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SAR EVALUATION REPORT

Applicant Name:
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Gyeonggi-do, 16677, Korea

Date of Testing:
03/21/16 - 04/11/16
Test Site/Location:
PCTEST Lab, Columbia, MD, USA
Document Serial No.:
0Y1603220560.A3L

FCC ID: **A3LSMG891A**

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

DUT Type: Portable Handset
Application Type: Certification
FCC Rule Part(s): CFR §2.1093
Model(s): SM-G891A

Equipment Class	Band & Mode	Tx Frequency	SAR		
			1 gm Head (W/kg)	1 gm Body-Worn (W/kg)	1 gm Hotspot (W/kg)
PCE	GSM/GPRS/EDGE 850	824.20 - 848.80 MHz	0.35	0.38	0.65
PCE	GSM/GPRS/EDGE 1900	1850.20 - 1909.80 MHz	0.36	0.31	0.59
PCE	UMTS 850	826.40 - 846.60 MHz	0.34	0.43	0.65
PCE	UMTS 1750	1712.4 - 1752.6 MHz	0.92	0.62	0.55
PCE	UMTS 1900	1852.4 - 1907.6 MHz	0.90	0.75	0.57
PCE	LTE Band 12	699.7 - 715.3 MHz	0.28	0.46	0.55
PCE	LTE Band 5 (Cell)	824.7 - 848.3 MHz	0.36	0.49	0.55
PCE	LTE Band 4 (AWS)	1710.7 - 1754.3 MHz	0.86	0.67	0.68
PCE	LTE Band 2 (PCS)	1850.7 - 1909.3 MHz	0.68	0.60	0.56
PCE	LTE Band 30	2307.5 - 2312.5 MHz	0.40	0.62	0.92
PCE	LTE Band 41	2498.5 - 2687.5 MHz	< 0.1	< 0.1	0.18
DTS	2.4 GHz WLAN	2412 - 2462 MHz	0.32	0.38	0.38
NII	U-NII-1	5180 - 5240 MHz	N/A	N/A	N/A
NII	U-NII-2A	5260 - 5320 MHz	0.23	0.48	N/A
NII	U-NII-2C	5500 - 5720 MHz	0.20	0.35	N/A
NII	U-NII-3	5745 - 5825 MHz	0.22	0.25	0.25
DSS/DTS	Bluetooth	2402 - 2480 MHz	N/A		
Simultaneous SAR per KDB 690783 D01v01r03:			1.25	1.55	1.55

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 Manufacturers Forum (MMF). While a product may be considered eligible, use of the SAR Tick logo requires an agreement with the MMF. Further details can be obtained by emailing: sartick@mmfai.info.

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1 DEVICE UNDER TEST

1.1 Device Overview

Band & Mode	Operating Modes	Tx Frequency
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 5 (Cell)	Voice/Data	824.7 - 848.3 MHz
LTE Band 4 (AWS)	Voice/Data	1710.7 - 1754.3 MHz
LTE Band 2 (PCS)	Voice/Data	1850.7 - 1909.3 MHz
LTE Band 30	Voice/Data	2307.5 - 2312.5 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	1 - 8.3 kHz

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 Power

Mode / Band		Voice (dBm)	Burst Average GMSK (dBm)		Burst Average 8-PSK (dBm)	
		1 TX Slot	*1 TX Slots*	*2 TX Slots*	*1 TX Slots*	*2 TX Slots*
GSM/GPRS/EDGE 850	Maximum	**33.7**	**33.7**	**32.0**	**27.5**	**26.0**
	Nominal	**33.2**	**33.2**	**31.5**	**27.0**	**25.5**
GSM/GPRS/EDGE 1900	Maximum	**30.5**	**30.5**	**29.5**	**26.0**	**25.0**
	Nominal	**30.0**	**30.0**	**29.0**	**25.5**	**24.5**

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Mode / Band		Modulated Average (dBm)		
		3GPP WCDMA	*3GPP HSDPA*	*3GPP HSUPA*
UMTS Band 5 (850 MHz)	Maximum	**25.0**	**24.5**	**24.5**
	Nominal	**24.5**	**24.0**	**24.0**
UMTS Band 4 (1750 MHz)	Maximum	**24.5**	**24.0**	**24.0**
	Nominal	**24.0**	**23.5**	**23.5**
UMTS Band 2 (1900 MHz)	Maximum	**24.5**	**24.0**	**24.0**
	Nominal	**24.0**	**23.5**	**23.5**

Mode / Band		Modulated Average (dBm)
LTE Band 12	Maximum	**25.0**
	Nominal	**24.5**
LTE Band 5 (Cell)	Maximum	**25.0**
	Nominal	**24.5**
LTE Band 4 (AWS)	Maximum	**25.0**
	Nominal	**24.5**
LTE Band 2 (PCS)	Maximum	**24.5**
	Nominal	**24.0**
LTE Band 30	Maximum	**23.0**
	Nominal	**22.5**
LTE Band 41	Maximum	**23.5**
	Nominal	**23.0**

1.3.2 Maximum WLAN/BT Power

Mode / Band		Modulated Average - Single Tx Chain (dBm)
IEEE 802.11b (2.4 GHz)	Maximum	**19.5**
	Nominal	**19.0**
IEEE 802.11g (2.4 GHz)	Maximum	**17.5**
	Nominal	**17.0**
IEEE 802.11n (2.4 GHz)	Maximum	**17.5**
	Nominal	**17.0**
Bluetooth	Maximum	**12.0**
	Nominal	**11.5**
Bluetooth LE	Maximum	**7.0**
	Nominal	**6.5**

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Mode / Band		Modulated Average - Single Tx Chain (dBm)					
		20 MHz Bandwidth		40 MHz Bandwidth		80 MHz Bandwidth	
		ch 36, 64, 100	ch 40-60 & 104-165	ch 38	ch 46-159	ch 42, 106	ch 58 & 122-155
IEEE 802.11a (5 GHz)	Maximum	**14.5**	**16.5**	**N/A**		**N/A**	
	Nominal	**14.0**	**16.0**				
IEEE 802.11n (5 GHz)	Maximum	**14.5**	**16.5**	**13.5**	**15.5**	**N/A**	
	Nominal	**14.0**	**16.0**	**13.0**	**15.0**		
IEEE 802.11ac (5 GHz)	Maximum	**14.5**	**16.5**	**13.5**	**15.5**	**12.5**	**14.5**
	Nominal	**14.0**	**16.0**	**13.0**	**15.0**	**12.0**	**14.0**
Mode / Band		Modulated Average - MIMO (dBm)					
		20 MHz Bandwidth		40 MHz Bandwidth		80 MHz Bandwidth	
IEEE 802.11n (2.4 GHz)	Maximum	**20.5**		**N/A**		**N/A**	
	Nominal	**20.0**					
		ch 36, 64, 100	ch 40-60 & 104-165	ch 38	ch 46-159	ch 42, 106	ch 58 & 122-155
IEEE 802.11n (5 GHz)	Maximum	**17.5**	**19.5**	**16.5**	**18.5**	**N/A**	
	Nominal	**17.0**	**19.0**	**16.0**	**18.0**		
IEEE 802.11ac (5 GHz)	Maximum	**17.5**	**19.5**	**16.5**	**18.5**	**15.5**	**17.5**
	Nominal	**17.0**	**19.0**	**16.0**	**18.0**	**15.0**	**17.0**

1.3.3 Reduced PCE Power – Hotspot Mode Activated

Mode / Band		Burst Average GMSK (dBm)		Burst Average 8-PSK (dBm)	
		1 TX Slot	*1 TX Slots*	*1 TX Slots*	*2 TX Slots*
GPRS/EDGE 1900	Maximum	**27.5**	**26.5**	**26.0**	**25.0**
	Nominal	**27.0**	**26.0**	**25.5**	**24.5**

Mode / Band		Modulated Average (dBm)		
		3GPP WCDMA	*3GPP HSDPA*	*3GPP HSUPA*
UMTS Band 4 (1750 MHz)	Maximum	**21.5**	**21.5**	**21.5**
	Nominal	**21.0**	**21.0**	**21.0**
UMTS Band 2 (1900 MHz)	Maximum	**21.5**	**21.5**	**21.5**
	Nominal	**21.0**	**21.0**	**21.0**

Mode / Band		Modulated Average (dBm)
LTE Band 4 (AWS)	Maximum	**22.0**
	Nominal	**21.5**
LTE Band 2 (PCS)	Maximum	**21.5**
	Nominal	**21.0**
LTE Band 30	Maximum	**21.5**
	Nominal	**21.0**

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1.3.4 Reduced WLAN Power – Held to Ear

Mode / Band		Modulated Average - Single Tx Chain (dBm)
IEEE 802.11b (2.4 GHz)	Maximum	**13.5**
	Nominal	**13.0**
IEEE 802.11g (2.4 GHz)	Maximum	**13.5**
	Nominal	**13.0**
IEEE 802.11n (2.4 GHz)	Maximum	**13.5**
	Nominal	**13.0**

Mode / Band		Modulated Average - Single Tx Chain (dBm)		
		20 MHz Bandwidth	40 MHz Bandwidth	80 MHz Bandwidth
IEEE 802.11a (5 GHz)	Maximum	**7.5**	**N/A**	**N/A**
	Nominal	**7.0**		
IEEE 802.11n (5 GHz)	Maximum	**7.5**	**7.5**	**N/A**
	Nominal	**7.0**	**7.0**	
IEEE 802.11ac (5 GHz)	Maximum	**7.5**	**7.5**	**7.5**
	Nominal	**7.0**	**7.0**	**7.0**

Mode / Band		Modulated Average - MIMO (dBm)		
		20 MHz Bandwidth	40 MHz Bandwidth	80 MHz Bandwidth
IEEE 802.11n (2.4 GHz)	Maximum	**16.5**	**N/A**	**N/A**
	Nominal	**16.0**		
IEEE 802.11n (5 GHz)	Maximum	**10.5**	**10.5**	**N/A**
	Nominal	**10.0**	**10.0**	
IEEE 802.11ac (5 GHz)	Maximum	**10.5**	**10.5**	**10.5**
	Nominal	**10.0**	**10.0**	**10.0**

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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
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 5 (Cell)	Yes	Yes	No	Yes	Yes	Yes
LTE Band 4 (AWS)	Yes	Yes	No	Yes	Yes	Yes
LTE Band 2 (PCS)	Yes	Yes	No	Yes	Yes	Yes
LTE Band 30	Yes	Yes	No	Yes	Yes	No
LTE Band 41	Yes	Yes	No	Yes	Yes	No
2.4 GHz WLAN Ant 1	Yes	Yes	Yes	No	No	No
2.4 GHz WLAN Ant 2	Yes	Yes	Yes	No	No	Yes
5 GHz WLAN Ant 1	Yes	Yes	Yes	No	No	No
5 GHz WLAN Ant 2	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 and FCC KDB Publication 648474 D04v01r03. 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.

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. Possible transmission paths for the DUT are shown in Figure 1-1 and are color-coded to indicate communication modes which share the same path. Modes which share the same transmission path cannot transmit simultaneously with one another.

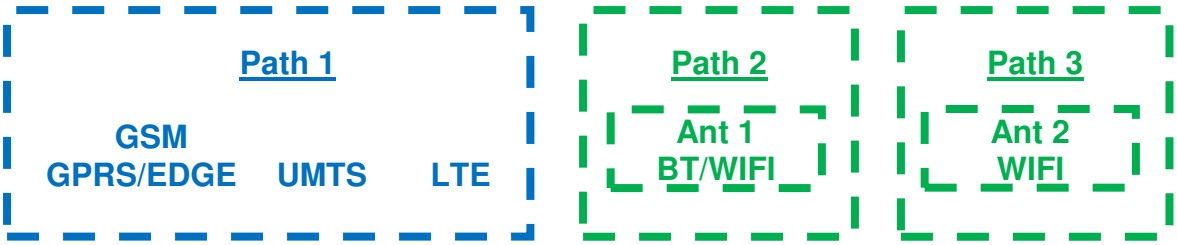

Figure 1-1
Simultaneous Transmission Paths

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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
1	GSM voice + 2.4 GHz WI-FI	Yes	Yes	N/A
2	GSM voice + 5 GHz WI-FI	Yes	Yes	N/A
3	GSM voice + 2.4 GHz Bluetooth	N/A	Yes	N/A
4	GSM voice + 2.4 GHz WI-FI MIMO	Yes	Yes	N/A
5	GSM voice + 5 GHz WI-FI MIMO	Yes	Yes	N/A
6	GSM voice + 2.4 GHz WI-FI + 5 GHz WI-FI	Yes	Yes	N/A
7	UMTS + 2.4 GHz WI-FI	Yes	Yes	Yes
8	UMTS + 5 GHz WI-FI	Yes	Yes	Yes
9	UMTS + 2.4 GHz Bluetooth	N/A	Yes	N/A
10	UMTS + 2.4 GHz WI-FI MIMO	Yes	Yes	Yes
11	UMTS + 5 GHz WI-FI MIMO	Yes	Yes	Yes
12	UMTS + 2.4 GHz WI-FI + 5 GHz WI-FI	Yes	Yes	Yes
13	LTE + 2.4 GHz WI-FI	Yes	Yes	Yes
14	LTE + 5 GHz WI-FI	Yes	Yes	Yes
15	LTE + 2.4 GHz Bluetooth	N/A	Yes	N/A
16	LTE + 2.4 GHz WI-FI MIMO	Yes	Yes	Yes
17	LTE + 5 GHz WI-FI MIMO	Yes	Yes	Yes
18	LTE + 2.4 GHz WI-FI + 5 GHz WI-FI	Yes	Yes	Yes
19	GPRS/EDGE + 2.4 GHz WI-FI	N/A	N/A	Yes
20	GPRS/EDGE + 5 GHz WI-FI	N/A	N/A	Yes
21	GPRS/EDGE + 2.4 GHz Bluetooth	N/A	N/A	N/A
22	GPRS/EDGE + 2.4 GHz WI-FI MIMO	N/A	N/A	Yes
23	GPRS/EDGE + 5 GHz WI-FI MIMO	N/A	N/A	Yes
24	GPRS/EDGE + 2.4 GHz WI-FI + 5 GHz WI-FI	N/A	N/A	Yes

1. All licensed modes share the same antenna path and cannot transmit simultaneously.
2. All unlicensed modes cannot transmit from the same antenna 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.
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 802.11n/ac. Each WLAN antenna can transmit independently or together when operating with MIMO.
7. This device supports VOLTE.
8. This device supports VOWIFI

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1.7 Miscellaneous SAR Test Considerations

(A) WIFI/BT

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.

Per FCC KDB 447498 D01v06, the 1g SAR exclusion threshold for distances <50mm is defined by the following equation:

$$\frac{Max\ Power\ of\ Channel\ (mW)}{Test\ Separation\ Dist\ (mm)} * \sqrt{Frequency(GHz)} \leq 3.0$$

Based on the maximum conducted power of Bluetooth (rounded to the nearest mW) and the antenna to user separation distance, body-worn Bluetooth SAR was not required; [(16/15)* √2.480] = 1.7< 3.0. Per KDB Publication 447498 D01v06, the maximum power of the channel was rounded to the nearest mW before calculation.

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)

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 only. 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.

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)

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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.

	Head Serial Number	Body-Worn Serial Number	Hotspot Serial Number
GSM/GPRS/EDGE 850	18253	18253	18253
GSM/GPRS/EDGE 1900	18196	18196	18170
UMTS 850	18253	18253	18253
UMTS 1750	18196	18196	18246
UMTS 1900	18196	18196	18170
LTE Band 12	18253	18253	18253
LTE Band 5 (Cell)	18253	18253	18253
LTE Band 4 (AWS)	18196	18196	18246
LTE Band 2 (PCS)	18196	18196	18170
LTE Band 30	19012	18196	18246
LTE Band 41	18196	18196	18196
2.4 GHz WLAN	18204	18204	18204
5 GHz WLAN	18204	18204	18204

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2 LTE INFORMATION

LTE Information					
FCC ID	**A3LSMG891A**				
Form Factor	Portable Handset				
Frequency Range of each LTE transmission band	LTE Band 12 (699.7 - 715.3 MHz)				
	LTE Band 5 (Cell) (824.7 - 848.3 MHz)				
	LTE Band 4 (AWS) (1710.7 - 1754.3 MHz)				
	LTE Band 2 (PCS) (1850.7 - 1909.3 MHz)				
	LTE Band 30 (2307.5 - 2312.5 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 5 (Cell): 1.4 MHz, 3 MHz, 5 MHz, 10 MHz				
	LTE Band 4 (AWS): 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 30: 5 MHz, 10 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 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 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 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 30: 5 MHz	2307.5 (27685)		2310 (27710)	2312.5 (27735)	
LTE Band 30: 10 MHz	N/A		2310 (27710)	N/A	
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)
UE Category	9				
Modulations Supported in UL	QPSK, 16QAM				
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 Release 10 Additional Information	This device does not support full CA features on 3GPP Release 10. All uplink communications are identical to the Release 8 Specifications. Uplink communications are done on the PCC. The following LTE Release 10 Features are not supported: Relay, HetNet, Enhanced MIMO, eICI, WIFI Offloading, MDH, eMBMA, 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:

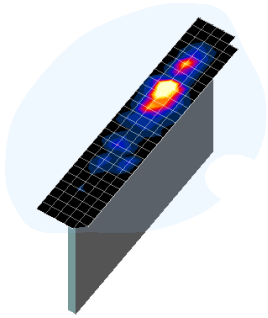

Figure 4-1
Sample SAR Area Scan

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 "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 B-M line passing through the two ear canals and M is defined as the Reference Plane. The 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 the N-F and B-M lines are marked on the external phantom shell to facilitate handset positioning [5].

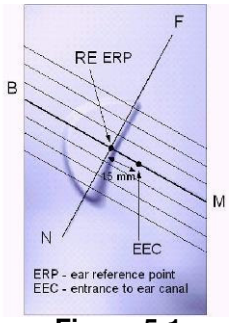

Figure 5-1
Close-Up Side view of ERP

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.

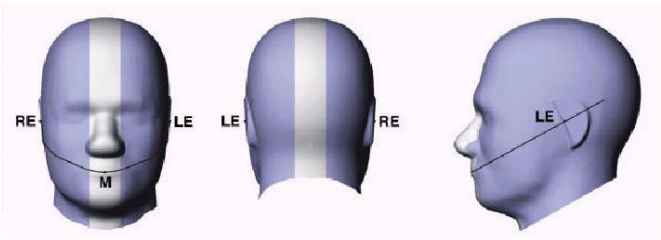

Figure 5-2
Front, back and side view of SAM Twin Phantom

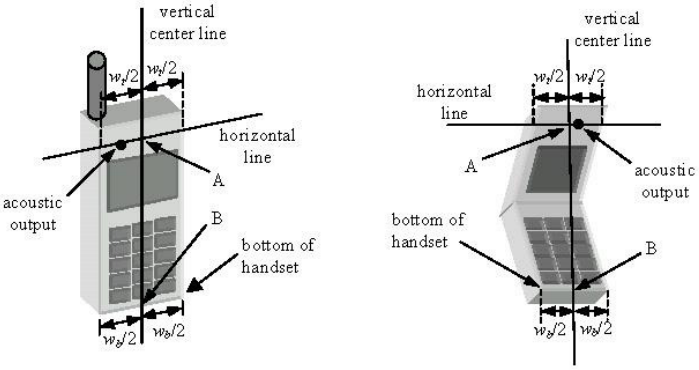

Figure 5-3
Handset Vertical Center & Horizontal Line Reference Points

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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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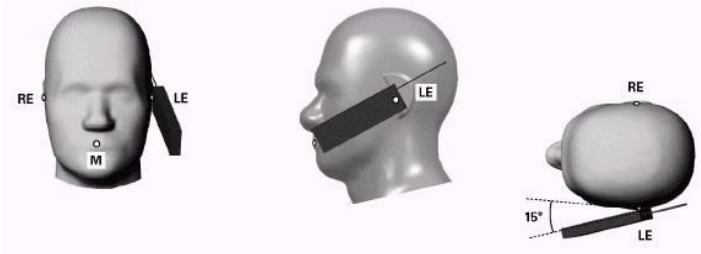

Figure 6-2 Front, Side and Top View of Ear/15º Tilt Position

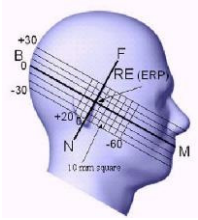

Figure 6-3
Side view w/ relevant markings

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.

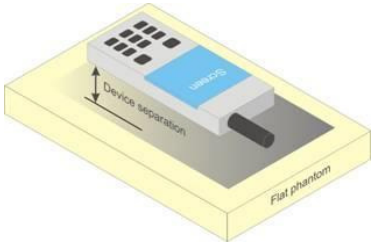

Figure 6-4
Sample Body-Worn Diagram

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 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

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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 1-g body and 10-g 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 ≤ 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 ≤ 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 UMTS

8.4.1 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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8.4.2 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.

8.4.3 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.

8.4.4 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.

8.4.5 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 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).

8.5.1 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.

8.5.2 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.

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8.5.3 A-MPR

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

8.5.4 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.

8.5.5 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.

8.5.6 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.

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8.6 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.

8.6.1 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.

8.6.2 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.

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

8.6.4 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.

8.6.5 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:

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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.

8.6.6 OFDM Transmission Mode and SAR Test Channel Selection

For the 2.4 GHz and 5 GHz bands, 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.

8.6.7 Initial Test Configuration Procedure

For OFDM, in both 2.4 and 5 GHz bands, 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.

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 8.6.6).

8.6.8 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.

8.6.9 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 GSM Conducted Powers

Table 9-1
Maximum Conducted Powers

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**	**EDGE [dBm] 1 Tx Slot**	**EDGE [dBm] 2 Tx Slot**
GSM 850	128	32.54	32.65	**31.29**	27.03	25.44
	190	32.68	32.72	**31.42**	27.08	25.52
	251	32.80	32.84	**31.65**	27.23	25.64
GSM 1900	512	30.50	30.46	29.48	25.95	24.91
	661	30.18	30.12	29.06	25.62	24.80
	810	30.39	30.41	29.27	25.79	24.78
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**	**EDGE [dBm] 1 Tx Slot**	**EDGE [dBm] 2 Tx Slot**
GSM 850	128	23.51	23.62	**25.27**	18.00	19.42
	190	23.65	23.69	**25.40**	18.05	19.50
	251	23.77	23.81	**25.63**	18.20	19.62
GSM 1900	512	21.47	21.43	23.46	16.92	18.89
	661	21.15	21.09	23.04	16.59	18.78
	810	21.36	21.38	23.25	16.76	18.76
GSM 850	**Frame Avg.Targets:**	24.17	24.17	**25.48**	17.97	19.48
GSM 1900		20.97	20.97	22.98	16.47	18.48

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Table 9-2
Reduced Conducted Powers - Hotspot Mode Active

Maximum Burst-Averaged Output Power					
		GPRS/EDGE Data (GMSK)		*EDGE Data (8-PSK)*	
Band	**Channel**	**GPRS [dBm] 1 Tx Slot**	**GPRS [dBm] 2 Tx Slot**	**EDGE [dBm] 1 Tx Slot**	**EDGE [dBm] 2 Tx Slot**
GSM 1900	512	27.50	**26.50**	26.00	24.92
	661	27.22	**26.09**	25.71	24.65
	810	27.41	**26.22**	25.93	24.77
Calculated Maximum Frame-Averaged Output Power					
		GPRS/EDGE Data (GMSK)		*EDGE Data (8-PSK)*	
Band	**Channel**	**GPRS [dBm] 1 Tx Slot**	**GPRS [dBm] 2 Tx Slot**	**EDGE [dBm] 1 Tx Slot**	**EDGE [dBm] 2 Tx Slot**
GSM 1900	512	18.47	**20.48**	16.97	18.90
	661	18.19	**20.07**	16.68	18.63
	810	18.38	**20.20**	16.90	18.75
GSM 1900	**Frame Avg.Targets:**	17.97	**19.98**	16.47	18.48

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: 10 (Max 2 Tx uplink slots)
EDGE Multislot class: 10 (Max 2 Tx uplink slots)
DTM Multislot Class: N/A

Figure 9-1
Power Measurement Setup

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9.2 UMTS Conducted Powers

Table 9-3
Maximum Conducted Powers

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	24.17	24.08	24.29	23.82	23.84	24.24	24.22	24.02	23.97	-
99		12.2 kbps AMR	24.12	24.00	24.23	23.80	23.82	24.18	24.30	23.98	23.91	-
6	HSDPA	Subtest 1	23.07	22.85	23.15	23.01	22.92	23.27	23.09	22.78	22.80	0
6		Subtest 2	23.10	22.90	23.19	23.02	22.95	23.34	23.10	22.84	22.82	0
6		Subtest 3	22.64	22.49	22.74	22.53	22.47	22.86	22.61	22.34	22.36	0.5
6		Subtest 4	22.59	22.50	22.68	22.42	22.48	22.81	22.60	22.32	22.45	0.5
6	HSUPA	Subtest 1	23.04	22.87	23.14	23.04	22.98	23.33	23.16	22.85	22.92	0
6		Subtest 2	21.06	20.88	21.14	20.95	21.01	21.36	21.17	20.89	20.90	2
6		Subtest 3	22.04	21.89	22.12	22.04	21.89	22.34	22.13	21.87	21.98	1
6		Subtest 4	21.08	20.90	21.17	21.06	21.02	21.37	21.15	20.88	20.75	2
6		Subtest 5	23.06	22.84	23.15	23.03	22.97	23.35	23.15	22.82	22.94	0

Table 9-4
Reduced Conducted Powers - Hotspot Mode Active

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	21.37	21.35	21.50	21.16	20.86	20.90	-
99		12.2 kbps AMR	21.42	21.38	21.49	21.00	20.80	20.99	-
6	HSDPA	Subtest 1	20.48	20.33	20.76	19.95	19.81	19.82	0
6		Subtest 2	20.52	20.30	20.80	19.99	19.77	19.82	0
6		Subtest 3	20.04	19.93	20.29	19.50	19.29	19.35	0.5
6		Subtest 4	20.05	19.91	20.31	19.51	19.26	19.34	0.5
6	HSUPA	Subtest 1	20.54	20.05	20.77	19.95	19.79	19.87	0
6		Subtest 2	18.55	18.37	18.81	18.01	17.83	17.94	2
6		Subtest 3	19.52	19.44	19.79	18.95	18.80	18.83	1
6		Subtest 4	18.57	18.45	18.83	18.02	17.60	17.92	2
6		Subtest 5	20.56	20.35	20.81	19.98	19.81	19.93	0

This device does not support DC-HSDPA.

It is expected by the manufacturer that MPR for some HSPA subtests may be up to 1 dB more than specified by 3GPP, but also as low as 0 dB according to the chipset implementation in this model.

Figure 9-2
Power Measurement Setup

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9.3 LTE Conducted Powers

9.3.1 LTE Band 12

Table 9-5
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	24.92	0	0
	1	25	**24.98**		0
	1	49	24.76		0
	25	0	23.91	0-1	1
	25	12	**24.00**		1
	25	25	23.94		1
	50	0	23.92		1
16QAM	1	0	23.92	0-1	1
	1	25	23.98		1
	1	49	23.88		1
	25	0	22.95	0-2	2
	25	12	23.00		2
	25	25	22.94		2
	50	0	22.85		2

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.

Table 9-6
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) Conducted Power [dBm]	Mid Channel 23095 (707.5 MHz) Conducted Power [dBm]	High Channel 23155 (713.5 MHz) Conducted Power [dBm]	MPR Allowed per 3GPP [dB]	MPR [dB]
QPSK	1	0	24.90	24.82	24.90	0	0
	1	12	24.94	24.80	24.59		0
	1	24	24.84	24.75	24.35		0
	12	0	23.81	23.86	23.63	0-1	1
	12	6	23.87	23.89	23.58		1
	12	13	23.95	23.87	23.51		1
	25	0	23.85	23.89	23.52		1
16QAM	1	0	23.99	23.90	23.95	0-1	1
	1	12	23.97	23.97	23.69		1
	1	24	23.65	23.84	23.36		1
	12	0	22.78	22.82	22.56	0-2	2
	12	6	22.85	22.87	22.66		2
	12	13	22.88	22.86	22.56		2
	25	0	22.81	22.86	22.64		2

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Table 9-7
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	24.94	24.99	24.85	0	0
	1	7	24.98	25.00	24.50		0
	1	14	25.00	24.97	24.52		0
	8	0	23.85	23.85	23.57	0-1	1
	8	4	23.98	23.82	23.48		1
	8	7	23.80	23.87	23.35		1
	15	0	23.81	23.93	23.49		1
16QAM	1	0	23.92	23.99	23.68	0-1	1
	1	7	23.88	24.00	23.45		1
	1	14	23.92	23.88	23.52		1
	8	0	22.83	22.84	22.45	0-2	2
	8	4	22.84	22.94	22.37		2
	8	7	22.80	22.81	22.52		2
	15	0	22.84	22.80	22.61		2

Table 9-8
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	24.93	24.93	24.50	0	0
	1	2	25.00	24.99	24.32		0
	1	5	24.83	24.94	24.41		0
	3	0	24.83	24.87	24.37		0
	3	2	24.90	24.91	24.24		0
	3	3	24.88	24.84	24.55		0
	6	0	23.83	23.91	23.35	0-1	1
16QAM	1	0	23.89	23.86	23.49	0-1	1
	1	2	23.95	23.97	23.43		1
	1	5	23.92	23.85	23.52		1
	3	0	24.00	23.92	23.48		1
	3	2	23.87	23.84	23.72		1
	3	3	23.99	23.90	23.56		1
	6	0	22.81	22.82	22.41	0-2	2

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9.3.2 LTE Band 5 (Cell)

Table 9-9
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	**24.55**	0	0
	1	25	24.36		0
	1	49	24.53		0
	25	0	**23.44**	0-1	1
	25	12	23.38		1
	25	25	23.37		1
	50	0	23.40		1
16QAM	1	0	23.93	0-1	1
	1	25	23.84		1
	1	49	23.98		1
	25	0	22.39	0-2	2
	25	12	22.37		2
	25	25	22.37		2
	50	0	22.43		2

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.

Table 9-10
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	24.35	24.32	24.54	0	0
	1	12	24.41	24.22	24.57		0
	1	24	24.47	24.26	24.60		0
	12	0	23.35	23.26	23.50	0-1	1
	12	6	23.39	23.28	23.51		1
	12	13	23.36	23.32	23.54		1
	25	0	23.34	23.37	23.52		1
16QAM	1	0	23.73	23.86	23.93	0-1	1
	1	12	23.70	23.79	24.00		1
	1	24	23.83	24.00	23.99		1
	12	0	22.36	22.35	22.59	0-2	2
	12	6	22.41	22.32	22.62		2
	12	13	22.34	22.36	22.64		2
	25	0	22.40	22.38	22.48		2

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Table 9-11
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	24.27	24.18	24.60	0	0
	1	7	24.39	24.25	24.48		0
	1	14	24.38	24.32	24.35		0
	8	0	23.32	23.34	23.50	0-1	1
	8	4	23.41	23.35	23.53		1
	8	7	23.33	23.30	23.48		1
	15	0	23.37	23.36	23.45		1
16QAM	1	0	23.73	23.50	23.62	0-1	1
	1	7	23.62	23.59	23.64		1
	1	14	23.53	23.65	23.57		1
	8	0	22.39	22.28	22.37	0-2	2
	8	4	22.42	22.27	22.38		2
	8	7	22.41	22.25	22.31		2
	15	0	22.34	22.38	22.39		2

Table 9-12
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	24.06	24.44	24.60	0	0
	1	2	24.17	24.42	24.56		0
	1	5	24.04	24.47	24.16		0
	3	0	24.13	24.34	24.26		0
	3	2	24.31	24.26	24.55		0
	3	3	24.23	24.28	24.38		0
	6	0	23.25	23.26	23.42	0-1	1
16QAM	1	0	23.39	23.18	23.52	0-1	1
	1	2	23.40	23.33	23.56		1
	1	5	23.28	23.14	23.51		1
	3	0	23.13	23.26	23.64		1
	3	2	23.33	23.31	23.67		1
	3	3	23.26	23.35	23.60		1
	6	0	22.18	22.34	22.34	0-2	2

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9.3.3 LTE Band 4 (AWS)

Table 9-13
LTE Band 4 (AWS) Conducted Powers - 20 MHz Bandwidth

LTE Band 4 (AWS) 20 MHzBandwidth					
Modulation	RB Size	RB Offset	Mid Channel 20175 (1732.5 MHz) Conducted Power [dBm]	MPR Allowed per 3GPP [dB]	MPR [dB]
QPSK	1	0	24.15	0	0
	1	50	23.97		0
	1	99	**24.23**		0
	50	0	23.04	0-1	1
	50	25	23.01		1
	50	50	**23.22**		1
	100	0	23.07		1
16QAM	1	0	23.47	0-1	1
	1	50	23.24		1
	1	99	23.50		1
	50	0	22.07	0-2	2
	50	25	22.02		2
	50	50	22.13		2
	100	0	22.08		2

Note: LTE Band 4 (AWS) at 20 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.

Table 9-14
LTE Band 4 (AWS) Conducted Powers - 15 MHz Bandwidth

LTE Band 4 (AWS) 15 MHzBandwidth							
Modulation	RB Size	RB Offset	Low Channel 20025 (1717.5 MHz)	Mid Channel 20175 (1732.5 MHz)	High Channel 20325 (1747.5 MHz)	MPR Allowed per 3GPP [dB]	MPR [dB]
			Conducted Power [dBm]				
QPSK	1	0	24.10	23.69	23.87	0	0
	1	36	23.76	23.52	23.52		0
	1	74	23.70	23.64	23.92		0
	36	0	22.89	22.64	22.77	0-1	1
	36	18	23.02	22.56	22.65		1
	36	37	22.80	22.49	22.73		1
	75	0	22.85	22.58	22.61		1
16QAM	1	0	23.09	22.73	22.86	0-1	1
	1	36	23.50	22.72	22.93		1
	1	74	22.83	22.73	23.00		1
	36	0	21.85	21.50	21.63	0-2	2
	36	18	22.01	21.53	21.63		2
	36	37	21.71	21.45	21.74		2
	75	0	21.84	21.48	21.61		2

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Table 9-15
LTE Band 4 (AWS) Conducted Powers - 10 MHz Bandwidth

LTE Band 4 (AWS) 10 MHzBandwidth							
Modulation	RB Size	RB Offset	Low Channel 20000 (1715.0 MHz)	Mid Channel 20175 (1732.5 MHz)	High Channel 20350 (1750.0 MHz)	MPR Allowed per 3GPP [dB]	MPR [dB]
			Conducted Power [dBm]				
QPSK	1	0	24.23	24.02	24.20	0	0
	1	25	23.89	23.90	23.87		0
	1	49	24.26	23.95	23.88		0
	25	0	23.04	22.90	23.05	0-1	1
	25	12	23.02	22.85	23.02		1
	25	25	23.06	22.87	23.05		1
	50	0	23.08	22.93	23.07		1
16QAM	1	0	23.42	23.30	23.48	0-1	1
	1	25	23.20	23.01	23.18		1
	1	49	23.54	23.27	23.23		1
	25	0	22.02	21.89	22.02	0-2	2
	25	12	21.92	21.85	22.00		2
	25	25	21.95	21.85	21.97		2
	50	0	21.93	21.76	21.96		2

Table 9-16
LTE Band 4 (AWS) Conducted Powers - 5 MHz Bandwidth

LTE Band 4 (AWS) 5 MHzBandwidth							
Modulation	RB Size	RB Offset	Low Channel 19975 (1712.5 MHz)	Mid Channel 20175 (1732.5 MHz)	High Channel 20375 (1752.5 MHz)	MPR Allowed per 3GPP [dB]	MPR [dB]
			Conducted Power [dBm]				
QPSK	1	0	23.45	24.01	23.68	0	0
	1	12	23.84	23.89	23.94		0
	1	24	23.90	23.91	23.91		0
	12	0	22.86	22.88	22.90	0-1	1
	12	6	22.83	22.88	22.87		1
	12	13	22.81	22.85	22.86		1
	25	0	22.84	22.85	22.88		1
16QAM	1	0	22.80	23.31	22.88	0-1	1
	1	12	23.13	23.13	23.20		1
	1	24	23.26	23.27	23.03		1
	12	0	21.90	21.92	21.94	0-2	2
	12	6	21.90	21.90	21.95		2
	12	13	21.83	21.88	21.90		2
	25	0	21.85	21.86	21.88		2

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Table 9-17
LTE Band 4 (AWS) Conducted Powers - 3 MHz Bandwidth

LTE Band 4 (AWS) 3 MHzBandwidth							
Modulation	RB Size	RB Offset	Low Channel 19965 (1711.5 MHz)	Mid Channel 20175 (1732.5 MHz)	High Channel 20385 (1753.5 MHz)	MPR Allowed per 3GPP [dB]	MPR [dB]
			Conducted Power [dBm]				
QPSK	1	0	23.62	23.67	23.78	0	0
	1	7	23.83	23.71	23.79		0
	1	14	23.82	23.61	23.77		0
	8	0	22.83	22.76	22.85	0-1	1
	8	4	22.99	22.66	22.94		1
	8	7	22.79	22.65	22.84		1
	15	0	22.81	22.66	22.84		1
16QAM	1	0	22.85	22.89	23.01	0-1	1
	1	7	23.12	23.01	23.03		1
	1	14	23.13	22.91	23.03		1
	8	0	21.87	21.73	22.00	0-2	2
	8	4	21.96	21.72	21.96		2
	8	7	21.85	21.70	21.89		2
	15	0	21.80	21.66	21.85		2

Table 9-18
LTE Band 4 (AWS) Conducted Powers -1.4 MHz Bandwidth

LTE Band 4 (AWS) 1.4 MHzBandwidth							
Modulation	RB Size	RB Offset	Low Channel 19957 (1710.7 MHz)	Mid Channel 20175 (1732.5 MHz)	High Channel 20393 (1754.3 MHz)	MPR Allowed per 3GPP [dB]	MPR [dB]
			Conducted Power [dBm]				
QPSK	1	0	23.74	23.62	23.81	0	0
	1	2	24.00	23.86	24.00		0
	1	5	23.73	23.83	23.77		0
	3	0	23.78	23.65	23.83		0
	3	2	23.86	23.65	23.88		0
	3	3	23.73	23.62	23.80		0
	6	0	22.77	22.71	22.82	0-1	1
16QAM	1	0	23.02	22.90	23.02	0-1	1
	1	2	23.16	22.92	23.15		1
	1	5	22.97	22.84	23.05		1
	3	0	22.99	22.77	22.99		1
	3	2	23.02	22.89	23.11		1
	3	3	22.90	22.75	22.98		1
	6	0	21.85	21.69	21.89	0-2	2

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Table 9-19
Reduced LTE Band 4 (AWS) Conducted Powers - 20 MHz Bandwidth -Hotspot Mode Active

LTE Band 4 (AWS) 20 MHzBandwidth					
Modulation	RB Size	RB Offset	Mid Channel 20175 (1732.5 MHz) Conducted Power [dBm]	MPR Allowed per 3GPP [dB]	MPR [dB]
QPSK	1	0	20.85	0	0
	1	50	20.66		0
	1	99	**21.00**		0
	50	0	19.81	0-1	1
	50	25	19.76		1
	50	50	**19.93**		1
	100	0	19.86		1
16QAM	1	0	19.99	0-1	1
	1	50	19.95		1
	1	99	20.00		1
	50	0	18.75	0-2	2
	50	25	18.74		2
	50	50	18.83		2
	100	0	18.81		2

Note: LTE Band 4 (AWS) at 20 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.

Table 9-20
Reduced LTE Band 4 (AWS) Conducted Powers - 15 MHz Bandwidth -Hotspot Mode Active

LTE Band 4 (AWS) 15 MHzBandwidth							
Modulation	RB Size	RB Offset	Low Channel 20025 (1717.5 MHz)	Mid Channel 20175 (1732.5 MHz)	High Channel 20325 (1747.5 MHz)	MPR Allowed per 3GPP [dB]	MPR [dB]
			Conducted Power [dBm]				
QPSK	1	0	21.14	20.93	21.03	0	0
	1	36	20.65	20.59	20.52		0
	1	74	20.69	20.87	21.00		0
	36	0	19.81	19.62	19.67	0-1	1
	36	18	19.81	19.58	19.65		1
	36	37	19.67	19.55	19.75		1
	75	0	19.75	19.62	19.65		1
16QAM	1	0	20.04	19.80	19.96	0-1	1
	1	36	19.99	19.74	19.83		1
	1	74	19.97	19.87	19.96		1
	36	0	18.80	18.57	18.63	0-2	2
	36	18	18.80	18.56	18.61		2
	36	37	18.63	18.54	18.77		2
	75	0	18.80	18.55	18.63		2

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Table 9-21
Reduced LTE Band 4 (AWS) Conducted Powers - 10 MHz Bandwidth -Hotspot Mode Active

LTE Band 4 (AWS) 10 MHzBandwidth							
Modulation	RB Size	RB Offset	Low Channel 20000 (1715.0 MHz)	Mid Channel 20175 (1732.5 MHz)	High Channel 20350 (1750.0 MHz)	MPR Allowed per 3GPP [dB]	MPR [dB]
			Conducted Power [dBm]				
QPSK	1	0	21.21	21.05	21.14	0	0
	1	25	20.89	20.82	20.88		0
	1	49	21.25	21.02	21.22		0
	25	0	20.02	19.88	19.97	0-1	1
	25	12	19.95	19.83	20.02		1
	25	25	20.01	19.88	20.05		1
	50	0	20.04	19.89	20.09		1
16QAM	1	0	20.43	20.24	20.34	0-1	1
	1	25	20.15	20.05	20.23		1
	1	49	20.49	20.28	20.47		1
	25	0	19.00	18.85	18.97	0-2	2
	25	12	18.97	18.83	19.01		2
	25	25	19.04	18.88	19.09		2
	50	0	19.01	18.96	19.07		2

Table 9-22
Reduced LTE Band 4 (AWS) Conducted Powers - 5 MHz Bandwidth -Hotspot Mode Active

LTE Band 4 (AWS) 5 MHzBandwidth							
Modulation	RB Size	RB Offset	Low Channel 19975 (1712.5 MHz)	Mid Channel 20175 (1732.5 MHz)	High Channel 20375 (1752.5 MHz)	MPR Allowed per 3GPP [dB]	MPR [dB]
			Conducted Power [dBm]				
QPSK	1	0	20.63	20.81	21.10	0	0
	1	12	20.91	20.78	21.01		0
	1	24	20.93	20.71	21.07		0
	12	0	19.94	19.80	20.00	0-1	1
	12	6	19.92	19.77	19.96		1
	12	13	19.89	19.73	20.00		1
	25	0	19.84	19.75	20.00		1
16QAM	1	0	19.90	19.91	20.37	0-1	1
	1	12	20.21	20.07	20.25		1
	1	24	20.30	20.03	20.20		1
	12	0	18.96	18.82	19.05	0-2	2
	12	6	18.95	18.80	19.03		2
	12	13	18.92	18.74	19.00		2
	25	0	18.93	18.96	18.98		2

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Table 9-23
Reduced LTE Band 4 (AWS) Conducted Powers - 3 MHz Bandwidth -Hotspot Mode Active

LTE Band 4 (AWS) 3 MHzBandwidth							
Modulation	RB Size	RB Offset	Low Channel 19965 (1711.5 MHz)	Mid Channel 20175 (1732.5 MHz)	High Channel 20385 (1753.5 MHz)	MPR Allowed per 3GPP [dB]	MPR [dB]
			Conducted Power [dBm]				
QPSK	1	0	20.74	20.79	20.95	0	0
	1	7	20.93	20.65	21.02		0
	1	14	20.84	20.57	20.99		0
	8	0	19.89	19.75	19.94	0-1	1
	8	4	20.03	19.73	19.99		1
	8	7	19.86	19.73	19.91		1
	15	0	19.88	19.75	19.91		1
16QAM	1	0	19.93	19.93	20.15	0-1	1
	1	7	20.11	19.90	20.20		1
	1	14	20.02	19.85	20.19		1
	8	0	18.98	18.80	19.02	0-2	2
	8	4	19.13	18.77	19.02		2
	8	7	18.96	18.77	19.01		2
	15	0	18.88	18.70	18.94		2

Table 9-24
Reduced LTE Band 4 (AWS) Conducted Powers -1.4 MHz Bandwidth -Hotspot Mode Active

LTE Band 4 (AWS) 1.4 MHzBandwidth							
Modulation	RB Size	RB Offset	Low Channel 19957 (1710.7 MHz)	Mid Channel 20175 (1732.5 MHz)	High Channel 20393 (1754.3 MHz)	MPR Allowed per 3GPP [dB]	MPR [dB]
			Conducted Power [dBm]				
QPSK	1	0	20.76	20.74	20.86	0	0
	1	2	20.78	20.72	20.90		0
	1	5	20.72	20.74	20.87		0
	3	0	20.81	20.75	20.90		0
	3	2	20.85	20.78	20.89		0
	3	3	20.79	20.76	20.86		0
	6	0	19.76	19.78	19.85	0-1	1
16QAM	1	0	20.03	19.91	20.07	0-1	1
	1	2	20.07	20.19	20.21		1
	1	5	19.98	20.11	20.12		1
	3	0	19.92	19.99	20.03		1
	3	2	20.04	20.02	20.05		1
	3	3	19.94	20.01	20.00		1
	6	0	18.86	18.84	18.96	0-2	2

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9.3.4 LTE Band 2 (PCS)

Table 9-25
LTE Band 2 (PCS) Conducted Powers - 20 MHz Bandwidth

LTE Band 2 (PCS) 20 MHz Bandwidth							
Modulation	RB Size	RB Offset	Low Channel 18700 (1860.0 MHz)	Mid Channel 18900 (1880.0 MHz)	High Channel 19100 (1900.0 MHz)	MPR Allowed per 3GPP [dB]	MPR [dB]
			Conducted Power [dBm]				
QPSK	1	0	24.45	24.06	24.37	0	0
	1	50	23.87	23.37	23.74		0
	1	99	24.28	23.99	**24.49**		0
	50	0	23.18	22.75	23.10	0-1	1
	50	25	23.07	22.59	23.15		1
	50	50	23.05	22.65	**23.19**		1
	100	0	23.12	22.64	23.18		1
16QAM	1	0	23.46	23.02	23.25	0-1	1
	1	50	23.20	22.75	23.32		1
	1	99	23.14	22.85	23.35		1
	50	0	22.11	21.63	22.09	0-2	2
	50	25	21.59	21.55	22.16		2
	50	50	21.94	21.61	22.17		2
	100	0	21.98	21.60	22.19		2

Table 9-26
LTE Band 2 (PCS) Conducted Powers - 15 MHz Bandwidth

LTE Band 2 (PCS) 15 MHz Bandwidth							
Modulation	RB Size	RB Offset	Low Channel 18675 (1857.5 MHz)	Mid Channel 18900 (1880.0 MHz)	High Channel 19125 (1902.5 MHz)	MPR Allowed per 3GPP [dB]	MPR [dB]
			Conducted Power [dBm]				
QPSK	1	0	24.45	24.05	24.42	0	0
	1	36	24.14	23.68	24.02		0
	1	74	24.48	24.07	24.26		0
	36	0	23.18	22.79	23.11	0-1	1
	36	18	23.24	22.75	23.10		1
	36	37	23.19	22.81	23.07		1
	75	0	23.14	22.77	23.04		1
16QAM	1	0	23.49	23.10	23.41	0-1	1
	1	36	23.28	22.90	23.20		1
	1	74	23.37	23.43	23.21		1
	36	0	22.15	21.75	22.10	0-2	2
	36	18	22.11	21.70	22.05		2
	36	37	22.05	21.75	22.09		2
	75	0	22.01	21.72	22.04		2

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Table 9-27
LTE Band 2 (PCS) Conducted Powers - 10 MHz Bandwidth

LTE Band 2 (PCS) 10 MHz Bandwidth							
Modulation	RB Size	RB Offset	Low Channel 18650 (1855.0 MHz)	Mid Channel 18900 (1880.0 MHz)	High Channel 19150 (1905.0 MHz)	MPR Allowed per 3GPP [dB]	MPR [dB]
			Conducted Power [dBm]				
QPSK	1	0	24.49	24.30	24.43	0	0
	1	25	24.33	23.91	24.24		0
	1	49	24.41	24.26	24.39		0
	25	0	23.49	23.23	23.38	0-1	1
	25	12	23.49	23.09	23.34		1
	25	25	23.44	23.09	23.35		1
	50	0	23.43	23.04	23.39		1
16QAM	1	0	23.48	23.48	23.45	0-1	1
	1	25	23.43	23.16	23.48		1
	1	49	23.50	23.49	23.47		1
	25	0	22.47	22.08	22.37	0-2	2
	25	12	22.46	21.94	22.35		2
	25	25	22.41	22.06	22.27		2
	50	0	22.49	21.99	22.28		2

