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SAR EVALUATION REPORT

Applicant Name:
Samsung Electronics Co., Ltd.
129, Samsung-ro, Maetan dong,
Yeongtong-gu, Suwon-si
Gyeonggi-do, 16677, Korea

Date of Testing:
11/09/17 – 12/11/17
Test Site/Location:
PCTEST Lab, Columbia, MD, USA
Document Serial No.:
1M1711080292-01.A3L

FCC ID: **A3LSMG9600**

APPLICANT: **SAMSUNG ELECTRONICS CO., LTD.**

DUT Type: Portable Handset
Application Type: Certification
FCC Rule Part(s): CFR §2.1093
Model: SM-G9600/DS
Additional Model(s): SM-G9600, SM-G9608/DS

Equipment Class	Band & Mode	Tx Frequency	SAR		
			1g Head (W/kg)	1g Body-Worn (W/kg)	1g Hotspot (W/kg)
PCE	Cell. CDMA/EVDO	824.70 - 848.31 MHz	0.38	0.50	0.79
PCE	GSM/GPRS/EDGE 850	824.20 - 848.80 MHz	0.25	0.33	0.50
PCE	GSM/GPRS/EDGE 1900	1850.20 - 1909.80 MHz	< 0.1	0.42	0.59
PCE	UMTS 850	826.40 - 846.60 MHz	0.23	0.33	0.51
PCE	UMTS 1750	1712.4 - 1752.6 MHz	0.18	0.48	0.51
PCE	UMTS 1900	1852.4 - 1907.6 MHz	0.15	0.76	0.54
PCE	LTE Band 12	699.7 - 715.3 MHz	0.11	0.24	0.34
PCE	LTE Band 17	706.5 - 713.5 MHz	N/A	N/A	N/A
PCE	LTE Band 13	779.5 - 784.5 MHz	0.21	0.27	0.47
PCE	LTE Band 26 (Cell)	814.7 - 848.3 MHz	0.22	0.31	0.47
PCE	LTE Band 5 (Cell)	824.7 - 848.3 MHz	0.27	0.36	0.55
PCE	LTE Band 66 (AWS)	1710.7 - 1779.3 MHz	0.21	0.78	0.79
PCE	LTE Band 4 (AWS)	1710.7 - 1754.3 MHz	N/A	N/A	N/A
PCE	LTE Band 25 (PCS)	1850.7 - 1914.3 MHz	0.13	0.87	0.63
PCE	LTE Band 2 (PCS)	1850.7 - 1909.3 MHz	N/A	N/A	N/A
PCE	LTE Band 41	2498.5 - 2687.5 MHz	< 0.1	0.32	0.51
DTS	2.4 GHz WLAN	2412 - 2462 MHz	0.57	0.11	0.24
NII	U-NII-1	5180 - 5240 MHz	N/A	N/A	N/A
NII	U-NII-2A	5260 - 5320 MHz	0.45	0.24	N/A
NII	U-NII-2C	5500 - 5720 MHz	0.44	0.72	N/A
NII	U-NII-3	5745 - 5825 MHz	0.33	0.48	0.92
DSS/DTS	Bluetooth	2402 - 2480 MHz	1.05	< 0.1	0.13
Simultaneous SAR per KDB 690783 D01v01r03:			1.43	1.59	1.58

This wireless portable device has been shown to be capable of compliance for localized specific absorption rate (SAR) for uncontrolled environment/general population exposure limits specified in ANSI/IEEE C95.1-1992 and has been tested in accordance with the measurement procedures specified in Section 1.8 of this report; for North American frequency bands only.

I attest to the accuracy of data. All measurements reported herein were performed by me or were made under my supervision and are correct to the best of my knowledge and belief. I assume full responsibility for the completeness of these measurements and vouch for the qualifications of all persons taking them. Test results reported herein relate only to the item(s) tested.

Randy Ortanez
President

The SAR Tick is an initiative of the Mobile & Wireless Forum (MWF). While a product may be considered eligible, use of the SAR Tick logo requires an agreement with the MWF. Further details can be obtained by emailing: sartick@mwfai.info.

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1 DEVICE UNDER TEST

1.1 Device Overview

Band & Mode	Operating Modes	Tx Frequency
Cell. CDMA/EVDO	Voice/Data	824.70 - 848.31 MHz
GSM/GPRS/EDGE 850	Voice/Data	824.20 - 848.80 MHz
GSM/GPRS/EDGE 1900	Voice/Data	1850.20 - 1909.80 MHz
UMTS 850	Voice/Data	826.40 - 846.60 MHz
UMTS 1750	Voice/Data	1712.4 - 1752.6 MHz
UMTS 1900	Voice/Data	1852.4 - 1907.6 MHz
LTE Band 12	Voice/Data	699.7 - 715.3 MHz
LTE Band 17	Voice/Data	706.5 - 713.5 MHz
LTE Band 13	Voice/Data	779.5 - 784.5 MHz
LTE Band 26 (Cell)	Voice/Data	814.7 - 848.3 MHz
LTE Band 5 (Cell)	Voice/Data	824.7 - 848.3 MHz
LTE Band 66 (AWS)	Voice/Data	1710.7 - 1779.3 MHz
LTE Band 4 (AWS)	Voice/Data	1710.7 - 1754.3 MHz
LTE Band 25 (PCS)	Voice/Data	1850.7 - 1914.3 MHz
LTE Band 2 (PCS)	Voice/Data	1850.7 - 1909.3 MHz
LTE Band 41	Voice/Data	2498.5 - 2687.5 MHz
2.4 GHz WLAN	Voice/Data	2412 - 2462 MHz
U-NII-1	Voice/Data	5180 - 5240 MHz
U-NII-2A	Voice/Data	5260 - 5320 MHz
U-NII-2C	Voice/Data	5500 - 5720 MHz
U-NII-3	Voice/Data	5745 - 5825 MHz
Bluetooth	Data	2402 - 2480 MHz
NFC	Data	13.56 MHz
ANT+	Data	2402 - 2480 MHz
MST	Data	555 Hz - 8.33 kHz

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1.2 Power Reduction for SAR

This device utilizes a single step power reduction mechanism for SAR compliance under portable hotspot conditions for some wireless modes and bands. All hotspot SAR evaluations for this device were performed at the maximum allowed output power when hotspot is enabled. Detailed descriptions of the power reduction mechanism are included in the operational description.

This device uses an independent fixed level power reduction mechanism for WLAN operations during voice or VoIP held to ear scenarios. Per FCC Guidance, the held-to-ear exposure conditions were evaluated at reduced power according to the head SAR positions described in IEEE 1528-2013. Detailed descriptions of the power reduction mechanism are included in the operational description.

1.3 Nominal and Maximum Output Power Specifications

This device operates using the following maximum and nominal output power specifications. SAR values were scaled to the maximum allowed power to determine compliance per KDB Publication 447498 D01v06.

1.3.1 Maximum PCE Output Power

Mode / Band		Modulated Average (dBm)
Cell. CDMA/EVDO	Maximum	**26.0**
	Nominal	**25.5**

Mode / Band		Voice (dBm)	Burst Average GMSK (dBm)				Burst Average 8-PSK (dBm)			
		1 TX Slot	*1 TX Slots*	*2 TX Slots*	*3 TX Slots*	*4 TX Slots*	*1 TX Slots*	*2 TX Slots*	*3 TX Slots*	*4 TX Slots*
GSM/GPRS/EDGE 850	Maximum	**33.5**	**33.5**	**31.5**	**29.8**	**28.0**	**28.0**	**26.0**	**24.0**	**22.0**
	Nominal	**33.0**	**33.0**	**31.0**	**29.3**	**27.5**	**27.5**	**25.5**	**23.5**	**21.5**
GSM/GPRS/EDGE 1900	Maximum	**30.5**	**30.5**	**29.0**	**27.0**	**25.0**	**26.7**	**24.7**	**22.7**	**21.3**
	Nominal	**30.0**	**30.0**	**28.5**	**26.5**	**24.5**	**26.2**	**24.2**	**22.2**	**20.8**

Mode / Band		Modulated Average (dBm)			
		3GPP WCDMA	*3GPP HSDPA*	*3GPP HSUPA*	*3GPP DC-HSDPA*
UMTS Band 5 (850 MHz)	Maximum	**24.0**	**24.0**	**24.0**	**24.0**
	Nominal	**23.5**	**23.5**	**23.5**	**23.5**
UMTS Band 4 (1750 MHz)	Maximum	**23.5**	**23.5**	**23.5**	**23.5**
	Nominal	**23.0**	**23.0**	**23.0**	**23.0**
UMTS Band 2 (1900 MHz)	Maximum	**23.5**	**23.5**	**23.5**	**23.5**
	Nominal	**23.0**	**23.0**	**23.0**	**23.0**

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Mode / Band		Modulated Average (dBm)
LTE Band 12	Maximum	**24.0**
	Nominal	**23.5**
LTE Band 17	Maximum	**24.0**
	Nominal	**23.5**
LTE Band 13	Maximum	**24.0**
	Nominal	**23.5**
LTE Band 26 (Cell)	Maximum	**24.0**
	Nominal	**23.5**
LTE Band 5 (Cell)	Maximum	**24.5**
	Nominal	**24.0**
LTE Band 66 (AWS)	Maximum	**24.0**
	Nominal	**23.5**
LTE Band 4 (AWS)	Maximum	**24.0**
	Nominal	**23.5**
LTE Band 25 (PCS)	Maximum	**24.0**
	Nominal	**23.5**
LTE Band 2 (PCS)	Maximum	**24.0**
	Nominal	**23.5**
LTE Band 41	Maximum	**24.5**
	Nominal	**24.0**

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1.3.2 Reduced PCE Output Power

Mode / Band		Voice (dBm)	Burst Average GMSK (dBm)				Burst Average 8-PSK (dBm)			
		1 TX Slot	*1 TX Slots*	*2 TX Slots*	*3 TX Slots*	*4 TX Slots*	*1 TX Slots*	*2 TX Slots*	*3 TX Slots*	*4 TX Slots*
GSM/GPRS/EDGE 1900	Maximum	**27.0**	**27.0**	**25.5**	**22.5**	**20.5**	**24.5**	**22.5**	**20.5**	**18.5**
	Nominal	**26.5**	**26.5**	**25.0**	**22.0**	**20.0**	**24.0**	**22.0**	**20.0**	**18.0**

Mode / Band		Modulated Average (dBm)			
		3GPP WCDMA	*3GPP HSDPA*	*3GPP HSUPA*	*3GPP DC-HSDPA*
UMTS Band 4 (1750 MHz)	Maximum	**18.5**	**18.0**	**18.0**	**18.0**
	Nominal	**18.0**	**17.5**	**17.5**	**17.5**
UMTS Band 2 (1900 MHz)	Maximum	**18.5**	**18.0**	**18.0**	**18.0**
	Nominal	**18.0**	**17.5**	**17.5**	**17.5**

Mode / Band		Modulated Average (dBm)
LTE Band 66 (AWS)	Maximum	**19.0**
	Nominal	**18.5**
LTE Band 4 (AWS)	Maximum	**19.0**
	Nominal	**18.5**
LTE Band 25 (PCS)	Maximum	**19.0**
	Nominal	**18.5**
LTE Band 2 (PCS)	Maximum	**19.0**
	Nominal	**18.5**
LTE Band 41	Maximum	**21.5**
	Nominal	**21.0**

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1.3.3 Maximum Bluetooth and WLAN Output Power

Mode / Band		Modulated Average - Single Tx Chain (dBm)
IEEE 802.11b (2.4 GHz)	Maximum	**20.5**
	Nominal	**20.0**
IEEE 802.11g (2.4 GHz)	Maximum	**17.5**
	Nominal	**17.0**
IEEE 802.11n (2.4 GHz)	Maximum	**17.5**
	Nominal	**17.0**

Mode / Band		Modulated Average - MIMO (dBm)		
		Ch. 1	Ch. 2-10	Ch. 11
IEEE 802.11g (2.4 GHz)	Maximum	**20.0**	**20.5**	**19.5**
	Nominal	**19.5**	**20.0**	**19.0**
IEEE 802.11n (2.4 GHz)	Maximum	**20.0**	**20.5**	**19.5**
	Nominal	**19.5**	**20.0**	**19.0**

Mode / Band		Modulated Average - Single Tx Chain (dBm)				
		20 MHz Bandwidth	40 MHz Bandwidth		80 MHz Bandwidth	
		Ch. 36-165	Ch. 38	Ch. 46 - 159	Ch. 106	Ch. 42-58, 122-155
IEEE 802.11a (5 GHz)	Maximum	**17.5**				
	Nominal	**17.0**				
IEEE 802.11n (5 GHz)	Maximum	**17.5**	**16.5**	**17.5**		
	Nominal	**17.0**	**16.0**	**17.0**		
IEEE 802.11ac (5 GHz)	Maximum	**17.5**	**16.5**	**17.5**	**16.0**	**17.5**
	Nominal	**17.0**	**16.0**	**17.0**	**15.5**	**17.0**

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Mode / Band		Modulated Average - MIMO (dBm)											
		20 MHz Bandwidth			40 MHz Bandwidth					80 MHz Bandwidth			
		Ch. 64	Ch. 36 - 60, 100 - 144	Ch. 149-165	Ch. 38	Ch. 62	Ch. 102	Ch. 46,54, 110-142	Ch. 151-159	Ch. 42,58	Ch. 106	Ch. 122 - 138	Ch. 155
IEEE 802.11a (5 GHz)	Maximum	20.0	20.5	18.5									
	Nominal	19.5	20.0	18.0									
IEEE 802.11n (5 GHz)	Maximum	20.0	20.5	18.5	18.5	18.0	19.0	20.5	18.5				
	Nominal	19.5	20.0	18.0	18.0	17.5	18.5	20.0	18.0				
IEEE 802.11ac (5 GHz)	Maximum	20.0	20.5	18.5	18.5	18.0	19.0	20.5	18.5	17.5	18.0	20.5	18.5
	Nominal	19.5	20.0	18.0	18.0	17.5	18.5	20.0	18.0	17.0	17.5	20.0	18.0

Mode / Band		Modulated Average - Single Tx Chain (dBm)
Bluetooth	Maximum	15.5
	Nominal	15.0
Bluetooth (EDR)	Maximum	6.0
	Nominal	5.5
Bluetooth LE	Maximum	9.0
	Nominal	8.5

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1.3.4 Reduced WLAN Output Power

Mode / Band		Modulated Average - Single Tx Chain (dBm)
IEEE 802.11b (2.4 GHz)	Maximum	**15.5**
	Nominal	**15.0**
IEEE 802.11g (2.4 GHz)	Maximum	**15.5**
	Nominal	**15.0**
IEEE 802.11n (2.4 GHz)	Maximum	**15.5**
	Nominal	**15.0**

Mode / Band		Modulated Average - Single Tx Chain (dBm)		
		20 MHz Bandwidth	40 MHz Bandwidth	80 MHz Bandwidth
IEEE 802.11a (5 GHz)	Maximum	**13.5**		
	Nominal	**13.0**		
IEEE 802.11n (5 GHz)	Maximum	**13.5**	**13.5**	
	Nominal	**13.0**	**13.0**	
IEEE 802.11ac (5 GHz)	Maximum	**13.5**	**13.5**	**13.5**
	Nominal	**13.0**	**13.0**	**13.0**

Mode / Band		Modulated Average - MIMO (dBm)
		20 MHz Bandwidth
IEEE 802.11n (2.4 GHz)	Maximum	**18.5**
	Nominal	**18.0**
IEEE 802.11g (2.4 GHz)	Maximum	**18.5**
	Nominal	**18.0**

Mode / Band		Modulated Average - MIMO (dBm)		
		20 MHz Bandwidth	40 MHz Bandwidth	80 MHz Bandwidth
IEEE 802.11a (5 GHz)	Maximum	**16.5**		
	Nominal	**16.0**		
IEEE 802.11n (5 GHz)	Maximum	**16.5**	**16.5**	
	Nominal	**16.0**	**16.0**	
IEEE 802.11ac (5 GHz)	Maximum	**16.5**	**16.5**	**16.5**
	Nominal	**16.0**	**16.0**	**16.0**

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1.3.5 Output Power During Conditions with Simultaneous 2.4 GHz WLAN and 5 GHz WLAN

	# Tx	5 GHz WIFI [dBm]		2.4 GHz WIFI [dBm]		802.11 Modes
		Ant1	Ant2	Ant1	Ant2	
2.4 GHz + 5 GHz	2	A	-	-	B	2.4 GHz: b,g,n 5 GHz: a,n,ac
	2	-	A	B	-	
	2	A	-	B	-	
	2	-	A	-	B	
	3	A	A	B	-	2.4 GHz: b, g, n 5 GHz: n, ac, a (CDD + STBC only)
	3	A	A	-	B	
	3	A	-	B	B	2.4 GHz: n, g (CDD + STBC only) 5 GHz: a, n, ac
	3	-	A	B	B	
	4	A	A	B	B	2.4 GHz: n, g (CDD + STBC only) 5 GHz: n, ac, a (CDD + STBC only)

Maximum Output Power
A = 13 dBm
B = 16 dBm
(Upper tolerance: target + 0.5 dB)

Reduced Output Power (Held-to-Ear)
A = 13 dBm
B = 13 dBm
(Upper tolerance: target + 0.5 dB)

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1.4 DUT Antenna Locations

The overall dimensions of this device are > 9 x 5 cm. The overall diagonal dimension of the device is ≤160 mm and the diagonal display is ≤150 mm. A diagram showing the location of the device antennas can be found in Appendix F.

Table 1-1
Device Edges/Sides for SAR Testing

Mode	Back	Front	Top	Bottom	Right	Left
Cell. EVDO	Yes	Yes	No	Yes	Yes	Yes
GPRS 850	Yes	Yes	No	Yes	Yes	Yes
GPRS 1900	Yes	Yes	No	Yes	Yes	Yes
UMTS 850	Yes	Yes	No	Yes	Yes	Yes
UMTS 1750	Yes	Yes	No	Yes	Yes	Yes
UMTS 1900	Yes	Yes	No	Yes	Yes	Yes
LTE Band 12	Yes	Yes	No	Yes	Yes	Yes
LTE Band 13	Yes	Yes	No	Yes	Yes	Yes
LTE Band 26 (Cell)	Yes	Yes	No	Yes	Yes	Yes
LTE Band 5 (Cell)	Yes	Yes	No	Yes	Yes	Yes
LTE Band 66 (AWS)	Yes	Yes	No	Yes	Yes	Yes
LTE Band 25 (PCS)	Yes	Yes	No	Yes	Yes	Yes
LTE Band 41	Yes	Yes	No	Yes	No	Yes
2.4 GHz WLAN Ant 1	Yes	Yes	Yes	No	No	Yes
2.4 GHz WLAN Ant 2	Yes	Yes	Yes	No	No	Yes
5 GHz WLAN Ant 1	Yes	Yes	Yes	No	No	Yes
5 GHz WLAN Ant 2	Yes	Yes	Yes	No	No	Yes
Bluetooth	Yes	Yes	Yes	No	No	Yes

Note: Particular DUT edges were not required to be evaluated for wireless router SAR if the edges were greater than 2.5 cm from the transmitting antenna according to FCC KDB Publication 941225 D06v02r01 Section III. The distances between the transmit antennas and the edges of the device are included in the filing. When wireless router mode is enabled, U-NII-1, U-NII-2A, U-NII-2C operations are disabled. Therefore, U-NII-1, U-NII-2A, U-NII-2C operations are not considered in this section.

1.5 Near Field Communications (NFC) Antenna

This DUT has NFC operations. The NFC antenna is integrated into the device for this model. Therefore, all SAR tests were performed with the device which already incorporates the NFC antenna. A diagram showing the location of the NFC antenna can be found in Appendix F.

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1.6 Simultaneous Transmission Capabilities

According to FCC KDB Publication 447498 D01v06, transmitters are considered to be transmitting simultaneously when there is overlapping transmission, with the exception of transmissions during network hand-offs with maximum hand-off duration less than 30 seconds.

This device contains multiple transmitters that may operate simultaneously, and therefore requires a simultaneous transmission analysis according to FCC KDB Publication 447498 D01v06 4.3.2 procedures.

Table 1-2
Simultaneous Transmission Scenarios

No.	Capable Transmit Configuration	Head	Body-Worn Accessory	Wireless Router	Notes
1	1x CDMA voice + 2.4 GHz WI-FI	Yes	Yes	N/A	
2	1x CDMA voice + 5 GHz WI-FI	Yes	Yes	N/A	
3	1x CDMA voice + 2.4 GHz Bluetooth	Yes^	Yes	N/A	^Bluetooth Tethering is considered
4	1x CDMA voice + 2.4 GHz WI-FI MIMO	Yes	Yes	N/A	
5	1x CDMA voice + 5 GHz WI-FI MIMO	Yes	Yes	N/A	
6	1x CDMA voice + 2.4 GHz WI-FI + 5 GHz WI-FI	Yes	Yes	N/A	
7	1x CDMA voice + 2.4 GHz WI-FI MIMO + 5 GHz WI-FI MIMO	Yes	Yes	N/A	
8	GSM voice + 2.4 GHz WI-FI	Yes	Yes	N/A	
9	GSM voice + 5 GHz WI-FI	Yes	Yes	N/A	
10	GSM voice + 2.4 GHz Bluetooth	Yes^	Yes	N/A	^Bluetooth Tethering is considered
11	GSM voice + 2.4 GHz WI-FI MIMO	Yes	Yes	N/A	
12	GSM voice + 5 GHz WI-FI MIMO	Yes	Yes	N/A	
13	GSM voice + 2.4 GHz WI-FI + 5 GHz WI-FI	Yes	Yes	N/A	
14	GSM voice + 2.4 GHz WI-FI MIMO + 5 GHz WI-FI MIMO	Yes	Yes	N/A	
15	UMTS + 2.4 GHz WI-FI	Yes	Yes	Yes	
16	UMTS + 5 GHz WI-FI	Yes	Yes	Yes	
17	UMTS + 2.4 GHz Bluetooth	Yes^	Yes	Yes^	^Bluetooth Tethering is considered
18	UMTS + 2.4 GHz WI-FI MIMO	Yes	Yes	Yes	
19	UMTS + 5 GHz WI-FI MIMO	Yes	Yes	Yes	
20	UMTS + 2.4 GHz WI-FI + 5 GHz WI-FI	Yes	Yes	Yes	
21	UMTS + 2.4 GHz WI-FI MIMO + 5 GHz WI-FI MIMO	Yes	Yes	Yes	
22	LTE + 2.4 GHz WI-FI	Yes	Yes	Yes	
23	LTE + 5 GHz WI-FI	Yes	Yes	Yes	
24	LTE + 2.4 GHz Bluetooth	Yes^	Yes	Yes^	^Bluetooth Tethering is considered
25	LTE + 2.4 GHz WI-FI MIMO	Yes	Yes	Yes	
26	LTE + 5 GHz WI-FI MIMO	Yes	Yes	Yes	
27	LTE + 2.4 GHz WI-FI + 5 GHz WI-FI	Yes	Yes	Yes	
28	LTE + 2.4 GHz WI-FI MIMO + 5 GHz WI-FI MIMO	Yes	Yes	Yes	
29	CDMA/EVDO data + 2.4 GHz WI-FI	Yes*	Yes*	Yes	* Pre-installed VOIP applications are considered
30	CDMA/EVDO data + 5 GHz WI-FI	Yes*	Yes*	Yes	* Pre-installed VOIP applications are considered
31	CDMA/EVDO data + 2.4 GHz Bluetooth	Yes*^	Yes*	Yes^	* Pre-installed VOIP applications are considered ^Bluetooth Tethering is considered
32	CDMA/EVDO data + 2.4 GHz WI-FI MIMO	Yes*	Yes*	Yes	* Pre-installed VOIP applications are considered
33	CDMA/EVDO data + 5 GHz WI-FI MIMO	Yes*	Yes*	Yes	* Pre-installed VOIP applications are considered
34	CDMA/EVDO data + 2.4 GHz WI-FI + 5 GHz WI-FI	Yes*	Yes*	Yes	* Pre-installed VOIP applications are considered
35	CDMA/EVDO data + 2.4 GHz WI-FI MIMO + 5 GHz WI-FI MIMO	Yes*	Yes*	Yes	* Pre-installed VOIP applications are considered
36	GPRS/EDGE + 2.4 GHz WI-FI	N/A	N/A	Yes	
37	GPRS/EDGE + 5 GHz WI-FI	N/A	N/A	Yes	
38	GPRS/EDGE + 2.4 GHz Bluetooth	N/A	N/A	Yes^	^Bluetooth Tethering is considered
39	GPRS/EDGE + 2.4 GHz WI-FI MIMO	N/A	N/A	Yes	
40	GPRS/EDGE + 5 GHz WI-FI MIMO	N/A	N/A	Yes	
41	GPRS/EDGE + 2.4 GHz WI-FI + 5 GHz WI-FI	N/A	N/A	Yes	
42	GPRS/EDGE + 2.4 GHz WI-FI MIMO + 5 GHz WI-FI MIMO	N/A	N/A	Yes	

1. Bluetooth cannot transmit simultaneously with WLAN.
2. All licensed modes share the same antenna path and cannot transmit simultaneously.
3. When the user utilizes multiple services in UMTS 3G mode it uses multi-Radio Access Bearer or multi-RAB. The power control is based on a physical control channel (Dedicated Physical Control Channel [DPCCH]) and power control will be adjusted to meet the needs of both services. Therefore, the UMTS+WLAN scenario also represents the UMTS Voice/DATA + WLAN Hotspot scenario.

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4. Per the manufacturer, WIFI Direct is not expected to be used in conjunction with a held-to-ear or body-worn accessory voice call. Therefore, there are no simultaneous transmission scenarios involving WIFI direct beyond that listed in the above table.
5. 5 GHz Wireless Router is only supported for the U-NII-3 by S/W, therefore U-NII-1, U-NII2A, and U-NII2C were not evaluated for wireless router conditions.
6. This device supports 2x2 MIMO Tx for WLAN. 802.11a/g/n/ac supports CDD and STBC and 802.11n/ac additionally supports SDM.
7. This device supports VOLTE.
8. This device supports VoWIFI.

1.7 Miscellaneous SAR Test Considerations

(A) WIFI/BT

Since U-NII-1 and U-NII-2A bands have the same maximum output power and the highest reported SAR for U-NII-2A is less than 1.2 W/kg, SAR is not required for U-NII-1 band according to FCC KDB Publication 248227 D01v02r02.

Since Wireless Router operations are not allowed by the chipset firmware using U-NII-1, U-NII-2A & U-NII-2C WIFI, only 2.4 GHz and U-NII-3 WIFI Hotspot SAR tests and combinations are considered for SAR with respect to Wireless Router configurations according to FCC KDB 941225 D06v02r01.

This device supports IEEE 802.11ac with the following features:
a) Up to 80 MHz Bandwidth only
b) No aggregate channel configurations
c) 2 Tx antenna output
d) 256 QAM is supported
e) TDWR and Band gap channels are supported

(B) Licensed Transmitter(s)

CDMA 1X Advanced technology was not required for SAR since the maximum allowed output powers for 1x Advanced was not more than 0.25 dB higher than the maximum powers for 1x and the measured SAR in any 1x mode exposure conditions was not greater than 1.2 W/kg per FCC KDB Publication 941225 D01v03r01.

GSM/GPRS/EDGE DTM is not supported for US bands. Therefore, the GSM Voice modes in this report do not transmit simultaneously with GPRS/EDGE Data.

This device is only capable of QPSK HSUPA in the uplink. Therefore, no additional SAR tests are required beyond that described for devices with HSUPA in KDB 941225 D01v03r01.

LTE SAR for the higher modulations and lower bandwidths were not tested since the maximum average output power of all required channels and configurations was not more than 0.5 dB higher than the highest bandwidth; and the reported LTE SAR for the highest bandwidth was less than 1.45 W/kg for all configurations according to FCC KDB 941225 D05v02r04.

This device supports LTE Carrier Aggregation (CA) in the downlink. All uplink communications are identical to Release 8 specifications. Per FCC KDB Publication 941225 D05A v01r02, SAR for LTE CA operations was not needed since the maximum average output power in LTE CA mode was not >0.25 dB higher than the maximum output power when downlink carrier aggregation was inactive.

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This device supports LTE Carrier Aggregation (CA) in the uplink for LTE Band 41 with two component carriers in the uplink. SAR Measurements and conducted powers were evaluated per FCC Guidance.

This device supports downlink 4x4 MIMO operations for some LTE Bands. Per FCC Guidance, SAR for downlink 4x4 MIMO was not needed since the maximum average output power in 4x4 downlink MIMO mode was not > 0.25 dB higher than the maximum output power with downlink 4x4 MIMO inactive.

This device supports 64QAM on the downlink for LTE Operations. Conducted powers for 64QAM configurations were measured per Section 5.1 of FCC KDB Publication 941225 D05v02r05. SAR was not required for 64QAM since the highest maximum output power for 64 QAM is ≤ ½ dB higher than the same configuration in QPSK and the reported SAR for the QPSK configuration is ≤ 1.45 W/kg, per Section 5.2.4 of FCC KDB Publication 941225 D05v02r05.

This device supports LTE capabilities with overlapping transmission frequency ranges. When the supported frequency range of an LTE Band falls completely within an LTE band with a larger transmission frequency range, both LTE bands have the same target power (or the band with the larger transmission frequency range has a higher target power), and both LTE bands share the same transmission path and signal characteristics, SAR was only assessed for the band with the larger transmission frequency range.

1.8 Guidance Applied

- IEEE 1528-2013
- FCC KDB Publication 941225 D01v03r01, D05v02r04, D05Av01r02, D06v02r01 (2G/3G/4G and Hotspot)
- FCC KDB Publication 248227 D01v02r02 (SAR Considerations for 802.11 Devices)
- FCC KDB Publication 447498 D01v06 (General SAR Guidance)
- FCC KDB Publication 865664 D01v01r04, D02v01r02 (SAR Measurements up to 6 GHz)
- October 2013 TCB Workshop Notes (GPRS Testing Considerations)

1.9 Device Serial Numbers

Several samples with identical hardware were used to support SAR testing. The manufacturer has confirmed that the device(s) tested have the same physical, mechanical and thermal characteristics and are within operational tolerances expected for production units. The serial numbers used for each test are indicated alongside the results in Section 11.

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2 LTE INFORMATION

LTE Information					
FCC ID	**A3LSMG9600**				
Form Factor	Portable Handset				
Frequency Range of each LTE transmission band	LTE Band 12 (699.7 - 715.3 MHz)				
	LTE Band 17 (706.5 - 713.5 MHz)				
	LTE Band 13 (779.5 - 784.5 MHz)				
	LTE Band 26 (Cell) (814.7 - 848.3 MHz)				
	LTE Band 5 (Cell) (824.7 - 848.3 MHz)				
	LTE Band 66 (AWS) (1710.7 - 1779.3 MHz)				
	LTE Band 4 (AWS) (1710.7 - 1754.3 MHz)				
	LTE Band 25 (PCS) (1850.7 - 1914.3 MHz)				
	LTE Band 2 (PCS) (1850.7 - 1909.3 MHz)				
	LTE Band 41 (2498.5 - 2687.5 MHz)				
Channel Bandwidths	LTE Band 12: 1.4 MHz, 3 MHz, 5 MHz, 10 MHz				
	LTE Band 17: 5 MHz, 10 MHz				
	LTE Band 13: 5 MHz, 10 MHz				
	LTE Band 26 (Cell): 1.4 MHz, 3 MHz, 5 MHz, 10 MHz, 15 MHz				
	LTE Band 5 (Cell): 1.4 MHz, 3 MHz, 5 MHz, 10 MHz				
	LTE Band 66 (AWS): 1.4 MHz, 3 MHz, 5 MHz, 10 MHz, 15 MHz, 20 MHz				
	LTE Band 4 (AWS): 1.4 MHz, 3 MHz, 5 MHz, 10 MHz, 15 MHz, 20 MHz				
	LTE Band 25 (PCS): 1.4 MHz, 3 MHz, 5 MHz, 10 MHz, 15 MHz, 20 MHz				
	LTE Band 2 (PCS): 1.4 MHz, 3 MHz, 5 MHz, 10 MHz, 15 MHz, 20 MHz				
	LTE Band 41: 5 MHz, 10 MHz, 15 MHz, 20 MHz				
Channel Numbers and Frequencies (MHz)	Low	Low-Mid	Mid	Mid-High	High
LTE Band 12: 1.4 MHz	699.7 (23017)		707.5 (23095)	715.3 (23173)	
LTE Band 12: 3 MHz	700.5 (23025)		707.5 (23095)	714.5 (23165)	
LTE Band 12: 5 MHz	701.5 (23035)		707.5 (23095)	713.5 (23155)	
LTE Band 12: 10 MHz	704 (23060)		707.5 (23095)	711 (23130)	
LTE Band 17: 5 MHz	706.5 (23755)		710 (23790)	713.5 (23825)	
LTE Band 17: 10 MHz	709 (23780)		710 (23790)	711 (23800)	
LTE Band 13: 5 MHz	779.5 (23205)		782 (23230)	784.5 (23255)	
LTE Band 13: 10 MHz	N/A		782 (23230)	N/A	
LTE Band 26 (Cell): 1.4 MHz	814.7 (26697)		831.5 (26865)	848.3 (27033)	
LTE Band 26 (Cell): 3 MHz	815.5 (26705)		831.5 (26865)	847.5 (27025)	
LTE Band 26 (Cell): 5 MHz	816.5 (26715)		831.5 (26865)	846.5 (27015)	
LTE Band 26 (Cell): 10 MHz	819 (26740)		831.5 (26865)	844 (26990)	
LTE Band 26 (Cell): 15 MHz	821.5 (26765)		831.5 (26865)	841.5 (26965)	
LTE Band 5 (Cell): 1.4 MHz	824.7 (20407)		836.5 (20525)	848.3 (20643)	
LTE Band 5 (Cell): 3 MHz	825.5 (20415)		836.5 (20525)	847.5 (20635)	
LTE Band 5 (Cell): 5 MHz	826.5 (20425)		836.5 (20525)	846.5 (20625)	
LTE Band 5 (Cell): 10 MHz	829 (20450)		836.5 (20525)	844 (20600)	
LTE Band 66 (AWS): 1.4 MHz	1710.7 (131979)		1745 (132322)	1779.3 (132665)	
LTE Band 66 (AWS): 3 MHz	1711.5 (131987)		1745 (132322)	1778.5 (132657)	
LTE Band 66 (AWS): 5 MHz	1712.5 (131997)		1745 (132322)	1777.5 (132647)	
LTE Band 66 (AWS): 10 MHz	1715 (132022)		1745 (132322)	1775 (132622)	
LTE Band 66 (AWS): 15 MHz	1717.5 (132047)		1745 (132322)	1772.5 (132597)	
LTE Band 66 (AWS): 20 MHz	1720 (132072)		1745 (132322)	1770 (132572)	
LTE Band 4 (AWS): 1.4 MHz	1710.7 (19957)		1732.5 (20175)	1754.3 (20393)	
LTE Band 4 (AWS): 3 MHz	1711.5 (19965)		1732.5 (20175)	1753.5 (20385)	
LTE Band 4 (AWS): 5 MHz	1712.5 (19975)		1732.5 (20175)	1752.5 (20375)	
LTE Band 4 (AWS): 10 MHz	1715 (20000)		1732.5 (20175)	1750 (20350)	
LTE Band 4 (AWS): 15 MHz	1717.5 (20025)		1732.5 (20175)	1747.5 (20325)	
LTE Band 4 (AWS): 20 MHz	1720 (20050)		1732.5 (20175)	1745 (20300)	
LTE Band 25 (PCS): 1.4 MHz	1850.7 (26047)		1882.5 (26365)	1914.3 (26683)	
LTE Band 25 (PCS): 3 MHz	1851.5 (26055)		1882.5 (26365)	1913.5 (26675)	
LTE Band 25 (PCS): 5 MHz	1852.5 (26065)		1882.5 (26365)	1912.5 (26665)	
LTE Band 25 (PCS): 10 MHz	1855 (26090)		1882.5 (26365)	1910 (26640)	
LTE Band 25 (PCS): 15 MHz	1857.5 (26115)		1882.5 (26365)	1907.5 (26615)	
LTE Band 25 (PCS): 20 MHz	1860 (26140)		1882.5 (26365)	1905 (26590)	
LTE Band 2 (PCS): 1.4 MHz	1850.7 (18607)		1880 (18900)	1909.3 (19193)	
LTE Band 2 (PCS): 3 MHz	1851.5 (18615)		1880 (18900)	1908.5 (19185)	
LTE Band 2 (PCS): 5 MHz	1852.5 (18625)		1880 (18900)	1907.5 (19175)	
LTE Band 2 (PCS): 10 MHz	1855 (18650)		1880 (18900)	1905 (19150)	
LTE Band 2 (PCS): 15 MHz	1857.5 (18675)		1880 (18900)	1902.5 (19125)	
LTE Band 2 (PCS): 20 MHz	1860 (18700)		1880 (18900)	1900 (19100)	
LTE Band 41: 5 MHz	2506 (39750)	2549.5 (40185)	2593 (40620)	2636.5 (41055)	2680 (41490)
LTE Band 41: 10 MHz	2506 (39750)	2549.5 (40185)	2593 (40620)	2636.5 (41055)	2680 (41490)
LTE Band 41: 15 MHz	2506 (39750)	2549.5 (40185)	2593 (40620)	2636.5 (41055)	2680 (41490)
LTE Band 41: 20 MHz	2506 (39750)	2549.5 (40185)	2593 (40620)	2636.5 (41055)	2680 (41490)
DL UE Category	18 (QPSK, 16QAM, 64QAM, 256QAM)				
UL UE Category	13 (QPSK, 16QAM, 64QAM)				
Modulations Supported in UL	QPSK, 16QAM, 64QAM				
LTE MPR Permanently implemented per 3GPP TS 36.101 section 6.2.3~6.2.5? (manufacturer attestation to be provided)	YES				
A-MPR (Additional MPR) disabled for SAR Testing?	YES				
LTE Carrier Aggregation Possible Combinations	The technical description includes all the possible carrier aggregation combinations				
LTE Additional Information	This device does not support full CA features on 3GPP Release 13. It supports uplink carrier aggregation for LTE CA_41C with a maximum of two 20 MHz component carriers. All uplink communications are identical to the Release 8 Specifications. Uplink communications are done on the PCC. The following LTE Release 13 Features are not supported: Relay, HetNet, Enhanced MIMO, eICIC, WIFI Offloading, MDH, eMBMS, Cross-Carrier Scheduling, Enhanced SC-FDMA.				

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3 INTRODUCTION

The FCC and Innovation, Science, and Economic Development Canada have adopted the guidelines for evaluating the environmental effects of radio frequency (RF) radiation in ET Docket 93-62 on Aug. 6, 1996 and Health Canada Safety Code 6 to protect the public and workers from the potential hazards of RF emissions due to FCC-regulated portable devices. [1]

The safety limits used for the environmental evaluation measurements are based on the criteria published by the American National Standards Institute (ANSI) for localized specific absorption rate (SAR) in IEEE/ANSI C95.1-1992 Standard for Safety Levels with Respect to Human Exposure to Radio Frequency Electromagnetic Fields, 3 kHz to 300 GHz [3] and Health Canada RF Exposure Guidelines Safety Code 6 [22]. The measurement procedure described in IEEE/ANSI C95.3-2002 Recommended Practice for the Measurement of Potentially Hazardous Electromagnetic Fields - RF and Microwave [4] is used for guidance in measuring the Specific Absorption Rate (SAR) due to the RF radiation exposure from the Equipment Under Test (EUT). These criteria for SAR evaluation are similar to those recommended by the International Committee for Non-Ionizing Radiation Protection (ICNIRP) in Biological Effects and Exposure Criteria for Radiofrequency Electromagnetic Fields," Report No. Vol 74. SAR is a measure of the rate of energy absorption due to exposure to an RF transmitting source. SAR values have been related to threshold levels for potential biological hazards.

3.1 SAR Definition

Specific Absorption Rate is defined as the time derivative (rate) of the incremental energy (dU) absorbed by (dissipated in) an incremental mass (dm) contained in a volume element (dV) of a given density (ρ). It is also defined as the rate of RF energy absorption per unit mass at a point in an absorbing body (see Equation 3-1).

Equation 3-1
SAR Mathematical Equation

$$SAR = \frac{d}{dt}\left(\frac{dU}{dm}\right) = \frac{d}{dt}\left(\frac{dU}{\rho dv}\right)$$

SAR is expressed in units of Watts per Kilogram (W/kg).

$$SAR = \frac{\sigma \cdot E^2}{\rho}$$

where:

σ = conductivity of the tissue-simulating material (S/m)
ρ = mass density of the tissue-simulating material (kg/m^3)
E = Total RMS electric field strength (V/m)

NOTE: The primary factors that control rate of energy absorption were found to be the wavelength of the incident field in relation to the dimensions and geometry of the irradiated organism, the orientation of the organism in relation to the polarity of field vectors, the presence of reflecting surfaces, and whether conductive contact is made by the organism with a ground plane.[6]

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4 DOSIMETRIC ASSESSMENT

4.1 Measurement Procedure

The evaluation was performed using the following procedure compliant to FCC KDB Publication 865664 D01v01r04 and IEEE 1528-2013:

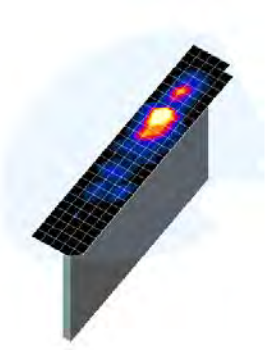


Figure 4-1
Sample SAR Area Scan

1. The SAR distribution at the exposed side of the head or body was measured at a distance no greater than 5.0 mm from the inner surface of the shell. The area covered the entire dimension of the device-head and body interface and the horizontal grid resolution was determined per FCC KDB Publication 865664 D01v01r04 (See Table 4-1) and IEEE 1528-2013.
2. The point SAR measurement was taken at the maximum SAR region determined from Step 1 to enable the monitoring of SAR fluctuations/drifts during the 1g/10g cube evaluation. SAR at this fixed point was measured and used as a reference value.
3. Based on the area scan data, the peak of the region with maximum SAR was determined by spline interpolation. Around this point, a volume was assessed according to the measurement resolution and volume size requirements of FCC KDB Publication 865664 D01v01r04 (See Table 4-1) and IEEE 1528-2013. On the basis of this data set, the spatial peak SAR value was evaluated with the following procedure (see references or the DASY manual online for more details):

   a. SAR values at the inner surface of the phantom are extrapolated from the measured values along the line away from the surface with spacing no greater than that in Table 4-1. The extrapolation was based on a least-squares algorithm. A polynomial of the fourth order was calculated through the points in the z-axis (normal to the phantom shell).

   b. After the maximum interpolated values were calculated between the points in the cube, the SAR was averaged over the spatial volume (1g or 10g) using a 3D-Spline interpolation algorithm. The 3D-spline is composed of three one-dimensional splines with the "Not a knot" condition (in x, y, and z directions). The volume was then integrated with the trapezoidal algorithm. One thousand points (10 x 10 x 10) were obtained through interpolation, in order to calculate the averaged SAR.

   c. All neighboring volumes were evaluated until no neighboring volume with a higher average value was found.
4. The SAR reference value, at the same location as step 2, was re-measured after the zoom scan was complete to calculate the SAR drift. If the drift deviated by more than 5%, the SAR test and drift measurements were repeated.

Table 4-1
Area and Zoom Scan Resolutions per FCC KDB Publication 865664 D01v01r04*

Frequency	Maximum Area Scan Resolution (mm) (Δx_{area}, Δy_{area})	Maximum Zoom Scan Resolution (mm) (Δx_{zoom}, Δy_{zoom})	Maximum Zoom Scan Spatial Resolution (mm)			Minimum Zoom Scan Volume (mm) (x,y,z)
			Uniform Grid	Graded Grid		
			$\Delta z_{zoom}(n)$	$\Delta z_{zoom}(1)$*	$\Delta z_{zoom}(n>1)$*	
≤ 2 GHz	≤ 15	≤ 8	≤ 5	≤ 4	≤ 1.5*$\Delta z_{zoom}(n-1)$	≥ 30
2-3 GHz	≤ 12	≤ 5	≤ 5	≤ 4	≤ 1.5*$\Delta z_{zoom}(n-1)$	≥ 30
3-4 GHz	≤ 12	≤ 5	≤ 4	≤ 3	≤ 1.5*$\Delta z_{zoom}(n-1)$	≥ 28
4-5 GHz	≤ 10	≤ 4	≤ 3	≤ 2.5	≤ 1.5*$\Delta z_{zoom}(n-1)$	≥ 25
5-6 GHz	≤ 10	≤ 4	≤ 2	≤ 2	≤ 1.5*$\Delta z_{zoom}(n-1)$	≥ 22

*Also compliant to IEEE 1528-2013 Table 6

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5 DEFINITION OF REFERENCE POINTS

5.1 EAR REFERENCE POINT

Figure 5-2 shows the front, back and side views of the SAM Twin Phantom. The point "M" is the reference point for the center of the mouth, "LE" is the left ear reference point (ERP), and "RE" is the right ERP. The ERP is 15mm posterior to the entrance to the ear canal (EEC) along the B-M line (Back-Mouth), as shown in Figure 5-1. The plane passing through the two ear canals and M is defined as the Reference Plane. The line N-F (Neck-Front), also called the Reference Pivoting Line, is not perpendicular to the reference plane (see Figure 5-1). Line B-M is perpendicular to the N-F line. Both N-F and B-M lines are marked on the external phantom shell to facilitate handset positioning [5].

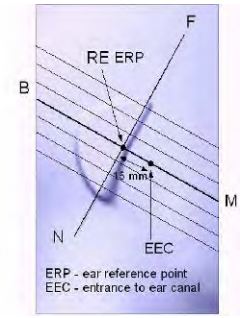


Figure 5-1
Close-Up Side view of ERP

5.2 HANDSET REFERENCE POINTS

Two imaginary lines on the handset were established: the vertical centerline and the horizontal line. The test device was placed in a normal operating position with the acoustic output located along the "vertical centerline" on the front of the device aligned to the "ear reference point" (See Figure 5-3). The acoustic output was than located at the same level as the center of the ear reference point. The test device was positioned so that the "vertical centerline" was bisecting the front surface of the handset at its top and bottom edges, positioning the "ear reference point" on the outer surface of the both the left and right head phantoms on the ear reference point.



Figure 5-2
Front, back and side view of SAM Twin Phantom

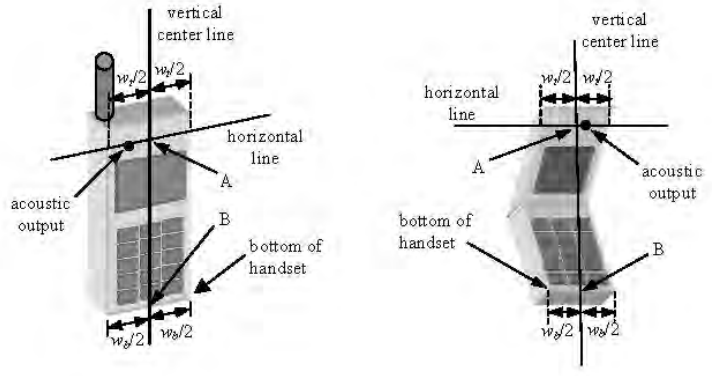


Figure 5-3
Handset Vertical Center & Horizontal Line Reference Points

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6 TEST CONFIGURATION POSITIONS

6.1 Device Holder

The device holder is made out of low-loss POM material having the following dielectric parameters: relative permittivity ε = 3 and loss tangent δ = 0.02.

6.2 Positioning for Cheek

1. The test device was positioned with the device close to the surface of the phantom such that point A is on the (virtual) extension of the line passing through points RE and LE on the phantom (see Figure 6-1), such that the plane defined by the vertical center line and the horizontal line of the phone is approximately parallel to the sagittal plane of the phantom.



Figure 6-1 Front, Side and Top View of Cheek Position

2. The handset was translated towards the phantom along the line passing through RE & LE until the handset touches the pinna.
3. While maintaining the handset in this plane, the handset was rotated around the LE-RE line until the vertical centerline was in the reference plane.
4. The phone was then rotated around the vertical centerline until the phone (horizontal line) was symmetrical was respect to the line NF.
5. While maintaining the vertical centerline in the reference plane, keeping point A on the line passing through RE and LE, and maintaining the device contact with the ear, the device was rotated about the NF line until any point on the handset made contact with a phantom point below the ear (cheek) (See Figure 6-2).

6.3 Positioning for Ear / 15º Tilt

With the test device aligned in the “Cheek Position”:

1. While maintaining the orientation of the phone, the phone was retracted parallel to the reference plane far enough to enable a rotation of the phone by 15degrees.
2. The phone was then rotated around the horizontal line by 15 degrees.
3. While maintaining the orientation of the phone, the phone was moved parallel to the reference plane until any part of the handset touched the head. (In this position, point A was located on the line RE-LE). The tilted position is obtained when the contact is on the pinna. If the contact was at any location other than the pinna, the angle of the phone would then be reduced. In this situation, the tilted position was obtained when any part of the phone was in contact of the ear as well as a second part of the phone was in contact with the head (see Figure 6-2).

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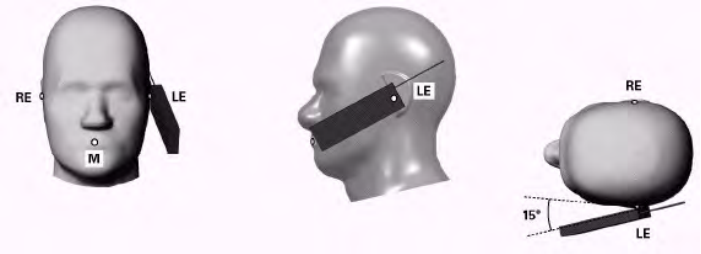


Figure 6-2 Front, Side and Top View of Ear/15º Tilt Position

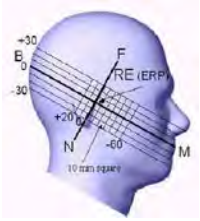


Figure 6-3
Side view w/ relevant markings

6.4 SAR Evaluations near the Mouth/Jaw Regions of the SAM Phantom

Antennas located near the bottom of a phone may require SAR measurements around the mouth and jaw regions of the SAM head phantom. This typically applies to clam-shell style phones that are generally longer in the unfolded normal use positions or to certain older style long rectangular phones. Per IEEE 1528-2013, a rotated SAM phantom is necessary to allow probe access to such regions. Both SAM heads of the TwinSAM-Chin20 are rotated 20 degrees around the NF line. Each head can be removed from the table for emptying and cleaning.

Under these circumstances, the following procedures apply, adopted from the FCC guidance on SAR handsets document FCC KDB Publication 648474 D04v01r03. The SAR required in these regions of SAM should be measured using a flat phantom. The phone should be positioned with a separation distance of 4 mm between the ear reference point (ERP) and the outer surface of the flat phantom shell. While maintaining this distance at the ERP location, the low (bottom) edge of the phone should be lowered from the phantom to establish the same separation distance between the peak SAR location identified by the truncated partial SAR distribution measured with the SAM phantom. The distance from the peak SAR location to the phone is determined by the straight line passing perpendicularly through the phantom surface. When it is not feasible to maintain 4 mm separation at the ERP while also establishing the required separation at the peak SAR location, the top edge of the phone will be allowed to touch the phantom with a separation < 4 mm at the ERP. The phone should not be tilted to the left or right while placed in this inclined position to the flat phantom.

6.5 Body-Worn Accessory Configurations

Body-worn operating configurations are tested with the belt-clips and holsters attached to the device and positioned against a flat phantom in a normal use configuration (see Figure 6-4). Per FCC KDB Publication 648474 D04v01r03, Body-worn accessory exposure is typically related to voice mode operations when handsets are carried in body-worn accessories. The body-worn accessory procedures in FCC KDB Publication 447498 D01v06 should be used to test for body-worn accessory SAR compliance, without a headset connected to it. This enables the test results for such configuration to be compatible with that required for hotspot mode when the body-worn accessory test separation distance is greater than or equal to that required for hotspot mode, when applicable. When the reported SAR for a body-worn accessory, measured without a headset connected to the handset, is > 1.2 W/kg, the highest reported SAR configuration for that wireless mode and frequency band should be repeated for that body-worn accessory with a headset attached to the handset.

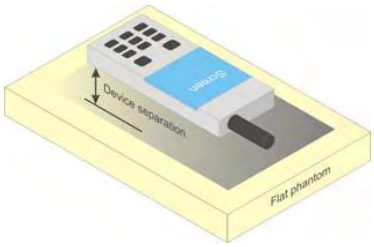


Figure 6-4
Sample Body-Worn Diagram

Accessories for Body-worn operation configurations are divided into two categories: those that do not contain metallic components and those that do contain metallic components. When multiple accessories that do not

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contain metallic components are supplied with the device, the device is tested with only the accessory that dictates the closest spacing to the body. Then multiple accessories that contain metallic components are tested with the device with each accessory. If multiple accessories share an identical metallic component (i.e. the same metallic belt-clip used with different holsters with no other metallic components) only the accessory that dictates the closest spacing to the body is tested.

Body-worn accessories may not always be supplied or available as options for some devices intended to be authorized for body-worn use. In this case, a test configuration with a separation distance between the back of the device and the flat phantom is used. Test position spacing was documented.
Transmitters that are designed to operate in front of a person's face, as in push-to-talk configurations, are tested for SAR compliance with the front of the device positioned to face the flat phantom in head fluid. For devices that are carried next to the body such as a shoulder, waist or chest-worn transmitters, SAR compliance is tested with the accessories, including headsets and microphones, attached to the device and positioned against a flat phantom in a normal use configuration.

6.6 Extremity Exposure Configurations

Devices that are designed or intended for use on extremities or mainly operated in extremity only exposure conditions; i.e., hands, wrists, feet and ankles, may require extremity SAR evaluation. When the device also operates in close proximity to the user's body, SAR compliance for the body is also required. The 1g body and 10g extremity SAR Exclusion Thresholds found in KDB Publication 447498 D01v06 should be applied to determine SAR test requirements.

Per KDB Publication 447498 D01v06, Cell phones (handsets) are not normally designed to be used on extremities or operated in extremity only exposure conditions. The maximum output power levels of handsets generally do not require extremity SAR testing to show compliance. Therefore, extremity SAR was not evaluated for this device.

6.7 Wireless Router Configurations

Some battery-operated handsets have the capability to transmit and receive user data through simultaneous transmission of WIFI simultaneously with a separate licensed transmitter. The FCC has provided guidance in FCC KDB Publication 941225 D06v02r01 where SAR test considerations for handsets (L x W ≥ 9 cm x 5 cm) are based on a composite test separation distance of 10 mm from the front, back and edges of the device containing transmitting antennas within 2.5 cm of their edges, determined from general mixed use conditions for this type of devices. Since the hotspot SAR results may overlap with the body-worn accessory SAR requirements, the more conservative configurations can be considered, thus excluding some body-worn accessory SAR tests.

When the user enables the personal wireless router functions for the handset, actual operations include simultaneous transmission of both the WIFI transmitter and another licensed transmitter. Both transmitters often do not transmit at the same transmitting frequency and thus cannot be evaluated for SAR under actual use conditions due to the limitations of the SAR assessment probes. Therefore, SAR must be evaluated for each frequency transmission and mode separately and spatially summed with the WIFI transmitter according to FCC KDB Publication 447498 D01v06 procedures. The "Portable Hotspot" feature on the handset was NOT activated during SAR assessments, to ensure the SAR measurements were evaluated for a single transmission frequency RF signal at a time.

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7 RF EXPOSURE LIMITS

7.1 Uncontrolled Environment

UNCONTROLLED ENVIRONMENTS are defined as locations where there is the exposure of individuals who have no knowledge or control of their exposure. The general population/uncontrolled exposure limits are applicable to situations in which the general public may be exposed or in which persons who are exposed as a consequence of their employment may not be made fully aware of the potential for exposure or cannot exercise control over their exposure. Members of the general public would come under this category when exposure is not employment-related; for example, in the case of a wireless transmitter that exposes persons in its vicinity.

7.2 Controlled Environment

CONTROLLED ENVIRONMENTS are defined as locations where there is exposure that may be incurred by persons who are aware of the potential for exposure, (i.e. as a result of employment or occupation). In general, occupational/controlled exposure limits are applicable to situations in which persons are exposed as a consequence of their employment, who have been made fully aware of the potential for exposure and can exercise control over their exposure. This exposure category is also applicable when the exposure is of a transient nature due to incidental passage through a location where the exposure levels may be higher than the general population/uncontrolled limits, but the exposed person is fully aware of the potential for exposure and can exercise control over his or her exposure by leaving the area or by some other appropriate means.

Table 7-1
SAR Human Exposure Specified in ANSI/IEEE C95.1-1992 and Health Canada Safety Code 6

HUMAN EXPOSURE LIMITS		
	UNCONTROLLED ENVIRONMENT *General Population* (W/kg) or (mW/g)	CONTROLLED ENVIRONMENT *Occupational* (W/kg) or (mW/g)
Peak Spatial Average SAR Head	1.6	8.0
Whole Body SAR	0.08	0.4
Peak Spatial Average SAR Hands, Feet, Ankle, Wrists, etc.	4.0	20

1. The Spatial Peak value of the SAR averaged over any 1 gram of tissue (defined as a tissue volume in the shape of a cube) and over the appropriate averaging time.
2. The Spatial Average value of the SAR averaged over the whole body.
3. The Spatial Peak value of the SAR averaged over any 10 grams of tissue (defined as a tissue volume in the shape of a cube) and over the appropriate averaging time.

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8 FCC MEASUREMENT PROCEDURES

Power measurements for licensed transmitters are performed using a base station simulator under digital average power.

8.1 Measured and Reported SAR

Per FCC KDB Publication 447498 D01v06, when SAR is not measured at the maximum power level allowed for production units, the results must be scaled to the maximum tune-up tolerance limit according to the power applied to the individual channels tested to determine compliance. For simultaneous transmission, the measured aggregate SAR must be scaled according to the sum of the differences between the maximum tune-up tolerance and actual power used to test each transmitter. When SAR is measured at or scaled to the maximum tune-up tolerance limit, the results are referred to as *reported* SAR. The highest *reported* SAR results are identified on the grant of equipment authorization according to procedures in KDB 690783 D01v01r03.

8.2 3G SAR Test Reduction Procedure

In FCC KDB Publication 941225 D01v03r01, certain transmission modes within a frequency band and wireless mode evaluated for SAR are defined as primary modes. The equivalent modes considered for SAR test reduction are denoted as secondary modes. When the maximum output power including tune-up tolerance specified for production units in a secondary mode is $\leq$ 0.25 dB higher than the primary mode or when the highest reported SAR of the primary mode, scaled by the ratio of specified maximum output power and tune-up tolerance of secondary to primary mode, is $\leq$ 1.2 W/kg, SAR measurements are not required for the secondary mode. These criteria are referred to as the 3G SAR test reduction procedure. When the 3G SAR test reduction procedure is not satisfied, SAR measurements are additionally required for the secondary mode.

8.3 Procedures Used to Establish RF Signal for SAR

The following procedures are according to FCC KDB Publication 941225 D01v03r01 “3G SAR Measurement Procedures.”

The device is placed into a simulated call using a base station simulator in a RF shielded chamber. Establishing connections in this manner ensure a consistent means for testing SAR and are recommended for evaluating SAR [4]. Devices under test are evaluated prior to testing, with a fully charged battery and were configured to operate at maximum output power. In order to verify that the device is tested throughout the SAR test at maximum output power, the SAR measurement system measures a “point SAR” at an arbitrary reference point at the start and end of the 1 gram SAR evaluation, to assess for any power drifts during the evaluation. If the power drift deviates by more than 5%, the SAR test and drift measurements are repeated.

8.4 SAR Measurement Conditions for CDMA2000

The following procedures were performed according to FCC KDB Publication 941225 D01v03r01 “3G SAR Measurement Procedures.”

8.4.1 Output Power Verification

See 3GPP2 C.S0011/TIA-98-E as recommended by FCC KDB Publication 941225 D01v03r01 “3G SAR Measurement Procedures.” Maximum output power is verified on the High, Middle and Low channels according to procedures in section 4.4.5.2 of 3GPP2 C.S0011/TIA-98-E. SO55 tests were measured with power control bits in the “All Up” condition.

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1. If the mobile station (MS) supports Reverse TCH RC 1 and Forward TCH RC 1, set up a call using Fundamental Channel Test Mode 1 (RC=1/1) with 9600 bps data rate only.
2. Under RC1, C.S0011 Table 4.4.5.2-1, Table 8-1 parameters were applied.
3. If the MS supports the RC 3 Reverse FCH, RC3 Reverse SCH_0 and demodulation of RC 3,4, or 5, set up a call using Supplemental Channel Test Mode 3 (RC 3/3) with 9600 bps Fundamental Channel and 9600 bps SCH0 data rate.
4. Under RC3, C.S0011 Table 4.4.5.2-2, Table 8-2 was applied.

Table 8-1
Parameters for Max. Power for RC1

Parameter	Units	Value
$\hat{I}_{or}$	dBm/1.23 MHz	-104
$\frac{\text{Pilot } E_c}{I_{or}}$	dB	-7
$\frac{\text{Traffic } E_c}{I_{or}}$	dB	-7.4

Table 8-2
Parameters for Max. Power for RC3

Parameter	Units	Value
$\hat{I}_{or}$	dBm/1.23 MHz	-86
$\frac{\text{Pilot } E_c}{I_{or}}$	dB	-7
$\frac{\text{Traffic } E_c}{I_{or}}$	dB	-7.4

5. FCHs were configured at full rate for maximum SAR with “All Up” power control bits.

8.4.2 Head SAR Measurements

SAR for next to the ear head exposure is measured in RC3 with the handset configured to transmit at fullrate in SO55. The 3G SAR test reduction procedure is applied to RC1 with RC3 as the primary mode; otherwise, SAR is required for the channel with maximum measured output in RC1 using the head exposure configuration that results in the highest reported SAR in RC3.

Head SAR is additionally evaluated using EVDO Rev. A to support compliance for VoIP operations. See Section 8.4.5 for EVDO Rev. A configuration parameters.

8.4.3 Body-worn SAR Measurements

SAR for body-worn exposure configurations is measured in RC3 with the DUT configured to transmit at full rate on FCH with all other code channels disabled using TDSO / SO32. The 3G SAR test reduction procedure is applied to the multiple code channel configuration (FCH+SCHn), with FCH only as the primary mode. Otherwise, SAR is required for multiple code channel configuration (FCH + SCHn), with FCH at full rate and SCH0 enabled at 9600 bps, using the highest reported SAR configuration for FCH only. When multiple code channels are enabled, the transmitter output can shift by more than 0.5 dB and may lead to higher SAR drifts and SCH dropouts.

The 3G SAR test reduction procedure is applied to body-worn accessory SAR in RC1 with RC3 as the primary mode. Otherwise, SAR is required for RC1, with SO55 and full rate, using the highest reported SAR configuration for body-worn accessory exposure in RC3.

8.4.4 Body-worn SAR Measurements for EVDO Devices

For handsets with EVDO capabilities, the 3G SAR test reduction procedure is applied to EVDO Rev. 0 with 1x RTT RC3 as the primary mode to determine body-worn accessory test requirements. Otherwise, body-worn accessory SAR is required for Rev. 0, at 153.6 kbps, using the highest reported SAR configuration for body-worn accessory exposure in RC3.

The 3G SAR test reduction procedure is applied to Rev. A, with Rev. 0 as the primary mode to determine body-worn accessory SAR test requirements. When SAR is not required for Rev. 0, the 3G SAR test reduction is applied with 1x RTT RC3 as the primary mode.

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When SAR is required for EVDO Rev. A, SAR is measured with a Reverse Data Channel payload size of 4096 bits and a Termination Target of 16 slots defined for Subtype 2 Physical Layer configurations, using the highest reported SAR configuration for body-worn accessory exposure in Rev. 0 or 1x RTT RC3, as appropriate.

8.4.5 Body SAR Measurements for EVDO Hotspot

Hotspot Body SAR is measured using Subtype 0/1 Physical Layer configurations for Rev. 0. The 3G SAR test reduction procedure is applied to Rev. A, Subtype 2 Physical layer configuration, with Rev. 0 as the primary mode; otherwise, SAR is measured for Rev. A using the highest reported SAR configuration for body-worn accessory exposure in Rev. 0. The AT is tested with a Reverse Data Channel rate of 153.6 kbps in Subtype 0/1 Physical Layer configurations; and a Reverse Data Channel payload size of 4096 bits and Termination Target of 16 slots in Subtype 2 Physical Layer configurations.

For EVDO data devices that also support 1x RTT voice and/or data operations, the 3G SAR test reduction procedure is applied to 1x RTT RC3 and RC1 with EVDO Rev. 0 and Rev. A as the respective primary modes. Otherwise, the 'Body-Worn Accessory SAR' procedures in the '3GPP2 CDMA 2000 1x Handsets' section are applied.

8.4.6 CDMA2000 1x Advanced

This device additionally supports 1x Advanced. Conducted powers are measured using SO75 with RC8 on the uplink and RC11 on the downlink per FCC KDB Publication 941225 D01v03r01. Smart blanking is disabled for all measurements. The EUT is configured with forward power control Mode 000 and reverse power control at 400 bps. Conducted powers are measured on an Agilent 8960 Series 10 Wireless Communications Test Set, Model E5515C using the CDMA2000 1x Advanced application, Option E1962B-410.

The 3G SAR test reduction procedure is applied to the 1x-Advanced transmission mode with 1x RTT RC3 as the primary mode. When SAR measurement is required, the 1x-Advanced power measurement configurations are used. The1x Advanced SAR procedures are applied separately to head, body-worn accessory and other exposure conditions.

8.5 SAR Measurement Conditions for UMTS

8.5.1 Output Power Verification

Maximum output power is verified on the High, Middle and Low channels according to the general descriptions in section 5.2 of 3GPP TS 34.121, using the appropriate RMC with TPC (transmit power control) set to all "1s" or applying the required inner loop power control procedures to maintain maximum output power while HSUPA is active. Results for all applicable physical channel configurations (DPCCH, DPDCHn and spreading codes, HS-DPCCH etc) are tabulated in this test report. All configurations that are not supported by the DUT or cannot be measured due to technical or equipment limitations are identified.

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8.5.2 Head SAR Measurements

SAR for next to the ear head exposure is measured using a 12.2 kbps RMC with TPC bits configured to all "1's". The 3G SAR test reduction procedure is applied to AMR configurations with 12.2 kbps RMC as the primary mode. Otherwise, SAR is measured for 12.2 kbps AMR in 3.4 kbps SRB (signaling radio bearer) using the highest reported SAR configuration in 12.2 kbps RMC for head exposure.

8.5.3 Body SAR Measurements

SAR for body exposure configurations is measured using the 12.2 kbps RMC with the TPC bits all "1s". The 3G SAR test reduction procedure is applied to other spreading codes and multiple $DPDCH_n$ configurations supported by the handset with 12.2 kbps RMC as the primary mode. Otherwise, SAR is measured using an applicable RMC configuration with the corresponding spreading code or $DPDCH_n$, for the highest reported SAR configuration in 12.2 kbps RMC.

8.5.4 SAR Measurements with Rel 5 HSDPA

The 3G SAR test reduction procedure is applied to HSDPA body configurations with 12.2 kbps RMC as the primary mode. Otherwise, Body SAR for HSDPA is measured using an FRC with H-Set 1 in Sub-test 1 and a 12.2 kbps RMC configured in Test Loop Mode 1, for the highest reported SAR configuration in 12.2 kbps RMC without HSDPA. Handsets with both HSDPA and HSUPA are tested according to Release 6 HSPA test procedures.

8.5.5 SAR Measurements with Rel 6 HSUPA

The 3G SAR test reduction procedure is applied to HSPA (HSUPA/HSDPA with RMC) body configurations with 12.2 kbps RMC as the primary mode. Otherwise, Body SAR for HSPA is measured with E-DCH Sub-test 5, using H-Set 1 and QPSK for FRC and a 12.2 kbps RMC configured in Test Loop Mode 1 and power control algorithm 2, according to the highest reported body SAR configuration in 12.2 kbps RMC without HSPA.

When VOIP applies to head exposure, the 3G SAR test reduction procedure is applied with 12.2 kbps RMC as the primary mode; otherwise, the same HSPA configuration used for body SAR measurements are applied to head exposure testing.

8.5.6 SAR Measurement Conditions for DC-HSDPA

SAR is required for Rel. 8 DC-HSDPA when SAR is required for Rel. 5 HSDPA; otherwise, the 3G SAR test reduction procedure is applied to DC-HSDPA with 12.2 kbps RMC as the primary mode. Power is measured for DC-HSDPA according to the H-Set 12, FRC configuration in Table C.8.1.12 of 3GPP TS 34.121-1 to determine SAR test reduction. A primary and a secondary serving HS-DSCH Cell are required to perform the power measurement and for the results to be acceptable.

8.6 SAR Measurement Conditions for LTE

LTE modes are tested according to FCC KDB 941225 D05v02r04 publication. Establishing connections with base station simulators ensure a consistent means for testing SAR and are recommended for evaluating SAR [4]. The R&S CMW500 or Anritsu MT8820C simulators are used for LTE output power measurements and SAR testing. Closed loop power control was used so the UE transmits with maximum output power during SAR testing. SAR tests were performed with the same number of RB and RB offsets transmitting on all TTI frames (maximum TTI).

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8.6.1 Spectrum Plots for RB Configurations

A properly configured base station simulator was used for SAR tests and power measurements. Therefore, spectrum plots for RB configurations were not required to be included in this report.

8.6.2 MPR

MPR is permanently implemented for this device by the manufacturer. The specific manufacturer target MPR is indicated alongside the SAR results. MPR is enabled for this device, according to 3GPP TS36.101 Section 6.2.3 – 6.2.5 under Table 6.2.3-1.

8.6.3 A-MPR

A-MPR (Additional MPR) has been disabled for all SAR tests by setting NS=01 on the base station simulator.

8.6.4 Required RB Size and RB Offsets for SAR Testing

According to FCC KDB 941225 D05v02r04:

a. Per Section 5.2.1, SAR is required for QPSK 1 RB Allocation for the largest bandwidth
   i. The required channel and offset combination with the highest maximum output power is required for SAR.
   ii. When the reported SAR is ≤ 0.8 W/kg, testing of the remaining RB offset configurations and required test channels is not required. Otherwise, SAR is required for the remaining required test channels using the RB offset configuration with highest output power for that channel.
   iii. When the reported SAR for a required test channel is > 1.45 W/kg, SAR is required for all RB offset configurations for that channel.
b. Per Section 5.2.2, SAR is required for 50% RB allocation using the largest bandwidth following the same procedures outlined in Section 5.2.1.
c. Per Section 5.2.3, QPSK SAR is not required for the 100% allocation when the highest maximum output power for the 100% allocation is less than the highest maximum output power of the 1 RB and 50% RB allocations and the reported SAR for the 1 RB and 50% RB allocations is < 0.8 W/kg.
d. Per Section 5.2.4 and 5.3, SAR tests for higher order modulations and lower bandwidths configurations are not required when the conducted power of the required test configurations determined by Sections 5.2.1 through 5.2.3 is less than or equal to ½ dB higher than the equivalent configuration using QPSK modulation and when the QPSK SAR for those configurations is <1.45 W/kg.

According to FCC KDB 447498 D01v06, when the reported (scaled) SAR for LTE Band 41 is ≤ 0.6 W/kg, testing of the remaining RB offset configurations and required test channels is not required. Otherwise, SAR is required for the remaining required test channels using the RB offset configuration with highest output power for that channel.

8.6.5 TDD

LTE TDD testing is performed using the SAR test guidance provided in FCC KDB 941225 D05v02r04. TDD is tested at the highest duty factor using UL-DL configuration 0 with special subframe configuration 6 and applying the FDD LTE procedures in KDB 941225 D05v02r04. SAR testing is performed using the extended cyclic prefix listed in 3GPP TS 36.211 Section 4.

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8.6.6 Downlink Only Carrier Aggregation

Conducted power measurements with LTE Carrier Aggregation (CA) (downlink only) active are made in accordance to KDB Publication 941225 D05Av01r02. The RRC connection is only handled by one cell, the primary component carrier (PCC) for downlink and uplink communications. After making a data connection to the PCC, the UE device adds secondary component carrier(s) (SCC) on the downlink only. All uplink communications and acknowledgements remain identical to specifications when downlink carrier aggregation is inactive on the PCC. For every supported combination of downlink only carrier aggregation, additional conducted output powers are measured with the downlink carrier aggregation active for the configuration with highest measured maximum conducted power with downlink carrier aggregation inactive measured among the channel bandwidth, modulation, and RB combinations in each frequency band. Per FCC KDB Publication 941225 D05Av01r02, no SAR measurements are required for carrier aggregation configurations when the average output power with downlink only carrier aggregation active is not more than 0.25 dB higher than the average output power with downlink only carrier aggregation inactive.

8.7 SAR Testing with 802.11 Transmitters

The normal network operating configurations of 802.11 transmitters are not suitable for SAR measurements. Unpredictable fluctuations in network traffic and antenna diversity conditions can introduce undesirable variations in SAR results. The SAR for these devices should be measured using chipset based test mode software to ensure the results are consistent and reliable. See KDB Publication 248227 D01v02r02 for more details.

8.7.1 General Device Setup

Chipset based test mode software is hardware dependent and generally varies among manufacturers. The device operating parameters established in test mode for SAR measurements must be identical to those programmed in production units, including output power levels, amplifier gain settings and other RF performance tuning parameters.

A periodic duty factor is required for current generation SAR systems to measure SAR. When 802.11 frame gaps are accounted for in the transmission, a maximum transmission duty factor of 92 - 96% is typically achievable in most test mode configurations. A minimum transmission duty factor of 85% is required to avoid certain hardware and device implementation issues related to wide range SAR scaling. The reported SAR is scaled to 100% transmission duty factor to determine compliance at the maximum tune-up tolerance limit.

8.7.2 U-NII-1 and U-NII-2A

For devices that operate in both U-NII-1 and U-NII-2A bands, when the same maximum output power is specified for both bands, SAR measurement using OFDM SAR test procedures is not required for U-NII-1 unless the highest reported SAR for U-NII-2A is > 1.2 W/kg. When different maximum output powers are specified for the bands, SAR measurement for the U-NII band with the lower maximum output power is not required unless the highest reported SAR for the U-NII band with the higher maximum output power, adjusted by the ratio of lower to higher specified maximum output power for the two bands, is > 1.2 W/kg.

8.7.3 U-NII-2C and U-NII-3

The frequency range covered by U-NII-2C and U-NII-3 is 380 MHz (5.47 – 5.85 GHz), which requires a minimum of at least two SAR probe calibration frequency points to support SAR measurements. When Terminal Doppler Weather Radar (TDWR) restriction applies, the channels at 5.60 – 5.65 GHz in U-NII-2C band must be disabled with acceptable mechanisms and documented in the equipment certification. Unless band gap channels are permanently disabled, SAR must be considered for these channels. Each band is

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tested independently according to the normally required OFDM SAR measurement and probe calibration frequency points requirements.

8.7.4 Initial Test Position Procedure

For exposure conditions with multiple test positions, such as handset operating next to the ear, devices with hotspot mode or UMPC mini-tablet, procedures for initial test position can be applied. Using the transmission mode determined by the DSSS procedure or initial test configuration, area scans are measured for all positions in an exposure condition. The test position with the highest extrapolated (peak) SAR is used as the initial test position. When reported SAR for the initial test position is ≤ 0.4 W/kg, no additional testing for the remaining test positions is required. Otherwise, SAR is evaluated at the subsequent highest peak SAR positions until the reported SAR result is ≤ 0.8 W/kg or all test positions are measured.

8.7.5 2.4 GHz SAR Test Requirements

SAR is measured for 2.4 GHz 802.11b DSSS using either the fixed test position or, when applicable, the initial test position procedure. SAR test reduction is determined according to the following:

1) When the reported SAR of the highest measured maximum output power channel for the exposure configuration is ≤ 0.8 W/kg, no further SAR testing is required for 802.11b DSSS in that exposure configuration.

2) When the reported SAR is > 0.8 W/kg, SAR is required for that position using the next highest measured output power channel. When any reported SAR is > 1.2 W/kg, SAR is required for the third channel; i.e., all channels require testing.

2.4 GHz 802.11 g/n OFDM are additionally evaluated for SAR if the highest reported SAR for 802.11b, adjusted by the ratio of the OFDM to DSSS specified maximum output power, is › 1.2 W/kg. When SAR is required for OFDM modes in 2.4 GHz band, the Initial Test Configuration Procedures should be followed.

8.7.6 OFDM Transmission Mode and SAR Test Channel Selection

When the same maximum output power was specified for multiple OFDM transmission mode configurations in a frequency band or aggregated band, SAR is measured using the configuration with the largest channel bandwidth, lowest order modulation and lowest data rate. When the maximum output power of a channel is the same for equivalent OFDM configurations; for example, 802.11a, 802.11n and 802.11ac or 802.11g and 802.11n with the same channel bandwidth, modulation and data rate etc., the lower order 802.11 mode i.e., 802.11a, then 802.11n and 802.11ac or 802.11g then 802.11n, is used for SAR measurement. When the maximum output power are the same for multiple test channels, either according to the default or additional power measurement requirements, SAR is measured using the channel closest to the middle of the frequency band or aggregated band. When there are multiple channels with the same maximum output power, SAR is measured using the higher number channel.

8.7.7 Initial Test Configuration Procedure

For OFDM, an initial test configuration is determined for each frequency band and aggregated band, according to the transmission mode with the highest maximum output power specified for SAR measurements. When the same maximum output power is specified for multiple OFDM transmission mode configurations in a frequency band or aggregated band, SAR is measured using the configuration(s) with the largest channel bandwidth, lowest order modulation, lowest data rate and lowest order IEEE 802.11 mode. The channel of the transmission mode with the highest average RF output conducted power will be the initial test configuration.

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When the reported SAR is ≤ 0.8 W/kg, no additional measurements on other test channels are required. Otherwise, SAR is evaluated using the subsequent highest average RF output channel until the reported SAR result is ≤ 1.2 W/kg or all channels are measured. When there are multiple untested channels having the same subsequent highest average RF output power, the channel with higher frequency from the lowest 802.11 mode is considered for SAR measurements (See Section 8.7.6).

8.7.8 Subsequent Test Configuration Procedures

For OFDM configurations in each frequency band and aggregated band, SAR is evaluated for initial test configuration using the fixed test position or the initial test position procedure. When the highest reported SAR (for the initial test configuration), adjusted by the ratio of the specified maximum output power of the subsequent test configuration to initial test configuration, is ≤ 1.2 W/kg, no additional SAR tests for the subsequent test configurations are required.

8.7.9 MIMO SAR considerations

Per KDB Publication 248227 D01v02r02, the simultaneous SAR provisions in KDB Publication 447498 D01v06 should be applied to determine simultaneous transmission SAR test exclusion for WIFI MIMO. If the sum of 1g single transmission chain SAR measurements is <1.6 W/kg, no additional SAR measurements for MIMO are required. Alternatively, SAR for MIMO can be measured with all antennas transmitting simultaneously at the specified maximum output power of MIMO operation.

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9 RF CONDUCTED POWERS

9.1 CDMA Conducted Powers

Table 9-1
Maximum Conducted Power

Band	Channel	Rule Part	Frequency	SO55 [dBm]	SO55 [dBm]	SO75 [dBm]	TDSO SO32 [dBm]	TDSO SO32 [dBm]	1x EvDO Rev. 0 [dBm]	1x EvDO Rev. A [dBm]
	F-RC		MHz	RC1	RC3	RC11	FCH+SCH	FCH	(RTAP)	(RETAP)
Cellular	1013	22H	824.7	25.40	25.35	25.45	25.41	25.42	25.77	25.76
	384	22H	836.52	25.35	25.30	25.40	25.37	25.37	25.72	25.69
	777	22H	848.31	25.14	25.08	25.19	25.11	25.12	25.49	25.42

Note: RC1 is only applicable for IS-95 compatibility.



Figure 9-1
Power Measurement Setup

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9.2 GSM Conducted Powers

Table 9-2
Maximum Conducted Power

Maximum Burst-Averaged Output Power										
		Voice	*GPRS/EDGE Data (GMSK)*				*EDGE Data (8-PSK)*			
Band	**Channel**	**GSM [dBm] CS (1 Slot)**	**GPRS [dBm] 1 Tx Slot**	**GPRS [dBm] 2 Tx Slot**	**GPRS [dBm] 3 Tx Slot**	**GPRS [dBm] 4 Tx Slot**	**EDGE [dBm] 1 Tx Slot**	**EDGE [dBm] 2 Tx Slot**	**EDGE [dBm] 3 Tx Slot**	**EDGE [dBm] 4 Tx Slot**
GSM 850	128	32.54	32.77	30.55	**28.55**	27.03	26.77	24.89	23.05	20.95
	190	32.62	32.66	30.59	**28.83**	26.97	27.04	25.17	23.11	21.24
	251	32.84	32.68	30.49	**28.72**	26.90	27.17	25.09	22.87	21.29
GSM 1900	512	29.62	29.68	27.49	**25.76**	23.99	25.86	24.04	21.92	19.84
	661	29.54	29.59	27.58	**25.77**	24.31	25.91	24.22	22.20	20.25
	810	29.24	29.32	27.20	**25.33**	23.70	25.53	23.60	21.60	19.58

Calculated Maximum Frame-Averaged Output Power										
		Voice	*GPRS/EDGE Data (GMSK)*				*EDGE Data (8-PSK)*			
Band	**Channel**	**GSM [dBm] CS (1 Slot)**	**GPRS [dBm] 1 Tx Slot**	**GPRS [dBm] 2 Tx Slot**	**GPRS [dBm] 3 Tx Slot**	**GPRS [dBm] 4 Tx Slot**	**EDGE [dBm] 1 Tx Slot**	**EDGE [dBm] 2 Tx Slot**	**EDGE [dBm] 3 Tx Slot**	**EDGE [dBm] 4 Tx Slot**
GSM 850	128	23.51	23.74	24.53	**24.29**	24.02	17.74	18.87	18.79	17.94
	190	23.59	23.63	24.57	**24.57**	23.96	18.01	19.15	18.85	18.23
	251	23.81	23.65	24.47	**24.46**	23.89	18.14	19.07	18.61	18.28
GSM 1900	512	20.59	20.65	21.47	**21.50**	20.98	16.83	18.02	17.66	16.83
	661	20.51	20.56	21.56	**21.51**	21.30	16.88	18.20	17.94	17.24
	810	20.21	20.29	21.18	**21.07**	20.69	16.50	17.58	17.34	16.57
GSM 850	**Frame Avg.Targets:**	23.97	23.97	24.98	**25.04**	24.49	18.47	19.48	19.24	18.49
GSM 1900		20.97	20.97	22.48	**22.24**	21.49	17.17	18.18	17.94	17.79

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Table 9-3
Reduced Conducted Power

Maximum Burst-Averaged Output Power										
		Voice	*GPRS/EDGE Data (GMSK)*				*EDGE Data (8-PSK)*			
Band	**Channel**	**GSM [dBm] CS (1 Slot)**	**GPRS [dBm] 1 Tx Slot**	**GPRS [dBm] 2 Tx Slot**	**GPRS [dBm] 3 Tx Slot**	**GPRS [dBm] 4 Tx Slot**	**EDGE [dBm] 1 Tx Slot**	**EDGE [dBm] 2 Tx Slot**	**EDGE [dBm] 3 Tx Slot**	**EDGE [dBm] 4 Tx Slot**
GSM 1900	512	25.61	25.61	**23.95**	21.88	19.84	23.86	21.66	19.88	17.87
	661	26.93	26.98	**24.27**	22.29	20.30	24.11	22.08	20.15	18.16
	810	25.50	25.58	**23.61**	21.73	19.93	23.77	21.74	19.71	17.70
GSM 1900	**Targets:**	26.5	26.5	**25.0**	22.0	20.0	24.0	22.0	20.0	18.0

Calculated Maximum Frame-Averaged Output Power										
		Voice	*GPRS/EDGE Data (GMSK)*				*EDGE Data (8-PSK)*			
Band	**Channel**	**GSM [dBm] CS (1 Slot)**	**GPRS [dBm] 1 Tx Slot**	**GPRS [dBm] 2 Tx Slot**	**GPRS [dBm] 3 Tx Slot**	**GPRS [dBm] 4 Tx Slot**	**EDGE [dBm] 1 Tx Slot**	**EDGE [dBm] 2 Tx Slot**	**EDGE [dBm] 3 Tx Slot**	**EDGE [dBm] 4 Tx Slot**
GSM 1900	512	16.58	16.58	**17.93**	17.62	16.83	14.83	15.64	15.62	14.86
	661	17.90	17.95	**18.25**	18.03	17.29	15.08	16.06	15.89	15.15
	810	16.47	16.55	**17.59**	17.47	16.92	14.74	15.72	15.45	14.69
GSM 1900	**Frame Avg.Targets:**	17.47	17.47	**18.98**	17.74	16.99	14.97	15.98	15.74	14.99

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Note:

1. Both burst-averaged and calculated frame-averaged powers are included. Frame-averaged power was calculated from the measured burst-averaged power by converting the slot powers into linear units and calculating the energy over 8 timeslots.
2. GPRS/EDGE (GMSK) output powers were measured with coding scheme setting of 1 (CS1) on the base station simulator. CS1 was configured to measure GPRS output power measurements and SAR to ensure GMSK modulation in the signal. Our Investigation has shown that CS1 - CS4 settings do not have any impact on the output levels or modulation in the GPRS modes.
3. EDGE (8-PSK) output powers were measured with MCS7 on the base station simulator. MCS7 coding scheme was used to measure the output powers for EDGE since investigation has shown that choosing MCS7 coding scheme will ensure 8-PSK modulation. It has been shown that MCS levels that produce 8PSK modulation do not have an impact on output power.

GSM Class: B
GPRS Multislot class: 33 (Max 4 Tx uplink slots)
EDGE Multislot class: 33 (Max 4 Tx uplink slots)
DTM Multislot Class: N/A



Figure 9-2
Power Measurement Setup

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9.3 UMTS Conducted Powers

Table 9-4
Maximum Conducted Power

3GPP Release Version	Mode	3GPP 34.121 Subtest	Cellular Band [dBm]			AWS Band [dBm]			PCS Band [dBm]			3GPP MPR [dB]
			4132	4183	4233	1312	1412	1513	9262	9400	9538	
99	WCDMA	12.2 kbps RMC	23.97	23.96	23.95	23.23	23.40	23.31	23.43	23.50	23.26	-
99		12.2 kbps AMR	23.98	23.97	23.94	23.24	23.41	23.31	23.45	23.50	23.28	-
6	HSDPA	Subtest 1	23.00	23.01	22.97	22.21	22.36	22.27	22.39	22.52	22.22	0
6		Subtest 2	22.90	22.83	22.88	22.16	22.14	22.09	22.37	22.44	22.02	0
6		Subtest 3	22.45	22.37	22.39	21.67	21.84	21.73	21.84	21.99	21.71	0.5
6		Subtest 4	22.46	22.44	22.40	21.67	21.85	21.72	21.86	22.01	21.70	0.5
6	HSUPA	Subtest 1	22.94	22.95	22.93	22.16	22.35	22.24	22.39	22.52	22.22	0
6		Subtest 2	20.84	20.85	20.80	20.12	20.29	20.18	20.35	20.46	20.15	2
6		Subtest 3	21.83	21.85	21.81	21.12	21.29	21.19	21.33	21.47	21.17	1
6		Subtest 4	20.80	20.82	20.79	20.14	20.28	20.19	20.33	20.44	20.13	2
6		Subtest 5	22.84	22.83	22.80	22.21	22.36	22.27	22.41	22.53	22.24	0
8	DC-HSDPA	Subtest 1	22.88	22.87	22.83	22.20	22.31	22.29	22.42	22.51	22.25	0
8		Subtest 2	22.81	22.82	22.79	22.15	22.33	22.22	22.38	22.51	22.19	0
8		Subtest 3	22.31	22.33	22.31	21.70	21.86	21.77	21.92	22.05	21.70	0.5
8		Subtest 4	22.35	22.29	22.28	21.72	21.87	21.75	21.90	22.02	21.74	0.5

Table 9-5
Reduced Conducted Power

3GPP Release Version	Mode	3GPP 34.121 Subtest	AWS Band [dBm]			PCS Band [dBm]			3GPP MPR [dB]
			1312	1412	1513	9262	9400	9538	
99	WCDMA	12.2 kbps RMC	18.06	18.28	18.23	18.27	18.41	18.08	-
99		12.2 kbps AMR	18.11	18.28	18.27	18.27	18.42	18.09	-
6	HSDPA	Subtest 1	17.22	17.44	17.31	17.18	17.41	17.10	0
6		Subtest 2	17.19	17.43	17.30	17.20	17.46	17.11	0
6		Subtest 3	16.72	16.92	16.89	16.73	16.95	16.61	0.5
6		Subtest 4	16.69	16.89	16.75	16.75	17.01	16.55	0.5
6	HSUPA	Subtest 1	16.70	17.45	17.31	17.20	17.44	17.07	0
6		Subtest 2	15.20	15.47	15.35	15.23	15.42	15.11	2
6		Subtest 3	16.20	16.44	16.34	16.18	16.46	16.08	1
6		Subtest 4	15.21	15.47	15.34	15.22	15.40	15.02	2
6		Subtest 5	17.25	17.46	17.33	17.22	17.46	17.09	0
8	DC-HSDPA	Subtest 1	17.17	17.44	17.27	17.21	17.44	17.08	0
8		Subtest 2	17.18	17.43	17.27	17.16	17.43	17.05	0
8		Subtest 3	16.69	16.87	16.71	16.67	16.72	16.48	0.5
8		Subtest 4	16.53	16.93	16.80	16.66	16.92	16.54	0.5

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DC-HSDPA considerations

- 3GPP Specification 34.121-1 Release 8 Ver 8.10.0 was used for DC-HSDPA guidance
- H-Set 12 (QPSK) was confirmed to be used during DC-HSDPA measurements
- The DUT supports UE category 24 for HSDPA

We, Samsung Electronics Co. Ltd., expect that MPR for some HSPA subtests may be up to 2 dB more than specified by 3GPP, but also as low as 0 dB according to the chipset implementation in this model.



Figure 9-3
Power Measurement Setup

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9.4 LTE Conducted Powers

9.4.1 LTE Band 12

Table 9-6
LTE Band 12 Conducted Powers - 10 MHz Bandwidth

LTE Band 12 10 MHz Bandwidth					
Modulation	**RB Size**	**RB Offset**	**Mid Channel** **23095** **(707.5 MHz)** **Conducted Power [dBm]**	**MPR Allowed per 3GPP [dB]**	**MPR [dB]**
QPSK	1	0	22.99	0	0
	1	25	**23.06**		0
	1	49	23.02		0
	25	0	22.12	0-1	1
	25	12	**22.13**		1
	25	25	22.05		1
	50	0	22.06		1
16QAM	1	0	22.26	0-1	1
	1	25	22.39		1
	1	49	22.44		1
	25	0	21.16	0-2	2
	25	12	21.16		2
	25	25	21.10		2
	50	0	21.08		2
64QAM	1	0	21.30	0-2	2
	1	25	21.35		2
	1	49	21.34		2
	25	0	20.17	0-3	3
	25	12	20.18		3
	25	25	20.15		3
	50	0	20.18		3

Note: LTE Band 12 at 10 MHz bandwidth does not support three non-overlapping channels. Per KDB Publication 941225 D05v02, when a device supports overlapping channel assignment in a channel bandwidth configuration, the middle channel of the group of overlapping channels should be selected for testing.

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Table 9-7
LTE Band 12 Conducted Powers - 5 MHz Bandwidth

LTE Band 12 5 MHz Bandwidth							
Modulation	RB Size	RB Offset	Low Channel 23035 (701.5 MHz)	Mid Channel 23095 (707.5 MHz)	High Channel 23155 (713.5 MHz)	MPR Allowed per 3GPP [dB]	MPR [dB]
			Conducted Power [dBm]				
QPSK	1	0	23.01	23.05	22.86	0	0
	1	12	22.97	22.97	23.01		0
	1	24	23.04	22.99	22.88		0
	12	0	22.06	22.00	21.92	0-1	1
	12	6	22.00	22.02	22.05		1
	12	13	21.98	21.94	21.96		1
	25	0	22.06	21.99	21.86		1
16QAM	1	0	22.19	22.24	22.25	0-1	1
	1	12	22.59	22.38	22.16		1
	1	24	22.26	22.21	21.97		1
	12	0	21.00	21.15	21.00	0-2	2
	12	6	21.05	21.06	21.18		2
	12	13	21.11	21.03	21.06		2
	25	0	21.18	21.10	20.87		2
64QAM	1	0	21.27	21.32	21.18	0-2	2
	1	12	21.25	21.35	21.29		2
	1	24	21.13	21.24	21.25		2
	12	0	20.09	20.07	20.02	0-3	3
	12	6	20.07	20.14	20.22		3
	12	13	20.17	20.20	20.06		3
	25	0	20.12	20.05	19.94		3

Table 9-8
LTE Band 12 Conducted Powers - 3 MHz Bandwidth

LTE Band 12 3 MHz Bandwidth							
Modulation	RB Size	RB Offset	Low Channel 23025 (700.5 MHz)	Mid Channel 23095 (707.5 MHz)	High Channel 23165 (714.5 MHz)	MPR Allowed per 3GPP [dB]	MPR [dB]
			Conducted Power [dBm]				
QPSK	1	0	22.92	22.80	22.91	0	0
	1	7	23.01	23.05	23.00		0
	1	14	22.86	22.87	22.78		0
	8	0	21.93	21.85	21.86	0-1	1
	8	4	21.82	21.88	21.91		1
	8	7	21.86	21.82	21.83		1
	15	0	21.90	21.85	21.95		1
16QAM	1	0	22.09	22.18	22.25	0-1	1
	1	7	22.24	22.29	22.18		1
	1	14	22.19	22.22	22.24		1
	8	0	20.99	20.92	20.98	0-2	2
	8	4	20.96	21.00	21.02		2
	8	7	20.98	21.02	20.91		2
	15	0	20.93	20.93	20.86		2
64QAM	1	0	20.97	21.21	21.01	0-2	2
	1	7	21.30	21.32	21.19		2
	1	14	21.24	21.12	21.34		2
	8	0	19.98	20.12	20.00	0-3	3
	8	4	20.08	19.99	19.95		3
	8	7	20.02	19.96	20.04		3
	15	0	20.04	20.02	19.98		3

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Table 9-9
LTE Band 12 Conducted Powers -1.4 MHz Bandwidth

LTE Band 12 1.4 MHz Bandwidth							
Modulation	RB Size	RB Offset	Low Channel 23017 (699.7 MHz)	Mid Channel 23095 (707.5 MHz)	High Channel 23173 (715.3 MHz)	MPR Allowed per 3GPP [dB]	MPR [dB]
			Conducted Power [dBm]				
QPSK	1	0	22.89	23.00	22.97	0	0
	1	2	23.11	22.96	23.04		0
	1	5	22.97	22.98	23.03		0
	3	0	23.04	22.97	22.95		0
	3	2	23.06	23.04	23.00		0
	3	3	22.93	23.00	23.03		0
	6	0	22.06	22.01	21.97	0-1	1
16QAM	1	0	22.44	22.31	22.44	0-1	1
	1	2	22.31	22.40	22.31		1
	1	5	22.65	22.32	22.40		1
	3	0	22.25	22.23	22.45		1
	3	2	22.19	22.16	22.39		1
	3	3	22.30	22.18	22.26		1
	6	0	21.22	21.23	21.19	0-2	2
64QAM	1	0	21.46	21.35	21.31	0-2	2
	1	2	21.36	21.39	21.34		2
	1	5	21.34	21.37	21.24		2
	3	0	21.25	21.10	21.26		2
	3	2	21.18	21.35	21.36		2
	3	3	21.26	21.40	21.27		2
	6	0	20.15	20.12	20.05	0-3	3

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9.4.2 LTE Band 13

Table 9-10
LTE Band 13 Conducted Powers - 10 MHz Bandwidth

LTE Band 13 10 MHz Bandwidth					
Modulation	RB Size	RB Offset	Mid Channel 23230 (782.0 MHz) Conducted Power [dBm]	MPR Allowed per 3GPP [dB]	MPR [dB]
QPSK	1	0	23.10	0	0
	1	25	**23.15**		0
	1	49	23.05		0
	25	0	**22.30**	0-1	1
	25	12	22.27		1
	25	25	22.18		1
	50	0	22.24		1
16QAM	1	0	22.05	0-1	1
	1	25	22.40		1
	1	49	22.44		1
	25	0	21.36	0-2	2
	25	12	21.32		2
	25	25	21.23		2
	50	0	21.36		2
64QAM	1	0	21.34	0-2	2
	1	25	21.35		2
	1	49	21.21		2
	25	0	20.28	0-3	3
	25	12	20.25		3
	25	25	20.17		3
	50	0	20.23		3

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Table 9-11
LTE Band 13 Conducted Powers - 5 MHz Bandwidth

LTE Band 13 5 MHz Bandwidth					
Modulation	**RB Size**	**RB Offset**	**Mid Channel** **23230 (782.0 MHz)** **Conducted Power [dBm]**	**MPR Allowed per 3GPP [dB]**	**MPR [dB]**
QPSK	1	0	23.24	0	0
	1	12	23.35		0
	1	24	23.41		0
	12	0	22.49	0-1	1
	12	6	22.45		1
	12	13	22.42		1
	25	0	22.46		1
16QAM	1	0	22.81	0-1	1
	1	12	22.85		1
	1	24	22.57		1
	12	0	21.59	0-2	2
	12	6	21.62		2
	12	13	21.57		2
	25	0	21.60		2
64QAM	1	0	21.66	0-2	2
	1	12	21.76		2
	1	24	21.53		2
	12	0	20.64	0-3	3
	12	6	20.65		3
	12	13	20.56		3
	25	0	20.57		3

Note: LTE Band 13 at 5 MHz bandwidth does not support three non-overlapping channels. Per KDB Publication 941225 D05v02, when a device supports overlapping channel assignment in a channel bandwidth configuration, the middle channel of the group of overlapping channels should be selected for testing.

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9.4.3 LTE Band 26 (Cell)

Table 9-12
LTE Band 26 (Cell) Conducted Powers - 15 MHz Bandwidth

LTE Band 26 (Cell) 15 MHz Bandwidth					
Modulation	RB Size	RB Offset	Mid Channel 26865 (831.5 MHz) Conducted Power [dBm]	MPR Allowed per 3GPP [dB]	MPR [dB]
QPSK	1	0	**23.50**	0	0
	1	36	23.47		0
	1	74	23.40		0
	36	0	**22.53**	0-1	1
	36	18	22.49		1
	36	37	22.43		1
	75	0	22.50		1
16QAM	1	0	22.86	0-1	1
	1	36	22.90		1
	1	74	22.85		1
	36	0	21.66	0-2	2
	36	18	21.67		2
	36	37	21.58		2
	75	0	21.59		2
64QAM	1	0	21.73	0-2	2
	1	36	21.64		2
	1	74	21.59		2
	36	0	20.53	0-3	3
	36	18	20.51		3
	36	37	20.43		3
	75	0	20.44		3

Note: LTE Band 26 (Cell) at 15 MHz bandwidth does not support three non-overlapping channels. Per KDB Publication 941225 D05v02, when a device supports overlapping channel assignment in a channel bandwidth configuration, the middle channel of the group of overlapping channels should be selected for testing.

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Table 9-13
LTE Band 26 (Cell) Conducted Powers - 10 MHz Bandwidth

LTE Band 26 (Cell) 10 MHz Bandwidth							
Modulation	RB Size	RB Offset	Low Channel 26740 (819.0 MHz)	Mid Channel 26865 (831.5 MHz)	High Channel 26990 (844.0 MHz)	MPR Allowed per 3GPP [dB]	MPR [dB]
			Conducted Power [dBm]				
QPSK	1	0	23.55	23.54	23.49	0	0
	1	25	23.48	23.47	23.43		0
	1	49	23.45	23.35	23.34		0
	25	0	22.57	22.54	22.49	0-1	1
	25	12	22.55	22.50	22.48		1
	25	25	22.49	22.45	22.41		1
	50	0	22.56	22.53	22.44		1
16QAM	1	0	22.66	22.76	22.67	0-1	1
	1	25	22.70	22.63	22.60		1
	1	49	22.59	22.59	22.50		1
	25	0	21.67	21.60	21.49	0-2	2
	25	12	21.63	21.63	21.50		2
	25	25	21.57	21.56	21.46		2
	50	0	21.60	21.62	21.50		2
64QAM	1	0	21.77	21.78	21.77	0-2	2
	1	25	21.75	21.81	21.64		2
	1	49	21.67	21.70	21.60		2
	25	0	20.67	20.65	20.54	0-3	3
	25	12	20.69	20.66	20.56		3
	25	25	20.60	20.60	20.48		3
	50	0	20.63	20.64	20.51		3

Table 9-14
LTE Band 26 (Cell) Conducted Powers - 5 MHz Bandwidth

LTE Band 26 (Cell) 5 MHz Bandwidth							
Modulation	RB Size	RB Offset	Low Channel 26715 (816.5 MHz)	Mid Channel 26865 (831.5 MHz)	High Channel 27015 (846.5 MHz)	MPR Allowed per 3GPP [dB]	MPR [dB]
			Conducted Power [dBm]				
QPSK	1	0	23.39	23.50	23.38	0	0
	1	12	23.33	23.42	23.36		0
	1	24	23.44	23.37	23.30		0
	12	0	22.42	22.45	22.38	0-1	1
	12	6	22.45	22.44	22.36		1
	12	13	22.47	22.38	22.30		1
	25	0	22.48	22.41	22.33		1
16QAM	1	0	22.57	22.64	22.61	0-1	1
	1	12	22.53	22.60	22.56		1
	1	24	22.58	22.56	22.51		1
	12	0	21.48	21.53	21.43	0-2	2
	12	6	21.47	21.52	21.45		2
	12	13	21.57	21.52	21.42		2
	25	0	21.56	21.48	21.44		2
64QAM	1	0	21.67	21.73	21.54	0-2	2
	1	12	21.61	21.69	21.59		2
	1	24	21.71	21.64	21.59		2
	12	0	20.54	20.62	20.52	0-3	3
	12	6	20.55	20.60	20.54		3
	12	13	20.61	20.58	20.48		3
	25	0	20.54	20.53	20.46		3

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Table 9-15
LTE Band 26 (Cell) Conducted Powers - 3 MHz Bandwidth

LTE Band 26 (Cell) 3 MHz Bandwidth							
Modulation	RB Size	RB Offset	Low Channel 26705 (815.5 MHz)	Mid Channel 26865 (831.5 MHz)	High Channel 27025 (847.5 MHz)	MPR Allowed per 3GPP [dB]	MPR [dB]
			Conducted Power [dBm]				
QPSK	1	0	23.39	23.40	23.34	0	0
	1	7	23.46	23.49	23.40		0
	1	14	23.33	23.34	23.33		0
	8	0	22.37	22.44	22.31	0-1	1
	8	4	22.42	22.41	22.32		1
	8	7	22.35	22.40	22.29		1
	15	0	22.38	22.39	22.33		1
16QAM	1	0	22.55	22.62	22.47	0-1	1
	1	7	22.64	22.66	22.62		1
	1	14	22.54	22.59	22.54		1
	8	0	21.46	21.49	21.40	0-2	2
	8	4	21.48	21.52	21.43		2
	8	7	21.47	21.50	21.41		2
	15	0	21.45	21.46	21.42		2
64QAM	1	0	21.57	21.67	21.61	0-2	2
	1	7	21.71	21.76	21.68		2
	1	14	21.58	21.62	21.56		2
	8	0	20.49	20.50	20.42	0-3	3
	8	4	20.49	20.52	20.44		3
	8	7	20.44	20.48	20.40		3
	15	0	20.44	20.48	20.39		3

Table 9-16
LTE Band 26 (Cell) Conducted Powers -1.4 MHz Bandwidth

LTE Band 26 (Cell) 1.4 MHz Bandwidth							
Modulation	RB Size	RB Offset	Low Channel 26697 (814.7 MHz)	Mid Channel 26865 (831.5 MHz)	High Channel 27033 (848.3 MHz)	MPR Allowed per 3GPP [dB]	MPR [dB]
			Conducted Power [dBm]				
QPSK	1	0	23.28	23.28	23.20	0	0
	1	2	23.36	23.34	23.29		0
	1	5	23.27	23.29	23.21		0
	3	0	23.30	23.31	23.21		0
	3	2	23.34	23.33	23.23		0
	3	3	23.32	23.27	23.24		0
	6	0	22.30	22.29	22.21	0-1	1
16QAM	1	0	22.45	22.49	22.45	0-1	1
	1	2	22.51	22.56	22.46		1
	1	5	22.38	22.53	22.40		1
	3	0	22.44	22.43	22.37		1
	3	2	22.44	22.50	22.42		1
	3	3	22.45	22.47	22.39		1
	6	0	21.37	21.41	21.34	0-2	2
64QAM	1	0	21.45	21.53	21.50	0-2	2
	1	2	21.58	21.61	21.53		2
	1	5	21.47	21.54	21.46		2
	3	0	21.44	21.48	21.39		2
	3	2	21.45	21.50	21.43		2
	3	3	21.42	21.48	21.38		2
	6	0	20.38	20.37	20.31	0-3	3

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9.4.4 LTE Band 5 (Cell)

Table 9-17
LTE Band 5 (Cell) Conducted Powers - 10 MHz Bandwidth

LTE Band 5 (Cell) 10 MHz Bandwidth					
Modulation	RB Size	RB Offset	Mid Channel 20525 (836.5 MHz) Conducted Power [dBm]	MPR Allowed per 3GPP [dB]	MPR [dB]
QPSK	1	0	23.40	0	0
	1	25	**23.45**		0
	1	49	23.33		0
	25	0	**22.54**	0-1	1
	25	12	22.48		1
	25	25	22.45		1
	50	0	22.48		1
16QAM	1	0	22.79	0-1	1
	1	25	22.84		1
	1	49	22.76		1
	25	0	21.62	0-2	2
	25	12	21.58		2
	25	25	21.49		2
	50	0	21.55		2
64QAM	1	0	21.32	0-2	2
	1	25	21.32		2
	1	49	21.27		2
	25	0	20.59	0-3	3
	25	12	20.56		3
	25	25	20.54		3
	50	0	20.58		3

Note: LTE Band 5 (Cell) at 10 MHz bandwidth does not support three non-overlapping channels. Per KDB Publication 941225 D05v02, when a device supports overlapping channel assignment in a channel bandwidth configuration, the middle channel of the group of overlapping channels should be selected for testing.

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Table 9-18
LTE Band 5 (Cell) Conducted Powers - 5 MHz Bandwidth

LTE Band 5 (Cell) 5 MHz Bandwidth							
Modulation	RB Size	RB Offset	Low Channel 20425 (826.5 MHz)	Mid Channel 20525 (836.5 MHz)	High Channel 20625 (846.5 MHz)	MPR Allowed per 3GPP [dB]	MPR [dB]
			Conducted Power [dBm]				
QPSK	1	0	23.41	23.61	23.36	0	0
	1	12	23.48	23.58	23.38		0
	1	24	23.45	23.43	23.26		0
	12	0	22.47	22.65	22.37	0-1	1
	12	6	22.61	22.66	22.44		1
	12	13	22.53	22.58	22.33		1
	25	0	22.58	22.60	22.35		1
16QAM	1	0	22.68	22.87	22.76	0-1	1
	1	12	22.89	22.92	22.54		1
	1	24	22.70	22.96	22.65		1
	12	0	21.56	21.77	21.49	0-2	2
	12	6	21.66	21.68	21.52		2
	12	13	21.64	21.66	21.46		2
	25	0	21.62	21.73	21.40		2
64QAM	1	0	21.63	21.86	21.48	0-2	2
	1	12	21.80	21.95	21.73		2
	1	24	21.69	21.92	21.68		2
	12	0	20.59	20.80	20.48	0-3	3
	12	6	20.76	20.79	20.55		3
	12	13	20.59	20.67	20.42		3
	25	0	20.65	20.58	20.44		3

Table 9-19
LTE Band 5 (Cell) Conducted Powers - 3 MHz Bandwidth

LTE Band 5 (Cell) 3 MHz Bandwidth							
Modulation	RB Size	RB Offset	Low Channel 20415 (825.5 MHz)	Mid Channel 20525 (836.5 MHz)	High Channel 20635 (847.5 MHz)	MPR Allowed per 3GPP [dB]	MPR [dB]
			Conducted Power [dBm]				
QPSK	1	0	23.31	23.45	23.34	0	0
	1	7	23.40	23.48	23.44		0
	1	14	23.28	23.41	23.27		0
	8	0	22.35	22.43	22.24	0-1	1
	8	4	22.31	22.39	22.29		1
	8	7	22.37	22.43	22.23		1
	15	0	22.35	22.47	22.25		1
16QAM	1	0	22.73	22.83	22.58	0-1	1
	1	7	22.69	22.77	22.64		1
	1	14	22.76	22.64	22.60		1
	8	0	21.44	21.40	21.40	0-2	2
	8	4	21.49	21.49	21.58		2
	8	7	21.36	21.51	21.37		2
	15	0	21.41	21.58	21.42		2
64QAM	1	0	21.51	21.79	21.58	0-2	2
	1	7	21.70	21.73	21.49		2
	1	14	21.66	21.55	21.54		2
	8	0	20.36	20.50	20.58	0-3	3
	8	4	20.50	20.61	20.43		3
	8	7	20.45	20.48	20.37		3
	15	0	20.52	20.42	20.45		3

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Table 9-20
LTE Band 5 (Cell) Conducted Powers -1.4 MHz Bandwidth

LTE Band 5 (Cell) 1.4 MHz Bandwidth							
Modulation	RB Size	RB Offset	Low Channel 20407 (824.7 MHz)	Mid Channel 20525 (836.5 MHz)	High Channel 20643 (848.3 MHz)	MPR Allowed per 3GPP [dB]	MPR [dB]
			Conducted Power [dBm]				
QPSK	1	0	23.29	23.28	23.14	0	0
	1	2	23.25	23.39	23.06		0
	1	5	23.15	23.25	23.08		0
	3	0	23.28	23.27	23.17		0
	3	2	23.21	23.26	23.25		0
	3	3	23.25	23.31	23.11		0
	6	0	22.18	22.33	22.08	0-1	1
16QAM	1	0	22.66	22.21	22.29	0-1	1
	1	2	22.58	22.66	22.59		1
	1	5	22.57	22.71	22.62		1
	3	0	22.35	22.38	22.36		1
	3	2	22.47	22.45	22.59		1
	3	3	22.52	22.47	22.14		1
	6	0	21.48	21.50	21.29	0-2	2
64QAM	1	0	21.55	21.63	21.54	0-2	2
	1	2	21.66	21.58	21.58		2
	1	5	21.63	21.56	21.51		2
	3	0	21.49	21.59	21.40		2
	3	2	21.55	21.71	21.43		2
	3	3	21.52	21.61	21.48		2
	6	0	20.31	20.40	20.29	0-3	3

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9.4.5 LTE Band 66 (AWS)

Table 9-21
LTE Band 66 (AWS) Maximum Conducted Powers - 20 MHz Bandwidth

LTE Band 66 (AWS) 20 MHz Bandwidth							
Modulation	RB Size	RB Offset	Low Channel 132072 (1720.0 MHz)	Mid Channel 132322 (1745.0 MHz)	High Channel 132572 (1770.0 MHz)	MPR Allowed per 3GPP [dB]	MPR [dB]
			Conducted Power [dBm]				
QPSK	1	0	23.33	**23.46**	23.32	0	0
	1	50	23.11	23.19	23.06		0
	1	99	23.19	23.10	23.11		0
	50	0	22.19	**22.37**	22.28	0-1	1
	50	25	22.14	22.30	22.18		1
	50	50	22.19	22.21	22.11		1
	100	0	22.27	22.33	22.19		1
16QAM	1	0	22.33	22.85	22.71	0-1	1
	1	50	22.15	22.90	22.53		1
	1	99	22.21	22.86	22.47		1
	50	0	21.36	21.41	21.40	0-2	2
	50	25	21.29	21.31	21.29		2
	50	50	21.34	21.31	21.26		2
	100	0	21.37	21.35	21.30		2
64QAM	1	0	21.49	21.87	21.29	0-2	2
	1	50	21.30	21.65	21.03		2
	1	99	21.36	21.61	20.94		2
	50	0	20.33	20.50	20.42	0-3	3
	50	25	20.27	20.40	20.29		3
	50	50	20.35	20.33	20.24		3
	100	0	20.33	20.37	20.34		3

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Table 9-22
LTE Band 66 (AWS) Maximum Conducted Powers - 15 MHz Bandwidth

LTE Band 66 (AWS) 15 MHz Bandwidth							
Modulation	RB Size	RB Offset	Low Channel 132047 (1717.5 MHz)	Mid Channel 132322 (1745.0 MHz)	High Channel 132597 (1772.5 MHz)	MPR Allowed per 3GPP [dB]	MPR [dB]
			Conducted Power [dBm]				
QPSK	1	0	23.22	23.26	23.39	0	0
	1	36	23.13	23.17	23.06		0
	1	74	23.07	23.14	23.09		0
	36	0	22.25	22.28	22.27	0-1	1
	36	18	22.20	22.31	22.21		1
	36	37	22.17	22.27	22.17		1
	75	0	22.22	22.26	22.23		1
16QAM	1	0	22.42	22.68	22.67	0-1	1
	1	36	22.46	22.54	22.53		1
	1	74	22.55	22.50	22.54		1
	36	0	21.28	21.37	21.38	0-2	2
	36	18	21.27	21.35	21.35		2
	36	37	21.23	21.28	21.30		2
	75	0	21.32	21.38	21.28		2
64QAM	1	0	21.51	21.42	21.69	0-2	2
	1	36	21.25	21.56	21.49		2
	1	74	21.54	21.59	21.45		2
	36	0	20.42	20.47	20.44	0-3	3
	36	18	20.34	20.42	20.26		3
	36	37	20.26	20.27	20.32		3
	75	0	20.38	20.34	20.28		3

Table 9-23
LTE Band 66 (AWS) Maximum Conducted Powers - 10 MHz Bandwidth

LTE Band 66 (AWS) 10 MHz Bandwidth							
Modulation	RB Size	RB Offset	Low Channel 132022 (1715.0 MHz)	Mid Channel 132322 (1745.0 MHz)	High Channel 132622 (1775.0 MHz)	MPR Allowed per 3GPP [dB]	MPR [dB]
			Conducted Power [dBm]				
QPSK	1	0	23.23	23.28	23.21	0	0
	1	25	23.07	23.22	23.15		0
	1	49	23.19	23.16	23.05		0
	25	0	22.27	22.36	22.19	0-1	1
	25	12	22.24	22.33	22.16		1
	25	25	22.12	22.24	22.14		1
	50	0	22.16	22.27	22.20		1
16QAM	1	0	22.75	22.69	22.55	0-1	1
	1	25	22.56	22.61	22.81		1
	1	49	22.45	22.48	22.74		1
	25	0	21.38	21.43	21.27	0-2	2
	25	12	21.33	21.37	21.31		2
	25	25	21.27	21.41	21.29		2
	50	0	21.25	21.34	21.25		2
64QAM	1	0	21.41	21.67	21.44	0-2	2
	1	25	21.39	21.33	21.49		2
	1	49	21.48	21.60	21.46		2
	25	0	20.33	20.51	20.32	0-3	3
	25	12	20.32	20.38	20.29		3
	25	25	20.30	20.36	20.20		3
	50	0	20.29	20.46	20.24		3

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Table 9-24
LTE Band 66 (AWS) Maximum Conducted Powers - 5 MHz Bandwidth

LTE Band 66 (AWS) 5 MHz Bandwidth							
Modulation	RB Size	RB Offset	Low Channel 131997 (1712.5 MHz)	Mid Channel 132322 (1745.0 MHz)	High Channel 132647 (1777.5 MHz)	MPR Allowed per 3GPP [dB]	MPR [dB]
			Conducted Power [dBm]				
QPSK	1	0	23.14	23.33	23.14	0	0
	1	12	23.18	23.17	23.06		0
	1	24	23.20	23.21	23.00		0
	12	0	22.25	22.26	22.18	0-1	1
	12	6	22.22	22.28	22.19		1
	12	13	22.14	22.31	22.18		1
	25	0	22.16	22.28	22.22		1
16QAM	1	0	22.32	22.51	22.40	0-1	1
	1	12	22.36	22.66	22.71		1
	1	24	22.50	22.47	22.79		1
	12	0	21.31	21.40	21.29	0-2	2
	12	6	21.34	21.44	21.26		2
	12	13	21.26	21.41	21.27		2
	25	0	21.21	21.34	21.21		2
64QAM	1	0	21.62	21.32	21.48	0-2	2
	1	12	21.47	21.37	21.36		2
	1	24	21.34	21.61	21.44		2
	12	0	20.30	20.48	20.42	0-3	3
	12	6	20.36	20.36	20.31		3
	12	13	20.41	20.54	20.33		3
	25	0	20.32	20.37	20.36		3

Table 9-25
LTE Band 66 (AWS) Maximum Conducted Powers - 3 MHz Bandwidth

LTE Band 66 (AWS) 3 MHz Bandwidth							
Modulation	RB Size	RB Offset	Low Channel 131987 (1711.5 MHz)	Mid Channel 132322 (1745.0 MHz)	High Channel 132657 (1778.5 MHz)	MPR Allowed per 3GPP [dB]	MPR [dB]
			Conducted Power [dBm]				
QPSK	1	0	23.24	23.26	23.12	0	0
	1	7	23.28	23.18	23.21		0
	1	14	23.13	23.25	23.10		0
	8	0	22.21	22.28	22.20	0-1	1
	8	4	22.17	22.29	22.17		1
	8	7	22.20	22.22	22.08		1
	15	0	22.16	22.25	22.20		1
16QAM	1	0	22.66	22.60	22.83	0-1	1
	1	7	22.54	22.54	22.60		1
	1	14	22.53	22.79	22.93		1
	8	0	21.46	21.35	21.21	0-2	2
	8	4	21.30	21.29	21.23		2
	8	7	21.39	21.33	21.36		2
	15	0	21.21	21.24	21.26		2
64QAM	1	0	21.48	21.57	21.53	0-2	2
	1	7	21.43	21.49	21.63		2
	1	14	21.56	21.54	21.35		2
	8	0	20.35	20.28	20.27	0-3	3
	8	4	20.29	20.42	20.34		3
	8	7	20.36	20.36	20.38		3
	15	0	20.41	20.38	20.36		3

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Table 9-26
LTE Band 66 (AWS) Maximum Conducted Powers -1.4 MHz Bandwidth

LTE Band 66 (AWS) 1.4 MHz Bandwidth							
Modulation	RB Size	RB Offset	Low Channel 131979 (1710.7 MHz)	Mid Channel 132322 (1745.0 MHz)	High Channel 132665 (1779.3 MHz)	MPR Allowed per 3GPP [dB]	MPR [dB]
			Conducted Power [dBm]				
QPSK	1	0	23.14	23.09	23.15	0	0
	1	2	23.20	23.31	23.17		0
	1	5	23.11	23.08	23.09		0
	3	0	23.14	23.12	23.07		0
	3	2	23.18	23.17	23.01		0
	3	3	23.10	23.23	23.08		0
	6	0	22.12	22.15	22.13	0-1	1
16QAM	1	0	22.55	22.56	22.52	0-1	1
	1	2	22.42	22.65	22.37		1
	1	5	22.79	22.57	22.52		1
	3	0	22.56	22.43	22.33		1
	3	2	22.52	22.37	22.27		1
	3	3	22.54	22.32	22.25		1
	6	0	21.40	21.42	21.37	0-2	2
64QAM	1	0	21.46	21.58	21.47	0-2	2
	1	2	21.35	21.62	21.44		2
	1	5	21.43	21.48	21.30		2
	3	0	21.38	21.49	21.28		2
	3	2	21.47	21.44	21.33		2
	3	3	21.39	21.47	21.20		2
	6	0	20.31	20.37	20.32	0-3	3

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Table 9-27
LTE Band 66 (AWS) Reduced Conducted Powers - 20 MHz Bandwidth

LTE Band 66 (AWS) 20 MHz Bandwidth							
Modulation	RB Size	RB Offset	Low Channel 132072 (1720.0 MHz)	Mid Channel 132322 (1745.0 MHz)	High Channel 132572 (1770.0 MHz)	MPR Allowed per 3GPP [dB]	MPR [dB]
			Conducted Power [dBm]				
QPSK	1	0	18.29	18.32	**18.47**	0	0
	1	50	18.11	18.15	18.05		0
	1	99	18.16	18.20	18.03		0
	50	0	18.34	**18.37**	18.25	0-1	0
	50	25	18.18	18.31	18.13		0
	50	50	18.20	18.17	18.07		0
	100	0	18.19	18.28	18.20		0
16QAM	1	0	18.55	18.50	18.38	0-1	0
	1	50	18.75	18.40	18.41		0
	1	99	18.70	18.44	18.27		0
	50	0	18.39	18.36	18.35	0-2	0
	50	25	18.29	18.32	18.16		0
	50	50	18.18	18.23	18.06		0
	100	0	18.24	18.35	18.27		0
64QAM	1	0	18.34	18.43	18.55	0-2	0
	1	50	18.43	18.48	18.30		0
	1	99	18.31	18.47	18.29		0
	50	0	18.37	18.36	18.38	0-3	0
	50	25	18.25	18.38	18.20		0
	50	50	18.18	18.28	18.13		0
	100	0	18.26	18.35	18.32		0

Table 9-28
LTE Band 66 (AWS) Reduced Conducted Powers - 15 MHz Bandwidth

LTE Band 66 (AWS) 15 MHz Bandwidth							
Modulation	RB Size	RB Offset	Low Channel 132047 (1717.5 MHz)	Mid Channel 132322 (1745.0 MHz)	High Channel 132597 (1772.5 MHz)	MPR Allowed per 3GPP [dB]	MPR [dB]
			Conducted Power [dBm]				
QPSK	1	0	18.35	18.41	18.42	0	0
	1	36	18.20	18.26	18.24		0
	1	74	18.24	18.22	18.17		0
	36	0	18.36	18.34	18.44	0-1	0
	36	18	18.39	18.35	18.37		0
	36	37	18.37	18.29	18.31		0
	75	0	18.39	18.31	18.36		0
16QAM	1	0	18.72	18.25	18.32	0-1	0
	1	36	18.46	18.10	18.10		0
	1	74	18.50	18.00	18.03		0
	36	0	18.42	18.46	18.40	0-2	0
	36	18	18.50	18.37	18.36		0
	36	37	18.43	18.35	18.29		0
	75	0	18.46	18.35	18.35		0
64QAM	1	0	18.50	18.69	18.42	0-2	0
	1	36	18.36	18.54	18.20		0
	1	74	18.46	18.47	18.13		0
	36	0	18.43	18.42	18.56	0-3	0
	36	18	18.46	18.33	18.51		0
	36	37	18.48	18.36	18.42		0
	75	0	18.47	18.37	18.45		0

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Table 9-29
LTE Band 66 (AWS) Reduced Conducted Powers - 10 MHz Bandwidth

LTE Band 66 (AWS) 10 MHz Bandwidth							
Modulation	RB Size	RB Offset	Low Channel 132022 (1715.0 MHz)	Mid Channel 132322 (1745.0 MHz)	High Channel 132622 (1775.0 MHz)	MPR Allowed per 3GPP [dB]	MPR [dB]
			Conducted Power [dBm]				
QPSK	1	0	18.37	18.23	18.36	0	0
	1	25	18.26	18.13	18.23		0
	1	49	18.22	18.18	18.20		0
	25	0	18.34	18.29	18.40	0-1	0
	25	12	18.30	18.31	18.36		0
	25	25	18.35	18.25	18.32		0
	50	0	18.38	18.27	18.35		0
16QAM	1	0	18.17	18.35	18.44	0-1	0
	1	25	18.28	18.31	18.35		0
	1	49	18.55	18.27	18.21		0
	25	0	18.43	18.44	18.48	0-2	0
	25	12	18.42	18.40	18.42		0
	25	25	18.41	18.37	18.32		0
	50	0	18.37	18.33	18.38		0
64QAM	1	0	18.45	18.37	18.78	0-2	0
	1	25	18.37	18.28	18.57		0
	1	49	18.42	18.21	18.47		0
	25	0	18.46	18.33	18.45	0-3	0
	25	12	18.45	18.34	18.46		0
	25	25	18.47	18.28	18.40		0
	50	0	18.42	18.31	18.42		0

Table 9-30
LTE Band 66 (AWS) Reduced Conducted Powers - 5 MHz Bandwidth

LTE Band 66 (AWS) 5 MHz Bandwidth							
Modulation	RB Size	RB Offset	Low Channel 131997 (1712.5 MHz)	Mid Channel 132322 (1745.0 MHz)	High Channel 132647 (1777.5 MHz)	MPR Allowed per 3GPP [dB]	MPR [dB]
			Conducted Power [dBm]				
QPSK	1	0	18.26	18.21	18.34	0	0
	1	12	18.20	18.19	18.28		0
	1	24	18.18	18.20	18.26		0
	12	0	18.25	18.26	18.37	0-1	0
	12	6	18.24	18.27	18.40		0
	12	13	18.21	18.21	18.32		0
	25	0	18.22	18.23	18.38		0
16QAM	1	0	18.36	18.47	18.33	0-1	0
	1	12	18.33	18.40	18.26		0
	1	24	18.30	18.35	18.22		0
	12	0	18.29	18.31	18.36	0-2	0
	12	6	18.28	18.34	18.41		0
	12	13	18.19	18.31	18.39		0
	25	0	18.32	18.27	18.32		0
64QAM	1	0	18.38	18.47	18.43	0-2	0
	1	12	18.46	18.41	18.39		0
	1	24	18.29	18.51	18.37		0
	12	0	18.35	18.46	18.39	0-3	0
	12	6	18.43	18.44	18.40		0
	12	13	18.41	18.43	18.37		0
	25	0	18.24	18.25	18.38		0

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Table 9-31
LTE Band 66 (AWS) Reduced Conducted Powers - 3 MHz Bandwidth

LTE Band 66 (AWS) 3 MHz Bandwidth							
Modulation	RB Size	RB Offset	Low Channel 131987 (1711.5 MHz)	Mid Channel 132322 (1745.0 MHz)	High Channel 132657 (1778.5 MHz)	MPR Allowed per 3GPP [dB]	MPR [dB]
			Conducted Power [dBm]				
QPSK	1	0	18.21	18.37	18.30	0	0
	1	7	18.33	18.42	18.36		0
	1	14	18.23	18.28	18.34		0
	8	0	18.33	18.29	18.37	0-1	0
	8	4	18.32	18.27	18.39		0
	8	7	18.34	18.28	18.38		0
	15	0	18.32	18.27	18.39		0
16QAM	1	0	18.51	18.68	18.17	0-1	0
	1	7	18.66	18.76	18.25		0
	1	14	18.62	18.54	18.15		0
	8	0	18.25	18.39	18.40	0-2	0
	8	4	18.28	18.45	18.43		0
	8	7	18.26	18.40	18.42		0
	15	0	18.40	18.38	18.36		0
64QAM	1	0	18.42	18.14	18.68	0-2	0
	1	7	18.52	18.23	18.76		0
	1	14	18.40	18.13	18.64		0
	8	0	18.39	18.43	18.48	0-3	0
	8	4	18.45	18.44	18.52		0
	8	7	18.44	18.26	18.49		0
	15	0	18.30	18.39	18.49		0

Table 9-32
LTE Band 66 (AWS) Reduced Conducted Powers -1.4 MHz Bandwidth

LTE Band 66 (AWS) 1.4 MHz Bandwidth							
Modulation	RB Size	RB Offset	Low Channel 131979 (1710.7 MHz)	Mid Channel 132322 (1745.0 MHz)	High Channel 132665 (1779.3 MHz)	MPR Allowed per 3GPP [dB]	MPR [dB]
			Conducted Power [dBm]				
QPSK	1	0	18.11	18.19	18.34	0	0
	1	2	18.19	18.24	18.38		0
	1	5	18.07	18.21	18.30		0
	3	0	18.22	18.18	18.35		0
	3	2	18.26	18.22	18.33		0
	3	3	18.20	18.17	18.28		0
	6	0	18.27	18.22	18.34	0-1	0
16QAM	1	0	18.06	18.56	18.54	0-1	0
	1	2	18.12	18.69	18.62		0
	1	5	18.04	18.57	18.55		0
	3	0	18.31	18.42	18.32		0
	3	2	18.34	18.46	18.36		0
	3	3	18.30	18.39	18.33		0
	6	0	18.22	18.23	18.40	0-2	0
64QAM	1	0	18.48	18.34	18.67	0-2	0
	1	2	18.56	18.41	18.71		0
	1	5	18.49	18.34	18.62		0
	3	0	18.37	18.15	18.56		0
	3	2	18.44	18.19	18.54		0
	3	3	18.46	18.09	18.30		0
	6	0	18.47	18.26	18.36	0-3	0

