



SAR EVALUATION REPORT

Applicant Name:

LG Electronics MobileComm U.S.A., Inc.
1000 Sylvan Avenue
Englewood Cliffs, NJ 07632
United States

Date of Testing:

10/20/14 - 10/28/14

Test Site/Location:

PCTEST Lab, Columbia, MD, USA

Document Serial No.:

0Y1410202021-R1.ZNF

FCC ID:

ZNFLS996

APPLICANT:

LG ELECTRONICS MOBILECOMM U.S.A., INC.

DUT Type:

Portable Handset

Application Type:

Certification

FCC Rule Part(s):

CFR §2.1093

Model(s):

LS996, LGLS996, LG-LS996

Equipment Class	Band & Mode	Tx Frequency	SAR		
			1 gm Head (W/kg)	1 gm Body-Worn (W/kg)	1 gm Hotspot (W/kg)
PCE	CDMA/EVDO BC10 (\$90S)	817.90 - 823.10 MHz	0.46	0.56	0.62
PCE	CDMA/EVDO BC0 (\$22H)	824.70 - 848.31 MHz	0.38	0.42	0.47
PCE	PCS CDMA/EVDO	1851.25 - 1908.75 MHz	0.56	0.59	0.64
PCE	GSM/GPRS/EDGE 850	824.20 - 848.80 MHz	0.36	0.38	0.41
PCE	GSM/GPRS/EDGE 1900	1850.20 - 1909.80 MHz	0.30	0.27	0.31
PCE	UMTS 850	826.40 - 846.60 MHz	0.28	0.34	0.35
PCE	UMTS 1900	1852.4 - 1907.6 MHz	0.45	0.43	0.46
PCE	LTE Band 12	699.7 - 715.3 MHz	0.17	0.22	0.27
PCE	LTE Band 26 (Cell)	814.7 - 848.3 MHz	0.26	0.28	0.34
PCE	LTE Band 4 (AWS)	1710.7 - 1754.3 MHz	0.44	0.61	0.61
PCE	LTE Band 25 (PCS)	1850.7 - 1914.3 MHz	0.39	0.40	0.48
PCE	LTE Band 41	2498.5 - 2687.5 MHz	0.56	0.21	0.47
DTS	2.4 GHz WLAN	2412 - 2462 MHz	0.64	0.15	0.15
NI	5.2 GHz WLAN	5180 - 5240 MHz	0.62	0.15	
NI	5.3 GHz WLAN	5260 - 5320 MHz	0.56	0.15	
NI	5.5 GHz WLAN	5500 - 5700 MHz	0.59	0.27	
NI	5.8 GHz WLAN	5745 - 5825 MHz	0.59	0.25	0.28
DSS/DTS	Bluetooth	2402 - 2480 MHz		N/A	
Simultaneous SAR per KDB 690783 D01v01r03:			1.20	0.88	0.90

Note: This revised test report (S/N: 0Y1410202021-R1.ZNF) supersedes and replaces the previously issued test report on the same subject DUT for the same type of testing indicated. Please discard or destroy the previously issued tests report(s) and dispose of accordingly.

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 1.9 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
CDMA/EVDO BC10 (\$90S)	Voice/Data	817.90 - 823.10 MHz
CDMA/EVDO BC0 (\$22H)	Voice/Data	824.70 - 848.31 MHz
PCS CDMA/EVDO	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 5 (Cell)	Data	824.7 - 848.3 MHz
LTE Band 26 (Cell)	Data	814.7 - 848.3 MHz
LTE Band 4 (AWS)	Data	1710.7 - 1754.3 MHz
LTE Band 2 (PCS)	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
5.8 GHz WLAN	Voice/Data	5745 - 5825 MHz
5.2 GHz WLAN	Voice/Data	5180 - 5240 MHz
5.3 GHz WLAN	Voice/Data	5260 - 5320 MHz
5.5 GHz WLAN	Voice/Data	5500 - 5700 MHz
Bluetooth	Data	2402 - 2480 MHz
NFC	Data	13.56 MHz

1.2 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		Modulated Average (dBm)
CDMA/EVDO BC10 (\$90S)	Maximum	25.4
	Nominal	24.9
CDMA/EVDO BC0 (\$22H)	Maximum	24.7
	Nominal	24.2
PCS CDMA/EVDO	Maximum	24.7
	Nominal	24.2

Mode / Band		Voice (dBm)	Burst Average GMSK (dBm)		Burst Average 8-PSK (dBm)	
		1 TX Slot	1 TX Slots	2 TX Slots	1 TX Slots	2 TX Slots
GSM/GPRS/EDGE 850	Maximum	33.2	33.2	31.2	27.7	27.7
	Nominal	32.7	32.7	30.7	27.2	27.2
GSM/GPRS/EDGE 1900	Maximum	30.7	30.7	28.7	26.7	26.7
	Nominal	30.2	30.2	28.2	26.2	26.2

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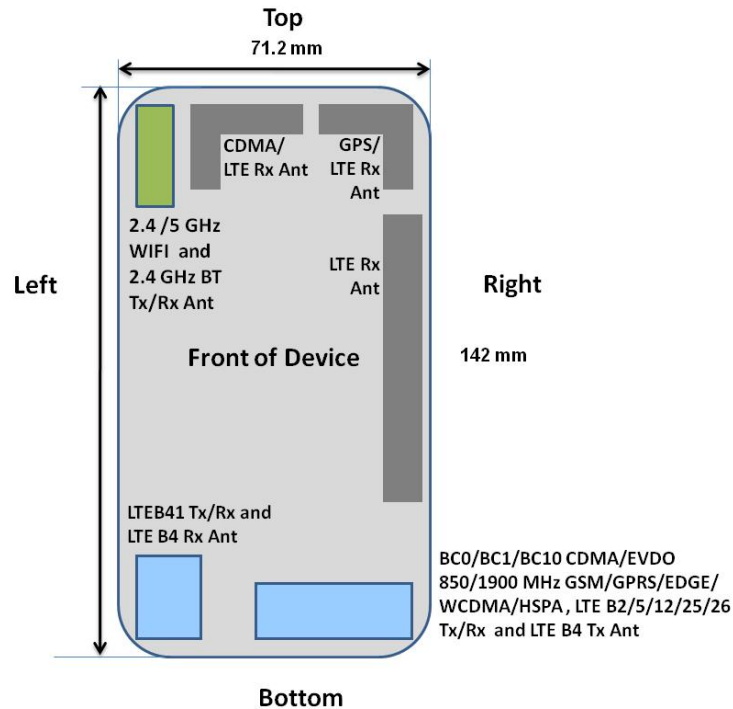
Mode / Band		Modulated Average (dBm)		
		3GPP WCDMA Rel 99	3GPP HSDPA Rel 5	3GPP HSUPA Rel 6
UMTS Band 5 (850 MHz)	Maximum	23.7	23.7	23.7
	Nominal	23.2	23.2	23.2
UMTS Band 2 (1900 MHz)	Maximum	23.7	23.7	23.7
	Nominal	23.2	23.2	23.2

Mode / Band		Modulated Average (dBm)
LTE Band 12	Maximum	23.7
	Nominal	23.2
LTE Band 5 (Cell)	Maximum	23.7
	Nominal	23.2
LTE Band 26 (Cell)	Maximum	24.2
	Nominal	23.7
LTE Band 4 (AWS)	Maximum	24.2
	Nominal	23.7
LTE Band 2 (PCS)	Maximum	23.7
	Nominal	23.2
LTE Band 25 (PCS)	Maximum	24.2
	Nominal	23.7
LTE Band 41	Maximum	24.2
	Nominal	23.7

Mode / Band		Modulated Average (dBm)
IEEE 802.11b (2.4 GHz)	Maximum	14.5
	Nominal	13.5
IEEE 802.11g (2.4 GHz)	Maximum	13.5
	Nominal	12.5
IEEE 802.11n (2.4 GHz)	Maximum	13.5
	Nominal	12.5
IEEE 802.11ac (2.4 GHz)	Maximum	12.5
	Nominal	11.5
IEEE 802.11a (5 GHz)	Maximum	14.5
	Nominal	13.5
IEEE 802.11n (5 GHz 20 MHz)	Maximum	13.5
	Nominal	12.5
IEEE 802.11n (5 GHz 40 MHz)	Maximum	12.5
	Nominal	11.5
IEEE 802.11ac (5 GHz)	Maximum	12.5
	Nominal	11.5
Bluetooth (1Mbps)	Maximum	8.5
	Nominal	7.5
Bluetooth (2Mbps)	Maximum	5.0
	Nominal	4.0
Bluetooth (3Mbps)	Maximum	5.0
	Nominal	4.0
Bluetooth LE	Maximum	6.0
	Nominal	5.0

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1.3 DUT Antenna Locations



Note: Exact antenna dimensions and separation distances are shown in the Technical Descriptions in the FCC Filing.

Figure 1-1
DUT Antenna Locations

Table 1-1
Mobile Hotspot Sides for SAR Testing

Mode	Back	Front	Top	Bottom	Right	Left
EVDO BC10 (\$90S)	Yes	Yes	No	Yes	Yes	Yes
EVDO BC0 (\$22H)	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 (Cell)	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	No	Yes
2.4 GHz WLAN	Yes	Yes	Yes	No	No	Yes
5.8 GHz WLAN	Yes	Yes	Yes	No	No	Yes

Note: Particular DUT edges were not required to be evaluated for Wireless Router SAR if the edges were greater than 2.5 cm from the transmitting antenna according to FCC KDB Publication 941225 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, 5.2-5.7 GHz WLAN operations are disabled. Therefore 5.2-5.7 GHz WLAN operations are not considered in this section.

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1.4 Near Field Communications (NFC) Antenna

This DUT has NFC operations. The NFC antenna is integrated into the device.

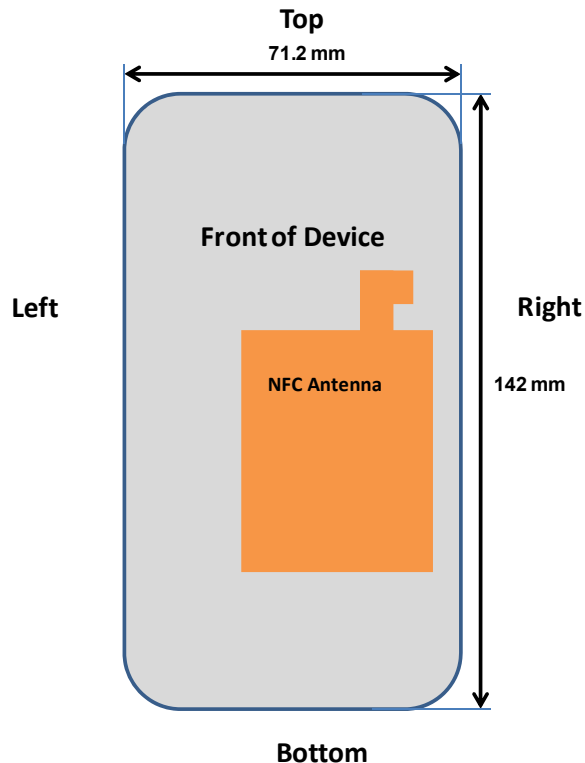


Figure 1-2
NFC Antenna Locations

1.5 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 1-3 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 1-3
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.

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Table 1-2
Simultaneous Transmission Scenarios

No.	Capable Transmit Configuration	Head	Body-Worn Accessory	Wireless Router
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
11	LTE + 5 GHz WI-FI	Yes*	Yes*	Yes
12	LTE + 2.4 GHz Bluetooth	N/A	Yes*	N/A
13	CDMA/EVDO data + 2.4 GHz WI-FI	Yes*	Yes*	Yes
14	CDMA/EVDO data + 5 GHz WI-FI	Yes*	Yes*	Yes
15	CDMA/EVDO data + 2.4 GHz Bluetooth	N/A	Yes*	N/A
16	GPRS/EDGE + 2.4 GHz WI-FI	Yes*	Yes*	Yes
17	GPRS/EDGE + 5 GHz WI-FI	Yes*	Yes*	Yes
18	GPRS/EDGE + 2.4 GHz Bluetooth	N/A	Yes*	N/A

- 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.
- (*) = for VOIP applications possibly used by the end-user
- 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.
- 5 GHz Wireless Router is only supported for the 5.8 GHz Band by S/W, therefore 5.2-5.7 GHz Bands were not evaluated for wireless router conditions.
- Per the manufacturer, WIFI Direct is expected to be used in conjunction with a held-to-ear or body-worn accessory voice call. Simultaneous transmission scenarios involving WIFI direct are specified above.
- 2.4 GHz WIFI supports Hotspot and WIFI-Direct(GO/GC).
- 5.8 GHz WIFI supports Hotspot and WIFI-Direct(GO/GC).

1.6 SAR Test Exclusions Applied

(A) WIFI/BT

Since Wireless Router operations are not allowed by the chipset firmware using 5.2-5.7 GHz WIFI, only 2.4 GHz and 5.8 GHz WIFI Hotspot SAR tests and combinations are considered for SAR with respect to Wireless Router configurations according to FCC KDB 941225 D06v01.

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; $[(7/8) * \sqrt{2.480}] = 1.4 < 3.0$.

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Per KDB Publication 447498 D01v05, the maximum power of the channel was rounded to the nearest mW before calculation.

This device supports 20 MHz and 40 MHz Bandwidths for IEEE 802.11n for 5 GHz WIFI only. IEEE 802.11n was not evaluated for SAR since the average output power of 20 MHz and 40 MHz bandwidths was not more than 0.25 dB higher than the average output power of IEEE 802.11a.

This device supports IEEE 802.11ac with the following features:

- a) Up to 80 MHz Bandwidth only
- b) No aggregate channel configurations
- c) 1 Tx antenna output
- d) 256 QAM is supported
- e) No new 5 GHz channels

(B) Licensed Transmitter(s)

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.

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

This device is only capable of QPSK HSUPA in the uplink. Therefore, no additional SAR tests are required beyond that described for devices with HSUPA in KDB 941225 D01v02.

This Device additionally supports LTE B2. LTE Band 25 and LTE Band 2 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 the Band 25 target power.

This Device additionally supports LTE B5. LTE Band 26 and LTE Band 5 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 the Band 26 target power.

Per the manufacturer LTE Band 26 only supports the middle channel at 15 MHz bandwidth.

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 inter-band LTE Carrier Aggregation (CA) in the downlink only. All uplink communications are identical to Release 8 specifications. Per FCC Guidance, LTE CA SAR was not needed for testing since the data sent by uplink on uplink physical channels does not change between Rel 8 and Rel 10.

1.7 SAR Test Positioning Based on Form Factor

Due to the embowed design of the device, Body SAR was configured per FCC Guidance. For Back side, the device was tested at a distance of 8 mm at the center of the device. For Front side, the device was

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tested at a distance of 8 mm from the outer ends of the device. The remaining surface or edges within 25 mm of a Tx antenna were tested at a distance of 10 mm.

1.8 Power Reduction for SAR

There is no power reduction used for any band/mode implemented in this device for SAR purposes.

1.9 Guidance Applied

- IEEE 1528-2003
- FCC KDB Publication 941225 D01v02, D02v02r02, D03v01, D05v02r03, D05Av01, D06v01r01 (2G/3G/4G, Hotspot, and CDMA 2000 1x Advanced)
- FCC KDB Publication 248227 D01v01r02 (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)
- April 2013 TCB Workshop Notes (IEEE 802.11ac)
- October 2013 TCB Workshop Notes (GPRS Testing Considerations)

1.10 Device Serial Numbers

Several samples were used with identical hardware 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
CDMA/EVDO BC10 (§90S)	1GLSV	1GLSV	1GLSV
CDMA/EVDO BC0 (§22H)	1GLSV	1GLSV	1GLSV
PCS CDMA/EVDO	1GLSV	1GLSV	1GLSV
GSM/GPRS/EDGE 850	1FMQW	1FMQW	1FMQW
GSM/GPRS/EDGE 1900	1FMQW	1FMQW	1FMQW
UMTS 850	1FMQW	1FMQW	1FMQW
UMTS 1900	1FMQW	1FMQW	1FMQW
LTE Band 12	1GLRX	1GLRW	1GLRW
LTE Band 26 (Cell)	1GLRW	1GLRX	1GLRX
LTE Band 4 (AWS)	1GLRW	1GLRW	1GLRW
LTE Band 25 (PCS)	1GLRX	1GLRX	1GLRX
LTE Band 41	1GLRW	1GLRW	1GLRW
2.4 GHz WLAN	1FMQT	1FMQT	1FMQT
5 GHz WLAN	1FMQT	1FMQT	1FMQT

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LTE INFORMATION

LTE Information				
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Form Factor	Portable Handset			
Frequency Range of each LTE transmission band	LTE Band 12 (699.7 - 715.3 MHz)			
	LTE Band 5 (Cell) (824.7 - 848.3 MHz)			
	LTE Band 26 (Cell) (814.7 - 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)			
Channel Bandwidths	LTE Band 41 (2498.5 - 2687.5 MHz)			
	LTE Band 12: 1.4 MHz, 3 MHz, 5 MHz, 10 MHz			
	LTE Band 5 (Cell): 1.4 MHz, 3 MHz, 5 MHz, 10 MHz			
	LTE Band 26 (Cell): 1.4 MHz, 3 MHz, 5 MHz, 10 MHz, 15 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			
Channel Numbers and Frequencies (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			
	Low	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 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 26 (Cell): 1.4 MHz	814.7 (26697)	831.5 (26865)	848.3 (27033)	
LTE Band 26 (Cell): 3 MHz	815.5 (26705)	831.5 (26865)	847.5 (27025)	
LTE Band 26 (Cell): 5 MHz	816.5 (26715)	831.5 (26865)	846.5 (27015)	
LTE Band 26 (Cell): 10 MHz	819 (26740)	831.5 (26865)	844 (26990)	
LTE Band 26 (Cell): 15 MHz	N/A	831.5 (26865)	N/A	
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 (26140)	1882.5 (26365)	1905 (26590)	
Channel Numbers and Frequencies (MHz)	Low	Low-Mid	Mid	High
	2498.5 (39675)	2545.8 (40148)	2593 (40620)	2640.3 (41093)
	2501 (39700)	2547 (40160)	2593 (40620)	2639 (41080)
	2503.5 (39725)	2548.3 (40173)	2593 (40620)	2637.8 (41068)
	2506 (39750)	2549.5 (40185)	2593 (40620)	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)			
	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, eICl, WlFl 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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4

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.

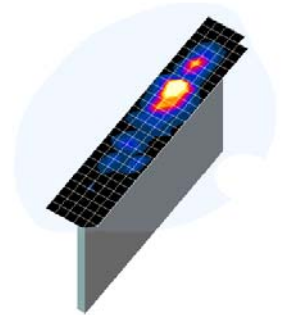


Figure 4-1
Sample SAR Area
Scan

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

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

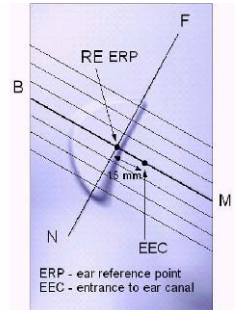


Figure 5-1
Close-Up Side view
of ERP

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

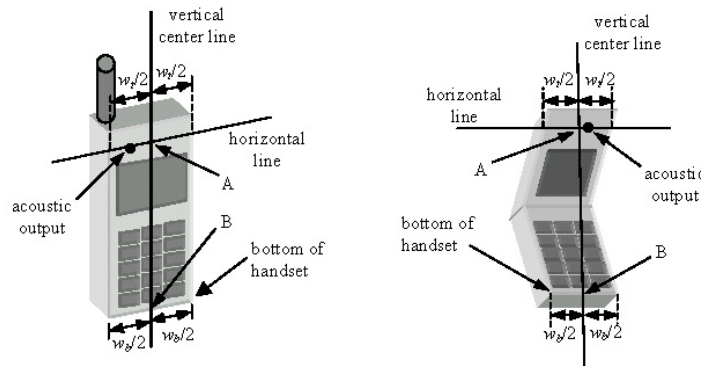


Figure 5-3
Handset Vertical Center & Horizontal Line Reference Points

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6 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.

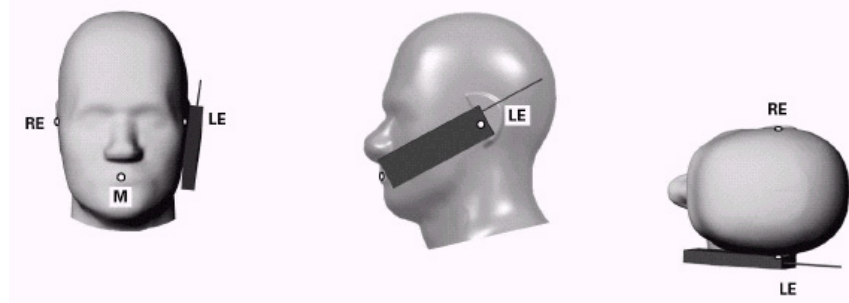


Figure 6-1 Front, Side and Top View of Cheek Position

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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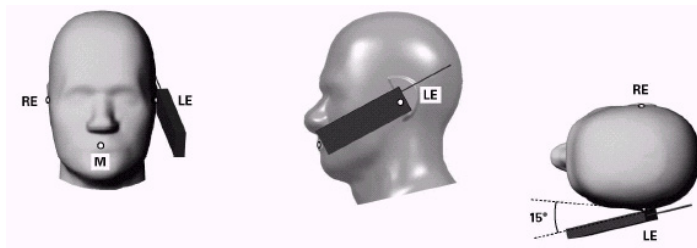


Figure 6-2 Front, Side and Top View of Ear/15° Tilt Position

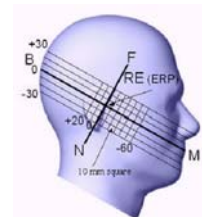


Figure 6-3 Side view w/ relevant markings

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

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

Under these circumstances, the following procedures apply, adopted from the FCC guidance on SAR handsets document FCC KDB Publication 648474 D04_v01. The SAR required in these regions of SAM should be measured using a flat phantom. The phone should be positioned with a separation distance of 4 mm between the ear reference point (ERP) and the outer surface of the flat phantom shell. While maintaining this distance at the ERP location, the low (bottom) edge of the phone should be lowered from the phantom to establish the same separation distance between the peak SAR location identified by the truncated partial SAR distribution measured with the SAM phantom. The distance from the peak SAR location to the phone is determined by the straight line passing perpendicularly through the phantom surface. When it is not feasible to maintain 4 mm separation at the ERP while also establishing the required separation at the peak SAR location, the top edge of the phone will be allowed to touch the phantom with a separation < 4 mm at the ERP. The phone should not be tilted to the left or right while placed in this inclined position to the flat phantom.

6.5 Body-Worn Accessory Configurations

Body-worn operating configurations are tested with the belt-clips and holsters attached to the device and positioned against a flat phantom in a normal use configuration (see Figure 6-4). Per FCC KDB Publication 648474 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 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.

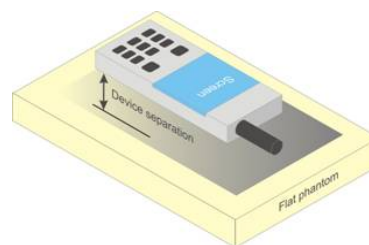


Figure 6-4 Sample Body-Worn Diagram

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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.

6.6 Extremity Exposure Configurations

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

For smart phones with a display diagonal dimension > 15.0 cm or an overall diagonal dimension > 16.0 cm that provide similar mobile web access and multimedia support found in mini-tablets or UMPC minitables that support voice calls next to the ear, the phablets procedures outlined in KDB Publication 648474 D04 v01r01DR04 should be applied to evaluate SAR compliance. A device marketed as phablets, regardless of form factors and operating characteristics must be tested as a phablet to determine SAR compliance. In addition to the normally required head and body-worn accessory SAR test procedures required for handsets, the UMPC mini-tablet procedures must also be applied to test the SAR of all surfaces and edges with an antenna ≤ 25 mm from that surface or edge, in direct contact with the phantom, for 10-g SAR. The UMPC mini-tablet 1-g SAR at 5 mm is not required. When hotspot mode applies, 10-g SAR is required only for the surfaces and edges with hotspot mode 1-g SAR > 1.2 W/kg.

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6.7 Wireless Router Configurations

Some battery-operated handsets have the capability to transmit and receive user data through simultaneous transmission of WIFI simultaneously with a separate licensed transmitter. The FCC has provided guidance in FCC KDB Publication 941225 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 FCC MEASUREMENT PROCEDURES

Power measurements were performed using a base station simulator under digital average power.

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 Procedures Used to Establish RF Signal for SAR

The following procedures are according to FCC KDB Publication 941225 D01 "SAR Measurement Procedures for 3G Devices" v02, October 2007.

The device was 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 were 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 was 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 deviated by more than 5%, the SAR test and drift measurements were repeated.

8.3 SAR Measurement Conditions for CDMA2000

The following procedures were performed according to FCC KDB Publication 941225 D01 "SAR Measurement Procedures for 3G Devices" v02, October 2007.

8.3.1 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.
3. 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.
4. Under RC3, C.S0011 Table 4.4.5.2-2, Table 8-2 was applied.

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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

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

8.3.2 CDMA2000 1x Advanced

This device additionally supports 1x Advanced. Conducted powers were measured using SO75 with RC8 on the uplink and RC11 on the downlink per KDB Publication 941225 D02v02. Smart blanking was disabled for all measurements. The EUT was configured with forward power control Mode 000 and reverse power control at 400 bps. Conducted powers were measured on an Agilent 8960 Series 10 Wireless Communications Test Set, Model E5515C using the CDMA2000 1x Advanced application, Option E1962B-410.

Based on the maximum output power measured for 1x Advanced, SAR would have to be evaluated for 1x advanced if the maximum output for 1x Advanced is more than 0.25 dB higher than the maximum measured for 1x. Also, if the measured SAR in any 1x mode exposure conditions (head, body etc.) is larger than 1.2 W/kg, the highest of those configurations above 1.2 W/kg for each exposure condition in 1x Advanced has to be repeated. All measured SAR in 1x mode higher than 1.5 W/kg must be repeated for 1x Advanced.

8.3.3 Head SAR Measurements

SAR for head exposure configurations is measured in RC3 with the DUT configured to transmit at full rate using Loopback Service Option SO55. SAR for RC1 is not required when the maximum average output of each channel is less than ¼ dB higher than that measured in RC3. Otherwise, SAR is measured on the maximum output channel in RC1 using the exposure configuration that results in the highest SAR for that channel in RC3.

Head SAR was additionally evaluated using EVDO Rev. A to support compliance for VoIP operations. See Section 8.3.5 for EVDO Rev. A configuration parameters.

8.3.4 Body SAR Measurements

SAR for body 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. SAR for multiple code channels (FCH + SCH_n) is not required when the maximum average output of each RF channel is less than ¼ dB higher than that measured with FCH only. Otherwise, SAR is measured on the maximum output channel (FCH + SCH_n) with FCH at full rate and SCH₀ enabled at 9600 bps using the exposure configuration that results in the highest SAR for that channel with FCH only. When multiple code channels are enabled, the DUT output may shift by more than 0.5 dB and lead to higher SAR drifts and SCH dropouts. Body SAR was measured using TDSO / SO32 with power control bits in the “All Up”

Body SAR in RC1 is not required when the maximum average output of each channel is less than ¼ dB higher than that measured in RC3. Otherwise, SAR is measured on the maximum output channel in RC1; with Loopback Service Option SO55, at full rate, using the body exposure configuration that results in the highest SAR for that channel in RC3.

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8.3.5 Handsets with EVDO

For handsets with Ev-Do capabilities, when the maximum average output of each channel in Rev. 0 is less than ¼ dB higher than that measured in RC3 (1x RTT), body SAR for EV-DO is not required. Otherwise, SAR for Rev. 0 is measured on the maximum output channel at 153.6 kbps using the body exposure configuration that results in the highest SAR for that channel in RC3. SAR for Rev. A is not required when the maximum average output of each channel is less than that measured in Rev. 0 or less than ¼ dB higher than that measured in RC3. Otherwise, SAR is measured on the maximum output channel for Rev. A using a Reverse Data Channel payload size of 4096 bits and a Termination Target of 16 slots defined for Subtype 2 Physical Layer configurations. A Forward Traffic Channel data rate corresponding to the 2-slot version of 307.2 kbps with the ACK Channel transmitting in all slots would be configured in the downlink for both Rev. 0 and Rev. A.

8.3.6 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 D01 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.

8.4 SAR Measurement Conditions for UMTS

8.4.1 Output Power Verification

Maximum output power is measured on the High, Middle and Low channels for each applicable transmission band according to the general descriptions in section 5.2 of 3GPP TS 34.121, using the appropriate RMC or AMR with TPC (transmit power control) set to all “1s”.

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 (release 5), 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.

8.4.2 Head SAR Measurements for Handsets

SAR for head exposure configurations is measured using the 12.2 kbps RMC with TPC bits configured to all “1s”. SAR in AMR configurations is not required when the maximum average output of each RF channel for 12.2 kbps AMR is less than 0.25 dB higher than that measured in

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12.2 kbps RMC. Otherwise, SAR is measured on the maximum output channel in 12.2 AMR with a 3.4 kbps SRB (signaling radio bearer) using the exposure configuration that resulted in the highest SAR for that RF channel in the 12.2 kbps RMC mode.

8.4.3 Body SAR Measurements

SAR for body exposure configurations is measured using the 12.2 kbps RMC with the TPC bits all “1s”.

8.4.4 SAR Measurements for Handsets with Rel 5 HSDPA

Body SAR for HSDPA is not required for handsets with HSDPA capabilities when the maximum average output power of each RF channel with HSDPA active is less than 0.25 dB higher than that measured without HSDPA using 12.2 kbps RMC and the maximum SAR for 12.2 kbps RMC is $\leq 75\%$ of the SAR limit. Otherwise, SAR is measured for HSDPA, using an FRC with H-Set 1 in Sub-test 1 and a 12.2 kbps RMC configured in Test Loop Mode 1, using the highest body SAR configuration measured in 12.2 kbps RMC without HSDPA, on the maximum output channel with the body exposure configuration that resulted in the highest SAR in 12.2 kbps RMC mode for that RF channel.

The H-set used in FRC for HSDPA should be configured according to the UE category of a test device. The number of HS-DSCH/HSPDSCHs, HARQ processes, minimum inter-TTI interval, transport block sizes and RV coding sequence are defined by the applicable H-set. To maintain a consistent test configuration and stable transmission conditions, QPSK is used in the FRC for SAR testing. HS-DPCCH should be configured with a CQI feedback cycle of 2 ms to maintain a constant rate of active CQI slots. DPCCH and DPDCH gain factors of $\beta_c=9$ and $\beta_d=15$, and power offset parameters of $\Delta_{ACK} = \Delta_{NACK} = 5$ and $\Delta_{CQI}=2$ is used. The CQI value is determined by the UE category, transport block size, number of HS-PDSCHs and modulation used in the FRC.

Sub-Test	β_c	β_d	β_d (SF)	β_c/β_d	β_{HS} (Note 1, Note 2)	CM (dB) (Note 3)	MPR (dB) (Note 3)
1	2/15	15/15	64	2/15	4/15	0.0	0.0
2	12/15 (Note 4)	15/15 (Note 4)	64	12/15 (Note 4)	24/15	1.0	0.0
3	15/15	8/15	64	15/8	30/15	1.5	0.5
4	15/15	4/15	64	15/4	30/15	1.5	0.5

Note 1: Δ_{ACK} , Δ_{NACK} and $\Delta_{CQI} = 8 \Leftrightarrow A_{HS} = \beta_{HS}/\beta_c = 30/15 \Leftrightarrow \beta_{HS} = 30/15 * \beta_c$.

Note 2: For the HS-DPCCH power mask requirement test in clause 5.2C, 5.7A, and the Error Vector Magnitude (EVM) with HS-DPCCH test in clause 5.13.1A, and HSDPA EVM with phase discontinuity in clause 5.13.1AA, Δ_{ACK} and $\Delta_{NACK} = 8$ ($A_{HS} = 30/15$) with $\beta_{HS} = 30/15 * \beta_c$, and $\Delta_{CQI} = 7$ ($A_{HS} = 24/15$) with $\beta_{HS} = 24/15 * \beta_c$.

Note 3: CM = 1 for $\beta_c/\beta_d = 12/15$, $\beta_{HS}/\beta_c = 24/15$. For all other combinations of DPDCH, DPCCH and HS-DPCCH the MPR is based on the relative CM difference. This is applicable for only UEs that support HSDPA in release 6 and later releases.

Figure 8-1
Table C.10.1.4 of TS 234.121-1

8.4.5 SAR Measurements for Handsets with Rel 6 HSUPA

Body SAR for HSUPA is not required when the maximum average output of each RF channel with HSUPA/HSDPA active is less than 0.25 dB higher than as measured without HSUPA/HSDPA using 12.2 kbps RMC and maximum SAR for 12.2 kbps RMC is $\leq 75\%$ of the SAR limit. Otherwise SAR is measured on the maximum output channel for the body exposure configuration produced highest SAR in 12.2 kbps RMC for that RF channel, using the additional procedures under “Release 6 HSPA data devices”

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Head SAR for VOIP operations under HSPA is not required when maximum average output of each RF channel with HSPA is less than 0.25 dB higher than as measured using 12.2 kbps RMC. Otherwise SAR is measured using same HSPA configuration as used for body SAR.

Sub-test	β_c	β_d	β_a (SF)	β_c/β_d	$\beta_{1s}^{(1)}$	β_{ec}	β_{ed}	β_{ed} (SF)	β_{ed} (codes)	CM ⁽²⁾ (dB)	MPR (dB)	AG ⁽⁴⁾ Index	E-TFCI
1	11/15 ⁽³⁾	15/15 ⁽³⁾	64	11/15 ⁽³⁾	22/15	209/225	1039/225	4	1	1.0	0.0	20	75
2	6/15	15/15	64	6/15	12/15	12/15	94/75	4	1	3.0	2.0	12	67
3	15/15	9/15	64	15/9	30/15	30/15	$\beta_{ed1}: 47/15$ $\beta_{ed2}: 47/15$	4	2	2.0	1.0	15	92
4	2/15	15/15	64	2/15	4/15	2/15	56/75	4	1	3.0	2.0	17	71
5	15/15 ⁽⁴⁾	15/15 ⁽⁴⁾	64	15/15 ⁽⁴⁾	30/15	24/15	134/15	4	1	1.0	0.0	21	81

Note 1: Δ_{ACK} , Δ_{NACK} and $\Delta_{OQI} = 8 \Leftrightarrow A_{1s} = \beta_{1s}/\beta_c = 30/15 \Leftrightarrow \beta_{1s} = 30/15 * \beta_c$.

Note 2: CM = 1 for $\beta_c/\beta_d = 12/15$, $\beta_{1s}/\beta_c = 24/15$. For all other combinations of DPDCH, DPCCCH, HS-DPCCH, E-DPDCH and E-DPCCH the MPR is based on the relative CM difference.

Note 3: For subtest 1 the β_c/β_d ratio of 11/15 for the TFC during the measurement period (TF1, TF0) is achieved by setting the signaled gain factors for the reference TFC (TF1, TF1) to $\beta_c = 10/15$ and $\beta_d = 15/15$.

Note 4: For subtest 5 the β_c/β_d ratio of 15/15 for the TFC during the measurement period (TF1, TF0) is achieved by setting the signaled gain factors for the reference TFC (TF1, TF1) to $\beta_c = 14/15$ and $\beta_d = 15/15$.

Note 5: Testing UE using E-DPDCH Physical Layer category 1 Sub-test 3 is not required according to TS 25.306 Table 5.1g.

Note 6: β_{ed} can not be set directly; it is set by Absolute Grant Value.

8.5 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).

8.5.1 Spectrum Plots for RB Configurations

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

8.5.2 MPR

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

8.5.3 A-MPR

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

8.5.4 Required RB Size and RB Offsets for SAR Testing

According to FCC KDB 941225 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 required for the remaining required test channels using the RB offset configuration with highest output power for that channel.

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

8.5.5 TDD

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

8.5.6 Carrier Aggregation

LTE Carrier Aggregation (CA) measurements were 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 were 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 Guidance, no SAR measurements were required.

8.6 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 D01v01r02 for more details.

8.6.1 General Device Setup

Chipset based test mode software is hardware dependent and generally varies among manufacturers. The device operating parameters established in test mode for SAR measurements must be identical to those programmed in production units, including output power levels, amplifier gain settings and other RF performance tuning parameters. The test frequencies should correspond to actual channel frequencies defined for domestic use. SAR for devices with switched diversity should be measured with only one antenna transmitting at a time during each SAR measurement, according to a fixed modulation and data rate. The same data pattern should be used for all measurements.

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8.6.2 Frequency Channel Configurations [24]

For 2.4 GHz, the highest average RF output power channel between the low, mid and high channel at the lowest data rate was selected for SAR evaluation in 802.11b mode. 802.11g/n/ac modes and higher data rates for 802.11b were additionally evaluated for SAR if the output power of the respective mode was 0.25 dB or higher than the powers of the SAR configurations tested in the 802.11b mode.

For 5 GHz, the highest average RF output power channel across the default test channels at the lowest data rate was selected for SAR evaluation in 802.11a. When the adjacent channels are higher in power than the default channels, these “required channels” were considered instead of the default channels for SAR testing. 802.11n modes and higher data rates for 802.11a/n were evaluated only if the respective mode was higher than 0.25 dB or more than the 802.11a mode. 802.11ac SAR was evaluated for highest 802.11a configuration in each 5 GHz band and each exposure condition. 802.11ac modes were additionally evaluated for SAR if the output power for the respective mode was more than 0.25 dB higher than powers of 802.11a modes.

If the maximum extrapolated peak SAR of the zoom scan for the highest output channel was less than 1.6 W/kg and if the 1g averaged SAR was less than 0.8 W/kg, SAR testing was not required for the other test channels in the band.

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9 RF CONDUCTED POWERS

9.1 CDMA Conducted Powers

Band	Channel	Rule Part	Frequency (MHz)	SO55 [dBm]	SO55 [dBm]	SO75 [dBm]	TDSO SO32 [dBm]	TDSO SO32 [dBm]	1x EvDO Rev. 0 [dBm]	1x EvDO Rev. A [dBm]
			F-RC	RC1	RC3	RC11	FCH+SCH	FCH	(RTAP)	(RETAP)
Cellular	564	90S	820.1	25.28	25.31	25.27	25.33	25.31	25.07	25.02
Cellular	1013	22H	824.7	24.56	24.57	24.51	24.61	24.60	24.64	24.60
	384	22H	836.52	24.53	24.54	24.46	24.57	24.57	24.59	24.58
	777	22H	848.31	24.62	24.65	24.56	24.64	24.63	24.69	24.64
PCS	25	24E	1851.25	24.60	24.66	24.53	24.66	24.65	24.63	24.60
	600	24E	1880	24.65	24.65	24.51	24.62	24.67	24.68	24.66
	1175	24E	1908.75	24.58	24.58	24.40	24.56	24.63	24.65	24.58

Note:

- 1.RC1 is only applicable for IS-95 compatibility.
- 2.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.

Per KDB Publication 941225 D01v02:

- 1.Head SAR was tested with SO55 RC3. SO55 RC1 was not required since the average output power was not more than 0.25 dB than the SO55 RC3 powers. Head SAR was additionally evaluated with EVDO Rev. A to determine compliance for held-to-ear VOIP operations.
- 2.Body-Worn SAR was tested with 1x RTT with TDSO / SO32 FCH Only. Ev-Do 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.
- 3.Hotspot SAR is measured using Subtype 0/1 Physical Layer configurations for Rev. 0. If the average output power of Subtype 2 for Rev. A is less than the Rev. 0 power levels, then Rev. A SAR is not required. Otherwise, SAR is measured on the maximum output channel for Rev. A using the exposure configuration that results in the highest SAR for that RF channel in Rev. 0. 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

Per KDB Publication 941225 D02v02:

- 1.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. See Section 8.3.2 for 1x Advanced test set up.



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	EDGE [dBm] 1 Tx Slot	EDGE [dBm] 2 Tx Slot
GSM 850	128	33.18	33.00	30.83	27.40	27.33
	190	33.05	32.80	31.02	27.59	27.48
	251	33.16	32.91	30.75	27.65	27.61
GSM 1900	512	30.66	30.69	28.33	26.55	26.40
	661	30.48	30.60	28.68	26.63	26.57
	810	30.64	30.62	28.50	26.60	26.50
Calculated Maximum Frame-Averaged Output Power						
		Voice	GPRS/EDGE Data (GMSK)		EDGE Data (8-PSK)	
Band	Channel	GSM [dBm] CS (1 Slot)	GPRS [dBm] 1 Tx Slot	GPRS [dBm] 2 Tx Slot	EDGE [dBm] 1 Tx Slot	EDGE [dBm] 2 Tx Slot
GSM 850	128	24.15	23.97	24.81	18.37	21.31
	190	24.02	23.77	25.00	18.56	21.46
	251	24.13	23.88	24.73	18.62	21.59
GSM 1900	512	21.63	21.66	22.31	17.52	20.38
	661	21.45	21.57	22.66	17.60	20.55
	810	21.61	21.59	22.48	17.57	20.48
GSM 850	Frame	23.67	23.67	24.68	18.17	21.18
GSM 1900	Avg.Targets	21.17	21.17	22.18	17.17	20.18

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.
- 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/EDGE (GMSK) output powers were measured with coding scheme setting of 1 (CS1) on the base station simulator. CS1 was configured to measure GPRS output power measurements and SAR to ensure GMSK modulation in the signal. Our investigation has shown that CS1 - CS4 settings do not have any impact on the output levels or modulation in the GPRS modes.
- 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 will ensure 8-PSK modulation. It has been shown that MCS levels that produce 8PSK modulation do not have an impact on output power.

GSM Class: B

GPRS Multislot class: 10 (Max 2 Tx uplink slots)

EDGE Multislot class: 10 (Max 2 Tx uplink slots)

DTM Multislot Class: N/A



Figure 9-2
Power Measurement Setup

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9.3 UMTS Conducted Powers

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	23.60	23.57	23.50	23.49	23.60	-
99		12.2 kbps AMR	23.55	23.60	23.56	23.47	23.51	23.58	-
6	HSDPA	Subtest 1	23.60	23.40	23.33	23.50	23.66	23.65	0
6		Subtest 2	23.62	23.60	23.35	23.60	23.64	23.61	0
6		Subtest 3	23.15	23.12	22.94	23.09	23.18	23.19	0.5
6		Subtest 4	23.15	23.10	23.00	23.12	23.20	23.00	0.5
6	HSUPA	Subtest 1	21.75	21.65	21.50	22.08	21.98	22.16	0
6		Subtest 2	21.20	20.92	20.94	21.56	21.22	21.48	2
6		Subtest 3	21.40	21.69	21.55	21.63	21.89	21.89	1
6		Subtest 4	21.66	21.59	21.49	21.86	21.77	22.00	2
6		Subtest 5	21.36	21.70	21.35	21.37	21.75	21.79	0

UMTS SAR was tested under RMC 12.2 kbps with HSPA Inactive per KDB Publication 941225 D01v02. 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 2 dB more than specified by 3GPP, but also as low as 0 dB according to the chipset implementation in this model.



Figure 9-3
Power Measurement Setup

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9.4 LTE Conducted Powers

9.4.1

LTE Band 12

Table 9-1
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]	Maximum Conducted Power [dBm]
Mid	707.5	23095	10	QPSK	1	0	23.61	0	0	23.7
	707.5	23095	10	QPSK	1	25	23.59	0	0	23.7
	707.5	23095	10	QPSK	1	49	23.40	0	0	23.7
	707.5	23095	10	QPSK	25	0	22.62	0-1	1	22.7
	707.5	23095	10	QPSK	25	12	22.43	0-1	1	22.7
	707.5	23095	10	QPSK	25	25	22.40	0-1	1	22.7
	707.5	23095	10	QPSK	50	0	22.41	0-1	1	22.7
	707.5	23095	10	16QAM	1	0	22.54	0-1	1	22.7
	707.5	23095	10	16QAM	1	25	22.64	0-1	1	22.7
	707.5	23095	10	16QAM	1	49	22.50	0-1	1	22.7
	707.5	23095	10	16QAM	25	0	21.59	0-2	2	21.7
	707.5	23095	10	16QAM	25	12	21.46	0-2	2	21.7
	707.5	23095	10	16QAM	25	25	21.31	0-2	2	21.7
	707.5	23095	10	16QAM	50	0	21.40	0-2	2	21.7

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 9-2
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]	Maximum Conducted Power [dBm]
Low	701.5	23035	5	QPSK	1	0	23.55	0	0	23.7
	701.5	23035	5	QPSK	1	12	23.56	0	0	23.7
	701.5	23035	5	QPSK	1	24	23.42	0	0	23.7
	701.5	23035	5	QPSK	12	0	22.57	0-1	1	22.7
	701.5	23035	5	QPSK	12	6	22.43	0-1	1	22.7
	701.5	23035	5	QPSK	12	13	22.48	0-1	1	22.7
	701.5	23035	5	QPSK	25	0	22.50	0-1	1	22.7
	701.5	23035	5	16-QAM	1	0	22.57	0-1	1	22.7
	701.5	23035	5	16-QAM	1	12	22.59	0-1	1	22.7
	701.5	23035	5	16-QAM	1	24	22.48	0-1	1	22.7
	701.5	23035	5	16-QAM	12	0	21.56	0-2	2	21.7
	701.5	23035	5	16-QAM	12	6	21.48	0-2	2	21.7
	701.5	23035	5	16-QAM	12	13	21.36	0-2	2	21.7
	701.5	23035	5	16-QAM	25	0	21.36	0-2	2	21.7
Mid	707.5	23095	5	QPSK	1	0	23.64	0	0	23.7
	707.5	23095	5	QPSK	1	12	23.33	0	0	23.7
	707.5	23095	5	QPSK	1	24	23.52	0	0	23.7
	707.5	23095	5	QPSK	12	0	22.43	0-1	1	22.7
	707.5	23095	5	QPSK	12	6	22.42	0-1	1	22.7
	707.5	23095	5	QPSK	12	13	22.51	0-1	1	22.7
	707.5	23095	5	QPSK	25	0	22.53	0-1	1	22.7
	707.5	23095	5	16-QAM	1	0	22.30	0-1	1	22.7
	707.5	23095	5	16-QAM	1	12	22.50	0-1	1	22.7
	707.5	23095	5	16-QAM	1	24	22.48	0-1	1	22.7
	707.5	23095	5	16-QAM	12	0	21.40	0-2	2	21.7
	707.5	23095	5	16-QAM	12	6	21.32	0-2	2	21.7
	707.5	23095	5	16-QAM	12	13	21.47	0-2	2	21.7
	707.5	23095	5	16-QAM	25	0	21.44	0-2	2	21.7
High	713.5	23155	5	QPSK	1	0	23.50	0	0	23.7
	713.5	23155	5	QPSK	1	12	23.33	0	0	23.7
	713.5	23155	5	QPSK	1	24	23.37	0	0	23.7
	713.5	23155	5	QPSK	12	0	22.34	0-1	1	22.7
	713.5	23155	5	QPSK	12	6	22.45	0-1	1	22.7
	713.5	23155	5	QPSK	12	13	22.48	0-1	1	22.7
	713.5	23155	5	QPSK	25	0	22.42	0-1	1	22.7
	713.5	23155	5	16-QAM	1	0	22.68	0-1	1	22.7
	713.5	23155	5	16-QAM	1	12	22.51	0-1	1	22.7
	713.5	23155	5	16-QAM	1	24	22.55	0-1	1	22.7
	713.5	23155	5	16-QAM	12	0	21.27	0-2	2	21.7
	713.5	23155	5	16-QAM	12	6	21.51	0-2	2	21.7
	713.5	23155	5	16-QAM	12	13	21.40	0-2	2	21.7
	713.5	23155	5	16-QAM	25	0	21.46	0-2	2	21.7

Table 9-3
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]	Maximum Conducted Power [dBm]
Low	700.5	23025	3	QPSK	1	0	23.49	0	0	23.7
	700.5	23025	3	QPSK	1	7	23.59	0	0	23.7
	700.5	23025	3	QPSK	1	14	23.44	0	0	23.7
	700.5	23025	3	QPSK	8	0	22.34	0-1	1	22.7
	700.5	23025	3	QPSK	8	4	22.57	0-1	1	22.7
	700.5	23025	3	QPSK	8	7	22.56	0-1	1	22.7
	700.5	23025	3	QPSK	15	0	22.34	0-1	1	22.7
	700.5	23025	3	16-QAM	1	0	22.38	0-1	1	22.7
	700.5	23025	3	16-QAM	1	7	22.46	0-1	1	22.7
	700.5	23025	3	16-QAM	1	14	22.40	0-1	1	22.7
	700.5	23025	3	16-QAM	8	0	21.57	0-2	2	21.7
	700.5	23025	3	16-QAM	8	4	21.41	0-2	2	21.7
Mid	700.5	23025	3	16-QAM	8	7	21.59	0-2	2	21.7
	700.5	23025	3	16-QAM	15	0	21.58	0-2	2	21.7
	707.5	23095	3	QPSK	1	0	23.32	0	0	23.7
	707.5	23095	3	QPSK	1	7	23.53	0	0	23.7
	707.5	23095	3	QPSK	1	14	23.47	0	0	23.7
	707.5	23095	3	QPSK	8	0	22.38	0-1	1	22.7
	707.5	23095	3	QPSK	8	4	22.32	0-1	1	22.7
	707.5	23095	3	QPSK	8	7	22.51	0-1	1	22.7
	707.5	23095	3	QPSK	15	0	22.45	0-1	1	22.7
	707.5	23095	3	16-QAM	1	0	22.55	0-1	1	22.7
	707.5	23095	3	16-QAM	1	7	22.43	0-1	1	22.7
	707.5	23095	3	16-QAM	1	14	22.37	0-1	1	22.7
High	707.5	23095	3	16-QAM	8	0	21.61	0-2	2	21.7
	707.5	23095	3	16-QAM	8	4	21.61	0-2	2	21.7
	707.5	23095	3	16-QAM	8	7	21.60	0-2	2	21.7
	707.5	23095	3	16-QAM	15	0	21.51	0-2	2	21.7
	714.5	23165	3	QPSK	1	0	23.41	0	0	23.7
	714.5	23165	3	QPSK	1	7	23.40	0	0	23.7
	714.5	23165	3	QPSK	1	14	23.59	0	0	23.7
	714.5	23165	3	QPSK	8	0	22.33	0-1	1	22.7
	714.5	23165	3	QPSK	8	4	22.36	0-1	1	22.7
	714.5	23165	3	QPSK	8	7	22.52	0-1	1	22.7
	714.5	23165	3	QPSK	15	0	22.59	0-1	1	22.7
	714.5	23165	3	16-QAM	1	0	22.54	0-1	1	22.7
	714.5	23165	3	16-QAM	1	7	22.36	0-1	1	22.7
	714.5	23165	3	16-QAM	1	14	22.35	0-1	1	22.7
	714.5	23165	3	16-QAM	8	0	21.36	0-2	2	21.7
	714.5	23165	3	16-QAM	8	4	21.50	0-2	2	21.7
	714.5	23165	3	16-QAM	8	7	21.48	0-2	2	21.7
	714.5	23165	3	16-QAM	15	0	21.45	0-2	2	21.7

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Table 9-4
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]	Maximum Conducted Power [dBm]
Low	699.7	23017	1.4	QPSK	1	0	23.43	0	0	23.7
	699.7	23017	1.4	QPSK	1	2	23.45	0	0	23.7
	699.7	23017	1.4	QPSK	1	5	23.48	0	0	23.7
	699.7	23017	1.4	QPSK	3	0	23.54	0	0	23.7
	699.7	23017	1.4	QPSK	3	2	23.63	0	0	23.7
	699.7	23017	1.4	QPSK	3	3	23.65	0	0	23.7
	699.7	23017	1.4	QPSK	6	0	22.60	0-1	1	22.7
	699.7	23017	1.4	16-QAM	1	0	22.45	0-1	1	22.7
	699.7	23017	1.4	16-QAM	1	2	22.56	0-1	1	22.7
	699.7	23017	1.4	16-QAM	1	5	22.63	0-1	1	22.7
	699.7	23017	1.4	16-QAM	3	0	22.56	0-1	1	22.7
	699.7	23017	1.4	16-QAM	3	2	22.51	0-1	1	22.7
Mid	699.7	23017	1.4	16-QAM	3	3	22.54	0-1	1	22.7
	699.7	23017	1.4	16-QAM	6	0	21.37	0-2	2	21.7
	707.5	23095	1.4	QPSK	1	0	23.62	0	0	23.7
	707.5	23095	1.4	QPSK	1	2	23.68	0	0	23.7
	707.5	23095	1.4	QPSK	1	5	23.48	0	0	23.7
	707.5	23095	1.4	QPSK	3	0	23.58	0	0	23.7
	707.5	23095	1.4	QPSK	3	2	23.43	0	0	23.7
	707.5	23095	1.4	QPSK	3	3	23.67	0	0	23.7
	707.5	23095	1.4	QPSK	6	0	22.37	0-1	1	22.7
	707.5	23095	1.4	16-QAM	1	0	22.49	0-1	1	22.7
	707.5	23095	1.4	16-QAM	1	2	22.48	0-1	1	22.7
	707.5	23095	1.4	16-QAM	1	5	22.41	0-1	1	22.7
High	707.5	23095	1.4	16-QAM	3	0	22.53	0-1	1	22.7
	707.5	23095	1.4	16-QAM	3	2	22.41	0-1	1	22.7
	707.5	23095	1.4	16-QAM	3	3	22.50	0-1	1	22.7
	707.5	23095	1.4	16-QAM	6	0	21.56	0-2	2	21.7
	715.3	23173	1.4	QPSK	1	0	23.36	0	0	23.7
	715.3	23173	1.4	QPSK	1	2	23.64	0	0	23.7
	715.3	23173	1.4	QPSK	1	5	23.54	0	0	23.7
	715.3	23173	1.4	QPSK	3	0	23.42	0	0	23.7
	715.3	23173	1.4	QPSK	3	2	23.65	0	0	23.7
	715.3	23173	1.4	QPSK	3	3	23.55	0	0	23.7
	715.3	23173	1.4	QPSK	6	0	22.45	0-1	1	22.7
	715.3	23173	1.4	16-QAM	1	0	22.46	0-1	1	22.7
	715.3	23173	1.4	16-QAM	1	2	22.42	0-1	1	22.7
	715.3	23173	1.4	16-QAM	1	5	22.40	0-1	1	22.7
	715.3	23173	1.4	16-QAM	3	0	22.48	0-1	1	22.7
	715.3	23173	1.4	16-QAM	3	2	22.55	0-1	1	22.7
	715.3	23173	1.4	16-QAM	3	3	22.49	0-1	1	22.7
	715.3	23173	1.4	16-QAM	6	0	21.61	0-2	2	21.7

9.4.2

LTE Band 26 (Cell)

Table 9-5
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]	Maximum Conducted Power [dBm]
Mid	831.5	26865	15	QPSK	1	0	23.93	0	0	24.2
	831.5	26865	15	QPSK	1	36	24.19	0	0	24.2
	831.5	26865	15	QPSK	1	74	24.12	0	0	24.2
	831.5	26865	15	QPSK	36	0	23.17	0-1	1	23.2
	831.5	26865	15	QPSK	36	18	23.11	0-1	1	23.2
	831.5	26865	15	QPSK	36	37	23.18	0-1	1	23.2
	831.5	26865	15	QPSK	75	0	23.17	0-1	1	23.2
	831.5	26865	15	16QAM	1	0	23.11	0-1	1	23.2
	831.5	26865	15	16QAM	1	36	22.92	0-1	1	23.2
	831.5	26865	15	16QAM	1	74	23.11	0-1	1	23.2
	831.5	26865	15	16QAM	36	0	22.15	0-2	2	22.2
	831.5	26865	15	16QAM	36	18	22.10	0-2	2	22.2
	831.5	26865	15	16QAM	36	37	22.14	0-2	2	22.2
	831.5	26865	15	16QAM	75	0	22.11	0-2	2	22.2

Note: Per the manufacturer LTE Band 26 (Cell) at 15 MHz bandwidth supports only middle channel.

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Table 9-6
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]	Maximum Conducted Power [dBm]
Low	819	26740	10	QPSK	1	0	24.12	0	0	24.2
	819	26740	10	QPSK	1	25	24.16	0	0	24.2
	819	26740	10	QPSK	1	49	23.91	0	0	24.2
	819	26740	10	QPSK	25	0	23.10	0-1	1	23.2
	819	26740	10	QPSK	25	12	22.93	0-1	1	23.2
	819	26740	10	QPSK	25	25	22.80	0-1	1	23.2
	819	26740	10	QPSK	50	0	22.86	0-1	1	23.2
	819	26740	10	16QAM	1	0	23.07	0-1	1	23.2
	819	26740	10	16QAM	1	25	23.03	0-1	1	23.2
	819	26740	10	16QAM	1	49	22.83	0-1	1	23.2
	819	26740	10	16QAM	25	0	21.91	0-2	2	22.2
	819	26740	10	16QAM	25	12	22.09	0-2	2	22.2
Mid	819	26740	10	16QAM	25	25	21.99	0-2	2	22.2
	819	26740	10	16QAM	50	0	22.06	0-2	2	22.2
	831.5	26865	10	QPSK	1	0	23.89	0	0	24.2
	831.5	26865	10	QPSK	1	25	24.04	0	0	24.2
	831.5	26865	10	QPSK	1	49	23.88	0	0	24.2
	831.5	26865	10	QPSK	25	0	23.08	0-1	1	23.2
	831.5	26865	10	QPSK	25	12	22.91	0-1	1	23.2
	831.5	26865	10	QPSK	25	25	23.15	0-1	1	23.2
	831.5	26865	10	QPSK	50	0	22.94	0-1	1	23.2
	831.5	26865	10	16QAM	1	0	23.10	0-1	1	23.2
	831.5	26865	10	16QAM	1	25	23.17	0-1	1	23.2
	831.5	26865	10	16QAM	1	49	22.96	0-1	1	23.2
High	844	26990	10	16QAM	25	0	22.03	0-2	2	22.2
	831.5	26865	10	16QAM	25	12	22.14	0-2	2	22.2
	831.5	26865	10	16QAM	25	25	21.85	0-2	2	22.2
	831.5	26865	10	16QAM	50	0	21.81	0-2	2	22.2
	844	26990	10	QPSK	1	0	23.98	0	0	24.2
	844	26990	10	QPSK	1	25	24.16	0	0	24.2
	844	26990	10	QPSK	1	49	23.91	0	0	24.2
	844	26990	10	QPSK	25	0	22.96	0-1	1	23.2
	844	26990	10	QPSK	25	12	22.87	0-1	1	23.2
	844	26990	10	QPSK	25	25	22.98	0-1	1	23.2
	844	26990	10	QPSK	50	0	22.82	0-1	1	23.2
	844	26990	10	16QAM	1	0	23.07	0-1	1	23.2
	844	26990	10	16QAM	1	25	22.94	0-1	1	23.2
	844	26990	10	16QAM	1	49	23.02	0-1	1	23.2
	844	26990	10	16QAM	25	0	21.94	0-2	2	22.2
	844	26990	10	16QAM	25	12	21.89	0-2	2	22.2
	844	26990	10	16QAM	25	25	22.14	0-2	2	22.2
	844	26990	10	16QAM	50	0	21.97	0-2	2	22.2

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Table 9-7
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]	Maximum Conducted Power [dBm]
Low	816.5	26715	5	QPSK	1	0	23.98	0	0	24.2
	816.5	26715	5	QPSK	1	12	24.01	0	0	24.2
	816.5	26715	5	QPSK	1	24	23.93	0	0	24.2
	816.5	26715	5	QPSK	12	0	23.16	0-1	1	23.2
	816.5	26715	5	QPSK	12	6	23.09	0-1	1	23.2
	816.5	26715	5	QPSK	12	13	23.08	0-1	1	23.2
	816.5	26715	5	QPSK	25	0	23.09	0-1	1	23.2
	816.5	26715	5	16-QAM	1	0	22.99	0-1	1	23.2
	816.5	26715	5	16-QAM	1	12	23.08	0-1	1	23.2
	816.5	26715	5	16-QAM	1	24	23.04	0-1	1	23.2
	816.5	26715	5	16-QAM	12	0	21.86	0-2	2	22.2
	816.5	26715	5	16-QAM	12	6	21.92	0-2	2	22.2
	816.5	26715	5	16-QAM	12	13	21.87	0-2	2	22.2
	816.5	26715	5	16-QAM	25	0	21.89	0-2	2	22.2
Mid	831.5	26865	5	QPSK	1	0	24.03	0	0	24.2
	831.5	26865	5	QPSK	1	12	24.12	0	0	24.2
	831.5	26865	5	QPSK	1	24	24.03	0	0	24.2
	831.5	26865	5	QPSK	12	0	22.99	0-1	1	23.2
	831.5	26865	5	QPSK	12	6	22.96	0-1	1	23.2
	831.5	26865	5	QPSK	12	13	22.82	0-1	1	23.2
	831.5	26865	5	QPSK	25	0	23.03	0-1	1	23.2
	831.5	26865	5	16-QAM	1	0	22.85	0-1	1	23.2
	831.5	26865	5	16-QAM	1	12	23.11	0-1	1	23.2
	831.5	26865	5	16-QAM	1	24	23.18	0-1	1	23.2
	831.5	26865	5	16-QAM	12	0	22.10	0-2	2	22.2
	831.5	26865	5	16-QAM	12	6	21.91	0-2	2	22.2
	831.5	26865	5	16-QAM	12	13	22.04	0-2	2	22.2
	831.5	26865	5	16-QAM	25	0	21.88	0-2	2	22.2
High	846.5	27015	5	QPSK	1	0	23.84	0	0	24.2
	846.5	27015	5	QPSK	1	12	23.85	0	0	24.2
	846.5	27015	5	QPSK	1	24	24.03	0	0	24.2
	846.5	27015	5	QPSK	12	0	22.83	0-1	1	23.2
	846.5	27015	5	QPSK	12	6	23.16	0-1	1	23.2
	846.5	27015	5	QPSK	12	13	22.96	0-1	1	23.2
	846.5	27015	5	QPSK	25	0	23.05	0-1	1	23.2
	846.5	27015	5	16-QAM	1	0	23.05	0-1	1	23.2
	846.5	27015	5	16-QAM	1	12	22.95	0-1	1	23.2
	846.5	27015	5	16-QAM	1	24	22.86	0-1	1	23.2
	846.5	27015	5	16-QAM	12	0	22.03	0-2	2	22.2
	846.5	27015	5	16-QAM	12	6	22.04	0-2	2	22.2
	846.5	27015	5	16-QAM	12	13	21.85	0-2	2	22.2
	846.5	27015	5	16-QAM	25	0	21.81	0-2	2	22.2

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Table 9-8
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]	Maximum Conducted Power [dBm]
Low	815.5	26705	3	QPSK	1	0	24.03	0	0	24.2
	815.5	26705	3	QPSK	1	7	23.92	0	0	24.2
	815.5	26705	3	QPSK	1	14	24.16	0	0	24.2
	815.5	26705	3	QPSK	8	0	22.95	0-1	1	23.2
	815.5	26705	3	QPSK	8	4	22.97	0-1	1	23.2
	815.5	26705	3	QPSK	8	7	23.09	0-1	1	23.2
	815.5	26705	3	QPSK	15	0	22.85	0-1	1	23.2
	815.5	26705	3	16-QAM	1	0	22.87	0-1	1	23.2
	815.5	26705	3	16-QAM	1	7	22.99	0-1	1	23.2
	815.5	26705	3	16-QAM	1	14	22.89	0-1	1	23.2
	815.5	26705	3	16-QAM	8	0	21.82	0-2	2	22.2
	815.5	26705	3	16-QAM	8	4	22.08	0-2	2	22.2
Mid	815.5	26705	3	16-QAM	8	7	21.97	0-2	2	22.2
	815.5	26705	3	16-QAM	15	0	22.01	0-2	2	22.2
	831.5	26865	3	QPSK	1	0	24.00	0	0	24.2
	831.5	26865	3	QPSK	1	7	24.08	0	0	24.2
	831.5	26865	3	QPSK	1	14	24.12	0	0	24.2
	831.5	26865	3	QPSK	8	0	22.91	0-1	1	23.2
	831.5	26865	3	QPSK	8	4	22.82	0-1	1	23.2
	831.5	26865	3	QPSK	8	7	22.85	0-1	1	23.2
	831.5	26865	3	QPSK	15	0	22.93	0-1	1	23.2
	831.5	26865	3	16-QAM	1	0	22.87	0-1	1	23.2
	831.5	26865	3	16-QAM	1	7	22.85	0-1	1	23.2
	831.5	26865	3	16-QAM	1	14	22.88	0-1	1	23.2
High	831.5	26865	3	16-QAM	8	0	21.95	0-2	2	22.2
	831.5	26865	3	16-QAM	8	4	21.93	0-2	2	22.2
	831.5	26865	3	16-QAM	8	7	22.07	0-2	2	22.2
	831.5	26865	3	16-QAM	15	0	22.05	0-2	2	22.2
	847.5	27025	3	QPSK	1	0	23.87	0	0	24.2
	847.5	27025	3	QPSK	1	7	23.92	0	0	24.2
	847.5	27025	3	QPSK	1	14	24.01	0	0	24.2
	847.5	27025	3	QPSK	8	0	22.90	0-1	1	23.2
	847.5	27025	3	QPSK	8	4	23.14	0-1	1	23.2
	847.5	27025	3	QPSK	8	7	22.85	0-1	1	23.2
	847.5	27025	3	QPSK	15	0	22.82	0-1	1	23.2
	847.5	27025	3	16-QAM	1	0	22.89	0-1	1	23.2
	847.5	27025	3	16-QAM	1	7	23.05	0-1	1	23.2
	847.5	27025	3	16-QAM	1	14	23.14	0-1	1	23.2
	847.5	27025	3	16-QAM	8	0	21.81	0-2	2	22.2
	847.5	27025	3	16-QAM	8	4	22.05	0-2	2	22.2
	847.5	27025	3	16-QAM	8	7	22.17	0-2	2	22.2
	847.5	27025	3	16-QAM	15	0	21.85	0-2	2	22.2

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Table 9-9
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]	Target MPR [dB]	Maximum Conducted Power [dBm]
Low	814.7	26697	1.4	QPSK	1	0	23.82	0	0	24.2
	814.7	26697	1.4	QPSK	1	2	23.86	0	0	24.2
	814.7	26697	1.4	QPSK	1	5	23.83	0	0	24.2
	814.7	26697	1.4	QPSK	3	0	24.01	0	0	24.2
	814.7	26697	1.4	QPSK	3	2	23.85	0	0	24.2
	814.7	26697	1.4	QPSK	3	3	24.02	0	0	24.2
	814.7	26697	1.4	QPSK	6	0	22.94	0-1	1	23.2
	814.7	26697	1.4	16-QAM	1	0	22.98	0-1	1	23.2
	814.7	26697	1.4	16-QAM	1	2	23.03	0-1	1	23.2
	814.7	26697	1.4	16-QAM	1	5	23.08	0-1	1	23.2
	814.7	26697	1.4	16-QAM	3	0	23.05	0-1	1	23.2
	814.7	26697	1.4	16-QAM	3	2	23.05	0-1	1	23.2
Mid	814.7	26697	1.4	16-QAM	3	3	23.02	0-1	1	23.2
	814.7	26697	1.4	16-QAM	6	0	22.09	0-2	2	22.2
	831.5	26865	1.4	QPSK	1	0	24.14	0	0	24.2
	831.5	26865	1.4	QPSK	1	2	24.14	0	0	24.2
	831.5	26865	1.4	QPSK	1	5	23.97	0	0	24.2
	831.5	26865	1.4	QPSK	3	0	23.81	0	0	24.2
	831.5	26865	1.4	QPSK	3	2	23.95	0	0	24.2
	831.5	26865	1.4	QPSK	3	3	23.84	0	0	24.2
	831.5	26865	1.4	QPSK	6	0	22.83	0-1	1	23.2
	831.5	26865	1.4	16-QAM	1	0	23.09	0-1	1	23.2
	831.5	26865	1.4	16-QAM	1	2	22.93	0-1	1	23.2
	831.5	26865	1.4	16-QAM	1	5	22.85	0-1	1	23.2
High	848.3	27033	1.4	16-QAM	3	0	22.82	0-1	1	23.2
	848.3	27033	1.4	16-QAM	3	2	23.00	0-1	1	23.2
	848.3	27033	1.4	16-QAM	3	3	22.80	0-1	1	23.2
	848.3	27033	1.4	16-QAM	6	0	21.90	0-2	2	22.2
	848.3	27033	1.4	QPSK	1	0	23.97	0	0	24.2
	848.3	27033	1.4	QPSK	1	2	24.00	0	0	24.2
	848.3	27033	1.4	QPSK	1	5	23.86	0	0	24.2
	848.3	27033	1.4	QPSK	3	0	23.83	0	0	24.2
	848.3	27033	1.4	QPSK	3	2	24.17	0	0	24.2
	848.3	27033	1.4	QPSK	3	3	23.93	0	0	24.2
	848.3	27033	1.4	QPSK	6	0	22.98	0-1	1	23.2
	848.3	27033	1.4	16-QAM	1	0	23.01	0-1	1	23.2
	848.3	27033	1.4	16-QAM	1	2	22.92	0-1	1	23.2