Table 9-28
LTE Band 2 (PCS) Conducted Powers - 5 MHz Bandwidth

LTE Band 2 (PCS) 5 MHz Bandwidth							
Modulation	RB Size	RB Offset	Low Channel 18625 (1852.5 MHz)	Mid Channel 18900 (1880.0 MHz)	High Channel 19175 (1907.5 MHz)	MPR Allowed per 3GPP [dB]	MPR [dB]
			Conducted Power [dBm]				
QPSK	1	0	24.48	24.18	24.39	0	0
	1	12	24.49	24.10	24.40		0
	1	24	24.44	24.02	24.16		0
	12	0	23.47	23.02	23.25	0-1	1
	12	6	23.47	23.01	23.24		1
	12	13	23.44	22.91	23.13		1
	25	0	23.43	22.94	23.17		1
16QAM	1	0	23.50	23.36	23.50	0-1	1
	1	12	23.36	23.16	23.48		1
	1	24	23.27	23.05	23.24		1
	12	0	22.42	21.93	22.31	0-2	2
	12	6	22.40	21.94	22.22		2
	12	13	22.49	21.91	22.12		2
	25	0	22.46	21.87	22.16		2

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Table 9-29
LTE Band 2 (PCS) Conducted Powers - 3 MHz Bandwidth

LTE Band 2 (PCS) 3 MHz Bandwidth							
Modulation	RB Size	RB Offset	Low Channel 18615 (1851.5 MHz)	Mid Channel 18900 (1880.0 MHz)	High Channel 19185 (1908.5 MHz)	MPR Allowed per 3GPP [dB]	MPR [dB]
			Conducted Power [dBm]				
QPSK	1	0	24.36	24.21	23.84	0	0
	1	7	24.46	24.17	24.11		0
	1	14	24.40	23.98	24.17		0
	8	0	23.42	22.86	23.16	0-1	1
	8	4	23.48	22.95	23.30		1
	8	7	23.41	22.88	23.11		1
	15	0	23.42	22.86	23.15		1
16QAM	1	0	23.41	23.41	23.21	0-1	1
	1	7	23.25	23.13	23.49		1
	1	14	23.49	23.09	23.47		1
	8	0	22.50	21.91	22.26	0-2	2
	8	4	22.44	21.97	22.36		2
	8	7	22.46	21.84	22.21		2
	15	0	22.41	21.85	22.15		2

Table 9-30
LTE Band 2 (PCS) Conducted Powers -1.4 MHz Bandwidth

LTE Band 2 (PCS) 1.4 MHz Bandwidth							
Modulation	RB Size	RB Offset	Low Channel 18607 (1850.7 MHz)	Mid Channel 18900 (1880.0 MHz)	High Channel 19193 (1909.3 MHz)	MPR Allowed per 3GPP [dB]	MPR [dB]
			Conducted Power [dBm]				
QPSK	1	0	24.32	23.81	23.98	0	0
	1	2	24.35	23.97	24.13		0
	1	5	24.31	23.79	24.06		0
	3	0	24.37	23.84	24.11		0
	3	2	24.45	23.83	24.18		0
	3	3	24.33	23.79	24.05		0
	6	0	23.37	22.82	23.06	0-1	1
16QAM	1	0	23.47	23.02	23.33	0-1	1
	1	2	23.46	23.12	23.30		1
	1	5	23.47	23.00	23.29		1
	3	0	23.49	22.95	23.25		1
	3	2	23.47	23.08	23.31		1
	3	3	23.46	22.94	23.20		1
	6	0	22.42	21.88	22.15	0-2	2

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Table 9-31
Reduced LTE Band 2 (PCS) Conducted Powers - 20 MHz Bandwidth -Hotspot Mode Active

LTE Band 2 (PCS) 20 MHz Bandwidth							
Modulation	RB Size	RB Offset	Low Channel 18700 (1860.0 MHz)	Mid Channel 18900 (1880.0 MHz)	High Channel 19100 (1900.0 MHz)	MPR Allowed per 3GPP [dB]	MPR [dB]
			Conducted Power [dBm]				
QPSK	1	0	20.81	20.73	20.81	0	0
	1	50	20.64	20.45	20.70		0
	1	99	20.66	20.82	**21.00**		0
	50	0	19.83	19.50	19.75	0-1	1
	50	25	19.81	19.47	19.79		1
	50	50	19.88	19.59	**19.93**		1
	100	0	19.85	19.52	19.92		1
16QAM	1	0	20.00	19.91	19.90	0-1	1
	1	50	19.97	19.68	19.85		1
	1	99	19.99	20.00	19.99		1
	50	0	18.83	18.54	18.74	0-2	2
	50	25	18.82	18.49	18.80		2
	50	50	18.86	18.59	18.94		2
	100	0	18.85	18.52	18.88		2

Table 9-32
Reduced LTE Band 2 (PCS) Conducted Powers - 15 MHz Bandwidth -Hotspot Mode Active

LTE Band 2 (PCS) 15 MHz Bandwidth							
Modulation	RB Size	RB Offset	Low Channel 18675 (1857.5 MHz)	Mid Channel 18900 (1880.0 MHz)	High Channel 19125 (1902.5 MHz)	MPR Allowed per 3GPP [dB]	MPR [dB]
			Conducted Power [dBm]				
QPSK	1	0	21.18	20.97	21.15	0	0
	1	36	20.91	20.63	20.86		0
	1	74	21.18	20.93	21.12		0
	36	0	20.00	19.70	19.87	0-1	1
	36	18	19.91	19.92	20.29		1
	36	37	20.03	19.69	19.90		1
	75	0	19.96	19.65	19.89		1
16QAM	1	0	20.28	19.97	20.09	0-1	1
	1	36	20.32	19.91	20.20		1
	1	74	20.18	20.00	20.05		1
	36	0	18.97	18.69	18.85	0-2	2
	36	18	18.78	18.92	19.20		2
	36	37	19.00	18.66	18.91		2
	75	0	18.96	18.63	18.90		2

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Table 9-33
Reduced LTE Band 2 (PCS) Conducted Powers - 10 MHz Bandwidth -Hotspot Mode Active

LTE Band 2 (PCS) 10 MHz Bandwidth							
Modulation	RB Size	RB Offset	Low Channel 18650 (1855.0 MHz)	Mid Channel 18900 (1880.0 MHz)	High Channel 19150 (1905.0 MHz)	MPR Allowed per 3GPP [dB]	MPR [dB]
			Conducted Power [dBm]				
QPSK	1	0	21.29	21.22	21.30	0	0
	1	25	21.22	20.83	21.17		0
	1	49	20.80	21.18	21.28		0
	25	0	20.48	20.11	20.32	0-1	1
	25	12	20.37	19.98	20.23		1
	25	25	20.44	20.04	20.29		1
	50	0	20.22	20.06	20.20		1
16QAM	1	0	20.49	20.47	20.46	0-1	1
	1	25	20.26	20.16	20.38		1
	1	49	20.44	20.46	20.40		1
	25	0	19.47	19.08	19.33	0-2	2
	25	12	19.37	19.01	19.22		2
	25	25	19.43	19.04	19.27		2
	50	0	19.24	19.02	19.23		2

Table 9-34
Reduced LTE Band 2 (PCS) Conducted Powers - 5 MHz Bandwidth -Hotspot Mode Active

LTE Band 2 (PCS) 5 MHz Bandwidth							
Modulation	RB Size	RB Offset	Low Channel 18625 (1852.5 MHz)	Mid Channel 18900 (1880.0 MHz)	High Channel 19175 (1907.5 MHz)	MPR Allowed per 3GPP [dB]	MPR [dB]
			Conducted Power [dBm]				
QPSK	1	0	21.24	21.18	21.25	0	0
	1	12	21.20	21.00	21.24		0
	1	24	21.28	20.99	21.11		0
	12	0	20.38	19.93	20.15	0-1	1
	12	6	20.34	19.95	20.15		1
	12	13	20.35	19.94	20.09		1
	25	0	20.32	19.88	20.08		1
16QAM	1	0	20.45	20.35	20.27	0-1	1
	1	12	20.48	20.24	20.48		1
	1	24	20.49	20.30	20.50		1
	12	0	19.42	18.96	19.20	0-2	2
	12	6	19.43	18.99	19.22		2
	12	13	19.39	18.97	19.12		2
	25	0	19.35	18.91	19.13		2

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Table 9-35
Reduced LTE Band 2 (PCS) Conducted Powers - 3 MHz Bandwidth -Hotspot Mode Active

LTE Band 2 (PCS) 3 MHz Bandwidth							
Modulation	RB Size	RB Offset	Low Channel 18615 (1851.5 MHz)	Mid Channel 18900 (1880.0 MHz)	High Channel 19185 (1908.5 MHz)	MPR Allowed per 3GPP [dB]	MPR [dB]
			Conducted Power [dBm]				
QPSK	1	0	21.26	20.82	21.09	0	0
	1	7	21.30	20.96	21.30		0
	1	14	21.29	20.92	21.23		0
	8	0	20.32	19.90	20.08	0-1	1
	8	4	20.34	19.92	20.18		1
	8	7	20.28	19.87	20.06		1
	15	0	20.33	19.91	20.04		1
16QAM	1	0	20.49	20.05	20.18	0-1	1
	1	7	20.35	20.22	20.43		1
	1	14	20.35	20.22	20.40		1
	8	0	19.41	19.12	19.13	0-2	2
	8	4	19.39	18.87	19.17		2
	8	7	19.39	18.91	19.08		2
	15	0	19.33	18.90	19.07		2

Table 9-36
Reduced LTE Band 2 (PCS) Conducted Powers -1.4 MHz Bandwidth -Hotspot Mode Active

LTE Band 2 (PCS) 1.4 MHz Bandwidth							
Modulation	RB Size	RB Offset	Low Channel 18607 (1850.7 MHz)	Mid Channel 18900 (1880.0 MHz)	High Channel 19193 (1909.3 MHz)	MPR Allowed per 3GPP [dB]	MPR [dB]
			Conducted Power [dBm]				
QPSK	1	0	21.26	20.82	21.11	0	0
	1	2	21.12	20.91	21.30		0
	1	5	21.29	20.81	21.09		0
	3	0	21.27	20.88	21.10		0
	3	2	21.30	20.87	21.12		0
	3	3	21.27	20.80	21.02		0
	6	0	20.24	19.85	20.01	0-1	1
16QAM	1	0	20.48	20.12	20.26	0-1	1
	1	2	20.47	20.20	20.46		1
	1	5	20.42	20.10	20.27		1
	3	0	20.39	20.00	20.20		1
	3	2	20.42	20.05	20.32		1
	3	3	20.35	19.99	20.12		1
	6	0	19.31	18.93	19.07	0-2	2

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9.3.5 LTE Band 30

Table 9-37
LTE Band 30 Conducted Powers - 10 MHz Bandwidth

LTE Band 30 10 MHz Bandwidth					
Modulation	RB Size	RB Offset	Mid Channel 27710 (2310.0 MHz) Conducted Power [dBm]	MPR Allowed per 3GPP [dB]	MPR [dB]
QPSK	1	0	**22.79**	0	0
		25	22.45		0
		49	22.32		0
	25	0	**21.69**	0-1	1
		12	21.50		1
		25	21.49		1
	50	0	21.39		1
16QAM	1	0	21.88	0-1	1
		25	21.93		1
		49	21.54		1
	25	0	20.63	0-2	2
		12	20.42		2
		25	20.33		2
	50	0	20.42		2

Table 9-38
LTE Band 30 Conducted Powers - 5 MHz Bandwidth

LTE Band 30 5 MHz Bandwidth					
Modulation	RB Size	RB Offset	Mid Channel 27710 (2310.0 MHz) Conducted Power [dBm]	MPR Allowed per 3GPP [dB]	MPR [dB]
QPSK	1	0	22.59	0	0
		12	22.52		0
		24	22.23		0
	12	0	21.51	0-1	1
		6	21.45		1
		13	21.39		1
	25	0	21.43		1
16QAM	1	0	21.87	0-1	1
		12	21.72		1
		24	21.56		1
	12	0	20.56	0-2	2
		6	20.48		2
		13	20.44		2
	25	0	20.43		2

Note: LTE Band 30 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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Table 9-39
Reduced LTE Band 30 Conducted Powers - 10 MHz Bandwidth -Hotspot Mode Active

LTE Band 30 10 MHz Bandwidth					
Modulation	RB Size	RB Offset	Mid Channel 27710 (2310.0 MHz) Conducted Power [dBm]	MPR Allowed per 3GPP [dB]	MPR [dB]
QPSK	1	0	20.63	0	0
		25	20.99		0
		49	**21.07**		0
	25	0	**20.17**	0-1	1
		12	20.13		1
		25	20.01		1
	50	0	20.10		1
16QAM	1	0	20.45	0-1	1
		25	20.24		1
		49	20.41		1
	25	0	19.14	0-2	2
		12	19.15		2
		25	19.02		2
	50	0	19.12		2

Table 9-40
Reduced LTE Band 30 Conducted Powers - 5 MHz Bandwidth -Hotspot Mode Active

LTE Band 30 5 MHz Bandwidth					
Modulation	RB Size	RB Offset	Mid Channel 27710 (2310.0 MHz) Conducted Power [dBm]	MPR Allowed per 3GPP [dB]	MPR [dB]
QPSK	1	0	21.18	0	0
		12	21.05		0
		24	21.02		0
	12	0	20.15	0-1	1
		6	20.11		1
		13	20.08		1
	25	0	20.13		1
16QAM	1	0	20.50	0-1	1
		12	20.46		1
		24	20.49		1
	12	0	19.15	0-2	2
		6	19.12		2
		13	19.04		2
	25	0	19.10		2

Note: LTE Band 30 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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9.3.6 LTE Band 41

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

LTE Band 41 20 MHzBandwidth									
Modulation	RB Size	RB Offset	Low Channel 39750 (2506.0 MHz)	Low-Mid Channel 40185 (2549.5 MHz)	Mid Channel 40620 (2593.0 MHz)	Mid-High Channel 41055 (2636.5 MHz)	High Channel 41490 (2680.0 MHz)	MPR Allowed per 3GPP [dB]	MPR [dB]
			Conducted Power [dBm]						
QPSK	1	0	22.73	22.96	**23.42**	23.41	23.26	0	0
	1	50	22.24	22.56	22.94	22.79	22.74		0
	1	99	22.26	22.66	22.94	22.77	22.75		0
	50	0	21.54	21.39	**22.19**	22.13	21.97	0-1	1
	50	25	21.34	21.59	22.05	21.90	21.84		1
	50	50	21.31	21.72	22.01	21.86	21.77		1
	100	0	21.38	21.73	22.13	21.97	21.91		1
16QAM	1	0	21.47	22.39	22.48	22.48	22.46	0-1	1
	1	50	21.25	21.86	22.24	22.11	21.96		1
	1	99	21.44	22.08	22.33	22.26	22.08		1
	50	0	20.47	20.88	21.26	21.16	21.12	0-2	2
	50	25	20.31	20.68	21.16	20.98	20.94		2
	50	50	20.23	20.69	20.98	20.88	20.79		2
	100	0	20.36	20.73	21.15	20.99	20.93		2

Table 9-42
LTE Band 41 Conducted Powers - 15 MHz Bandwidth

LTE Band 41 15 MHzBandwidth									
Modulation	RB Size	RB Offset	Low Channel 39750 (2506.0 MHz)	Low-Mid Channel 40185 (2549.5 MHz)	Mid Channel 40620 (2593.0 MHz)	Mid-High Channel 41055 (2636.5 MHz)	High Channel 41490 (2680.0 MHz)	MPR Allowed per 3GPP [dB]	MPR [dB]
			Conducted Power [dBm]						
QPSK	1	0	22.83	23.36	23.50	23.42	23.28	0	0
	1	36	22.56	23.00	23.44	22.98	22.90		0
	1	74	22.51	23.18	23.42	22.99	22.83		0
	36	0	21.58	22.08	22.44	22.19	21.93	0-1	1
	36	18	21.51	21.92	22.34	22.02	21.80		1
	36	37	21.35	21.95	22.31	21.89	21.68		1
	75	0	21.47	21.96	22.40	22.04	21.82		1
16QAM	1	0	22.24	22.43	22.50	22.50	22.45	0-1	1
	1	36	21.93	22.22	22.47	22.48	22.26		1
	1	74	22.04	22.45	22.46	22.41	22.23		1
	36	0	20.48	21.22	21.42	21.13	20.88	0-2	2
	36	18	20.43	20.99	21.43	20.99	20.79		2
	36	37	20.35	21.03	21.40	20.91	20.68		2
	75	0	20.44	20.93	21.40	21.12	20.84		2

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Table 9-43
LTE Band 41 Conducted Powers - 10 MHz Bandwidth

LTE Band 41 10 MHzBandwidth									
Modulation	RB Size	RB Offset	Low Channel 39750 (2506.0 MHz)	Low-Mid Channel 40185 (2549.5 MHz)	Mid Channel 40620 (2593.0 MHz)	Mid-High Channel 41055 (2636.5 MHz)	High Channel 41490 (2680.0 MHz)	MPR Allowed per 3GPP [dB]	MPR [dB]
			Conducted Power [dBm]						
QPSK	1	0	22.64	23.24	23.50	23.38	22.80	0	0
	1	25	22.46	23.01	23.49	23.15	22.62		0
	1	49	22.45	23.13	23.43	23.01	22.53		0
	25	0	21.56	22.00	22.46	22.16	21.89	0-1	1
	25	12	21.56	22.02	22.44	22.14	21.81		1
	25	25	21.43	22.01	22.40	22.10	21.71		1
	50	0	21.49	22.03	22.45	22.12	21.85		1
16QAM	1	0	22.24	22.50	22.50	22.45	22.42	0-1	1
	1	25	22.12	22.49	22.49	22.48	22.17		1
	1	49	22.05	22.46	22.47	22.45	22.16		1
	25	0	20.44	20.96	21.42	21.11	20.90	0-2	2
	25	12	20.43	20.95	21.42	21.07	20.86		2
	25	25	20.33	20.96	21.38	21.01	20.74		2
	50	0	20.41	20.99	21.47	21.06	20.90		2

Table 9-44
LTE Band 41 Conducted Powers - 5 MHz Bandwidth

LTE Band 41 5 MHzBandwidth									
Modulation	RB Size	RB Offset	Low Channel 39750 (2506.0 MHz)	Low-Mid Channel 40185 (2549.5 MHz)	Mid Channel 40620 (2593.0 MHz)	Mid-High Channel 41055 (2636.5 MHz)	High Channel 41490 (2680.0 MHz)	MPR Allowed per 3GPP [dB]	MPR [dB]
			Conducted Power [dBm]						
QPSK	1	0	22.46	22.99	23.42	23.05	22.82	0	0
	1	12	22.41	22.91	23.33	22.96	22.73		0
	1	24	22.39	23.00	23.33	23.00	22.68		0
	12	0	21.48	21.93	22.39	22.10	21.78	0-1	1
	12	6	21.49	21.93	22.38	22.05	21.75		1
	12	13	21.38	21.95	22.37	22.03	21.67		1
	25	0	21.44	21.91	22.39	22.06	21.77		1
16QAM	1	0	21.86	22.22	22.42	22.49	22.15	0-1	1
	1	12	21.76	22.29	22.45	22.41	22.00		1
	1	24	21.72	22.23	22.43	22.49	21.94		1
	12	0	20.47	20.98	21.43	21.21	20.91	0-2	2
	12	6	20.46	21.00	21.43	21.21	20.89		2
	12	13	20.35	21.01	21.42	21.14	20.73		2
	25	0	20.39	20.91	21.38	21.12	20.75		2

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9.3.7 LTE Carrier Aggregation Conducted Powers

Table 9-45
Two Component Carrier Maximum Conducted Powers

PCC									SCC				Power	
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 Rel 10 Tx.Power (dBm)	LTE Rel. 8 Tx.Power (dBm)
LTE B2	20	19100	1900	QPSK	1	99	600	1980	LTE B5	10	2525	881.5	24.41	24.49
LTE B2	20	19100	1900	QPSK	1	99	600	1980	LTE B12	10	5095	737.5	24.41	24.49
LTE B2	20	19100	1900	QPSK	1	99	600	1980	LTE B29	10	9715	722.5	24.38	24.49
LTE B2	20	19100	1900	QPSK	1	99	600	1980	LTE B30	10	9820	2355	24.16	24.49
LTE B4	10	20000	1715	QPSK	1	49	2000	2115	LTE B5	10	2525	881.5	24.46	24.26
LTE B4	10	20000	1715	QPSK	1	49	2000	2115	LTE B12	10	5095	737.5	24.45	24.26
LTE B4	10	20000	1715	QPSK	1	49	2000	2115	LTE B29	10	9715	722.5	24.41	24.26
LTE B4	10	20000	1715	QPSK	1	49	2000	2115	LTE B30	10	9820	2355	24.44	24.26
LTE B5	5	20625	846.5	QPSK	1	24	2625	891.5	LTE B2	20	900	1960	24.51	24.60
LTE B5	5	20625	846.5	QPSK	1	24	2625	891.5	LTE B4	20	2175	2132.5	24.56	24.60
LTE B5	5	20625	846.5	QPSK	1	24	2625	891.5	LTE B30	10	9820	2355	24.68	24.60
LTE B12	3	23095	707.5	QPSK	1	7	5095	737.5	LTE B2	20	900	1960	24.50	25.00
LTE B12	10	23095	707.5	QPSK	1	25	5095	737.5	LTE B30	10	9820	2355	24.70	24.98
LTE B30	10	27710	2310	QPSK	1	0	9820	2355	LTE B2	20	900	1960	22.59	22.79
LTE B30	10	27710	2310	QPSK	1	0	9820	2355	LTE B4	20	2175	2132.5	22.61	22.79
LTE B30	10	27710	2310	QPSK	1	0	9820	2355	LTE B5	10	2525	881.5	22.62	22.79
LTE B30	10	27710	2310	QPSK	1	0	9820	2355	LTE B12	10	5095	737.5	22.61	22.79
LTE B30	10	27710	2310	QPSK	1	0	9820	2355	LTE B29	10	9715	722.5	22.63	22.79

Table 9-46
Three Component Carrier Maximum Conducted Powers

PCC									SCC1				SCC2				Power	
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 Rel 10 Tx.Power (dBm)	LTE Rel. 8 Tx.Power (dBm)
LTE B2	20	19100	1900	QPSK	1	99	600	1980	LTE B5	10	2525	881.5	LTE B30	10	9820	2355	24.35	24.49
LTE B2	20	19100	1900	QPSK	1	99	600	1980	LTE B12	10	5095	737.5	LTE B30	10	9820	2355	24.37	24.49
LTE B2	20	19100	1900	QPSK	1	99	600	1980	LTE B29	10	9715	722.5	LTE B30	10	9820	2355	24.39	24.49
LTE B4	10	20000	1715	QPSK	1	49	2000	2115	LTE B5	10	2525	881.5	LTE B30	10	9820	2355	24.22	24.26
LTE B4	10	20000	1715	QPSK	1	49	2000	2115	LTE B12	10	5095	737.5	LTE B30	10	9820	2355	24.21	24.26
LTE B4	10	20000	1715	QPSK	1	49	2000	2115	LTE B29	10	9715	722.5	LTE B30	10	9820	2355	24.23	24.26
LTE B5	5	20625	846.5	QPSK	1	24	2625	891.5	LTE B2	20	900	1960	LTE B30	10	9820	2355	24.26	24.60
LTE B5	5	20625	846.5	QPSK	1	24	2625	891.5	LTE B4	20	2175	2132.5	LTE B30	10	9820	2355	24.18	24.60
LTE B12	10	23095	707.5	QPSK	1	25	5095	737.5	LTE B2	20	900	1960	LTE B30	10	9820	2355	24.63	24.98
LTE B30	10	27710	2310	QPSK	1	0	9820	2355	LTE B2	20	900	1960	LTE B5	10	2525	881.5	22.63	22.79
LTE B30	10	27710	2310	QPSK	1	0	9820	2355	LTE B2	20	900	1960	LTE B12	10	5095	737.5	22.62	22.79
LTE B30	10	27710	2310	QPSK	1	0	9820	2355	LTE B2	20	900	1960	LTE B29	10	9715	722.5	22.64	22.79
LTE B30	10	27710	2310	QPSK	1	0	9820	2355	LTE B4	20	2175	2132.5	LTE B5	10	2525	881.5	22.63	22.79
LTE B30	10	27710	2310	QPSK	1	0	9820	2355	LTE B4	20	2175	2132.5	LTE B12	10	5095	737.5	22.64	22.79
LTE B30	10	27710	2310	QPSK	1	0	9820	2355	LTE B4	20	2175	2132.5	LTE B29	10	9715	722.5	22.65	22.79

Table 9-47
Two Component Carrier Reduced Conducted Powers – Hotspot Mode Active

PCC									SCC				Power	
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 Rel 10 Tx.Power (dBm)	LTE Rel. 8 Tx.Power (dBm)
LTE B2	10	19150	1905	QPSK	1	0	1150	1985	LTE B5	10	2525	881.5	21.28	21.30
LTE B2	10	19150	1905	QPSK	1	0	1150	1985	LTE B12	10	5095	737.5	21.27	21.30
LTE B2	10	19150	1905	QPSK	1	0	1150	1985	LTE B29	10	9715	722.5	21.26	21.30
LTE B2	10	19150	1905	QPSK	1	0	1150	1985	LTE B30	10	9820	2355	21.41	21.30
LTE B4	10	20000	1715	QPSK	1	49	2000	2115	LTE B5	10	2525	881.5	21.29	21.25
LTE B4	10	20000	1715	QPSK	1	49	2000	2115	LTE B12	10	5095	737.5	21.28	21.25
LTE B4	10	20000	1715	QPSK	1	49	2000	2115	LTE B29	10	9715	722.5	21.33	21.25
LTE B4	10	20000	1715	QPSK	1	49	2000	2115	LTE B30	10	9820	2355	21.32	21.25
LTE B30	5	27710	2310	QPSK	1	0	9820	2355	LTE B2	20	900	1960	21.07	21.18
LTE B30	5	27710	2310	QPSK	1	0	9820	2355	LTE B4	20	2175	2132.5	21.09	21.18
LTE B30	5	27710	2310	QPSK	1	0	9820	2355	LTE B5	10	2525	881.5	21.01	21.18
LTE B30	5	27710	2310	QPSK	1	0	9820	2355	LTE B12	10	5095	737.5	21.36	21.18
LTE B30	5	27710	2310	QPSK	1	0	9820	2355	LTE B29	10	9715	722.5	21.11	21.18

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Table 9-48
Three Component Carrier Reduced Conducted Powers – Hotspot Mode Active

PCC									SCC1				SCC2				Power	
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 Rel 10 Tx.Power (dBm)	LTE Rel. 8 Tx.Power (dBm)
LTE B2	10	19150	1905	QPSK	1	0	1150	1985	LTE B5	10	2525	881.5	LTE B30	10	9820	2355	21.37	21.30
LTE B2	10	19150	1905	QPSK	1	0	1150	1985	LTE B12	10	5095	737.5	LTE B30	10	9820	2355	21.40	21.30
LTE B2	10	19150	1905	QPSK	1	0	1150	1985	LTE B29	10	9715	722.5	LTE B30	10	9820	2355	21.38	21.30
LTE B4	10	20000	1715	QPSK	1	49	2000	2115	LTE B5	10	2525	881.5	LTE B30	10	9820	2355	21.35	21.25
LTE B4	10	20000	1715	QPSK	1	49	2000	2115	LTE B12	10	5095	737.5	LTE B30	10	9820	2355	21.27	21.25
LTE B4	10	20000	1715	QPSK	1	49	2000	2115	LTE B29	10	9715	722.5	LTE B30	10	9820	2355	21.28	21.25
LTE B30	5	27710	2310	QPSK	1	0	9820	2355	LTE B2	20	900	1960	LTE B5	10	2525	881.5	21.40	21.18
LTE B30	5	27710	2310	QPSK	1	0	9820	2355	LTE B2	20	900	1960	LTE B12	10	5095	737.5	21.41	21.18
LTE B30	5	27710	2310	QPSK	1	0	9820	2355	LTE B2	20	900	1960	LTE B29	10	9715	722.5	21.42	21.18
LTE B30	5	27710	2310	QPSK	1	0	9820	2355	LTE B4	20	2175	2132.5	LTE B5	10	2525	881.5	21.40	21.18
LTE B30	5	27710	2310	QPSK	1	0	9820	2355	LTE B4	20	2175	2132.5	LTE B12	10	5095	737.5	21.42	21.18
LTE B30	5	27710	2310	QPSK	1	0	9820	2355	LTE B4	20	2175	2132.5	LTE B29	10	9715	722.5	21.41	21.18

Notes:

1. The device only supports downlink Carrier Aggregation. Uplink Carrier Aggregation is not supported. 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.

Figure 9-3
Power Measurement Setup

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9.4 WLAN Conducted Powers

Table 9-49
2.4 GHz WLAN Maximum Average RF Power – Antenna 1

Freq [MHz]	Channel	2.4GHz Conducted Power [dBm]		
		IEEE Transmission Mode		
		802.11b	802.11g	802.11n
2412	1	18.64	16.78	17.43
2437	6	**19.11**	17.32	16.91
2462	11	18.54	16.74	17.36

Table 9-50
2.4 GHz WLAN Maximum Average RF Power – Antenna 2

Freq [MHz]	Channel	2.4GHz Conducted Power [dBm]		
		IEEE Transmission Mode		
		802.11b	802.11g	802.11n
2412	1	18.34	16.76	16.55
2437	6	**18.71**	16.85	17.49
2462	11	18.35	16.74	17.36

Table 9-51
2.4 GHz WLAN Reduced Average RF Power – Antenna 1 (Held to Ear)

Freq [MHz]	Channel	2.4GHz Conducted Power [dBm]		
		IEEE Transmission Mode		
		802.11b	802.11g	802.11n
2412	1	11.71	11.84	11.89
2437	6	11.39	11.78	11.50
2462	11	**11.82**	11.71	11.68

Table 9-52
2.4 GHz WLAN Reduced Average RF Power – Antenna 2 (Held to Ear)

Freq [MHz]	Channel	2.4GHz Conducted Power [dBm]		
		IEEE Transmission Mode		
		802.11b	802.11g	802.11n
2412	1	11.62	12.05	11.79
2437	6	**12.12**	11.72	11.76
2462	11	11.87	12.14	12.01

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Table 9-53
IEEE 802.11a WLAN Maximum Average RF Power – Antenna 1

Freq [MHz]	Channel	5GHz (20MHz) Conducted Power [dBm]		
		IEEE Transmission Mode		
		802.11a	802.11n	802.11ac
5180	36	13.70	13.69	13.65
5200	40	15.84	15.88	15.89
5220	44	15.84	15.93	15.90
5240	48	15.72	15.91	15.83
5260	52	16.32	15.60	15.53
5280	56	**16.45**	15.54	15.55
5300	60	16.43	16.46	16.44
5320	64	13.52	14.12	14.16
5500	100	13.86	13.75	13.66
5600	120	**16.21**	16.25	16.32
5620	124	16.17	16.21	16.23
5720	144	16.04	16.06	16.02
5745	149	16.12	16.32	16.49
5785	157	**16.20**	16.21	16.23
5825	165	15.83	15.93	16.05

Table 9-54
IEEE 802.11a WLAN Maximum Average RF Power – Antenna 2

Freq [MHz]	Channel	5GHz (20MHz) Conducted Power [dBm]		
		IEEE Transmission Mode		
		802.11a	802.11n	802.11ac
5180	36	13.96	13.72	13.93
5200	40	15.60	15.99	15.94
5220	44	16.27	16.07	15.97
5240	48	15.51	16.07	15.90
5260	52	**16.47**	16.08	15.93
5280	56	16.42	16.04	15.99
5300	60	16.34	16.03	16.05
5320	64	13.60	13.69	13.77
5500	100	14.40	13.87	13.81
5600	120	15.82	15.67	15.62
5620	124	16.42	15.65	15.56
5720	144	**16.49**	16.15	16.11
5745	149	**16.22**	15.85	15.85
5785	157	16.09	15.81	15.89
5825	165	15.82	15.67	15.71

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Table 9-55
IEEE 802.11ac Reduced Average RF Power – 80 MHz Bandwidth Antenna 1 (Held to Ear)

5GHz (80MHz) Conducted Power [dBm]		
Freq [MHz]	Channel	IEEE Transmission Mode
		802.11ac
5210	42	6.56
5290	58	**6.52**
5530	106	6.55
5610	122	6.47
5690	138	**7.17**
5775	155	**6.43**

Table 9-56
IEEE 802.11ac Reduced Average RF Power – 80 MHz Bandwidth Antenna 2 (Held to Ear)

5GHz (80MHz) Conducted Power [dBm]		
Freq [MHz]	Channel	IEEE Transmission Mode
		802.11ac
5210	42	7.49
5290	58	**6.61**
5530	106	6.38
5610	122	**6.72**
5690	138	6.67
5775	155	**6.80**

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.

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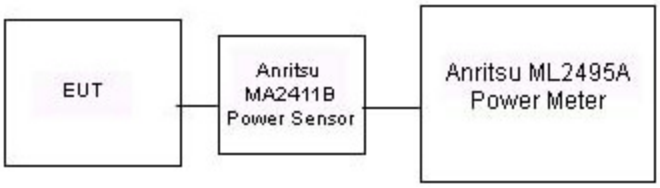

Figure 9-4
Power Measurement Setup for Bandwidths < 50 MHz

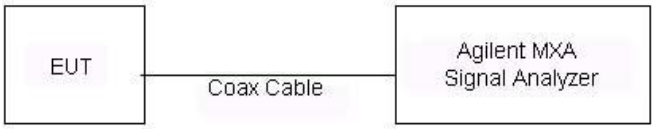

Figure 9-5
Power Measurement Setup for Bandwidths > 50 MHz

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10 SYSTEM VERIFICATION

10.1 Tissue Verification

Table 10-1
Measured Tissue Properties – Head Tissues

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
3/24/2016	750H	22.9	700	0.847	42.738	0.889	42.201	-4.72%	1.27%
			710	0.855	42.571	0.890	42.149	-3.93%	1.00%
			740	0.879	42.130	0.893	41.994	-1.57%	0.32%
			755	0.893	41.924	0.894	41.916	-0.11%	0.02%
3/21/2016	835H	20.7	820	0.894	42.573	0.899	41.578	-0.56%	2.39%
			835	0.910	42.377	0.900	41.500	1.11%	2.11%
			850	0.914	42.188	0.916	41.500	-0.22%	1.66%
3/24/2016	835H	23.4	820	0.913	42.705	0.899	41.578	1.56%	2.71%
			835	0.929	42.503	0.900	41.500	3.22%	2.42%
			850	0.942	42.389	0.916	41.500	2.84%	2.14%
3/22/2016	1750H	22.0	1710	1.346	38.619	1.348	40.142	-0.15%	-3.79%
			1750	1.388	38.411	1.371	40.079	1.24%	-4.16%
			1790	1.430	38.215	1.394	40.016	2.58%	-4.50%
3/28/2016	1750H	20.9	1710	1.358	39.067	1.348	40.142	0.74%	-2.68%
			1750	1.398	38.871	1.371	40.079	1.97%	-3.01%
			1790	1.439	38.665	1.394	40.016	3.23%	-3.38%
3/22/2016	1900H	22.1	1850	1.390	40.545	1.400	40.000	-0.71%	1.36%
			1880	1.425	40.330	1.400	40.000	1.79%	0.82%
			1910	1.452	40.260	1.400	40.000	3.71%	0.65%
3/28/2016	1900H	21.5	1850	1.393	40.293	1.400	40.000	-0.50%	0.73%
			1880	1.432	40.154	1.400	40.000	2.29%	0.39%
			1910	1.459	40.086	1.400	40.000	4.21%	0.21%
4/1/2016	2300H	23.4	2300	1.680	39.043	1.670	39.500	0.60%	-1.16%
			2310	1.692	39.035	1.679	39.480	0.77%	-1.13%
			2320	1.711	39.038	1.687	39.460	1.42%	-1.07%
3/29/2016	2450H	23.5	2400	1.812	38.831	1.756	39.289	3.19%	-1.17%
			2450	1.866	38.662	1.800	39.200	3.67%	-1.37%
			2500	1.924	38.409	1.855	39.136	3.72%	-1.86%
3/24/2016	2600H	24.0	2550	1.981	38.697	1.909	39.073	3.77%	-0.96%
			2600	2.038	38.506	1.964	39.009	3.77%	-1.29%
			2650	2.100	38.260	2.018	38.945	4.06%	-1.76%
03/30/2016	5200H-5800H	21.4	5240	4.575	37.291	4.696	35.940	-2.58%	3.76%
			5260	4.603	37.259	4.717	35.917	-2.42%	3.74%
			5280	4.612	37.219	4.737	35.894	-2.64%	3.69%
			5300	4.644	37.171	4.758	35.871	-2.40%	3.62%
			5600	4.954	36.844	5.065	35.529	-2.19%	3.70%
			5620	4.979	36.762	5.086	35.506	-2.10%	3.54%
			5680	5.022	36.672	5.147	35.437	-2.43%	3.49%
			5700	5.062	36.686	5.168	35.414	-2.05%	3.59%
			5745	5.117	36.635	5.214	35.363	-1.86%	3.60%
			5765	5.135	36.570	5.234	35.340	-1.89%	3.48%
			5785	5.144	36.539	5.255	35.317	-2.11%	3.46%

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Table 10-2
Measured Tissue Properties – Body Tissues

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
3/26/2016	750B	21.4	700	0.915	54.988	0.959	55.726	-4.59%	-1.32%
			710	0.921	54.780	0.960	55.687	-4.06%	-1.63%
			740	0.950	54.453	0.963	55.570	-1.35%	-2.01%
			755	0.966	54.330	0.964	55.512	0.21%	-2.13%
3/22/2016	835B	23.0	820	0.964	53.764	0.969	55.258	-0.52%	-2.70%
			835	0.976	53.612	0.970	55.200	0.62%	-2.88%
			850	0.995	53.518	0.988	55.154	0.71%	-2.97%
3/28/2016	835B	22.0	820	0.977	53.468	0.969	55.258	0.83%	-3.24%
			835	0.991	53.301	0.970	55.200	2.16%	-3.44%
			850	1.007	53.142	0.988	55.154	1.92%	-3.65%
3/24/2016	1750B	23.0	1710	1.439	51.049	1.463	53.537	-1.64%	-4.65%
			1750	1.478	50.964	1.488	53.432	-0.67%	-4.62%
			1790	1.520	50.823	1.514	53.326	0.40%	-4.69%
3/23/2016	1900B	24.1	1850	1.465	52.771	1.520	53.300	-3.62%	-0.99%
			1880	1.500	52.661	1.520	53.300	-1.32%	-1.20%
			1910	1.538	52.606	1.520	53.300	1.18%	-1.30%
3/22/2016	2300B	23.5	2300	1.770	53.170	1.809	52.900	-2.16%	0.51%
			2310	1.782	53.142	1.816	52.887	-1.87%	0.48%
			2320	1.795	53.106	1.826	52.873	-1.70%	0.44%
4/4/2016	2300B	21.9	2300	1.785	52.334	1.809	52.900	-1.33%	-1.07%
			2310	1.799	52.319	1.816	52.887	-0.94%	-1.07%
			2320	1.810	52.313	1.826	52.873	-0.88%	-1.06%
3/22/2016	2450B	23.5	2400	1.899	52.827	1.902	52.767	-0.16%	0.11%
			2450	1.965	52.665	1.950	52.700	0.77%	-0.07%
			2500	2.033	52.490	2.021	52.636	0.59%	-0.28%
3/22/2016	2600B	23.5	2550	2.109	52.318	2.092	52.573	0.81%	-0.49%
			2600	2.177	52.117	2.163	52.509	0.65%	-0.75%
			2650	2.248	51.912	2.234	52.445	0.63%	-1.02%
4/11/2016	2600B	23.3	2550	2.100	50.530	2.092	52.573	0.38%	-3.89%
			2600	2.164	50.348	2.163	52.509	0.05%	-4.12%
			2650	2.234	50.143	2.234	52.445	0.00%	-4.39%
03/24/2016	5200B-5800B	22.8	5240	5.474	47.943	5.346	48.960	2.39%	-2.08%
			5260	5.476	47.948	5.369	48.933	1.99%	-2.01%
			5280	5.490	48.025	5.393	48.906	1.80%	-1.80%
			5600	5.945	47.464	5.766	48.471	3.10%	-2.08%
			5700	6.064	47.298	5.883	48.336	3.08%	-2.15%
			5745	6.101	47.361	5.936	48.275	2.78%	-1.89%
			5765	6.182	47.292	5.959	48.248	3.74%	-1.98%
			5785	6.175	47.187	5.982	48.220	3.23%	-2.14%

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)	Dipole SN	Probe SN	Measured SAR_{1g} (W/kg)	1 W Target SAR_{1g} (W/kg)	1 W Normalized SAR_{1g} (W/kg)	$Deviation_{1g}$ (%)
H	750	HEAD	03/24/2016	23.2	23.1	0.200	1046	3263	1.690	8.200	8.450	3.05%
H	835	HEAD	03/21/2016	21.0	20.7	0.200	4d133	3263	1.930	9.130	9.650	5.70%
H	835	HEAD	03/24/2016	23.9	23.4	0.200	4d133	3263	1.920	9.130	9.600	5.15%
K	1750	HEAD	03/22/2016	23.4	22.0	0.100	1051	3022	3.670	36.200	36.700	1.38%
J	1750	HEAD	03/28/2016	19.5	20.8	0.100	1051	3318	3.520	36.200	35.200	-2.76%
K	1900	HEAD	03/22/2016	23.6	22.3	0.100	5d149	3022	4.090	40.700	40.900	0.49%
G	1900	HEAD	03/28/2016	23.8	22.1	0.100	5d149	3334	3.990	40.700	39.900	-1.97%
J	2300	HEAD	04/01/2016	23.1	22.7	0.100	1064	3318	4.380	47.600	43.800	-7.98%
E	2450	HEAD	03/29/2016	24.5	23.5	0.100	719	3351	5.620	54.200	56.200	3.69%
C	2600	HEAD	03/24/2016	24.3	23.5	0.100	1071	3288	5.850	55.900	58.500	4.65%
D	5250	HEAD	03/30/2016	19.1	20.5	0.050	1120	3914	3.630	78.700	72.600	-7.75%
D	5600	HEAD	03/30/2016	19.1	20.5	0.050	1120	3914	3.940	82.300	78.800	-4.25%
D	5750	HEAD	03/30/2016	19.1	20.5	0.050	1120	3914	3.600	79.100	72.000	-8.98%
K	750	BODY	03/26/2016	23.8	21.5	0.200	1046	3022	1.730	8.770	8.650	-1.37%
G	835	BODY	03/22/2016	23.9	23.0	0.200	4d119	3334	1.860	9.200	9.300	1.09%
D	835	BODY	03/28/2016	21.5	21.6	0.200	4d119	3213	1.990	9.200	9.950	8.15%
C	1750	BODY	03/24/2016	24.3	23.5	0.100	1008	3288	3.680	38.000	36.800	-3.16%
A	1900	BODY	03/23/2016	22.8	22.5	0.100	5d141	3332	4.120	40.000	41.200	3.00%
E	2300	BODY	03/22/2016	23.5	22.0	0.100	1064	3351	4.680	45.500	46.800	2.86%
G	2300	BODY	04/04/2016	23.9	22.6	0.100	1064	3334	4.230	45.500	42.300	-7.03%
E	2450	BODY	03/22/2016	23.5	22.0	0.100	719	3351	5.310	51.900	53.100	2.31%
E	2600	BODY	03/22/2016	23.5	22.0	0.100	1004	3351	5.580	56.200	55.800	-0.71%
K	2600	BODY	04/11/2016	24.0	23.4	0.100	1071	3022	5.720	54.900	57.200	4.19%
J	5250	BODY	03/24/2016	21.6	22.2	0.050	1120	7308	3.580	75.600	71.600	-5.29%
J	5600	BODY	03/24/2016	21.6	22.2	0.050	1120	7308	3.720	80.800	74.400	-7.92%
J	5750	BODY	03/24/2016	21.6	22.2	0.050	1120	7308	3.510	76.500	70.200	-8.24%

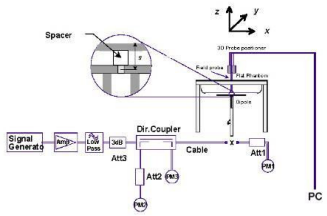

Figure 10-1
System Verification Setup Diagram

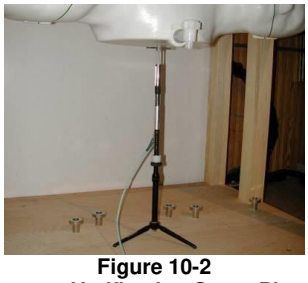

Figure 10-2
System Verification Setup Photo

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11 SAR DATA SUMMARY

11.1 Standalone Head SAR Data

Table 11-1
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	# of Time Slots	Duty Cycle	SAR (1g)	Scaling Factor	Reported SAR (1g)	Plot #
MHz	Ch.											(W/kg)		(W/kg)	
836.60	190	GSM 850	GSM	33.7	32.68	-0.05	Right	Cheek	18253	1	1:8.3	0.201	1.265	0.254	
836.60	190	GSM 850	GSM	33.7	32.68	0.06	Right	Tilt	18253	1	1:8.3	0.130	1.265	0.164	
836.60	190	GSM 850	GSM	33.7	32.68	0.04	Left	Cheek	18253	1	1:8.3	0.274	1.265	0.347	A1
836.60	190	GSM 850	GSM	33.7	32.68	-0.04	Left	Tilt	18253	1	1:8.3	0.157	1.265	0.199	
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 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	# of Time Slots	Duty Cycle	SAR (1g)	Scaling Factor	Reported SAR (1g)	Plot #
MHz	Ch.											(W/kg)		(W/kg)	
1880.00	661	GSM 1900	GSM	30.5	30.18	-0.05	Right	Cheek	18196	1	1:8.3	0.169	1.076	0.182	
1880.00	661	GSM 1900	GSM	30.5	30.18	-0.08	Right	Tilt	18196	1	1:8.3	0.144	1.076	0.155	
1880.00	661	GSM 1900	GSM	30.5	30.18	-0.07	Left	Cheek	18196	1	1:8.3	0.333	1.076	0.358	A2
1880.00	661	GSM 1900	GSM	30.5	30.18	0.01	Left	Tilt	18196	1	1:8.3	0.114	1.076	0.123	
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 11-3
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	25.0	24.08	0.02	Right	Cheek	18253	1:1	0.249	1.236	0.308		
836.60	4183	UMTS 850	RMC	25.0	24.08	-0.03	Right	Tilt	18253	1:1	0.143	1.236	0.177		
836.60	4183	UMTS 850	RMC	25.0	24.08	0.04	Left	Cheek	18253	1:1	0.271	1.236	0.335	A3	
836.60	4183	UMTS 850	RMC	25.0	24.08	0.02	Left	Tilt	18253	1:1	0.166	1.236	0.205		
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 11-4
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	24.5	23.84	-0.10	Right	Cheek	18196	1:1	0.398	1.164	0.463	
1732.40	1412	UMTS 1750	RMC	24.5	23.84	0.12	Right	Tilt	18196	1:1	0.401	1.164	0.467	
1712.40	1312	UMTS 1750	RMC	24.5	23.82	0.03	Left	Cheek	18196	1:1	0.673	1.169	0.787	
1732.40	1412	UMTS 1750	RMC	24.5	23.84	0.20	Left	Cheek	18196	1:1	0.731	1.164	0.851	
1752.60	1513	UMTS 1750	RMC	24.5	24.24	0.08	Left	Cheek	18196	1:1	0.869	1.062	**0.923**	A4
1732.40	1412	UMTS 1750	RMC	24.5	23.84	0.03	Left	Tilt	18196	1:1	0.298	1.164	0.347	
1752.60	1513	UMTS 1750	RMC	24.5	24.24	0.09	Left	Cheek	18196	1:1	0.766	1.062	0.813	
ANSI / IEEE C95.1 1992 - SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population							Head 1.6 W/kg (mW/g) averaged over 1 gram							

Note: blue entry represents variability measurement.