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9.4.6 LTE Band 25 (PCS)

Table 9-33
LTE Band 25 (PCS) Maximum Conducted Powers - 20 MHz Bandwidth

LTE Band 25 (PCS) 20 MHz Bandwidth							
Modulation	RB Size	RB Offset	Low Channel 26140 (1860.0 MHz)	Mid Channel 26365 (1882.5 MHz)	High Channel 26590 (1905.0 MHz)	MPR Allowed per 3GPP [dB]	MPR [dB]
			Conducted Power [dBm]				
QPSK	1	0	23.43	**23.64**	23.34	0	0
	1	50	23.18	23.34	23.15		0
	1	99	23.43	23.35	23.12		0
	50	0	22.32	**22.51**	22.48	0-1	1
	50	25	22.29	22.35	22.45		1
	50	50	22.30	22.34	22.37		1
	100	0	22.31	22.38	22.42		1
16QAM	1	0	22.82	22.92	22.81	0-1	1
	1	50	22.45	22.60	22.62		1
	1	99	22.56	22.63	22.54		1
	50	0	21.35	21.41	21.55	0-2	2
	50	25	21.38	21.48	21.52		2
	50	50	21.34	21.47	21.46		2
	100	0	21.37	21.45	21.48		2
64QAM	1	0	21.68	21.89	21.82	0-2	2
	1	50	21.37	21.57	21.60		2
	1	99	21.56	21.62	21.56		2
	50	0	20.39	20.54	20.67	0-3	3
	50	25	20.43	20.51	20.58		3
	50	50	20.38	20.46	20.55		3
	100	0	20.44	20.48	20.59		3

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Table 9-34
LTE Band 25 (PCS) Maximum Conducted Powers - 15 MHz Bandwidth

LTE Band 25 (PCS) 15 MHz Bandwidth							
Modulation	RB Size	RB Offset	Low Channel 26115 (1857.5 MHz)	Mid Channel 26365 (1882.5 MHz)	High Channel 26615 (1907.5 MHz)	MPR Allowed per 3GPP [dB]	MPR [dB]
			Conducted Power [dBm]				
QPSK	1	0	23.28	23.47	23.57	0	0
	1	36	23.12	23.39	23.27		0
	1	74	23.21	23.25	23.31		0
	36	0	22.27	22.48	22.43	0-1	1
	36	18	22.25	22.41	22.34		1
	36	37	22.27	22.33	22.25		1
	75	0	22.23	22.39	22.36		1
16QAM	1	0	22.43	22.86	22.91	0-1	1
	1	36	22.33	22.71	22.54		1
	1	74	22.50	22.74	22.67		1
	36	0	21.36	21.50	21.51	0-2	2
	36	18	21.34	21.49	21.54		2
	36	37	21.36	21.46	21.42		2
	75	0	21.30	21.48	21.48		2
64QAM	1	0	21.59	21.71	21.88	0-2	2
	1	36	21.44	21.65	21.68		2
	1	74	21.55	21.63	21.61		2
	36	0	20.35	20.55	20.52	0-3	3
	36	18	20.27	20.48	20.46		3
	36	37	20.32	20.52	20.42		3
	75	0	20.29	20.57	20.49		3

Table 9-35
LTE Band 25 (PCS) Maximum Conducted Powers - 10 MHz Bandwidth

LTE Band 25 (PCS) 10 MHz Bandwidth							
Modulation	RB Size	RB Offset	Low Channel 26090 (1855.0 MHz)	Mid Channel 26365 (1882.5 MHz)	High Channel 26640 (1910.0 MHz)	MPR Allowed per 3GPP [dB]	MPR [dB]
			Conducted Power [dBm]				
QPSK	1	0	23.35	23.54	23.37	0	0
	1	25	23.20	23.22	23.24		0
	1	49	23.19	23.44	23.27		0
	25	0	22.21	22.38	22.27	0-1	1
	25	12	22.16	22.36	22.24		1
	25	25	22.17	22.35	22.18		1
	50	0	22.14	22.32	22.26		1
16QAM	1	0	22.38	22.85	22.77	0-1	1
	1	25	22.45	22.59	22.83		1
	1	49	22.60	22.83	22.65		1
	25	0	21.30	21.52	21.39	0-2	2
	25	12	21.22	21.45	21.37		2
	25	25	21.18	21.47	21.32		2
	50	0	21.20	21.46	21.26		2
64QAM	1	0	21.64	21.96	21.73	0-2	2
	1	25	21.51	21.67	21.55		2
	1	49	21.49	21.85	21.57		2
	25	0	20.38	20.49	20.35	0-3	3
	25	12	20.30	20.58	20.31		3
	25	25	20.24	20.44	20.29		3
	50	0	20.34	20.42	20.34		3

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Table 9-36
LTE Band 25 (PCS) Maximum Conducted Powers - 5 MHz Bandwidth

LTE Band 25 (PCS) 5 MHz Bandwidth							
Modulation	RB Size	RB Offset	Low Channel 26065 (1852.5 MHz)	Mid Channel 26365 (1882.5 MHz)	High Channel 26665 (1912.5 MHz)	MPR Allowed per 3GPP [dB]	MPR [dB]
			Conducted Power [dBm]				
QPSK	1	0	23.02	23.39	23.16	0	0
	1	12	22.99	23.28	23.21		0
	1	24	23.18	23.26	23.18		0
	12	0	22.07	22.30	22.23	0-1	1
	12	6	22.03	22.37	22.18		1
	12	13	22.08	22.35	22.20		1
	25	0	22.21	22.27	22.25		1
16QAM	1	0	22.34	22.67	22.66	0-1	1
	1	12	22.31	22.71	22.62		1
	1	24	22.37	22.61	22.65		1
	12	0	21.17	21.45	21.32	0-2	2
	12	6	21.26	21.36	21.35		2
	12	13	21.23	21.38	21.33		2
	25	0	21.29	21.33	21.24		2
64QAM	1	0	21.47	21.52	21.57	0-2	2
	1	12	21.43	21.59	21.59		2
	1	24	21.29	21.54	21.61		2
	12	0	20.23	20.52	20.30	0-3	3
	12	6	20.30	20.50	20.43		3
	12	13	20.37	20.46	20.29		3
	25	0	20.21	20.41	20.35		3

Table 9-37
LTE Band 25 (PCS) Maximum Conducted Powers - 3 MHz Bandwidth

LTE Band 25 (PCS) 3 MHz Bandwidth							
Modulation	RB Size	RB Offset	Low Channel 26055 (1851.5 MHz)	Mid Channel 26365 (1882.5 MHz)	High Channel 26675 (1913.5 MHz)	MPR Allowed per 3GPP [dB]	MPR [dB]
			Conducted Power [dBm]				
QPSK	1	0	23.09	23.29	23.23	0	0
	1	7	23.15	23.18	23.39		0
	1	14	23.03	23.22	23.14		0
	8	0	22.02	22.30	22.17	0-1	1
	8	4	22.08	22.28	22.16		1
	8	7	21.98	22.26	22.24		1
	15	0	22.01	22.30	22.28		1
16QAM	1	0	22.67	22.73	22.80	0-1	1
	1	7	22.55	22.71	22.58		1
	1	14	22.50	22.67	22.85		1
	8	0	21.15	21.41	21.45	0-2	2
	8	4	21.21	21.45	21.38		2
	8	7	21.34	21.36	21.29		2
	15	0	21.11	21.39	21.28		2
64QAM	1	0	21.30	21.63	21.57	0-2	2
	1	7	21.38	21.75	21.67		2
	1	14	21.50	21.62	21.30		2
	8	0	20.25	20.49	20.42	0-3	3
	8	4	20.32	20.44	20.33		3
	8	7	20.20	20.53	20.30		3
	15	0	20.14	20.44	20.29		3

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Table 9-38
LTE Band 25 (PCS) Maximum Conducted Powers -1.4 MHz Bandwidth

LTE Band 25 (PCS) 1.4 MHz Bandwidth							
Modulation	RB Size	RB Offset	Low Channel 26047 (1850.7 MHz)	Mid Channel 26365 (1882.5 MHz)	High Channel 26683 (1914.3 MHz)	MPR Allowed per 3GPP [dB]	MPR [dB]
			Conducted Power [dBm]				
QPSK	1	0	23.03	23.49	23.16	0	0
	1	2	22.93	23.50	23.18		0
	1	5	22.98	23.28	23.13		0
	3	0	22.90	23.38	23.11		0
	3	2	22.94	23.48	23.27		0
	3	3	22.99	23.44	23.10		0
	6	0	22.02	22.56	22.21	0-1	1
16QAM	1	0	22.38	22.69	22.89	0-1	1
	1	2	22.25	22.71	22.59		1
	1	5	22.31	22.83	22.77		1
	3	0	22.19	22.61	22.32		1
	3	2	22.23	22.76	22.40		1
	3	3	22.38	22.62	22.36		1
	6	0	21.15	21.72	21.35	0-2	2
64QAM	1	0	21.32	21.82	21.46	0-2	2
	1	2	21.37	21.75	21.31		2
	1	5	21.35	21.79	21.43		2
	3	0	21.30	21.76	21.41		2
	3	2	21.26	21.50	21.48		2
	3	3	21.22	21.77	21.52		2
	6	0	20.04	20.64	20.20	0-3	3

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Table 9-39
LTE Band 25 (PCS) Reduced Conducted Powers - 20 MHz Bandwidth

LTE Band 25 (PCS) 20 MHz Bandwidth							
Modulation	RB Size	RB Offset	Low Channel 26140 (1860.0 MHz)	Mid Channel 26365 (1882.5 MHz)	High Channel 26590 (1905.0 MHz)	MPR Allowed per 3GPP [dB]	MPR [dB]
			Conducted Power [dBm]				
QPSK	1	0	18.40	**18.60**	18.56	0	0
	1	50	18.06	18.23	18.22		0
	1	99	18.36	18.26	18.20		0
	50	0	18.24	**18.45**	18.44	0-1	0
	50	25	18.27	18.31	18.35		0
	50	50	18.19	18.29	18.36		0
	100	0	18.23	18.38	18.44		0
16QAM	1	0	18.58	18.73	18.71	0-1	0
	1	50	18.24	18.38	18.41		0
	1	99	18.43	18.46	18.32		0
	50	0	18.34	18.47	18.57	0-2	0
	50	25	18.36	18.43	18.46		0
	50	50	18.27	18.39	18.44		0
	100	0	18.36	18.41	18.49		0
64QAM	1	0	18.63	18.79	18.78	0-2	0
	1	50	18.29	18.45	18.56		0
	1	99	18.48	18.52	18.53		0
	50	0	18.39	18.50	18.62	0-3	0
	50	25	18.41	18.44	18.49		0
	50	50	18.30	18.40	18.51		0
	100	0	18.42	18.43	18.52		0

Table 9-40
LTE Band 25 (PCS) Reduced Conducted Powers - 15 MHz Bandwidth

LTE Band 25 (PCS) 15 MHz Bandwidth							
Modulation	RB Size	RB Offset	Low Channel 26115 (1857.5 MHz)	Mid Channel 26365 (1882.5 MHz)	High Channel 26615 (1907.5 MHz)	MPR Allowed per 3GPP [dB]	MPR [dB]
			Conducted Power [dBm]				
QPSK	1	0	18.26	18.40	18.57	0	0
	1	36	18.05	18.27	18.45		0
	1	74	18.22	18.17	18.51		0
	36	0	18.30	18.37	18.62	0-1	0
	36	18	18.28	18.33	18.60		0
	36	37	18.35	18.28	18.62		0
	75	0	18.23	18.29	18.56		0
16QAM	1	0	18.53	18.56	18.78	0-1	0
	1	36	18.40	18.26	18.79		0
	1	74	18.44	18.12	18.79		0
	36	0	18.32	18.49	18.76	0-2	0
	36	18	18.27	18.40	18.71		0
	36	37	18.32	18.33	18.74		0
	75	0	18.25	18.40	18.65		0
64QAM	1	0	18.52	18.52	18.79	0-2	0
	1	36	18.22	18.44	18.72		0
	1	74	18.26	18.55	18.76		0
	36	0	18.35	18.50	18.70	0-3	0
	36	18	18.28	18.46	18.74		0
	36	37	18.32	18.42	18.69		0
	75	0	18.29	18.43	18.71		0

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Table 9-41
LTE Band 25 (PCS) Reduced Conducted Powers - 10 MHz Bandwidth

LTE Band 25 (PCS) 10 MHz Bandwidth							
Modulation	RB Size	RB Offset	Low Channel 26090 (1855.0 MHz)	Mid Channel 26365 (1882.5 MHz)	High Channel 26640 (1910.0 MHz)	MPR Allowed per 3GPP [dB]	MPR [dB]
			Conducted Power [dBm]				
QPSK	1	0	18.39	18.59	18.34	0	0
	1	25	18.17	18.28	18.21		0
	1	49	18.31	18.27	18.18		0
	25	0	18.26	18.35	18.31	0-1	0
	25	12	18.23	18.37	18.28		0
	25	25	18.17	18.34	18.27		0
	50	0	18.22	18.33	18.28		0
16QAM	1	0	18.78	18.45	18.70	0-1	0
	1	25	18.52	18.11	18.77		0
	1	49	18.74	18.27	18.75		0
	25	0	18.38	18.46	18.38	0-2	0
	25	12	18.37	18.41	18.42		0
	25	25	18.29	18.42	18.39		0
	50	0	18.32	18.45	18.34		0
64QAM	1	0	18.67	18.78	18.48	0-2	0
	1	25	18.53	18.62	18.42		0
	1	49	18.69	18.73	18.43		0
	25	0	18.38	18.52	18.47	0-3	0
	25	12	18.35	18.48	18.47		0
	25	25	18.34	18.46	18.48		0
	50	0	18.42	18.45	18.44		0

Table 9-42
LTE Band 25 (PCS) Reduced Conducted Powers - 5 MHz Bandwidth

LTE Band 25 (PCS) 5 MHz Bandwidth							
Modulation	RB Size	RB Offset	Low Channel 26065 (1852.5 MHz)	Mid Channel 26365 (1882.5 MHz)	High Channel 26665 (1912.5 MHz)	MPR Allowed per 3GPP [dB]	MPR [dB]
			Conducted Power [dBm]				
QPSK	1	0	18.18	18.34	18.32	0	0
	1	12	18.12	18.32	18.30		0
	1	24	18.22	18.33	18.33		0
	12	0	18.21	18.36	18.35	0-1	0
	12	6	18.19	18.39	18.36		0
	12	13	18.26	18.35	18.32		0
	25	0	18.27	18.36	18.33		0
16QAM	1	0	18.55	18.78	18.61	0-1	0
	1	12	18.39	18.76	18.59		0
	1	24	18.45	18.75	18.67		0
	12	0	18.35	18.52	18.48	0-2	0
	12	6	18.37	18.51	18.50		0
	12	13	18.45	18.50	18.47		0
	25	0	18.34	18.46	18.42		0
64QAM	1	0	18.57	18.77	18.55	0-2	0
	1	12	18.57	18.73	18.50		0
	1	24	18.65	18.47	18.66		0
	12	0	18.38	18.48	18.51	0-3	0
	12	6	18.35	18.46	18.52		0
	12	13	18.44	18.47	18.50		0
	25	0	18.46	18.45	18.46		0

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Table 9-43
LTE Band 25 (PCS) Reduced Conducted Powers - 3 MHz Bandwidth

LTE Band 25 (PCS) 3 MHz Bandwidth							
Modulation	RB Size	RB Offset	Low Channel 26055 (1851.5 MHz)	Mid Channel 26365 (1882.5 MHz)	High Channel 26675 (1913.5 MHz)	MPR Allowed per 3GPP [dB]	MPR [dB]
			Conducted Power [dBm]				
QPSK	1	0	18.10	18.26	18.25	0	0
	1	7	18.19	18.31	18.37		0
	1	14	18.07	18.13	18.31		0
	8	0	18.12	18.24	18.30	0-1	0
	8	4	18.15	18.27	18.33		0
	8	7	18.11	18.25	18.32		0
	15	0	18.09	18.23	18.31		0
16QAM	1	0	18.16	18.17	18.53	0-1	0
	1	7	18.23	18.27	18.60		0
	1	14	18.08	18.38	18.59		0
	8	0	18.23	18.42	18.39	0-2	0
	8	4	18.22	18.45	18.45		0
	8	7	18.21	18.46	18.42		0
	15	0	18.12	18.29	18.36		0
64QAM	1	0	18.02	18.62	18.60	0-2	0
	1	7	18.11	18.68	18.67		0
	1	14	18.06	18.60	18.57		0
	8	0	18.31	18.39	18.61	0-3	0
	8	4	18.24	18.42	18.63		0
	8	7	18.22	18.39	18.61		0
	15	0	18.34	18.44	18.38		0

Table 9-44
LTE Band 25 (PCS) Reduced Conducted Powers -1.4 MHz Bandwidth

LTE Band 25 (PCS) 1.4 MHz Bandwidth							
Modulation	RB Size	RB Offset	Low Channel 26047 (1850.7 MHz)	Mid Channel 26365 (1882.5 MHz)	High Channel 26683 (1914.3 MHz)	MPR Allowed per 3GPP [dB]	MPR [dB]
			Conducted Power [dBm]				
QPSK	1	0	18.03	18.45	18.18	0	0
	1	2	18.08	18.49	18.27		0
	1	5	18.09	18.42	18.18		0
	3	0	18.09	18.48	18.21		0
	3	2	18.14	18.52	18.19		0
	3	3	18.08	18.49	18.20		0
	6	0	18.17	18.46	18.23	0-1	0
16QAM	1	0	18.35	18.52	18.55	0-1	0
	1	2	18.37	18.60	18.57		0
	1	5	18.30	18.70	18.60		0
	3	0	18.37	18.73	18.35		0
	3	2	18.43	18.74	18.43		0
	3	3	18.30	18.76	18.37		0
	6	0	18.31	18.51	18.32	0-2	0
64QAM	1	0	18.44	18.40	18.33	0-2	0
	1	2	18.38	18.45	18.37		0
	1	5	18.33	18.35	18.31		0
	3	0	18.44	18.70	18.37		0
	3	2	18.49	18.71	18.43		0
	3	3	18.44	18.77	18.41		0
	6	0	18.24	18.55	18.48	0-3	0

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9.4.7 LTE Band 41

Table 9-45
LTE Band 41 Maximum Conducted Powers - 20 MHz Bandwidth

LTE Band 41 20 MHz Bandwidth									
Modulation	RB Size	RB Offset	Low Channel	Low-Mid Channel	Mid Channel	Mid-High Channel	High Channel	MPR Allowed per 3GPP [dB]	MPR [dB]
			39750 (2506.0 MHz)	40185 (2549.5 MHz)	40620 (2593.0 MHz)	41055 (2636.5 MHz)	41490 (2680.0 MHz)		
			Conducted Power [dBm]						
QPSK	1	0	24.11	24.08	**24.22**	23.54	24.00	0	0
	1	50	23.96	23.88	23.85	23.43	23.93		0
	1	99	24.00	23.80	23.70	23.37	23.92		0
	50	0	**23.11**	23.09	23.10	22.49	22.98	0-1	1
	50	25	23.10	23.01	22.93	22.42	22.90		1
	50	50	23.07	22.92	22.78	22.45	22.97		1
	100	0	23.09	23.02	22.95	22.45	22.91		1
16QAM	1	0	22.84	22.81	23.25	22.59	22.76	0-1	1
	1	50	22.72	22.63	22.90	22.47	22.64		1
	1	99	22.71	22.54	22.75	22.42	22.59		1
	50	0	22.18	22.16	22.17	21.60	22.03	0-2	2
	50	25	22.12	22.05	22.04	21.52	21.99		2
	50	50	22.10	21.98	21.85	21.53	22.06		2
	100	0	22.15	22.06	22.03	21.53	21.99		2
64QAM	1	0	22.04	22.01	22.12	21.43	21.93	0-2	2
	1	50	21.88	21.75	21.68	21.25	21.76		2
	1	99	21.92	21.64	21.49	21.18	21.65		2
	50	0	21.04	20.98	21.01	20.36	20.82	0-3	3
	50	25	21.00	20.88	20.83	20.29	20.73		3
	50	50	20.95	20.78	20.63	20.32	20.72		3
	100	0	21.00	20.87	20.79	20.27	20.71		3

Table 9-46
LTE Band 41 Maximum Conducted Powers - 15 MHz Bandwidth

LTE Band 41 15 MHz Bandwidth									
Modulation	RB Size	RB Offset	Low Channel	Low-Mid Channel	Mid Channel	Mid-High Channel	High Channel	MPR Allowed per 3GPP [dB]	MPR [dB]
			39750 (2506.0 MHz)	40185 (2549.5 MHz)	40620 (2593.0 MHz)	41055 (2636.5 MHz)	41490 (2680.0 MHz)		
			Conducted Power [dBm]						
QPSK	1	0	23.99	24.05	24.03	23.24	23.83	0	0
	1	36	23.87	23.81	23.72	23.14	23.75		0
	1	74	23.90	23.70	23.56	23.05	23.59		0
	36	0	23.00	22.94	22.99	22.17	22.70	0-1	1
	36	18	22.98	22.92	22.83	22.13	22.68		1
	36	37	22.94	22.80	22.70	22.16	22.67		1
	75	0	22.95	22.86	22.80	22.12	22.65		1
16QAM	1	0	23.31	23.14	23.36	22.54	23.09	0-1	1
	1	36	23.19	22.94	23.01	22.43	23.03		1
	1	74	23.17	22.81	22.86	22.33	22.87		1
	36	0	22.05	21.99	22.01	21.25	21.78	0-2	2
	36	18	22.03	21.95	21.89	21.18	21.77		2
	36	37	22.01	21.84	21.74	21.21	21.76		2
	75	0	22.03	21.94	21.93	21.20	21.73		2
64QAM	1	0	21.80	21.78	21.83	21.02	21.54	0-2	2
	1	36	21.69	21.58	21.53	20.90	21.52		2
	1	74	21.67	21.49	21.39	20.83	21.38		2
	36	0	21.05	20.98	21.03	20.25	20.80	0-3	3
	36	18	21.04	20.96	20.93	20.19	20.72		3
	36	37	20.99	20.89	20.78	20.23	20.77		3
	75	0	21.05	20.95	20.94	20.20	20.74		3

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Table 9-47
LTE Band 41 Maximum Conducted Powers - 10 MHz Bandwidth

LTE Band 41 10 MHz Bandwidth									
Modulation	RB Size	RB Offset	Low Channel	Low-Mid Channel	Mid Channel	Mid-High Channel	High Channel	MPR Allowed per 3GPP [dB]	MPR [dB]
			39750 (2506.0 MHz)	40185 (2549.5 MHz)	40620 (2593.0 MHz)	41055 (2636.5 MHz)	41490 (2680.0 MHz)		
			Conducted Power [dBm]						
QPSK	1	0	23.93	23.90	23.95	23.15	23.71	0	0
	1	25	23.89	23.81	23.73	23.15	23.68		0
	1	49	23.86	23.71	23.55	23.06	23.66		0
	25	0	22.93	22.89	22.87	22.14	22.68	0-1	1
	25	12	22.97	22.86	22.82	22.10	22.64		1
	25	25	22.90	22.76	22.67	22.11	22.68		1
	50	0	22.94	22.86	22.82	22.10	22.63		1
16QAM	1	0	23.24	23.01	23.23	22.43	23.00	0-1	1
	1	25	23.19	22.92	23.02	22.40	22.99		1
	1	49	23.19	22.84	22.84	22.36	22.93		1
	25	0	22.00	21.93	21.93	21.19	21.67	0-2	2
	25	12	21.96	21.85	21.88	21.11	21.63		2
	25	25	21.89	21.82	21.71	21.17	21.68		2
	50	0	22.04	21.95	21.91	21.17	21.72		2
64QAM	1	0	21.75	21.70	21.71	20.93	21.51	0-2	2
	1	25	21.70	21.58	21.52	20.91	21.46		2
	1	49	21.66	21.49	21.35	20.83	21.45		2
	25	0	21.07	21.01	21.07	20.26	20.78	0-3	3
	25	12	21.07	20.99	20.95	20.24	20.77		3
	25	25	21.02	20.89	20.84	20.27	20.81		3
	50	0	21.07	20.95	20.94	20.19	20.75		3

Table 9-48
LTE Band 41 Maximum Conducted Powers - 5 MHz Bandwidth

LTE Band 41 5 MHz Bandwidth									
Modulation	RB Size	RB Offset	Low Channel	Low-Mid Channel	Mid Channel	Mid-High Channel	High Channel	MPR Allowed per 3GPP [dB]	MPR [dB]
			39750 (2506.0 MHz)	40185 (2549.5 MHz)	40620 (2593.0 MHz)	41055 (2636.5 MHz)	41490 (2680.0 MHz)		
			Conducted Power [dBm]						
QPSK	1	0	23.84	23.84	23.80	23.08	23.61	0	0
	1	12	23.85	23.78	23.70	23.11	23.64		0
	1	24	23.82	23.68	23.58	23.05	23.61		0
	12	0	22.93	22.86	22.79	22.05	22.58	0-1	1
	12	6	22.92	22.81	22.77	22.09	22.59		1
	12	13	22.83	22.78	22.67	22.19	22.64		1
	25	0	22.90	22.77	22.77	22.06	22.59		1
16QAM	1	0	23.19	23.00	23.10	22.39	22.92	0-1	1
	1	12	23.17	22.90	22.98	22.41	22.96		1
	1	24	23.16	22.87	22.87	22.30	22.91		1
	12	0	21.94	21.89	21.88	21.11	21.63	0-2	2
	12	6	21.98	21.90	21.80	21.13	21.67		2
	12	13	21.95	21.84	21.76	21.16	21.72		2
	25	0	21.93	21.84	21.79	21.06	21.62		2
64QAM	1	0	21.68	21.60	21.57	20.84	21.37	0-2	2
	1	12	21.64	21.53	21.47	20.85	21.44		2
	1	24	21.66	21.53	21.41	20.84	21.41		2
	12	0	21.06	20.97	20.95	20.21	20.75	0-3	3
	12	6	21.04	20.96	20.95	20.19	20.73		3
	12	13	21.04	20.91	20.83	20.27	20.79		3
	25	0	21.05	20.98	20.92	20.20	20.75		3

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Table 9-49
LTE Band 41 Reduced Conducted Powers - 20 MHz Bandwidth

LTE Band 41 20 MHz Bandwidth									
Modulation	RB Size	RB Offset	Low Channel	Low-Mid Channel	Mid Channel	Mid-High Channel	High Channel	MPR Allowed per 3GPP [dB]	MPR [dB]
			39750 (2506.0 MHz)	40185 (2549.5 MHz)	40620 (2593.0 MHz)	41055 (2636.5 MHz)	41490 (2680.0 MHz)		
			Conducted Power [dBm]						
QPSK	1	0	20.85	20.88	20.77	20.54	**20.96**	0	0
	1	50	20.74	20.62	20.40	20.38	20.85		0
	1	99	20.70	20.57	20.27	20.32	20.82		0
	50	0	20.86	20.85	20.62	20.45	**20.95**	0-1	0
	50	25	20.84	20.78	20.49	20.37	20.88		0
	50	50	20.79	20.68	20.33	20.41	20.91		0
	100	0	20.85	20.76	20.48	20.41	20.86		0
16QAM	1	0	20.58	20.60	20.83	20.55	21.02	0-1	0
	1	50	20.42	20.39	20.45	20.43	20.93		0
	1	99	20.47	20.31	20.32	20.40	20.90		0
	50	0	20.94	20.93	20.75	20.57	21.07	0-2	0
	50	25	20.90	20.84	20.61	20.46	20.96		0
	50	50	20.87	20.76	20.47	20.53	21.01		0
	100	0	20.91	20.83	20.64	20.50	20.99		0
64QAM	1	0	20.78	20.79	20.70	20.40	20.83	0-2	0
	1	50	20.73	20.61	20.39	20.35	20.77		0
	1	99	20.72	20.49	20.16	20.27	20.64		0
	50	0	20.72	20.68	20.58	20.28	20.72	0-3	0
	50	25	20.70	20.57	20.37	20.21	20.64		0
	50	50	20.66	20.48	20.17	20.24	20.62		0
	100	0	20.78	20.66	20.45	20.25	20.73		0

Table 9-50
LTE Band 41 Reduced Conducted Powers - 15 MHz Bandwidth

LTE Band 41 15 MHz Bandwidth									
Modulation	RB Size	RB Offset	Low Channel	Low-Mid Channel	Mid Channel	Mid-High Channel	High Channel	MPR Allowed per 3GPP [dB]	MPR [dB]
			39750 (2506.0 MHz)	40185 (2549.5 MHz)	40620 (2593.0 MHz)	41055 (2636.5 MHz)	41490 (2680.0 MHz)		
			Conducted Power [dBm]						
QPSK	1	0	20.80	20.76	20.72	20.26	20.82	0	0
	1	36	20.68	20.60	20.39	20.17	20.71		0
	1	74	20.67	20.50	20.22	20.07	20.62		0
	36	0	20.76	20.73	20.55	20.19	20.73	0-1	0
	36	18	20.75	20.67	20.47	20.13	20.68		0
	36	37	20.74	20.59	20.30	20.17	20.68		0
	75	0	20.72	20.63	20.40	20.11	20.65		0
16QAM	1	0	21.03	20.98	20.99	20.49	21.06	0-1	0
	1	36	20.90	20.81	20.64	20.41	20.94		0
	1	74	20.91	20.75	20.51	20.35	20.84		0
	36	0	20.82	20.77	20.62	20.25	20.79	0-2	0
	36	18	20.80	20.69	20.53	20.17	20.72		0
	36	37	20.78	20.64	20.37	20.23	20.77		0
	75	0	20.80	20.70	20.51	20.19	20.74		0
64QAM	1	0	20.56	20.57	20.48	20.03	20.54	0-2	0
	1	36	20.45	20.36	20.15	19.93	20.47		0
	1	74	20.44	20.27	20.00	19.86	20.37		0
	36	0	20.82	20.81	20.65	20.28	20.78	0-3	0
	36	18	20.82	20.76	20.53	20.20	20.73		0
	36	37	20.79	20.67	20.39	20.22	20.80		0
	75	0	20.85	20.74	20.52	20.21	20.78		0

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Table 9-51
LTE Band 41 Reduced Conducted Powers - 10 MHz Bandwidth

LTE Band 41 10 MHz Bandwidth									
Modulation	RB Size	RB Offset	Low Channel	Low-Mid Channel	Mid Channel	Mid-High Channel	High Channel	MPR Allowed per 3GPP [dB]	MPR [dB]
			39750 (2506.0 MHz)	40185 (2549.5 MHz)	40620 (2593.0 MHz)	41055 (2636.5 MHz)	41490 (2680.0 MHz)		
			Conducted Power [dBm]						
QPSK	1	0	20.75	20.71	20.57	20.17	20.76	0	0
	1	25	20.69	20.64	20.38	20.18	20.72		0
	1	49	20.65	20.55	20.20	20.10	20.65		0
	25	0	20.72	20.67	20.51	20.15	20.71	0-1	0
	25	12	20.74	20.66	20.44	20.14	20.63		0
	25	25	20.68	20.57	20.30	20.17	20.67		0
	50	0	20.73	20.64	20.41	20.11	20.66		0
16QAM	1	0	21.01	20.97	20.85	20.43	21.01	0-1	0
	1	25	20.97	20.86	20.66	20.36	20.92		0
	1	49	20.93	20.78	20.50	20.36	20.86		0
	25	0	20.76	20.68	20.53	20.13	20.71	0-2	0
	25	12	20.74	20.64	20.49	20.18	20.67		0
	25	25	20.71	20.58	20.37	20.20	20.71		0
	50	0	20.83	20.72	20.52	20.19	20.76		0
64QAM	1	0	20.56	20.52	20.42	19.98	20.48	0-2	0
	1	25	20.50	20.40	20.17	19.97	20.47		0
	1	49	20.47	20.31	19.98	19.91	20.45		0
	25	0	20.92	20.81	20.63	20.27	20.81	0-3	0
	25	12	20.86	20.79	20.61	20.25	20.83		0
	25	25	20.85	20.74	20.46	20.30	20.81		0
	50	0	20.86	20.75	20.53	20.24	20.79		0

Table 9-52
LTE Band 41 Reduced Conducted Powers - 5 MHz Bandwidth

LTE Band 41 5 MHz Bandwidth									
Modulation	RB Size	RB Offset	Low Channel	Low-Mid Channel	Mid Channel	Mid-High Channel	High Channel	MPR Allowed per 3GPP [dB]	MPR [dB]
			39750 (2506.0 MHz)	40185 (2549.5 MHz)	40620 (2593.0 MHz)	41055 (2636.5 MHz)	41490 (2680.0 MHz)		
			Conducted Power [dBm]						
QPSK	1	0	20.70	20.64	20.45	20.13	20.64	0	0
	1	12	20.71	20.56	20.39	20.15	20.70		0
	1	24	20.68	20.51	20.26	20.11	20.65		0
	12	0	20.73	20.63	20.48	20.13	20.67	0-1	0
	12	6	20.75	20.72	20.46	20.14	20.68		0
	12	13	20.69	20.60	20.36	20.17	20.71		0
	25	0	20.69	20.62	20.41	20.10	20.62		0
16QAM	1	0	20.97	20.89	20.75	20.41	20.90	0-1	0
	1	12	20.93	20.85	20.68	20.42	20.93		0
	1	24	20.90	20.75	20.55	20.37	20.89		0
	12	0	20.75	20.68	20.52	20.17	20.72	0-2	0
	12	6	20.77	20.70	20.49	20.19	20.72		0
	12	13	20.74	20.67	20.43	20.21	20.73		0
	25	0	20.76	20.62	20.46	20.10	20.65		0
64QAM	1	0	20.49	20.39	20.28	19.95	20.40	0-2	0
	1	12	20.46	20.37	20.16	19.95	20.44		0
	1	24	20.47	20.35	20.09	19.94	20.43		0
	12	0	20.83	20.80	20.62	20.20	20.80	0-3	0
	12	6	20.78	20.77	20.61	20.22	20.77		0
	12	13	20.83	20.71	20.49	20.33	20.81		0
	25	0	20.86	20.77	20.55	20.23	20.77		0

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9.4.8 LTE Band 12 Carrier Aggregation Conducted Powers

Table 9-53
LTE Band 12 Two Component Carrier Aggregation Conducted Powers

	PCC									SCC				Power	
Combination	PCC Band	PCC Bandwidth [MHz]	PCC (UL) Channel	PCC (UL) Frequency [MHz]	Modulation	PCC UL# RB	PCC UL RB Offset	PCC (DL) Channel	PCC (DL) Frequency [MHz]	SCC Band	SCC Bandwidth [MHz]	SCC (DL) Channel	SCC (DL) Frequency [MHz]	LTE Tx.Power with DL CA Enabled (dBm)	LTE Single Carrier Tx Power (dBm)
CA_2A-12A	LTE B12	10	23095	707.5	QPSK	1	25	5095	737.5	LTE B2	20	900	1960	23.09	23.06
CA_4A-12A (4)	LTE B12	10	23095	707.5	QPSK	1	25	5095	737.5	LTE B4	20	2175	2132.5	23.11	23.06

Table 9-54
LTE Band 12 Three Component Carrier Aggregation Conducted Powers

	PCC									SCC 1				SCC 2				Power	
Combination	PCC Band	PCC Bandwidth [MHz]	PCC (UL) Channel	PCC (UL) Frequency [MHz]	Modulation	PCC UL# RB	PCC UL RB Offset	PCC (DL) Channel	PCC (DL) Frequency [MHz]	SCC Band	SCC Bandwidth [MHz]	SCC (DL) Channel	SCC (DL) Frequency [MHz]	SCC Band	SCC Bandwidth [MHz]	SCC (DL) Channel	SCC (DL) Frequency [MHz]	LTE Tx.Power with DL CA Enabled (dBm)	LTE Single Carrier Tx Power (dBm)
CA_12A-66A-66A	LTE B12	10	23095	707.5	QPSK	1	25	5095	737.5	LTE B66	20	66786	2145	LTE B66	20	67236	2190	23.08	23.06

9.4.9 LTE Band 17 Carrier Aggregation Conducted Powers

Table 9-55
LTE Band 17 Two Component Carrier Aggregation Conducted Powers

	PCC									SCC				Power	
Combination	PCC Band	PCC Bandwidth [MHz]	PCC (UL) Channel	PCC (UL) Frequency [MHz]	Modulation	PCC UL# RB	PCC UL RB Offset	PCC (DL) Channel	PCC (DL) Frequency [MHz]	SCC Band	SCC Bandwidth [MHz]	SCC (DL) Channel	SCC (DL) Frequency [MHz]	LTE Tx.Power with DL CA Enabled (dBm)	LTE Single Carrier Tx Power (dBm)
CA_2A-17A	LTE B17	10	23790	710	QPSK	1	25	5790	740	LTE B2	10	900	1960	23.08	23.06
CA_4A-17A	LTE B17	10	23790	710	QPSK	1	25	5790	740	LTE B4	10	2175	2132.5	23.01	23.06

9.4.10 LTE Band 13 Carrier Aggregation Conducted Powers

Table 9-56
LTE Band 13 Two Component Carrier Aggregation Conducted Powers

	PCC									SCC				Power	
Combination	PCC Band	PCC Bandwidth [MHz]	PCC (UL) Channel	PCC (UL) Frequency [MHz]	Modulation	PCC UL# RB	PCC UL RB Offset	PCC (DL) Channel	PCC (DL) Frequency [MHz]	SCC Band	SCC Bandwidth [MHz]	SCC (DL) Channel	SCC (DL) Frequency [MHz]	LTE Tx.Power with DL CA Enabled (dBm)	LTE Single Carrier Tx Power (dBm)
CA_2A-13A	LTE B13	10	23230	782	QPSK	1	25	5230	751	LTE B2	20	900	1960	23.18	23.15
CA_4A-13A	LTE B13	10	23230	782	QPSK	1	25	5230	751	LTE B4	20	2175	2132.5	23.19	23.15

9.4.11 LTE Band 5 Carrier Aggregation Conducted Powers

Table 9-57
LTE Band 5 Two Component Carrier Aggregation Conducted Powers

	PCC									SCC				Power	
Combination	PCC Band	PCC Bandwidth [MHz]	PCC (UL) Channel	PCC (UL) Frequency [MHz]	Modulation	PCC UL# RB	PCC UL RB Offset	PCC (DL) Channel	PCC (DL) Frequency [MHz]	SCC Band	SCC Bandwidth [MHz]	SCC (DL) Channel	SCC (DL) Frequency [MHz]	LTE Tx.Power with DL CA Enabled (dBm)	LTE Single Carrier Tx Power (dBm)
CA_2A-5A	LTE B5	5	20525	836.5	QPSK	1	0	2525	881.5	LTE B2	20	900	1960	23.66	23.61
CA_4A-5A (1)	LTE B5	5	20525	836.5	QPSK	1	0	2525	881.5	LTE B4	20	2175	2132.5	23.68	23.61
CA_5A-41A	LTE B5	5	20525	836.5	QPSK	1	0	2525	881.5	LTE B41	20	40620	2593	23.65	23.61

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9.4.12 LTE Band 66 Maximum Carrier Aggregation Conducted Powers

Table 9-58
LTE Band 66 Two Component Carrier Aggregation Conducted Powers

	PCC									SCC				Power	
Combination	PCC Band	PCC Bandwidth [MHz]	PCC (UL) Channel	PCC (UL) Frequency [MHz]	Modulation	PCC UL# RB	PCC UL RB Offset	PCC (DL) Channel	PCC (DL) Frequency [MHz]	SCC Band	SCC Bandwidth [MHz]	SCC (DL) Channel	SCC (DL) Frequency [MHz]	LTE Tx.Power with DL CA Enabled (dBm)	LTE Single Carrier Tx Power (dBm)
CA_66B	LTE B66	15	132597	1772.5	QPSK	1	0	67061	2172.5	LTE B66	5	66968	2163.2	23.44	23.39
CA_66C	LTE B66	20	132322	1745	QPSK	1	0	66786	2145	LTE B66	20	66588	2125.2	23.47	23.46

Table 9-59
LTE Band 66 Three Component Carrier Aggregation Conducted Powers

	PCC									SCC 1				SCC 2				Power	
Combination	PCC Band	PCC Bandwidth [MHz]	PCC (UL) Channel	PCC (UL) Frequency [MHz]	Modulation	PCC UL# RB	PCC UL RB Offset	PCC (DL) Channel	PCC (DL) Frequency [MHz]	SCC Band	SCC Bandwidth [MHz]	SCC (DL) Channel	SCC (DL) Frequency [MHz]	SCC Band	SCC Bandwidth [MHz]	SCC (DL) Channel	SCC (DL) Frequency [MHz]	LTE Tx.Power with DL CA Enabled (dBm)	LTE Single Carrier Tx Power (dBm)
CA_12A-66A-66A	LTE B66	20	132322	1745	QPSK	1	0	66786	2145	LTE B66	20	67236	2190	LTE B12	10	5095	737.5	23.58	23.46

9.4.13 LTE Band 66 Reduced Carrier Aggregation Conducted Powers

Table 9-60
LTE Band 66 Two Component Carrier Aggregation Conducted Powers

	PCC									SCC				Power	
Combination	PCC Band	PCC Bandwidth [MHz]	PCC (UL) Channel	PCC (UL) Frequency [MHz]	Modulation	PCC UL# RB	PCC UL RB Offset	PCC (DL) Channel	PCC (DL) Frequency [MHz]	SCC Band	SCC Bandwidth [MHz]	SCC (DL) Channel	SCC (DL) Frequency [MHz]	LTE Tx.Power with DL CA Enabled (dBm)	LTE Single Carrier Tx Power (dBm)
CA_66B	LTE B66	10	132622	1775	64QAM	1	0	67086	2175	LTE B66	10	66987	2165.1	18.97	18.78
CA_66C	LTE B66	10	132622	1775	64QAM	1	0	67086	2175	LTE B66	20	66942	2160.6	18.91	18.78

Table 9-61
LTE Band 66 Three Component Carrier Aggregation Conducted Powers

	PCC									SCC 1				SCC 2				Power	
Combination	PCC Band	PCC Bandwidth [MHz]	PCC (UL) Channel	PCC (UL) Frequency [MHz]	Modulation	PCC UL# RB	PCC UL RB Offset	PCC (DL) Channel	PCC (DL) Frequency [MHz]	SCC Band	SCC Bandwidth [MHz]	SCC (DL) Channel	SCC (DL) Frequency [MHz]	SCC Band	SCC Bandwidth [MHz]	SCC (DL) Channel	SCC (DL) Frequency [MHz]	LTE Tx.Power with DL CA Enabled (dBm)	LTE Single Carrier Tx Power (dBm)
CA_12A-66A-66A	LTE B66	10	132622	1775	64QAM	1	0	67086	2175	LTE B66	20	66536	2120	LTE B12	10	5095	737.5	18.67	18.78

9.4.14 LTE Band 4 Maximum Carrier Aggregation Conducted Powers

Table 9-62
LTE Band 4 Two Component Carrier Aggregation Conducted Powers

	PCC									SCC				Power	
Combination	PCC Band	PCC Bandwidth [MHz]	PCC (UL) Channel	PCC (UL) Frequency [MHz]	Modulation	PCC UL# RB	PCC UL RB Offset	PCC (DL) Channel	PCC (DL) Frequency [MHz]	SCC Band	SCC Bandwidth [MHz]	SCC (DL) Channel	SCC (DL) Frequency [MHz]	LTE Tx.Power with DL CA Enabled (dBm)	LTE Single Carrier Tx Power (dBm)
CA_2A-4A (2)	LTE B4	20	20300	1745	QPSK	1	0	2300	2145	LTE B2	20	900	1960	23.50	23.46
CA_4A-4A	LTE B4	20	20300	1745	QPSK	1	0	2300	2145	LTE B4	20	2050	2120	23.51	23.46
CA_4A-5A (1)	LTE B4	20	20300	1745	QPSK	1	0	2300	2145	LTE B5	10	2525	881.5	23.49	23.46
CA_4A-12A (4)	LTE B4	20	20300	1745	QPSK	1	0	2300	2145	LTE B12	10	5095	737.5	23.55	23.46
CA_4A-13A	LTE B4	20	20300	1745	QPSK	1	0	2300	2145	LTE B13	10	5230	751	23.56	23.46
CA_4A-17A	LTE B4	5	20300	1745	QPSK	1	0	2300	2145	LTE B17	10	5790	740	23.33	23.33

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9.4.15 LTE Band 4 Reduced Carrier Aggregation Conducted Powers

Table 9-63
LTE Band 4 Two Component Carrier Aggregation Conducted Powers

	PCC									SCC				Power	
Combination	PCC Band	PCC Bandwidth [MHz]	PCC (UL) Channel	PCC (UL) Frequency [MHz]	Modulation	PCC UL# RB	PCC UL RB Offset	PCC (DL) Channel	PCC (DL) Frequency [MHz]	SCC Band	SCC Bandwidth [MHz]	SCC (DL) Channel	SCC (DL) Frequency [MHz]	LTE Tx.Power with DL CA Enabled (dBm)	LTE Single Carrier Tx Power (dBm)
CA_2A-4A (2)	LTE B4	20	20050	1720	16QAM	1	50	2050	2120	LTE B2	20	900	1960	18.81	18.75
CA_4A-4A	LTE B4	20	20050	1720	16QAM	1	50	2050	2120	LTE B4	20	2300	2145	18.88	18.75
CA_4A-5A (1)	LTE B4	20	20050	1720	16QAM	1	50	2050	2120	LTE B5	10	2525	881.5	18.94	18.75
CA_4A-12A (4)	LTE B4	20	20050	1720	16QAM	1	50	2050	2120	LTE B12	10	5095	737.5	18.83	18.75
CA_4A-13A	LTE B4	20	20050	1720	16QAM	1	50	2050	2120	LTE B13	10	5230	751	18.95	18.75
CA_4A-17A	LTE B4	5	20300	1745	64QAM	1	24	2300	2145	LTE B17	10	5790	740	18.63	18.49

9.4.16 LTE Band 2 Maximum Carrier Aggregation Conducted Powers

Table 9-64
LTE Band 2 Two Component Carrier Aggregation Conducted Powers

	PCC									SCC				Power	
Combination	PCC Band	PCC Bandwidth [MHz]	PCC (UL) Channel	PCC (UL) Frequency [MHz]	Modulation	PCC UL# RB	PCC UL RB Offset	PCC (DL) Channel	PCC (DL) Frequency [MHz]	SCC Band	SCC Bandwidth [MHz]	SCC (DL) Channel	SCC (DL) Frequency [MHz]	LTE Tx.Power with DL CA Enabled (dBm)	LTE Single Carrier Tx Power (dBm)
CA_2C	LTE B2	20	18925	1882.5	QPSK	1	0	925	1962.5	LTE B2	20	727	1942.7	23.66	23.64
CA_2A-4A (2)	LTE B2	20	18925	1882.5	QPSK	1	0	925	1962.5	LTE B4	20	2175	2132.5	23.68	23.64
CA_2A-5A	LTE B2	20	18925	1882.5	QPSK	1	0	925	1962.5	LTE B5	10	2525	881.5	23.69	23.64
CA_2A-12A	LTE B2	20	18925	1882.5	QPSK	1	0	925	1962.5	LTE B12	10	5095	737.5	23.67	23.64
CA_2A-13A	LTE B2	20	18925	1882.5	QPSK	1	0	925	1962.5	LTE B13	10	5230	751	23.64	23.64
CA_2A-17A	LTE B2	10	18925	1882.5	QPSK	1	0	925	1962.5	LTE B17	10	5790	740	23.63	23.54

9.4.17 LTE Band 2 Reduced Carrier Aggregation Conducted Powers

Table 9-65
LTE Band 2 Two Component Carrier Aggregation Conducted Powers

	PCC									SCC				Power	
Combination	PCC Band	PCC Bandwidth [MHz]	PCC (UL) Channel	PCC (UL) Frequency [MHz]	Modulation	PCC UL# RB	PCC UL RB Offset	PCC (DL) Channel	PCC (DL) Frequency [MHz]	SCC Band	SCC Bandwidth [MHz]	SCC (DL) Channel	SCC (DL) Frequency [MHz]	LTE Tx.Power with DL CA Enabled (dBm)	LTE Single Carrier Tx Power (dBm)
CA_2C	LTE B2	20	18925	1882.5	64QAM	1	0	925	1962.5	LTE B2	20	727	1942.7	18.74	18.79
CA_2A-4A (2)	LTE B2	20	18925	1882.5	64QAM	1	0	925	1962.5	LTE B4	20	2175	2132.5	18.83	18.79
CA_2A-5A	LTE B2	20	18925	1882.5	64QAM	1	0	925	1962.5	LTE B5	10	2525	881.5	18.98	18.79
CA_2A-12A	LTE B2	20	18925	1882.5	64QAM	1	0	925	1962.5	LTE B12	10	5095	737.5	19.00	18.79
CA_2A-13A	LTE B2	20	18925	1882.5	64QAM	1	0	925	1962.5	LTE B13	10	5230	751	18.98	18.79
CA_2A-17A	LTE B2	10	18650	1855	16QAM	1	0	650	1935	LTE B17	10	5790	740	18.94	18.78

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9.4.18 LTE Band 41 Maximum Carrier Aggregation Conducted Powers

Table 9-66
LTE Band 41 Two Component Carrier Aggregation Conducted Powers

	PCC									SCC				Power	
Combination	PCC Band	PCC Bandwidth [MHz]	PCC (UL) Channel	PCC (UL) Frequency [MHz]	Modulation	PCC UL# RB	PCC UL RB Offset	PCC (DL) Channel	PCC (DL) Frequency [MHz]	SCC Band	SCC Bandwidth [MHz]	SCC (DL) Channel	SCC (DL) Frequency [MHz]	LTE Tx.Power with DL CA Enabled (dBm)	LTE Single Carrier Tx Power (dBm)
CA_41A-41A (1)	LTE B41	20	40620	2593	QPSK	1	0	40620	2593	LTE B41	20	39750	2506	24.00	24.22

Table 9-67
LTE Band 41 Three Component Carrier Aggregation Conducted Powers

	PCC									SCC 1				SCC 2				Power	
Combination	PCC Band	PCC Bandwidth [MHz]	PCC (UL) Channel	PCC (UL) Frequency [MHz]	Modulation	PCC UL# RB	PCC UL RB Offset	PCC (DL) Channel	PCC (DL) Frequency [MHz]	SCC Band	SCC Bandwidth [MHz]	SCC (DL) Channel	SCC (DL) Frequency [MHz]	SCC Band	SCC Bandwidth [MHz]	SCC (DL) Channel	SCC (DL) Frequency [MHz]	LTE Tx.Power with DL CA Enabled (dBm)	LTE Single Carrier Tx Power (dBm)
CA_41D	LTE B41	20	40620	2593	QPSK	1	0	40620	2593	LTE B41	20	40422	2573.2	LTE B41	20	40818	2612.8	24.25	24.22
CA_41A-41C	LTE B41	20	40620	2593	QPSK	1	0	40620	2593	LTE B41	20	41292	2660.2	LTE B41	20	41490	2680	24.21	24.22
CA_41C-41A	LTE B41	20	40620	2593	QPSK	1	0	40620	2593	LTE B41	20	40818	2612.8	LTE B41	20	39750	2506	24.20	24.22

Table 9-68
LTE Band 41 Four Component Carrier Aggregation Conducted Powers

	PCC									SCC 1				SCC 2				SCC 3				Power	
Combination	PCC Band	PCC BW [MHz]	PCC (UL) Channel	PCC (UL) Freq. [MHz]	Modulation	PCC UL# RB	PCC UL RB Offset	PCC (DL) Channel	PCC (DL) Freq. [MHz]	SCC Band	SCC BW [MHz]	SCC (DL) Channel	SCC (DL) Freq. [MHz]	SCC Band	SCC BW [MHz]	SCC (DL) Channel	SCC (DL) Freq. [MHz]	SCC Band	SCC BW [MHz]	SCC (DL) Channel	SCC (DL) Freq. [MHz]	LTE Tx.Power with DL CA Enabled (dBm)	LTE Single Carrier Tx Power (dBm)
CA_41E	LTE B41	20	40620	2593	QPSK	1	0	40620	2593	LTE B41	20	40422	2573.2	LTE B41	20	40224	2553.4	LTE B41	20	40026	2533.6	24.03	24.22
CA_41C-41C	LTE B41	20	40620	2593	QPSK	1	0	40620	2593	LTE B41	20	40422	2573.2	LTE B41	20	41292	2660.2	LTE B41	20	41490	2680	24.01	24.22

9.4.19 LTE Band 41 Reduced Carrier Aggregation Conducted Powers

Table 9-69
LTE Band 41 Two Component Carrier Aggregation Conducted Powers

	PCC									SCC				Power	
Combination	PCC Band	PCC Bandwidth [MHz]	PCC (UL) Channel	PCC (UL) Frequency [MHz]	Modulation	PCC UL# RB	PCC UL RB Offset	PCC (DL) Channel	PCC (DL) Frequency [MHz]	SCC Band	SCC Bandwidth [MHz]	SCC (DL) Channel	SCC (DL) Frequency [MHz]	LTE Tx.Power with DL CA Enabled (dBm)	LTE Single Carrier Tx Power (dBm)
CA_41A-41A (1)	LTE B41	20	41490	2680	16QAM	50	0	41490	2680	LTE B41	20	39750	2506	21.03	21.07

Table 9-70
LTE Band 41 Three Component Carrier Aggregation Conducted Powers

	PCC									SCC 1				SCC 2				Power	
Combination	PCC Band	PCC Bandwidth [MHz]	PCC (UL) Channel	PCC (UL) Frequency [MHz]	Modulation	PCC UL# RB	PCC UL RB Offset	PCC (DL) Channel	PCC (DL) Frequency [MHz]	SCC Band	SCC Bandwidth [MHz]	SCC (DL) Channel	SCC (DL) Frequency [MHz]	SCC Band	SCC Bandwidth [MHz]	SCC (DL) Channel	SCC (DL) Frequency [MHz]	LTE Tx.Power with DL CA Enabled (dBm)	LTE Single Carrier Tx Power (dBm)
CA_41D	LTE B41	20	41490	2680	16QAM	50	0	41490	2680	LTE B41	20	41292	2660.2	LTE B41	20	41094	2640.4	21.03	21.07
CA_41A-41C	LTE B41	20	41490	2680	16QAM	50	0	41490	2680	LTE B41	20	39948	2525.8	LTE B41	20	39750	2506	21.04	21.07
CA_41C-41A	LTE B41	20	41490	2680	16QAM	50	0	41490	2680	LTE B41	20	41292	2660.2	LTE B41	20	39750	2506	21.04	21.07

Table 9-71
LTE Band 41 Four Component Carrier Aggregation Conducted Powers

	PCC									SCC 1				SCC 2				SCC 3				Power	
Combination	PCC Band	PCC BW [MHz]	PCC (UL) Channel	PCC (UL) Freq. [MHz]	Modulation	PCC UL# RB	PCC UL RB Offset	PCC (DL) Channel	PCC (DL) Freq. [MHz]	SCC Band	SCC BW [MHz]	SCC (DL) Channel	SCC (DL) Freq. [MHz]	SCC Band	SCC BW [MHz]	SCC (DL) Channel	SCC (DL) Freq. [MHz]	SCC Band	SCC BW [MHz]	SCC (DL) Channel	SCC (DL) Freq. [MHz]	LTE Tx.Power with DL CA Enabled (dBm)	LTE Single Carrier Tx Power (dBm)
CA_41E	LTE B41	20	41490	2680	16QAM	50	0	41490	2680	LTE B41	20	41292	2660.2	LTE B41	20	41094	2640.4	LTE B41	20	40896	2620.6	20.94	21.07
CA_41C-41C	LTE B41	20	41490	2680	16QAM	50	0	41490	2680	LTE B41	20	41292	2660.2	LTE B41	20	39948	2525.8	LTE B41	20	39750	2506	21.06	21.07

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Notes:

1. For every supported combination of downlink carrier aggregation, power measurements were performed with the downlink carrier aggregation active for the configuration with highest measured maximum conducted power with downlink carrier aggregation inactive measured among the channel bandwidth, modulation, and RB combinations in each frequency band.
2. All control and acknowledge data is sent on uplink channels that operate identical to specifications when downlink carrier aggregation is inactive.
3. For downlink carrier aggregation combinations, PCC uplink channel was selected based on section C)3)b)ii) of KBD 941225 D05 V01r02. The downlink PCC channel was paired with the selected PCC uplink channel according to normal configurations without carrier aggregation. For inter-band CA, the SCC downlink channels were selected near the middle of their transmission bands. For contiguous intra-band CA, the downlink channel spacing between the component carriers was set to multiple of 300 kHz less than the nominal channel spacing defined in section 5.4.1A of 3GPP TS 36.521. For non-contiguous intra-band CA, the downlink channel spacing between the component carriers was set to be larger than the nominal channel spacing and provided maximum separation between the component carriers. All selected downlink channels remained fully within the downlink transmission band of the respective component carrier.
4. This device supports LTE capabilities with overlapping transmission frequency ranges. When the supported frequency range of an LTE Band falls completely within an LTE band with a larger transmission frequency range, both LTE bands have the same target power (or the band with the larger transmission frequency range has a higher target power), and both LTE bands share the same transmission path and signal characteristics, SAR was only assessed for the band with the larger transmission frequency range.

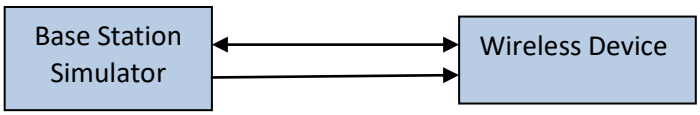


Figure 9-4
Power Measurement Setup

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9.4.20 LTE Uplink Maximum Carrier Aggregation Conducted Powers

Table 9-72
LTE Uplink Two Component Carrier Aggregation Conducted Powers

	PCC							SCC							Power	
Combination	PCC Band	PCC Bandwidth [MHz]	PCC (UL/DL) Channel	PCC (UL/DL) Frequency [MHz]	Modulation	PCC UL# RB	PCC UL RB Offset	SCC Band	SCC Bandwidth [MHz]	SCC (UL/DL) Channel	SCC (UL/DL) Frequency [MHz]	Modulation	SCC UL# RB	SCC UL RB Offset	LTE Tx.Power with UL CA Enabled (dBm)	LTE Single Carrier Tx Power (dBm)
CA_41C	LTE B41	20	40620	2593.0	QPSK	1	0	LTE B41	20	40422	2573.2	QPSK	1	99	23.98	24.22

9.4.21 LTE Uplink Reduced Carrier Aggregation Conducted Powers

Table 9-73
LTE Uplink Two Component Carrier Aggregation Conducted Powers

	PCC							SCC							Power	
Combination	PCC Band	PCC Bandwidth [MHz]	PCC (UL/DL) Channel	PCC (UL/DL) Frequency [MHz]	Modulation	PCC UL# RB	PCC UL RB Offset	SCC Band	SCC Bandwidth [MHz]	SCC (UL/DL) Channel	SCC (UL/DL) Frequency [MHz]	Modulation	SCC UL# RB	SCC UL RB Offset	LTE Tx.Power with UL CA Enabled (dBm)	LTE Single Carrier Tx Power (dBm)
CA_41C	LTE B41	20	41490	2680.0	QPSK	1	0	LTE B41	20	41292	2660.2	QPSK	1	99	21.00	20.96

Notes:

1. This device supports uplink carrier aggregation for LTE CA_41C with a maximum of two 20 MHz component carriers. For intraband contiguous carrier aggregation scenarios, 3GPP 36.101 Table 6.2.2A-1 specifies that the aggregate maximum allowed output power is equivalent to the single carrier scenario. 3GPP 36.101 6.2.3A allows for several dB of MPR to be applied when non-contiguous RB allocation is implemented. The conducted powers and MPR settings in this device are permanently implemented per the above 3GPP requirements.
2. Per FCC Guidance, the output power with uplink CA active was measured for the configuration with the highest reported SAR with single carrier for each exposure condition. The power was measured with wideband signal integration over both component carriers.



Figure 9-5
Power Measurement Setup

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9.5 WLAN Conducted Powers

Table 9-74
2.4 GHz WLAN Maximum Average RF Power – Ant 1

2.4GHz Conducted Power [dBm]				
Freq [MHz]	Channel	IEEE Transmission Mode		
		802.11b	802.11g	802.11n
		Average	Average	Average
2412	1	19.58	17.48	17.26
2437	6	19.62	17.48	17.36
2462	11	**20.22**	17.12	17.09

Table 9-75
2.4 GHz WLAN Maximum Average RF Power – Ant 2

2.4GHz Conducted Power [dBm]				
Freq [MHz]	Channel	IEEE Transmission Mode		
		802.11b	802.11g	802.11n
		Average	Average	Average
2412	1	**20.19**	17.34	17.09
2437	6	20.16	17.31	17.05
2462	11	19.76	16.91	17.05

Table 9-76
5 GHz WLAN Maximum Average RF Power – Ant 1

5GHz (80MHz) Conducted Power [dBm]		
Freq [MHz]	Channel	IEEE Transmission Mode
		802.11ac
		Average
5210	42	16.92
5290	58	**16.90**
5530	106	15.94
5610	122	**16.85**
5690	138	16.55
5775	155	**16.81**

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Table 9-77
5 GHz WLAN Maximum Average RF Power – Ant 2

5GHz (80MHz) Conducted Power [dBm]		
Freq [MHz]	Channel	IEEE Transmission Mode
		802.11ac
		Average
5210	42	16.58
5290	58	**16.63**
5530	106	15.19
5610	122	**16.76**
5690	138	16.60
5775	155	**16.65**

Table 9-78
5 GHz WLAN Maximum Average RF Power – MIMO

5GHz (40MHz) 802.11n Conducted Power [dBm]				
Freq [MHz]	Channel	ANT1	ANT2	MIMO
5190	38	15.50	15.39	18.46
5230	46	16.97	16.67	19.83
5270	54	**16.73**	**16.68**	**19.72**
5310	62	14.72	14.46	17.60
5510	102	15.57	15.54	18.57
5590	118	16.52	16.54	19.54
5630	126	16.86	17.40	20.15
5710	142	16.57	17.19	19.90
5755	151	14.86	15.30	18.10
5795	159	14.80	15.19	18.01
5GHz (80MHz) 802.11ac Conducted Power [dBm]				
Freq [MHz]	Channel	ANT1	ANT2	MIMO
5210	42	14.50	14.25	17.39
5290	58	14.49	14.28	17.40
5530	106	15.00	14.30	17.67
5610	122	**16.85**	**16.76**	**19.82**
5690	138	16.55	16.60	19.59
5775	155	**14.76**	**15.12**	**17.95**

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Table 9-79
2.4 GHz WLAN Reduced Average RF Power (Held-to-Ear) – Ant 1

2.4GHz Conducted Power [dBm]				
Freq [MHz]	Channel	IEEE Transmission Mode		
		802.11b	802.11g	802.11n
		Average	Average	Average
2412	1	15.07	15.35	15.31
2437	6	14.80	15.15	15.05
2462	11	**15.27**	15.35	15.21

Table 9-80
2.4 GHz WLAN Reduced Average RF Power (Held-to-Ear) – Ant 2

2.4GHz Conducted Power [dBm]				
Freq [MHz]	Channel	IEEE Transmission Mode		
		802.11b	802.11g	802.11n
		Average	Average	Average
2412	1	**14.90**	14.63	14.38
2437	6	14.69	14.88	14.86
2462	11	14.60	15.36	15.12

Table 9-81
5 GHz WLAN Reduced Average RF Power (Held-to-Ear) – Ant 1

5GHz (80MHz) Conducted Power [dBm]		
Freq [MHz]	Channel	IEEE Transmission Mode
		802.11ac
		Average
5210	42	12.79
5290	58	**13.21**
5530	106	12.80
5610	122	12.75
5690	138	**13.38**
5775	155	**13.07**

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Table 9-82
5 GHz WLAN Reduced Average RF Power (Held-to-Ear) – Ant 2

5GHz (80MHz) Conducted Power [dBm]		
Freq [MHz]	Channel	IEEE Transmission Mode
		802.11ac
		Average
5210	42	12.97
5290	58	**12.81**
5530	106	12.73
5610	122	12.63
5690	138	**13.37**
5775	155	**13.00**

Table 9-83
Reduced Output Powers During Conditions with 2.4 GHz and 5 GHz WLAN (Held-to-Ear)

2.4GHz 802.11n Conducted Power [dBm]				
Freq [MHz]	Channel	ANT1	ANT2	MIMO
2412	1	12.85	12.97	15.92
2437	6	**13.36**	**13.00**	**16.19**
2462	11	12.77	12.70	15.75

DTS MIMO was additionally evaluated at the maximum allowed output power during operations with Simultaneous 2.4 GHz and 5 GHz WLAN.

Table 9-84
Maximum Output Powers During Conditions with 2.4 GHz and 5 GHz WLAN

2.4GHz 802.11n Conducted Power [dBm]				
Freq [MHz]	Channel	ANT1	ANT2	MIMO
2412	1	15.77	16.04	18.92
2437	6	15.96	16.26	19.12
2462	11	**16.13**	**16.27**	**19.21**
5GHz (80MHz) 802.11ac Conducted Power [dBm]				
Freq [MHz]	Channel	ANT1	ANT2	MIMO
5210	42	12.79	12.97	15.89
5290	58	**13.21**	**12.81**	**16.02**
5530	106	12.80	12.73	15.78
5610	122	12.75	12.63	15.70
5690	138	**13.38**	**13.37**	**16.39**
5775	155	**13.07**	**13.00**	**16.05**

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Justification for test configurations for WLAN per KDB Publication 248227 D01v02r02:

- Power measurements were performed for the transmission mode configuration with the highest maximum output power specified for production units.
- For transmission modes with the same maximum output power specification, powers were measured for the largest channel bandwidth, lowest order modulation and lowest data rate.
- For transmission modes with identical maximum specified output power, channel bandwidth, modulation and data rates, power measurements were required for all identical configurations.
- For each transmission mode configuration, powers were measured for the highest and lowest channels; and at the mid-band channel(s) when there were at least 3 channels supported. For configurations with multiple mid-band channels, due to an even number of channels, both channels were measured.
- The bolded data rate and channel above were tested for SAR.

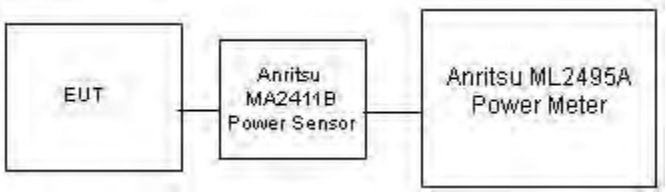


Figure 9-6
Power Measurement Setup for Bandwidths < 50 MHz

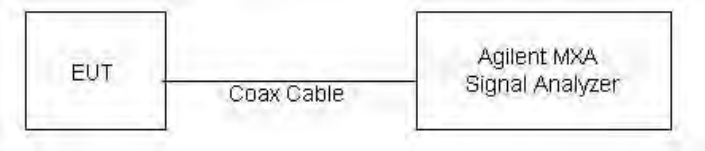


Figure 9-7
Power Measurement Setup for Bandwidths > 50 MHz

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9.6 Bluetooth Conducted Powers

Table 9-85
Bluetooth Average RF Power

Frequency [MHz]	Data Rate [Mbps]	Channel No.	Avg Conducted Power	
			[dBm]	[mW]
2402	1.0	0	**15.04**	31.924
2441	1.0	39	14.63	29.046
2480	1.0	78	13.62	23.004
2402	2.0	0	5.91	3.896
2441	2.0	39	5.75	3.759
2480	2.0	78	4.31	2.699
2402	3.0	0	5.77	3.779
2441	3.0	39	5.88	3.875
2480	3.0	78	4.49	2.809

Note: The bolded data rates and channel above were tested for SAR.

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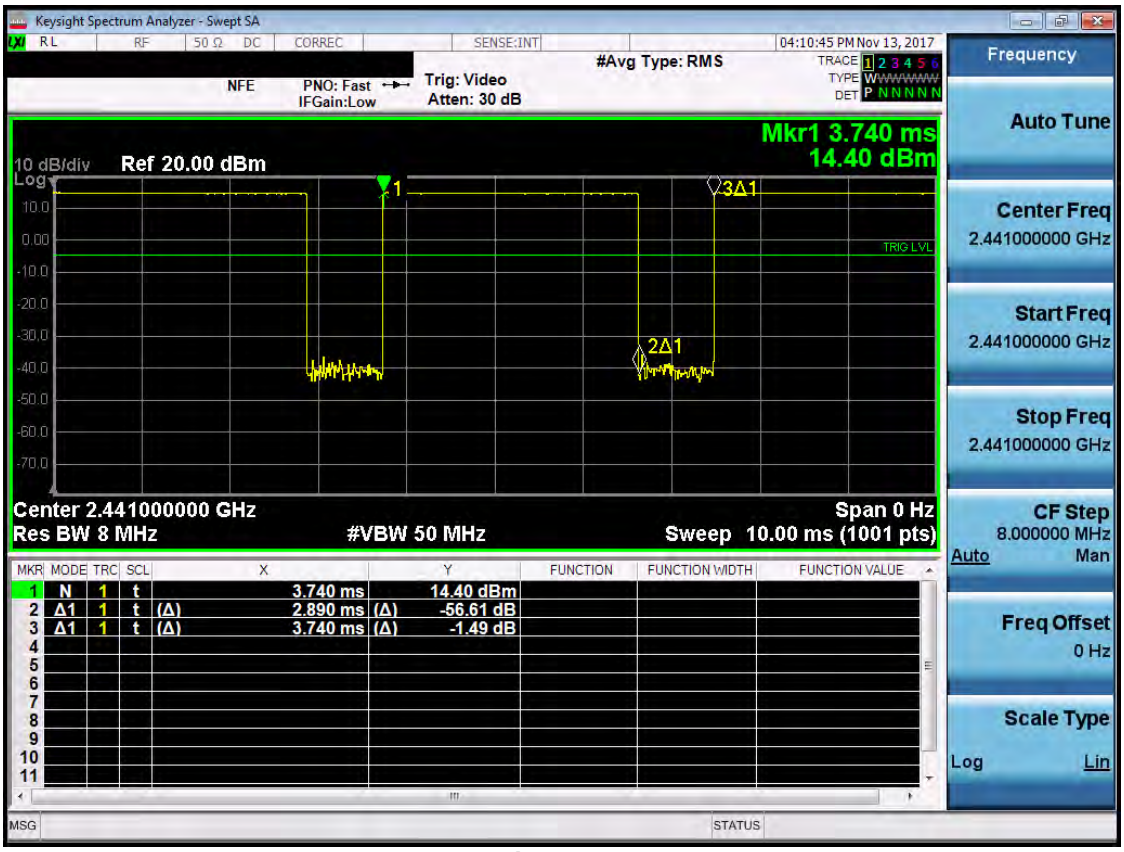


Figure 9-8
Bluetooth Transmission Plot

Equation 9-1
Bluetooth Duty Cycle Calculation

$$\boldsymbol{Duty\ Cycle = \frac{Pulse\ Width}{Period} * 100\% = \frac{2.89ms}{3.74ms} * 100\% = 77.3\%}$$

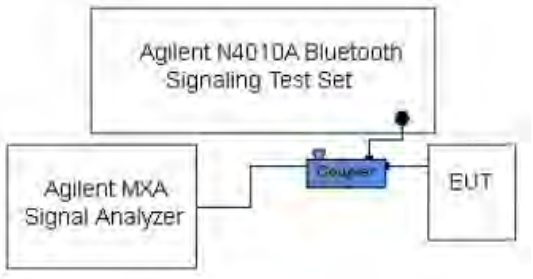


Figure 9-9
Power Measurement Setup

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10 SYSTEM VERIFICATION

10.1 Tissue Verification

Table 10-1
Measured Head Tissue Properties

Calibrated for Tests Performed on:	Tissue Type	Tissue Temp During Calibration (˚C)	Measured Frequency (MHz)	Measured Conductivity, σ (S/m)	Measured Dielectric Constant, ε	TARGET Conductivity, σ (S/m)	TARGET Dielectric Constant, ε	%dev σ	%dev ε
11/20/2017	750H	20.4	700	0.871	42.157	0.889	42.201	-2.02%	-0.10%
			710	0.875	42.127	0.890	42.149	-1.69%	-0.05%
			720	0.878	42.102	0.891	42.097	-1.46%	0.01%
			725	0.880	42.093	0.891	42.071	-1.23%	0.05%
			740	0.886	42.072	0.893	41.994	-0.78%	0.19%
			755	0.891	42.030	0.894	41.916	-0.34%	0.27%
			770	0.895	41.980	0.895	41.838	0.00%	0.34%
			785	0.900	41.936	0.896	41.760	0.45%	0.42%
11/29/2017	835H	21.3	820	0.884	41.140	0.899	41.578	-1.67%	-1.05%
			835	0.898	40.954	0.900	41.500	-0.22%	-1.32%
			850	0.912	40.767	0.916	41.500	-0.44%	-1.77%
11/9/2017	1750H	21.9	1710	1.331	39.387	1.348	40.142	-1.26%	-1.88%
			1750	1.372	39.195	1.371	40.079	0.07%	-2.21%
			1790	1.414	38.998	1.394	40.016	1.43%	-2.54%
11/15/2017	1900H	21.7	1850	1.383	39.844	1.400	40.000	-1.21%	-0.39%
			1880	1.415	39.750	1.400	40.000	1.07%	-0.63%
			1910	1.446	39.637	1.400	40.000	3.29%	-0.91%
11/15/2017	2450H	21.7	2400	1.816	40.833	1.756	39.289	3.42%	3.93%
			2450	1.881	40.678	1.800	39.200	4.50%	3.77%
			2500	1.932	40.481	1.855	39.136	4.15%	3.44%
			2550	1.995	40.280	1.909	39.073	4.50%	3.09%
			2600	2.053	40.115	1.964	39.009	4.53%	2.84%
			2650	2.112	39.902	2.018	38.945	4.66%	2.46%
			2700	2.174	39.724	2.073	38.882	4.87%	2.17%
12/1/2017	2450H	22.6	2400	1.795	38.556	1.756	39.289	2.22%	-1.87%
			2450	1.854	38.387	1.800	39.200	3.00%	-2.07%
			2500	1.908	38.193	1.855	39.136	2.86%	-2.41%
12/04/2017	5200H-5800H	20.7	5240	4.484	34.500	4.696	35.940	-4.51%	-4.01%
			5260	4.506	34.484	4.717	35.917	-4.47%	-3.99%
			5280	4.527	34.433	4.737	35.894	-4.43%	-4.07%
			5300	4.543	34.418	4.758	35.871	-4.52%	-4.05%
			5600	4.840	34.010	5.065	35.529	-4.44%	-4.28%
			5680	4.927	33.912	5.147	35.437	-4.27%	-4.30%
			5700	4.945	33.883	5.168	35.414	-4.32%	-4.32%
			5745	5.001	33.798	5.214	35.363	-4.09%	-4.43%
			5765	5.016	33.805	5.234	35.340	-4.17%	-4.34%
			5785	5.042	33.757	5.255	35.317	-4.05%	-4.42%

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Table 10-2
Measured Body Tissue Properties

Calibrated for Tests Performed on:	Tissue Type	Tissue Temp During Calibration (°C)	Measured Frequency (MHz)	Measured Conductivity, σ (S/m)	Measured Dielectric Constant, ε	TARGET Conductivity, σ (S/m)	TARGET Dielectric Constant, ε	%dev σ	%dev ε
11/19/2017	750B	21.2	700	0.922	55.467	0.959	55.726	-3.86%	-0.46%
			710	0.931	55.368	0.960	55.687	-3.02%	-0.57%
			720	0.940	55.269	0.961	55.648	-2.19%	-0.68%
			725	0.944	55.224	0.961	55.629	-1.77%	-0.73%
			740	0.958	55.086	0.963	55.570	-0.52%	-0.87%
			755	0.972	54.941	0.964	55.512	0.83%	-1.03%
			770	0.986	54.801	0.965	55.453	2.18%	-1.18%
			785	1.001	54.639	0.966	55.395	3.62%	-1.36%
11/15/2017	835B	21.6	820	0.957	52.994	0.969	55.258	-1.24%	-4.10%
			835	0.974	52.846	0.970	55.200	0.41%	-4.26%
			850	0.989	52.697	0.988	55.154	0.10%	-4.45%
11/28/2017	835B	19.4	820	0.980	53.392	0.969	55.258	1.14%	-3.38%
			835	0.994	53.225	0.970	55.200	2.47%	-3.58%
			850	1.009	53.065	0.988	55.154	2.13%	-3.79%
12/1/2017	835B	20.8	820	0.989	54.115	0.969	55.258	2.06%	-2.07%
			835	1.004	53.977	0.970	55.200	3.51%	-2.22%
			850	1.020	53.819	0.988	55.154	3.24%	-2.42%
11/15/2017	1750B	22.3	1710	1.437	51.042	1.463	53.537	-1.78%	-4.66%
			1750	1.483	50.918	1.488	53.432	-0.34%	-4.71%
			1790	1.522	50.739	1.514	53.326	0.53%	-4.85%
11/10/2017	1900B	22.7	1850	1.522	51.902	1.520	53.300	0.13%	-2.62%
			1880	1.556	51.824	1.520	53.300	2.37%	-2.77%
			1910	1.591	51.753	1.520	53.300	4.67%	-2.90%
11/15/2017	1900B	21.9	1850	1.522	53.562	1.520	53.300	0.13%	0.49%
			1880	1.557	53.476	1.520	53.300	2.43%	0.33%
			1910	1.593	53.370	1.520	53.300	4.80%	0.13%
11/29/2017	2450B	22.9	2400	1.962	51.945	1.902	52.767	3.15%	-1.56%
			2450	2.030	51.773	1.950	52.700	4.10%	-1.76%
			2500	2.098	51.595	2.021	52.636	3.81%	-1.98%
12/11/2017	2450B	21.7	2400	1.966	51.932	1.902	52.767	3.36%	-1.58%
			2450	2.035	51.818	1.950	52.700	4.36%	-1.67%
			2500	2.103	51.538	2.021	52.636	4.06%	-2.09%
			2550	2.177	51.343	2.092	52.573	4.06%	-2.34%
			2600	2.244	51.179	2.163	52.509	3.74%	-2.53%
			2650	2.321	50.989	2.234	52.445	3.89%	-2.78%
			2700	2.386	50.758	2.305	52.382	3.51%	-3.10%
12/04/2017	5200B-5800B	21.6	5745	6.134	46.423	5.936	48.275	3.34%	-3.84%
			5765	6.157	46.396	5.959	48.248	3.32%	-3.84%
			5785	6.183	46.348	5.982	48.220	3.36%	-3.88%
12/11/2017	5200B-5800B	21.6	5240	5.462	47.473	5.346	48.960	2.17%	-3.04%
			5260	5.495	47.462	5.369	48.933	2.35%	-3.01%
			5280	5.525	47.434	5.393	48.906	2.45%	-3.01%
			5300	5.547	47.425	5.416	48.879	2.42%	-2.97%
			5520	5.842	47.043	5.673	48.580	2.98%	-3.16%
			5540	5.861	47.002	5.696	48.553	2.90%	-3.19%
			5600	5.939	46.905	5.766	48.471	3.00%	-3.23%
			5620	5.969	46.828	5.790	48.444	3.09%	-3.34%
			5680	6.065	46.783	5.860	48.363	3.50%	-3.27%
			5700	6.084	46.751	5.883	48.336	3.42%	-3.28%
			5745	6.163	46.626	5.936	48.275	3.82%	-3.42%
			5765	6.181	46.616	5.959	48.248	3.73%	-3.38%
			5785	6.213	46.617	5.982	48.220	3.86%	-3.32%

The above measured tissue parameters were used in the DASY software. The DASY software was used to perform interpolation to determine the dielectric parameters at the SAR test device frequencies (per KDB Publication 865664 D01v01r04 and IEEE 1528-2013 6.6.1.2). The tissue parameters listed in the SAR test plots may slightly differ from the table above due to significant digit rounding in the software.

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10.2 Test System Verification

Prior to SAR assessment, the system is verified to ±10% of the SAR measurement on the reference dipole at the time of calibration by the calibration facility. Full system validation status and result summary can be found in Appendix E.

Table 10-3
System Verification Results

System Verification TARGET & MEASURED												
SAR System #	Tissue Frequency (MHz)	Tissue Type	Date:	Amb. Temp (°C)	Liquid Temp (°C)	Input Power (W)	Source SN	Probe SN	Measured SAR_{1g} (W/kg)	1 W Target SAR_{1g} (W/kg)	1 W Normalized SAR_{1g} (W/kg)	$Deviation_{1g}$ (%)
D	750	HEAD	11/20/2017	21.6	20.2	0.200	1054	3318	1.650	8.370	8.250	-1.43%
K	835	HEAD	11/29/2017	22.0	21.3	0.200	4d133	7406	1.920	9.520	9.600	0.84%
H	1750	HEAD	11/09/2017	24.2	22.0	0.100	1148	7410	3.530	36.400	35.300	-3.02%
H	1900	HEAD	11/15/2017	23.6	21.0	0.100	5d148	7410	3.840	40.200	38.400	-4.48%
E	2450	HEAD	11/15/2017	22.5	21.7	0.100	981	3319	5.190	52.800	51.900	-1.70%
E	2450	HEAD	12/01/2017	23.1	22.6	0.100	981	3319	5.420	52.800	54.200	2.65%
E	2600	HEAD	11/15/2017	22.5	21.7	0.100	1126	3319	5.900	56.400	59.000	4.61%
H	5250	HEAD	12/04/2017	22.0	20.7	0.050	1057	3914	3.770	81.600	75.400	-7.60%
H	5600	HEAD	12/04/2017	22.0	20.7	0.050	1057	3914	4.080	83.700	81.600	-2.51%
H	5750	HEAD	12/04/2017	22.0	20.7	0.050	1057	3914	3.790	80.000	75.800	-5.25%
G	750	BODY	11/19/2017	22.2	20.2	0.200	1161	3332	1.710	8.430	8.550	1.42%
J	835	BODY	11/15/2017	24.1	21.5	0.200	4d133	3209	1.960	9.410	9.800	4.14%
H	835	BODY	11/28/2017	22.1	19.7	0.200	4d047	7410	2.020	9.570	10.100	5.54%
H	835	BODY	12/01/2017	22.6	20.8	0.200	4d133	7410	2.060	9.410	10.300	9.46%
K	1750	BODY	11/15/2017	23.3	22.3	0.100	1148	7406	3.820	37.000	38.200	3.24%
J	1900	BODY	11/10/2017	23.5	22.1	0.100	5d148	3209	4.070	40.900	40.700	-0.49%
J	1900	BODY	11/15/2017	21.5	21.9	0.100	5d148	3209	3.960	40.900	39.600	-3.18%
I	2450	BODY	11/29/2017	22.0	20.9	0.100	719	3213	5.360	50.100	53.600	6.99%
E	2450	BODY	12/11/2017	20.3	21.7	0.100	719	3319	5.210	50.100	52.100	3.99%
E	2600	BODY	12/11/2017	20.3	21.7	0.100	1064	3319	5.630	54.700	56.300	2.93%
D	5250	BODY	12/11/2017	21.4	20.6	0.050	1237	7308	3.570	76.900	71.400	-7.15%
D	5600	BODY	12/11/2017	21.4	20.6	0.050	1237	7308	3.950	78.500	79.000	0.64%
D	5750	BODY	12/04/2017	22.3	20.4	0.050	1237	7308	3.670	77.100	73.400	-4.80%
D	5750	BODY	12/11/2017	21.4	20.6	0.050	1237	7308	3.680	77.100	73.600	-4.54%

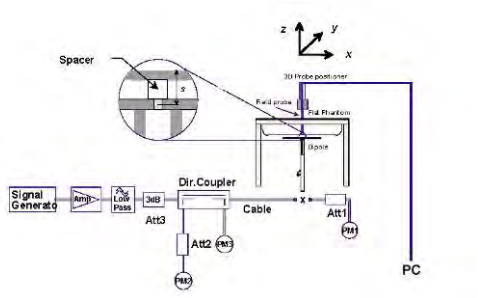


Figure 10-1
System Verification Setup Diagram



Figure 10-2
System Verification Setup Photo

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11 SAR DATA SUMMARY

11.1 Standalone Head SAR Data

Table 11-1
Cell. CDMA Head SAR

MEASUREMENT RESULTS														
FREQUENCY		Mode/Band	Service	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Power Drift [dB]	Side	Test Position	Device Serial Number	Duty Cycle	SAR (1g)	Scaling Factor	Reported SAR (1g)	Plot #
MHz	Ch.										(W/kg)		(W/kg)	
836.52	384	Cell. CDMA	RC3 / SO55	26.0	25.30	-0.19	Right	Cheek	5E0CA	1:1	0.323	1.175	**0.380**	A1
836.52	384	Cell. CDMA	RC3 / SO55	26.0	25.30	0.11	Right	Tilt	5E0CA	1:1	0.148	1.175	0.174	
836.52	384	Cell. CDMA	RC3 / SO55	26.0	25.30	-0.05	Left	Cheek	5E0CA	1:1	0.244	1.175	0.287	
836.52	384	Cell. CDMA	RC3 / SO55	26.0	25.30	0.07	Left	Tilt	5E0CA	1:1	0.138	1.175	0.162	
836.52	384	Cell. CDMA	EVDO Rev. A	26.0	25.69	0.15	Right	Cheek	5E0CA	1:1	0.313	1.074	0.336	
836.52	384	Cell. CDMA	EVDO Rev. A	26.0	25.69	-0.16	Right	Tilt	5E0CA	1:1	0.108	1.074	0.116	
836.52	384	Cell. CDMA	EVDO Rev. A	26.0	25.69	0.13	Left	Cheek	5E0CA	1:1	0.224	1.074	0.241	
836.52	384	Cell. CDMA	EVDO Rev. A	26.0	25.69	0.16	Left	Tilt	5E0CA	1:1	0.149	1.074	0.160	
ANSI / IEEE C95.1 1992 - SAFETY LIMIT **Spatial Peak** **Uncontrolled Exposure/General Population**							**Head** **1.6 W/kg (mW/g)** averaged over 1 gram							

Table 11-2
GSM 850 Head SAR

MEASUREMENT RESULTS														
FREQUENCY		Mode/Band	Service	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Power Drift [dB]	Side	Test Position	Device Serial Number	Duty Cycle	SAR (1g)	Scaling Factor	Reported SAR (1g)	Plot #
MHz	Ch.										(W/kg)		(W/kg)	
836.60	190	GSM 850	GSM	33.5	32.62	0.06	Right	Cheek	21B02	1:8.3	0.202	1.225	0.247	A2
836.60	190	GSM 850	GSM	33.5	32.62	0.06	Right	Tilt	21B02	1:8.3	0.097	1.225	0.119	
836.60	190	GSM 850	GSM	33.5	32.62	-0.06	Left	Cheek	21B02	1:8.3	0.163	1.225	0.200	
836.60	190	GSM 850	GSM	33.5	32.62	0.08	Left	Tilt	21B02	1:8.3	0.097	1.225	0.119	
ANSI / IEEE C95.1 1992 - SAFETY LIMIT **Spatial Peak** **Uncontrolled Exposure/General Population**							**Head** **1.6 W/kg (mW/g)** averaged over 1 gram							

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Table 11-3
GSM 1900 Head SAR

MEASUREMENT RESULTS														
FREQUENCY		Mode/Band	Service	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Power Drift [dB]	Side	Test Position	Device Serial Number	Duty Cycle	SAR (1g)	Scaling Factor	Reported SAR (1g)	Plot #
MHz	Ch.										(W/kg)		(W/kg)	
1880.00	661	GSM 1900	GSM	30.5	29.54	0.13	Right	Cheek	21B04	1:8.3	0.044	1.247	0.055	
1880.00	661	GSM 1900	GSM	30.5	29.54	0.13	Right	Tilt	21B04	1:8.3	0.021	1.247	0.026	
1880.00	661	GSM 1900	GSM	30.5	29.54	0.17	Left	Cheek	21B04	1:8.3	0.063	1.247	0.079	A3
1880.00	661	GSM 1900	GSM	30.5	29.54	0.17	Left	Tilt	21B04	1:8.3	0.013	1.247	0.016	
ANSI / IEEE C95.1 1992 - SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population							Head 1.6 W/kg (mW/g) averaged over 1 gram							

Table 11-4
UMTS 850 Head SAR

MEASUREMENT RESULTS														
FREQUENCY		Mode/Band	Service	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Power Drift [dB]	Side	Test Position	Device Serial Number	Duty Cycle	SAR (1g)	Scaling Factor	Reported SAR (1g)	Plot #
MHz	Ch.										(W/kg)		(W/kg)	
836.60	4183	UMTS 850	RMC	24.0	23.96	0.03	Right	Cheek	21B5A	1:1	0.229	1.009	0.231	A4
836.60	4183	UMTS 850	RMC	24.0	23.96	0.11	Right	Tilt	21B5A	1:1	0.107	1.009	0.108	
836.60	4183	UMTS 850	RMC	24.0	23.96	0.10	Left	Cheek	21B5A	1:1	0.176	1.009	0.178	
836.60	4183	UMTS 850	RMC	24.0	23.96	0.12	Left	Tilt	21B5A	1:1	0.113	1.009	0.114	
ANSI / IEEE C95.1 1992 - SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population							Head 1.6 W/kg (mW/g) averaged over 1 gram							

Table 11-5
UMTS 1750 Head SAR

MEASUREMENT RESULTS														
FREQUENCY		Mode/Band	Service	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Power Drift [dB]	Side	Test Position	Device Serial Number	Duty Cycle	SAR (1g)	Scaling Factor	Reported SAR (1g)	Plot #
MHz	Ch.										(W/kg)		(W/kg)	
1732.40	1412	UMTS 1750	RMC	23.5	23.40	0.05	Right	Cheek	21B04	1:1	0.120	1.023	0.123	
1732.40	1412	UMTS 1750	RMC	23.5	23.40	0.03	Right	Tilt	21B04	1:1	0.069	1.023	0.071	
1732.40	1412	UMTS 1750	RMC	23.5	23.40	0.00	Left	Cheek	21B04	1:1	0.177	1.023	0.181	A5
1732.40	1412	UMTS 1750	RMC	23.5	23.40	0.12	Left	Tilt	21B04	1:1	0.084	1.023	0.086	
ANSI / IEEE C95.1 1992 - SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population							Head 1.6 W/kg (mW/g) averaged over 1 gram							

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Table 11-6
UMTS 1900 Head SAR

MEASUREMENT RESULTS														
FREQUENCY		Mode/Band	Service	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Power Drift [dB]	Side	Test Position	Device Serial Number	Duty Cycle	SAR (1g)	Scaling Factor	Reported SAR (1g)	Plot #
MHz	Ch.										(W/kg)		(W/kg)	
1880.00	9400	UMTS 1900	RMC	23.5	23.50	0.04	Right	Cheek	21B04	1:1	0.094	1.000	0.094	
1880.00	9400	UMTS 1900	RMC	23.5	23.50	0.04	Right	Tilt	21B04	1:1	0.048	1.000	0.048	
1880.00	9400	UMTS 1900	RMC	23.5	23.50	0.06	Left	Cheek	21B04	1:1	0.149	1.000	0.149	A6
1880.00	9400	UMTS 1900	RMC	23.5	23.50	0.12	Left	Tilt	21B04	1:1	0.030	1.000	0.030	
ANSI / IEEE C95.1 1992 - SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population							Head 1.6 W/kg (mW/g) averaged over 1 gram							

Table 11-7
LTE Band 12 Head SAR

MEASUREMENT RESULTS																				
FREQUENCY			Mode	Bandwidth [MHz]	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Power Drift [dB]	MPR [dB]	Side	Test Position	Modulation	RB Size	RB Offset	Device Serial Number	Duty Cycle	SAR (1g)	Scaling Factor	Reported SAR (1g)	Plot #
MHz	Ch.															(W/kg)		(W/kg)	
707.50	23095	Mid	LTE Band 12	10	24.0	23.06	0.09	0	Right	Cheek	QPSK	1	25	21AD3	1:1	0.092	1.242	0.114	
707.50	23095	Mid	LTE Band 12	10	23.0	22.13	0.06	1	Right	Cheek	QPSK	25	12	21AD3	1:1	0.074	1.222	0.090	
707.50	23095	Mid	LTE Band 12	10	24.0	23.06	0.02	0	Right	Tilt	QPSK	1	25	21AD3	1:1	0.068	1.242	0.084	
707.50	23095	Mid	LTE Band 12	10	23.0	22.13	0.04	1	Right	Tilt	QPSK	25	12	21AD3	1:1	0.057	1.222	0.070	
707.50	23095	Mid	LTE Band 12	10	24.0	23.06	0.07	0	Left	Cheek	QPSK	1	25	21AD3	1:1	0.088	1.242	0.109	
707.50	23095	Mid	LTE Band 12	10	23.0	22.13	0.09	1	Left	Cheek	QPSK	25	12	21AD3	1:1	0.069	1.222	0.084	
707.50	23095	Mid	LTE Band 12	10	24.0	23.06	0.12	0	Left	Tilt	QPSK	1	25	21AD3	1:1	0.092	1.242	0.114	A7
707.50	23095	Mid	LTE Band 12	10	23.0	22.13	0.02	1	Left	Tilt	QPSK	25	12	21AD3	1:1	0.074	1.222	0.090	
ANSI / IEEE C95.1 1992 - SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population									Head 1.6 W/kg (mW/g) averaged over 1 gram										

Table 11-8
LTE Band 13 Head SAR

MEASUREMENT RESULTS																			
FREQUENCY			Mode	Bandwidth [MHz]	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Power Drift [dB]	MPR [dB]	Side	Test Position	Modulation	RB Size	RB Offset	Device Serial Number	Duty Cycle	SAR (1g)	Scaling Factor	Reported SAR (1g)	Plot #
MHz	Ch.															(W/kg)		(W/kg)	
782.00	23230	Mid	LTE Band 13	10	24.0	23.15	0.04	0	Right	Cheek	QPSK	1	25	21AD3	1:1	0.169	1.216	0.206	A8
782.00	23230	Mid	LTE Band 13	10	23.0	22.30	0.03	1	Right	Cheek	QPSK	25	0	21AD3	1:1	0.129	1.175	0.152	
782.00	23230	Mid	LTE Band 13	10	24.0	23.15	0.10	0	Right	Tilt	QPSK	1	25	21AD3	1:1	0.074	1.216	0.090	
782.00	23230	Mid	LTE Band 13	10	23.0	22.30	0.02	1	Right	Tilt	QPSK	25	0	21AD3	1:1	0.054	1.175	0.063	
782.00	23230	Mid	LTE Band 13	10	24.0	23.15	0.05	0	Left	Cheek	QPSK	1	25	21AD3	1:1	0.145	1.216	0.176	
782.00	23230	Mid	LTE Band 13	10	23.0	22.30	0.03	1	Left	Cheek	QPSK	25	0	21AD3	1:1	0.111	1.175	0.130	
782.00	23230	Mid	LTE Band 13	10	24.0	23.15	0.08	0	Left	Tilt	QPSK	1	25	21AD3	1:1	0.071	1.216	0.086	
782.00	23230	Mid	LTE Band 13	10	23.0	22.30	-0.02	1	Left	Tilt	QPSK	25	0	21AD3	1:1	0.055	1.175	0.065	
ANSI / IEEE C95.1 1992 - SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population									Head 1.6 W/kg (mW/g) averaged over 1 gram										

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Table 11-9
LTE Band 26 (Cell) Head SAR

MEASUREMENT RESULTS																				
FREQUENCY			Mode	Bandwidth [MHz]	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Power Drift [dB]	MPR [dB]	Side	Test Position	Modulation	RB Size	RB Offset	Device Serial Number	Duty Cycle	SAR (1g)	Scaling Factor	Reported SAR (1g)	Plot #
MHz	Ch.															(W/kg)		(W/kg)	
831.50	26865	Mid	LTE Band 26 (Cell)	15	24.0	23.50	0.10	0	Right	Cheek	QPSK	1	0	21AEE	1:1	0.192	1.122	0.215	A9
831.50	26865	Mid	LTE Band 26 (Cell)	15	23.0	22.53	0.10	1	Right	Cheek	QPSK	36	0	21AEE	1:1	0.149	1.114	0.166	
831.50	26865	Mid	LTE Band 26 (Cell)	15	24.0	23.50	-0.20	0	Right	Tilt	QPSK	1	0	21AEE	1:1	0.085	1.122	0.095	
831.50	26865	Mid	LTE Band 26 (Cell)	15	23.0	22.53	-0.07	1	Right	Tilt	QPSK	36	0	21AEE	1:1	0.061	1.114	0.068	
831.50	26865	Mid	LTE Band 26 (Cell)	15	24.0	23.50	0.05	0	Left	Cheek	QPSK	1	0	21AEE	1:1	0.138	1.122	0.155	
831.50	26865	Mid	LTE Band 26 (Cell)	15	23.0	22.53	0.11	1	Left	Cheek	QPSK	36	0	21AEE	1:1	0.112	1.114	0.125	
831.50	26865	Mid	LTE Band 26 (Cell)	15	24.0	23.50	0.10	0	Left	Tilt	QPSK	1	0	21AEE	1:1	0.100	1.122	0.112	
831.50	26865	Mid	LTE Band 26 (Cell)	15	23.0	22.53	0.14	1	Left	Tilt	QPSK	36	0	21AEE	1:1	0.075	1.114	0.084	
ANSI / IEEE C95.1 1992 - SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population									Head 1.6 W/kg (mW/g) averaged over 1 gram										

Table 11-10
LTE Band 5 (Cell) Head SAR

MEASUREMENT RESULTS																				
FREQUENCY			Mode	Bandwidth [MHz]	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Power Drift [dB]	MPR [dB]	Side	Test Position	Modulation	RB Size	RB Offset	Device Serial Number	Duty Cycle	SAR (1g)	Scaling Factor	Reported SAR (1g)	Plot #
MHz	Ch.															(W/kg)		(W/kg)	
836.50	20525	Mid	LTE Band 5 (Cell)	10	24.5	23.45	0.07	0	Right	Cheek	QPSK	1	25	21B5A	1:1	0.210	1.274	0.268	A10
836.50	20525	Mid	LTE Band 5 (Cell)	10	23.5	22.54	0.16	1	Right	Cheek	QPSK	25	0	21B5A	1:1	0.169	1.247	0.211	
836.50	20525	Mid	LTE Band 5 (Cell)	10	24.5	23.45	0.07	0	Right	Tilt	QPSK	1	25	21B5A	1:1	0.066	1.274	0.084	
836.50	20525	Mid	LTE Band 5 (Cell)	10	23.5	22.54	-0.20	1	Right	Tilt	QPSK	25	0	21B5A	1:1	0.055	1.247	0.069	
836.50	20525	Mid	LTE Band 5 (Cell)	10	24.5	23.45	0.17	0	Left	Cheek	QPSK	1	25	21B5A	1:1	0.158	1.274	0.201	
836.50	20525	Mid	LTE Band 5 (Cell)	10	23.5	22.54	0.14	1	Left	Cheek	QPSK	25	0	21B5A	1:1	0.124	1.247	0.155	
836.50	20525	Mid	LTE Band 5 (Cell)	10	24.5	23.45	0.11	0	Left	Tilt	QPSK	1	25	21B5A	1:1	0.088	1.274	0.112	
836.50	20525	Mid	LTE Band 5 (Cell)	10	23.5	22.54	0.18	1	Left	Tilt	QPSK	25	0	21B5A	1:1	0.077	1.247	0.096	
ANSI / IEEE C95.1 1992 - SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population									Head 1.6 W/kg (mW/g) averaged over 1 gram										

Table 11-11
LTE Band 66 (AWS) Head SAR

MEASUREMENT RESULTS																				
FREQUENCY			Mode	Bandwidth [MHz]	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Power Drift [dB]	MPR [dB]	Side	Test Position	Modulation	RB Size	RB Offset	Device Serial Number	Duty Cycle	SAR (1g)	Scaling Factor	Reported SAR (1g)	Plot #
MHz	Ch.															(W/kg)		(W/kg)	
1745.00	132322	Mid	LTE Band 66 (AWS)	20	24.0	23.46	0.06	0	Right	Cheek	QPSK	1	0	21B02	1:1	0.117	1.132	0.132	
1745.00	132322	Mid	LTE Band 66 (AWS)	20	23.0	22.37	0.02	1	Right	Cheek	QPSK	50	0	21B02	1:1	0.100	1.156	0.116	
1745.00	132322	Mid	LTE Band 66 (AWS)	20	24.0	23.46	-0.10	0	Right	Tilt	QPSK	1	0	21B02	1:1	0.068	1.132	0.077	
1745.00	132322	Mid	LTE Band 66 (AWS)	20	23.0	22.37	0.05	1	Right	Tilt	QPSK	50	0	21B02	1:1	0.057	1.156	0.066	
1745.00	132322	Mid	LTE Band 66 (AWS)	20	24.0	23.46	0.14	0	Left	Cheek	QPSK	1	0	21B02	1:1	0.189	1.132	0.214	A11
1745.00	132322	Mid	LTE Band 66 (AWS)	20	23.0	22.37	0.01	1	Left	Cheek	QPSK	50	0	21B02	1:1	0.150	1.156	0.173	
1745.00	132322	Mid	LTE Band 66 (AWS)	20	24.0	23.46	-0.06	0	Left	Tilt	QPSK	1	0	21B02	1:1	0.094	1.132	0.106	
1745.00	132322	Mid	LTE Band 66 (AWS)	20	23.0	22.37	0.06	1	Left	Tilt	QPSK	50	0	21B02	1:1	0.077	1.156	0.089	
ANSI / IEEE C95.1 1992 - SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population									Head 1.6 W/kg (mW/g) averaged over 1 gram										

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Table 11-12
LTE Band 25 (PCS) Head SAR

MEASUREMENT RESULTS																				
FREQUENCY			Mode	Bandwidth [MHz]	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Power Drift [dB]	MPR [dB]	Side	Test Position	Modulation	RB Size	RB Offset	Device Serial Number	Duty Cycle	SAR (1g)	Scaling Factor	Reported SAR (1g)	Plot #
MHz	Ch.															(W/kg)		(W/kg)	
1882.50	26365	Mid	LTE Band 25 (PCS)	20	24.0	23.64	0.02	0	Right	Cheek	QPSK	1	0	21B04	1:1	0.073	1.086	0.079	
1882.50	26365	Mid	LTE Band 25 (PCS)	20	23.0	22.51	0.03	1	Right	Cheek	QPSK	50	0	21B04	1:1	0.062	1.119	0.069	
1882.50	26365	Mid	LTE Band 25 (PCS)	20	24.0	23.64	0.12	0	Right	Tilt	QPSK	1	0	21B04	1:1	0.038	1.086	0.041	
1882.50	26365	Mid	LTE Band 25 (PCS)	20	23.0	22.51	0.21	1	Right	Tilt	QPSK	50	0	21B04	1:1	0.029	1.119	0.032	
1882.50	26365	Mid	LTE Band 25 (PCS)	20	24.0	23.64	0.04	0	Left	Cheek	QPSK	1	0	21B04	1:1	0.115	1.086	0.125	A12
1882.50	26365	Mid	LTE Band 25 (PCS)	20	23.0	22.51	0.06	1	Left	Cheek	QPSK	50	0	21B04	1:1	0.083	1.119	0.093	
1882.50	26365	Mid	LTE Band 25 (PCS)	20	24.0	23.64	0.03	0	Left	Tilt	QPSK	1	0	21B04	1:1	0.021	1.086	0.023	
1882.50	26365	Mid	LTE Band 25 (PCS)	20	23.0	22.51	0.15	1	Left	Tilt	QPSK	50	0	21B04	1:1	0.015	1.119	0.017	
ANSI / IEEE C95.1 1992 - SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population									Head 1.6 W/kg (mW/g) averaged over 1 gram										

Table 11-13
LTE Band 41 Head SAR

MEASUREMENT RESULTS																					
1 CC Uplink | 2 CC Uplink	Component Carrier	FREQUENCY			Mode	Bandwidth [MHz]	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Power Drift [dB]	MPR [dB]	Side	Test Position	Modulation	RB Size	RB Offset	Device Serial Number	Duty Cycle	SAR (1g)	Scaling Factor	Reported SAR (1g)	Plot #
		MHz	Ch.															(W/kg)		(W/kg)	
1 CC Uplink	N/A	2593.00	40620	Mid	LTE Band 41	20	24.5	24.22	0.07	0	Right	Cheek	QPSK	1	0	21B3C	1:1.58	0.061	1.067	0.065	
1 CC Uplink	N/A	2506.00	39750	Low	LTE Band 41	20	23.5	23.11	0.20	1	Right	Cheek	QPSK	50	0	21B3C	1:1.58	0.041	1.094	0.045	
1 CC Uplink	N/A	2593.00	40620	Mid	LTE Band 41	20	24.5	24.22	0.13	0	Right	Tilt	QPSK	1	0	21B3C	1:1.58	0.057	1.067	0.061	
1 CC Uplink	N/A	2506.00	39750	Low	LTE Band 41	20	23.5	23.11	0.12	1	Right	Tilt	QPSK	50	0	21B3C	1:1.58	0.040	1.094	0.044	
1 CC Uplink	N/A	2593.00	40620	Mid	LTE Band 41	20	24.5	24.22	0.12	0	Left	Cheek	QPSK	1	0	21B3C	1:1.58	0.080	1.067	0.085	A13
1 CC Uplink	N/A	2506.00	39750	Low	LTE Band 41	20	23.5	23.11	0.13	1	Left	Cheek	QPSK	50	0	21B3C	1:1.58	0.054	1.094	0.059	
2 CC Uplink	PCC	2593.00	40620	Mid	LTE Band 41	20	24.5	23.98	0.07	0	Left	Cheek	QPSK	1	0	21B3C	1:1.58	0.066	1.127	0.074	
	SCC	2573.20	40422	Mid	LTE Band 41	20							QPSK	1	99						
1 CC Uplink	N/A	2593.00	40620	Mid	LTE Band 41	20	24.5	24.22	0.17	0	Left	Tilt	QPSK	1	0	21B3C	1:1.58	0.039	1.067	0.042	
1 CC Uplink	N/A	2506.00	39750	Low	LTE Band 41	20	23.5	23.11	0.21	1	Left	Tilt	QPSK	50	0	21B3C	1:1.58	0.024	1.094	0.026	
ANSI / IEEE C95.1 1992 - SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population											Head 1.6 W/kg (mW/g) averaged over 1 gram										

Table 11-14
DTS Head SISO SAR

MEASUREMENT RESULTS																			
FREQUENCY		Mode	Service	Bandwidth [MHz]	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Power Drift [dB]	Side	Test Position	Antenna Config.	Device Serial Number	Data Rate (Mbps)	Duty Cycle (%)	Peak SAR of Area Scan	SAR (1g)	Scaling Factor (Power)	Scaling Factor (Duty Cycle)	Reported SAR (1g)	Plot #
MHz	Ch.													W/kg	(W/kg)			(W/kg)	
2462	11	802.11b	DSSS	22	15.5	15.27	0.13	Right	Cheek	1	5DD38	1	99.8	0.394	0.281	1.054	1.002	0.297	
2462	11	802.11b	DSSS	22	15.5	15.27	0.09	Right	Tilt	1	5DD38	1	99.8	0.340	-	1.054	1.002	-	
2462	11	802.11b	DSSS	22	15.5	15.27	-0.16	Left	Cheek	1	5DD38	1	99.8	0.177	-	1.054	1.002	-	
2462	11	802.11b	DSSS	22	15.5	15.27	-0.04	Left	Tilt	1	5DD38	1	99.8	0.176	-	1.054	1.002	-	
2412	1	802.11b	DSSS	22	15.5	14.90	0.12	Right	Cheek	2	5DD38	1	99.8	0.557	0.499	1.148	1.002	**0.574**	A14
2412	1	802.11b	DSSS	22	15.5	14.90	0.11	Right	Tilt	2	5DD38	1	99.8	0.407	0.396	1.148	1.002	0.456	
2412	1	802.11b	DSSS	22	15.5	14.90	-0.13	Left	Cheek	2	5DD38	1	99.8	0.219	-	1.148	1.002	-	
2412	1	802.11b	DSSS	22	15.5	14.90	0.20	Left	Tilt	2	5DD38	1	99.8	0.194	-	1.148	1.002	-	
ANSI / IEEE C95.1 1992 - SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population									Head 1.6 W/kg (mW/g) averaged over 1 gram										

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Table 11-15
DTS Head MIMO SAR for Conditions with 2.4 GHz and 5 GHz WLAN

MEASUREMENT RESULTS																						
FREQUENCY		Mode	Service	Bandwidth [MHz]	Maximum Allowed Power (Ant 1) [dBm]	Conducted Power (Ant 1) [dBm]	Maximum Allowed Power (Ant 2) [dBm]	Conducted Power (Ant 2) [dBm]	Power Drift [dB]	Side	Test Position	Antenna Config.	Device Serial Number	Data Rate (Mbps)	Duty Cycle (%)	Peak SAR of Area Scan	SAR (1g)	Scaling Factor (Power)	Scaling Factor (Duty Cycle)	Reported SAR (1g)	Plot #
MHz	Ch.															W/kg	(W/kg)			(W/kg)	
2437	6	802.11n	OFDM	20	13.5	13.36	13.5	13.00	0.19	Right	Cheek	MIMO	5DD38	13	97.8	0.444	0.361	1.122	1.022	0.414	
2437	6	802.11n	OFDM	20	13.5	13.36	13.5	13.00	0.01	Right	Tilt	MIMO	5DD38	13	97.8	0.452	0.350	1.122	1.022	0.401	
2437	6	802.11n	OFDM	20	13.5	13.36	13.5	13.00	-0.14	Left	Cheek	MIMO	5DD38	13	97.8	0.233	-	1.122	1.022	-	
2437	6	802.11n	OFDM	20	13.5	13.36	13.5	13.00	0.12	Left	Tilt	MIMO	5DD38	13	97.8	0.230	-	1.122	1.022	-	
ANSI / IEEE C95.1 1992 - SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population										Head 1.6 W/kg (mW/g) averaged over 1 gram											

DTS MIMO was additionally evaluated at the maximum allowed output power during operations with Simultaneous 2.4 GHz and 5 GHz WLAN. 5 GHz WIFI was not transmitting during the above evaluations.

Table 11-16
NII Head SAR

MEASUREMENT RESULTS																				
FREQUENCY		Mode	Service	Bandwidth [MHz]	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Power Drift [dB]	Side	Test Position	Antenna Config.	Device Serial Number	Data Rate (Mbps)	Duty Cycle (%)	Peak SAR of Area Scan	SAR (1g)	Scaling Factor (Power)	Scaling Factor (Duty Cycle)	Reported SAR (1g)	Plot #
MHz	Ch.													W/kg	(W/kg)			(W/kg)	
5290	58	802.11ac	OFDM	80	13.5	13.21	-0.19	Right	Cheek	1	5DD38	29.3	93.2	0.089	0.029	1.069	1.073	0.033	
5290	58	802.11ac	OFDM	80	13.5	13.21	0.21	Right	Tilt	1	5DD38	29.3	93.2	0.063	-	1.069	1.073	-	
5290	58	802.11ac	OFDM	80	13.5	13.21	0.21	Left	Cheek	1	5DD38	29.3	93.2	0.055	-	1.069	1.073	-	
5290	58	802.11ac	OFDM	80	13.5	13.21	0.12	Left	Tilt	1	5DD38	29.3	93.2	0.073	-	1.069	1.073	-	
5290	58	802.11ac	OFDM	80	13.5	12.81	0.18	Right	Cheek	2	5DD38	29.3	93.2	0.717	0.358	1.172	1.073	**0.450**	
5290	58	802.11ac	OFDM	80	13.5	12.81	0.15	Right	Tilt	2	5DD38	29.3	93.2	0.521	0.269	1.172	1.073	0.338	
5290	58	802.11ac	OFDM	80	13.5	12.81	0.15	Left	Cheek	2	5DD38	29.3	93.2	0.272	-	1.172	1.073	-	
5290	58	802.11ac	OFDM	80	13.5	12.81	0.21	Left	Tilt	2	5DD38	29.3	93.2	0.209	-	1.172	1.073	-	
5690	138	802.11ac	OFDM	80	13.5	13.38	0.19	Right	Cheek	1	5DD38	29.3	93.2	0.142	0.055	1.028	1.073	0.061	
5690	138	802.11ac	OFDM	80	13.5	13.38	0.17	Right	Tilt	1	5DD38	29.3	93.2	0.114	-	1.028	1.073	-	
5690	138	802.11ac	OFDM	80	13.5	13.38	0.11	Left	Cheek	1	5DD38	29.3	93.2	0.072	-	1.028	1.073	-	
5690	138	802.11ac	OFDM	80	13.5	13.38	0.19	Left	Tilt	1	5DD38	29.3	93.2	0.099	-	1.028	1.073	-	
5690	138	802.11ac	OFDM	80	13.5	13.37	0.15	Right	Cheek	2	5DD38	29.3	93.2	0.819	0.394	1.030	1.073	0.435	A15
5690	138	802.11ac	OFDM	80	13.5	13.37	0.18	Right	Tilt	2	5DD38	29.3	93.2	0.666	0.321	1.030	1.073	0.355	
5690	138	802.11ac	OFDM	80	13.5	13.37	0.19	Left	Cheek	2	5DD38	29.3	93.2	0.401	-	1.030	1.073	-	
5690	138	802.11ac	OFDM	80	13.5	13.37	0.18	Left	Tilt	2	5DD38	29.3	93.2	0.341	-	1.030	1.073	-	
5775	155	802.11ac	OFDM	80	13.5	13.07	0.19	Right	Cheek	1	5DD38	29.3	93.2	0.110	0.041	1.104	1.073	0.049	
5775	155	802.11ac	OFDM	80	13.5	13.07	0.19	Right	Tilt	1	5DD38	29.3	93.2	0.082	-	1.104	1.073	-	
5775	155	802.11ac	OFDM	80	13.5	13.07	0.21	Left	Cheek	1	5DD38	29.3	93.2	0.035	-	1.104	1.073	-	
5775	155	802.11ac	OFDM	80	13.5	13.07	0.17	Left	Tilt	1	5DD38	29.3	93.2	0.059	-	1.104	1.073	-	
5775	155	802.11ac	OFDM	80	13.5	13.00	0.03	Right	Cheek	2	5DD38	29.3	93.2	0.543	0.272	1.122	1.073	0.327	
5775	155	802.11ac	OFDM	80	13.5	13.00	0.17	Right	Tilt	2	5DD38	29.3	93.2	0.388	-	1.122	1.073	-	
5775	155	802.11ac	OFDM	80	13.5	13.00	0.13	Left	Cheek	2	5DD38	29.3	93.2	0.262	-	1.122	1.073	-	
5775	155	802.11ac	OFDM	80	13.5	13.00	-0.12	Left	Tilt	2	5DD38	29.3	93.2	0.170	-	1.122	1.073	-	
ANSI / IEEE C95.1 1992 - SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population										Head 1.6 W/kg (mW/g) averaged over 1 gram									

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Table 11-17
DSS Head SAR

MEASUREMENT RESULTS																
FREQUENCY		Mode	Service	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Power Drift [dB]	Side	Test Position	Device Serial Number	Data Rate (Mbps)	Duty Cycle %	SAR (1g)	Scaling Factor (Cond Power)	Scaling Factor (Duty Cycle)	Reported SAR (1g)	Plot #
MHz	Ch.											(W/kg)			(W/kg)	
2402.00	0	Bluetooth	FHSS	15.5	15.04	0.16	Right	Cheek	5DD38	1	77.3	0.643	1.112	1.294	0.925	
2441.00	39	Bluetooth	FHSS	15.5	14.63	-0.11	Right	Cheek	5DD38	1	77.3	0.664	1.222	1.294	**1.050**	A16
2480.00	78	Bluetooth	FHSS	15.5	13.62	0.09	Right	Cheek	5DD38	1	77.3	0.420	1.542	1.294	0.838	
2402.00	0	Bluetooth	FHSS	15.5	15.04	0.01	Right	Tilt	5DD38	1	77.3	0.520	1.112	1.294	0.748	
2402.00	0	Bluetooth	FHSS	15.5	15.04	-0.03	Left	Cheek	5DD38	1	77.3	0.326	1.112	1.294	0.469	
2402.00	0	Bluetooth	FHSS	15.5	15.04	0.04	Left	Tilt	5DD38	1	77.3	0.308	1.112	1.294	0.443	
ANSI / IEEE C95.1 1992 - SAFETY LIMIT **Spatial Peak** **Uncontrolled Exposure/General Population**							**Head** **1.6 W/kg (mW/g)** averaged over 1 gram									

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11.2 Standalone Body-Worn SAR Data

Table 11-18
GSM/UMTS/CDMA Body-Worn SAR Data

MEASUREMENT RESULTS														
FREQUENCY		Mode	Service	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Power Drift [dB]	Spacing	Device Serial Number	Duty Cycle	Side	SAR (1g)	Scaling Factor	Reported SAR (1g)	Plot #
MHz	Ch.										(W/kg)		(W/kg)	
836.52	384	Cell. CDMA	TDSO / SO32	26.0	25.37	0.04	15 mm	5E0CA	1:1	back	0.431	1.156	0.498	A17
836.60	190	GSM 850	GSM	33.5	32.62	0.02	15 mm	21B02	1:8.3	back	0.270	1.225	0.331	A19
1880.00	661	GSM 1900	GSM	30.5	29.54	-0.04	15 mm	217D9	1:8.3	back	0.340	1.247	0.424	A21
836.60	4183	UMTS 850	RMC	24.0	23.96	0.01	15 mm	21B02	1:1	back	0.330	1.009	0.333	A23
1732.40	1412	UMTS 1750	RMC	23.5	23.40	-0.01	15 mm	217D9	1:1	back	0.466	1.023	0.477	A25
1852.40	9262	UMTS 1900	RMC	23.5	23.43	-0.05	15 mm	217D9	1:1	back	0.716	1.016	0.727	
1880.00	9400	UMTS 1900	RMC	23.5	23.50	-0.01	15 mm	217D9	1:1	back	0.762	1.000	0.762	A27
1907.60	9538	UMTS 1900	RMC	23.5	23.26	0.00	15 mm	217D9	1:1	back	0.697	1.057	0.737	
ANSI / IEEE C95.1 1992 - SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population											Body 1.6 W/kg (mW/g) averaged over 1 gram			

Table 11-19
LTE FDD Body-Worn SAR

MEASUREMENT RESULTS																		
FREQUENCY			Mode	Bandwidth [MHz]	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Power Drift [dB]	MPR [dB]	Device Serial Number	Modulation	RB Size	RB Offset	Spacing	Side	Duty Cycle	SAR (1g)	Scaling Factor	Reported SAR (1g)	Plot #
MHz	Ch.															(W/kg)		(W/kg)	
707.50	23095	Mid	LTE Band 12	10	24.0	23.06	-0.03	0	21B3C	QPSK	1	25	15 mm	back	1:1	0.195	1.242	0.242	A29
707.50	23095	Mid	LTE Band 12	10	23.0	22.13	-0.01	1	21B3C	QPSK	25	12	15 mm	back	1:1	0.156	1.222	0.191	
782.00	23230	Mid	LTE Band 13	10	24.0	23.15	0.00	0	21B3C	QPSK	1	25	15 mm	back	1:1	0.220	1.216	0.268	A31
782.00	23230	Mid	LTE Band 13	10	23.0	22.30	0.01	1	21B3C	QPSK	25	0	15 mm	back	1:1	0.173	1.175	0.203	
831.50	26865	Mid	LTE Band 26 (Cell)	15	24.0	23.50	0.01	0	21AD0	QPSK	1	0	15 mm	back	1:1	0.276	1.122	0.310	A33
831.50	26865	Mid	LTE Band 26 (Cell)	15	23.0	22.53	0.01	1	21AD0	QPSK	36	0	15 mm	back	1:1	0.217	1.114	0.242	
836.50	20525	Mid	LTE Band 5 (Cell)	10	24.5	23.45	0.00	0	21B02	QPSK	1	25	15 mm	back	1:1	0.280	1.274	0.357	A35
836.50	20525	Mid	LTE Band 5 (Cell)	10	23.5	22.54	-0.02	1	21B02	QPSK	25	0	15 mm	back	1:1	0.228	1.247	0.284	
1720.00	132072	Low	LTE Band 66 (AWS)	20	24.0	23.33	0.00	0	217D9	QPSK	1	0	15 mm	back	1:1	0.553	1.167	0.645	
1745.00	132322	Mid	LTE Band 66 (AWS)	20	24.0	23.46	0.02	0	217D9	QPSK	1	0	15 mm	back	1:1	0.678	1.132	0.767	A37
1770.00	132572	High	LTE Band 66 (AWS)	20	24.0	23.32	0.03	0	217D9	QPSK	1	0	15 mm	back	1:1	0.665	1.169	0.777	
1745.00	132322	Mid	LTE Band 66 (AWS)	20	23.0	22.37	0.03	1	217D9	QPSK	50	0	15 mm	back	1:1	0.551	1.156	0.637	
1860.00	26140	Low	LTE Band 25 (PCS)	20	24.0	23.43	-0.05	0	217D9	QPSK	1	0	15 mm	back	1:1	0.729	1.140	0.831	
1882.50	26365	Mid	LTE Band 25 (PCS)	20	24.0	23.64	0.00	0	217D9	QPSK	1	0	15 mm	back	1:1	0.782	1.086	0.849	A39
1905.00	26590	High	LTE Band 25 (PCS)	20	24.0	23.34	0.01	0	217D9	QPSK	1	0	15 mm	back	1:1	0.748	1.164	0.871	
1882.50	26365	Mid	LTE Band 25 (PCS)	20	23.0	22.51	0.00	1	217D9	QPSK	50	0	15 mm	back	1:1	0.591	1.119	0.661	
1905.00	26590	High	LTE Band 25 (PCS)	20	23.0	22.42	0.00	1	217D9	QPSK	100	0	15 mm	back	1:1	0.570	1.143	0.652	
ANSI / IEEE C95.1 1992 - SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population															Body 1.6 W/kg (mW/g) averaged over 1 gram				

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Table 11-20
LTE TDD Body-Worn SAR

MEASUREMENT RESULTS																					
1 CC Uplink | 2 CC Uplink	Component Carrier	FREQUENCY			Mode	Bandwidth [MHz]	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Power Drift [dB]	MPR [dB]	Device Serial Number	Modulation	RB Size	RB Offset	Spacing	Side	Duty Cycle	SAR (1g) (W/kg)	Scaling Factor	Reported SAR (1g) (W/kg)	Plot #
		MHz	Ch.																		
1 CC Uplink	N/A	2593.00	40620	Mid	LTE Band 41	20	24.5	24.22	-0.01	0	21AD3	QPSK	1	0	15 mm	back	1:1.58	0.283	1.067	0.302	A41
1 CC Uplink	N/A	2506.00	39750	Low	LTE Band 41	20	23.5	23.11	-0.02	1	21AD3	QPSK	50	0	15 mm	back	1:1.58	0.204	1.094	0.223	
2 CC Uplink	PCC	2593.00	40620	Mid	LTE Band 41	20	24.5	23.98	0.10	0	21AD3	QPSK	1	0	15 mm	back	1:1.58	0.280	1.127	0.316	
	SCC	2573.20	40422	Mid	LTE Band 41	20						QPSK	1	99							
ANSI / IEEE C95.1 1992 - SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population												Body 1.6 W/kg (mW/g) averaged over 1 gram									

Table 11-21
DTS SISO Body-Worn SAR

MEASUREMENT RESULTS																		
FREQUENCY		Mode	Service	Bandwidth [MHz]	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Power Drift [dB]	Spacing	Antenna Config.	Device Serial Number	Data Rate (Mbps)	Side	Duty Cycle (%)	Peak SAR of Area Scan W/kg	SAR (1g) (W/kg)	Scaling Factor (Power)	Scaling Factor (Duty Cycle)	Reported SAR (1g) (W/kg)	Plot #
MHz	Ch.																		
2462	11	802.11b	DSSS	22	20.5	20.22	-0.03	15 mm	1	21B04	1	back	99.8	0.131	0.097	1.067	1.002	0.104	
2412	1	802.11b	DSSS	22	20.5	20.19	-0.11	15 mm	2	21B04	1	back	99.8	0.135	0.102	1.074	1.002	**0.110**	A43
ANSI / IEEE C95.1 1992 - SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population												Body 1.6 W/kg (mW/g) averaged over 1 gram							

Table 11-22
DTS MIMO Body-Worn SAR for Conditions with 2.4 GHz and 5 GHz WLAN

MEASUREMENT RESULTS																			
FREQUENCY		Mode	Service	Bandwidth [MHz]	Maximum Allowed Power (Ant 1) [dBm]	Conducted Power (Ant 1) [dBm]	Maximum Allowed Power (Ant 2) [dBm]	Conducted Power (Ant 2) [dBm]	Power Drift [dB]	Spacing	Antenna Config.	Device Serial Number	Data Rate (Mbps)	Side	Duty Cycle (%)	Peak SAR of Area Scan W/kg	SAR (1g) (W/kg)	Scaling Factor (Power)	Scaling Factor (Duty Cycle)	Reported SAR (1g) (W/kg)	Plot #
MHz	Ch.																				
2462	11	802.11n	OFDM	20	16.5	16.13	16.5	16.27	0.08	15 mm	MIMO	5D4E2	13	back	97.8	0.080	0.074	1.089	1.022	0.082	
ANSI / IEEE C95.1 1992 - SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population														Body 1.6 W/kg (mW/g) averaged over 1 gram							

DTS MIMO was additionally evaluated at the maximum allowed output power during operations with Simultaneous 2.4 GHz and 5 GHz WLAN. 5 GHz WIFI was not transmitting during the above evaluations.

Table 11-23
NII SISO Body-Worn SAR

MEASUREMENT RESULTS																			
FREQUENCY		Mode	Service	Bandwidth [MHz]	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Power Drift [dB]	Spacing	Antenna Config.	Device Serial Number	Data Rate (Mbps)	Side	Duty Cycle (%)	Peak SAR of Area Scan W/kg	SAR (1g) (W/kg)	Scaling Factor (Power)	Scaling Factor (Duty Cycle)	Reported SAR (1g) (W/kg)	Plot #
MHz	Ch.																		
5290	58	802.11ac	OFDM	80	17.5	16.90	-0.10	15 mm	1	5E0CA	29.3	back	93.2	0.383	0.197	1.148	1.073	0.243	
5290	58	802.11ac	OFDM	80	17.5	16.63	0.00	15 mm	2	5E0CA	29.3	back	93.2	0.271	0.118	1.222	1.073	0.155	
5610	122	802.11ac	OFDM	80	17.5	16.85	0.11	15 mm	1	5E0CA	29.3	back	93.2	0.562	0.240	1.161	1.073	0.299	
5530	106	802.11ac	OFDM	80	16.0	15.19	0.02	15 mm	2	5E0CA	29.3	back	93.2	0.492	0.253	1.205	1.073	0.327	
5610	122	802.11ac	OFDM	80	17.5	16.76	0.03	15 mm	2	5E0CA	29.3	back	93.2	0.996	0.504	1.186	1.073	0.641	
5690	138	802.11ac	OFDM	80	17.5	16.60	-0.02	15 mm	2	5E0CA	29.3	back	93.2	1.004	0.544	1.230	1.073	**0.718**	
5775	155	802.11ac	OFDM	80	17.5	16.81	-0.09	15 mm	1	5E0CA	29.3	back	93.2	0.542	0.241	1.172	1.073	0.303	
5775	155	802.11ac	OFDM	80	17.5	16.65	0.04	15 mm	2	5E0CA	29.3	back	93.2	0.755	0.371	1.216	1.073	0.484	
ANSI / IEEE C95.1 1992 - SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population												Body 1.6 W/kg (mW/g) averaged over 1 gram							

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Table 11-24
NII MIMO Body-Worn SAR

MEASUREMENT RESULTS																						
FREQUENCY		Mode	Service	Bandwidth [MHz]	Maximum Allowed Power (Ant 1) [dBm]	Conducted Power (Ant 1) [dBm]	Maximum Allowed Power (Ant 2) [dBm]	Conducted Power (Ant 2) [dBm]	Power Drift [dB]	Spacing	Antenna Config.	Device Serial Number	Data Rate (Mbps)	Side	Duty Cycle (%)	Peak SAR of Area Scan	SAR (1g)	Scaling Factor (Power)	Scaling Factor (Duty Cycle)	Reported SAR (1g)	Plot #
MHz	Ch.															W/kg	(W/kg)			(W/kg)	
5270	54	802.11n	OFDM	40	17.5	16.73	17.5	16.68	0.08	15 mm	MIMO	5E0CA	27	back	95.7	0.552	0.253	1.208	1.045	0.319	
5530	106	802.11ac	OFDM	80	15.0	15.00	15.0	14.30	-0.02	15 mm	MIMO	5E0CA	58.5	back	92.3	0.820	0.416	1.175	1.083	0.529	
5610	122	802.11ac	OFDM	80	17.5	16.85	17.5	16.76	0.01	15 mm	MIMO	5E0CA	58.5	back	92.3	1.446	0.676	1.186	1.083	0.868	A45
5690	138	802.11ac	OFDM	80	17.5	16.55	17.5	16.60	-0.06	15 mm	MIMO	5E0CA	58.5	back	92.3	1.178	0.633	1.245	1.083	0.853	
5775	155	802.11ac	OFDM	80	15.5	14.76	15.5	15.12	0.00	15 mm	MIMO	5E0CA	58.5	back	92.3	0.689	0.339	1.186	1.083	0.435	
ANSI / IEEE C95.1 1992 - SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population																Body 1.6 W/kg (mW/g) averaged over 1 gram					

To achieve the 20.5 dBm (18.0 dBm ch. 106) maximum allowed MIMO power shown in the documentation, each antenna transmits at a maximum allowed power of 17.5 dBm (15.0 dBm ch. 106).

