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SAR EVALUATION REPORT

Applicant Name:
Panasonic Corporation of North America
Two Riverfront Plaza, 9th Floor
Newark, NJ 07102
United States

Date of Testing:
06/12/14 - 06/17/14 &
09/17/14 - 10/01/14
Test Site/Location:
PCTEST Lab, Columbia, MD, USA
Document Serial No.:
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FCC ID: **ACJFZE1A**

APPLICANT: **PANASONIC CORPORATION OF NORTH AMERICA**

DUT Type: Portable Handset
Application Type: Certification
FCC Rule Part(s): CFR §2.1093
Model(s): FZ-E1

Equipment Class	Band & Mode	Tx Frequency	SAR			
			1 gm Head (W/kg)	1 gm Body-Worn (W/kg)	1 gm Hotspot (W/kg)	10 gm Extremity (W/kg)
PCE	GSM/GPRS/EDGE 850	824.20 - 848.80 MHz	0.55	0.30	0.38	0.28
PCE	GSM/GPRS/EDGE 1900	1850.20 - 1909.80 MHz	0.26	0.15	0.37	0.19
PCE	UMTS 850	826.40 - 846.60 MHz	0.42	0.28	0.36	0.26
PCE	UMTS 1900	1852.4 - 1907.6 MHz	0.41	0.29	0.73	0.38
PCE	Cell. CDMA/EVDO	824.70 - 848.31 MHz	0.19	0.55	0.55	0.62
PCE	PCS CDMA/EVDO	1851.25 - 1908.75 MHz	0.23	0.90	0.96	1.06
PCE	LTE Band 17	706.5 - 713.5 MHz	0.28	0.19	0.29	0.15
PCE	LTE Band 13	782 MHz	0.38	0.25	0.34	0.39
PCE	LTE Band 4 (AWS)	1712.5 - 1752.5 MHz	0.28	0.22	0.70	0.21
DTS	2.4 GHz WLAN	2412 - 2462 MHz	< 0.1	0.20	0.20	0.17
DTS	Bluetooth LE	2402 - 2480 MHz	N/A			
NII	5.2 GHz WLAN	5180 - 5240 MHz	< 0.1	0.41		0.37
NII	5.3 GHz WLAN	5260 - 5320 MHz	0.11	0.35		0.47
NII	5.5 GHz WLAN	5500 - 5700 MHz	< 0.1	0.52		0.39
NII	5.8 GHz WLAN	5745 - 5825 MHz	< 0.1	0.53		0.42
DSS	Bluetooth	2402 - 2480 MHz	N/A	<0.1	N/A	N/A
Simultaneous SAR per KDB 690783 D01v01r03:			0.65	1.36	1.35	1.63

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

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

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1 DEVICE UNDER TEST

1.1 Device Overview

Band & Mode	Operating Modes	Tx Frequency
GSM/GPRS/EDGE 850	Voice/Data	824.20 - 848.80 MHz
GSM/GPRS/EDGE 1900	Voice/Data	1850.20 - 1909.80 MHz
UMTS 850	Voice/Data	826.40 - 846.60 MHz
UMTS 1900	Voice/Data	1852.4 - 1907.6 MHz
Cell. CDMA/EVDO	Voice/Data	824.70 - 848.31 MHz
PCS CDMA/EVDO	Voice/Data	1851.25 - 1908.75 MHz
LTE Band 17	Data	706.5 - 713.5 MHz
LTE Band 13	Data	782 MHz
LTE Band 4 (AWS)	Data	1712.5 - 1752.5 MHz
2.4 GHz WLAN	Data	2412 - 2462 MHz
Bluetooth LE	Data	2402 - 2480 MHz
5.2 GHz WLAN	Data	5180 - 5240 MHz
5.3 GHz WLAN	Data	5260 - 5320 MHz
5.5 GHz WLAN	Data	5500 - 5700 MHz
5.8 GHz WLAN	Data	5745 - 5825 MHz
Bluetooth	Data	2402 - 2480 MHz
NFC	Data	13.56 MHz

1.2 Power Reduction for SAR

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

The device additionally utilizes power reduction for LTE when simultaneously transmitting with 1x-RTT CDMA Voice in certain SVLTE conditions. However, since this mechanism was not implemented for SAR compliance, all LTE SAR evaluations were performed with the device operating at maximum output power. Detailed description of this power reduction mechanism is included in the FCC filing. Please note that the actual simultaneous transmission SAR will not exceed the summed levels.

1.3 Nominal and Maximum Output Power Specifications

This device operates using the following maximum and nominal output power specifications. SAR values were scaled to the maximum allowed power to determine compliance per KDB Publication 447498 D01v05.

Mode / Band		Voice (dBm)	Burst Average GMSK (dBm)				Burst Average 8-PSK (dBm)	
		1 TX Slot	*1 TX Slot*	*2 TX Slots*	*3 TX Slots*	*4 TX Slots*	*1 TX Slot*	*2 TX Slots*
GSM/GPRS/EDGE 850	Maximum	**33.3**	**33.3**	**30.8**	**29.0**	**27.8**	**27.3**	**27.3**
	Nominal	**32.5**	**32.5**	**30.0**	**28.2**	**27.0**	**26.5**	**26.5**
GSM/GPRS/EDGE 1900	Maximum	**30.2**	**30.2**	**27.7**	**25.9**	**24.7**	**26.2**	**26.2**
	Nominal	**29.5**	**29.5**	**27.0**	**25.2**	**24.0**	**25.5**	**25.5**

Mode / Band		Modulated Average (dBm)		
		3GPP Rel. 99	*3GPP Rel. 5*	*3GPP Rel. 6*
		RMC/AMR	*HSDPA*	*HSUPA*
UMTS Band 5 (850 MHz)	Maximum	**23.6**	**23.6**	**22.6**
	Nominal	**23.0**	**23.0**	**22.0**
UMTS Band 2 (1900 MHz)	Maximum	**23.5**	**23.5**	**22.5**
	Nominal	**23.0**	**23.0**	**22.0**

Mode / Band		Modulated Average (dBm)		
		1x-RTT	*EVDO Rev 0*	*EVDO Rev A*
Cell. CDMA/EVDO	Maximum	**24.5**	**23.9**	**23.9**
	Nominal	**23.6**	**23.0**	**23.0**
PCS CDMA/EVDO	Maximum	**24.0**	**23.8**	**23.8**
	Nominal	**23.3**	**23.1**	**23.1**

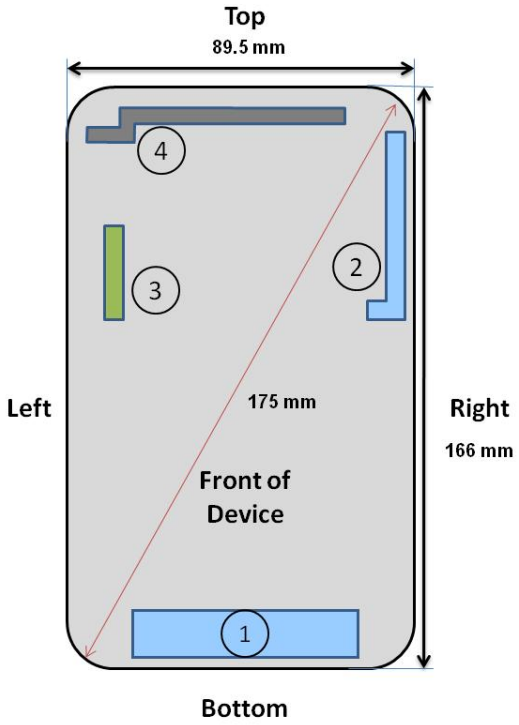
Mode / Band		Modulated Average (dBm)
LTE Band 17	Maximum	**23.4**
	Nominal	**23.0**
LTE Band 13	Maximum	**24.0**
	Nominal	**23.0**
LTE Band 4 (AWS)	Maximum	**23.5**
	Nominal	**23.0**

Mode / Band		Modulated Average (dBm)		
IEEE 802.11b (2.4 GHz)	Channel	1-10	11	
	Maximum	**15.9**	**15.8**	
	Nominal	**14.0**	**14.0**	
	Minimum	**12.5**	**12.5**	
IEEE 802.11g (2.4 GHz)	Channel	1	2-10	11
	Maximum	**10.4**	**13.4**	**10.4**
	Nominal	**9.0**	**12.0**	**9.0**
	Minimum	**7.5**	**10.5**	**7.5**
IEEE 802.11n (2.4 GHz)	Channel	1	2-10	11
	Maximum	**10.4**	**12.3**	**10.4**
	Nominal	**9.0**	**11.0**	**9.0**
	Minimum	**7.5**	**9.5**	**7.5**

Mode / Band		Modulated Average (dBm)				
IEEE 802.11a/n/ac (5 GHz HT20) (5.2 GHz Band)	Channel	36	40-44	48		
	Maximum	**13.3**	**15.2**	**15.4**		
	Nominal	**12.0**	**14.0**	**14.0**		
	Minimum	**10.5**	**12.5**	**12.5**		
IEEE 802.11a/n/ac (5 GHz HT20) (5.3 GHz Band)	Channel	52-56	60	64		
	Maximum	**17.0**	**16.4**	**15.0**		
	Nominal	**15.5**	**15.5**	**14.0**		
	Minimum	**14.0**	**14.0**	**12.5**		
IEEE 802.11a/n/ac (5 GHz HT20) (5.5 - 5.7 GHz Band)	Channel	100	104-112	116	120-136	140
	Maximum	**14.2**	**17.1**	**16.6**	**16.8**	**15.2**
	Nominal	**14.0**	**15.5**	**15.5**	**15.5**	**14.0**
	Minimum	**12.5**	**14.0**	**14.0**	**14.0**	**12.5**
IEEE 802.11a/n/ac (5 GHz HT20) (5.8 GHz Band)	Channel	149	153	157-161	165	
	Maximum	**15.1**	**16.6**	**16.8**	**15.1**	
	Nominal	**14.0**	**15.5**	**15.5**	**14.0**	
	Minimum	**12.5**	**14.0**	**14.0**	**12.5**	
IEEE 802.11n/ac (5 GHz HT40) (MCS0 - MCS8)	Channel	38-159				
	Maximum	**12.2**				
	Nominal	**11.0**				
	Minimum	**9.5**				
IEEE 802.11ac (5 GHz HT40) (MCS9)	Channel	38-159				
	Maximum	**11.2**				
	Nominal	**10.0**				
	Minimum	**8.5**				
IEEE 802.11ac (5 GHz HT80) (MCS0 - MCS8)	Channel	42-58	106	122-155		
	Maximum	**12.5**	**12.0**	**12.5**		
	Nominal	**11.0**	**11.0**	**11.0**		
	Minimum	**9.5**	**9.5**	**9.5**		
IEEE 802.11ac (5 GHz HT80) (MCS9)	Channel	42-58	106	122-155		
	Maximum	**11.5**	**11.0**	**11.5**		
	Nominal	**10.0**	**10.0**	**10.0**		
	Minimum	**8.5**	**8.5**	**8.5**		

Mode / Band		Modulated Average (dBm)		
Bluetooth (BR)	Channel	Low	Mid	High
	Maximum	**9.8**	**10.2**	**9.5**
	Nominal	**8.5**	**8.5**	**8.0**
	Minimum	**7.0**	**7.0**	**6.5**
Bluetooth (EDR 2 Mbps/3 Mbps)	Channel	Low	Mid	High
	Maximum	**9.0**	**9.4**	**8.7**
	Nominal	**7.7**	**7.7**	**7.3**
	Minimum	**6.2**	**6.2**	**5.8**
Bluetooth LE	Channel	Low	Mid	High
	Maximum	**3.0**	**3.5**	**2.5**
	Nominal	**1.5**	**1.5**	**1.0**
	Minimum	**0.0**	**0.0**	**-0.5**

1.4 DUT Antenna Locations



1. Main Antenna 1 (Tx/Rx)
   - GSM/GPRS/EDGE 850/1900 MHz
   - UMTS Band 5/2
   - LTE Band 17/13/4
2. Main Antenna 2 (Tx/Rx)
   - CDMA/EVDO BC0/1 Antenna
3. BT/WLAN Antenna (Tx/Rx)
   - 2.4 GHz WIFI
   - 5 GHz WIFI
   - 2.4 GHz Bluetooth
4. Rx Only Antenna
   - LTE
   - UMTS
   - CDMA/EVDO
   - GPS

Figure 1-1
DUT Antenna Locations

Note:
1. Exact antenna dimensions and separation distances are shown in the Technical Descriptions in the FCC Filing.
2. Since the diagonal dimension of this device is > 160 mm and <200 mm, it is considered a “phablet.”

Table 1-1
Mobile Sides for SAR Testing

Mode	Back	Front	Top	Bottom	Right	Left
GPRS 850	Yes	Yes	No	Yes	Yes	Yes
GPRS 1900	Yes	Yes	No	Yes	Yes	Yes
UMTS 850	Yes	Yes	No	Yes	Yes	Yes
UMTS 1900	Yes	Yes	No	Yes	Yes	Yes
Cell. EVDO	Yes	Yes	Yes	No	Yes	No
PCS EVDO	Yes	Yes	Yes	No	Yes	No
LTE Band 17	Yes	Yes	No	Yes	Yes	Yes
LTE Band 13	Yes	Yes	No	Yes	Yes	Yes
LTE Band 4 (AWS)	Yes	Yes	No	Yes	Yes	Yes
2.4 GHz WLAN	Yes	Yes	No	No	No	Yes
5 GHz WLAN	Yes	Yes	No	No	No	Yes

Note: Particular DUT edges were not required to be evaluated for Wireless Router SAR or Extremity SAR if the edges were greater than 2.5 cm from the transmitting antenna according to FCC KDB Publication 941225 D06v01 guidance, page 2 and FCC KDB 648474 D04v01r01. The distances between the transmit antennas and the edges of the device are included in the filing. When wireless router mode is enabled, all 5 GHz bands are disabled.

1.5 Near Field Communications (NFC) Antenna

This DUT has NFC operations. The NFC antenna is integrated into the device. Therefore, all SAR tests were performed with the NFC antenna already incorporated.

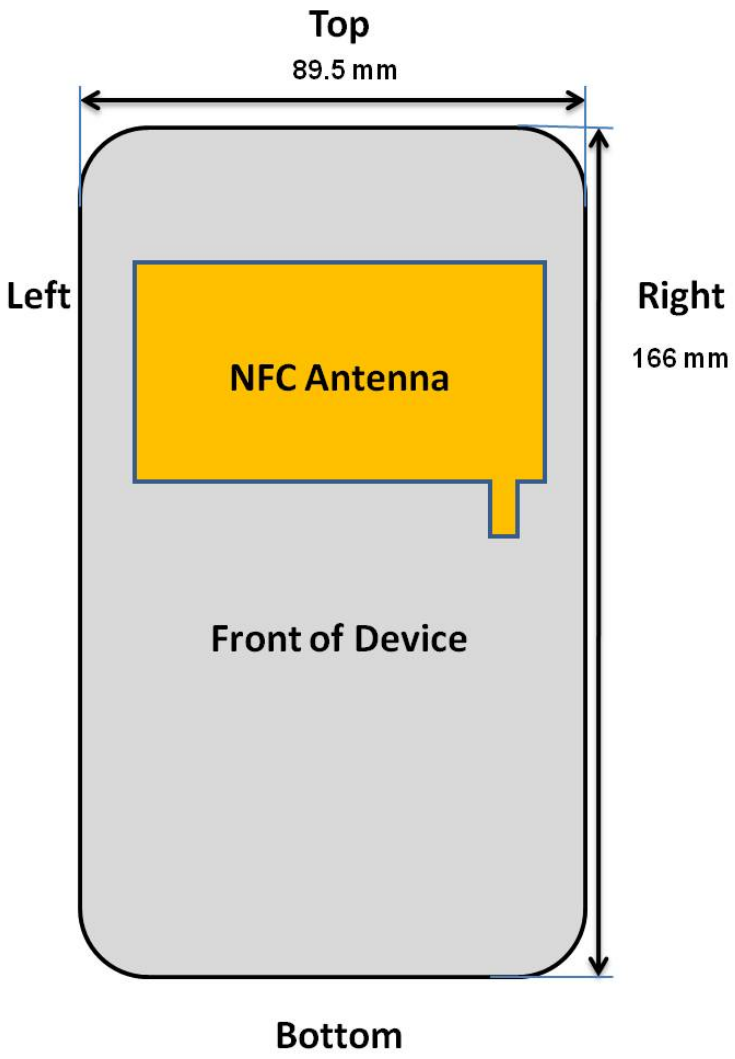


Figure 1-2
NFC Antenna Locations

1.6 Simultaneous Transmission Capabilities

According to FCC KDB Publication 447498 D05v01, transmitters are considered to be transmitting simultaneously when there is overlapping transmission, with the exception of transmissions during network hand-offs with maximum hand-off duration less than 30 seconds. Possible transmission paths for the DUT are shown in Figure 1-3 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.

Table 1-2
Simultaneous Transmission Scenarios

No.	Capable Transmit Configuration	Head	Body-Worn Accessory	Wireless Router	Extremity	Notes
1	1x CDMA voice + 2.4 GHz WI-FI	Yes	Yes	N/A	Yes	
2	1x CDMA voice + 5 GHz WI-FI	Yes	Yes	N/A	Yes	
3	1x CDMA voice + 2.4 GHz Bluetooth	N/A	Yes	N/A	Yes	
4	GSM voice + 2.4 GHz WI-FI	Yes	Yes	N/A	Yes	
5	GSM voice + 5 GHz WI-FI	Yes	Yes	N/A	Yes	
6	GSM voice + 2.4 GHz Bluetooth	N/A	Yes	N/A	Yes	
7	UMTS + 2.4 GHz WI-FI	Yes	Yes	Yes	Yes	
8	UMTS + 5 GHz WI-FI	Yes	Yes	N/A	Yes	
9	UMTS + 2.4 GHz Bluetooth	N/A	Yes	N/A	Yes	
10	LTE + 2.4 GHz WI-FI	Yes*	Yes*	Yes	Yes	*Pre-installed VOIP applications are considered
11	LTE + 5 GHz WI-FI	N/A	N/A	N/A	Yes	*Pre-installed VOIP applications are considered
12	LTE + 2.4 GHz Bluetooth	N/A	Yes*	N/A	Yes	*Pre-installed VOIP applications are considered
13	CDMA/EVDO data + 2.4 GHz WI-FI	Yes*	Yes*	Yes	Yes	*Pre-installed VOIP applications are considered
14	CDMA/EVDO data + 5 GHz WI-FI	N/A	N/A	N/A	Yes	
15	CDMA/EVDO data + 2.4 GHz Bluetooth	N/A	Yes*	N/A	Yes	*Pre-installed VOIP applications are considered
16	GPRS/EDGE + 2.4 GHz WI-FI	Yes*	Yes*	Yes	Yes	*Pre-installed VOIP applications are considered
17	GPRS/EDGE + 5 GHz WI-FI	N/A	N/A	N/A	Yes	
18	GPRS/EDGE + 2.4 GHz Bluetooth	N/A	Yes*	N/A	Yes	*Pre-installed VOIP applications are considered
19	1x CDMA voice + LTE	Yes	Yes	N/A	Yes	SVLTE
20	1x CDMA voice + LTE + 2.4 GHz WI-FI	Yes	Yes	Yes	Yes	SVLTE
21	1x CDMA voice + LTE + 5 GHz WI-FI	N/A	N/A	N/A	Yes	SVLTE
22	1x CDMA voice + LTE + 2.4 GHz Bluetooth	N/A	Yes	N/A	Yes	SVLTE
23	1x CDMA voice + CDMA/EVDO data	N/A	N/A	N/A	N/A	Not supported by HW
24	1X CDMA voice + GSM/UMTS	N/A	N/A	N/A	N/A	Not supported by SW
25	CDMA/EVDO data + LTE	N/A	N/A	N/A	N/A	Not supported by SW

1. 2.4 GHz WLAN, 5 GHz WLAN, and 2.4 GHz Bluetooth share the same antenna path and cannot transmit simultaneously.
2. GSM/GPRS, UMTS, and LTE share the same antenna and cannot transmit simultaneously.
3. (*) = for VOIP applications possibly used by the end-user.
4. 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. Per the manufacturer, WIFI Direct is not expected to be used in conjunction with a held-to-ear or body-worn accessory voice call. Therefore, there are no simultaneous transmission scenarios involving WIFI direct beyond that listed in the above table.
6. When wireless router mode is enabled, all 5GHz bands are disabled.
7. SVLTE Operations are only possible with LTE Bands 4 and 13. SVLTE with LTE B17 is not supported via SW.

1.7 Body Holster and Hand Strap Device Accessories

This DUT may also be used with two accessories containing metallic components: a body holster and a hand strap. Per FCC KDB Publication 447498 D01 v05r02, the accessories were tested in conjunction with the host device to demonstrate compliance. The belt holster was evaluated as a body-worn accessory with front and back side evaluated for 1g body-worn SAR with the belt holster for each wireless technology and frequency band at 0mm from the phantom. The hand strap accessory was evaluated for compliance by measuring back side 10g extremity SAR at 0mm for each wireless technology and frequency band. Two diagonal configurations of the metallic components are possible when attaching the hand strap to the device and both were considered in the SAR evaluation. They are referred to as "Hand Strap, Top Right" and "Hand Strap, Top Left." Please see Figure 1-4 for clarification of the location of the metallic components in these configurations.

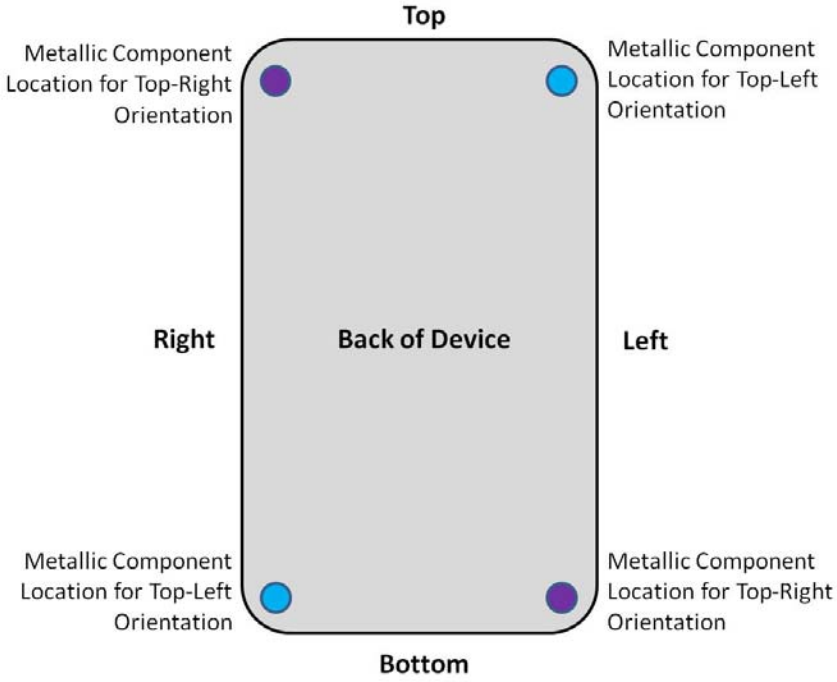


Figure 1-4
Hand Strap Metallic Component Locations

1.8 SAR Test Exclusions Applied

(A) WIFI/BT

Since Wireless Router operations are not allowed by the chipset firmware using 5 GHz WIFI, only 2.4 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:

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

Based on the maximum conducted power of Bluetooth (rounded to the nearest mW) and the antenna to user separation distance, Bluetooth body-worn SAR at 10mm was not required; [(10/10)* √2.441] = 1.6< 3.0. Per KDB Publication 447498 D01v05, the maximum power of the channel was rounded to the nearest mW before calculation.

Based on the maximum conducted power of Bluetooth LE (rounded to the nearest mW) and the antenna to user separation distance, Bluetooth LE body-worn (belt holster) accessory SAR was not required; [(2/5)* √2.480] = 0.6< 3.0. Per KDB Publication 447498 D01v05, the maximum power of the channel was rounded to the nearest mW before calculation.

Per FCC KDB 447498 D01v05, the 10g Extremity SAR exclusion threshold for distances <50mm is defined by the following equation:

$$\frac{Max\ Power\ of\ Channel\ (mW)}{Test\ Separation\ Dist\ (mm)} * \sqrt{Frequency(GHz)} \leq 7.5$$

Based on the maximum conducted power of Bluetooth (rounded to the nearest mW) and the antenna to user separation distance, extremity Bluetooth SAR was not required; [(10/5)* √2.441] = 3.1< 7.5. Per KDB Publication 447498 D01v05, the maximum power of the channel was rounded to the nearest mW before calculation.

Per FCC KDB Publication 648474 D04v01r01, this device is considered a "phablet" since the diagonal dimension is greater than 160mm and less than 200mm. Extremity SAR tests are required when wireless router mode does not apply or if wireless router 1g SAR > 1.2 W/kg. Because wireless router operations are not supported for 5 GHz WLAN, extremity SAR tests were performed. Extremity SAR was not evaluated for 2.4 GHz WLAN operations since wireless router 1g SAR was < 1.2 W/kg.

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

Full SAR evaluations for all IEEE 802.11ac configurations were not required since 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.

(B) Licensed Transmitter(s)

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

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

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.

Per FCC KDB Publication 648474 D04v01r01, this device is considered a "phablet" since the diagonal dimension is greater than 160mm and less than 200mm. Therefore, extremity SAR tests are required when wireless router mode does not apply or if wireless router 1g SAR > 1.2 W/kg. Extremity SAR was not evaluated for licensed technologies since wireless router 1g SAR was < 1.2 W/kg for these modes.

1.9 Guidance Applied

- IEEE 1528-2003
- FCC KDB Publication 941225 D01v02, D03v01, D05v02r03, D06v01r01 (2G/3G/4G and Hotspot)
- 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)
- FCC KDB Publication 648474 D04 (Phablet Procedures)
- 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.

Band/Mode	Head Serial Number	Body-Worn Serial Number	Hotspot Serial Number	Extremity Serial Number
GSM/GPRS/EDGE 850	46	45	45	45
GSM/GPRS/EDGE 1900	45	46	46	46
UMTS 850	46	45	45	45
UMTS 1900	45	44	44	46
Cell. CDMA/EVDO	44	44	44	44
PCS CDMA/EVDO	44	44	44	44
LTE Band 17	44	46	46	46
LTE Band 13	46	46	46	46
LTE Band 4 (AWS)	44	44	44	44
2.4 GHz WLAN	WIFI_SAR	WIFI_SAR	WIFI_SAR	WIFI_SAR
5 GHz WLAN	WIFI_SAR	WIFI_SAR	-	WIFI_SAR
Bluetooth	-	WIFI_SAR	-	-

2 LTE INFORMATION

LTE Information			
FCC ID	**ACJFZE1A**		
Form Factor	Portable Handset		
Frequency Range of each LTE transmission band	LTE Band 17 (706.5 - 713.5 MHz)		
	LTE Band 13 (782 MHz)		
	LTE Band 4 (AWS) (1712.5 - 1752.5 MHz)		
Channel Bandwidths	LTE Band 17: 5 MHz, 10 MHz		
	LTE Band 13: 10 MHz		
	LTE Band 4 (AWS): 5 MHz, 10 MHz, 15 MHz, 20 MHz		
Channel Numbers and Frequencies (MHz)	Low	Mid	High
LTE Band 17: 5 MHz	706.5 (23755)	710 (23790)	713.5 (23825)
LTE Band 17: 10 MHz	709 (23780)	710 (23790)	711 (23800)
LTE Band 13: 10 MHz	N/A	782 (23230)	N/A
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)
UE Category	4		
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		

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/m^3)
E = Total RMS electric field strength (V/m)

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

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:

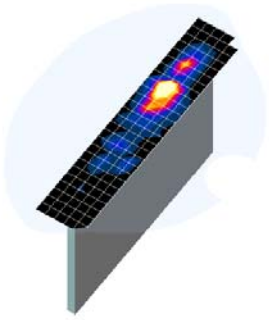


Figure 4-1
Sample SAR Area Scan

1. The SAR distribution at the exposed side of the head or body was measured at a distance no greater than 5.0 mm from the inner surface of the shell. The area covered the entire dimension of the device-head and body interface and the horizontal grid resolution was determined per FCC KDB Publication 865664 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.

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

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

*Also compliant to IEEE 1528-2013 Table 6

5 DEFINITION OF REFERENCE POINTS

5.1 EAR REFERENCE POINT

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

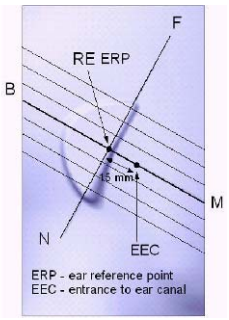


Figure 5-1
Close-Up Side view of ERP

5.2 HANDSET REFERENCE POINTS

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

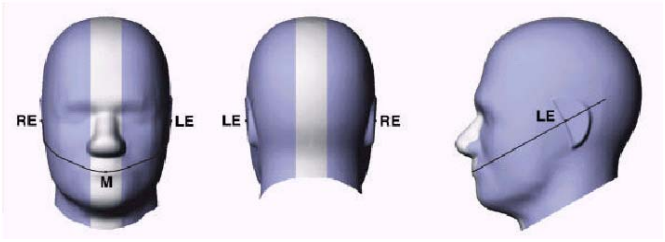


Figure 5-2
Front, back and side view of SAM Twin Phantom

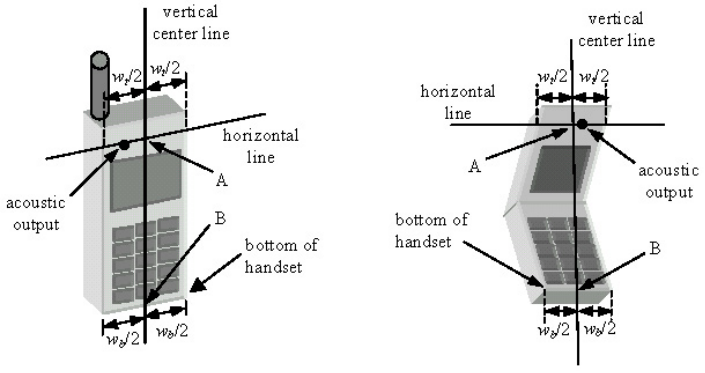


Figure 5-3
Handset Vertical Center & Horizontal Line Reference Points

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 ε = 3 and loss tangent δ = 0.02.

6.2 Positioning for Cheek

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

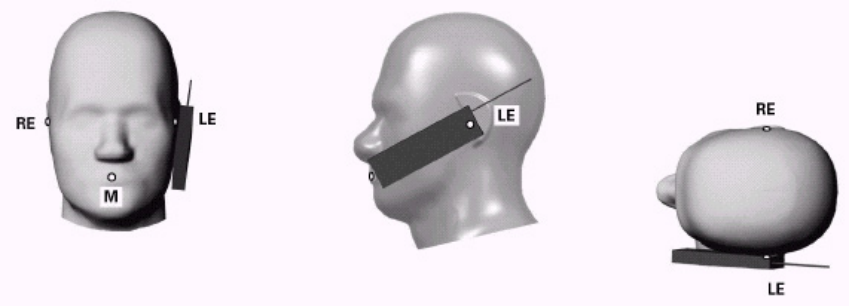


Figure 6-1 Front, Side and Top View of Cheek Position

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

6.3 Positioning for Ear / 15º Tilt

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

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

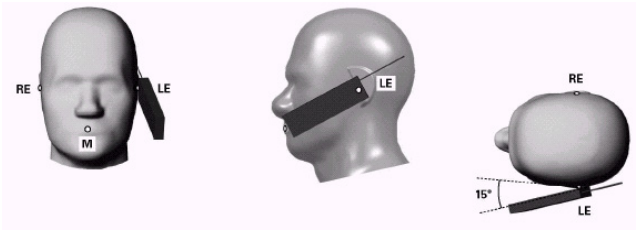


Figure 6-2 Front, Side and Top View of Ear/15º Tilt Position

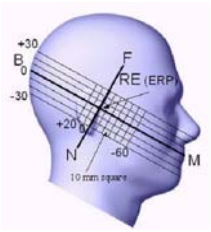


Figure 6-3
Side view w/ relevant markings

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

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

Under these circumstances, the following procedures apply, adopted from the FCC guidance on SAR handsets document FCC KDB Publication 648474 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

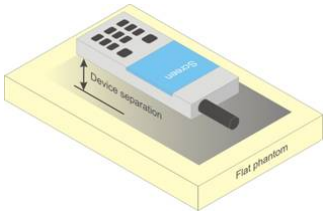


Figure 6-4
Sample Body-Worn Diagram

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.

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.

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 minitablets 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.

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 x W ≥ 9 cm x 5 cm) are based on a composite test separation distance of 10 mm from the front, back and edges of the device containing transmitting antennas within 2.5 cm of their edges, determined from general mixed use conditions for this type of devices. Since the hotspot SAR results may overlap with the body-worn accessory SAR requirements, the more conservative configurations can be considered, thus excluding some body-worn accessory SAR tests.

When the user enables the personal wireless router functions for the handset, actual operations include simultaneous transmission of both the WIFI transmitter and another licensed transmitter. Both transmitters often do not transmit at the same transmitting frequency and thus cannot be evaluated for SAR under actual use conditions due to the limitations of the SAR assessment probes. Therefore, SAR must be evaluated for each frequency transmission and mode separately and spatially summed with the WIFI transmitter according to FCC KDB Publication 447498 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.

7 RF EXPOSURE LIMITS

7.1 Uncontrolled Environment

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

7.2 Controlled Environment

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

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

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

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

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 SCH_0 and demodulation of RC 3,4, or 5, set up a call using Supplemental Channel Test Mode 3 (RC 3/3) with 9600 bps Fundamental Channel and 9600 bps SCH0 data rate.
4. Under RC3, C.S0011 Table 4.4.5.2-2, Table 8-2 was applied.

Table 8-1
Parameters for Max. Power for RC1

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

Table 8-2
Parameters for Max. Power for RC3

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

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

8.3.2 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 8.3.4 for EVDO Rev. A configuration parameters.

8.3.3 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 SCH_0 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.

8.3.4 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.

8.3.5 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 ¼ 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 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 ≤ 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 βc=9 and βd=15, and power offset parameters of ΔACK= ΔNACK =5 and ΔCQI=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} (Note1, 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 β_c/β_d =12/15, β_{hs}/β_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 ≤ 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.”

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_d (SF)	β_c/β_d	β_{hs}(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	β_{ed1}: 47/15 β_{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 $\Delta_{CQI} = 8 \Leftrightarrow A_{hs} = \beta_{hs}/\beta_c = 30/15 \Leftrightarrow \beta_{hs} = 30/15 * \beta_c$.
Note 2: CM = 1 for β_c/β_d =12/15, β_{hs}/β_c=24/15. For all other combinations of DPDCH, DPCCH, 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.
   iii. When the reported SAR for a required test channel is > 1.45 W/kg, SAR is required for all RB offset configurations for that channel.
b. Per Section 5.2.2, SAR is required for 50% RB allocation using the largest bandwidth following the same procedures outlined in Section 5.2.1.
c. Per Section 5.2.3, QPSK SAR is not required for the 100% allocation when the highest maximum output power for the 100% allocation is less than the highest maximum output power of the 1 RB and 50% RB allocations and the reported SAR for the 1 RB and 50% RB allocations is < 0.8 W/kg.
d. Per Section 5.2.4 and 5.3, SAR tests for higher order modulations and lower bandwidths configurations are not required when the conducted power of the required test configurations determined by Sections 5.2.1 through 5.2.3 is less than or equal to ½ dB higher than the equivalent configuration using QPSK modulation and when the QPSK SAR for those configurations is <1.45 W/kg.

8.6 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.

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 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 then 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.

9 RF CONDUCTED POWERS

9.1 GSM Conducted Powers

		Maximum Burst-Averaged Output Power						
		Voice	*GPRS/EDGE Data (GMSK)*				*EDGE Data (8-PSK)*	
Band	**Channel**	**GSM [dBm] CS (1 Slot)**	**GPRS [dBm] 1 Tx Slot**	**GPRS [dBm] 2 Tx Slot**	**GPRS [dBm] 3 Tx Slot**	**GPRS [dBm] 4 Tx Slot**	**EDGE [dBm] 1 Tx Slot**	**EDGE [dBm] 2 Tx Slot**
GSM 850	128	32.97	32.37	30.62	28.62	**27.62**	26.61	26.73
	190	33.00	32.45	30.69	28.87	**27.62**	26.56	26.61
	251	32.99	32.50	30.71	28.86	**27.73**	26.78	26.56
GSM 1900	512	30.20	30.14	27.50	25.85	**24.62**	26.20	26.19
	661	30.10	30.11	27.69	25.89	**24.70**	26.06	26.11
	810	30.01	30.00	27.62	25.86	**24.67**	26.12	26.09
		Calculated Maximum Frame-Averaged Output Power						
		Voice	*GPRS/EDGE Data (GMSK)*				*EDGE Data (8-PSK)*	
Band	**Channel**	**GSM [dBm] CS (1 Slot)**	**GPRS [dBm] 1 Tx Slot**	**GPRS [dBm] 2 Tx Slot**	**GPRS [dBm] 3 Tx Slot**	**GPRS [dBm] 4 Tx Slot**	**EDGE [dBm] 1 Tx Slot**	**EDGE [dBm] 2 Tx Slot**
GSM 850	128	23.94	23.34	24.60	24.36	**24.61**	17.58	20.71
	190	23.97	23.42	24.67	24.61	**24.61**	17.53	20.59
	251	23.96	23.47	24.69	24.60	**24.72**	17.75	20.54
GSM 1900	512	21.17	21.11	21.48	21.59	**21.61**	17.17	20.17
	661	21.07	21.08	21.67	21.63	**21.69**	17.03	20.09
	810	20.98	20.97	21.60	21.60	**21.66**	17.09	20.07
GSM 850	**Frame Avg. Targets:**	23.47	23.47	23.98	23.94	**23.99**	17.47	20.48
GSM 1900		20.47	20.47	20.98	20.94	**20.99**	16.47	19.48

Note:

1. Both burst-averaged and calculated frame-averaged powers are included. Frame-averaged power was calculated from the measured burst-averaged power by converting the slot powers into linear units and calculating the energy over 8 timeslots.
2. 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 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. 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.
4. EDGE (8-PSK) output powers were measured with MCS7 on the base station simulator. MCS7 coding scheme was used to measure the output powers for EDGE since investigation has shown that choosing MCS7 coding scheme will ensure 8-PSK modulation. It has been shown that MCS levels that produce 8PSK modulation do not have an impact on output power.

GSM Class: B
GPRS Multislot class: 12 (Max 4 Tx uplink slots)
EDGE Multislot class: 10 (Max 2 Tx uplink slots)
DTM Multislot Class: N/A

Figure 9-1
Power Measurement Setup

9.2 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	23.32	23.42	23.46	23.15	23.08	23.27	-
99		12.2 kbps AMR	23.24	23.36	23.39	23.09	23.00	23.14	-
6	HSDPA	Subtest 1	22.66	22.82	22.94	22.13	21.92	22.06	0
6		Subtest 2	22.65	22.89	22.93	22.05	21.92	22.05	0
6		Subtest 3	22.19	22.40	22.45	21.55	21.43	21.66	0.5
6		Subtest 4	22.19	22.40	22.46	21.45	21.39	21.66	0.5
6	HSUPA	Subtest 1	22.44	22.39	22.34	21.57	21.85	21.78	0
6		Subtest 2	20.37	20.49	20.28	19.91	19.84	20.12	2
6		Subtest 3	21.39	21.49	21.50	20.76	20.81	20.99	1
6		Subtest 4	21.95	22.00	21.98	21.20	21.13	21.38	2
6		Subtest 5	22.28	22.41	22.48	22.08	21.98	22.03	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.

Figure 9-2
Power Measurement Setup

9.3 CDMA Conducted Powers

Band	Channel	Rule Part	Frequency	SO55 [dBm]	SO55 [dBm]	TDSO SO32 [dBm]	TDSO SO32 [dBm]	1x EvDO Rev. 0 [dBm]	1x EvDO Rev. A [dBm]
	F-RC		MHz	RC1	RC3	FCH+SCH	FCH	(RTAP)	(RETAP)
Cellular	1013	22H	824.7	23.38	23.78	23.78	23.83	23.70	23.66
	384	22H	836.52	23.36	23.73	23.73	23.79	23.58	23.54
	777	22H	848.31	23.44	23.72	23.74	23.76	23.75	23.72
PCS	25	24E	1851.25	23.75	23.89	23.99	23.91	23.75	23.72
	600	24E	1880	22.86	23.24	23.24	23.25	23.25	23.23
	1175	24E	1908.75	23.72	23.95	23.94	23.96	23.80	23.78

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

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.
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.
4. CDMA 1x-RTT SAR was additionally required to be evaluated for Hotspot exposure conditions to support simultaneous transmission capabilities.
5. Head SAR was additionally evaluated with EVDO Rev. A to determine compliance for held-to-ear VoIP operations.

Figure 9-3
Power Measurement Setup

9.4 LTE Conducted Powers

9.4.1 LTE Band 17

Table 9-1
LTE Band 17 Conducted Power – 10 MHz Bandwidth

	Frequency [MHz]	Channel	Bandwidth [MHz]	Modulation	RB Size	RB Offset	Conducted Power [dBm]	MPR Allowed per 3GPP [dB]	MPR [dB]
Mid	710.0	23790	10	QPSK	1	0	**23.35**	0	0
	710.0	23790	10	QPSK	1	25	23.22	0	0
	710.0	23790	10	QPSK	1	49	23.27	0	0
	710.0	23790	10	QPSK	25	0	22.29	0-1	1
	710.0	23790	10	QPSK	25	12	22.23	0-1	1
	710.0	23790	10	QPSK	25	25	**22.30**	0-1	1
	710.0	23790	10	QPSK	50	0	22.28	0-1	1
	710.0	23790	10	16QAM	1	0	22.26	0-1	1
	710.0	23790	10	16QAM	1	25	22.12	0-1	1
	710.0	23790	10	16QAM	1	49	22.16	0-1	1
	710.0	23790	10	16QAM	25	0	21.27	0-2	2
	710.0	23790	10	16QAM	25	12	21.30	0-2	2
	710.0	23790	10	16QAM	25	25	21.29	0-2	2
	710.0	23790	10	16QAM	50	0	21.25	0-2	2

Note: LTE Band 17 at 10 MHz bandwidth does not support three non-overlapping channels. Per KDB Publication 941225 D05v02, when a device supports overlapping channel assignment in a channel bandwidth configuration, the middle channel of the group of overlapping channels should be selected for testing.

Table 9-2
LTE Band 17 Conducted Power – 5 MHz Bandwidth

	Frequency [MHz]	Channel	Bandwidth [MHz]	Modulation	RB Size	RB Offset	Conducted Power [dBm]	MPR Allowed per 3GPP [dB]	MPR [dB]
Mid	710.0	23790	5	QPSK	1	0	23.26	0	0
	710.0	23790	5	QPSK	1	12	23.27	0	0
	710.0	23790	5	QPSK	1	24	23.27	0	0
	710.0	23790	5	QPSK	12	0	21.51	0-1	1
	710.0	23790	5	QPSK	12	6	21.56	0-1	1
	710.0	23790	5	QPSK	12	13	21.57	0-1	1
	710.0	23790	5	QPSK	25	0	21.54	0-1	1
	710.0	23790	5	16-QAM	1	0	22.25	0-1	1
	710.0	23790	5	16-QAM	1	12	22.31	0-1	1
	710.0	23790	5	16-QAM	1	24	22.33	0-1	1
	710.0	23790	5	16-QAM	12	0	20.60	0-2	2
	710.0	23790	5	16-QAM	12	6	20.61	0-2	2
	710.0	23790	5	16-QAM	12	13	20.67	0-2	2
	710.0	23790	5	16-QAM	25	0	20.65	0-2	2

Note: LTE Band 17 at 5 MHz bandwidth does not support three non-overlapping channels. Per KDB Publication 941225 D05v02, when a device supports overlapping channel assignment in a channel bandwidth configuration, the middle channel of the group of overlapping channels should be selected for testing.

9.4.2 LTE Band 13

Table 9-3
LTE Band 13 Conducted Power – 10 MHz Bandwidth

	Frequency [MHz]	Channel	Bandwidth [MHz]	Modulation	RB Size	RB Offset	Conducted Power [dBm]	MPR Allowed per 3GPP [dB]	MPR [dB]
Mid	782.0	23230	10	QPSK	1	0	22.94	0	0
	782.0	23230	10	QPSK	1	25	**23.23**	0	0
	782.0	23230	10	QPSK	1	49	22.88	0	0
	782.0	23230	10	QPSK	25	0	22.18	0-1	1
	782.0	23230	10	QPSK	25	12	**22.26**	0-1	1
	782.0	23230	10	QPSK	25	25	22.24	0-1	1
	782.0	23230	10	QPSK	50	0	22.25	0-1	1
	782.0	23230	10	16QAM	1	0	21.98	0-1	1
	782.0	23230	10	16QAM	1	25	22.09	0-1	1
	782.0	23230	10	16QAM	1	49	21.87	0-1	1
	782.0	23230	10	16QAM	25	0	21.22	0-2	2
	782.0	23230	10	16QAM	25	12	21.28	0-2	2
	782.0	23230	10	16QAM	25	25	21.26	0-2	2
	782.0	23230	10	16QAM	50	0	21.26	0-2	2

9.4.3 LTE Band 4 (AWS)

Table 9-4
LTE Band 4 (AWS) Conducted Power – 20 MHz Bandwidth

	Frequency [MHz]	Channel	Bandwidth [MHz]	Modulation	RB Size	RB Offset	Conducted Power [dBm]	MPR Allowed per 3GPP [dB]	MPR [dB]
Mid	1732.5	20175	20	QPSK	1	0	23.09	0	0
	1732.5	20175	20	QPSK	1	50	23.47	0	0
	1732.5	20175	20	QPSK	1	99	**23.49**	0	0
	1732.5	20175	20	QPSK	50	0	22.41	0-1	1
	1732.5	20175	20	QPSK	50	25	22.48	0-1	1
	1732.5	20175	20	QPSK	50	50	**22.50**	0-1	1
	1732.5	20175	20	QPSK	100	0	22.47	0-1	1
	1732.5	20175	20	16QAM	1	0	22.08	0-1	1
	1732.5	20175	20	16QAM	1	50	22.46	0-1	1
	1732.5	20175	20	16QAM	1	99	22.48	0-1	1
	1732.5	20175	20	16QAM	50	0	21.29	0-2	2
	1732.5	20175	20	16QAM	50	25	21.38	0-2	2
	1732.5	20175	20	16QAM	50	50	21.43	0-2	2
	1732.5	20175	20	16QAM	100	0	21.39	0-2	2

Note: LTE Band 4 (AWS) at 20 MHz bandwidth does not support three non-overlapping channels. Per KDB Publication 941225 D05v02, when a device supports overlapping channel assignment in a channel bandwidth configuration, the middle channel of the group of overlapping channels should be selected for testing.