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LTE Band 4 (AWS)

Table 9-10
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]	Maximum Conducted Power [dBm]
Mid	1732.5	20175	20	QPSK	1	0	24.00	0	0	24.2
	1732.5	20175	20	QPSK	1	50	24.05	0	0	24.2
	1732.5	20175	20	QPSK	1	99	24.18	0	0	24.2
	1732.5	20175	20	QPSK	50	0	22.96	0-1	1	23.2
	1732.5	20175	20	QPSK	50	25	22.95	0-1	1	23.2
	1732.5	20175	20	QPSK	50	50	22.89	0-1	1	23.2
	1732.5	20175	20	QPSK	100	0	22.81	0-1	1	23.2
	1732.5	20175	20	16QAM	1	0	22.91	0-1	1	23.2
	1732.5	20175	20	16QAM	1	50	23.10	0-1	1	23.2
	1732.5	20175	20	16QAM	1	99	23.12	0-1	1	23.2
	1732.5	20175	20	16QAM	50	0	21.85	0-2	2	22.2
	1732.5	20175	20	16QAM	50	25	21.81	0-2	2	22.2
	1732.5	20175	20	16QAM	50	50	21.93	0-2	2	22.2
	1732.5	20175	20	16QAM	100	0	21.98	0-2	2	22.2

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 9-11
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]	Maximum Conducted Power [dBm]
Low	1717.5	20025	15	QPSK	1	0	23.80	0	0	24.2
	1717.5	20025	15	QPSK	1	36	23.83	0	0	24.2
	1717.5	20025	15	QPSK	1	74	23.81	0	0	24.2
	1717.5	20025	15	QPSK	36	0	22.89	0-1	1	23.2
	1717.5	20025	15	QPSK	36	18	22.91	0-1	1	23.2
	1717.5	20025	15	QPSK	36	37	22.89	0-1	1	23.2
	1717.5	20025	15	QPSK	75	0	22.83	0-1	1	23.2
	1717.5	20025	15	16QAM	1	0	22.93	0-1	1	23.2
	1717.5	20025	15	16QAM	1	36	23.00	0-1	1	23.2
	1717.5	20025	15	16QAM	1	74	22.81	0-1	1	23.2
	1717.5	20025	15	16QAM	36	0	21.85	0-2	2	22.2
	1717.5	20025	15	16QAM	36	18	21.87	0-2	2	22.2
Mid	1717.5	20025	15	16QAM	36	37	21.81	0-2	2	22.2
	1717.5	20025	15	16QAM	75	0	21.80	0-2	2	22.2
	1732.5	20175	15	QPSK	1	0	23.84	0	0	24.2
	1732.5	20175	15	QPSK	1	36	24.17	0	0	24.2
	1732.5	20175	15	QPSK	1	74	24.13	0	0	24.2
	1732.5	20175	15	QPSK	36	0	22.88	0-1	1	23.2
	1732.5	20175	15	QPSK	36	18	22.95	0-1	1	23.2
	1732.5	20175	15	QPSK	36	37	22.88	0-1	1	23.2
	1732.5	20175	15	QPSK	75	0	22.80	0-1	1	23.2
	1732.5	20175	15	16QAM	1	0	22.81	0-1	1	23.2
	1732.5	20175	15	16QAM	1	36	22.84	0-1	1	23.2
	1732.5	20175	15	16QAM	1	74	22.88	0-1	1	23.2
High	1732.5	20175	15	16QAM	36	0	21.97	0-2	2	22.2
	1732.5	20175	15	16QAM	36	18	21.96	0-2	2	22.2
	1732.5	20175	15	16QAM	36	37	21.88	0-2	2	22.2
	1732.5	20175	15	16QAM	75	0	21.80	0-2	2	22.2
	1747.5	20325	15	QPSK	1	0	24.00	0	0	24.2
	1747.5	20325	15	QPSK	1	36	24.00	0	0	24.2
	1747.5	20325	15	QPSK	1	74	23.85	0	0	24.2
	1747.5	20325	15	QPSK	36	0	23.04	0-1	1	23.2
	1747.5	20325	15	QPSK	36	18	23.07	0-1	1	23.2
	1747.5	20325	15	QPSK	36	37	22.81	0-1	1	23.2
	1747.5	20325	15	QPSK	75	0	22.90	0-1	1	23.2
	1747.5	20325	15	16QAM	1	0	22.94	0-1	1	23.2
	1747.5	20325	15	16QAM	1	36	22.95	0-1	1	23.2
	1747.5	20325	15	16QAM	1	74	22.85	0-1	1	23.2
	1747.5	20325	15	16QAM	36	0	22.00	0-2	2	22.2
	1747.5	20325	15	16QAM	36	18	22.06	0-2	2	22.2
	1747.5	20325	15	16QAM	36	37	21.89	0-2	2	22.2
	1747.5	20325	15	16QAM	75	0	21.80	0-2	2	22.2

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Table 9-12
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]	Maximum Conducted Power [dBm]
Low	1715	20000	10	QPSK	1	0	23.87	0	0	24.2
	1715	20000	10	QPSK	1	25	24.02	0	0	24.2
	1715	20000	10	QPSK	1	49	24.01	0	0	24.2
	1715	20000	10	QPSK	25	0	22.96	0-1	1	23.2
	1715	20000	10	QPSK	25	12	22.96	0-1	1	23.2
	1715	20000	10	QPSK	25	25	22.85	0-1	1	23.2
	1715	20000	10	QPSK	50	0	22.82	0-1	1	23.2
	1715	20000	10	16QAM	1	0	23.05	0-1	1	23.2
	1715	20000	10	16QAM	1	25	22.98	0-1	1	23.2
	1715	20000	10	16QAM	1	49	22.85	0-1	1	23.2
	1715	20000	10	16QAM	25	0	21.83	0-2	2	22.2
	1715	20000	10	16QAM	25	12	22.01	0-2	2	22.2
Mid	1715	20000	10	16QAM	25	25	21.84	0-2	2	22.2
	1715	20000	10	16QAM	50	0	21.95	0-2	2	22.2
	1732.5	20175	10	QPSK	1	0	23.94	0	0	24.2
	1732.5	20175	10	QPSK	1	25	24.17	0	0	24.2
	1732.5	20175	10	QPSK	1	49	23.81	0	0	24.2
	1732.5	20175	10	QPSK	25	0	22.81	0-1	1	23.2
	1732.5	20175	10	QPSK	25	12	22.86	0-1	1	23.2
	1732.5	20175	10	QPSK	25	25	22.88	0-1	1	23.2
	1732.5	20175	10	QPSK	50	0	22.80	0-1	1	23.2
	1732.5	20175	10	16QAM	1	0	22.85	0-1	1	23.2
	1732.5	20175	10	16QAM	1	25	23.00	0-1	1	23.2
	1732.5	20175	10	16QAM	1	49	22.97	0-1	1	23.2
High	1732.5	20175	10	16QAM	25	0	22.01	0-2	2	22.2
	1732.5	20175	10	16QAM	25	12	21.87	0-2	2	22.2
	1732.5	20175	10	16QAM	25	25	21.87	0-2	2	22.2
	1732.5	20175	10	16QAM	50	0	21.95	0-2	2	22.2
	1750	20350	10	QPSK	1	0	24.11	0	0	24.2
	1750	20350	10	QPSK	1	25	24.03	0	0	24.2
	1750	20350	10	QPSK	1	49	23.83	0	0	24.2
	1750	20350	10	QPSK	25	0	23.10	0-1	1	23.2
	1750	20350	10	QPSK	25	12	22.94	0-1	1	23.2
	1750	20350	10	QPSK	25	25	22.99	0-1	1	23.2
	1750	20350	10	QPSK	50	0	22.80	0-1	1	23.2
	1750	20350	10	16QAM	1	0	22.88	0-1	1	23.2
	1750	20350	10	16QAM	1	25	22.80	0-1	1	23.2
	1750	20350	10	16QAM	1	49	22.90	0-1	1	23.2
	1750	20350	10	16QAM	25	0	22.04	0-2	2	22.2
	1750	20350	10	16QAM	25	12	21.86	0-2	2	22.2
	1750	20350	10	16QAM	25	25	21.97	0-2	2	22.2
	1750	20350	10	16QAM	50	0	21.98	0-2	2	22.2

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Table 9-13
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]	Maximum Conducted Power [dBm]
Low	1712.5	19975	5	QPSK	1	0	23.87	0	0	24.2
	1712.5	19975	5	QPSK	1	12	23.94	0	0	24.2
	1712.5	19975	5	QPSK	1	24	24.15	0	0	24.2
	1712.5	19975	5	QPSK	12	0	22.92	0-1	1	23.2
	1712.5	19975	5	QPSK	12	6	23.03	0-1	1	23.2
	1712.5	19975	5	QPSK	12	13	23.04	0-1	1	23.2
	1712.5	19975	5	QPSK	25	0	22.97	0-1	1	23.2
	1712.5	19975	5	16-QAM	1	0	22.84	0-1	1	23.2
	1712.5	19975	5	16-QAM	1	12	23.06	0-1	1	23.2
	1712.5	19975	5	16-QAM	1	24	23.08	0-1	1	23.2
	1712.5	19975	5	16-QAM	12	0	21.99	0-2	2	22.2
	1712.5	19975	5	16-QAM	12	6	21.89	0-2	2	22.2
Mid	1712.5	19975	5	16-QAM	12	13	22.07	0-2	2	22.2
	1712.5	19975	5	16-QAM	25	0	21.85	0-2	2	22.2
	1732.5	20175	5	QPSK	1	0	24.01	0	0	24.2
	1732.5	20175	5	QPSK	1	12	24.06	0	0	24.2
	1732.5	20175	5	QPSK	1	24	23.83	0	0	24.2
	1732.5	20175	5	QPSK	12	0	23.11	0-1	1	23.2
	1732.5	20175	5	QPSK	12	6	22.92	0-1	1	23.2
	1732.5	20175	5	QPSK	12	13	23.15	0-1	1	23.2
	1732.5	20175	5	QPSK	25	0	23.07	0-1	1	23.2
	1732.5	20175	5	16-QAM	1	0	22.88	0-1	1	23.2
	1732.5	20175	5	16-QAM	1	12	22.91	0-1	1	23.2
	1732.5	20175	5	16-QAM	1	24	22.88	0-1	1	23.2
	1732.5	20175	5	16-QAM	12	0	22.11	0-2	2	22.2
	1732.5	20175	5	16-QAM	12	6	21.86	0-2	2	22.2
	1732.5	20175	5	16-QAM	12	13	21.99	0-2	2	22.2
High	1732.5	20175	5	16-QAM	25	0	21.98	0-2	2	22.2
	1752.5	20375	5	QPSK	1	0	24.07	0	0	24.2
	1752.5	20375	5	QPSK	1	12	24.12	0	0	24.2
	1752.5	20375	5	QPSK	1	24	23.91	0	0	24.2
	1752.5	20375	5	QPSK	12	0	23.00	0-1	1	23.2
	1752.5	20375	5	QPSK	12	6	23.01	0-1	1	23.2
	1752.5	20375	5	QPSK	12	13	22.89	0-1	1	23.2
	1752.5	20375	5	QPSK	25	0	22.94	0-1	1	23.2
	1752.5	20375	5	16-QAM	1	0	22.92	0-1	1	23.2
	1752.5	20375	5	16-QAM	1	12	22.90	0-1	1	23.2
	1752.5	20375	5	16-QAM	1	24	22.94	0-1	1	23.2
	1752.5	20375	5	16-QAM	12	0	21.95	0-2	2	22.2
	1752.5	20375	5	16-QAM	12	6	22.00	0-2	2	22.2
	1752.5	20375	5	16-QAM	12	13	21.87	0-2	2	22.2
	1752.5	20375	5	16-QAM	25	0	21.83	0-2	2	22.2

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Table 9-14
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]	Maximum Conducted Power [dBm]
Low	1711.5	19965	3	QPSK	1	0	24.00	0	0	24.2
	1711.5	19965	3	QPSK	1	7	23.91	0	0	24.2
	1711.5	19965	3	QPSK	1	14	24.11	0	0	24.2
	1711.5	19965	3	QPSK	8	0	22.85	0-1	1	23.2
	1711.5	19965	3	QPSK	8	4	22.95	0-1	1	23.2
	1711.5	19965	3	QPSK	8	7	22.90	0-1	1	23.2
	1711.5	19965	3	QPSK	15	0	23.03	0-1	1	23.2
	1711.5	19965	3	16-QAM	1	0	23.07	0-1	1	23.2
	1711.5	19965	3	16-QAM	1	7	22.99	0-1	1	23.2
	1711.5	19965	3	16-QAM	1	14	23.06	0-1	1	23.2
	1711.5	19965	3	16-QAM	8	0	21.93	0-2	2	22.2
	1711.5	19965	3	16-QAM	8	4	21.92	0-2	2	22.2
Mid	1711.5	19965	3	16-QAM	8	7	21.93	0-2	2	22.2
	1711.5	19965	3	16-QAM	15	0	22.07	0-2	2	22.2
	1732.5	20175	3	QPSK	1	0	23.99	0	0	24.2
	1732.5	20175	3	QPSK	1	7	24.07	0	0	24.2
	1732.5	20175	3	QPSK	1	14	24.07	0	0	24.2
	1732.5	20175	3	QPSK	8	0	22.81	0-1	1	23.2
	1732.5	20175	3	QPSK	8	4	22.87	0-1	1	23.2
	1732.5	20175	3	QPSK	8	7	22.85	0-1	1	23.2
	1732.5	20175	3	QPSK	15	0	22.83	0-1	1	23.2
	1732.5	20175	3	16-QAM	1	0	22.85	0-1	1	23.2
	1732.5	20175	3	16-QAM	1	7	22.90	0-1	1	23.2
	1732.5	20175	3	16-QAM	1	14	23.00	0-1	1	23.2
High	1732.5	20175	3	16-QAM	8	0	21.84	0-2	2	22.2
	1732.5	20175	3	16-QAM	8	4	21.84	0-2	2	22.2
	1732.5	20175	3	16-QAM	8	7	22.00	0-2	2	22.2
	1732.5	20175	3	16-QAM	15	0	21.87	0-2	2	22.2
	1753.5	20385	3	QPSK	1	0	24.02	0	0	24.2
	1753.5	20385	3	QPSK	1	7	23.88	0	0	24.2
	1753.5	20385	3	QPSK	1	14	23.83	0	0	24.2
	1753.5	20385	3	QPSK	8	0	22.89	0-1	1	23.2
	1753.5	20385	3	QPSK	8	4	23.01	0-1	1	23.2
	1753.5	20385	3	QPSK	8	7	22.91	0-1	1	23.2
	1753.5	20385	3	QPSK	15	0	22.90	0-1	1	23.2
	1753.5	20385	3	16-QAM	1	0	22.80	0-1	1	23.2
	1753.5	20385	3	16-QAM	1	7	23.11	0-1	1	23.2
	1753.5	20385	3	16-QAM	1	14	23.07	0-1	1	23.2
	1753.5	20385	3	16-QAM	8	0	21.82	0-2	2	22.2
	1753.5	20385	3	16-QAM	8	4	21.87	0-2	2	22.2
	1753.5	20385	3	16-QAM	8	7	21.90	0-2	2	22.2
	1753.5	20385	3	16-QAM	15	0	21.89	0-2	2	22.2

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Table 9-15
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]	Maximum Conducted Power [dBm]
Low	1710.7	19957	1.4	QPSK	1	0	23.98	0	0	24.2
	1710.7	19957	1.4	QPSK	1	2	23.88	0	0	24.2
	1710.7	19957	1.4	QPSK	1	5	23.81	0	0	24.2
	1710.7	19957	1.4	QPSK	3	0	23.86	0	0	24.2
	1710.7	19957	1.4	QPSK	3	2	23.83	0	0	24.2
	1710.7	19957	1.4	QPSK	3	3	23.90	0	0	24.2
	1710.7	19957	1.4	QPSK	6	0	22.89	0-1	1	23.2
	1710.7	19957	1.4	16-QAM	1	0	22.96	0-1	1	23.2
	1710.7	19957	1.4	16-QAM	1	2	22.94	0-1	1	23.2
	1710.7	19957	1.4	16-QAM	1	5	22.86	0-1	1	23.2
	1710.7	19957	1.4	16-QAM	3	0	22.88	0-1	1	23.2
	1710.7	19957	1.4	16-QAM	3	2	23.00	0-1	1	23.2
Mid	1710.7	19957	1.4	16-QAM	3	3	22.90	0-1	1	23.2
	1710.7	19957	1.4	16-QAM	6	0	21.95	0-2	2	22.2
	1732.5	20175	1.4	QPSK	1	0	23.81	0	0	24.2
	1732.5	20175	1.4	QPSK	1	2	23.88	0	0	24.2
	1732.5	20175	1.4	QPSK	1	5	24.06	0	0	24.2
	1732.5	20175	1.4	QPSK	3	0	23.96	0	0	24.2
	1732.5	20175	1.4	QPSK	3	2	24.09	0	0	24.2
	1732.5	20175	1.4	QPSK	3	3	23.86	0	0	24.2
	1732.5	20175	1.4	QPSK	6	0	22.81	0-1	1	23.2
	1732.5	20175	1.4	16-QAM	1	0	22.89	0-1	1	23.2
	1732.5	20175	1.4	16-QAM	1	2	22.86	0-1	1	23.2
	1732.5	20175	1.4	16-QAM	1	5	23.10	0-1	1	23.2
High	1732.5	20175	1.4	16-QAM	3	0	22.86	0-1	1	23.2
	1732.5	20175	1.4	16-QAM	3	2	22.86	0-1	1	23.2
	1732.5	20175	1.4	16-QAM	3	3	22.99	0-1	1	23.2
	1732.5	20175	1.4	16-QAM	6	0	21.83	0-2	2	22.2
	1754.3	20393	1.4	QPSK	1	0	23.84	0	0	24.2
	1754.3	20393	1.4	QPSK	1	2	23.87	0	0	24.2
	1754.3	20393	1.4	QPSK	1	5	24.16	0	0	24.2
	1754.3	20393	1.4	QPSK	3	0	24.04	0	0	24.2
	1754.3	20393	1.4	QPSK	3	2	24.02	0	0	24.2
	1754.3	20393	1.4	QPSK	3	3	23.81	0	0	24.2
	1754.3	20393	1.4	QPSK	6	0	23.07	0-1	1	23.2
	1754.3	20393	1.4	16-QAM	1	0	22.82	0-1	1	23.2
	1754.3	20393	1.4	16-QAM	1	2	22.81	0-1	1	23.2
	1754.3	20393	1.4	16-QAM	1	5	22.88	0-1	1	23.2
	1754.3	20393	1.4	16-QAM	3	0	22.88	0-1	1	23.2
	1754.3	20393	1.4	16-QAM	3	2	22.97	0-1	1	23.2
	1754.3	20393	1.4	16-QAM	3	3	23.16	0-1	1	23.2
	1754.3	20393	1.4	16-QAM	6	0	21.92	0-2	2	22.2

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LTE Band 25 (PCS)

Table 9-16
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]	Maximum Conducted Power [dBm]
Low	1860	26140	20	QPSK	1	0	23.89	0	0	24.2
	1860	26140	20	QPSK	1	50	23.96	0	0	24.2
	1860	26140	20	QPSK	1	99	23.98	0	0	24.2
	1860	26140	20	QPSK	50	0	22.82	0-1	1	23.2
	1860	26140	20	QPSK	50	25	22.97	0-1	1	23.2
	1860	26140	20	QPSK	50	50	22.94	0-1	1	23.2
	1860	26140	20	QPSK	100	0	22.91	0-1	1	23.2
	1860	26140	20	16QAM	1	0	22.96	0-1	1	23.2
	1860	26140	20	16QAM	1	50	22.89	0-1	1	23.2
	1860	26140	20	16QAM	1	99	22.84	0-1	1	23.2
	1860	26140	20	16QAM	50	0	21.89	0-2	2	22.2
	1860	26140	20	16QAM	50	25	21.90	0-2	2	22.2
Mid	1860	26140	20	16QAM	50	50	21.95	0-2	2	22.2
	1860	26140	20	16QAM	100	0	21.94	0-2	2	22.2
	1882.5	26365	20	QPSK	1	0	23.99	0	0	24.2
	1882.5	26365	20	QPSK	1	50	23.94	0	0	24.2
	1882.5	26365	20	QPSK	1	99	23.96	0	0	24.2
	1882.5	26365	20	QPSK	50	0	22.94	0-1	1	23.2
	1882.5	26365	20	QPSK	50	25	22.99	0-1	1	23.2
	1882.5	26365	20	QPSK	50	50	22.98	0-1	1	23.2
	1882.5	26365	20	QPSK	100	0	22.95	0-1	1	23.2
	1882.5	26365	20	16QAM	1	0	22.92	0-1	1	23.2
	1882.5	26365	20	16QAM	1	50	22.95	0-1	1	23.2
	1882.5	26365	20	16QAM	1	99	22.96	0-1	1	23.2
High	1882.5	26365	20	16QAM	50	0	21.97	0-2	2	22.2
	1882.5	26365	20	16QAM	50	25	21.98	0-2	2	22.2
	1882.5	26365	20	16QAM	50	50	21.96	0-2	2	22.2
	1882.5	26365	20	16QAM	100	0	21.95	0-2	2	22.2
	1905	26590	20	QPSK	1	0	23.96	0	0	24.2
	1905	26590	20	QPSK	1	50	23.94	0	0	24.2
	1905	26590	20	QPSK	1	99	23.96	0	0	24.2
	1905	26590	20	QPSK	50	0	22.93	0-1	1	23.2
	1905	26590	20	QPSK	50	25	22.95	0-1	1	23.2
	1905	26590	20	QPSK	50	50	22.91	0-1	1	23.2
	1905	26590	20	QPSK	100	0	22.93	0-1	1	23.2
	1905	26590	20	16QAM	1	0	22.95	0-1	1	23.2
	1905	26590	20	16QAM	1	50	22.89	0-1	1	23.2
	1905	26590	20	16QAM	1	99	22.94	0-1	1	23.2
	1905	26590	20	16QAM	50	0	21.95	0-2	2	22.2
	1905	26590	20	16QAM	50	25	21.91	0-2	2	22.2
	1905	26590	20	16QAM	50	50	21.84	0-2	2	22.2
	1905	26590	20	16QAM	100	0	21.86	0-2	2	22.2

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Table 9-17
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]	Maximum Conducted Power [dBm]
Low	1857.5	26115	15	QPSK	1	0	23.89	0	0	24.2
	1857.5	26115	15	QPSK	1	36	23.92	0	0	24.2
	1857.5	26115	15	QPSK	1	74	23.94	0	0	24.2
	1857.5	26115	15	QPSK	36	0	22.83	0-1	1	23.2
	1857.5	26115	15	QPSK	36	18	22.67	0-1	1	23.2
	1857.5	26115	15	QPSK	36	37	22.84	0-1	1	23.2
	1857.5	26115	15	QPSK	75	0	22.71	0-1	1	23.2
	1857.5	26115	15	16QAM	1	0	22.95	0-1	1	23.2
	1857.5	26115	15	16QAM	1	36	22.97	0-1	1	23.2
	1857.5	26115	15	16QAM	1	74	22.82	0-1	1	23.2
	1857.5	26115	15	16QAM	36	0	21.68	0-2	2	22.2
	1857.5	26115	15	16QAM	36	18	22.00	0-2	2	22.2
Mid	1857.5	26115	15	16QAM	36	37	21.67	0-2	2	22.2
	1857.5	26115	15	16QAM	75	0	21.87	0-2	2	22.2
	1882.5	26365	15	QPSK	1	0	23.80	0	0	24.2
	1882.5	26365	15	QPSK	1	36	23.67	0	0	24.2
	1882.5	26365	15	QPSK	1	74	23.94	0	0	24.2
	1882.5	26365	15	QPSK	36	0	22.67	0-1	1	23.2
	1882.5	26365	15	QPSK	36	18	22.69	0-1	1	23.2
	1882.5	26365	15	QPSK	36	37	22.79	0-1	1	23.2
	1882.5	26365	15	QPSK	75	0	22.69	0-1	1	23.2
	1882.5	26365	15	16QAM	1	0	22.96	0-1	1	23.2
	1882.5	26365	15	16QAM	1	36	22.75	0-1	1	23.2
	1882.5	26365	15	16QAM	1	74	22.98	0-1	1	23.2
High	1882.5	26365	15	16QAM	36	0	21.74	0-2	2	22.2
	1882.5	26365	15	16QAM	36	18	21.91	0-2	2	22.2
	1882.5	26365	15	16QAM	36	37	21.84	0-2	2	22.2
	1882.5	26365	15	16QAM	75	0	22.00	0-2	2	22.2
	1907.5	26615	15	QPSK	1	0	23.71	0	0	24.2
	1907.5	26615	15	QPSK	1	36	23.80	0	0	24.2
	1907.5	26615	15	QPSK	1	74	23.70	0	0	24.2
	1907.5	26615	15	QPSK	36	0	22.67	0-1	1	23.2
	1907.5	26615	15	QPSK	36	18	22.90	0-1	1	23.2
	1907.5	26615	15	QPSK	36	37	22.93	0-1	1	23.2
	1907.5	26615	15	QPSK	75	0	22.89	0-1	1	23.2
	1907.5	26615	15	16QAM	1	0	22.71	0-1	1	23.2
	1907.5	26615	15	16QAM	1	36	22.99	0-1	1	23.2
	1907.5	26615	15	16QAM	1	74	22.80	0-1	1	23.2
	1907.5	26615	15	16QAM	36	0	21.89	0-2	2	22.2
	1907.5	26615	15	16QAM	36	18	21.84	0-2	2	22.2
	1907.5	26615	15	16QAM	36	37	21.85	0-2	2	22.2
	1907.5	26615	15	16QAM	75	0	21.72	0-2	2	22.2

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Table 9-18
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]	Maximum Conducted Power [dBm]
Low	1855	26090	10	QPSK	1	0	23.72	0	0	24.2
	1855	26090	10	QPSK	1	25	23.81	0	0	24.2
	1855	26090	10	QPSK	1	49	23.87	0	0	24.2
	1855	26090	10	QPSK	25	0	22.83	0-1	1	23.2
	1855	26090	10	QPSK	25	12	22.87	0-1	1	23.2
	1855	26090	10	QPSK	25	25	22.78	0-1	1	23.2
	1855	26090	10	QPSK	50	0	22.90	0-1	1	23.2
	1855	26090	10	16QAM	1	0	22.97	0-1	1	23.2
	1855	26090	10	16QAM	1	25	22.88	0-1	1	23.2
	1855	26090	10	16QAM	1	49	22.93	0-1	1	23.2
	1855	26090	10	16QAM	25	0	21.93	0-2	2	22.2
	1855	26090	10	16QAM	25	12	21.90	0-2	2	22.2
Mid	1855	26090	10	16QAM	25	25	21.79	0-2	2	22.2
	1855	26090	10	16QAM	50	0	21.88	0-2	2	22.2
	1882.5	26365	10	QPSK	1	0	23.87	0	0	24.2
	1882.5	26365	10	QPSK	1	25	23.86	0	0	24.2
	1882.5	26365	10	QPSK	1	49	23.85	0	0	24.2
	1882.5	26365	10	QPSK	25	0	22.72	0-1	1	23.2
	1882.5	26365	10	QPSK	25	12	22.85	0-1	1	23.2
	1882.5	26365	10	QPSK	25	25	22.89	0-1	1	23.2
	1882.5	26365	10	QPSK	50	0	22.67	0-1	1	23.2
	1882.5	26365	10	16QAM	1	0	22.87	0-1	1	23.2
	1882.5	26365	10	16QAM	1	25	22.97	0-1	1	23.2
	1882.5	26365	10	16QAM	1	49	22.70	0-1	1	23.2
High	1882.5	26365	10	16QAM	25	0	21.72	0-2	2	22.2
	1882.5	26365	10	16QAM	25	12	21.77	0-2	2	22.2
	1882.5	26365	10	16QAM	25	25	21.80	0-2	2	22.2
	1882.5	26365	10	16QAM	50	0	21.92	0-2	2	22.2
	1910	26640	10	QPSK	1	0	23.84	0	0	24.2
	1910	26640	10	QPSK	1	25	23.76	0	0	24.2
	1910	26640	10	QPSK	1	49	23.68	0	0	24.2
	1910	26640	10	QPSK	25	0	22.87	0-1	1	23.2
	1910	26640	10	QPSK	25	12	22.90	0-1	1	23.2
	1910	26640	10	QPSK	25	25	22.85	0-1	1	23.2
	1910	26640	10	QPSK	50	0	22.96	0-1	1	23.2
	1910	26640	10	16QAM	1	0	22.77	0-1	1	23.2
	1910	26640	10	16QAM	1	25	22.72	0-1	1	23.2
	1910	26640	10	16QAM	1	49	22.90	0-1	1	23.2
	1910	26640	10	16QAM	25	0	21.91	0-2	2	22.2
	1910	26640	10	16QAM	25	12	21.97	0-2	2	22.2
	1910	26640	10	16QAM	25	25	21.70	0-2	2	22.2
	1910	26640	10	16QAM	50	0	21.74	0-2	2	22.2

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Table 9-19
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]	Maximum Conducted Power [dBm]
Low	1852.5	26065	5	QPSK	1	0	23.81	0	0	24.2
	1852.5	26065	5	QPSK	1	12	23.86	0	0	24.2
	1852.5	26065	5	QPSK	1	24	23.98	0	0	24.2
	1852.5	26065	5	QPSK	12	0	22.74	0-1	1	23.2
	1852.5	26065	5	QPSK	12	6	22.76	0-1	1	23.2
	1852.5	26065	5	QPSK	12	13	22.67	0-1	1	23.2
	1852.5	26065	5	QPSK	25	0	22.88	0-1	1	23.2
	1852.5	26065	5	16-QAM	1	0	22.97	0-1	1	23.2
	1852.5	26065	5	16-QAM	1	12	22.90	0-1	1	23.2
	1852.5	26065	5	16-QAM	1	24	22.83	0-1	1	23.2
	1852.5	26065	5	16-QAM	12	0	21.81	0-2	2	22.2
	1852.5	26065	5	16-QAM	12	6	21.89	0-2	2	22.2
Mid	1852.5	26065	5	16-QAM	12	13	21.93	0-2	2	22.2
	1852.5	26065	5	16-QAM	25	0	21.97	0-2	2	22.2
	1882.5	26365	5	QPSK	1	0	23.87	0	0	24.2
	1882.5	26365	5	QPSK	1	12	23.72	0	0	24.2
	1882.5	26365	5	QPSK	1	24	23.80	0	0	24.2
	1882.5	26365	5	QPSK	12	0	22.78	0-1	1	23.2
	1882.5	26365	5	QPSK	12	6	22.77	0-1	1	23.2
	1882.5	26365	5	QPSK	12	13	22.71	0-1	1	23.2
	1882.5	26365	5	QPSK	25	0	22.94	0-1	1	23.2
	1882.5	26365	5	16-QAM	1	0	22.97	0-1	1	23.2
	1882.5	26365	5	16-QAM	1	12	22.82	0-1	1	23.2
	1882.5	26365	5	16-QAM	1	24	22.85	0-1	1	23.2
High	1882.5	26365	5	16-QAM	12	0	21.73	0-2	2	22.2
	1882.5	26365	5	16-QAM	12	6	21.79	0-2	2	22.2
	1882.5	26365	5	16-QAM	12	13	21.91	0-2	2	22.2
	1882.5	26365	5	16-QAM	25	0	21.82	0-2	2	22.2
	1912.5	26665	5	QPSK	1	0	23.79	0	0	24.2
	1912.5	26665	5	QPSK	1	12	23.99	0	0	24.2
	1912.5	26665	5	QPSK	1	24	23.98	0	0	24.2
	1912.5	26665	5	QPSK	12	0	22.74	0-1	1	23.2
	1912.5	26665	5	QPSK	12	6	22.77	0-1	1	23.2
	1912.5	26665	5	QPSK	12	13	22.93	0-1	1	23.2
	1912.5	26665	5	QPSK	25	0	22.89	0-1	1	23.2
	1912.5	26665	5	16-QAM	1	0	22.67	0-1	1	23.2
	1912.5	26665	5	16-QAM	1	12	22.98	0-1	1	23.2
	1912.5	26665	5	16-QAM	1	24	22.87	0-1	1	23.2
	1912.5	26665	5	16-QAM	12	0	21.74	0-2	2	22.2
	1912.5	26665	5	16-QAM	12	6	21.92	0-2	2	22.2
	1912.5	26665	5	16-QAM	12	13	21.68	0-2	2	22.2
	1912.5	26665	5	16-QAM	25	0	21.95	0-2	2	22.2

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Table 9-20
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]	Maximum Conducted Power [dBm]
Low	1851.5	26055	3	QPSK	1	0	23.83	0	0	24.2
	1851.5	26055	3	QPSK	1	7	23.97	0	0	24.2
	1851.5	26055	3	QPSK	1	14	24.00	0	0	24.2
	1851.5	26055	3	QPSK	8	0	22.91	0-1	1	23.2
	1851.5	26055	3	QPSK	8	4	22.93	0-1	1	23.2
	1851.5	26055	3	QPSK	8	7	22.95	0-1	1	23.2
	1851.5	26055	3	QPSK	15	0	22.79	0-1	1	23.2
	1851.5	26055	3	16-QAM	1	0	22.87	0-1	1	23.2
	1851.5	26055	3	16-QAM	1	7	22.94	0-1	1	23.2
	1851.5	26055	3	16-QAM	1	14	22.69	0-1	1	23.2
	1851.5	26055	3	16-QAM	8	0	21.79	0-2	2	22.2
	1851.5	26055	3	16-QAM	8	4	21.77	0-2	2	22.2
Mid	1851.5	26055	3	16-QAM	8	7	21.90	0-2	2	22.2
	1851.5	26055	3	16-QAM	15	0	21.69	0-2	2	22.2
	1882.5	26365	3	QPSK	1	0	23.85	0	0	24.2
	1882.5	26365	3	QPSK	1	7	23.99	0	0	24.2
	1882.5	26365	3	QPSK	1	14	23.99	0	0	24.2
	1882.5	26365	3	QPSK	8	0	22.77	0-1	1	23.2
	1882.5	26365	3	QPSK	8	4	22.92	0-1	1	23.2
	1882.5	26365	3	QPSK	8	7	22.79	0-1	1	23.2
	1882.5	26365	3	QPSK	15	0	22.91	0-1	1	23.2
	1882.5	26365	3	16-QAM	1	0	22.88	0-1	1	23.2
	1882.5	26365	3	16-QAM	1	7	22.79	0-1	1	23.2
	1882.5	26365	3	16-QAM	1	14	22.70	0-1	1	23.2
High	1882.5	26365	3	16-QAM	8	0	21.98	0-2	2	22.2
	1882.5	26365	3	16-QAM	8	4	21.94	0-2	2	22.2
	1882.5	26365	3	16-QAM	8	7	21.69	0-2	2	22.2
	1882.5	26365	3	16-QAM	15	0	21.88	0-2	2	22.2
	1913.5	26675	3	QPSK	1	0	23.83	0	0	24.2
	1913.5	26675	3	QPSK	1	7	23.81	0	0	24.2
	1913.5	26675	3	QPSK	1	14	23.92	0	0	24.2
	1913.5	26675	3	QPSK	8	0	22.79	0-1	1	23.2
	1913.5	26675	3	QPSK	8	4	22.98	0-1	1	23.2
	1913.5	26675	3	QPSK	8	7	22.74	0-1	1	23.2
	1913.5	26675	3	QPSK	15	0	22.69	0-1	1	23.2
	1913.5	26675	3	16-QAM	1	0	22.92	0-1	1	23.2
	1913.5	26675	3	16-QAM	1	7	22.84	0-1	1	23.2
	1913.5	26675	3	16-QAM	1	14	22.84	0-1	1	23.2
	1913.5	26675	3	16-QAM	8	0	21.95	0-2	2	22.2
	1913.5	26675	3	16-QAM	8	4	21.98	0-2	2	22.2
	1913.5	26675	3	16-QAM	8	7	21.92	0-2	2	22.2
	1913.5	26675	3	16-QAM	15	0	21.83	0-2	2	22.2
	1913.5	26675	3	16-QAM	15	0	21.83	0-2	2	22.2

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Table 9-21
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]	Maximum Conducted Power [dBm]
Low	1850.7	26047	1.4	QPSK	1	0	23.82	0	0	24.2
	1850.7	26047	1.4	QPSK	1	2	23.76	0	0	24.2
	1850.7	26047	1.4	QPSK	1	5	23.97	0	0	24.2
	1850.7	26047	1.4	QPSK	3	0	23.67	0	0	24.2
	1850.7	26047	1.4	QPSK	3	2	23.93	0	0	24.2
	1850.7	26047	1.4	QPSK	3	3	23.71	0	0	24.2
	1850.7	26047	1.4	QPSK	6	0	22.88	0-1	1	23.2
	1850.7	26047	1.4	16-QAM	1	0	22.75	0-1	1	23.2
	1850.7	26047	1.4	16-QAM	1	2	22.89	0-1	1	23.2
	1850.7	26047	1.4	16-QAM	1	5	22.90	0-1	1	23.2
	1850.7	26047	1.4	16-QAM	3	0	22.91	0-1	1	23.2
	1850.7	26047	1.4	16-QAM	3	2	22.81	0-1	1	23.2
	1850.7	26047	1.4	16-QAM	3	3	22.98	0-1	1	23.2
Mid	1850.7	26047	1.4	16-QAM	6	0	21.85	0-2	2	22.2
	1882.5	26365	1.4	QPSK	1	0	23.79	0	0	24.2
	1882.5	26365	1.4	QPSK	1	2	23.89	0	0	24.2
	1882.5	26365	1.4	QPSK	1	5	23.73	0	0	24.2
	1882.5	26365	1.4	QPSK	3	0	23.97	0	0	24.2
	1882.5	26365	1.4	QPSK	3	2	23.90	0	0	24.2
	1882.5	26365	1.4	QPSK	3	3	23.99	0	0	24.2
	1882.5	26365	1.4	QPSK	6	0	23.00	0-1	1	23.2
	1882.5	26365	1.4	16-QAM	1	0	22.92	0-1	1	23.2
	1882.5	26365	1.4	16-QAM	1	2	22.86	0-1	1	23.2
	1882.5	26365	1.4	16-QAM	1	5	22.98	0-1	1	23.2
	1882.5	26365	1.4	16-QAM	3	0	22.69	0-1	1	23.2
	1882.5	26365	1.4	16-QAM	3	2	22.79	0-1	1	23.2
High	1882.5	26365	1.4	16-QAM	3	3	22.83	0-1	1	23.2
	1882.5	26365	1.4	16-QAM	6	0	21.93	0-2	2	22.2
	1914.3	26683	1.4	QPSK	1	0	23.97	0	0	24.2
	1914.3	26683	1.4	QPSK	1	2	23.76	0	0	24.2
	1914.3	26683	1.4	QPSK	1	5	23.85	0	0	24.2
	1914.3	26683	1.4	QPSK	3	0	23.80	0	0	24.2
	1914.3	26683	1.4	QPSK	3	2	23.67	0	0	24.2
	1914.3	26683	1.4	QPSK	3	3	23.78	0	0	24.2
	1914.3	26683	1.4	QPSK	6	0	22.99	0-1	1	23.2
	1914.3	26683	1.4	16-QAM	1	0	22.78	0-1	1	23.2
	1914.3	26683	1.4	16-QAM	1	2	22.79	0-1	1	23.2
	1914.3	26683	1.4	16-QAM	1	5	22.73	0-1	1	23.2
	1914.3	26683	1.4	16-QAM	3	0	22.79	0-1	1	23.2
	1914.3	26683	1.4	16-QAM	3	2	22.76	0-1	1	23.2
	1914.3	26683	1.4	16-QAM	3	3	22.95	0-1	1	23.2
	1914.3	26683	1.4	16-QAM	6	0	21.71	0-2	2	22.2

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9.4.5

LTE Band 41

Table 9-22
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]	Maximum Conducted Power [dBm]
Low	2506	39750	20	QPSK	1	0	23.91	0	0	24.2
	2506	39750	20	QPSK	1	50	23.85	0	0	24.2
	2506	39750	20	QPSK	1	99	23.90	0	0	24.2
	2506	39750	20	QPSK	50	0	22.59	0-1	1	23.2
	2506	39750	20	QPSK	50	25	22.65	0-1	1	23.2
	2506	39750	20	QPSK	50	50	22.71	0-1	1	23.2
	2506	39750	20	QPSK	100	0	22.70	0-1	1	23.2
	2506	39750	20	16QAM	1	0	23.08	0-1	1	23.2
	2506	39750	20	16QAM	1	50	22.82	0-1	1	23.2
	2506	39750	20	16QAM	1	99	23.01	0-1	1	23.2
	2506	39750	20	16QAM	50	0	21.84	0-2	2	22.2
	2506	39750	20	16QAM	50	25	21.62	0-2	2	22.2
	2506	39750	20	16QAM	50	50	21.96	0-2	2	22.2
	2506	39750	20	16QAM	100	0	21.81	0-2	2	22.2
Low Mid	2549.5	40185	20	QPSK	1	0	23.72	0	0	24.2
	2549.5	40185	20	QPSK	1	50	23.84	0	0	24.2
	2549.5	40185	20	QPSK	1	99	23.79	0	0	24.2
	2549.5	40185	20	QPSK	50	0	22.53	0-1	1	23.2
	2549.5	40185	20	QPSK	50	25	22.56	0-1	1	23.2
	2549.5	40185	20	QPSK	50	50	22.58	0-1	1	23.2
	2549.5	40185	20	QPSK	100	0	22.53	0-1	1	23.2
	2549.5	40185	20	16-QAM	1	0	22.89	0-1	1	23.2
	2549.5	40185	20	16-QAM	1	50	22.79	0-1	1	23.2
	2549.5	40185	20	16-QAM	1	99	22.73	0-1	1	23.2
	2549.5	40185	20	16-QAM	50	0	21.57	0-2	2	22.2
	2549.5	40185	20	16-QAM	50	25	21.79	0-2	2	22.2
	2549.5	40185	20	16-QAM	50	50	21.74	0-2	2	22.2
	2549.5	40185	20	16-QAM	100	0	21.74	0-2	2	22.2
Mid	2593	40620	20	QPSK	1	0	23.84	0	0	24.2
	2593	40620	20	QPSK	1	50	24.11	0	0	24.2
	2593	40620	20	QPSK	1	99	24.09	0	0	24.2
	2593	40620	20	QPSK	50	0	23.04	0-1	1	23.2
	2593	40620	20	QPSK	50	25	23.10	0-1	1	23.2
	2593	40620	20	QPSK	50	50	23.12	0-1	1	23.2
	2593	40620	20	QPSK	100	0	23.05	0-1	1	23.2
	2593	40620	20	16-QAM	1	0	22.76	0-1	1	23.2
	2593	40620	20	16-QAM	1	50	22.88	0-1	1	23.2
	2593	40620	20	16-QAM	1	99	22.66	0-1	1	23.2
	2593	40620	20	16-QAM	50	0	22.16	0-2	2	22.2
	2593	40620	20	16-QAM	50	25	22.19	0-2	2	22.2
	2593	40620	20	16-QAM	50	50	22.18	0-2	2	22.2
	2593	40620	20	16-QAM	100	0	22.17	0-2	2	22.2
Mid High	2636.5	41055	20	QPSK	1	0	23.94	0	0	24.2
	2636.5	41055	20	QPSK	1	50	23.85	0	0	24.2
	2636.5	41055	20	QPSK	1	99	23.87	0	0	24.2
	2636.5	41055	20	QPSK	50	0	22.88	0-1	1	23.2
	2636.5	41055	20	QPSK	50	25	22.84	0-1	1	23.2
	2636.5	41055	20	QPSK	50	50	22.79	0-1	1	23.2
	2636.5	41055	20	QPSK	100	0	22.77	0-1	1	23.2
	2636.5	41055	20	16-QAM	1	0	23.06	0-1	1	23.2
	2636.5	41055	20	16-QAM	1	50	23.03	0-1	1	23.2
	2636.5	41055	20	16-QAM	1	99	22.97	0-1	1	23.2
	2636.5	41055	20	16-QAM	50	0	21.90	0-2	2	22.2
	2636.5	41055	20	16-QAM	50	25	21.86	0-2	2	22.2
	2636.5	41055	20	16-QAM	50	50	21.86	0-2	2	22.2
	2636.5	41055	20	16-QAM	100	0	21.79	0-2	2	22.2
High	2680	41490	20	QPSK	1	0	23.72	0	0	24.2
	2680	41490	20	QPSK	1	50	23.99	0	0	24.2
	2680	41490	20	QPSK	1	99	23.75	0	0	24.2
	2680	41490	20	QPSK	50	0	22.62	0-1	1	23.2
	2680	41490	20	QPSK	50	25	22.91	0-1	1	23.2
	2680	41490	20	QPSK	50	50	22.98	0-1	1	23.2
	2680	41490	20	QPSK	100	0	22.86	0-1	1	23.2
	2680	41490	20	16-QAM	1	0	22.80	0-1	1	23.2
	2680	41490	20	16-QAM	1	50	22.62	0-1	1	23.2
	2680	41490	20	16-QAM	1	99	22.92	0-1	1	23.2
	2680	41490	20	16-QAM	50	0	21.91	0-2	2	22.2
	2680	41490	20	16-QAM	50	25	22.00	0-2	2	22.2
	2680	41490	20	16-QAM	50	50	21.97	0-2	2	22.2
	2680	41490	20	16-QAM	100	0	22.02	0-2	2	22.2

Table 9-23
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]	Maximum Conducted Power [dBm]
Low	2503.5	39725	15	QPSK	1	0	23.84	0	0	24.2
	2503.5	39725	15	QPSK	1	36	23.71	0	0	24.2
	2503.5	39725	15	QPSK	1	74	23.81	0	0	24.2
	2503.5	39725	15	QPSK	36	0	22.35	0-1	1	23.2
	2503.5	39725	15	QPSK	36	18	22.32	0-1	1	23.2
	2503.5	39725	15	QPSK	36	37	22.29	0-1	1	23.2
	2503.5	39725	15	QPSK	75	0	22.25	0-1	1	23.2
	2503.5	39725	15	16QAM	1	0	23.03	0-1	1	23.2
	2503.5	39725	15	16QAM	1	36	22.71	0-1	1	23.2
	2503.5	39725	15	16QAM	1	74	23.08	0-1	1	23.2
	2503.5	39725	15	16QAM	36	0	21.37	0-2	2	22.2
	2503.5	39725	15	16QAM	36	18	21.35	0-2	2	22.2
	2503.5	39725	15	16QAM	36	37	21.32	0-2	2	22.2
	2503.5	39725	15	16QAM	75	0	21.25	0-2	2	22.2
Low Mid	2548.25	40173	15	QPSK	1	0	23.96	0	0	24.2
	2548.25	40173	15	QPSK	1	36	23.77	0	0	24.2
	2548.25	40173	15	QPSK	1	74	23.89	0	0	24.2
	2548.25	40173	15	QPSK	36	0	22.52	0-1	1	23.2
	2548.25	40173	15	QPSK	36	18	22.45	0-1	1	23.2
	2548.25	40173	15	QPSK	36	37	22.46	0-1	1	23.2
	2548.25	40173	15	QPSK	75	0	22.50	0-1	1	23.2
	2548.25	40173	15	16-QAM	1	0	22.74	0-1	1	23.2
	2548.25	40173	15	16-QAM	1	36	22.72	0-1	1	23.2
	2548.25	40173	15	16-QAM	1	74	22.86	0-1	1	23.2
	2548.25	40173	15	16-QAM	36	0	21.74	0-2	2	22.2
	2548.25	40173	15	16-QAM	36	18	21.73	0-2	2	22.2
	2548.25	40173	15	16-QAM	36	37	21.64	0-2	2	22.2
	2548.25	40173	15	16-QAM	75	0	21.58	0-2	2	22.2
Mid	2593	40620	15	QPSK	1	0	24.09	0	0	24.2
	2593	40620	15	QPSK	1	36	24.18	0	0	24.2
	2593	40620	15	QPSK	1	74	24.17	0	0	24.2
	2593	40620	15	QPSK	36	0	22.72	0-1	1	23.2
	2593	40620	15	QPSK	36	18	22.82	0-1	1	23.2
	2593	40620	15	QPSK	36	37	22.85	0-1	1	23.2
	2593	40620	15	QPSK	75	0	22.74	0-1	1	23.2
	2593	40620	15	16-QAM	1	0	22.91	0-1	1	23.2
	2593	40620	15	16-QAM	1	36	22.89	0-1	1	23.2
	2593	40620	15	16-QAM	1	74	22.93	0-1	1	23.2
	2593	40620	15	16-QAM	36	0	21.96	0-2	2	22.2
	2593	40620	15	16-QAM	36	18	22.04	0-2	2	22.2
	2593	40620	15	16-QAM	36	37	22.09	0-2	2	22.2
	2593	40620	15	16-QAM	75	0	21.98	0-2	2	22.2
Mid High	2637.75	41068	15	QPSK	1	0	23.89	0	0	24.2
	2637.75	41068	15	QPSK	1	36	23.79	0	0	24.2
	2637.75	41068	15	QPSK	1	74	23.97	0	0	24.2
	2637.75	41068	15	QPSK	36	0	22.72	0-1	1	23.2
	2637.75	41068	15	QPSK	36	18	22.63	0-1	1	23.2
	2637.75	41068	15	QPSK	36	37	22.74	0-1	1	23.2
	2637.75	41068	15	QPSK	75	0	22.71	0-1	1	23.2
	2637.75	41068	15	16-QAM	1	0	23.11	0-1	1	23.2
	2637.75	41068	15	16-QAM	1	36	23.08	0-1	1	23.2
	2637.75	41068	15	16-QAM	1	74	22.99	0-1	1	23.2
	2637.75	41068	15	16-QAM	36	0	21.76	0-2	2	22.2
	2637.75	41068	15	16-QAM	36	18	21.80	0-2	2	22.2
	2637.75	41068	15	16-QAM	36	37	21.75	0-2	2	22.2
	2637.75	41068	15	16-QAM	75	0	21.79	0-2	2	22.2
High	2682.5	41515	15	QPSK	1	0	23.84	0	0	24.2
	2682.5	41515	15	QPSK	1	36	24.02	0	0	24.2
	2682.5	41515	15	QPSK	1	74	23.91	0	0	24.2
	2682.5	41515	15	QPSK	36	0	22.71	0-1	1	23.2
	2682.5	41515	15	QPSK	36	18	22.76	0-1	1	23.2
	2682.5	41515	15	QPSK	36	37	22.55	0-1	1	23.2
	2682.5	41515	15	QPSK	75	0	22.78	0-1	1	23.2
	2682.5	41515	15	16-QAM	1	0	23.17	0-1	1	23.2
	2682.5	41515	15	16-QAM	1	36	23.07	0-1	1	23.2
	2682.5	41515	15	16-QAM	1	74	23.06	0-1	1	23.2
	2682.5	41515	15	16-QAM	36	0	21.70	0-2	2	22.2
	2682.5	41515	15	16-QAM	36	18	21.84	0-2	2	22.2
	2682.5	41515	15	16-QAM	36	37	21.74	0-2	2	22.2
	2682.5	41515	15	16-QAM	75	0	21.82	0-2	2	22.2

Table 9-24
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]	Maximum Conducted Power [dBm]
Low	2501	39700	10	QPSK	1	0	23.22	0	0	24.2
	2501	39700	10	QPSK	1	25	23.82	0	0	24.2
	2501	39700	10	QPSK	1	49	23.37	0	0	24.2
	2501	39700	10	QPSK	25	0	22.68	0-1	1	23.2
	2501	39700	10	QPSK	25	12	22.90	0-1	1	23.2
	2501	39700	10	QPSK	25	25	22.71	0-1	1	23.2
	2501	39700	10	QPSK	50	0	22.66	0-1	1	23.2
	2501	39700	10	16QAM	1	0	22.39	0-1	1	23.2
	2501	39700	10	16QAM	1	25	23.20	0-1	1	23.2
	2501	39700	10	16QAM	1	49	23.13	0-1	1	23.2
	2501	39700	10	16QAM	25	0	22.15	0-2	2	22.2
	2501	39700	10	16QAM	25	12	21.55	0-2	2	22.2
	2501	39700	10	16QAM	25	25	21.66	0-2	2	22.2
	2501	39700	10	16QAM	50	0	21.32	0-2	2	22.2
Low Mid	2547	40160	10	QPSK	1	0	23.38	0	0	24.2
	2547	40160	10	QPSK	1	25	23.23	0	0	24.2
	2547	40160	10	QPSK	1	49	23.51	0	0	24.2
	2547	40160	10	QPSK	25	0	22.34	0-1	1	23.2
	2547	40160	10	QPSK	25	12	22.21	0-1	1	23.2
	2547	40160	10	QPSK	25	25	22.72	0-1	1	23.2
	2547	40160	10	QPSK	50	0	23.12	0-1	1	23.2
	2547	40160	10	16-QAM	1	0	22.56	0-1	1	23.2
	2547	40160	10	16-QAM	1	25	22.75	0-1	1	23.2
	2547	40160	10	16-QAM	1	49	22.82	0-1	1	23.2
	2547	40160	10	16-QAM	25	0	21.64	0-2	2	22.2
	2547	40160	10	16-QAM	25	12	21.61	0-2	2	22.2
	2547	40160	10	16-QAM	25	25	22.00	0-2	2	22.2
	2547	40160	10	16-QAM	50	0	21.94	0-2	2	22.2
Mid	2593	40620	10	QPSK	1	0	23.83	0	0	24.2
	2593	40620	10	QPSK	1	25	23.23	0	0	24.2
	2593	40620	10	QPSK	1	49	24.07	0	0	24.2
	2593	40620	10	QPSK	25	0	22.83	0-1	1	23.2
	2593	40620	10	QPSK	25	12	22.80	0-1	1	23.2
	2593	40620	10	QPSK	25	25	22.38	0-1	1	23.2
	2593	40620	10	QPSK	50	0	22.32	0-1	1	23.2
	2593	40620	10	16-QAM	1	0	22.24	0-1	1	23.2
	2593	40620	10	16-QAM	1	25	22.79	0-1	1	23.2
	2593	40620	10	16-QAM	1	49	22.92	0-1	1	23.2
	2593	40620	10	16-QAM	25	0	21.87	0-2	2	22.2
	2593	40620	10	16-QAM	25	12	21.82	0-2	2	22.2
	2593	40620	10	16-QAM	25	25	21.43	0-2	2	22.2
	2593	40620	10	16-QAM	50	0	21.69	0-2	2	22.2
Mid High	2639	41080	10	QPSK	1	0	24.12	0	0	24.2
	2639	41080	10	QPSK	1	25	23.69	0	0	24.2
	2639	41080	10	QPSK	1	49	24.00	0	0	24.2
	2639	41080	10	QPSK	25	0	22.68	0-1	1	23.2
	2639	41080	10	QPSK	25	12	22.41	0-1	1	23.2
	2639	41080	10	QPSK	25	25	22.70	0-1	1	23.2
	2639	41080	10	QPSK	50	0	23.18	0-1	1	23.2
	2639	41080	10	16-QAM	1	0	23.19	0-1	1	23.2
	2639	41080	10	16-QAM	1	25	22.83	0-1	1	23.2
	2639	41080	10	16-QAM	1	49	23.03	0-1	1	23.2
	2639	41080	10	16-QAM	25	0	22.08	0-2	2	22.2
	2639	41080	10	16-QAM	25	12	21.75	0-2	2	22.2
	2639	41080	10	16-QAM	25	25	21.43	0-2	2	22.2
	2639	41080	10	16-QAM	50	0	21.44	0-2	2	22.2
High	2685	41540	10	QPSK	1	0	23.60	0	0	24.2
	2685	41540	10	QPSK	1	25	23.83	0	0	24.2
	2685	41540	10	QPSK	1	49	24.16	0	0	24.2
	2685	41540	10	QPSK	25	0	23.17	0-1	1	23.2
	2685	41540	10	QPSK	25	12	22.87	0-1	1	23.2
	2685	41540	10	QPSK	25	25	22.64	0-1	1	23.2
	2685	41540	10	QPSK	50	0	23.18	0-1	1	23.2
	2685	41540	10	16-QAM	1	0	22.30	0-1	1	23.2
	2685	41540	10	16-QAM	1	25	22.64	0-1	1	23.2
	2685	41540	10	16-QAM	1	49	22.25	0-1	1	23.2
	2685	41540	10	16-QAM	25	0	22.02	0-2	2	22.2
	2685	41540	10	16-QAM	25	12	21.88	0-2	2	22.2
	2685	41540	10	16-QAM	25	25	22.18	0-2	2	22.2
	2685	41540	10	16-QAM	50	0	21.35	0-2	2	22.2

Table 9-25
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]	Maximum Conducted Power [dBm]
Low	2498.5	39675	5	QPSK	1	0	24.06	0	0	24.2
	2498.5	39675	5	QPSK	1	12	24.03	0	0	24.2
	2498.5	39675	5	QPSK	1	24	23.88	0	0	24.2
	2498.5	39675	5	QPSK	12	0	22.84	0-1	1	23.2
	2498.5	39675	5	QPSK	12	6	22.83	0-1	1	23.2
	2498.5	39675	5	QPSK	12	13	22.60	0-1	1	23.2
	2498.5	39675	5	QPSK	25	0	22.60	0-1	1	23.2
	2498.5	39675	5	16-QAM	1	0	23.00	0-1	1	23.2
	2498.5	39675	5	16-QAM	1	12	22.59	0-1	1	23.2
	2498.5	39675	5	16-QAM	1	24	23.02	0-1	1	23.2
	2498.5	39675	5	16-QAM	12	0	21.99	0-2	2	22.2
	2498.5	39675	5	16-QAM	12	6	21.76	0-2	2	22.2
	2498.5	39675	5	16-QAM	12	13	21.97	0-2	2	22.2
	2498.5	39675	5	16-QAM	25	0	21.90	0-2	2	22.2
Low Mid	2545.75	40148	5	QPSK	1	0	24.08	0	0	24.2
	2545.75	40148	5	QPSK	1	12	23.76	0	0	24.2
	2545.75	40148	5	QPSK	1	24	23.89	0	0	24.2
	2545.75	40148	5	QPSK	12	0	22.71	0-1	1	23.2
	2545.75	40148	5	QPSK	12	6	22.74	0-1	1	23.2
	2545.75	40148	5	QPSK	12	13	23.04	0-1	1	23.2
	2545.75	40148	5	QPSK	25	0	23.00	0-1	1	23.2
	2545.75	40148	5	16-QAM	1	0	23.01	0-1	1	23.2
	2545.75	40148	5	16-QAM	1	12	23.00	0-1	1	23.2
	2545.75	40148	5	16-QAM	1	24	22.65	0-1	1	23.2
	2545.75	40148	5	16-QAM	12	0	22.02	0-2	2	22.2
	2545.75	40148	5	16-QAM	12	6	21.89	0-2	2	22.2
	2545.75	40148	5	16-QAM	12	13	21.91	0-2	2	22.2
	2545.75	40148	5	16-QAM	25	0	21.66	0-2	2	22.2
Mid	2593	40620	5	QPSK	1	0	24.01	0	0	24.2
	2593	40620	5	QPSK	1	12	23.60	0	0	24.2
	2593	40620	5	QPSK	1	24	23.63	0	0	24.2
	2593	40620	5	QPSK	12	0	22.86	0-1	1	23.2
	2593	40620	5	QPSK	12	6	22.85	0-1	1	23.2
	2593	40620	5	QPSK	12	13	22.87	0-1	1	23.2
	2593	40620	5	QPSK	25	0	22.71	0-1	1	23.2
	2593	40620	5	16-QAM	1	0	22.62	0-1	1	23.2
	2593	40620	5	16-QAM	1	12	22.70	0-1	1	23.2
	2593	40620	5	16-QAM	1	24	23.00	0-1	1	23.2
	2593	40620	5	16-QAM	12	0	21.76	0-2	2	22.2
	2593	40620	5	16-QAM	12	6	21.55	0-2	2	22.2
	2593	40620	5	16-QAM	12	13	21.61	0-2	2	22.2
	2593	40620	5	16-QAM	25	0	21.84	0-2	2	22.2
Mid High	2640.25	41093	5	QPSK	1	0	23.74	0	0	24.2
	2640.25	41093	5	QPSK	1	12	23.78	0	0	24.2
	2640.25	41093	5	QPSK	1	24	23.80	0	0	24.2
	2640.25	41093	5	QPSK	12	0	22.94	0-1	1	23.2
	2640.25	41093	5	QPSK	12	6	23.01	0-1	1	23.2
	2640.25	41093	5	QPSK	12	13	22.67	0-1	1	23.2
	2640.25	41093	5	QPSK	25	0	22.87	0-1	1	23.2
	2640.25	41093	5	16-QAM	1	0	23.07	0-1	1	23.2
	2640.25	41093	5	16-QAM	1	12	23.10	0-1	1	23.2
	2640.25	41093	5	16-QAM	1	24	22.92	0-1	1	23.2
	2640.25	41093	5	16-QAM	12	0	21.58	0-2	2	22.2
	2640.25	41093	5	16-QAM	12	6	22.07	0-2	2	22.2
	2640.25	41093	5	16-QAM	12	13	21.72	0-2	2	22.2
	2640.25	41093	5	16-QAM	25	0	21.78	0-2	2	22.2
High	2687.5	41565	5	QPSK	1	0	23.70	0	0	24.2
	2687.5	41565	5	QPSK	1	12	23.64	0	0	24.2
	2687.5	41565	5	QPSK	1	24	23.86	0	0	24.2
	2687.5	41565	5	QPSK	12	0	22.77	0-1	1	23.2
	2687.5	41565	5	QPSK	12	6	22.68	0-1	1	23.2
	2687.5	41565	5	QPSK	12	13	22.73	0-1	1	23.2
	2687.5	41565	5	QPSK	25	0	22.66	0-1	1	23.2
	2687.5	41565	5	16-QAM	1	0	22.90	0-1	1	23.2
	2687.5	41565	5	16-QAM	1	12	22.58	0-1	1	23.2
	2687.5	41565	5	16-QAM	1	24	23.00	0-1	1	23.2
	2687.5	41565	5	16-QAM	12	0	21.77	0-2	2	22.2
	2687.5	41565	5	16-QAM	12	6	21.81	0-2	2	22.2
	2687.5	41565	5	16-QAM	12	13	21.73	0-2	2	22.2
	2687.5	41565	5	16-QAM	25	0	21.73	0-2	2	22.2

9.4.6

LTE Carrier Aggregation Conducted Powers

Table 9-26

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

Band 41 (PCC) + Band 41 (SCC), 20 MHz				
2593.0 MHz / ch.40620 + 2612.8 MHz / ch. 40818	PCC UL # RB	PCC UL RB Offset	LTE Rel 10 Tx.Power (dBm)	LTE Rel 8 Tx.Power (dBm)
	1	50	24.16	24.11

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 only 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.

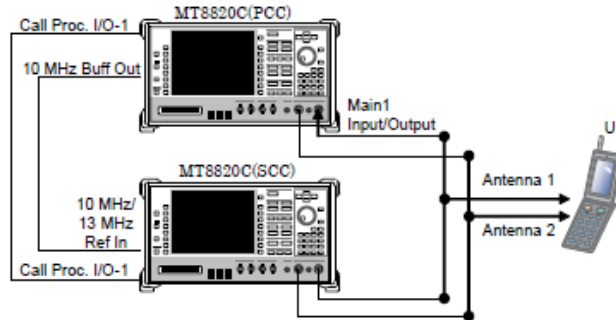


Figure 9-4
Power Measurement Setup

9.5 WLAN Conducted Powers

Table 9-27

IEEE 802.11b Average RF Power

Mode	Freq [MHz]	Channel	802.11b (2.4 GHz) Conducted Power			
			Data Rate [Mbps]			
			1	2	5.5	11
802.11b	2412	1*	13.23	13.20	13.20	13.16
802.11b	2437	6*	13.24	13.22	13.14	13.24
802.11b	2462	11*	13.57	13.50	13.47	13.45

Table 9-28

IEEE 802.11g Average RF Power

Mode	Freq [MHz]	Channel	802.11g (2.4 GHz) Conducted Power [dBm]							
			Data Rate [Mbps]							
			6	9	12	18	24	36	48	54
802.11g	2412	1	12.19	12.10	12.06	12.12	12.44	12.36	12.33	12.23
802.11g	2437	6	12.03	11.94	11.90	11.96	12.28	12.20	12.17	12.07
802.11g	2462	11	12.25	12.16	12.12	12.18	12.50	12.42	12.39	12.29

FCC ID ZNFS996		SAR EVALUATION REPORT			Reviewed by: Quality Manager
Document S/N: 0Y1410202021-R1.ZNF	Test Dates: 10/20/14 - 10/28/14	DUT Type: Portable Handset			Page 54 of 88

Table 9-29

Mode	Freq [MHz]	Channel	802.11n (2.4 GHz) Conducted Power [dBm]							
			Data Rate [Mbps]							
			6.5	13	20	26	39	52	58	65
802.11n	2412	1	11.95	11.93	11.92	12.28	12.24	12.26	12.23	12.26
802.11n	2437	6	11.81	11.79	11.78	12.14	12.10	12.12	12.09	12.12
802.11n	2462	11	12.05	12.03	12.02	12.38	12.34	12.36	12.33	12.36

Table 9-30

IEEE 802.11ac Average RF Power

802.11ac (2.4GHz) Conducted Power [dBm]			
Mode	Freq [MHz]	Channel	Data Rate 6.5 Mbps
802.11ac	2412	1	11.06
802.11ac	2437	6	10.85
802.11ac	2462	11	11.20

Table 9-31

IEEE 802.11a Average RF Power

Mode	Freq [MHz]	Channel	802.11a (5GHz) Conducted Power [dBm]							
			Data Rate [Mbps]							
			6	9	12	18	24	36	48	54
802.11a	5180	36*	13.20	13.12	13.18	12.81	13.32	13.15	13.31	13.16
802.11a	5200	40	13.05	12.97	13.03	12.66	13.17	13.00	13.16	13.01
802.11a	5220	44	13.12	13.04	13.10	12.73	13.24	13.07	13.23	13.08
802.11a	5240	48*	13.32	13.24	13.30	12.93	13.44	13.27	13.43	13.28
802.11a	5260	52*	13.00	13.06	12.93	12.61	13.27	13.06	13.11	13.02
802.11a	5280	56	13.08	13.14	13.01	12.69	13.35	13.14	13.19	13.10
802.11a	5300	60	13.29	13.35	13.22	12.90	13.56	13.35	13.40	13.31
802.11a	5320	64*	13.34	13.40	13.27	12.95	13.58	13.40	13.45	13.36
802.11a	5500	100	12.83	12.67	12.81	12.43	12.99	12.71	12.93	12.99
802.11a	5520	104*	12.93	12.77	12.91	12.53	13.09	12.81	13.03	13.09
802.11a	5540	108	12.92	12.76	12.90	12.52	13.08	12.80	13.02	13.08
802.11a	5560	112	12.94	12.78	12.92	12.54	13.10	12.82	13.04	13.10
802.11a	5580	116*	12.93	12.77	12.91	12.53	13.09	12.81	13.03	13.09
802.11a	5600	120	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
802.11a	5620	124	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
802.11a	5640	128	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
802.11a	5660	132	13.07	12.91	13.05	12.67	13.23	12.95	13.17	13.23
802.11a	5680	136*	13.03	12.87	13.01	12.63	13.19	12.91	13.13	13.19
802.11a	5700	140	12.93	12.77	12.91	12.53	13.09	12.81	13.03	13.09
802.11a	5720	144	12.95	12.79	12.93	12.55	13.11	12.83	13.05	13.11
802.11a	5745	149*	13.17	13.21	13.14	12.72	13.23	13.16	13.10	13.28
802.11a	5765	153	12.61	12.65	12.58	12.16	12.67	12.60	12.54	12.72
802.11a	5785	157*	12.67	12.71	12.64	12.22	12.73	12.66	12.60	12.78
802.11a	5805	161	12.83	12.87	12.80	12.38	12.89	12.82	12.76	12.94
802.11a	5825	165*	12.80	12.84	12.77	12.35	12.86	12.79	12.73	12.91

Per FCC KDB Publication 443999 and RSS-210 A9.2(3), transmission on channels which overlap the 5600-5650 MHz is prohibited as a client. This device does not transmit any beacons or initiate any transmissions in 5.3 and 5.5 GHz Band.