Table 11-25
NII MIMO Body-Worn SAR for Conditions with 2.4 GHz and 5 GHz WLAN

MEASUREMENT RESULTS																						
FREQUENCY		Mode	Service	Bandwidth [MHz]	Maximum Allowed Power (Ant 1) [dBm]	Conducted Power (Ant 1) [dBm]	Maximum Allowed Power (Ant 2) [dBm]	Conducted Power (Ant 2) [dBm]	Power Drift [dB]	Spacing	Antenna Config.	Device Serial Number	Data Rate (Mbps)	Side	Duty Cycle (%)	Peak SAR of Area Scan	SAR (1g)	Scaling Factor (Power)	Scaling Factor (Duty Cycle)	Reported SAR (1g)	Plot #
MHz	Ch.															W/kg	(W/kg)			(W/kg)	
5290	58	802.11ac	OFDM	80	13.5	13.21	13.5	12.81	0.09	15 mm	MIMO	5E0CA	58.5	back	92.3	0.223	0.109	1.172	1.083	0.138	
5690	138	802.11ac	OFDM	80	13.5	13.38	13.5	13.37	-0.06	15 mm	MIMO	5E0CA	58.5	back	92.3	0.675	0.300	1.030	1.083	0.335	
5775	155	802.11ac	OFDM	80	13.5	13.07	13.5	13.00	-0.10	15 mm	MIMO	5E0CA	58.5	back	92.3	0.569	0.255	1.122	1.083	0.310	
ANSI / IEEE C95.1 1992 - SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population																Body 1.6 W/kg (mW/g) averaged over 1 gram					

NII MIMO was additionally evaluated at the maximum allowed output power during operations with Simultaneous 2.4 GHz and 5 GHz WLAN. 2.4 GHz WIFI was not transmitting during the above evaluations.

Table 11-26
DSS Body-Worn SAR

MEASUREMENT RESULTS															
FREQUENCY		Mode	Service	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Power Drift [dB]	Spacing	Device Serial Number	Data Rate (Mbps)	Side	Duty Cycle	SAR (1g)	Scaling Factor (Cond Power)	Scaling Factor (Duty Cycle)	Reported SAR (1g)	Plot #
MHz	Ch.											(W/kg)			(W/kg)	
2402	0	Bluetooth	FHSS	15.5	15.04	-0.14	15 mm	5E0CA	1	back	77.3	0.033	1.112	1.294	**0.047**	A47
ANSI / IEEE C95.1 1992 - SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population												Body 1.6 W/kg (mW/g) averaged over 1 gram				

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11.3 Standalone Hotspot SAR Data

Table 11-27
GPRS/UMTS/CDMA Hotspot SAR Data

MEASUREMENT RESULTS															
FREQUENCY		Mode	Service	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Power Drift [dB]	Spacing	Device Serial Number	# of GPRS Slots	Duty Cycle	Side	SAR (1g)	Scaling Factor	Reported SAR (1g)	Plot #
MHz	Ch.											(W/kg)		(W/kg)	
824.70	1013	Cell. CDMA	EVDO Rev. 0	26.0	25.77	-0.04	10 mm	5E0CA	N/A	1:1	back	0.687	1.054	0.724	
836.52	384	Cell. CDMA	EVDO Rev. 0	26.0	25.72	0.00	10 mm	5E0CA	N/A	1:1	back	0.712	1.067	0.760	A18
848.31	777	Cell. CDMA	EVDO Rev. 0	26.0	25.49	-0.06	10 mm	5E0CA	N/A	1:1	back	0.698	1.125	**0.785**	
836.52	384	Cell. CDMA	EVDO Rev. 0	26.0	25.72	-0.02	10 mm	5E0CA	N/A	1:1	front	0.552	1.067	0.589	
836.52	384	Cell. CDMA	EVDO Rev. 0	26.0	25.72	-0.05	10 mm	5E0CA	N/A	1:1	bottom	0.404	1.067	0.431	
836.52	384	Cell. CDMA	EVDO Rev. 0	26.0	25.72	-0.04	10 mm	5E0CA	N/A	1:1	right	0.561	1.067	0.599	
836.52	384	Cell. CDMA	EVDO Rev. 0	26.0	25.72	0.03	10 mm	5E0CA	N/A	1:1	left	0.163	1.067	0.174	
836.60	190	GSM 850	GPRS	29.8	28.83	-0.05	10 mm	21B02	3	1:2.76	back	0.403	1.250	0.504	A20
836.60	190	GSM 850	GPRS	29.8	28.83	0.03	10 mm	21B02	3	1:2.76	front	0.315	1.250	0.394	
836.60	190	GSM 850	GPRS	29.8	28.83	-0.09	10 mm	21B02	3	1:2.76	bottom	0.233	1.250	0.291	
836.60	190	GSM 850	GPRS	29.8	28.83	-0.03	10 mm	21B02	3	1:2.76	right	0.381	1.250	0.476	
836.60	190	GSM 850	GPRS	29.8	28.83	0.14	10 mm	21B02	3	1:2.76	left	0.138	1.250	0.173	
1880.00	661	GSM 1900	GPRS	25.5	24.27	0.04	10 mm	21B3C	2	1:4.15	back	0.281	1.327	0.373	
1880.00	661	GSM 1900	GPRS	25.5	24.27	-0.03	10 mm	21B3C	2	1:4.15	front	0.246	1.327	0.326	
1880.00	661	GSM 1900	GPRS	25.5	24.27	-0.03	10 mm	21B3C	2	1:4.15	bottom	0.447	1.327	0.593	A22
1880.00	661	GSM 1900	GPRS	25.5	24.27	-0.10	10 mm	21B3C	2	1:4.15	right	0.048	1.327	0.064	
1880.00	661	GSM 1900	GPRS	25.5	24.27	-0.19	10 mm	21B3C	2	1:4.15	left	0.032	1.327	0.042	
836.60	4183	UMTS 850	RMC	24.0	23.96	-0.04	10 mm	21B02	N/A	1:1	back	0.505	1.009	0.510	A24
836.60	4183	UMTS 850	RMC	24.0	23.96	0.02	10 mm	21B02	N/A	1:1	front	0.375	1.009	0.378	
836.60	4183	UMTS 850	RMC	24.0	23.96	-0.06	10 mm	21B02	N/A	1:1	bottom	0.271	1.009	0.273	
836.60	4183	UMTS 850	RMC	24.0	23.96	0.01	10 mm	21B02	N/A	1:1	right	0.420	1.009	0.424	
836.60	4183	UMTS 850	RMC	24.0	23.96	-0.02	10 mm	21B02	N/A	1:1	left	0.175	1.009	0.177	
1732.40	1412	UMTS 1750	RMC	18.5	18.28	0.08	10 mm	217D9	N/A	1:1	back	0.322	1.052	0.339	
1732.40	1412	UMTS 1750	RMC	18.5	18.28	0.11	10 mm	217D9	N/A	1:1	front	0.254	1.052	0.267	
1732.40	1412	UMTS 1750	RMC	18.5	18.28	-0.04	10 mm	217D9	N/A	1:1	bottom	0.484	1.052	0.509	A26
1732.40	1412	UMTS 1750	RMC	18.5	18.28	0.14	10 mm	217D9	N/A	1:1	right	0.060	1.052	0.063	
1732.40	1412	UMTS 1750	RMC	18.5	18.28	0.12	10 mm	217D9	N/A	1:1	left	0.075	1.052	0.079	
1880.00	9400	UMTS 1900	RMC	18.5	18.41	-0.02	10 mm	217D9	N/A	1:1	back	0.426	1.021	0.435	
1880.00	9400	UMTS 1900	RMC	18.5	18.41	0.00	10 mm	217D9	N/A	1:1	front	0.295	1.021	0.301	
1880.00	9400	UMTS 1900	RMC	18.5	18.41	-0.06	10 mm	217D9	N/A	1:1	bottom	0.532	1.021	0.543	A28
1880.00	9400	UMTS 1900	RMC	18.5	18.41	-0.04	10 mm	217D9	N/A	1:1	right	0.066	1.021	0.067	
1880.00	9400	UMTS 1900	RMC	18.5	18.41	0.07	10 mm	217D9	N/A	1:1	left	0.036	1.021	0.037	
ANSI / IEEE C95.1 1992 - SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population								Body 1.6 W/kg (mW/g) averaged over 1 gram							

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Table 11-28
LTE Band 12 Hotspot SAR

MEASUREMENT RESULTS																				
FREQUENCY			Mode	Bandwidth [MHz]	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Power Drift [dB]	MPR [dB]	Device Serial Number	Modulation	RB Size	RB Offset	Spacing	Side	Duty Cycle	SAR (1g)	Scaling Factor	Reported SAR (1g)	Plot #
MHz	Ch.															(W/kg)		(W/kg)	
707.50	23095	Mid	LTE Band 12	10	24.0	23.06	0.05	0	21B3C	QPSK	1	25	10 mm	back	1:1	0.275	1.242	0.342	A30
707.50	23095	Mid	LTE Band 12	10	23.0	22.13	0.01	1	21B3C	QPSK	25	12	10 mm	back	1:1	0.222	1.222	0.271	
707.50	23095	Mid	LTE Band 12	10	24.0	23.06	0.01	0	21B3C	QPSK	1	25	10 mm	front	1:1	0.191	1.242	0.237	
707.50	23095	Mid	LTE Band 12	10	23.0	22.13	0.00	1	21B3C	QPSK	25	12	10 mm	front	1:1	0.156	1.222	0.191	
707.50	23095	Mid	LTE Band 12	10	24.0	23.06	-0.01	0	21B3C	QPSK	1	25	10 mm	bottom	1:1	0.135	1.242	0.168	
707.50	23095	Mid	LTE Band 12	10	23.0	22.13	-0.04	1	21B3C	QPSK	25	12	10 mm	bottom	1:1	0.107	1.222	0.131	
707.50	23095	Mid	LTE Band 12	10	24.0	23.06	-0.07	0	21B3C	QPSK	1	25	10 mm	right	1:1	0.210	1.242	0.261	
707.50	23095	Mid	LTE Band 12	10	23.0	22.13	-0.01	1	21B3C	QPSK	25	12	10 mm	right	1:1	0.168	1.222	0.205	
707.50	23095	Mid	LTE Band 12	10	24.0	23.06	0.07	0	21B3C	QPSK	1	25	10 mm	left	1:1	0.123	1.242	0.153	
707.50	23095	Mid	LTE Band 12	10	23.0	22.13	0.06	1	21B3C	QPSK	25	12	10 mm	left	1:1	0.097	1.222	0.119	
ANSI / IEEE C95.1 1992 - SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population													Body 1.6 W/kg (mW/g) averaged over 1 gram							

Table 11-29
LTE Band 13 Hotspot SAR

MEASUREMENT RESULTS																				
FREQUENCY			Mode	Bandwidth [MHz]	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Power Drift [dB]	MPR [dB]	Device Serial Number	Modulation	RB Size	RB Offset	Spacing	Side	Duty Cycle	SAR (1g)	Scaling Factor	Reported SAR (1g)	Plot #
MHz	Ch.															(W/kg)		(W/kg)	
782.00	23230	Mid	LTE Band 13	10	24.0	23.15	0.02	0	21B3C	QPSK	1	25	10 mm	back	1:1	0.383	1.216	0.466	A32
782.00	23230	Mid	LTE Band 13	10	23.0	22.30	-0.02	1	21B3C	QPSK	25	0	10 mm	back	1:1	0.304	1.175	0.357	
782.00	23230	Mid	LTE Band 13	10	24.0	23.15	0.00	0	21B3C	QPSK	1	25	10 mm	front	1:1	0.310	1.216	0.377	
782.00	23230	Mid	LTE Band 13	10	23.0	22.30	-0.01	1	21B3C	QPSK	25	0	10 mm	front	1:1	0.243	1.175	0.286	
782.00	23230	Mid	LTE Band 13	10	24.0	23.15	0.01	0	21B3C	QPSK	1	25	10 mm	bottom	1:1	0.204	1.216	0.248	
782.00	23230	Mid	LTE Band 13	10	23.0	22.30	0.01	1	21B3C	QPSK	25	0	10 mm	bottom	1:1	0.168	1.175	0.197	
782.00	23230	Mid	LTE Band 13	10	24.0	23.15	0.04	0	21B3C	QPSK	1	25	10 mm	right	1:1	0.270	1.216	0.328	
782.00	23230	Mid	LTE Band 13	10	23.0	22.30	-0.01	1	21B3C	QPSK	25	0	10 mm	right	1:1	0.213	1.175	0.250	
782.00	23230	Mid	LTE Band 13	10	24.0	23.15	0.06	0	21B3C	QPSK	1	25	10 mm	left	1:1	0.135	1.216	0.164	
782.00	23230	Mid	LTE Band 13	10	23.0	22.30	0.00	1	21B3C	QPSK	25	0	10 mm	left	1:1	0.106	1.175	0.125	
ANSI / IEEE C95.1 1992 - SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population													Body 1.6 W/kg (mW/g) averaged over 1 gram							

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Table 11-30
LTE Band 26 (Cell) Hotspot SAR

MEASUREMENT RESULTS																				
FREQUENCY			Mode	Bandwidth [MHz]	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Power Drift [dB]	MPR [dB]	Device Serial Number	Modulation	RB Size	RB Offset	Spacing	Side	Duty Cycle	SAR (1g)	Scaling Factor	Reported SAR (1g)	Plot #
MHz	Ch.															(W/kg)		(W/kg)	
831.50	26865	Mid	LTE Band 26 (Cell)	15	24.0	23.50	0.00	0	21AD0	QPSK	1	0	10 mm	back	1:1	0.416	1.122	0.467	A34
831.50	26865	Mid	LTE Band 26 (Cell)	15	23.0	22.53	-0.02	1	21AD0	QPSK	36	0	10 mm	back	1:1	0.339	1.114	0.378	
831.50	26865	Mid	LTE Band 26 (Cell)	15	24.0	23.50	-0.02	0	21AD0	QPSK	1	0	10 mm	front	1:1	0.358	1.122	0.402	
831.50	26865	Mid	LTE Band 26 (Cell)	15	23.0	22.53	-0.02	1	21AD0	QPSK	36	0	10 mm	front	1:1	0.287	1.114	0.320	
831.50	26865	Mid	LTE Band 26 (Cell)	15	24.0	23.50	-0.04	0	21AD0	QPSK	1	0	10 mm	bottom	1:1	0.270	1.122	0.303	
831.50	26865	Mid	LTE Band 26 (Cell)	15	23.0	22.53	-0.06	1	21AD0	QPSK	36	0	10 mm	bottom	1:1	0.207	1.114	0.231	
831.50	26865	Mid	LTE Band 26 (Cell)	15	24.0	23.50	-0.01	0	21AD0	QPSK	1	0	10 mm	right	1:1	0.372	1.122	0.417	
831.50	26865	Mid	LTE Band 26 (Cell)	15	23.0	22.53	-0.02	1	21AD0	QPSK	36	0	10 mm	right	1:1	0.285	1.114	0.317	
831.50	26865	Mid	LTE Band 26 (Cell)	15	24.0	23.50	0.06	0	21AD0	QPSK	1	0	10 mm	left	1:1	0.119	1.122	0.134	
831.50	26865	Mid	LTE Band 26 (Cell)	15	23.0	22.53	-0.01	1	21AD0	QPSK	36	0	10 mm	left	1:1	0.082	1.114	0.091	
ANSI / IEEE C95.1 1992 - SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population										Body 1.6 W/kg (mW/g) averaged over 1 gram										

Table 11-31
LTE Band 5 (Cell) Hotspot SAR

MEASUREMENT RESULTS																				
FREQUENCY			Mode	Bandwidth [MHz]	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Power Drift [dB]	MPR [dB]	Device Serial Number	Modulation	RB Size	RB Offset	Spacing	Side	Duty Cycle	SAR (1g)	Scaling Factor	Reported SAR (1g)	Plot #
MHz	Ch.															(W/kg)		(W/kg)	
836.50	20525	Mid	LTE Band 5 (Cell)	10	24.5	23.45	-0.10	0	21B02	QPSK	1	25	10 mm	back	1:1	0.433	1.274	0.552	A36
836.50	20525	Mid	LTE Band 5 (Cell)	10	23.5	22.54	-0.08	1	21B02	QPSK	25	0	10 mm	back	1:1	0.353	1.247	0.440	
836.50	20525	Mid	LTE Band 5 (Cell)	10	24.5	23.45	0.01	0	21B02	QPSK	1	25	10 mm	front	1:1	0.402	1.274	0.512	
836.50	20525	Mid	LTE Band 5 (Cell)	10	23.5	22.54	0.00	1	21B02	QPSK	25	0	10 mm	front	1:1	0.327	1.247	0.408	
836.50	20525	Mid	LTE Band 5 (Cell)	10	24.5	23.45	-0.03	0	21B02	QPSK	1	25	10 mm	bottom	1:1	0.291	1.274	0.371	
836.50	20525	Mid	LTE Band 5 (Cell)	10	23.5	22.54	0.00	1	21B02	QPSK	25	0	10 mm	bottom	1:1	0.237	1.247	0.296	
836.50	20525	Mid	LTE Band 5 (Cell)	10	24.5	23.45	0.00	0	21B02	QPSK	1	25	10 mm	right	1:1	0.367	1.274	0.468	
836.50	20525	Mid	LTE Band 5 (Cell)	10	23.5	22.54	0.00	1	21B02	QPSK	25	0	10 mm	right	1:1	0.307	1.247	0.383	
836.50	20525	Mid	LTE Band 5 (Cell)	10	24.5	23.45	0.02	0	21B02	QPSK	1	25	10 mm	left	1:1	0.090	1.274	0.115	
836.50	20525	Mid	LTE Band 5 (Cell)	10	23.5	22.54	-0.01	1	21B02	QPSK	25	0	10 mm	left	1:1	0.087	1.247	0.108	
ANSI / IEEE C95.1 1992 - SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population										Body 1.6 W/kg (mW/g) averaged over 1 gram										

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Table 11-32
LTE Band 66 (AWS) Hotspot SAR

MEASUREMENT RESULTS																				
FREQUENCY			Mode	Bandwidth [MHz]	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Power Drift [dB]	MPR [dB]	Device Serial Number	Modulation	RB Size	RB Offset	Spacing	Side	Duty Cycle	SAR (1g)	Scaling Factor	Reported SAR (1g)	Plot #
MHz	Ch.															(W/kg)		(W/kg)	
1770.00	132572	High	LTE Band 66 (AWS)	20	19.0	18.47	0.01	0	217D9	QPSK	1	0	10 mm	back	1:1	0.458	1.130	0.518	
1745.00	132322	Mid	LTE Band 66 (AWS)	20	19.0	18.37	0.04	0	217D9	QPSK	50	0	10 mm	back	1:1	0.454	1.156	0.525	
1770.00	132572	High	LTE Band 66 (AWS)	20	19.0	18.47	0.21	0	217D9	QPSK	1	0	10 mm	front	1:1	0.397	1.130	0.449	
1745.00	132322	Mid	LTE Band 66 (AWS)	20	19.0	18.37	-0.04	0	217D9	QPSK	50	0	10 mm	front	1:1	0.385	1.156	0.445	
1770.00	132572	High	LTE Band 66 (AWS)	20	19.0	18.47	0.00	0	217D9	QPSK	1	0	10 mm	bottom	1:1	0.635	1.130	0.718	
1720.00	132072	Low	LTE Band 66 (AWS)	20	19.0	18.34	-0.19	0	217D9	QPSK	50	0	10 mm	bottom	1:1	0.628	1.164	0.731	
1745.00	132322	Mid	LTE Band 66 (AWS)	20	19.0	18.37	0.00	0	217D9	QPSK	50	0	10 mm	bottom	1:1	0.641	1.156	0.741	
1770.00	132572	High	LTE Band 66 (AWS)	20	19.0	18.25	-0.10	0	217D9	QPSK	50	0	10 mm	bottom	1:1	0.663	1.189	**0.788**	A38
1770.00	132572	High	LTE Band 66 (AWS)	20	19.0	18.47	0.13	0	217D9	QPSK	1	0	10 mm	right	1:1	0.072	1.130	0.081	
1745.00	132322	Mid	LTE Band 66 (AWS)	20	19.0	18.37	0.11	0	217D9	QPSK	50	0	10 mm	right	1:1	0.075	1.156	0.087	
1770.00	132572	High	LTE Band 66 (AWS)	20	19.0	18.47	0.10	0	217D9	QPSK	1	0	10 mm	left	1:1	0.106	1.130	0.120	
1745.00	132322	Mid	LTE Band 66 (AWS)	20	19.0	18.37	0.06	0	217D9	QPSK	50	0	10 mm	left	1:1	0.096	1.156	0.111	
ANSI / IEEE C95.1 1992 - SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population													Body 1.6 W/kg (mW/g) averaged over 1 gram							

Table 11-33
LTE Band 25 (PCS) Hotspot SAR

MEASUREMENT RESULTS																				
FREQUENCY			Mode	Bandwidth [MHz]	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Power Drift [dB]	MPR [dB]	Device Serial Number	Modulation	RB Size	RB Offset	Spacing	Side	Duty Cycle	SAR (1g)	Scaling Factor	Reported SAR (1g)	Plot #
MHz	Ch.															(W/kg)		(W/kg)	
1882.50	26365	Mid	LTE Band 25 (PCS)	20	19.0	18.60	-0.04	0	217D9	QPSK	1	0	10 mm	back	1:1	0.407	1.096	0.446	
1882.50	26365	Mid	LTE Band 25 (PCS)	20	19.0	18.45	0.00	0	217D9	QPSK	50	0	10 mm	back	1:1	0.391	1.135	0.444	
1882.50	26365	Mid	LTE Band 25 (PCS)	20	19.0	18.60	-0.03	0	217D9	QPSK	1	0	10 mm	front	1:1	0.304	1.096	0.333	
1882.50	26365	Mid	LTE Band 25 (PCS)	20	19.0	18.45	-0.06	0	217D9	QPSK	50	0	10 mm	front	1:1	0.290	1.135	0.329	
1860.00	26140	Low	LTE Band 25 (PCS)	20	19.0	18.40	-0.10	0	217D9	QPSK	1	0	10 mm	bottom	1:1	0.497	1.148	0.571	
1882.50	26365	Mid	LTE Band 25 (PCS)	20	19.0	18.60	-0.04	0	217D9	QPSK	1	0	10 mm	bottom	1:1	0.571	1.096	0.626	A40
1905.00	26590	High	LTE Band 25 (PCS)	20	19.0	18.56	-0.08	0	217D9	QPSK	1	0	10 mm	bottom	1:1	0.559	1.107	0.619	
1882.50	26365	Mid	LTE Band 25 (PCS)	20	19.0	18.45	-0.06	0	217D9	QPSK	50	0	10 mm	bottom	1:1	0.551	1.135	0.625	
1882.50	26365	Mid	LTE Band 25 (PCS)	20	19.0	18.60	0.00	0	217D9	QPSK	1	0	10 mm	right	1:1	0.068	1.096	0.075	
1882.50	26365	Mid	LTE Band 25 (PCS)	20	19.0	18.45	-0.05	0	217D9	QPSK	50	0	10 mm	right	1:1	0.065	1.135	0.074	
1882.50	26365	Mid	LTE Band 25 (PCS)	20	19.0	18.60	0.04	0	217D9	QPSK	1	0	10 mm	left	1:1	0.040	1.096	0.044	
1882.50	26365	Mid	LTE Band 25 (PCS)	20	19.0	18.45	-0.01	0	217D9	QPSK	50	0	10 mm	left	1:1	0.038	1.135	0.043	
ANSI / IEEE C95.1 1992 - SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population													Body 1.6 W/kg (mW/g) averaged over 1 gram							

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Table 11-34
LTE Band 41 Hotspot SAR

MEASUREMENT RESULTS																					
1 CC Uplink | 2 CC Uplink	Component Carrier	FREQUENCY			Mode	Bandwidth [MHz]	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Power Drift [dB]	MPR [dB]	Device Serial Number	Modulation	RB Size	RB Offset	Spacing	Side	Duty Cycle	SAR (1g)	Scaling Factor	Reported SAR (1g)	Plot #
		MHz	Ch.															(W/kg)		(W/kg)	
1 CC Uplink	N/A	2680.00	41490	High	LTE Band 41	20	21.5	20.96	-0.04	0	21AD3	QPSK	1	0	10 mm	back	1:1.58	0.215	1.132	0.243	
1 CC Uplink	N/A	2680.00	41490	High	LTE Band 41	20	21.5	20.95	-0.04	0	21AD3	QPSK	50	0	10 mm	back	1:1.58	0.214	1.135	0.243	
1 CC Uplink	N/A	2680.00	41490	High	LTE Band 41	20	21.5	20.96	-0.01	0	21AD3	QPSK	1	0	10 mm	front	1:1.58	0.260	1.132	0.294	
1 CC Uplink	N/A	2680.00	41490	High	LTE Band 41	20	21.5	20.95	-0.04	0	21AD3	QPSK	50	0	10 mm	front	1:1.58	0.261	1.135	0.296	
1 CC Uplink	N/A	2680.00	41490	High	LTE Band 41	20	21.5	20.96	-0.04	0	21AD3	QPSK	1	0	10 mm	bottom	1:1.58	0.437	1.132	0.495	
1 CC Uplink	N/A	2680.00	41490	High	LTE Band 41	20	21.5	20.95	0.02	0	21AD3	QPSK	50	0	10 mm	bottom	1:1.58	0.430	1.135	0.488	
2 CC Uplink	PCC	2680.00	41490	High	LTE Band 41	20	21.5	21.00	-0.03	0	21AD3	QPSK	1	0	10 mm	bottom	1:1.58	0.454	1.122	0.509	A42
	SCC	2660.20	41292	High	LTE Band 41	20						QPSK	1	99							
1 CC Uplink	N/A	2680.00	41490	High	LTE Band 41	20	21.5	20.96	-0.02	0	21AD3	QPSK	1	0	10 mm	left	1:1.58	0.188	1.132	0.213	
1 CC Uplink	N/A	2680.00	41490	High	LTE Band 41	20	21.5	20.95	-0.03	0	21AD3	QPSK	50	0	10 mm	left	1:1.58	0.187	1.135	0.212	
ANSI / IEEE C95.1 1992 - SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population												Body 1.6 W/kg (mW/g) averaged over 1 gram									

Table 11-35
WLAN Hotspot SAR

MEASUREMENT RESULTS																			
FREQUENCY		Mode	Service	Bandwidth [MHz]	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Power Drift [dB]	Spacing	Antenna Config.	Device Serial Number	Data Rate (Mbps)	Side	Duty Cycle (%)	Peak SAR of Area Scan	SAR (1g)	Scaling Factor (Power)	Scaling Factor (Duty Cycle)	Reported SAR (1g)	Plot #
MHz	Ch.													W/kg	(W/kg)			(W/kg)	
2462	11	802.11b	DSSS	22	20.5	20.22	0.13	10 mm	1	21B04	1	back	99.8	0.241	-	1.067	1.002	-	
2462	11	802.11b	DSSS	22	20.5	20.22	0.18	10 mm	1	21B04	1	front	99.8	0.186	-	1.067	1.002	-	
2462	11	802.11b	DSSS	22	20.5	20.22	-0.05	10 mm	1	21B04	1	top	99.8	0.324	0.221	1.067	1.002	**0.236**	A44
2462	11	802.11b	DSSS	22	20.5	20.22	0.19	10 mm	1	21B04	1	left	99.8	0.043	-	1.067	1.002	-	
2412	1	802.11b	DSSS	22	20.5	20.19	-0.11	10 mm	2	21B04	1	back	99.8	0.210	-	1.074	1.002	-	
2412	1	802.11b	DSSS	22	20.5	20.19	0.02	10 mm	2	21B04	1	front	99.8	0.192	-	1.074	1.002	-	
2412	1	802.11b	DSSS	22	20.5	20.19	0.16	10 mm	2	21B04	1	top	99.8	0.218	0.191	1.074	1.002	0.206	
2412	1	802.11b	DSSS	22	20.5	20.19	0.02	10 mm	2	21B04	1	left	99.8	0.146	-	1.074	1.002	-	
5775	155	802.11ac	OFDM	80	17.5	16.81	0.18	10 mm	1	5E0CA	29.3	back	93.2	0.884	0.449	1.172	1.073	0.565	
5775	155	802.11ac	OFDM	80	17.5	16.81	0.15	10 mm	1	5E0CA	29.3	front	93.2	0.060	-	1.172	1.073	-	
5775	155	802.11ac	OFDM	80	17.5	16.81	0.18	10 mm	1	5E0CA	29.3	top	93.2	0.304	0.126	1.172	1.073	0.158	
5775	155	802.11ac	OFDM	80	17.5	16.81	-0.13	10 mm	1	5E0CA	29.3	left	93.2	0.091	-	1.172	1.073	-	
5775	155	802.11ac	OFDM	80	17.5	16.65	-0.04	10 mm	2	5E0CA	29.3	back	93.2	1.484	0.702	1.216	1.073	**0.916**	
5775	155	802.11ac	OFDM	80	17.5	16.65	-0.16	10 mm	2	5E0CA	29.3	front	93.2	0.222	-	1.216	1.073	-	
5775	155	802.11ac	OFDM	80	17.5	16.65	-0.13	10 mm	2	5E0CA	29.3	top	93.2	0.406	0.171	1.216	1.073	0.223	
5775	155	802.11ac	OFDM	80	17.5	16.65	0.12	10 mm	2	5E0CA	29.3	left	93.2	0.245	-	1.216	1.073	-	
ANSI / IEEE C95.1 1992 - SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population												Body 1.6 W/kg (mW/g) averaged over 1 gram							

Table 11-36
WLAN MIMO Hotspot SAR

MEASUREMENT RESULTS																					
FREQUENCY		Mode	Service	Bandwidth [MHz]	Maximum Allowed Power (Ant 1) [dBm]	Conducted Power (Ant 1) [dBm]	Maximum Allowed Power (Ant 2) [dBm]	Conducted Power (Ant 2) [dBm]	Power Drift [dB]	Spacing	Antenna Config.	Device Serial Number	Data Rate (Mbps)	Side	Duty Cycle (%)	Peak SAR of Area Scan	SAR (1g)	Scaling Factor (Power)	Scaling Factor (Duty Cycle)	Reported SAR (1g)	Plot #
MHz	Ch.															W/kg	(W/kg)			(W/kg)	
5775	155	802.11ac	OFDM	80	15.5	14.76	15.5	15.12	0.02	10 mm	MIMO	5E0CA	58.5	back	92.3	1.374	0.766	1.186	1.083	0.984	A46
5775	155	802.11ac	OFDM	80	15.5	14.76	15.5	15.12	-0.11	10 mm	MIMO	5E0CA	58.5	front	92.3	0.090	-	1.186	1.083	-	
5775	155	802.11ac	OFDM	80	15.5	14.76	15.5	15.12	0.18	10 mm	MIMO	5E0CA	58.5	top	92.3	0.296	0.114	1.186	1.083	0.146	
5775	155	802.11ac	OFDM	80	15.5	14.76	15.5	15.12	0.18	10 mm	MIMO	5E0CA	58.5	left	92.3	0.121	-	1.186	1.083	-	
ANSI / IEEE C95.1 1992 - SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population																Body 1.6 W/kg (mW/g) averaged over 1 gram					

To achieve the 18.5 dBm maximum allowed MIMO power shown in the documentation, each antenna transmits at a maximum allowed power of 15.5 dBm.

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Table 11-37
WLAN MIMO Hotspot SAR for Conditions with 2.4 GHz and 5 GHz WLAN

MEASUREMENT RESULTS																					
FREQUENCY		Mode	Service	Bandwidth [MHz]	Maximum Allowed Power (Ant 1) [dBm]	Conducted Power (Ant 1) [dBm]	Maximum Allowed Power (Ant 2) [dBm]	Conducted Power (Ant 2) [dBm]	Power Drift [dB]	Spacing	Antenna Config.	Device Serial Number	Data Rate (Mbps)	Side	Duty Cycle (%)	Peak SAR of Area Scan	SAR (1g)	Scaling Factor (Power)	Scaling Factor (Duty Cycle)	Reported SAR (1g)	Plot #
MHz	Ch.															W/kg	(W/kg)			(W/kg)	
2462	11	802.11n	OFDM	20	16.5	16.13	16.5	16.27	0.18	10 mm	MIMO	5D4E2	13	back	97.8	0.189	-	1.089	1.022	-	
2462	11	802.11n	OFDM	20	16.5	16.13	16.5	16.27	0.11	10 mm	MIMO	5D4E2	13	front	97.8	0.155	-	1.089	1.022	-	
2462	11	802.11n	OFDM	20	16.5	16.13	16.5	16.27	-0.04	10 mm	MIMO	5D4E2	13	top	97.8	0.197	0.163	1.089	1.022	0.181	
2462	11	802.11n	OFDM	20	16.5	16.13	16.5	16.27	0.01	10 mm	MIMO	5D4E2	13	left	97.8	0.080	-	1.089	1.022	-	
5775	155	802.11ac	OFDM	80	13.5	13.07	13.5	13.00	-0.02	10 mm	MIMO	5E0CA	58.5	back	92.3	1.007	0.481	1.122	1.083	0.584	
5775	155	802.11ac	OFDM	80	13.5	13.07	13.5	13.00	0.11	10 mm	MIMO	5E0CA	58.5	front	92.3	0.079	-	1.122	1.083	-	
5775	155	802.11ac	OFDM	80	13.5	13.07	13.5	13.00	0.18	10 mm	MIMO	5E0CA	58.5	top	92.3	0.209	0.073	1.122	1.083	0.089	
5775	155	802.11ac	OFDM	80	13.5	13.07	13.5	13.00	0.11	10 mm	MIMO	5E0CA	58.5	left	92.3	0.102	-	1.122	1.083	-	
ANSI / IEEE C95.1 1992 - SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population														Body 1.6 W/kg (mW/g) averaged over 1 gram							

DTS MIMO and NII MIMO were additionally evaluated at the maximum allowed output power during operations with Simultaneous 2.4 GHz and 5 GHz WLAN. 2.4 GHz WIFI was not transmitting during the NII evaluations, and 5 GHz WIFI was not transmitting during the DTS evaluations.

Table 11-38
DSS Hotspot SAR

MEASUREMENT RESULTS															
FREQUENCY		Mode	Service	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Power Drift [dB]	Spacing	Device Serial Number	Data Rate (Mbps)	Side	Duty Cycle	SAR (1g)	Scaling Factor (Cond Power)	Scaling Factor (Duty Cycle)	Reported SAR (1g)	Plot #
MHz	Ch.											(W/kg)			(W/kg)	
2402	0	Bluetooth	FHSS	15.5	15.04	-0.12	10 mm	5E0CA	1	back	77.3	0.093	1.112	1.294	**0.134**	A48
2402	0	Bluetooth	FHSS	15.5	15.04	-0.08	10 mm	5E0CA	1	front	77.3	0.057	1.112	1.294	0.082	
2402	0	Bluetooth	FHSS	15.5	15.04	-0.08	10 mm	5E0CA	1	top	77.3	0.089	1.112	1.294	**0.128**	
2402	0	Bluetooth	FHSS	15.5	15.04	-0.13	10 mm	5E0CA	1	left	77.3	0.041	1.112	1.294	0.059	
ANSI / IEEE C95.1 1992 - SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population										Body 1.6 W/kg (mW/g) averaged over 1 gram						

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11.4 SAR Test Notes

General Notes:

1. The test data reported are the worst-case SAR values according to test procedures specified in IEEE 1528-2013, and FCC KDB Publication 447498 D01v06.
2. Batteries are fully charged at the beginning of the SAR measurements.
3. Liquid tissue depth was at least 15.0 cm for all frequencies.
4. The manufacturer has confirmed that the device(s) tested have the same physical, mechanical and thermal characteristics and are within operational tolerances expected for production units.
5. SAR results were scaled to the maximum allowed power to demonstrate compliance per FCC KDB Publication 447498 D01v06.
6. Device was tested using a fixed spacing for body-worn accessory testing. A separation distance of 15 mm was considered because the manufacturer has determined that there will be body-worn accessories available in the marketplace for users to support this separation distance.
7. Per FCC KDB Publication 648474 D04v01r03, body-worn SAR was evaluated without a headset connected to the device. Since the standalone reported body-worn SAR was ≤ 1.2 W/kg, no additional body-worn SAR evaluations using a headset cable were required.
8. Per FCC KDB Publication 865664 D01v01r04, variability SAR tests were not required since measured SAR results for all frequency bands were less than 0.8 W/kg.
9. During SAR Testing for the Wireless Router conditions per FCC KDB Publication 941225 D06v02r01, the actual Portable Hotspot operation (with actual simultaneous transmission of a transmitter with WIFI) was not activated (See Section 6.7 for more details).
10. This device utilizes power reduction for some wireless modes and technologies, as outlined in Section 1.2. The maximum output power allowed for each transmitter and exposure condition was evaluated for SAR compliance based on expected use conditions and simultaneous transmission scenarios.

GSM Test Notes:

1. Body-Worn accessory testing is typically associated with voice operations. Therefore, GSM voice was evaluated for body-worn SAR.
2. Justification for reduced test configurations per KDB Publication 941225 D01v03r01 and October 2013 TCB Workshop Notes: The source-based frame-averaged output power was evaluated for all GPRS/EDGE slot configurations. The configuration with the highest target frame averaged output power was evaluated for hotspot SAR. When the maximum frame-averaged powers are equivalent across two or more slots (within 0.25 dB), the configuration with the most number of time slots was tested.
3. Per FCC KDB Publication 447498 D01v06, if the reported (scaled) SAR measured at the middle channel or highest output power channel for each test configuration is ≤ 0.8 W/kg for 1g evaluations then testing at the other channels is not required for such test configuration(s). When the maximum output power variation across the required test channels is > ½ dB, instead of the middle channel, the highest output power channel was used.

CDMA Notes:

1. Head SAR for CDMA2000 mode was tested under RC3/SO55 per FCC KDB Publication 941225 D01v03r01.
2. Body-Worn SAR was tested with 1x RTT with TDSO / SO32 FCH Only. EVDO Rev0 and RevA and TDSO / SO32 FCH+SCH SAR tests were not required per the 3G SAR Test Reduction Procedure in FCC KDB Publication 941225 D01v03r01.
3. CDMA Wireless Router SAR is measured using Subtype 0/1 Physical Layer configurations for Rev. 0 according to KDB 941225 D01v03r01 procedures for data devices. Wireless Router SAR tests for Subtype 2 of Rev.A and 1x RTT configurations were not required per the 3G SAR Test Reduction Policy in KDB Publication 941225 D01v03r01.
4. Head SAR was additionally evaluated using EVDO Rev. A to determine compliance for VoIP operations.
5. Per FCC KDB Publication 447498 D01v06, if the reported (scaled) SAR measured at the middle channel or highest output power channel for each test configuration is ≤ 0.8 W/kg for 1g evaluations then testing at

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the other channels is not required for such test configuration(s). When the maximum output power variation across the required test channels is > ½ dB, instead of the middle channel, the highest output power channel was used.

6. CDMA 1X Advanced technology was not required for SAR since the maximum allowed output powers for 1X Advanced was not more than 0.25 dB higher than the maximum powers for 1X.

UMTS Notes:

1. UMTS mode in was tested under RMC 12.2 kbps with HSPA Inactive per KDB Publication 941225 D01v03r01. AMR and HSPA SAR was not required per the 3G Test Reduction Procedure in KDB Publication 941225 D01v03r01.
2. Per FCC KDB Publication 447498 D01v06, if the reported (scaled) SAR measured at the middle channel or highest output power channel for each test configuration is ≤ 0.8 W/kg for 1g evaluations then testing at the other channels is not required for such test configuration(s). When the maximum output power variation across the required test channels is > ½ dB, instead of the middle channel, the highest output power channel was used.

LTE Notes:

1. LTE Considerations: LTE test configurations are determined according to SAR Evaluation Considerations for LTE Devices in FCC KDB Publication 941225 D05v02r04. The general test procedures used for testing can be found in Section 8.6.4.
2. MPR is permanently implemented for this device by the manufacturer. The specific manufacturer target MPR is indicated alongside the SAR results. MPR is enabled for this device, according to 3GPP TS36.101 Section 6.2.3 – 6.2.5 under Table 6.2.3-1.
3. A-MPR was disabled for all SAR tests by setting NS=01 on the base station simulator. SAR tests were performed with the same number of RB and RB offsets transmitting on all TTI frames (maximum TTI).
4. Per FCC KDB Publication 447498 D01v06, when the reported (scaled) for LTE Band 41 SAR measured at the highest output power channel in a given a test configuration was > 0.6 W/kg for 1g evaluations, testing at the other channels was required for such test configurations.
5. TDD LTE was tested per the guidance provided in FCC KDB Publication 941225 D05v02r04. Testing was performed using UL-DL configuration 0 with 6 UL subframes and 2 S subframes using extended cyclic prefix only and special subframe configuration 6. SAR tests were performed at maximum output power and worst-case transmission duty factor in extended cyclic prefix. Per 3GPP 36.211 Section 4, the duty factor for special subframe configuration 6 using extended cyclic prefix is 0.633.
6. Per KDB Publication 941225 D05Av01r02, SAR for downlink only LTE CA operations was not needed since the maximum average output power in LTE CA mode was not >0.25 dB higher than the maximum output power when downlink carrier aggregation was inactive.
7. For LTE Band 41, per FCC guidance, SAR was first measured with only a single carrier active in the uplink (carrier aggregation not active). For each exposure condition, the uplink CA scenario with two component carriers was additionally tested for the configuration with the highest SAR when carrier aggregation was not active. The SCC was configured with the closest available contiguous channel. The two component carriers were configured so the resource blocks are physically allocated side by side to achieve the maximum output power.

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WLAN Notes:

1. For held-to-ear and hotspot operations, the initial test position procedures were applied. The test position with the highest extrapolated peak SAR will be used as the initial test position. When reported SAR for the initial test position is ≤ 0.4 W/kg for 1g evaluations, no additional testing for the remaining test positions was required. Otherwise, SAR is evaluated at the subsequent highest peak SAR positions until the reported SAR result is ≤ 0.8 W/kg or all test positions are measured.
2. Justification for test configurations for WLAN per KDB Publication 248227 D01v02r02 for 2.4 GHz WIFI single transmission chain operations, the highest measured maximum output power channel for DSSS was selected for SAR measurement. SAR for OFDM modes (2.4 GHz 802.11g/n) was not required due to the maximum allowed powers and the highest reported DSSS SAR. See Section 8.7.5 for more information.
3. Justification for test configurations for WLAN per KDB Publication 248227 D01v02r02 for 5 GHz WIFI single transmission chain operations, the initial test configuration was selected according to the transmission mode with the highest maximum allowed powers. Other transmission modes were not investigated since the highest reported SAR for initial test configuration adjusted by the ratio of maximum output powers is less than 1.2 W/kg for 1g evaluations. See Section 8.7.6 for more information.
4. Per KDB Publication 248227 D01v02r02, SAR for MIMO was evaluated by following the simultaneous SAR provisions from KDB Publication 447498 D01v06 by either evaluating the sum of the 1g SAR values of each antenna transmitting independently or making a SAR measurement with both antennas transmitting simultaneously. Please see Section 12 for complete analysis.
5. When the maximum reported 1g averaged SAR is ≤0.8 W/kg, SAR testing on additional channels was not required. Otherwise, SAR for the next highest output power channel was required until the reported SAR result was ≤ 1.20 W/kg for 1g evaluations or all test channels were measured.
6. The device was configured to transmit continuously at the required data rate, channel bandwidth and signal modulation, using the highest transmission duty factor supported by the test mode tools. The reported SAR was scaled to the 100% transmission duty factor to determine compliance. Procedures used to measure the duty factor are identical to that in the associated EMC test reports.

Bluetooth Notes

1. Bluetooth SAR was measured with the device connected to a call box with hopping disabled with DH5 operation and Tx Tests test mode type. Per October 2016 TCB Workshop Notes, the reported SAR was scaled to the 100% transmission duty factor to determine compliance. See Section 9.6 for the time domain plot and calculation for the duty factor of the device.
2. Head and hotspot Bluetooth SAR was evaluated for BT BR tethering applications.

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12 FCC MULTI-TX AND ANTENNA SAR CONSIDERATIONS

12.1.1 Introduction

The following procedures adopted from FCC KDB Publication 447498 D01v06 are applicable to devices with built-in unlicensed transmitters such as 802.11 and Bluetooth devices which may simultaneously transmit with the licensed transmitter.

12.2 Simultaneous Transmission Procedures

This device contains transmitters that may operate simultaneously. Therefore simultaneous transmission analysis is required. Per FCC KDB Publication 447498 D01v06 4.3.2 and IEEE 1528-2013 Section 6.3.4.1.2, simultaneous transmission SAR test exclusion may be applied when the sum of the 1g SAR for all the simultaneous transmitting antennas in a specific a physical test configuration is ≤1.6 W/kg. The different test positions in an exposure condition may be considered collectively to determine SAR test exclusion according to the sum of 1g or 10g SAR.

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12.3 Head SAR Simultaneous Transmission Analysis

Table 12-1
Simultaneous Transmission Scenario with 2.4 GHz WLAN (Held to Ear)

Exposure Condition	Mode	2G/3G/4G SAR (W/kg)	2.4 GHz WLAN Ant 1 SAR (W/kg)	2.4 GHz WLAN Ant 2 SAR (W/kg)	Σ SAR (W/kg)		
		1	2	3	1+2	1+3	1+2+3
Head SAR	Cell. CDMA/EVDO	0.380	0.297	0.574	0.677	0.954	**1.251**
	GSM 850	0.247	0.297	0.574	0.544	0.821	1.118
	GSM 1900	0.079	0.297	0.574	0.376	0.653	0.950
	UMTS 850	0.231	0.297	0.574	0.528	0.805	1.102
	UMTS 1750	0.181	0.297	0.574	0.478	0.755	1.052
	UMTS 1900	0.149	0.297	0.574	0.446	0.723	1.020
	LTE Band 12	0.114	0.297	0.574	0.411	0.688	0.985
	LTE Band 13	0.206	0.297	0.574	0.503	0.780	1.077
	LTE Band 26 (Cell)	0.215	0.297	0.574	0.512	0.789	1.086
	LTE Band 5 (Cell)	0.268	0.297	0.574	0.565	0.842	1.139
	LTE Band 66 (AWS)	0.214	0.297	0.574	0.511	0.788	1.085
	LTE Band 25 (PCS)	0.125	0.297	0.574	0.422	0.699	0.996
	LTE Band 41	0.085	0.297	0.574	0.382	0.659	0.956

Table 12-2
Simultaneous Transmission Scenario with 5 GHz WLAN (Held to Ear)

Exposure Condition	Mode	2G/3G/4G SAR (W/kg)	5 GHz WLAN Ant 1 SAR (W/kg)	5 GHz WLAN Ant 2 SAR (W/kg)	Σ SAR (W/kg)		
		1	2	3	1+2	1+3	1+2+3
Head SAR	Cell. CDMA/EVDO	0.380	0.061	0.450	0.441	0.830	**0.891**
	GSM 850	0.247	0.061	0.450	0.308	0.697	0.758
	GSM 1900	0.079	0.061	0.450	0.140	0.529	0.590
	UMTS 850	0.231	0.061	0.450	0.292	0.681	0.742
	UMTS 1750	0.181	0.061	0.450	0.242	0.631	0.692
	UMTS 1900	0.149	0.061	0.450	0.210	0.599	0.660
	LTE Band 12	0.114	0.061	0.450	0.175	0.564	0.625
	LTE Band 13	0.206	0.061	0.450	0.267	0.656	0.717
	LTE Band 26 (Cell)	0.215	0.061	0.450	0.276	0.665	0.726
	LTE Band 5 (Cell)	0.268	0.061	0.450	0.329	0.718	0.779
	LTE Band 66 (AWS)	0.214	0.061	0.450	0.275	0.664	0.725
	LTE Band 25 (PCS)	0.125	0.061	0.450	0.186	0.575	0.636
	LTE Band 41	0.085	0.061	0.450	0.146	0.535	0.596

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Table 12-3
Simultaneous Transmission Scenario with 2.4 GHz WLAN MIMO and 5 GHz WLAN MIMO (Held to Ear)

Exposure Condition	Mode	2G/3G/4G SAR (W/kg)	2.4 GHz WLAN MIMO at 13 dBm SAR (W/kg)	5 GHz WLAN Ant 1 SAR (W/kg)	5 GHz WLAN Ant 2 SAR (W/kg)	Σ SAR (W/kg)
		1	2	3	4	1+2+3+4
Head SAR	Cell. CDMA/EVDO	0.380	0.414	0.061	0.450	**1.305**
	GSM 850	0.247	0.414	0.061	0.450	1.172
	GSM 1900	0.079	0.414	0.061	0.450	1.004
	UMTS 850	0.231	0.414	0.061	0.450	1.156
	UMTS 1750	0.181	0.414	0.061	0.450	1.106
	UMTS 1900	0.149	0.414	0.061	0.450	1.074
	LTE Band 12	0.114	0.414	0.061	0.450	1.039
	LTE Band 13	0.206	0.414	0.061	0.450	1.131
	LTE Band 26 (Cell)	0.215	0.414	0.061	0.450	1.140
	LTE Band 5 (Cell)	0.268	0.414	0.061	0.450	1.193
	LTE Band 66 (AWS)	0.214	0.414	0.061	0.450	1.139
	LTE Band 25 (PCS)	0.125	0.414	0.061	0.450	1.050
	LTE Band 41	0.085	0.414	0.061	0.450	1.010

Table 12-4
Simultaneous Transmission Scenario with Bluetooth (Held to Ear)

Exposure Condition	Mode	2G/3G/4G SAR (W/kg)	Bluetooth SAR (W/kg)	Σ SAR (W/kg)
		1	2	1+2
Head SAR	Cell. CDMA/EVDO	0.380	1.050	**1.430**
	GSM 850	0.247	1.050	1.297
	GSM 1900	0.079	1.050	1.129
	UMTS 850	0.231	1.050	1.281
	UMTS 1750	0.181	1.050	1.231
	UMTS 1900	0.149	1.050	1.199
	LTE Band 12	0.114	1.050	1.164
	LTE Band 13	0.206	1.050	1.256
	LTE Band 26 (Cell)	0.215	1.050	1.265
	LTE Band 5 (Cell)	0.268	1.050	1.318
	LTE Band 66 (AWS)	0.214	1.050	1.264
	LTE Band 25 (PCS)	0.125	1.050	1.175
	LTE Band 41	0.085	1.050	1.135

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12.4 Body-Worn Simultaneous Transmission Analysis

Table 12-5
Simultaneous Transmission Scenario with 2.4 GHz WLAN (Body-Worn at 1.5 cm)

Exposure Condition	Mode	2G/3G/4G SAR (W/kg)	2.4 GHz WLAN Ant 1 SAR (W/kg)	2.4 GHz WLAN Ant 2 SAR (W/kg)	Σ SAR (W/kg)		
		1	2	3	1+2	1+3	1+2+3
Body-Worn	Cell. CDMA	0.498	0.104	0.110	0.602	0.608	0.712
	GSM 850	0.331	0.104	0.110	0.435	0.441	0.545
	GSM 1900	0.424	0.104	0.110	0.528	0.534	0.638
	UMTS 850	0.333	0.104	0.110	0.437	0.443	0.547
	UMTS 1750	0.477	0.104	0.110	0.581	0.587	0.691
	UMTS 1900	0.762	0.104	0.110	0.866	0.872	0.976
	LTE Band 12	0.242	0.104	0.110	0.346	0.352	0.456
	LTE Band 13	0.268	0.104	0.110	0.372	0.378	0.482
	LTE Band 26 (Cell)	0.310	0.104	0.110	0.414	0.420	0.524
	LTE Band 5 (Cell)	0.357	0.104	0.110	0.461	0.467	0.571
	LTE Band 66 (AWS)	0.777	0.104	0.110	0.881	0.887	0.991
	LTE Band 25 (PCS)	0.871	0.104	0.110	0.975	0.981	**1.085**
	LTE Band 41	0.316	0.104	0.110	0.420	0.426	0.530

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Table 12-6
Simultaneous Transmission Scenario with 5 GHz WLAN (Body-Worn at 1.5 cm)

Exposure Condition	Mode	2G/3G/4G SAR (W/kg)	5 GHz WLAN Ant 1 SAR (W/kg)	5 GHz WLAN Ant 2 SAR (W/kg)	Σ SAR (W/kg)	
		1	2	3	1+2	1+3
Body-Worn	Cell. CDMA	0.498	0.303	0.718	0.801	1.216
	GSM 850	0.331	0.303	0.718	0.634	1.049
	GSM 1900	0.424	0.303	0.718	0.727	1.142
	UMTS 850	0.333	0.303	0.718	0.636	1.051
	UMTS 1750	0.477	0.303	0.718	0.780	1.195
	UMTS 1900	0.762	0.303	0.718	1.065	1.480
	LTE Band 12	0.242	0.303	0.718	0.545	0.960
	LTE Band 13	0.268	0.303	0.718	0.571	0.986
	LTE Band 26 (Cell)	0.310	0.303	0.718	0.613	1.028
	LTE Band 5 (Cell)	0.357	0.303	0.718	0.660	1.075
	LTE Band 66 (AWS)	0.777	0.303	0.718	1.080	1.495
	LTE Band 25 (PCS)	0.871	0.303	0.718	1.174	**1.589**
	LTE Band 41	0.316	0.303	0.718	0.619	1.034

Table 12-7
Simultaneous Transmission Scenario with 5 GHz WLAN MIMO (Body-Worn at 1.5 cm)

Exposure Condition	Mode	2G/3G/4G SAR (W/kg)	5 GHz WLAN MIMO SAR (W/kg)	Σ SAR (W/kg)	SPLSR
		1	2	1+2	1+2
Body-Worn	Cell. CDMA	0.498	0.868	**1.366**	N/A
	GSM 850	0.331	0.868	1.199	N/A
	GSM 1900	0.424	0.868	1.292	N/A
	UMTS 850	0.333	0.868	1.201	N/A
	UMTS 1750	0.477	0.868	1.345	N/A
	UMTS 1900	0.762	0.868	See Note 1	0.02
	LTE Band 12	0.242	0.868	1.110	N/A
	LTE Band 13	0.268	0.868	1.136	N/A
	LTE Band 26 (Cell)	0.310	0.868	1.178	N/A
	LTE Band 5 (Cell)	0.357	0.868	1.225	N/A
	LTE Band 66 (AWS)	0.777	0.868	See Note 1	0.02
	LTE Band 25 (PCS)	0.871	0.868	See Note 1	0.02
	LTE Band 41	0.316	0.868	1.184	N/A

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Table 12-8
Simultaneous Transmission Scenario with 2.4 GHz WLAN MIMO and 5 GHz WLAN MIMO (Body-Worn at 1.5 cm)

Exposure Condition	Mode	2G/3G/4G SAR (W/kg)	2.4 GHz WLAN MIMO at 16 dBm SAR (W/kg)	5 GHz WLAN MIMO at 13 dBm SAR (W/kg)	Σ SAR (W/kg)
		1	2	3	1+2+3
Body-Worn	Cell. CDMA	0.498	0.082	0.335	0.915
	GSM 850	0.331	0.082	0.335	0.748
	GSM 1900	0.424	0.082	0.335	0.841
	UMTS 850	0.333	0.082	0.335	0.750
	UMTS 1750	0.477	0.082	0.335	0.894
	UMTS 1900	0.762	0.082	0.335	1.179
	LTE Band 12	0.242	0.082	0.335	0.659
	LTE Band 13	0.268	0.082	0.335	0.685
	LTE Band 26 (Cell)	0.310	0.082	0.335	0.727
	LTE Band 5 (Cell)	0.357	0.082	0.335	0.774
	LTE Band 66 (AWS)	0.777	0.082	0.335	1.194
	LTE Band 25 (PCS)	0.871	0.082	0.335	**1.288**
	LTE Band 41	0.316	0.082	0.335	0.733

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Table 12-9
Simultaneous Transmission Scenario with Bluetooth (Body-Worn at 1.5 cm)

Exposure Condition	Mode	2G/3G/4G SAR (W/kg)	Bluetooth SAR (W/kg)	Σ SAR (W/kg)
		1	2	1+2
Body-Worn	Cell. CDMA	0.498	0.047	0.545
	GSM 850	0.331	0.047	0.378
	GSM 1900	0.424	0.047	0.471
	UMTS 850	0.333	0.047	0.380
	UMTS 1750	0.477	0.047	0.524
	UMTS 1900	0.762	0.047	0.809
	LTE Band 12	0.242	0.047	0.289
	LTE Band 13	0.268	0.047	0.315
	LTE Band 26 (Cell)	0.310	0.047	0.357
	LTE Band 5 (Cell)	0.357	0.047	0.404
	LTE Band 66 (AWS)	0.777	0.047	0.824
	LTE Band 25 (PCS)	0.871	0.047	**0.918**
	LTE Band 41	0.316	0.047	0.363

Notes:
1. No evaluation was performed to determine the aggregate 1g SAR for these configurations as the SPLS ratio between the antenna pairs was not greater than 0.04 per FCC KDB 447498 D01v06. See Section 12.6 for detailed SPLS ratio analysis.

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12.5 Hotspot SAR Simultaneous Transmission Analysis

Per FCC KDB Publication 941225 D06v02r01, the devices edges with antennas more than 2.5 cm from edge are not required to be evaluated for SAR ("-").

(*) For SAR summation, the highest reported SAR across all test distances was used as the most conservative evaluation for simultaneous transmission analysis for each device edge.

Table 12-10
Simultaneous Transmission Scenario with 2.4 GHz WLAN (Hotspot at 1.0 cm)

Exposure Condition	Mode	2G/3G/4G SAR (W/kg)	2.4 GHz WLAN Ant 1 SAR (W/kg)	2.4 GHz WLAN Ant 2 SAR (W/kg)	Σ SAR (W/kg)		
		1	2	3	1+2	1+3	1+2+3
Hotspot SAR	Cell. EVDO	0.785	0.236	0.206	1.021	0.991	1.227
	GPRS 850	0.504	0.236	0.206	0.740	0.710	0.946
	GPRS 1900	0.593	0.236	0.206	0.829	0.799	1.035
	UMTS 850	0.510	0.236	0.206	0.746	0.716	0.952
	UMTS 1750	0.509	0.236	0.206	0.745	0.715	0.951
	UMTS 1900	0.543	0.236	0.206	0.779	0.749	0.985
	LTE Band 12	0.342	0.236	0.206	0.578	0.548	0.784
	LTE Band 13	0.466	0.236	0.206	0.702	0.672	0.908
	LTE Band 26 (Cell)	0.467	0.236	0.206	0.703	0.673	0.909
	LTE Band 5 (Cell)	0.552	0.236	0.206	0.788	0.758	0.994
	LTE Band 66 (AWS)	0.788	0.236	0.206	1.024	0.994	**1.230**
	LTE Band 25 (PCS)	0.626	0.236	0.206	0.862	0.832	1.068
	LTE Band 41	0.509	0.236	0.206	0.745	0.715	0.951

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Table 12-11
Simultaneous Transmission Scenario with 5 GHz WLAN (Hotspot at 1.0 cm)

Exposure Condition	Mode	2G/3G/4G SAR (W/kg)	5 GHz WLAN Ant 1 SAR (W/kg)	5 GHz WLAN Ant 2 SAR (W/kg)	Σ SAR (W/kg)	
		1	2	3	1+2	1+3
Hotspot SAR	Cell. EVDO	0.785	0.565	0.916	1.350	See Table Below
	GPRS 850	0.504	0.565	0.916	1.069	1.420
	GPRS 1900	0.593	0.565	0.916	1.158	1.509
	UMTS 850	0.510	0.565	0.916	1.075	1.426
	UMTS 1750	0.509	0.565	0.916	1.074	1.425
	UMTS 1900	0.543	0.565	0.916	1.108	1.459
	LTE Band 12	0.342	0.565	0.916	0.907	1.258
	LTE Band 13	0.466	0.565	0.916	1.031	1.382
	LTE Band 26 (Cell)	0.467	0.565	0.916	1.032	1.383
	LTE Band 5 (Cell)	0.552	0.565	0.916	1.117	1.468
	LTE Band 66 (AWS)	0.788	0.565	0.916	1.353	See Table Below
	LTE Band 25 (PCS)	0.626	0.565	0.916	1.191	**1.542**
	LTE Band 41	0.509	0.565	0.916	1.074	1.425

Simult Tx	Configuration	Cell. EVDO SAR (W/kg)	5 GHz WLAN Ant 2 SAR (W/kg)	Σ SAR (W/kg)	SPLSR
		1	2	1+2	1+2
Hotspot SAR	Back	0.785	0.916	See Note 1	0.02
	Front	0.589	0.916*	**1.505**	N/A
	Top	-	0.223	0.223	N/A
	Bottom	0.431	-	0.431	N/A
	Right	0.599	-	0.599	N/A
	Left	0.174	0.916*	1.090	N/A

Simult Tx	Configuration	LTE Band 66 (AWS) SAR (W/kg)	5 GHz WLAN Ant 2 SAR (W/kg)	Σ SAR (W/kg)
		1	2	1+2
Hotspot SAR	Back	0.525	0.916	**1.441**
	Front	0.449	0.916*	1.365
	Top	-	0.223	0.223
	Bottom	0.788	-	0.788
	Right	0.087	-	0.087
	Left	0.120	0.916*	1.036

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Table 12-12
Simultaneous Transmission Scenario with 5 GHz WLAN MIMO (Hotspot at 1.0 cm)

Exposure Condition	Mode	2G/3G/4G SAR (W/kg)	5 GHz WLAN MIMO SAR (W/kg)	Σ SAR (W/kg)
		1	2	1+2
Hotspot SAR	Cell. EVDO	0.785	0.984	See Table Below
	GPRS 850	0.504	0.984	1.488
	GPRS 1900	0.593	0.984	**1.577**
	UMTS 850	0.510	0.984	1.494
	UMTS 1750	0.509	0.984	1.493
	UMTS 1900	0.543	0.984	1.527
	LTE Band 12	0.342	0.984	1.326
	LTE Band 13	0.466	0.984	1.450
	LTE Band 26 (Cell)	0.467	0.984	1.451
	LTE Band 5 (Cell)	0.552	0.984	1.536
	LTE Band 66 (AWS)	0.788	0.984	See Table Below
	LTE Band 25 (PCS)	0.626	0.984	See Table Below
	LTE Band 41	0.509	0.984	1.493

Simult Tx	Configuration	Cell. EVDO SAR (W/kg)	5 GHz WLAN MIMO SAR (W/kg)	Σ SAR (W/kg)	SPLSR
		1	2	1+2	1+2
Hotspot SAR	Back	0.785	0.984	See Note 1	0.02
	Front	0.589	0.984*	**1.573**	N/A
	Top	-	0.146	0.146	N/A
	Bottom	0.431	-	0.431	N/A
	Right	0.599	-	0.599	N/A
	Left	0.174	0.984*	1.158	N/A

Simult Tx	Configuration	LTE Band 66 (AWS) SAR (W/kg)	5 GHz WLAN MIMO SAR (W/kg)	Σ SAR (W/kg)
		1	2	1+2
Hotspot SAR	Back	0.525	0.984	**1.509**
	Front	0.449	0.984*	1.433
	Top	-	0.146	0.146
	Bottom	0.788	-	0.788
	Right	0.087	-	0.087
	Left	0.120	0.984*	1.104

Simult Tx	Configuration	LTE Band 25 (PCS) SAR (W/kg)	5 GHz WLAN MIMO SAR (W/kg)	Σ SAR (W/kg)
		1	2	1+2
Hotspot SAR	Back	0.446	0.984	**1.430**
	Front	0.333	0.984*	1.317
	Top	-	0.146	0.146
	Bottom	0.626	-	0.626
	Right	0.075	-	0.075
	Left	0.044	0.984*	1.028

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Table 12-13
Simultaneous Transmission Scenario with 2.4 GHz WLAN MIMO and 5 GHz WLAN MIMO (Hotspot at 1.0 cm)

Exposure Condition	Mode	2G/3G/4G SAR (W/kg)	2.4 GHz WLAN MIMO at 16 dBm SAR (W/kg)	5 GHz WLAN MIMO at 13 dBm SAR (W/kg)	Σ SAR (W/kg)
		1	2	3	1+2+3
Hotspot SAR	Cell. EVDO	0.785	0.181	0.584	1.550
	GPRS 850	0.504	0.181	0.584	1.269
	GPRS 1900	0.593	0.181	0.584	1.358
	UMTS 850	0.510	0.181	0.584	1.275
	UMTS 1750	0.509	0.181	0.584	1.274
	UMTS 1900	0.543	0.181	0.584	1.308
	LTE Band 12	0.342	0.181	0.584	1.107
	LTE Band 13	0.466	0.181	0.584	1.231
	LTE Band 26 (Cell)	0.467	0.181	0.584	1.232
	LTE Band 5 (Cell)	0.552	0.181	0.584	1.317
	LTE Band 66 (AWS)	0.788	0.181	0.584	**1.553**
	LTE Band 25 (PCS)	0.626	0.181	0.584	1.391
	LTE Band 41	0.509	0.181	0.584	1.274

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Table 12-14
Simultaneous Transmission Scenario with Bluetooth (Hotspot at 1.0 cm)

Exposure Condition	Mode	2G/3G/4G SAR (W/kg)	Bluetooth SAR (W/kg)	Σ SAR (W/kg)
		1	2	1+2
Hotspot SAR	Cell. EVDO	0.785	0.134	0.919
	GPRS 850	0.504	0.134	0.638
	GPRS 1900	0.593	0.134	0.727
	UMTS 850	0.510	0.134	0.644
	UMTS 1750	0.509	0.134	0.643
	UMTS 1900	0.543	0.134	0.677
	LTE Band 12	0.342	0.134	0.476
	LTE Band 13	0.466	0.134	0.600
	LTE Band 26 (Cell)	0.467	0.134	0.601
	LTE Band 5 (Cell)	0.552	0.134	0.686
	LTE Band 66 (AWS)	0.788	0.134	**0.922**
	LTE Band 25 (PCS)	0.626	0.134	0.760
	LTE Band 41	0.509	0.134	0.643

Notes:
1. No evaluation was performed to determine the aggregate 1g SAR for these configurations as the SPLS ratio between the antenna pairs was not greater than 0.04 per FCC KDB 447498 D01v06. See Section 12.6 for detailed SPLS ratio analysis.

12.6 SPLSR Evaluation and Analysis

Per FCC KDB Publication 447498 D01v06, when the sum of the standalone transmitters is more than 1.6 W/kg for 1g, the SAR sum to peak locations can be analyzed to determine SAR distribution overlaps. When the SAR peak to location ratio (shown below) for each pair of antennas is
≤ 0.04 for 1g, simultaneous SAR evaluation is not required. The distance between the transmitters was calculated using the following formula.

$$\text{Distance}_{Tx1-Tx2} = R_i = \sqrt{(x_1 - x_2)^2 + (y_1 - y_2)^2}$$

$$\text{SPLS Ratio} = \frac{(SAR_1 + SAR_2)^{1.5}}{R_i}$$

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12.6.1 Body-Worn Back Side SPLSR Evaluation and Analysis

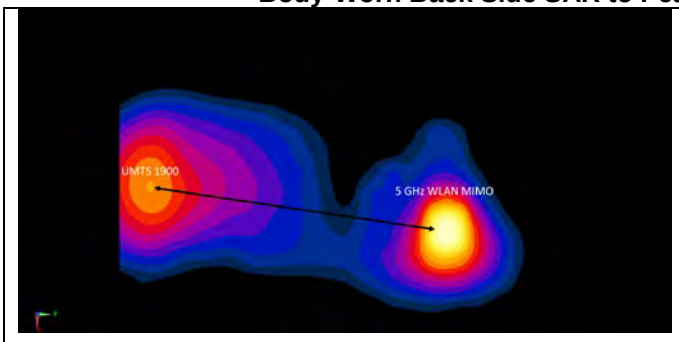
Table 12-15
Peak SAR Locations for Body-Worn Back Side

Mode/Band	x (mm)	y (mm)	Reported SAR (W/kg)
5 GHz WLAN MIMO	-1.00	67.00	0.868
UMTS 1900	-20.00	-70.00	0.762
LTE Band 66 (AWS)	-20.00	-70.50	0.777
LTE Band 25 (PCS)	-21.50	-70.00	0.871

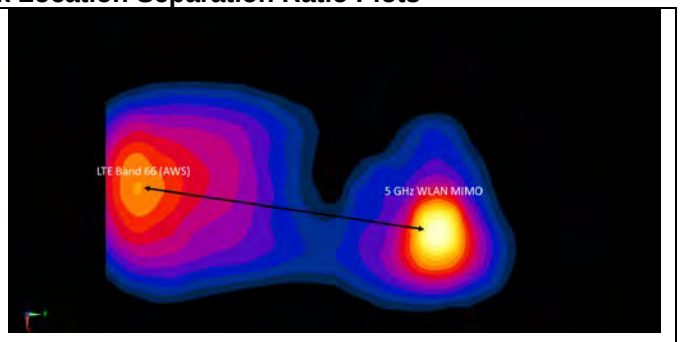
Table 12-16
Body-Worn Back Side SAR to Peak Location Separation Ratio Calculations

Antenna Pair		Standalone 1g SAR (W/kg)		Standalone SAR Sum (W/kg)	Peak SAR Separation Distance (mm)	SPLS Ratio	Plot Number
Ant "a"	Ant "b"	a	b	a+b	D_{a-b}	$(a+b)^{1.5}/D_{a-b}$	
5 GHz WLAN MIMO	UMTS 1900	0.868	0.762	1.630	138.31	0.02	1
5 GHz WLAN MIMO	LTE Band 66 (AWS)	0.868	0.777	1.645	138.81	0.02	2
5 GHz WLAN MIMO	LTE Band 25 (PCS)	0.868	0.871	1.739	138.53	0.02	3

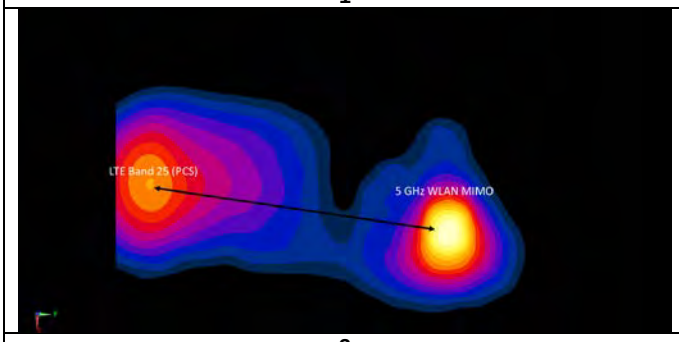
Table 12-17
Body-Worn Back Side SAR to Peak Location Separation Ratio Plots



1



2



3

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12.6.2 Hotspot Back Side SPLSR Evaluation and Analysis

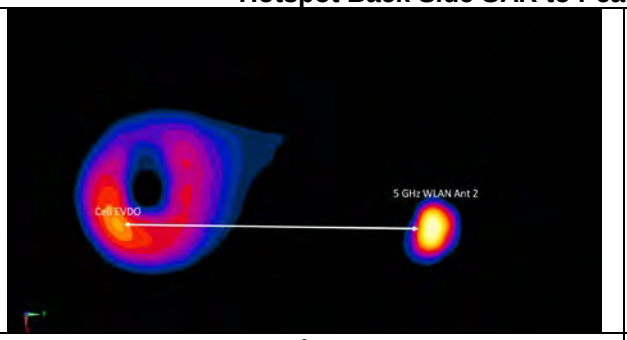
Table 12-18
Peak SAR Locations for Hotspot Back Side

Mode/Band	x (mm)	y (mm)	Reported SAR (W/kg)
5 GHz WLAN Ant 2	-2.00	67.00	0.916
5 GHz WLAN MIMO	-1.00	56.00	0.984
Cell. EVDO	-3.50	-72.00	0.785

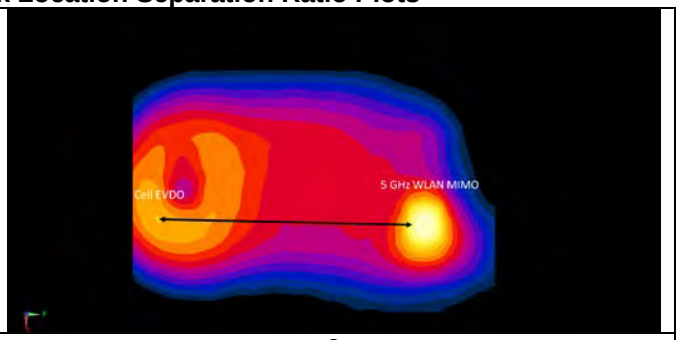
Table 12-19
Hotspot Back Side SAR to Peak Location Separation Ratio Calculations

Antenna Pair		Standalone 1g SAR (W/kg)		Standalone SAR Sum (W/kg)	Peak SAR Separation Distance (mm)	SPLS Ratio	Plot Number
Ant "a"	Ant "b"	a	b	a+b	D_{a-b}	$(a+b)^{1.5}/D_{a-b}$	
5 GHz WLAN Ant 2	Cell. EVDO	0.916	0.785	1.701	139.01	0.02	1
5 GHz WLAN MIMO	Cell. EVDO	0.984	0.785	1.769	128.02	0.02	2

Table 12-20
Hotspot Back Side SAR to Peak Location Separation Ratio Plots



1



2

12.7 Simultaneous Transmission Conclusion

The above numerical summed SAR results and SPLSR analysis are sufficient to determine that simultaneous transmission cases will not exceed the SAR limit and therefore no measured volumetric simultaneous SAR summation is required per FCC KDB Publication 447498 D01v06 and IEEE 1528- 2013 Section 6.3.4.1.

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13 SAR MEASUREMENT VARIABILITY

13.1 Measurement Variability

Per FCC KDB Publication 865664 D01v01r04, SAR measurement variability was not assessed for each frequency band since all measured SAR values are < 0.8 W/kg for 1g SAR.

13.2 Measurement Uncertainty

The measured SAR was <1.5 W/kg for all frequency bands. Therefore, per KDB Publication 865664 D01v01r04, the extended measurement uncertainty analysis per IEEE 1528-2013 was not required.

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14 EQUIPMENT LIST

Manufacturer	Model	Description	Cal Date	Cal Interval	Cal Due	Serial Number
Agilent	8594A	(9kHz-2.9GHz) Spectrum Analyzer	N/A	N/A	N/A	3051A00187
Agilent	8648D	(9kHz-4GHz) Signal Generator	CBT	N/A	CBT	3629U00687
Agilent	8753ES	S-Parameter Vector Network Analyzer	8/17/2017	Annual	8/17/2018	MY40003841
Agilent	8753ES	S-Parameter Network Analyzer	9/14/2017	Annual	9/14/2018	US39170118
Agilent	E4432B	ESG-D Series Signal Generator	3/24/2017	Annual	3/24/2018	US40053896
Agilent	E4438C	ESG Vector Signal Generator	3/24/2017	Biennial	3/24/2019	MY42082385
Agilent	E5515C	Wireless Communications Test Set	1/8/2015	Triennial	1/8/2018	GB43163447
Agilent	E8257D	(250kHz-20GHz) Signal Generator	3/22/2017	Annual	3/22/2018	MY45470194
Agilent	N4010A	Wireless Connectivity Test Set	N/A	N/A	N/A	GB44450273
Agilent	N5182A	MXG Vector Signal Generator	2/28/2017	Annual	2/28/2018	MY47420800
Agilent	N9020A	MXA Signal Analyzer	12/28/2016	Annual	12/28/2017	US46470561
Amplifier Research	15S1G6	Amplifier	CBT	N/A	CBT	433971
Anritsu	MA24106A	USB Power Sensor	6/7/2017	Annual	6/7/2018	1231535
Anritsu	MA24106A	USB Power Sensor	6/7/2017	Annual	6/7/2018	1231538
Anritsu	MA2411B	Pulse Power Sensor	2/10/2017	Annual	2/10/2018	1207364
Anritsu	MA2411B	Pulse Power Sensor	2/10/2017	Annual	2/10/2018	1339018
Anritsu	ML2495A	Power Meter	10/22/2017	Annual	10/22/2018	941001
Anritsu	MT8820C	Radio Communication Analyzer	5/23/2017	Annual	5/23/2018	6201240328
Anritsu	MT8821C	Radio Communication Analyzer	8/15/2017	Annual	8/15/2018	6200901190
Anritsu	MT8821C	Radio Communication Analyzer	7/25/2017	Annual	7/25/2018	6201664756
COMTECH	AR85729-5/5759B	Solid State Amplifier	CBT	N/A	CBT	M3W1A00-1002
Control Company	4040	Therm./ Clock/ Humidity Monitor	3/1/2017	Biennial	3/1/2019	170152009
Control Company	4352	Ultra Long Stem Thermometer	3/8/2016	Biennial	3/8/2018	160261694
Keysight	772D	Dual Directional Coupler	CBT	N/A	CBT	MY52180215
MCL	BW-N6W5+	6dB Attenuator	CBT	N/A	CBT	1139
MiniCircuits	SLP-2400+	Low Pass Filter	CBT	N/A	CBT	R8979500903
MiniCircuits	VLF-6000+	Low Pass Filter	CBT	N/A	CBT	N/A
Mini-Circuits	BW-N20W5	Power Attenuator	CBT	N/A	CBT	1226
Mini-Circuits	BW-N20W5+	DC to 18 GHz Precision Fixed 20 dB Attenuator	CBT	N/A	CBT	N/A
Mini-Circuits	NLP-1200+	Low Pass Filter DC to 1000 MHz	CBT	N/A	CBT	N/A
Mini-Circuits	NLP-2950+	Low Pass Filter DC to 2700 MHz	CBT	N/A	CBT	N/A
Mitutoyo	CD-6"CSX	Digital Caliper	3/2/2016	Biennial	3/2/2018	13264165
Narda	4014C-6	4 - 8 GHz SMA 6 dB Directional Coupler	CBT	N/A	CBT	N/A
Narda	4772-3	Attenuator (3dB)	CBT	N/A	CBT	9406
Pasternack	NC-100	Torque Wrench	3/8/2017	Annual	3/8/2018	N/A
Pasternack	PE2209-10	Bidirectional Coupler	CBT	N/A	CBT	N/A
Pasternack	PE2208-6	Bidirectional Coupler	CBT	N/A	CBT	N/A
Rohde & Schwarz	CMU200	Base Station Simulator	4/11/2017	Annual	4/11/2018	836371/0079
Rohde & Schwarz	CMW500	Radio Communication Tester	3/29/2017	Annual	3/29/2018	128633
Rohde & Schwarz	CMW500	Wideband Radio Communication Tester	7/20/2017	Annual	7/20/2018	132885
Seekonk	NC-100	Torque Wrench (8" lb)	9/1/2016	Biennial	9/1/2018	21053
Seekonk	NC-100	Torque Wrench 5/16", 8" lbs	3/2/2016	Biennial	3/2/2018	N/A
SPEAG	D750V3	750 MHz Dipole	3/7/2017	Annual	3/7/2018	1054
SPEAG	D835V2	835 MHz SAR Dipole	7/11/2017	Annual	7/11/2018	4d133
SPEAG	D1750V2	1750 MHz SAR Dipole	5/9/2017	Annual	5/9/2018	1148
SPEAG	D1900V2	1900 MHz SAR Dipole	2/9/2017	Annual	2/9/2018	5d148
SPEAG	D2450V2	2450 MHz SAR Dipole	7/25/2016	Biennial	7/25/2018	981
SPEAG	D2600V2	2600 MHz SAR Dipole	7/10/2017	Annual	7/10/2018	1126
SPEAG	D5GHzV2	5 GHz SAR Dipole	1/20/2017	Annual	1/20/2018	1057
SPEAG	D750V3	750 MHz SAR Dipole	7/13/2016	Biennial	7/13/2018	1161
SPEAG	D835V2	835 MHz SAR Dipole	7/13/2016	Biennial	7/13/2018	4d047
SPEAG	D2450V2	2450 MHz SAR Dipole	8/17/2017	Annual	8/17/2018	719
SPEAG	D2600V2	2600 MHz SAR Dipole	6/7/2017	Annual	6/7/2018	1064
SPEAG	D5GHzV2	5 GHz SAR Dipole	8/15/2017	Annual	8/15/2018	1237
SPEAG	ES3DV3	SAR Probe	9/22/2017	Annual	9/22/2018	3318
SPEAG	EX3DV4	SAR Probe	4/18/2017	Annual	4/18/2018	7406
SPEAG	EX3DV4	SAR Probe	2/13/2017	Annual	2/13/2018	3914
SPEAG	ES3DV3	SAR Probe	3/14/2017	Annual	3/14/2018	3319
SPEAG	ES3DV3	SAR Probe	8/14/2017	Annual	8/14/2018	3332
SPEAG	ES3DV3	SAR Probe	3/14/2017	Annual	3/14/2018	3209
SPEAG	EX3DV4	SAR Probe	7/17/2017	Annual	7/17/2018	7410
SPEAG	ES3DV3	SAR Probe	2/10/2017	Annual	2/10/2018	3213
SPEAG	EX3DV4	SAR Probe	8/16/2017	Annual	8/16/2018	7308
SPEAG	DAE4	Dasy Data Acquisition Electronics	6/14/2017	Annual	6/14/2018	1334
SPEAG	DAE4	Dasy Data Acquisition Electronics	4/11/2017	Annual	4/11/2018	1407
SPEAG	DAE4	Dasy Data Acquisition Electronics	7/13/2017	Annual	7/13/2018	1322
SPEAG	DAE4	Dasy Data Acquisition Electronics	2/9/2017	Annual	2/9/2018	665
SPEAG	DAE4	Dasy Data Acquisition Electronics	3/8/2017	Annual	3/8/2018	1368
SPEAG	DAE4	Dasy Data Acquisition Electronics	8/9/2017	Annual	8/9/2018	1323
SPEAG	DAE4	Dasy Data Acquisition Electronics	3/13/2017	Annual	3/13/2018	1415
SPEAG	DAE4	Dasy Data Acquisition Electronics	2/9/2017	Annual	2/9/2018	1272
SPEAG	DAK-3.5	Dielectric Assessment Kit	5/10/2017	Annual	5/10/2018	1070

Note:

1. CBT (Calibrated Before Testing). Prior to testing, the measurement paths containing a cable, amplifier, attenuator, coupler or filter were connected to a calibrated source (i.e. a signal generator) to determine the losses of the measurement path. The power meter offset was then adjusted to compensate for the measurement system losses. This level offset is stored within the power meter before measurements are made. This calibration verification procedure applies to the system verification and output power measurements. The calibrated reading is then taken directly from the power meter after compensation of the losses for all final power measurements.
2. Each equipment item was used solely within its respective calibration period.

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15 MEASUREMENT UNCERTAINTIES

a	c	d	e= f(d,k)	f	g	h = c x f/e	i = c x g/e	k
Uncertainty Component	**Tol. (± %)**	**Prob. Dist.**	**Div.**	**c_i 1gm**	**c_i 10 gms**	**1gm u_i (± %)**	**10gms u_i (± %)**	**v_i**
Measurement System								
Probe Calibration	6.55	N	1	1.0	1.0	6.6	6.6	∞
Axial Isotropy	0.25	N	1	0.7	0.7	0.2	0.2	∞
Hemishperical Isotropy	1.3	N	1	0.7	0.7	0.9	0.9	∞
Boundary Effect	2.0	R	1.73	1.0	1.0	1.2	1.2	∞
Linearity	0.3	N	1	1.0	1.0	0.3	0.3	∞
System Detection Limits	0.25	R	1.73	1.0	1.0	0.1	0.1	∞
Readout Electronics	0.3	N	1	1.0	1.0	0.3	0.3	∞
Response Time	0.8	R	1.73	1.0	1.0	0.5	0.5	∞
Integration Time	2.6	R	1.73	1.0	1.0	1.5	1.5	∞
RF Ambient Conditions - Noise	3.0	R	1.73	1.0	1.0	1.7	1.7	∞
RF Ambient Conditions - Reflections	3.0	R	1.73	1.0	1.0	1.7	1.7	∞
Probe Positioner Mechanical Tolerance	0.4	R	1.73	1.0	1.0	0.2	0.2	∞
Probe Positioning w/ respect to Phantom	6.7	R	1.73	1.0	1.0	3.9	3.9	∞
Extrapolation, Interpolation & Integration algorithms for Max. SAR Evaluation	4.0	R	1.73	1.0	1.0	2.3	2.3	∞
Test Sample Related								
Test Sample Positioning	2.7	N	1	1.0	1.0	2.7	2.7	35
Device Holder Uncertainty	1.67	N	1	1.0	1.0	1.7	1.7	5
Output Power Variation - SAR drift measurement	5.0	R	1.73	1.0	1.0	2.9	2.9	∞
SAR Scaling	0.0	R	1.73	1.0	1.0	0.0	0.0	∞
Phantom & Tissue Parameters								
Phantom Uncertainty (Shape & Thickness tolerances)	7.6	R	1.73	1.0	1.0	4.4	4.4	∞
Liquid Conductivity - measurement uncertainty	4.2	N	1	0.78	0.71	3.3	3.0	10
Liquid Permittivity - measurement uncertainty	4.1	N	1	0.23	0.26	1.0	1.1	10
Liquid Conductivity - Temperature Uncertainty	3.4	R	1.73	0.78	0.71	1.5	1.4	∞
Liquid Permittivity - Temperature Unceritainty	0.6	R	1.73	0.23	0.26	0.1	0.1	∞
Liquid Conductivity - deviation from target values	5.0	R	1.73	0.64	0.43	1.8	1.2	∞
Liquid Permittivity - deviation from target values	5.0	R	1.73	0.60	0.49	1.7	1.4	∞
Combined Standard Uncertainty (k=1)		RSS				11.5	11.3	60
Expanded Uncertainty (95% CONFIDENCE LEVEL)		k=2				23.0	22.6	

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16 CONCLUSION

16.1 Measurement Conclusion

The SAR evaluation indicates that the EUT complies with the RF radiation exposure limits of the FCC and Innovation, Science, and Economic Development Canada, with respect to all parameters subject to this test. These measurements were taken to simulate the RF effects of RF exposure under worst-case conditions. Precise laboratory measures were taken to assure repeatability of the tests. The results and statements relate only to the item(s) tested.

Please note that the absorption and distribution of electromagnetic energy in the body are very complex phenomena that depend on the mass, shape, and size of the body, the orientation of the body with respect to the field vectors, and the electrical properties of both the body and the environment. Other variables that may play a substantial role in possible biological effects are those that characterize the environment (e.g. ambient temperature, air velocity, relative humidity, and body insulation) and those that characterize the individual (e.g. age, gender, activity level, debilitation, or disease). Because various factors may interact with one another to vary the specific biological outcome of an exposure to electromagnetic fields, any protection guide should consider maximal amplification of biological effects as a result of field-body interactions, environmental conditions, and physiological variables. [3]

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APPENDIX A: SAR TEST DATA

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PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LSMG9600; Type: Portable Handset; Serial: 5E0CA

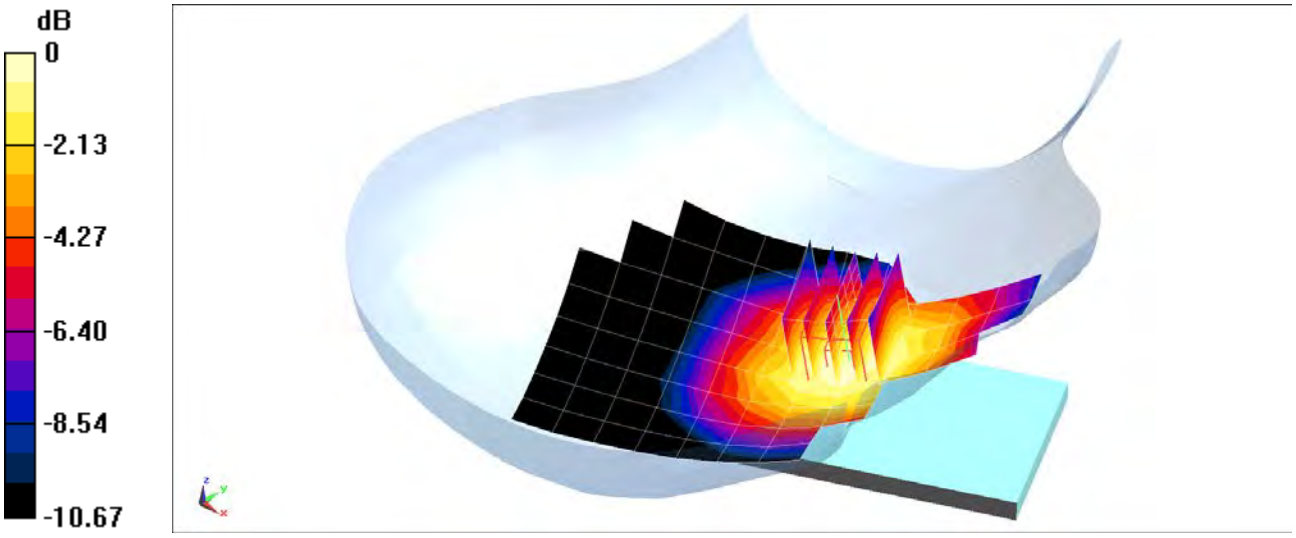
Communication System: UID 0, CDMA; Frequency: 836.52 MHz; Duty Cycle: 1:1
Medium: 835 Head Medium parameters used (interpolated):
$f = 836.52$ MHz; $\sigma = 0.899$ S/m; $\varepsilon_r = 40.935$; $\rho = 1000$ kg/m^3
Phantom section: Right Section

Test Date: 11-29-2017; Ambient Temp: 22.0°C; Tissue Temp: 21.3°C

Probe: EX3DV4 - SN7406; ConvF(9.97, 9.97, 9.97); Calibrated: 4/18/2017;
Sensor-Surface: 1.4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1407; Calibrated: 4/11/2017
Phantom: SAM with CRP v5.0, Right; Type: QD000P40CD; Serial: TP:7535
Measurement SW: DASY52, Version 52.10;SEMCAD X Version 14.6.10 (7417)

Mode: Cell. CDMA, Rule Part 22H, Right Head, Cheek, Mid.ch

Area Scan (9x15x1): Measurement grid: dx=15mm, dy=15mm
Zoom Scan (6x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 19.25 V/m; Power Drift = -0.19 dB
Peak SAR (extrapolated) = 0.412 W/kg
SAR(1 g) = 0.323 W/kg



0 dB = 0.378 W/kg = -4.23 dBW/kg

DUT: A3LSMG9600; Type: Portable Handset; Serial: 21B02

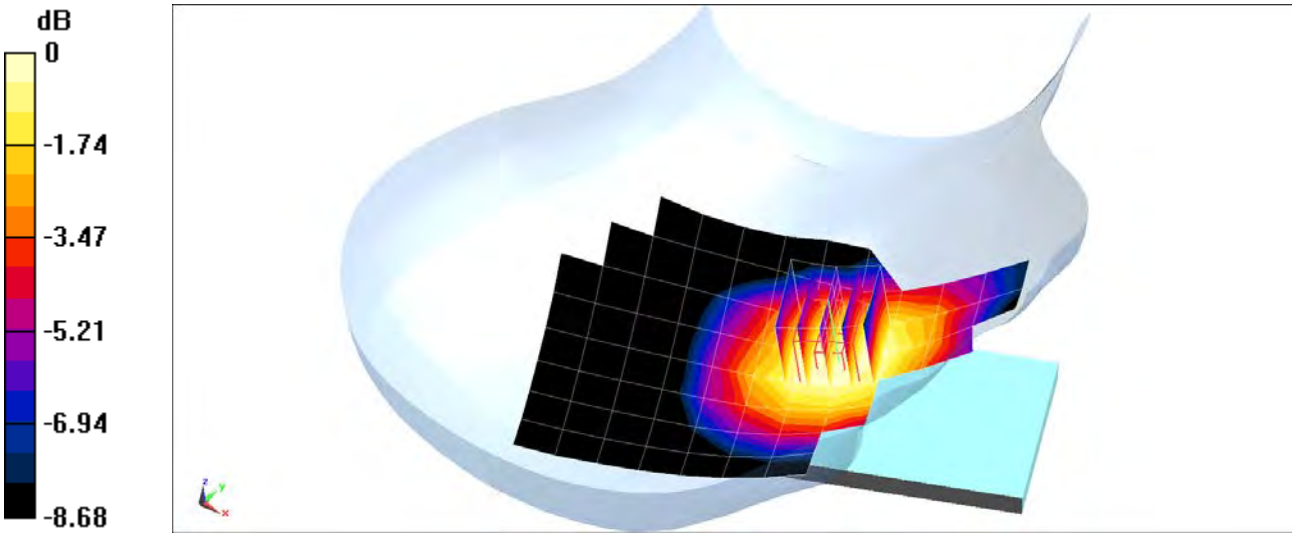
Communication System: UID 0, GSM; Frequency: 836.6 MHz; Duty Cycle: 1:8.3
Medium: 835 Head Medium parameters used (interpolated):
$f = 836.6$ MHz; $\sigma = 0.899$ S/m; $\varepsilon_r = 40.934$; $\rho = 1000$ kg/m^3
Phantom section: Right Section

Test Date: 11-29-2017; Ambient Temp: 22.0°C; Tissue Temp: 21.3°C

Probe: EX3DV4 - SN7406; ConvF(9.97, 9.97, 9.97); Calibrated: 4/18/2017;
Sensor-Surface: 1.4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1407; Calibrated: 4/11/2017
Phantom: SAM with CRP v5.0, Right; Type: QD000P40CD; Serial: TP:7535
Measurement SW: DASY52, Version 52.10;SEMCAD X Version 14.6.10 (7417)

Mode: GSM 850, Right Head, Cheek, Mid.ch

Area Scan (9x15x1): Measurement grid: dx=15mm, dy=15mm
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 15.38 V/m; Power Drift = 0.06 dB
Peak SAR (extrapolated) = 0.253 W/kg
SAR(1 g) = 0.202 W/kg



0 dB = 0.237 W/kg = -6.25 dBW/kg

DUT: A3LSMG9600; Type: Portable Handset; Serial: 21B04

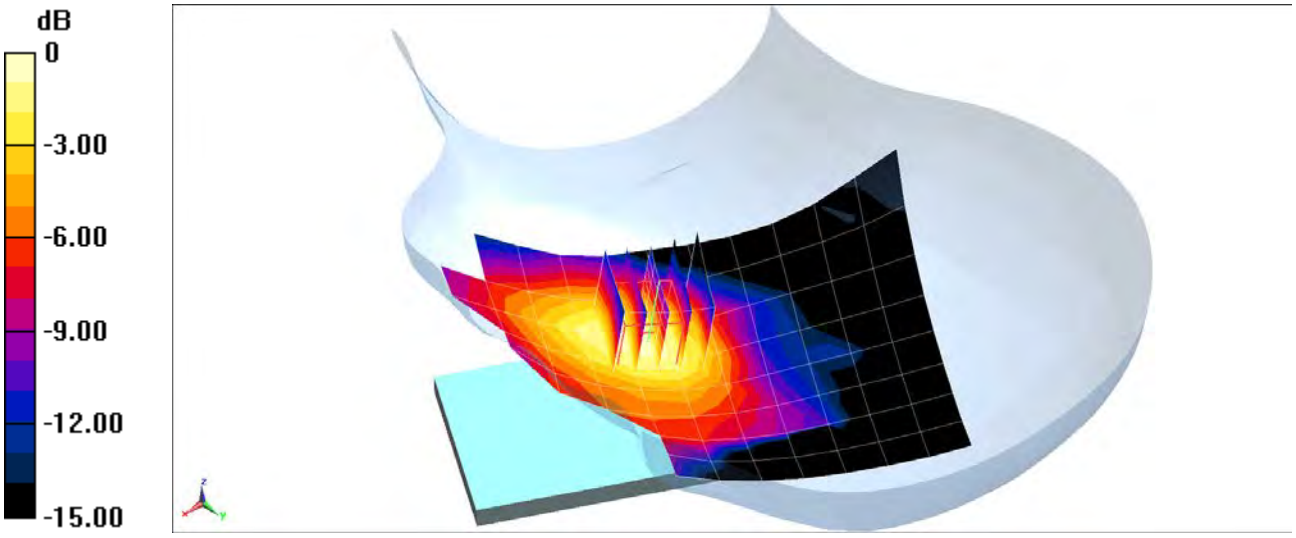
Communication System: UID 0, GSM; Frequency: 1880 MHz; Duty Cycle: 1:8.3
Medium: 1900 Head Medium parameters used:
f = 1880 MHz; σ = 1.415 S/m; ε_r = 39.75; ρ = 1000 kg/m^3
Phantom section: Left Section

Test Date: 11-15-2017; Ambient Temp: 23.6°C; Tissue Temp: 21.0°C

Probe: EX3DV4 - SN7410; ConvF(8.37, 8.37, 8.37); Calibrated: 7/17/2017;
Sensor-Surface: 1.4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1322; Calibrated: 7/13/2017
Phantom: SAM with CRP v5.0 (Right); Type: QD000P40CD; Serial: TP:1759
Measurement SW: DASY52, Version 52.10;SEMCAD X Version 14.6.10 (7417)

Mode: GSM 1900, Left Head, Cheek, Mid.ch

Area Scan (9x15x1): Measurement grid: dx=15mm, dy=15mm
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 6.724 V/m; Power Drift = 0.17 dB
Peak SAR (extrapolated) = 0.0940 W/kg
SAR(1 g) = 0.063 W/kg



0 dB = 0.0825 W/kg = -10.84 dBW/kg

DUT: A3LSMG9600; Type: Portable Handset; Serial: 21B5A

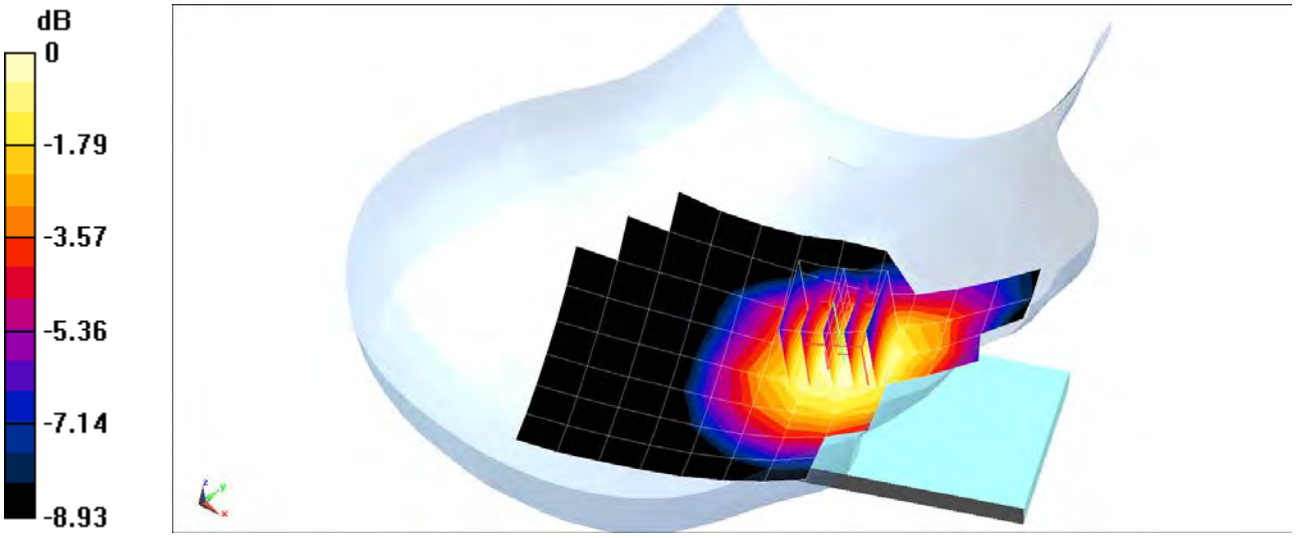
Communication System: UID 0, UMTS; Frequency: 836.6 MHz; Duty Cycle: 1:1
Medium: 835 Head Medium parameters used (interpolated):
$f = 836.6$ MHz; $\sigma = 0.899$ S/m; $\varepsilon_r = 40.934$; $\rho = 1000$ kg/m^3
Phantom section: Right Section

Test Date: 11-29-2017; Ambient Temp: 22.0°C; Tissue Temp: 21.3°C

Probe: EX3DV4 - SN7406; ConvF(9.97, 9.97, 9.97); Calibrated: 4/18/2017;
Sensor-Surface: 1.4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1407; Calibrated: 4/11/2017
Phantom: SAM with CRP v5.0, Right; Type: QD000P40CD; Serial: TP:7535
Measurement SW: DASY52, Version 52.10;SEMCAD X Version 14.6.10 (7417)

Mode: UMTS 850, Right Head, Cheek, Mid.ch

Area Scan (9x15x1): Measurement grid: dx=15mm, dy=15mm
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 16.37 V/m; Power Drift = 0.03 dB
Peak SAR (extrapolated) = 0.290 W/kg
SAR(1 g) = 0.229 W/kg



0 dB = 0.269 W/kg = -5.70 dBW/kg

DUT: A3LSMG9600; Type: Portable Handset; Serial: 21B04

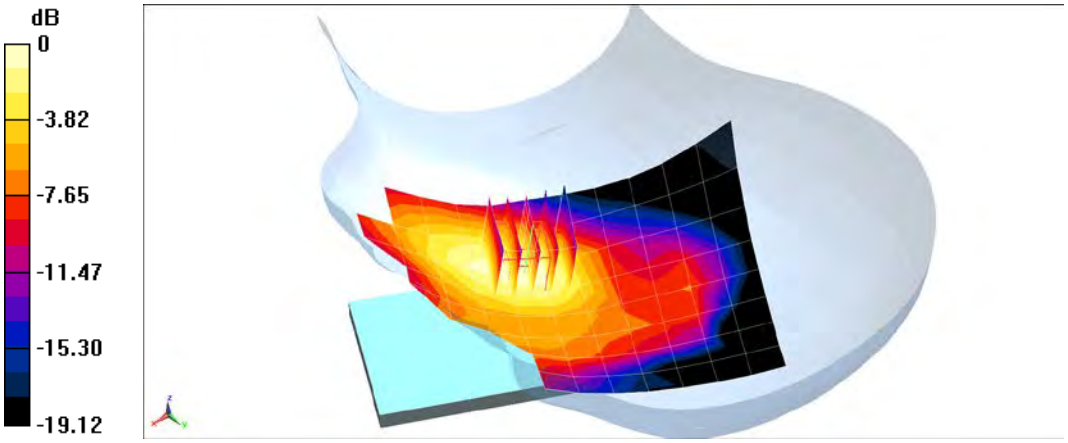
Communication System: UID 0, UMTS; Frequency: 1732.4 MHz; Duty Cycle: 1:1
Medium: 1750 Head Medium parameters used (interpolated):
$f = 1732.4$ MHz; $\sigma = 1.354$ S/m; $\varepsilon_r = 39.279$; $\rho = 1000$ kg/m^3
Phantom section: Left Section

Test Date: 11-09-2017; Ambient Temp: 24.2°C; Tissue Temp: 22.0°C

Probe: EX3DV4 - SN7410; ConvF(8.66, 8.66, 8.66); Calibrated: 7/17/2017;
Sensor-Surface: 1.4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1322; Calibrated: 7/13/2017
Phantom: SAM with CRP v5.0 (Right); Type: QD000P40CD; Serial: TP:1759
Measurement SW: DASY52, Version 52.10;SEMCAD X Version 14.6.10 (7417)

Mode: UMTS 1750, Left Head, Cheek, Mid.ch

Area Scan (9x15x1): Measurement grid: dx=15mm, dy=15mm
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 11.98 V/m; Power Drift = 0.00 dB
Peak SAR (extrapolated) = 0.264 W/kg
SAR(1 g) = 0.177 W/kg



0 dB = 0.232 W/kg = -6.35 dBW/kg

DUT: A3LSMG9600; Type: Portable Handset; Serial: 21B04

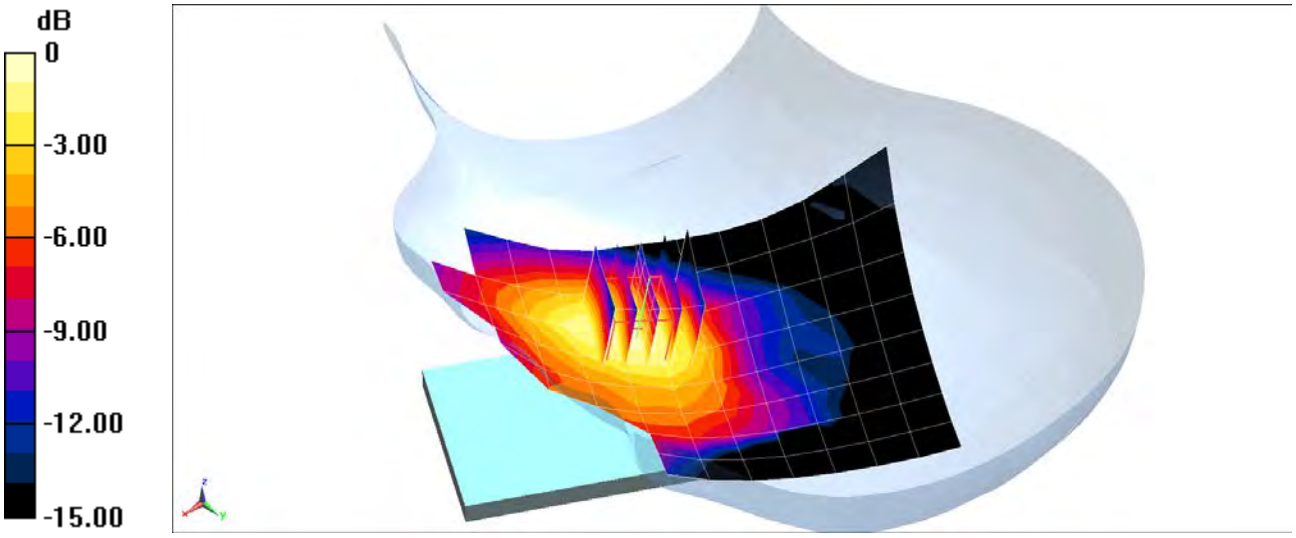
Communication System: UID 0, UMTS; Frequency: 1880 MHz; Duty Cycle: 1:1
Medium: 1900 Head Medium parameters used:
f = 1880 MHz; σ = 1.415 S/m; ε_r = 39.75; ρ = 1000 kg/m^3
Phantom section: Left Section

Test Date: 11-15-2017; Ambient Temp: 23.6°C; Tissue Temp: 21.0°C

Probe: EX3DV4 - SN7410; ConvF(8.37, 8.37, 8.37); Calibrated: 7/17/2017;
Sensor-Surface: 1.4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1322; Calibrated: 7/13/2017
Phantom: SAM with CRP v5.0 (Right); Type: QD000P40CD; Serial: TP:1759
Measurement SW: DASY52, Version 52.10;SEMCAD X Version 14.6.10 (7417)

Mode: UMTS 1900, Left Head, Cheek, Mid.ch

Area Scan (9x15x1): Measurement grid: dx=15mm, dy=15mm
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 10.73 V/m; Power Drift = 0.06 dB
Peak SAR (extrapolated) = 0.218 W/kg
SAR(1 g) = 0.149 W/kg



0 dB = 0.193 W/kg = -7.14 dBW/kg

DUT: A3LSMG9600; Type: Portable Handset; Serial: 21AD3

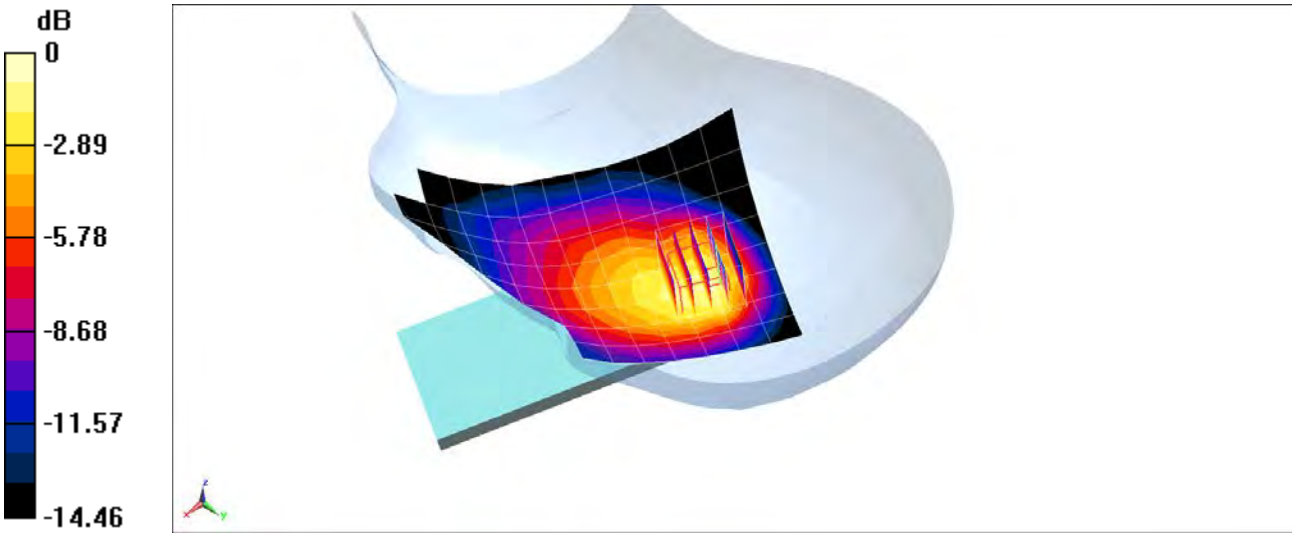
Communication System: UID 0, LTE Band 12; Frequency: 707.5 MHz; Duty Cycle: 1:1
Medium: 750 Head Medium parameters used (interpolated):
f = 707.5 MHz; σ = 0.874 S/m; ε_r = 42.135; ρ = 1000 kg/m^3
Phantom section: Left Section

Test Date: 11-20-2017; Ambient Temp: 21.6°C; Tissue Temp: 20.2°C

Probe: ES3DV3 - SN3318; ConvF(6.72, 6.72, 6.72); Calibrated: 9/22/2017;
Sensor-Surface: 3mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1334; Calibrated: 6/14/2017
Phantom: SAM with CRP v5.0 Front; Type: QD000P40CD; Serial: 1646
Measurement SW: DASY52, Version 52.10;SEMCAD X Version 14.6.10 (7417)

Mode: LTE Band 12, Left Head, Tilt, Mid.ch, QPSK, 10 MHz Bandwidth, 1 RB, 25 RB Offset

Area Scan (9x14x1): Measurement grid: dx=15mm, dy=15mm
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 10.56 V/m; Power Drift = 0.12 dB
Peak SAR (extrapolated) = 0.190 W/kg
SAR(1 g) = 0.092 W/kg



0 dB = 0.119 W/kg = -9.24 dBW/kg

DUT: A3LSMG9600; Type: Portable Handset; Serial: 21AD3

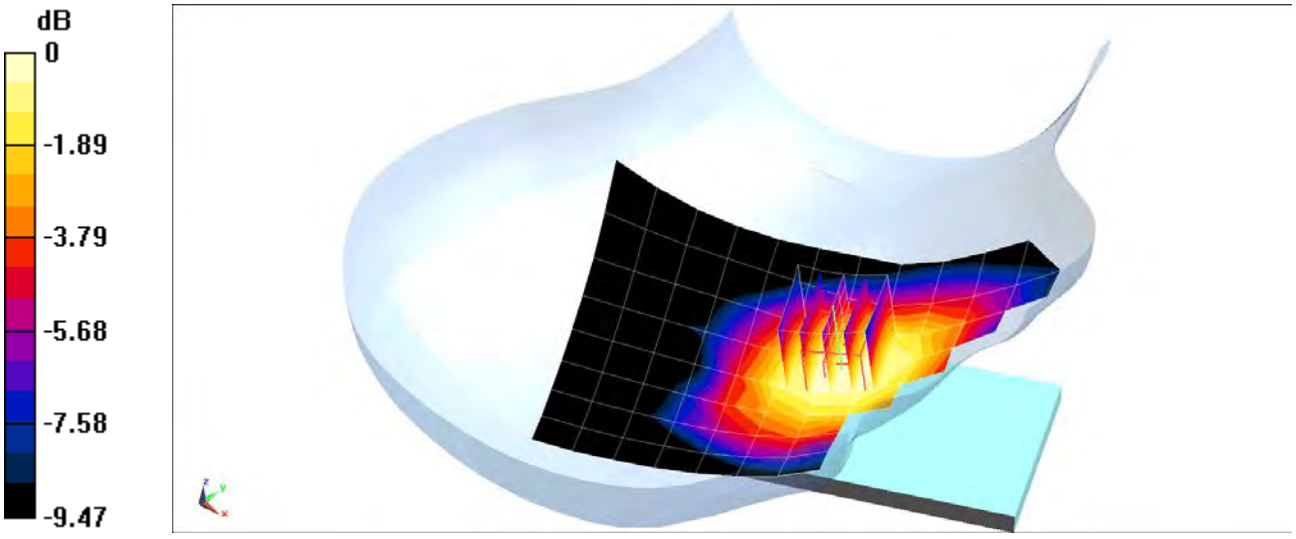
Communication System: UID 0, LTE Band 13; Frequency: 782 MHz; Duty Cycle: 1:1
Medium: 750 Head Medium parameters used (interpolated):
f = 782 MHz; σ = 0.899 S/m; ε_r = 41.945; ρ = 1000 kg/m^3
Phantom section: Right Section

Test Date: 11-20-2017; Ambient Temp: 21.6°C; Tissue Temp: 20.2°C

Probe: ES3DV3 - SN3318; ConvF(6.72, 6.72, 6.72); Calibrated: 9/22/2017;
Sensor-Surface: 3mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1334; Calibrated: 6/14/2017
Phantom: SAM with CRP v5.0 Front; Type: QD000P40CD; Serial: 1646
Measurement SW: DASY52, Version 52.10;SEMCAD X Version 14.6.10 (7417)

Mode: LTE Band 13, Right Head, Cheek, Mid.ch, 10 MHz Bandwidth, QPSK, 1 RB, 25 RB Offset

Area Scan (9x13x1): Measurement grid: dx=15mm, dy=15mm
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 14.71 V/m; Power Drift = 0.04 dB
Peak SAR (extrapolated) = 0.213 W/kg
SAR(1 g) = 0.169 W/kg



0 dB = 0.185 W/kg = -7.33 dBW/kg

DUT: A3LSMG9600; Type: Portable Handset; Serial: 21AEE

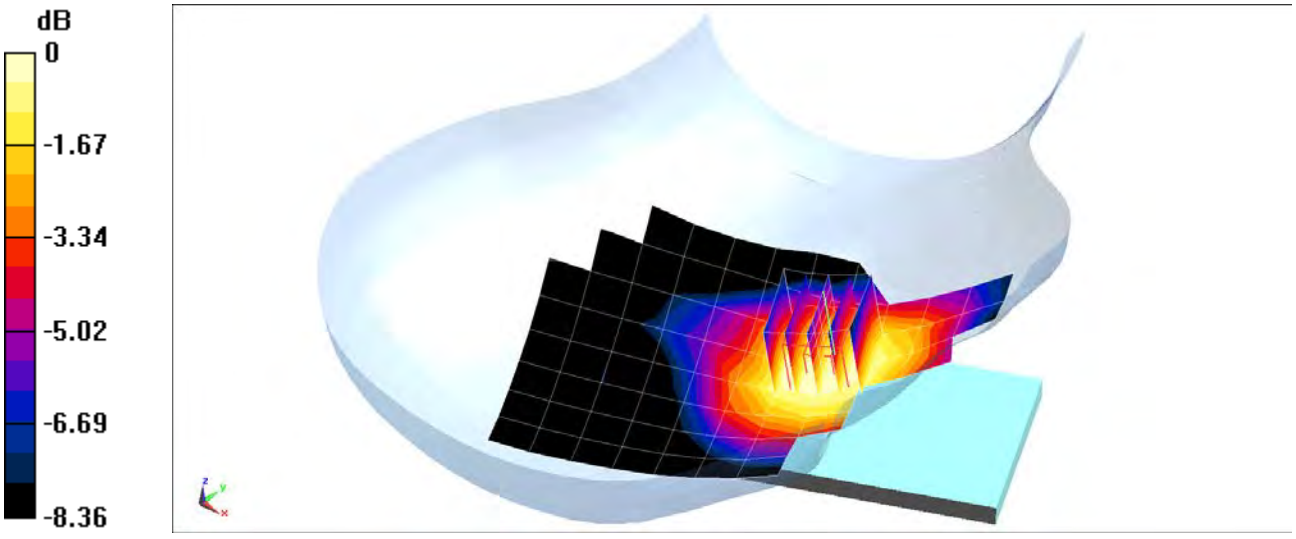
Communication System: UID 0, LTE Band 26; Frequency: 831.5 MHz; Duty Cycle: 1:1
Medium: 835 Head Medium parameters used (interpolated):
f = 831.5 MHz; σ = 0.895 S/m; ε_r = 40.997; ρ = 1000 kg/m^3
Phantom section: Right Section

Test Date: 11-29-2017; Ambient Temp: 22.0°C; Tissue Temp: 21.3°C

Probe: EX3DV4 - SN7406; ConvF(9.97, 9.97, 9.97); Calibrated: 4/18/2017;
Sensor-Surface: 1.4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1407; Calibrated: 4/11/2017
Phantom: SAM with CRP v5.0, Right; Type: QD000P40CD; Serial: TP:7535
Measurement SW: DASY52, Version 52.10;SEMCAD X Version 14.6.10 (7417)

Mode: LTE Band 26 (Cell.), Right Head, Cheek, Mid.ch, 15 MHz Bandwidth, QPSK, 1 RB, 0 RB Offset

Area Scan (9x15x1): Measurement grid: dx=15mm, dy=15mm
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 15.07 V/m; Power Drift = 0.10 dB
Peak SAR (extrapolated) = 0.243 W/kg
SAR(1 g) = 0.192 W/kg



0 dB = 0.223 W/kg = -6.52 dBW/kg

DUT: A3LSMG9600; Type: Portable Handset; Serial: 21B5A

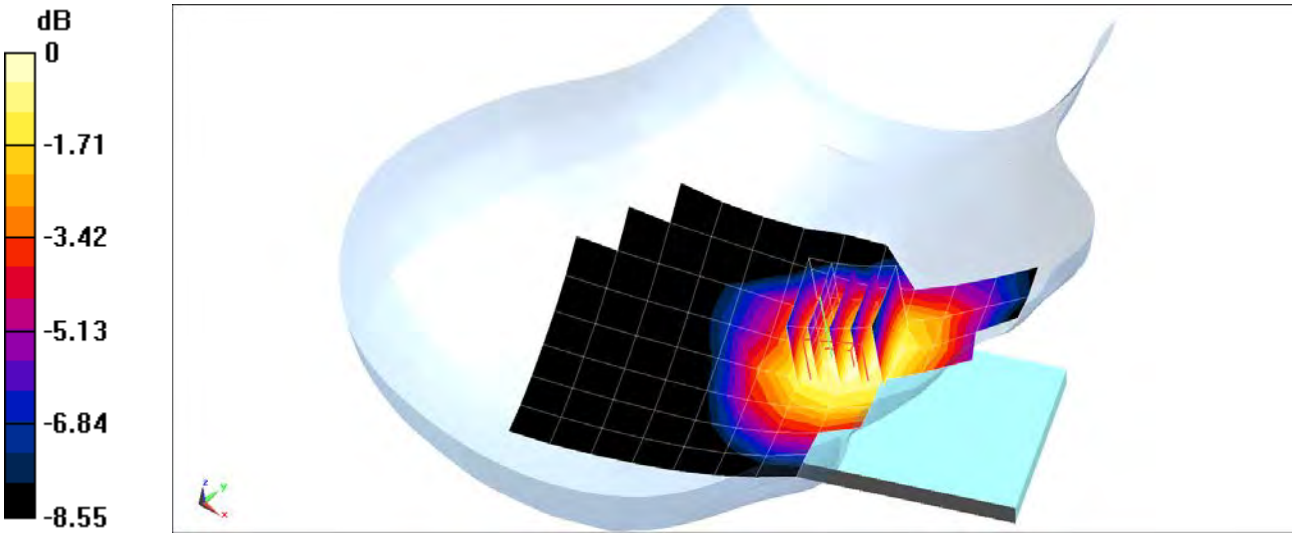
Communication System: UID 0, LTE Band 5 (Cell.); Frequency: 836.5 MHz; Duty Cycle: 1:1
Medium: 835 Head Medium parameters used (interpolated):
f = 836.5 MHz; σ = 0.899 S/m; ε_r = 40.935; ρ = 1000 kg/m^3
Phantom section: Right Section

Test Date: 11-29-2017; Ambient Temp: 22.0°C; Tissue Temp: 21.3°C

Probe: EX3DV4 - SN7406; ConvF(9.97, 9.97, 9.97); Calibrated: 4/18/2017;
Sensor-Surface: 1.4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1407; Calibrated: 4/11/2017
Phantom: SAM with CRP v5.0, Right; Type: QD000P40CD; Serial: TP:7535
Measurement SW: DASY52, Version 52.10;SEMCAD X Version 14.6.10 (7417)

Mode: LTE Band 5 (Cell.), Right Head, Cheek, Mid.ch, 10 MHz Bandwidth, QPSK, 1 RB, 25 RB Offset

Area Scan (9x15x1): Measurement grid: dx=15mm, dy=15mm
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 15.99 V/m; Power Drift = 0.07 dB
Peak SAR (extrapolated) = 0.263 W/kg
SAR(1 g) = 0.210 W/kg



0 dB = 0.246 W/kg = -6.09 dBW/kg

DUT: A3LSMG9600; Type: Portable Handset; Serial: 21B02

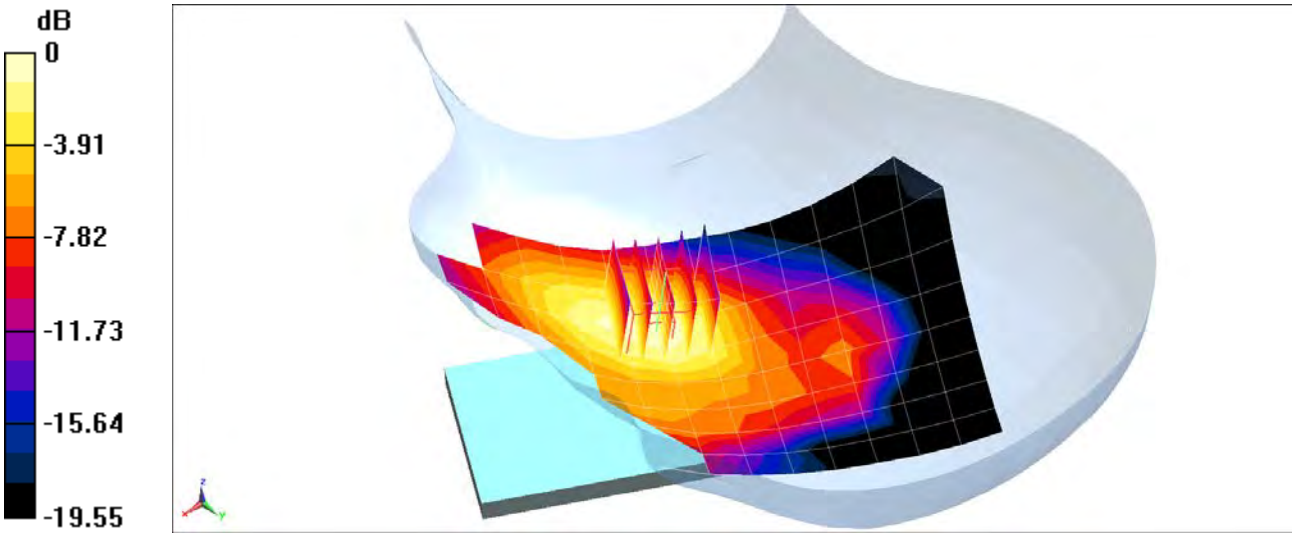
Communication System: UID 0, LTE Band 66 (AWS); Frequency: 1745 MHz; Duty Cycle: 1:1
Medium: 1750 Head Medium parameters used (interpolated):
f = 1745 MHz; σ = 1.367 S/m; ε_r = 39.219; ρ = 1000 kg/m^3
Phantom section: Left Section

Test Date: 11-09-2017; Ambient Temp: 24.2°C; Tissue Temp: 22.0°C

Probe: EX3DV4 - SN7410; ConvF(8.66, 8.66, 8.66); Calibrated: 7/17/2017;
Sensor-Surface: 1.4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1322; Calibrated: 7/13/2017
Phantom: SAM with CRP v5.0 (Right); Type: QD000P40CD; Serial: TP:1759
Measurement SW: DASY52, Version 52.10;SEMCAD X Version 14.6.10 (7417)

Mode: LTE Band 66 (AWS), Left Head, Cheek, Mid.ch, 20 MHz Bandwidth, QPSK, 1 RB, 0 RB Offset

Area Scan (9x15x1): Measurement grid: dx=15mm, dy=15mm
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 12.69 V/m; Power Drift = 0.14 dB
Peak SAR (extrapolated) = 0.284 W/kg
SAR(1 g) = 0.189 W/kg



0 dB = 0.248 W/kg = -6.06 dBW/kg

DUT: A3LSMG9600; Type: Portable Handset; Serial: 21B04

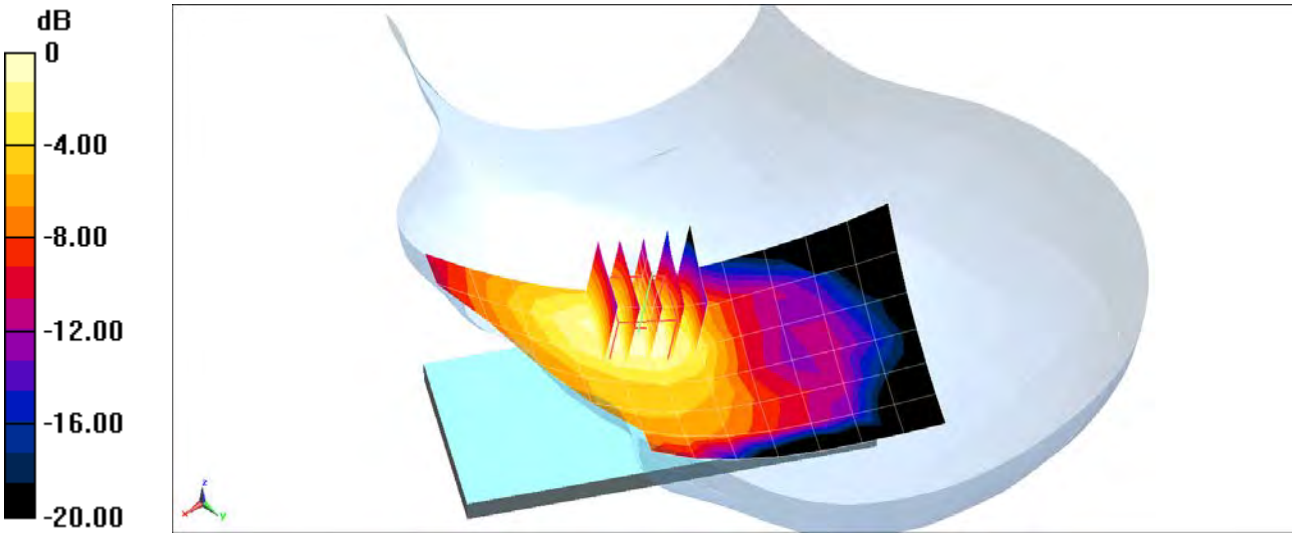
Communication System: UID 0, LTE Band 25 (PCS); Frequency: 1882.5 MHz; Duty Cycle: 1:1
Medium: 1900 Head Medium parameters used (interpolated):
f = 1882.5 MHz; σ = 1.418 S/m; ε_r = 39.741; ρ = 1000 kg/m^3
Phantom section: Left Section

