



SAR EVALUATION REPORT

Applicant Name:

Samsung Electronics, Co. Ltd.
129, Samsung-ro, Maetan dong,
Yeongtong-gu, Suwon-si
Gyeonggi-do 443-742, Korea

Date of Testing:

01/15/15 - 02/06/15

Test Site/Location:

PCTEST Lab, Columbia, MD, USA

Document Serial No.:

0Y1501190127.A3L

FCC ID:

A3LSMG920P

APPLICANT:

SAMSUNG ELECTRONICS, CO. LTD.

DUT Type:

Portable Handset

Application Type:

Certification

FCC Rule Part(s):

CFR §2.1093

Model(s):

SM-G920P

Equipment Class	Band & Mode	Tx Frequency	SAR		
			1 gm Head (W/kg)	1 gm Body-Worn (W/kg)	1 gm Hotspot (W/kg)
PCE	Cell CDMA/EVDO BC10	817.90 - 823.10 MHz	0.24	0.39	0.41
PCE	Cell CDMA/EVDO BC0	824.70 - 848.31 MHz	0.24	0.42	0.42
PCE	PCS CDMA/EVDO BC1	1851.25 - 1908.75 MHz	0.33	0.57	0.72
PCE	GSM/GPRS/EDGE 850	824.20 - 848.80 MHz	0.19	0.34	0.80
PCE	GSM/GPRS/EDGE 1900	1850.20 - 1909.80 MHz	< 0.1	0.26	0.56
PCE	UMTS 850	826.40 - 846.60 MHz	0.19	0.39	0.39
PCE	UMTS 1900	1852.4 - 1907.6 MHz	0.23	0.48	0.91
PCE	LTE Band 12	699.7 - 715.3 MHz	0.18	0.36	0.36
PCE	LTE Band 26	814.7 - 848.3 MHz	0.22	0.41	0.41
PCE	LTE Band 4 (AWS)	1710.7 - 1754.3 MHz	0.24	0.50	0.90
PCE	LTE Band 25 (PCS)	1850.7 - 1914.3 MHz	0.44	0.78	0.78
PCE	LTE Band 41	2498.5 - 2687.5 MHz	< 0.1	0.17	0.17
DTS	2.4 GHz WLAN	2412 - 2462 MHz	0.70	< 0.1	< 0.1
NII	U-NII-1	5180 - 5240 MHz	N/A		
NII	U-NII-2A	5260 - 5320 MHz	0.15	< 0.1	
NII	U-NII-2C < 5.65 GHz	5500 - 5580 MHz	0.27	0.11	
NII	U-NII-2C > 5.65 GHz + U-NII-3	5660 - 5825 MHz	0.55	0.12	0.12
DSS/DTS	Bluetooth	2402 - 2480 MHz	N/A		
Simultaneous SAR per KDB 690783 D01v01r03:			1.09	0.95	1.13

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



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1 DEVICE UNDER TEST

1.1 Device Overview

Band & Mode	Operating Modes	Tx Frequency
Cell CDMA/EVDO BC10	Voice/Data	817.90 - 823.10 MHz
Cell CDMA/EVDO BC0	Voice/Data	824.70 - 848.31MHz
PCS CDMA/EVDO BC1	Voice/Data	1851.25 - 1908.75 MHz
GSM/GPRS/EDGE 850	Voice/Data	824.20 - 848.80 MHz
GSM/GPRS/EDGE 1900	Voice/Data	1850.20 - 1909.80 MHz
UMTS 850	Voice/Data	826.40 - 846.60 MHz
UMTS 1900	Voice/Data	1852.4 - 1907.6 MHz
LTE Band 12	Data	699.7 - 715.3 MHz
LTE Band 26	Data	814.7 - 848.3 MHz
LTE Band 5	Data	824.7 - 848.3 MHz
LTE Band 4 (AWS)	Data	1710.7 - 1754.3 MHz
LTE Band 2	Data	1850.7 - 1909.3 MHz
LTE Band 25 (PCS)	Data	1850.7 - 1914.3 MHz
LTE Band 41	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 < 5.65 GHz	Voice/Data	5500 - 5580 MHz
U-NII-2C > 5.65 GHz + U-NII-3	Voice/Data	5660 - 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

The device utilizes power reduction under portable hotspot for SAR compliance. There is power reduction for UMTS Band 2, CDMA/EVDO 1900, and LTE Band 4/2/25. There is no power reduction for GSM/GPRS/EDGE 850/1900, UMTS Band 5, CDMA/EVDO 850, LTE Bands 12/5/26, and WLAN modes. The reduced powers were confirmed via conducted power measurements at the RF port (See Section 9). A detailed description of the hotspot power reduction is included in the technical descriptions in the FCC Filing.

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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 D01v05.

Mode / Band		Voice (dBm)	Burst Average GMSK (dBm)				Burst Average 8-PSK (dBm)			
		1 TX Slot	1 TX Slots	2 TX Slots	3 TX Slots	4 TX Slots	1 TX Slots	2 TX Slots	3 TX Slots	4 TX Slots
GSM/GPRS/EDGE 850	Maximum	33.0	33.0	32.5	31.0	30.5	28.0	26.5	24.0	23.5
	Nominal	32.5	32.5	32.0	30.5	30.0	27.5	26.0	23.5	23.0
GSM/GPRS/EDGE 1900	Maximum	30.5	30.5	29.0	27.5	26.5	26.5	25.5	23.5	22.5
	Nominal	30.0	30.0	28.5	27.0	26.0	26.0	25.0	23.0	22.0

Mode / Band		Modulated Average (dBm)		
		3GPP WCDMA Rel 99	3GPP HSDPA Rel 5	3GPP HSUPA Rel 6
UMTS Band 5 (850 MHz)	Maximum	24.5	23.0	22.5
	Nominal	24.0	22.5	22.0
UMTS Band 2 (1900 MHz) - Hotspot Mode Inactive	Maximum	24.5	23.0	22.5
	Nominal	24.0	22.5	22.0
UMTS Band 2 (1900 MHz) - Hotspot Mode Active	Maximum	22.5	20.5	20.5
	Nominal	22.0	20.0	20.0

Mode / Band		Modulated Average (dBm)
CDMA/EVDO BC10 (§90S)	Maximum	25.0
	Nominal	24.5
CDMA/EVDO BC0 (§22H)	Maximum	25.0
	Nominal	24.5
PCS CDMA/EVDO - Hotspot Mode Inactive	Maximum	25.0
	Nominal	24.5
PCS CDMA/EVDO - Hotspot Mode Active	Maximum	23.0
	Nominal	22.5

Mode / Band		Modulated Average (dBm)
LTE Band 12	Maximum	24.5
	Nominal	24.0
LTE Band 26	Maximum	24.5
	Nominal	24.0
LTE Band 5	Maximum	24.5
	Nominal	24.0
LTE Band 4 (AWS) - Hotspot Mode Inactive	Maximum	24.5
	Nominal	24.0
LTE Band 4 (AWS) - Hotspot Mode Active	Maximum	22.5
	Nominal	22.0
LTE Band 2 (PCS) - Hotspot Mode Inactive	Maximum	24.5
	Nominal	24.0
LTE Band 2 (PCS) - Hotspot Mode Active	Maximum	22.5
	Nominal	22.0
LTE Band 25 (PCS) - Hotspot Mode Inactive	Maximum	24.5
	Nominal	24.0
LTE Band 25 (PCS) - Hotspot Mode Active	Maximum	22.5
	Nominal	22.0
LTE Band 41	Maximum	24.5
	Nominal	24.0

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Mode / Band		Modulated Average (dBm)
IEEE 802.11b (2.4 GHz) - SISO	Maximum	17.5
	Nominal	17.0
IEEE 802.11g (2.4 GHz) - SISO	Maximum	14.5
	Nominal	14.0
IEEE 802.11n (2.4 GHz) - SISO	Maximum	13.5
	Nominal	13.0
IEEE 802.11n (2.4 GHz) - MIMO	Maximum	16.5
	Nominal	16.0
IEEE 802.11a (5 GHz) - SISO	Maximum	14.5
	Nominal	14.0
IEEE 802.11n/ac (5 GHz) 20 MHz BW - SISO	Maximum	13.5
	Nominal	13.0
IEEE 802.11n/ac (5 GHz) 40 MHz BW - SISO	Maximum	12.5
	Nominal	12.0
IEEE 802.11ac (5 GHz) 80 MHz BW - SISO	Maximum	11.5
	Nominal	11.0
IEEE 802.11n/ac (5 GHz) 20 MHz BW - MIMO	Maximum	16.5
	Nominal	16.0
IEEE 802.11n/ac (5 GHz) 40 MHz BW - MIMO	Maximum	15.5
	Nominal	15.0
IEEE 802.11ac (5 GHz) 80 MHz BW - MIMO	Maximum	14.5
	Nominal	14.0
Bluetooth	Maximum	10.5
	Nominal	10.0
Bluetooth LE	Maximum	7.0
	Nominal	6.5

1.4 DUT Antenna Locations

- A diagram showing the location of the device antennas can be found in Appendix F. Exact antenna dimensions and separation distances are shown in the Technical Descriptions in the FCC filing.
- 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.

**Table 1-1
Sides for SAR Testing**

Sides for SAR Testing						
Mode	Back	Front	Top	Bottom	Right	Left
EVDO BC10 (S90S)	Yes	Yes	No	Yes	Yes	Yes
EVDO BC0 (S22H)	Yes	Yes	No	Yes	Yes	Yes
PCS EVDO	Yes	Yes	No	Yes	Yes	Yes
GPRS 850	Yes	Yes	No	Yes	Yes	Yes
GPRS 1900	Yes	Yes	No	Yes	Yes	Yes
UMTS 850	Yes	Yes	No	Yes	Yes	Yes
UMTS 1900	Yes	Yes	No	Yes	Yes	Yes
LTE Band 12	Yes	Yes	No	Yes	Yes	Yes
LTE Band 26	Yes	Yes	No	Yes	Yes	Yes
LTE Band 4 (AWS)	Yes	Yes	No	Yes	Yes	Yes
LTE Band 25 (PCS)	Yes	Yes	No	Yes	Yes	Yes
LTE Band 41	Yes	Yes	No	Yes	Yes	Yes
2.4 GHz WLAN Ant 1	Yes	Yes	Yes	No	No	Yes
2.4 GHz WLAN Ant 2	Yes	Yes	Yes	No	Yes	No
5.8 GHz WLAN Ant 1	Yes	Yes	Yes	No	No	Yes
5.8 GHz WLAN Ant 2	Yes	Yes	Yes	No	Yes	No

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 D06v01 guidance, page 2. 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 WLAN operations are disabled. Therefore U-NII-1, U-NII-2A & U-NII-2C WLAN operations are not considered in this section.

1.5 Near Field Communications (NFC) Antenna

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

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1.6 Simultaneous Transmission Capabilities

According to FCC KDB Publication 447498 D05v01, 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

This device contains multiple transmitters that may operate simultaneously, and therefore requires a simultaneous transmission analysis according to FCC KDB Publication 447498 D01v05 3) procedures.

Table 1-2
Simultaneous Transmission Scenarios

No.	Capable Transmit Configuration	Head	Body-Worn Accessory	Wireless Router	Notes
1	1x CDMA voice + 2.4 GHz Wi-Fi	Yes	Yes	N/A	
2	1x CDMA voice + 5 GHz Wi-Fi	Yes	Yes	N/A	
3	1x CDMA voice + 2.4 GHz Bluetooth	N/A	Yes	N/A	
4	GSM voice + 2.4 GHz Wi-Fi	Yes	Yes	N/A	
5	GSM voice + 5 GHz Wi-Fi	Yes	Yes	N/A	
6	GSM voice + 2.4 GHz Bluetooth	N/A	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	LTE + 2.4 GHz Wi-Fi	Yes*	Yes*	Yes	*-Pre-installed VOIP applications are considered.
11	LTE + 5 GHz Wi-Fi	Yes*	Yes*	Yes	*-Pre-installed VOIP applications are considered.
12	LTE + 2.4 GHz Bluetooth	N/A	Yes*	N/A	*-Pre-installed VOIP applications are considered.
13	CDMA/EVDO data + 2.4 GHz Wi-Fi	Yes*	Yes*	Yes	*-Pre-installed VOIP applications are considered.
14	CDMA/EVDO data + 5 GHz Wi-Fi	Yes*	Yes*	Yes	*-Pre-installed VOIP applications are considered.
15	CDMA/EVDO data + 2.4 GHz Bluetooth	N/A	Yes*	N/A	*-Pre-installed VOIP applications are considered.
16	GPRS/EDGE + 2.4 GHz Wi-Fi	N/A	N/A	Yes	
17	GPRS/EDGE + 5 GHz Wi-Fi	N/A	N/A	Yes	
18	1x CDMA voice + CDMA/EVDO data	N/A	N/A	N/A	Not supported by HW
19	CDMA/EVDO data + LTE	N/A	N/A	N/A	Not supported by HW
20	1x CDMA voice + LTE	N/A	N/A	N/A	Not supported by HW
21	1x CDMA voice + LTE + 2.4 GHz Wi-Fi	N/A	N/A	N/A	Not supported by HW
22	1x CDMA voice + LTE + 5 GHz Wi-Fi	N/A	N/A	N/A	Not supported by HW

- 2.4 GHz WLAN, 5 GHz WLAN, and 2.4 GHz Bluetooth share the same antenna path and cannot transmit simultaneously.
- All licensed modes share the same antenna path and cannot transmit simultaneously.
- 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.
- 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 GHz Wireless Router is only supported for the U-NII-3 Band by S/W, therefore U-NII1, U-NII-2A, & U-NII-2C Bands were not evaluated for wireless router conditions.
- This device supports 2x2 MIMO Tx for WLAN 802.11n/ac. Each WLAN antenna can transmit independently or together when operating with MIMO.
- This device does not support VoLTE.

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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 UNII-3 WIFI Hotspot SAR tests and combinations are considered for SAR with respect to Wireless Router configurations according to FCC KDB 941225 D06v02.

Since U-NII-1 and U-NII-2A bands have the same maximum output power and the highest reported SAR for U-NII-2A is less than 1.2 W/kg, SAR is not required for U-NII-1 band according to FCC KDB 248227 D01 DR02-41929.

Since this device supports the band gap channels, the channels in the U-NII-2C band above 5.65 GHz were grouped with the channels in the U-NII-3 as a single aggregate band. The channels in U-NII-2C below 5.65 GHz were considered separately for SAR evaluation.

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) Band gap channels are supported

Per FCC KDB 447498 D01v05, the 1g SAR exclusion threshold for distances <50mm is defined by the following equation:

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

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; $[(11/15) * \sqrt{2.480}] = 1.2 < 3.0$. Per KDB Publication 447498 D01v05, the maximum power of the channel was rounded to the nearest mW before calculation.

(B) Licensed Transmitter(s)

GSM/GPRS DTM is not supported for US bands. Therefore, the GSM Voice modes in this report do not transmit simultaneously with GPRS 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 D01v03.

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

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 D05v02.

This device supports intra-band LTE Carrier Aggregation (CA) in the downlink only. All uplink communications are identical to Release 8 specifications. Per FCC KDB Publication 941225 D05A v01r01, SAR for LTE CA operations was not needed since the maximum average output power in LTE CA mode was not >0.25 dB higher than the maximum output power when downlink carrier aggregation was inactive.

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This Device additionally supports LTE B2. LTE Band 2 and LTE Band 25 share the same transmission path. LTE Band 2 was not evaluated for SAR since the supported frequency range falls within the LTE Band 25 supported frequency range and the Band 2 target power was less than or equal to the Band 25 target power.

This Device additionally supports LTE B5. LTE Band 5 and LTE Band 26 share the same transmission path. LTE Band 5 was not evaluated for SAR since the supported frequency range falls within the LTE Band 26 supported frequency range and the Band 5 target power was less than or equal to the Band 26 target power.

1.8 Guidance Applied

- IEEE 1528-2003
- FCC KDB Publication 941225 D01v03, D05v02r03, D05Av01r01, D06v01r01 (2G/3G/4G and Hotspot)
- FCC KDB Publication 248227 D01 DR02-41929 (SAR Considerations for 802.11 Devices)
- FCC KDB Publication 447498 D01v05r02 (General SAR Guidance)
- FCC KDB Publication 865664 D01v01r03, D02v01r01 (SAR Measurements up to 6 GHz)
- October 2013 TCB Workshop Notes (GPRS Testing Considerations)

1.9 Device Serial Numbers

Several samples with identical hardware were used to support SAR testing. The manufacturer has confirmed that the device(s) tested have the same physical, mechanical and thermal characteristics and are within operational tolerances expected for production units.

	Head Serial Number	Body-Worn Serial Number	Hotspot Serial Number
Cell. CDMA/EVDO	08FCB	08FC8	08FC8
PCS CDMA/EVDO - Hotspot Mode Inactive	08FCF	08FCF	N/A
PCS CDMA/EVDO - Hotspot Mode Active	08FD5	N/A	08FD5
GSM/GPRS/EDGE 850	08C6B	08C68	08C68
UMTS 850	08C6B	08C6B	08C6B
GSM/GPRS/EDGE 1900	08C6B	08C68	08C68
UMTS 1900 - Hotspot Mode Inactive	08C6B	08C6B	N/A
UMTS 1900 - Hotspot Mode Active	N/A	N/A	08FDB
LTE Band 12	08FA6	08FC4	08FC4
LTE Band 26 (Cell)	08FC4	08FC4	08FC4
LTE Band 4 (AWS) - Hotspot Mode Inactive	08FA6	08FA6	N/A
LTE Band 4 (AWS) - Hotspot Mode Active	08FD5	N/A	08FD5
LTE Band 25 (PCS) - Hotspot Mode Inactive	08FA6	08FA6	N/A
LTE Band 25 (PCS) - Hotspot Mode Active	08FDB	N/A	08DB6
LTE Band 41	12D77	12D77	12D77
2.4 GHz WLAN	08FA2	08FA2	08FA2
5 GHz WLAN	08FA2	08FA2	08FA2

When wireless router mode is enabled, Only U-NII-3 is enabled for 5 GHz.

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LTE INFORMATION

LTE Information					
FCC ID	A3LSMG920P				
Form Factor	Portable Handset				
Frequency Range of each LTE transmission band	LTE Band 12 (699.7 - 715.3 MHz)				
	LTE Band 26 (814.7 - 848.3 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 25 (PCS) (1850.7 - 1914.3 MHz)				
	LTE Band 41 (2498.5 - 2687.5 MHz)				
Channel Bandwidths	LTE Band 12: 1.4 MHz, 3 MHz, 5 MHz, 10 MHz				
	LTE Band 26: 1.4 MHz, 3 MHz, 5 MHz, 10 MHz, 15 MHz				
	LTE Band 5 (Cell): 1.4 MHz, 3 MHz, 5 MHz, 10 MHz				
	LTE Band 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 25 (PCS): 1.4 MHz, 3 MHz, 5 MHz, 10 MHz, 15 MHz, 20 MHz				
	LTE Band 41: 5 MHz, 10 MHz, 15 MHz, 20 MHz				
Channel Numbers and Frequencies (MHz)	Low	Low-Mid	Mid	High-Mid	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 26: 1.4 MHz	814.7 (26697)		831.5 (26865)		848.3 (27033)
LTE Band 26: 3 MHz	815.5 (26705)		831.5 (26865)		847.5 (27025)
LTE Band 26: 5 MHz	816.5 (26715)		831.5 (26865)		846.5 (27015)
LTE Band 26: 10 MHz	819 (26740)		831.5 (26865)		844 (26990)
LTE Band 26: 15 MHz	831.5 (26765)		836.5 (26915)		841.5 (26965)
LTE Band 5 (Cell): 1.4 MHz	824.7 (20407)		836.5 (20525)		848.3 (20643)
LTE Band 5 (Cell): 3 MHz	825.5 (20415)		836.5 (20525)		847.5 (20635)
LTE Band 5 (Cell): 5 MHz	826.5 (20425)		836.5 (20525)		846.5 (20625)
LTE Band 5 (Cell): 10 MHz	829 (20450)		836.5 (20525)		844 (20600)
LTE Band 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 25 (PCS): 1.4 MHz	1850.7 (26047)		1882.5 (26365)		1914.3 (26683)
LTE Band 25 (PCS): 3 MHz	1851.5 (26055)		1882.5 (26365)		1913.5 (26675)
LTE Band 25 (PCS): 5 MHz	1852.5 (26065)		1882.5 (26365)		1912.5 (26665)
LTE Band 25 (PCS): 10 MHz	1855 (26090)		1882.5 (26365)		1910 (26640)
LTE Band 25 (PCS): 15 MHz	1857.5 (26115)		1882.5 (26365)		1907.5 (26615)
LTE Band 25 (PCS): 20 MHz	1860 (18700)		1882.5 (26365)		1905 (26590)
LTE Band 41 (PCS): 5 MHz	2498.5 (39675)	2545.75 (40148)	2593 (40620)	2640.25 (41093)	2687.5 (41565)
LTE Band 41 (PCS): 10 MHz	2501 (39700)	2547 (40160)	2593 (40620)	2639 (41080)	2685 (41540)
LTE Band 41 (PCS): 15 MHz	2503.5 (39725)	2548.3 (41073)	2593 (40620)	2637.8 (41068)	2682.5 (41515)
LTE Band 41 (PCS): 20 MHz	2506 (39750)	2549.5 (40185)	2593 (40620)	2636.5 (41055)	2636.5 (41055)
UE Category	6				
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	LTE B41 (PCC) + LTE B41 (SCC)				
	10MHz (B41)+10MHz (B41)				
	10MHz (B41)+15MHz (B41)				
	10MHz (B41)+20MHz (B41)				
	15MHz (B41)+10MHz (B41)				
	15MHz (B41)+15MHz (B41)				
	15MHz (B41)+20MHz (B41)				
	20MHz (B41)+10MHz (B41)				
	20MHz (B41)+15MHz (B41)				
	20MHz (B41)+20MHz (B41)				
LTE Carrier Aggregation Additional Information	This device does not support full CA features on 3GPP Release 10. It supports a maximum of 2 carriers in the downlink with a total maximum bandwidth of 20 MHz of the spectrum. All uplink communications are identical to the Release 8 Specifications. Uplink communications are done on the PCC. Due to carrier capability, only the combinations listed above are supported. 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 Industry 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/m³)
- 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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DOSIMETRIC ASSESSMENT

4.1 Measurement Procedure

The evaluation was performed using the following procedure compliant to FCC KDB Publication 865664 D01v01 and IEEE 1528-2013:

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 D01v01 (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 D01v01 (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.

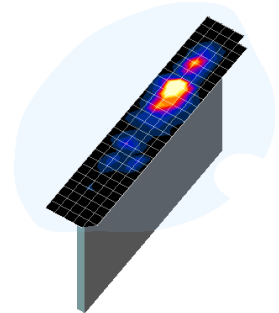


Figure 4-1
Sample SAR Area Scan

Table 4-1
Area and Zoom Scan Resolutions per FCC KDB Publication 865664 D01v01*

Frequency	Maximum Area Scan Resolution (mm) ($\Delta x_{area}, \Delta y_{area}$)	Maximum Zoom Scan Resolution (mm) ($\Delta x_{zoom}, \Delta y_{zoom}$)	Maximum Zoom Scan Spatial Resolution (mm)			Minimum Zoom Scan Volume (mm) (x,y,z)
			Uniform Grid	Graded Grid		
				$\Delta z_{zoom}(n)$	$\Delta z_{zoom}(1)^*$	
≤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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DEFINITION OF REFERENCE POINTS

5.1 EAR REFERENCE POINT

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

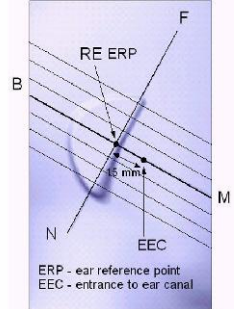


Figure 5-1
Close-Up Side view
of ERP

5.2 HANDSET REFERENCE POINTS

Two imaginary lines on the handset were established: the vertical centerline and the horizontal line. The test device was placed in a normal operating position with the acoustic output located along the “vertical centerline” on the front of the device aligned to the “ear reference point” (See Figure 5-3). The acoustic output was then 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.

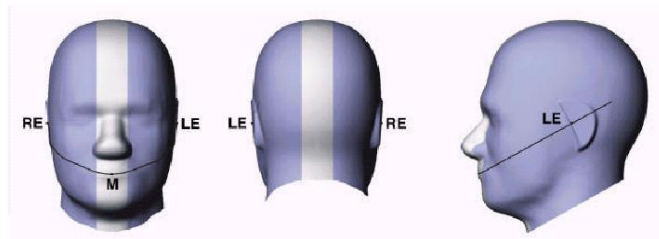


Figure 5-2
Front, back and side view of SAM Twin Phantom

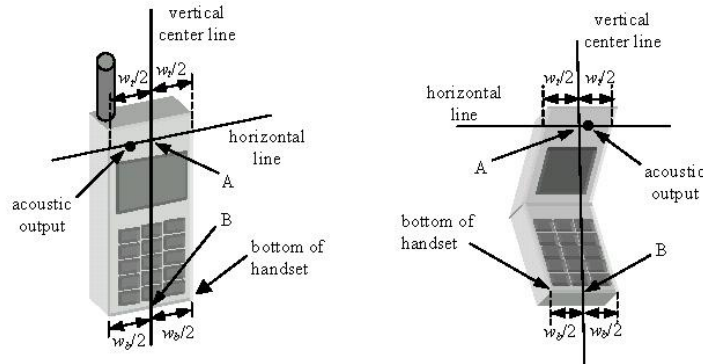


Figure 5-3
Handset Vertical Center & Horizontal Line Reference Points

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TEST CONFIGURATION POSITIONS FOR HANDSETS

6.1 Device Holder

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

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.

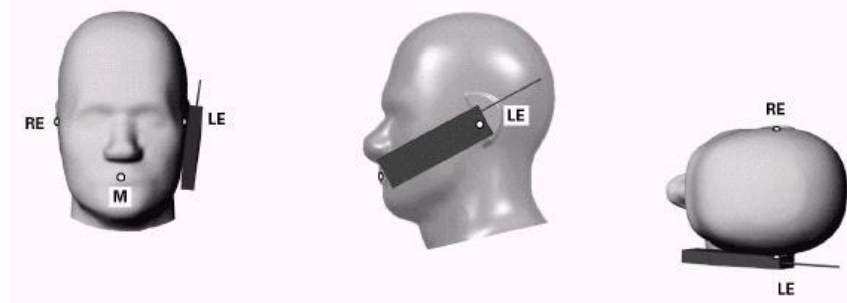


Figure 6-1 Front, Side and Top View of Cheek Position

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 with 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 / 15° 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 15 degrees.
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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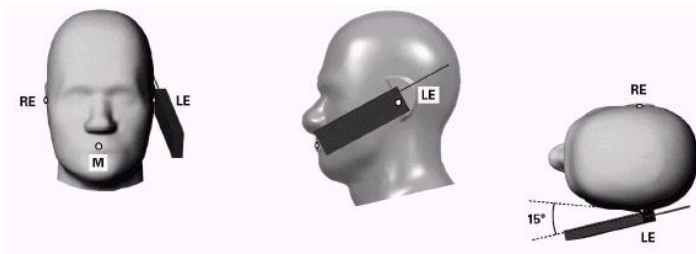


Figure 6-2 Front, Side and Top View of Ear/15° Tilt Position

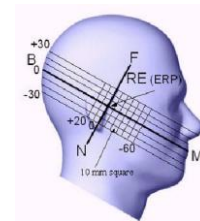


Figure 6-3 Side view w/ relevant markings

6.4 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 D04v01, 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 D01v05 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 $> 1.2 \text{ W/kg}$, 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.

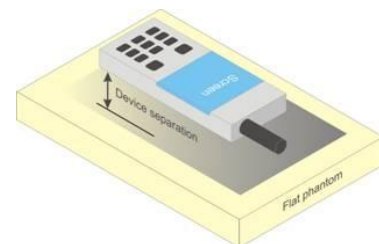


Figure 6-4 Sample Body-Worn Diagram

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 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.

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6.5 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 44798 D01v05 should be applied to determine SAR test requirements.

Per KDB Publication 447498 D01v05, 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.

6.6 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 D06 v01 where SAR test considerations for handsets ($L \times W \geq 9 \text{ cm} \times 5 \text{ cm}$) 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 D01v05 publication 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 <i>General Population</i> (W/kg) or (mW/g)	CONTROLLED ENVIRONMENT <i>Occupational</i> (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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8.1 Measured and Reported SAR

Per FCC KDB Publication 447498 D01v05, 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 D01v01r02.

8.2 3G SAR Test Reduction Procedure

In FCC KDB Publication 941225 D01v03, 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 D01v03 "3G SAR Measurement Procedures."

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

8.4 SAR Measurement Conditions for CDMA2000

The following procedures were performed according to FCC KDB Publication 941225 D01v03 "3G SAR Measurement Procedures.

8.4.1 Output Power Verification

See 3GPP2 C.S0011/TIA-98-E as recommended by "SAR Measurement Procedures for 3G Devices" v02, October 2007. Maximum output power is verified on the High, Middle and Low channels according to procedures in section 4.4.5.2 of 3GPP2 C.S0011/TIA-98-E. SO55 tests were measured with power control bits in the "All Up" condition.

1. If the mobile station (MS) supports Reverse TCH RC 1 and Forward TCH RC 1, set up a call using Fundamental Channel Test Mode 1 (RC=1/1) with 9600 bps data rate only.
2. Under RC1, C.S0011 Table 4.4.5.2-1, Table 8-1 parameters were applied.

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

Table 8-1

Parameters for Max. Power for RC1

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

Table 8-2

Parameters for Max. Power for RC3

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

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

8.4.2 CDMA2000 1x Advanced

This device additionally supports 1x Advanced. Conducted powers are measured using SO75 with RC8 on the uplink and RC11 on the downlink per FCC KDB Publication 941225 D01v03. Smart blanking is disabled for all measurements. The EUT is configured with forward power control Mode 000 and reverse power control at 400 bps. Conducted powers are measured on an Agilent 8960 Series 10 Wireless Communications Test Set, Model E5515C using the CDMA2000 1x Advanced application, Option E1962B-410.

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

8.4.3 Head SAR Measurements

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

Head SAR is additionally evaluated using EVDO Rev. A to support compliance for VoIP operations. See Section 8.4.6 for EVDO Rev. A configuration parameters.

8.4.4 Body-worn SAR Measurements

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

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

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8.4.5 Body-worn SAR Measurements for EVDO Devices

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

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

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

8.4.6 Body SAR Measurements for EVDO Hotspot

Hotspot Body SAR is measured using Subtype 0/1 Physical Layer configurations for Rev. 0 per KDB Publication 941225 D01v03 procedures for “1x Ev-Do data Devices”. SAR for Subtype 2 Physical layer configurations is not required for Rev. A when the maximum average output of each RF channels is less than that measured in Subtype 0/1 Physical layer configurations. Otherwise, SAR is measured on the maximum output channel for Rev. A using the exposure configuration that results in the highest SAR for the RF channels in Rev. 0. The AT is tested with a Reverse Data Channel rate of 153.6 kbps in Subtype 0/1 Physical Layer configurations; and a Reverse Data Channel payload size of 4096 bits and Termination Target of 16 slots in Subtype 2 Physical Layer configurations.

SAR is not required for 1x RTT for Ev-Do devices that also support 1x RTT voice and/or data operations, when the maximum average output of each channel is less than 1/4 dB higher than that measured in Subtype 0/1 Physical Layer configurations for Rev. 0. Otherwise, CDMA “Body-SAR Measurement” procedures for “CDMA 2000 1x Handsets” were applied.

8.5 SAR Measurement Conditions for UMTS

8.5.1 Output Power Verification

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

8.5.2 Head SAR Measurements

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

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8.5.3 Body SAR Measurements

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

8.5.4 SAR Measurements for Handsets with Rel 5 HSDPA

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

8.5.5 SAR Measurements for Handsets 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.

8.6 SAR Measurement Conditions for LTE

LTE modes were tested according to FCC KDB 941225 D05v02 publication. Please see notes after the tabulated SAR data for required test configurations. Establishing connections with base station simulators ensure a consistent means for testing SAR and are recommended for evaluating SAR [4]. The R&S CMW500 was 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).

8.6.1 Spectrum Plots for RB Configurations

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

8.6.2 MPR

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

8.6.3 A-MPR

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

8.6.4 Required RB Size and RB Offsets for SAR Testing

According to FCC KDB 941225 D05v02r01:

- 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

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- 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.

8.6.5 TDD

LTE TDD testing is performed using guidance from FCC KDB 941225 D05v02r03 and the SAR test guidance provided in April 2013 TCB workshop notes. 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 D05v02r03. SAR testing is performed using the extended cyclic prefix listed in 3GPP TS 36.211 Section 4.

8.6.6 Downlink Carrier Aggregation

LTE Carrier Aggregation (CA) measurements are made in accordance to 3GPP TS 36.521-1 V10.4.0 (2012-12). 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 the Secondary component carrier (SCC) on the downlink only. All uplink communications and acknowledgements remain identical to release 8 specifications on the PCC. Additional output powers are measured using two carriers in the downlink for the release 8 configurations with the highest output power among all channels, RB configurations and bandwidths for each uplink band. Per FCC KDB Publication 941225 D05A v01r01, no SAR measurements are required when the average output power with downlink carrier aggregation active is not more than 0.25 dB higher than the average output power with downlink carrier aggregation inactive.

8.7 SAR Testing with 802.11 Transmitters

Normal network operating configurations are not suitable for measuring the SAR of 802.11 a/b/g/n/ac transmitters. 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 D01v DR02-41929 for more details.

8.7.1 General Device Setup

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

A periodic duty factor is required for current generation SAR systems to measure SAR. When 802.11 frame gaps are accounted for in the transmission, a maximum transmission duty factor of 92 - 96% is

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typically achievable in most test mode configurations. A minimum transmission duty factor of 85% is required to avoid certain hardware and device implementation issues related to wide range SAR scaling. The reported SAR is scaled to 100% transmission duty factor to determine compliance at the maximum tune-up tolerance limit.

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

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

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

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

Unless band gap channels are permanently disabled, SAR must be considered for these channels. To maintain SAR measurement accuracy and to facilitate test reduction, the channels in U-NII-2C band above 5.65 GHz are grouped with the 5.8 GHz channels in U-NII-3 band or §15.247 5.8 GHz band to enable two SAR probe calibration frequency points to cover the bands, including the band gap channels. When band gap channels are disabled, each band is tested independently according to the normally required OFDM SAR measurement and probe calibration frequency points requirements.

8.7.4 Initial Test Position Procedure

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

8.7.5 2.4 GHz SAR Test Requirements

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

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

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8.7.6 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.

8.7.7 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, and lowest data rate. If the average RF output powers of the highest identical transmission modes are within 0.25 dB of each other, mid channel of the transmission mode with highest average RF output power is the initial test channel. Otherwise, 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 8.7.6)

8.7.8 Subsequent Test Configuration Procedures

For OFDM configurations, in each frequency band and aggregated band, SAR is evaluated for initial test configuration using the fixed test position or the initial test position procedure, when applicable.

When the highest reported SAR for the initial test configuration, adjusted by the ratio of the subsequent test configuration to initial test configuration specified maximum output power, is ≤ 1.2 W/kg, no additional SAR testing for the subsequent test configurations is required.

8.7.9 MIMO SAR considerations

Per KDB 248227 D01 DR02-41929, the simultaneous SAR provisions in KDB Publication 447498 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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9.1 CDMA Conducted Powers

Table 9-1
Maximum Average RF Output Powers - Hotspot Mode Inactive

Band	Channel	Rule Part	Frequency	SO55 [dBm]	SO55 [dBm]	SO75 [dBm]	TDSO SO32 [dBm]	TDSO SO32 [dBm]	1x EVDO Rev. 0 [dBm]	1x EVDO Rev. A [dBm]
	F-RC		MHz	RC1	RC3	RC11	FCH+SCH	FCH	(RTAP)	(RETAP)
Cellular	564	90S	820.1	24.35	24.39	24.63	24.41	24.40	24.37	24.33
	1013	22H	824.7	24.25	24.23	24.47	24.25	24.22	24.21	24.19
	384	22H	836.52	24.99	24.92	24.57	24.87	24.92	24.88	24.87
	777	22H	848.31	24.94	24.91	24.59	24.89	24.89	24.80	24.72
PCS	25	24E	1851.25	24.86	24.95	24.99	24.83	24.89	24.98	24.93
	600	24E	1880	24.55	24.44	24.68	24.51	24.47	24.51	24.42
	1175	24E	1908.75	24.75	24.73	24.89	24.69	24.71	24.85	24.82

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

Table 9-2
Hotspot Reduced Average RF Output Powers - Hotspot Mode Active

Band	Channel	Rule Part	Frequency	TDSO SO32 [dBm]	TDSO SO32 [dBm]	1x EVDO Rev. 0 [dBm]	1x EVDO Rev. A [dBm]
	F-RC		MHz	FCH+SCH	FCH	(RTAP)	(RETAP)
PCS	25	24E	1851.25	22.90	22.94	22.99	22.93
	600	24E	1880	22.47	22.48	22.48	22.41
	1175	24E	1908.75	22.71	22.78	22.69	22.68

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

Per KDB Publication 941225 D01v03:

1. Head SAR is additionally evaluated using EVDO Rev. A to support compliance for VoIP operations. See Section 8.4.6 for EVDO Rev. A configuration parameters.
2. Body-Worn SAR is required for RC1, with SO55 and full rate, using the highest reported SAR configuration for body-worn accessory exposure in RC3.
3. SAR is not required for 1x RTT for Ev-Do devices that also support 1x RTT voice and/or data operations, when the maximum average output of each channel is less than 1/4 dB higher than that measured in Subtype 0/1 Physical Layer configurations for Rev. 0. Otherwise, CDMA "Body-SAR Measurement" procedures for "CDMA 2000 1x Handsets" were applied.
4. For FCC Rule Part 90S, Per FCC KDB Publication 447498 D01v05 4.1.6, only one channel is required since the device operates within the transmission range of 817.90 – 823.10 MHz.
5. The 3G SAR test reduction procedure is applied to the 1x-Advanced transmission mode with 1x RTT RC3 as the primary mode. When SAR measurement is required, the 1x-Advanced power measurement configurations are used. The 1x Advanced SAR procedures are applied separately to head, body-worn accessory and other exposure conditions.

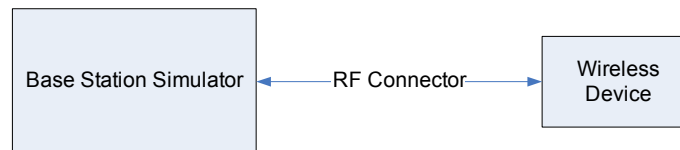


Figure 9-1
Power Measurement Setup

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9.2 GSM 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	GPRS [dBm] 3 Tx Slot	GPRS [dBm] 4 Tx Slot	EDGE [dBm] 1 Tx Slot	EDGE [dBm] 2 Tx Slot	EDGE [dBm] 3 Tx Slot	EDGE [dBm] 4 Tx Slot
GSM 850	128	31.82	32.04	31.46	29.67	28.97	27.89	25.33	23.19	22.69
	190	32.86	33.00	32.41	30.52	30.10	27.83	26.21	24.00	23.50
	251	32.52	32.61	32.00	30.59	29.49	27.51	26.07	23.88	23.44
GSM 1900	512	29.97	29.93	28.50	27.21	25.74	25.57	24.40	22.43	21.08
	661	29.76	29.74	28.32	26.72	25.09	25.37	24.31	22.38	21.04
	810	30.05	30.04	28.42	26.85	25.34	25.71	24.79	22.65	21.43
		Calculated Maximum Frame-Averaged Output Power								
		Voice	GPRS/EDGE Data (GMSK)				EDGE Data (8-PSK)			
Band	Channel	GSM [dBm] CS (1 Slot)	GPRS [dBm] 1 Tx Slot	GPRS [dBm] 2 Tx Slot	GPRS [dBm] 3 Tx Slot	GPRS [dBm] 4 Tx Slot	EDGE [dBm] 1 Tx Slot	EDGE [dBm] 2 Tx Slot	EDGE [dBm] 3 Tx Slot	EDGE [dBm] 4 Tx Slot
GSM 850	128	22.79	23.01	25.44	25.41	25.96	18.86	19.31	18.93	19.68
	190	23.83	23.97	26.39	26.26	27.09	18.80	20.19	19.74	20.49
	251	23.49	23.58	25.98	26.33	26.48	18.48	20.05	19.62	20.43
GSM 1900	512	20.94	20.90	22.89	22.95	22.73	16.54	18.38	18.17	18.07
	661	20.73	20.71	22.70	22.46	22.08	16.34	18.29	18.12	18.03
	810	21.02	21.01	22.80	22.59	22.33	16.68	18.77	18.39	18.42
GSM 850	Frame Avg.Targets:	23.47	23.47	25.98	26.24	26.99	18.47	19.98	19.24	19.99
GSM 1900		20.97	20.97	22.48	22.74	22.99	16.97	18.98	18.74	18.99

Note:

- 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.
- Per October 2013 TCB Workshop: 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.
- GPRS (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.
- EDGE (8-PSK) output powers were measured with MCS7 on the base station simulator. MCS7 coding scheme was used to measure the output powers for EDGE since investigation has shown that choosing MCS7 coding scheme will ensure 8-PSK modulation. It has been shown that MCS levels that produce 8PSK modulation do not have an impact on output power.

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



Figure 9-2
Power Measurement Setup

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9.3 UMTS Conducted Powers

Table 9-3
Maximum Average RF Output Powers - Hotspot Mode Inactive

3GPP Release Version	Mode	3GPP 34.121 Subtest	Cellular Band [dBm]			PCS Band [dBm]			3GPP MPR [dB]
			4132	4183	4233	9262	9400	9538	
99	WCDMA	12.2 kbps RMC	23.59	23.93	23.93	23.98	23.58	23.72	-
99		12.2 kbps AMR	23.57	23.81	23.84	23.96	23.41	23.65	-
6	HSDPA	Subtest 1	21.93	22.66	22.77	22.76	22.27	22.61	0
6		Subtest 2	21.99	22.71	22.78	22.82	22.21	22.45	0
6		Subtest 3	21.51	22.47	22.41	22.29	21.67	21.71	0.5
6		Subtest 4	21.59	22.38	22.41	22.30	21.67	21.91	0.5
6	HSUPA	Subtest 1	21.92	22.39	22.49	22.32	21.53	22.30	0
6		Subtest 2	21.10	21.52	21.82	20.66	20.50	20.42	2
6		Subtest 3	21.11	21.25	21.33	20.52	20.44	20.48	1
6		Subtest 4	21.15	21.45	21.81	20.55	20.57	20.43	2
6		Subtest 5	21.51	22.08	22.43	22.38	21.79	22.19	0

Table 9-4
Hotspot Reduced Average RF Output Powers - Hotspot Mode Active

3GPP Release Version	Mode	3GPP 34.121 Subtest	PCS Band [dBm]			3GPP MPR [dB]
			9262	9400	9538	
99	WCDMA	12.2 kbps RMC	21.59	21.37	21.49	-
99		12.2 kbps AMR	21.41	21.26	21.34	-
6	HSDPA	Subtest 1	20.47	20.27	20.32	0
6		Subtest 2	20.44	20.26	20.30	0
6		Subtest 3	19.95	19.73	19.71	0.5
6		Subtest 4	19.94	19.74	19.74	0.5
6	HSUPA	Subtest 1	20.45	20.26	20.31	0
6		Subtest 2	19.33	19.22	19.23	2
6		Subtest 3	19.13	19.06	19.11	1
6		Subtest 4	19.62	19.52	19.45	2
6		Subtest 5	20.27	20.16	20.22	0

UMTS SAR was tested under RMC 12.2 kbps with HSPA Inactive per KDB Publication 941225 D01v03. HSPA SAR was not required since the average output power of the HSPA subtests was not more than 0.25 dB higher than the RMC level and SAR was less than 1.2 W/kg.

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 9-3
Power Measurement Setup

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9.4 LTE Conducted Powers

9.4.1 LTE Band 12

Table 9-5
LTE Band 12 Conducted Powers - 10 MHz Bandwidth

	Frequency [MHz]	Channel	Bandwidth [MHz]	Modulation	RB Size	RB Offset	Conducted Power [dBm]	MPR Allowed per 3GPP [dB]	MPR [dB]
Mid	707.5	23095	10	QPSK	1	0	24.12	0	0
	707.5	23095	10	QPSK	1	25	24.37	0	0
	707.5	23095	10	QPSK	1	49	24.07	0	0
	707.5	23095	10	QPSK	25	0	23.04	0-1	1
	707.5	23095	10	QPSK	25	12	23.15	0-1	1
	707.5	23095	10	QPSK	25	25	23.14	0-1	1
	707.5	23095	10	QPSK	50	0	23.03	0-1	1
	707.5	23095	10	16QAM	1	0	23.09	0-1	1
	707.5	23095	10	16QAM	1	25	23.26	0-1	1
	707.5	23095	10	16QAM	1	49	23.22	0-1	1
	707.5	23095	10	16QAM	25	0	22.01	0-2	2
	707.5	23095	10	16QAM	25	12	22.16	0-2	2
	707.5	23095	10	16QAM	25	25	22.10	0-2	2
	707.5	23095	10	16QAM	50	0	22.09	0-2	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.

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Table 9-6
LTE Band 12 Conducted Powers - 5 MHz Bandwidth

	Frequency [MHz]	Channel	Bandwidth [MHz]	Modulation	RB Size	RB Offset	Conducted Power [dBm]	MPR Allowed per 3GPP [dB]	MPR [dB]
Low	701.5	23035	5	QPSK	1	0	24.16	0	0
	701.5	23035	5	QPSK	1	12	24.36	0	0
	701.5	23035	5	QPSK	1	24	24.26	0	0
	701.5	23035	5	QPSK	12	0	23.07	0-1	1
	701.5	23035	5	QPSK	12	6	23.13	0-1	1
	701.5	23035	5	QPSK	12	13	23.08	0-1	1
	701.5	23035	5	QPSK	25	0	23.13	0-1	1
	701.5	23035	5	16-QAM	1	0	23.45	0-1	1
	701.5	23035	5	16-QAM	1	12	23.40	0-1	1
	701.5	23035	5	16-QAM	1	24	23.42	0-1	1
	701.5	23035	5	16-QAM	12	0	22.04	0-2	2
	701.5	23035	5	16-QAM	12	6	22.10	0-2	2
Mid	701.5	23035	5	16-QAM	12	13	22.05	0-2	2
	701.5	23035	5	16-QAM	25	0	22.01	0-2	2
	707.5	23095	5	QPSK	1	0	24.15	0	0
	707.5	23095	5	QPSK	1	12	24.00	0	0
	707.5	23095	5	QPSK	1	24	24.12	0	0
	707.5	23095	5	QPSK	12	0	23.05	0-1	1
	707.5	23095	5	QPSK	12	6	23.18	0-1	1
	707.5	23095	5	QPSK	12	13	23.09	0-1	1
	707.5	23095	5	QPSK	25	0	23.16	0-1	1
	707.5	23095	5	16-QAM	1	0	23.28	0-1	1
	707.5	23095	5	16-QAM	1	12	23.30	0-1	1
	707.5	23095	5	16-QAM	1	24	23.29	0-1	1
High	707.5	23095	5	16-QAM	12	0	22.13	0-2	2
	707.5	23095	5	16-QAM	12	6	22.20	0-2	2
	707.5	23095	5	16-QAM	12	13	22.17	0-2	2
	707.5	23095	5	16-QAM	25	0	22.14	0-2	2
	713.5	23155	5	QPSK	1	0	24.25	0	0
	713.5	23155	5	QPSK	1	12	24.09	0	0
	713.5	23155	5	QPSK	1	24	24.22	0	0
	713.5	23155	5	QPSK	12	0	23.11	0-1	1
	713.5	23155	5	QPSK	12	6	23.12	0-1	1
	713.5	23155	5	QPSK	12	13	23.22	0-1	1
	713.5	23155	5	QPSK	25	0	23.17	0-1	1
	713.5	23155	5	16-QAM	1	0	23.23	0-1	1
	713.5	23155	5	16-QAM	1	12	23.29	0-1	1
	713.5	23155	5	16-QAM	1	24	23.34	0-1	1
	713.5	23155	5	16-QAM	12	0	22.22	0-2	2
	713.5	23155	5	16-QAM	12	6	22.25	0-2	2
	713.5	23155	5	16-QAM	12	13	22.23	0-2	2
	713.5	23155	5	16-QAM	25	0	22.18	0-2	2

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Table 9-7
LTE Band 12 Conducted Powers - 3 MHz Bandwidth

	Frequency [MHz]	Channel	Bandwidth [MHz]	Modulation	RB Size	RB Offset	Conducted Power [dBm]	MPR Allowed per 3GPP [dB]	MPR [dB]
Low	700.5	23025	3	QPSK	1	0	24.00	0	0
	700.5	23025	3	QPSK	1	7	24.12	0	0
	700.5	23025	3	QPSK	1	14	24.13	0	0
	700.5	23025	3	QPSK	8	0	23.16	0-1	1
	700.5	23025	3	QPSK	8	4	23.14	0-1	1
	700.5	23025	3	QPSK	8	7	23.10	0-1	1
	700.5	23025	3	QPSK	15	0	23.11	0-1	1
	700.5	23025	3	16-QAM	1	0	23.05	0-1	1
	700.5	23025	3	16-QAM	1	7	23.06	0-1	1
	700.5	23025	3	16-QAM	1	14	23.19	0-1	1
	700.5	23025	3	16-QAM	8	0	22.15	0-2	2
	700.5	23025	3	16-QAM	8	4	22.10	0-2	2
Mid	700.5	23025	3	16-QAM	8	7	22.09	0-2	2
	700.5	23025	3	16-QAM	15	0	22.18	0-2	2
	707.5	23095	3	QPSK	1	0	24.21	0	0
	707.5	23095	3	QPSK	1	7	24.03	0	0
	707.5	23095	3	QPSK	1	14	24.06	0	0
	707.5	23095	3	QPSK	8	0	23.16	0-1	1
	707.5	23095	3	QPSK	8	4	23.11	0-1	1
	707.5	23095	3	QPSK	8	7	23.12	0-1	1
	707.5	23095	3	QPSK	15	0	23.22	0-1	1
	707.5	23095	3	16-QAM	1	0	23.20	0-1	1
	707.5	23095	3	16-QAM	1	7	23.18	0-1	1
	707.5	23095	3	16-QAM	1	14	23.19	0-1	1
High	707.5	23095	3	16-QAM	8	0	22.01	0-2	2
	707.5	23095	3	16-QAM	8	4	22.16	0-2	2
	707.5	23095	3	16-QAM	8	7	22.17	0-2	2
	707.5	23095	3	16-QAM	15	0	22.10	0-2	2
	714.5	23165	3	QPSK	1	0	24.19	0	0
	714.5	23165	3	QPSK	1	7	24.15	0	0
	714.5	23165	3	QPSK	1	14	24.15	0	0
	714.5	23165	3	QPSK	8	0	23.03	0-1	1
	714.5	23165	3	QPSK	8	4	23.00	0-1	1
	714.5	23165	3	QPSK	8	7	23.09	0-1	1
	714.5	23165	3	QPSK	15	0	23.15	0-1	1
	714.5	23165	3	16-QAM	1	0	23.22	0-1	1
	714.5	23165	3	16-QAM	1	7	23.21	0-1	1
	714.5	23165	3	16-QAM	1	14	23.26	0-1	1
	714.5	23165	3	16-QAM	8	0	22.12	0-2	2
	714.5	23165	3	16-QAM	8	4	22.10	0-2	2
	714.5	23165	3	16-QAM	8	7	22.15	0-2	2
	714.5	23165	3	16-QAM	15	0	22.06	0-2	2

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Table 9-8
LTE Band 12 Conducted Powers – 1.4 MHz Bandwidth

	Frequency [MHz]	Channel	Bandwidth [MHz]	Modulation	RB Size	RB Offset	Conducted Power [dBm]	MPR Allowed per 3GPP [dB]	MPR [dB]
Low	699.7	23017	1.4	QPSK	1	0	24.11	0	0
	699.7	23017	1.4	QPSK	1	2	24.02	0	0
	699.7	23017	1.4	QPSK	1	5	24.06	0	0
	699.7	23017	1.4	QPSK	3	0	24.13	0	0
	699.7	23017	1.4	QPSK	3	2	24.10	0	0
	699.7	23017	1.4	QPSK	3	3	24.09	0	0
	699.7	23017	1.4	QPSK	6	0	23.16	0-1	1
	699.7	23017	1.4	16-QAM	1	0	23.22	0-1	1
	699.7	23017	1.4	16-QAM	1	2	23.05	0-1	1
	699.7	23017	1.4	16-QAM	1	5	23.15	0-1	1
	699.7	23017	1.4	16-QAM	3	0	23.11	0-1	1
	699.7	23017	1.4	16-QAM	3	2	23.24	0-1	1
	699.7	23017	1.4	16-QAM	3	3	23.20	0-1	1
	699.7	23017	1.4	16-QAM	6	0	22.10	0-2	2
Mid	707.5	23095	1.4	QPSK	1	0	24.01	0	0
	707.5	23095	1.4	QPSK	1	2	24.15	0	0
	707.5	23095	1.4	QPSK	1	5	24.13	0	0
	707.5	23095	1.4	QPSK	3	0	24.16	0	0
	707.5	23095	1.4	QPSK	3	2	24.05	0	0
	707.5	23095	1.4	QPSK	3	3	24.20	0	0
	707.5	23095	1.4	QPSK	6	0	23.12	0-1	1
	707.5	23095	1.4	16-QAM	1	0	23.02	0-1	1
	707.5	23095	1.4	16-QAM	1	2	23.06	0-1	1
	707.5	23095	1.4	16-QAM	1	5	23.09	0-1	1
	707.5	23095	1.4	16-QAM	3	0	23.16	0-1	1
	707.5	23095	1.4	16-QAM	3	2	23.17	0-1	1
	707.5	23095	1.4	16-QAM	3	3	23.04	0-1	1
	707.5	23095	1.4	16-QAM	6	0	22.10	0-2	2
High	715.3	23173	1.4	QPSK	1	0	24.15	0	0
	715.3	23173	1.4	QPSK	1	2	24.15	0	0
	715.3	23173	1.4	QPSK	1	5	24.13	0	0
	715.3	23173	1.4	QPSK	3	0	24.13	0	0
	715.3	23173	1.4	QPSK	3	2	24.06	0	0
	715.3	23173	1.4	QPSK	3	3	24.22	0	0
	715.3	23173	1.4	QPSK	6	0	23.20	0-1	1
	715.3	23173	1.4	16-QAM	1	0	23.00	0-1	1
	715.3	23173	1.4	16-QAM	1	2	23.10	0-1	1
	715.3	23173	1.4	16-QAM	1	5	23.01	0-1	1
	715.3	23173	1.4	16-QAM	3	0	23.06	0-1	1
	715.3	23173	1.4	16-QAM	3	2	23.05	0-1	1
	715.3	23173	1.4	16-QAM	3	3	23.15	0-1	1
	715.3	23173	1.4	16-QAM	6	0	22.12	0-2	2

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9.4.2 LTE Band 26 (Cell)

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

	Frequency [MHz]	Channel	Bandwidth [MHz]	Modulation	RB Size	RB Offset	Conducted Power [dBm]	MPR Allowed per 3GPP [dB]	MPR [dB]
Mid	836.5	26915	15	QPSK	1	0	24.41	0	0
	836.5	26915	15	QPSK	1	36	24.05	0	0
	836.5	26915	15	QPSK	1	74	24.45	0	0
	836.5	26915	15	QPSK	36	0	23.25	0-1	1
	836.5	26915	15	QPSK	36	18	23.26	0-1	1
	836.5	26915	15	QPSK	36	37	23.36	0-1	1
	836.5	26915	15	QPSK	75	0	23.26	0-1	1
	836.5	26915	15	16QAM	1	0	23.50	0-1	1
	836.5	26915	15	16QAM	1	36	23.48	0-1	1
	836.5	26915	15	16QAM	1	74	23.49	0-1	1
	836.5	26915	15	16QAM	36	0	22.29	0-2	2
	836.5	26915	15	16QAM	36	18	22.27	0-2	2
	836.5	26915	15	16QAM	36	37	22.33	0-2	2
	836.5	26915	15	16QAM	75	0	22.27	0-2	2

Note: LTE Band 26 at 15 MHz bandwidth is only supported for FCC Rule Part 22H. There are not three non-overlapping channels within FCC Rule Part 22H. 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 9-10
LTE Band 26 (Cell) Conducted Powers - 10 MHz Bandwidth

	Frequency [MHz]	Channel	Bandwidth [MHz]	Modulation	RB Size	RB Offset	Conducted Power [dBm]	MPR Allowed per 3GPP [dB]	MPR [dB]
Low	819	26740	10	QPSK	1	0	24.05	0	0
	819	26740	10	QPSK	1	25	24.32	0	0
	819	26740	10	QPSK	1	49	24.29	0	0
	819	26740	10	QPSK	25	0	23.13	0-1	1
	819	26740	10	QPSK	25	12	23.29	0-1	1
	819	26740	10	QPSK	25	25	23.05	0-1	1
	819	26740	10	QPSK	50	0	23.06	0-1	1
	819	26740	10	16QAM	1	0	23.07	0-1	1
	819	26740	10	16QAM	1	25	23.29	0-1	1
	819	26740	10	16QAM	1	49	23.27	0-1	1
	819	26740	10	16QAM	25	0	22.34	0-2	2
	819	26740	10	16QAM	25	12	22.33	0-2	2
Mid	819	26740	10	16QAM	25	25	22.02	0-2	2
	819	26740	10	16QAM	50	0	22.06	0-2	2
	831.5	26865	10	QPSK	1	0	24.37	0	0
	831.5	26865	10	QPSK	1	25	24.35	0	0
	831.5	26865	10	QPSK	1	49	24.18	0	0
	831.5	26865	10	QPSK	25	0	23.21	0-1	1
	831.5	26865	10	QPSK	25	12	23.37	0-1	1
	831.5	26865	10	QPSK	25	25	23.17	0-1	1
	831.5	26865	10	QPSK	50	0	23.35	0-1	1
	831.5	26865	10	16QAM	1	0	23.34	0-1	1
	831.5	26865	10	16QAM	1	25	23.05	0-1	1
	831.5	26865	10	16QAM	1	49	23.09	0-1	1
High	831.5	26865	10	16QAM	25	0	22.34	0-2	2
	831.5	26865	10	16QAM	25	12	22.36	0-2	2
	831.5	26865	10	16QAM	25	25	22.15	0-2	2
	831.5	26865	10	16QAM	50	0	22.35	0-2	2
	844	26990	10	QPSK	1	0	24.08	0	0
	844	26990	10	QPSK	1	25	24.10	0	0
	844	26990	10	QPSK	1	49	24.36	0	0
	844	26990	10	QPSK	25	0	23.24	0-1	1
	844	26990	10	QPSK	25	12	23.20	0-1	1
	844	26990	10	QPSK	25	25	23.37	0-1	1
	844	26990	10	QPSK	50	0	23.35	0-1	1
	844	26990	10	16QAM	1	0	23.26	0-1	1
	844	26990	10	16QAM	1	25	23.20	0-1	1
	844	26990	10	16QAM	1	49	23.27	0-1	1
	844	26990	10	16QAM	25	0	22.14	0-2	2
	844	26990	10	16QAM	25	12	22.01	0-2	2
	844	26990	10	16QAM	25	25	22.07	0-2	2
	844	26990	10	16QAM	50	0	22.32	0-2	2

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Table 9-11
LTE Band 26 (Cell) Conducted Powers - 5 MHz Bandwidth

	Frequency [MHz]	Channel	Bandwidth [MHz]	Modulation	RB Size	RB Offset	Conducted Power [dBm]	MPR Allowed per 3GPP [dB]	MPR [dB]
Low	816.5	26715	5	QPSK	1	0	24.30	0	0
	816.5	26715	5	QPSK	1	12	24.11	0	0
	816.5	26715	5	QPSK	1	24	24.28	0	0
	816.5	26715	5	QPSK	12	0	23.04	0-1	1
	816.5	26715	5	QPSK	12	6	23.22	0-1	1
	816.5	26715	5	QPSK	12	13	23.35	0-1	1
	816.5	26715	5	QPSK	25	0	23.16	0-1	1
	816.5	26715	5	16-QAM	1	0	23.26	0-1	1
	816.5	26715	5	16-QAM	1	12	23.35	0-1	1
	816.5	26715	5	16-QAM	1	24	23.35	0-1	1
	816.5	26715	5	16-QAM	12	0	22.21	0-2	2
	816.5	26715	5	16-QAM	12	6	22.03	0-2	2
Mid	816.5	26715	5	16-QAM	12	13	22.34	0-2	2
	816.5	26715	5	16-QAM	25	0	22.39	0-2	2
	831.5	26865	5	QPSK	1	0	24.24	0	0
	831.5	26865	5	QPSK	1	12	24.39	0	0
	831.5	26865	5	QPSK	1	24	24.29	0	0
	831.5	26865	5	QPSK	12	0	23.03	0-1	1
	831.5	26865	5	QPSK	12	6	23.28	0-1	1
	831.5	26865	5	QPSK	12	13	23.10	0-1	1
	831.5	26865	5	QPSK	25	0	23.06	0-1	1
	831.5	26865	5	16-QAM	1	0	23.10	0-1	1
	831.5	26865	5	16-QAM	1	12	23.35	0-1	1
	831.5	26865	5	16-QAM	1	24	23.43	0-1	1
High	831.5	26865	5	16-QAM	12	0	22.23	0-2	2
	831.5	26865	5	16-QAM	12	6	22.25	0-2	2
	831.5	26865	5	16-QAM	12	13	22.36	0-2	2
	831.5	26865	5	16-QAM	25	0	22.43	0-2	2
	846.5	27015	5	QPSK	1	0	24.13	0	0
	846.5	27015	5	QPSK	1	12	24.28	0	0
	846.5	27015	5	QPSK	1	24	24.42	0	0
	846.5	27015	5	QPSK	12	0	23.28	0-1	1
	846.5	27015	5	QPSK	12	6	23.26	0-1	1
	846.5	27015	5	QPSK	12	13	23.21	0-1	1
	846.5	27015	5	QPSK	25	0	23.24	0-1	1
	846.5	27015	5	16-QAM	1	0	23.43	0-1	1
	846.5	27015	5	16-QAM	1	12	23.27	0-1	1
	846.5	27015	5	16-QAM	1	24	23.16	0-1	1
	846.5	27015	5	16-QAM	12	0	22.23	0-2	2
	846.5	27015	5	16-QAM	12	6	22.01	0-2	2
	846.5	27015	5	16-QAM	12	13	22.05	0-2	2
	846.5	27015	5	16-QAM	25	0	22.12	0-2	2

Table 9-12
LTE Band 26 (Cell) Conducted Powers - 3 MHz Bandwidth

	Frequency [MHz]	Channel	Bandwidth [MHz]	Modulation	RB Size	RB Offset	Conducted Power [dBm]	MPR Allowed per 3GPP [dB]	MPR [dB]
Low	815.5	26705	3	QPSK	1	0	24.39	0	0
	815.5	26705	3	QPSK	1	7	24.32	0	0
	815.5	26705	3	QPSK	1	14	24.25	0	0
	815.5	26705	3	QPSK	8	0	23.33	0-1	1
	815.5	26705	3	QPSK	8	4	23.00	0-1	1
	815.5	26705	3	QPSK	8	7	23.27	0-1	1
	815.5	26705	3	QPSK	15	0	23.23	0-1	1
	815.5	26705	3	16-QAM	1	0	23.28	0-1	1
	815.5	26705	3	16-QAM	1	7	23.03	0-1	1
	815.5	26705	3	16-QAM	1	14	23.23	0-1	1
	815.5	26705	3	16-QAM	8	0	22.26	0-2	2
	815.5	26705	3	16-QAM	8	4	22.30	0-2	2
Mid	815.5	26705	3	16-QAM	8	7	22.34	0-2	2
	815.5	26705	3	16-QAM	15	0	22.24	0-2	2
	831.5	26865	3	QPSK	1	0	24.02	0	0
	831.5	26865	3	QPSK	1	7	24.24	0	0
	831.5	26865	3	QPSK	1	14	24.20	0	0
	831.5	26865	3	QPSK	8	0	23.08	0-1	1
	831.5	26865	3	QPSK	8	4	23.23	0-1	1
	831.5	26865	3	QPSK	8	7	23.05	0-1	1
	831.5	26865	3	QPSK	15	0	23.15	0-1	1
	831.5	26865	3	16-QAM	1	0	23.16	0-1	1
	831.5	26865	3	16-QAM	1	7	23.07	0-1	1
	831.5	26865	3	16-QAM	1	14	23.20	0-1	1
High	831.5	26865	3	16-QAM	8	0	22.05	0-2	2
	831.5	26865	3	16-QAM	8	4	22.47	0-2	2
	831.5	26865	3	16-QAM	8	7	22.16	0-2	2
	831.5	26865	3	16-QAM	15	0	22.03	0-2	2
	847.5	27025	3	QPSK	1	0	24.36	0	0
	847.5	27025	3	QPSK	1	7	24.34	0	0
	847.5	27025	3	QPSK	1	14	24.29	0	0
	847.5	27025	3	QPSK	8	0	23.38	0-1	1
	847.5	27025	3	QPSK	8	4	23.06	0-1	1
	847.5	27025	3	QPSK	8	7	23.05	0-1	1
	847.5	27025	3	QPSK	15	0	23.31	0-1	1
	847.5	27025	3	16-QAM	1	0	23.17	0-1	1
	847.5	27025	3	16-QAM	1	7	23.22	0-1	1
	847.5	27025	3	16-QAM	1	14	23.35	0-1	1
	847.5	27025	3	16-QAM	8	0	22.38	0-2	2
	847.5	27025	3	16-QAM	8	4	22.20	0-2	2
	847.5	27025	3	16-QAM	8	7	22.38	0-2	2
	847.5	27025	3	16-QAM	15	0	22.04	0-2	2

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Table 9-13
LTE Band 26 (Cell) Conducted Powers -1.4 MHz Bandwidth

	Frequency [MHz]	Channel	Bandwidth [MHz]	Modulation	RB Size	RB Offset	Conducted Power [dBm]	MPR Allowed per 3GPP [dB]	MPR [dB]
Low	814.7	26697	1.4	QPSK	1	0	24.29	0	0
	814.7	26697	1.4	QPSK	1	2	24.24	0	0
	814.7	26697	1.4	QPSK	1	5	24.36	0	0
	814.7	26697	1.4	QPSK	3	0	24.16	0	0
	814.7	26697	1.4	QPSK	3	2	24.43	0	0
	814.7	26697	1.4	QPSK	3	3	24.44	0	0
	814.7	26697	1.4	QPSK	6	0	23.32	0-1	1
	814.7	26697	1.4	16-QAM	1	0	23.05	0-1	1
	814.7	26697	1.4	16-QAM	1	2	23.35	0-1	1
	814.7	26697	1.4	16-QAM	1	5	23.32	0-1	1
	814.7	26697	1.4	16-QAM	3	0	23.24	0-1	1
	814.7	26697	1.4	16-QAM	3	2	23.19	0-1	1
	814.7	26697	1.4	16-QAM	3	3	23.14	0-1	1
Mid	831.5	26865	1.4	16-QAM	6	0	22.09	0-2	2
	831.5	26865	1.4	QPSK	1	0	24.43	0	0
	831.5	26865	1.4	QPSK	1	2	24.16	0	0
	831.5	26865	1.4	QPSK	1	5	24.28	0	0
	831.5	26865	1.4	QPSK	3	0	24.33	0	0
	831.5	26865	1.4	QPSK	3	2	24.34	0	0
	831.5	26865	1.4	QPSK	3	3	24.41	0	0
	831.5	26865	1.4	QPSK	6	0	23.04	0-1	1
	831.5	26865	1.4	16-QAM	1	0	23.47	0-1	1
	831.5	26865	1.4	16-QAM	1	2	23.26	0-1	1
	831.5	26865	1.4	16-QAM	1	5	23.18	0-1	1
	831.5	26865	1.4	16-QAM	3	0	23.19	0-1	1
	831.5	26865	1.4	16-QAM	3	2	23.21	0-1	1
High	831.5	26865	1.4	16-QAM	3	3	23.28	0-1	1
	831.5	26865	1.4	16-QAM	6	0	22.21	0-2	2
	848.3	27033	1.4	QPSK	1	0	24.27	0	0
	848.3	27033	1.4	QPSK	1	2	24.25	0	0
	848.3	27033	1.4	QPSK	1	5	24.31	0	0
	848.3	27033	1.4	QPSK	3	0	24.42	0	0
	848.3	27033	1.4	QPSK	3	2	24.21	0	0
	848.3	27033	1.4	QPSK	3	3	24.40	0	0
	848.3	27033	1.4	QPSK	6	0	23.08	0-1	1
	848.3	27033	1.4	16-QAM	1	0	23.44	0-1	1
	848.3	27033	1.4	16-QAM	1	2	23.17	0-1	1
	848.3	27033	1.4	16-QAM	1	5	23.33	0-1	1
	848.3	27033	1.4	16-QAM	3	0	23.07	0-1	1
	848.3	27033	1.4	16-QAM	3	2	23.16	0-1	1
	848.3	27033	1.4	16-QAM	3	3	23.19	0-1	1
	848.3	27033	1.4	16-QAM	6	0	22.24	0-2	2

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9.4.3 LTE Band 4 (AWS) - Hotspot Mode Inactive

Table 9-14

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

	Frequency [MHz]	Channel	Bandwidth [MHz]	Modulation	RB Size	RB Offset	Conducted Power [dBm]	MPR Allowed per 3GPP [dB]	MPR [dB]
Mid	1732.5	20175	20	QPSK	1	0	24.36	0	0
	1732.5	20175	20	QPSK	1	50	23.57	0	0
	1732.5	20175	20	QPSK	1	99	23.83	0	0
	1732.5	20175	20	QPSK	50	0	22.91	0-1	1
	1732.5	20175	20	QPSK	50	25	22.58	0-1	1
	1732.5	20175	20	QPSK	50	50	22.65	0-1	1
	1732.5	20175	20	QPSK	100	0	22.62	0-1	1
	1732.5	20175	20	16QAM	1	0	23.50	0-1	1
	1732.5	20175	20	16QAM	1	50	22.92	0-1	1
	1732.5	20175	20	16QAM	1	99	23.23	0-1	1
	1732.5	20175	20	16QAM	50	0	21.96	0-2	2
	1732.5	20175	20	16QAM	50	25	21.65	0-2	2
	1732.5	20175	20	16QAM	50	50	21.72	0-2	2
	1732.5	20175	20	16QAM	100	0	21.64	0-2	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.