(*) – indicates default channels per KDB Publication 248227 D01v01r02. When the adjacent channels are higher in power then the default channels, these “required channels” are considered for SAR testing instead of the default channels.

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Table 9-32
IEEE 802.11n Average RF Power – 20 MHz Bandwidth

Mode	Freq [MHz]	Channel	20MHz BW 802.11n (5GHz) Conducted Power [dBm]							
			Data Rate [Mbps]							
			6.5	13	19.5	26	39	52	58.5	65
802.11n	5180	36	12.06	12.22	12.25	12.39	12.29	12.40	12.35	12.29
802.11n	5200	40	12.11	12.27	12.30	12.44	12.34	12.45	12.40	12.34
802.11n	5220	44	12.17	12.33	12.36	12.50	12.40	12.51	12.46	12.40
802.11n	5240	48	12.15	12.31	12.34	12.48	12.38	12.49	12.44	12.38
802.11n	5260	52	11.93	11.95	12.15	12.24	12.25	12.31	12.27	12.25
802.11n	5280	56	12.11	12.13	12.33	12.42	12.43	12.49	12.45	12.43
802.11n	5300	60	12.01	12.03	12.23	12.32	12.33	12.39	12.35	12.33
802.11n	5320	64	12.09	12.11	12.31	12.40	12.41	12.47	12.43	12.41
802.11n	5500	100	11.57	11.59	11.67	11.79	11.71	11.97	11.96	11.83
802.11n	5520	104	11.51	11.53	11.61	11.73	11.65	11.91	11.90	11.77
802.11n	5540	108	11.62	11.64	11.72	11.84	11.76	12.02	12.01	11.88
802.11n	5560	112	11.55	11.57	11.65	11.77	11.69	11.95	11.94	11.81
802.11n	5580	116	11.61	11.63	11.71	11.83	11.75	12.01	12.00	11.87
802.11n	5600	120	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
802.11n	5620	124	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
802.11n	5640	128	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
802.11n	5660	132	11.65	11.67	11.75	11.87	11.79	12.05	12.04	11.91
802.11n	5680	136	11.84	11.86	11.94	12.06	11.98	12.24	12.23	12.10
802.11n	5700	140	11.57	11.59	11.67	11.79	11.71	11.97	11.96	11.83
802.11n	5720	144	11.44	11.46	11.54	11.66	11.58	11.84	11.83	11.70
802.11n	5745	149	12.16	12.13	12.21	12.19	12.25	12.44	12.24	12.32
802.11n	5765	153	12.09	12.06	12.14	12.12	12.18	12.37	12.17	12.25
802.11n	5785	157	12.02	11.99	12.07	12.05	12.11	12.30	12.10	12.18
802.11n	5805	161	12.01	11.98	12.06	12.04	12.10	12.29	12.09	12.17
802.11n	5825	165	11.82	11.79	11.87	11.85	11.91	12.10	11.90	11.98

Table 9-33
IEEE 802.11n Average RF Power – 40 MHz Bandwidth

Mode	Freq [MHz]	Channel	40MHz BW 802.11n (5GHz) Conducted Power [dBm]							
			Data Rate [Mbps]							
			13.5	27	40.5	54	81	108	121.5	135
802.11n	5190	38	11.62	11.82	11.57	11.84	11.86	11.83	11.81	11.85
802.11n	5230	46	11.73	11.93	11.68	11.95	11.97	11.94	11.92	11.96
802.11n	5270	54	11.33	11.35	11.11	11.34	11.59	11.53	11.43	11.55
802.11n	5310	62	11.24	11.26	11.02	11.25	11.50	11.44	11.34	11.46
802.11n	5510	102	11.12	11.09	10.95	11.23	11.25	11.23	11.28	11.21
802.11n	5550	110	11.24	11.21	11.07	11.35	11.37	11.35	11.40	11.33
802.11n	5590	118	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
802.11n	5630	126	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
802.11n	5670	134	11.21	11.18	11.04	11.32	11.34	11.32	11.37	11.30
802.11n	5710	142	11.19	11.16	11.02	11.30	11.32	11.30	11.35	11.28
802.11n	5755	151	11.95	12.09	11.94	12.07	12.02	12.05	11.88	12.04
802.11n	5795	159	11.79	11.93	11.78	11.91	11.86	11.89	11.72	11.88

Table 9-34
IEEE 802.11ac Average RF Power – 80 MHz Bandwidth

Mode	Freq [MHz]	Channel	80MHz BW 802.11ac (5GHz) Conducted Power [dBm]									
			Data Rate [Mbps]									
			29.3	58.5	87.8	117	175.5	234	263.3	292.5	351	390
802.11ac	5210	42	11.01	10.88	10.75	11.10	11.15	11.14	11.14	11.17	11.18	11.19
802.11ac	5290	58	11.15	10.93	10.80	11.24	11.06	11.14	11.12	11.09	11.20	11.21
802.11ac	5530	106	11.30	10.96	10.95	11.29	11.52	11.40	11.37	11.09	11.35	11.11
802.11ac	5690	138	11.47	11.27	11.33	11.43	11.46	11.54	11.49	11.45	11.39	11.54
802.11ac	5775	155	11.76	11.63	11.57	11.81	11.90	11.92	11.93	11.94	11.98	11.88

Justification for reduced test configurations for WIFI channels per KDB Publication 248227 D01v01r02 and October 2012/April 2013 FCC/TCB Meeting Notes:

- For 2.4 GHz operations, highest average RF output power channel for the lowest data rate for IEEE 802.11b were selected for SAR evaluation. Other IEEE 802.11 modes (including 802.11g/n/ac) were not investigated since the average output powers over all channels and data rates were not more than 0.25 dB higher than the tested channel in the lowest data rate of IEEE 802.11b mode.
- For 5 GHz operations, highest average RF output power channel for the lowest data rate for IEEE 802.11a were selected for SAR evaluation. Other IEEE 802.11 modes (including 802.11n 20 MHz and 40 MHz) were not investigated since the average output powers over all channels and data rates were not more than 0.25 dB higher than the tested channel in the lowest data rate of IEEE 802.11a mode.
- Full SAR tests for all IEEE 802.11ac configurations were not required because the average output power was not more than 0.25 dB higher than IEEE 802.11a mode. IEEE 802.11ac was evaluated for the highest IEEE 802.11a position in each 5 GHz band and exposure condition.
- When the maximum extrapolated peak SAR of the zoom scan for the maximum output channel is <1.6 W/kg and the reported 1g averaged SAR is <0.8 W/kg, SAR testing on other channels is not required. Otherwise, the other default (or corresponding required) test channels were additionally tested using the lowest data rate.
- The bolded data rate and channel above were tested for SAR.

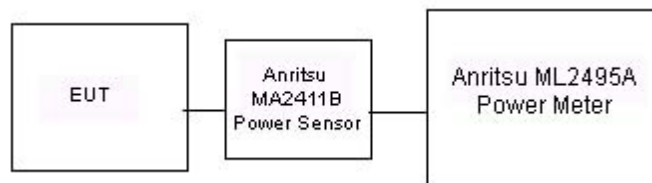


Figure 9-5
Power Measurement Setup for Bandwidths < 50 MHz

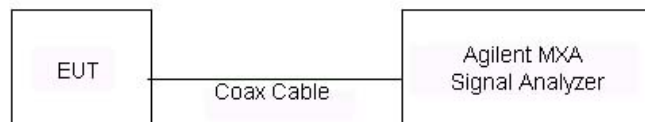


Figure 9-6
Power Measurement Setup for Bandwidths > 50 MHz

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10 SYSTEM VERIFICATION

10.1 Tissue Verification

Table 10-1
Measured Head Tissue Properties

Calibrated for Tests Performed on:	Tissue Type	Tissue Temp During Calibration (C°)	Measured Frequency (MHz)	Measured Conductivity, σ (S/m)	Measured Dielectric Constant, ϵ	TARGET Conductivity, σ (S/m)	TARGET Dielectric Constant, ϵ	% dev σ	% dev ϵ
10/27/2014	750H	20.5	695	0.872	43.140	0.889	42.227	-1.91%	2.16%
			710	0.888	42.921	0.890	42.149	-0.22%	1.83%
			725	0.902	42.709	0.891	42.071	1.23%	1.52%
			740	0.914	42.497	0.893	41.994	2.35%	1.20%
			755	0.930	42.306	0.894	41.916	4.03%	0.93%
10/21/2014	835H	23.2	820	0.924	43.045	0.899	41.578	2.78%	3.53%
			835	0.942	42.921	0.900	41.500	4.67%	3.42%
			850	0.954	42.747	0.916	41.500	4.15%	3.00%
10/24/2014	835H	22.3	820	0.924	42.397	0.899	41.578	2.78%	1.97%
			835	0.939	42.195	0.900	41.500	4.33%	1.67%
			850	0.952	42.029	0.916	41.500	3.93%	1.27%
10/28/2014	835H	21.5	820	0.909	41.042	0.899	41.578	1.11%	-1.29%
			835	0.923	40.863	0.900	41.500	2.56%	-1.53%
			850	0.937	40.676	0.916	41.500	2.29%	-1.99%
10/22/2014	1750H	22.8	1710	1.346	39.979	1.348	40.142	-0.15%	-0.41%
			1750	1.390	39.819	1.371	40.079	1.39%	-0.65%
			1790	1.429	39.628	1.394	40.016	2.51%	-0.97%
10/23/2014	1900H	22.6	1850	1.400	38.536	1.400	40.000	0.00%	-3.66%
			1880	1.432	38.416	1.400	40.000	2.29%	-3.96%
			1910	1.462	38.291	1.400	40.000	4.43%	-4.27%
10/21/2014	2450H	22.1	2401	1.718	38.423	1.756	39.287	-2.16%	-2.20%
			2450	1.782	38.251	1.800	39.200	-1.00%	-2.42%
			2500	1.847	38.093	1.855	39.136	-0.43%	-2.67%
			2550	1.892	37.893	1.909	39.073	-0.89%	-3.02%
			2600	1.944	37.702	1.964	39.009	-1.02%	-3.35%
10/28/2014	5200H-5800H	22.1	5180	4.482	36.337	4.635	36.009	-3.30%	0.91%
			5200	4.489	36.282	4.655	35.986	-3.57%	0.82%
			5220	4.521	36.276	4.676	35.963	-3.31%	0.87%
			5240	4.541	36.257	4.696	35.940	-3.30%	0.88%
			5280	4.574	36.210	4.737	35.894	-3.44%	0.88%
			5300	4.602	36.170	4.758	35.871	-3.28%	0.83%
			5320	4.640	36.137	4.778	35.849	-2.89%	0.80%
			5500	4.833	36.070	4.963	35.643	-2.62%	1.20%
			5520	4.853	36.044	4.983	35.620	-2.61%	1.19%
			5560	4.900	35.991	5.024	35.574	-2.47%	1.17%
			5600	4.949	36.010	5.065	35.529	-2.29%	1.35%
			5660	4.982	35.891	5.127	35.460	-2.83%	1.22%
			5680	5.011	35.850	5.147	35.437	-2.64%	1.17%
			5700	5.044	35.885	5.168	35.414	-2.40%	1.33%
			5745	5.056	35.833	5.214	35.363	-3.03%	1.33%
			5765	5.078	35.752	5.234	35.340	-2.98%	1.17%
			5785	5.106	35.678	5.255	35.317	-2.84%	1.02%
			5800	5.124	35.700	5.270	35.300	-2.77%	1.13%
			5805	5.133	35.672	5.275	35.294	-2.69%	1.07%
			5825	5.145	35.684	5.296	35.271	-2.85%	1.17%

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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Table 10-2
Measured Body Tissue Properties

Calibrated for Tests Performed on:	Tissue Type	Tissue Temp During Calibration (C°)	Measured Frequency (MHz)	Measured Conductivity, σ (S/m)	Measured Dielectric Constant, ϵ	TARGET Conductivity, σ (S/m)	TARGET Dielectric Constant, ϵ	% dev σ	% dev ϵ
10/20/2014	750B	21.0	695	0.915	56.197	0.959	55.745	-4.59%	0.81%
			710	0.931	56.005	0.960	55.687	-3.02%	0.57%
			725	0.945	55.792	0.961	55.629	-1.66%	0.29%
			740	0.960	55.636	0.963	55.570	-0.31%	0.12%
			755	0.976	55.503	0.964	55.512	1.24%	-0.02%
10/21/2014	835B	20.6	820	0.940	54.089	0.969	55.258	-2.99%	-2.12%
			835	0.954	53.934	0.970	55.200	-1.65%	-2.29%
			850	0.969	53.836	0.988	55.154	-1.92%	-2.39%
10/21/2014	1750B	22.4	1710	1.451	51.660	1.463	53.537	-0.82%	-3.51%
			1750	1.496	51.474	1.488	53.432	0.54%	-3.66%
			1790	1.538	51.334	1.514	53.326	1.59%	-3.74%
10/21/2014	1900B	21.0	1850	1.511	53.706	1.520	53.300	-0.59%	0.76%
			1880	1.553	53.613	1.520	53.300	2.17%	0.59%
			1910	1.584	53.550	1.520	53.300	4.21%	0.47%
10/20/2014	2450B	22.6	2401	1.977	50.914	1.903	52.765	3.89%	-3.51%
			2450	2.039	50.743	1.950	52.700	4.56%	-3.71%
			2499	2.106	50.548	2.019	52.638	4.31%	-3.97%
10/23/2014	2450B	22.9	2500	2.046	51.716	2.021	52.636	1.24%	-1.75%
			2550	2.119	51.515	2.092	52.573	1.29%	-2.01%
			2600	2.183	51.300	2.163	52.509	0.92%	-2.30%
10/20/2014	5200B-5800B	23.7	5200	5.286	48.674	5.299	49.014	-0.25%	-0.69%
			5220	5.307	48.656	5.323	48.987	-0.30%	-0.68%
			5240	5.348	48.652	5.346	48.960	0.04%	-0.63%
			5280	5.404	48.535	5.393	48.906	0.20%	-0.76%
			5300	5.417	48.492	5.416	48.879	0.02%	-0.79%
			5320	5.437	48.463	5.439	48.851	-0.04%	-0.79%
			5600	5.824	47.875	5.766	48.471	1.01%	-1.23%
			5660	5.900	47.823	5.837	48.390	1.08%	-1.17%
			5680	5.932	47.800	5.860	48.363	1.23%	-1.16%
			5700	5.960	47.769	5.883	48.336	1.31%	-1.17%
			5745	6.029	47.707	5.936	48.275	1.57%	-1.18%
			5765	6.068	47.734	5.959	48.248	1.83%	-1.07%
			5785	6.088	47.673	5.982	48.220	1.77%	-1.13%
			5800	6.121	47.717	6.000	48.200	2.02%	-1.00%

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 10-3
System Verification Results

System Verification TARGET & MEASURED												
SAR System #	Tissue Frequency (MHz)	Tissue Type	Date:	Amb. Temp (°C)	Liquid Temp (°C)	Input Power (W)	Dipole SN	Probe SN	Measured SAR _{1g} (W/kg)	1 W Target SAR _{1g} (W/kg)	1 W Normalized SAR _{1g} (W/kg)	Deviation _{1g} (%)
B	750	HEAD	10/27/2014	22.1	20.5	0.100	1046	3318	0.857	8.270	8.570	3.63%
I	835	HEAD	10/21/2014	23.3	23.2	0.100	4d119	3209	0.881	9.220	8.810	-4.45%
I	835	HEAD	10/24/2014	23.3	22.3	0.100	4d119	3209	0.873	9.220	8.730	-5.31%
C	835	HEAD	10/28/2014	22.6	21.5	0.100	4d132	3213	0.941	9.270	9.410	1.51%
J	1750	HEAD	10/22/2014	23.0	22.4	0.100	1008	3022	3.910	36.900	39.100	5.96%
J	1900	HEAD	10/23/2014	22.6	22.6	0.100	5d141	3022	4.150	40.100	41.500	3.49%
G	2450	HEAD	10/21/2014	24.3	23.1	0.100	797	3258	5.460	51.800	54.600	5.41%
G	2600	HEAD	10/21/2014	24.3	23.1	0.100	1004	3258	6.080	57.300	60.800	6.11%
A	5200	HEAD	10/28/2014	21.8	20.9	0.100	1120	3920	7.830	79.100	78.300	-1.01%
A	5300	HEAD	10/28/2014	21.8	20.9	0.100	1120	3920	8.400	83.400	84.000	0.72%
A	5500	HEAD	10/28/2014	21.8	20.9	0.100	1120	3920	8.310	84.900	83.100	-2.12%
A	5600	HEAD	10/28/2014	21.8	20.9	0.100	1120	3920	8.120	82.200	81.200	-1.22%
A	5800	HEAD	10/28/2014	21.8	20.7	0.100	1120	3920	8.000	79.100	80.000	1.14%
D	750	BODY	10/20/2014	22.1	21.0	0.100	1003	3263	0.878	8.770	8.780	0.11%
C	835	BODY	10/21/2014	21.4	20.6	0.100	4d132	3213	0.994	9.580	9.940	3.76%
J	1750	BODY	10/21/2014	22.6	22.4	0.100	1008	3022	4.010	37.600	40.100	6.65%
H	1900	BODY	10/21/2014	23.6	22.4	0.100	5d141	3319	4.260	40.600	42.600	4.93%
B	2450	BODY	10/20/2014	22.6	21.9	0.100	882	3318	5.330	49.500	53.300	7.68%
K	2600	BODY	10/23/2014	24.2	22.9	0.100	1004	3288	5.830	56.700	58.300	2.82%
A	5200	BODY	10/20/2014	21.7	22.6	0.100	1120	3920	7.510	74.000	75.100	1.49%
A	5300	BODY	10/20/2014	21.7	22.6	0.100	1120	3920	7.700	75.800	77.000	1.58%
A	5600	BODY	10/20/2014	21.7	22.6	0.100	1120	3920	8.140	79.400	81.400	2.52%
A	5800	BODY	10/20/2014	21.7	22.6	0.100	1120	3920	7.520	74.400	75.200	1.08%

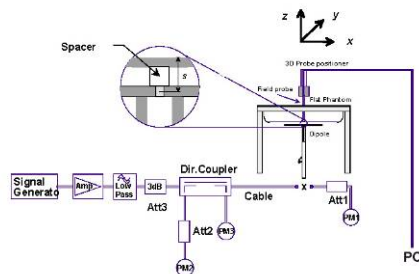


Figure 10-1
System Verification Setup Diagram



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 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	25.4	25.31	0.03	Right	Cheek	1GLSV	1:1	0.427	1.021	0.436	A1
820.10	564	CDMA BC10 (§90S)	RC3 / SO55	25.4	25.31	-0.11	Right	Tilt	1GLSV	1:1	0.234	1.021	0.239	
820.10	564	CDMA BC10 (§90S)	RC3 / SO55	25.4	25.31	0.09	Left	Cheek	1GLSV	1:1	0.354	1.021	0.361	
820.10	564	CDMA BC10 (§90S)	RC3 / SO55	25.4	25.31	-0.13	Left	Tilt	1GLSV	1:1	0.327	1.021	0.334	
820.10	564	CDMA BC10 (§90S)	EVDO Rev. A	25.4	25.02	-0.01	Right	Cheek	1GLSV	1:1	0.421	1.091	0.459	
820.10	564	CDMA BC10 (§90S)	EVDO Rev. A	25.4	25.02	0.02	Right	Tilt	1GLSV	1:1	0.270	1.091	0.295	
820.10	564	CDMA BC10 (§90S)	EVDO Rev. A	25.4	25.02	0.03	Left	Cheek	1GLSV	1:1	0.320	1.091	0.349	
820.10	564	CDMA BC10 (§90S)	EVDO Rev. A	25.4	25.02	0.12	Left	Tilt	1GLSV	1:1	0.204	1.091	0.223	
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 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	24.7	24.54	0.01	Right	Cheek	1GLSV	1:1	0.350	1.038	0.363	
836.52	384	CDMA BC0 (§22H)	RC3 / SO55	24.7	24.54	0.05	Right	Tilt	1GLSV	1:1	0.187	1.038	0.194	
836.52	384	CDMA BC0 (§22H)	RC3 / SO55	24.7	24.54	-0.05	Left	Cheek	1GLSV	1:1	0.320	1.038	0.332	
836.52	384	CDMA BC0 (§22H)	RC3 / SO55	24.7	24.54	0.19	Left	Tilt	1GLSV	1:1	0.164	1.038	0.170	
836.52	384	CDMA BC0 (§22H)	EVDO Rev. A	24.7	24.58	-0.03	Right	Cheek	1GLSV	1:1	0.371	1.028	0.381	A2
836.52	384	CDMA BC0 (§22H)	EVDO Rev. A	24.7	24.58	0.04	Right	Tilt	1GLSV	1:1	0.212	1.028	0.218	
836.52	384	CDMA BC0 (§22H)	EVDO Rev. A	24.7	24.58	0.02	Left	Cheek	1GLSV	1:1	0.301	1.028	0.309	
836.52	384	CDMA BC0 (§22H)	EVDO Rev. A	24.7	24.58	0.11	Left	Tilt	1GLSV	1:1	0.174	1.028	0.179	
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
PCS CDMA Head SAR

MEASUREMENT RESULTS														
FREQUENCY		Mode/Band	Service	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Power Drift [dB]	Side	Test Position	Device Serial Number	Duty Cycle	SAR (1g)	Scaling Factor	Scaled SAR (1g)	Plot #
MHz	Ch.										(W/kg)		(W/kg)	
1880.00	600	PCS CDMA	RC3 / SO55	24.7	24.65	0.03	Right	Cheek	1GLSV	1:1	0.526	1.012	0.532	
1880.00	600	PCS CDMA	RC3 / SO55	24.7	24.65	0.02	Right	Tilt	1GLSV	1:1	0.154	1.012	0.156	
1880.00	600	PCS CDMA	RC3 / SO55	24.7	24.65	-0.04	Left	Cheek	1GLSV	1:1	0.293	1.012	0.297	
1880.00	600	PCS CDMA	RC3 / SO55	24.7	24.65	0.05	Left	Tilt	1GLSV	1:1	0.148	1.012	0.150	
1880.00	600	PCS CDMA	EVDO Rev. A	24.7	24.66	-0.08	Right	Cheek	1GLSV	1:1	0.553	1.009	0.558	A3
1880.00	600	PCS CDMA	EVDO Rev. A	24.7	24.66	0.09	Right	Tilt	1GLSV	1:1	0.161	1.009	0.162	
1880.00	600	PCS CDMA	EVDO Rev. A	24.7	24.66	-0.07	Left	Cheek	1GLSV	1:1	0.282	1.009	0.285	
1880.00	600	PCS CDMA	EVDO Rev. A	24.7	24.66	0.02	Left	Tilt	1GLSV	1:1	0.147	1.009	0.148	
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	Maxim um 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	33.2	33.05	0.01	Right	Cheek	1FMQW	1	1:8.3	0.238	1.035	0.246	
836.60	190	GSM 850	GSM	33.2	33.05	0.13	Right	Tilt	1FMQW	1	1:8.3	0.125	1.035	0.129	
836.60	190	GSM 850	GSM	33.2	33.05	0.14	Left	Cheek	1FMQW	1	1:8.3	0.100	1.035	0.104	
836.60	190	GSM 850	GSM	33.2	33.05	0.12	Left	Tilt	1FMQW	1	1:8.3	0.108	1.035	0.112	
836.60	190	GSM 850	GPRS	31.2	31.02	0.02	Right	Cheek	1FMQW	2	1:4.15	0.344	1.042	0.358	A4
836.60	190	GSM 850	GPRS	31.2	31.02	0.10	Right	Tilt	1FMQW	2	1:4.15	0.185	1.042	0.193	
836.60	190	GSM 850	GPRS	31.2	31.02	0.05	Left	Cheek	1FMQW	2	1:4.15	0.309	1.042	0.322	
836.60	190	GSM 850	GPRS	31.2	31.02	0.05	Left	Tilt	1FMQW	2	1:4.15	0.165	1.042	0.172	
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	30.7	30.48	-0.16	Right	Cheek	1FMQW	1	1:8.3	0.221	1.052	0.232	
1880.00	661	GSM 1900	GSM	30.7	30.48	0.00	Right	Tilt	1FMQW	1	1:8.3	0.061	1.052	0.064	
1880.00	661	GSM 1900	GSM	30.7	30.48	0.01	Left	Cheek	1FMQW	1	1:8.3	0.107	1.052	0.113	
1880.00	661	GSM 1900	GSM	30.7	30.48	0.13	Left	Tilt	1FMQW	1	1:8.3	0.059	1.052	0.062	
1880.00	661	GSM 1900	GPRS	28.7	28.68	-0.16	Right	Cheek	1FMQW	2	1:4.15	0.297	1.005	0.298	A5
1880.00	661	GSM 1900	GPRS	28.7	28.68	-0.08	Right	Tilt	1FMQW	2	1:4.15	0.077	1.005	0.077	
1880.00	661	GSM 1900	GPRS	28.7	28.68	0.13	Left	Cheek	1FMQW	2	1:4.15	0.128	1.005	0.129	
1880.00	661	GSM 1900	GPRS	28.7	28.68	-0.03	Left	Tilt	1FMQW	2	1:4.15	0.072	1.005	0.072	
ANSI / IEEE C95.1 1992 - SAFETY LIMIT								Head							
Spatial Peak								1.6 W/kg (mW/g)							
Uncontrolled Exposure/General Population								averaged over 1 gram							

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Table 11-6
UMTS 850 Head SAR

MEASUREMENT RESULTS														
FREQUENCY		Mode/Band	Service	Maxim um 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	23.7	23.60	0.03	Right	Cheek	1FMQW	1:1	0.274	1.023	0.280	A6
836.60	4183	UMTS 850	RMC	23.7	23.60	0.06	Right	Tilt	1FMQW	1:1	0.151	1.023	0.154	
836.60	4183	UMTS 850	RMC	23.7	23.60	0.07	Left	Cheek	1FMQW	1:1	0.243	1.023	0.249	
836.60	4183	UMTS 850	RMC	23.7	23.60	0.09	Left	Tilt	1FMQW	1:1	0.133	1.023	0.136	
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	23.7	23.49	-0.05	Right	Cheek	1FMQW	1:1	0.424	1.050	0.445	A7
1880.00	9400	UMTS 1900	RMC	23.7	23.49	0.10	Right	Tilt	1FMQW	1:1	0.104	1.050	0.109	
1880.00	9400	UMTS 1900	RMC	23.7	23.49	-0.18	Left	Cheek	1FMQW	1:1	0.191	1.050	0.201	
1880.00	9400	UMTS 1900	RMC	23.7	23.49	-0.08	Left	Tilt	1FMQW	1:1	0.107	1.050	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 11-8
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	23.7	23.61	0.12	0	Right	Cheek	QPSK	1	0	1GLRX	1:1	0.170	1.021	0.174	A8
707.50	23095	Mid	LTE Band 12	10	22.7	22.62	-0.06	1	Right	Cheek	QPSK	25	0	1GLRX	1:1	0.141	1.019	0.144	
707.50	23095	Mid	LTE Band 12	10	23.7	23.61	-0.11	0	Right	Tilt	QPSK	1	0	1GLRX	1:1	0.112	1.021	0.114	
707.50	23095	Mid	LTE Band 12	10	22.7	22.62	-0.03	1	Right	Tilt	QPSK	25	0	1GLRX	1:1	0.087	1.019	0.089	
707.50	23095	Mid	LTE Band 12	10	23.7	23.61	0.00	0	Left	Cheek	QPSK	1	0	1GLRX	1:1	0.149	1.021	0.152	
707.50	23095	Mid	LTE Band 12	10	22.7	22.62	0.13	1	Left	Cheek	QPSK	25	0	1GLRX	1:1	0.119	1.019	0.121	
707.50	23095	Mid	LTE Band 12	10	23.7	23.61	0.21	0	Left	Tilt	QPSK	1	0	1GLRX	1:1	0.087	1.021	0.089	
707.50	23095	Mid	LTE Band 12	10	22.7	22.62	0.15	1	Left	Tilt	QPSK	25	0	1GLRX	1:1	0.075	1.019	0.076	
ANSI / IEEE C95.1 1992 - SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population									Head 1.6 W/kg (mW/g) averaged over 1 gram										

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

MEASUREMENT RESULTS																			
FREQUENCY		Mode	Bandwidth [MHz]	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Power Drift [dB]	MPR [dB]	Side	Test Position	Modulation	RB Size	RB Offset	Device Serial Number	Duty Cycle	SAR (1g)	Scaling Factor	Scaled SAR (1g)	Plot #	
MHz	Ch.														(W/kg)		(W/kg)		
831.50	26865	Mid	LTE Band 26 (Cell)	15	24.2	24.19	-0.06	0	Right	Cheek	QPSK	1	36	1GLRW	1:1	0.260	1.002	0.261	A9
831.50	26865	Mid	LTE Band 26 (Cell)	15	23.2	23.18	0.07	1	Right	Cheek	QPSK	36	37	1GLRW	1:1	0.201	1.005	0.202	
831.50	26865	Mid	LTE Band 26 (Cell)	15	24.2	24.19	-0.12	0	Right	Tilt	QPSK	1	36	1GLRW	1:1	0.162	1.002	0.162	
831.50	26865	Mid	LTE Band 26 (Cell)	15	23.2	23.18	0.11	1	Right	Tilt	QPSK	36	37	1GLRW	1:1	0.122	1.005	0.123	
831.50	26865	Mid	LTE Band 26 (Cell)	15	24.2	24.19	-0.02	0	Left	Cheek	QPSK	1	36	1GLRW	1:1	0.210	1.002	0.210	
831.50	26865	Mid	LTE Band 26 (Cell)	15	23.2	23.18	0.00	1	Left	Cheek	QPSK	36	37	1GLRW	1:1	0.167	1.005	0.168	
831.50	26865	Mid	LTE Band 26 (Cell)	15	24.2	24.19	-0.07	0	Left	Tilt	QPSK	1	36	1GLRW	1:1	0.137	1.002	0.137	
831.50	26865	Mid	LTE Band 26 (Cell)	15	23.2	23.18	0.09	1	Left	Tilt	QPSK	36	37	1GLRW	1:1	0.109	1.005	0.110	
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 11-10
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	24.2	24.18	-0.06	0	Right	Cheek	QPSK	1	99	1GLRW	1:1	0.441	1.005	0.443	A10
1732.50	20175	Mid	LTE Band 4 (AWS)	20	23.2	22.96	-0.08	1	Right	Cheek	QPSK	50	0	1GLRW	1:1	0.264	1.057	0.279	
1732.50	20175	Mid	LTE Band 4 (AWS)	20	24.2	24.18	0.04	0	Right	Tilt	QPSK	1	99	1GLRW	1:1	0.234	1.005	0.235	
1732.50	20175	Mid	LTE Band 4 (AWS)	20	23.2	22.96	0.07	1	Right	Tilt	QPSK	50	0	1GLRW	1:1	0.127	1.057	0.134	
1732.50	20175	Mid	LTE Band 4 (AWS)	20	24.2	24.18	0.03	0	Left	Cheek	QPSK	1	99	1GLRW	1:1	0.183	1.005	0.184	
1732.50	20175	Mid	LTE Band 4 (AWS)	20	23.2	22.96	-0.01	1	Left	Cheek	QPSK	50	0	1GLRW	1:1	0.110	1.057	0.116	
1732.50	20175	Mid	LTE Band 4 (AWS)	20	24.2	24.18	-0.06	0	Left	Tilt	QPSK	1	99	1GLRW	1:1	0.213	1.005	0.214	
1732.50	20175	Mid	LTE Band 4 (AWS)	20	23.2	22.96	0.12	1	Left	Tilt	QPSK	50	0	1GLRW	1:1	0.120	1.057	0.127	
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 11-11
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)			
1882.50	26365	Mid	LTE Band 25 (PCS)	20	24.2	23.99	-0.01	0	Right	Cheek	QPSK	1	0	1GLRX	1:1	0.372	1.050	0.391	A11
1882.50	26365	Mid	LTE Band 25 (PCS)	20	23.2	22.99	0.03	1	Right	Cheek	QPSK	50	25	1GLRX	1:1	0.276	1.050	0.290	
1882.50	26365	Mid	LTE Band 25 (PCS)	20	24.2	23.99	0.18	0	Right	Tilt	QPSK	1	0	1GLRX	1:1	0.099	1.050	0.104	
1882.50	26365	Mid	LTE Band 25 (PCS)	20	23.2	22.99	0.09	1	Right	Tilt	QPSK	50	25	1GLRX	1:1	0.079	1.050	0.083	
1882.50	26365	Mid	LTE Band 25 (PCS)	20	24.2	23.99	0.06	0	Left	Cheek	QPSK	1	0	1GLRX	1:1	0.163	1.050	0.171	
1882.50	26365	Mid	LTE Band 25 (PCS)	20	23.2	22.99	0.04	1	Left	Cheek	QPSK	50	25	1GLRX	1:1	0.105	1.050	0.110	
1882.50	26365	Mid	LTE Band 25 (PCS)	20	24.2	23.99	-0.02	0	Left	Tilt	QPSK	1	0	1GLRX	1:1	0.107	1.050	0.112	
1882.50	26365	Mid	LTE Band 25 (PCS)	20	23.2	22.99	0.02	1	Left	Tilt	QPSK	50	25	1GLRX	1:1	0.071	1.050	0.075	
ANSI / IEEE C95.1 1992 - SAFETY LIMIT										Head									
Spatial Peak										1.6 W/kg (mW/g)									
Uncontrolled Exposure/General Population										averaged over 1 gram									

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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 (Cond. Power)	Scaling Factor (CP Duty)	Scaled SAR (1g)	Plot #	
MHz	Ch.														(W/kg)			(W/kg)		
2593.00	40620	Mid	LTE Band 41	20	24.2	24.11	-0.03	0	Right	Cheek	QPSK	1	50	1GLRW	1:1.59	0.233	1.021	1.010	0.240	
2593.00	40620	Mid	LTE Band 41	20	23.2	23.12	0.02	1	Right	Cheek	QPSK	50	50	1GLRW	1:1.59	0.186	1.019	1.010	0.191	
2593.00	40620	Mid	LTE Band 41	20	24.2	24.11	-0.01	0	Right	Tilt	QPSK	1	50	1GLRW	1:1.59	0.254	1.021	1.010	0.262	
2593.00	40620	Mid	LTE Band 41	20	23.2	23.12	0.04	1	Right	Tilt	QPSK	50	50	1GLRW	1:1.59	0.195	1.019	1.010	0.201	
2593.00	40620	Mid	LTE Band 41	20	24.2	24.11	0.09	0	Left	Cheek	QPSK	1	50	1GLRW	1:1.59	0.543	1.021	1.010	0.560	A12
2593.00	40620	Mid	LTE Band 41	20	23.2	23.12	-0.08	1	Left	Cheek	QPSK	50	50	1GLRW	1:1.59	0.426	1.019	1.010	0.438	
2593.00	40620	Mid	LTE Band 41	20	24.2	24.11	-0.09	0	Left	Tilt	QPSK	1	50	1GLRW	1:1.59	0.178	1.021	1.010	0.184	
2593.00	40620	Mid	LTE Band 41	20	23.2	23.12	0.03	1	Left	Tilt	QPSK	50	50	1GLRW	1:1.59	0.136	1.019	1.010	0.140	
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	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Power Drift [dB]	Side	Test Position	Device Serial Number	Data Rate (Mbps)	Duty Cycle	SAR (1g)	Scaling Factor	Scaled SAR (1g) (W/kg)	Plot #
MHz	Ch.											(W/kg)			
2462	11	IEEE 802.11b	DSSS	14.5	13.57	0.07	Right	Cheek	1FMQT	1	1:1	0.515	1.239	0.638	A13
2462	11	IEEE 802.11b	DSSS	14.5	13.57	0.13	Right	Tilt	1FMQT	1	1:1	0.350	1.239	0.434	
2462	11	IEEE 802.11b	DSSS	14.5	13.57	0.06	Left	Cheek	1FMQT	1	1:1	0.254	1.239	0.315	
2462	11	IEEE 802.11b	DSSS	14.5	13.57	0.09	Left	Tilt	1FMQT	1	1:1	0.224	1.239	0.278	
ANSI / IEEE C95.1 1992 - SAFETY LIMIT									Head						
Spatial Peak									1.6 W/kg (mW/g)						
Uncontrolled Exposure/General Population									averaged over 1 gram						

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**Table 11-14
NII Head SAR**

MEASUREMENT RESULTS															
FREQUENCY		Mode	Service	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Power Drift [dB]	Side	Test Position	Device Serial Number	Data Rate (Mbps)	Duty Cycle	SAR (1g)	Scaling Factor	Scaled SAR (1g)	Plot #
MHz	Ch.											(W/kg)		(W/kg)	
5180	36	IEEE 802.11a	OFDM	14.5	13.20	-0.20	Right	Cheek	1FMQT	6	1:1	0.437	1.349	0.590	
5240	48	IEEE 802.11a	OFDM	14.5	13.32	0.00	Right	Cheek	1FMQT	6	1:1	0.470	1.312	0.617	A14
5210	42	IEEE 802.11ac	OFDM	12.5	11.01	0.14	Right	Cheek	1FMQT	29.3	1:1	0.205	1.409	0.289	
5240	48	IEEE 802.11a	OFDM	14.5	13.32	0.19	Right	Tilt	1FMQT	6	1:1	0.248	1.312	0.325	
5240	48	IEEE 802.11a	OFDM	14.5	13.32	0.17	Left	Cheek	1FMQT	6	1:1	0.199	1.312	0.261	
5240	48	IEEE 802.11a	OFDM	14.5	13.32	-0.09	Left	Tilt	1FMQT	6	1:1	0.229	1.312	0.300	
5280	56	IEEE 802.11a	OFDM	14.5	13.08	0.20	Right	Cheek	1FMQT	6	1:1	0.405	1.387	0.562	
5320	64	IEEE 802.11a	OFDM	14.5	13.34	0.04	Right	Cheek	1FMQT	6	1:1	0.394	1.306	0.515	
5290	58	IEEE 802.11ac	OFDM	12.5	11.15	-0.09	Right	Cheek	1FMQT	29.3	1:1	0.188	1.365	0.257	
5320	64	IEEE 802.11a	OFDM	14.5	13.34	0.21	Right	Tilt	1FMQT	6	1:1	0.239	1.306	0.312	
5320	64	IEEE 802.11a	OFDM	14.5	13.34	0.19	Left	Cheek	1FMQT	6	1:1	0.227	1.306	0.296	
5320	64	IEEE 802.11a	OFDM	14.5	13.34	0.15	Left	Tilt	1FMQT	6	1:1	0.212	1.306	0.277	
5520	104	IEEE 802.11a	OFDM	14.5	12.93	0.09	Right	Cheek	1FMQT	6	1:1	0.355	1.435	0.509	
5560	112	IEEE 802.11a	OFDM	14.5	12.94	0.15	Right	Cheek	1FMQT	6	1:1	0.404	1.432	0.579	
5660	132	IEEE 802.11a	OFDM	14.5	13.07	0.16	Right	Cheek	1FMQT	6	1:1	0.426	1.390	0.592	
5690	138	IEEE 802.11ac	OFDM	12.5	11.47	0.14	Right	Cheek	1FMQT	29.3	1:1	0.180	1.268	0.228	
5660	132	IEEE 802.11a	OFDM	14.5	13.07	0.18	Right	Tilt	1FMQT	6	1:1	0.283	1.390	0.393	
5660	132	IEEE 802.11a	OFDM	14.5	13.07	0.19	Left	Cheek	1FMQT	6	1:1	0.284	1.390	0.395	
5660	132	IEEE 802.11a	OFDM	14.5	13.07	0.16	Left	Tilt	1FMQT	6	1:1	0.288	1.390	0.400	
5745	149	IEEE 802.11a	OFDM	14.5	13.17	0.17	Right	Cheek	1FMQT	6	1:1	0.418	1.358	0.568	
5805	161	IEEE 802.11a	OFDM	14.5	12.83	0.01	Right	Cheek	1FMQT	6	1:1	0.402	1.469	0.591	
5825	165	IEEE 802.11a	OFDM	14.5	12.80	-0.14	Right	Cheek	1FMQT	6	1:1	0.385	1.479	0.569	
5775	155	IEEE 802.11ac	OFDM	12.5	11.76	0.16	Right	Cheek	1FMQT	29.3	1:1	0.174	1.186	0.206	
5745	149	IEEE 802.11a	OFDM	14.5	13.17	0.13	Right	Tilt	1FMQT	6	1:1	0.316	1.358	0.429	
5745	149	IEEE 802.11a	OFDM	14.5	13.17	0.18	Left	Cheek	1FMQT	6	1:1	0.349	1.358	0.474	
5745	149	IEEE 802.11a	OFDM	14.5	13.17	0.05	Left	Tilt	1FMQT	6	1:1	0.331	1.358	0.449	
ANSI / IEEE C95.1 1992 - SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population								Head 1.6 W/kg (mW/g) averaged over 1 gram							

11.2 Standalone Body-Worn SAR Data

**Table 11-15
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	25.4	25.31	0.01	8 mm	1GLSV	N/A	1:1	back	0.548	1.021	0.560	A15
836.52	384	CDMA BC0 (§22H)	TDSO / SO32	24.7	24.57	-0.01	8 mm	1GLSV	N/A	1:1	back	0.405	1.030	0.417	A17
1880.00	600	PCS CDMA	TDSO / SO32	24.7	24.67	-0.04	8 mm	1GLSV	N/A	1:1	back	0.585	1.007	0.589	A19
836.60	190	GSM 850	GSM	33.2	33.05	-0.04	8 mm	1FMQW	1	1:8.3	back	0.269	1.035	0.278	
836.60	190	GSM 850	GPRS	31.2	31.02	0.00	8 mm	1FMQW	2	1:4.15	back	0.362	1.042	0.377	A21
1880.00	661	GSM 1900	GSM	30.7	30.48	-0.09	8 mm	1FMQW	1	1:8.3	back	0.226	1.052	0.238	
1880.00	661	GSM 1900	GPRS	28.7	28.68	-0.05	8 mm	1FMQW	2	1:4.15	back	0.273	1.005	0.274	A23
836.60	4183	UMTS 850	RMC	23.7	23.60	0.00	8 mm	1FMQW	N/A	1:1	back	0.336	1.023	0.344	A25
1880.00	9400	UMTS 1900	RMC	23.7	23.49	-0.06	8 mm	1FMQW	N/A	1:1	back	0.410	1.050	0.431	A27
ANSI / IEEE C95.1 1992 - SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population								Body 1.6 W/kg (mW/g) averaged over 1 gram							

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Table 11-16
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)	Scaling Factor (Cond. Power)	Scaling Factor (CP Duty)	Scaled SAR (1g)	Plot #	
MHz	Ch.														(W/kg)		(W/kg)			
707.50	23095	Mid	LTE Band 12	10	23.7	23.61	0.04	0	1GLRW	QPSK	1	0	8 mm	back	1:1	0.215	1.021	N/A	0.220	A29
707.50	23095	Mid	LTE Band 12	10	22.7	22.62	-0.09	1	1GLRW	QPSK	25	0	8 mm	back	1:1	0.188	1.019	N/A	0.192	
831.50	26865	Mid	LTE Band 26 (Cell)	15	24.2	24.19	0.01	0	1GLRX	QPSK	1	36	8 mm	back	1:1	0.279	1.002	N/A	0.280	A31
831.50	26865	Mid	LTE Band 26 (Cell)	15	23.2	23.18	-0.07	1	1GLRX	QPSK	36	37	8 mm	back	1:1	0.230	1.005	N/A	0.231	
1732.50	20175	Mid	LTE Band 4 (AWS)	20	24.2	24.18	0.13	0	1GLRW	QPSK	1	99	8 mm	back	1:1	0.605	1.005	N/A	0.608	A33
1732.50	20175	Mid	LTE Band 4 (AWS)	20	23.2	22.96	-0.10	1	1GLRW	QPSK	50	0	8 mm	back	1:1	0.393	1.057	N/A	0.415	
1882.50	26365	Mid	LTE Band 25 (PCS)	20	24.2	23.99	0.11	0	1GLRX	QPSK	1	0	8 mm	back	1:1	0.383	1.050	N/A	0.402	A34
1882.50	26365	Mid	LTE Band 25 (PCS)	20	23.2	22.99	-0.02	1	1GLRX	QPSK	50	25	8 mm	back	1:1	0.298	1.050	N/A	0.313	
2593.00	40620	Mid	LTE Band 41	20	24.2	24.11	-0.11	0	1GLRW	QPSK	1	50	8 mm	back	1:1.59	0.202	1.021	1.010	0.208	A36
2593.00	40620	Mid	LTE Band 41	20	23.2	23.12	-0.03	1	1GLRW	QPSK	50	50	8 mm	back	1:1.59	0.163	1.019	1.010	0.168	
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	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Power Drift [dB]	Spacing	Device Serial Number	Data Rate (Mbps)	Side	Duty Cycle	SAR (1g)	Scaling Factor	Scale d SAR (1g)	Plot #
MHz	Ch.											(W/kg)		(W/kg)	
2462	11	IEEE 802.11b	DSSS	14.5	13.57	-0.10	8 mm	1FMQT	1	back	1:1	0.117	1.239	0.145	A38
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	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Power Drift [dB]	Spacing	Device Serial Number	Data Rate (Mbps)	Side	Duty Cycle	SAR (1g)	Scaling Factor	Scaled SAR (1g)	Plot #
MHz	Ch.											(W/kg)		(W/kg)	
5240	48	IEEE 802.11a	OFDM	14.5	13.32	0.21	8 mm	1FMQT	6	back	1:1	0.116	1.312	0.152	
5210	42	IEEE 802.11ac	OFDM	12.5	11.01	-0.16	8 mm	1FMQT	29.3	back	1:1	0.058	1.409	0.082	
5320	64	IEEE 802.11a	OFDM	14.5	13.34	-0.04	8 mm	1FMQT	6	back	1:1	0.113	1.306	0.148	
5290	58	IEEE 802.11ac	OFDM	12.5	11.15	0.16	8 mm	1FMQT	29.3	back	1:1	0.059	1.365	0.081	
5660	132	IEEE 802.11a	OFDM	14.5	13.07	-0.12	8 mm	1FMQT	6	back	1:1	0.195	1.390	0.271	A39
5690	138	IEEE 802.11ac	OFDM	12.5	11.47	0.11	8 mm	1FMQT	29.3	back	1:1	0.091	1.268	0.115	
5745	149	IEEE 802.11a	OFDM	14.5	13.17	0.20	8 mm	1FMQT	6	back	1:1	0.187	1.358	0.254	
5775	155	IEEE 802.11ac	OFDM	12.5	11.76	-0.21	8 mm	1FMQT	29.3	back	1:1	0.087	1.186	0.103	
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
GPRS/UMTS/CDMA Hotspot SAR Data

MEASUREMENT RESULTS															
FREQUENCY		Mode	Service	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Power Drift [dB]	Spacing	Device Serial Number	# of GPRS Slots	Duty Cycle	Side	SAR (1g)	Scaling Factor	Scaled SAR (1g)	Plot #
MHz	Ch.											(W/kg)		(W/kg)	
820.10	564	CDMA BC10 (\$90S)	EVDO Rev. 0	25.4	25.07	0.03	8 mm	1GLSV	N/A	1:1	back	0.512	1.079	0.552	A16
820.10	564	CDMA BC10 (\$90S)	EVDO Rev. 0	25.4	25.07	-0.03	8 mm	1GLSV	N/A	1:1	front	0.574	1.079	0.619	
820.10	564	CDMA BC10 (\$90S)	EVDO Rev. 0	25.4	25.07	0.02	10 mm	1GLSV	N/A	1:1	bottom	0.319	1.079	0.344	
820.10	564	CDMA BC10 (\$90S)	EVDO Rev. 0	25.4	25.07	0.01	10 mm	1GLSV	N/A	1:1	right	0.537	1.079	0.579	
820.10	564	CDMA BC10 (\$90S)	EVDO Rev. 0	25.4	25.07	0.04	10 mm	1GLSV	N/A	1:1	left	0.369	1.079	0.398	
836.52	384	CDMA BC0 (\$22H)	EVDO Rev. 0	24.7	24.59	0.00	8 mm	1GLSV	N/A	1:1	back	0.413	1.026	0.424	A18
836.52	384	CDMA BC0 (\$22H)	EVDO Rev. 0	24.7	24.59	0.12	8 mm	1GLSV	N/A	1:1	front	0.313	1.026	0.321	
836.52	384	CDMA BC0 (\$22H)	EVDO Rev. 0	24.7	24.59	-0.01	10 mm	1GLSV	N/A	1:1	bottom	0.278	1.026	0.285	
836.52	384	CDMA BC0 (\$22H)	EVDO Rev. 0	24.7	24.59	-0.01	10 mm	1GLSV	N/A	1:1	right	0.459	1.026	0.471	
836.52	384	CDMA BC0 (\$22H)	EVDO Rev. 0	24.7	24.59	-0.05	10 mm	1GLSV	N/A	1:1	left	0.317	1.026	0.325	
1880.00	600	PCS CDMA	EVDO Rev. 0	24.7	24.68	-0.05	8 mm	1GLSV	N/A	1:1	back	0.639	1.005	0.642	A20
1880.00	600	PCS CDMA	EVDO Rev. 0	24.7	24.68	-0.05	8 mm	1GLSV	N/A	1:1	front	0.592	1.005	0.595	A22
1880.00	600	PCS CDMA	EVDO Rev. 0	24.7	24.68	0.01	10 mm	1GLSV	N/A	1:1	bottom	0.458	1.005	0.460	
1880.00	600	PCS CDMA	EVDO Rev. 0	24.7	24.68	0.02	10 mm	1GLSV	N/A	1:1	right	0.421	1.005	0.423	
1880.00	600	PCS CDMA	EVDO Rev. 0	24.7	24.68	-0.01	10 mm	1GLSV	N/A	1:1	left	0.114	1.005	0.115	
836.60	190	GSM 850	GPRS	31.2	31.02	0.00	8 mm	1FMQW	2	1:4.15	back	0.362	1.042	0.377	
836.60	190	GSM 850	GPRS	31.2	31.02	-0.01	8 mm	1FMQW	2	1:4.15	front	0.327	1.042	0.341	A24
836.60	190	GSM 850	GPRS	31.2	31.02	0.00	10 mm	1FMQW	2	1:4.15	bottom	0.279	1.042	0.291	
836.60	190	GSM 850	GPRS	31.2	31.02	0.17	10 mm	1FMQW	2	1:4.15	right	0.393	1.042	0.410	
836.60	190	GSM 850	GPRS	31.2	31.02	-0.02	10 mm	1FMQW	2	1:4.15	left	0.289	1.042	0.301	
1880.00	661	GSM 1900	GPRS	28.7	28.68	-0.05	8 mm	1FMQW	2	1:4.15	back	0.273	1.005	0.274	
1880.00	661	GSM 1900	GPRS	28.7	28.68	0.04	8 mm	1FMQW	2	1:4.15	front	0.311	1.005	0.313	A26
1880.00	661	GSM 1900	GPRS	28.7	28.68	-0.18	10 mm	1FMQW	2	1:4.15	bottom	0.199	1.005	0.200	
1880.00	661	GSM 1900	GPRS	28.7	28.68	-0.02	10 mm	1FMQW	2	1:4.15	right	0.210	1.005	0.211	
1880.00	661	GSM 1900	GPRS	28.7	28.68	0.08	10 mm	1FMQW	2	1:4.15	left	0.047	1.005	0.047	
836.60	4183	UMTS 850	RMC	23.7	23.60	0.00	8 mm	1FMQW	N/A	1:1	back	0.336	1.023	0.344	
836.60	4183	UMTS 850	RMC	23.7	23.60	0.05	8 mm	1FMQW	N/A	1:1	front	0.284	1.023	0.291	A28
836.60	4183	UMTS 850	RMC	23.7	23.60	0.01	10 mm	1FMQW	N/A	1:1	bottom	0.230	1.023	0.235	
836.60	4183	UMTS 850	RMC	23.7	23.60	0.00	10 mm	1FMQW	N/A	1:1	right	0.339	1.023	0.347	
836.60	4183	UMTS 850	RMC	23.7	23.60	0.01	10 mm	1FMQW	N/A	1:1	left	0.249	1.023	0.255	
1880.00	9400	UMTS 1900	RMC	23.7	23.49	-0.06	8 mm	1FMQW	N/A	1:1	back	0.410	1.050	0.431	
1880.00	9400	UMTS 1900	RMC	23.7	23.49	-0.02	8 mm	1FMQW	N/A	1:1	front	0.442	1.050	0.464	A28
1880.00	9400	UMTS 1900	RMC	23.7	23.49	0.00	10 mm	1FMQW	N/A	1:1	bottom	0.331	1.050	0.348	
1880.00	9400	UMTS 1900	RMC	23.7	23.49	0.01	10 mm	1FMQW	N/A	1:1	right	0.300	1.050	0.315	
1880.00	9400	UMTS 1900	RMC	23.7	23.49	0.00	10 mm	1FMQW	N/A	1:1	left	0.081	1.050	0.085	
ANSI / IEEE C95.1 1992 - SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population							Body 1.6 W/kg (mW/g) averaged over 1 gram								

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Table 11-20
LTE Band 12 Hotspot SAR Data

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	23.7	23.61	0.04	0	1GLRW	QPSK	1	0	8 mm	back	1:1	0.215	1.021	0.220	
707.50	23095	Mid	LTE Band 12	10	22.7	22.62	-0.09	1	1GLRW	QPSK	25	0	8 mm	back	1:1	0.188	1.019	0.192	
707.50	23095	Mid	LTE Band 12	10	23.7	23.61	-0.05	0	1GLRW	QPSK	1	0	8 mm	front	1:1	0.203	1.021	0.207	
704.00	23060	Low	LTE Band 12	10	22.7	22.62	0.01	1	1GLRW	QPSK	25	0	8 mm	front	1:1	0.178	1.019	0.181	
707.50	23095	Mid	LTE Band 12	10	23.7	23.61	0.03	0	1GLRW	QPSK	1	0	10 mm	bottom	1:1	0.083	1.021	0.085	
707.50	23095	Mid	LTE Band 12	10	22.7	22.62	-0.07	1	1GLRW	QPSK	25	0	10 mm	bottom	1:1	0.069	1.019	0.070	
707.50	23095	Mid	LTE Band 12	10	23.7	23.61	0.04	0	1GLRW	QPSK	1	0	10 mm	right	1:1	0.267	1.021	0.273	A30
707.50	23095	Mid	LTE Band 12	10	22.7	22.62	-0.05	1	1GLRW	QPSK	25	0	10 mm	right	1:1	0.237	1.019	0.242	
707.50	23095	Mid	LTE Band 12	10	23.7	23.61	0.11	0	1GLRW	QPSK	1	0	10 mm	left	1:1	0.156	1.021	0.159	
707.50	23095	Mid	LTE Band 12	10	22.7	22.62	0.07	1	1GLRW	QPSK	25	0	10 mm	left	1:1	0.125	1.019	0.127	
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 Data

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)		
831.50	26865	Mid	LTE Band 26 (Cell)	15	24.2	24.19	0.01	0	1GLRX	QPSK	1	36	8 mm	back	1:1	0.279	1.002	0.280	
831.50	26865	Mid	LTE Band 26 (Cell)	15	23.2	23.18	-0.07	1	1GLRX	QPSK	36	37	8 mm	back	1:1	0.230	1.005	0.231	
831.50	26865	Mid	LTE Band 26 (Cell)	15	24.2	24.19	-0.10	0	1GLRX	QPSK	1	36	8 mm	front	1:1	0.287	1.002	0.288	
831.50	26865	Mid	LTE Band 26 (Cell)	15	23.2	23.18	0.18	1	1GLRX	QPSK	36	37	8 mm	front	1:1	0.257	1.005	0.258	
831.50	26865	Mid	LTE Band 26 (Cell)	15	24.2	24.19	0.06	0	1GLRX	QPSK	1	36	10 mm	bottom	1:1	0.217	1.002	0.217	
831.50	26865	Mid	LTE Band 26 (Cell)	15	23.2	23.18	0.11	1	1GLRX	QPSK	36	37	10 mm	bottom	1:1	0.178	1.005	0.179	
831.50	26865	Mid	LTE Band 26 (Cell)	15	24.2	24.19	-0.03	0	1GLRX	QPSK	1	36	10 mm	right	1:1	0.336	1.002	0.337	A32
831.50	26865	Mid	LTE Band 26 (Cell)	15	23.2	23.18	-0.07	1	1GLRX	QPSK	36	37	10 mm	right	1:1	0.270	1.005	0.271	
831.50	26865	Mid	LTE Band 26 (Cell)	15	24.2	24.19	-0.01	0	1GLRX	QPSK	1	36	10 mm	left	1:1	0.224	1.002	0.224	
831.50	26865	Mid	LTE Band 26 (Cell)	15	23.2	23.18	-0.05	1	1GLRX	QPSK	36	37	10 mm	left	1:1	0.181	1.005	0.182	
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 Data

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	24.2	24.18	0.13	0	1GLRW	QPSK	1	99	8 mm	back	1:1	0.605	1.005	0.608	A33
1732.50	20175	Mid	LTE Band 4 (AWS)	20	23.2	22.96	-0.10	1	1GLRW	QPSK	50	0	8 mm	back	1:1	0.393	1.057	0.415	
1732.50	20175	Mid	LTE Band 4 (AWS)	20	24.2	24.18	0.01	0	1GLRW	QPSK	1	99	8 mm	front	1:1	0.488	1.005	0.490	
1732.50	20175	Mid	LTE Band 4 (AWS)	20	23.2	22.96	-0.11	1	1GLRW	QPSK	50	0	8 mm	front	1:1	0.305	1.057	0.322	
1732.50	20175	Mid	LTE Band 4 (AWS)	20	24.2	24.18	0.02	0	1GLRW	QPSK	1	99	10 mm	bottom	1:1	0.224	1.005	0.225	
1732.50	20175	Mid	LTE Band 4 (AWS)	20	23.2	22.96	-0.08	1	1GLRW	QPSK	50	0	10 mm	bottom	1:1	0.127	1.057	0.134	
1732.50	20175	Mid	LTE Band 4 (AWS)	20	24.2	24.18	-0.05	0	1GLRW	QPSK	1	99	10 mm	right	1:1	0.297	1.005	0.298	
1732.50	20175	Mid	LTE Band 4 (AWS)	20	23.2	22.96	0.01	1	1GLRW	QPSK	50	0	10 mm	right	1:1	0.189	1.057	0.200	
1732.50	20175	Mid	LTE Band 4 (AWS)	20	24.2	24.18	0.11	0	1GLRW	QPSK	1	99	10 mm	left	1:1	0.058	1.005	0.058	
1732.50	20175	Mid	LTE Band 4 (AWS)	20	23.2	22.96	-0.10	1	1GLRW	QPSK	50	0	10 mm	left	1:1	0.031	1.057	0.033	
ANSI / IEEE C95.1 1992 - SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population								Body 1.6 W/kg (mW/g) averaged over 1 gram											

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

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.																	
1882.50	26365	Mid	LTE Band 25 (PCS)	20	24.2	23.99	0.11	0	1GLRX	QPSK	1	0	8 mm	back	1:1	0.383	1.050	0.402
1882.50	26365	Mid	LTE Band 25 (PCS)	20	23.2	22.99	-0.02	1	1GLRX	QPSK	50	25	8 mm	back	1:1	0.298	1.050	0.313
1882.50	26365	Mid	LTE Band 25 (PCS)	20	24.2	23.99	-0.02	0	1GLRX	QPSK	1	0	8 mm	front	1:1	0.461	1.050	0.484
1882.50	26365	Mid	LTE Band 25 (PCS)	20	23.2	22.99	-0.04	1	1GLRX	QPSK	50	25	8 mm	front	1:1	0.314	1.050	0.330
1882.50	26365	Mid	LTE Band 25 (PCS)	20	24.2	23.99	0.00	0	1GLRX	QPSK	1	0	10 mm	bottom	1:1	0.292	1.050	0.307
1882.50	26365	Mid	LTE Band 25 (PCS)	20	23.2	22.99	-0.07	1	1GLRX	QPSK	50	25	10 mm	bottom	1:1	0.210	1.050	0.221
1882.50	26365	Mid	LTE Band 25 (PCS)	20	24.2	23.99	-0.01	0	1GLRX	QPSK	1	0	10 mm	right	1:1	0.336	1.050	0.353
1882.50	26365	Mid	LTE Band 25 (PCS)	20	23.2	22.99	-0.07	1	1GLRX	QPSK	50	25	10 mm	right	1:1	0.213	1.050	0.224
1882.50	26365	Mid	LTE Band 25 (PCS)	20	24.2	23.99	0.03	0	1GLRX	QPSK	1	0	10 mm	left	1:1	0.079	1.050	0.083
1882.50	26365	Mid	LTE Band 25 (PCS)	20	23.2	22.99	0.03	1	1GLRX	QPSK	50	25	10 mm	left	1:1	0.045	1.050	0.047
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 Data

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 (Cond. Power)	Scaling Factor (CP Duty)	Scaled SAR (1g) (W/kg)	Plot #	
MHz	Ch.														(W/kg)					
2593.00	40620	Mid	LTE Band 41	20	24.2	24.11	-0.11	0	1GLRW	QPSK	1	50	8 mm	back	1:1.59	0.202	1.021	1.010	0.208	A37
2593.00	40620	Mid	LTE Band 41	20	23.2	23.12	-0.03	1	1GLRW	QPSK	50	50	8 mm	back	1:1.59	0.163	1.019	1.010	0.168	
2593.00	40620	Mid	LTE Band 41	20	24.2	24.11	-0.03	0	1GLRW	QPSK	1	50	8 mm	front	1:1.59	0.451	1.021	1.010	0.465	
2593.00	40620	Mid	LTE Band 41	20	23.2	23.12	0.02	1	1GLRW	QPSK	50	50	8 mm	front	1:1.59	0.365	1.019	1.010	0.376	
2593.00	40620	Mid	LTE Band 41	20	24.2	24.11	-0.12	0	1GLRW	QPSK	1	50	10 mm	bottom	1:1.59	0.241	1.021	1.010	0.249	
2593.00	40620	Mid	LTE Band 41	20	23.2	23.12	-0.04	1	1GLRW	QPSK	50	50	10 mm	bottom	1:1.59	0.188	1.019	1.010	0.193	
2593.00	40620	Mid	LTE Band 41	20	24.2	24.11	0.01	0	1GLRW	QPSK	1	50	10 mm	left	1:1.59	0.296	1.021	1.010	0.305	
2593.00	40620	Mid	LTE Band 41	20	23.2	23.12	0.00	1	1GLRW	QPSK	50	50	10 mm	left	1:1.59	0.250	1.019	1.010	0.257	
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
WIFI Hotspot SAR Data

MEASUREMENT RESULTS															
FREQUENCY		Mode	Service	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Power Drift [dB]	Spacing	Device Serial Number	Data Rate (Mbps)	Side	Duty Cycle	SAR (1g)	Scaling Factor	Scaled SAR (1g)	Plot #
MHz	Ch.											(W/kg)		(W/kg)	
2462	11	IEEE 802.11b	DSSS	14.5	13.57	-0.10	8 mm	1FMQT	1	back	1:1	0.117	1.239	0.145	A38
2462	11	IEEE 802.11b	DSSS	14.5	13.57	0.05	8 mm	1FMQT	1	front	1:1	0.109	1.239	0.135	
2462	11	IEEE 802.11b	DSSS	14.5	13.57	0.02	10 mm	1FMQT	1	top	1:1	0.071	1.239	0.088	
2462	11	IEEE 802.11b	DSSS	14.5	13.57	-0.02	10 mm	1FMQT	1	left	1:1	0.055	1.239	0.068	
5745	149	IEEE 802.11a	OFDM	14.5	13.17	0.20	8 mm	1FMQT	6	back	1:1	0.187	1.358	0.254	
5745	149	IEEE 802.11a	OFDM	14.5	13.17	0.12	8 mm	1FMQT	6	front	1:1	0.102	1.358	0.139	
5745	149	IEEE 802.11a	OFDM	14.5	13.17	0.19	10 mm	1FMQT	6	top	1:1	0.115	1.358	0.156	
5745	149	IEEE 802.11a	OFDM	14.5	13.17	0.07	10 mm	1FMQT	6	left	1:1	0.205	1.358	0.278	A40
5775	155	IEEE 802.11ac	OFDM	12.5	11.76	0.17	10 mm	1FMQT	29.3	left	1:1	0.094	1.186	0.111	
ANSI / IEEE C95.1 1992 - SAFETY LIMIT							Body								
Spatial Peak							1.6 W/kg (mW/g)								
Uncontrolled Exposure/General Population							averaged over 1 gram								

11.4 SAR Test Notes

General Notes:

1. The test data reported are the worst-case SAR values according to test procedures specified in IEEE 1528-2003, 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. Due to the embowed design of the device, Body SAR was configured per FCC Guidance. See section 1.7 for more information.
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 not performed since the measured SAR results for a frequency band were less than 0.8 W/kg. 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 6.7 for more details).

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/EDGE slot configurations. The configuration with the highest target frame averaged output power was evaluated for hotspot SAR. When the maximum frame-averaged powers are equivalent across two or more slots (within 0.25 dB), the configuration with the most number of time slots was tested.
3. Per FCC KDB Publication 447498 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.

CDMA Notes:

1. Head SAR for CDMA2000 mode was tested under RC3/SO55 per FCC KDB Publication 941225 D01v02.
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 D01v02.
3. CDMA Wireless Router SAR is measured using Subtype 0/1 Physical Layer configurations for Rev. 0 according to KDB 941225 D01 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. Head SAR was additionally evaluated using EVDO Rev. A to determine compliance for VoIP operations.

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- 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.