Test Date: 11-15-2017; Ambient Temp: 23.6°C; Tissue Temp: 21.0°C

Probe: EX3DV4 - SN7410; ConvF(8.37, 8.37, 8.37); Calibrated: 7/17/2017;
Sensor-Surface: 1.4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1322; Calibrated: 7/13/2017
Phantom: SAM with CRP v5.0 (Right); Type: QD000P40CD; Serial: TP:1759
Measurement SW: DASY52, Version 52.10;SEMCAD X Version 14.6.10 (7417)

Mode: LTE Band 25 (PCS), Left Head, Cheek, Mid.ch, 20 MHz Bandwidth, QPSK, 1 RB, 0 RB Offset

Area Scan (7x14x1): Measurement grid: dx=15mm, dy=15mm
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 9.884 V/m; Power Drift = 0.04 dB
Peak SAR (extrapolated) = 0.170 W/kg
SAR(1 g) = 0.115 W/kg



0 dB = 0.151 W/kg = -8.21 dBW/kg

DUT: A3LSMG9600; Type: Portable Handset; Serial: 21B3C

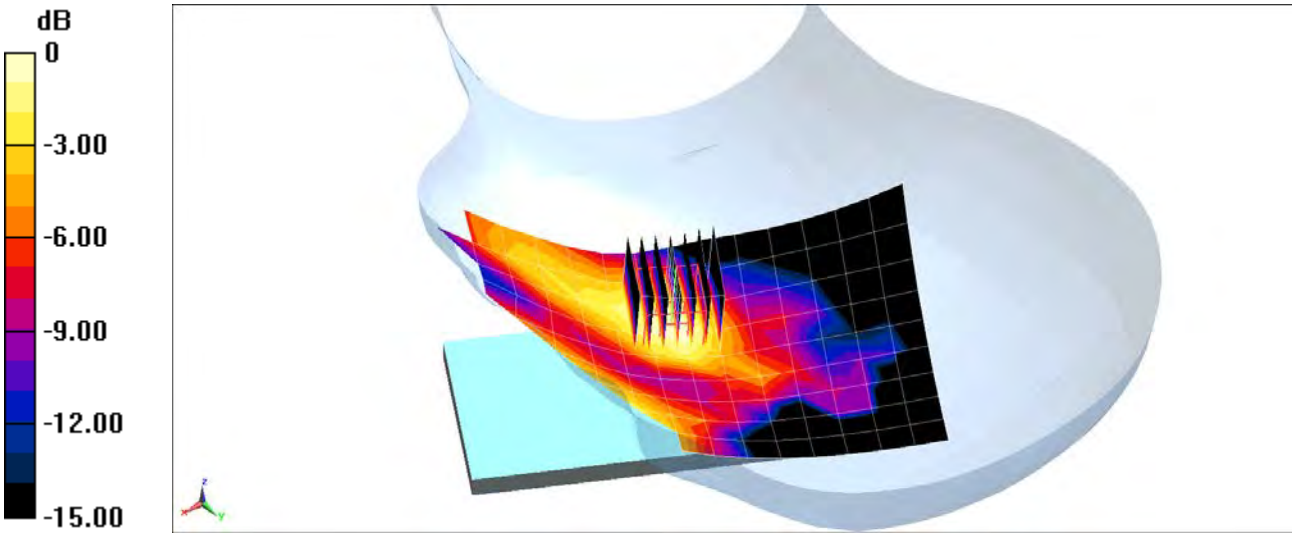
Communication System: UID 0, LTE Band 41; Frequency: 2593 MHz; Duty Cycle: 1:1.58
Medium: 2450-2600 Head Medium parameters used (interpolated):
$f = 2593$ MHz; $\sigma = 2.045$ S/m; $\varepsilon_r = 40.138$; $\rho = 1000$ kg/m^3
Phantom section: Left Section

Test Date: 11-15-2017; Ambient Temp: 22.5°C; Tissue Temp: 21.7°C

Probe: ES3DV3 - SN3319; ConvF(4.41, 4.41, 4.41); Calibrated: 3/14/2017;
Sensor-Surface: 3mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1368; Calibrated: 3/8/2017
Phantom: SAM 5.0 front; Type: QD000P40CD; Serial: 1648
Measurement SW: DASY52, Version 52.10;SEMCAD X Version 14.6.10 (7417)

Mode: LTE Band 41, Left Head, Cheek, Mid.ch, QPSK, 20 MHz Bandwidth, 1 RB, 0 RB Offset

Area Scan (10x17x1): Measurement grid: dx=12mm, dy=12mm
Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 7.339 V/m; Power Drift = 0.12 dB
Peak SAR (extrapolated) = 0.145 W/kg
SAR(1 g) = 0.080 W/kg



0 dB = 0.0996 W/kg = -10.02 dBW/kg

DUT: A3LSMG9600; Type: Portable Handset; Serial: 5DD38

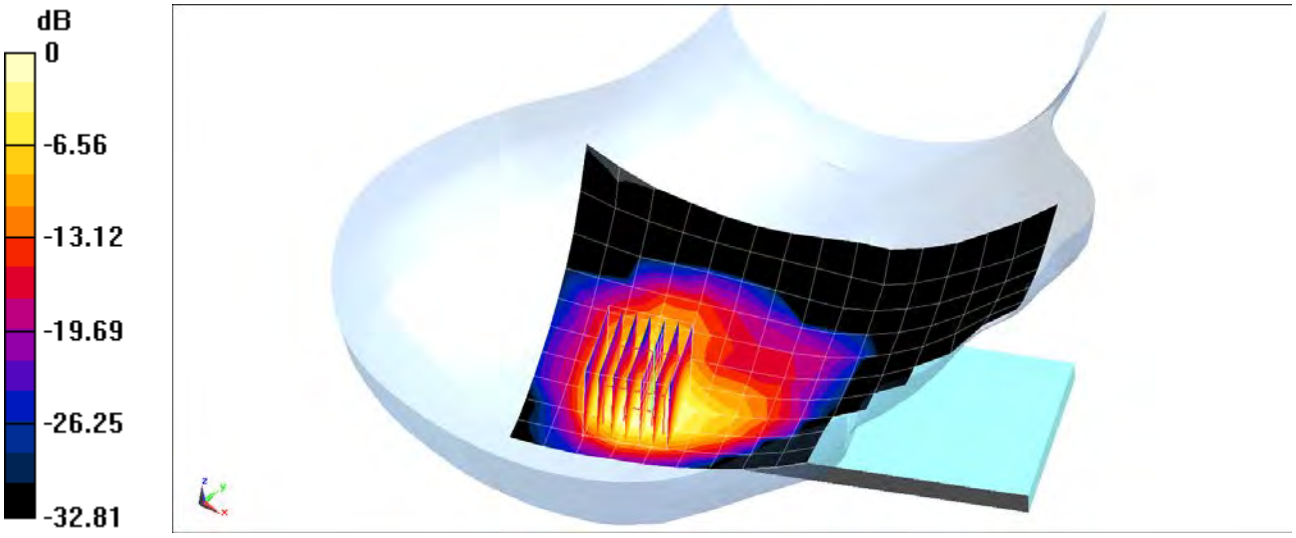
Communication System: UID 0, IEEE 802.11b; Frequency: 2412 MHz; Duty Cycle: 1:1
Medium: 2450 Head Medium parameters used (interpolated):
$f = 2412$ MHz; $\sigma = 1.809$ S/m; $\varepsilon_r = 38.515$; $\rho = 1000$ kg/m^3
Phantom section: Right Section

Test Date: 12-01-2017; Ambient Temp: 23.1°C; Tissue Temp: 22.6°C

Probe: ES3DV3 - SN3319; ConvF(4.6, 4.6, 4.6); Calibrated: 3/14/2017;
Sensor-Surface: 3mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1368; Calibrated: 3/8/2017
Phantom: SAM 5.0 front; Type: QD000P40CD; Serial: 1648
Measurement SW: DASY52, Version 52.10;SEMCAD X Version 14.6.10 (7417)

Mode: IEEE 802.11b, Antenna 2, 22 MHz Bandwidth, Right Head, Cheek, Ch 1, 1 Mbps

Area Scan (11x18x1): Measurement grid: dx=12mm, dy=12mm
Zoom Scan (8x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 9.456 V/m; Power Drift = 0.12 dB
Peak SAR (extrapolated) = 1.20 W/kg
SAR(1 g) = 0.499 W/kg



0 dB = 0.664 W/kg = -1.78 dBW/kg

DUT: A3LSMG9600; Type: Portable Handset; Serial: 5DD38

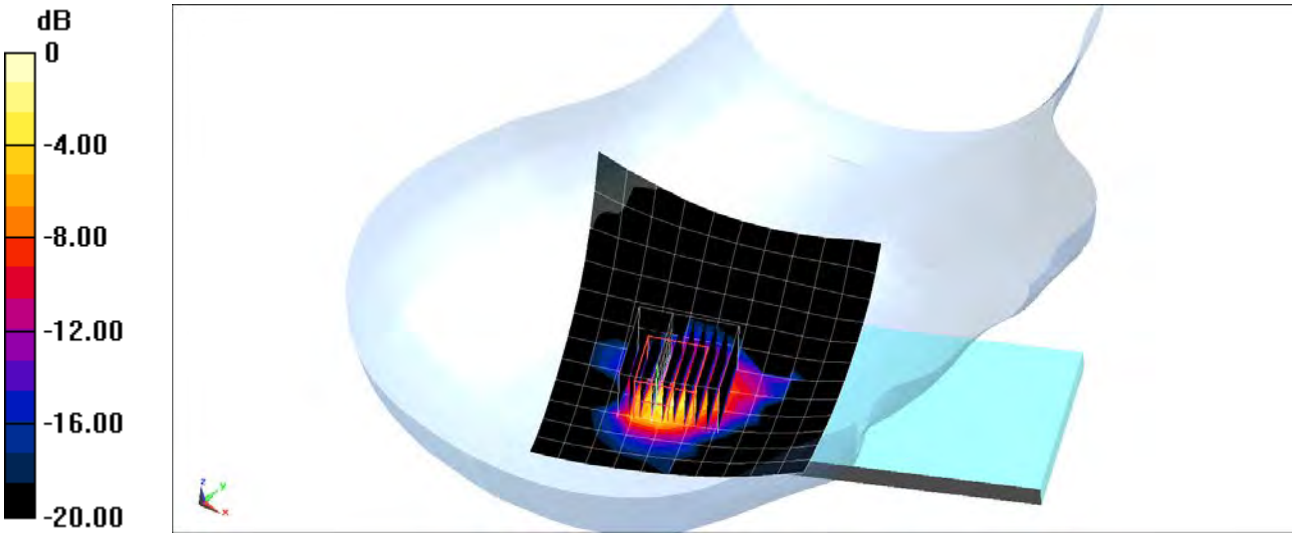
Communication System: UID 0, 802.11ac 5.2-5.8 GHz Band; Frequency: 5690 MHz; Duty Cycle: 1:1
Medium: 5 GHz Medium parameters used (interpolated):
f = 5690 MHz; σ = 4.936 S/m; ε_r = 33.898; ρ = 1000 kg/m^3
Phantom section: Right Section

Test Date: 12-04-2017; Ambient Temp: 22.0°C; Tissue Temp: 20.7°C

Probe: EX3DV4 - SN3914; ConvF(4.91, 4.91, 4.91); Calibrated: 2/13/2017;
Sensor-Surface: 1.4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn665; Calibrated: 2/9/2017
Phantom: SAM with CRP (Left); Type: SAM; Serial: 1715
Measurement SW: DASY52, Version 52.10;SEMCAD X Version 14.6.10 (7417)

Mode: IEEE 802.11ac, Antenna 2, U-NII-2C, 80 MHz Bandwidth, Right Head, Cheek, Ch 138, 29.3 Mbps

Area Scan (13x11x1): Measurement grid: dx=10mm, dy=10mm
Zoom Scan (9x10x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm; Graded Ratio: 1.4
Reference Value = 2.155 V/m; Power Drift = 0.15 dB
Peak SAR (extrapolated) = 2.04 W/kg
SAR(1 g) = 0.394 W/kg



0 dB = 1.16 W/kg = 0.64 dBW/kg

DUT: A3LSMG9600; Type: Portable Handset; Serial: 5DD38

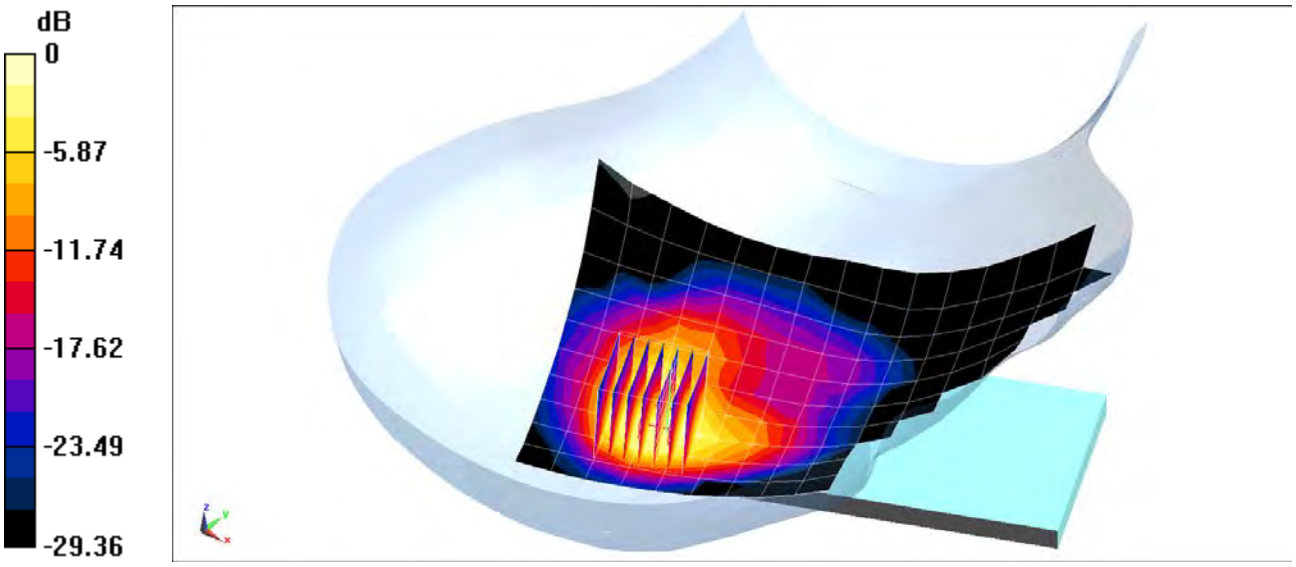
Communication System: UID 0, Bluetooth; Frequency: 2441 MHz; Duty Cycle: 1:1.294
Medium: 2450 Head Medium parameters used (interpolated):
f = 2441 MHz; σ = 1.843 S/m; ε_r = 38.417; ρ = 1000 kg/m^3
Phantom section: Right Section

Test Date: 12-01-2017; Ambient Temp: 23.1°C; Tissue Temp: 22.6°C

Probe: ES3DV3 - SN3319; ConvF(4.6, 4.6, 4.6); Calibrated: 3/14/2017;
Sensor-Surface: 3mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1368; Calibrated: 3/8/2017
Phantom: SAM 5.0 front; Type: QD000P40CD; Serial: 1648
Measurement SW: DASY52, Version 52.10;SEMCAD X Version 14.6.10 (7417)

Mode: Bluetooth, Right Head, Cheek, Ch 39, 1 Mbps

Area Scan (11x19x1): Measurement grid: dx=12mm, dy=12mm
Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 19.94 V/m; Power Drift = -0.11 dB
Peak SAR (extrapolated) = 1.67 W/kg
SAR(1 g) = 0.664 W/kg



0 dB = 0.900 W/kg = -0.46 dBW/kg

DUT: A3LSMG9600; Type: Portable Handset; Serial: 5E0CA

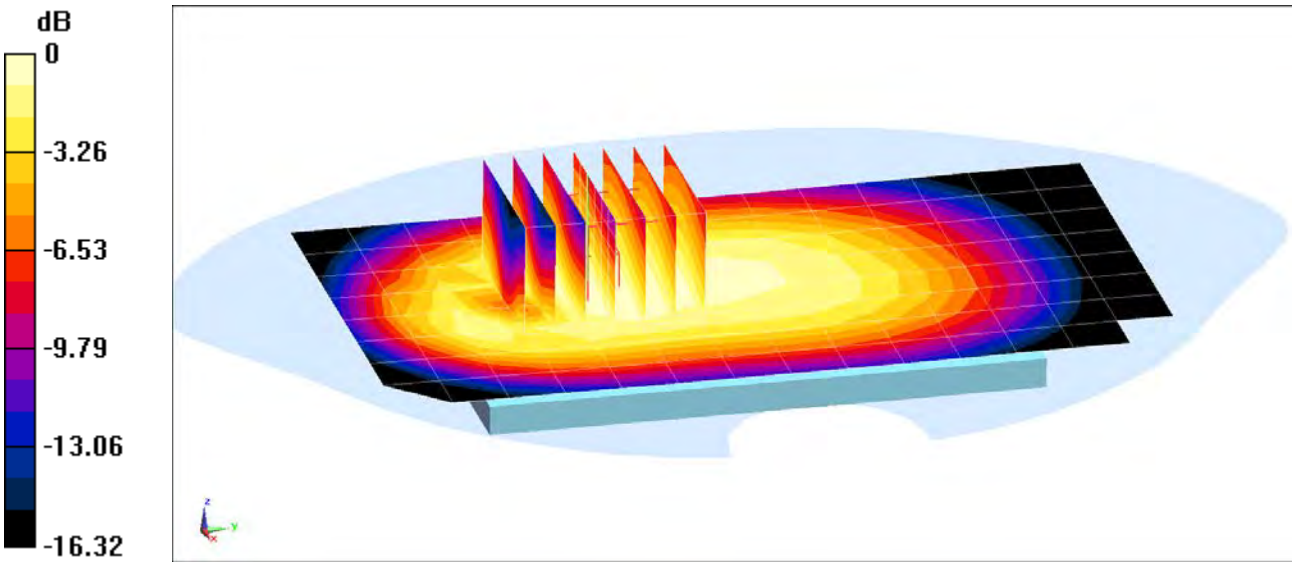
Communication System: UID 0, CDMA; Frequency: 836.52 MHz; Duty Cycle: 1:1
Medium: 835 Body Medium parameters used (interpolated):
f = 836.52 MHz; σ = 1.006 S/m; ε_r = 53.961; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.5 cm

Test Date: 12-01-2017; Ambient Temp: 22.6°C; Tissue Temp: 20.8°C

Probe: EX3DV4 - SN7410; ConvF(9.95, 9.95, 9.95); Calibrated: 7/17/2017;
Sensor-Surface: 1.4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1322; Calibrated: 7/13/2017
Phantom: SAM with CRP v5.0 (Right); Type: QD000P40CD; Serial: TP:1759
Measurement SW: DASY52, Version 52.10;SEMCAD X Version 14.6.10 (7417)

Mode: Cell. CDMA, Body SAR, Back side, Mid.ch

Area Scan (9x15x1): Measurement grid: dx=15mm, dy=15mm
Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 17.70 V/m; Power Drift = 0.04 dB
Peak SAR (extrapolated) = 0.565 W/kg
SAR(1 g) = 0.431 W/kg



0 dB = 0.520 W/kg = -2.84 dBW/kg

DUT: A3LSMG9600; Type: Portable Handset; Serial: 5E0CA

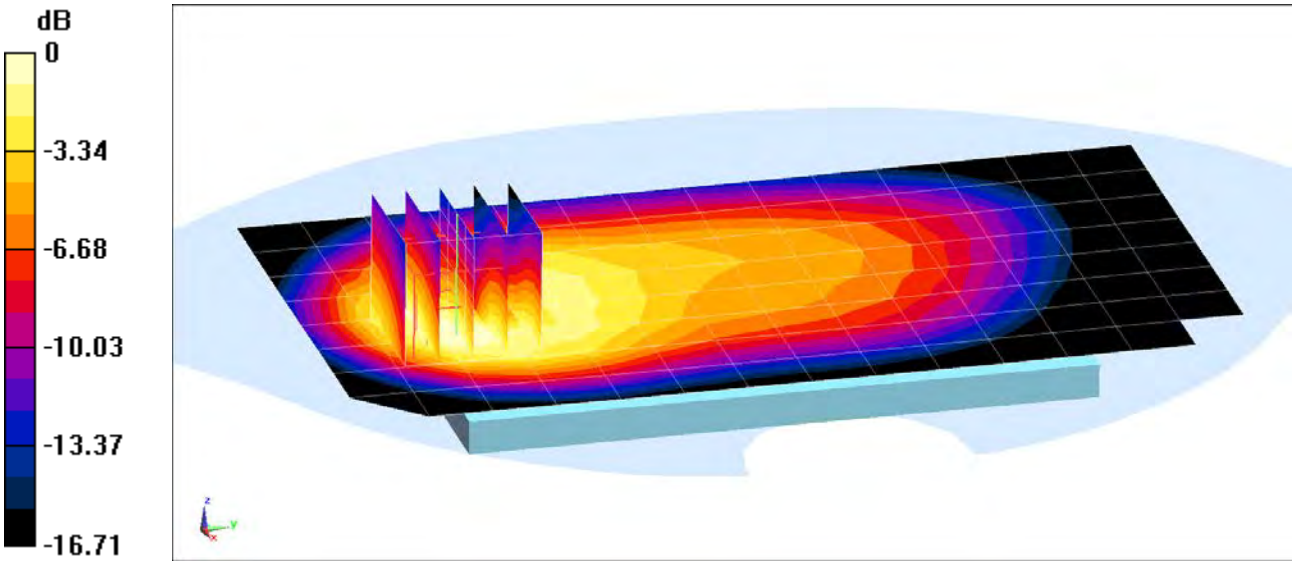
Communication System: UID 0, CDMA; Frequency: 836.52 MHz; Duty Cycle: 1:1
Medium: 835 Body Medium parameters used (interpolated):
$f = 836.52$ MHz; $\sigma = 1.006$ S/m; $\varepsilon_r = 53.961$; $\rho = 1000$ kg/m^3
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 12-01-2017; Ambient Temp: 22.6°C; Tissue Temp: 20.8°C

Probe: EX3DV4 - SN7410; ConvF(9.95, 9.95, 9.95); Calibrated: 7/17/2017;
Sensor-Surface: 1.4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1322; Calibrated: 7/13/2017
Phantom: SAM with CRP v5.0 (Right); Type: QD000P40CD; Serial: TP:1759
Measurement SW: DASY52, Version 52.10;SEMCAD X Version 14.6.10 (7417)

Mode: Cell. EVDO, Body SAR, Back side, Mid.ch

Area Scan (9x15x1): Measurement grid: dx=15mm, dy=15mm
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 27.68 V/m; Power Drift = 0.00 dB
Peak SAR (extrapolated) = 1.23 W/kg
SAR(1 g) = 0.712 W/kg



0 dB = 1.04 W/kg = 0.17 dBW/kg

DUT: A3LSMG9600; Type: Portable Handset; Serial: 21B02

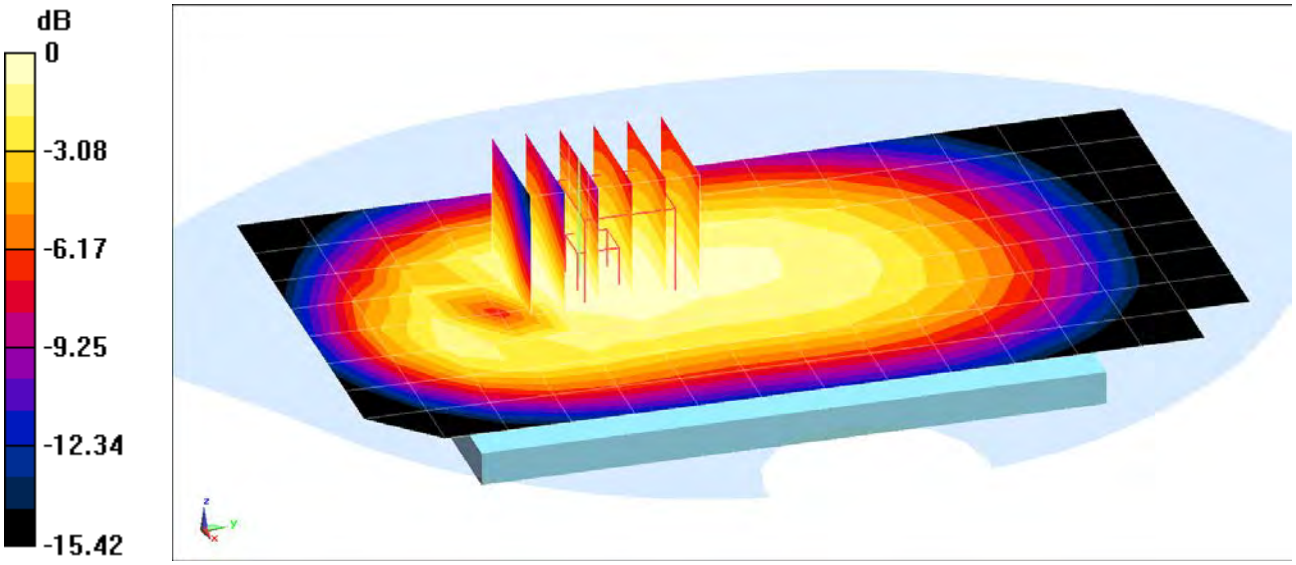
Communication System: UID 0, GSM; Frequency: 836.6 MHz; Duty Cycle: 1:8.3
Medium: 835 Body Medium parameters used (interpolated):
f = 836.6 MHz; σ = 0.996 S/m; ε_r = 53.208; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.5 cm

Test Date: 11-28-2017; Ambient Temp: 22.1°C; Tissue Temp: 19.7°C

Probe: EX3DV4 - SN7410; ConvF(9.95, 9.95, 9.95); Calibrated: 7/17/2017;
Sensor-Surface: 1.4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1322; Calibrated: 7/13/2017
Phantom: SAM with CRP v5.0 (Right); Type: QD000P40CD; Serial: TP:1759
Measurement SW: DASY52, Version 52.10;SEMCAD X Version 14.6.10 (7417)

Mode: GSM 850, Body SAR, Back side, Mid.ch

Area Scan (9x15x1): Measurement grid: dx=15mm, dy=15mm
Zoom Scan (5x6x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 16.88 V/m; Power Drift = 0.02 dB
Peak SAR (extrapolated) = 0.355 W/kg
SAR(1 g) = 0.270 W/kg



0 dB = 0.327 W/kg = -4.85 dBW/kg

DUT: A3LSMG9600; Type: Portable Handset; Serial: 21B02

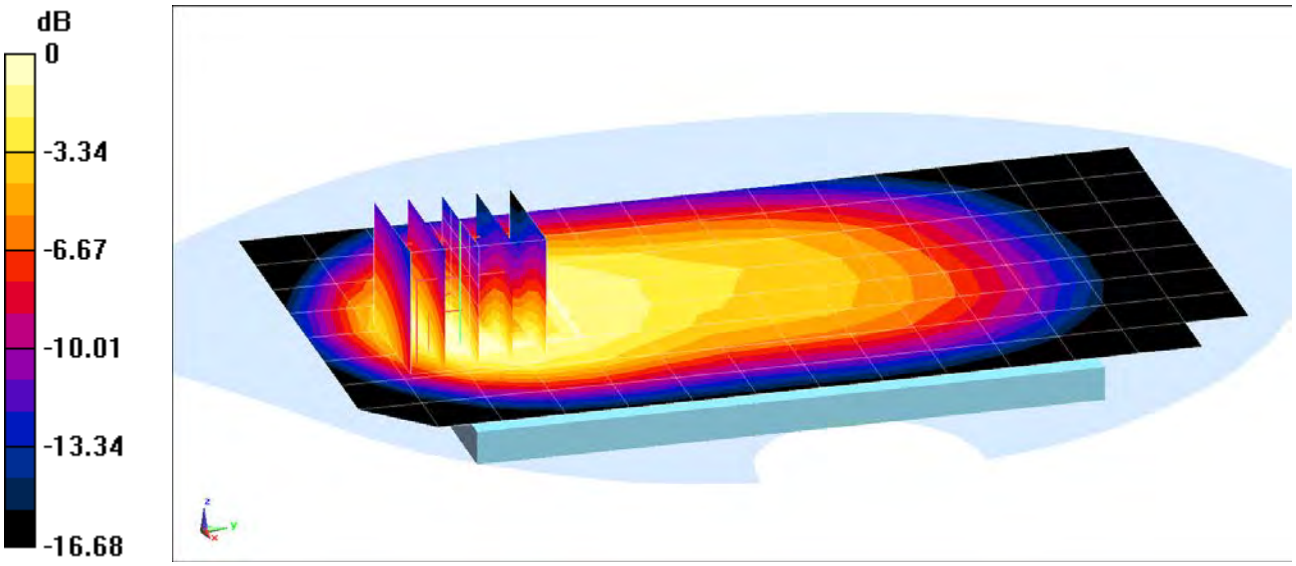
Communication System: UID 0, GSM GPRS; 3 Tx slots; Frequency: 836.6 MHz; Duty Cycle: 1:2.76
Medium: 835 Body Medium parameters used (interpolated):
$f = 836.6$ MHz; $\sigma = 0.996$ S/m; $\varepsilon_r = 53.208$; $\rho = 1000$ kg/m^3
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 11-28-2017; Ambient Temp: 22.1°C; Tissue Temp: 19.7°C

Probe: EX3DV4 - SN7410; ConvF(9.95, 9.95, 9.95); Calibrated: 7/17/2017;
Sensor-Surface: 1.4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1322; Calibrated: 7/13/2017
Phantom: SAM with CRP v5.0 (Right); Type: QD000P40CD; Serial: TP:1759
Measurement SW: DASY52, Version 52.10;SEMCAD X Version 14.6.10 (7417)

Mode: GPRS 850, Body SAR, Back side, Mid.ch, 3 Tx Slots

Area Scan (9x15x1): Measurement grid: dx=15mm, dy=15mm
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 21.13 V/m; Power Drift = -0.05 dB
Peak SAR (extrapolated) = 0.707 W/kg
SAR(1 g) = 0.403 W/kg



0 dB = 0.586 W/kg = -2.32 dBW/kg

DUT: A3LSMG9600; Type: Portable Handset; Serial: 217D9

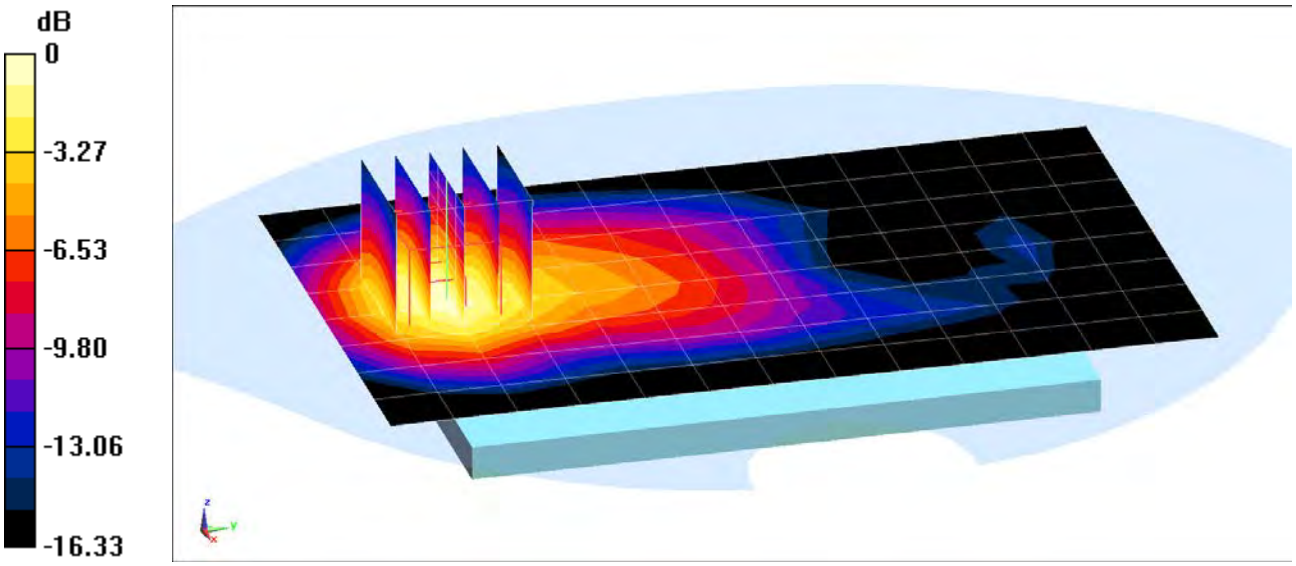
Communication System: UID 0, GSM; Frequency: 1880 MHz; Duty Cycle: 1:8.3
Medium: 1900 Body Medium parameters used:
f = 1880 MHz; σ = 1.556 S/m; ε_r = 51.824; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.5 cm

Test Date: 11-10-2017; Ambient Temp: 23.5°C; Tissue Temp: 22.1°C

Probe: ES3DV3 - SN3209; ConvF(4.93, 4.93, 4.93); Calibrated: 3/14/2017;
Sensor-Surface: 3mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1415; Calibrated: 3/13/2017
Phantom: SAM Right; Type: QD000P40CD; Serial: 1800
Measurement SW: DASY52, Version 52.10;SEMCAD X Version 14.6.10 (7417)

Mode: GSM 1900, Body SAR, Back side, Mid.ch

Area Scan (9x14x1): Measurement grid: dx=15mm, dy=15mm
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 15.73 V/m; Power Drift = -0.04 dB
Peak SAR (extrapolated) = 0.543 W/kg
SAR(1 g) = 0.340 W/kg



0 dB = 0.404 W/kg = -3.94 dBW/kg

DUT: A3LSMG9600; Type: Portable Handset; Serial: 21B3C

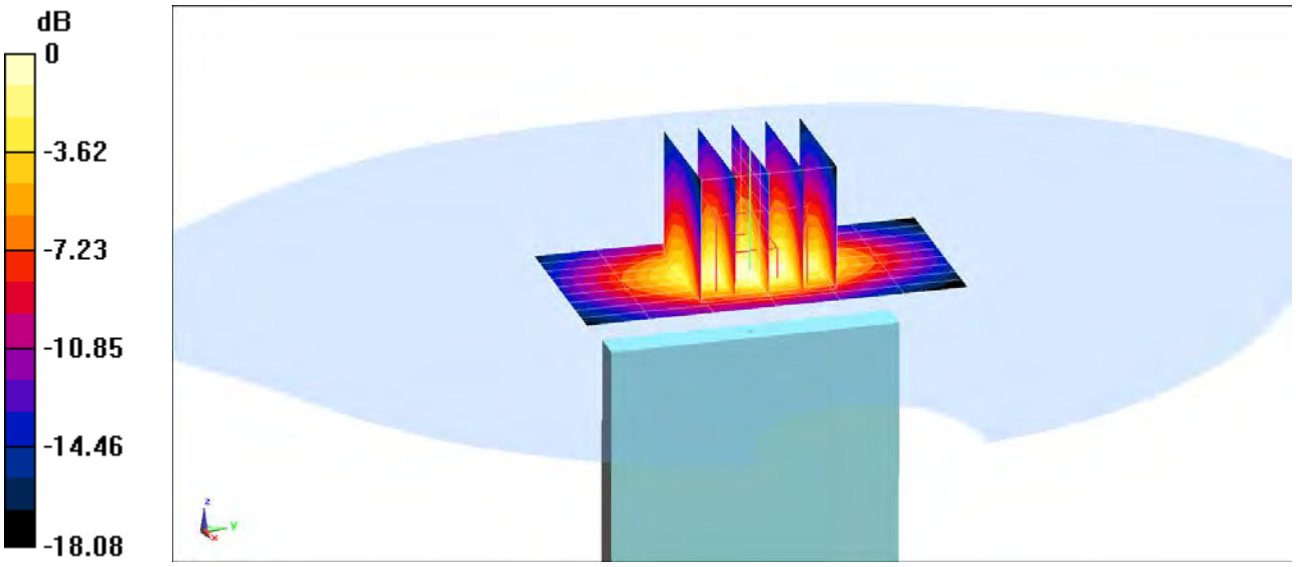
Communication System: UID 0, GSM GPRS; 2 Tx slots; Frequency: 1880 MHz; Duty Cycle: 1:4.15
Medium: 1900 Body Medium parameters used:
f = 1880 MHz; σ = 1.557 S/m; ε_r = 53.476; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 11-15-2017; Ambient Temp: 21.5°C; Tissue Temp: 21.9°C

Probe: ES3DV3 - SN3209; ConvF(4.93, 4.93, 4.93); Calibrated: 3/14/2017;
Sensor-Surface: 3mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1415; Calibrated: 3/13/2017
Phantom: SAM Right; Type: QD000P40CD; Serial: 1800
Measurement SW: DASY52, Version 52.10;SEMCAD X Version 14.6.10 (7417)

Mode: GPRS 1900, Body SAR, Bottom Edge, Mid.ch, 2 Tx Slots

Area Scan (10x7x1): Measurement grid: dx=5mm, dy=15mm
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 18.48 V/m; Power Drift = -0.03 dB
Peak SAR (extrapolated) = 0.742 W/kg
SAR(1 g) = 0.447 W/kg



0 dB = 0.557 W/kg = -2.54 dBW/kg

DUT: A3LSMG9600; Type: Portable Handset; Serial: 21B02

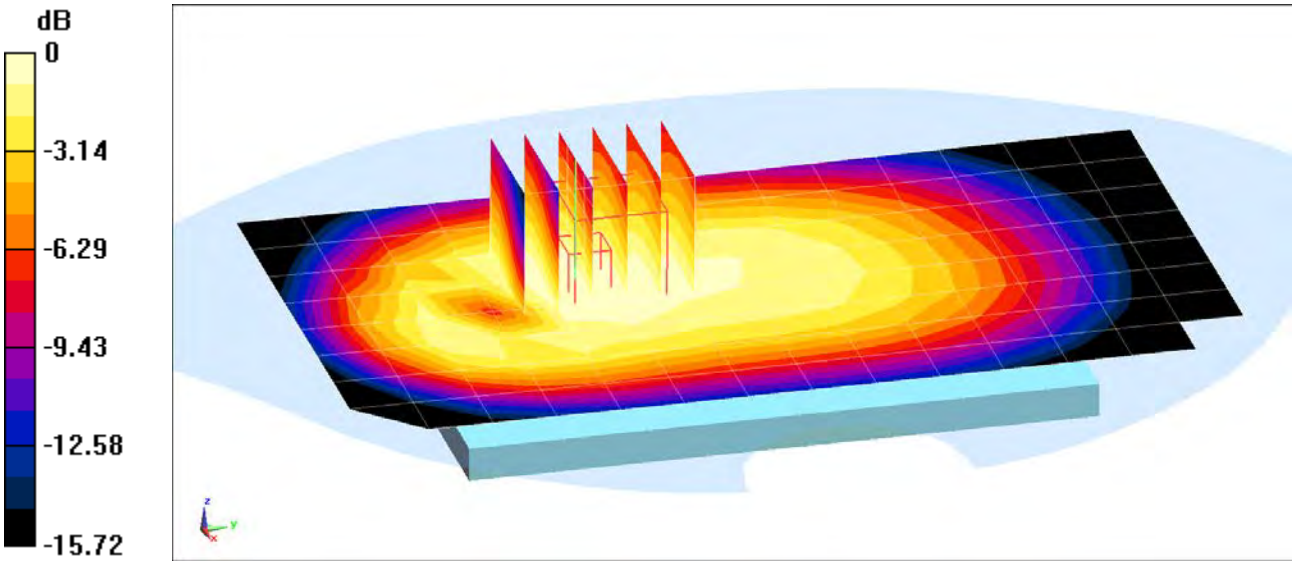
Communication System: UID 0, UMTS; Frequency: 836.6 MHz; Duty Cycle: 1:1
Medium: 835 Body Medium parameters used (interpolated):
f = 836.6 MHz; σ = 0.996 S/m; ε_r = 53.208; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.5 cm

Test Date: 11-28-2017; Ambient Temp: 22.1°C; Tissue Temp: 19.7°C

Probe: EX3DV4 - SN7410; ConvF(9.95, 9.95, 9.95); Calibrated: 7/17/2017;
Sensor-Surface: 1.4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1322; Calibrated: 7/13/2017
Phantom: SAM with CRP v5.0 (Right); Type: QD000P40CD; Serial: TP:1759
Measurement SW: DASY52, Version 52.10;SEMCAD X Version 14.6.10 (7417)

Mode: UMTS 850, Body SAR, Back side, Mid.ch

Area Scan (9x15x1): Measurement grid: dx=15mm, dy=15mm
Zoom Scan (5x6x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 18.74 V/m; Power Drift = 0.01 dB
Peak SAR (extrapolated) = 0.438 W/kg
SAR(1 g) = 0.330 W/kg



0 dB = 0.401 W/kg = -3.97 dBW/kg

DUT: A3LSMG9600; Type: Portable Handset; Serial: 21B02

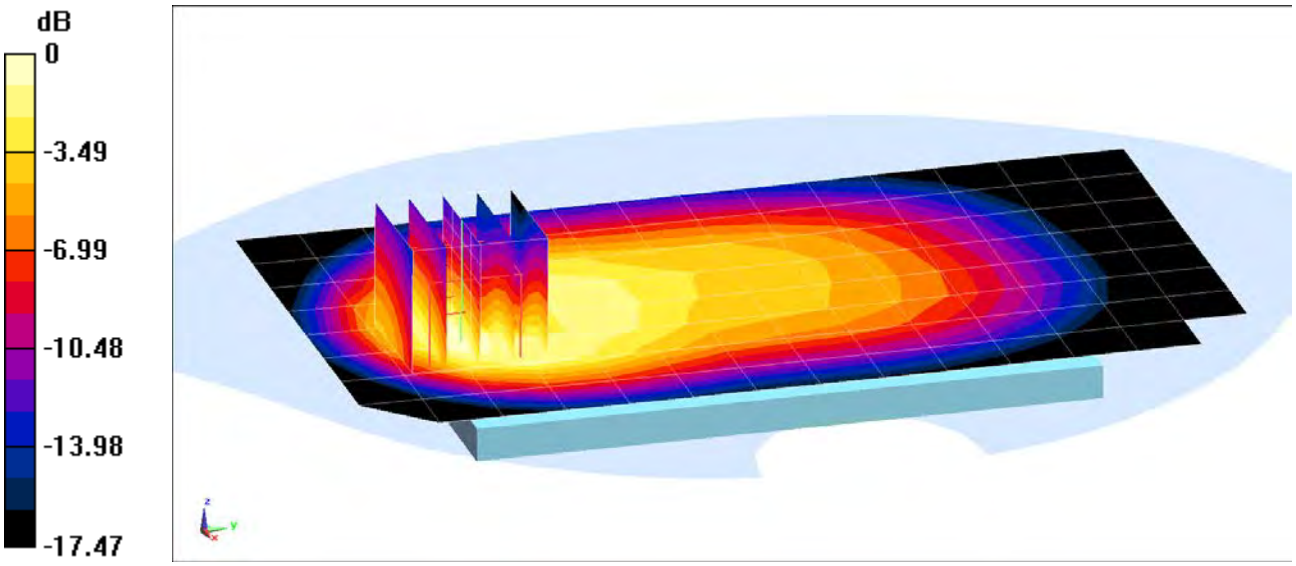
Communication System: UID 0, UMTS; Frequency: 836.6 MHz; Duty Cycle: 1:1
Medium: 835 Body Medium parameters used (interpolated):
f = 836.6 MHz; σ = 0.996 S/m; ε_r = 53.208; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 11-28-2017; Ambient Temp: 22.1°C; Tissue Temp: 19.7°C

Probe: EX3DV4 - SN7410; ConvF(9.95, 9.95, 9.95); Calibrated: 7/17/2017;
Sensor-Surface: 1.4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1322; Calibrated: 7/13/2017
Phantom: SAM with CRP v5.0 (Right); Type: QD000P40CD; Serial: TP:1759
Measurement SW: DASY52, Version 52.10;SEMCAD X Version 14.6.10 (7417)

Mode: UMTS 850, Body SAR, Back side, Mid.ch

Area Scan (9x15x1): Measurement grid: dx=15mm, dy=15mm
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 23.86 V/m; Power Drift = -0.04 dB
Peak SAR (extrapolated) = 0.896 W/kg
SAR(1 g) = 0.505 W/kg



0 dB = 0.763 W/kg = -1.17 dBW/kg

DUT: A3LSMG9600; Type: Portable Handset; Serial: 217D9

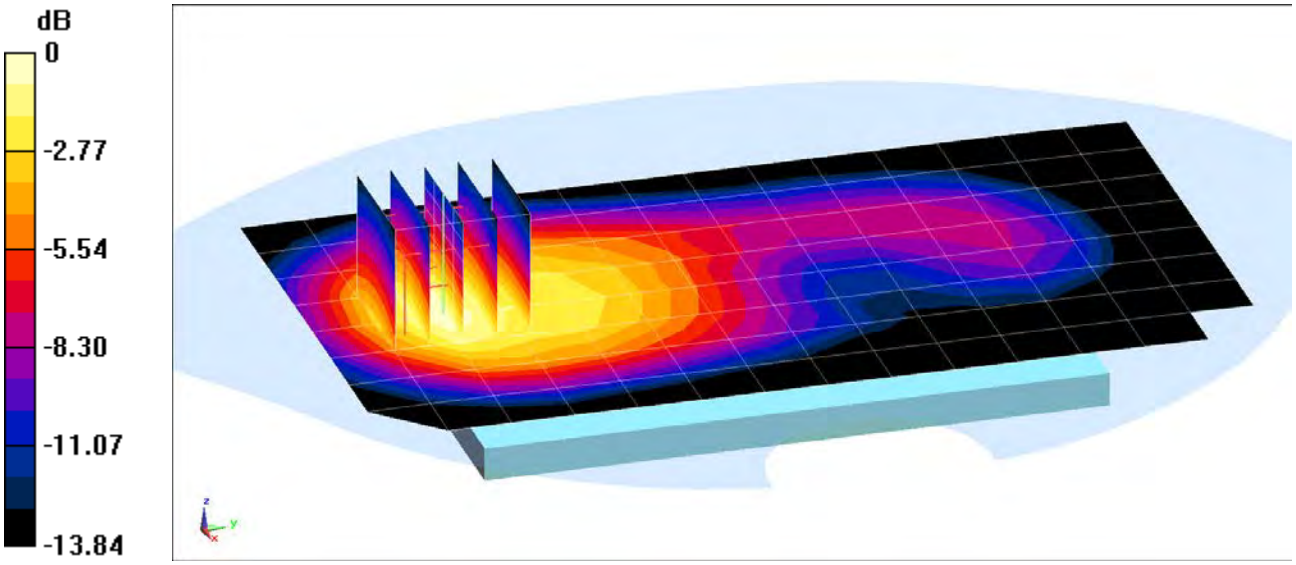
Communication System: UID 0, UMTS; Frequency: 1732.4 MHz; Duty Cycle: 1:1
Medium: 1750 Body Medium parameters used (interpolated):
f = 1732.4 MHz; σ = 1.463 S/m; ε_r = 50.973; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.5 cm

Test Date: 11-15-2017; Ambient Temp: 23.3°C; Tissue Temp: 22.3°C

Probe: EX3DV4 - SN7406; ConvF(8.08, 8.08, 8.08); Calibrated: 4/18/2017;
Sensor-Surface: 1.4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1407; Calibrated: 4/11/2017
Phantom: SAM Left; Type: QD000P40CC; Serial: TP: 1375
Measurement SW: DASY52, Version 52.10;SEMCAD X Version 14.6.10 (7417)

Mode: UMTS 1750, Body SAR, Back side, Mid.ch

Area Scan (9x15x1): Measurement grid: dx=15mm, dy=15mm
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 18.61 V/m; Power Drift = -0.01 dB
Peak SAR (extrapolated) = 0.740 W/kg
SAR(1 g) = 0.466 W/kg



0 dB = 0.645 W/kg = -1.90 dBW/kg

DUT: A3LSMG9600; Type: Portable Handset; Serial: 217D9

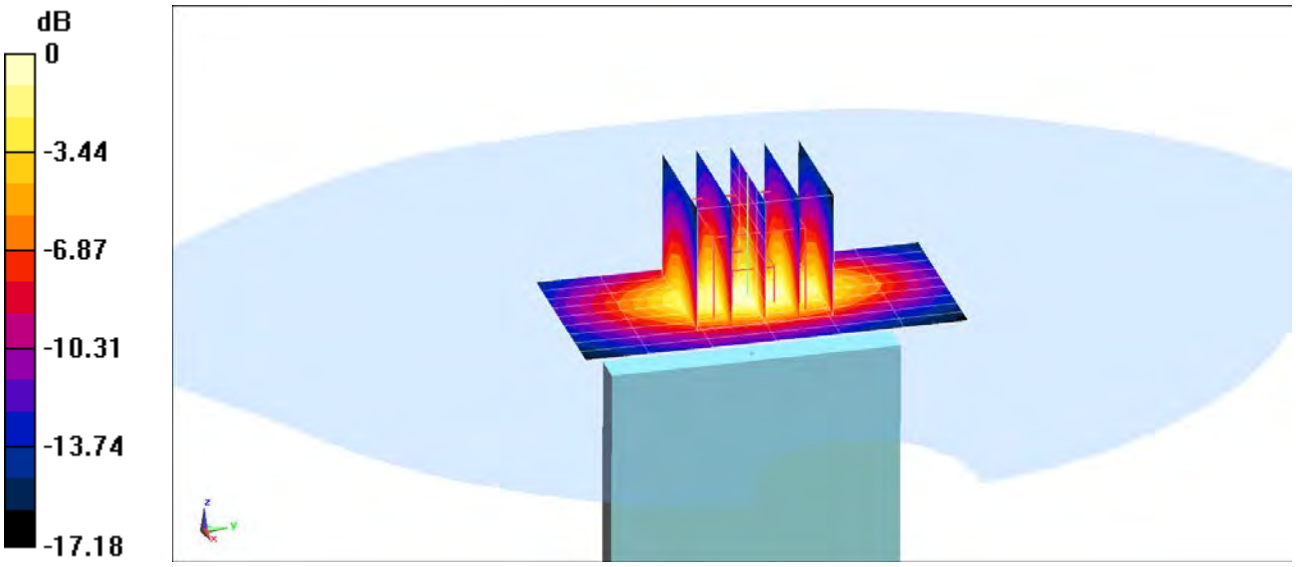
Communication System: UID 0, UMTS; Frequency: 1732.4 MHz; Duty Cycle: 1:1
Medium: 1750 Body Medium parameters used (interpolated):
f = 1732.4 MHz; σ = 1.463 S/m; ε_r = 50.973; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 11-15-2017; Ambient Temp: 23.3°C; Tissue Temp: 22.3°C

Probe: EX3DV4 - SN7406; ConvF(8.08, 8.08, 8.08); Calibrated: 4/18/2017;
Sensor-Surface: 1.4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1407; Calibrated: 4/11/2017
Phantom: SAM Left; Type: QD000P40CC; Serial: TP: 1375
Measurement SW: DASY52, Version 52.10;SEMCAD X Version 14.6.10 (7417)

Mode: UMTS 1750, Body SAR, Bottom Edge, Mid.ch

Area Scan (10x7x1): Measurement grid: dx=5mm, dy=15mm
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 19.27 V/m; Power Drift = -0.04 dB
Peak SAR (extrapolated) = 0.836 W/kg
SAR(1 g) = 0.484 W/kg



0 dB = 0.718 W/kg = -1.44 dBW/kg

DUT: A3LSMG9600; Type: Portable Handset; Serial: 217D9

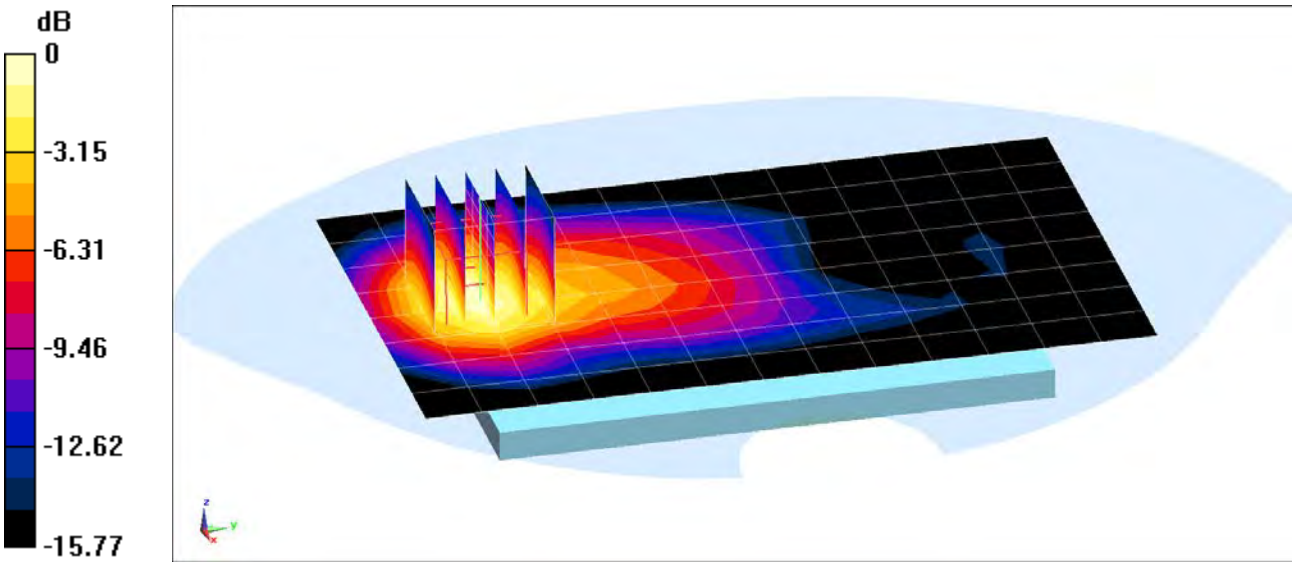
Communication System: UID 0, UMTS; Frequency: 1880 MHz; Duty Cycle: 1:1
Medium: 1900 Body Medium parameters used:
f = 1880 MHz; σ = 1.556 S/m; ε_r = 51.824; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.5 cm

Test Date: 11-10-2017; Ambient Temp: 23.5°C; Tissue Temp: 22.1°C

Probe: ES3DV3 - SN3209; ConvF(4.93, 4.93, 4.93); Calibrated: 3/14/2017;
Sensor-Surface: 3mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1415; Calibrated: 3/13/2017
Phantom: SAM Right; Type: QD000P40CD; Serial: 1800
Measurement SW: DASY52, Version 52.10;SEMCAD X Version 14.6.10 (7417)

Mode: UMTS 1900, Body SAR, Back side, Mid.ch

Area Scan (9x14x1): Measurement grid: dx=15mm, dy=15mm
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 23.52 V/m; Power Drift = -0.01 dB
Peak SAR (extrapolated) = 1.21 W/kg
SAR(1 g) = 0.762 W/kg



0 dB = 0.902 W/kg = -0.45 dBW/kg

DUT: A3LSMG9600; Type: Portable Handset; Serial: 217D9

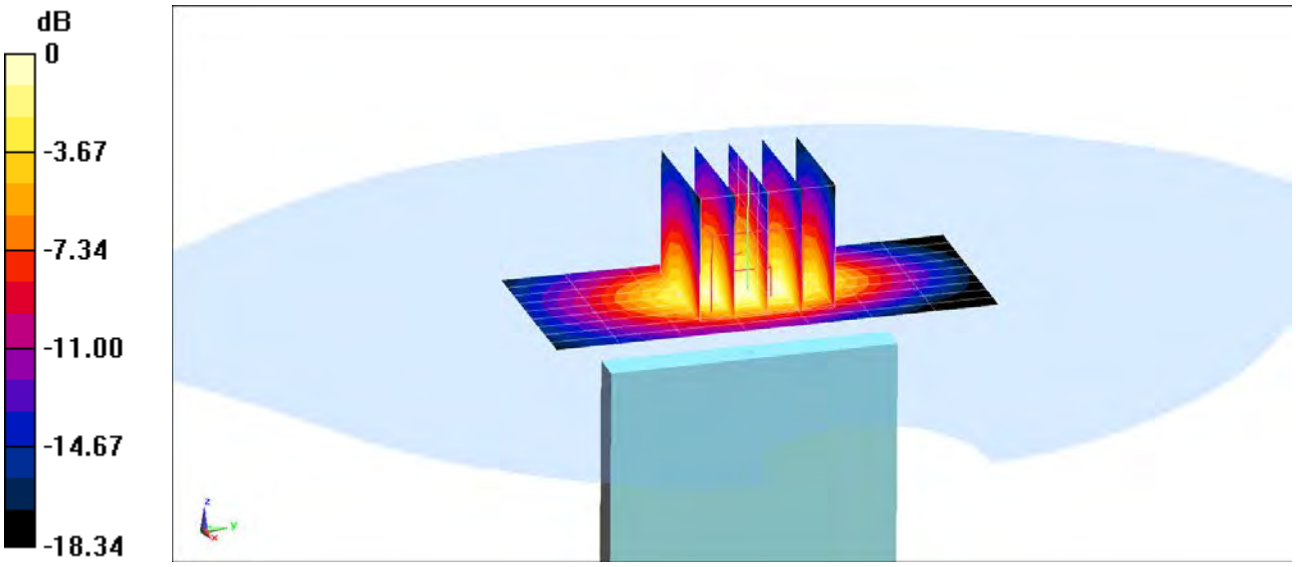
Communication System: UID 0, UMTS; Frequency: 1880 MHz; Duty Cycle: 1:1
Medium: 1900 Body Medium parameters used:
f = 1880 MHz; σ = 1.556 S/m; ε_r = 51.824; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 11-10-2017; Ambient Temp: 23.5°C; Tissue Temp: 22.1°C

Probe: ES3DV3 - SN3209; ConvF(4.93, 4.93, 4.93); Calibrated: 3/14/2017;
Sensor-Surface: 3mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1415; Calibrated: 3/13/2017
Phantom: SAM Right; Type: QD000P40CD; Serial: 1800
Measurement SW: DASY52, Version 52.10;SEMCAD X Version 14.6.10 (7417)

Mode: UMTS 1900, Body SAR, Bottom Edge, Mid.ch

Area Scan (10x8x1): Measurement grid: dx=5mm, dy=15mm
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 20.07 V/m; Power Drift = -0.06 dB
Peak SAR (extrapolated) = 0.902 W/kg
SAR(1 g) = 0.532 W/kg



0 dB = 0.665 W/kg = -1.77 dBW/kg

DUT: A3LSMG9600; Type: Portable Handset; Serial: 21B3C

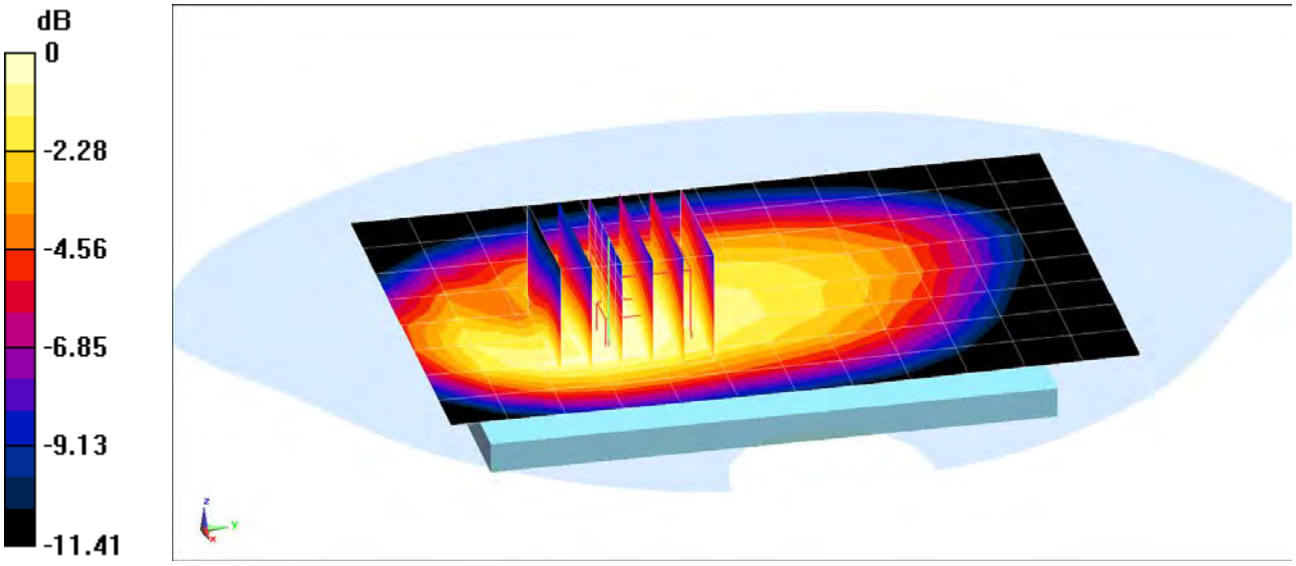
Communication System: UID 0, LTE Band 12; Frequency: 707.5 MHz; Duty Cycle: 1:1
Medium: 750 Body Medium parameters used (interpolated):
f = 707.5 MHz; σ = 0.929 S/m; ε_r = 55.393; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.5 cm

Test Date: 11-19-2017; Ambient Temp: 22.2°C; Tissue Temp: 20.2°C

Probe: ES3DV3 - SN3332; ConvF(6.54, 6.54, 6.54); Calibrated: 8/14/2017;
Sensor-Surface: 3mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1323; Calibrated: 8/9/2017
Phantom: SAM Left; Type: QD000P40CA; Serial: TP:82355
Measurement SW: DASY52, Version 52.10;SEMCAD X Version 14.6.10 (7417)

Mode: LTE Band 12, Body SAR, Back side, Mid.ch, 10 MHz Bandwidth, QPSK, 1 RB, 25 RB Offset

Area Scan (9x13x1): Measurement grid: dx=15mm, dy=15mm
Zoom Scan (6x6x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 15.09 V/m; Power Drift = -0.03 dB
Peak SAR (extrapolated) = 0.269 W/kg
SAR(1 g) = 0.195 W/kg



0 dB = 0.219 W/kg = -6.60 dBW/kg

DUT: A3LSMG9600; Type: Portable Handset; Serial: 21B3C

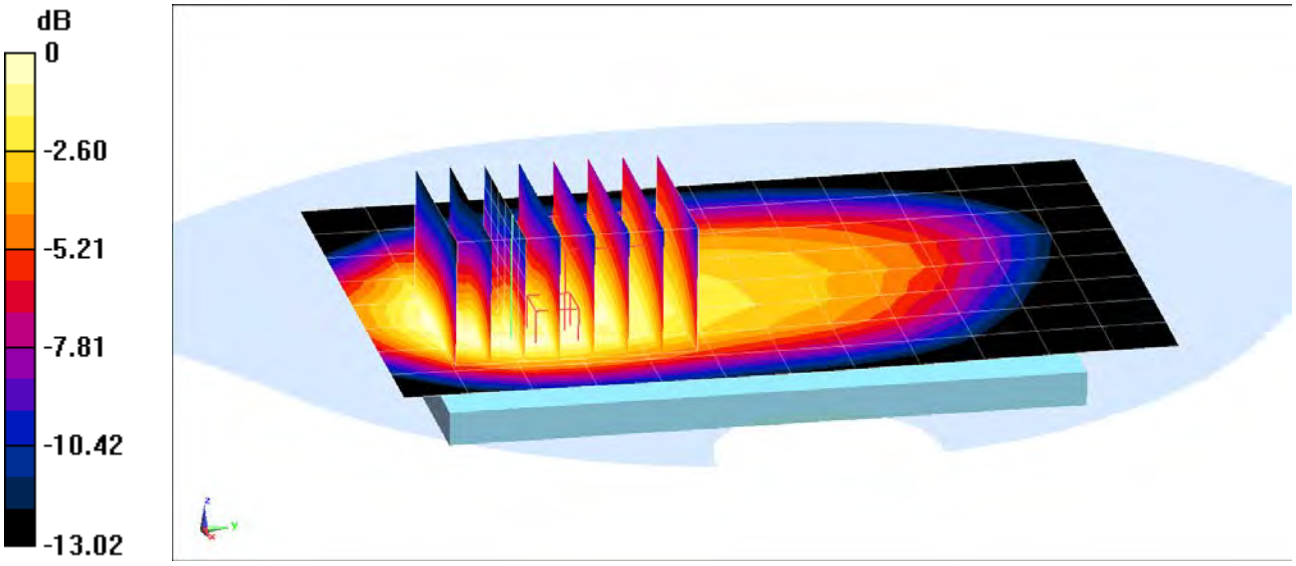
Communication System: UID 0, LTE Band 12; Frequency: 707.5 MHz; Duty Cycle: 1:1
Medium: 750 Body Medium parameters used (interpolated):
f = 707.5 MHz; σ = 0.929 S/m; ε_r = 55.393; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 11-19-2017; Ambient Temp: 22.2°C; Tissue Temp: 20.2°C

Probe: ES3DV3 - SN3332; ConvF(6.54, 6.54, 6.54); Calibrated: 8/14/2017;
Sensor-Surface: 3mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1323; Calibrated: 8/9/2017
Phantom: SAM Left; Type: QD000P40CA; Serial: TP:82355
Measurement SW: DASY52, Version 52.10;SEMCAD X Version 14.6.10 (7417)

Mode: LTE Band 12, Body SAR, Back side, Mid.ch, 10 MHz Bandwidth, QPSK, 1 RB, 25 RB Offset

Area Scan (9x13x1): Measurement grid: dx=15mm, dy=15mm
Zoom Scan (7x8x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 18.02 V/m; Power Drift = 0.05 dB
Peak SAR (extrapolated) = 0.459 W/kg
SAR(1 g) = 0.275 W/kg



0 dB = 0.326 W/kg = -4.87 dBW/kg

DUT: A3LSMG9600; Type: Portable Handset; Serial: 21B3C

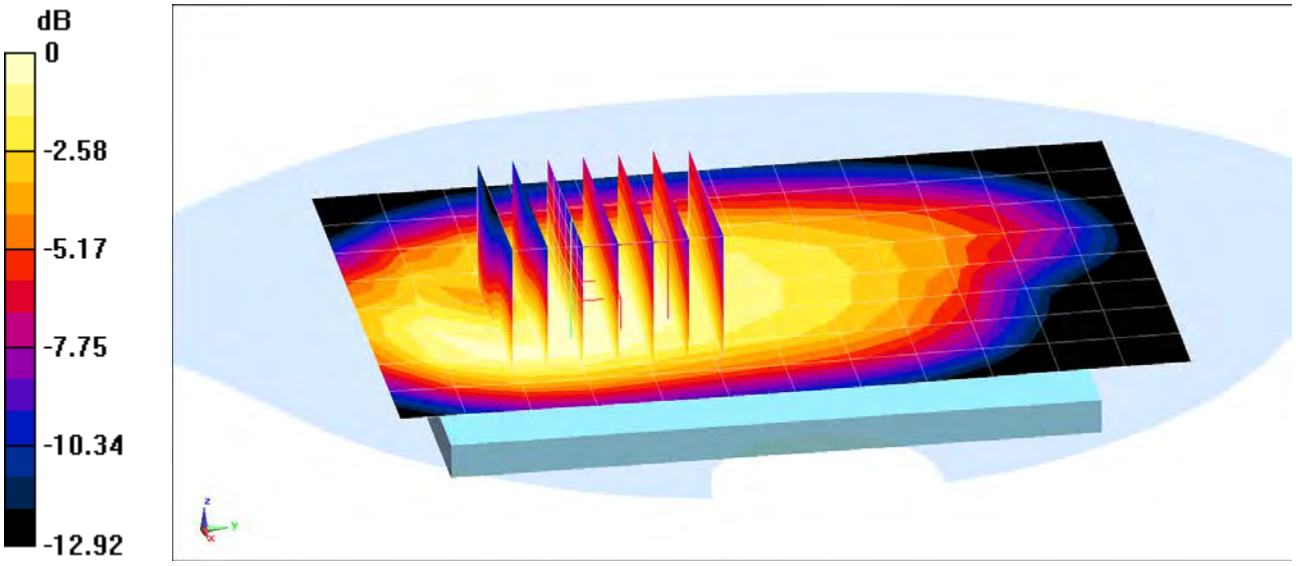
Communication System: UID 0, LTE Band 13; Frequency: 782 MHz; Duty Cycle: 1:1
Medium: 750 Body Medium parameters used (interpolated):
f = 782 MHz; σ = 0.998 S/m; ε_r = 54.671; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.5 cm

Test Date: 11-19-2017; Ambient Temp: 22.2°C; Tissue Temp: 20.2°C

Probe: ES3DV3 - SN3332; ConvF(6.54, 6.54, 6.54); Calibrated: 8/14/2017;
Sensor-Surface: 3mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1323; Calibrated: 8/9/2017
Phantom: SAM Left; Type: QD000P40CA; Serial: TP:82355
Measurement SW: DASY52, Version 52.10;SEMCAD X Version 14.6.10 (7417)

Mode: LTE Band 13, Body SAR, Back side, Mid.ch, 10 MHz Bandwidth, QPSK, 1 RB, 25 RB Offset

Area Scan (9x13x1): Measurement grid: dx=15mm, dy=15mm
Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 15.42 V/m; Power Drift = 0.00 dB
Peak SAR (extrapolated) = 0.314 W/kg
SAR(1 g) = 0.220 W/kg



0 dB = 0.248 W/kg = -6.06 dBW/kg

DUT: A3LSMG9600; Type: Portable Handset; Serial: 21B3C

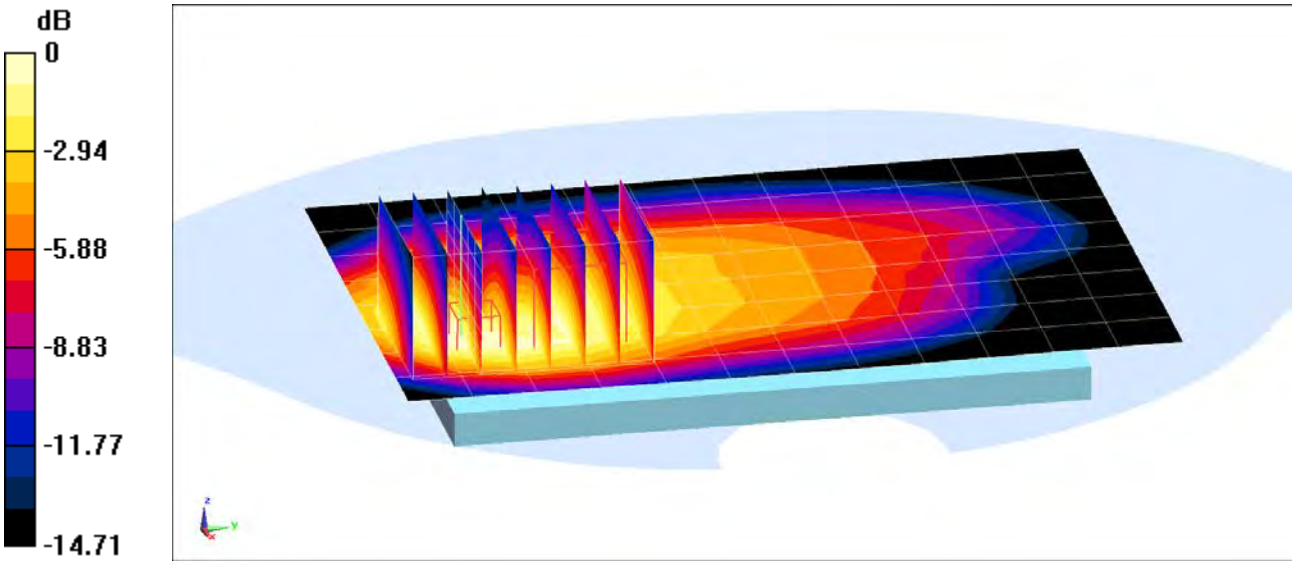
Communication System: UID 0, LTE Band 13; Frequency: 782 MHz; Duty Cycle: 1:1
Medium: 750 Body Medium parameters used (interpolated):
f = 782 MHz; σ = 0.998 S/m; ε_r = 54.671; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 11-19-2017; Ambient Temp: 22.2°C; Tissue Temp: 20.2°C

Probe: ES3DV3 - SN3332; ConvF(6.54, 6.54, 6.54); Calibrated: 8/14/2017;
Sensor-Surface: 3mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1323; Calibrated: 8/9/2017
Phantom: SAM Left; Type: QD000P40CA; Serial: TP:82355
Measurement SW: DASY52, Version 52.10;SEMCAD X Version 14.6.10 (7417)

Mode: LTE Band 13, Body SAR, Back side, Mid.ch, 10 MHz Bandwidth, QPSK, 1 RB, 25 RB Offset

Area Scan (9x13x1): Measurement grid: dx=15mm, dy=15mm
Zoom Scan (6x8x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 20.76 V/m; Power Drift = 0.02 dB
Peak SAR (extrapolated) = 0.651 W/kg
SAR(1 g) = 0.383 W/kg



0 dB = 0.466 W/kg = -3.32 dBW/kg

DUT: A3LSMG9600; Type: Portable Handset; Serial: 21AD0

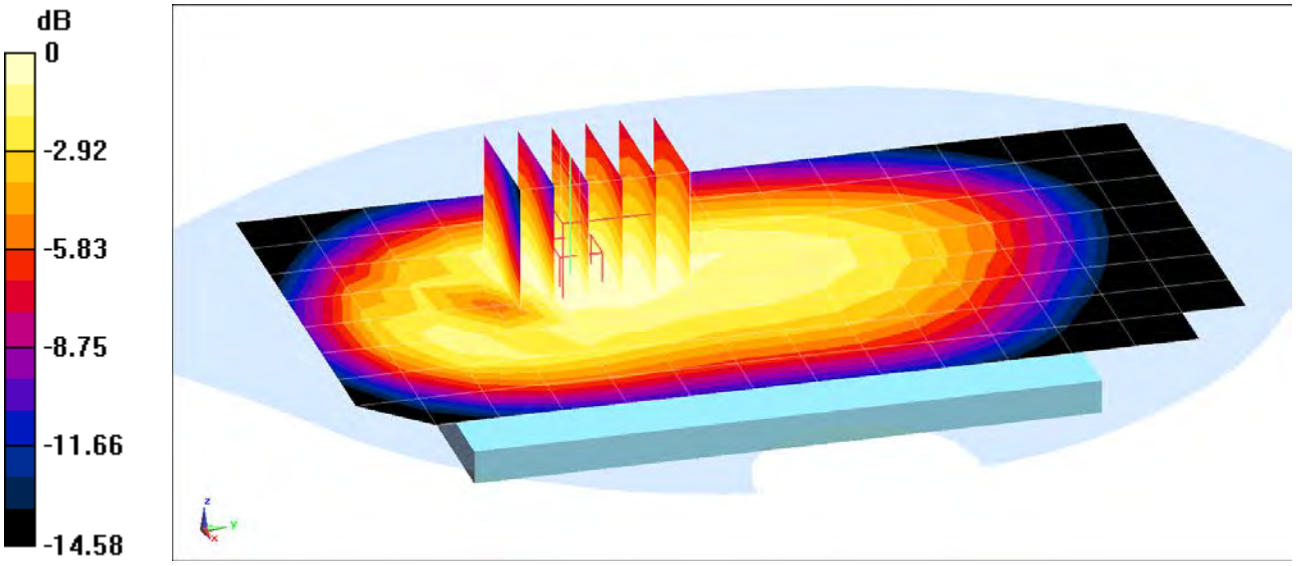
Communication System: UID 0, LTE Band 26; Frequency: 831.5 MHz; Duty Cycle: 1:1
Medium: 835 Body Medium parameters used (interpolated):
f = 831.5 MHz; σ = 0.97 S/m; ε_r = 52.881; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.5 cm

Test Date: 11-15-2017; Ambient Temp: 24.1°C; Tissue Temp: 21.5°C

Probe: ES3DV3 - SN3209; ConvF(6.36, 6.36, 6.36); Calibrated: 3/14/2017;
Sensor-Surface: 3mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1415; Calibrated: 3/13/2017
Phantom: SAM Right; Type: QD000P40CD; Serial: 1800
Measurement SW: DASY52, Version 52.10;SEMCAD X Version 14.6.10 (7417)

Mode: LTE Band 26 (Cell.), Body SAR, Back side, Mid.ch, 15 MHz Bandwidth, QPSK, 1 RB, 0 RB Offset

Area Scan (9x15x1): Measurement grid: dx=15mm, dy=15mm
Zoom Scan (5x6x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 17.55 V/m; Power Drift = 0.01 dB
Peak SAR (extrapolated) = 0.357 W/kg
SAR(1 g) = 0.276 W/kg



0 dB = 0.308 W/kg = -5.11 dBW/kg

DUT: A3LSMG9600; Type: Portable Handset; Serial: 21AD0

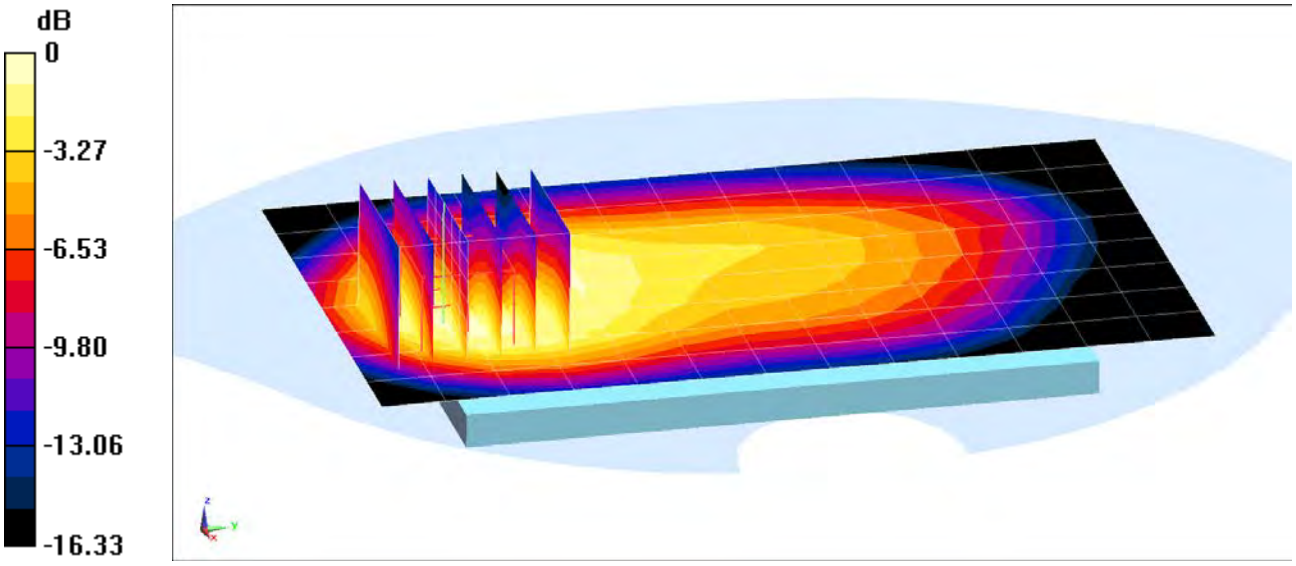
Communication System: UID 0, LTE Band 26; Frequency: 831.5 MHz; Duty Cycle: 1:1
Medium: 835 Body Medium parameters used (interpolated):
f = 831.5 MHz; σ = 0.97 S/m; ε_r = 52.881; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 11-15-2017; Ambient Temp: 24.1°C; Tissue Temp: 21.5°C

Probe: ES3DV3 - SN3209; ConvF(6.36, 6.36, 6.36); Calibrated: 3/14/2017;
Sensor-Surface: 3mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1415; Calibrated: 3/13/2017
Phantom: SAM Right; Type: QD000P40CD; Serial: 1800
Measurement SW: DASY52, Version 52.10;SEMCAD X Version 14.6.10 (7417)

Mode: LTE Band 26 (Cell.), Body SAR, Back side, Mid.ch, 15 MHz Bandwidth, QPSK, 1 RB, 0 RB Offset

Area Scan (9x14x1): Measurement grid: dx=15mm, dy=15mm
Zoom Scan (6x6x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 21.22 V/m; Power Drift = 0.00 dB
Peak SAR (extrapolated) = 0.714 W/kg
SAR(1 g) = 0.416 W/kg



0 dB = 0.511 W/kg = -2.92 dBW/kg

DUT: A3LSMG9600; Type: Portable Handset; Serial: 21B02

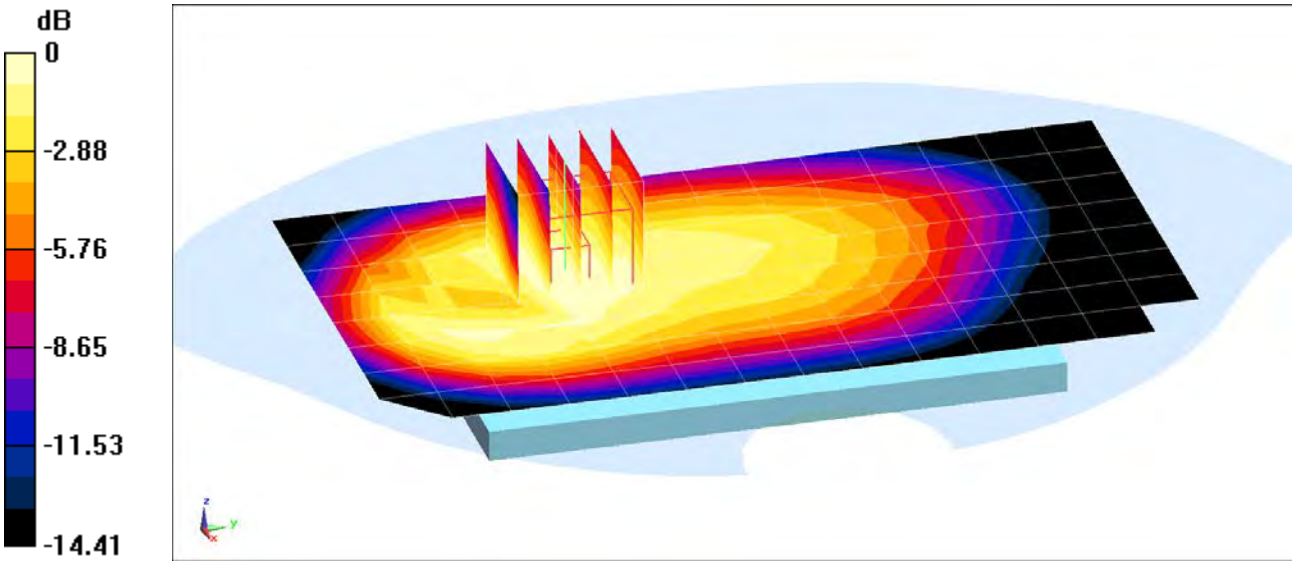
Communication System: UID 0, LTE Band 5; Frequency: 836.5 MHz; Duty Cycle: 1:1
Medium: 835 Body Medium parameters used (interpolated):
f = 836.5 MHz; σ = 0.996 S/m; ε_r = 53.209; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.5 cm

Test Date: 11-28-2017; Ambient Temp: 22.1°C; Tissue Temp: 19.7°C

Probe: EX3DV4 - SN7410; ConvF(9.95, 9.95, 9.95); Calibrated: 7/17/2017;
Sensor-Surface: 1.4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1322; Calibrated: 7/13/2017
Phantom: SAM with CRP v5.0 (Right); Type: QD000P40CD; Serial: TP:1759
Measurement SW: DASY52, Version 52.10;SEMCAD X Version 14.6.10 (7417)

Mode: LTE Band 5 (Cell.), Body SAR, Back side, Mid.ch, 10 MHz Bandwidth, QPSK, 1 RB, 25 RB Offset

Area Scan (9x15x1): Measurement grid: dx=15mm, dy=15mm
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 17.26 V/m; Power Drift = 0.00 dB
Peak SAR (extrapolated) = 0.370 W/kg
SAR(1 g) = 0.280 W/kg



0 dB = 0.339 W/kg = -4.70 dBW/kg

DUT: A3LSMG9600; Type: Portable Handset; Serial: 21B02

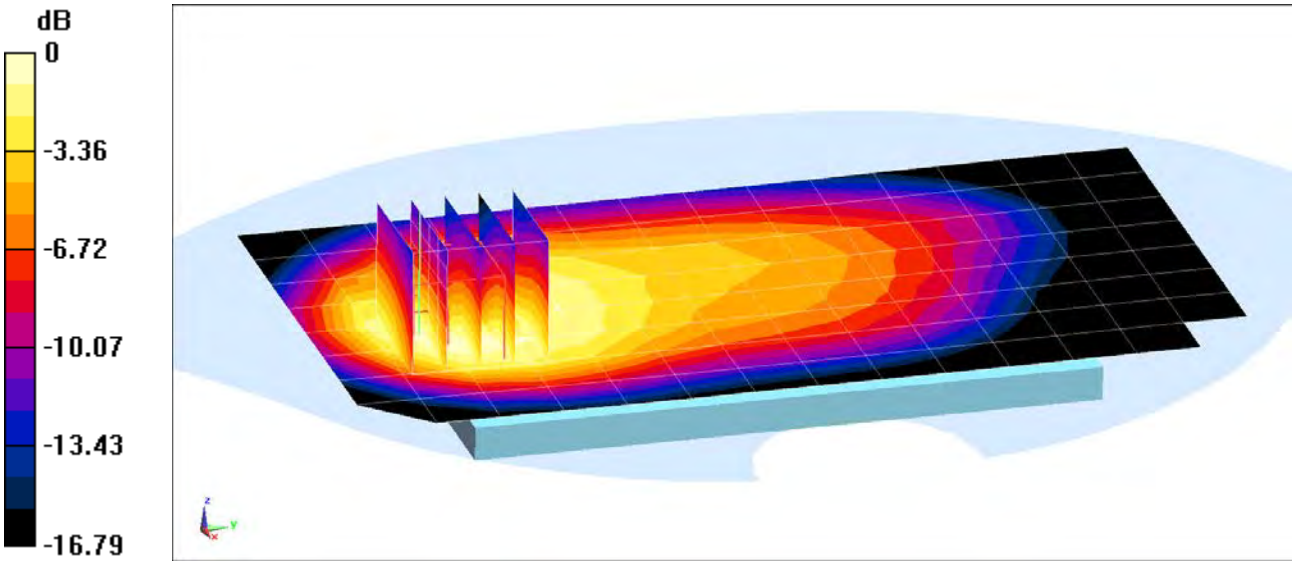
Communication System: UID 0, LTE Band 5; Frequency: 836.5 MHz; Duty Cycle: 1:1
Medium: 835 Body Medium parameters used (interpolated):
$f = 836.5$ MHz; $\sigma = 0.996$ S/m; $\varepsilon_r = 53.209$; $\rho = 1000$ kg/m^3
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 11-28-2017; Ambient Temp: 22.1°C; Tissue Temp: 19.7°C

Probe: EX3DV4 - SN7410; ConvF(9.95, 9.95, 9.95); Calibrated: 7/17/2017;
Sensor-Surface: 1.4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1322; Calibrated: 7/13/2017
Phantom: SAM with CRP v5.0 (Right); Type: QD000P40CD; Serial: TP:1759
Measurement SW: DASY52, Version 52.10;SEMCAD X Version 14.6.10 (7417)

Mode: LTE Band 5 (Cell.), Body SAR, Back side, Mid.ch, 10 MHz Bandwidth, QPSK, 1 RB, 25 RB Offset

Area Scan (9x15x1): Measurement grid: dx=15mm, dy=15mm
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 21.34 V/m; Power Drift = -0.10 dB
Peak SAR (extrapolated) = 0.745 W/kg
SAR(1 g) = 0.433 W/kg



0 dB = 0.631 W/kg = -2.00 dBW/kg

DUT: A3LSMG9600; Type: Portable Handset; Serial: 217D9

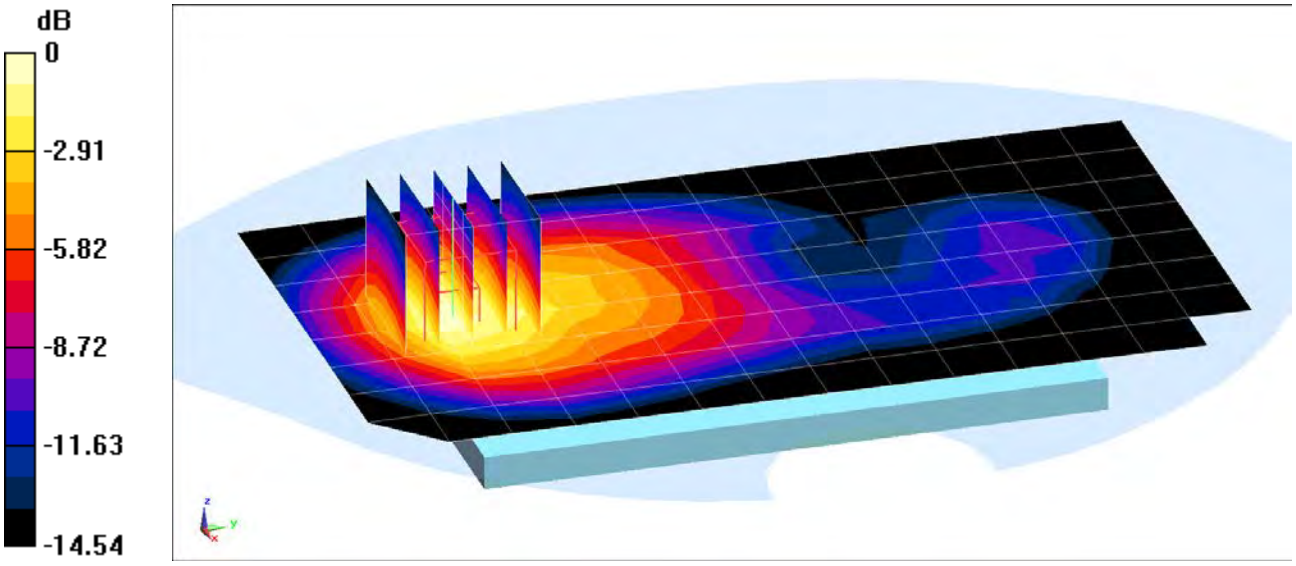
Communication System: UID 0, LTE Band 66 (AWS); Frequency: 1745 MHz; Duty Cycle: 1:1
Medium: 1750 Body Medium parameters used (interpolated):
$f = 1745$ MHz; $\sigma = 1.477$ S/m; $\varepsilon_r = 50.934$; $\rho = 1000$ kg/m^3
Phantom section: Flat Section; Space: 1.5 cm

Test Date: 11-15-2017; Ambient Temp: 23.3°C; Tissue Temp: 22.3°C

Probe: EX3DV4 - SN7406; ConvF(8.08, 8.08, 8.08); Calibrated: 4/18/2017;
Sensor-Surface: 1.4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1407; Calibrated: 4/11/2017
Phantom: SAM Left; Type: QD000P40CC; Serial: TP: 1375
Measurement SW: DASY52, Version 52.10;SEMCAD X Version 14.6.10 (7417)

Mode: LTE Band 66 (AWS), Body SAR, Back side, Mid.ch, 20 MHz Bandwidth, QPSK, 1 RB, 0 RB Offset

Area Scan (9x15x1): Measurement grid: dx=15mm, dy=15mm
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 22.39 V/m; Power Drift = 0.02 dB
Peak SAR (extrapolated) = 1.09 W/kg
SAR(1 g) = 0.678 W/kg



0 dB = 0.946 W/kg = -0.24 dBW/kg

DUT: A3LSMG9600; Type: Portable Handset; Serial: 217D9

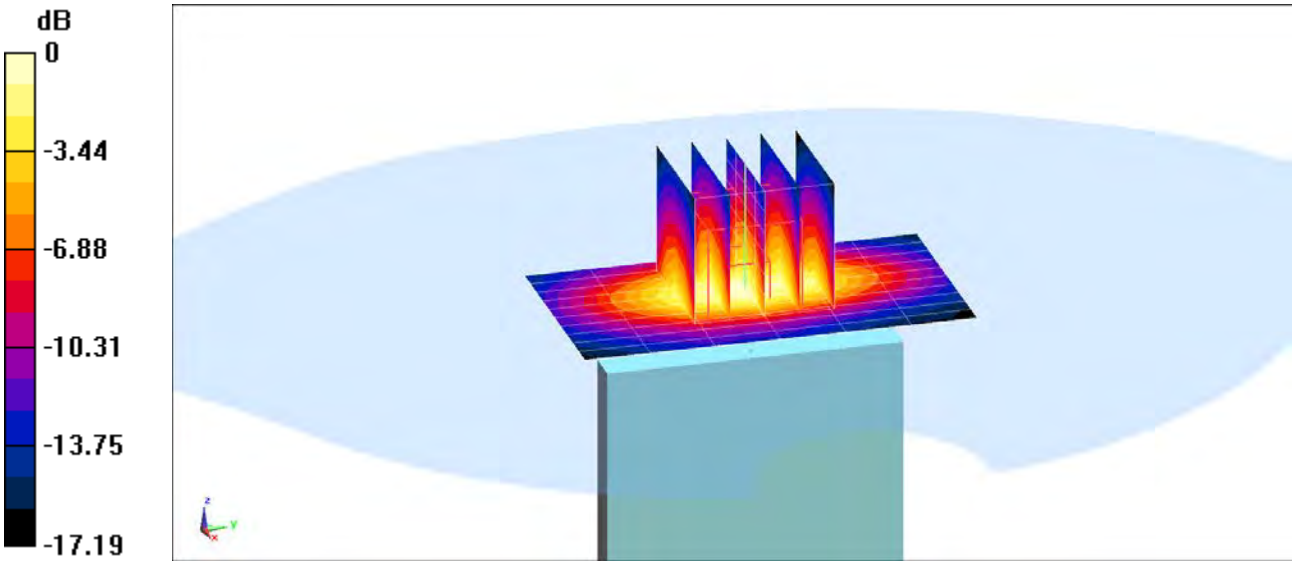
Communication System: UID 0, LTE Band 66 (AWS); Frequency: 1770 MHz; Duty Cycle: 1:1
Medium: 1750 Body Medium parameters used (interpolated):
$f = 1770$ MHz; $\sigma = 1.503$ S/m; $\varepsilon_r = 50.828$; $\rho = 1000$ kg/m^3
Phantom section: Flat Section; Space: 1. cm

Test Date: 11-15-2017; Ambient Temp: 23.3°C; Tissue Temp: 22.3°C

Probe: EX3DV4 - SN7406; ConvF(8.08, 8.08, 8.08); Calibrated: 4/18/2017;
Sensor-Surface: 1.4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1407; Calibrated: 4/11/2017
Phantom: SAM Left; Type: QD000P40CC; Serial: TP: 1375
Measurement SW: DASY52, Version 52.10;SEMCAD X Version 14.6.10 (7417)

Mode: LTE Band 66 (AWS), Body SAR, Bottom Edge, High.ch,
20 MHz Bandwidth, QPSK, 50 RB, 0 RB Offset

Area Scan (11x7x1): Measurement grid: dx=5mm, dy=15mm
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 22.19 V/m; Power Drift = -0.10 dB
Peak SAR (extrapolated) = 1.15 W/kg
SAR(1 g) = 0.663 W/kg



0 dB = 0.976 W/kg = -0.11 dBW/kg

DUT: A3LSMG9600; Type: Portable Handset; Serial: 217D9

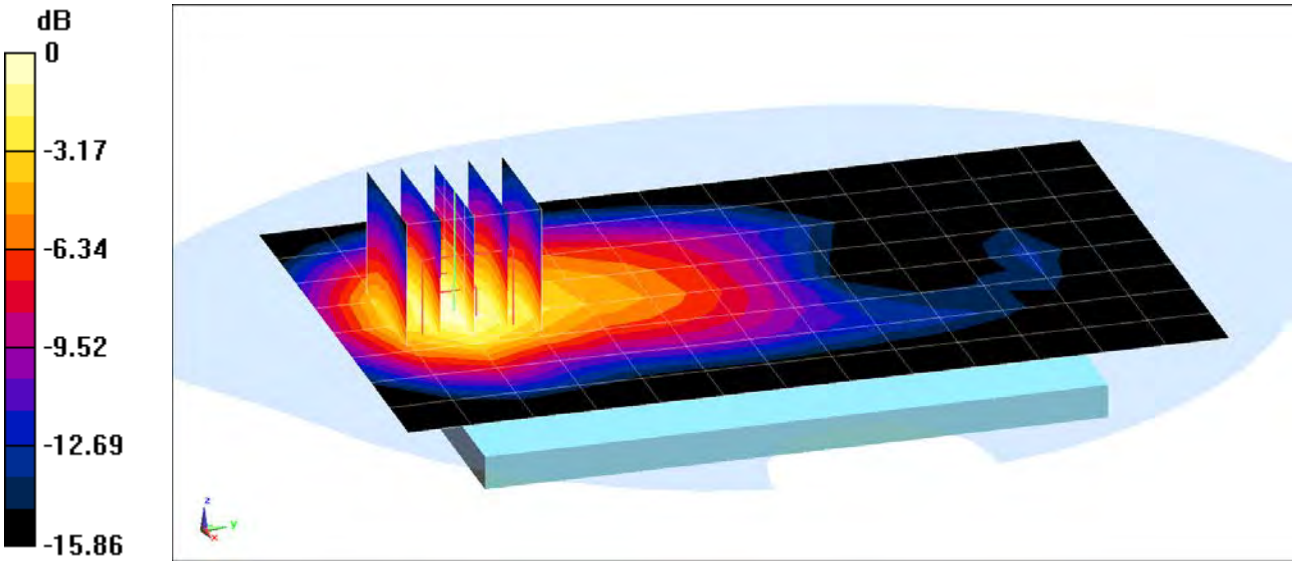
Communication System: UID 0, LTE Band 25 (PCS); Frequency: 1882.5 MHz; Duty Cycle: 1:1
Medium: 1900 Body Medium parameters used (interpolated):
$f = 1882.5$ MHz; $\sigma = 1.559$ S/m; $\varepsilon_r = 51.818$; $\rho = 1000$ kg/m^3
Phantom section: Flat Section; Space: 1.5 cm

Test Date: 11-10-2017; Ambient Temp: 23.5°C; Tissue Temp: 22.1°C

Probe: ES3DV3 - SN3209; ConvF(4.93, 4.93, 4.93); Calibrated: 3/14/2017;
Sensor-Surface: 3mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1415; Calibrated: 3/13/2017
Phantom: SAM Right; Type: QD000P40CD; Serial: 1800
Measurement SW: DASY52, Version 52.10;SEMCAD X Version 14.6.10 (7417)

Mode: LTE Band 25 (PCS), Body SAR, Back side, Mid.ch, 20 MHz Bandwidth, QPSK, 1 RB, 0 RB Offset

Area Scan (9x14x1): Measurement grid: dx=15mm, dy=15mm
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 23.88 V/m; Power Drift = 0.00 dB
Peak SAR (extrapolated) = 1.24 W/kg
SAR(1 g) = 0.782 W/kg



0 dB = 0.942 W/kg = -0.26 dBW/kg

DUT: A3LSMG9600; Type: Portable Handset; Serial: 217D9

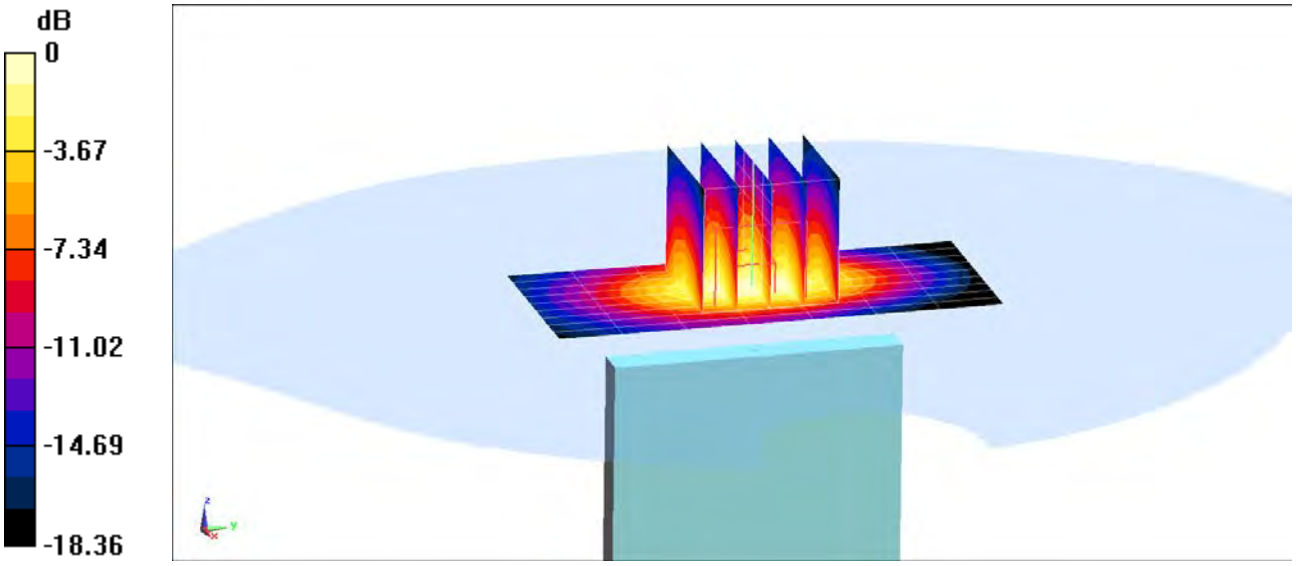
Communication System: UID 0, LTE Band 25 (PCS); Frequency: 1882.5 MHz; Duty Cycle: 1:1
Medium: 1900 Body Medium parameters used (interpolated):
$f = 1882.5$ MHz; $\sigma = 1.559$ S/m; $\varepsilon_r = 51.818$; $\rho = 1000$ kg/m^3
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 11-10-2017; Ambient Temp: 23.5°C; Tissue Temp: 22.1°C

Probe: ES3DV3 - SN3209; ConvF(4.93, 4.93, 4.93); Calibrated: 3/14/2017;
Sensor-Surface: 3mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1415; Calibrated: 3/13/2017
Phantom: SAM Right; Type: QD000P40CD; Serial: 1800
Measurement SW: DASY52, Version 52.10;SEMCAD X Version 14.6.10 (7417)

Mode: LTE Band 25 (PCS), Body SAR, Bottom Edge, Mid.ch, 20 MHz Bandwidth, QPSK, 1 RB, 0 RB Offset

Area Scan (10x8x1): Measurement grid: dx=5mm, dy=15mm
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 20.80 V/m; Power Drift = -0.04 dB
Peak SAR (extrapolated) = 0.969 W/kg
SAR(1 g) = 0.571 W/kg



0 dB = 0.715 W/kg = -1.46 dBW/kg

DUT: A3LSMG9600; Type: Portable Handset; Serial: 21AD3

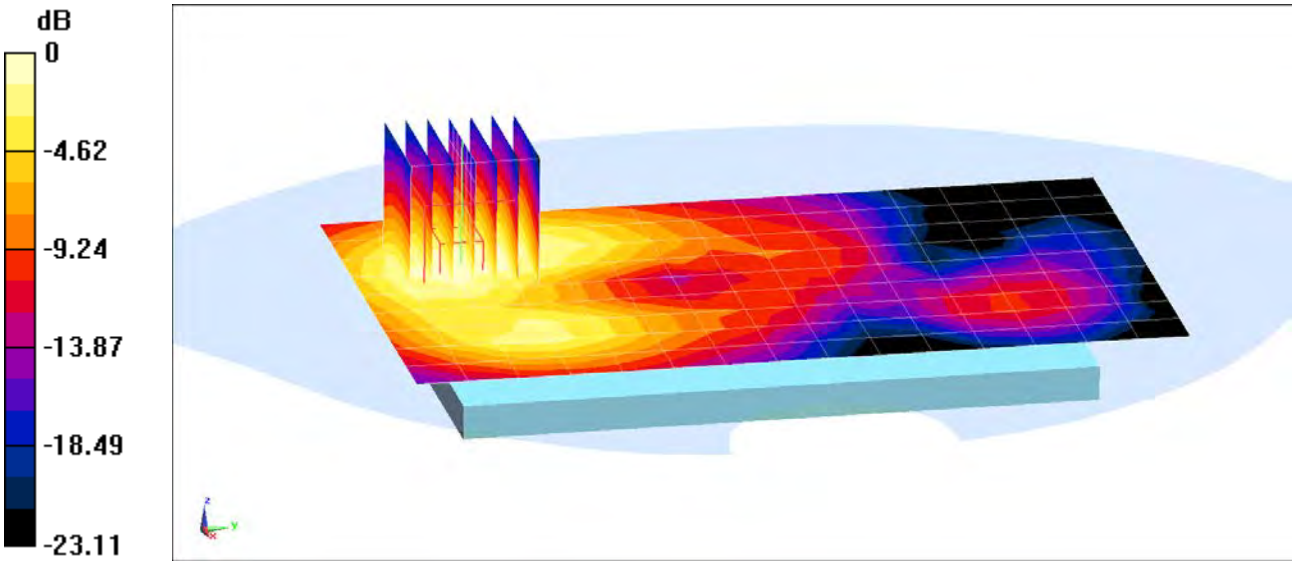
Communication System: UID 0, LTE Band 41; Frequency: 2593 MHz; Duty Cycle: 1:1.58
Medium: 2450 MHz Medium parameters used (interpolated):
$f = 2593$ MHz; $\sigma = 2.235$ S/m; $\varepsilon_r = 51.202$; $\rho = 1000$ kg/m^3
Phantom section: Flat Section; Space: 1.5 cm

Test Date: 12-11-2017; Ambient Temp: 20.3°C; Tissue Temp: 21.7°C

Probe: ES3DV3 - SN3319; ConvF(4.18, 4.18, 4.18); Calibrated: 3/14/2017;
Sensor-Surface: 3mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1368; Calibrated: 3/8/2017
Phantom: SAM 5.0 front; Type: QD000P40CD; Serial: 1648
Measurement SW: DASY52, Version 52.10;SEMCAD X Version 14.6.10 (7417)

Mode: LTE Band 41, Body SAR, Back side, Mid.ch, 20 MHz Bandwidth, QPSK, 1 RB, 0 RB Offset

Area Scan (10x16x1): Measurement grid: dx=12mm, dy=12mm
Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 11.99 V/m; Power Drift = -0.01 dB
Peak SAR (extrapolated) = 0.533 W/kg
SAR(1 g) = 0.283 W/kg



0 dB = 0.352 W/kg = -4.53 dBW/kg

DUT: A3LSMG9600; Type: Portable Handset; Serial: 21AD3

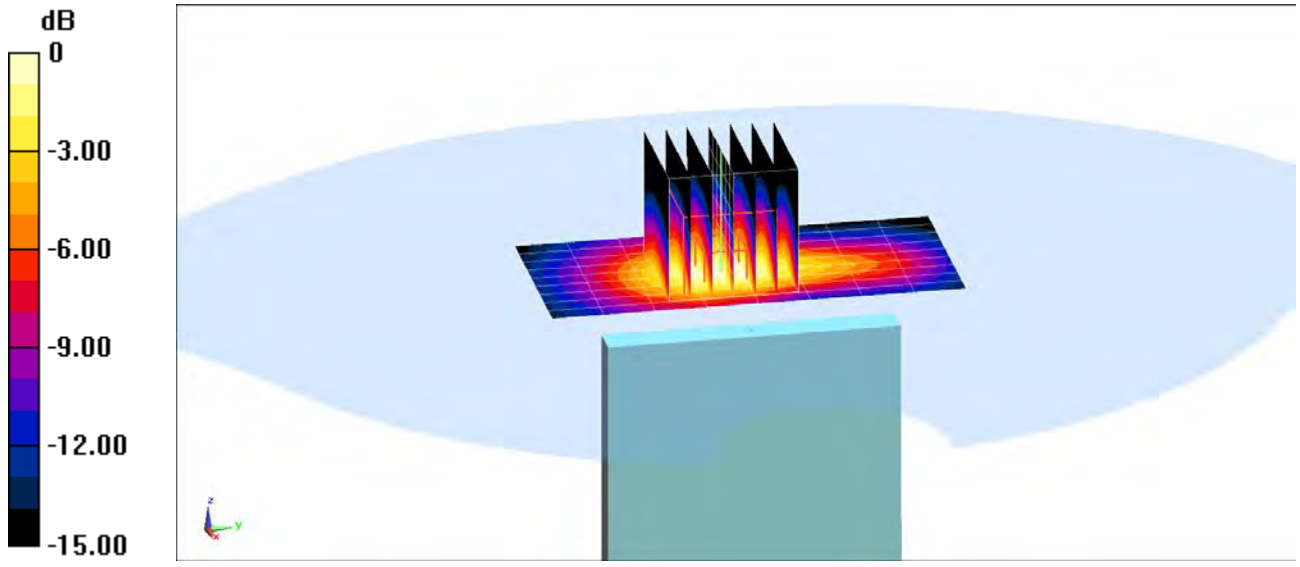
Communication System: UID 0, LTE Band 41; Frequency: 2680 MHz; Duty Cycle: 1:1.58
Medium: 2450 MHz Medium parameters used (interpolated):
f = 2680 MHz; σ = 2.36 S/m; ε_r = 50.85; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 12-11-2017; Ambient Temp: 20.3°C; Tissue Temp: 21.7°C

Probe: ES3DV3 - SN3319; ConvF(4.18, 4.18, 4.18); Calibrated: 3/14/2017;
Sensor-Surface: 3mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1368; Calibrated: 3/8/2017
Phantom: SAM 5.0 front; Type: QD000P40CD; Serial: 1648
Measurement SW: DASY52, Version 52.10;SEMCAD X Version 14.6.10 (7417)

Mode: LTE Band 41, 2CC Uplink, Body SAR, Bottom Edge, High.ch, 20 MHz Bandwidth
PCC: QPSK, Ch 41490, 1 RB, 0 RB Offset
SCC: QPSK, Ch 41292, 1 RB, 99 RB Offset

Area Scan (10x9x1): Measurement grid: dx=5mm, dy=12mm
Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 15.02 V/m; Power Drift = -0.03 dB
Peak SAR (extrapolated) = 0.948 W/kg
SAR(1 g) = 0.454 W/kg



0 dB = 0.594 W/kg = -2.26 dBW/kg

DUT: A3LSMG9600; Type: Portable Handset; Serial: 21B04

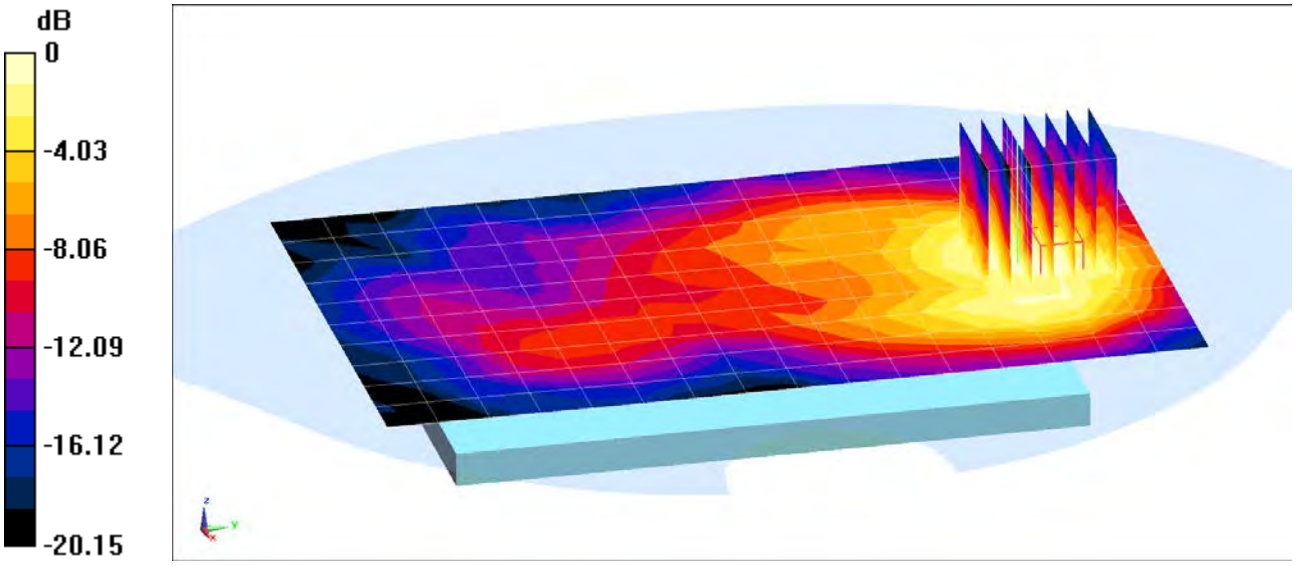
Communication System: UID 0, 802.11b; Frequency: 2412 MHz; Duty Cycle: 1:1
Medium: 2450 Body Medium parameters used (interpolated):
f = 2412 MHz; σ = 1.978 S/m; ε_r = 51.904; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.5 cm

Test Date: 11-29-2017; Ambient Temp: 22.0°C; Tissue Temp: 20.9°C

Probe: ES3DV3 - SN3213; ConvF(4.53, 4.53, 4.53); Calibrated: 2/10/2017;
Sensor-Surface: 3mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1272; Calibrated: 2/9/2017
Phantom: SAM Front; Type: QD000P40CD; Serial: TP:1758
Measurement SW: DASY52, Version 52.10;SEMCAD X Version 14.6.10 (7417)

Mode: IEEE 802.11b, Antenna 2, 22 MHz Bandwidth, Body SAR, Ch 1, 1 Mbps, Back Side

Area Scan (11x17x1): Measurement grid: dx=12mm, dy=12mm
Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 8.045 V/m; Power Drift = -0.11 dB
Peak SAR (extrapolated) = 0.228 W/kg
SAR(1 g) = 0.102 W/kg



0 dB = 0.132 W/kg = -8.79 dBW/kg

DUT: A3LSMG9600; Type: Portable Handset; Serial: 21B04

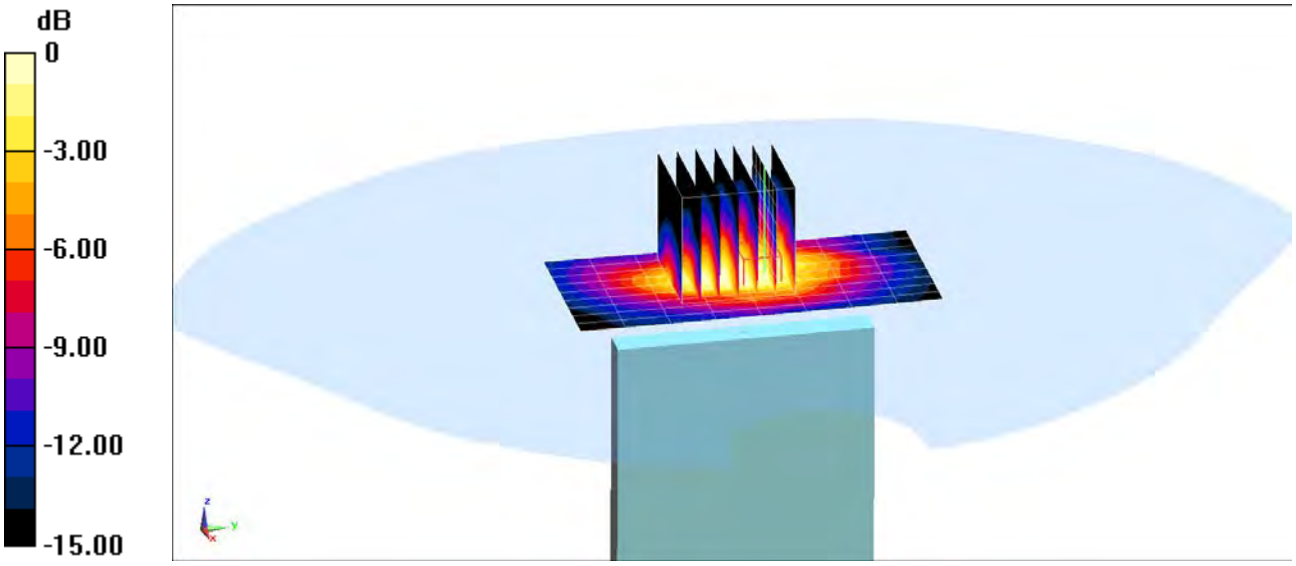
Communication System: UID 0, 802.11b; Frequency: 2462 MHz; Duty Cycle: 1:1
Medium: 2450 Body Medium parameters used (interpolated):
$f = 2462$ MHz; $\sigma = 2.046$ S/m; $\varepsilon_r = 51.73$; $\rho = 1000$ kg/m^3
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 11-29-2017; Ambient Temp: 22.0°C; Tissue Temp: 20.9°C

Probe: ES3DV3 - SN3213; ConvF(4.53, 4.53, 4.53); Calibrated: 2/10/2017;
Sensor-Surface: 3mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1272; Calibrated: 2/9/2017
Phantom: SAM Front; Type: QD000P40CD; Serial: TP:1758
Measurement SW: DASY52, Version 52.10;SEMCAD X Version 14.6.10 (7417)

Mode: IEEE 802.11b, Antenna 1, 22 MHz Bandwidth, Body SAR, Ch 11, 1 Mbps, Top Edge

Area Scan (10x9x1): Measurement grid: dx=5mm, dy=12mm
Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 11.35 V/m; Power Drift = -0.05 dB
Peak SAR (extrapolated) = 0.410 W/kg
SAR(1 g) = 0.221 W/kg



0 dB = 0.305 W/kg = -5.16 dBW/kg

DUT: A3LSMG9600; Type: Portable Handset; Serial: 5E0CA

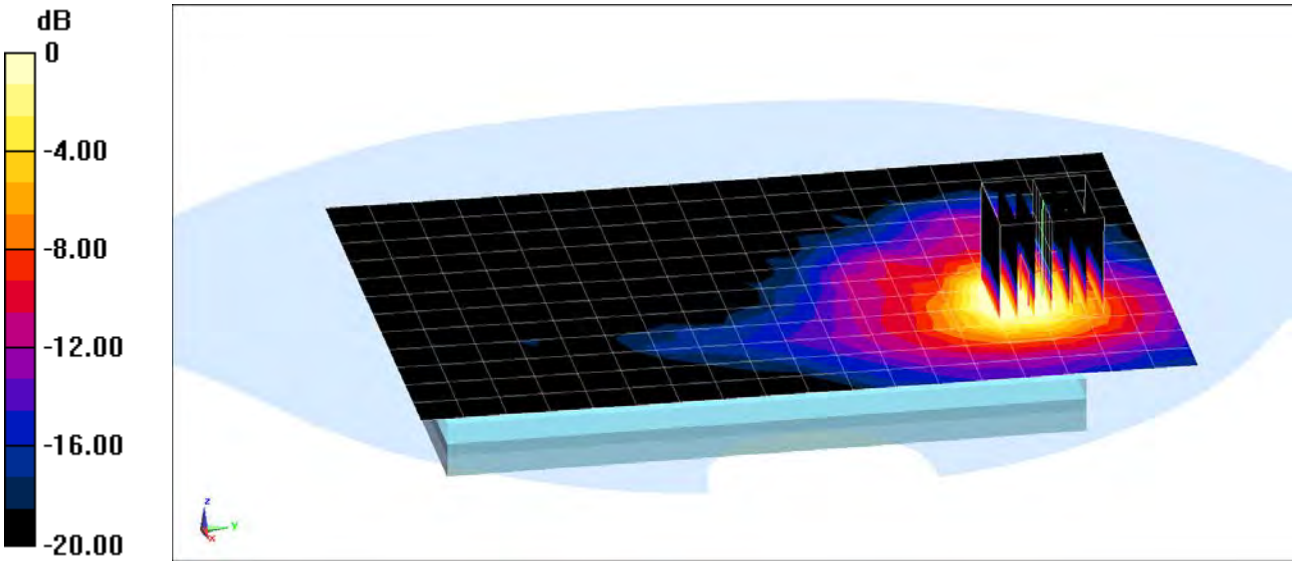
Communication System: UID 0, 802.11ac 5.2-5.8 GHz Band; Frequency: 5610 MHz; Duty Cycle: 1:1
Medium: 5 GHz Body Medium parameters used (interpolated):
f = 5610 MHz; σ = 5.954 S/m; ε_r = 46.867; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.5 cm

Test Date: 12-11-2017; Ambient Temp: 21.4°C; Tissue Temp: 20.6°C

Probe: EX3DV4 - SN7308; ConvF(4.23, 4.23, 4.23); Calibrated: 8/16/2017;
Sensor-Surface: 1.4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1334; Calibrated: 6/14/2017
Phantom: SAM with CRP v5.0 Front; Type: QD000P40CD; Serial: 1646
Measurement SW: DASY52, Version 52.10;SEMCAD X Version 14.6.10 (7417)

Mode: IEEE 802.11ac, MIMO, UNII-2C, 80 MHz Bandwidth, Body SAR, Ch 122, 58.5 Mbps, Back Side

Area Scan (13x19x1): Measurement grid: dx=10mm, dy=10mm
Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm; Graded Ratio: 1.4
Reference Value = 11.02 V/m; Power Drift = 0.01 dB
Peak SAR (extrapolated) = 2.84 W/kg
SAR(1 g) = 0.676 W/kg



0 dB = 1.62 W/kg = 2.10 dBW/kg

DUT: A3LSMG9600; Type: Portable Handset; Serial: 5E0CA

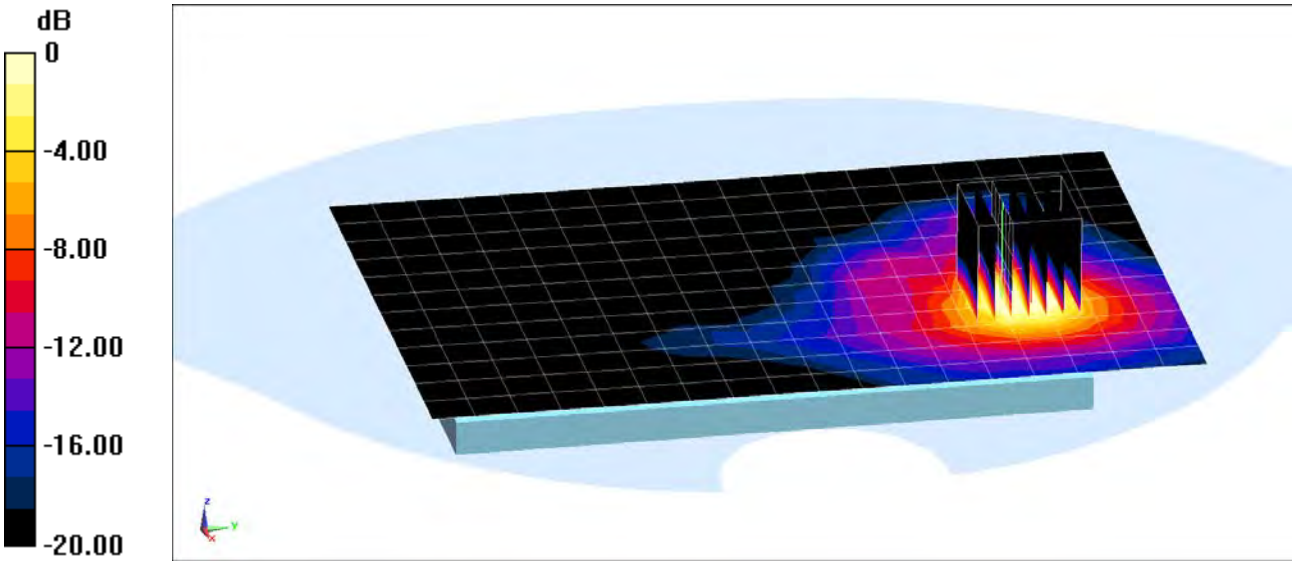
Communication System: UID 0, IEEE 802.11ac; Frequency: 5775 MHz; Duty Cycle: 1:1
Medium: 5 GHz Body Medium parameters used (interpolated):
f = 5775 MHz; σ = 6.17 S/m; ε_r = 46.372; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 12-04-2017; Ambient Temp: 22.3°C; Tissue Temp: 20.4°C

Probe: EX3DV4 - SN7308; ConvF(4.5, 4.5, 4.5); Calibrated: 8/16/2017;
Sensor-Surface: 1.4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1334; Calibrated: 6/14/2017
Phantom: SAM with CRP v5.0 Front; Type: QD000P40CD; Serial: 1646
Measurement SW: DASY52, Version 52.10;SEMCAD X Version 14.6.10 (7417)

Mode: IEEE 802.11ac, MIMO, UNII-3, 80 MHz Bandwidth, Body SAR, Ch 155, 58.5 Mbps, Back Side

Area Scan (13x19x1): Measurement grid: dx=10mm, dy=10mm
Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm; Graded Ratio: 1.4
Reference Value = 16.12 V/m; Power Drift = 0.02 dB
Peak SAR (extrapolated) = 3.88 W/kg
SAR(1 g) = 0.766 W/kg



0 dB = 1.94 W/kg = 2.88 dBW/kg

DUT: A3LSMG9600; Type: Portable Handset; Serial: 5E0CA

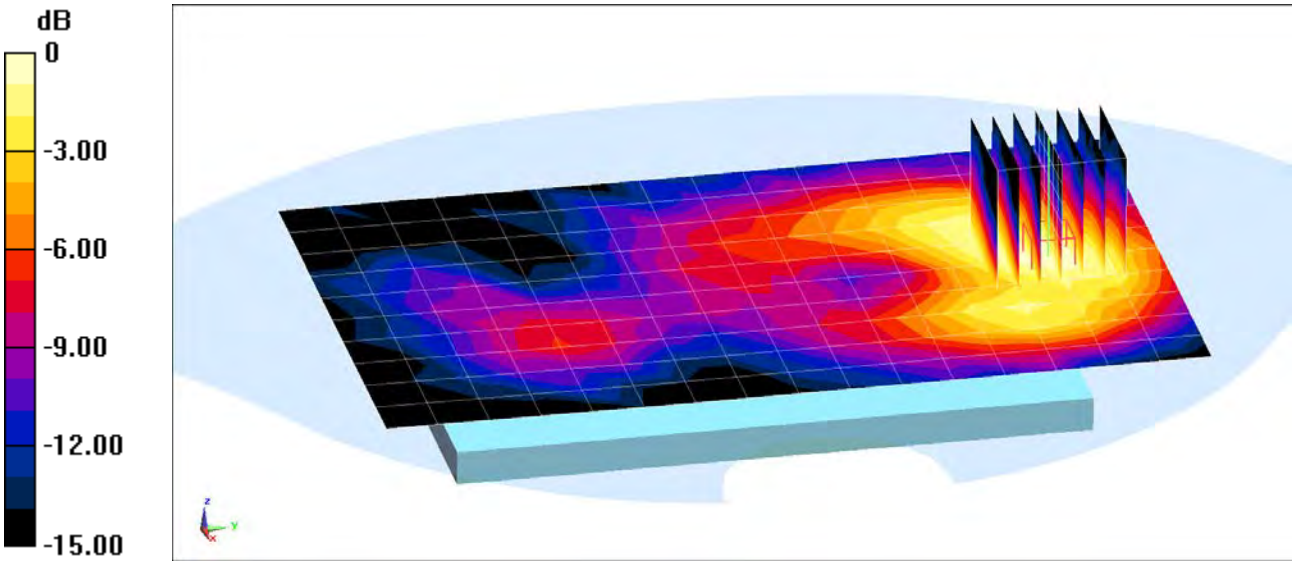
Communication System: UID 0, Bluetooth; Frequency: 2402 MHz; Duty Cycle: 1:1.294
Medium: 2450 Body Medium parameters used (interpolated):
f = 2402 MHz; σ = 1.965 S/m; ε_r = 51.938; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.5 cm

Test Date: 11-29-2017; Ambient Temp: 22.0°C; Tissue Temp: 20.9°C

Probe: ES3DV3 - SN3213; ConvF(4.53, 4.53, 4.53); Calibrated: 2/10/2017;
Sensor-Surface: 3mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1272; Calibrated: 2/9/2017
Phantom: SAM Front; Type: QD000P40CD; Serial: TP:1758
Measurement SW: DASY52, Version 52.10;SEMCAD X Version 14.6.10 (7417)

Mode: Bluetooth, Body SAR, Ch 0, 1 Mbps, Back Side

Area Scan (11x17x1): Measurement grid: dx=12mm, dy=12mm
Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 4.379 V/m; Power Drift = -0.14 dB
Peak SAR (extrapolated) = 0.0610 W/kg
SAR(1 g) = 0.033 W/kg



0 dB = 0.0403 W/kg = -13.95 dBW/kg

DUT: A3LSMG9600; Type: Portable Handset; Serial: 5E0CA

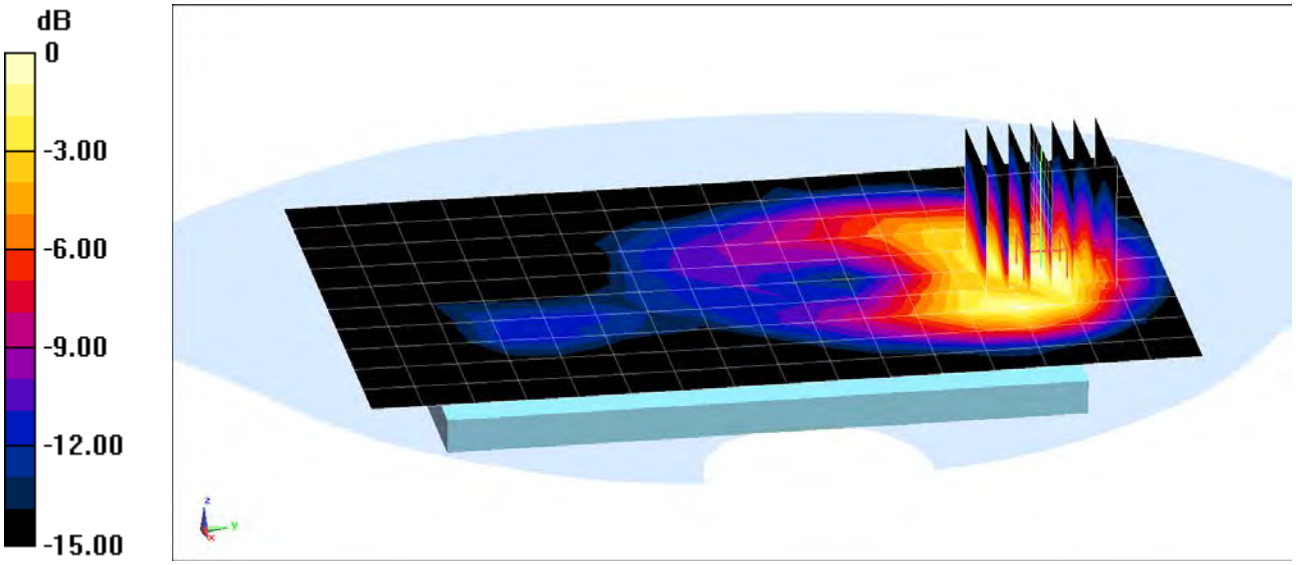
Communication System: UID 0, Bluetooth; Frequency: 2402 MHz; Duty Cycle: 1:1.294
Medium: 2450 Body Medium parameters used (interpolated):
f = 2402 MHz; σ = 1.965 S/m; ε_r = 51.938; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 11-29-2017; Ambient Temp: 22.0°C; Tissue Temp: 20.9°C

Probe: ES3DV3 - SN3213; ConvF(4.53, 4.53, 4.53); Calibrated: 2/10/2017;
Sensor-Surface: 3mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1272; Calibrated: 2/9/2017
Phantom: SAM Front; Type: QD000P40CD; Serial: TP:1758
Measurement SW: DASY52, Version 52.10;SEMCAD X Version 14.6.10 (7417)

Mode: Bluetooth, Body SAR, Ch 0, 1 Mbps, Back Side

Area Scan (11x17x1): Measurement grid: dx=12mm, dy=12mm
Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 7.562 V/m; Power Drift = -0.12 dB
Peak SAR (extrapolated) = 0.196 W/kg
SAR(1 g) = 0.093 W/kg



0 dB = 0.121 W/kg = -9.17 dBW/kg

APPENDIX B: SYSTEM VERIFICATION

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DUT: Dipole 750 MHz; Type: D750V3; Serial: 1054

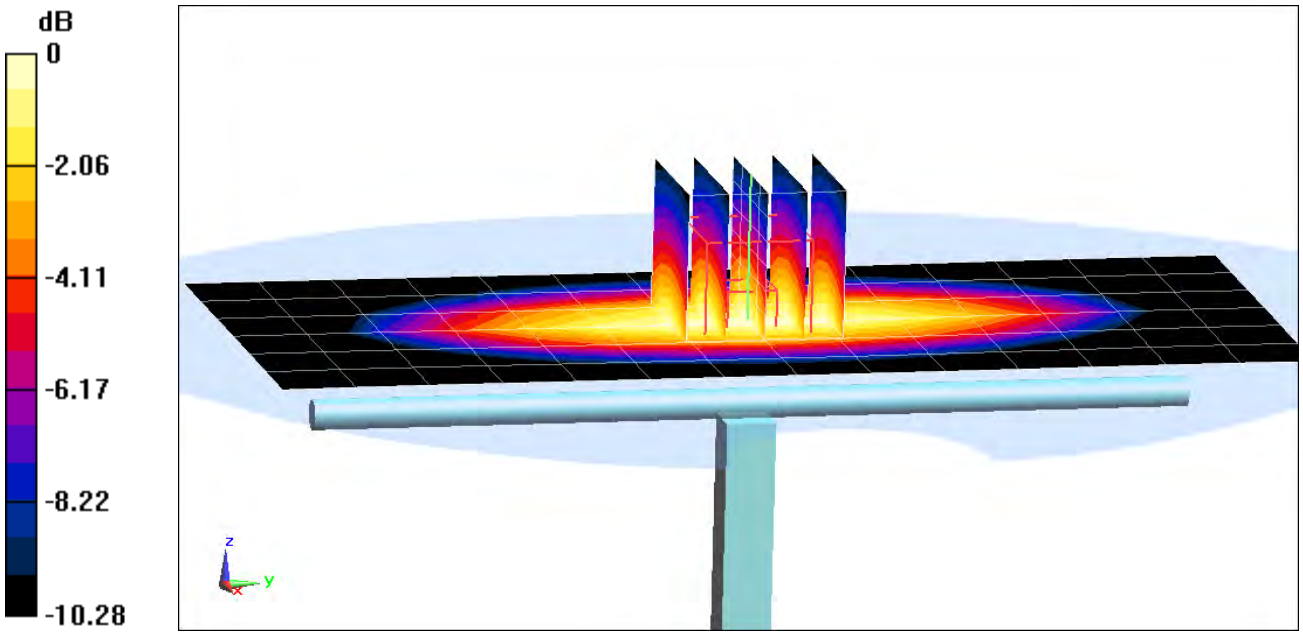
Communication System: UID 0, CW; Frequency: 750 MHz; Duty Cycle: 1:1
Medium: 750 Head Medium parameters used (interpolated):
f = 750 MHz; σ = 0.889 S/m; ε_r = 42.044; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.5 cm

Test Date: 11-20-2017; Ambient Temp: 21.6°C; Tissue Temp: 20.2°C

Probe: ES3DV3 - SN3318; ConvF(6.72, 6.72, 6.72); Calibrated: 9/22/2017;
Sensor-Surface: 3mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1334; Calibrated: 6/14/2017
Phantom: SAM with CRP v5.0 Front; Type: QD000P40CD; Serial: 1646
Measurement SW: DASY52, Version 52.10;SEMCAD X Version 14.6.10 (7417)

750 MHz System Verification at 23.0 dBm (200 mW)

Area Scan (7x15x1): Measurement grid: dx=15mm, dy=15mm
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Peak SAR (extrapolated) = 2.45 W/kg
SAR(1 g) = 1.65 W/kg
Deviation(1 g) = -1.43%



0 dB = 1.92 W/kg = 2.83 dBW/kg

PCTEST ENGINEERING LABORATORY, INC.