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

	Frequency [MHz]	Channel	Bandwidth [MHz]	Modulation	RB Size	RB Offset	Conducted Power [dBm]	MPR Allowed per 3GPP [dB]	MPR [dB]
Low	1717.5	20025	15	QPSK	1	0	24.13	0	0
	1717.5	20025	15	QPSK	1	36	23.91	0	0
	1717.5	20025	15	QPSK	1	74	23.90	0	0
	1717.5	20025	15	QPSK	36	0	23.02	0-1	1
	1717.5	20025	15	QPSK	36	18	22.96	0-1	1
	1717.5	20025	15	QPSK	36	37	22.97	0-1	1
	1717.5	20025	15	QPSK	75	0	22.96	0-1	1
	1717.5	20025	15	16QAM	1	0	23.45	0-1	1
	1717.5	20025	15	16QAM	1	36	23.35	0-1	1
	1717.5	20025	15	16QAM	1	74	23.21	0-1	1
	1717.5	20025	15	16QAM	36	0	22.16	0-2	2
	1717.5	20025	15	16QAM	36	18	22.07	0-2	2
Mid	1717.5	20025	15	16QAM	36	37	22.03	0-2	2
	1717.5	20025	15	16QAM	75	0	21.99	0-2	2
	1732.5	20175	15	QPSK	1	0	23.70	0	0
	1732.5	20175	15	QPSK	1	36	23.52	0	0
	1732.5	20175	15	QPSK	1	74	23.65	0	0
	1732.5	20175	15	QPSK	36	0	22.54	0-1	1
	1732.5	20175	15	QPSK	36	18	22.50	0-1	1
	1732.5	20175	15	QPSK	36	37	22.57	0-1	1
	1732.5	20175	15	QPSK	75	0	22.51	0-1	1
	1732.5	20175	15	16QAM	1	0	22.82	0-1	1
	1732.5	20175	15	16QAM	1	36	22.84	0-1	1
	1732.5	20175	15	16QAM	1	74	22.90	0-1	1
High	1732.5	20175	15	16QAM	36	0	21.63	0-2	2
	1732.5	20175	15	16QAM	36	18	21.59	0-2	2
	1732.5	20175	15	16QAM	36	37	21.58	0-2	2
	1732.5	20175	15	16QAM	75	0	21.53	0-2	2
	1747.5	20325	15	QPSK	1	0	23.78	0	0
	1747.5	20325	15	QPSK	1	36	23.89	0	0
	1747.5	20325	15	QPSK	1	74	24.14	0	0
	1747.5	20325	15	QPSK	36	0	22.85	0-1	1
	1747.5	20325	15	QPSK	36	18	22.96	0-1	1
	1747.5	20325	15	QPSK	36	37	23.11	0-1	1
	1747.5	20325	15	QPSK	75	0	22.92	0-1	1
	1747.5	20325	15	16QAM	1	0	23.26	0-1	1
	1747.5	20325	15	16QAM	1	36	23.44	0-1	1
	1747.5	20325	15	16QAM	1	74	23.09	0-1	1
	1747.5	20325	15	16QAM	36	0	21.84	0-2	2
	1747.5	20325	15	16QAM	36	18	21.92	0-2	2
	1747.5	20325	15	16QAM	36	37	22.10	0-2	2
	1747.5	20325	15	16QAM	75	0	21.93	0-2	2

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Table 9-16
LTE Band 4 (AWS) Conducted Powers - 10 MHz Bandwidth

	Frequency [MHz]	Channel	Bandwidth [MHz]	Modulation	RB Size	RB Offset	Conducted Power [dBm]	MPR Allowed per 3GPP [dB]	MPR [dB]
Low	1715	20000	10	QPSK	1	0	24.31	0	0
	1715	20000	10	QPSK	1	25	24.14	0	0
	1715	20000	10	QPSK	1	49	24.05	0	0
	1715	20000	10	QPSK	25	0	23.01	0-1	1
	1715	20000	10	QPSK	25	12	22.71	0-1	1
	1715	20000	10	QPSK	25	25	22.70	0-1	1
	1715	20000	10	QPSK	50	0	22.77	0-1	1
	1715	20000	10	16QAM	1	0	23.28	0-1	1
	1715	20000	10	16QAM	1	25	23.12	0-1	1
	1715	20000	10	16QAM	1	49	22.78	0-1	1
	1715	20000	10	16QAM	25	0	21.98	0-2	2
	1715	20000	10	16QAM	25	12	21.84	0-2	2
Mid	1715	20000	10	16QAM	25	25	21.82	0-2	2
	1715	20000	10	16QAM	50	0	21.79	0-2	2
	1732.5	20175	10	QPSK	1	0	23.86	0	0
	1732.5	20175	10	QPSK	1	25	23.77	0	0
	1732.5	20175	10	QPSK	1	49	23.78	0	0
	1732.5	20175	10	QPSK	25	0	22.60	0-1	1
	1732.5	20175	10	QPSK	25	12	22.58	0-1	1
	1732.5	20175	10	QPSK	25	25	22.51	0-1	1
	1732.5	20175	10	QPSK	50	0	22.52	0-1	1
	1732.5	20175	10	16QAM	1	0	23.17	0-1	1
	1732.5	20175	10	16QAM	1	25	23.19	0-1	1
	1732.5	20175	10	16QAM	1	49	23.08	0-1	1
High	1732.5	20175	10	16QAM	25	0	21.57	0-2	2
	1732.5	20175	10	16QAM	25	12	21.58	0-2	2
	1732.5	20175	10	16QAM	25	25	21.56	0-2	2
	1732.5	20175	10	16QAM	50	0	21.51	0-2	2
	1750	20350	10	QPSK	1	0	24.14	0	0
	1750	20350	10	QPSK	1	25	24.09	0	0
	1750	20350	10	QPSK	1	49	24.22	0	0
	1750	20350	10	QPSK	25	0	23.17	0-1	1
	1750	20350	10	QPSK	25	12	23.15	0-1	1
	1750	20350	10	QPSK	25	25	23.14	0-1	1
	1750	20350	10	QPSK	50	0	23.16	0-1	1
	1750	20350	10	16QAM	1	0	23.33	0-1	1
	1750	20350	10	16QAM	1	25	23.23	0-1	1
	1750	20350	10	16QAM	1	49	23.15	0-1	1
	1750	20350	10	16QAM	25	0	22.32	0-2	2
	1750	20350	10	16QAM	25	12	22.19	0-2	2
	1750	20350	10	16QAM	25	25	22.15	0-2	2
	1750	20350	10	16QAM	50	0	22.09	0-2	2

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Table 9-17
LTE Band 4 (AWS) Conducted Powers - 5 MHz Bandwidth

	Frequency [MHz]	Channel	Bandwidth [MHz]	Modulation	RB Size	RB Offset	Conducted Power [dBm]	MPR Allowed per 3GPP [dB]	MPR [dB]
Low	1712.5	19975	5	QPSK	1	0	24.08	0	0
	1712.5	19975	5	QPSK	1	12	24.10	0	0
	1712.5	19975	5	QPSK	1	24	23.94	0	0
	1712.5	19975	5	QPSK	12	0	22.89	0-1	1
	1712.5	19975	5	QPSK	12	6	22.90	0-1	1
	1712.5	19975	5	QPSK	12	13	22.73	0-1	1
	1712.5	19975	5	QPSK	25	0	22.86	0-1	1
	1712.5	19975	5	16-QAM	1	0	23.20	0-1	1
	1712.5	19975	5	16-QAM	1	12	23.14	0-1	1
	1712.5	19975	5	16-QAM	1	24	23.34	0-1	1
	1712.5	19975	5	16-QAM	12	0	21.95	0-2	2
	1712.5	19975	5	16-QAM	12	6	21.92	0-2	2
Mid	1712.5	19975	5	16-QAM	12	13	21.81	0-2	2
	1712.5	19975	5	16-QAM	25	0	21.78	0-2	2
	1732.5	20175	5	QPSK	1	0	23.75	0	0
	1732.5	20175	5	QPSK	1	12	23.67	0	0
	1732.5	20175	5	QPSK	1	24	23.88	0	0
	1732.5	20175	5	QPSK	12	0	22.55	0-1	1
	1732.5	20175	5	QPSK	12	6	22.59	0-1	1
	1732.5	20175	5	QPSK	12	13	22.56	0-1	1
	1732.5	20175	5	QPSK	25	0	22.52	0-1	1
	1732.5	20175	5	16-QAM	1	0	23.09	0-1	1
	1732.5	20175	5	16-QAM	1	12	23.12	0-1	1
	1732.5	20175	5	16-QAM	1	24	23.01	0-1	1
High	1732.5	20175	5	16-QAM	12	0	21.60	0-2	2
	1732.5	20175	5	16-QAM	12	6	21.57	0-2	2
	1732.5	20175	5	16-QAM	12	13	21.59	0-2	2
	1732.5	20175	5	16-QAM	25	0	21.52	0-2	2
	1752.5	20375	5	QPSK	1	0	24.18	0	0
	1752.5	20375	5	QPSK	1	12	24.11	0	0
	1752.5	20375	5	QPSK	1	24	24.21	0	0
	1752.5	20375	5	QPSK	12	0	23.25	0-1	1
	1752.5	20375	5	QPSK	12	6	23.19	0-1	1
	1752.5	20375	5	QPSK	12	13	23.17	0-1	1
	1752.5	20375	5	QPSK	25	0	23.20	0-1	1
	1752.5	20375	5	16-QAM	1	0	23.16	0-1	1
	1752.5	20375	5	16-QAM	1	12	23.42	0-1	1
	1752.5	20375	5	16-QAM	1	24	23.30	0-1	1
	1752.5	20375	5	16-QAM	12	0	22.48	0-2	2
	1752.5	20375	5	16-QAM	12	6	22.41	0-2	2
	1752.5	20375	5	16-QAM	12	13	22.40	0-2	2
	1752.5	20375	5	16-QAM	25	0	22.36	0-2	2

Table 9-18
LTE Band 4 (AWS) Conducted Powers - 3 MHz Bandwidth

	Frequency [MHz]	Channel	Bandwidth [MHz]	Modulation	RB Size	RB Offset	Conducted Power [dBm]	MPR Allowed per 3GPP [dB]	MPR [dB]
Low	1711.5	19965	3	QPSK	1	0	24.02	0	0
	1711.5	19965	3	QPSK	1	7	23.95	0	0
	1711.5	19965	3	QPSK	1	14	24.05	0	0
	1711.5	19965	3	QPSK	8	0	22.99	0-1	1
	1711.5	19965	3	QPSK	8	4	22.87	0-1	1
	1711.5	19965	3	QPSK	8	7	22.79	0-1	1
	1711.5	19965	3	QPSK	15	0	22.86	0-1	1
	1711.5	19965	3	16-QAM	1	0	23.31	0-1	1
	1711.5	19965	3	16-QAM	1	7	23.14	0-1	1
	1711.5	19965	3	16-QAM	1	14	23.18	0-1	1
	1711.5	19965	3	16-QAM	8	0	22.15	0-2	2
	1711.5	19965	3	16-QAM	8	4	22.10	0-2	2
Mid	1711.5	19965	3	16-QAM	8	7	22.08	0-2	2
	1711.5	19965	3	16-QAM	15	0	21.92	0-2	2
	1732.5	20175	3	QPSK	1	0	23.66	0	0
	1732.5	20175	3	QPSK	1	7	23.80	0	0
	1732.5	20175	3	QPSK	1	14	24.15	0	0
	1732.5	20175	3	QPSK	8	0	22.58	0-1	1
	1732.5	20175	3	QPSK	8	4	22.50	0-1	1
	1732.5	20175	3	QPSK	8	7	22.57	0-1	1
	1732.5	20175	3	QPSK	15	0	22.52	0-1	1
	1732.5	20175	3	16-QAM	1	0	22.84	0-1	1
	1732.5	20175	3	16-QAM	1	7	23.05	0-1	1
	1732.5	20175	3	16-QAM	1	14	23.00	0-1	1
High	1732.5	20175	3	16-QAM	8	0	21.66	0-2	2
	1732.5	20175	3	16-QAM	8	4	21.73	0-2	2
	1732.5	20175	3	16-QAM	8	7	21.64	0-2	2
	1732.5	20175	3	16-QAM	15	0	21.52	0-2	2
	1753.5	20385	3	QPSK	1	0	24.28	0	0
	1753.5	20385	3	QPSK	1	7	24.07	0	0
	1753.5	20385	3	QPSK	1	14	24.10	0	0
	1753.5	20385	3	QPSK	8	0	23.32	0-1	1
	1753.5	20385	3	QPSK	8	4	23.41	0-1	1
	1753.5	20385	3	QPSK	8	7	23.42	0-1	1
	1753.5	20385	3	QPSK	15	0	23.38	0-1	1
	1753.5	20385	3	16-QAM	1	0	23.17	0-1	1
	1753.5	20385	3	16-QAM	1	7	23.05	0-1	1
	1753.5	20385	3	16-QAM	1	14	23.19	0-1	1
	1753.5	20385	3	16-QAM	8	0	22.32	0-2	2
	1753.5	20385	3	16-QAM	8	4	22.35	0-2	2
	1753.5	20385	3	16-QAM	8	7	22.40	0-2	2
	1753.5	20385	3	16-QAM	15	0	22.26	0-2	2

Table 9-19
LTE Band 4 (AWS) Conducted Powers -1.4 MHz Bandwidth

	Frequency [MHz]	Channel	Bandwidth [MHz]	Modulation	RB Size	RB Offset	Conducted Power [dBm]	MPR Allowed per 3GPP [dB]	MPR [dB]
Low	1710.7	19957	1.4	QPSK	1	0	24.13	0	0
	1710.7	19957	1.4	QPSK	1	2	24.05	0	0
	1710.7	19957	1.4	QPSK	1	5	23.99	0	0
	1710.7	19957	1.4	QPSK	3	0	23.86	0	0
	1710.7	19957	1.4	QPSK	3	2	23.77	0	0
	1710.7	19957	1.4	QPSK	3	3	23.90	0	0
	1710.7	19957	1.4	QPSK	6	0	22.90	0-1	1
	1710.7	19957	1.4	16-QAM	1	0	23.13	0-1	1
	1710.7	19957	1.4	16-QAM	1	2	23.04	0-1	1
	1710.7	19957	1.4	16-QAM	1	5	22.90	0-1	1
	1710.7	19957	1.4	16-QAM	3	0	22.97	0-1	1
	1710.7	19957	1.4	16-QAM	3	2	22.74	0-1	1
Mid	1710.7	19957	1.4	16-QAM	3	3	22.60	0-1	1
	1710.7	19957	1.4	16-QAM	6	0	22.00	0-2	2
	1732.5	20175	1.4	QPSK	1	0	23.64	0	0
	1732.5	20175	1.4	QPSK	1	2	23.59	0	0
	1732.5	20175	1.4	QPSK	1	5	23.60	0	0
	1732.5	20175	1.4	QPSK	3	0	23.51	0	0
	1732.5	20175	1.4	QPSK	3	2	23.50	0	0
	1732.5	20175	1.4	QPSK	3	3	23.61	0	0
	1732.5	20175	1.4	QPSK	6	0	22.50	0-1	1
	1732.5	20175	1.4	16-QAM	1	0	23.05	0-1	1
	1732.5	20175	1.4	16-QAM	1	2	22.92	0-1	1
	1732.5	20175	1.4	16-QAM	1	5	22.87	0-1	1
High	1732.5	20175	1.4	16-QAM	3	0	22.61	0-1	1
	1732.5	20175	1.4	16-QAM	3	2	22.63	0-1	1
	1732.5	20175	1.4	16-QAM	3	3	22.72	0-1	1
	1732.5	20175	1.4	16-QAM	6	0	21.53	0-2	2
	1754.3	20393	1.4	QPSK	1	0	23.97	0	0
	1754.3	20393	1.4	QPSK	1	2	23.88	0	0
	1754.3	20393	1.4	QPSK	1	5	24.07	0	0
	1754.3	20393	1.4	QPSK	3	0	24.11	0	0
	1754.3	20393	1.4	QPSK	3	2	23.77	0	0
	1754.3	20393	1.4	QPSK	3	3	23.70	0	0
	1754.3	20393	1.4	QPSK	6	0	23.06	0-1	1
	1754.3	20393	1.4	16-QAM	1	0	22.98	0-1	1
	1754.3	20393	1.4	16-QAM	1	2	23.02	0-1	1
	1754.3	20393	1.4	16-QAM	1	5	22.99	0-1	1
	1754.3	20393	1.4	16-QAM	3	0	23.00	0-1	1
	1754.3	20393	1.4	16-QAM	3	2	22.85	0-1	1
	1754.3	20393	1.4	16-QAM	3	3	22.76	0-1	1
	1754.3	20393	1.4	16-QAM	6	0	21.78	0-2	2

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9.4.4 LTE Band 4 (AWS) - Hotspot Mode Active

Table 9-20

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

	Frequency [MHz]	Channel	Bandwidth [MHz]	Modulation	RB Size	RB Offset	Conducted Power [dBm]	MPR Allowed per 3GPP [dB]	MPR [dB]
Mid	1732.5	20175	20	QPSK	1	0	21.75	0	0
	1732.5	20175	20	QPSK	1	50	21.82	0	0
	1732.5	20175	20	QPSK	1	99	22.16	0	0
	1732.5	20175	20	QPSK	50	0	20.89	0-1	1
	1732.5	20175	20	QPSK	50	25	20.86	0-1	1
	1732.5	20175	20	QPSK	50	50	20.98	0-1	1
	1732.5	20175	20	QPSK	100	0	20.96	0-1	1
	1732.5	20175	20	16QAM	1	0	21.06	0-1	1
	1732.5	20175	20	16QAM	1	50	20.99	0-1	1
	1732.5	20175	20	16QAM	1	99	21.26	0-1	1
	1732.5	20175	20	16QAM	50	0	19.80	0-2	2
	1732.5	20175	20	16QAM	50	25	19.82	0-2	2
	1732.5	20175	20	16QAM	50	50	19.95	0-2	2
	1732.5	20175	20	16QAM	100	0	19.87	0-2	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.

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Table 9-21
LTE Band 4 (AWS) Conducted Powers - 15 MHz Bandwidth

	Frequency [MHz]	Channel	Bandwidth [MHz]	Modulation	RB Size	RB Offset	Conducted Power [dBm]	MPR Allowed per 3GPP [dB]	MPR [dB]
Low	1717.5	20025	15	QPSK	1	0	21.58	0	0
	1717.5	20025	15	QPSK	1	36	22.01	0	0
	1717.5	20025	15	QPSK	1	74	22.01	0	0
	1717.5	20025	15	QPSK	36	0	20.76	0-1	1
	1717.5	20025	15	QPSK	36	18	21.02	0-1	1
	1717.5	20025	15	QPSK	36	37	21.17	0-1	1
	1717.5	20025	15	QPSK	75	0	21.24	0-1	1
	1717.5	20025	15	16QAM	1	0	21.05	0-1	1
	1717.5	20025	15	16QAM	1	36	21.16	0-1	1
	1717.5	20025	15	16QAM	1	74	21.06	0-1	1
	1717.5	20025	15	16QAM	36	0	19.58	0-2	2
	1717.5	20025	15	16QAM	36	18	20.08	0-2	2
Mid	1717.5	20025	15	16QAM	36	37	19.66	0-2	2
	1717.5	20025	15	16QAM	75	0	19.84	0-2	2
	1732.5	20175	15	QPSK	1	0	21.76	0	0
	1732.5	20175	15	QPSK	1	36	21.88	0	0
	1732.5	20175	15	QPSK	1	74	22.15	0	0
	1732.5	20175	15	QPSK	36	0	20.76	0-1	1
	1732.5	20175	15	QPSK	36	18	21.03	0-1	1
	1732.5	20175	15	QPSK	36	37	21.11	0-1	1
	1732.5	20175	15	QPSK	75	0	21.08	0-1	1
	1732.5	20175	15	16QAM	1	0	21.12	0-1	1
	1732.5	20175	15	16QAM	1	36	20.97	0-1	1
	1732.5	20175	15	16QAM	1	74	21.10	0-1	1
High	1732.5	20175	15	16QAM	36	0	19.64	0-2	2
	1732.5	20175	15	16QAM	36	18	19.92	0-2	2
	1732.5	20175	15	16QAM	36	37	19.80	0-2	2
	1732.5	20175	15	16QAM	75	0	19.82	0-2	2
	1747.5	20325	15	QPSK	1	0	21.69	0	0
	1747.5	20325	15	QPSK	1	36	21.95	0	0
	1747.5	20325	15	QPSK	1	74	22.10	0	0
	1747.5	20325	15	QPSK	36	0	20.59	0-1	1
	1747.5	20325	15	QPSK	36	18	21.17	0-1	1
	1747.5	20325	15	QPSK	36	37	20.95	0-1	1
	1747.5	20325	15	QPSK	75	0	21.14	0-1	1
	1747.5	20325	15	16QAM	1	0	21.07	0-1	1
	1747.5	20325	15	16QAM	1	36	21.17	0-1	1
	1747.5	20325	15	16QAM	1	74	20.91	0-1	1
	1747.5	20325	15	16QAM	36	0	19.79	0-2	2
	1747.5	20325	15	16QAM	36	18	19.72	0-2	2
	1747.5	20325	15	16QAM	36	37	19.80	0-2	2
	1747.5	20325	15	16QAM	75	0	19.90	0-2	2
	1747.5	20325	15	16QAM	75	0	19.90	0-2	2

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Table 9-22
LTE Band 4 (AWS) Conducted Powers - 10 MHz Bandwidth

	Frequency [MHz]	Channel	Bandwidth [MHz]	Modulation	RB Size	RB Offset	Conducted Power [dBm]	MPR Allowed per 3GPP [dB]	MPR [dB]
Low	1715	20000	10	QPSK	1	0	22.00	0	0
	1715	20000	10	QPSK	1	25	21.59	0	0
	1715	20000	10	QPSK	1	49	22.15	0	0
	1715	20000	10	QPSK	25	0	20.66	0-1	1
	1715	20000	10	QPSK	25	12	21.26	0-1	1
	1715	20000	10	QPSK	25	25	21.00	0-1	1
	1715	20000	10	QPSK	50	0	20.77	0-1	1
	1715	20000	10	16QAM	1	0	21.03	0-1	1
	1715	20000	10	16QAM	1	25	21.14	0-1	1
	1715	20000	10	16QAM	1	49	21.38	0-1	1
	1715	20000	10	16QAM	25	0	19.83	0-2	2
	1715	20000	10	16QAM	25	12	20.18	0-2	2
Mid	1715	20000	10	16QAM	25	25	19.53	0-2	2
	1715	20000	10	16QAM	50	0	20.12	0-2	2
	1732.5	20175	10	QPSK	1	0	21.80	0	0
	1732.5	20175	10	QPSK	1	25	21.68	0	0
	1732.5	20175	10	QPSK	1	49	22.08	0	0
	1732.5	20175	10	QPSK	25	0	20.64	0-1	1
	1732.5	20175	10	QPSK	25	12	21.18	0-1	1
	1732.5	20175	10	QPSK	25	25	20.93	0-1	1
	1732.5	20175	10	QPSK	50	0	20.92	0-1	1
	1732.5	20175	10	16QAM	1	0	20.92	0-1	1
	1732.5	20175	10	16QAM	1	25	20.95	0-1	1
	1732.5	20175	10	16QAM	1	49	21.25	0-1	1
High	1732.5	20175	10	16QAM	25	0	19.74	0-2	2
	1732.5	20175	10	16QAM	25	12	20.01	0-2	2
	1732.5	20175	10	16QAM	25	25	19.60	0-2	2
	1732.5	20175	10	16QAM	50	0	19.92	0-2	2
	1750	20350	10	QPSK	1	0	21.99	0	0
	1750	20350	10	QPSK	1	25	21.71	0	0
	1750	20350	10	QPSK	1	49	22.01	0	0
	1750	20350	10	QPSK	25	0	20.59	0-1	1
	1750	20350	10	QPSK	25	12	21.17	0-1	1
	1750	20350	10	QPSK	25	25	20.76	0-1	1
	1750	20350	10	QPSK	50	0	21.00	0-1	1
	1750	20350	10	16QAM	1	0	20.99	0-1	1
	1750	20350	10	16QAM	1	25	20.78	0-1	1
	1750	20350	10	16QAM	1	49	21.40	0-1	1
	1750	20350	10	16QAM	25	0	19.60	0-2	2
	1750	20350	10	16QAM	25	12	20.17	0-2	2
	1750	20350	10	16QAM	25	25	19.76	0-2	2
	1750	20350	10	16QAM	50	0	20.00	0-2	2

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Table 9-23
LTE Band 4 (AWS) Conducted Powers - 5 MHz Bandwidth

	Frequency [MHz]	Channel	Bandwidth [MHz]	Modulation	RB Size	RB Offset	Conducted Power [dBm]	MPR Allowed per 3GPP [dB]	MPR [dB]
Low	1712.5	19975	5	QPSK	1	0	21.72	0	0
	1712.5	19975	5	QPSK	1	12	21.94	0	0
	1712.5	19975	5	QPSK	1	24	21.92	0	0
	1712.5	19975	5	QPSK	12	0	20.51	0-1	1
	1712.5	19975	5	QPSK	12	6	21.05	0-1	1
	1712.5	19975	5	QPSK	12	13	20.91	0-1	1
	1712.5	19975	5	QPSK	25	0	21.05	0-1	1
	1712.5	19975	5	16-QAM	1	0	21.05	0-1	1
	1712.5	19975	5	16-QAM	1	12	20.70	0-1	1
	1712.5	19975	5	16-QAM	1	24	21.03	0-1	1
	1712.5	19975	5	16-QAM	12	0	19.85	0-2	2
	1712.5	19975	5	16-QAM	12	6	20.14	0-2	2
Mid	1712.5	19975	5	16-QAM	12	13	19.87	0-2	2
	1712.5	19975	5	16-QAM	25	0	19.88	0-2	2
	1732.5	20175	5	QPSK	1	0	21.63	0	0
	1732.5	20175	5	QPSK	1	12	21.77	0	0
	1732.5	20175	5	QPSK	1	24	22.10	0	0
	1732.5	20175	5	QPSK	12	0	20.69	0-1	1
	1732.5	20175	5	QPSK	12	6	21.06	0-1	1
	1732.5	20175	5	QPSK	12	13	21.08	0-1	1
	1732.5	20175	5	QPSK	25	0	21.05	0-1	1
	1732.5	20175	5	16-QAM	1	0	21.05	0-1	1
	1732.5	20175	5	16-QAM	1	12	20.77	0-1	1
	1732.5	20175	5	16-QAM	1	24	21.11	0-1	1
High	1732.5	20175	5	16-QAM	12	0	19.93	0-2	2
	1732.5	20175	5	16-QAM	12	6	19.99	0-2	2
	1732.5	20175	5	16-QAM	12	13	19.71	0-2	2
	1732.5	20175	5	16-QAM	25	0	19.96	0-2	2
	1752.5	20375	5	QPSK	1	0	21.82	0	0
	1752.5	20375	5	QPSK	1	12	21.61	0	0
	1752.5	20375	5	QPSK	1	24	22.12	0	0
	1752.5	20375	5	QPSK	12	0	20.54	0-1	1
	1752.5	20375	5	QPSK	12	6	20.97	0-1	1
	1752.5	20375	5	QPSK	12	13	21.23	0-1	1
	1752.5	20375	5	QPSK	25	0	20.95	0-1	1
	1752.5	20375	5	16-QAM	1	0	21.15	0-1	1
	1752.5	20375	5	16-QAM	1	12	20.81	0-1	1
	1752.5	20375	5	16-QAM	1	24	21.26	0-1	1
	1752.5	20375	5	16-QAM	12	0	19.80	0-2	2
	1752.5	20375	5	16-QAM	12	6	19.98	0-2	2
	1752.5	20375	5	16-QAM	12	13	19.88	0-2	2
	1752.5	20375	5	16-QAM	25	0	19.86	0-2	2

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Table 9-24
LTE Band 4 (AWS) Conducted Powers - 3 MHz Bandwidth

	Frequency [MHz]	Channel	Bandwidth [MHz]	Modulation	RB Size	RB Offset	Conducted Power [dBm]	MPR Allowed per 3GPP [dB]	MPR [dB]
Low	1711.5	19965	3	QPSK	1	0	21.76	0	0
	1711.5	19965	3	QPSK	1	7	21.70	0	0
	1711.5	19965	3	QPSK	1	14	21.87	0	0
	1711.5	19965	3	QPSK	8	0	20.65	0-1	1
	1711.5	19965	3	QPSK	8	4	20.94	0-1	1
	1711.5	19965	3	QPSK	8	7	20.96	0-1	1
	1711.5	19965	3	QPSK	15	0	20.73	0-1	1
	1711.5	19965	3	16-QAM	1	0	21.15	0-1	1
	1711.5	19965	3	16-QAM	1	7	20.75	0-1	1
	1711.5	19965	3	16-QAM	1	14	21.19	0-1	1
	1711.5	19965	3	16-QAM	8	0	19.66	0-2	2
	1711.5	19965	3	16-QAM	8	4	19.97	0-2	2
Mid	1711.5	19965	3	16-QAM	8	7	19.81	0-2	2
	1711.5	19965	3	16-QAM	15	0	19.95	0-2	2
	1732.5	20175	3	QPSK	1	0	21.63	0	0
	1732.5	20175	3	QPSK	1	7	21.83	0	0
	1732.5	20175	3	QPSK	1	14	21.96	0	0
	1732.5	20175	3	QPSK	8	0	20.50	0-1	1
	1732.5	20175	3	QPSK	8	4	21.10	0-1	1
	1732.5	20175	3	QPSK	8	7	21.10	0-1	1
	1732.5	20175	3	QPSK	15	0	20.88	0-1	1
	1732.5	20175	3	16-QAM	1	0	21.24	0-1	1
	1732.5	20175	3	16-QAM	1	7	20.74	0-1	1
	1732.5	20175	3	16-QAM	1	14	21.04	0-1	1
High	1732.5	20175	3	16-QAM	8	0	19.54	0-2	2
	1732.5	20175	3	16-QAM	8	4	19.95	0-2	2
	1732.5	20175	3	16-QAM	8	7	19.51	0-2	2
	1732.5	20175	3	16-QAM	15	0	20.08	0-2	2
	1753.5	20385	3	QPSK	1	0	21.73	0	0
	1753.5	20385	3	QPSK	1	7	21.83	0	0
	1753.5	20385	3	QPSK	1	14	21.96	0	0
	1753.5	20385	3	QPSK	8	0	20.54	0-1	1
	1753.5	20385	3	QPSK	8	4	21.06	0-1	1
	1753.5	20385	3	QPSK	8	7	21.22	0-1	1
	1753.5	20385	3	QPSK	15	0	21.00	0-1	1
	1753.5	20385	3	16-QAM	1	0	21.41	0-1	1
	1753.5	20385	3	16-QAM	1	7	20.59	0-1	1
	1753.5	20385	3	16-QAM	1	14	20.90	0-1	1
	1753.5	20385	3	16-QAM	8	0	19.53	0-2	2
	1753.5	20385	3	16-QAM	8	4	19.95	0-2	2
	1753.5	20385	3	16-QAM	8	7	19.71	0-2	2
	1753.5	20385	3	16-QAM	15	0	20.07	0-2	2

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Table 9-25
LTE Band 4 (AWS) Conducted Powers -1.4 MHz Bandwidth

	Frequency [MHz]	Channel	Bandwidth [MHz]	Modulation	RB Size	RB Offset	Conducted Power [dBm]	MPR Allowed per 3GPP [dB]	MPR [dB]
Low	1710.7	19957	1.4	QPSK	1	0	21.57	0	0
	1710.7	19957	1.4	QPSK	1	2	22.06	0	0
	1710.7	19957	1.4	QPSK	1	5	22.04	0	0
	1710.7	19957	1.4	QPSK	3	0	21.57	0	0
	1710.7	19957	1.4	QPSK	3	2	21.97	0	0
	1710.7	19957	1.4	QPSK	3	3	22.08	0	0
	1710.7	19957	1.4	QPSK	6	0	21.21	0-1	1
	1710.7	19957	1.4	16-QAM	1	0	21.30	0-1	1
	1710.7	19957	1.4	16-QAM	1	2	20.99	0-1	1
	1710.7	19957	1.4	16-QAM	1	5	21.21	0-1	1
	1710.7	19957	1.4	16-QAM	3	0	20.61	0-1	1
	1710.7	19957	1.4	16-QAM	3	2	20.85	0-1	1
Mid	1710.7	19957	1.4	16-QAM	3	3	20.55	0-1	1
	1710.7	19957	1.4	16-QAM	6	0	20.26	0-2	2
	1732.5	20175	1.4	QPSK	1	0	21.62	0	0
	1732.5	20175	1.4	QPSK	1	2	21.87	0	0
	1732.5	20175	1.4	QPSK	1	5	21.91	0	0
	1732.5	20175	1.4	QPSK	3	0	21.69	0	0
	1732.5	20175	1.4	QPSK	3	2	21.94	0	0
	1732.5	20175	1.4	QPSK	3	3	22.08	0	0
	1732.5	20175	1.4	QPSK	6	0	21.05	0-1	1
	1732.5	20175	1.4	16-QAM	1	0	21.14	0-1	1
	1732.5	20175	1.4	16-QAM	1	2	20.91	0-1	1
	1732.5	20175	1.4	16-QAM	1	5	21.12	0-1	1
High	1732.5	20175	1.4	16-QAM	3	0	20.88	0-1	1
	1732.5	20175	1.4	16-QAM	3	2	21.02	0-1	1
	1732.5	20175	1.4	16-QAM	3	3	21.40	0-1	1
	1732.5	20175	1.4	16-QAM	6	0	20.20	0-2	2
	1754.3	20393	1.4	QPSK	1	0	21.90	0	0
	1754.3	20393	1.4	QPSK	1	2	22.02	0	0
	1754.3	20393	1.4	QPSK	1	5	22.08	0	0
	1754.3	20393	1.4	QPSK	3	0	21.90	0	0
	1754.3	20393	1.4	QPSK	3	2	22.03	0	0
	1754.3	20393	1.4	QPSK	3	3	22.09	0	0
	1754.3	20393	1.4	QPSK	6	0	20.90	0-1	1
	1754.3	20393	1.4	16-QAM	1	0	21.17	0-1	1
	1754.3	20393	1.4	16-QAM	1	2	21.04	0-1	1
	1754.3	20393	1.4	16-QAM	1	5	21.09	0-1	1
	1754.3	20393	1.4	16-QAM	3	0	20.93	0-1	1
	1754.3	20393	1.4	16-QAM	3	2	20.85	0-1	1
	1754.3	20393	1.4	16-QAM	3	3	20.82	0-1	1
	1754.3	20393	1.4	16-QAM	6	0	20.35	0-2	2

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9.4.5 LTE Band 25 (PCS) - Hotspot Mode Inactive

Table 9-26
LTE Band 25 (PCS) Conducted Powers - 20 MHz Bandwidth

	Frequency [MHz]	Channel	Bandwidth [MHz]	Modulation	RB Size	RB Offset	Conducted Power [dBm]	MPR Allowed per 3GPP [dB]	MPR [dB]
Low	1860	26140	20	QPSK	1	0	24.49	0	0
	1860	26140	20	QPSK	1	50	24.50	0	0
	1860	26140	20	QPSK	1	99	24.48	0	0
	1860	26140	20	QPSK	50	0	23.50	0-1	1
	1860	26140	20	QPSK	50	25	23.49	0-1	1
	1860	26140	20	QPSK	50	50	23.48	0-1	1
	1860	26140	20	QPSK	100	0	23.42	0-1	1
	1860	26140	20	16QAM	1	0	23.17	0-1	1
	1860	26140	20	16QAM	1	50	23.36	0-1	1
	1860	26140	20	16QAM	1	99	23.45	0-1	1
	1860	26140	20	16QAM	50	0	22.29	0-2	2
	1860	26140	20	16QAM	50	25	22.39	0-2	2
	1860	26140	20	16QAM	50	50	22.43	0-2	2
Mid	1860	26140	20	16QAM	100	0	22.13	0-2	2
	1882.5	26365	20	QPSK	1	0	24.49	0	0
	1882.5	26365	20	QPSK	1	50	24.12	0	0
	1882.5	26365	20	QPSK	1	99	24.37	0	0
	1882.5	26365	20	QPSK	50	0	23.37	0-1	1
	1882.5	26365	20	QPSK	50	25	23.05	0-1	1
	1882.5	26365	20	QPSK	50	50	22.94	0-1	1
	1882.5	26365	20	QPSK	100	0	22.99	0-1	1
	1882.5	26365	20	16QAM	1	0	23.20	0-1	1
	1882.5	26365	20	16QAM	1	50	23.21	0-1	1
	1882.5	26365	20	16QAM	1	99	23.44	0-1	1
	1882.5	26365	20	16QAM	50	0	22.32	0-2	2
	1882.5	26365	20	16QAM	50	25	22.41	0-2	2
High	1882.5	26365	20	16QAM	50	50	22.40	0-2	2
	1882.5	26365	20	16QAM	100	0	22.17	0-2	2
	1905	26590	20	QPSK	1	0	24.32	0	0
	1905	26590	20	QPSK	1	50	24.23	0	0
	1905	26590	20	QPSK	1	99	24.49	0	0
	1905	26590	20	QPSK	50	0	23.49	0-1	1
	1905	26590	20	QPSK	50	25	23.02	0-1	1
	1905	26590	20	QPSK	50	50	23.10	0-1	1
	1905	26590	20	QPSK	100	0	23.15	0-1	1
	1905	26590	20	16QAM	1	0	23.39	0-1	1
	1905	26590	20	16QAM	1	50	23.02	0-1	1
	1905	26590	20	16QAM	1	99	23.31	0-1	1
	1905	26590	20	16QAM	50	0	22.15	0-2	2
	1905	26590	20	16QAM	50	25	22.34	0-2	2
	1905	26590	20	16QAM	50	50	22.24	0-2	2
	1905	26590	20	16QAM	100	0	22.02	0-2	2

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Table 9-27
LTE Band 25 (PCS) Conducted Powers - 15 MHz Bandwidth

	Frequency [MHz]	Channel	Bandwidth [MHz]	Modulation	RB Size	RB Offset	Conducted Power [dBm]	MPR Allowed per 3GPP [dB]	MPR [dB]
Low	1857.5	26115	15	QPSK	1	0	24.39	0	0
	1857.5	26115	15	QPSK	1	36	24.42	0	0
	1857.5	26115	15	QPSK	1	74	24.20	0	0
	1857.5	26115	15	QPSK	36	0	23.41	0-1	1
	1857.5	26115	15	QPSK	36	18	23.44	0-1	1
	1857.5	26115	15	QPSK	36	37	23.33	0-1	1
	1857.5	26115	15	QPSK	75	0	23.44	0-1	1
	1857.5	26115	15	16QAM	1	0	23.16	0-1	1
	1857.5	26115	15	16QAM	1	36	23.37	0-1	1
	1857.5	26115	15	16QAM	1	74	23.35	0-1	1
	1857.5	26115	15	16QAM	36	0	22.31	0-2	2
	1857.5	26115	15	16QAM	36	18	22.41	0-2	2
	1857.5	26115	15	16QAM	36	37	22.41	0-2	2
Mid	1857.5	26115	15	16QAM	75	0	22.21	0-2	2
	1882.5	26365	15	QPSK	1	0	24.49	0	0
	1882.5	26365	15	QPSK	1	36	24.32	0	0
	1882.5	26365	15	QPSK	1	74	24.43	0	0
	1882.5	26365	15	QPSK	36	0	23.38	0-1	1
	1882.5	26365	15	QPSK	36	18	23.03	0-1	1
	1882.5	26365	15	QPSK	36	37	22.89	0-1	1
	1882.5	26365	15	QPSK	75	0	23.04	0-1	1
	1882.5	26365	15	16QAM	1	0	23.32	0-1	1
	1882.5	26365	15	16QAM	1	36	23.32	0-1	1
	1882.5	26365	15	16QAM	1	74	23.47	0-1	1
	1882.5	26365	15	16QAM	36	0	22.38	0-2	2
	1882.5	26365	15	16QAM	36	18	22.22	0-2	2
	1882.5	26365	15	16QAM	36	37	22.26	0-2	2
High	1882.5	26365	15	16QAM	75	0	22.36	0-2	2
	1907.5	26615	15	QPSK	1	0	24.47	0	0
	1907.5	26615	15	QPSK	1	36	24.12	0	0
	1907.5	26615	15	QPSK	1	74	24.15	0	0
	1907.5	26615	15	QPSK	36	0	23.34	0-1	1
	1907.5	26615	15	QPSK	36	18	23.20	0-1	1
	1907.5	26615	15	QPSK	36	37	23.02	0-1	1
	1907.5	26615	15	QPSK	75	0	23.34	0-1	1
	1907.5	26615	15	16QAM	1	0	23.31	0-1	1
	1907.5	26615	15	16QAM	1	36	23.04	0-1	1
	1907.5	26615	15	16QAM	1	74	23.28	0-1	1
	1907.5	26615	15	16QAM	36	0	22.03	0-2	2
	1907.5	26615	15	16QAM	36	18	22.02	0-2	2
	1907.5	26615	15	16QAM	36	37	22.20	0-2	2
	1907.5	26615	15	16QAM	75	0	22.10	0-2	2

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Table 9-28
LTE Band 25 (PCS) Conducted Powers - 10 MHz Bandwidth

	Frequency [MHz]	Channel	Bandwidth [MHz]	Modulation	RB Size	RB Offset	Conducted Power [dBm]	MPR Allowed per 3GPP [dB]	MPR [dB]
Low	1855	26090	10	QPSK	1	0	24.39	0	0
	1855	26090	10	QPSK	1	25	24.42	0	0
	1855	26090	10	QPSK	1	49	24.16	0	0
	1855	26090	10	QPSK	25	0	23.47	0-1	1
	1855	26090	10	QPSK	25	12	23.44	0-1	1
	1855	26090	10	QPSK	25	25	23.21	0-1	1
	1855	26090	10	QPSK	50	0	23.19	0-1	1
	1855	26090	10	16QAM	1	0	23.01	0-1	1
	1855	26090	10	16QAM	1	25	23.39	0-1	1
	1855	26090	10	16QAM	1	49	23.34	0-1	1
	1855	26090	10	16QAM	25	0	22.12	0-2	2
	1855	26090	10	16QAM	25	12	22.35	0-2	2
	1855	26090	10	16QAM	25	25	22.39	0-2	2
	1855	26090	10	16QAM	50	0	22.29	0-2	2
Mid	1882.5	26365	10	QPSK	1	0	24.50	0	0
	1882.5	26365	10	QPSK	1	25	24.44	0	0
	1882.5	26365	10	QPSK	1	49	24.46	0	0
	1882.5	26365	10	QPSK	25	0	23.45	0-1	1
	1882.5	26365	10	QPSK	25	12	22.86	0-1	1
	1882.5	26365	10	QPSK	25	25	22.79	0-1	1
	1882.5	26365	10	QPSK	50	0	22.93	0-1	1
	1882.5	26365	10	16QAM	1	0	23.44	0-1	1
	1882.5	26365	10	16QAM	1	25	23.33	0-1	1
	1882.5	26365	10	16QAM	1	49	23.35	0-1	1
	1882.5	26365	10	16QAM	25	0	22.28	0-2	2
	1882.5	26365	10	16QAM	25	12	22.28	0-2	2
	1882.5	26365	10	16QAM	25	25	22.13	0-2	2
	1882.5	26365	10	16QAM	50	0	22.18	0-2	2
High	1910	26640	10	QPSK	1	0	24.19	0	0
	1910	26640	10	QPSK	1	25	23.94	0	0
	1910	26640	10	QPSK	1	49	23.97	0	0
	1910	26640	10	QPSK	25	0	23.49	0-1	1
	1910	26640	10	QPSK	25	12	23.14	0-1	1
	1910	26640	10	QPSK	25	25	22.83	0-1	1
	1910	26640	10	QPSK	50	0	23.41	0-1	1
	1910	26640	10	16QAM	1	0	23.46	0-1	1
	1910	26640	10	16QAM	1	25	23.16	0-1	1
	1910	26640	10	16QAM	1	49	23.37	0-1	1
	1910	26640	10	16QAM	25	0	22.15	0-2	2
	1910	26640	10	16QAM	25	12	22.09	0-2	2
	1910	26640	10	16QAM	25	25	22.20	0-2	2
	1910	26640	10	16QAM	50	0	22.10	0-2	2

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Table 9-29
LTE Band 25 (PCS) Conducted Powers - 5 MHz Bandwidth

	Frequency [MHz]	Channel	Bandwidth [MHz]	Modulation	RB Size	RB Offset	Conducted Power [dBm]	MPR Allowed per 3GPP [dB]	MPR [dB]
Low	1852.5	26065	5	QPSK	1	0	24.45	0	0
	1852.5	26065	5	QPSK	1	12	24.48	0	0
	1852.5	26065	5	QPSK	1	24	24.03	0	0
	1852.5	26065	5	QPSK	12	0	23.42	0-1	1
	1852.5	26065	5	QPSK	12	6	23.25	0-1	1
	1852.5	26065	5	QPSK	12	13	23.19	0-1	1
	1852.5	26065	5	QPSK	25	0	23.36	0-1	1
	1852.5	26065	5	16-QAM	1	0	23.07	0-1	1
	1852.5	26065	5	16-QAM	1	12	23.48	0-1	1
	1852.5	26065	5	16-QAM	1	24	23.38	0-1	1
	1852.5	26065	5	16-QAM	12	0	22.05	0-2	2
	1852.5	26065	5	16-QAM	12	6	22.44	0-2	2
	1852.5	26065	5	16-QAM	12	13	22.39	0-2	2
Mid	1852.5	26065	5	16-QAM	25	0	22.36	0-2	2
	1882.5	26365	5	QPSK	1	0	24.46	0	0
	1882.5	26365	5	QPSK	1	12	24.46	0	0
	1882.5	26365	5	QPSK	1	24	24.41	0	0
	1882.5	26365	5	QPSK	12	0	23.35	0-1	1
	1882.5	26365	5	QPSK	12	6	22.94	0-1	1
	1882.5	26365	5	QPSK	12	13	22.92	0-1	1
	1882.5	26365	5	QPSK	25	0	23.06	0-1	1
	1882.5	26365	5	16-QAM	1	0	23.45	0-1	1
	1882.5	26365	5	16-QAM	1	12	23.21	0-1	1
	1882.5	26365	5	16-QAM	1	24	23.29	0-1	1
	1882.5	26365	5	16-QAM	12	0	22.24	0-2	2
	1882.5	26365	5	16-QAM	12	6	22.16	0-2	2
High	1882.5	26365	5	16-QAM	12	13	21.93	0-2	2
	1882.5	26365	5	16-QAM	25	0	22.24	0-2	2
	1912.5	26665	5	QPSK	1	0	24.40	0	0
	1912.5	26665	5	QPSK	1	12	23.77	0	0
	1912.5	26665	5	QPSK	1	24	23.92	0	0
	1912.5	26665	5	QPSK	12	0	23.41	0-1	1
	1912.5	26665	5	QPSK	12	6	23.08	0-1	1
	1912.5	26665	5	QPSK	12	13	22.81	0-1	1
	1912.5	26665	5	QPSK	25	0	23.45	0-1	1
	1912.5	26665	5	16-QAM	1	0	23.27	0-1	1
	1912.5	26665	5	16-QAM	1	12	22.99	0-1	1
	1912.5	26665	5	16-QAM	1	24	23.50	0-1	1
	1912.5	26665	5	16-QAM	12	0	22.33	0-2	2
	1912.5	26665	5	16-QAM	12	6	21.93	0-2	2
	1912.5	26665	5	16-QAM	12	13	22.34	0-2	2
	1912.5	26665	5	16-QAM	25	0	22.09	0-2	2

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Table 9-30
LTE Band 25 (PCS) Conducted Powers - 3 MHz Bandwidth

	Frequency [MHz]	Channel	Bandwidth [MHz]	Modulation	RB Size	RB Offset	Conducted Power [dBm]	MPR Allowed per 3GPP [dB]	MPR [dB]
Low	1851.5	26055	3	QPSK	1	0	24.28	0	0
	1851.5	26055	3	QPSK	1	7	24.33	0	0
	1851.5	26055	3	QPSK	1	14	24.06	0	0
	1851.5	26055	3	QPSK	8	0	23.38	0-1	1
	1851.5	26055	3	QPSK	8	4	23.20	0-1	1
	1851.5	26055	3	QPSK	8	7	23.17	0-1	1
	1851.5	26055	3	QPSK	15	0	23.39	0-1	1
	1851.5	26055	3	16-QAM	1	0	22.90	0-1	1
	1851.5	26055	3	16-QAM	1	7	23.43	0-1	1
	1851.5	26055	3	16-QAM	1	14	23.30	0-1	1
	1851.5	26055	3	16-QAM	8	0	21.89	0-2	2
	1851.5	26055	3	16-QAM	8	4	22.32	0-2	2
Mid	1851.5	26055	3	16-QAM	8	7	22.26	0-2	2
	1851.5	26055	3	16-QAM	15	0	22.47	0-2	2
	1882.5	26365	3	QPSK	1	0	24.27	0	0
	1882.5	26365	3	QPSK	1	7	24.25	0	0
	1882.5	26365	3	QPSK	1	14	24.25	0	0
	1882.5	26365	3	QPSK	8	0	23.31	0-1	1
	1882.5	26365	3	QPSK	8	4	22.97	0-1	1
	1882.5	26365	3	QPSK	8	7	22.88	0-1	1
	1882.5	26365	3	QPSK	15	0	23.14	0-1	1
	1882.5	26365	3	16-QAM	1	0	23.44	0-1	1
	1882.5	26365	3	16-QAM	1	7	23.32	0-1	1
	1882.5	26365	3	16-QAM	1	14	23.25	0-1	1
High	1882.5	26365	3	16-QAM	8	0	22.42	0-2	2
	1882.5	26365	3	16-QAM	8	4	22.17	0-2	2
	1882.5	26365	3	16-QAM	8	7	21.85	0-2	2
	1882.5	26365	3	16-QAM	15	0	22.28	0-2	2
	1913.5	26675	3	QPSK	1	0	24.37	0	0
	1913.5	26675	3	QPSK	1	7	23.63	0	0
	1913.5	26675	3	QPSK	1	14	24.06	0	0
	1913.5	26675	3	QPSK	8	0	23.35	0-1	1
	1913.5	26675	3	QPSK	8	4	23.13	0-1	1
	1913.5	26675	3	QPSK	8	7	22.69	0-1	1
	1913.5	26675	3	QPSK	15	0	23.19	0-1	1
	1913.5	26675	3	16-QAM	1	0	23.07	0-1	1
	1913.5	26675	3	16-QAM	1	7	23.13	0-1	1
	1913.5	26675	3	16-QAM	1	14	23.33	0-1	1
	1913.5	26675	3	16-QAM	8	0	22.18	0-2	2
	1913.5	26675	3	16-QAM	8	4	22.13	0-2	2
	1913.5	26675	3	16-QAM	8	7	22.49	0-2	2
	1913.5	26675	3	16-QAM	15	0	21.94	0-2	2

Table 9-31
LTE Band 25 (PCS) Conducted Powers -1.4 MHz Bandwidth

	Frequency [MHz]	Channel	Bandwidth [MHz]	Modulation	RB Size	RB Offset	Conducted Power [dBm]	MPR Allowed per 3GPP [dB]	MPR [dB]
Low	1850.7	26047	1.4	QPSK	1	0	24.34	0	0
	1850.7	26047	1.4	QPSK	1	2	24.24	0	0
	1850.7	26047	1.4	QPSK	1	5	24.19	0	0
	1850.7	26047	1.4	QPSK	3	0	24.48	0	0
	1850.7	26047	1.4	QPSK	3	2	24.29	0	0
	1850.7	26047	1.4	QPSK	3	3	24.24	0	0
	1850.7	26047	1.4	QPSK	6	0	23.22	0-1	1
	1850.7	26047	1.4	16-QAM	1	0	23.02	0-1	1
	1850.7	26047	1.4	16-QAM	1	2	23.41	0-1	1
	1850.7	26047	1.4	16-QAM	1	5	23.32	0-1	1
	1850.7	26047	1.4	16-QAM	3	0	22.69	0-1	1
	1850.7	26047	1.4	16-QAM	3	2	23.45	0-1	1
	1850.7	26047	1.4	16-QAM	3	3	23.49	0-1	1
Mid	1850.7	26047	1.4	16-QAM	6	0	22.38	0-2	2
	1882.5	26365	1.4	QPSK	1	0	24.17	0	0
	1882.5	26365	1.4	QPSK	1	2	24.36	0	0
	1882.5	26365	1.4	QPSK	1	5	24.06	0	0
	1882.5	26365	1.4	QPSK	3	0	24.26	0	0
	1882.5	26365	1.4	QPSK	3	2	23.95	0	0
	1882.5	26365	1.4	QPSK	3	3	23.70	0	0
	1882.5	26365	1.4	QPSK	6	0	23.22	0-1	1
	1882.5	26365	1.4	16-QAM	1	0	23.10	0-1	1
	1882.5	26365	1.4	16-QAM	1	2	23.20	0-1	1
	1882.5	26365	1.4	16-QAM	1	5	23.20	0-1	1
	1882.5	26365	1.4	16-QAM	3	0	23.32	0-1	1
	1882.5	26365	1.4	16-QAM	3	2	23.09	0-1	1
	1882.5	26365	1.4	16-QAM	3	3	22.90	0-1	1
High	1882.5	26365	1.4	16-QAM	6	0	22.19	0-2	2
	1914.3	26683	1.4	QPSK	1	0	24.30	0	0
	1914.3	26683	1.4	QPSK	1	2	23.50	0	0
	1914.3	26683	1.4	QPSK	1	5	24.25	0	0
	1914.3	26683	1.4	QPSK	3	0	24.42	0	0
	1914.3	26683	1.4	QPSK	3	2	24.06	0	0
	1914.3	26683	1.4	QPSK	3	3	23.73	0	0
	1914.3	26683	1.4	QPSK	6	0	23.09	0-1	1
	1914.3	26683	1.4	16-QAM	1	0	23.07	0-1	1
	1914.3	26683	1.4	16-QAM	1	2	23.12	0-1	1
	1914.3	26683	1.4	16-QAM	1	5	23.36	0-1	1
	1914.3	26683	1.4	16-QAM	3	0	23.08	0-1	1
	1914.3	26683	1.4	16-QAM	3	2	23.02	0-1	1
	1914.3	26683	1.4	16-QAM	3	3	23.15	0-1	1
	1914.3	26683	1.4	16-QAM	6	0	21.88	0-2	2

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9.4.6 LTE Band 25 (PCS) - Hotspot Mode Active

Table 9-32
LTE Band 25 (PCS) Conducted Powers - 20 MHz Bandwidth

	Frequency [MHz]	Channel	Bandwidth [MHz]	Modulation	RB Size	RB Offset	Conducted Power [dBm]	MPR Allowed per 3GPP [dB]	MPR [dB]
Low	1860	26140	20	QPSK	1	0	22.30	0	0
	1860	26140	20	QPSK	1	50	22.34	0	0
	1860	26140	20	QPSK	1	99	22.13	0	0
	1860	26140	20	QPSK	50	0	21.37	0-1	1
	1860	26140	20	QPSK	50	25	21.22	0-1	1
	1860	26140	20	QPSK	50	50	21.15	0-1	1
	1860	26140	20	QPSK	100	0	21.22	0-1	1
	1860	26140	20	16QAM	1	0	21.50	0-1	1
	1860	26140	20	16QAM	1	50	21.22	0-1	1
	1860	26140	20	16QAM	1	99	21.37	0-1	1
	1860	26140	20	16QAM	50	0	20.30	0-2	2
	1860	26140	20	16QAM	50	25	20.19	0-2	2
	1860	26140	20	16QAM	50	50	20.13	0-2	2
Mid	1860	26140	20	16QAM	100	0	20.08	0-2	2
	1882.5	26365	20	QPSK	1	0	22.17	0	0
	1882.5	26365	20	QPSK	1	50	22.04	0	0
	1882.5	26365	20	QPSK	1	99	22.19	0	0
	1882.5	26365	20	QPSK	50	0	21.18	0-1	1
	1882.5	26365	20	QPSK	50	25	21.10	0-1	1
	1882.5	26365	20	QPSK	50	50	20.97	0-1	1
	1882.5	26365	20	QPSK	100	0	21.00	0-1	1
	1882.5	26365	20	16QAM	1	0	21.15	0-1	1
	1882.5	26365	20	16QAM	1	50	21.10	0-1	1
	1882.5	26365	20	16QAM	1	99	21.50	0-1	1
	1882.5	26365	20	16QAM	50	0	20.22	0-2	2
	1882.5	26365	20	16QAM	50	25	20.06	0-2	2
High	1882.5	26365	20	16QAM	50	50	19.95	0-2	2
	1882.5	26365	20	16QAM	100	0	20.04	0-2	2
	1905	26590	20	QPSK	1	0	22.00	0	0
	1905	26590	20	QPSK	1	50	22.08	0	0
	1905	26590	20	QPSK	1	99	21.94	0	0
	1905	26590	20	QPSK	50	0	21.04	0-1	1
	1905	26590	20	QPSK	50	25	21.06	0-1	1
	1905	26590	20	QPSK	50	50	20.99	0-1	1
	1905	26590	20	QPSK	100	0	21.06	0-1	1
	1905	26590	20	16QAM	1	0	21.13	0-1	1
	1905	26590	20	16QAM	1	50	21.07	0-1	1
	1905	26590	20	16QAM	1	99	21.24	0-1	1
	1905	26590	20	16QAM	50	0	20.00	0-2	2
	1905	26590	20	16QAM	50	25	20.04	0-2	2
	1905	26590	20	16QAM	50	50	20.18	0-2	2
	1905	26590	20	16QAM	100	0	20.27	0-2	2

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Table 9-33
LTE Band 25 (PCS) Conducted Powers - 15 MHz Bandwidth

	Frequency [MHz]	Channel	Bandwidth [MHz]	Modulation	RB Size	RB Offset	Conducted Power [dBm]	MPR Allowed per 3GPP [dB]	MPR [dB]
Low	1857.5	26115	15	QPSK	1	0	22.38	0	0
	1857.5	26115	15	QPSK	1	36	22.15	0	0
	1857.5	26115	15	QPSK	1	74	22.25	0	0
	1857.5	26115	15	QPSK	36	0	21.22	0-1	1
	1857.5	26115	15	QPSK	36	18	21.40	0-1	1
	1857.5	26115	15	QPSK	36	37	21.06	0-1	1
	1857.5	26115	15	QPSK	75	0	21.36	0-1	1
	1857.5	26115	15	16QAM	1	0	21.45	0-1	1
	1857.5	26115	15	16QAM	1	36	21.14	0-1	1
	1857.5	26115	15	16QAM	1	74	21.18	0-1	1
	1857.5	26115	15	16QAM	36	0	20.12	0-2	2
	1857.5	26115	15	16QAM	36	18	20.07	0-2	2
	1857.5	26115	15	16QAM	36	37	20.25	0-2	2
Mid	1857.5	26115	15	16QAM	75	0	19.98	0-2	2
	1882.5	26365	15	QPSK	1	0	22.32	0	0
	1882.5	26365	15	QPSK	1	36	22.24	0	0
	1882.5	26365	15	QPSK	1	74	22.28	0	0
	1882.5	26365	15	QPSK	36	0	21.14	0-1	1
	1882.5	26365	15	QPSK	36	18	21.29	0-1	1
	1882.5	26365	15	QPSK	36	37	20.93	0-1	1
	1882.5	26365	15	QPSK	75	0	20.85	0-1	1
	1882.5	26365	15	16QAM	1	0	21.34	0-1	1
	1882.5	26365	15	16QAM	1	36	21.06	0-1	1
	1882.5	26365	15	16QAM	1	74	21.43	0-1	1
	1882.5	26365	15	16QAM	36	0	20.33	0-2	2
	1882.5	26365	15	16QAM	36	18	20.21	0-2	2
	1882.5	26365	15	16QAM	36	37	19.92	0-2	2
High	1882.5	26365	15	16QAM	75	0	20.22	0-2	2
	1907.5	26615	15	QPSK	1	0	22.11	0	0
	1907.5	26615	15	QPSK	1	36	22.04	0	0
	1907.5	26615	15	QPSK	1	74	22.01	0	0
	1907.5	26615	15	QPSK	36	0	21.01	0-1	1
	1907.5	26615	15	QPSK	36	18	20.96	0-1	1
	1907.5	26615	15	QPSK	36	37	20.90	0-1	1
	1907.5	26615	15	QPSK	75	0	21.22	0-1	1
	1907.5	26615	15	16QAM	1	0	21.02	0-1	1
	1907.5	26615	15	16QAM	1	36	21.24	0-1	1
	1907.5	26615	15	16QAM	1	74	21.32	0-1	1
	1907.5	26615	15	16QAM	36	0	20.15	0-2	2
	1907.5	26615	15	16QAM	36	18	19.90	0-2	2
	1907.5	26615	15	16QAM	36	37	20.33	0-2	2
	1907.5	26615	15	16QAM	75	0	20.10	0-2	2

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Table 9-34
LTE Band 25 (PCS) Conducted Powers - 10 MHz Bandwidth

	Frequency [MHz]	Channel	Bandwidth [MHz]	Modulation	RB Size	RB Offset	Conducted Power [dBm]	MPR Allowed per 3GPP [dB]	MPR [dB]
Low	1855	26090	10	QPSK	1	0	22.24	0	0
	1855	26090	10	QPSK	1	25	22.42	0	0
	1855	26090	10	QPSK	1	49	22.14	0	0
	1855	26090	10	QPSK	25	0	21.23	0-1	1
	1855	26090	10	QPSK	25	12	21.25	0-1	1
	1855	26090	10	QPSK	25	25	20.99	0-1	1
	1855	26090	10	QPSK	50	0	21.48	0-1	1
	1855	26090	10	16QAM	1	0	21.46	0-1	1
	1855	26090	10	16QAM	1	25	20.99	0-1	1
	1855	26090	10	16QAM	1	49	21.27	0-1	1
	1855	26090	10	16QAM	25	0	20.24	0-2	2
	1855	26090	10	16QAM	25	12	20.14	0-2	2
	1855	26090	10	16QAM	25	25	20.44	0-2	2
Mid	1855	26090	10	16QAM	50	0	19.90	0-2	2
	1882.5	26365	10	QPSK	1	0	22.49	0	0
	1882.5	26365	10	QPSK	1	25	22.38	0	0
	1882.5	26365	10	QPSK	1	49	22.44	0	0
	1882.5	26365	10	QPSK	25	0	21.16	0-1	1
	1882.5	26365	10	QPSK	25	12	21.34	0-1	1
	1882.5	26365	10	QPSK	25	25	21.05	0-1	1
	1882.5	26365	10	QPSK	50	0	20.69	0-1	1
	1882.5	26365	10	16QAM	1	0	21.33	0-1	1
	1882.5	26365	10	16QAM	1	25	20.89	0-1	1
	1882.5	26365	10	16QAM	1	49	21.43	0-1	1
	1882.5	26365	10	16QAM	25	0	20.23	0-2	2
	1882.5	26365	10	16QAM	25	12	20.30	0-2	2
	1882.5	26365	10	16QAM	25	25	20.12	0-2	2
High	1882.5	26365	10	16QAM	50	0	20.25	0-2	2
	1910	26640	10	QPSK	1	0	22.29	0	0
	1910	26640	10	QPSK	1	25	22.23	0	0
	1910	26640	10	QPSK	1	49	21.82	0	0
	1910	26640	10	QPSK	25	0	21.04	0-1	1
	1910	26640	10	QPSK	25	12	20.78	0-1	1
	1910	26640	10	QPSK	25	25	20.87	0-1	1
	1910	26640	10	QPSK	50	0	21.37	0-1	1
	1910	26640	10	16QAM	1	0	21.22	0-1	1
	1910	26640	10	16QAM	1	25	21.22	0-1	1
	1910	26640	10	16QAM	1	49	21.47	0-1	1
	1910	26640	10	16QAM	25	0	19.97	0-2	2
	1910	26640	10	16QAM	25	12	20.05	0-2	2
	1910	26640	10	16QAM	25	25	20.30	0-2	2
	1910	26640	10	16QAM	50	0	20.14	0-2	2

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Table 9-35
LTE Band 25 (PCS) Conducted Powers - 5 MHz Bandwidth

	Frequency [MHz]	Channel	Bandwidth [MHz]	Modulation	RB Size	RB Offset	Conducted Power [dBm]	MPR Allowed per 3GPP [dB]	MPR [dB]
Low	1852.5	26065	5	QPSK	1	0	22.18	0	0
	1852.5	26065	5	QPSK	1	12	22.40	0	0
	1852.5	26065	5	QPSK	1	24	22.19	0	0
	1852.5	26065	5	QPSK	12	0	21.29	0-1	1
	1852.5	26065	5	QPSK	12	6	21.40	0-1	1
	1852.5	26065	5	QPSK	12	13	20.80	0-1	1
	1852.5	26065	5	QPSK	25	0	21.39	0-1	1
	1852.5	26065	5	16-QAM	1	0	21.30	0-1	1
	1852.5	26065	5	16-QAM	1	12	20.86	0-1	1
	1852.5	26065	5	16-QAM	1	24	21.07	0-1	1
	1852.5	26065	5	16-QAM	12	0	20.19	0-2	2
	1852.5	26065	5	16-QAM	12	6	20.07	0-2	2
	1852.5	26065	5	16-QAM	12	13	20.31	0-2	2
Mid	1852.5	26065	5	16-QAM	25	0	19.79	0-2	2
	1882.5	26365	5	QPSK	1	0	22.44	0	0
	1882.5	26365	5	QPSK	1	12	22.34	0	0
	1882.5	26365	5	QPSK	1	24	22.15	0	0
	1882.5	26365	5	QPSK	12	0	21.11	0-1	1
	1882.5	26365	5	QPSK	12	6	21.44	0-1	1
	1882.5	26365	5	QPSK	12	13	21.07	0-1	1
	1882.5	26365	5	QPSK	25	0	20.81	0-1	1
	1882.5	26365	5	16-QAM	1	0	21.28	0-1	1
	1882.5	26365	5	16-QAM	1	12	20.96	0-1	1
	1882.5	26365	5	16-QAM	1	24	21.36	0-1	1
	1882.5	26365	5	16-QAM	12	0	20.03	0-2	2
	1882.5	26365	5	16-QAM	12	6	20.27	0-2	2
	1882.5	26365	5	16-QAM	12	13	20.08	0-2	2
High	1882.5	26365	5	16-QAM	25	0	20.09	0-2	2
	1912.5	26665	5	QPSK	1	0	22.44	0	0
	1912.5	26665	5	QPSK	1	12	22.11	0	0
	1912.5	26665	5	QPSK	1	24	22.02	0	0
	1912.5	26665	5	QPSK	12	0	21.18	0-1	1
	1912.5	26665	5	QPSK	12	6	20.93	0-1	1
	1912.5	26665	5	QPSK	12	13	20.90	0-1	1
	1912.5	26665	5	QPSK	25	0	21.50	0-1	1
	1912.5	26665	5	16-QAM	1	0	21.35	0-1	1
	1912.5	26665	5	16-QAM	1	12	21.28	0-1	1
	1912.5	26665	5	16-QAM	1	24	21.28	0-1	1
	1912.5	26665	5	16-QAM	12	0	20.13	0-2	2
	1912.5	26665	5	16-QAM	12	6	20.21	0-2	2
	1912.5	26665	5	16-QAM	12	13	20.22	0-2	2
	1912.5	26665	5	16-QAM	25	0	20.32	0-2	2

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Table 9-36
LTE Band 25 (PCS) Conducted Powers - 3 MHz Bandwidth

	Frequency [MHz]	Channel	Bandwidth [MHz]	Modulation	RB Size	RB Offset	Conducted Power [dBm]	MPR Allowed per 3GPP [dB]	MPR [dB]
Low	1851.5	26055	3	QPSK	1	0	22.31	0	0
	1851.5	26055	3	QPSK	1	7	22.49	0	0
	1851.5	26055	3	QPSK	1	14	22.15	0	0
	1851.5	26055	3	QPSK	8	0	21.38	0-1	1
	1851.5	26055	3	QPSK	8	4	21.47	0-1	1
	1851.5	26055	3	QPSK	8	7	20.67	0-1	1
	1851.5	26055	3	QPSK	15	0	21.47	0-1	1
	1851.5	26055	3	16-QAM	1	0	21.36	0-1	1
	1851.5	26055	3	16-QAM	1	7	21.00	0-1	1
	1851.5	26055	3	16-QAM	1	14	21.01	0-1	1
	1851.5	26055	3	16-QAM	8	0	20.37	0-2	2
	1851.5	26055	3	16-QAM	8	4	20.19	0-2	2
	1851.5	26055	3	16-QAM	8	7	20.31	0-2	2
Mid	1851.5	26055	3	16-QAM	15	0	19.81	0-2	2
	1882.5	26365	3	QPSK	1	0	22.26	0	0
	1882.5	26365	3	QPSK	1	7	22.17	0	0
	1882.5	26365	3	QPSK	1	14	22.34	0	0
	1882.5	26365	3	QPSK	8	0	21.23	0-1	1
	1882.5	26365	3	QPSK	8	4	21.40	0-1	1
	1882.5	26365	3	QPSK	8	7	21.12	0-1	1
	1882.5	26365	3	QPSK	15	0	20.61	0-1	1
	1882.5	26365	3	16-QAM	1	0	21.15	0-1	1
	1882.5	26365	3	16-QAM	1	7	21.04	0-1	1
	1882.5	26365	3	16-QAM	1	14	21.40	0-1	1
	1882.5	26365	3	16-QAM	8	0	20.01	0-2	2
	1882.5	26365	3	16-QAM	8	4	20.33	0-2	2
High	1882.5	26365	3	16-QAM	8	7	20.28	0-2	2
	1882.5	26365	3	16-QAM	15	0	20.00	0-2	2
	1913.5	26675	3	QPSK	1	0	22.39	0	0
	1913.5	26675	3	QPSK	1	7	21.93	0	0
	1913.5	26675	3	QPSK	1	14	21.92	0	0
	1913.5	26675	3	QPSK	8	0	21.27	0-1	1
	1913.5	26675	3	QPSK	8	4	21.02	0-1	1
	1913.5	26675	3	QPSK	8	7	20.81	0-1	1
	1913.5	26675	3	QPSK	15	0	21.26	0-1	1
	1913.5	26675	3	16-QAM	1	0	21.17	0-1	1
	1913.5	26675	3	16-QAM	1	7	21.12	0-1	1
	1913.5	26675	3	16-QAM	1	14	21.36	0-1	1
	1913.5	26675	3	16-QAM	8	0	20.30	0-2	2
	1913.5	26675	3	16-QAM	8	4	20.36	0-2	2
	1913.5	26675	3	16-QAM	8	7	20.05	0-2	2
	1913.5	26675	3	16-QAM	15	0	20.49	0-2	2

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Table 9-37
LTE Band 25 (PCS) Conducted Powers -1.4 MHz Bandwidth

	Frequency [MHz]	Channel	Bandwidth [MHz]	Modulation	RB Size	RB Offset	Conducted Power [dBm]	MPR Allowed per 3GPP [dB]	MPR [dB]
Low	1850.7	26047	1.4	QPSK	1	0	22.43	0	0
	1850.7	26047	1.4	QPSK	1	2	22.45	0	0
	1850.7	26047	1.4	QPSK	1	5	22.28	0	0
	1850.7	26047	1.4	QPSK	3	0	22.40	0	0
	1850.7	26047	1.4	QPSK	3	2	22.31	0	0
	1850.7	26047	1.4	QPSK	3	3	21.76	0	0
	1850.7	26047	1.4	QPSK	6	0	21.36	0-1	1
	1850.7	26047	1.4	16-QAM	1	0	21.40	0-1	1
	1850.7	26047	1.4	16-QAM	1	2	21.05	0-1	1
	1850.7	26047	1.4	16-QAM	1	5	21.18	0-1	1
	1850.7	26047	1.4	16-QAM	3	0	21.30	0-1	1
	1850.7	26047	1.4	16-QAM	3	2	21.15	0-1	1
	1850.7	26047	1.4	16-QAM	3	3	21.12	0-1	1
Mid	1850.7	26047	1.4	16-QAM	6	0	19.85	0-2	2
	1882.5	26365	1.4	QPSK	1	0	22.30	0	0
	1882.5	26365	1.4	QPSK	1	2	22.28	0	0
	1882.5	26365	1.4	QPSK	1	5	22.48	0	0
	1882.5	26365	1.4	QPSK	3	0	22.31	0	0
	1882.5	26365	1.4	QPSK	3	2	22.39	0	0
	1882.5	26365	1.4	QPSK	3	3	21.93	0	0
	1882.5	26365	1.4	QPSK	6	0	20.61	0-1	1
	1882.5	26365	1.4	16-QAM	1	0	20.95	0-1	1
	1882.5	26365	1.4	16-QAM	1	2	20.94	0-1	1
	1882.5	26365	1.4	16-QAM	1	5	21.30	0-1	1
	1882.5	26365	1.4	16-QAM	3	0	20.84	0-1	1
	1882.5	26365	1.4	16-QAM	3	2	21.30	0-1	1
	1882.5	26365	1.4	16-QAM	3	3	21.46	0-1	1
High	1882.5	26365	1.4	16-QAM	6	0	19.85	0-2	2
	1914.3	26683	1.4	QPSK	1	0	22.39	0	0
	1914.3	26683	1.4	QPSK	1	2	21.99	0	0
	1914.3	26683	1.4	QPSK	1	5	21.86	0	0
	1914.3	26683	1.4	QPSK	3	0	22.30	0	0
	1914.3	26683	1.4	QPSK	3	2	22.00	0	0
	1914.3	26683	1.4	QPSK	3	3	21.99	0	0
	1914.3	26683	1.4	QPSK	6	0	21.17	0-1	1
	1914.3	26683	1.4	16-QAM	1	0	21.37	0-1	1
	1914.3	26683	1.4	16-QAM	1	2	20.94	0-1	1
	1914.3	26683	1.4	16-QAM	1	5	21.39	0-1	1
	1914.3	26683	1.4	16-QAM	3	0	21.45	0-1	1
	1914.3	26683	1.4	16-QAM	3	2	21.43	0-1	1
	1914.3	26683	1.4	16-QAM	3	3	21.24	0-1	1
	1914.3	26683	1.4	16-QAM	6	0	20.33	0-2	2