Table 11-5
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	24.5	24.02	-0.14	Right	Cheek	18196	1:1	0.440	1.117	0.491	
1880.00	9400	UMTS 1900	RMC	24.5	24.02	-0.03	Right	Tilt	18196	1:1	0.313	1.117	0.350	
1852.40	9262	UMTS 1900	RMC	24.5	24.22	-0.06	Left	Cheek	18196	1:1	0.844	1.067	0.901	
1880.00	9400	UMTS 1900	RMC	24.5	24.02	-0.02	Left	Cheek	18196	1:1	0.720	1.117	0.804	
1907.60	9538	UMTS 1900	RMC	24.5	23.97	0.08	Left	Cheek	18196	1:1	0.650	1.130	0.735	
1880.00	9400	UMTS 1900	RMC	24.5	24.02	0.04	Left	Tilt	18196	1:1	0.243	1.117	0.271	
1852.40	9262	UMTS 1900	RMC	24.5	24.22	-0.06	Left	Cheek	18196	1:1	0.846	1.067	0.903	A5
ANSI / IEEE C95.1 1992 - SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population							Head 1.6 W/kg (mW/g) averaged over 1 gram							

Note: blue entry represents variability measurement.

Table 11-6
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	25.0	24.98	0.14	0	Right	Cheek	QPSK	1	25	18253	1:1	0.246	1.005	0.247	
707.50	23095	Mid	LTE Band 12	10	24.0	24.00	0.02	1	Right	Cheek	QPSK	25	12	18253	1:1	0.185	1.000	0.185	
707.50	23095	Mid	LTE Band 12	10	25.0	24.98	-0.01	0	Right	Tilt	QPSK	1	25	18253	1:1	0.171	1.005	0.172	
707.50	23095	Mid	LTE Band 12	10	24.0	24.00	0.05	1	Right	Tilt	QPSK	25	12	18253	1:1	0.141	1.000	0.141	
707.50	23095	Mid	LTE Band 12	10	25.0	24.98	0.04	0	Left	Cheek	QPSK	1	25	18253	1:1	0.275	1.005	0.276	A6
707.50	23095	Mid	LTE Band 12	10	24.0	24.00	0.00	1	Left	Cheek	QPSK	25	12	18253	1:1	0.221	1.000	0.221	
707.50	23095	Mid	LTE Band 12	10	25.0	24.98	-0.03	0	Left	Tilt	QPSK	1	25	18253	1:1	0.157	1.005	0.158	
707.50	23095	Mid	LTE Band 12	10	24.0	24.00	0.03	1	Left	Tilt	QPSK	25	12	18253	1:1	0.126	1.000	0.126	
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 11-7
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	25.0	24.55	0.01	0	Right	Cheek	QPSK	1	0	18253	1:1	0.278	1.109	0.308	
836.50	20525	Mid	LTE Band 5 (Cell)	10	24.0	23.44	0.01	1	Right	Cheek	QPSK	25	0	18253	1:1	0.238	1.138	0.271	
836.50	20525	Mid	LTE Band 5 (Cell)	10	25.0	24.55	0.01	0	Right	Tilt	QPSK	1	0	18253	1:1	0.184	1.109	0.204	
836.50	20525	Mid	LTE Band 5 (Cell)	10	24.0	23.44	-0.02	1	Right	Tilt	QPSK	25	0	18253	1:1	0.154	1.138	0.175	
836.50	20525	Mid	LTE Band 5 (Cell)	10	25.0	24.55	0.01	0	Left	Cheek	QPSK	1	0	18253	1:1	0.322	1.109	0.357	A7
836.50	20525	Mid	LTE Band 5 (Cell)	10	24.0	23.44	0.01	1	Left	Cheek	QPSK	25	0	18253	1:1	0.263	1.138	0.299	
836.50	20525	Mid	LTE Band 5 (Cell)	10	25.0	24.55	0.03	0	Left	Tilt	QPSK	1	0	18253	1:1	0.217	1.109	0.241	
836.50	20525	Mid	LTE Band 5 (Cell)	10	24.0	23.44	-0.05	1	Left	Tilt	QPSK	25	0	18253	1:1	0.172	1.138	0.196	
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 4 (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)	
1732.50	20175	Mid	LTE Band 4 (AWS)	20	25.0	24.23	-0.02	0	Right	Cheek	QPSK	1	99	18196	1:1	0.364	1.194	0.435	
1732.50	20175	Mid	LTE Band 4 (AWS)	20	24.0	23.22	-0.01	1	Right	Cheek	QPSK	50	50	18196	1:1	0.289	1.197	0.346	
1732.50	20175	Mid	LTE Band 4 (AWS)	20	25.0	24.23	0.05	0	Right	Tilt	QPSK	1	99	18196	1:1	0.406	1.194	0.485	
1732.50	20175	Mid	LTE Band 4 (AWS)	20	24.0	23.22	0.05	1	Right	Tilt	QPSK	50	50	18196	1:1	0.317	1.197	0.379	
1732.50	20175	Mid	LTE Band 4 (AWS)	20	25.0	24.23	0.07	0	Left	Cheek	QPSK	1	99	18196	1:1	0.716	1.194	0.855	A8
1732.50	20175	Mid	LTE Band 4 (AWS)	20	24.0	23.22	-0.10	1	Left	Cheek	QPSK	50	50	18196	1:1	0.562	1.197	0.673	
1732.50	20175	Mid	LTE Band 4 (AWS)	20	24.0	23.07	-0.05	1	Left	Cheek	QPSK	100	0	18196	1:1	0.567	1.239	0.703	
1732.50	20175	Mid	LTE Band 4 (AWS)	20	25.0	24.23	-0.01	0	Left	Tilt	QPSK	1	99	18196	1:1	0.342	1.194	0.408	
1732.50	20175	Mid	LTE Band 4 (AWS)	20	24.0	23.22	0.04	1	Left	Tilt	QPSK	50	50	18196	1:1	0.239	1.197	0.286	
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 11-9
LTE Band 2 (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)	
1900.00	19100	High	LTE Band 2 (PCS)	20	24.5	24.49	-0.12	0	Right	Cheek	QPSK	1	99	18196	1:1	0.344	1.002	0.345	
1900.00	19100	High	LTE Band 2 (PCS)	20	23.5	23.19	0.00	1	Right	Cheek	QPSK	50	50	18196	1:1	0.260	1.074	0.279	
1900.00	19100	High	LTE Band 2 (PCS)	20	24.5	24.49	0.03	0	Right	Tilt	QPSK	1	99	18196	1:1	0.307	1.002	0.308	
1900.00	19100	High	LTE Band 2 (PCS)	20	23.5	23.19	0.02	1	Right	Tilt	QPSK	50	50	18196	1:1	0.234	1.074	0.251	
1900.00	19100	High	LTE Band 2 (PCS)	20	24.5	24.49	0.05	0	Left	Cheek	QPSK	1	99	18196	1:1	0.675	1.002	0.676	A9
1900.00	19100	High	LTE Band 2 (PCS)	20	23.5	23.19	0.01	1	Left	Cheek	QPSK	50	50	18196	1:1	0.529	1.074	0.568	
1900.00	19100	High	LTE Band 2 (PCS)	20	24.5	24.49	0.00	0	Left	Tilt	QPSK	1	99	18196	1:1	0.287	1.002	0.288	
1900.00	19100	High	LTE Band 2 (PCS)	20	23.5	23.19	0.02	1	Left	Tilt	QPSK	50	50	18196	1:1	0.209	1.074	0.224	
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 11-10
LTE Band 30 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)	
2310.00	27710	Mid	LTE Band 30	10	23.0	22.79	-0.02	0	Right	Cheek	QPSK	1	0	19012	1:1	0.368	1.050	0.386	
2310.00	27710	Mid	LTE Band 30	10	22.0	21.69	-0.01	1	Right	Cheek	QPSK	25	0	19012	1:1	0.370	1.074	0.397	A10
2310.00	27710	Mid	LTE Band 30	10	23.0	22.79	0.05	0	Right	Tilt	QPSK	1	0	19012	1:1	0.113	1.050	0.119	
2310.00	27710	Mid	LTE Band 30	10	22.0	21.69	0.04	1	Right	Tilt	QPSK	25	0	19012	1:1	0.093	1.074	0.100	
2310.00	27710	Mid	LTE Band 30	10	23.0	22.79	0.04	0	Left	Cheek	QPSK	1	0	19012	1:1	0.226	1.050	0.237	
2310.00	27710	Mid	LTE Band 30	10	22.0	21.69	0.08	1	Left	Cheek	QPSK	25	0	19012	1:1	0.184	1.074	0.198	
2310.00	27710	Mid	LTE Band 30	10	23.0	22.79	0.09	0	Left	Tilt	QPSK	1	0	19012	1:1	0.133	1.050	0.140	
2310.00	27710	Mid	LTE Band 30	10	22.0	21.69	0.03	1	Left	Tilt	QPSK	25	0	19012	1:1	0.104	1.074	0.112	
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 41 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)	
2593.00	40620	Mid	LTE Band 41	20	23.5	23.42	0.06	0	Right	Cheek	QPSK	1	0	18196	1:1.58	0.078	1.019	0.079	A11
2593.00	40620	Mid	LTE Band 41	20	22.5	22.19	0.09	1	Right	Cheek	QPSK	50	0	18196	1:1.58	0.055	1.074	0.059	
2593.00	40620	Mid	LTE Band 41	20	23.5	23.42	0.13	0	Right	Tilt	QPSK	1	0	18196	1:1.58	0.029	1.019	0.030	
2593.00	40620	Mid	LTE Band 41	20	22.5	22.19	0.03	1	Right	Tilt	QPSK	50	0	18196	1:1.58	0.020	1.074	0.021	
2593.00	40620	Mid	LTE Band 41	20	23.5	23.42	0.02	0	Left	Cheek	QPSK	1	0	18196	1:1.58	0.052	1.019	0.053	
2593.00	40620	Mid	LTE Band 41	20	22.5	22.19	0.03	1	Left	Cheek	QPSK	50	0	18196	1:1.58	0.036	1.074	0.039	
2593.00	40620	Mid	LTE Band 41	20	23.5	23.42	0.07	0	Left	Tilt	QPSK	1	0	18196	1:1.58	0.051	1.019	0.052	
2593.00	40620	Mid	LTE Band 41	20	22.5	22.19	0.01	1	Left	Tilt	QPSK	50	0	18196	1:1.58	0.034	1.074	0.037	
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 11-12
DTS 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)	
2462	11	802.11b	DSSS	22	13.5	11.82	0.08	Right	Cheek	1	18204	1	99.8	0.282	0.218	1.472	1.002	**0.322**	A12
2462	11	802.11b	DSSS	22	13.5	11.82	-0.05	Right	Tilt	1	18204	1	99.8	0.263	0.178	1.472	1.002	0.263	
2462	11	802.11b	DSSS	22	13.5	11.82	0.05	Left	Cheek	1	18204	1	99.8	0.189	0.144	1.472	1.002	0.212	
2462	11	802.11b	DSSS	22	13.5	11.82	0.08	Left	Tilt	1	18204	1	99.8	0.168	0.133	1.472	1.002	0.196	
2437	6	802.11b	DSSS	22	13.5	12.12	0.08	Right	Cheek	2	18204	1	99.9	0.231	0.158	1.374	1.001	0.217	
2437	6	802.11b	DSSS	22	13.5	12.12	0.00	Right	Tilt	2	18204	1	99.9	0.048	0.036	1.374	1.001	0.049	
2437	6	802.11b	DSSS	22	13.5	12.12	0.01	Left	Cheek	2	18204	1	99.9	0.090	0.079	1.374	1.001	0.109	
2437	6	802.11b	DSSS	22	13.5	12.12	0.00	Left	Tilt	2	18204	1	99.9	0.016	0.014	1.374	1.001	0.019	
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 11-13
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	7.5	6.52	0.01	Right	Cheek	1	18204	29.3	94.1	0.243	-	1.253	1.063	-	
5290	58	802.11ac	OFDM	80	7.5	6.52	0.08	Right	Tilt	1	18204	29.3	94.1	0.211	-	1.253	1.063	-	
5290	58	802.11ac	OFDM	80	7.5	6.52	0.03	Left	Cheek	1	18204	29.3	94.1	0.318	0.150	1.253	1.063	0.200	
5290	58	802.11ac	OFDM	80	7.5	6.52	0.09	Left	Tilt	1	18204	29.3	94.1	0.297	-	1.253	1.063	-	
5290	58	802.11ac	OFDM	80	7.5	6.61	0.02	Right	Cheek	2	18204	29.3	93.9	0.320	0.176	1.227	1.065	**0.230**	A13
5290	58	802.11ac	OFDM	80	7.5	6.61	0.04	Right	Tilt	2	18204	29.3	93.9	0.204	-	1.227	1.065	-	
5290	58	802.11ac	OFDM	80	7.5	6.61	0.03	Left	Cheek	2	18204	29.3	93.9	0.143	0.064	1.227	1.065	0.084	
5290	58	802.11ac	OFDM	80	7.5	6.61	0.04	Left	Tilt	2	18204	29.3	93.9	0.135	-	1.227	1.065	-	
5690	138	802.11ac	OFDM	80	7.5	7.17	0.03	Right	Cheek	1	18204	29.3	94.1	0.279	-	1.079	1.063	-	
5690	138	802.11ac	OFDM	80	7.5	7.17	0.12	Right	Tilt	1	18204	29.3	94.1	0.280	-	1.079	1.063	-	
5690	138	802.11ac	OFDM	80	7.5	7.17	0.04	Left	Cheek	1	18204	29.3	94.1	0.420	0.172	1.079	1.063	0.198	
5690	138	802.11ac	OFDM	80	7.5	7.17	0.06	Left	Tilt	1	18204	29.3	94.1	0.295	-	1.079	1.063	-	
5610	122	802.11ac	OFDM	80	7.5	6.72	-0.07	Right	Cheek	2	18204	29.3	93.9	0.274	0.148	1.197	1.065	0.189	
5610	122	802.11ac	OFDM	80	7.5	6.72	0.08	Right	Tilt	2	18204	29.3	93.9	0.207	-	1.197	1.065	-	
5610	122	802.11ac	OFDM	80	7.5	6.72	0.05	Left	Cheek	2	18204	29.3	93.9	0.164	0.068	1.197	1.065	0.086	
5610	122	802.11ac	OFDM	80	7.5	6.72	0.04	Left	Tilt	2	18204	29.3	93.9	0.147	-	1.197	1.065	-	
5775	155	802.11ac	OFDM	80	7.5	6.43	0.11	Right	Cheek	1	18204	29.3	94.1	0.245	-	1.279	1.063	-	
5775	155	802.11ac	OFDM	80	7.5	6.43	0.12	Right	Tilt	1	18204	29.3	94.1	0.202	-	1.279	1.063	-	
5775	155	802.11ac	OFDM	80	7.5	6.43	0.05	Left	Cheek	1	18204	29.3	94.1	0.390	0.160	1.279	1.063	0.218	
5775	155	802.11ac	OFDM	80	7.5	6.43	0.09	Left	Tilt	1	18204	29.3	94.1	0.262	-	1.279	1.063	-	
5775	155	802.11ac	OFDM	80	7.5	6.80	0.16	Right	Cheek	2	18204	29.3	93.9	0.202	0.139	1.175	1.065	0.174	
5775	155	802.11ac	OFDM	80	7.5	6.80	0.03	Right	Tilt	2	18204	29.3	93.9	0.196	-	1.175	1.065	-	
5775	155	802.11ac	OFDM	80	7.5	6.80	0.08	Left	Cheek	2	18204	29.3	93.9	0.134	0.047	1.175	1.065	0.059	
5775	155	802.11ac	OFDM	80	7.5	6.80	0.06	Left	Tilt	2	18204	29.3	93.9	0.135	-	1.175	1.065	-	
ANSI / IEEE C95.1 1992 - SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population						Head 1.6 W/kg (mW/g) averaged over 1 gram													

11.2 Standalone Body-Worn SAR Data

Table 11-14
GSM/UMTS Body-Worn SAR Data

MEASUREMENT RESULTS															
FREQUENCY		Mode	Service	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Power Drift [dB]	Spacing	Device Serial Number	# of Time Slots	Duty Cycle	Side	SAR (1g)	Scaling Factor	Reported SAR (1g)	Plot #
MHz	Ch.											(W/kg)		(W/kg)	
836.60	190	GSM 850	GSM	33.7	32.68	-0.10	15 mm	18253	1	1:8.3	back	0.299	1.265	0.378	A14
1880.00	661	GSM 1900	GSM	30.5	30.18	-0.03	15 mm	18196	1	1:8.3	back	0.292	1.076	0.314	A16
836.60	4183	UMTS 850	RMC	25.0	24.08	0.00	15 mm	18253	N/A	1:1	back	0.346	1.236	0.428	A18
1732.40	1412	UMTS 1750	RMC	24.5	23.84	0.00	15 mm	18196	N/A	1:1	back	0.528	1.164	0.615	A20
1880.00	9400	UMTS 1900	RMC	24.5	24.02	-0.07	15 mm	18196	N/A	1:1	back	0.672	1.117	**0.751**	A22
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 11-15
LTE 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	25.0	24.98	-0.01	0	18253	QPSK	1	25	15 mm	back	1:1	0.456	1.005	0.458	A24
707.50	23095	Mid	LTE Band 12	10	24.0	24.00	0.02	1	18253	QPSK	25	12	15 mm	back	1:1	0.366	1.000	0.366	
836.50	20525	Mid	LTE Band 5 (Cell)	10	25.0	24.55	-0.05	0	18253	QPSK	1	0	15 mm	back	1:1	0.439	1.109	0.487	A26
836.50	20525	Mid	LTE Band 5 (Cell)	10	24.0	23.44	0.00	1	18253	QPSK	25	0	15 mm	back	1:1	0.343	1.138	0.390	
1732.50	20175	Mid	LTE Band 4 (AWS)	20	25.0	24.23	0.03	0	18196	QPSK	1	99	15 mm	back	1:1	0.562	1.194	0.671	A28
1732.50	20175	Mid	LTE Band 4 (AWS)	20	24.0	23.22	0.02	1	18196	QPSK	50	50	15 mm	back	1:1	0.433	1.197	0.518	
1900.00	19100	High	LTE Band 2 (PCS)	20	24.5	24.49	0.08	0	18196	QPSK	1	99	15 mm	back	1:1	0.599	1.002	0.600	A30
1900.00	19100	High	LTE Band 2 (PCS)	20	23.5	23.19	0.01	1	18196	QPSK	50	50	15 mm	back	1:1	0.480	1.074	0.516	
2310.00	27710	Mid	LTE Band 30	10	23.0	22.79	-0.02	0	18196	QPSK	1	0	15 mm	back	1:1	0.594	1.050	0.624	A32
2310.00	27710	Mid	LTE Band 30	10	22.0	21.69	0.00	1	18196	QPSK	25	0	15 mm	back	1:1	0.452	1.074	0.485	
2593.00	40620	Mid	LTE Band 41	20	23.5	23.42	-0.19	0	18196	QPSK	1	0	15 mm	back	1:1.58	0.067	1.019	0.068	A34
2593.00	40620	Mid	LTE Band 41	20	22.5	22.19	0.02	1	18196	QPSK	50	0	15 mm	back	1:1.58	0.048	1.074	0.052	
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 11-16
DTS 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	SAR (1g)	Scaling Factor (Power)	Scaling Factor (Duty Cycle)	Reported SAR (1g)	Plot #
MHz	Ch.													W/kg	(W/kg)			(W/kg)	
2437	6	802.11b	DSSS	22	19.5	19.11	0.00	10 mm	1	18204	1	back	99.8	0.403	0.344	1.094	1.002	**0.377**	A36
2437	6	802.11b	DSSS	22	19.5	18.71	0.16	10 mm	2	18204	1	back	99.9	0.338	0.261	1.199	1.001	0.313	
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 11-17
NII 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	SAR (1g)	Scaling Factor (Power)	Scaling Factor (Duty Cycle)	Reported SAR (1g)	Plot #
MHz	Ch.													W/kg	(W/kg)			(W/kg)	
5280	56	802.11a	OFDM	20	16.5	16.45	0.12	10 mm	1	18204	6	back	98.5	1.016	0.468	1.012	1.015	**0.481**	A37
5260	52	802.11a	OFDM	20	16.5	16.47	0.03	10 mm	2	18204	6	back	98.5	0.357	0.147	1.007	1.015	0.150	
5600	120	802.11a	OFDM	20	16.5	16.21	0.20	10 mm	1	18204	6	back	98.5	0.721	0.319	1.069	1.015	0.346	
5720	144	802.11a	OFDM	20	16.5	16.49	0.06	10 mm	2	18204	6	back	98.5	0.313	0.126	1.002	1.015	0.128	
5785	157	802.11a	OFDM	20	16.5	16.20	0.05	10 mm	1	18204	6	back	98.5	0.547	0.228	1.072	1.015	0.248	
5745	149	802.11a	OFDM	20	16.5	16.22	0.05	10 mm	2	18204	6	back	98.5	0.298	0.121	1.067	1.015	0.131	
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 11-18
GPRS/UMTS 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)	
836.60	190	GSM 850	GPRS	32.0	31.42	0.02	10 mm	18253	2	1:4.15	back	0.387	1.143	0.442	
836.60	190	GSM 850	GPRS	32.0	31.42	0.09	10 mm	18253	2	1:4.15	front	0.312	1.143	0.357	
836.60	190	GSM 850	GPRS	32.0	31.42	-0.08	10 mm	18253	2	1:4.15	bottom	0.140	1.143	0.160	
836.60	190	GSM 850	GPRS	32.0	31.42	0.00	10 mm	18253	2	1:4.15	right	0.263	1.143	0.301	
836.60	190	GSM 850	GPRS	32.0	31.42	-0.08	10 mm	18253	2	1:4.15	left	0.565	1.143	0.646	A15
1880.00	661	GSM 1900	GPRS	26.5	26.09	0.02	10 mm	18170	2	1:4.15	back	0.534	1.099	0.587	A17
1880.00	661	GSM 1900	GPRS	26.5	26.09	0.03	10 mm	18170	2	1:4.15	front	0.473	1.099	0.520	
1880.00	661	GSM 1900	GPRS	26.5	26.09	0.09	10 mm	18170	2	1:4.15	bottom	0.392	1.099	0.431	
1880.00	661	GSM 1900	GPRS	26.5	26.09	0.02	10 mm	18170	2	1:4.15	right	0.073	1.099	0.080	
1880.00	661	GSM 1900	GPRS	26.5	26.09	-0.05	10 mm	18170	2	1:4.15	left	0.326	1.099	0.358	
836.60	4183	UMTS 850	RMC	25.0	24.08	-0.02	10 mm	18253	N/A	1:1	back	0.401	1.236	0.496	
836.60	4183	UMTS 850	RMC	25.0	24.08	0.05	10 mm	18253	N/A	1:1	front	0.332	1.236	0.410	
836.60	4183	UMTS 850	RMC	25.0	24.08	0.00	10 mm	18253	N/A	1:1	bottom	0.101	1.236	0.125	
836.60	4183	UMTS 850	RMC	25.0	24.08	-0.01	10 mm	18253	N/A	1:1	right	0.347	1.236	0.429	
836.60	4183	UMTS 850	RMC	25.0	24.08	0.08	10 mm	18253	N/A	1:1	left	0.525	1.236	0.649	A19
1732.40	1412	UMTS 1750	RMC	21.5	21.35	0.04	10 mm	18246	N/A	1:1	back	0.534	1.035	0.553	A21
1732.40	1412	UMTS 1750	RMC	21.5	21.35	0.01	10 mm	18246	N/A	1:1	front	0.524	1.035	0.542	
1732.40	1412	UMTS 1750	RMC	21.5	21.35	0.05	10 mm	18246	N/A	1:1	bottom	0.367	1.035	0.380	
1732.40	1412	UMTS 1750	RMC	21.5	21.35	0.03	10 mm	18246	N/A	1:1	right	0.053	1.035	0.055	
1732.40	1412	UMTS 1750	RMC	21.5	21.35	0.04	10 mm	18246	N/A	1:1	left	0.269	1.035	0.278	
1880.00	9400	UMTS 1900	RMC	21.5	20.86	-0.06	10 mm	18170	N/A	1:1	back	0.490	1.159	0.568	A23
1880.00	9400	UMTS 1900	RMC	21.5	20.86	0.02	10 mm	18170	N/A	1:1	front	0.413	1.159	0.479	
1880.00	9400	UMTS 1900	RMC	21.5	20.86	0.03	10 mm	18170	N/A	1:1	bottom	0.282	1.159	0.327	
1880.00	9400	UMTS 1900	RMC	21.5	20.86	-0.01	10 mm	18170	N/A	1:1	right	0.054	1.159	0.063	
1880.00	9400	UMTS 1900	RMC	21.5	20.86	-0.06	10 mm	18170	N/A	1:1	left	0.349	1.159	0.404	
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 11-19
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	25.0	24.98	0.04	0	18253	QPSK	1	25	10 mm	back	1:1	0.520	1.005	0.523	
707.50	23095	Mid	LTE Band 12	10	24.0	24.00	0.01	1	18253	QPSK	25	12	10 mm	back	1:1	0.418	1.000	0.418	
707.50	23095	Mid	LTE Band 12	10	25.0	24.98	-0.06	0	18253	QPSK	1	25	10 mm	front	1:1	0.412	1.005	0.414	
707.50	23095	Mid	LTE Band 12	10	24.0	24.00	0.07	1	18253	QPSK	25	12	10 mm	front	1:1	0.333	1.000	0.333	
707.50	23095	Mid	LTE Band 12	10	25.0	24.98	0.08	0	18253	QPSK	1	25	10 mm	bottom	1:1	0.101	1.005	0.102	
707.50	23095	Mid	LTE Band 12	10	24.0	24.00	-0.09	1	18253	QPSK	25	12	10 mm	bottom	1:1	0.082	1.000	0.082	
707.50	23095	Mid	LTE Band 12	10	25.0	24.98	0.04	0	18253	QPSK	1	25	10 mm	right	1:1	0.265	1.005	0.266	
707.50	23095	Mid	LTE Band 12	10	24.0	24.00	-0.04	1	18253	QPSK	25	12	10 mm	right	1:1	0.215	1.000	0.215	
707.50	23095	Mid	LTE Band 12	10	25.0	24.98	-0.01	0	18253	QPSK	1	25	10 mm	left	1:1	0.544	1.005	0.547	A25
707.50	23095	Mid	LTE Band 12	10	24.0	24.00	0.00	1	18253	QPSK	25	12	10 mm	left	1:1	0.444	1.000	0.444	

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 11-20
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	25.0	24.55	0.01	0	18253	QPSK	1	0	10 mm	back	1:1	0.480	1.109	0.532	
836.50	20525	Mid	LTE Band 5 (Cell)	10	24.0	23.44	0.20	1	18253	QPSK	25	0	10 mm	back	1:1	0.368	1.138	0.419	
836.50	20525	Mid	LTE Band 5 (Cell)	10	25.0	24.55	0.05	0	18253	QPSK	1	0	10 mm	front	1:1	0.364	1.109	0.404	
836.50	20525	Mid	LTE Band 5 (Cell)	10	24.0	23.44	0.01	1	18253	QPSK	25	0	10 mm	front	1:1	0.361	1.138	0.411	
836.50	20525	Mid	LTE Band 5 (Cell)	10	25.0	24.55	0.04	0	18253	QPSK	1	0	10 mm	bottom	1:1	0.073	1.109	0.081	
836.50	20525	Mid	LTE Band 5 (Cell)	10	24.0	23.44	0.04	1	18253	QPSK	25	0	10 mm	bottom	1:1	0.075	1.138	0.085	
836.50	20525	Mid	LTE Band 5 (Cell)	10	25.0	24.55	0.04	0	18253	QPSK	1	0	10 mm	right	1:1	0.312	1.109	0.346	
836.50	20525	Mid	LTE Band 5 (Cell)	10	24.0	23.44	-0.02	1	18253	QPSK	25	0	10 mm	right	1:1	0.248	1.138	0.282	
836.50	20525	Mid	LTE Band 5 (Cell)	10	25.0	24.55	-0.12	0	18253	QPSK	1	0	10 mm	left	1:1	0.491	1.109	0.545	A27
836.50	20525	Mid	LTE Band 5 (Cell)	10	24.0	23.44	0.11	1	18253	QPSK	25	0	10 mm	left	1:1	0.395	1.138	0.450	

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
LTE Band 4 (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)	
1732.50	20175	Mid	LTE Band 4 (AWS)	20	22.0	21.00	-0.01	0	18246	QPSK	1	99	10 mm	back	1:1	0.538	1.259	0.677	A29
1732.50	20175	Mid	LTE Band 4 (AWS)	20	21.0	19.93	0.00	1	18246	QPSK	50	50	10 mm	back	1:1	0.406	1.279	0.519	
1732.50	20175	Mid	LTE Band 4 (AWS)	20	22.0	21.00	0.07	0	18246	QPSK	1	99	10 mm	front	1:1	0.454	1.259	0.572	
1732.50	20175	Mid	LTE Band 4 (AWS)	20	21.0	19.93	0.00	1	18246	QPSK	50	50	10 mm	front	1:1	0.352	1.279	0.450	
1732.50	20175	Mid	LTE Band 4 (AWS)	20	22.0	21.00	0.00	0	18246	QPSK	1	99	10 mm	bottom	1:1	0.326	1.259	0.410	
1732.50	20175	Mid	LTE Band 4 (AWS)	20	21.0	19.93	-0.01	1	18246	QPSK	50	50	10 mm	bottom	1:1	0.248	1.279	0.317	
1732.50	20175	Mid	LTE Band 4 (AWS)	20	22.0	21.00	0.02	0	18246	QPSK	1	99	10 mm	right	1:1	0.048	1.259	0.060	
1732.50	20175	Mid	LTE Band 4 (AWS)	20	21.0	19.93	-0.03	1	18246	QPSK	50	50	10 mm	right	1:1	0.045	1.279	0.058	
1732.50	20175	Mid	LTE Band 4 (AWS)	20	22.0	21.00	0.01	0	18246	QPSK	1	99	10 mm	left	1:1	0.251	1.259	0.316	
1732.50	20175	Mid	LTE Band 4 (AWS)	20	21.0	19.93	0.01	1	18246	QPSK	50	50	10 mm	left	1:1	0.194	1.279	0.248	

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 11-22
LTE Band 2 (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)	
1900.00	19100	High	LTE Band 2 (PCS)	20	21.5	21.00	0.01	0	18170	QPSK	1	99	10 mm	back	1:1	0.503	1.122	0.564	A31
1900.00	19100	High	LTE Band 2 (PCS)	20	20.5	19.93	0.02	1	18170	QPSK	50	50	10 mm	back	1:1	0.396	1.140	0.451	
1900.00	19100	High	LTE Band 2 (PCS)	20	21.5	21.00	-0.03	0	18170	QPSK	1	99	10 mm	front	1:1	0.406	1.122	0.456	
1900.00	19100	High	LTE Band 2 (PCS)	20	20.5	19.93	-0.03	1	18170	QPSK	50	50	10 mm	front	1:1	0.315	1.140	0.359	
1900.00	19100	High	LTE Band 2 (PCS)	20	21.5	21.00	-0.05	0	18170	QPSK	1	99	10 mm	bottom	1:1	0.291	1.122	0.327	
1900.00	19100	High	LTE Band 2 (PCS)	20	20.5	19.93	0.00	1	18170	QPSK	50	50	10 mm	bottom	1:1	0.218	1.140	0.249	
1900.00	19100	High	LTE Band 2 (PCS)	20	21.5	21.00	0.09	0	18170	QPSK	1	99	10 mm	right	1:1	0.054	1.122	0.061	
1900.00	19100	High	LTE Band 2 (PCS)	20	20.5	19.93	0.12	1	18170	QPSK	50	50	10 mm	right	1:1	0.042	1.140	0.048	
1900.00	19100	High	LTE Band 2 (PCS)	20	21.5	21.00	0.00	0	18170	QPSK	1	99	10 mm	left	1:1	0.285	1.122	0.320	
1900.00	19100	High	LTE Band 2 (PCS)	20	20.5	19.93	-0.03	1	18170	QPSK	50	50	10 mm	left	1:1	0.219	1.140	0.250	
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 11-23
LTE Band 30 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)	
2310.00	27710	Mid	LTE Band 30	10	21.5	21.07	-0.12	0	18246	QPSK	1	49	10 mm	back	1:1	0.697	1.104	0.769	
2310.00	27710	Mid	LTE Band 30	10	20.5	20.17	-0.02	1	18246	QPSK	25	0	10 mm	back	1:1	0.764	1.079	0.824	
2310.00	27710	Mid	LTE Band 30	10	20.5	20.10	-0.03	1	18246	QPSK	50	0	10 mm	back	1:1	0.777	1.096	0.852	
2310.00	27710	Mid	LTE Band 30	10	21.5	21.07	0.01	0	18246	QPSK	1	49	10 mm	front	1:1	0.690	1.104	0.762	
2310.00	27710	Mid	LTE Band 30	10	20.5	20.17	-0.01	1	18246	QPSK	25	0	10 mm	front	1:1	0.700	1.079	0.755	
2310.00	27710	Mid	LTE Band 30	10	21.5	21.07	-0.06	0	18246	QPSK	1	49	10 mm	bottom	1:1	0.345	1.104	0.381	
2310.00	27710	Mid	LTE Band 30	10	20.5	20.17	0.00	1	18246	QPSK	25	0	10 mm	bottom	1:1	0.395	1.079	0.426	
2310.00	27710	Mid	LTE Band 30	10	21.5	21.07	0.06	0	18246	QPSK	1	49	10 mm	right	1:1	0.644	1.104	0.711	
2310.00	27710	Mid	LTE Band 30	10	20.5	20.17	0.01	1	18246	QPSK	25	0	10 mm	right	1:1	0.744	1.079	0.803	
2310.00	27710	Mid	LTE Band 30	10	20.5	20.10	0.01	1	18246	QPSK	50	0	10 mm	right	1:1	0.837	1.096	**0.917**	A33
2310.00	27710	Mid	LTE Band 30	10	20.5	20.10	-0.03	1	18246	QPSK	50	0	10 mm	right	1:1	0.790	1.096	0.866	
ANSI / IEEE C95.1 1992 - SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population						Body 1.6 W/kg (mW/g) averaged over 1 gram													

Note: blue entry represents variability measurement.

Table 11-24
LTE Band 41 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)	
2593.00	40620	Mid	LTE Band 41	20	23.5	23.42	-0.05	0	18196	QPSK	1	0	10 mm	back	1:1.58	0.174	1.019	0.177	A35
2593.00	40620	Mid	LTE Band 41	20	22.5	22.19	-0.01	1	18196	QPSK	50	0	10 mm	back	1:1.58	0.123	1.074	0.132	
2593.00	40620	Mid	LTE Band 41	20	23.5	23.42	0.06	0	18196	QPSK	1	0	10 mm	front	1:1.58	0.132	1.019	0.135	
2593.00	40620	Mid	LTE Band 41	20	22.5	22.19	0.05	1	18196	QPSK	50	0	10 mm	front	1:1.58	0.094	1.074	0.101	
2593.00	40620	Mid	LTE Band 41	20	23.5	23.42	0.17	0	18196	QPSK	1	0	10 mm	bottom	1:1.58	0.066	1.019	0.067	
2593.00	40620	Mid	LTE Band 41	20	22.5	22.19	0.04	1	18196	QPSK	50	0	10 mm	bottom	1:1.58	0.048	1.074	0.052	
2593.00	40620	Mid	LTE Band 41	20	23.5	23.42	0.05	0	18196	QPSK	1	0	10 mm	right	1:1.58	0.143	1.019	0.146	
2593.00	40620	Mid	LTE Band 41	20	22.5	22.19	0.02	1	18196	QPSK	50	0	10 mm	right	1:1.58	0.099	1.074	0.106	
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 11-25
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)	
2437	6	802.11b	DSSS	22	19.5	19.11	0.00	10 mm	1	18204	1	back	99.8	0.403	0.344	1.094	1.002	**0.377**	A36
2437	6	802.11b	DSSS	22	19.5	19.11	0.16	10 mm	1	18204	1	front	99.8	0.341	-	1.094	1.002	-	
2437	6	802.11b	DSSS	22	19.5	19.11	-0.04	10 mm	1	18204	1	top	99.8	0.253	-	1.094	1.002	-	
2437	6	802.11b	DSSS	22	19.5	18.71	0.16	10 mm	2	18204	1	back	99.9	0.338	0.261	1.199	1.001	0.313	
2437	6	802.11b	DSSS	22	19.5	18.71	0.02	10 mm	2	18204	1	front	99.9	0.087	-	1.199	1.001	-	
2437	6	802.11b	DSSS	22	19.5	18.71	0.17	10 mm	2	18204	1	top	99.9	0.013	-	1.199	1.001	-	
2437	6	802.11b	DSSS	22	19.5	18.71	0.02	10 mm	2	18204	1	left	99.9	0.082	-	1.199	1.001	-	
5785	157	802.11a	OFDM	20	16.5	16.20	0.05	10 mm	1	18204	6	back	98.5	0.547	-	1.072	1.015	-	
5785	157	802.11a	OFDM	20	16.5	16.20	0.09	10 mm	1	18204	6	front	98.5	0.354	-	1.072	1.015	-	
5785	157	802.11a	OFDM	20	16.5	16.20	0.06	10 mm	1	18204	6	top	98.5	0.548	0.221	1.072	1.015	0.241	
5745	149	802.11a	OFDM	20	16.5	16.22	0.05	10 mm	2	18204	6	back	98.5	0.298	-	1.067	1.015	-	
5745	149	802.11a	OFDM	20	16.5	16.22	0.16	10 mm	2	18204	6	front	98.5	0.525	0.234	1.067	1.015	**0.254**	A38
5745	149	802.11a	OFDM	20	16.5	16.22	0.07	10 mm	2	18204	6	top	98.5	0.327	-	1.067	1.015	-	
5745	149	802.11a	OFDM	20	16.5	16.22	0.02	10 mm	2	18204	6	left	98.5	0.464	-	1.067	1.015	-	
ANSI / IEEE C95.1 1992 - SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population								Body 1.6 W/kg (mW/g) averaged over 1 gram											

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. The test data reported are the worst-case SAR values according to test procedures specified in FCC KDB Publication 616217 D04v01r02 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 865664 D01v01r04, variability SAR tests were performed when the measured SAR results for a frequency band were greater than or equal to 0.8 W/kg. Repeated SAR measurements are highlighted in the tables above for clarity. Please see Section 13 for variability analysis.
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).

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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 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.

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 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 8.5.4.
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, 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 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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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, 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 8.6.5 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. See Section 8.6.6 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. 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 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.

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12 FCC MULTI-TX AND ANTENNA SAR CONSIDERATIONS

12.1 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 1-g 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 1-g or 10-g SAR.

When standalone SAR is not required to be measured, per FCC KDB 447498 D01v06 4.3.2 b), the following equation must be used to estimate the standalone 1g SAR for simultaneous transmission assessment involving that transmitter.

$$\text{Estimated SAR} = \frac{\sqrt{f(GHz)}}{7.5} * \frac{(\text{Max Power of channel, mW})}{\text{Min. Separation Distance, mm}}$$

Table 12-1
Estimated SAR

Mode	Frequency	Maximum Allowed Power	Separation Distance (Body)	Estimated SAR (Body)
	[MHz]	[dBm]	[mm]	[W/kg]
Bluetooth	2480	12.00	15	0.224

Note: Held-to ear configurations are not applicable to Bluetooth operations and therefore were not considered for simultaneous transmission. Per KDB Publication 447498 D01v06, the maximum power of the channel was rounded to the nearest mW before calculation.

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12.3 Head SAR Simultaneous Transmission Analysis

Note: Values marked with (*) represent test positions that were not required to be evaluated for WLAN SAR per FCC KDB Publication 248227, therefore the worst case WLAN head SAR result was used for simultaneous transmission analysis.

Table 12-2
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	GSM 850	0.347	0.322	0.217	0.669	0.564	0.886
	GSM 1900	0.358	0.322	0.217	0.680	0.575	0.897
	UMTS 850	0.335	0.322	0.217	0.657	0.552	0.874
	UMTS 1750	0.923	0.322	0.217	**1.245**	1.140	See Table 12-3
	UMTS 1900	0.903	0.322	0.217	1.225	1.120	See Table 12-3
	LTE Band 12	0.276	0.322	0.217	0.598	0.493	0.815
	LTE Band 5 (Cell)	0.357	0.322	0.217	0.679	0.574	0.896
	LTE Band 4 (AWS)	0.855	0.322	0.217	1.177	1.072	See Table 12-3
	LTE Band 2 (PCS)	0.676	0.322	0.217	0.998	0.893	1.215
	LTE Band 30	0.397	0.322	0.217	0.719	0.614	0.936
	LTE Band 41	0.079	0.322	0.217	0.401	0.296	0.618

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

Simult Tx	Configuration	UMTS 1750 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+3
Head SAR	Right Cheek	0.463	0.322	0.217	1.002
	Right Tilt	0.467	0.263	0.049	0.779
	Left Cheek	0.923	0.212	0.109	**1.244**
	Left Tilt	0.347	0.196	0.019	0.562

Simult Tx	Configuration	UMTS 1900 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+3
Head SAR	Right Cheek	0.491	0.322	0.217	1.030
	Right Tilt	0.350	0.263	0.049	0.662
	Left Cheek	0.903	0.212	0.109	**1.224**
	Left Tilt	0.271	0.196	0.019	0.486

Simult Tx	Configuration	LTE Band 4 (AWS) 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+3
Head SAR	Right Cheek	0.435	0.322	0.217	0.974
	Right Tilt	0.485	0.263	0.049	0.797
	Left Cheek	0.855	0.212	0.109	**1.176**
	Left Tilt	0.408	0.196	0.019	0.623

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Table 12-4
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	GSM 850	0.347	0.218	0.230	0.565	0.577	0.795
	GSM 1900	0.358	0.218	0.230	0.576	0.588	0.806
	UMTS 850	0.335	0.218	0.230	0.553	0.565	0.783
	UMTS 1750	0.923	0.218	0.230	1.141	**1.153**	See Table 12-5
	UMTS 1900	0.903	0.218	0.230	1.121	1.133	See Table 12-5
	LTE Band 12	0.276	0.218	0.230	0.494	0.506	0.724
	LTE Band 5 (Cell)	0.357	0.218	0.230	0.575	0.587	0.805
	LTE Band 4 (AWS)	0.855	0.218	0.230	1.073	1.085	See Table 12-5
	LTE Band 2 (PCS)	0.676	0.218	0.230	0.894	0.906	1.124
	LTE Band 30	0.397	0.218	0.230	0.615	0.627	0.845
	LTE Band 41	0.079	0.218	0.230	0.297	0.309	0.527

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

Simult Tx	Configuration	UMTS 1750 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+3
Head SAR	Right Cheek	0.463	0.218*	0.230	0.911
	Right Tilt	0.467	0.218*	0.230*	0.915
	Left Cheek	0.923	0.218	0.086	**1.227**
	Left Tilt	0.347	0.218*	0.230*	0.795

Simult Tx	Configuration	UMTS 1900 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+3
Head SAR	Right Cheek	0.491	0.218*	0.230	0.939
	Right Tilt	0.350	0.218*	0.230*	0.798
	Left Cheek	0.903	0.218	0.086	**1.207**
	Left Tilt	0.271	0.218*	0.230*	0.719

Simult Tx	Configuration	LTE Band 4 (AWS) 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+3
Head SAR	Right Cheek	0.435	0.218*	0.230	0.883
	Right Tilt	0.485	0.218*	0.230*	0.933
	Left Cheek	0.855	0.218	0.086	**1.159**
	Left Tilt	0.408	0.218*	0.230*	0.856

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Table 12-6
Simultaneous Transmission Scenario with 2.4 GHz Ant 1 and 5 GHz Ant 2 WLAN (Held to Ear)

Exposure Condition	Mode	2G/3G/4G SAR (W/kg)	2.4 GHz WLAN Ant 1 SAR (W/kg)	5 GHz WLAN Ant 2 SAR (W/kg)	Σ SAR (W/kg)
		1	2	3	1+2+3
Head SAR	GSM 850	0.347	0.322	0.230	0.899
	GSM 1900	0.358	0.322	0.230	0.910
	UMTS 850	0.335	0.322	0.230	0.887
	UMTS 1750	0.923	0.322	0.230	See Table 12-7
	UMTS 1900	0.903	0.322	0.230	See Table 12-7
	LTE Band 12	0.276	0.322	0.230	0.828
	LTE Band 5 (Cell)	0.357	0.322	0.230	0.909
	LTE Band 4 (AWS)	0.855	0.322	0.230	See Table 12-7
	LTE Band 2 (PCS)	0.676	0.322	0.230	**1.228**
	LTE Band 30	0.397	0.322	0.230	0.949
	LTE Band 41	0.079	0.322	0.230	0.631

Table 12-7
Simultaneous Transmission Scenario with 2.4 GHz Ant 1 and 5 GHz Ant 2 WLAN (Held to Ear)

Simult Tx	Configuration	UMTS 1750 SAR (W/kg)	2.4 GHz WLAN Ant 1 SAR (W/kg)	5 GHz WLAN Ant 2 SAR (W/kg)	Σ SAR (W/kg)
		1	2	3	1+2+3
Head SAR	Right Cheek	0.463	0.322	0.230	1.015
	Right Tilt	0.467	0.263	0.230*	0.960
	Left Cheek	0.923	0.212	0.086	**1.221**
	Left Tilt	0.347	0.196	0.230*	0.773

Simult Tx	Configuration	UMTS 1900 SAR (W/kg)	2.4 GHz WLAN Ant 1 SAR (W/kg)	5 GHz WLAN Ant 2 SAR (W/kg)	Σ SAR (W/kg)
		1	2	3	1+2+3
Head SAR	Right Cheek	0.491	0.322	0.230	1.043
	Right Tilt	0.350	0.263	0.230*	0.843
	Left Cheek	0.903	0.212	0.086	**1.201**
	Left Tilt	0.271	0.196	0.230*	0.697

Simult Tx	Configuration	LTE Band 4 (AWS) SAR (W/kg)	2.4 GHz WLAN Ant 1 SAR (W/kg)	5 GHz WLAN Ant 2 SAR (W/kg)	Σ SAR (W/kg)
		1	2	3	1+2+3
Head SAR	Right Cheek	0.435	0.322	0.230	0.987
	Right Tilt	0.485	0.263	0.230*	0.978
	Left Cheek	0.855	0.212	0.086	**1.153**
	Left Tilt	0.408	0.196	0.230*	0.834

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Table 12-8
Simultaneous Transmission Scenario with 2.4 GHz Ant 2 and 5 GHz Ant 1 WLAN (Held to Ear)

Exposure Condition	Mode	2G/3G/4G SAR (W/kg)	2.4 GHz WLAN Ant 2 SAR (W/kg)	5 GHz WLAN Ant 1 SAR (W/kg)	Σ SAR (W/kg)
		1	2	3	1+2+3
Head SAR	GSM 850	0.347	0.217	0.218	0.782
	GSM 1900	0.358	0.217	0.218	0.793
	UMTS 850	0.335	0.217	0.218	0.770
	UMTS 1750	0.923	0.217	0.218	See Table 12-9
	UMTS 1900	0.903	0.217	0.218	See Table 12-9
	LTE Band 12	0.276	0.217	0.218	0.711
	LTE Band 5 (Cell)	0.357	0.217	0.218	0.792
	LTE Band 4 (AWS)	0.855	0.217	0.218	See Table 12-9
	LTE Band 2 (PCS)	0.676	0.217	0.218	**1.111**
	LTE Band 30	0.397	0.217	0.218	0.832
	LTE Band 41	0.079	0.217	0.218	0.514

Table 12-9
Simultaneous Transmission Scenario with 2.4 GHz Ant 2 and 5 GHz Ant 1 WLAN (Held to Ear)

Simult Tx	Configuration	UMTS 1750 SAR (W/kg)	2.4 GHz WLAN Ant 2 SAR (W/kg)	5 GHz WLAN Ant 1 SAR (W/kg)	Σ SAR (W/kg)
		1	2	3	1+2+3
Head SAR	Right Cheek	0.463	0.217	0.218*	0.898
	Right Tilt	0.467	0.049	0.218*	0.734
	Left Cheek	0.923	0.109	0.218	**1.250**
	Left Tilt	0.347	0.019	0.218*	0.584

Simult Tx	Configuration	UMTS 1900 SAR (W/kg)	2.4 GHz WLAN Ant 2 SAR (W/kg)	5 GHz WLAN Ant 1 SAR (W/kg)	Σ SAR (W/kg)
		1	2	3	1+2+3
Head SAR	Right Cheek	0.491	0.217	0.218*	0.926
	Right Tilt	0.350	0.049	0.218*	0.617
	Left Cheek	0.903	0.109	0.218	**1.230**
	Left Tilt	0.271	0.019	0.218*	0.508

Simult Tx	Configuration	LTE Band 4 (AWS) SAR (W/kg)	2.4 GHz WLAN Ant 2 SAR (W/kg)	5 GHz WLAN Ant 1 SAR (W/kg)	Σ SAR (W/kg)
		1	2	3	1+2+3
Head SAR	Right Cheek	0.435	0.217	0.218*	0.870
	Right Tilt	0.485	0.049	0.218*	0.752
	Left Cheek	0.855	0.109	0.218	**1.182**
	Left Tilt	0.408	0.019	0.218*	0.645

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12.4 Body-Worn Simultaneous Transmission Analysis

Note: For body-worn simultaneous transmission scenarios WLAN was tested at a more conservative body-worn distance of 1.0 cm.