Table 9-5
LTE Band 4 (AWS) Conducted Power – 15 MHz Bandwidth

	Frequency [MHz]	Channel	Bandwidth [MHz]	Modulation	RB Size	RB Offset	Conducted Power [dBm]	MPR Allowed per 3GPP [dB]	MPR [dB]
Low	1717.5	20025	15	QPSK	1	0	22.64	0	0
	1717.5	20025	15	QPSK	1	36	22.81	0	0
	1717.5	20025	15	QPSK	1	74	23.02	0	0
	1717.5	20025	15	QPSK	36	0	21.72	0-1	1
	1717.5	20025	15	QPSK	36	18	21.78	0-1	1
	1717.5	20025	15	QPSK	36	37	21.87	0-1	1
	1717.5	20025	15	QPSK	75	0	21.81	0-1	1
	1717.5	20025	15	16QAM	1	0	22.18	0-1	1
	1717.5	20025	15	16QAM	1	36	22.31	0-1	1
	1717.5	20025	15	16QAM	1	74	22.40	0-1	1
	1717.5	20025	15	16QAM	36	0	21.20	0-2	2
	1717.5	20025	15	16QAM	36	18	21.19	0-2	2
	1717.5	20025	15	16QAM	36	37	21.42	0-2	2
	1717.5	20025	15	16QAM	75	0	21.16	0-2	2
Mid	1732.5	20175	15	QPSK	1	0	23.19	0	0
	1732.5	20175	15	QPSK	1	36	23.42	0	0
	1732.5	20175	15	QPSK	1	74	23.49	0	0
	1732.5	20175	15	QPSK	36	0	22.45	0-1	1
	1732.5	20175	15	QPSK	36	18	22.47	0-1	1
	1732.5	20175	15	QPSK	36	37	22.50	0-1	1
	1732.5	20175	15	QPSK	75	0	22.48	0-1	1
	1732.5	20175	15	16QAM	1	0	22.41	0-1	1
	1732.5	20175	15	16QAM	1	36	22.43	0-1	1
	1732.5	20175	15	16QAM	1	74	22.49	0-1	1
	1732.5	20175	15	16QAM	36	0	21.36	0-2	2
	1732.5	20175	15	16QAM	36	18	21.41	0-2	2
	1732.5	20175	15	16QAM	36	37	21.49	0-2	2
	1732.5	20175	15	16QAM	75	0	21.35	0-2	2
High	1747.5	20325	15	QPSK	1	0	23.24	0	0
	1747.5	20325	15	QPSK	1	36	23.11	0	0
	1747.5	20325	15	QPSK	1	74	22.85	0	0
	1747.5	20325	15	QPSK	36	0	22.42	0-1	1
	1747.5	20325	15	QPSK	36	18	22.40	0-1	1
	1747.5	20325	15	QPSK	36	37	22.27	0-1	1
	1747.5	20325	15	QPSK	75	0	22.39	0-1	1
	1747.5	20325	15	16QAM	1	0	22.35	0-1	1
	1747.5	20325	15	16QAM	1	36	22.12	0-1	1
	1747.5	20325	15	16QAM	1	74	21.94	0-1	1
	1747.5	20325	15	16QAM	36	0	21.34	0-2	2
	1747.5	20325	15	16QAM	36	18	21.37	0-2	2
	1747.5	20325	15	16QAM	36	37	21.36	0-2	2
	1747.5	20325	15	16QAM	75	0	21.32	0-2	2

Table 9-6
LTE Band 4 (AWS) Conducted Power – 10 MHz Bandwidth

	Frequency [MHz]	Channel	Bandwidth [MHz]	Modulation	RB Size	RB Offset	Conducted Power [dBm]	MPR Allowed per 3GPP [dB]	MPR [dB]
Low	1715	20000	10	QPSK	1	0	22.62	0	0
	1715	20000	10	QPSK	1	25	22.78	0	0
	1715	20000	10	QPSK	1	49	22.95	0	0
	1715	20000	10	QPSK	25	0	21.63	0-1	1
	1715	20000	10	QPSK	25	12	21.67	0-1	1
	1715	20000	10	QPSK	25	25	21.83	0-1	1
	1715	20000	10	QPSK	50	0	21.68	0-1	1
	1715	20000	10	16QAM	1	0	22.16	0-1	1
	1715	20000	10	16QAM	1	25	22.41	0-1	1
	1715	20000	10	16QAM	1	49	22.44	0-1	1
	1715	20000	10	16QAM	25	0	21.18	0-2	2
	1715	20000	10	16QAM	25	12	21.17	0-2	2
	1715	20000	10	16QAM	25	25	21.45	0-2	2
	1715	20000	10	16QAM	50	0	21.14	0-2	2
Mid	1732.5	20175	10	QPSK	1	0	23.26	0	0
	1732.5	20175	10	QPSK	1	25	23.25	0	0
	1732.5	20175	10	QPSK	1	49	23.41	0	0
	1732.5	20175	10	QPSK	25	0	22.43	0-1	1
	1732.5	20175	10	QPSK	25	12	22.49	0-1	1
	1732.5	20175	10	QPSK	25	25	22.50	0-1	1
	1732.5	20175	10	QPSK	50	0	22.43	0-1	1
	1732.5	20175	10	16QAM	1	0	22.25	0-1	1
	1732.5	20175	10	16QAM	1	25	22.29	0-1	1
	1732.5	20175	10	16QAM	1	49	22.46	0-1	1
	1732.5	20175	10	16QAM	25	0	21.44	0-2	2
	1732.5	20175	10	16QAM	25	12	21.45	0-2	2
	1732.5	20175	10	16QAM	25	25	21.48	0-2	2
	1732.5	20175	10	16QAM	50	0	21.47	0-2	2
High	1750	20350	10	QPSK	1	0	23.22	0	0
	1750	20350	10	QPSK	1	25	23.04	0	0
	1750	20350	10	QPSK	1	49	22.83	0	0
	1750	20350	10	QPSK	25	0	22.46	0-1	1
	1750	20350	10	QPSK	25	12	22.38	0-1	1
	1750	20350	10	QPSK	25	25	22.26	0-1	1
	1750	20350	10	QPSK	50	0	22.37	0-1	1
	1750	20350	10	16QAM	1	0	22.31	0-1	1
	1750	20350	10	16QAM	1	25	22.07	0-1	1
	1750	20350	10	16QAM	1	49	21.88	0-1	1
	1750	20350	10	16QAM	25	0	21.48	0-2	2
	1750	20350	10	16QAM	25	12	21.49	0-2	2
	1750	20350	10	16QAM	25	25	21.46	0-2	2
	1750	20350	10	16QAM	50	0	21.49	0-2	2

Table 9-7
LTE Band 4 (AWS) Conducted Power – 5 MHz Bandwidth

	Frequency [MHz]	Channel	Bandwidth [MHz]	Modulation	RB Size	RB Offset	Conducted Power [dBm]	MPR Allowed per 3GPP [dB]	MPR [dB]
Low	1712.5	19975	5	QPSK	1	0	22.51	0	0
	1712.5	19975	5	QPSK	1	12	22.54	0	0
	1712.5	19975	5	QPSK	1	24	22.62	0	0
	1712.5	19975	5	QPSK	12	0	22.18	0-1	1
	1712.5	19975	5	QPSK	12	6	22.23	0-1	1
	1712.5	19975	5	QPSK	12	13	22.24	0-1	1
	1712.5	19975	5	QPSK	25	0	22.23	0-1	1
	1712.5	19975	5	16-QAM	1	0	21.91	0-1	1
	1712.5	19975	5	16-QAM	1	12	21.96	0-1	1
	1712.5	19975	5	16-QAM	1	24	22.16	0-1	1
	1712.5	19975	5	16-QAM	12	0	21.49	0-2	2
	1712.5	19975	5	16-QAM	12	6	21.46	0-2	2
	1712.5	19975	5	16-QAM	12	13	21.48	0-2	2
	1712.5	19975	5	16-QAM	25	0	21.45	0-2	2
Mid	1732.5	20175	5	QPSK	1	0	23.21	0	0
	1732.5	20175	5	QPSK	1	12	23.17	0	0
	1732.5	20175	5	QPSK	1	24	23.24	0	0
	1732.5	20175	5	QPSK	12	0	22.49	0-1	1
	1732.5	20175	5	QPSK	12	6	22.47	0-1	1
	1732.5	20175	5	QPSK	12	13	22.50	0-1	1
	1732.5	20175	5	QPSK	25	0	22.49	0-1	1
	1732.5	20175	5	16-QAM	1	0	22.21	0-1	1
	1732.5	20175	5	16-QAM	1	12	22.20	0-1	1
	1732.5	20175	5	16-QAM	1	24	22.30	0-1	1
	1732.5	20175	5	16-QAM	12	0	21.40	0-2	2
	1732.5	20175	5	16-QAM	12	6	21.39	0-2	2
	1732.5	20175	5	16-QAM	12	13	21.46	0-2	2
	1732.5	20175	5	16-QAM	25	0	21.45	0-2	2
High	1752.5	20375	5	QPSK	1	0	23.27	0	0
	1752.5	20375	5	QPSK	1	12	23.13	0	0
	1752.5	20375	5	QPSK	1	24	23.03	0	0
	1752.5	20375	5	QPSK	12	0	22.47	0-1	1
	1752.5	20375	5	QPSK	12	6	22.40	0-1	1
	1752.5	20375	5	QPSK	12	13	22.36	0-1	1
	1752.5	20375	5	QPSK	25	0	22.43	0-1	1
	1752.5	20375	5	16-QAM	1	0	22.47	0-1	1
	1752.5	20375	5	16-QAM	1	12	22.44	0-1	1
	1752.5	20375	5	16-QAM	1	24	22.42	0-1	1
	1752.5	20375	5	16-QAM	12	0	21.46	0-2	2
	1752.5	20375	5	16-QAM	12	6	21.36	0-2	2
	1752.5	20375	5	16-QAM	12	13	21.49	0-2	2
	1752.5	20375	5	16-QAM	25	0	21.45	0-2	2

9.5 WLAN Conducted Powers

Table 9-8
IEEE 802.11b Average RF Power

Mode	Freq [MHz]	Channel	802.11b Conducted Power [dBm]			
			Data Rate [Mbps]			
			1	2	5.5	11
802.11b	2412	1*	14.02	14.05	14.01	14.17
802.11b	2437	6*	14.11	14.10	14.07	14.28
802.11b	2462	11*	**14.14**	14.21	14.15	14.29

Table 9-9
IEEE 802.11g Average RF Power

Mode	Freq [MHz]	Channel	802.11g Conducted Power [dBm]							
			Data Rate [Mbps]							
			6	9	12	18	24	36	48	54
802.11g	2412	1	8.56	8.62	8.54	8.56	8.48	8.52	8.46	8.47
802.11g	2417	2	11.78	11.61	11.51	11.70	11.81	11.52	11.80	11.47
802.11g	2437	6	11.78	11.84	11.70	11.81	11.66	11.72	11.55	11.69
802.11g	2457	10	11.48	11.59	11.94	11.53	11.92	11.70	11.69	11.48
802.11g	2462	11	8.61	8.61	8.64	8.69	8.57	8.56	8.58	8.52

Table 9-10
IEEE 802.11n Average RF Power

Mode	Freq [MHz]	Channel	802.11n (2.4GHz) Conducted Power [dBm]							
			Data Rate [Mbps]							
			6.5	13	19.5	26	39	52	58.5	65
802.11n	2412	1	8.59	8.61	8.55	8.45	8.52	8.54	8.57	8.52
802.11n	2417	2	10.68	10.89	10.38	10.70	10.48	10.39	10.49	10.92
802.11n	2437	6	10.74	10.76	10.71	10.54	10.61	10.65	10.71	10.60
802.11n	2457	10	10.97	10.53	10.50	10.31	10.81	10.51	10.37	10.49
802.11n	2462	11	8.58	8.59	8.47	8.46	8.55	8.45	8.59	8.55

Table 9-11
IEEE 802.11a Average RF Power

Mode	Freq [MHz]	Channel	802.11a Conducted Power [dBm]							
			Data Rate [Mbps]							
			6	9	12	18	24	36	48	54
802.11a	5180	36*	11.62	11.59	11.49	11.67	11.63	11.61	11.41	11.46
802.11a	5200	40	**13.79**	13.78	13.63	13.88	13.90	13.78	13.57	13.55
802.11a	5220	44	13.59	13.55	13.52	13.61	13.63	13.51	13.34	13.41
802.11a	5240	48*	13.65	13.69	13.56	13.73	13.64	13.70	13.46	13.42
802.11a	5260	52*	15.58	15.77	15.65	15.74	15.67	15.80	15.74	15.69
802.11a	5280	56	15.44	15.59	15.51	15.59	15.53	15.72	15.59	15.60
802.11a	5300	60	**15.59**	15.72	15.65	15.73	15.69	15.76	15.78	15.65
802.11a	5320	64*	13.65	13.83	13.69	13.87	13.74	13.84	13.80	13.78
802.11a	5500	100	13.57	13.54	13.65	13.51	13.49	13.52	13.46	13.58
802.11a	5520	104*	15.51	15.45	15.53	15.46	15.44	15.43	15.36	15.50
802.11a	5540	108	15.36	15.35	15.42	15.39	15.32	15.28	15.22	15.38
802.11a	5560	112	15.31	15.23	15.45	15.31	15.22	15.24	15.17	15.36
802.11a	5580	116*	15.27	15.28	15.36	15.19	15.14	15.25	15.12	15.33
802.11a	5600	120	**16.01**	15.95	15.93	15.93	15.99	16.00	15.97	15.92
802.11a	5620	124*	15.97	15.93	15.90	15.98	16.00	15.96	15.99	15.90
802.11a	5640	128	15.99	15.96	15.98	15.99	16.00	16.02	15.91	15.98
802.11a	5660	132	15.21	15.16	15.26	15.18	15.17	15.13	15.10	15.22
802.11a	5680	136*	15.45	15.41	15.53	15.34	15.39	15.40	15.41	15.47
802.11a	5700	140	13.52	13.56	13.65	13.42	13.46	13.52	13.37	13.47
802.11a	5745	149*	13.42	13.49	13.62	13.42	13.40	13.46	13.37	13.33
802.11a	5765	153	**15.41**	15.47	15.59	15.45	15.40	15.49	15.38	15.33
802.11a	5785	157*	15.39	15.38	15.62	15.43	15.37	15.39	15.27	15.29
802.11a	5805	161	15.35	15.41	15.55	15.34	15.35	15.35	15.20	15.24
802.11a	5825	165*	13.29	13.34	13.52	13.26	13.24	13.29	13.21	13.23

(*) – 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.

Table 9-12
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	11.72	11.84	11.98	11.75	11.70	11.85	11.79	11.81
802.11n	5200	40	13.90	13.98	14.01	13.87	13.88	14.03	13.97	13.92
802.11n	5220	44	13.81	13.92	13.99	13.85	13.83	13.90	13.88	13.85
802.11n	5240	48	13.87	13.94	13.97	13.80	13.84	13.92	13.89	13.97
802.11n	5260	52	15.72	15.82	15.80	15.77	15.81	15.68	15.61	15.81
802.11n	5280	56	15.62	15.80	15.75	15.79	15.77	15.63	15.58	15.70
802.11n	5300	60	15.65	15.72	15.83	15.75	15.80	15.55	15.56	15.76
802.11n	5320	64	13.67	13.93	13.92	13.75	13.85	13.68	13.52	13.73
802.11n	5500	100	13.59	13.51	13.49	13.56	13.68	13.71	13.55	13.67
802.11n	5520	104	15.41	15.27	15.31	15.40	15.48	15.62	15.38	15.50
802.11n	5540	108	15.45	15.40	15.29	15.38	15.60	15.66	15.40	15.49
802.11n	5560	112	15.52	15.41	15.50	15.44	15.65	15.65	15.49	15.64
802.11n	5580	116	15.51	15.47	15.45	15.50	15.61	15.63	15.39	15.57
802.11n	5600	120	16.19	16.09	16.15	16.09	16.15	16.13	16.16	16.12
802.11n	5620	124	16.05	16.02	16.04	16.06	16.02	16.05	16.04	16.06
802.11n	5640	128	16.06	16.05	16.08	16.07	16.03	16.08	16.05	16.09
802.11n	5660	132	15.54	15.49	15.43	15.48	15.63	15.72	15.51	15.60
802.11n	5680	136	15.62	15.55	15.46	15.54	15.69	15.73	15.66	15.76
802.11n	5700	140	13.98	13.91	13.88	13.90	14.02	14.05	13.93	14.14
802.11n	5745	149	13.50	13.38	13.55	13.40	13.57	13.35	13.62	13.44
802.11n	5765	153	15.35	15.20	15.41	15.35	15.34	15.22	15.43	15.34
802.11n	5785	157	15.45	15.42	15.57	15.34	15.50	15.25	15.64	15.37
802.11n	5805	161	15.38	15.29	15.40	15.33	15.51	15.23	15.53	15.29
802.11n	5825	165	13.38	13.24	13.37	13.22	13.42	13.29	13.58	13.37

Table 9-13
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	10.89	10.86	10.74	10.79	10.77	10.81	10.90	10.75
802.11n	5230	46	11.02	11.00	10.81	10.85	10.91	10.90	11.03	10.84
802.11n	5270	54	10.71	10.89	10.94	10.87	10.84	10.96	10.91	10.94
802.11n	5310	62	10.64	10.78	10.96	10.79	10.77	10.80	10.88	10.86
802.11n	5510	102	10.67	10.69	10.79	10.61	10.59	10.81	10.61	10.67
802.11n	5550	110	10.81	10.84	10.85	10.74	10.74	10.88	10.74	10.81
802.11n	5590	118	11.11	11.03	11.06	11.15	11.12	11.05	11.05	11.13
802.11n	5630	126	11.05	11.06	11.08	11.06	10.95	11.00	10.94	10.98
802.11n	5670	134	10.52	10.46	10.67	10.47	10.36	10.68	10.46	10.52
802.11n	5755	151	10.51	10.62	10.54	10.57	10.42	10.49	10.58	10.55
802.11n	5795	159	10.47	10.65	10.49	10.56	10.39	10.40	10.48	10.56

Table 9-14
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	**11.24**	11.25	11.12	11.28	11.34	11.40	11.40	11.38	11.35	10.47
802.11ac	5290	58	**11.26**	11.47	11.34	11.46	11.42	11.44	11.45	11.44	11.40	10.54
802.11ac	5530	106	**11.20**	11.12	11.15	11.35	11.22	11.37	11.21	11.34	11.19	10.16
802.11ac	5610	122	10.79	10.77	10.75	10.82	10.74	10.75	10.77	10.73	10.85	9.95
802.11ac	5775	155	**10.89**	10.94	10.85	10.99	10.91	11.09	10.92	10.95	10.99	10.09

Table 9-15
Average Bluetooth Conducted Power

Mode	Freq [MHz]	Channel	Average Bluetooth Conducted Power [dBm]		
			Data Rate [Mbps]		
			1.0	2.0	3.0
Bluetooth	2402	0	9.27	7.73	7.78
Bluetooth	2441	39	**9.61**	7.93	8.11
Bluetooth	2480	78	8.94	7.38	7.45

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, 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) 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, 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.

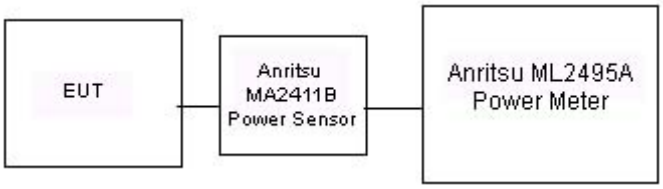


Figure 9-4
Power Measurement Setup for Bandwidths < 50 MHz

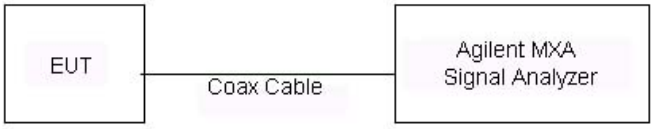


Figure 9-5
Power Measurement Setup for Bandwidths > 50 MHz

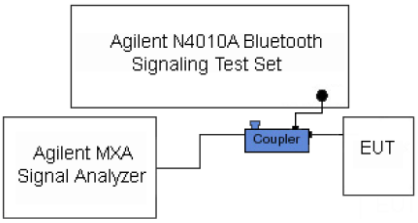


Figure 9-6
Bluetooth Power Measurement Setup

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
09/18/2014	750H	22.6	710	0.873	40.911	0.890	42.149	-1.91%	-2.94%
			740	0.899	40.444	0.893	41.994	0.67%	-3.69%
			755	0.910	40.227	0.894	41.916	1.79%	-4.03%
			770	0.923	40.010	0.895	41.838	3.13%	-4.37%
			785	0.938	39.808	0.896	41.760	4.69%	-4.67%
09/22/2014	835H	24.3	820	0.908	41.920	0.899	41.578	1.00%	0.82%
			835	0.921	41.715	0.900	41.500	2.33%	0.52%
			850	0.935	41.527	0.916	41.500	2.07%	0.07%
09/17/2014	1750H	22.8	1710	1.318	39.693	1.348	40.142	-2.23%	-1.12%
			1750	1.357	39.498	1.371	40.079	-1.02%	-1.45%
			1790	1.397	39.314	1.394	40.016	0.22%	-1.75%
09/18/2014	1900H	22.9	1850	1.371	40.103	1.400	40.000	-2.07%	0.26%
			1880	1.404	39.962	1.400	40.000	0.29%	-0.09%
			1910	1.435	39.849	1.400	40.000	2.50%	-0.38%
09/22/2014	1900H	22.3	1850	1.394	39.468	1.400	40.000	-0.43%	-1.33%
			1880	1.423	39.372	1.400	40.000	1.64%	-1.57%
			1910	1.454	39.210	1.400	40.000	3.86%	-1.98%
06/17/2014	2450H	22.4	2401	1.692	40.138	1.756	39.287	-3.64%	2.17%
			2450	1.743	39.937	1.800	39.200	-3.17%	1.88%
			2499	1.795	39.764	1.853	39.138	-3.13%	1.60%
06/12/2014	5200H-5800H	23.6	5200	4.490	36.570	4.655	35.986	-3.54%	1.62%
			5220	4.513	36.537	4.676	35.963	-3.49%	1.60%
			5280	4.575	36.531	4.737	35.894	-3.42%	1.77%
			5300	4.584	36.488	4.758	35.871	-3.66%	1.72%
			5500	4.783	36.228	4.963	35.643	-3.63%	1.64%
			5520	4.798	36.209	4.983	35.620	-3.71%	1.65%
			5540	4.816	36.197	5.004	35.597	-3.76%	1.69%
			5600	4.883	36.072	5.065	35.529	-3.59%	1.53%
			5765	5.050	35.930	5.234	35.340	-3.52%	1.67%
			5785	5.055	35.910	5.255	35.317	-3.81%	1.68%
			5800	5.066	35.886	5.270	35.300	-3.87%	1.66%

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
09/17/2014	750B	22.4	710	0.936	54.206	0.960	55.687	-2.50%	-2.66%
			725	0.949	54.067	0.961	55.629	-1.25%	-2.81%
			740	0.962	53.869	0.963	55.570	-0.10%	-3.06%
			755	0.976	53.716	0.964	55.512	1.24%	-3.24%
			770	0.991	53.532	0.965	55.453	2.69%	-3.46%
			785	1.006	53.352	0.966	55.395	4.14%	-3.69%
09/22/2014	750B	24.5	710	0.941	54.405	0.960	55.687	-1.98%	-2.30%
			740	0.971	54.113	0.963	55.570	0.83%	-2.62%
			755	0.983	53.931	0.964	55.512	1.97%	-2.85%
			770	0.996	53.752	0.965	55.453	3.21%	-3.07%
			785	1.010	53.568	0.966	55.395	4.55%	-3.30%
09/18/2014	835B	23.2	820	0.988	54.276	0.969	55.258	1.96%	-1.78%
			835	1.002	54.133	0.970	55.200	3.30%	-1.93%
			850	1.017	53.955	0.988	55.154	2.94%	-2.17%
10/01/2014	835B	22.8	820	0.984	54.324	0.969	55.258	1.55%	-1.69%
			835	0.999	54.166	0.970	55.200	2.99%	-1.87%
			850	1.015	54.031	0.988	55.154	2.73%	-2.04%
09/18/2014	1750B	23.1	1710	1.405	52.059	1.463	53.537	-3.96%	-2.76%
			1750	1.445	51.879	1.488	53.432	-2.89%	-2.91%
			1790	1.487	51.747	1.514	53.326	-1.78%	-2.96%
09/24/2014	1750B	22.1	1710	1.404	53.373	1.463	53.537	-4.03%	-0.31%
			1750	1.447	53.197	1.488	53.432	-2.76%	-0.44%
			1790	1.494	53.111	1.514	53.326	-1.32%	-0.40%
09/23/2014	1900B	23.7	1850	1.468	50.986	1.520	53.300	-3.42%	-4.34%
			1880	1.502	50.892	1.520	53.300	-1.18%	-4.52%
			1910	1.539	50.799	1.520	53.300	1.25%	-4.69%
06/12/2014	2450B	23.4	2401	1.904	51.405	1.903	52.765	0.05%	-2.58%
			2450	1.970	51.213	1.950	52.700	1.03%	-2.82%
			2499	2.031	51.040	2.019	52.638	0.59%	-3.04%
06/16/2014	5200B-5800B	23.0	5200	5.248	48.501	5.299	49.014	-0.96%	-1.05%
			5220	5.283	48.420	5.323	48.987	-0.75%	-1.16%
			5280	5.380	48.310	5.393	48.906	-0.24%	-1.22%
			5300	5.412	48.270	5.416	48.879	-0.07%	-1.25%
			5500	5.714	47.790	5.650	48.607	1.13%	-1.68%
			5520	5.752	47.726	5.673	48.580	1.39%	-1.76%
			5540	5.772	47.675	5.696	48.553	1.33%	-1.81%
			5600	5.865	47.502	5.766	48.471	1.72%	-2.00%
			5640	5.923	47.472	5.813	48.417	1.89%	-1.95%
			5680	5.973	47.350	5.860	48.363	1.93%	-2.09%
			5765	6.122	47.153	5.959	48.248	2.74%	-2.27%
			5785	6.139	47.129	5.982	48.220	2.62%	-2.26%
			5800	6.168	47.082	6.000	48.200	2.80%	-2.32%
			5805	6.173	47.043	6.006	48.193	2.78%	-2.39%

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.

10.2 Test System Verification

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

Table 10-3
System Verification Results – 1g

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)	$Deviation_{1g}$ (%)
D	750	HEAD	09/18/2014	24.3	23.6	0.100	1003	3263	0.860	8.370	8.600	2.75%
E	835	HEAD	09/22/2014	24.2	23.0	0.100	4d119	3914	0.991	9.220	9.910	7.48%
G	1750	HEAD	09/17/2014	24.0	23.0	0.100	1008	3258	3.430	36.900	34.300	-7.05%
K	1900	HEAD	09/18/2014	24.5	23.1	0.100	5d141	3287	3.980	40.100	39.800	-0.75%
K	1900	HEAD	09/22/2014	24.4	22.3	0.100	5d141	3287	4.260	40.100	42.600	6.23%
G	2450	HEAD	06/17/2014	22.5	21.8	0.100	797	3258	4.990	51.800	49.900	-3.67%
E	5200	HEAD	06/12/2014	23.9	23.6	0.100	1057	3914	7.710	78.000	77.100	-1.15%
E	5300	HEAD	06/12/2014	23.9	23.6	0.100	1057	3914	8.020	83.000	80.200	-3.37%
E	5500	HEAD	06/12/2014	24.0	23.6	0.100	1057	3914	7.770	84.300	77.700	-7.83%
E	5600	HEAD	06/12/2014	23.9	23.6	0.100	1057	3914	7.760	83.500	77.600	-7.07%
E	5800	HEAD	06/12/2014	23.9	23.7	0.100	1057	3914	7.320	79.300	73.200	-7.69%
I	750	BODY	09/17/2014	23.9	22.4	0.100	1003	3209	0.920	8.770	9.200	4.90%
I	750	BODY	09/22/2014	24.5	24.5	0.100	1003	3209	0.933	8.770	9.330	6.39%
D	835	BODY	09/18/2014	23.8	23.2	0.100	4d119	3263	0.974	9.340	9.740	4.28%
D	835	BODY	10/01/2014	23.6	23.4	0.100	4d119	3263	0.995	9.340	9.950	6.53%
H	1750	BODY	09/18/2014	24.5	22.8	0.100	1008	3319	3.650	37.600	36.500	-2.93%
G	1750	BODY	09/24/2014	22.1	22.4	0.100	1008	3258	3.460	37.600	34.600	-7.98%
K	1900	BODY	09/23/2014	23.8	23.7	0.100	5d141	3287	3.960	40.600	39.600	-2.46%
G	2450	BODY	06/12/2014	23.1	22.5	0.100	797	3258	4.920	49.400	49.200	-0.40%
E	5200	BODY	06/16/2014	24.4	23.0	0.100	1057	3914	7.220	75.300	72.200	-4.12%
E	5300	BODY	06/16/2014	24.4	23.0	0.100	1057	3914	7.500	77.400	75.000	-3.10%
E	5500	BODY	06/16/2014	24.1	23.1	0.100	1057	3914	7.240	79.100	72.400	-8.47%
E	5600	BODY	06/16/2014	24.1	23.0	0.100	1057	3914	7.690	80.200	76.900	-4.11%
E	5800	BODY	06/16/2014	24.1	23.0	0.100	1057	3914	6.880	74.300	68.800	-7.40%

Table 10-4
System Verification Results – 10g

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_{10g} (W/kg)	1 W Target SAR_{10g} (W/kg)	1 W Normalized SAR_{10g} (W/kg)	$Deviation_{10g}$ (%)
I	750	BODY	09/22/2014	24.5	24.5	0.100	1003	3209	0.621	5.780	6.210	7.44%
D	835	BODY	09/18/2014	23.8	23.2	0.100	4d119	3263	0.639	6.150	6.390	3.90%
G	1750	BODY	09/24/2014	22.1	22.4	0.100	1008	3258	1.850	20.100	18.500	-7.96%
K	1900	BODY	09/23/2014	23.8	23.7	0.100	5d141	3287	2.060	21.600	20.600	-4.63%
G	2450	BODY	06/12/2014	23.1	22.5	0.100	797	3258	2.310	23.100	23.100	0.00%
E	5200	BODY	06/16/2014	24.4	23.0	0.100	1057	3914	2.090	21.000	20.900	-0.48%
E	5300	BODY	06/16/2014	24.4	23.0	0.100	1057	3914	2.120	21.500	21.200	-1.40%
E	5500	BODY	06/16/2014	24.1	23.1	0.100	1057	3914	2.050	22.000	20.500	-6.82%
E	5600	BODY	06/16/2014	24.1	23.0	0.100	1057	3914	2.160	22.200	21.600	-2.70%
E	5800	BODY	06/16/2014	24.1	23.0	0.100	1057	3914	1.950	20.400	19.500	-4.41%

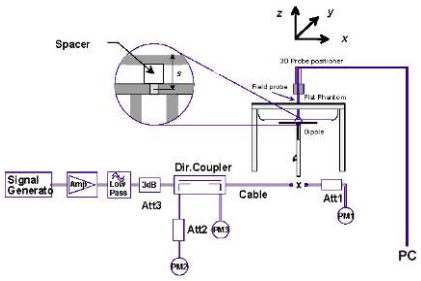


Figure 10-1
System Verification Setup Diagram

Figure 10-2
System Verification Setup Photo

11 SAR DATA SUMMARY

11.1 Standalone Head SAR Data

Table 11-1
GSM 850 Head SAR Data

MEASUREMENT RESULTS															
FREQUENCY		Mode/Band	Service	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Power Drift [dB]	Side	Test Position	Device Serial Number	# of Time Slots	Duty Cycle	SAR (1g)	Scaling Factor	Scaled SAR (1g)	Plot #
MHz	Ch.											(W/kg)		(W/kg)	
836.60	190	GSM 850	GSM	33.3	33.00	0.01	Right	Cheek	46	1	1:8.3	0.274	1.072	0.294	
836.60	190	GSM 850	GSM	33.3	33.00	0.06	Right	Tilt	46	1	1:8.3	0.152	1.072	0.163	
836.60	190	GSM 850	GSM	33.3	33.00	0.05	Left	Cheek	46	1	1:8.3	0.264	1.072	0.283	
836.60	190	GSM 850	GSM	33.3	33.00	0.00	Left	Tilt	46	1	1:8.3	0.161	1.072	0.173	
836.60	190	GSM 850	GPRS	27.8	27.62	-0.05	Right	Cheek	46	4	1:2.076	0.532	1.042	**0.554**	A1
836.60	190	GSM 850	GPRS	27.8	27.62	-0.02	Right	Tilt	46	4	1:2.076	0.302	1.042	0.315	
836.60	190	GSM 850	GPRS	27.8	27.62	0.04	Left	Cheek	46	4	1:2.076	0.474	1.042	0.494	
836.60	190	GSM 850	GPRS	27.8	27.62	-0.07	Left	Tilt	46	4	1:2.076	0.310	1.042	0.323	
ANSI / IEEE C95.1 1992 - SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population							Head 1.6 W/kg (mW/g) averaged over 1 gram								

Table 11-2
GSM 1900 Head SAR Data

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	30.2	30.10	-0.19	Right	Cheek	45	1	1:8.3	0.226	1.023	0.231	
1880.00	661	GSM 1900	GSM	30.2	30.10	-0.04	Right	Tilt	45	1	1:8.3	0.130	1.023	0.133	
1880.00	661	GSM 1900	GSM	30.2	30.10	0.09	Left	Cheek	45	1	1:8.3	0.253	1.023	0.259	A2
1880.00	661	GSM 1900	GSM	30.2	30.10	-0.15	Left	Tilt	45	1	1:8.3	0.123	1.023	0.126	
1880.00	661	GSM 1900	GPRS	24.7	24.70	-0.10	Right	Cheek	45	4	1:2.076	0.171	1.000	0.171	
1880.00	661	GSM 1900	GPRS	24.7	24.70	-0.17	Right	Tilt	45	4	1:2.076	0.118	1.000	0.118	
1880.00	661	GSM 1900	GPRS	24.7	24.70	0.13	Left	Cheek	45	4	1:2.076	0.230	1.000	0.230	
1880.00	661	GSM 1900	GPRS	24.7	24.70	-0.16	Left	Tilt	45	4	1:2.076	0.122	1.000	0.122	
ANSI / IEEE C95.1 1992 - SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population							Head 1.6 W/kg (mW/g) averaged over 1 gram								

Table 11-3
UMTS 850 Head SAR Data

MEASUREMENT RESULTS														
FREQUENCY		Mode/Band	Service	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Power Drift [dB]	Side	Test Position	Device Serial Number	Duty Cycle	SAR (1g)	Scaling Factor	Scaled SAR (1g)	Plot #
MHz	Ch.										(W/kg)		(W/kg)	
836.60	4183	UMTS 850	RMC	23.6	23.42	-0.01	Right	Cheek	46	1:1	0.405	1.042	0.422	A3
836.60	4183	UMTS 850	RMC	23.6	23.42	0.01	Right	Tilt	46	1:1	0.221	1.042	0.230	
836.60	4183	UMTS 850	RMC	23.6	23.42	0.15	Left	Cheek	46	1:1	0.343	1.042	0.357	
836.60	4183	UMTS 850	RMC	23.6	23.42	0.02	Left	Tilt	46	1:1	0.211	1.042	0.220	
ANSI / IEEE C95.1 1992 - SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population							Head 1.6 W/kg (mW/g) averaged over 1 gram							

Table 11-4
UMTS 1900 Head SAR Data

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	23.5	23.08	-0.19	Right	Cheek	45	1:1	0.343	1.102	0.378	
1880.00	9400	UMTS 1900	RMC	23.5	23.08	-0.14	Right	Tilt	45	1:1	0.201	1.102	0.222	
1880.00	9400	UMTS 1900	RMC	23.5	23.08	0.16	Left	Cheek	45	1:1	0.368	1.102	0.406	A4
1880.00	9400	UMTS 1900	RMC	23.5	23.08	-0.06	Left	Tilt	45	1:1	0.183	1.102	0.202	
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
Cell. CDMA Head SAR Data

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	Cell. CDMA	RC3 / SO55	24.5	23.73	-0.07	Right	Cheek	44	1:1	0.155	1.194	0.185	
836.52	384	Cell. CDMA	RC3 / SO55	24.5	23.73	0.10	Right	Tilt	44	1:1	0.108	1.194	0.129	
836.52	384	Cell. CDMA	RC3 / SO55	24.5	23.73	0.06	Left	Cheek	44	1:1	0.159	1.194	0.190	A5
836.52	384	Cell. CDMA	RC3 / SO55	24.5	23.73	0.10	Left	Tilt	44	1:1	0.110	1.194	0.131	
836.52	384	Cell. CDMA	EVDO Rev. A	23.9	23.54	0.05	Right	Cheek	44	1:1	0.157	1.086	0.171	
836.52	384	Cell. CDMA	EVDO Rev. A	23.9	23.54	0.01	Right	Tilt	44	1:1	0.105	1.086	0.114	
836.52	384	Cell. CDMA	EVDO Rev. A	23.9	23.54	0.01	Left	Cheek	44	1:1	0.150	1.086	0.163	
836.52	384	Cell. CDMA	EVDO Rev. A	23.9	23.54	0.03	Left	Tilt	44	1:1	0.107	1.086	0.116	
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 11-6
PCS CDMA Head SAR Data

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)	
1908.75	1175	PCS CDMA	RC3 / SO55	24.0	23.95	-0.06	Right	Cheek	44	1:1	0.132	1.012	0.134	
1908.75	1175	PCS CDMA	RC3 / SO55	24.0	23.95	0.16	Right	Tilt	44	1:1	0.059	1.012	0.060	
1908.75	1175	PCS CDMA	RC3 / SO55	24.0	23.95	0.03	Left	Cheek	44	1:1	0.225	1.012	0.228	A6
1908.75	1175	PCS CDMA	RC3 / SO55	24.0	23.95	-0.16	Left	Tilt	44	1:1	0.097	1.012	0.098	
1908.75	1175	PCS CDMA	EVDO Rev. A	23.8	23.78	0.05	Right	Cheek	44	1:1	0.108	1.005	0.109	
1908.75	1175	PCS CDMA	EVDO Rev. A	23.8	23.78	-0.09	Right	Tilt	44	1:1	0.067	1.005	0.067	
1908.75	1175	PCS CDMA	EVDO Rev. A	23.8	23.78	0.13	Left	Cheek	44	1:1	0.185	1.005	0.186	
1908.75	1175	PCS CDMA	EVDO Rev. A	23.8	23.78	-0.07	Left	Tilt	44	1:1	0.086	1.005	0.086	
ANSI / IEEE C95.1 1992 - SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population							Head 1.6 W/kg (mW/g) averaged over 1 gram							

Table 11-7
LTE Band 17 Head SAR Data

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) (W/kg)	Scaling Factor	Scaled SAR (1g) (W/kg)	Plot #
MHz	Ch.																		
710.00	23790	Mid	LTE Band 17	10	23.4	23.35	0.01	0	Right	Cheek	QPSK	1	0	44	1:1	0.280	1.012	0.283	A7
710.00	23790	Mid	LTE Band 17	10	22.4	22.30	-0.03	1	Right	Cheek	QPSK	25	25	44	1:1	0.217	1.023	0.222	
710.00	23790	Mid	LTE Band 17	10	23.4	23.35	0.13	0	Right	Tilt	QPSK	1	0	44	1:1	0.150	1.012	0.152	
710.00	23790	Mid	LTE Band 17	10	22.4	22.30	0.03	1	Right	Tilt	QPSK	25	25	44	1:1	0.118	1.023	0.121	
710.00	23790	Mid	LTE Band 17	10	23.4	23.35	0.15	0	Left	Cheek	QPSK	1	0	44	1:1	0.251	1.012	0.254	
710.00	23790	Mid	LTE Band 17	10	22.4	22.30	-0.01	1	Left	Cheek	QPSK	25	25	44	1:1	0.191	1.023	0.195	
710.00	23790	Mid	LTE Band 17	10	23.4	23.35	0.02	0	Left	Tilt	QPSK	1	0	44	1:1	0.125	1.012	0.127	
710.00	23790	Mid	LTE Band 17	10	22.4	22.30	0.09	1	Left	Tilt	QPSK	25	25	44	1:1	0.094	1.023	0.096	
ANSI / IEEE C95.1 1992 - SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population																Head 1.6 W/kg (mW/g) averaged over 1 gram			

Table 11-8
LTE Band 13 Head SAR Data

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) (W/kg)	Scaling Factor	Scaled SAR (1g) (W/kg)	Plot #
MHz	Ch.																		
782.00	23230	Mid	LTE Band 13	10	24.0	23.23	0.06	0	Right	Cheek	QPSK	1	25	46	1:1	0.302	1.194	0.361	
782.00	23230	Mid	LTE Band 13	10	23.0	22.26	0.03	1	Right	Cheek	QPSK	25	12	46	1:1	0.250	1.186	0.297	
782.00	23230	Mid	LTE Band 13	10	24.0	23.23	0.09	0	Right	Tilt	QPSK	1	25	46	1:1	0.165	1.194	0.197	
782.00	23230	Mid	LTE Band 13	10	23.0	22.26	0.06	1	Right	Tilt	QPSK	25	12	46	1:1	0.137	1.186	0.162	
782.00	23230	Mid	LTE Band 13	10	24.0	23.23	0.04	0	Left	Cheek	QPSK	1	25	46	1:1	0.318	1.194	0.380	A8
782.00	23230	Mid	LTE Band 13	10	23.0	22.26	0.07	1	Left	Cheek	QPSK	25	12	46	1:1	0.253	1.186	0.300	
782.00	23230	Mid	LTE Band 13	10	24.0	23.23	-0.03	0	Left	Tilt	QPSK	1	25	46	1:1	0.180	1.194	0.215	
782.00	23230	Mid	LTE Band 13	10	23.0	22.26	0.05	1	Left	Tilt	QPSK	25	12	46	1:1	0.139	1.186	0.165	
ANSI / IEEE C95.1 1992 - SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population																Head 1.6 W/kg (mW/g) averaged over 1 gram			

Table 11-9
LTE Band 4 (AWS) Head SAR Data

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) (W/kg)	Scaling Factor	Scaled SAR (1g) (W/kg)	Plot #
MHz	Ch.																		
1732.50	20175	Mid	LTE Band 4 (AWS)	20	23.5	23.49	-0.08	0	Right	Cheek	QPSK	1	99	44	1:1	0.267	1.002	0.268	
1732.50	20175	Mid	LTE Band 4 (AWS)	20	22.5	22.50	-0.03	1	Right	Cheek	QPSK	50	50	44	1:1	0.197	1.000	0.197	
1732.50	20175	Mid	LTE Band 4 (AWS)	20	23.5	23.49	0.00	0	Right	Tilt	QPSK	1	99	44	1:1	0.155	1.002	0.155	
1732.50	20175	Mid	LTE Band 4 (AWS)	20	22.5	22.50	0.07	1	Right	Tilt	QPSK	50	50	44	1:1	0.150	1.000	0.150	
1732.50	20175	Mid	LTE Band 4 (AWS)	20	23.5	23.49	0.05	0	Left	Cheek	QPSK	1	99	44	1:1	0.281	1.002	0.282	A9
1732.50	20175	Mid	LTE Band 4 (AWS)	20	22.5	22.50	-0.15	1	Left	Cheek	QPSK	50	50	44	1:1	0.276	1.000	0.276	
1732.50	20175	Mid	LTE Band 4 (AWS)	20	23.5	23.49	-0.05	0	Left	Tilt	QPSK	1	99	44	1:1	0.160	1.002	0.160	
1732.50	20175	Mid	LTE Band 4 (AWS)	20	22.5	22.50	-0.03	1	Left	Tilt	QPSK	50	50	44	1:1	0.155	1.000	0.155	
ANSI / IEEE C95.1 1992 - SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population																Head 1.6 W/kg (mW/g) averaged over 1 gram			

Table 11-10
DTS Head SAR Data

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) (W/kg)	Scaling Factor	Scaled SAR (1g) (W/kg)	Plot #
MHz	Ch.														
2462	11	IEEE 802.11b	DSSS	15.8	14.14	0.02	Right	Cheek	WIFI_SAR	1	1:1	0.037	1.466	**0.054**	A10
2462	11	IEEE 802.11b	DSSS	15.8	14.14	0.02	Right	Tilt	WIFI_SAR	1	1:1	0.029	1.466	0.043	
2462	11	IEEE 802.11b	DSSS	15.8	14.14	0.11	Left	Cheek	WIFI_SAR	1	1:1	0.031	1.466	0.045	
2462	11	IEEE 802.11b	DSSS	15.8	14.14	0.08	Left	Tilt	WIFI_SAR	1	1:1	0.032	1.466	0.047	
ANSI / IEEE C95.1 1992 - SAFETY LIMIT **Spatial Peak** **Uncontrolled Exposure/General Population**							**Head** **1.6 W/kg (mW/g)** averaged over 1 gram								

Table 11-11
NII Head SAR Data

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) (W/kg)	Scaling Factor	Scaled SAR (1g) (W/kg)	Plot #
MHz	Ch.														
5200	40	IEEE 802.11a	OFDM	15.2	13.79	-0.01	Right	Cheek	WIFI_SAR	6	1:1	0.026	1.384	0.036	
5210	42	IEEE 802.11ac	OFDM	12.5	11.24	0.08	Right	Cheek	WIFI_SAR	29.3	1:1	0.017	1.337	0.023	
5200	40	IEEE 802.11a	OFDM	15.2	13.79	0.19	Right	Tilt	WIFI_SAR	6	1:1	0.010	1.384	0.014	
5200	40	IEEE 802.11a	OFDM	15.2	13.79	-0.19	Left	Cheek	WIFI_SAR	6	1:1	0.020	1.384	0.028	
5200	40	IEEE 802.11a	OFDM	15.2	13.79	-0.13	Left	Tilt	WIFI_SAR	6	1:1	0.011	1.384	0.015	
5300	60	IEEE 802.11a	OFDM	16.4	15.59	-0.14	Right	Cheek	WIFI_SAR	6	1:1	0.087	1.205	**0.105**	A11
5290	58	IEEE 802.11ac	OFDM	12.5	11.26	0.02	Right	Cheek	WIFI_SAR	29.3	1:1	0.022	1.330	0.029	
5300	60	IEEE 802.11a	OFDM	16.4	15.59	0.14	Right	Tilt	WIFI_SAR	6	1:1	0.014	1.205	0.017	
5300	60	IEEE 802.11a	OFDM	16.4	15.59	-0.11	Left	Cheek	WIFI_SAR	6	1:1	0.038	1.205	0.046	
5300	60	IEEE 802.11a	OFDM	16.4	15.59	-0.14	Left	Tilt	WIFI_SAR	6	1:1	0.020	1.205	0.024	
5600	120	IEEE 802.11a	OFDM	16.8	16.01	-0.16	Right	Cheek	WIFI_SAR	6	1:1	0.072	1.199	0.086	
5530	106	IEEE 802.11ac	OFDM	12.0	11.20	0.02	Right	Cheek	WIFI_SAR	29.3	1:1	0.025	1.202	0.030	
5600	120	IEEE 802.11a	OFDM	16.8	16.01	-0.13	Right	Tilt	WIFI_SAR	6	1:1	0.016	1.199	0.019	
5600	120	IEEE 802.11a	OFDM	16.8	16.01	-0.14	Left	Cheek	WIFI_SAR	6	1:1	0.040	1.199	0.048	
5600	120	IEEE 802.11a	OFDM	16.8	16.01	-0.06	Left	Tilt	WIFI_SAR	6	1:1	0.025	1.199	0.030	
5765	153	IEEE 802.11a	OFDM	16.6	15.41	0.07	Right	Cheek	WIFI_SAR	6	1:1	0.050	1.315	0.066	
5775	155	IEEE 802.11ac	OFDM	12.5	10.89	-0.14	Right	Cheek	WIFI_SAR	29.3	1:1	0.026	1.449	0.038	
5765	153	IEEE 802.11a	OFDM	16.6	15.41	0.18	Right	Tilt	WIFI_SAR	6	1:1	0.029	1.315	0.038	
5765	153	IEEE 802.11a	OFDM	16.6	15.41	-0.17	Left	Cheek	WIFI_SAR	6	1:1	0.018	1.315	0.024	
5765	153	IEEE 802.11a	OFDM	16.6	15.41	-0.13	Left	Tilt	WIFI_SAR	6	1:1	0.013	1.315	0.017	
ANSI / IEEE C95.1 1992 - SAFETY LIMIT **Spatial Peak** **Uncontrolled Exposure/General Population**							**Head** **1.6 W/kg (mW/g)** averaged over 1 gram								

11.2 Standalone Body-Worn SAR Data

Table 11-12
GSM/UMTS/CDMA Body-Worn SAR Data

MEASUREMENT RESULTS																	
FREQUENCY		Mode	Service	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Power Drift [dB]	Device Serial Number	# of Time Slots	Duty Cycle	Accessory Type	Spacing	Side	SAR (1g)	Scaling Factor	Scaled SAR (1g)	Plot #
MHz	Ch.												(W/kg)		(W/kg)	
836.60	190	GSM 850	GSM	33.3	33.00	0.02	45	1	1:8.3	None	10 mm	back	0.173	1.072	0.185	
836.60	190	GSM 850	GSM	33.3	33.00	-0.02	45	1	1:8.3	Body Holster	0 mm	back	0.105	1.072	0.113	
836.60	190	GSM 850	GSM	33.3	33.00	-0.02	45	1	1:8.3	Body Holster	0 mm	front	0.143	1.072	0.153	
836.60	190	GSM 850	GPRS	27.8	27.62	0.01	45	4	1:2.076	None	10 mm	back	0.287	1.042	0.299	
836.60	190	GSM 850	GPRS	27.8	27.62	-0.05	45	4	1:2.076	Body Holster	0 mm	back	0.217	1.042	0.226	
836.60	190	GSM 850	GPRS	27.8	27.62	-0.08	45	4	1:2.076	Body Holster	0 mm	front	0.292	1.042	0.304	A12
1880.00	661	GSM 1900	GSM	30.2	30.10	0.05	46	1	1:8.3	None	10 mm	back	0.148	1.023	0.151	A14
1880.00	661	GSM 1900	GSM	30.2	30.10	0.04	46	1	1:8.3	Body Holster	0 mm	back	0.071	1.023	0.073	
1880.00	661	GSM 1900	GSM	30.2	30.10	0.15	46	1	1:8.3	Body Holster	0 mm	front	0.077	1.023	0.079	
1880.00	661	GSM 1900	GPRS	24.7	24.70	-0.02	46	4	1:2.076	None	10 mm	back	0.138	1.000	0.138	
1880.00	661	GSM 1900	GPRS	24.7	24.70	0.04	46	4	1:2.076	Body Holster	0 mm	back	0.087	1.000	0.087	
1880.00	661	GSM 1900	GPRS	24.7	24.70	0.09	46	4	1:2.076	Body Holster	0 mm	front	0.096	1.000	0.096	
836.60	4183	UMTS 850	RMC	23.6	23.42	0.02	45	N/A	1:1	None	10 mm	back	0.272	1.042	0.283	A16
836.60	4183	UMTS 850	RMC	23.6	23.42	0.04	45	N/A	1:1	Body Holster	0 mm	back	0.155	1.042	0.162	
836.60	4183	UMTS 850	RMC	23.6	23.42	0.02	45	N/A	1:1	Body Holster	0 mm	front	0.221	1.042	0.230	
1880.00	9400	UMTS 1900	RMC	23.5	23.08	-0.05	44	N/A	1:1	None	10 mm	back	0.265	1.102	0.292	A18
1880.00	9400	UMTS 1900	RMC	23.5	23.08	0.05	44	N/A	1:1	Body Holster	0 mm	back	0.146	1.102	0.161	
1880.00	9400	UMTS 1900	RMC	23.5	23.08	0.06	44	N/A	1:1	Body Holster	0 mm	front	0.159	1.102	0.175	
836.52	384	Cell. CDMA	TDSO / SO32	24.5	23.79	0.02	44	N/A	1:1	None	10 mm	back	0.463	1.178	0.545	A20
836.52	384	Cell. CDMA	TDSO / SO32	24.5	23.79	-0.01	44	N/A	1:1	Body Holster	0 mm	back	0.204	1.178	0.240	
836.52	384	Cell. CDMA	TDSO / SO32	24.5	23.79	0.04	44	N/A	1:1	Body Holster	0 mm	front	0.072	1.178	0.085	
1851.25	25	PCS CDMA	TDSO / SO32	24.0	23.91	-0.08	44	N/A	1:1	None	10 mm	back	0.807	1.021	0.824	
1880.00	600	PCS CDMA	TDSO / SO32	24.0	23.25	-0.13	44	N/A	1:1	None	10 mm	back	0.758	1.189	**0.901**	
1908.75	1175	PCS CDMA	TDSO / SO32	24.0	23.96	-0.06	44	N/A	1:1	None	10 mm	back	0.877	1.009	0.885	A21
1908.75	1175	PCS CDMA	TDSO / SO32	24.0	23.96	-0.13	44	N/A	1:1	Body Holster	0 mm	back	0.424	1.009	0.428	
1908.75	1175	PCS CDMA	TDSO / SO32	24.0	23.96	-0.07	44	N/A	1:1	Body Holster	0 mm	front	0.033	1.009	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						

Table 11-13
LTE Body-Worn 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	Accessory Type	Spacing	Side	Duty Cycle	SAR (1g)	Scaling Factor	Scaled SAR (1g)	Plot #
MHz	Ch.																(W/kg)		(W/kg)	
710.00	23790	Mid	LTE Band 17	10	23.4	23.35	0.05	0	46	QPSK	1	0	None	10 mm	back	1:1	0.160	1.012	0.162	
710.00	23790	Mid	LTE Band 17	10	22.4	22.30	0.02	1	46	QPSK	25	25	None	10 mm	back	1:1	0.125	1.023	0.128	
710.00	23790	Mid	LTE Band 17	10	23.4	23.35	-0.01	0	46	QPSK	1	0	Body Holster	0 mm	back	1:1	0.091	1.012	0.092	
710.00	23790	Mid	LTE Band 17	10	22.4	22.30	0.03	1	46	QPSK	25	25	Body Holster	0 mm	back	1:1	0.070	1.023	0.072	
710.00	23790	Mid	LTE Band 17	10	23.4	23.35	0.04	0	46	QPSK	1	0	Body Holster	0 mm	front	1:1	0.184	1.012	0.186	A23
710.00	23790	Mid	LTE Band 17	10	22.4	22.30	-0.01	1	46	QPSK	25	25	Body Holster	0 mm	front	1:1	0.142	1.023	0.145	
782.00	23230	Mid	LTE Band 13	10	24.0	23.23	-0.21	0	46	QPSK	1	25	None	10 mm	back	1:1	0.211	1.194	0.252	A25
782.00	23230	Mid	LTE Band 13	10	23.0	22.26	0.02	1	46	QPSK	25	12	None	10 mm	back	1:1	0.152	1.186	0.180	
782.00	23230	Mid	LTE Band 13	10	24.0	23.23	-0.08	0	46	QPSK	1	25	Body Holster	0 mm	back	1:1	0.069	1.194	0.082	
782.00	23230	Mid	LTE Band 13	10	23.0	22.26	0.00	1	46	QPSK	25	12	Body Holster	0 mm	back	1:1	0.055	1.186	0.065	
782.00	23230	Mid	LTE Band 13	10	24.0	23.23	0.00	0	46	QPSK	1	25	Body Holster	0 mm	front	1:1	0.162	1.194	0.193	
782.00	23230	Mid	LTE Band 13	10	23.0	22.26	0.04	1	46	QPSK	25	12	Body Holster	0 mm	front	1:1	0.128	1.186	0.152	
1732.50	20175	Mid	LTE Band 4 (AWS)	20	23.5	23.49	-0.08	0	44	QPSK	1	99	None	10 mm	back	1:1	0.139	1.002	0.139	
1732.50	20175	Mid	LTE Band 4 (AWS)	20	22.5	22.50	0.06	1	44	QPSK	50	50	None	10 mm	back	1:1	0.115	1.000	0.115	
1732.50	20175	Mid	LTE Band 4 (AWS)	20	23.5	23.49	-0.01	0	44	QPSK	1	99	Body Holster	0 mm	back	1:1	0.065	1.002	0.065	
1732.50	20175	Mid	LTE Band 4 (AWS)	20	22.5	22.50	-0.03	1	44	QPSK	50	50	Body Holster	0 mm	back	1:1	0.061	1.000	0.061	
1732.50	20175	Mid	LTE Band 4 (AWS)	20	23.5	23.49	0.00	0	44	QPSK	1	99	Body Holster	0 mm	front	1:1	0.222	1.002	0.222	A27
1732.50	20175	Mid	LTE Band 4 (AWS)	20	22.5	22.50	-0.03	1	44	QPSK	50	50	Body Holster	0 mm	front	1:1	0.206	1.000	0.206	
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 11-14
DTS Body-Worn SAR Data