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9.4.1 LTE Band 41

Table 9-38
LTE Band 41 Conducted Powers - 20 MHz Bandwidth

	Frequency [MHz]	Channel	Bandwidth [MHz]	Modulation	RB Size	RB Offset	Conducted Power [dBm]	MPR Allowed per 3GPP [dB]	MPR [dB]
Low	2506	39750	20	QPSK	1	0	24.39	0	0
	2506	39750	20	QPSK	1	50	23.62	0	0
	2506	39750	20	QPSK	1	99	24.09	0	0
	2506	39750	20	QPSK	50	0	22.89	0-1	1
	2506	39750	20	QPSK	50	25	22.63	0-1	1
	2506	39750	20	QPSK	50	50	22.62	0-1	1
	2506	39750	20	QPSK	100	0	22.69	0-1	1
	2506	39750	20	16QAM	1	0	23.50	0-1	1
	2506	39750	20	16QAM	1	50	23.16	0-1	1
	2506	39750	20	16QAM	1	99	23.49	0-1	1
	2506	39750	20	16QAM	50	0	21.98	0-2	2
	2506	39750	20	16QAM	50	25	21.64	0-2	2
	2506	39750	20	16QAM	50	50	21.69	0-2	2
	2506	39750	20	16QAM	100	0	21.76	0-2	2
	2506	39750	20	16QAM	100	0	21.76	0-2	2
Low Mid	2549.5	40185	20	QPSK	1	0	24.37	0	0
	2549.5	40185	20	QPSK	1	50	23.62	0	0
	2549.5	40185	20	QPSK	1	99	23.74	0	0
	2549.5	40185	20	QPSK	50	0	22.86	0-1	1
	2549.5	40185	20	QPSK	50	25	22.62	0-1	1
	2549.5	40185	20	QPSK	50	50	22.77	0-1	1
	2549.5	40185	20	QPSK	100	0	22.83	0-1	1
	2549.5	40185	20	16-QAM	1	0	23.50	0-1	1
	2549.5	40185	20	16-QAM	1	50	22.99	0-1	1
	2549.5	40185	20	16-QAM	1	99	23.32	0-1	1
	2549.5	40185	20	16-QAM	50	0	21.99	0-2	2
	2549.5	40185	20	16-QAM	50	25	21.70	0-2	2
	2549.5	40185	20	16-QAM	50	50	21.86	0-2	2
	2549.5	40185	20	16-QAM	100	0	21.98	0-2	2
	2549.5	40185	20	16-QAM	100	0	21.98	0-2	2
	2549.5	40185	20	16-QAM	100	0	21.98	0-2	2
Mid	2593	40620	20	QPSK	1	0	24.15	0	0
	2593	40620	20	QPSK	1	50	23.50	0	0
	2593	40620	20	QPSK	1	99	24.16	0	0
	2593	40620	20	QPSK	50	0	22.71	0-1	1
	2593	40620	20	QPSK	50	25	22.68	0-1	1
	2593	40620	20	QPSK	50	50	22.82	0-1	1
	2593	40620	20	QPSK	100	0	22.79	0-1	1
	2593	40620	20	16-QAM	1	0	23.32	0-1	1
	2593	40620	20	16-QAM	1	50	22.70	0-1	1
	2593	40620	20	16-QAM	1	99	23.50	0-1	1
	2593	40620	20	16-QAM	50	0	21.83	0-2	2
	2593	40620	20	16-QAM	50	25	21.77	0-2	2
	2593	40620	20	16-QAM	50	50	21.95	0-2	2
	2593	40620	20	16-QAM	100	0	21.88	0-2	2
	2593	40620	20	16-QAM	100	0	21.88	0-2	2
	2593	40620	20	16-QAM	100	0	21.88	0-2	2
Mid High	2636.5	41055	20	QPSK	1	0	24.50	0	0
	2636.5	41055	20	QPSK	1	50	24.15	0	0
	2636.5	41055	20	QPSK	1	99	24.06	0	0
	2636.5	41055	20	QPSK	50	0	23.50	0-1	1
	2636.5	41055	20	QPSK	50	25	23.38	0-1	1
	2636.5	41055	20	QPSK	50	50	23.28	0-1	1
	2636.5	41055	20	QPSK	100	0	23.40	0-1	1
	2636.5	41055	20	16-QAM	1	0	23.50	0-1	1
	2636.5	41055	20	16-QAM	1	50	23.49	0-1	1
	2636.5	41055	20	16-QAM	1	99	23.47	0-1	1
	2636.5	41055	20	16-QAM	50	0	22.47	0-2	2
	2636.5	41055	20	16-QAM	50	25	22.44	0-2	2
	2636.5	41055	20	16-QAM	50	50	22.32	0-2	2
	2636.5	41055	20	16-QAM	100	0	22.42	0-2	2
	2636.5	41055	20	16-QAM	100	0	22.42	0-2	2
	2636.5	41055	20	16-QAM	100	0	22.42	0-2	2
High	2680	41490	20	QPSK	1	0	23.83	0	0
	2680	41490	20	QPSK	1	50	23.40	0	0
	2680	41490	20	QPSK	1	99	23.35	0	0
	2680	41490	20	QPSK	50	0	22.74	0-1	1
	2680	41490	20	QPSK	50	25	22.55	0-1	1
	2680	41490	20	QPSK	50	50	22.25	0-1	1
	2680	41490	20	QPSK	100	0	22.42	0-1	1
	2680	41490	20	16-QAM	1	0	22.99	0-1	1
	2680	41490	20	16-QAM	1	50	22.71	0-1	1
	2680	41490	20	16-QAM	1	99	22.45	0-1	1
	2680	41490	20	16-QAM	50	0	21.81	0-2	2
	2680	41490	20	16-QAM	50	25	21.64	0-2	2
	2680	41490	20	16-QAM	50	50	21.29	0-2	2
	2680	41490	20	16-QAM	100	0	21.49	0-2	2
	2680	41490	20	16-QAM	100	0	21.49	0-2	2
	2680	41490	20	16-QAM	100	0	21.49	0-2	2

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Table 9-39
LTE Band 41 Conducted Powers - 15 MHz Bandwidth

	Frequency [MHz]	Channel	Bandwidth [MHz]	Modulation	RB Size	RB Offset	Conducted Power [dBm]	MPR Allowed per 3GPP [dB]	MPR [dB]
Low	2503.5	39725	15	QPSK	1	0	24.50	0	0
	2503.5	39725	15	QPSK	1	36	23.90	0	0
	2503.5	39725	15	QPSK	1	74	24.03	0	0
	2503.5	39725	15	QPSK	36	0	23.18	0-1	1
	2503.5	39725	15	QPSK	36	18	23.00	0-1	1
	2503.5	39725	15	QPSK	36	37	22.91	0-1	1
	2503.5	39725	15	QPSK	75	0	23.02	0-1	1
	2503.5	39725	15	16QAM	1	0	23.50	0-1	1
	2503.5	39725	15	16QAM	1	36	23.01	0-1	1
	2503.5	39725	15	16QAM	1	74	23.19	0-1	1
	2503.5	39725	15	16QAM	36	0	21.99	0-2	2
	2503.5	39725	15	16QAM	36	18	21.83	0-2	2
	2503.5	39725	15	16QAM	36	37	21.76	0-2	2
	2503.5	39725	15	16QAM	75	0	21.81	0-2	2
	2548.25	40173	15	QPSK	1	0	24.50	0	0
Low Mid	2548.25	40173	15	QPSK	1	36	23.81	0	0
	2548.25	40173	15	QPSK	1	74	23.98	0	0
	2548.25	40173	15	QPSK	36	0	22.78	0-1	1
	2548.25	40173	15	QPSK	36	18	22.77	0-1	1
	2548.25	40173	15	QPSK	36	37	22.72	0-1	1
	2548.25	40173	15	QPSK	75	0	22.70	0-1	1
	2548.25	40173	15	16-QAM	1	0	23.34	0-1	1
	2548.25	40173	15	16-QAM	1	36	22.70	0-1	1
	2548.25	40173	15	16-QAM	1	74	22.88	0-1	1
	2548.25	40173	15	16-QAM	36	0	21.87	0-2	2
	2548.25	40173	15	16-QAM	36	18	21.84	0-2	2
	2548.25	40173	15	16-QAM	36	37	21.79	0-2	2
	2548.25	40173	15	16-QAM	75	0	21.70	0-2	2
	2593	40620	15	QPSK	1	0	24.50	0	0
	2593	40620	15	QPSK	1	36	23.86	0	0
Mid	2593	40620	15	QPSK	1	74	24.20	0	0
	2593	40620	15	QPSK	36	0	23.06	0-1	1
	2593	40620	15	QPSK	36	18	23.05	0-1	1
	2593	40620	15	QPSK	36	37	23.04	0-1	1
	2593	40620	15	QPSK	75	0	23.01	0-1	1
	2593	40620	15	16-QAM	1	0	23.50	0-1	1
	2593	40620	15	16-QAM	1	36	23.09	0-1	1
	2593	40620	15	16-QAM	1	74	23.45	0-1	1
	2593	40620	15	16-QAM	36	0	22.05	0-2	2
	2593	40620	15	16-QAM	36	18	22.02	0-2	2
	2593	40620	15	16-QAM	36	37	22.02	0-2	2
	2593	40620	15	16-QAM	75	0	22.01	0-2	2
	2637.75	41068	15	QPSK	1	0	24.33	0	0
	2637.75	41068	15	QPSK	1	36	23.84	0	0
	2637.75	41068	15	QPSK	1	74	23.73	0	0
Mid High	2637.75	41068	15	QPSK	36	0	23.18	0-1	1
	2637.75	41068	15	QPSK	36	18	23.11	0-1	1
	2637.75	41068	15	QPSK	36	37	22.94	0-1	1
	2637.75	41068	15	QPSK	75	0	23.02	0-1	1
	2637.75	41068	15	16-QAM	1	0	23.50	0-1	1
	2637.75	41068	15	16-QAM	1	36	23.21	0-1	1
	2637.75	41068	15	16-QAM	1	74	23.11	0-1	1
	2637.75	41068	15	16-QAM	36	0	22.28	0-2	2
	2637.75	41068	15	16-QAM	36	18	22.22	0-2	2
	2637.75	41068	15	16-QAM	36	37	22.05	0-2	2
	2637.75	41068	15	16-QAM	75	0	22.08	0-2	2
	2682.5	41515	15	QPSK	1	0	23.56	0	0
	2682.5	41515	15	QPSK	1	36	23.12	0	0
	2682.5	41515	15	QPSK	1	74	22.93	0	0
	2682.5	41515	15	QPSK	36	0	22.41	0-1	1
High	2682.5	41515	15	QPSK	36	18	22.14	0-1	1
	2682.5	41515	15	QPSK	36	37	21.98	0-1	1
	2682.5	41515	15	QPSK	75	0	22.20	0-1	1
	2682.5	41515	15	16-QAM	1	0	23.01	0-1	1
	2682.5	41515	15	16-QAM	1	36	22.64	0-1	1
	2682.5	41515	15	16-QAM	1	74	22.47	0-1	1
	2682.5	41515	15	16-QAM	36	0	21.64	0-2	2
	2682.5	41515	15	16-QAM	36	18	21.39	0-2	2
	2682.5	41515	15	16-QAM	36	37	21.18	0-2	2
	2682.5	41515	15	16-QAM	75	0	21.29	0-2	2

Table 9-40
LTE Band 41 Conducted Powers - 10 MHz Bandwidth

	Frequency [MHz]	Channel	Bandwidth [MHz]	Modulation	RB Size	RB Offset	Conducted Power [dBm]	MPR Allowed per 3GPP [dB]	MPR [dB]
Low	2501	39700	10	QPSK	1	0	23.70	0	0
	2501	39700	10	QPSK	1	25	23.59	0	0
	2501	39700	10	QPSK	1	49	23.50	0	0
	2501	39700	10	QPSK	25	0	22.76	0-1	1
	2501	39700	10	QPSK	25	12	22.71	0-1	1
	2501	39700	10	QPSK	25	25	22.50	0-1	1
	2501	39700	10	QPSK	50	0	22.62	0-1	1
	2501	39700	10	16QAM	1	0	22.90	0-1	1
	2501	39700	10	16QAM	1	25	22.88	0-1	1
	2501	39700	10	16QAM	1	49	22.52	0-1	1
	2501	39700	10	16QAM	25	0	21.80	0-2	2
	2501	39700	10	16QAM	25	12	21.75	0-2	2
	2501	39700	10	16QAM	25	25	21.53	0-2	2
	2501	39700	10	16QAM	50	0	21.66	0-2	2
	2547	40160	10	QPSK	1	0	23.91	0	0
	2547	40160	10	QPSK	1	25	23.57	0	0
Low Mid	2547	40160	10	QPSK	1	49	23.50	0	0
	2547	40160	10	QPSK	25	0	22.64	0-1	1
	2547	40160	10	QPSK	25	12	22.72	0-1	1
	2547	40160	10	QPSK	25	25	22.57	0-1	1
	2547	40160	10	QPSK	50	0	22.64	0-1	1
	2547	40160	10	16-QAM	1	0	23.12	0-1	1
	2547	40160	10	16-QAM	1	25	22.94	0-1	1
	2547	40160	10	16-QAM	1	49	22.70	0-1	1
	2547	40160	10	16-QAM	25	0	21.63	0-2	2
	2547	40160	10	16-QAM	25	12	21.71	0-2	2
	2547	40160	10	16-QAM	25	25	21.55	0-2	2
	2547	40160	10	16-QAM	50	0	21.61	0-2	2
Mid	2593	40620	10	QPSK	1	0	24.13	0	0
	2593	40620	10	QPSK	1	25	23.89	0	0
	2593	40620	10	QPSK	1	49	23.75	0	0
	2593	40620	10	QPSK	25	0	22.92	0-1	1
	2593	40620	10	QPSK	25	12	22.96	0-1	1
	2593	40620	10	QPSK	25	25	22.86	0-1	1
	2593	40620	10	QPSK	50	0	22.86	0-1	1
	2593	40620	10	16-QAM	1	0	22.89	0-1	1
	2593	40620	10	16-QAM	1	25	22.78	0-1	1
	2593	40620	10	16-QAM	1	49	22.71	0-1	1
	2593	40620	10	16-QAM	25	0	21.96	0-2	2
	2593	40620	10	16-QAM	25	12	22.01	0-2	2
	2593	40620	10	16-QAM	25	25	21.92	0-2	2
	2593	40620	10	16-QAM	50	0	21.89	0-2	2
Mid High	2639	41080	10	QPSK	1	0	24.09	0	0
	2639	41080	10	QPSK	1	25	24.01	0	0
	2639	41080	10	QPSK	1	49	23.70	0	0
	2639	41080	10	QPSK	25	0	23.21	0-1	1
	2639	41080	10	QPSK	25	12	23.24	0-1	1
	2639	41080	10	QPSK	25	25	23.04	0-1	1
	2639	41080	10	QPSK	50	0	23.14	0-1	1
	2639	41080	10	16-QAM	1	0	23.26	0-1	1
	2639	41080	10	16-QAM	1	25	23.28	0-1	1
	2639	41080	10	16-QAM	1	49	22.99	0-1	1
	2639	41080	10	16-QAM	25	0	22.25	0-2	2
	2639	41080	10	16-QAM	25	12	22.29	0-2	2
	2639	41080	10	16-QAM	25	25	22.11	0-2	2
	2639	41080	10	16-QAM	50	0	22.20	0-2	2
High	2685	41540	10	QPSK	1	0	23.24	0	0
	2685	41540	10	QPSK	1	25	23.05	0	0
	2685	41540	10	QPSK	1	49	22.54	0	0
	2685	41540	10	QPSK	25	0	22.16	0-1	1
	2685	41540	10	QPSK	25	12	22.12	0-1	1
	2685	41540	10	QPSK	25	25	21.86	0-1	1
	2685	41540	10	QPSK	50	0	22.05	0-1	1
	2685	41540	10	16-QAM	1	0	22.50	0-1	1
	2685	41540	10	16-QAM	1	25	22.32	0-1	1
	2685	41540	10	16-QAM	1	49	22.09	0-1	1
	2685	41540	10	16-QAM	25	0	21.24	0-2	2
	2685	41540	10	16-QAM	25	12	21.22	0-2	2
	2685	41540	10	16-QAM	25	25	20.94	0-2	2
	2685	41540	10	16-QAM	50	0	21.16	0-2	2

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

	Frequency [MHz]	Channel	Bandwidth [MHz]	Modulation	RB Size	RB Offset	Conducted Power [dBm]	MPR Allowed per 3GPP [dB]	MPR [dB]
Low	2498.5	39675	5	QPSK	1	0	23.67	0	0
	2498.5	39675	5	QPSK	1	12	23.60	0	0
	2498.5	39675	5	QPSK	1	24	23.58	0	0
	2498.5	39675	5	QPSK	12	0	22.74	0-1	1
	2498.5	39675	5	QPSK	12	6	22.72	0-1	1
	2498.5	39675	5	QPSK	12	13	22.68	0-1	1
	2498.5	39675	5	QPSK	25	0	22.72	0-1	1
	2498.5	39675	5	16-QAM	1	0	22.96	0-1	1
	2498.5	39675	5	16-QAM	1	12	22.95	0-1	1
	2498.5	39675	5	16-QAM	1	24	22.88	0-1	1
	2498.5	39675	5	16-QAM	12	0	21.79	0-2	2
	2498.5	39675	5	16-QAM	12	6	21.80	0-2	2
	2498.5	39675	5	16-QAM	12	13	21.75	0-2	2
	2498.5	39675	5	16-QAM	25	0	21.80	0-2	2
	2545.75	40148	5	QPSK	1	0	23.70	0	0
	2545.75	40148	5	QPSK	1	12	23.66	0	0
Low Mid	2545.75	40148	5	QPSK	1	24	23.51	0	0
	2545.75	40148	5	QPSK	12	0	22.61	0-1	1
	2545.75	40148	5	QPSK	12	6	22.59	0-1	1
	2545.75	40148	5	QPSK	12	13	22.54	0-1	1
	2545.75	40148	5	QPSK	25	0	22.56	0-1	1
	2545.75	40148	5	16-QAM	1	0	22.60	0-1	1
	2545.75	40148	5	16-QAM	1	12	22.61	0-1	1
	2545.75	40148	5	16-QAM	1	24	22.50	0-1	1
	2545.75	40148	5	16-QAM	12	0	21.61	0-2	2
	2545.75	40148	5	16-QAM	12	6	21.63	0-2	2
	2545.75	40148	5	16-QAM	12	13	21.58	0-2	2
	2545.75	40148	5	16-QAM	25	0	21.53	0-2	2
	2593	40620	5	QPSK	1	0	24.00	0	0
	2593	40620	5	QPSK	1	12	23.86	0	0
	2593	40620	5	QPSK	1	24	23.86	0	0
Mid	2593	40620	5	QPSK	12	0	22.98	0-1	1
	2593	40620	5	QPSK	12	6	22.97	0-1	1
	2593	40620	5	QPSK	12	13	22.94	0-1	1
	2593	40620	5	QPSK	25	0	22.94	0-1	1
	2593	40620	5	16-QAM	1	0	23.31	0-1	1
	2593	40620	5	16-QAM	1	12	23.24	0-1	1
	2593	40620	5	16-QAM	1	24	23.27	0-1	1
	2593	40620	5	16-QAM	12	0	21.93	0-2	2
	2593	40620	5	16-QAM	12	6	21.96	0-2	2
	2593	40620	5	16-QAM	12	13	21.92	0-2	2
	2593	40620	5	16-QAM	25	0	21.91	0-2	2
	2640.25	41093	5	QPSK	1	0	24.11	0	0
	2640.25	41093	5	QPSK	1	12	23.94	0	0
	2640.25	41093	5	QPSK	1	24	23.80	0	0
	2640.25	41093	5	QPSK	12	0	23.19	0-1	1
Mid High	2640.25	41093	5	QPSK	12	6	23.15	0-1	1
	2640.25	41093	5	QPSK	12	13	23.05	0-1	1
	2640.25	41093	5	QPSK	25	0	23.11	0-1	1
	2640.25	41093	5	16-QAM	1	0	23.39	0-1	1
	2640.25	41093	5	16-QAM	1	12	23.27	0-1	1
	2640.25	41093	5	16-QAM	1	24	23.07	0-1	1
	2640.25	41093	5	16-QAM	12	0	22.24	0-2	2
	2640.25	41093	5	16-QAM	12	6	22.20	0-2	2
	2640.25	41093	5	16-QAM	12	13	22.11	0-2	2
	2640.25	41093	5	16-QAM	25	0	22.24	0-2	2
	2687.5	41565	5	QPSK	1	0	23.12	0	0
	2687.5	41565	5	QPSK	1	12	22.88	0	0
	2687.5	41565	5	QPSK	1	24	22.69	0	0
	2687.5	41565	5	QPSK	12	0	21.99	0-1	1
	2687.5	41565	5	QPSK	12	6	21.92	0-1	1
	2687.5	41565	5	QPSK	12	13	21.79	0-1	1
High	2687.5	41565	5	QPSK	25	0	21.90	0-1	1
	2687.5	41565	5	16-QAM	1	0	22.56	0-1	1
	2687.5	41565	5	16-QAM	1	12	22.36	0-1	1
	2687.5	41565	5	16-QAM	1	24	22.19	0-1	1
	2687.5	41565	5	16-QAM	12	0	21.15	0-2	2
	2687.5	41565	5	16-QAM	12	6	21.08	0-2	2
	2687.5	41565	5	16-QAM	12	13	20.96	0-2	2
	2687.5	41565	5	16-QAM	25	0	20.96	0-2	2

9.5 LTE Carrier Aggregation Conducted Powers

Table 9-42
LTE Carrier Aggregation Conducted Powers
– Band 41 (PCC) 20MHz BW + Band 41 (SCC) 20 MHz BW

Band 41 (PCC) 20 MHz BW + Band 41 (SCC) 20 MHz BW				
2636.5 MHz / ch.41055 + 2656.3 MHz / ch. 41253	PCC UL# RB	PCC UL RB Offset	LTE Rel 10 Tx.Power (dBm)	Rel. 8 Tx.Power (dBm)
	1	0	24.16	24.50

Notes:

1. The device does not support all Rel. 10 Carrier Aggregation features due to modem chipset limitation.
2. The device only supports downlink Carrier Aggregation. Uplink Carrier Aggregation is not supported. Power measurements were performed with two DL carriers for the Release 8 configuration that had the highest output power (across all bandwidths, channels and RB Configurations) for each band
3. This device supports intra-band CA with 2 carriers (B41+B41) with a maximum of 20 MHz of spectrum.
4. All control and acknowledge data is sent on uplink channels that operate identical to release 8 specifications.

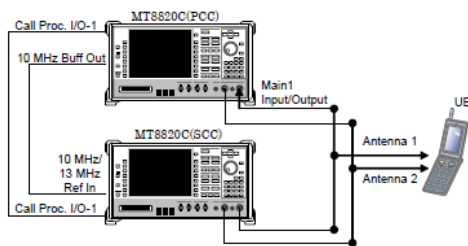


Figure 9-4
Power Measurement Setup

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9.6 WLAN Conducted Powers

Table 9-43
2.4 GHz Average RF Power – Antenna 1

Freq [MHz]	Channel	2.4GHz Conducted Power [dBm]
		IEEE Transmission Mode
		802.11b
2412	1	16.66
2437	6	16.93
2462	11	17.49

Table 9-44
2.4 GHz Average RF Power – Antenna 2

Freq [MHz]	Channel	2.4GHz Conducted Power [dBm]
		IEEE Transmission Mode
		802.11b
2412	1	17.30
2437	6	16.94
2462	11	17.10

Table 9-45
5 GHz (20 MHz Bandwidth) Average RF Power – Antenna 1

Freq [MHz]	Channel	5GHz (20MHz) Conducted Power [dBm]
		IEEE Transmission Mode
		802.11a
5180	36	14.49
5200	40	14.46
5220	44	13.44
5240	48	13.54
5260	52	13.52
5280	56	13.55
5300	60	13.55
5320	64	14.46
5500	100	14.17
5540	108	13.42
5580	116	14.05
5660	132	13.62
5745	149	13.72
5825	165	13.47

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Table 9-46
5 GHz (20 MHz Bandwidth) Average RF Power – Antenna 2

Freq [MHz]	Channel	5GHz (20MHz) Conducted Power [dBm]
		IEEE Transmission Mode
		802.11a
5180	36	13.89
5200	40	13.80
5220	44	13.85
5240	48	13.81
5260	52	13.57
5280	56	13.48
5300	60	13.38
5320	64	13.45
5500	100	13.58
5540	108	13.78
5580	116	14.12
5660	132	13.80
5745	149	13.81
5825	165	13.46

Justification for test configurations for WLAN per KDB Publication 248227 D01DR02-41929:

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

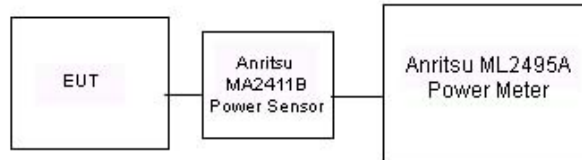


Figure 9-5
Power Measurement Setup

FCC ID: A3LSMG920P	 PCTEST ENGINEERING LABORATORY, INC.	SAR EVALUATION REPORT		Reviewed by: Quality Manager
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10 SYSTEM VERIFICATION

10.1 Tissue Verification

Table 10-1
Measured Tissue Properties

Calibrated for Tests Performed on:	Tissue Type	Tissue Temp During Calibration (C°)	Measured Frequency (MHz)	Measured Conductivity, σ (S/m)	Measured Dielectric Constant, ϵ	TARGET Conductivity, σ (S/m)	TARGET Dielectric Constant, ϵ	% dev σ	% dev ϵ
01/29/2015	750H	21.7	695	0.878	42.604	0.889	42.227	-1.24%	0.89%
			710	0.893	42.399	0.890	42.149	0.34%	0.59%
			725	0.906	42.221	0.891	42.071	1.68%	0.36%
			740	0.920	42.051	0.893	41.994	3.02%	0.14%
			755	0.935	41.892	0.894	41.916	4.59%	-0.06%
01/16/2015	835H	23.3	820	0.883	40.963	0.899	41.578	-1.78%	-1.48%
			835	0.897	40.801	0.900	41.500	-0.33%	-1.68%
			850	0.911	40.621	0.916	41.500	-0.55%	-2.12%
			820	0.917	43.652	0.899	41.578	2.00%	4.99%
01/19/2015	835H	22.0	835	0.933	43.439	0.900	41.500	3.67%	4.67%
			850	0.944	43.224	0.916	41.500	3.06%	4.15%
			820	0.895	41.442	0.899	41.578	-0.44%	-0.33%
01/31/2015	835H	21.1	835	0.914	41.238	0.900	41.500	1.56%	-0.63%
			850	0.925	41.020	0.916	41.500	0.98%	-1.16%
			1710	1.299	38.638	1.348	40.142	-3.64%	-3.75%
01/16/2015	1750H	22.7	1750	1.340	38.482	1.371	40.079	-2.26%	-3.98%
			1790	1.382	38.312	1.394	40.016	-0.86%	-4.26%
			1850	1.347	39.528	1.400	40.000	-3.79%	-1.18%
01/16/2015	1900H	21.9	1880	1.378	39.355	1.400	40.000	-1.57%	-1.61%
			1910	1.412	39.200	1.400	40.000	0.86%	-2.00%
			1850	1.333	39.659	1.400	40.000	-4.79%	-0.85%
02/06/2015	1900H	23.6	1880	1.365	39.522	1.400	40.000	-2.50%	-1.20%
			1910	1.395	39.379	1.400	40.000	-0.36%	-1.55%
			2401	1.794	40.670	1.756	39.287	2.16%	3.52%
01/20/2015	2450H	23.0	2450	1.849	40.470	1.800	39.200	2.72%	3.24%
			2499	1.903	40.278	1.853	39.138	2.70%	2.91%
			2600	1.972	40.382	1.964	39.009	0.41%	3.52%
02/05/2015	2600H	23.0	2650	2.022	40.199	2.018	38.945	0.20%	3.22%
			2700	2.063	40.025	2.073	38.882	0.48%	2.94%
			5280	4.877	35.739	4.737	35.894	2.96%	-0.43%
01/27/2015	5200H-5800H	22.8	5300	4.903	35.673	4.758	35.871	3.05%	-0.55%
			5320	4.920	35.637	4.778	35.849	2.97%	-0.59%
			5500	5.129	35.206	4.963	35.643	3.34%	-1.23%
			5580	5.236	34.988	5.045	35.551	3.79%	-1.58%
			5600	5.254	34.958	5.065	35.529	3.73%	-1.61%
			5745	5.430	34.635	5.214	35.363	4.14%	-2.06%
			5800	5.496	34.471	5.270	35.300	4.29%	-2.35%
			695	0.912	53.856	0.959	55.745	-4.90%	-3.39%
			710	0.926	53.688	0.960	55.687	-3.54%	-3.59%
			725	0.940	53.555	0.961	55.629	-2.19%	-3.73%
01/22/2015	750B	24.3	740	0.955	53.372	0.963	55.570	-0.83%	-3.96%
			755	0.968	53.254	0.964	55.512	0.41%	-4.07%
			820	0.989	53.432	0.969	55.258	2.06%	-3.30%
			835	1.004	53.289	0.970	55.200	3.51%	-3.46%
			850	1.018	53.128	0.988	55.154	3.04%	-3.67%
01/15/2015	835B	22.0	820	0.979	54.586	0.969	55.258	1.03%	-1.22%
			835	0.993	54.447	0.970	55.200	2.37%	-1.36%
			850	1.007	54.302	0.988	55.154	1.92%	-1.54%
01/19/2015	835B	22.6	1710	1.418	51.678	1.463	53.537	-3.08%	-3.47%
			1750	1.461	51.563	1.488	53.432	-1.81%	-3.50%
			1790	1.498	51.358	1.514	53.326	-1.06%	-3.69%
01/19/2015	1900B	21.8	1850	1.518	51.842	1.520	53.300	-0.13%	-2.74%
			1880	1.548	51.717	1.520	53.300	1.84%	-2.97%
			1910	1.583	51.570	1.520	53.300	4.14%	-3.25%
01/26/2015	1900B	21.8	1850	1.523	52.183	1.520	53.300	0.20%	-2.10%
			1880	1.555	52.108	1.520	53.300	2.30%	-2.24%
			1910	1.590	52.007	1.520	53.300	4.61%	-2.43%
01/29/2015	1900B	22.9	1850	1.494	52.412	1.520	53.300	-1.71%	-1.67%
			1880	1.527	52.312	1.520	53.300	0.46%	-1.85%
			1910	1.563	52.220	1.520	53.300	2.83%	-2.03%
02/06/2015	1900B	22.1	1850	1.525	52.464	1.520	53.300	0.33%	-1.57%
			1880	1.555	52.357	1.520	53.300	2.30%	-1.77%
			1910	1.591	52.250	1.520	53.300	4.67%	-1.97%
01/19/2015	2450B	22.8	2401	1.956	51.267	1.903	52.765	2.79%	-2.84%
			2450	2.031	51.040	1.950	52.700	4.15%	-3.15%
			2499	2.092	50.858	2.019	52.638	3.62%	-3.38%
02/02/2015	2600B	23.5	2600	2.160	52.058	2.163	52.509	-0.14%	-0.86%
			2650	2.222	51.839	2.234	52.445	-0.54%	-1.16%
			2700	2.295	51.691	2.305	52.382	-0.43%	-1.32%
01/19/2015	5200B-5800B	22.6	5280	5.500	48.179	5.393	48.906	1.98%	-1.49%
			5300	5.542	48.230	5.416	48.879	2.33%	-1.33%
			5320	5.582	48.064	5.439	48.851	2.63%	-1.61%
			5500	5.845	47.908	5.650	48.607	3.45%	-1.44%
			5580	5.899	47.646	5.743	48.499	2.72%	-1.76%
			5600	5.977	47.642	5.766	48.471	3.66%	-1.71%
			5745	6.176	47.389	5.936	48.275	4.04%	-1.84%
			5800	6.183	47.296	6.000	48.200	3.05%	-1.88%

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 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 $\pm 10\%$ 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 10-2
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} (%)
I	750	HEAD	01/29/2015	22.5	21.7	0.100	1054	3209	0.824	8.330	8.240	-1.08%
J	835	HEAD	01/16/2015	23.4	23.3	0.100	4d133	3022	0.915	9.200	9.150	-0.54%
D	835	HEAD	01/19/2015	23.1	23.0	0.100	4d133	3263	0.971	9.200	9.710	5.54%
D	835	HEAD	01/31/2015	22.9	21.1	0.100	4d133	3263	0.951	9.200	9.510	3.37%
I	1750	HEAD	01/16/2015	23.3	22.7	0.100	1008	3209	3.370	36.900	33.700	-8.67%
G	1900	HEAD	01/16/2015	24.2	22.8	0.100	5d149	3258	3.810	40.200	38.100	-5.22%
D	1900	HEAD	02/06/2015	24.9	23.0	0.100	5d149	3263	3.910	40.200	39.100	-2.74%
I	2450	HEAD	01/20/2015	21.9	23.0	0.100	719	3209	4.860	52.100	48.600	-6.72%
G	2600	HEAD	02/05/2015	24.3	22.5	0.100	1071	3258	5.840	57.500	58.400	1.57%
E	5300	HEAD	01/27/2015	24.3	21.8	0.100	1120	7308	7.910	83.400	79.100	-5.16%
E	5500	HEAD	01/27/2015	24.3	21.8	0.100	1120	7308	7.950	84.900	79.500	-6.36%
E	5600	HEAD	01/27/2015	24.4	21.8	0.100	1120	7308	8.150	82.200	81.500	-0.85%
E	5800	HEAD	01/27/2015	24.3	21.8	0.100	1120	7308	7.650	79.100	76.500	-3.29%
E	750	BODY	01/22/2015	23.2	23.4	0.100	1054	3332	0.855	8.640	8.550	-1.04%
K	835	BODY	01/19/2015	24.2	22.6	0.100	4d133	3288	0.972	9.350	9.720	3.96%
D	1750	BODY	01/19/2015	23.0	23.0	0.100	1008	3263	3.690	37.600	36.900	-1.86%
G	1900	BODY	01/19/2015	24.4	21.8	0.100	5d149	3258	3.950	40.400	39.500	-2.23%
G	1900	BODY	01/26/2015	23.9	22.0	0.100	5d149	3258	3.970	40.400	39.700	-1.73%
G	1900	BODY	01/29/2015	24.0	22.9	0.100	5d141	3258	4.080	40.600	40.800	0.49%
E	1900	BODY	02/06/2015	23.8	22.1	0.100	5d149	3332	4.130	40.400	41.300	2.23%
I	2450	BODY	01/19/2015	24.0	22.8	0.100	719	3209	5.150	51.800	51.500	-0.58%
I	2600	BODY	02/02/2015	23.0	23.6	0.100	1071	3209	5.970	56.900	59.700	4.92%
H	5300	BODY	01/19/2015	24.7	23.1	0.100	1191	3920	7.950	79.900	79.500	-0.50%
H	5500	BODY	01/19/2015	24.1	23.1	0.100	1191	3920	7.600	83.100	76.000	-8.54%
H	5600	BODY	01/19/2015	24.1	23.1	0.100	1191	3920	7.630	84.100	76.300	-9.27%
H	5800	BODY	01/19/2015	23.9	23.1	0.100	1191	3920	7.090	78.000	70.900	-9.10%

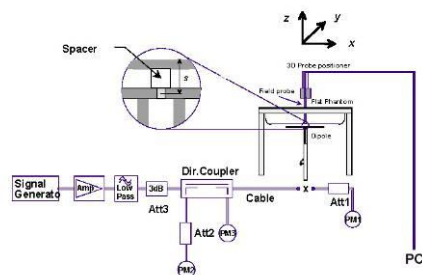


Figure 10-1
System Verification Setup Diagram



Figure 10-2
System Verification Setup Photo

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11 SAR DATA SUMMARY

11.1 Standalone Head SAR Data

Table 11-1
CDMA/EVDO BC10 (§90S) 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	Scaled SAR (1g)	Plot #
MHz	Ch.										(W/kg)		(W/kg)	
820.10	564	CDMA BC10 (§90S)	RC3 / SO55	25.0	24.39	0.01	Right	Cheek	08FCB	1:1	0.181	1.151	0.208	
820.10	564	CDMA BC10 (§90S)	RC3 / SO55	25.0	24.39	0.04	Right	Tilt	08FCB	1:1	0.121	1.151	0.139	
820.10	564	CDMA BC10 (§90S)	RC3 / SO55	25.0	24.39	-0.03	Left	Cheek	08FCB	1:1	0.175	1.151	0.201	
820.10	564	CDMA BC10 (§90S)	RC3 / SO55	25.0	24.39	0.09	Left	Tilt	08FCB	1:1	0.139	1.151	0.160	
820.10	564	CDMA BC10 (§90S)	EVDO Rev. A	25.0	24.33	-0.07	Right	Cheek	08FCB	1:1	0.208	1.167	0.243	A1
820.10	564	CDMA BC10 (§90S)	EVDO Rev. A	25.0	24.33	0.06	Right	Tilt	08FCB	1:1	0.133	1.167	0.155	
820.10	564	CDMA BC10 (§90S)	EVDO Rev. A	25.0	24.33	0.06	Left	Cheek	08FCB	1:1	0.190	1.167	0.222	
820.10	564	CDMA BC10 (§90S)	EVDO Rev. A	25.0	24.33	0.08	Left	Tilt	08FCB	1:1	0.146	1.167	0.170	
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
CDMA/EVDO BC0 (§22H) 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	Scaled SAR (1g)	Plot #
MHz	Ch.										(W/kg)		(W/kg)	
836.52	384	CDMA BC0 (§22H)	RC3 / SO55	25.0	24.92	0.03	Right	Cheek	08FCB	1:1	0.228	1.019	0.232	
836.52	384	CDMA BC0 (§22H)	RC3 / SO55	25.0	24.92	0.08	Right	Tilt	08FCB	1:1	0.154	1.019	0.157	
836.52	384	CDMA BC0 (§22H)	RC3 / SO55	25.0	24.92	0.13	Left	Cheek	08FCB	1:1	0.194	1.019	0.198	
836.52	384	CDMA BC0 (§22H)	RC3 / SO55	25.0	24.92	0.06	Left	Tilt	08FCB	1:1	0.155	1.019	0.158	
836.52	384	CDMA BC0 (§22H)	EVDO Rev. A	25.0	24.87	0.14	Right	Cheek	08FCB	1:1	0.233	1.030	0.240	A2
836.52	384	CDMA BC0 (§22H)	EVDO Rev. A	25.0	24.87	-0.09	Right	Tilt	08FCB	1:1	0.156	1.030	0.161	
836.52	384	CDMA BC0 (§22H)	EVDO Rev. A	25.0	24.87	-0.03	Left	Cheek	08FCB	1:1	0.199	1.030	0.205	
836.52	384	CDMA BC0 (§22H)	EVDO Rev. A	25.0	24.87	0.06	Left	Tilt	08FCB	1:1	0.148	1.030	0.152	
ANSI / IEEE C95.1 1992 - SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population							Head 1.6 W/kg (mW/g) averaged over 1 gram							

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Table 11-3
CDMA/EVDO BC1 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	Scaled SAR (1g)	Plot #
MHz	Ch.										(W/kg)		(W/kg)	
1851.25	25	PCS CDMA	RC3 / SO55	25.0	24.95	0.14	Right	Cheek	08FCF	1:1	0.212	1.012	0.215	
1851.25	25	PCS CDMA	RC3 / SO55	25.0	24.95	0.11	Right	Tilt	08FCF	1:1	0.137	1.012	0.139	
1851.25	25	PCS CDMA	RC3 / SO55	25.0	24.95	-0.08	Left	Cheek	08FCF	1:1	0.326	1.012	0.330	A3
1851.25	25	PCS CDMA	RC3 / SO55	25.0	24.95	0.05	Left	Tilt	08FCF	1:1	0.194	1.012	0.196	
1851.25	25	PCS CDMA	EVDO Rev. A	23.0	22.93	-0.01	Right	Cheek	08FD5	1:1	0.146	1.016	0.148	
1851.25	25	PCS CDMA	EVDO Rev. A	23.0	22.93	0.09	Right	Tilt	08FD5	1:1	0.048	1.016	0.049	
1851.25	25	PCS CDMA	EVDO Rev. A	23.0	22.93	0.10	Left	Cheek	08FD5	1:1	0.224	1.016	0.228	
1851.25	25	PCS CDMA	EVDO Rev. A	23.0	22.93	0.16	Left	Tilt	08FD5	1:1	0.055	1.016	0.056	
1851.25	25	PCS CDMA	EVDO Rev. A	25.0	24.93	0.13	Right	Cheek	08FCF	1:1	0.230	1.016	0.234	
1851.25	25	PCS CDMA	EVDO Rev. A	25.0	24.93	-0.02	Right	Tilt	08FCF	1:1	0.106	1.016	0.108	
1851.25	25	PCS CDMA	EVDO Rev. A	25.0	24.93	0.06	Left	Cheek	08FCF	1:1	0.296	1.016	0.301	
1851.25	25	PCS CDMA	EVDO Rev. A	25.0	24.93	0.18	Left	Tilt	08FCF	1:1	0.104	1.016	0.106	
ANSI / IEEE C95.1 1992 - SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population								Head 1.6 W/kg (mW/g) averaged over 1 gram						

Table 11-4
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	Scaled SAR (1g)	Plot #
MHz	Ch.											(W/kg)		(W/kg)	
836.60	190	GSM 850	GSM	33.0	32.86	0.01	Right	Cheek	08C6B	1	1:8.3	0.188	1.033	0.194	A4
836.60	190	GSM 850	GSM	33.0	32.86	0.04	Right	Tilt	08C6B	1	1:8.3	0.119	1.033	0.123	
836.60	190	GSM 850	GSM	33.0	32.86	0.04	Left	Cheek	08C6B	1	1:8.3	0.180	1.033	0.186	
836.60	190	GSM 850	GSM	33.0	32.86	0.06	Left	Tilt	08C6B	1	1:8.3	0.117	1.033	0.121	
ANSI / IEEE C95.1 1992 - SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population							Head 1.6 W/kg (mW/g) averaged over 1 gram								

Table 11-5
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	Scaled SAR (1g)	Plot #
MHz	Ch.											(W/kg)		(W/kg)	
1880.00	661	GSM 1900	GSM	30.5	29.76	-0.04	Right	Cheek	08C6B	1	1:8.3	0.071	1.186	0.084	
1880.00	661	GSM 1900	GSM	30.5	29.76	-0.02	Right	Tilt	08C6B	1	1:8.3	0.020	1.186	0.024	
1880.00	661	GSM 1900	GSM	30.5	29.76	0.04	Left	Cheek	08C6B	1	1:8.3	0.075	1.186	0.089	A5
1880.00	661	GSM 1900	GSM	30.5	29.76	0.07	Left	Tilt	08C6B	1	1:8.3	0.019	1.186	0.023	
ANSI / IEEE C95.1 1992 - SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population							Head 1.6 W/kg (mW/g) averaged over 1 gram								

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Table 11-6
UMTS 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	Scaled SAR (1g)	Plot #
MHz	Ch.										(W/kg)		(W/kg)	
836.60	4183	UMTS 850	RMC	24.5	23.93	0.04	Right	Cheek	08C6B	1:1	0.166	1.140	0.189	A6
836.60	4183	UMTS 850	RMC	24.5	23.93	0.07	Right	Tilt	08C6B	1:1	0.111	1.140	0.127	
836.60	4183	UMTS 850	RMC	24.5	23.93	0.03	Left	Cheek	08C6B	1:1	0.127	1.140	0.145	
836.60	4183	UMTS 850	RMC	24.5	23.93	0.13	Left	Tilt	08C6B	1:1	0.098	1.140	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 11-7
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	Scaled SAR (1g)	Plot #
MHz	Ch.										(W/kg)		(W/kg)	
1880.00	9400	UMTS 1900	RMC	24.5	23.58	0.07	Right	Cheek	08C6B	1:1	0.150	1.236	0.185	
1880.00	9400	UMTS 1900	RMC	24.5	23.58	0.12	Right	Tilt	08C6B	1:1	0.039	1.236	0.048	
1880.00	9400	UMTS 1900	RMC	24.5	23.58	-0.14	Left	Cheek	08C6B	1:1	0.184	1.236	0.227	A7
1880.00	9400	UMTS 1900	RMC	24.5	23.58	0.06	Left	Tilt	08C6B	1:1	0.036	1.236	0.044	
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 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	Scaled SAR (1g)	Plot #	
MHz	Ch.														(W/kg)		(W/kg)		
707.50	23095	Mid	LTE Band 12	10	24.5	24.37	0.12	0	Right	Cheek	QPSK	1	25	08FA6	1:1	0.142	1.030	0.146	
707.50	23095	Mid	LTE Band 12	10	23.5	23.15	0.03	1	Right	Cheek	QPSK	25	12	08FA6	1:1	0.116	1.084	0.126	
707.50	23095	Mid	LTE Band 12	10	24.5	24.37	0.03	0	Right	Tilt	QPSK	1	25	08FA6	1:1	0.080	1.030	0.082	
707.50	23095	Mid	LTE Band 12	10	23.5	23.15	0.05	1	Right	Tilt	QPSK	25	12	08FA6	1:1	0.064	1.084	0.069	
707.50	23095	Mid	LTE Band 12	10	24.5	24.37	0.04	0	Left	Cheek	QPSK	1	25	08FA6	1:1	0.176	1.030	0.181	A8
707.50	23095	Mid	LTE Band 12	10	23.5	23.15	0.06	1	Left	Cheek	QPSK	25	12	08FA6	1:1	0.131	1.084	0.142	
707.50	23095	Mid	LTE Band 12	10	24.5	24.37	0.08	0	Left	Tilt	QPSK	1	25	08FA6	1:1	0.100	1.030	0.103	
707.50	23095	Mid	LTE Band 12	10	23.5	23.15	0.01	1	Left	Tilt	QPSK	25	12	08FA6	1:1	0.084	1.084	0.091	
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 26 (Cell) Head SAR

MEASUREMENT RESULTS																			
FREQUENCY		Mode	Bandwidth [MHz]	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Power Drift [dB]	MPR [dB]	Side	Test Position	Modulation	RB Size	RB Offset	Device Serial Number	Duty Cycle	SAR (1g)	Scaling Factor	Scaled SAR (1g)	Plot #	
MHz	Ch.														(W/kg)		(W/kg)		
836.50	26915	Mid	LTE Band 26	15	24.5	24.45	0.03	0	Right	Cheek	QPSK	1	74	08FC4	1:1	0.213	1.012	0.216	A9
836.50	26915	Mid	LTE Band 26	15	23.5	23.36	0.05	1	Right	Cheek	QPSK	36	37	08FC4	1:1	0.171	1.033	0.177	
836.50	26915	Mid	LTE Band 26	15	24.5	24.45	0.10	0	Right	Tilt	QPSK	1	74	08FC4	1:1	0.136	1.012	0.138	
836.50	26915	Mid	LTE Band 26	15	23.5	23.36	0.05	1	Right	Tilt	QPSK	36	37	08FC4	1:1	0.109	1.033	0.113	
836.50	26915	Mid	LTE Band 26	15	24.5	24.45	0.01	0	Left	Cheek	QPSK	1	74	08FC4	1:1	0.158	1.012	0.160	
836.50	26915	Mid	LTE Band 26	15	23.5	23.36	0.00	1	Left	Cheek	QPSK	36	37	08FC4	1:1	0.136	1.033	0.140	
836.50	26915	Mid	LTE Band 26	15	24.5	24.45	0.05	0	Left	Tilt	QPSK	1	74	08FC4	1:1	0.131	1.012	0.133	
836.50	26915	Mid	LTE Band 26	15	23.5	23.36	0.04	1	Left	Tilt	QPSK	36	37	08FC4	1:1	0.111	1.033	0.115	
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 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	Scaled SAR (1g)	Plot #	
MHz	Ch.														(W/kg)	(W/kg)			
1732.50	20175	Mid	LTE Band 4 (AWS)	20	24.5	24.36	0.05	0	Right	Cheek	QPSK	1	0	08FA6	1:1	0.160	1.033	0.165	
1732.50	20175	Mid	LTE Band 4 (AWS)	20	23.5	22.91	0.00	1	Right	Cheek	QPSK	50	0	08FA6	1:1	0.134	1.146	0.154	
1732.50	20175	Mid	LTE Band 4 (AWS)	20	24.5	24.36	0.03	0	Right	Tilt	QPSK	1	0	08FA6	1:1	0.100	1.033	0.103	
1732.50	20175	Mid	LTE Band 4 (AWS)	20	23.5	22.91	0.01	1	Right	Tilt	QPSK	50	0	08FA6	1:1	0.078	1.146	0.089	
1732.50	20175	Mid	LTE Band 4 (AWS)	20	24.5	24.36	0.05	0	Left	Cheek	QPSK	1	0	08FA6	1:1	0.231	1.033	0.239	A10
1732.50	20175	Mid	LTE Band 4 (AWS)	20	23.5	22.91	0.00	1	Left	Cheek	QPSK	50	0	08FA6	1:1	0.172	1.146	0.197	
1732.50	20175	Mid	LTE Band 4 (AWS)	20	24.5	24.36	0.05	0	Left	Tilt	QPSK	1	0	08FA6	1:1	0.037	1.033	0.038	
1732.50	20175	Mid	LTE Band 4 (AWS)	20	23.5	22.91	0.06	1	Left	Tilt	QPSK	50	0	08FA6	1:1	0.031	1.146	0.036	
1732.50	20175	Mid	LTE Band 4 (AWS)	20	22.5	22.16	0.09	0	Right	Cheek	QPSK	1	99	08FD5	1:1	0.144	1.081	0.156	
1732.50	20175	Mid	LTE Band 4 (AWS)	20	21.5	20.98	0.09	1	Right	Cheek	QPSK	50	50	08FD5	1:1	0.135	1.127	0.152	
1732.50	20175	Mid	LTE Band 4 (AWS)	20	22.5	22.16	0.06	0	Right	Tilt	QPSK	1	99	08FD5	1:1	0.092	1.081	0.099	
1732.50	20175	Mid	LTE Band 4 (AWS)	20	21.5	20.98	-0.01	1	Right	Tilt	QPSK	50	50	08FD5	1:1	0.067	1.127	0.076	
1732.50	20175	Mid	LTE Band 4 (AWS)	20	22.5	22.16	-0.05	0	Left	Cheek	QPSK	1	99	08FD5	1:1	0.179	1.081	0.193	
1732.50	20175	Mid	LTE Band 4 (AWS)	20	21.5	20.98	0.04	1	Left	Cheek	QPSK	50	50	08FD5	1:1	0.154	1.127	0.174	
1732.50	20175	Mid	LTE Band 4 (AWS)	20	22.5	22.16	0.02	0	Left	Tilt	QPSK	1	99	08FD5	1:1	0.040	1.081	0.043	
1732.50	20175	Mid	LTE Band 4 (AWS)	20	21.5	20.98	0.07	1	Left	Tilt	QPSK	50	50	08FD5	1:1	0.031	1.127	0.035	
ANSI / IEEE C95.1 1992 - SAFETY LIMIT Spatial Peak									Head 1.6 W/kg (mW/g)										
Uncontrolled Exposure/General Population									averaged over 1 gram										

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

MEASUREMENT RESULTS																			
FREQUENCY		Mode	Bandwidth [MHz]	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Power Drift [dB]	MPR [dB]	Side	Test Position	Modulation	RB Size	RB Offset	Device Serial Number	Duty Cycle	SAR (1g)	Scaling Factor	Scaled SAR (1g)	Plot #	
MHz	Ch.														(W/kg)		(W/kg)		
1860.00	26140	Low	LTE Band 25 (PCS)	20	24.5	24.50	-0.05	0	Right	Cheek	QPSK	1	50	08FA6	1:1	0.425	1.000	0.425	
1860.00	26140	Low	LTE Band 25 (PCS)	20	23.5	23.50	-0.05	1	Right	Cheek	QPSK	50	0	08FA6	1:1	0.346	1.000	0.346	
1860.00	26140	Low	LTE Band 25 (PCS)	20	24.5	24.50	0.00	0	Right	Tilt	QPSK	1	50	08FA6	1:1	0.164	1.000	0.164	
1860.00	26140	Low	LTE Band 25 (PCS)	20	23.5	23.50	0.06	1	Right	Tilt	QPSK	50	0	08FA6	1:1	0.129	1.000	0.129	
1860.00	26140	Low	LTE Band 25 (PCS)	20	24.5	24.50	-0.02	0	Left	Cheek	QPSK	1	50	08FA6	1:1	0.440	1.000	0.440	A11
1860.00	26140	Low	LTE Band 25 (PCS)	20	23.5	23.50	0.20	1	Left	Cheek	QPSK	50	0	08FA6	1:1	0.354	1.000	0.354	
1860.00	26140	Low	LTE Band 25 (PCS)	20	24.5	24.50	0.04	0	Left	Tilt	QPSK	1	50	08FA6	1:1	0.175	1.000	0.175	
1860.00	26140	Low	LTE Band 25 (PCS)	20	23.5	23.50	0.08	1	Left	Tilt	QPSK	50	0	08FA6	1:1	0.141	1.000	0.141	
1860.00	26140	Low	LTE Band 25 (PCS)	20	22.5	22.34	0.06	0	Right	Cheek	QPSK	1	50	08FDB	1:1	0.203	1.038	0.211	
1860.00	26140	Low	LTE Band 25 (PCS)	20	21.5	21.37	0.05	1	Right	Cheek	QPSK	50	0	08FDB	1:1	0.191	1.030	0.197	
1860.00	26140	Low	LTE Band 25 (PCS)	20	22.5	22.34	0.02	0	Right	Tilt	QPSK	1	50	08FDB	1:1	0.048	1.038	0.050	
1860.00	26140	Low	LTE Band 25 (PCS)	20	21.5	21.37	0.06	1	Right	Tilt	QPSK	50	0	08FDB	1:1	0.051	1.030	0.053	
1860.00	26140	Low	LTE Band 25 (PCS)	20	22.5	22.34	0.08	0	Left	Cheek	QPSK	1	50	08FDB	1:1	0.102	1.038	0.106	
1860.00	26140	Low	LTE Band 25 (PCS)	20	21.5	21.37	0.09	1	Left	Cheek	QPSK	50	0	08FDB	1:1	0.099	1.030	0.102	
1860.00	26140	Low	LTE Band 25 (PCS)	20	22.5	22.34	0.14	0	Left	Tilt	QPSK	1	50	08FDB	1:1	0.035	1.038	0.036	
1860.00	26140	Low	LTE Band 25 (PCS)	20	21.5	21.37	0.14	1	Left	Tilt	QPSK	50	0	08FDB	1:1	0.032	1.030	0.033	
ANSI / IEEE C95.1 1992 - SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population									Head 1.6 W/kg (mW/g) averaged over 1 gram										

FCC ID: A3LSMG920P		SAR EVALUATION REPORT		Reviewed by: Quality Manager
Document S/N: 0Y1501190127.A3L	Test Dates: 01/15/15 - 02/06/15	DUT Type: Portable Handset		Page 72 of 95

Table 11-12
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	Scaled SAR (1g)	Plot #	
MHz	Ch.														(W/kg)		(W/kg)		
2636.50	41055	Mid-High	LTE Band 41	20	24.5	24.50	0.08	0	Right	Cheek	QPSK	1	0	12D77	1:1.58	0.062	1.000	0.062	A12
2636.50	41055	Mid-High	LTE Band 41	20	23.5	23.50	0.13	1	Right	Cheek	QPSK	50	0	12D77	1:1.58	0.046	1.000	0.046	
2636.50	41055	Mid-High	LTE Band 41	20	24.5	24.50	0.06	0	Right	Tilt	QPSK	1	0	12D77	1:1.58	0.016	1.000	0.016	
2636.50	41055	Mid-High	LTE Band 41	20	23.5	23.50	0.19	1	Right	Tilt	QPSK	50	0	12D77	1:1.58	0.012	1.000	0.012	
2636.50	41055	Mid-High	LTE Band 41	20	24.5	24.50	0.04	0	Left	Cheek	QPSK	1	0	12D77	1:1.58	0.021	1.000	0.021	
2636.50	41055	Mid-High	LTE Band 41	20	23.5	23.50	0.05	1	Left	Cheek	QPSK	50	0	12D77	1:1.58	0.015	1.000	0.015	
2636.50	41055	Mid-High	LTE Band 41	20	24.5	24.50	0.05	0	Left	Tilt	QPSK	1	0	12D77	1:1.58	0.023	1.000	0.023	
2636.50	41055	Mid-High	LTE Band 41	20	23.5	23.50	0.06	1	Left	Tilt	QPSK	50	0	12D77	1:1.58	0.017	1.000	0.017	
ANSI / IEEE C95.1 1992 - SAFETY LIMIT										Head									
Spatial Peak										1.6 W/kg (mW/g)									
Uncontrolled Exposure/General Population										averaged over 1 gram									

Table 11-13
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)	Scaled SAR (1g)	Plot #
MHz	Ch.													W/kg				(W/kg)	
2462	11	802.11b	DSSS	22	17.5	17.49	0.01	Right	Cheek	1	08FA2	1	99.95	0.042	0.055	1.002	1.001	0.055	
2462	11	802.11b	DSSS	22	17.5	17.49		Right	Tilt	1	08FA2	1	99.95	0.016	-	1.002	1.001	-	
2462	11	802.11b	DSSS	22	17.5	17.49		Left	Cheek	1	08FA2	1	99.95	0.009	-	1.002	1.001	-	
2462	11	802.11b	DSSS	22	17.5	17.49		Left	Tilt	1	08FA2	1	99.95	0.006	-	1.002	1.001	-	
2412	1	802.11b	DSSS	22	17.5	17.30		Right	Cheek	2	08FA2	1	99.27	0.259	-	1.047	1.007	-	
2412	1	802.11b	DSSS	22	17.5	17.30		Right	Tilt	2	08FA2	1	99.27	0.134	-	1.047	1.007	-	
2412	1	802.11b	DSSS	22	17.5	17.30	-0.01	Left	Cheek	2	08FA2	1	99.27	0.840	0.666	1.047	1.007	0.702	A13
2412	1	802.11b	DSSS	22	17.5	17.30	0.02	Left	Tilt	2	08FA2	1	99.27	0.338	0.260	1.047	1.007	0.274	
ANSI / IEEE C95.1 1992 - SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population										Head 1.6 W/kg (mW/g) averaged over 1 gram									

Table 11-14
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)	Scaled SAR (1g) (W/kg)	Plot #
MHz	Ch.													W/kg	(W/kg)				
5320	64	802.11a	OFDM	20	14.5	14.46	0.07	Right	Cheek	1	08FA2	6	98.96	0.325	0.144	1.009	1.011	0.147	
5320	64	802.11a	OFDM	20	14.5	14.46		Right	Tilt	1	08FA2	6	98.96	0.268	-	1.009	1.011	-	
5320	64	802.11a	OFDM	20	14.5	14.46		Left	Cheek	1	08FA2	6	98.96	0.225	-	1.009	1.011	-	
5320	64	802.11a	OFDM	20	14.5	14.46		Left	Tilt	1	08FA2	6	98.96	0.209	-	1.009	1.011	-	
5280	56	802.11a	OFDM	20	14.5	13.48		Right	Cheek	2	08FA2	6	98.60	0.006	-	1.265	1.014	-	
5280	56	802.11a	OFDM	20	14.5	13.48		Right	Tilt	2	08FA2	6	98.60	0.005	-	1.265	1.014	-	
5280	56	802.11a	OFDM	20	14.5	13.48	0.06	Left	Cheek	2	08FA2	6	98.60	0.016	0.007	1.265	1.014	0.009	
5280	56	802.11a	OFDM	20	14.5	13.48		Left	Tilt	2	08FA2	6	98.60	0.005	-	1.265	1.014	-	
5500	100	802.11a	OFDM	20	14.5	14.17	0.03	Right	Cheek	1	08FA2	6	98.96	0.552	0.251	1.079	1.011	0.274	
5500	100	802.11a	OFDM	20	14.5	14.17		Right	Tilt	1	08FA2	6	98.96	0.416	-	1.079	1.011	-	
5500	100	802.11a	OFDM	20	14.5	14.17		Left	Cheek	1	08FA2	6	98.96	0.217	-	1.079	1.011	-	
5500	100	802.11a	OFDM	20	14.5	14.17		Left	Tilt	1	08FA2	6	98.96	0.208	-	1.079	1.011	-	
5580	116	802.11a	OFDM	20	14.5	14.12		Right	Cheek	2	08FA2	6	98.60	0.016	-	1.091	1.014	-	
5580	116	802.11a	OFDM	20	14.5	14.12		Right	Tilt	2	08FA2	6	98.60	0.015	-	1.091	1.014	-	
5580	116	802.11a	OFDM	20	14.5	14.12	0.04	Left	Cheek	2	08FA2	6	98.60	0.027	0.008	1.091	1.014	0.009	
5580	116	802.11a	OFDM	20	14.5	14.12		Left	Tilt	2	08FA2	6	98.60	0.016	-	1.091	1.014	-	
5745	149	802.11a	OFDM	20	14.5	13.72	0.01	Right	Cheek	1	08FA2	6	98.96	0.774	0.457	1.197	1.011	0.553	A14
5745	149	802.11a	OFDM	20	14.5	13.72	0.01	Right	Tilt	1	08FA2	6	98.96	0.679	0.365	1.197	1.011	0.442	
5745	149	802.11a	OFDM	20	14.5	13.72		Left	Cheek	1	08FA2	6	98.96	0.586	-	1.197	1.011	-	
5745	149	802.11a	OFDM	20	14.5	13.72		Left	Tilt	1	08FA2	6	98.96	0.500	-	1.197	1.011	-	
5745	149	802.11a	OFDM	20	14.5	13.81		Right	Cheek	2	08FA2	6	98.60	0.041	-	1.172	1.014	-	
5745	149	802.11a	OFDM	20	14.5	13.81		Right	Tilt	2	08FA2	6	98.60	0.037	-	1.172	1.014	-	
5745	149	802.11a	OFDM	20	14.5	13.81		Left	Cheek	2	08FA2	6	98.60	0.041	-	1.172	1.014	-	
5745	149	802.11a	OFDM	20	14.5	13.81	0.02	Left	Tilt	2	08FA2	6	98.60	0.042	0.017	1.172	1.014	0.020	
ANSI / IEEE C95.1 1992 - SAFETY LIMIT									Head										
Spatial Peak									1.6 W/kg (mW/g)										
Uncontrolled Exposure/General Population									averaged over 1 gram										

FCC ID: A3LSMG920P		SAR EVALUATION REPORT		Reviewed by: Quality Manager
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11.2 Standalone Body-Worn SAR Data

Table 11-15
CDMA/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	Scaled SAR (1g)	Plot #
MHz	Ch.											(W/kg)		(W/kg)	
820.10	564	CDMA BC10 (§90S)	TDSO / SO32	25.0	24.40	0.03	10 mm	08FC8	N/A	1:1	back	0.341	1.148	0.391	A15
836.52	384	CDMA BC0 (§22H)	TDSO / SO32	25.0	24.92	0.00	10 mm	08FC8	N/A	1:1	back	0.409	1.019	0.417	A17
1880.00	600	PCS CDMA	TDSO / SO32	25.0	24.47	-0.03	15 mm	08FCF	N/A	1:1	back	0.501	1.130	0.566	A19
836.60	190	GSM 850	GSM	33.0	32.86	0.01	10 mm	08C68	1	1:8.3	back	0.327	1.033	0.338	A21
1880.00	661	GSM 1900	GSM	30.5	29.76	0.05	10 mm	08C68	1	1:8.3	back	0.218	1.186	0.259	A23
836.60	4183	UMTS 850	RMC	24.5	23.93	-0.01	10 mm	08C6B	N/A	1:1	back	0.339	1.140	0.386	A25
1880.00	9400	UMTS 1900	RMC	24.5	23.58	0.02	15 mm	08C6B	N/A	1:1	back	0.384	1.236	0.475	A26
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
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) (W/kg)	Scaling Factor	Scaled SAR (1g) (W/kg)	Plot #	
MHz	Ch.																		
707.50	23095	Mid	LTE Band 12	10	24.5	24.37	-0.03	0	08FC4	QPSK	1	25	10 mm	back	1:1	0.346	1.030	0.356	A28
707.50	23095	Mid	LTE Band 12	10	23.5	23.15	0.02	1	08FC4	QPSK	25	12	10 mm	back	1:1	0.274	1.084	0.297	
836.50	26915	Mid	LTE Band 26	15	24.5	24.45	0.00	0	08FC4	QPSK	1	74	10 mm	back	1:1	0.409	1.012	0.414	A29
836.50	26915	Mid	LTE Band 26	15	23.5	23.36	-0.03	1	08FC4	QPSK	36	37	10 mm	back	1:1	0.325	1.033	0.336	
1732.50	20175	Mid	LTE Band 4 (AWS)	20	24.5	24.36	-0.09	0	08FA6	QPSK	1	0	15 mm	back	1:1	0.485	1.033	0.501	A30
1732.50	20175	Mid	LTE Band 4 (AWS)	20	23.5	22.91	-0.02	1	08FA6	QPSK	50	0	15 mm	back	1:1	0.377	1.146	0.432	
1860.00	26140	Low	LTE Band 25 (PCS)	20	24.5	24.50	-0.03	0	08FA6	QPSK	1	50	15 mm	back	1:1	0.776	1.000	0.776	A32
1860.00	26140	Low	LTE Band 25 (PCS)	20	23.5	23.50	-0.07	1	08FA6	QPSK	50	0	15 mm	back	1:1	0.611	1.000	0.611	
2636.50	41055	Mid-High	LTE Band 41	20	24.5	24.50	0.00	0	12D77	QPSK	1	0	10 mm	back	1:1.58	0.172	1.000	0.172	A34
2636.50	41055	Mid-High	LTE Band 41	20	23.5	23.50	0.08	1	12D77	QPSK	50	0	10 mm	back	1:1.58	0.134	1.000	0.134	
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
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)	Scaled SAR (1g)	Plot #
MHz	Ch.													W/kg	(W/kg)			(W/kg)	
2462	11	802.11b	DSSS	22	17.5	17.49	0.05	10 mm	1	08FA2	1	back	99.95	0.023	0.016	1.002	1.001	0.016	
2412	1	802.11b	DSSS	22	17.5	17.30	0.10	10 mm	2	08FA2	1	back	99.27	0.059	0.048	1.047	1.007	0.050	A35
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 11-18
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)	Scaled SAR (1g)	Plot #
MHz	Ch.													W/kg	(W/kg)		(W/kg)		
5320	64	802.11a	OFDM	20	14.5	14.46	0.02	10 mm	1	08FA2	6	back	98.96	0.085	0.035	1.009	1.011	0.035	
5280	56	802.11a	OFDM	20	14.5	13.48	0.00	10 mm	2	08FA2	6	back	98.60	0.047	0.018	1.265	1.014	0.023	
5500	100	802.11a	OFDM	20	14.5	14.17	0.04	10 mm	1	08FA2	6	back	98.96	0.118	0.051	1.079	1.011	0.056	
5580	116	802.11a	OFDM	20	14.5	14.12	-0.05	10 mm	2	08FA2	6	back	98.60	0.214	0.103	1.091	1.014	0.114	A37
5745	149	802.11a	OFDM	20	14.5	13.72	0.00	10 mm	1	08FA2	6	back	98.96	0.061	0.026	1.197	1.011	0.031	
5745	149	802.11a	OFDM	20	14.5	13.81	0.07	10 mm	2	08FA2	6	back	98.96	0.232	0.100	1.172	1.011	0.119	
ANSI / IEEE C95.1 1992 - SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population								Body 1.6 W/kg (mW/g) averaged over 1 gram											

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11.3 Standalone Wireless Router SAR Data

Table 11-19
EVDO/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	Scaled SAR (1g)	Plot #
MHz	Ch.											(W/kg)		(W/kg)	
820.10	564	CDMA BC10 (§90S)	EVDO Rev. 0	25.0	24.37	0.04	10 mm	08FC8	N/A	1:1	back	0.342	1.156	0.395	
820.10	564	CDMA BC10 (§90S)	EVDO Rev. 0	25.0	24.37	0.01	10 mm	08FC8	N/A	1:1	front	0.318	1.156	0.368	
820.10	564	CDMA BC10 (§90S)	EVDO Rev. 0	25.0	24.37	0.12	10 mm	08FC8	N/A	1:1	bottom	0.097	1.156	0.112	
820.10	564	CDMA BC10 (§90S)	EVDO Rev. 0	25.0	24.37	0.02	10 mm	08FC8	N/A	1:1	right	0.083	1.156	0.096	
820.10	564	CDMA BC10 (§90S)	EVDO Rev. 0	25.0	24.37	0.05	10 mm	08FC8	N/A	1:1	left	0.355	1.156	0.410	A16
836.52	384	CDMA BC0 (§22H)	EVDO Rev. 0	25.0	24.88	0.02	10 mm	08FC8	N/A	1:1	back	0.411	1.028	0.423	A18
836.52	384	CDMA BC0 (§22H)	EVDO Rev. 0	25.0	24.88	-0.02	10 mm	08FC8	N/A	1:1	front	0.325	1.028	0.334	
836.52	384	CDMA BC0 (§22H)	EVDO Rev. 0	25.0	24.88	-0.03	10 mm	08FC8	N/A	1:1	bottom	0.171	1.028	0.176	
836.52	384	CDMA BC0 (§22H)	EVDO Rev. 0	25.0	24.88	0.05	10 mm	08FC8	N/A	1:1	right	0.109	1.028	0.112	
836.52	384	CDMA BC0 (§22H)	EVDO Rev. 0	25.0	24.88	0.04	10 mm	08FC8	N/A	1:1	left	0.315	1.028	0.324	
1851.25	25	PCS CDMA	EVDO Rev. 0	23.0	22.99	0.17	10 mm	08FD5	N/A	1:1	back	0.547	1.002	0.548	
1851.25	25	PCS CDMA	EVDO Rev. 0	23.0	22.99	-0.02	10 mm	08FD5	N/A	1:1	front	0.584	1.002	0.585	
1851.25	25	PCS CDMA	EVDO Rev. 0	23.0	22.99	0.12	10 mm	08FD5	N/A	1:1	bottom	0.718	1.002	0.719	A20
1851.25	25	PCS CDMA	EVDO Rev. 0	23.0	22.99	0.04	10 mm	08FD5	N/A	1:1	right	0.046	1.002	0.046	
1851.25	25	PCS CDMA	EVDO Rev. 0	23.0	22.99	-0.03	10 mm	08FD5	N/A	1:1	left	0.215	1.002	0.215	
836.60	190	GSM 850	GPRS	30.5	30.10	-0.16	10 mm	08C68	4	1:2.076	back	0.727	1.096	0.797	A22
836.60	190	GSM 850	GPRS	30.5	30.10	0.07	10 mm	08C68	4	1:2.076	front	0.539	1.096	0.591	
836.60	190	GSM 850	GPRS	30.5	30.10	-0.02	10 mm	08C68	4	1:2.076	bottom	0.188	1.096	0.206	
836.60	190	GSM 850	GPRS	30.5	30.10	-0.05	10 mm	08C68	4	1:2.076	right	0.651	1.096	0.713	
836.60	190	GSM 850	GPRS	30.5	30.10	0.05	10 mm	08C68	4	1:2.076	left	0.670	1.096	0.734	
1850.20	512	GSM 1900	GPRS	26.5	25.74	-0.05	10 mm	08C68	4	1:2.076	back	0.293	1.191	0.349	
1850.20	512	GSM 1900	GPRS	26.5	25.74	0.01	10 mm	08C68	4	1:2.076	front	0.285	1.191	0.339	
1850.20	512	GSM 1900	GPRS	26.5	25.74	-0.02	10 mm	08C68	4	1:2.076	bottom	0.469	1.191	0.559	A24
1850.20	512	GSM 1900	GPRS	26.5	25.74	0.07	10 mm	08C68	4	1:2.076	right	0.018	1.191	0.022	
1850.20	512	GSM 1900	GPRS	26.5	25.74	-0.06	10 mm	08C68	4	1:2.076	left	0.087	1.191	0.104	
836.60	4183	UMTS 850	RMC	24.5	23.93	-0.01	10 mm	08C6B	N/A	1:1	back	0.339	1.140	0.386	A25
836.60	4183	UMTS 850	RMC	24.5	23.93	0.00	10 mm	08C6B	N/A	1:1	front	0.269	1.140	0.307	
836.60	4183	UMTS 850	RMC	24.5	23.93	-0.03	10 mm	08C6B	N/A	1:1	bottom	0.142	1.140	0.162	
836.60	4183	UMTS 850	RMC	24.5	23.93	-0.02	10 mm	08C6B	N/A	1:1	right	0.329	1.140	0.375	
836.60	4183	UMTS 850	RMC	24.5	23.93	-0.02	10 mm	08C6B	N/A	1:1	left	0.196	1.140	0.223	
1880.00	9400	UMTS 1900	RMC	22.5	21.37	-0.03	10 mm	08FDB	N/A	1:1	back	0.551	1.297	0.715	
1880.00	9400	UMTS 1900	RMC	22.5	21.37	0.00	10 mm	08FDB	N/A	1:1	front	0.315	1.297	0.409	
1852.40	9262	UMTS 1900	RMC	22.5	21.59	0.05	10 mm	08FDB	N/A	1:1	bottom	0.618	1.233	0.762	
1880.00	9400	UMTS 1900	RMC	22.5	21.37	-0.06	10 mm	08FDB	N/A	1:1	bottom	0.645	1.297	0.837	
1907.60	9538	UMTS 1900	RMC	22.5	21.49	-0.03	10 mm	08FDB	N/A	1:1	bottom	0.721	1.262	0.910	A27
1880.00	9400	UMTS 1900	RMC	22.5	21.37	0.20	10 mm	08FDB	N/A	1:1	right	0.043	1.297	0.056	
1880.00	9400	UMTS 1900	RMC	22.5	21.37	-0.02	10 mm	08FDB	N/A	1:1	left	0.207	1.297	0.268	
ANSI / IEEE C95.1 1992 - SAFETY LIMIT							Body								
Spatial Peak							1.6 W/kg (mW/g)								
Uncontrolled Exposure/General Population							averaged over 1 gram								

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Table 11-20
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	Scaled SAR (1g)	Plot #	
MHz	Ch.														(W/kg)		(W/kg)		
707.50	23095	Mid	LTE Band 12	10	24.5	24.37	-0.03	0	08FC4	QPSK	1	25	10 mm	back	1:1	0.346	1.030	0.356	A28
707.50	23095	Mid	LTE Band 12	10	23.5	23.15	0.02	1	08FC4	QPSK	25	12	10 mm	back	1:1	0.274	1.084	0.297	
707.50	23095	Mid	LTE Band 12	10	24.5	24.37	0.00	0	08FC4	QPSK	1	25	10 mm	front	1:1	0.309	1.030	0.318	
707.50	23095	Mid	LTE Band 12	10	23.5	23.15	0.03	1	08FC4	QPSK	25	12	10 mm	front	1:1	0.240	1.084	0.260	
707.50	23095	Mid	LTE Band 12	10	24.5	24.37	0.04	0	08FC4	QPSK	1	25	10 mm	bottom	1:1	0.100	1.030	0.103	
707.50	23095	Mid	LTE Band 12	10	23.5	23.15	-0.04	1	08FC4	QPSK	25	12	10 mm	bottom	1:1	0.077	1.084	0.083	
707.50	23095	Mid	LTE Band 12	10	24.5	24.37	-0.02	0	08FC4	QPSK	1	25	10 mm	right	1:1	0.165	1.030	0.170	
707.50	23095	Mid	LTE Band 12	10	23.5	23.15	0.03	1	08FC4	QPSK	25	12	10 mm	right	1:1	0.135	1.084	0.146	
707.50	23095	Mid	LTE Band 12	10	24.5	24.37	0.05	0	08FC4	QPSK	1	25	10 mm	left	1:1	0.185	1.030	0.191	
707.50	23095	Mid	LTE Band 12	10	23.5	23.15	-0.02	1	08FC4	QPSK	25	12	10 mm	left	1:1	0.140	1.084	0.152	
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 26 (Cell) Hotspot SAR

MEASUREMENT RESULTS																			
FREQUENCY		Mode	Bandwidth [MHz]	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Power Drift [dB]	MPR [dB]	Device Serial Number	Modulation	RB Size	RB Offset	Spacing	Side	Duty Cycle	SAR (1g)	Scaling Factor	Scaled SAR (1g)	Plot	
MHz	Ch.														(W/kg)		(W/kg)		
836.50	26915	Mid	LTE Band 26	15	24.5	24.45	0.00	0	08FC4	QPSK	1	74	10 mm	back	1:1	0.409	1.012	0.414	A29
836.50	26915	Mid	LTE Band 26	15	23.5	23.36	-0.03	1	08FC4	QPSK	36	37	10 mm	back	1:1	0.325	1.033	0.336	
836.50	26915	Mid	LTE Band 26	15	24.5	24.45	-0.01	0	08FC4	QPSK	1	74	10 mm	front	1:1	0.342	1.012	0.346	
836.50	26915	Mid	LTE Band 26	15	23.5	23.36	-0.04	1	08FC4	QPSK	36	37	10 mm	front	1:1	0.273	1.033	0.282	
836.50	26915	Mid	LTE Band 26	15	24.5	24.45	-0.01	0	08FC4	QPSK	1	74	10 mm	bottom	1:1	0.162	1.012	0.164	
836.50	26915	Mid	LTE Band 26	15	23.5	23.36	-0.06	1	08FC4	QPSK	36	37	10 mm	bottom	1:1	0.131	1.033	0.135	
836.50	26915	Mid	LTE Band 26	15	24.5	24.45	0.13	0	08FC4	QPSK	1	74	10 mm	right	1:1	0.369	1.012	0.373	
836.50	26915	Mid	LTE Band 26	15	23.5	23.36	0.02	1	08FC4	QPSK	36	37	10 mm	right	1:1	0.291	1.033	0.301	
836.50	26915	Mid	LTE Band 26	15	24.5	24.45	-0.10	0	08FC4	QPSK	1	74	10 mm	left	1:1	0.273	1.012	0.276	
836.50	26915	Mid	LTE Band 26	15	23.5	23.36	0.07	1	08FC4	QPSK	36	37	10 mm	left	1:1	0.234	1.033	0.242	
ANSI / IEEE C95.1 1992 - SAFETY LIMIT								Body											
Spatial Peak								1.6 W/kg (mW/g)											
Uncontrolled Exposure/General Population								averaged over 1 gram											

Table 11-22
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	Scaled SAR (1g)	Plot #	
MHz	Ch.														(W/kg)		(W/kg)		
1732.50	20175	Mid	LTE Band 4 (AWS)	20	22.5	22.16	0.06	0	08FD5	QPSK	1	99	10 mm	back	1:1	0.796	1.081	0.860	
1732.50	20175	Mid	LTE Band 4 (AWS)	20	21.5	20.98	0.03	1	08FD5	QPSK	50	50	10 mm	back	1:1	0.582	1.127	0.656	
1732.50	20175	Mid	LTE Band 4 (AWS)	20	21.5	20.96	0.02	1	08FD5	QPSK	100	0	10 mm	back	1:1	0.537	1.132	0.608	
1732.50	20175	Mid	LTE Band 4 (AWS)	20	22.5	22.16	-0.01	0	08FD5	QPSK	1	99	10 mm	front	1:1	0.632	1.081	0.683	
1732.50	20175	Mid	LTE Band 4 (AWS)	20	21.5	20.98	-0.04	1	08FD5	QPSK	50	50	10 mm	front	1:1	0.459	1.127	0.517	
1732.50	20175	Mid	LTE Band 4 (AWS)	20	22.5	22.16	0.02	0	08FD5	QPSK	1	99	10 mm	bottom	1:1	0.832	1.081	0.899	
1732.50	20175	Mid	LTE Band 4 (AWS)	20	21.5	20.98	-0.07	1	08FD5	QPSK	50	50	10 mm	bottom	1:1	0.609	1.127	0.686	
1732.50	20175	Mid	LTE Band 4 (AWS)	20	21.5	20.96	0.01	1	08FD5	QPSK	100	0	10 mm	bottom	1:1	0.569	1.132	0.644	
1732.50	20175	Mid	LTE Band 4 (AWS)	20	22.5	22.16	-0.02	0	08FD5	QPSK	1	99	10 mm	right	1:1	0.082	1.081	0.089	
1732.50	20175	Mid	LTE Band 4 (AWS)	20	21.5	20.98	0.06	1	08FD5	QPSK	50	50	10 mm	right	1:1	0.062	1.127	0.070	
1732.50	20175	Mid	LTE Band 4 (AWS)	20	22.5	22.16	0.00	0	08FD5	QPSK	1	99	10 mm	left	1:1	0.261	1.081	0.282	
1732.50	20175	Mid	LTE Band 4 (AWS)	20	21.5	20.98	0.01	1	08FD5	QPSK	50	50	10 mm	left	1:1	0.196	1.127	0.221	
1732.50	20175	Mid	LTE Band 4 (AWS)	20	22.5	22.16	-0.01	0	08FD5	QPSK	1	99	10 mm	bottom	1:1	0.834	1.081	0.902	A31
ANSI / IEEE C95.1 1992 - SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population								Body 1.6 W/kg (mW/g) averaged over 1 gram											

Blue entry represents variability measurement.