Table 12-10
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	GSM 850	0.378	0.377	0.313	0.755	0.691	1.068
	GSM 1900	0.314	0.377	0.313	0.691	0.627	1.004
	UMTS 850	0.428	0.377	0.313	0.805	0.741	1.118
	UMTS 1750	0.615	0.377	0.313	0.992	0.928	1.305
	UMTS 1900	0.751	0.377	0.313	1.128	1.064	**1.441**
	LTE Band 12	0.458	0.377	0.313	0.835	0.771	1.148
	LTE Band 5 (Cell)	0.487	0.377	0.313	0.864	0.800	1.177
	LTE Band 4 (AWS)	0.671	0.377	0.313	1.048	0.984	1.361
	LTE Band 2 (PCS)	0.600	0.377	0.313	0.977	0.913	1.290
	LTE Band 30	0.624	0.377	0.313	1.001	0.937	1.314
	LTE Band 41	0.068	0.377	0.313	0.445	0.381	0.758

Table 12-11
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	1+2+3
Body-Worn	GSM 850	0.378	0.481	0.150	0.859	0.528	1.009
	GSM 1900	0.314	0.481	0.150	0.795	0.464	0.945
	UMTS 850	0.428	0.481	0.150	0.909	0.578	1.059
	UMTS 1750	0.615	0.481	0.150	1.096	0.765	1.246
	UMTS 1900	0.751	0.481	0.150	1.232	0.901	**1.382**
	LTE Band 12	0.458	0.481	0.150	0.939	0.608	1.089
	LTE Band 5 (Cell)	0.487	0.481	0.150	0.968	0.637	1.118
	LTE Band 4 (AWS)	0.671	0.481	0.150	1.152	0.821	1.302
	LTE Band 2 (PCS)	0.600	0.481	0.150	1.081	0.750	1.231
	LTE Band 30	0.624	0.481	0.150	1.105	0.774	1.255
	LTE Band 41	0.068	0.481	0.150	0.549	0.218	0.699

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Table 12-12
Simultaneous Transmission Scenario with 2.4 GHz Ant 1 and 5 GHz Ant 2 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)	5 GHz WLAN Ant 2 SAR (W/kg)	Σ SAR (W/kg)
		1	2	3	1+2+3
Body-Worn	GSM 850	0.378	0.377	0.150	0.905
	GSM 1900	0.314	0.377	0.150	0.841
	UMTS 850	0.428	0.377	0.150	0.955
	UMTS 1750	0.615	0.377	0.150	1.142
	UMTS 1900	0.751	0.377	0.150	**1.278**
	LTE Band 12	0.458	0.377	0.150	0.985
	LTE Band 5 (Cell)	0.487	0.377	0.150	1.014
	LTE Band 4 (AWS)	0.671	0.377	0.150	1.198
	LTE Band 2 (PCS)	0.600	0.377	0.150	1.127
	LTE Band 30	0.624	0.377	0.150	1.151
	LTE Band 41	0.068	0.377	0.150	0.595

Table 12-13
Simultaneous Transmission Scenario with 2.4 GHz Ant 2 and 5 GHz Ant 1 WLAN (Body-Worn at 1.5 cm)

Exposure Condition	Mode	2G/3G/4G SAR (W/kg)	2.4 GHz WLAN Ant 2 SAR (W/kg)	5 GHz WLAN Ant 1 SAR (W/kg)	Σ SAR (W/kg)
		1	2	3	1+2+3
Body-Worn	GSM 850	0.378	0.313	0.481	1.172
	GSM 1900	0.314	0.313	0.481	1.108
	UMTS 850	0.428	0.313	0.481	1.222
	UMTS 1750	0.615	0.313	0.481	1.409
	UMTS 1900	0.751	0.313	0.481	**1.545**
	LTE Band 12	0.458	0.313	0.481	1.252
	LTE Band 5 (Cell)	0.487	0.313	0.481	1.281
	LTE Band 4 (AWS)	0.671	0.313	0.481	1.465
	LTE Band 2 (PCS)	0.600	0.313	0.481	1.394
	LTE Band 30	0.624	0.313	0.481	1.418
	LTE Band 41	0.068	0.313	0.481	0.862

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Table 12-14
Simultaneous Transmission Scenario with 2.4 GHz 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	GSM 850	0.378	0.224	0.602
	GSM 1900	0.314	0.224	0.538
	UMTS 850	0.428	0.224	0.652
	UMTS 1750	0.615	0.224	0.839
	UMTS 1900	0.751	0.224	**0.975**
	LTE Band 12	0.458	0.224	0.682
	LTE Band 5 (Cell)	0.487	0.224	0.711
	LTE Band 4 (AWS)	0.671	0.224	0.895
	LTE Band 2 (PCS)	0.600	0.224	0.824
	LTE Band 30	0.624	0.224	0.848
	LTE Band 41	0.068	0.224	0.292

Note: Bluetooth SAR was not required to be measured per FCC KDB 447498. Estimated SAR results were used in the above table to determine simultaneous transmission SAR test exclusion.

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 ("-").

Table 12-15
Simultaneous Transmission Scenario (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	GPRS 850	0.646	0.377	0.313	1.023	0.959	1.336
	GPRS 1900	0.587	0.377	0.313	0.964	0.900	1.277
	UMTS 850	0.649	0.377	0.313	1.026	0.962	1.339
	UMTS 1750	0.553	0.377	0.313	0.930	0.866	1.243
	UMTS 1900	0.568	0.377	0.313	0.945	0.881	1.258
	LTE Band 12	0.547	0.377	0.313	0.924	0.860	1.237
	LTE Band 5 (Cell)	0.545	0.377	0.313	0.922	0.858	1.235
	LTE Band 4 (AWS)	0.677	0.377	0.313	1.054	0.990	**1.367**
	LTE Band 2 (PCS)	0.564	0.377	0.313	0.941	0.877	1.254
	LTE Band 30	0.917	0.377	0.313	1.294	1.230	See Table 12-16
	LTE Band 41	0.177	0.377	0.313	0.554	0.490	0.867

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Table 12-16
Simultaneous Transmission Scenario (2.4 GHz WLAN Hotspot at 1.0 cm)

Note:

1. Values marked with (*) represent test positions that were not required to be evaluated for WLAN SAR per FCC KDB Publication 248227, therefore the worst case WLAN hotspot SAR result was used for simultaneous transmission analysis.
2. Per FCC KDB Publication 941225 D06v01, the devices edges with antennas more than 2.5 cm from edge are not required to be evaluated for SAR ("-").

Simult Tx	Configuration	LTE Band 30 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+3
Hotspot SAR	Back	0.852	0.377	0.313	**1.542**
	Front	0.762	0.377*	0.313*	1.452
	Top	-	0.377*	0.313*	0.690
	Bottom	0.426	-	-	0.426
	Right	0.917	-	-	0.917
	Left	-	-	0.313*	0.313

Table 12-17
Simultaneous Transmission Scenario (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	1+2+3
Hotspot SAR	GPRS 850	0.646	0.241	0.254	0.887	0.900	1.141
	GPRS 1900	0.587	0.241	0.254	0.828	0.841	1.082
	UMTS 850	0.649	0.241	0.254	0.890	0.903	1.144
	UMTS 1750	0.553	0.241	0.254	0.794	0.807	1.048
	UMTS 1900	0.568	0.241	0.254	0.809	0.822	1.063
	LTE Band 12	0.547	0.241	0.254	0.788	0.801	1.042
	LTE Band 5 (Cell)	0.545	0.241	0.254	0.786	0.799	1.040
	LTE Band 4 (AWS)	0.677	0.241	0.254	0.918	0.931	1.172
	LTE Band 2 (PCS)	0.564	0.241	0.254	0.805	0.818	1.059
	LTE Band 30	0.917	0.241	0.254	1.158	1.171	**1.412**
	LTE Band 41	0.177	0.241	0.254	0.418	0.431	0.672

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Table 12-18
Simultaneous Transmission Scenario (2.4 GHz Ant 1 and 5 GHz Ant 2 WLAN Hotspot at 1.0 cm)

Exposure Condition	Mode	2G/3G/4G SAR (W/kg)	2.4 GHz WLAN Ant 1 SAR (W/kg)	5 GHz WLAN Ant 2 SAR (W/kg)	Σ SAR (W/kg)
		1	2	3	1+2+3
Hotspot SAR	GPRS 850	0.646	0.377	0.254	1.277
	GPRS 1900	0.587	0.377	0.254	1.218
	UMTS 850	0.649	0.377	0.254	1.280
	UMTS 1750	0.553	0.377	0.254	1.184
	UMTS 1900	0.568	0.377	0.254	1.199
	LTE Band 12	0.547	0.377	0.254	1.178
	LTE Band 5 (Cell)	0.545	0.377	0.254	1.176
	LTE Band 4 (AWS)	0.677	0.377	0.254	1.308
	LTE Band 2 (PCS)	0.564	0.377	0.254	1.195
	LTE Band 30	0.917	0.377	0.254	**1.548**
	LTE Band 41	0.177	0.377	0.254	0.808

Table 12-19
Simultaneous Transmission Scenario (2.4 GHz Ant 2 and 5 GHz Ant 1 WLAN Hotspot at 1.0 cm)

Exposure Condition	Mode	2G/3G/4G SAR (W/kg)	2.4 GHz WLAN Ant 2 SAR (W/kg)	5 GHz WLAN Ant 1 SAR (W/kg)	Σ SAR (W/kg)
		1	2	3	1+2+3
Hotspot SAR	GPRS 850	0.646	0.313	0.241	1.200
	GPRS 1900	0.587	0.313	0.241	1.141
	UMTS 850	0.649	0.313	0.241	1.203
	UMTS 1750	0.553	0.313	0.241	1.107
	UMTS 1900	0.568	0.313	0.241	1.122
	LTE Band 12	0.547	0.313	0.241	1.101
	LTE Band 5 (Cell)	0.545	0.313	0.241	1.099
	LTE Band 4 (AWS)	0.677	0.313	0.241	1.231
	LTE Band 2 (PCS)	0.564	0.313	0.241	1.118
	LTE Band 30	0.917	0.313	0.241	**1.471**
	LTE Band 41	0.177	0.313	0.241	0.731

12.6 Simultaneous Transmission Conclusion

The above numerical summed SAR results for all the worst-case simultaneous transmission conditions were below the SAR limit. Therefore, the above analysis is 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 6.3.4.1.2.

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13 SAR MEASUREMENT VARIABILITY

13.1 Measurement Variability

Per FCC KDB Publication 865664 D01v01r04, SAR measurement variability was assessed for each frequency band, which was determined by the SAR probe calibration point and tissue-equivalent medium used for the device measurements. When both head and body tissue-equivalent media were required for SAR measurements in a frequency band, the variability measurement procedures were applied to the tissue medium with the highest measured SAR, using the highest measured SAR configuration for that tissue-equivalent medium. These additional measurements were repeated after the completion of all measurements requiring the same head or body tissue-equivalent medium in a frequency band. The test device was returned to ambient conditions (normal room temperature) with the battery fully charged before it was re-mounted on the device holder for the repeated measurement(s) to minimize any unexpected variations in the repeated results.

SAR Measurement Variability was assessed using the following procedures for each frequency band:

1) When the original highest measured SAR is ≥ 0.80 W/kg, the measurement was repeated once.
2) A second repeated measurement was performed only if the ratio of largest to smallest SAR for the original and first repeated measurements was > 1.20 or when the original or repeated measurement was ≥ 1.45 W/kg (~ 10% from the 1-g SAR limit).
3) A third repeated measurement was performed only if the original, first or second repeated measurement was ≥ 1.5 W/kg and the ratio of largest to smallest SAR for the original, first and second repeated measurements is > 1.20.
4) Repeated measurements are not required when the original highest measured SAR is < 0.80 W/kg

Table 13-1
Head SAR Measurement Variability Results

HEAD VARIABILITY RESULTS													
Band	FREQUENCY		Mode/Band	Service	Side	Test Position	Measured SAR (1g)	1st Repeated SAR (1g)	Ratio	2nd Repeated SAR (1g)	Ratio	3rd Repeated SAR (1g)	Ratio
	MHz	Ch.					(W/kg)	(W/kg)		(W/kg)		(W/kg)	
1750	1752.60	1513	UMTS 1750	RMC	Left	Cheek	0.869	0.766	1.13	N/A	N/A	N/A	N/A
1900	1852.40	9262	UMTS 1900	RMC	Left	Cheek	0.844	0.846	1.00	N/A	N/A	N/A	N/A
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 13-2
Body SAR Measurement Variability Results

BODY VARIABILITY RESULTS													
Band	FREQUENCY		Mode	Service	Side	Spacing	Measured SAR (1g)	1st Repeated SAR (1g)	Ratio	2nd Repeated SAR (1g)	Ratio	3rd Repeated SAR (1g)	Ratio
	MHz	Ch.					(W/kg)	(W/kg)		(W/kg)		(W/kg)	
2300	2310.00	27710	LTE Band 30, 10 MHz Bandwidth	QPSK, 50 RB, 0 RB Offset	right	10 mm	0.837	0.790	1.06	N/A	N/A	N/A	N/A
ANSI / IEEE C95.1 1992 - SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population					Body 1.6 W/kg (mW/g) averaged over 1 gram								

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
SPEAG	D1750V2	1750 MHz SAR Dipole	4/15/2015	Annual	4/15/2016	1051
SPEAG	D1765V2	1765 MHz SAR Dipole	5/13/2015	Annual	5/13/2016	1008
SPEAG	D1900V2	1900 MHz SAR Dipole	4/14/2015	Annual	4/14/2016	5d141
SPEAG	D1900V2	1900 MHz SAR Dipole	7/14/2015	Annual	7/14/2016	5d149
SPEAG	D2300V2	2300 MHz SAR Dipole	12/8/2015	Annual	12/8/2016	1064
SPEAG	D2450V2	2450 MHz SAR Dipole	8/20/2015	Annual	8/20/2016	719
SPEAG	D2600V2	2600 MHz SAR Dipole	4/14/2015	Annual	4/14/2016	1004
SPEAG	D2600V2	2600 MHz SAR Dipole	10/21/2015	Annual	10/21/2016	1071
SPEAG	D5GHzV2	5 GHz SAR Dipole	2/25/2016	Annual	2/25/2017	1120
SPEAG	D750V3	750 MHz SAR Dipole	2/16/2016	Annual	2/16/2017	1046
SPEAG	D835V2	835 MHz SAR Dipole	4/13/2015	Annual	4/13/2016	4d119
SPEAG	D835V2	835 MHz SAR Dipole	7/23/2015	Annual	7/23/2016	4d133
SPEAG	DAE4	Dasy Data Acquisition Electronics	2/19/2016	Annual	2/19/2017	665
SPEAG	DAE4	Dasy Data Acquisition Electronics	6/17/2015	Annual	6/17/2016	859
SPEAG	DAE4	Dasy Data Acquisition Electronics	2/18/2016	Annual	2/18/2017	1272
SPEAG	DAE4	Dasy Data Acquisition Electronics	8/24/2015	Annual	8/24/2016	1322
SPEAG	DAE4	Dasy Data Acquisition Electronics	9/16/2015	Annual	9/16/2016	1323
SPEAG	DAE4	Dasy Data Acquisition Electronics	9/18/2015	Annual	9/18/2016	1364
SPEAG	DAE4	Dasy Data Acquisition Electronics	11/11/2015	Annual	11/11/2016	1415
SPEAG	DAE4	Dasy Data Acquisition Electronics	1/15/2016	Annual	1/15/2017	1466
SPEAG	ES3DV2	SAR Probe	8/26/2015	Annual	8/26/2016	3022
SPEAG	ES3DV3	SAR Probe	2/19/2016	Annual	2/19/2017	3213
SPEAG	ES3DV3	SAR Probe	5/20/2015	Annual	5/20/2016	3263
SPEAG	ES3DV3	SAR Probe	9/18/2015	Annual	9/18/2016	3288
SPEAG	ES3DV3	SAR Probe	2/19/2016	Annual	2/19/2017	3318
SPEAG	ES3DV3	SAR Probe	9/18/2015	Annual	9/18/2016	3332
SPEAG	ES3DV3	SAR Probe	11/17/2015	Annual	11/17/2016	3334
SPEAG	ES3DV3	SAR Probe	6/22/2015	Annual	6/22/2016	3351
SPEAG	EX3DV4	SAR Probe	2/22/2016	Annual	2/22/2017	3914
SPEAG	EX3DV4	SAR Probe	7/21/2015	Annual	7/21/2016	7308
SPEAG	DAK-3.5	Dielectric Assessment Kit	5/12/2015	Annual	5/12/2016	1070
SPEAG	DAK-3.5	Dielectric Assessment Kit	10/20/2015	Annual	10/20/2016	1091
SPEAG	DAKS-3.5	Portable Dielectric Assessment Kit	7/14/2015	Annual	7/14/2016	1039
SPEAG	DAKS-3.5	Portable Dielectric Assessment Kit	8/19/2015	Annual	8/19/2016	1041
SPEAG	Planar R140	Reflectometer	8/2/2015	Annual	8/2/2016	50513
Seekonk	NC-100	Torque Wrench	11/6/2015	Biennial	11/6/2017	22313
Seekonk	NC-100	Torque Wrench	11/6/2015	Biennial	11/6/2017	N/A
Rohde & Schwarz	CMW500	Radio Communication Tester	9/8/2015	Annual	9/8/2016	109366
Rohde & Schwarz	CMW500	Radio Communication Tester	5/15/2015	Annual	5/15/2016	112347
Pasternack	PE2208-6	Bidirectional Coupler	CBT	N/A	CBT	N/A
Pasternack	PE2209-10	Bidirectional Coupler	CBT	N/A	CBT	N/A
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
Narda	BW-S3W2	Attenuator (3dB)	CBT	N/A	CBT	120
Mitutoyo	CD-6"CSX	Digital Caliper	5/8/2014	Biennial	5/8/2016	13264165
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
Mini-Circuits	BW-N20W5	Power Attenuator	CBT	N/A	CBT	1226
MiniCircuits	SLP-2400+	Low Pass Filter	CBT	N/A	CBT	R8979500903
MiniCircuits	VLF-6000+	Low Pass Filter	CBT	N/A	CBT	N/A
MCL	BW-N6W5+	6dB Attenuator	CBT	N/A	CBT	1139
Keysight	772D	Dual Directional Coupler	CBT	N/A	CBT	MY52180215
Gigatronics	80701A	(0.05-18GHz) Power Sensor	11/4/2015	Annual	11/4/2016	1833460
Gigatronics	8651A	Universal Power Meter	11/4/2015	Annual	11/4/2016	8650319
Control Company	4040	Digital Thermometer	3/18/2015	Biennial	3/18/2017	150195001
Control Company	4040	Digital Thermometer	3/15/2015	Biennial	3/15/2017	150195005
Control Company	4353	Long Stem Thermometer	1/22/2015	Biennial	1/22/2017	150053029
Control Company	4353	Long Stem Thermometer	1/22/2015	Biennial	1/22/2017	150053036
COMTech	AR85729-5	Solid State Amplifier	CBT	N/A	CBT	M1S5A00-009
COMTECH	AR85729-5/5759B	Solid State Amplifier	CBT	N/A	CBT	M3W1A00-1002
Anritsu	ML2495A	Power Meter	10/16/2015	Biennial	10/16/2017	941001
Anritsu	ML2496A	Power Meter	2/28/2016	Annual	2/28/2017	1306009
Anritsu	MA2411B	Pulse Power Sensor	12/7/2015	Annual	12/7/2016	1339018
Anritsu	MT8820C	Radio Communication Analyzer	12/4/2015	Annual	12/4/2016	6201300731
Anritsu	MA24106A	USB Power Sensor	5/29/2015	Annual	5/29/2016	1231535
Anritsu	MA24106A	USB Power Sensor	5/29/2015	Annual	5/29/2016	1231538
Amplifier Research	15S1G6	Amplifier	CBT	N/A	CBT	433971
Amplifier Research	15S1G6	Amplifier	CBT	N/A	CBT	433972
Agilent	E8257D	(250kHz-20GHz) Signal Generator	3/2/2016	Annual	3/2/2017	MY45470194
Agilent	8753E	(30kHz-6GHz) Network Analyzer	3/2/2016	Annual	3/2/2017	JP38020182
Agilent	8594A	(9kHz-2.9GHz) Spectrum Analyzer	N/A	N/A	N/A	3051A00187
Agilent	E4438C	ESG Vector Signal Generator	3/2/2016	Annual	3/2/2017	MY47270002
Agilent	E4432B	ESG-D Series Signal Generator	3/5/2016	Annual	3/5/2017	US40053896
Agilent	N9020A	MXA Signal Analyzer	11/5/2015	Annual	11/5/2016	US46470561
Agilent	N5182A	MXG Vector Signal Generator	3/5/2016	Annual	3/5/2017	MY47420800
Agilent	8753ES	S-Parameter Network Analyzer	11/4/2015	Annual	11/4/2016	US39170118

Note: 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.

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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: A3LSMG891A; Type: Portable Handset; Serial: 18253

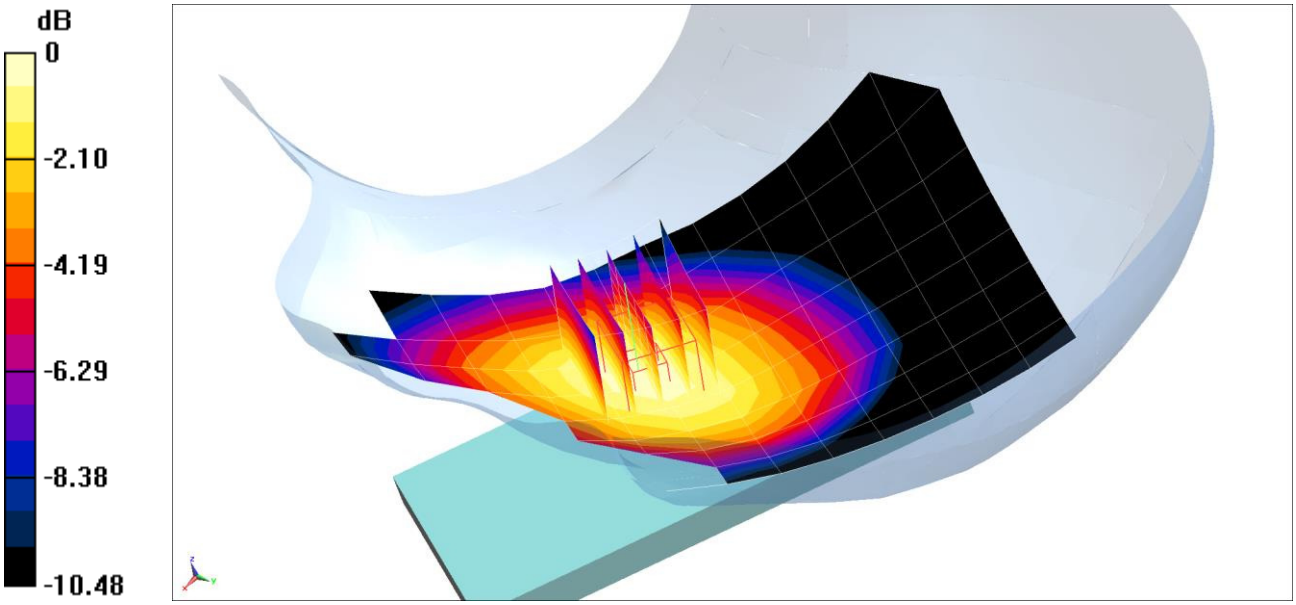
Communication System: UID 0, GSM; Frequency: 836.6 MHz; Duty Cycle: 1:8.3
Medium: 835 Head Medium parameters used (interpolated):
f = 836.6 MHz; σ = 0.93 S/m; ε_r = 42.491; ρ = 1000 kg/m^3
Phantom section: Left Section

Test Date: 03-24-2016; Ambient Temp: 23.9°C; Tissue Temp: 23.4°C

Probe: ES3DV3 - SN3263; ConvF(6.18, 6.18, 6.18); Calibrated: 5/20/2015;
Sensor-Surface: 3mm (Mechanical Surface Detection)
Electronics: DAE4 Sn859; Calibrated: 6/17/2015
Phantom: SAM with CRP v5.0 (Right); Type: QD000P40CD; Serial: TP:1759
Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Mode: GSM 850, Left 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 = 17.702 V/m; Power Drift = 0.04 dB
Peak SAR (extrapolated) = 0.345 W/kg
SAR(1 g) = 0.274 W/kg



0 dB = 0.299 W/kg = -5.24 dBW/kg

PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LSMG891A; Type: Portable Handset; Serial: 18196

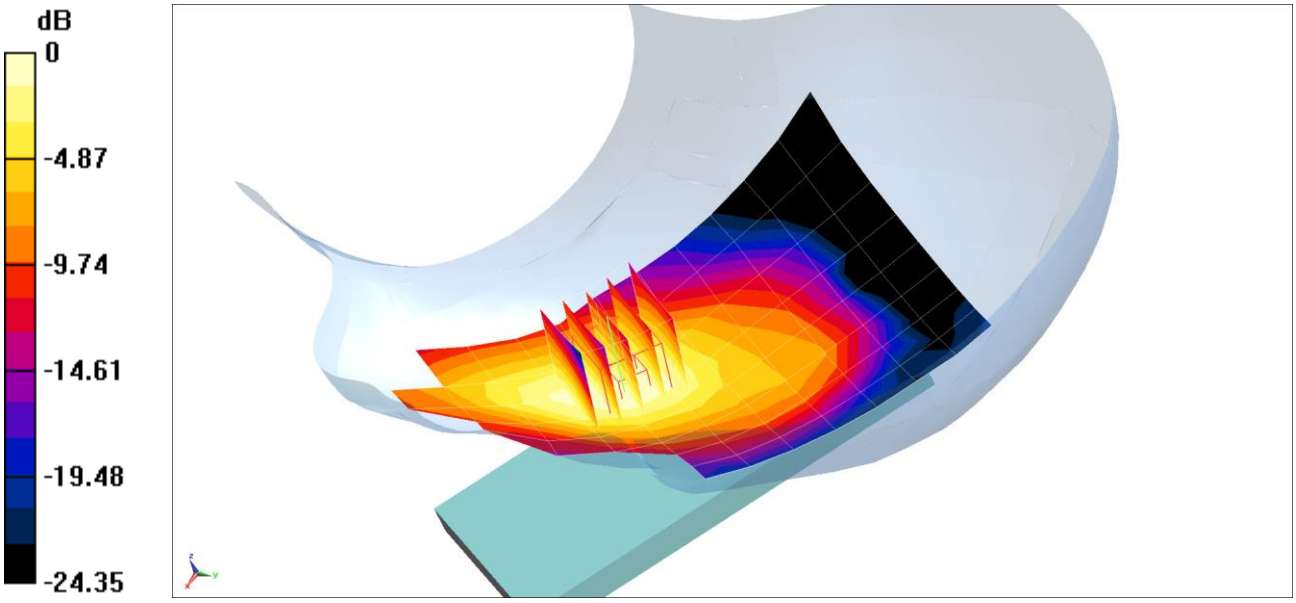
Communication System: UID 0, GSM; Frequency: 1880 MHz; Duty Cycle: 1:8.3
Medium: 1900 Head Medium parameters used:
f = 1880 MHz; σ = 1.425 S/m; ε_r = 40.33; ρ = 1000 kg/m^3
Phantom section: Left Section

Test Date: 03-22-2016; Ambient Temp: 23.6°C; Tissue Temp: 22.3°C

Probe: ES3DV2 - SN3022; ConvF(4.93, 4.93, 4.93); Calibrated: 8/26/2015;
Sensor-Surface: 3mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1323; Calibrated: 9/16/2015
Phantom: SAM Right; Type: QD000P40CD; Serial: TP:7535
Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

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 = 15.483 V/m; Power Drift = -0.07 dB
Peak SAR (extrapolated) = 0.530 W/kg
SAR(1 g) = 0.333 W/kg



0 dB = 0.391 W/kg = -4.08 dBW/kg

PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LSMG891A; Type: Portable Handset; Serial: 18253

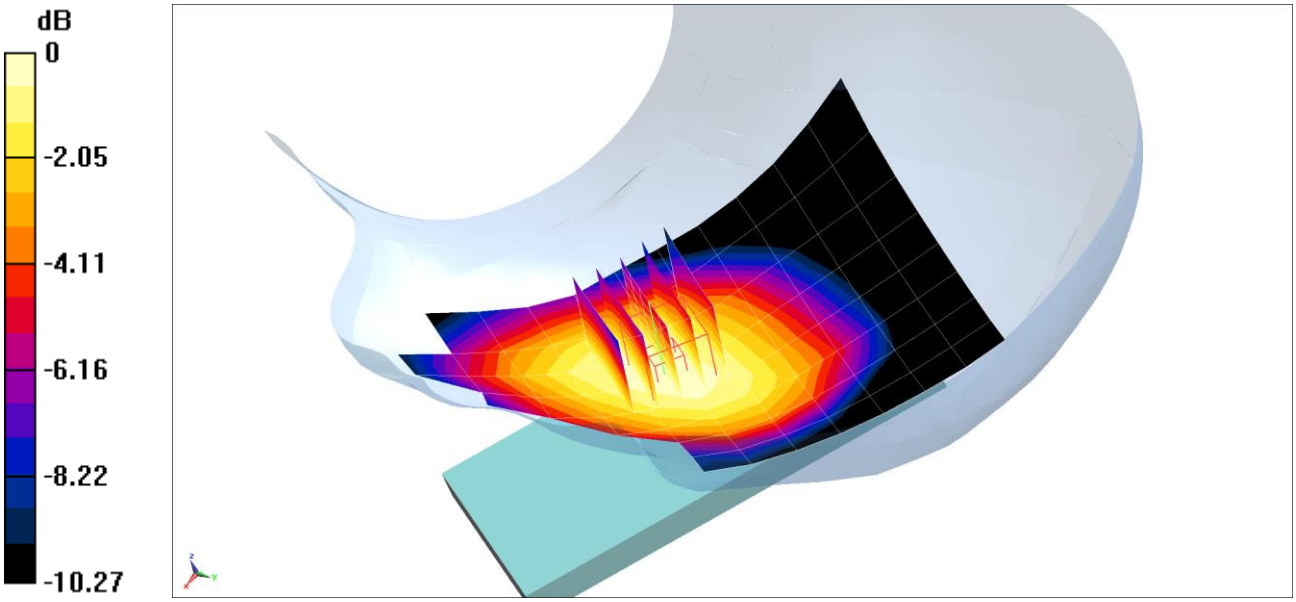
Communication System: UID 0, UMTS; Frequency: 836.6 MHz; Duty Cycle: 1:1
Medium: 835 Head Medium parameters used (interpolated):
f = 836.6 MHz; σ = 0.91 S/m; ε_r = 42.357; ρ = 1000 kg/m^3
Phantom section: Left Section

Test Date: 03-21-2016; Ambient Temp: 21.0°C; Tissue Temp: 20.7°C

Probe: ES3DV3 - SN3263; ConvF(6.18, 6.18, 6.18); Calibrated: 5/20/2015;
Sensor-Surface: 3mm (Mechanical Surface Detection)
Electronics: DAE4 Sn859; Calibrated: 6/17/2015
Phantom: SAM with CRP v5.0 (Right); Type: QD000P40CD; Serial: TP:1759
Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

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

Area Scan (9x14x1): Measurement grid: dx=15mm, dy=15mm
Zoom Scan (6x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 17.762 V/m; Power Drift = 0.04 dB
Peak SAR (extrapolated) = 0.342 W/kg
SAR(1 g) = 0.271 W/kg



0 dB = 0.294 W/kg = -5.32 dBW/kg

PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LSMG891A; Type: Portable Handset; Serial: 18196

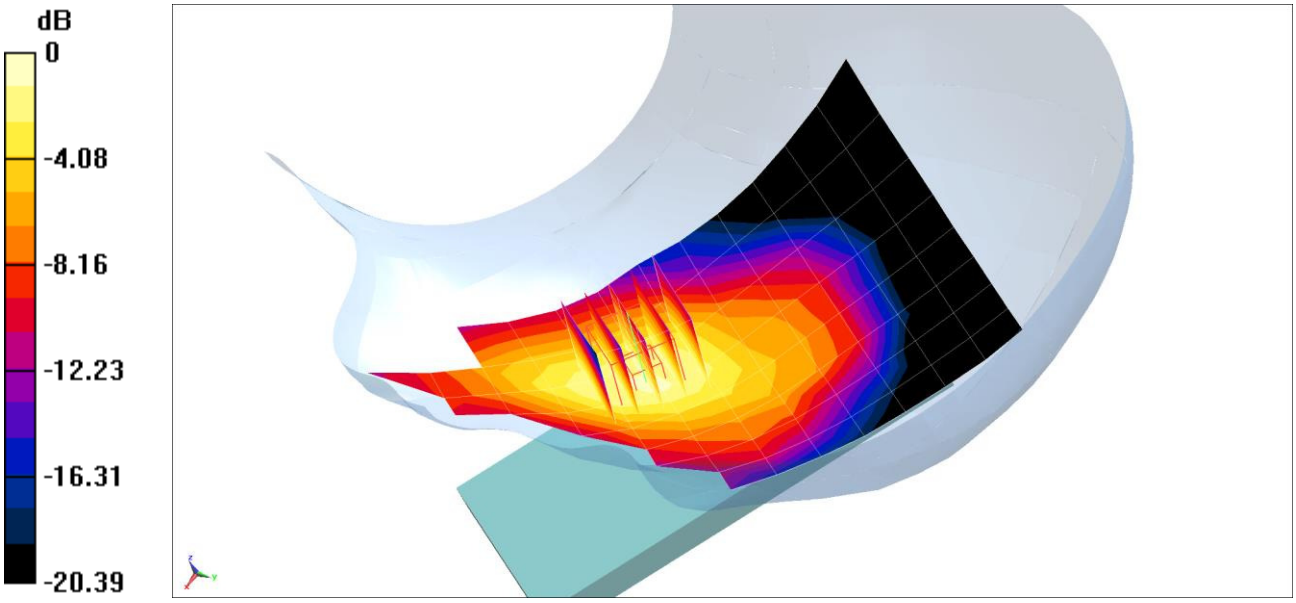
Communication System: UID 0, UMTS; Frequency: 1752.6 MHz; Duty Cycle: 1:1
Medium: 1750 Head Medium parameters used (interpolated):
f = 1752.6 MHz; σ = 1.391 S/m; ε_r = 38.398; ρ = 1000 kg/m^3
Phantom section: Left Section

Test Date: 03-22-2016; Ambient Temp: 23.4°C; Tissue Temp: 22.0°C

Probe: ES3DV2 - SN3022; ConvF(5.08, 5.08, 5.08); Calibrated: 8/26/2015;
Sensor-Surface: 3mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1323; Calibrated: 9/16/2015
Phantom: SAM Left; Type: QD000P40CC; Serial: TP: 1375
Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Mode: UMTS 1750, Left Head, Cheek, High.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 = 26.166 V/m; Power Drift = 0.08 dB
Peak SAR (extrapolated) = 1.33 W/kg
SAR(1 g) = 0.869 W/kg



0 dB = 1.01 W/kg = 0.04 dBW/kg

DUT: A3LSMG891A; Type: Portable Handset; Serial: 18196

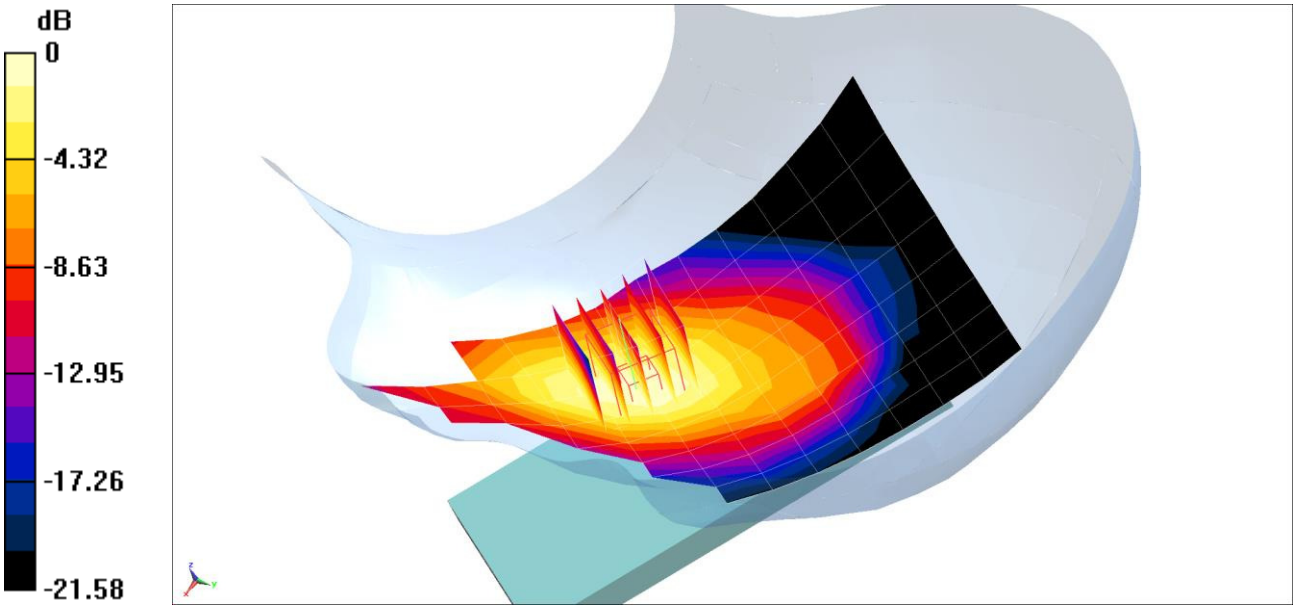
Communication System: UID 0, UMTS; Frequency: 1852.4 MHz; Duty Cycle: 1:1
Medium: 1900 Head Medium parameters used (interpolated):
f = 1852.4 MHz; σ = 1.396 S/m; ε_r = 40.282; ρ = 1000 kg/m^3
Phantom section: Left Section

Test Date: 03-28-2016; Ambient Temp: 23.8°C; Tissue Temp: 22.1°C

Probe: ES3DV3 - SN3334; ConvF(5.18, 5.18, 5.18); Calibrated: 11/17/2015;
Sensor-Surface: 3mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1415; Calibrated: 11/11/2015
Phantom: SAM Front; Type: SAM; Serial: 1686
Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Mode: UMTS 1900, Left Head, Cheek, Low.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 = 26.085 V/m; Power Drift = -0.06 dB
Peak SAR (extrapolated) = 1.32 W/kg
SAR(1 g) = 0.846 W/kg



0 dB = 1.01 W/kg = 0.04 dBW/kg

PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LSMG891A; Type: Portable Handset; Serial: 18253

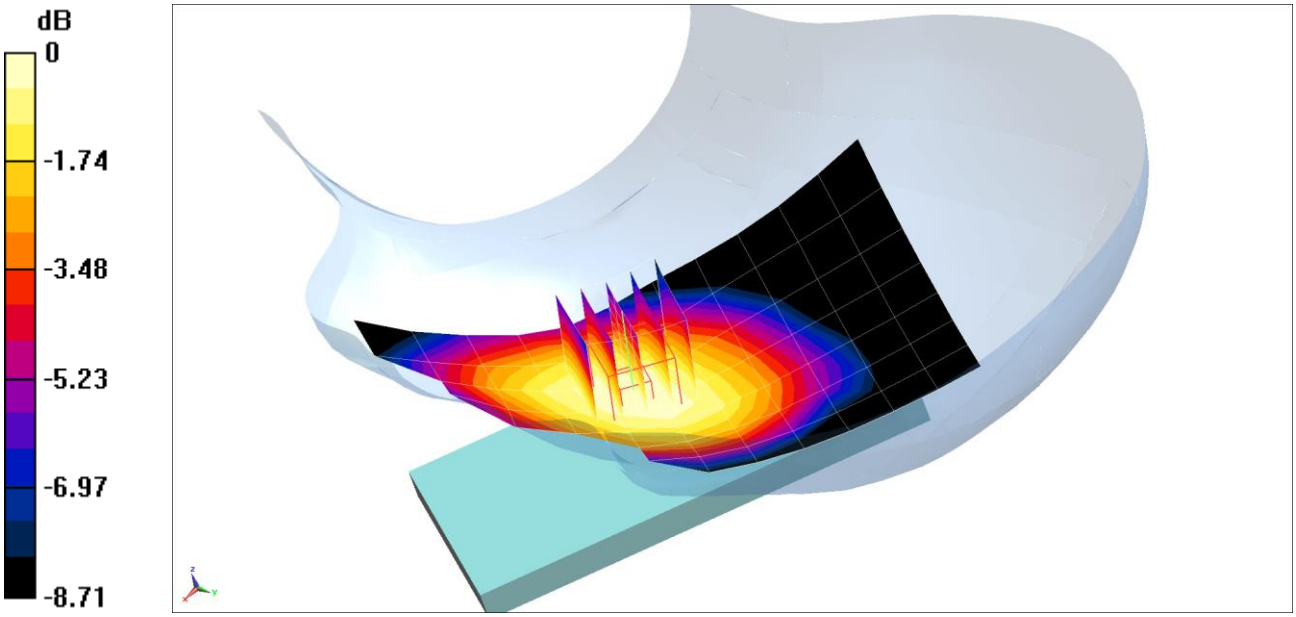
Communication System: UID 0, LTE Band 12; Frequency: 707.5 MHz; Duty Cycle: 1:1
Medium: 750 Head Medium parameters used (interpolated):
f = 707.5 MHz; σ = 0.853 S/m; ε_r = 42.613; ρ = 1000 kg/m^3
Phantom section: Left Section

Test Date: 03-24-2016; Ambient Temp: 23.2°C; Tissue Temp: 23.1°C

Probe: ES3DV3 - SN3263; ConvF(6.27, 6.27, 6.27); Calibrated: 5/20/2015;
Sensor-Surface: 3mm (Mechanical Surface Detection)
Electronics: DAE4 Sn859; Calibrated: 6/17/2015
Phantom: SAM with CRP (Left); Type: SAM; Serial: 1715
Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

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

Area Scan (8x14x1): Measurement grid: dx=15mm, dy=15mm
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 19.063 V/m; Power Drift = 0.04 dB
Peak SAR (extrapolated) = 0.336 W/kg
SAR(1 g) = 0.275 W/kg



0 dB = 0.300 W/kg = -5.23 dBW/kg

PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LSMG891A; Type: Portable Handset; Serial: 18253

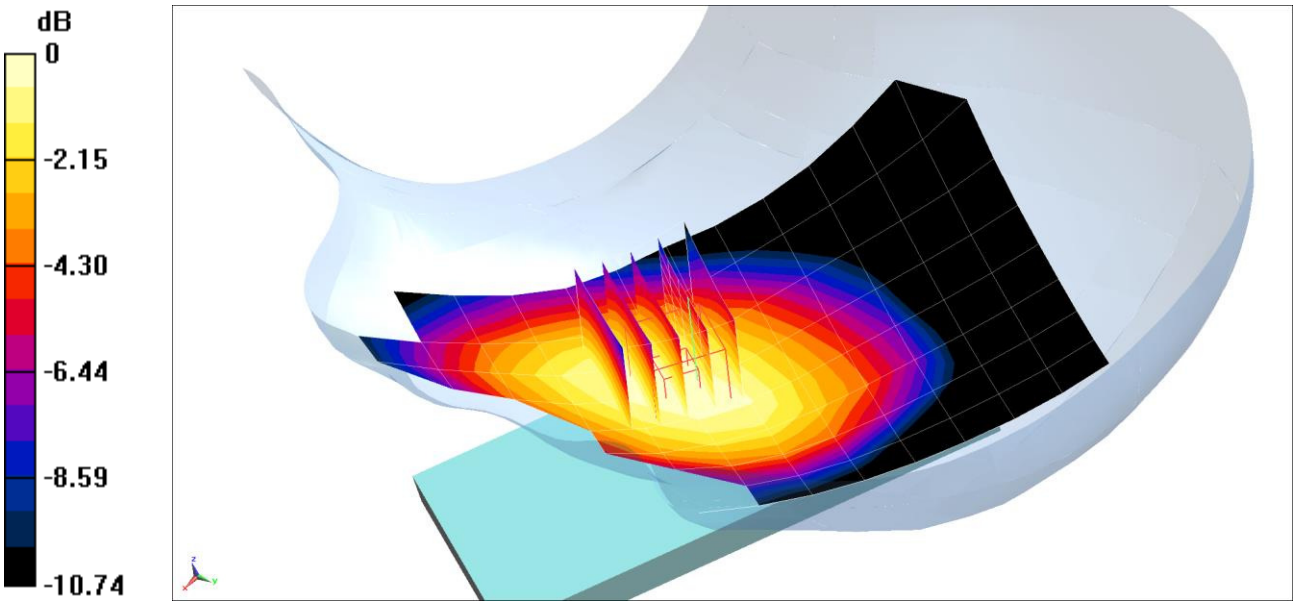
Communication System: UID 0, LTE Band 5 (Cell.); Frequency: 836.5 MHz; Duty Cycle: 1:1
Medium: 835 Head Medium parameters used (interpolated):
f = 836.5 MHz; σ = 0.93 S/m; ε_r = 42.492; ρ = 1000 kg/m^3
Phantom section: Left Section

Test Date: 03-24-2016; Ambient Temp: 23.9°C; Tissue Temp: 23.4°C

Probe: ES3DV3 - SN3263; ConvF(6.18, 6.18, 6.18); Calibrated: 5/20/2015;
Sensor-Surface: 3mm (Mechanical Surface Detection)
Electronics: DAE4 Sn859; Calibrated: 6/17/2015
Phantom: SAM with CRP v5.0 (Right); Type: QD000P40CD; Serial: TP:1759
Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Mode: LTE Band 5 (Cell.), Left Head, Cheek, Mid.ch
10 MHz Bandwidth, QPSK, 1 RB, 0 RB Offset

Area Scan (9x15x1): Measurement grid: dx=15mm, dy=15mm
Zoom Scan (6x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 19.846 V/m; Power Drift = 0.01 dB
Peak SAR (extrapolated) = 0.402 W/kg
SAR(1 g) = 0.322 W/kg



0 dB = 0.347 W/kg = -4.60 dBW/kg

PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LSMG891A; Type: Portable Handset; Serial: 18196

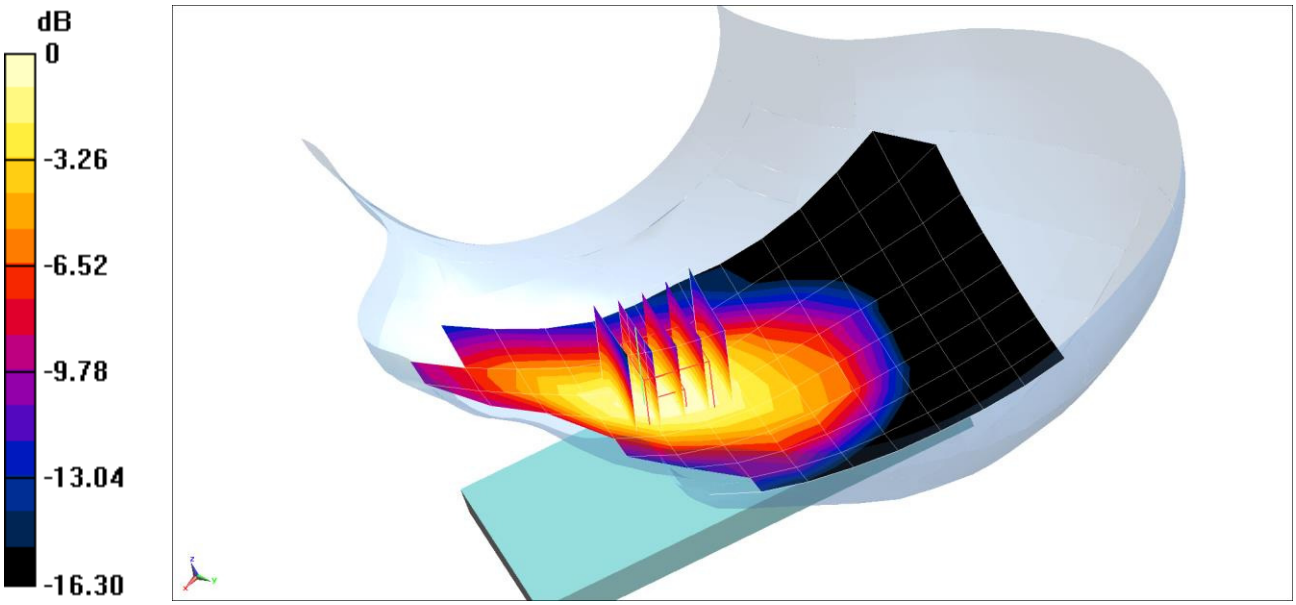
Communication System: UID 0, LTE Band 4 (AWS); Frequency: 1732.5 MHz; Duty Cycle: 1:1
Medium: 1750 Head Medium parameters used (interpolated):
f = 1732.5 MHz; σ = 1.381 S/m; ε_r = 38.957; ρ = 1000 kg/m^3
Phantom section: Left Section