DUT: Dipole 835 MHz; Type: D835V2; Serial: 4d133

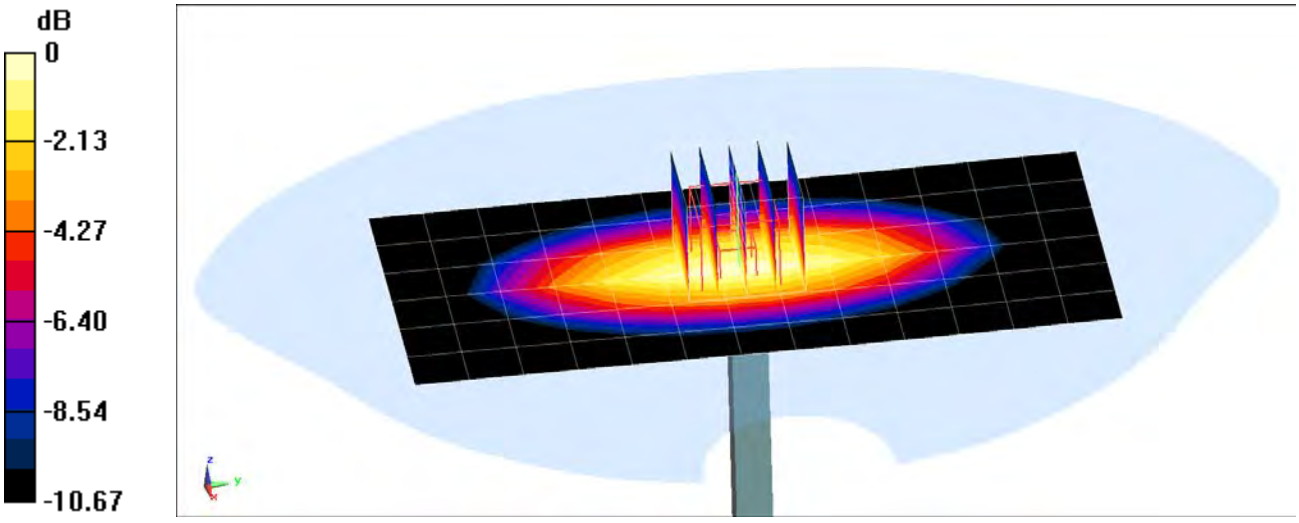
Communication System: UID 0, CW; Frequency: 835 MHz; Duty Cycle: 1:1
Medium: 835 Head Medium parameters used:
f = 835 MHz; σ = 0.898 S/m; ε_r = 40.954; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.5 cm

Test Date: 11-29-2017; Ambient Temp: 22.0°C; Tissue Temp: 21.3°C

Probe: EX3DV4 - SN7406; ConvF(9.97, 9.97, 9.97); Calibrated: 4/18/2017;
Sensor-Surface: 1.4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1407; Calibrated: 4/11/2017
Phantom: SAM with CRP v5.0, Right; Type: QD000P40CD; Serial: TP:7535
Measurement SW: DASY52, Version 52.10;SEMCAD X Version 14.6.10 (7417)

835 MHz System Verification at 23.0 dBm (200 mW)

Area Scan (7x14x1): Measurement grid: dx=15mm, dy=15mm
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Peak SAR (extrapolated) = 2.88 W/kg
SAR(1 g) = 1.92 W/kg
Deviation(1 g) = 0.84%



0 dB = 2.56 W/kg = 4.08 dBW/kg

PCTEST ENGINEERING LABORATORY, INC.

DUT: Dipole 1750 MHz; Type: D1750V2; Serial: 1148

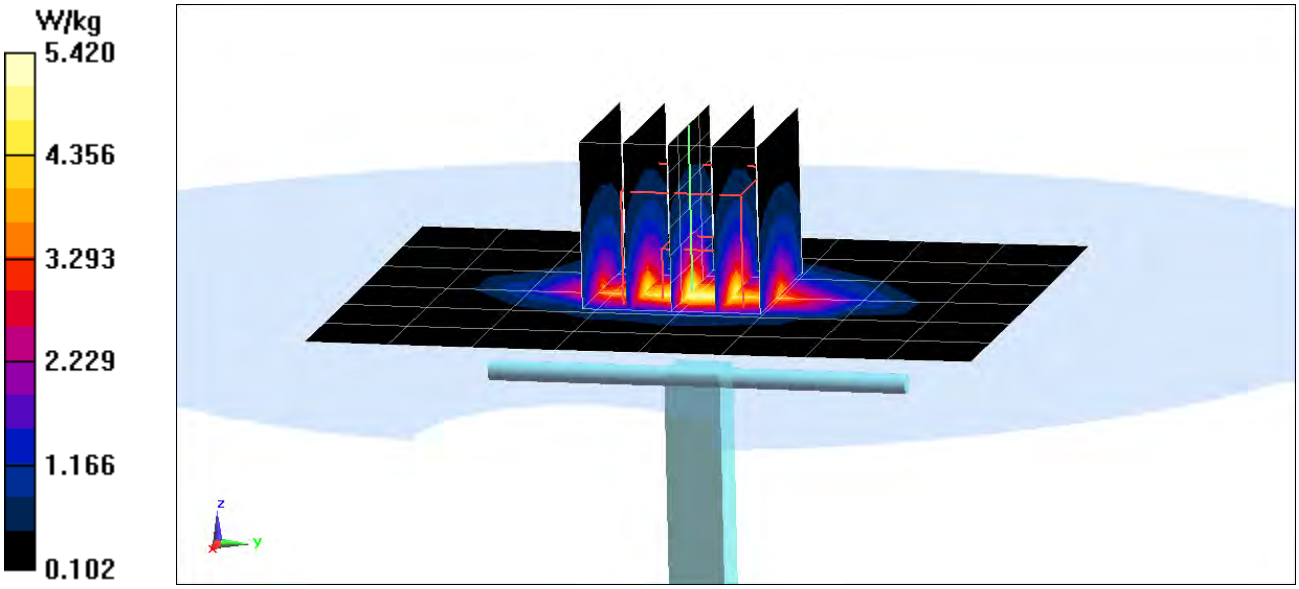
Communication System: UID 0, CW; Frequency: 1750 MHz; Duty Cycle: 1:1
Medium: 1750 Head Medium parameters used:
f = 1750 MHz; σ = 1.372 S/m; ε_r = 39.195; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 11-09-2017; Ambient Temp: 24.2°C; Tissue Temp: 22.0°C

Probe: EX3DV4 - SN7410; ConvF(8.66, 8.66, 8.66); Calibrated: 7/17/2017;
Sensor-Surface: 1.4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1322; Calibrated: 7/13/2017
Phantom: SAM with CRP v5.0 (Right); Type: QD000P40CD; Serial: TP:1759
Measurement SW: DASY52, Version 52.10;SEMCAD X Version 14.6.10 (7417)

1750 MHz System Verification at 20.0 dBm (100 mW)

Area Scan (7x9x1): Measurement grid: dx=15mm, dy=15mm
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Peak SAR (extrapolated) = 6.38 W/kg
SAR(1 g) = 3.53 W/kg
Deviation(1 g) = -3.02%



DUT: Dipole 1900 MHz; Type: D1900V2; Serial: 5d148

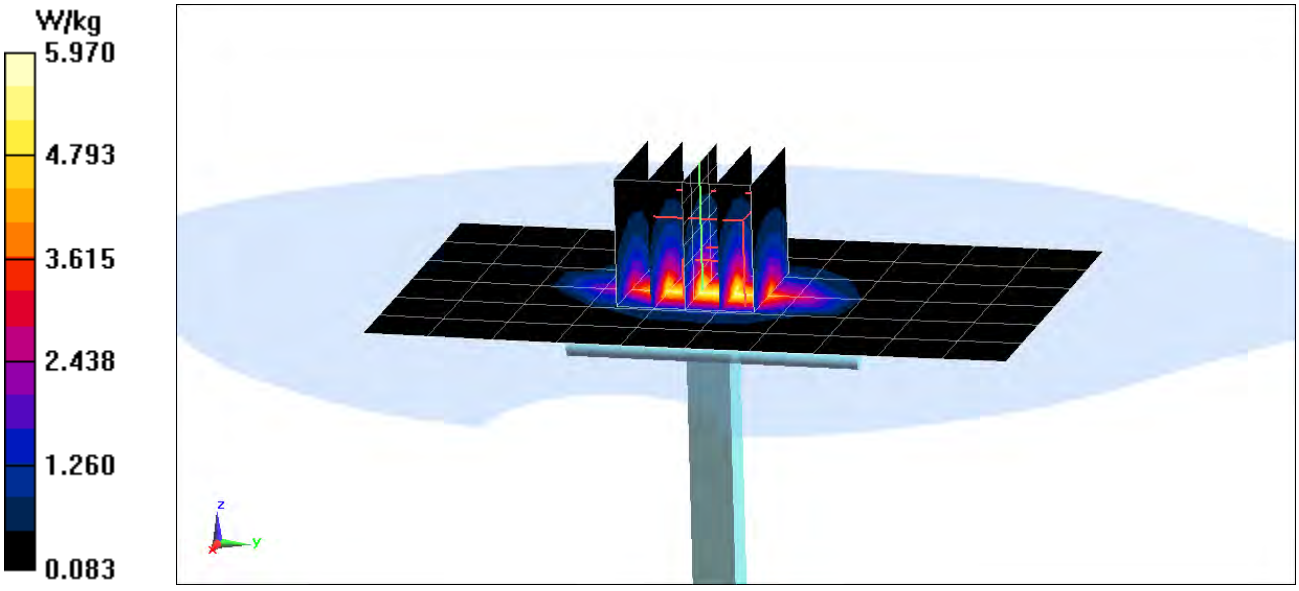
Communication System: UID 0, CW; Frequency: 1900 MHz; Duty Cycle: 1:1
Medium: 1900 Head Medium parameters used (interpolated):
f = 1900 MHz; σ = 1.436 S/m; ε_r = 39.675; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 11-15-2017; Ambient Temp: 23.6°C; Tissue Temp: 21.0°C

Probe: EX3DV4 - SN7410; ConvF(8.37, 8.37, 8.37); Calibrated: 7/17/2017;
Sensor-Surface: 1.4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1322; Calibrated: 7/13/2017
Phantom: SAM with CRP v5.0 (Right); Type: QD000P40CD; Serial: TP:1759
Measurement SW: DASY52, Version 52.10;SEMCAD X Version 14.6.10 (7417)

1900 MHz System Verification at 20.0 dBm (100 mW)

Area Scan (7x11x1): Measurement grid: dx=15mm, dy=15mm
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Peak SAR (extrapolated) = 7.07 W/kg
SAR(1 g) = 3.84 W/kg
Deviation(1 g) = -4.48%



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DUT: Dipole 2450 MHz; Type: D2450V2; Serial: 981

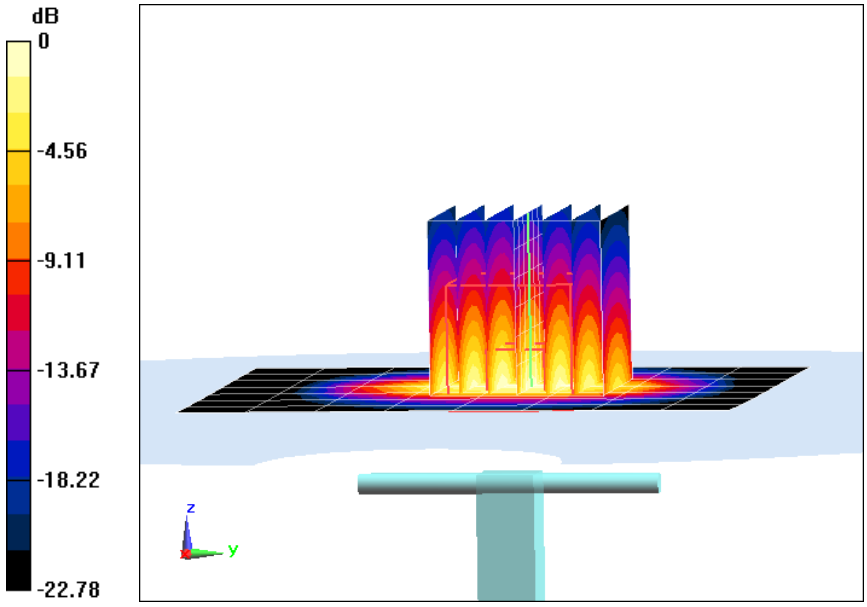
Communication System: UID 0, CW; Frequency: 2450 MHz; Duty Cycle: 1:1
Medium: 2450 Head Medium parameters used:
f = 2450 MHz; σ = 1.881 S/m; ε_r = 40.678; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 11-15-2017; Ambient Temp: 22.5°C; Tissue Temp: 21.7°C

Probe: ES3DV3 - SN3319; ConvF(4.6, 4.6, 4.6); Calibrated: 3/14/2017;
Sensor-Surface: 3mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1368; Calibrated: 3/8/2017
Phantom: SAM 5.0 front; Type: QD000P40CD; Serial: 1648
Measurement SW: DASY52, Version 52.10; SEMCAD X Version 14.6.10 (7417)

2450 MHz System Verification at 20.0 dBm (100 mW)

Area Scan (8x9x1): Measurement grid: dx=12mm, dy=12mm
Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Peak SAR (extrapolated) = 10.8 W/kg
SAR(1 g) = 5.19 W/kg
Deviation(1 g) = -1.70%



0 dB = 6.81 W/kg = 8.33 dBW/kg

PCTEST ENGINEERING LABORATORY, INC.

DUT: Dipole 2450 MHz; Type: D2450V2; Serial: 981

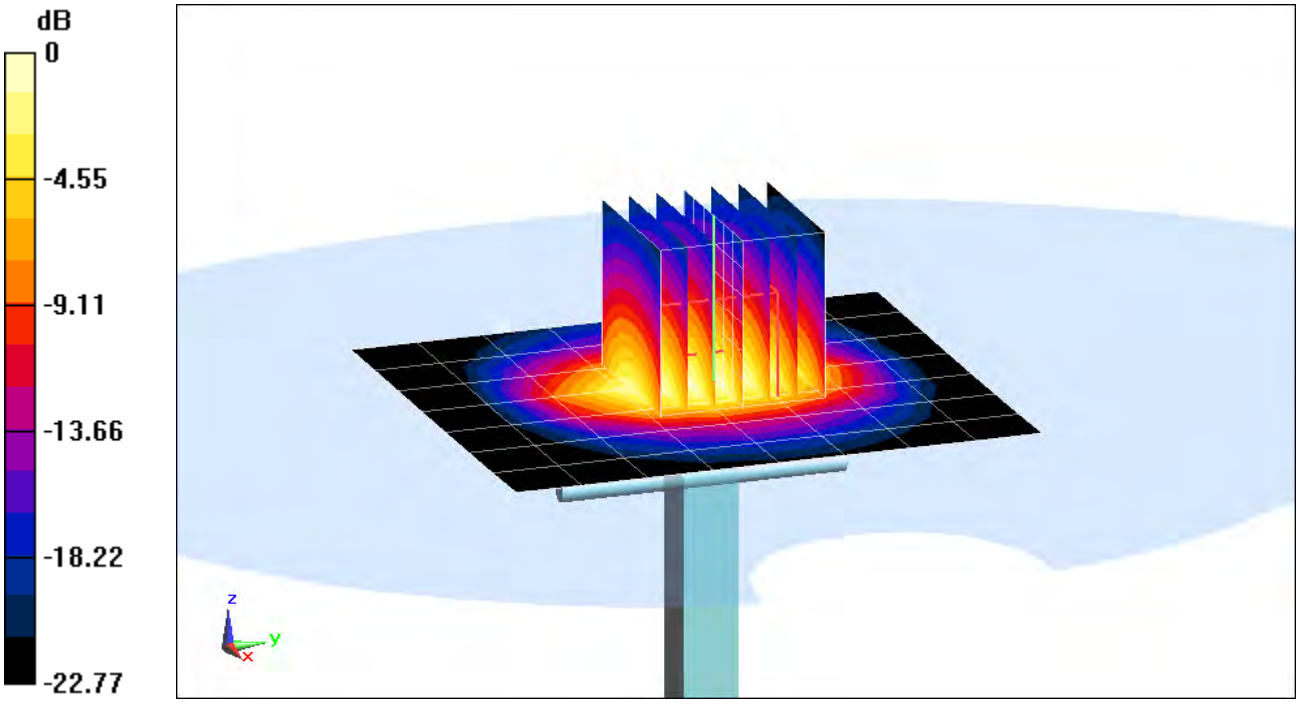
Communication System: UID 0, CW; Frequency: 2450 MHz; Duty Cycle: 1:1
Medium: 2450 Head Medium parameters used:
f = 2450 MHz; σ = 1.854 S/m; ε_r = 38.387; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 12-01-2017; Ambient Temp: 23.1°C; Tissue Temp: 22.6°C

Probe: ES3DV3 - SN3319; ConvF(4.6, 4.6, 4.6); Calibrated: 3/14/2017;
Sensor-Surface: 3mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1368; Calibrated: 3/8/2017
Phantom: SAM 5.0 front; Type: QD000P40CD; Serial: 1648
Measurement SW: DASY52, Version 52.10;SEMCAD X Version 14.6.10 (7417)

2450 MHz System Verification at 20.0 dBm (100 mW)

Area Scan (8x9x1): Measurement grid: dx=12mm, dy=12mm
Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Peak SAR (extrapolated) = 11.3 W/kg
SAR(1 g) = 5.42 W/kg
Deviation(1 g) = 2.65%



0 dB = 7.07 W/kg = 8.49 dBW/kg

DUT: Dipole 2600 MHz; Type: D2600V2; Serial: 1126

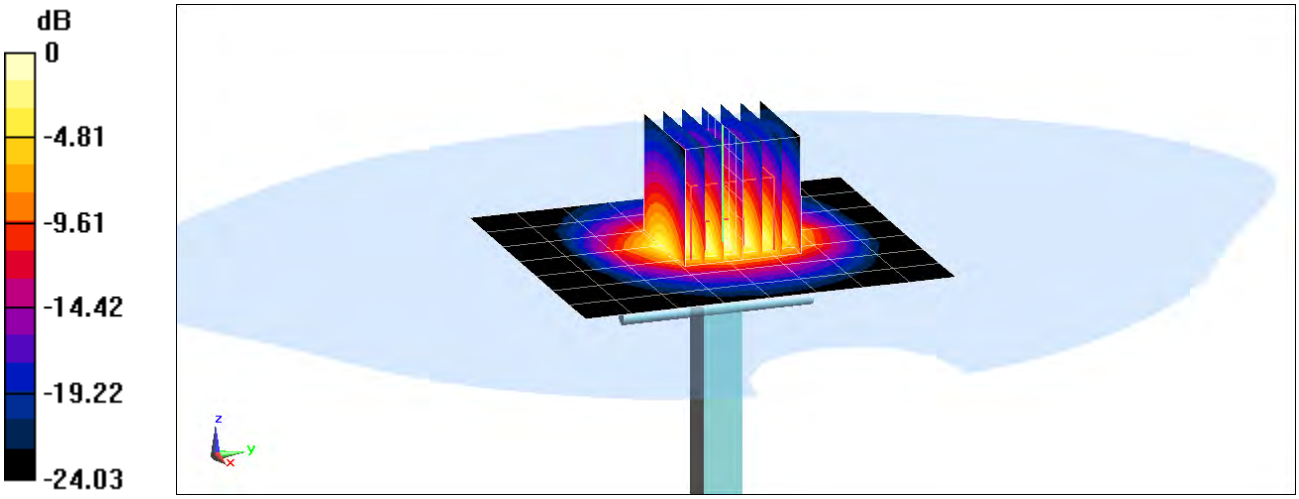
Communication System: UID 0, CW; Frequency: 2600 MHz; Duty Cycle: 1:1
Medium: 2600 Head Medium parameters used:
f = 2600 MHz; σ = 2.053 S/m; ε_r = 40.115; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 11-15-2017; Ambient Temp: 22.5°C; Tissue Temp: 21.7°C

Probe: ES3DV3 - SN3319; ConvF(4.41, 4.41, 4.41); Calibrated: 3/14/2017;
Sensor-Surface: 3mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1368; Calibrated: 3/8/2017
Phantom: SAM 5.0 front; Type: QD000P40CD; Serial: 1648
Measurement SW: DASY52, Version 52.10; SEMCAD X Version 14.6.10 (7417)

2600 MHz System Verification at 20.0 dBm (100 mW)

Area Scan (8x9x1): Measurement grid: dx=12mm, dy=12mm
Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Peak SAR (extrapolated) = 12.8 W/kg
SAR(1 g) = 5.9 W/kg
Deviation(1 g) = 4.61%



0 dB = 7.92 W/kg = 8.99 dBW/kg

DUT: Dipole 5 GHz; Type: D5GHzV2; Serial: 1057

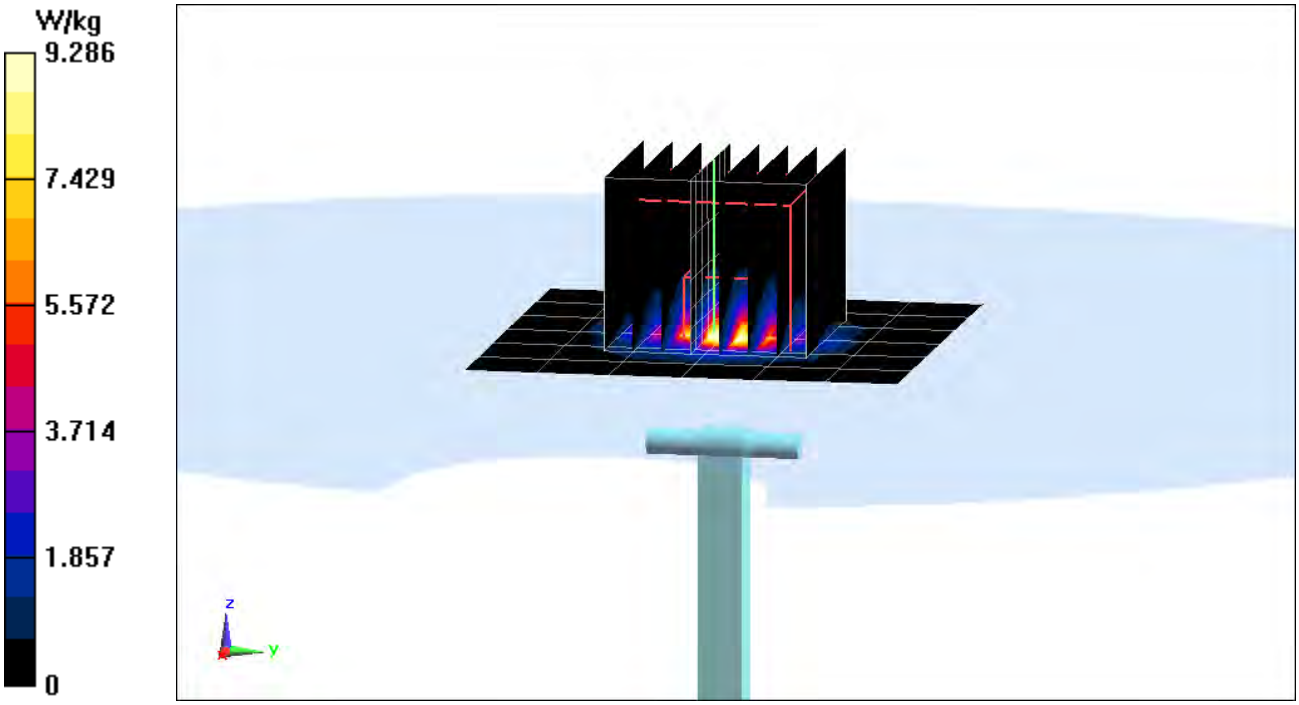
Communication System: UID 0, CW; Frequency: 5250 MHz; Duty Cycle: 1:1
Medium: 5 GHz Medium parameters used (interpolated):
f = 5250 MHz; σ = 4.495 S/m; ε_r = 34.492; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 12-04-2017; Ambient Temp: 22.0°C; Tissue Temp: 20.7°C

Probe: EX3DV4 - SN3914; ConvF(5.49, 5.49, 5.49); Calibrated: 2/13/2017;
Sensor-Surface: 1.4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn665; Calibrated: 2/9/2017
Phantom: SAM with CRP (Left); Type: SAM; Serial: 1715
Measurement SW: DASY52, Version 52.10;SEMCAD X Version 14.6.10 (7417)

5250 MHz System Verification at 17.0 dBm (50 mW)

Area Scan (7x7x1): Measurement grid: dx=10mm, dy=10mm
Zoom Scan (8x8x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm; Graded Ratio: 1.4
Peak SAR (extrapolated) = 16.1 W/kg
SAR(1 g) = 3.77 W/kg
Deviation(1 g) = -7.60%



DUT: Dipole 5 GHz; Type: D5GHzV2; Serial: 1057

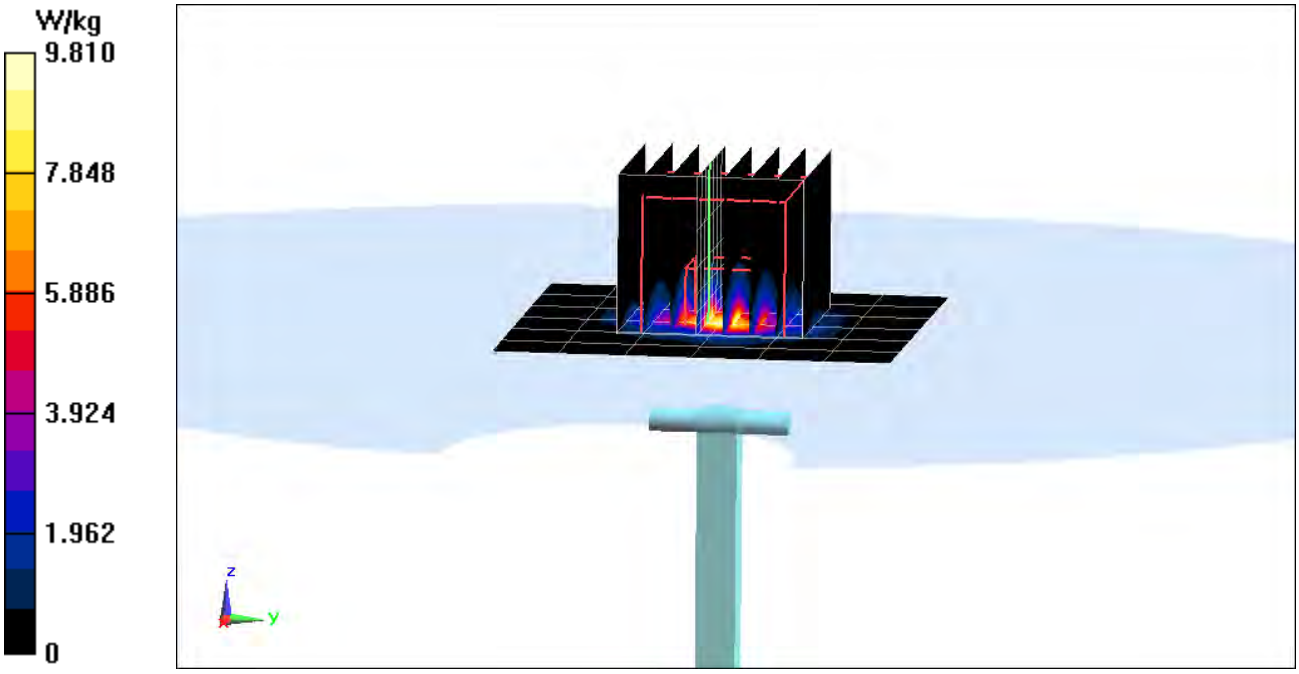
Communication System: UID 0, CW; Frequency: 5600 MHz; Duty Cycle: 1:1
Medium: 5 GHz Medium parameters used:
f = 5600 MHz; σ = 4.84 S/m; ε_r = 34.01; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 12-04-2017; Ambient Temp: 22.0°C; Tissue Temp: 20.7°C

Probe: EX3DV4 - SN3914; ConvF(4.94, 4.94, 4.94); Calibrated: 2/13/2017;
Sensor-Surface: 1.4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn665; Calibrated: 2/9/2017
Phantom: SAM with CRP (Left); Type: SAM; Serial: 1715
Measurement SW: DASY52, Version 52.10;SEMCAD X Version 14.6.10 (7417)

5600 MHz System Verification at 17.0 dBm (50 mW)

Area Scan (7x7x1): Measurement grid: dx=10mm, dy=10mm
Zoom Scan (8x8x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm; Graded Ratio: 1.4
Peak SAR (extrapolated) = 18.0 W/kg
SAR(1 g) = 4.08 W/kg
Deviation(1 g) = -2.51%



DUT: Dipole 5 GHz; Type: D5GHzV2; Serial: 1057

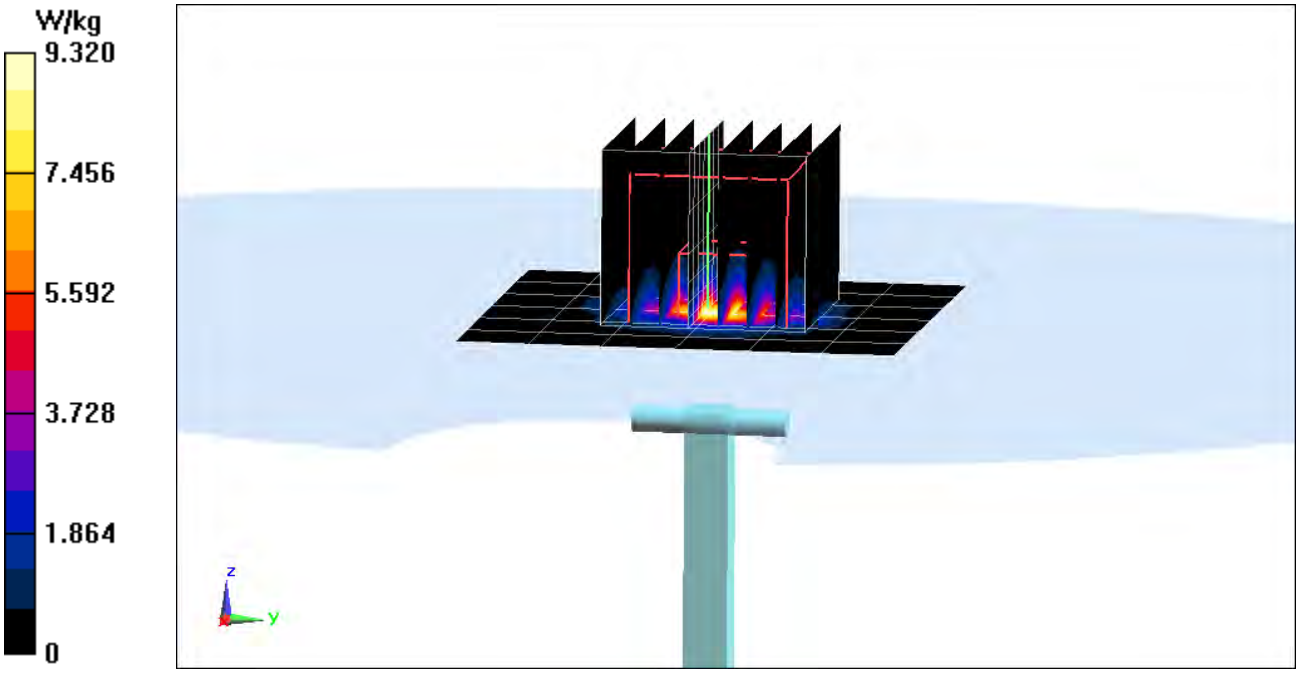
Communication System: UID 0, CW; Frequency: 5750 MHz; Duty Cycle: 1:1
Medium: 5 GHz Medium parameters used (interpolated):
f = 5750 MHz; σ = 5.005 S/m; ε_r = 33.8; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 12-04-2017; Ambient Temp: 22.0°C; Tissue Temp: 20.7°C

Probe: EX3DV4 - SN3914; ConvF(4.91, 4.91, 4.91); Calibrated: 2/13/2017;
Sensor-Surface: 1.4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn665; Calibrated: 2/9/2017
Phantom: SAM with CRP (Left); Type: SAM; Serial: 1715
Measurement SW: DASY52, Version 52.10;SEMCAD X Version 14.6.10 (7417)

5750 MHz System Verification at 17.0 dBm (50 mW)

Area Scan (7x7x1): Measurement grid: dx=10mm, dy=10mm
Zoom Scan (8x8x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm; Graded Ratio: 1.4
Peak SAR (extrapolated) = 17.1 W/kg
SAR(1 g) = 3.79 W/kg
Deviation(1 g) = -5.25%



DUT: Dipole 750 MHz; Type: D750V3; Serial: 1161

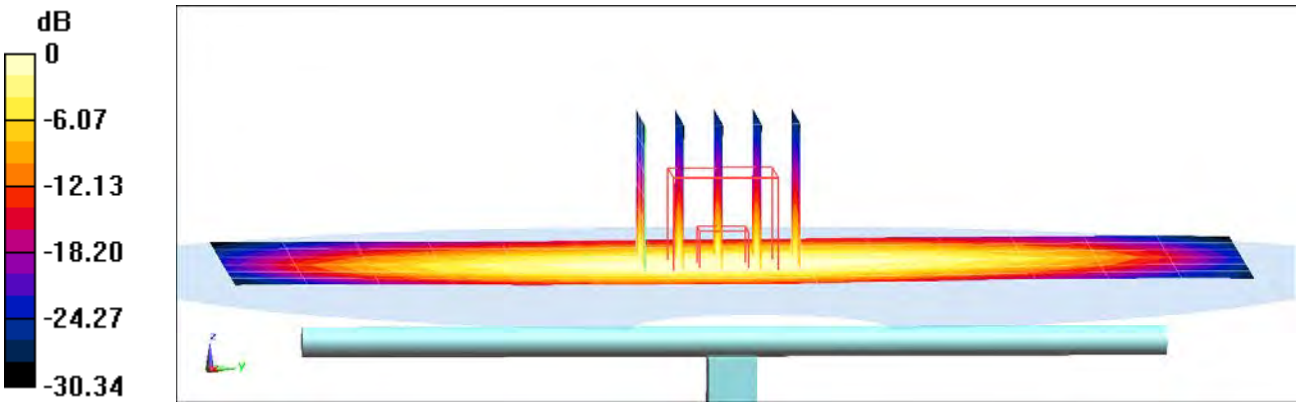
Communication System: UID 0, CW; Frequency: 750 MHz; Duty Cycle: 1:1
Medium: 750 Body Medium parameters used (interpolated):
f = 750 MHz; σ = 0.967 S/m; ε_r = 54.989; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.5 cm

Test Date: 11-19-2017; Ambient Temp: 22.2°C; Tissue Temp: 20.2°C

Probe: ES3DV3 - SN3332; ConvF(6.54, 6.54, 6.54); Calibrated: 8/14/2017;
Sensor-Surface: 3mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1323; Calibrated: 8/9/2017
Phantom: SAM Left; Type: QD000P40CA; Serial: TP:82355
Measurement SW: DASY52, Version 52.10;SEMCAD X Version 14.6.10 (7417)

750 MHz System Verification at 23.0 dBm (200 mW)

Area Scan (7x15x1): Measurement grid: dx=15mm, dy=15mm
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Peak SAR (extrapolated) = 2.50 W/kg
SAR(1 g) = 1.71 W/kg
Deviation(1 g) = 1.42%;



0 dB = 1.98 W/kg = 2.96 dBW/kg

DUT: Dipole 835 MHz; Type: D835V2; Serial: 4d133

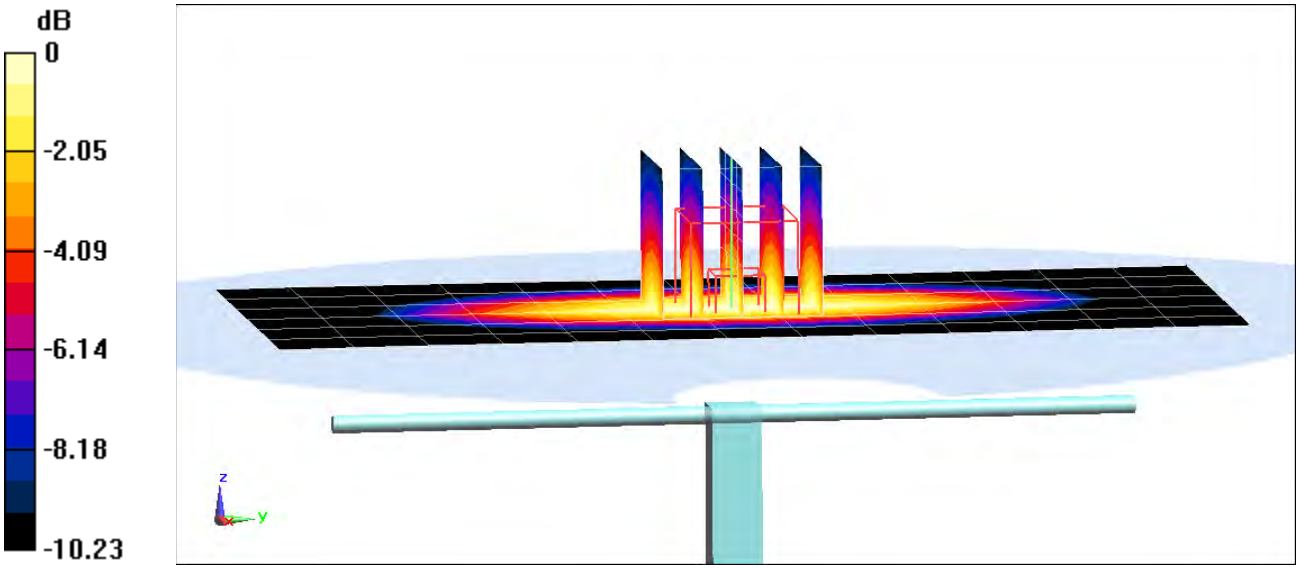
Communication System: UID 0, CW; Frequency: 835 MHz; Duty Cycle: 1:1
Medium: 835 Body Medium parameters used:
f = 835 MHz; σ = 0.974 S/m; ε_r = 52.846; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.5 cm

Test Date: 11-15-2017; Ambient Temp: 24.1°C; Tissue Temp: 21.5°C

Probe: ES3DV3 - SN3209; ConvF(6.36, 6.36, 6.36); Calibrated: 3/14/2017;
Sensor-Surface: 3mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1415; Calibrated: 3/13/2017
Phantom: SAM Right; Type: QD000P40CD; Serial: 1800
Measurement SW: DASY52, Version 52.10;SEMCAD X Version 14.6.10 (7417)

835 MHz System Verification at 23.0 dBm (200 mW)

Area Scan (7x14x1): Measurement grid: dx=15mm, dy=15mm
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Peak SAR (extrapolated) = 2.82 W/kg
SAR(1 g) = 1.96 W/kg
Deviation(1 g) = 4.14%



0 dB = 2.26 W/kg = 3.54 dBW/kg

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DUT: Dipole 835 MHz; Type: D835V2; Serial: 4d047

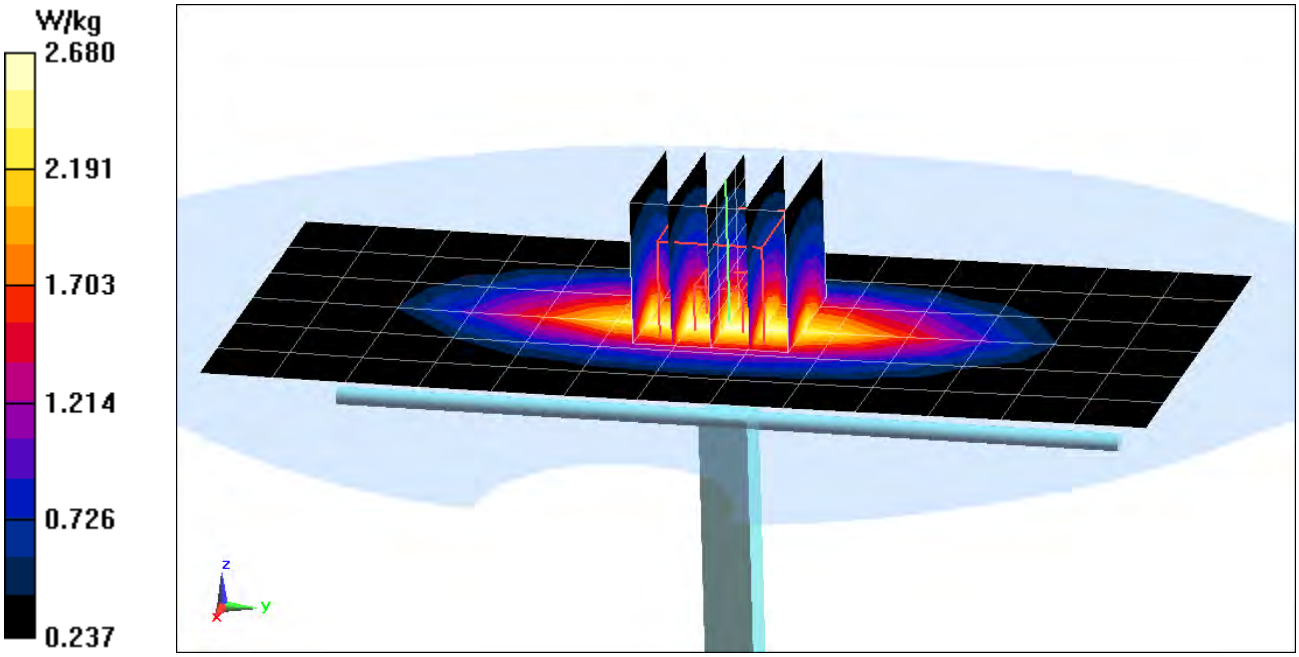
Communication System: UID 0, CW; Frequency: 835 MHz; Duty Cycle: 1:1
Medium: 835 Body Medium parameters used:
f = 835 MHz; σ = 0.994 S/m; ε_r = 53.225; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.5 cm

Test Date: 11-28-2017; Ambient Temp: 22.1°C; Tissue Temp: 19.7°C

Probe: EX3DV4 - SN7410; ConvF(9.95, 9.95, 9.95); Calibrated: 7/17/2017;
Sensor-Surface: 1.4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1322; Calibrated: 7/13/2017
Phantom: SAM with CRP v5.0 (Right); Type: QD000P40CD; Serial: TP:1759
Measurement SW: DASY52, Version 52.10;SEMCAD X Version 14.6.10 (7417)

835 MHz System Verification at 23.0 dBm (200 mW)

Area Scan (7x14x1): Measurement grid: dx=15mm, dy=15mm
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Peak SAR (extrapolated) = 3.00 W/kg
SAR(1 g) = 2.02 W/kg
Deviation(1 g) = 5.54%



DUT: Dipole 835 MHz; Type: D835V2; Serial: 4d133

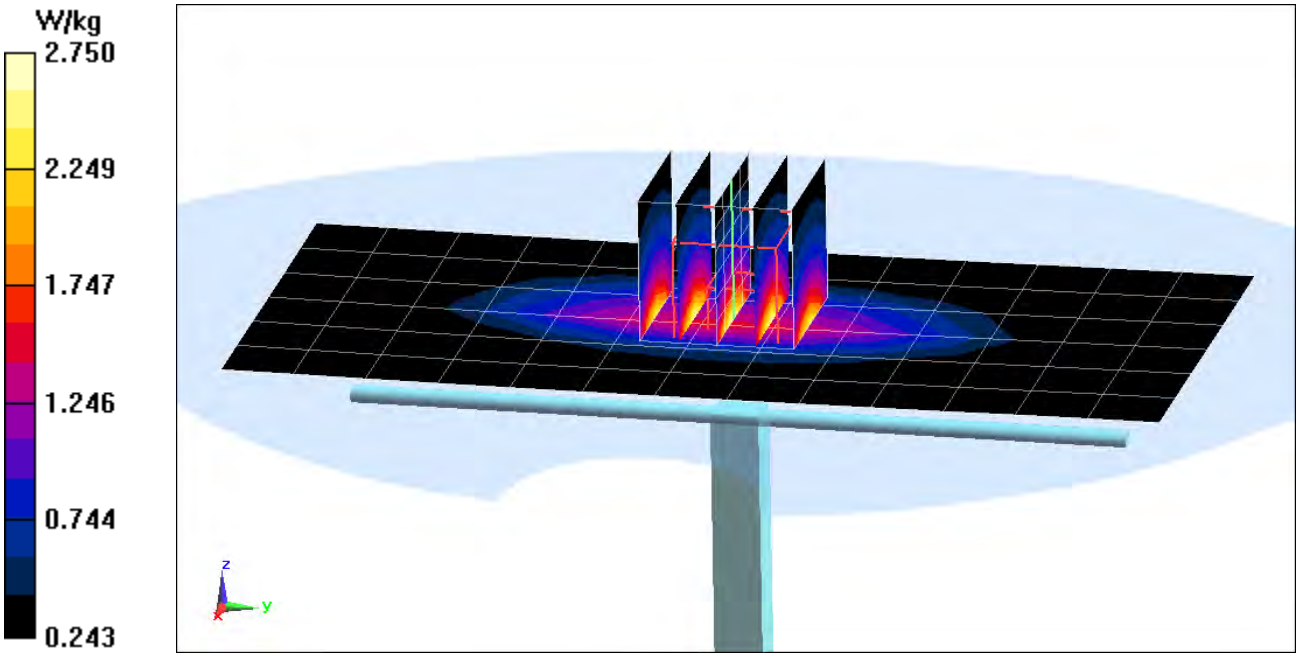
Communication System: UID 0, CW; Frequency: 835 MHz; Duty Cycle: 1:1
Medium: 835 Body Medium parameters used:
f = 835 MHz; σ = 1.004 S/m; ε_r = 53.977; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.5 cm

Test Date: 12-01-2017; Ambient Temp: 22.6°C; Tissue Temp: 20.8°C

Probe: EX3DV4 - SN7410; ConvF(9.95, 9.95, 9.95); Calibrated: 7/17/2017;
Sensor-Surface: 1.4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1322; Calibrated: 7/13/2017
Phantom: SAM with CRP v5.0 (Right); Type: QD000P40CD; Serial: TP:1759
Measurement SW: DASY52, Version 52.10;SEMCAD X Version 14.6.10 (7417)

835 MHz System Verification at 23.0 dBm (200 mW)

Area Scan (7x14x1): Measurement grid: dx=15mm, dy=15mm
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Peak SAR (extrapolated) = 3.08 W/kg
SAR(1 g) = 2.06 W/kg
Deviation(1 g) = 9.46%



DUT: Dipole 1750 MHz; Type: D1750V2; Serial: 1148

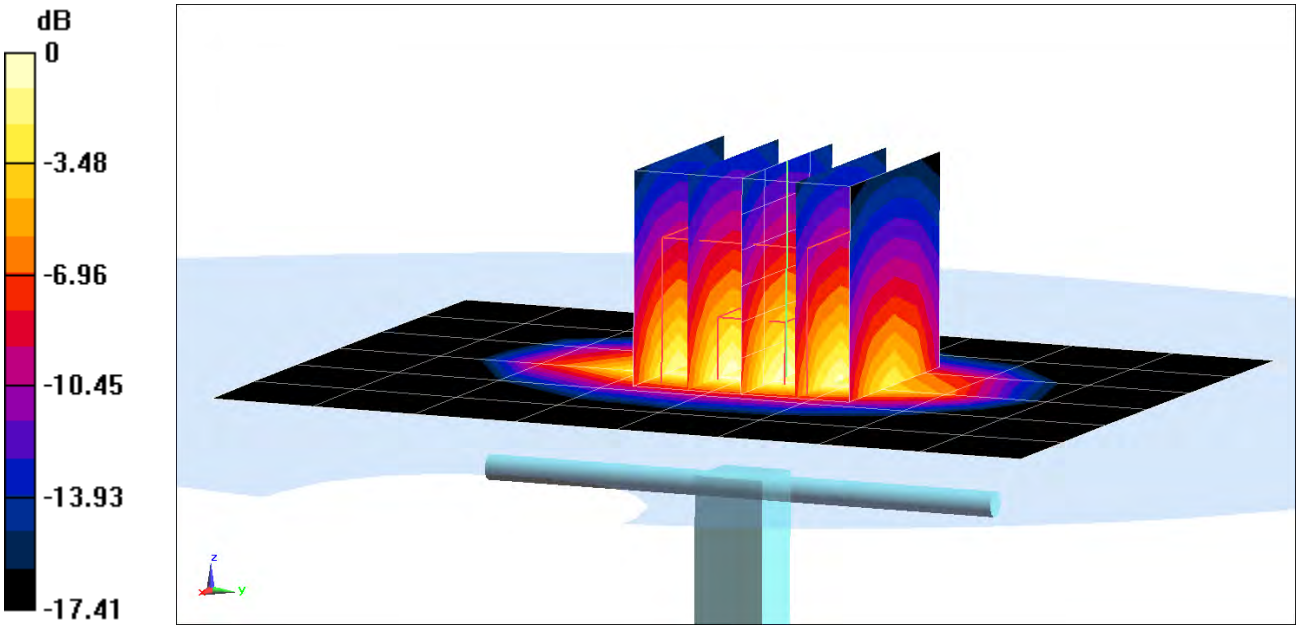
Communication System: UID 0, CW; Frequency: 1750 MHz; Duty Cycle: 1:1
Medium: 1750 Body Medium parameters used:
f = 1750 MHz; σ = 1.483 S/m; ε_r = 50.918; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 11-15-2017; Ambient Temp: 23.3°C; Tissue Temp: 22.3°C

Probe: EX3DV4 - SN7406; ConvF(8.08, 8.08, 8.08); Calibrated: 4/18/2017;
Sensor-Surface: 1.4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1407; Calibrated: 4/11/2017
Phantom: SAM Left; Type: QD000P40CC; Serial: TP: 1375
Measurement SW: DASY52, Version 52.10;SEMCAD X Version 14.6.10 (7417)

1750 MHz System Verification at 20.0 dBm (100 mW)

Area Scan (7x9x1): Measurement grid: dx=15mm, dy=15mm
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Peak SAR (extrapolated) = 6.93 W/kg
SAR(1 g) = 3.82 W/kg
Deviation(1 g) = 3.24%



0 dB = 5.81 W/kg = 7.64 dBW/kg

DUT: Dipole 1900 MHz; Type: D1900V2; Serial: 5d148

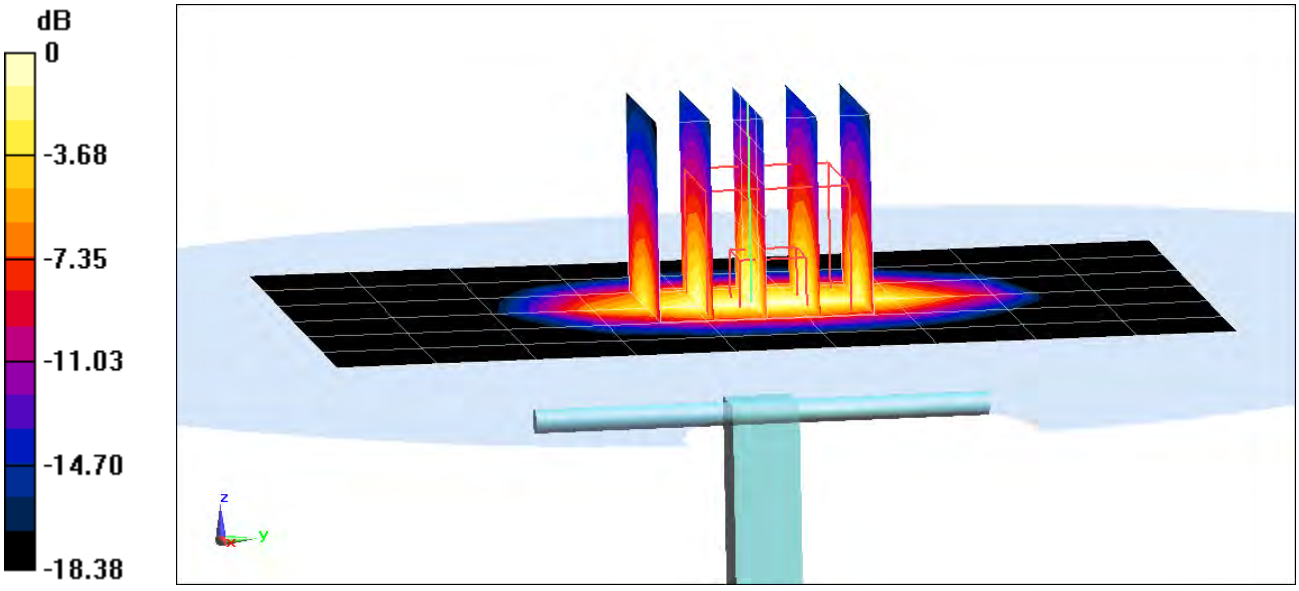
Communication System: UID 0, CW; Frequency: 1900 MHz; Duty Cycle: 1:1
Medium: 1900 Body Medium parameters used (interpolated):
f = 1900 MHz; σ = 1.579 S/m; ε_r = 51.777; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 11-10-2017; Ambient Temp: 23.5°C; Tissue Temp: 22.1°C

Probe: ES3DV3 - SN3209; ConvF(4.93, 4.93, 4.93); Calibrated: 3/14/2017;
Sensor-Surface: 3mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1415; Calibrated: 3/13/2017
Phantom: SAM Right; Type: QD000P40CD; Serial: 1800
Measurement SW: DASY52, Version 52.10;SEMCAD X Version 14.6.10 (7417)

1900 MHz System Verification at 20.0 dBm (100 mW)

Area Scan (7x10x1): Measurement grid: dx=15mm, dy=15mm
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Peak SAR (extrapolated) = 7.27 W/kg
SAR(1 g) = 4.07 W/kg
Deviation(1 g) = -0.49%



0 dB = 5.10 W/kg = 7.08 dBW/kg

DUT: Dipole 1900 MHz; Type: D1900V2; Serial: 5d148

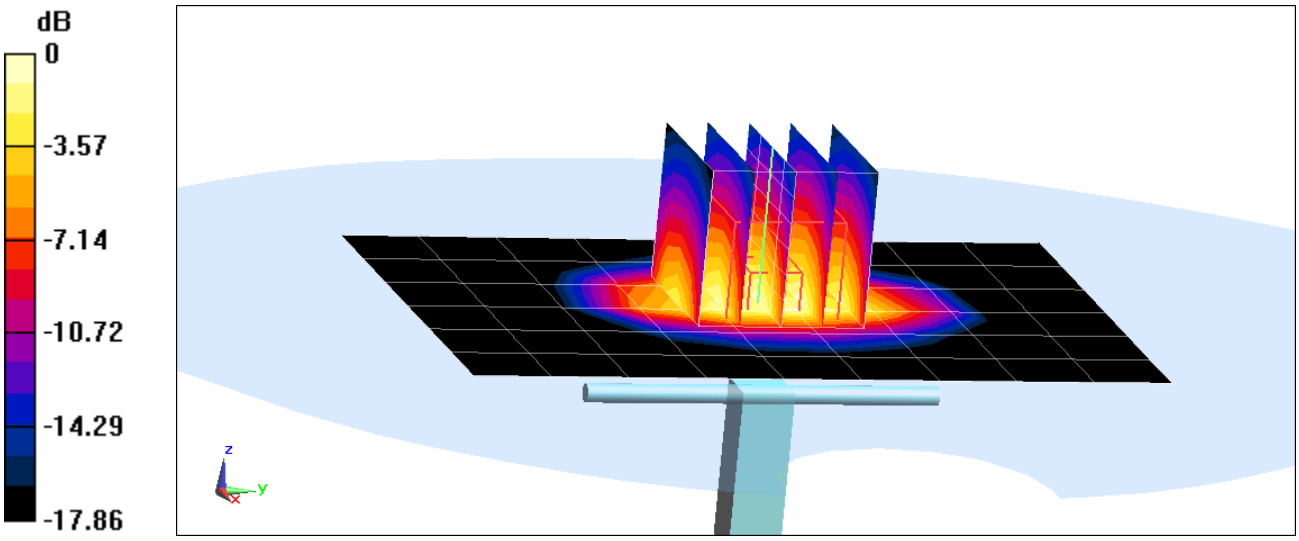
Communication System: UID 0, CW; Frequency: 1900 MHz; Duty Cycle: 1:1
Medium: 1900 Body Medium parameters used (interpolated):
f = 1900 MHz; σ = 1.581 S/m; ε_r = 53.405; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 11-15-2017; Ambient Temp: 21.5°C; Tissue Temp: 21.9°C

Probe: ES3DV3 - SN3209; ConvF(4.93, 4.93, 4.93); Calibrated: 3/14/2017;
Sensor-Surface: 3mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1415; Calibrated: 3/13/2017
Phantom: SAM Right; Type: QD000P40CD; Serial: 1800
Measurement SW: DASY52, Version 52.10; SEMCAD X Version 14.6.10 (7417)

1900 MHz System Verification at 20.0 dBm (100 mW)

Area Scan (7x10x1): Measurement grid: dx=15mm, dy=15mm
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Peak SAR (extrapolated) = 7.02 W/kg
SAR(1 g) = 3.96 W/kg
Deviation(1 g) = -3.18%



0 dB = 4.99 W/kg = 6.98 dBW/kg

DUT: Dipole 2450 MHz; Type: D2450V2; Serial: 719

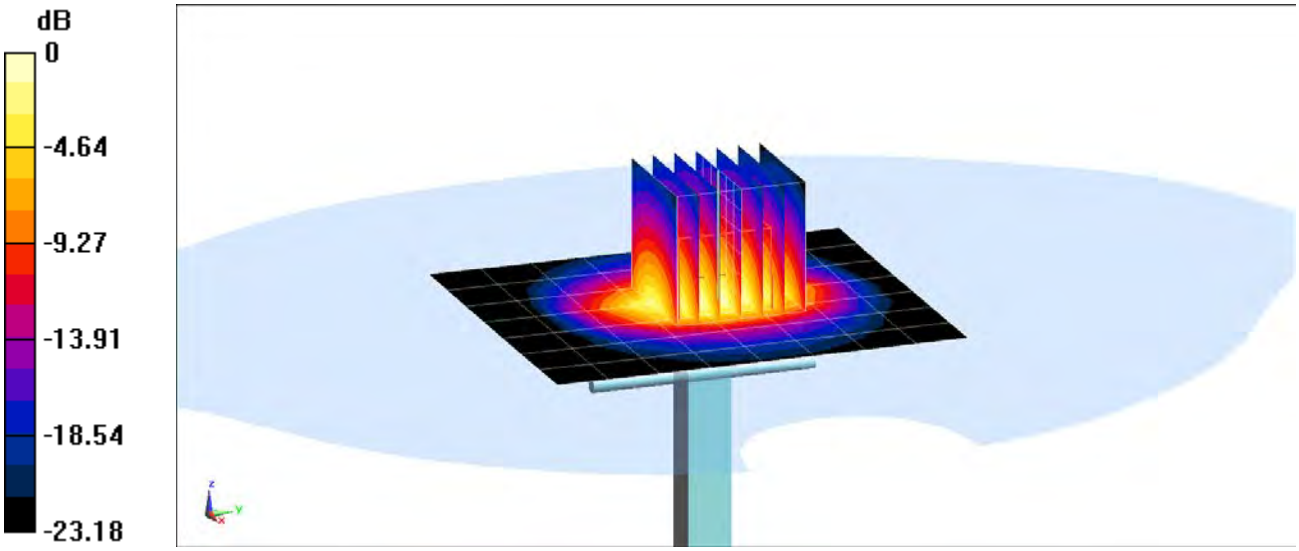
Communication System: UID 0, CW; Frequency: 2450 MHz; Duty Cycle: 1:1
Medium: 2450 Body Medium parameters used:
f = 2450 MHz; σ = 2.03 S/m; ε_r = 51.773; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 11-29-2017; Ambient Temp: 22.0°C; Tissue Temp: 20.9°C

Probe: ES3DV3 - SN3213; ConvF(4.53, 4.53, 4.53); Calibrated: 2/10/2017;
Sensor-Surface: 3mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1272; Calibrated: 2/9/2017
Phantom: SAM Front; Type: QD000P40CD; Serial: TP:1758
Measurement SW: DASY52, Version 52.10;SEMCAD X Version 14.6.10 (7417)

2450 MHz System Verification at 20.0 dBm (100 mW)

Area Scan (8x9x1): Measurement grid: dx=12mm, dy=12mm
Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Peak SAR (extrapolated) = 11.4 W/kg
SAR(1 g) = 5.36 W/kg
Deviation(1 g) = 6.99%



0 dB = 7.11 W/kg = 8.52 dBW/kg

DUT: Dipole 2450 MHz; Type: D2450V2; Serial: 719

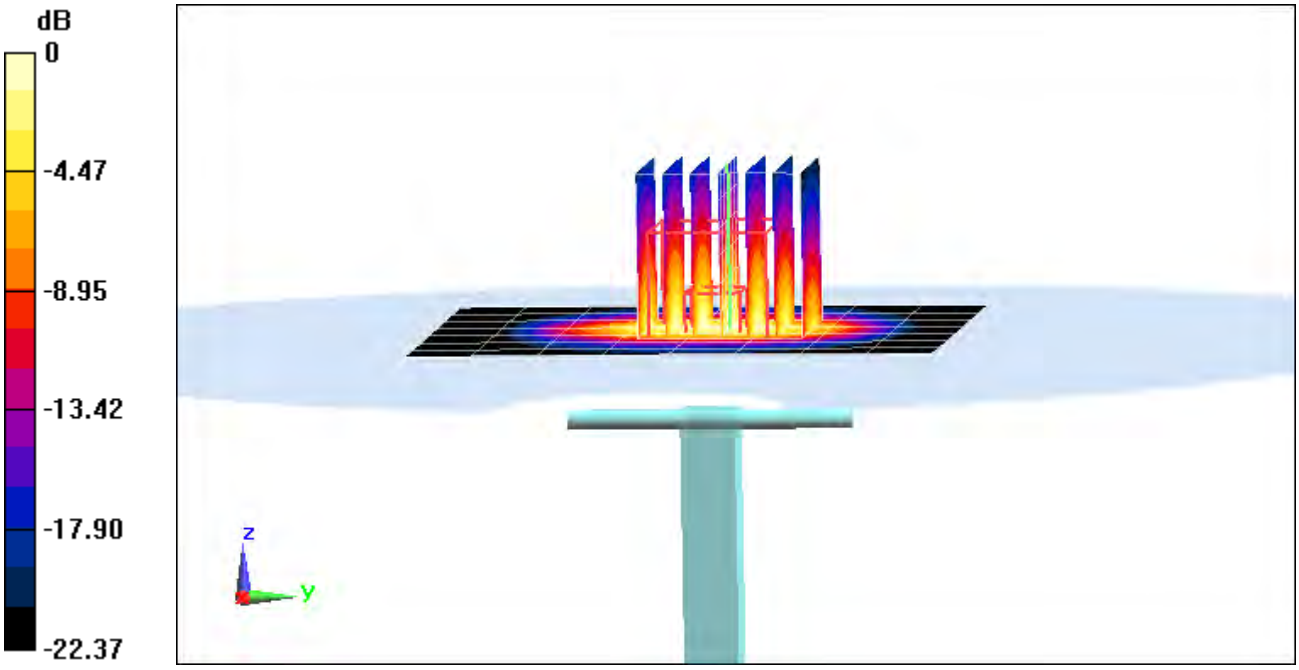
Communication System: UID 0, CW; Frequency: 2450 MHz; Duty Cycle: 1:1
Medium: 2450 MHz Medium parameters used:
f = 2450 MHz; σ = 2.035 S/m; ε_r = 51.818; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 12-11-2017; Ambient Temp: 20.3°C; Tissue Temp: 21.7°C

Probe: ES3DV3 - SN3319; ConvF(4.42, 4.42, 4.42); Calibrated: 3/14/2017;
Sensor-Surface: 3mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1368; Calibrated: 3/8/2017
Phantom: SAM 5.0 front; Type: QD000P40CD; Serial: 1648
Measurement SW: DASY52, Version 52.10;SEMCAD X Version 14.6.10 (7417)

2450 MHz System Verification at 20.0 dBm (100 mW)

Area Scan (8x9x1): Measurement grid: dx=12mm, dy=12mm
Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Peak SAR (extrapolated) = 10.8 W/kg
SAR(1 g) = 5.21 W/kg
Deviation(1 g) = 3.99%



0 dB = 6.80 W/kg = 8.33 dBW/kg

DUT: Dipole 2600 MHz; Type: D2600V2; Serial: 1064

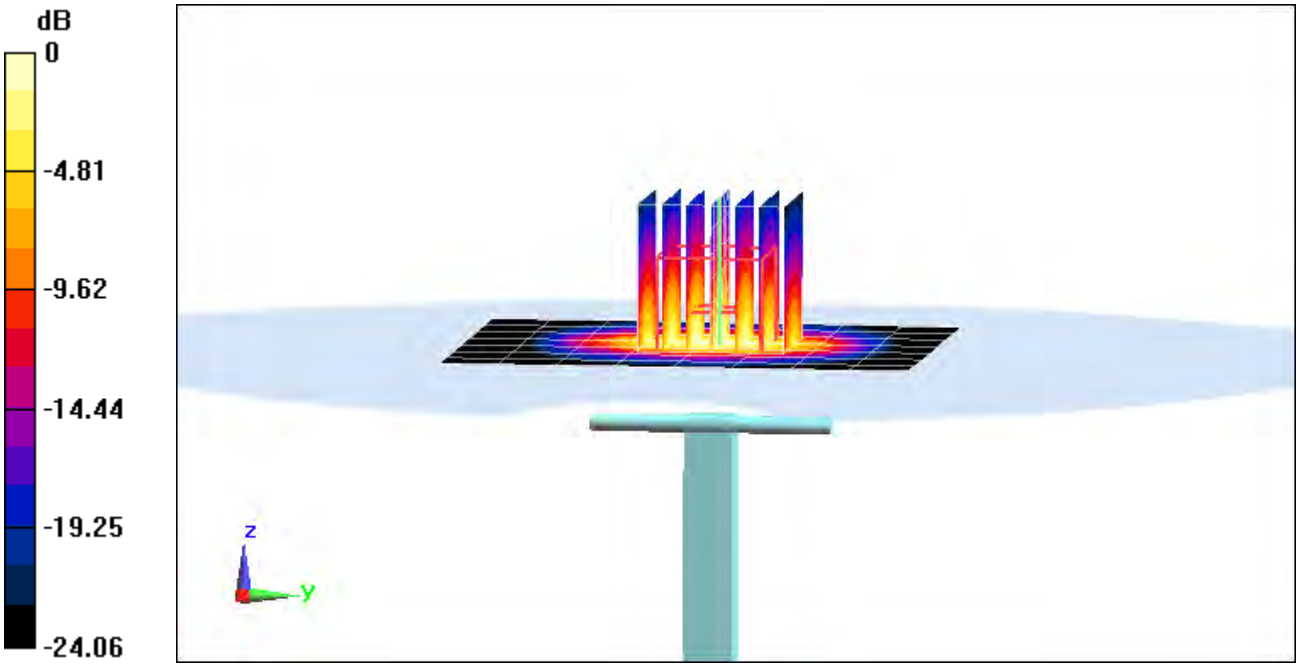
Communication System: UID 0, CW; Frequency: 2600 MHz; Duty Cycle: 1:1
Medium: 2450 MHz Medium parameters used:
f = 2600 MHz; σ = 2.244 S/m; ε_r = 51.179; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 12-11-2017; Ambient Temp: 20.3°C; Tissue Temp: 21.7°C

Probe: ES3DV3 - SN3319; ConvF(4.18, 4.18, 4.18); Calibrated: 3/14/2017;
Sensor-Surface: 3mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1368; Calibrated: 3/8/2017
Phantom: SAM 5.0 front; Type: QD000P40CD; Serial: 1648
Measurement SW: DASY52, Version 52.10;SEMCAD X Version 14.6.10 (7417)

2600 MHz System Verification at 20.0 dBm (100 mW)

Area Scan (8x9x1): Measurement grid: dx=12mm, dy=12mm
Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Peak SAR (extrapolated) = 12.3 W/kg
SAR(1 g) = 5.63 W/kg
Deviation(1 g) = 2.93%



0 dB = 7.48 W/kg = 8.74 dBW/kg

DUT: Dipole 5 GHz; Type: D5GHzV2; Serial: 1237

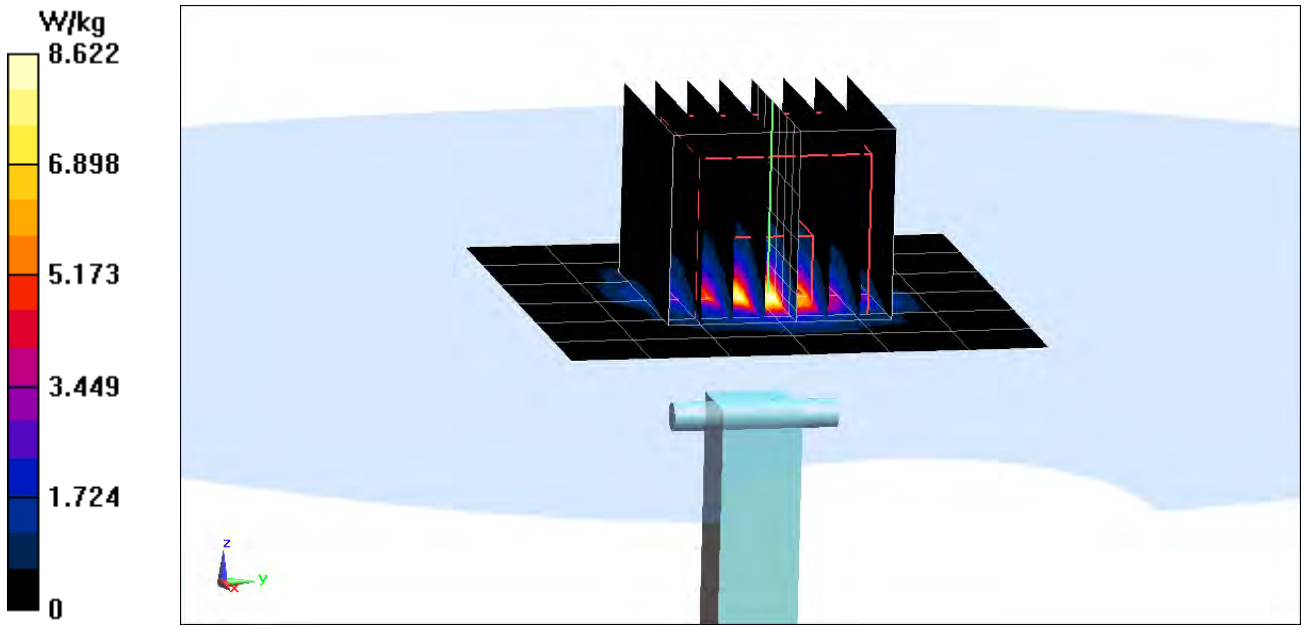
Communication System: UID 0, CW; Frequency: 5250 MHz; Duty Cycle: 1:1
Medium: 5 GHz Body Medium parameters used (interpolated):
$f = 5250$ MHz; $\sigma = 5.478$ S/m; $\varepsilon_r = 47.468$; $\rho = 1000$ kg/m^3
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 12-11-2017; Ambient Temp: 21.4°C; Tissue Temp: 20.6°C

Probe: EX3DV4 - SN7308; ConvF(4.84, 4.84, 4.84); Calibrated: 8/16/2017;
Sensor-Surface: 1.4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1334; Calibrated: 6/14/2017
Phantom: SAM with CRP v5.0 Front; Type: QD000P40CD; Serial: 1646
Measurement SW: DASY52, Version 52.10;SEMCAD X Version 14.6.10 (7417)

5250 MHz System Verification at 17.0 dBm (50 mW)

Area Scan (7x7x1): Measurement grid: dx=10mm, dy=10mm
Zoom Scan (8x8x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm; Graded Ratio: 1.4
Peak SAR (extrapolated) = 16.5 W/kg
SAR(1 g) = 3.57 W/kg
Deviation(1 g) = -7.15%



DUT: Dipole 5 GHz; Type: D5GHzV2; Serial: 1237

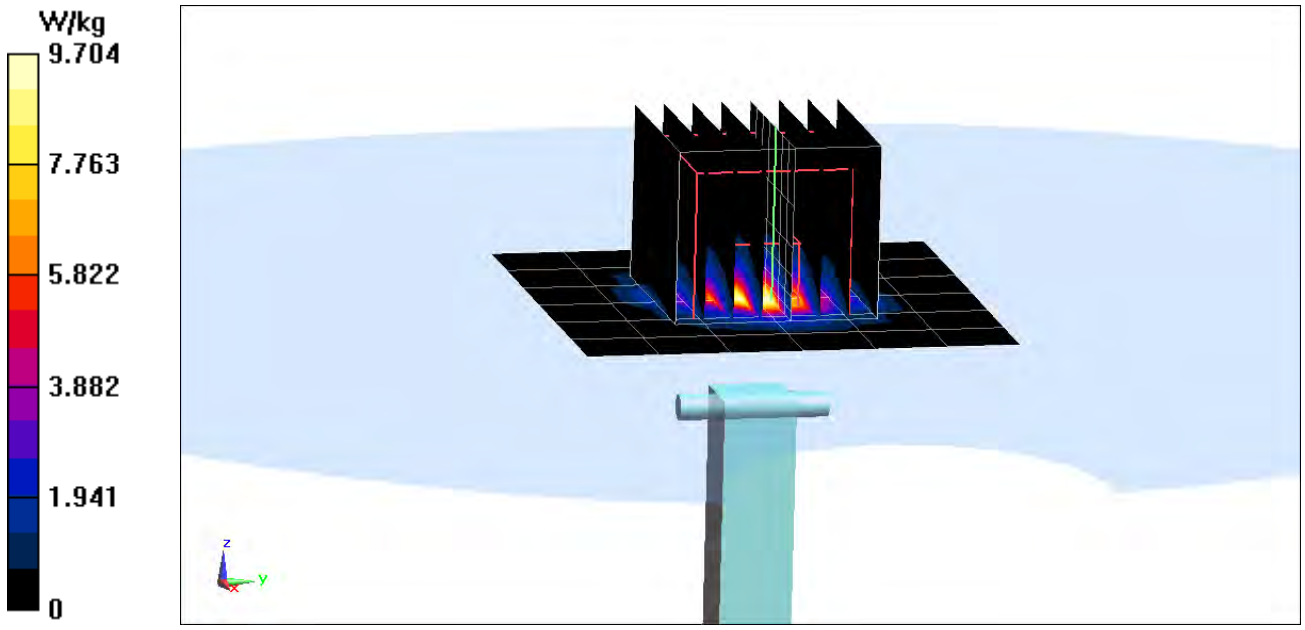
Communication System: UID 0, CW; Frequency: 5600 MHz; Duty Cycle: 1:1
Medium: 5 GHz Body Medium parameters used:
f = 5600 MHz; σ = 5.939 S/m; ε_r = 46.905; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 12-11-2017; Ambient Temp: 21.4°C; Tissue Temp: 20.6°C

Probe: EX3DV4 - SN7308; ConvF(4.23, 4.23, 4.23); Calibrated: 8/16/2017;
Sensor-Surface: 1.4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1334; Calibrated: 6/14/2017
Phantom: SAM with CRP v5.0 Front; Type: QD000P40CD; Serial: 1646
Measurement SW: DASY52, Version 52.10;SEMCAD X Version 14.6.10 (7417)

5600 MHz System Verification at 17.0 dBm (50 mW)

Area Scan (7x7x1): Measurement grid: dx=10mm, dy=10mm
Zoom Scan (8x8x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm; Graded Ratio: 1.4
Peak SAR (extrapolated) = 18.9 W/kg
SAR(1 g) = 3.95 W/kg
Deviation(1 g) = 0.64%



DUT: Dipole 5 GHz; Type: D5GHzV2; Serial: 1237

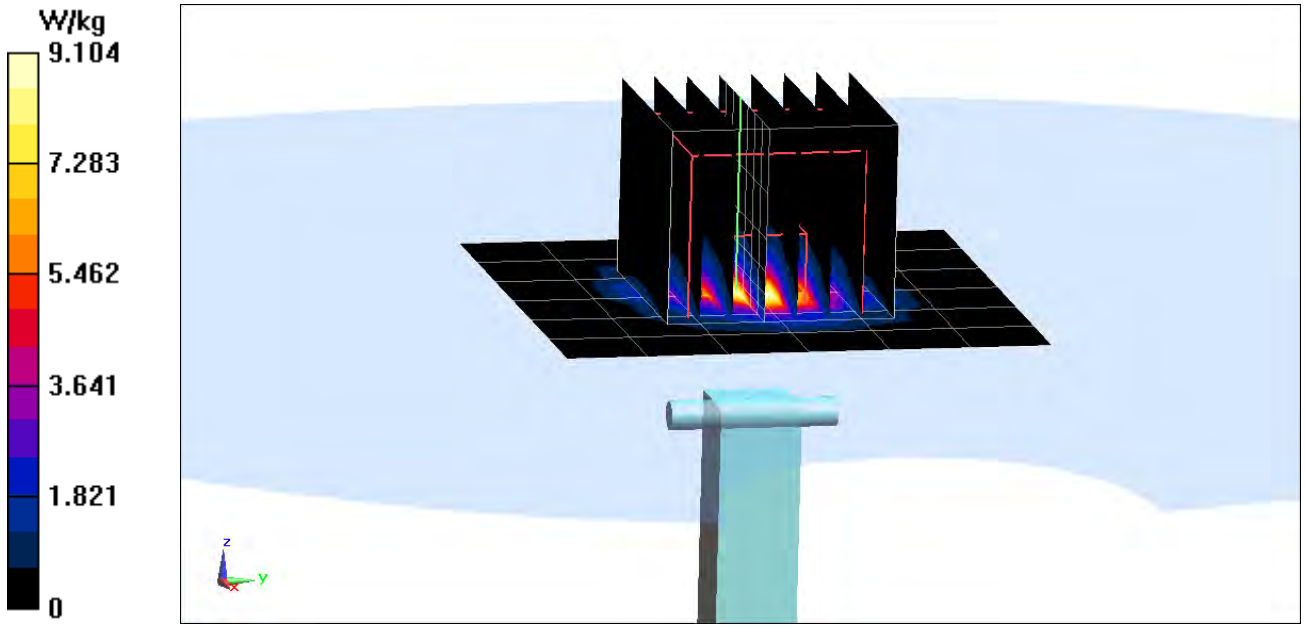
Communication System: UID 0, CW; Frequency: 5750 MHz; Duty Cycle: 1:1
Medium: 5 GHz Body Medium parameters used (interpolated):
f = 5750 MHz; σ = 6.14 S/m; ε_r = 46.416; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 12-04-2017; Ambient Temp: 22.3°C; Tissue Temp: 20.4°C

Probe: EX3DV4 - SN7308; ConvF(4.5, 4.5, 4.5); Calibrated: 8/16/2017;
Sensor-Surface: 1.4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1334; Calibrated: 6/14/2017
Phantom: SAM with CRP v5.0 Front; Type: QD000P40CD; Serial: 1646
Measurement SW: DASY52, Version 52.10;SEMCAD X Version 14.6.10 (7417)

5750 MHz System Verification at 17.0 dBm (50 mW)

Area Scan (7x7x1): Measurement grid: dx=10mm, dy=10mm
Zoom Scan (8x8x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm; Graded Ratio: 1.4
Peak SAR (extrapolated) = 18.9 W/kg
SAR(1 g) = 3.67 W/kg
Deviation(1 g) = -4.80%



DUT: Dipole 5 GHz; Type: D5GHzV2; Serial: 1237

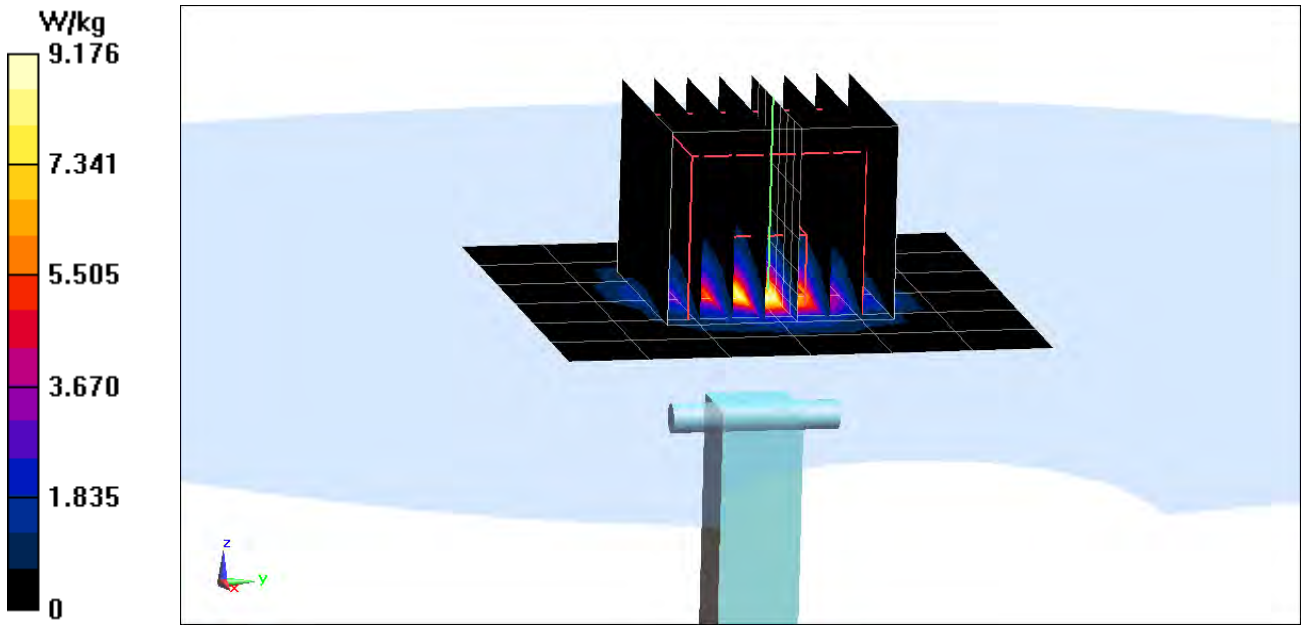
Communication System: UID 0, CW; Frequency: 5750 MHz; Duty Cycle: 1:1
Medium: 5 GHz Body Medium parameters used (interpolated):
f = 5750 MHz; σ = 6.167 S/m; ε_r = 46.624; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 12-11-2017; Ambient Temp: 21.4°C; Tissue Temp: 20.6°C

Probe: EX3DV4 - SN7308; ConvF(4.5, 4.5, 4.5); Calibrated: 8/16/2017;
Sensor-Surface: 1.4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1334; Calibrated: 6/14/2017
Phantom: SAM with CRP v5.0 Front; Type: QD000P40CD; Serial: 1646
Measurement SW: DASY52, Version 52.10;SEMCAD X Version 14.6.10 (7417)

5750 MHz System Verification at 17.0 dBm (50 mW)

Area Scan (7x7x1): Measurement grid: dx=10mm, dy=10mm
Zoom Scan (8x8x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm; Graded Ratio: 1.4
Peak SAR (extrapolated) = 18.6 W/kg
SAR(1 g) = 3.68 W/kg
Deviation(1 g) = -4.54%



APPENDIX C: PROBE CALIBRATION

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Accreditation No.: SCS 0108

Client **PC Test**

Certificate No: D750V3-1054_Mar17

CALIBRATION CERTIFICATE

Object D750V3 - SN:1054

Calibration procedure(s) QA CAL-05.v9
Calibration procedure for dipole validation kits above 700 MHz

BNV 03-27-2017

Calibration date: March 07, 2017

This calibration certificate documents the traceability to national standards, which realize the physical units of measurements (SI).
The measurements and the uncertainties with confidence probability are given on the following pages and are part of the certificate.

All calibrations have been conducted in the closed laboratory facility: environment temperature (22 ± 3)°C and humidity < 70%.

Calibration Equipment used (M&TE critical for calibration)

Primary Standards	ID #	Cal Date (Certificate No.)	Scheduled Calibration
Power meter NRP	SN: 104778	06-Apr-16 (No. 217-02288/02289)	Apr-17
Power sensor NRP-Z91	SN: 103244	06-Apr-16 (No. 217-02288)	Apr-17
Power sensor NRP-Z91	SN: 103245	06-Apr-16 (No. 217-02289)	Apr-17
Reference 20 dB Attenuator	SN: 5058 (20k)	05-Apr-16 (No. 217-02292)	Apr-17
Type-N mismatch combination	SN: 5047.2 / 06327	05-Apr-16 (No. 217-02295)	Apr-17
Reference Probe EX3DV4	SN: 7349	31-Dec-16 (No. EX3-7349_Dec16)	Dec-17
DAE4	SN: 601	04-Jan-17 (No. DAE4-601_Jan17)	Jan-18

Secondary Standards	ID #	Check Date (in house)	Scheduled Check
Power meter EPM-442A	SN: GB37480704	07-Oct-15 (in house check Oct-16)	In house check: Oct-18
Power sensor HP 8481A	SN: US37292783	07-Oct-15 (in house check Oct-16)	In house check: Oct-18
Power sensor HP 8481A	SN: MY41092317	07-Oct-15 (in house check Oct-16)	In house check: Oct-18
RF generator R&S SMT-06	SN: 100972	15-Jun-15 (in house check Oct-16)	In house check: Oct-18
Network Analyzer HP 8753E	SN: US37390585	18-Oct-01 (in house check Oct-16)	In house check: Oct-17

	Name	Function	Signature
Calibrated by:	Johannes Kurikka	Laboratory Technician	
Approved by:	Katja Pokovic	Technical Manager	

Issued: March 14, 2017

This calibration certificate shall not be reproduced except in full without written approval of the laboratory.

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Accreditation No.: SCS 0108

Glossary:

TSL	tissue simulating liquid
ConvF	sensitivity in TSL / NORM x,y,z
N/A	not applicable or not measured

Calibration is Performed According to the Following Standards:

a) IEEE Std 1528-2013, "IEEE Recommended Practice for Determining the Peak Spatial-Averaged Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques", June 2013
b) IEC 62209-1, "Procedure to measure the Specific Absorption Rate (SAR) for hand-held devices used in close proximity to the ear (frequency range of 300 MHz to 3 GHz)", February 2005
c) IEC 62209-2, "Procedure to determine the Specific Absorption Rate (SAR) for wireless communication devices used in close proximity to the human body (frequency range of 30 MHz to 6 GHz)", March 2010
d) KDB 865664, "SAR Measurement Requirements for 100 MHz to 6 GHz"

Additional Documentation:

e) DASY4/5 System Handbook

Methods Applied and Interpretation of Parameters:

- *Measurement Conditions:* Further details are available from the Validation Report at the end of the certificate. All figures stated in the certificate are valid at the frequency indicated.
- *Antenna Parameters with TSL:* The dipole is mounted with the spacer to position its feed point exactly below the center marking of the flat phantom section, with the arms oriented parallel to the body axis.
- *Feed Point Impedance and Return Loss:* These parameters are measured with the dipole positioned under the liquid filled phantom. The impedance stated is transformed from the measurement at the SMA connector to the feed point. The Return Loss ensures low reflected power. No uncertainty required.
- *Electrical Delay:* One-way delay between the SMA connector and the antenna feed point. No uncertainty required.
- *SAR measured:* SAR measured at the stated antenna input power.
- *SAR normalized:* SAR as measured, normalized to an input power of 1 W at the antenna connector.
- *SAR for nominal TSL parameters:* The measured TSL parameters are used to calculate the nominal SAR result.

The reported uncertainty of measurement is stated as the standard uncertainty of measurement multiplied by the coverage factor k=2, which for a normal distribution corresponds to a coverage probability of approximately 95%.

Measurement Conditions

DASY system configuration, as far as not given on page 1.

DASY Version	DASY5	V52.8.8
Extrapolation	Advanced Extrapolation	
Phantom	Modular Flat Phantom	
Distance Dipole Center - TSL	15 mm	with Spacer
Zoom Scan Resolution	dx, dy, dz = 5 mm	
Frequency	750 MHz ± 1 MHz	

Head TSL parameters

The following parameters and calculations were applied.

	Temperature	**Permittivity**	**Conductivity**
Nominal Head TSL parameters	22.0 °C	41.9	0.89 mho/m
Measured Head TSL parameters	(22.0 ± 0.2) °C	40.9 ± 6 %	0.91 mho/m ± 6 %
Head TSL temperature change during test	< 0.5 °C	----	----

SAR result with Head TSL

SAR averaged over 1 cm³ (1 g) of Head TSL	Condition	
SAR measured	250 mW input power	2.14 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**8.37 W/kg ± 17.0 % (k=2)**

SAR averaged over 10 cm³ (10 g) of Head TSL	condition	
SAR measured	250 mW input power	1.40 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**5.50 W/kg ± 16.5 % (k=2)**

Body TSL parameters

The following parameters and calculations were applied.

	Temperature	**Permittivity**	**Conductivity**
Nominal Body TSL parameters	22.0 °C	55.5	0.96 mho/m
Measured Body TSL parameters	(22.0 ± 0.2) °C	54.6 ± 6 %	0.99 mho/m ± 6 %
Body TSL temperature change during test	< 0.5 °C	----	----

SAR result with Body TSL

SAR averaged over 1 cm³ (1 g) of Body TSL	Condition	
SAR measured	250 mW input power	2.21 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	**8.61 W/kg ± 17.0 % (k=2)**

SAR averaged over 10 cm³ (10 g) of Body TSL	condition	
SAR measured	250 mW input power	1.45 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	**5.68 W/kg ± 16.5 % (k=2)**

Appendix (Additional assessments outside the scope of SCS 0108)

Antenna Parameters with Head TSL

Impedance, transformed to feed point	54.7 Ω - 0.7 jΩ
Return Loss	- 26.8 dB

Antenna Parameters with Body TSL

Impedance, transformed to feed point	50.7 Ω - 3.6 jΩ
Return Loss	- 28.7 dB

General Antenna Parameters and Design

Electrical Delay (one direction)	1.033 ns

After long term use with 100W radiated power, only a slight warming of the dipole near the feedpoint can be measured.

The dipole is made of standard semirigid coaxial cable. The center conductor of the feeding line is directly connected to the second arm of the dipole. The antenna is therefore short-circuited for DC-signals. On some of the dipoles, small end caps are added to the dipole arms in order to improve matching when loaded according to the position as explained in the "Measurement Conditions" paragraph. The SAR data are not affected by this change. The overall dipole length is still according to the Standard.
No excessive force must be applied to the dipole arms, because they might bend or the soldered connections near the feedpoint may be damaged.

Additional EUT Data

Manufactured by	SPEAG
Manufactured on	November 08, 2011

DASY5 Validation Report for Head TSL

Date: 07.03.2017

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole 750 MHz; Type: D750V3; Serial: D750V3 - SN:1054

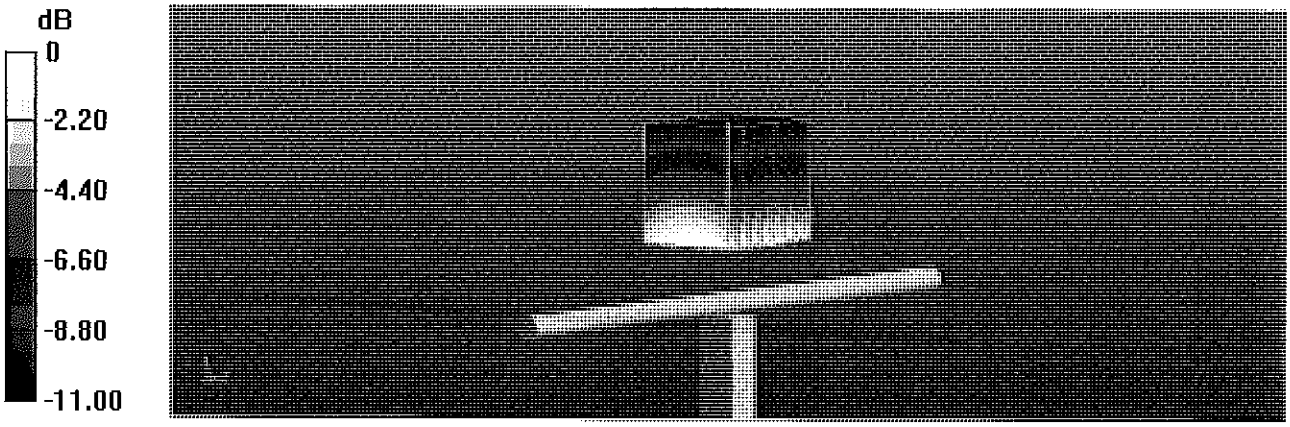
Communication System: UID 0 - CW ; Frequency: 750 MHz
Medium parameters used: f = 750 MHz; σ = 0.91 S/m; ε_r = 40.9; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)

DASY52 Configuration:

- Probe: EX3DV4 - SN7349; ConvF(10.17, 10.17, 10.17); Calibrated: 31.12.2016;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 04.01.2017
- Phantom: Flat Phantom 4.9 (front); Type: QD 00L P49 AA; Serial: 1001
- DASY52 52.8.8(1222); SEMCAD X 14.6.10(7331)

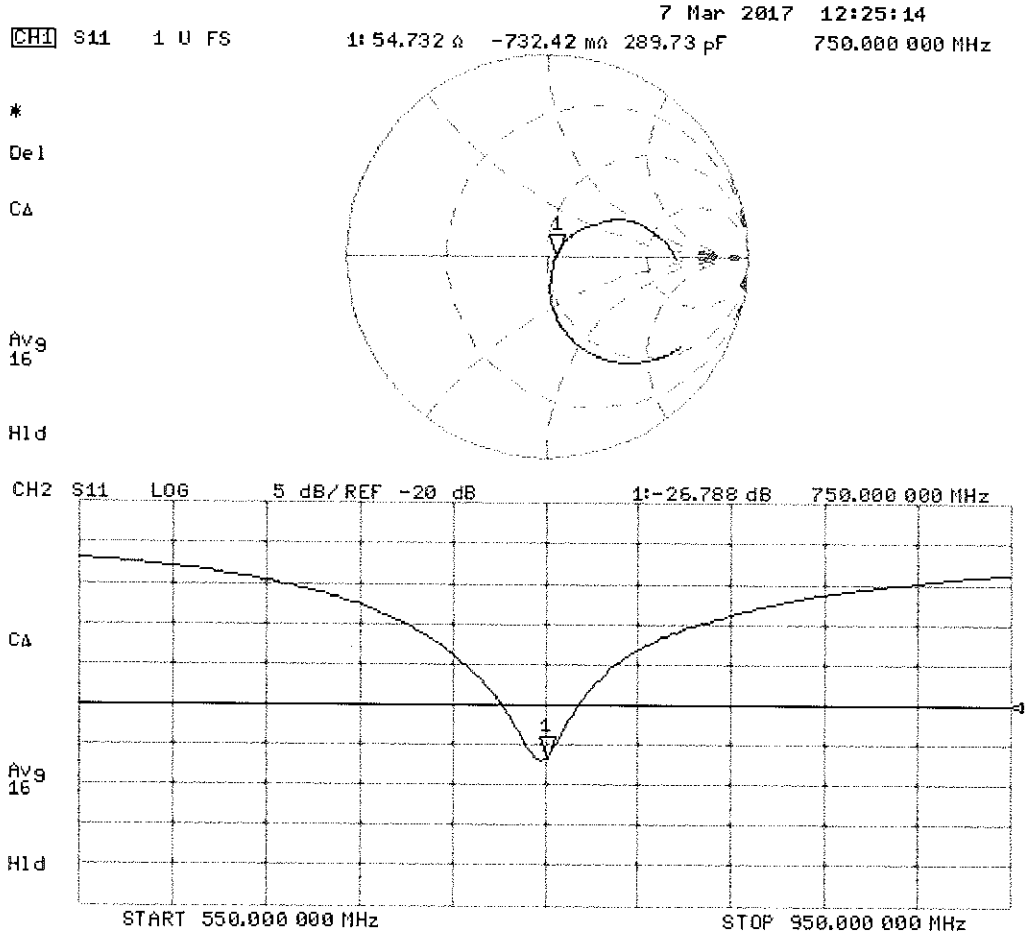
Dipole Calibration for Head Tissue/Pin=250 mW, d=15mm/Zoom Scan (7x7x7)/Cube 0:

Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 59.71 V/m; Power Drift = 0.01 dB
Peak SAR (extrapolated) = 3.21 W/kg
SAR(1 g) = 2.14 W/kg; SAR(10 g) = 1.4 W/kg
Maximum value of SAR (measured) = 2.85 W/kg



0 dB = 2.85 W/kg = 4.55 dBW/kg

Impedance Measurement Plot for Head TSL



DASY5 Validation Report for Body TSL

Date: 07.03.2017

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole 750 MHz; Type: D750V3; Serial: D750V3 - SN:1054

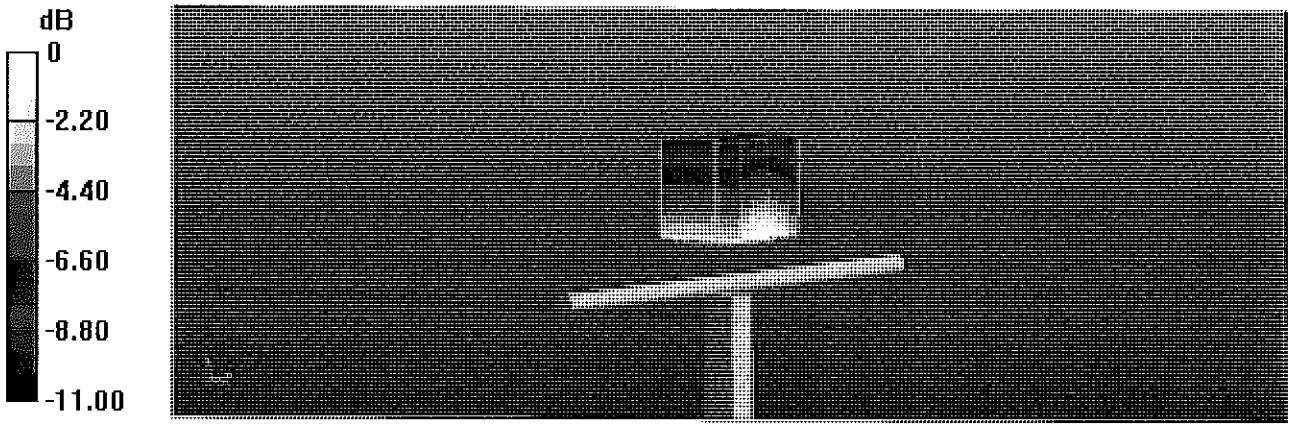
Communication System: UID 0 - CW ; Frequency: 750 MHz
Medium parameters used: f = 750 MHz; σ = 0.99 S/m; ε_r = 54.6; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)

DASY52 Configuration:

- Probe: EX3DV4 - SN7349; ConvF(9.99, 9.99, 9.99); Calibrated: 31.12.2016;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 04.01.2017
- Phantom: Flat Phantom 4.9 (Back); Type: QD 00R P49 AA; Serial: 1005
- DASY52 52.8.8(1222); SEMCAD X 14.6.10(7331)

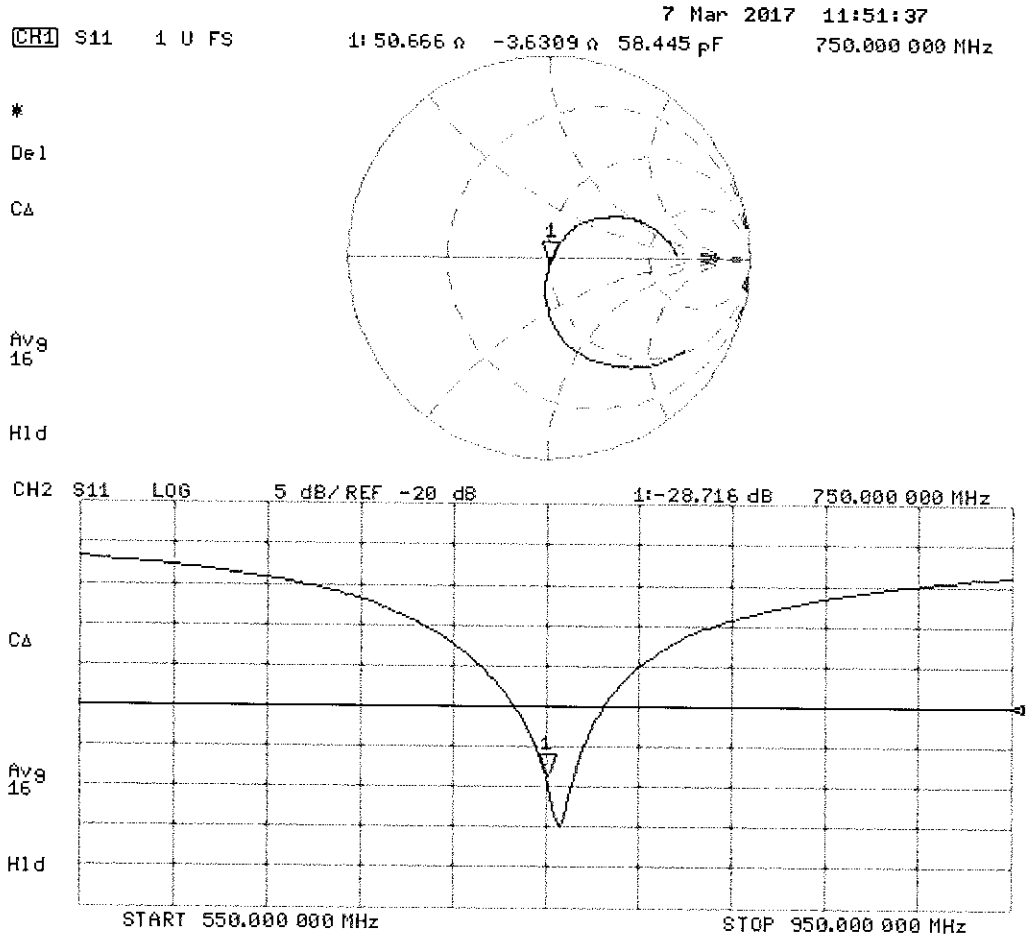
Dipole Calibration for Body Tissue/Pin=250 mW, d=15mm/Zoom Scan (7x7x7)/Cube 0:

Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 57.88 V/m; Power Drift = -0.01 dB
Peak SAR (extrapolated) = 3.31 W/kg
SAR(1 g) = 2.21 W/kg; SAR(10 g) = 1.45 W/kg
Maximum value of SAR (measured) = 2.94 W/kg



0 dB = 2.94 W/kg = 4.68 dBW/kg

Impedance Measurement Plot for Body TSL



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Accreditation No.: SCS 0108

Client **PC Test**

Certificate No: D835V2-4d133_Jul17

CALIBRATION CERTIFICATE

PN ✓ 8/3/2017

Object	D835V2 - SN:4d133
Calibration procedure(s)	QA CAL-05.v9 Calibration procedure for dipole validation kits above 700 MHz
Calibration date:	July 11, 2017

This calibration certificate documents the traceability to national standards, which realize the physical units of measurements (SI).
The measurements and the uncertainties with confidence probability are given on the following pages and are part of the certificate.

All calibrations have been conducted in the closed laboratory facility: environment temperature (22 ± 3)°C and humidity < 70%.

Calibration Equipment used (M&TE critical for calibration)

Primary Standards	ID #	Cal Date (Certificate No.)	Scheduled Calibration
Power meter NRP	SN: 104778	04-Apr-17 (No. 217-02521/02522)	Apr-18
Power sensor NRP-Z91	SN: 103244	04-Apr-17 (No. 217-02521)	Apr-18
Power sensor NRP-Z91	SN: 103245	04-Apr-17 (No. 217-02522)	Apr-18
Reference 20 dB Attenuator	SN: 5058 (20k)	07-Apr-17 (No. 217-02528)	Apr-18
Type-N mismatch combination	SN: 5047.2 / 06327	07-Apr-17 (No. 217-02529)	Apr-18
Reference Probe EX3DV4	SN: 7349	31-May-17 (No. EX3-7349_May17)	May-18
DAE4	SN: 601	28-Mar-17 (No. DAE4-601_Mar17)	Mar-18

Secondary Standards	ID #	Check Date (in house)	Scheduled Check
Power meter EPM-442A	SN: GB37480704	07-Oct-15 (in house check Oct-16)	In house check: Oct-18
Power sensor HP 8481A	SN: US37292783	07-Oct-15 (in house check Oct-16)	In house check: Oct-18
Power sensor HP 8481A	SN: MY41092317	07-Oct-15 (in house check Oct-16)	In house check: Oct-18
RF generator R&S SMT-06	SN: 100972	15-Jun-15 (in house check Oct-16)	In house check: Oct-18
Network Analyzer HP 8753E	SN: US37390585	18-Oct-01 (in house check Oct-16)	In house check: Oct-17

	Name	Function	Signature
Calibrated by:	Johannes Kurikka	Laboratory Technician	
Approved by:	Katja Pokovic	Technical Manager	

Issued: July 12, 2017

This calibration certificate shall not be reproduced except in full without written approval of the laboratory.

Glossary:

TSL	tissue simulating liquid
ConvF	sensitivity in TSL / NORM x,y,z
N/A	not applicable or not measured

Calibration is Performed According to the Following Standards:

a) IEEE Std 1528-2013, "IEEE Recommended Practice for Determining the Peak Spatial-Averaged Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques", June 2013
b) IEC 62209-1, "Measurement procedure for the assessment of Specific Absorption Rate (SAR) from hand-held and body-mounted devices used next to the ear (frequency range of 300 MHz to 6 GHz)", July 2016
c) IEC 62209-2, "Procedure to determine the Specific Absorption Rate (SAR) for wireless communication devices used in close proximity to the human body (frequency range of 30 MHz to 6 GHz)", March 2010
d) KDB 865664, "SAR Measurement Requirements for 100 MHz to 6 GHz"

Additional Documentation:

e) DASY4/5 System Handbook

Methods Applied and Interpretation of Parameters:

- *Measurement Conditions:* Further details are available from the Validation Report at the end of the certificate. All figures stated in the certificate are valid at the frequency indicated.
- *Antenna Parameters with TSL:* The dipole is mounted with the spacer to position its feed point exactly below the center marking of the flat phantom section, with the arms oriented parallel to the body axis.
- *Feed Point Impedance and Return Loss:* These parameters are measured with the dipole positioned under the liquid filled phantom. The impedance stated is transformed from the measurement at the SMA connector to the feed point. The Return Loss ensures low reflected power. No uncertainty required.
- *Electrical Delay:* One-way delay between the SMA connector and the antenna feed point. No uncertainty required.
- *SAR measured:* SAR measured at the stated antenna input power.
- *SAR normalized:* SAR as measured, normalized to an input power of 1 W at the antenna connector.
- *SAR for nominal TSL parameters:* The measured TSL parameters are used to calculate the nominal SAR result.

The reported uncertainty of measurement is stated as the standard uncertainty of measurement multiplied by the coverage factor k=2, which for a normal distribution corresponds to a coverage probability of approximately 95%.

Measurement Conditions

DASY system configuration, as far as not given on page 1.

DASY Version	DASY5	V52.10.0
Extrapolation	Advanced Extrapolation	
Phantom	Modular Flat Phantom	
Distance Dipole Center - TSL	15 mm	with Spacer
Zoom Scan Resolution	dx, dy, dz = 5 mm	
Frequency	835 MHz ± 1 MHz	

Head TSL parameters

The following parameters and calculations were applied.

	Temperature	**Permittivity**	**Conductivity**
Nominal Head TSL parameters	22.0 °C	41.5	0.90 mho/m
Measured Head TSL parameters	(22.0 ± 0.2) °C	40.8 ± 6 %	0.91 mho/m ± 6 %
Head TSL temperature change during test	< 0.5 °C	----	----

SAR result with Head TSL

SAR averaged over 1 cm³ (1 g) of Head TSL	Condition	
SAR measured	250 mW input power	2.41 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**9.52 W/kg ± 17.0 % (k=2)**

SAR averaged over 10 cm³ (10 g) of Head TSL	condition	
SAR measured	250 mW input power	1.54 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**6.10 W/kg ± 16.5 % (k=2)**

Body TSL parameters

The following parameters and calculations were applied.

	Temperature	**Permittivity**	**Conductivity**
Nominal Body TSL parameters	22.0 °C	55.2	0.97 mho/m
Measured Body TSL parameters	(22.0 ± 0.2) °C	54.8 ± 6 %	1.01 mho/m ± 6 %
Body TSL temperature change during test	< 0.5 °C	----	----

SAR result with Body TSL

SAR averaged over 1 cm³ (1 g) of Body TSL	Condition	
SAR measured	250 mW input power	2.43 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	**9.41 W/kg ± 17.0 % (k=2)**

SAR averaged over 10 cm³ (10 g) of Body TSL	condition	
SAR measured	250 mW input power	1.58 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	**6.16 W/kg ± 16.5 % (k=2)**

Appendix (Additional assessments outside the scope of SCS 0108)

Antenna Parameters with Head TSL

Impedance, transformed to feed point	51.0 Ω - 2.9 jΩ
Return Loss	- 30.4 dB

Antenna Parameters with Body TSL

Impedance, transformed to feed point	46.7 Ω - 6.8 jΩ
Return Loss	- 22.2 dB

General Antenna Parameters and Design

Electrical Delay (one direction)	1.196 ns

After long term use with 100W radiated power, only a slight warming of the dipole near the feedpoint can be measured.

The dipole is made of standard semirigid coaxial cable. The center conductor of the feeding line is directly connected to the second arm of the dipole. The antenna is therefore short-circuited for DC-signals. On some of the dipoles, small end caps are added to the dipole arms in order to improve matching when loaded according to the position as explained in the "Measurement Conditions" paragraph. The SAR data are not affected by this change. The overall dipole length is still according to the Standard.
No excessive force must be applied to the dipole arms, because they might bend or the soldered connections near the feedpoint may be damaged.

Additional EUT Data

Manufactured by	SPEAG
Manufactured on	July 22, 2011

DASY5 Validation Report for Head TSL

Date: 11.07.2017

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole 835 MHz; Type: D835V2; Serial: D835V2 - SN:4d133

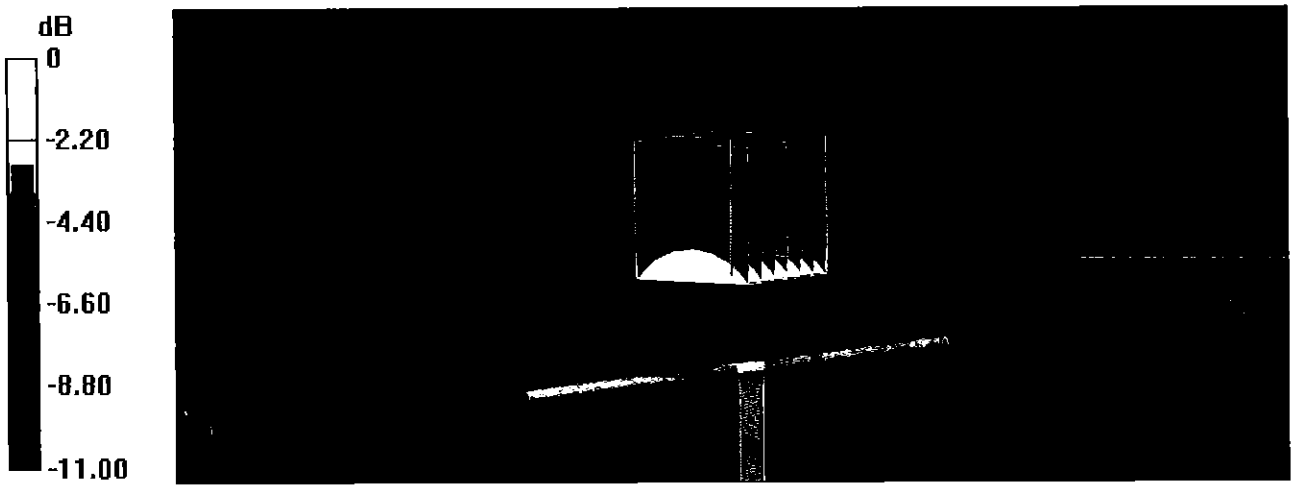
Communication System: UID 0 - CW; Frequency: 835 MHz
Medium parameters used: f = 835 MHz; σ = 0.91 S/m; ε_r = 40.8; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)

DASY52 Configuration:

- Probe: EX3DV4 - SN7349; ConvF(10.07, 10.07, 10.07); Calibrated: 31.05.2017;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 28.03.2017
- Phantom: Flat Phantom 4.9 (front); Type: QD 00L P49 AA; Serial: 1001
- DASY52 52.10.0(1446); SEMCAD X 14.6.10(7417)

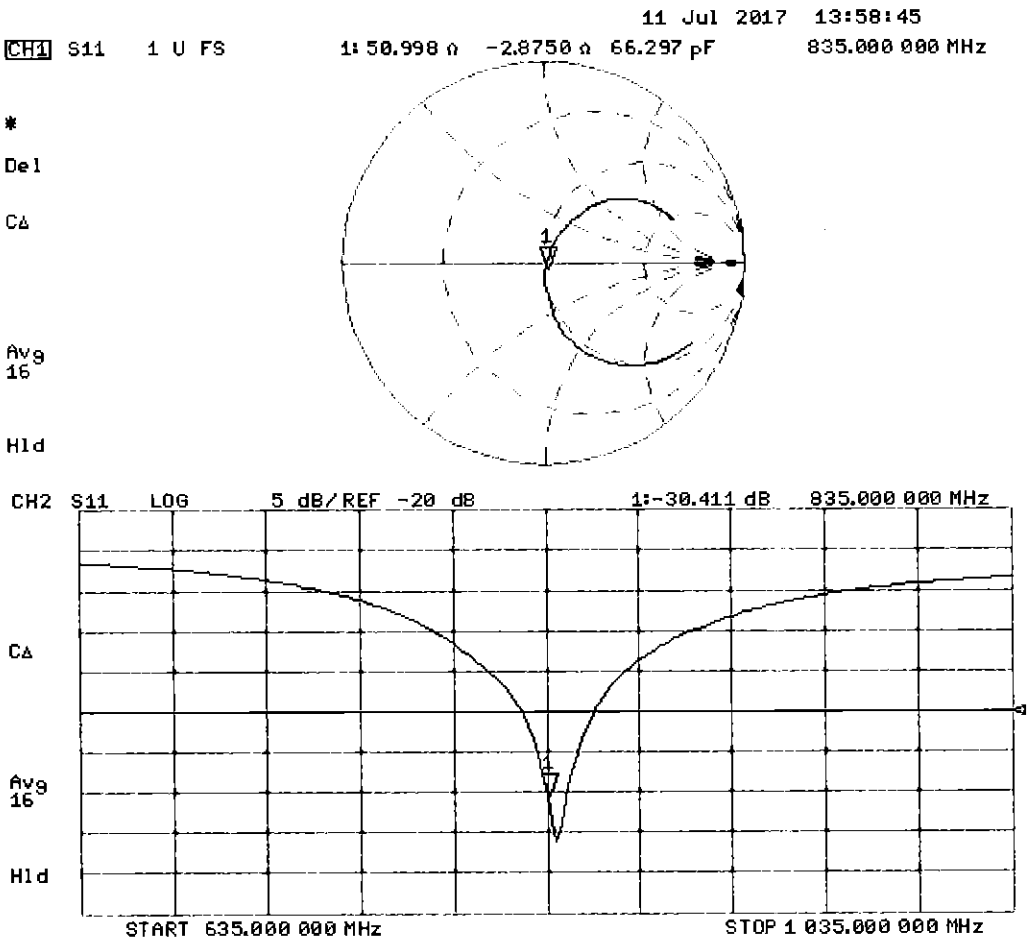
Dipole Calibration for Head Tissue/Pin=250 mW, d=15mm/Zoom Scan (7x7x7)/Cube 0:

Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 62.84 V/m; Power Drift = 0.02 dB
Peak SAR (extrapolated) = 3.74 W/kg
SAR(1 g) = 2.41 W/kg; SAR(10 g) = 1.54 W/kg
Maximum value of SAR (measured) = 3.28 W/kg



0 dB = 3.28 W/kg = 5.16 dBW/kg

Impedance Measurement Plot for Head TSL



DASY5 Validation Report for Body TSL

Date: 11.07.2017

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole 835 MHz; Type: D835V2; Serial: D835V2 - SN:4d133

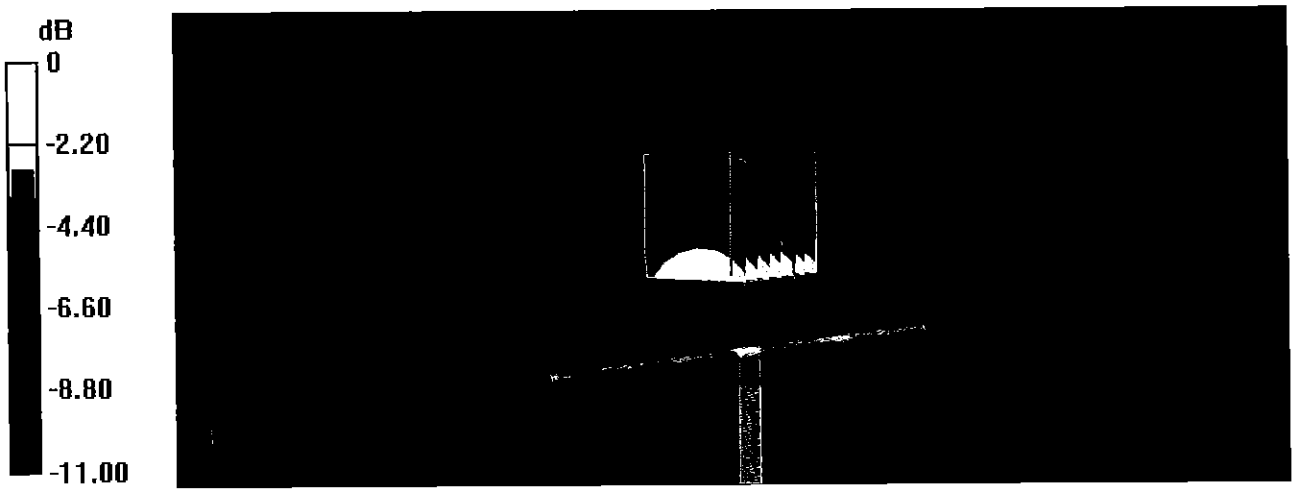
Communication System: UID 0 - CW; Frequency: 835 MHz
Medium parameters used: f = 835 MHz; σ = 1.01 S/m; ε_r = 54.8; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)

DASY52 Configuration:

- Probe: EX3DV4 - SN7349; ConvF(10.2, 10.2, 10.2); Calibrated: 31.05.2017;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 28.03.2017
- Phantom: Flat Phantom 4.9 (Back); Type: QD 00R P49 AA; Serial: 1005
- DASY52 52.10.0(1446); SEMCAD X 14.6.10(7417)

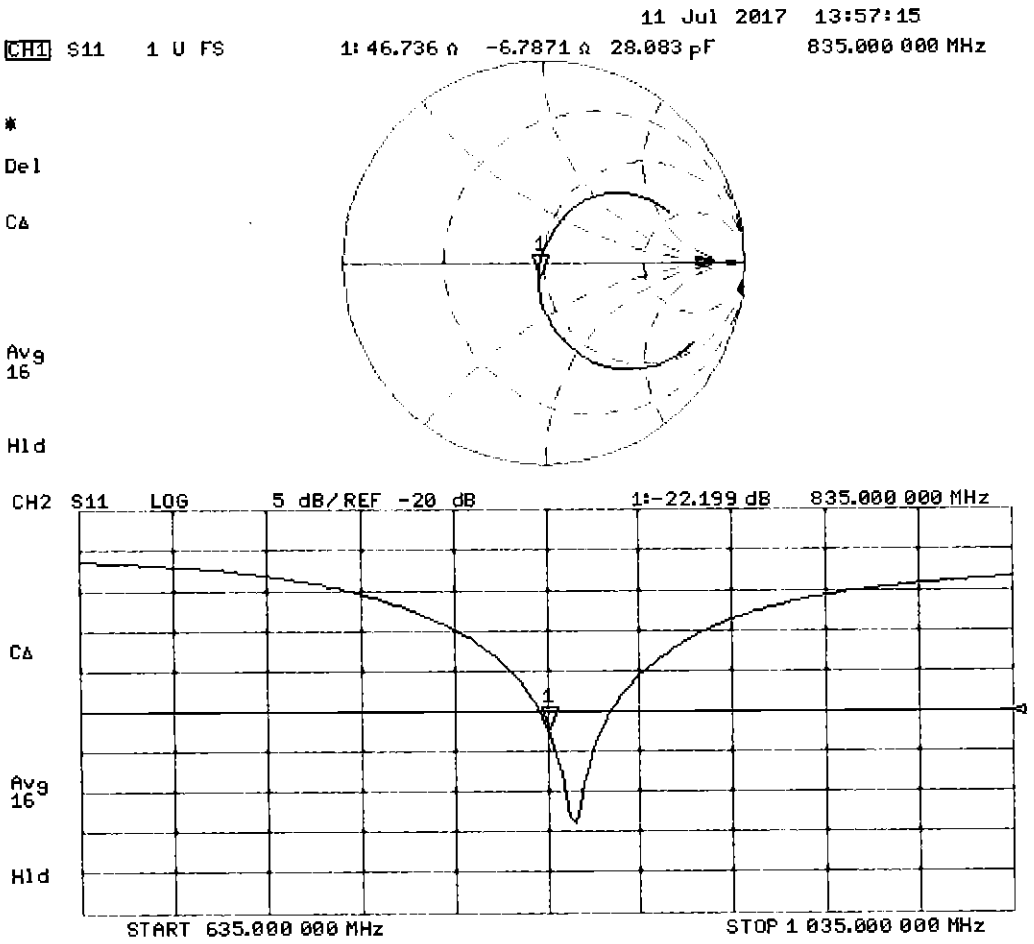
Dipole Calibration for Body Tissue/Pin=250 mW, d=15mm/Zoom Scan (7x7x7)/Cube 0:

Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 59.25 V/m; Power Drift = -0.03 dB
Peak SAR (extrapolated) = 3.67 W/kg
SAR(1 g) = 2.43 W/kg; SAR(10 g) = 1.58 W/kg
Maximum value of SAR (measured) = 3.21 W/kg



0 dB = 3.21 W/kg = 5.07 dBW/kg

Impedance Measurement Plot for Body TSL



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Engineering AG
Zeughausstrasse 43, 8004 Zurich, Switzerland

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Accreditation No.: SCS 0108

Client **PC Test** **Certificate No: D1750V2-1148_May17**

CALIBRATION CERTIFICATE

Object D1750V2 - SN:1148

Calibration procedure(s) QA CAL-05.v9
Calibration procedure for dipole validation kits above 700 MHz

BN ✓
05-23-2017

Calibration date: May 09, 2017

This calibration certificate documents the traceability to national standards, which realize the physical units of measurements (SI).
The measurements and the uncertainties with confidence probability are given on the following pages and are part of the certificate.