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Table 11-23
LTE Band 25 (PCS) Hotspot SAR

MEASUREMENT RESULTS																			
FREQUENCY		Mode	Bandwidth [MHz]	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Power Drift [dB]	MPR [dB]	Device Serial Number	Modulation	RB Size	RB Offset	Spacing	Side	Duty Cycle	SAR (1g)	Scaling Factor	Scaled SAR (1g)	Plot #	
MHz	Ch.														(W/kg)		(W/kg)		
1860.00	26140	Low	LTE Band 25 (PCS)	20	22.5	22.34	-0.07	0	08DB6	QPSK	1	50	10 mm	back	1:1	0.682	1.038	0.708	
1860.00	26140	Low	LTE Band 25 (PCS)	20	21.5	21.37	0.01	1	08DB6	QPSK	50	0	10 mm	back	1:1	0.571	1.030	0.588	
1860.00	26140	Low	LTE Band 25 (PCS)	20	22.5	22.34	0.02	0	08DB6	QPSK	1	50	10 mm	front	1:1	0.454	1.038	0.471	
1860.00	26140	Low	LTE Band 25 (PCS)	20	21.5	21.37	0.04	1	08DB6	QPSK	50	0	10 mm	front	1:1	0.387	1.030	0.399	
1860.00	26140	Low	LTE Band 25 (PCS)	20	22.5	22.34	0.01	0	08DB6	QPSK	1	50	10 mm	bottom	1:1	0.751	1.038	0.780	A33
1860.00	26140	Low	LTE Band 25 (PCS)	20	21.5	21.37	-0.04	1	08DB6	QPSK	50	0	10 mm	bottom	1:1	0.612	1.030	0.630	
1860.00	26140	Low	LTE Band 25 (PCS)	20	22.5	22.34	0.00	0	08DB6	QPSK	1	50	10 mm	right	1:1	0.143	1.038	0.148	
1860.00	26140	Low	LTE Band 25 (PCS)	20	21.5	21.37	-0.05	1	08DB6	QPSK	50	0	10 mm	right	1:1	0.112	1.030	0.115	
1860.00	26140	Low	LTE Band 25 (PCS)	20	22.5	22.34	0.05	0	08DB6	QPSK	1	50	10 mm	left	1:1	0.094	1.038	0.098	
1860.00	26140	Low	LTE Band 25 (PCS)	20	21.5	21.37	0.01	1	08DB6	QPSK	50	0	10 mm	left	1:1	0.078	1.030	0.080	
ANSI / IEEE C95.1 1992 - SAFETY LIMIT								Body											
Spatial Peak								1.6 W/kg (mW/g)											
Uncontrolled Exposure/General Population								averaged over 1 gram											

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	Scaled SAR (1g)	Plot #	
MHz	Ch.														(W/kg)		(W/kg)		
2636.50	41055	Mid-High	LTE Band 41	20	24.5	24.50	0.00	0	12D77	QPSK	1	0	10 mm	back	1:1.58	0.172	1.000	0.172	A34
2636.50	41055	Mid-High	LTE Band 41	20	23.5	23.50	0.08	1	12D77	QPSK	50	0	10 mm	back	1:1.58	0.134	1.000	0.134	
2636.50	41055	Mid-High	LTE Band 41	20	24.5	24.50	0.06	0	12D77	QPSK	1	0	10 mm	front	1:1.58	0.103	1.000	0.103	
2636.50	41055	Mid-High	LTE Band 41	20	23.5	23.50	0.11	1	12D77	QPSK	50	0	10 mm	front	1:1.58	0.078	1.000	0.078	
2636.50	41055	Mid-High	LTE Band 41	20	24.5	24.50	0.08	0	12D77	QPSK	1	0	10 mm	bottom	1:1.58	0.116	1.000	0.116	
2636.50	41055	Mid-High	LTE Band 41	20	23.5	23.50	0.15	1	12D77	QPSK	50	0	10 mm	bottom	1:1.58	0.090	1.000	0.090	
2636.50	41055	Mid-High	LTE Band 41	20	24.5	24.50	0.08	0	12D77	QPSK	1	0	10 mm	right	1:1.58	0.082	1.000	0.082	
2636.50	41055	Mid-High	LTE Band 41	20	23.5	23.50	0.13	1	12D77	QPSK	50	0	10 mm	right	1:1.58	0.061	1.000	0.061	
2636.50	41055	Mid-High	LTE Band 41	20	24.5	24.50	0.07	0	12D77	QPSK	1	0	10 mm	left	1:1.58	0.001	1.000	0.001	
2636.50	41055	Mid-High	LTE Band 41	20	23.5	23.50	0.00	1	12D77	QPSK	50	0	10 mm	left	1:1.58	0.000	1.000	0.000	
ANSI / IEEE C95.1 1992 - SAFETY LIMIT								Body											
Spatial Peak								1.6 W/kg (mW/g)											
Uncontrolled Exposure/General Population								averaged over 1 gram											

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)	Scaled SAR (1g)	Plot #
MHz	Ch.													W/kg	(W/kg)			(W/kg)	
2462	11	802.11b	DSSS	22	17.5	17.49	0.05	10 mm	1	08FA2	1	back	99.95	0.018	0.016	1.002	1.001	0.016	
2462	11	802.11b	DSSS	22	17.5	17.49		10 mm	1	08FA2	1	front	99.95	0.005	-	1.002	1.001	-	
2462	11	802.11b	DSSS	22	17.5	17.49		10 mm	1	08FA2	1	top	99.95	0.006	-	1.002	1.001	-	
2462	11	802.11b	DSSS	22	17.5	17.49		10 mm	1	08FA2	1	left	99.95	0.003	-	1.002	1.001	-	
2412	1	802.11b	DSSS	22	17.5	17.30		10 mm	2	08FA2	1	back	99.27	0.059	-	1.047	1.007	-	
2412	1	802.11b	DSSS	22	17.5	17.30	0.00	10 mm	2	08FA2	1	front	99.27	0.078	0.070	1.047	1.007	0.074	A36
2412	1	802.11b	DSSS	22	17.5	17.30		10 mm	2	08FA2	1	top	99.27	0.007	-	1.047	1.007	-	
2412	1	802.11b	DSSS	22	17.5	17.30		10 mm	2	08FA2	1	right	99.27	0.015	-	1.047	1.007	-	
5745	149	802.11a	OFDM	20	14.5	13.72		10 mm	1	08FA2	6	back	98.96	0.061	-	1.197	1.011	-	
5745	149	802.11a	OFDM	20	14.5	13.72	0.11	10 mm	1	08FA2	6	front	98.96	0.203	0.080	1.197	1.011	0.097	
5745	149	802.11a	OFDM	20	14.5	13.72		10 mm	1	08FA2	6	top	98.96	0.065	-	1.197	1.011	-	
5745	149	802.11a	OFDM	20	14.5	13.72		10 mm	1	08FA2	6	left	98.96	0.023	-	1.197	1.011	-	
5745	149	802.11a	OFDM	20	14.5	13.81	0.07	10 mm	2	08FA2	6	back	98.60	0.232	0.100	1.172	1.014	0.119	A38
5745	149	802.11a	OFDM	20	14.5	13.81		10 mm	2	08FA2	6	front	98.60	0.006	-	1.172	1.014	-	
5745	149	802.11a	OFDM	20	14.5	13.81		10 mm	2	08FA2	6	top	98.60	0.035	-	1.172	1.014	-	
5745	149	802.11a	OFDM	20	14.5	13.81		10 mm	2	08FA2	6	right	98.60	0.024	-	1.172	1.014	-	
ANSI / IEEE C95.1 1992 - SAFETY LIMIT								Body											
Spatial Peak								1.6 W/kg (mW/g)											
Uncontrolled Exposure/General Population								averaged over 1 gram											

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11.4 SAR Test Notes

General Notes:

1. The test data reported are the worst-case SAR values according to test procedures specified in IEEE 1528-2003, and FCC KDB Publication 447498 D01v05.
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 D01v05.
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. A test separation distance of 10 mm for body-worn SAR was also used for Cell CDMA, GSM 850/1900, UMTS 850, LTE Bands 12/26/41, and 2.4/5 GHz WLAN as it is more conservative.
7. Per FCC KDB Publication 648474 D04v01, 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 D01 v01, variability SAR tests were performed when the measured SAR results for a frequency band were greater than 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 D06v01, the actual Portable Hotspot operation (with actual simultaneous transmission of a transmitter with WIFI) was not activated (See Section 6.6 for more details).
10. This device utilizes power reduction for PCS CDMA/EVDO, UMTS 1900, LTE Band 4, and LTE Band 25 under some portable hotspot conditions for SAR compliance. Therefore, these wireless router configurations were tested at reduced output power levels.

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 D03v01 and October 2013 TCB Workshop Notes: The source-based frame-averaged output power was evaluated for all GPRS 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 D01v05, 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 $> \frac{1}{2}$ dB, instead of the middle channel, the highest output power channel was used.

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CDMA Notes:

1. Head SAR for CDMA2000 mode was tested under RC3/SO55 per FCC KDB Publication 941225 D01v03.
2. Body-Worn SAR was tested with 1x RTT with TDSO / SO32 FCH Only. EVDO and TDSO / SO32 FCH+SCH SAR tests were not required since the average output power was not more than 0.25 dB higher than the TDSO / SO32 FCH only powers, per FCC KDB Publication 941225 D01v03.
3. CDMA Wireless Router SAR is measured using Subtype 0/1 Physical Layer configurations for Rev. 0 according to KDB 941225 D01v03 procedures for data devices. Since the average output power of Subtype 2 for Rev. A is less than the Rev. 0 power levels, EVDO Rev. A SAR is not required. SAR is not required for 1x RTT for Ev-Do hotspot devices when the maximum average output of each channel is less than 1/4 dB higher than that measured in Subtype 0/1 Physical Layer configurations for Rev. 0.
4. Per FCC KDB Publication 447498 D01v05, 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 $> \frac{1}{2}$ dB, instead of the middle channel, the highest output power channel was used.
5. Head SAR was also evaluated using EVDO Rev. A to determine compliance for VoIP operations.
6. This device applies power reduction for CDMA/EVDO BC1 when Hotspot is ON. Therefore, CDMA/EVDO BC1 was evaluated at hotspot reduced power levels.
7. The 3G SAR test reduction procedure is applied to the 1x-Advanced transmission mode with 1x RTT RC3 as the primary mode. When SAR measurement is required, the 1x-Advanced power measurement configurations are used. The 1x Advanced SAR procedures are applied separately to head, body-worn accessory and other exposure conditions.

UMTS Notes:

1. UMTS mode in was tested under RMC 12.2 kbps with HSPA Inactive per KDB Publication 941225 D01v03. HSPA SAR was not required since the average output power of the HSPA subtests was not more than 0.25 dB higher than the RMC level and SAR was less than 1.2 W/kg.
2. Per FCC KDB Publication 447498 D01v05, 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 $> \frac{1}{2}$ 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 D05v02r01. The general test procedures used for testing can be found in Section 8.6.4.
2. MPR is permanently implemented for this device by the manufacturer. The specific manufacturer target MPR is indicated alongside the SAR results. MPR is enabled for this device, according to 3GPP TS36.101 Section 6.2.3 – 6.2.5 under Table 6.2.3-1.
3. A-MPR was disabled for all SAR tests by setting NS=01 on the base station simulator. SAR tests were performed with the same number of RB and RB offsets transmitting on all TTI frames (maximum TTI).
4. Per FCC KDB Publication 447498 D01v05r01, since the reported (scaled) LTE Band 41 SAR measured at the highest output power channel for each test configuration is ≤ 0.6 W/kg, testing at the other channels is not required for such test configuration(s).

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5. TDD LTE was tested 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 D05Av01r01, 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 not activated.

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 D01DR02-41929 for 2.4 GHz WIFI single transmission chain operations, the highest measured maximum output power channel for DSSS was selected for SAR measurement. SAR for OFDM modes (2.4 GHz 802.11g/n) was not required due to the maximum allowed powers and the highest reported DSSS SAR. See Section 8.7.5 for more information.
3. Justification for test configurations for WLAN per KDB Publication 248227 D01DR02-41929 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 8.7.6 for more information.
4. Per KDB Publication 248227 D01DR02-41929, SAR for MIMO was evaluated by following the simultaneous SAR provisions from KDB Publication 447498. Please see Section 12 for complete analysis. Per KDB Publication 248227 D01DR02-41929, MIMO SAR was measured with both antennas transmitting simultaneously at the specified maximum output power in MIMO mode following the initial test configuration procedures.
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.
7. Only channels in the U-NII-2C (> 5.65 GHz WIFI) & U-NII-3 aggregate band that support wireless router were considered for hotspot SAR tests.

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12 FCC MULTI-TX AND ANTENNA SAR CONSIDERATIONS

12.1 Introduction

The following procedures adopted from FCC KDB Publication 447498 D01v05r02 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 447498 D01v05 IV.C.1.iii 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 D01v05 4.3.2 2), the following equation must be used to estimate the standalone 1g SAR for simultaneous transmission assessment involving that transmitter.

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

Table 12-1
Estimated SAR

Mode	Frequency	Maximum Allowed Power	Separation Distance (Body)	Estimated SAR (Body)
	[MHz]	[dBm]	[mm]	[W/kg]
Bluetooth	2480	10.50	15	0.154

Note:

- Held-to-ear configurations are not applicable to Bluetooth operations and therefore were not considered for simultaneous transmission. Per KDB Publication 447498 D01v05, the maximum power of the channel was rounded to the nearest mW before calculation.
- Since the sum of 1g single transmission chain SAR measurements is < 1.6 W/kg, MIMO SAR is determined by the sum of 1g single transmission chain SAR values because the summation represents higher output power and yields more conservative result per KDB 248227 D01 DR02-41929.
- The highest Reported SAR for each exposure condition is used for SAR summation purpose.

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12.3 Head SAR Simultaneous Transmission Analysis

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

Exposure Condition	Mode	2G/3G/4G SAR (W/kg)	2.4 GHz WLAN Ant 1 SAR (W/kg)	Σ SAR (W/kg)
		1	2	1+2
Head SAR	CDMA/EVDO BC10 (\$90S)	0.243	0.055	0.298
	CDMA/EVDO BC0 (\$22H)	0.240	0.055	0.295
	PCS CDMA/EVDO	0.330	0.055	0.385
	GSM 850	0.194	0.055	0.249
	GSM 1900	0.089	0.055	0.144
	UMTS 850	0.189	0.055	0.244
	UMTS 1900	0.227	0.055	0.282
	LTE Band 12	0.181	0.055	0.236
	LTE Band 26	0.216	0.055	0.271
	LTE Band 4 (AWS)	0.193	0.055	0.248
	LTE Band 25 (PCS)	0.211	0.055	0.266
	LTE Band 41	0.062	0.055	0.117

Table 12-3
Simultaneous Transmission Scenario with 2.4 GHz WLAN – Ant 2 (Held to Ear)

Exposure Condition	Mode	2G/3G/4G SAR (W/kg)	2.4 GHz WLAN Ant 2 SAR (W/kg)	Σ SAR (W/kg)
		1	2	1+2
Head SAR	CDMA/EVDO BC10 (\$90S)	0.243	0.702	0.945
	CDMA/EVDO BC0 (\$22H)	0.240	0.702	0.942
	PCS CDMA/EVDO	0.330	0.702	1.032
	GSM 850	0.194	0.702	0.896
	GSM 1900	0.089	0.702	0.791
	UMTS 850	0.189	0.702	0.891
	UMTS 1900	0.227	0.702	0.929
	LTE Band 12	0.181	0.702	0.883
	LTE Band 26	0.216	0.702	0.918
	LTE Band 4 (AWS)	0.193	0.702	0.895
	LTE Band 25 (PCS)	0.211	0.702	0.913
	LTE Band 41	0.062	0.702	0.764

Table 12-4
Simultaneous Transmission Scenario with 2.4 GHz WLAN – MIMO (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+3
Head SAR	CDMA/EVDO BC10 (\$90S)	0.243	0.055	0.702	1.000
	CDMA/EVDO BC0 (\$22H)	0.240	0.055	0.702	0.997
	PCS CDMA/EVDO	0.330	0.055	0.702	1.087
	GSM 850	0.194	0.055	0.702	0.951
	GSM 1900	0.089	0.055	0.702	0.846
	UMTS 850	0.189	0.055	0.702	0.946
	UMTS 1900	0.227	0.055	0.702	0.984
	LTE Band 12	0.181	0.055	0.702	0.938
	LTE Band 26	0.216	0.055	0.702	0.973
	LTE Band 4 (AWS)	0.193	0.055	0.702	0.950
	LTE Band 25 (PCS)	0.211	0.055	0.702	0.968
	LTE Band 41	0.062	0.055	0.702	0.819

Table 12-5
Simultaneous Transmission Scenario with 5 GHz WLAN – Ant 1 (Held to Ear)

Exposure Condition	Mode	2G/3G/4G SAR (W/kg)	5 GHz WLAN Ant 1 SAR (W/kg)	Σ SAR (W/kg)
		1	2	
Head SAR	CDMA/EVDO BC10 (§90S)	0.243	0.553	0.796
	CDMA/EVDO BC0 (§22H)	0.240	0.553	0.793
	PCS CDMA/EVDO	0.330	0.553	0.883
	GSM 850	0.194	0.553	0.747
	GSM 1900	0.089	0.553	0.642
	UMTS 850	0.189	0.553	0.742
	UMTS 1900	0.227	0.553	0.780
	LTE Band 12	0.181	0.553	0.734
	LTE Band 26	0.216	0.553	0.769
	LTE Band 4 (AWS)	0.193	0.553	0.746
	LTE Band 25 (PCS)	0.211	0.553	0.764
	LTE Band 41	0.062	0.553	0.615

Note: The worst case 5 GHz WIFI reported SAR for each head configuration was considered for simultaneous SAR exclusion via summation of standalone SAR, regardless of whether the WIFI channel has WIFI Hotspot capability, for simplicity to determine compliance. Please note that the actual simultaneous transmission SAR will not exceed the summed levels indicated.

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

Exposure Condition	Mode	2G/3G/4G SAR (W/kg)	5 GHz WLAN Ant 2 SAR (W/kg)	Σ SAR (W/kg)
		1	2	
Head SAR	CDMA/EVDO BC10 (§90S)	0.243	0.020	0.263
	CDMA/EVDO BC0 (§22H)	0.240	0.020	0.260
	PCS CDMA/EVDO	0.330	0.020	0.350
	GSM 850	0.194	0.020	0.214
	GSM 1900	0.089	0.020	0.109
	UMTS 850	0.189	0.020	0.209
	UMTS 1900	0.227	0.020	0.247
	LTE Band 12	0.181	0.020	0.201
	LTE Band 26	0.216	0.020	0.236
	LTE Band 4 (AWS)	0.193	0.020	0.213
	LTE Band 25 (PCS)	0.211	0.020	0.231
	LTE Band 41	0.062	0.020	0.082

Note: The worst case 5 GHz WIFI reported SAR for each head configuration was considered for simultaneous SAR exclusion via summation of standalone SAR, regardless of whether the WIFI channel has WIFI Hotspot capability, for simplicity to determine compliance. Please note that the actual simultaneous transmission SAR will not exceed the summed levels indicated.

Table 12-7
Simultaneous Transmission Scenario with 5 GHz WLAN – MIMO (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	
Head SAR	CDMA/EVDO BC10 (§90S)	0.243	0.553	0.020	0.816
	CDMA/EVDO BC0 (§22H)	0.240	0.553	0.020	0.813
	PCS CDMA/EVDO	0.330	0.553	0.020	0.903
	GSM 850	0.194	0.553	0.020	0.767
	GSM 1900	0.089	0.553	0.020	0.662
	UMTS 850	0.189	0.553	0.020	0.762
	UMTS 1900	0.227	0.553	0.020	0.800
	LTE Band 12	0.181	0.553	0.020	0.754
	LTE Band 26	0.216	0.553	0.020	0.789
	LTE Band 4 (AWS)	0.193	0.553	0.020	0.766
	LTE Band 25 (PCS)	0.211	0.553	0.020	0.784
	LTE Band 41	0.062	0.553	0.020	0.635

Note: The worst case 5 GHz WIFI reported SAR for each head configuration was considered for simultaneous SAR exclusion via summation of standalone SAR, regardless of whether the WIFI channel has WIFI Hotspot capability, for simplicity to determine compliance. Please note that the actual simultaneous transmission SAR will not exceed the summed levels indicated.

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12.4 Body-Worn Simultaneous Transmission Analysis

1. For SAR summation for body-worn back side at 15mm, GSM 850/1900, UMTS 850, Cell CDMA, LTE Band 12/26/41, and WLAN SAR values at 10mm were used since the 10mm test distance was more conservative. "<" denotes that the 10mm GSM 850/1900, UMTS 850, Cell CDMA, and LTE Band 12/26/41 and WLAN SAR values were used for summation purposes.
2. For SAR summation for body-worn back side at 15mm, Maximum LTE Band 4/25 SAR values at 15mm were used since the Maximum LTE Band 4/25 at 15mm test distance was more conservative. "<" denotes that the 15mm Maximum LTE Band 4/25 SAR values were used for summation purposes.
3. Bluetooth SAR was not required to be measured per FCC KDB 447498. Estimated SAR results were used for SAR summation for body-worn back side at 15mm to determine simultaneous transmission SAR test exclusion.

Table 12-8

Simultaneous Transmission Scenario with 2.4 GHz WLAN - Ant 1 (Body-Worn at 1.5 cm)

Exposure Condition	Mode	2G/3G/4G SAR (W/kg)	2.4 GHz WLAN Ant 1 SAR (W/kg)	Σ SAR (W/kg)
		1	2	1+2
Body-Worn	CDMA BC10 (\$90S)	<0.391	<0.016	<0.407
	CDMA BCD (\$22H)	<0.417	<0.016	<0.433
	PCS CDMA	0.566	<0.016	<0.582
	GSM 850	<0.338	<0.016	<0.354
	GSM 1900	<0.259	<0.016	<0.275
	UMTS 850	<0.386	<0.016	<0.402
	UMTS 1900	0.475	<0.016	<0.491
	LTE Band 12	<0.356	<0.016	<0.372
	LTE Band 26	<0.414	<0.016	<0.430
	LTE Band 4 (AWS)	<0.501	<0.016	<0.517
	LTE Band 25 (PCS)	<0.776	<0.016	<0.792
	LTE Band 41	<0.172	<0.016	<0.188

Table 12-9

Simultaneous Transmission Scenario with 2.4 GHz WLAN - Ant 2 (Body-Worn at 1.5 cm)

Exposure Condition	Mode	2G/3G/4G SAR (W/kg)	2.4 GHz WLAN Ant 2 SAR (W/kg)	Σ SAR (W/kg)
		1	2	1+2
Body-Worn	CDMA BC10 (\$90S)	<0.391	<0.050	<0.441
	CDMA BCD (\$22H)	<0.417	<0.050	<0.467
	PCS CDMA	0.566	<0.050	<0.616
	GSM 850	<0.338	<0.050	<0.388
	GSM 1900	<0.259	<0.050	<0.309
	UMTS 850	<0.386	<0.050	<0.436
	UMTS 1900	0.475	<0.050	<0.525
	LTE Band 12	<0.356	<0.050	<0.406
	LTE Band 26	<0.414	<0.050	<0.464
	LTE Band 4 (AWS)	<0.501	<0.050	<0.551
	LTE Band 25 (PCS)	<0.776	<0.050	<0.826
	LTE Band 41	<0.172	<0.050	<0.222

Table 12-10

Simultaneous Transmission Scenario with 2.4 GHz WLAN - MIMO (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+3
Body-Worn	CDMA BC10 (\$90S)	<0.391	<0.016	<0.050	<0.457
	CDMA BCD (\$22H)	<0.417	<0.016	<0.050	<0.483
	PCS CDMA	0.566	<0.016	<0.050	<0.632
	GSM 850	<0.338	<0.016	<0.050	<0.404
	GSM 1900	<0.259	<0.016	<0.050	<0.325
	UMTS 850	<0.386	<0.016	<0.050	<0.452
	UMTS 1900	0.475	<0.016	<0.050	<0.541
	LTE Band 12	<0.356	<0.016	<0.050	<0.422
	LTE Band 26	<0.414	<0.016	<0.050	<0.480
	LTE Band 4 (AWS)	<0.501	<0.016	<0.050	<0.567
	LTE Band 25 (PCS)	<0.776	<0.016	<0.050	<0.842
	LTE Band 41	<0.172	<0.016	<0.050	<0.238

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Table 12-11
Simultaneous Transmission Scenario with 5 GHz WLAN - Ant 1 (Body-Worn at 1.5 cm)

Exposure Condition	Mode	2G/3G/4G SAR (W/kg)	5 GHz WLAN Ant 1 SAR (W/kg)	Σ SAR (W/kg)
		1	2	1+2
Body-Worn	CDMA BC10 (\$90S)	<0.391	<0.056	<0.447
	CDMA BC0 (\$22H)	<0.417	<0.056	<0.473
	PCS CDMA	0.566	<0.056	<0.622
	GSM 850	<0.338	<0.056	<0.394
	GSM 1900	<0.259	<0.056	<0.315
	UMTS 850	<0.386	<0.056	<0.442
	UMTS 1900	0.475	<0.056	<0.531
	LTE Band 12	<0.356	<0.056	<0.412
	LTE Band 26	<0.414	<0.056	<0.430
	LTE Band 4 (AWS)	<0.501	<0.056	<0.557
	LTE Band 25 (PCS)	<0.776	<0.056	<0.832
	LTE Band 41	<0.172	<0.056	<0.228

Note: The worst case 5 GHz WIFI reported SAR for each body-worn configuration was considered for simultaneous SAR exclusion via summation of standalone SAR, regardless of whether the WIFI channel has WIFI Hotspot capability, for simplicity to determine compliance. Please note that the actual simultaneous transmission SAR will not exceed the summed levels indicated.

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

Exposure Condition	Mode	2G/3G/4G SAR (W/kg)	5 GHz WLAN Ant 2 SAR (W/kg)	Σ SAR (W/kg)
		1	2	1+2
Body-Worn	CDMA BC10 (\$90S)	<0.391	<0.119	<0.510
	CDMA BC0 (\$22H)	<0.417	<0.119	<0.536
	PCS CDMA	0.566	<0.119	<0.685
	GSM 850	<0.338	<0.119	<0.457
	GSM 1900	<0.259	<0.119	<0.378
	UMTS 850	<0.386	<0.119	<0.505
	UMTS 1900	0.475	<0.119	<0.594
	LTE Band 12	<0.356	<0.119	<0.475
	LTE Band 26	<0.414	<0.119	<0.430
	LTE Band 4 (AWS)	<0.501	<0.119	<0.620
	LTE Band 25 (PCS)	<0.776	<0.119	<0.895
	LTE Band 41	<0.172	<0.119	<0.291

Note: The worst case 5 GHz WIFI reported SAR for each body-worn configuration was considered for simultaneous SAR exclusion via summation of standalone SAR, regardless of whether the WIFI channel has WIFI Hotspot capability, for simplicity to determine compliance. Please note that the actual simultaneous transmission SAR will not exceed the summed levels indicated.

Table 12-13
Simultaneous Transmission Scenario with 5 GHz WLAN - MIMO (Body-Worn at 1.5 cm)

Exposure Condition	Mode	2G/3G/4G SAR (W/kg)	5 GHz WLAN 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	CDMA BC10 (\$90S)	<0.391	<0.056	<0.119	<0.566
	CDMA BC0 (\$22H)	<0.417	<0.056	<0.119	<0.592
	PCS CDMA	0.566	<0.056	<0.119	<0.741
	GSM 850	<0.338	<0.056	<0.119	<0.513
	GSM 1900	<0.259	<0.056	<0.119	<0.434
	UMTS 850	<0.386	<0.056	<0.119	<0.561
	UMTS 1900	0.475	<0.056	<0.119	<0.650
	LTE Band 12	<0.356	<0.056	<0.119	<0.531
	LTE Band 26	<0.414	<0.056	<0.119	<0.589
	LTE Band 4 (AWS)	<0.501	<0.056	<0.119	<0.676
	LTE Band 25 (PCS)	<0.776	<0.056	<0.119	<0.951
	LTE Band 41	<0.172	<0.056	<0.119	<0.347

Note: The worst case 5 GHz WIFI reported SAR for each body-worn configuration was considered for simultaneous SAR exclusion via summation of standalone SAR, regardless of whether the WIFI channel has WIFI Hotspot capability, for simplicity to determine compliance. Please note that the actual simultaneous transmission SAR will not exceed the summed levels indicated.

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Table 12-14
Simultaneous Transmission Scenario with Bluetooth (Body-Worn at 1.5 cm)

Exposure Condition	Mode	2G/3G/4G SAR (W/kg)	Bluetooth SAR (W/kg)	Σ SAR (W/kg)
		1	2	1+2
Body-Worn	CDMA BC10 (§90S)	<0.391	0.154	<0.545
	CDMA BC0 (§22H)	<0.417	0.154	<0.571
	PCS CDMA	0.566	0.154	0.720
	GSM 850	<0.338	0.154	<0.492
	GSM 1900	<0.259	0.154	<0.413
	UMTS 850	<0.386	0.154	<0.540
	UMTS 1900	0.475	0.154	0.629
	LTE Band 12	<0.356	0.154	<0.510
	LTE Band 26	<0.414	0.154	<0.568
	LTE Band 4 (AWS)	<0.501	0.154	<0.655
	LTE Band 25 (PCS)	<0.776	0.154	<0.930
	LTE Band 41	<0.172	0.154	<0.326

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.

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12.5 Hotspot SAR Simultaneous Transmission Analysis

Table 12-15
Simultaneous Transmission Scenario 2.4 GHz WLAN – Ant 1 (Hotspot at 1.0 cm)

Exposure Condition	Mode	2G/3G/4G SAR (W/kg)	2.4 GHz WLAN Ant 1 SAR (W/kg)	Σ SAR (W/kg)
		1	2	1+2
Hotspot SAR	EVDO BC10 (\$90S)	0.410	0.016	0.426
	EVDO BC0 (\$22H)	0.423	0.016	0.439
	PCS EVDO	0.719	0.016	0.735
	GPRS 850	0.797	0.016	0.813
	GPRS 1900	0.559	0.016	0.575
	UMTS 850	0.386	0.016	0.402
	UMTS 1900	0.910	0.016	0.926
	LTE Band 12	0.356	0.016	0.372
	LTE Band 26	0.414	0.016	0.430
	LTE Band 4 (AWS)	0.902	0.016	0.918
	LTE Band 25 (PCS)	0.780	0.016	0.796
	LTE Band 41	0.172	0.016	0.188

Table 12-16
Simultaneous Transmission Scenario 2.4 GHz WLAN – Ant 2 (Hotspot at 1.0 cm)

Exposure Condition	Mode	2G/3G/4G SAR (W/kg)	2.4 GHz WLAN Ant 2 SAR (W/kg)	Σ SAR (W/kg)
		1	2	1+2
Hotspot SAR	EVDO BC10 (\$90S)	0.410	0.074	0.484
	EVDO BC0 (\$22H)	0.423	0.074	0.497
	PCS EVDO	0.719	0.074	0.793
	GPRS 850	0.797	0.074	0.871
	GPRS 1900	0.559	0.074	0.633
	UMTS 850	0.386	0.074	0.460
	UMTS 1900	0.910	0.074	0.984
	LTE Band 12	0.356	0.074	0.430
	LTE Band 26	0.414	0.074	0.488
	LTE Band 4 (AWS)	0.902	0.074	0.976
	LTE Band 25 (PCS)	0.780	0.074	0.854
	LTE Band 41	0.172	0.074	0.246

Table 12-17
Simultaneous Transmission Scenario 2.4 GHz WLAN – MIMO (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+3
Hotspot SAR	EVDO BC10 (\$90S)	0.410	0.016	0.074	0.500
	EVDO BC0 (\$22H)	0.423	0.016	0.074	0.513
	PCS EVDO	0.719	0.016	0.074	0.809
	GPRS 850	0.797	0.016	0.074	0.887
	GPRS 1900	0.559	0.016	0.074	0.649
	UMTS 850	0.386	0.016	0.074	0.476
	UMTS 1900	0.910	0.016	0.074	1.000
	LTE Band 12	0.356	0.016	0.074	0.446
	LTE Band 26	0.414	0.016	0.074	0.504
	LTE Band 4 (AWS)	0.902	0.016	0.074	0.992
	LTE Band 25 (PCS)	0.780	0.016	0.074	0.870
	LTE Band 41	0.172	0.016	0.074	0.262

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

Exposure Condition	Mode	2G/3G/4G SAR (W/kg)	5 GHz WLAN Ant 1 SAR (W/kg)	Σ SAR (W/kg)
		1	2	1+2
Hotspot SAR	EVDO BC10 (\$90S)	0.410	0.097	0.507
	EVDO BC0 (\$22H)	0.423	0.097	0.520
	PCS EVDO	0.719	0.097	0.816
	GPRS 850	0.797	0.097	0.894
	GPRS 1900	0.559	0.097	0.656
	UMTS 850	0.386	0.097	0.483
	UMTS 1900	0.910	0.097	1.007
	LTE Band 12	0.356	0.097	0.453
	LTE Band 26	0.414	0.097	0.511
	LTE Band 4 (AWS)	0.902	0.097	0.999
	LTE Band 25 (PCS)	0.780	0.097	0.877
	LTE Band 41	0.172	0.097	0.269

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

Exposure Condition	Mode	2G/3G/4G SAR (W/kg)	5 GHz WLAN Ant 2 SAR (W/kg)	Σ SAR (W/kg)
		1	2	1+2
Hotspot SAR	EVDO BC10 (\$90S)	0.410	0.119	0.529
	EVDO BC0 (\$22H)	0.423	0.119	0.542
	PCS EVDO	0.719	0.119	0.838
	GPRS 850	0.797	0.119	0.916
	GPRS 1900	0.559	0.119	0.678
	UMTS 850	0.386	0.119	0.505
	UMTS 1900	0.910	0.119	1.029
	LTE Band 12	0.356	0.119	0.475
	LTE Band 26	0.414	0.119	0.533
	LTE Band 4 (AWS)	0.902	0.119	1.021
	LTE Band 25 (PCS)	0.780	0.119	0.899
	LTE Band 41	0.172	0.119	0.291

Table 12-20
Simultaneous Transmission Scenario 5 GHz WLAN – MIMO (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+3
Hotspot SAR	EVDO BC10 (\$90S)	0.410	0.097	0.119	0.626
	EVDO BC0 (\$22H)	0.423	0.097	0.119	0.639
	PCS EVDO	0.719	0.097	0.119	0.935
	GPRS 850	0.797	0.097	0.119	1.013
	GPRS 1900	0.559	0.097	0.119	0.775
	UMTS 850	0.386	0.097	0.119	0.602
	UMTS 1900	0.910	0.097	0.119	1.126
	LTE Band 12	0.356	0.097	0.119	0.572
	LTE Band 26	0.414	0.097	0.119	0.630
	LTE Band 4 (AWS)	0.902	0.097	0.119	1.118
	LTE Band 25 (PCS)	0.780	0.097	0.119	0.996
	LTE Band 41	0.172	0.097	0.119	0.388

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 D01v05 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 D01v01, 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
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)	
1750	1732.50	20175	LTE Band 4 (AWS)	QPSK, 1 RB, 99 RB Offset	bottom	10 mm	0.832	0.834	1.00	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 D01v01, the extended measurement uncertainty analysis per IEEE 1528-2003 was not required.

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14 EQUIPMENT LIST

Manufacturer	Model	Description	Cal Date	Cal Interval	Cal Due	Serial Number
Agilent	E8257D	(250kHz-20GHz) Signal Generator	4/15/2014	Annual	4/15/2015	MY45470194
Agilent	8648D	(9kHz-4GHz) Signal Generator	4/15/2014	Annual	4/15/2015	3629U00687
Agilent	E4438C	ESG Vector Signal Generator	4/15/2014	Annual	4/15/2015	MY45091346
Agilent	N5182A	MXG Vector Signal Generator	4/15/2014	Annual	4/15/2015	MY47420800
Agilent	N5182A	MXG Vector Signal Generator	4/15/2014	Annual	4/15/2015	MY47420651
Agilent	E4438C	ESG Vector Signal Generator	4/25/2014	Annual	4/25/2015	MY42082385
Agilent	8753ES	S-Parameter Network Analyzer	5/22/2014	Annual	5/22/2015	US39170118
Agilent	E5515C	Wireless Communications Test Set	11/4/2014	Biennial	11/4/2016	GB43193563
Agilent	E5515C	Wireless Communications Test Set	11/20/2014	Biennial	11/20/2016	GB43163447
Agilent	8753E	(30kHz-6GHz) Network Analyzer	12/30/2014	Annual	12/30/2015	JP38020182
Agilent	8594A	(9kHz-2.9GHz) Spectrum Analyzer	N/A	N/A	N/A	3051A00187
Amplifier Research	1551G6	Amplifier	CBT	N/A	CBT	433978
Anritsu	ML2469A	Power Meter	3/14/2014	Annual	3/14/2015	1306009
Anritsu	MA2411B	Pulse Power Sensor	3/25/2014	Annual	3/25/2015	1207470
Anritsu	MA24106A	USB Power Sensor	5/15/2014	Annual	5/15/2015	1244524
Anritsu	MA24106A	USB Power Sensor	5/15/2014	Annual	5/15/2015	1244512
Anritsu	MT8820C	Radio Communication Analyzer	9/19/2014	Annual	9/19/2015	6201144418
Anritsu	MA2411B	Pulse Power Sensor	11/13/2014	Annual	11/13/2015	1339018
Anritsu	MT8820C	Radio Communication Analyzer	5/6/2014	Annual	5/6/2015	6201144419
Anritsu	MT8820C	Radio Communication Analyzer	11/18/2014	Annual	11/18/2015	6201300731
Anritsu	ML2495A	Power Meter	10/31/2013	Biennial	10/31/2015	941001
Anritsu	ML2495A	Power Meter	10/31/2013	Biennial	10/31/2015	1039008
COMTECH	AR85729-5/57598	Solid State Amplifier	CBT	N/A	CBT	M3W1A00-1002
Control Company	4052	Long Stem Thermometer	9/27/2013	Biennial	9/27/2015	130567447
Control Company	61220-416	Long-Stem Thermometer	4/29/2014	Biennial	4/29/2016	111331323
Control Company	36934-158	Wall-Mounted Thermometer	4/29/2014	Biennial	4/29/2016	122014488
Fisher Scientific	S97611	Thermometer	4/12/2013	Biennial	4/12/2015	130219304
Fisher Scientific	15-077-960	Digital Thermometer	12/4/2013	Biennial	12/4/2015	130764558
Gigatronics	80701A	(0.05-18GHz) Power Sensor	10/30/2014	Annual	10/30/2015	1833460
Gigatronics	8651A	Universal Power Meter	10/30/2014	Annual	10/30/2015	8650319
MCL	BW-N6W5+	6dB Attenuator	CBT	N/A	CBT	1139
MiniCircuits	VLF-6000+	Low Pass Filter	CBT	N/A	CBT	N/A
MiniCircuits	SLP-2400+	Low Pass Filter	CBT	N/A	CBT	R8979500903
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
Mitutoyo	CD-6" CSX	Digital Caliper	5/8/2014	Biennial	5/8/2016	13264165
Narda	4014C-6	4 - 8 GHz SMA 6 dB Directional Coupler	CBT	N/A	CBT	N/A
Narda	BW-S3W2	Attenuator (3dB)	CBT	N/A	CBT	120
Pasternack	PE2208-6	Bidirectional Coupler	CBT	N/A	CBT	N/A
Pasternack	PE2209-10	Bidirectional Coupler	CBT	N/A	CBT	N/A
Rohde & Schwarz	CMW500	Radio Communication Tester	10/4/2013	Biennial	10/4/2015	103962
Rohde & Schwarz	CMW500	Radio Communication Tester	10/3/2014	Annual	10/3/2015	100976
Rohde & Schwarz	CMU200	Base Station Simulator	12/4/2014	Annual	12/4/2015	833855/0010
Seekonk	NC-100	Torque Wrench	3/18/2014	Biennial	3/18/2016	22313
Seekonk	NC-100	Torque Wrench 5/16", 8" lbs	3/18/2014	Biennial	3/18/2016	N/A
SPEAG	ES3DV3	SAR Probe	2/25/2014	Annual	2/25/2015	3258
SPEAG	D5GHZV2	5 GHz SAR Dipole	2/26/2014	Annual	2/26/2015	1120
SPEAG	DAE4	Dasy Data Acquisition Electronics	2/26/2014	Annual	2/26/2015	665
SPEAG	D750V3	750 MHz Dipole	3/17/2014	Annual	3/17/2015	1054
SPEAG	DAE4	Dasy Data Acquisition Electronics	3/17/2014	Annual	3/17/2015	1334
SPEAG	ES3DV3	SAR Probe	3/19/2014	Annual	3/19/2015	3209
SPEAG	D1900V2	1900 MHz SAR Dipole	4/9/2014	Annual	4/9/2015	5d141
SPEAG	DAE4	Dasy Data Acquisition Electronics	4/11/2014	Annual	4/11/2015	1368
SPEAG	DAK-3.5	Dielectric Assessment Kit	5/6/2014	Annual	5/6/2015	1070
SPEAG	D1765V2	1765 MHz SAR Dipole	5/7/2014	Annual	5/7/2015	1008
SPEAG	DAE4	Dasy Data Acquisition Electronics	5/14/2014	Annual	5/14/2015	859
SPEAG	ES3DV3	SAR Probe	5/15/2014	Annual	5/15/2015	3263
SPEAG	EX3DV4	SAR Probe	7/16/2014	Annual	7/16/2015	7308
SPEAG	D1900V2	1900 MHz SAR Dipole	7/23/2014	Annual	7/23/2015	5d149
SPEAG	D835V2	835 MHz SAR Dipole	7/24/2014	Annual	7/24/2015	4d133
SPEAG	D2450V2	2450 MHz SAR Dipole	8/11/2014	Annual	8/11/2015	719
SPEAG	DAE4	Dasy Data Acquisition Electronics	8/12/2014	Annual	8/12/2015	1322
SPEAG	ES3DV2	SAR Probe	8/19/2014	Annual	8/19/2015	3022
SPEAG	DAE4	Dasy Data Acquisition Electronics	9/17/2014	Annual	9/17/2015	1323
SPEAG	DAE4	Dasy Data Acquisition Electronics	9/18/2014	Annual	9/18/2015	1364
SPEAG	ES3DV3	SAR Probe	9/18/2014	Annual	9/18/2015	3332
SPEAG	ES3DV3	SAR Probe	9/24/2014	Annual	9/24/2015	3288
SPEAG	D5GHZV2	5 GHz SAR Dipole	9/25/2014	Annual	9/25/2015	1191
SPEAG	D2600V2	2600 MHz SAR Dipole	10/20/2014	Annual	10/20/2015	1071
SPEAG	EX3DV4	SAR Probe	12/12/2014	Annual	12/12/2015	3920
Tektronix	RSA6114A	Real Time Spectrum Analyzer	4/16/2014	Annual	4/16/2015	B010177

Note:

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

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15 MEASUREMENT UNCERTAINTIES

Applicable for frequencies less than 3000 MHz:

a	b	c	d	e= f(d,k)	f	g	h = c x f/e	i = c x g/e	k
Uncertainty Component	IEEE 1528 Sec.	Tol. (± %)	Prob. Dist.	Div.	c _i 1gm	c _i 10 gms	1gm u _i (± %)	10gms u _i (± %)	v _i
Measurement System									
Probe Calibration	E.2.1	6.0	N	1	1.0	1.0	6.0	6.0	∞
Axial Isotropy	E.2.2	0.25	N	1	0.7	0.7	0.2	0.2	∞
Hemishperical Isotropy	E.2.2	1.3	N	1	1.0	1.0	1.3	1.3	∞
Boundary E ffect	E.2.3	0.4	N	1	1.0	1.0	0.4	0.4	∞
Linearity	E.2.4	0.3	N	1	1.0	1.0	0.3	0.3	∞
System Detection Limits	E.2.5	5.1	N	1	1.0	1.0	5.1	5.1	∞
Readout E lectronics	E.2.6	1.0	N	1	1.0	1.0	1.0	1.0	∞
Response Time	E.2.7	0.8	R	1.73	1.0	1.0	0.5	0.5	∞
Integration Time	E.2.8	2.6	R	1.73	1.0	1.0	1.5	1.5	∞
RF Ambient Conditions	E.6.1	3.0	R	1.73	1.0	1.0	1.7	1.7	∞
Probe Positioner Mechanical Tolerance	E.6.2	0.4	R	1.73	1.0	1.0	0.2	0.2	∞
Probe Positioning w/ respect to Phantom	E.6.3	2.9	R	1.73	1.0	1.0	1.7	1.7	∞
Extrapolation, Interpolation & Integration algorithms for Max. SAR Evaluation	E.5	1.0	R	1.73	1.0	1.0	0.6	0.6	∞
Test Sample Related									
Test Sample Positioning	E.4.2	6.0	N	1	1.0	1.0	6.0	6.0	287
Device Holder Uncertainty	E.4.1	3.32	R	1.73	1.0	1.0	1.9	1.9	∞
Output Power Variation - SAR drift measurement	6.6.2	5.0	R	1.73	1.0	1.0	2.9	2.9	∞
Phantom & Tissue Parameters									
Phantom Uncertainty (Shape & Thickness tolerances)	E.3.1	4.0	R	1.73	1.0	1.0	2.3	2.3	∞
Liquid Conductivity - deviation from target values	E.3.2	5.0	R	1.73	0.64	0.43	1.8	1.2	∞
Liquid Conductivity - measurement uncertainty	E.3.3	3.8	N	1	0.64	0.43	2.4	1.6	6
Liquid Permittivity - deviation from target values	E.3.2	5.0	R	1.73	0.60	0.49	1.7	1.4	∞
Liquid Permittivity - measurement uncertainty	E.3.3	4.5	N	1	0.60	0.49	2.7	2.2	6
Combined Standard Uncertainty (k=1)	RSS						12.1	11.7	299
Expanded Uncertainty (95% CONFIDENCE LEVEL)	k=2						24.2	23.5	

The above measurement uncertainties are according to IEEE Std. 1528-2003

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Applicable for frequencies up to 6 GHz:

a	b	c	d	e= f(d,k)	f	g	h= c x f/e	i= c x g/e	k
Uncertainty Component	IEEE 1528 Sec.	Tol. (± %)	Prob. Dist.	Div.	c _i 1gm	c _i 10 gms	1gm u _i (± %)	10gms u _i (± %)	v _i
Measurement System									
Probe Calibration	E.2.1	6.55	N	1	1.0	1.0	6.6	6.6	∞
Axial Isotropy	E.2.2	0.25	N	1	0.7	0.7	0.2	0.2	∞
Hemishperical Isotropy	E.2.2	1.3	N	1	1.0	1.0	1.3	1.3	∞
Boundary Effect	E.2.3	0.4	N	1	1.0	1.0	0.4	0.4	∞
Linearity	E.2.4	0.3	N	1	1.0	1.0	0.3	0.3	∞
System Detection Limits	E.2.5	5.1	N	1	1.0	1.0	5.1	5.1	∞
Readout Electronics	E.2.6	1.0	N	1	1.0	1.0	1.0	1.0	∞
Response Time	E.2.7	0.8	R	1.73	1.0	1.0	0.5	0.5	∞
Integration Time	E.2.8	2.6	R	1.73	1.0	1.0	1.5	1.5	∞
RF Ambient Conditions	E.6.1	3.0	R	1.73	1.0	1.0	1.7	1.7	∞
Probe Positioner Mechanical Tolerance	E.6.2	0.4	R	1.73	1.0	1.0	0.2	0.2	∞
Probe Positioning w/ respect to Phantom	E.6.3	2.9	R	1.73	1.0	1.0	1.7	1.7	∞
Extrapolation, Interpolation & Integration algorithms for Max. SAR Evaluation	E.5	1.0	R	1.73	1.0	1.0	0.6	0.6	∞
Test Sample Related									
Test Sample Positioning	E.4.2	6.0	N	1	1.0	1.0	6.0	6.0	287
Device Holder Uncertainty	E.4.1	3.32	R	1.73	1.0	1.0	1.9	1.9	∞
Output Power Variation - SAR drift measurement	E.6.2	5.0	R	1.73	1.0	1.0	2.9	2.9	∞
Phantom & Tissue Parameters									
Phantom Uncertainty (Shape & Thickness tolerances)	E.3.1	4.0	R	1.73	1.0	1.0	2.3	2.3	∞
Liquid Conductivity - deviation from target values	E.3.2	5.0	R	1.73	0.64	0.43	1.8	1.2	∞
Liquid Conductivity - measurement uncertainty	E.3.3	3.8	N	1	0.64	0.43	2.4	1.6	6
Liquid Permittivity - deviation from target values	E.3.2	5.0	R	1.73	0.60	0.49	1.7	1.4	∞
Liquid Permittivity - measurement uncertainty	E.3.3	4.5	N	1	0.60	0.49	2.7	2.2	6
Combined Standard Uncertainty (k=1)							RSS	12.4	12.0
Expanded Uncertainty (95% CONFIDENCE LEVEL)							k=2	24.7	24.0

The above measurement uncertainties are according to IEEE Std. 1528-2003

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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 Industry 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

PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LSMG920P; Type: Portable Handset; Serial: 08FCB

Communication System: UID 0, CDMA; 820.1 MHz; Duty Cycle: 1:1

Medium: 835 Head Medium parameters used (interpolated):

$f = 820.1 \text{ MHz}$; $\sigma = 0.917 \text{ S/m}$; $\epsilon_r = 43.651$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Right Section

Test Date: 01-19-2015; Ambient Temp: 23.1°C; Tissue Temp: 23.0°C

Probe: ES3DV3 - SN3263; ConvF(6.23, 6.23, 6.23); Calibrated: 5/15/2014;

Sensor-Surface: 3mm (Mechanical Surface Detection)

Electronics: DAE4 Sn859; Calibrated: 5/14/2014

Phantom: SAM v5.0 Left; Type: QD000P40CD; Serial: TP: 1687

Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Mode: Cell EVDO RevA BC10, Right Head, Cheek, Mid.ch

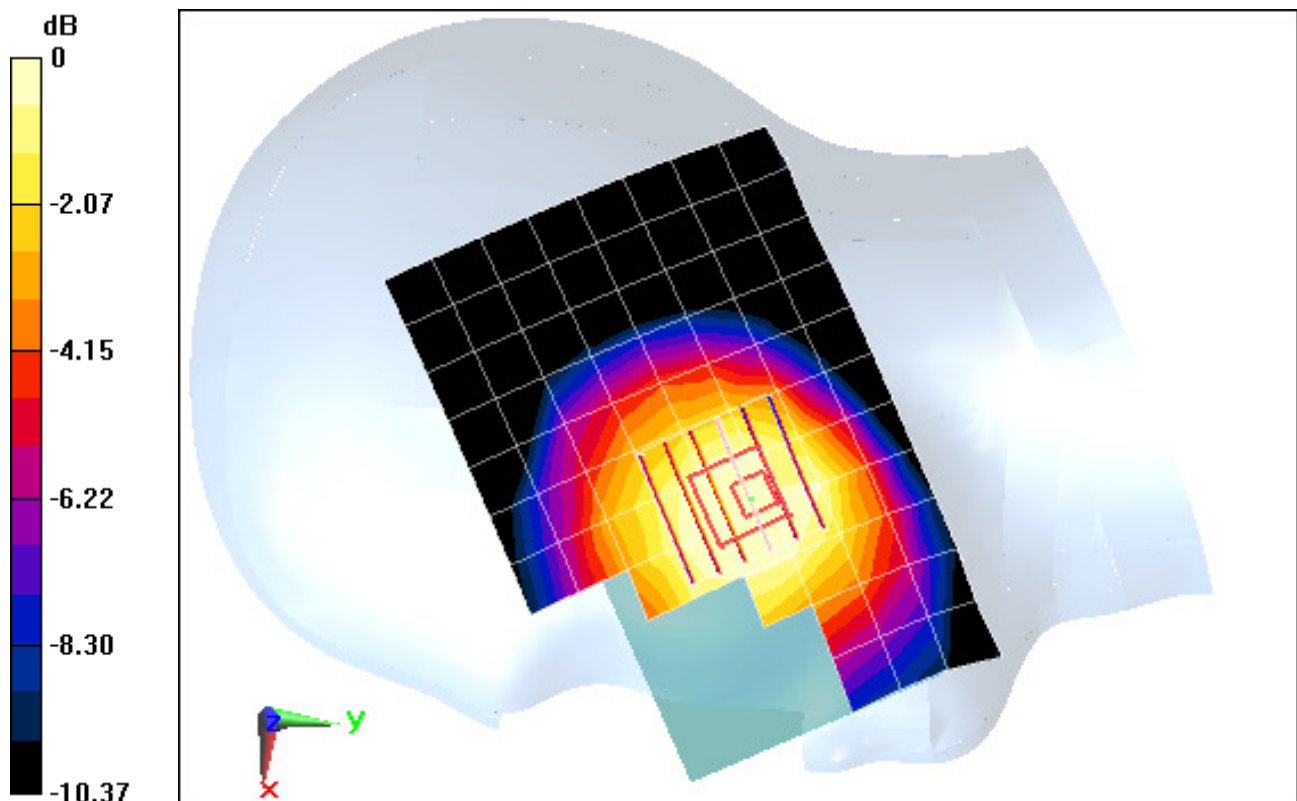
Area Scan (9x13x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$

Zoom Scan (6x6x7)/Cube 0: Measurement grid: $dx=8\text{mm}$, $dy=8\text{mm}$, $dz=5\text{mm}$

Reference Value = 15.89 V/m; Power Drift = -0.07 dB

Peak SAR (extrapolated) = 0.262 W/kg

SAR(1 g) = 0.208 W/kg



PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LSMG920P; Type: Portable Handset; Serial: 08FCB

Communication System: UID 0, CDMA; Frequency: 836.52 MHz; Duty Cycle: 1:1

Medium: 835 Head, Medium parameters used (interpolated):

$f = 836.52 \text{ MHz}$; $\sigma = 0.934 \text{ S/m}$; $\epsilon_r = 43.417$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Right Section

Test Date: 01-19-2015; Ambient Temp: 23.1°C; Tissue Temp: 23.0°C

Probe: ES3DV3 - SN3263; ConvF(6.23, 6.23, 6.23); Calibrated: 5/15/2014;

Sensor-Surface: 3mm (Mechanical Surface Detection)

Electronics: DAE4 Sn859; Calibrated: 5/14/2014

Phantom: SAM v5.0 Left; Type: QD000P40CD; Serial: TP: 1687

Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Mode: Cell EVDO RevA BC0, Right Head, Cheek, Mid.ch

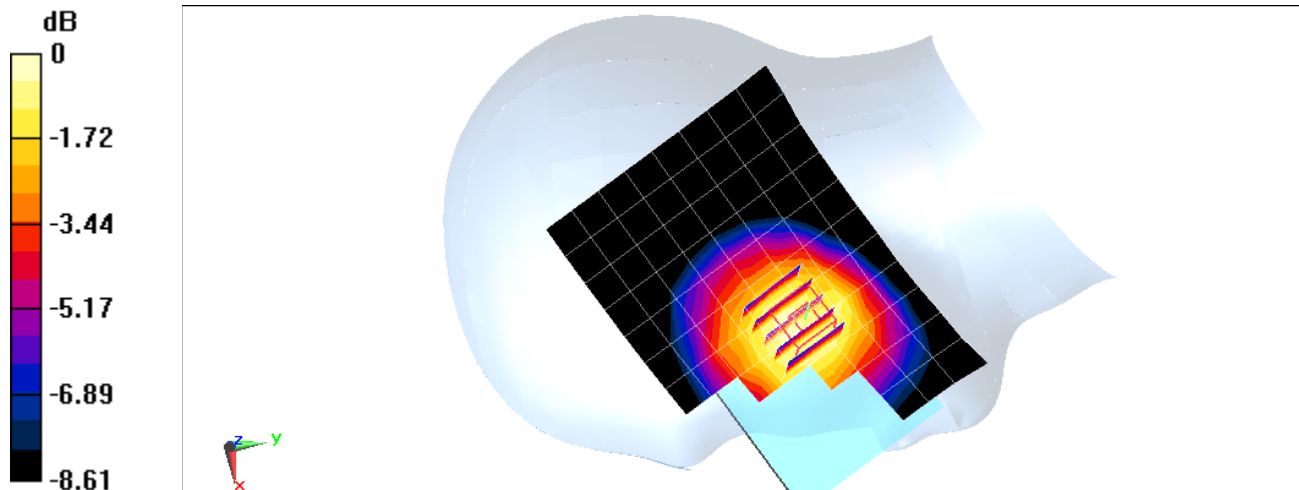
Area Scan (9x13x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$

Zoom Scan (5x5x7)/Cube 0: Measurement grid: $dx=8\text{mm}$, $dy=8\text{mm}$, $dz=5\text{mm}$

Reference Value = 16.08 V/m; Power Drift = 0.14 dB

Peak SAR (extrapolated) = 0.300 W/kg

SAR(1 g) = 0.233 W/kg



PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LSMG920P; Type: Portable Handset; Serial: 08FCF

Communication System: UID 0, CDMA; Frequency: 1851.25 MHz; Duty Cycle: 1:1
Medium: 1900 Head, Medium parameters used (interpolated):
 $f = 1851.25 \text{ MHz}$; $\sigma = 1.348 \text{ S/m}$; $\epsilon_r = 39.521$; $\rho = 1000 \text{ kg/m}^3$
Phantom section: Left Section

Test Date: 01-16-2015; Ambient Temp: 24.2°C; Tissue Temp: 22.8°C

Probe: ES3DV3 - SN3258; ConvF(5.04, 5.04, 5.04); Calibrated: 2/25/2014;
Sensor-Surface: 3mm (Mechanical Surface Detection)
Electronics: DAE4 Sn665; Calibrated: 2/26/2014
Phantom: SAM Front; Type: SAM; Serial: 1686
Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Mode: PCS CDMA, Left Head, Cheek, Low.ch

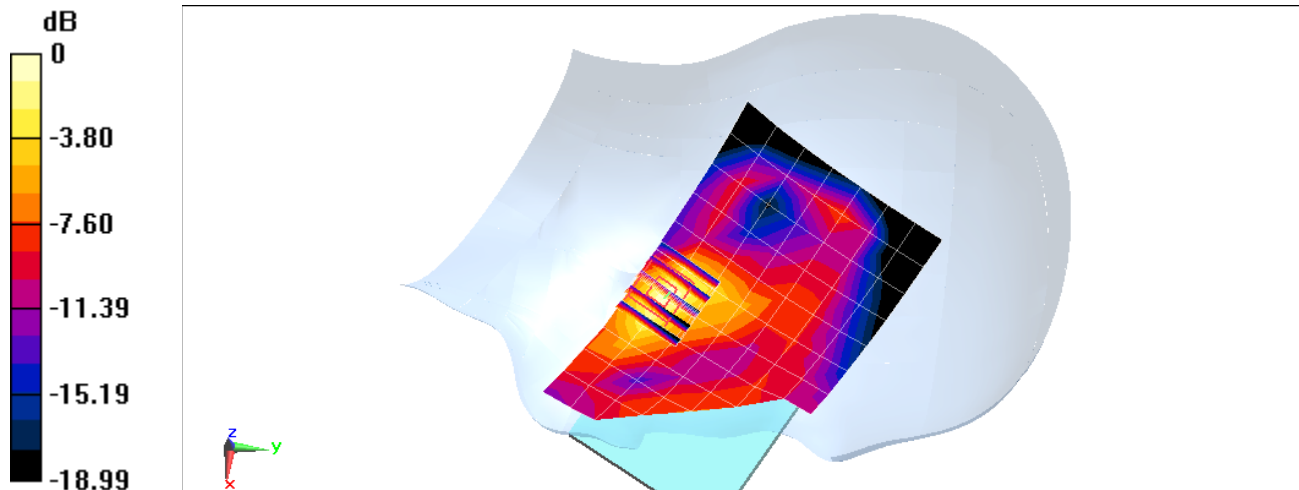
Area Scan (8x13x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$

Zoom Scan (5x5x7)/Cube 0: Measurement grid: $dx=8\text{mm}$, $dy=8\text{mm}$, $dz=5\text{mm}$

Reference Value = 17.33 V/m; Power Drift = -0.08 dB

Peak SAR (extrapolated) = 0.618 W/kg

SAR(1 g) = 0.326 W/kg



PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LSMG920P; Type: Portable Handset; Serial: 08C6B

Communication System: UID 0, GSM; Frequency: 836.6 MHz; Duty Cycle: 1:8.3

Medium: 835 Head, Medium parameters used (interpolated):

$f = 836.6 \text{ MHz}$; $\sigma = 0.898 \text{ S/m}$; $\epsilon_r = 40.782$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Right Section

Test Date: 01-16-2015; Ambient Temp: 23.4°C; Tissue Temp: 23.3°C

Probe: ES3DV2 - SN3022; ConvF(6.18, 6.18, 6.18); Calibrated: 8/19/2014;

Sensor-Surface: 3mm (Mechanical Surface Detection)

Electronics: DAE4 Sn1322; Calibrated: 8/12/2014

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

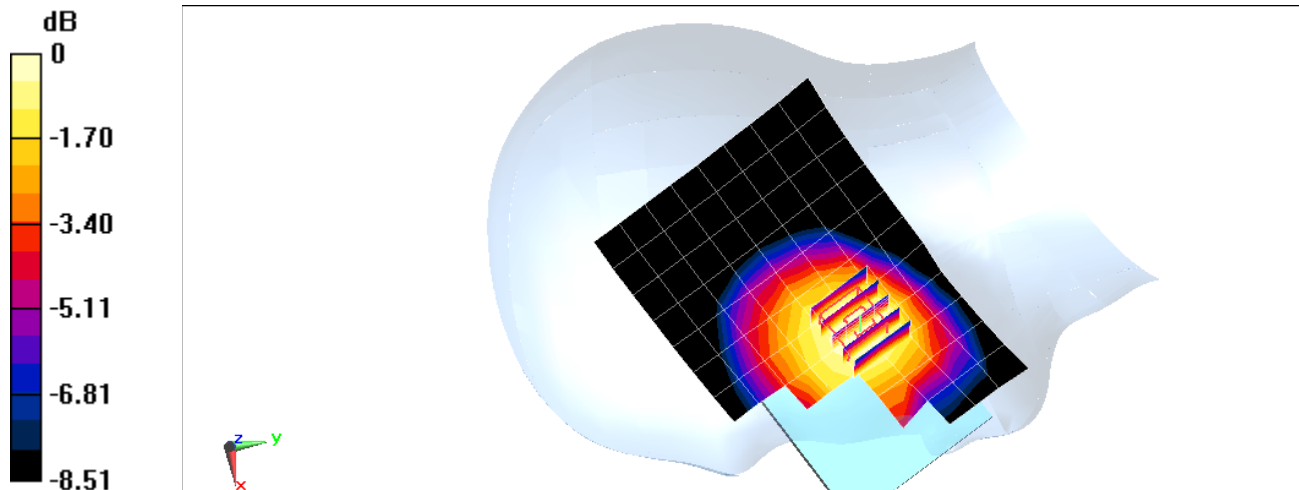
Area Scan (9x15x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$