Test Date: 03-28-2016; Ambient Temp: 19.5°C; Tissue Temp: 20.8°C

Probe: ES3DV3 - SN3318; ConvF(5.34, 5.34, 5.34); Calibrated: 2/19/2016;
Sensor-Surface: 3mm (Mechanical Surface Detection)
Electronics: DAE4 Sn665; Calibrated: 2/19/2016
Phantom: SAM with CRP v4.0; Type: QD000P40CD; Serial: TP:1800
Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Mode: LTE Band 4 (AWS), Left Head, Cheek, Mid.ch
20 MHz Bandwidth, QPSK, 1 RB, 99 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 = 24.945 V/m; Power Drift = 0.07 dB
Peak SAR (extrapolated) = 1.10 W/kg
SAR(1 g) = 0.716 W/kg



0 dB = 0.824 W/kg = -0.84 dBW/kg

PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LSMG891A; Type: Portable Handset; Serial: 18196

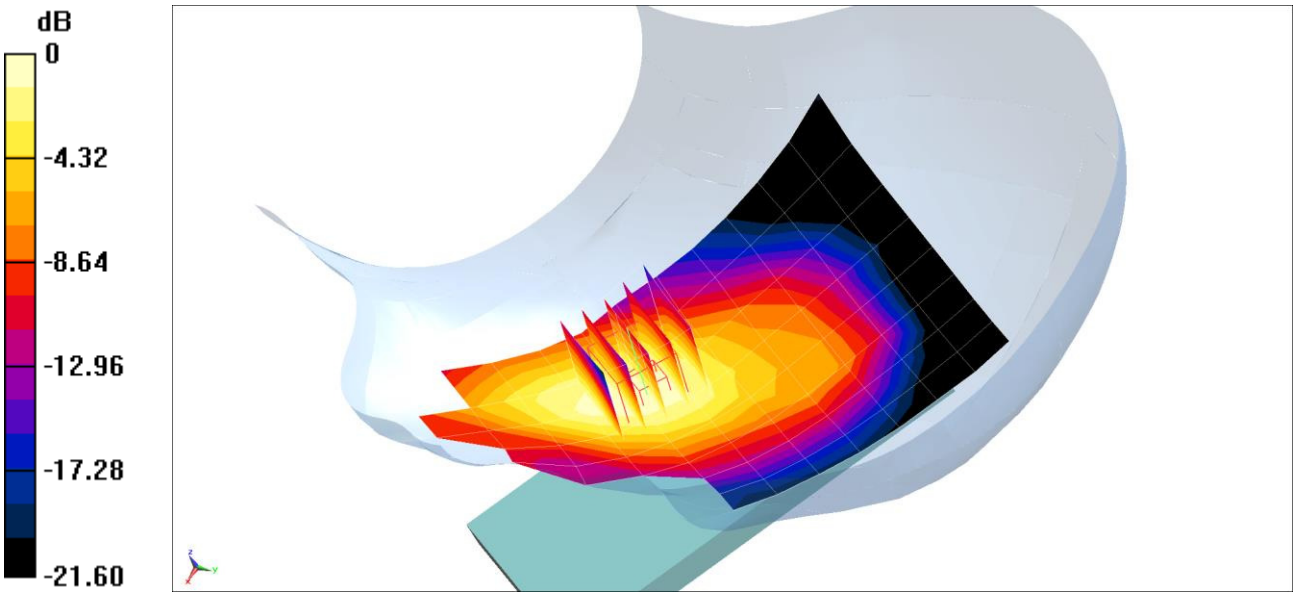
Communication System: UID 0, LTE Band 2 (PCS); Frequency: 1900 MHz; Duty Cycle: 1:1
Medium: 1900 Head Medium parameters used (interpolated):
f = 1900 MHz; σ = 1.443 S/m; ε_r = 40.283; ρ = 1000 kg/m^3
Phantom section: Left Section

Test Date: 03-22-2016; Ambient Temp: 23.6°C; Tissue Temp: 22.3°C

Probe: ES3DV2 - SN3022; ConvF(4.93, 4.93, 4.93); Calibrated: 8/26/2015;
Sensor-Surface: 3mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1323; Calibrated: 9/16/2015
Phantom: SAM Right; Type: QD000P40CD; Serial: TP:7535
Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Mode: LTE Band 2 (PCS), Left Head, Cheek, High.ch
20 MHz Bandwidth, QPSK, 1 RB, 99 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 = 24.070 V/m; Power Drift = 0.05 dB
Peak SAR (extrapolated) = 1.04 W/kg
SAR(1 g) = 0.675 W/kg



0 dB = 0.799 W/kg = -0.97 dBW/kg

PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LSMG891A; Type: Portable Handset; Serial: 19012

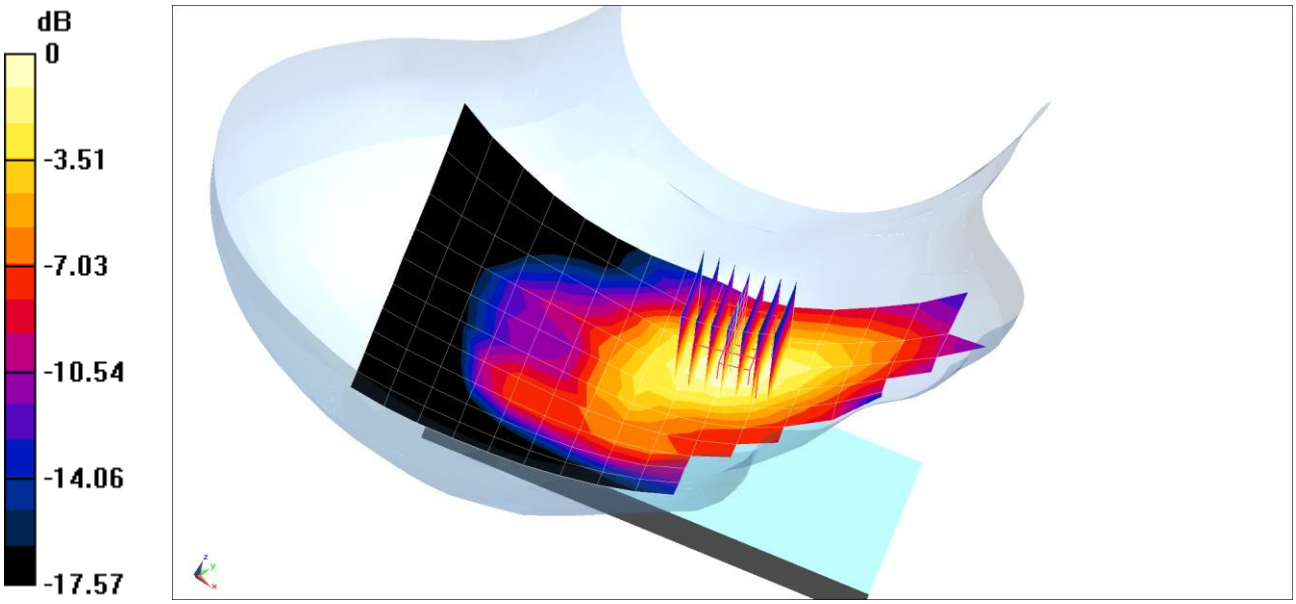
Communication System: UID 0, LTE Band 30; Frequency: 2310 MHz; Duty Cycle: 1:1
Medium: 2300 Head Medium parameters used:
f = 2310 MHz; σ = 1.692 S/m; ε_r = 39.035; ρ = 1000 kg/m^3
Phantom section: Right Section

Test Date: 04-01-2016; Ambient Temp: 23.1°C; Tissue Temp: 22.7°C

Probe: ES3DV3 - SN3318; ConvF(4.78, 4.78, 4.78); Calibrated: 2/19/2016;
Sensor-Surface: 3mm (Mechanical Surface Detection)
Electronics: DAE4 Sn665; Calibrated: 2/19/2016
Phantom: SAM with CRP v4.0; Type: QD000P40CD; Serial: TP:1800
Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Mode: LTE Band 30, Right Head, Cheek, Mid.ch
10 MHz Bandwidth, QPSK, 25 RB, 0 RB Offset

Area Scan (11x18x1): Measurement grid: dx=12mm, dy=12mm
Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 16.232 V/m; Power Drift = -0.01 dB
Peak SAR (extrapolated) = 0.629 W/kg
SAR(1 g) = 0.370 W/kg



0 dB = 0.450 W/kg = -3.47 dBW/kg

DUT: A3LSMG891A; Type: Portable Handset; Serial: 18196

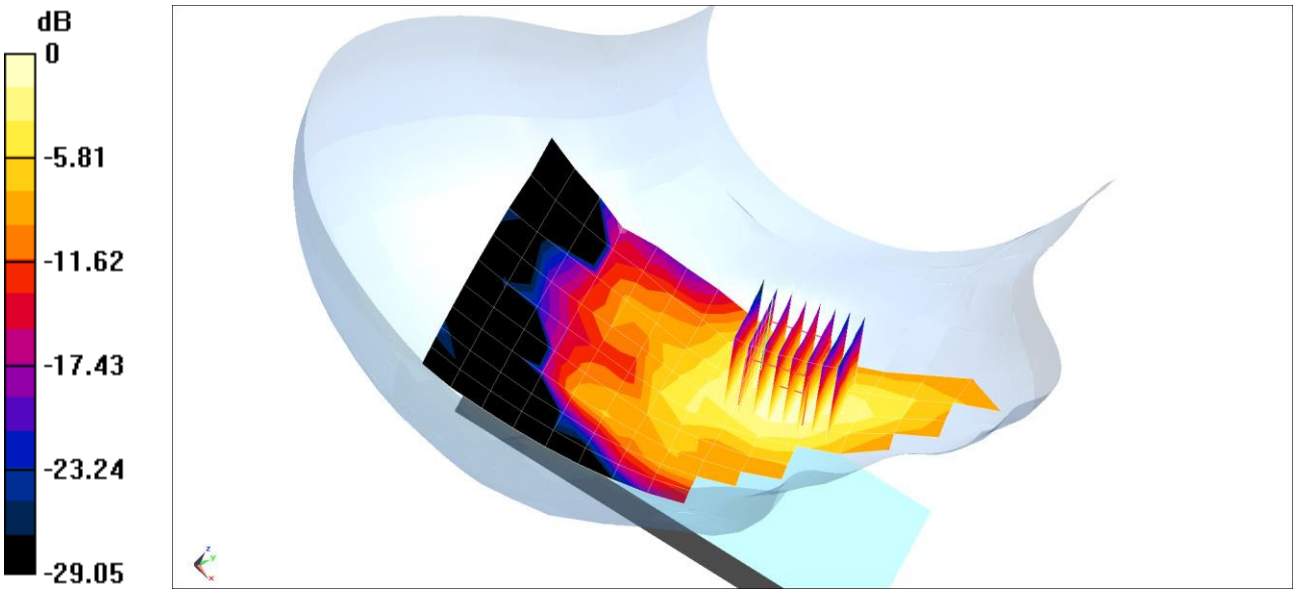
Communication System: UID 0, LTE Band 41; Frequency: 2593 MHz; Duty Cycle: 1:1.58
Medium: 2600 Head Medium parameters used (interpolated):
f = 2593 MHz; σ = 2.03 S/m; ε_r = 38.533; ρ = 1000 kg/m^3
Phantom section: Right Section

Test Date: 03-24-2016; Ambient Temp: 24.3°C; Tissue Temp: 23.5°C

Probe: ES3DV3 - SN3288; ConvF(4.44, 4.44, 4.44); Calibrated: 9/18/2015;
Sensor-Surface: 3mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1364; Calibrated: 9/18/2015
Phantom: Main TWIN SAM; Type: QD000P40CC; Serial: TP-1406
Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

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

Area Scan (10x17x1): Measurement grid: dx=12mm, dy=12mm
Zoom Scan (7x8x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 7.100 V/m; Power Drift = 0.06 dB
Peak SAR (extrapolated) = 0.172 W/kg
SAR(1 g) = 0.078 W/kg



0 dB = 0.105 W/kg = -9.79 dBW/kg

PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LSMG891A; Type: Portable Handset; Serial: 18204

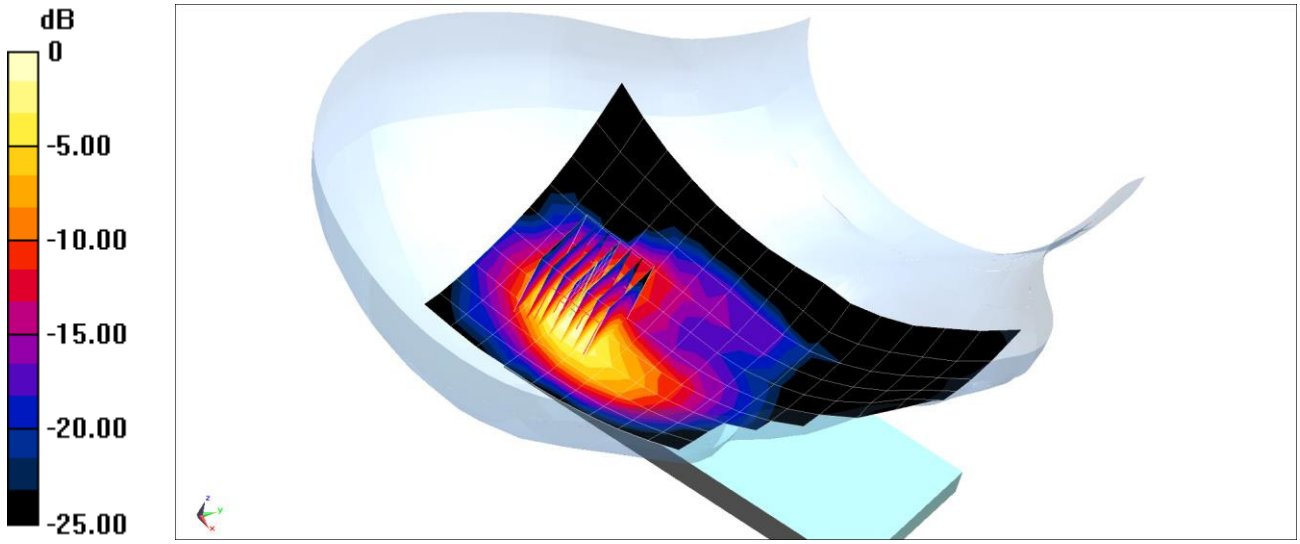
Communication System: UID 0, IEEE 802.11b; Frequency: 2462 MHz; Duty Cycle: 1:1
Medium: 2450 Head Medium parameters used (interpolated):
f = 2462 MHz; σ = 1.88 S/m; ε_r = 38.601; ρ = 1000 kg/m^3
Phantom section: Right Section

Test Date: 03-29-2016; Ambient Temp: 24.5°C; Tissue Temp: 23.5°C

Probe: ES3DV3 - SN3351; ConvF(4.46, 4.46, 4.46); Calibrated: 6/22/2015;
Sensor-Surface: 3mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1322; Calibrated: 8/24/2015
Phantom: SAM 5.0 front; Type: QD000P40CD; Serial: TP:-1648
Measurement SW: DASY52, Version 52.8 (8);SEMCAD X Version 14.6.10 (7331)

Mode: IEEE 802.11b, 22 MHz Bandwidth, Right Head, Cheek, Ch 11, 1 Mbps, Antenna 1

Area Scan (11x18x1): Measurement grid: dx=12mm, dy=12mm
Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 6.846 V/m; Power Drift = 0.08
Peak SAR (extrapolated) = 0.506 W/kg
SAR(1 g) = 0.218 W/kg



0 dB = 0.289 W/kg = -5.39 dBW/kg

PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LSMG891A; Type: Portable Handset; Serial: 18204

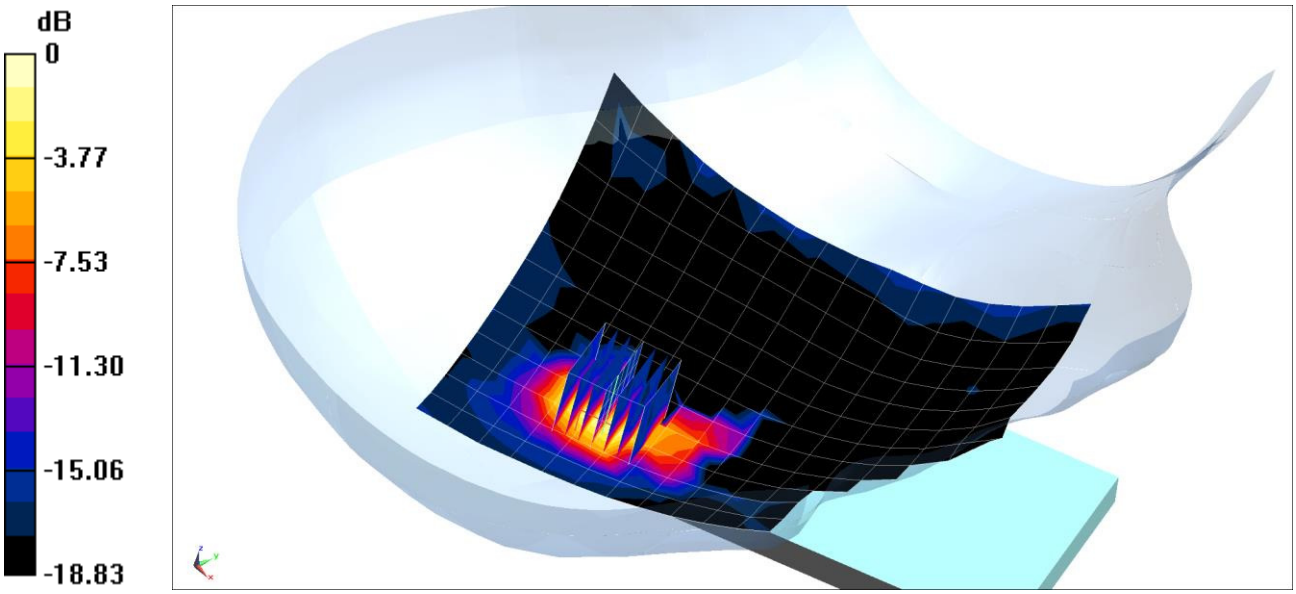
Communication System: UID 0, IEEE 802.11ac; Frequency: 5290 MHz; Duty Cycle: 1:1
Medium: 5 GHz Head Medium parameters used (interpolated):
f = 5290 MHz; σ = 4.628 S/m; ε_r = 37.195; ρ = 1000 kg/m^3
Phantom section: Right Section

Test Date: 03-30-2016; Ambient Temp: 19.1°C; Tissue Temp: 20.5°C

Probe: EX3DV4 - SN3914; ConvF(5.07, 5.07, 5.07); Calibrated: 2/22/2016;
Sensor-Surface: 1.4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1272; Calibrated: 2/18/2016
Phantom: SAM v5.0 front; Type: QD000P40CD; Serial: TP-1646
Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Mode: IEEE 802.11ac, U-NII-2A, 80 MHz Bandwidth, Right Head, Cheek
Ch 58, 29.3 Mbps, Antenna 2

Area Scan (13x16x1): 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 = 6.267 V/m; Power Drift = 0.02 dB
Peak SAR (extrapolated) = 0.836 W/kg
SAR(1 g) = 0.176 W/kg



0 dB = 0.449 W/kg = -3.48 dBW/kg

DUT: A3LSMG891A; Type: Portable Handset; Serial: 18253

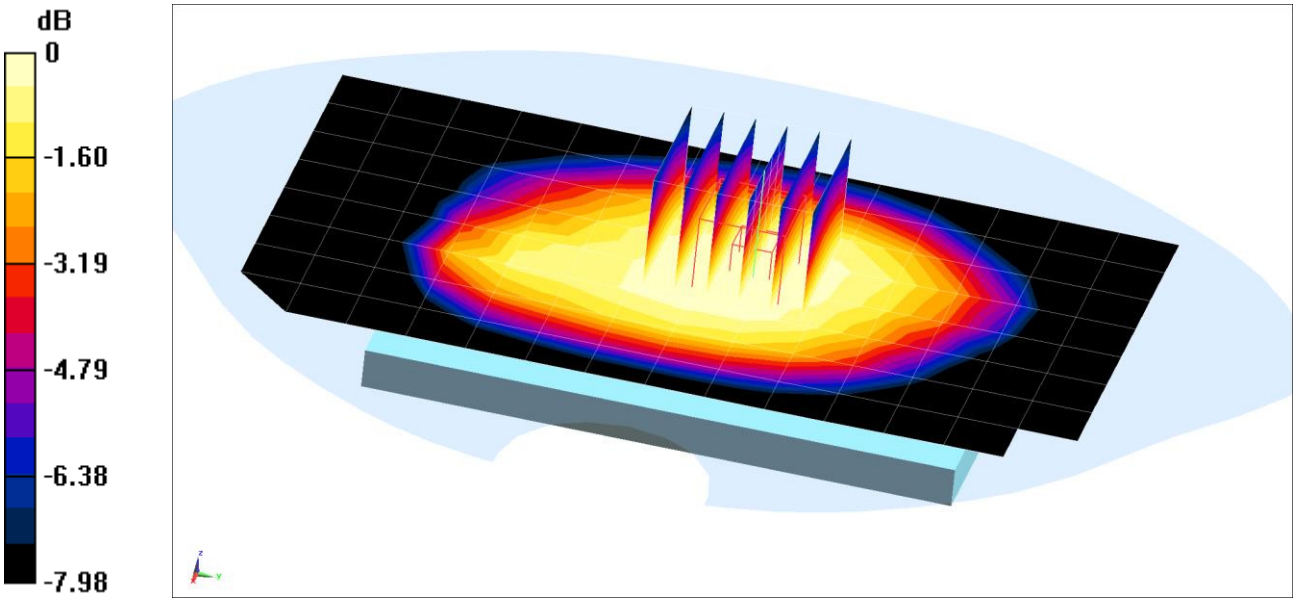
Communication System: UID 0, GSM; Frequency: 836.6 MHz; Duty Cycle: 1:8.3
Medium: 835 Body Medium parameters used (interpolated):
f = 836.6 MHz; σ = 0.978 S/m; ε_r = 53.602; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.5 cm

Test Date: 03-22-2016; Ambient Temp: 23.9°C; Tissue Temp: 23.0°C

Probe: ES3DV3 - SN3334; ConvF(6.24, 6.24, 6.24); Calibrated: 11/17/2015;
Sensor-Surface: 3mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1415; Calibrated: 11/11/2015
Phantom: SAM Front; Type: SAM; Serial: 1686
Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

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

Area Scan (9x15x1): Measurement grid: dx=15mm, dy=15mm
Zoom Scan (6x6x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 18.047 V/m; Power Drift = -0.10 dB
Peak SAR (extrapolated) = 0.382 W/kg
SAR(1 g) = 0.299 W/kg



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

DUT: A3LSMG891A; Type: Portable Handset; Serial: 18253

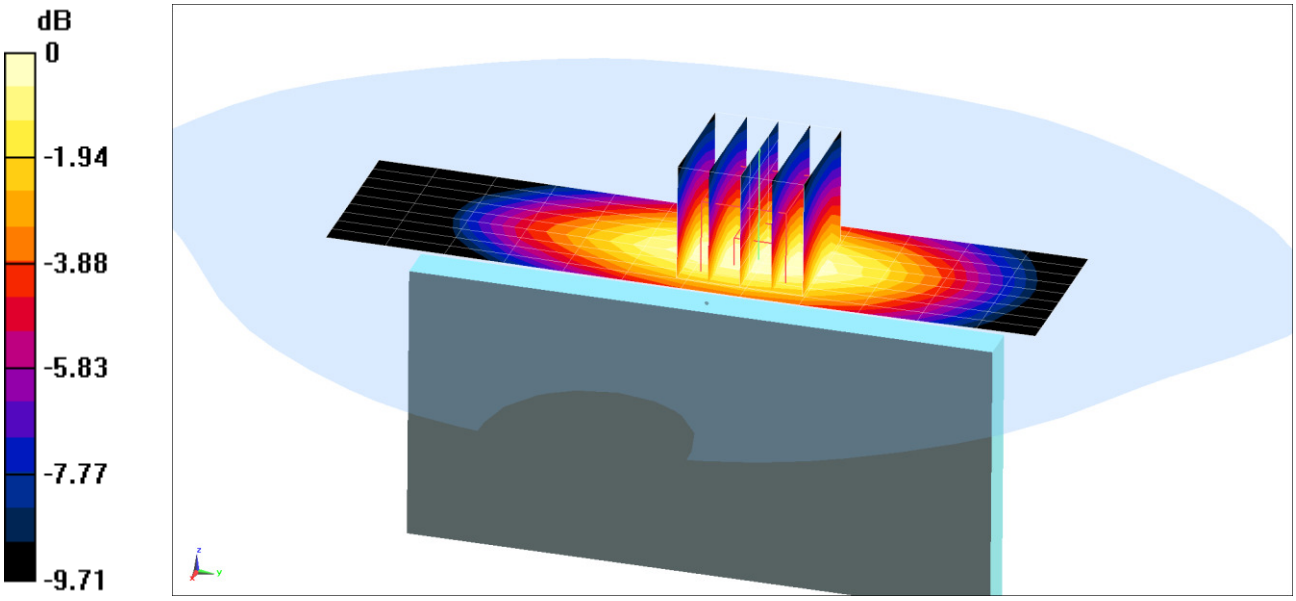
Communication System: UID 0, GSM GPRS; 2 Tx slots; Frequency: 836.6 MHz; Duty Cycle: 1:4.15
Medium: 835 Body Medium parameters used (interpolated):
f = 836.6 MHz; σ = 0.978 S/m; ε_r = 53.602; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 03-22-2016; Ambient Temp: 23.9°C; Tissue Temp: 23.0°C

Probe: ES3DV3 - SN3334; ConvF(6.24, 6.24, 6.24); Calibrated: 11/17/2015;
Sensor-Surface: 3mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1415; Calibrated: 11/11/2015
Phantom: SAM Front; Type: SAM; Serial: 1686
Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Mode: GPRS 850, Body SAR, Left Edge, Mid.ch, 2 Tx Slots

Area Scan (10x13x1): Measurement grid: dx=5mm, dy=15mm
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 25.161 V/m; Power Drift = -0.08 dB
Peak SAR (extrapolated) = 0.806 W/kg
SAR(1 g) = 0.565 W/kg



0 dB = 0.656 W/kg = -1.83 dBW/kg

DUT: A3LSMG891A; Type: Portable Handset; Serial: 18196

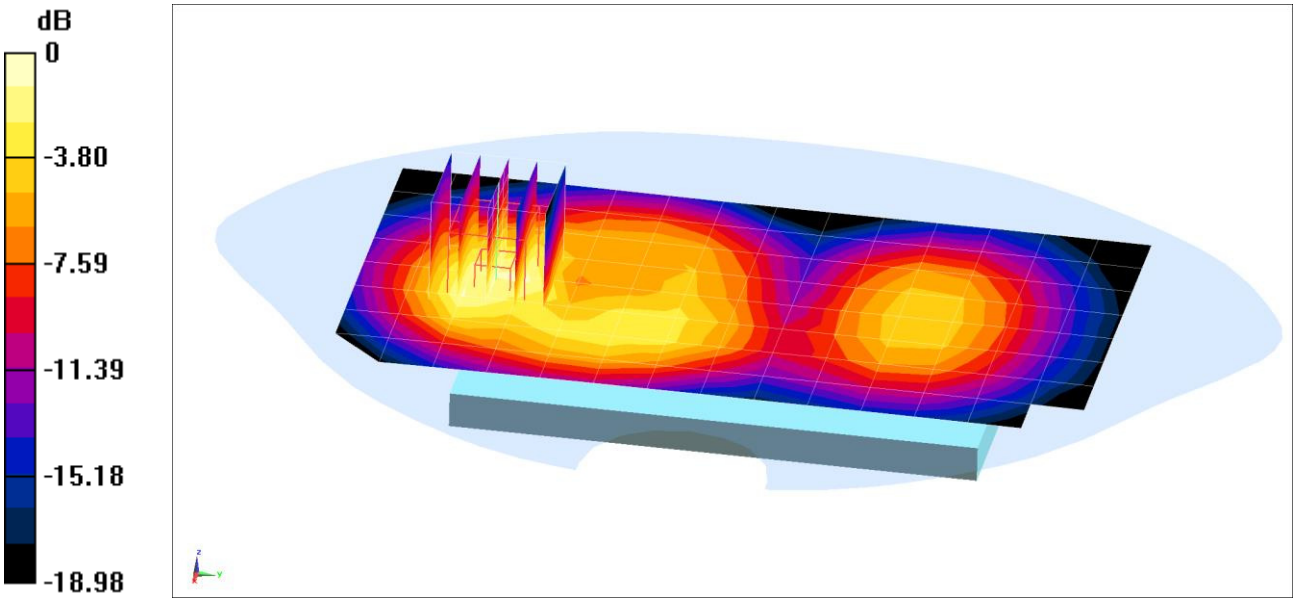
Communication System: UID 0, GSM; Frequency: 1880 MHz; Duty Cycle: 1:8.3
Medium: 1900 Body Medium parameters used:
f = 1880 MHz; σ = 1.5 S/m; ε_r = 52.661; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.5 cm

Test Date: 03-23-2016; Ambient Temp: 22.8°C; Tissue Temp: 22.5°C

Probe: ES3DV3 - SN3332; ConvF(4.7, 4.7, 4.7); Calibrated: 9/18/2015;
Sensor-Surface: 3mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1466; Calibrated: 1/15/2016
Phantom: SAM Sub ; Type: QD000P40CC; Serial: TP:1357
Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Mode: GSM 1900, 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 = 15.057 V/m; Power Drift = -0.03 dB
Peak SAR (extrapolated) = 0.488 W/kg
SAR(1 g) = 0.292 W/kg



0 dB = 0.357 W/kg = -4.47 dBW/kg

DUT: A3LSMG891A; Type: Portable Handset; Serial: 18170

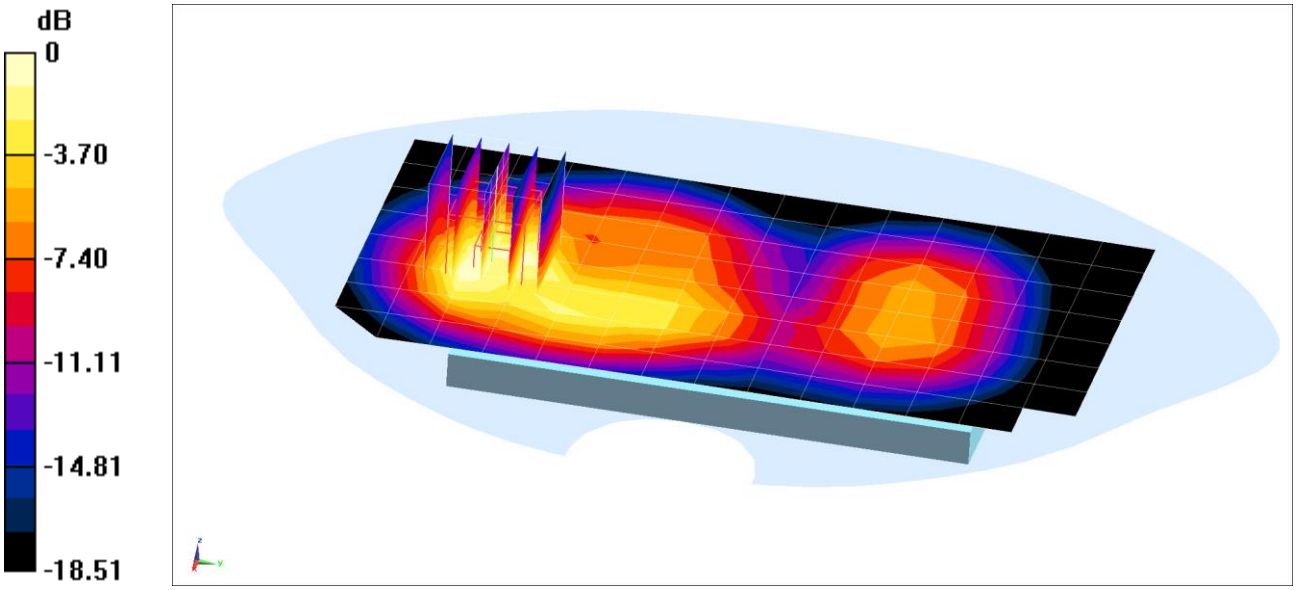
Communication System: UID 0, GSM GPRS; 2 Tx slots; Frequency: 1880 MHz; Duty Cycle: 1:4.15
Medium: 1900 Body Medium parameters used:
f = 1880 MHz; σ = 1.5 S/m; ε_r = 52.661; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 03-23-2016; Ambient Temp: 22.8°C; Tissue Temp: 22.5°C

Probe: ES3DV3 - SN3332; ConvF(4.7, 4.7, 4.7); Calibrated: 9/18/2015;
Sensor-Surface: 3mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1466; Calibrated: 1/15/2016
Phantom: SAM Sub ; Type: QD000P40CC; Serial: TP:1357
Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Mode: GPRS 1900, Body SAR, Back side, Mid.ch, 2 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 = 20.576 V/m; Power Drift = 0.02 dB
Peak SAR (extrapolated) = 0.930 W/kg
SAR(1 g) = 0.534 W/kg



0 dB = 0.667 W/kg = -1.76 dBW/kg

DUT: A3LSMG891A; Type: Portable Handset; Serial: 18253

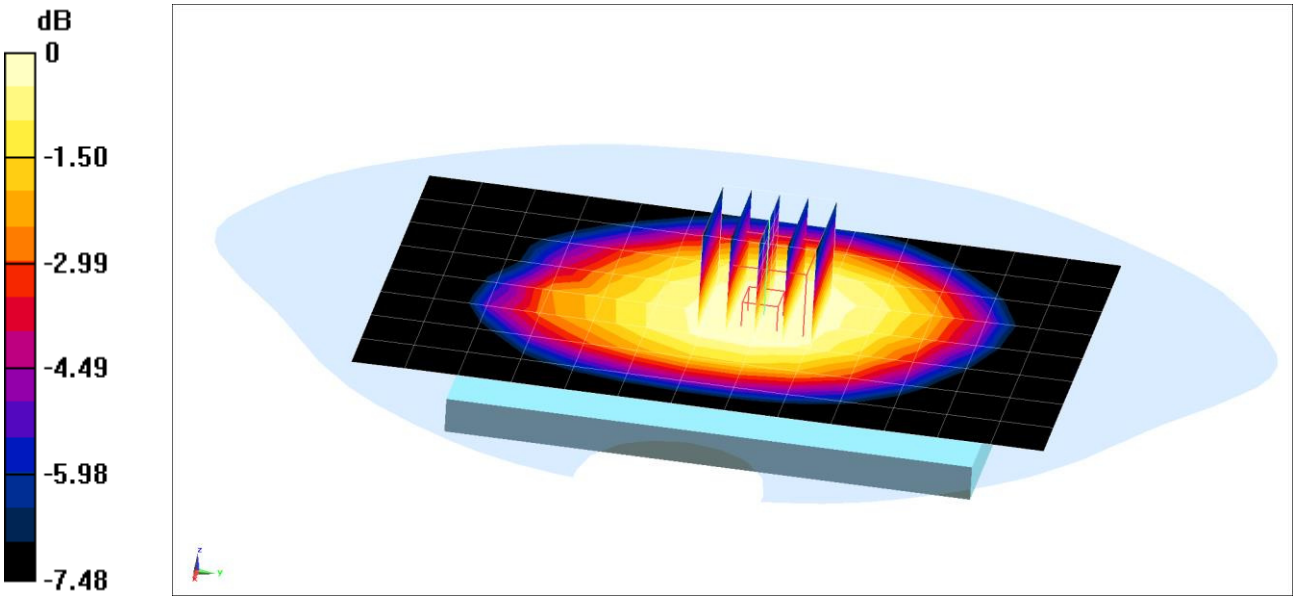
Communication System: UID 0, UMTS; Frequency: 836.6 MHz; Duty Cycle: 1:1
Medium: 835 Body Medium parameters used (interpolated):
f = 836.6 MHz; σ = 0.978 S/m; ε_r = 53.602; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.5 cm

Test Date: 03-22-2016; Ambient Temp: 23.9°C; Tissue Temp: 23.0°C

Probe: ES3DV3 - SN3334; ConvF(6.24, 6.24, 6.24); Calibrated: 11/17/2015;
Sensor-Surface: 3mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1415; Calibrated: 11/11/2015
Phantom: SAM Front; Type: SAM; Serial: 1686
Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Mode: UMTS 850, 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 = 19.478 V/m; Power Drift = 0.00 dB
Peak SAR (extrapolated) = 0.437 W/kg
SAR(1 g) = 0.346 W/kg



0 dB = 0.379 W/kg = -4.21 dBW/kg

DUT: A3LSMG891A; Type: Portable Handset; Serial: 18253

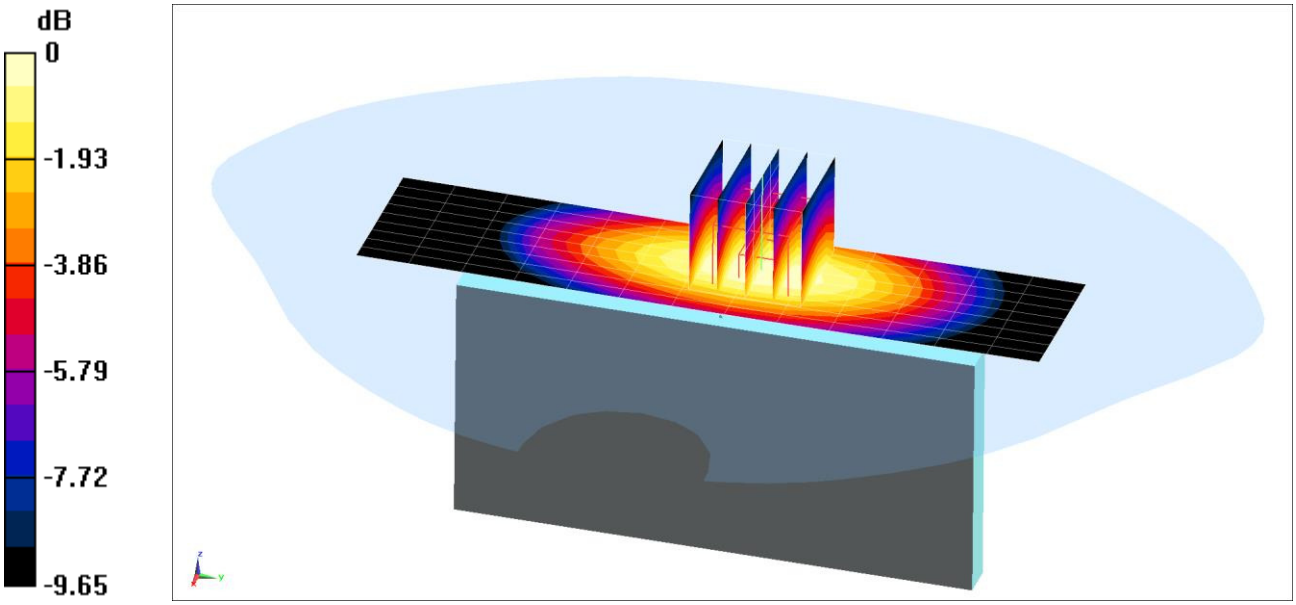
Communication System: UID 0, UMTS; Frequency: 836.6 MHz; Duty Cycle: 1:1
Medium: 835 Body Medium parameters used (interpolated):
f = 836.6 MHz; σ = 0.978 S/m; ε_r = 53.602; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 03-22-2016; Ambient Temp: 23.9°C; Tissue Temp: 23.0°C

Probe: ES3DV3 - SN3334; ConvF(6.24, 6.24, 6.24); Calibrated: 11/17/2015;
Sensor-Surface: 3mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1415; Calibrated: 11/11/2015
Phantom: SAM Front; Type: SAM; Serial: 1686
Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Mode: UMTS 850, Body SAR, Left Edge, Mid.ch

Area Scan (10x14x1): Measurement grid: dx=5mm, dy=15mm
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 24.105 V/m; Power Drift = 0.08 dB
Peak SAR (extrapolated) = 0.741 W/kg
SAR(1 g) = 0.525 W/kg



0 dB = 0.604 W/kg = -2.19 dBW/kg

DUT: A3LSMG891A; Type: Portable Handset; Serial: 18196

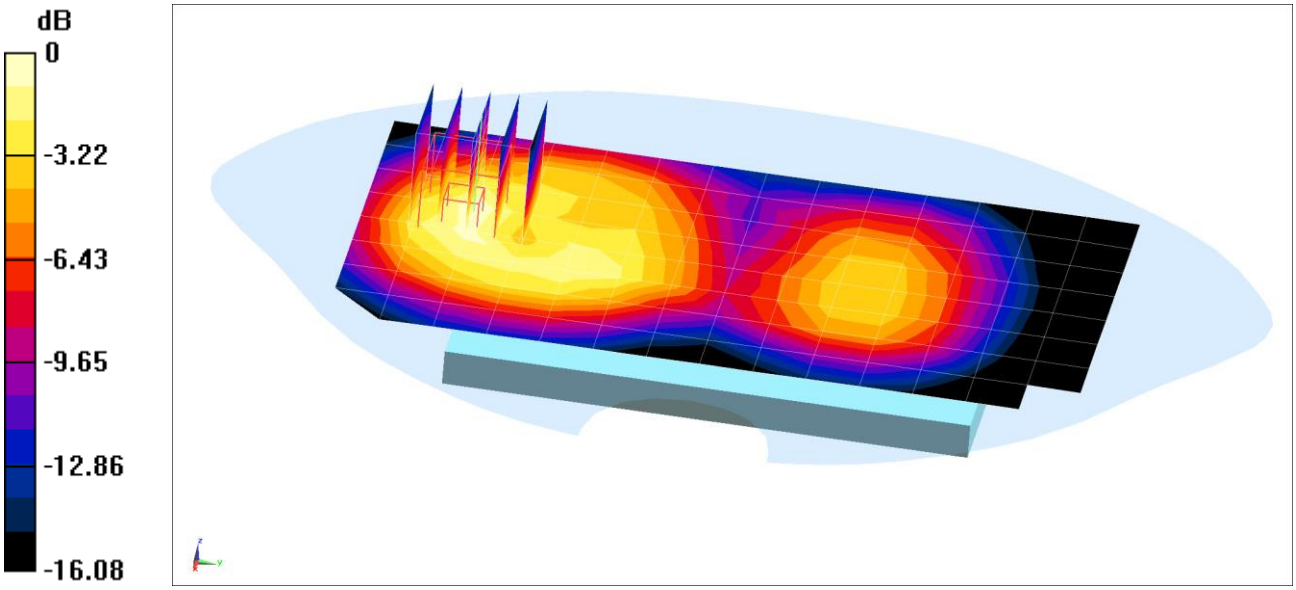
Communication System: UID 0, UMTS; Frequency: 1732.4 MHz; Duty Cycle: 1:1
Medium: 1750 Body Medium parameters used (interpolated):
f = 1732.4 MHz; σ = 1.461 S/m; ε_r = 51.001; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.5 cm

Test Date: 03-24-2016; Ambient Temp: 24.3°C; Tissue Temp: 23.5°C

Probe: ES3DV3 - SN3288; ConvF(4.99, 4.99, 4.99); Calibrated: 9/18/2015;
Sensor-Surface: 3mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1364; Calibrated: 9/18/2015
Phantom: Sub TWIN SAM; Type: QD000P40CC; Serial: TP-1357
Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

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 = 19.958 V/m; Power Drift = 0.00 dB
Peak SAR (extrapolated) = 0.874 W/kg
SAR(1 g) = 0.528 W/kg



0 dB = 0.630 W/kg = -2.01 dBW/kg

DUT: A3LSMG891A; Type: Portable Handset; Serial: 18246

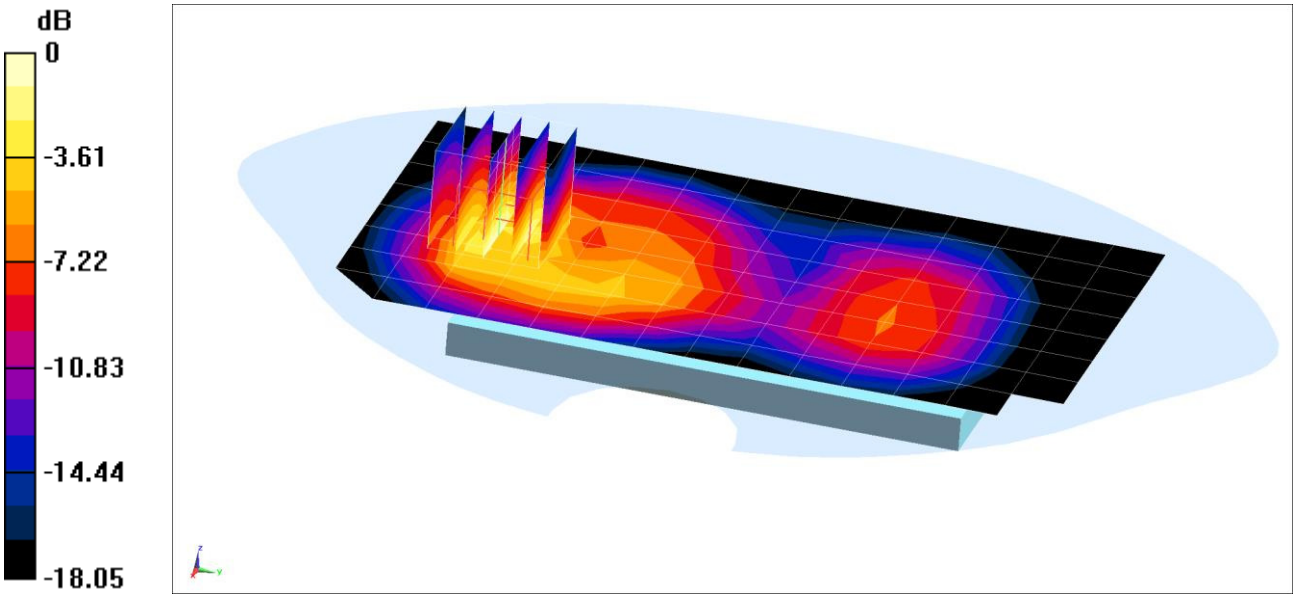
Communication System: UID 0, UMTS; Frequency: 1732.4 MHz; Duty Cycle: 1:1
Medium: 1750 Body Medium parameters used (interpolated):
f = 1732.4 MHz; σ = 1.461 S/m; ε_r = 51.001; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 03-24-2016; Ambient Temp: 24.3°C; Tissue Temp: 23.5°C

Probe: ES3DV3 - SN3288; ConvF(4.99, 4.99, 4.99); Calibrated: 9/18/2015;
Sensor-Surface: 3mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1364; Calibrated: 9/18/2015
Phantom: Sub TWIN SAM; Type: QD000P40CC; Serial: TP-1357
Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

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 = 15.006 V/m; Power Drift = 0.04 dB
Peak SAR (extrapolated) = 0.916 W/kg
SAR(1 g) = 0.534 W/kg



0 dB = 0.646 W/kg = -1.90 dBW/kg

PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LSMG891A; Type: Portable Handset; Serial: 18196