UMTS Notes:

- UMTS mode in was tested under RMC 12.2 kbps with HSPA Inactive per KDB Publication 941225 D01v02. 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.
- 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:

- 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 8.5.4.
- 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.
- 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).
- Per FCC KDB Publication 447498 D01v05r01, when the reported (scaled) for LTE Band 41 SAR measured at the highest output power channel in a given a test configuration was > 0.6 W/kg, testing at the other channels was required for such test configurations.
- TDD LTE was tested using UL-DL configuration 0 with 6 UL subframes and 2 S subframes using normal cyclic prefix only and special subframe configuration 6. Due to equipment setup issues with extended cyclic prefix as a result of test samples configured for normal cyclic prefix, SAR tests were performed at maximum output power and worst-case transmission duty factor in normal cyclic prefix. Results were then scaled to the duty factor required for extended cyclic prefix listed in 3GPP TS 36.211 Section 4. The cyclic prefix scaling factor for LTE Band 41 was calculated by dividing the extended cyclic prefix duty factor by the normal cyclic prefix duty factor. Per 3GPP 36.211 Section 4, the duty factor for special subframe configuration 6 using normal cyclic prefix is 0.629. The duty factor for special subframe configuration 6 using extended cyclic prefix is 0.633.
- Per FCC Guidance, LTE CA SAR was not needed for testing since the data sent by uplink on the uplink physical channels does not change between Rel. 8 and Rel. 10.

WLAN Notes:

- Justification for reduced test configurations for WIFI channels per KDB Publication 248227 D01v01r02 and October 2012 FCC/TCB Meeting Notes for 2.4 GHz WIFI operations: Highest average RF output power channel for the lowest data rate was selected for SAR evaluation in 802.11b. Other IEEE 802.11 modes (including 802.11g/n/ac) were not investigated since the average output powers over all channels and data rates were not more than 0.25 dB higher than the tested channel in the lowest data rate of IEEE 802.11b mode.
- Justification for reduced test configurations for WIFI channels per KDB Publication 248227 D01v01r02 and October 2012 FCC/TCB Meeting Notes for 5 GHz WIFI operations: Highest average RF output power channel for the lowest data rate was selected for SAR evaluation in

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- 802.11a. Other IEEE 802.11 modes (including 802.11n 20 MHz and 40 MHz bandwidths) were not investigated since the average output powers over all channels and data rates were not more than 0.25 dB higher than the tested channel in the lowest data rate of IEEE 802.11a mode.
3. Per April 2013 TCB Workshop notes, full SAR tests for all IEEE 802.11ac configurations were not required because the average output power was not more than 0.25 dB higher than IEEE 802.11a mode. IEEE 802.11ac was evaluated for the highest IEEE 802.11a position in each 5 GHz band and exposure condition.
 4. When Hotspot is enabled, all 5 GHz bands are disabled. Therefore no 5 GHz WIFI Wireless Router SAR Data was required. When Hotspot is enabled, 5.2-5.7 GHz bands are disabled. Therefore no 5.2 – 5.7 GHz WIFI Wireless Router SAR Data was required.
 5. WIFI transmission was verified using an uncalibrated spectrum analyzer.
 6. When the maximum extrapolated peak SAR of the zoom scan for the maximum output channel is >1.6 W/kg and the reported 1g averaged SAR is >0.8 W/kg, SAR testing on other default channels was required.

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12 FCC MULTI-TX AND ANTENNA SAR CONSIDERATIONS

12.1 Introduction

The following procedures adopted from FCC KDB Publication 447498 D01v05 are applicable to handsets with built-in unlicensed transmitters such as 802.11a/b/g/n/ac 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 physical test configuration is ≤ 1.6 W/kg. 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	8.50	8	0.184

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.

12.3 Head SAR Simultaneous Transmission Analysis

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

Simult Tx	Configuration	CDMA BC10 (\$90S) SAR (W/kg)	2.4 GHz WLAN SAR (W/kg)	Σ SAR (W/kg)	Simult Tx	Configuration	EVDO BC10 (\$90S) SAR (W/kg)	2.4 GHz WLAN SAR (W/kg)	Σ SAR (W/kg)
Head SAR	Right Cheek	0.436	0.638	1.074	Head SAR	Right Cheek	0.459	0.638	1.097
	Right Tilt	0.239	0.434	0.673		Right Tilt	0.295	0.434	0.729
	Left Cheek	0.361	0.315	0.676		Left Cheek	0.349	0.315	0.664
	Left Tilt	0.334	0.278	0.612		Left Tilt	0.223	0.278	0.501

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Simult Tx	Configuration	CDMA BC0 (\$22H) SAR (W/kg)	2.4 GHz WLAN SAR (W/kg)	Σ SAR (W/kg)	Simult Tx	Configuration	EVDO BC0 (\$22H) SAR (W/kg)	2.4 GHz WLAN SAR (W/kg)	Σ SAR (W/kg)
Head SAR	Right Cheek	0.363	0.638	1.001	Head SAR	Right Cheek	0.381	0.638	1.019
	Right Tilt	0.194	0.434	0.628		Right Tilt	0.218	0.434	0.652
	Left Cheek	0.332	0.315	0.647		Left Cheek	0.309	0.315	0.624
	Left Tilt	0.170	0.278	0.448		Left Tilt	0.179	0.278	0.457
Simult Tx	Configuration	PCS CDMA SAR (W/kg)	2.4 GHz WLAN SAR (W/kg)	Σ SAR (W/kg)	Simult Tx	Configuration	PCS EVDO SAR (W/kg)	2.4 GHz WLAN SAR (W/kg)	Σ SAR (W/kg)
Head SAR	Right Cheek	0.532	0.638	1.170	Head SAR	Right Cheek	0.558	0.638	1.196
	Right Tilt	0.156	0.434	0.590		Right Tilt	0.162	0.434	0.596
	Left Cheek	0.297	0.315	0.612		Left Cheek	0.285	0.315	0.600
	Left Tilt	0.150	0.278	0.428		Left Tilt	0.148	0.278	0.426
Simult Tx	Configuration	GSM 850 SAR (W/kg)	2.4 GHz WLAN SAR (W/kg)	Σ SAR (W/kg)	Simult Tx	Configuration	GPRS 850 SAR (W/kg)	2.4 GHz WLAN SAR (W/kg)	Σ SAR (W/kg)
Head SAR	Right Cheek	0.246	0.638	0.884	Head SAR	Right Cheek	0.358	0.638	0.996
	Right Tilt	0.129	0.434	0.563		Right Tilt	0.193	0.434	0.627
	Left Cheek	0.104	0.315	0.419		Left Cheek	0.322	0.315	0.637
	Left Tilt	0.112	0.278	0.390		Left Tilt	0.172	0.278	0.450
Simult Tx	Configuration	GSM 1900 SAR (W/kg)	2.4 GHz WLAN SAR (W/kg)	Σ SAR (W/kg)	Simult Tx	Configuration	GPRS 1900 SAR (W/kg)	2.4 GHz WLAN SAR (W/kg)	Σ SAR (W/kg)
Head SAR	Right Cheek	0.232	0.638	0.870	Head SAR	Right Cheek	0.298	0.638	0.936
	Right Tilt	0.064	0.434	0.498		Right Tilt	0.077	0.434	0.511
	Left Cheek	0.113	0.315	0.428		Left Cheek	0.129	0.315	0.444
	Left Tilt	0.062	0.278	0.340		Left Tilt	0.072	0.278	0.350
Simult Tx	Configuration	UMTS 850 SAR (W/kg)	2.4 GHz WLAN SAR (W/kg)	Σ SAR (W/kg)	Simult Tx	Configuration	UMTS 1900 SAR (W/kg)	2.4 GHz WLAN SAR (W/kg)	Σ SAR (W/kg)
Head SAR	Right Cheek	0.280	0.638	0.918	Head SAR	Right Cheek	0.445	0.638	1.083
	Right Tilt	0.154	0.434	0.588		Right Tilt	0.109	0.434	0.543
	Left Cheek	0.249	0.315	0.564		Left Cheek	0.201	0.315	0.516
	Left Tilt	0.136	0.278	0.414		Left Tilt	0.112	0.278	0.390
Simult Tx	Configuration	LTE Band 12 SAR (W/kg)	2.4 GHz WLAN SAR (W/kg)	Σ SAR (W/kg)	Simult Tx	Configuration	LTE Band 26 (Cell) SAR (W/kg)	2.4 GHz WLAN SAR (W/kg)	Σ SAR (W/kg)
Head SAR	Right Cheek	0.174	0.638	0.812	Head SAR	Right Cheek	0.261	0.638	0.899
	Right Tilt	0.114	0.434	0.548		Right Tilt	0.162	0.434	0.596
	Left Cheek	0.152	0.315	0.467		Left Cheek	0.210	0.315	0.525
	Left Tilt	0.089	0.278	0.367		Left Tilt	0.137	0.278	0.415

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Simult Tx	Configuration	LTE Band 4 (AWS) SAR (W/kg)	2.4 GHz WLAN SAR (W/kg)	Σ SAR (W/kg)	Simult Tx	Configuration	LTE Band 25 (PCS) SAR (W/kg)	2.4 GHz WLAN SAR (W/kg)	Σ SAR (W/kg)
Head SAR	Right Cheek	0.443	0.638	1.081	Head SAR	Right Cheek	0.391	0.638	1.029
	Right Tilt	0.235	0.434	0.669		Right Tilt	0.104	0.434	0.538
	Left Cheek	0.184	0.315	0.499		Left Cheek	0.171	0.315	0.486
	Left Tilt	0.214	0.278	0.492		Left Tilt	0.112	0.278	0.390

Simult Tx	Configuration	LTE Band 41 SAR (W/kg)	2.4 GHz WLAN SAR (W/kg)	Σ SAR (W/kg)
Head SAR	Right Cheek	0.240	0.638	0.878
	Right Tilt	0.262	0.434	0.696
	Left Cheek	0.560	0.315	0.875
	Left Tilt	0.184	0.278	0.462

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

Simult Tx	Configuration	CDMA BC10 (\$90S) SAR (W/kg)	5 GHz WLAN SAR (W/kg)	Σ SAR (W/kg)	Simult Tx	Configuration	EVDO BC10 (\$90S) SAR (W/kg)	5 GHz WLAN SAR (W/kg)	Σ SAR (W/kg)
Head SAR	Right Cheek	0.436	0.617	1.053	Head SAR	Right Cheek	0.459	0.617	1.076
	Right Tilt	0.239	0.429	0.668		Right Tilt	0.295	0.429	0.724
	Left Cheek	0.361	0.474	0.835		Left Cheek	0.349	0.474	0.823
	Left Tilt	0.334	0.449	0.783		Left Tilt	0.223	0.449	0.672

Simult Tx	Configuration	CDMA BC0 (\$22H) SAR (W/kg)	5 GHz WLAN SAR (W/kg)	Σ SAR (W/kg)	Simult Tx	Configuration	EVDO BC0 (\$22H) SAR (W/kg)	5 GHz WLAN SAR (W/kg)	Σ SAR (W/kg)
Head SAR	Right Cheek	0.363	0.617	0.980	Head SAR	Right Cheek	0.381	0.617	0.998
	Right Tilt	0.194	0.429	0.623		Right Tilt	0.218	0.429	0.647
	Left Cheek	0.332	0.474	0.806		Left Cheek	0.309	0.474	0.783
	Left Tilt	0.170	0.449	0.619		Left Tilt	0.179	0.449	0.628

Simult Tx	Configuration	PCS CDMA SAR (W/kg)	5 GHz WLAN SAR (W/kg)	Σ SAR (W/kg)	Simult Tx	Configuration	PCS EVDO SAR (W/kg)	5 GHz WLAN SAR (W/kg)	Σ SAR (W/kg)
Head SAR	Right Cheek	0.532	0.617	1.149	Head SAR	Right Cheek	0.558	0.617	1.175
	Right Tilt	0.156	0.429	0.585		Right Tilt	0.162	0.429	0.591
	Left Cheek	0.297	0.474	0.771		Left Cheek	0.285	0.474	0.759
	Left Tilt	0.150	0.449	0.599		Left Tilt	0.148	0.449	0.597

Simult Tx	Configuration	GSM 850 SAR (W/kg)	5 GHz WLAN SAR (W/kg)	Σ SAR (W/kg)	Simult Tx	Configuration	GPRS 850 SAR (W/kg)	5 GHz WLAN SAR (W/kg)	Σ SAR (W/kg)
Head SAR	Right Cheek	0.246	0.617	0.863	Head SAR	Right Cheek	0.358	0.617	0.975
	Right Tilt	0.129	0.429	0.558		Right Tilt	0.193	0.429	0.622
	Left Cheek	0.104	0.474	0.578		Left Cheek	0.322	0.474	0.796
	Left Tilt	0.112	0.449	0.561		Left Tilt	0.172	0.449	0.621

Simult Tx	Configuration	GSM 1900 SAR (W/kg)	5 GHz WLAN SAR (W/kg)	Σ SAR (W/kg)	Simult Tx	Configuration	GPRS 1900 SAR (W/kg)	5 GHz WLAN SAR (W/kg)	Σ SAR (W/kg)
Head SAR	Right Cheek	0.232	0.617	0.849	Head SAR	Right Cheek	0.298	0.617	0.915
	Right Tilt	0.064	0.429	0.493		Right Tilt	0.077	0.429	0.506
	Left Cheek	0.113	0.474	0.587		Left Cheek	0.129	0.474	0.603
	Left Tilt	0.062	0.449	0.511		Left Tilt	0.072	0.449	0.521

Simult Tx	Configuration	UMTS 850 SAR (W/kg)	5 GHz WLAN SAR (W/kg)	Σ SAR (W/kg)	Simult Tx	Configuration	UMTS 1900 SAR (W/kg)	5 GHz WLAN SAR (W/kg)	Σ SAR (W/kg)
Head SAR	Right Cheek	0.280	0.617	0.897	Head SAR	Right Cheek	0.445	0.617	1.062
	Right Tilt	0.154	0.429	0.583		Right Tilt	0.109	0.429	0.538
	Left Cheek	0.249	0.474	0.723		Left Cheek	0.201	0.474	0.675
	Left Tilt	0.136	0.449	0.585		Left Tilt	0.112	0.449	0.561
Simult Tx	Configuration	LTE Band 12 SAR (W/kg)	5 GHz WLAN SAR (W/kg)	Σ SAR (W/kg)	Simult Tx	Configuration	LTE Band 26 (Cell) SAR (W/kg)	5 GHz WLAN SAR (W/kg)	Σ SAR (W/kg)
Head SAR	Right Cheek	0.174	0.617	0.791	Head SAR	Right Cheek	0.261	0.617	0.878
	Right Tilt	0.114	0.429	0.543		Right Tilt	0.162	0.429	0.591
	Left Cheek	0.152	0.474	0.626		Left Cheek	0.210	0.474	0.684
	Left Tilt	0.089	0.449	0.538		Left Tilt	0.137	0.449	0.586
Simult Tx	Configuration	LTE Band 4 (AWS) SAR (W/kg)	5 GHz WLAN SAR (W/kg)	Σ SAR (W/kg)	Simult Tx	Configuration	LTE Band 25 (PCS) SAR (W/kg)	5 GHz WLAN SAR (W/kg)	Σ SAR (W/kg)
Head SAR	Right Cheek	0.443	0.617	1.060	Head SAR	Right Cheek	0.391	0.617	1.008
	Right Tilt	0.235	0.429	0.664		Right Tilt	0.104	0.429	0.533
	Left Cheek	0.184	0.474	0.658		Left Cheek	0.171	0.474	0.645
	Left Tilt	0.214	0.449	0.663		Left Tilt	0.112	0.449	0.561
Simult Tx	Configuration	LTE Band 41 SAR (W/kg)	5 GHz WLAN SAR (W/kg)	Σ SAR (W/kg)					
Head SAR	Right Cheek	0.240	0.617	0.857					
	Right Tilt	0.262	0.429	0.691					
	Left Cheek	0.560	0.474	1.034					
	Left Tilt	0.184	0.449	0.633					

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.

12.4 Body-Worn Simultaneous Transmission Analysis

Table 12-4
Simultaneous Transmission Scenario with 2.4 GHz WLAN (Body-Worn at 0.8 cm)

Configuration	Mode	2G/3G/4G SAR (W/kg)	2.4 GHz WLAN SAR (W/kg)	Σ SAR (W/kg)
Back Side	CDMA BC10 (\$90S)	0.560	0.145	0.705
Back Side	CDMA BC0 (\$22H)	0.417	0.145	0.562
Back Side	PCS CDMA	0.589	0.145	0.734
Back Side	GSM 850	0.278	0.145	0.423
Back Side	GPRS 850	0.377	0.145	0.522
Back Side	GSM 1900	0.238	0.145	0.383
Back Side	GPRS 1900	0.274	0.145	0.419
Back Side	UMTS 850	0.344	0.145	0.489
Back Side	UMTS 1900	0.431	0.145	0.576
Back Side	LTE Band 12	0.220	0.145	0.365
Back Side	LTE Band 26 (Cell)	0.280	0.145	0.425
Back Side	LTE Band 4 (AWS)	0.608	0.145	0.753
Back Side	LTE Band 25 (PCS)	0.402	0.145	0.547
Back Side	LTE Band 41	0.208	0.145	0.353

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Table 12-5
Simultaneous Transmission Scenario with 5 GHz WLAN (Body-Worn at 0.8 cm)

Configuration	Mode	2G/3G/4G SAR (W/kg)	5 GHz WLAN SAR (W/kg)	Σ SAR (W/kg)
Back Side	CDMA BC10 (\$90S)	0.560	0.271	0.831
Back Side	CDMA BC0 (\$22H)	0.417	0.271	0.688
Back Side	PCS CDMA	0.589	0.271	0.860
Back Side	GSM 850	0.278	0.271	0.549
Back Side	GPRS 850	0.377	0.271	0.648
Back Side	GSM 1900	0.238	0.271	0.509
Back Side	GPRS 1900	0.274	0.271	0.545
Back Side	UMTS 850	0.344	0.271	0.615
Back Side	UMTS 1900	0.431	0.271	0.702
Back Side	LTE Band 12	0.220	0.271	0.491
Back Side	LTE Band 26 (Cell)	0.280	0.271	0.551
Back Side	LTE Band 4 (AWS)	0.608	0.271	0.879
Back Side	LTE Band 25 (PCS)	0.402	0.271	0.673
Back Side	LTE Band 41	0.208	0.271	0.479

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 12-6
Simultaneous Transmission Scenario with Bluetooth (Body-Worn at 0.8 cm)

Configuration	Mode	2G/3G/4G SAR (W/kg)	Bluetooth SAR (W/kg)	Σ SAR (W/kg)
Back Side	CDMA BC10 (\$90S)	0.560	0.184	0.744
Back Side	CDMA BC0 (\$22H)	0.417	0.184	0.601
Back Side	PCS CDMA	0.589	0.184	0.773
Back Side	GSM 850	0.278	0.184	0.462
Back Side	GPRS 850	0.377	0.184	0.561
Back Side	GSM 1900	0.238	0.184	0.422
Back Side	GPRS 1900	0.274	0.184	0.458
Back Side	UMTS 850	0.344	0.184	0.528
Back Side	UMTS 1900	0.431	0.184	0.615
Back Side	LTE Band 12	0.220	0.184	0.404
Back Side	LTE Band 26 (Cell)	0.280	0.184	0.464
Back Side	LTE Band 4 (AWS)	0.608	0.184	0.792
Back Side	LTE Band 25 (PCS)	0.402	0.184	0.586
Back Side	LTE Band 41	0.208	0.184	0.392

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

Per FCC KDB Publication 941225 D06v01, the devices edges with antennas more than 2.5 cm from edge are not required to be evaluated for SAR (“-”).

Table 12-7
Simultaneous Transmission Scenario (2.4 GHz Hotspot)

Simult Tx	Configuration	EVDO BC10 (\$90S) SAR (W/kg)	2.4 GHz WLAN SAR (W/kg)	Σ SAR (W/kg)	Simult Tx	Configuration	EVDO BC0 (\$22H) SAR (W/kg)	2.4 GHz WLAN SAR (W/kg)	Σ SAR (W/kg)
Body SAR	Back	0.552	0.145	0.697	Body SAR	Back	0.424	0.145	0.569
	Front	0.619	0.135	0.754		Front	0.321	0.135	0.456
	Top	-	0.088	0.088		Top	-	0.088	0.088
	Bottom	0.344	-	0.344		Bottom	0.285	-	0.285
	Right	0.579	-	0.579		Right	0.471	-	0.471
	Left	0.398	0.068	0.466		Left	0.325	0.068	0.393
Simult Tx	Configuration	PCS EVDO SAR (W/kg)	2.4 GHz WLAN SAR (W/kg)	Σ SAR (W/kg)	Simult Tx	Configuration	GPRS 850 SAR (W/kg)	2.4 GHz WLAN SAR (W/kg)	Σ SAR (W/kg)
Body SAR	Back	0.642	0.145	0.787	Body SAR	Back	0.377	0.145	0.522
	Front	0.595	0.135	0.730		Front	0.341	0.135	0.476
	Top	-	0.088	0.088		Top	-	0.088	0.088
	Bottom	0.460	-	0.460		Bottom	0.291	-	0.291
	Right	0.423	-	0.423		Right	0.410	-	0.410
	Left	0.115	0.068	0.183		Left	0.301	0.068	0.369
Simult Tx	Configuration	GPRS 1900 SAR (W/kg)	2.4 GHz WLAN SAR (W/kg)	Σ SAR (W/kg)	Simult Tx	Configuration	UMTS 850 SAR (W/kg)	2.4 GHz WLAN SAR (W/kg)	Σ SAR (W/kg)
Body SAR	Back	0.274	0.145	0.419	Body SAR	Back	0.344	0.145	0.489
	Front	0.313	0.135	0.448		Front	0.291	0.135	0.426
	Top	-	0.088	0.088		Top	-	0.088	0.088
	Bottom	0.200	-	0.200		Bottom	0.235	-	0.235
	Right	0.211	-	0.211		Right	0.347	-	0.347
	Left	0.047	0.068	0.115		Left	0.255	0.068	0.323
Simult Tx	Configuration	UMTS 1900 SAR (W/kg)	2.4 GHz WLAN SAR (W/kg)	Σ SAR (W/kg)	Simult Tx	Configuration	LTE Band 12 SAR (W/kg)	2.4 GHz WLAN SAR (W/kg)	Σ SAR (W/kg)
Body SAR	Back	0.431	0.145	0.576	Body SAR	Back	0.220	0.145	0.365
	Front	0.464	0.135	0.599		Front	0.207	0.135	0.342
	Top	-	0.088	0.088		Top	-	0.088	0.088
	Bottom	0.348	-	0.348		Bottom	0.085	-	0.085
	Right	0.315	-	0.315		Right	0.273	-	0.273
	Left	0.085	0.068	0.153		Left	0.159	0.068	0.227
Simult Tx	Configuration	LTE Band 26 (Cell) SAR (W/kg)	2.4 GHz WLAN SAR (W/kg)	Σ SAR (W/kg)	Simult Tx	Configuration	LTE Band 4 (AWS) SAR (W/kg)	2.4 GHz WLAN SAR (W/kg)	Σ SAR (W/kg)
Body SAR	Back	0.280	0.145	0.425	Body SAR	Back	0.608	0.145	0.753
	Front	0.288	0.135	0.423		Front	0.490	0.135	0.625
	Top	-	0.088	0.088		Top	-	0.088	0.088
	Bottom	0.217	-	0.217		Bottom	0.225	-	0.225
	Right	0.337	-	0.337		Right	0.298	-	0.298
	Left	0.224	0.068	0.292		Left	0.058	0.068	0.126

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Simult Tx	Configuration	LTE Band 25 (PCS) SAR (W/kg)	2.4 GHz WLAN SAR (W/kg)	Σ SAR (W/kg)	Simult Tx	Configuration	LTE Band 41 SAR (W/kg)	2.4 GHz WLAN SAR (W/kg)	Σ SAR (W/kg)
Body SAR	Back	0.402	0.145	0.547	Body SAR	Back	0.208	0.145	0.353
	Front	0.484	0.135	0.619		Front	0.465	0.135	0.600
	Top	-	0.088	0.088		Top	-	0.088	0.088
	Bottom	0.307	-	0.307		Bottom	0.249	-	0.249
	Right	0.353	-	0.353		Right	-	-	0.000
	Left	0.083	0.068	0.151		Left	0.305	0.068	0.373

Table 12-8
Simultaneous Transmission Scenario (5 GHz WLAN Hotspot)

Simult Tx	Configuration	EVDO BC10 (\$90S) SAR (W/kg)	5 GHz WLAN SAR (W/kg)	Σ SAR (W/kg)
Body SAR	Back	0.552	0.254	0.806
	Front	0.619	0.139	0.758
	Top	-	0.156	0.156
	Bottom	0.344	-	0.344
	Right	0.579	-	0.579
	Left	0.398	0.278	0.676

Simult Tx	Configuration	EVDO BC0 (\$22H) SAR (W/kg)	5 GHz WLAN SAR (W/kg)	Σ SAR (W/kg)	Simult Tx	Configuration	PCS EVDO SAR (W/kg)	5 GHz WLAN SAR (W/kg)	Σ SAR (W/kg)
Body SAR	Back	0.424	0.254	0.678	Body SAR	Back	0.642	0.254	0.896
	Front	0.321	0.139	0.460		Front	0.595	0.139	0.734
	Top	-	0.156	0.156		Top	-	0.156	0.156
	Bottom	0.285	-	0.285		Bottom	0.460	-	0.460
	Right	0.471	-	0.471		Right	0.423	-	0.423
	Left	0.325	0.278	0.603		Left	0.115	0.278	0.393
Simult Tx	Configuration	GPRS 850 SAR (W/kg)	5 GHz WLAN SAR (W/kg)	Σ SAR (W/kg)	Simult Tx	Configuration	GPRS 1900 SAR (W/kg)	5 GHz WLAN SAR (W/kg)	Σ SAR (W/kg)
Body SAR	Back	0.377	0.254	0.631	Body SAR	Back	0.274	0.254	0.528
	Front	0.341	0.139	0.480		Front	0.313	0.139	0.452
	Top	-	0.156	0.156		Top	-	0.156	0.156
	Bottom	0.291	-	0.291		Bottom	0.200	-	0.200
	Right	0.410	-	0.410		Right	0.211	-	0.211
	Left	0.301	0.278	0.579		Left	0.047	0.278	0.325
Simult Tx	Configuration	UMTS 850 SAR (W/kg)	5 GHz WLAN SAR (W/kg)	Σ SAR (W/kg)	Simult Tx	Configuration	UMTS 1900 SAR (W/kg)	5 GHz WLAN SAR (W/kg)	Σ SAR (W/kg)
Body SAR	Back	0.344	0.254	0.598	Body SAR	Back	0.431	0.254	0.685
	Front	0.291	0.139	0.430		Front	0.464	0.139	0.603
	Top	-	0.156	0.156		Top	-	0.156	0.156
	Bottom	0.235	-	0.235		Bottom	0.348	-	0.348
	Right	0.347	-	0.347		Right	0.315	-	0.315
	Left	0.255	0.278	0.533		Left	0.085	0.278	0.363

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Simult Tx	Configuration	LTE Band 12 SAR (W/kg)	5 GHz WLAN SAR (W/kg)	Σ SAR (W/kg)	Simult Tx	Configuration	LTE Band 26 (Cell) SAR (W/kg)	5 GHz WLAN SAR (W/kg)	Σ SAR (W/kg)
Body SAR	Back	0.220	0.254	0.474	Body SAR	Back	0.280	0.254	0.534
	Front	0.207	0.139	0.346		Front	0.288	0.139	0.427
	Top	-	0.156	0.156		Top	-	0.156	0.156
	Bottom	0.085	-	0.085		Bottom	0.217	-	0.217
	Right	0.273	-	0.273		Right	0.337	-	0.337
	Left	0.159	0.278	0.437		Left	0.224	0.278	0.502
Simult Tx	Configuration	LTE Band 4 (AWS) SAR (W/kg)	5 GHz WLAN SAR (W/kg)	Σ SAR (W/kg)	Simult Tx	Configuration	LTE Band 25 (PCS) SAR (W/kg)	5 GHz WLAN SAR (W/kg)	Σ SAR (W/kg)
Body SAR	Back	0.608	0.254	0.862	Body SAR	Back	0.402	0.254	0.656
	Front	0.490	0.139	0.629		Front	0.484	0.139	0.623
	Top	-	0.156	0.156		Top	-	0.156	0.156
	Bottom	0.225	-	0.225		Bottom	0.307	-	0.307
	Right	0.298	-	0.298		Right	0.353	-	0.353
	Left	0.058	0.278	0.336		Left	0.083	0.278	0.361

	Simult Tx	Configuration	LTE Band 41 SAR (W/kg)	5 GHz WLAN SAR (W/kg)	Σ SAR (W/kg)
	Body SAR	Back	0.208	0.254	0.462
		Front	0.465	0.139	0.604
		Top	-	0.156	0.156
		Bottom	0.249	-	0.249
		Right	-	-	0.000
		Left	0.305	0.278	0.583

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 not assessed since measured 1g SAR each frequency band was below 0.8 W/kg.

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	8594A	(9kHz-2.9GHz) Spectrum Analyzer	N/A	N/A	N/A	3051A00187
Agilent	8648D	(9kHz-4GHz) Signal Generator	4/15/2014	Annual	4/15/2015	3629U00687
Agilent	8753ES	S-Parameter Network Analyzer	5/22/2014	Annual	5/22/2015	US39170118
Agilent	E4438C	ESG Vector Signal Generator	4/25/2014	Annual	4/25/2015	MY42082385
Agilent	E5515C	Wireless Communications Test Set	3/28/2014	Annual	3/28/2015	GB42230325
Agilent	E5515C	Wireless Communications Test Set	3/18/2014	Annual	3/18/2015	GB46110872
Agilent	E8257D	(250kHz-20GHz) Signal Generator	4/15/2014	Annual	4/15/2015	MY45470194
Agilent	N5182A	MXG Vector Signal Generator	4/15/2014	Annual	4/15/2015	MY47420651
Agilent	N9020A	MXA Signal Analyzer	10/29/2013	Annual	10/29/2014	US46470561
Amplifier Research	15S1G6	Amplifier	CBT	N/A	CBT	433971
Anritsu	MA24106A	USB Power Sensor	5/14/2014	Annual	5/14/2015	1231535
Anritsu	MA24106A	USB Power Sensor	5/14/2014	Annual	5/14/2015	1231538
Anritsu	MA24106A	USB Power Sensor	5/15/2014	Annual	5/15/2015	1244512
Anritsu	MA24106A	USB Power Sensor	5/14/2014	Annual	5/14/2015	1244515
Anritsu	ML2495A	Power Meter	10/31/2013	Biennial	10/31/2015	941001
Anritsu	MA2411B	Pulse Power Sensor	11/14/2013	Annual	11/14/2014	1126066
Anritsu	MA2411B	Pulse Power Sensor	3/25/2014	Annual	3/25/2015	1207470
Anritsu	MT8820C	Radio Communication Analyzer	12/12/2013	Annual	12/12/2014	6200901190
Anritsu	MT8820C	Radio Communication Analyzer	5/6/2014	Annual	5/6/2015	6201144419
Anritsu	MT8820C	Radio Communication Analyzer	8/28/2014	Annual	8/28/2015	6201240328
Anritsu	MT8820C	Radio Communication Analyzer	12/12/2013	Annual	12/12/2014	6201300731
COMTECH	AR85729-5	Solid State Amplifier	CBT	N/A	CBT	M155A00-009
COMTECH	AR85729-5/5759B	Solid State Amplifier	CBT	N/A	CBT	M3W1A00-1002
Control Company	36934-158	Wall-Mounted Thermometer	4/29/2014	Biennial	4/29/2016	122014488
Control Company	61220-416	Long-Stem Thermometer	4/29/2014	Biennial	4/29/2016	111331323
Fisher Scientific	S97611	Thermometer	4/12/2013	Biennial	4/12/2015	130219303
MCL	BW-N6W5+	6dB Attenuator	CBT	N/A	CBT	1139
MiniCircuits	SLP-2400+	Low Pass Filter	CBT	N/A	CBT	R8979500903
MiniCircuits	VLF-6000+	Low Pass Filter	CBT	N/A	CBT	N/A
Mini-Circuits	BW-N20W5	Power Attenuator	CBT	N/A	CBT	1226
Mini-Circuits	BW-N20W5+	DC to 18 GHz Precision Fixed 20 dB Attenuator	CBT	N/A	CBT	N/A
Mini-Circuits	NLP-1200+	Low Pass Filter DC to 1000 MHz	CBT	N/A	CBT	N/A
Mini-Circuits	NLP-2950+	Low Pass Filter DC to 2700 MHz	CBT	N/A	CBT	N/A
Mitutoyo	CD-6"CSX	Digital Caliper	5/8/2014	Biennial	5/8/2016	13264162
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	4772-3	Attenuator (3dB)	CBT	N/A	CBT	9406
Narda	BW-53W2	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	CMU200	Base Station Simulator	4/24/2014	Annual	4/24/2015	836371/0079
Rohde & Schwarz	CMW500	Radio Communication Tester	7/22/2014	Annual	7/22/2015	116743
Rohde & Schwarz	CMW500	Radio Communication Tester	2/20/2014	Annual	2/20/2015	128633
Seekonk	NC-100	Torque Wrench	3/18/2014	Biennial	3/18/2016	22313
SPEAG	D1765V2	1765 MHz SAR Dipole	5/7/2014	Annual	5/7/2015	1008
SPEAG	D1900V2	1900 MHz SAR Dipole	4/9/2014	Annual	4/9/2015	5d141
SPEAG	D2450V2	2450 MHz SAR Dipole	1/21/2014	Annual	1/21/2015	797
SPEAG	D2450V2	2450 MHz SAR Dipole	2/24/2014	Annual	2/24/2015	882
SPEAG	D2600V2	2600 MHz SAR Dipole	4/8/2014	Annual	4/8/2015	1004
SPEAG	D5GHzV2	5 GHz SAR Dipole	2/26/2014	Annual	2/26/2015	1120
SPEAG	D750V3	750 MHz Dipole	1/20/2014	Annual	1/20/2015	1003
SPEAG	D750V3	750 MHz Dipole	2/27/2014	Annual	2/27/2015	1046
SPEAG	D835V2	835 MHz SAR Dipole	4/7/2014	Annual	4/7/2015	4d119
SPEAG	D835V2	835 MHz SAR Dipole	7/10/2014	Annual	7/10/2015	4d132
SPEAG	DAE4	Dasy Data Acquisition Electronics	12/12/2013	Annual	12/12/2014	649
SPEAG	DAE4	Dasy Data Acquisition Electronics	2/26/2014	Annual	2/26/2015	665
SPEAG	DAE4	Dasy Data Acquisition Electronics	5/14/2014	Annual	5/14/2015	859
SPEAG	DAE4	Dasy Data Acquisition Electronics	1/22/2014	Annual	1/22/2015	1272
SPEAG	DAE4	Dasy Data Acquisition Electronics	8/12/2014	Annual	8/12/2015	1322
SPEAG	DAE4	Dasy Data Acquisition Electronics	3/17/2014	Annual	3/17/2015	1334
SPEAG	DAE4	Dasy Data Acquisition Electronics	9/18/2014	Annual	9/18/2015	1364
SPEAG	DAE4	Dasy Data Acquisition Electronics	4/11/2014	Annual	4/11/2015	1368
SPEAG	DAE4	Dasy Data Acquisition Electronics	11/18/2013	Annual	11/18/2014	1407
SPEAG	DAK-3.5	Dielectric Assessment Kit	5/6/2014	Annual	5/6/2015	1070
SPEAG	DAK-3.5	Dielectric Assessment Kit	11/13/2013	Annual	11/13/2014	1091
SPEAG	ES3DV2	SAR Probe	8/19/2014	Annual	8/19/2015	3022
SPEAG	ES3DV3	SAR Probe	3/19/2014	Annual	3/19/2015	3209
SPEAG	ES3DV3	SAR Probe	4/11/2014	Annual	4/11/2015	3213
SPEAG	ES3DV3	SAR Probe	2/25/2014	Annual	2/25/2015	3258
SPEAG	ES3DV3	SAR Probe	5/15/2014	Annual	5/15/2015	3263
SPEAG	ES3DV3	SAR Probe	9/24/2014	Annual	9/24/2015	3288
SPEAG	ES3DV3	SAR Probe	3/19/2014	Annual	3/19/2015	3318
SPEAG	ES3DV3	SAR Probe	4/17/2014	Annual	4/17/2015	3319
SPEAG	EX3DV4	SAR Probe	12/18/2013	Annual	12/18/2014	3920
VWR	36934-158	Wall-Mounted Thermometer	4/29/2014	Biennial	4/29/2016	111859323

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

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15 MEASUREMENT UNCERTAINTIES

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 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	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
Expanded Uncertainty							k=2	24.2	23.5
(95% CONFIDENCE LEVEL)									

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 i/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 E 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	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	12.4	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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- [25] FCC SAR Considerations for Handsets with Multiple Transmitters and Antennas, KDB Publications 648474 D02-D04
- [26] FCC SAR Evaluation Considerations for Laptop, Notebook, Netbook and Tablet Computers, FCC KDB Publication 616217 D04
- [27] FCC SAR Measurement and Reporting Requirements for 100MHz – 6 GHz, KDB Publications 865664 D01-D02
- [28] FCC General RF Exposure Guidance and SAR Procedures for Dongles, KDB Publication 447498, D01-D02
- [29] Anexo à Resolução No. 533, de 10 de Setembro de 2009.
- [30] IEC 62209-2, Human exposure to radio frequency fields from hand-held and body-mounted wireless communication devices - Human models, instrumentation, and procedures - Part 2: Procedure to determine the specific absorption rate (SAR) for wireless communication devices used in close proximity to the human body (frequency range of 30 MHz to 6 GHz), Mar. 2010.

FCC ID ZNFS996	 SAR EVALUATION REPORT 		Reviewed by: Quality Manager
Document S/N: 0Y1410202021-R1.ZNF	Test Dates: 10/20/14 - 10/28/14	DUT Type: Portable Handset	Page 88 of 88

APPENDIX A: SAR TEST DATA

PCTEST ENGINEERING LABORATORY, INC.

DUT: ZNFLS996; Type: Portable Handset; Serial: 1GLSV

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

Medium: 835 Head Medium parameters used (interpolated):

$f = 820.1 \text{ MHz}$; $\sigma = 0.924 \text{ S/m}$; $\epsilon_r = 43.044$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Right Section

Test Date: 10-21-2014; Ambient Temp: 23.3°C; Tissue Temp: 23.2°C

Probe: ES3DV3 - SN3209; ConvF(6.23, 6.23, 6.23); Calibrated: 3/19/2014;

Sensor-Surface: 3mm (Mechanical Surface Detection)

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

Phantom: SAM front; Type: QD000P40CD; Serial: TP:1759

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

Mode: Cell CDMA BC10, Right Head, Cheek, Mid.ch

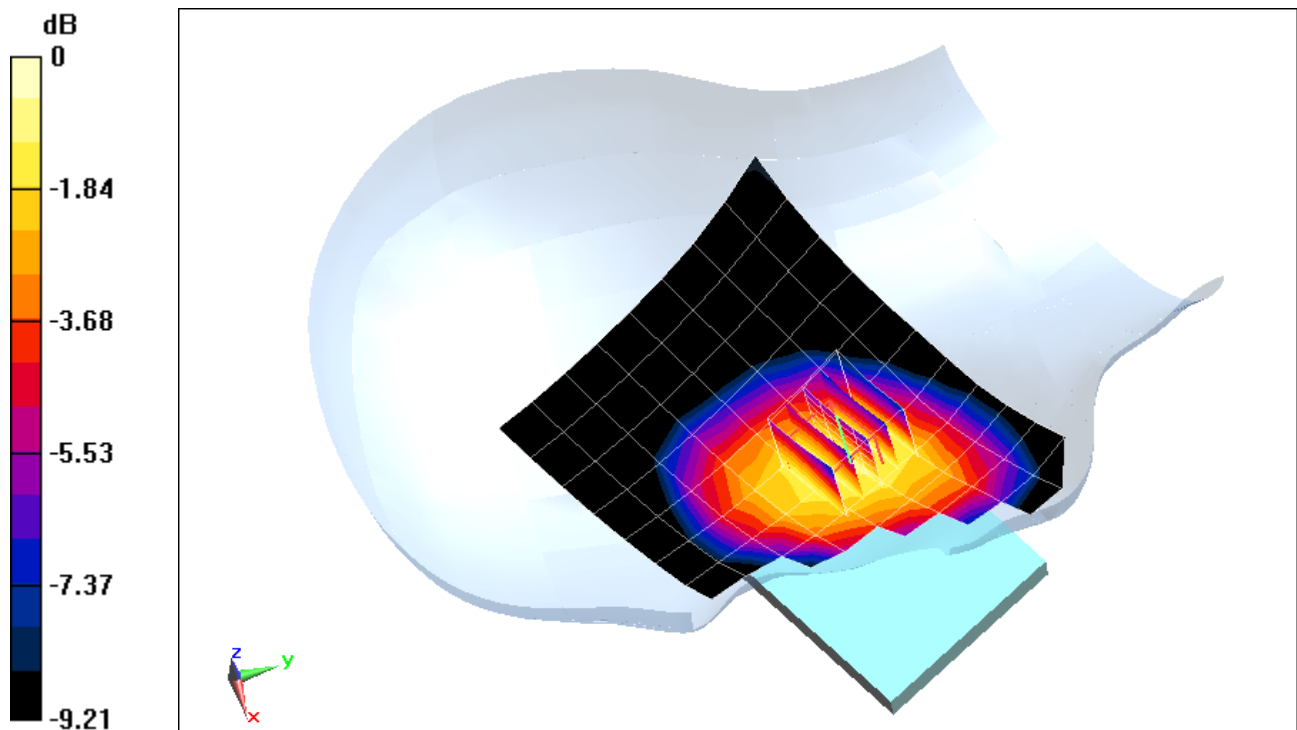
Area Scan (9x13x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$

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

Reference Value = 23.16 V/m; Power Drift = 0.03 dB

Peak SAR (extrapolated) = 0.544 W/kg

SAR(1 g) = 0.427 W/kg



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

PCTEST ENGINEERING LABORATORY, INC.

DUT: ZNFLS996; Type: Portable Handset; Serial: 1GLSV

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

Medium: 835 Head Medium parameters used (interpolated):

$f = 836.52 \text{ MHz}$; $\sigma = 0.943 \text{ S/m}$; $\epsilon_r = 42.903$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Right Section

Test Date: 10-21-2014; Ambient Temp: 23.3°C; Tissue Temp: 23.2°C

Probe: ES3DV3 - SN3209; ConvF(6.23, 6.23, 6.23); Calibrated: 3/19/2014;

Sensor-Surface: 3mm (Mechanical Surface Detection)

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

Phantom: SAM front; Type: QD000P40CD; Serial: TP:1759

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

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

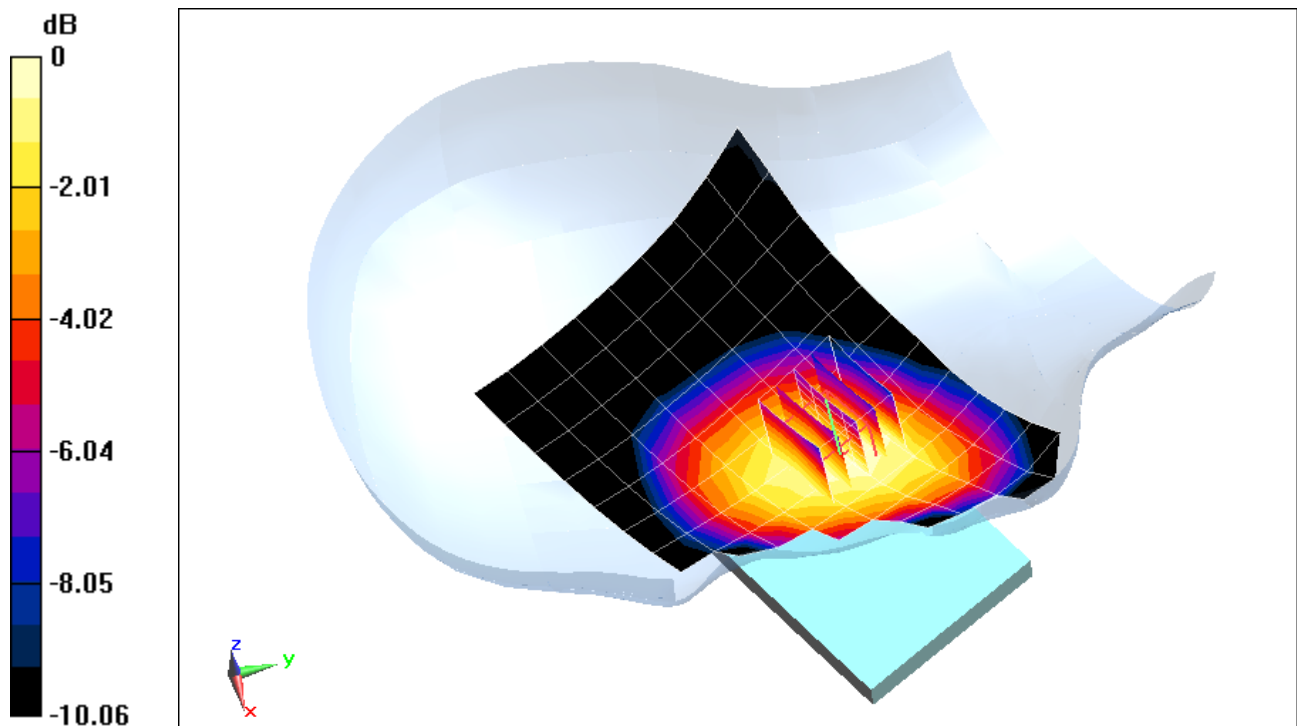
Area Scan (9x15x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$

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

Reference Value = 21.39 V/m; Power Drift = -0.03 dB

Peak SAR (extrapolated) = 0.482 W/kg

SAR(1 g) = 0.371 W/kg



0 dB = 0.409 W/kg = -3.88 dBW/kg

PCTEST ENGINEERING LABORATORY, INC.

DUT: ZNFLS996; Type: Portable Handset; Serial: 1GLSV

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

Medium: 1900 Head Medium parameters used:

$f = 1880 \text{ MHz}$; $\sigma = 1.432 \text{ S/m}$; $\epsilon_r = 38.416$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Right Section

Test Date: 10-23-2014; Ambient Temp: 22.6°C; Tissue Temp: 22.6°C

Probe: ES3DV2 - SN3022; ConvF(4.85, 4.85, 4.85); 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: PCS EVDO Rev. A, Right Head, Cheek, Mid.ch

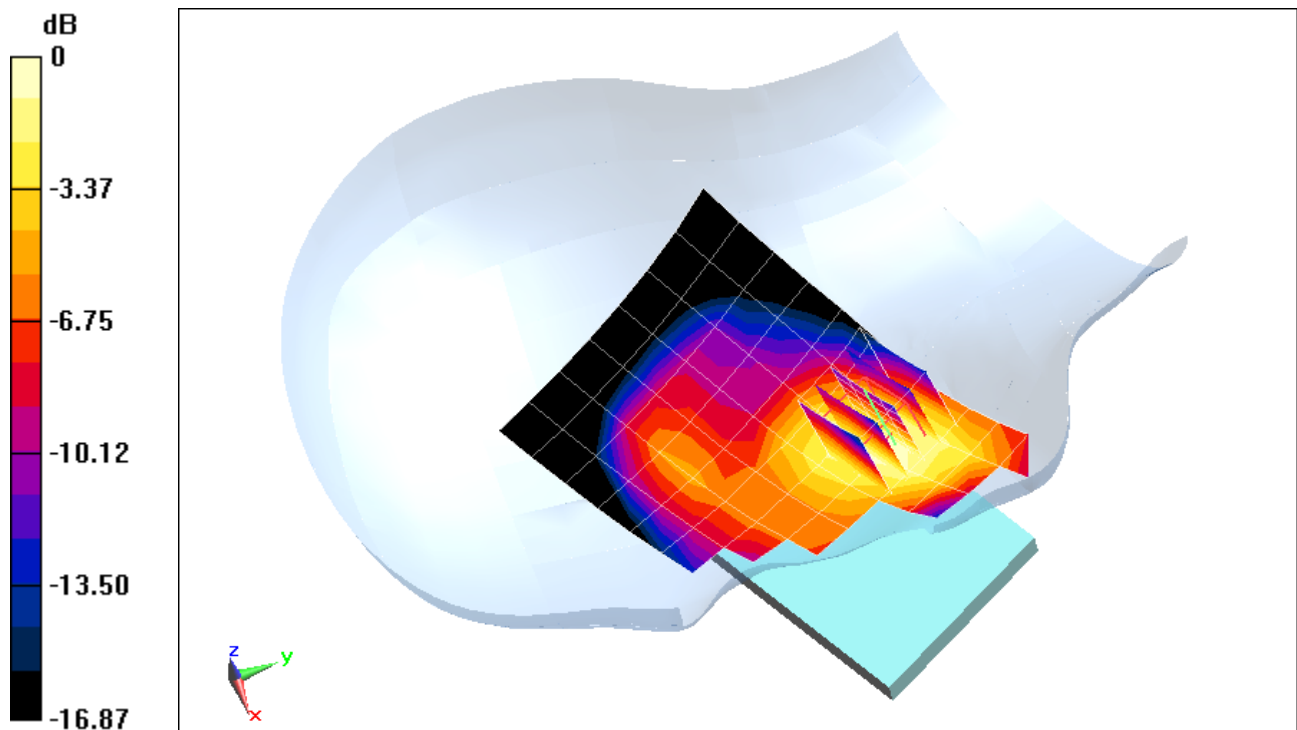
Area Scan (8x13x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$

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

Reference Value = 20.37 V/m; Power Drift = -0.08 dB

Peak SAR (extrapolated) = 0.834 W/kg

SAR(1 g) = 0.553 W/kg



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

PCTEST ENGINEERING LABORATORY, INC.

DUT: ZNFLS996; Type: Portable Handset; Serial: 1FMQW

Communication System: UID 0, GSM GPRS; 2 Tx slots; Frequency: 836.6 MHz; Duty Cycle: 1:4.15

Medium: 835 Head Medium parameters used (interpolated):

$f = 836.6 \text{ MHz}$; $\sigma = 0.94 \text{ S/m}$; $\epsilon_r = 42.177$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Right Section

Test Date: 10-24-2014; Ambient Temp: 23.3°C; Tissue Temp: 22.3°C

Probe: ES3DV3 - SN3209; ConvF(6.23, 6.23, 6.23); Calibrated: 3/19/2014;

Sensor-Surface: 3mm (Mechanical Surface Detection)

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

Phantom: SAM front; Type: QD000P40CD; Serial: TP:1759

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

Mode: GPRS 850, Right Head, Cheek, Mid.ch, 2 Tx slots

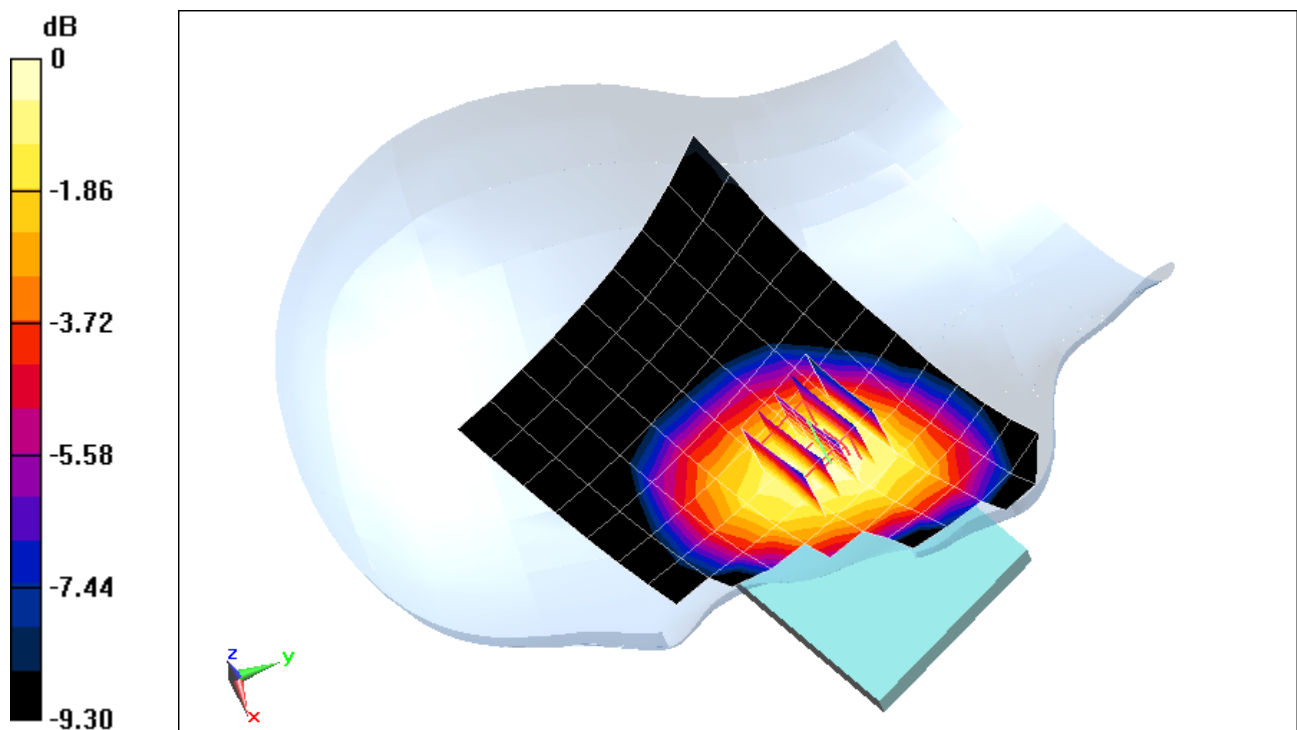
Area Scan (9x14x1): Measurement grid: dx=15mm, dy=15mm

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

Reference Value = 19.75 V/m; Power Drift = 0.02 dB

Peak SAR (extrapolated) = 0.444 W/kg

SAR(1 g) = 0.344 W/kg



0 dB = 0.376 W/kg = -4.25 dBW/kg

PCTEST ENGINEERING LABORATORY, INC.

DUT: ZNFLS996; Type: Portable Handset; Serial: 1FMQW

Communication System: UID 0, GSM GPRS; 2 Tx slots; Frequency: 1880 MHz; Duty Cycle: 1:4.15

Medium: 1900 Head Medium parameters used:

$f = 1880 \text{ MHz}$; $\sigma = 1.432 \text{ S/m}$; $\epsilon_r = 38.416$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Right Section

Test Date: 10-23-2014; Ambient Temp: 22.6°C; Tissue Temp: 22.6°C

Probe: ES3DV2 - SN3022; ConvF(4.85, 4.85, 4.85); 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: GPRS 1900, Right Head, Cheek, Mid.ch, 2 Tx slots

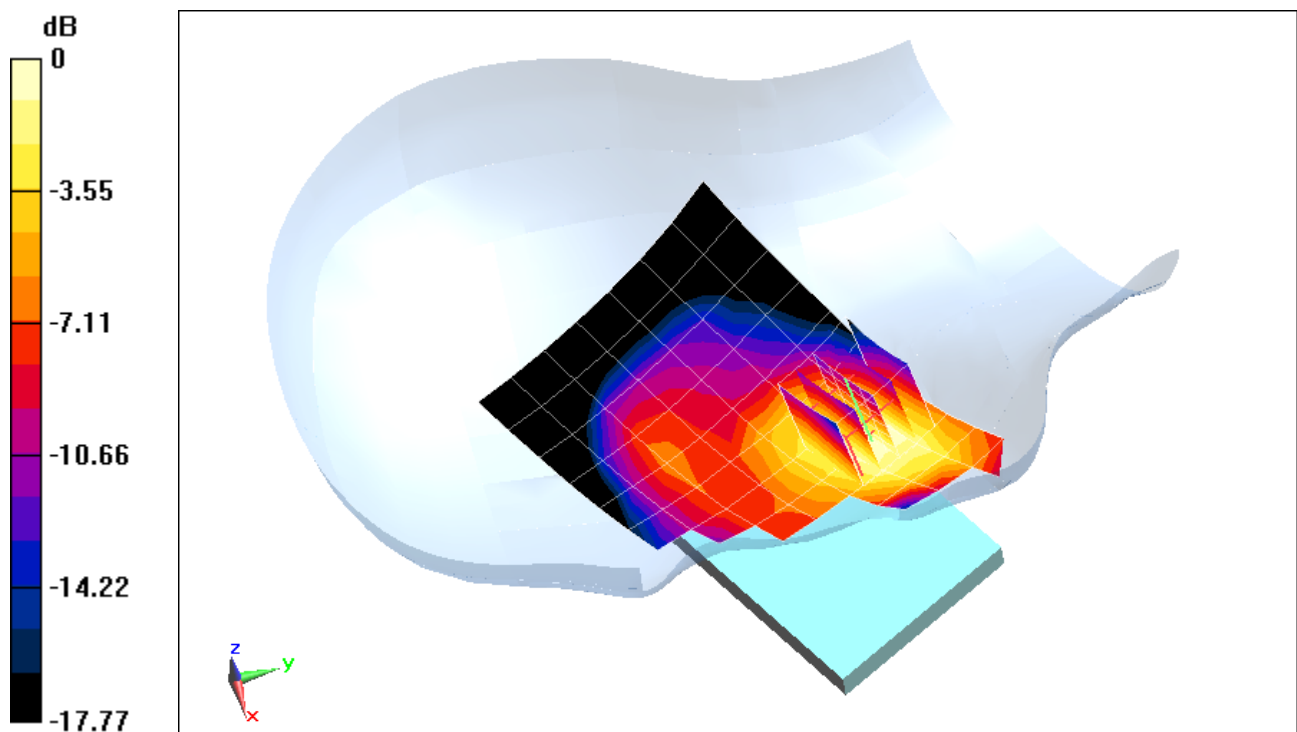
Area Scan (8x13x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$

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

Reference Value = 14.41 V/m; Power Drift = -0.16 dB

Peak SAR (extrapolated) = 0.454 W/kg

SAR(1 g) = 0.297 W/kg



PCTEST ENGINEERING LABORATORY, INC.

DUT: ZNFLS996; Type: Portable Handset; Serial: 1FMQW

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

Medium: 835 Head Medium parameters used (interpolated):

$f = 836.6 \text{ MHz}$; $\sigma = 0.94 \text{ S/m}$; $\epsilon_r = 42.177$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Right Section

Test Date: 10-24-2014; Ambient Temp: 23.3°C; Tissue Temp: 22.3°C

Probe: ES3DV3 - SN3209; ConvF(6.23, 6.23, 6.23); Calibrated: 3/19/2014;

Sensor-Surface: 3mm (Mechanical Surface Detection)

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

Phantom: SAM front; Type: QD000P40CD; Serial: TP:1759

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

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

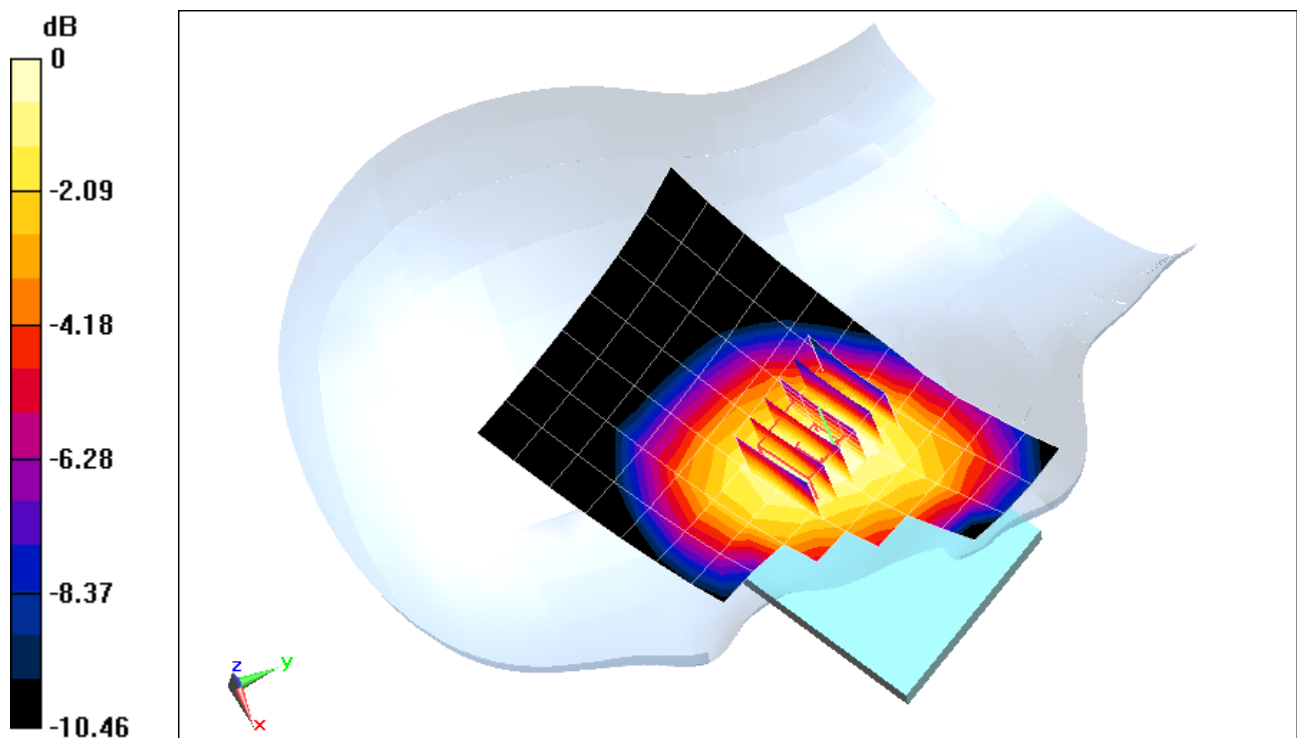
Area Scan (8x13x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$

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

Reference Value = 17.53 V/m; Power Drift = 0.03 dB

Peak SAR (extrapolated) = 0.355 W/kg

SAR(1 g) = 0.274 W/kg



0 dB = 0.302 W/kg = -5.20 dBW/kg

PCTEST ENGINEERING LABORATORY, INC.

DUT: ZNFLS996; Type: Portable Handset; Serial: 1FMQW

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

Medium: 1900 Head Medium parameters used:

$f = 1880 \text{ MHz}$; $\sigma = 1.432 \text{ S/m}$; $\epsilon_r = 38.416$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Right Section

Test Date: 10-23-2014; Ambient Temp: 22.6°C; Tissue Temp: 22.6°C

Probe: ES3DV2 - SN3022; ConvF(4.85, 4.85, 4.85); 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: UMTS 1900, Right Head, Cheek, Mid.ch

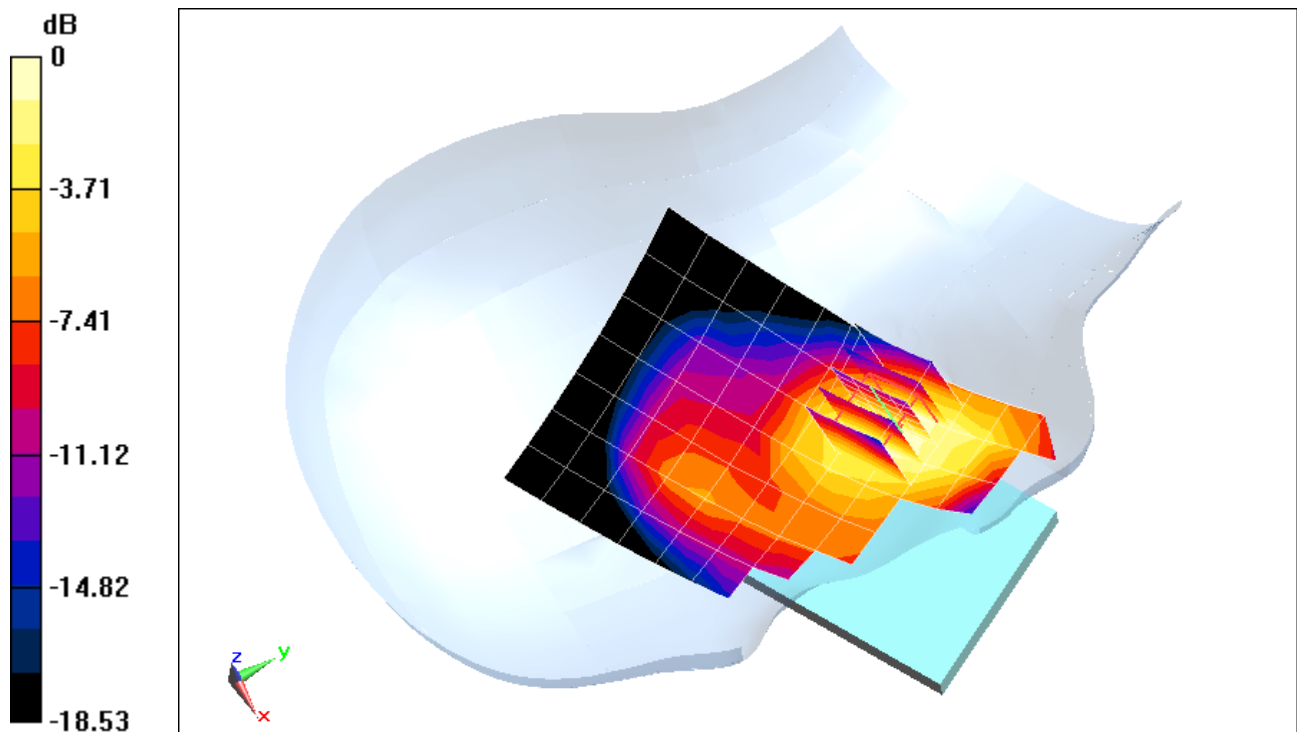
Area Scan (8x13x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$

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

Reference Value = 17.24 V/m; Power Drift = -0.05 dB

Peak SAR (extrapolated) = 0.661 W/kg

SAR(1 g) = 0.424 W/kg



0 dB = 0.498 W/kg = -3.03 dBW/kg

PCTEST ENGINEERING LABORATORY, INC.