Zoom Scan (5x5x7)/Cube 0: Measurement grid: $dx=8\text{mm}$, $dy=8\text{mm}$, $dz=5\text{mm}$

Reference Value = 15.00 V/m; Power Drift = 0.01 dB

Peak SAR (extrapolated) = 0.240 W/kg

SAR(1 g) = 0.188 W/kg



PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LSMG920P; Type: Portable Handset; Serial: 08C6B

Communication System: UID 0, GSM1900; Frequency: 1880 MHz; Duty Cycle: 1:8.3

Medium: 1900 Head, Medium parameters used:

$f = 1880 \text{ MHz}$; $\sigma = 1.378 \text{ S/m}$; $\epsilon_r = 39.355$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Left Section

Test Date: 01-16-2015; Ambient Temp: 24.2°C; Tissue Temp: 22.8°C

Probe: ES3DV3 - SN3258; ConvF(5.04, 5.04, 5.04); Calibrated: 2/25/2014;

Sensor-Surface: 3mm (Mechanical Surface Detection)

Electronics: DAE4 Sn665; Calibrated: 2/26/2014

Phantom: SAM Front; Type: SAM; Serial: 1686

Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

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

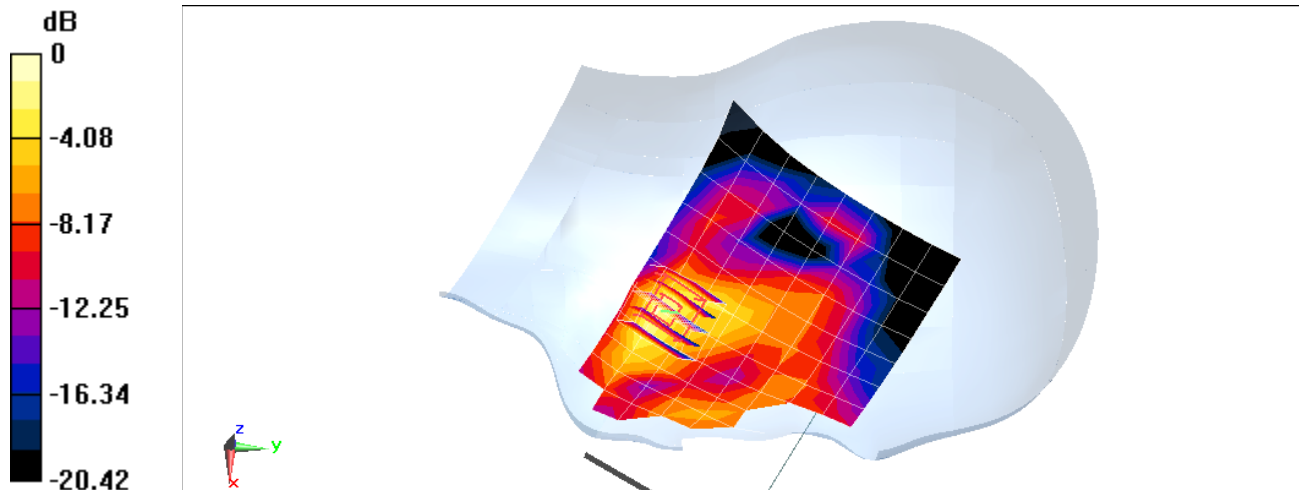
Area Scan (9x15x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$

Zoom Scan (5x5x7)/Cube 0: Measurement grid: $dx=8\text{mm}$, $dy=8\text{mm}$, $dz=5\text{mm}$

Reference Value = 7.184 V/m; Power Drift = 0.04 dB

Peak SAR (extrapolated) = 0.127 W/kg

SAR(1 g) = 0.075 W/kg



PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LSMG920P; Type: Portable Handset; Serial: 08C6B

Communication System: UID 0, UMTS; Frequency: 836.6 MHz; Duty Cycle: 1:1

Medium: 835 Head, Medium parameters used (interpolated):

$f = 836.6 \text{ MHz}$; $\sigma = 0.934 \text{ S/m}$; $\epsilon_r = 43.416$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Right Section

Test Date: 01-19-2015; Ambient Temp: 23.1°C; Tissue Temp: 23.0°C

Probe: ES3DV3 - SN3263; ConvF(6.23, 6.23, 6.23); Calibrated: 5/15/2014;

Sensor-Surface: 3mm (Mechanical Surface Detection)

Electronics: DAE4 Sn859; Calibrated: 5/14/2014

Phantom: SAM v5.0 Left; Type: QD000P40CD; Serial: TP: 1687

Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

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

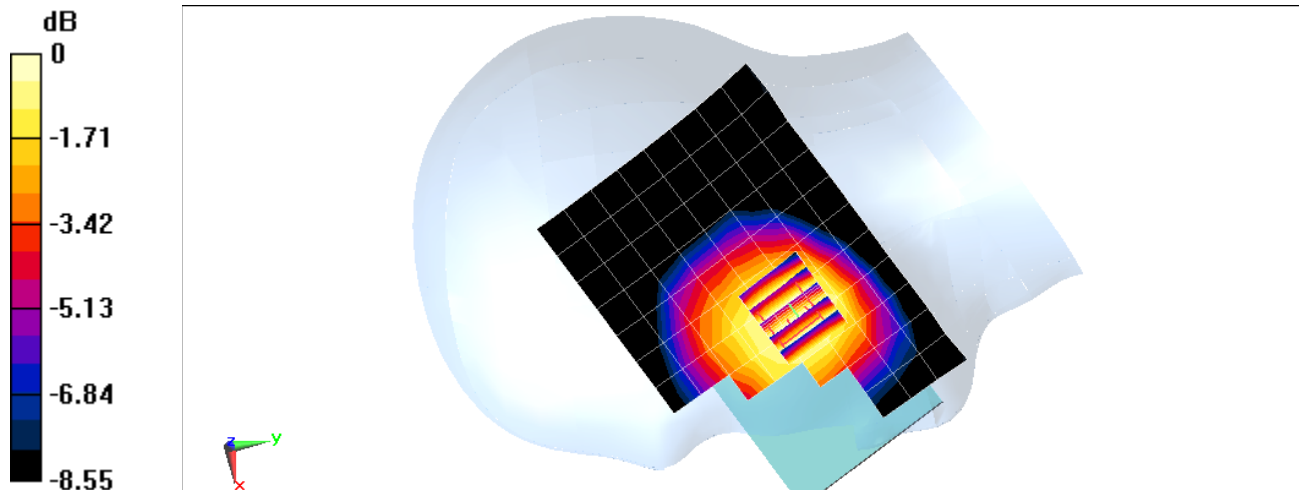
Area Scan (9x13x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$

Zoom Scan (5x5x7)/Cube 0: Measurement grid: $dx=8\text{mm}$, $dy=8\text{mm}$, $dz=5\text{mm}$

Reference Value = 13.71 V/m; Power Drift = 0.04 dB

Peak SAR (extrapolated) = 0.205 W/kg

SAR(1 g) = 0.166 W/kg



PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LSMG920P; Type: Portable Handset; Serial: 08C6B

Communication System: UID 0, UMTS; Frequency: 1880 MHz; Duty Cycle: 1:1

Medium: 1900 Head, Medium parameters used:

$f = 1880 \text{ MHz}$; $\sigma = 1.378 \text{ S/m}$; $\epsilon_r = 39.355$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Left Section

Test Date: 01-16-2015; Ambient Temp: 24.2°C; Tissue Temp: 22.8°C

Probe: ES3DV3 - SN3258; ConvF(5.04, 5.04, 5.04); Calibrated: 2/25/2014;

Sensor-Surface: 3mm (Mechanical Surface Detection)

Electronics: DAE4 Sn665; Calibrated: 2/26/2014

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, Mid.ch

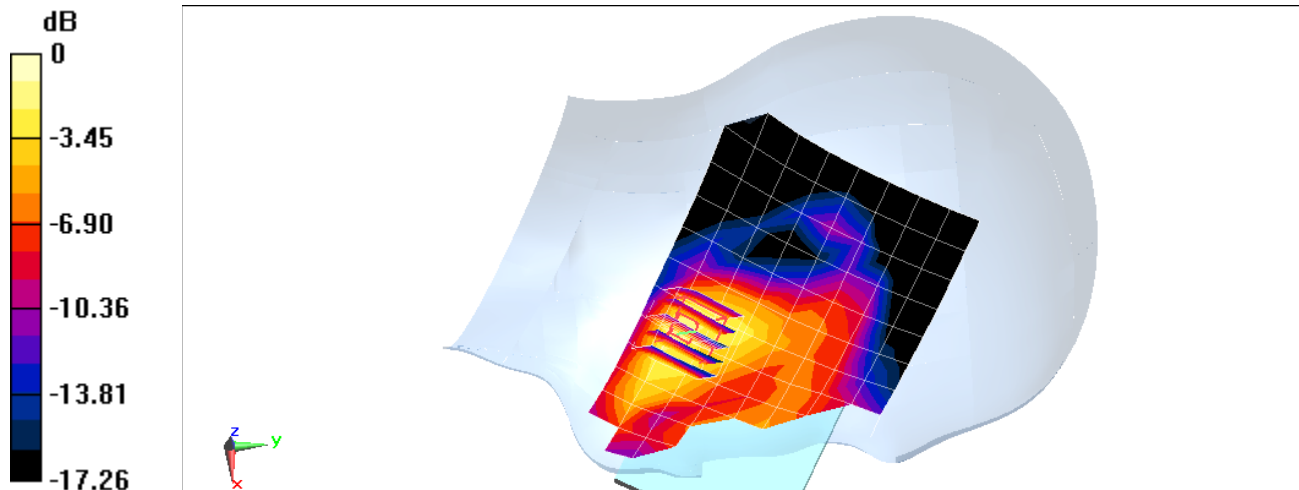
Area Scan (9x15x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$

Zoom Scan (5x5x7)/Cube 0: Measurement grid: $dx=8\text{mm}$, $dy=8\text{mm}$, $dz=5\text{mm}$

Reference Value = 11.78 V/m; Power Drift = -0.14 dB

Peak SAR (extrapolated) = 0.314 W/kg

SAR(1 g) = 0.184 W/kg



PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LSMG920P; Type: Portable Handset; Serial: 08FA6

Communication System: UID 0, LTE Band 12; Frequency: 707.5 MHz; Duty Cycle: 1:1

Medium: 750 Head Medium parameters used (interpolated):

$f = 707.5 \text{ MHz}$; $\sigma = 0.89 \text{ S/m}$; $\epsilon_r = 42.433$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Left Section

Test Date: 01-29-2015; Ambient Temp: 22.5°C; Tissue Temp: 21.7°C

Probe: ES3DV3 - SN3209; ConvF(6.43, 6.43, 6.43); Calibrated: 3/19/2014;

Sensor-Surface: 3mm (Mechanical Surface Detection)

Electronics: DAE4 Sn1334; Calibrated: 3/17/2014

Phantom: SAM; Type: QD000P40CD; Serial: TP:1758

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**

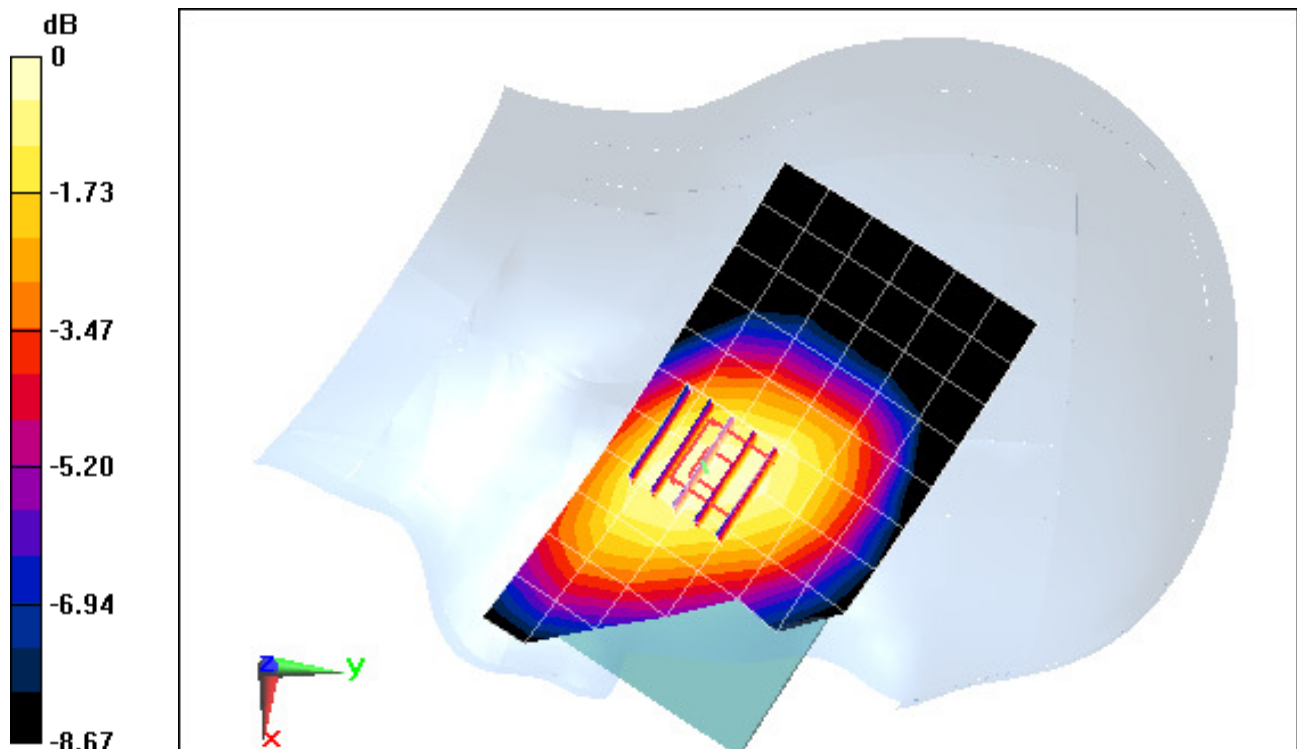
Area Scan (7x14x1): Measurement grid: dx=15mm, dy=15mm

Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 14.94 V/m; Power Drift = 0.04 dB

Peak SAR (extrapolated) = 0.216 W/kg

SAR(1 g) = 0.176 W/kg



PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LSMG920P; Type: Portable Handset; Serial: 08FC4

Communication System: UID 0, LTE Band 26; Frequency: 836.5 MHz; Duty Cycle: 1:1

Medium: 835 Head Medium parameters used (interpolated):

$f = 836.5 \text{ MHz}$; $\sigma = 0.915 \text{ S/m}$; $\epsilon_r = 41.216$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Right Section

Test Date: 01-31-2015; Ambient Temp: 22.9°C; Tissue Temp: 21.1°C

Probe: ES3DV3 - SN3263; ConvF(6.23, 6.23, 6.23); Calibrated: 5/15/2014;

Sensor-Surface: 3mm (Mechanical Surface Detection)

Electronics: DAE4 Sn859; Calibrated: 5/14/2014

Phantom: SAM v5.0 Left; Type: QD000P40CD; Serial: TP: 1687

Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

**Mode: LTE Band 26 (Cell.), Right Head, Cheek, Mid.ch,
15 MHz Bandwidth, QPSK, 1 RB, 74 RB Offset**

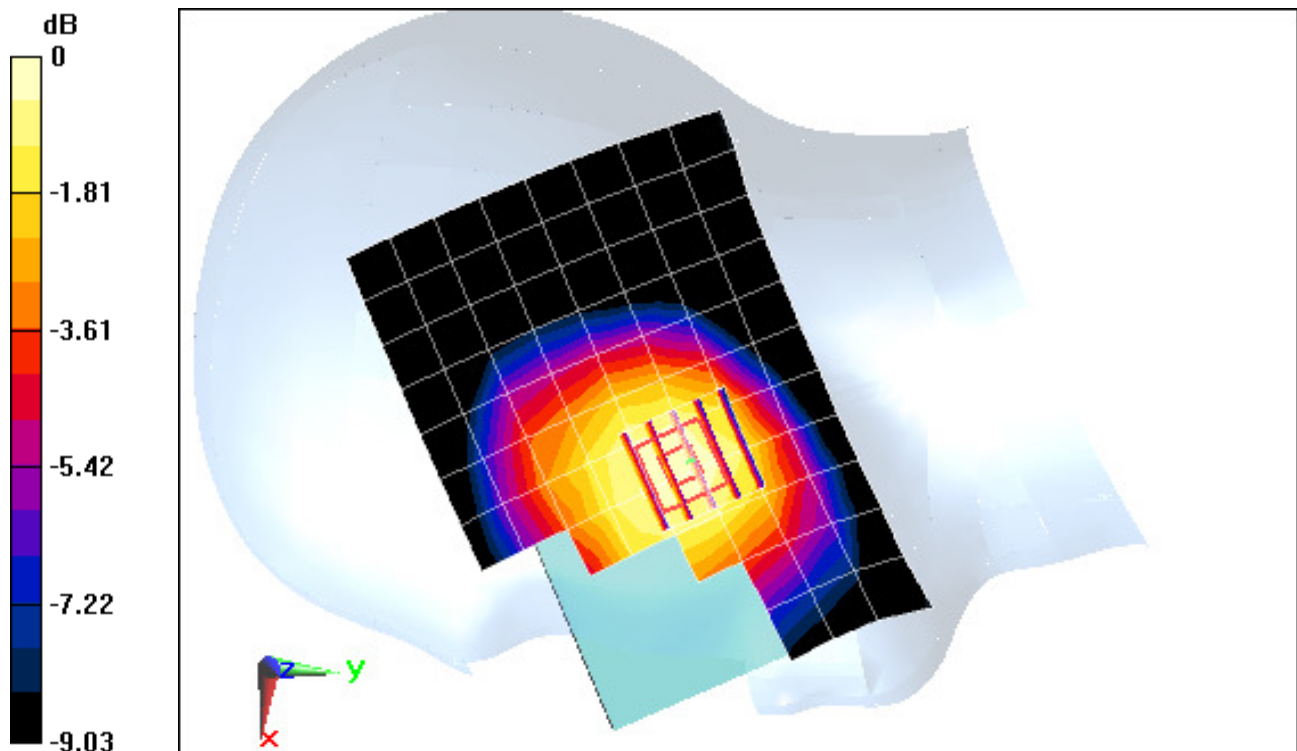
Area Scan (9x13x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$

Zoom Scan (5x5x7)/Cube 0: Measurement grid: $dx=8\text{mm}$, $dy=8\text{mm}$, $dz=5\text{mm}$

Reference Value = 16.51 V/m; Power Drift = 0.03 dB

Peak SAR (extrapolated) = 0.263 W/kg

SAR(1 g) = 0.213 W/kg



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

PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LSMG920P; Type: Portable Handset; Serial: 08FA6

Communication System: UID 0, LTE Band 4 (AWS); Frequency: 1732.5 MHz; Duty Cycle: 1:1

Medium: 1750 Head, Medium parameters used (interpolated):

$f = 1732.5 \text{ MHz}$; $\sigma = 1.322 \text{ S/m}$; $\epsilon_r = 38.55$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Left Section

Test Date: 01-16-2015; Ambient Temp: 23.3°C; Tissue Temp: 22.7°C

Probe: ES3DV3 - SN3209; ConvF(5.24, 5.24, 5.24); Calibrated: 3/19/2014;

Sensor-Surface: 3mm (Mechanical Surface Detection)

Electronics: DAE4 Sn1334; Calibrated: 3/17/2014

Phantom: SAM Right; Type: SAM; Serial: 1757

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, 0 RB Offset**

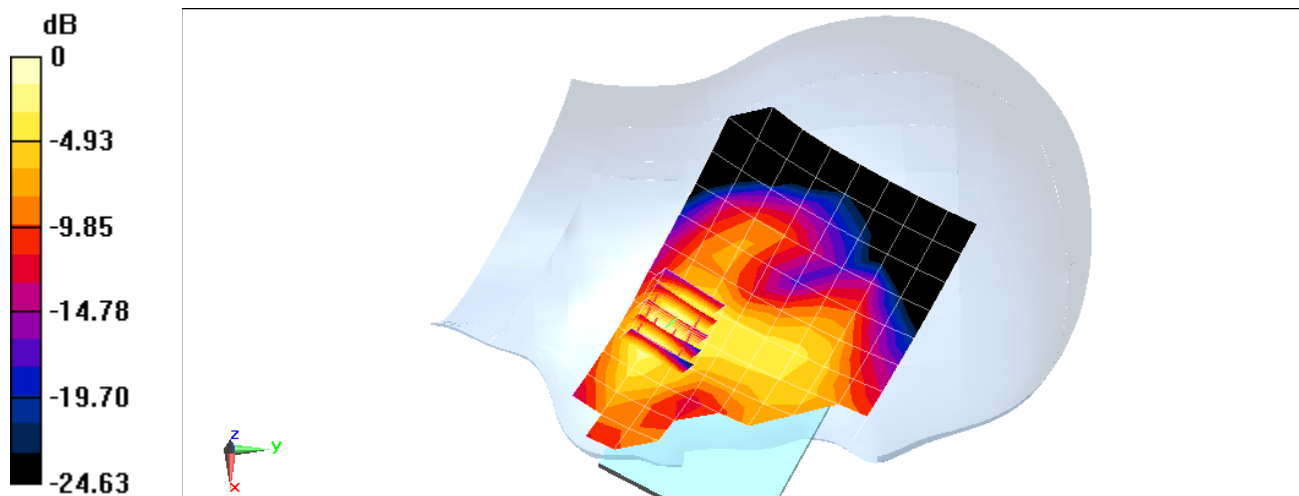
Area Scan (9x15x1): Measurement grid: dx=15mm, dy=15mm

Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 15.51 V/m; Power Drift = 0.05 dB

Peak SAR (extrapolated) = 0.388 W/kg

SAR(1 g) = 0.231 W/kg



PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LSMG920P; Type: Portable Handset; Serial: 08FA6

Communication System: UID 0, LTE Band 25 (PCS); Frequency: 1860 MHz; Duty Cycle: 1:1

Medium: 1900 Head Medium parameters used (interpolated):

$f = 1860 \text{ MHz}$; $\sigma = 1.344 \text{ S/m}$; $\epsilon_r = 39.613$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Left Section

Test Date: 02-06-2015; Ambient Temp: 24.9°C; Tissue Temp: 23.0°C

Probe: ES3DV3 - SN3263; ConvF(5.08, 5.08, 5.08); Calibrated: 5/15/2014;

Sensor-Surface: 3mm (Mechanical Surface Detection)

Electronics: DAE4 Sn859; Calibrated: 5/14/2014

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 25 (PCS), Left Head, Cheek, Low.ch,
20 MHz Bandwidth, QPSK, 1 RB, 50 RB Offset**

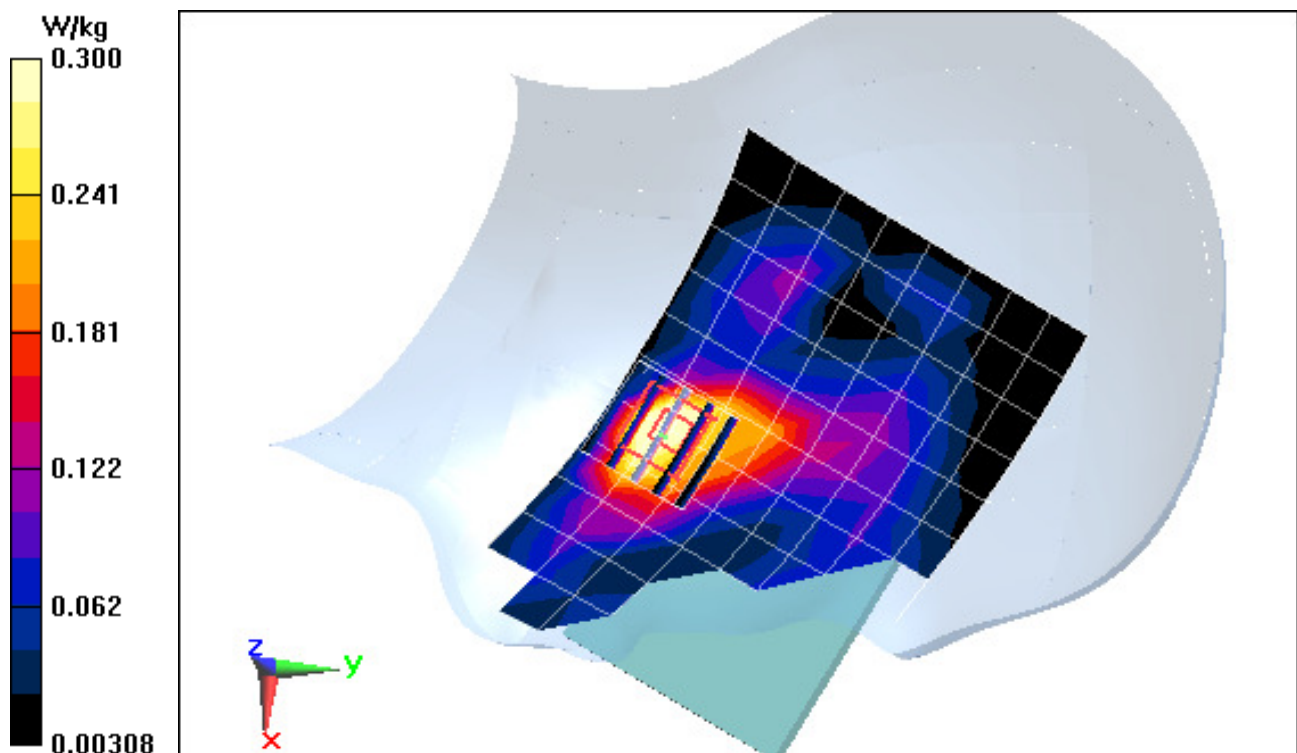
Area Scan (9x13x1): Measurement grid: dx=15mm, dy=15mm

Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 18.21 V/m; Power Drift = -0.02 dB

Peak SAR (extrapolated) = 0.797 W/kg

SAR(1 g) = 0.440 W/kg



PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LSMG920P; Type: Portable Handset; Serial: 12D77

Communication System: UID 0, LTE Band 41; Frequency: 2636.5 MHz; Duty Cycle: 1:1.58

Medium: 2450 Head Medium parameters used (interpolated):

$f = 2636.5 \text{ MHz}$; $\sigma = 2.009 \text{ S/m}$; $\epsilon_r = 40.248$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Right Section

Test Date: 02-05-2015; Ambient Temp: 24.3°C; Tissue Temp: 22.5°C

Probe: ES3DV3 - SN3258; ConvF(4.34, 4.34, 4.34); Calibrated: 2/25/2014;

Sensor-Surface: 3mm (Mechanical Surface Detection)

Electronics: DAE4 Sn665; Calibrated: 2/26/2014

Phantom: SAM Front; Type: SAM; Serial: 1686

Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

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

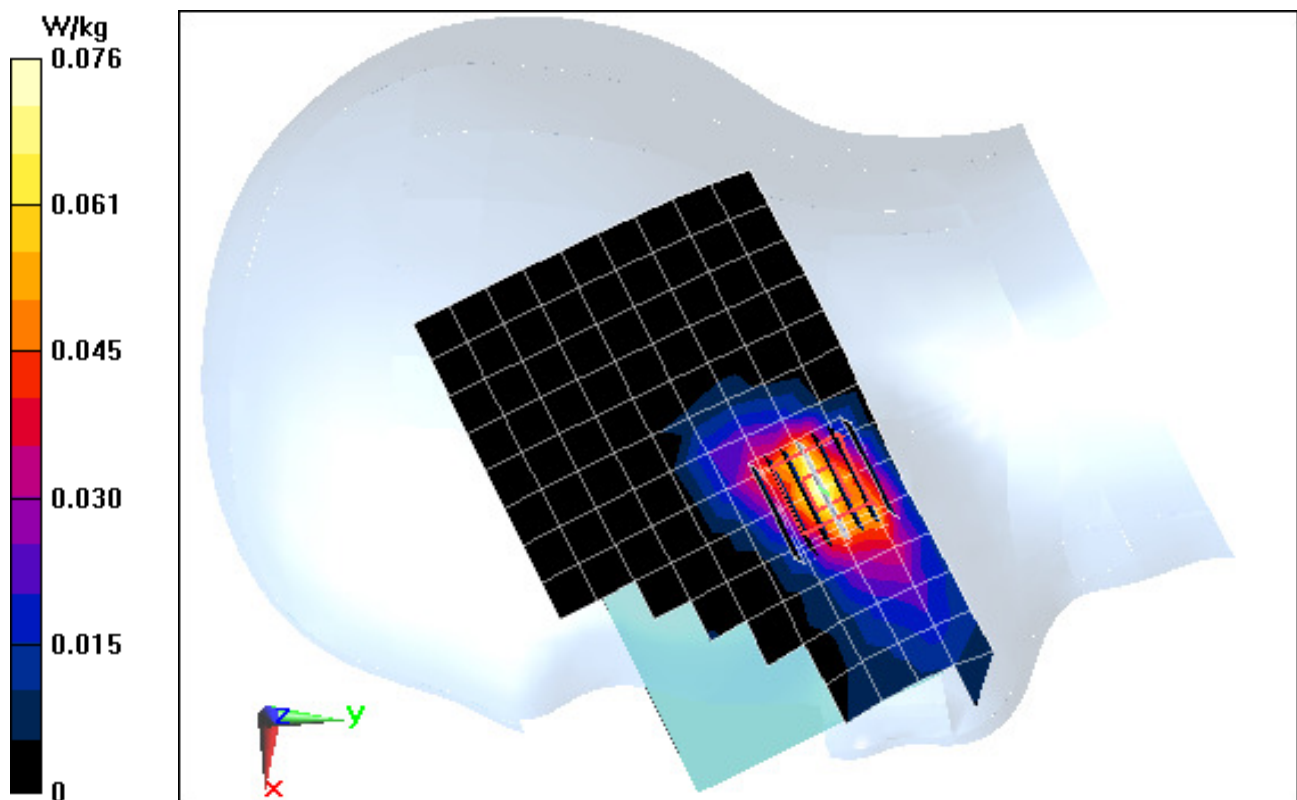
Area Scan (10x17x1): Measurement grid: dx=12mm, dy=12mm

Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 6.592 V/m; Power Drift = 0.08 dB

Peak SAR (extrapolated) = 0.122 W/kg

SAR(1 g) = 0.062 W/kg



PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LSMG920P; Type: Portable Handset; Serial: 08FA2

Communication System: UID 0, IEEE 802.11b; Frequency: 2412 MHz; Duty Cycle: 1:1

Medium: 2450 Head, Medium parameters used (interpolated):

$f = 2412 \text{ MHz}$; $\sigma = 1.806 \text{ S/m}$; $\epsilon_r = 40.625$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Left Section

Test Date: 01-20-2015; Ambient Temp: 21.9°C; Tissue Temp: 23.0°C

Probe: ES3DV3 - SN3209; ConvF(4.54, 4.54, 4.54); Calibrated: 3/19/2014;

Sensor-Surface: 3mm (Mechanical Surface Detection)

Electronics: DAE4 Sn1334; Calibrated: 3/17/2014

Phantom: SAM Right; Type: SAM; Serial: 1757

Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Mode: IEEE 802.11b, Left Head, Cheek, Ch 1, 1 Mbps, Antenna 2

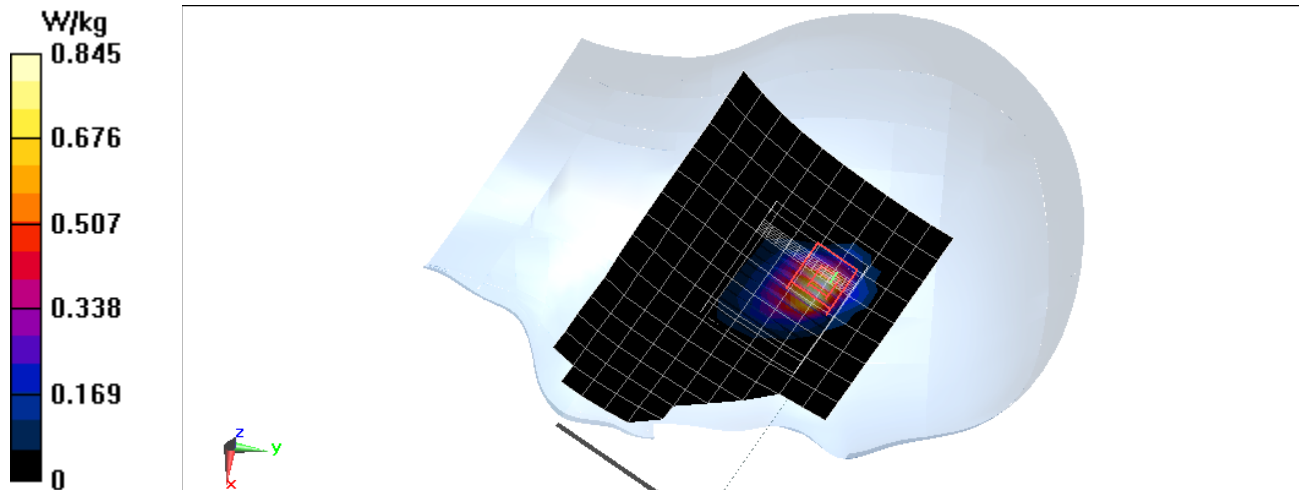
Area Scan (11x18x1): Measurement grid: $dx=12\text{mm}$, $dy=12\text{mm}$

Zoom Scan (11x12x7)/Cube 0: Measurement grid: $dx=5\text{mm}$, $dy=5\text{mm}$, $dz=5\text{mm}$

Reference Value = 21.12 V/m; Power Drift = -0.01 dB

Peak SAR (extrapolated) = 1.35 W/kg

SAR(1 g) = 0.666 W/kg



PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LSMG920P; Type: Portable Handset; Serial: 08FA2

Communication System: UID 0, IEEE 802.11a; Frequency: 5745 MHz; Duty Cycle: 1:1

Medium: 5 GHz Head, Medium parameters used:

$f = 5745 \text{ MHz}$; $\sigma = 5.43 \text{ S/m}$; $\epsilon_r = 34.635$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Right Section

Test Date: 01-27-2015; Ambient Temp: 24.3°C; Tissue Temp: 21.8°C

Probe: EX3DV4 - SN7308; ConvF(4.81, 4.81, 4.81); Calibrated: 7/16/2014;

Sensor-Surface: 1.4mm (Mechanical Surface Detection)

Electronics: DAE4 Sn1323; Calibrated: 9/17/2014

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 802.11a, U-NII-3, 20 MHz Bandwidth, Right Head,
Cheek, Ch 149, 6 Mbps, Antenna 1**

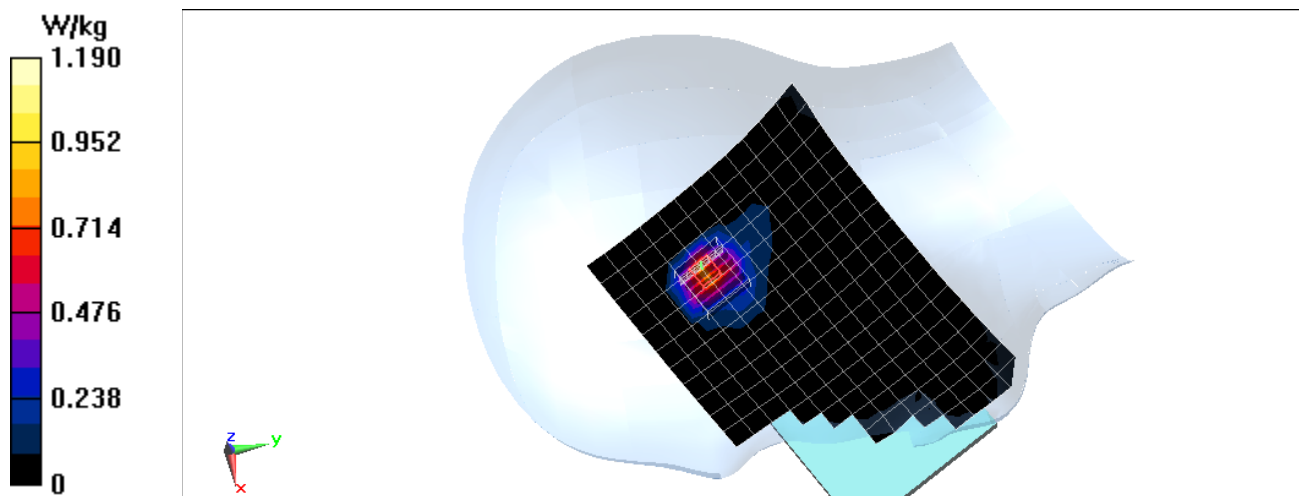
Area Scan (13x18x1): Measurement grid: dx=10mm, dy=10mm

Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm; Graded Ratio: 1.4

Reference Value = 6.901 V/m; Power Drift = 0.01 dB

Peak SAR (extrapolated) = 2.35 W/kg

SAR(1 g) = 0.457 W/kg



PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LSMG920P; Type: Portable Handset; Serial: 08FC8

Communication System: UID 0, Cellular CDMA; Frequency: 820.1 MHz; Duty Cycle: 1:1

Medium: 835 Body Medium parameters used (interpolated):

$f = 820.1 \text{ MHz}$; $\sigma = 0.979 \text{ S/m}$; $\epsilon_r = 54.585$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section ; Space: 1.0 cm

Test Date: 01-19-2015; Ambient Temp: 24.2°C; Tissue Temp: 22.6°C

Probe: ES3DV3 - SN3288; ConvF(6.32, 6.32, 6.32); Calibrated: 9/24/2014;

Sensor-Surface: 3mm (Mechanical Surface Detection)

Electronics: DAE4 Sn1364; Calibrated: 9/18/2014

Phantom: ELI v5.0; Type: QDOVA001BB; Serial: 1229

Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Mode: Cell. CDMA BC10, Body SAR, Back Side, Mid.ch

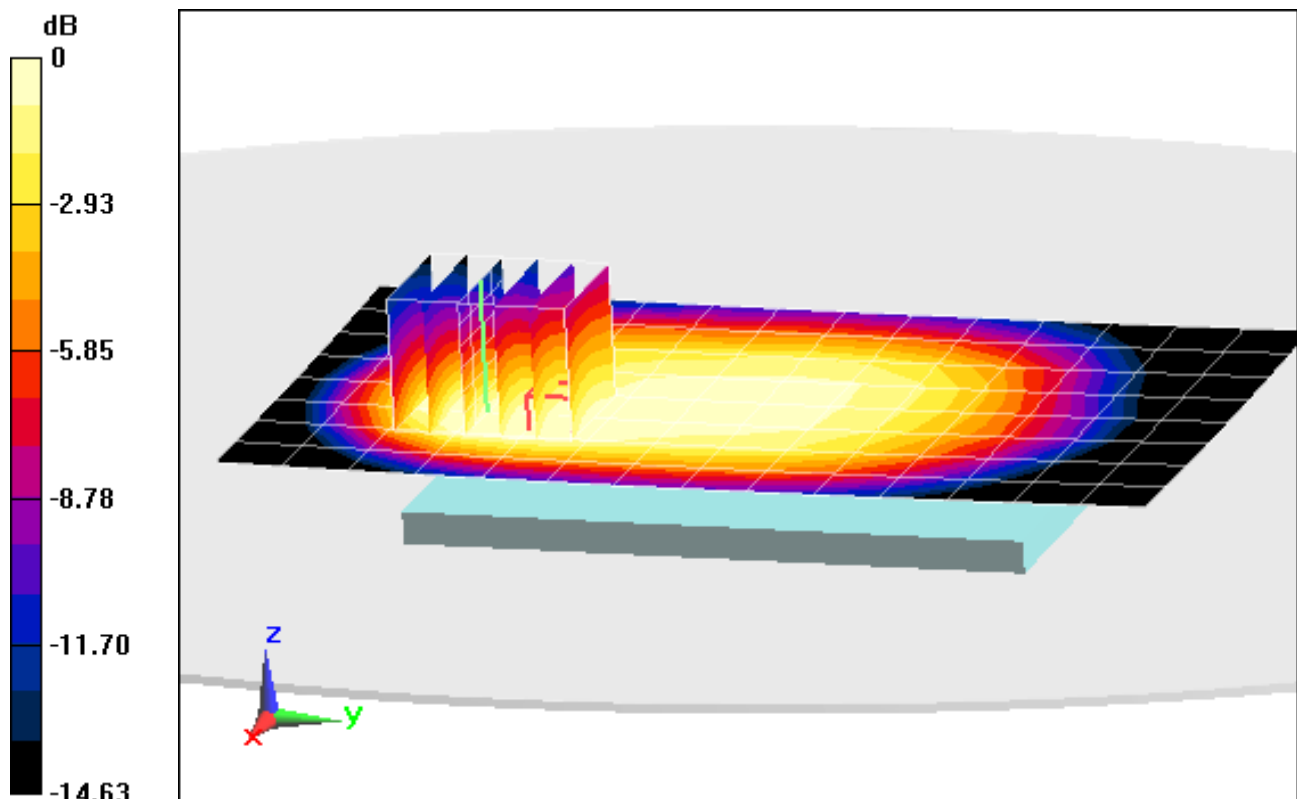
Area Scan (9x15x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$

Zoom Scan (5x6x7)/Cube 0: Measurement grid: $dx=8\text{mm}$, $dy=8\text{mm}$, $dz=5\text{mm}$

Reference Value = 19.14 V/m; Power Drift = 0.03 dB

Peak SAR (extrapolated) = 0.548 W/kg

SAR(1 g) = 0.341 W/kg



PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LSMG920P; Type: Portable Handset; Serial: 08FC8

Communication System: UID 0, Cellular CDMA; Frequency: 820.1 MHz; Duty Cycle: 1:1

Medium: 835 Body Medium parameters used (interpolated):

$f = 820.1 \text{ MHz}$; $\sigma = 0.979 \text{ S/m}$; $\epsilon_r = 54.585$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section ; Space: 1.0 cm

Test Date: 01-19-2015; Ambient Temp: 24.2°C; Tissue Temp: 22.6°C

Probe: ES3DV3 - SN3288; ConvF(6.32, 6.32, 6.32); Calibrated: 9/24/2014;

Sensor-Surface: 3mm (Mechanical Surface Detection)

Electronics: DAE4 Sn1364; Calibrated: 9/18/2014

Phantom: ELI v5.0; Type: QDOVA001BB; Serial: 1229

Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Mode: Cell. EVDO Rev0 BC10, Body SAR, Left Edge, Mid.ch

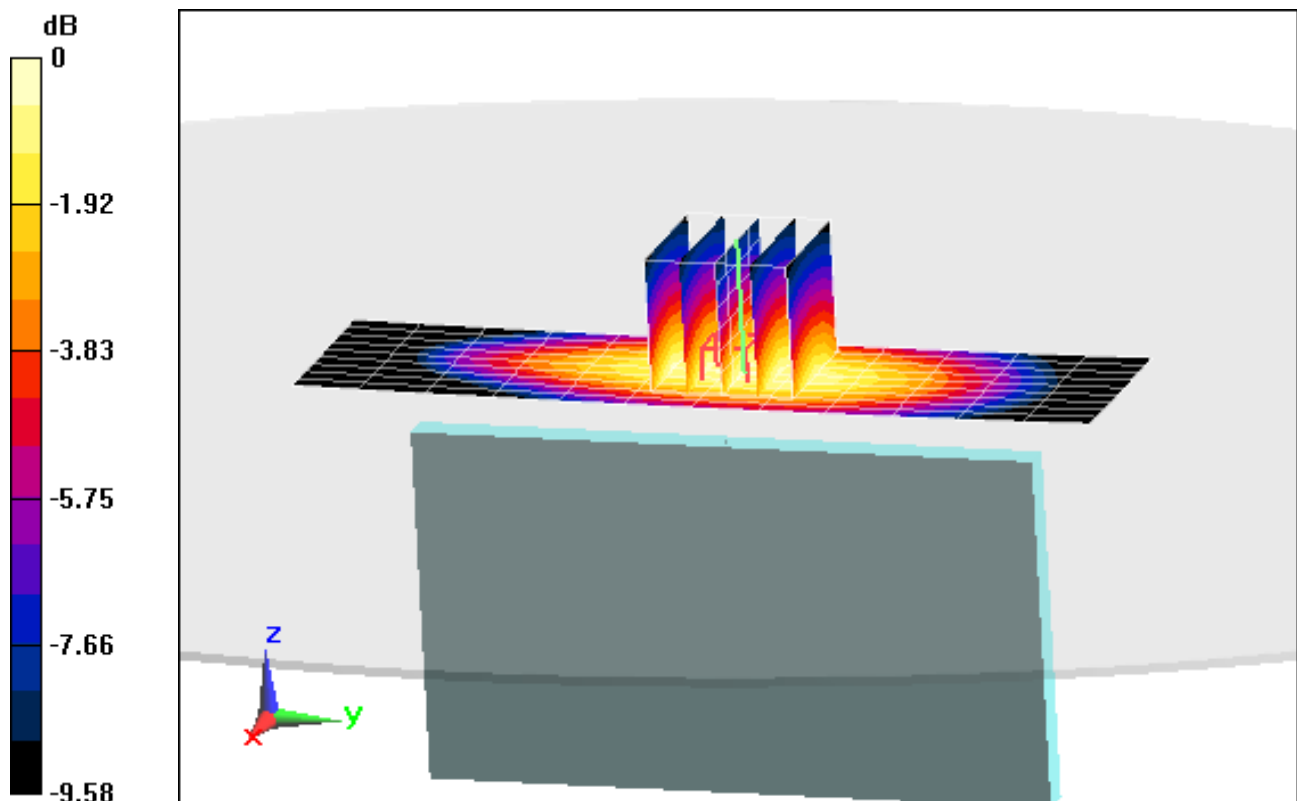
Area Scan (10x13x1): Measurement grid: $dx=5\text{mm}$, $dy=15\text{mm}$

Zoom Scan (5x5x7)/Cube 0: Measurement grid: $dx=8\text{mm}$, $dy=8\text{mm}$, $dz=5\text{mm}$

Reference Value = 19.93 V/m; Power Drift = 0.05 dB

Peak SAR (extrapolated) = 0.507 W/kg

SAR(1 g) = 0.355 W/kg



PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LSMG920P; Type: Portable Handset; Serial: 08FC8

Communication System: UID 0, CDMA; Frequency: 836.52 MHz; Duty Cycle: 1:1

Medium: 835 Body, Medium parameters used (interpolated):

$f = 836.52 \text{ MHz}$; $\sigma = 0.994 \text{ S/m}$; $\epsilon_r = 54.432$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.0 cm

Test Date: 01-19-2015; Ambient Temp: 24.2°C; Tissue Temp: 22.6°C

Probe: ES3DV3 - SN3288; ConvF(6.32, 6.32, 6.32); Calibrated: 9/24/2014;

Sensor-Surface: 3mm (Mechanical Surface Detection)

Electronics: DAE4 Sn1364; Calibrated: 9/18/2014

Phantom: ELI v5.0; Type: QDOVA001BB; Serial: 1229

Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Mode: Cell. CDMA BC0, Body SAR, Back Side, Mid.ch

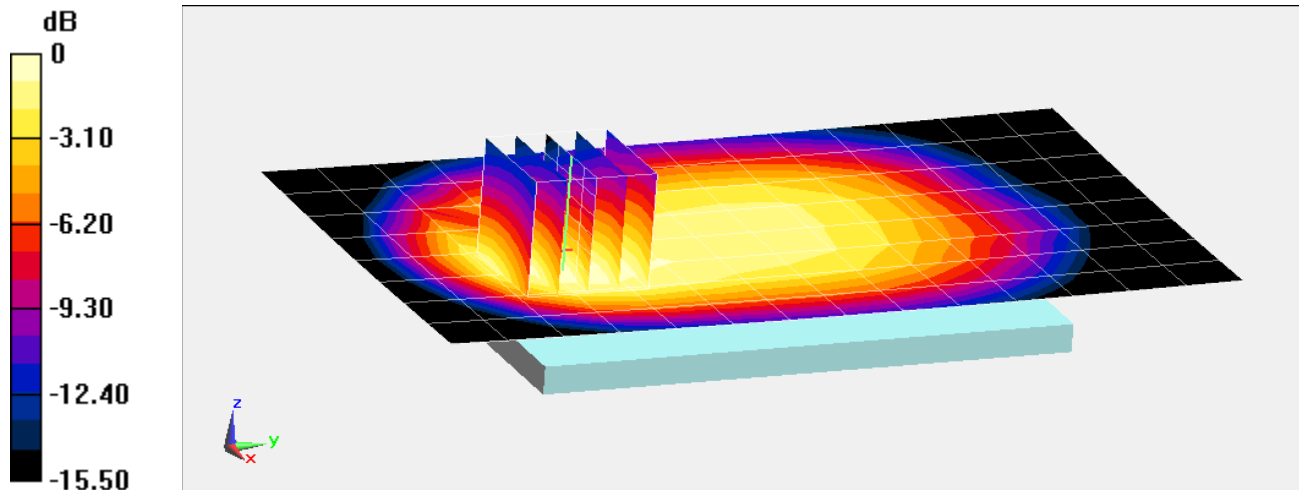
Area Scan (9x15x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$

Zoom Scan (5x5x7)/Cube 0: Measurement grid: $dx=8\text{mm}$, $dy=8\text{mm}$, $dz=5\text{mm}$

Reference Value = 21.31 V/m; Power Drift = 0.00 dB

Peak SAR (extrapolated) = 0.720 W/kg

SAR(1 g) = 0.409 W/kg



PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LSMG920P; Type: Portable Handset; Serial: 08FC8

Communication System: UID 0, CDMA; Frequency: 836.52 MHz; Duty Cycle: 1:1
Medium: 835 Body, Medium parameters used (interpolated):
 $f = 836.52 \text{ MHz}$; $\sigma = 0.994 \text{ S/m}$; $\epsilon_r = 54.432$; $\rho = 1000 \text{ kg/m}^3$
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 01-19-2015; Ambient Temp: 24.2°C; Tissue Temp: 22.6°C

Probe: ES3DV3 - SN3288; ConvF(6.32, 6.32, 6.32); Calibrated: 9/24/2014;
Sensor-Surface: 3mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1364; Calibrated: 9/18/2014
Phantom: ELI v5.0; Type: QDOVA001BB; Serial: 1229
Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Mode: Cell. EVDO Rev0 BC0, Body SAR, Back Side, Mid.ch

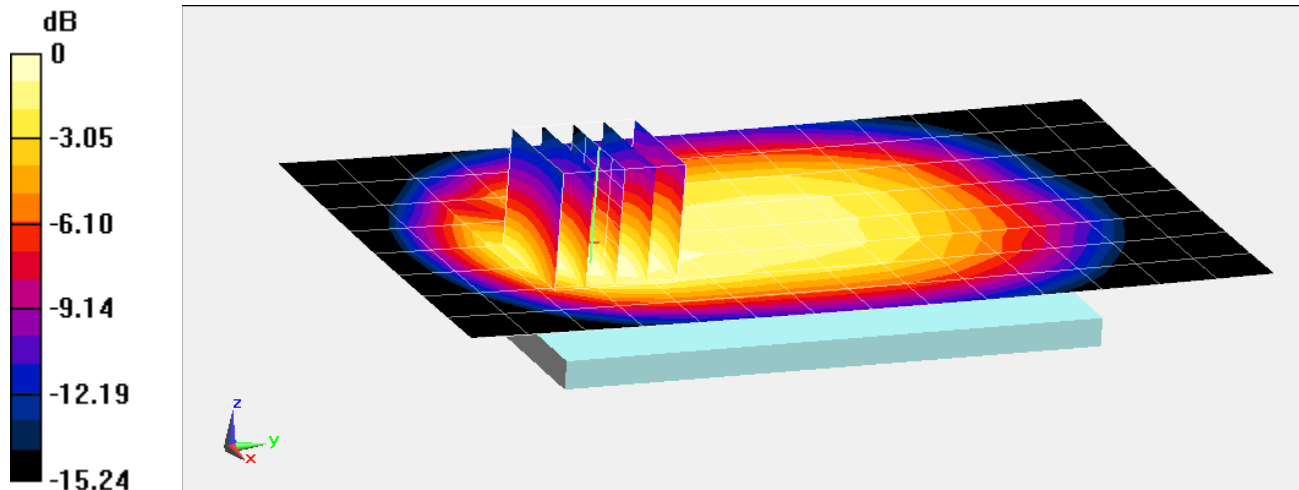
Area Scan (9x15x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$

Zoom Scan (5x5x7)/Cube 0: Measurement grid: $dx=8\text{mm}$, $dy=8\text{mm}$, $dz=5\text{mm}$

Reference Value = 21.32 V/m; Power Drift = 0.02 dB

Peak SAR (extrapolated) = 0.722 W/kg

SAR(1 g) = 0.411 W/kg



PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LSMG920P; Type: Portable Handset; Serial: 08FCF

Communication System: UID 0, CDMA; Frequency: 1880 MHz; Duty Cycle: 1:1

Medium: 1900 Body, Medium parameters used:

$f = 1880 \text{ MHz}$; $\sigma = 1.548 \text{ S/m}$; $\epsilon_r = 51.717$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.5 cm

Test Date: 01-19-2015; Ambient Temp: 24.4°C; Tissue Temp: 21.8°C

Probe: ES3DV3 - SN3258; ConvF(4.61, 4.61, 4.61); Calibrated: 2/25/2014;

Sensor-Surface: 3mm (Mechanical Surface Detection)

Electronics: DAE4 Sn665; Calibrated: 2/26/2014

Phantom: ELI v5.0; Type: QDOVA002AA; Serial: TP-1158

Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

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

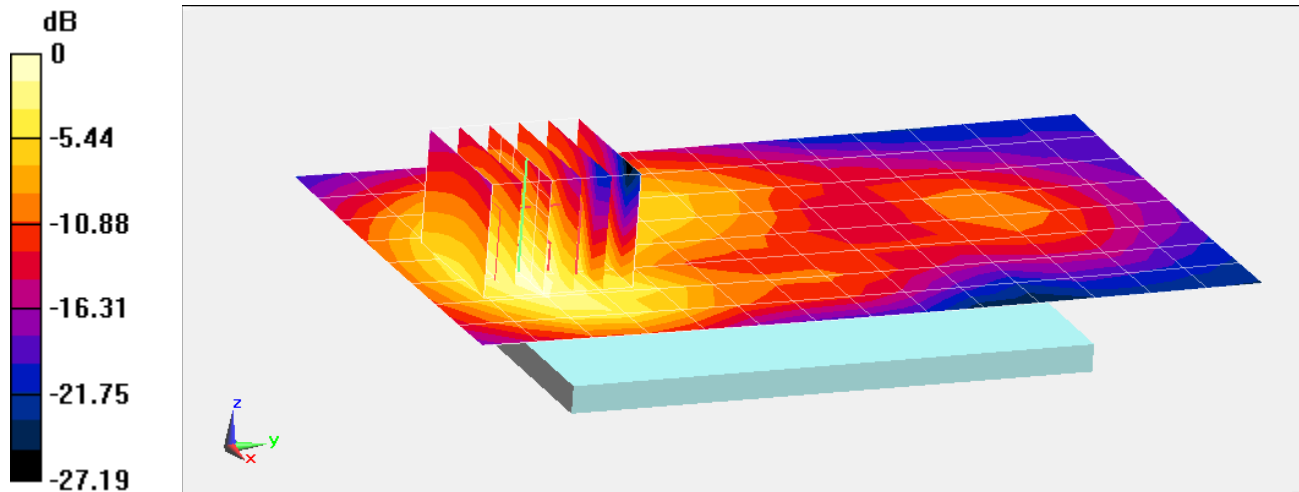
Area Scan (9x15x1): Measurement grid: dx=15mm, dy=15mm

Zoom Scan (6x6x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 18.52 V/m; Power Drift = -0.03 dB

Peak SAR (extrapolated) = 0.825 W/kg

SAR(1 g) = 0.501 W/kg



PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LSMG920P; Type: Portable Handset; Serial: 08FD5

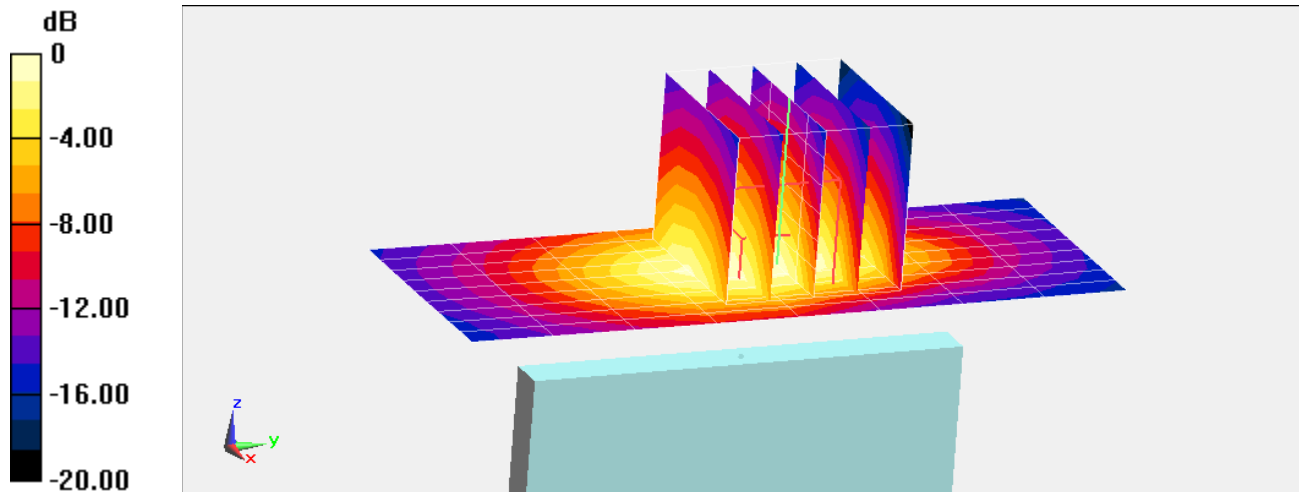
Communication System: UID 0, CDMA; Frequency: 1851.25 MHz; Duty Cycle: 1:1
Medium: 1900 Body, Medium parameters used (interpolated):
 $f = 1851.25 \text{ MHz}$; $\sigma = 1.519 \text{ S/m}$; $\epsilon_r = 51.837$; $\rho = 1000 \text{ kg/m}^3$
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 01-19-2015; Ambient Temp: 24.4°C; Tissue Temp: 21.8°C

Probe: ES3DV3 - SN3258; ConvF(4.61, 4.61, 4.61); Calibrated: 2/25/2014;
Sensor-Surface: 3mm (Mechanical Surface Detection)
Electronics: DAE4 Sn665; Calibrated: 2/26/2014
Phantom: ELI v5.0; Type: QDOVA002AA; Serial: TP-1158
Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Mode: PCS EVDO Rev0, Body SAR, Bottom Edge, Low.ch

Area Scan (10x9x1): Measurement grid: dx=5mm, dy=15mm
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 23.38 V/m; Power Drift = 0.12 dB
Peak SAR (extrapolated) = 1.18 W/kg
SAR(1 g) = 0.718 W/kg



PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LSMG920P; Type: Portable Handset; Serial: 08C68

Communication System: UID 0, GSM; Frequency: 836.6 MHz; Duty Cycle: 1:8.3

Medium: 835 Body, Medium parameters used (interpolated):

$f = 836.6 \text{ MHz}$; $\sigma = 0.994 \text{ S/m}$; $\epsilon_r = 54.432$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.0 cm

Test Date: 01-19-2015; Ambient Temp: 24.2°C; Tissue Temp: 22.6°C

Probe: ES3DV3 - SN3288; ConvF(6.32, 6.32, 6.32); Calibrated: 9/24/2014;

Sensor-Surface: 3mm (Mechanical Surface Detection)

Electronics: DAE4 Sn1364; Calibrated: 9/18/2014

Phantom: ELI v5.0; Type: QDOVA001BB; Serial: 1229

Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

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

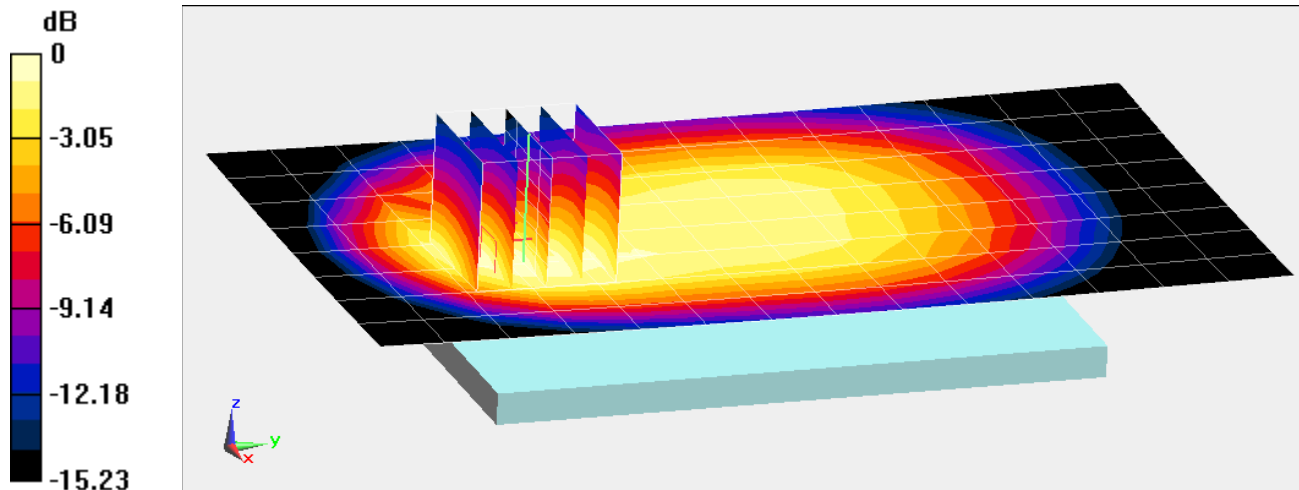
Area Scan (9x15x1): Measurement grid: dx=15mm, dy=15mm

Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 18.94 V/m; Power Drift = 0.01 dB

Peak SAR (extrapolated) = 0.592 W/kg

SAR(1 g) = 0.327 W/kg



PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LSMG920P; Type: Portable Handset; Serial: 08C68

Communication System: UID 0, GSM850 GPRS; 4 Tx slots; Frequency: 836.6 MHz; Duty Cycle: 1:2.076

Medium: 835 Body, Medium parameters used (interpolated):

$f = 836.6 \text{ MHz}$; $\sigma = 0.994 \text{ S/m}$; $\epsilon_r = 54.432$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.0 cm

Test Date: 01-19-2015; Ambient Temp: 24.2°C; Tissue Temp: 22.6°C

Probe: ES3DV3 - SN3288; ConvF(6.32, 6.32, 6.32); Calibrated: 9/24/2014;

Sensor-Surface: 3mm (Mechanical Surface Detection)

Electronics: DAE4 Sn1364; Calibrated: 9/18/2014

Phantom: ELI v5.0; Type: QDOVA001BB; Serial: 1229

Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Mode: GPRS 850, Body SAR, Back Side, Mid.ch, 4 Tx Slots

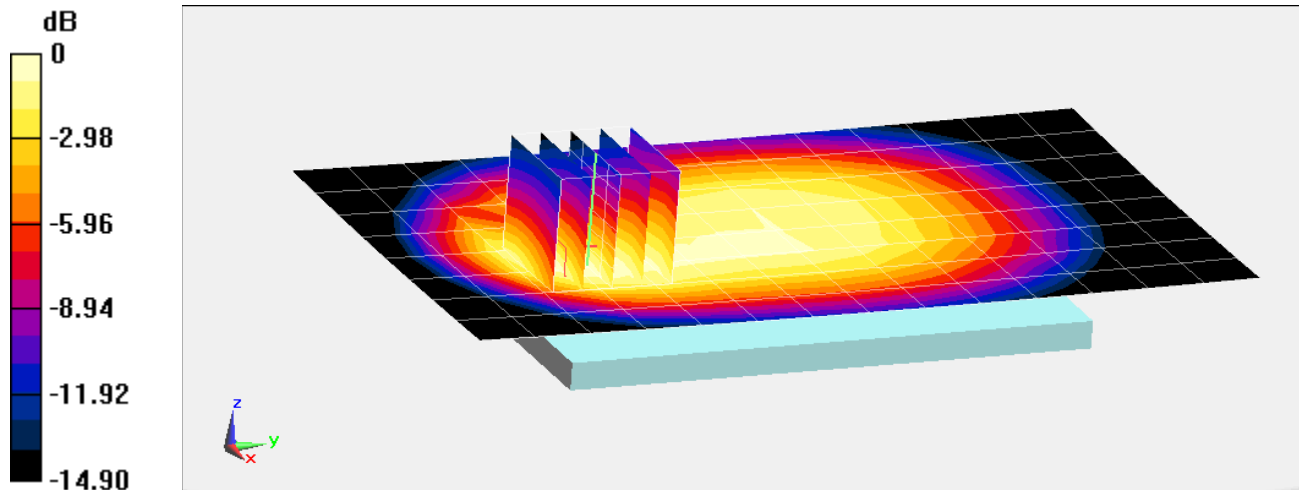
Area Scan (9x15x1): Measurement grid: dx=15mm, dy=15mm

Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 28.79 V/m; Power Drift = -0.16 dB

Peak SAR (extrapolated) = 1.31 W/kg

SAR(1 g) = 0.727 W/kg



PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LSMG920P; Type: Portable Handset; Serial: 08C68

Communication System: UID 0, GSM; Frequency: 1880 MHz; Duty Cycle: 1:8.3

Medium: 1900 Body, Medium parameters used:

$f = 1880 \text{ MHz}$; $\sigma = 1.548 \text{ S/m}$; $\epsilon_r = 51.717$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.0 cm

Test Date: 01-19-2015; Ambient Temp: 24.4°C; Tissue Temp: 21.8°C

Probe: ES3DV3 - SN3258; ConvF(4.61, 4.61, 4.61); Calibrated: 2/25/2014;

Sensor-Surface: 3mm (Mechanical Surface Detection)

Electronics: DAE4 Sn665; Calibrated: 2/26/2014

Phantom: ELI v5.0; Type: QDOVA002AA; Serial: TP-1158

Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

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

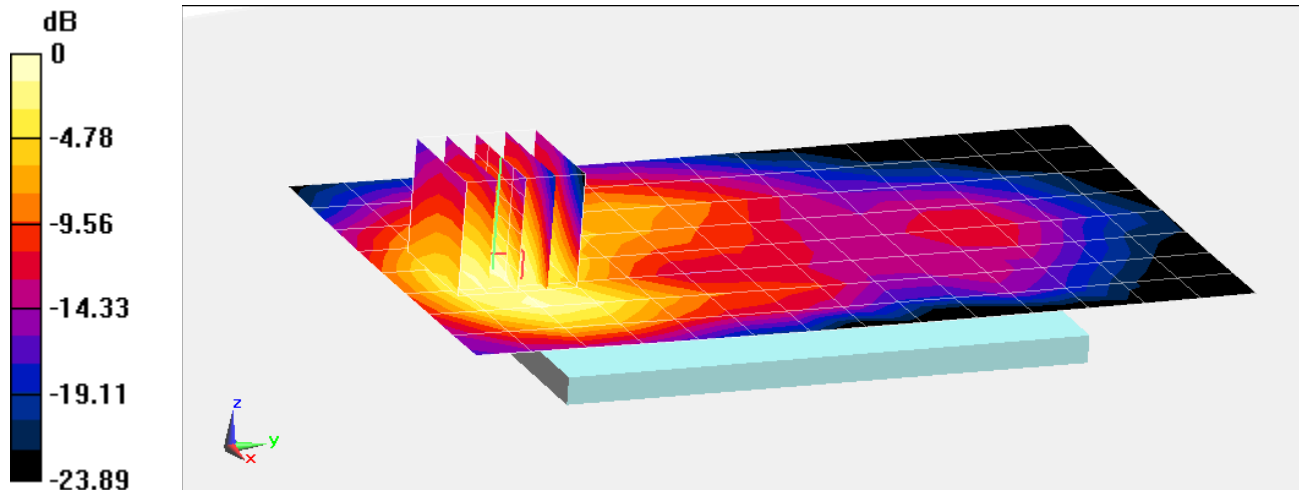
Area Scan (9x15x1): Measurement grid: dx=15mm, dy=15mm

Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 12.41 V/m; Power Drift = 0.05 dB

Peak SAR (extrapolated) = 0.363 W/kg

SAR(1 g) = 0.218 W/kg



PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LSMG920P; Type: Portable Handset; Serial: 08C68

Communication System: UID 0, GSM GPRS; 4 Tx slots; Frequency: 1850.2 MHz; Duty Cycle: 1:2.076

Medium: 1900 Body, Medium parameters used (interpolated):

$f = 1850.2 \text{ MHz}$; $\sigma = 1.518 \text{ S/m}$; $\epsilon_r = 51.841$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.0 cm

Test Date: 01-19-2015; Ambient Temp: 24.4°C; Tissue Temp: 21.8°C

Probe: ES3DV3 - SN3258; ConvF(4.61, 4.61, 4.61); Calibrated: 2/25/2014;

Sensor-Surface: 3mm (Mechanical Surface Detection)

Electronics: DAE4 Sn665; Calibrated: 2/26/2014

Phantom: ELI v5.0; Type: QDOVA002AA; Serial: TP-1158

Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Mode: GPRS 1900, Body SAR, Bottom Edge, Low.ch, 4 Tx Slots

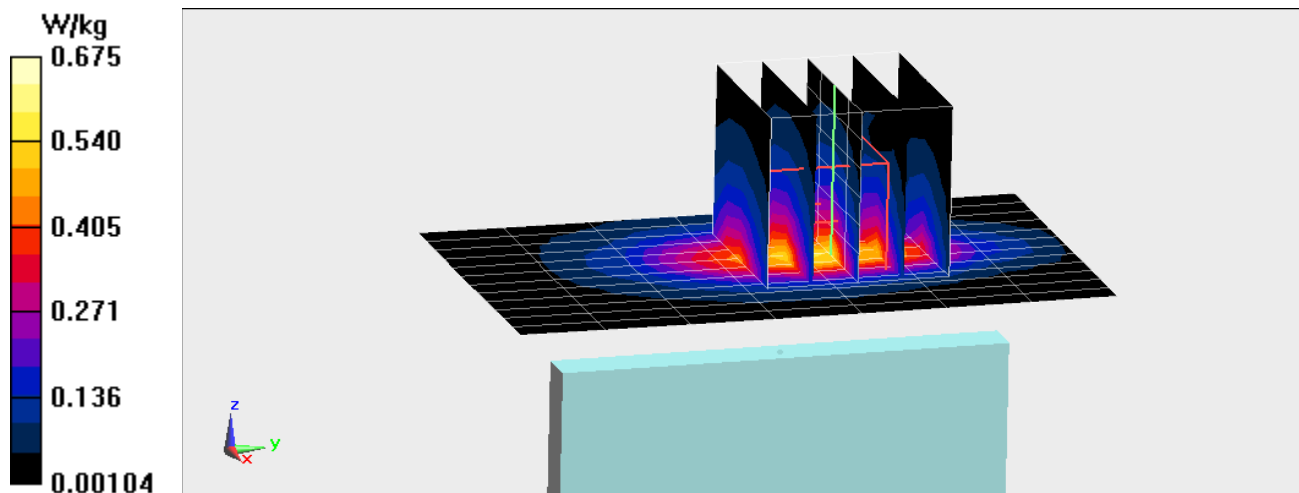
Area Scan (13x8x1): Measurement grid: dx=5mm, dy=15mm

Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 18.91 V/m; Power Drift = -0.02 dB

Peak SAR (extrapolated) = 0.779 W/kg

SAR(1 g) = 0.469 W/kg



PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LSMG920P; Type: Portable Handset; Serial: 08C6B