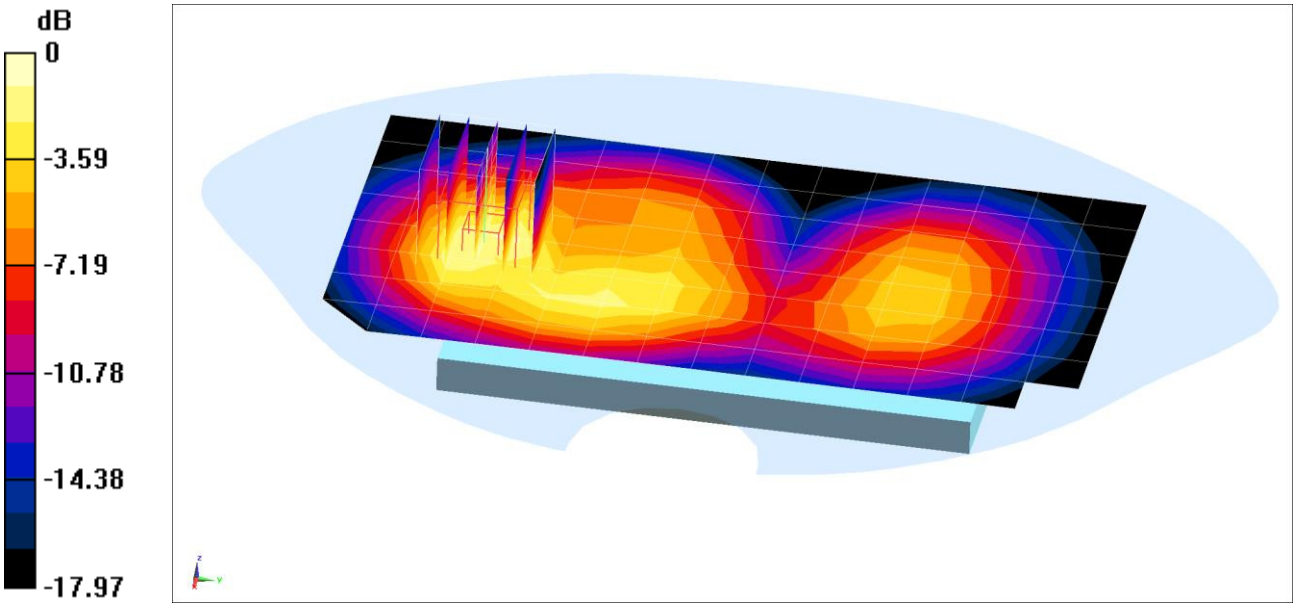
Communication System: UID 0, UMTS; Frequency: 1880 MHz; Duty Cycle: 1:1
Medium: 1900 Body Medium parameters used:
f = 1880 MHz; σ = 1.5 S/m; ε_r = 52.661; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.5 cm

Test Date: 03-23-2016; Ambient Temp: 22.8°C; Tissue Temp: 22.5°C

Probe: ES3DV3 - SN3332; ConvF(4.7, 4.7, 4.7); Calibrated: 9/18/2015;
Sensor-Surface: 3mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1466; Calibrated: 1/15/2016
Phantom: SAM Sub ; Type: QD000P40CC; Serial: TP:1357
Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Mode: UMTS 1900, 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 = 20.970 V/m; Power Drift = -0.07 dB
Peak SAR (extrapolated) = 1.12 W/kg
SAR(1 g) = 0.672 W/kg



0 dB = 0.827 W/kg = -0.82 dBW/kg

DUT: A3LSMG891A; Type: Portable Handset; Serial: 18170

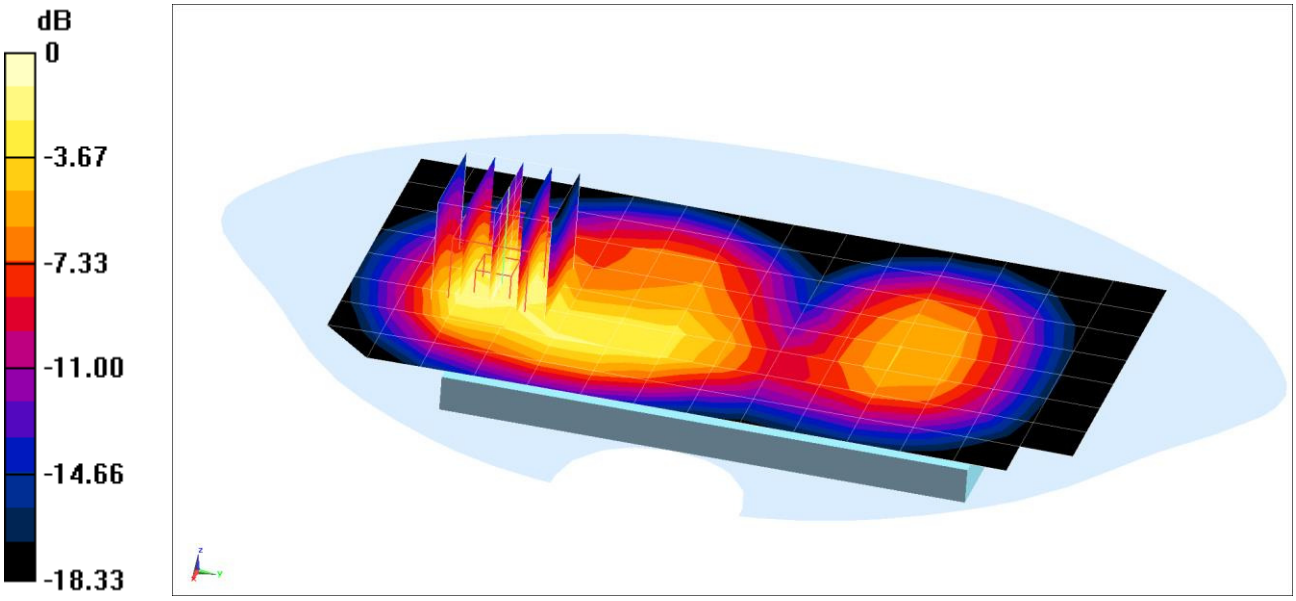
Communication System: UID 0, UMTS; Frequency: 1880 MHz; Duty Cycle: 1:1
Medium: 1900 Body Medium parameters used:
f = 1880 MHz; σ = 1.5 S/m; ε_r = 52.661; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 03-23-2016; Ambient Temp: 22.8°C; Tissue Temp: 22.5°C

Probe: ES3DV3 - SN3332; ConvF(4.7, 4.7, 4.7); Calibrated: 9/18/2015;
Sensor-Surface: 3mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1466; Calibrated: 1/15/2016
Phantom: SAM Sub ; Type: QD000P40CC; Serial: TP:1357
Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Mode: UMTS 1900, 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 = 20.970 V/m; Power Drift = -0.06 dB
Peak SAR (extrapolated) = 0.849 W/kg
SAR(1 g) = 0.490 W/kg



0 dB = 0.608 W/kg = -2.16 dBW/kg

DUT: A3LSMG891A; Type: Portable Handset; Serial: 18253

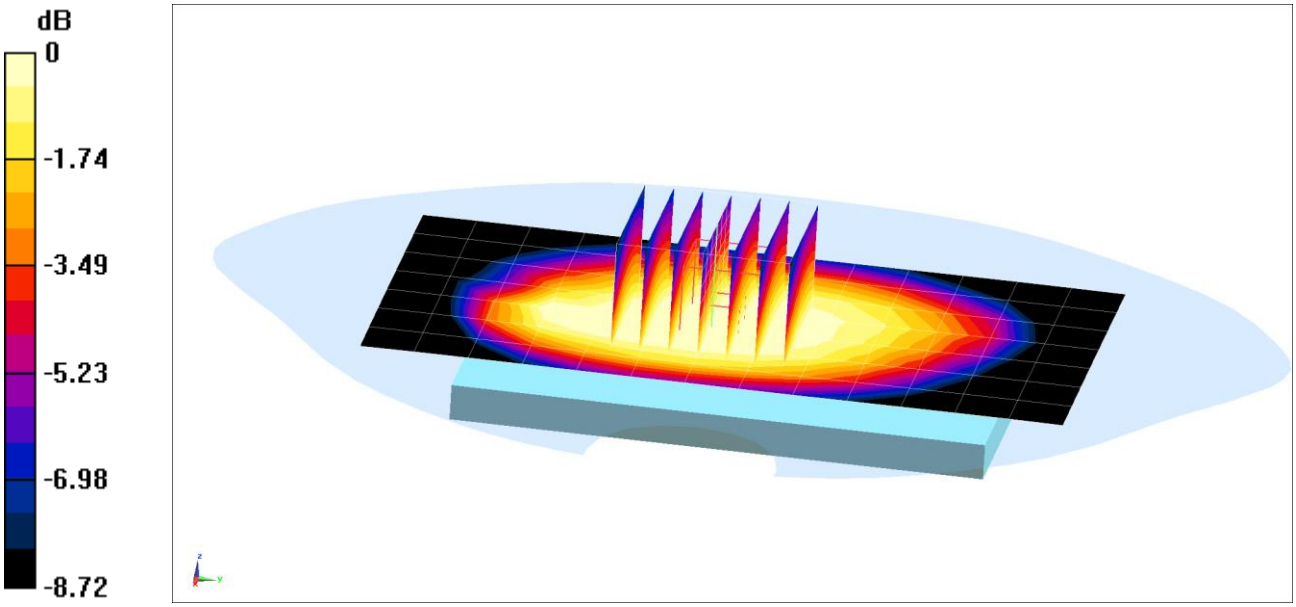
Communication System: UID 0, LTE Band 12; Frequency: 707.5 MHz; Duty Cycle: 1:1
Medium: 750 Body Medium parameters used (interpolated):
f = 707.5 MHz; σ = 0.919 S/m; ε_r = 54.832; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.5 cm

Test Date: 03-26-2016; Ambient Temp: 23.8°C; Tissue Temp: 21.5°C

Probe: ES3DV2 - SN3022; ConvF(6.16, 6.16, 6.16); Calibrated: 8/26/2015;
Sensor-Surface: 3mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1323; Calibrated: 9/16/2015
Phantom: SAM Left; Type: QD000P40CC; Serial: TP: 1375
Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

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

Area Scan (8x14x1): Measurement grid: dx=15mm, dy=15mm
Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 22.940 V/m; Power Drift = -0.01 dB
Peak SAR (extrapolated) = 0.570 W/kg
SAR(1 g) = 0.456 W/kg



0 dB = 0.497 W/kg = -3.04 dBW/kg

PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LSMG891A; Type: Portable Handset; Serial: 18253

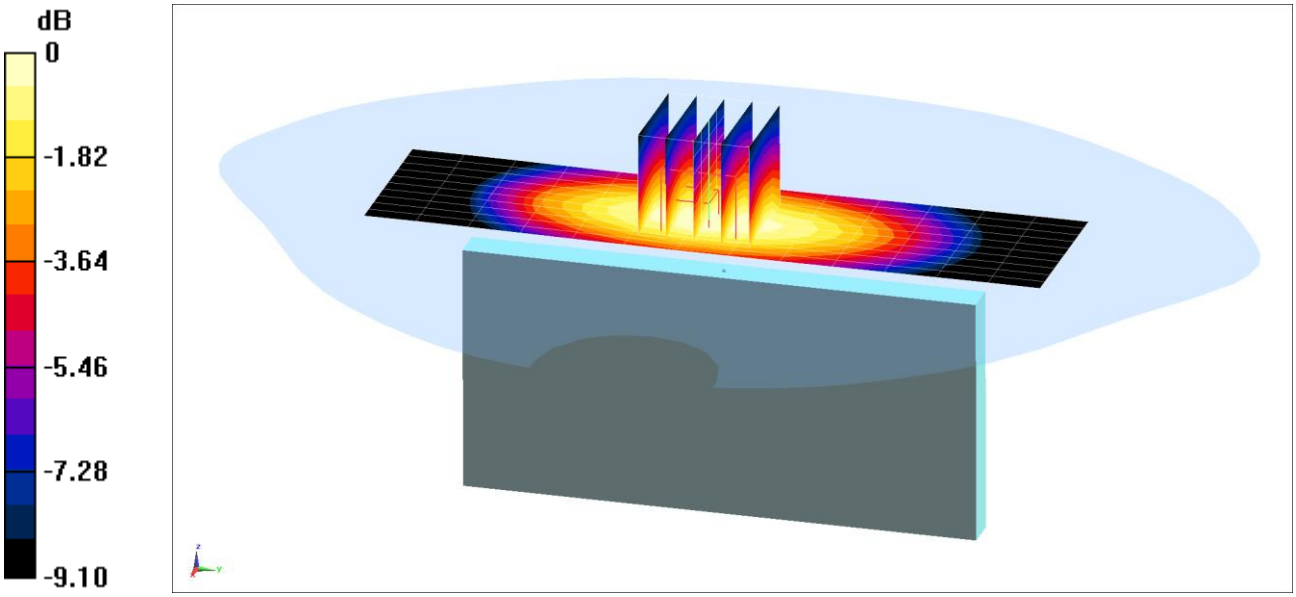
Communication System: UID 0, LTE Band 12; Frequency: 707.5 MHz; Duty Cycle: 1:1
Medium: 750 Body Medium parameters used (interpolated):
f = 707.5 MHz; σ = 0.919 S/m; ε_r = 54.832; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 03-26-2016; Ambient Temp: 23.8°C; Tissue Temp: 21.5°C

Probe: ES3DV2 - SN3022; ConvF(6.16, 6.16, 6.16); Calibrated: 8/26/2015;
Sensor-Surface: 3mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1323; Calibrated: 9/16/2015
Phantom: SAM Left; Type: QD000P40CC; Serial: TP: 1375
Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

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

Area Scan (11x14x1): Measurement grid: dx=5mm, dy=15mm
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 25.133 V/m; Power Drift = -0.01 dB
Peak SAR (extrapolated) = 0.766 W/kg
SAR(1 g) = 0.544 W/kg



0 dB = 0.619 W/kg = -2.08 dBW/kg

DUT: A3LSMG891A; Type: Portable Handset; Serial: 18253

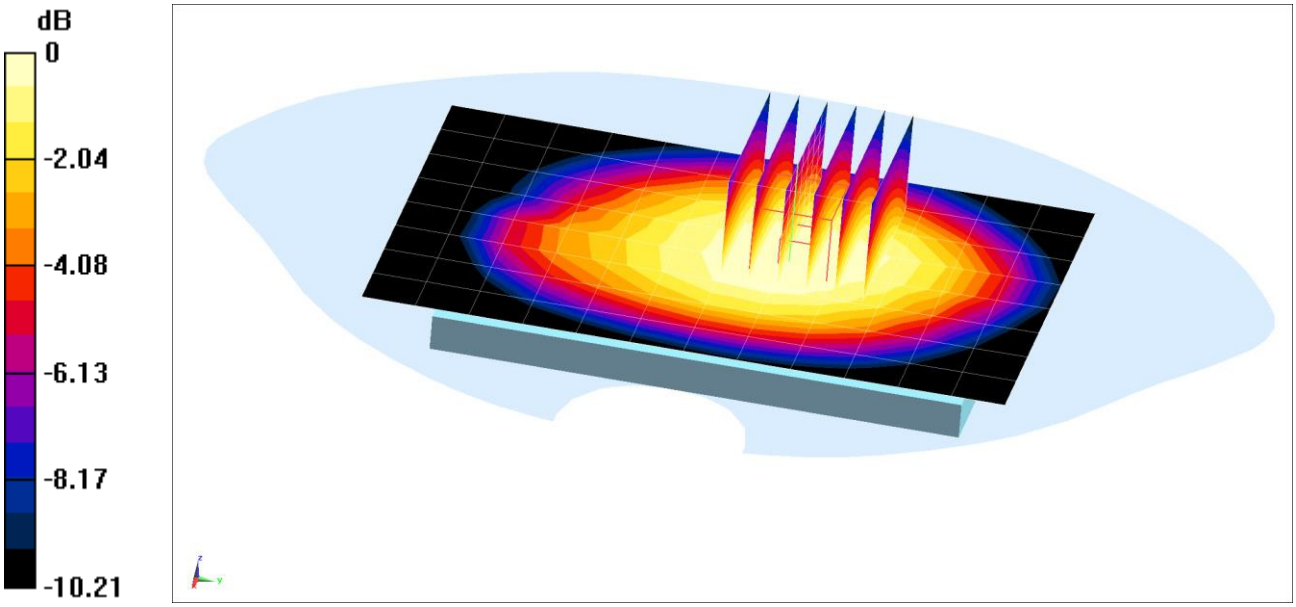
Communication System: UID 0, LTE Band 5; Frequency: 836.5 MHz; Duty Cycle: 1:1
Medium: 835 Body Medium parameters used (interpolated):
f = 836.5 MHz; σ = 0.993 S/m; ε_r = 53.285; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.5 cm

Test Date: 03-28-2016; Ambient Temp: 21.5°C; Tissue Temp: 21.6°C

Probe: ES3DV3 - SN3213; ConvF(6, 6, 6); Calibrated: 2/19/2016;
Sensor-Surface: 3mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1272; Calibrated: 2/18/2016
Phantom: SAM v5.0 front; Type: QD000P40CD; Serial: TP-1646
Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Mode: LTE Band 5 (Cell.), Body SAR, Back side, Mid.ch
10 MHz Bandwidth, QPSK, 1 RB, 0 RB Offset

Area Scan (9x13x1): Measurement grid: dx=15mm, dy=15mm
Zoom Scan (8x6x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 21.654 V/m; Power Drift = -0.05 dB
Peak SAR (extrapolated) = 0.554 W/kg
SAR(1 g) = 0.439 W/kg



0 dB = 0.480 W/kg = -3.19 dBW/kg

DUT: A3LSMG891A; Type: Portable Handset; Serial: 18253

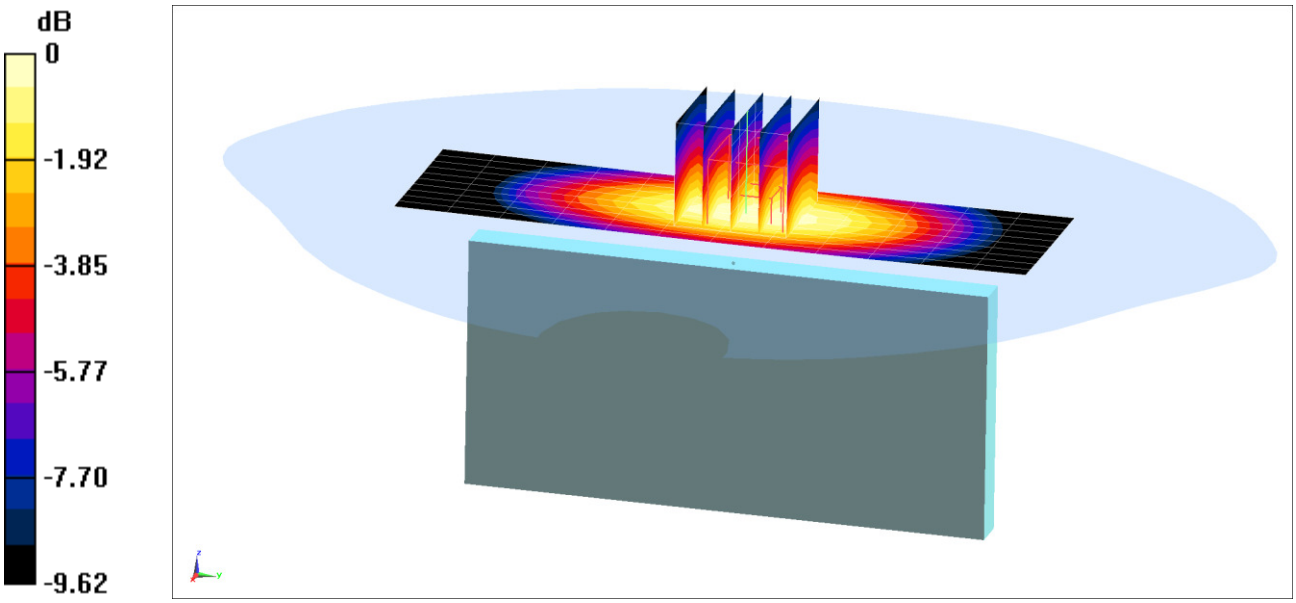
Communication System: UID 0, LTE Band 5; Frequency: 836.5 MHz; Duty Cycle: 1:1
Medium: 835 Body Medium parameters used (interpolated):
f = 836.5 MHz; σ = 0.978 S/m; ε_r = 53.603; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 03-22-2016; Ambient Temp: 23.9°C; Tissue Temp: 23.0°C

Probe: ES3DV3 - SN3334; ConvF(6.24, 6.24, 6.24); Calibrated: 11/17/2015;
Sensor-Surface: 3mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1415; Calibrated: 11/11/2015
Phantom: SAM Front; Type: SAM; Serial: 1686
Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Mode: LTE Band 5 (Cell.), Body SAR, Left Edge, Mid.ch
10 MHz Bandwidth, QPSK, 1 RB, 0 RB Offset

Area Scan (11x13x1): Measurement grid: dx=5mm, dy=15mm
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 23.848 V/m; Power Drift = -0.12 dB
Peak SAR (extrapolated) = 0.691 W/kg
SAR(1 g) = 0.491 W/kg



0 dB = 0.565 W/kg = -2.48 dBW/kg

DUT: A3LSMG891A; Type: Portable Handset; Serial: 18196

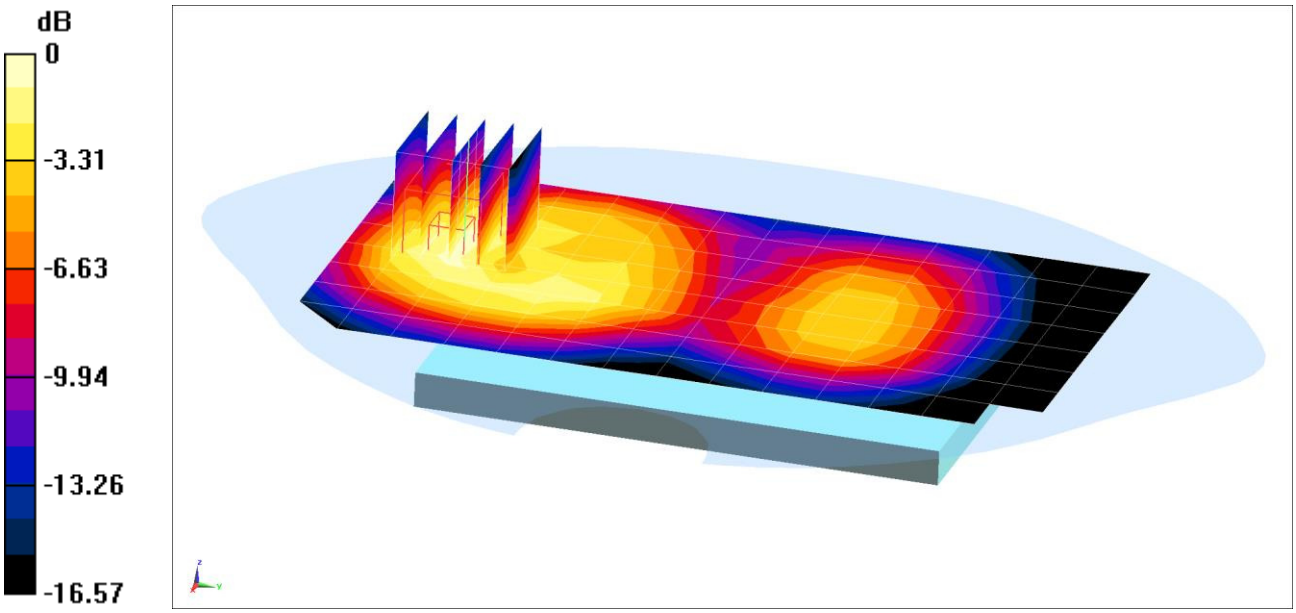
Communication System: UID 0, LTE Band 4 (AWS); Frequency: 1732.5 MHz; Duty Cycle: 1:1
Medium: 1750 Body Medium parameters used (interpolated):
f = 1732.5 MHz; σ = 1.461 S/m; ε_r = 51.001; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.5 cm

Test Date: 03-24-2016; Ambient Temp: 24.3°C; Tissue Temp: 23.5°C

Probe: ES3DV3 - SN3288; ConvF(4.99, 4.99, 4.99); Calibrated: 9/18/2015;
Sensor-Surface: 3mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1364; Calibrated: 9/18/2015
Phantom: Sub TWIN SAM; Type: QD000P40CC; Serial: TP-1357
Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Mode: LTE Band 4 (AWS), Body SAR, Back side, Mid.ch
20 MHz Bandwidth, QPSK, 1 RB, 99 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 = 20.561 V/m; Power Drift = 0.03 dB
Peak SAR (extrapolated) = 0.932 W/kg
SAR(1 g) = 0.562 W/kg



0 dB = 0.668 W/kg = -1.75 dBW/kg

PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LSMG891A; Type: Portable Handset; Serial: 18246

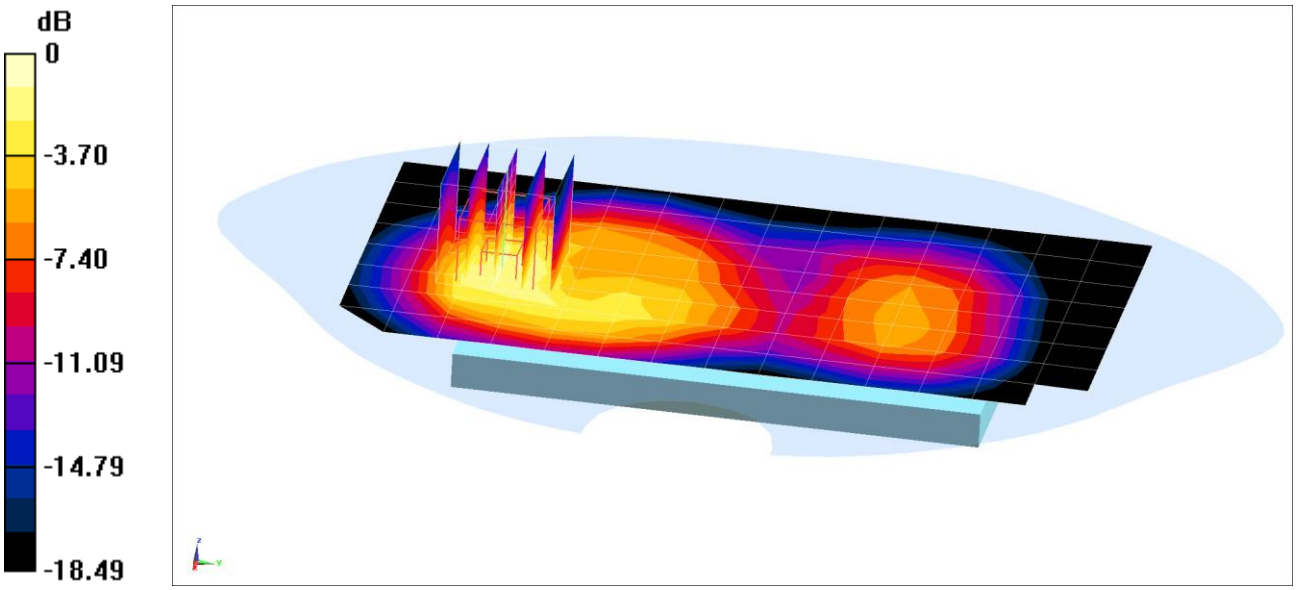
Communication System: UID 0, LTE Band 4 (AWS); Frequency: 1732.5 MHz; Duty Cycle: 1:1
Medium: 1750 Body Medium parameters used (interpolated):
f = 1732.5 MHz; σ = 1.461 S/m; ε_r = 51.001; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 03-24-2016; Ambient Temp: 24.3°C; Tissue Temp: 23.5°C

Probe: ES3DV3 - SN3288; ConvF(4.99, 4.99, 4.99); Calibrated: 9/18/2015;
Sensor-Surface: 3mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1364; Calibrated: 9/18/2015
Phantom: Sub TWIN SAM; Type: QD000P40CC; Serial: TP-1357
Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Mode: LTE Band 4 (AWS), Body SAR, Back side, Mid.ch
20 MHz Bandwidth, QPSK, 1 RB, 99 RB Offset

Area Scan (9x15x1): Measurement grid: dx=15mm, dy=15mm
Zoom Scan (6x6x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 15.604 V/m; Power Drift = -0.01 dB
Peak SAR (extrapolated) = 0.975 W/kg
SAR(1 g) = 0.538 W/kg



0 dB = 0.444 W/kg = -3.53 dBW/kg

PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LSMG891A; Type: Portable Handset; Serial: 18196

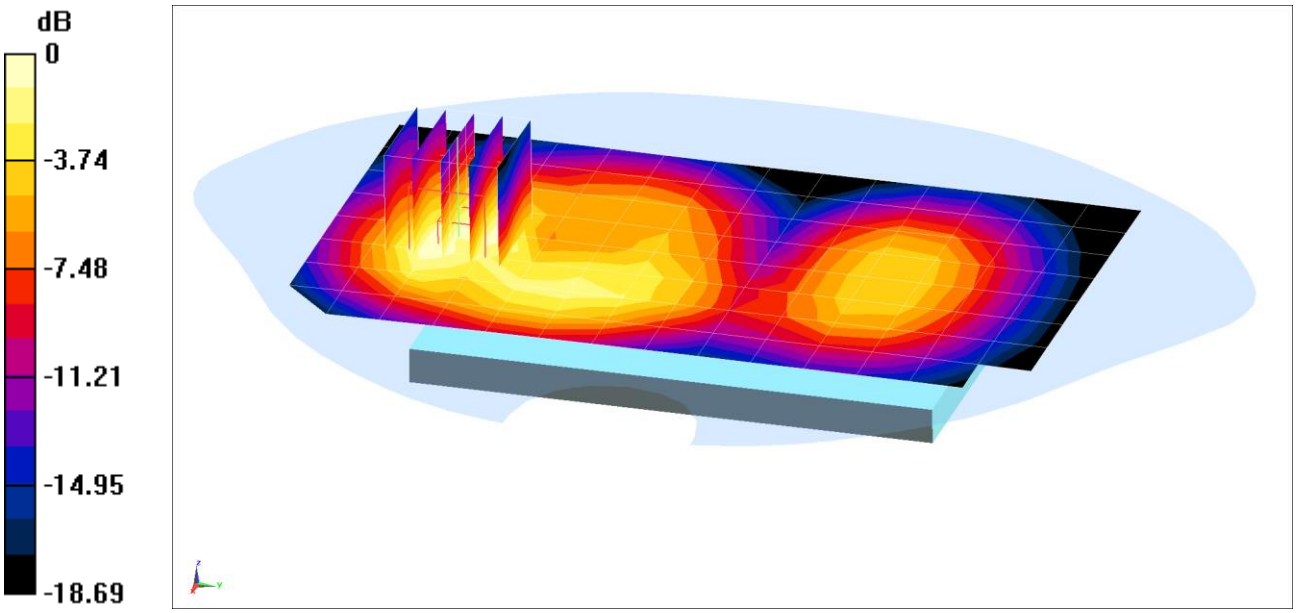
Communication System: UID 0, LTE Band 2 (PCS); Frequency: 1900 MHz; Duty Cycle: 1:1
Medium: 1900 Body Medium parameters used (interpolated):
f = 1900 MHz; σ = 1.525 S/m; ε_r = 52.624; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.5 cm

Test Date: 03-23-2016; Ambient Temp: 22.8°C; Tissue Temp: 22.5°C

Probe: ES3DV3 - SN3332; ConvF(4.7, 4.7, 4.7); Calibrated: 9/18/2015;
Sensor-Surface: 3mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1466; Calibrated: 1/15/2016
Phantom: SAM Sub ; Type: QD000P40CC; Serial: TP:1357
Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Mode: LTE Band 2 (PCS), Body SAR, Back side, High.ch
20 MHz Bandwidth, QPSK, 1 RB, 99 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 = 19.003 V/m; Power Drift = 0.08 dB
Peak SAR (extrapolated) = 1.01 W/kg
SAR(1 g) = 0.599 W/kg



0 dB = 0.725 W/kg = -1.40 dBW/kg

DUT: A3LSMG891A; Type: Portable Handset; Serial: 18170

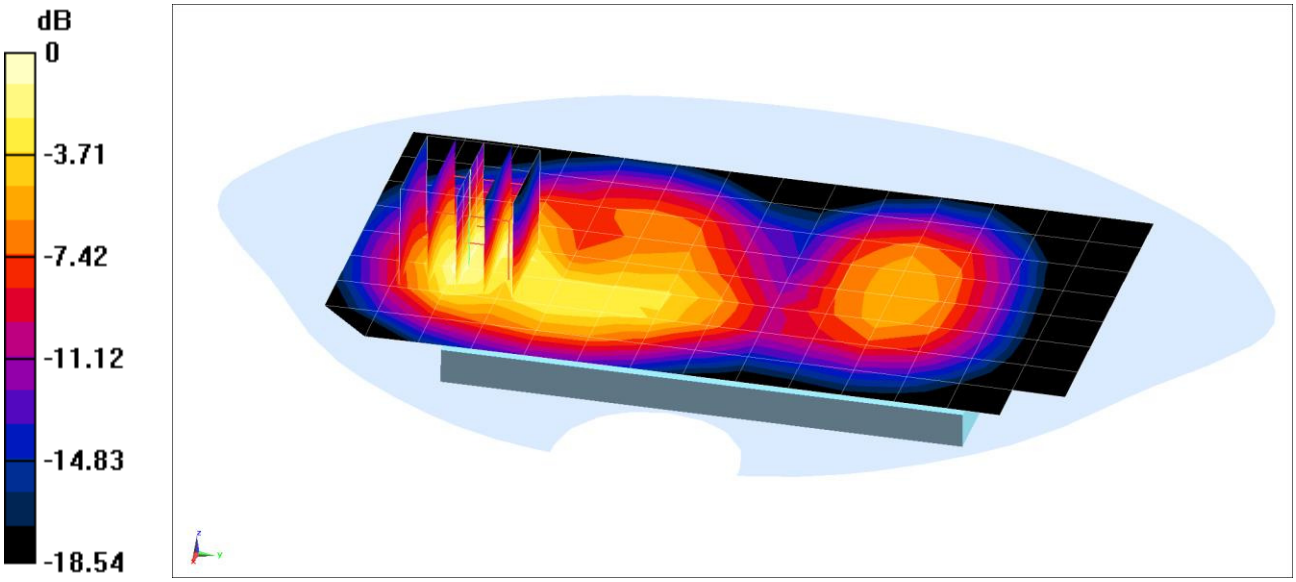
Communication System: UID 0, LTE Band 2 (PCS); Frequency: 1900 MHz; Duty Cycle: 1:1
Medium: 1900 Body Medium parameters used (interpolated):
f = 1900 MHz; σ = 1.525 S/m; ε_r = 52.624; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 03-23-2016; Ambient Temp: 22.8°C; Tissue Temp: 22.5°C

Probe: ES3DV3 - SN3332; ConvF(4.7, 4.7, 4.7); Calibrated: 9/18/2015;
Sensor-Surface: 3mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1466; Calibrated: 1/15/2016
Phantom: SAM Sub ; Type: QD000P40CC; Serial: TP:1357
Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Mode: LTE Band 2 (PCS), Body SAR, Back side, High.ch
20 MHz Bandwidth, QPSK, 1 RB, 99 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 = 18.320 V/m; Power Drift = 0.01 dB
Peak SAR (extrapolated) = 0.886 W/kg
SAR(1 g) = 0.503 W/kg



0 dB = 0.616 W/kg = -2.10 dBW/kg

PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LSMG891A; Type: Portable Handset; Serial: 18196

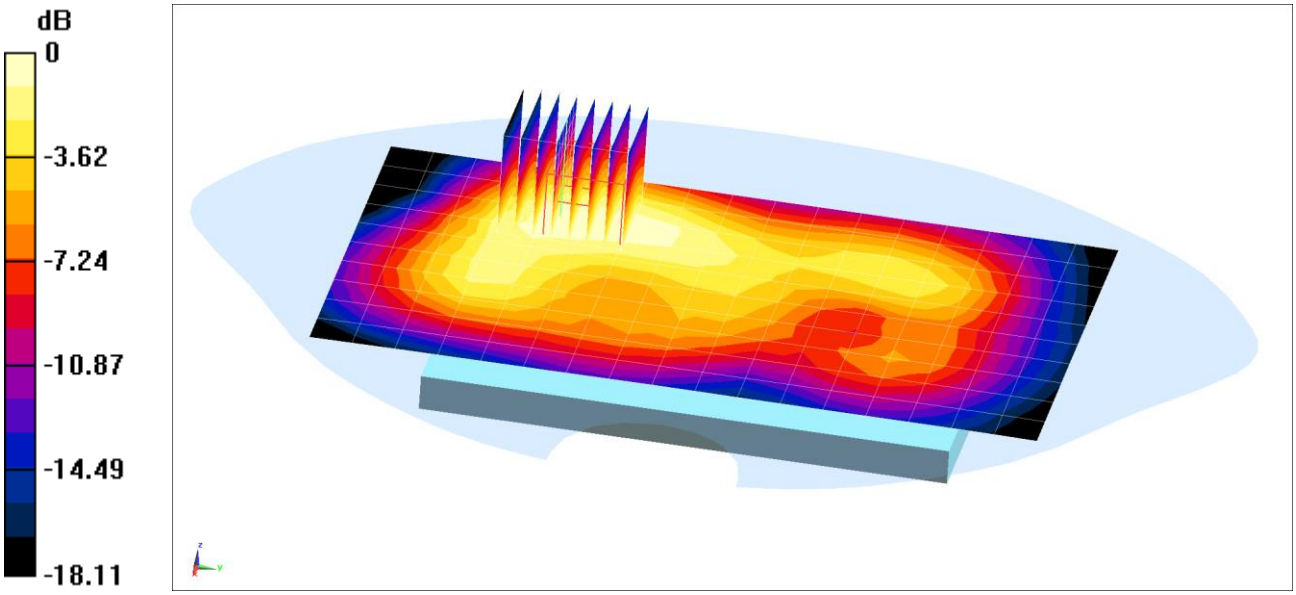
Communication System: UID 0, LTE Band 30; Frequency: 2310 MHz; Duty Cycle: 1:1
Medium: 2300 Body Medium parameters used:
f = 2310 MHz; σ = 1.782 S/m; ε_r = 53.142; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.5 cm

Test Date: 03-22-2016; Ambient Temp: 23.5°C; Tissue Temp: 22.0°C

Probe: ES3DV3 - SN3351; ConvF(4.47, 4.47, 4.47); Calibrated: 6/22/2015;
Sensor-Surface: 3mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1322; Calibrated: 8/24/2015
Phantom: SAM V5.0 Right; Type: QD000P40CD; Serial: 1647
Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Mode: LTE Band 30, Body SAR, Back side, Mid.ch
10 MHz Bandwidth, QPSK, 1 RB, 0 RB Offset

Area Scan (11x18x1): Measurement grid: dx=12mm, dy=12mm
Zoom Scan (7x8x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 19.234 V/m; Power Drift = -0.02 dB
Peak SAR (extrapolated) = 1.03 W/kg
SAR(1 g) = 0.594 W/kg



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

DUT: A3LSMG891A; Type: Portable Handset; Serial: 18246

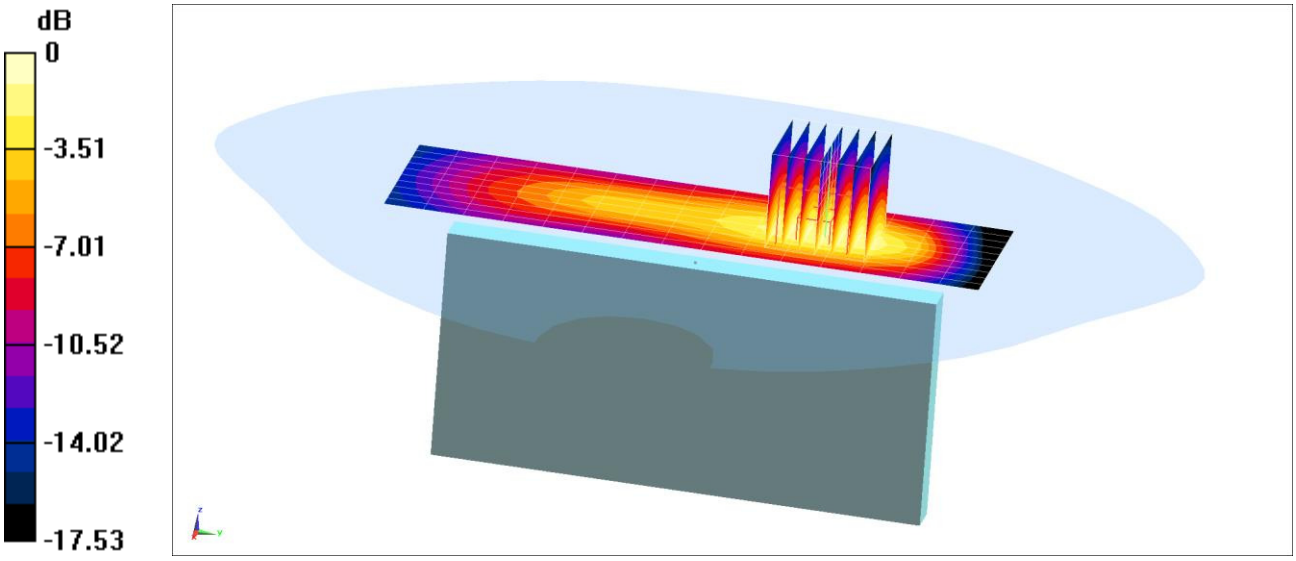
Communication System: UID 0, LTE Band 30; Frequency: 2310 MHz; Duty Cycle: 1:1
Medium: 2300 Body Medium parameters used:
f = 2310 MHz; σ = 1.782 S/m; ε_r = 53.142; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 03-22-2016; Ambient Temp: 23.5°C; Tissue Temp: 22.0°C

Probe: ES3DV3 - SN3351; ConvF(4.47, 4.47, 4.47); Calibrated: 6/22/2015;
Sensor-Surface: 3mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1322; Calibrated: 8/24/2015
Phantom: SAM V5.0 Right; Type: QD000P40CD; Serial: 1647
Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Mode: LTE Band 30, Body SAR, Right Edge, Mid.ch
10 MHz Bandwidth, QPSK, 50 RB, 0 RB Offset

Area Scan (11x16x1): Measurement grid: dx=5mm, dy=12mm
Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 23.084 V/m; Power Drift = 0.01 dB
Peak SAR (extrapolated) = 1.51 W/kg
SAR(1 g) = 0.837 W/kg



0 dB = 1.03 W/kg = 0.13 dBW/kg

DUT: A3LSMG891A; Type: Portable Handset; Serial: 18196

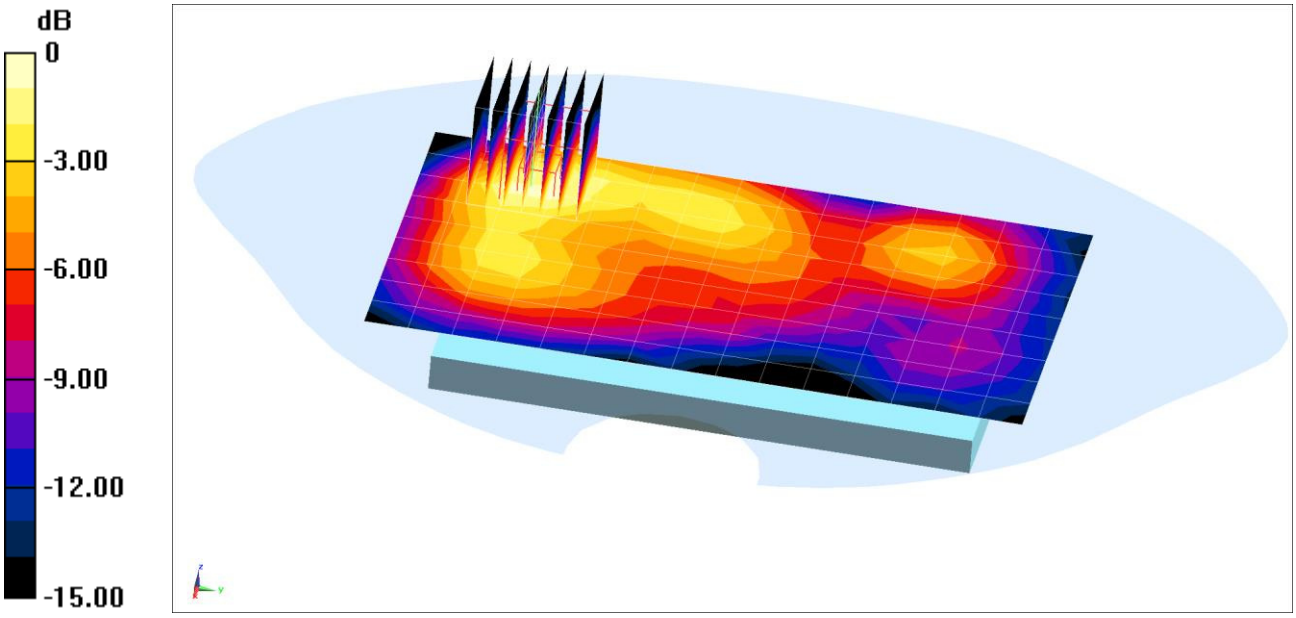
Communication System: UID 0, LTE Band 41; Frequency: 2593 MHz; Duty Cycle: 1:1.58
Medium: 2600 Body Medium parameters used (interpolated):
f = 2593 MHz; σ = 2.167 S/m; ε_r = 52.145; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.5 cm

Test Date: 03-22-2016; Ambient Temp: 23.5°C; Tissue Temp: 22.0°C

Probe: ES3DV3 - SN3351; ConvF(4.16, 4.16, 4.16); Calibrated: 6/22/2015;
Sensor-Surface: 3mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1322; Calibrated: 8/24/2015
Phantom: SAM V5.0 Right; Type: QD000P40CD; Serial: 1647
Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

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 = 5.676 V/m; Power Drift = -0.19 dB
Peak SAR (extrapolated) = 0.141 W/kg
SAR(1 g) = 0.067 W/kg



0 dB = 0.0854 W/kg = -10.69 dBW/kg

DUT: A3LSMG891A; Type: Portable Handset; Serial: 18196

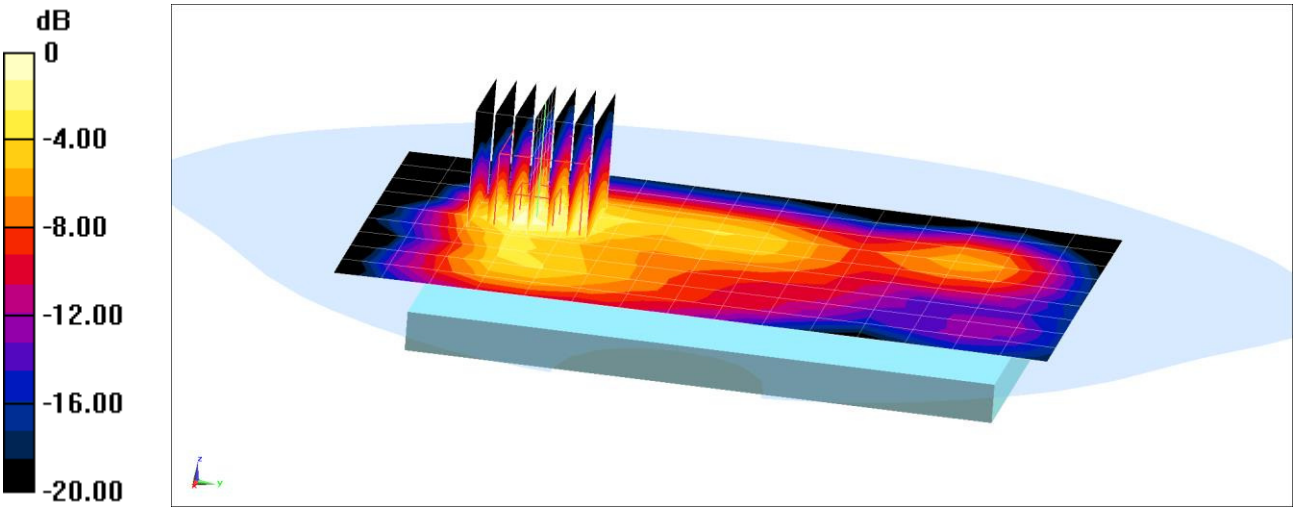
Communication System: UID 0, LTE Band 41; Frequency: 2593 MHz; Duty Cycle: 1:1.58
Medium: 2600 Body Medium parameters used (interpolated):
f = 2593 MHz; σ = 2.155 S/m; ε_r = 50.373; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 04-11-2016; Ambient Temp: 24.0°C; Tissue Temp: 23.4°C