MEASUREMENT RESULTS																
FREQUENCY		Mode	Service	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Power Drift [dB]	Spacing	Accessory Type	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	15.8	14.14	0.03	10 mm	None	WIFI_SAR	1	back	1:1	0.137	1.466	**0.201**	A29
2462	11	IEEE 802.11b	DSSS	15.8	14.14	-0.13	0 mm	Body Holster	WIFI_SAR	1	back	1:1	0.042	1.466	0.062	
2462	11	IEEE 802.11b	DSSS	15.8	14.14	0.12	0 mm	Body Holster	WIFI_SAR	1	front	1:1	0.016	1.466	0.023	
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 11-15
NII Body-Worn SAR Data

MEASUREMENT RESULTS																
FREQUENCY		Mode	Service	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Power Drift [dB]	Spacing	Accessory Type	Device Serial Number	Data Rate (Mbps)	Side	Duty Cycle	SAR (1g)	Scaling Factor	Scaled SAR (1g)	Plot #
MHz	Ch.												(W/kg)		(W/kg)	
5200	40	IEEE 802.11a	OFDM	15.2	13.79	0.15	10 mm	None	WIFI_SAR	6	back	1:1	0.201	1.384	0.278	
5200	40	IEEE 802.11a	OFDM	15.2	13.79	-0.12	0 mm	Body Holster	WIFI_SAR	6	back	1:1	0.295	1.384	0.408	
5210	42	IEEE 802.11ac	OFDM	12.5	11.24	-0.14	0 mm	Body Holster	WIFI_SAR	29.3	back	1:1	0.092	1.337	0.123	
5200	40	IEEE 802.11a	OFDM	15.2	13.79	-0.18	0 mm	Body Holster	WIFI_SAR	6	front	1:1	0.010	1.384	0.014	
5300	60	IEEE 802.11a	OFDM	16.4	15.59	-0.10	10 mm	None	WIFI_SAR	6	back	1:1	0.286	1.205	0.345	
5300	60	IEEE 802.11a	OFDM	16.4	15.59	-0.10	0 mm	Body Holster	WIFI_SAR	6	back	1:1	0.292	1.205	0.352	
5290	58	IEEE 802.11ac	OFDM	12.5	11.26	0.10	0 mm	Body Holster	WIFI_SAR	29.3	back	1:1	0.081	1.330	0.108	
5300	60	IEEE 802.11a	OFDM	16.4	15.59	-0.20	0 mm	Body Holster	WIFI_SAR	6	front	1:1	0.034	1.205	0.041	
5600	120	IEEE 802.11a	OFDM	16.8	16.01	-0.17	10 mm	None	WIFI_SAR	6	back	1:1	0.278	1.199	0.333	
5520	104	IEEE 802.11a	OFDM	17.1	15.51	-0.16	0 mm	Body Holster	WIFI_SAR	6	back	1:1	0.296	1.442	0.427	
5600	120	IEEE 802.11a	OFDM	16.8	16.01	-0.12	0 mm	Body Holster	WIFI_SAR	6	back	1:1	0.430	1.199	0.516	A30
5640	128	IEEE 802.11a	OFDM	16.8	15.99	-0.08	0 mm	Body Holster	WIFI_SAR	6	back	1:1	0.294	1.205	0.354	
5680	136	IEEE 802.11a	OFDM	16.8	15.45	-0.04	0 mm	Body Holster	WIFI_SAR	6	back	1:1	0.311	1.365	0.425	
5530	106	IEEE 802.11ac	OFDM	12.0	11.20	-0.15	0 mm	Body Holster	WIFI_SAR	29.3	back	1:1	0.055	1.202	0.066	
5600	120	IEEE 802.11a	OFDM	16.8	16.01	-0.17	0 mm	Body Holster	WIFI_SAR	6	front	1:1	0.034	1.199	0.041	
5765	153	IEEE 802.11a	OFDM	16.6	15.41	-0.08	10 mm	None	WIFI_SAR	6	back	1:1	0.284	1.315	0.373	
5765	153	IEEE 802.11a	OFDM	16.6	15.41	0.08	0 mm	Body Holster	WIFI_SAR	6	back	1:1	0.403	1.315	**0.530**	
5785	157	IEEE 802.11a	OFDM	16.8	15.39	-0.21	0 mm	Body Holster	WIFI_SAR	6	back	1:1	0.272	1.384	0.376	
5805	161	IEEE 802.11a	OFDM	16.8	15.35	-0.11	0 mm	Body Holster	WIFI_SAR	6	back	1:1	0.317	1.396	0.443	
5775	155	IEEE 802.11ac	OFDM	12.5	10.89	-0.06	0 mm	Body Holster	WIFI_SAR	29.3	back	1:1	0.072	1.449	0.104	
5765	153	IEEE 802.11a	OFDM	16.6	15.41	0.12	0 mm	Body Holster	WIFI_SAR	6	front	1:1	0.025	1.315	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								

Table 11-16
DSS Body-Worn SAR Data

MEASUREMENT RESULTS																
FREQUENCY		Mode	Service	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Power Drift [dB]	Spacing	Accessory Type	Device Serial Number	Data Rate (Mbps)	Side	Duty Cycle	SAR (1g)	Scaling Factor	Scaled SAR (1g)	Plot #
MHz	Ch.												(W/kg)		(W/kg)	
2441	39	Bluetooth	FHSS	10.2	9.61	0.13	0 mm	Body Holster	WIFI_SAR	1	back	1:1	0.006	1.146	**0.007**	A31
2441	39	Bluetooth	FHSS	10.2	9.61	0.18	0 mm	Body Holster	WIFI_SAR	1	front	1:1	0.002	1.146	0.002	
ANSI / IEEE C95.1 1992 - SAFETY LIMIT **Spatial Peak** **Uncontrolled Exposure/General Population**								**Body** **1.6 W/kg (mW/g)** averaged over 1 gram								

11.3 Standalone Wireless Router SAR Data

Table 11-17
GPRS 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)	
836.60	190	GSM 850	GPRS	27.8	27.62	0.01	10 mm	45	4	1:2.076	back	0.287	1.042	0.299	
836.60	190	GSM 850	GPRS	27.8	27.62	-0.02	10 mm	45	4	1:2.076	front	0.368	1.042	0.383	A13
836.60	190	GSM 850	GPRS	27.8	27.62	-0.01	10 mm	45	4	1:2.076	bottom	0.208	1.042	0.217	
836.60	190	GSM 850	GPRS	27.8	27.62	-0.11	10 mm	45	4	1:2.076	right	0.361	1.042	0.376	
836.60	190	GSM 850	GPRS	27.8	27.62	-0.04	10 mm	45	4	1:2.076	left	0.283	1.042	0.295	
1880.00	661	GSM 1900	GPRS	24.7	24.70	-0.02	10 mm	46	4	1:2.076	back	0.138	1.000	0.138	
1880.00	661	GSM 1900	GPRS	24.7	24.70	0.12	10 mm	46	4	1:2.076	front	0.373	1.000	0.373	A15
1880.00	661	GSM 1900	GPRS	24.7	24.70	0.00	10 mm	46	4	1:2.076	bottom	0.237	1.000	0.237	
1880.00	661	GSM 1900	GPRS	24.7	24.70	0.05	10 mm	46	4	1:2.076	right	0.071	1.000	0.071	
1880.00	661	GSM 1900	GPRS	24.7	24.70	0.04	10 mm	46	4	1:2.076	left	0.131	1.000	0.131	
ANSI / IEEE C95.1 1992 - SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population							Body 1.6 W/kg (mW/g) averaged over 1 gram								

Table 11-18
UMTS Hotspot SAR Data

MEASUREMENT RESULTS														
FREQUENCY		Mode	Service	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Power Drift [dB]	Spacing	Device Serial Number	Duty Cycle	Side	SAR (1g)	Scaling Factor	Scaled SAR (1g)	Plot #
MHz	Ch.										(W/kg)		(W/kg)	
836.60	4183	UMTS 850	RMC	23.6	23.42	0.02	10 mm	45	1:1	back	0.272	1.042	0.283	
836.60	4183	UMTS 850	RMC	23.6	23.42	0.02	10 mm	45	1:1	front	0.345	1.042	0.359	A17
836.60	4183	UMTS 850	RMC	23.6	23.42	-0.06	10 mm	45	1:1	bottom	0.170	1.042	0.177	
836.60	4183	UMTS 850	RMC	23.6	23.42	-0.03	10 mm	45	1:1	right	0.295	1.042	0.307	
836.60	4183	UMTS 850	RMC	23.6	23.42	0.03	10 mm	45	1:1	left	0.237	1.042	0.247	
1880.00	9400	UMTS 1900	RMC	23.5	23.08	-0.05	10 mm	44	1:1	back	0.265	1.102	0.292	
1880.00	9400	UMTS 1900	RMC	23.5	23.08	-0.10	10 mm	44	1:1	front	0.665	1.102	0.733	A19
1880.00	9400	UMTS 1900	RMC	23.5	23.08	0.03	10 mm	44	1:1	bottom	0.375	1.102	0.413	
1880.00	9400	UMTS 1900	RMC	23.5	23.08	-0.02	10 mm	44	1:1	right	0.123	1.102	0.136	
1880.00	9400	UMTS 1900	RMC	23.5	23.08	-0.02	10 mm	44	1:1	left	0.221	1.102	0.244	
ANSI / IEEE C95.1 1992 - SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population							Body 1.6 W/kg (mW/g) averaged over 1 gram							

Table 11-19
CDMA Hotspot SAR Data

MEASUREMENT RESULTS														
FREQUENCY		Mode	Service	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Power Drift [dB]	Spacing	Device Serial Number	Duty Cycle	Side	SAR (1g)	Scaling Factor	Scaled SAR (1g)	Plot #
MHz	Ch.										(W/kg)		(W/kg)	
836.52	384	Cell. CDMA	TDSO / SO32	24.5	23.79	0.02	10 mm	44	1:1	back	0.463	1.178	0.545	A20
836.52	384	Cell. CDMA	TDSO / SO32	24.5	23.79	0.06	10 mm	44	1:1	front	0.105	1.178	0.124	
836.52	384	Cell. CDMA	TDSO / SO32	24.5	23.79	0.08	10 mm	44	1:1	top	0.068	1.178	0.080	
836.52	384	Cell. CDMA	TDSO / SO32	24.5	23.79	-0.01	10 mm	44	1:1	right	0.262	1.178	0.309	
836.52	384	Cell. CDMA	EVDO Rev. 0	23.9	23.58	0.01	10 mm	44	1:1	back	0.457	1.076	0.492	
836.52	384	Cell. CDMA	EVDO Rev. 0	23.9	23.58	0.03	10 mm	44	1:1	front	0.110	1.076	0.118	
836.52	384	Cell. CDMA	EVDO Rev. 0	23.9	23.58	0.00	10 mm	44	1:1	top	0.065	1.076	0.070	
836.52	384	Cell. CDMA	EVDO Rev. 0	23.9	23.58	0.00	10 mm	44	1:1	right	0.271	1.076	0.292	
1851.25	25	PCS CDMA	TDSO / SO32	24.0	23.91	-0.08	10 mm	44	1:1	back	0.807	1.021	0.824	
1880.00	600	PCS CDMA	TDSO / SO32	24.0	23.25	-0.13	10 mm	44	1:1	back	0.758	1.189	0.901	
1908.75	1175	PCS CDMA	TDSO / SO32	24.0	23.96	-0.06	10 mm	44	1:1	back	0.877	1.009	0.885	
1908.75	1175	PCS CDMA	TDSO / SO32	24.0	23.96	0.02	10 mm	44	1:1	front	0.097	1.009	0.098	
1908.75	1175	PCS CDMA	TDSO / SO32	24.0	23.96	0.07	10 mm	44	1:1	top	0.063	1.009	0.064	
1851.25	25	PCS CDMA	TDSO / SO32	24.0	23.91	0.06	10 mm	44	1:1	right	0.656	1.021	0.670	
1880.00	600	PCS CDMA	TDSO / SO32	24.0	23.25	-0.02	10 mm	44	1:1	right	0.631	1.189	0.750	
1908.75	1175	PCS CDMA	TDSO / SO32	24.0	23.96	0.02	10 mm	44	1:1	right	0.822	1.009	0.829	
1851.25	25	PCS CDMA	EVDO Rev. 0	23.8	23.75	-0.08	10 mm	44	1:1	back	0.784	1.012	0.793	
1880.00	600	PCS CDMA	EVDO Rev. 0	23.8	23.25	-0.10	10 mm	44	1:1	back	0.735	1.135	0.834	
1908.75	1175	PCS CDMA	EVDO Rev. 0	23.8	23.80	-0.15	10 mm	44	1:1	back	0.964	1.000	**0.964**	A22
1908.75	1175	PCS CDMA	EVDO Rev. 0	23.8	23.80	-0.09	10 mm	44	1:1	front	0.076	1.000	0.076	
1908.75	1175	PCS CDMA	EVDO Rev. 0	23.8	23.80	0.03	10 mm	44	1:1	top	0.053	1.000	0.053	
1908.75	1175	PCS CDMA	EVDO Rev. 0	23.8	23.80	-0.02	10 mm	44	1:1	right	0.725	1.000	0.725	
1908.75	1175	PCS CDMA	EVDO Rev. 0	23.8	23.80	-0.13	10 mm	44	1:1	back	0.909	1.000	0.909	
ANSI / IEEE C95.1 1992 - SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population										Body 1.6 W/kg (mW/g) averaged over 1 gram				

Note: Blue entry represents variability data.

Table 11-20
LTE Band 17 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)	
710.00	23790	Mid	LTE Band 17	10	23.4	23.35	0.05	0	46	QPSK	1	0	10 mm	back	1:1	0.160	1.012	0.162	
710.00	23790	Mid	LTE Band 17	10	22.4	22.30	0.02	1	46	QPSK	25	25	10 mm	back	1:1	0.125	1.023	0.128	
710.00	23790	Mid	LTE Band 17	10	23.4	23.35	-0.01	0	46	QPSK	1	0	10 mm	front	1:1	0.287	1.012	0.290	A24
710.00	23790	Mid	LTE Band 17	10	22.4	22.30	-0.03	1	46	QPSK	25	25	10 mm	front	1:1	0.240	1.023	0.246	
710.00	23790	Mid	LTE Band 17	10	23.4	23.35	0.10	0	46	QPSK	1	0	10 mm	bottom	1:1	0.037	1.012	0.037	
710.00	23790	Mid	LTE Band 17	10	22.4	22.30	0.09	1	46	QPSK	25	25	10 mm	bottom	1:1	0.032	1.023	0.033	
710.00	23790	Mid	LTE Band 17	10	23.4	23.35	0.04	0	46	QPSK	1	0	10 mm	right	1:1	0.158	1.012	0.160	
710.00	23790	Mid	LTE Band 17	10	22.4	22.30	0.01	1	46	QPSK	25	25	10 mm	right	1:1	0.119	1.023	0.122	
710.00	23790	Mid	LTE Band 17	10	23.4	23.35	0.00	0	46	QPSK	1	0	10 mm	left	1:1	0.177	1.012	0.179	
710.00	23790	Mid	LTE Band 17	10	22.4	22.30	0.04	1	46	QPSK	25	25	10 mm	left	1:1	0.133	1.023	0.136	
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 13 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.																		
782.00	23230	Mid	LTE Band 13	10	24.0	23.23	-0.21	0	46	QPSK	1	25	10 mm	back	1:1	0.211	1.194	0.252	
782.00	23230	Mid	LTE Band 13	10	23.0	22.26	0.02	1	46	QPSK	25	12	10 mm	back	1:1	0.152	1.186	0.180	
782.00	23230	Mid	LTE Band 13	10	24.0	23.23	0.01	0	46	QPSK	1	25	10 mm	front	1:1	0.285	1.194	0.340	A26
782.00	23230	Mid	LTE Band 13	10	23.0	22.26	0.01	1	46	QPSK	25	12	10 mm	front	1:1	0.227	1.186	0.269	
782.00	23230	Mid	LTE Band 13	10	24.0	23.23	0.05	0	46	QPSK	1	25	10 mm	bottom	1:1	0.094	1.194	0.112	
782.00	23230	Mid	LTE Band 13	10	23.0	22.26	-0.03	1	46	QPSK	25	12	10 mm	bottom	1:1	0.077	1.186	0.091	
782.00	23230	Mid	LTE Band 13	10	24.0	23.23	0.03	0	46	QPSK	1	25	10 mm	right	1:1	0.159	1.194	0.190	
782.00	23230	Mid	LTE Band 13	10	23.0	22.26	-0.01	1	46	QPSK	25	12	10 mm	right	1:1	0.126	1.186	0.149	
782.00	23230	Mid	LTE Band 13	10	24.0	23.23	0.02	0	46	QPSK	1	25	10 mm	left	1:1	0.132	1.194	0.158	
782.00	23230	Mid	LTE Band 13	10	23.0	22.26	0.10	1	46	QPSK	25	12	10 mm	left	1:1	0.106	1.186	0.126	
ANSI / IEEE C95.1 1992 - SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population										Body 1.6 W/kg (mW/g) averaged over 1 gram									

Table 11-22
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) (W/kg)	Scaling Factor	Scaled SAR (1g) (W/kg)	Plot #
MHz	Ch.																		
1732.50	20175	Mid	LTE Band 4 (AWS)	20	23.5	23.49	-0.08	0	44	QPSK	1	99	10 mm	back	1:1	0.139	1.002	0.139	
1732.50	20175	Mid	LTE Band 4 (AWS)	20	22.5	22.50	0.06	1	44	QPSK	50	50	10 mm	back	1:1	0.115	1.000	0.115	
1732.50	20175	Mid	LTE Band 4 (AWS)	20	23.5	23.49	0.07	0	44	QPSK	1	99	10 mm	front	1:1	0.702	1.002	0.703	A28
1732.50	20175	Mid	LTE Band 4 (AWS)	20	22.5	22.50	0.07	1	44	QPSK	50	50	10 mm	front	1:1	0.549	1.000	0.549	
1732.50	20175	Mid	LTE Band 4 (AWS)	20	23.5	23.49	-0.04	0	44	QPSK	1	99	10 mm	bottom	1:1	0.217	1.002	0.217	
1732.50	20175	Mid	LTE Band 4 (AWS)	20	22.5	22.50	-0.02	1	44	QPSK	50	50	10 mm	bottom	1:1	0.198	1.000	0.198	
1732.50	20175	Mid	LTE Band 4 (AWS)	20	23.5	23.49	0.14	0	44	QPSK	1	99	10 mm	right	1:1	0.038	1.002	0.038	
1732.50	20175	Mid	LTE Band 4 (AWS)	20	22.5	22.50	-0.01	1	44	QPSK	50	50	10 mm	right	1:1	0.034	1.000	0.034	
1732.50	20175	Mid	LTE Band 4 (AWS)	20	23.5	23.49	-0.01	0	44	QPSK	1	99	10 mm	left	1:1	0.183	1.002	0.183	
1732.50	20175	Mid	LTE Band 4 (AWS)	20	22.5	22.50	-0.04	1	44	QPSK	50	50	10 mm	left	1:1	0.168	1.000	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 11-23
DTS Hotspot SAR Data

MEASUREMENT RESULTS														
FREQUENCY		Mode	Service	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Power Drift [dB]	Spacing	Data Rate (Mbps)	Device Serial Number	Side	Duty Cycle	SAR (1g) (W/kg)	Scaling Factor	Scaled SAR (1g) (W/kg)	Plot #
MHz	Ch.														
2462	11	IEEE 802.11b	DSSS	15.8	14.14	0.03	10 mm	1	WIFI_SAR	back	1:1	0.137	1.466	**0.201**	A29
2462	11	IEEE 802.11b	DSSS	15.8	14.14	0.14	10 mm	1	WIFI_SAR	front	1:1	0.026	1.466	0.038	
2462	11	IEEE 802.11b	DSSS	15.8	14.14	0.08	10 mm	1	WIFI_SAR	left	1:1	0.099	1.466	0.145	
ANSI / IEEE C95.1 1992 - SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population										Body 1.6 W/kg (mW/g) averaged over 1 gram					

11.4 Standalone Extremity SAR Data

Table 11-24
GPRS/UMTS/CDMA Extremity SAR Data

MEASUREMENT RESULTS																	
FREQUENCY		Mode	Service	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Power Drift [dB]	Device Serial Number	# of GPRS Slots	Duty Cycle	Accessory Type	Spacing	Side	SAR (10g)	Scaling Factor	Scaled SAR (10g)	Plot #
MHz	Ch.												(W/kg)		(W/kg)	
836.60	190	GSM 850	GPRS	27.8	27.62	0.00	45	4	1:2.076	Hand Strap, Top Right	0 mm	back	0.247	1.042	0.257	
836.60	190	GSM 850	GPRS	27.8	27.62	-0.02	45	4	1:2.076	Hand Strap, Top Left	0 mm	back	0.270	1.042	0.281	A32
1880.00	661	GSM 1900	GPRS	24.7	24.70	0.10	46	4	1:2.076	Hand Strap, Top Right	0 mm	back	0.163	1.000	0.163	
1880.00	661	GSM 1900	GPRS	24.7	24.70	0.03	46	4	1:2.076	Hand Strap, Top Left	0 mm	back	0.191	1.000	0.191	A33
836.60	4183	UMTS 850	RMC	23.6	23.42	0.01	45	N/A	1:1	Hand Strap, Top Right	0 mm	back	0.250	1.042	0.261	A34
836.60	4183	UMTS 850	RMC	23.6	23.42	0.06	45	N/A	1:1	Hand Strap, Top Left	0 mm	back	0.248	1.042	0.258	
1880.00	9400	UMTS 1900	RMC	23.5	23.08	-0.07	46	N/A	1:1	Hand Strap, Top Right	0 mm	back	0.299	1.102	0.329	
1880.00	9400	UMTS 1900	RMC	23.5	23.08	0.04	46	N/A	1:1	Hand Strap, Top Left	0 mm	back	0.345	1.102	0.380	A35
836.52	384	Cell. CDMA	TDSO / SO32	24.5	23.79	-0.17	44	N/A	1:1	Hand Strap, Top Right	0 mm	back	0.467	1.178	0.550	
836.52	384	Cell. CDMA	TDSO / SO32	24.5	23.79	-0.16	44	N/A	1:1	Hand Strap, Top Left	0 mm	back	0.514	1.178	0.605	
836.52	384	Cell. CDMA	EVDO Rev. 0	23.9	23.58	0.01	44	N/A	1:1	Hand Strap, Top Right	0 mm	back	0.563	1.076	0.606	
836.52	384	Cell. CDMA	EVDO Rev. 0	23.9	23.58	-0.01	44	N/A	1:1	Hand Strap, Top Left	0 mm	back	0.572	1.076	0.615	A36
1908.75	1175	PCS CDMA	TDSO / SO32	24.0	23.96	0.07	44	N/A	1:1	Hand Strap, Top Right	0 mm	back	0.964	1.009	0.973	
1908.75	1175	PCS CDMA	TDSO / SO32	24.0	23.96	-0.17	44	N/A	1:1	Hand Strap, Top Left	0 mm	back	0.940	1.009	0.948	
1908.75	1175	PCS CDMA	EVDO Rev. 0	23.8	23.80	-0.13	44	N/A	1:1	Hand Strap, Top Right	0 mm	back	1.060	1.000	**1.060**	A37
1908.75	1175	PCS CDMA	EVDO Rev. 0	23.8	23.80	-0.12	44	N/A	1:1	Hand Strap, Top Left	0 mm	back	1.050	1.000	1.050	

ANSI / IEEE C95.1 1992 - SAFETY LIMIT	Extremity
Spatial Peak	4.0 W/kg (mW/g)
Uncontrolled Exposure/General Population	averaged over 10 grams

Table 11-25
LTE Extremity 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	Accessory Type	Spacing	Side	Duty Cycle	SAR (10g)	Scaling Factor	Scaled SAR (10g)	Plot #
MHz	Ch.																(W/kg)		(W/kg)	
710.00	23790	Mid	LTE Band 17	10	23.4	23.35	0.01	0	46	QPSK	1	0	Hand Strap, Top Right	0 mm	back	1:1	0.145	1.012	0.147	A38
710.00	23790	Mid	LTE Band 17	10	22.4	22.30	0.03	1	46	QPSK	25	25	Hand Strap, Top Right	0 mm	back	1:1	0.113	1.023	0.116	
710.00	23790	Mid	LTE Band 17	10	23.4	23.35	0.01	0	46	QPSK	1	0	Hand Strap, Top Left	0 mm	back	1:1	0.135	1.012	0.137	
710.00	23790	Mid	LTE Band 17	10	22.4	22.30	0.10	1	46	QPSK	25	25	Hand Strap, Top Left	0 mm	back	1:1	0.106	1.023	0.108	
782.00	23230	Mid	LTE Band 13	10	24.0	23.23	-0.02	0	46	QPSK	1	25	Hand Strap, Top Right	0 mm	back	1:1	0.327	1.194	0.390	A39
782.00	23230	Mid	LTE Band 13	10	23.0	22.26	-0.02	1	46	QPSK	25	12	Hand Strap, Top Right	0 mm	back	1:1	0.261	1.186	0.310	
782.00	23230	Mid	LTE Band 13	10	24.0	23.23	-0.02	0	46	QPSK	1	25	Hand Strap, Top Left	0 mm	back	1:1	0.303	1.194	0.362	
782.00	23230	Mid	LTE Band 13	10	23.0	22.26	0.02	1	46	QPSK	25	12	Hand Strap, Top Left	0 mm	back	1:1	0.243	1.186	0.288	
1732.50	20175	Mid	LTE Band 4 (AWS)	20	23.5	23.49	-0.04	0	44	QPSK	1	99	Hand Strap, Top Right	0 mm	back	1:1	0.209	1.002	0.209	A40
1732.50	20175	Mid	LTE Band 4 (AWS)	20	22.5	22.50	-0.07	1	44	QPSK	50	50	Hand Strap, Top Right	0 mm	back	1:1	0.169	1.000	0.169	
1732.50	20175	Mid	LTE Band 4 (AWS)	20	23.5	23.49	0.01	0	44	QPSK	1	99	Hand Strap, Top Left	0 mm	back	1:1	0.164	1.002	0.164	
1732.50	20175	Mid	LTE Band 4 (AWS)	20	22.5	22.50	-0.02	1	44	QPSK	50	50	Hand Strap, Top Left	0 mm	back	1:1	0.134	1.000	0.134	

ANSI / IEEE C95.1 1992 - SAFETY LIMIT	Extremity
Spatial Peak	4.0 W/kg (mW/g)
Uncontrolled Exposure/General Population	averaged over 10 grams

Table 11-26
DTS Extremity SAR Data

MEASUREMENT RESULTS																
FREQUENCY		Mode	Service	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Power Drift [dB]	Spacing	Accessory Type	Device Serial Number	Data Rate (Mbps)	Side	Duty Cycle	SAR (10g) (W/kg)	Scaling Factor	Scaled SAR (10g) (W/kg)	Plot #
MHz	Ch.															
2462	11	IEEE 802.11b	DSSS	15.8	14.14	0.05	0 mm	Hand Strap, Top Right	WIFI_SAR	1	back	1:1	0.115	1.466	**0.169**	A41
2462	11	IEEE 802.11b	DSSS	15.8	14.14	-0.02	0 mm	Hand Strap, Top Left	WIFI_SAR	1	back	1:1	0.105	1.466	0.154	
ANSI / IEEE C95.1 1992 - SAFETY LIMIT **Spatial Peak** **Uncontrolled Exposure/General Population**								**Extremity** **4.0 W/kg (mW/g)** averaged over 10 grams								

Table 11-27
NII Extremity SAR Data

MEASUREMENT RESULTS																
FREQUENCY		Mode	Service	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Power Drift [dB]	Spacing	Accessory Type	Device Serial Number	Data Rate (Mbps)	Side	Duty Cycle	SAR (10g) (W/kg)	Scaling Factor	Scaled SAR (10g) (W/kg)	Plot #
MHz	Ch.															
5200	40	IEEE 802.11a	OFDM	15.2	13.79	-0.12	0 mm	Hand Strap, Top Right	WIFI_SAR	6	back	1:1	0.153	1.384	0.212	
5200	40	IEEE 802.11a	OFDM	15.2	13.79	-0.04	0 mm	Hand Strap, Top Left	WIFI_SAR	6	back	1:1	0.093	1.384	0.129	
5200	40	IEEE 802.11a	OFDM	15.2	13.79	-0.02	0 mm	None	WIFI_SAR	6	back	1:1	0.268	1.384	0.371	
5210	42	IEEE 802.11ac	OFDM	12.5	11.24	-0.16	0 mm	None	WIFI_SAR	29.3	back	1:1	0.124	1.337	0.166	
5200	40	IEEE 802.11a	OFDM	15.2	13.79	-0.15	0 mm	None	WIFI_SAR	6	front	1:1	0.023	1.384	0.032	
5200	40	IEEE 802.11a	OFDM	15.2	13.79	-0.08	0 mm	None	WIFI_SAR	6	left	1:1	0.173	1.384	0.239	
5300	60	IEEE 802.11a	OFDM	16.4	15.59	-0.13	0 mm	Hand Strap, Top Right	WIFI_SAR	6	back	1:1	0.219	1.205	0.264	
5300	60	IEEE 802.11a	OFDM	16.4	15.59	0.03	0 mm	Hand Strap, Top Left	WIFI_SAR	6	back	1:1	0.173	1.205	0.208	
5300	60	IEEE 802.11a	OFDM	16.4	15.59	-0.03	0 mm	None	WIFI_SAR	6	back	1:1	0.390	1.205	**0.470**	A42
5290	58	IEEE 802.11ac	OFDM	12.5	11.26	-0.12	0 mm	None	WIFI_SAR	29.3	back	1:1	0.122	1.330	0.162	
5300	60	IEEE 802.11a	OFDM	16.4	15.59	-0.13	0 mm	None	WIFI_SAR	6	front	1:1	0.035	1.205	0.042	
5300	60	IEEE 802.11a	OFDM	16.4	15.59	-0.07	0 mm	None	WIFI_SAR	6	left	1:1	0.242	1.205	0.292	
5600	120	IEEE 802.11a	OFDM	16.8	16.01	-0.07	0 mm	Hand Strap, Top Right	WIFI_SAR	6	back	1:1	0.209	1.199	0.251	
5600	120	IEEE 802.11a	OFDM	16.8	16.01	-0.09	0 mm	Hand Strap, Top Left	WIFI_SAR	6	back	1:1	0.194	1.199	0.233	
5600	120	IEEE 802.11a	OFDM	16.8	16.01	-0.01	0 mm	None	WIFI_SAR	6	back	1:1	0.328	1.199	0.393	
5530	106	IEEE 802.11ac	OFDM	12.0	11.20	-0.19	0 mm	None	WIFI_SAR	29.3	back	1:1	0.147	1.202	0.177	
5600	120	IEEE 802.11a	OFDM	16.8	16.01	0.05	0 mm	None	WIFI_SAR	6	front	1:1	0.040	1.199	0.048	
5600	120	IEEE 802.11a	OFDM	16.8	16.01	0.00	0 mm	None	WIFI_SAR	6	left	1:1	0.263	1.199	0.315	
5765	153	IEEE 802.11a	OFDM	16.6	15.41	0.04	0 mm	Hand Strap, Top Right	WIFI_SAR	6	back	1:1	0.178	1.315	0.234	
5765	153	IEEE 802.11a	OFDM	16.6	15.41	-0.09	0 mm	Hand Strap, Top Left	WIFI_SAR	6	back	1:1	0.198	1.315	0.260	
5765	153	IEEE 802.11a	OFDM	16.6	15.41	-0.01	0 mm	None	WIFI_SAR	6	back	1:1	0.322	1.315	0.423	
5775	155	IEEE 802.11ac	OFDM	12.5	10.89	-0.05	0 mm	None	WIFI_SAR	29.3	back	1:1	0.137	1.449	0.199	
5765	153	IEEE 802.11a	OFDM	16.6	15.41	-0.13	0 mm	None	WIFI_SAR	6	front	1:1	0.032	1.315	0.042	
5765	153	IEEE 802.11a	OFDM	16.6	15.41	0.18	0 mm	None	WIFI_SAR	6	left	1:1	0.144	1.315	0.189	
ANSI / IEEE C95.1 1992 - SAFETY LIMIT **Spatial Peak** **Uncontrolled Exposure/General Population**								**Extremity** **4.0 W/kg (mW/g)** averaged over 10 grams								

11.5 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. A standard battery was used for all 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. This device has NFC operations. SAR tests were performed with the NFC antenna already incorporated.
6. SAR results were scaled to the maximum allowed power to demonstrate compliance per FCC KDB Publication 447498 D01v05.
7. Device was tested using a fixed spacing for body-worn accessory testing. A separation distance of 10 mm was considered because the manufacturer has determined that there will be body-worn accessories available in the marketplace for users to support this separation distance. A body-worn distance of 0 mm was used for testing with the belt holder accessory.
8. 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.
9. Per FCC KDB 865664 D01 v01, variability SAR tests were performed when the measured 1g SAR results for a frequency band were greater than 0.8 W/kg or when the measured 10g SAR results for a frequency band were greater than 2.0 W/kg. Repeated SAR measurements are highlighted in the tables above for clarity. Please see Section 13 for variability analysis.
10. 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).
11. Per FCC KDB Publication 648474 D04v01r01, this device is considered a "phablet" since the diagonal dimension is > 160 mm and < 200 mm. Therefore, extremity SAR tests are required when wireless router mode does not apply or if wireless router 1g SAR > 1.2 W/kg.
12. Per FCC KDB Publication 447498 D01 v05r02, the metallic body-worn accessories (body-holster and hand strap) were tested in conjunction with the host device to demonstrate compliance. The belt holster was evaluated as a body-worn accessory with front and back side evaluated for 1g body-worn SAR with the belt holster for each wireless technology and frequency band at 0mm from the phantom. The hand strap accessory was evaluated for compliance by measuring back side 10g extremity SAR at 0mm for each wireless technology and frequency band for both diagonal orientations of the metallic components.

GSM Test Notes:

1. This device supports GSM VOIP in the head and body-worn configurations; therefore GPRS was evaluated for head and body-worn compliance.
2. Body-Worn accessory testing is typically associated with voice operations. Therefore, GSM voice was evaluated for body-worn SAR. GPRS body-worn SAR was additionally evaluated for VOIP considerations.
3. 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 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.

4. Per FCC KDB Publication 447498 D01v05, if the reported (scaled) SAR measured at the middle channel or highest output power channel for each test configuration is ≤ 0.8 W/kg for 1g SAR or ≤ 2.0 W/kg for 10g SAR then testing at the other channels is not required for such test configuration(s). When the maximum output power variation across the required test channels is > ½ dB, instead of the middle channel, the highest output power channel was used.

UMTS Notes:

1. UMTS mode in was tested under RMC 12.2 kbps with HSPA Inactive per KDB Publication 941225 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.
2. Per FCC KDB Publication 447498 D01v05, if the reported (scaled) SAR measured at the middle channel or highest output power channel for each test configuration is ≤ 0.8 W/kg for 1g SAR or ≤ 2.0 W/kg for 10g SAR then testing at the other channels is not required for such test configuration(s). When the maximum output power variation across the required test channels is > ½ dB, instead of the middle channel, the highest output power channel was used.

CDMA Notes:

1. Head SAR for CDMA2000 mode was tested under RC3/SO55 per FCC KDB Publication 941225 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 ¼ 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.
5. 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 for 1g SAR or ≤ 2.0 W/kg for 10g SAR then testing at the other channels is not required for such test configuration(s). When the maximum output power variation across the required test channels is > ½ dB, instead of the middle channel, the highest output power channel was used.
6. CDMA 1x-RTT SAR was required to be evaluated for Hotspot & Hand Strap Extremity exposure conditions to support simultaneous transmission capabilities.

LTE Notes:

1. LTE Considerations: LTE test configurations are determined according to SAR Evaluation Considerations for LTE Devices in FCC KDB Publication 941225 D05v02r01. The general test procedures used for testing can be found in Section 8.5.4.
2. MPR is permanently implemented for this device by the manufacturer. The specific manufacturer target MPR is indicated alongside the SAR results. MPR is enabled for this device, according to 3GPP TS36.101 Section 6.2.3 – 6.2.5 under Table 6.2.3-1.
3. A-MPR was disabled for all SAR tests by setting NS=01 on the base station simulator. SAR tests were performed with the same number of RB and RB offsets transmitting on all TTI frames (maximum TTI).

WLAN/BT Notes:

1. 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) 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.
2. 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 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.
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 or the reported 1g averaged SAR is <0.8 W/kg or the reported 10g averaged SAR is <2.0 W/kg, SAR testing on other default channels was required.

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 a 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.

$$Estimated\ 1g\ SAR = \frac{\sqrt{\mathrm{f(GHz)}}}{7.5} * \frac{(\mathrm{Max\ Power\ of\ channel, mW})}{\mathrm{Min.\ Separation\ Distance, mm}}$$

$$Estimated\ 10g\ SAR = \frac{\sqrt{\mathrm{f(GHz}}}{18.75} * \frac{(\mathrm{Max\ Power\ of\ channel, mW})}{\mathrm{Min.\ Separation\ Distance, mm}}$$

Table 12-1
Estimated SAR

Mode	Frequency	Maximum Allowed Power	Separation Distance (Body)	Estimated 1g SAR (Body)
	[MHz]	[dBm]	[mm]	[W/kg]
Bluetooth	2441	10.20	10	0.208
Bluetooth LE	2480	2.50	5	0.084

Mode	Frequency	Maximum Allowed Power	Separation Distance (Body)	Estimated 10g SAR (Extremity)
	[MHz]	[dBm]	[mm]	[W/kg]
Bluetooth	2441	10.20	5	0.167

Note:

1. 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.
2. Per FCC KDB Publication 447498 D01v05r01, when the test separation distance is < 5 mm (touching), a distance of 5 mm is applied to determine estimated SAR.

12.3 Head SAR Simultaneous Transmission Analysis

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

Simult Tx	Configuration	GSM 850 SAR (W/kg)	2.4 GHz WLAN SAR (W/kg)	Σ 1g SAR (W/kg)
Head SAR	Right Cheek	0.294	0.054	**0.348**
	Right Tilt	0.163	0.043	0.206
	Left Cheek	0.283	0.045	0.328
	Left Tilt	0.173	0.047	0.220

Simult Tx	Configuration	GPRS 850 SAR (W/kg)	2.4 GHz WLAN SAR (W/kg)	Σ 1g SAR (W/kg)
Head SAR	Right Cheek	0.554	0.054	**0.608**
	Right Tilt	0.315	0.043	0.358
	Left Cheek	0.494	0.045	0.539
	Left Tilt	0.323	0.047	0.370

Simult Tx	Configuration	GSM 1900 SAR (W/kg)	2.4 GHz WLAN SAR (W/kg)	Σ 1g SAR (W/kg)
Head SAR	Right Cheek	0.231	0.054	0.285
	Right Tilt	0.133	0.043	0.176
	Left Cheek	0.259	0.045	**0.304**
	Left Tilt	0.126	0.047	0.173

Simult Tx	Configuration	GPRS 1900 SAR (W/kg)	2.4 GHz WLAN SAR (W/kg)	Σ 1g SAR (W/kg)
Head SAR	Right Cheek	0.171	0.054	0.225
	Right Tilt	0.118	0.043	0.161
	Left Cheek	0.230	0.045	**0.275**
	Left Tilt	0.122	0.047	0.169

Simult Tx	Configuration	UMTS 850 SAR (W/kg)	2.4 GHz WLAN SAR (W/kg)	Σ 1g SAR (W/kg)
Head SAR	Right Cheek	0.422	0.054	**0.476**
	Right Tilt	0.230	0.043	0.273
	Left Cheek	0.357	0.045	0.402
	Left Tilt	0.220	0.047	0.267

Simult Tx	Configuration	UMTS 1900 SAR (W/kg)	2.4 GHz WLAN SAR (W/kg)	Σ 1g SAR (W/kg)
Head SAR	Right Cheek	0.378	0.054	0.432
	Right Tilt	0.222	0.043	0.265
	Left Cheek	0.406	0.045	**0.451**
	Left Tilt	0.202	0.047	0.249

Simult Tx	Configuration	Cell. CDMA SAR (W/kg)	2.4 GHz WLAN SAR (W/kg)	Σ 1g SAR (W/kg)
Head SAR	Right Cheek	0.185	0.054	**0.239**
	Right Tilt	0.129	0.043	0.172
	Left Cheek	0.190	0.045	0.235
	Left Tilt	0.131	0.047	0.178

Simult Tx	Configuration	Cell. EVDO SAR (W/kg)	2.4 GHz WLAN SAR (W/kg)	Σ 1g SAR (W/kg)
Head SAR	Right Cheek	0.171	0.054	**0.225**
	Right Tilt	0.114	0.043	0.157
	Left Cheek	0.163	0.045	0.208
	Left Tilt	0.116	0.047	0.163

Simult Tx	Configuration	PCS CDMA SAR (W/kg)	2.4 GHz WLAN SAR (W/kg)	Σ 1g SAR (W/kg)
Head SAR	Right Cheek	0.134	0.054	0.188
	Right Tilt	0.060	0.043	0.103
	Left Cheek	0.228	0.045	**0.273**
	Left Tilt	0.098	0.047	0.145

Simult Tx	Configuration	PCS EVDO SAR (W/kg)	2.4 GHz WLAN SAR (W/kg)	Σ 1g SAR (W/kg)
Head SAR	Right Cheek	0.109	0.054	0.163
	Right Tilt	0.067	0.043	0.110
	Left Cheek	0.186	0.045	**0.231**
	Left Tilt	0.086	0.047	0.133

Simult Tx	Configuration	LTE Band 17 SAR (W/kg)	2.4 GHz WLAN SAR (W/kg)	Σ 1g SAR (W/kg)
Head SAR	Right Cheek	0.283	0.054	**0.337**
	Right Tilt	0.152	0.043	0.195
	Left Cheek	0.254	0.045	0.299
	Left Tilt	0.127	0.047	0.174

Simult Tx	Configuration	LTE Band 13 SAR (W/kg)	2.4 GHz WLAN SAR (W/kg)	Σ 1g SAR (W/kg)
Head SAR	Right Cheek	0.361	0.054	0.415
	Right Tilt	0.197	0.043	0.240
	Left Cheek	0.380	0.045	**0.425**
	Left Tilt	0.215	0.047	0.262

Simult Tx	Configuration	LTE Band 4 (AWS) SAR (W/kg)	2.4 GHz WLAN SAR (W/kg)	Σ 1g SAR (W/kg)
Head SAR	Right Cheek	0.268	0.054	0.322
	Right Tilt	0.155	0.043	0.198
	Left Cheek	0.282	0.045	**0.327**
	Left Tilt	0.160	0.047	0.207

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

Simult Tx	Configuration	GSM 850 SAR (W/kg)	5 GHz WLAN SAR (W/kg)	Σ 1g SAR (W/kg)
Head SAR	Right Cheek	0.294	0.105	**0.399**
	Right Tilt	0.163	0.038	0.201
	Left Cheek	0.283	0.048	0.331
	Left Tilt	0.173	0.030	0.203

Simult Tx	Configuration	GSM 1900 SAR (W/kg)	5 GHz WLAN SAR (W/kg)	Σ 1g SAR (W/kg)
Head SAR	Right Cheek	0.231	0.105	**0.336**
	Right Tilt	0.133	0.038	0.171
	Left Cheek	0.259	0.048	0.307
	Left Tilt	0.126	0.030	0.156

Simult Tx	Configuration	UMTS 850 SAR (W/kg)	5 GHz WLAN SAR (W/kg)	Σ 1g SAR (W/kg)
Head SAR	Right Cheek	0.422	0.105	**0.527**
	Right Tilt	0.230	0.038	0.268
	Left Cheek	0.357	0.048	0.405
	Left Tilt	0.220	0.030	0.250

Simult Tx	Configuration	UMTS 1900 SAR (W/kg)	5 GHz WLAN SAR (W/kg)	Σ 1g SAR (W/kg)
Head SAR	Right Cheek	0.378	0.105	**0.483**
	Right Tilt	0.222	0.038	0.260
	Left Cheek	0.406	0.048	0.454
	Left Tilt	0.202	0.030	0.232

Simult Tx	Configuration	Cell. CDMA SAR (W/kg)	5 GHz WLAN SAR (W/kg)	Σ 1g SAR (W/kg)
Head SAR	Right Cheek	0.185	0.105	**0.290**
	Right Tilt	0.129	0.038	0.167
	Left Cheek	0.190	0.048	0.238
	Left Tilt	0.131	0.030	0.161

Simult Tx	Configuration	PCS CDMA SAR (W/kg)	5 GHz WLAN SAR (W/kg)	Σ 1g SAR (W/kg)
Head SAR	Right Cheek	0.134	0.105	0.239
	Right Tilt	0.060	0.038	0.098
	Left Cheek	0.228	0.048	**0.276**
	Left Tilt	0.098	0.030	0.128

12.4 Body-Worn Simultaneous Transmission Analysis

Table 12-4
Simultaneous Transmission Scenario with 2.4 GHz WLAN (Body-Worn at 1.0 cm)

Configuration	Mode	2G/3G/4G SAR (W/kg)	2.4 GHz WLAN SAR (W/kg)	Σ 1g SAR (W/kg)
Back Side	GSM 850	0.185	0.201	0.386
Back Side	GPRS 850	0.299	0.201	0.500
Back Side	GSM 1900	0.151	0.201	0.352
Back Side	GPRS 1900	0.138	0.201	0.339
Back Side	UMTS 850	0.283	0.201	0.484
Back Side	UMTS 1900	0.292	0.201	0.493
Back Side	Cell. CDMA	0.545	0.201	0.746
Back Side	PCS CDMA	0.901	0.201	**1.102**
Back Side	LTE Band 17	0.162	0.201	0.363
Back Side	LTE Band 13	0.252	0.201	0.453
Back Side	LTE Band 4 (AWS)	0.139	0.201	0.340

Table 12-5
Simultaneous Transmission Scenario with 5 GHz WLAN (Body-Worn at 1.0 cm)

Configuration	Mode	2G/3G SAR (W/kg)	5 GHz WLAN SAR (W/kg)	Σ 1g SAR (W/kg)
Back Side	GSM 850	0.185	0.373	0.558
Back Side	GSM 1900	0.151	0.373	0.524
Back Side	UMTS 850	0.283	0.373	0.656
Back Side	UMTS 1900	0.292	0.373	0.665
Back Side	Cell. CDMA	0.545	0.373	0.918
Back Side	PCS CDMA	0.901	0.373	**1.274**

Table 12-6
Simultaneous Transmission Scenario with Bluetooth (Body-Worn at 1.0 cm)

Configuration	Mode	2G/3G/4G SAR (W/kg)	Bluetooth SAR (W/kg)	Σ 1g SAR (W/kg)
Back Side	GSM 850	0.185	0.208	0.393
Back Side	GPRS 850	0.299	0.208	0.507
Back Side	GSM 1900	0.151	0.208	0.359
Back Side	GPRS 1900	0.138	0.208	0.346
Back Side	UMTS 850	0.283	0.208	0.491
Back Side	UMTS 1900	0.292	0.208	0.500
Back Side	Cell. CDMA	0.545	0.208	0.753
Back Side	PCS CDMA	0.901	0.208	**1.109**
Back Side	LTE Band 17	0.162	0.208	0.370
Back Side	LTE Band 13	0.252	0.208	0.460
Back Side	LTE Band 4 (AWS)	0.139	0.208	0.347

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.

Table 12-7
Simultaneous Transmission Scenario with 2.4 GHz WLAN (Body Holster Accessory at 0.0 cm)

Configuration	Mode	2G/3G/4G SAR (W/kg)	2.4 GHz WLAN SAR (W/kg)	Σ 1g SAR (W/kg)
Back Side	GSM 850	0.113	0.062	0.175
Back Side	GPRS 850	0.226	0.062	0.288
Back Side	GSM 1900	0.073	0.062	0.135
Back Side	GPRS 1900	0.087	0.062	0.149
Back Side	UMTS 850	0.162	0.062	0.224
Back Side	UMTS 1900	0.161	0.062	0.223
Back Side	Cell. CDMA	0.240	0.062	0.302
Back Side	PCS CDMA	0.428	0.062	**0.490**
Back Side	LTE Band 17	0.092	0.062	0.154
Back Side	LTE Band 13	0.082	0.062	0.144
Back Side	LTE Band 4 (AWS)	0.065	0.062	0.127

Configuration	Mode	2G/3G/4G SAR (W/kg)	2.4 GHz WLAN SAR (W/kg)	Σ 1g SAR (W/kg)
Front Side	GSM 850	0.153	0.023	0.176
Front Side	GPRS 850	0.304	0.023	**0.327**
Front Side	GSM 1900	0.079	0.023	0.102
Front Side	GPRS 1900	0.096	0.023	0.119
Front Side	UMTS 850	0.230	0.023	0.253
Front Side	UMTS 1900	0.175	0.023	0.198
Front Side	Cell. CDMA	0.085	0.023	0.108
Front Side	PCS CDMA	0.033	0.023	0.056
Front Side	LTE Band 17	0.186	0.023	0.209
Front Side	LTE Band 13	0.193	0.023	0.216
Front Side	LTE Band 4 (AWS)	0.222	0.023	0.245

Table 12-8
Simultaneous Transmission Scenario with 5 GHz WLAN (Body Holster Accessory at 0.0 cm)

Configuration	Mode	2G/3G SAR (W/kg)	5 GHz WLAN SAR (W/kg)	Σ 1g SAR (W/kg)
Back Side	GSM 850	0.113	0.530	0.643
Back Side	GSM 1900	0.073	0.530	0.603
Back Side	UMTS 850	0.162	0.530	0.692
Back Side	UMTS 1900	0.161	0.530	0.691
Back Side	Cell. CDMA	0.240	0.530	0.770
Back Side	PCS CDMA	0.428	0.530	**0.958**

Configuration	Mode	2G/3G/4G SAR (W/kg)	5 GHz WLAN SAR (W/kg)	Σ 1g SAR (W/kg)
Front Side	GSM 850	0.153	0.041	0.194
Front Side	GSM 1900	0.079	0.041	0.120
Front Side	UMTS 850	0.230	0.041	0.271
Front Side	UMTS 1900	0.175	0.041	0.216
Front Side	Cell. CDMA	0.085	0.041	0.126
Front Side	PCS CDMA	0.033	0.041	0.074

Table 12-9
Simultaneous Transmission Scenario with Bluetooth (Body Holster Accessory 0.0 cm)

Configuration	Mode	2G/3G/4G SAR (W/kg)	Bluetooth LE SAR (W/kg)	Σ 1g SAR (W/kg)
Back Side	GSM 850	0.113	0.084	0.197
Back Side	GPRS 850	0.226	0.084	0.310
Back Side	GSM 1900	0.073	0.084	0.157
Back Side	GPRS 1900	0.087	0.084	0.171
Back Side	UMTS 850	0.162	0.084	0.246
Back Side	UMTS 1900	0.161	0.084	0.245
Back Side	Cell. CDMA	0.240	0.084	0.324
Back Side	PCS CDMA	0.428	0.084	**0.512**
Back Side	LTE Band 17	0.092	0.084	0.176
Back Side	LTE Band 13	0.082	0.084	0.166
Back Side	LTE Band 4 (AWS)	0.065	0.084	0.149

Configuration	Mode	2G/3G/4G SAR (W/kg)	Bluetooth LE SAR (W/kg)	Σ 1g SAR (W/kg)
Front Side	GSM 850	0.153	0.084	0.237
Front Side	GPRS 850	0.304	0.084	**0.388**
Front Side	GSM 1900	0.079	0.084	0.163
Front Side	GPRS 1900	0.096	0.084	0.180
Front Side	UMTS 850	0.230	0.084	0.314
Front Side	UMTS 1900	0.175	0.084	0.259
Front Side	Cell. CDMA	0.085	0.084	0.169
Front Side	PCS CDMA	0.033	0.084	0.117
Front Side	LTE Band 17	0.186	0.084	0.270
Front Side	LTE Band 13	0.193	0.084	0.277
Front Side	LTE Band 4 (AWS)	0.222	0.084	0.306

Note: Estimated Bluetooth LE SAR results were used in the above table to determine simultaneous transmission SAR test compliance since these results were higher than measured Bluetooth SAR.