Communication System: UID 0, UMTS; Frequency: 836.6 MHz; Duty Cycle: 1:1

Medium: 835 Body, Medium parameters used (interpolated):

$f = 836.6 \text{ MHz}$; $\sigma = 0.994 \text{ S/m}$; $\epsilon_r = 54.432$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.0 cm

Test Date: 01-19-2015; Ambient Temp: 24.2°C; Tissue Temp: 22.6°C

Probe: ES3DV3 - SN3288; ConvF(6.32, 6.32, 6.32); Calibrated: 9/24/2014;

Sensor-Surface: 3mm (Mechanical Surface Detection)

Electronics: DAE4 Sn1364; Calibrated: 9/18/2014

Phantom: ELI v5.0; Type: QDOVA001BB; Serial: 1229

Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

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

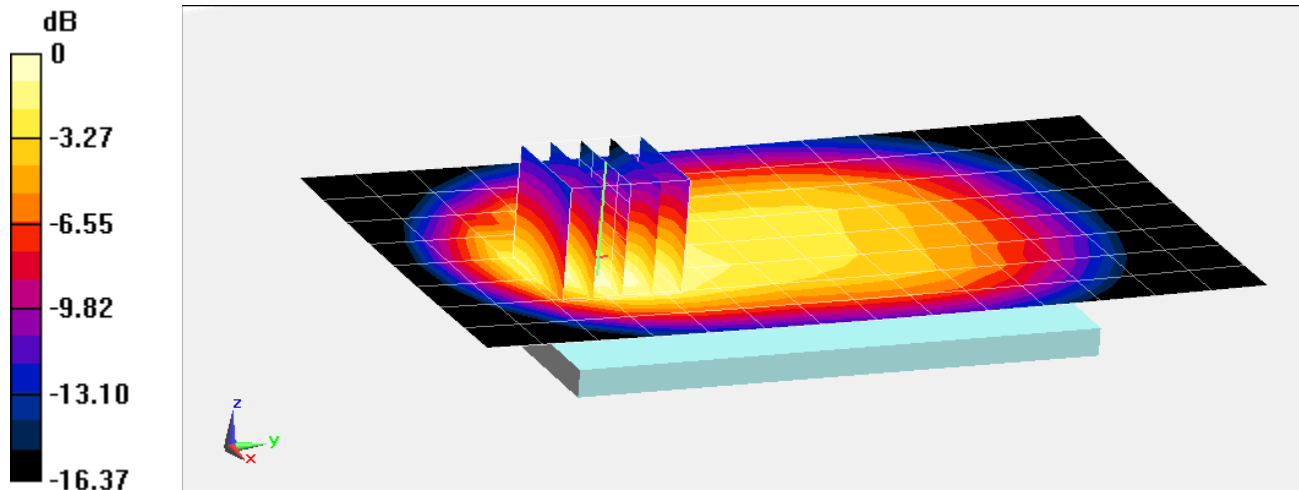
Area Scan (9x15x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$

Zoom Scan (5x5x7)/Cube 0: Measurement grid: $dx=8\text{mm}$, $dy=8\text{mm}$, $dz=5\text{mm}$

Reference Value = 19.51 V/m; Power Drift = -0.01 dB

Peak SAR (extrapolated) = 0.609 W/kg

SAR(1 g) = 0.339 W/kg



PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LSMG920P; Type: Portable Handset; Serial: 08C6B

Communication System: UID 0, UMTS, Frequency: 1880 MHz; Duty Cycle: 1:1

Medium: 1900 Body, Medium parameters used:

$f = 1880 \text{ MHz}$; $\sigma = 1.527 \text{ S/m}$; $\epsilon_r = 52.312$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.5 cm

Test Date: 01-29-2015; Ambient Temp: 24.0°C; Tissue Temp: 22.9°C

Probe: ES3DV3 - SN3258; ConvF(4.61, 4.61, 4.61); Calibrated: 2/25/2014;

Sensor-Surface: 3mm (Mechanical Surface Detection)

Electronics: DAE4 Sn665; Calibrated: 2/26/2014

Phantom: ELI v5.0; Type: QDOVA002AA; Serial: TP-1158

Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

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

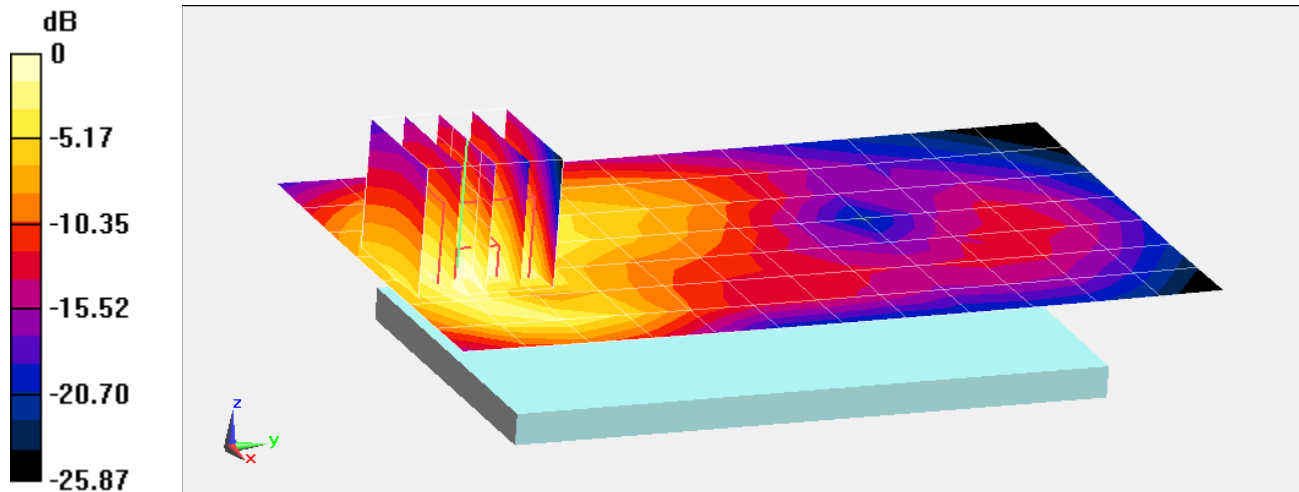
Area Scan (8x13x1): Measurement grid: dx=15mm, dy=15mm

Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 26.43 V/m; Power Drift = 0.02 dB

Peak SAR (extrapolated) = 0.609 W/kg

SAR(1 g) = 0.384 W/kg



PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LSMG920P; Type: Portable Handset; Serial: 08FDB

Communication System: UID 0, UMTS; Frequency: 1907.6 MHz; Duty Cycle: 1:1

Medium: 1900 Body, Medium parameters used (interpolated):

$f = 1907.6 \text{ MHz}$; $\sigma = 1.56 \text{ S/m}$; $\epsilon_r = 52.227$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.0 cm

Test Date: 01-29-2015; Ambient Temp: 24.0°C; Tissue Temp: 22.9°C

Probe: ES3DV3 - SN3258; ConvF(4.61, 4.61, 4.61); Calibrated: 2/25/2014;

Sensor-Surface: 3mm (Mechanical Surface Detection)

Electronics: DAE4 Sn665; Calibrated: 2/26/2014

Phantom: ELI v5.0; Type: QDOVA002AA; Serial: TP-1158

Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

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

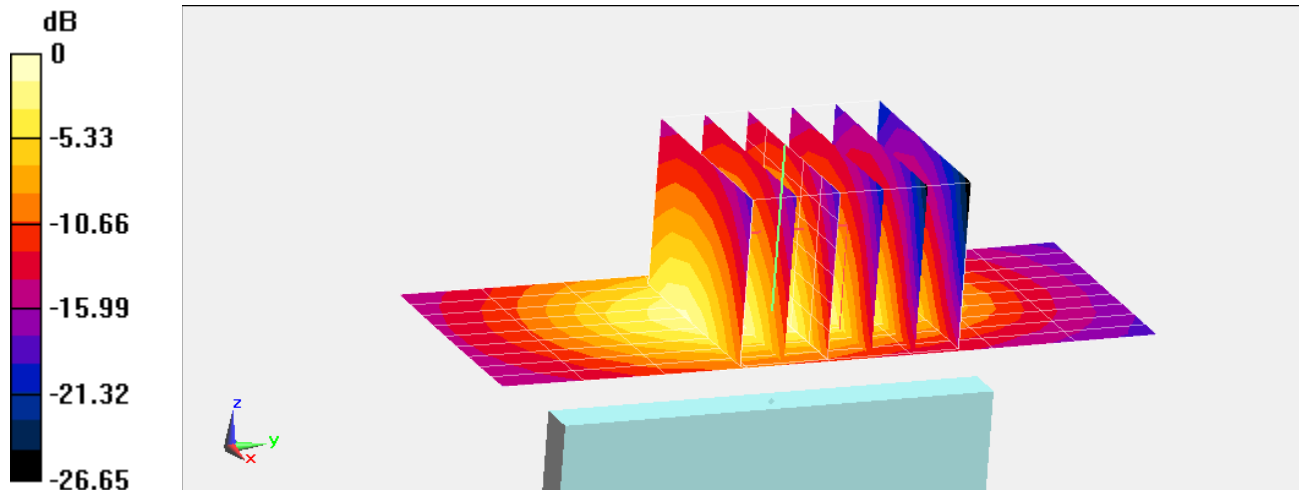
Area Scan (10x9x1): Measurement grid: dx=5mm, dy=15mm

Zoom Scan (6x6x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 23.24 V/m; Power Drift = -0.03 dB

Peak SAR (extrapolated) = 1.21 W/kg

SAR(1 g) = 0.721 W/kg



PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LSMG920P; Type: Portable Handset; Serial: 08FC4

Communication System: UID 0, LTE Band 12; Frequency: 707.5 MHz; Duty Cycle: 1:1

Medium: 750 Body Medium parameters used (interpolated):

$f = 707.5 \text{ MHz}$; $\sigma = 0.924 \text{ S/m}$; $\epsilon_r = 53.716$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.0 cm

Test Date: 01-22-2015; Ambient Temp: 23.2°C; Tissue Temp: 23.4°C

Probe: ES3DV3 - SN3332; ConvF(6.24, 6.24, 6.24); Calibrated: 9/18/2014;

Sensor-Surface: 3mm (Mechanical Surface Detection)

Electronics: DAE4 Sn1323; Calibrated: 9/17/2014

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

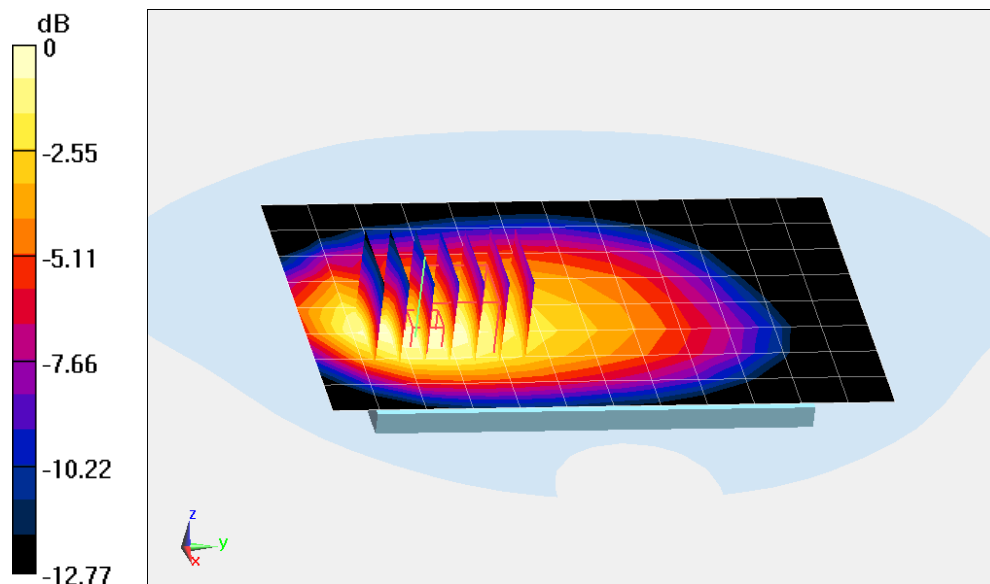
Area Scan (9x13x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$

Zoom Scan (5x7x7)/Cube 0: Measurement grid: $dx=8\text{mm}$, $dy=8\text{mm}$, $dz=5\text{mm}$

Reference Value = 20.12 V/m; Power Drift = -0.03 dB

Peak SAR (extrapolated) = 0.545 W/kg

SAR(1 g) = 0.346 W/kg



PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LSMG920P; Type: Portable Handset; Serial: 08FC4

Communication System: UID 0, LTE Band 26; Frequency: 836.5 MHz; Duty Cycle: 1:1

Medium: 835 Body Medium parameters used (interpolated):

$f = 836.5 \text{ MHz}$; $\sigma = 1.005 \text{ S/m}$; $\epsilon_r = 53.273$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section ; Space: 1.0 cm

Test Date: 01-15-2015; Ambient Temp: 23.3°C; Tissue Temp: 22.0°C

Probe: ES3DV3 - SN3288; ConvF(6.32, 6.32, 6.32); Calibrated: 9/24/2014;

Sensor-Surface: 3mm (Mechanical Surface Detection)

Electronics: DAE4 Sn1364; Calibrated: 9/18/2014

Phantom: ELI v5.0; Type: QDOVA001BB; Serial: 1229

Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

**Mode: LTE Band 26 (Cell.), Body SAR, Back Side, Mid.ch,
15 MHz Bandwidth, QPSK, 1 RB, 74 RB Offset**

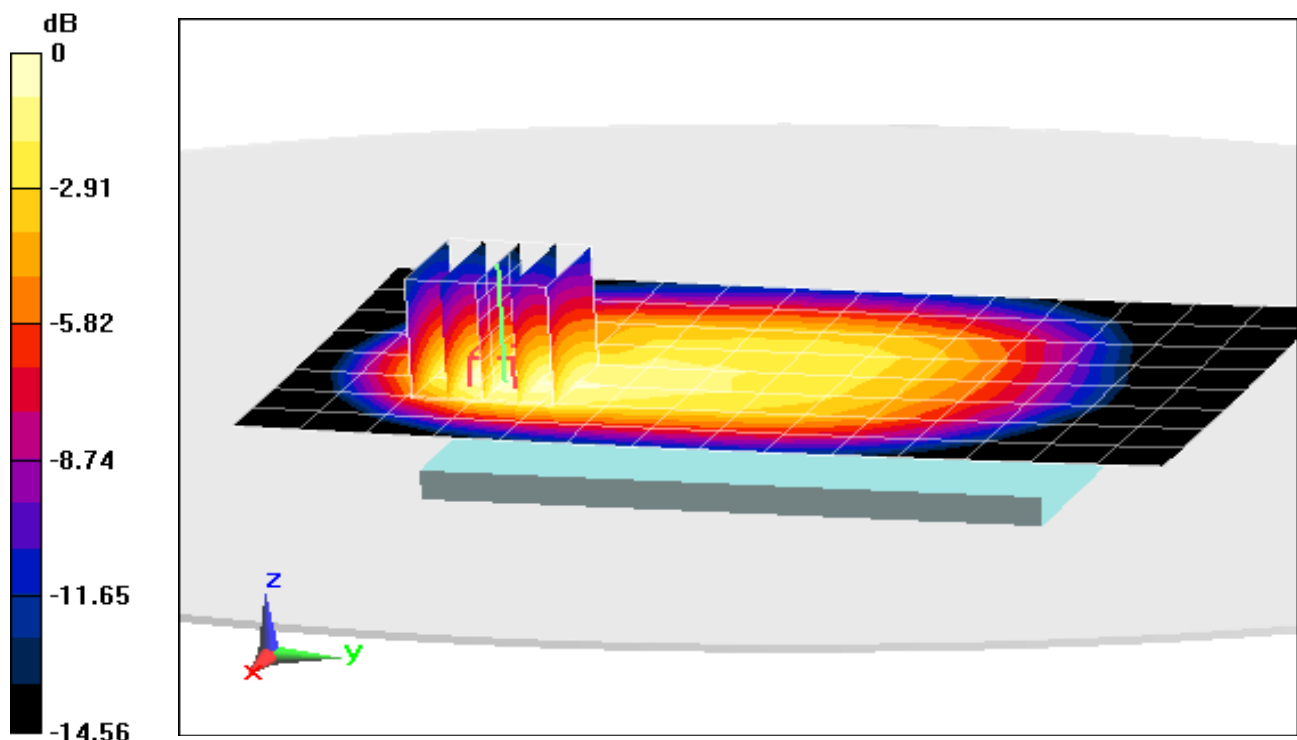
Area Scan (9x15x1): Measurement grid: dx=15mm, dy=15mm

Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 21.31 V/m; Power Drift = 0.00 dB

Peak SAR (extrapolated) = 0.720 W/kg

SAR(1 g) = 0.414 W/kg



PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LSMG920P; Type: Portable Handset; Serial: 08FA6

Communication System: UID 0, LTE Band 4 (AWS); Frequency: 1732.5 MHz; Duty Cycle: 1:1

Medium: 1750 Body, Medium parameters used (interpolated):

$f = 1732.5 \text{ MHz}$; $\sigma = 1.442 \text{ S/m}$; $\epsilon_r = 51.613$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.5 cm

Test Date: 01-19-2015; Ambient Temp: 23.0°C; Tissue Temp: 23.0°C

Probe: ES3DV3 - SN3263; ConvF(4.98, 4.98, 4.98); Calibrated: 5/15/2014;

Sensor-Surface: 3mm (Mechanical Surface Detection)

Electronics: DAE4 Sn859; Calibrated: 5/14/2014

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 4 (AWS), Body SAR, Back side, Mid.ch,
20 MHz Bandwidth, QPSK, 1 RB, 0 RB Offset**

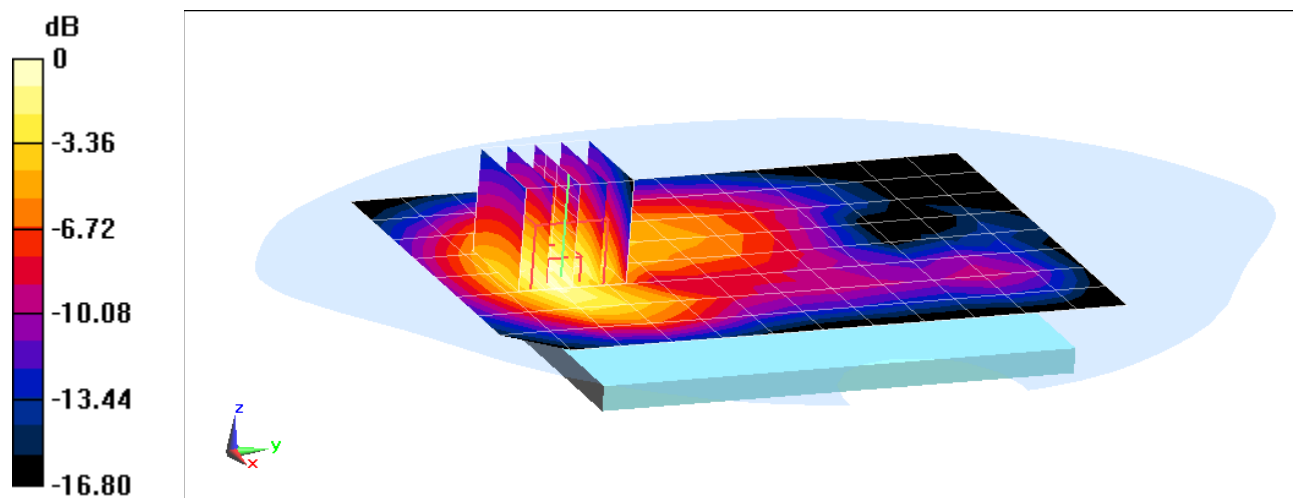
Area Scan (9x13x1): Measurement grid: dx=15mm, dy=15mm

Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 19.29 V/m; Power Drift = -0.09 dB

Peak SAR (extrapolated) = 0.754 W/kg

SAR(1 g) = 0.485 W/kg



PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LSMG920P; Type: Portable Handset; Serial: 08FD5

Communication System: UID 0, LTE Band 4 (AWS); Frequency: 1732.5 MHz; Duty Cycle: 1:1

Medium: 1750 Body, Medium parameters used (interpolated):

$f = 1732.5 \text{ MHz}$; $\sigma = 1.442 \text{ S/m}$; $\epsilon_r = 51.613$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.0 cm

Test Date: 01-19-2015; Ambient Temp: 23.0°C; Tissue Temp: 23.0°C

Probe: ES3DV3 - SN3263; ConvF(4.98, 4.98, 4.98); Calibrated: 5/15/2014;

Sensor-Surface: 3mm (Mechanical Surface Detection)

Electronics: DAE4 Sn859; Calibrated: 5/14/2014

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 4 (AWS), Body SAR, Bottom Edge, Mid.ch,
20 MHz Bandwidth, QPSK, 1 RB, 99 RB Offset**

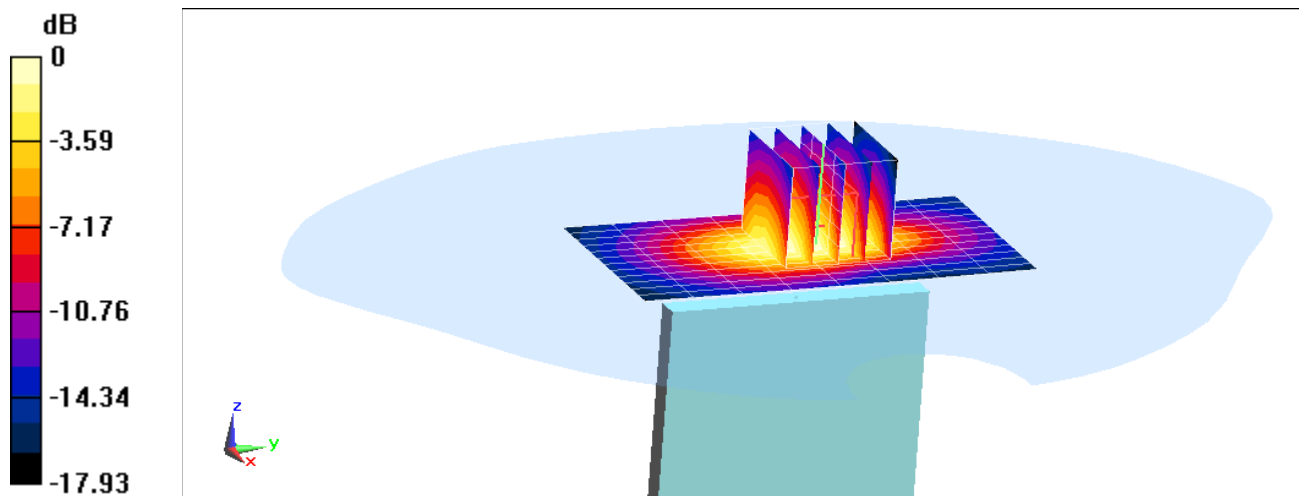
Area Scan (13x9x1): Measurement grid: $dx=5\text{mm}$, $dy=15\text{mm}$

Zoom Scan (5x5x7)/Cube 0: Measurement grid: $dx=8\text{mm}$, $dy=8\text{mm}$, $dz=5\text{mm}$

Reference Value = 25.96 V/m; Power Drift = -0.01 dB

Peak SAR (extrapolated) = 1.37 W/kg

SAR(1 g) = 0.834 W/kg



PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LSMG920P; Type: Portable Handset; Serial: 08FA6

Communication System: UID 0, LTE Band 25 (PCS); Frequency: 1860 MHz; Duty Cycle: 1:1

Medium: 1900 Body Medium parameters used (interpolated):

$f = 1860 \text{ MHz}$; $\sigma = 1.535 \text{ S/m}$; $\epsilon_r = 52.428$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section ; Space: 1.5 cm

Test Date: 02-06-2015; Ambient Temp: 23.8°C; Tissue Temp: 22.1°C

Probe: ES3DV3 - SN3332; ConvF(4.64, 4.64, 4.64); Calibrated: 9/18/2014;

Sensor-Surface: 3mm (Mechanical Surface Detection)

Electronics: DAE4 Sn1323; Calibrated: 9/17/2014

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: LTE Band 25 (PCS), Body SAR, Back side, Low.ch,
20 MHz Bandwidth, QPSK, 1 RB, 50 RB Offset**

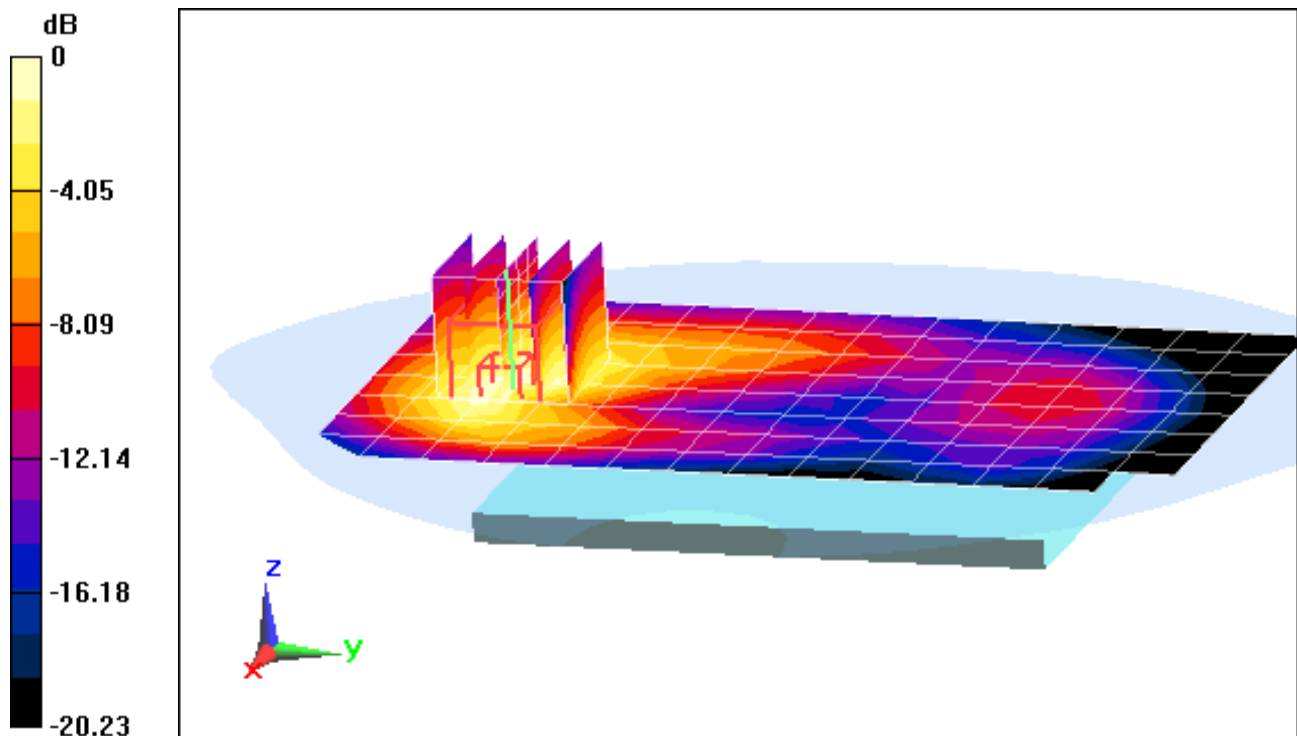
Area Scan (9x15x1): Measurement grid: dx=15mm, dy=15mm

Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 22.75 V/m; Power Drift = -0.03 dB

Peak SAR (extrapolated) = 1.23 W/kg

SAR(1 g) = 0.776 W/kg



PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LSMG920P; Type: Portable Handset; Serial: 08DB6

Communication System: UID 0, LTE Band 25 (PCS); Frequency: 1860 MHz; Duty Cycle: 1:1

Medium: 1900 Body Medium parameters used (interpolated):

$f = 1860 \text{ MHz}$; $\sigma = 1.534 \text{ S/m}$; $\epsilon_r = 52.158$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section ; Space: 1.0 cm

Test Date: 01-26-2015; Ambient Temp: 23.9°C; Tissue Temp: 22.0°C

Probe: ES3DV3 - SN3258; ConvF(4.61, 4.61, 4.61); Calibrated: 2/25/2014;

Sensor-Surface: 3mm (Mechanical Surface Detection)

Electronics: DAE4 Sn665; Calibrated: 2/26/2014

Phantom: ELI v5.0; Type: QDOVA002AA; Serial: TP-1158

Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

**Mode: LTE Band 25 (PCS), Body SAR, Bottom Edge, Low.ch,
20 MHz Bandwidth, QPSK, 1 RB, 50 RB Offset**

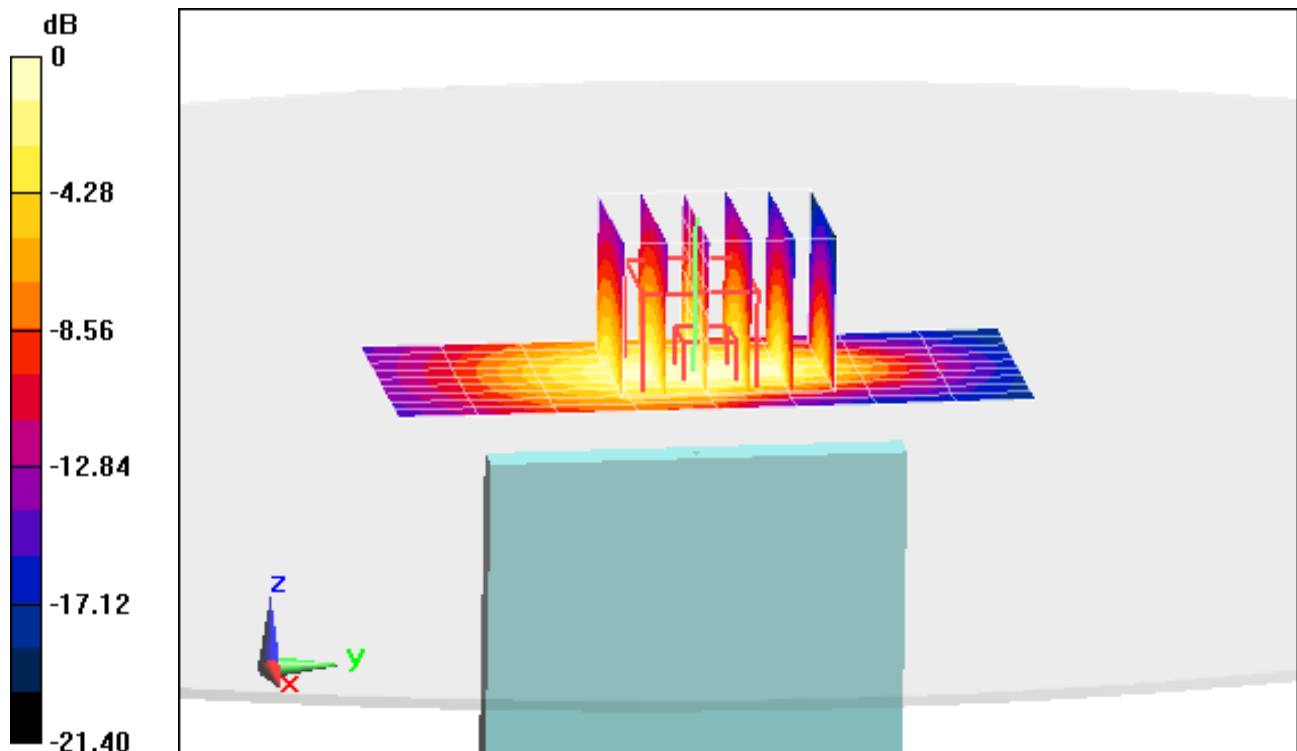
Area Scan (10x9x1): Measurement grid: dx=5mm, dy=15mm

Zoom Scan (5x6x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 23.51 V/m; Power Drift = 0.01 dB

Peak SAR (extrapolated) = 1.24 W/kg

SAR(1 g) = 0.751 W/kg



PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LSMG920P; Type: Portable Handset; Serial: 12D77

Communication System: UID 0, LTE Band 41; Frequency: 2636.5 MHz; Duty Cycle: 1:1.58

Medium: 2450 Body Medium parameters used (interpolated):

$f = 2636.5 \text{ MHz}$; $\sigma = 2.205 \text{ S/m}$; $\epsilon_r = 51.898$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section ; Space: 1.0 cm

Test Date: 02-02-2015; Ambient Temp: 23.0°C; Tissue Temp: 23.6°C

Probe: ES3DV3 - SN3209; ConvF(4.04, 4.04, 4.04); Calibrated: 3/19/2014;

Sensor-Surface: 3mm (Mechanical Surface Detection)

Electronics: DAE4 Sn1334; Calibrated: 3/17/2014

Phantom: SAM left; Type: QD000P40CD; Serial: TP:1715

Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

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

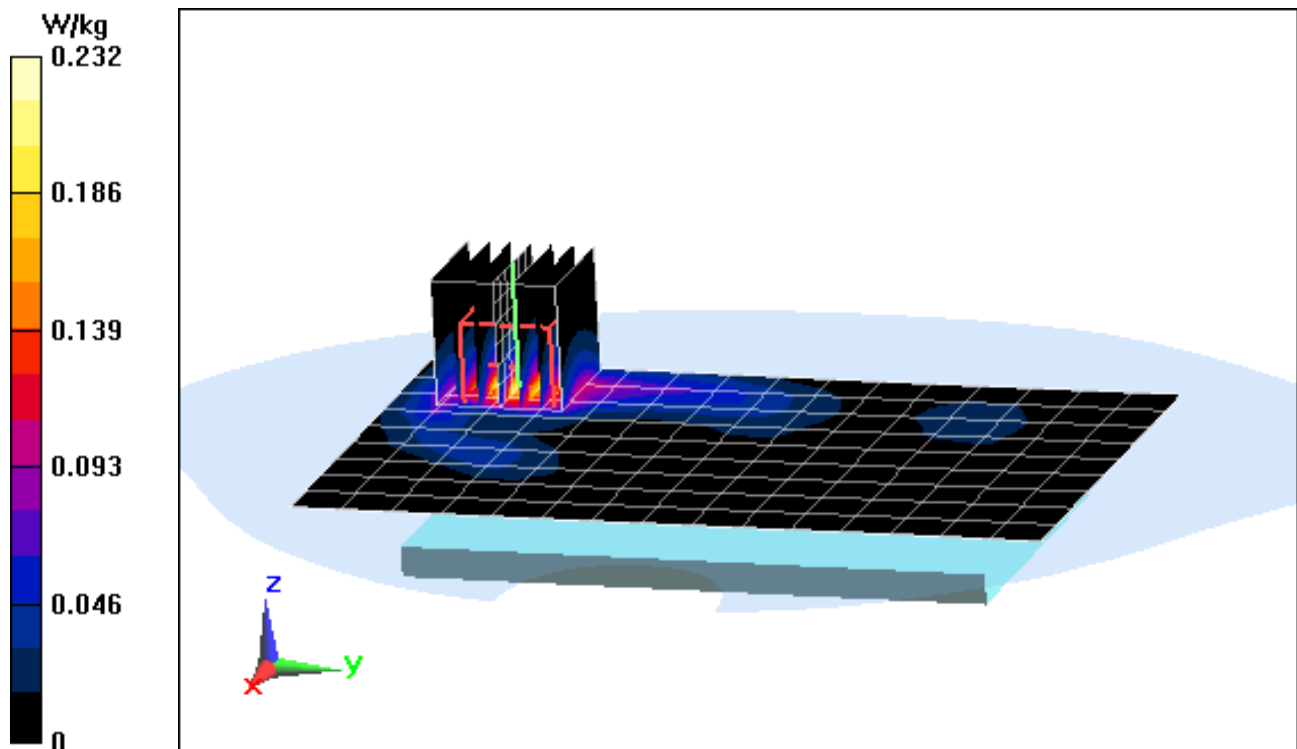
Area Scan (10x16x1): Measurement grid: dx=12mm, dy=12mm

Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 9.524 V/m; Power Drift = 0.00 dB

Peak SAR (extrapolated) = 0.408 W/kg

SAR(1 g) = 0.172 W/kg



PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LSMG920P; Type: Portable Handset; Serial: 08FA2

Communication System: UID 0, IEEE 802.11b; Frequency: 2412 MHz; Duty Cycle: 1:1

Medium: 2450 Body, Medium parameters used (interpolated):

$f = 2412 \text{ MHz}$; $\sigma = 1.973 \text{ S/m}$; $\epsilon_r = 51.216$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.0 cm

Test Date: 01-19-2015; Ambient Temp: 24.0°C; Tissue Temp: 22.8°C

Probe: ES3DV3 - SN3209; ConvF(4.2, 4.2, 4.2); Calibrated: 3/19/2014;

Sensor-Surface: 3mm (Mechanical Surface Detection)

Electronics: DAE4 Sn1334; Calibrated: 3/17/2014

Phantom: SAM left; Type: QD000P40CD; Serial: TP:1715

Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Mode: IEEE 802.11b, Body SAR, Ch 01, 1 Mbps, Back Side, Antenna 2

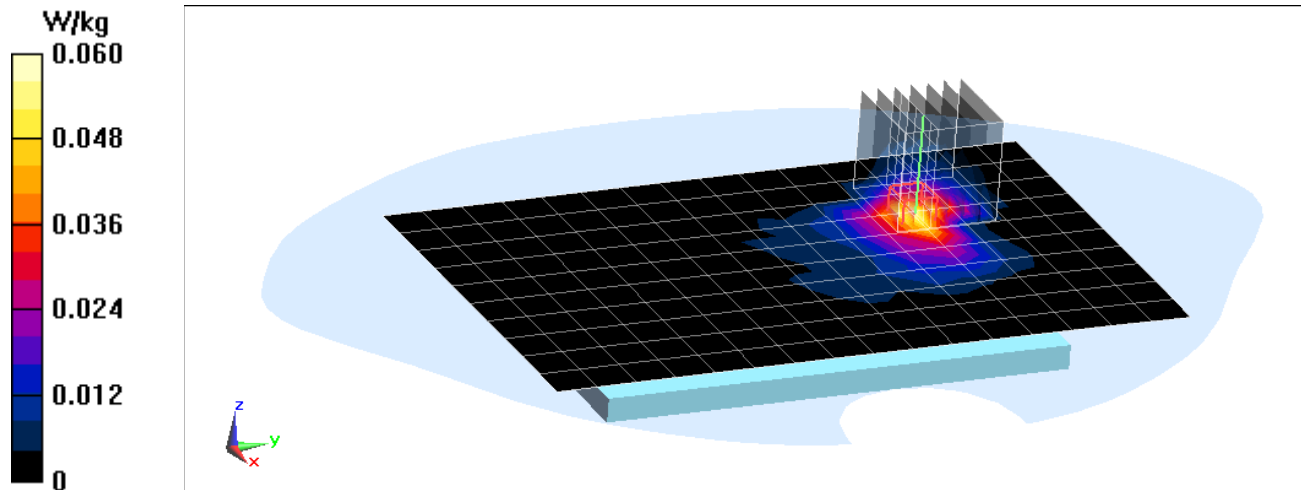
Area Scan (11x17x1): Measurement grid: $dx=12\text{mm}$, $dy=12\text{mm}$

Zoom Scan (7x7x7)/Cube 0: Measurement grid: $dx=5\text{mm}$, $dy=5\text{mm}$, $dz=5\text{mm}$

Reference Value = 5.256 V/m; Power Drift = 0.10 dB

Peak SAR (extrapolated) = 0.0890 W/kg

SAR(1 g) = 0.048 W/kg



PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LSMG920P; Type: Portable Handset; Serial: 08FA2

Communication System: UID 0, IEEE 802.11b; Frequency: 2412 MHz; Duty Cycle: 1:1

Medium: 2450 Body, Medium parameters used (interpolated):

$f = 2412 \text{ MHz}$; $\sigma = 1.973 \text{ S/m}$; $\epsilon_r = 51.216$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.0 cm

Test Date: 01-19-2015; Ambient Temp: 24.0°C; Tissue Temp: 22.8°C

Probe: ES3DV3 - SN3209; ConvF(4.2, 4.2, 4.2); Calibrated: 3/19/2014;

Sensor-Surface: 3mm (Mechanical Surface Detection)

Electronics: DAE4 Sn1334; Calibrated: 3/17/2014

Phantom: SAM left; Type: QD000P40CD; Serial: TP:1715

Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Mode: IEEE 802.11b, Body SAR, Ch 1, 1 Mbps, Front Side, Antenna 2

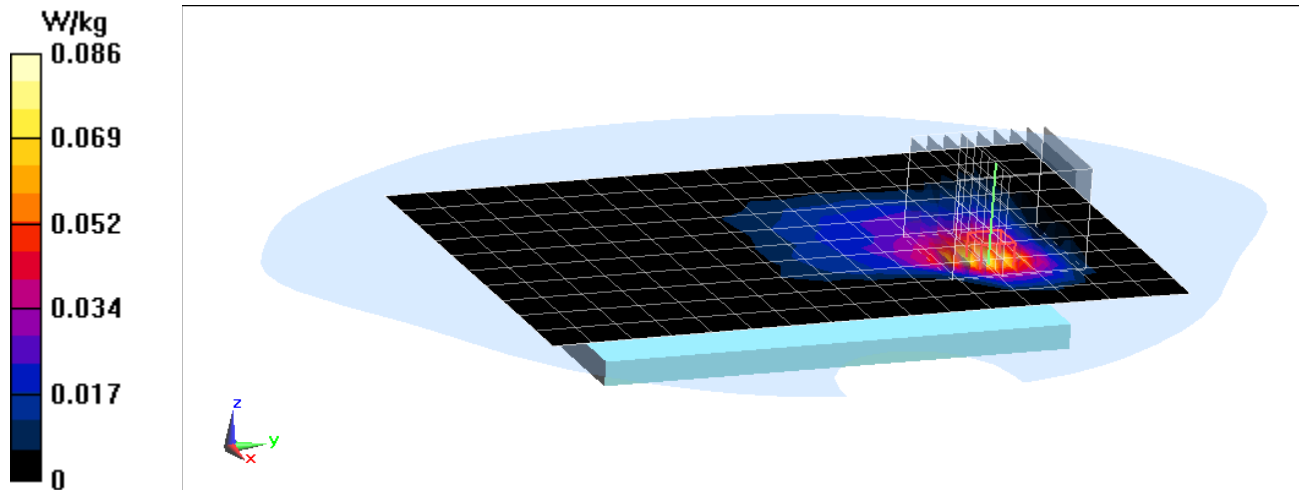
Area Scan (11x17x1): Measurement grid: $dx=12\text{mm}$, $dy=12\text{mm}$

Zoom Scan (8x9x7)/Cube 0: Measurement grid: $dx=5\text{mm}$, $dy=5\text{mm}$, $dz=5\text{mm}$

Reference Value = 6.239 V/m; Power Drift = 0.00 dB

Peak SAR (extrapolated) = 0.138 W/kg

SAR(1 g) = 0.070 W/kg



PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LSMG920P; Type: Portable Handset; Serial: 08FA2

Communication System: UID 0, IEEE 802.11a; Frequency: 5580 MHz; Duty Cycle: 1:1

Medium: 5 GHz Body , Medium parameters used:

$f = 5580 \text{ MHz}$; $\sigma = 5.899 \text{ S/m}$; $\epsilon_r = 47.646$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.0 cm

Test Date: 01-19-2015; Ambient Temp: 24.1°C; Tissue Temp: 23.1°C

Probe: EX3DV4 - SN3920; ConvF(3.66, 3.66, 3.66); Calibrated: 12/12/2014;

Sensor-Surface: 1.4mm (Mechanical Surface Detection)

Electronics: DAE4 Sn1368; Calibrated: 4/11/2014

Phantom: SAM; Type: QD000P40CD; Serial: TP:1758

Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

**Mode: IEEE 802.11a, U-NII-2C, 20 MHz Bandwidth,
Body SAR, Ch 116, 6 Mbps, Back Side, Antenna 2**

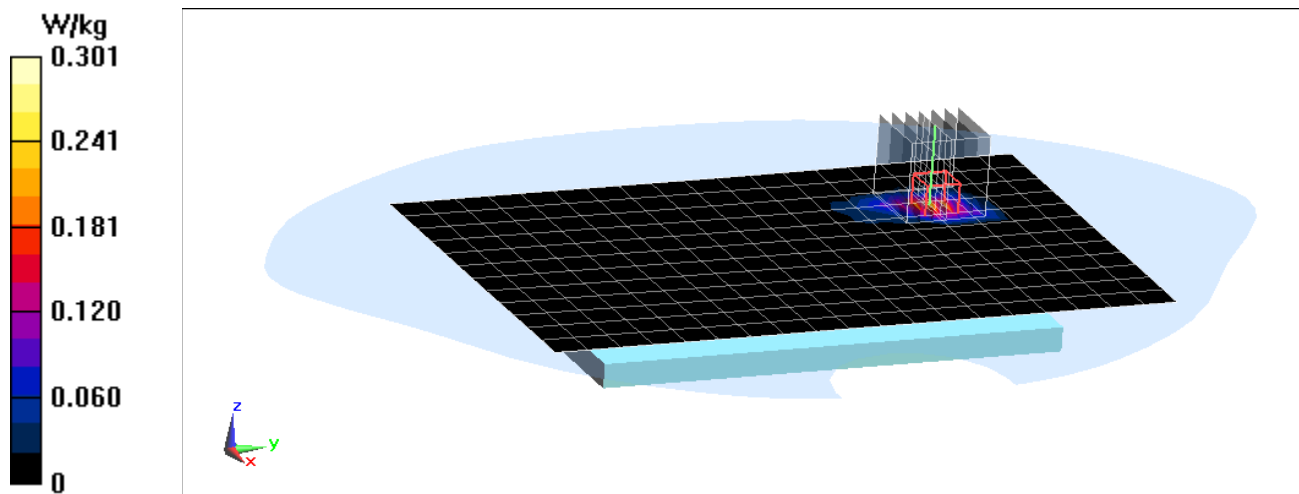
Area Scan (13x20x1): Measurement grid: dx=10mm, dy=10mm

Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm; Graded Ratio: 1.4

Reference Value = 3.833 V/m; Power Drift = -0.05 dB

Peak SAR (extrapolated) = 0.479 W/kg

SAR(1 g) = 0.103 W/kg



PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LSMG920P; Type: Portable Handset; Serial: 08FA2

Communication System: UID 0, 802.11a 5.2-5.8 GHz Band; Frequency: 5745 MHz; Duty Cycle: 1:1

Medium: 5 GHz Body , Medium parameters used:

$f = 5745 \text{ MHz}$; $\sigma = 6.176 \text{ S/m}$; $\epsilon_r = 47.389$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.0 cm

Test Date: 01-19-2015; Ambient Temp: 23.9°C; Tissue Temp: 23.1°C

Probe: EX3DV4 - SN3920; ConvF(3.93, 3.93, 3.93); Calibrated: 12/12/2014;

Sensor-Surface: 1.4mm (Mechanical Surface Detection)

Electronics: DAE4 Sn1368; Calibrated: 4/11/2014

Phantom: SAM; Type: QD000P40CD; Serial: TP:1758

Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

**Mode: IEEE 802.11a, U-NII-3, 20 MHz Bandwidth,
Body SAR, Ch 149, 6 Mbps, Back Side, Antenna 2**

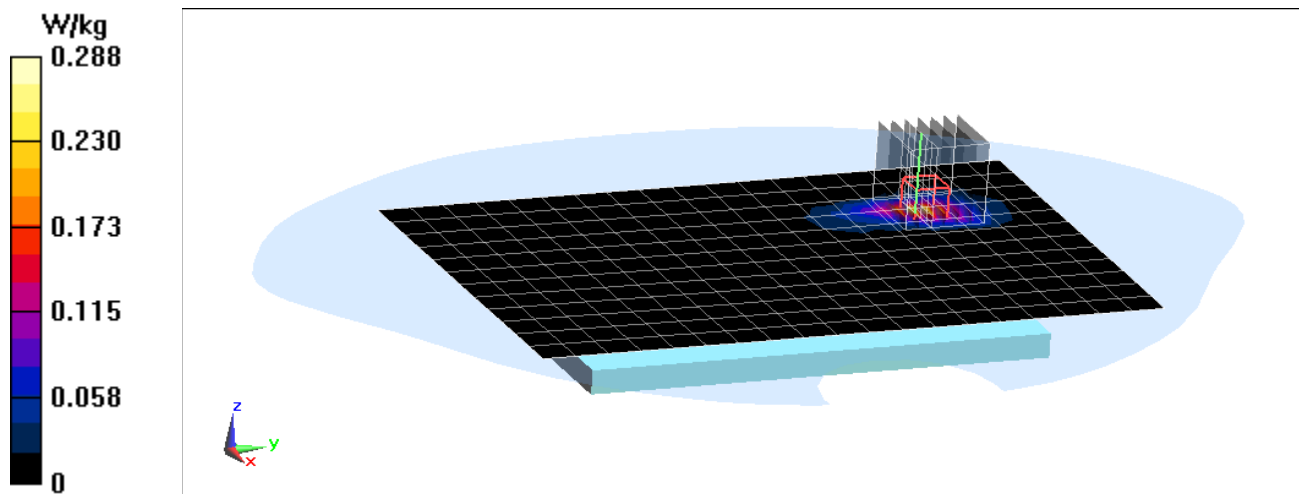
Area Scan (13x20x1): Measurement grid: dx=10mm, dy=10mm

Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm; Graded Ratio: 1.4

Reference Value = 4.015 V/m; Power Drift = 0.07 dB

Peak SAR (extrapolated) = 0.473 W/kg

SAR(1 g) = 0.100 W/kg



APPENDIX B: SYSTEM VERIFICATION

PCTEST ENGINEERING LABORATORY, INC.

DUT: Dipole 750 MHz; Type: D750V3; Serial: 1054

Communication System: UID 0, CW; Frequency: 750 MHz; Duty Cycle: 1:1

Medium: 750 Head Medium parameters used (interpolated):

$f = 750 \text{ MHz}$; $\sigma = 0.93 \text{ S/m}$; $\epsilon_r = 41.945$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section ; Space: 1.5 cm

Test Date: 01-29-2015; Ambient Temp: 22.5°C; Tissue Temp: 21.7°C

Probe: ES3DV3 - SN3209; ConvF(6.43, 6.43, 6.43); Calibrated: 3/19/2014;

Sensor-Surface: 3mm (Mechanical Surface Detection)

Electronics: DAE4 Sn1334; Calibrated: 3/17/2014

Phantom: SAM; Type: QD000P40CD; Serial: TP:1758

Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

750 MHz System Verification

Area Scan (7x15x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$

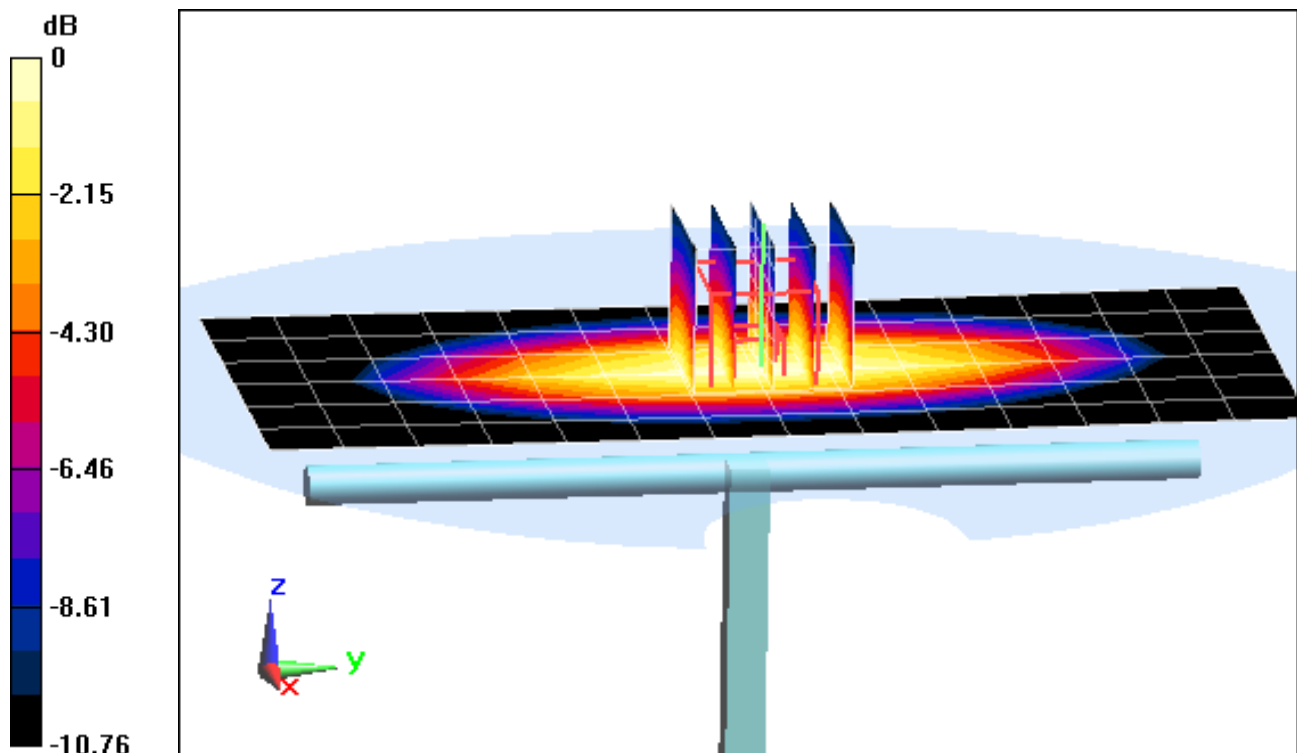
Zoom Scan (5x5x7)/Cube 0: Measurement grid: $dx=8\text{mm}$, $dy=8\text{mm}$, $dz=5\text{mm}$

Input Power = 20 dBm (100 mW)

Peak SAR (extrapolated) = 1.22 W/kg

SAR(1 g) = 0.824 W/kg

Deviation = -1.08%



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:

$f = 835 \text{ MHz}$; $\sigma = 0.897 \text{ S/m}$; $\epsilon_r = 40.801$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.5 cm

Test Date: 01-16-2015; Ambient Temp: 23.4°C; Tissue Temp: 23.3°C

Probe: ES3DV2 - SN3022; ConvF(6.18, 6.18, 6.18); Calibrated: 8/19/2014;

Sensor-Surface: 3mm (Mechanical Surface Detection)

Electronics: DAE4 Sn1322; Calibrated: 8/12/2014

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)

835 MHz System Verification

Area Scan (7x14x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$

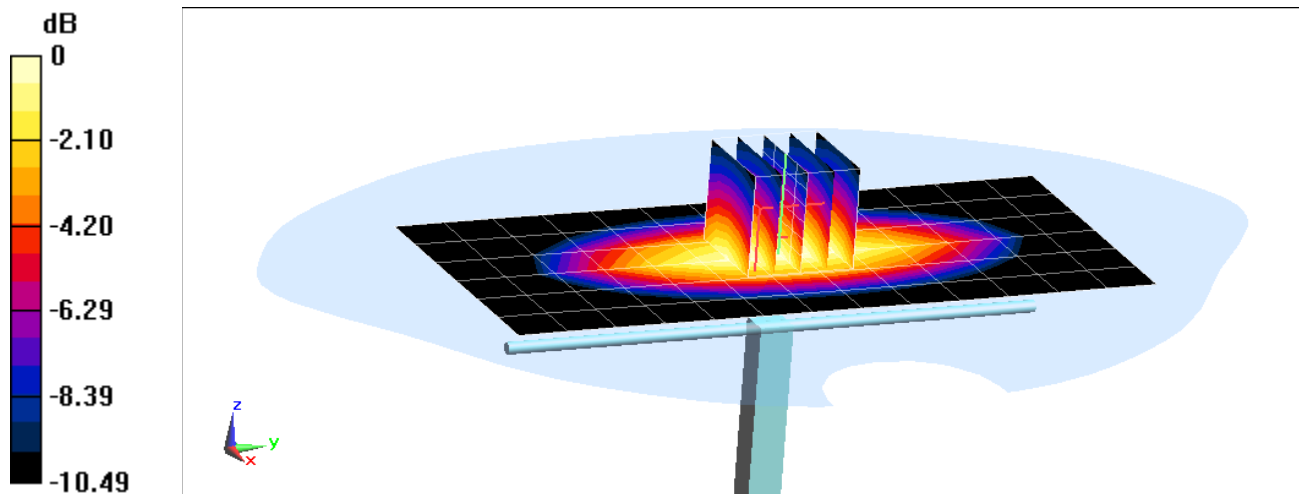
Zoom Scan (5x5x7)/Cube 0: Measurement grid: $dx=8\text{mm}$, $dy=8\text{mm}$, $dz=5\text{mm}$

Input Power = 20.0 dBm (100 mW)

Peak SAR (extrapolated) = 1.34 W/kg

SAR(1 g) = 0.915 W/kg

Deviation = -0.54%



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:

$f = 835 \text{ MHz}$; $\sigma = 0.933 \text{ S/m}$; $\epsilon_r = 43.439$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.5 cm

Test Date: 01-19-2015; Ambient Temp: 23.1°C; Tissue Temp: 23.0°C

Probe: ES3DV3 - SN3263; ConvF(6.23, 6.23, 6.23); Calibrated: 5/15/2014;

Sensor-Surface: 3mm (Mechanical Surface Detection)

Electronics: DAE4 Sn859; Calibrated: 5/14/2014

Phantom: SAM v5.0 Left; Type: QD000P40CD; Serial: TP: 1687

Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

835 MHz System Verification

Area Scan (7x14x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$

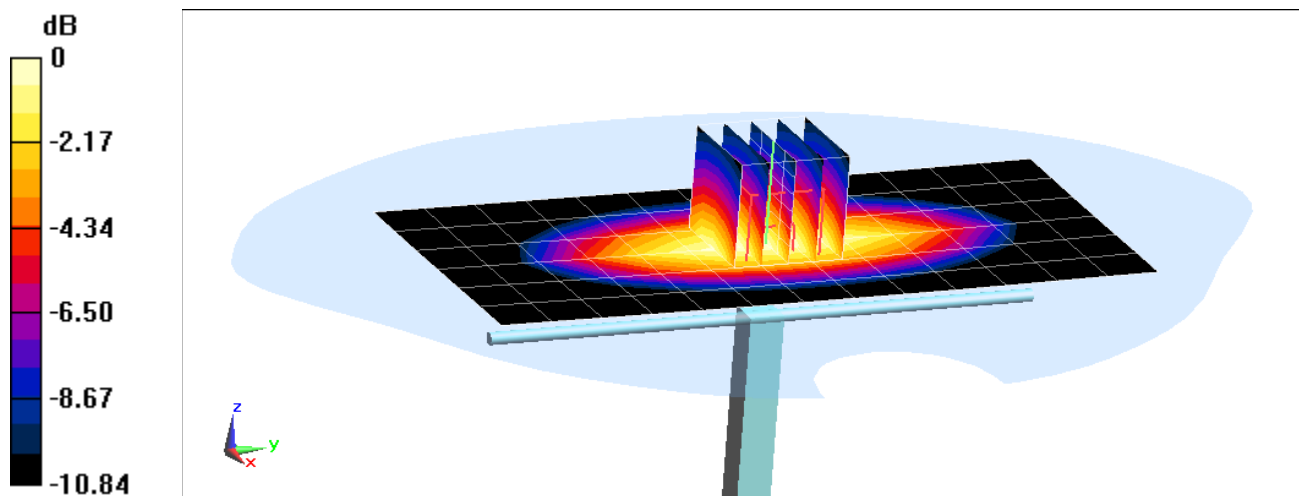
Zoom Scan (5x5x7)/Cube 0: Measurement grid: $dx=8\text{mm}$, $dy=8\text{mm}$, $dz=5\text{mm}$

Input Power = 20.0 dBm (100 mW)

Peak SAR (extrapolated) = 1.47 W/kg

SAR(1 g) = 0.971 W/kg

Deviation = 5.54%



PCTEST ENGINEERING LABORATORY, INC.

DUT: Dipole 1750 MHz; Type: D1765V2; Serial: 1008

Communication System: UID 0, CW; Frequency: 1750 MHz; Duty Cycle: 1:1

Medium: 1750 Head, Medium parameters used:

$f = 1750 \text{ MHz}$; $\sigma = 1.34 \text{ S/m}$; $\epsilon_r = 38.482$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.0 cm

Test Date: 01-16-2015; Ambient Temp: 23.3°C; Tissue Temp: 22.7°C

Probe: ES3DV3 - SN3209; ConvF(5.24, 5.24, 5.24); Calibrated: 3/19/2014;

Sensor-Surface: 3mm (Mechanical Surface Detection)

Electronics: DAE4 Sn1334; Calibrated: 3/17/2014

Phantom: SAM Right; Type: SAM; Serial: 1757

Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

1750 MHz System Verification

Area Scan (7x9x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$

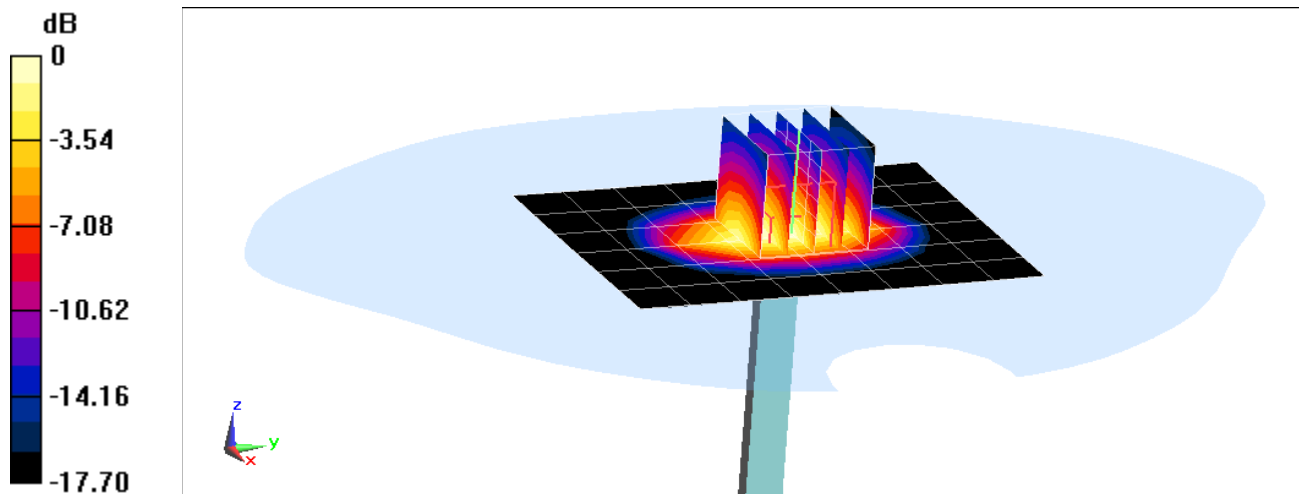
Zoom Scan (5x5x7)/Cube 0: Measurement grid: $dx=8\text{mm}$, $dy=8\text{mm}$, $dz=5\text{mm}$

Input Power = 20.0 dBm (100 mW)

Peak SAR (extrapolated) = 6.13 W/kg

SAR(1 g) = 3.37 W/kg

Deviation = -8.67%



PCTEST ENGINEERING LABORATORY, INC.

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):

$f = 1900 \text{ MHz}$; $\sigma = 1.401 \text{ S/m}$; $\epsilon_r = 39.252$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.0 cm

Test Date: 01-16-2015; Ambient Temp: 24.2°C; Tissue Temp: 22.8°C

Probe: ES3DV3 - SN3258; ConvF(5.04, 5.04, 5.04); Calibrated: 2/25/2014;

Sensor-Surface: 3mm (Mechanical Surface Detection)

Electronics: DAE4 Sn665; Calibrated: 2/26/2014

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

Area Scan (7x14x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$

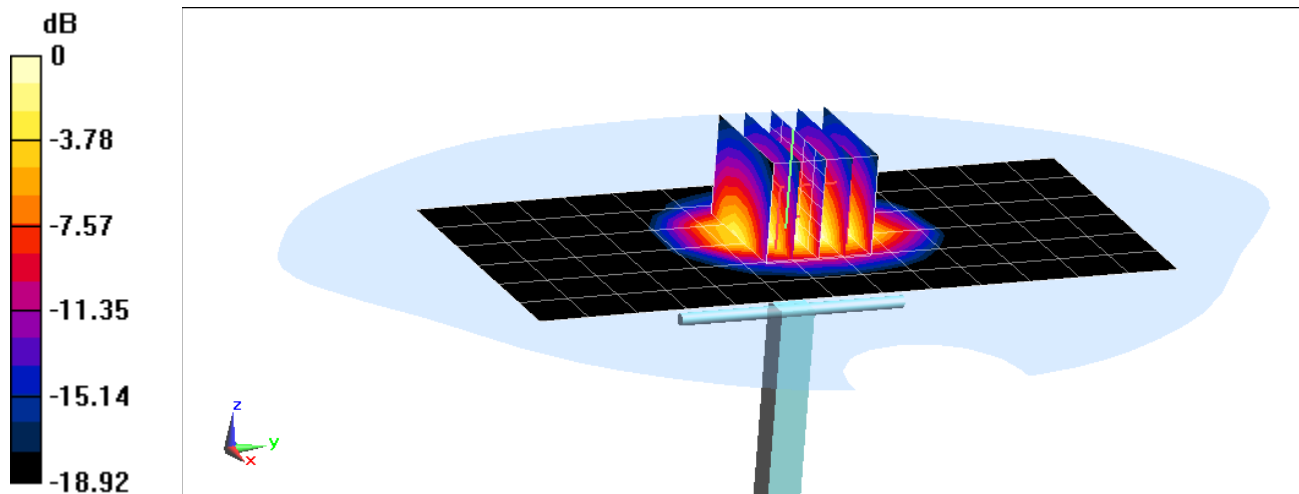
Zoom Scan (6x5x7)/Cube 0: Measurement grid: $dx=8\text{mm}$, $dy=8\text{mm}$, $dz=5\text{mm}$

Input Power = 20.0 dBm (100 mW)

Peak SAR (extrapolated) = 6.92 W/kg

SAR(1 g) = 3.81 W/kg

Deviation = -5.22%



PCTEST ENGINEERING LABORATORY, INC.

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):

$f = 1900 \text{ MHz}$; $\sigma = 1.385 \text{ S/m}$; $\epsilon_r = 39.427$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section ; Space: 1.0 cm

Test Date: 02-06-2015; Ambient Temp: 24.9°C; Tissue Temp: 23.0°C

Probe: ES3DV3 - SN3263; ConvF(5.08, 5.08, 5.08); Calibrated: 5/15/2014;

Sensor-Surface: 3mm (Mechanical Surface Detection)

Electronics: DAE4 Sn859; Calibrated: 5/14/2014

Phantom: SAM v5.0 front; Type: QD000P40CD; Serial: TP-1646

Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

1900 MHz System Verification

Area Scan (7x10x1): Measurement grid: dx=15mm, dy=15mm

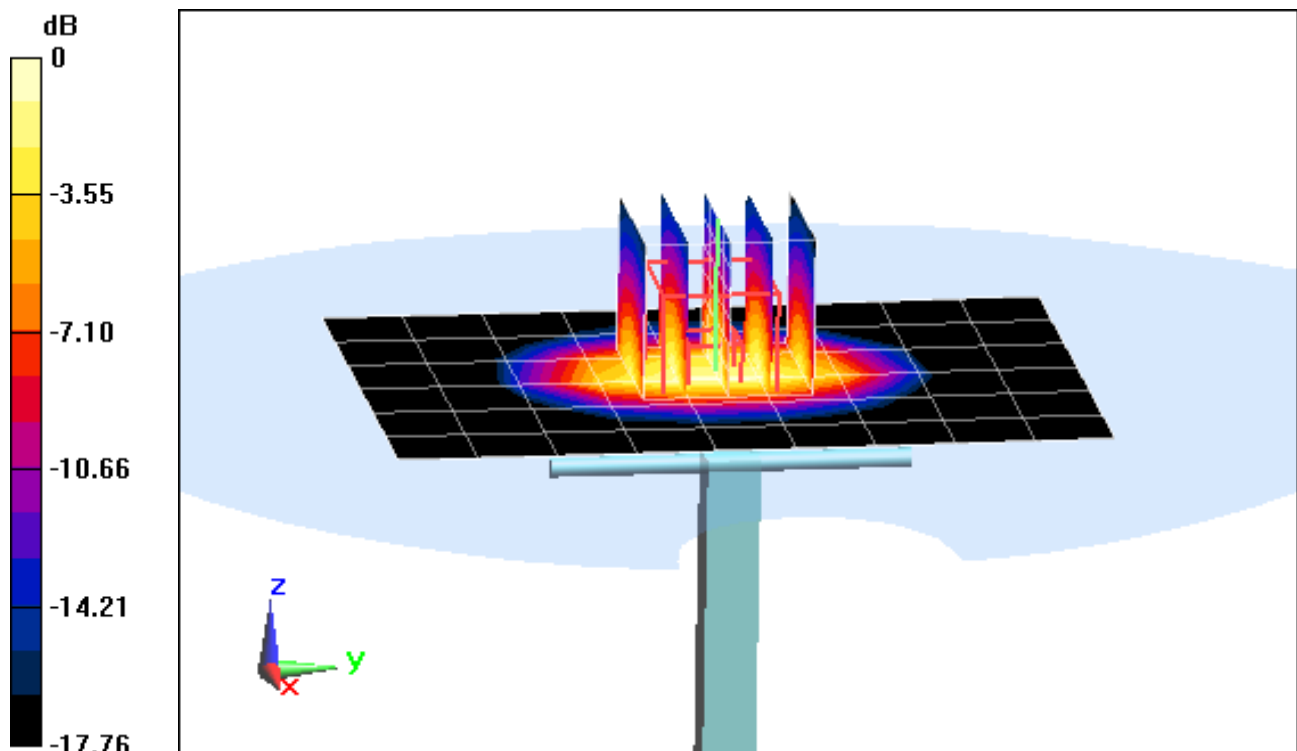
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Input Power = 20.0 dBm (100 mW)

Peak SAR (extrapolated) = 7.15 W/kg

SAR(1 g) = 3.91 W/kg

Deviation = -2.74%



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 Head, Medium parameters used:

$f = 2450 \text{ MHz}$; $\sigma = 1.849 \text{ S/m}$; $\epsilon_r = 40.47$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.0 cm

Test Date: 01-20-2015; Ambient Temp: 21.9°C; Tissue Temp: 23.0°C

Probe: ES3DV3 - SN3209; ConvF(4.54, 4.54, 4.54); Calibrated: 3/19/2014;

Sensor-Surface: 3mm (Mechanical Surface Detection)

Electronics: DAE4 Sn1334; Calibrated: 3/17/2014

Phantom: SAM Right; Type: SAM; Serial: 1757

Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

2450 MHz System Verification

Area Scan (8x9x1): Measurement grid: $dx=12\text{mm}$, $dy=12\text{mm}$

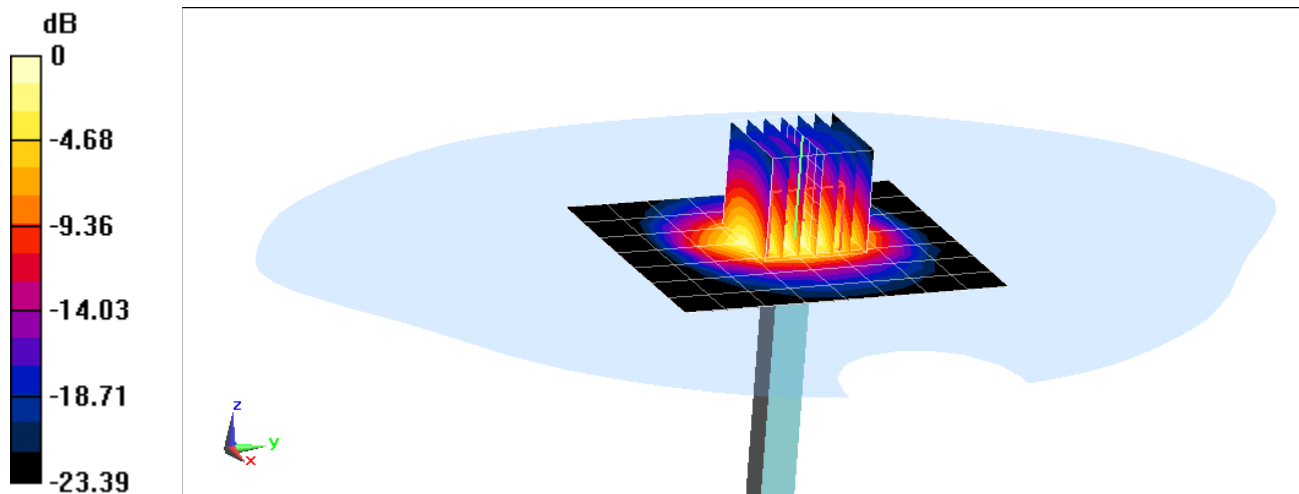
Zoom Scan (7x7x7)/Cube 0: Measurement grid: $dx=5\text{mm}$, $dy=5\text{mm}$, $dz=5\text{mm}$

Input Power = 20.0 dBm (100 mW)

Peak SAR (extrapolated) = 10.3 W/kg

SAR(1 g) = 4.86 W/kg

Deviation = -6.72%



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: 2450 Head Medium parameters used:

$f = 2600 \text{ MHz}$; $\sigma = 1.972 \text{ S/m}$; $\epsilon_r = 40.382$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section ; Space: 1.0 cm

Test Date: 02-05-2015; Ambient Temp: 24.3°C; Tissue Temp: 22.5°C

Probe: ES3DV3 - SN3258; ConvF(4.34, 4.34, 4.34); Calibrated: 2/25/2014;

Sensor-Surface: 3mm (Mechanical Surface Detection)

Electronics: DAE4 Sn665; Calibrated: 2/26/2014

Phantom: SAM Front; Type: SAM; Serial: 1686

Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

2600 MHz System Verification

Area Scan (8x9x1): Measurement grid: dx=12mm, dy=12mm

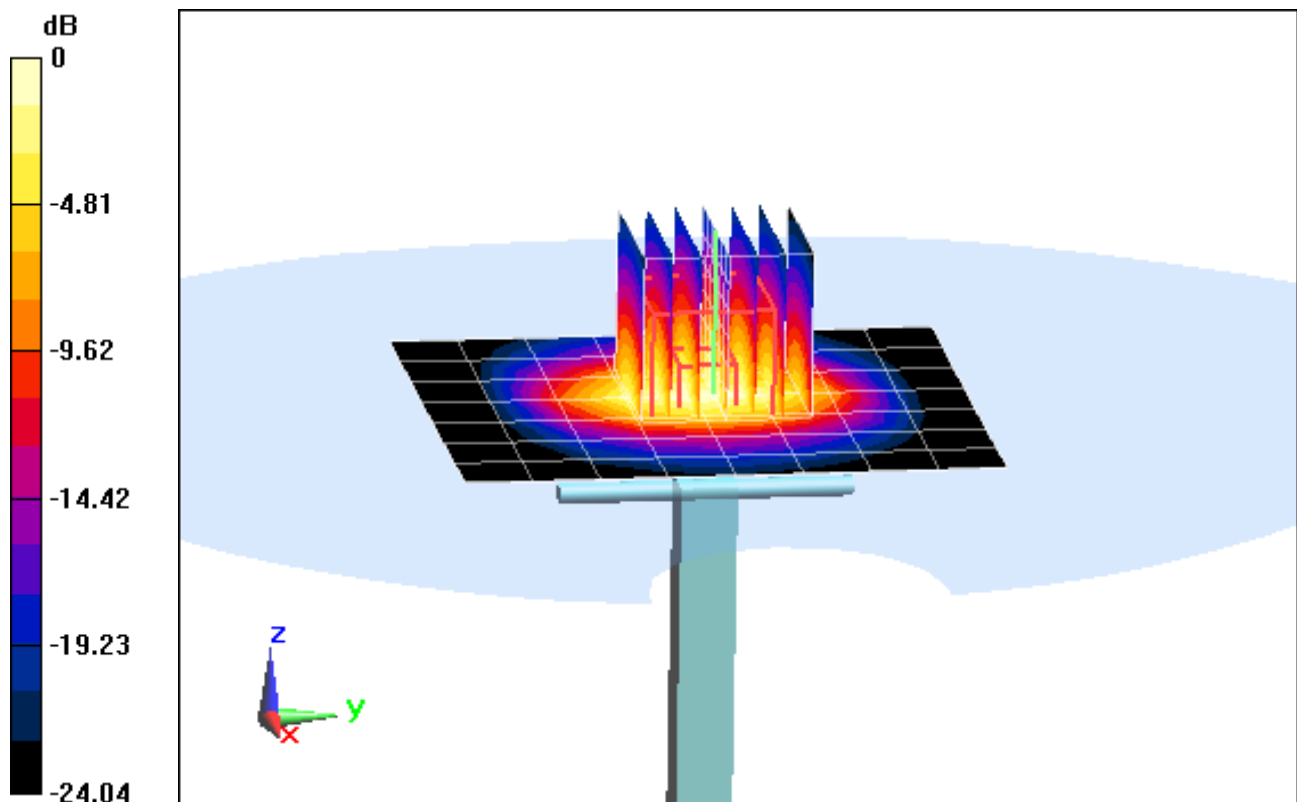
Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Input Power = 20.0 dBm (100 mW)

Peak SAR (extrapolated) = 12.5 W/kg

SAR(1 g) = 5.84 W/kg

Deviation = 1.57%



PCTEST ENGINEERING LABORATORY, INC.