Probe: ES3DV2 - SN3022; ConvF(3.96, 3.96, 3.96); Calibrated: 8/26/2015;
Sensor-Surface: 3mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1323; Calibrated: 9/16/2015
Phantom: SAM Left; Type: QD000P40CC; Serial: TP: 1375
Measurement SW: DASY52, Version 52.8 (8);SEMCAD X Version 14.6.10 (7331)

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 = 9.719 V/m; Power Drift = -0.05 dB
Peak SAR (extrapolated) = 0.392 W/kg
SAR(1 g) = 0.174 W/kg



0 dB = 0.230 W/kg = -6.38 dBW/kg

PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LSMG891A; Type: Portable Handset; Serial: 18204

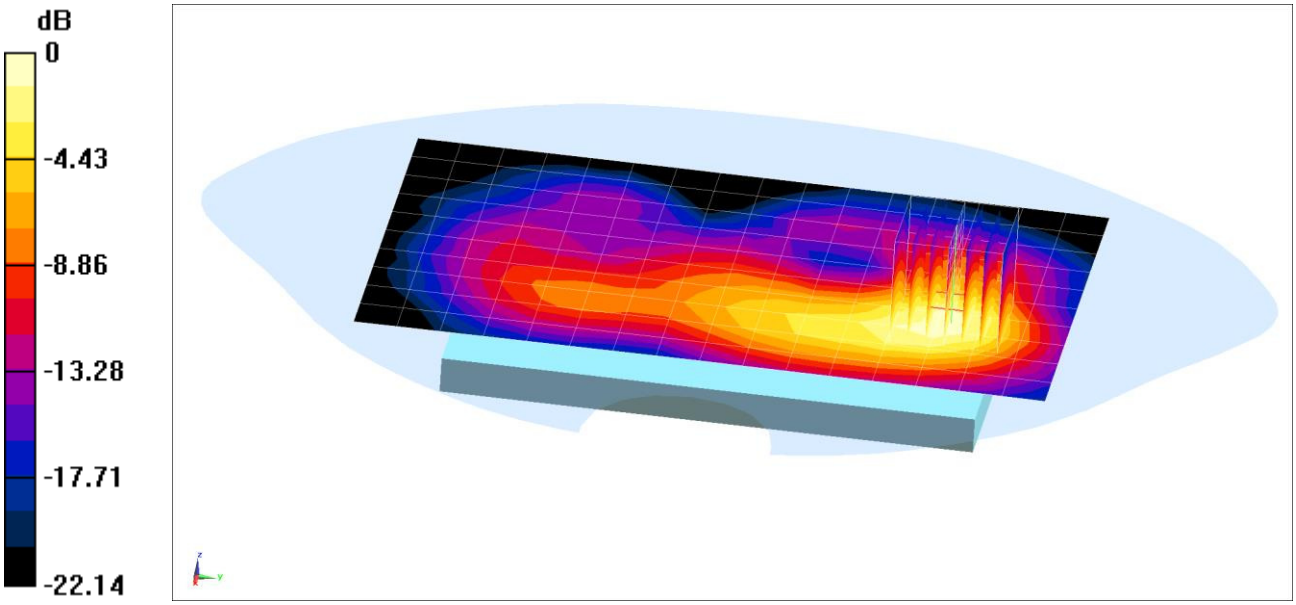
Communication System: UID 0, IEEE 802.11b; Frequency: 2437 MHz; Duty Cycle: 1:1
Medium: 2450 Body Medium parameters used (interpolated):
f = 2437 MHz; σ = 1.948 S/m; ε_r = 52.707; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 03-22-2016; Ambient Temp: 23.5°C; Tissue Temp: 22.0°C

Probe: ES3DV3 - SN3351; ConvF(4.3, 4.3, 4.3); Calibrated: 6/22/2015;
Sensor-Surface: 3mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1322; Calibrated: 8/24/2015
Phantom: SAM V5.0 Right; Type: QD000P40CD; Serial: 1647
Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Mode: IEEE 802.11b, 22 MHz Bandwidth, Body SAR, Ch 6, 1 Mbps, Back Side, Antenna 1

Area Scan (11x17x1): Measurement grid: dx=12mm, dy=12mm
Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 14.168 V/m; Power Drift = 0.00 dB
Peak SAR (extrapolated) = 0.665 W/kg
SAR(1 g) = 0.344 W/kg



0 dB = 0.432 W/kg = -3.65 dBW/kg

PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LSMG891A; Type: Portable Handset; Serial: 18204

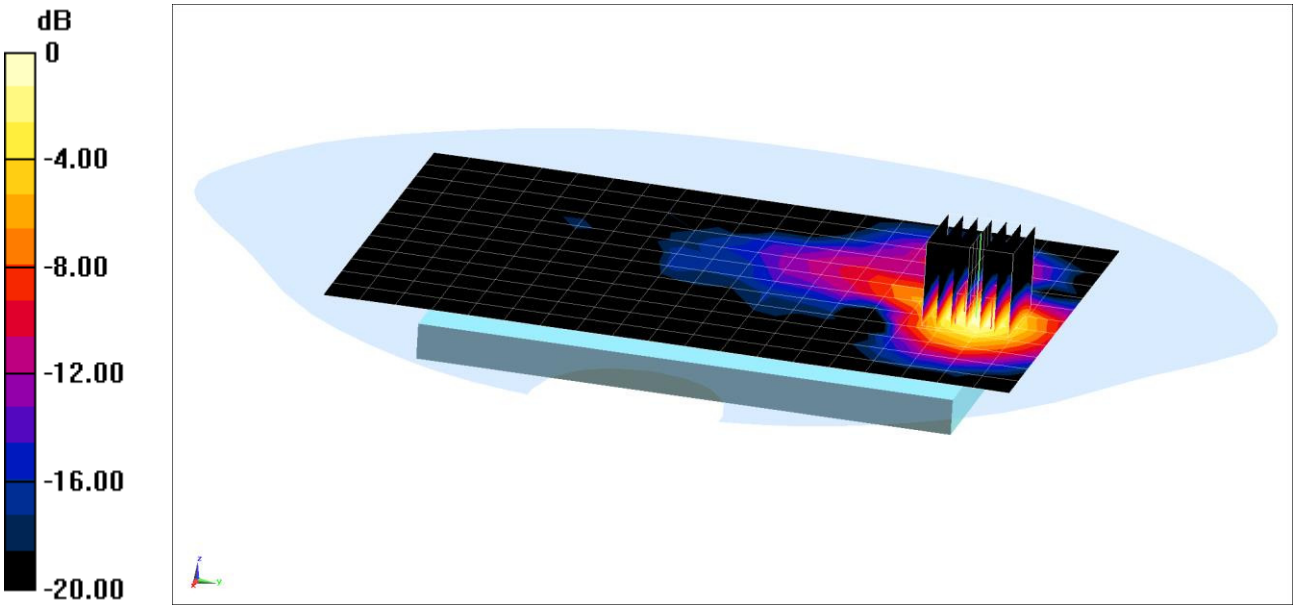
Communication System: UID 0, IEEE 802.11a; Frequency: 5280 MHz; Duty Cycle: 1:1
Medium: 5 GHz Medium parameters used:
f = 5280 MHz; σ = 5.49 S/m; ε_r = 48.025; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 03-24-2016; Ambient Temp: 21.6°C; Tissue Temp: 22.2°C

Probe: EX3DV4 - SN7308; ConvF(4.63, 4.63, 4.63); Calibrated: 7/21/2015;
Sensor-Surface: 1.4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn665; Calibrated: 2/19/2016
Phantom: SAM with CRP v4.0; Type: QD000P40CD; Serial: TP:1800
Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Mode: IEEE 802.11a, UNII-2A, 20 MHz Bandwidth, Body SAR
Ch 56, 6 Mbps, Back Side, Antenna 1

Area Scan (13x20x1): 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 = 9.388 V/m; Power Drift = 0.12 dB
Peak SAR (extrapolated) = 1.82 W/kg
SAR(1 g) = 0.468 W/kg



0 dB = 1.09 W/kg = 0.37 dBW/kg

DUT: A3LSMG891A; Type: Portable Handset; Serial: 18204

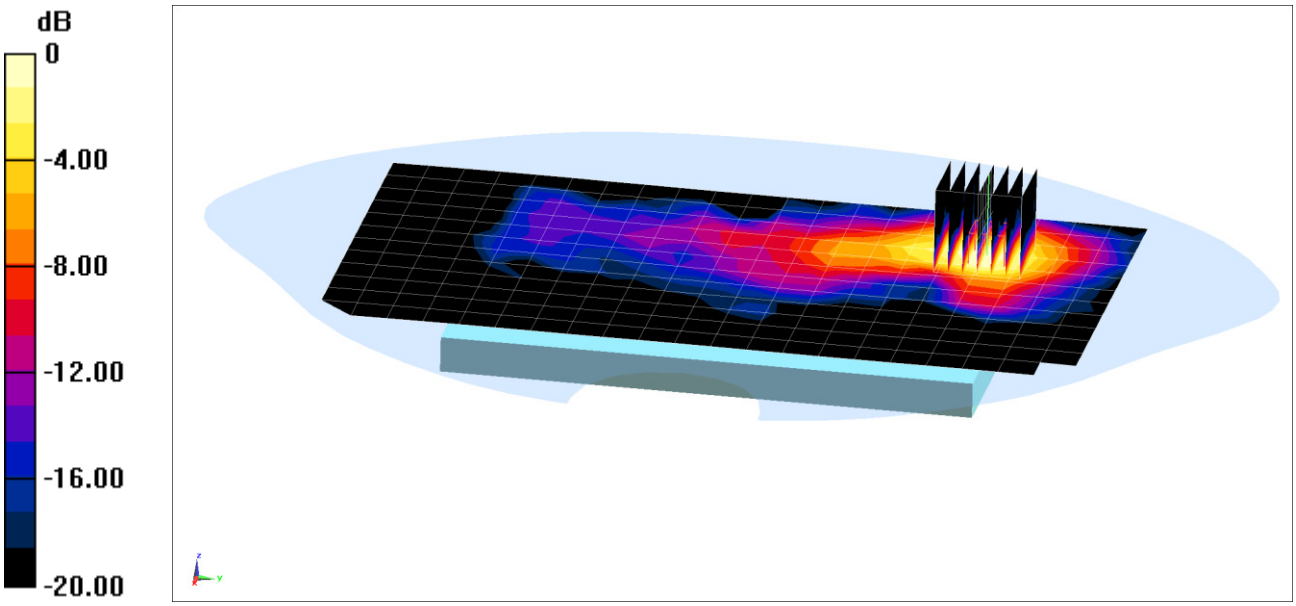
Communication System: UID 0, IEEE 802.11a; Frequency: 5745 MHz; Duty Cycle: 1:1
Medium: 5 GHz Medium parameters used:
f = 5745 MHz; σ = 6.101 S/m; ε_r = 47.361; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 03-24-2016; Ambient Temp: 21.6°C; Tissue Temp: 22.2°C

Probe: EX3DV4 - SN7308; ConvF(4.24, 4.24, 4.24); Calibrated: 7/21/2015;
Sensor-Surface: 1.4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn665; Calibrated: 2/19/2016
Phantom: SAM with CRP v4.0; Type: QD000P40CD; Serial: TP:1800
Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Mode: IEEE 802.11a, UNII-3, 20 MHz Bandwidth, Body SAR
Ch 149, 6 Mbps, Front Side, Antenna 2

Area Scan (13x22x1): 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 = 1.290 V/m; Power Drift = 0.16 dB
Peak SAR (extrapolated) = 0.948 W/kg
SAR(1 g) = 0.234 W/kg



0 dB = 0.556 W/kg = -2.55 dBW/kg

APPENDIX B: SYSTEM VERIFICATION

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PCTEST ENGINEERING LABORATORY, INC.

DUT: Dipole 750 MHz; Type: D750V3; Serial: 1046

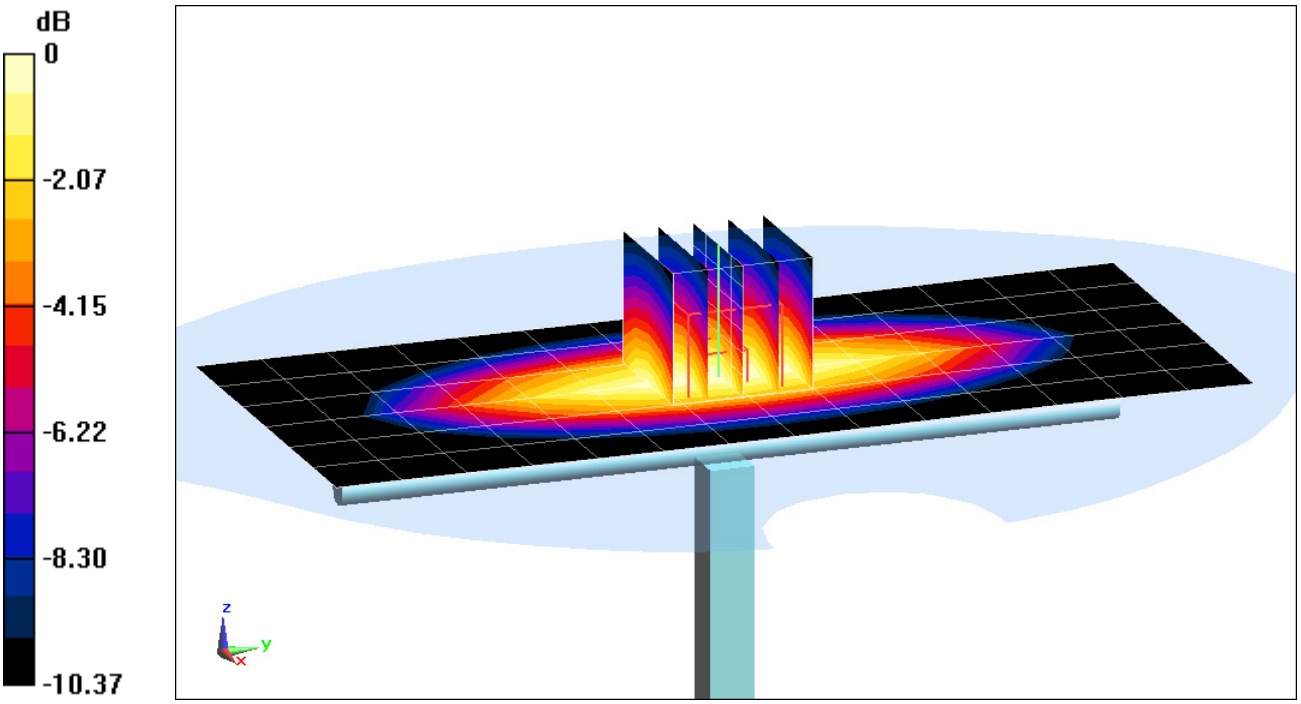
Communication System: UID 0, CW; Frequency: 750 MHz; Duty Cycle: 1:1
Medium: 750 Head Medium parameters used (interpolated):
f = 750 MHz; σ = 0.888 S/m; ε_r = 41.993; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.5 cm

Test Date: 03-24-2016; Ambient Temp: 23.2°C; Tissue Temp: 23.1°C

Probe: ES3DV3 - SN3263; ConvF(6.27, 6.27, 6.27); Calibrated: 5/20/2015;
Sensor-Surface: 3mm (Mechanical Surface Detection)
Electronics: DAE4 Sn859; Calibrated: 6/17/2015
Phantom: SAM with CRP (Left); Type: SAM; Serial: 1715
Measurement SW: DASY52, Version 52.8 (8);SEMCAD X Version 14.6.10 (7331)

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) = 2.51 W/kg
SAR(1 g) = 1.69 W/kg
Deviation(1 g) = 3.05%



0 dB = 1.98 W/kg = 2.97 dBW/kg

PCTEST ENGINEERING LABORATORY, INC.

DUT: Dipole 835 MHz; Type: D835V2; Serial: 4d133

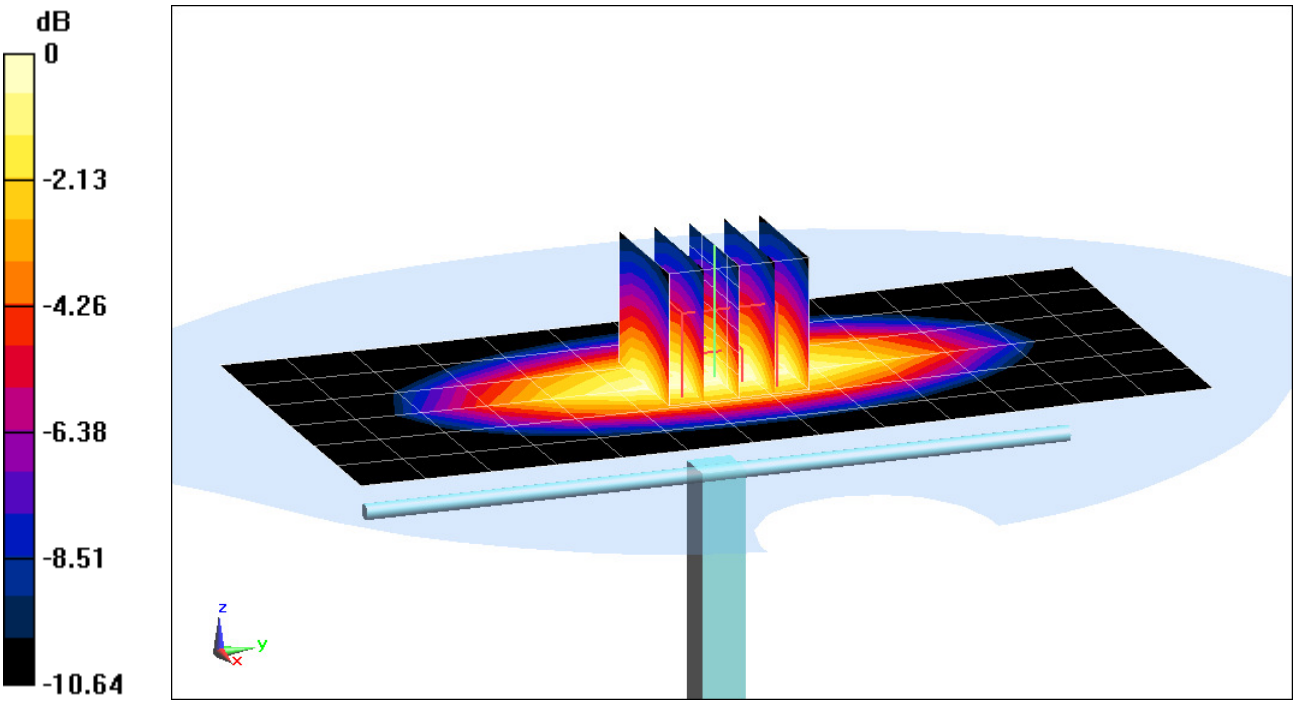
Communication System: UID 0, CW; Frequency: 835 MHz; Duty Cycle: 1:1
Medium: 835 Head Medium parameters used:
f = 835 MHz; σ = 0.91 S/m; ε_r = 42.377; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.5 cm

Test Date: 03-21-2016; Ambient Temp: 21.0°C; Tissue Temp: 20.7°C

Probe: ES3DV3 - SN3263; ConvF(6.18, 6.18, 6.18); Calibrated: 5/20/2015;
Sensor-Surface: 3mm (Mechanical Surface Detection)
Electronics: DAE4 Sn859; Calibrated: 6/17/2015
Phantom: SAM with CRP v5.0 (Right); Type: QD000P40CD; Serial: TP:1759
Measurement SW: DASY52, Version 52.8 (8);SEMCAD X Version 14.6.10 (7331)

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) = 2.84 W/kg
SAR(1 g) = 1.93 W/kg
Deviation(1 g) = 5.70%



0 dB = 2.25 W/kg = 3.52 dBW/kg

PCTEST ENGINEERING LABORATORY, INC.

DUT: Dipole 1750 MHz; Type: D1750V2; Serial: 1051

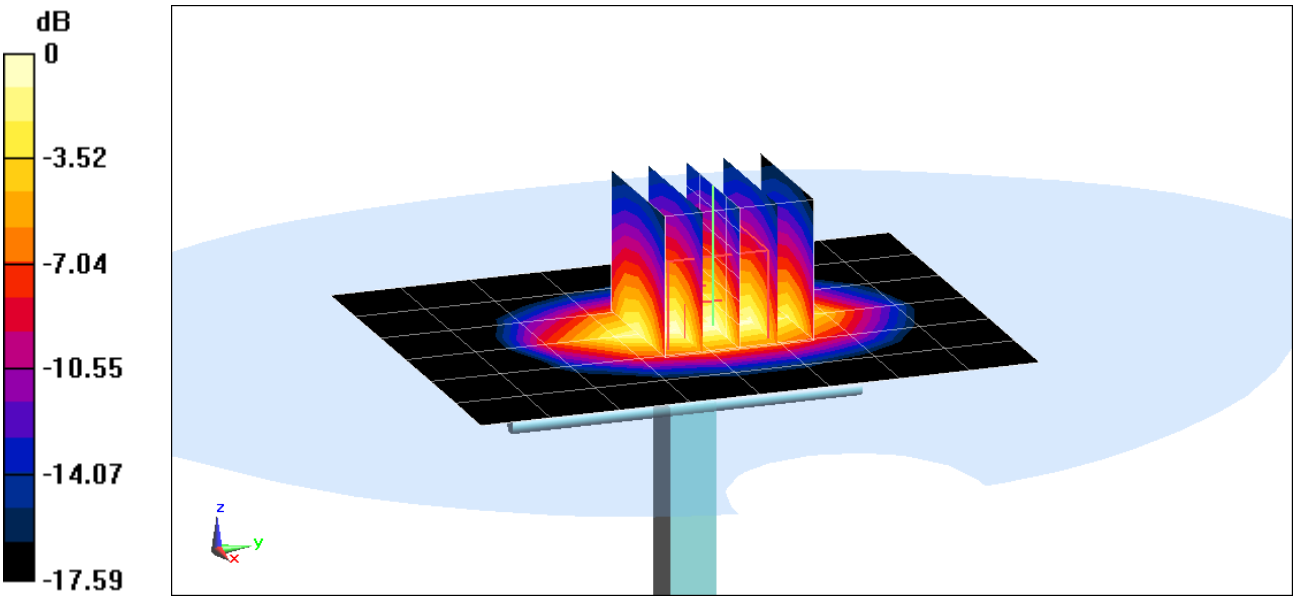
Communication System: UID 0, CW; Frequency: 1750 MHz; Duty Cycle: 1:1
Medium: 1750 Head Medium parameters used:
f = 1750 MHz; σ = 1.388 S/m; ε_r = 38.411; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 03-22-2016; Ambient Temp: 23.4°C; Tissue Temp: 22.0°C

Probe: ES3DV2 - SN3022; ConvF(5.08, 5.08, 5.08); Calibrated: 8/26/2015;
Sensor-Surface: 3mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1323; Calibrated: 9/16/2015
Phantom: SAM Left; Type: QD000P40CC; Serial: TP: 1375
Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

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) = 6.69 W/kg
SAR(1 g) = 3.67 W/kg
Deviation(1 g) = 1.38%



0 dB = 4.63 W/kg = 6.66 dBW/kg

PCTEST ENGINEERING LABORATORY, INC.

DUT: Dipole 1750 MHz; Type: D1750V2; Serial: 1051

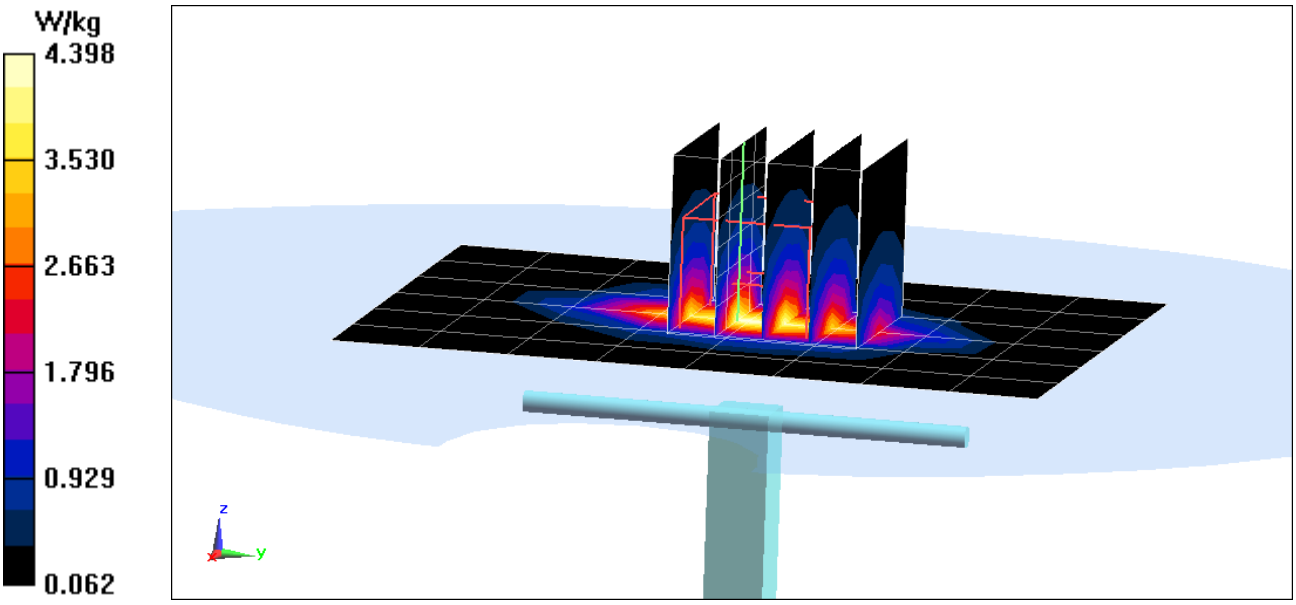
Communication System: UID 0, CW; Frequency: 1750 MHz; Duty Cycle: 1:1
Medium: 1750 Head Medium parameters used:
f = 1750 MHz; σ = 1.398 S/m; ε_r = 38.871; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 03-28-2016; Ambient Temp: 19.5°C; Tissue Temp: 20.8°C

Probe: ES3DV3 - SN3318; ConvF(5.34, 5.34, 5.34); Calibrated: 2/19/2016;
Sensor-Surface: 3mm (Mechanical Surface Detection)
Electronics: DAE4 Sn665; Calibrated: 2/19/2016
Phantom: SAM with CRP v4.0; Type: QD000P40CD; Serial: TP:1800
Measurement SW: DASY52, Version 52.8 (8);SEMCAD X Version 14.6.10 (7331)

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) = 6.32 W/kg
SAR(1 g) = 3.52 W/kg
Deviation(1 g) = -2.76%



DUT: Dipole 1900 MHz; Type: D1900V2; Serial: 5d149

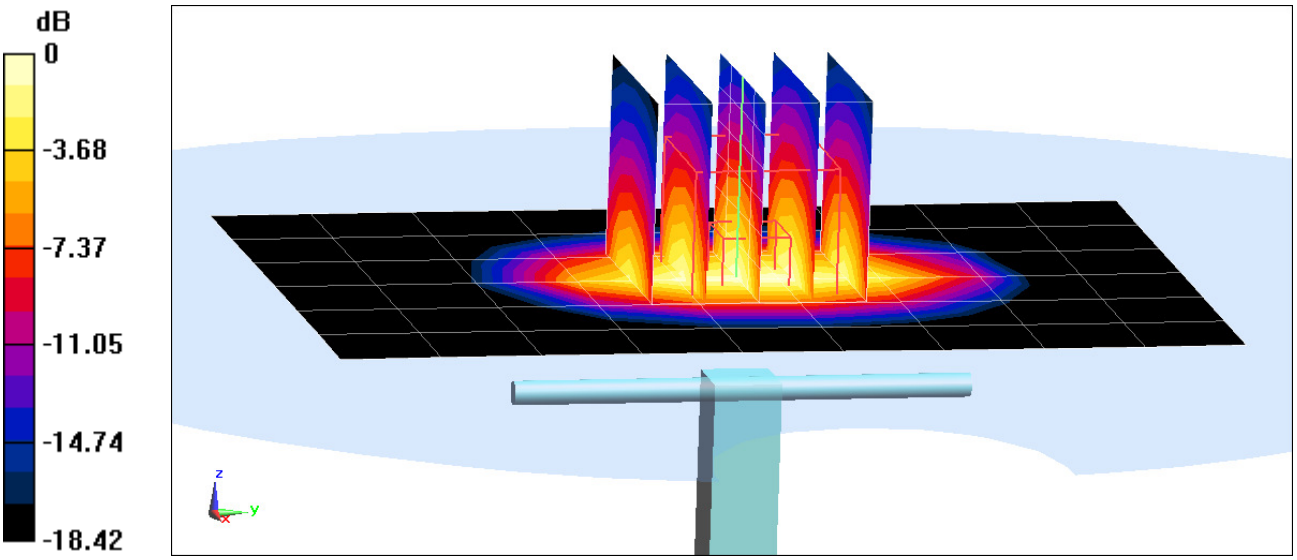
Communication System: UID 0, CW; Frequency: 1900 MHz; Duty Cycle: 1:1
Medium: 1900 Head Medium parameters used (interpolated):
f = 1900 MHz; σ = 1.443 S/m; ε_r = 40.283; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 03-22-2016; Ambient Temp: 23.6°C; Tissue Temp: 22.3°C

Probe: ES3DV2 - SN3022; ConvF(4.93, 4.93, 4.93); Calibrated: 8/26/2015;
Sensor-Surface: 3mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1323; Calibrated: 9/16/2015
Phantom: SAM Right; Type: QD000P40CD; Serial: TP:7535
Measurement SW: DASY52, Version 52.8 (8);SEMCAD X Version 14.6.10 (7331)

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) = 7.56 W/kg
SAR(1 g) = 4.09 W/kg
Deviation(1 g) = 0.49%



0 dB = 5.18 W/kg = 7.14 dBW/kg

DUT: Dipole 1900 MHz; Type: D1900V2; Serial: 5d149

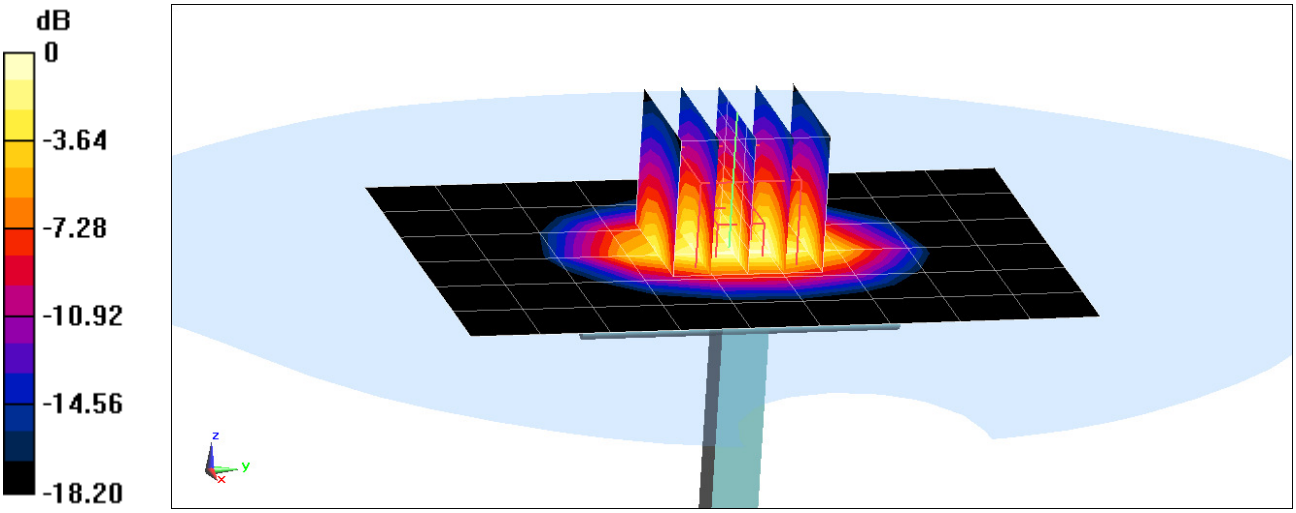
Communication System: UID 0, CW; Frequency: 1900 MHz; Duty Cycle: 1:1
Medium: 1900 Head Medium parameters used (interpolated):
f = 1900 MHz; σ = 1.45 S/m; ε_r = 40.109; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 03-28-2016; Ambient Temp: 23.8°C; Tissue Temp: 22.1°C

Probe: ES3DV3 - SN3334; ConvF(5.18, 5.18, 5.18); Calibrated: 11/17/2015;
Sensor-Surface: 3mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1415; Calibrated: 11/11/2015
Phantom: SAM Front; Type: SAM; Serial: 1686
Measurement SW: DASY52, Version 52.8 (8);SEMCAD X Version 14.6.10 (7331)

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) = 7.33 W/kg
SAR(1 g) = 3.99 W/kg
Deviation(1 g) = -1.97%



0 dB = 5.09 W/kg = 7.07 dBW/kg

PCTEST ENGINEERING LABORATORY, INC.

DUT: Dipole 2300 MHz; Type: D2300V2; Serial: 1064

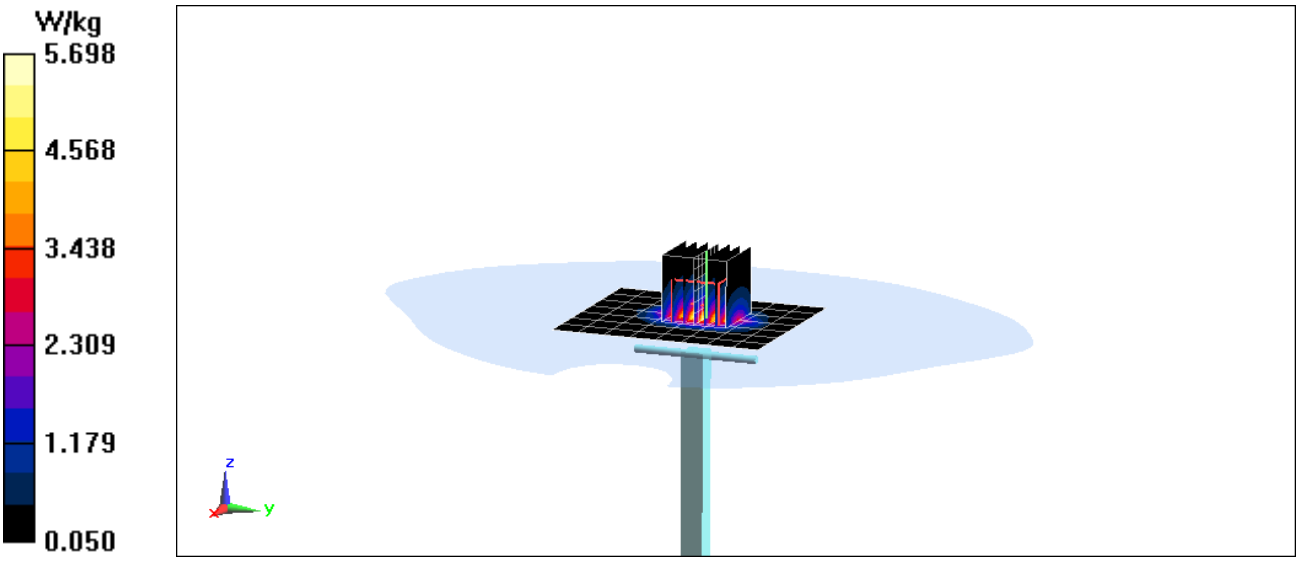
Communication System: UID 0, CW; Frequency: 2300 MHz; Duty Cycle: 1:1
Medium: 2300 Head Medium parameters used:
f = 2300 MHz; σ = 1.68 S/m; ε_r = 39.043; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 04-01-2016; Ambient Temp: 23.1°C; Tissue Temp: 22.7°C

Probe: ES3DV3 - SN3318; ConvF(4.78, 4.78, 4.78); Calibrated: 2/19/2016;
Sensor-Surface: 3mm (Mechanical Surface Detection)
Electronics: DAE4 Sn665; Calibrated: 2/19/2016
Phantom: SAM with CRP v4.0; Type: QD000P40CD; Serial: TP:1800
Measurement SW: DASY52, Version 52.8 (8);SEMCAD X Version 14.6.10 (7331)

2300 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) = 8.58 W/kg
SAR(1 g) = 4.38 W/kg
Deviation(1 g) = -7.98%



DUT: Dipole 2450 MHz; Type: D2450V2; Serial: 719

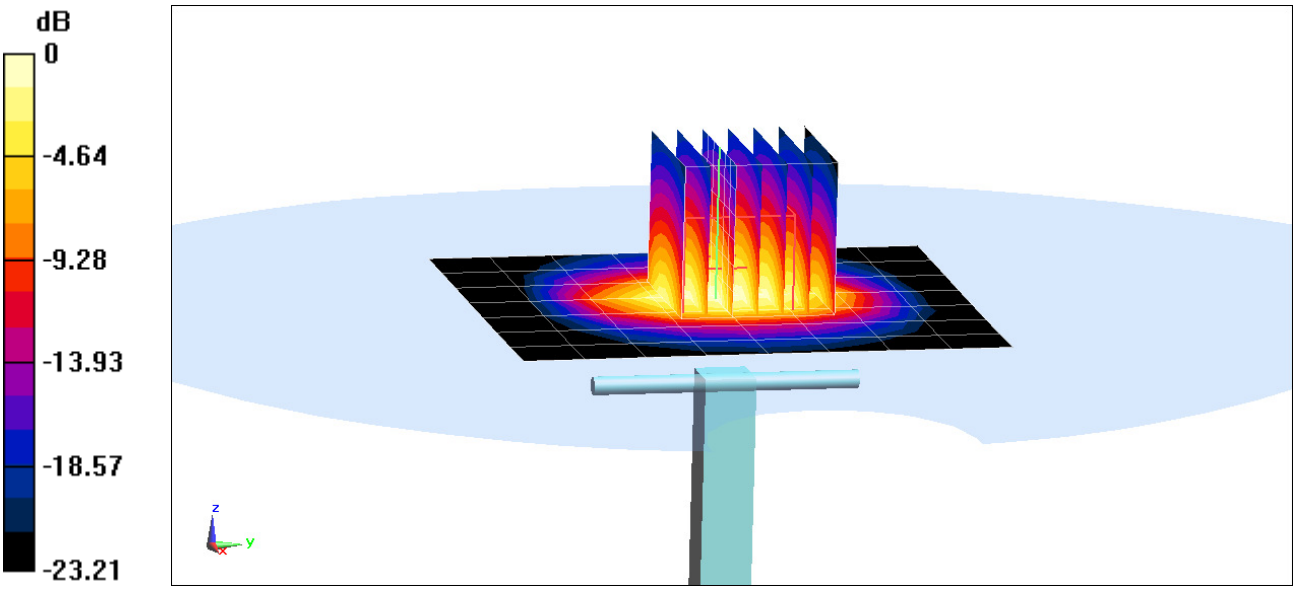
Communication System: UID 0, CW; Frequency: 2450 MHz; Duty Cycle: 1:1
Medium: 2450 Head Medium parameters used:
f = 2450 MHz; σ = 1.866 S/m; ε_r = 38.662; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 03-29-2016; Ambient Temp: 24.5°C; Tissue Temp: 23.5°C

Probe: ES3DV3 - SN3351; ConvF(4.46, 4.46, 4.46); Calibrated: 6/22/2015;
Sensor-Surface: 3mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1322; Calibrated: 8/24/2015
Phantom: SAM 5.0 front; Type: QD000P40CD; Serial: TP:-1648
Measurement SW: DASY52, Version 52.8 (8);SEMCAD X Version 14.6.10 (7331)

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) = 11.7 W/kg
SAR(1 g) = 5.62 W/kg
Deviation(1 g) = 3.69%



0 dB = 7.34 W/kg = 8.66 dBW/kg

PCTEST ENGINEERING LABORATORY, INC.

DUT: Dipole 2600 MHz; Type: D2600V2; Serial: 1071

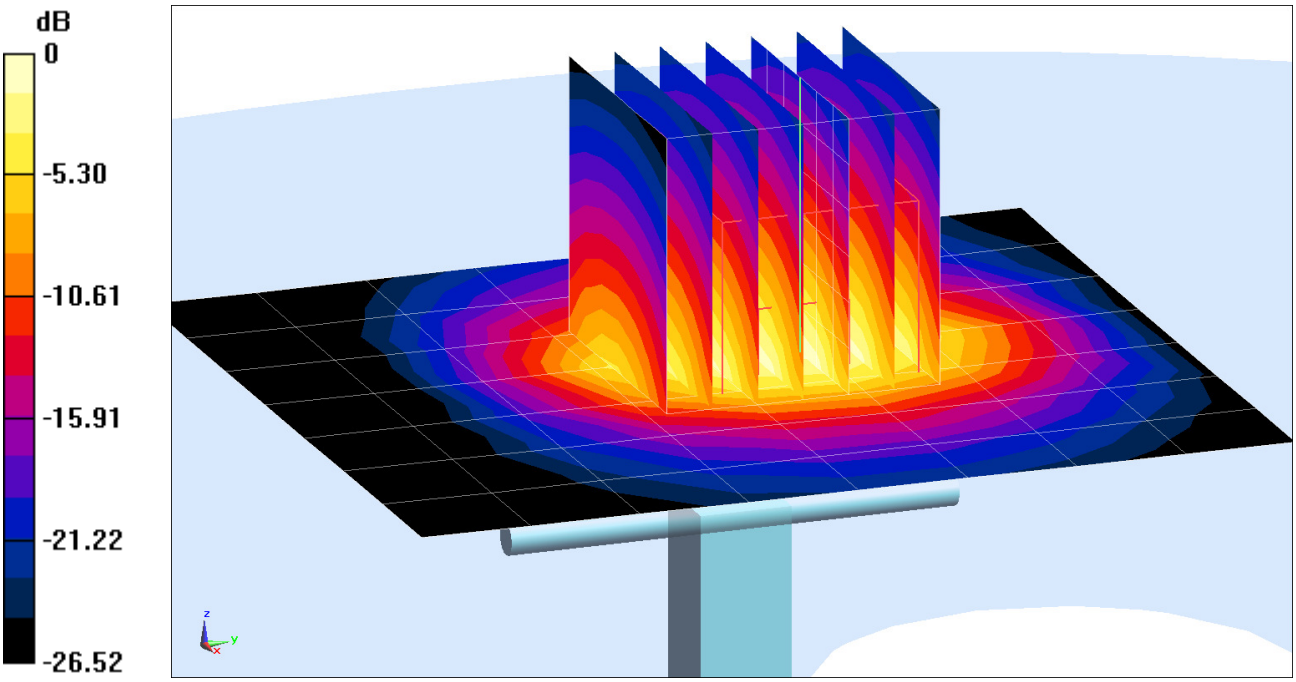
Communication System: UID 0, CW; Frequency: 2600 MHz; Duty Cycle: 1:1
Medium: 2600 Head Medium parameters used:
f = 2600 MHz; σ = 2.038 S/m; ε_r = 38.506; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 03-24-2016; Ambient Temp: 24.3°C; Tissue Temp: 23.5°C

Probe: ES3DV3 - SN3288; ConvF(4.44, 4.44, 4.44); Calibrated: 9/18/2015;
Sensor-Surface: 3mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1364; Calibrated: 9/18/2015
Phantom: Main TWIN SAM; Type: QD000P40CC; Serial: TP-1406
Measurement SW: DASY52, Version 52.8 (8);SEMCAD X Version 14.6.10 (7331)

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) = 14.1 W/kg
SAR(1 g) = 5.85 W/kg
Deviation(1 g) = 4.65%



0 dB = 7.83 W/kg = 8.94 dBW/kg

PCTEST ENGINEERING LABORATORY, INC.

DUT: Dipole 5 GHz; Type: D5GHzV2; Serial: 1120

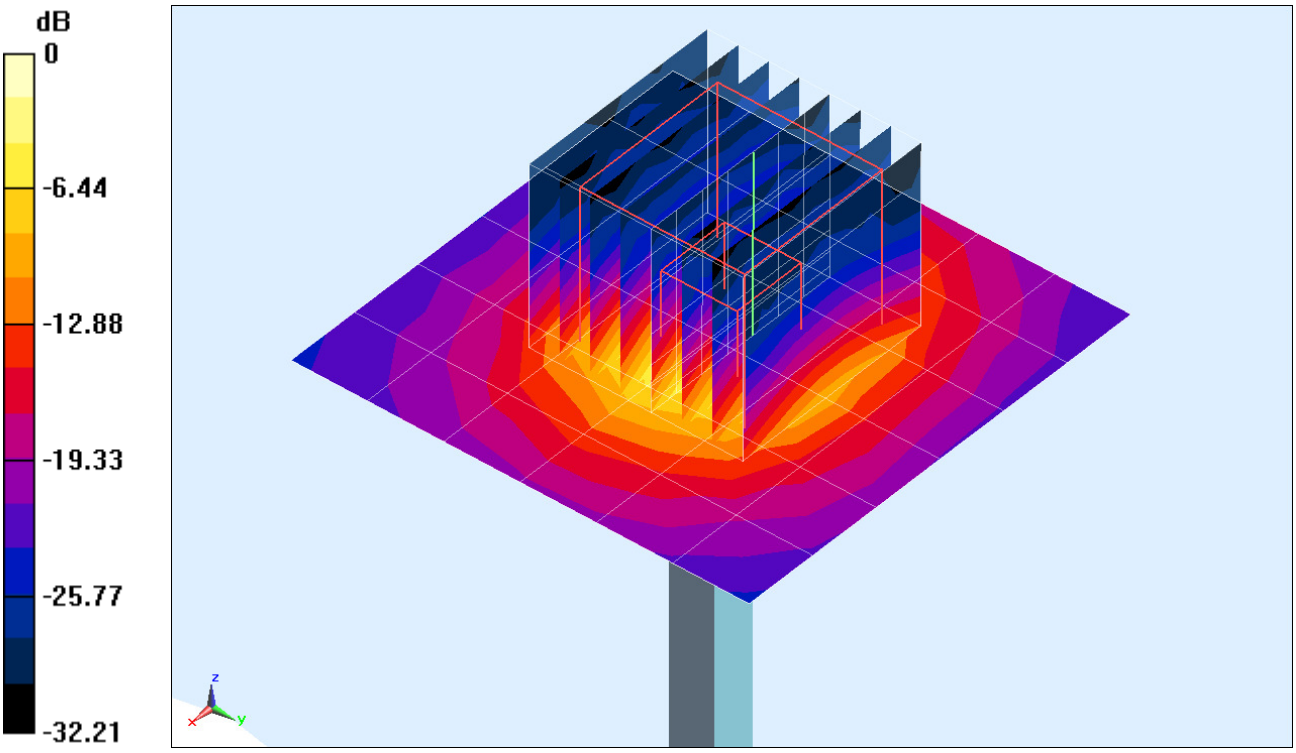
Communication System: UID 0, CW; Frequency: 5250 MHz; Duty Cycle: 1:1
Medium: 5 GHz Head; Medium parameters used (interpolated):
f = 5250 MHz; σ = 4.589 S/m; ε_r = 37.275; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 03-30-2016; Ambient Temp: 19.1°C; Tissue Temp: 20.5°C

Probe: EX3DV4 - SN3914; ConvF(5.07, 5.07, 5.07); Calibrated: 2/22/2016;
Sensor-Surface: 1.4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1272; Calibrated: 2/18/2016
Phantom: SAM v5.0 front; Type: QD000P40CD; Serial: TP-1646
Measurement SW: DASY52, Version 52.8 (8);SEMCAD X Version 14.6.10 (7331)

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) = 15.8 W/kg
SAR(1 g) = 3.63 W/kg
Deviation(1 g) = -7.75%



0 dB = 8.72 W/kg = 9.41 dBW/kg

PCTEST ENGINEERING LABORATORY, INC.