DUT: ZNFLS996; Type: Portable Handset; Serial: 1GLRX

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

Medium: 750 Head Medium parameters used (interpolated):

$f = 707.5 \text{ MHz}$; $\sigma = 0.885 \text{ S/m}$; $\epsilon_r = 42.958$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Right Section

Test Date: 10-27-2014; Ambient Temp: 22.1°C; Tissue Temp: 20.5°C

Probe: ES3DV3 - SN3318; ConvF(6.45, 6.45, 6.45); Calibrated: 3/19/2014;

Sensor-Surface: 3mm (Mechanical Surface Detection)

Electronics: DAE4 Sn1272; Calibrated: 6/19/2014

Phantom: Main Twin Sam; Type: QD000P40CC; Serial: TP: 1375

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

Mode: LTE Band 12, Right Head, Cheek, Mid.ch

10 MHz Bandwidth, QPSK, 1 RB, 0 RB Offset

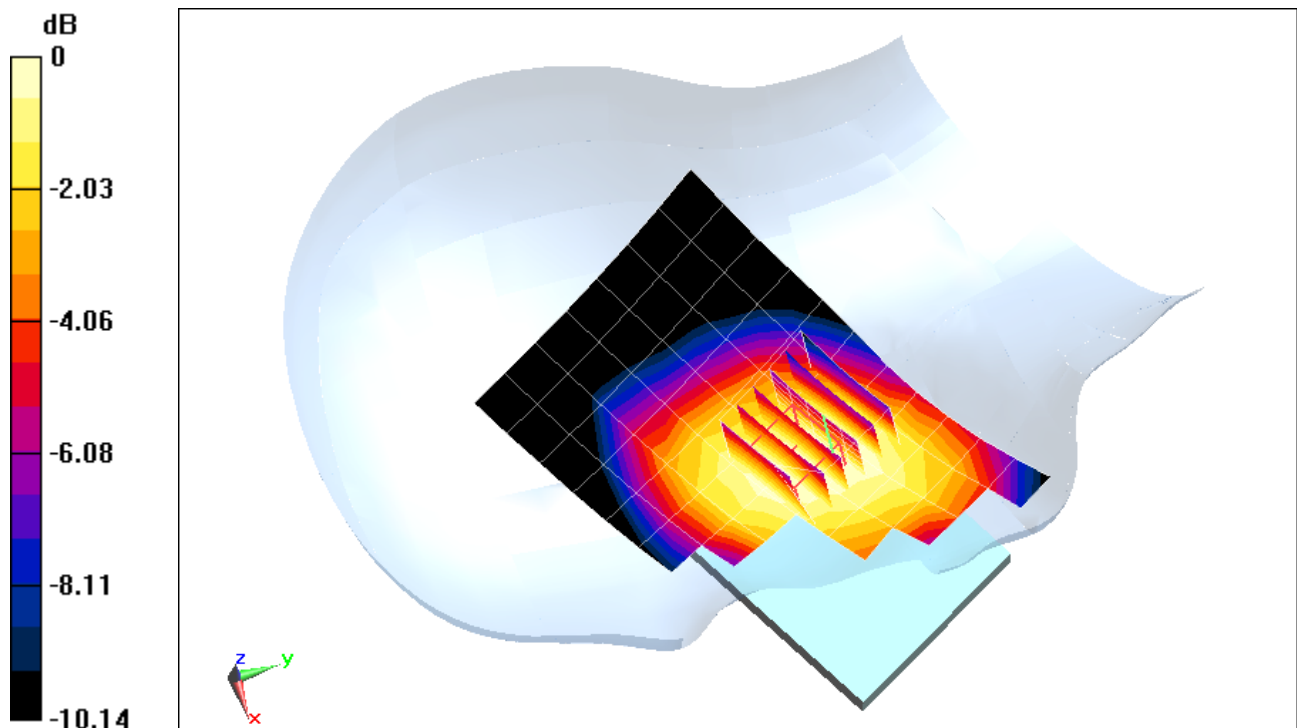
Area Scan (8x13x1): Measurement grid: dx=15mm, dy=15mm

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

Reference Value = 14.85 V/m; Power Drift = 0.12 dB

Peak SAR (extrapolated) = 0.213 W/kg

SAR(1 g) = 0.170 W/kg



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

PCTEST ENGINEERING LABORATORY, INC.

DUT: ZNFLS996; Type: Portable Handset; Serial: 1GLRW

Communication System: UID 0, LTE Band 26; Frequency: 831.5 MHz; Duty Cycle: 1:1

Medium: 835 Head Medium parameters used (interpolated):

$f = 831.5 \text{ MHz}$; $\sigma = 0.92 \text{ S/m}$; $\epsilon_r = 40.905$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Right Section

Test Date: 10-28-2014; Ambient Temp: 22.6°C; Tissue Temp: 21.5°C

Probe: ES3DV3 - SN3213; ConvF(6.37, 6.37, 6.37); Calibrated: 4/11/2014;

Sensor-Surface: 3mm (Mechanical Surface Detection)

Electronics: DAE4 Sn1407; Calibrated: 11/18/2013

Phantom: Sub TWIN SAM; Type: QD000P40CC; Serial: TP-1357

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

Mode: LTE Band 26 (Cell.), Right Head, Cheek, Mid.ch
15 MHz Bandwidth, QPSK, 1 RB, 36 RB Offset

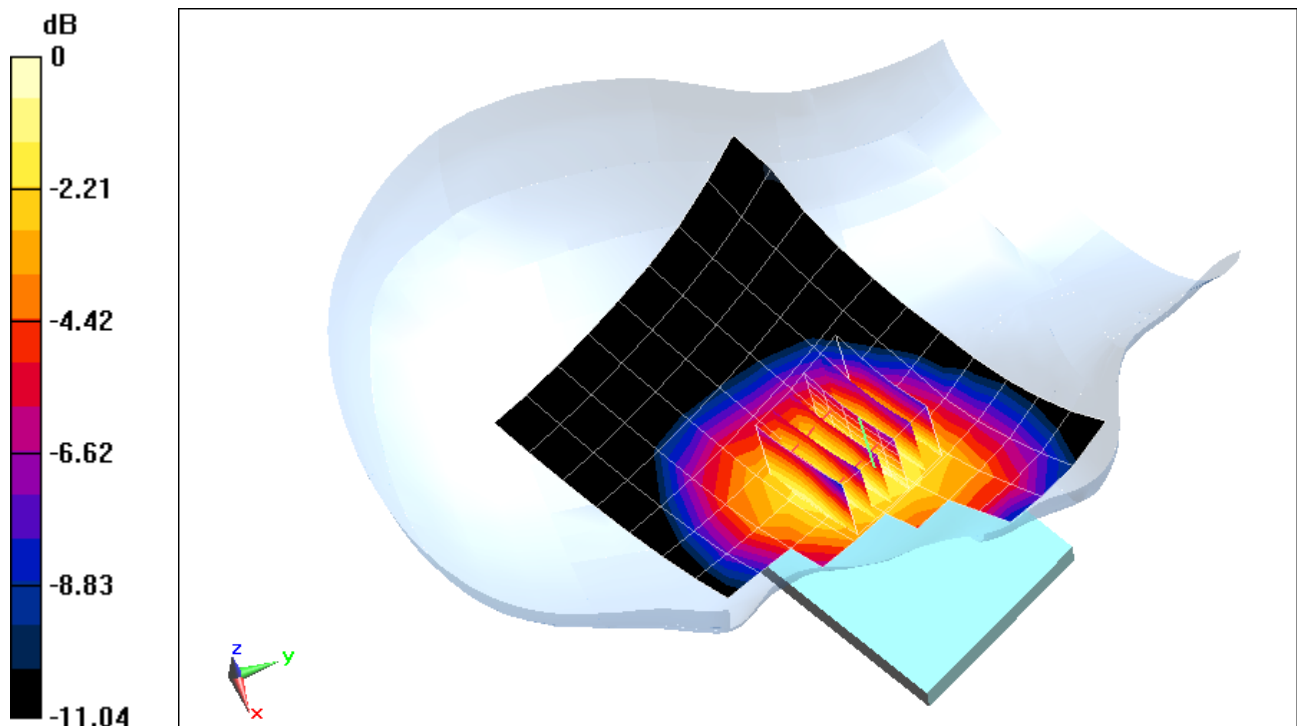
Area Scan (9x15x1): Measurement grid: dx=15mm, dy=15mm

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

Reference Value = 18.54 V/m; Power Drift = -0.06 dB

Peak SAR (extrapolated) = 0.332 W/kg

SAR(1 g) = 0.260 W/kg



0 dB = 0.287 W/kg = -5.42 dBW/kg

PCTEST ENGINEERING LABORATORY, INC.

DUT: ZNFLS996; Type: Portable Handset; Serial: 1GLRW

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

Medium: 1750 Head Medium parameters used (interpolated):

$f = 1732.5 \text{ MHz}$; $\sigma = 1.371 \text{ S/m}$; $\epsilon_r = 39.889$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Right Section

Test Date: 10-22-2014; Ambient Temp: 23.0°C; Tissue Temp: 22.4°C

Probe: ES3DV2 - SN3022; ConvF(5.04, 5.04, 5.04); 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: LTE Band 4 (AWS), Right Head, Cheek, Mid.ch

20 MHz Bandwidth, QPSK, 1 RB, 99 RB Offset

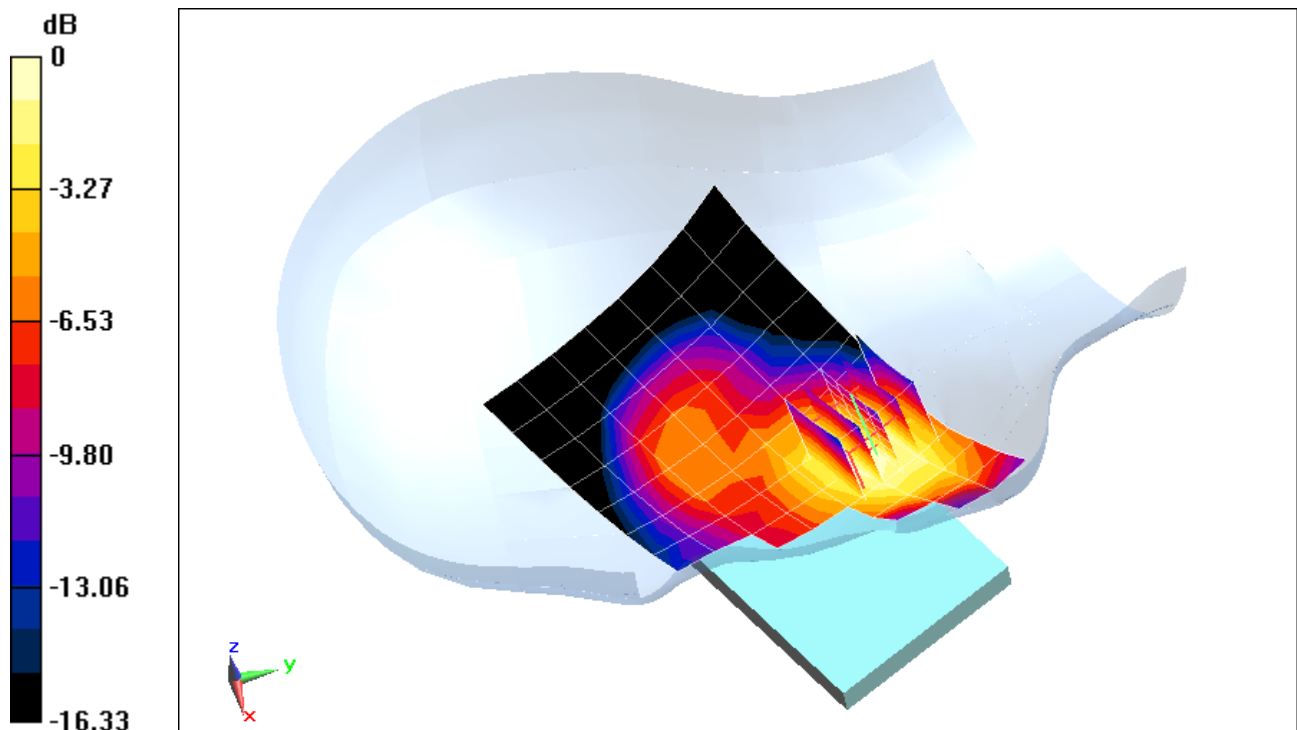
Area Scan (8x13x1): Measurement grid: dx=15mm, dy=15mm

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

Reference Value = 20.07 V/m; Power Drift = -0.06 dB

Peak SAR (extrapolated) = 0.654 W/kg

SAR(1 g) = 0.441 W/kg



0 dB = 0.518 W/kg = -2.86 dBW/kg

PCTEST ENGINEERING LABORATORY, INC.

DUT: ZNFLS996; Type: Portable Handset; Serial: 1GLRX

Communication System: UID 0, LTE Band 25 (PCS); Frequency: 1882.5 MHz; Duty Cycle: 1:1

Medium: 1900 Head Medium parameters used (interpolated):

$f = 1882.5 \text{ MHz}$; $\sigma = 1.434 \text{ S/m}$; $\epsilon_r = 38.406$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Right Section

Test Date: 10-23-2014; Ambient Temp: 22.6°C; Tissue Temp: 22.6°C

Probe: ES3DV2 - SN3022; ConvF(4.85, 4.85, 4.85); 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: LTE Band 25 (PCS), Right Head, Cheek, Mid.ch

20 MHz Bandwidth, QPSK, 1 RB, 0 RB Offset

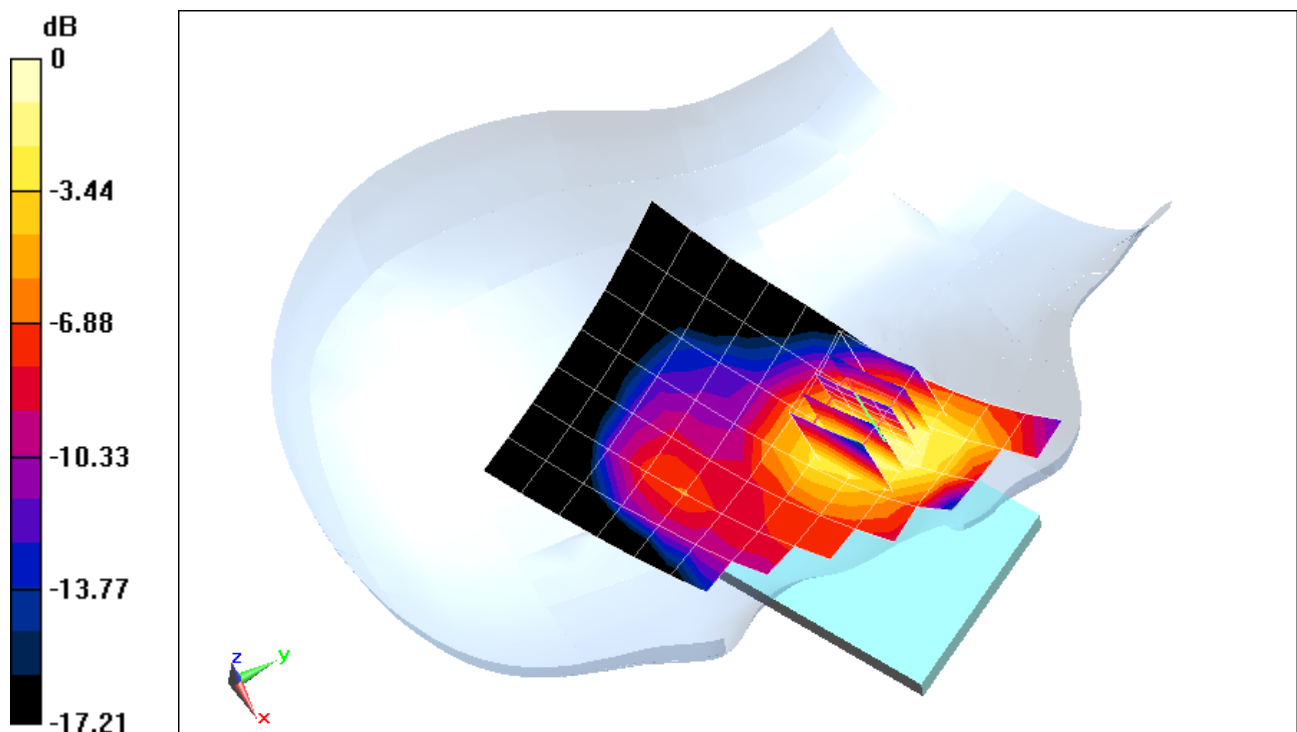
Area Scan (8x13x1): Measurement grid: dx=15mm, dy=15mm

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

Reference Value = 17.62 V/m; Power Drift = -0.01 dB

Peak SAR (extrapolated) = 0.571 W/kg

SAR(1 g) = 0.372 W/kg



0 dB = 0.437 W/kg = -3.60 dBW/kg

PCTEST ENGINEERING LABORATORY, INC.

DUT: ZNFLS996; Type: Portable Handset; Serial: 1GLRW

Communication System: UID 0, LTE Band 41; Frequency: 2593 MHz; Duty Cycle: 1:1.59

Medium: 2450 Head Medium parameters used (interpolated):

$f = 2593 \text{ MHz}$; $\sigma = 1.937 \text{ S/m}$; $\epsilon_r = 37.729$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Left Section

Test Date: 10-21-2014; Ambient Temp: 24.3°C; Tissue Temp: 23.1°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, Left Head, Cheek, Mid.ch, QPSK
20 MHz Bandwidth, 1 RB, 50 RB Offset

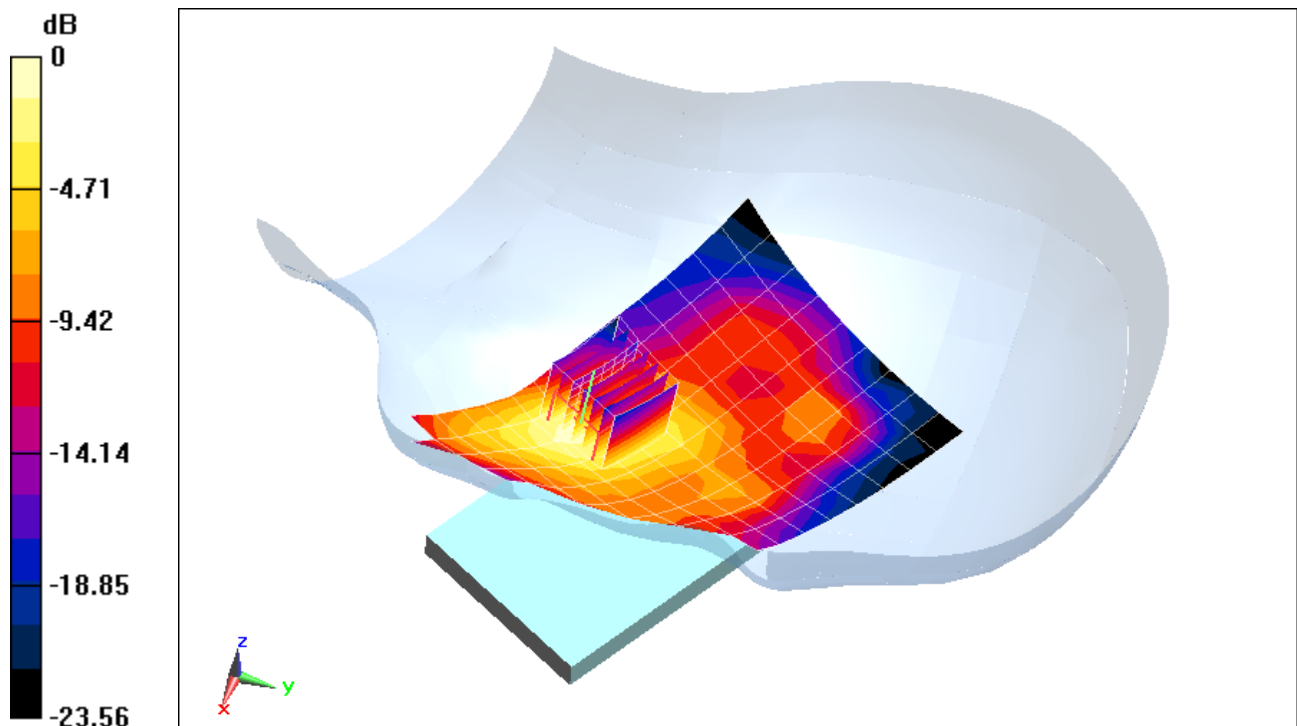
Area Scan (10x17x1): Measurement grid: dx=12mm, dy=12mm

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

Reference Value = 18.41 V/m; Power Drift = 0.09 dB

Peak SAR (extrapolated) = 0.953 W/kg

SAR(1 g) = 0.543 W/kg



0 dB = 0.678 W/kg = -1.69 dBW/kg

PCTEST ENGINEERING LABORATORY, INC.

DUT: ZNFLS996; Type: Portable Handset; Serial: 1FMQT

Communication System: UID 0, IEEE 802.11b; Frequency: 2462 MHz; Duty Cycle: 1:1

Medium: 2450 Head Medium parameters used (interpolated):

$f = 2462 \text{ MHz}$; $\sigma = 1.798 \text{ S/m}$; $\epsilon_r = 38.205$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Right Section

Test Date: 10-21-2014; Ambient Temp: 24.3°C; Tissue Temp: 23.1°C

Probe: ES3DV3 - SN3258; ConvF(4.52, 4.52, 4.52); 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: IEEE 802.11b, Right Head, Cheek, Ch 11, 1 Mbps

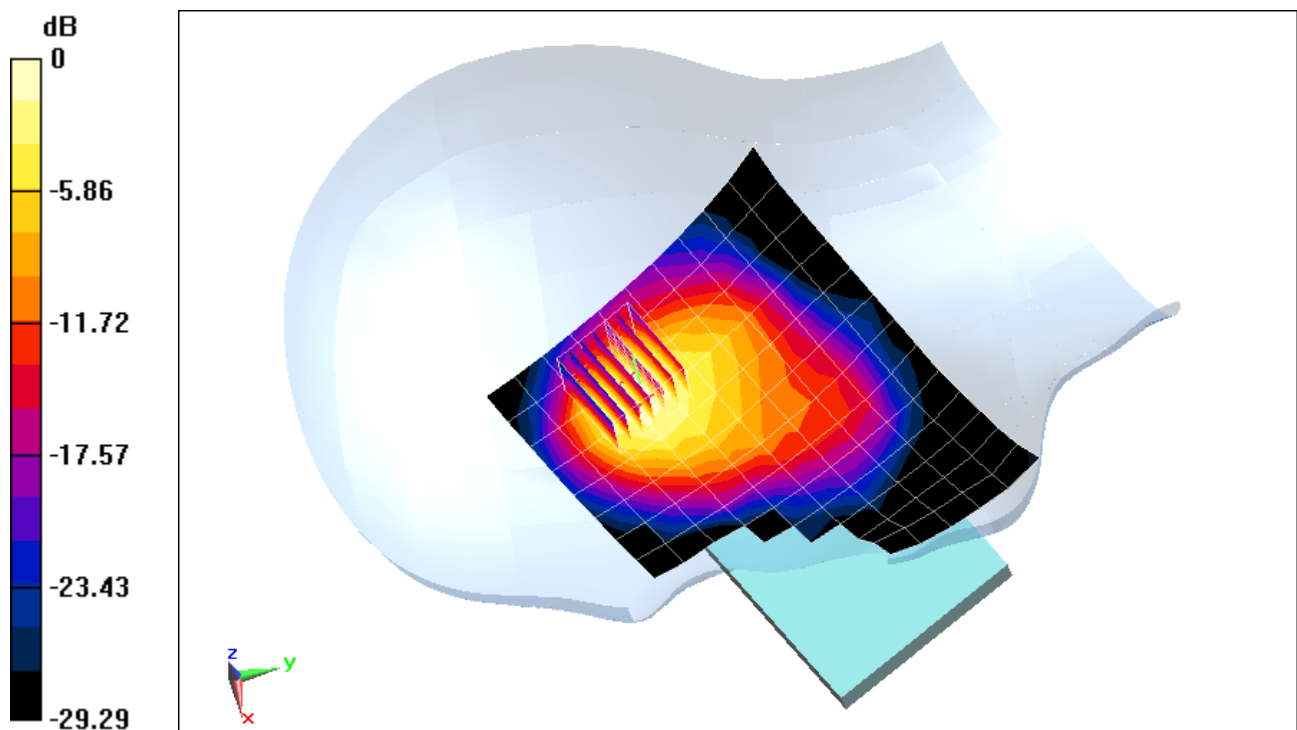
Area Scan (11x16x1): Measurement grid: $dx=12\text{mm}$, $dy=12\text{mm}$

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

Reference Value = 16.74 V/m; Power Drift = 0.07 dB

Peak SAR (extrapolated) = 1.04 W/kg

SAR(1 g) = 0.515 W/kg



0 dB = 0.659 W/kg = -1.81 dBW/kg

PCTEST ENGINEERING LABORATORY, INC.

DUT: ZNFLS996; Type: Portable Handset; Serial: 1FMQT

Communication System: UID 0, IEEE 802.11a; Frequency: 5240 MHz; Duty Cycle: 1:1

Medium: 5 GHz Head Medium parameters used:

$f = 5240 \text{ MHz}$; $\sigma = 4.541 \text{ S/m}$; $\epsilon_r = 36.257$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Right Section

Test Date: 10-28-2014; Ambient Temp: 21.8°C; Tissue Temp: 20.9°C

Probe: EX3DV4 - SN3920; ConvF(4.87, 4.87, 4.87); Calibrated: 12/18/2013;

Sensor-Surface: 1.4mm (Mechanical Surface Detection)

Electronics: DAE4 Sn649; Calibrated: 12/12/2013

Phantom: SAM Main with CRP v4.0; Type: QD000P40CC; Serial: TP 1114

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

Mode: IEEE 802.11a, 5.2 GHz, Right Head, Cheek, Ch 48, 6 Mbps

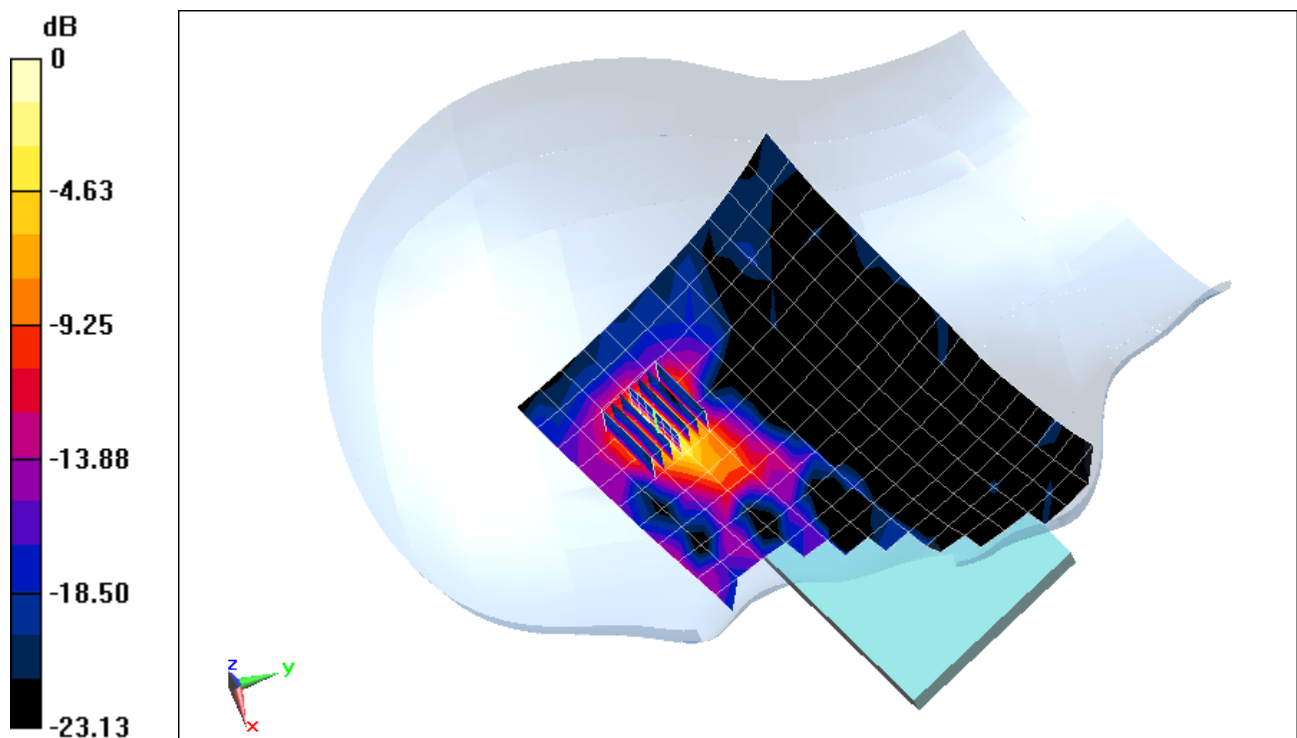
Area Scan (13x19x1): Measurement grid: dx=10mm, dy=10mm

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

Reference Value = 10.70 V/m; Power Drift = 0.00 dB

Peak SAR (extrapolated) = 1.90 W/kg

SAR(1 g) = 0.470 W/kg



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

PCTEST ENGINEERING LABORATORY, INC.

DUT: ZNFLS996; Type: Portable Handset; Serial: 1GLSV

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

Medium: 835 Body Medium parameters used (interpolated):

$f = 820.1 \text{ MHz}$; $\sigma = 0.94 \text{ S/m}$; $\epsilon_r = 54.088$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 0.8 cm

Test Date: 10-21-2014; Ambient Temp: 21.4°C; Tissue Temp: 20.6°C

Probe: ES3DV3 - SN3213; ConvF(6.18, 6.18, 6.18); Calibrated: 4/11/2014;

Sensor-Surface: 3mm (Mechanical Surface Detection)

Electronics: DAE4 Sn1407; Calibrated: 11/18/2013

Phantom: Sub TWIN SAM; Type: QD000P40CC; Serial: TP-1357

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

Mode: Cell. CDMA BC 10, Body SAR, Back side, Mid.ch

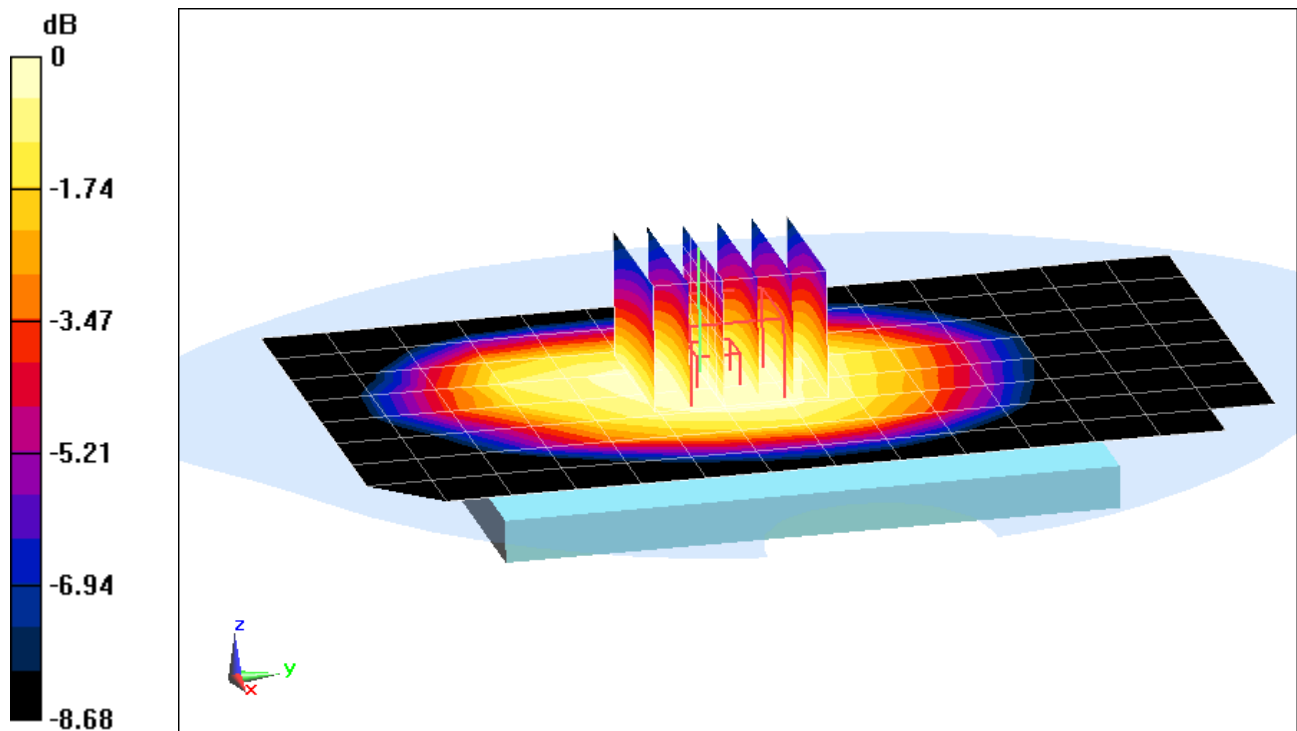
Area Scan (9x15x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$

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

Reference Value = 24.78 V/m; Power Drift = 0.01 dB

Peak SAR (extrapolated) = 0.686 W/kg

SAR(1 g) = 0.548 W/kg



0 dB = 0.597 W/kg = -2.24 dBW/kg

PCTEST ENGINEERING LABORATORY, INC.

DUT: ZNFLS996; Type: Portable Handset; Serial:1GLSV

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

Medium: 835 Body Medium parameters used (interpolated):

$f = 820.1 \text{ MHz}$; $\sigma = 0.94 \text{ S/m}$; $\epsilon_r = 54.088$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 0.8 cm

Test Date: 10-21-2014; Ambient Temp: 21.4°C; Tissue Temp: 20.6°C

Probe: ES3DV3 - SN3213; ConvF(6.18, 6.18, 6.18); Calibrated: 4/11/2014;

Sensor-Surface: 3mm (Mechanical Surface Detection)

Electronics: DAE4 Sn1407; Calibrated: 11/18/2013

Phantom: Sub TWIN SAM; Type: QD000P40CC; Serial: TP-1357

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

Mode: Cell. EVDO Rev. 0, BC10, Body SAR, Front side, Mid.ch

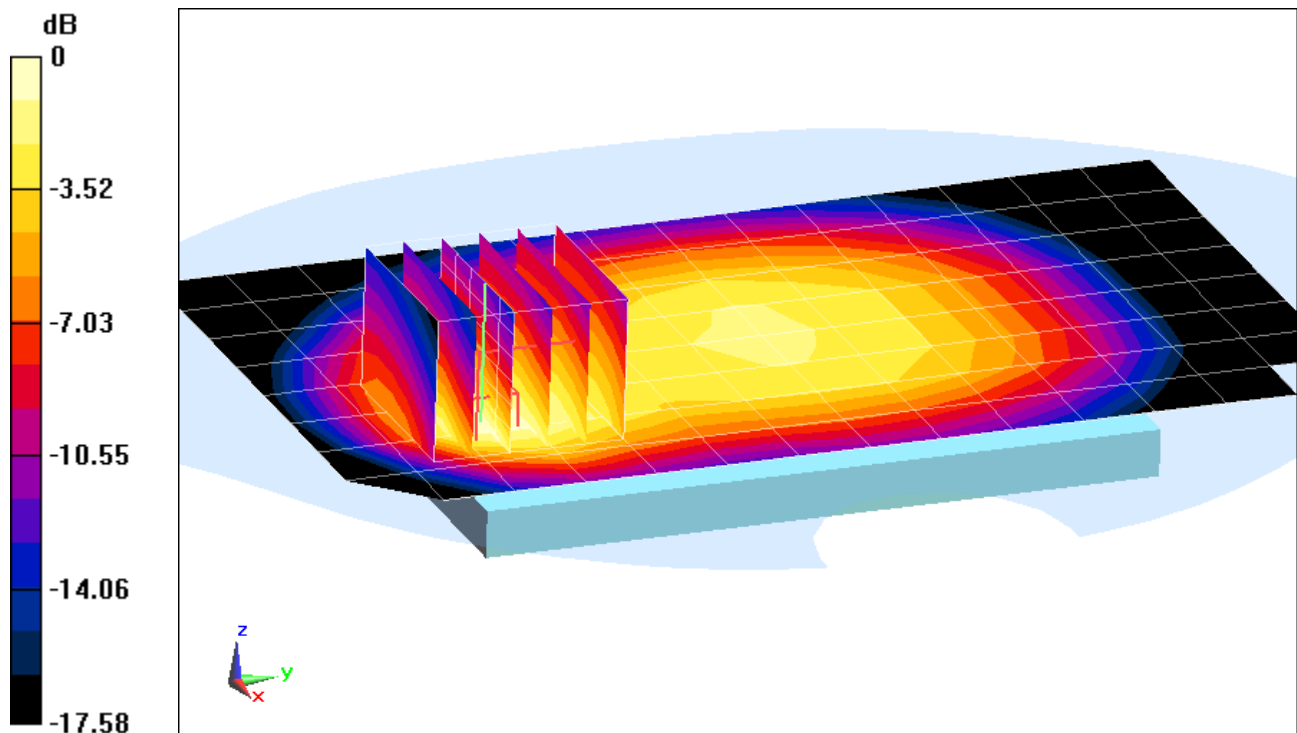
Area Scan (9x15x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$

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

Reference Value = 24.65 V/m; Power Drift = -0.03 dB

Peak SAR (extrapolated) = 1.07 W/kg

SAR(1 g) = 0.574 W/kg



0 dB = 0.706 W/kg = -1.51 dBW/kg

PCTEST ENGINEERING LABORATORY, INC.

DUT: ZNFLS996; Type: Portable Handset; Serial: 1GLSV

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

Medium: 835 Body Medium parameters used (interpolated):

$f = 836.52 \text{ MHz}$; $\sigma = 0.956 \text{ S/m}$; $\epsilon_r = 53.924$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 0.8 cm

Test Date: 10-21-2014; Ambient Temp: 21.4°C; Tissue Temp: 20.6°C

Probe: ES3DV3 - SN3213; ConvF(6.18, 6.18, 6.18); Calibrated: 4/11/2014;

Sensor-Surface: 3mm (Mechanical Surface Detection)

Electronics: DAE4 Sn1407; Calibrated: 11/18/2013

Phantom: Sub TWIN SAM; Type: QD000P40CC; Serial: TP-1357

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

Mode: Cell. CDMA BC 0, Body SAR, Back side, Mid.ch

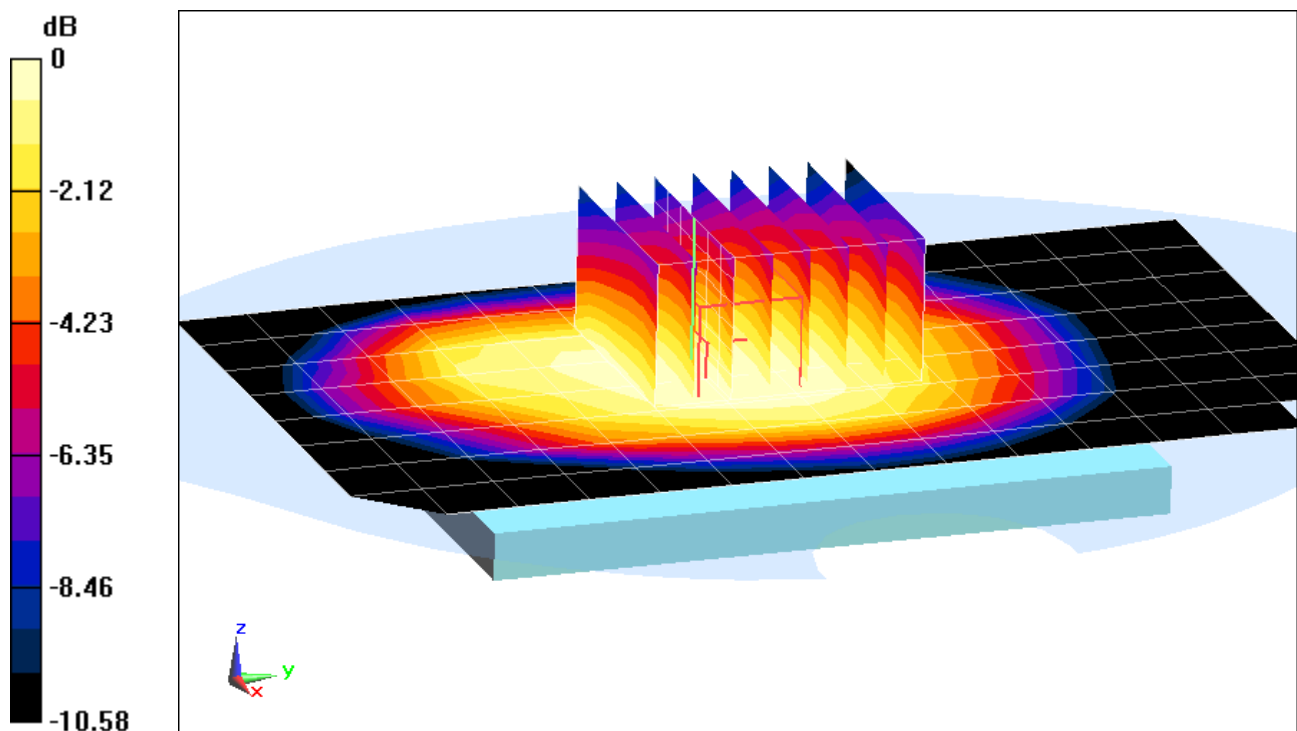
Area Scan (9x15x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$

Zoom Scan (7x8x7)/Cube 0: Measurement grid: $dx=8\text{mm}$, $dy=8\text{mm}$, $dz=5\text{mm}$

Reference Value = 20.41 V/m; Power Drift = -0.01 dB

Peak SAR (extrapolated) = 0.506 W/kg

SAR(1 g) = 0.405 W/kg



0 dB = 0.441 W/kg = -3.56 dBW/kg

PCTEST ENGINEERING LABORATORY, INC.

DUT: ZNFLS996; Type: Portable Handset; Serial: 1GLSV

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

Medium: 835 Body Medium parameters used (interpolated):

$f = 836.52 \text{ MHz}$; $\sigma = 0.956 \text{ S/m}$; $\epsilon_r = 53.924$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.0 cm

Test Date: 10-21-2014; Ambient Temp: 21.4°C; Tissue Temp: 20.6°C

Probe: ES3DV3 - SN3213; ConvF(6.18, 6.18, 6.18); Calibrated: 4/11/2014;

Sensor-Surface: 3mm (Mechanical Surface Detection)

Electronics: DAE4 Sn1407; Calibrated: 11/18/2013

Phantom: Sub TWIN SAM; Type: QD000P40CC; Serial: TP-1357

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

Mode: Cell. EVDO Rev. 0, BC0, Body SAR, Right Edge, Mid.ch

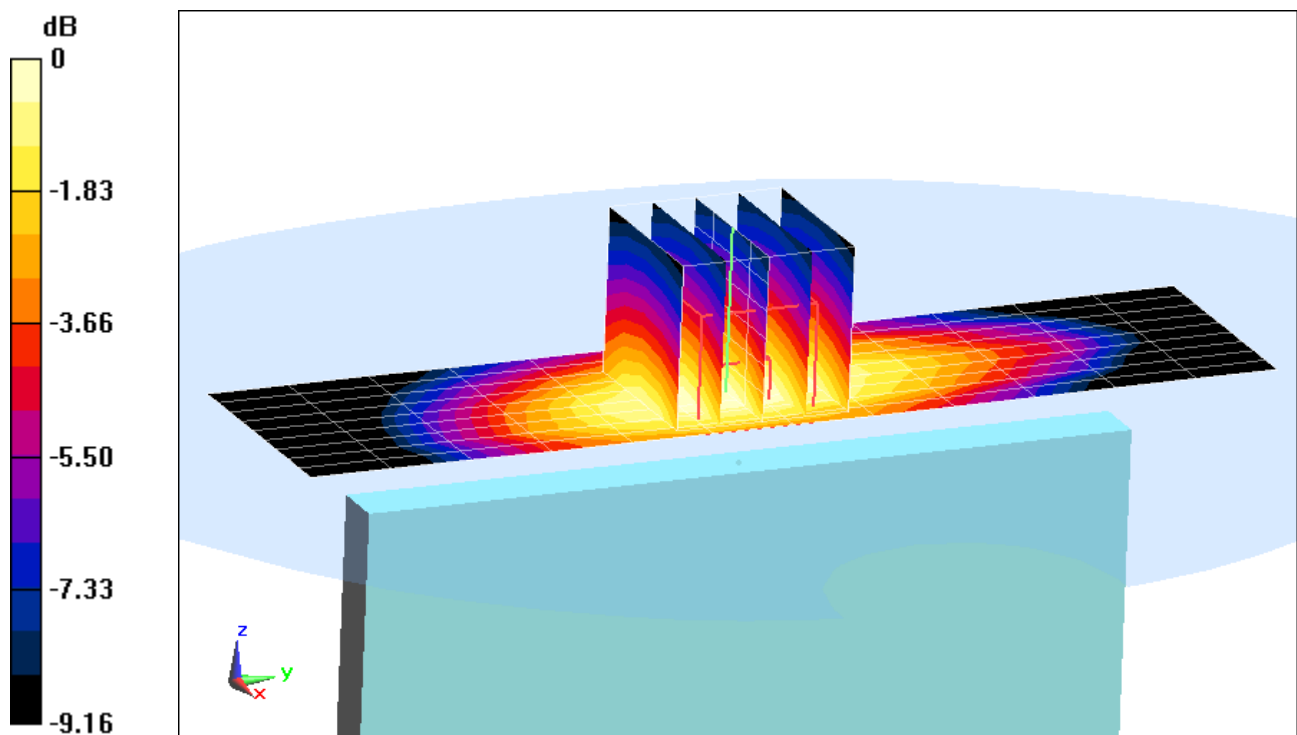
Area Scan (10x13x1): Measurement grid: $dx=5\text{mm}$, $dy=15\text{mm}$

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

Reference Value = 22.96 V/m; Power Drift = -0.01 dB

Peak SAR (extrapolated) = 0.641 W/kg

SAR(1 g) = 0.459 W/kg



0 dB = 0.526 W/kg = -2.79 dBW/kg

PCTEST ENGINEERING LABORATORY, INC.

DUT: ZNFLS996; Type: Portable Handset; Serial: 1GLSV

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

Medium: 1900 Body Medium parameters used:

$f = 1880 \text{ MHz}$; $\sigma = 1.553 \text{ S/m}$; $\epsilon_r = 53.613$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 0.8 cm

Test Date: 10-21-2014; Ambient Temp: 23.6°C; Tissue Temp: 22.4°C

Probe: ES3DV3 - SN3319; ConvF(4.67, 4.67, 4.67); Calibrated: 4/17/2014;

Sensor-Surface: 3mm (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: PCS CDMA, Body SAR, Back side, Mid.ch

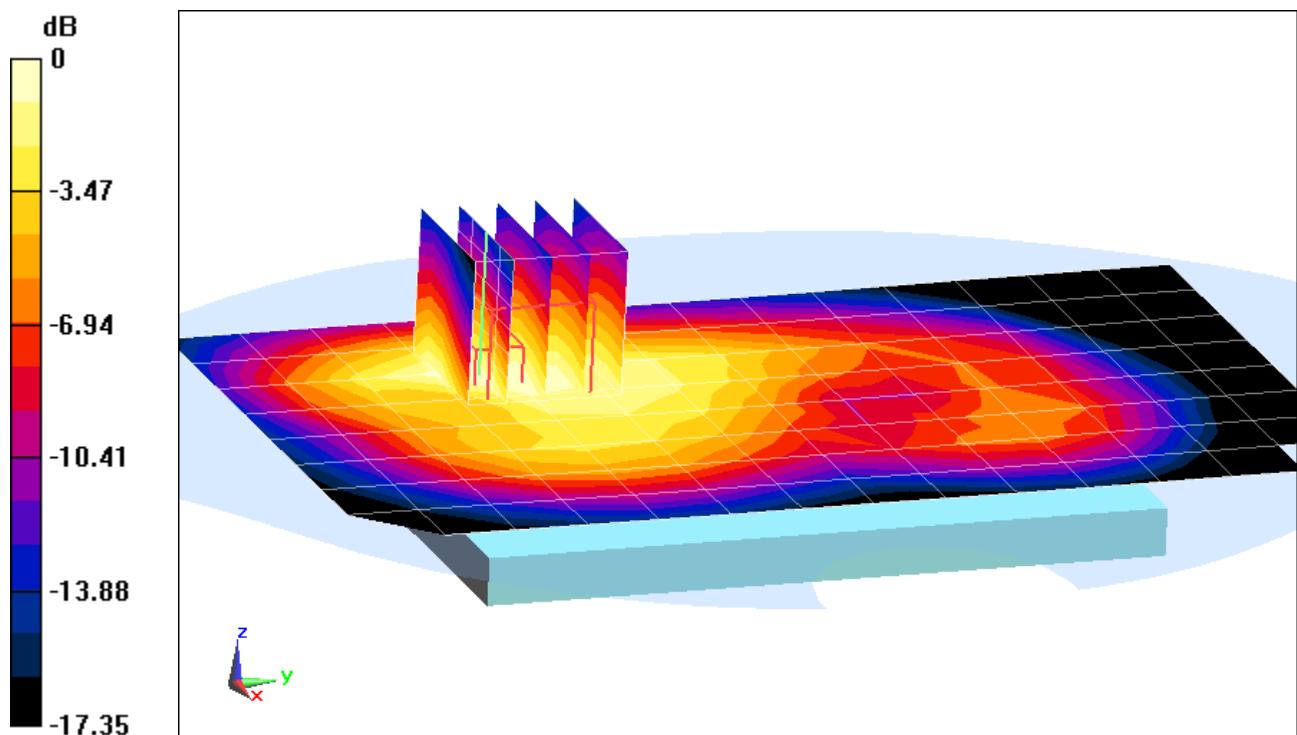
Area Scan (9x15x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$

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

Reference Value = 20.18 V/m; Power Drift = -0.04 dB

Peak SAR (extrapolated) = 0.958 W/kg

SAR(1 g) = 0.585 W/kg



0 dB = 0.704 W/kg = -1.52 dBW/kg

PCTEST ENGINEERING LABORATORY, INC.

DUT: ZNFLS996; Type: Portable Handset; Serial: 1GLSV

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

Medium: 1900 Body Medium parameters used:

$f = 1880 \text{ MHz}$; $\sigma = 1.553 \text{ S/m}$; $\epsilon_r = 53.613$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 0.8 cm

Test Date: 10-21-2014; Ambient Temp: 23.6°C; Tissue Temp: 22.4°C

Probe: ES3DV3 - SN3319; ConvF(4.67, 4.67, 4.67); Calibrated: 4/17/2014;

Sensor-Surface: 3mm (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: PCS EVDO Rev. 0, Body SAR, Back side, Mid.ch

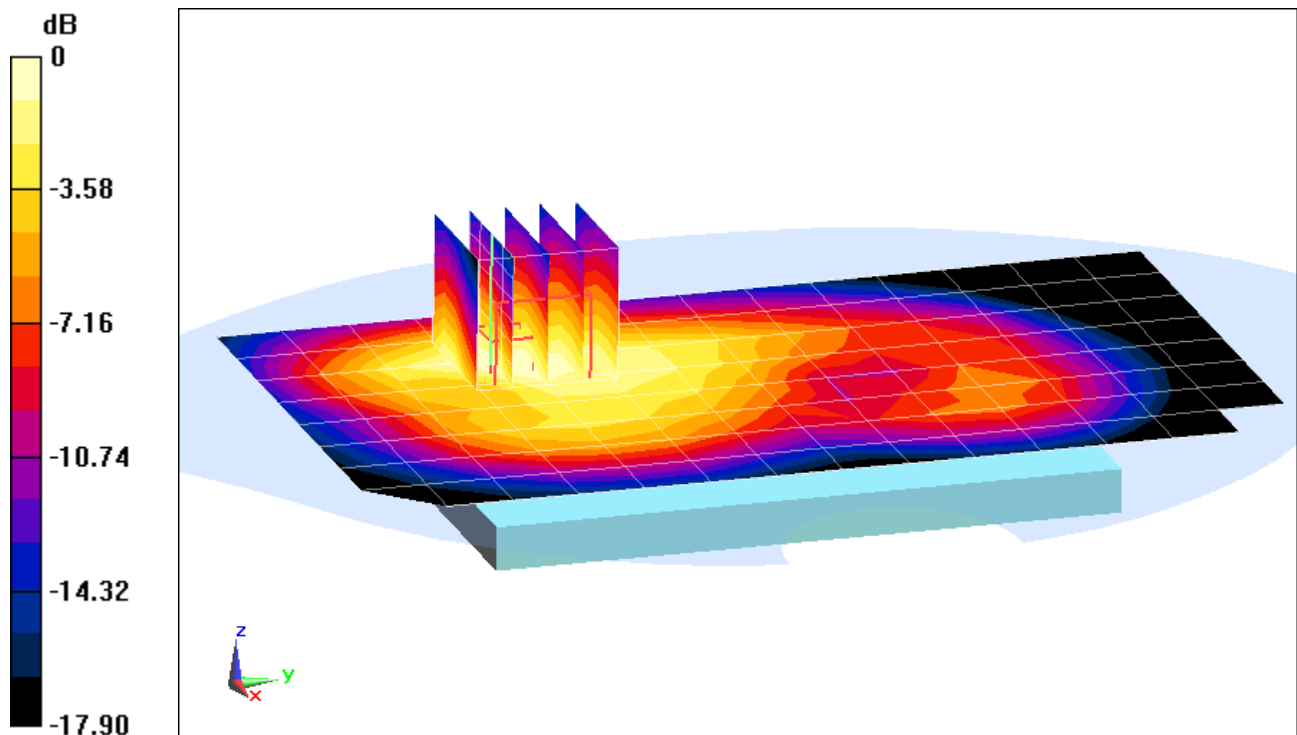
Area Scan (9x15x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$

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

Reference Value = 20.95 V/m; Power Drift = -0.05 dB

Peak SAR (extrapolated) = 1.06 W/kg

SAR(1 g) = 0.639 W/kg



0 dB = 0.765 W/kg = -1.16 dBW/kg

PCTEST ENGINEERING LABORATORY, INC.

DUT: ZNFLS996; Type: Portable Handset; Serial: 1FMQW

Communication System: UID 0, GSM GPRS; 2 Tx slots; Frequency: 836.6 MHz; Duty Cycle: 1:4.15

Medium: 835 Body Medium parameters used (interpolated):

$f = 836.6 \text{ MHz}$; $\sigma = 0.956 \text{ S/m}$; $\epsilon_r = 53.924$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 0.8 cm

Test Date: 10-21-2014; Ambient Temp: 21.4°C; Tissue Temp: 20.6°C

Probe: ES3DV3 - SN3213; ConvF(6.18, 6.18, 6.18); Calibrated: 4/11/2014;

Sensor-Surface: 3mm (Mechanical Surface Detection)

Electronics: DAE4 Sn1407; Calibrated: 11/18/2013

Phantom: Sub TWIN SAM; Type: QD000P40CC; Serial: TP-1357

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

Mode: GPRS 850, Body SAR, Back side, Mid.ch, 2 Tx Slots

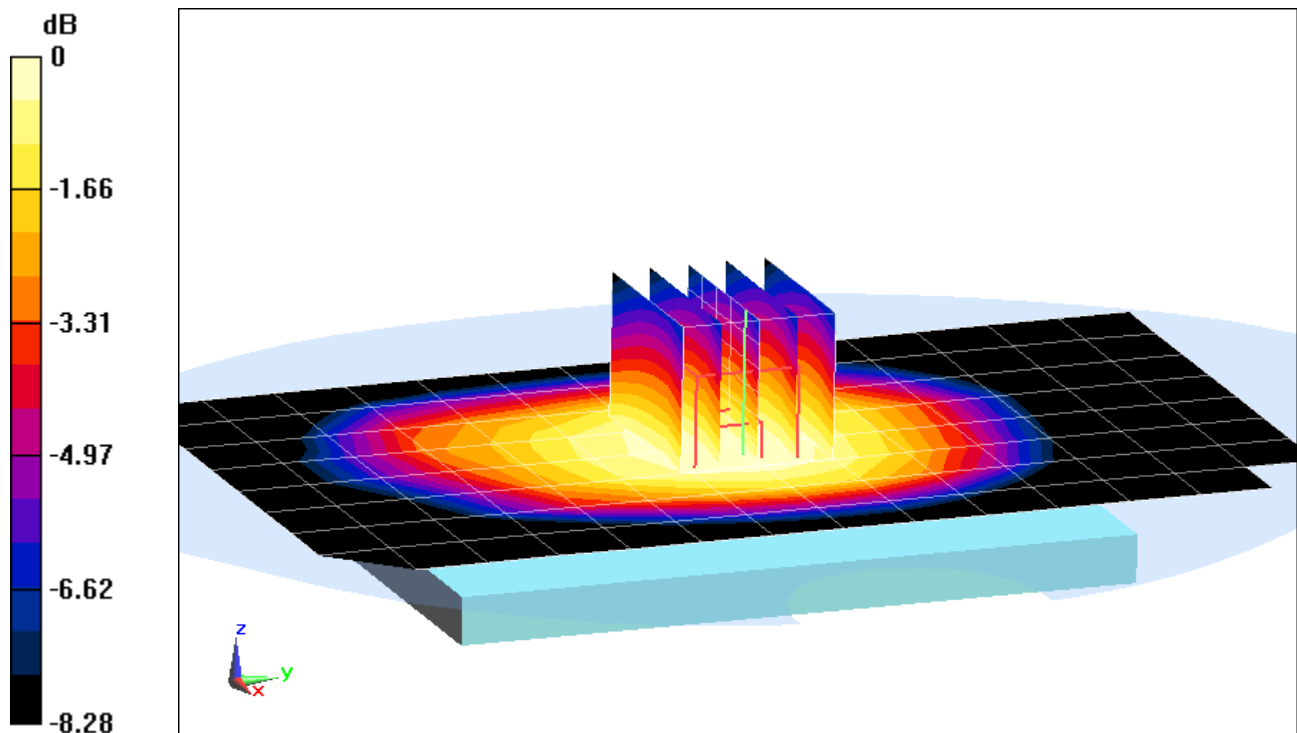
Area Scan (9x15x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$

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

Reference Value = 19.89 V/m; Power Drift = 0.00 dB

Peak SAR (extrapolated) = 0.445 W/kg

SAR(1 g) = 0.362 W/kg



0 dB = 0.394 W/kg = -4.05 dBW/kg

PCTEST ENGINEERING LABORATORY, INC.

DUT: ZNFLS996; Type: Portable Handset; Serial: 1FMQW

Communication System: UID 0, GSM GPRS; 2 Tx slots; Frequency: 836.6 MHz; Duty Cycle: 1:4.15

Medium: 835 Body Medium parameters used (interpolated):

$f = 836.6 \text{ MHz}$; $\sigma = 0.956 \text{ S/m}$; $\epsilon_r = 53.924$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.0 cm

Test Date: 10-21-2014; Ambient Temp: 21.4°C; Tissue Temp: 20.6°C

Probe: ES3DV3 - SN3213; ConvF(6.18, 6.18, 6.18); Calibrated: 4/11/2014;

Sensor-Surface: 3mm (Mechanical Surface Detection)

Electronics: DAE4 Sn1407; Calibrated: 11/18/2013

Phantom: Sub TWIN SAM; Type: QD000P40CC; Serial: TP-1357

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

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

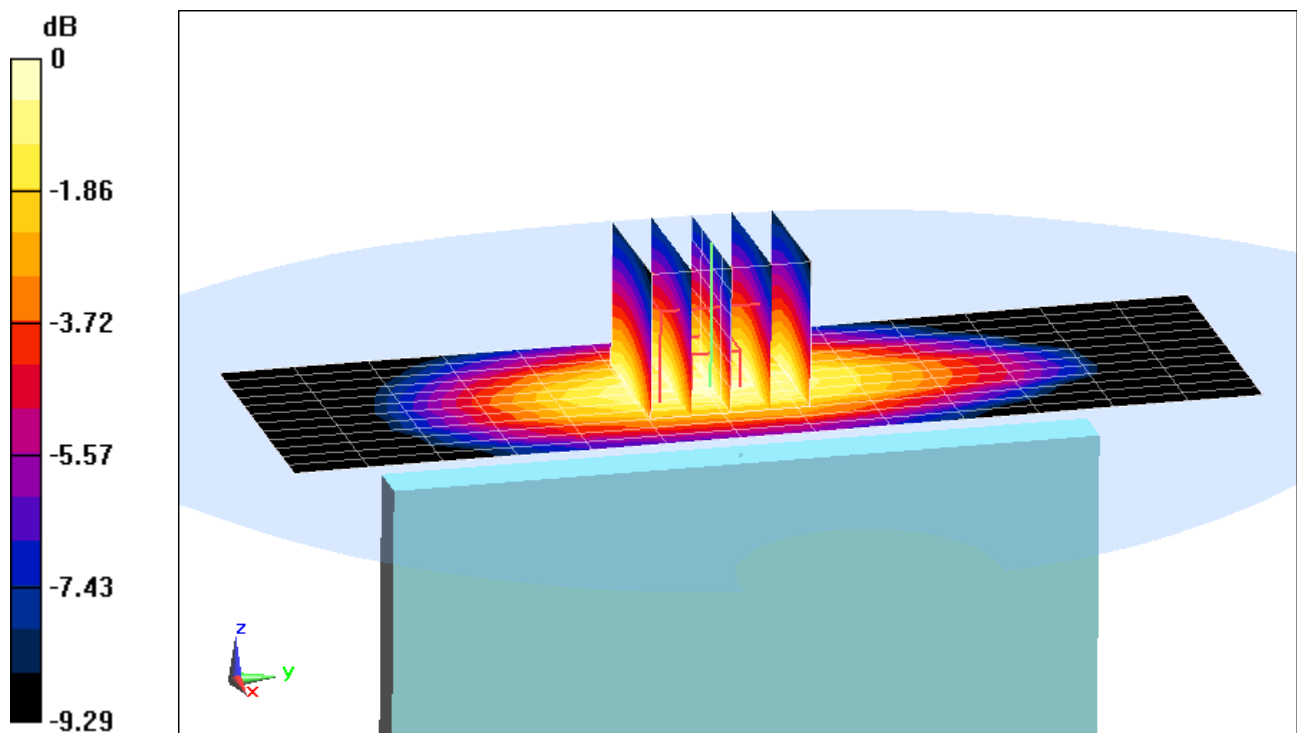
Area Scan (13x14x1): Measurement grid: $dx=5\text{mm}$, $dy=15\text{mm}$

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

Reference Value = 19.95 V/m; Power Drift = 0.17 dB

Peak SAR (extrapolated) = 0.551 W/kg

SAR(1 g) = 0.393 W/kg



0 dB = 0.434 W/kg = -3.63 dBW/kg

PCTEST ENGINEERING LABORATORY, INC.

DUT: ZNFLS996; Type: Portable Handset; Serial: 1FMQW

Communication System: UID 0, GSM GPRS; 2 Tx slots; Frequency: 1880 MHz; Duty Cycle: 1:4.15

Medium: 1900 Body Medium parameters used:

$f = 1880 \text{ MHz}$; $\sigma = 1.553 \text{ S/m}$; $\epsilon_r = 53.613$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 0.8 cm

Test Date: 10-21-2014; Ambient Temp: 23.6°C; Tissue Temp: 22.4°C

Probe: ES3DV3 - SN3319; ConvF(4.67, 4.67, 4.67); Calibrated: 4/17/2014;

Sensor-Surface: 3mm (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: GPRS 1900, Body SAR, Back side, Mid.ch, 2 Tx Slots

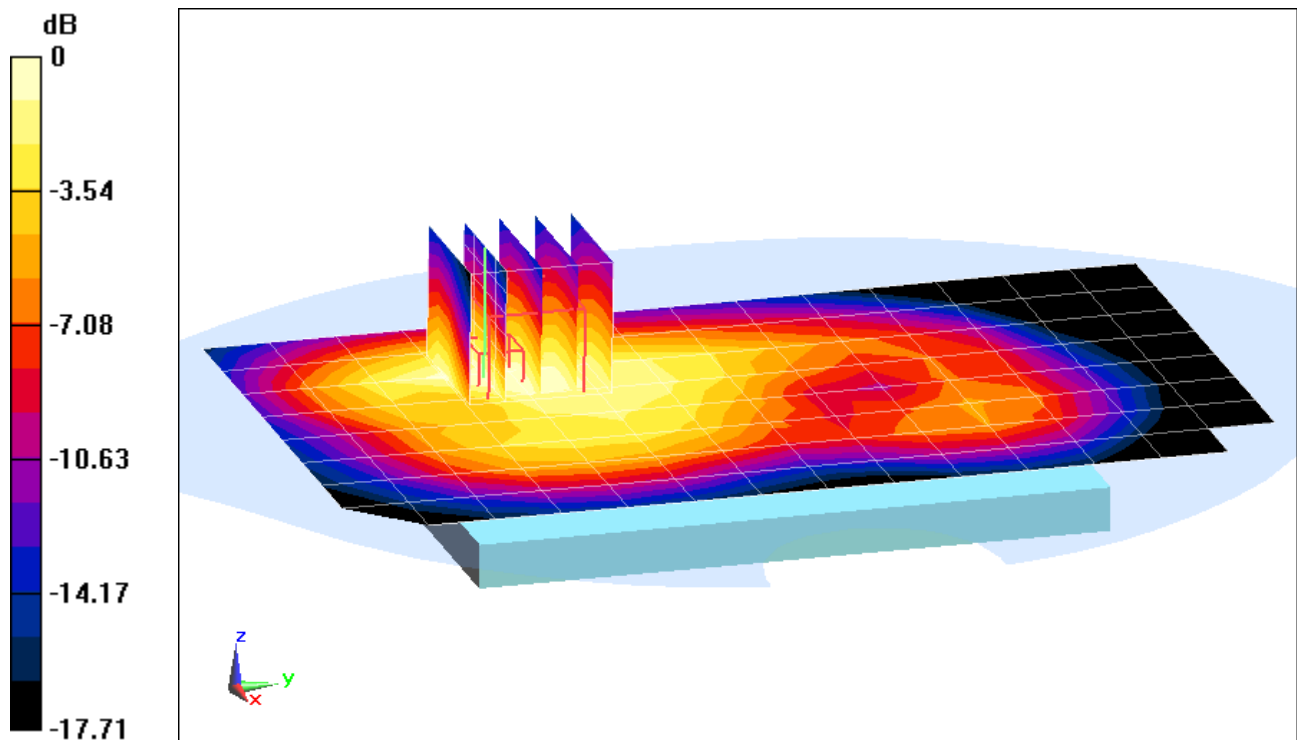
Area Scan (9x15x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$

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

Reference Value = 13.82 V/m; Power Drift = -0.05 dB

Peak SAR (extrapolated) = 0.448 W/kg

SAR(1 g) = 0.273 W/kg



0 dB = 0.328 W/kg = -4.84 dBW/kg

PCTEST ENGINEERING LABORATORY, INC.

DUT: ZNFLS996; Type: Portable Handset; Serial: 1FMQW

Communication System: UID 0, GSM GPRS; 2 Tx slots; Frequency: 1880 MHz; Duty Cycle: 1:4.15

Medium: 1900 Body Medium parameters used:

$f = 1880 \text{ MHz}$; $\sigma = 1.553 \text{ S/m}$; $\epsilon_r = 53.613$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 0.8 cm

Test Date: 10-21-2014; Ambient Temp: 23.6°C; Tissue Temp: 22.4°C

Probe: ES3DV3 - SN3319; ConvF(4.67, 4.67, 4.67); Calibrated: 4/17/2014;

Sensor-Surface: 3mm (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: GPRS 1900, Body SAR, Front side, Mid.ch, 2 Tx Slots

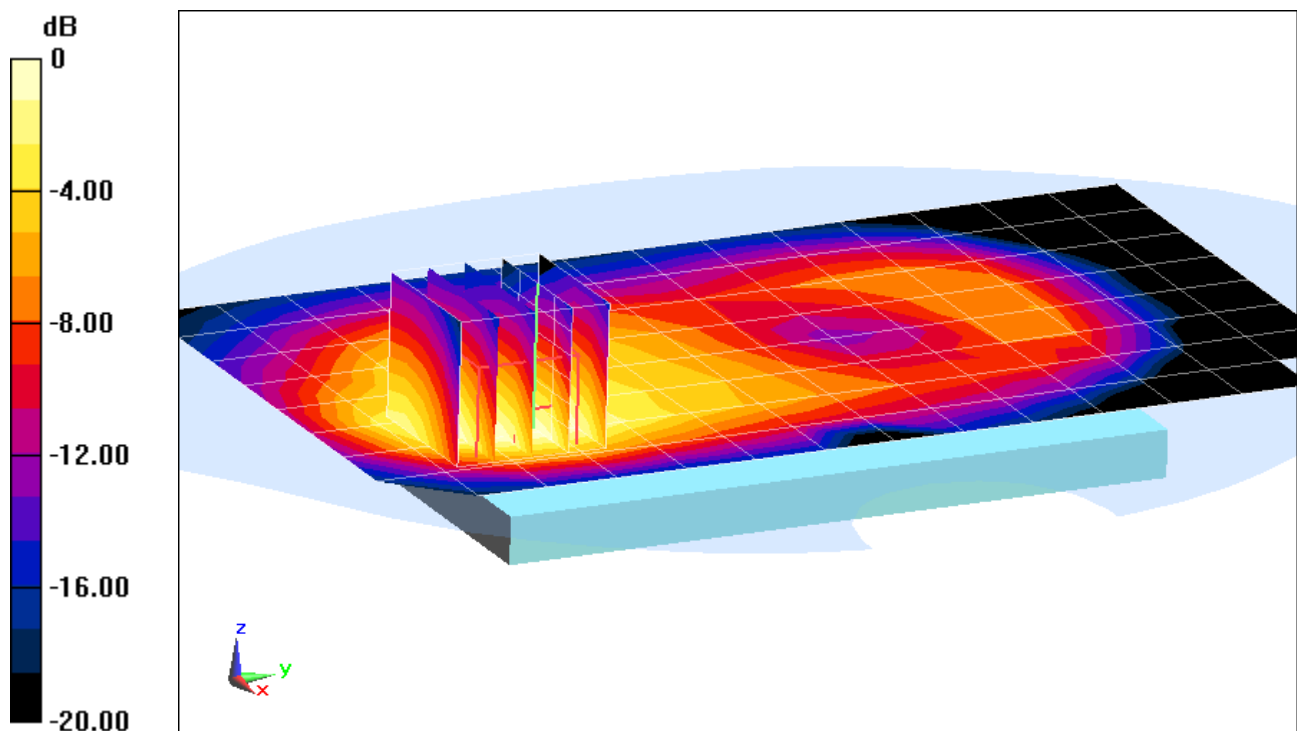
Area Scan (9x15x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$

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

Reference Value = 15.23 V/m; Power Drift = 0.04 dB

Peak SAR (extrapolated) = 0.555 W/kg

SAR(1 g) = 0.311 W/kg



0 dB = 0.380 W/kg = -4.20 dBW/kg

PCTEST ENGINEERING LABORATORY, INC.