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

Simult Tx	Configuration	GPRS 850 SAR (W/kg)	2.4 GHz WLAN SAR (W/kg)	Σ 1g SAR (W/kg)
Body SAR	Back	0.299	0.201	**0.500**
	Front	0.383	0.038	0.421
	Top	-	-	0.000
	Bottom	0.217	-	0.217
	Right	0.376	-	0.376
	Left	0.295	0.145	0.440

Simult Tx	Configuration	GPRS 1900 SAR (W/kg)	2.4 GHz WLAN SAR (W/kg)	Σ 1g SAR (W/kg)
Body SAR	Back	0.138	0.201	0.339
	Front	0.373	0.038	**0.411**
	Top	-	-	0.000
	Bottom	0.237	-	0.237
	Right	0.071	-	0.071
	Left	0.131	0.145	0.276

Simult Tx	Configuration	UMTS 850 SAR (W/kg)	2.4 GHz WLAN SAR (W/kg)	Σ 1g SAR (W/kg)
Body SAR	Back	0.283	0.201	**0.484**
	Front	0.359	0.038	0.397
	Top	-	-	0.000
	Bottom	0.177	-	0.177
	Right	0.307	-	0.307
	Left	0.247	0.145	0.392

Simult Tx	Configuration	UMTS 1900 SAR (W/kg)	2.4 GHz WLAN SAR (W/kg)	Σ 1g SAR (W/kg)
Body SAR	Back	0.292	0.201	0.493
	Front	0.733	0.038	**0.771**
	Top	-	-	0.000
	Bottom	0.413	-	0.413
	Right	0.136	-	0.136
	Left	0.244	0.145	0.389

Simult Tx	Configuration	Cell. EVDO SAR (W/kg)	2.4 GHz WLAN SAR (W/kg)	Σ 1g SAR (W/kg)
Body SAR	Back	0.492	0.201	**0.693**
	Front	0.118	0.038	0.156
	Top	0.070	-	0.070
	Bottom	-	-	0.000
	Right	0.292	-	0.292
	Left	-	0.145	0.145

Simult Tx	Configuration	PCS EVDO SAR (W/kg)	2.4 GHz WLAN SAR (W/kg)	Σ 1g SAR (W/kg)
Body SAR	Back	0.964	0.201	**1.165**
	Front	0.076	0.038	0.114
	Top	0.053	-	0.053
	Bottom	-	-	0.000
	Right	0.725	-	0.725
	Left	-	0.145	0.145

Simult Tx	Configuration	LTE Band 17 SAR (W/kg)	2.4 GHz WLAN SAR (W/kg)	Σ 1g SAR (W/kg)
Body SAR	Back	0.162	0.201	**0.363**
	Front	0.290	0.038	0.328
	Top	-	-	0.000
	Bottom	0.037	-	0.037
	Right	0.160	-	0.160
	Left	0.179	0.145	0.324

Simult Tx	Configuration	LTE Band 13 SAR (W/kg)	2.4 GHz WLAN SAR (W/kg)	Σ 1g SAR (W/kg)
Body SAR	Back	0.252	0.201	**0.453**
	Front	0.340	0.038	0.378
	Top	-	-	0.000
	Bottom	0.112	-	0.112
	Right	0.190	-	0.190
	Left	0.158	0.145	0.303

Simult Tx	Configuration	LTE Band 4 (AWS) SAR (W/kg)	2.4 GHz WLAN SAR (W/kg)	Σ 1g SAR (W/kg)
Body SAR	Back	0.139	0.201	0.340
	Front	0.703	0.038	**0.741**
	Top	-	-	0.000
	Bottom	0.217	-	0.217
	Right	0.038	-	0.038
	Left	0.183	0.145	0.328

12.6 Extremity Simultaneous Transmission Analysis

Note:

1. The worst case reported SAR for each hand strap extremity configuration was used for SAR summation, regardless of orientation of metallic components. Therefore, the summations above represent the absolute worst cases for simultaneous transmission.
2. Extremity SAR testing without the metallic hand strap accessory was excluded from SAR testing per FCC KDB 648474 D04v01r02. Therefore, no further analysis was required to determine that possible simultaneous scenarios would not exceed the SAR limit.

Table 12-11
Simultaneous Transmission Scenario with 2.4 GHz WLAN (Hand Strap Accessory at 0.0 cm)

Configuration	Mode	2G/3G/4G SAR (W/kg)	2.4 GHz WLAN SAR (W/kg)	Σ 10g SAR (W/kg)
Back Side	GPRS 850	0.281	0.169	0.450
Back Side	GPRS 1900	0.191	0.169	0.360
Back Side	UMTS 850	0.261	0.169	0.430
Back Side	UMTS 1900	0.380	0.169	0.549
Back Side	Cell. EVDO	0.615	0.169	0.784
Back Side	PCS EVDO	1.060	0.169	**1.229**
Back Side	LTE Band 17	0.147	0.169	0.316
Back Side	LTE Band 13	0.390	0.169	0.559
Back Side	LTE Band 4 (AWS)	0.209	0.169	0.378

Table 12-12
Simultaneous Transmission Scenario with 5 GHz WLAN (Hand Strap Accessory at 0.0 cm)

Configuration	Mode	2G/3G/4G SAR (W/kg)	5 GHz WLAN SAR (W/kg)	Σ 10g SAR (W/kg)
Back Side	GPRS 850	0.281	0.264	0.545
Back Side	GPRS 1900	0.191	0.264	0.455
Back Side	UMTS 850	0.261	0.264	0.525
Back Side	UMTS 1900	0.380	0.264	0.644
Back Side	Cell. EVDO	0.615	0.264	0.879
Back Side	PCS EVDO	1.060	0.264	**1.324**
Back Side	LTE Band 17	0.147	0.264	0.411
Back Side	LTE Band 13	0.390	0.264	0.654
Back Side	LTE Band 4 (AWS)	0.209	0.264	0.473

Table 12-13
Simultaneous Transmission Scenario with Bluetooth (Hand Strap Accessory at 0.0 cm)

Configuration	Mode	2G/3G/4G SAR (W/kg)	Bluetooth SAR (W/kg)	Σ 10g SAR (W/kg)
Back Side	GPRS 850	0.281	0.167	0.448
Back Side	GPRS 1900	0.191	0.167	0.358
Back Side	UMTS 850	0.261	0.167	0.428
Back Side	UMTS 1900	0.380	0.167	0.547
Back Side	Cell. EVDO	0.615	0.167	0.782
Back Side	PCS EVDO	1.060	0.167	**1.227**
Back Side	LTE Band 17	0.147	0.167	0.314
Back Side	LTE Band 13	0.390	0.167	0.557
Back Side	LTE Band 4 (AWS)	0.209	0.167	0.376

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

12.7 SVLTE Simultaneous Transmission Analysis

12.7.1 Head SAR Simultaneous Transmission Analysis

Table 12-14
Simultaneous Transmission Scenario with 2.4 GHz WLAN (Held to Ear)

Simult Tx	Configuration	Cell. CDMA SAR (W/kg)	LTE Band 13 SAR (W/kg)	2.4 GHz WLAN SAR (W/kg)	Σ 1g SAR (W/kg)	
		1	2	3	1+2	1+2+3
Head SAR	Right Cheek	0.185	0.361	0.054	0.546	0.600
	Right Tilt	0.129	0.197	0.043	0.326	0.369
	Left Cheek	0.190	0.380	0.045	0.570	**0.615**
	Left Tilt	0.131	0.215	0.047	0.346	0.393

Simult Tx	Configuration	Cell. CDMA SAR (W/kg)	LTE Band 4 (AWS) SAR (W/kg)	2.4 GHz WLAN SAR (W/kg)	Σ 1g SAR (W/kg)	
		1	2	3	1+2	1+2+3
Head SAR	Right Cheek	0.185	0.268	0.054	0.453	0.507
	Right Tilt	0.129	0.155	0.043	0.284	0.327
	Left Cheek	0.190	0.282	0.045	0.472	**0.517**
	Left Tilt	0.131	0.160	0.047	0.291	0.338

Simult Tx	Configuration	PCS CDMA SAR (W/kg)	LTE Band 13 SAR (W/kg)	2.4 GHz WLAN SAR (W/kg)	Σ 1g SAR (W/kg)	
		1	2	3	1+2	1+2+3
Head SAR	Right Cheek	0.134	0.361	0.054	0.495	0.549
	Right Tilt	0.060	0.197	0.043	0.257	0.300
	Left Cheek	0.228	0.380	0.045	0.608	**0.653**
	Left Tilt	0.098	0.215	0.047	0.313	0.360

Simult Tx	Configuration	PCS CDMA SAR (W/kg)	LTE Band 4 (AWS) SAR (W/kg)	2.4 GHz WLAN SAR (W/kg)	Σ 1g SAR (W/kg)	
		1	2	3	1+2	1+2+3
Head SAR	Right Cheek	0.134	0.268	0.054	0.402	0.456
	Right Tilt	0.060	0.155	0.043	0.215	0.258
	Left Cheek	0.228	0.282	0.045	0.510	**0.555**
	Left Tilt	0.098	0.160	0.047	0.258	0.305

12.7.2 Body-Worn SAR Simultaneous Transmission Analysis

Table 12-15
Simultaneous Transmission Scenario with 2.4 GHz WLAN (Body-Worn at 1.0 cm)

Configuration	Mode	CDMA SAR (W/kg)	LTE Band 13 SAR (W/kg)	2.4 GHz WLAN SAR (W/kg)	Σ 1g SAR (W/kg)	
		1	2	3	1+2	1+2+3
Back Side	Cell. CDMA	0.545	0.252	0.201	0.797	0.998
Back Side	PCS CDMA	0.901	0.252	0.201	1.153	**1.354**

Configuration	Mode	CDMA SAR (W/kg)	LTE Band 4 (AWS) SAR (W/kg)	2.4 GHz WLAN SAR (W/kg)	Σ 1g SAR (W/kg)	
		1	2	3	1+2	1+2+3
Back Side	Cell. CDMA	0.545	0.139	0.201	0.684	0.885
Back Side	PCS CDMA	0.901	0.139	0.201	1.040	**1.241**

Table 12-16
Simultaneous Transmission Scenario with Bluetooth (Body-Worn at 1.0 cm)

Configuration	Mode	CDMA SAR (W/kg)	LTE Band 13 SAR (W/kg)	Bluetooth SAR (W/kg)	Σ 1g SAR (W/kg)	
		1	2	3	1+2	1+2+3
Back Side	Cell. CDMA	0.545	0.252	0.208	0.797	1.005
Back Side	PCS CDMA	0.901	0.252	0.208	1.153	**1.361**

Configuration	Mode	CDMA SAR (W/kg)	LTE Band 4 (AWS) SAR (W/kg)	Bluetooth SAR (W/kg)	Σ 1g SAR (W/kg)	
		1	2	3	1+2	1+2+3
Back Side	Cell. CDMA	0.545	0.139	0.208	0.684	0.892
Back Side	PCS CDMA	0.901	0.139	0.208	1.040	**1.248**

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.

Table 12-17
Simultaneous Transmission Scenario with 2.4 GHz WLAN (Body Holster Accessory at 0.0 cm)

Configuration	Mode	CDMA SAR (W/kg)	LTE Band 13 SAR (W/kg)	2.4 GHz WLAN SAR (W/kg)	Σ 1g SAR (W/kg)	
		1	2	3	1+2	1+2+3
Back Side	Cell. CDMA	0.240	0.082	0.062	0.322	0.384
Back Side	PCS CDMA	0.428	0.082	0.062	0.510	**0.572**

Configuration	Mode	CDMA SAR (W/kg)	LTE Band 13 SAR (W/kg)	2.4 GHz WLAN SAR (W/kg)	Σ 1g SAR (W/kg)	
		1	2	3	1+2	1+2+3
Front Side	Cell. CDMA	0.085	0.193	0.023	0.278	**0.301**
Front Side	PCS CDMA	0.033	0.193	0.023	0.226	0.249

Configuration	Mode	CDMA SAR (W/kg)	LTE Band 4 (AWS) SAR (W/kg)	2.4 GHz WLAN SAR (W/kg)	Σ 1g SAR (W/kg)	
		1	2	3	1+2	1+2+3
Back Side	Cell. CDMA	0.240	0.065	0.062	0.305	0.367
Back Side	PCS CDMA	0.428	0.065	0.062	0.493	**0.555**

Configuration	Mode	CDMA SAR (W/kg)	LTE Band 4 (AWS) SAR (W/kg)	2.4 GHz WLAN SAR (W/kg)	Σ 1g SAR (W/kg)	
		1	2	3	1+2	1+2+3
Front Side	Cell. CDMA	0.085	0.222	0.023	0.307	**0.330**
Front Side	PCS CDMA	0.033	0.222	0.023	0.255	0.278

Table 12-18
Simultaneous Transmission Scenario with Bluetooth (Body Holster Accessory 0.0 cm)

Configuration	Mode	CDMA SAR (W/kg)	LTE Band 13 SAR (W/kg)	Bluetooth LE SAR (W/kg)	Σ 1g SAR (W/kg)
		1	2	3	1+2+3
Back Side	Cell. CDMA	0.240	0.082	0.084	0.406
Back Side	PCS CDMA	0.428	0.082	0.084	**0.594**

Configuration	Mode	CDMA SAR (W/kg)	LTE Band 13 SAR (W/kg)	Bluetooth LE SAR (W/kg)	Σ 1g SAR (W/kg)
		1	2	3	1+2+3
Front Side	Cell. CDMA	0.085	0.193	0.084	**0.362**
Front Side	PCS CDMA	0.033	0.193	0.084	0.310

Configuration	Mode	CDMA SAR (W/kg)	LTE Band 4 (AWS) SAR (W/kg)	Bluetooth LE SAR (W/kg)	Σ 1g SAR (W/kg)
		1	2	3	1+2+3
Back Side	Cell. CDMA	0.240	0.065	0.084	0.389
Back Side	PCS CDMA	0.428	0.065	0.084	**0.577**

Configuration	Mode	CDMA SAR (W/kg)	LTE Band 4 (AWS) SAR (W/kg)	Bluetooth LE SAR (W/kg)	Σ 1g SAR (W/kg)
		1	2	3	1+2+3
Front Side	Cell. CDMA	0.085	0.222	0.084	**0.391**
Front Side	PCS CDMA	0.033	0.222	0.084	0.339

Note: Estimated Bluetooth LE SAR results were used in the above table to determine simultaneous transmission SAR test compliance since these results were higher than measured Bluetooth SAR.

12.7.3 Hotspot SAR Simultaneous Transmission Analysis

Table 12-19
Simultaneous Transmission Scenario (2.4 GHz Hotspot at 1.0 cm)

Simult Tx	Configuration	Cell. CDMA SAR (W/kg)	LTE Band 13 SAR (W/kg)	2.4 GHz WLAN SAR (W/kg)	Σ 1g SAR (W/kg)
		1	2	3	1+2+3
Body SAR	Back	0.545	0.252	0.201	**0.998**
	Front	0.124	0.340	0.038	0.502
	Top	0.080	-	-	0.080
	Bottom	-	0.112	-	0.112
	Right	0.309	0.190	-	0.499
	Left	-	0.158	0.145	0.303

Simult Tx	Configuration	Cell. CDMA SAR (W/kg)	LTE Band 4 (AWS) SAR (W/kg)	2.4 GHz WLAN SAR (W/kg)	Σ 1g SAR (W/kg)
		1	2	3	1+2+3
Body SAR	Back	0.545	0.139	0.201	**0.885**
	Front	0.124	0.703	0.038	0.865
	Top	0.080	-	-	0.080
	Bottom	-	0.217	-	0.217
	Right	0.309	0.038	-	0.347
	Left	-	0.183	0.145	0.328

Simult Tx	Configuration	PCS CDMA SAR (W/kg)	LTE Band 13 SAR (W/kg)	2.4 GHz WLAN SAR (W/kg)	Σ 1g SAR (W/kg)
		1	2	3	1+2+3
Body SAR	Back	0.901	0.252	0.201	**1.354**
	Front	0.098	0.340	0.038	0.476
	Top	0.064	-	-	0.064
	Bottom	-	0.112	-	0.112
	Right	0.829	0.190	-	1.019
	Left	-	0.158	0.145	0.303

Simult Tx	Configuration	PCS CDMA SAR (W/kg)	LTE Band 4 (AWS) SAR (W/kg)	2.4 GHz WLAN SAR (W/kg)	Σ 1g SAR (W/kg)
		1	2	3	1+2+3
Body SAR	Back	0.901	0.139	0.201	**1.241**
	Front	0.098	0.703	0.038	0.839
	Top	0.064	-	-	0.064
	Bottom	-	0.217	-	0.217
	Right	0.829	0.038	-	0.867
	Left	-	0.183	0.145	0.328

12.7.4 Extremity SAR Simultaneous Transmission Analysis

Note:

1. The worst case reported SAR for each hand strap extremity configuration was used for SAR summation, regardless of orientation of metallic components. Therefore, the summations above represent the absolute worst cases for simultaneous transmission.
2. Extremity SAR testing without the metallic hand strap accessory was excluded from SAR testing per FCC KDB 648474 D04v01r02. Therefore, no further analysis was required to determine that possible simultaneous scenarios would not exceed the SAR limit.

Table 12-20
Simultaneous Transmission Scenario with 2.4 GHz WLAN (Hand Strap Accessory at 0.0 cm)

Configuration	Mode	CDMA SAR (W/kg)	LTE Band 13 SAR (W/kg)	2.4 GHz WLAN SAR (W/kg)	Σ 10g SAR (W/kg)	
		1	2	3	1+2	1+2+3
Back Side	Cell. CDMA	0.605	0.390	0.169	0.995	1.164
Back Side	PCS CDMA	0.973	0.390	0.169	1.363	**1.532**

Configuration	Mode	CDMA SAR (W/kg)	LTE Band 4 (AWS) SAR (W/kg)	2.4 GHz WLAN SAR (W/kg)	Σ 10g SAR (W/kg)	
		1	2	3	1+2	1+2+3
Back Side	Cell. CDMA	0.605	0.209	0.169	0.814	0.983
Back Side	PCS CDMA	0.973	0.209	0.169	1.182	**1.351**

Table 12-21
Simultaneous Transmission Scenario with 5 GHz WLAN (Hand Strap Accessory at 0.0 cm)

Configuration	Mode	CDMA SAR (W/kg)	LTE Band 13 SAR (W/kg)	5 GHz WLAN SAR (W/kg)	Σ 10g SAR (W/kg)	
		1	2	3	1+2	1+2+3
Back Side	Cell. CDMA	0.605	0.390	0.264	0.995	1.259
Back Side	PCS CDMA	0.973	0.390	0.264	1.363	**1.627**

Configuration	Mode	CDMA SAR (W/kg)	LTE Band 4 (AWS) SAR (W/kg)	5 GHz WLAN SAR (W/kg)	Σ 10g SAR (W/kg)	
		1	2	3	1+2	1+2+3
Back Side	Cell. CDMA	0.605	0.209	0.264	0.814	1.078
Back Side	PCS CDMA	0.973	0.209	0.264	1.182	**1.446**

Table 12-22
Simultaneous Transmission Scenario with Bluetooth (Hand Strap Accessory at 0.0 cm)

Configuration	Mode	CDMA SAR (W/kg)	LTE Band 13 SAR (W/kg)	Bluetooth SAR (W/kg)	Σ 10g SAR (W/kg)	
		1	2	3	1+2	1+2+3
Back Side	Cell. CDMA	0.605	0.390	0.167	0.995	1.162
Back Side	PCS CDMA	0.973	0.390	0.167	1.363	**1.530**

Configuration	Mode	CDMA SAR (W/kg)	LTE Band 4 (AWS) SAR (W/kg)	Bluetooth SAR (W/kg)	Σ 10g SAR (W/kg)	
		1	2	3	1+2	1+2+3
Back Side	Cell. CDMA	0.605	0.209	0.167	0.814	0.981
Back Side	PCS CDMA	0.973	0.209	0.167	1.182	**1.349**

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

12.8 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.

13 SAR MEASUREMENT VARIABILITY

13.1 Measurement Variability

Per FCC KDB Publication 865664 D01v01, SAR measurement variability was assessed for each frequency band, which was determined by the SAR probe calibration point and tissue-equivalent medium used for the device measurements. When both head and body tissue-equivalent media were required for SAR measurements in a frequency band, the variability measurement procedures were applied to the tissue medium with the highest measured SAR, using the highest measured SAR configuration for that tissue-equivalent medium. These additional measurements were repeated after the completion of all measurements requiring the same head or body tissue-equivalent medium in a frequency band. The test device was returned to ambient conditions (normal room temperature) with the battery fully charged before it was re-mounted on the device holder for the repeated measurement(s) to minimize any unexpected variations in the repeated results.

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

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

Table 13-1
Body SAR Measurement Variability Results

BODY VARIABILITY RESULTS														
Band	FREQUENCY		Mode	Service	Side	Spacing	Measured SAR (1g)	1st Repeated SAR (1g)	Ratio	2nd Repeated SAR (1g)	Ratio	3rd Repeated SAR (1g)	Ratio
	MHz	Ch.					(W/kg)	(W/kg)		(W/kg)		(W/kg)	
1900	1908.75	1175	PCS CDMA	EVDO Rev. 0	back	10 mm	0.964	0.909	1.06	N/A	N/A	N/A	N/A
ANSI / IEEE C95.1 1992 - SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population						Body 1.6 W/kg (mW/g) averaged over 1 gram							

13.2 Measurement Uncertainty

The measured SAR was <1.5 W/kg for all frequency bands. Therefore, per KDB Publication 865664 D01v01, the extended measurement uncertainty analysis per IEEE 1528-2003 was not required.

14 EQUIPMENT LIST

Equipment used for testing 06/12/14 - 06/17/14:

Manufacturer	Model	Description	Cal Date	Cal Interval	Cal Due	Serial Number
Agilent	E8257D	(250kHz-20GHz) Signal Generator	4/15/2014	Annual	4/15/2015	MY45470194
Agilent	8753E	(30kHz-6GHz) Network Analyzer	7/23/2013	Annual	7/23/2014	US37390350
Agilent	8594A	(9kHz-2.9GHz) Spectrum Analyzer	N/A	N/A	N/A	3051A00187
Agilent	E4438C	ESG Vector Signal Generator	4/25/2014	Annual	4/25/2015	MY42082385
Agilent	N4010A	Wireless Connectivity Test Set	CBT	NA	CBT	GB46170464
Agilent	N9020A	MXA Signal Analyzer	10/29/2013	Annual	10/29/2014	US46470561
Agilent	N5182A	MXG Vector Signal Generator	4/15/2014	Annual	4/15/2015	MY47420651
Agilent	8753ES	S-Parameter Network Analyzer	10/29/2013	Annual	10/29/2014	US39170122
Amplifier Research	15S1G6	Amplifier	CBT	N/A	CBT	433971
Amplifier Research	15S1G6	Amplifier	CBT	N/A	CBT	433978
Anritsu	ML2495A	Power Meter	10/31/2013	Annual	10/31/2014	1039008
Anritsu	ML2469A	Power Meter	3/14/2014	Annual	3/14/2015	1306009
Anritsu	MA2411B	Pulse Power Sensor	11/14/2013	Annual	11/14/2014	1126066
Anritsu	MA2411B	Pulse Power Sensor	2/3/2014	Annual	2/3/2015	1339018
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
COMTech	AR85729-5	Solid State Amplifier	CBT	N/A	CBT	M1S5A00-009
COMTECH	AR85729-5/5759B	Solid State Amplifier	CBT	N/A	CBT	M3W1A00-1002
Control Company	4353	Long Stem Thermometer	9/25/2012	Biennial	9/25/2014	122541139
Control Company	36934-158	Wall-Mounted Thermometer	4/29/2014	Biennial	4/29/2016	122014488
Fisher Scientific	15-077-960	Digital Thermometer	11/6/2012	Biennial	11/6/2014	122640025
Fisher Scientific	S407993	Long Stem Thermometer	11/4/2013	Biennial	11/4/2015	130671826
Fisher Scientific	S97611	Thermometer	4/12/2013	Biennial	4/12/2015	130219304
MCL	BW-N6W5+	6dB Attenuator	CBT	N/A	CBT	1139
MiniCircuits	VLF-6000+	Low Pass Filter	CBT	N/A	CBT	N/A
MiniCircuits	SLP-2400+	Low Pass Filter	CBT	N/A	CBT	R8979500903
Mini-Circuits	BW-N20W5+	DC to 18 GHz Precision Fixed 20 dB Attenuator	CBT	N/A	CBT	N/A
Mini-Circuits	NLP-2950+	Low Pass Filter DC to 2700 MHz	CBT	N/A	CBT	N/A
Mini-Circuits	BW-N20W5	Power Attenuator	CBT	N/A	CBT	1226
Mitutoyo	CD-6"CSX	Digital Caliper	5/8/2014	Biennial	5/8/2016	13264162
Narda	4014C-6	4 - 8 GHz SMA 6 dB Directional Coupler	CBT	N/A	CBT	N/A
Narda	BW-S3W2	Attenuator (3dB)	CBT	N/A	CBT	120
Narda	4772-3	Attenuator (3dB)	CBT	N/A	CBT	9406
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	6/6/2014	Annual	6/6/2015	109892
Rohde & Schwarz	NRVD	Dual Channel Power Meter	10/12/2012	Biennial	10/12/2014	101695
Rohde & Schwarz	NRV-Z32	Peak Power Sensor	10/12/2012	Biennial	10/12/2014	836019/013
Rohde & Schwarz	SME06	Signal Generator	10/30/2013	Annual	10/30/2014	832026
Seekonk	NC-100	Torque Wrench	3/18/2014	Biennial	3/18/2016	22313
Seekonk	NC-100	Torque Wrench	3/18/2014	Biennial	3/18/2016	N/A
SPEAG	D2450V2	2450 MHz SAR Dipole	1/21/2014	Annual	1/21/2015	797
SPEAG	D5GHzV2	5 GHz SAR Dipole	1/27/2014	Annual	1/27/2015	1057
SPEAG	DAE4	Dasy Data Acquisition Electronics	2/26/2014	Annual	2/26/2015	665
SPEAG	DAE4	Dasy Data Acquisition Electronics	11/19/2013	Annual	11/19/2014	1333
SPEAG	DAK-3.5	Dielectric Assessment Kit	5/6/2014	Annual	5/6/2015	1070
SPEAG	DAKS-3.5	Portable Dielectric Assessment Kit	8/18/2013	Annual	8/18/2014	1009
SPEAG	ES3DV3	SAR Probe	2/25/2014	Annual	2/25/2015	3258
SPEAG	EX3DV4	SAR Probe	10/23/2013	Annual	10/23/2014	3914
Tektronix	RSA6114A	Real Time Spectrum Analyzer	4/16/2014	Annual	4/16/2015	B010177
VWR	23226-658	Long Stem Thermometer	6/27/2012	Biennial	6/27/2014	122363923
VWR	36934-158	Wall-Mounted Thermometer	8/8/2013	Biennial	8/8/2015	130477877

Equipment used for testing 09/17/14 - 10/01/14:

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	E4438C	ESG Vector Signal Generator	3/31/2014	Annual	3/31/2015	MY42082659
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	N5182A	MXG Vector Signal Generator	4/15/2014	Annual	4/15/2015	MY47420800
Agilent	N9020A	MXA Signal Analyzer	10/29/2013	Annual	10/29/2014	US46470561
Amplifier Research	15S1G6	Amplifier	CBT	N/A	CBT	433971
Amplifier Research	15S1G6	Amplifier	CBT	N/A	CBT	433972
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	ML2469A	Power Meter	3/14/2014	Annual	3/14/2015	1306009
Anritsu	ML2495A	Power Meter	10/31/2013	Annual	10/31/2014	1039008
Anritsu	MT8820C	Radio Communication Analyzer	12/12/2013	Annual	12/12/2014	6200901190
Anritsu	MT8820C	Radio Communication Analyzer	12/12/2013	Annual	12/12/2014	6201300731
COMTech	AR85729-5	Solid State Amplifier	CBT	N/A	CBT	M1S5A00-009
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	15-077-960	Digital Thermometer	11/6/2012	Biennial	11/6/2014	122640025
Fisher Scientific	S407993	Long Stem Thermometer	11/4/2013	Biennial	11/4/2015	130671821
Fisher Scientific	S97611	Thermometer	4/12/2013	Biennial	4/12/2015	130219303
Gigatronics	80701A	(0.05-18GHz) Power Sensor	10/30/2013	Annual	10/30/2014	1833460
Gigatronics	8651A	Universal Power Meter	10/30/2013	Annual	10/30/2014	8650319
MCL	BW-N6W5+	6dB Attenuator	CBT	N/A	CBT	1139
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
Narda	4014C-6	4 - 8 GHz SMA 6 dB Directional Coupler	CBT	N/A	CBT	N/A
Narda	4772-3	Attenuator (3dB)	CBT	N/A	CBT	9406
Narda	BW-S3W2	Attenuator (3dB)	CBT	N/A	CBT	120
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	6/6/2014	Annual	6/6/2015	109892
Rohde & Schwarz	CMW500	Radio Communication Tester	4/18/2014	Annual	4/18/2015	101699
Rohde & Schwarz	CMW500	Radio Communication Tester	7/9/2014	Annual	7/9/2015	106578
Rohde & Schwarz	CMW500	Radio Communication Tester	2/20/2014	Annual	2/20/2015	128633
Rohde & Schwarz	NRVD	Dual Channel Power Meter	10/12/2012	Biennial	10/12/2014	101695
Rohde & Schwarz	SME06	Signal Generator	10/30/2013	Annual	10/30/2014	832026
Seekonk	NC-100	Torque Wrench	3/18/2014	Biennial	3/18/2016	22313
Seekonk	NC-100	Torque Wrench	3/18/2014	Biennial	3/18/2016	N/A
SPEAG	D750V3	750 MHz Dipole	1/20/2014	Annual	1/20/2015	1003
SPEAG	D835V2	835 MHz SAR Dipole	4/7/2014	Annual	4/7/2015	4d119
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	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	11/19/2013	Annual	11/19/2014	1333
SPEAG	DAE4	Dasy Data Acquisition Electronics	3/17/2014	Annual	3/17/2015	1334
SPEAG	DAE4	Dasy Data Acquisition Electronics	4/11/2014	Annual	4/11/2015	1368
SPEAG	DAE4	Dasy Data Acquisition Electronics	11/19/2013	Annual	11/19/2014	1408
SPEAG	DAK-3.5	Dielectric Assessment Kit	11/13/2013	Annual	11/13/2014	1091
SPEAG	ES3DV3	SAR Probe	3/19/2014	Annual	3/19/2015	3209
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	11/20/2013	Annual	11/20/2014	3287
SPEAG	ES3DV3	SAR Probe	4/17/2014	Annual	4/17/2015	3319
SPEAG	EX3DV4	SAR Probe	10/23/2013	Annual	10/23/2014	3914
Tektronix	RSA6114A	Real Time Spectrum Analyzer	4/16/2014	Annual	4/16/2015	B010177
VWR	36934-158	Wall-Mounted Thermometer	8/8/2013	Biennial	8/8/2015	130477877

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.

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	299
Expanded Uncertainty (95% CONFIDENCE LEVEL)				k=2			24.2	23.5	

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

Applicable for frequencies up to 6 GHz.

a	b	c	d	e= f(d,k)	f	g	h = c x f/e	i = c x g/e	k
Uncertainty Component	**IEEE 1528 Sec.**	**Tol. (± %)**	**Prob. Dist.**	**Div.**	**c_i 1gm**	**c_i 10 gms**	**1gm u_i (± %)**	**10gms u_i (± %)**	**v_i**
Measurement System									
Probe Calibration	E.2.1	6.55	N	1	1.0	1.0	6.6	6.6	∞
Axial Isotropy	E.2.2	0.25	N	1	0.7	0.7	0.2	0.2	∞
Hemishperical Isotropy	E.2.2	1.3	N	1	1.0	1.0	1.3	1.3	∞
Boundary Effect	E.2.3	0.4	N	1	1.0	1.0	0.4	0.4	∞
Linearity	E.2.4	0.3	N	1	1.0	1.0	0.3	0.3	∞
System Detection Limits	E.2.5	5.1	N	1	1.0	1.0	5.1	5.1	∞
Readout Electronics	E.2.6	1.0	N	1	1.0	1.0	1.0	1.0	∞
Response Time	E.2.7	0.8	R	1.73	1.0	1.0	0.5	0.5	∞
Integration Time	E.2.8	2.6	R	1.73	1.0	1.0	1.5	1.5	∞
RF Ambient Conditions	E.6.1	3.0	R	1.73	1.0	1.0	1.7	1.7	∞
Probe Positioner Mechanical Tolerance	E.6.2	0.4	R	1.73	1.0	1.0	0.2	0.2	∞
Probe Positioning w/ respect to Phantom	E.6.3	2.9	R	1.73	1.0	1.0	1.7	1.7	∞
Extrapolation, Interpolation & Integration algorithms for Max. SAR Evaluation	E.5	1.0	R	1.73	1.0	1.0	0.6	0.6	∞
Test Sample Related									
Test Sample Positioning	E.4.2	6.0	N	1	1.0	1.0	6.0	6.0	287
Device Holder Uncertainty	E.4.1	3.32	R	1.73	1.0	1.0	1.9	1.9	∞
Output Power Variation - SAR drift measurement	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	299
Expanded Uncertainty (95% CONFIDENCE LEVEL)			k=2				24.7	24.0	

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

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]

17 REFERENCES

[1] Federal Communications Commission, ET Docket 93-62, Guidelines for Evaluating the Environmental Effects of Radiofrequency Radiation, Aug. 1996.

[2] ANSI/IEEE C95.1-2005, American National Standard safety levels with respect to human exposure to radio frequency electromagnetic fields, 3kHz to 300GHz, New York: IEEE, 2006.

[3] ANSI/IEEE C95.1-1992, American National Standard safety levels with respect to human exposure to radio frequency electromagnetic fields, 3kHz to 300GHz, New York: IEEE, Sept. 1992.

[4] ANSI/IEEE C95.3-2002, IEEE Recommended Practice for the Measurement of Potentially Hazardous Electromagnetic Fields - RF and Microwave, New York: IEEE, December 2002.

[5] IEEE Standards Coordinating Committee 39 –Standards Coordinating Committee 34 – IEEE Std. 1528-2003, Recommended Practice for Determining the Peak Spatial-Average Specific Absorption Rate (SAR) in the Human Head Due to Wireless Communications Devices: Measurement Techniques.

[6] NCRP, National Council on Radiation Protection and Measurements, Biological Effects and Exposure Criteria for RadioFrequency Electromagnetic Fields, NCRP Report No. 86, 1986. Reprinted Feb. 1995.

[7] T. Schmid, O. Egger, N. Kuster, Automated E-field scanning system for dosimetric assessments, IEEE Transaction on Microwave Theory and Techniques, vol. 44, Jan. 1996, pp. 105-113.

[8] K. Pokovic, T. Schmid, N. Kuster, Robust setup for precise calibration of E-field probes in tissue simulating liquids at mobile communications frequencies, ICECOM97, Oct. 1997, pp. -124.

[9] K. Pokovic, T. Schmid, and N. Kuster, E-field Probe with improved isotropy in brain simulating liquids, Proceedings of the ELMAR, Zadar, Croatia, June 23-25, 1996, pp. 172-175.

[10] Schmid & Partner Engineering AG, Application Note: Data Storage and Evaluation, June 1998, p2.

[11] V. Hombach, K. Meier, M. Burkhardt, E. Kuhn, N. Kuster, The Dependence of EM Energy Absorption upon Human Modeling at 900 MHz, IEEE Transaction on Microwave Theory and Techniques, vol. 44 no. 10, Oct. 1996, pp. 1865-1873.

[12] N. Kuster and Q. Balzano, Energy absorption mechanism by biological bodies in the near field of dipole antennas above 300MHz, IEEE Transaction on Vehicular Technology, vol. 41, no. 1, Feb. 1992, pp. 17-23.

[13] G. Hartsgrove, A. Kraszewski, A. Surowiec, Simulated Biological Materials for Electromagnetic Radiation Absorption Studies, University of Ottawa, Bioelectromagnetics, Canada: 1987, pp. 29-36.

[14] Q. Balzano, O. Garay, T. Manning Jr., Electromagnetic Energy Exposure of Simulated Users of Portable Cellular Telephones, IEEE Transactions on Vehicular Technology, vol. 44, no.3, Aug. 1995.

[15] W. Gander, Computermathematick, Birkhaeuser, Basel, 1992.

[16] W.H. Press, S.A. Teukolsky, W.T. Vetterling, and B.P. Flannery, Numerical Recipes in C, The Art of Scientific Computing, Second edition, Cambridge University Press, 1992.

[17] N. Kuster, R. Kastle, T. Schmid, Dosimetric evaluation of mobile communications equipment with known precision, IEEE Transaction on Communications, vol. E80-B, no. 5, May 1997, pp. 645-652.

[18] CENELEC CLC/SC111B, European Prestandard (prENV 50166-2), Human Exposure to Electromagnetic Fields High-frequency: 10kHz-300GHz, Jan. 1995.

[19] Prof. Dr. Niels Kuster, ETH, Eidgenössische Technische Hoschschule Zürich, Dosimetric Evaluation of the Cellular Phone.

[20] IEC 62209-1, Human exposure to radio frequency fields from hand-held and body-mounted wireless communication devices - Human models, instrumentation, and procedures - Part 1: Procedure to determine the specific absorption rate (SAR) for hand-held devices used in close proximity to the ear (frequency range of 300 MHz to 3 GHz), Feb. 2005.

[21] Industry Canada RSS-102 Radio Frequency Exposure Compliance of Radiocommunication Apparatus (All Frequency Bands) Issue 4, March 2010.

[22] Health Canada Safety Code 6 Limits of Human Exposure to Radio Frequency Electromagnetic Fields in the Frequency Range from 3 kHz – 300 GHz, 2009

[23] FCC SAR Test Procedures for 2G-3G Devices, Mobile Hotspot and UMPC Devices KDB Publications 941225, D01-D07

[24] SAR Measurement procedures for IEEE 802.11a/b/g KDB Publication 248227 D01v01r02

[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 Septembro 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.

APPENDIX A: SAR TEST DATA

PCTEST ENGINEERING LABORATORY, INC.

DUT: ACJFZE1A; Type: Portable Handset; Serial: 46

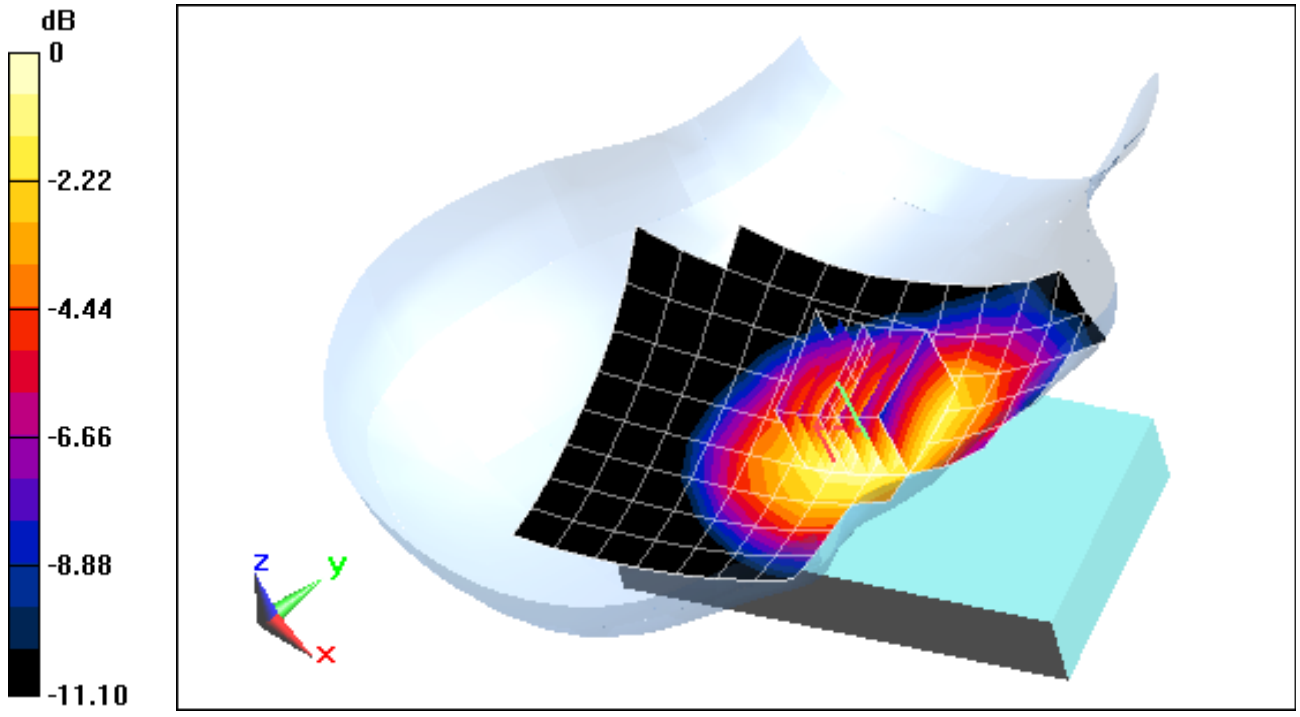
Communication System: UID 0, GSM GPRS; 4 Tx slots; Frequency: 836.6 MHz; Duty Cycle: 1:2.076
Medium: 835 Head, Medium parameters used (interpolated):
f = 836.6 MHz; σ = 0.922 S/m; ε_r = 41.695; ρ = 1000 kg/m^3
Phantom section: Right Section

Test Date: 09-22-2014; Ambient Temp: 24.2°C; Tissue Temp: 23.0°C

Probe: EX3DV4 - SN3914; ConvF(9.34, 9.34, 9.34); Calibrated: 10/23/2013;
Sensor-Surface: 2mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1333; Calibrated: 11/19/2013
Phantom: SAM 5.0 front; Type: QD000P40CD; Serial: TP:-1648
Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Mode: GPRS 850, Right Head, Cheek, Mid.ch, 4 Tx slots

Area Scan (10x15x1): Measurement grid: dx=15mm, dy=15mm
Zoom Scan (6x6x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 24.33 V/m; Power Drift = -0.05 dB
Peak SAR (extrapolated) = 0.685 W/kg
SAR(1 g) = 0.532 W/kg



0 dB = 0.607 W/kg = -2.17 dBW/kg

PCTEST ENGINEERING LABORATORY, INC.

DUT: ACJFZE1A; Type: Portable Handset; Serial: 45

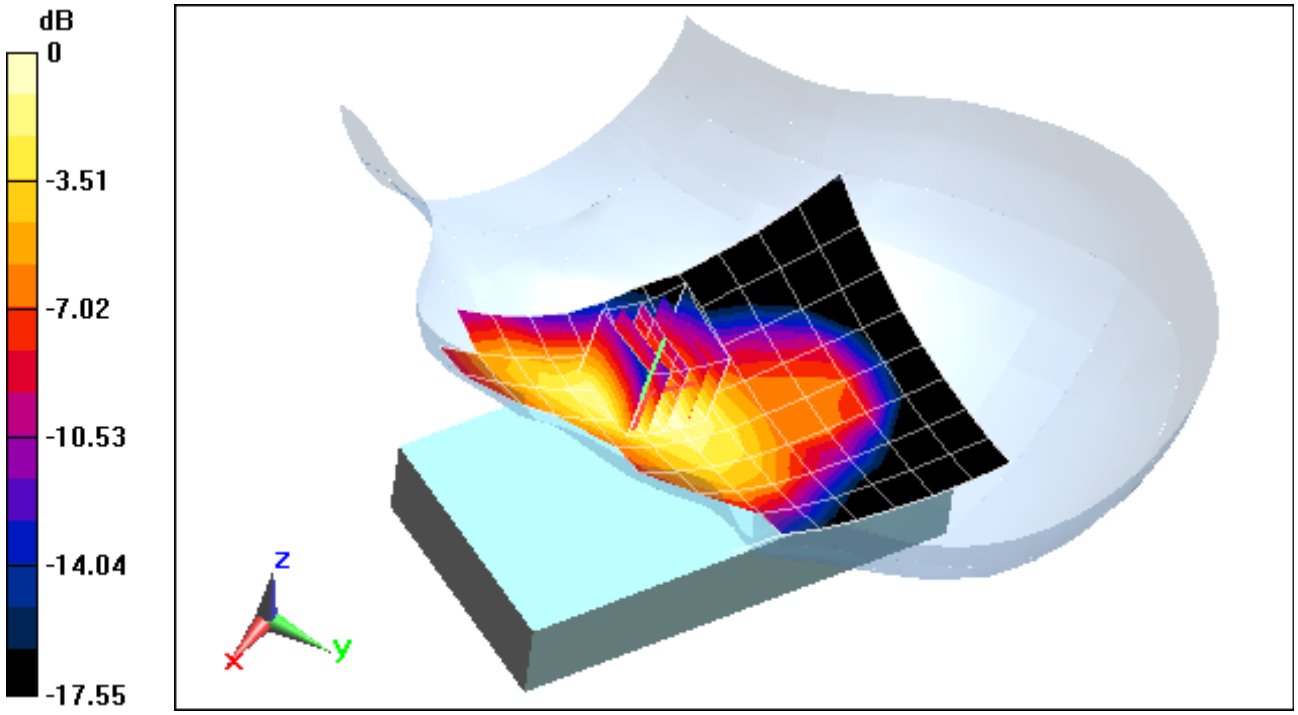
Communication System: UID 0, GSM1900; Frequency: 1880 MHz; Duty Cycle: 1:8.3
Medium: 1900 Head, Medium parameters used:
f = 1880 MHz; σ = 1.423 S/m; ε_r = 39.372; ρ = 1000 kg/m^3
Phantom section: Left Section

Test Date: 09-22-2014; Ambient Temp: 24.4°C; Tissue Temp: 22.3°C

Probe: ES3DV3 - SN3287; ConvF(5.08, 5.08, 5.08); Calibrated: 11/20/2013;
Sensor-Surface: 3mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1408; Calibrated: 11/19/2013
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: GSM 1900, Left Head, Cheek, Mid.ch

Area Scan (9x13x1): Measurement grid: dx=15mm, dy=15mm
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 13.40 V/m; Power Drift = 0.09 dB
Peak SAR (extrapolated) = 0.374 W/kg
SAR(1 g) = 0.253 W/kg



0 dB = 0.296 W/kg = -5.29 dBW/kg

PCTEST ENGINEERING LABORATORY, INC.

DUT: ACJFZE1A; Type: Portable Handset; Serial: 46

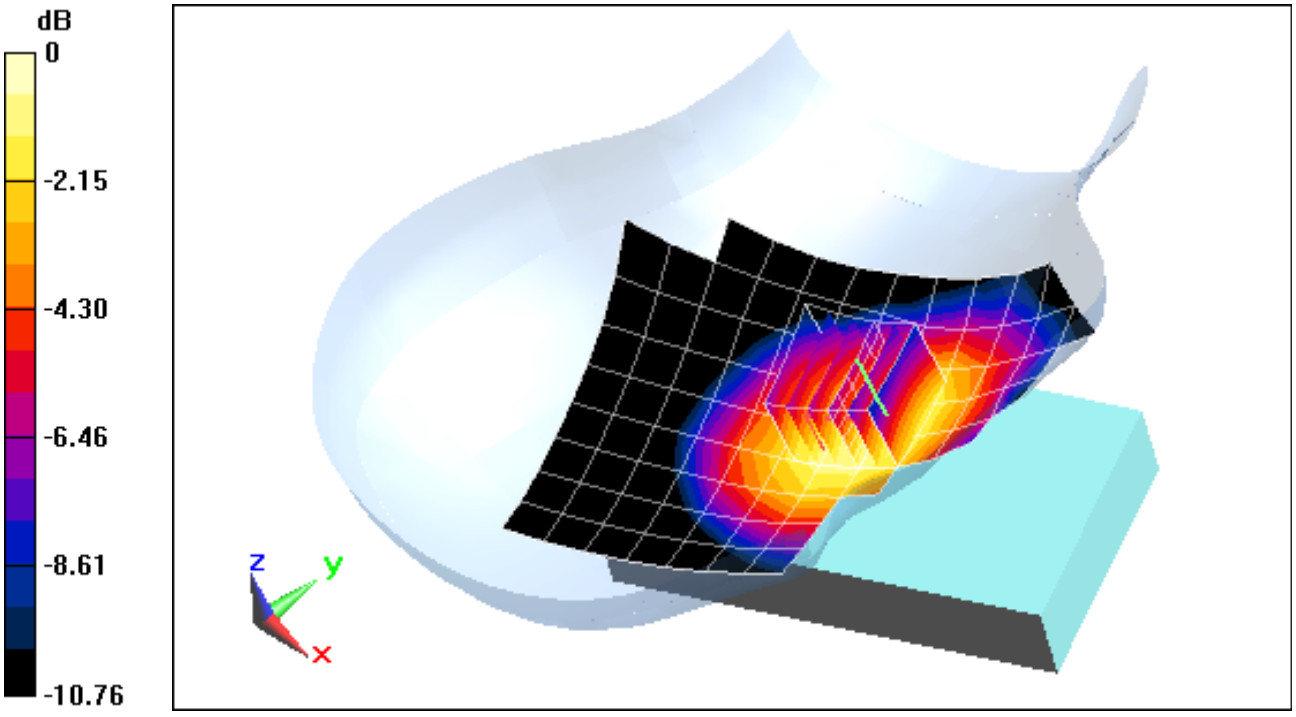
Communication System: UID 0, UMTS; Frequency: 836.6 MHz; Duty Cycle: 1:1
Medium: 835 Head, Medium parameters used (interpolated):
f = 836.6 MHz; σ = 0.922 S/m; ε_r = 41.695; ρ = 1000 kg/m^3
Phantom section: Right Section

Test Date: 09-22-2014; Ambient Temp: 24.2°C; Tissue Temp: 23.0°C

Probe: EX3DV4 - SN3914; ConvF(9.34, 9.34, 9.34); Calibrated: 10/23/2013;
Sensor-Surface: 2mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1333; Calibrated: 11/19/2013
Phantom: SAM 5.0 front; Type: QD000P40CD; Serial: TP:-1648
Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

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

Area Scan (10x15x1): Measurement grid: dx=15mm, dy=15mm
Zoom Scan (6x6x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 20.90 V/m; Power Drift = -0.01 dB
Peak SAR (extrapolated) = 0.520 W/kg
SAR(1 g) = 0.405 W/kg



0 dB = 0.463 W/kg = -3.34 dBW/kg

PCTEST ENGINEERING LABORATORY, INC.