DUT: Dipole 5 GHz; Type: D5GHzV2; Serial: 1120

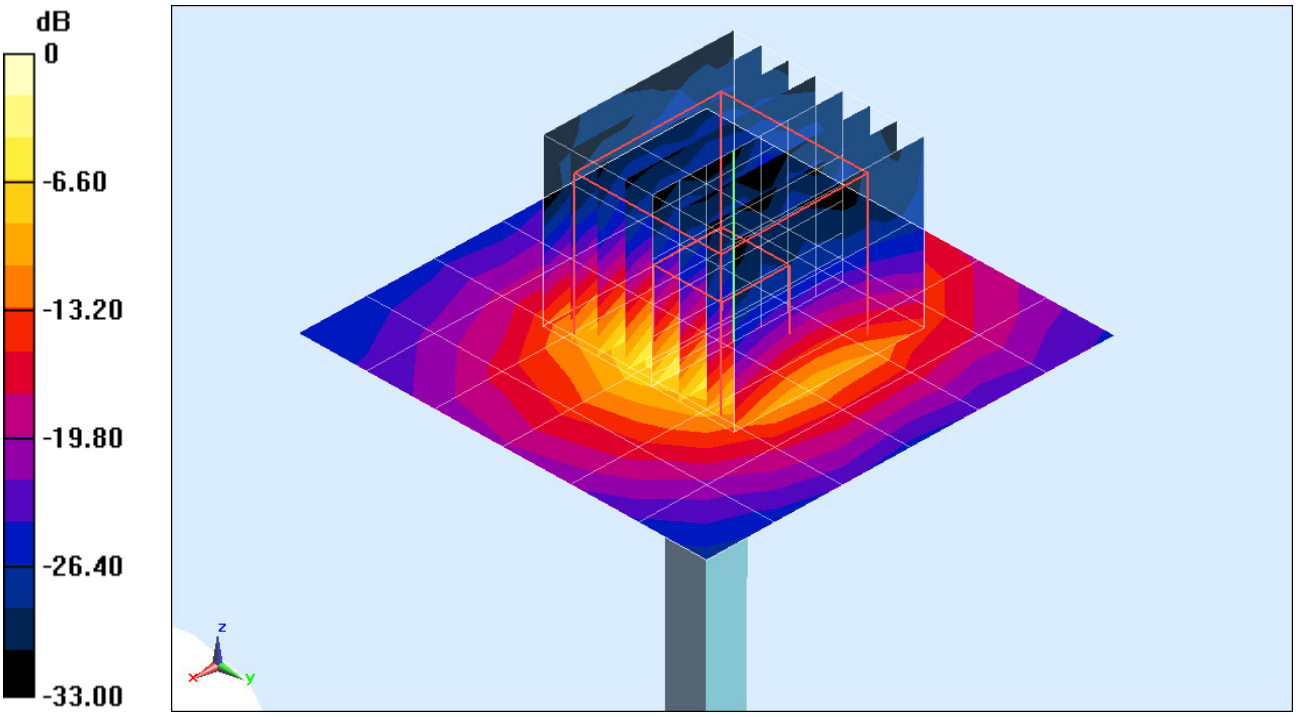
Communication System: UID 0, CW; Frequency: 5600 MHz; Duty Cycle: 1:1
Medium: 5 GHz Head; Medium parameters used:
f = 5600 MHz; σ = 4.954 S/m; ε_r = 36.844; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 03-30-2016; Ambient Temp: 19.1°C; Tissue Temp: 20.5°C

Probe: EX3DV4 - SN3914; ConvF(4.66, 4.66, 4.66); Calibrated: 2/22/2016;
Sensor-Surface: 1.4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1272; Calibrated: 2/18/2016
Phantom: SAM v5.0 front; Type: QD000P40CD; Serial: TP-1646
Measurement SW: DASY52, Version 52.8 (8);SEMCAD X Version 14.6.10 (7331)

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) = 17.7 W/kg
SAR(1 g) = 3.94 W/kg
Deviation(1 g) = -4.25%



0 dB = 9.94 W/kg = 9.97 dBW/kg

PCTEST ENGINEERING LABORATORY, INC.

DUT: Dipole 5 GHz; Type: D5GHzV2; Serial: 1120

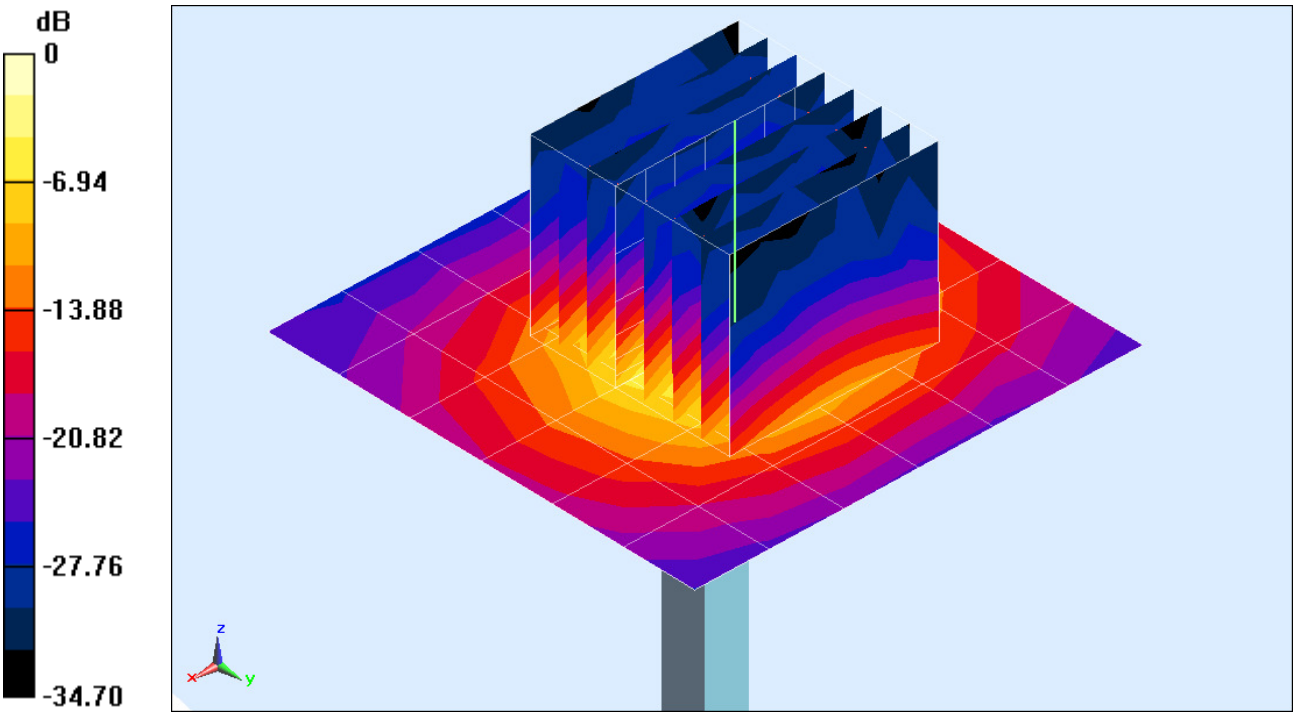
Communication System: UID 0, CW; Frequency: 5750 MHz; Duty Cycle: 1:1
Medium: 5 GHz Head; Medium parameters used (interpolated):
f = 5750 MHz; σ = 5.121 S/m; ε_r = 36.619; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 03-30-2016; Ambient Temp: 19.1°C; Tissue Temp: 20.5°C

Probe: EX3DV4 - SN3914; ConvF(4.74, 4.74, 4.74); Calibrated: 2/22/2016;
Sensor-Surface: 1.4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1272; Calibrated: 2/18/2016
Phantom: SAM v5.0 front; Type: QD000P40CD; Serial: TP-1646
Measurement SW: DASY52, Version 52.8 (8);SEMCAD X Version 14.6.10 (7331)

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) = 16.6 W/kg
SAR(1 g) = 3.6 W/kg;
Deviation(1 g) = -8.98%



0 dB = 9.23 W/kg = 9.65 dBW/kg

DUT: Dipole 750 MHz; Type: D750V3; Serial: 1046

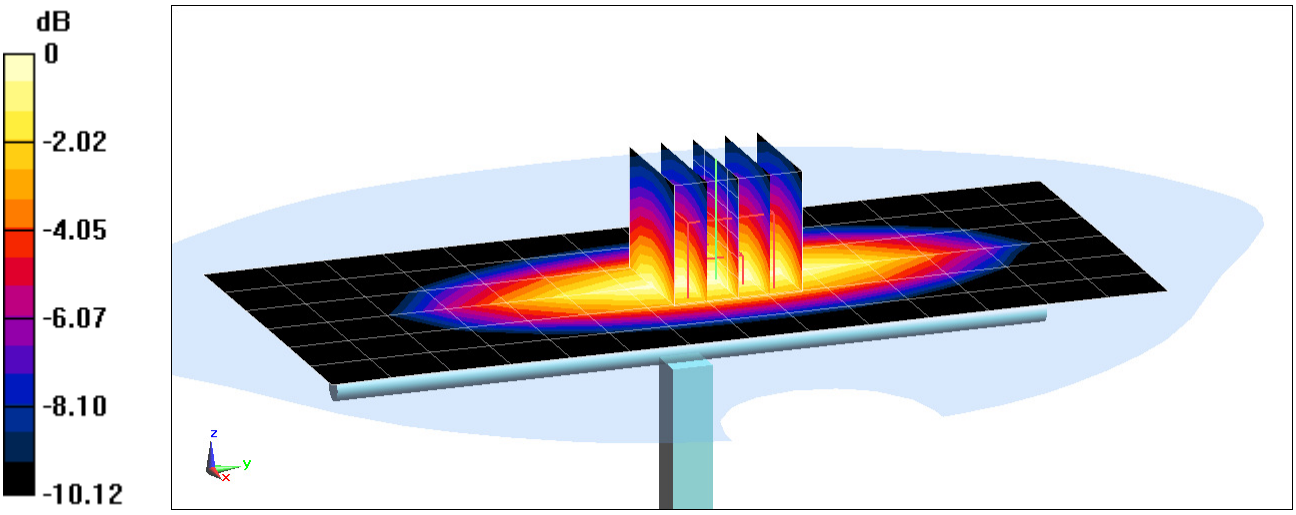
Communication System: UID 0, CW; Frequency: 750 MHz; Duty Cycle: 1:1
Medium: 750 Body Medium parameters used (interpolated):
f = 750 MHz; σ = 0.961 S/m; ε_r = 54.371; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.5 cm

Test Date: 03-26-2016; Ambient Temp: 23.8°C; Tissue Temp: 21.5°C

Probe: ES3DV2 - SN3022; ConvF(6.16, 6.16, 6.16); Calibrated: 8/26/2015;
Sensor-Surface: 3mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1323; Calibrated: 9/16/2015
Phantom: SAM Left; Type: QD000P40CC; Serial: TP: 1375
Measurement SW: DASY52, Version 52.8 (8);SEMCAD X Version 14.6.10 (7331)

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) = 2.54 W/kg
SAR(1 g) = 1.73 W/kg
Deviation(1 g) = -1.37%



0 dB = 2.01 W/kg = 3.03 dBW/kg

PCTEST ENGINEERING LABORATORY, INC.

DUT: Dipole 835 MHz; Type: D835V2; Serial: 4d119

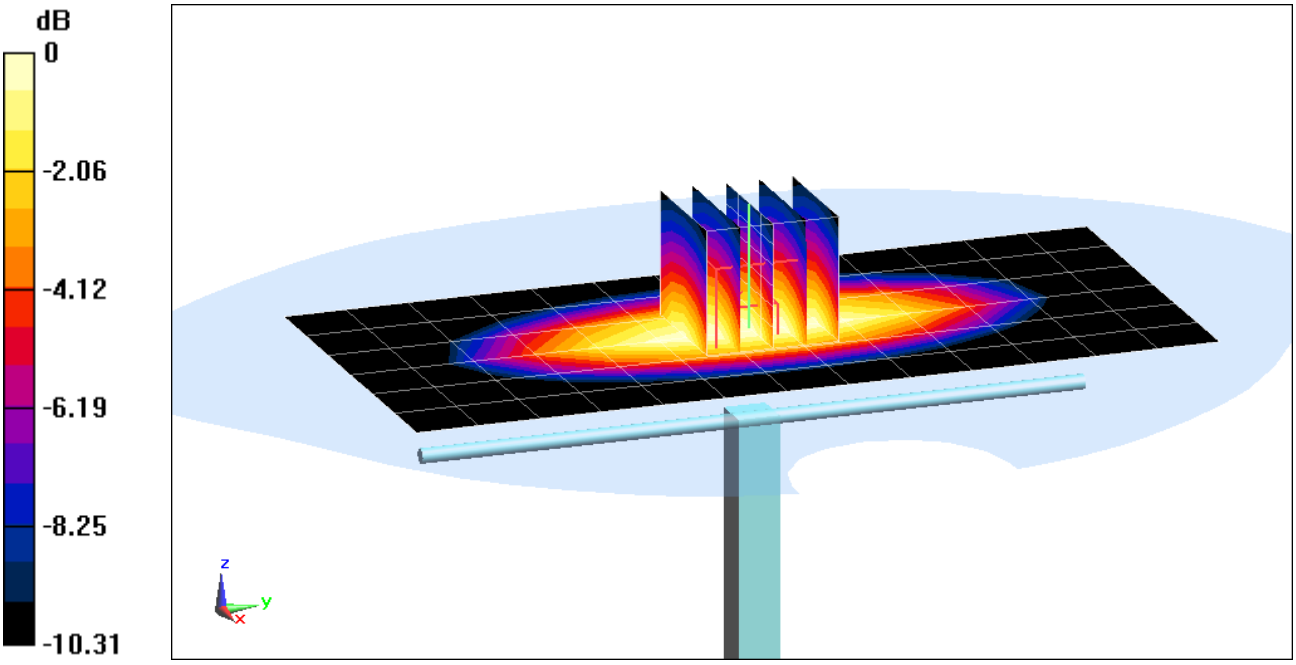
Communication System: UID 0, CW; Frequency: 835 MHz; Duty Cycle: 1:1
Medium: 835 Body Medium parameters used:
f = 835 MHz; σ = 0.976 S/m; ε_r = 53.612; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.5 cm

Test Date: 03-22-2016; Ambient Temp: 23.9°C; Tissue Temp: 23.0°C

Probe: ES3DV3 - SN3334; ConvF(6.24, 6.24, 6.24); Calibrated: 11/17/2015;
Sensor-Surface: 3mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1415; Calibrated: 11/11/2015
Phantom: SAM Front; Type: SAM; Serial: 1686
Measurement SW: DASY52, Version 52.8 (8);SEMCAD X Version 14.6.10 (7331)

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) = 2.70 W/kg
SAR(1 g) = 1.86 W/kg
Deviation(1 g) = 1.09%



0 dB = 2.22 W/kg = 3.46 dBW/kg

PCTEST ENGINEERING LABORATORY, INC.

DUT: Dipole 835 MHz; Type: D835V2; Serial: 4d119

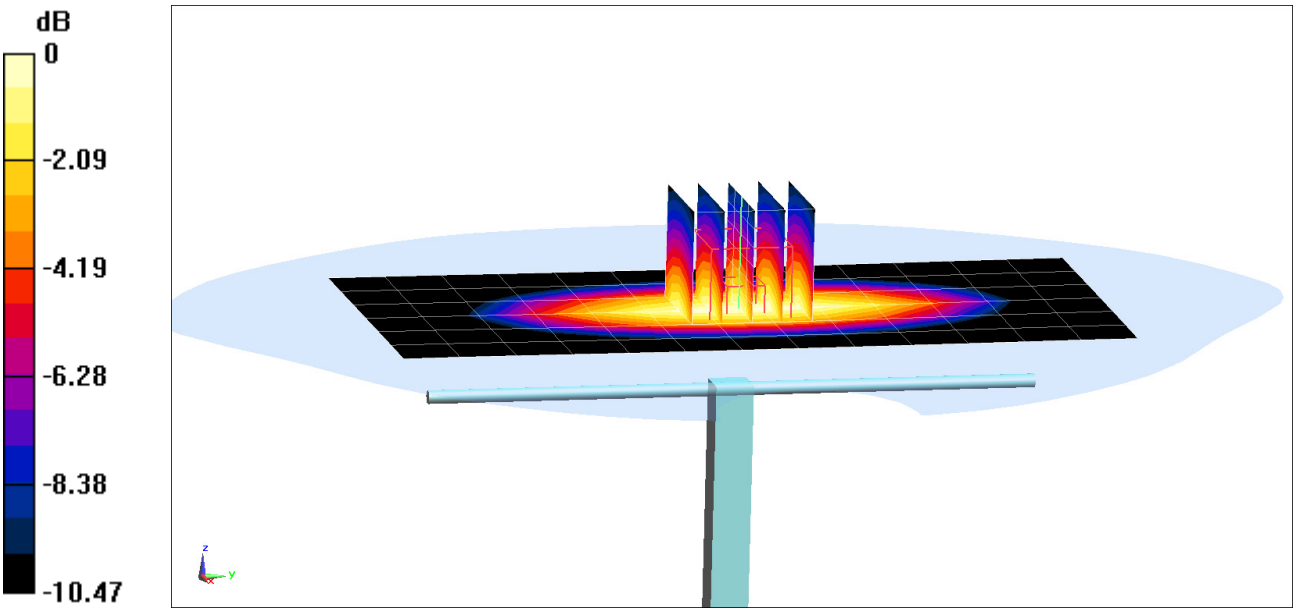
Communication System: UID 0, CW; Frequency: 835 MHz; Duty Cycle: 1:1
Medium: 835 Body Medium parameters used:
f = 835 MHz; σ = 0.991 S/m; ε_r = 53.301; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.5 cm

Test Date: 03-28-2016; Ambient Temp: 21.5°C; Tissue Temp: 21.6°C

Probe: ES3DV3 - SN3213; ConvF(6, 6, 6); Calibrated: 2/19/2016;
Sensor-Surface: 3mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1272; Calibrated: 2/18/2016
Phantom: SAM v5.0 front; Type: QD000P40CD; Serial: TP-1646
Measurement SW: DASY52, Version 52.8 (8);SEMCAD X Version 14.6.10 (7331)

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) = 2.95 W/kg
SAR(1 g) = 1.99 W/kg
Deviation(1 g) = 8.15%



0 dB = 2.33 W/kg = 3.67 dBW/kg

DUT: Dipole 1765 MHz; Type: D1765V2; Serial: 1008

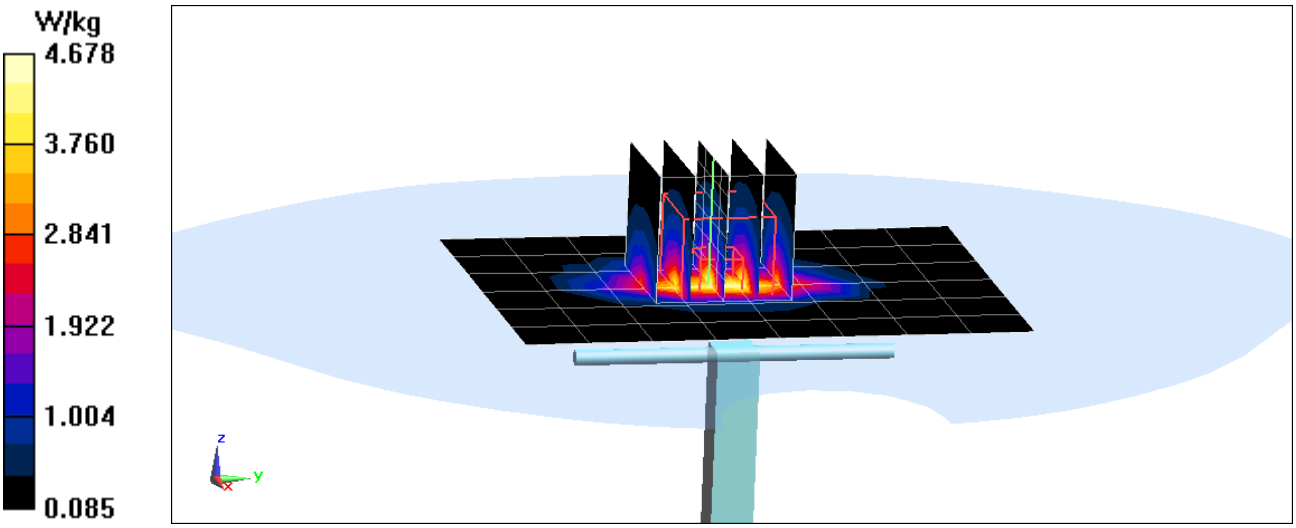
Communication System: UID 0, CW; Frequency: 1750 MHz; Duty Cycle: 1:1
Medium: 1750 Body Medium parameters used:
f = 1750 MHz; σ = 1.478 S/m; ε_r = 50.964; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 03-24-2016; Ambient Temp: 24.3°C; Tissue Temp: 23.5°C

Probe: ES3DV3 - SN3288; ConvF(4.99, 4.99, 4.99); Calibrated: 9/18/2015;
Sensor-Surface: 3mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1364; Calibrated: 9/18/2015
Phantom: Sub TWIN SAM; Type: QD000P40CC; Serial: TP-1357
Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

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) = 6.54 W/kg
SAR(1 g) = 3.68 W/kg
Deviation(1 g) = -3.16 %



DUT: Dipole 1900 MHz; Type: D1900V2; Serial: 5d141

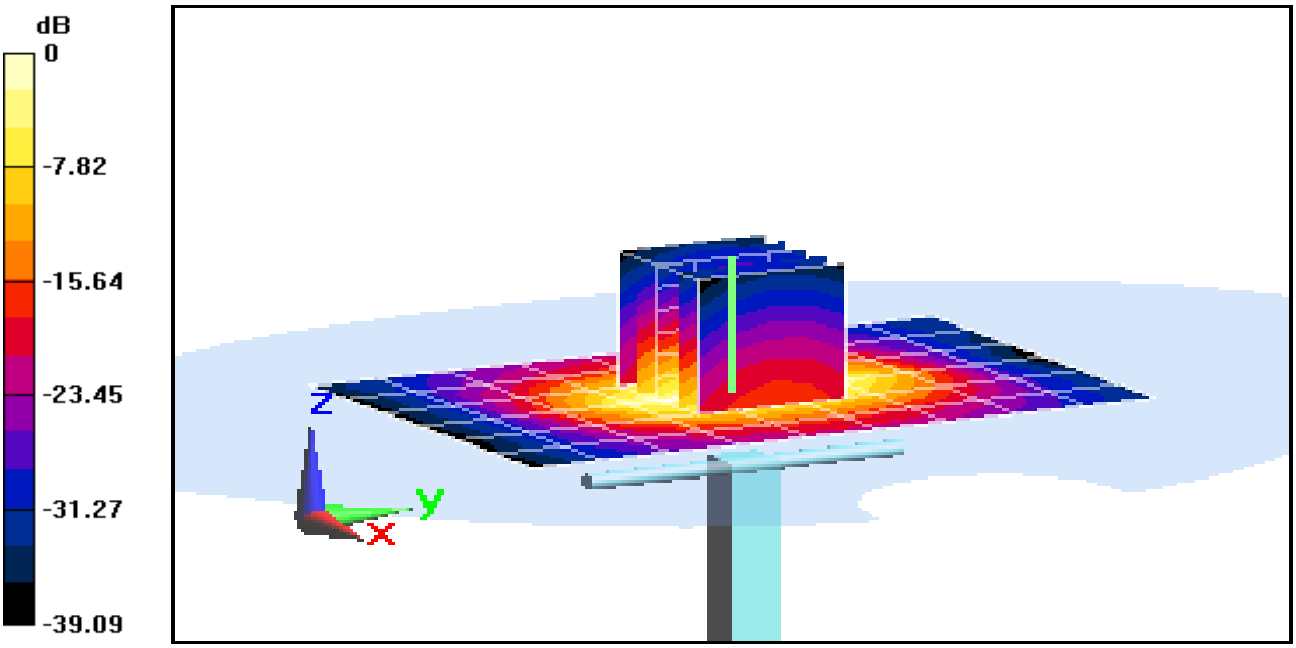
Communication System: UID 0, CW; Frequency: 1900 MHz; Duty Cycle: 1:1
Medium: 1900 Body Medium parameters used (interpolated):
f = 1900 MHz; σ = 1.525 S/m; ε_r = 52.624; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 03-23-2016; Ambient Temp: 22.8°C; Tissue Temp: 22.5°C

Probe: ES3DV3 - SN3332; ConvF(4.7, 4.7, 4.7); Calibrated: 9/18/2015;
Sensor-Surface: 3mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1466; Calibrated: 1/15/2016
Phantom: SAM Sub ; Type: QD000P40CC; Serial: TP:1357
Measurement SW: DASY52, Version 52.8 (8);SEMCAD X Version 14.6.10 (7331)

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) = 7.34 W/kg
SAR(1 g) = 4.12 W/kg
Deviation(1 g) = 3.00%



0 dB = 4.94 W/kg = 6.94 dBW/kg

DUT: Dipole 2300 MHz; Type: D2300V2; Serial: 1064

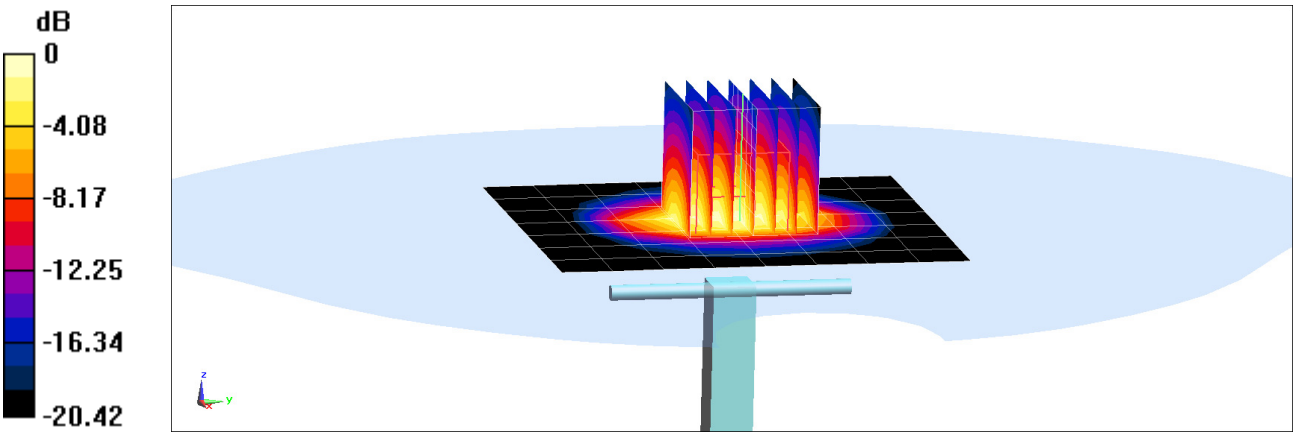
Communication System: UID 0, CW; Frequency: 2300 MHz; Duty Cycle: 1:1
Medium: 2300 Body Medium parameters used:
f = 2300 MHz; σ = 1.77 S/m; ε_r = 53.17; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 03-22-2016; Ambient Temp: 23.5°C; Tissue Temp: 22.0°C

Probe: ES3DV3 - SN3351; ConvF(4.47, 4.47, 4.47); Calibrated: 6/22/2015;
Sensor-Surface: 3mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1322; Calibrated: 8/24/2015
Phantom: SAM V5.0 Right; Type: QD000P40CD; Serial: 1647
Measurement SW: DASY52, Version 52.8 (8);SEMCAD X Version 14.6.10 (7331)

2300 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) = 9.23 W/kg
SAR(1 g) = 4.68 W/kg
Deviation(1 g) = 2.86%



0 dB = 6.05 W/kg = 7.82 dBW/kg

DUT: Dipole 2300 MHz; Type: D2300V2; Serial: 1064

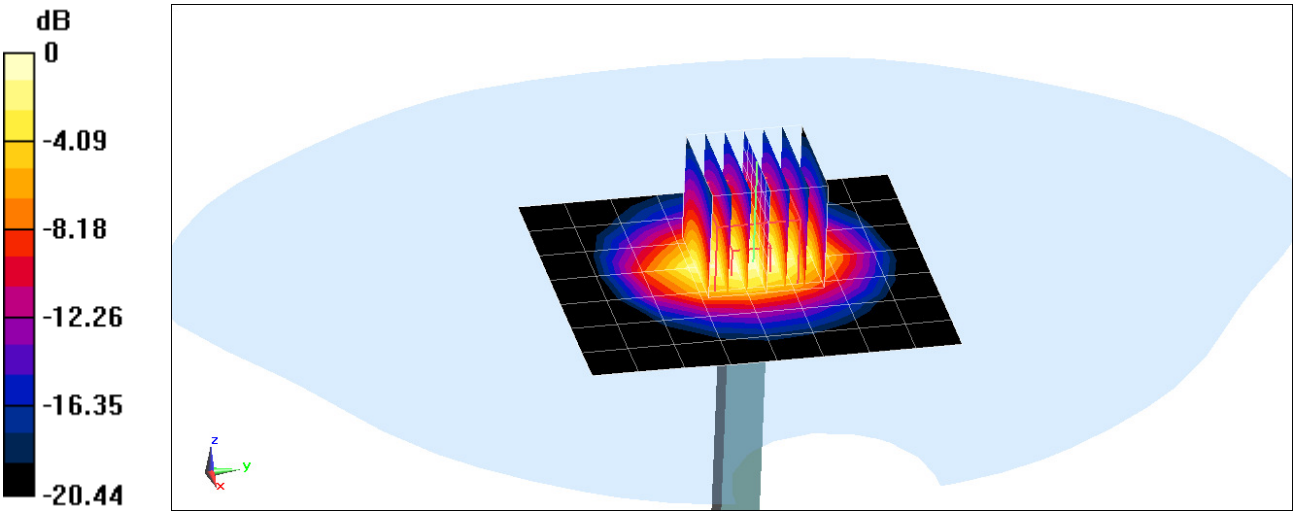
Communication System: UID 0, CW; Frequency: 2300 MHz; Duty Cycle: 1:1
Medium: 2300 Body Medium parameters used:
f = 2300 MHz; σ = 1.785 S/m; ε_r = 52.334; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 04-04-2016; Ambient Temp: 23.9°C; Tissue Temp: 22.6°C

Probe: ES3DV3 - SN3334; ConvF(4.61, 4.61, 4.61); Calibrated: 11/17/2015;
Sensor-Surface: 3mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1415; Calibrated: 11/11/2015
Phantom: SAM Front; Type: SAM; Serial: 1686
Measurement SW: DASY52, Version 52.8 (8);SEMCAD X Version 14.6.10 (7331)

2300 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) = 8.19 W/kg
SAR(1 g) = 4.23 W/kg
Deviation(1 g) = -7.03%



0 dB = 5.42 W/kg = 7.34 dBW/kg

PCTEST ENGINEERING LABORATORY, INC.

DUT: Dipole 2450 MHz; Type: D2450V2; Serial: 719

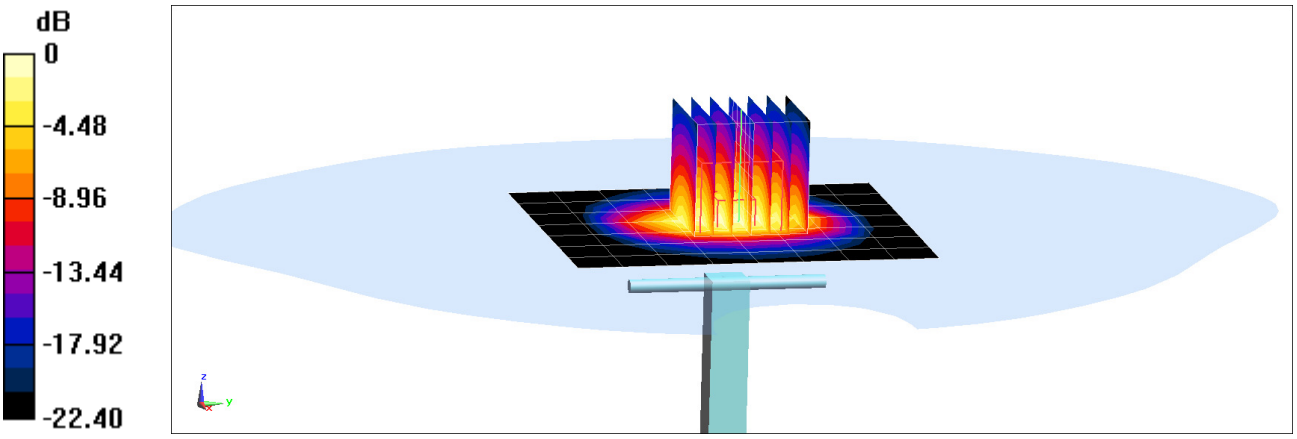
Communication System: UID 0, CW; Frequency: 2450 MHz; Duty Cycle: 1:1
Medium: 2450 Body Medium parameters used:
f = 2450 MHz; σ = 1.965 S/m; ε_r = 52.665; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 03-22-2016; Ambient Temp: 23.5°C; Tissue Temp: 22.0°C

Probe: ES3DV3 - SN3351; ConvF(4.3, 4.3, 4.3); Calibrated: 6/22/2015;
Sensor-Surface: 3mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1322; Calibrated: 8/24/2015
Phantom: SAM V5.0 Right; Type: QD000P40CD; Serial: 1647
Measurement SW: DASY52, Version 52.8 (8);SEMCAD X Version 14.6.10 (7331)

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) = 11.0 W/kg
SAR(1 g) = 5.31 W/kg
Deviation(1 g) = 2.31%



0 dB = 6.96 W/kg = 8.43 dBW/kg

PCTEST ENGINEERING LABORATORY, INC.

DUT: Dipole 2600 MHz; Type: D2600V2; Serial: 1004

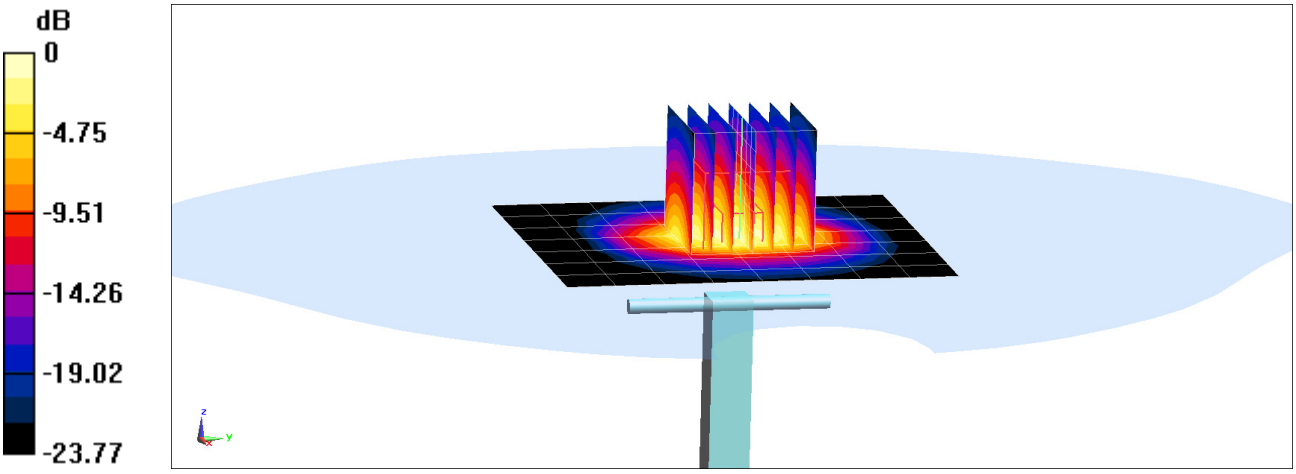
Communication System: UID 0, CW; Frequency: 2600 MHz; Duty Cycle: 1:1
Medium: 2600 Body Medium parameters used:
f = 2600 MHz; σ = 2.177 S/m; ε_r = 52.117; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 03-22-2016; Ambient Temp: 23.5°C; Tissue Temp: 22.0°C

Probe: ES3DV3 - SN3351; ConvF(4.16, 4.16, 4.16); Calibrated: 6/22/2015;
Sensor-Surface: 3mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1322; Calibrated: 8/24/2015
Phantom: SAM V5.0 Right; Type: QD000P40CD; Serial: 1647
Measurement SW: DASY52, Version 52.8 (8);SEMCAD X Version 14.6.10 (7331)

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) = 12.0 W/kg
SAR(1 g) = 5.58 W/kg
Deviation(1 g) = -0.71%



0 dB = 7.35 W/kg = 8.66 dBW/kg

DUT: Dipole 2600 MHz; Type: D2600V2; Serial: 1071

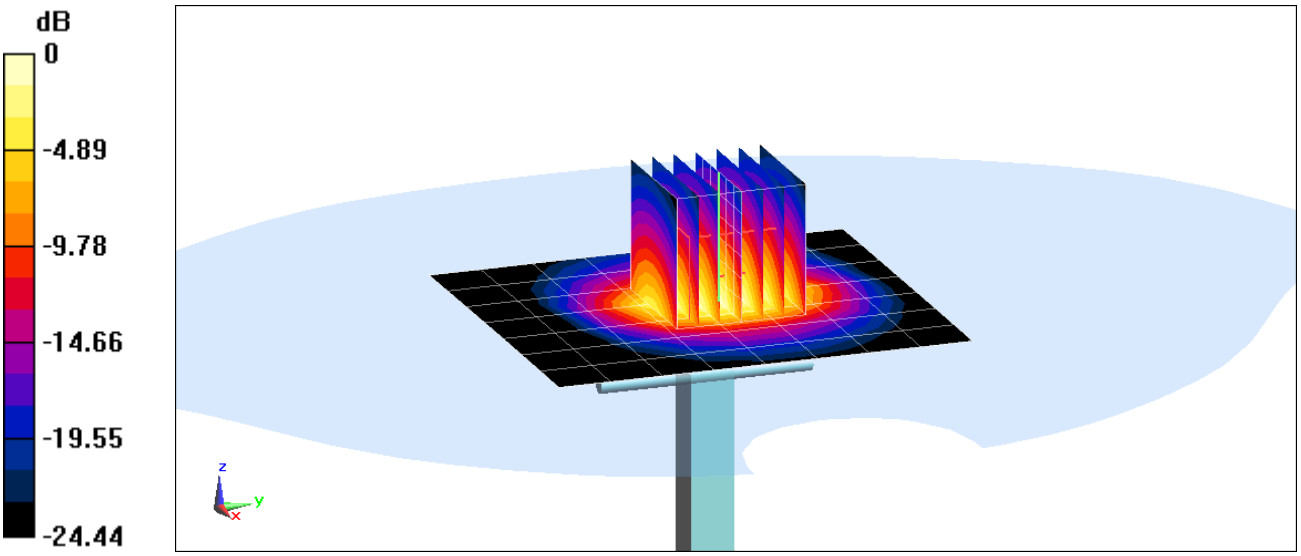
Communication System: UID 0, CW; Frequency: 2600 MHz; Duty Cycle: 1:1
Medium: 2600 Body Medium parameters used:
f = 2600 MHz; σ = 2.164 S/m; ε_r = 50.348; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 04-11-2016; Ambient Temp: 24.0°C; Tissue Temp: 23.4°C

Probe: ES3DV2 - SN3022; ConvF(3.96, 3.96, 3.96); Calibrated: 8/26/2015;
Sensor-Surface: 3mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1323; Calibrated: 9/16/2015
Phantom: SAM Left; Type: QD000P40CC; Serial: TP: 1375
Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

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) = 5.72 W/kg
Deviation(1 g) = 4.19%



0 dB = 7.55 W/kg = 8.78 dBW/kg

PCTEST ENGINEERING LABORATORY, INC.

DUT: Dipole 5 GHz; Type: D5GHzV2; Serial: 1120

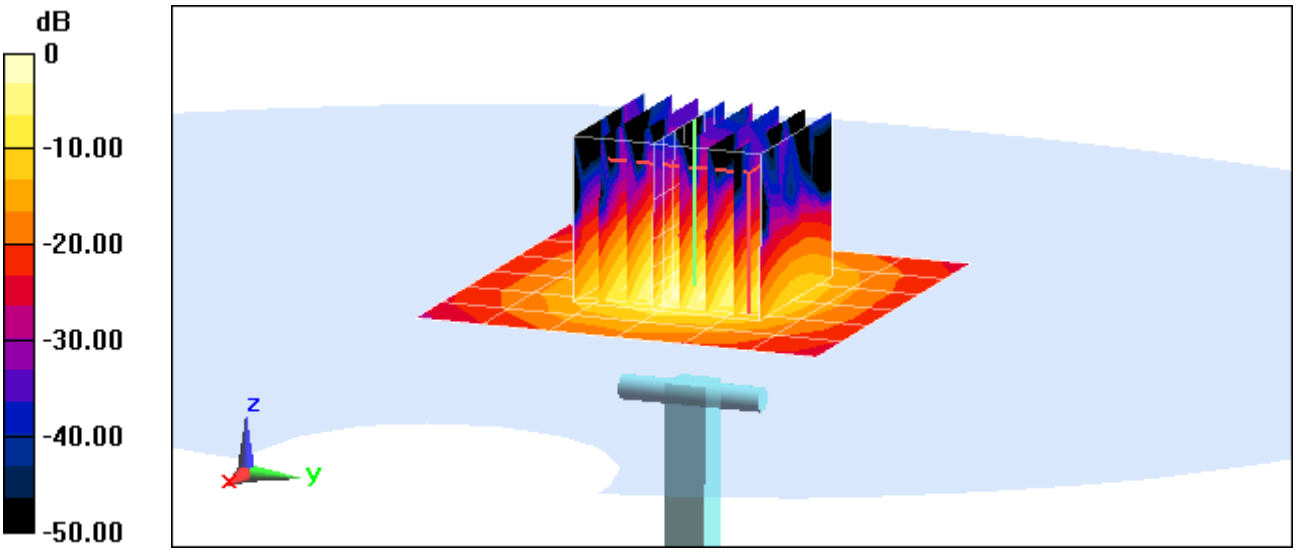
Communication System: UID 0, CW; Frequency: 5250 MHz; Duty Cycle: 1:1
Medium: 5 GHz Body Medium parameters used (interpolated):
f = 5250 MHz; σ = 5.475 S/m; ε_r = 47.945; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 03-24-2016; Ambient Temp: 21.6°C; Tissue Temp: 22.2°C

Probe: EX3DV4 - SN7308; ConvF(4.63, 4.63, 4.63); Calibrated: 7/21/2015;
Sensor-Surface: 1.4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn665; Calibrated: 2/19/2016
Phantom: SAM with CRP v4.0; Type: QD000P40CD; Serial: TP:1800
Measurement SW: DASY52, Version 52.8 (8);SEMCAD X Version 14.6.10 (7331)

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) = 15.4 W/kg
SAR(1 g) = 3.58 W/kg
Deviation(1 g) = -5.29%



0 dB = 8.58 W/kg = 9.33 dBW/kg

PCTEST ENGINEERING LABORATORY, INC.

DUT: Dipole 5 GHz; Type: D5GHzV2; Serial: 1120

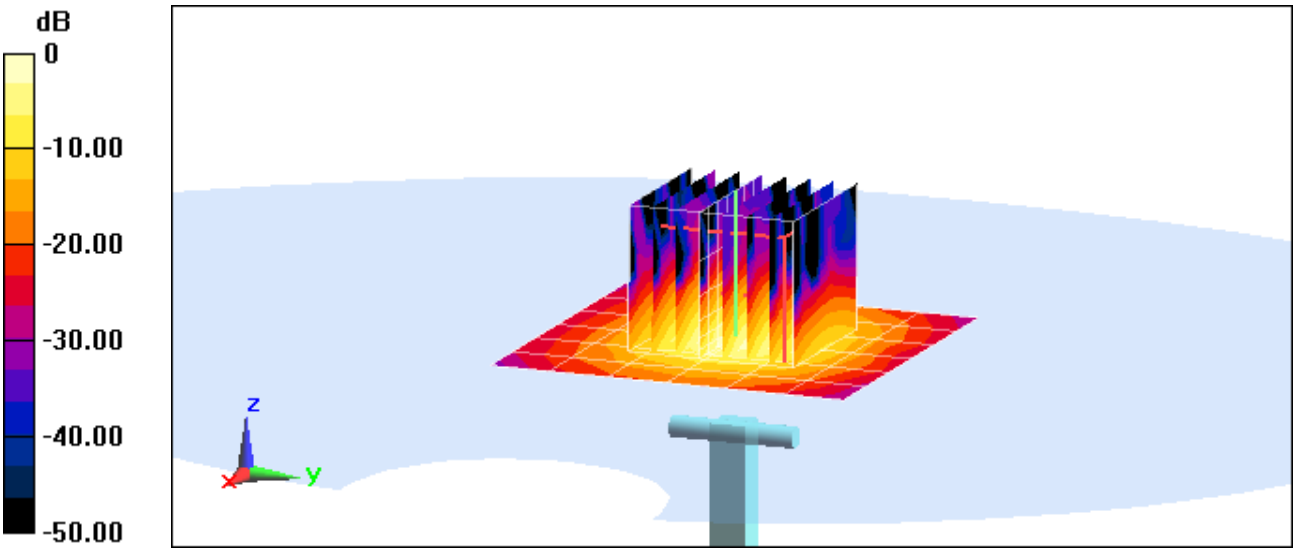
Communication System: UID 0, CW; Frequency: 5600 MHz; Duty Cycle: 1:1
Medium: 5 GHz Body Medium parameters used:
f = 5600 MHz; σ = 5.945 S/m; ε_r = 47.464; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 03-24-2016; Ambient Temp: 21.6°C; Tissue Temp: 22.2°C

Probe: EX3DV4 - SN7308; ConvF(3.92, 3.92, 3.92); Calibrated: 7/21/2015;
Sensor-Surface: 1.4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn665; Calibrated: 2/19/2016
Phantom: SAM with CRP v4.0; Type: QD000P40CD; Serial: TP:1800
Measurement SW: DASY52, Version 52.8 (8);SEMCAD X Version 14.6.10 (7331)

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) = 16.4 W/kg
SAR(1 g) = 3.72 W/kg
Deviation(1 g) = -7.92%



0 dB = 9.11 W/kg = 9.60 dBW/kg

PCTEST ENGINEERING LABORATORY, INC.

DUT: Dipole 5 GHz; Type: D5GHzV2; Serial: 1120

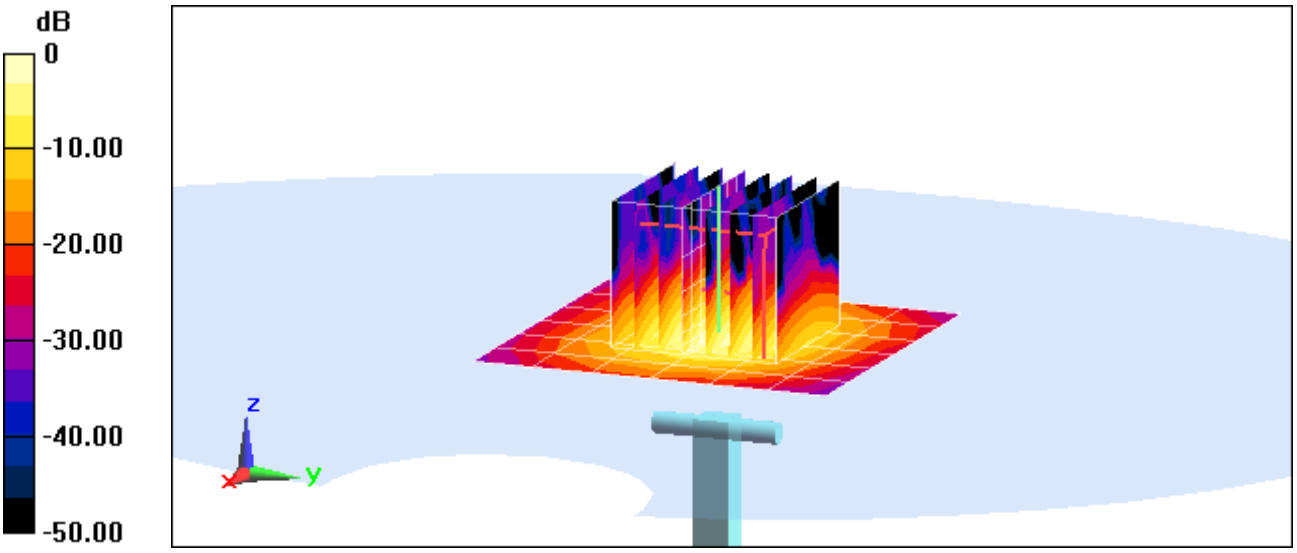
Communication System: UID 0, CW; Frequency: 5750 MHz; Duty Cycle: 1:1
Medium: 5 GHz Body Medium parameters used (interpolated):
f = 5750 MHz; σ = 6.121 S/m; ε_r = 47.344; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 03-24-2016; Ambient Temp: 21.6°C; Tissue Temp: 22.2°C

Probe: EX3DV4 - SN7308; ConvF(4.24, 4.24, 4.24); Calibrated: 7/21/2015;
Sensor-Surface: 1.4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn665; Calibrated: 2/19/2016
Phantom: SAM with CRP v4.0; Type: QD000P40CD; Serial: TP:1800
Measurement SW: DASY52, Version 52.8 (8);SEMCAD X Version 14.6.10 (7331)

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) = 16.1 W/kg
SAR(1 g) = 3.51 W/kg
Deviation(1 g) = -8.24%



0 dB = 8.53 W/kg = 9.31 dBW/kg