DUT: ZNFLS996; Type: Portable Handset; Serial: 1FMQW

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

Medium: 835 Body Medium parameters used (interpolated):

$f = 836.6 \text{ MHz}$; $\sigma = 0.956 \text{ S/m}$; $\epsilon_r = 53.924$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 0.8 cm

Test Date: 10-21-2014; Ambient Temp: 21.4°C; Tissue Temp: 20.6°C

Probe: ES3DV3 - SN3213; ConvF(6.18, 6.18, 6.18); Calibrated: 4/11/2014;

Sensor-Surface: 3mm (Mechanical Surface Detection)

Electronics: DAE4 Sn1407; Calibrated: 11/18/2013

Phantom: Sub TWIN SAM; Type: QD000P40CC; Serial: TP-1357

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

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

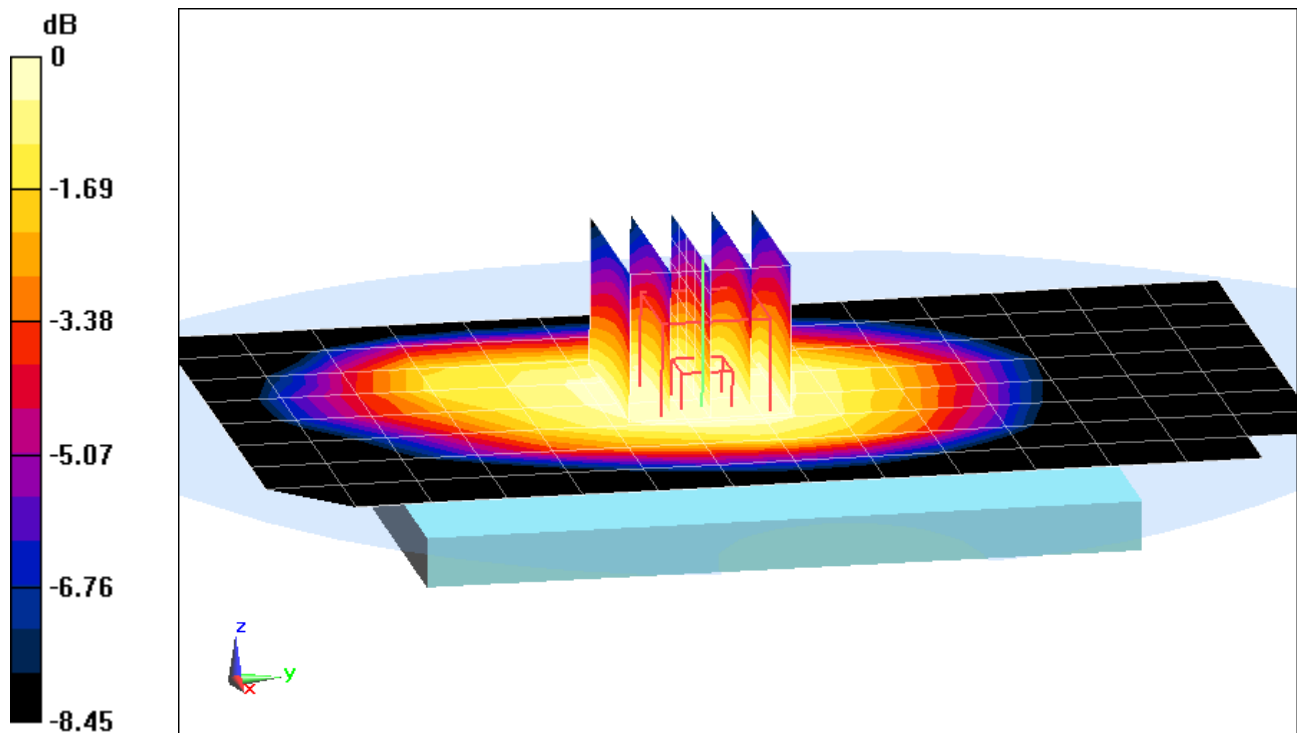
Area Scan (9x15x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$

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

Reference Value = 19.20 V/m; Power Drift = 0.00 dB

Peak SAR (extrapolated) = 0.414 W/kg

SAR(1 g) = 0.336 W/kg



0 dB = 0.363 W/kg = -4.40 dBW/kg

PCTEST ENGINEERING LABORATORY, INC.

DUT: ZNFLS996; Type: Portable Handset; Serial: 1FMQW

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

Medium: 835 Body Medium parameters used (interpolated):

$f = 836.6 \text{ MHz}$; $\sigma = 0.956 \text{ S/m}$; $\epsilon_r = 53.924$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.0 cm

Test Date: 10-21-2014; Ambient Temp: 21.4°C; Tissue Temp: 20.6°C

Probe: ES3DV3 - SN3213; ConvF(6.18, 6.18, 6.18); Calibrated: 4/11/2014;

Sensor-Surface: 3mm (Mechanical Surface Detection)

Electronics: DAE4 Sn1407; Calibrated: 11/18/2013

Phantom: Sub TWIN SAM; Type: QD000P40CC; Serial: TP-1357

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

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

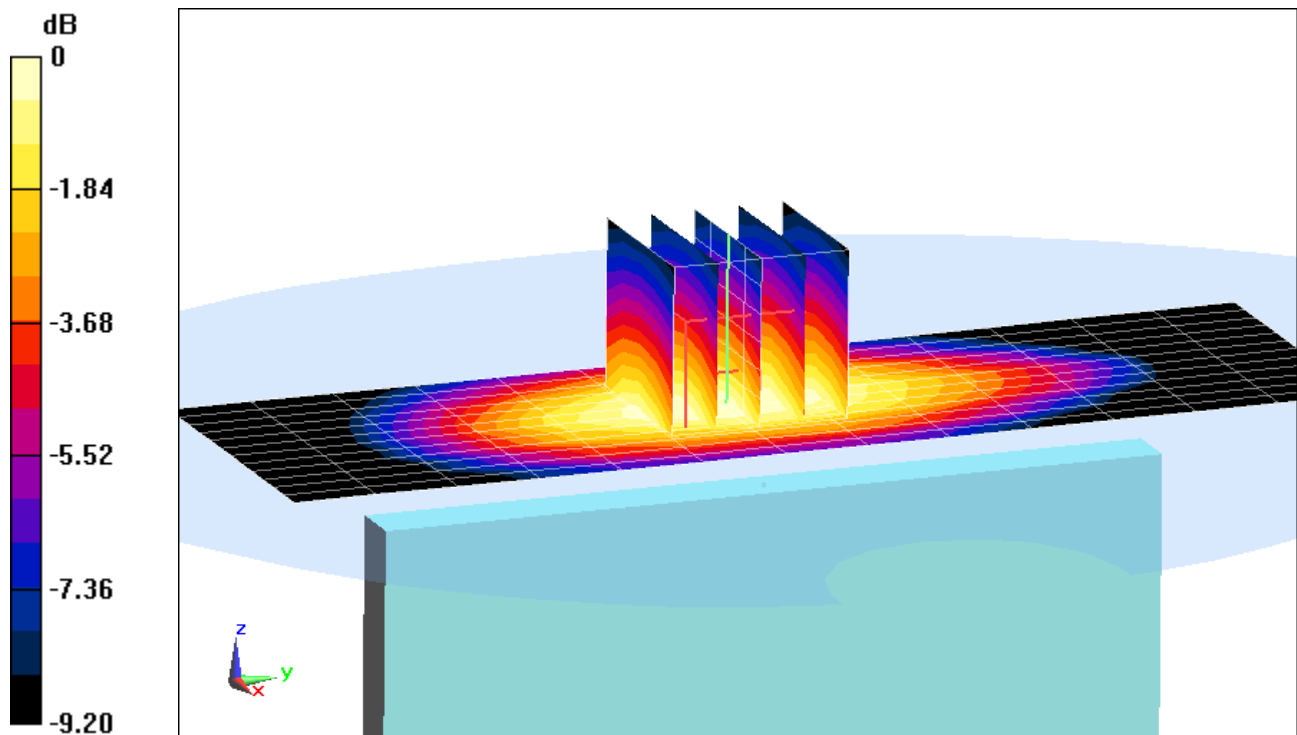
Area Scan (13x14x1): Measurement grid: $dx=5\text{mm}$, $dy=15\text{mm}$

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

Reference Value = 19.69 V/m; Power Drift = 0.00 dB

Peak SAR (extrapolated) = 0.487 W/kg

SAR(1 g) = 0.339 W/kg



0 dB = 0.389 W/kg = -4.10 dBW/kg

PCTEST ENGINEERING LABORATORY, INC.

DUT: ZNFLS996; Type: Portable Handset; Serial: 1FMQW

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

Medium: 1900 Body Medium parameters used:

$f = 1880 \text{ MHz}$; $\sigma = 1.553 \text{ S/m}$; $\epsilon_r = 53.613$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 0.8 cm

Test Date: 10-21-2014; Ambient Temp: 23.6°C; Tissue Temp: 22.4°C

Probe: ES3DV3 - SN3319; ConvF(4.67, 4.67, 4.67); Calibrated: 4/17/2014;

Sensor-Surface: 3mm (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: UMTS 1900, Body SAR, Back side, Mid.ch

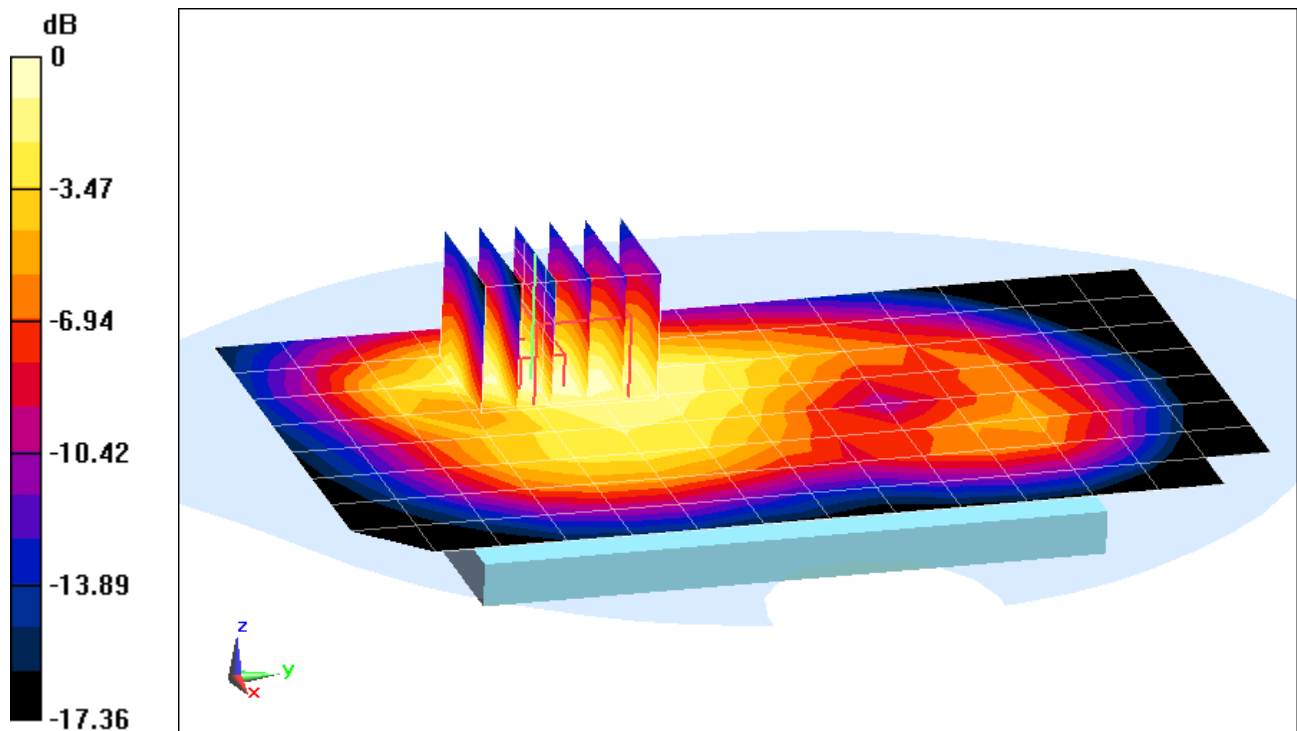
Area Scan (9x15x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$

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

Reference Value = 17.42 V/m; Power Drift = -0.06 dB

Peak SAR (extrapolated) = 0.660 W/kg

SAR(1 g) = 0.410 W/kg



0 dB = 0.500 W/kg = -3.01 dBW/kg

PCTEST ENGINEERING LABORATORY, INC.

DUT: ZNFLS996; Type: Portable Handset; Serial: 1FMQW

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

Medium: 1900 Body Medium parameters used:

$f = 1880 \text{ MHz}$; $\sigma = 1.553 \text{ S/m}$; $\epsilon_r = 53.613$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 0.8 cm

Test Date: 10-21-2014; Ambient Temp: 23.6°C; Tissue Temp: 22.4°C

Probe: ES3DV3 - SN3319; ConvF(4.67, 4.67, 4.67); Calibrated: 4/17/2014;

Sensor-Surface: 3mm (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: UMTS 1900, Body SAR, Front side, Mid.ch

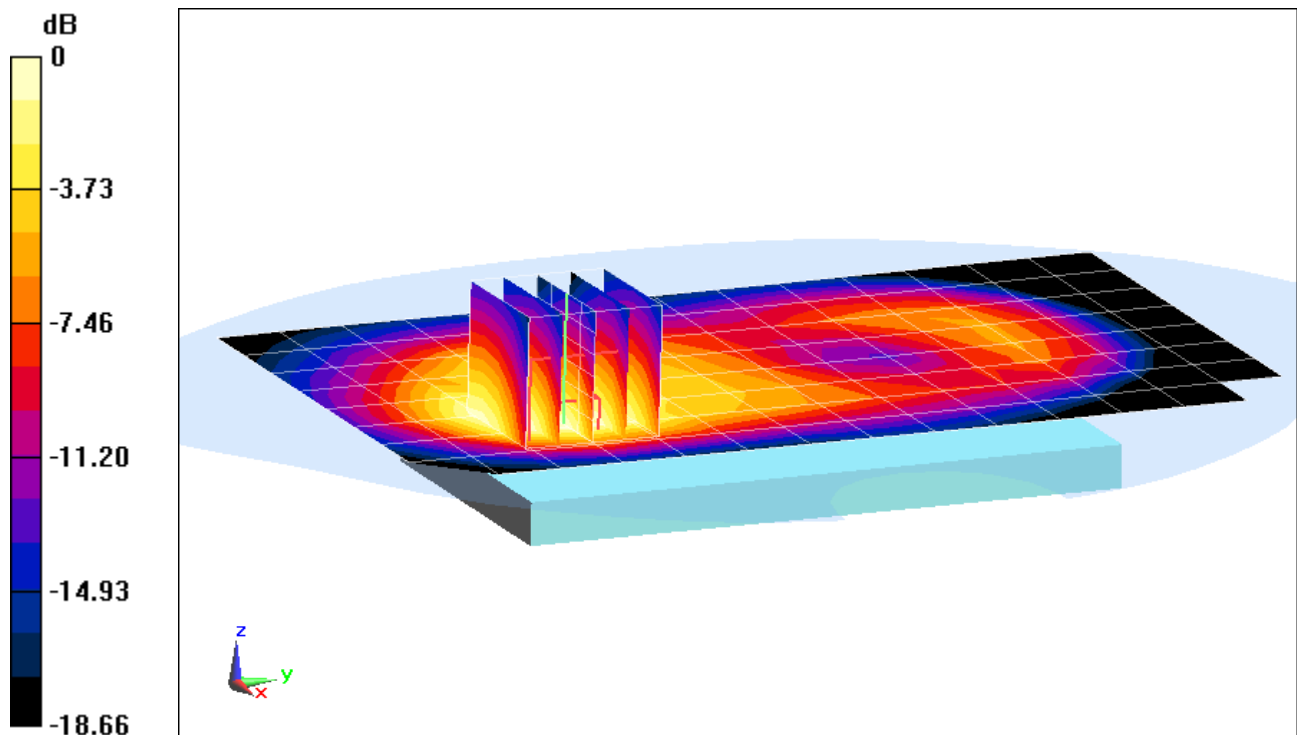
Area Scan (9x15x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$

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

Reference Value = 17.45 V/m; Power Drift = -0.02 dB

Peak SAR (extrapolated) = 0.768 W/kg

SAR(1 g) = 0.442 W/kg



0 dB = 0.558 W/kg = -2.53 dBW/kg

PCTEST ENGINEERING LABORATORY, INC.

DUT: ZNFLS996; Type: Portable Handset; Serial: 1GLRW

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

Medium: 750 Body Medium parameters used (interpolated):

$f = 707.5 \text{ MHz}$; $\sigma = 0.928 \text{ S/m}$; $\epsilon_r = 56.037$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 0.8 cm

Test Date: 10-20-2014; Ambient Temp: 22.1°C; Tissue Temp: 21.0°C

Probe: ES3DV3 - SN3263; ConvF(6.19, 6.19, 6.19); 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 12, Body SAR, Back side, Mid.ch

10 MHz Bandwidth, QPSK, 1 RB, 0 RB Offset

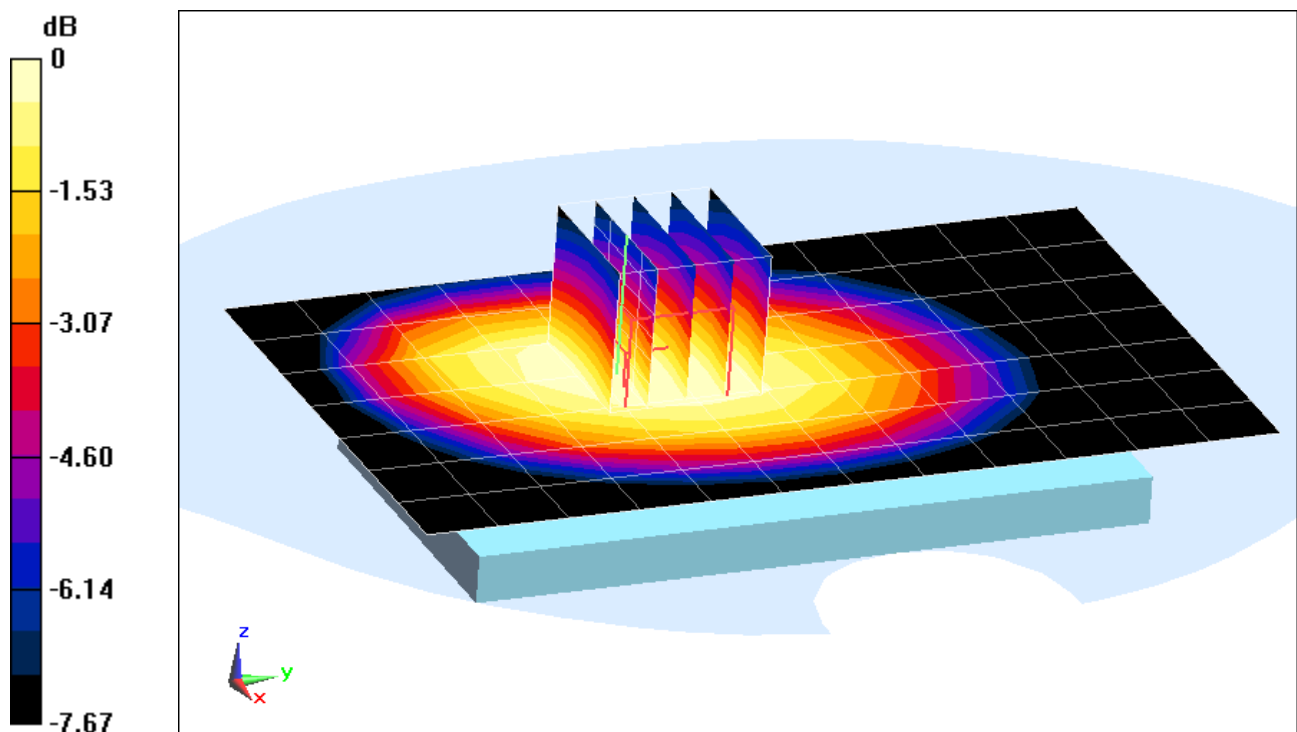
Area Scan (8x13x1): Measurement grid: dx=15mm, dy=15mm

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

Reference Value = 15.52 V/m; Power Drift = 0.04 dB

Peak SAR (extrapolated) = 0.273 W/kg

SAR(1 g) = 0.215 W/kg



0 dB = 0.235 W/kg = -6.29 dBW/kg

PCTEST ENGINEERING LABORATORY, INC.

DUT: ZNFLS996; Type: Portable Handset; Serial: 1GLRW

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

Medium: 750 Body Medium parameters used (interpolated):

$f = 707.5 \text{ MHz}$; $\sigma = 0.928 \text{ S/m}$; $\epsilon_r = 56.037$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.0 cm

Test Date: 10-20-2014; Ambient Temp: 22.1°C; Tissue Temp: 21.0°C

Probe: ES3DV3 - SN3263; ConvF(6.19, 6.19, 6.19); 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 12, Body SAR, Right Edge, Mid.ch

10 MHz Bandwidth, QPSK, 1 RB, 0 RB Offset

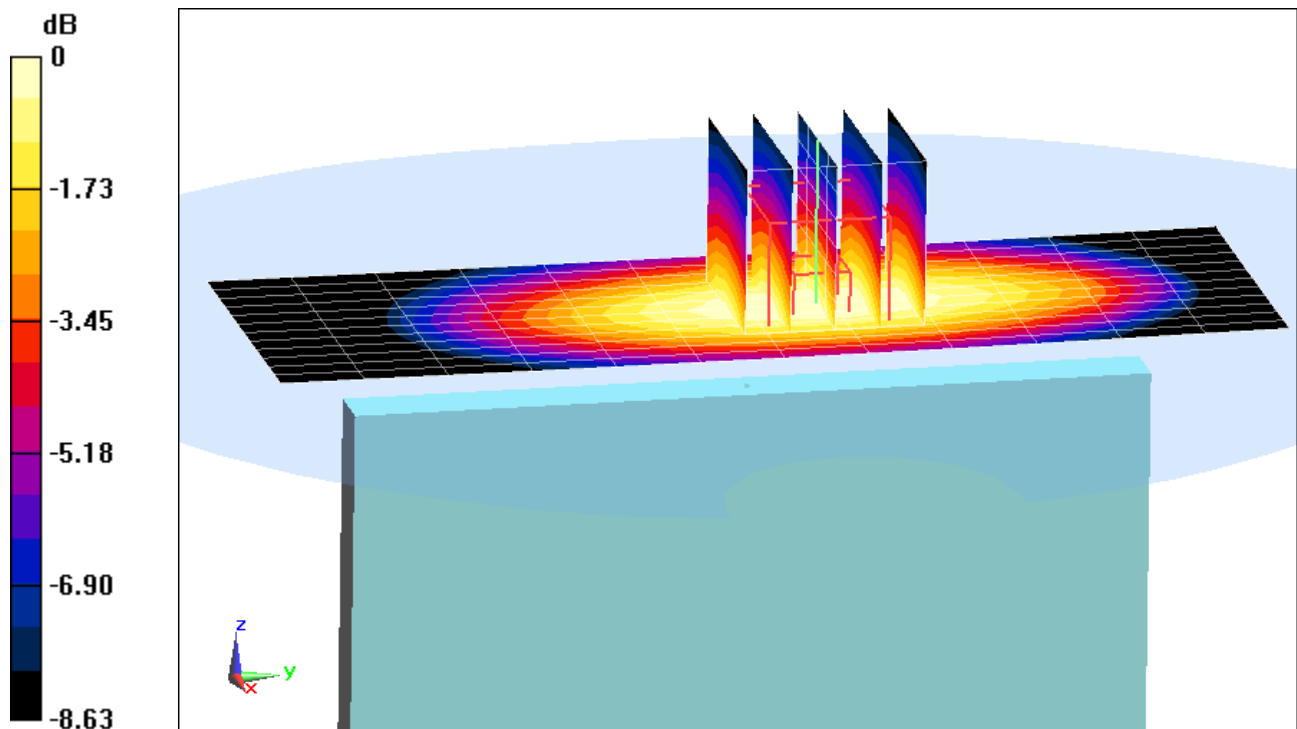
Area Scan (13x13x1): Measurement grid: $dx=5\text{mm}$, $dy=15\text{mm}$

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

Reference Value = 17.72 V/m; Power Drift = 0.04 dB

Peak SAR (extrapolated) = 0.371 W/kg

SAR(1 g) = 0.267 W/kg



0 dB = 0.304 W/kg = -5.17 dBW/kg

PCTEST ENGINEERING LABORATORY, INC.

DUT: ZNFLS996; Type: Portable Handset; Serial: 1GLRX

Communication System: UID 0, LTE Band 26; Frequency: 831.5 MHz; Duty Cycle: 1:1

Medium: 835 Body Medium parameters used (interpolated):

$f = 831.5 \text{ MHz}$; $\sigma = 0.951 \text{ S/m}$; $\epsilon_r = 53.97$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 0.8 cm

Test Date: 10-21-2014; Ambient Temp: 21.4°C; Tissue Temp: 20.6°C

Probe: ES3DV3 - SN3213; ConvF(6.18, 6.18, 6.18); Calibrated: 4/11/2014;

Sensor-Surface: 3mm (Mechanical Surface Detection)

Electronics: DAE4 Sn1407; Calibrated: 11/18/2013

Phantom: Sub TWIN SAM; Type: QD000P40CC; Serial: TP-1357

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

Mode: LTE Band 26, Body SAR, Back side, Mid.ch
15 MHz Bandwidth, QPSK, 1 RB, 36 RB Offset

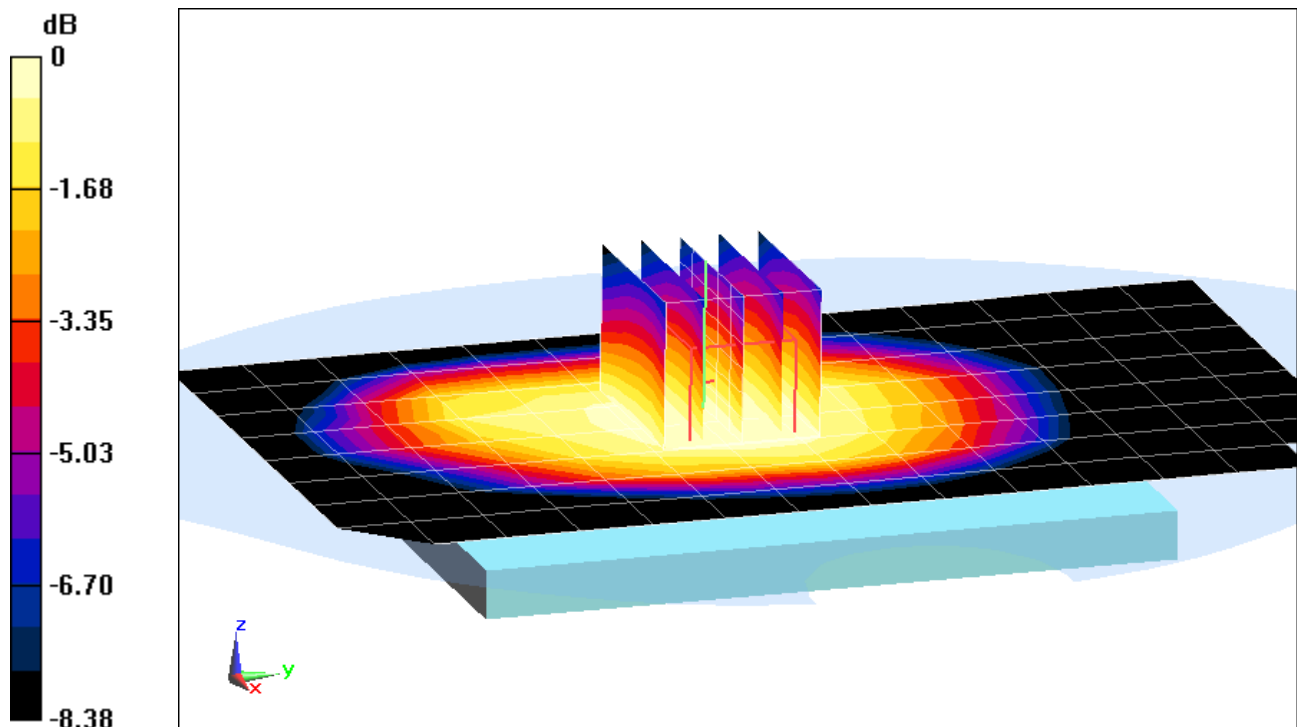
Area Scan (9x15x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$

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

Reference Value = 17.66 V/m; Power Drift = 0.01 dB

Peak SAR (extrapolated) = 0.343 W/kg

SAR(1 g) = 0.279 W/kg



0 dB = 0.304 W/kg = -5.17 dBW/kg

PCTEST ENGINEERING LABORATORY, INC.

DUT: ZNFLS996; Type: Portable Handset; Serial: 1GLRX

Communication System: UID 0, LTE Band 26; Frequency: 831.5 MHz; Duty Cycle: 1:1

Medium: 835 Body Medium parameters used (interpolated):

$f = 831.5 \text{ MHz}$; $\sigma = 0.951 \text{ S/m}$; $\epsilon_r = 53.97$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.0 cm

Test Date: 10-21-2014; Ambient Temp: 21.4°C; Tissue Temp: 20.6°C

Probe: ES3DV3 - SN3213; ConvF(6.18, 6.18, 6.18); Calibrated: 4/11/2014;

Sensor-Surface: 3mm (Mechanical Surface Detection)

Electronics: DAE4 Sn1407; Calibrated: 11/18/2013

Phantom: Sub TWIN SAM; Type: QD000P40CC; Serial: TP-1357

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

Mode: LTE Band 26, Body SAR, Right Edge, Mid.ch
15 MHz Bandwidth, QPSK, 1 RB, 36 RB Offset

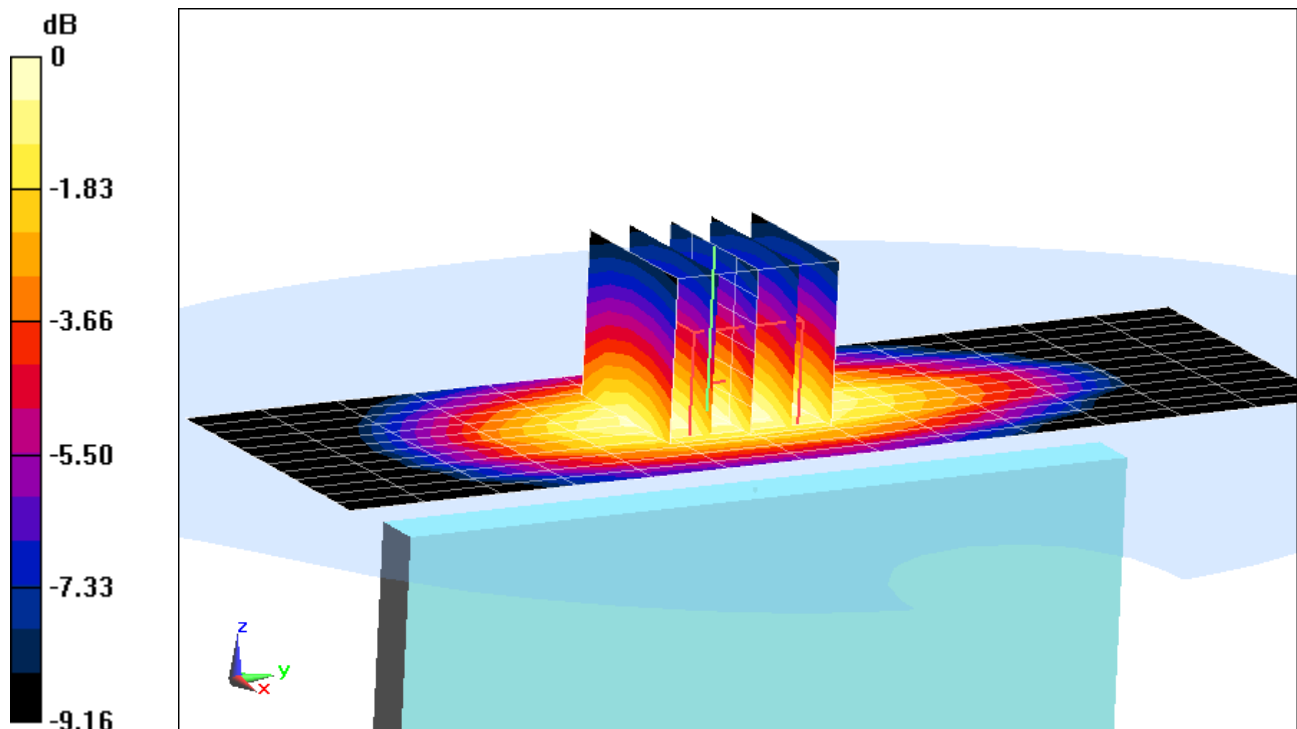
Area Scan (13x14x1): Measurement grid: dx=5mm, dy=15mm

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

Reference Value = 19.73 V/m; Power Drift = -0.03 dB

Peak SAR (extrapolated) = 0.461 W/kg

SAR(1 g) = 0.336 W/kg



0 dB = 0.384 W/kg = -4.16 dBW/kg

PCTEST ENGINEERING LABORATORY, INC.

DUT: ZNFLS996; Type: Portable Handset; Serial: 1GLRW

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

Medium: 1750 Body Medium parameters used (interpolated):

$f = 1732.5 \text{ MHz}$; $\sigma = 1.476 \text{ S/m}$; $\epsilon_r = 51.555$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 0.8 cm

Test Date: 10-21-2014; Ambient Temp: 22.6°C; Tissue Temp: 22.4°C

Probe: ES3DV2 - SN3022; ConvF(4.7, 4.7, 4.7); Calibrated: 8/19/2014;

Sensor-Surface: 3mm (Mechanical Surface Detection)

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

Phantom: ELI v5.0; Type: QDOVA001BB; Serial: 1226

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

Mode: LTE Band 4 (AWS), Body SAR, Back side, Mid.ch

20 MHz Bandwidth, QPSK, 1 RB, 99 RB Offset

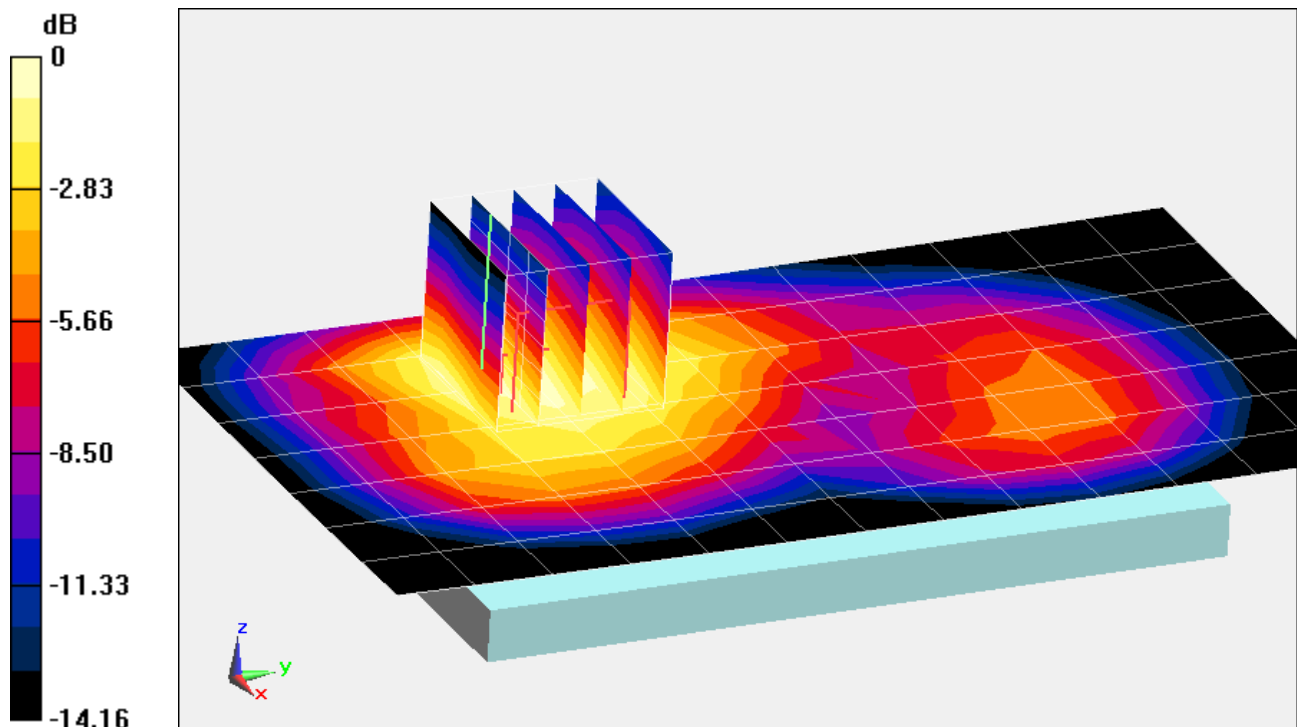
Area Scan (8x14x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$

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

Reference Value = 20.74 V/m; Power Drift = 0.13 dB

Peak SAR (extrapolated) = 0.935 W/kg

SAR(1 g) = 0.605 W/kg



0 dB = 0.689 W/kg = -1.62 dBW/kg

PCTEST ENGINEERING LABORATORY, INC.

DUT: ZNFLS996; Type: Portable Handset; Serial: 1GLRX

Communication System: UID 0, LTE BAND 25; Frequency: 1882.5 MHz; Duty Cycle: 1:1

Medium: 1900 Body Medium parameters used (interpolated):

$f = 1882.5 \text{ MHz}$; $\sigma = 1.556 \text{ S/m}$; $\epsilon_r = 53.608$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 0.8 cm

Test Date: 10-21-2014; Ambient Temp: 23.6°C; Tissue Temp: 22.4°C

Probe: ES3DV3 - SN3319; ConvF(4.67, 4.67, 4.67); Calibrated: 4/17/2014;

Sensor-Surface: 3mm (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: LTE Band 25 (PCS), Body SAR, Back side, Mid.ch
20 MHz Bandwidth, QPSK, 1 RB, 0 RB Offset

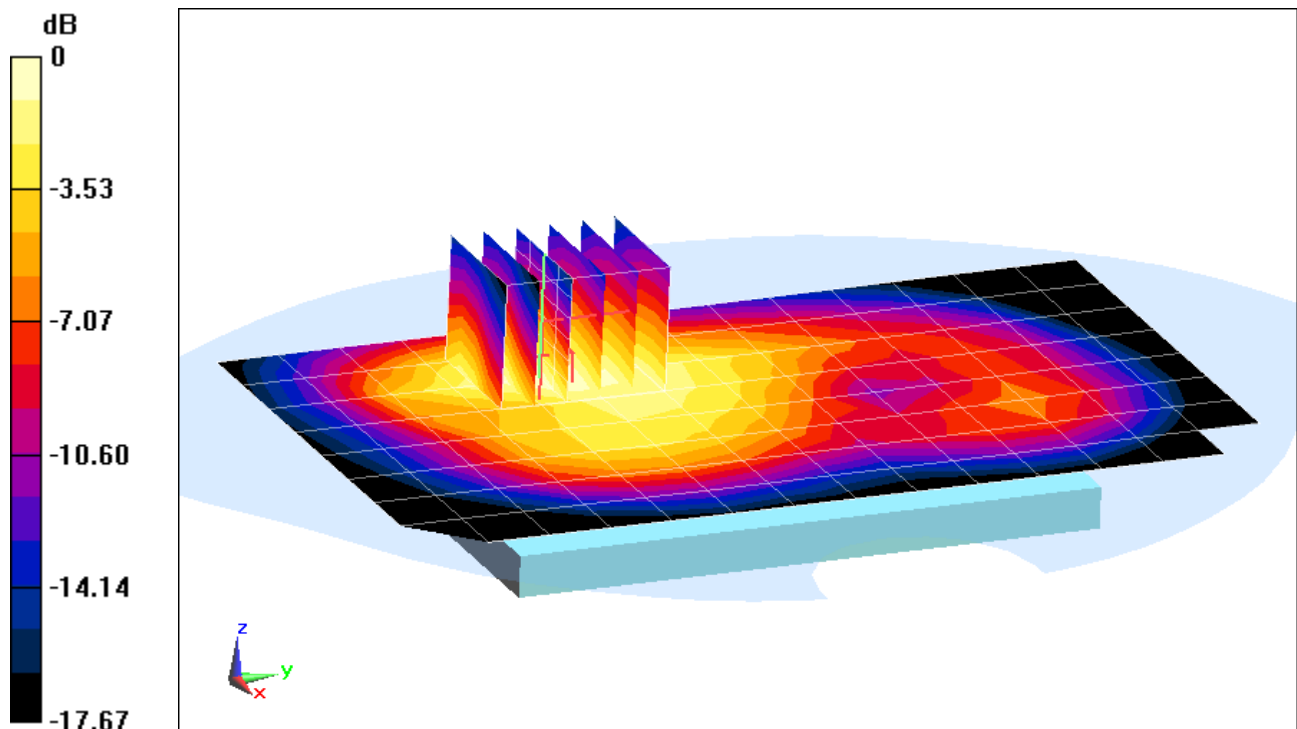
Area Scan (9x15x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$

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

Reference Value = 15.83 V/m; Power Drift = 0.11 dB

Peak SAR (extrapolated) = 0.637 W/kg

SAR(1 g) = 0.383 W/kg



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

PCTEST ENGINEERING LABORATORY, INC.

DUT: ZNFLS996; Type: Portable Handset; Serial: 1GLRX

Communication System: UID 0, LTE Band 25 (PCS); Frequency: 1882.5 MHz; Duty Cycle: 1:1

Medium: 1900 Body Medium parameters used (interpolated):

$f = 1882.5 \text{ MHz}$; $\sigma = 1.556 \text{ S/m}$; $\epsilon_r = 53.608$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 0.8 cm

Test Date: 10-21-2014; Ambient Temp: 23.6°C; Tissue Temp: 22.4°C

Probe: ES3DV3 - SN3319; ConvF(4.67, 4.67, 4.67); Calibrated: 4/17/2014;

Sensor-Surface: 3mm (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: LTE Band 25 (PCS), Body SAR, Front side, Mid.ch
20 MHz Bandwidth, QPSK, 1 RB, 0 RB Offset

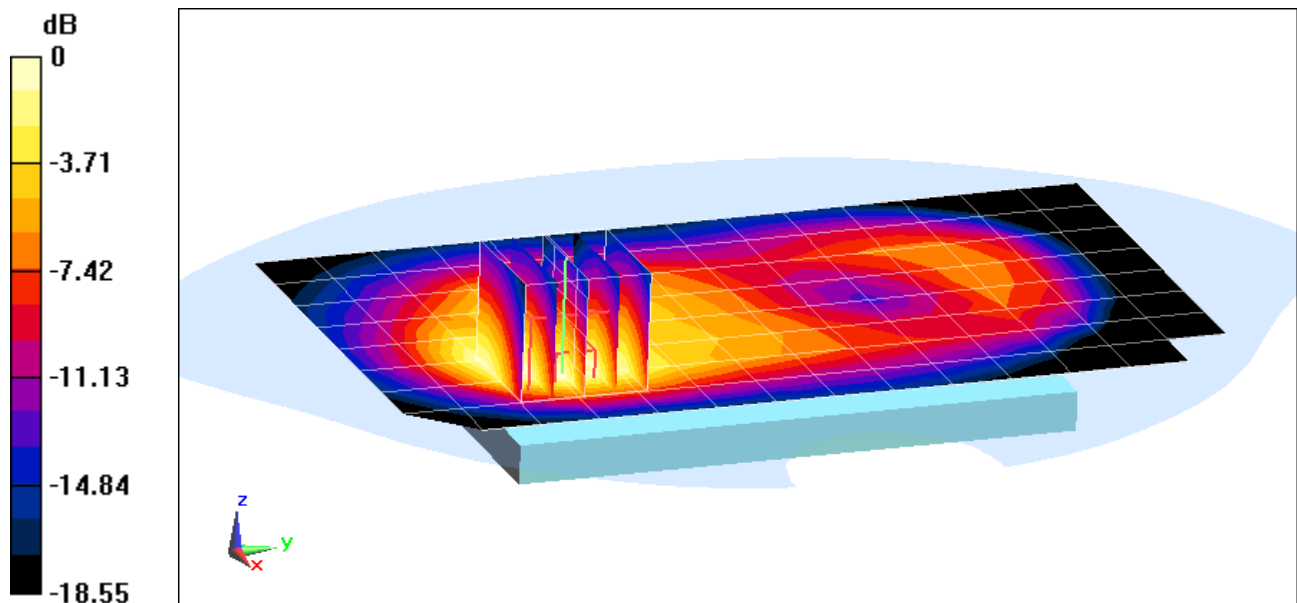
Area Scan (9x15x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$

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

Reference Value = 18.17 V/m; Power Drift = -0.02 dB

Peak SAR (extrapolated) = 0.815 W/kg

SAR(1 g) = 0.461 W/kg



0 dB = 0.574 W/kg = -2.41 dBW/kg

PCTEST ENGINEERING LABORATORY, INC.

DUT: ZNFLS996; Type: Portable Handset; Serial: 1GLRW

Communication System: UID 0, LTE Band 41; Frequency: 2593 MHz; Duty Cycle: 1:1.59

Medium: 2450 Body Medium parameters used (interpolated):

$f = 2593 \text{ MHz}$; $\sigma = 2.174 \text{ S/m}$; $\epsilon_r = 51.33$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 0.8 cm

Test Date: 10-23-2014; Ambient Temp: 24.2°C; Tissue Temp: 22.9°C

Probe: ES3DV3 - SN3288; ConvF(4.22, 4.22, 4.22); Calibrated: 9/24/2014;

Sensor-Surface: 3mm (Mechanical Surface Detection)

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

Phantom: SAM with CRP v4.0; Type: QD000P40CD; Serial: TP:1797

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

Mode: LTE Band 41, Body SAR, Back Side, Mid.ch

20 MHz Bandwidth, QPSK, 1 RB, 50 RB Offset

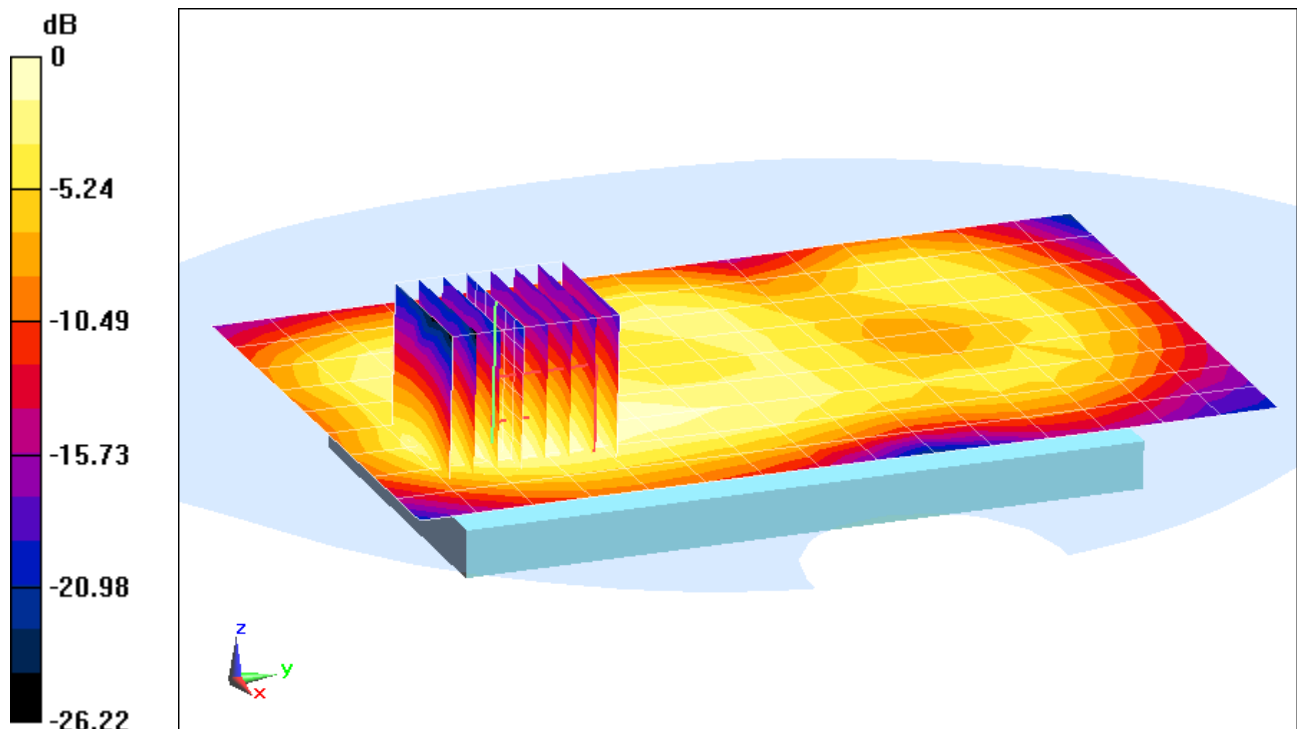
Area Scan (10x16x1): Measurement grid: $dx=12\text{mm}$, $dy=12\text{mm}$

Zoom Scan (7x8x7)/Cube 0: Measurement grid: $dx=5\text{mm}$, $dy=5\text{mm}$, $dz=5\text{mm}$

Reference Value = 10.20 V/m; Power Drift = -0.11 dB

Peak SAR (extrapolated) = 0.414 W/kg

SAR(1 g) = 0.202 W/kg



0 dB = 0.254 W/kg = -5.95 dBW/kg

PCTEST ENGINEERING LABORATORY, INC.

DUT: ZNFLS996; Type: Portable Handset; Serial: 1GLRW

Communication System: UID 0, LTE Band 41; Frequency: 2593 MHz; Duty Cycle: 1:1.59

Medium: 2450 Body Medium parameters used (interpolated):

$f = 2593 \text{ MHz}$; $\sigma = 2.174 \text{ S/m}$; $\epsilon_r = 51.33$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 0.8 cm

Test Date: 10-23-2014; Ambient Temp: 24.2°C; Tissue Temp: 22.9°C

Probe: ES3DV3 - SN3288; ConvF(4.22, 4.22, 4.22); Calibrated: 9/24/2014;

Sensor-Surface: 3mm (Mechanical Surface Detection)

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

Phantom: SAM with CRP v4.0; Type: QD000P40CD; Serial: TP:1797

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

Mode: LTE Band 41, Body SAR, Front Side, Mid.ch
20 MHz Bandwidth, QPSK, 1 RB, 50 RB Offset

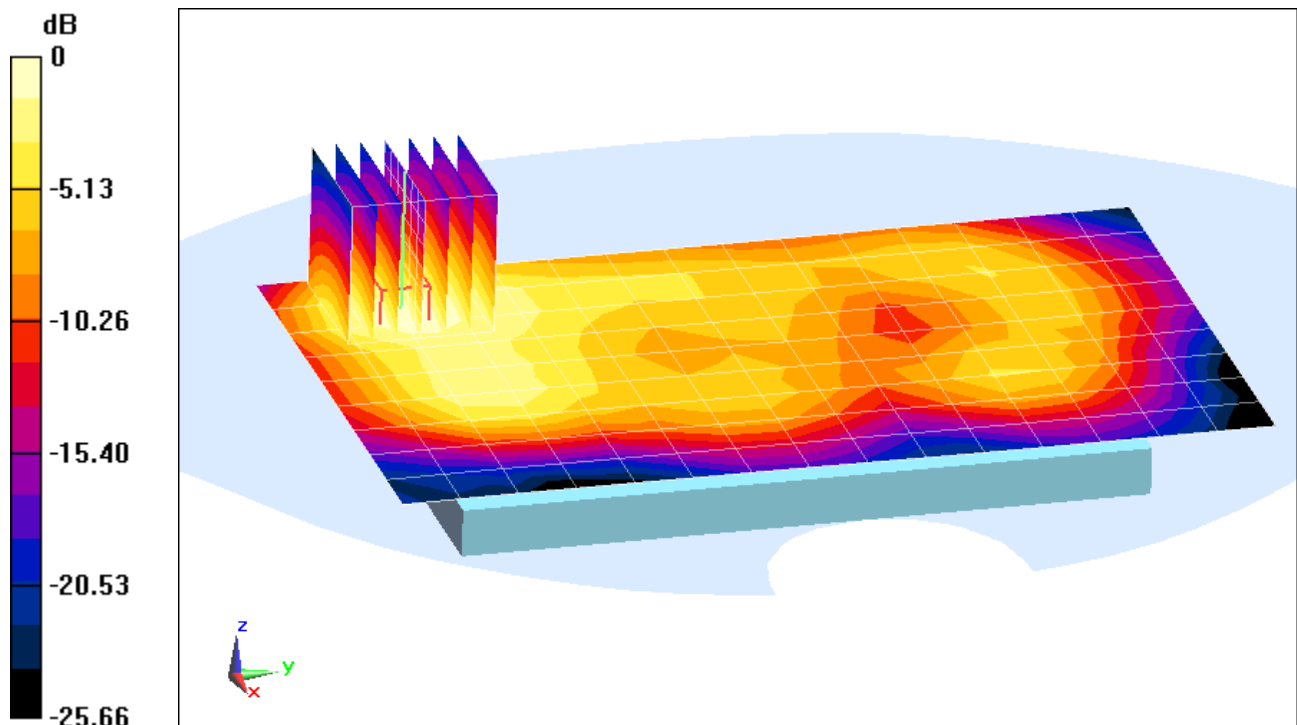
Area Scan (10x16x1): Measurement grid: $dx=12\text{mm}$, $dy=12\text{mm}$

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

Reference Value = 15.26 V/m; Power Drift = -0.03 dB

Peak SAR (extrapolated) = 0.949 W/kg

SAR(1 g) = 0.451 W/kg



0 dB = 0.575 W/kg = -2.40 dBW/kg

PCTEST ENGINEERING LABORATORY, INC.

DUT: ZNFLS996; Type: Portable Handset; Serial: 1FMQT

Communication System: UID 0, IEEE 802.11b; Frequency: 2462 MHz; Duty Cycle: 1:1

Medium: 2450 Body Medium parameters used (interpolated):

$f = 2462 \text{ MHz}$; $\sigma = 2.055 \text{ S/m}$; $\epsilon_r = 50.695$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 0.8 cm

Test Date: 10-20-2014; Ambient Temp: 22.6°C; Tissue Temp: 21.9°C

Probe: ES3DV3 - SN3318; ConvF(4.15, 4.15, 4.15); Calibrated: 3/19/2014;

Sensor-Surface: 3mm (Mechanical Surface Detection)

Electronics: DAE4 Sn1272; Calibrated: 6/19/2014

Phantom: Main Twin Sam; Type: QD000P40CC; Serial: TP: 1375

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

Mode: IEEE 802.11b, Body SAR, Ch 11, 1 Mbps, Back Side

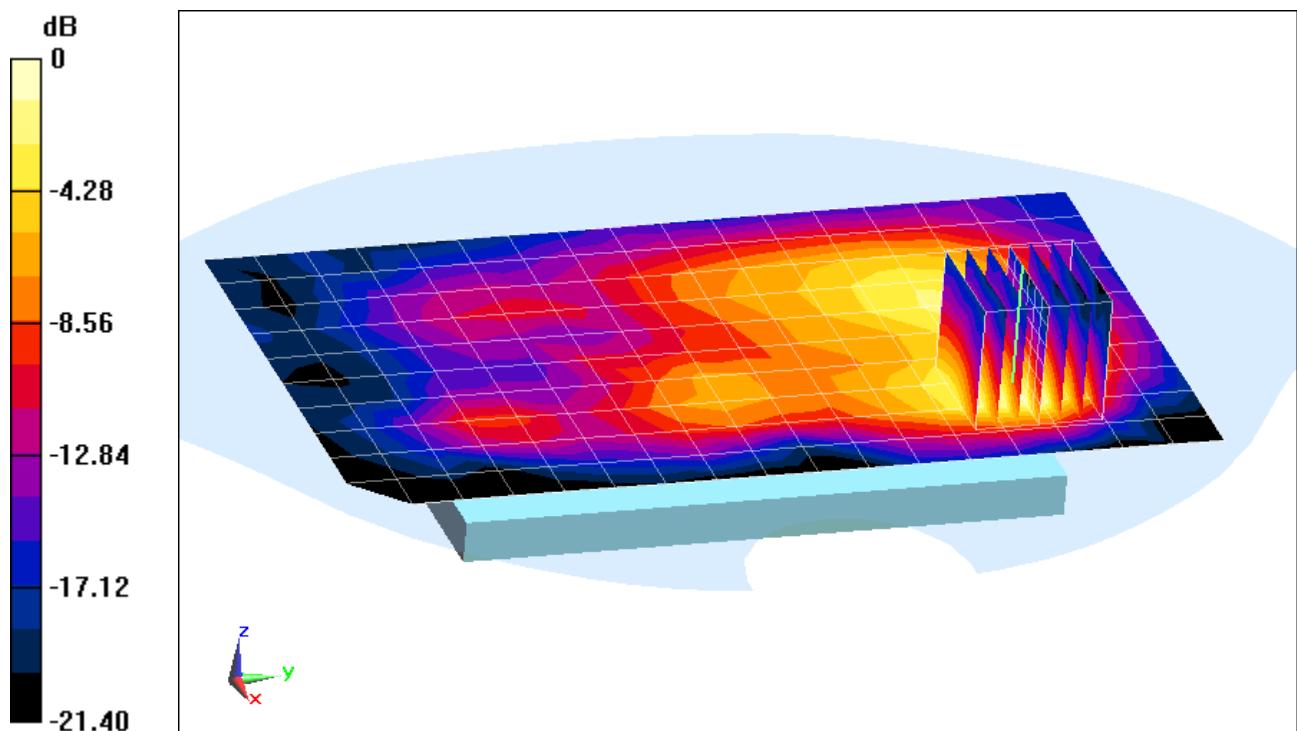
Area Scan (11x18x1): Measurement grid: $dx=12\text{mm}$, $dy=12\text{mm}$

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

Reference Value = 7.780 V/m; Power Drift = -0.10 dB

Peak SAR (extrapolated) = 0.257 W/kg

SAR(1 g) = 0.117 W/kg



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

PCTEST ENGINEERING LABORATORY, INC.

DUT: ZNFLS996; Type: Portable Handset; Serial: 1FMQT

Communication System: UID 0, 802.11a 5.2-5.8 GHz Band; Frequency: 5660 MHz; Duty Cycle: 1:1

Medium: 5 GHz Body Medium parameters used:

$f = 5660 \text{ MHz}$; $\sigma = 5.9 \text{ S/m}$; $\epsilon_r = 47.823$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 0.8 cm

Test Date: 10-20-2014; Ambient Temp: 21.7°C; Tissue Temp: 22.6°C

Probe: EX3DV4 - SN3920; ConvF(3.62, 3.62, 3.62); Calibrated: 12/18/2013;

Sensor-Surface: 1.4mm (Mechanical Surface Detection)

Electronics: DAE4 Sn649; Calibrated: 12/12/2013

Phantom: SAM Sub with CRP v4.0; Type: QD000P40CC; Serial: TP:1357

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

Mode: IEEE 802.11a, 5.5 GHz, Body SAR, Ch 132, 6 Mbps, Back Side

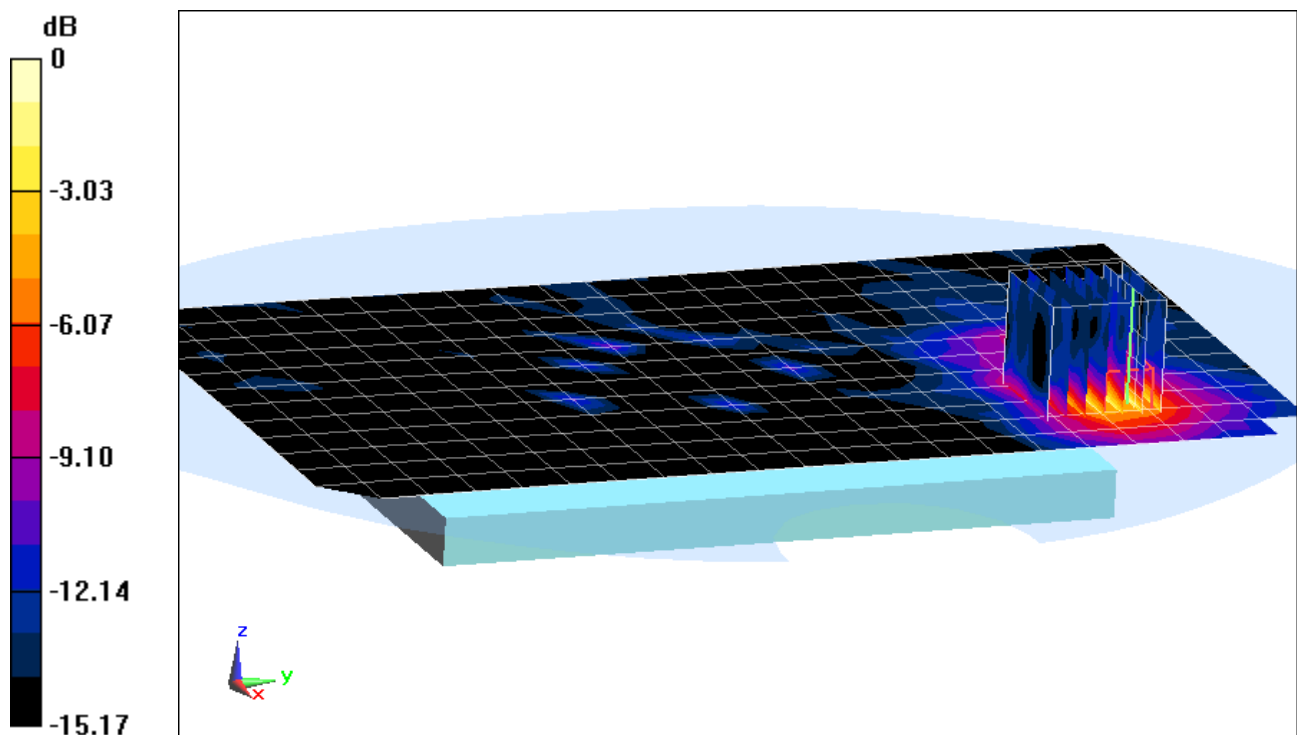
Area Scan (13x22x1): Measurement grid: $dx=10\text{mm}$, $dy=10\text{mm}$

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

Reference Value = 5.509 V/m; Power Drift = -0.12 dB

Peak SAR (extrapolated) = 0.750 W/kg

SAR(1 g) = 0.195 W/kg



0 dB = 0.471 W/kg = -3.27 dBW/kg

PCTEST ENGINEERING LABORATORY, INC.

DUT: ZNFLS996; Type: Portable Handset; Serial: 1FMQT

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:

$f = 5745 \text{ MHz}$; $\sigma = 6.029 \text{ S/m}$; $\epsilon_r = 47.707$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.0 cm

Test Date: 10-20-2014; Ambient Temp: 21.7°C; Tissue Temp: 22.6°C

Probe: EX3DV4 - SN3920; ConvF(4, 4, 4); Calibrated: 12/18/2013;

Sensor-Surface: 1.4mm (Mechanical Surface Detection)

Electronics: DAE4 Sn649; Calibrated: 12/12/2013

Phantom: SAM Sub with CRP v4.0; Type: QD000P40CC; Serial: TP:1357

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

Mode: IEEE 802.11a, 5.8 GHz, Body SAR, Ch 149, 6 Mbps, Left Edge

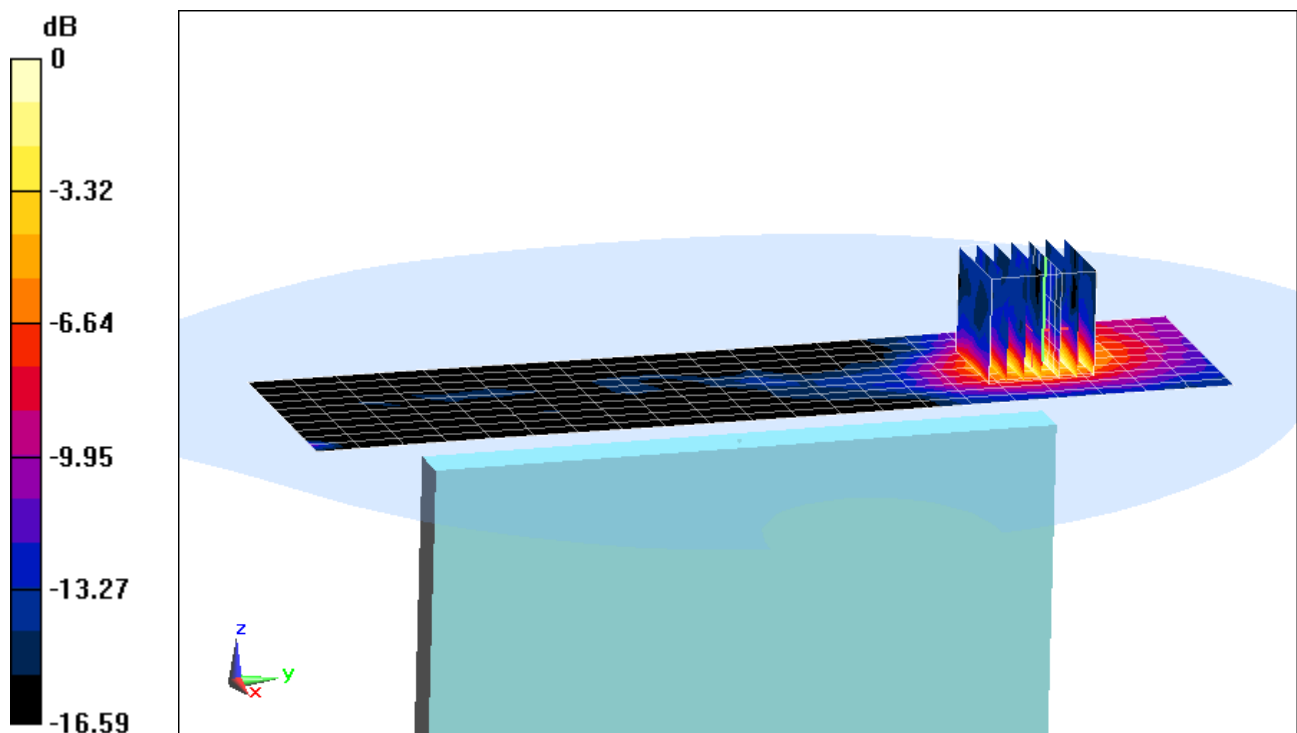
Area Scan (11x22x1): Measurement grid: $dx=5\text{mm}$, $dy=10\text{mm}$

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

Reference Value = 5.618 V/m; Power Drift = 0.07 dB

Peak SAR (extrapolated) = 0.827 W/kg

SAR(1 g) = 0.205 W/kg



0 dB = 0.461 W/kg = -3.36 dBW/kg

APPENDIX B: SYSTEM VERIFICATION

PCTEST ENGINEERING LABORATORY, INC.