DUT: Dipole 5300 MHz; Type: D5GHzV2; Serial: 1120

Communication System: UID 0, CW; Frequency: 5300 MHz; Duty Cycle: 1:1

Medium: 5 GHz Head, Medium parameters used:

$f = 5300 \text{ MHz}$; $\sigma = 4.903 \text{ S/m}$; $\epsilon_r = 35.673$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.0 cm

Test Date: 01-27-2015; Ambient Temp: 24.3°C; Tissue Temp: 21.8°C

Probe: EX3DV4 - SN7308; ConvF(5.37, 5.37, 5.37); Calibrated: 7/16/2014;

Sensor-Surface: 1.4mm (Mechanical Surface Detection)

Electronics: DAE4 Sn1323; Calibrated: 9/17/2014

Phantom: SAM 5.0 front; Type: QD000P40CD; Serial: TP:-1648

Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

5300 MHz System Verification

Area Scan (7x8x1): Measurement grid: $dx=10\text{mm}$, $dy=10\text{mm}$

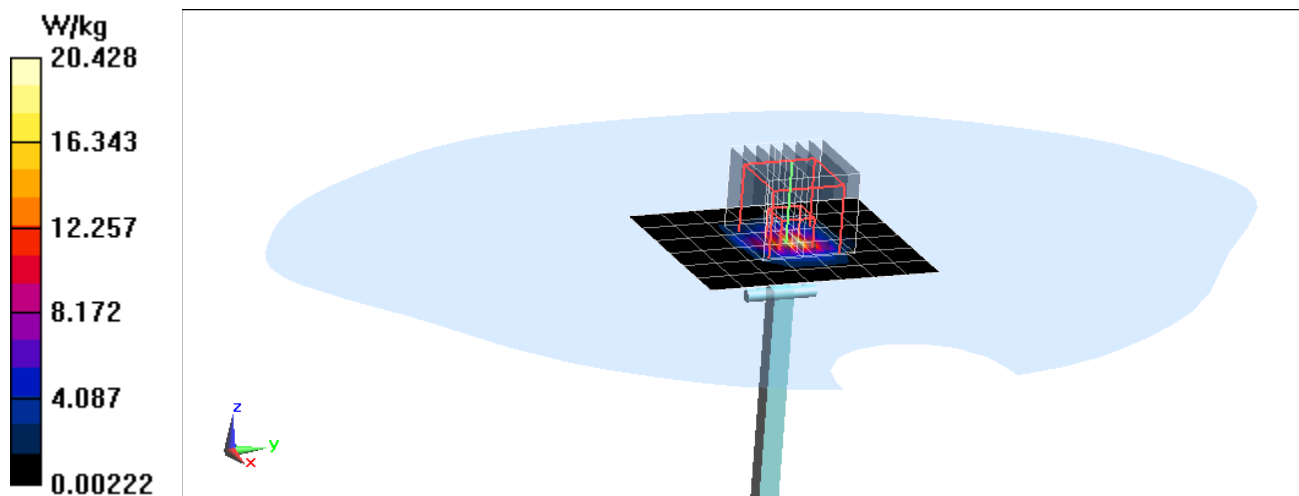
Zoom Scan (8x8x7)/Cube 0: Measurement grid: $dx=4\text{mm}$, $dy=4\text{mm}$, $dz=1.4\text{mm}$; Graded Ratio: 1.4

Input Power = 20.0 dBm (100 mW)

Peak SAR (extrapolated) = 34.6 W/kg

SAR(1 g) = 7.91 W/kg

Deviation = -5.16%



PCTEST ENGINEERING LABORATORY, INC.

DUT: Dipole 5500 MHz; Type: D5GHzV2; Serial: 1120

Communication System: UID 0, CW; Frequency: 5500 MHz; Duty Cycle: 1:1

Medium: 5 GHz Head, Medium parameters used:

$f = 5500 \text{ MHz}$; $\sigma = 5.129 \text{ S/m}$; $\epsilon_r = 35.206$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.0 cm

Test Date: 01-27-2015; Ambient Temp: 24.3°C; Tissue Temp: 21.8°C

Probe: EX3DV4 - SN7308; ConvF(4.64, 4.64, 4.64); Calibrated: 7/16/2014;

Sensor-Surface: 1.4mm (Mechanical Surface Detection)

Electronics: DAE4 Sn1323; Calibrated: 9/17/2014

Phantom: SAM 5.0 front; Type: QD000P40CD; Serial: TP:-1648

Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

5500 MHz System Verification

Area Scan (7x8x1): Measurement grid: $dx=10\text{mm}$, $dy=10\text{mm}$

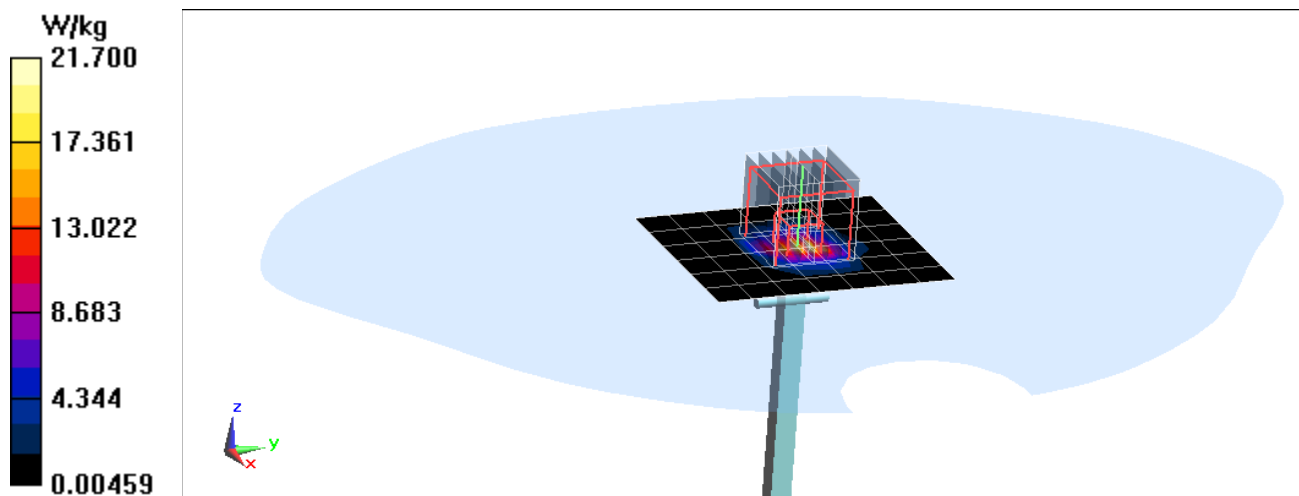
Zoom Scan (8x8x7)/Cube 0: Measurement grid: $dx=4\text{mm}$, $dy=4\text{mm}$, $dz=1.4\text{mm}$; Graded Ratio: 1.4

Input Power = 20.0 dBm (100 mW)

Peak SAR (extrapolated) = 35.7 W/kg

SAR(1 g) = 7.95 W/kg

Deviation = -6.36%



PCTEST ENGINEERING LABORATORY, INC.

DUT: Dipole 5600 MHz; Type: D5GHzV2; Serial: 1120

Communication System: UID 0, CW; Frequency: 5600 MHz; Duty Cycle: 1:1

Medium: 5 GHz Head, Medium parameters used:

$f = 5600 \text{ MHz}$; $\sigma = 5.254 \text{ S/m}$; $\epsilon_r = 34.958$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.0 cm

Test Date: 01-27-2015; Ambient Temp: 24.4°C; Tissue Temp: 21.8°C

Probe: EX3DV4 - SN7308; ConvF(4.64, 4.64, 4.64); Calibrated: 7/16/2014;

Sensor-Surface: 1.4mm (Mechanical Surface Detection)

Electronics: DAE4 Sn1323; Calibrated: 9/17/2014

Phantom: SAM 5.0 front; Type: QD000P40CD; Serial: TP:-1648

Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

5600 MHz System Verification

Area Scan (7x8x1): Measurement grid: $dx=10\text{mm}$, $dy=10\text{mm}$

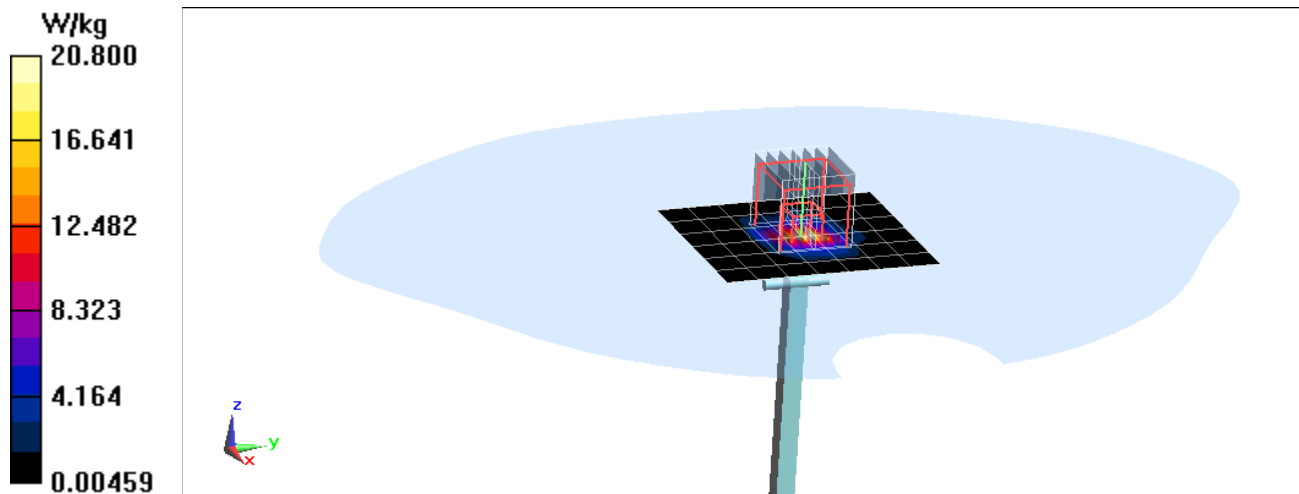
Zoom Scan (7x7x7)/Cube 0: Measurement grid: $dx=4\text{mm}$, $dy=4\text{mm}$, $dz=1.4\text{mm}$; Graded Ratio: 1.4

Input Power = 20.0 dBm (100 mW)

Peak SAR (extrapolated) = 37.6 W/kg

SAR(1 g) = 8.15 W/kg

Deviation = -0.85%



PCTEST ENGINEERING LABORATORY, INC.

DUT: Dipole 5800 MHz; Type: D5GHzV2; Serial: 1120

Communication System: UID 0, CW; Frequency: 5800 MHz; Duty Cycle: 1:1

Medium: 5 GHz Head, Medium parameters used:

$f = 5800 \text{ MHz}$; $\sigma = 5.496 \text{ S/m}$; $\epsilon_r = 34.471$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.0 cm

Test Date: 01-27-2015; Ambient Temp: 24.3°C; Tissue Temp: 21.8°C

Probe: EX3DV4 - SN7308; ConvF(4.81, 4.81, 4.81); Calibrated: 7/16/2014;

Sensor-Surface: 1.4mm (Mechanical Surface Detection)

Electronics: DAE4 Sn1323; Calibrated: 9/17/2014

Phantom: SAM 5.0 front; Type: QD000P40CD; Serial: TP:-1648

Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

5800 MHz System Verification

Area Scan (7x8x1): Measurement grid: $dx=10\text{mm}$, $dy=10\text{mm}$

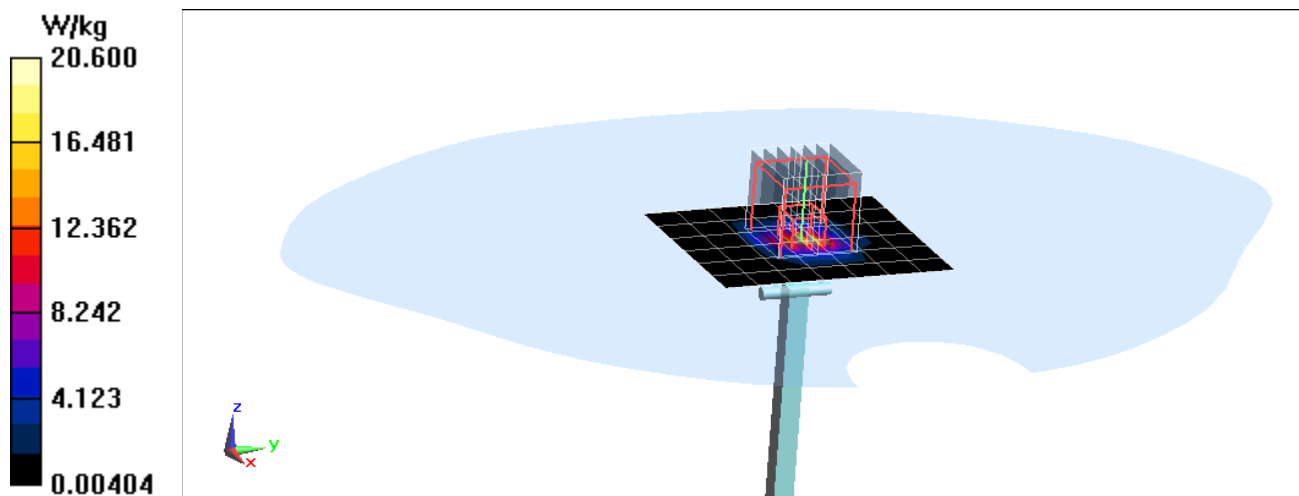
Zoom Scan (7x7x7)/Cube 0: Measurement grid: $dx=4\text{mm}$, $dy=4\text{mm}$, $dz=1.4\text{mm}$; Graded Ratio: 1.4

Input Power = 20.0 dBm (100 mW)

Peak SAR (extrapolated) = 36.7 W/kg

SAR(1 g) = 7.65 W/kg

Deviation = -3.29%



PCTEST ENGINEERING LABORATORY, INC.

DUT: Dipole 750 MHz; Type: D750V3; Serial: 1054

Communication System: UID 0, CW; Frequency: 750 MHz; Duty Cycle: 1:1

Medium: 750 Body Medium parameters used (interpolated):

$f = 750 \text{ MHz}$; $\sigma = 0.964 \text{ S/m}$; $\epsilon_r = 53.293$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section ; Space: 1.5 cm

Test Date: 01-22-2015; Ambient Temp: 23.2°C; Tissue Temp: 23.4°C

Probe: ES3DV3 - SN3332; ConvF(6.24, 6.24, 6.24); Calibrated: 9/18/2014;

Sensor-Surface: 3mm (Mechanical Surface Detection)

Electronics: DAE4 Sn1323; Calibrated: 9/17/2014

Phantom: SAM 5.0 front; Type: QD000P40CD; Serial: TP:-1648

Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

750 MHz System Verification

Area Scan (7x15x1): Measurement grid: dx=15mm, dy=15mm

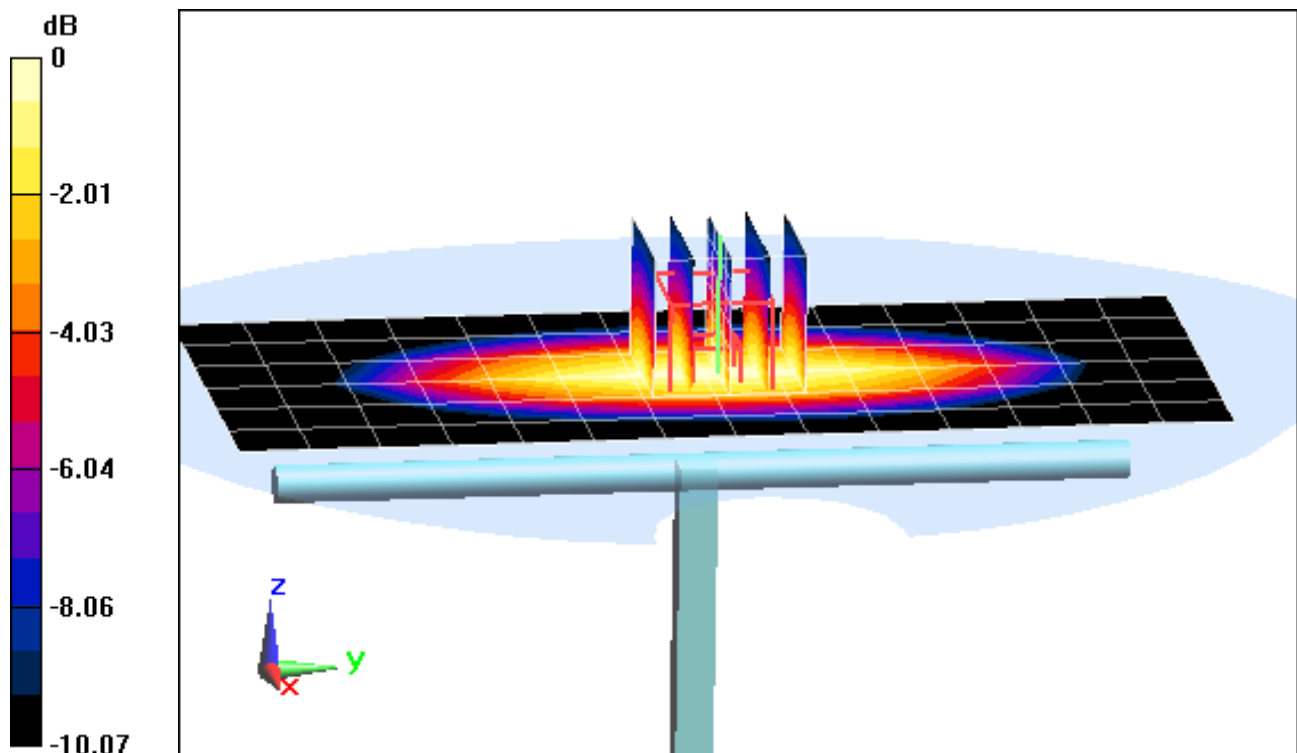
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Input Power = 20.0 dBm (100 mW)

Peak SAR (extrapolated) = 1.24 W/kg

SAR(1 g) = 0.855 W/kg

Deviation = -1.04%



0 dB = 0.996 W/kg = -0.02 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 Body, Medium parameters used:

$f = 835 \text{ MHz}$; $\sigma = 0.993 \text{ S/m}$; $\epsilon_r = 54.447$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.5 cm

Test Date: 01-19-2015; Ambient Temp: 24.2°C; Tissue Temp: 22.6°C

Probe: ES3DV3 - SN3288; ConvF(6.32, 6.32, 6.32); Calibrated: 9/24/2014;

Sensor-Surface: 3mm (Mechanical Surface Detection)

Electronics: DAE4 Sn1364; Calibrated: 9/18/2014

Phantom: ELI v5.0; Type: QDOVA001BB; Serial: 1229

Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

835 MHz System Verification

Area Scan (7x14x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$

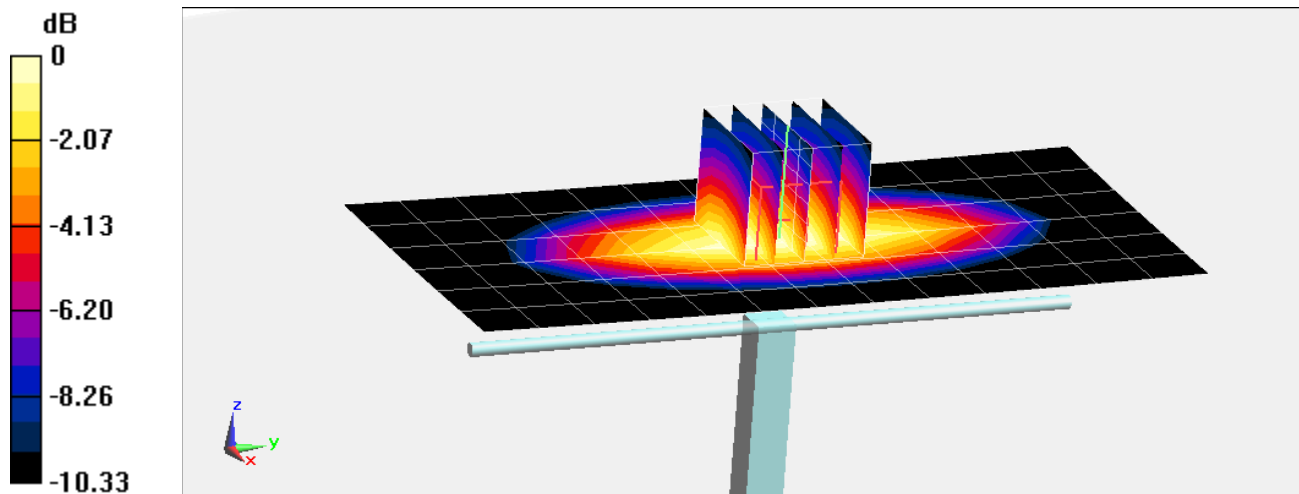
Zoom Scan (5x5x7)/Cube 0: Measurement grid: $dx=8\text{mm}$, $dy=8\text{mm}$, $dz=5\text{mm}$

Input Power = 20.0 dBm (100 mW)

Peak SAR (extrapolated) = 1.43 W/kg

SAR(1 g) = 0.972 W/kg

Deviation = 3.96%



PCTEST ENGINEERING LABORATORY, INC.

DUT: Dipole 1750 MHz; Type: D1765V2; Serial: 1008

Communication System: UID 0, CW; Frequency: 1750 MHz; Duty Cycle: 1:1

Medium: 1750 Body, Medium parameters used:

$f = 1750 \text{ MHz}$; $\sigma = 1.461 \text{ S/m}$; $\epsilon_r = 51.563$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.0 cm

Test Date: 01-19-2015; Ambient Temp: 23.0°C; Tissue Temp: 23.0°C

Probe: ES3DV3 - SN3263; ConvF(4.98, 4.98, 4.98); Calibrated: 5/15/2014;

Sensor-Surface: 3mm (Mechanical Surface Detection)

Electronics: DAE4 Sn859; Calibrated: 5/14/2014

Phantom: SAM v5.0 front; Type: QD000P40CD; Serial: TP-1646

Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

1750 MHz System Verification

Area Scan (7x9x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$

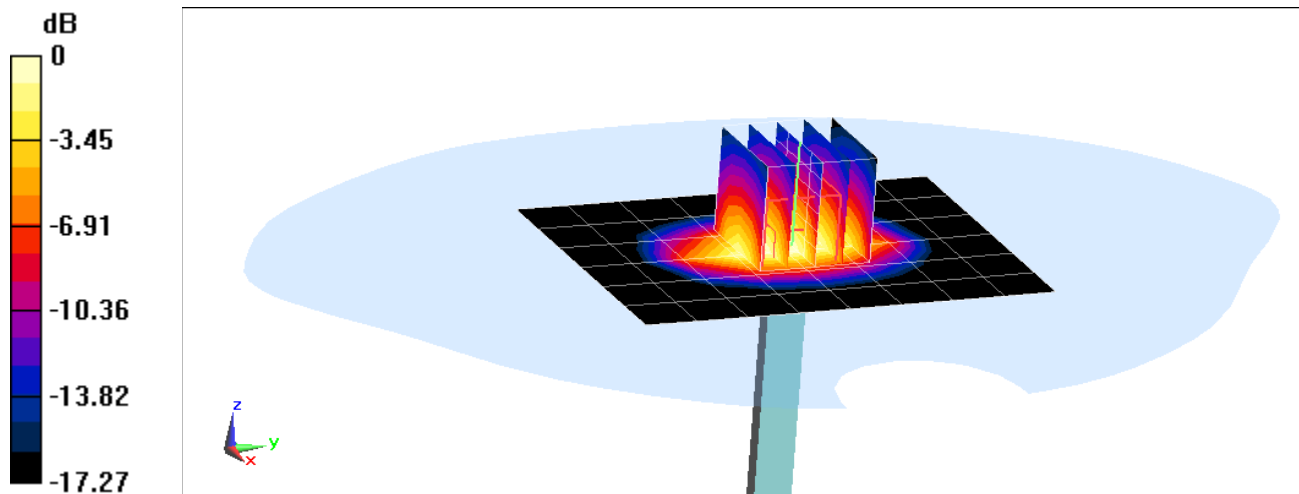
Zoom Scan (5x5x7)/Cube 0: Measurement grid: $dx=8\text{mm}$, $dy=8\text{mm}$, $dz=5\text{mm}$

Input Power = 20.0 dBm (100 mW)

Peak SAR (extrapolated) = 6.40 W/kg

SAR(1 g) = 3.69 W/kg

Deviation = -1.86%



PCTEST ENGINEERING LABORATORY, INC.

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

Communication System: UID 0, CW; Frequency: 1900 MHz; Duty Cycle: 1:1

Medium: 1900 Body, Medium parameters used (interpolated):

$f = 1900 \text{ MHz}$; $\sigma = 1.571 \text{ S/m}$; $\epsilon_r = 51.619$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.0 cm

Test Date: 01-19-2015; Ambient Temp: 24.4°C; Tissue Temp: 21.8°C

Probe: ES3DV3 - SN3258; ConvF(4.61, 4.61, 4.61); Calibrated: 2/25/2014;

Sensor-Surface: 3mm (Mechanical Surface Detection)

Electronics: DAE4 Sn665; Calibrated: 2/26/2014

Phantom: ELI v5.0; Type: QDOVA002AA; Serial: TP-1158

Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

1900 MHz System Verification

Area Scan (7x10x1): Measurement grid: dx=15mm, dy=15mm

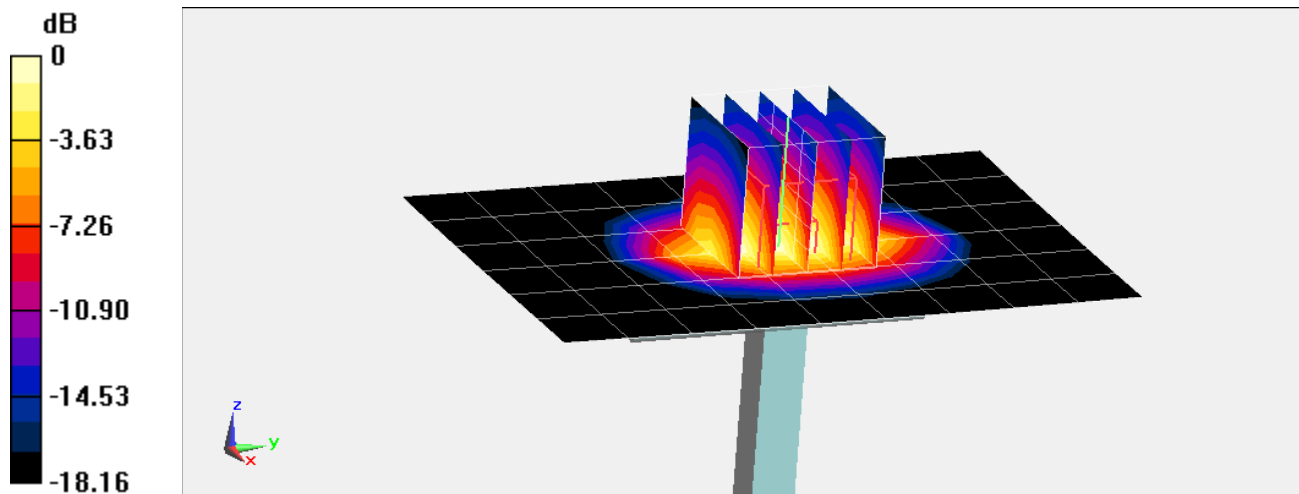
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Input Power = 20.0 dBm (100 mW)

Peak SAR (extrapolated) = 6.98 W/kg

SAR(1 g) = 3.95 W/kg

Deviation = -2.23%



PCTEST ENGINEERING LABORATORY, INC.

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):

$f = 1900 \text{ MHz}$; $\sigma = 1.551 \text{ S/m}$; $\epsilon_r = 52.251$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.0 cm

Test Date: 01-29-2015; Ambient Temp: 24.0°C; Tissue Temp: 22.9°C

Probe: ES3DV3 - SN3258; ConvF(4.61, 4.61, 4.61); Calibrated: 2/25/2014;

Sensor-Surface: 3mm (Mechanical Surface Detection)

Electronics: DAE4 Sn665; Calibrated: 2/26/2014

Phantom: ELI v5.0; Type: QDOVA002AA; Serial: TP-1158

Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

1900 MHz System Verification

Area Scan (7x10x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$

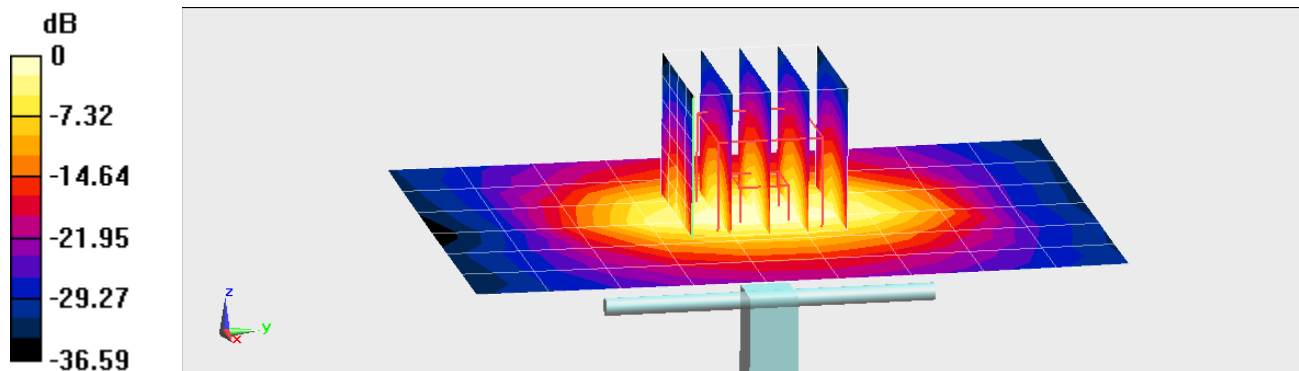
Zoom Scan (5x5x7)/Cube 0: Measurement grid: $dx=8\text{mm}$, $dy=8\text{mm}$, $dz=5\text{mm}$

Input Power = 20.0 dBm (100 mW)

Peak SAR (extrapolated) = 7.05 W/kg

SAR(1 g) = 4.08 W/kg

Deviation = 0.49%



PCTEST ENGINEERING LABORATORY, INC.

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

Communication System: UID 0, CW; Frequency: 1900 MHz; Duty Cycle: 1:1

Medium: 1900 Body Medium parameters used (interpolated):

$f = 1900 \text{ MHz}$; $\sigma = 1.579 \text{ S/m}$; $\epsilon_r = 52.286$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section ; Space: 1.0 cm

Test Date: 02-06-2015; Ambient Temp: 23.8°C; Tissue Temp: 22.1°C

Probe: ES3DV3 - SN3332; ConvF(4.64, 4.64, 4.64); Calibrated: 9/18/2014;

Sensor-Surface: 3mm (Mechanical Surface Detection)

Electronics: DAE4 Sn1323; Calibrated: 9/17/2014

Phantom: SAM 5.0 front; Type: QD000P40CD; Serial: TP:-1648

Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

1900 MHz System Verification

Area Scan (7x10x1): Measurement grid: dx=15mm, dy=15mm

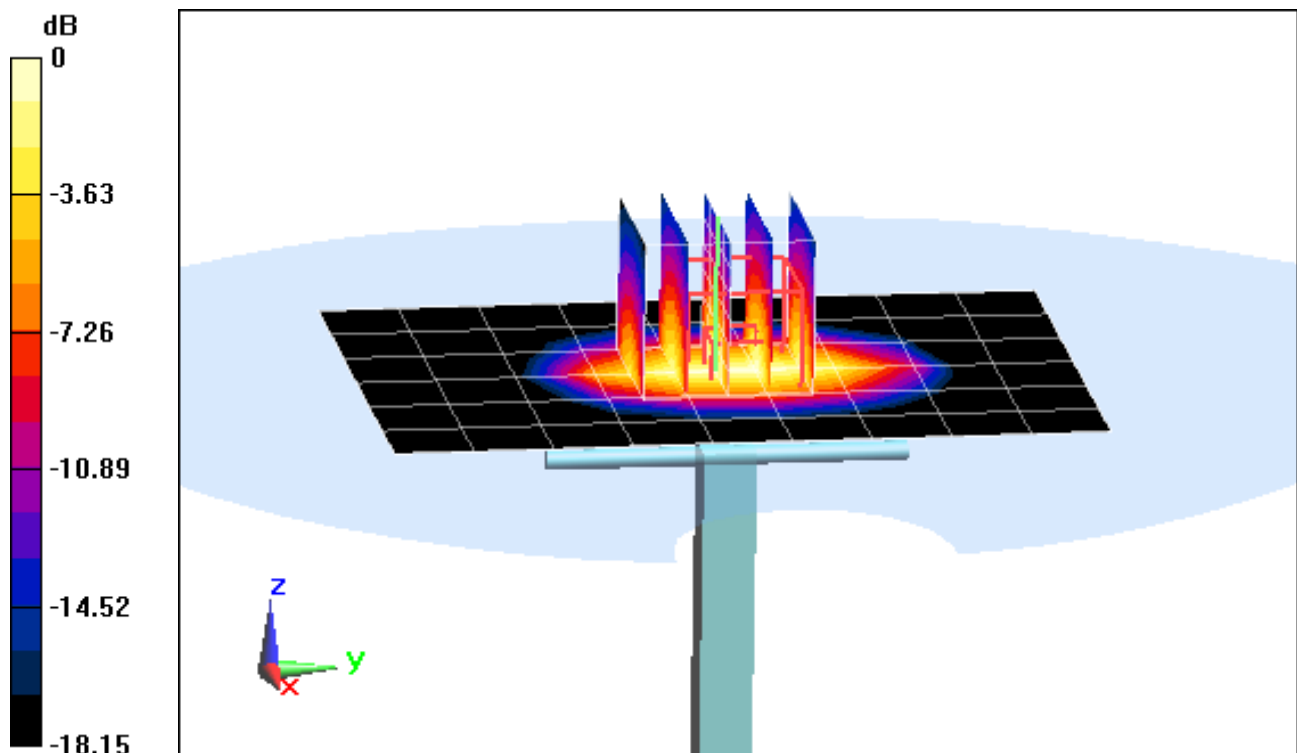
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Input Power = 20.0 dBm (100 mW)

Peak SAR (extrapolated) = 7.29 W/kg

SAR(1 g) = 4.13 W/kg

Deviation = 2.23%



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:

$f = 2450 \text{ MHz}$; $\sigma = 2.031 \text{ S/m}$; $\epsilon_r = 51.04$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.0 cm

Test Date: 01-19-2015; Ambient Temp: 24.0°C; Tissue Temp: 22.8°C

Probe: ES3DV3 - SN3209; ConvF(4.2, 4.2, 4.2); Calibrated: 3/19/2014;

Sensor-Surface: 3mm (Mechanical Surface Detection)

Electronics: DAE4 Sn1334; Calibrated: 3/17/2014

Phantom: SAM left; Type: QD000P40CD; Serial: TP:1715

Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

2450 MHz System Verification

Area Scan (8x9x1): Measurement grid: $dx=12\text{mm}$, $dy=12\text{mm}$

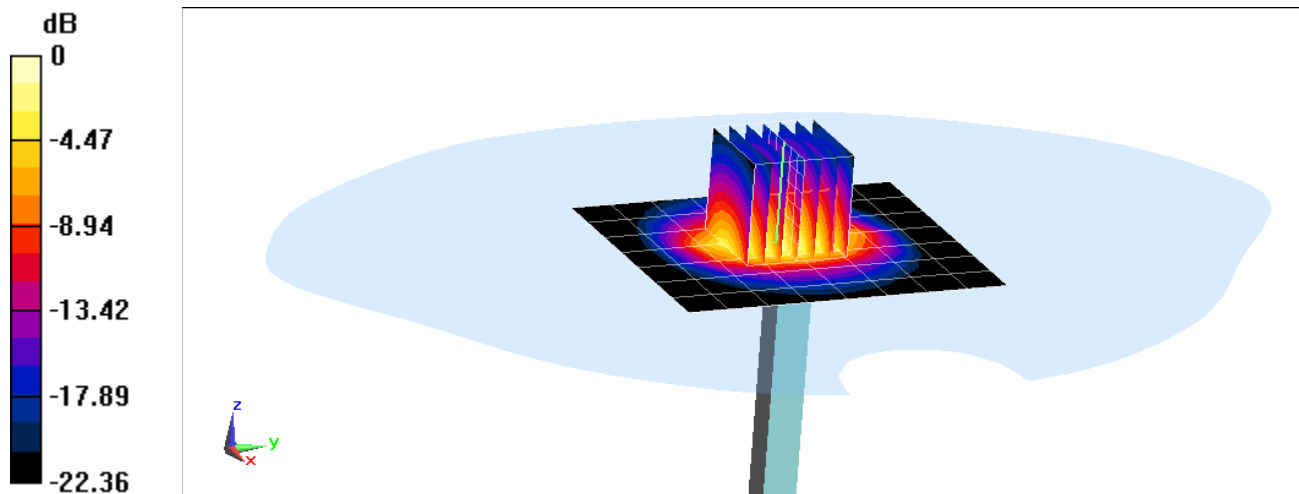
Zoom Scan (7x7x7)/Cube 0: Measurement grid: $dx=5\text{mm}$, $dy=5\text{mm}$, $dz=5\text{mm}$

Input Power = 20.0 dBm (100 mW)

Peak SAR (extrapolated) = 11.2 W/kg

SAR(1 g) = 5.15 W/kg

Deviation = -0.58%



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: 2450 Body Medium parameters used:

$f = 2600 \text{ MHz}$; $\sigma = 2.16 \text{ S/m}$; $\epsilon_r = 52.058$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section ; Space: 1.0 cm

Test Date: 02-02-2015; Ambient Temp: 23.0°C; Tissue Temp: 23.6°C

Probe: ES3DV3 - SN3209; ConvF(4.04, 4.04, 4.04); Calibrated: 3/19/2014;

Sensor-Surface: 3mm (Mechanical Surface Detection)

Electronics: DAE4 Sn1334; Calibrated: 3/17/2014

Phantom: SAM left; Type: QD000P40CD; Serial: TP:1715

Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

2600 MHz System Verification

Area Scan (8x9x1): Measurement grid: dx=12mm, dy=12mm

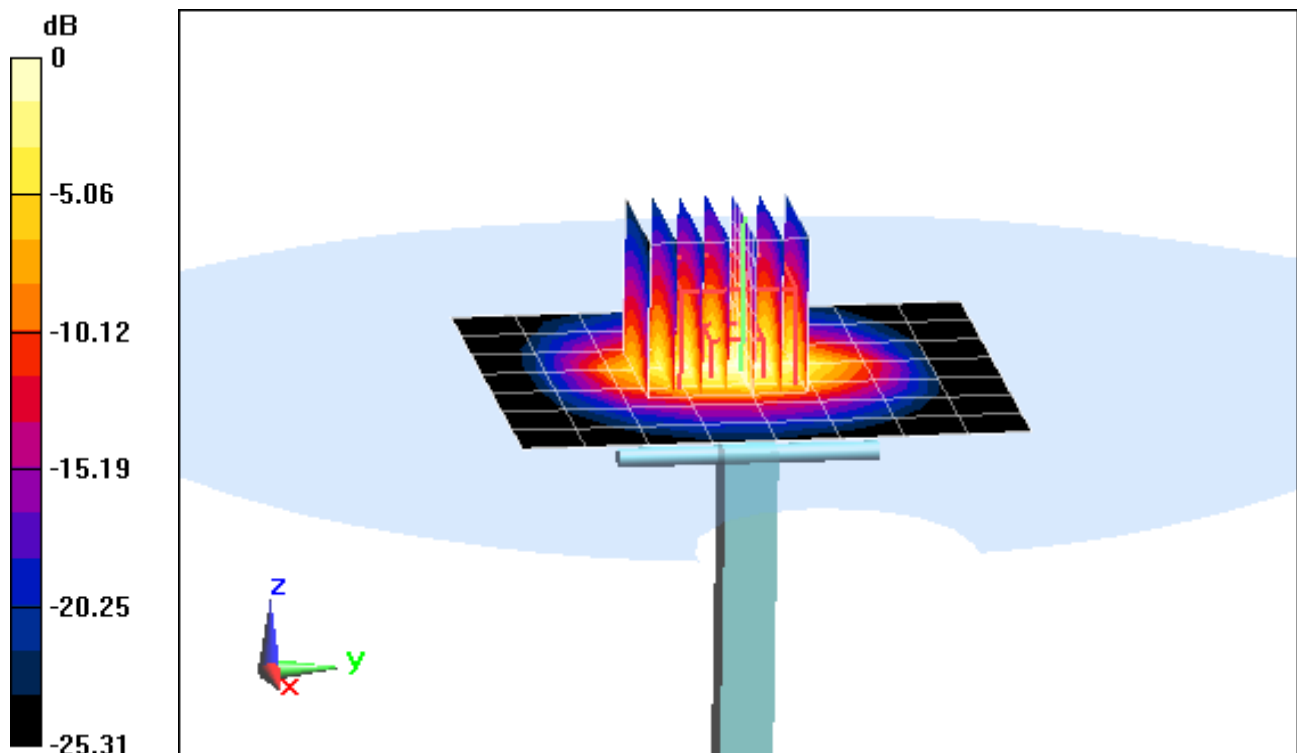
Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Input Power = 20.0 dBm (100 mW)

Peak SAR (extrapolated) = 13.9 W/kg

SAR(1 g) = 5.97 W/kg

Deviation = 4.92%



PCTEST ENGINEERING LABORATORY, INC.

DUT: Dipole 5300 MHz; Type: D5GHzV2; Serial: 1191

Communication System: UID 0, CW; Frequency: 5300 MHz; Duty Cycle: 1:1

Medium: 5 GHz Body , Medium parameters used:

$f = 5300 \text{ MHz}$; $\sigma = 5.542 \text{ S/m}$; $\epsilon_r = 48.23$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.0 cm

Test Date: 01-19-2015; Ambient Temp: 24.7°C; Tissue Temp: 23.1°C

Probe: EX3DV4 - SN3920; ConvF(4.16, 4.16, 4.16); Calibrated: 12/12/2014;

Sensor-Surface: 1.4mm (Mechanical Surface Detection)

Electronics: DAE4 Sn1368; Calibrated: 4/11/2014

Phantom: SAM; Type: QD000P40CD; Serial: TP:1758

Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

5300 MHz System Verification

Area Scan (7x8x1): Measurement grid: $dx=10\text{mm}$, $dy=10\text{mm}$

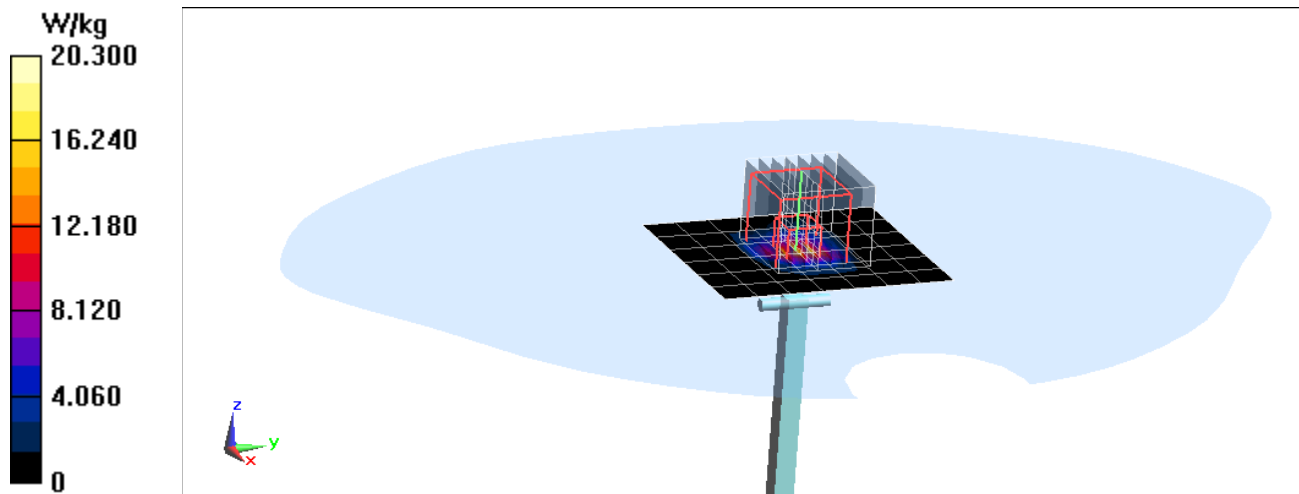
Zoom Scan (8x8x7)/Cube 0: Measurement grid: $dx=4\text{mm}$, $dy=4\text{mm}$, $dz=1.4\text{mm}$; Graded Ratio: 1.4

Input Power = 20.0 dBm (100 mW)

Peak SAR (extrapolated) = 32.4 W/kg

SAR(1 g) = 7.95 W/kg

Deviation = -0.50%



PCTEST ENGINEERING LABORATORY, INC.

DUT: Dipole 5500 MHz; Type: D5GHzV2; Serial: 1191

Communication System: UID 0, 802.11a 5.2-5.8 GHz Band; Frequency: 5500 MHz; Duty Cycle: 1:1

Medium: 5 GHz Body , Medium parameters used:

$f = 5500 \text{ MHz}$; $\sigma = 5.845 \text{ S/m}$; $\epsilon_r = 47.908$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.0 cm

Test Date: 01-19-2015; Ambient Temp: 24.1°C; Tissue Temp: 23.1°C

Probe: EX3DV4 - SN3920; ConvF(3.79, 3.79, 3.79); Calibrated: 12/12/2014;

Sensor-Surface: 1.4mm (Mechanical Surface Detection)

Electronics: DAE4 Sn1368; Calibrated: 4/11/2014

Phantom: SAM; Type: QD000P40CD; Serial: TP:1758

Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

5500 MHz System Verification

Area Scan (7x8x1): Measurement grid: $dx=10\text{mm}$, $dy=10\text{mm}$

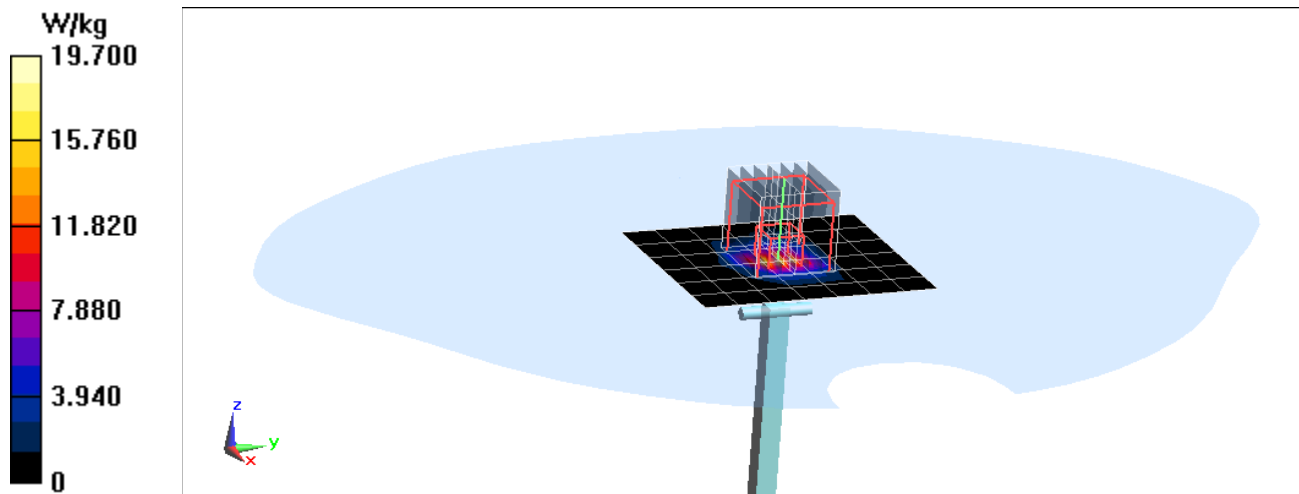
Zoom Scan (7x7x7)/Cube 0: Measurement grid: $dx=4\text{mm}$, $dy=4\text{mm}$, $dz=1.4\text{mm}$; Graded Ratio: 1.4

Input Power = 20.0 dBm (100 mW)

Peak SAR (extrapolated) = 32.3 W/kg

SAR(1 g) = 7.6 W/kg

Deviation = -8.54%



PCTEST ENGINEERING LABORATORY, INC.

DUT: Dipole 5600 MHz; Type: D5GHzV2; Serial: 1191

Communication System: UID 0, 802.11a 5.2-5.8 GHz Band; Frequency: 5600 MHz; Duty Cycle: 1:1

Medium: 5 GHz Body , Medium parameters used:

$f = 5600 \text{ MHz}$; $\sigma = 5.977 \text{ S/m}$; $\epsilon_r = 47.642$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.0 cm

Test Date: 01-19-2015; Ambient Temp: 24.1°C; Tissue Temp: 23.1°C

Probe: EX3DV4 - SN3920; ConvF(3.66, 3.66, 3.66); Calibrated: 12/12/2014;

Sensor-Surface: 1.4mm (Mechanical Surface Detection)

Electronics: DAE4 Sn1368; Calibrated: 4/11/2014

Phantom: SAM; Type: QD000P40CD; Serial: TP:1758

Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

5600 MHz System Verification

Area Scan (7x8x1): Measurement grid: $dx=10\text{mm}$, $dy=10\text{mm}$

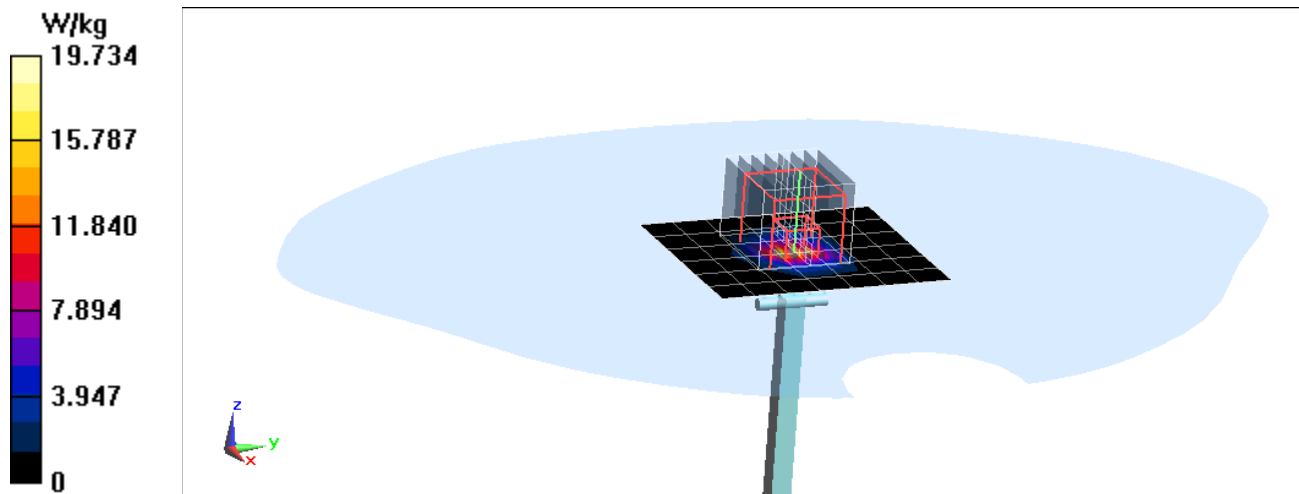
Zoom Scan (8x8x7)/Cube 0: Measurement grid: $dx=4\text{mm}$, $dy=4\text{mm}$, $dz=1.4\text{mm}$; Graded Ratio: 1.4

Input Power = 20.0 dBm (100 mW)

Peak SAR (extrapolated) = 32.4 W/kg

SAR(1 g) = 7.63 W/kg

Deviation = -9.27%



PCTEST ENGINEERING LABORATORY, INC.

DUT: Dipole 5800 MHz; Type: D5GHzV2; Serial: 1191

Communication System: UID 0, 802.11a 5.2-5.8 GHz Band; Frequency: 5800 MHz; Duty Cycle: 1:1

Medium: 5 GHz Body , Medium parameters used:

$f = 5800 \text{ MHz}$; $\sigma = 6.183 \text{ S/m}$; $\epsilon_r = 47.296$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.0 cm

Test Date: 01-19-2015; Ambient Temp: 23.9°C; Tissue Temp: 23.1°C

Probe: EX3DV4 - SN3920; ConvF(3.93, 3.93, 3.93); Calibrated: 12/12/2014;

Sensor-Surface: 1.4mm (Mechanical Surface Detection)

Electronics: DAE4 Sn1368; Calibrated: 4/11/2014

Phantom: SAM; Type: QD000P40CD; Serial: TP:1758

Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

5800 MHz System Verification

Area Scan (7x8x1): Measurement grid: $dx=10\text{mm}$, $dy=10\text{mm}$

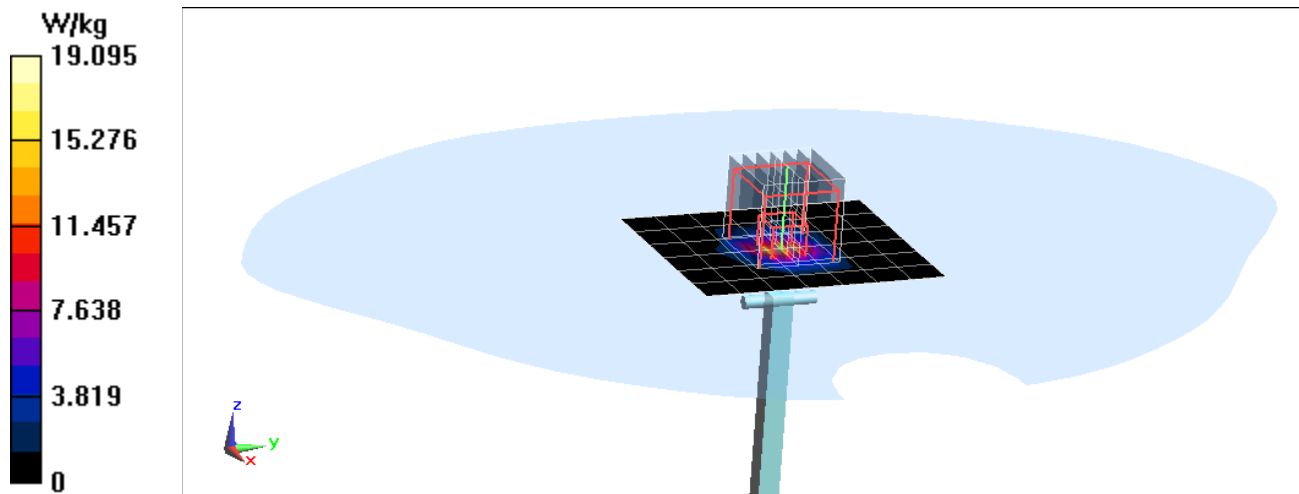
Zoom Scan (7x7x7)/Cube 0: Measurement grid: $dx=4\text{mm}$, $dy=4\text{mm}$, $dz=1.4\text{mm}$; Graded Ratio: 1.4

Input Power = 20.0 dBm (100 mW)

Peak SAR (extrapolated) = 32.9 W/kg

SAR(1 g) = 7.09 W/kg

Deviation = -9.10%



APPENDIX C: PROBE CALIBRATION



Accredited by the Swiss Accreditation Service (SAS)

Accreditation No.: **SCS 108**

The Swiss Accreditation Service is one of the signatories to the EA
Multilateral Agreement for the recognition of calibration certificates

Client **PC Test**

Certificate No: **D750V3-1054_Mar14**

CALIBRATION CERTIFICATE

Object **D750V3 - SN: 1054**

Calibration procedure(s) **QA CAL-05.v9**
Calibration procedure for dipole validation kits above 700 MHz

Calibration date: **March 17, 2014**

This calibration certificate documents the traceability to national standards, which realize the physical units of measurements (SI).
The measurements and the uncertainties with confidence probability are given on the following pages and are part of the certificate.

All calibrations have been conducted in the closed laboratory facility: environment temperature (22 ± 3)°C and humidity < 70%.

Calibration Equipment used (M&TE critical for calibration)

Primary Standards	ID #	Cal Date (Certificate No.)	Scheduled Calibration
Power meter EPM-442A	GB37480704	09-Oct-13 (No. 217-01827)	Oct-14
Power sensor HP 8481A	US37292783	09-Oct-13 (No. 217-01827)	Oct-14
Power sensor HP 8481A	MY41092317	09-Oct-13 (No. 217-01828)	Oct-14
Reference 20 dB Attenuator	SN: 5058 (20k)	04-Apr-13 (No. 217-01736)	Apr-14
Type-N mismatch combination	SN: 5047.3 / 06327	04-Apr-13 (No. 217-01739)	Apr-14
Reference Probe ES3DV3	SN: 3205	30-Dec-13 (No. ES3-3205_Dec13)	Dec-14
DAE4	SN: 601	25-Apr-13 (No. DAE4-601_Apr13)	Apr-14
Secondary Standards	ID #	Check Date (in house)	Scheduled Check
RF generator R&S SMT-06	100005	04-Aug-99 (in house check Oct-13)	In house check: Oct-16
Network Analyzer HP 8753E	US37390585 S4206	18-Oct-01 (in house check Oct-13)	In house check: Oct-14

Calibrated by: **Israe El-Naouq** Name: **Israe El-Naouq** Function: **Laboratory Technician**

Approved by: **Katja Pokovic** Name: **Katja Pokovic** Technical Manager

Signature

Israe El-Naouq
Katja Pokovic

Issued: March 17, 2014

This calibration certificate shall not be reproduced except in full without written approval of the laboratory.



Accredited by the Swiss Accreditation Service (SAS)

Accreditation No.: **SCS 108**

The Swiss Accreditation Service is one of the signatories to the EA
Multilateral Agreement for the recognition of calibration certificates

Glossary:

TSL	tissue simulating liquid
ConvF	sensitivity in TSL / NORM x,y,z
N/A	not applicable or not measured

Calibration is Performed According to the Following Standards:

- IEEE Std 1528-2013, "IEEE Recommended Practice for Determining the Peak Spatial-Averaged Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques", June 2013
- IEC 62209-1, "Procedure to measure the Specific Absorption Rate (SAR) for hand-held devices used in close proximity to the ear (frequency range of 300 MHz to 3 GHz)", February 2005
- KDB 865664, "SAR Measurement Requirements for 100 MHz to 6 GHz"

Additional Documentation:

- DASY4/5 System Handbook

Methods Applied and Interpretation of Parameters:

- Measurement Conditions:* Further details are available from the Validation Report at the end of the certificate. All figures stated in the certificate are valid at the frequency indicated.
- Antenna Parameters with TSL:* The dipole is mounted with the spacer to position its feed point exactly below the center marking of the flat phantom section, with the arms oriented parallel to the body axis.
- Feed Point Impedance and Return Loss:* These parameters are measured with the dipole positioned under the liquid filled phantom. The impedance stated is transformed from the measurement at the SMA connector to the feed point. The Return Loss ensures low reflected power. No uncertainty required.
- Electrical Delay:* One-way delay between the SMA connector and the antenna feed point. No uncertainty required.
- SAR measured:* SAR measured at the stated antenna input power.
- SAR normalized:* SAR as measured, normalized to an input power of 1 W at the antenna connector.
- SAR for nominal TSL parameters:* The measured TSL parameters are used to calculate the nominal SAR result.

The reported uncertainty of measurement is stated as the standard uncertainty of measurement multiplied by the coverage factor $k=2$, which for a normal distribution corresponds to a coverage probability of approximately 95%.

Measurement Conditions

DASY system configuration, as far as not given on page 1.

DASY Version	DASY5	V52.8.7
Extrapolation	Advanced Extrapolation	
Phantom	Modular Flat Phantom	
Distance Dipole Center - TSL	15 mm	with Spacer
Zoom Scan Resolution	dx, dy, dz = 5 mm	
Frequency	750 MHz $\pm$ 1 MHz	

Head TSL parameters

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Head TSL parameters	22.0 °C	41.9	0.89 mho/m
Measured Head TSL parameters	(22.0 $\pm$ 0.2) °C	40.6 $\pm$ 6 %	0.92 mho/m $\pm$ 6 %
Head TSL temperature change during test	< 0.5 °C	----	----

SAR result with Head TSL

SAR averaged over 1 cm ³ (1 g) of Head TSL	Condition	
SAR measured	250 mW input power	2.15 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	8.33 W/kg $\pm$ 17.0 % (k=2)

SAR averaged over 10 cm ³ (10 g) of Head TSL	condition	
SAR measured	250 mW input power	1.39 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	5.42 W/kg $\pm$ 16.5 % (k=2)

Body TSL parameters

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Body TSL parameters	22.0 °C	55.5	0.96 mho/m
Measured Body TSL parameters	(22.0 $\pm$ 0.2) °C	55.2 $\pm$ 6 %	1.00 mho/m $\pm$ 6 %
Body TSL temperature change during test	< 0.5 °C	----	----

SAR result with Body TSL

SAR averaged over 1 cm ³ (1 g) of Body TSL	Condition	
SAR measured	250 mW input power	2.23 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	8.64 W/kg $\pm$ 17.0 % (k=2)

SAR averaged over 10 cm ³ (10 g) of Body TSL	condition	
SAR measured	250 mW input power	1.46 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	5.69 W/kg $\pm$ 16.5 % (k=2)

Appendix

Antenna Parameters with Head TSL

Impedance, transformed to feed point	$55.1 \Omega + 0.7 j\Omega$
Return Loss	- 26.2 dB

Antenna Parameters with Body TSL

Impedance, transformed to feed point	$48.5 \Omega - 2.8 j\Omega$
Return Loss	- 29.8 dB

General Antenna Parameters and Design

Electrical Delay (one direction)	1.035 ns
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After long term use with 100W radiated power, only a slight warming of the dipole near the feedpoint can be measured.

The dipole is made of standard semirigid coaxial cable. The center conductor of the feeding line is directly connected to the second arm of the dipole. The antenna is therefore short-circuited for DC-signals. On some of the dipoles, small end caps are added to the dipole arms in order to improve matching when loaded according to the position as explained in the "Measurement Conditions" paragraph. The SAR data are not affected by this change. The overall dipole length is still according to the Standard.

No excessive force must be applied to the dipole arms, because they might bend or the soldered connections near the feedpoint may be damaged.