All calibrations have been conducted in the closed laboratory facility: environment temperature (22 ± 3)°C and humidity < 70%.

Calibration Equipment used (M&TE critical for calibration)

Primary Standards	ID #	Cal Date (Certificate No.)	Scheduled Calibration
Power meter NRP	SN: 104778	04-Apr-17 (No. 217-02521/02522)	Apr-18
Power sensor NRP-Z91	SN: 103244	04-Apr-17 (No. 217-02521)	Apr-18
Power sensor NRP-Z91	SN: 103245	04-Apr-17 (No. 217-02522)	Apr-18
Reference 20 dB Attenuator	SN: 5058 (20k)	07-Apr-17 (No. 217-02528)	Apr-18
Type-N mismatch combination	SN: 5047.2 / 06327	07-Apr-17 (No. 217-02529)	Apr-18
Reference Probe EX3DV4	SN: 7349	31-Dec-16 (No. EX3-7349_Dec16)	Dec-17
DAE4	SN: 601	28-Mar-17 (No. DAE4-601_Mar17)	Mar-18

Secondary Standards	ID #	Check Date (in house)	Scheduled Check
Power meter EPM-442A	SN: GB37480704	07-Oct-15 (in house check Oct-16)	In house check: Oct-18
Power sensor HP 8481A	SN: US37292783	07-Oct-15 (in house check Oct-16)	In house check: Oct-18
Power sensor HP 8481A	SN: MY41092317	07-Oct-15 (in house check Oct-16)	In house check: Oct-18
RF generator R&S SMT-06	SN: 100972	15-Jun-15 (in house check Oct-16)	In house check: Oct-18
Network Analyzer HP 8753E	SN: US37390585	18-Oct-01 (in house check Oct-16)	In house check: Oct-17

	Name	Function	Signature
Calibrated by:	Claudio Leubler	Laboratory Technician	
Approved by:	Katja Pokovic	Technical Manager	

Issued: May 11, 2017

This calibration certificate shall not be reproduced except in full without written approval of the laboratory.

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Accreditation No.: SCS 0108

Glossary:

TSL	tissue simulating liquid
ConvF	sensitivity in TSL / NORM x,y,z
N/A	not applicable or not measured

Calibration is Performed According to the Following Standards:

a) IEEE Std 1528-2013, "IEEE Recommended Practice for Determining the Peak Spatial-Averaged Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques", June 2013
b) IEC 62209-1, "Procedure to measure the Specific Absorption Rate (SAR) for hand-held devices used in close proximity to the ear (frequency range of 300 MHz to 3 GHz)", February 2005
c) IEC 62209-2, "Procedure to determine the Specific Absorption Rate (SAR) for wireless communication devices used in close proximity to the human body (frequency range of 30 MHz to 6 GHz)", March 2010
d) KDB 865664, "SAR Measurement Requirements for 100 MHz to 6 GHz"

Additional Documentation:

e) DASY4/5 System Handbook

Methods Applied and Interpretation of Parameters:

- *Measurement Conditions:* Further details are available from the Validation Report at the end of the certificate. All figures stated in the certificate are valid at the frequency indicated.
- *Antenna Parameters with TSL:* The dipole is mounted with the spacer to position its feed point exactly below the center marking of the flat phantom section, with the arms oriented parallel to the body axis.
- *Feed Point Impedance and Return Loss:* These parameters are measured with the dipole positioned under the liquid filled phantom. The impedance stated is transformed from the measurement at the SMA connector to the feed point. The Return Loss ensures low reflected power. No uncertainty required.
- *Electrical Delay:* One-way delay between the SMA connector and the antenna feed point. No uncertainty required.
- *SAR measured:* SAR measured at the stated antenna input power.
- *SAR normalized:* SAR as measured, normalized to an input power of 1 W at the antenna connector.
- *SAR for nominal TSL parameters:* The measured TSL parameters are used to calculate the nominal SAR result.

The reported uncertainty of measurement is stated as the standard uncertainty of measurement multiplied by the coverage factor k=2, which for a normal distribution corresponds to a coverage probability of approximately 95%.

Measurement Conditions

DASY system configuration, as far as not given on page 1.

DASY Version	DASY5	V52.10.0
Extrapolation	Advanced Extrapolation	
Phantom	Modular Flat Phantom	
Distance Dipole Center - TSL	10 mm	with Spacer
Zoom Scan Resolution	dx, dy, dz = 5 mm	
Frequency	1750 MHz ± 1 MHz	

Head TSL parameters

The following parameters and calculations were applied.

	Temperature	**Permittivity**	**Conductivity**
Nominal Head TSL parameters	22.0 °C	40.1	1.37 mho/m
Measured Head TSL parameters	(22.0 ± 0.2) °C	39.0 ± 6 %	1.36 mho/m ± 6 %
Head TSL temperature change during test	< 0.5 °C	----	----

SAR result with Head TSL

SAR averaged over 1 cm^3 (1 g) of Head TSL	Condition	
SAR measured	250 mW input power	9.11 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**36.4 W/kg ± 17.0 % (k=2)**

SAR averaged over 10 cm^3 (10 g) of Head TSL	condition	
SAR measured	250 mW input power	4.83 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**19.3 W/kg ± 16.5 % (k=2)**

Body TSL parameters

The following parameters and calculations were applied.

	Temperature	**Permittivity**	**Conductivity**
Nominal Body TSL parameters	22.0 °C	53.4	1.49 mho/m
Measured Body TSL parameters	(22.0 ± 0.2) °C	53.7 ± 6 %	1.47 mho/m ± 6 %
Body TSL temperature change during test	< 0.5 °C	----	----

SAR result with Body TSL

SAR averaged over 1 cm^3 (1 g) of Body TSL	Condition	
SAR measured	250 mW input power	9.17 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	**37.0 W/kg ± 17.0 % (k=2)**

SAR averaged over 10 cm^3 (10 g) of Body TSL	condition	
SAR measured	250 mW input power	4.93 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	**19.8 W/kg ± 16.5 % (k=2)**

Appendix (Additional assessments outside the scope of SCS 0108)

Antenna Parameters with Head TSL

Impedance, transformed to feed point	49.8 Ω - 0.7 jΩ
Return Loss	- 42.9 dB

Antenna Parameters with Body TSL

Impedance, transformed to feed point	45.7 Ω - 0.5 jΩ
Return Loss	- 26.9 dB

General Antenna Parameters and Design

Electrical Delay (one direction)	1.223 ns

After long term use with 100W radiated power, only a slight warming of the dipole near the feedpoint can be measured.

The dipole is made of standard semirigid coaxial cable. The center conductor of the feeding line is directly connected to the second arm of the dipole. The antenna is therefore short-circuited for DC-signals. On some of the dipoles, small end caps are added to the dipole arms in order to improve matching when loaded according to the position as explained in the "Measurement Conditions" paragraph. The SAR data are not affected by this change. The overall dipole length is still according to the Standard.
No excessive force must be applied to the dipole arms, because they might bend or the soldered connections near the feedpoint may be damaged.

Additional EUT Data

Manufactured by	SPEAG
Manufactured on	September 30, 2014

DASY5 Validation Report for Head TSL

Date: 09.05.2017

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole 1750 MHz; Type: D1750V2; Serial: D1750V2 - SN:1148

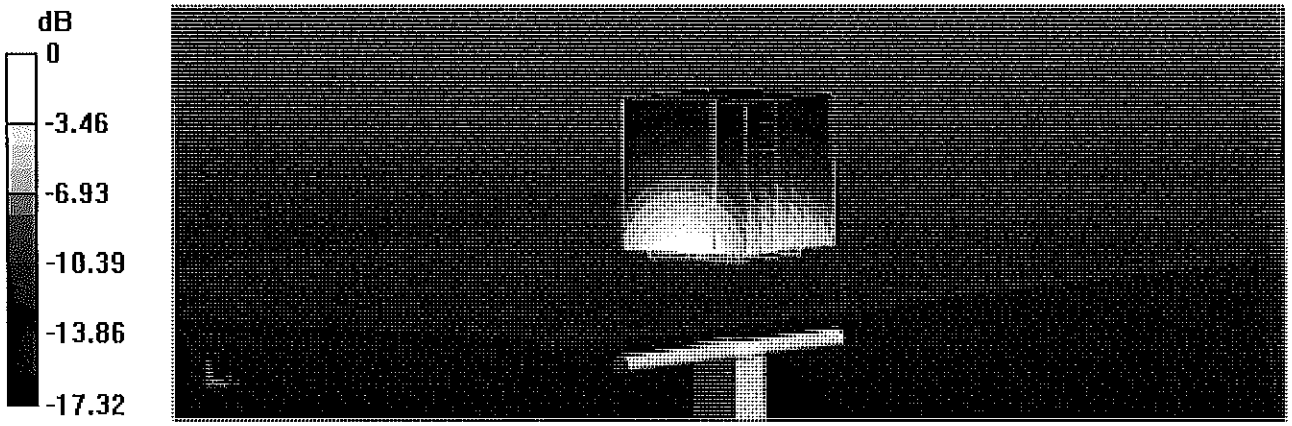
Communication System: UID 0 - CW; Frequency: 1750 MHz
Medium parameters used: f = 1750 MHz; σ = 1.36 S/m; ε_r = 39; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)

DASY52 Configuration:

- Probe: EX3DV4 - SN7349; ConvF(8.46, 8.46, 8.46); Calibrated: 31.12.2016;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 28.03.2017
- Phantom: Flat Phantom 5.0 (front); Type: QD000P50AA; Serial: 1001
- DASY52 52.10.0(1442); SEMCAD X 14.6.10(7413)

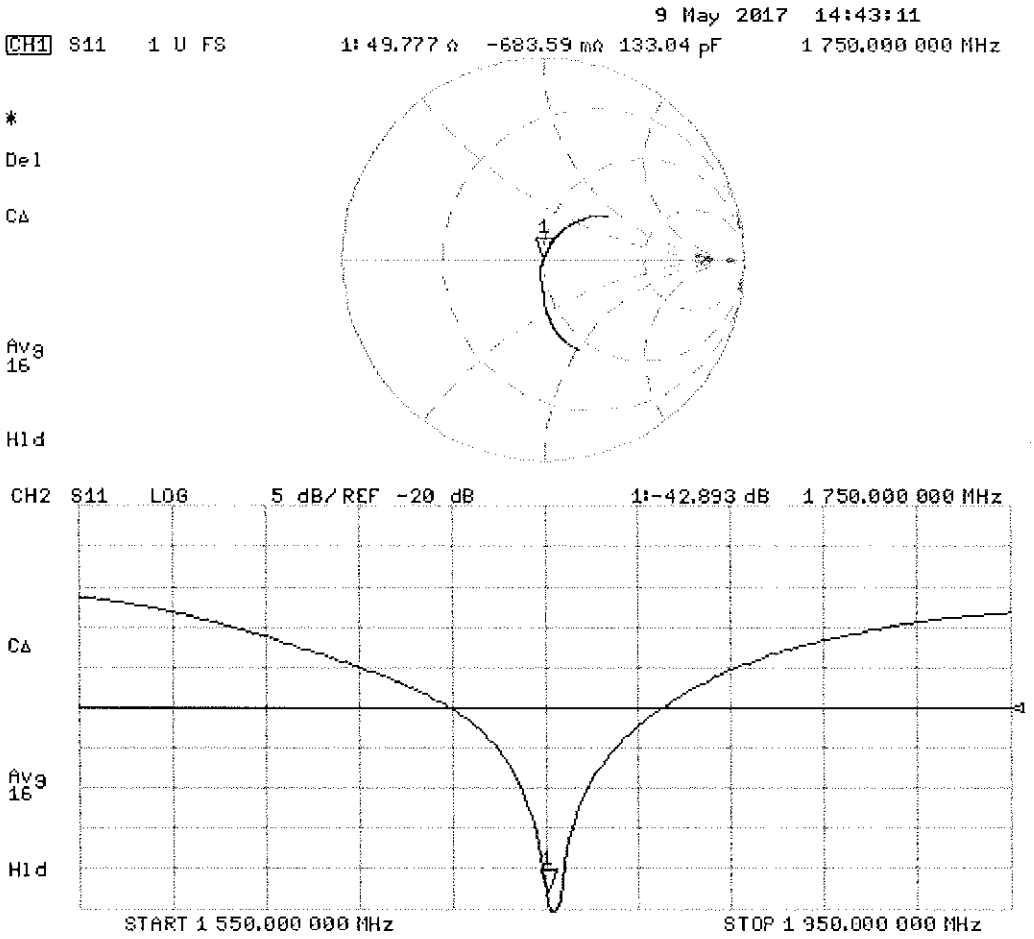
Dipole Calibration for Head Tissue/Pin=250 mW, d=10mm/Zoom Scan (7x7x7)/Cube 0:

Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 105.4 V/m; Power Drift = -0.01 dB
Peak SAR (extrapolated) = 16.5 W/kg
SAR(1 g) = 9.11 W/kg; SAR(10 g) = 4.83 W/kg
Maximum value of SAR (measured) = 13.9 W/kg



0 dB = 13.9 W/kg = 11.43 dBW/kg

Impedance Measurement Plot for Head TSL



DASY5 Validation Report for Body TSL

Date: 09.05.2017

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole 1750 MHz; Type: D1750V2; Serial: D1750V2 - SN:1148

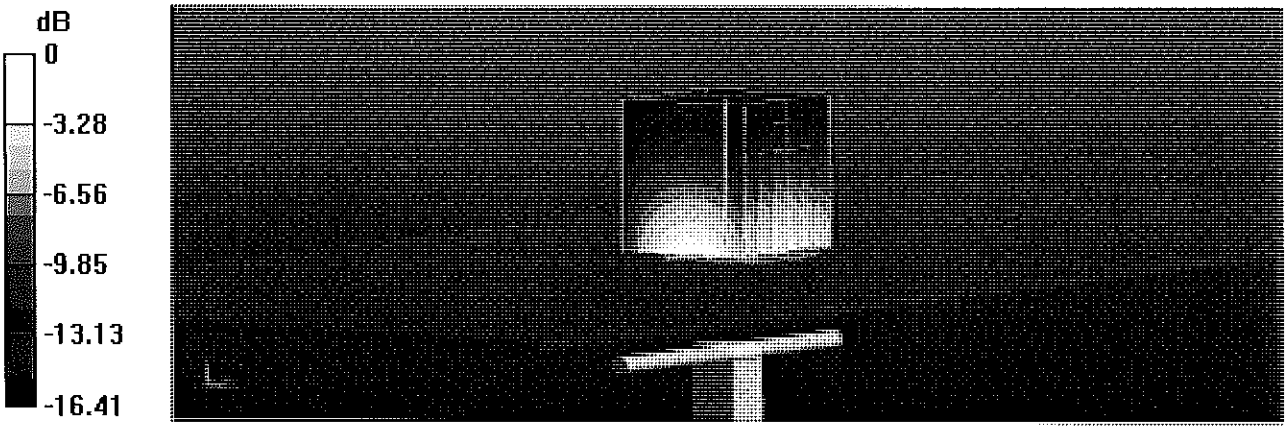
Communication System: UID 0 - CW; Frequency: 1750 MHz
Medium parameters used: f = 1750 MHz; σ = 1.47 S/m; ε_r = 53.7; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)

DASY52 Configuration:

- Probe: EX3DV4 - SN7349; ConvF(8.25, 8.25, 8.25); Calibrated: 31.12.2016;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 28.03.2017
- Phantom: Flat Phantom 5.0 (back); Type: QD 000 P50 AA; Serial: 1002
- DASY52 52.10.0(1442); SEMCAD X 14.6.10(7413)

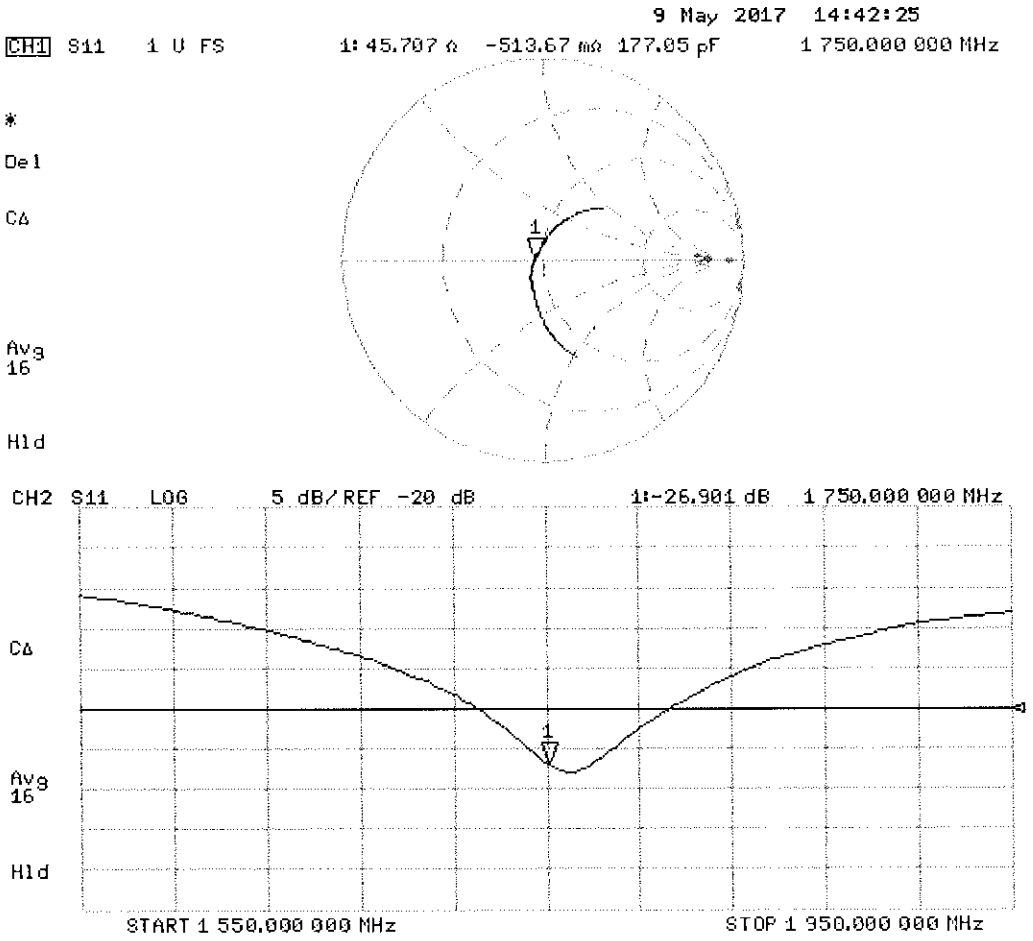
Dipole Calibration for Body Tissue/Pin=250 mW, d=10mm/Zoom Scan (7x7x7)/Cube 0:

Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 99.49 V/m; Power Drift = -0.04 dB
Peak SAR (extrapolated) = 15.9 W/kg
SAR(1 g) = 9.17 W/kg; SAR(10 g) = 4.93 W/kg
Maximum value of SAR (measured) = 13.1 W/kg



0 dB = 13.1 W/kg = 11.17 dBW/kg

Impedance Measurement Plot for Body TSL



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Accreditation No.: **SCS 0108**

Client **PC Test**

Certificate No: **D1900V2-5d148_Feb17**

CALIBRATION CERTIFICATE

Object D1900V2 - SN:5d148

Calibration procedure(s) QA CAL-05.v9
Calibration procedure for dipole validation kits above 700 MHz

BNV
03/06/2017

Calibration date: February 09, 2017

This calibration certificate documents the traceability to national standards, which realize the physical units of measurements (SI).
The measurements and the uncertainties with confidence probability are given on the following pages and are part of the certificate.

All calibrations have been conducted in the closed laboratory facility: environment temperature (22 ± 3)°C and humidity < 70%.

Calibration Equipment used (M&TE critical for calibration)

Primary Standards	ID #	Cal Date (Certificate No.)	Scheduled Calibration
Power meter NRP	SN: 104778	06-Apr-16 (No. 217-02288/02289)	Apr-17
Power sensor NRP-Z91	SN: 103244	06-Apr-16 (No. 217-02288)	Apr-17
Power sensor NRP-Z91	SN: 103245	06-Apr-16 (No. 217-02289)	Apr-17
Reference 20 dB Attenuator	SN: 5058 (20k)	05-Apr-16 (No. 217-02292)	Apr-17
Type-N mismatch combination	SN: 5047.2 / 06327	05-Apr-16 (No. 217-02295)	Apr-17
Reference Probe EX3DV4	SN: 7349	31-Dec-16 (No. EX3-7349_Dec16)	Dec-17
DAE4	SN: 601	04-Jan-17 (No. DAE4-601_Jan17)	Jan-18

Secondary Standards	ID #	Check Date (in house)	Scheduled Check
Power meter EPM-442A	SN: GB37480704	07-Oct-15 (in house check Oct-16)	In house check: Oct-18
Power sensor HP 8481A	SN: US37292783	07-Oct-15 (in house check Oct-16)	In house check: Oct-18
Power sensor HP 8481A	SN: MY41092317	07-Oct-15 (in house check Oct-16)	In house check: Oct-18
RF generator R&S SMT-06	SN: 100972	15-Jun-15 (in house check Oct-16)	In house check: Oct-18
Network Analyzer HP 8753E	SN: US37390585	18-Oct-01 (in house check Oct-16)	In house check: Oct-17

	Name	Function	Signature
Calibrated by:	Claudio Leubler	Laboratory Technician	
Approved by:	Katja Pokovic	Technical Manager	

Issued: February 10, 2017

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Accreditation No.: SCS 0108

Glossary:

TSL	tissue simulating liquid
ConvF	sensitivity in TSL / NORM x,y,z
N/A	not applicable or not measured

Calibration is Performed According to the Following Standards:

a) IEEE Std 1528-2013, "IEEE Recommended Practice for Determining the Peak Spatial-Averaged Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques", June 2013
b) IEC 62209-1, "Procedure to measure the Specific Absorption Rate (SAR) for hand-held devices used in close proximity to the ear (frequency range of 300 MHz to 3 GHz)", February 2005
c) IEC 62209-2, "Procedure to determine the Specific Absorption Rate (SAR) for wireless communication devices used in close proximity to the human body (frequency range of 30 MHz to 6 GHz)", March 2010
d) KDB 865664, "SAR Measurement Requirements for 100 MHz to 6 GHz"

Additional Documentation:

e) DASY4/5 System Handbook

Methods Applied and Interpretation of Parameters:

- *Measurement Conditions:* Further details are available from the Validation Report at the end of the certificate. All figures stated in the certificate are valid at the frequency indicated.
- *Antenna Parameters with TSL:* The dipole is mounted with the spacer to position its feed point exactly below the center marking of the flat phantom section, with the arms oriented parallel to the body axis.
- *Feed Point Impedance and Return Loss:* These parameters are measured with the dipole positioned under the liquid filled phantom. The impedance stated is transformed from the measurement at the SMA connector to the feed point. The Return Loss ensures low reflected power. No uncertainty required.
- *Electrical Delay:* One-way delay between the SMA connector and the antenna feed point. No uncertainty required.
- *SAR measured:* SAR measured at the stated antenna input power.
- *SAR normalized:* SAR as measured, normalized to an input power of 1 W at the antenna connector.
- *SAR for nominal TSL parameters:* The measured TSL parameters are used to calculate the nominal SAR result.

The reported uncertainty of measurement is stated as the standard uncertainty of measurement multiplied by the coverage factor k=2, which for a normal distribution corresponds to a coverage probability of approximately 95%.

Measurement Conditions

DASY system configuration, as far as not given on page 1.

DASY Version	DASY5	V52.8.8
Extrapolation	Advanced Extrapolation	
Phantom	Modular Flat Phantom	
Distance Dipole Center - TSL	10 mm	with Spacer
Zoom Scan Resolution	dx, dy, dz = 5 mm	
Frequency	1900 MHz ± 1 MHz	

Head TSL parameters

The following parameters and calculations were applied.

	Temperature	**Permittivity**	**Conductivity**
Nominal Head TSL parameters	22.0 °C	40.0	1.40 mho/m
Measured Head TSL parameters	(22.0 ± 0.2) °C	40.7 ± 6 %	1.38 mho/m ± 6 %
Head TSL temperature change during test	< 0.5 °C	----	----

SAR result with Head TSL

SAR averaged over 1 cm^3 (1 g) of Head TSL	Condition	
SAR measured	250 mW input power	9.93 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**40.2 W/kg ± 17.0 % (k=2)**

SAR averaged over 10 cm^3 (10 g) of Head TSL	condition	
SAR measured	250 mW input power	5.18 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**20.9 W/kg ± 16.5 % (k=2)**

Body TSL parameters

The following parameters and calculations were applied.

	Temperature	**Permittivity**	**Conductivity**
Nominal Body TSL parameters	22.0 °C	53.3	1.52 mho/m
Measured Body TSL parameters	(22.0 ± 0.2) °C	54.1 ± 6 %	1.50 mho/m ± 6 %
Body TSL temperature change during test	< 0.5 °C	----	----

SAR result with Body TSL

SAR averaged over 1 cm^3 (1 g) of Body TSL	Condition	
SAR measured	250 mW input power	10.1 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	**40.9 W/kg ± 17.0 % (k=2)**

SAR averaged over 10 cm^3 (10 g) of Body TSL	condition	
SAR measured	250 mW input power	5.33 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	**21.5 W/kg ± 16.5 % (k=2)**

Appendix (Additional assessments outside the scope of SCS 0108)

Antenna Parameters with Head TSL

Impedance, transformed to feed point	54.1 Ω + 5.8 jΩ
Return Loss	- 23.3 dB

Antenna Parameters with Body TSL

Impedance, transformed to feed point	48.3 Ω + 7.1 jΩ
Return Loss	- 22.6 dB

General Antenna Parameters and Design

Electrical Delay (one direction)	1.199 ns

After long term use with 100W radiated power, only a slight warming of the dipole near the feedpoint can be measured.

The dipole is made of standard semirigid coaxial cable. The center conductor of the feeding line is directly connected to the second arm of the dipole. The antenna is therefore short-circuited for DC-signals. On some of the dipoles, small end caps are added to the dipole arms in order to improve matching when loaded according to the position as explained in the "Measurement Conditions" paragraph. The SAR data are not affected by this change. The overall dipole length is still according to the Standard.
No excessive force must be applied to the dipole arms, because they might bend or the soldered connections near the feedpoint may be damaged.

Additional EUT Data

Manufactured by	SPEAG
Manufactured on	March 11, 2011

DASY5 Validation Report for Head TSL

Date: 09.02.2017

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole 1900 MHz; Type: D1900V2; Serial: D1900V2 - SN:5d148

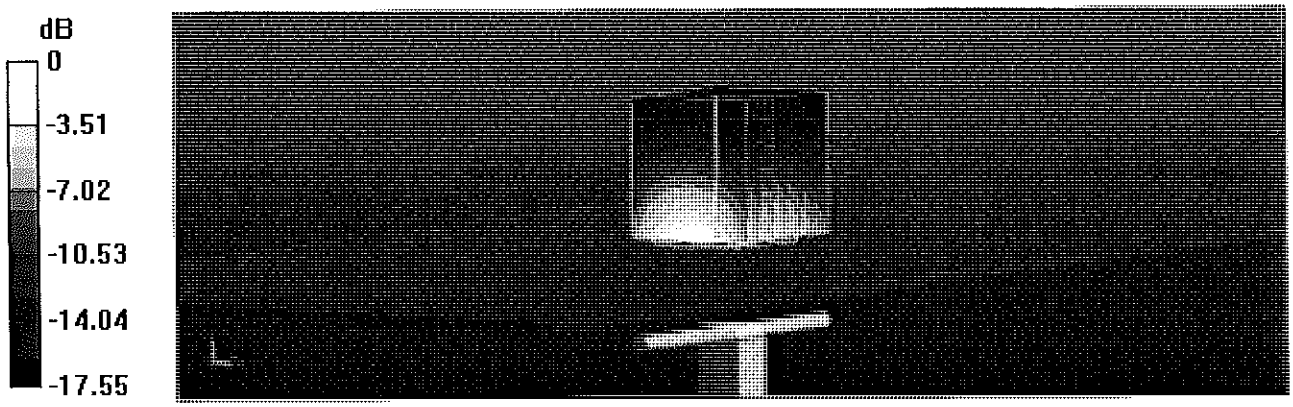
Communication System: UID 0 - CW; Frequency: 1900 MHz
Medium parameters used: f = 1900 MHz; σ = 1.38 S/m; ε_r = 40.7; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)

DASY52 Configuration:

- Probe: EX3DV4 - SN7349; ConvF(8.12, 8.12, 8.12); Calibrated: 31.12.2016;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 04.01.2017
- Phantom: Flat Phantom 5.0 (front); Type: QD 000 P50 AA; Serial: 1001
- DASY52 52.8.8(1258); SEMCAD X 14.6.10(7372)

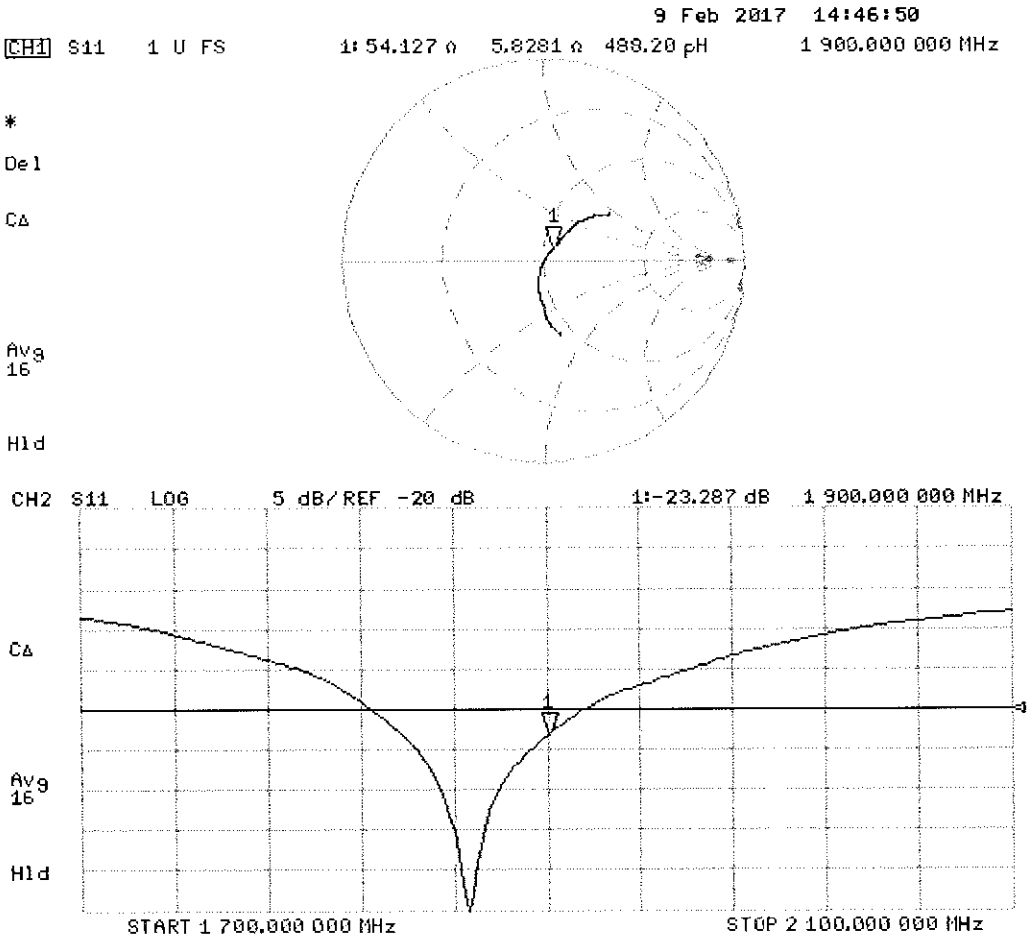
Dipole Calibration for Head Tissue/Pin=250 mW, d=10mm/Zoom Scan (7x7x7)/Cube 0:

Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 108.8 V/m; Power Drift = -0.02 dB
Peak SAR (extrapolated) = 19.2 W/kg
SAR(1 g) = 9.93 W/kg; SAR(10 g) = 5.18 W/kg
Maximum value of SAR (measured) = 15.6 W/kg



0 dB = 15.6 W/kg = 11.93 dBW/kg

Impedance Measurement Plot for Head TSL



DASY5 Validation Report for Body TSL

Date: 09.02.2017

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole 1900 MHz; Type: D1900V2; Serial: D1900V2 - SN:5d148

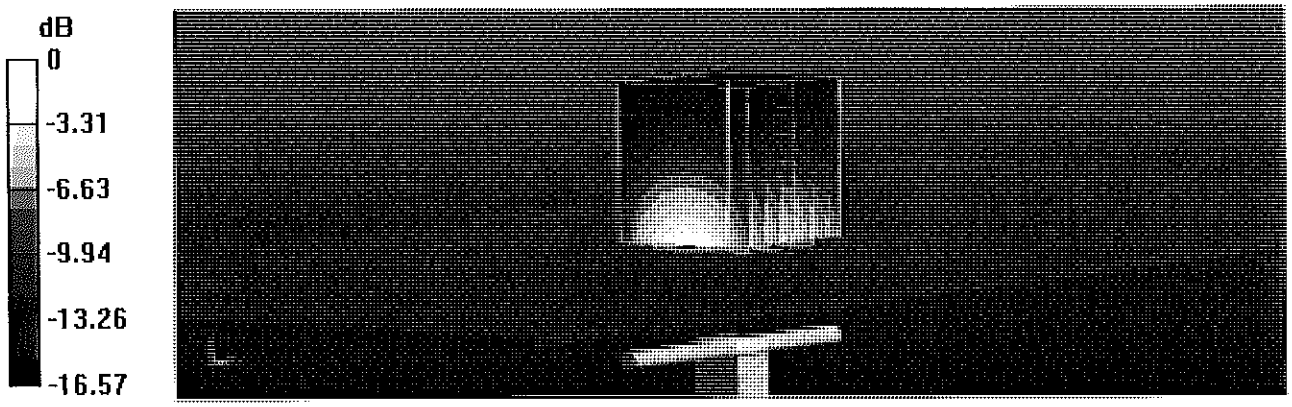
Communication System: UID 0 - CW; Frequency: 1900 MHz
Medium parameters used: f = 1900 MHz; σ = 1.5 S/m; ε_r = 54.1; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)

DASY52 Configuration:

- Probe: EX3DV4 - SN7349; ConvF(8.03, 8.03, 8.03); Calibrated: 31.12.2016;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 04.01.2017
- Phantom: Flat Phantom 5.0 (back); Type: QD 000 P50 AA; Serial: 1002
- DASY52 52.8.8(1258); SEMCAD X 14.6.10(7372)

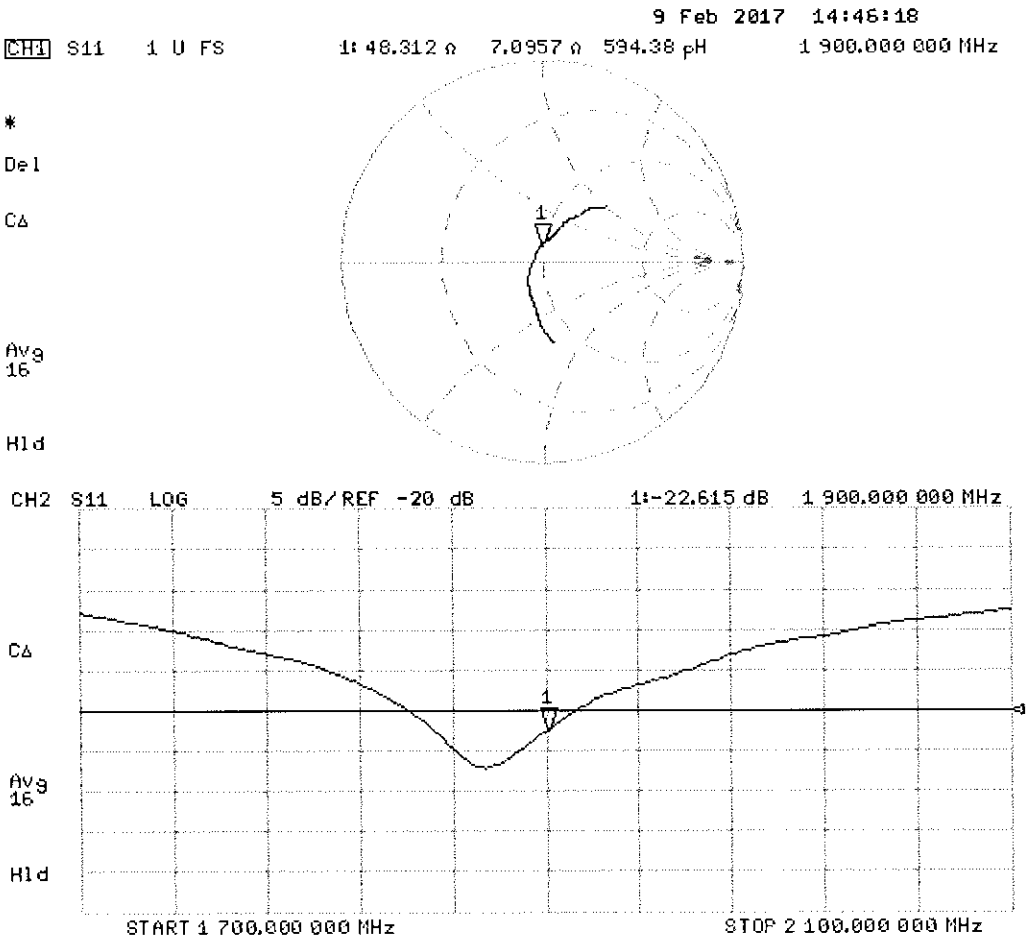
Dipole Calibration for Body Tissue/Pin=250 mW, d=10mm/Zoom Scan (7x7x7)/Cube 0:

Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 105.3 V/m; Power Drift = -0.02 dB
Peak SAR (extrapolated) = 18.1 W/kg
SAR(1 g) = 10.1 W/kg; SAR(10 g) = 5.33 W/kg
Maximum value of SAR (measured) = 15.3 W/kg



0 dB = 15.3 W/kg = 11.85 dBW/kg

Impedance Measurement Plot for Body TSL



Calibration Laboratory of
Schmid & Partner
Engineering AG
Zeughausstrasse 43, 8004 Zurich, Switzerland

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Accreditation No.: SCS 0108

Client PC Test

Certificate No: D2450V2-981_Jul16

CALIBRATION CERTIFICATE

Object: D2450V2 - SN:981

Calibration procedure(s): QA CAL-05.v9
Calibration procedure for dipole validation kits above 700 MHz

VPM 8/9/16 Extended 7/2017 SCU

Calibration date: July 25, 2016

This calibration certificate documents the traceability to national standards, which realize the physical units of measurements (SI).
The measurements and the uncertainties with confidence probability are given on the following pages and are part of the certificate.

All calibrations have been conducted in the closed laboratory facility: environment temperature (22 ± 3)°C and humidity < 70%.

Calibration Equipment used (M&TE critical for calibration)

Primary Standards	ID #	Cal Date (Certificate No.)	Scheduled Calibration
Power meter NRP	SN: 104778	06-Apr-16 (No. 217-02288/02289)	Apr-17
Power sensor NRP-Z91	SN: 103244	06-Apr-16 (No. 217-02288)	Apr-17
Power sensor NRP-Z91	SN: 103245	06-Apr-16 (No. 217-02289)	Apr-17
Reference 20 dB Attenuator	SN: 5058 (20k)	05-Apr-16 (No. 217-02292)	Apr-17
Type-N mismatch combination	SN: 5047.2 / 06327	05-Apr-16 (No. 217-02295)	Apr-17
Reference Probe EX3DV4	SN: 7349	15-Jun-16 (No. EX3-7349_Jun16)	Jun-17
DAE4	SN: 601	30-Dec-15 (No. DAE4-601_Dec15)	Dec-16

Secondary Standards	ID #	Check Date (in house)	Scheduled Check
Power meter EPM-442A	SN: GB37480704	07-Oct-15 (No. 217-02222)	In house check: Oct-16
Power sensor HP 8481A	SN: US37292783	07-Oct-15 (No. 217-02222)	In house check: Oct-16
Power sensor HP 8481A	SN: MY41092317	07-Oct-15 (No. 217-02223)	In house check: Oct-16
RF generator R&S SMT-06	SN: 100972	15-Jun-15 (in house check Jun-15)	In house check: Oct-16
Network Analyzer HP 8753E	SN: US37390585	18-Oct-01 (in house check Oct-15)	In house check: Oct-16

	Name	Function	Signature
Calibrated by:	Michael Weber	Laboratory Technician	
Approved by:	Katja Pokovic	Technical Manager	

Issued: July 27, 2016

This calibration certificate shall not be reproduced except in full without written approval of the laboratory.

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S Swiss Calibration Service

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Accreditation No.: SCS 0108

Glossary:

TSL	tissue simulating liquid
ConvF	sensitivity in TSL / NORM x,y,z
N/A	not applicable or not measured

Calibration is Performed According to the Following Standards:

a) IEEE Std 1528-2013, "IEEE Recommended Practice for Determining the Peak Spatial-Averaged Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques", June 2013
b) IEC 62209-1, "Procedure to measure the Specific Absorption Rate (SAR) for hand-held devices used in close proximity to the ear (frequency range of 300 MHz to 3 GHz)", February 2005
c) IEC 62209-2, "Procedure to determine the Specific Absorption Rate (SAR) for wireless communication devices used in close proximity to the human body (frequency range of 30 MHz to 6 GHz)", March 2010
d) KDB 865664, "SAR Measurement Requirements for 100 MHz to 6 GHz"

Additional Documentation:

e) DASY4/5 System Handbook

Methods Applied and Interpretation of Parameters:

- *Measurement Conditions:* Further details are available from the Validation Report at the end of the certificate. All figures stated in the certificate are valid at the frequency indicated.
- *Antenna Parameters with TSL:* The dipole is mounted with the spacer to position its feed point exactly below the center marking of the flat phantom section, with the arms oriented parallel to the body axis.
- *Feed Point Impedance and Return Loss:* These parameters are measured with the dipole positioned under the liquid filled phantom. The impedance stated is transformed from the measurement at the SMA connector to the feed point. The Return Loss ensures low reflected power. No uncertainty required.
- *Electrical Delay:* One-way delay between the SMA connector and the antenna feed point. No uncertainty required.
- *SAR measured:* SAR measured at the stated antenna input power.
- *SAR normalized:* SAR as measured, normalized to an input power of 1 W at the antenna connector.
- *SAR for nominal TSL parameters:* The measured TSL parameters are used to calculate the nominal SAR result.

The reported uncertainty of measurement is stated as the standard uncertainty of measurement multiplied by the coverage factor k=2, which for a normal distribution corresponds to a coverage probability of approximately 95%.

Measurement Conditions

DASY system configuration, as far as not given on page 1.

DASY Version	DASY5	V52.8.8
Extrapolation	Advanced Extrapolation	
Phantom	Modular Flat Phantom	
Distance Dipole Center - TSL	10 mm	with Spacer
Zoom Scan Resolution	dx, dy, dz = 5 mm	
Frequency	2450 MHz ± 1 MHz	

Head TSL parameters

The following parameters and calculations were applied.

	Temperature	**Permittivity**	**Conductivity**
Nominal Head TSL parameters	22.0 °C	39.2	1.80 mho/m
Measured Head TSL parameters	(22.0 ± 0.2) °C	38.0 ± 6 %	1.86 mho/m ± 6 %
Head TSL temperature change during test	< 0.5 °C	----	----

SAR result with Head TSL

SAR averaged over 1 cm^3 (1 g) of Head TSL	Condition	
SAR measured	250 mW input power	13.5 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**52.8 W/kg ± 17.0 % (k=2)**

SAR averaged over 10 cm^3 (10 g) of Head TSL	condition	
SAR measured	250 mW input power	6.26 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**24.7 W/kg ± 16.5 % (k=2)**

Body TSL parameters

The following parameters and calculations were applied.

	Temperature	**Permittivity**	**Conductivity**
Nominal Body TSL parameters	22.0 °C	52.7	1.95 mho/m
Measured Body TSL parameters	(22.0 ± 0.2) °C	51.8 ± 6 %	2.03 mho/m ± 6 %
Body TSL temperature change during test	< 0.5 °C	----	----

SAR result with Body TSL

SAR averaged over 1 cm^3 (1 g) of Body TSL	Condition	
SAR measured	250 mW input power	13.0 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	**50.8 W/kg ± 17.0 % (k=2)**

SAR averaged over 10 cm^3 (10 g) of Body TSL	condition	
SAR measured	250 mW input power	6.04 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	**23.8 W/kg ± 16.5 % (k=2)**

Appendix (Additional assessments outside the scope of SCS 0108)

Antenna Parameters with Head TSL

Impedance, transformed to feed point	53.2 Ω + 3.4 jΩ
Return Loss	- 26.9 dB

Antenna Parameters with Body TSL

Impedance, transformed to feed point	50.2 Ω + 4.5 jΩ
Return Loss	- 27.0 dB

General Antenna Parameters and Design

Electrical Delay (one direction)	1.162 ns

After long term use with 100W radiated power, only a slight warming of the dipole near the feedpoint can be measured.

The dipole is made of standard semirigid coaxial cable. The center conductor of the feeding line is directly connected to the second arm of the dipole. The antenna is therefore short-circuited for DC-signals. On some of the dipoles, small end caps are added to the dipole arms in order to improve matching when loaded according to the position as explained in the "Measurement Conditions" paragraph. The SAR data are not affected by this change. The overall dipole length is still according to the Standard.
No excessive force must be applied to the dipole arms, because they might bend or the soldered connections near the feedpoint may be damaged.

Additional EUT Data

Manufactured by	SPEAG
Manufactured on	December 30, 2014

DASY5 Validation Report for Head TSL

Date: 13.07.2016

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole 2450 MHz D2450V2; Type: D2450V2; Serial: D2450V2 - SN:981

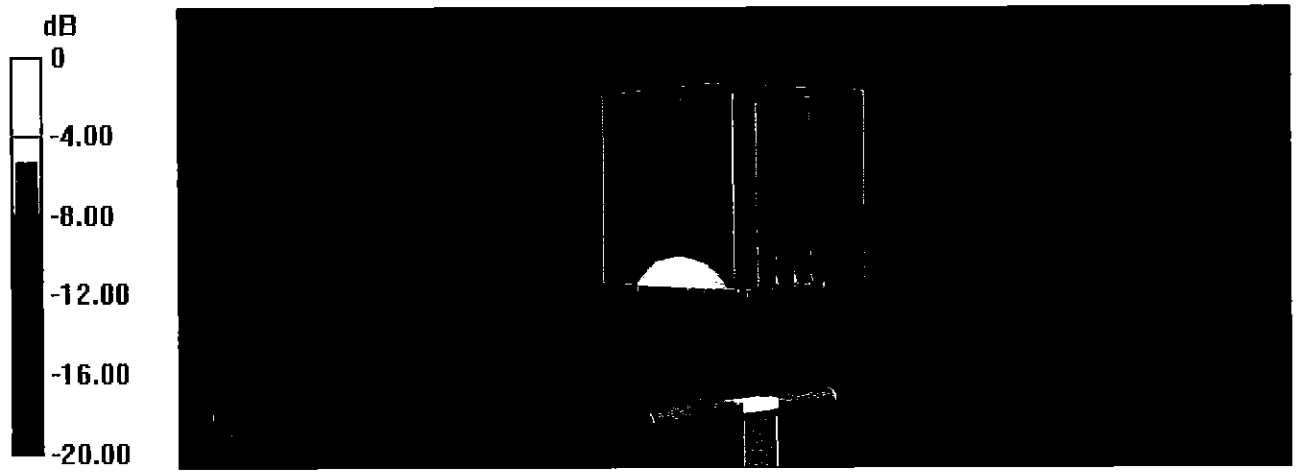
Communication System: UID 0 - CW; Frequency: 2450 MHz
Medium parameters used: f = 2450 MHz; σ = 1.86 S/m; ε_r = 38; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)

DASY52 Configuration:

- Probe: EX3DV4 - SN7349; ConvF(7.72, 7.72, 7.72); Calibrated: 15.06.2016;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 30.12.2015
- Phantom: Flat Phantom 5.0 (front); Type: QD000P50AA; Serial: 1001
- DASY52 52.8.8(1258); SEMCAD X 14.6.10(7372)

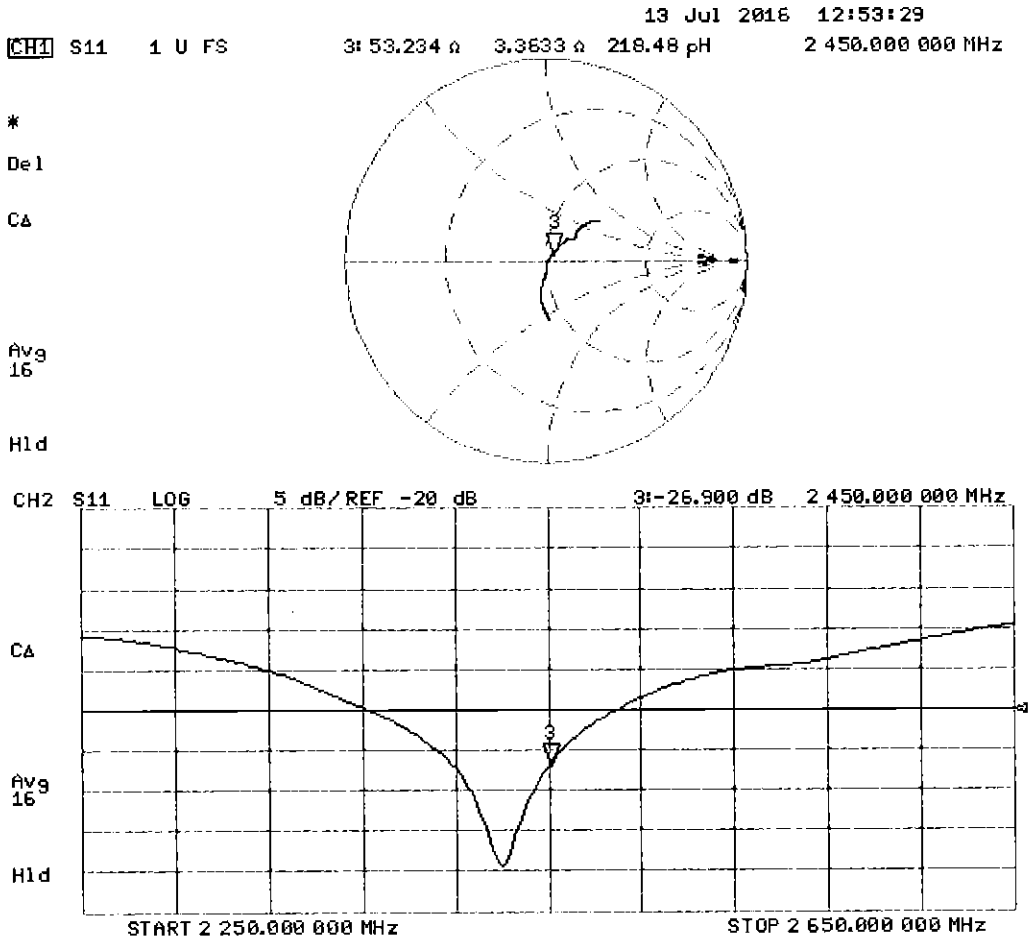
Dipole Calibration for Head Tissue/Pin=250 mW, d=10mm/Zoom Scan (7x7x7)/Cube 0:

Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 115.8 V/m; Power Drift = 0.02 dB
Peak SAR (extrapolated) = 27.4 W/kg
SAR(1 g) = 13.5 W/kg; SAR(10 g) = 6.26 W/kg
Maximum value of SAR (measured) = 22.5 W/kg



0 dB = 22.5 W/kg = 13.52 dBW/kg

Impedance Measurement Plot for Head TSL



DASY5 Validation Report for Body TSL

Date: 25.07.2016

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole 2450 MHz D2450V2; Type: D2450V2; Serial: D2450V2 - SN:981

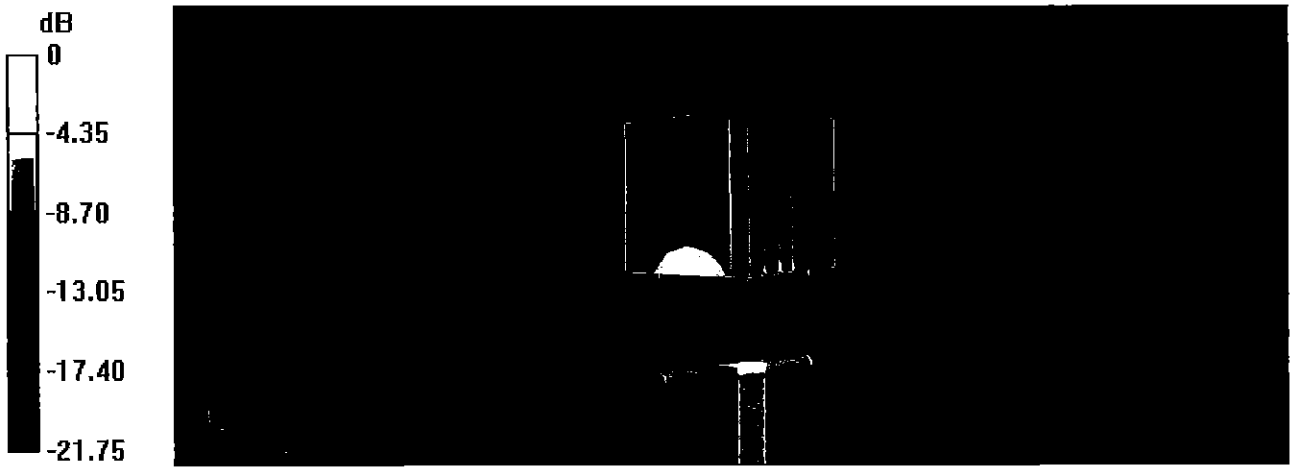
Communication System: UID 0 - CW; Frequency: 2450 MHz
Medium parameters used: f = 2450 MHz; σ = 2.03 S/m; ε_r = 51.8; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)

DASY52 Configuration:

- Probe: EX3DV4 - SN7349; ConvF(7.79, 7.79, 7.79); Calibrated: 15.06.2016;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 30.12.2015
- Phantom: Flat Phantom 5.0 (back); Type: QD000P50AA; Serial: 1002
- DASY52 52.8.8(1258); SEMCAD X 14.6.10(7372)

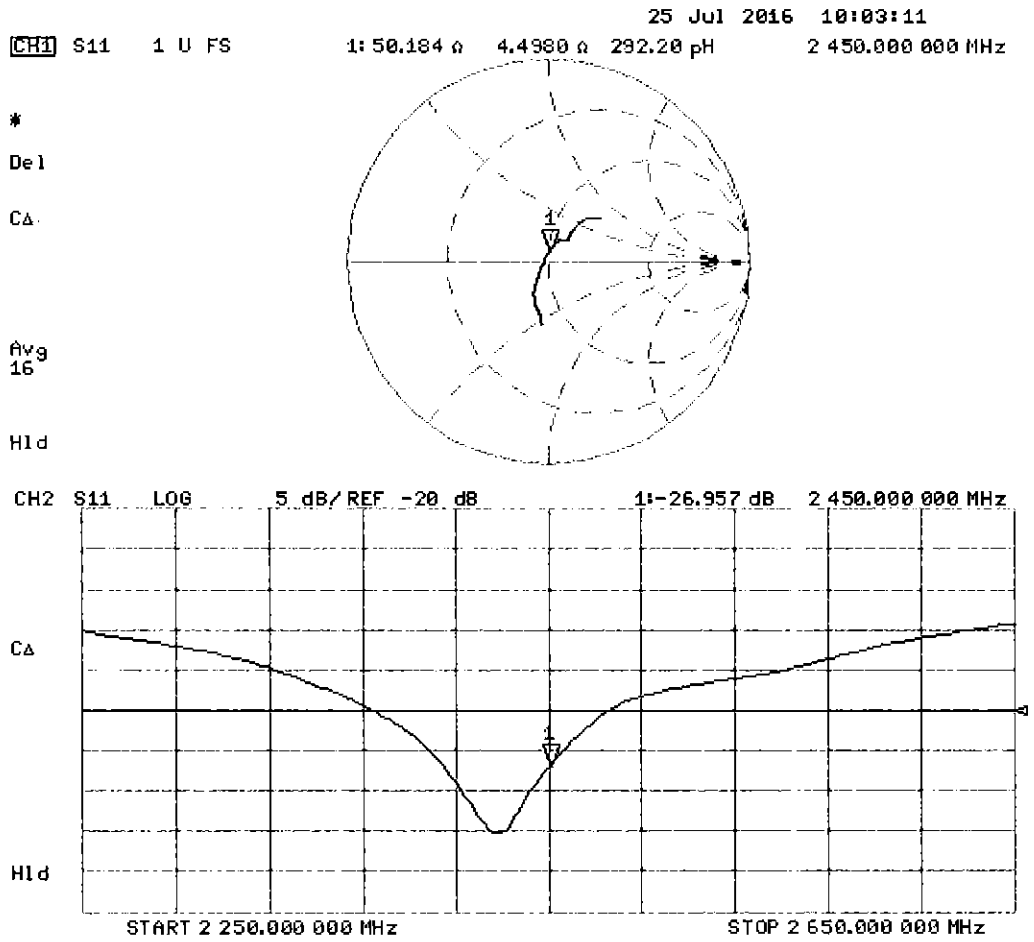
Dipole Calibration for Body Tissue/Pin=250 mW, d=10mm/Zoom Scan (7x7x7)/Cube 0:

Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 107.1 V/m; Power Drift = -0.02 dB
Peak SAR (extrapolated) = 26.0 W/kg
SAR(1 g) = 13 W/kg; SAR(10 g) = 6.04 W/kg
Maximum value of SAR (measured) = 21.4 W/kg



0 dB = 21.4 W/kg = 13.30 dBW/kg

Impedance Measurement Plot for Body TSL



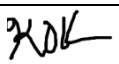
Certification of Calibration

Object	D2450V2 – SN: 981
Calibration procedure(s)	Procedure for Calibration Extension for SAR Dipoles.
Calibration date:	July 24, 2017
Description:	SAR Validation Dipole at 2450 MHz.

Calibration Equipment used:

Manufacturer	Model	Description	Cal Date	Cal Interval	Cal Due	Serial Number
Control Company	4040	Therm./Clock/Humidity Monitor	3/31/2017	Biennial	3/31/2019	170232394
Control Company	4352	Ultra Long Stem Thermometer	5/2/2017	Biennial	5/2/2019	170330156
Amplifier Research	15S1G6	Amplifier	CBT	N/A	CBT	433971
Narda	4772-3	Attenuator (3dB)	CBT	N/A	CBT	9406
Keysight	772D	Dual Directional Coupler	CBT	N/A	CBT	MY52180215
Keysight Technologies	85033E	Standard Mechanical Calibration Kit (DC to 9GHz, 3.5mm)	6/1/2017	Annual	6/1/2018	MY53401181
Agilent	8753ES	S-Parameter Network Analyzer	10/26/2016	Annual	10/26/2017	US39170118
Mini-Circuits	BW-N20W5+	DC to 18 GHz Precision Fixed 20 dB Attenuator	CBT	N/A	CBT	N/A
SPEAG	DAE4	Dasy Data Acquisition Electronics	9/14/2016	Annual	9/14/2017	1408
SPEAG	DAE4	Dasy Data Acquisition Electronics	2/9/2017	Annual	2/9/2018	1272
SPEAG	DAK-3.5	Dielectric Assessment Kit	5/10/2017	Annual	5/10/2018	1070
SPEAG	ES3DV3	SAR Probe	9/19/2016	Annual	9/19/2017	3287
SPEAG	ES3DV3	SAR Probe	2/10/2017	Annual	2/10/2018	3213
Anritsu	MA2411B	Pulse Power Sensor	2/10/2017	Annual	2/10/2018	1207364
Anritsu	MA2411B	Pulse Power Sensor	2/10/2017	Annual	2/10/2018	1339018
Anritsu	ML2495A	Power Meter	10/16/2015	Biennial	10/16/2017	941001
Agilent	N5182A	MXG Vector Signal Generator	2/28/2017	Annual	2/28/2018	MY47420800
Seekonk	NC-100	Torque Wrench	11/6/2015	Biennial	11/6/2017	N/A
Mini-Circuits	NLP-2950+	Low Pass Filter DC to 2700 MHz	CBT	N/A	CBT	N/A
Pasternack	PE2209-10	Bidirectional Coupler	CBT	N/A	CBT	N/A

Measurement Uncertainty = ±23% (k=2)

	Name	Function	Signature
Calibrated By:	Brodie Halbfoster	Test Engineer	
Approved By:	Kaitlin O'Keefe	Senior Technical Manager	

DIPOLE CALIBRATION EXTENSION

Per KDB 865664 D01, calibration intervals of up to three years may be considered for reference dipoles when it is demonstrated that the SAR target, impedance and return loss of a dipole have remained stable according to the following requirements:

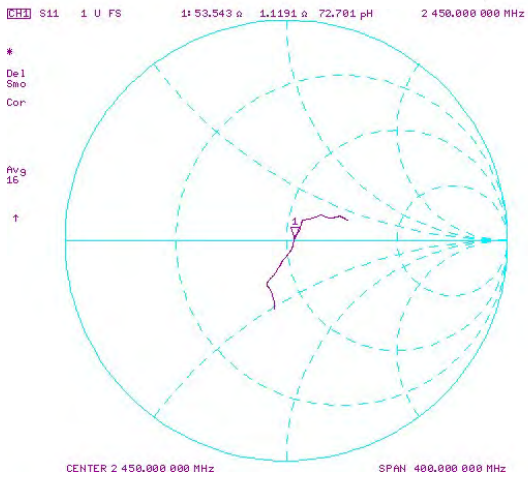
1. The measured SAR does not deviate more than 10% from the target on the calibration certificate.
2. The return-loss does not deviate more than 20% from the previous measurement and meets the required 20dB minimum return-loss requirement.
3. The measurement of real or imaginary parts of impedance does not deviate more than 5Ω from the previous measurement.

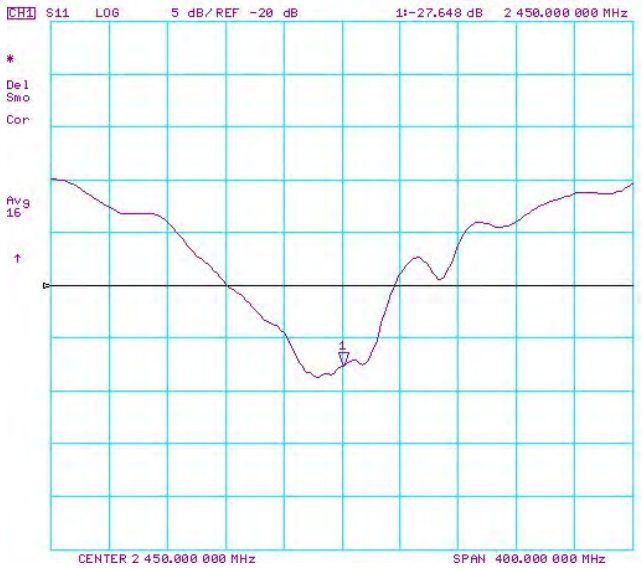
The following dipole was checked to pass the above 3 requirements to have 2-year calibration period from the calibration date:

Calibration Date	Extension Date	Certificate Electrical Delay (ns)	Certificate SAR Target Head (1g) W/kg @ 20.0 dBm	Measured Head SAR (1g) W/kg @ 20.0 dBm	Deviation 1g (%)	Certificate SAR Target Head (10g) W/kg @ 20.0 dBm	Measured Head SAR (10g) W/kg @ 20.0 dBm	Deviation 10g (%)	Certificate Impedance Head (Ohm) Real	Measured Impedance Head (Ohm) Real	Difference (Ohm) Real	Certificate Impedance Head (Ohm) Imaginary	Measured Impedance Head (Ohm) Imaginary	Difference (Ohm) Imaginary	Certificate Return Loss Head (dB)	Measured Return Loss Head (dB)	Deviation (%)	PASS/FAIL
7/25/2016	7/24/2017	1.162	5.28	5.57	5.49%	2.47	2.56	3.64%	53.2	53.5	0.3	3.4	1.1	2.3	-26.9	-27.6	-2.60%	PASS

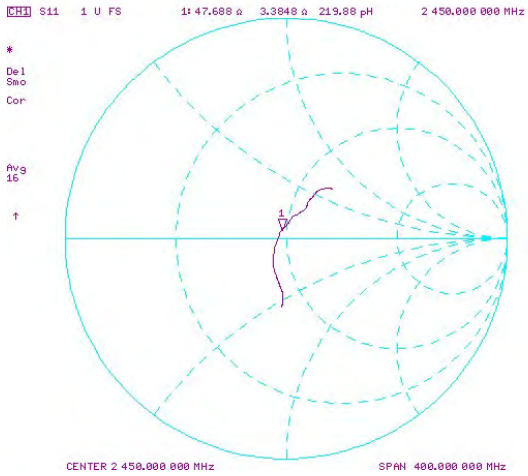
Calibration Date	Extension Date	Certificate Electrical Delay (ns)	Certificate SAR Target Body (1g) W/kg @ 20.0 dBm	Measured Body SAR (1g) W/kg @ 20.0 dBm	Deviation 1g (%)	Certificate SAR Target Body (10g) W/kg @ 20.0 dBm	Measured Body SAR (10g) W/kg @ 20.0 dBm	Deviation 10g (%)	Certificate Impedance Body (Ohm) Real	Measured Impedance Body (Ohm) Real	Difference (Ohm) Real	Certificate Impedance Body (Ohm) Imaginary	Measured Impedance Body (Ohm) Imaginary	Difference (Ohm) Imaginary	Certificate Return Loss Body (dB)	Measured Return Loss Body (dB)	Deviation (%)	PASS/FAIL
7/25/2016	7/24/2017	1.162	5.08	5.34	5.12%	2.38	2.39	0.42%	50.2	47.7	2.5	4.5	3.4	1.1	-27.0	-27.6	-2.20%	PASS

Impedance & Return-Loss Measurement Plot for Head TSL





Impedance & Return-Loss Measurement Plot for Body TSL





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Accreditation No.: **SCS 0108**

Client **PC Test**

Certificate No: **D2600V2-1126_Jul17**

CALIBRATION CERTIFICATE

Object D2600V2 - SN:1126

BNV 8/3/2017

Calibration procedure(s) QA CAL-05.v9
Calibration procedure for dipole validation kits above 700 MHz

Calibration date: July 10, 2017

This calibration certificate documents the traceability to national standards, which realize the physical units of measurements (SI).
The measurements and the uncertainties with confidence probability are given on the following pages and are part of the certificate.

All calibrations have been conducted in the closed laboratory facility: environment temperature (22 ± 3)°C and humidity < 70%.

Calibration Equipment used (M&TE critical for calibration)

Primary Standards	ID #	Cal Date (Certificate No.)	Scheduled Calibration
Power meter NRP	SN: 104778	04-Apr-17 (No. 217-02521/02522)	Apr-18
Power sensor NRP-Z91	SN: 103244	04-Apr-17 (No. 217-02521)	Apr-18
Power sensor NRP-Z91	SN: 103245	04-Apr-17 (No. 217-02522)	Apr-18
Reference 20 dB Attenuator	SN: 5058 (20k)	07-Apr-17 (No. 217-02528)	Apr-18
Type-N mismatch combination	SN: 5047.2 / 06327	07-Apr-17 (No. 217-02529)	Apr-18
Reference Probe EX3DV4	SN: 7349	31-May-17 (No. EX3-7349_May17)	May-18
DAE4	SN: 601	28-Mar-17 (No. DAE4-601_Mar17)	Mar-18

Secondary Standards	ID #	Check Date (in house)	Scheduled Check
Power meter EPM-442A	SN: GB37480704	07-Oct-15 (in house check Oct-16)	In house check: Oct-18
Power sensor HP 8481A	SN: US37292783	07-Oct-15 (in house check Oct-16)	In house check: Oct-18
Power sensor HP 8481A	SN: MY41092317	07-Oct-15 (in house check Oct-16)	In house check: Oct-18
RF generator R&S SMT-06	SN: 100972	15-Jun-15 (in house check Oct-16)	In house check: Oct-18
Network Analyzer HP 8753E	SN: US37390585	18-Oct-01 (in house check Oct-16)	In house check: Oct-17

	Name	Function	Signature
Calibrated by:	Jeton Kastrati	Laboratory Technician	
Approved by:	Katja Pokovic	Technical Manager	

Issued: July 11, 2017

This calibration certificate shall not be reproduced except in full without written approval of the laboratory.

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Accreditation No.: **SCS 0108**

Glossary:

TSL	tissue simulating liquid
ConvF	sensitivity in TSL / NORM x,y,z
N/A	not applicable or not measured

Calibration is Performed According to the Following Standards:

a) IEEE Std 1528-2013, "IEEE Recommended Practice for Determining the Peak Spatial-Averaged Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques", June 2013
b) IEC 62209-1, "Measurement procedure for the assessment of Specific Absorption Rate (SAR) from hand-held and body-mounted devices used next to the ear (frequency range of 300 MHz to 6 GHz)", July 2016
c) IEC 62209-2, "Procedure to determine the Specific Absorption Rate (SAR) for wireless communication devices used in close proximity to the human body (frequency range of 30 MHz to 6 GHz)", March 2010
d) KDB 865664, "SAR Measurement Requirements for 100 MHz to 6 GHz"

Additional Documentation:

e) DASY4/5 System Handbook

Methods Applied and Interpretation of Parameters:

- *Measurement Conditions:* Further details are available from the Validation Report at the end of the certificate. All figures stated in the certificate are valid at the frequency indicated.
- *Antenna Parameters with TSL:* The dipole is mounted with the spacer to position its feed point exactly below the center marking of the flat phantom section, with the arms oriented parallel to the body axis.
- *Feed Point Impedance and Return Loss:* These parameters are measured with the dipole positioned under the liquid filled phantom. The impedance stated is transformed from the measurement at the SMA connector to the feed point. The Return Loss ensures low reflected power. No uncertainty required.
- *Electrical Delay:* One-way delay between the SMA connector and the antenna feed point. No uncertainty required.
- *SAR measured:* SAR measured at the stated antenna input power.
- *SAR normalized:* SAR as measured, normalized to an input power of 1 W at the antenna connector.
- *SAR for nominal TSL parameters:* The measured TSL parameters are used to calculate the nominal SAR result.

The reported uncertainty of measurement is stated as the standard uncertainty of measurement multiplied by the coverage factor k=2, which for a normal distribution corresponds to a coverage probability of approximately 95%.

Measurement Conditions

DASY system configuration, as far as not given on page 1.

DASY Version	DASY5	V52.10.0
Extrapolation	Advanced Extrapolation	
Phantom	Modular Flat Phantom	
Distance Dipole Center - TSL	10 mm	with Spacer
Zoom Scan Resolution	dx, dy, dz = 5 mm	
Frequency	2600 MHz ± 1 MHz	

Head TSL parameters

The following parameters and calculations were applied.

	Temperature	**Permittivity**	**Conductivity**
Nominal Head TSL parameters	22.0 °C	39.0	1.96 mho/m
Measured Head TSL parameters	(22.0 ± 0.2) °C	37.2 ± 6 %	2.04 mho/m ± 6 %
Head TSL temperature change during test	< 0.5 °C	----	----

SAR result with Head TSL

SAR averaged over 1 cm^3 (1 g) of Head TSL	Condition	
SAR measured	250 mW input power	14.5 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**56.4 W/kg ± 17.0 % (k=2)**

SAR averaged over 10 cm^3 (10 g) of Head TSL	condition	
SAR measured	250 mW input power	6.40 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**25.2 W/kg ± 16.5 % (k=2)**

Body TSL parameters

The following parameters and calculations were applied.

	Temperature	**Permittivity**	**Conductivity**
Nominal Body TSL parameters	22.0 °C	52.5	2.16 mho/m
Measured Body TSL parameters	(22.0 ± 0.2) °C	51.6 ± 6 %	2.22 mho/m ± 6 %
Body TSL temperature change during test	< 0.5 °C	----	----

SAR result with Body TSL

SAR averaged over 1 cm^3 (1 g) of Body TSL	Condition	
SAR measured	250 mW input power	13.8 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	**54.3 W/kg ± 17.0 % (k=2)**

SAR averaged over 10 cm^3 (10 g) of Body TSL	condition	
SAR measured	250 mW input power	6.16 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	**24.4 W/kg ± 16.5 % (k=2)**

Appendix (Additional assessments outside the scope of SCS 0108)

Antenna Parameters with Head TSL

Impedance, transformed to feed point	47.8 Ω - 7.7 jΩ
Return Loss	- 21.8 dB

Antenna Parameters with Body TSL

Impedance, transformed to feed point	44.8 Ω - 5.8 jΩ
Return Loss	- 21.7 dB

General Antenna Parameters and Design

Electrical Delay (one direction)	1.154 ns

After long term use with 100W radiated power, only a slight warming of the dipole near the feedpoint can be measured.

The dipole is made of standard semirigid coaxial cable. The center conductor of the feeding line is directly connected to the second arm of the dipole. The antenna is therefore short-circuited for DC-signals. On some of the dipoles, small end caps are added to the dipole arms in order to improve matching when loaded according to the position as explained in the "Measurement Conditions" paragraph. The SAR data are not affected by this change. The overall dipole length is still according to the Standard.
No excessive force must be applied to the dipole arms, because they might bend or the soldered connections near the feedpoint may be damaged.

Additional EUT Data

Manufactured by	SPEAG
Manufactured on	October 22, 2015

DASY5 Validation Report for Head TSL

Date: 10.07.2017

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole 2600 MHz; Type: D2600V2; Serial: D2600V2 - SN:1126

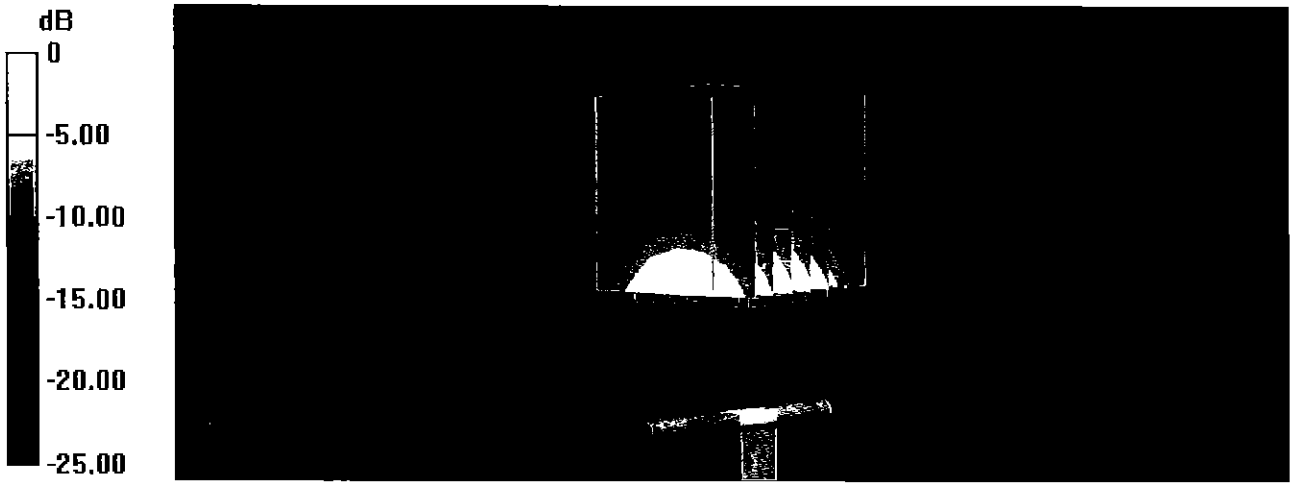
Communication System: UID 0 - CW; Frequency: 2600 MHz
Medium parameters used: f = 2600 MHz; σ = 2.04 S/m; ε_r = 37.2; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)

DASY52 Configuration:

- Probe: EX3DV4 - SN7349; ConvF(7.96, 7.96, 7.96); Calibrated: 31.05.2017;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 28.03.2017
- Phantom: Flat Phantom 5.0 (front); Type: QD 000 P50 AA; Serial: 1001
- DASY52 52.10.0(1446); SEMCAD X 14.6.10(7417)

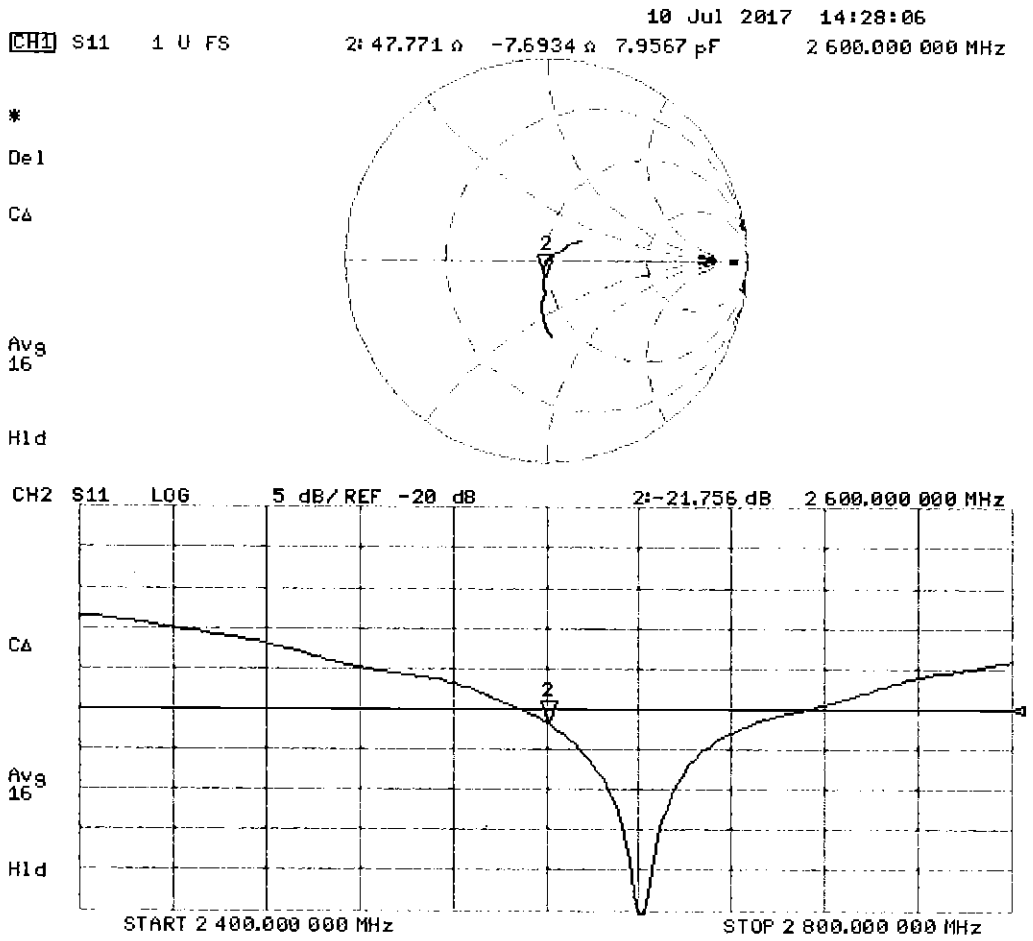
Dipole Calibration for Head Tissue/Pin=250 mW, d=10mm/Zoom Scan (7x7x7)/Cube 0:

Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 113.2 V/m; Power Drift = -0.06 dB
Peak SAR (extrapolated) = 31.3 W/kg
SAR(1 g) = 14.5 W/kg; SAR(10 g) = 6.4 W/kg
Maximum value of SAR (measured) = 24.0 W/kg



0 dB = 24.0 W/kg = 13.80 dBW/kg

Impedance Measurement Plot for Head TSL



DASY5 Validation Report for Body TSL

Date: 10.07.2017

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole 2600 MHz; Type: D2600V2; Serial: D2600V2 - SN:1126

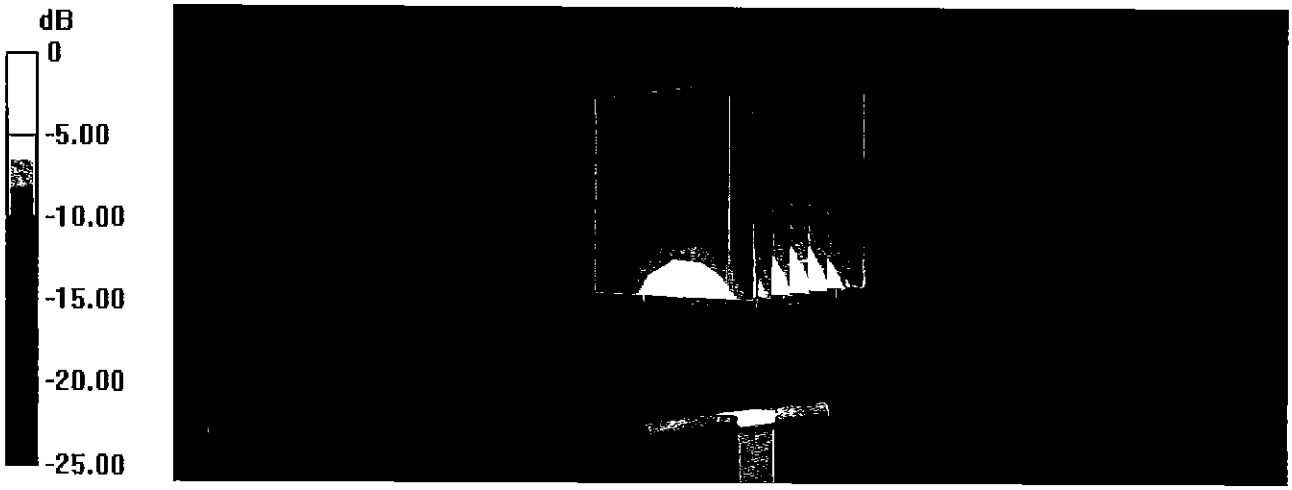
Communication System: UID 0 - CW; Frequency: 2600 MHz
Medium parameters used: f = 2600 MHz; σ = 2.22 S/m; ε_r = 51.6; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)

DASY52 Configuration:

- Probe: EX3DV4 - SN7349; ConvF(7.94, 7.94, 7.94); Calibrated: 31.05.2017;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 28.03.2017
- Phantom: Flat Phantom 5.0 (back); Type: QD 000 P50 AA; Serial: 1002
- DASY52 52.10.0(1446); SEMCAD X 14.6.10(7417)

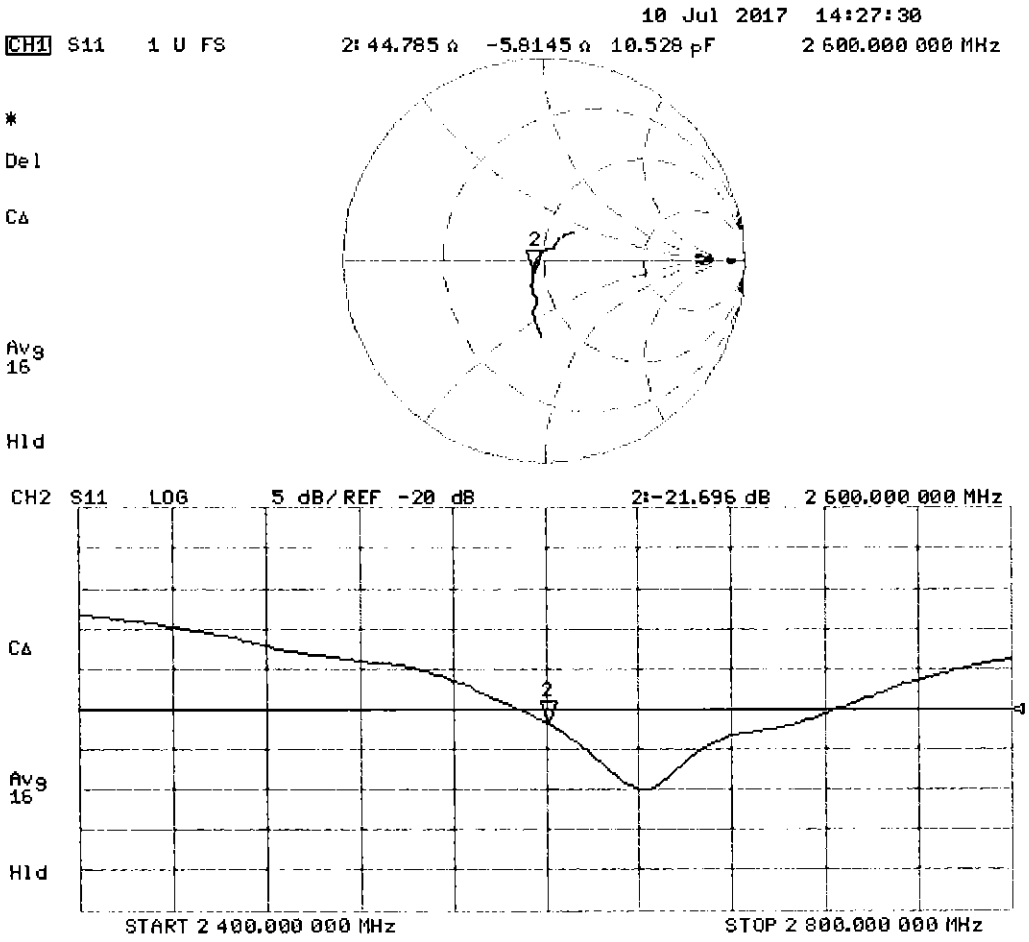
Dipole Calibration for Body Tissue/Pin=250 mW, d=10mm/Zoom Scan (7x7x7)/Cube 0:

Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 103.8 V/m; Power Drift = -0.03 dB
Peak SAR (extrapolated) = 28.9 W/kg
SAR(1 g) = 13.8 W/kg; SAR(10 g) = 6.16 W/kg
Maximum value of SAR (measured) = 22.2 W/kg



0 dB = 22.2 W/kg = 13.46 dBW/kg

Impedance Measurement Plot for Body TSL



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Accreditation No.: SCS 0108

Client **PC Test**

Certificate No: D5GHzV2-1057_Jan17

CALIBRATION CERTIFICATE

Object D5GHzV2 - SN:1057

Calibration procedure(s) QA CAL-22.v2
Calibration procedure for dipole validation kits between 3-6 GHz

BNV 01-26-2017

Calibration date: January 20, 2017

This calibration certificate documents the traceability to national standards, which realize the physical units of measurements (SI).
The measurements and the uncertainties with confidence probability are given on the following pages and are part of the certificate.

All calibrations have been conducted in the closed laboratory facility: environment temperature (22 ± 3)°C and humidity < 70%.

Calibration Equipment used (M&TE critical for calibration)

Primary Standards	ID #	Cal Date (Certificate No.)	Scheduled Calibration
Power meter NRP	SN: 104778	06-Apr-16 (No. 217-02288/02289)	Apr-17
Power sensor NRP-Z91	SN: 103244	06-Apr-16 (No. 217-02288)	Apr-17
Power sensor NRP-Z91	SN: 103245	06-Apr-16 (No. 217-02289)	Apr-17
Reference 20 dB Attenuator	SN: 5058 (20k)	05-Apr-16 (No. 217-02292)	Apr-17
Type-N mismatch combination	SN: 5047.2 / 06327	05-Apr-16 (No. 217-02295)	Apr-17
Reference Probe EX3DV4	SN: 3503	31-Dec-16 (No. EX3-3503_Dec16)	Dec-17
DAE4	SN: 601	04-Jan-17 (No. DAE4-601_Jan17)	Jan-18

Secondary Standards	ID #	Check Date (in house)	Scheduled Check
Power meter EPM-442A	SN: GB37480704	07-Oct-16 (No. 217-02222)	In house check: Oct-18
Power sensor HP 8481A	SN: US37292783	07-Oct-16 (No. 217-02222)	In house check: Oct-18
Power sensor HP 8481A	SN: MY41092317	07-Oct-16 (No. 217-02223)	In house check: Oct-18
RF generator R&S SMT-06	SN: 100972	15-Jun-15 (in house check Oct-16)	In house check: Oct-18
Network Analyzer HP 8753E	SN: US37390585	18-Oct-01 (in house check Oct-16)	In house check: Oct-17

	Name	Function	Signature
Calibrated by:	Jeton Kastrati	Laboratory Technician	
Approved by:	Katja Pokovic	Technical Manager	

Issued: January 23, 2017

This calibration certificate shall not be reproduced except in full without written approval of the laboratory.

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Accreditation No.: SCS 0108

Glossary:

TSL	tissue simulating liquid
ConvF	sensitivity in TSL / NORM x,y,z
N/A	not applicable or not measured

Calibration is Performed According to the Following Standards:

a) IEEE Std 1528-2013, "IEEE Recommended Practice for Determining the Peak Spatial-Averaged Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques", June 2013
b) IEC 62209-2, "Procedure to determine the Specific Absorption Rate (SAR) for wireless communication devices used in close proximity to the human body (frequency range of 30 MHz to 6 GHz)", March 2010
c) KDB 865664, "SAR Measurement Requirements for 100 MHz to 6 GHz"

Additional Documentation:

d) DASY4/5 System Handbook

Methods Applied and Interpretation of Parameters:

- *Measurement Conditions:* Further details are available from the Validation Report at the end of the certificate. All figures stated in the certificate are valid at the frequency indicated.
- *Antenna Parameters with TSL:* The dipole is mounted with the spacer to position its feed point exactly below the center marking of the flat phantom section, with the arms oriented parallel to the body axis.
- *Feed Point Impedance and Return Loss:* These parameters are measured with the dipole positioned under the liquid filled phantom. The impedance stated is transformed from the measurement at the SMA connector to the feed point. The Return Loss ensures low reflected power. No uncertainty required.
- *Electrical Delay:* One-way delay between the SMA connector and the antenna feed point. No uncertainty required.
- *SAR measured:* SAR measured at the stated antenna input power.
- *SAR normalized:* SAR as measured, normalized to an input power of 1 W at the antenna connector.
- *SAR for nominal TSL parameters:* The measured TSL parameters are used to calculate the nominal SAR result.

The reported uncertainty of measurement is stated as the standard uncertainty of measurement multiplied by the coverage factor k=2, which for a normal distribution corresponds to a coverage probability of approximately 95%.

Measurement Conditions

DASY system configuration, as far as not given on page 1.

DASY Version	DASY5	V52.8.8
Extrapolation	Advanced Extrapolation	
Phantom	Modular Flat Phantom V5.0	
Distance Dipole Center - TSL	10 mm	with Spacer
Zoom Scan Resolution	dx, dy = 4.0 mm, dz = 1.4 mm	Graded Ratio = 1.4 (Z direction)
Frequency	5250 MHz ± 1 MHz 5600 MHz ± 1 MHz 5750 MHz ± 1 MHz	

Head TSL parameters at 5250 MHz

The following parameters and calculations were applied.

	Temperature	**Permittivity**	**Conductivity**
Nominal Head TSL parameters	22.0 °C	35.9	4.71 mho/m
Measured Head TSL parameters	(22.0 ± 0.2) °C	35.3 ± 6 %	4.50 mho/m ± 6 %
Head TSL temperature change during test	< 0.5 °C	----	----

SAR result with Head TSL at 5250 MHz

SAR averaged over 1 cm^3 (1 g) of Head TSL	Condition	
SAR measured	100 mW input power	8.20 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**81.6 W/kg ± 19.9 % (k=2)**

SAR averaged over 10 cm^3 (10 g) of Head TSL	condition	
SAR measured	100 mW input power	2.36 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**23.4 W/kg ± 19.5 % (k=2)**

Head TSL parameters at 5600 MHz

The following parameters and calculations were applied.

	Temperature	**Permittivity**	**Conductivity**
Nominal Head TSL parameters	22.0 °C	35.5	5.07 mho/m
Measured Head TSL parameters	(22.0 ± 0.2) °C	34.7 ± 6 %	4.85 mho/m ± 6 %
Head TSL temperature change during test	< 0.5 °C	----	----

SAR result with Head TSL at 5600 MHz

SAR averaged over 1 cm^3 (1 g) of Head TSL	Condition	
SAR measured	100 mW input power	8.43 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**83.7 W/kg ± 19.9 % (k=2)**

SAR averaged over 10 cm^3 (10 g) of Head TSL	condition	
SAR measured	100 mW input power	2.40 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**23.8 W/kg ± 19.5 % (k=2)**

Head TSL parameters at 5750 MHz

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Head TSL parameters	22.0 °C	35.4	5.22 mho/m
Measured Head TSL parameters	(22.0 ± 0.2) °C	34.5 ± 6 %	4.99 mho/m ± 6 %
Head TSL temperature change during test	< 0.5 °C	----	----

SAR result with Head TSL at 5750 MHz

SAR averaged over 1 cm^3 (1 g) of Head TSL	Condition	
SAR measured	100 mW input power	8.06 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**80.0 W/kg ± 19.9 % (k=2)**

SAR averaged over 10 cm^3 (10 g) of Head TSL	condition	
SAR measured	100 mW input power	2.28 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**22.6 W/kg ± 19.5 % (k=2)**

Body TSL parameters at 5250 MHz

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Body TSL parameters	22.0 °C	48.9	5.36 mho/m
Measured Body TSL parameters	(22.0 ± 0.2) °C	47.4 ± 6 %	5.43 mho/m ± 6 %
Body TSL temperature change during test	< 0.5 °C	----	----

SAR result with Body TSL at 5250 MHz

SAR averaged over 1 cm^3 (1 g) of Body TSL	Condition	
SAR measured	100 mW input power	7.50 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	**74.6 W/kg ± 19.9 % (k=2)**

SAR averaged over 10 cm^3 (10 g) of Body TSL	condition	
SAR measured	100 mW input power	2.09 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	**20.7 W/kg ± 19.5 % (k=2)**

Body TSL parameters at 5600 MHz

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Body TSL parameters	22.0 °C	48.5	5.77 mho/m
Measured Body TSL parameters	(22.0 ± 0.2) °C	46.6 ± 6 %	5.90 mho/m ± 6 %
Body TSL temperature change during test	< 0.5 °C	----	----

SAR result with Body TSL at 5600 MHz

SAR averaged over 1 cm^3 (1 g) of Body TSL	Condition	
SAR measured	100 mW input power	7.95 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	**78.9 W/kg ± 19.9 % (k=2)**

SAR averaged over 10 cm^3 (10 g) of Body TSL	condition	
SAR measured	100 mW input power	2.22 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	**22.0 W/kg ± 19.5 % (k=2)**

Body TSL parameters at 5750 MHz

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Body TSL parameters	22.0 °C	48.3	5.94 mho/m
Measured Body TSL parameters	(22.0 ± 0.2) °C	46.4 ± 6 %	6.10 mho/m ± 6 %
Body TSL temperature change during test	< 0.5 °C	----	----

SAR result with Body TSL at 5750 MHz

SAR averaged over 1 cm^3 (1 g) of Body TSL	Condition	
SAR measured	100 mW input power	7.60 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	**75.5 W/kg ± 19.9 % (k=2)**

SAR averaged over 10 cm^3 (10 g) of Body TSL	condition	
SAR measured	100 mW input power	2.11 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	**20.9 W/kg ± 19.5 % (k=2)**

Appendix (Additional assessments outside the scope of SCS 0108)

Antenna Parameters with Head TSL at 5250 MHz

Impedance, transformed to feed point	50.1 Ω - 5.1 jΩ
Return Loss	- 25.8 dB

Antenna Parameters with Head TSL at 5600 MHz

Impedance, transformed to feed point	54.9 Ω - 0.7 jΩ
Return Loss	- 26.6 dB

Antenna Parameters with Head TSL at 5750 MHz

Impedance, transformed to feed point	52.4 Ω + 0.7 jΩ
Return Loss	- 32.4 dB

Antenna Parameters with Body TSL at 5250 MHz

Impedance, transformed to feed point	48.9 Ω - 2.9 jΩ
Return Loss	- 30.0 dB

Antenna Parameters with Body TSL at 5600 MHz

Impedance, transformed to feed point	56.4 Ω + 0.1 jΩ
Return Loss	- 24.5 dB

Antenna Parameters with Body TSL at 5750 MHz

Impedance, transformed to feed point	52.9 Ω + 2.1 jΩ
Return Loss	- 29.2 dB

General Antenna Parameters and Design

Electrical Delay (one direction)	1.204 ns

After long term use with 100W radiated power, only a slight warming of the dipole near the feedpoint can be measured.

The dipole is made of standard semirigid coaxial cable. The center conductor of the feeding line is directly connected to the second arm of the dipole. The antenna is therefore short-circuited for DC-signals. On some of the dipoles, small end caps are added to the dipole arms in order to improve matching when loaded according to the position as explained in the "Measurement Conditions" paragraph. The SAR data are not affected by this change. The overall dipole length is still according to the Standard.
No excessive force must be applied to the dipole arms, because they might bend or the soldered connections near the feedpoint may be damaged.

Additional EUT Data

Manufactured by	SPEAG
Manufactured on	November 27, 2006

DASY5 Validation Report for Head TSL

Date: 20.01.2017

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole D5GHzV2; Type: D5GHzV2; Serial: D5GHzV2 - SN:1057

Communication System: UID 0 - CW;
Frequency: 5250 MHz, Frequency: 5600 MHz, Frequency: 5750 MHz
Medium parameters used: f = 5250 MHz; σ = 4.5 S/m; ε_r = 35.3; ρ = 1000 kg/m^3 ,
Medium parameters used: f = 5600 MHz; σ = 4.85 S/m; ε_r = 34.7; ρ = 1000 kg/m^3 ,
Medium parameters used: f = 5750 MHz; σ = 4.99 S/m; ε_r = 34.5; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)

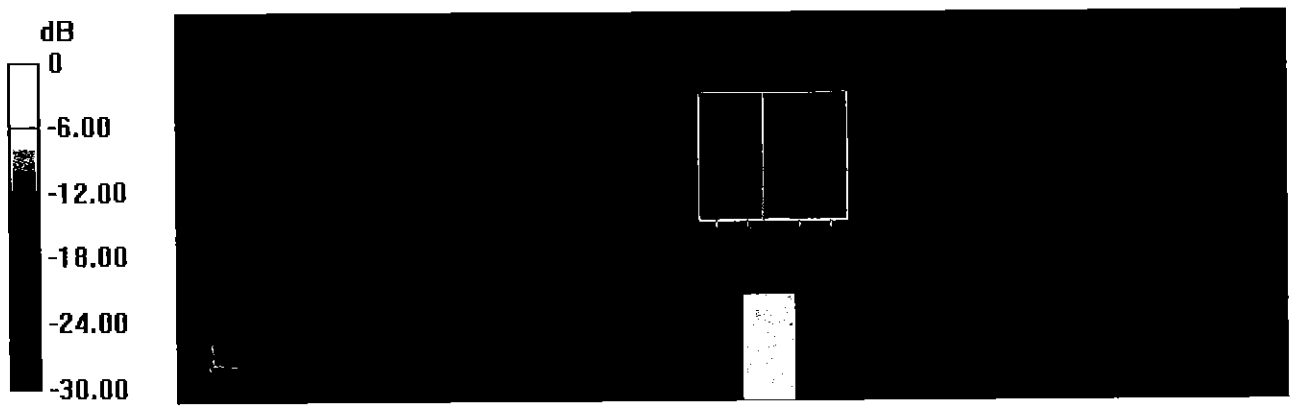
DASY52 Configuration:

- Probe: EX3DV4 - SN3503; ConvF(5.58, 5.58, 5.58); Calibrated: 31.12.2016, ConvF(5.09, 5.09, 5.09); Calibrated: 31.12.2016, ConvF(5.02, 5.02, 5.02); Calibrated: 31.12.2016;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 04.01.2017
- Phantom: Flat Phantom 5.0 (front); Type: QD000P50AA; Serial: 1001
- DASY52 52.8.8(1258); SEMCAD X 14.6.10(7372)

Dipole Calibration for Head Tissue/Pin=100mW, dist=10mm, f=5250 MHz/Zoom Scan, dist=1.4mm (8x8x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm
Reference Value = 72.84 V/m; Power Drift = -0.07 dB
Peak SAR (extrapolated) = 31.2 W/kg
SAR(1 g) = 8.2 W/kg; SAR(10 g) = 2.36 W/kg
Maximum value of SAR (measured) = 18.8 W/kg

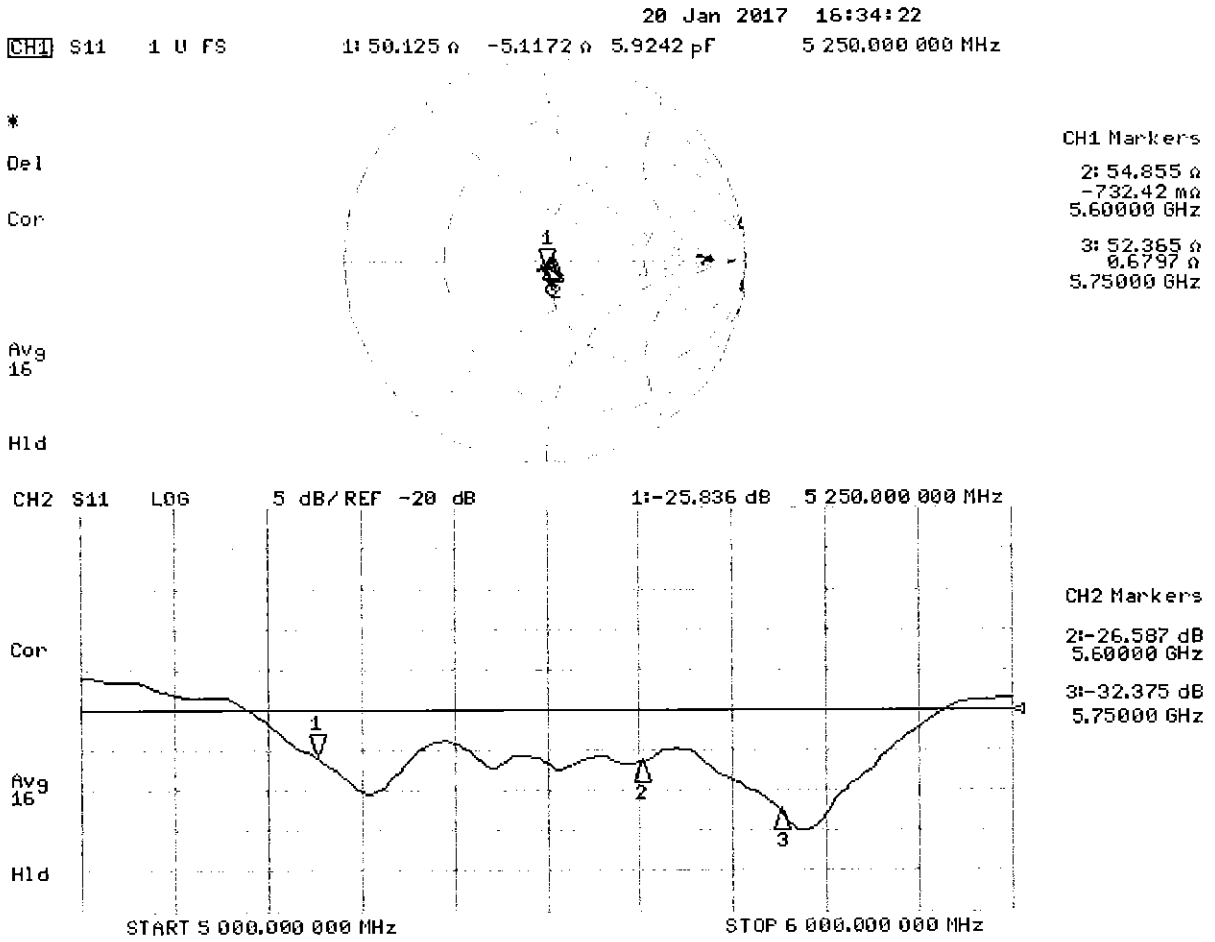
Dipole Calibration for Head Tissue/Pin=100mW, dist=10mm, f=5600 MHz/Zoom Scan, dist=1.4mm (8x8x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm
Reference Value = 73.41 V/m; Power Drift = -0.05 dB
Peak SAR (extrapolated) = 34.0 W/kg
SAR(1 g) = 8.43 W/kg; SAR(10 g) = 2.4 W/kg
Maximum value of SAR (measured) = 19.9 W/kg

Dipole Calibration for Head Tissue/Pin=100mW, dist=10mm, f=5750 MHz/Zoom Scan, dist=1.4mm (8x8x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm
Reference Value = 71.30 V/m; Power Drift = -0.04 dB
Peak SAR (extrapolated) = 33.8 W/kg
SAR(1 g) = 8.06 W/kg; SAR(10 g) = 2.28 W/kg
Maximum value of SAR (measured) = 19.3 W/kg



0 dB = 18.8 W/kg = 12.74 dBW/kg

Impedance Measurement Plot for Head TSL



DASY5 Validation Report for Body TSL

Date: 20.01.2017

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole D5GHzV2; Type: D5GHzV2; Serial: D5GHzV2 - SN:1057

Communication System: UID 0 - CW;
Frequency: 5250 MHz, Frequency: 5600 MHz, Frequency: 5750 MHz
Medium parameters used: f = 5250 MHz; σ = 5.43 S/m; ε_r = 47.4; ρ = 1000 kg/m^3 ,
Medium parameters used: f = 5600 MHz; σ = 5.9 S/m; ε_r = 46.6; ρ = 1000 kg/m^3 ,
Medium parameters used: f = 5750 MHz; σ = 6.1 S/m; ε_r = 46.4; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)

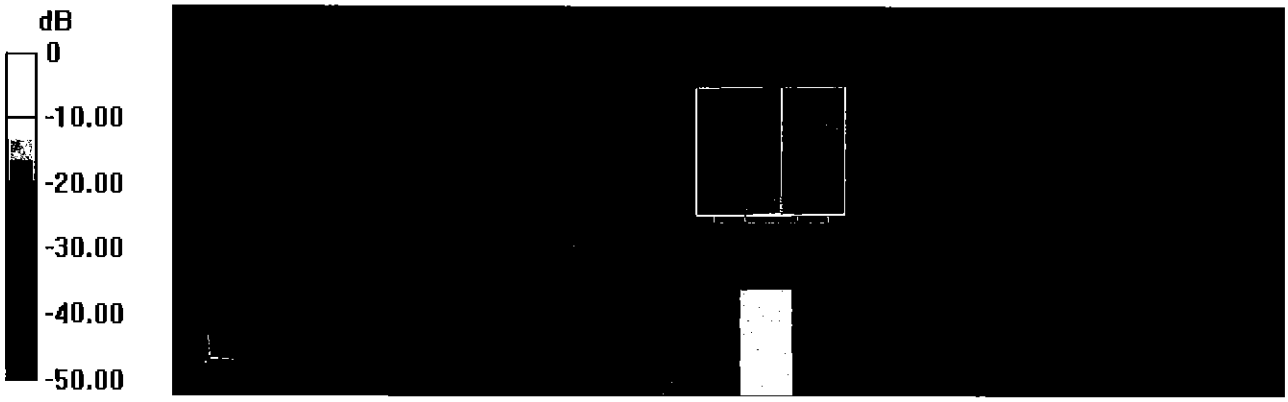
DASY52 Configuration:

- Probe: EX3DV4 - SN3503; ConvF(5.14, 5.14, 5.14); Calibrated: 31.12.2016, ConvF(4.57, 4.57, 4.57); Calibrated: 31.12.2016, ConvF(4.52, 4.52, 4.52); Calibrated: 31.12.2016;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 04.01.2017
- Phantom: Flat Phantom 5.0 (back); Type: QD 000 P50 AA; Serial: 1002
- DASY52 52.8.8(1258); SEMCAD X 14.6.10(7372)

Dipole Calibration for Body Tissue/Pin=100mW, dist=10mm, f=5250MHz/Zoom Scan, dist=1.4mm (8x8x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm
Reference Value = 66.83 V/m; Power Drift = -0.07 dB
Peak SAR (extrapolated) = 29.1 W/kg
SAR(1 g) = 7.5 W/kg; SAR(10 g) = 2.09 W/kg
Maximum value of SAR (measured) = 17.1 W/kg

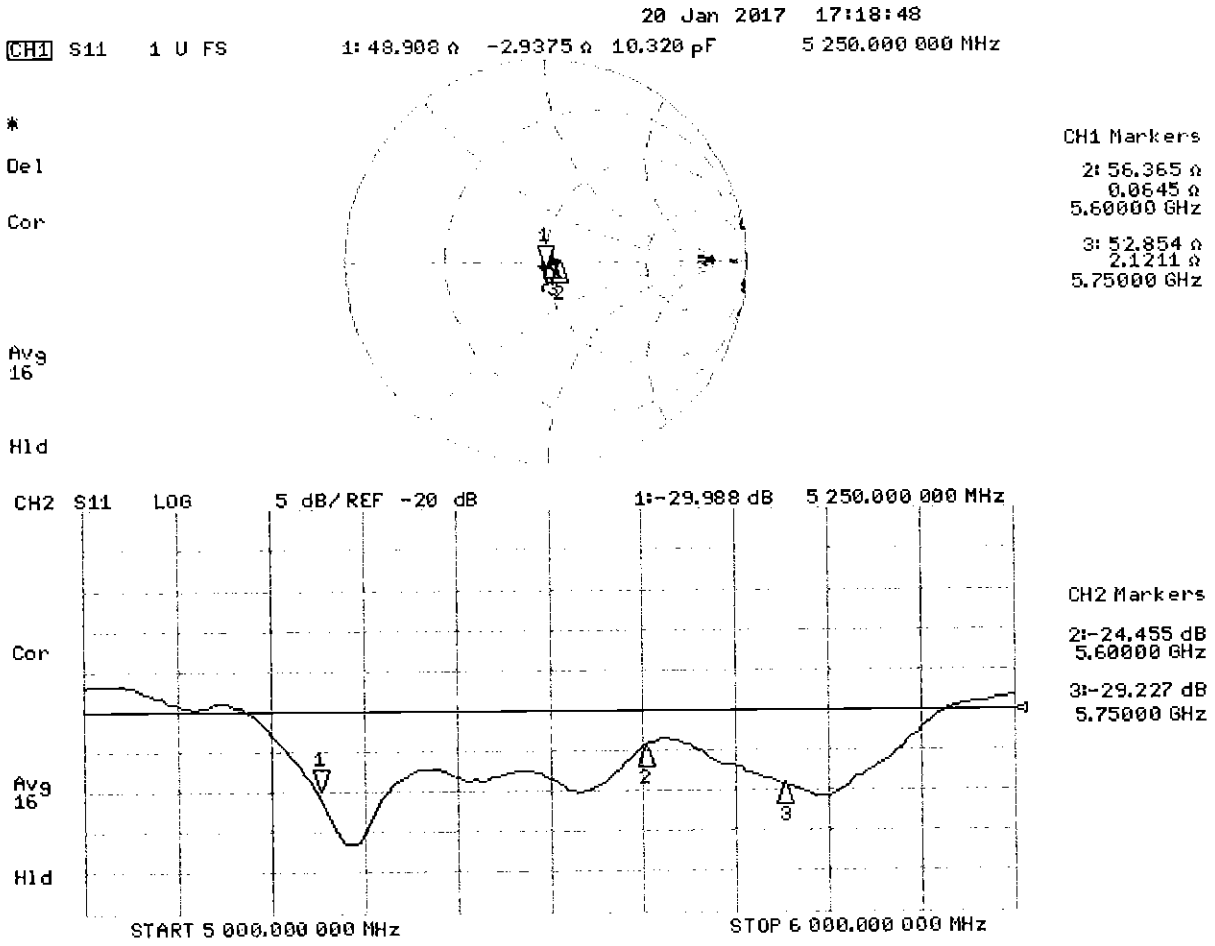
Dipole Calibration for Body Tissue/Pin=100mW, dist=10mm, f=5600 MHz/Zoom Scan, dist=1.4mm (8x8x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm
Reference Value = 67.06 V/m; Power Drift = -0.06 dB
Peak SAR (extrapolated) = 33.5 W/kg
SAR(1 g) = 7.95 W/kg; SAR(10 g) = 2.22 W/kg
Maximum value of SAR (measured) = 18.7 W/kg

Dipole Calibration for Body Tissue/Pin=100mW, dist=10mm, f=5750 MHz/Zoom Scan, dist=1.4mm (8x8x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm
Reference Value = 65.46 V/m; Power Drift = -0.07 dB
Peak SAR (extrapolated) = 33.4 W/kg
SAR(1 g) = 7.6 W/kg; SAR(10 g) = 2.11 W/kg
Maximum value of SAR (measured) = 18.2 W/kg



0 dB = 17.1 W/kg = 12.33 dBW/kg

Impedance Measurement Plot for Body TSL



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Zeughausstrasse 43, 8004 Zurich, Switzerland

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S Swiss Calibration Service

Accredited by the Swiss Accreditation Service (SAS)
The Swiss Accreditation Service is one of the signatories to the EA Multilateral Agreement for the recognition of calibration certificates

Accreditation No.: SCS 0108

Client **PC Test**

Certificate No: D750V3-1161_Jul16

CALIBRATION CERTIFICATE

Object	D750V3 - SN:1161
Calibration procedure(s)	QA CAL-05.v9 Calibration procedure for dipole validation kits above 700 MHz
Calibration date:	July 13, 2016

√PN
8/9/16
Extended
7/2017
SC

This calibration certificate documents the traceability to national standards, which realize the physical units of measurements (SI).
The measurements and the uncertainties with confidence probability are given on the following pages and are part of the certificate.

All calibrations have been conducted in the closed laboratory facility: environment temperature (22 ± 3)°C and humidity < 70%.

Calibration Equipment used (M&TE critical for calibration)

Primary Standards	ID #	Cal Date (Certificate No.)	Scheduled Calibration
Power meter NRP	SN: 104778	06-Apr-16 (No. 217-02288/02289)	Apr-17
Power sensor NRP-Z91	SN: 103244	06-Apr-16 (No. 217-02288)	Apr-17
Power sensor NRP-Z91	SN: 103245	06-Apr-16 (No. 217-02289)	Apr-17
Reference 20 dB Attenuator	SN: 5058 (20k)	05-Apr-16 (No. 217-02292)	Apr-17
Type-N mismatch combination	SN: 5047.2 / 06327	05-Apr-16 (No. 217-02295)	Apr-17
Reference Probe EX3DV4	SN: 7349	15-Jun-16 (No. EX3-7349_Jun16)	Jun-17
DAE4	SN: 601	30-Dec-15 (No. DAE4-601_Dec15)	Dec-16

Secondary Standards	ID #	Check Date (in house)	Scheduled Check
Power meter EPM-442A	SN: GB37480704	07-Oct-15 (No. 217-02222)	In house check: Oct-16
Power sensor HP 8481A	SN: US37292783	07-Oct-15 (No. 217-02222)	In house check: Oct-16
Power sensor HP 8481A	SN: MY41092317	07-Oct-15 (No. 217-02223)	In house check: Oct-16
RF generator R&S SMT-06	SN: 100972	15-Jun-15 (in house check Jun-15)	In house check: Oct-16
Network Analyzer HP 8753E	SN: US37390585	18-Oct-01 (in house check Oct-15)	In house check: Oct-16

	Name	Function	Signature
Calibrated by:	Claudio Leubler	Laboratory Technician	
Approved by:	Katja Pokovic	Technical Manager	

Issued: July 13, 2016

This calibration certificate shall not be reproduced except in full without written approval of the laboratory.

Glossary:

TSL	tissue simulating liquid
ConvF	sensitivity in TSL / NORM x,y,z
N/A	not applicable or not measured

Calibration is Performed According to the Following Standards:

a) IEEE Std 1528-2013, "IEEE Recommended Practice for Determining the Peak Spatial-Averaged Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques", June 2013
b) IEC 62209-1, "Procedure to measure the Specific Absorption Rate (SAR) for hand-held devices used in close proximity to the ear (frequency range of 300 MHz to 3 GHz)", February 2005
c) IEC 62209-2, "Procedure to determine the Specific Absorption Rate (SAR) for wireless communication devices used in close proximity to the human body (frequency range of 30 MHz to 6 GHz)", March 2010
d) KDB 865664, "SAR Measurement Requirements for 100 MHz to 6 GHz"

Additional Documentation:

e) DASY4/5 System Handbook

Methods Applied and Interpretation of Parameters:

- *Measurement Conditions:* Further details are available from the Validation Report at the end of the certificate. All figures stated in the certificate are valid at the frequency indicated.
- *Antenna Parameters with TSL:* The dipole is mounted with the spacer to position its feed point exactly below the center marking of the flat phantom section, with the arms oriented parallel to the body axis.
- *Feed Point Impedance and Return Loss:* These parameters are measured with the dipole positioned under the liquid filled phantom. The impedance stated is transformed from the measurement at the SMA connector to the feed point. The Return Loss ensures low reflected power. No uncertainty required.
- *Electrical Delay:* One-way delay between the SMA connector and the antenna feed point. No uncertainty required.
- *SAR measured:* SAR measured at the stated antenna input power.
- *SAR normalized:* SAR as measured, normalized to an input power of 1 W at the antenna connector.
- *SAR for nominal TSL parameters:* The measured TSL parameters are used to calculate the nominal SAR result.

The reported uncertainty of measurement is stated as the standard uncertainty of measurement multiplied by the coverage factor k=2, which for a normal distribution corresponds to a coverage probability of approximately 95%.

Measurement Conditions

DASY system configuration, as far as not given on page 1.

DASY Version	DASY5	V52.8.8
Extrapolation	Advanced Extrapolation	
Phantom	Modular Flat Phantom	
Distance Dipole Center - TSL	15 mm	with Spacer
Zoom Scan Resolution	dx, dy, dz = 5 mm	
Frequency	750 MHz ± 1 MHz	

Head TSL parameters

The following parameters and calculations were applied.

	Temperature	**Permittivity**	**Conductivity**
Nominal Head TSL parameters	22.0 °C	41.9	0.89 mho/m
Measured Head TSL parameters	(22.0 ± 0.2) °C	40.9 ± 6 %	0.91 mho/m ± 6 %
Head TSL temperature change during test	< 0.5 °C	----	----

SAR result with Head TSL

SAR averaged over 1 cm^3 (1 g) of Head TSL	Condition	
SAR measured	250 mW input power	2.09 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**8.17 W/kg ± 17.0 % (k=2)**

SAR averaged over 10 cm^3 (10 g) of Head TSL	condition	
SAR measured	250 mW input power	1.37 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**5.39 W/kg ± 16.5 % (k=2)**

Body TSL parameters

The following parameters and calculations were applied.

	Temperature	**Permittivity**	**Conductivity**
Nominal Body TSL parameters	22.0 °C	55.5	0.96 mho/m
Measured Body TSL parameters	(22.0 ± 0.2) °C	55.1 ± 6 %	0.99 mho/m ± 6 %
Body TSL temperature change during test	< 0.5 °C	----	----

SAR result with Body TSL

SAR averaged over 1 cm^3 (1 g) of Body TSL	Condition	
SAR measured	250 mW input power	2.16 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	**8.43 W/kg ± 17.0 % (k=2)**

SAR averaged over 10 cm^3 (10 g) of Body TSL	condition	
SAR measured	250 mW input power	1.41 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	**5.53 W/kg ± 16.5 % (k=2)**

Appendix (Additional assessments outside the scope of SCS 0108)

Antenna Parameters with Head TSL

Impedance, transformed to feed point	55.6 Ω - 0.9 jΩ
Return Loss	- 25.4 dB

Antenna Parameters with Body TSL

Impedance, transformed to feed point	50.2 Ω - 4.0 jΩ
Return Loss	- 28.0 dB

General Antenna Parameters and Design

Electrical Delay (one direction)	1.033 ns

After long term use with 100W radiated power, only a slight warming of the dipole near the feedpoint can be measured.

The dipole is made of standard semirigid coaxial cable. The center conductor of the feeding line is directly connected to the second arm of the dipole. The antenna is therefore short-circuited for DC-signals. On some of the dipoles, small end caps are added to the dipole arms in order to improve matching when loaded according to the position as explained in the "Measurement Conditions" paragraph. The SAR data are not affected by this change. The overall dipole length is still according to the Standard.
No excessive force must be applied to the dipole arms, because they might bend or the soldered connections near the feedpoint may be damaged.