DUT: ACJFZE1A; Type: Portable Handset; Serial: 45

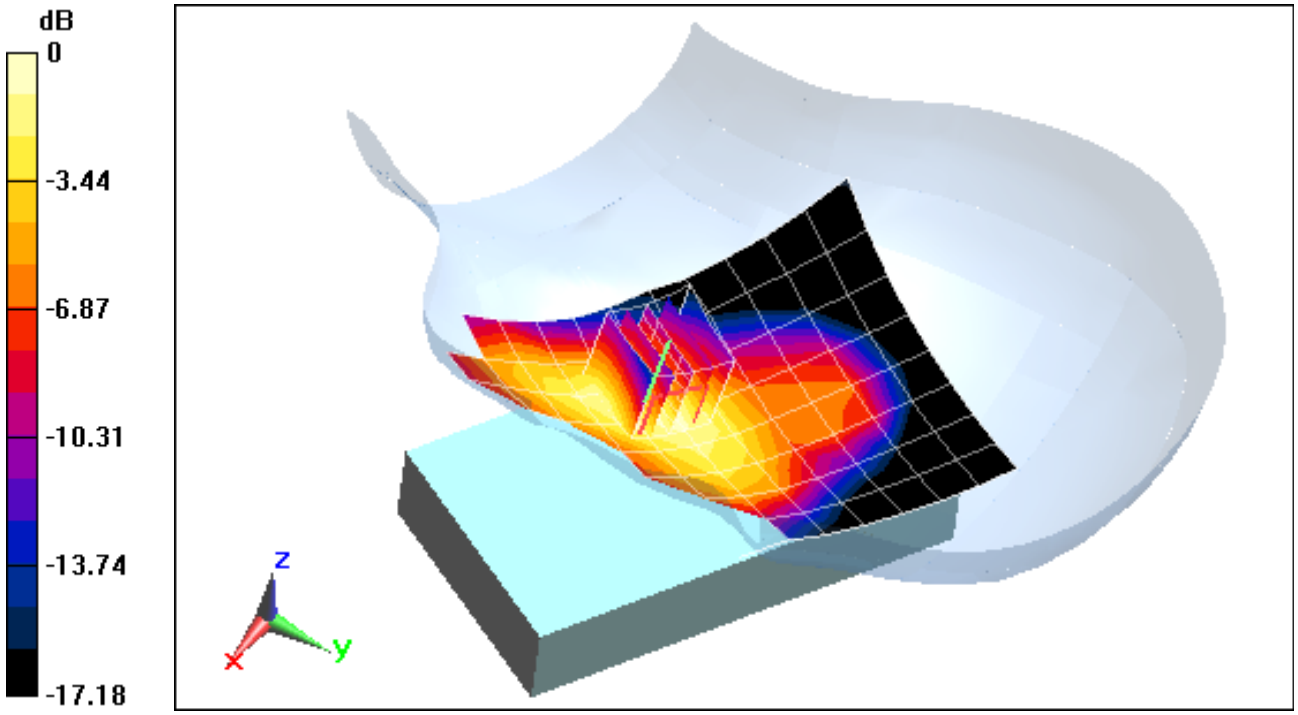
Communication System: UID 0, UMTS; Frequency: 1880 MHz; Duty Cycle: 1:1
Medium: 1900 Head, Medium parameters used:
f = 1880 MHz; σ = 1.423 S/m; ε_r = 39.372; ρ = 1000 kg/m^3
Phantom section: Left Section

Test Date: 09-22-2014; Ambient Temp: 24.4°C; Tissue Temp: 22.3°C

Probe: ES3DV3 - SN3287; ConvF(5.08, 5.08, 5.08); Calibrated: 11/20/2013;
Sensor-Surface: 3mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1408; Calibrated: 11/19/2013
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: UMTS 1900, Left Head, Cheek, Mid.ch

Area Scan (9x13x1): Measurement grid: dx=15mm, dy=15mm
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 16.17 V/m; Power Drift = 0.16 dB
Peak SAR (extrapolated) = 0.540 W/kg
SAR(1 g) = 0.368 W/kg



0 dB = 0.433 W/kg = -3.64 dBW/kg

PCTEST ENGINEERING LABORATORY, INC.

DUT: ACJFZE1A; Type: Portable Handset; Serial: 44

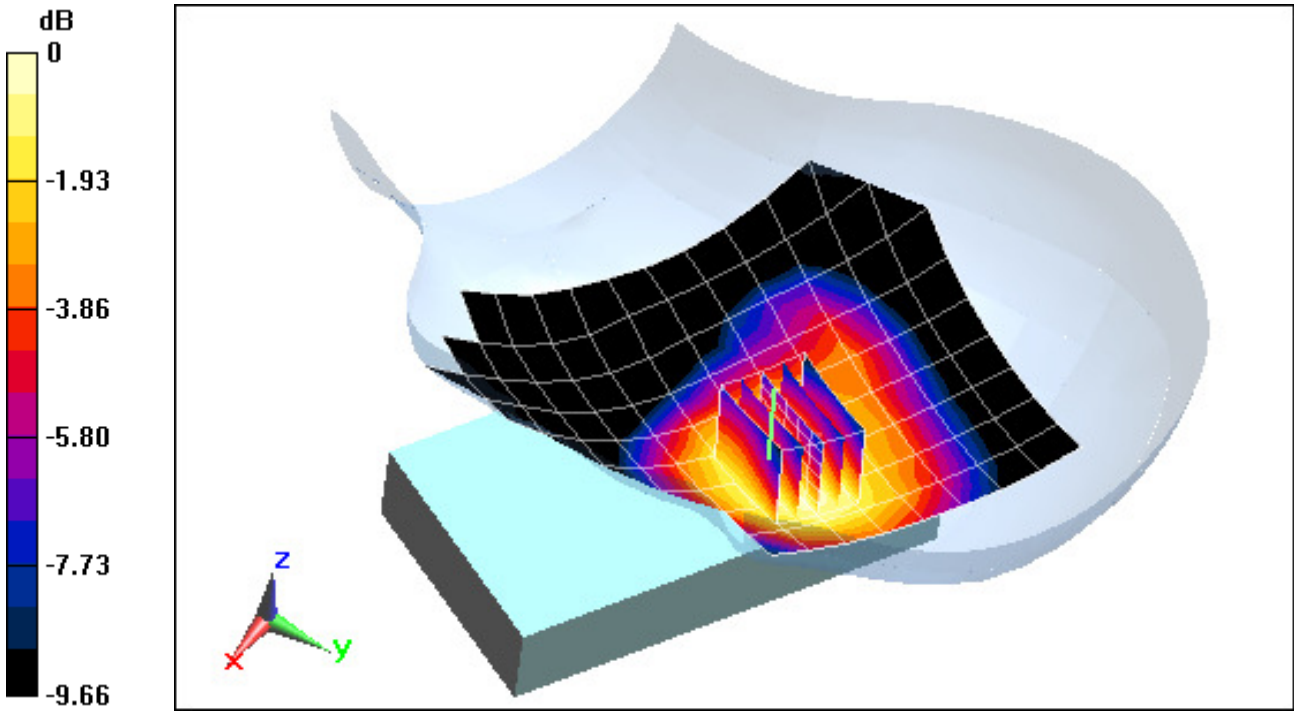
Communication System: UID 0, CDMA; Frequency: 836.52 MHz; Duty Cycle: 1:1
Medium: 835 Head, Medium parameters used (interpolated):
f = 836.52 MHz; σ = 0.922 S/m; ε_r = 41.696; ρ = 1000 kg/m^3
Phantom section: Left Section

Test Date: 09-22-2014; Ambient Temp: 24.2°C; Tissue Temp: 23.0°C

Probe: EX3DV4 - SN3914; ConvF(9.34, 9.34, 9.34); Calibrated: 10/23/2013;
Sensor-Surface: 2mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1333; Calibrated: 11/19/2013
Phantom: SAM 5.0 front; Type: QD000P40CD; Serial: TP:-1648
Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Mode: Cell. CDMA, Left Head, Cheek, Mid.ch

Area Scan (10x15x1): Measurement grid: dx=15mm, dy=15mm
Zoom Scan (6x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 13.08 V/m; Power Drift = 0.06 dB
Peak SAR (extrapolated) = 0.206 W/kg
SAR(1 g) = 0.159 W/kg



0 dB = 0.180 W/kg = -7.45 dBW/kg

PCTEST ENGINEERING LABORATORY, INC.

DUT: ACJFZE1A; Type: Portable Handset; Serial: 44

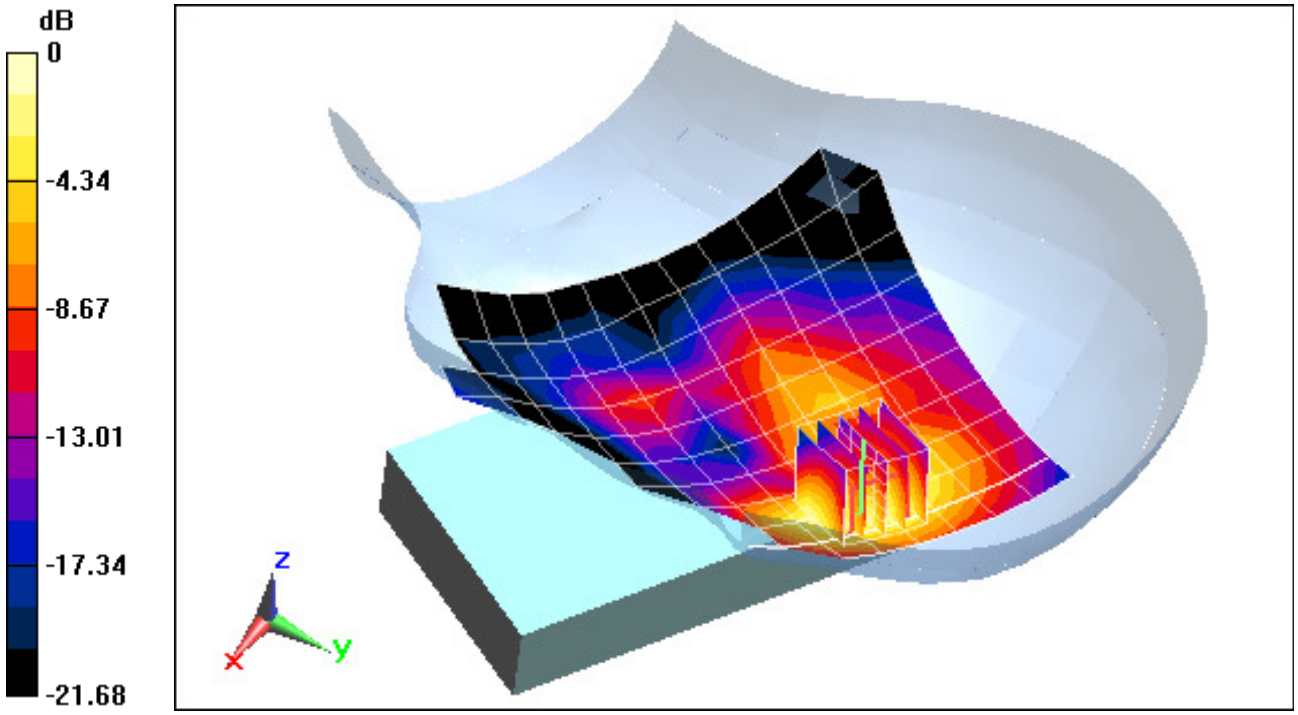
Communication System: UID 0, CDMA; Frequency: 1908.75 MHz; Duty Cycle: 1:1
Medium: 1900 Head, Medium parameters used (interpolated):
f = 1908.75 MHz; σ = 1.434 S/m; ε_r = 39.854; ρ = 1000 kg/m^3
Phantom section: Left Section

Test Date: 09-18-2014; Ambient Temp: 24.5°C; Tissue Temp: 23.1°C

Probe: ES3DV3 - SN3287; ConvF(5.08, 5.08, 5.08); Calibrated: 11/20/2013;
Sensor-Surface: 3mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1408; Calibrated: 11/19/2013
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: PCS CDMA, Left Head, Cheek, High.ch

Area Scan (10x15x1): Measurement grid: dx=15mm, dy=15mm
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 13.22 V/m; Power Drift = 0.03 dB
Peak SAR (extrapolated) = 0.408 W/kg
SAR(1 g) = 0.225 W/kg



0 dB = 0.253 W/kg = -5.97 dBW/kg

PCTEST ENGINEERING LABORATORY, INC.

DUT: ACJFZE1A; Type: Portable Handset; Serial: 44

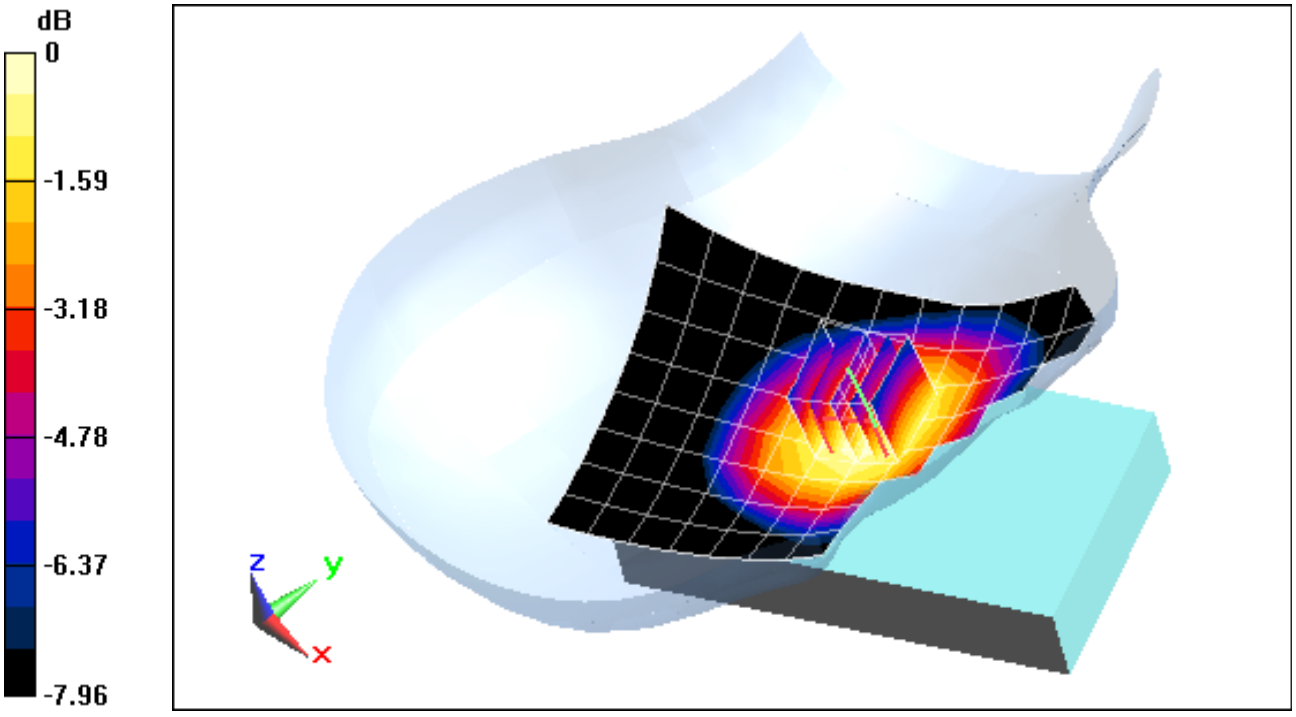
Communication System: UID 0, LTE Band 17; Frequency: 710 MHz; Duty Cycle: 1:1
Medium: 750 Head, Medium parameters used:
f = 710 MHz; σ = 0.873 S/m; ε_r = 40.911; ρ = 1000 kg/m^3
Phantom section: Right Section

Test Date: 09-18-2014; Ambient Temp: 24.3°C; Tissue Temp: 23.6°C

Probe: ES3DV3 - SN3263; ConvF(6.42, 6.42, 6.42); 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 17, Right Head, Cheek, Mid.ch,
10 MHz Bandwidth, QPSK, 1 RB, 0 RB Offset

Area Scan (9x14x1): Measurement grid: dx=15mm, dy=15mm
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 19.07 V/m; Power Drift = 0.01 dB
Peak SAR (extrapolated) = 0.341 W/kg
SAR(1 g) = 0.280 W/kg



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

DUT: ACJFZE1A; Type: Portable Handset; Serial: 46

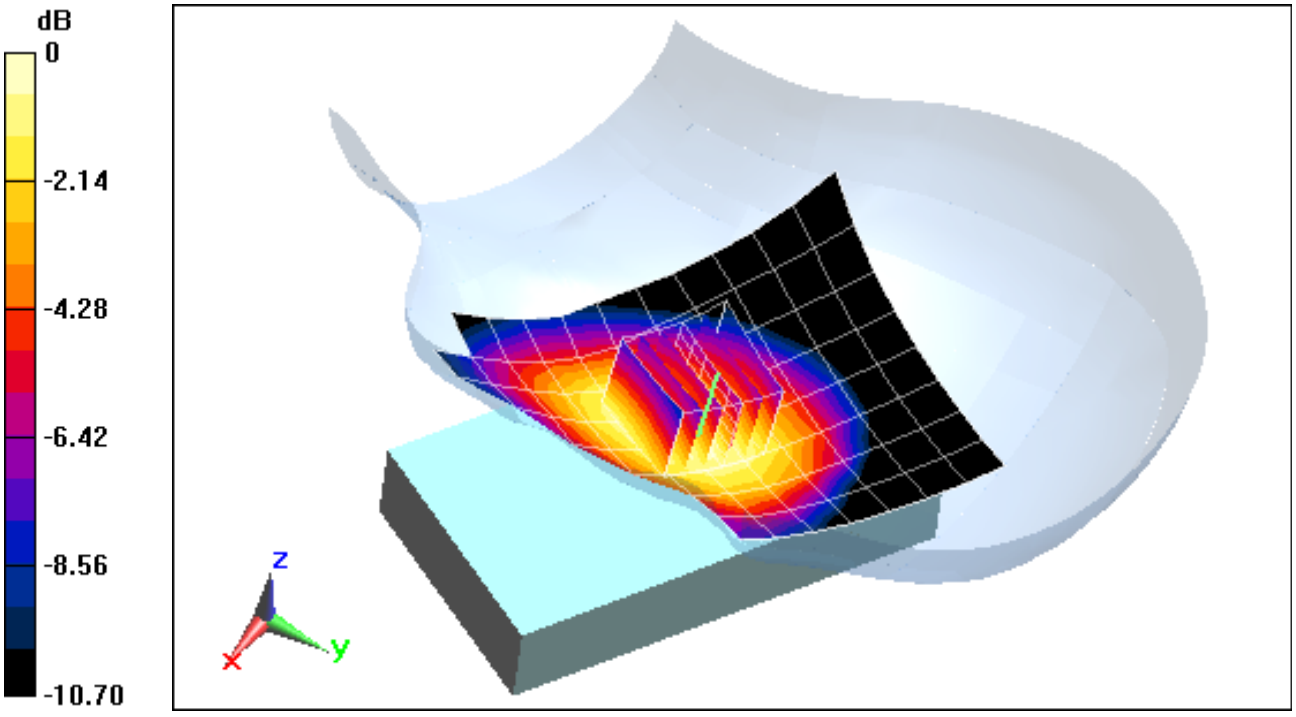
Communication System: UID 0, LTE Band 13; Frequency: 782 MHz; Duty Cycle: 1:1
Medium: 750 Head, Medium parameters used (interpolated):
f = 782 MHz; σ = 0.935 S/m; ε_r = 39.848; ρ = 1000 kg/m^3
Phantom section: Left Section

Test Date: 09-18-2014; Ambient Temp: 24.3°C; Tissue Temp: 23.6°C

Probe: ES3DV3 - SN3263; ConvF(6.42, 6.42, 6.42); 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 13, Left Head, Cheek, Mid.ch,
10 MHz Bandwidth, QPSK, 1 RB, 25 RB Offset

Area Scan (9x14x1): Measurement grid: dx=15mm, dy=15mm
Zoom Scan (6x6x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 19.68 V/m; Power Drift = 0.04 dB
Peak SAR (extrapolated) = 0.400 W/kg
SAR(1 g) = 0.318 W/kg



0 dB = 0.346 W/kg = -4.61 dBW/kg

DUT: ACJFZE1A; Type: Portable Handset; Serial: 44

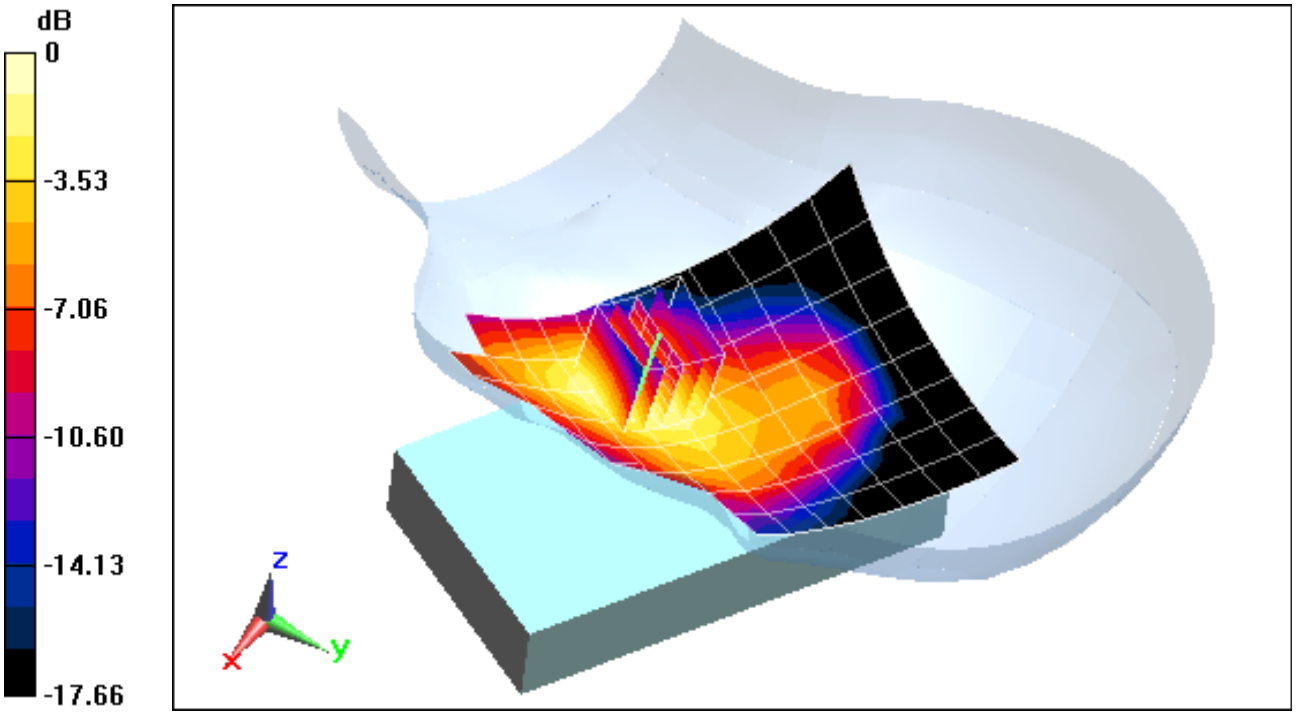
Communication System: UID 0, LTE Band 4 (AWS); Frequency: 1732.5 MHz; Duty Cycle: 1:1
Medium: 1750 Head, Medium parameters used (interpolated):
f = 1732.5 MHz; σ = 1.34 S/m; ε_r = 39.583; ρ = 1000 kg/m^3
Phantom section: Left Section

Test Date: 09-17-2014; Ambient Temp: 24.0°C; Tissue Temp: 23.0°C

Probe: ES3DV3 - SN3258; ConvF(5.19, 5.19, 5.19); 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 4 (AWS), Left Head, Cheek, Mid.ch,
20 MHz Bandwidth, QPSK, 1 RB, 99 RB Offset

Area Scan (9x15x1): Measurement grid: dx=15mm, dy=15mm
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 15.91 V/m; Power Drift = 0.05 dB
Peak SAR (extrapolated) = 0.426 W/kg
SAR(1 g) = 0.281 W/kg



0 dB = 0.330 W/kg = -4.81 dBW/kg

DUT: ACJFZE1A; Type: Portable Handset; Serial: WIFI_SAR

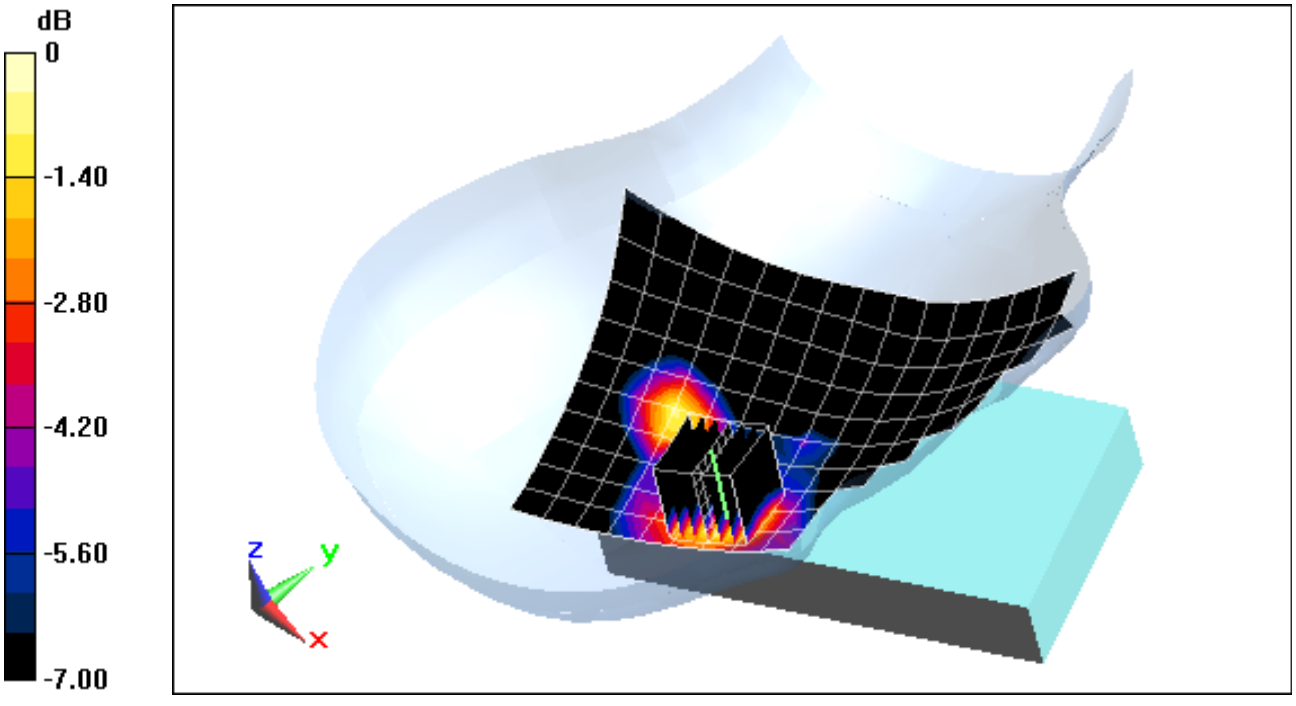
Communication System: UID 0, IEEE 802.11b; Frequency: 2462 MHz; Duty Cycle: 1:1
Medium: 2450 Head, Medium parameters used (interpolated):
f = 2462 MHz; σ = 1.756 S/m; ε_r = 39.895; ρ = 1000 kg/m^3
Phantom section: Right Section

Test Date: 06-17-2014; Ambient Temp: 22.5°C; Tissue Temp: 21.8°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 (11x18x1): Measurement grid: dx=12mm, dy=12mm
Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 4.475 V/m; Power Drift = 0.02 dB
Peak SAR (extrapolated) = 0.0700 W/kg
SAR(1 g) = 0.037 W/kg



0 dB = 0.0466 W/kg = -13.32 dBW/kg

PCTEST ENGINEERING LABORATORY, INC.

DUT: ACJFZE1A; Type: Portable Handset; Serial: WIFI_SAR

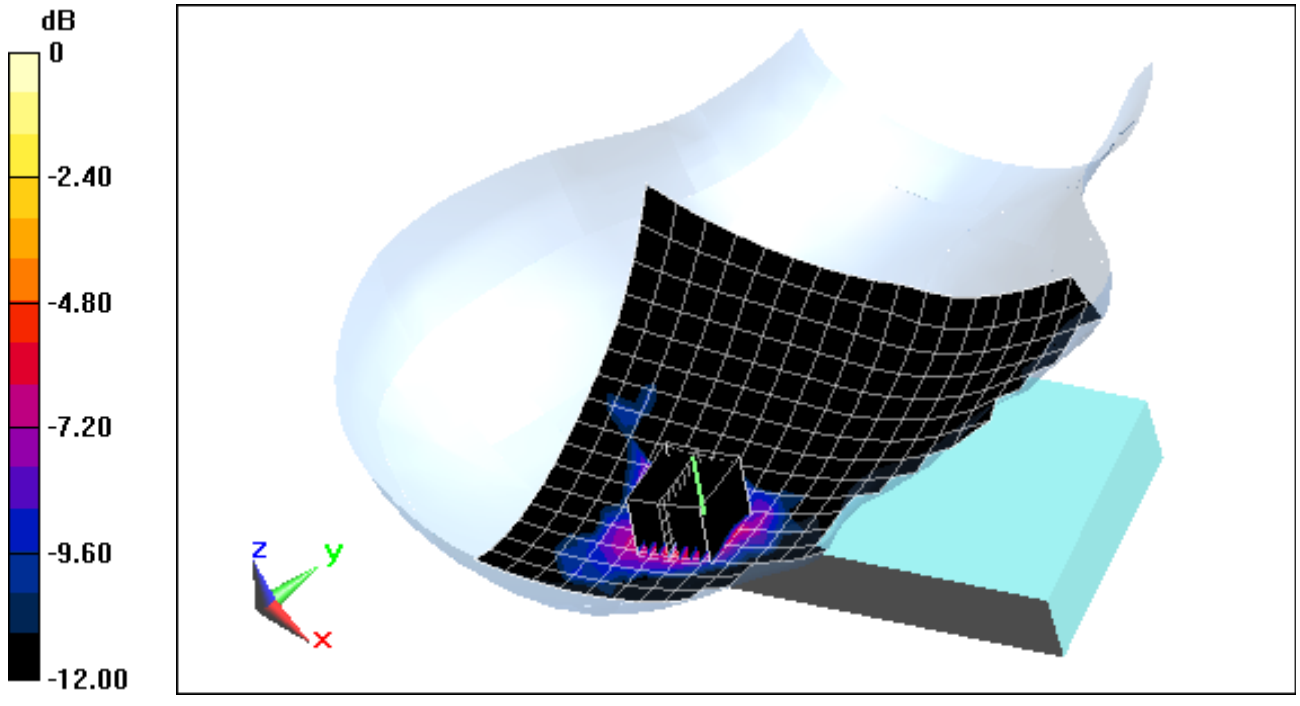
Communication System: UID 0, IEEE 802.11a; Frequency: 5300 MHz; Duty Cycle: 1:1
Medium: 5 GHz Head, Medium parameters used:
f = 5300 MHz; σ = 4.584 S/m; ε_r = 36.488; ρ = 1000 kg/m^3
Phantom section: Right Section

Test Date: 06-12-2014; Ambient Temp: 23.9°C; Tissue Temp: 23.6°C

Probe: EX3DV4 - SN3914; ConvF(4.82, 4.82, 4.82); Calibrated: 10/23/2013;
Sensor-Surface: 1.4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1333; Calibrated: 11/19/2013
Phantom: SAM V5.0 Right; Type: QD000P40CD; Serial: 1647
Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Mode: IEEE 802.11a, 5.3 GHz, Right Head, Cheek, Ch 60, 6 Mbps

Area Scan (17x22x1): Measurement grid: dx=10mm, dy=10mm
Zoom Scan (9x8x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm; Graded Ratio: 1.4
Reference Value = 1.983 V/m; Power Drift = -0.14 dB
Peak SAR (extrapolated) = 0.328 W/kg
SAR(1 g) = 0.087 W/kg



0 dB = 0.211 W/kg = -6.76 dBW/kg

DUT: ACJFZE1A; Type: Portable Handset; Serial: 45

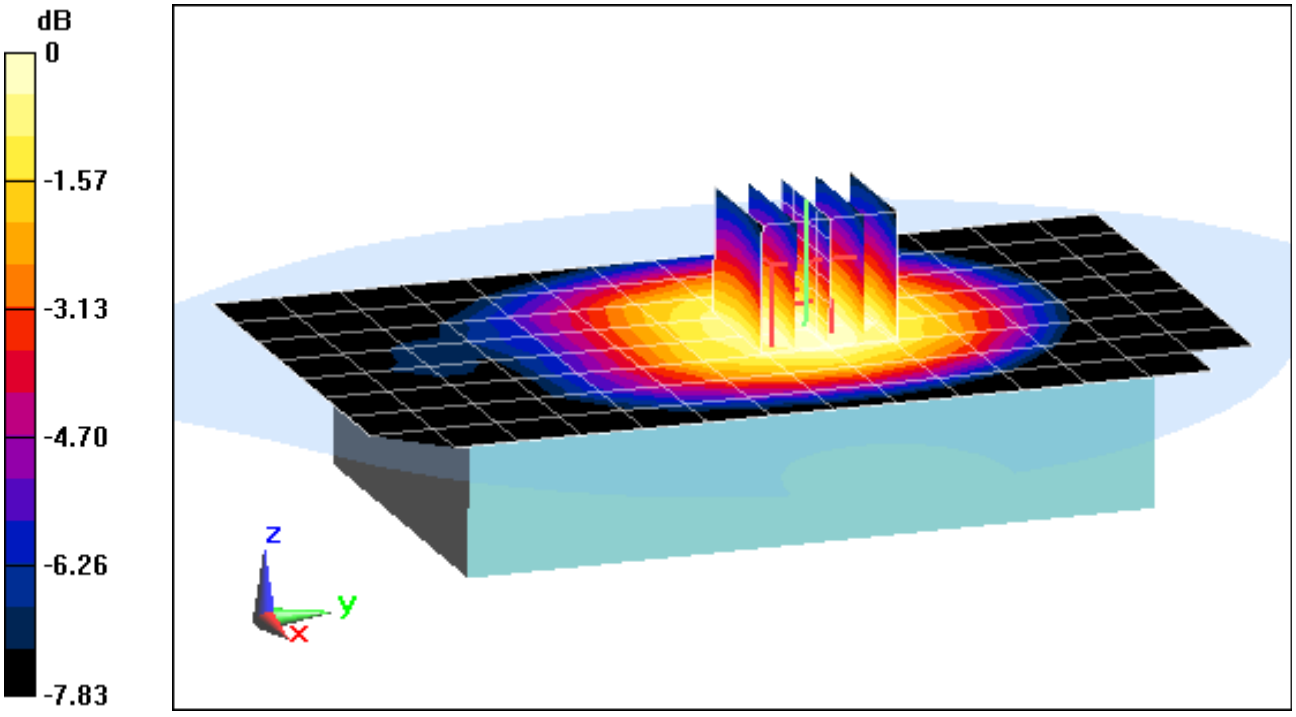
Communication System: UID 0, GSM GPRS; 4 Tx slots; Frequency: 836.6 MHz; Duty Cycle: 1:2.076
Medium: 835 Body, Medium parameters used (interpolated):
f = 836.6 MHz; σ = 1.001 S/m; ε_r = 54.152; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 0.0 cm

Test Date: 10-01-2014; Ambient Temp: 23.6°C; Tissue Temp: 23.4°C

Probe: ES3DV3 - SN3263; ConvF(6.16, 6.16, 6.16); Calibrated: 5/15/2014;
Sensor-Surface: 3mm (Mechanical Surface Detection)
Electronics: DAE4 Sn859; Calibrated: 5/14/2014
Phantom: SAM v5.0 front; Type: QD000P40CD; Serial: TP-1646
Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Mode: GPRS 850, Body SAR, Front Side, Mid.ch, 4 Tx Slots with Body Holster

Area Scan (9x15x1): Measurement grid: dx=15mm, dy=15mm
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 17.89 V/m; Power Drift = -0.08 dB
Peak SAR (extrapolated) = 0.373 W/kg
SAR(1 g) = 0.292 W/kg



0 dB = 0.323 W/kg = -4.91 dBW/kg

PCTEST ENGINEERING LABORATORY, INC.

DUT: ACJFZE1A; Type: Portable Handset; Serial: 45

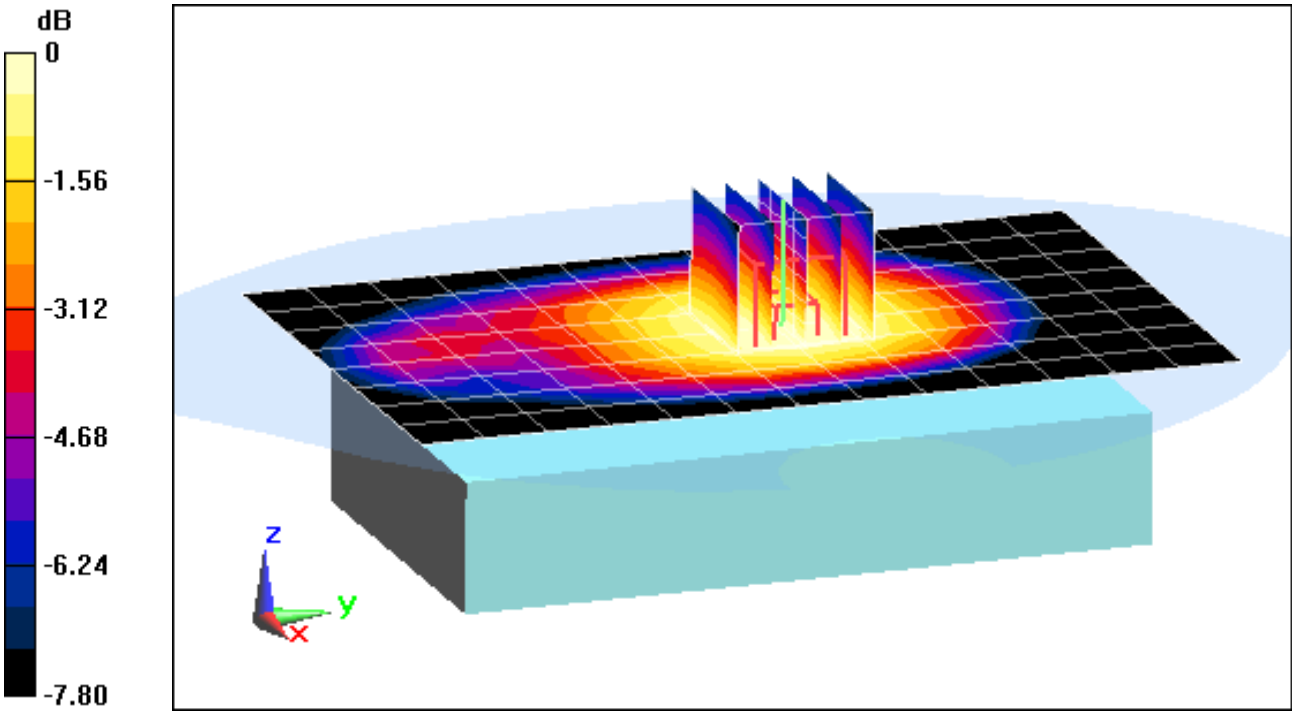
Communication System: UID 0, GSM GPRS; 4 Tx slots; Frequency: 836.6 MHz; Duty Cycle: 1:2.076
Medium: 835 Body, Medium parameters used (interpolated):
f = 836.6 MHz; σ = 1.004 S/m; ε_r = 54.114; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 09-18-2014; Ambient Temp: 23.8°C; Tissue Temp: 23.2°C

Probe: ES3DV3 - SN3263; ConvF(6.16, 6.16, 6.16); Calibrated: 5/15/2014;
Sensor-Surface: 3mm (Mechanical Surface Detection)
Electronics: DAE4 Sn859; Calibrated: 5/14/2014
Phantom: SAM v5.0 front; Type: QD000P40CD; Serial: TP-1646
Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Mode: GPRS 850, Body SAR, Front Side, Mid.ch, 4 Tx Slots without Accessory

Area Scan (9x14x1): Measurement grid: dx=15mm, dy=15mm
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 19.84 V/m; Power Drift = -0.02 dB
Peak SAR (extrapolated) = 0.457 W/kg
SAR(1 g) = 0.368 W/kg



0 dB = 0.399 W/kg = -3.99 dBW/kg

PCTEST ENGINEERING LABORATORY, INC.

DUT: ACJFZE1A; Type: Portable Handset; Serial: 46

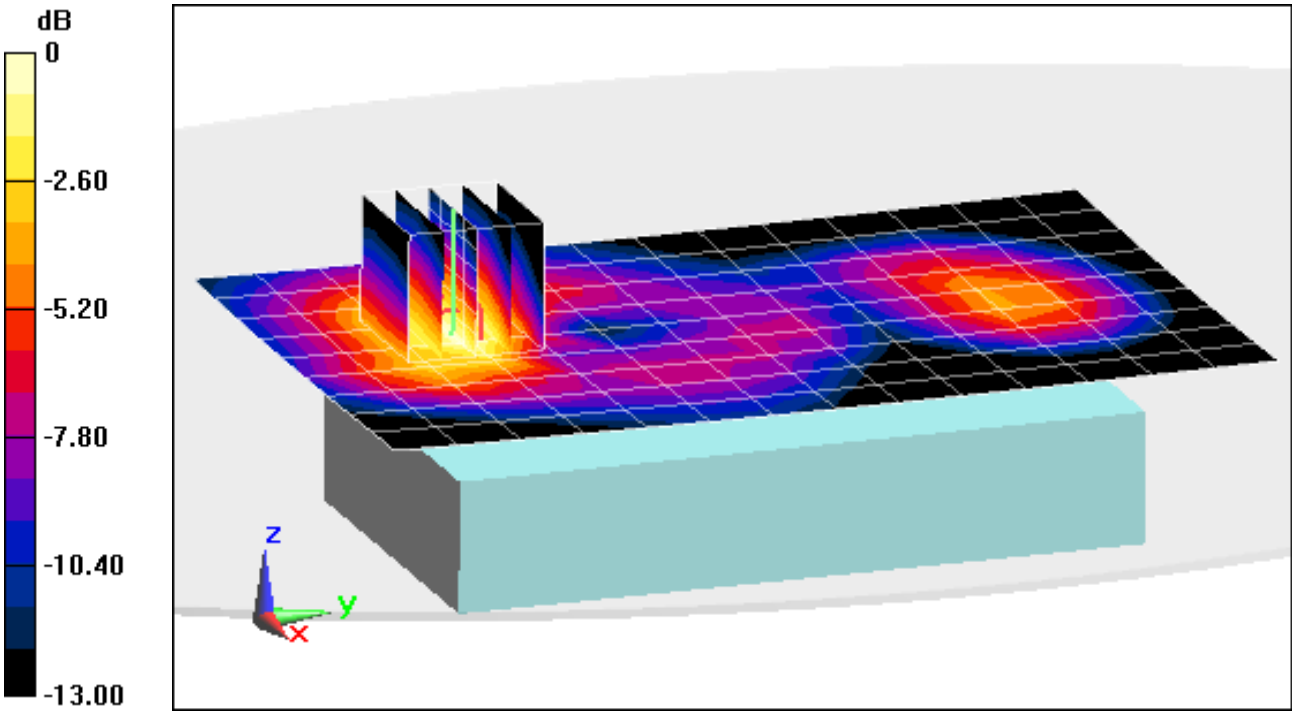
Communication System: UID 0, GSM; Frequency: 1880 MHz; Duty Cycle: 1:8.3
Medium: 1900 Body, Medium parameters used:
f = 1880 MHz; σ = 1.502 S/m; ε_r = 50.892; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 09-23-2014; Ambient Temp: 23.8°C; Tissue Temp: 23.7°C

Probe: ES3DV3 - SN3287; ConvF(4.67, 4.67, 4.67); Calibrated: 11/20/2013;
Sensor-Surface: 3mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1408; Calibrated: 11/19/2013
Phantom: ELI v5.0; Type: QDOVA001BB; Serial: 1229
Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Mode: GSM 1900, Body SAR, Back Side, Mid.ch
without Accessory

Area Scan (10x15x1): Measurement grid: dx=15mm, dy=15mm
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 10.32 V/m; Power Drift = 0.05 dB
Peak SAR (extrapolated) = 0.238 W/kg
SAR(1 g) = 0.148 W/kg



0 dB = 0.177 W/kg = -7.52 dBW/kg

DUT: ACJFZE1A; Type: Portable Handset; Serial: 46

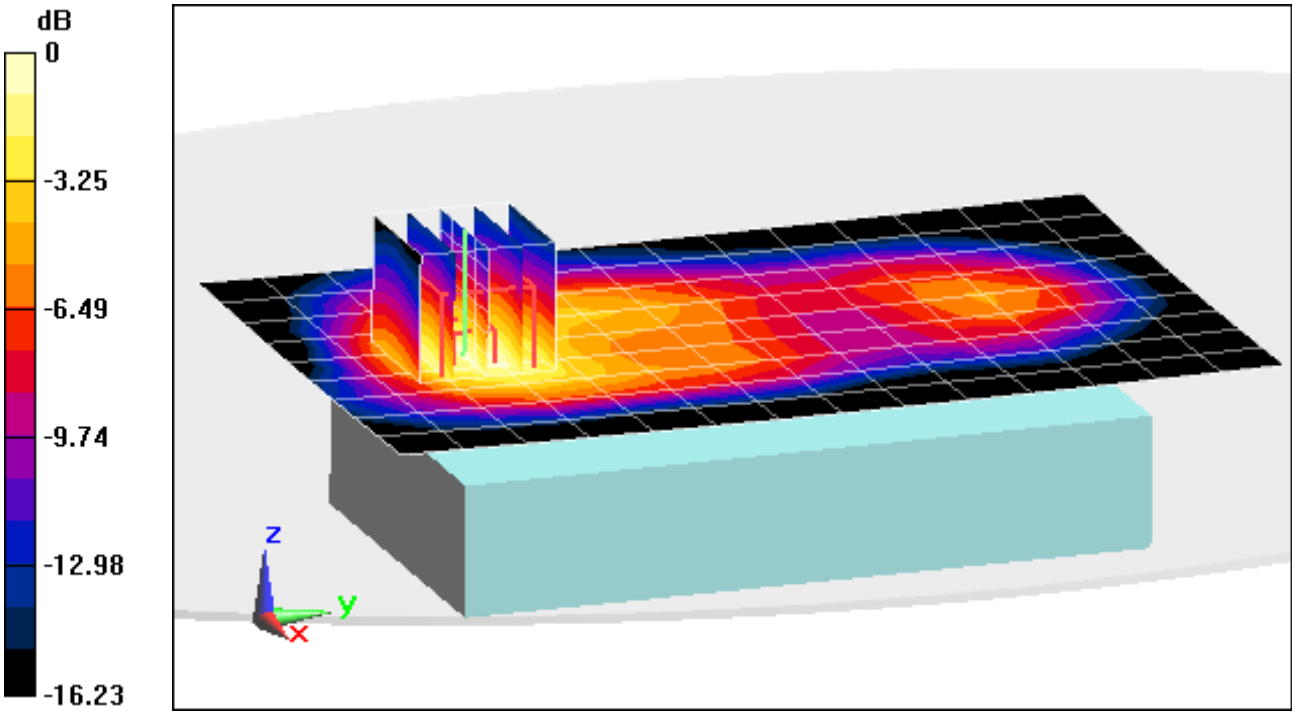
Communication System: UID 0, GSM GPRS; 4 Tx slots; Frequency: 1880 MHz; Duty Cycle: 1:2.076
Medium: 1900 Body, Medium parameters used:
f = 1880 MHz; σ = 1.502 S/m; ε_r = 50.892; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 09-23-2014; Ambient Temp: 23.8°C; Tissue Temp: 23.7°C

Probe: ES3DV3 - SN3287; ConvF(4.67, 4.67, 4.67); Calibrated: 11/20/2013;
Sensor-Surface: 3mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1408; Calibrated: 11/19/2013
Phantom: ELI v5.0; Type: QDOVA001BB; Serial: 1229
Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Mode: GPRS 1900, Body SAR, Front Side, Mid.ch, 4 Tx Slots without Accessory

Area Scan (10x15x1): Measurement grid: dx=15mm, dy=15mm
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 15.33 V/m; Power Drift = 0.12 dB
Peak SAR (extrapolated) = 0.628 W/kg
SAR(1 g) = 0.373 W/kg



0 dB = 0.451 W/kg = -3.46 dBW/kg

DUT: ACJFZE1A; Type: Portable Handset; Serial: 45

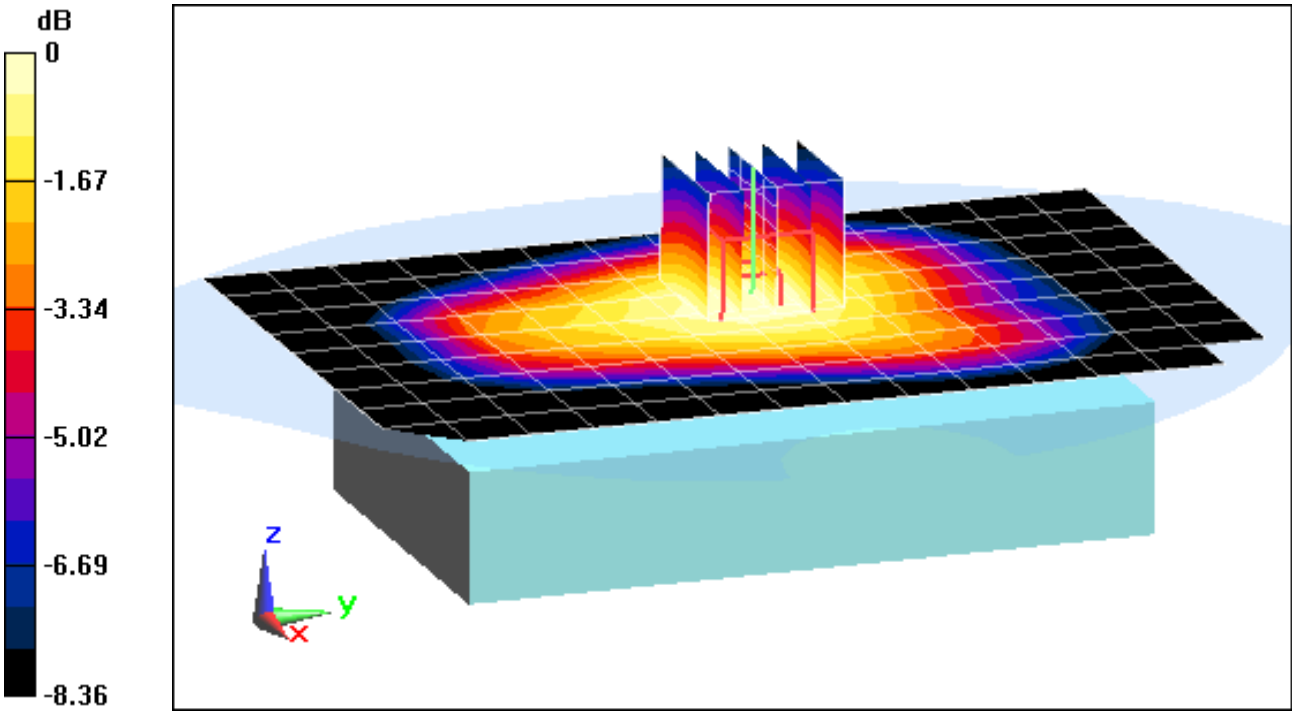
Communication System: UID 0, UMTS; Frequency: 836.6 MHz; Duty Cycle: 1:1
Medium: 835 Body, Medium parameters used (interpolated):
f = 836.6 MHz; σ = 1.004 S/m; ε_r = 54.114; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 09-18-2014; Ambient Temp: 23.8°C; Tissue Temp: 23.2°C