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

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

Medium: 750 Head Medium parameters used (interpolated):

$f = 750 \text{ MHz}$; $\sigma = 0.925 \text{ S/m}$; $\epsilon_r = 42.37$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.5 cm

Test Date: 10-27-2014; Ambient Temp: 22.1°C; Tissue Temp: 20.5°C

Probe: ES3DV3 - SN3318; ConvF(6.45, 6.45, 6.45); Calibrated: 3/19/2014;

Sensor-Surface: 3mm (Mechanical Surface Detection)

Electronics: DAE4 Sn1272; Calibrated: 6/19/2014

Phantom: Main Twin Sam; Type: QD000P40CC; Serial: TP: 1375

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

750 MHz System Verification

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

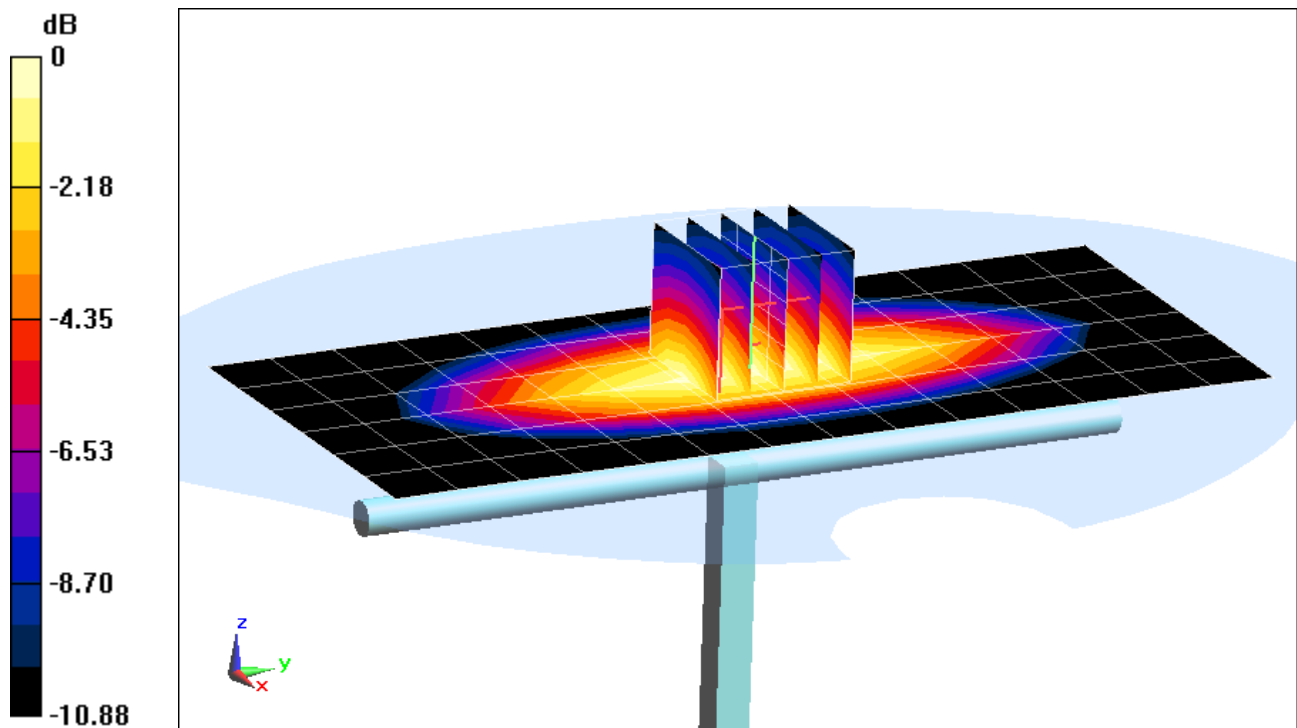
Zoom Scan (5x5x7)/Cube 0: Measurement grid: $dx=8\text{mm}$, $dy=8\text{mm}$, $dz=5\text{mm}$

Input Power = 20 dBm (100 mW)

Peak SAR (extrapolated) = 1.30 W/kg

SAR(1 g) = 0.857 W/kg

Deviation = 3.63%



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

PCTEST ENGINEERING LABORATORY, INC.

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

Communication System: UID 0, CW; Frequency: 835 MHz; Duty Cycle: 1:1

Medium: 835 Head Medium parameters used:

$f = 835 \text{ MHz}$; $\sigma = 0.939 \text{ S/m}$; $\epsilon_r = 42.195$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.5 cm

Test Date: 10-24-2014; Ambient Temp: 23.3°C; Tissue Temp: 22.3°C

Probe: ES3DV3 - SN3209; ConvF(6.23, 6.23, 6.23); Calibrated: 3/19/2014;

Sensor-Surface: 3mm (Mechanical Surface Detection)

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

Phantom: SAM front; Type: QD000P40CD; Serial: TP:1759

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

835 MHz System Verification

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

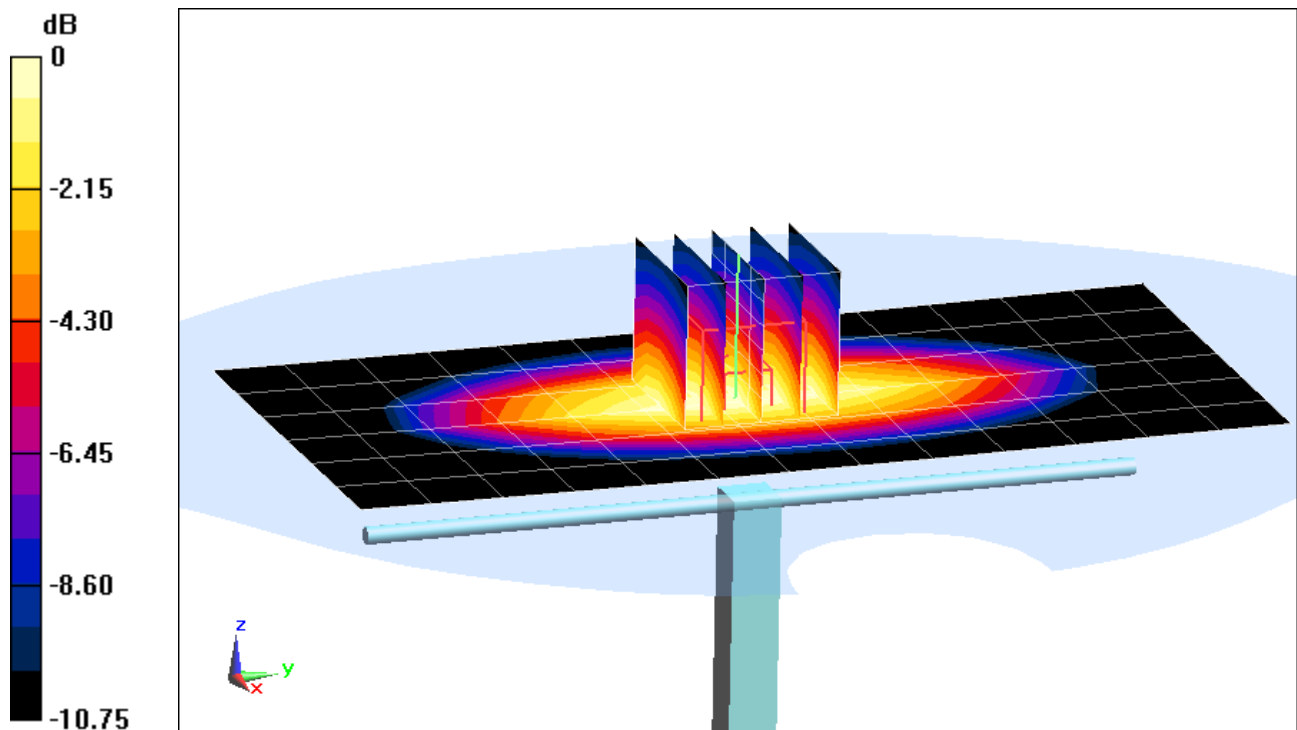
Zoom Scan (5x5x7)/Cube 0: Measurement grid: $dx=8\text{mm}$, $dy=8\text{mm}$, $dz=5\text{mm}$

Input Power = 20 dBm (100 mW)

Peak SAR (extrapolated) = 1.31 W/kg

SAR(1 g) = 0.873 W/kg

Deviation = -5.31%



0 dB = 1.02 W/kg = 0.09 dBW/kg

PCTEST ENGINEERING LABORATORY, INC.

DUT: Dipole 835 MHz; Type: D835V2; Serial: 4d132

Communication System: UID 0, CW; Frequency: 835 MHz; Duty Cycle: 1:1

Medium: 835 Head Medium parameters used:

$f = 835 \text{ MHz}$; $\sigma = 0.923 \text{ S/m}$; $\epsilon_r = 40.863$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.5 cm

Test Date: 10-28-2014; Ambient Temp: 22.6°C; Tissue Temp: 21.5°C

Probe: ES3DV3 - SN3213; ConvF(6.37, 6.37, 6.37); Calibrated: 4/11/2014;

Sensor-Surface: 3mm (Mechanical Surface Detection)

Electronics: DAE4 Sn1407; Calibrated: 11/18/2013

Phantom: Sub TWIN SAM; Type: QD000P40CC; Serial: TP-1357

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

835 MHz System Verification

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

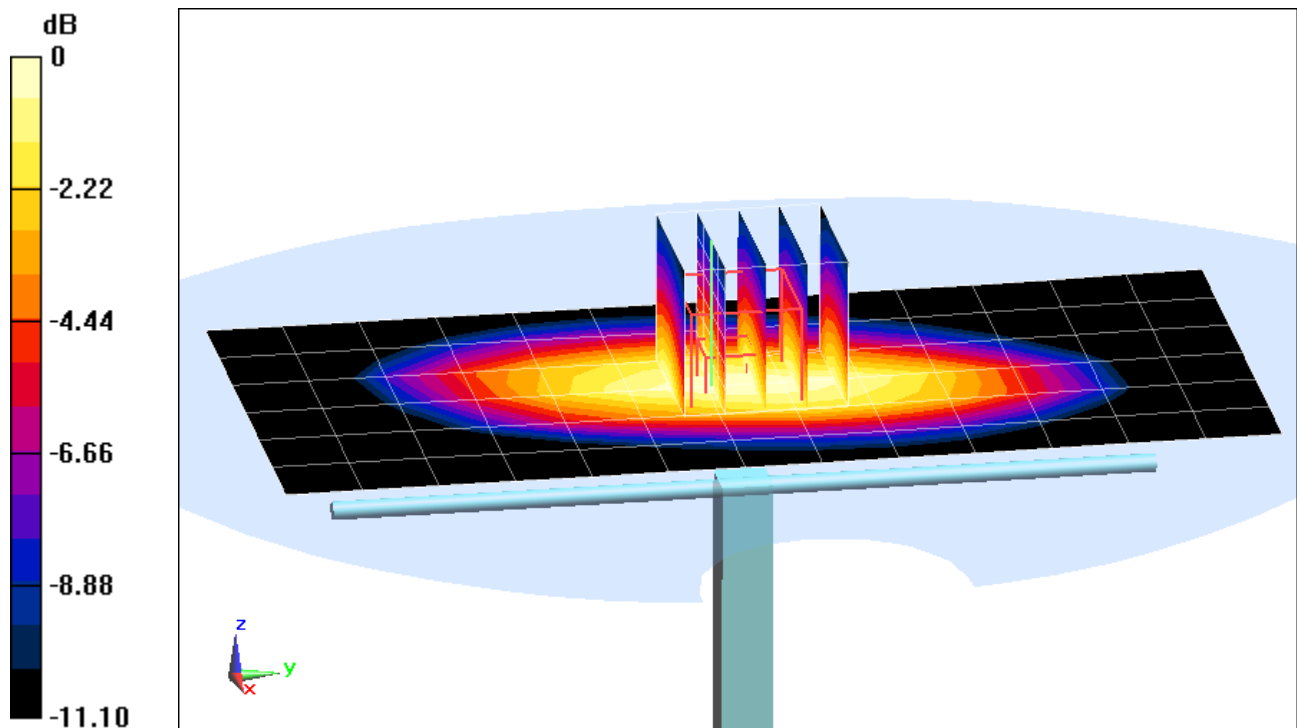
Zoom Scan (5x5x7)/Cube 0: Measurement grid: $dx=8\text{mm}$, $dy=8\text{mm}$, $dz=5\text{mm}$

Input Power = 20 dBm (100 mW)

Peak SAR (extrapolated) = 1.40 W/kg

SAR(1 g) = 0.941 W/kg

Deviation = 1.51%



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:

$f = 1750 \text{ MHz}$; $\sigma = 1.39 \text{ S/m}$; $\epsilon_r = 39.819$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.0 cm

Test Date: 10-22-2014; Ambient Temp: 23.0°C; Tissue Temp: 22.4°C

Probe: ES3DV2 - SN3022; ConvF(5.04, 5.04, 5.04); 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)

1750 MHz System Verification

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

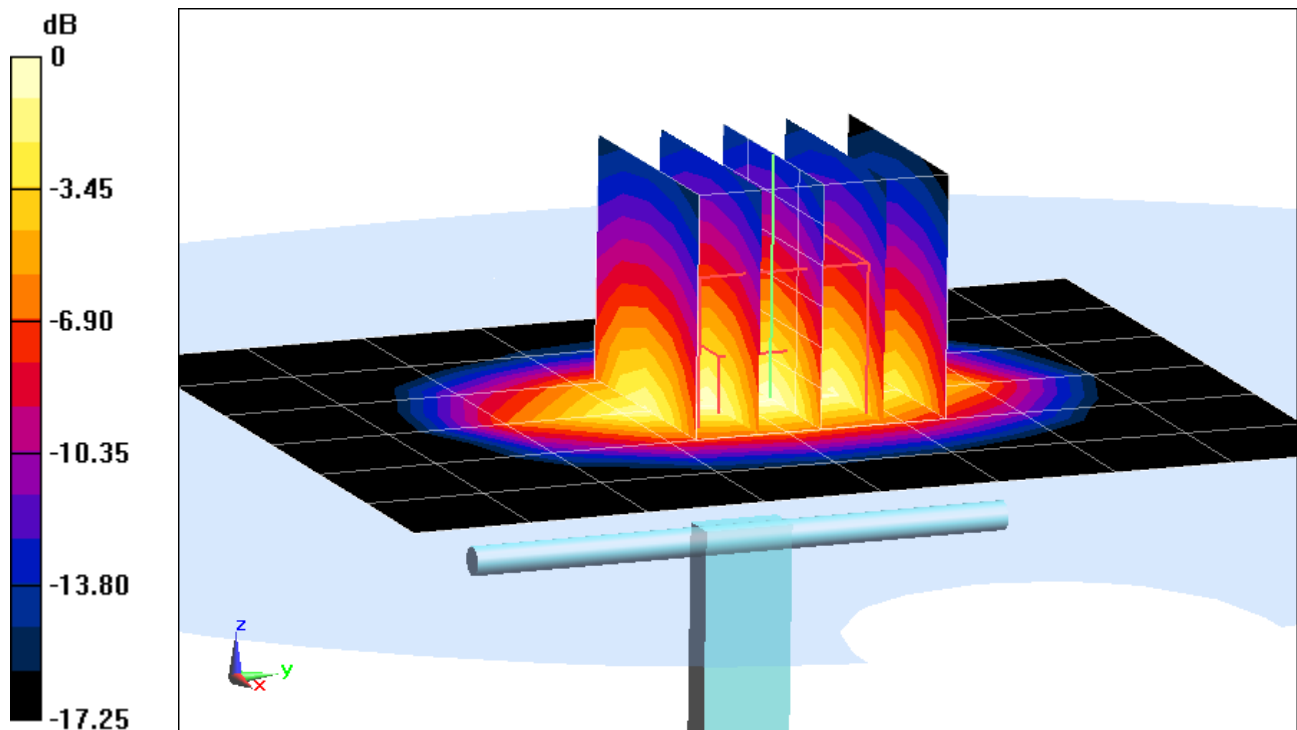
Zoom Scan (5x5x7)/Cube 0: Measurement grid: $dx=8\text{mm}$, $dy=8\text{mm}$, $dz=5\text{mm}$

Input Power = 20 dBm (100 mW)

Peak SAR (extrapolated) = 6.91 W/kg

SAR(1 g) = 3.91 W/kg

Deviation = 5.96%



0 dB = 4.86 W/kg = 6.87 dBW/kg

PCTEST ENGINEERING LABORATORY, INC.

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

Communication System: UID 0, CW; Frequency: 1900 MHz; Duty Cycle: 1:1

Medium: 1900 Head Medium parameters used (interpolated):

$f = 1900 \text{ MHz}$; $\sigma = 1.452 \text{ S/m}$; $\epsilon_r = 38.333$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.0 cm

Test Date: 10-23-2014; Ambient Temp: 22.6°C; Tissue Temp: 22.6°C

Probe: ES3DV2 - SN3022; ConvF(4.85, 4.85, 4.85); 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)

1900 MHz System Verification

Area Scan (7x10x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$

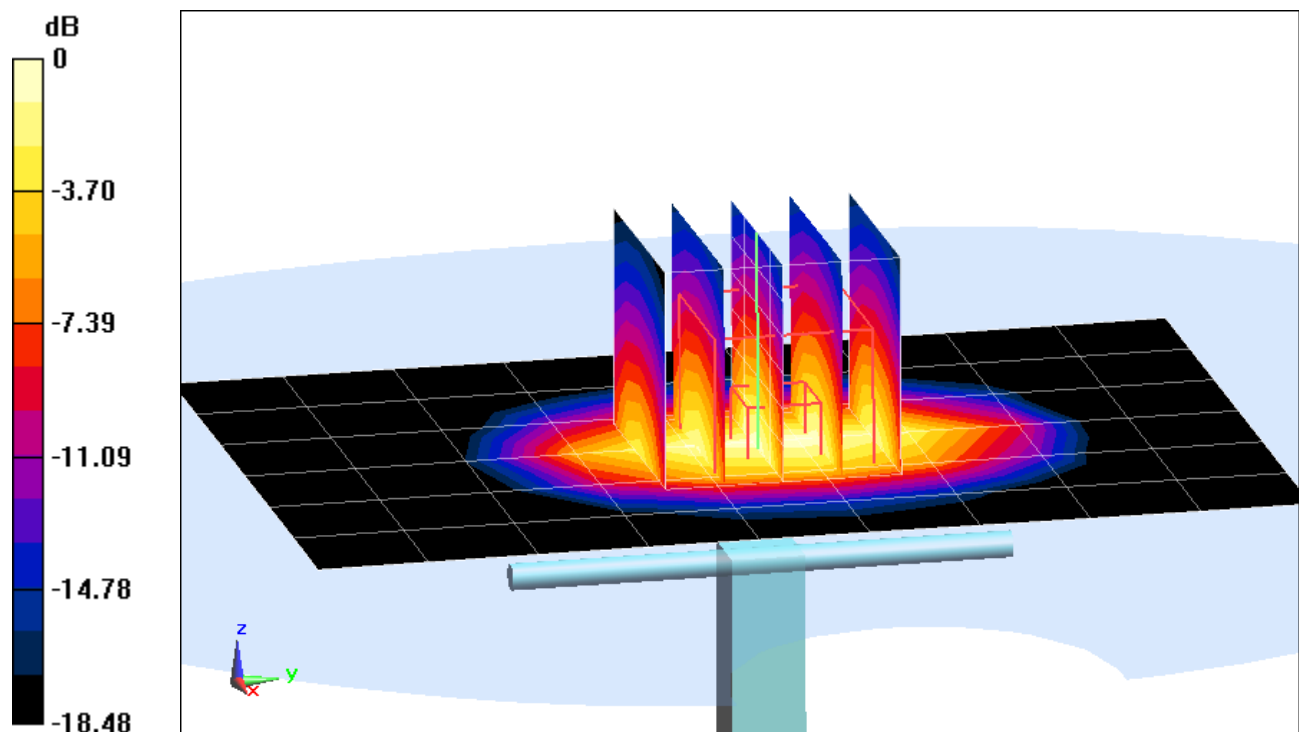
Zoom Scan (5x5x7)/Cube 0: Measurement grid: $dx=8\text{mm}$, $dy=8\text{mm}$, $dz=5\text{mm}$

Input Power = 20 dBm (100 mW)

Peak SAR (extrapolated) = 7.42 W/kg

SAR(1 g) = 4.15 W/kg

Deviation = 3.49%



0 dB = 5.19 W/kg = 7.15 dBW/kg

PCTEST ENGINEERING LABORATORY, INC.

DUT: Dipole 2450 MHz; Type: D2450V2; Serial: 797

Communication System: UID 0, CW; Frequency: 2450 MHz; Duty Cycle: 1:1

Medium: 2450 Head Medium parameters used:

$f = 2450 \text{ MHz}$; $\sigma = 1.782 \text{ S/m}$; $\epsilon_r = 38.251$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.0 cm

Test Date: 10-21-2014; Ambient Temp: 24.3°C; Tissue Temp: 23.1°C

Probe: ES3DV3 - SN3258; ConvF(4.52, 4.52, 4.52); 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)

2450 MHz System Verification

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

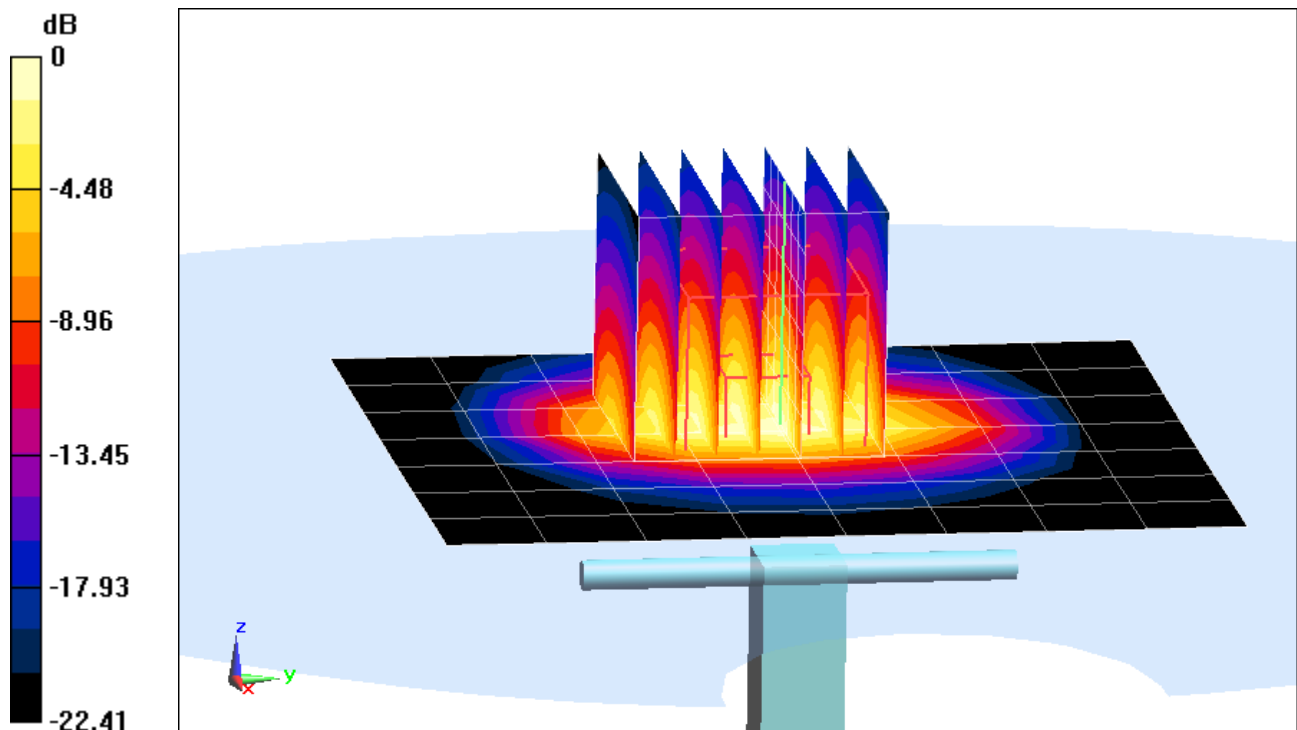
Zoom Scan (7x7x7)/Cube 0: Measurement grid: $dx=5\text{mm}$, $dy=5\text{mm}$, $dz=5\text{mm}$

Input Power = 20 dBm (100 mW)

Peak SAR (extrapolated) = 11.2 W/kg

SAR(1 g) = 5.46 W/kg

Deviation = 5.41%



0 dB = 7.10 W/kg = 8.51 dBW/kg

PCTEST ENGINEERING LABORATORY, INC.

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

Communication System: UID 0, CW; Frequency: 2600 MHz; Duty Cycle: 1:1

Medium: 2450 Head Medium parameters used:

$f = 2600 \text{ MHz}$; $\sigma = 1.944 \text{ S/m}$; $\epsilon_r = 37.702$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.0 cm

Test Date: 10-21-2014; Ambient Temp: 24.3°C; Tissue Temp: 23.1°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

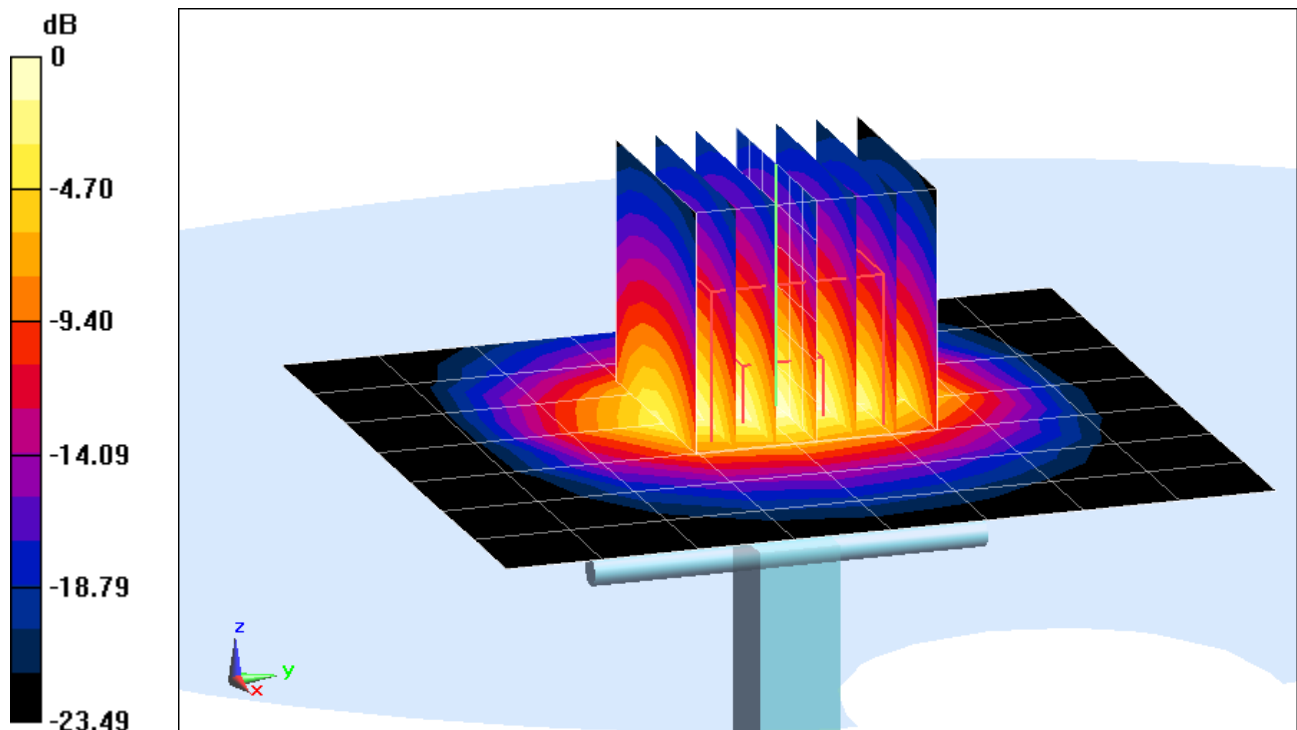
Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Input Power = 20 dBm (100 mW)

Peak SAR (extrapolated) = 12.8 W/kg

SAR(1 g) = 6.08 W/kg

Deviation = 6.11%



0 dB = 8.11 W/kg = 9.09 dBW/kg

PCTEST ENGINEERING LABORATORY, INC.

DUT: SAR Dipole 5200 MHz; Type: D5GHzV2; Serial: 1120

Communication System: UID 0, CW; Frequency: 5200 MHz; Duty Cycle: 1:1

Medium: 5 GHz Head Medium parameters used:

$f = 5200 \text{ MHz}$; $\sigma = 4.489 \text{ S/m}$; $\epsilon_r = 36.282$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.0 cm

Test Date: 10-28-2014; Ambient Temp: 21.8°C; Tissue Temp: 20.9°C

Probe: EX3DV4 - SN3920; ConvF(4.87, 4.87, 4.87); Calibrated: 12/18/2013;

Sensor-Surface: 1.4mm (Mechanical Surface Detection)

Electronics: DAE4 Sn649; Calibrated: 12/12/2013

Phantom: SAM Main with CRP v4.0; Type: QD000P40CC; Serial: TP 1114

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

5200MHz System Verification

Area Scan (7x9x1): Measurement grid: dx=10mm, dy=10mm

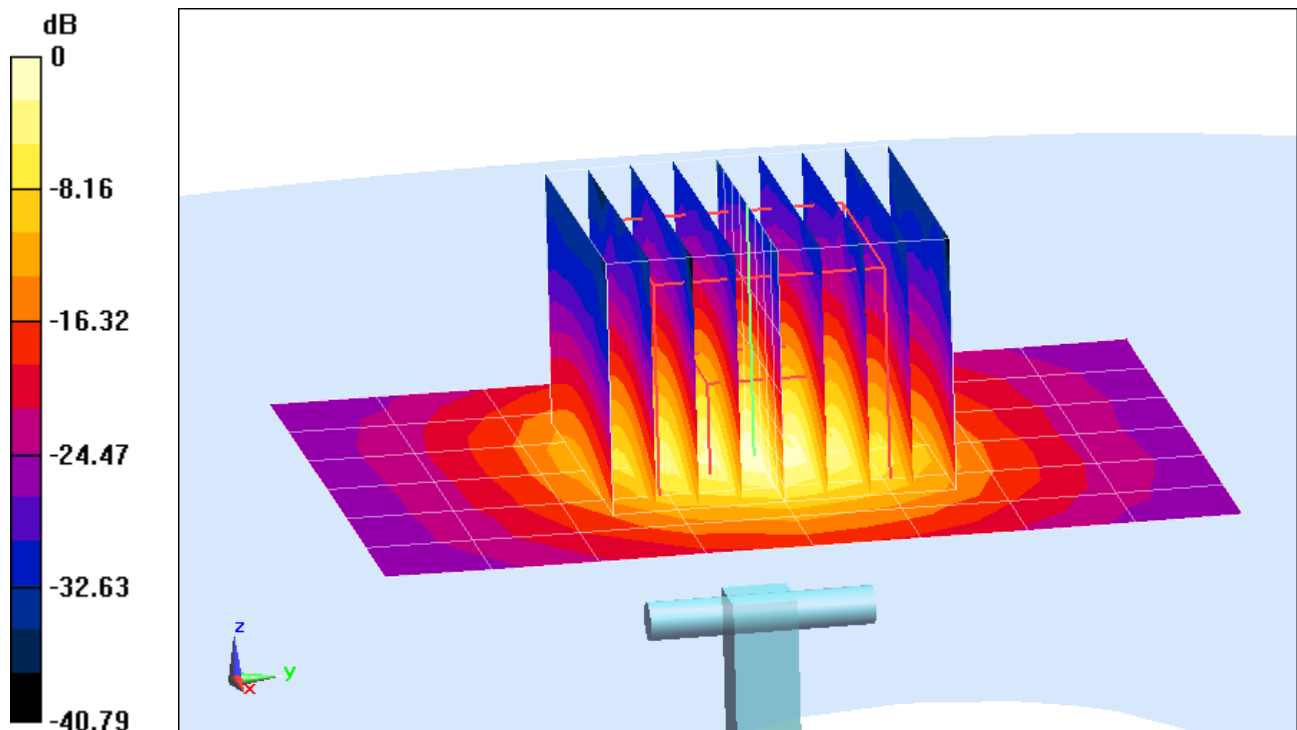
Zoom Scan (9x9x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm; Graded Ratio: 1.4

Input Power = 20 dBm (100 mW)

Peak SAR (extrapolated) = 32.5 W/kg

SAR(1 g) = 7.83 W/kg

Deviation = -1.01%



0 dB = 19.6 W/kg = 12.92 dBW/kg

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:

$f = 5300 \text{ MHz}$; $\sigma = 4.602 \text{ S/m}$; $\epsilon_r = 36.17$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.0 cm

Test Date: 10-28-2014; Ambient Temp: 21.8°C; Tissue Temp: 20.9°C

Probe: EX3DV4 - SN3920; ConvF(4.66, 4.66, 4.66); Calibrated: 12/18/2013;

Sensor-Surface: 1.4mm (Mechanical Surface Detection)

Electronics: DAE4 Sn649; Calibrated: 12/12/2013

Phantom: SAM Main with CRP v4.0; Type: QD000P40CC; Serial: TP 1114

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

5300MHz System Verification

Area Scan (7x9x1): Measurement grid: $dx=10\text{mm}$, $dy=10\text{mm}$

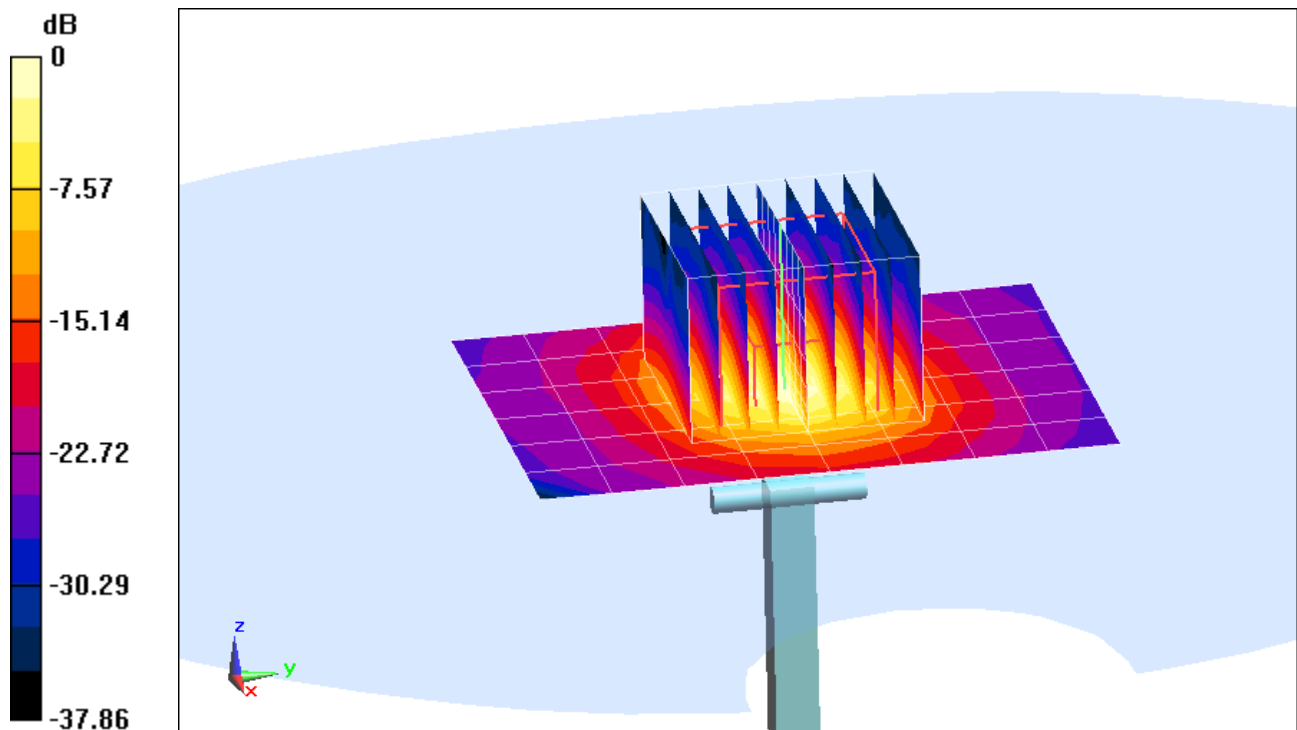
Zoom Scan (9x9x7)/Cube 0: Measurement grid: $dx=4\text{mm}$, $dy=4\text{mm}$, $dz=1.4\text{mm}$; Graded Ratio: 1.4

Input Power = 20 dBm (100 mW)

Peak SAR (extrapolated) = 35.7 W/kg

SAR(1 g) = 8.4 W/kg

Deviation = 0.72%



0 dB = 21.3 W/kg = 13.28 dBW/kg

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:

$f = 5500 \text{ MHz}$; $\sigma = 4.833 \text{ S/m}$; $\epsilon_r = 36.07$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.0 cm

Test Date: 10-28-2014; Ambient Temp: 21.8°C; Tissue Temp: 20.9°C

Probe: EX3DV4 - SN3920; ConvF(4.54, 4.54, 4.54); Calibrated: 12/18/2013;

Sensor-Surface: 1.4mm (Mechanical Surface Detection)

Electronics: DAE4 Sn649; Calibrated: 12/12/2013

Phantom: SAM Main with CRP v4.0; Type: QD000P40CC; Serial: TP 1114

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

5500MHz System Verification

Area Scan (7x9x1): Measurement grid: $dx=10\text{mm}$, $dy=10\text{mm}$

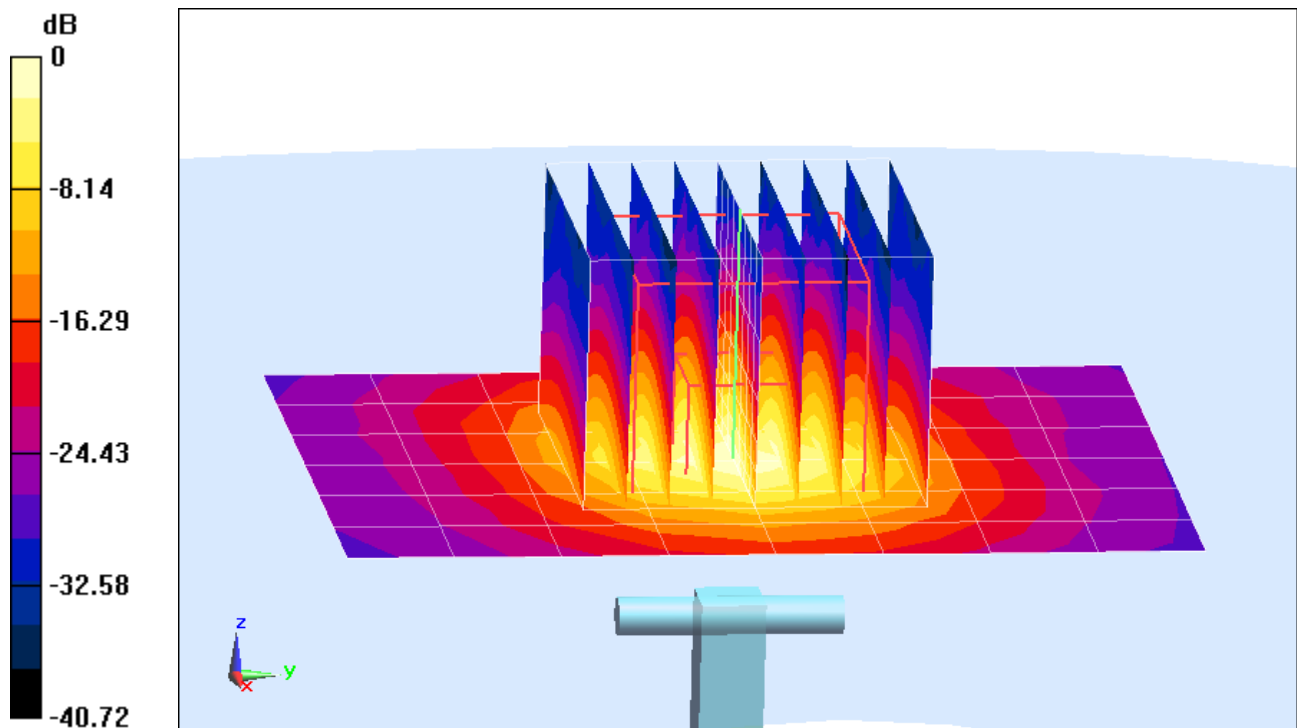
Zoom Scan (9x9x7)/Cube 0: Measurement grid: $dx=4\text{mm}$, $dy=4\text{mm}$, $dz=1.4\text{mm}$; Graded Ratio: 1.4

Input Power = 20 dBm (100 mW)

Peak SAR (extrapolated) = 37.1 W/kg

SAR(1 g) = 8.31 W/kg

Deviation = -2.12%



0 dB = 21.4 W/kg = 13.30 dBW/kg

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:

$f = 5600 \text{ MHz}$; $\sigma = 4.949 \text{ S/m}$; $\epsilon_r = 36.01$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.0 cm

Test Date: 10-28-2014; Ambient Temp: 21.8°C; Tissue Temp: 20.9°C

Probe: EX3DV4 - SN3920; ConvF(4.37, 4.37, 4.37); Calibrated: 12/18/2013;

Sensor-Surface: 1.4mm (Mechanical Surface Detection)

Electronics: DAE4 Sn649; Calibrated: 12/12/2013

Phantom: SAM Main with CRP v4.0; Type: QD000P40CC; Serial: TP 1114

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

5600MHz System Verification

Area Scan (7x9x1): Measurement grid: dx=10mm, dy=10mm

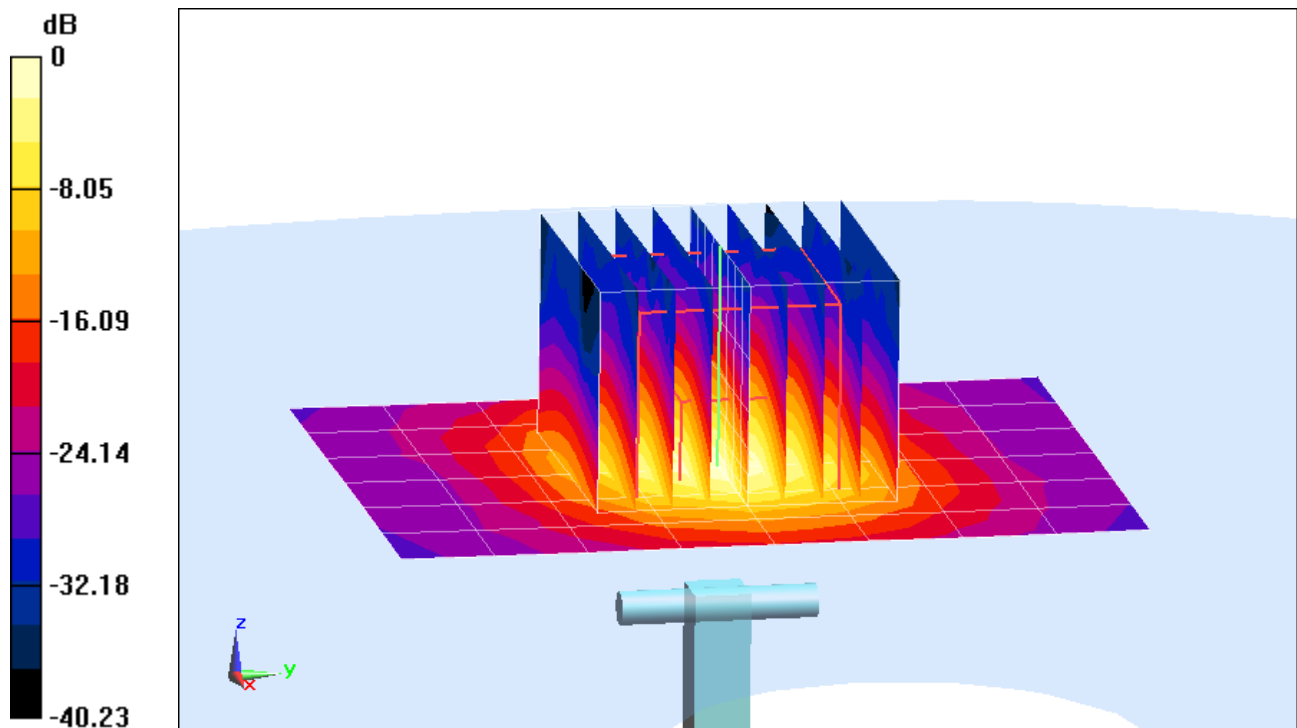
Zoom Scan (9x9x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm; Graded Ratio: 1.4

Input Power = 20 dBm (100 mW)

Peak SAR (extrapolated) = 37.4 W/kg

SAR(1 g) = 8.12 W/kg

Deviation = -1.22%



0 dB = 21.2 W/kg = 13.26 dBW/kg

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:

$f = 5800 \text{ MHz}$; $\sigma = 5.124 \text{ S/m}$; $\epsilon_r = 35.7$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.0 cm

Test Date: 10-28-2014; Ambient Temp: 21.8°C; Tissue Temp: 20.7°C

Probe: EX3DV4 - SN3920; ConvF(4.11, 4.11, 4.11); Calibrated: 12/18/2013;

Sensor-Surface: 1.4mm (Mechanical Surface Detection)

Electronics: DAE4 Sn649; Calibrated: 12/12/2013

Phantom: SAM Main with CRP v4.0; Type: QD000P40CC; Serial: TP 1114

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

5800MHz System Verification

Area Scan (7x9x1): Measurement grid: $dx=10\text{mm}$, $dy=10\text{mm}$

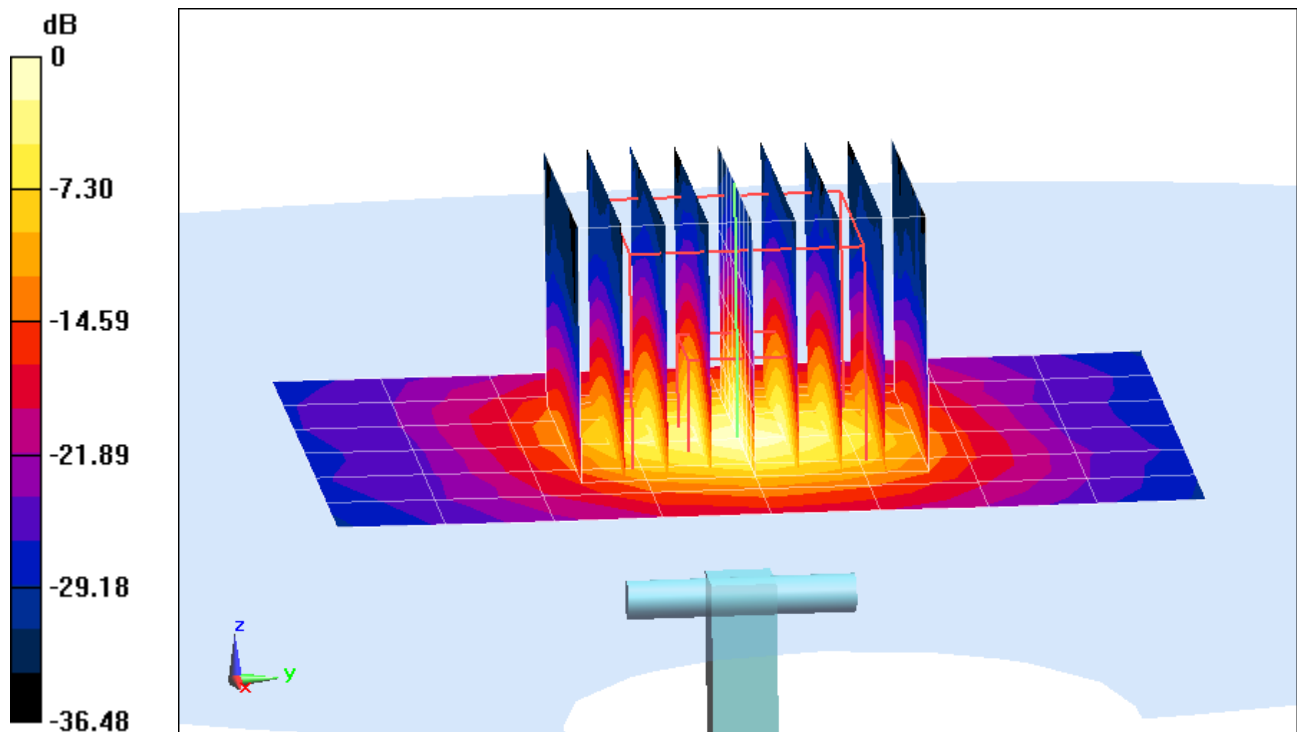
Zoom Scan (9x9x7)/Cube 0: Measurement grid: $dx=4\text{mm}$, $dy=4\text{mm}$, $dz=1.4\text{mm}$; Graded Ratio: 1.4

Input Power = 20 dBm (100 mW)

Peak SAR (extrapolated) = 35.8 W/kg

SAR(1 g) = 8 W/kg

Deviation = 1.14%



0 dB = 21.0 W/kg = 13.22 dBW/kg

PCTEST ENGINEERING LABORATORY, INC.

DUT: Dipole 750 MHz; Type: D750V3; Serial: 1003

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

Medium: 750 Body Medium parameters used (interpolated):

$f = 750 \text{ MHz}$; $\sigma = 0.971 \text{ S/m}$; $\epsilon_r = 55.547$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.5 cm

Test Date: 10-20-2014; Ambient Temp: 22.1°C; Tissue Temp: 21.0°C

Probe: ES3DV3 - SN3263; ConvF(6.19, 6.19, 6.19); 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)

750 MHz System Verification

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

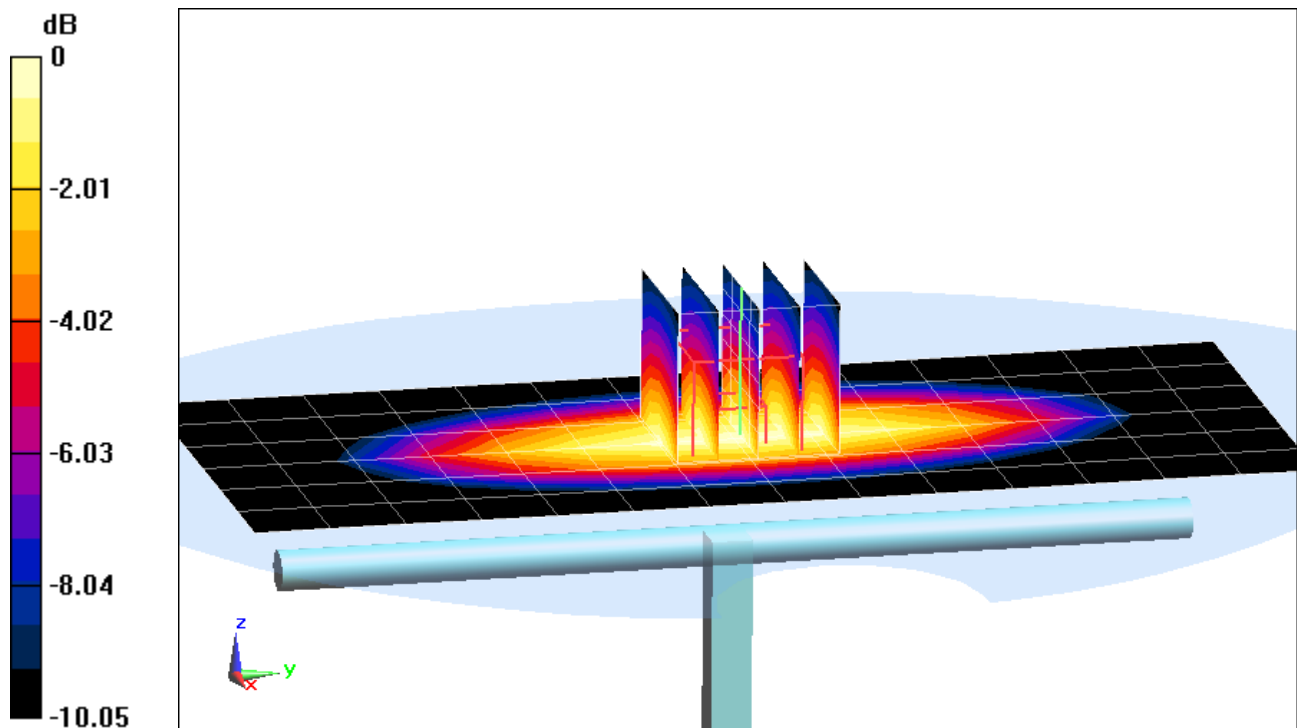
Zoom Scan (5x5x7)/Cube 0: Measurement grid: $dx=8\text{mm}$, $dy=8\text{mm}$, $dz=5\text{mm}$

Input Power = 20 dBm (100 mW)

Peak SAR (extrapolated) = 1.29 W/kg

SAR(1 g) = 0.878 W/kg

Deviation = 0.11%



PCTEST ENGINEERING LABORATORY, INC.

DUT: SAR Dipole 835 MHz; Type: D835V2; Serial: 4d132

Communication System: UID 0, CW; Frequency: 835 MHz; Duty Cycle: 1:1

Medium: 835 Body Medium parameters used:

$f = 835 \text{ MHz}$; $\sigma = 0.954 \text{ S/m}$; $\epsilon_r = 53.934$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.5 cm

Test Date: 10-21-2014; Ambient Temp: 21.4°C; Tissue Temp: 20.6°C

Probe: ES3DV3 - SN3213; ConvF(6.18, 6.18, 6.18); Calibrated: 4/11/2014;

Sensor-Surface: 3mm (Mechanical Surface Detection)

Electronics: DAE4 Sn1407; Calibrated: 11/18/2013

Phantom: Sub TWIN SAM; Type: QD000P40CC; Serial: TP-1357

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

835 MHz System Verification

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

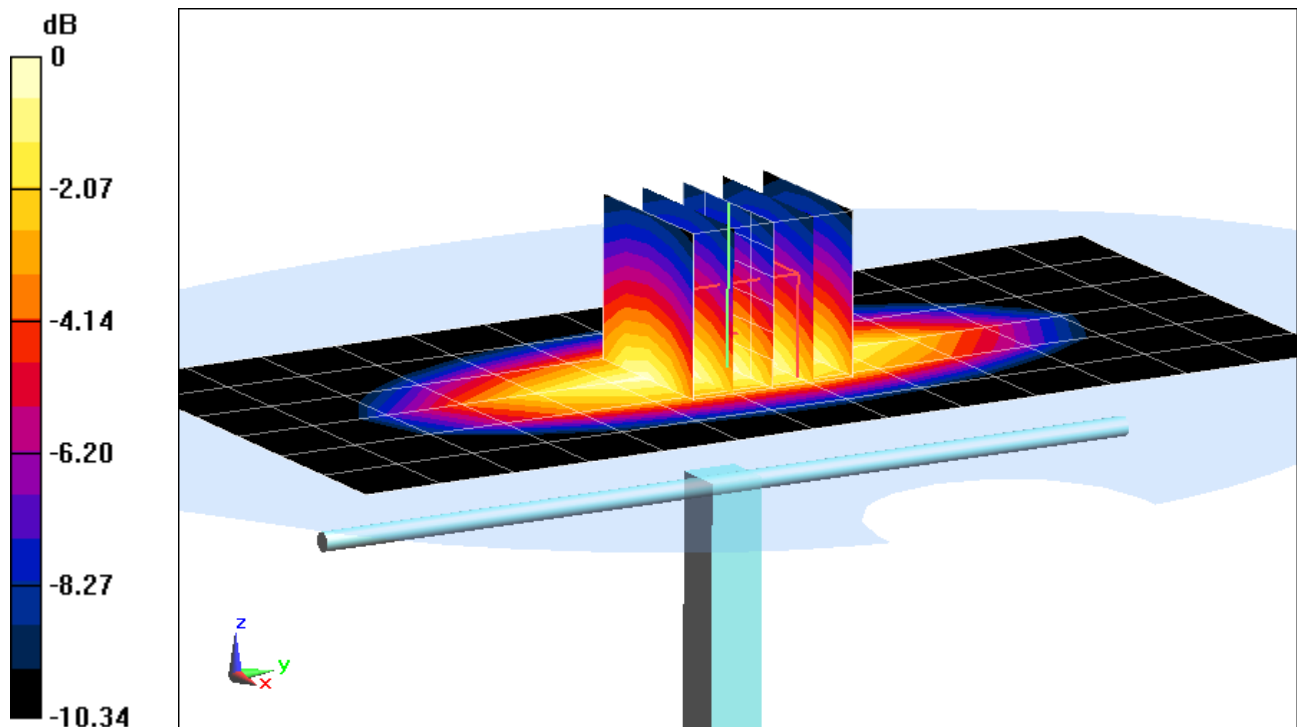
Zoom Scan (5x5x7)/Cube 0: Measurement grid: $dx=8\text{mm}$, $dy=8\text{mm}$, $dz=5\text{mm}$

Input Power = 20 dBm (100 mW)

Peak SAR (extrapolated) = 1.45 W/kg

SAR(1 g) = 0.994 W/kg

Deviation = 3.76%



0 dB = 1.15 W/kg = 0.61 dBW/kg

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:

$f = 1750 \text{ MHz}$; $\sigma = 1.496 \text{ S/m}$; $\epsilon_r = 51.474$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.0 cm

Test Date: 10-21-2014; Ambient Temp: 22.6°C; Tissue Temp: 22.4°C

Probe: ES3DV2 - SN3022; ConvF(4.7, 4.7, 4.7); Calibrated: 8/19/2014;

Sensor-Surface: 3mm (Mechanical Surface Detection)

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

Phantom: ELI v5.0; Type: QDOVA001BB; Serial: 1226

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

1750 MHz System Verification

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

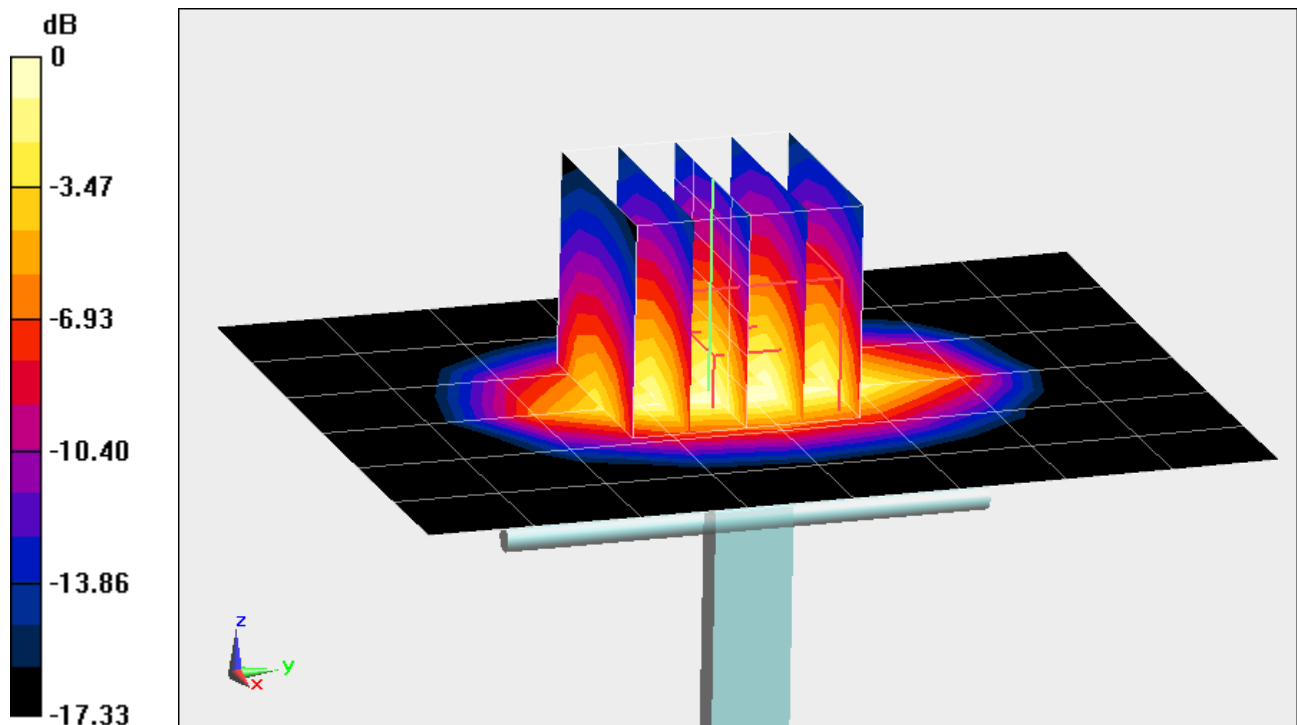
Zoom Scan (5x5x7)/Cube 0: Measurement grid: $dx=8\text{mm}$, $dy=8\text{mm}$, $dz=5\text{mm}$

Input Power = 20 dBm (100 mW)

Peak SAR (extrapolated) = 6.97 W/kg

SAR(1 g) = 4.01 W/kg

Deviation = 6.65%



0 dB = 4.91 W/kg = 6.91 dBW/kg

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):

$f = 1900 \text{ MHz}$; $\sigma = 1.574 \text{ S/m}$; $\epsilon_r = 53.571$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.0 cm

Test Date: 10-21-2014; Ambient Temp: 23.6°C; Tissue Temp: 22.4°C

Probe: ES3DV3 - SN3319; ConvF(4.67, 4.67, 4.67); Calibrated: 4/17/2014;

Sensor-Surface: 3mm (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)

1900 MHz System Verification

Area Scan (7x10x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$

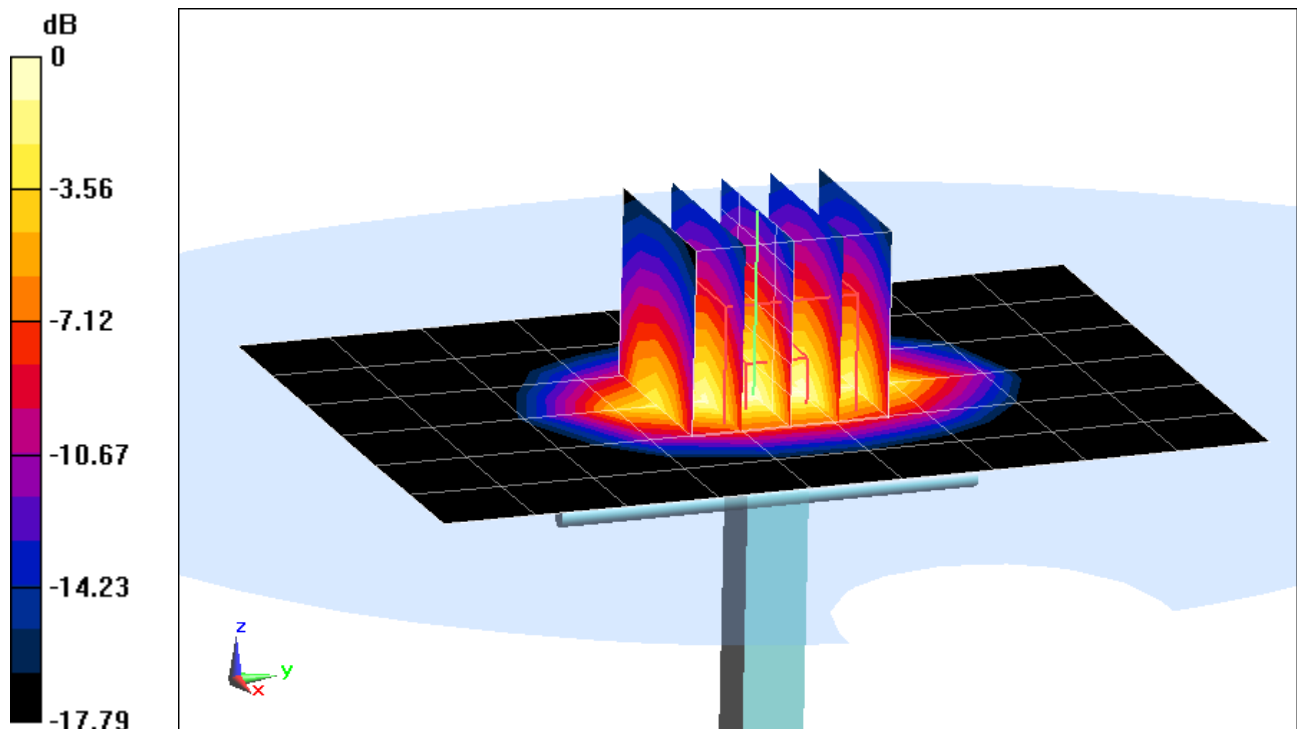
Zoom Scan (5x5x7)/Cube 0: Measurement grid: $dx=8\text{mm}$, $dy=8\text{mm}$, $dz=5\text{mm}$

Input Power = 20 dBm (100 mW)

Peak SAR (extrapolated) = 7.46 W/kg

SAR(1 g) = 4.26 W/kg

Deviation = 4.93%



0 dB = 5.37 W/kg = 7.30 dBW/kg

PCTEST ENGINEERING LABORATORY, INC.