Additional EUT Data

Manufactured by	SPEAG
Manufactured on	November 19, 2015

DASY5 Validation Report for Head TSL

Date: 13.07.2016

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole 750 MHz; Type: D750V3; Serial: D750V3 - SN:1161

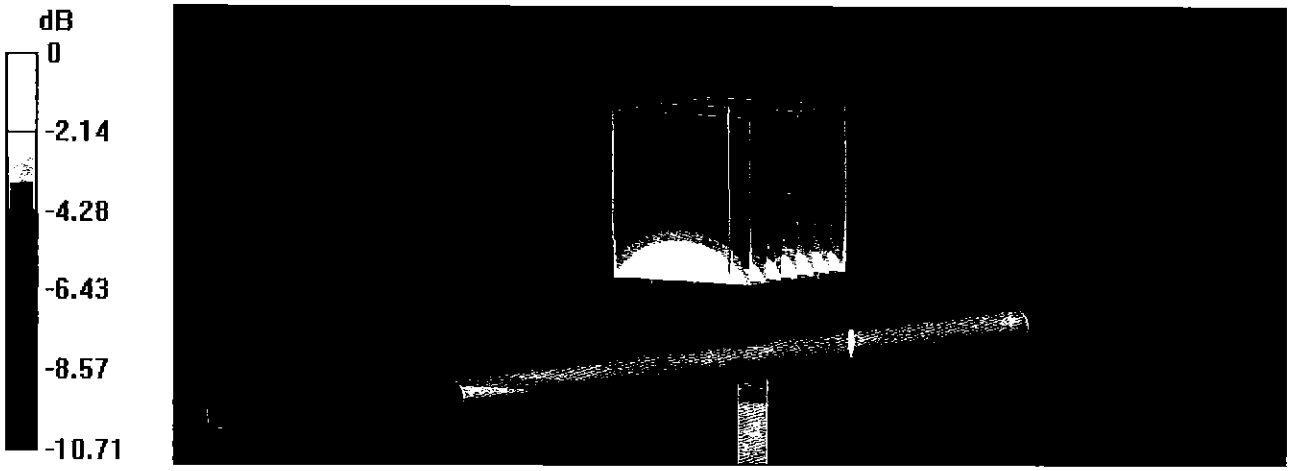
Communication System: UID 0 - CW; Frequency: 750 MHz
Medium parameters used: f = 750 MHz; σ = 0.91 S/m; ε_r = 40.9; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)

DASY52 Configuration:

- Probe: EX3DV4 - SN7349; ConvF(10.07, 10.07, 10.07); Calibrated: 15.06.2016;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 30.12.2015
- Phantom: Flat Phantom 4.9L; Type: QD000P49AA; Serial: 1001
- DASY52 52.8.8(1258); SEMCAD X 14.6.10(7372)

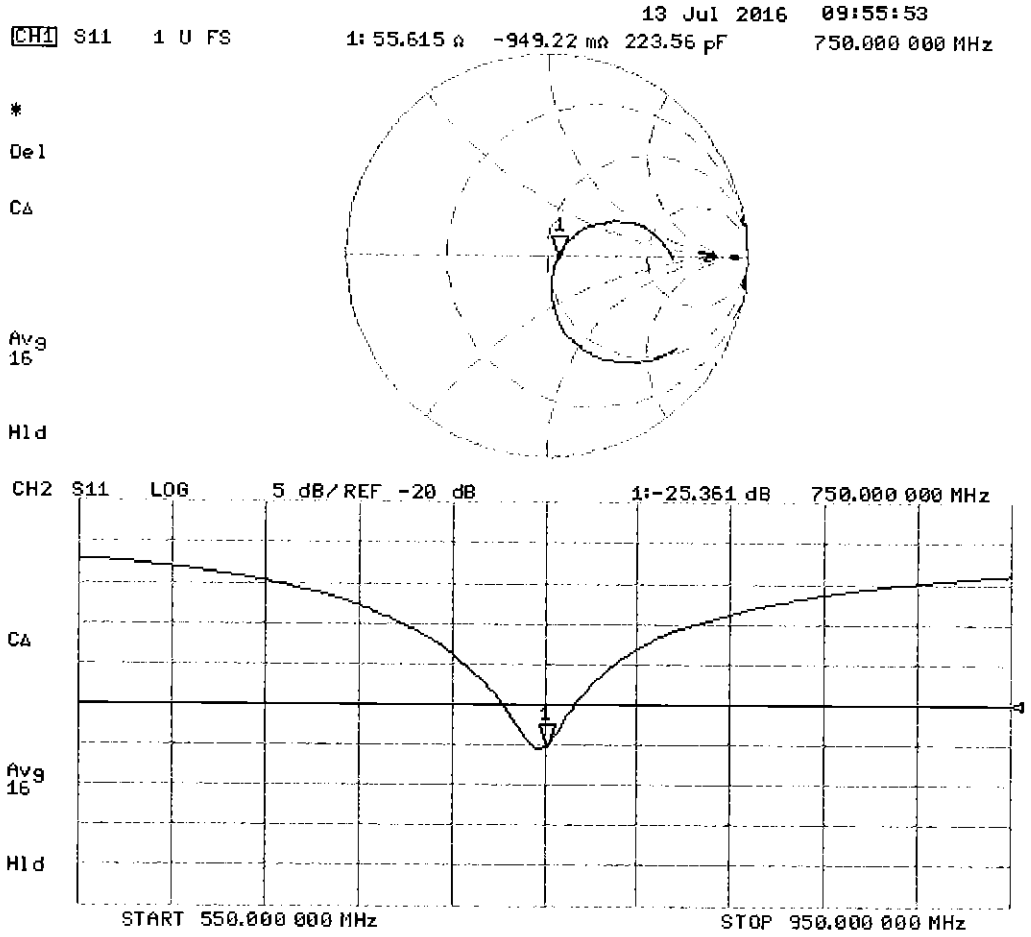
Dipole Calibration for Head Tissue/Pin=250 mW, d=15mm/Zoom Scan (7x7x7)/Cube 0:

Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 58.07 V/m; Power Drift = -0.00 dB
Peak SAR (extrapolated) = 3.13 W/kg
SAR(1 g) = 2.09 W/kg; SAR(10 g) = 1.37 W/kg
Maximum value of SAR (measured) = 2.80 W/kg



0 dB = 2.80 W/kg = 4.47 dBW/kg

Impedance Measurement Plot for Head TSL



DASY5 Validation Report for Body TSL

Date: 13.07.2016

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole 750 MHz; Type: D750V3; Serial: D750V3 - SN:1161

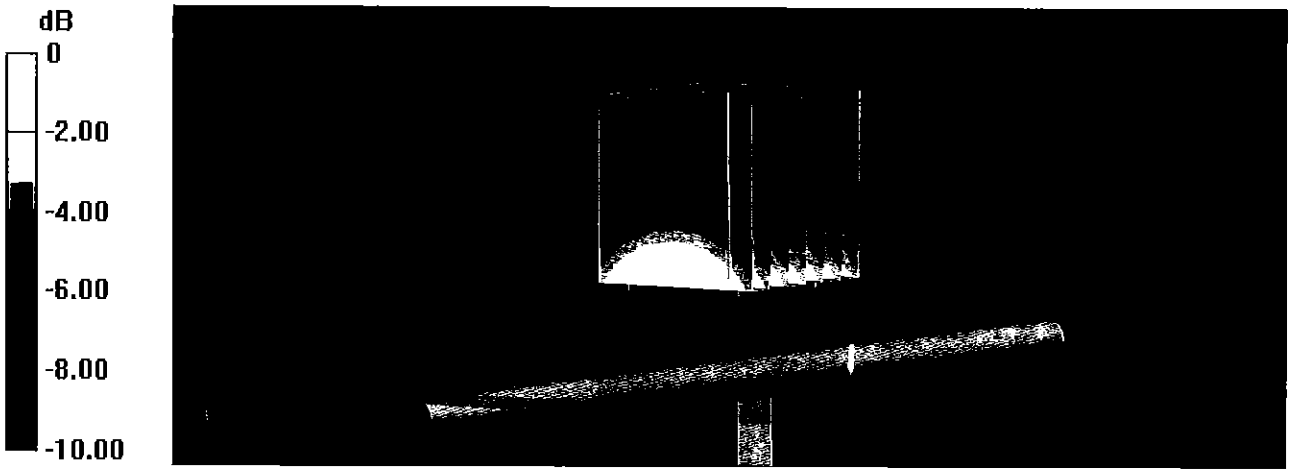
Communication System: UID 0 - CW; Frequency: 750 MHz
Medium parameters used: f = 750 MHz; σ = 0.99 S/m; ε_r = 55.1; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)

DASY52 Configuration:

- Probe: EX3DV4 - SN7349; ConvF(9.99, 9.99, 9.99); Calibrated: 15.06.2016;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 30.12.2015
- Phantom: Flat Phantom 4.9L; Type: QD000P49AA; Serial: 1001
- DASY52 52.8.8(1258); SEMCAD X 14.6.10(7372)

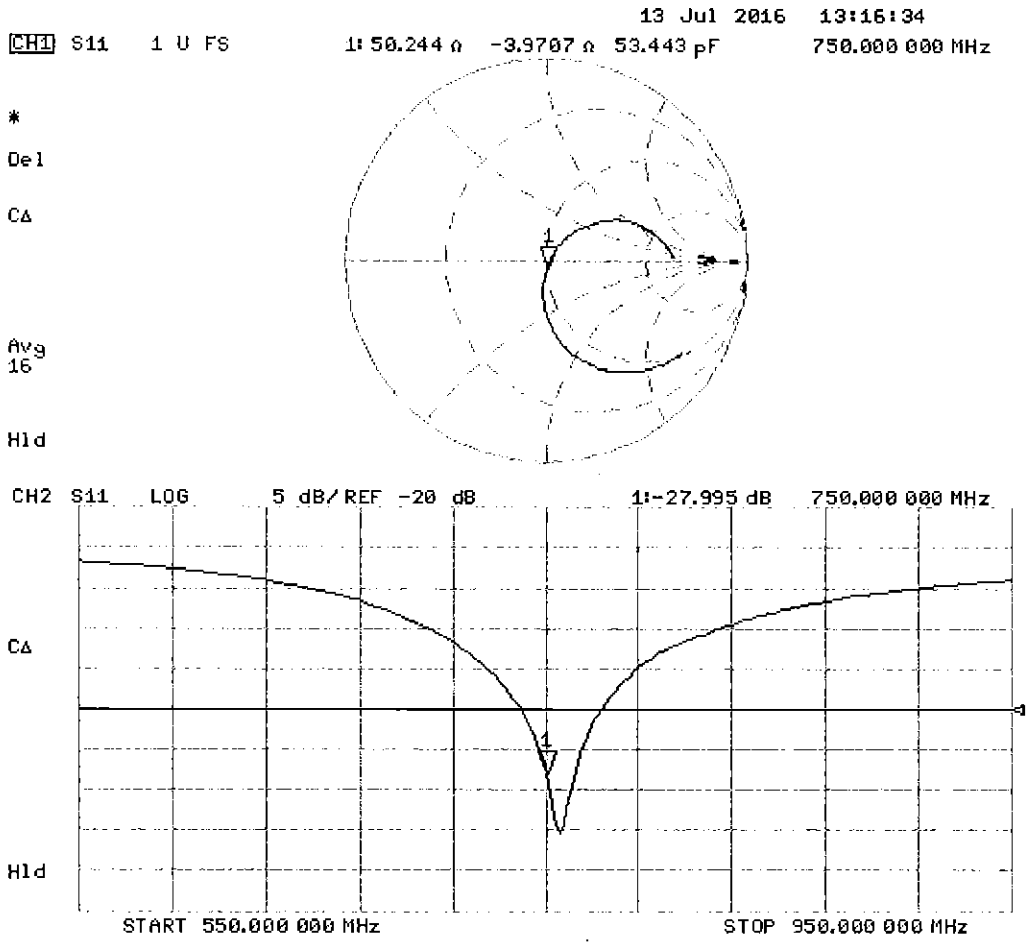
Dipole Calibration for Body Tissue/Pin=250 mW, d=15mm/Zoom Scan (7x7x7)/Cube 0:

Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 56.33 V/m; Power Drift = -0.00 dB
Peak SAR (extrapolated) = 3.22 W/kg
SAR(1 g) = 2.16 W/kg; SAR(10 g) = 1.41 W/kg
Maximum value of SAR (measured) = 2.87 W/kg



0 dB = 2.87 W/kg = 4.58 dBW/kg

Impedance Measurement Plot for Body TSL



Certification of Calibration

Object	D750V3 – SN: 1161
Calibration procedure(s)	Procedure for Calibration Extension for SAR Dipoles.
Calibration date:	July 12, 2017
Description:	SAR Validation Dipole at 750 MHz.

Calibration Equipment used:

Manufacturer	Model	Description	Cal Date	Cal Interval	Cal Due	Serial Number
Control Company	4040	Therm./Clock/Humidity Monitor	3/31/2017	Biennial	3/31/2019	170232394
Control Company	4352	Ultra Long Stem Thermometer	5/2/2017	Biennial	5/2/2019	170330156
Amplifier Research	15S1G6	Amplifier	CBT	N/A	CBT	433971
Narda	4772-3	Attenuator (3dB)	CBT	N/A	CBT	9406
Keysight Technologies	85033E	Standard Mechanical Calibration Kit (DC to 9GHz, 3.5mm)	6/1/2017	Annual	6/1/2018	MY53401181
Agilent	8753ES	S-Parameter Network Analyzer	10/26/2016	Annual	10/26/2017	US39170118
Mini-Circuits	BW-N20W5+	DC to 18 GHz Precision Fixed 20 dB Attenuator	CBT	N/A	CBT	N/A
SPEAG	DAE4	Dasy Data Acquisition Electronics	3/8/2017	Annual	3/8/2018	1368
SPEAG	DAE4	Dasy Data Acquisition Electronics	6/14/2017	Annual	6/14/2018	1334
SPEAG	DAK-3.5	Dielectric Assessment Kit	5/10/2017	Annual	5/10/2018	1070
SPEAG	ES3DV3	SAR Probe	11/15/2016	Annual	11/15/2017	3334
SPEAG	ES3DV3	SAR Probe	3/14/2017	Annual	3/14/2018	3319
Anritsu	MA2411B	Pulse Power Sensor	2/10/2017	Annual	2/10/2018	1207364
Anritsu	MA2411B	Pulse Power Sensor	2/10/2017	Annual	2/10/2018	1339018
Anritsu	ML2495A	Power Meter	10/16/2015	Biennial	10/16/2017	941001
Agilent	N5182A	MXG Vector Signal Generator	2/28/2017	Annual	2/28/2018	MY47420800
Seekonk	NC-100	Torque Wrench	11/6/2015	Biennial	11/6/2017	N/A
Mini-Circuits	NLP-2950+	Low Pass Filter DC to 2700 MHz	CBT	N/A	CBT	N/A
Pasternack	PE2208-6	Bidirectional Coupler	CBT	N/A	CBT	N/A

Measurement Uncertainty = ±23% (k=2)

	Name	Function	Signature
Calibrated By:	Brodie Halbfoster	Test Engineer	BRODIE HALBFOSTER
Approved By:	Kaitlin O'Keefe	Senior Technical Manager	KOK

DIPOLE CALIBRATION EXTENSION

Per KDB 865664 D01, calibration intervals of up to three years may be considered for reference dipoles when it is demonstrated that the SAR target, impedance and return loss of a dipole have remained stable according to the following requirements:

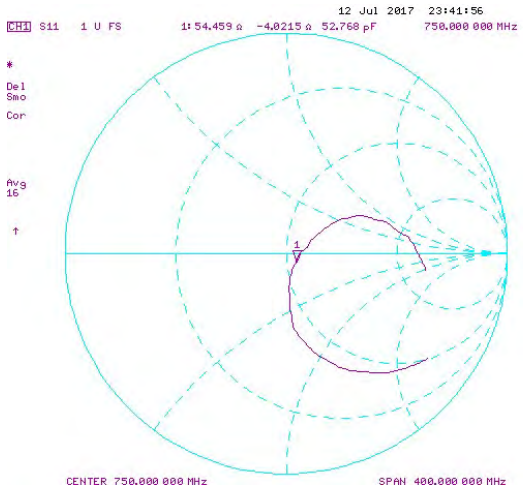
1. The measured SAR does not deviate more than 10% from the target on the calibration certificate.
2. The return-loss does not deviate more than 20% from the previous measurement and meets the required 20dB minimum return-loss requirement.
3. The measurement of real or imaginary parts of impedance does not deviate more than 5Ω from the previous measurement.

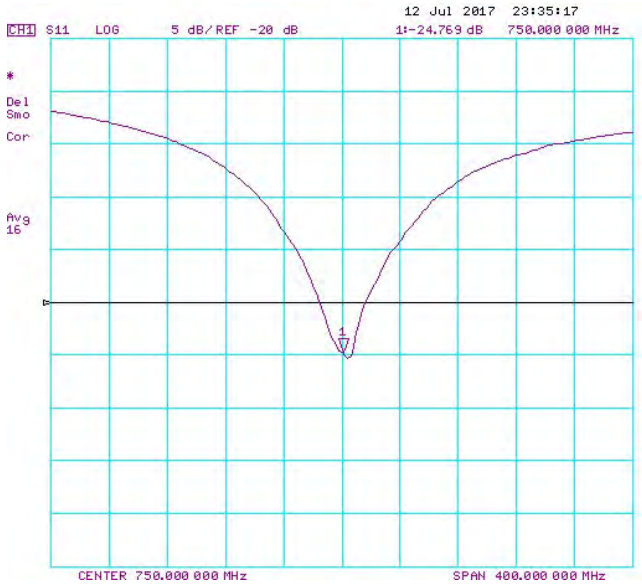
The following dipole was checked to pass the above 3 requirements to have 2-year calibration period from the calibration date:

Calibration Date	Extension Date	Certificate Electrical Delay (ns)	Certificate SAR Target Head (1g) W/kg @ 23.0 dBm	Measured Head SAR (1g) W/kg @ 23.0 dBm	Deviation 1g (%)	Certificate SAR Target Head (10g) W/kg @ 23.0 dBm	Measured Head SAR (10g) W/kg @ 23.0 dBm	Deviation 10g (%)	Certificate Impedance Head (Ohm) Real	Measured Impedance Head (Ohm) Real	Difference (Ohm) Real	Certificate Impedance Head (Ohm) Imaginary	Measured Impedance Head (Ohm) Imaginary	Difference (Ohm) Imaginary	Certificate Return Loss Head (dB)	Measured Return Loss Head (dB)	Deviation (%)	PASS/FAIL
7/13/2016	7/12/2017	1.033	1.63	1.65	0.98%	1.08	1.09	1.11%	55.6	54.5	1.1	-0.9	-4.0	3.1	-25.4	-24.8	2.40%	PASS

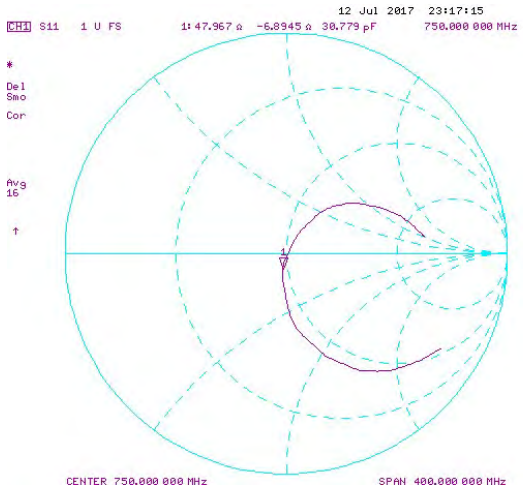
Calibration Date	Extension Date	Certificate Electrical Delay (ns)	Certificate SAR Target Body (1g) W/kg @ 23.0 dBm	Measured Body SAR (1g) W/kg @ 23.0 dBm	Deviation 1g (%)	Certificate SAR Target Body (10g) W/kg @ 23.0 dBm	Measured Body SAR (10g) W/kg @ 23.0 dBm	Deviation 10g (%)	Certificate Impedance Body (Ohm) Real	Measured Impedance Body (Ohm) Real	Difference (Ohm) Real	Certificate Impedance Body (Ohm) Imaginary	Measured Impedance Body (Ohm) Imaginary	Difference (Ohm) Imaginary	Certificate Return Loss Body (dB)	Measured Return Loss Body (dB)	Deviation (%)	PASS/FAIL
7/13/2016	7/12/2017	1.033	1.69	1.75	3.80%	1.11	1.17	5.79%	50.2	48.0	2.2	-4.0	-6.9	2.9	-28.0	-23.9	14.60%	PASS

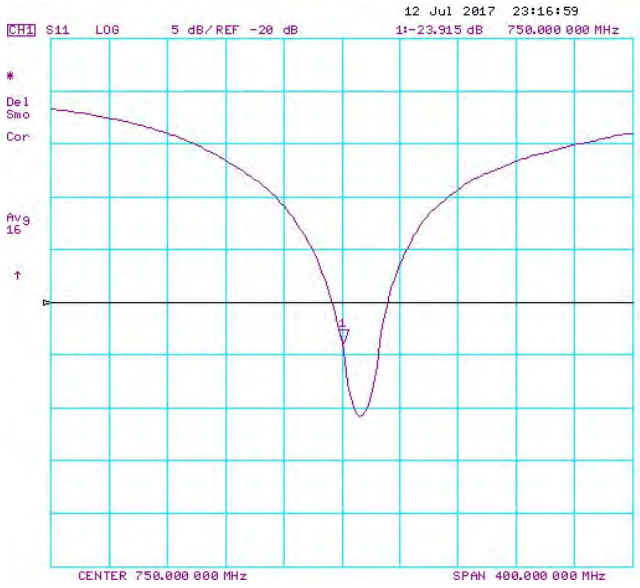
Impedance & Return-Loss Measurement Plot for Head TSL





Impedance & Return-Loss Measurement Plot for Body TSL





Calibration Laboratory of
Schmid & Partner
Engineering AG
Zeughausstrasse 43, 8004 Zurich, Switzerland

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S Swiss Calibration Service

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Accreditation No.: SCS 0108

Client **PC Test**

Certificate No: D835V2-4d047_Jul16

CALIBRATION CERTIFICATE

Object: D835V2 - SN:4d047

Calibration procedure(s): QA CAL-05.v9
Calibration procedure for dipole validation kits above 700 MHz

BN ✓
7/16/2016

Calibration date: July 13, 2016

Extended
7/2017
SC ✓

This calibration certificate documents the traceability to national standards, which realize the physical units of measurements (SI).
The measurements and the uncertainties with confidence probability are given on the following pages and are part of the certificate.

All calibrations have been conducted in the closed laboratory facility: environment temperature (22 ± 3)°C and humidity < 70%.

Calibration Equipment used (M&TE critical for calibration)

Primary Standards	ID #	Cal Date (Certificate No.)	Scheduled Calibration
Power meter NRP	SN: 104778	06-Apr-16 (No. 217-02288/02289)	Apr-17
Power sensor NRP-Z91	SN: 103244	06-Apr-16 (No. 217-02288)	Apr-17
Power sensor NRP-Z91	SN: 103245	06-Apr-16 (No. 217-02289)	Apr-17
Reference 20 dB Attenuator	SN: 5058 (20k)	05-Apr-16 (No. 217-02292)	Apr-17
Type-N mismatch combination	SN: 5047.2 / 06327	05-Apr-16 (No. 217-02295)	Apr-17
Reference Probe EX3DV4	SN: 7349	15-Jun-16 (No. EX3-7349_Jun16)	Jun-17
DAE4	SN: 601	30-Dec-15 (No. DAE4-601_Dec15)	Dec-16

Secondary Standards	ID #	Check Date (in house)	Scheduled Check
Power meter EPM-442A	SN: GB37480704	07-Oct-15 (No. 217-02222)	In house check: Oct-16
Power sensor HP 8481A	SN: US37292783	07-Oct-15 (No. 217-02222)	In house check: Oct-16
Power sensor HP 8481A	SN: MY41092317	07-Oct-15 (No. 217-02223)	In house check: Oct-16
RF generator R&S SMT-06	SN: 100972	15-Jun-15 (in house check Jun-15)	In house check: Oct-16
Network Analyzer HP 8753E	SN: US37390585	18-Oct-01 (in house check Oct-15)	In house check: Oct-16

	Name	Function	Signature
Calibrated by:	Jeton Kastrati	Laboratory Technician	
Approved by:	Katja Pokovic	Technical Manager	

Issued: July 13, 2016

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Calibration Laboratory of
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Accreditation No.: SCS 0108

Glossary:

TSL	tissue simulating liquid
ConvF	sensitivity in TSL / NORM x,y,z
N/A	not applicable or not measured

Calibration is Performed According to the Following Standards:

a) IEEE Std 1528-2013, "IEEE Recommended Practice for Determining the Peak Spatial-Averaged Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques", June 2013
b) IEC 62209-1, "Procedure to measure the Specific Absorption Rate (SAR) for hand-held devices used in close proximity to the ear (frequency range of 300 MHz to 3 GHz)", February 2005
c) IEC 62209-2, "Procedure to determine the Specific Absorption Rate (SAR) for wireless communication devices used in close proximity to the human body (frequency range of 30 MHz to 6 GHz)", March 2010
d) KDB 865664, "SAR Measurement Requirements for 100 MHz to 6 GHz"

Additional Documentation:

e) DASY4/5 System Handbook

Methods Applied and Interpretation of Parameters:

- *Measurement Conditions:* Further details are available from the Validation Report at the end of the certificate. All figures stated in the certificate are valid at the frequency indicated.
- *Antenna Parameters with TSL:* The dipole is mounted with the spacer to position its feed point exactly below the center marking of the flat phantom section, with the arms oriented parallel to the body axis.
- *Feed Point Impedance and Return Loss:* These parameters are measured with the dipole positioned under the liquid filled phantom. The impedance stated is transformed from the measurement at the SMA connector to the feed point. The Return Loss ensures low reflected power. No uncertainty required.
- *Electrical Delay:* One-way delay between the SMA connector and the antenna feed point. No uncertainty required.
- *SAR measured:* SAR measured at the stated antenna input power.
- *SAR normalized:* SAR as measured, normalized to an input power of 1 W at the antenna connector.
- *SAR for nominal TSL parameters:* The measured TSL parameters are used to calculate the nominal SAR result.

The reported uncertainty of measurement is stated as the standard uncertainty of measurement multiplied by the coverage factor k=2, which for a normal distribution corresponds to a coverage probability of approximately 95%.

Measurement Conditions

DASY system configuration, as far as not given on page 1.

DASY Version	DASY5	V52.8.8
Extrapolation	Advanced Extrapolation	
Phantom	Modular Flat Phantom	
Distance Dipole Center - TSL	15 mm	with Spacer
Zoom Scan Resolution	dx, dy, dz = 5 mm	
Frequency	835 MHz ± 1 MHz	

Head TSL parameters

The following parameters and calculations were applied.

	Temperature	**Permittivity**	**Conductivity**
Nominal Head TSL parameters	22.0 °C	41.5	0.90 mho/m
Measured Head TSL parameters	(22.0 ± 0.2) °C	40.6 ± 6 %	0.94 mho/m ± 6 %
Head TSL temperature change during test	< 0.5 °C	----	----

SAR result with Head TSL

SAR averaged over 1 cm^3 (1 g) of Head TSL	Condition	
SAR measured	250 mW input power	2.37 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**9.13 W/kg ± 17.0 % (k=2)**

SAR averaged over 10 cm^3 (10 g) of Head TSL	condition	
SAR measured	250 mW input power	1.53 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**5.95 W/kg ± 16.5 % (k=2)**

Body TSL parameters

The following parameters and calculations were applied.

	Temperature	**Permittivity**	**Conductivity**
Nominal Body TSL parameters	22.0 °C	55.2	0.97 mho/m
Measured Body TSL parameters	(22.0 ± 0.2) °C	54.9 ± 6 %	1.01 mho/m ± 6 %
Body TSL temperature change during test	< 0.5 °C	----	----

SAR result with Body TSL

SAR averaged over 1 cm^3 (1 g) of Body TSL	Condition	
SAR measured	250 mW input power	2.47 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	**9.57 W/kg ± 17.0 % (k=2)**

SAR averaged over 10 cm^3 (10 g) of Body TSL	condition	
SAR measured	250 mW input power	1.60 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	**6.24 W/kg ± 16.5 % (k=2)**

Appendix (Additional assessments outside the scope of SCS 0108)

Antenna Parameters with Head TSL

Impedance, transformed to feed point	49.8 Ω - 5.9 jΩ
Return Loss	- 24.5 dB

Antenna Parameters with Body TSL

Impedance, transformed to feed point	45.8 Ω - 8.2 jΩ
Return Loss	- 20.3 dB

General Antenna Parameters and Design

Electrical Delay (one direction)	None ns

After long term use with 100W radiated power, only a slight warming of the dipole near the feedpoint can be measured.

The dipole is made of standard semirigid coaxial cable. The center conductor of the feeding line is directly connected to the second arm of the dipole. The antenna is therefore short-circuited for DC-signals. On some of the dipoles, small end caps are added to the dipole arms in order to improve matching when loaded according to the position as explained in the "Measurement Conditions" paragraph. The SAR data are not affected by this change. The overall dipole length is still according to the Standard.
No excessive force must be applied to the dipole arms, because they might bend or the soldered connections near the feedpoint may be damaged.

Additional EUT Data

Manufactured by	SPEAG
Manufactured on	August 16, 2006

DASY5 Validation Report for Head TSL

Date: 13.07.201

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole 835 MHz D835V2; Type: D835V2; Serial: D835V2 - SN:4d047

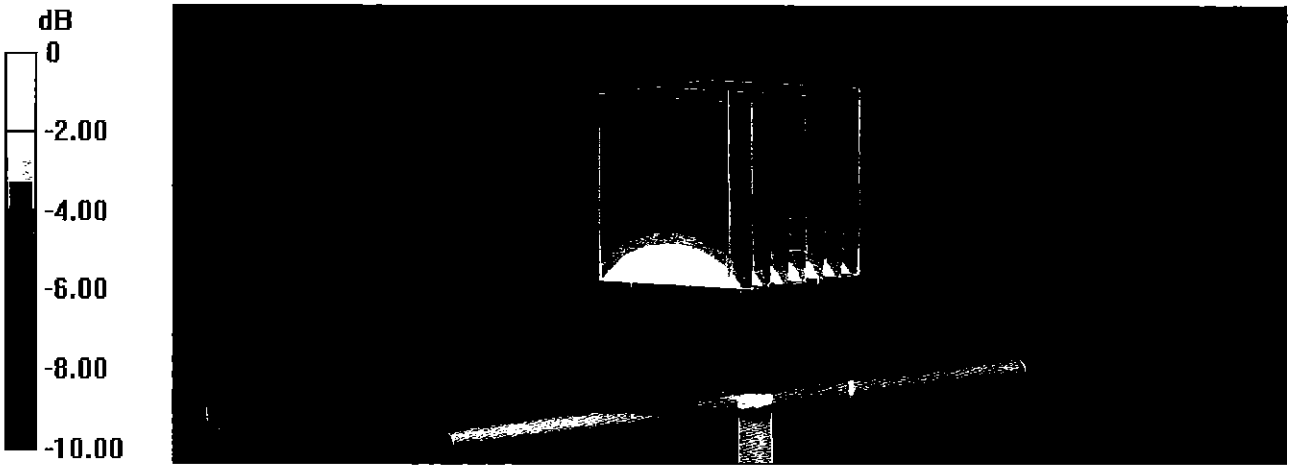
Communication System: UID 0 - CW; Frequency: 835 MHz
Medium parameters used: f = 835 MHz; σ = 0.94 S/m; ε_r = 40.6; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)

DASY52 Configuration:

- Probe: EX3DV4 - SN7349; ConvF(9.72, 9.72, 9.72); Calibrated: 15.06.2016;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 30.12.2015
- Phantom: Flat Phantom 4.9L; Type: QD000P49AA; Serial: 1001
- DASY52 52.8.8(1258); SEMCAD X 14.6.10(7372)

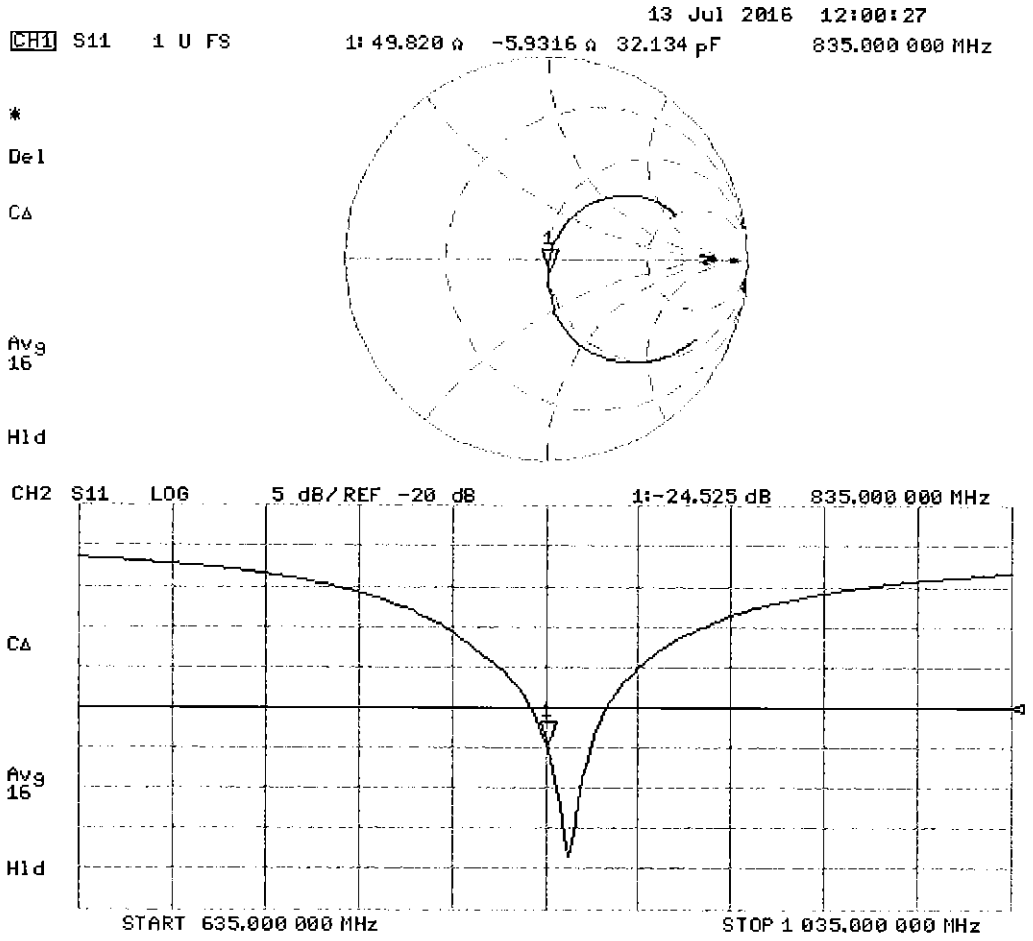
Dipole Calibration for Head Tissue/Pin=250 mW, d=15mm/Zoom Scan (7x7x7)/Cube 0:

Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 60.98 V/m; Power Drift = 0.01 dB
Peak SAR (extrapolated) = 3.56 W/kg
SAR(1 g) = 2.37 W/kg; SAR(10 g) = 1.53 W/kg
Maximum value of SAR (measured) = 3.17 W/kg



0 dB = 3.17 W/kg = 5.01 dBW/kg

Impedance Measurement Plot for Head TSL



DASY5 Validation Report for Body TSL

Date: 13.07.2016

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole 835 MHz D835V2; Type: D835V2; Serial: D835V2 - SN:4d047

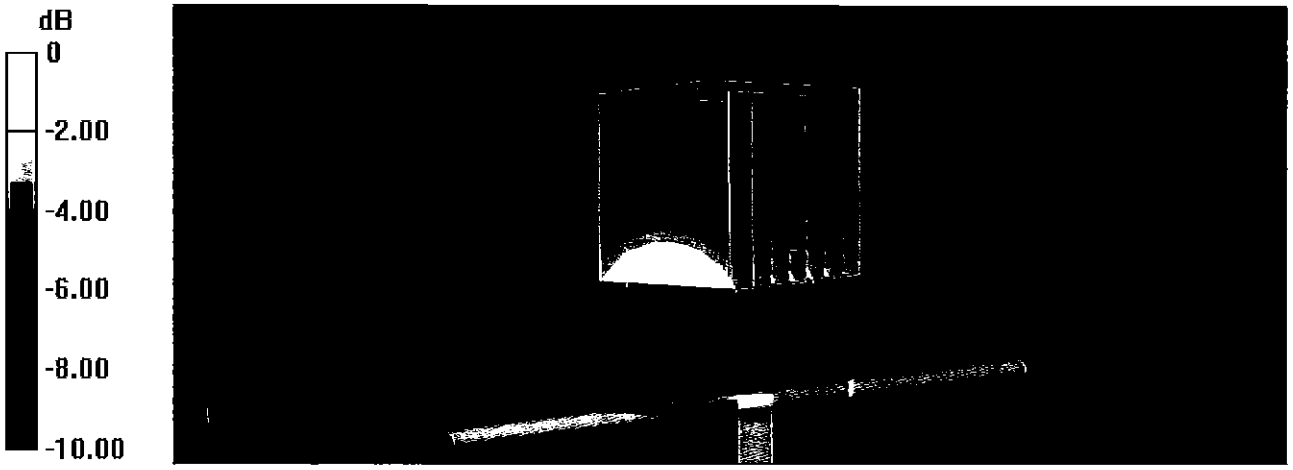
Communication System: UID 0 - CW; Frequency: 835 MHz
Medium parameters used: f = 835 MHz; σ = 1.01 S/m; ε_r = 54.9; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)

DASY52 Configuration:

- Probe: EX3DV4 - SN7349; ConvF(9.73, 9.73, 9.73); Calibrated: 15.06.2016;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 30.12.2015
- Phantom: Flat Phantom 4.9L; Type: QD000P49AA; Serial: 1001
- DASY52 52.8.8(1258); SEMCAD X 14.6.10(7372)

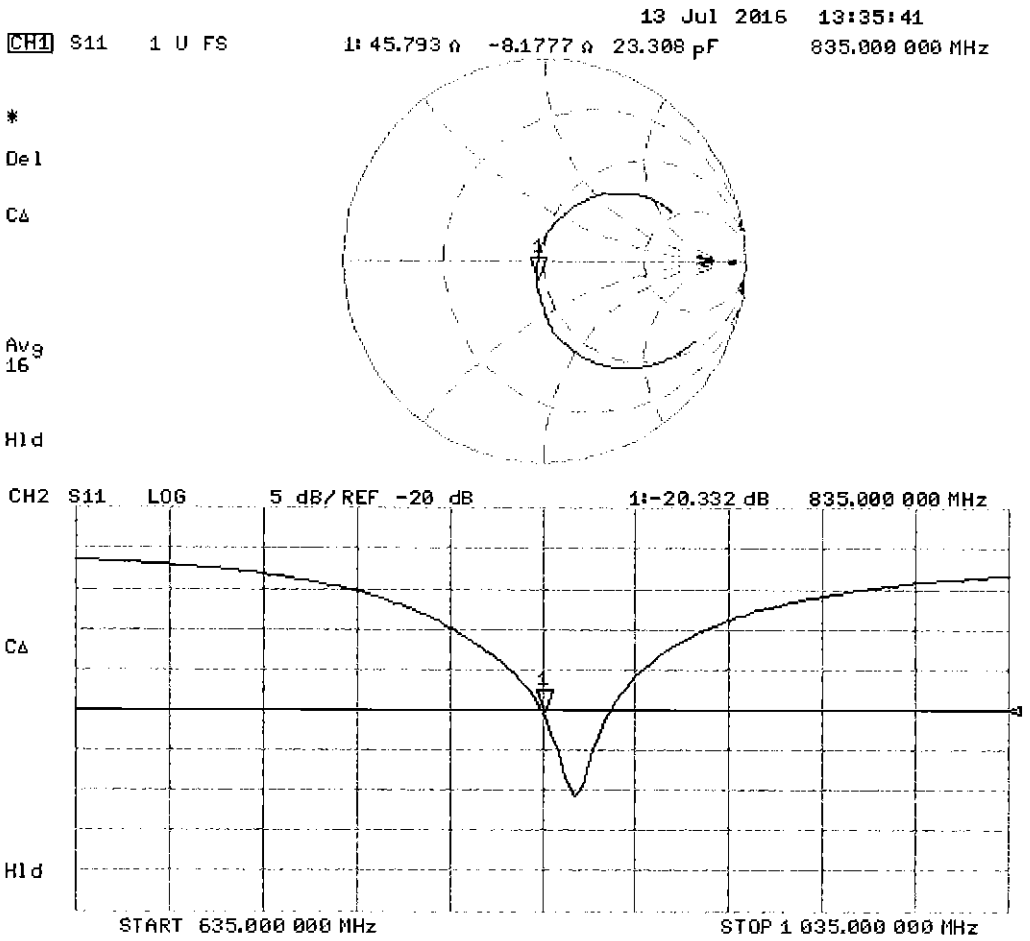
Dipole Calibration for Body Tissue/Pin=250 mW, d=15mm/Zoom Scan (7x7x7)/Cube 0:

Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 59.88 V/m; Power Drift = -0.01 dB
Peak SAR (extrapolated) = 3.67 W/kg
SAR(1 g) = 2.47 W/kg; SAR(10 g) = 1.6 W/kg
Maximum value of SAR (measured) = 3.27 W/kg



0 dB = 3.27 W/kg = 5.15 dBW/kg

Impedance Measurement Plot for Body TSL



Certification of Calibration

Object	D835V2 – SN: 4d047
Calibration procedure(s)	Procedure for Calibration Extension for SAR Dipoles.
Calibration date:	July 13, 2017
Description:	SAR Validation Dipole at 835 MHz.

Calibration Equipment used:

Manufacturer	Model	Description	Cal Date	Cal Interval	Cal Due	Serial Number
Control Company	4040	Therm./Clock/Humidity Monitor	3/31/2017	Biennial	3/31/2019	170232394
Control Company	4352	Ultra Long Stem Thermometer	5/2/2017	Biennial	5/2/2019	170330156
Amplifier Research	15S1G6	Amplifier	CBT	N/A	CBT	433971
Narda	4772-3	Attenuator (3dB)	CBT	N/A	CBT	9406
Keysight Technologies	85033E	Standard Mechanical Calibration Kit (DC to 9GHz, 3.5mm)	6/1/2017	Annual	6/1/2018	MY53401181
Agilent	8753ES	S-Parameter Network Analyzer	10/26/2016	Annual	10/26/2017	US39170118
Mini-Circuits	BW-N20W5+	DC to 18 GHz Precision Fixed 20 dB Attenuator	CBT	N/A	CBT	N/A
SPEAG	DAE4	Dasy Data Acquisition Electronics	3/8/2017	Annual	3/8/2018	1368
SPEAG	DAE4	Dasy Data Acquisition Electronics	3/13/2017	Annual	3/13/2018	1415
SPEAG	DAK-3.5	Dielectric Assessment Kit	5/10/2017	Annual	5/10/2018	1070
SPEAG	ES3DV3	SAR Probe	3/14/2017	Annual	3/14/2018	3209
SPEAG	ES3DV3	SAR Probe	3/14/2017	Annual	3/14/2018	3319
Anritsu	MA2411B	Pulse Power Sensor	2/10/2017	Annual	2/10/2018	1207364
Anritsu	MA2411B	Pulse Power Sensor	2/10/2017	Annual	2/10/2018	1339018
Anritsu	ML2495A	Power Meter	10/16/2015	Biennial	10/16/2017	941001
Agilent	N5182A	MXG Vector Signal Generator	2/28/2017	Annual	2/28/2018	MY47420800
Seekonk	NC-100	Torque Wrench	11/6/2015	Biennial	11/6/2017	N/A
Mini-Circuits	NLP-2950+	Low Pass Filter DC to 2700 MHz	CBT	N/A	CBT	N/A
Pasternack	PE2208-6	Bidirectional Coupler	CBT	N/A	CBT	N/A

Measurement Uncertainty = ±23% (k=2)

	Name	Function	Signature
Calibrated By:	Brodie Halbfoster	Test Engineer	BRODIE HALBFOSTER
Approved By:	Kaitlin O'Keefe	Senior Technical Manager	KOK

DIPOLE CALIBRATION EXTENSION

Per KDB 865664 D01, calibration intervals of up to three years may be considered for reference dipoles when it is demonstrated that the SAR target, impedance and return loss of a dipole have remained stable according to the following requirements:

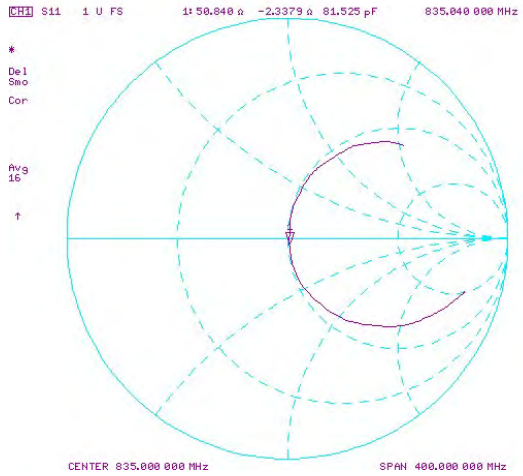
1. The measured SAR does not deviate more than 10% from the target on the calibration certificate.
2. The return-loss does not deviate more than 20% from the previous measurement and meets the required 20dB minimum return-loss requirement.
3. The measurement of real or imaginary parts of impedance does not deviate more than 5Ω from the previous measurement.

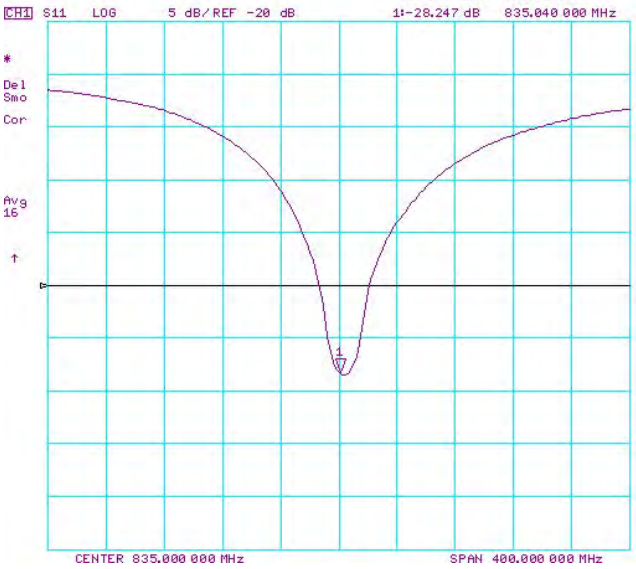
The following dipole was checked to pass the above 3 requirements to have 2-year calibration period from the calibration date:

Calibration Date	Extension Date	Certificate Electrical Delay (ns)	Certificate SAR Target Head (1g) W/kg @ 23.0 dBm	Measured Head SAR (1g) W/kg @ 23.0 dBm	Deviation 1g (%)	Certificate SAR Target Head (10g) W/kg @ 23.0 dBm	Measured Head SAR (10g) W/kg @ 23.0 dBm	Deviation 10g (%)	Certificate Impedance Head (Ohm) Real	Measured Impedance Head (Ohm) Real	Difference (Ohm) Real	Certificate Impedance Head (Ohm) Imaginary	Measured Impedance Head (Ohm) Imaginary	Difference (Ohm) Imaginary	Certificate Return Loss Head (dB)	Measured Return Loss Head (dB)	Deviation (%)	PASS/FAIL
7/13/2016	7/13/2017	0	1.83	1.95	6.79%	1.19	1.28	7.56%	49.8	50.8	1	-5.9	-2.3	3.6	-24.5	-28.2	-15.10%	PASS

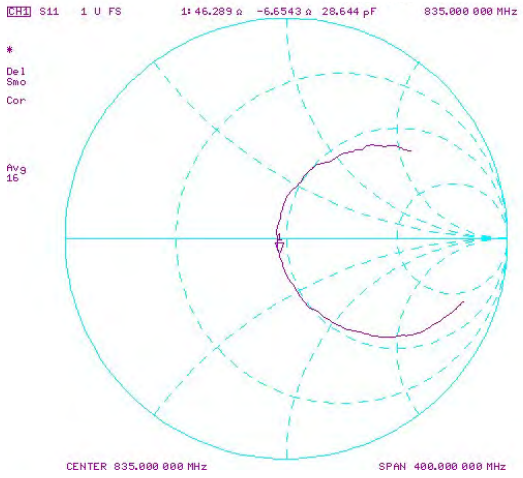
Calibration Date	Extension Date	Certificate Electrical Delay (ns)	Certificate SAR Target Body (1g) W/kg @ 23.0 dBm	Measured Body SAR (1g) W/kg @ 23.0 dBm	Deviation 1g (%)	Certificate SAR Target Body (10g) W/kg @ 23.0 dBm	Measured Body SAR (10g) W/kg @ 23.0 dBm	Deviation 10g (%)	Certificate Impedance Body (Ohm) Real	Measured Impedance Body (Ohm) Real	Difference (Ohm) Real	Certificate Impedance Body (Ohm) Imaginary	Measured Impedance Body (Ohm) Imaginary	Difference (Ohm) Imaginary	Certificate Return Loss Body (dB)	Measured Return Loss Body (dB)	Deviation (%)	PASS/FAIL
7/13/2016	7/13/2017	0	1.91	1.99	3.97%	1.25	1.31	4.97%	45.8	46.3	0.5	-8.2	-6.7	1.5	-20.3	-22.5	-10.80%	PASS

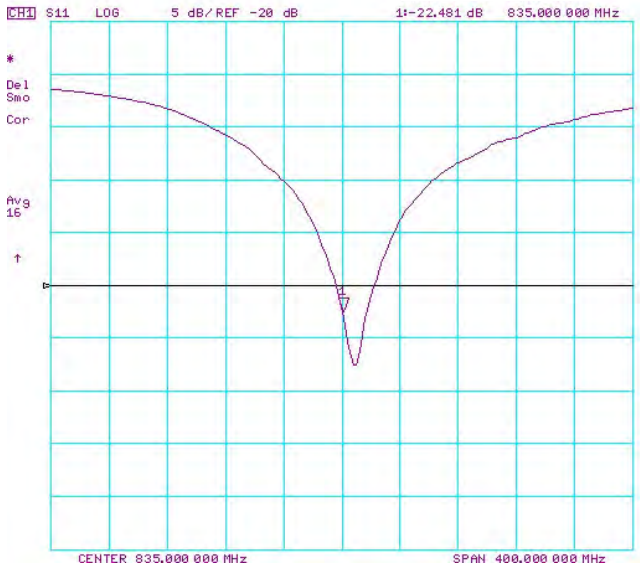
Impedance & Return-Loss Measurement Plot for Head TSL





Impedance & Return-Loss Measurement Plot for Body TSL





Calibration Laboratory of
Schmid & Partner
Engineering AG
Zeughausstrasse 43, 8004 Zurich, Switzerland

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Accreditation No.: SCS 0108

Client **PC Test**

Certificate No: D2450V2-719_Aug17

CALIBRATION CERTIFICATE

Object D2450V2 - SN:719

PM ✓ 8/27/17

Calibration procedure(s) QA CAL-05.v9
Calibration procedure for dipole validation kits above 700 MHz

Calibration date: August 17, 2017

This calibration certificate documents the traceability to national standards, which realize the physical units of measurements (SI).
The measurements and the uncertainties with confidence probability are given on the following pages and are part of the certificate.

All calibrations have been conducted in the closed laboratory facility: environment temperature (22 ± 3)°C and humidity < 70%.

Calibration Equipment used (M&TE critical for calibration)

Primary Standards	ID #	Cal Date (Certificate No.)	Scheduled Calibration
Power meter NRP	SN: 104778	04-Apr-17 (No. 217-02521/02522)	Apr-18
Power sensor NRP-Z91	SN: 103244	04-Apr-17 (No. 217-02521)	Apr-18
Power sensor NRP-Z91	SN: 103245	04-Apr-17 (No. 217-02522)	Apr-18
Reference 20 dB Attenuator	SN: 5058 (20k)	07-Apr-17 (No. 217-02528)	Apr-18
Type-N mismatch combination	SN: 5047.2 / 06327	07-Apr-17 (No. 217-02529)	Apr-18
Reference Probe EX3DV4	SN: 7349	31-May-17 (No. EX3-7349_May17)	May-18
DAE4	SN: 601	28-Mar-17 (No. DAE4-601_Mar17)	Mar-18

Secondary Standards	ID #	Check Date (in house)	Scheduled Check
Power meter EPM-442A	SN: GB37480704	07-Oct-15 (in house check Oct-16)	In house check: Oct-18
Power sensor HP 8481A	SN: US37292783	07-Oct-15 (in house check Oct-16)	In house check: Oct-18
Power sensor HP 8481A	SN: MY41092317	07-Oct-15 (in house check Oct-16)	In house check: Oct-18
RF generator R&S SMT-06	SN: 100972	15-Jun-15 (in house check Oct-16)	In house check: Oct-18
Network Analyzer HP 8753E	SN: US37390585	18-Oct-01 (in house check Oct-16)	In house check: Oct-17

	Name	Function	Signature
Calibrated by:	Michael Weber	Laboratory Technician	
Approved by:	Katja Pokovic	Technical Manager	

Issued: August 17, 2017

This calibration certificate shall not be reproduced except in full without written approval of the laboratory.

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Schmid & Partner
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Accreditation No.: SCS 0108

Glossary:

TSL	tissue simulating liquid
ConvF	sensitivity in TSL / NORM x,y,z
N/A	not applicable or not measured

Calibration is Performed According to the Following Standards:

a) IEEE Std 1528-2013, "IEEE Recommended Practice for Determining the Peak Spatial-Averaged Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques", June 2013
b) IEC 62209-1, "Measurement procedure for the assessment of Specific Absorption Rate (SAR) from hand-held and body-mounted devices used next to the ear (frequency range of 300 MHz to 6 GHz)", July 2016
c) IEC 62209-2, "Procedure to determine the Specific Absorption Rate (SAR) for wireless communication devices used in close proximity to the human body (frequency range of 30 MHz to 6 GHz)", March 2010
d) KDB 865664, "SAR Measurement Requirements for 100 MHz to 6 GHz"

Additional Documentation:

e) DASY4/5 System Handbook

Methods Applied and Interpretation of Parameters:

- *Measurement Conditions:* Further details are available from the Validation Report at the end of the certificate. All figures stated in the certificate are valid at the frequency indicated.
- *Antenna Parameters with TSL:* The dipole is mounted with the spacer to position its feed point exactly below the center marking of the flat phantom section, with the arms oriented parallel to the body axis.
- *Feed Point Impedance and Return Loss:* These parameters are measured with the dipole positioned under the liquid filled phantom. The impedance stated is transformed from the measurement at the SMA connector to the feed point. The Return Loss ensures low reflected power. No uncertainty required.
- *Electrical Delay:* One-way delay between the SMA connector and the antenna feed point. No uncertainty required.
- *SAR measured:* SAR measured at the stated antenna input power.
- *SAR normalized:* SAR as measured, normalized to an input power of 1 W at the antenna connector.
- *SAR for nominal TSL parameters:* The measured TSL parameters are used to calculate the nominal SAR result.

The reported uncertainty of measurement is stated as the standard uncertainty of measurement multiplied by the coverage factor k=2, which for a normal distribution corresponds to a coverage probability of approximately 95%.

Measurement Conditions

DASY system configuration, as far as not given on page 1.

DASY Version	DASY5	V52.10.0
Extrapolation	Advanced Extrapolation	
Phantom	Modular Flat Phantom	
Distance Dipole Center - TSL	10 mm	with Spacer
Zoom Scan Resolution	dx, dy, dz = 5 mm	
Frequency	2450 MHz ± 1 MHz	

Head TSL parameters

The following parameters and calculations were applied.

	Temperature	**Permittivity**	**Conductivity**
Nominal Head TSL parameters	22.0 °C	39.2	1.80 mho/m
Measured Head TSL parameters	(22.0 ± 0.2) °C	37.8 ± 6 %	1.86 mho/m ± 6 %
Head TSL temperature change during test	< 0.5 °C	----	----

SAR result with Head TSL

SAR averaged over 1 cm³ (1 g) of Head TSL	Condition	
SAR measured	250 mW input power	13.3 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**51.9 W/kg ± 17.0 % (k=2)**

SAR averaged over 10 cm³ (10 g) of Head TSL	condition	
SAR measured	250 mW input power	6.15 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**24.3 W/kg ± 16.5 % (k=2)**

Body TSL parameters

The following parameters and calculations were applied.

	Temperature	**Permittivity**	**Conductivity**
Nominal Body TSL parameters	22.0 °C	52.7	1.95 mho/m
Measured Body TSL parameters	(22.0 ± 0.2) °C	51.9 ± 6 %	2.03 mho/m ± 6 %
Body TSL temperature change during test	< 0.5 °C	----	----

SAR result with Body TSL

SAR averaged over 1 cm³ (1 g) of Body TSL	Condition	
SAR measured	250 mW input power	12.8 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	**50.1 W/kg ± 17.0 % (k=2)**

SAR averaged over 10 cm³ (10 g) of Body TSL	condition	
SAR measured	250 mW input power	6.00 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	**23.7 W/kg ± 16.5 % (k=2)**

Appendix (Additional assessments outside the scope of SCS 0108)

Antenna Parameters with Head TSL

Impedance, transformed to feed point	55.7 Ω + 7.0 jΩ
Return Loss	- 21.4 dB

Antenna Parameters with Body TSL

Impedance, transformed to feed point	51.4 Ω + 8.1 jΩ
Return Loss	- 21.8 dB

General Antenna Parameters and Design

Electrical Delay (one direction)	1.150 ns

After long term use with 100W radiated power, only a slight warming of the dipole near the feedpoint can be measured.

The dipole is made of standard semirigid coaxial cable. The center conductor of the feeding line is directly connected to the second arm of the dipole. The antenna is therefore short-circuited for DC-signals. On some of the dipoles, small end caps are added to the dipole arms in order to improve matching when loaded according to the position as explained in the "Measurement Conditions" paragraph. The SAR data are not affected by this change. The overall dipole length is still according to the Standard.
No excessive force must be applied to the dipole arms, because they might bend or the soldered connections near the feedpoint may be damaged.

Additional EUT Data

Manufactured by	SPEAG
Manufactured on	September 10, 2002

DASY5 Validation Report for Head TSL

Date: 17.08.2017

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole 2450 MHz; Type: D2450V2; Serial: D2450V2 - SN: 719

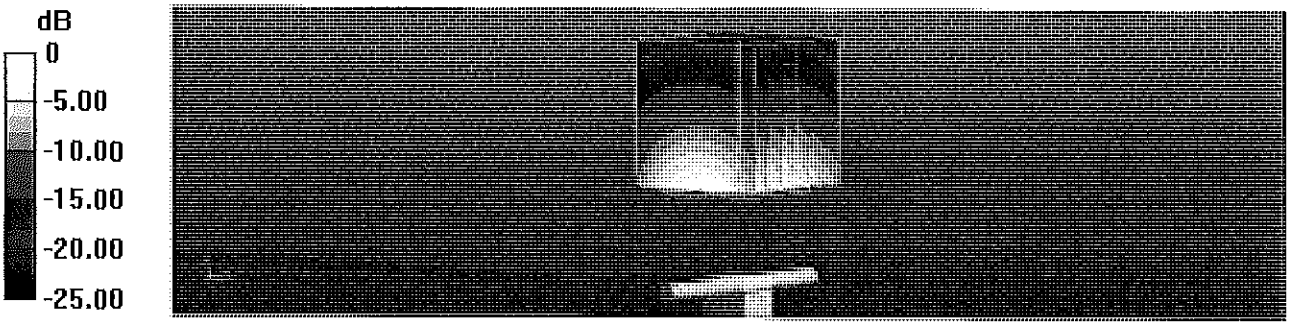
Communication System: UID 0 - CW; Frequency: 2450 MHz
Medium parameters used: f = 2450 MHz; σ = 1.86 S/m; ε_r = 37.8; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)

DASY52 Configuration:

- Probe: EX3DV4 - SN7349; ConvF(8.12, 8.12, 8.12); Calibrated: 31.05.2017;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 28.03.2017
- Phantom: Flat Phantom 5.0 (front); Type: QD 000 P50 AA; Serial: 1001
- DASY52 52.10.0(1446); SEMCAD X 14.6.10(7417)

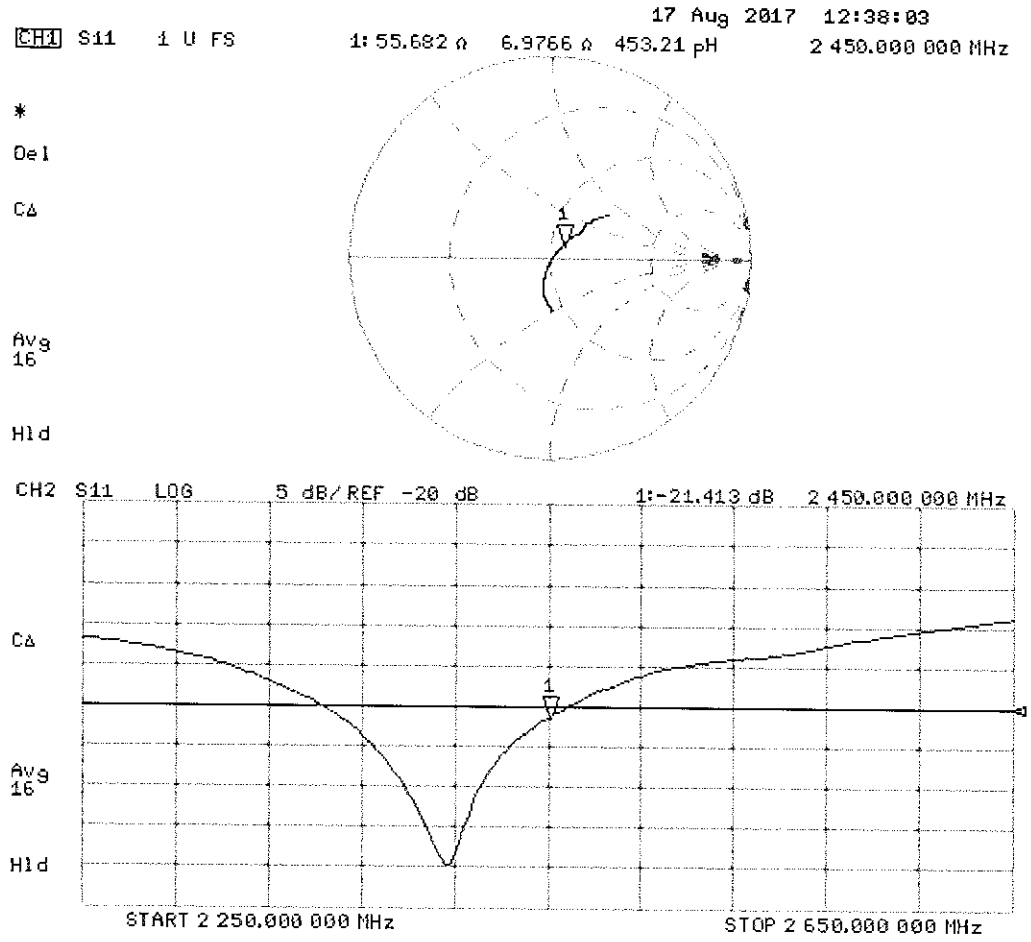
Dipole Calibration for Head Tissue/Pin=250 mW, d=10mm/Zoom Scan (7x7x7)/Cube 0:

Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 112.8 V/m; Power Drift = -0.01 dB
Peak SAR (extrapolated) = 26.9 W/kg
SAR(1 g) = 13.3 W/kg; SAR(10 g) = 6.15 W/kg
Maximum value of SAR (measured) = 21.6 W/kg



0 dB = 21.6 W/kg = 13.34 dBW/kg

Impedance Measurement Plot for Head TSL



DASY5 Validation Report for Body TSL

Date: 17.08.2017

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole 2450 MHz; Type: D2450V2; Serial: D2450V2 - SN: 719

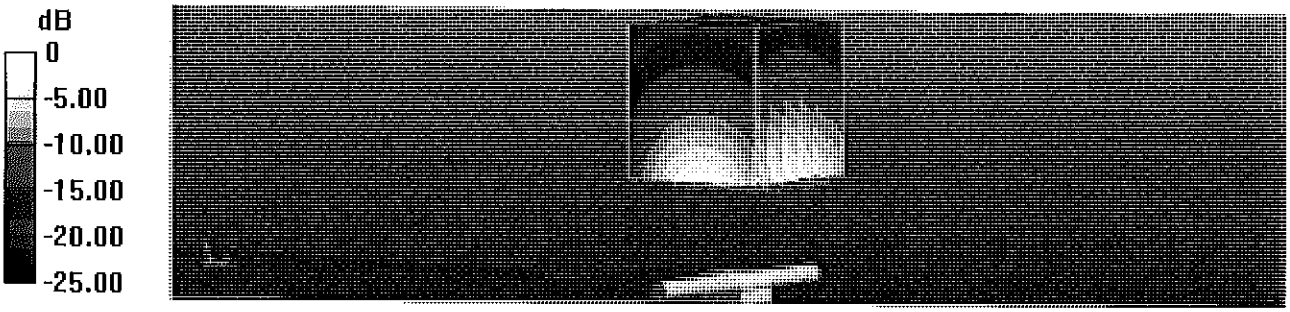
Communication System: UID 0 - CW; Frequency: 2450 MHz
Medium parameters used: f = 2450 MHz; σ = 2.03 S/m; ε_r = 51.9; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)

DASY52 Configuration:

- Probe: EX3DV4 - SN7349; ConvF(8.1, 8.1, 8.1); Calibrated: 31.05.2017;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 28.03.2017
- Phantom: Flat Phantom 5.0 (back); Type: QD 000 P50 AA; Serial: 1002
- DASY52 52.10.0(1446); SEMCAD X 14.6.10(7417)

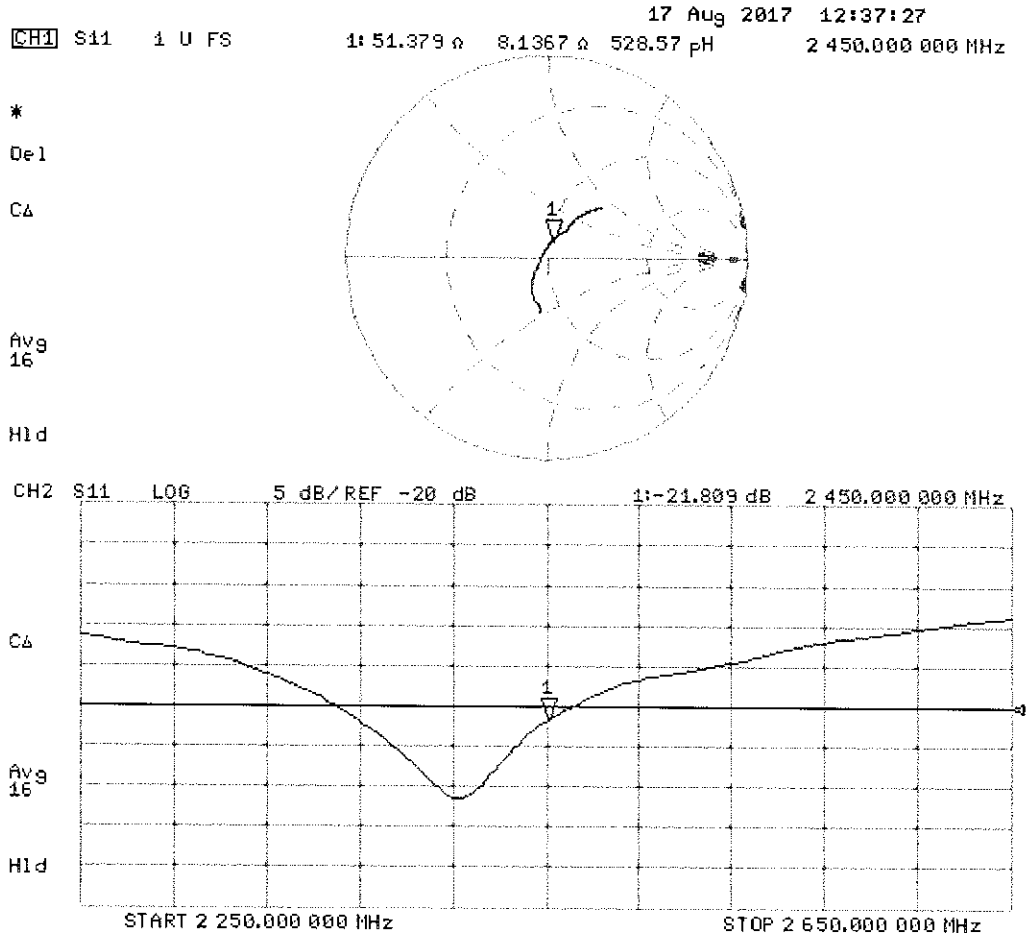
Dipole Calibration for Body Tissue/Pin=250 mW, d=10mm/Zoom Scan (7x7x7)/Cube 0:

Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 103.0 V/m; Power Drift = -0.07 dB
Peak SAR (extrapolated) = 25.2 W/kg
SAR(1 g) = 12.8 W/kg; SAR(10 g) = 6 W/kg
Maximum value of SAR (measured) = 19.8 W/kg



0 dB = 19.8 W/kg = 12.97 dBW/kg

Impedance Measurement Plot for Body TSL



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Accreditation No.: SCS 0108

Client **PC Test**

Certificate No: D2600V2-1064_Jun17

CALIBRATION CERTIFICATE

Object D2600V2 - SN:1064

Calibration procedure(s) QA CAL-05.v9
Calibration procedure for dipole validation kits above 700 MHz

BN
8/3/2017

Calibration date: June 07, 2017

This calibration certificate documents the traceability to national standards, which realize the physical units of measurements (SI).
The measurements and the uncertainties with confidence probability are given on the following pages and are part of the certificate.

All calibrations have been conducted in the closed laboratory facility: environment temperature (22 ± 3)°C and humidity < 70%.

Calibration Equipment used (M&TE critical for calibration)

Primary Standards	ID #	Cal Date (Certificate No.)	Scheduled Calibration
Power meter NRP	SN: 104778	04-Apr-17 (No. 217-02521/02522)	Apr-18
Power sensor NRP-Z91	SN: 103244	04-Apr-17 (No. 217-02521)	Apr-18
Power sensor NRP-Z91	SN: 103245	04-Apr-17 (No. 217-02522)	Apr-18
Reference 20 dB Attenuator	SN: 5058 (20k)	07-Apr-17 (No. 217-02528)	Apr-18
Type-N mismatch combination	SN: 5047.2 / 06327	07-Apr-17 (No. 217-02529)	Apr-18
Reference Probe EX3DV4	SN: 7349	31-Dec-16 (No. EX3-7349_Dec16)	Dec-17
DAE4	SN: 601	28-Mar-17 (No. DAE4-601_Mar17)	Mar-18

Secondary Standards	ID #	Check Date (in house)	Scheduled Check
Power meter EPM-442A	SN: GB37480704	07-Oct-15 (in house check Oct-16)	In house check: Oct-18
Power sensor HP 8481A	SN: US37292783	07-Oct-15 (in house check Oct-16)	In house check: Oct-18
Power sensor HP 8481A	SN: MY41092317	07-Oct-15 (in house check Oct-16)	In house check: Oct-18
RF generator R&S SMT-06	SN: 100972	15-Jun-15 (in house check Oct-16)	In house check: Oct-18
Network Analyzer HP 8753E	SN: US37390585	18-Oct-01 (in house check Oct-16)	In house check: Oct-17

	Name	Function	Signature
Calibrated by:	Johannes Kurikka	Laboratory Technician	
Approved by:	Katja Pokovic	Technical Manager	

Issued: June 8, 2017

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Accreditation No.: SCS 0108

Glossary:

TSL	tissue simulating liquid
ConvF	sensitivity in TSL / NORM x,y,z
N/A	not applicable or not measured

Calibration is Performed According to the Following Standards:

a) IEEE Std 1528-2013, "IEEE Recommended Practice for Determining the Peak Spatial-Averaged Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques", June 2013
b) IEC 62209-1, "Measurement procedure for the assessment of Specific Absorption Rate (SAR) from hand-held and body-mounted devices used next to the ear (frequency range of 300 MHz to 6 GHz)", July 2016
c) IEC 62209-2, "Procedure to determine the Specific Absorption Rate (SAR) for wireless communication devices used in close proximity to the human body (frequency range of 30 MHz to 6 GHz)", March 2010
d) KDB 865664, "SAR Measurement Requirements for 100 MHz to 6 GHz"

Additional Documentation:

e) DASY4/5 System Handbook

Methods Applied and Interpretation of Parameters:

- *Measurement Conditions:* Further details are available from the Validation Report at the end of the certificate. All figures stated in the certificate are valid at the frequency indicated.
- *Antenna Parameters with TSL:* The dipole is mounted with the spacer to position its feed point exactly below the center marking of the flat phantom section, with the arms oriented parallel to the body axis.
- *Feed Point Impedance and Return Loss:* These parameters are measured with the dipole positioned under the liquid filled phantom. The impedance stated is transformed from the measurement at the SMA connector to the feed point. The Return Loss ensures low reflected power. No uncertainty required.
- *Electrical Delay:* One-way delay between the SMA connector and the antenna feed point. No uncertainty required.
- *SAR measured:* SAR measured at the stated antenna input power.
- *SAR normalized:* SAR as measured, normalized to an input power of 1 W at the antenna connector.
- *SAR for nominal TSL parameters:* The measured TSL parameters are used to calculate the nominal SAR result.

The reported uncertainty of measurement is stated as the standard uncertainty of measurement multiplied by the coverage factor k=2, which for a normal distribution corresponds to a coverage probability of approximately 95%.

Measurement Conditions

DASY system configuration, as far as not given on page 1.

DASY Version	DASY5	V52.10.0
Extrapolation	Advanced Extrapolation	
Phantom	Modular Flat Phantom	
Distance Dipole Center - TSL	10 mm	with Spacer
Zoom Scan Resolution	dx, dy, dz = 5 mm	
Frequency	2600 MHz ± 1 MHz	

Head TSL parameters

The following parameters and calculations were applied.

	Temperature	**Permittivity**	**Conductivity**
Nominal Head TSL parameters	22.0 °C	39.0	1.96 mho/m
Measured Head TSL parameters	(22.0 ± 0.2) °C	37.3 ± 6 %	2.02 mho/m ± 6 %
Head TSL temperature change during test	< 0.5 °C	----	----

SAR result with Head TSL

SAR averaged over 1 cm³ (1 g) of Head TSL	Condition	
SAR measured	250 mW input power	14.6 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**57.0 W/kg ± 17.0 % (k=2)**

SAR averaged over 10 cm³ (10 g) of Head TSL	condition	
SAR measured	250 mW input power	6.46 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**25.5 W/kg ± 16.5 % (k=2)**

Body TSL parameters

The following parameters and calculations were applied.

	Temperature	**Permittivity**	**Conductivity**
Nominal Body TSL parameters	22.0 °C	52.5	2.16 mho/m
Measured Body TSL parameters	(22.0 ± 0.2) °C	51.7 ± 6 %	2.22 mho/m ± 6 %
Body TSL temperature change during test	< 0.5 °C	----	----

SAR result with Body TSL

SAR averaged over 1 cm³ (1 g) of Body TSL	Condition	
SAR measured	250 mW input power	13.9 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	**54.7 W/kg ± 17.0 % (k=2)**

SAR averaged over 10 cm³ (10 g) of Body TSL	condition	
SAR measured	250 mW input power	6.15 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	**24.4 W/kg ± 16.5 % (k=2)**

Appendix (Additional assessments outside the scope of SCS 0108)

Antenna Parameters with Head TSL

Impedance, transformed to feed point	49.4 Ω - 6.3 jΩ
Return Loss	- 23.9 dB

Antenna Parameters with Body TSL

Impedance, transformed to feed point	46.4 Ω - 4.1 jΩ
Return Loss	- 25.0 dB

General Antenna Parameters and Design

Electrical Delay (one direction)	1.151 ns

After long term use with 100W radiated power, only a slight warming of the dipole near the feedpoint can be measured.

The dipole is made of standard semirigid coaxial cable. The center conductor of the feeding line is directly connected to the second arm of the dipole. The antenna is therefore short-circuited for DC-signals. On some of the dipoles, small end caps are added to the dipole arms in order to improve matching when loaded according to the position as explained in the "Measurement Conditions" paragraph. The SAR data are not affected by this change. The overall dipole length is still according to the Standard.
No excessive force must be applied to the dipole arms, because they might bend or the soldered connections near the feedpoint may be damaged.

Additional EUT Data

Manufactured by	SPEAG
Manufactured on	August 14, 2012

DASY5 Validation Report for Head TSL

Date: 07.06.2017

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole 2600 MHz; Type: D2600V2; Serial: D2600V2 - SN:1064

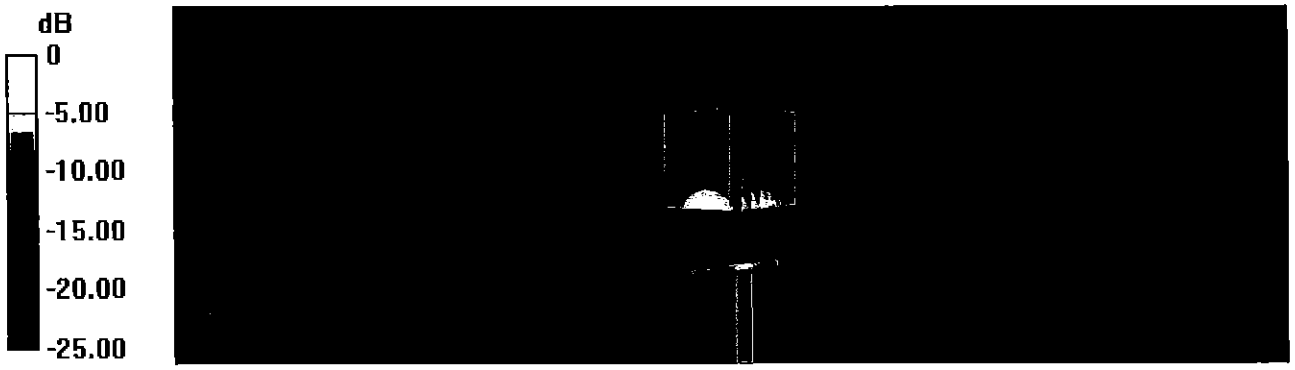
Communication System: UID 0 - CW; Frequency: 2600 MHz
Medium parameters used: f = 2600 MHz; σ = 2.02 S/m; ε_r = 37.3; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)

DASY52 Configuration:

- Probe: EX3DV4 - SN7349; ConvF(7.96, 7.96, 7.96); Calibrated: 31.05.2017;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 28.03.2017
- Phantom: Flat Phantom 5.0 (front); Type: QD 000 P50 AA; Serial: 1001
- DASY52 52.10.0(1446); SEMCAD X 14.6.10(7417)

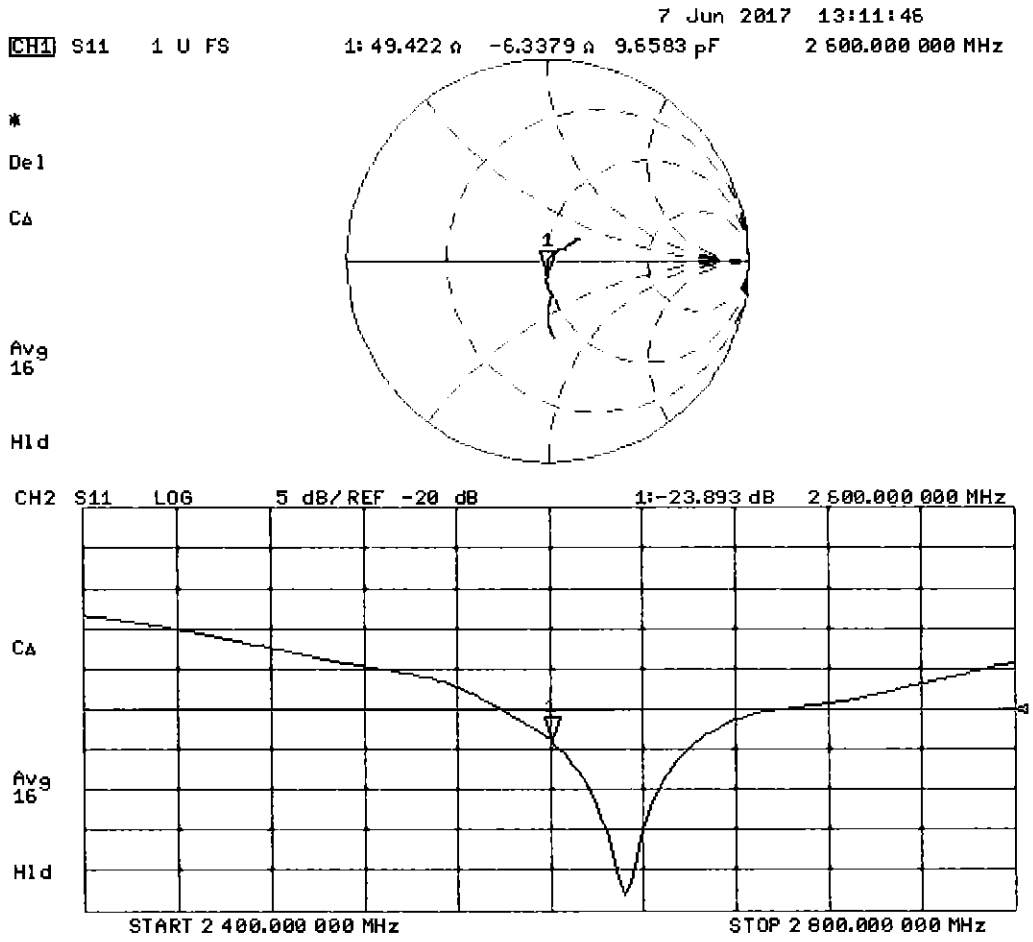
Dipole Calibration for Head Tissue/Pin=250 mW, d=10mm/Zoom Scan (7x7x7)/Cube 0:

Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 115.9 V/m; Power Drift = -0.07 dB
Peak SAR (extrapolated) = 32.1 W/kg
SAR(1 g) = 14.6 W/kg; SAR(10 g) = 6.46 W/kg
Maximum value of SAR (measured) = 24.5 W/kg



0 dB = 24.5 W/kg = 13.89 dBW/kg

Impedance Measurement Plot for Head TSL



DASY5 Validation Report for Body TSL

Date: 07.06.2017

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole 2600 MHz; Type: D2600V2; Serial: D2600V2 - SN:1064

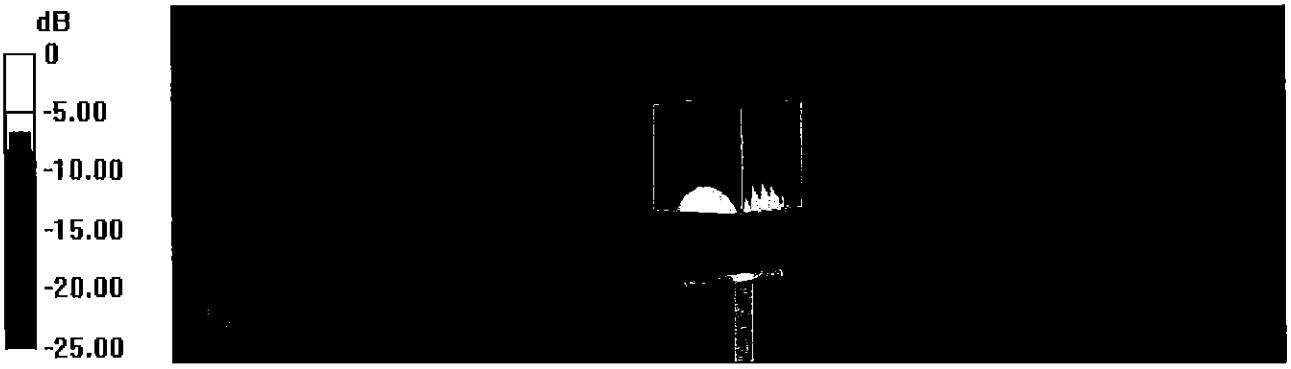
Communication System: UID 0 - CW; Frequency: 2600 MHz
Medium parameters used: f = 2600 MHz; σ = 2.22 S/m; ε_r = 51.7; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)

DASY52 Configuration:

- Probe: EX3DV4 - SN7349; ConvF(7.94, 7.94, 7.94); Calibrated: 31.05.2017;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 28.03.2017
- Phantom: Flat Phantom 5.0 (back); Type: QD 000 P50 AA; Serial: 1002
- DASY52 52.10.0(1446); SEMCAD X 14.6.10(7417)

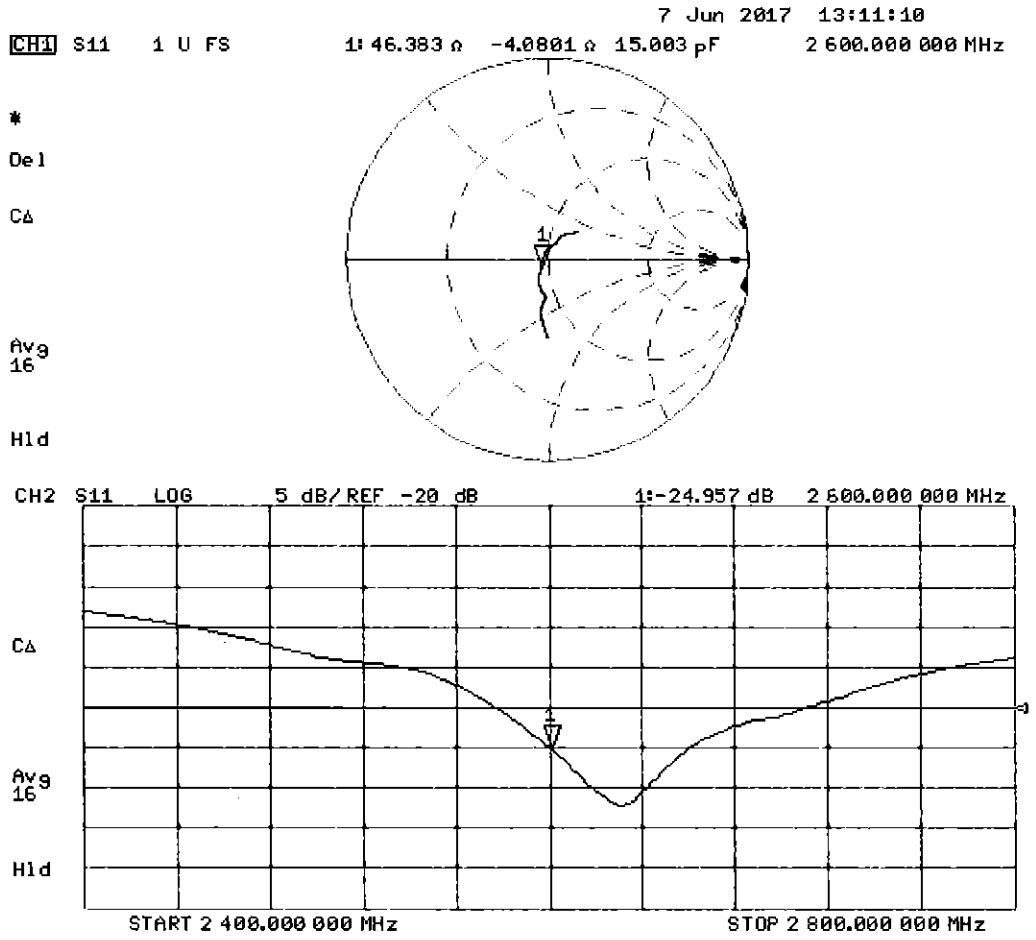
Dipole Calibration for Body Tissue/Pin=250 mW, d=10mm/Zoom Scan (7x7x7)/Cube 0:

Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 101.9 V/m; Power Drift = -0.04 dB
Peak SAR (extrapolated) = 29.8 W/kg
SAR(1 g) = 13.9 W/kg; SAR(10 g) = 6.15 W/kg
Maximum value of SAR (measured) = 22.4 W/kg



0 dB = 22.4 W/kg = 13.50 dBW/kg

Impedance Measurement Plot for Body TSL



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Accreditation No.: SCS 0108

Client **PC Test**

Certificate No: D5GHzV2-1237_Aug17

CALIBRATION CERTIFICATE

Object	D5GHzV2 - SN:1237
Calibration procedure(s)	QA CAL-22.v2 Calibration procedure for dipole validation kits between 3-6 GHz
Calibration date:	August 15, 2017

PMV 8/27/17

This calibration certificate documents the traceability to national standards, which realize the physical units of measurements (SI).
The measurements and the uncertainties with confidence probability are given on the following pages and are part of the certificate.

All calibrations have been conducted in the closed laboratory facility: environment temperature (22 ± 3)°C and humidity < 70%.

Calibration Equipment used (M&TE critical for calibration)

Primary Standards	ID #	Cal Date (Certificate No.)	Scheduled Calibration
Power meter NRP	SN: 104778	04-Apr-17 (No. 217-02521/02522)	Apr-18
Power sensor NRP-Z91	SN: 103244	04-Apr-17 (No. 217-02521)	Apr-18
Power sensor NRP-Z91	SN: 103245	04-Apr-17 (No. 217-02522)	Apr-18
Reference 20 dB Attenuator	SN: 5058 (20k)	07-Apr-17 (No. 217-02528)	Apr-18
Type-N mismatch combination	SN: 5047.2 / 06327	07-Apr-17 (No. 217-02529)	Apr-18
Reference Probe EX3DV4	SN: 3503	31-Dec-16 (No. EX3-3503_Dec16)	Dec-17
DAE4	SN: 601	28-Mar-17 (No. DAE4-601_Mar17)	Mar-18

Secondary Standards	ID #	Check Date (in house)	Scheduled Check
Power meter EPM-442A	SN: GB37480704	07-Oct-15 (in house check Oct-16)	In house check: Oct-18
Power sensor HP 8481A	SN: US37292783	07-Oct-15 (in house check Oct-16)	In house check: Oct-18
Power sensor HP 8481A	SN: MY41092317	07-Oct-15 (in house check Oct-16)	In house check: Oct-18
RF generator R&S SMT-06	SN: 100972	15-Jun-15 (in house check Oct-16)	In house check: Oct-18
Network Analyzer HP 8753E	SN: US37390585	18-Oct-01 (in house check Oct-16)	In house check: Oct-17

	Name	Function	Signature
Calibrated by:	Johannes Kurikka	Laboratory Technician	
Approved by:	Katja Pokovic	Technical Manager	

Issued: August 16, 2017

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Accreditation No.: SCS 0108

Glossary:

TSL	tissue simulating liquid
ConvF	sensitivity in TSL / NORM x,y,z
N/A	not applicable or not measured

Calibration is Performed According to the Following Standards:

a) IEEE Std 1528-2013, "IEEE Recommended Practice for Determining the Peak Spatial-Averaged Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques", June 2013
b) IEC 62209-1, "Measurement procedure for the assessment of Specific Absorption Rate (SAR) from hand-held and body-mounted devices used next to the ear (frequency range of 300 MHz to 6 GHz)", July 2016
c) IEC 62209-2, "Procedure to determine the Specific Absorption Rate (SAR) for wireless communication devices used in close proximity to the human body (frequency range of 30 MHz to 6 GHz)", March 2010
d) KDB 865664, "SAR Measurement Requirements for 100 MHz to 6 GHz"

Additional Documentation:

e) DASY4/5 System Handbook

Methods Applied and Interpretation of Parameters:

- *Measurement Conditions:* Further details are available from the Validation Report at the end of the certificate. All figures stated in the certificate are valid at the frequency indicated.
- *Antenna Parameters with TSL:* The dipole is mounted with the spacer to position its feed point exactly below the center marking of the flat phantom section, with the arms oriented parallel to the body axis.
- *Feed Point Impedance and Return Loss:* These parameters are measured with the dipole positioned under the liquid filled phantom. The impedance stated is transformed from the measurement at the SMA connector to the feed point. The Return Loss ensures low reflected power. No uncertainty required.
- *Electrical Delay:* One-way delay between the SMA connector and the antenna feed point. No uncertainty required.
- *SAR measured:* SAR measured at the stated antenna input power.
- *SAR normalized:* SAR as measured, normalized to an input power of 1 W at the antenna connector.
- *SAR for nominal TSL parameters:* The measured TSL parameters are used to calculate the nominal SAR result.

The reported uncertainty of measurement is stated as the standard uncertainty of measurement multiplied by the coverage factor k=2, which for a normal distribution corresponds to a coverage probability of approximately 95%.

Measurement Conditions

DASY system configuration, as far as not given on page 1.

DASY Version	DASY5	V52.10.0
Extrapolation	Advanced Extrapolation	
Phantom	Modular Flat Phantom V5.0	
Distance Dipole Center - TSL	10 mm	with Spacer
Zoom Scan Resolution	dx, dy = 4.0 mm, dz = 1.4 mm	Graded Ratio = 1.4 (Z direction)
Frequency	5250 MHz ± 1 MHz 5600 MHz ± 1 MHz 5750 MHz ± 1 MHz	

Head TSL parameters at 5250 MHz

The following parameters and calculations were applied.

	Temperature	**Permittivity**	**Conductivity**
Nominal Head TSL parameters	22.0 °C	35.9	4.71 mho/m
Measured Head TSL parameters	(22.0 ± 0.2) °C	34.7 ± 6 %	4.49 mho/m ± 6 %
Head TSL temperature change during test	< 0.5 °C	----	----

SAR result with Head TSL at 5250 MHz

SAR averaged over 1 cm³ (1 g) of Head TSL	Condition	
SAR measured	100 mW input power	8.14 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**80.7 W/kg ± 19.9 % (k=2)**

SAR averaged over 10 cm³ (10 g) of Head TSL	condition	
SAR measured	100 mW input power	2.33 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**23.0 W/kg ± 19.5 % (k=2)**

Head TSL parameters at 5600 MHz

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Head TSL parameters	22.0 °C	35.5	5.07 mho/m
Measured Head TSL parameters	(22.0 ± 0.2) °C	34.2 ± 6 %	4.84 mho/m ± 6 %
Head TSL temperature change during test	< 0.5 °C	----	----

SAR result with Head TSL at 5600 MHz

SAR averaged over 1 cm³ (1 g) of Head TSL	Condition	
SAR measured	100 mW input power	8.33 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**82.5 W / kg ± 19.9 % (k=2)**

SAR averaged over 10 cm³ (10 g) of Head TSL	condition	
SAR measured	100 mW input power	2.38 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**23.5 W/kg ± 19.5 % (k=2)**

Head TSL parameters at 5750 MHz

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Head TSL parameters	22.0 °C	35.4	5.22 mho/m
Measured Head TSL parameters	(22.0 ± 0.2) °C	34.0 ± 6 %	4.99 mho/m ± 6 %
Head TSL temperature change during test	< 0.5 °C	----	----

SAR result with Head TSL at 5750 MHz

SAR averaged over 1 cm³ (1 g) of Head TSL	Condition	
SAR measured	100 mW input power	8.10 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**80.2 W/kg ± 19.9 % (k=2)**

SAR averaged over 10 cm³ (10 g) of Head TSL	condition	
SAR measured	100 mW input power	2.31 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**22.8 W/kg ± 19.5 % (k=2)**

Body TSL parameters at 5250 MHz

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Body TSL parameters	22.0 °C	48.9	5.36 mho/m
Measured Body TSL parameters	(22.0 ± 0.2) °C	47.0 ± 6 %	5.46 mho/m ± 6 %
Body TSL temperature change during test	< 0.5 °C	----	----

SAR result with Body TSL at 5250 MHz

SAR averaged over 1 cm³ (1 g) of Body TSL	Condition	
SAR measured	100 mW input power	7.75 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	**76.9 W/kg ± 19.9 % (k=2)**

SAR averaged over 10 cm³ (10 g) of Body TSL	condition	
SAR measured	100 mW input power	2.17 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	**21.5 W/kg ± 19.5 % (k=2)**

Body TSL parameters at 5600 MHz

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Body TSL parameters	22.0 °C	48.5	5.77 mho/m
Measured Body TSL parameters	(22.0 ± 0.2) °C	46.4 ± 6 %	5.93 mho/m ± 6 %
Body TSL temperature change during test	< 0.5 °C	----	----

SAR result with Body TSL at 5600 MHz

SAR averaged over 1 cm³ (1 g) of Body TSL	Condition	
SAR measured	100 mW input power	7.91 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	**78.5 W/kg ± 19.9 % (k=2)**

SAR averaged over 10 cm³ (10 g) of Body TSL	condition	
SAR measured	100 mW input power	2.23 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	**22.1 W/kg ± 19.5 % (k=2)**

Body TSL parameters at 5750 MHz

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Body TSL parameters	22.0 °C	48.3	5.94 mho/m
Measured Body TSL parameters	(22.0 ± 0.2) °C	46.2 ± 6 %	6.13 mho/m ± 6 %
Body TSL temperature change during test	< 0.5 °C	----	----

SAR result with Body TSL at 5750 MHz

SAR averaged over 1 cm³ (1 g) of Body TSL	Condition	
SAR measured	100 mW input power	7.77 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	**77.1 W/kg ± 19.9 % (k=2)**

SAR averaged over 10 cm³ (10 g) of Body TSL	condition	
SAR measured	100 mW input power	2.16 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	**21.4 W/kg ± 19.5 % (k=2)**

Appendix (Additional assessments outside the scope of SCS 0108)

Antenna Parameters with Head TSL at 5250 MHz

Impedance, transformed to feed point	49.9 Ω - 5.3 jΩ
Return Loss	- 25.5 dB

Antenna Parameters with Head TSL at 5600 MHz

Impedance, transformed to feed point	51.9 Ω + 2.3 jΩ
Return Loss	- 30.7 dB

Antenna Parameters with Head TSL at 5750 MHz

Impedance, transformed to feed point	55.6 Ω - 0.5 jΩ
Return Loss	- 25.5 dB

Antenna Parameters with Body TSL at 5250 MHz

Impedance, transformed to feed point	46.9 Ω - 4.2 jΩ
Return Loss	- 25.4 dB

Antenna Parameters with Body TSL at 5600 MHz

Impedance, transformed to feed point	50.2 Ω + 3.0 jΩ
Return Loss	- 30.4 dB

Antenna Parameters with Body TSL at 5750 MHz

Impedance, transformed to feed point	53.4 Ω + 0.2 jΩ
Return Loss	- 29.7 dB

General Antenna Parameters and Design

Electrical Delay (one direction)	1.194 ns

After long term use with 100W radiated power, only a slight warming of the dipole near the feedpoint can be measured.

The dipole is made of standard semirigid coaxial cable. The center conductor of the feeding line is directly connected to the second arm of the dipole. The antenna is therefore short-circuited for DC-signals. On some of the dipoles, small end caps are added to the dipole arms in order to improve matching when loaded according to the position as explained in the "Measurement Conditions" paragraph. The SAR data are not affected by this change. The overall dipole length is still according to the Standard.
No excessive force must be applied to the dipole arms, because they might bend or the soldered connections near the feedpoint may be damaged.

Additional EUT Data

Manufactured by	SPEAG
Manufactured on	May 04, 2015

DASY5 Validation Report for Head TSL

Date: 15.08.2017

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole D5GHzV2; Type: D5GHzV2; Serial: D5GHzV2 - SN: 1237

Communication System: UID 0 - CW; Frequency: 5250 MHz, Frequency: 5600 MHz, Frequency: 5750 MHz
Medium parameters used: f = 5250 MHz; σ = 4.49 S/m; ε_r = 34.7; ρ = 1000 kg/m^3 ,
Medium parameters used: f = 5600 MHz; σ = 4.84 S/m; ε_r = 34.2; ρ = 1000 kg/m^3 ,
Medium parameters used: f = 5750 MHz; σ = 4.99 S/m; ε_r = 34; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)

DASY52 Configuration:

- Probe: EX3DV4 - SN3503; ConvF(5.58, 5.58, 5.58); Calibrated: 31.12.2016, ConvF(5.09, 5.09, 5.09); Calibrated: 31.12.2016, ConvF(5.02, 5.02, 5.02); Calibrated: 31.12.2016;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 28.03.2017
- Phantom: Flat Phantom 5.0 (front); Type: QD 000 P50 AA; Serial: 1001
- DASY52 52.10.0(1446); SEMCAD X 14.6.10(7417)

Dipole Calibration for Head Tissue/Pin=100mW, dist=10mm, f=5250 MHz/Zoom Scan, dist=1.4mm (8x8x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm

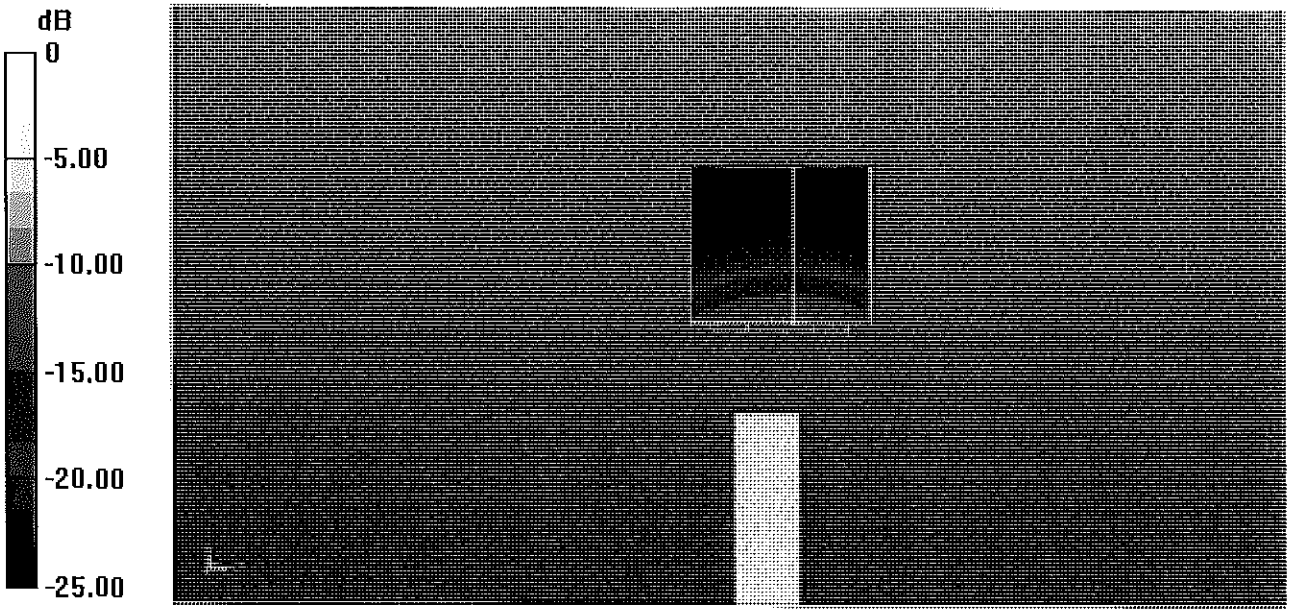
Reference Value = 70.08 V/m; Power Drift = -0.06 dB
Peak SAR (extrapolated) = 30.6 W/kg
SAR(1 g) = 8.14 W/kg; SAR(10 g) = 2.33 W/kg
Maximum value of SAR (measured) = 19.2 W/kg

Dipole Calibration for Head Tissue/Pin=100mW, dist=10mm, f=5600 MHz/Zoom Scan, dist=1.4mm (8x8x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm

Reference Value = 70.04 V/m; Power Drift = -0.06 dB
Peak SAR (extrapolated) = 32.7 W/kg
SAR(1 g) = 8.33 W/kg; SAR(10 g) = 2.38 W/kg
Maximum value of SAR (measured) = 19.8 W/kg

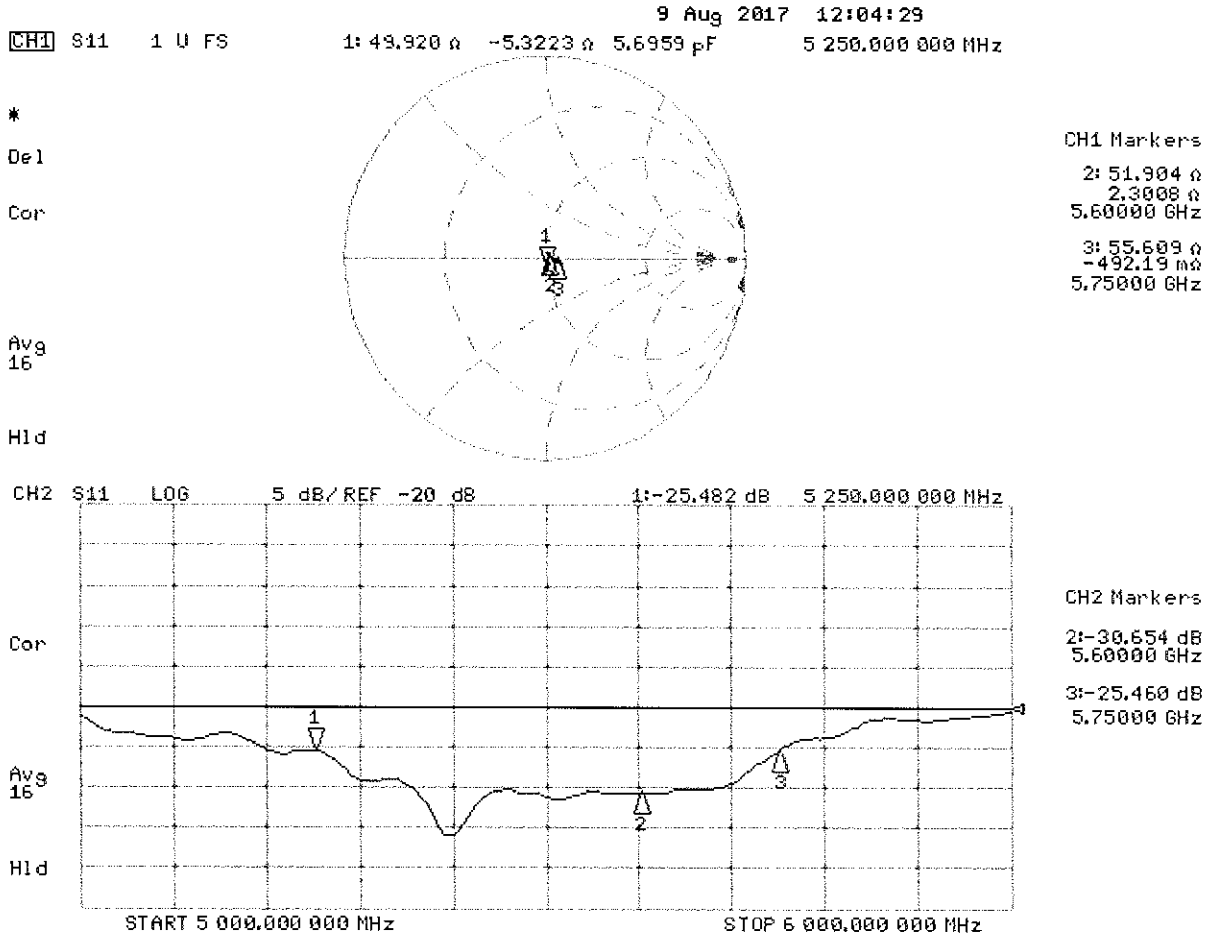
Dipole Calibration for Head Tissue/Pin=100mW, dist=10mm, f=5750 MHz/Zoom Scan, dist=1.4mm (8x8x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm

Reference Value = 69.11 V/m; Power Drift = -0.09 dB
Peak SAR (extrapolated) = 32.4 W/kg
SAR(1 g) = 8.1 W/kg; SAR(10 g) = 2.31 W/kg
Maximum value of SAR (measured) = 19.6 W/kg



0 dB = 19.2 W/kg = 12.83 dBW/kg

Impedance Measurement Plot for Head TSL



DASY5 Validation Report for Body TSL

Date: 08.08.2017

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole D5GHzV2; Type: D5GHzV2; Serial: D5GHzV2 - SN: 1237

Communication System: UID 0 - CW; Frequency: 5250 MHz, Frequency: 5600 MHz, Frequency: 5750 MHz
Medium parameters used: f = 5250 MHz; σ = 5.46 S/m; ε_r = 47; ρ = 1000 kg/m^3 ,
Medium parameters used: f = 5600 MHz; σ = 5.93 S/m; ε_r = 46.4; ρ = 1000 kg/m^3 ,
Medium parameters used: f = 5750 MHz; σ = 6.13 S/m; ε_r = 46.2; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)

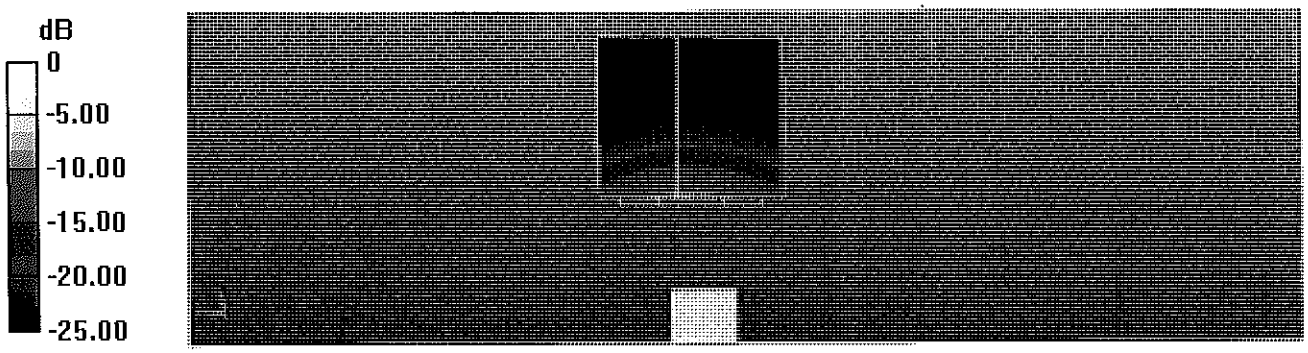
DASY52 Configuration:

- Probe: EX3DV4 - SN3503; ConvF(5.14, 5.14, 5.14); Calibrated: 31.12.2016, ConvF(4.57, 4.57, 4.57); Calibrated: 31.12.2016, ConvF(4.51, 4.51, 4.51); Calibrated: 31.12.2016;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 28.03.2017
- Phantom: Flat Phantom 5.0 (back); Type: QD 000 P50 AA; Serial: 1002
- DASY52 52.10.0(1446); SEMCAD X 14.6.10(7417)

Dipole Calibration for Body Tissue/Pin=100mW, dist=10mm, f=5250MHz/Zoom Scan, dist=1.4mm (8x8x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm
Reference Value = 65.87 V/m; Power Drift = -0.05 dB
Peak SAR (extrapolated) = 29.9 W/kg
SAR(1 g) = 7.75 W/kg; SAR(10 g) = 2.17 W/kg
Maximum value of SAR (measured) = 18.4 W/kg

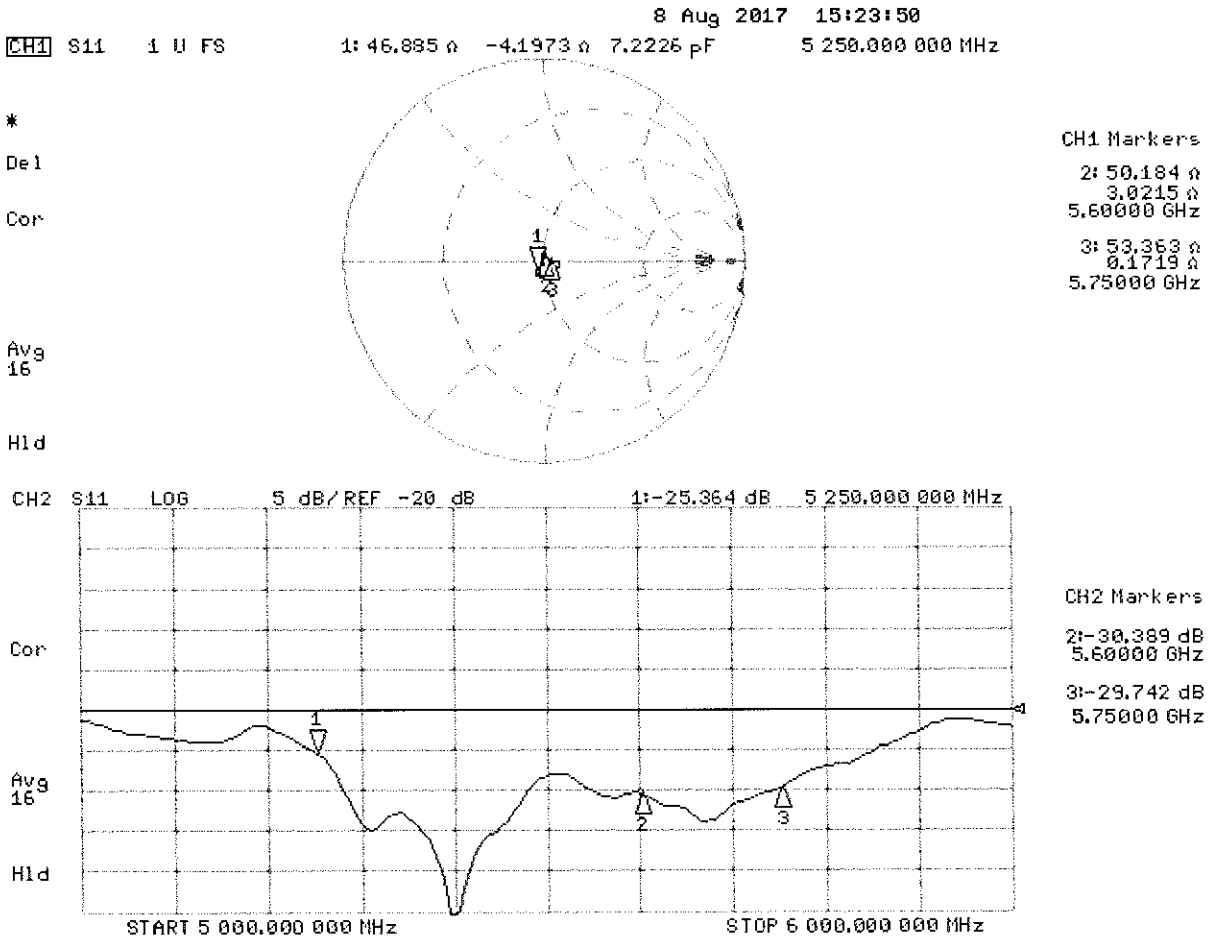
Dipole Calibration for Body Tissue/Pin=100mW, dist=10mm, f=5600 MHz/Zoom Scan, dist=1.4mm (8x8x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm
Reference Value = 65.11 V/m; Power Drift = -0.05 dB
Peak SAR (extrapolated) = 33.0 W/kg
SAR(1 g) = 7.91 W/kg; SAR(10 g) = 2.23 W/kg
Maximum value of SAR (measured) = 19.3 W/kg

Dipole Calibration for Body Tissue/Pin=100mW, dist=10mm, f=5750 MHz/Zoom Scan, dist=1.4mm (8x8x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm
Reference Value = 63.64 V/m; Power Drift = -0.08 dB
Peak SAR (extrapolated) = 33.8 W/kg
SAR(1 g) = 7.77 W/kg; SAR(10 g) = 2.16 W/kg
Maximum value of SAR (measured) = 19.1 W/kg



0 dB = 18.4 W/kg = 12.65 dBW/kg

Impedance Measurement Plot for Body TSL



Calibration Laboratory of
Schmid & Partner
Engineering AG
Zeughausstrasse 43, 8004 Zurich, Switzerland

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Accreditation No.: SCS 0108

Client **PC Test**

Certificate No: ES3-3318_Sep17

CALIBRATION CERTIFICATE

Object ES3DV3 - SN:3318

Calibration procedure(s) QA CAL-01.v9, QA CAL-23.v5, QA CAL-25.v6
Calibration procedure for dosimetric E-field probes

SLV
10/03/2017

Calibration date: September 22, 2017

This calibration certificate documents the traceability to national standards, which realize the physical units of measurements (SI).
The measurements and the uncertainties with confidence probability are given on the following pages and are part of the certificate.

All calibrations have been conducted in the closed laboratory facility: environment temperature (22 ± 3)°C and humidity < 70%.

Calibration Equipment used (M&TE critical for calibration)

Primary Standards	ID	Cal Date (Certificate No.)	Scheduled Calibration
Power meter NRP	SN: 104778	04-Apr-17 (No. 217-02521/02522)	Apr-18
Power sensor NRP-Z91	SN: 103244	04-Apr-17 (No. 217-02521)	Apr-18
Power sensor NRP-Z91	SN: 103245	04-Apr-17 (No. 217-02525)	Apr-18
Reference 20 dB Attenuator	SN: S5277 (20x)	07-Apr-17 (No. 217-02528)	Apr-18
Reference Probe ES3DV2	SN: 3013	31-Dec-16 (No. ES3-3013_Dec16)	Dec-17
DAE4	SN: 660	7-Dec-16 (No. DAE4-660_Dec16)	Dec-17
Secondary Standards	ID	Check Date (in house)	Scheduled Check
Power meter E4419B	SN: GB41293874	06-Apr-16 (in house check Jun-16)	In house check: Jun-18
Power sensor E4412A	SN: MY41498087	06-Apr-16 (in house check Jun-16)	In house check: Jun-18
Power sensor E4412A	SN: 000110210	06-Apr-16 (in house check Jun-16)	In house check: Jun-18
RF generator HP 8648C	SN: US3642U01700	04-Aug-99 (in house check Jun-16)	In house check: Jun-18
Network Analyzer HP 8753E	SN: US37390585	18-Oct-01 (in house check Oct-16)	In house check: Oct-17

	Name	Function	Signature
Calibrated by:	Jeton Kastrati	Laboratory Technician	
Approved by:	Katja Pokovic	Technical Manager	

Issued: September 22, 2017

This calibration certificate shall not be reproduced except in full without written approval of the laboratory.

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Accreditation No.: SCS 0108

Glossary:

TSL	tissue simulating liquid
NORMx,y,z	sensitivity in free space
ConvF	sensitivity in TSL / NORMx,y,z
DCP	diode compression point
CF	crest factor (1/duty_cycle) of the RF signal
A, B, C, D	modulation dependent linearization parameters
Polarization φ	φ rotation around probe axis
Polarization ϑ	ϑ rotation around an axis that is in the plane normal to probe axis (at measurement center), i.e., ϑ = 0 is normal to probe axis
Connector Angle	information used in DASY system to align probe sensor X to the robot coordinate system

Calibration is Performed According to the Following Standards:

a) IEEE Std 1528-2013, "IEEE Recommended Practice for Determining the Peak Spatial-Averaged Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques", June 2013
b) IEC 62209-1, ", "Measurement procedure for the assessment of Specific Absorption Rate (SAR) from hand-held and body-mounted devices used next to the ear (frequency range of 300 MHz to 6 GHz)", July 2016
c) IEC 62209-2, "Procedure to determine the Specific Absorption Rate (SAR) for wireless communication devices used in close proximity to the human body (frequency range of 30 MHz to 6 GHz)", March 2010
d) KDB 865664, "SAR Measurement Requirements for 100 MHz to 6 GHz"

Methods Applied and Interpretation of Parameters:

- *NORMx,y,z:* Assessed for E-field polarization ϑ = 0 (f ≤ 900 MHz in TEM-cell; f > 1800 MHz: R22 waveguide). NORMx,y,z are only intermediate values, i.e., the uncertainties of NORMx,y,z does not affect the E^2-field uncertainty inside TSL (see below *ConvF*).
- *NORM(f)x,y,z = NORMx,y,z * frequency_response* (see Frequency Response Chart). This linearization is implemented in DASY4 software versions later than 4.2. The uncertainty of the frequency response is included in the stated uncertainty of *ConvF*.
- *DCPx,y,z:* DCP are numerical linearization parameters assessed based on the data of power sweep with CW signal (no uncertainty required). DCP does not depend on frequency nor media.
- *PAR:* PAR is the Peak to Average Ratio that is not calibrated but determined based on the signal characteristics
- *Ax,y,z; Bx,y,z; Cx,y,z; Dx,y,z; VRx,y,z: A, B, C, D* are numerical linearization parameters assessed based on the data of power sweep for specific modulation signal. The parameters do not depend on frequency nor media. *VR* is the maximum calibration range expressed in RMS voltage across the diode.
- *ConvF and Boundary Effect Parameters:* Assessed in flat phantom using E-field (or Temperature Transfer Standard for f ≤ 800 MHz) and inside waveguide using analytical field distributions based on power measurements for f > 800 MHz. The same setups are used for assessment of the parameters applied for boundary compensation (alpha, depth) of which typical uncertainty values are given. These parameters are used in DASY4 software to improve probe accuracy close to the boundary. The sensitivity in TSL corresponds to *NORMx,y,z * ConvF* whereby the uncertainty corresponds to that given for *ConvF*. A frequency dependent *ConvF* is used in DASY version 4.4 and higher which allows extending the validity from ± 50 MHz to ± 100 MHz.
- *Spherical isotropy (3D deviation from isotropy)*: in a field of low gradients realized using a flat phantom exposed by a patch antenna.
- *Sensor Offset*: The sensor offset corresponds to the offset of virtual measurement center from the probe tip (on probe axis). No tolerance required.
- *Connector Angle*: The angle is assessed using the information gained by determining the *NORMx* (no uncertainty required).

Probe ES3DV3

SN:3318

Manufactured:	January 10, 2012
Repaired:	September 18, 2017
Calibrated:	September 22, 2017

Calibrated for DASY/EASY Systems
(Note: non-compatible with DASY2 system!)

DASY/EASY - Parameters of Probe: ES3DV3 - SN:3318

Basic Calibration Parameters

	Sensor X	Sensor Y	Sensor Z	Unc (k=2)
Norm ($\mu V/(V/m)^2$)[A]	1.02	1.12	0.98	± 10.1 %
DCP (mV)[B]	103.7	104.0	102.5	

Modulation Calibration Parameters

UID	Communication System Name		A dB	B dB$\sqrt{\mu V}$	C	D dB	VR mV	Unc[E] (k=2)
0	CW	X	0.0	0.0	1.0	0.00	183.4	±3.5 %
		Y	0.0	0.0	1.0		193.5	
		Z	0.0	0.0	1.0		183.0	

Note: For details on UID parameters see Appendix.

Sensor Model Parameters

	C1 fF	C2 fF	α V^{-1}	T1 $ms.V^{-2}$	T2 $ms.V^{-1}$	T3 ms	T4 V^{-2}	T5 V^{-1}	T6
X	40.36	285.5	34.97	23.53	0.939	5.100	1.568	0.156	1.011
Y	40.15	284.7	34.96	25.8	1.330	5.092	1.283	0.265	1.008
Z	38.32	269.2	34.28	24.09	0.917	5.100	0.995	0.237	1.007

The reported uncertainty of measurement is stated as the standard uncertainty of measurement multiplied by the coverage factor k=2, which for a normal distribution corresponds to a coverage probability of approximately 95%.

[A] The uncertainties of Norm X,Y,Z do not affect the E^2-field uncertainty inside TSL (see Pages 5 and 6).
[B] Numerical linearization parameter: uncertainty not required.
[E] Uncertainty is determined using the max. deviation from linear response applying rectangular distribution and is expressed for the square of the field value.

DASY/EASY - Parameters of Probe: ES3DV3 - SN:3318

Calibration Parameter Determined in Head Tissue Simulating Media

f (MHz) [C]	Relative Permittivity [F]	Conductivity (S/m) [F]	ConvF X	ConvF Y	ConvF Z	Alpha [G]	Depth [G] (mm)	Unc (k=2)
750	41.9	0.89	6.72	6.72	6.72	0.80	1.15	± 12.0 %
835	41.5	0.90	6.42	6.42	6.42	0.71	1.26	± 12.0 %
1750	40.1	1.37	5.50	5.50	5.50	0.49	1.50	± 12.0 %
1900	40.0	1.40	5.31	5.31	5.31	0.65	1.29	± 12.0 %
2300	39.5	1.67	4.96	4.96	4.96	0.72	1.27	± 12.0 %
2450	39.2	1.80	4.71	4.71	4.71	0.77	1.26	± 12.0 %
2600	39.0	1.96	4.58	4.58	4.58	0.75	1.32	± 12.0 %

[C] Frequency validity above 300 MHz of ± 100 MHz only applies for DASY v4.4 and higher (see Page 2), else it is restricted to ± 50 MHz. The uncertainty is the RSS of the ConvF uncertainty at calibration frequency and the uncertainty for the indicated frequency band. Frequency validity below 300 MHz is ± 10, 25, 40, 50 and 70 MHz for ConvF assessments at 30, 64, 128, 150 and 220 MHz respectively. Above 5 GHz frequency validity can be extended to ± 110 MHz.

[F] At frequencies below 3 GHz, the validity of tissue parameters (ε and σ) can be relaxed to ± 10% if liquid compensation formula is applied to measured SAR values. At frequencies above 3 GHz, the validity of tissue parameters (ε and σ) is restricted to ± 5%. The uncertainty is the RSS of the ConvF uncertainty for indicated target tissue parameters.

[G] Alpha/Depth are determined during calibration. SPEAG warrants that the remaining deviation due to the boundary effect after compensation is always less than ± 1% for frequencies below 3 GHz and below ± 2% for frequencies between 3-6 GHz at any distance larger than half the probe tip diameter from the boundary.

DASY/EASY - Parameters of Probe: ES3DV3 - SN:3318

Calibration Parameter Determined in Body Tissue Simulating Media

f (MHz) [C]	Relative Permittivity [F]	Conductivity (S/m) [F]	ConvF X	ConvF Y	ConvF Z	Alpha [G]	Depth [G] (mm)	Unc (k=2)
750	55.5	0.96	6.46	6.46	6.46	0.80	1.21	± 12.0 %
835	55.2	0.97	6.32	6.32	6.32	0.80	1.20	± 12.0 %
1750	53.4	1.49	5.18	5.18	5.18	0.65	1.36	± 12.0 %
1900	53.3	1.52	4.96	4.96	4.96	0.57	1.49	± 12.0 %
2300	52.9	1.81	4.71	4.71	4.71	0.73	1.33	± 12.0 %
2450	52.7	1.95	4.55	4.55	4.55	0.80	1.12	± 12.0 %
2600	52.5	2.16	4.34	4.34	4.34	0.80	1.13	± 12.0 %

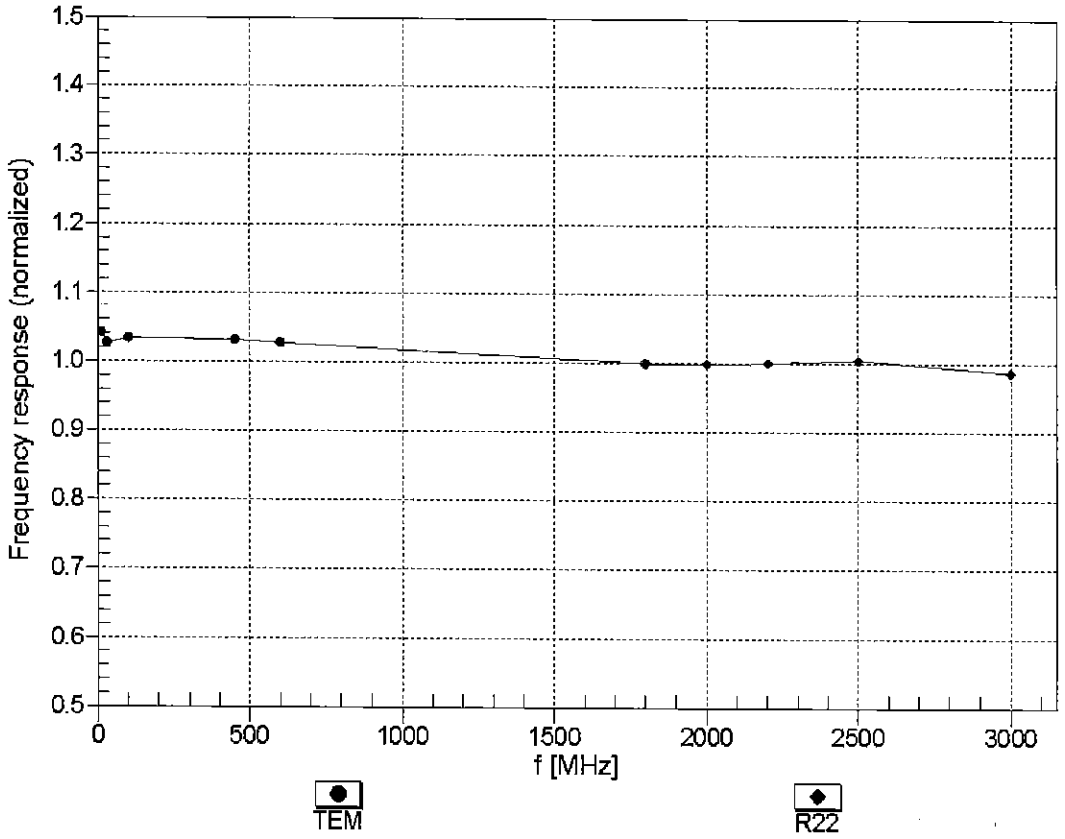
[C] Frequency validity above 300 MHz of ± 100 MHz only applies for DASY v4.4 and higher (see Page 2), else it is restricted to ± 50 MHz. The uncertainty is the RSS of the ConvF uncertainty at calibration frequency and the uncertainty for the indicated frequency band. Frequency validity below 300 MHz is ± 10, 25, 40, 50 and 70 MHz for ConvF assessments at 30, 64, 128, 150 and 220 MHz respectively. Above 5 GHz frequency validity can be extended to ± 110 MHz.

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[G] Alpha/Depth are determined during calibration. SPEAG warrants that the remaining deviation due to the boundary effect after compensation is always less than ± 1% for frequencies below 3 GHz and below ± 2% for frequencies between 3-6 GHz at any distance larger than half the probe tip diameter from the boundary.