Probe: ES3DV3 - SN3263; ConvF(6.16, 6.16, 6.16); Calibrated: 5/15/2014;
Sensor-Surface: 3mm (Mechanical Surface Detection)
Electronics: DAE4 Sn859; Calibrated: 5/14/2014
Phantom: SAM v5.0 front; Type: QD000P40CD; Serial: TP-1646
Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Mode: UMTS 850, Body SAR, Back Side, Mid.ch
without Accessory

Area Scan (10x15x1): Measurement grid: dx=15mm, dy=15mm
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 16.83 V/m; Power Drift = 0.02 dB
Peak SAR (extrapolated) = 0.351 W/kg
SAR(1 g) = 0.272 W/kg



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

DUT: ACJFZE1A; Type: Portable Handset; Serial: 45

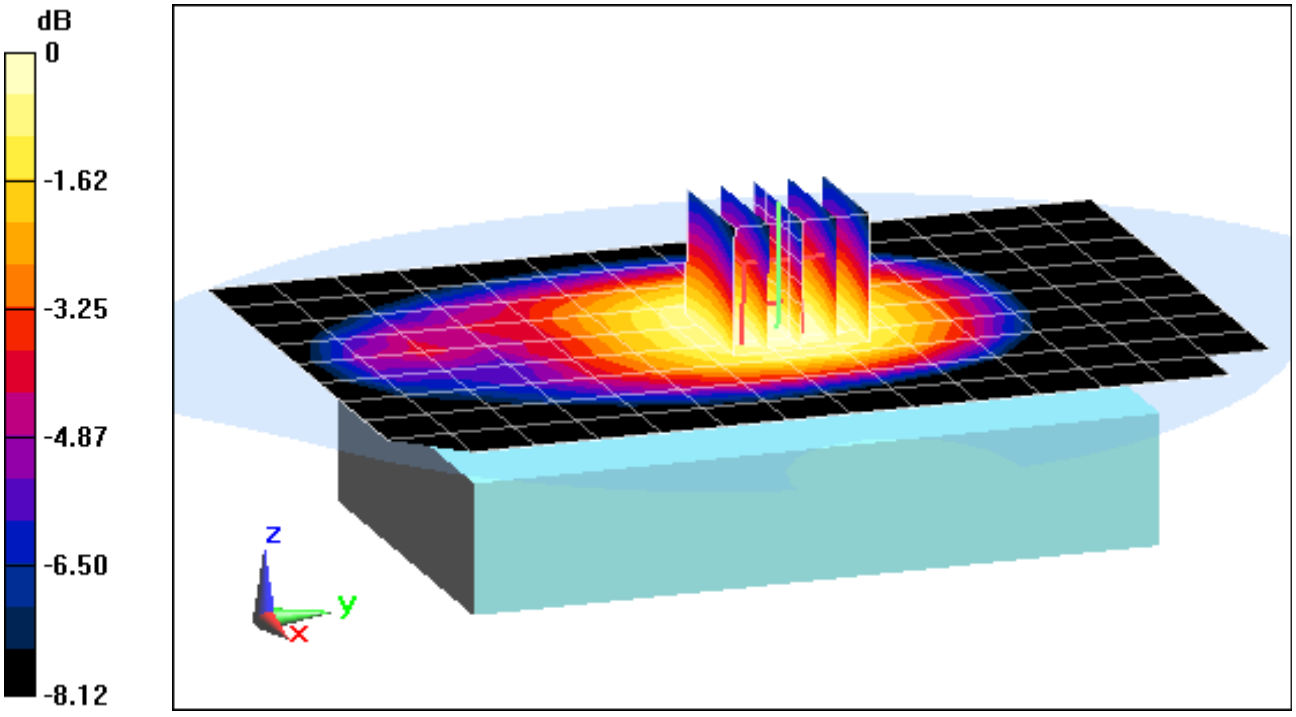
Communication System: UID 0, UMTS; Frequency: 836.6 MHz; Duty Cycle: 1:1
Medium: 835 Body, Medium parameters used (interpolated):
f = 836.6 MHz; σ = 1.004 S/m; ε_r = 54.114; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 09-18-2014; Ambient Temp: 23.8°C; Tissue Temp: 23.2°C

Probe: ES3DV3 - SN3263; ConvF(6.16, 6.16, 6.16); Calibrated: 5/15/2014;
Sensor-Surface: 3mm (Mechanical Surface Detection)
Electronics: DAE4 Sn859; Calibrated: 5/14/2014
Phantom: SAM v5.0 front; Type: QD000P40CD; Serial: TP-1646
Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Mode: UMTS 850, Body SAR, Front Side, Mid.ch
without Accessory

Area Scan (10x15x1): Measurement grid: dx=15mm, dy=15mm
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 18.84 V/m; Power Drift = 0.02 dB
Peak SAR (extrapolated) = 0.433 W/kg
SAR(1 g) = 0.345 W/kg



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

DUT: ACJFZE1A; Type: Portable Handset; Serial: 44

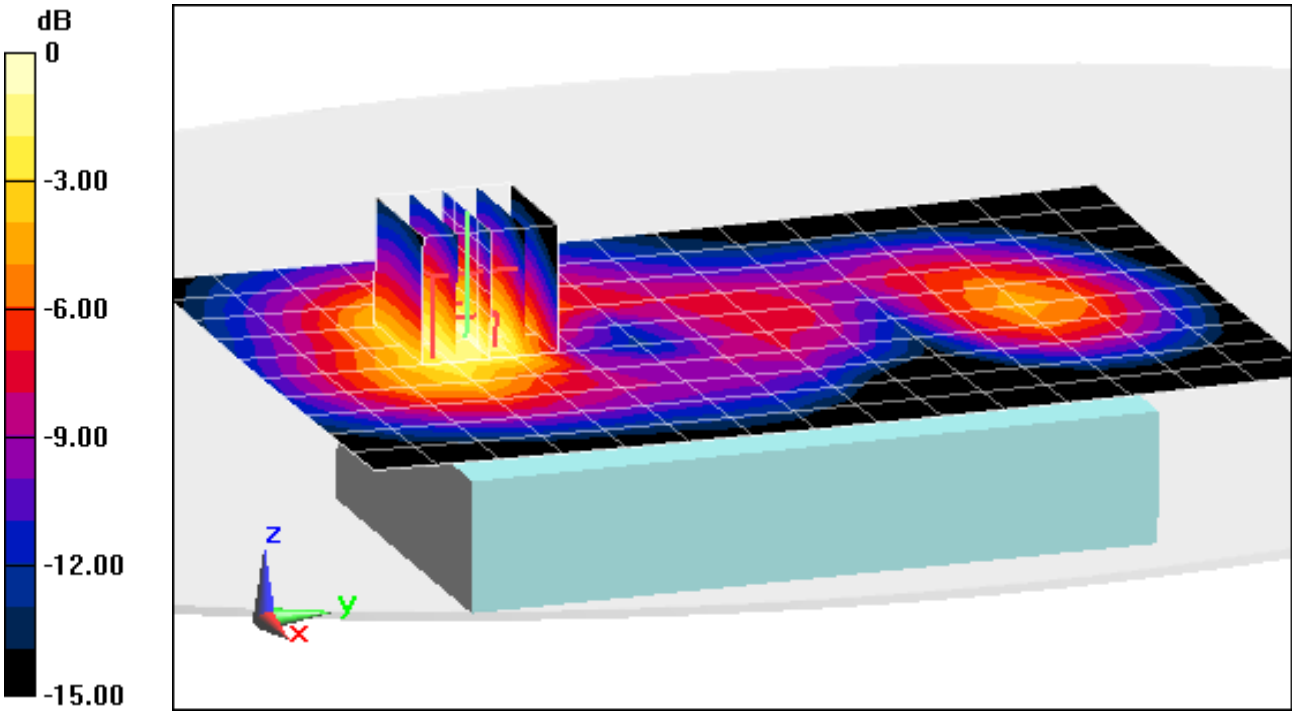
Communication System: UID 0, UMTS; Frequency: 1880 MHz; Duty Cycle: 1:1
Medium: 1900 Body, Medium parameters used:
f = 1880 MHz; σ = 1.502 S/m; ε_r = 50.892; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 09-23-2014; Ambient Temp: 23.8°C; Tissue Temp: 23.7°C

Probe: ES3DV3 - SN3287; ConvF(4.67, 4.67, 4.67); Calibrated: 11/20/2013;
Sensor-Surface: 3mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1408; Calibrated: 11/19/2013
Phantom: ELI v5.0; Type: QDOVA001BB; Serial: 1229
Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Mode: UMTS 1900, Body SAR, Back Side, Mid.ch
without Accessory

Area Scan (11x16x1): Measurement grid: dx=15mm, dy=15mm
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 13.21 V/m; Power Drift = -0.05 dB
Peak SAR (extrapolated) = 0.421 W/kg
SAR(1 g) = 0.265 W/kg



0 dB = 0.320 W/kg = -4.95 dBW/kg

DUT: ACJFZE1A; Type: Portable Handset; Serial: 44

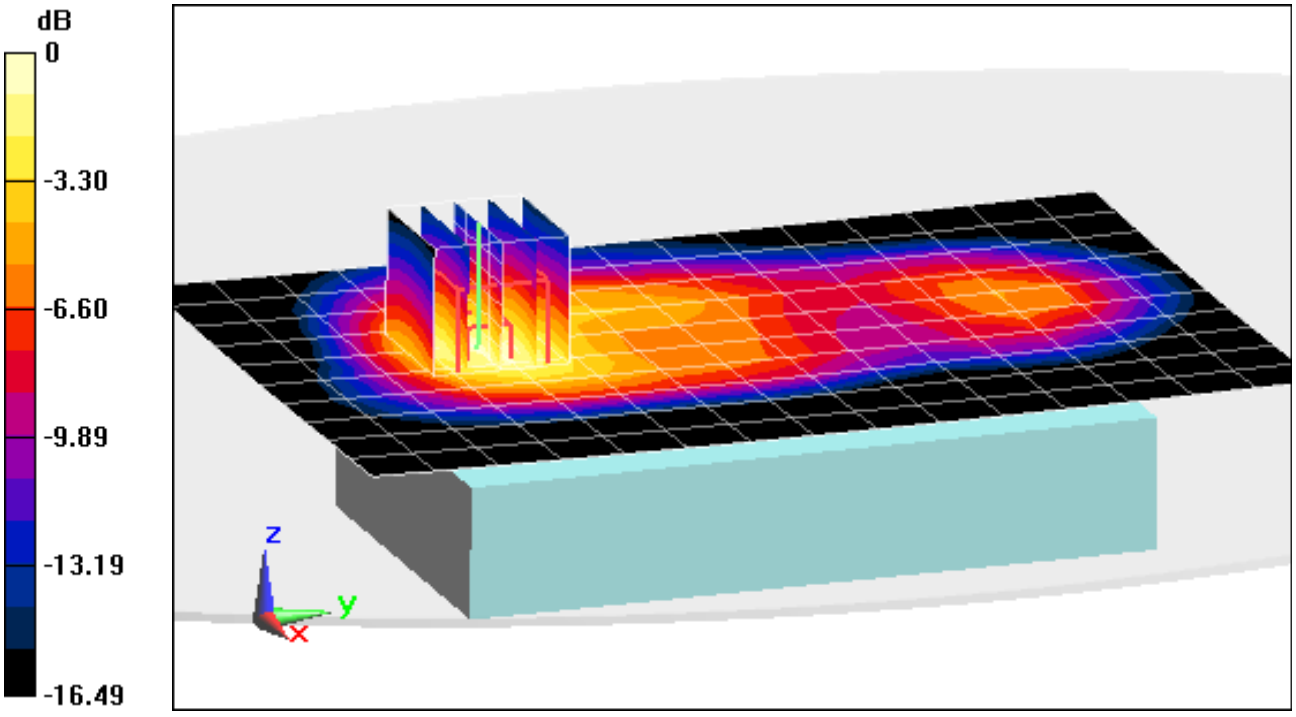
Communication System: UID 0, UMTS; Frequency: 1880 MHz; Duty Cycle: 1:1
Medium: 1900 Body, Medium parameters used:
f = 1880 MHz; σ = 1.502 S/m; ε_r = 50.892; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 09-23-2014; Ambient Temp: 23.8°C; Tissue Temp: 23.7°C

Probe: ES3DV3 - SN3287; ConvF(4.67, 4.67, 4.67); Calibrated: 11/20/2013;
Sensor-Surface: 3mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1408; Calibrated: 11/19/2013
Phantom: ELI v5.0; Type: QDOVA001BB; Serial: 1229
Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Mode: UMTS 1900, Body SAR, Front Side, Mid.ch
without Accessory

Area Scan (11x16x1): Measurement grid: dx=15mm, dy=15mm
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 21.55 V/m; Power Drift = -0.10 dB
Peak SAR (extrapolated) = 1.12 W/kg
SAR(1 g) = 0.665 W/kg



0 dB = 0.813 W/kg = -0.90 dBW/kg

DUT: ACJFZE1A; Type: Portable Handset; Serial: 44

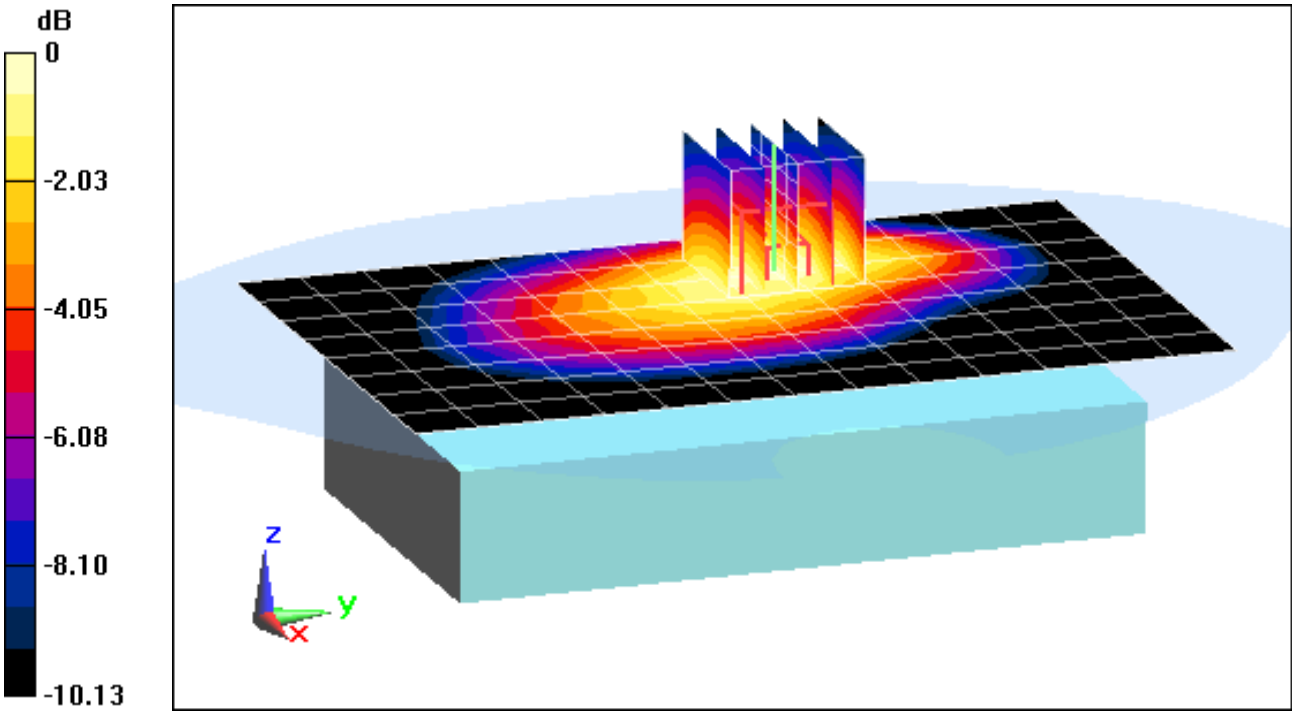
Communication System: UID 0, CDMA; Frequency: 836.52 MHz; Duty Cycle: 1:1
Medium: 835 Body, Medium parameters used (interpolated):
f = 836.52 MHz; σ = 1.004 S/m; ε_r = 54.115; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 09-18-2014; Ambient Temp: 23.8°C; Tissue Temp: 23.2°C

Probe: ES3DV3 - SN3263; ConvF(6.16, 6.16, 6.16); Calibrated: 5/15/2014;
Sensor-Surface: 3mm (Mechanical Surface Detection)
Electronics: DAE4 Sn859; Calibrated: 5/14/2014
Phantom: SAM v5.0 front; Type: QD000P40CD; Serial: TP-1646
Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Mode: Cell. CDMA, Body SAR, Back Side, Mid.ch
without Accessory

Area Scan (9x14x1): Measurement grid: dx=15mm, dy=15mm
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 22.35 V/m; Power Drift = 0.02 dB
Peak SAR (extrapolated) = 0.654 W/kg
SAR(1 g) = 0.463 W/kg



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

PCTEST ENGINEERING LABORATORY, INC.

DUT: ACJFZE1A; Type: Portable Handset; Serial: 44

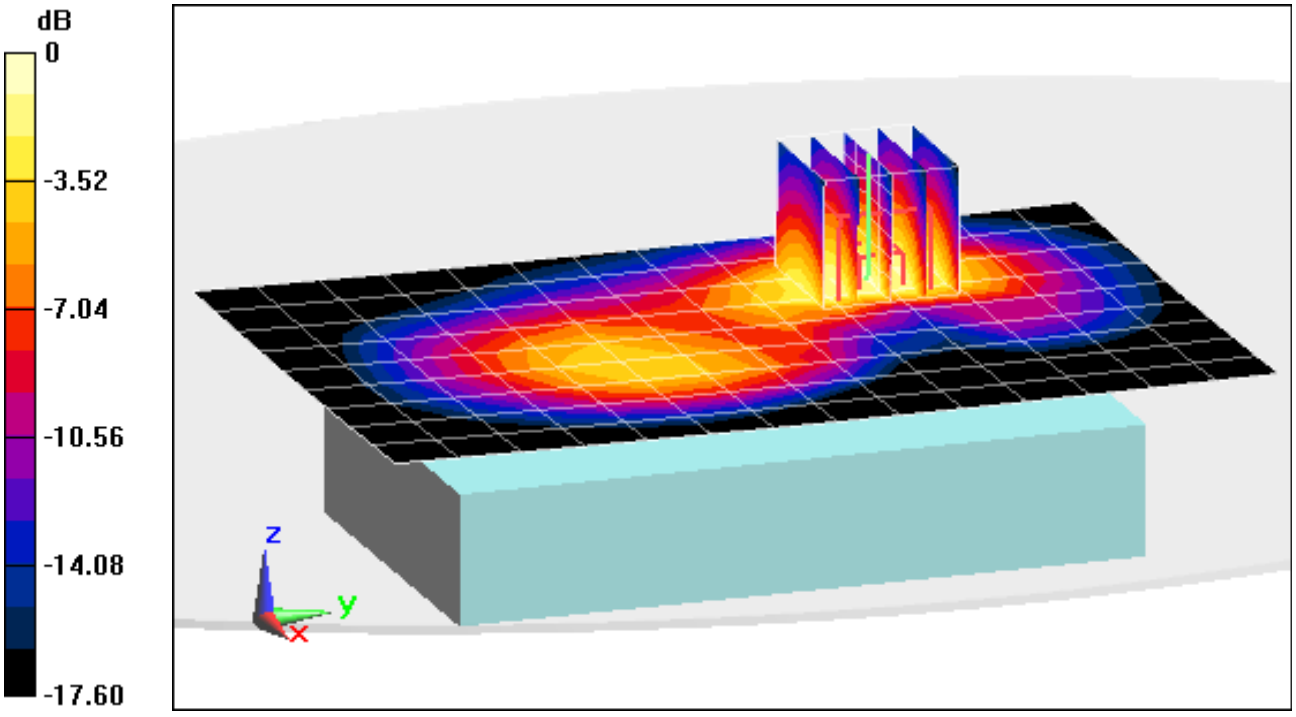
Communication System: UID 0, CDMA; Frequency: 1908.75 MHz; Duty Cycle: 1:1
Medium: 1900 Body, Medium parameters used (interpolated):
f = 1908.75 MHz; σ = 1.537 S/m; ε_r = 50.803; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 09-23-2014; Ambient Temp: 23.8°C; Tissue Temp: 23.7°C

Probe: ES3DV3 - SN3287; ConvF(4.67, 4.67, 4.67); Calibrated: 11/20/2013;
Sensor-Surface: 3mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1408; Calibrated: 11/19/2013
Phantom: ELI v5.0; Type: QDOVA001BB; Serial: 1229
Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Mode: PCS CDMA, Body SAR, Back Side, High.ch
without Accessory

Area Scan (10x15x1): Measurement grid: dx=15mm, dy=15mm
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 23.51 V/m; Power Drift = -0.06 dB
Peak SAR (extrapolated) = 1.43 W/kg
SAR(1 g) = 0.877 W/kg



0 dB = 1.05 W/kg = 0.21 dBW/kg

DUT: ACJFZE1A; Type: Portable Handset; Serial: 44

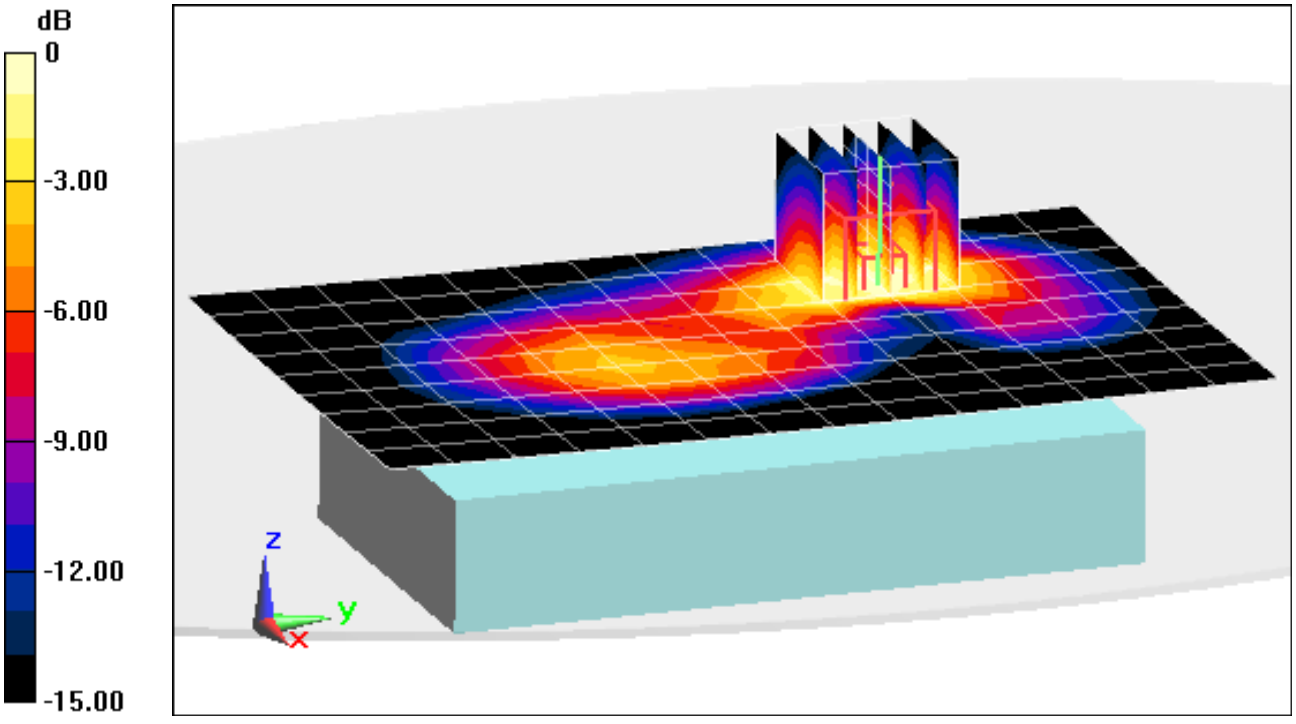
Communication System: UID 0, CDMA; Frequency: 1908.75 MHz; Duty Cycle: 1:1
Medium: 1900 Body, Medium parameters used (interpolated):
f = 1908.75 MHz; σ = 1.537 S/m; ε_r = 50.803; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 09-23-2014; Ambient Temp: 23.8°C; Tissue Temp: 23.7°C

Probe: ES3DV3 - SN3287; ConvF(4.67, 4.67, 4.67); Calibrated: 11/20/2013;
Sensor-Surface: 3mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1408; Calibrated: 11/19/2013
Phantom: ELI v5.0; Type: QDOVA001BB; Serial: 1229
Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Mode: PCS EVDO Rev. 0, Body SAR, Back Side, High.ch without Accessory

Area Scan (10x15x1): Measurement grid: dx=15mm, dy=15mm
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 25.10 V/m; Power Drift = -0.15 dB
Peak SAR (extrapolated) = 1.60 W/kg
SAR(1 g) = 0.964 W/kg



0 dB = 1.18 W/kg = 0.72 dBW/kg

DUT: ACJFZE1A; Type: Portable Handset; Serial: 46

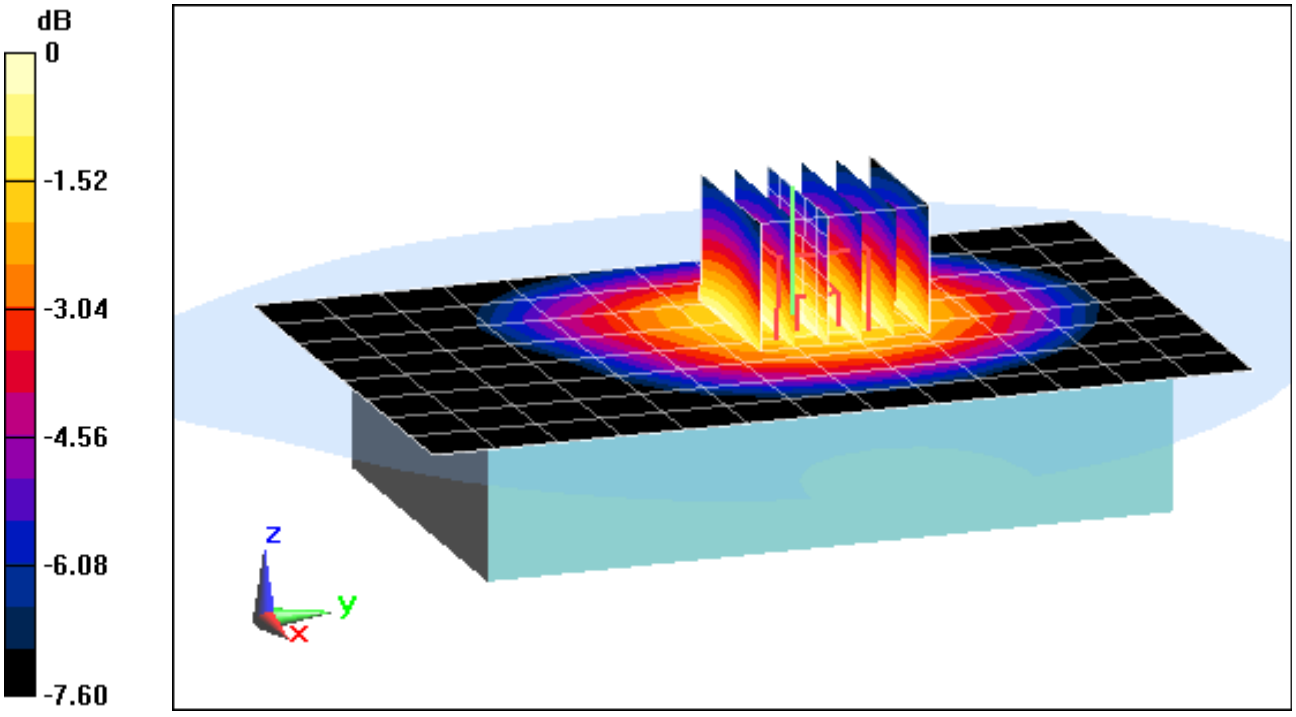
Communication System: UID 0, LTE Band 17; Frequency: 710 MHz; Duty Cycle: 1:1
Medium: 750 Body, Medium parameters used:
f = 710 MHz; σ = 0.941 S/m; ε_r = 54.405; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 0.0 cm

Test Date: 09-22-2014; Ambient Temp: 24.5°C; Tissue Temp: 24.5°C

Probe: ES3DV3 - SN3209; ConvF(6.16, 6.16, 6.16); 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: LTE Band 17, Body SAR, Front Side, Mid.ch, 10 MHz Bandwidth, QPSK, 1 RB, 0 RB Offset, with Body Holster

Area Scan (9x14x1): Measurement grid: dx=15mm, dy=15mm
Zoom Scan (6x6x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 14.36 V/m; Power Drift = 0.04 dB
Peak SAR (extrapolated) = 0.228 W/kg
SAR(1 g) = 0.184 W/kg



0 dB = 0.199 W/kg = -7.01 dBW/kg

DUT: ACJFZE1A; Type: Portable Handset; Serial: 46

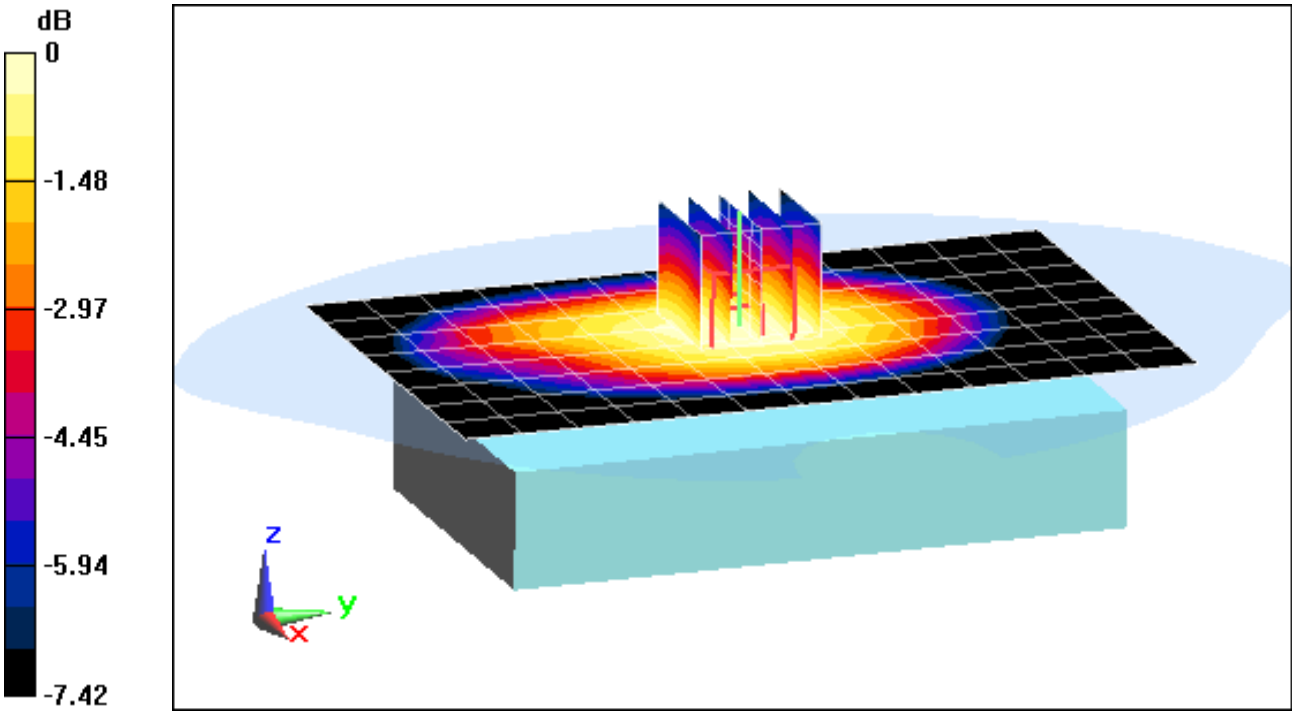
Communication System: UID 0, LTE Band 17; Frequency: 710 MHz; Duty Cycle: 1:1
Medium: 750 Body, Medium parameters used:
f = 710 MHz; σ = 0.941 S/m; ε_r = 54.405; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 09-22-2014; Ambient Temp: 24.5°C; Tissue Temp: 24.5°C

Probe: ES3DV3 - SN3209; ConvF(6.16, 6.16, 6.16); 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: LTE Band 17, Body SAR, Front Side, Mid.ch, 10 MHz Bandwidth, QPSK, 1 RB, 0 RB Offset, without Accessory

Area Scan (9x14x1): Measurement grid: dx=15mm, dy=15mm
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 17.86 V/m; Power Drift = -0.01 dB
Peak SAR (extrapolated) = 0.350 W/kg
SAR(1 g) = 0.287 W/kg



0 dB = 0.311 W/kg = -5.07 dBW/kg

DUT: ACJFZE1A; Type: Portable Handset; Serial: 46

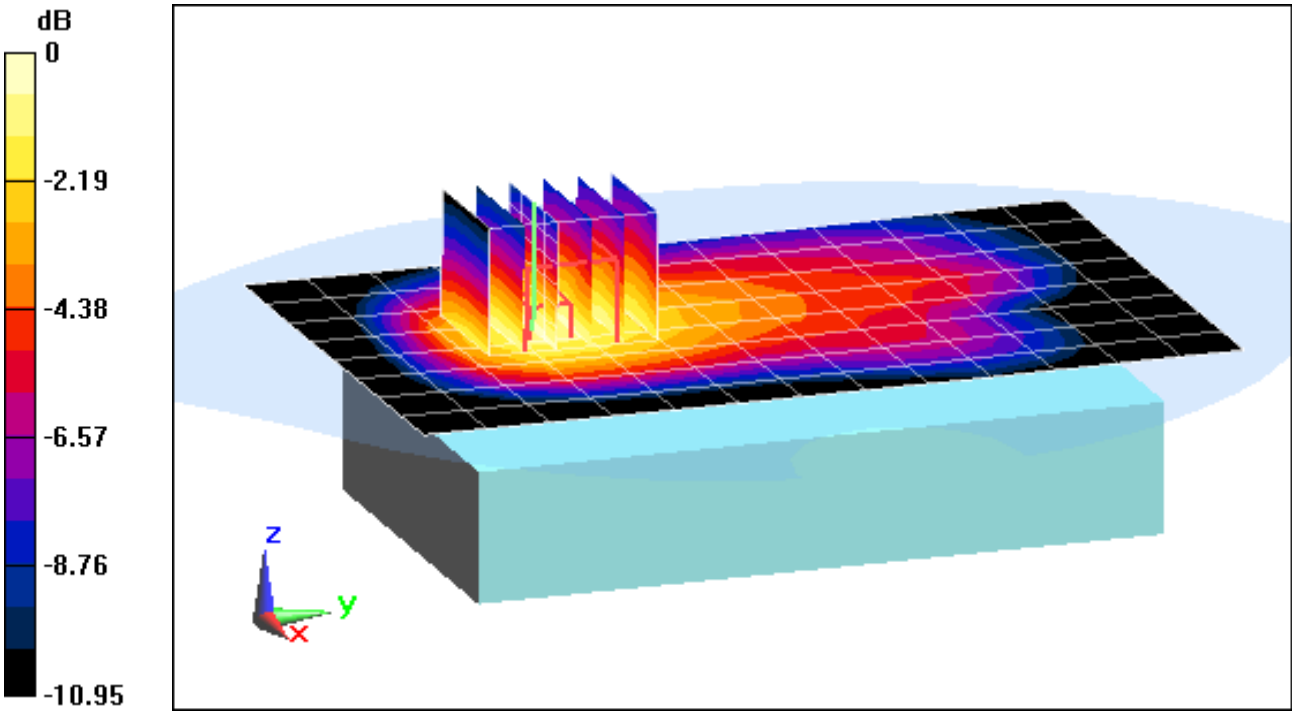
Communication System: UID 0, LTE Band 13; Frequency: 782 MHz; Duty Cycle: 1:1
Medium: 750 Body, Medium parameters used (interpolated):
f = 782 MHz; σ = 1.003 S/m; ε_r = 53.388; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 09-17-2014; Ambient Temp: 23.9°C; Tissue Temp: 22.4°C

Probe: ES3DV3 - SN3209; ConvF(6.16, 6.16, 6.16); 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: LTE Band 13, Body SAR, Back Side, Mid.ch, 10 MHz Bandwidth, QPSK, 1 RB, 25 RB Offset, without Accessory

Area Scan (9x14x1): Measurement grid: dx=15mm, dy=15mm
Zoom Scan (5x6x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 15.08 V/m; Power Drift = -0.21 dB
Peak SAR (extrapolated) = 0.288 W/kg
SAR(1 g) = 0.211 W/kg



0 dB = 0.240 W/kg = -6.20 dBW/kg

DUT: ACJFZE1A; Type: Portable Handset; Serial: 46

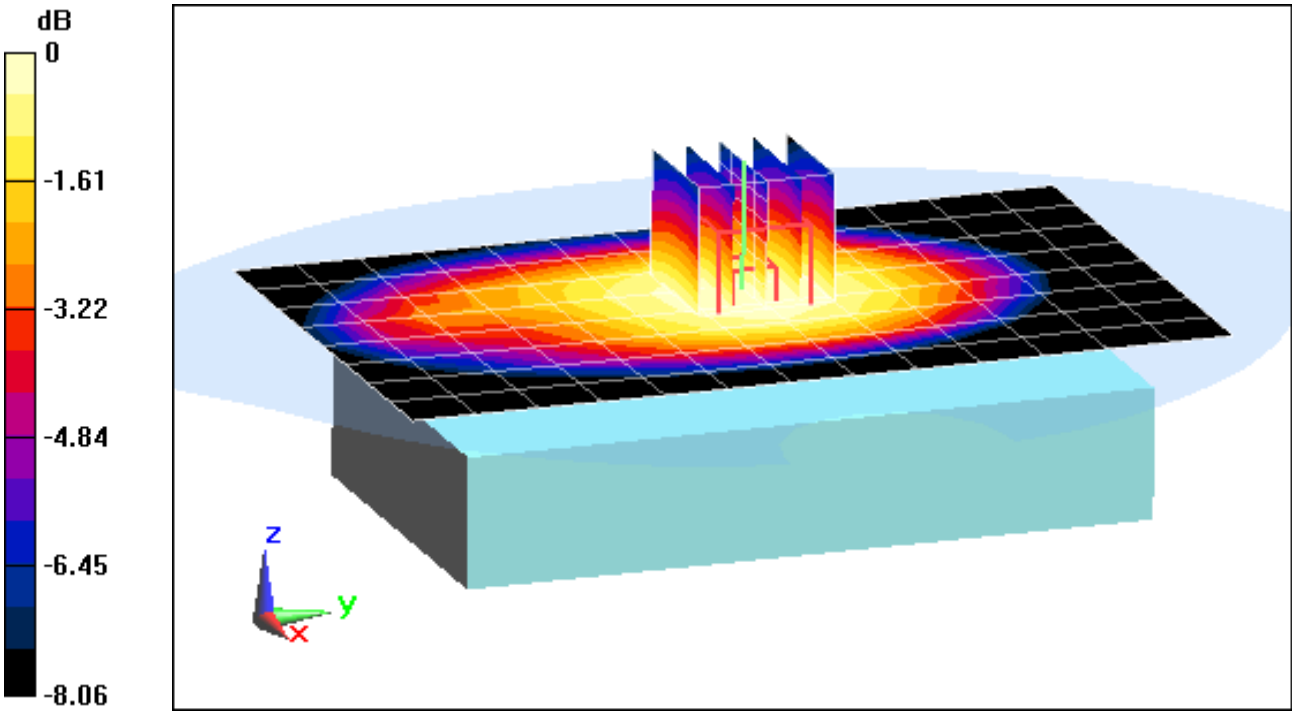
Communication System: UID 0, LTE Band 13; Frequency: 782 MHz; Duty Cycle: 1:1
Medium: 750 Body, Medium parameters used (interpolated):
f = 782 MHz; σ = 1.003 S/m; ε_r = 53.388; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 09-17-2014; Ambient Temp: 23.9°C; Tissue Temp: 22.4°C

Probe: ES3DV3 - SN3209; ConvF(6.16, 6.16, 6.16); 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: LTE Band 13, Body SAR, Front Side, Mid.ch, 10 MHz Bandwidth, QPSK, 1 RB, 25 RB Offset, without Accessory

Area Scan (9x14x1): Measurement grid: dx=15mm, dy=15mm
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 17.34 V/m; Power Drift = 0.01 dB
Peak SAR (extrapolated) = 0.355 W/kg
SAR(1 g) = 0.285 W/kg



0 dB = 0.311 W/kg = -5.07 dBW/kg

DUT: ACJFZE1A; Type: Portable Handset; Serial: 44

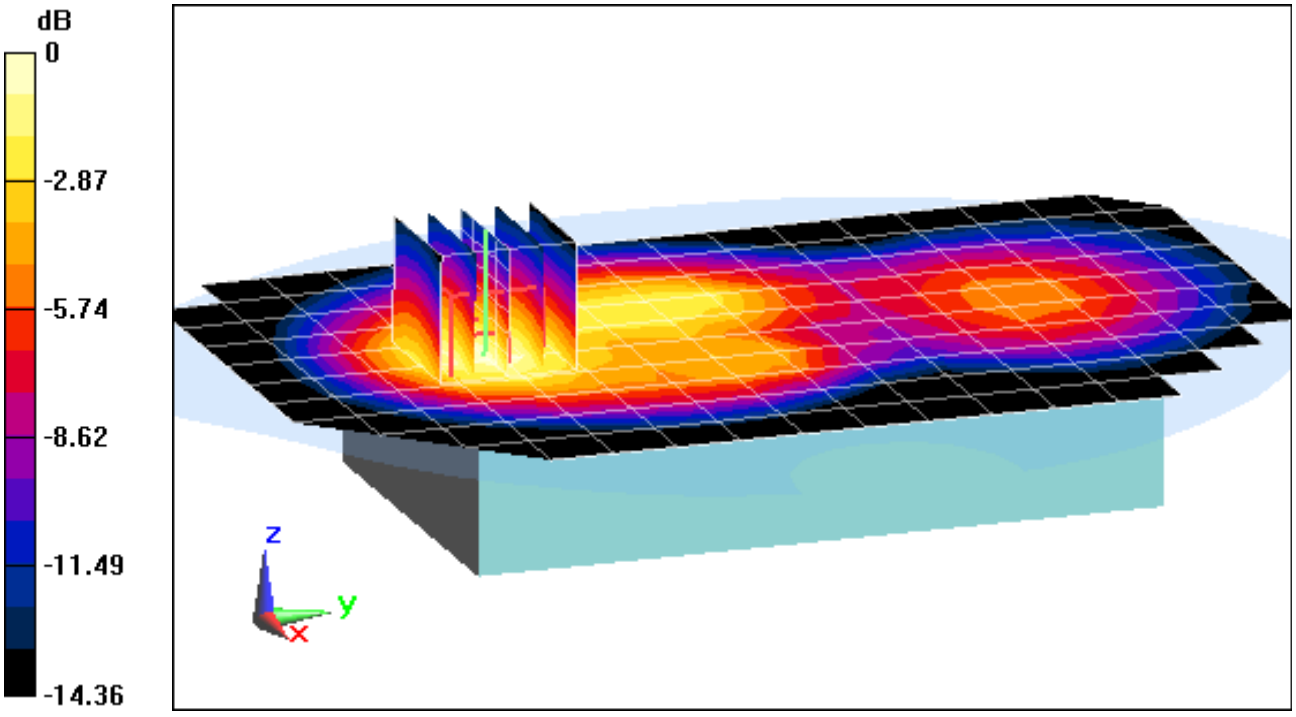
Communication System: UID 0, LTE Band 4 (AWS); Frequency: 1732.5 MHz; Duty Cycle: 1:1
Medium: 1750 Body, Medium parameters used (interpolated):
f = 1732.5 MHz; σ = 1.428 S/m; ε_r = 51.958; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 0.0 cm

Test Date: 09-18-2014; Ambient Temp: 24.5°C; Tissue Temp: 22.8°C

Probe: ES3DV3 - SN3319; ConvF(4.85, 4.85, 4.85); 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 4 (AWS), Body SAR, Front Side, Mid.ch, 20 MHz Bandwidth, QPSK, 1 RB, 99 RB Offset, with Body Holster

Area Scan (11x17x1): Measurement grid: dx=15mm, dy=15mm
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 13.25 V/m; Power Drift = 0.00 dB
Peak SAR (extrapolated) = 0.349 W/kg
SAR(1 g) = 0.222 W/kg



0 dB = 0.265 W/kg = -5.77 dBW/kg

DUT: ACJFZE1A; Type: Portable Handset; Serial: 44

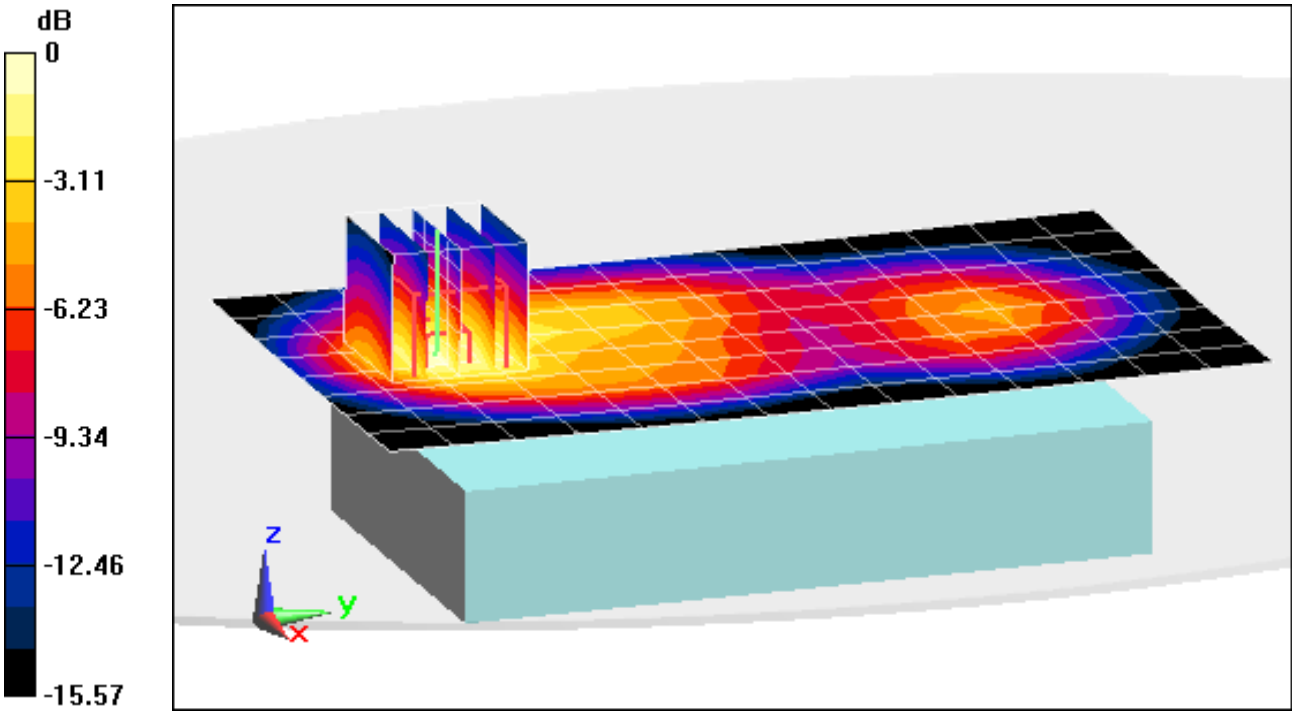
Communication System: UID 0, LTE Band 4 (AWS); Frequency: 1732.5 MHz; Duty Cycle: 1:1
Medium: 1750 Body, Medium parameters used (interpolated):
f = 1732.5 MHz; σ = 1.428 S/m; ε_r = 53.274; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 09-24-2014; Ambient Temp: 22.1°C; Tissue Temp: 22.4°C

Probe: ES3DV3 - SN3258; ConvF(4.83, 4.83, 4.83); Calibrated: 2/25/2014;
Sensor-Surface: 3mm (Mechanical Surface Detection)
Electronics: DAE4 Sn665; Calibrated: 2/26/2014
Phantom: ELI v5.0; Type: QDOVA002AA; Serial: TP-1158
Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Mode: LTE Band 4 (AWS), Body SAR, Front Side, Mid.ch, 20 MHz Bandwidth, QPSK, 1 RB, 99 RB Offset, without Accessory

Area Scan (9x15x1): Measurement grid: dx=15mm, dy=15mm
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 21.49 V/m; Power Drift = 0.07 dB
Peak SAR (extrapolated) = 1.12 W/kg
SAR(1 g) = 0.702 W/kg