DUT: SAR Dipole 2450 MHz; Type: D2450V2; Serial: 882

Communication System: UID 0, CW; Frequency: 2450 MHz; Duty Cycle: 1:1

Medium: 2450 Body Medium parameters used:

$f = 2450 \text{ MHz}$; $\sigma = 2.039 \text{ S/m}$; $\epsilon_r = 50.743$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.0 cm

Test Date: 10-20-2014; Ambient Temp: 22.6°C; Tissue Temp: 21.9°C

Probe: ES3DV3 - SN3318; ConvF(4.15, 4.15, 4.15); Calibrated: 3/19/2014;

Sensor-Surface: 3mm (Mechanical Surface Detection)

Electronics: DAE4 Sn1272; Calibrated: 6/19/2014

Phantom: Main Twin Sam; Type: QD000P40CC; Serial: TP: 1375

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

2450 MHz System Verification

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

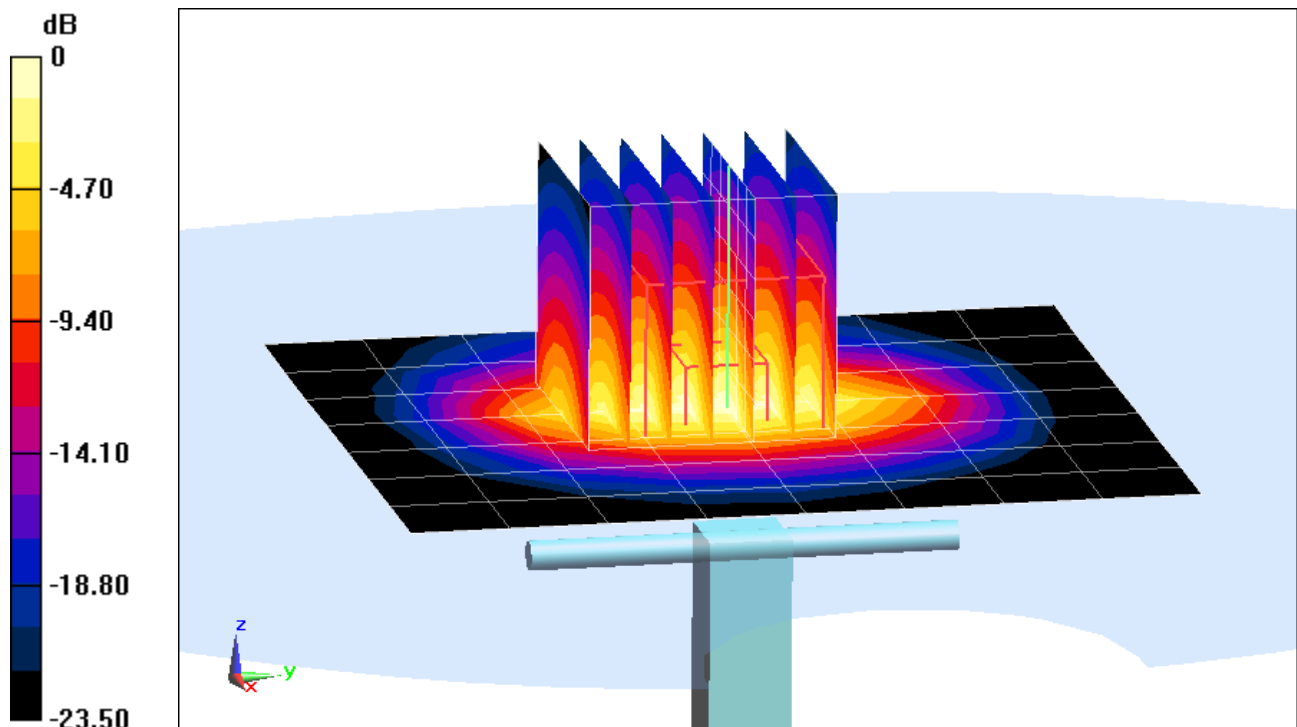
Zoom Scan (7x7x7)/Cube 0: Measurement grid: $dx=5\text{mm}$, $dy=5\text{mm}$, $dz=5\text{mm}$

Input Power = 20 dBm (100 mW)

Peak SAR (extrapolated) = 12.4 W/kg

SAR(1 g) = 5.33 W/kg

Deviation = 7.68%



0 dB = 7.26 W/kg = 8.61 dBW/kg

PCTEST ENGINEERING LABORATORY, INC.

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

Communication System: UID 0, CW; Frequency: 2600 MHz; Duty Cycle: 1:1

Medium: 2450 Body Medium parameters used:

$f = 2600 \text{ MHz}$; $\sigma = 2.183 \text{ S/m}$; $\epsilon_r = 51.3$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.0 cm

Test Date: 10-23-2014; Ambient Temp: 24.2°C; Tissue Temp: 22.9°C

Probe: ES3DV3 - SN3288; ConvF(4.22, 4.22, 4.22); Calibrated: 9/24/2014;

Sensor-Surface: 3mm (Mechanical Surface Detection)

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

Phantom: SAM with CRP v4.0; Type: QD000P40CD; Serial: TP:1797

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

2600 MHz System Verification

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

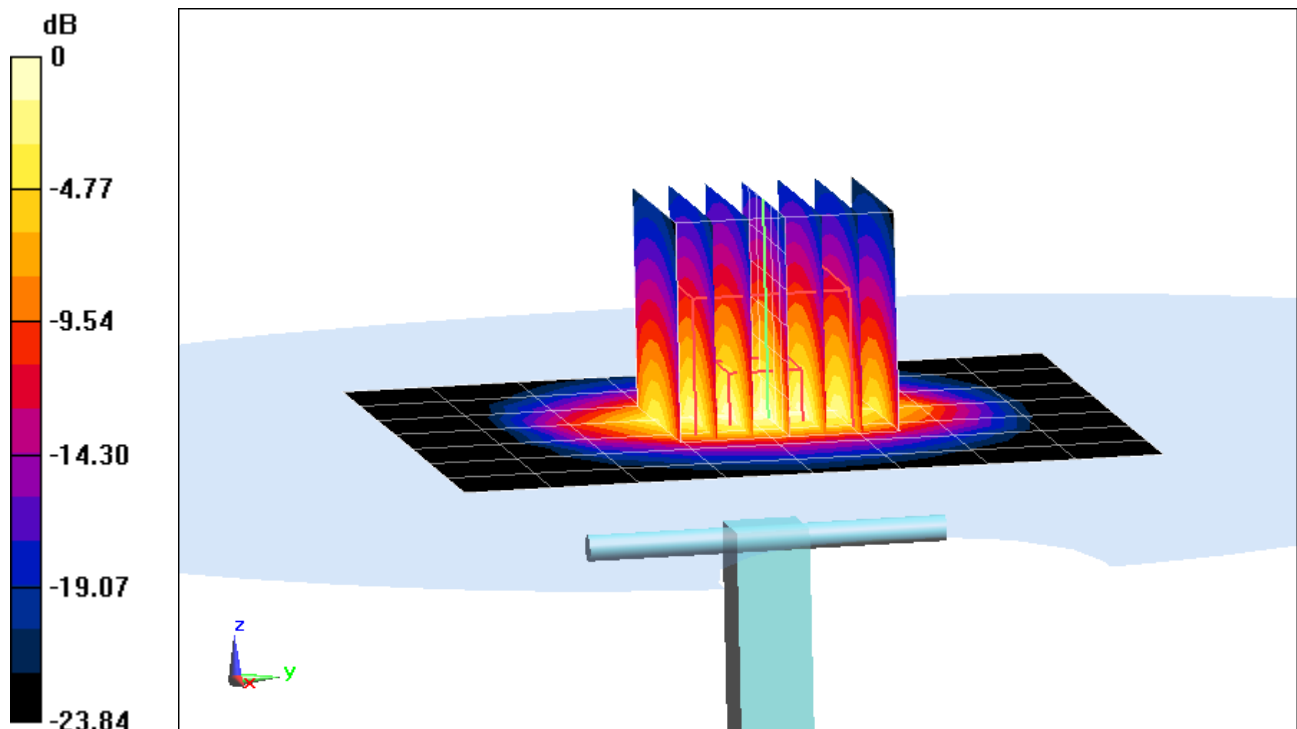
Zoom Scan (7x7x7)/Cube 0: Measurement grid: $dx=5\text{mm}$, $dy=5\text{mm}$, $dz=5\text{mm}$

Input Power = 20 dBm (100 mW)

Peak SAR (extrapolated) = 13.1 W/kg

SAR(1 g) = 5.83 W/kg

Deviation = 2.82%



0 dB = 7.65 W/kg = 8.84 dBW/kg

PCTEST ENGINEERING LABORATORY, INC.

DUT: SAR Dipole 5200 MHz; Type: D5GHzV2; Serial: 1120

Communication System: UID 0, CW; Frequency: 5200 MHz; Duty Cycle: 1:1

Medium: 5 GHz Body Medium parameters used:

$f = 5200 \text{ MHz}$; $\sigma = 5.286 \text{ S/m}$; $\epsilon_r = 48.674$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.0 cm

Test Date: 10-20-2014; Ambient Temp: 21.7°C; Tissue Temp: 22.6°C

Probe: EX3DV4 - SN3920; ConvF(4.23, 4.23, 4.23); Calibrated: 12/18/2013;

Sensor-Surface: 1.4mm (Mechanical Surface Detection)

Electronics: DAE4 Sn649; Calibrated: 12/12/2013

Phantom: SAM Sub with CRP v4.0; Type: QD000P40CC; Serial: TP:1357

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

5200MHz System Verification

Area Scan (7x9x1): Measurement grid: $dx=10\text{mm}$, $dy=10\text{mm}$

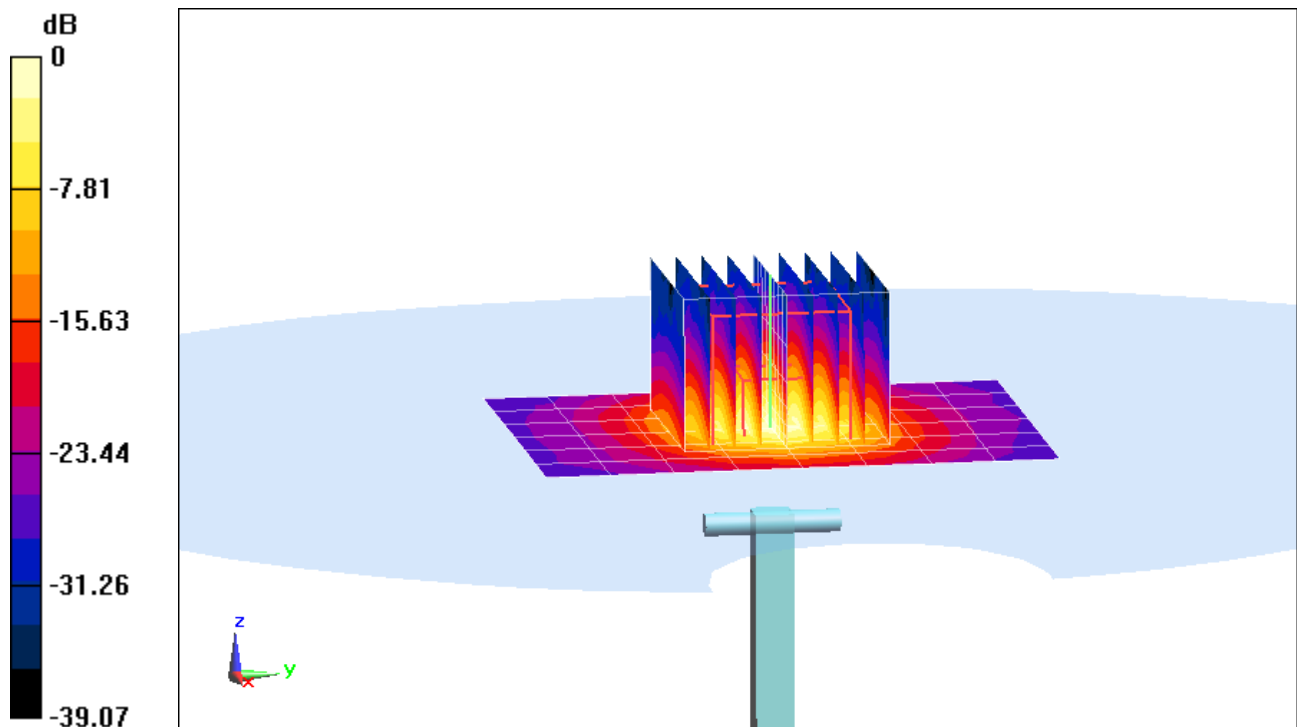
Zoom Scan (9x9x7)/Cube 0: Measurement grid: $dx=4\text{mm}$, $dy=4\text{mm}$, $dz=1.4\text{mm}$; Graded Ratio: 1.4

Input Power = 20 dBm (100 mW)

Peak SAR (extrapolated) = 30.2 W/kg

SAR(1 g) = 7.51 W/kg

Deviation = 1.49%



0 dB = 19.1 W/kg = 12.81 dBW/kg

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 Body Medium parameters used:

$f = 5300 \text{ MHz}$; $\sigma = 5.417 \text{ S/m}$; $\epsilon_r = 48.492$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.0 cm

Test Date: 10-20-2014; Ambient Temp: 21.7°C; Tissue Temp: 22.6°C

Probe: EX3DV4 - SN3920; ConvF(4.11, 4.11, 4.11); Calibrated: 12/18/2013;

Sensor-Surface: 1.4mm (Mechanical Surface Detection)

Electronics: DAE4 Sn649; Calibrated: 12/12/2013

Phantom: SAM Sub with CRP v4.0; Type: QD000P40CC; Serial: TP:1357

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

5300MHz System Verification

Area Scan (7x9x1): Measurement grid: dx=10mm, dy=10mm

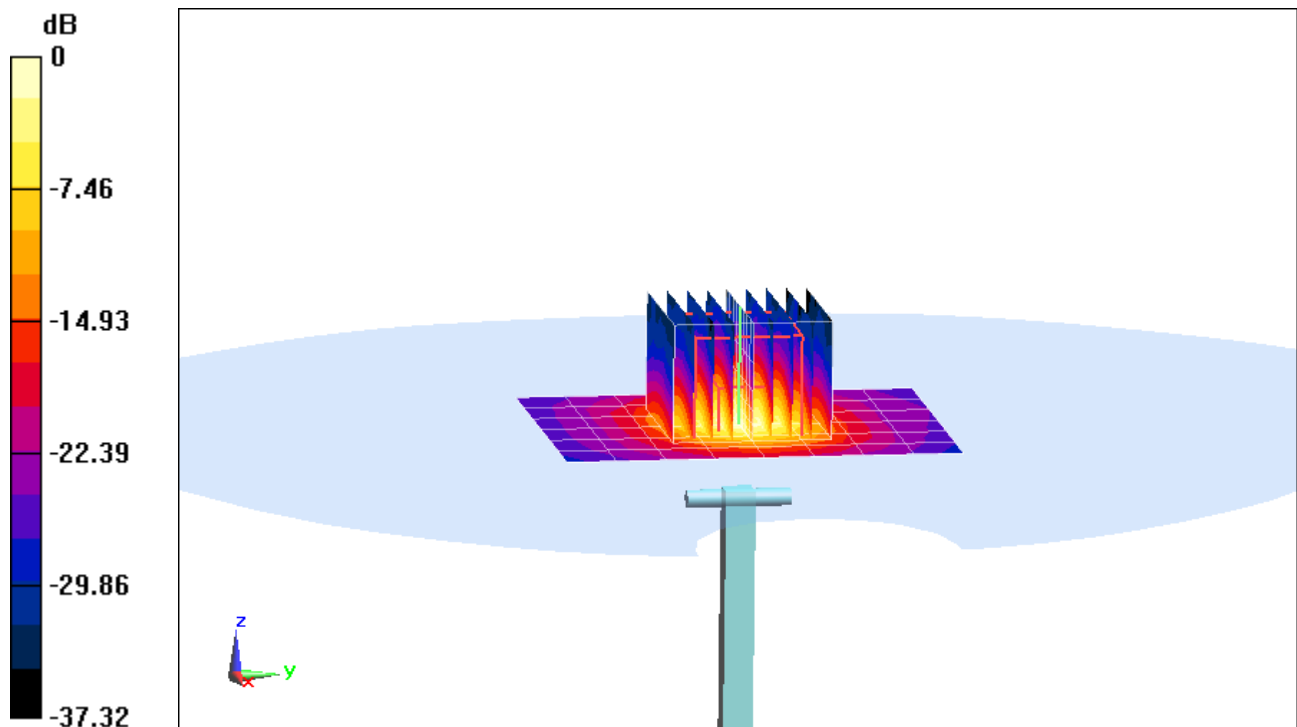
Zoom Scan (9x9x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm; Graded Ratio: 1.4

Input Power = 20 dBm (100 mW)

Peak SAR (extrapolated) = 31.9 W/kg

SAR(1 g) = 7.7 W/kg

Deviation = 1.58%



0 dB = 19.9 W/kg = 12.99 dBW/kg

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 Body Medium parameters used:

$f = 5600 \text{ MHz}$; $\sigma = 5.824 \text{ S/m}$; $\epsilon_r = 47.875$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.0 cm

Test Date: 10-20-2014; Ambient Temp: 21.7°C; Tissue Temp: 22.6°C

Probe: EX3DV4 - SN3920; ConvF(3.62, 3.62, 3.62); Calibrated: 12/18/2013;

Sensor-Surface: 1.4mm (Mechanical Surface Detection)

Electronics: DAE4 Sn649; Calibrated: 12/12/2013

Phantom: SAM Sub with CRP v4.0; Type: QD000P40CC; Serial: TP:1357

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

5600MHz System Verification

Area Scan (7x9x1): Measurement grid: $dx=10\text{mm}$, $dy=10\text{mm}$

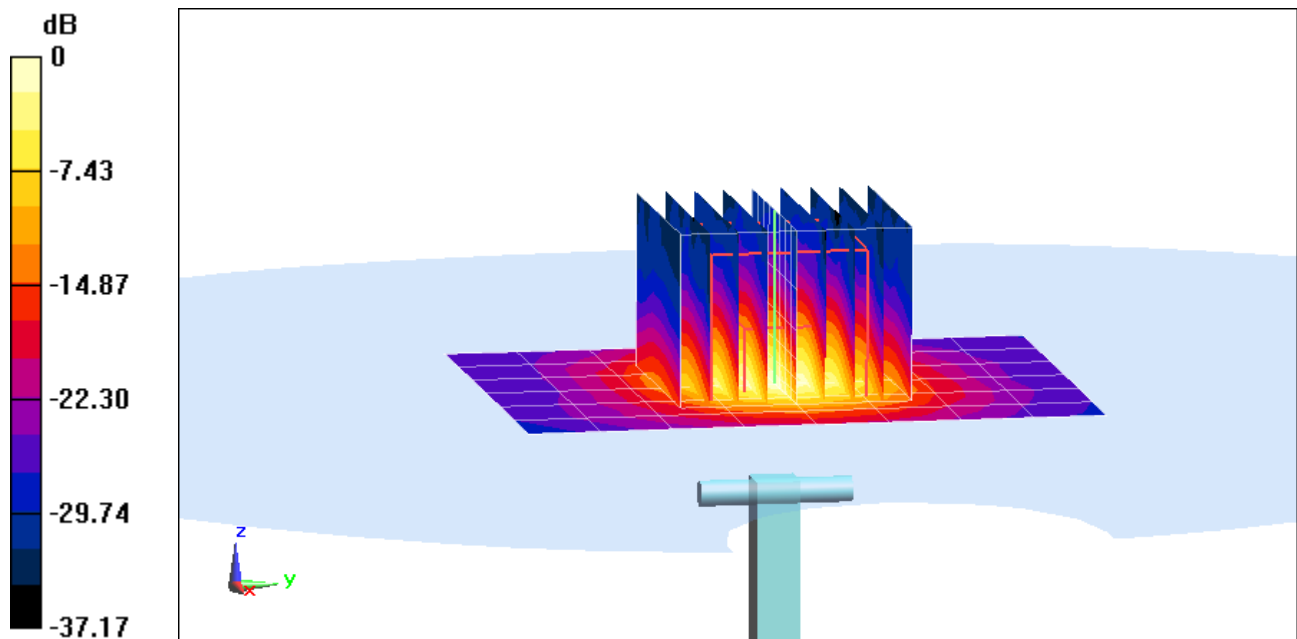
Zoom Scan (9x9x7)/Cube 0: Measurement grid: $dx=4\text{mm}$, $dy=4\text{mm}$, $dz=1.4\text{mm}$; Graded Ratio: 1.4

Input Power = 20 dBm (100 mW)

Peak SAR (extrapolated) = 36.7 W/kg

SAR(1 g) = 8.14 W/kg

Deviation = 2.52%



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 Body Medium parameters used:

$f = 5800 \text{ MHz}$; $\sigma = 6.121 \text{ S/m}$; $\epsilon_r = 47.717$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.0 cm

Test Date: 10-20-2014; Ambient Temp: 21.7°C; Tissue Temp: 22.6°C

Probe: EX3DV4 - SN3920; ConvF(4, 4, 4); Calibrated: 12/18/2013;

Sensor-Surface: 1.4mm (Mechanical Surface Detection)

Electronics: DAE4 Sn649; Calibrated: 12/12/2013

Phantom: SAM Sub with CRP v4.0; Type: QD000P40CC; Serial: TP:1357

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

5800MHz System Verification

Area Scan (7x9x1): Measurement grid: $dx=10\text{mm}$, $dy=10\text{mm}$

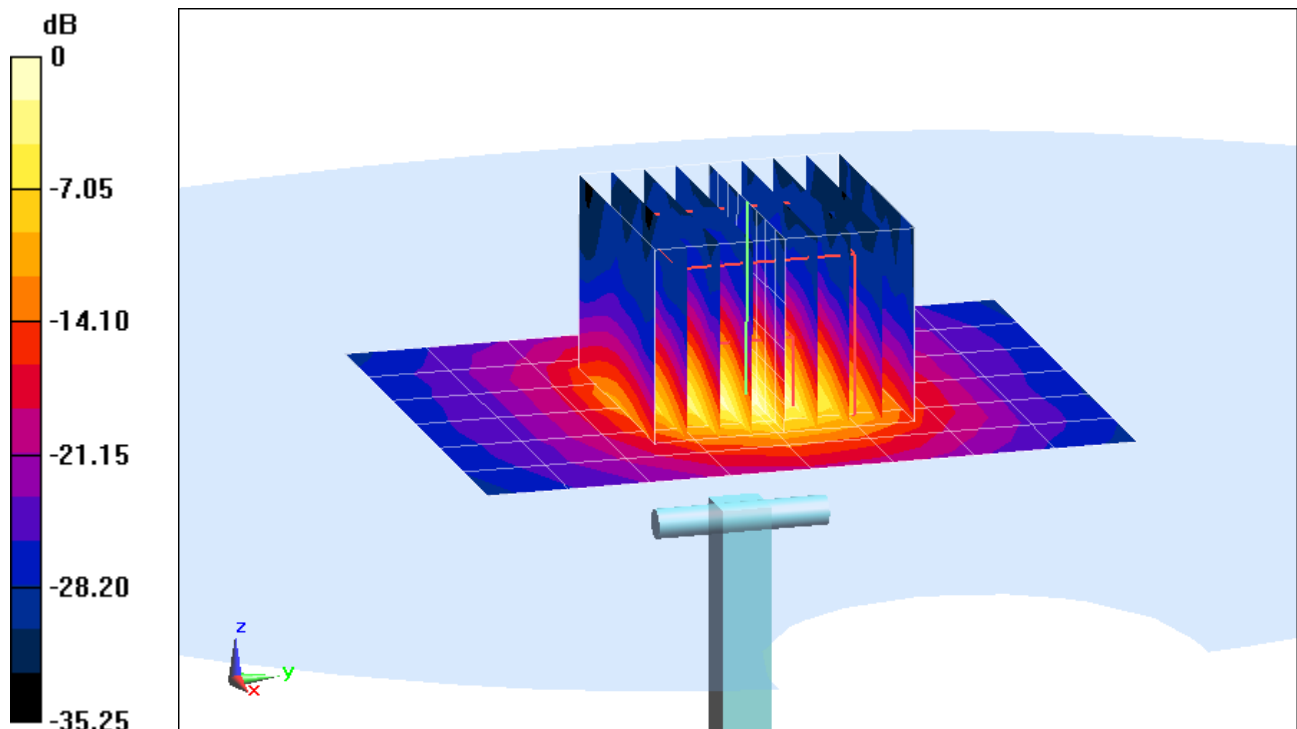
Zoom Scan (9x9x7)/Cube 0: Measurement grid: $dx=4\text{mm}$, $dy=4\text{mm}$, $dz=1.4\text{mm}$; Graded Ratio: 1.4

Input Power = 20 dBm (100 mW)

Peak SAR (extrapolated) = 35.4 W/kg

SAR(1 g) = 7.52 W/kg

Deviation = 1.08%



0 dB = 19.4 W/kg = 12.88 dBW/kg

APPENDIX C: PROBE CALIBRATION



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: **D750V3-1003_Jan14**

CALIBRATION CERTIFICATE

Object **D750V3 - SN: 1003**

Calibration procedure(s) **QA CAL-05.v9**
Calibration procedure for dipole validation kits above 700 MHz

Calibration date: **January 20, 2014**

CC
21/14 ✓

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 8401A	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** **Labratory Technician**

Approved by: **Katja Pokovic** **Technical Manager**

Signature

Israe El-Naouq
Katja Pokovic

Issued: January 21, 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	40.8 $\pm$ 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	2.16 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	8.37 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	1.40 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	5.46 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	54.0 $\pm$ 6 %	0.98 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	2.24 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	8.77 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	1.47 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	5.78 W/kg $\pm$ 16.5 % (k=2)

Appendix

Antenna Parameters with Head TSL

Impedance, transformed to feed point	54.7 Ω - 0.2 j Ω
Return Loss	- 27.0 dB

Antenna Parameters with Body TSL

Impedance, transformed to feed point	49.5 Ω - 2.6 j Ω
Return Loss	- 31.4 dB

General Antenna Parameters and Design

Electrical Delay (one direction)	1.043 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	January 21, 2009

DASY5 Validation Report for Head TSL

Date: 20.01.2014

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole 750 MHz; Type: D750V3; Serial: D750V3 - SN: 1003

Communication System: UTD 0 - CW; Frequency: 750 MHz

Medium parameters used: $f = 750 \text{ MHz}$; $\sigma = 0.92 \text{ S/m}$; $\epsilon_r = 40.8$; $\rho = 1000 \text{ kg/m}^3$

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:

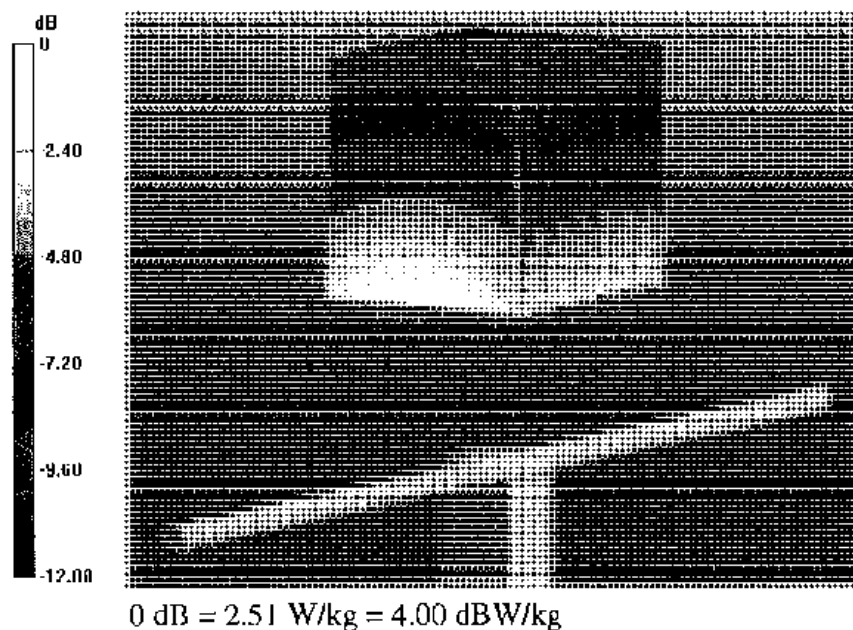
Measurement grid: $dx=5\text{mm}$, $dy=5\text{mm}$, $dz=5\text{mm}$

Reference Value = 53.711 V/m; Power Drift = 0.02 dB

Peak SAR (extrapolated) = 3.27 W/kg

SAR(1 g) = 2.16 W/kg; SAR(10 g) = 1.4 W/kg

Maximum value of SAR (measured) = 2.51 W/kg



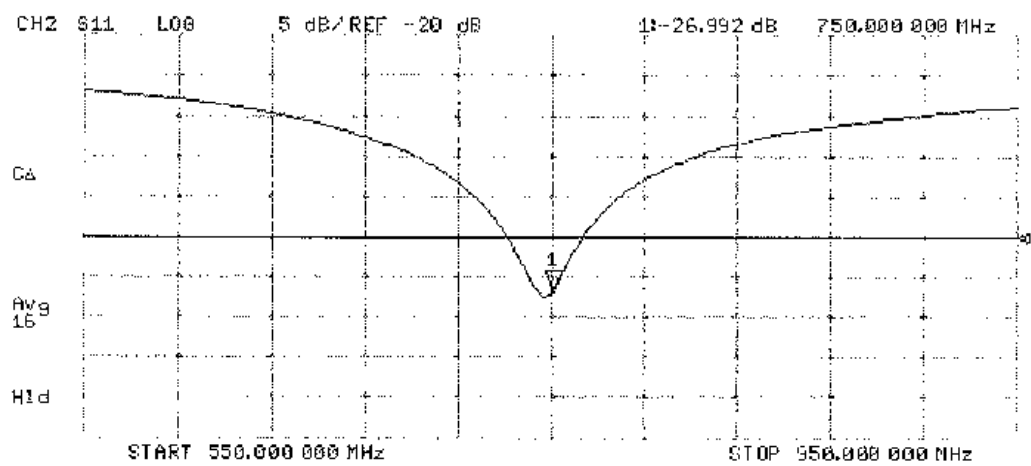
Impedance Measurement Plot for Head TSL

20 Jan 2014 16:36:06
 [CH1] S11 1 U FS 1: 54.678 Ω -156.25 m Ω 1.3581 nF 750.000 000 MHz

*
 Del
 CA

Avg
 16

H1d



DASY5 Validation Report for Body TSL

Date: 20.01.2014

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole 750 MHz; Type: D750V3; Serial: D750V3 - SN: 1003

Communication System: UID 0 - CW; Frequency: 750 MHz

Medium parameters used: $f = 750 \text{ MHz}$; $\sigma = 0.98 \text{ S/m}$; $\epsilon_r = 54$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section

Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY52 Configuration:

- Probe: ES3DV3 - SN3205; ConvF(6.13, 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:

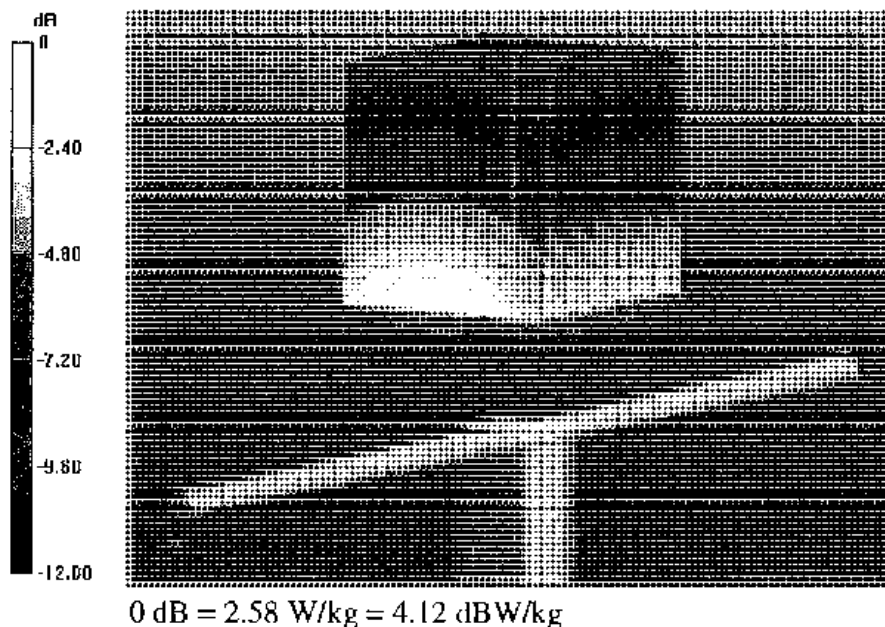
Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 53.082 V/m; Power Drift = 0.03 dB

Peak SAR (extrapolated) = 3.31 W/kg

SAR(1 g) = 2.24 W/kg; SAR(10 g) = 1.47 W/kg

Maximum value of SAR (measured) = 2.58 W/kg



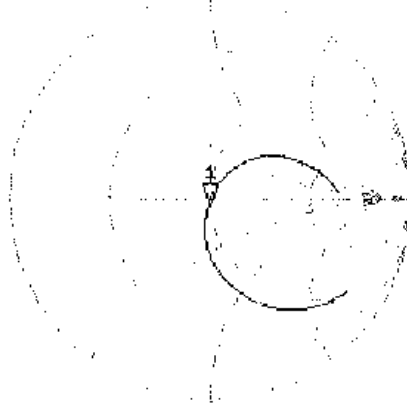
Impedance Measurement Plot for Body TSL

20 Jan 2014 10:20:18
 [CH1] S11 1 U FS 1: 49.459 Ω -2.6367 Ω 80.481 pF 750.000 000 MHz

*
 Del
 CA

Avg
 16

H1d

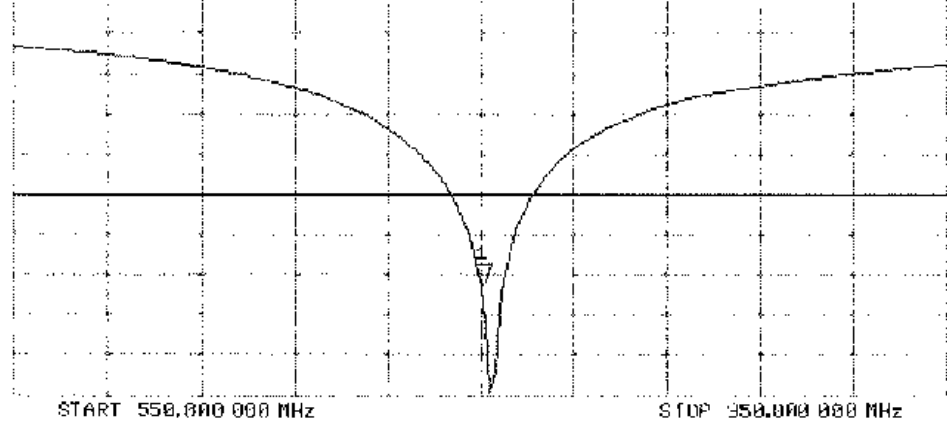


CH2 S11 LOG 5 dB/ REF -20 dB 1: -31.359 dB 750.000 000 MHz

CA

Avg
 16

H1d





Accredited by the Swiss Accreditation Service (SAS)

Accreditation No.: **SCS 108**

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Client **PC Test**

Certificate No: **D750V3-1046_Feb14**

CALIBRATION CERTIFICATE

Object **D750V3 - SN: 1046**

Calibration procedure(s) **QA CAL-05.v9**
Calibration procedure for dipole validation kits above 700 MHz

CC✓
3/14

Calibration date: **February 27, 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 LPM-442A	GR37480704	09-Oct-13 (No. 217-01827)	Oct-14
Power sensor HP 8481A	US37292783	09-Oct-13 (No. 217-01827)	Oct-14
Power sensor IIP 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 CS3DV3	SN: 3205	30-Dec-13 (No. CS3-3205_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: **Jeton Kastrati** Name: **Jeton Kastrati** Function: **Laboratory Technician**

Approved by: **Katja Pokovic** Name: **Katja Pokovic** Technical Manager

Signature

Issued: February 27, 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:

- a) IEEE Std 1528-2013, "IEEE Recommended Practice for Determining the Peak Spatial-Averaged Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques", June 2013
- b) IEC 62209-1, "Procedure to measure the Specific Absorption Rate (SAR) for hand-held devices used in close proximity to the ear (frequency range of 300 MHz to 3 GHz)", February 2005
- c) KDB 865664, "SAR Measurement Requirements for 100 MHz to 6 GHz"

Additional Documentation:

- d) DASY4/5 System Handbook

Methods Applied and Interpretation of Parameters:

- *Measurement Conditions:* Further details are available from the Validation Report at the end of the certificate. All figures stated in the certificate are valid at the frequency indicated.
- *Antenna Parameters with TSL:* The dipole is mounted with the spacer to position its feed point exactly below the center marking of the flat phantom section, with the arms oriented parallel to the body axis.
- *Feed Point Impedance and Return Loss:* These parameters are measured with the dipole positioned under the liquid filled phantom. The impedance stated is transformed from the measurement at the SMA connector to the feed point. The Return Loss ensures low reflected power. No uncertainty required.
- *Electrical Delay:* One-way delay between the SMA connector and the antenna feed point. No uncertainty required.
- *SAR measured:* SAR measured at the stated antenna input power.
- *SAR normalized:* SAR as measured, normalized to an input power of 1 W at the antenna connector.
- *SAR for nominal TSL parameters:* The measured TSL parameters are used to calculate the nominal SAR result.

The reported uncertainty of measurement is stated as the standard uncertainty of measurement multiplied by the coverage factor $k=2$, which for a normal distribution corresponds to a coverage probability of approximately 95%.

Measurement Conditions

DASY system configuration, as far as not given on page 1.

DASY Version	DASY5	V52.8.7
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	40.7 $\pm$ 6 %	0.90 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	2.10 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	8.27 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	1.37 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	54.2 $\pm$ 6 %	0.98 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	2.18 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	8.54 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	1.43 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	5.63 W/kg $\pm$ 16.5 % (k=2)

Appendix

Antenna Parameters with Head TSL

Impedance, transformed to feed point	$56.4 \Omega + 2.1 j\Omega$
Return Loss	- 24.0 dB

Antenna Parameters with Body TSL

Impedance, transformed to feed point	$50.8 \Omega - 2.0 j\Omega$
Return Loss	- 33.5 dB

General Antenna Parameters and Design

Electrical Delay (one direction)	1.032 ns
----------------------------------	----------

After long term use with 100W radiated power, only a slight warming of the dipole near the feedpoint can be measured.

The dipole is made of standard semirigid coaxial cable. The center conductor of the feeding line is directly connected to the second arm of the dipole. The antenna is therefore short-circuited for DC-signals. On some of the dipoles, small end caps are added to the dipole arms in order to improve matching when loaded according to the position as explained in the "Measurement Conditions" paragraph. The SAR data are not affected by this change. The overall dipole length is still according to the Standard.

No excessive force must be applied to the dipole arms, because they might bend or the soldered connections near the feedpoint may be damaged.

Additional EUT Data

Manufactured by	SPEAG
Manufactured on	September 02, 2011

DASY5 Validation Report for Head TSL

Date: 21.02.2014

Test Laboratory: SPEAG, Zurich, Switzerland

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

Communication System: UID 0 - CW; Frequency: 750 MHz

Medium parameters used: $f = 750$ MHz; $\sigma = 0.9$ S/m; $\epsilon_r = 40.7$; $\rho = 1000$ kg/m³

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 4.9I; 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:

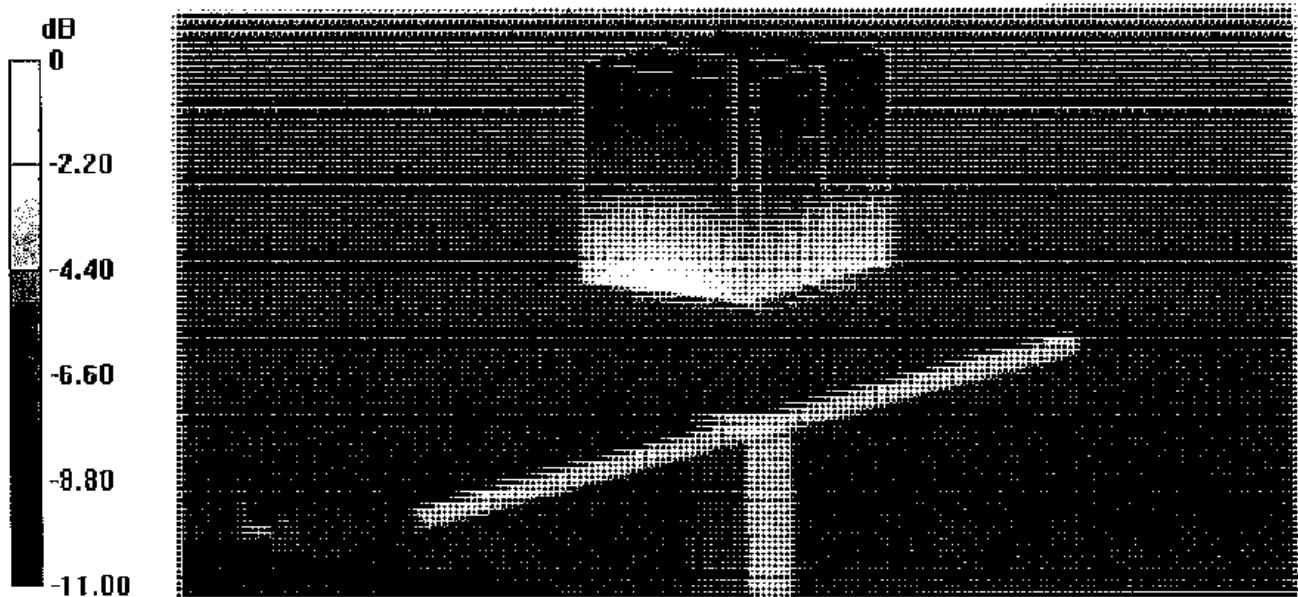
Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 53.936 V/m; Power Drift = 0.01 dB

Peak SAR (extrapolated) = 3.17 W/kg

SAR(1 g) = 2.1 W/kg; SAR(10 g) = 1.37 W/kg

Maximum value of SAR (measured) = 2.46 W/kg



0 dB = 2.46 W/kg = 3.91 dBW/kg

Impedance Measurement Plot for Head TSL

21 Feb 2014 09:11:00
[CR1] S11 1 U FS 1: 56.385 Ω 2: 136.7 Ω 453.43 pF 750.000 000 MHz

*

De1

Ca

Avg
16

H1 d

CH2 S11 LOG 5 dB/REF -20 dB 1: -23.976 dB 750.000 000 MHz

De1

Ca

Avg
16

H1 d

START 550.000 000 MHz

STOP 950.000 000 MHz

DASY5 Validation Report for Body TSL

Date: 27.02.2014

Test Laboratory: SPEAG, Zurich, Switzerland

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

Communication System: UTD 0 - CW; Frequency: 750 MHz

Medium parameters used: $f = 750$ MHz; $\sigma = 0.98$ S/m; $\epsilon_r = 54.2$; $\rho = 1000$ 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:

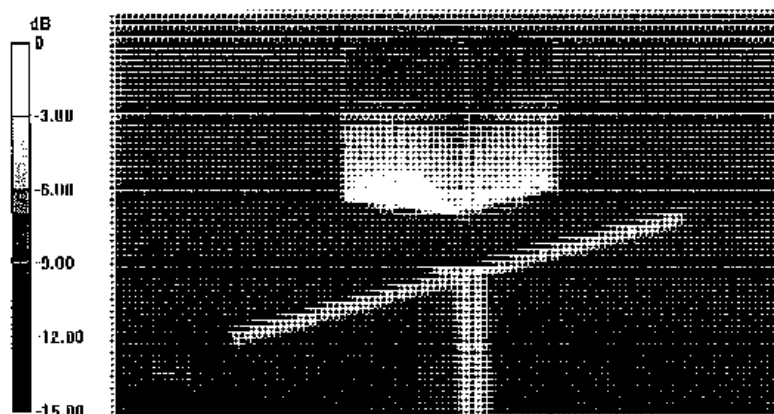
Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 52.721 V/m; Power Drift = 0.01 dB

Peak SAR (extrapolated) = 3.20 W/kg

SAR(1 g) = 2.18 W/kg; SAR(10 g) = 1.43 W/kg

Maximum value of SAR (measured) = 2.54 W/kg



0 dB = 2.54 W/kg = 4.05 dBW/kg

Impedance Measurement Plot for Body TSL

27 Feb 2014 10:22:23
 [CH1] S11 1 U F8 1: 50.007 $\angle$ -1.9805 $\angle$ 107.15 pF 750.000 000 MHz

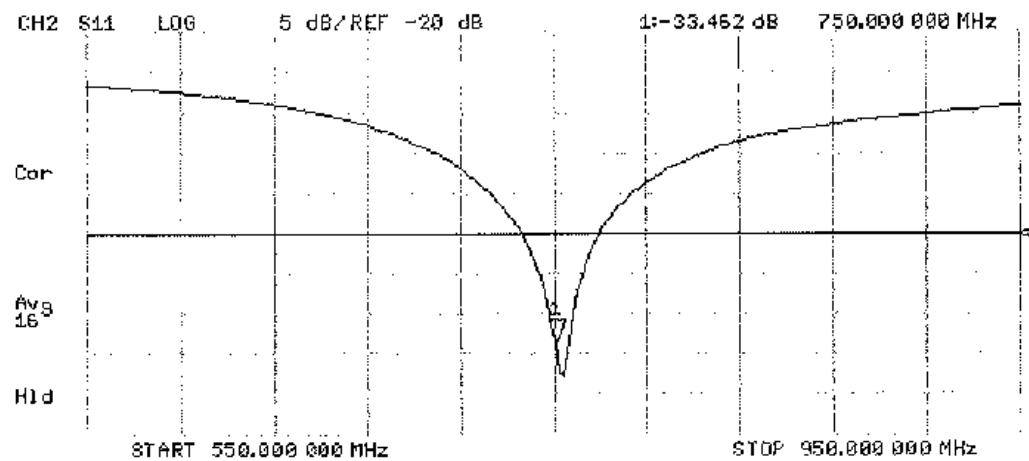
*

De1

Cor

Avg
16

H1d





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Accreditation No.: **SCS 108**

Client **PC Test**

Certificate No: **D835V2-4d119_Apr14**

CALIBRATION CERTIFICATE

Object **D835V2 - SN: 4d119**

Calibration procedure(s) **QA CAL-05.v9**
Calibration procedure for dipole validation kits above 700 MHz

CC✓
4/25/14

Calibration date: **April 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	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: **Name** **Function**
Leif Klysner **Laboratory Technician**

Signature

Approved by: **Katja Pokovic** **Technical Manager**

[Signature]

Issued: April 9, 2014

This calibration certificate shall not be reproduced except in full without written approval of the laboratory.



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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:

- a) IEEE Std 1528-2013, "IEEE Recommended Practice for Determining the Peak Spatial-Averaged Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques", June 2013
- b) IEC 62209-1, "Procedure to measure the Specific Absorption Rate (SAR) for hand-held devices used in close proximity to the ear (frequency range of 300 MHz to 3 GHz)", February 2005
- c) KDB 865664, "SAR Measurement Requirements for 100 MHz to 6 GHz"

Additional Documentation:

- d) DASY4/5 System Handbook

Methods Applied and Interpretation of Parameters:

- *Measurement Conditions:* Further details are available from the Validation Report at the end of the certificate. All figures stated in the certificate are valid at the frequency indicated.
- *Antenna Parameters with TSL:* The dipole is mounted with the spacer to position its feed point exactly below the center marking of the flat phantom section, with the arms oriented parallel to the body axis.
- *Feed Point Impedance and Return Loss:* These parameters are measured with the dipole positioned under the liquid filled phantom. The impedance stated is transformed from the measurement at the SMA connector to the feed point. The Return Loss ensures low reflected power. No uncertainty required.
- *Electrical Delay:* One-way delay between the SMA connector and the antenna feed point. No uncertainty required.
- *SAR measured:* SAR measured at the stated antenna input power.
- *SAR normalized:* SAR as measured, normalized to an input power of 1 W at the antenna connector.
- *SAR for nominal TSL parameters:* The measured TSL parameters are used to calculate the nominal SAR result.

The reported uncertainty of measurement is stated as the standard uncertainty of measurement multiplied by the coverage factor $k=2$, which for a normal distribution corresponds to a coverage probability of approximately 95%.

Measurement Conditions

DASY system configuration, as far as not given on page 1.

DASY Version	DASY5	V52.8.7
Extrapolation	Advanced Extrapolation	
Phantom	Modular Flat Phantom	
Distance Dipole Center - TSL	15 mm	with Spacer
Zoom Scan Resolution	dx, dy, dz = 5 mm	
Frequency	935 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	41.6 $\pm$ 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	9.22 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	5.97 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	53.6 $\pm$ 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	9.34 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

Antenna Parameters with Head TSL

Impedance, transformed to feed point	51.2 Ω - 1.6 j Ω
Return Loss	- 34.0 dB

Antenna Parameters with Body TSL

Impedance, transformed to feed point	46.3 Ω - 4.5 j Ω
Return Loss	- 24.4 dB

General Antenna Parameters and Design

Electrical Delay (one direction)	1.386 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	June 29, 2010

DASY5 Validation Report for Head TSL

Date: 07.04.2014

Test Laboratory: SPEAG, Zurich, Switzerland

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

Communication System: UID 0 - CW; Frequency: 835 MHz

Medium parameters used: $f = 835$ MHz; $\sigma = 0.94$ S/m; $\epsilon_r = 41.6$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

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: 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:

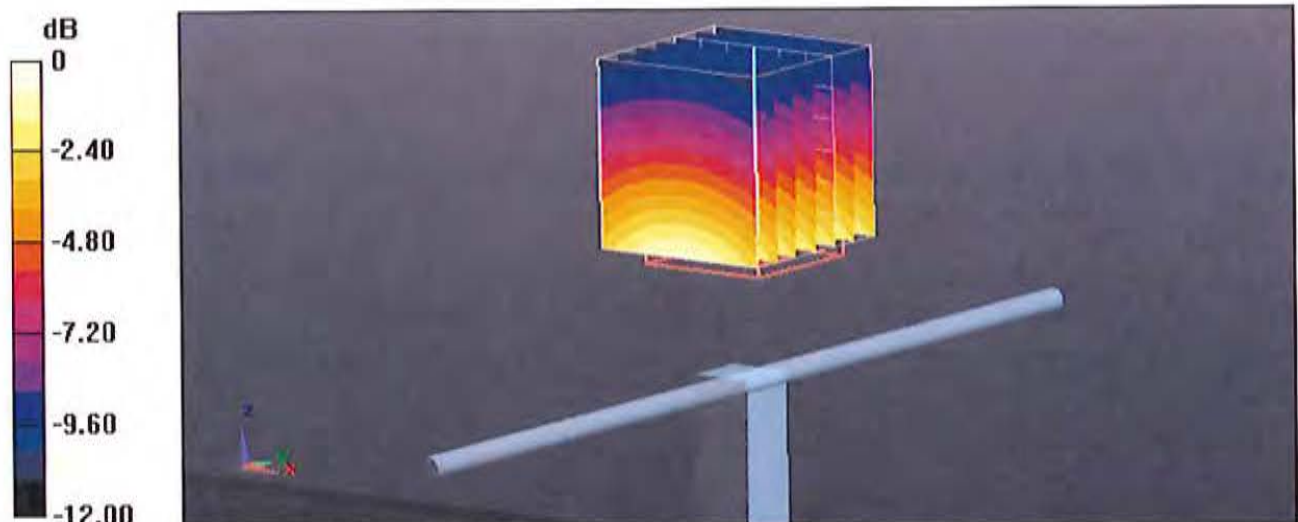
Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 56.289 V/m; Power Drift = 0.01 dB

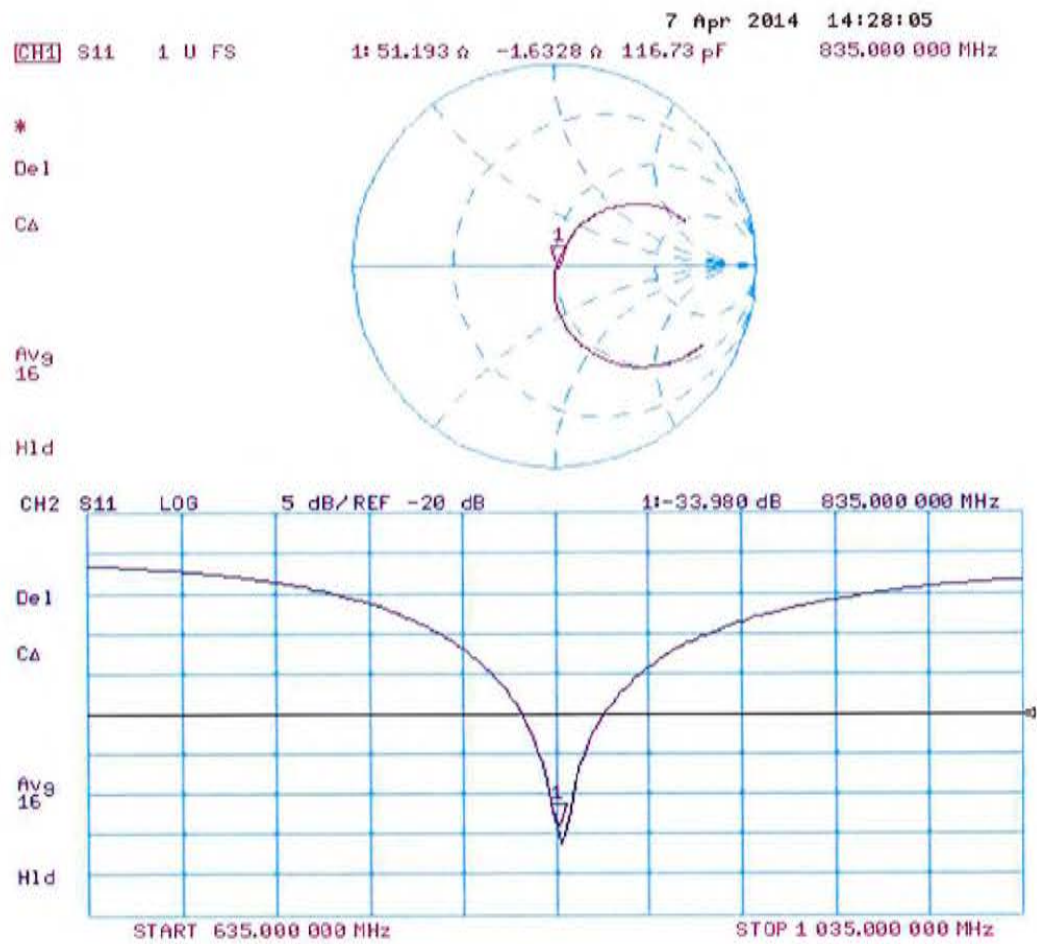
Peak SAR (extrapolated) = 3.59 W/kg

SAR(1 g) = 2.38 W/kg; SAR(10 g) = 1.53 W/kg

Maximum value of SAR (measured) = 2.80 W/kg



Impedance Measurement Plot for Head TSL



DASY5 Validation Report for Body TSL

Date: 07.04.2014

Test Laboratory: SPEAG, Zurich, Switzerland

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

Communication System: UID 0 - CW; Frequency: 835 MHz

Medium parameters used: $f = 835$ MHz; $\sigma = 1.02$ S/m; $\epsilon_r = 53.6$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

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: 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:

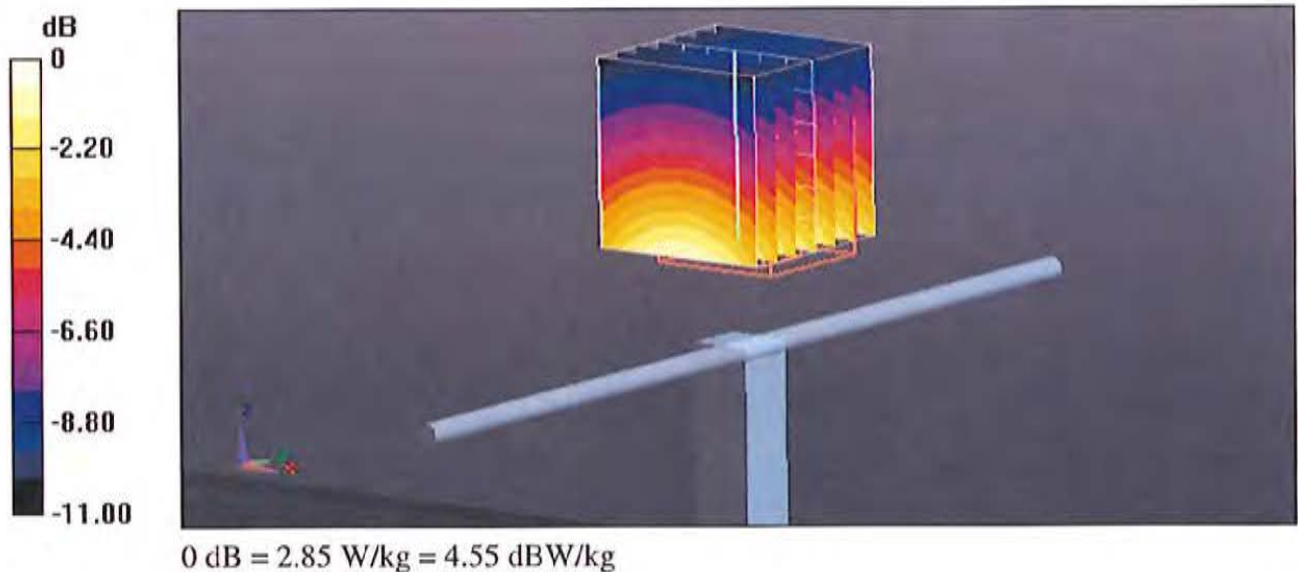
Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 54.594 V/m; Power Drift = -0.01 dB

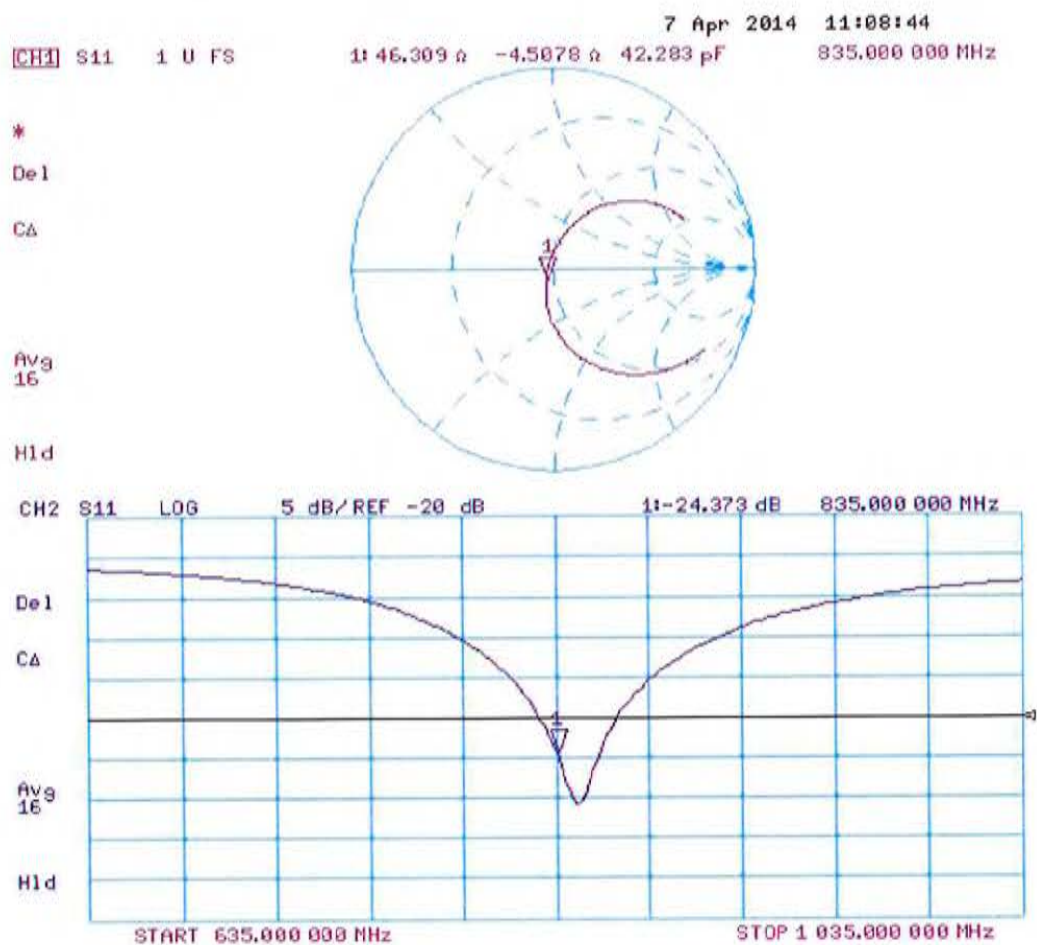
Peak SAR (extrapolated) = 3.61 W/kg

SAR(1 g) = 2.44 W/kg; SAR(10 g) = 1.59 W/kg

Maximum value of SAR (measured) = 2.85 W/kg



Impedance Measurement Plot for Body TSL





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Client **PC Test**

Certificate No: **D835V2-4d132_Jul14**

CALIBRATION CERTIFICATE

Object **D835V2 - SN: 4d132**

Calibration procedure(s) **QA CAL-05.v9**
Calibration procedure for dipole validation kits above 700 MHz

Calibration date: **July 10, 2014**

✓
KOK
7/17/14

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	GB37480701	09-Oct-13 (No. 217-01827)	Oct-14
Power sensor HP 8481A	US97292783	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** Name: **Michael Weber** Function: **Laboratory Technician**

Approved by: **Katja Pokovic** Technical Manager

Signature

[Signature]

[Signature]

Issued: July 11, 2014

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Accreditation No.: **SCS 108**

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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	2.40 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	9.27 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	1.55 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	6.03 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	2.50 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	9.58 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	1.63 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	6.30 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	52.0 Ω - 1.6 j Ω
Return Loss	- 31.9 dB

Antenna Parameters with Body TSL

Impedance, transformed to feed point	47.7 Ω - 3.4 j Ω
Return Loss	- 27.5 dB

General Antenna Parameters and Design

Electrical Delay (one direction)	1.386 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: 10.07.2014

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole 835 MHz; Type: D835V2; Serial: D835V2 - SN: 4d132

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/ $P_{in}=250 \text{ mW}$, $d=15\text{mm}$ /Zoom Scan (7x7x7)/Cube 0:

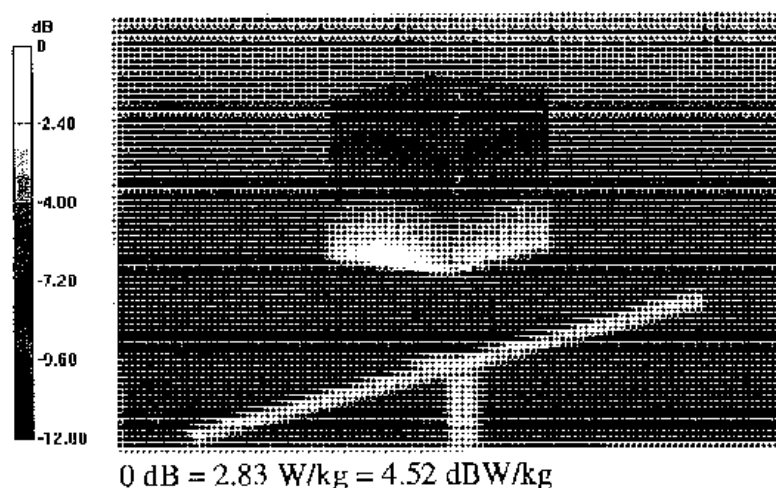
Measurement grid: $dx=5\text{mm}$, $dy=5\text{mm}$, $dz=5\text{mm}$

Reference Value = 56.43 V/m ; Power Drift = 0.00 dB

Peak SAR (extrapolated) = 3.62 W/kg

SAR(1 g) = 2.4 W/kg ; SAR(10 g) = 1.55 W/kg

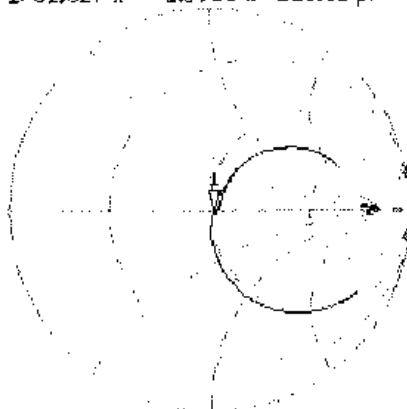
Maximum value of SAR (measured) = 2.83 W/kg



Impedance Measurement Plot for Head TSL

10 Jul 2014 11:02:43
 CH1 S11 1 U FS 1: 52.027 Ω -1.6016 $\angle$ 119.01 pF 835.000 000 MHz

*
 De1
 CA



AVG
 16

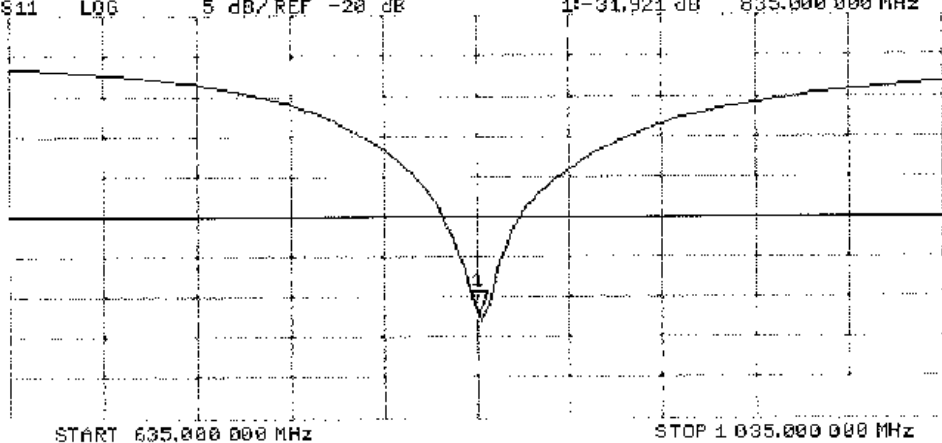
H1d

CH2 S11 LOG 5 dB/REF -20 dB 1: -31.921 dB 835.000 000 MHz

CA

AVG
 16

H1d



DASY5 Validation Report for Body TSL

Date: 09.07.2014

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole 835 MHz; Type: D835V2; Serial: D835V2 - SN: 4d132

Communication System: UID 0 - CW; Frequency: 835 MHz

Medium parameters used: $f = 835$ MHz; $\sigma = 1.02$ S/m; $c_r = 53.8$; $\rho = 1000$ 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:

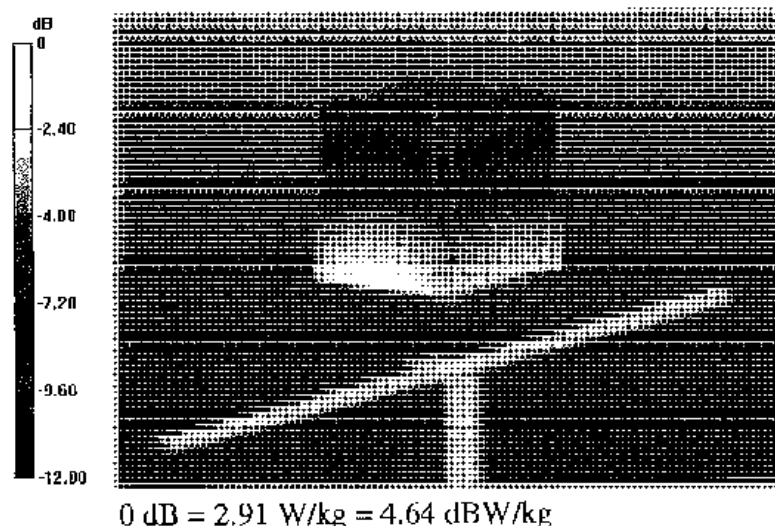
Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 55.35 V/m; Power Drift = -0.00 dB

Peak SAR (extrapolated) = 3.72 W/kg

SAR(1 g) = 2.5 W/kg; SAR(10 g) = 1.63 W/kg

Maximum value of SAR (measured) = 2.91 W/kg



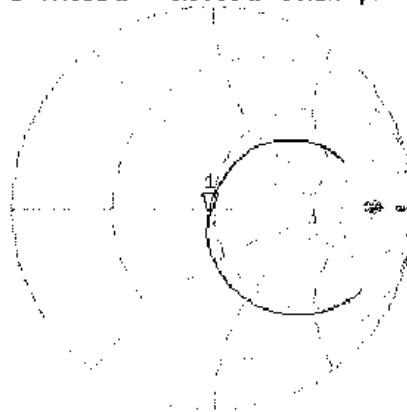
Impedance Measurement Plot for Body TSL

9 Jul 2014 09:46:12
 CH1 S11 1 U FS 1: 47.682 $\angle$ -3.3965 $\angle$ 56.118 pF 835.000 000 MHz

*
 De1
 CA

Avg
 16

H1d



CH2 S11 LOG 5 dB/REF -20. dB 1: -27.522 dB 835.000 000 MHz

CA

Avg
 16

H1d