Additional EUT Data

Manufactured by	SPEAG
Manufactured on	November 08, 2011

DASY5 Validation Report for Head TSL

Date: 17.03.2014

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole 750 MHz; Type: D750V3; Serial: D750V3 - SN: 1054

Communication System: UID 0 - CW; Frequency: 750 MHz

Medium parameters used: $f = 750 \text{ MHz}$; $\sigma = 0.92 \text{ S/m}$; $\epsilon_r = 40.6$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section

Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY52 Configuration:

- Probe: ES3DV3 - SN3205; ConvF(6.37, 6.37, 6.37); Calibrated: 30.12.2013;
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 25.04.2013
- Phantom: Flat Phantom 4.9L; Type: QD000P49AA; Serial: 1001
- DASY52 52.8.7(1137); SEMCAD X 14.6.10(7164)

Dipole Calibration for Head Tissue/Pin=250 mW, d=15mm/Zoom Scan (7x7x7)/Cube 0:

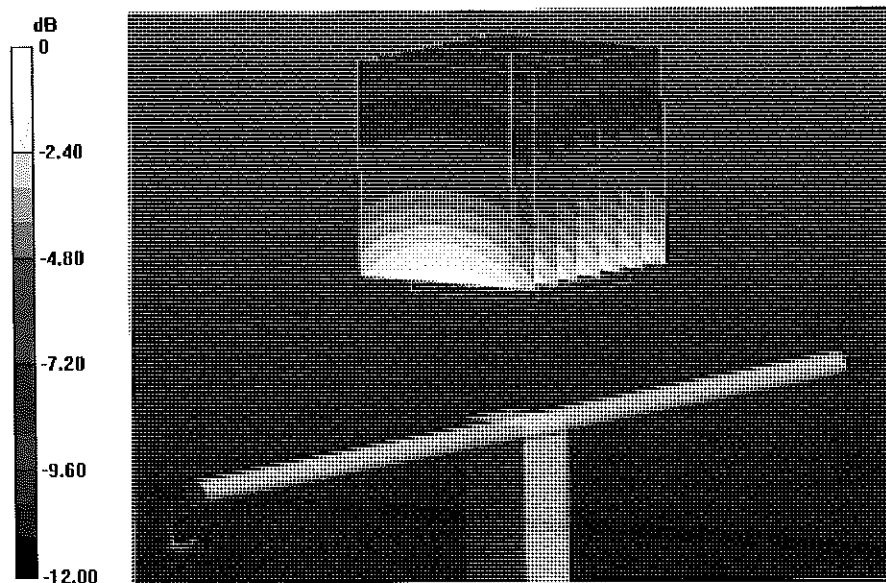
Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 53.851 V/m; Power Drift = 0.02 dB

Peak SAR (extrapolated) = 3.25 W/kg

SAR(1 g) = 2.15 W/kg; SAR(10 g) = 1.39 W/kg

Maximum value of SAR (measured) = 2.51 W/kg

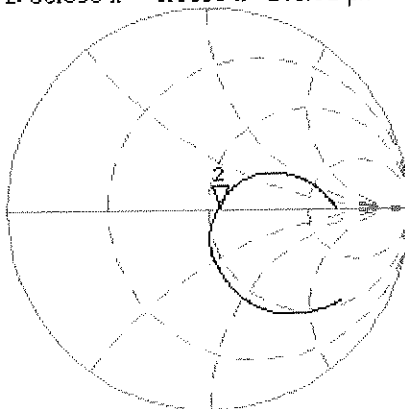


0 dB = 2.51 W/kg = 4.00 dBW/kg

Impedance Measurement Plot for Head TSL

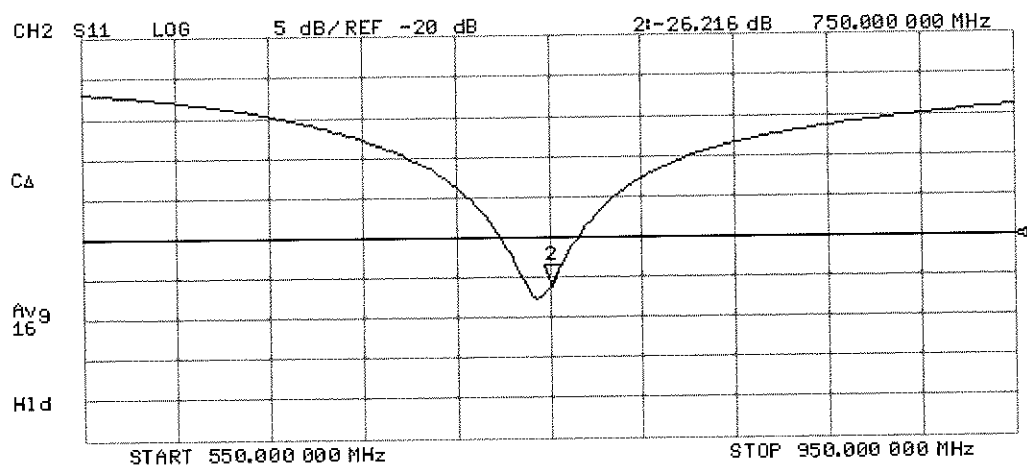
17 Mar 2014 15:32:32
 CH1 S11 1 U FS 2: 55.090 Ω 0.6895 Ω 146.31 pF 750.000 000 MHz

*
 Del
 CA



AVG
 16

H1d



DASY5 Validation Report for Body TSL

Date: 14.03.2014

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole 750 MHz; Type: D750V3; Serial: D750V3 - SN: 1054

Communication System: UID 0 - CW; Frequency: 750 MHz

Medium parameters used: $f = 750$ MHz; $\sigma = 1$ S/m; $\epsilon_r = 55.2$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY52 Configuration:

- Probe: ES3DV3 - SN3205; ConvF(6.13, 6.13, 6.13); Calibrated: 30.12.2013;
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 25.04.2013
- Phantom: Flat Phantom 4.9L; Type: QD000P49AA; Serial: 1001
- DASY52 52.8.7(1137); SEMCAD X 14.6.10(7164)

Dipole Calibration for Body Tissue/Pin=250 mW, d=15mm/Zoom Scan (7x7x7)/Cube 0:

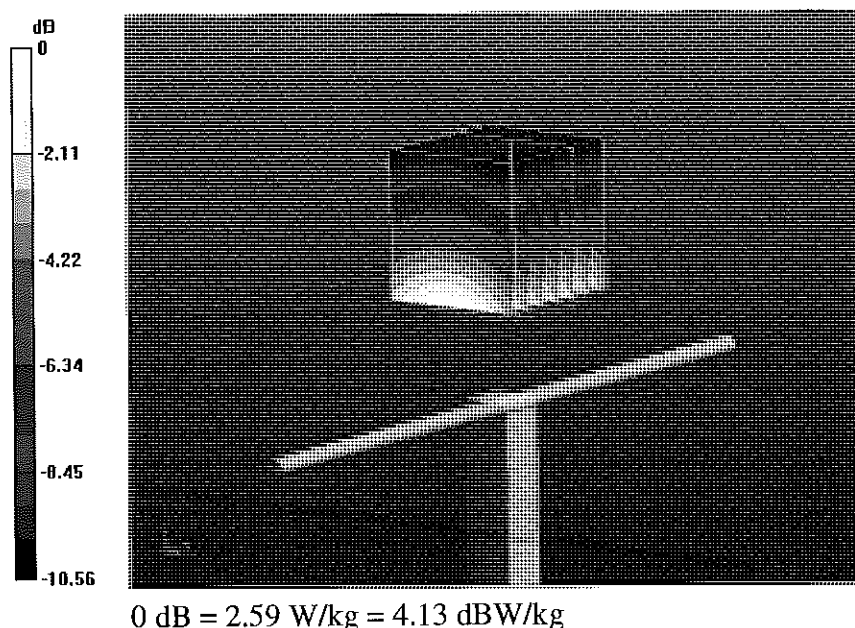
Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 52.788 V/m; Power Drift = -0.03 dB

Peak SAR (extrapolated) = 3.27 W/kg

SAR(1 g) = 2.23 W/kg; SAR(10 g) = 1.46 W/kg

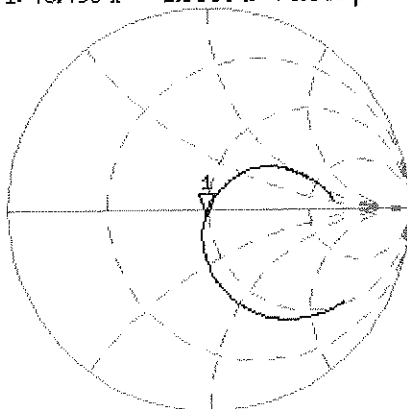
Maximum value of SAR (measured) = 2.59 W/kg



Impedance Measurement Plot for Body TSL

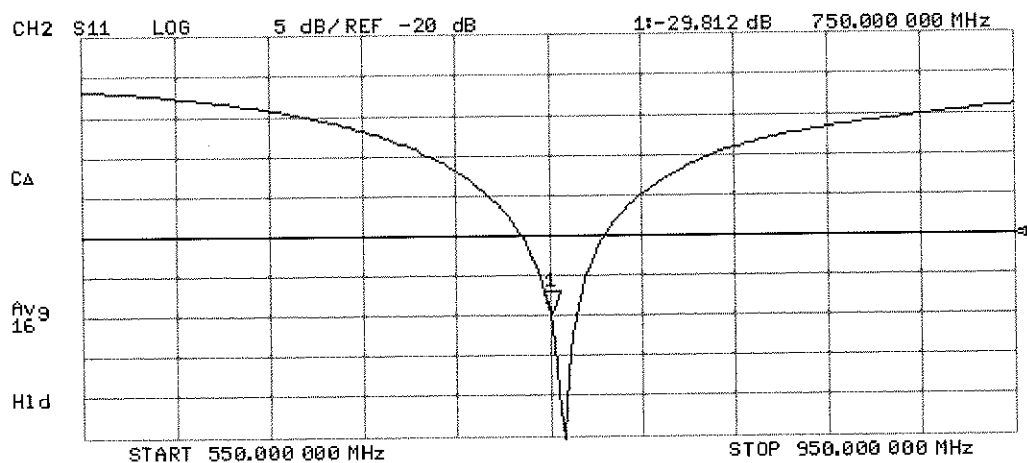
14 Mar 2014 17:44:13
 CH1 S11 1 U FS 1: 48.496 Ω -2.8066 Ω 75.609 pF 750.000 000 MHz

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 Del
 CA



AVG
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H1d





Accredited by the Swiss Accreditation Service (SAS)
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Accreditation No.: **SCS 108**

Client **PC Test**

Certificate No: **D835V2-4d133_Jul14**

CALIBRATION CERTIFICATE

Object **D835V2 - SN: 4d133**

Calibration procedure(s) **QA CAL-05.v9**
Calibration procedure for dipole validation kits above 700 MHz

CC
W/CM

Calibration date: **July 24, 2014**

This calibration certificate documents the traceability to national standards, which realize the physical units of measurements (SI).
The measurements and the uncertainties with confidence probability are given on the following pages and are part of the certificate.

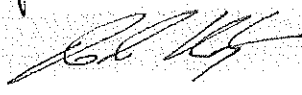
All calibrations have been conducted in the closed laboratory facility: environment temperature (22 ± 3)°C and humidity < 70%.

Calibration Equipment used (M&TE critical for calibration)

Primary Standards	ID #	Cal Date (Certificate No.)	Scheduled Calibration
Power meter EPM-442A	GB37480704	09-Oct-13 (No. 217-01827)	Oct-14
Power sensor HP 8481A	US37292783	09-Oct-13 (No. 217-01827)	Oct-14
Power sensor HP 8481A	MY41092317	09-Oct-13 (No. 217-01828)	Oct-14
Reference 20 dB Attenuator	SN: 5058 (20k)	03-Apr-14 (No. 217-01918)	Apr-15
Type-N mismatch combination	SN: 5047.2 / 06327	03-Apr-14 (No. 217-01921)	Apr-15
Reference Probe ES3DV3	SN: 3205	30-Dec-13 (No. ES3-3205_Dec13)	Dec-14
DAE4	SN: 601	30-Apr-14 (No. DAE4-601_Apr14)	Apr-15

Secondary Standards	ID #	Check Date (in house)	Scheduled Check
RF generator R&S SMT-06	100005	04-Aug-99 (in house check Oct-13)	In house check: Oct-16
Network Analyzer HP 8763E	US37390585 S4206	18-Oct-01 (in house check Oct-13)	In house check: Oct-14

Calibrated by: **Jeton Kastrali** **Laboratory Technician** 

Approved by: **Katja Pokovic** **Technical Manager** 

Issued: July 24, 2014

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Accredited by the Swiss Accreditation Service (SAS)
The Swiss Accreditation Service is one of the signatories to the EA
Multilateral Agreement for the recognition of calibration certificates

Accreditation No.: **SCS 108**

Glossary:

TSL	tissue simulating liquid
ConvF	sensitivity in TSL / NORM x,y,z
N/A	not applicable or not measured

Calibration is Performed According to the Following Standards:

- IEEE Std 1528-2013, "IEEE Recommended Practice for Determining the Peak Spatial-Averaged Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques", June 2013
- IEC 62209-1, "Procedure to measure the Specific Absorption Rate (SAR) for hand-held devices used in close proximity to the ear (frequency range of 300 MHz to 3 GHz)", February 2005
- KDB 865664, "SAR Measurement Requirements for 100 MHz to 6 GHz"

Additional Documentation:

- DASY4/5 System Handbook

Methods Applied and Interpretation of Parameters:

- Measurement Conditions:** Further details are available from the Validation Report at the end of the certificate. All figures stated in the certificate are valid at the frequency indicated.
- Antenna Parameters with TSL:** The dipole is mounted with the spacer to position its feed point exactly below the center marking of the flat phantom section, with the arms oriented parallel to the body axis.
- Feed Point Impedance and Return Loss:** These parameters are measured with the dipole positioned under the liquid filled phantom. The impedance stated is transformed from the measurement at the SMA connector to the feed point. The Return Loss ensures low reflected power. No uncertainty required.
- Electrical Delay:** One-way delay between the SMA connector and the antenna feed point. No uncertainty required.
- SAR measured:** SAR measured at the stated antenna input power.
- SAR normalized:** SAR as measured, normalized to an input power of 1 W at the antenna connector.
- SAR for nominal TSL parameters:** The measured TSL parameters are used to calculate the nominal SAR result.

The reported uncertainty of measurement is stated as the standard uncertainty of measurement multiplied by the coverage factor $k=2$, which for a normal distribution corresponds to a coverage probability of approximately 95%.

Measurement Conditions

DASY system configuration, as far as not given on page 1.

DASY Version	DASY5	V52.8.8
Extrapolation	Advanced Extrapolation	
Phantom	Modular Flat Phantom	
Distance Dipole Center - TSL	15 mm	with Spacer
Zoom Scan Resolution	dx, dy, dz = 5 mm	
Frequency	835 MHz $\pm$ 1 MHz	

Head TSL parameters

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Head TSL parameters	22.0 °C	41.5	0.90 mho/m
Measured Head TSL parameters	(22.0 $\pm$ 0.2) °C	41.1 $\pm$ 6 %	0.94 mho/m $\pm$ 6 %
Head TSL temperature change during test	< 0.5 °C	----	----

SAR result with Head TSL

SAR averaged over 1 cm ³ (1 g) of Head TSL	Condition	
SAR measured	250 mW input power	2.38 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	9.20 W/kg $\pm$ 17.0 % (k=2)

SAR averaged over 10 cm ³ (10 g) of Head TSL	condition	
SAR measured	250 mW input power	1.53 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	5.96 W/kg $\pm$ 16.5 % (k=2)

Body TSL parameters

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Body TSL parameters	22.0 °C	55.2	0.97 mho/m
Measured Body TSL parameters	(22.0 $\pm$ 0.2) °C	53.8 $\pm$ 6 %	1.02 mho/m $\pm$ 6 %
Body TSL temperature change during test	< 0.5 °C	----	----

SAR result with Body TSL

SAR averaged over 1 cm ³ (1 g) of Body TSL	Condition	
SAR measured	250 mW input power	2.44 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	9.35 W/kg $\pm$ 17.0 % (k=2)

SAR averaged over 10 cm ³ (10 g) of Body TSL	condition	
SAR measured	250 mW input power	1.59 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	6.15 W/kg $\pm$ 16.5 % (k=2)

Appendix (Additional assessments outside the scope of SCS108)

Antenna Parameters with Head TSL

Impedance, transformed to feed point	51.6 Ω - 1.0 j Ω
Return Loss	- 34.7 dB

Antenna Parameters with Body TSL

Impedance, transformed to feed point	47.8 Ω - 3.3 j Ω
Return Loss	- 27.8 dB

General Antenna Parameters and Design

Electrical Delay (one direction)	1.395 ns
----------------------------------	----------

After long term use with 100W radiated power, only a slight warming of the dipole near the feedpoint can be measured.

The dipole is made of standard semirigid coaxial cable. The center conductor of the feeding line is directly connected to the second arm of the dipole. The antenna is therefore short-circuited for DC-signals. On some of the dipoles, small end caps are added to the dipole arms in order to improve matching when loaded according to the position as explained in the "Measurement Conditions" paragraph. The SAR data are not affected by this change. The overall dipole length is still according to the Standard.

No excessive force must be applied to the dipole arms, because they might bend or the soldered connections near the feedpoint may be damaged.

Additional EUT Data

Manufactured by	SPEAG
Manufactured on	July 22, 2011

DASY5 Validation Report for Head TSL

Date: 24.07.2014

Test Laboratory: SPEAG, Zurich, Switzerland

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

Communication System: UID 0 - CW; Frequency: 835 MHz

Medium parameters used: $f = 835 \text{ MHz}$; $\sigma = 0.94 \text{ S/m}$; $\epsilon_r = 41.1$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section

Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)

DASY52 Configuration:

- Probe: ES3DV3 - SN3205; ConvF(6.22, 6.22, 6.22); Calibrated: 30.12.2013;
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 30.04.2014
- Phantom: Flat Phantom 4.9L; Type: QD000P49AA; Serial: 1001
- DASY52 52.8.8(1222); SEMCAD X 14.6.10(7331)

Dipole Calibration for Head Tissue/ $P_{\text{in}}=250 \text{ mW}$, $d=15\text{mm}$ /**Zoom Scan (7x7x7)/Cube 0:**

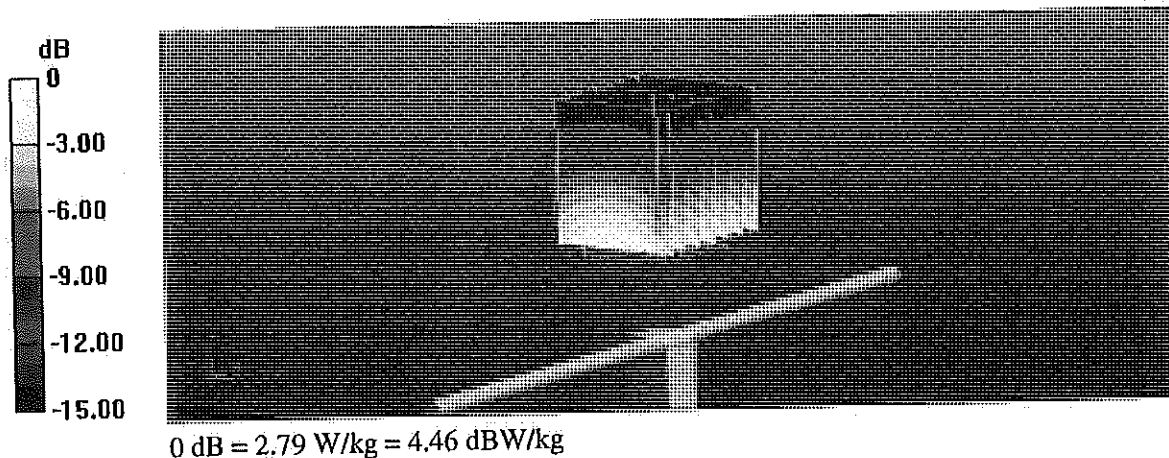
Measurement grid: $dx=5\text{mm}$, $dy=5\text{mm}$, $dz=5\text{mm}$

Reference Value = 56.07 V/m ; Power Drift = 0.03 dB

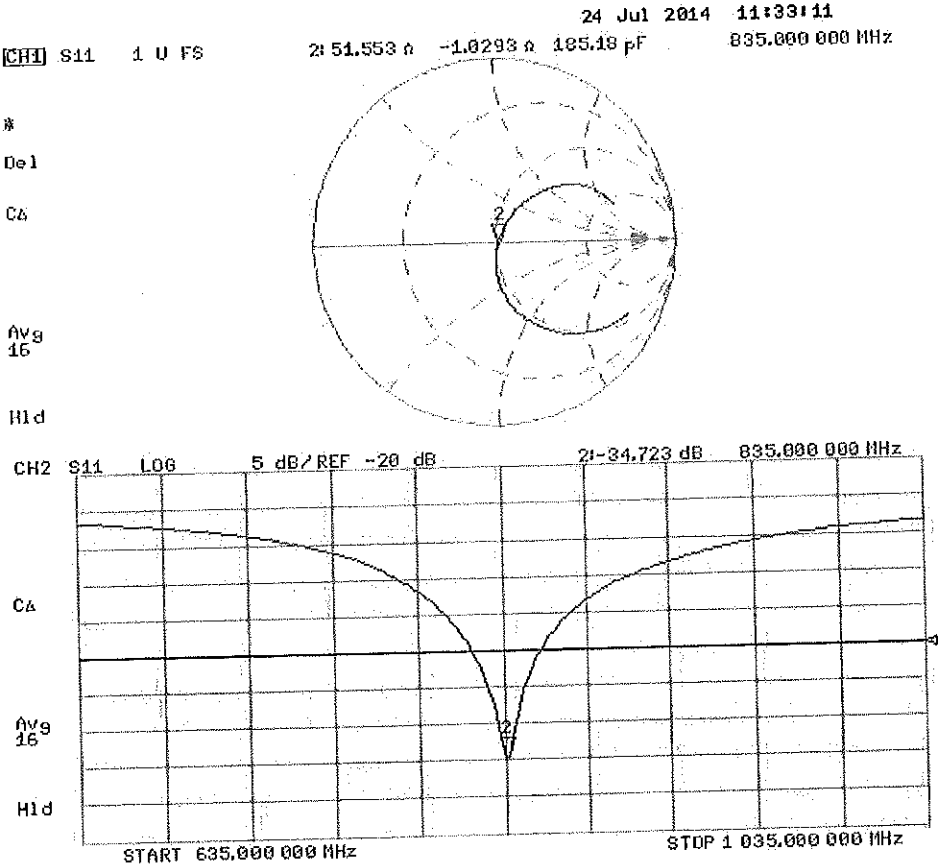
Peak SAR (extrapolated) = 3.58 W/kg

SAR(1 g) = 2.38 W/kg ; SAR(10 g) = 1.53 W/kg

Maximum value of SAR (measured) = 2.79 W/kg



Impedance Measurement Plot for Head TSL



DASY5 Validation Report for Body TSL

Date: 17.07.2014

Test Laboratory: SPEAG, Zurich, Switzerland

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

Communication System: UID 0 - CW; Frequency: 835 MHz

Medium parameters used: $f = 835$ MHz; $\sigma = 1.02$ S/m; $\epsilon_r = 53.8$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)

DASY52 Configuration:

- Probe: ES3DV3 - SN3205; ConvF(6.09, 6.09, 6.09); Calibrated: 30.12.2013;
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 30.04.2014
- Phantom: Flat Phantom 4.9L; Type: QD000P49AA; Serial: 1001
- DASY52 52.8.8(1222); SEMCAD X 14.6.10(7331)

Dipole Calibration for Body Tissue/Pin=250 mW, d=15mm/Zoom Scan (7x7x7)/Cube 0:

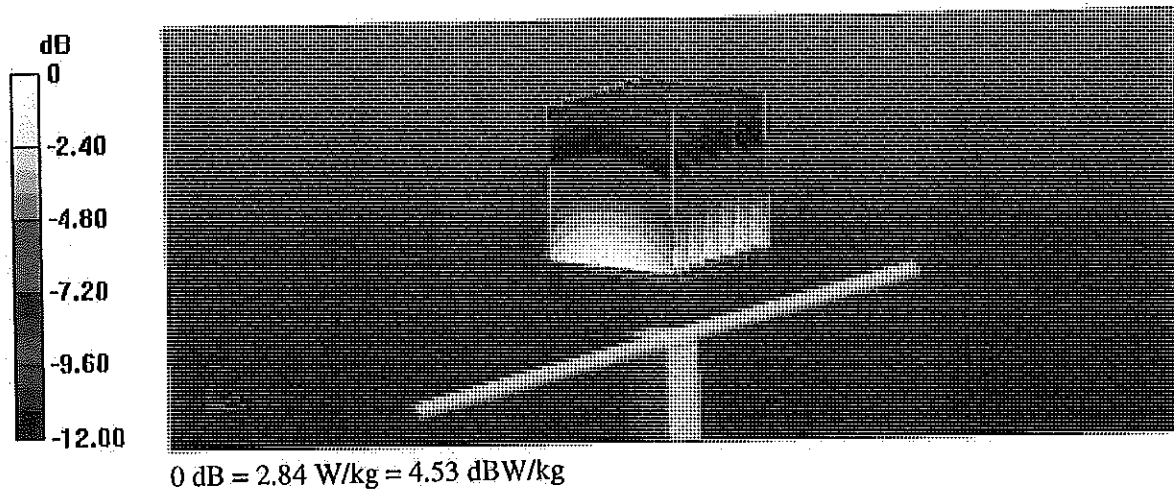
Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 54.61 V/m; Power Drift = -0.01 dB

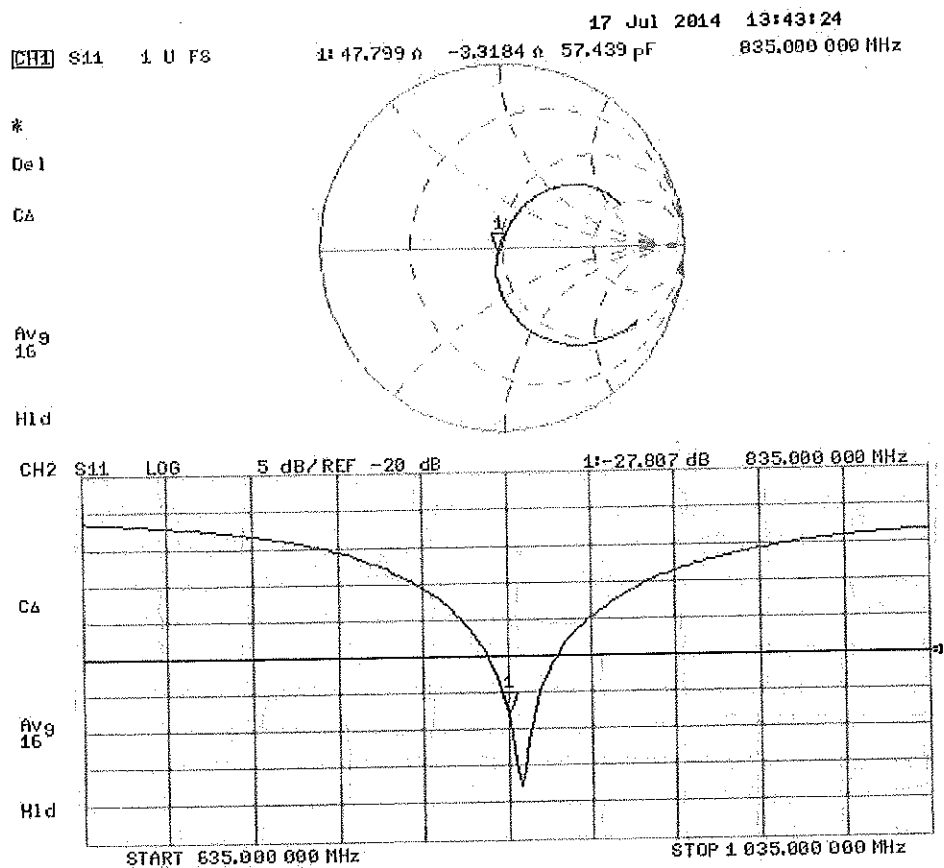
Peak SAR (extrapolated) = 3.59 W/kg

SAR(1 g) = 2.44 W/kg; SAR(10 g) = 1.59 W/kg

Maximum value of SAR (measured) = 2.84 W/kg



Impedance Measurement Plot for Body TSL





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Multilateral Agreement for the recognition of calibration certificates

Accreditation No.: **SCS 108**

Client **PC Test**

Certificate No: **D1765V2-1008_May14**

CALIBRATION CERTIFICATE

Object **D1765V2 - SN: 1008**

Calibration procedure(s) **QA CAL-05.v9**
Calibration procedure for dipole validation kits above 700 MHz

CCV
6/2/14

Calibration date: **May 07, 2014**

This calibration certificate documents the traceability to national standards, which realize the physical units of measurements (SI).
The measurements and the uncertainties with confidence probability are given on the following pages and are part of the certificate.

All calibrations have been conducted in the closed laboratory facility: environment temperature (22 ± 3)°C and humidity < 70%.

Calibration Equipment used (M&TE critical for calibration)

Primary Standards	ID #	Cal Date (Certificate No.)	Scheduled Calibration
Power meter EPM-442A	GB37480704	09-Oct-13 (No. 217-01827)	Oct-14
Power sensor HP 8481A	US37292783	09-Oct-13 (No. 217-01827)	Oct-14
Power sensor HP 8481A	MY41092317	09-Oct-13 (No. 217-01828)	Oct-14
Reference 20 dB Attenuator	SN: 5058 (20k)	03-Apr-14 (No. 217-01918)	Apr-15
Type-N mismatch combination	SN: 5047.2 / 06327	03-Apr-14 (No. 217-01921)	Apr-15
Reference Probe ES3DV3	SN: 3205	30-Dec-13 (No. ES3-3205_Dec13)	Dec-14
DAE4	SN: 601	30-Apr-14 (No. DAE4-601_Apr14)	Apr-15
Secondary Standards	ID #	Check Date (in house)	Scheduled Check
RF generator R&S SMT-06	100005	04-Aug-99 (in house check Oct-13)	In house check: Oct-16
Network Analyzer HP 8753E	US37390585 S4206	18-Oct-01 (in house check Oct-13)	In house check: Oct-14

Calibrated by:	Name Jeton Kastrati	Function Laboratory Technician	Signature
Approved by:	Name Katja Pokovic	Technical Manager	

Issued: May 12, 2014

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Multilateral Agreement for the recognition of calibration certificates

Accreditation No.: **SCS 108**

Glossary:

TSL	tissue simulating liquid
ConvF	sensitivity in TSL / NORM x,y,z
N/A	not applicable or not measured

Calibration is Performed According to the Following Standards:

- IEEE Std 1528-2013, "IEEE Recommended Practice for Determining the Peak Spatial-Averaged Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques", June 2013
- IEC 62209-1, "Procedure to measure the Specific Absorption Rate (SAR) for hand-held devices used in close proximity to the ear (frequency range of 300 MHz to 3 GHz)", February 2005
- KDB 865664, "SAR Measurement Requirements for 100 MHz to 6 GHz"

Additional Documentation:

- DASY4/5 System Handbook

Methods Applied and Interpretation of Parameters:

- Measurement Conditions:** Further details are available from the Validation Report at the end of the certificate. All figures stated in the certificate are valid at the frequency indicated.
- Antenna Parameters with TSL:** The dipole is mounted with the spacer to position its feed point exactly below the center marking of the flat phantom section, with the arms oriented parallel to the body axis.
- Feed Point Impedance and Return Loss:** These parameters are measured with the dipole positioned under the liquid filled phantom. The impedance stated is transformed from the measurement at the SMA connector to the feed point. The Return Loss ensures low reflected power. No uncertainty required.
- Electrical Delay:** One-way delay between the SMA connector and the antenna feed point. No uncertainty required.
- SAR measured:** SAR measured at the stated antenna input power.
- SAR normalized:** SAR as measured, normalized to an input power of 1 W at the antenna connector.
- SAR for nominal TSL parameters:** The measured TSL parameters are used to calculate the nominal SAR result.

The reported uncertainty of measurement is stated as the standard uncertainty of measurement multiplied by the coverage factor $k=2$, which for a normal distribution corresponds to a coverage probability of approximately 95%.

Measurement Conditions

DASY system configuration, as far as not given on page 1.

DASY Version	DASY5	V52.8.8
Extrapolation	Advanced Extrapolation	
Phantom	Modular Flat Phantom	
Distance Dipole Center - TSL	10 mm	with Spacer
Zoom Scan Resolution	dx, dy, dz = 5 mm	
Frequency	1750 MHz $\pm$ 1 MHz	

Head TSL parameters

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Head TSL parameters	22.0 °C	40.1	1.37 mho/m
Measured Head TSL parameters	(22.0 $\pm$ 0.2) °C	39.0 $\pm$ 6 %	1.36 mho/m $\pm$ 6 %
Head TSL temperature change during test	< 0.5 °C	----	----

SAR result with Head TSL

SAR averaged over 1 cm³ (1 g) of Head TSL	Condition	
SAR measured	250 mW input power	9.23 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	36.9 W/kg $\pm$ 17.0 % (k=2)

SAR averaged over 10 cm³ (10 g) of Head TSL	condition	
SAR measured	250 mW input power	4.87 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	19.5 W/kg $\pm$ 16.5 % (k=2)

Body TSL parameters

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Body TSL parameters	22.0 °C	53.4	1.49 mho/m
Measured Body TSL parameters	(22.0 $\pm$ 0.2) °C	52.2 $\pm$ 6 %	1.48 mho/m $\pm$ 6 %
Body TSL temperature change during test	< 0.5 °C	----	----

SAR result with Body TSL

SAR averaged over 1 cm³ (1 g) of Body TSL	Condition	
SAR measured	250 mW input power	9.41 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	37.6 W/kg $\pm$ 17.0 % (k=2)

SAR averaged over 10 cm³ (10 g) of Body TSL	condition	
SAR measured	250 mW input power	5.02 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	20.1 W/kg $\pm$ 16.5 % (k=2)

Appendix

Antenna Parameters with Head TSL

Impedance, transformed to feed point	47.7 Ω - 6.1 j Ω
Return Loss	- 23.6 dB

Antenna Parameters with Body TSL

Impedance, transformed to feed point	43.7 Ω - 6.4 j Ω
Return Loss	- 20.4 dB

General Antenna Parameters and Design

Electrical Delay (one direction)	1.211 ns
----------------------------------	----------

After long term use with 100W radiated power, only a slight warming of the dipole near the feedpoint can be measured.

The dipole is made of standard semirigid coaxial cable. The center conductor of the feeding line is directly connected to the second arm of the dipole. The antenna is therefore short-circuited for DC-signals. On some of the dipoles, small end caps are added to the dipole arms in order to improve matching when loaded according to the position as explained in the "Measurement Conditions" paragraph. The SAR data are not affected by this change. The overall dipole length is still according to the Standard.

No excessive force must be applied to the dipole arms, because they might bend or the soldered connections near the feedpoint may be damaged.

Additional EUT Data

Manufactured by	SPEAG
Manufactured on	October 06, 2005

DASY5 Validation Report for Head TSL

Date: 07.05.2014

Test Laboratory: SPEAG, Zurich, Switzerland

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

Communication System: UID 0 - CW; Frequency: 1750 MHz

Medium parameters used: $f = 1750$ MHz; $\sigma = 1.36$ S/m; $\epsilon_r = 39$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY52 Configuration:

- Probe: ES3DV3 - SN3205; ConvF(5.23, 5.23, 5.23); Calibrated: 30.12.2013;
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 30.04.2014
- Phantom: Flat Phantom 5.0 (front); Type: QD000P50AA; Serial: 1001
- DASY52 52.8.8(1222); SEMCAD X 14.6.10(7331)

Dipole Calibration for Head Tissue/Pin=250 mW, d=10mm/Zoom Scan (7x7x7)/Cube 0:

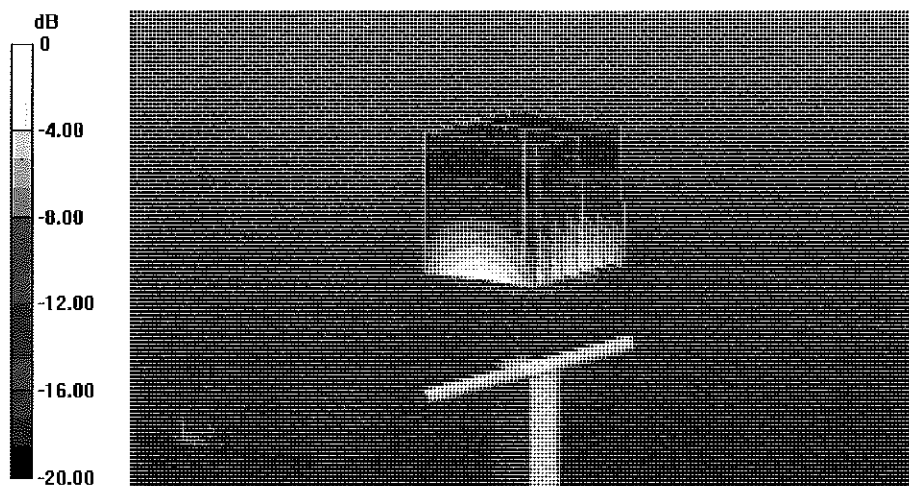
Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 96.06 V/m; Power Drift = 0.01 dB

Peak SAR (extrapolated) = 16.7 W/kg

SAR(1 g) = 9.23 W/kg; SAR(10 g) = 4.87 W/kg

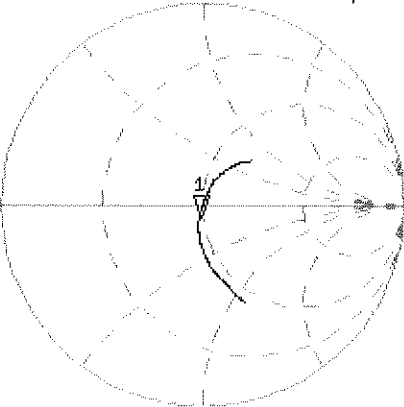
Maximum value of SAR (measured) = 11.7 W/kg



Impedance Measurement Plot for Head TSL

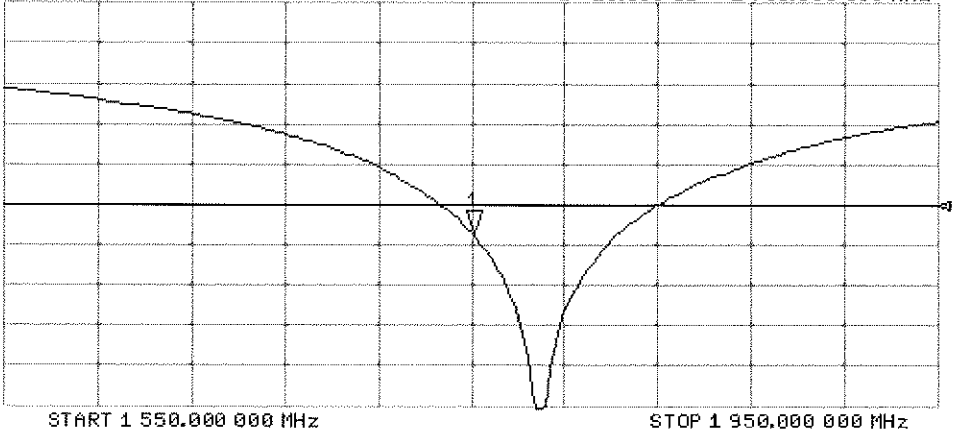
7 May 2014 09:22:36
[CH1] S11 1 U FS 1: 47.709 Ω -6.0566 Ω 15.016 pF 1 750.000 000 MHz

*
De1
CA
Avg
16
H1d



CH2 S11 LOG 5 dB/REF -20 dB 1:-23.588 dB 1 750.000 000 MHz

CA
Avg
16
H1d



DASY5 Validation Report for Body TSL

Date: 07.05.2014

Test Laboratory: SPEAG, Zurich, Switzerland

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

Communication System: UID 0 - CW; Frequency: 1750 MHz

Medium parameters used: $f = 1750$ MHz; $\sigma = 1.48$ S/m; $\epsilon_r = 52.2$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY52 Configuration:

- Probe: ES3DV3 - SN3205; ConvF(4.89, 4.89, 4.89); Calibrated: 30.12.2013;
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 30.04.2014
- Phantom: Flat Phantom 5.0 (back); Type: QD000P50AA; Serial: 1002
- DASY52 52.8.8(1222); SEMCAD X 14.6.10(7331)

Dipole Calibration for Body Tissue/Pin=250 mW, d=10mm/Zoom Scan (7x7x7)/Cube 0:

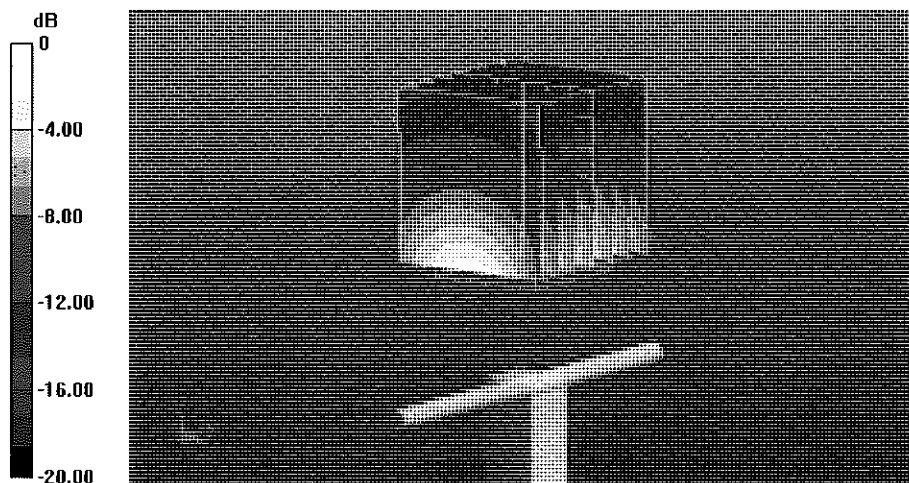
Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 93.01 V/m; Power Drift = 0.00 dB

Peak SAR (extrapolated) = 16.3 W/kg

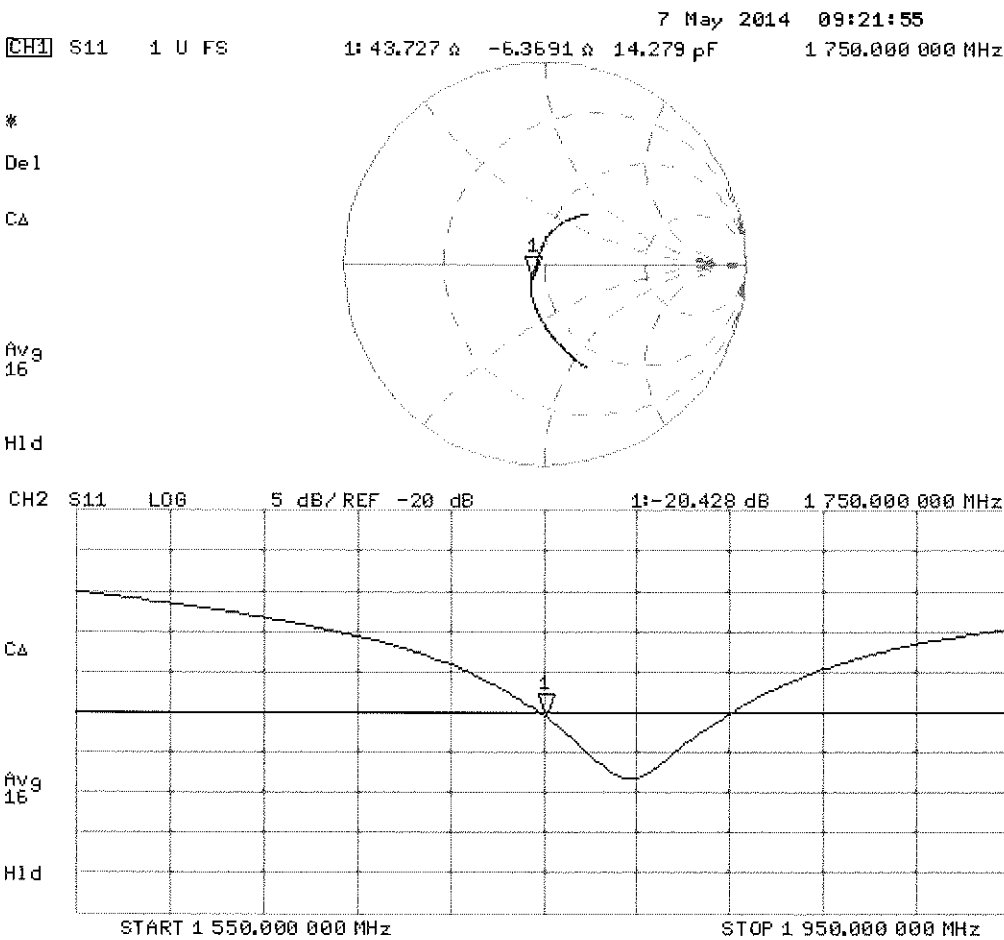
SAR(1 g) = 9.41 W/kg; SAR(10 g) = 5.02 W/kg

Maximum value of SAR (measured) = 11.8 W/kg



0 dB = 11.8 W/kg = 10.72 dBW/kg

Impedance Measurement Plot for Body TSL





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 Multilateral Agreement for the recognition of calibration certificates

Accreditation No.: **SCS 108**

Client **PC Test**

Certificate No: **D1900V2-5d149_Jul14**

CALIBRATION CERTIFICATE

Object **D1900V2 - SN: 5d149**

Calibration procedure(s) **QA CAL-05.v9**
Calibration procedure for dipole validation kits above 700 MHz

CC
 11/5/14

Calibration date: **July 23, 2014**

This calibration certificate documents the traceability to national standards, which realize the physical units of measurements (SI).
 The measurements and the uncertainties with confidence probability are given on the following pages and are part of the certificate.

All calibrations have been conducted in the closed laboratory facility: environment temperature $(22 \pm 3)^{\circ}\text{C}$ and humidity $< 70\%$.

Calibration Equipment used (M&TE critical for calibration)

Primary Standards	ID #	Cal Date (Certificate No.)	Scheduled Calibration
Power meter EPM-442A	GB37480704	09-Oct-13 (No. 217-01827)	Oct-14
Power sensor HP 8481A	US37292783	09-Oct-13 (No. 217-01827)	Oct-14
Power sensor HP 8481A	MY41092317	09-Oct-13 (No. 217-01828)	Oct-14
Reference 20 dB Attenuator	SN: 5058 (20k)	03-Apr-14 (No. 217-01918)	Apr-15
Type-N mismatch combination	SN: 5047.2 / 06327	03-Apr-14 (No. 217-01921)	Apr-15
Reference Probe ES3DV3	SN: 3205	30-Dec-13 (No. ES3-3205_Dec13)	Dec-14
DAE4	SN: 601	30-Apr-14 (No. DAE4-601_Apr14)	Apr-15
Secondary Standards	ID #	Check Date (In house)	Scheduled Check
RF generator R&S SMT-06	100005	04-Aug-99 (In house check Oct-13)	In house check: Oct-16
Network Analyzer HP 8753E	US37390585 S4206	18-Oct-01 (In house check Oct-13)	In house check: Oct-14

Calibrated by:	Name Jeton Kastrati	Function Laboratory Technician	Signature
Approved by:	Name Katja Pokovic	Technical Manager	

Issued: July 23, 2014

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Accredited by the Swiss Accreditation Service (SAS)

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Multilateral Agreement for the recognition of calibration certificates

Accreditation No.: **SCS 108**

Glossary:

TSL	tissue simulating liquid
ConvF	sensitivity in TSL / NORM x,y,z
N/A	not applicable or not measured

Calibration is Performed According to the Following Standards:

- IEEE Std 1528-2013, "IEEE Recommended Practice for Determining the Peak Spatial-Averaged Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques", June 2013
- IEC 62209-1, "Procedure to measure the Specific Absorption Rate (SAR) for hand-held devices used in close proximity to the ear (frequency range of 300 MHz to 3 GHz)", February 2005
- KDB 865664, "SAR Measurement Requirements for 100 MHz to 6 GHz"

Additional Documentation:

- DASY4/5 System Handbook

Methods Applied and Interpretation of Parameters:

- Measurement Conditions:* Further details are available from the Validation Report at the end of the certificate. All figures stated in the certificate are valid at the frequency indicated.
- Antenna Parameters with TSL:* The dipole is mounted with the spacer to position its feed point exactly below the center marking of the flat phantom section, with the arms oriented parallel to the body axis.
- Feed Point Impedance and Return Loss:* These parameters are measured with the dipole positioned under the liquid filled phantom. The impedance stated is transformed from the measurement at the SMA connector to the feed point. The Return Loss ensures low reflected power. No uncertainty required.
- Electrical Delay:* One-way delay between the SMA connector and the antenna feed point. No uncertainty required.
- SAR measured:* SAR measured at the stated antenna input power.
- SAR normalized:* SAR as measured, normalized to an input power of 1 W at the antenna connector.
- SAR for nominal TSL parameters:* The measured TSL parameters are used to calculate the nominal SAR result.

The reported uncertainty of measurement is stated as the standard uncertainty of measurement multiplied by the coverage factor $k=2$, which for a normal distribution corresponds to a coverage probability of approximately 95%.

Measurement Conditions

DASY system configuration, as far as not given on page 1.

DASY Version	DASY5	V52.8.8
Extrapolation	Advanced Extrapolation	
Phantom	Modular Flat Phantom	
Distance Dipole Center - TSL	10 mm	with Spacer
Zoom Scan Resolution	dx, dy, dz = 5 mm	
Frequency	1900 MHz $\pm$ 1 MHz	

Head TSL parameters

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Head TSL parameters	22.0 °C	40.0	1.40 mho/m
Measured Head TSL parameters	(22.0 $\pm$ 0.2) °C	39.5 $\pm$ 6 %	1.38 mho/m $\pm$ 6 %
Head TSL temperature change during test	< 0.5 °C	----	----

SAR result with Head TSL

SAR averaged over 1 cm ³ (1 g) of Head TSL	Condition	
SAR measured	250 mW input power	10.0 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	40.2 W/kg $\pm$ 17.0 % (k=2)

SAR averaged over 10 cm ³ (10 g) of Head TSL	condition	
SAR measured	250 mW input power	5.24 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	21.0 W/kg $\pm$ 16.5 % (k=2)

Body TSL parameters

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Body TSL parameters	22.0 °C	53.3	1.52 mho/m
Measured Body TSL parameters	(22.0 $\pm$ 0.2) °C	52.5 $\pm$ 6 %	1.51 mho/m $\pm$ 6 %
Body TSL temperature change during test	< 0.5 °C	----	----

SAR result with Body TSL

SAR averaged over 1 cm ³ (1 g) of Body TSL	Condition	
SAR measured	250 mW input power	10.1 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	40.4 W/kg $\pm$ 17.0 % (k=2)

SAR averaged over 10 cm ³ (10 g) of Body TSL	condition	
SAR measured	250 mW input power	5.33 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	21.3 W/kg $\pm$ 16.5 % (k=2)

Appendix (Additional assessments outside the scope of SCS108)

Antenna Parameters with Head TSL

Impedance, transformed to feed point	$52.6 \Omega + 5.5 j\Omega$
Return Loss	- 24.6 dB

Antenna Parameters with Body TSL

Impedance, transformed to feed point	$48.8 \Omega + 6.1 j\Omega$
Return Loss	- 24.0 dB

General Antenna Parameters and Design

Electrical Delay (one direction)	1.197 ns
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After long term use with 100W radiated power, only a slight warming of the dipole near the feedpoint can be measured.

The dipole is made of standard semirigid coaxial cable. The center conductor of the feeding line is directly connected to the second arm of the dipole. The antenna is therefore short-circuited for DC-signals. On some of the dipoles, small end caps are added to the dipole arms in order to improve matching when loaded according to the position as explained in the "Measurement Conditions" paragraph. The SAR data are not affected by this change. The overall dipole length is still according to the Standard.

No excessive force must be applied to the dipole arms, because they might bend or the soldered connections near the feedpoint may be damaged.

Additional EUT Data

Manufactured by	SPEAG
Manufactured on	March 11, 2011

DASY5 Validation Report for Head TSL

Date: 23.07.2014

Test Laboratory: SPEAG, Zurich, Switzerland

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

Communication System: UID 0 - CW; Frequency: 1900 MHz

Medium parameters used: $f = 1900$ MHz; $\sigma = 1.38$ S/m; $\epsilon_r = 39.5$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)

DASY52 Configuration:

- Probe: ES3DV3 - SN3205; ConvF(5.06, 5.06, 5.06); Calibrated: 30.12.2013;
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 30.04.2014
- Phantom: Flat Phantom 5.0 (front); Type: QD000P50AA; Serial: 100I
- DASY52 52.8.8(1222); SEMCAD X 14.6.10(7331)

Dipole Calibration for Head Tissue/Pin=250 mW, $d=10$ mm/Zoom Scan (7x7x7)/Cube 0:

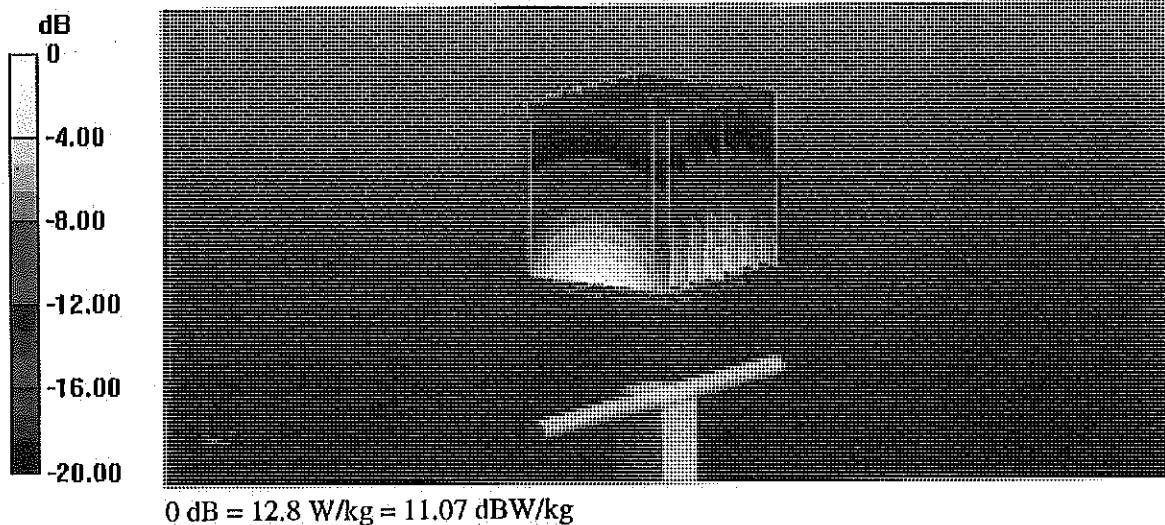
Measurement grid: $dx=5$ mm, $dy=5$ mm, $dz=5$ mm

Reference Value = 98.92 V/m; Power Drift = 0.02 dB

Peak SAR (extrapolated) = 18.4 W/kg

SAR(1 g) = 10 W/kg; SAR(10 g) = 5.24 W/kg

Maximum value of SAR (measured) = 12.8 W/kg



Impedance Measurement Plot for Head TSL

23 Jul 2014 10:46:05

[CH1] S11 1 U FS

1: 52.600 Ω 5.4570 Ω 457.11 pH

1 900.000 000 MHz

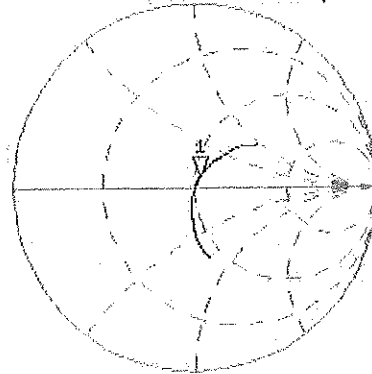
#

De1

Cor

Avg
16

H1d

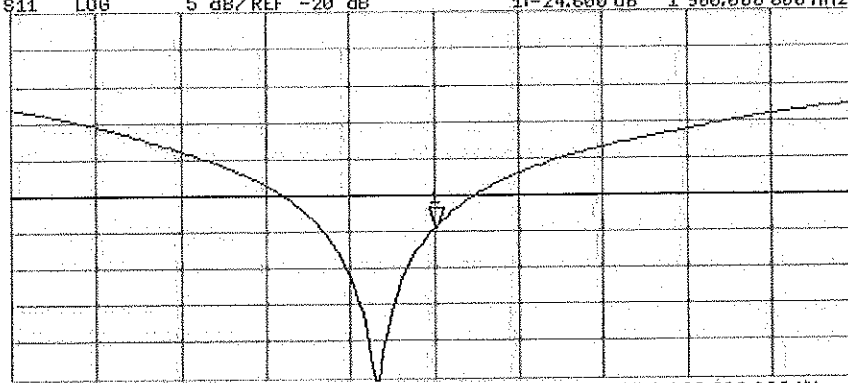


CH2 S11 LOG 5 dB/REF -20 dB 1: -24.600 dB 1 900.000 000 MHz

Cor

Avg
16

H1d



START 1 700.000 000 MHz

STOP 2 100.000 000 MHz

DASY5 Validation Report for Body TSL

Date: 23.07.2014

Test Laboratory: SPEAG, Zurich, Switzerland

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

Communication System: UID 0 - CW; Frequency: 1900 MHz

Medium parameters used: $f = 1900$ MHz; $\sigma = 1.51$ S/m; $\epsilon_r = 52.5$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)

DASY52 Configuration:

- Probe: ES3DV3 - SN3205; ConvF(4.76, 4.76, 4.76); Calibrated: 30.12.2013;
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 30.04.2014
- Phantom: Flat Phantom 5.0 (back); Type: QD000P50AA; Serial: 1002
- DASY52 52.8.8(1222); SEMCAD X 14.6.10(7331)

Dipole Calibration for Body Tissue/Pin=250 mW, d=10mm/Zoom Scan (7x7x7)/Cube 0:

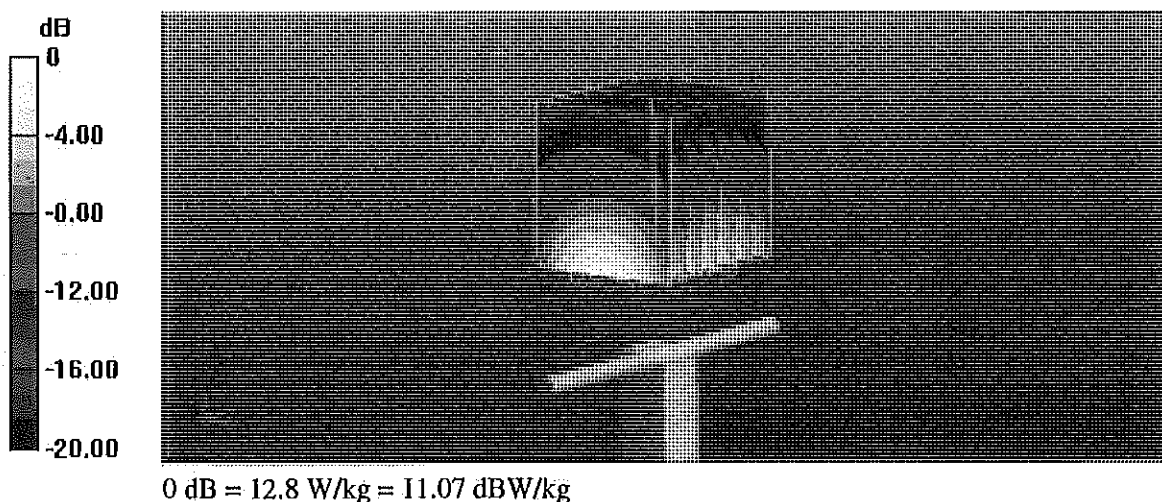
Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 95.83 V/m; Power Drift = -0.01 dB

Peak SAR (extrapolated) = 17.6 W/kg

SAR(1 g) = 10.1 W/kg; SAR(10 g) = 5.33 W/kg

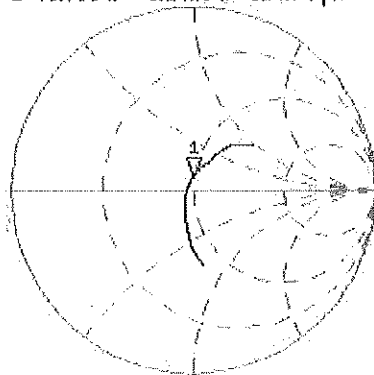
Maximum value of SAR (measured) = 12.8 W/kg



Impedance Measurement Plot for Body TSL

23 Jul 2014 10:45:45
 CH1 S11 1 U FS 1: 48.789 Ω 6.1426 Ω 514.54 μH 1 900.000 000 MHz

*
 Del
 Cor



Avg
 16

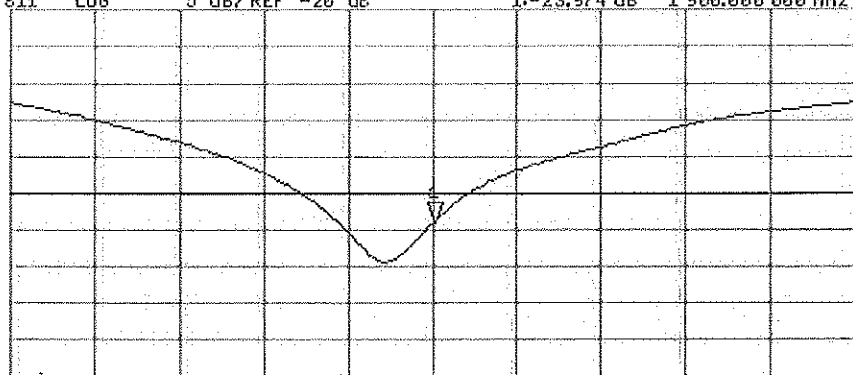
H1d

CH2 S11 LOG 5 dB/REF -20 dB 1: -23.974 dB 1 900.000 000 MHz

Cor

Avg
 16

H1d



START 1 700.000 000 MHz

STOP 2 100.000 000 MHz



Accredited by the Swiss Accreditation Service (SAS)
 The Swiss Accreditation Service is one of the signatories to the EA
 Multilateral Agreement for the recognition of calibration certificates

Accreditation No.: **SCS 108**

Client **PC Test**

Certificate No: **D2450V2-719_Aug14**

CALIBRATION CERTIFICATE

Object **D2450V2 - SN: 719**

Calibration procedure(s) **QA CAL-05.v9**
Calibration procedure for dipole validation kits above 700 MHz

Calibration date: **August 11, 2014**

✓ KOK
9/8/14

This calibration certificate documents the traceability to national standards, which realize the physical units of measurements (SI).
 The measurements and the uncertainties with confidence probability are given on the following pages and are part of the certificate.

All calibrations have been conducted in the closed laboratory facility: environment temperature $(22 \pm 3)^{\circ}\text{C}$ and humidity $< 70\%$.

Calibration Equipment used (M&TE critical for calibration)

Primary Standards	ID #	Cal Date (Certificate No.)	Scheduled Calibration
Power meter EPM-442A	GB37480704	09-Oct-13 (No. 217-01827)	Oct-14
Power sensor HP 8481A	US37292783	09-Oct-13 (No. 217-01827)	Oct-14
Power sensor HP 8481A	MY41092317	09-Oct-13 (No. 217-01828)	Oct-14
Reference 20 dB Attenuator	SN: 5058 (20k)	03-Apr-14 (No. 217-01918)	Apr-15
Type-N mismatch combination	SN: 5047.2 / 06327	03-Apr-14 (No. 217-01921)	Apr-15
Reference Probe ES3DV3	SN: 3205	30-Dec-13 (No. ES3-3205_Dec13)	Dec-14
DAE4	SN: 601	30-Apr-14 (No. DAE4-601_Apr14)	Apr-15
Secondary Standards	ID #	Check Date (in house)	Scheduled Check
RF generator R&S SMT-06	100005	04-Aug-99 (in house check Oct-13)	In house check: Oct-16
Network Analyzer HP 8753E	US37390585 S4206	18-Oct-01 (in house check Oct-13)	In house check: Oct-14

Calibrated by: **Michael Weber** Function: **Laboratory Technician**

Signature

M. Weber

Approved by: **Katja Pokovic** Technical Manager

Katja Pokovic

Issued: August 12, 2014

This calibration certificate shall not be reproduced except in full without written approval of the laboratory.



Accredited by the Swiss Accreditation Service (SAS)

Accreditation No.: **SCS 108**

The Swiss Accreditation Service is one of the signatories to the EA
Multilateral Agreement for the recognition of calibration certificates

Glossary:

TSL	tissue simulating liquid
ConvF	sensitivity in TSL / NORM x,y,z
N/A	not applicable or not measured

Calibration is Performed According to the Following Standards:

- IEEE Std 1528-2013, "IEEE Recommended Practice for Determining the Peak Spatial-Averaged Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques", June 2013
- IEC 62209-1, "Procedure to measure the Specific Absorption Rate (SAR) for hand-held devices used in close proximity to the ear (frequency range of 300 MHz to 3 GHz)", February 2005
- KDB 865664, "SAR Measurement Requirements for 100 MHz to 6 GHz"

Additional Documentation:

- DASY4/5 System Handbook

Methods Applied and Interpretation of Parameters:

- Measurement Conditions:** Further details are available from the Validation Report at the end of the certificate. All figures stated in the certificate are valid at the frequency indicated.
- Antenna Parameters with TSL:** The dipole is mounted with the spacer to position its feed point exactly below the center marking of the flat phantom section, with the arms oriented parallel to the body axis.
- Feed Point Impedance and Return Loss:** These parameters are measured with the dipole positioned under the liquid filled phantom. The impedance stated is transformed from the measurement at the SMA connector to the feed point. The Return Loss ensures low reflected power. No uncertainty required.
- Electrical Delay:** One-way delay between the SMA connector and the antenna feed point. No uncertainty required.
- SAR measured:** SAR measured at the stated antenna input power.
- SAR normalized:** SAR as measured, normalized to an input power of 1 W at the antenna connector.
- SAR for nominal TSL parameters:** The measured TSL parameters are used to calculate the nominal SAR result.

The reported uncertainty of measurement is stated as the standard uncertainty of measurement multiplied by the coverage factor $k=2$, which for a normal distribution corresponds to a coverage probability of approximately 95%.

Measurement Conditions

DASY system configuration, as far as not given on page 1.

DASY Version	DASY5	V52.8.8
Extrapolation	Advanced Extrapolation	
Phantom	Modular Flat Phantom	
Distance Dipole Center - TSL	10 mm	with Spacer
Zoom Scan Resolution	dx, dy, dz = 5 mm	
Frequency	2450 MHz $\pm$ 1 MHz	

Head TSL parameters

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Head TSL parameters	22.0 °C	39.2	1.80 mho/m
Measured Head TSL parameters	(22.0 $\pm$ 0.2) °C	38.0 $\pm$ 6 %	1.82 mho/m $\pm$ 6 %
Head TSL temperature change during test	< 0.5 °C	----	----

SAR result with Head TSL

SAR averaged over 1 cm³ (1 g) of Head TSL	Condition	
SAR measured	250 mW input power	13.2 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	52.1 W/kg $\pm$ 17.0 % (k=2)

SAR averaged over 10 cm³ (10 g) of Head TSL	condition	
SAR measured	250 mW input power	6.09 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	24.2 W/kg $\pm$ 16.5 % (k=2)

Body TSL parameters

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Body TSL parameters	22.0 °C	52.7	1.95 mho/m
Measured Body TSL parameters	(22.0 $\pm$ 0.2) °C	50.5 $\pm$ 6 %	2.02 mho/m $\pm$ 6 %
Body TSL temperature change during test	< 0.5 °C	----	----

SAR result with Body TSL

SAR averaged over 1 cm³ (1 g) of Body TSL	Condition	
SAR measured	250 mW input power	13.3 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	51.8 W/kg $\pm$ 17.0 % (k=2)

SAR averaged over 10 cm³ (10 g) of Body TSL	condition	
SAR measured	250 mW input power	6.10 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	24.0 W/kg $\pm$ 16.5 % (k=2)

Appendix (Additional assessments outside the scope of SCS108)

Antenna Parameters with Head TSL

Impedance, transformed to feed point	$54.9 \Omega + 3.0 j\Omega$
Return Loss	- 25.2 dB

Antenna Parameters with Body TSL

Impedance, transformed to feed point	$50.9 \Omega + 5.8 j\Omega$
Return Loss	- 24.7 dB

General Antenna Parameters and Design

Electrical Delay (one direction)	1.149 ns
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After long term use with 100W radiated power, only a slight warming of the dipole near the feedpoint can be measured.

The dipole is made of standard semirigid coaxial cable. The center conductor of the feeding line is directly connected to the second arm of the dipole. The antenna is therefore short-circuited for DC-signals. On some of the dipoles, small end caps are added to the dipole arms in order to improve matching when loaded according to the position as explained in the "Measurement Conditions" paragraph. The SAR data are not affected by this change. The overall dipole length is still according to the Standard.

No excessive force must be applied to the dipole arms, because they might bend or the soldered connections near the feedpoint may be damaged.

Additional EUT Data

Manufactured by	SPEAG
Manufactured on	September 10, 2002

DASY5 Validation Report for Head TSL

Date: 11.08.2014

Test Laboratory: SPEAG, Zurich, Switzerland

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

Communication System: UID 0 - CW; Frequency: 2450 MHz

Medium parameters used: $f = 2450$ MHz; $\sigma = 1.82$ S/m; $\epsilon_r = 38$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)

DASY52 Configuration:

- Probe: ES3DV3 - SN3205; ConvF(4.53, 4.53, 4.53); Calibrated: 30.12.2013;
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 30.04.2014
- Phantom: Flat Phantom 5.0 (front); Type: QD000P50AA; Serial: 1001
- DASY52 52.8.8(1222); SEMCAD X 14.6.10(7331)

Dipole Calibration for Head Tissue/Pin=250 mW, d=10mm/Zoom Scan (7x7x7)/Cube 0:

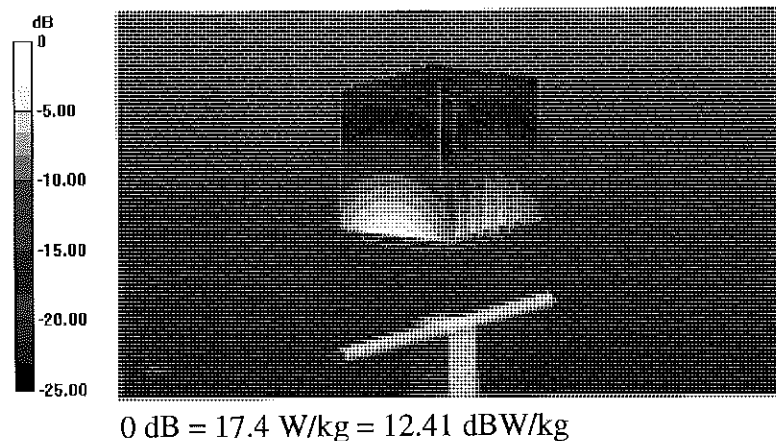
Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 101.6 V/m; Power Drift = 0.03 dB

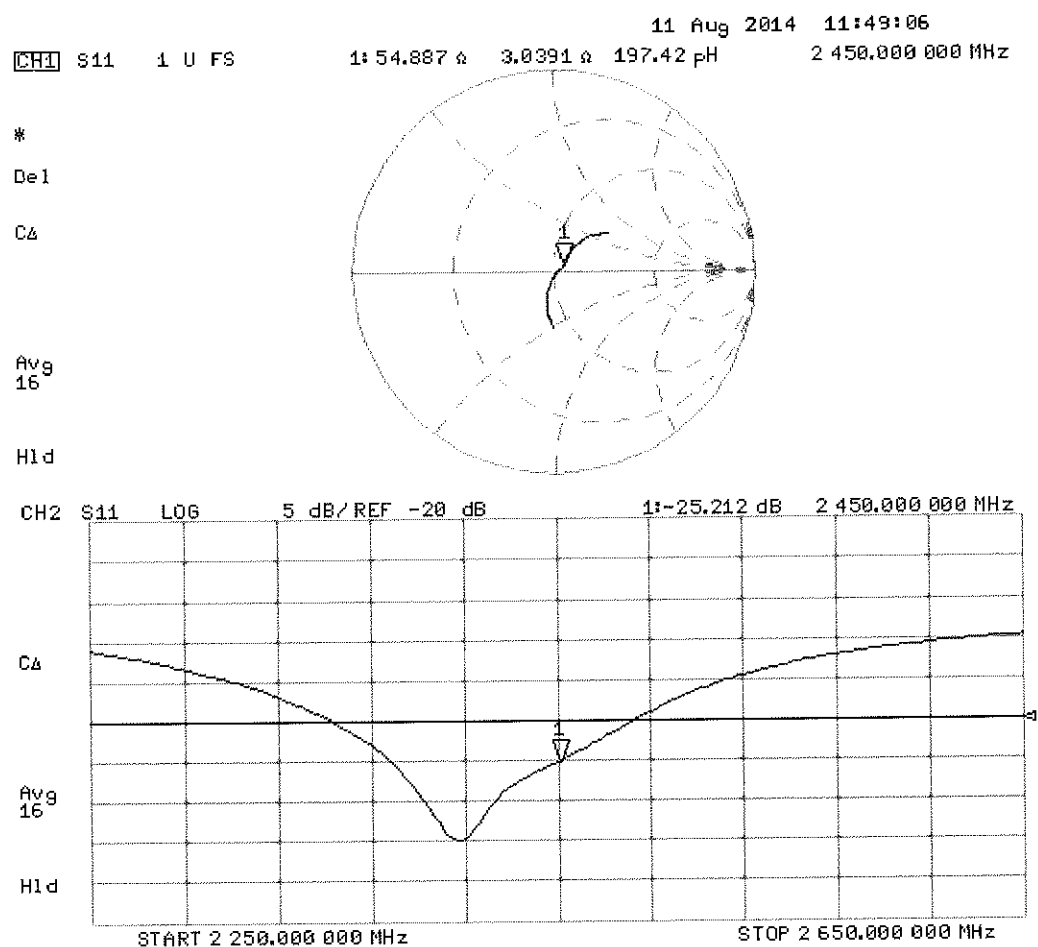
Peak SAR (extrapolated) = 27.5 W/kg

SAR(1 g) = 13.2 W/kg; SAR(10 g) = 6.09 W/kg

Maximum value of SAR (measured) = 17.4 W/kg



Impedance Measurement Plot for Head TSL



DASY5 Validation Report for Body TSL

Date: 11.08.2014

Test Laboratory: SPEAG, Zurich, Switzerland

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

Communication System: UID 0 - CW; Frequency: 2450 MHz

Medium parameters used: $f = 2450$ MHz; $\sigma = 2.02$ S/m; $\epsilon_r = 50.5$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)

DASY52 Configuration:

- Probe: ES3DV3 - SN3205; ConvF(4.35, 4.35, 4.35); Calibrated: 30.12.2013;
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 30.04.2014
- Phantom: Flat Phantom 5.0 (back); Type: QD000P50AA; Serial: 1002
- DASY52 52.8.8(1222); SEMCAD X 14.6.10(7331)

Dipole Calibration for Body Tissue/Pin=250 mW, d=10mm/Zoom Scan (7x7x7)/Cube 0:

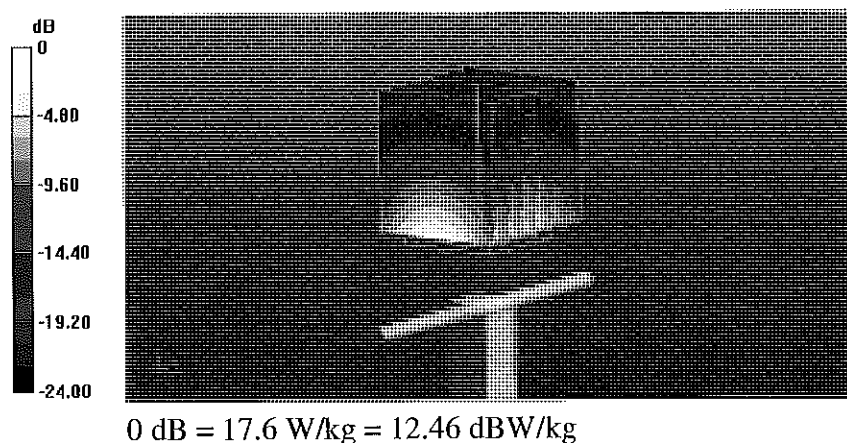
Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 96.08 V/m; Power Drift = -0.01 dB

Peak SAR (extrapolated) = 27.9 W/kg

SAR(1 g) = 13.3 W/kg; SAR(10 g) = 6.1 W/kg

Maximum value of SAR (measured) = 17.6 W/kg



Impedance Measurement Plot for Body TSL