0 dB = 0.847 W/kg = -0.72 dBW/kg

DUT: ACJFZE1A; Type: Portable Handset; Serial: WIFI_SAR

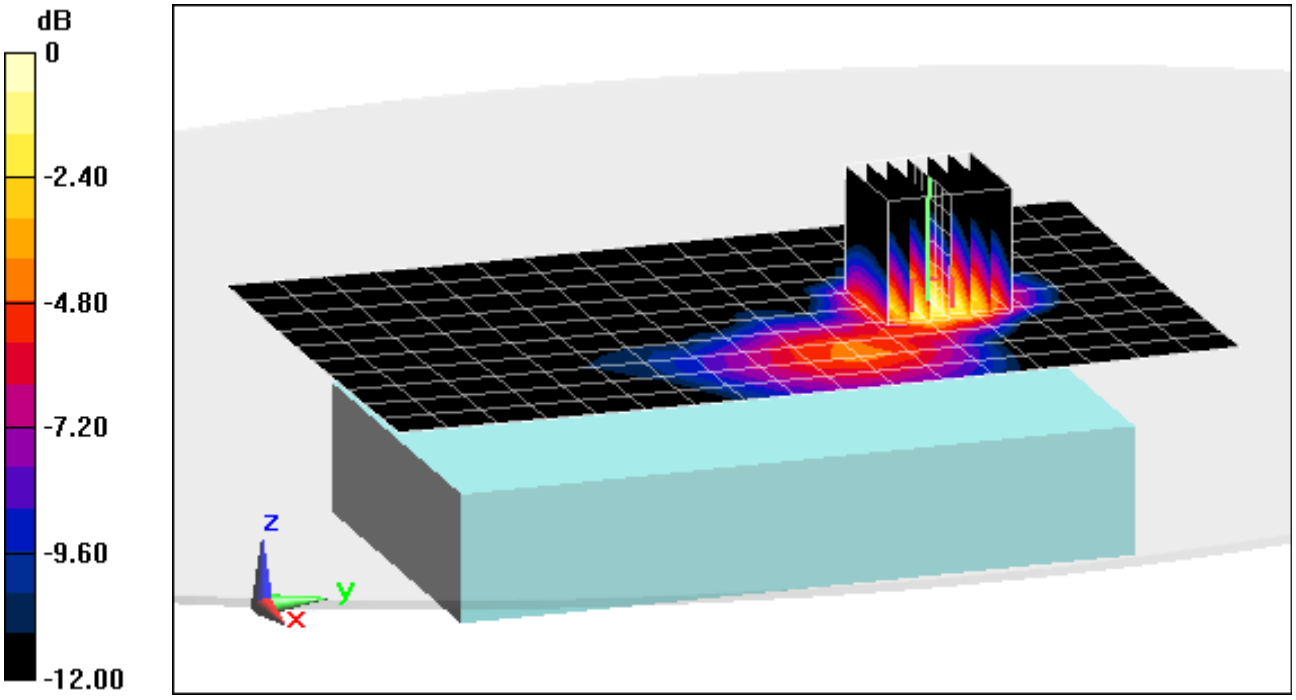
Communication System: UID 0, IEEE 802.11b; Frequency: 2462 MHz; Duty Cycle: 1:1
Medium: 2450 Body, Medium parameters used (interpolated):
f = 2462 MHz; σ = 1.985 S/m; ε_r = 51.171; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 06-12-2014; Ambient Temp: 23.1°C; Tissue Temp: 22.5°C

Probe: ES3DV3 - SN3258; ConvF(4.14, 4.14, 4.14); Calibrated: 2/25/2014;
Sensor-Surface: 3mm (Mechanical Surface Detection)
Electronics: DAE4 Sn665; Calibrated: 2/26/2014
Phantom: ELI v5.0; Type: QDOVA002AA; Serial: TP-1158
Measurement SW: DASY52, Version 52.8 (7); SEMCAD X Version 14.6.10 (7331)

Mode: IEEE 802.11b, Body SAR, Ch 11, 1 Mbps, Back Side without Accessory

Area Scan (11x18x1): Measurement grid: dx=12mm, dy=12mm
Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 8.563 V/m; Power Drift = 0.03 dB
Peak SAR (extrapolated) = 0.257 W/kg
SAR(1 g) = 0.137 W/kg



0 dB = 0.173 W/kg = -7.62 dBW/kg

DUT: ACJFZE1A; Type: Portable Handset; Serial: WIFI_SAR

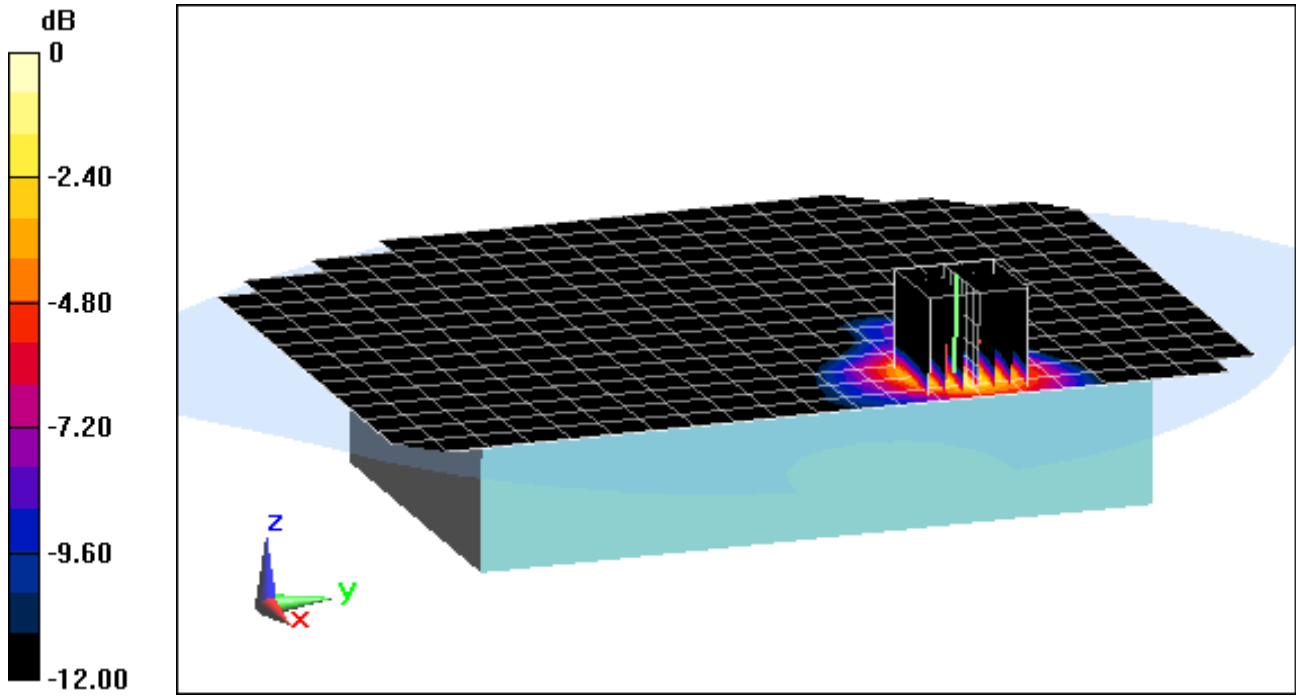
Communication System: UID 0, IEEE 802.11a; Frequency: 5600 MHz; Duty Cycle: 1:1
Medium: 5 GHz Body, Medium parameters used:
f = 5600 MHz; σ = 5.865 S/m; ε_r = 47.502; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 0.0 cm

Test Date: 06-16-2014; Ambient Temp: 24.1°C; Tissue Temp: 23.0°C

Probe: EX3DV4 - SN3914; ConvF(3.97, 3.97, 3.97); Calibrated: 10/23/2013;
Sensor-Surface: 1.4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1333; Calibrated: 11/19/2013
Phantom: SAM 5.0 front; Type: QD000P40CD; Serial: TP:-1648
Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Mode: IEEE 802.11a, 5.5-5.7 GHz, Body SAR, Ch 120, 6 Mbps, Back Side with Body Holster

Area Scan (17x22x1): 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 = 8.319 V/m; Power Drift = -0.12 dB
Peak SAR (extrapolated) = 1.72 W/kg
SAR(1 g) = 0.430 W/kg



0 dB = 0.969 W/kg = -0.14 dBW/kg

DUT: ACJFZE1A; Type: Portable Handset; Serial: WIFI_SAR

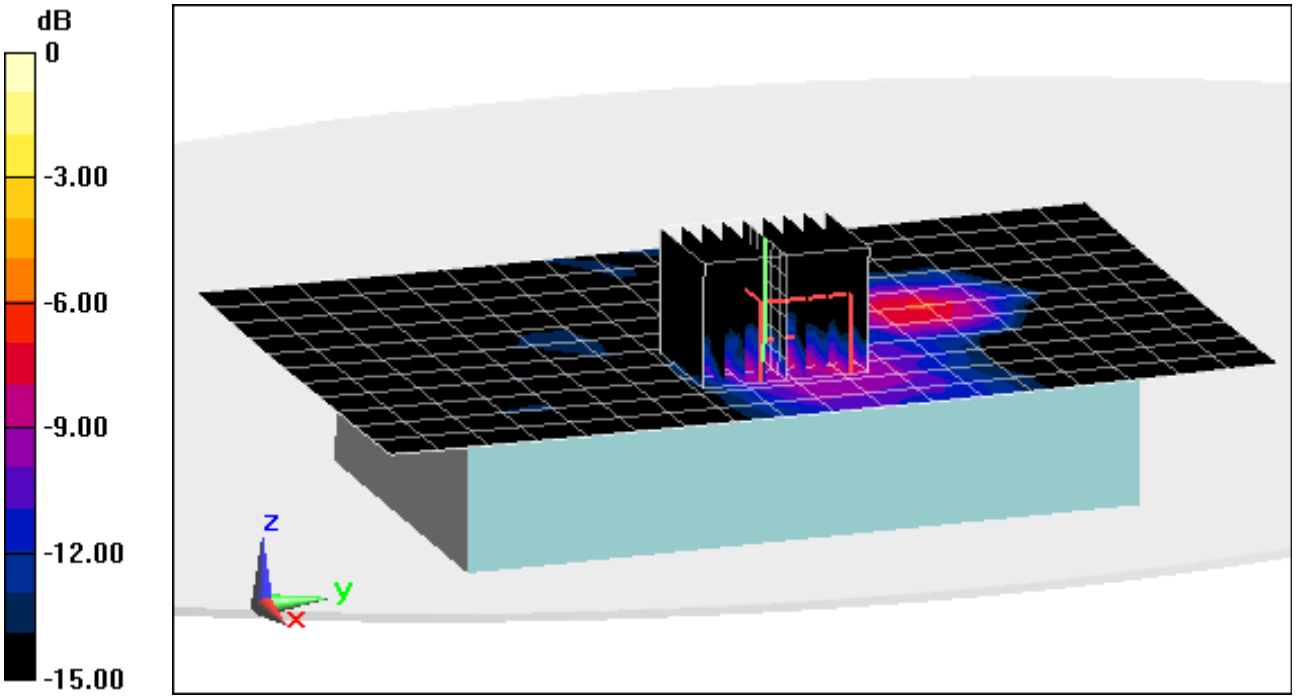
Communication System: UID 0, Bluetooth; Frequency: 2441 MHz; Duty Cycle: 1:1
Medium: 2450 Body, Medium parameters used (interpolated):
f = 2441 MHz; σ = 1.958 S/m; ε_r = 51.248; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 0.0 cm

Test Date: 06-12-2014; Ambient Temp: 23.1°C; Tissue Temp: 22.5°C

Probe: ES3DV3 - SN3258; ConvF(4.14, 4.14, 4.14); Calibrated: 2/25/2014;
Sensor-Surface: 3mm (Mechanical Surface Detection)
Electronics: DAE4 Sn665; Calibrated: 2/26/2014
Phantom: ELI v5.0; Type: QDOVA002AA; Serial: TP-1158
Measurement SW: DASY52, Version 52.8 (7); SEMCAD X Version 14.6.10 (7331)

Mode: Bluetooth, Body SAR, Ch 39, 1 Mbps, Back Side with Body Holster

Area Scan (12x19x1): Measurement grid: dx=12mm, dy=12mm
Zoom Scan (7x9x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 2.214 V/m; Power Drift = 0.13 dB
Peak SAR (extrapolated) = 0.0160 W/kg
SAR(1 g) = 0.00609 W/kg



0 dB = 0.0500 W/kg = -13.01 dBW/kg

PCTEST ENGINEERING LABORATORY, INC.

DUT: ACJFZE1A; Type: Portable Handset; Serial: 45

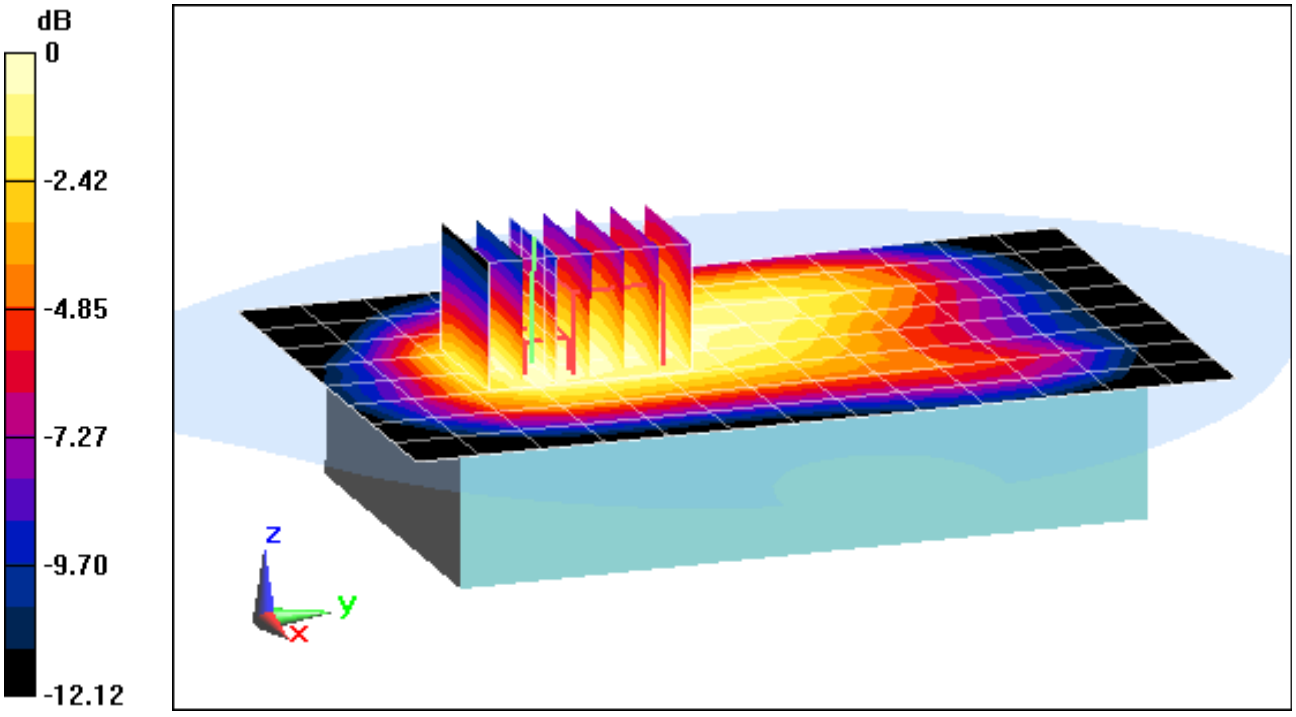
Communication System: UID 0, GSM GPRS; 4 Tx slots; Frequency: 836.6 MHz; Duty Cycle: 1:2.076
Medium: 835 Body, Medium parameters used (interpolated):
f = 836.6 MHz; σ = 1.004 S/m; ε_r = 54.114; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 0.0 cm

Test Date: 09-18-2014; Ambient Temp: 23.8°C; Tissue Temp: 23.2°C

Probe: ES3DV3 - SN3263; ConvF(6.16, 6.16, 6.16); Calibrated: 5/15/2014;
Sensor-Surface: 3mm (Mechanical Surface Detection)
Electronics: DAE4 Sn859; Calibrated: 5/14/2014
Phantom: SAM v5.0 front; Type: QD000P40CD; Serial: TP-1646
Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Mode: GPRS 850, Extremity SAR, Back Side, Mid.ch, 4 Tx Slots with Hand Strap, Top Left

Area Scan (9x14x1): Measurement grid: dx=15mm, dy=15mm
Zoom Scan (5x7x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 19.93 V/m; Power Drift = -0.02 dB
Peak SAR (extrapolated) = 0.531 W/kg
SAR(10 g) = 0.270 W/kg



0 dB = 0.424 W/kg = -3.73 dBW/kg

DUT: ACJFZE1A; Type: Portable Handset; Serial: 46

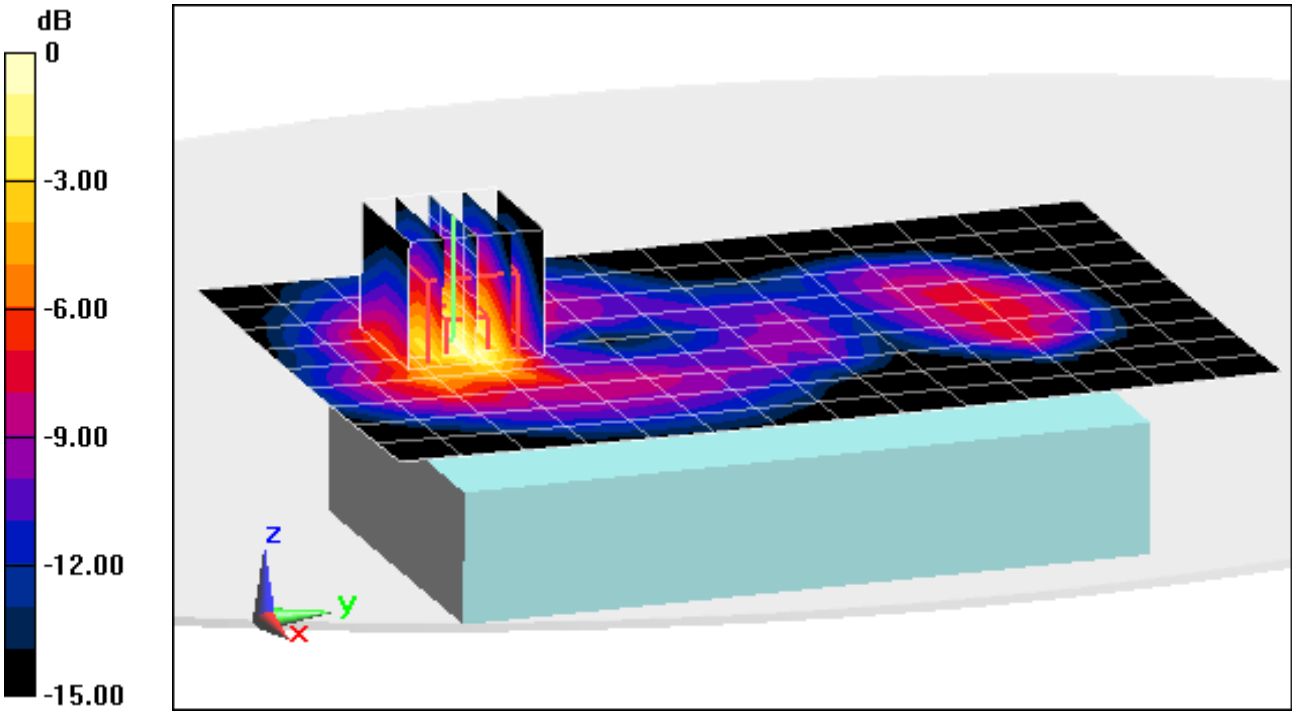
Communication System: UID 0, GSM GPRS; 4 Tx slots; Frequency: 1880 MHz; Duty Cycle: 1:2.076
Medium: 1900 Body, Medium parameters used:
f = 1880 MHz; σ = 1.502 S/m; ε_r = 50.892; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 0.0 cm

Test Date: 09-23-2014; Ambient Temp: 23.8°C; Tissue Temp: 23.7°C

Probe: ES3DV3 - SN3287; ConvF(4.67, 4.67, 4.67); Calibrated: 11/20/2013;
Sensor-Surface: 3mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1408; Calibrated: 11/19/2013
Phantom: ELI v5.0; Type: QDOVA001BB; Serial: 1229
Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Mode: GPRS 1900, Extremity SAR, Back Side, Mid.ch, 4 Tx Slots with Hand Strap, Top Left

Area Scan (10x15x1): Measurement grid: dx=15mm, dy=15mm
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 15.75 V/m; Power Drift = 0.03 dB
Peak SAR (extrapolated) = 0.634 W/kg
SAR(10 g) = 0.191 W/kg



0 dB = 0.451 W/kg = -3.46 dBW/kg

DUT: ACJFZE1A; Type: Portable Handset; Serial: 45

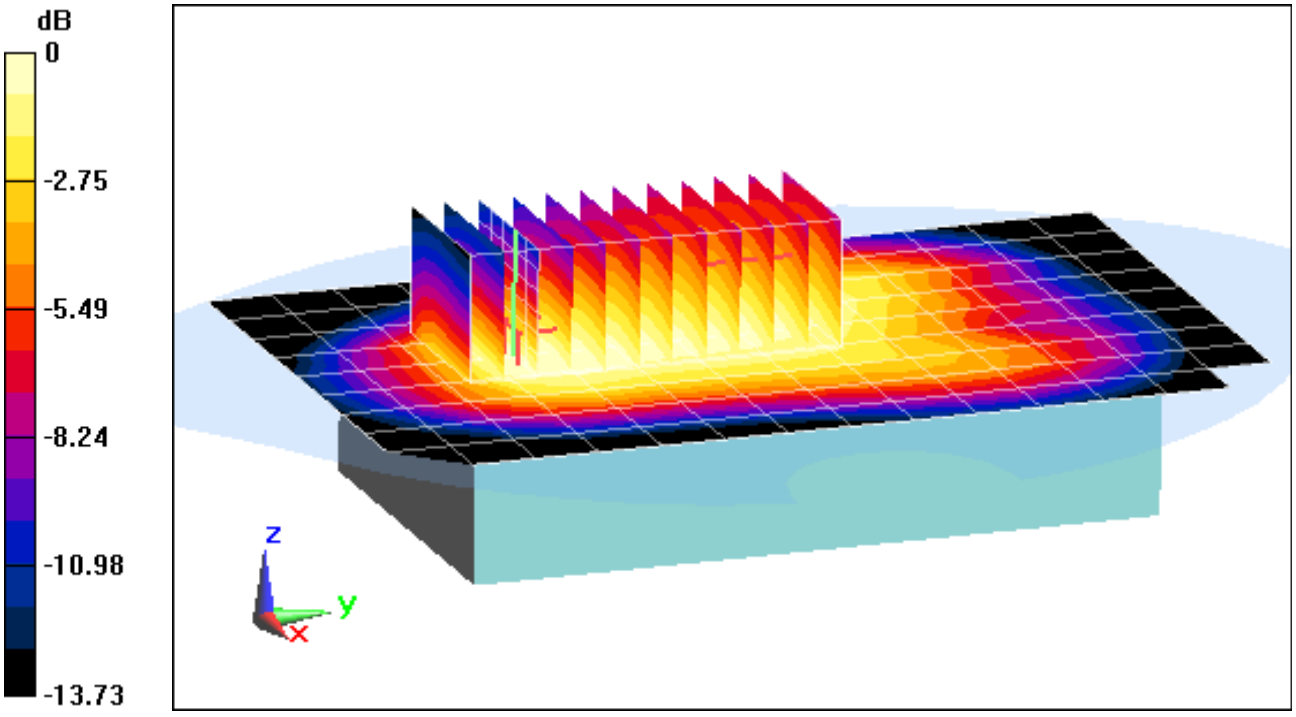
Communication System: UID 0, UMTS; Frequency: 836.6 MHz; Duty Cycle: 1:1
Medium: 835 Body, Medium parameters used (interpolated):
f = 836.6 MHz; σ = 1.004 S/m; ε_r = 54.114; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 0.0 cm

Test Date: 09-18-2014; Ambient Temp: 23.8°C; Tissue Temp: 23.2°C

Probe: ES3DV3 - SN3263; ConvF(6.16, 6.16, 6.16); Calibrated: 5/15/2014;
Sensor-Surface: 3mm (Mechanical Surface Detection)
Electronics: DAE4 Sn859; Calibrated: 5/14/2014
Phantom: SAM v5.0 front; Type: QD000P40CD; Serial: TP-1646
Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Mode: UMTS 850, Extremity SAR, Back Side, Mid.ch with Hand Strap, Top Right

Area Scan (10x15x1): Measurement grid: dx=15mm, dy=15mm
Zoom Scan (6x12x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 18.85 V/m; Power Drift = 0.01 dB
Peak SAR (extrapolated) = 0.513 W/kg
SAR(10 g) = 0.250 W/kg



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

DUT: ACJFZE1A; Type: Portable Handset; Serial: 46

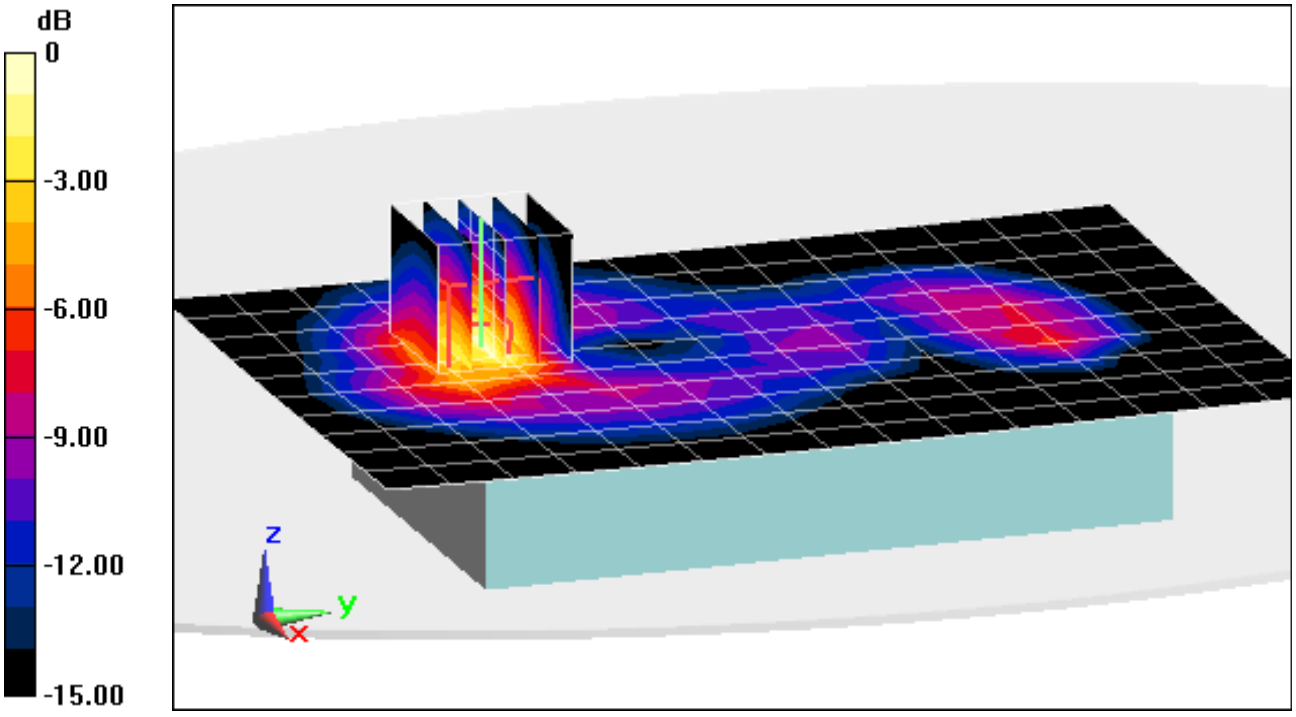
Communication System: UID 0, UMTS; Frequency: 1880 MHz; Duty Cycle: 1:1
Medium: 1900 Body, Medium parameters used:
f = 1880 MHz; σ = 1.502 S/m; ε_r = 50.892; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 0.0 cm

Test Date: 09-23-2014; Ambient Temp: 23.8°C; Tissue Temp: 23.7°C

Probe: ES3DV3 - SN3287; ConvF(4.67, 4.67, 4.67); Calibrated: 11/20/2013;
Sensor-Surface: 3mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1408; Calibrated: 11/19/2013
Phantom: ELI v5.0; Type: QDOVA001BB; Serial: 1229
Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Mode: UMTS 1900, Extremity SAR, Back Side, Mid.ch with Hand Strap, Top Left

Area Scan (11x16x1): Measurement grid: dx=15mm, dy=15mm
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 19.70 V/m; Power Drift = 0.04 dB
Peak SAR (extrapolated) = 1.14 W/kg
SAR(10 g) = 0.345 W/kg



0 dB = 0.844 W/kg = -0.74 dBW/kg

DUT: ACJFZE1A; Type: Portable Handset; Serial: 44

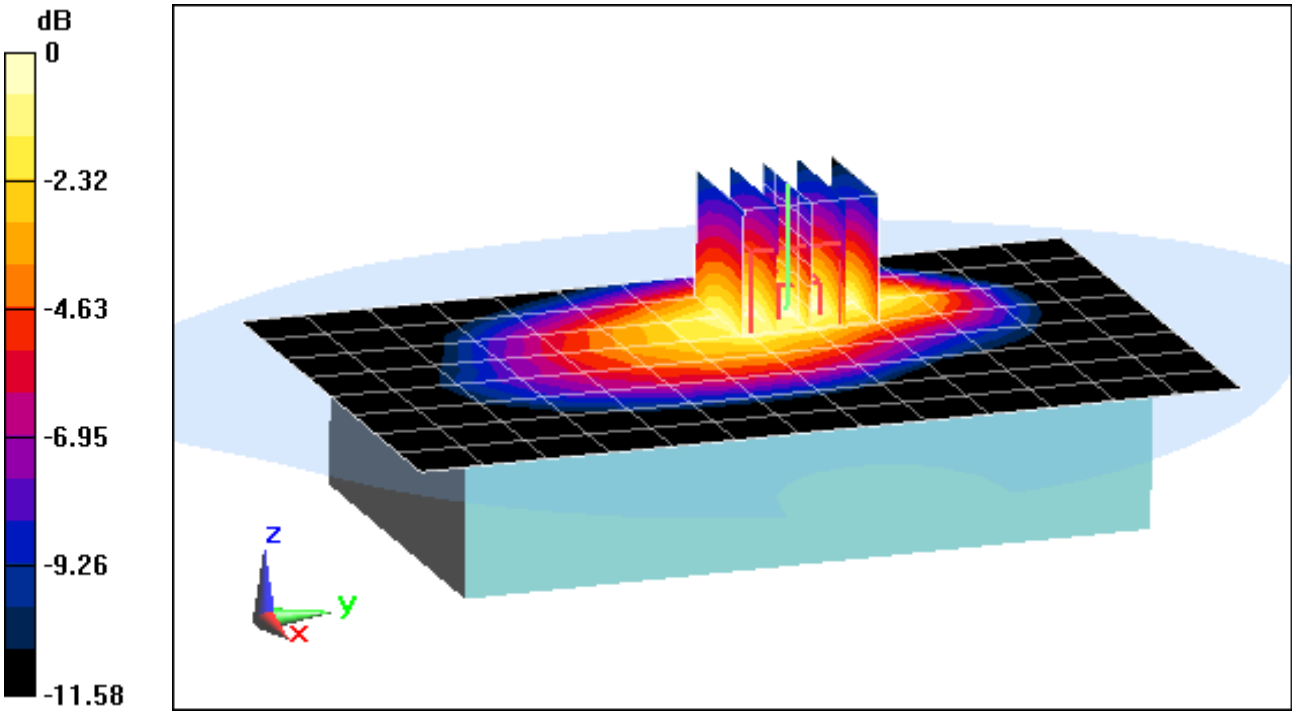
Communication System: UID 0, CDMA; Frequency: 836.52 MHz; Duty Cycle: 1:1
Medium: 835 Body, Medium parameters used (interpolated):
f = 836.52 MHz; σ = 1.004 S/m; ε_r = 54.115; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 0.0 cm

Test Date: 09-18-2014; Ambient Temp: 23.8°C; Tissue Temp: 23.2°C

Probe: ES3DV3 - SN3263; ConvF(6.16, 6.16, 6.16); Calibrated: 5/15/2014;
Sensor-Surface: 3mm (Mechanical Surface Detection)
Electronics: DAE4 Sn859; Calibrated: 5/14/2014
Phantom: SAM v5.0 front; Type: QD000P40CD; Serial: TP-1646
Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Mode: Cell. EVDO Rev. 0, Extremity SAR, Back Side, Mid.ch with Hand Strap, Top Left

Area Scan (9x14x1): Measurement grid: dx=15mm, dy=15mm
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 31.03 V/m; Power Drift = -0.01 dB
Peak SAR (extrapolated) = 1.31 W/kg
SAR(10 g) = 0.572 W/kg



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

DUT: ACJFZE1A; Type: Portable Handset; Serial: 44

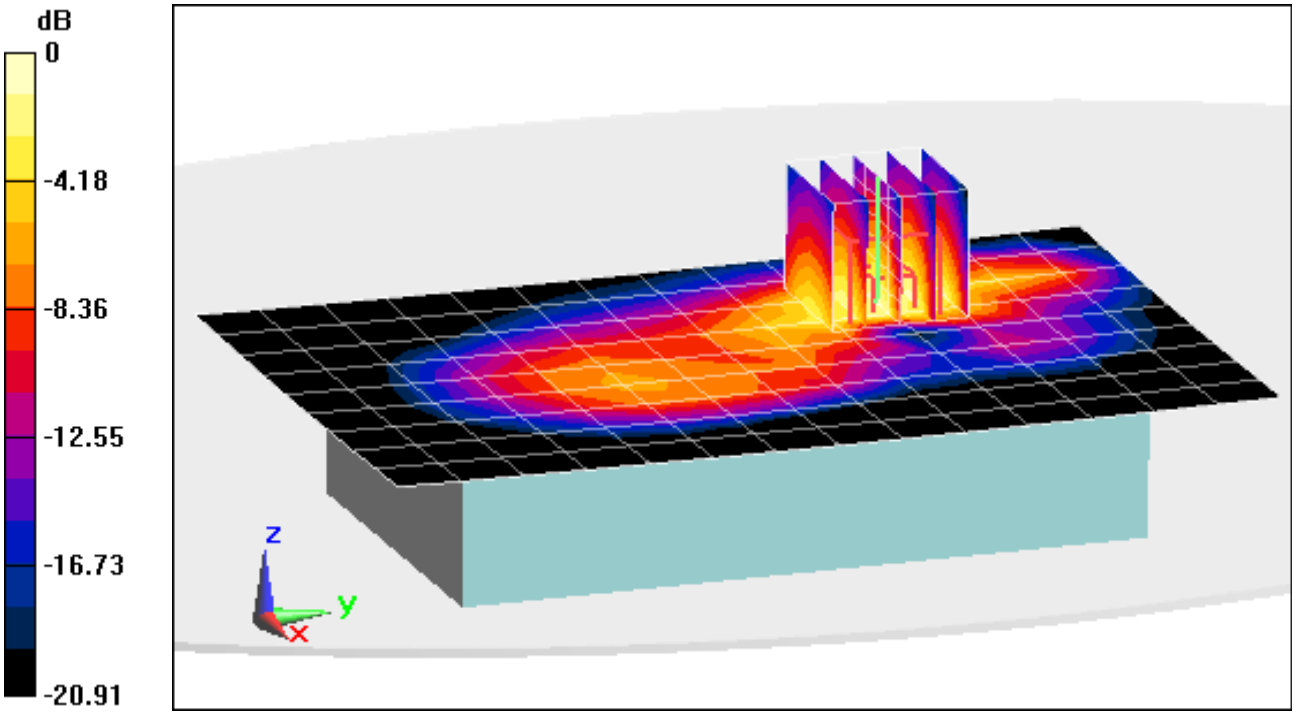
Communication System: UID 0, CDMA; Frequency: 1908.75 MHz; Duty Cycle: 1:1
Medium: 1900 Body, Medium parameters used (interpolated):
f = 1908.75 MHz; σ = 1.537 S/m; ε_r = 50.803; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 0.0 cm

Test Date: 09-23-2014; Ambient Temp: 23.8°C; Tissue Temp: 23.7°C

Probe: ES3DV3 - SN3287; ConvF(4.67, 4.67, 4.67); Calibrated: 11/20/2013;
Sensor-Surface: 3mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1408; Calibrated: 11/19/2013
Phantom: ELI v5.0; Type: QDOVA001BB; Serial: 1229
Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Mode: PCS EVDO Rev. 0, Extremity SAR, Back Side, High.ch with Hand Strap, Top Right

Area Scan (10x15x1): Measurement grid: dx=15mm, dy=15mm
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 34.28 V/m; Power Drift = -0.13 dB
Peak SAR (extrapolated) = 3.64 W/kg
SAR(10 g) = 1.06 W/kg



0 dB = 2.55 W/kg = 4.07 dBW/kg

DUT: ACJFZE1A; Type: Portable Handset; Serial: 46

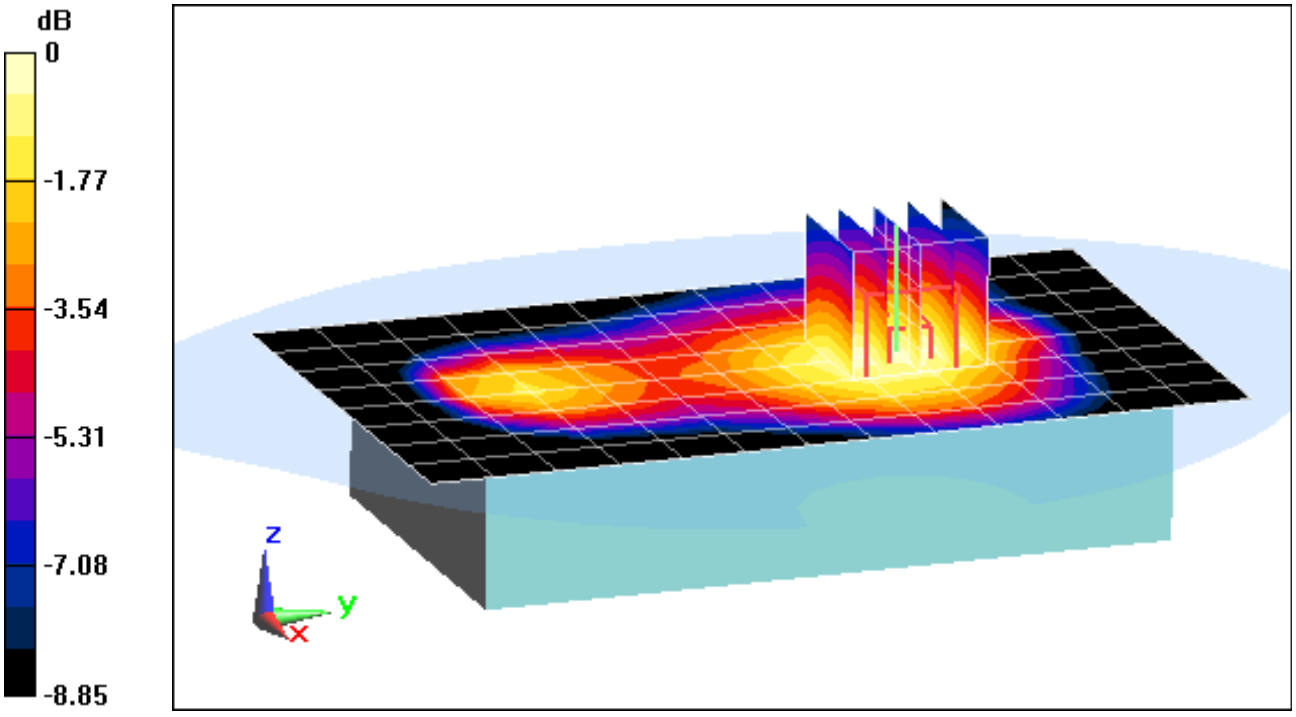
Communication System: UID 0, LTE Band 17; Frequency: 710 MHz; Duty Cycle: 1:1
Medium: 750 Body, Medium parameters used:
f = 710 MHz; σ = 0.941 S/m; ε_r = 54.405; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 0.0 cm

Test Date: 09-22-2014; Ambient Temp: 24.5°C; Tissue Temp: 24.5°C

Probe: ES3DV3 - SN3209; ConvF(6.16, 6.16, 6.16); 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: LTE Band 17, Extremity SAR, Back Side, Mid.ch, 10 MHz Bandwidth, QPSK, 1 RB, 0 RB Offset, with Hand Strap, Top Right

Area Scan (9x14x1): Measurement grid: dx=15mm, dy=15mm
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 14.88 V/m; Power Drift = 0.01 dB
Peak SAR (extrapolated) = 0.244 W/kg
SAR(10 g) = 0.145 W/kg



0 dB = 0.212 W/kg = -6.74 dBW/kg

DUT: ACJFZE1A; Type: Portable Handset; Serial: 46

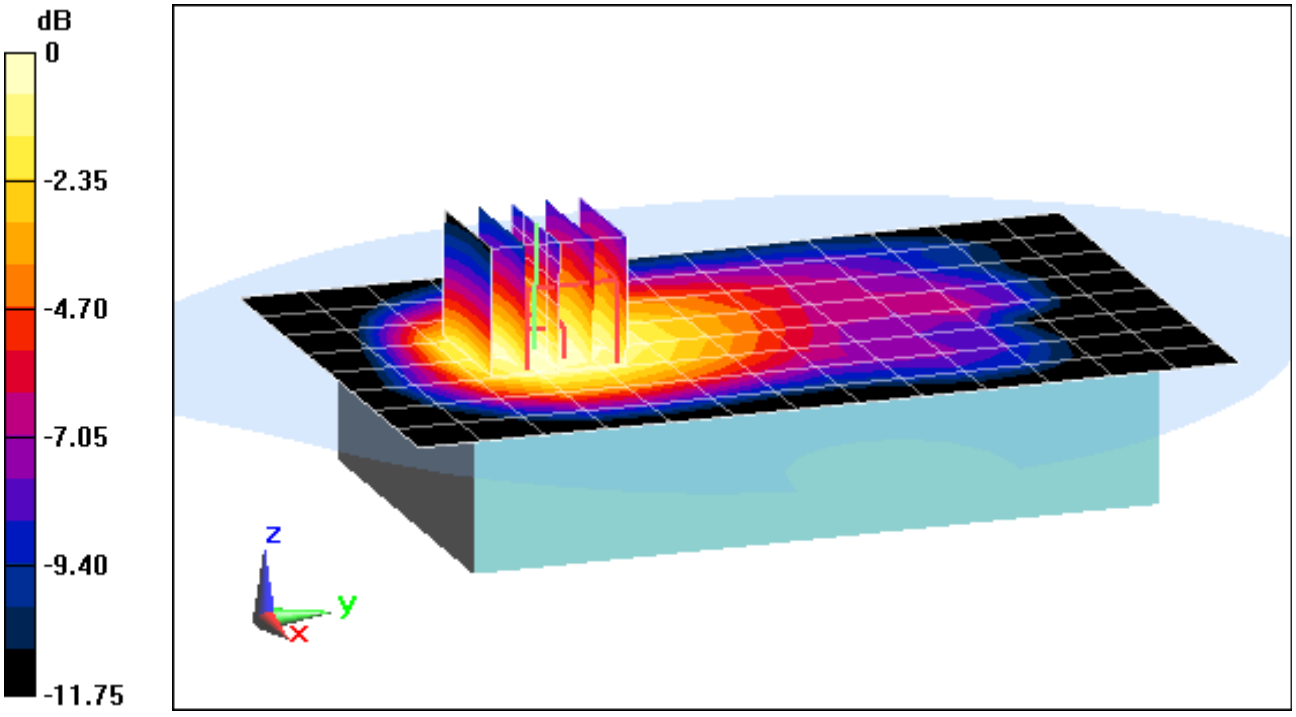
Communication System: UID 0, LTE Band 13; Frequency: 782 MHz; Duty Cycle: 1:1
Medium: 750 Body, Medium parameters used (interpolated):
f = 782 MHz; σ = 1.007 S/m; ε_r = 53.605; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 0.0 cm

Test Date: 09-22-2014; Ambient Temp: 24.5°C; Tissue Temp: 24.5°C

Probe: ES3DV3 - SN3209; ConvF(6.16, 6.16, 6.16); 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: LTE Band 13, Extremity SAR, Back Side, Mid.ch, 10 MHz Bandwidth, QPSK, 1 RB, 25 RB Offset, with Hand Strap, Top Right

Area Scan (9x14x1): Measurement grid: dx=15mm, dy=15mm
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 22.16 V/m; Power Drift = -0.02 dB
Peak SAR (extrapolated) = 0.650 W/kg
SAR(10 g) = 0.327 W/kg



0 dB = 0.523 W/kg = -2.81 dBW/kg

DUT: ACJFZE1A; Type: Portable Handset; Serial: 44

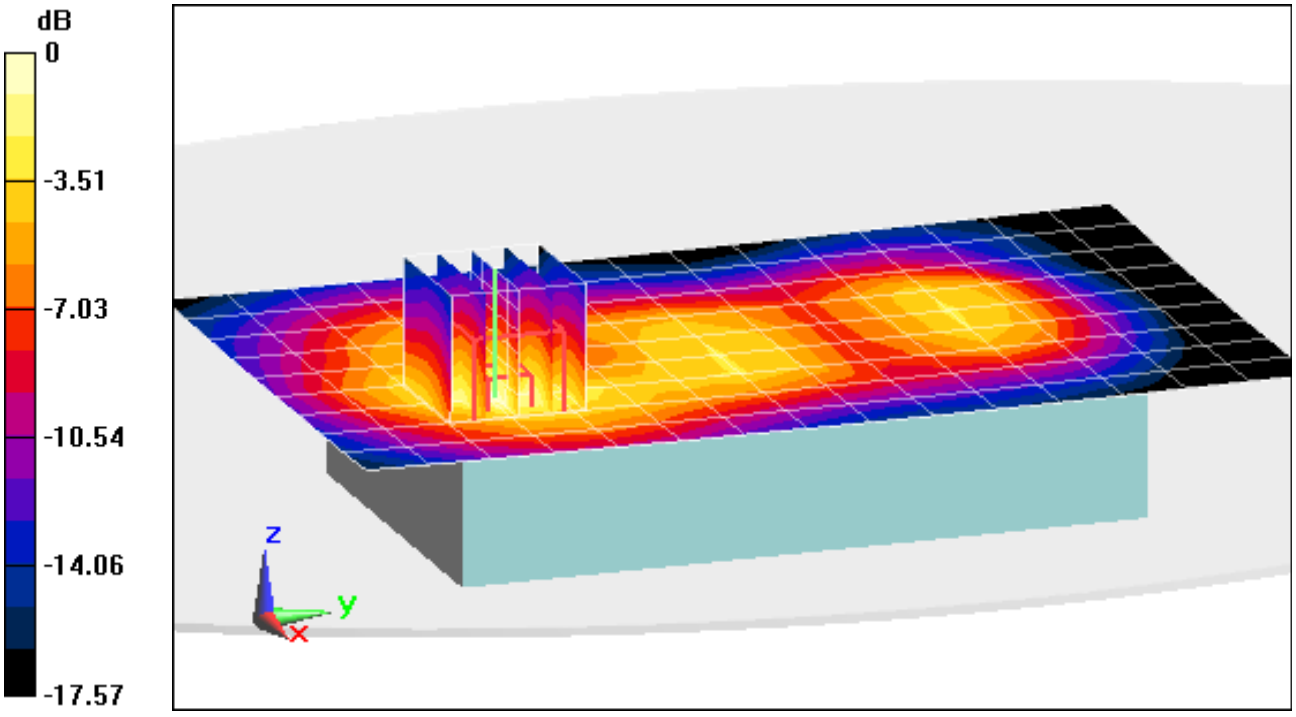
Communication System: UID 0, LTE Band 4 (AWS); Frequency: 1732.5 MHz; Duty Cycle: 1:1
Medium: 1750 Body, Medium parameters used (interpolated):
f = 1732.5 MHz; σ = 1.428 S/m; ε_r = 53.274; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 0.0 cm

Test Date: 09-24-2014; Ambient Temp: 22.1°C; Tissue Temp: 22.4°C

Probe: ES3DV3 - SN3258; ConvF(4.83, 4.83, 4.83); Calibrated: 2/25/2014;
Sensor-Surface: 3mm (Mechanical Surface Detection)
Electronics: DAE4 Sn665; Calibrated: 2/26/2014
Phantom: ELI v5.0; Type: QDOVA002AA; Serial: TP-1158
Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Mode: LTE Band 4 (AWS), Extremity SAR, Back Side, Mid.ch, 20 MHz Bandwidth, QPSK, 1 RB, 99 RB Offset, with Hand Strap, Top Right

Area Scan (10x16x1): Measurement grid: dx=15mm, dy=15mm
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 18.11 V/m; Power Drift = -0.04 dB
Peak SAR (extrapolated) = 0.645 W/kg
SAR(10 g) = 0.209 W/kg



0 dB = 0.504 W/kg = -2.98 dBW/kg

DUT: ACJFZE1A; Type: Portable Handset; Serial: WIFI_SAR

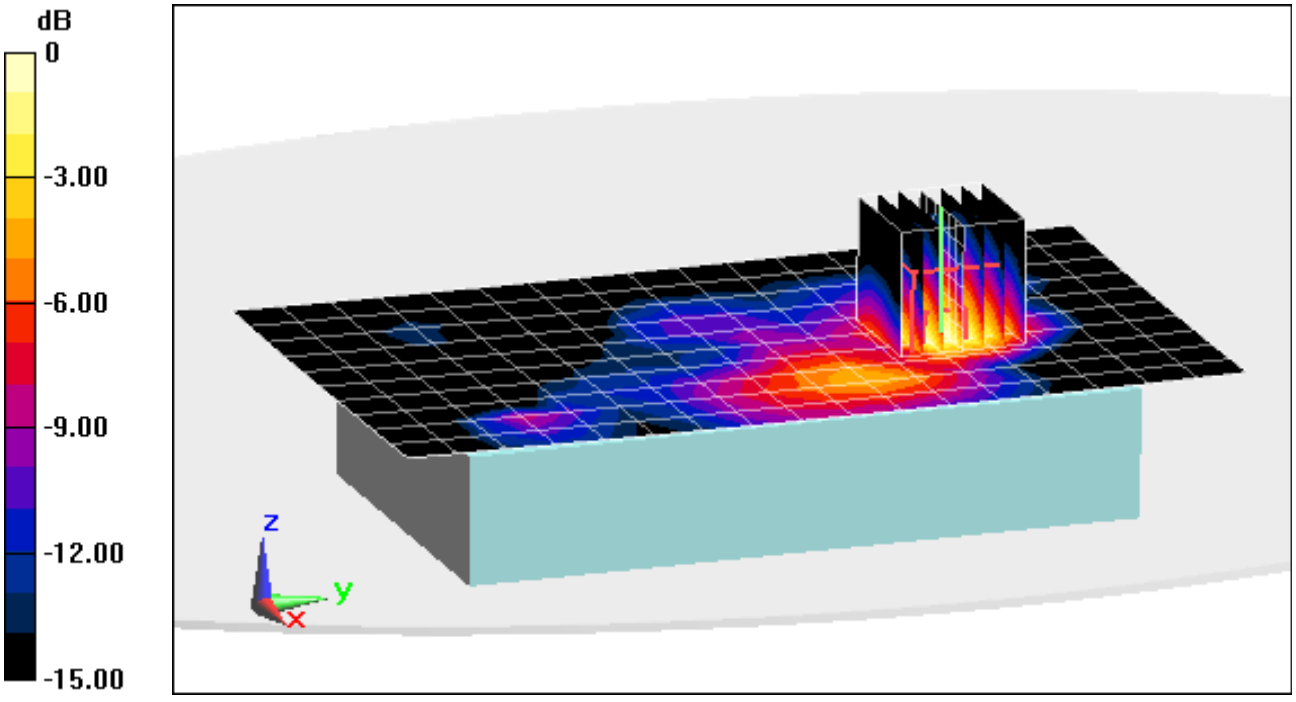
Communication System: UID 0, IEEE 802.11b; Frequency: 2462 MHz; Duty Cycle: 1:1
Medium: 2450 Body, Medium parameters used (interpolated):
f = 2462 MHz; σ = 1.985 S/m; ε_r = 51.171; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 0.0 cm

Test Date: 06-12-2014; Ambient Temp: 23.1°C; Tissue Temp: 22.5°C

Probe: ES3DV3 - SN3258; ConvF(4.14, 4.14, 4.14); Calibrated: 2/25/2014;
Sensor-Surface: 3mm (Mechanical Surface Detection)
Electronics: DAE4 Sn665; Calibrated: 2/26/2014
Phantom: ELI v5.0; Type: QDOVA002AA; Serial: TP-1158
Measurement SW: DASY52, Version 52.8 (7); SEMCAD X Version 14.6.10 (7331)

Mode: IEEE 802.11b, Extremity SAR, Ch 11, 1 Mbps, Back Side with Hand Strap, Top-Right

Area Scan (11x18x1): Measurement grid: dx=12mm, dy=12mm
Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 10.53 V/m; Power Drift = 0.05 dB
Peak SAR (extrapolated) = 0.429 W/kg
SAR(10 g) = 0.115 W/kg



0 dB = 0.292 W/kg = -5.35 dBW/kg

DUT: ACJFZE1A; Type: Portable Handset; Serial: WIFI_SAR

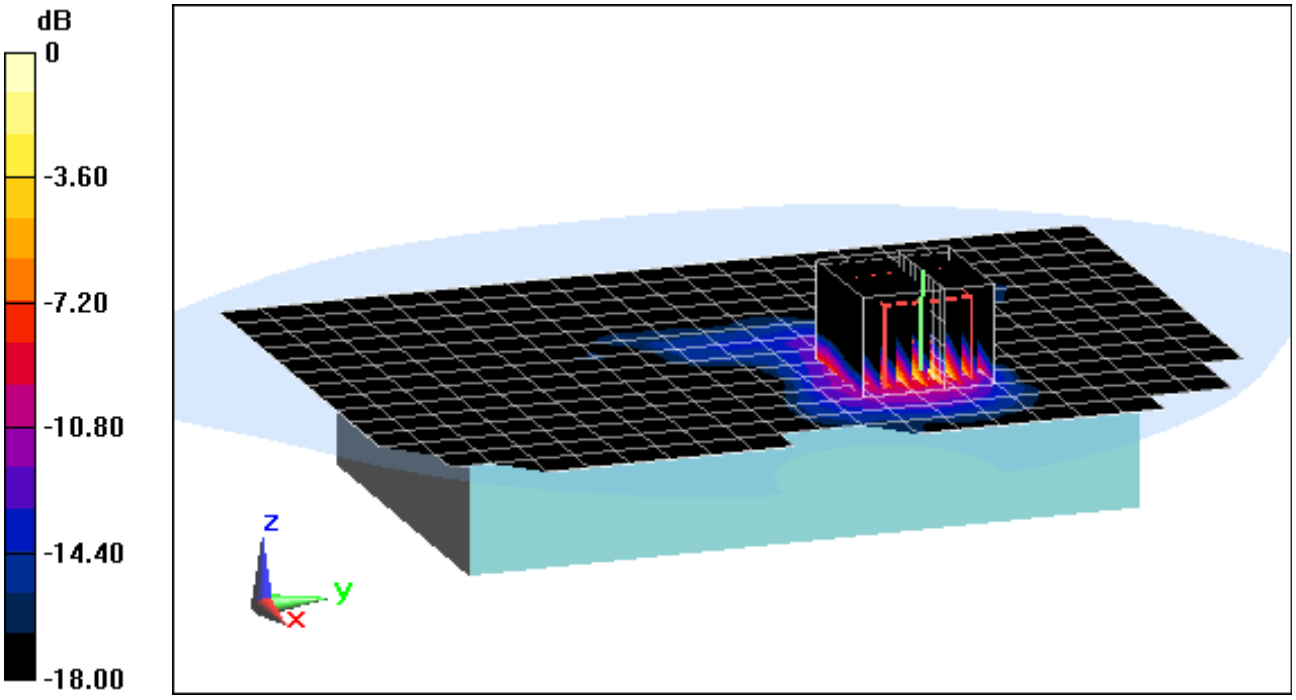
Communication System: UID 0, IEEE 802.11a; Frequency: 5300 MHz; Duty Cycle: 1:1
Medium: 5 GHz Body, Medium parameters used:
f = 5300 MHz; σ = 5.412 S/m; ε_r = 48.27; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 0.0 cm

Test Date: 06-16-2014; Ambient Temp: 24.4°C; Tissue Temp: 23.0°C

Probe: EX3DV4 - SN3914; ConvF(4.32, 4.32, 4.32); Calibrated: 10/23/2013;
Sensor-Surface: 1.4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1333; Calibrated: 11/19/2013
Phantom: SAM 5.0 front; Type: QD000P40CD; Serial: TP:-1648
Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Mode: IEEE 802.11a, 5.3 GHz, Extremity SAR, Ch 60, 6 Mbps, Back Side without Accessory

Area Scan (15x22x1): Measurement grid: dx=10mm, dy=10mm
Zoom Scan (9x9x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm; Graded Ratio: 1.4
Reference Value = 7.423 V/m; Power Drift = -0.03 dB
Peak SAR (extrapolated) = 4.81 W/kg
SAR(10 g) = 0.390 W/kg



0 dB = 2.84 W/kg = 4.53 dBW/kg

APPENDIX B: SYSTEM VERIFICATION

PCTEST ENGINEERING LABORATORY, INC.