Frequency Response of E-Field

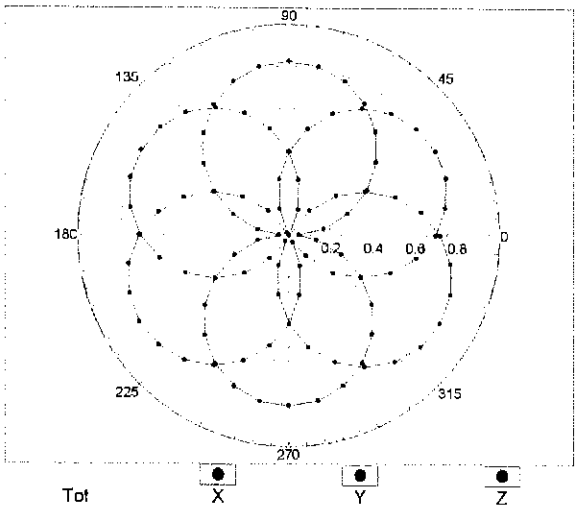
(TEM-Cell:ifi110 EXX, Waveguide: R22)



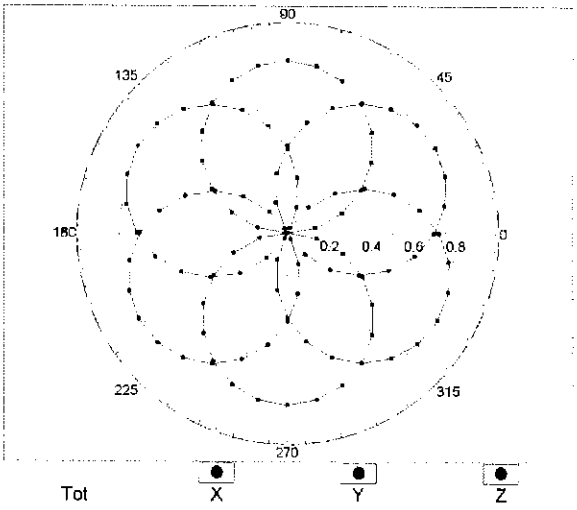
Uncertainty of Frequency Response of E-field: ± 6.3% (k=2)

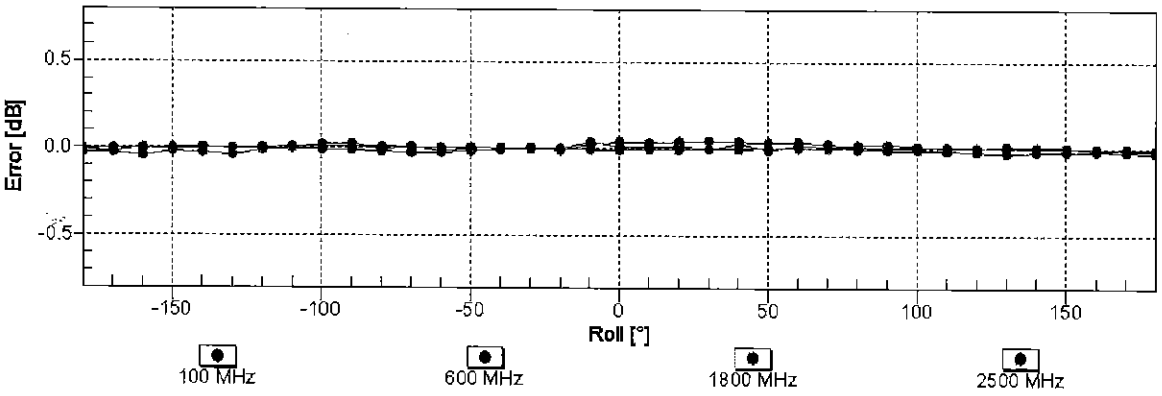
Receiving Pattern (ϕ), ϑ = 0°

f=600 MHz,TEM



f=1800 MHz,R22

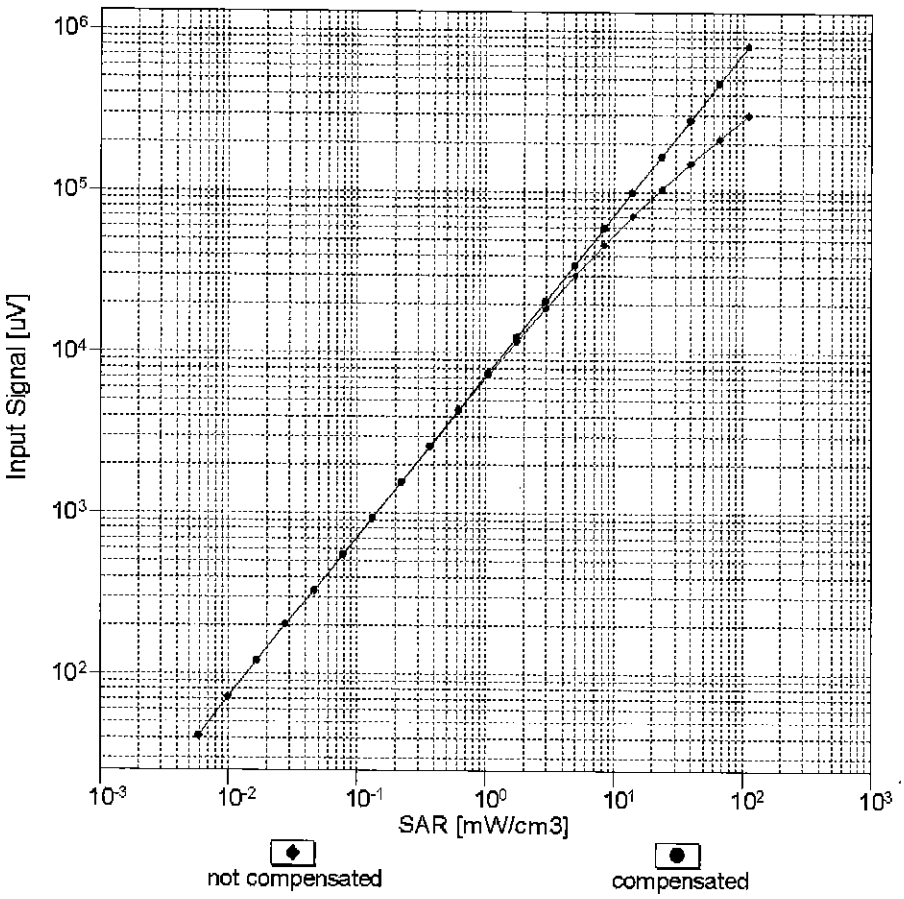


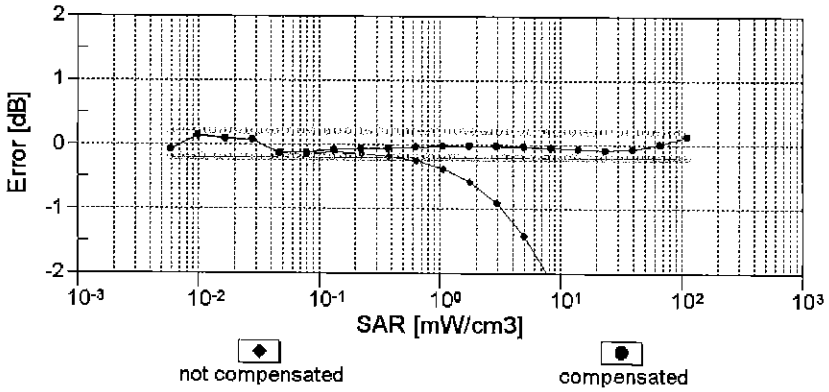


Uncertainty of Axial Isotropy Assessment: ± 0.5% (k=2)

Dynamic Range f(SAR_{head})

(TEM cell , f_{eval}= 1900 MHz)

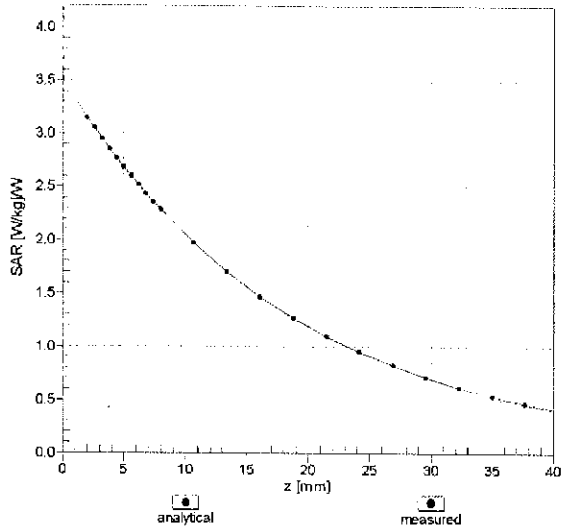




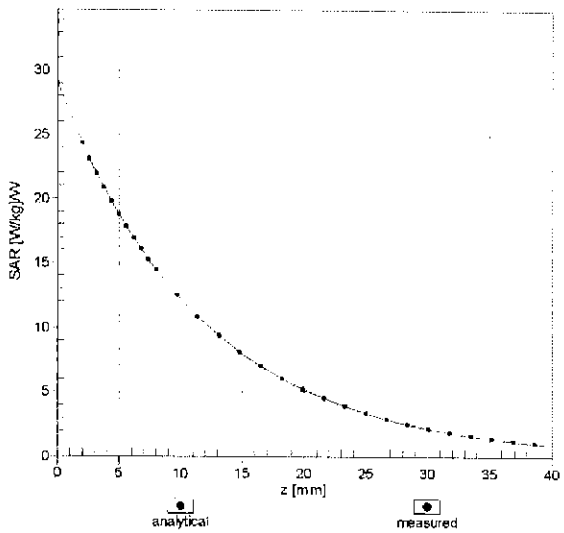
Uncertainty of Linearity Assessment: ± 0.6% (k=2)

Conversion Factor Assessment

f = 835 MHz,WGLS R9 (H_convF)

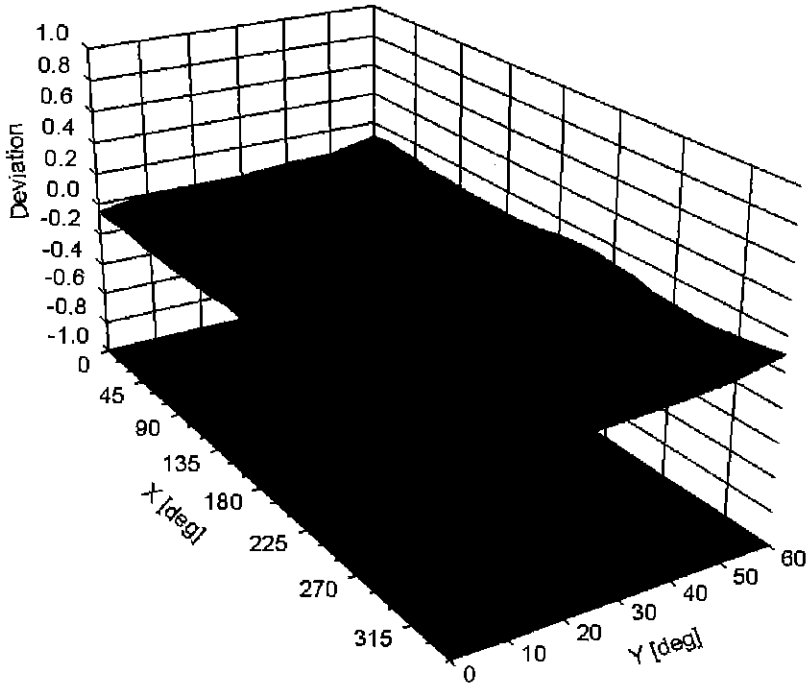


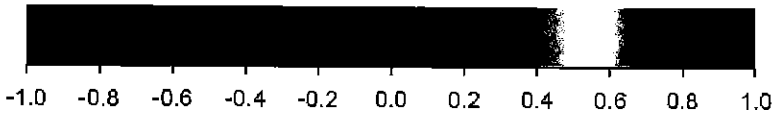
f = 1900 MHz,WGLS R22 (H_convF)



Deviation from Isotropy in Liquid

Error (ϕ, ϑ), f = 900 MHz





Uncertainty of Spherical Isotropy Assessment: ± 2.6% (k=2)

DASY/EASY - Parameters of Probe: ES3DV3 - SN:3318

Other Probe Parameters

Sensor Arrangement	Triangular
Connector Angle (°)	80.2
Mechanical Surface Detection Mode	enabled
Optical Surface Detection Mode	disabled
Probe Overall Length	337 mm
Probe Body Diameter	10 mm
Tip Length	10 mm
Tip Diameter	4 mm
Probe Tip to Sensor X Calibration Point	2 mm
Probe Tip to Sensor Y Calibration Point	2 mm
Probe Tip to Sensor Z Calibration Point	2 mm
Recommended Measurement Distance from Surface	3 mm

Appendix: Modulation Calibration Parameters

UID	Communication System Name		A dB	B dB√μV	C	D dB	VR mV	Max Unc[E] (k=2)
0	CW	X	0.00	0.00	1.00	0.00	183.4	± 3.5 %
		Y	0.00	0.00	1.00		193.5	
		Z	0.00	0.00	1.00		183.0	
10010-CAA	SAR Validation (Square, 100ms, 10ms)	X	100.00	113.13	27.11	10.00	25.0	± 9.6 %
		Y	56.27	106.32	26.04		25.0	
		Z	48.42	102.92	24.36		25.0	
10011-CAB	UMTS-FDD (WCDMA)	X	2.66	86.53	24.90	0.00	150.0	± 9.6 %
		Y	1.68	77.14	20.67		150.0	
		Z	1.29	72.20	18.01		150.0	
10012-CAB	IEEE 802.11b WiFi 2.4 GHz (DSSS, 1 Mbps)	X	1.46	68.78	18.94	0.41	150.0	± 9.6 %
		Y	1.42	67.66	17.93		150.0	
		Z	1.34	66.38	16.88		150.0	
10013-CAB	IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 6 Mbps)	X	5.02	68.02	18.09	1.46	150.0	± 9.6 %
		Y	5.02	67.88	17.89		150.0	
		Z	4.94	67.70	17.67		150.0	
10021-DAC	GSM-FDD (TDMA, GMSK)	X	100.00	121.76	31.97	9.39	50.0	± 9.6 %
		Y	100.00	121.57	32.33		50.0	
		Z	100.00	120.24	31.25		50.0	
10023-DAC	GPRS-FDD (TDMA, GMSK, TN 0)	X	100.00	121.43	31.86	9.57	50.0	± 9.6 %
		Y	100.00	121.34	32.26		50.0	
		Z	100.00	119.95	31.15		50.0	
10024-DAC	GPRS-FDD (TDMA, GMSK, TN 0-1)	X	100.00	120.99	30.63	6.56	60.0	± 9.6 %
		Y	100.00	119.61	30.34		60.0	
		Z	100.00	118.45	29.44		60.0	
10025-DAC	EDGE-FDD (TDMA, 8PSK, TN 0)	X	27.34	129.78	51.29	12.57	50.0	± 9.6 %
		Y	16.72	108.51	42.49		50.0	
		Z	41.36	141.52	54.29		50.0	
10026-DAC	EDGE-FDD (TDMA, 8PSK, TN 0-1)	X	51.11	136.85	47.83	9.56	60.0	± 9.6 %
		Y	25.23	114.58	40.30		60.0	
		Z	34.77	125.06	43.92		60.0	
10027-DAC	GPRS-FDD (TDMA, GMSK, TN 0-1-2)	X	100.00	123.21	30.86	4.80	80.0	± 9.6 %
		Y	100.00	120.40	29.90		80.0	
		Z	100.00	119.24	29.05		80.0	
10028-DAC	GPRS-FDD (TDMA, GMSK, TN 0-1-2-3)	X	100.00	127.88	32.20	3.55	100.0	± 9.6 %
		Y	100.00	123.11	30.36		100.0	
		Z	100.00	121.73	29.45		100.0	
10029-DAC	EDGE-FDD (TDMA, 8PSK, TN 0-1-2)	X	16.47	106.41	37.26	7.80	80.0	± 9.6 %
		Y	13.16	98.31	33.75		80.0	
		Z	13.79	100.84	34.87		80.0	
10030-CAA	IEEE 802.15.1 Bluetooth (GFSK, DH1)	X	100.00	120.38	29.87	5.30	70.0	± 9.6 %
		Y	100.00	118.42	29.28		70.0	
		Z	100.00	117.17	28.39		70.0	
10031-CAA	IEEE 802.15.1 Bluetooth (GFSK, DH3)	X	100.00	140.58	36.01	1.88	100.0	± 9.6 %
		Y	100.00	129.80	31.70		100.0	
		Z	100.00	126.35	29.95		100.0	

10032-CAA	IEEE 802.15.1 Bluetooth (GFSK, DH5)	X	100.00	168.14	46.04	1.17	100.0	± 9.6 %
		Y	100.00	146.16	37.32		100.0	
		Z	100.00	139.03	34.08		100.0	
10033-CAA	IEEE 802.15.1 Bluetooth (PI/4-DQPSK, DH1)	X	100.00	128.00	34.78	5.30	70.0	± 9.6 %
		Y	100.00	125.47	33.78		70.0	
		Z	100.00	124.94	33.27		70.0	
10034-CAA	IEEE 802.15.1 Bluetooth (PI/4-DQPSK, DH3)	X	100.00	127.76	32.85	1.88	100.0	± 9.6 %
		Y	100.00	124.38	31.40		100.0	
		Z	100.00	122.39	30.30		100.0	
10035-CAA	IEEE 802.15.1 Bluetooth (PI/4-DQPSK, DH5)	X	100.00	129.00	32.88	1.17	100.0	± 9.6 %
		Y	100.00	125.22	31.24		100.0	
		Z	42.89	111.69	27.45		100.0	
10036-CAA	IEEE 802.15.1 Bluetooth (8-DPSK, DH1)	X	100.00	128.35	34.94	5.30	70.0	± 9.6 %
		Y	100.00	125.78	33.93		70.0	
		Z	100.00	125.27	33.42		70.0	
10037-CAA	IEEE 802.15.1 Bluetooth (8-DPSK, DH3)	X	100.00	127.83	32.85	1.88	100.0	± 9.6 %
		Y	100.00	124.40	31.38		100.0	
		Z	100.00	122.41	30.28		100.0	
10038-CAA	IEEE 802.15.1 Bluetooth (8-DPSK, DH5)	X	100.00	129.90	33.29	1.17	100.0	± 9.6 %
		Y	100.00	126.04	31.61		100.0	
		Z	46.73	113.50	28.05		100.0	
10039-CAB	CDMA2000 (1xRTT, RC1)	X	100.00	131.54	33.19	0.00	150.0	± 9.6 %
		Y	52.05	119.24	29.67		150.0	
		Z	3.76	82.84	19.15		150.0	
10042-CAB	IS-54 / IS-136 FDD (TDMA/FDM, PI/4-DQPSK, Halfrate)	X	100.00	118.03	29.44	7.78	50.0	± 9.6 %
		Y	100.00	117.44	29.54		50.0	
		Z	100.00	116.07	28.52		50.0	
10044-CAA	IS-91/EIA/TIA-553 FDD (FDMA, FM)	X	0.01	105.46	9.85	0.00	150.0	± 9.6 %
		Y	0.03	60.00	39.49		150.0	
		Z	0.02	60.00	28.89		150.0	
10048-CAA	DECT (TDD, TDMA/FDM, GFSK, Full Slot, 24)	X	100.00	123.25	33.96	13.80	25.0	± 9.6 %
		Y	100.00	123.00	34.45		25.0	
		Z	100.00	122.08	33.38		25.0	
10049-CAA	DECT (TDD, TDMA/FDM, GFSK, Double Slot, 12)	X	100.00	121.02	31.95	10.79	40.0	± 9.6 %
		Y	100.00	121.43	32.63		40.0	
		Z	100.00	119.80	31.36		40.0	
10056-CAA	UMTS-TDD (TD-SCDMA, 1.28 Mcps)	X	100.00	126.02	35.11	9.03	50.0	± 9.6 %
		Y	69.75	118.57	33.24		50.0	
		Z	100.00	124.37	34.25		50.0	
10058-DAC	EDGE-FDD (TDMA, 8PSK, TN 0-1-2-3)	X	9.73	93.83	32.07	6.55	100.0	± 9.6 %
		Y	8.94	89.89	29.98		100.0	
		Z	8.70	90.23	30.24		100.0	
10059-CAB	IEEE 802.11b WiFi 2.4 GHz (DSSS, 2 Mbps)	X	1.70	72.06	20.55	0.61	110.0	± 9.6 %
		Y	1.64	70.58	19.34		110.0	
		Z	1.50	68.77	18.10		110.0	
10060-CAB	IEEE 802.11b WiFi 2.4 GHz (DSSS, 5.5 Mbps)	X	100.00	148.21	40.90	1.30	110.0	± 9.6 %
		Y	100.00	141.35	37.99		110.0	
		Z	100.00	139.41	36.95		110.0	

10061-CAB	IEEE 802.11b WiFi 2.4 GHz (DSSS, 11 Mbps)	X	100.00	146.12	41.94	2.04	110.0	± 9.6 %
		Y	100.00	141.22	39.79		110.0	
		Z	39.08	124.31	35.57		110.0	
10062-CAB	IEEE 802.11a/h WiFi 5 GHz (OFDM, 6 Mbps)	X	4.78	67.89	17.44	0.49	100.0	± 9.6 %
		Y	4.76	67.70	17.22		100.0	
		Z	4.68	67.49	16.96		100.0	
10063-CAB	IEEE 802.11a/h WiFi 5 GHz (OFDM, 9 Mbps)	X	4.81	68.05	17.58	0.72	100.0	± 9.6 %
		Y	4.79	67.86	17.35		100.0	
		Z	4.71	67.65	17.10		100.0	
10064-CAB	IEEE 802.11a/h WiFi 5 GHz (OFDM, 12 Mbps)	X	5.07	68.24	17.76	0.86	100.0	± 9.6 %
		Y	5.05	68.06	17.55		100.0	
		Z	4.97	67.86	17.30		100.0	
10065-CAB	IEEE 802.11a/h WiFi 5 GHz (OFDM, 18 Mbps)	X	4.97	68.22	17.93	1.21	100.0	± 9.6 %
		Y	4.96	68.06	17.72		100.0	
		Z	4.87	67.84	17.47		100.0	
10066-CAB	IEEE 802.11a/h WiFi 5 GHz (OFDM, 24 Mbps)	X	5.00	68.29	18.13	1.46	100.0	± 9.6 %
		Y	5.00	68.14	17.92		100.0	
		Z	4.91	67.92	17.68		100.0	
10067-CAB	IEEE 802.11a/h WiFi 5 GHz (OFDM, 36 Mbps)	X	5.32	68.56	18.62	2.04	100.0	± 9.6 %
		Y	5.32	68.43	18.41		100.0	
		Z	5.23	68.26	18.21		100.0	
10068-CAB	IEEE 802.11a/h WiFi 5 GHz (OFDM, 48 Mbps)	X	5.38	68.60	18.85	2.55	100.0	± 9.6 %
		Y	5.39	68.49	18.65		100.0	
		Z	5.29	68.30	18.45		100.0	
10069-CAB	IEEE 802.11a/h WiFi 5 GHz (OFDM, 54 Mbps)	X	5.45	68.63	19.05	2.67	100.0	± 9.6 %
		Y	5.47	68.52	18.85		100.0	
		Z	5.37	68.35	18.66		100.0	
10071-CAB	IEEE 802.11g WiFi 2.4 GHz (DSSS/OFDM, 9 Mbps)	X	5.14	68.16	18.43	1.99	100.0	± 9.6 %
		Y	5.15	68.05	18.24		100.0	
		Z	5.06	67.88	18.03		100.0	
10072-CAB	IEEE 802.11g WiFi 2.4 GHz (DSSS/OFDM, 12 Mbps)	X	5.16	68.64	18.75	2.30	100.0	± 9.6 %
		Y	5.17	68.53	18.56		100.0	
		Z	5.08	68.32	18.34		100.0	
10073-CAB	IEEE 802.11g WiFi 2.4 GHz (DSSS/OFDM, 18 Mbps)	X	5.27	68.97	19.18	2.83	100.0	± 9.6 %
		Y	5.29	68.88	18.98		100.0	
		Z	5.19	68.68	18.77		100.0	
10074-CAB	IEEE 802.11g WiFi 2.4 GHz (DSSS/OFDM, 24 Mbps)	X	5.29	68.99	19.39	3.30	100.0	± 9.6 %
		Y	5.33	68.94	19.20		100.0	
		Z	5.23	68.74	19.00		100.0	
10075-CAB	IEEE 802.11g WiFi 2.4 GHz (DSSS/OFDM, 36 Mbps)	X	5.36	69.20	19.76	3.82	90.0	± 9.6 %
		Y	5.42	69.18	19.58		90.0	
		Z	5.30	68.95	19.38		90.0	
10076-CAB	IEEE 802.11g WiFi 2.4 GHz (DSSS/OFDM, 48 Mbps)	X	5.40	69.06	19.93	4.15	90.0	± 9.6 %
		Y	5.47	69.07	19.76		90.0	
		Z	5.35	68.86	19.58		90.0	
10077-CAB	IEEE 802.11g WiFi 2.4 GHz (DSSS/OFDM, 54 Mbps)	X	5.44	69.18	20.05	4.30	90.0	± 9.6 %
		Y	5.51	69.19	19.88		90.0	
		Z	5.40	68.99	19.71		90.0	

10081-CAB	CDMA2000 (1xRTT, RC3)	X	100.00	135.94	34.03	0.00	150.0	± 9.6 %
		Y	4.36	89.76	21.79		150.0	
		Z	1.23	72.30	14.98		150.0	
10082-CAB	IS-54 / IS-136 FDD (TDMA/FDM, PI/4-DQPSK, Fullrate)	X	1.46	62.74	7.36	4.77	80.0	± 9.6 %
		Y	1.67	63.13	7.83		80.0	
		Z	1.40	62.09	6.92		80.0	
10090-DAC	GPRS-FDD (TDMA, GMSK, TN 0-4)	X	100.00	121.01	30.66	6.56	60.0	± 9.6 %
		Y	100.00	119.66	30.39		60.0	
		Z	100.00	118.49	29.48		60.0	
10097-CAB	UMTS-FDD (HSDPA)	X	2.68	75.81	20.12	0.00	150.0	± 9.6 %
		Y	2.34	73.02	18.58		150.0	
		Z	2.07	70.78	17.18		150.0	
10098-CAB	UMTS-FDD (HSUPA, Subtest 2)	X	2.65	75.95	20.19	0.00	150.0	± 9.6 %
		Y	2.30	73.06	18.61		150.0	
		Z	2.03	70.77	17.19		150.0	
10099-DAC	EDGE-FDD (TDMA, 8PSK, TN 0-4)	X	51.37	136.92	47.83	9.56	60.0	± 9.6 %
		Y	25.26	114.55	40.28		60.0	
		Z	34.93	125.12	43.92		60.0	
10100-CAD	LTE-FDD (SC-FDMA, 100% RB, 20 MHz, QPSK)	X	3.91	75.35	19.66	0.00	150.0	± 9.6 %
		Y	3.58	73.57	18.67		150.0	
		Z	3.29	72.01	17.75		150.0	
10101-CAD	LTE-FDD (SC-FDMA, 100% RB, 20 MHz, 16-QAM)	X	3.50	69.80	17.58	0.00	150.0	± 9.6 %
		Y	3.39	69.08	17.05		150.0	
		Z	3.27	68.42	16.53		150.0	
10102-CAD	LTE-FDD (SC-FDMA, 100% RB, 20 MHz, 64-QAM)	X	3.58	69.60	17.56	0.00	150.0	± 9.6 %
		Y	3.49	68.97	17.09		150.0	
		Z	3.37	68.35	16.58		150.0	
10103-CAD	LTE-TDD (SC-FDMA, 100% RB, 20 MHz, QPSK)	X	10.46	84.85	24.49	3.98	65.0	± 9.6 %
		Y	9.76	82.69	23.44		65.0	
		Z	9.49	82.61	23.35		65.0	
10104-CAD	LTE-TDD (SC-FDMA, 100% RB, 20 MHz, 16-QAM)	X	8.62	79.80	23.37	3.98	65.0	± 9.6 %
		Y	8.54	78.80	22.69		65.0	
		Z	8.26	78.63	22.58		65.0	
10105-CAD	LTE-TDD (SC-FDMA, 100% RB, 20 MHz, 64-QAM)	X	8.48	79.41	23.51	3.98	65.0	± 9.6 %
		Y	7.84	77.04	22.24		65.0	
		Z	7.95	77.81	22.54		65.0	
10108-CAE	LTE-FDD (SC-FDMA, 100% RB, 10 MHz, QPSK)	X	3.42	74.91	19.71	0.00	150.0	± 9.6 %
		Y	3.13	73.04	18.65		150.0	
		Z	2.86	71.41	17.66		150.0	
10109-CAE	LTE-FDD (SC-FDMA, 100% RB, 10 MHz, 16-QAM)	X	3.19	70.21	17.75	0.00	150.0	± 9.6 %
		Y	3.07	69.34	17.14		150.0	
		Z	2.93	68.52	16.50		150.0	
10110-CAE	LTE-FDD (SC-FDMA, 100% RB, 5 MHz, QPSK)	X	2.94	75.32	19.95	0.00	150.0	± 9.6 %
		Y	2.62	72.92	18.60		150.0	
		Z	2.34	70.98	17.41		150.0	
10111-CAE	LTE-FDD (SC-FDMA, 100% RB, 5 MHz, 16-QAM)	X	3.13	72.86	18.80	0.00	150.0	± 9.6 %
		Y	2.95	71.56	17.99		150.0	
		Z	2.72	70.10	16.99		150.0	

10112-CAE	LTE-FDD (SC-FDMA, 100% RB, 10 MHz, 64-QAM)	X	3.29	70.03	17.69	0.00	150.0	± 9.6 %
		Y	3.18	69.26	17.13		150.0	
		Z	3.05	68.50	16.53		150.0	
10113-CAE	LTE-FDD (SC-FDMA, 100% RB, 5 MHz, 64-QAM)	X	3.26	72.71	18.75	0.00	150.0	± 9.6 %
		Y	3.09	71.55	18.02		150.0	
		Z	2.86	70.17	17.07		150.0	
10114-CAB	IEEE 802.11n (HT Greenfield, 13.5 Mbps, BPSK)	X	5.20	68.15	17.23	0.00	150.0	± 9.6 %
		Y	5.17	67.92	17.01		150.0	
		Z	5.08	67.68	16.75		150.0	
10115-CAB	IEEE 802.11n (HT Greenfield, 81 Mbps, 16-QAM)	X	5.45	68.16	17.22	0.00	150.0	± 9.6 %
		Y	5.42	67.95	17.02		150.0	
		Z	5.33	67.74	16.77		150.0	
10116-CAB	IEEE 802.11n (HT Greenfield, 135 Mbps, 64-QAM)	X	5.30	68.36	17.26	0.00	150.0	± 9.6 %
		Y	5.26	68.13	17.04		150.0	
		Z	5.17	67.89	16.78		150.0	
10117-CAB	IEEE 802.11n (HT Mixed, 13.5 Mbps, BPSK)	X	5.18	68.04	17.19	0.00	150.0	± 9.6 %
		Y	5.14	67.83	16.98		150.0	
		Z	5.07	67.63	16.74		150.0	
10118-CAB	IEEE 802.11n (HT Mixed, 81 Mbps, 16-QAM)	X	5.54	68.41	17.35	0.00	150.0	± 9.6 %
		Y	5.51	68.19	17.14		150.0	
		Z	5.41	67.95	16.89		150.0	
10119-CAB	IEEE 802.11n (HT Mixed, 135 Mbps, 64-QAM)	X	5.29	68.34	17.26	0.00	150.0	± 9.6 %
		Y	5.25	68.12	17.04		150.0	
		Z	5.16	67.88	16.78		150.0	
10140-CAD	LTE-FDD (SC-FDMA, 100% RB, 15 MHz, 16-QAM)	X	3.61	69.64	17.49	0.00	150.0	± 9.6 %
		Y	3.52	68.99	17.00		150.0	
		Z	3.39	68.38	16.51		150.0	
10141-CAD	LTE-FDD (SC-FDMA, 100% RB, 15 MHz, 64-QAM)	X	3.73	69.64	17.59	0.00	150.0	± 9.6 %
		Y	3.64	69.06	17.15		150.0	
		Z	3.51	68.48	16.66		150.0	
10142-CAD	LTE-FDD (SC-FDMA, 100% RB, 3 MHz, QPSK)	X	3.10	78.13	20.64	0.00	150.0	± 9.6 %
		Y	2.57	74.51	18.81		150.0	
		Z	2.18	71.67	17.19		150.0	
10143-CAD	LTE-FDD (SC-FDMA, 100% RB, 3 MHz, 16-QAM)	X	3.55	76.59	19.53	0.00	150.0	± 9.6 %
		Y	3.13	74.18	18.27		150.0	
		Z	2.68	71.54	16.74		150.0	
10144-CAD	LTE-FDD (SC-FDMA, 100% RB, 3 MHz, 64-QAM)	X	2.79	71.64	16.81	0.00	150.0	± 9.6 %
		Y	2.50	69.67	15.66		150.0	
		Z	2.26	68.10	14.57		150.0	
10145-CAE	LTE-FDD (SC-FDMA, 100% RB, 1.4 MHz, QPSK)	X	3.29	79.35	17.65	0.00	150.0	± 9.6 %
		Y	1.58	69.65	13.52		150.0	
		Z	1.10	65.19	10.91		150.0	
10146-CAE	LTE-FDD (SC-FDMA, 100% RB, 1.4 MHz, 16-QAM)	X	10.51	86.51	18.78	0.00	150.0	± 9.6 %
		Y	2.34	69.06	12.29		150.0	
		Z	1.46	64.05	9.40		150.0	
10147-CAE	LTE-FDD (SC-FDMA, 100% RB, 1.4 MHz, 64-QAM)	X	100.00	112.53	25.58	0.00	150.0	± 9.6 %
		Y	3.94	74.93	14.77		150.0	
		Z	1.65	65.37	10.17		150.0	

10149-CAD	LTE-FDD (SC-FDMA, 50% RB, 20 MHz, 16-QAM)	X	3.20	70.28	17.80	0.00	150.0	± 9.6 %
		Y	3.08	69.42	17.19		150.0	
		Z	2.94	68.59	16.55		150.0	
10150-CAD	LTE-FDD (SC-FDMA, 50% RB, 20 MHz, 64-QAM)	X	3.30	70.10	17.74	0.00	150.0	± 9.6 %
		Y	3.19	69.33	17.18		150.0	
		Z	3.06	68.56	16.57		150.0	
10151-CAD	LTE-TDD (SC-FDMA, 50% RB, 20 MHz, QPSK)	X	12.94	90.52	26.60	3.98	65.0	± 9.6 %
		Y	11.63	87.44	25.23		65.0	
		Z	11.21	87.22	25.07		65.0	
10152-CAD	LTE-TDD (SC-FDMA, 50% RB, 20 MHz, 16-QAM)	X	8.51	80.82	23.41	3.98	65.0	± 9.6 %
		Y	8.31	79.48	22.59		65.0	
		Z	8.01	79.28	22.44		65.0	
10153-CAD	LTE-TDD (SC-FDMA, 50% RB, 20 MHz, 64-QAM)	X	9.02	81.90	24.19	3.98	65.0	± 9.6 %
		Y	8.86	80.67	23.43		65.0	
		Z	8.54	80.43	23.26		65.0	
10154-CAE	LTE-FDD (SC-FDMA, 50% RB, 10 MHz, QPSK)	X	3.03	75.93	20.26	0.00	150.0	± 9.6 %
		Y	2.70	73.52	18.93		150.0	
		Z	2.40	71.40	17.66		150.0	
10155-CAE	LTE-FDD (SC-FDMA, 50% RB, 10 MHz, 16-QAM)	X	3.14	72.90	18.83	0.00	150.0	± 9.6 %
		Y	2.95	71.60	18.01		150.0	
		Z	2.72	70.14	17.02		150.0	
10156-CAE	LTE-FDD (SC-FDMA, 50% RB, 5 MHz, QPSK)	X	3.42	81.12	21.46	0.00	150.0	± 9.6 %
		Y	2.60	76.04	19.11		150.0	
		Z	2.06	72.15	17.02		150.0	
10157-CAE	LTE-FDD (SC-FDMA, 50% RB, 5 MHz, 16-QAM)	X	3.03	74.63	17.79	0.00	150.0	± 9.6 %
		Y	2.53	71.54	16.20		150.0	
		Z	2.15	69.02	14.66		150.0	
10158-CAE	LTE-FDD (SC-FDMA, 50% RB, 10 MHz, 64-QAM)	X	3.27	72.81	18.82	0.00	150.0	± 9.6 %
		Y	3.10	71.66	18.08		150.0	
		Z	2.87	70.26	17.13		150.0	
10159-CAE	LTE-FDD (SC-FDMA, 50% RB, 5 MHz, 64-QAM)	X	3.21	75.21	18.07	0.00	150.0	± 9.6 %
		Y	2.69	72.18	16.53		150.0	
		Z	2.25	69.45	14.90		150.0	
10160-CAD	LTE-FDD (SC-FDMA, 50% RB, 15 MHz, QPSK)	X	3.31	73.32	19.12	0.00	150.0	± 9.6 %
		Y	3.09	71.84	18.22		150.0	
		Z	2.86	70.49	17.35		150.0	
10161-CAD	LTE-FDD (SC-FDMA, 50% RB, 15 MHz, 16-QAM)	X	3.21	70.26	17.75	0.00	150.0	± 9.6 %
		Y	3.10	69.43	17.16		150.0	
		Z	2.95	68.59	16.50		150.0	
10162-CAD	LTE-FDD (SC-FDMA, 50% RB, 15 MHz, 64-QAM)	X	3.33	70.39	17.83	0.00	150.0	± 9.6 %
		Y	3.21	69.59	17.26		150.0	
		Z	3.06	68.78	16.62		150.0	
10166-CAE	LTE-FDD (SC-FDMA, 50% RB, 1.4 MHz, QPSK)	X	3.94	73.38	21.77	3.01	150.0	± 9.6 %
		Y	3.79	72.11	20.84		150.0	
		Z	3.50	70.74	19.96		150.0	
10167-CAE	LTE-FDD (SC-FDMA, 50% RB, 1.4 MHz, 16-QAM)	X	5.65	79.78	23.51	3.01	150.0	± 9.6 %
		Y	5.10	77.08	22.03		150.0	
		Z	4.43	74.72	20.82		150.0	

10168-CAE	LTE-FDD (SC-FDMA, 50% RB, 1.4 MHz, 64-QAM)	X	6.73	83.76	25.44	3.01	150.0	± 9.6 %
		Y	6.02	80.78	23.93		150.0	
		Z	5.04	77.58	22.39		150.0	
10169-CAD	LTE-FDD (SC-FDMA, 1 RB, 20 MHz, QPSK)	X	3.37	73.36	21.96	3.01	150.0	± 9.6 %
		Y	3.23	71.75	20.78		150.0	
		Z	2.89	69.73	19.58		150.0	
10170-CAD	LTE-FDD (SC-FDMA, 1 RB, 20 MHz, 16-QAM)	X	6.39	86.84	27.07	3.01	150.0	± 9.6 %
		Y	5.38	82.06	24.76		150.0	
		Z	4.13	77.19	22.57		150.0	
10171-AAD	LTE-FDD (SC-FDMA, 1 RB, 20 MHz, 64-QAM)	X	4.69	79.68	23.25	3.01	150.0	± 9.6 %
		Y	4.06	75.75	21.17		150.0	
		Z	3.35	72.68	19.64		150.0	
10172-CAD	LTE-TDD (SC-FDMA, 1 RB, 20 MHz, QPSK)	X	100.00	146.59	45.53	6.02	65.0	± 9.6 %
		Y	40.14	123.32	38.78		65.0	
		Z	46.23	127.51	39.93		65.0	
10173-CAD	LTE-TDD (SC-FDMA, 1 RB, 20 MHz, 16-QAM)	X	100.00	136.26	40.09	6.02	65.0	± 9.6 %
		Y	100.00	132.71	38.54		65.0	
		Z	100.00	133.96	38.85		65.0	
10174-CAD	LTE-TDD (SC-FDMA, 1 RB, 20 MHz, 64-QAM)	X	100.00	133.98	38.85	6.02	65.0	± 9.6 %
		Y	100.00	130.96	37.56		65.0	
		Z	100.00	131.78	37.67		65.0	
10175-CAE	LTE-FDD (SC-FDMA, 1 RB, 10 MHz, QPSK)	X	3.32	73.00	21.69	3.01	150.0	± 9.6 %
		Y	3.19	71.38	20.50		150.0	
		Z	2.86	69.46	19.35		150.0	
10176-CAE	LTE-FDD (SC-FDMA, 1 RB, 10 MHz, 16-QAM)	X	6.41	86.88	27.08	3.01	150.0	± 9.6 %
		Y	5.39	82.10	24.78		150.0	
		Z	4.14	77.22	22.58		150.0	
10177-CAG	LTE-FDD (SC-FDMA, 1 RB, 5 MHz, QPSK)	X	3.35	73.17	21.78	3.01	150.0	± 9.6 %
		Y	3.21	71.55	20.60		150.0	
		Z	2.88	69.58	19.42		150.0	
10178-CAE	LTE-FDD (SC-FDMA, 1 RB, 5 MHz, 16-QAM)	X	6.32	86.56	26.94	3.01	150.0	± 9.6 %
		Y	5.33	81.82	24.65		150.0	
		Z	4.11	77.04	22.49		150.0	
10179-CAE	LTE-FDD (SC-FDMA, 1 RB, 10 MHz, 64-QAM)	X	5.51	83.28	25.09	3.01	150.0	± 9.6 %
		Y	4.67	78.80	22.85		150.0	
		Z	3.72	74.89	21.01		150.0	
10180-CAE	LTE-FDD (SC-FDMA, 1 RB, 5 MHz, 64-QAM)	X	4.68	79.60	23.20	3.01	150.0	± 9.6 %
		Y	4.04	75.67	21.12		150.0	
		Z	3.35	72.63	19.61		150.0	
10181-CAD	LTE-FDD (SC-FDMA, 1 RB, 15 MHz, QPSK)	X	3.35	73.15	21.78	3.01	150.0	± 9.6 %
		Y	3.21	71.53	20.59		150.0	
		Z	2.87	69.57	19.42		150.0	
10182-CAD	LTE-FDD (SC-FDMA, 1 RB, 15 MHz, 16-QAM)	X	6.31	86.52	26.93	3.01	150.0	± 9.6 %
		Y	5.32	81.78	24.63		150.0	
		Z	4.10	77.02	22.48		150.0	
10183-AAC	LTE-FDD (SC-FDMA, 1 RB, 15 MHz, 64-QAM)	X	4.66	79.56	23.19	3.01	150.0	± 9.6 %
		Y	4.04	75.64	21.10		150.0	
		Z	3.34	72.61	19.60		150.0	

10184-CAD	LTE-FDD (SC-FDMA, 1 RB, 3 MHz, QPSK)	X	3.36	73.20	21.80	3.01	150.0	± 9.6 %
		Y	3.22	71.58	20.61		150.0	
		Z	2.88	69.61	19.44		150.0	
10185-CAD	LTE-FDD (SC-FDMA, 1 RB, 3 MHz, 16-QAM)	X	6.35	86.64	26.98	3.01	150.0	± 9.6 %
		Y	5.35	81.89	24.68		150.0	
		Z	4.12	77.10	22.52		150.0	
10186-AAD	LTE-FDD (SC-FDMA, 1 RB, 3 MHz, 64-QAM)	X	4.70	79.67	23.24	3.01	150.0	± 9.6 %
		Y	4.06	75.73	21.14		150.0	
		Z	3.36	72.68	19.63		150.0	
10187-CAE	LTE-FDD (SC-FDMA, 1 RB, 1.4 MHz, QPSK)	X	3.37	73.27	21.88	3.01	150.0	± 9.6 %
		Y	3.23	71.66	20.69		150.0	
		Z	2.89	69.68	19.51		150.0	
10188-CAE	LTE-FDD (SC-FDMA, 1 RB, 1.4 MHz, 16-QAM)	X	6.67	87.77	27.49	3.01	150.0	± 9.6 %
		Y	5.59	82.87	25.16		150.0	
		Z	4.25	77.76	22.89		150.0	
10189-AAE	LTE-FDD (SC-FDMA, 1 RB, 1.4 MHz, 64-QAM)	X	4.86	80.38	23.61	3.01	150.0	± 9.6 %
		Y	4.18	76.34	21.49		150.0	
		Z	3.43	73.12	19.92		150.0	
10193-CAB	IEEE 802.11n (HT Greenfield, 6.5 Mbps, BPSK)	X	4.60	67.78	17.00	0.00	150.0	± 9.6 %
		Y	4.56	67.53	16.75		150.0	
		Z	4.48	67.31	16.48		150.0	
10194-CAB	IEEE 802.11n (HT Greenfield, 39 Mbps, 16-QAM)	X	4.76	68.05	17.13	0.00	150.0	± 9.6 %
		Y	4.72	67.80	16.88		150.0	
		Z	4.63	67.57	16.61		150.0	
10195-CAB	IEEE 802.11n (HT Greenfield, 65 Mbps, 64-QAM)	X	4.80	68.07	17.14	0.00	150.0	± 9.6 %
		Y	4.75	67.82	16.90		150.0	
		Z	4.67	67.59	16.62		150.0	
10196-CAB	IEEE 802.11n (HT Mixed, 6.5 Mbps, BPSK)	X	4.59	67.81	17.01	0.00	150.0	± 9.6 %
		Y	4.55	67.56	16.76		150.0	
		Z	4.47	67.33	16.48		150.0	
10197-CAB	IEEE 802.11n (HT Mixed, 39 Mbps, 16-QAM)	X	4.77	68.06	17.13	0.00	150.0	± 9.6 %
		Y	4.73	67.81	16.89		150.0	
		Z	4.64	67.58	16.62		150.0	
10198-CAB	IEEE 802.11n (HT Mixed, 65 Mbps, 64-QAM)	X	4.79	68.08	17.15	0.00	150.0	± 9.6 %
		Y	4.75	67.83	16.90		150.0	
		Z	4.66	67.60	16.63		150.0	
10219-CAB	IEEE 802.11n (HT Mixed, 7.2 Mbps, BPSK)	X	4.55	67.87	16.99	0.00	150.0	± 9.6 %
		Y	4.51	67.61	16.74		150.0	
		Z	4.43	67.37	16.45		150.0	
10220-CAB	IEEE 802.11n (HT Mixed, 43.3 Mbps, 16-QAM)	X	4.76	68.02	17.12	0.00	150.0	± 9.6 %
		Y	4.72	67.77	16.87		150.0	
		Z	4.63	67.54	16.60		150.0	
10221-CAB	IEEE 802.11n (HT Mixed, 72.2 Mbps, 64-QAM)	X	4.80	67.99	17.12	0.00	150.0	± 9.6 %
		Y	4.76	67.75	16.88		150.0	
		Z	4.68	67.53	16.61		150.0	
10222-CAB	IEEE 802.11n (HT Mixed, 15 Mbps, BPSK)	X	5.15	68.03	17.18	0.00	150.0	± 9.6 %
		Y	5.11	67.81	16.96		150.0	
		Z	5.04	67.60	16.72		150.0	

10223-CAB	IEEE 802.11n (HT Mixed, 90 Mbps, 16-QAM)	X	5.44	68.23	17.28	0.00	150.0	± 9.6 %
		Y	5.40	68.03	17.07		150.0	
		Z	5.32	67.81	16.83		150.0	
10224-CAB	IEEE 802.11n (HT Mixed, 150 Mbps, 64-QAM)	X	5.20	68.15	17.16	0.00	150.0	± 9.6 %
		Y	5.16	67.93	16.95		150.0	
		Z	5.08	67.72	16.70		150.0	
10225-CAB	UMTS-FDD (HSPA+)	X	3.00	68.59	16.83	0.00	150.0	± 9.6 %
		Y	2.92	67.92	16.31		150.0	
		Z	2.80	67.25	15.70		150.0	
10226-CAA	LTE-TDD (SC-FDMA, 1 RB, 1.4 MHz, 16-QAM)	X	100.00	136.47	40.23	6.02	65.0	± 9.6 %
		Y	100.00	132.93	38.68		65.0	
		Z	100.00	134.18	38.99		65.0	
10227-CAA	LTE-TDD (SC-FDMA, 1 RB, 1.4 MHz, 64-QAM)	X	100.00	133.67	38.75	6.02	65.0	± 9.6 %
		Y	100.00	130.47	37.37		65.0	
		Z	100.00	131.50	37.57		65.0	
10228-CAA	LTE-TDD (SC-FDMA, 1 RB, 1.4 MHz, QPSK)	X	100.00	146.91	45.69	6.02	65.0	± 9.6 %
		Y	100.00	142.38	43.59		65.0	
		Z	62.29	133.89	41.59		65.0	
10229-CAB	LTE-TDD (SC-FDMA, 1 RB, 3 MHz, 16-QAM)	X	100.00	136.23	40.09	6.02	65.0	± 9.6 %
		Y	100.00	132.70	38.54		65.0	
		Z	100.00	133.95	38.85		65.0	
10230-CAB	LTE-TDD (SC-FDMA, 1 RB, 3 MHz, 64-QAM)	X	100.00	133.55	38.67	6.02	65.0	± 9.6 %
		Y	100.00	130.33	37.27		65.0	
		Z	100.00	131.37	37.48		65.0	
10231-CAB	LTE-TDD (SC-FDMA, 1 RB, 3 MHz, QPSK)	X	100.00	146.76	45.58	6.02	65.0	± 9.6 %
		Y	98.12	141.81	43.38		65.0	
		Z	54.79	131.03	40.79		65.0	
10232-CAD	LTE-TDD (SC-FDMA, 1 RB, 5 MHz, 16-QAM)	X	100.00	136.25	40.10	6.02	65.0	± 9.6 %
		Y	100.00	132.72	38.55		65.0	
		Z	100.00	133.96	38.86		65.0	
10233-CAD	LTE-TDD (SC-FDMA, 1 RB, 5 MHz, 64-QAM)	X	100.00	133.57	38.68	6.02	65.0	± 9.6 %
		Y	100.00	130.35	37.28		65.0	
		Z	100.00	131.40	37.49		65.0	
10234-CAD	LTE-TDD (SC-FDMA, 1 RB, 5 MHz, QPSK)	X	100.00	146.41	45.37	6.02	65.0	± 9.6 %
		Y	85.73	138.62	42.48		65.0	
		Z	49.48	128.58	40.03		65.0	
10235-CAD	LTE-TDD (SC-FDMA, 1 RB, 10 MHz, 16-QAM)	X	100.00	136.27	40.10	6.02	65.0	± 9.6 %
		Y	100.00	132.73	38.55		65.0	
		Z	100.00	133.98	38.86		65.0	
10236-CAD	LTE-TDD (SC-FDMA, 1 RB, 10 MHz, 64-QAM)	X	100.00	133.50	38.65	6.02	65.0	± 9.6 %
		Y	100.00	130.29	37.26		65.0	
		Z	100.00	131.33	37.46		65.0	
10237-CAD	LTE-TDD (SC-FDMA, 1 RB, 10 MHz, QPSK)	X	100.00	146.81	45.60	6.02	65.0	± 9.6 %
		Y	99.93	142.23	43.48		65.0	
		Z	55.78	131.45	40.90		65.0	
10238-CAD	LTE-TDD (SC-FDMA, 1 RB, 15 MHz, 16-QAM)	X	100.00	136.27	40.10	6.02	65.0	± 9.6 %
		Y	100.00	132.73	38.55		65.0	
		Z	100.00	133.98	38.86		65.0	

10239-CAD	LTE-TDD (SC-FDMA, 1 RB, 15 MHz, 64-QAM)	X	100.00	133.60	38.69	6.02	65.0	± 9.6 %
		Y	100.00	130.37	37.29		65.0	
		Z	100.00	131.42	37.50		65.0	
10240-CAD	LTE-TDD (SC-FDMA, 1 RB, 15 MHz, QPSK)	X	100.00	146.82	45.60	6.02	65.0	± 9.6 %
		Y	99.77	142.20	43.47		65.0	
		Z	55.59	131.39	40.89		65.0	
10241-CAA	LTE-TDD (SC-FDMA, 50% RB, 1.4 MHz, 16-QAM)	X	17.87	100.55	33.28	6.98	65.0	± 9.6 %
		Y	15.07	94.94	30.80		65.0	
		Z	13.77	93.88	30.45		65.0	
10242-CAA	LTE-TDD (SC-FDMA, 50% RB, 1.4 MHz, 64-QAM)	X	17.67	100.29	33.12	6.98	65.0	± 9.6 %
		Y	12.29	90.51	29.15		65.0	
		Z	12.81	92.35	29.83		65.0	
10243-CAA	LTE-TDD (SC-FDMA, 50% RB, 1.4 MHz, QPSK)	X	11.06	91.58	31.22	6.98	65.0	± 9.6 %
		Y	8.79	84.63	27.92		65.0	
		Z	9.16	86.51	28.72		65.0	
10244-CAB	LTE-TDD (SC-FDMA, 50% RB, 3 MHz, 16-QAM)	X	15.61	90.37	23.65	3.98	65.0	± 9.6 %
		Y	11.28	84.18	21.28		65.0	
		Z	8.72	80.34	19.49		65.0	
10245-CAB	LTE-TDD (SC-FDMA, 50% RB, 3 MHz, 64-QAM)	X	13.68	88.02	22.81	3.98	65.0	± 9.6 %
		Y	10.35	82.60	20.65		65.0	
		Z	8.13	79.04	18.94		65.0	
10246-CAB	LTE-TDD (SC-FDMA, 50% RB, 3 MHz, QPSK)	X	25.39	101.46	27.34	3.98	65.0	± 9.6 %
		Y	15.71	92.64	24.44		65.0	
		Z	12.87	89.62	23.18		65.0	
10247-CAD	LTE-TDD (SC-FDMA, 50% RB, 5 MHz, 16-QAM)	X	9.04	82.99	22.10	3.98	65.0	± 9.6 %
		Y	8.34	80.70	21.02		65.0	
		Z	7.61	79.49	20.32		65.0	
10248-CAD	LTE-TDD (SC-FDMA, 50% RB, 5 MHz, 64-QAM)	X	8.42	81.37	21.47	3.98	65.0	± 9.6 %
		Y	7.88	79.34	20.47		65.0	
		Z	7.23	78.25	19.81		65.0	
10249-CAD	LTE-TDD (SC-FDMA, 50% RB, 5 MHz, QPSK)	X	33.71	108.55	30.66	3.98	65.0	± 9.6 %
		Y	20.64	98.74	27.50		65.0	
		Z	18.25	96.85	26.70		65.0	
10250-CAD	LTE-TDD (SC-FDMA, 50% RB, 10 MHz, 16-QAM)	X	10.08	85.96	25.19	3.98	65.0	± 9.6 %
		Y	9.64	84.09	24.21		65.0	
		Z	9.09	83.41	23.82		65.0	
10251-CAD	LTE-TDD (SC-FDMA, 50% RB, 10 MHz, 64-QAM)	X	8.74	81.98	23.31	3.98	65.0	± 9.6 %
		Y	8.42	80.36	22.40		65.0	
		Z	8.02	79.93	22.11		65.0	
10252-CAD	LTE-TDD (SC-FDMA, 50% RB, 10 MHz, QPSK)	X	20.41	100.95	29.84	3.98	65.0	± 9.6 %
		Y	15.89	94.95	27.60		65.0	
		Z	15.09	94.44	27.31		65.0	
10253-CAD	LTE-TDD (SC-FDMA, 50% RB, 15 MHz, 16-QAM)	X	8.27	80.12	23.07	3.98	65.0	± 9.6 %
		Y	8.11	78.88	22.29		65.0	
		Z	7.82	78.68	22.13		65.0	
10254-CAD	LTE-TDD (SC-FDMA, 50% RB, 15 MHz, 64-QAM)	X	8.73	81.09	23.75	3.98	65.0	± 9.6 %
		Y	8.60	79.94	23.01		65.0	
		Z	8.29	79.69	22.83		65.0	

10255-CAD	LTE-TDD (SC-FDMA, 50% RB, 15 MHz, QPSK)	X	12.08	89.56	26.46	3.98	65.0	± 9.6 %
		Y	11.00	86.69	25.13		65.0	
		Z	10.61	86.49	24.98		65.0	
10256-CAA	LTE-TDD (SC-FDMA, 100% RB, 1.4 MHz, 16-QAM)	X	9.73	81.73	19.44	3.98	65.0	± 9.6 %
		Y	7.42	76.93	17.43		65.0	
		Z	5.73	73.50	15.63		65.0	
10257-CAA	LTE-TDD (SC-FDMA, 100% RB, 1.4 MHz, 64-QAM)	X	8.33	79.13	18.36	3.98	65.0	± 9.6 %
		Y	6.73	75.21	16.63		65.0	
		Z	5.32	72.16	14.95		65.0	
10258-CAA	LTE-TDD (SC-FDMA, 100% RB, 1.4 MHz, QPSK)	X	12.04	87.95	22.05	3.98	65.0	± 9.6 %
		Y	8.85	82.44	20.00		65.0	
		Z	7.11	79.43	18.57		65.0	
10259-CAB	LTE-TDD (SC-FDMA, 100% RB, 3 MHz, 16-QAM)	X	9.53	84.22	23.26	3.98	65.0	± 9.6 %
		Y	8.90	82.06	22.20		65.0	
		Z	8.25	81.09	21.63		65.0	
10260-CAB	LTE-TDD (SC-FDMA, 100% RB, 3 MHz, 64-QAM)	X	9.20	83.27	22.90	3.98	65.0	± 9.6 %
		Y	8.68	81.32	21.91		65.0	
		Z	8.06	80.39	21.35		65.0	
10261-CAB	LTE-TDD (SC-FDMA, 100% RB, 3 MHz, QPSK)	X	23.02	102.54	29.52	3.98	65.0	± 9.6 %
		Y	16.54	95.31	26.97		65.0	
		Z	15.22	94.17	26.42		65.0	
10262-CAD	LTE-TDD (SC-FDMA, 100% RB, 5 MHz, 16-QAM)	X	10.05	85.86	25.14	3.98	65.0	± 9.6 %
		Y	9.60	83.99	24.15		65.0	
		Z	9.05	83.31	23.76		65.0	
10263-CAD	LTE-TDD (SC-FDMA, 100% RB, 5 MHz, 64-QAM)	X	8.72	81.95	23.30	3.98	65.0	± 9.6 %
		Y	8.40	80.33	22.40		65.0	
		Z	8.01	79.90	22.10		65.0	
10264-CAD	LTE-TDD (SC-FDMA, 100% RB, 5 MHz, QPSK)	X	19.99	100.52	29.68	3.98	65.0	± 9.6 %
		Y	15.61	94.59	27.46		65.0	
		Z	14.84	94.09	27.18		65.0	
10265-CAD	LTE-TDD (SC-FDMA, 100% RB, 10 MHz, 16-QAM)	X	8.51	80.83	23.42	3.98	65.0	± 9.6 %
		Y	8.31	79.48	22.60		65.0	
		Z	8.01	79.28	22.45		65.0	
10266-CAD	LTE-TDD (SC-FDMA, 100% RB, 10 MHz, 64-QAM)	X	9.02	81.88	24.18	3.98	65.0	± 9.6 %
		Y	8.86	80.66	23.42		65.0	
		Z	8.53	80.41	23.25		65.0	
10267-CAD	LTE-TDD (SC-FDMA, 100% RB, 10 MHz, QPSK)	X	12.89	90.43	26.57	3.98	65.0	± 9.6 %
		Y	11.59	87.37	25.20		65.0	
		Z	11.17	87.15	25.04		65.0	
10268-CAD	LTE-TDD (SC-FDMA, 100% RB, 15 MHz, 16-QAM)	X	8.65	79.35	23.27	3.98	65.0	± 9.6 %
		Y	8.60	78.47	22.65		65.0	
		Z	8.34	78.33	22.54		65.0	
10269-CAD	LTE-TDD (SC-FDMA, 100% RB, 15 MHz, 64-QAM)	X	8.50	78.69	23.04	3.98	65.0	± 9.6 %
		Y	8.49	77.91	22.46		65.0	
		Z	8.23	77.77	22.36		65.0	
10270-CAD	LTE-TDD (SC-FDMA, 100% RB, 15 MHz, QPSK)	X	9.87	83.32	24.17	3.98	65.0	± 9.6 %
		Y	9.54	81.82	23.34		65.0	
		Z	9.23	81.64	23.20		65.0	

10274-CAB	UMTS-FDD (HSUPA, Subtest 5, 3GPP Rel8.10)	X	2.93	69.92	17.28	0.00	150.0	± 9.6 %
		Y	2.80	68.92	16.59		150.0	
		Z	2.67	68.10	15.90		150.0	
10275-CAB	UMTS-FDD (HSUPA, Subtest 5, 3GPP Rel8.4)	X	2.65	78.26	21.12	0.00	150.0	± 9.6 %
		Y	2.15	74.09	18.99		150.0	
		Z	1.84	71.24	17.33		150.0	
10277-CAA	PHS (QPSK)	X	3.36	65.20	9.94	9.03	50.0	± 9.6 %
		Y	3.89	66.16	10.82		50.0	
		Z	3.28	64.75	9.58		50.0	
10278-CAA	PHS (QPSK, BW 884MHz, Rolloff 0.5)	X	9.68	82.05	19.91	9.03	50.0	± 9.6 %
		Y	8.39	79.03	18.95		50.0	
		Z	7.49	77.63	17.92		50.0	
10279-CAA	PHS (QPSK, BW 884MHz, Rolloff 0.38)	X	9.79	82.20	20.01	9.03	50.0	± 9.6 %
		Y	8.47	79.14	19.03		50.0	
		Z	7.60	77.79	18.03		50.0	
10290-AAB	CDMA2000, RC1, SO55, Full Rate	X	100.00	128.73	31.86	0.00	150.0	± 9.6 %
		Y	5.46	88.02	21.05		150.0	
		Z	1.91	73.76	15.51		150.0	
10291-AAB	CDMA2000, RC3, SO55, Full Rate	X	100.00	135.73	33.92	0.00	150.0	± 9.6 %
		Y	3.79	87.86	21.18		150.0	
		Z	1.18	71.73	14.72		150.0	
10292-AAB	CDMA2000, RC3, SO32, Full Rate	X	100.00	142.87	36.94	0.00	150.0	± 9.6 %
		Y	100.00	136.51	34.18		150.0	
		Z	5.31	92.64	22.43		150.0	
10293-AAB	CDMA2000, RC3, SO3, Full Rate	X	100.00	147.53	39.13	0.00	150.0	± 9.6 %
		Y	100.00	141.37	36.44		150.0	
		Z	100.00	134.56	33.36		150.0	
10295-AAB	CDMA2000, RC1, SO3, 1/8th Rate 25 fr.	X	51.26	114.86	33.17	9.03	50.0	± 9.6 %
		Y	27.72	102.36	29.45		50.0	
		Z	34.06	106.19	30.27		50.0	
10297-AAC	LTE-FDD (SC-FDMA, 50% RB, 20 MHz, QPSK)	X	3.44	75.06	19.80	0.00	150.0	± 9.6 %
		Y	3.15	73.19	18.73		150.0	
		Z	2.87	71.52	17.73		150.0	
10298-AAC	LTE-FDD (SC-FDMA, 50% RB, 3 MHz, QPSK)	X	4.53	85.32	21.43	0.00	150.0	± 9.6 %
		Y	2.49	75.98	17.66		150.0	
		Z	1.68	70.19	14.73		150.0	
10299-AAC	LTE-FDD (SC-FDMA, 50% RB, 3 MHz, 16-QAM)	X	35.97	105.52	25.86	0.00	150.0	± 9.6 %
		Y	5.66	80.41	18.09		150.0	
		Z	2.55	70.20	13.62		150.0	
10300-AAC	LTE-FDD (SC-FDMA, 50% RB, 3 MHz, 64-QAM)	X	3.08	71.93	14.32	0.00	150.0	± 9.6 %
		Y	2.13	67.03	11.85		150.0	
		Z	1.63	64.24	10.02		150.0	
10301-AAA	IEEE 802.16e WiMAX (29:18, 5ms, 10MHz, QPSK, PUSC)	X	5.45	69.13	19.39	4.17	80.0	± 9.6 %
		Y	5.47	68.97	19.13		80.0	
		Z	5.25	68.28	18.65		80.0	
10302-AAA	IEEE 802.16e WiMAX (29:18, 5ms, 10MHz, QPSK, PUSC, 3 CTRL symbols)	X	5.78	69.10	19.80	4.96	80.0	± 9.6 %
		Y	5.77	68.75	19.42		80.0	
		Z	5.66	68.63	19.27		80.0	

10303-AAA	IEEE 802.16e WiMAX (31:15, 5ms, 10MHz, 64QAM, PUSC)	X	5.58	68.98	19.73	4.96	80.0	± 9.6 %
		Y	5.58	68.66	19.35		80.0	
		Z	5.46	68.50	19.18		80.0	
10304-AAA	IEEE 802.16e WiMAX (29:18, 5ms, 10MHz, 64QAM, PUSC)	X	5.34	68.67	19.12	4.17	80.0	± 9.6 %
		Y	5.33	68.32	18.76		80.0	
		Z	5.21	68.15	18.55		80.0	
10305-AAA	IEEE 802.16e WiMAX (31:15, 10ms, 10MHz, 64QAM, PUSC, 15 symbols)	X	6.61	77.30	24.10	6.02	50.0	± 9.6 %
		Y	7.10	78.07	24.03		50.0	
		Z	6.42	76.34	23.21		50.0	
10306-AAA	IEEE 802.16e WiMAX (29:18, 10ms, 10MHz, 64QAM, PUSC, 18 symbols)	X	5.68	70.99	21.21	6.02	50.0	± 9.6 %
		Y	6.11	72.92	22.11		50.0	
		Z	5.54	70.33	20.52		50.0	
10307-AAA	IEEE 802.16e WiMAX (29:18, 10ms, 10MHz, QPSK, PUSC, 18 symbols)	X	5.65	71.36	21.23	6.02	50.0	± 9.6 %
		Y	6.19	73.69	22.31		50.0	
		Z	5.79	72.63	21.74		50.0	
10308-AAA	IEEE 802.16e WiMAX (29:18, 10ms, 10MHz, 16QAM, PUSC)	X	6.01	73.91	22.77	6.02	50.0	± 9.6 %
		Y	6.30	74.37	22.65		50.0	
		Z	5.88	73.25	22.07		50.0	
10309-AAA	IEEE 802.16e WiMAX (29:18, 10ms, 10MHz, 16QAM, AMC 2x3, 18 symbols)	X	5.73	71.20	21.36	6.02	50.0	± 9.6 %
		Y	6.16	73.11	22.25		50.0	
		Z	5.58	70.50	20.65		50.0	
10310-AAA	IEEE 802.16e WiMAX (29:18, 10ms, 10MHz, QPSK, AMC 2x3, 18 symbols)	X	5.67	71.20	21.24	6.02	50.0	± 9.6 %
		Y	6.15	73.31	22.23		50.0	
		Z	5.52	70.51	20.54		50.0	
10311-AAC	LTE-FDD (SC-FDMA, 100% RB, 15 MHz, QPSK)	X	3.80	73.58	19.01	0.00	150.0	± 9.6 %
		Y	3.53	72.03	18.12		150.0	
		Z	3.24	70.56	17.24		150.0	
10313-AAA	iDEN 1:3	X	59.05	112.13	29.07	6.99	70.0	± 9.6 %
		Y	21.12	95.82	24.56		70.0	
		Z	18.22	93.85	23.73		70.0	
10314-AAA	iDEN 1:6	X	100.00	130.93	37.14	10.00	30.0	± 9.6 %
		Y	75.09	122.91	34.76		30.0	
		Z	51.44	117.42	33.31		30.0	
10315-AAB	IEEE 802.11b WiFi 2.4 GHz (DSSS, 1 Mbps, 96pc duty cycle)	X	1.34	68.63	18.94	0.17	150.0	± 9.6 %
		Y	1.29	67.42	17.86		150.0	
		Z	1.21	66.04	16.71		150.0	
10316-AAB	IEEE 802.11g WiFi 2.4 GHz (ERP-OFDM, 6 Mbps, 96pc duty cycle)	X	4.67	67.89	17.21	0.17	150.0	± 9.6 %
		Y	4.64	67.66	16.96		150.0	
		Z	4.56	67.44	16.70		150.0	
10317-AAB	IEEE 802.11a WiFi 5 GHz (OFDM, 6 Mbps, 96pc duty cycle)	X	4.67	67.89	17.21	0.17	150.0	± 9.6 %
		Y	4.64	67.66	16.96		150.0	
		Z	4.56	67.44	16.70		150.0	
10400-AAC	IEEE 802.11ac WiFi (20MHz, 64-QAM, 99pc duty cycle)	X	4.74	68.13	17.15	0.00	150.0	± 9.6 %
		Y	4.69	67.85	16.88		150.0	
		Z	4.60	67.62	16.61		150.0	
10401-AAC	IEEE 802.11ac WiFi (40MHz, 64-QAM, 99pc duty cycle)	X	5.46	68.11	17.20	0.00	150.0	± 9.6 %
		Y	5.42	67.87	16.96		150.0	
		Z	5.29	67.51	16.65		150.0	

10402-AAC	IEEE 802.11ac WiFi (80MHz, 64-QAM, 99pc duty cycle)	X	5.70	68.27	17.13	0.00	150.0	± 9.6 %
		Y	5.67	68.08	16.93		150.0	
		Z	5.59	67.90	16.71		150.0	
10403-AAB	CDMA2000 (1xEV-DO, Rev. 0)	X	100.00	128.73	31.86	0.00	115.0	± 9.6 %
		Y	5.46	88.02	21.05		115.0	
		Z	1.91	73.76	15.51		115.0	
10404-AAB	CDMA2000 (1xEV-DO, Rev. A)	X	100.00	128.73	31.86	0.00	115.0	± 9.6 %
		Y	5.46	88.02	21.05		115.0	
		Z	1.91	73.76	15.51		115.0	
10406-AAB	CDMA2000, RC3, SO32, SCH0, Full Rate	X	100.00	125.52	31.82	0.00	100.0	± 9.6 %
		Y	100.00	122.74	30.63		100.0	
		Z	100.00	121.04	29.50		100.0	
10410-AAC	LTE-TDD (SC-FDMA, 1 RB, 10 MHz, QPSK, UL Subframe=2,3,4,7,8,9)	X	100.00	131.41	34.92	3.23	80.0	± 9.6 %
		Y	100.00	126.46	32.79		80.0	
		Z	100.00	125.69	32.11		80.0	
10415-AAA	IEEE 802.11b WiFi 2.4 GHz (DSSS, 1 Mbps, 99pc duty cycle)	X	1.18	66.83	17.95	0.00	150.0	± 9.6 %
		Y	1.13	65.66	16.89		150.0	
		Z	1.08	64.56	15.83		150.0	
10416-AAA	IEEE 802.11g WiFi 2.4 GHz (ERP-OFDM, 6 Mbps, 99pc duty cycle)	X	4.60	67.79	17.08	0.00	150.0	± 9.6 %
		Y	4.56	67.54	16.83		150.0	
		Z	4.48	67.32	16.55		150.0	
10417-AAA	IEEE 802.11a/h WiFi 5 GHz (OFDM, 6 Mbps, 99pc duty cycle)	X	4.60	67.79	17.08	0.00	150.0	± 9.6 %
		Y	4.56	67.54	16.83		150.0	
		Z	4.48	67.32	16.55		150.0	
10418-AAA	IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 6 Mbps, 99pc duty cycle, Long preambule)	X	4.60	68.04	17.15	0.00	150.0	± 9.6 %
		Y	4.56	67.77	16.89		150.0	
		Z	4.48	67.54	16.61		150.0	
10419-AAA	IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 6 Mbps, 99pc duty cycle, Short preambule)	X	4.61	67.95	17.12	0.00	150.0	± 9.6 %
		Y	4.57	67.69	16.87		150.0	
		Z	4.49	67.46	16.60		150.0	
10422-AAA	IEEE 802.11n (HT Greenfield, 7.2 Mbps, BPSK)	X	4.72	67.88	17.10	0.00	150.0	± 9.6 %
		Y	4.68	67.64	16.86		150.0	
		Z	4.60	67.42	16.59		150.0	
10423-AAA	IEEE 802.11n (HT Greenfield, 43.3 Mbps, 16-QAM)	X	4.86	68.17	17.20	0.00	150.0	± 9.6 %
		Y	4.82	67.92	16.96		150.0	
		Z	4.73	67.70	16.69		150.0	
10424-AAA	IEEE 802.11n (HT Greenfield, 72.2 Mbps, 64-QAM)	X	4.79	68.14	17.19	0.00	150.0	± 9.6 %
		Y	4.75	67.89	16.94		150.0	
		Z	4.66	67.66	16.67		150.0	
10425-AAA	IEEE 802.11n (HT Greenfield, 15 Mbps, BPSK)	X	5.41	68.25	17.27	0.00	150.0	± 9.6 %
		Y	5.37	68.04	17.06		150.0	
		Z	5.28	67.83	16.82		150.0	
10426-AAA	IEEE 802.11n (HT Greenfield, 90 Mbps, 16-QAM)	X	5.44	68.38	17.34	0.00	150.0	± 9.6 %
		Y	5.40	68.16	17.12		150.0	
		Z	5.31	67.93	16.86		150.0	

10427-AAA	IEEE 802.11n (HT Greenfield, 150 Mbps, 64-QAM)	X	5.41	68.20	17.24	0.00	150.0	± 9.6 %
		Y	5.37	67.99	17.02		150.0	
		Z	5.27	67.73	16.76		150.0	
10430-AAB	LTE-FDD (OFDMA, 5 MHz, E-TM 3.1)	X	4.68	74.13	19.83	0.00	150.0	± 9.6 %
		Y	4.66	73.98	19.65		150.0	
		Z	4.33	72.57	18.70		150.0	
10431-AAB	LTE-FDD (OFDMA, 10 MHz, E-TM 3.1)	X	4.30	68.76	17.23	0.00	150.0	± 9.6 %
		Y	4.24	68.39	16.91		150.0	
		Z	4.13	68.04	16.54		150.0	
10432-AAB	LTE-FDD (OFDMA, 15 MHz, E-TM 3.1)	X	4.58	68.36	17.21	0.00	150.0	± 9.6 %
		Y	4.53	68.06	16.94		150.0	
		Z	4.43	67.79	16.63		150.0	
10433-AAB	LTE-FDD (OFDMA, 20 MHz, E-TM 3.1)	X	4.81	68.17	17.21	0.00	150.0	± 9.6 %
		Y	4.77	67.92	16.96		150.0	
		Z	4.68	67.69	16.69		150.0	
10434-AAA	W-CDMA (BS Test Model 1, 64 DPCH)	X	5.03	75.87	20.06	0.00	150.0	± 9.6 %
		Y	4.99	75.61	19.83		150.0	
		Z	4.49	73.69	18.66		150.0	
10435-AAC	LTE-TDD (SC-FDMA, 1 RB, 20 MHz, QPSK, UL Subframe=2,3,4,7,8,9)	X	100.00	131.13	34.80	3.23	80.0	± 9.6 %
		Y	100.00	126.21	32.67		80.0	
		Z	100.00	125.44	31.99		80.0	
10447-AAB	LTE-FDD (OFDMA, 5 MHz, E-TM 3.1, Clipping 44%)	X	3.69	69.53	16.77	0.00	150.0	± 9.6 %
		Y	3.58	68.87	16.29		150.0	
		Z	3.42	68.21	15.70		150.0	
10448-AAB	LTE-FDD (OFDMA, 10 MHz, E-TM 3.1, Clippin 44%)	X	4.15	68.58	17.12	0.00	150.0	± 9.6 %
		Y	4.09	68.20	16.80		150.0	
		Z	3.99	67.84	16.42		150.0	
10449-AAB	LTE-FDD (OFDMA, 15 MHz, E-TM 3.1, Cliping 44%)	X	4.41	68.22	17.14	0.00	150.0	± 9.6 %
		Y	4.36	67.92	16.86		150.0	
		Z	4.27	67.63	16.54		150.0	
10450-AAB	LTE-FDD (OFDMA, 20 MHz, E-TM 3.1, Clipping 44%)	X	4.60	67.99	17.10	0.00	150.0	± 9.6 %
		Y	4.55	67.72	16.84		150.0	
		Z	4.47	67.48	16.56		150.0	
10451-AAA	W-CDMA (BS Test Model 1, 64 DPCH, Clipping 44%)	X	3.62	69.93	16.40	0.00	150.0	± 9.6 %
		Y	3.47	69.09	15.83		150.0	
		Z	3.27	68.23	15.13		150.0	
10456-AAA	IEEE 802.11ac WiFi (160MHz, 64-QAM, 99pc duty cycle)	X	6.36	68.84	17.42	0.00	150.0	± 9.6 %
		Y	6.32	68.67	17.24		150.0	
		Z	6.23	68.46	17.01		150.0	
10457-AAA	UMTS-FDD (DC-HSDPA)	X	3.88	66.43	16.81	0.00	150.0	± 9.6 %
		Y	3.85	66.20	16.55		150.0	
		Z	3.80	66.01	16.28		150.0	
10458-AAA	CDMA2000 (1xEV-DO, Rev. B, 2 carriers)	X	4.65	75.19	19.34	0.00	150.0	± 9.6 %
		Y	4.52	74.56	18.92		150.0	
		Z	4.04	72.55	17.67		150.0	
10459-AAA	CDMA2000 (1xEV-DO, Rev. B, 3 carriers)	X	5.15	69.96	18.79	0.00	150.0	± 9.6 %
		Y	5.22	70.24	18.85		150.0	
		Z	4.92	69.20	18.07		150.0	

10460-AAA	UMTS-FDD (WCDMA, AMR)	X	3.37	95.81	29.07	0.00	150.0	± 9.6 %
		Y	1.74	81.67	23.23		150.0	
		Z	1.21	74.42	19.58		150.0	
10461-AAA	LTE-TDD (SC-FDMA, 1 RB, 1.4 MHz, QPSK, UL Subframe=2,3,4,7,8,9)	X	100.00	143.01	40.15	3.29	80.0	± 9.6 %
		Y	100.00	134.90	36.63		80.0	
		Z	100.00	132.97	35.44		80.0	
10462-AAA	LTE-TDD (SC-FDMA, 1 RB, 1.4 MHz, 16-QAM, UL Subframe=2,3,4,7,8,9)	X	100.00	119.25	28.85	3.23	80.0	± 9.6 %
		Y	100.00	113.20	26.37		80.0	
		Z	100.00	110.00	24.63		80.0	
10463-AAA	LTE-TDD (SC-FDMA, 1 RB, 1.4 MHz, 64-QAM, UL Subframe=2,3,4,7,8,9)	X	100.00	113.75	26.28	3.23	80.0	± 9.6 %
		Y	100.00	108.57	24.18		80.0	
		Z	100.00	105.07	22.33		80.0	
10464-AAA	LTE-TDD (SC-FDMA, 1 RB, 3 MHz, QPSK, UL Subframe=2,3,4,7,8,9)	X	100.00	141.23	39.11	3.23	80.0	± 9.6 %
		Y	100.00	132.81	35.48		80.0	
		Z	100.00	130.60	34.16		80.0	
10465-AAA	LTE-TDD (SC-FDMA, 1 RB, 3 MHz, 16-QAM, UL Subframe=2,3,4,7,8,9)	X	100.00	118.41	28.46	3.23	80.0	± 9.6 %
		Y	100.00	112.48	26.02		80.0	
		Z	100.00	109.28	24.29		80.0	
10466-AAA	LTE-TDD (SC-FDMA, 1 RB, 3 MHz, 64-QAM, UL Subframe=2,3,4,7,8,9)	X	100.00	112.90	25.90	3.23	80.0	± 9.6 %
		Y	100.00	107.89	23.87		80.0	
		Z	100.00	104.43	22.04		80.0	
10467-AAC	LTE-TDD (SC-FDMA, 1 RB, 5 MHz, QPSK, UL Subframe=2,3,4,7,8,9)	X	100.00	141.61	39.28	3.23	80.0	± 9.6 %
		Y	100.00	133.15	35.63		80.0	
		Z	100.00	130.94	34.31		80.0	
10468-AAC	LTE-TDD (SC-FDMA, 1 RB, 5 MHz, 16-QAM, UL Subframe=2,3,4,7,8,9)	X	100.00	118.75	28.61	3.23	80.0	± 9.6 %
		Y	100.00	112.75	26.15		80.0	
		Z	100.00	109.56	24.42		80.0	
10469-AAC	LTE-TDD (SC-FDMA, 1 RB, 5 MHz, 64-QAM, UL Subframe=2,3,4,7,8,9)	X	100.00	112.98	25.93	3.23	80.0	± 9.6 %
		Y	100.00	107.94	23.89		80.0	
		Z	100.00	104.47	22.05		80.0	
10470-AAC	LTE-TDD (SC-FDMA, 1 RB, 10 MHz, QPSK, UL Subframe=2,3,4,7,8,9)	X	100.00	141.70	39.31	3.23	80.0	± 9.6 %
		Y	100.00	133.21	35.65		80.0	
		Z	100.00	130.98	34.32		80.0	
10471-AAC	LTE-TDD (SC-FDMA, 1 RB, 10 MHz, 16-QAM, UL Subframe=2,3,4,7,8,9)	X	100.00	118.69	28.58	3.23	80.0	± 9.6 %
		Y	100.00	112.69	26.12		80.0	
		Z	100.00	109.48	24.38		80.0	
10472-AAC	LTE-TDD (SC-FDMA, 1 RB, 10 MHz, 64-QAM, UL Subframe=2,3,4,7,8,9)	X	100.00	112.90	25.89	3.23	80.0	± 9.6 %
		Y	100.00	107.86	23.85		80.0	
		Z	100.00	104.38	22.01		80.0	
10473-AAC	LTE-TDD (SC-FDMA, 1 RB, 15 MHz, QPSK, UL Subframe=2,3,4,7,8,9)	X	100.00	141.67	39.29	3.23	80.0	± 9.6 %
		Y	100.00	133.18	35.63		80.0	
		Z	100.00	130.96	34.31		80.0	
10474-AAC	LTE-TDD (SC-FDMA, 1 RB, 15 MHz, 16-QAM, UL Subframe=2,3,4,7,8,9)	X	100.00	118.71	28.58	3.23	80.0	± 9.6 %
		Y	100.00	112.70	26.12		80.0	
		Z	100.00	109.49	24.38		80.0	
10475-AAC	LTE-TDD (SC-FDMA, 1 RB, 15 MHz, 64-QAM, UL Subframe=2,3,4,7,8,9)	X	100.00	112.93	25.90	3.23	80.0	± 9.6 %
		Y	100.00	107.88	23.85		80.0	
		Z	100.00	104.40	22.02		80.0	

10477-AAC	LTE-TDD (SC-FDMA, 1 RB, 20 MHz, 16-QAM, UL Subframe=2,3,4,7,8,9)	X	100.00	118.43	28.45	3.23	80.0	± 9.6 %
		Y	100.00	112.46	26.00		80.0	
		Z	100.00	109.24	24.26		80.0	
10478-AAC	LTE-TDD (SC-FDMA, 1 RB, 20 MHz, 64-QAM, UL Subframe=2,3,4,7,8,9)	X	100.00	112.82	25.85	3.23	80.0	± 9.6 %
		Y	100.00	107.79	23.82		80.0	
		Z	100.00	104.31	21.98		80.0	
10479-AAA	LTE-TDD (SC-FDMA, 50% RB, 1.4 MHz, QPSK, UL Subframe=2,3,4,7,8,9)	X	100.00	132.85	37.00	3.23	80.0	± 9.6 %
		Y	100.00	128.47	35.00		80.0	
		Z	100.00	127.00	34.04		80.0	
10480-AAA	LTE-TDD (SC-FDMA, 50% RB, 1.4 MHz, 16-QAM, UL Subframe=2,3,4,7,8,9)	X	100.00	120.16	30.90	3.23	80.0	± 9.6 %
		Y	100.00	116.69	29.36		80.0	
		Z	100.00	114.91	28.26		80.0	
10481-AAA	LTE-TDD (SC-FDMA, 50% RB, 1.4 MHz, 64-QAM, UL Subframe=2,3,4,7,8,9)	X	100.00	117.70	29.67	3.23	80.0	± 9.6 %
		Y	100.00	114.39	28.21		80.0	
		Z	100.00	112.46	27.04		80.0	
10482-AAA	LTE-TDD (SC-FDMA, 50% RB, 3 MHz, QPSK, UL Subframe=2,3,4,7,8,9)	X	100.00	122.13	31.51	2.23	80.0	± 9.6 %
		Y	54.92	111.25	28.42		80.0	
		Z	13.32	91.56	22.86		80.0	
10483-AAA	LTE-TDD (SC-FDMA, 50% RB, 3 MHz, 16-QAM, UL Subframe=2,3,4,7,8,9)	X	100.00	116.38	29.36	2.23	80.0	± 9.6 %
		Y	100.00	113.46	28.01		80.0	
		Z	11.26	84.75	19.89		80.0	
10484-AAA	LTE-TDD (SC-FDMA, 50% RB, 3 MHz, 64-QAM, UL Subframe=2,3,4,7,8,9)	X	100.00	115.90	29.19	2.23	80.0	± 9.6 %
		Y	50.77	104.49	25.86		80.0	
		Z	8.43	80.95	18.67		80.0	
10485-AAC	LTE-TDD (SC-FDMA, 50% RB, 5 MHz, QPSK, UL Subframe=2,3,4,7,8,9)	X	65.25	120.82	33.02	2.23	80.0	± 9.6 %
		Y	24.29	103.39	28.10		80.0	
		Z	11.52	91.94	24.54		80.0	
10486-AAC	LTE-TDD (SC-FDMA, 50% RB, 5 MHz, 16-QAM, UL Subframe=2,3,4,7,8,9)	X	10.69	87.70	22.97	2.23	80.0	± 9.6 %
		Y	8.09	82.63	21.00		80.0	
		Z	5.71	77.63	18.94		80.0	
10487-AAC	LTE-TDD (SC-FDMA, 50% RB, 5 MHz, 64-QAM, UL Subframe=2,3,4,7,8,9)	X	9.28	85.21	22.13	2.23	80.0	± 9.6 %
		Y	7.33	80.85	20.36		80.0	
		Z	5.35	76.37	18.44		80.0	
10488-AAC	LTE-TDD (SC-FDMA, 50% RB, 10 MHz, QPSK, UL Subframe=2,3,4,7,8,9)	X	11.48	93.02	26.74	2.23	80.0	± 9.6 %
		Y	9.12	87.88	24.67		80.0	
		Z	6.88	83.40	22.96		80.0	
10489-AAC	LTE-TDD (SC-FDMA, 50% RB, 10 MHz, 16-QAM, UL Subframe=2,3,4,7,8,9)	X	6.05	78.94	21.72	2.23	80.0	± 9.6 %
		Y	5.74	77.30	20.79		80.0	
		Z	4.98	75.13	19.74		80.0	
10490-AAC	LTE-TDD (SC-FDMA, 50% RB, 10 MHz, 64-QAM, UL Subframe=2,3,4,7,8,9)	X	5.92	78.02	21.35	2.23	80.0	± 9.6 %
		Y	5.66	76.55	20.49		80.0	
		Z	4.96	74.57	19.51		80.0	
10491-AAC	LTE-TDD (SC-FDMA, 50% RB, 15 MHz, QPSK, UL Subframe=2,3,4,7,8,9)	X	7.36	83.03	23.55	2.23	80.0	± 9.6 %
		Y	6.73	80.60	22.34		80.0	
		Z	5.73	78.11	21.25		80.0	
10492-AAC	LTE-TDD (SC-FDMA, 50% RB, 15 MHz, 16-QAM, UL Subframe=2,3,4,7,8,9)	X	5.42	74.92	20.52	2.23	80.0	± 9.6 %
		Y	5.33	74.03	19.90		80.0	
		Z	4.87	72.71	19.18		80.0	

10493-AAC	LTE-TDD (SC-FDMA, 50% RB, 15 MHz, 64-QAM, UL Subframe=2,3,4,7,8,9)	X	5.40	74.45	20.32	2.23	80.0	± 9.6 %
		Y	5.32	73.63	19.73		80.0	
		Z	4.88	72.39	19.05		80.0	
10494-AAC	LTE-TDD (SC-FDMA, 50% RB, 20 MHz, QPSK, UL Subframe=2,3,4,7,8,9)	X	9.17	86.80	24.72	2.23	80.0	± 9.6 %
		Y	8.03	83.58	23.27		80.0	
		Z	6.60	80.52	22.02		80.0	
10495-AAC	LTE-TDD (SC-FDMA, 50% RB, 20 MHz, 16-QAM, UL Subframe=2,3,4,7,8,9)	X	5.52	75.46	20.81	2.23	80.0	± 9.6 %
		Y	5.42	74.52	20.17		80.0	
		Z	4.93	73.12	19.44		80.0	
10496-AAC	LTE-TDD (SC-FDMA, 50% RB, 20 MHz, 64-QAM, UL Subframe=2,3,4,7,8,9)	X	5.45	74.64	20.50	2.23	80.0	± 9.6 %
		Y	5.38	73.84	19.92		80.0	
		Z	4.93	72.57	19.24		80.0	
10497-AAA	LTE-TDD (SC-FDMA, 100% RB, 1.4 MHz, QPSK, UL Subframe=2,3,4,7,8,9)	X	100.00	115.27	27.88	2.23	80.0	± 9.6 %
		Y	25.28	96.48	22.93		80.0	
		Z	5.87	78.71	17.31		80.0	
10498-AAA	LTE-TDD (SC-FDMA, 100% RB, 1.4 MHz, 16-QAM, UL Subframe=2,3,4,7,8,9)	X	2.96	68.45	12.76	2.23	80.0	± 9.6 %
		Y	2.21	64.78	11.01		80.0	
		Z	1.67	62.18	9.40		80.0	
10499-AAA	LTE-TDD (SC-FDMA, 100% RB, 1.4 MHz, 64-QAM, UL Subframe=2,3,4,7,8,9)	X	2.39	65.91	11.50	2.23	80.0	± 9.6 %
		Y	1.96	63.35	10.16		80.0	
		Z	1.55	61.26	8.77		80.0	
10500-AAA	LTE-TDD (SC-FDMA, 100% RB, 3 MHz, QPSK, UL Subframe=2,3,4,7,8,9)	X	21.96	103.85	29.24	2.23	80.0	± 9.6 %
		Y	13.48	94.40	26.05		80.0	
		Z	8.53	87.25	23.57		80.0	
10501-AAA	LTE-TDD (SC-FDMA, 100% RB, 3 MHz, 16-QAM, UL Subframe=2,3,4,7,8,9)	X	8.02	83.54	22.29	2.23	80.0	± 9.6 %
		Y	6.90	80.32	20.86		80.0	
		Z	5.43	76.80	19.30		80.0	
10502-AAA	LTE-TDD (SC-FDMA, 100% RB, 3 MHz, 64-QAM, UL Subframe=2,3,4,7,8,9)	X	7.77	82.58	21.87	2.23	80.0	± 9.6 %
		Y	6.74	79.56	20.50		80.0	
		Z	5.37	76.23	19.00		80.0	
10503-AAC	LTE-TDD (SC-FDMA, 100% RB, 5 MHz, QPSK, UL Subframe=2,3,4,7,8,9)	X	11.17	92.54	26.57	2.23	80.0	± 9.6 %
		Y	8.90	87.45	24.51		80.0	
		Z	6.74	83.07	22.83		80.0	
10504-AAC	LTE-TDD (SC-FDMA, 100% RB, 5 MHz, 16-QAM, UL Subframe=2,3,4,7,8,9)	X	6.00	78.78	21.64	2.23	80.0	± 9.6 %
		Y	5.69	77.13	20.71		80.0	
		Z	4.94	74.99	19.66		80.0	
10505-AAC	LTE-TDD (SC-FDMA, 100% RB, 5 MHz, 64-QAM, UL Subframe=2,3,4,7,8,9)	X	5.88	77.87	21.28	2.23	80.0	± 9.6 %
		Y	5.62	76.40	20.42		80.0	
		Z	4.93	74.45	19.44		80.0	
10506-AAC	LTE-TDD (SC-FDMA, 100% RB, 10 MHz, QPSK, UL Subframe=2,3,4,7,8,9)	X	9.03	86.51	24.60	2.23	80.0	± 9.6 %
		Y	7.91	83.32	23.16		80.0	
		Z	6.52	80.31	21.93		80.0	
10507-AAC	LTE-TDD (SC-FDMA, 100% RB, 10 MHz, 16-QAM, UL Subframe=2,3,4,7,8,9)	X	5.50	75.38	20.77	2.23	80.0	± 9.6 %
		Y	5.39	74.44	20.13		80.0	
		Z	4.91	73.05	19.40		80.0	

10508-AAC	LTE-TDD (SC-FDMA, 100% RB, 10 MHz, 64-QAM, UL Subframe=2,3,4,7,8,9)	X	5.43	74.55	20.45	2.23	80.0	± 9.6 %
		Y	5.35	73.74	19.86		80.0	
		Z	4.91	72.49	19.19		80.0	
10509-AAC	LTE-TDD (SC-FDMA, 100% RB, 15 MHz, QPSK, UL Subframe=2,3,4,7,8,9)	X	7.27	80.16	22.31	2.23	80.0	± 9.6 %
		Y	6.86	78.46	21.40		80.0	
		Z	6.07	76.60	20.55		80.0	
10510-AAC	LTE-TDD (SC-FDMA, 100% RB, 15 MHz, 16-QAM, UL Subframe=2,3,4,7,8,9)	X	5.60	73.37	20.04	2.23	80.0	± 9.6 %
		Y	5.56	72.76	19.56		80.0	
		Z	5.19	71.77	19.01		80.0	
10511-AAC	LTE-TDD (SC-FDMA, 100% RB, 15 MHz, 64-QAM, UL Subframe=2,3,4,7,8,9)	X	5.57	72.82	19.83	2.23	80.0	± 9.6 %
		Y	5.55	72.29	19.39		80.0	
		Z	5.21	71.39	18.87		80.0	
10512-AAC	LTE-TDD (SC-FDMA, 100% RB, 20 MHz, QPSK, UL Subframe=2,3,4,7,8,9)	X	8.90	84.26	23.64	2.23	80.0	± 9.6 %
		Y	8.02	81.72	22.45		80.0	
		Z	6.83	79.22	21.40		80.0	
10513-AAC	LTE-TDD (SC-FDMA, 100% RB, 20 MHz, 16-QAM, UL Subframe=2,3,4,7,8,9)	X	5.59	74.00	20.32	2.23	80.0	± 9.6 %
		Y	5.54	73.30	19.79		80.0	
		Z	5.13	72.20	19.19		80.0	
10514-AAC	LTE-TDD (SC-FDMA, 100% RB, 20 MHz, 64-QAM, UL Subframe=2,3,4,7,8,9)	X	5.48	73.14	20.00	2.23	80.0	± 9.6 %
		Y	5.45	72.55	19.53		80.0	
		Z	5.09	71.56	18.98		80.0	
10515-AAA	IEEE 802.11b WiFi 2.4 GHz (DSSS, 2 Mbps, 99pc duty cycle)	X	1.15	67.44	18.30	0.00	150.0	± 9.6 %
		Y	1.10	66.10	17.12		150.0	
		Z	1.04	64.87	15.98		150.0	
10516-AAA	IEEE 802.11b WiFi 2.4 GHz (DSSS, 5.5 Mbps, 99pc duty cycle)	X	100.00	185.02	53.92	0.00	150.0	± 9.6 %
		Y	4.08	110.19	34.01		150.0	
		Z	1.21	84.34	24.35		150.0	
10517-AAA	IEEE 802.11b WiFi 2.4 GHz (DSSS, 11 Mbps, 99pc duty cycle)	X	1.23	74.63	21.82	0.00	150.0	± 9.6 %
		Y	1.06	70.88	19.41		150.0	
		Z	0.94	68.06	17.43		150.0	
10518-AAA	IEEE 802.11a/h WiFi 5 GHz (OFDM, 9 Mbps, 99pc duty cycle)	X	4.59	67.92	17.08	0.00	150.0	± 9.6 %
		Y	4.55	67.66	16.83		150.0	
		Z	4.47	67.43	16.55		150.0	
10519-AAA	IEEE 802.11a/h WiFi 5 GHz (OFDM, 12 Mbps, 99pc duty cycle)	X	4.75	68.08	17.16	0.00	150.0	± 9.6 %
		Y	4.71	67.83	16.91		150.0	
		Z	4.62	67.60	16.63		150.0	
10520-AAA	IEEE 802.11a/h WiFi 5 GHz (OFDM, 18 Mbps, 99pc duty cycle)	X	4.61	68.08	17.11	0.00	150.0	± 9.6 %
		Y	4.57	67.81	16.85		150.0	
		Z	4.48	67.55	16.56		150.0	
10521-AAA	IEEE 802.11a/h WiFi 5 GHz (OFDM, 24 Mbps, 99pc duty cycle)	X	4.55	68.08	17.11	0.00	150.0	± 9.6 %
		Y	4.50	67.80	16.85		150.0	
		Z	4.42	67.54	16.55		150.0	
10522-AAA	IEEE 802.11a/h WiFi 5 GHz (OFDM, 36 Mbps, 99pc duty cycle)	X	4.61	68.22	17.21	0.00	150.0	± 9.6 %
		Y	4.56	67.94	16.95		150.0	
		Z	4.47	67.67	16.65		150.0	

10523-AAA	IEEE 802.11a/h WiFi 5 GHz (OFDM, 48 Mbps, 99pc duty cycle)	X	4.52	68.18	17.12	0.00	150.0	± 9.6 %
		Y	4.48	67.89	16.85		150.0	
		Z	4.39	67.64	16.56		150.0	
10524-AAA	IEEE 802.11a/h WiFi 5 GHz (OFDM, 54 Mbps, 99pc duty cycle)	X	4.56	68.16	17.20	0.00	150.0	± 9.6 %
		Y	4.51	67.87	16.93		150.0	
		Z	4.42	67.62	16.64		150.0	
10525-AAA	IEEE 802.11ac WiFi (20MHz, MCS0, 99pc duty cycle)	X	4.58	67.22	16.79	0.00	150.0	± 9.6 %
		Y	4.53	66.96	16.53		150.0	
		Z	4.45	66.71	16.25		150.0	
10526-AAA	IEEE 802.11ac WiFi (20MHz, MCS1, 99pc duty cycle)	X	4.73	67.55	16.92	0.00	150.0	± 9.6 %
		Y	4.68	67.28	16.66		150.0	
		Z	4.58	67.01	16.37		150.0	
10527-AAA	IEEE 802.11ac WiFi (20MHz, MCS2, 99pc duty cycle)	X	4.66	67.55	16.87	0.00	150.0	± 9.6 %
		Y	4.61	67.26	16.61		150.0	
		Z	4.51	66.98	16.31		150.0	
10528-AAA	IEEE 802.11ac WiFi (20MHz, MCS3, 99pc duty cycle)	X	4.67	67.56	16.90	0.00	150.0	± 9.6 %
		Y	4.62	67.27	16.64		150.0	
		Z	4.53	67.00	16.34		150.0	
10529-AAA	IEEE 802.11ac WiFi (20MHz, MCS4, 99pc duty cycle)	X	4.67	67.56	16.90	0.00	150.0	± 9.6 %
		Y	4.62	67.27	16.64		150.0	
		Z	4.53	67.00	16.34		150.0	
10531-AAA	IEEE 802.11ac WiFi (20MHz, MCS6, 99pc duty cycle)	X	4.65	67.64	16.91	0.00	150.0	± 9.6 %
		Y	4.60	67.34	16.64		150.0	
		Z	4.50	67.04	16.33		150.0	
10532-AAA	IEEE 802.11ac WiFi (20MHz, MCS7, 99pc duty cycle)	X	4.52	67.51	16.86	0.00	150.0	± 9.6 %
		Y	4.47	67.22	16.59		150.0	
		Z	4.37	66.91	16.27		150.0	
10533-AAA	IEEE 802.11ac WiFi (20MHz, MCS8, 99pc duty cycle)	X	4.68	67.65	16.91	0.00	150.0	± 9.6 %
		Y	4.63	67.36	16.65		150.0	
		Z	4.53	67.08	16.35		150.0	
10534-AAA	IEEE 802.11ac WiFi (40MHz, MCS0, 99pc duty cycle)	X	5.20	67.39	16.83	0.00	150.0	± 9.6 %
		Y	5.16	67.18	16.61		150.0	
		Z	5.07	66.93	16.35		150.0	
10535-AAA	IEEE 802.11ac WiFi (40MHz, MCS1, 99pc duty cycle)	X	5.27	67.58	16.92	0.00	150.0	± 9.6 %
		Y	5.22	67.35	16.70		150.0	
		Z	5.12	67.09	16.43		150.0	
10536-AAA	IEEE 802.11ac WiFi (40MHz, MCS2, 99pc duty cycle)	X	5.15	67.59	16.91	0.00	150.0	± 9.6 %
		Y	5.11	67.36	16.68		150.0	
		Z	5.02	67.10	16.41		150.0	
10537-AAA	IEEE 802.11ac WiFi (40MHz, MCS3, 99pc duty cycle)	X	5.20	67.53	16.88	0.00	150.0	± 9.6 %
		Y	5.16	67.30	16.66		150.0	
		Z	5.07	67.07	16.40		150.0	
10538-AAA	IEEE 802.11ac WiFi (40MHz, MCS4, 99pc duty cycle)	X	5.27	67.48	16.89	0.00	150.0	± 9.6 %
		Y	5.23	67.27	16.67		150.0	
		Z	5.14	67.03	16.42		150.0	
10540-AAA	IEEE 802.11ac WiFi (40MHz, MCS6, 99pc duty cycle)	X	5.20	67.48	16.91	0.00	150.0	± 9.6 %
		Y	5.16	67.26	16.69		150.0	
		Z	5.07	67.00	16.42		150.0	

10541-AAA	IEEE 802.11ac WiFi (40MHz, MCS7, 99pc duty cycle)	X	5.18	67.34	16.82	0.00	150.0	± 9.6 %
		Y	5.14	67.12	16.61		150.0	
		Z	5.05	66.89	16.35		150.0	
10542-AAA	IEEE 802.11ac WiFi (40MHz, MCS8, 99pc duty cycle)	X	5.33	67.42	16.87	0.00	150.0	± 9.6 %
		Y	5.29	67.21	16.66		150.0	
		Z	5.20	66.99	16.41		150.0	
10543-AAA	IEEE 802.11ac WiFi (40MHz, MCS9, 99pc duty cycle)	X	5.40	67.44	16.90	0.00	150.0	± 9.6 %
		Y	5.36	67.24	16.70		150.0	
		Z	5.27	67.04	16.47		150.0	
10544-AAA	IEEE 802.11ac WiFi (80MHz, MCS0, 99pc duty cycle)	X	5.53	67.39	16.75	0.00	150.0	± 9.6 %
		Y	5.49	67.20	16.56		150.0	
		Z	5.41	66.99	16.32		150.0	
10545-AAA	IEEE 802.11ac WiFi (80MHz, MCS1, 99pc duty cycle)	X	5.74	67.91	16.97	0.00	150.0	± 9.6 %
		Y	5.70	67.70	16.77		150.0	
		Z	5.60	67.47	16.52		150.0	
10546-AAA	IEEE 802.11ac WiFi (80MHz, MCS2, 99pc duty cycle)	X	5.57	67.55	16.80	0.00	150.0	± 9.6 %
		Y	5.53	67.35	16.60		150.0	
		Z	5.45	67.13	16.36		150.0	
10547-AAA	IEEE 802.11ac WiFi (80MHz, MCS3, 99pc duty cycle)	X	5.66	67.65	16.84	0.00	150.0	± 9.6 %
		Y	5.62	67.45	16.64		150.0	
		Z	5.53	67.23	16.41		150.0	
10548-AAA	IEEE 802.11ac WiFi (80MHz, MCS4, 99pc duty cycle)	X	5.90	68.59	17.29	0.00	150.0	± 9.6 %
		Y	5.84	68.33	17.06		150.0	
		Z	5.71	67.98	16.76		150.0	
10550-AAA	IEEE 802.11ac WiFi (80MHz, MCS6, 99pc duty cycle)	X	5.64	67.75	16.92	0.00	150.0	± 9.6 %
		Y	5.60	67.54	16.71		150.0	
		Z	5.51	67.32	16.47		150.0	
10551-AAA	IEEE 802.11ac WiFi (80MHz, MCS7, 99pc duty cycle)	X	5.59	67.58	16.79	0.00	150.0	± 9.6 %
		Y	5.55	67.38	16.59		150.0	
		Z	5.45	67.11	16.33		150.0	
10552-AAA	IEEE 802.11ac WiFi (80MHz, MCS8, 99pc duty cycle)	X	5.54	67.49	16.75	0.00	150.0	± 9.6 %
		Y	5.50	67.29	16.55		150.0	
		Z	5.42	67.10	16.32		150.0	
10553-AAA	IEEE 802.11ac WiFi (80MHz, MCS9, 99pc duty cycle)	X	5.60	67.45	16.75	0.00	150.0	± 9.6 %
		Y	5.56	67.25	16.56		150.0	
		Z	5.48	67.05	16.33		150.0	
10554-AAB	IEEE 802.11ac WiFi (160MHz, MCS0, 99pc duty cycle)	X	5.95	67.70	16.80	0.00	150.0	± 9.6 %
		Y	5.91	67.51	16.61		150.0	
		Z	5.83	67.32	16.39		150.0	
10555-AAB	IEEE 802.11ac WiFi (160MHz, MCS1, 99pc duty cycle)	X	6.07	68.00	16.93	0.00	150.0	± 9.6 %
		Y	6.03	67.81	16.74		150.0	
		Z	5.94	67.58	16.50		150.0	
10556-AAB	IEEE 802.11ac WiFi (160MHz, MCS2, 99pc duty cycle)	X	6.11	68.10	16.97	0.00	150.0	± 9.6 %
		Y	6.07	67.90	16.78		150.0	
		Z	5.98	67.68	16.55		150.0	
10557-AAB	IEEE 802.11ac WiFi (160MHz, MCS3, 99pc duty cycle)	X	6.05	67.93	16.91	0.00	150.0	± 9.6 %
		Y	6.01	67.74	16.72		150.0	
		Z	5.92	67.53	16.49		150.0	

10558-AAB	IEEE 802.11ac WiFi (160MHz, MCS4, 99pc duty cycle)	X	6.09	68.07	16.99	0.00	150.0	± 9.6 %
		Y	6.04	67.87	16.80		150.0	
		Z	5.95	67.63	16.56		150.0	
10560-AAB	IEEE 802.11ac WiFi (160MHz, MCS6, 99pc duty cycle)	X	6.08	67.92	16.95	0.00	150.0	± 9.6 %
		Y	6.04	67.73	16.77		150.0	
		Z	5.95	67.52	16.54		150.0	
10561-AAB	IEEE 802.11ac WiFi (160MHz, MCS7, 99pc duty cycle)	X	6.02	67.94	17.00	0.00	150.0	± 9.6 %
		Y	5.98	67.74	16.81		150.0	
		Z	5.89	67.52	16.58		150.0	
10562-AAB	IEEE 802.11ac WiFi (160MHz, MCS8, 99pc duty cycle)	X	6.09	68.17	17.12	0.00	150.0	± 9.6 %
		Y	6.05	67.96	16.92		150.0	
		Z	5.95	67.72	16.67		150.0	
10563-AAB	IEEE 802.11ac WiFi (160MHz, MCS9, 99pc duty cycle)	X	6.19	68.10	17.04	0.00	150.0	± 9.6 %
		Y	6.15	67.90	16.85		150.0	
		Z	6.04	67.65	16.60		150.0	
10564-AAA	IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 9 Mbps, 99pc duty cycle)	X	4.91	67.89	17.17	0.46	150.0	± 9.6 %
		Y	4.87	67.64	16.93		150.0	
		Z	4.80	67.46	16.69		150.0	
10565-AAA	IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 12 Mbps, 99pc duty cycle)	X	5.11	68.27	17.46	0.46	150.0	± 9.6 %
		Y	5.08	68.05	17.23		150.0	
		Z	4.99	67.85	16.98		150.0	
10566-AAA	IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 18 Mbps, 99pc duty cycle)	X	4.96	68.15	17.30	0.46	150.0	± 9.6 %
		Y	4.92	67.91	17.06		150.0	
		Z	4.83	67.70	16.81		150.0	
10567-AAA	IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 24 Mbps, 99pc duty cycle)	X	4.99	68.55	17.66	0.46	150.0	± 9.6 %
		Y	4.96	68.34	17.45		150.0	
		Z	4.87	68.08	17.17		150.0	
10568-AAA	IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 36 Mbps, 99pc duty cycle)	X	4.88	67.99	17.11	0.46	150.0	± 9.6 %
		Y	4.83	67.70	16.84		150.0	
		Z	4.75	67.51	16.61		150.0	
10569-AAA	IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 48 Mbps, 99pc duty cycle)	X	4.98	68.78	17.81	0.46	150.0	± 9.6 %
		Y	4.95	68.58	17.60		150.0	
		Z	4.86	68.32	17.31		150.0	
10570-AAA	IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 54 Mbps, 99pc duty cycle)	X	4.98	68.56	17.69	0.46	150.0	± 9.6 %
		Y	4.95	68.33	17.47		150.0	
		Z	4.86	68.09	17.20		150.0	
10571-AAA	IEEE 802.11b WiFi 2.4 GHz (DSSS, 1 Mbps, 90pc duty cycle)	X	1.53	70.26	19.68	0.46	130.0	± 9.6 %
		Y	1.48	68.95	18.55		130.0	
		Z	1.37	67.40	17.39		130.0	
10572-AAA	IEEE 802.11b WiFi 2.4 GHz (DSSS, 2 Mbps, 90pc duty cycle)	X	1.59	71.46	20.33	0.46	130.0	± 9.6 %
		Y	1.53	70.00	19.13		130.0	
		Z	1.41	68.22	17.86		130.0	
10573-AAA	IEEE 802.11b WiFi 2.4 GHz (DSSS, 5.5 Mbps, 90pc duty cycle)	X	100.00	167.17	47.85	0.46	130.0	± 9.6 %
		Y	100.00	157.87	43.89		130.0	
		Z	100.00	153.13	41.71		130.0	
10574-AAA	IEEE 802.11b WiFi 2.4 GHz (DSSS, 11 Mbps, 90pc duty cycle)	X	3.10	89.83	28.24	0.46	130.0	± 9.6 %
		Y	2.51	83.93	25.32		130.0	
		Z	1.87	77.75	22.34		130.0	

10575-AAA	IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 6 Mbps, 90pc duty cycle)	X	4.72	67.77	17.29	0.46	130.0	± 9.6 %
		Y	4.68	67.55	17.05		130.0	
		Z	4.61	67.35	16.79		130.0	
10576-AAA	IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 9 Mbps, 90pc duty cycle)	X	4.75	67.98	17.37	0.46	130.0	± 9.6 %
		Y	4.72	67.76	17.14		130.0	
		Z	4.64	67.55	16.88		130.0	
10577-AAA	IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 12 Mbps, 90pc duty cycle)	X	4.92	68.19	17.49	0.46	130.0	± 9.6 %
		Y	4.89	67.98	17.27		130.0	
		Z	4.80	67.76	17.01		130.0	
10578-AAA	IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 18 Mbps, 90pc duty cycle)	X	4.83	68.39	17.63	0.46	130.0	± 9.6 %
		Y	4.80	68.19	17.41		130.0	
		Z	4.71	67.93	17.12		130.0	
10579-AAA	IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 24 Mbps, 90pc duty cycle)	X	4.60	67.68	16.96	0.46	130.0	± 9.6 %
		Y	4.56	67.40	16.68		130.0	
		Z	4.48	67.20	16.44		130.0	
10580-AAA	IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 36 Mbps, 90pc duty cycle)	X	4.64	67.76	17.00	0.46	130.0	± 9.6 %
		Y	4.60	67.47	16.71		130.0	
		Z	4.52	67.27	16.47		130.0	
10581-AAA	IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 48 Mbps, 90pc duty cycle)	X	4.75	68.54	17.65	0.46	130.0	± 9.6 %
		Y	4.72	68.32	17.42		130.0	
		Z	4.63	68.05	17.12		130.0	
10582-AAA	IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 54 Mbps, 90pc duty cycle)	X	4.53	67.47	16.77	0.46	130.0	± 9.6 %
		Y	4.49	67.15	16.46		130.0	
		Z	4.41	66.99	16.24		130.0	
10583-AAA	IEEE 802.11a/h WiFi 5 GHz (OFDM, 6 Mbps, 90pc duty cycle)	X	4.72	67.77	17.29	0.46	130.0	± 9.6 %
		Y	4.68	67.55	17.05		130.0	
		Z	4.61	67.35	16.79		130.0	
10584-AAA	IEEE 802.11a/h WiFi 5 GHz (OFDM, 9 Mbps, 90pc duty cycle)	X	4.75	67.98	17.37	0.46	130.0	± 9.6 %
		Y	4.72	67.76	17.14		130.0	
		Z	4.64	67.55	16.88		130.0	
10585-AAA	IEEE 802.11a/h WiFi 5 GHz (OFDM, 12 Mbps, 90pc duty cycle)	X	4.92	68.19	17.49	0.46	130.0	± 9.6 %
		Y	4.89	67.98	17.27		130.0	
		Z	4.80	67.76	17.01		130.0	
10586-AAA	IEEE 802.11a/h WiFi 5 GHz (OFDM, 18 Mbps, 90pc duty cycle)	X	4.83	68.39	17.63	0.46	130.0	± 9.6 %
		Y	4.80	68.19	17.41		130.0	
		Z	4.71	67.93	17.12		130.0	
10587-AAA	IEEE 802.11a/h WiFi 5 GHz (OFDM, 24 Mbps, 90pc duty cycle)	X	4.60	67.68	16.96	0.46	130.0	± 9.6 %
		Y	4.56	67.40	16.68		130.0	
		Z	4.48	67.20	16.44		130.0	
10588-AAA	IEEE 802.11a/h WiFi 5 GHz (OFDM, 36 Mbps, 90pc duty cycle)	X	4.64	67.76	17.00	0.46	130.0	± 9.6 %
		Y	4.60	67.47	16.71		130.0	
		Z	4.52	67.27	16.47		130.0	
10589-AAA	IEEE 802.11a/h WiFi 5 GHz (OFDM, 48 Mbps, 90pc duty cycle)	X	4.75	68.54	17.65	0.46	130.0	± 9.6 %
		Y	4.72	68.32	17.42		130.0	
		Z	4.63	68.05	17.12		130.0	
10590-AAA	IEEE 802.11a/h WiFi 5 GHz (OFDM, 54 Mbps, 90pc duty cycle)	X	4.53	67.47	16.77	0.46	130.0	± 9.6 %
		Y	4.49	67.15	16.46		130.0	
		Z	4.41	66.99	16.24		130.0	

10591-AAA	IEEE 802.11n (HT Mixed, 20MHz, MCS0, 90pc duty cycle)	X	4.86	67.77	17.35	0.46	130.0	± 9.6 %
		Y	4.83	67.57	17.13		130.0	
		Z	4.76	67.39	16.89		130.0	
10592-AAA	IEEE 802.11n (HT Mixed, 20MHz, MCS1, 90pc duty cycle)	X	5.00	68.10	17.48	0.46	130.0	± 9.6 %
		Y	4.97	67.89	17.26		130.0	
		Z	4.88	67.69	17.01		130.0	
10593-AAA	IEEE 802.11n (HT Mixed, 20MHz, MCS2, 90pc duty cycle)	X	4.92	68.01	17.36	0.46	130.0	± 9.6 %
		Y	4.89	67.79	17.13		130.0	
		Z	4.80	67.59	16.88		130.0	
10594-AAA	IEEE 802.11n (HT Mixed, 20MHz, MCS3, 90pc duty cycle)	X	4.97	68.18	17.52	0.46	130.0	± 9.6 %
		Y	4.94	67.97	17.30		130.0	
		Z	4.86	67.76	17.04		130.0	
10595-AAA	IEEE 802.11n (HT Mixed, 20MHz, MCS4, 90pc duty cycle)	X	4.95	68.18	17.45	0.46	130.0	± 9.6 %
		Y	4.91	67.96	17.21		130.0	
		Z	4.83	67.75	16.96		130.0	
10596-AAA	IEEE 802.11n (HT Mixed, 20MHz, MCS5, 90pc duty cycle)	X	4.88	68.19	17.46	0.46	130.0	± 9.6 %
		Y	4.85	67.95	17.22		130.0	
		Z	4.76	67.74	16.97		130.0	
10597-AAA	IEEE 802.11n (HT Mixed, 20MHz, MCS6, 90pc duty cycle)	X	4.83	68.07	17.33	0.46	130.0	± 9.6 %
		Y	4.80	67.83	17.08		130.0	
		Z	4.71	67.61	16.83		130.0	
10598-AAA	IEEE 802.11n (HT Mixed, 20MHz, MCS7, 90pc duty cycle)	X	4.82	68.29	17.59	0.46	130.0	± 9.6 %
		Y	4.79	68.08	17.36		130.0	
		Z	4.70	67.83	17.08		130.0	
10599-AAA	IEEE 802.11n (HT Mixed, 40MHz, MCS0, 90pc duty cycle)	X	5.54	68.17	17.50	0.46	130.0	± 9.6 %
		Y	5.51	67.99	17.30		130.0	
		Z	5.43	67.80	17.08		130.0	
10600-AAA	IEEE 802.11n (HT Mixed, 40MHz, MCS1, 90pc duty cycle)	X	5.69	68.70	17.74	0.46	130.0	± 9.6 %
		Y	5.65	68.47	17.52		130.0	
		Z	5.55	68.23	17.28		130.0	
10601-AAA	IEEE 802.11n (HT Mixed, 40MHz, MCS2, 90pc duty cycle)	X	5.56	68.37	17.60	0.46	130.0	± 9.6 %
		Y	5.53	68.17	17.39		130.0	
		Z	5.44	67.97	17.16		130.0	
10602-AAA	IEEE 802.11n (HT Mixed, 40MHz, MCS3, 90pc duty cycle)	X	5.70	68.54	17.60	0.46	130.0	± 9.6 %
		Y	5.66	68.33	17.38		130.0	
		Z	5.58	68.16	17.17		130.0	
10603-AAA	IEEE 802.11n (HT Mixed, 40MHz, MCS4, 90pc duty cycle)	X	5.78	68.87	17.89	0.46	130.0	± 9.6 %
		Y	5.75	68.67	17.69		130.0	
		Z	5.64	68.42	17.44		130.0	
10604-AAA	IEEE 802.11n (HT Mixed, 40MHz, MCS5, 90pc duty cycle)	X	5.65	68.51	17.70	0.46	130.0	± 9.6 %
		Y	5.62	68.31	17.49		130.0	
		Z	5.52	68.06	17.24		130.0	
10605-AAA	IEEE 802.11n (HT Mixed, 40MHz, MCS6, 90pc duty cycle)	X	5.67	68.56	17.73	0.46	130.0	± 9.6 %
		Y	5.64	68.34	17.50		130.0	
		Z	5.54	68.11	17.26		130.0	
10606-AAA	IEEE 802.11n (HT Mixed, 40MHz, MCS7, 90pc duty cycle)	X	5.41	67.85	17.23	0.46	130.0	± 9.6 %
		Y	5.38	67.63	17.01		130.0	
		Z	5.31	67.50	16.82		130.0	

10607-AAA	IEEE 802.11ac WiFi (20MHz, MCS0, 90pc duty cycle)	X	4.73	67.22	17.05	0.46	130.0	± 9.6 %
		Y	4.69	66.99	16.81		130.0	
		Z	4.61	66.77	16.55		130.0	
10608-AAA	IEEE 802.11ac WiFi (20MHz, MCS1, 90pc duty cycle)	X	4.89	67.59	17.21	0.46	130.0	± 9.6 %
		Y	4.85	67.36	16.97		130.0	
		Z	4.76	67.12	16.70		130.0	
10609-AAA	IEEE 802.11ac WiFi (20MHz, MCS2, 90pc duty cycle)	X	4.79	67.47	17.06	0.46	130.0	± 9.6 %
		Y	4.75	67.21	16.81		130.0	
		Z	4.66	66.98	16.54		130.0	
10610-AAA	IEEE 802.11ac WiFi (20MHz, MCS3, 90pc duty cycle)	X	4.84	67.62	17.21	0.46	130.0	± 9.6 %
		Y	4.80	67.38	16.98		130.0	
		Z	4.71	67.13	16.70		130.0	
10611-AAA	IEEE 802.11ac WiFi (20MHz, MCS4, 90pc duty cycle)	X	4.75	67.43	17.07	0.46	130.0	± 9.6 %
		Y	4.71	67.19	16.83		130.0	
		Z	4.62	66.94	16.55		130.0	
10612-AAA	IEEE 802.11ac WiFi (20MHz, MCS5, 90pc duty cycle)	X	4.76	67.63	17.15	0.46	130.0	± 9.6 %
		Y	4.72	67.36	16.89		130.0	
		Z	4.62	67.11	16.61		130.0	
10613-AAA	IEEE 802.11ac WiFi (20MHz, MCS6, 90pc duty cycle)	X	4.76	67.45	16.99	0.46	130.0	± 9.6 %
		Y	4.71	67.17	16.73		130.0	
		Z	4.62	66.92	16.46		130.0	
10614-AAA	IEEE 802.11ac WiFi (20MHz, MCS7, 90pc duty cycle)	X	4.71	67.65	17.23	0.46	130.0	± 9.6 %
		Y	4.68	67.41	16.99		130.0	
		Z	4.58	67.13	16.69		130.0	
10615-AAA	IEEE 802.11ac WiFi (20MHz, MCS8, 90pc duty cycle)	X	4.75	67.29	16.86	0.46	130.0	± 9.6 %
		Y	4.71	67.01	16.59		130.0	
		Z	4.62	66.80	16.34		130.0	
10616-AAA	IEEE 802.11ac WiFi (40MHz, MCS0, 90pc duty cycle)	X	5.36	67.41	17.11	0.46	130.0	± 9.6 %
		Y	5.32	67.22	16.91		130.0	
		Z	5.24	67.01	16.67		130.0	
10617-AAA	IEEE 802.11ac WiFi (40MHz, MCS1, 90pc duty cycle)	X	5.44	67.66	17.21	0.46	130.0	± 9.6 %
		Y	5.40	67.45	17.00		130.0	
		Z	5.30	67.20	16.74		130.0	
10618-AAA	IEEE 802.11ac WiFi (40MHz, MCS2, 90pc duty cycle)	X	5.34	67.71	17.26	0.46	130.0	± 9.6 %
		Y	5.30	67.51	17.04		130.0	
		Z	5.21	67.26	16.79		130.0	
10619-AAA	IEEE 802.11ac WiFi (40MHz, MCS3, 90pc duty cycle)	X	5.34	67.48	17.07	0.46	130.0	± 9.6 %
		Y	5.30	67.27	16.86		130.0	
		Z	5.22	67.06	16.62		130.0	
10620-AAA	IEEE 802.11ac WiFi (40MHz, MCS4, 90pc duty cycle)	X	5.41	67.47	17.11	0.46	130.0	± 9.6 %
		Y	5.38	67.26	16.90		130.0	
		Z	5.29	67.06	16.67		130.0	
10621-AAA	IEEE 802.11ac WiFi (40MHz, MCS5, 90pc duty cycle)	X	5.41	67.55	17.27	0.46	130.0	± 9.6 %
		Y	5.38	67.38	17.08		130.0	
		Z	5.29	67.14	16.82		130.0	
10622-AAA	IEEE 802.11ac WiFi (40MHz, MCS6, 90pc duty cycle)	X	5.42	67.70	17.34	0.46	130.0	± 9.6 %
		Y	5.38	67.50	17.14		130.0	
		Z	5.29	67.26	16.88		130.0	

10623-AAA	IEEE 802.11ac WiFi (40MHz, MCS7, 90pc duty cycle)	X	5.29	67.21	16.97	0.46	130.0	± 9.6 %
		Y	5.26	67.01	16.75		130.0	
		Z	5.17	66.80	16.52		130.0	
10624-AAA	IEEE 802.11ac WiFi (40MHz, MCS8, 90pc duty cycle)	X	5.49	67.44	17.13	0.46	130.0	± 9.6 %
		Y	5.46	67.25	16.93		130.0	
		Z	5.37	67.04	16.70		130.0	
10625-AAA	IEEE 802.11ac WiFi (40MHz, MCS9, 90pc duty cycle)	X	5.67	67.85	17.40	0.46	130.0	± 9.6 %
		Y	5.63	67.64	17.18		130.0	
		Z	5.49	67.29	16.88		130.0	
10626-AAA	IEEE 802.11ac WiFi (80MHz, MCS0, 90pc duty cycle)	X	5.67	67.37	17.01	0.46	130.0	± 9.6 %
		Y	5.64	67.20	16.82		130.0	
		Z	5.56	67.01	16.60		130.0	
10627-AAA	IEEE 802.11ac WiFi (80MHz, MCS1, 90pc duty cycle)	X	5.95	68.11	17.34	0.46	130.0	± 9.6 %
		Y	5.91	67.91	17.14		130.0	
		Z	5.81	67.67	16.90		130.0	
10628-AAA	IEEE 802.11ac WiFi (80MHz, MCS2, 90pc duty cycle)	X	5.68	67.42	16.93	0.46	130.0	± 9.6 %
		Y	5.65	67.22	16.73		130.0	
		Z	5.56	67.03	16.51		130.0	
10629-AAA	IEEE 802.11ac WiFi (80MHz, MCS3, 90pc duty cycle)	X	5.78	67.58	17.01	0.46	130.0	± 9.6 %
		Y	5.75	67.38	16.80		130.0	
		Z	5.66	67.19	16.59		130.0	
10630-AAA	IEEE 802.11ac WiFi (80MHz, MCS4, 90pc duty cycle)	X	6.18	69.00	17.72	0.46	130.0	± 9.6 %
		Y	6.12	68.72	17.47		130.0	
		Z	5.97	68.32	17.16		130.0	
10631-AAA	IEEE 802.11ac WiFi (80MHz, MCS5, 90pc duty cycle)	X	6.05	68.69	17.74	0.46	130.0	± 9.6 %
		Y	6.02	68.51	17.56		130.0	
		Z	5.90	68.19	17.27		130.0	
10632-AAA	IEEE 802.11ac WiFi (80MHz, MCS6, 90pc duty cycle)	X	5.92	68.20	17.52	0.46	130.0	± 9.6 %
		Y	5.89	68.03	17.34		130.0	
		Z	5.79	67.79	17.09		130.0	
10633-AAA	IEEE 802.11ac WiFi (80MHz, MCS7, 90pc duty cycle)	X	5.75	67.61	17.06	0.46	130.0	± 9.6 %
		Y	5.71	67.43	16.87		130.0	
		Z	5.61	67.18	16.62		130.0	
10634-AAA	IEEE 802.11ac WiFi (80MHz, MCS8, 90pc duty cycle)	X	5.73	67.62	17.12	0.46	130.0	± 9.6 %
		Y	5.70	67.45	16.93		130.0	
		Z	5.61	67.26	16.71		130.0	
10635-AAA	IEEE 802.11ac WiFi (80MHz, MCS9, 90pc duty cycle)	X	5.59	66.93	16.52	0.46	130.0	± 9.6 %
		Y	5.55	66.70	16.29		130.0	
		Z	5.48	66.56	16.11		130.0	
10636-AAB	IEEE 802.11ac WiFi (160MHz, MCS0, 90pc duty cycle)	X	6.10	67.70	17.06	0.46	130.0	± 9.6 %
		Y	6.07	67.53	16.88		130.0	
		Z	5.99	67.35	16.67		130.0	
10637-AAB	IEEE 802.11ac WiFi (160MHz, MCS1, 90pc duty cycle)	X	6.26	68.11	17.25	0.46	130.0	± 9.6 %
		Y	6.22	67.93	17.06		130.0	
		Z	6.13	67.70	16.83		130.0	
10638-AAB	IEEE 802.11ac WiFi (160MHz, MCS2, 90pc duty cycle)	X	6.27	68.11	17.23	0.46	130.0	± 9.6 %
		Y	6.23	67.92	17.04		130.0	
		Z	6.14	67.72	16.82		130.0	

10639-AAB	IEEE 802.11ac WiFi (160MHz, MCS3, 90pc duty cycle)	X	6.22	67.97	17.20	0.46	130.0	± 9.6 %
		Y	6.18	67.80	17.02		130.0	
		Z	6.10	67.60	16.80		130.0	
10640-AAB	IEEE 802.11ac WiFi (160MHz, MCS4, 90pc duty cycle)	X	6.21	67.98	17.15	0.46	130.0	± 9.6 %
		Y	6.17	67.78	16.95		130.0	
		Z	6.08	67.56	16.73		130.0	
10641-AAB	IEEE 802.11ac WiFi (160MHz, MCS5, 90pc duty cycle)	X	6.30	68.00	17.18	0.46	130.0	± 9.6 %
		Y	6.26	67.81	16.98		130.0	
		Z	6.17	67.61	16.77		130.0	
10642-AAB	IEEE 802.11ac WiFi (160MHz, MCS6, 90pc duty cycle)	X	6.30	68.13	17.40	0.46	130.0	± 9.6 %
		Y	6.27	67.97	17.23		130.0	
		Z	6.18	67.76	17.01		130.0	
10643-AAB	IEEE 802.11ac WiFi (160MHz, MCS7, 90pc duty cycle)	X	6.16	67.91	17.20	0.46	130.0	± 9.6 %
		Y	6.12	67.71	17.00		130.0	
		Z	6.03	67.50	16.78		130.0	
10644-AAB	IEEE 802.11ac WiFi (160MHz, MCS8, 90pc duty cycle)	X	6.24	68.16	17.34	0.46	130.0	± 9.6 %
		Y	6.20	67.95	17.14		130.0	
		Z	6.10	67.72	16.91		130.0	
10645-AAB	IEEE 802.11ac WiFi (160MHz, MCS9, 90pc duty cycle)	X	6.44	68.39	17.42	0.46	130.0	± 9.6 %
		Y	6.39	68.17	17.21		130.0	
		Z	6.27	67.87	16.95		130.0	
10646-AAD	LTE-TDD (SC-FDMA, 1 RB, 5 MHz, QPSK, UL Subframe=2,7)	X	100.00	154.07	50.96	9.30	60.0	± 9.6 %
		Y	100.00	149.19	48.64		60.0	
		Z	100.00	151.77	49.64		60.0	
10647-AAC	LTE-TDD (SC-FDMA, 1 RB, 20 MHz, QPSK, UL Subframe=2,7)	X	100.00	155.63	51.65	9.30	60.0	± 9.6 %
		Y	100.00	150.58	49.25		60.0	
		Z	100.00	153.26	50.29		60.0	
10648-AAA	CDMA2000 (1x Advanced)	X	7.29	96.44	23.44	0.00	150.0	± 9.6 %
		Y	1.15	71.60	14.63		150.0	
		Z	0.73	65.79	11.39		150.0	
10652-AAB	LTE-TDD (OFDMA, 5 MHz, E-TM 3.1, Clipping 44%)	X	4.70	71.99	19.13	2.23	80.0	± 9.6 %
		Y	4.65	71.36	18.64		80.0	
		Z	4.32	70.31	17.98		80.0	
10653-AAB	LTE-TDD (OFDMA, 10 MHz, E-TM 3.1, Clipping 44%)	X	4.86	69.58	18.56	2.23	80.0	± 9.6 %
		Y	4.87	69.28	18.24		80.0	
		Z	4.66	68.67	17.81		80.0	
10654-AAB	LTE-TDD (OFDMA, 15 MHz, E-TM 3.1, Clipping 44%)	X	4.78	68.93	18.47	2.23	80.0	± 9.6 %
		Y	4.81	68.69	18.18		80.0	
		Z	4.62	68.14	17.78		80.0	
10655-AAB	LTE-TDD (OFDMA, 20 MHz, E-TM 3.1, Clipping 44%)	X	4.83	68.76	18.45	2.23	80.0	± 9.6 %
		Y	4.86	68.54	18.16		80.0	
		Z	4.67	68.01	17.79		80.0	

[E] Uncertainty is determined using the max. deviation from linear response applying rectangular distribution and is expressed for the square of the field value.