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

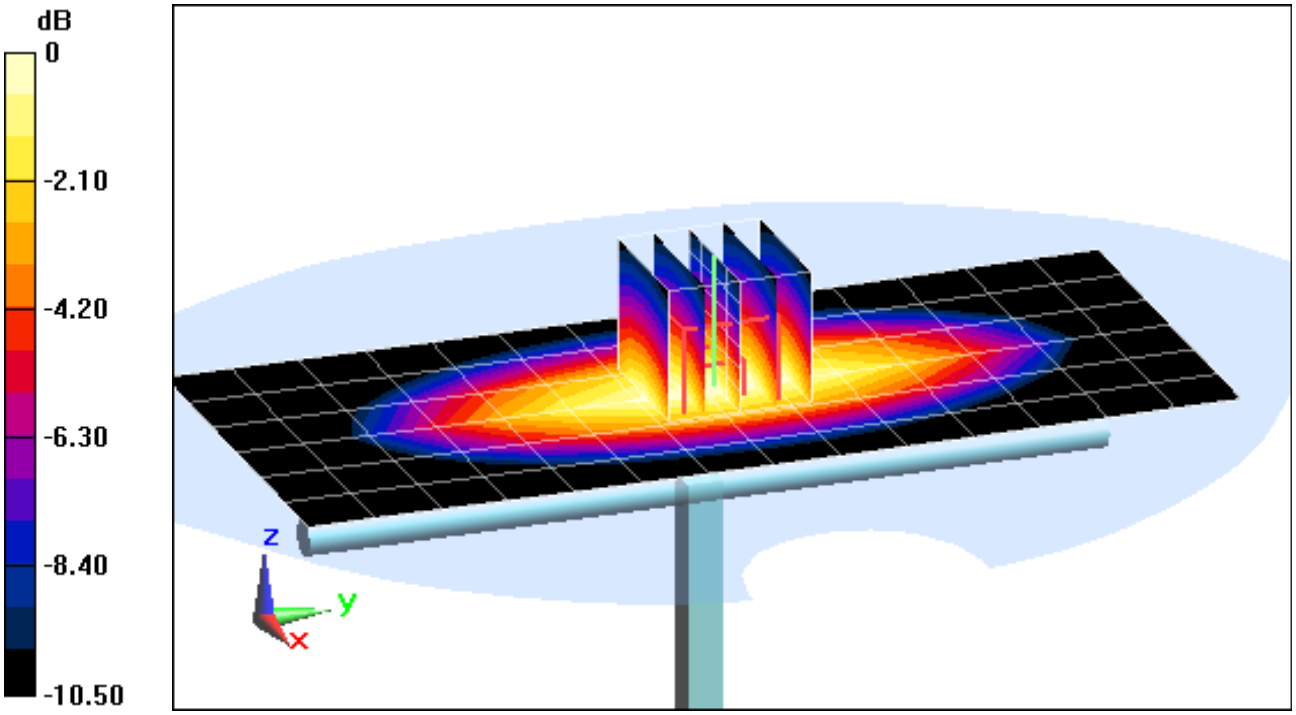
Communication System: UID 0, CW; Frequency: 750 MHz; Duty Cycle: 1:1
Medium: 750 Head, Medium parameters used (interpolated):
f = 750 MHz; σ = 0.906 S/m; ε_r = 40.299; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.5 cm

Test Date: 09-18-2014; Ambient Temp: 24.3°C; Tissue Temp: 23.6°C

Probe: ES3DV3 - SN3263; ConvF(6.42, 6.42, 6.42); 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=15mm, dy=15mm
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Input Power = 20.0 dBm (100 mW)
Peak SAR (extrapolated) = 1.31 W/kg
SAR(1 g) = 0.860 W/kg
Deviation (1 g) = 2.75%



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

PCTEST ENGINEERING LABORATORY, INC.

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

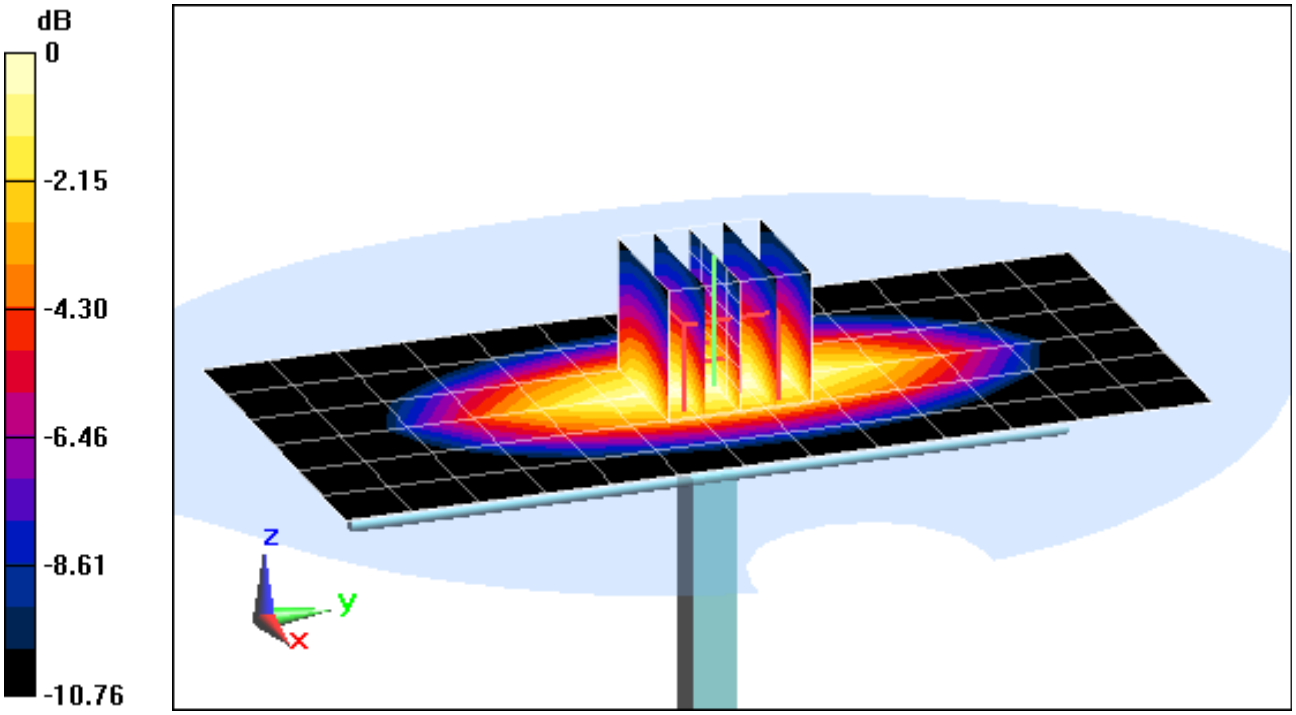
Communication System: UID 0, CW; Frequency: 835 MHz; Duty Cycle: 1:1
Medium: 835 Head, Medium parameters used:
f = 835 MHz; σ = 0.921 S/m; ε_r = 41.715; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.5 cm

Test Date: 09-22-2014; Ambient Temp: 24.2°C; Tissue Temp: 23.0°C

Probe: EX3DV4 - SN3914; ConvF(9.34, 9.34, 9.34); Calibrated: 10/23/2013;
Sensor-Surface: 2mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1333; Calibrated: 11/19/2013
Phantom: SAM 5.0 front; Type: QD000P40CD; Serial: TP:-1648
Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

835 MHz System Verification

Area Scan (7x14x1): Measurement grid: dx=15mm, dy=15mm
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Input Power = 20.0 dBm (100 mW)
Peak SAR (extrapolated) = 1.49 W/kg
SAR(1 g) = 0.991 W/kg
Deviation (1 g) = 7.48%



0 dB = 1.26 W/kg = 1.00 dBW/kg

PCTEST ENGINEERING LABORATORY, INC.

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

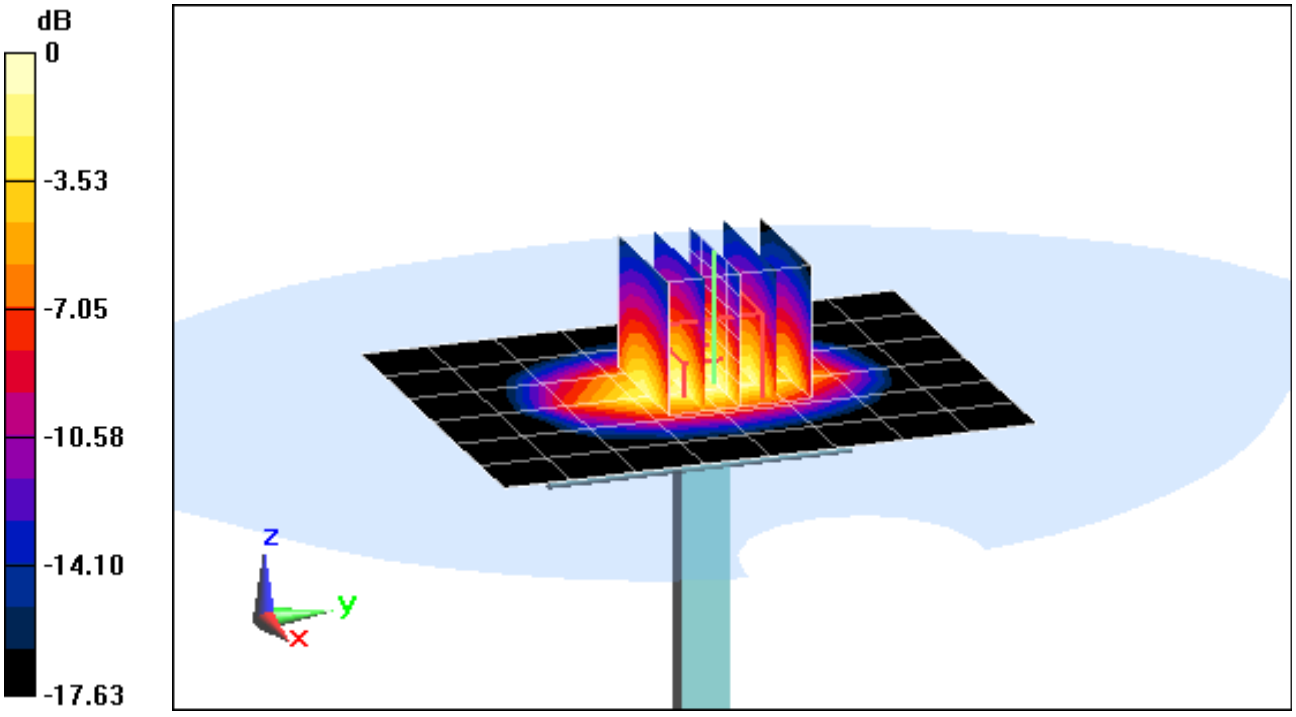
Communication System: UID 0, CW; Frequency: 1750 MHz; Duty Cycle: 1:1
Medium: 1750 Head, Medium parameters used:
f = 1750 MHz; σ = 1.357 S/m; ε_r = 39.498; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 09-17-2014; Ambient Temp: 24.0°C; Tissue Temp: 23.0°C

Probe: ES3DV3 - SN3258; ConvF(5.19, 5.19, 5.19); 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)

1750 MHz System Verification

Area Scan (7x9x1): Measurement grid: dx=15mm, dy=15mm
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Input Power = 20.0 dBm (100 mW)
Peak SAR (extrapolated) = 6.27 W/kg
SAR(1 g) = 3.43 W/kg
Deviation (1 g) = -7.05%



0 dB = 4.29 W/kg = 6.32 dBW/kg

PCTEST ENGINEERING LABORATORY, INC.

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

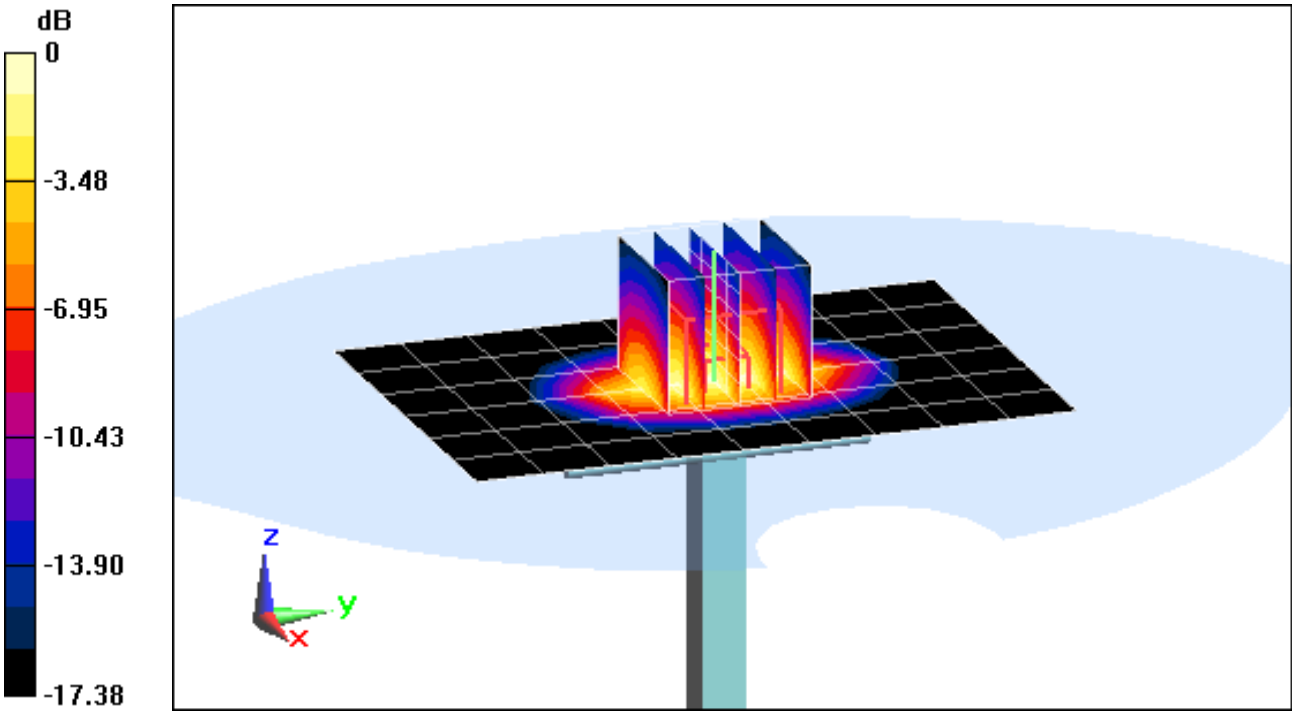
Communication System: UID 0, CW; Frequency: 1900 MHz; Duty Cycle: 1:1
Medium: 1900 Head, Medium parameters used (interpolated):
f = 1900 MHz; σ = 1.444 S/m; ε_r = 39.264; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 09-22-2014; Ambient Temp: 24.4°C; Tissue Temp: 22.3°C

Probe: ES3DV3 - SN3287; ConvF(5.08, 5.08, 5.08); Calibrated: 11/20/2013;
Sensor-Surface: 3mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1408; Calibrated: 11/19/2013
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)

1900 MHz System Verification

Area Scan (7x10x1): Measurement grid: dx=15mm, dy=15mm
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Input Power = 20.0 dBm (100 mW)
Peak SAR (extrapolated) = 7.63 W/kg
SAR(1 g) = 4.26 W/kg
Deviation (1 g) = 6.23%



0 dB = 5.40 W/kg = 7.32 dBW/kg

PCTEST ENGINEERING LABORATORY, INC.

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

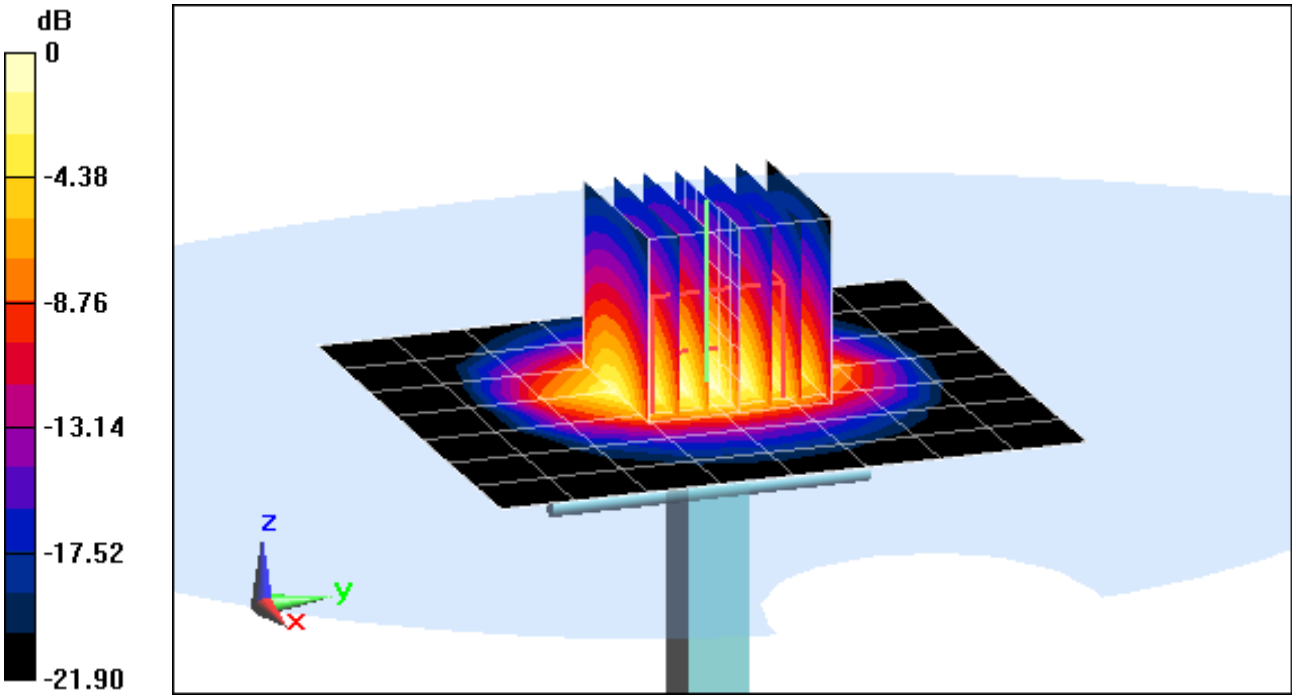
Communication System: UID 0, CW; Frequency: 2450 MHz; Duty Cycle: 1:1
Medium: 2450 Head, Medium parameters used:
f = 2450 MHz; σ = 1.743 S/m; ε_r = 39.937; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 06-17-2014; Ambient Temp: 22.5°C; Tissue Temp: 21.8°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=12mm, dy=12mm
Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Input Power = 20.0 dBm (100 mW)
Peak SAR (extrapolated) = 10.2 W/kg
SAR(1 g) = 4.99 W/kg
Deviation (1 g) = -3.67%



0 dB = 6.53 W/kg = 8.15 dBW/kg

PCTEST ENGINEERING LABORATORY, INC.

DUT: Dipole 5200 MHz; Type: D5GHzV2; Serial: 1057

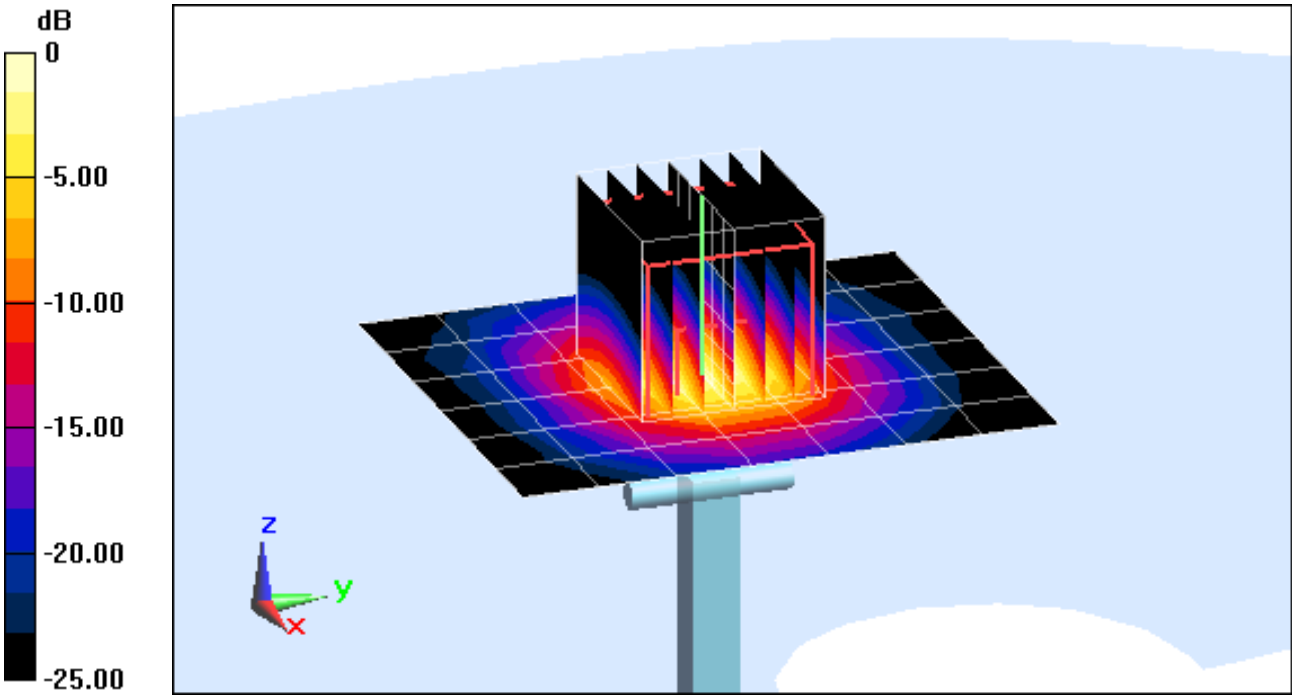
Communication System: UID 0, CW; Frequency: 5200 MHz; Duty Cycle: 1:1
Medium: 5 GHz Head, Medium parameters used:
f = 5200 MHz; σ = 4.49 S/m; ε_r = 36.57; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 06-12-2014; Ambient Temp: 23.9°C; Tissue Temp: 23.6°C

Probe: EX3DV4 - SN3914; ConvF(4.99, 4.99, 4.99); Calibrated: 10/23/2013;
Sensor-Surface: 1.4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1333; Calibrated: 11/19/2013
Phantom: SAM V5.0 Right; Type: QD000P40CD; Serial: 1647
Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

5200 MHz System Verification

Area Scan (7x8x1): Measurement grid: dx=10mm, dy=10mm
Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm; Graded Ratio: 1.4
Input Power = 20.0 dBm (100 mW)
Peak SAR (extrapolated) = 32.2 W/kg
SAR(1 g) = 7.71 W/kg
Deviation (1 g) = -1.15%



0 dB = 19.4 W/kg = 12.88 dBW/kg

PCTEST ENGINEERING LABORATORY, INC.

DUT: Dipole 5300 MHz; Type: D5GHzV2; Serial: 1057

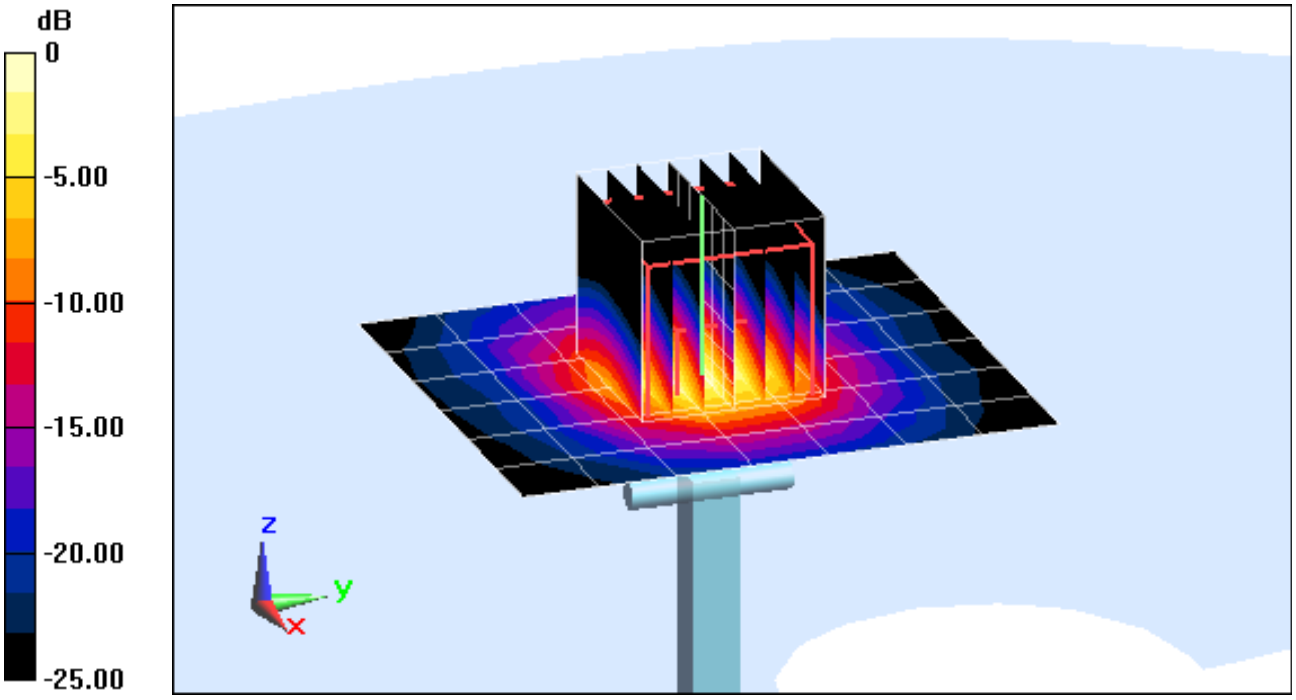
Communication System: UID 0, CW; Frequency: 5300 MHz; Duty Cycle: 1:1
Medium: 5 GHz Head, Medium parameters used:
f = 5300 MHz; σ = 4.584 S/m; ε_r = 36.488; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 06-12-2014; Ambient Temp: 23.9°C; Tissue Temp: 23.6°C

Probe: EX3DV4 - SN3914; ConvF(4.82, 4.82, 4.82); Calibrated: 10/23/2013;
Sensor-Surface: 1.4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1333; Calibrated: 11/19/2013
Phantom: SAM V5.0 Right; Type: QD000P40CD; Serial: 1647
Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

5300 MHz System Verification

Area Scan (7x8x1): Measurement grid: dx=10mm, dy=10mm
Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm; Graded Ratio: 1.4
Input Power = 20.0 dBm (100 mW)
Peak SAR (extrapolated) = 34.9 W/kg
SAR(1 g) = 8.02 W/kg
Deviation (1 g) = -3.37%



0 dB = 20.7 W/kg = 13.16 dBW/kg

PCTEST ENGINEERING LABORATORY, INC.

DUT: Dipole 5500 MHz; Type: D5GHzV2; Serial: 1057

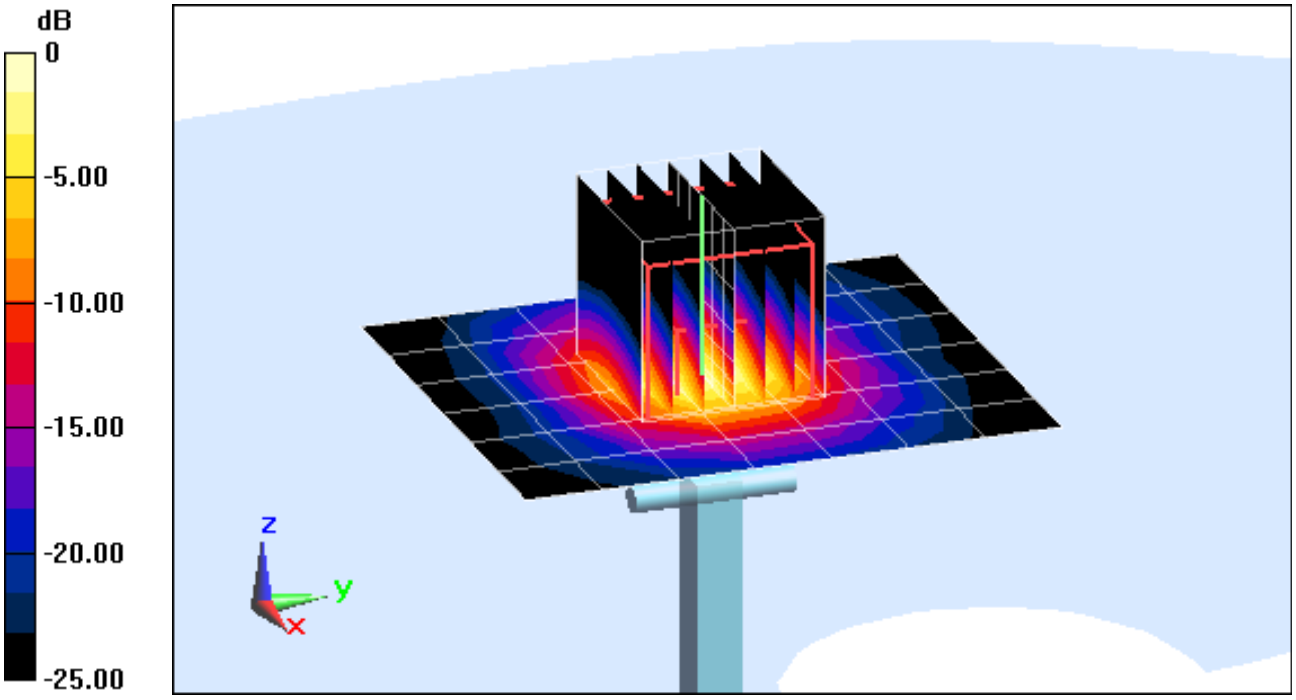
Communication System: UID 0, CW; Frequency: 5500 MHz; Duty Cycle: 1:1
Medium: 5 GHz Head, Medium parameters used:
f = 5500 MHz; σ = 4.783 S/m; ε_r = 36.228; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 06-12-2014; Ambient Temp: 24.0°C; Tissue Temp: 23.6°C

Probe: EX3DV4 - SN3914; ConvF(4.55, 4.55, 4.55); Calibrated: 10/23/2013;
Sensor-Surface: 1.4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1333; Calibrated: 11/19/2013
Phantom: SAM V5.0 Right; Type: QD000P40CD; Serial: 1647
Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

5500 MHz System Verification

Area Scan (7x8x1): Measurement grid: dx=10mm, dy=10mm
Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm; Graded Ratio: 1.4
Input Power = 20.0 dBm (100 mW)
Peak SAR (extrapolated) = 34.9 W/kg
SAR(1 g) = 7.77 W/kg
Deviation (1 g) = -7.83%



0 dB = 20.3 W/kg = 13.07 dBW/kg

PCTEST ENGINEERING LABORATORY, INC.

DUT: Dipole 5600 MHz; Type: D5GHzV2; Serial: 1057

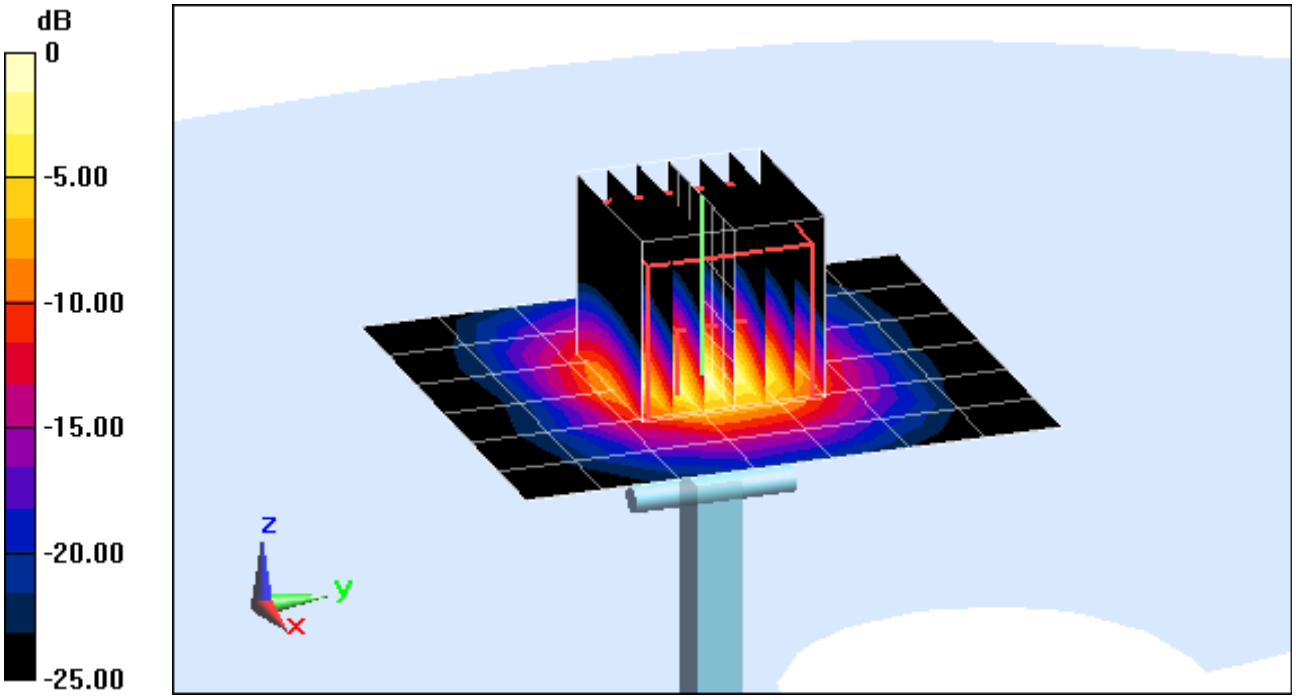
Communication System: UID 0, CW; Frequency: 5600 MHz; Duty Cycle: 1:1
Medium: 5 GHz Head, Medium parameters used:
f = 5600 MHz; σ = 4.883 S/m; ε_r = 36.072; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 06-12-2014; Ambient Temp: 23.9°C; Tissue Temp: 23.6°C

Probe: EX3DV4 - SN3914; ConvF(4.37, 4.37, 4.37); Calibrated: 10/23/2013;
Sensor-Surface: 1.4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1333; Calibrated: 11/19/2013
Phantom: SAM V5.0 Right; Type: QD000P40CD; Serial: 1647
Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

5600 MHz System Verification

Area Scan (7x8x1): Measurement grid: dx=10mm, dy=10mm
Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm; Graded Ratio: 1.4
Input Power = 20.0 dBm (100 mW)
Peak SAR (extrapolated) = 35.1 W/kg
SAR(1 g) = 7.76 W/kg
Deviation (1 g) = -7.07%



0 dB = 20.2 W/kg = 13.05 dBW/kg

PCTEST ENGINEERING LABORATORY, INC.

DUT: Dipole 5800 MHz; Type: D5GHzV2; Serial: 1057

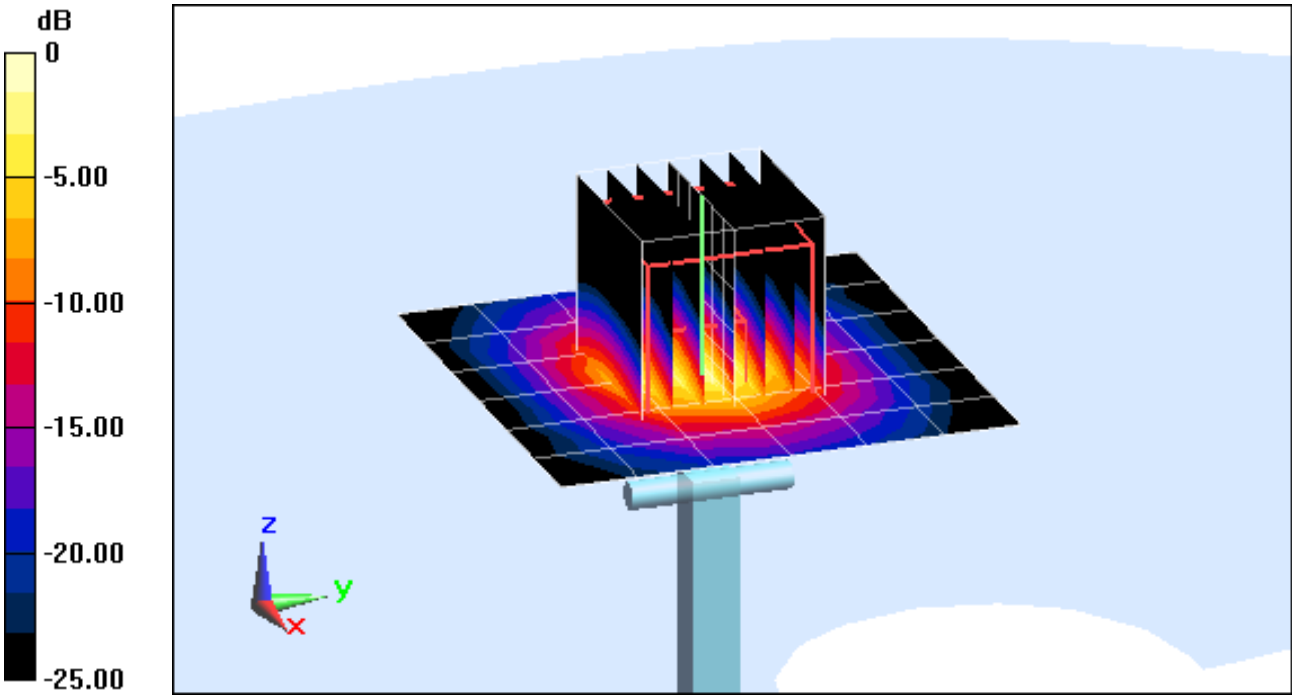
Communication System: UID 0, CW; Frequency: 5800 MHz; Duty Cycle: 1:1
Medium: 5 GHz Head, Medium parameters used:
f = 5800 MHz; σ = 5.066 S/m; ε_r = 35.886; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 06-12-2014; Ambient Temp: 23.9°C; Tissue Temp: 23.7°C

Probe: EX3DV4 - SN3914; ConvF(4.52, 4.52, 4.52); Calibrated: 10/23/2013;
Sensor-Surface: 1.4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1333; Calibrated: 11/19/2013
Phantom: SAM V5.0 Right; Type: QD000P40CD; Serial: 1647
Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

5800 MHz System Verification

Area Scan (7x7x1): Measurement grid: dx=10mm, dy=10mm
Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm; Graded Ratio: 1.4
Input Power = 20.0 dBm (100 mW)
Peak SAR (extrapolated) = 34.5 W/kg
SAR(1 g) = 7.32 W/kg
Deviation (1 g) = -7.69%



0 dB = 19.4 W/kg = 12.88 dBW/kg

PCTEST ENGINEERING LABORATORY, INC.

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

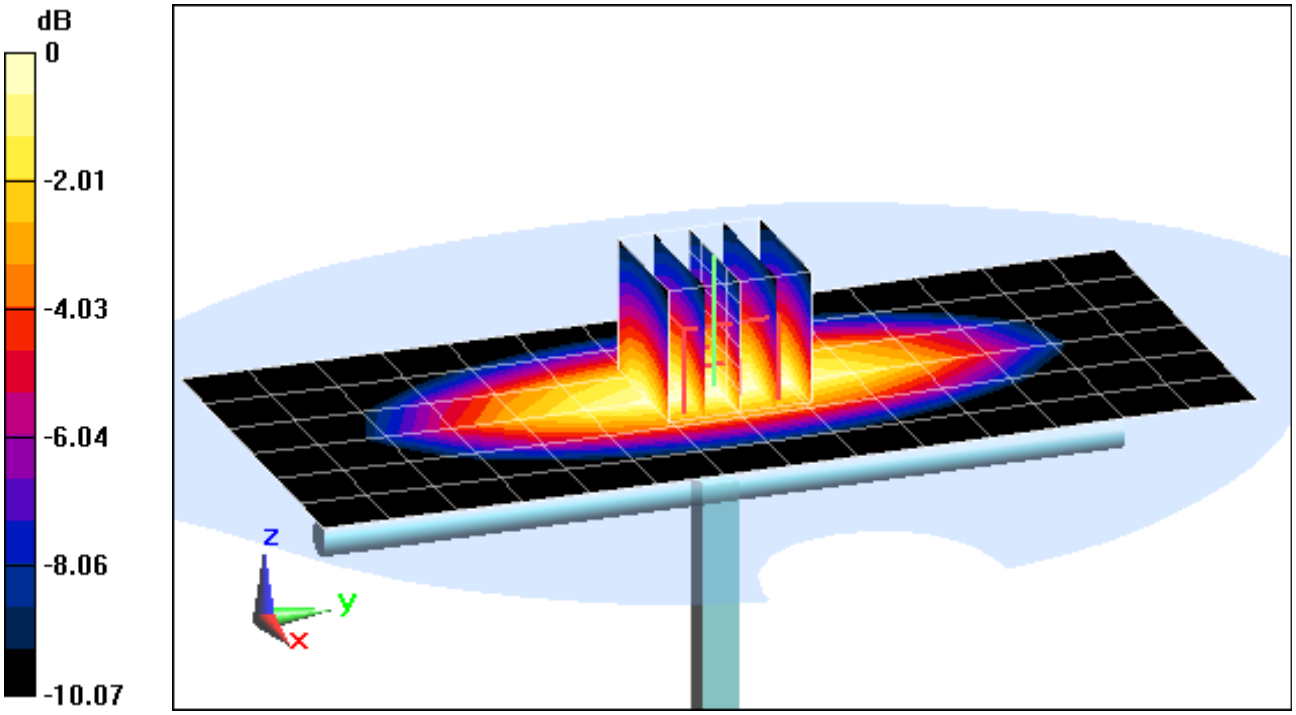
Communication System: UID 0, CW; Frequency: 750 MHz; Duty Cycle: 1:1
Medium: 750 Body, Medium parameters used (interpolated):
f = 750 MHz; σ = 0.979 S/m; ε_r = 53.992; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.5 cm

Test Date: 09-22-2014; Ambient Temp: 24.5°C; Tissue Temp: 24.5°C

Probe: ES3DV3 - SN3209; ConvF(6.16, 6.16, 6.16); 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)

750 MHz System Verification

Area Scan (7x15x1): Measurement grid: dx=15mm, dy=15mm
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Input Power = 20.0 dBm (100 mW)
Peak SAR (extrapolated) = 1.35 W/kg
SAR(1 g) = 0.933 W/kg; SAR(10 g) = 0.621 W/kg
Deviation (1 g) = 6.39%; Deviation (10 g) = 7.44%



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

PCTEST ENGINEERING LABORATORY, INC.

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

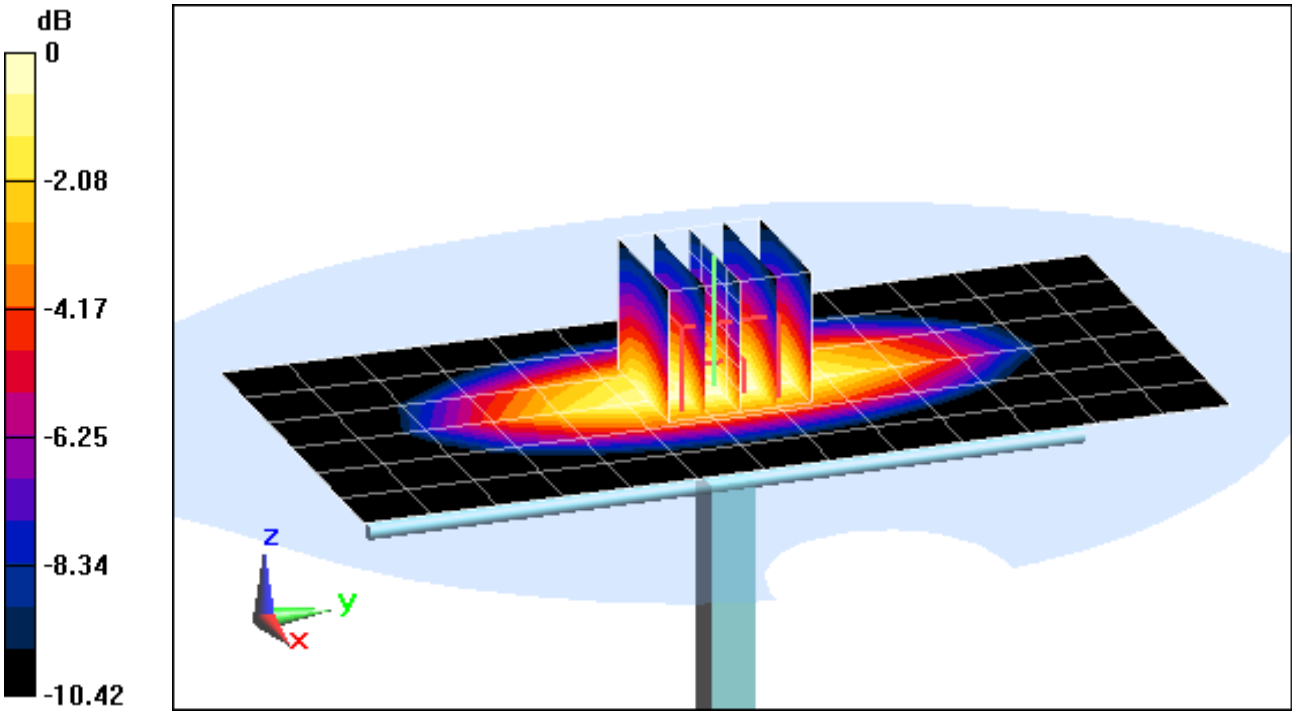
Communication System: UID 0, CW; Frequency: 835 MHz; Duty Cycle: 1:1
Medium: 835 Body, Medium parameters used:
f = 835 MHz; σ = 1.002 S/m; ε_r = 54.133; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.5 cm

Test Date: 09-18-2014; Ambient Temp: 23.8°C; Tissue Temp: 23.2°C

Probe: ES3DV3 - SN3263; ConvF(6.16, 6.16, 6.16); Calibrated: 5/15/2014;
Sensor-Surface: 3mm (Mechanical Surface Detection)
Electronics: DAE4 Sn859; Calibrated: 5/14/2014
Phantom: SAM v5.0 front; Type: QD000P40CD; Serial: TP-1646
Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

835 MHz System Verification

Area Scan (7x14x1): Measurement grid: dx=15mm, dy=15mm
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Input Power = 20.0 dBm (100 mW)
Peak SAR (extrapolated) = 1.43 W/kg
SAR(1 g) = 0.974 W/kg; SAR(10 g) = 0.639 W/kg
Deviation (1 g) = 4.28%; Deviation (10 g) = 3.90%



0 dB = 1.14 W/kg = 0.57 dBW/kg

PCTEST ENGINEERING LABORATORY, INC.

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

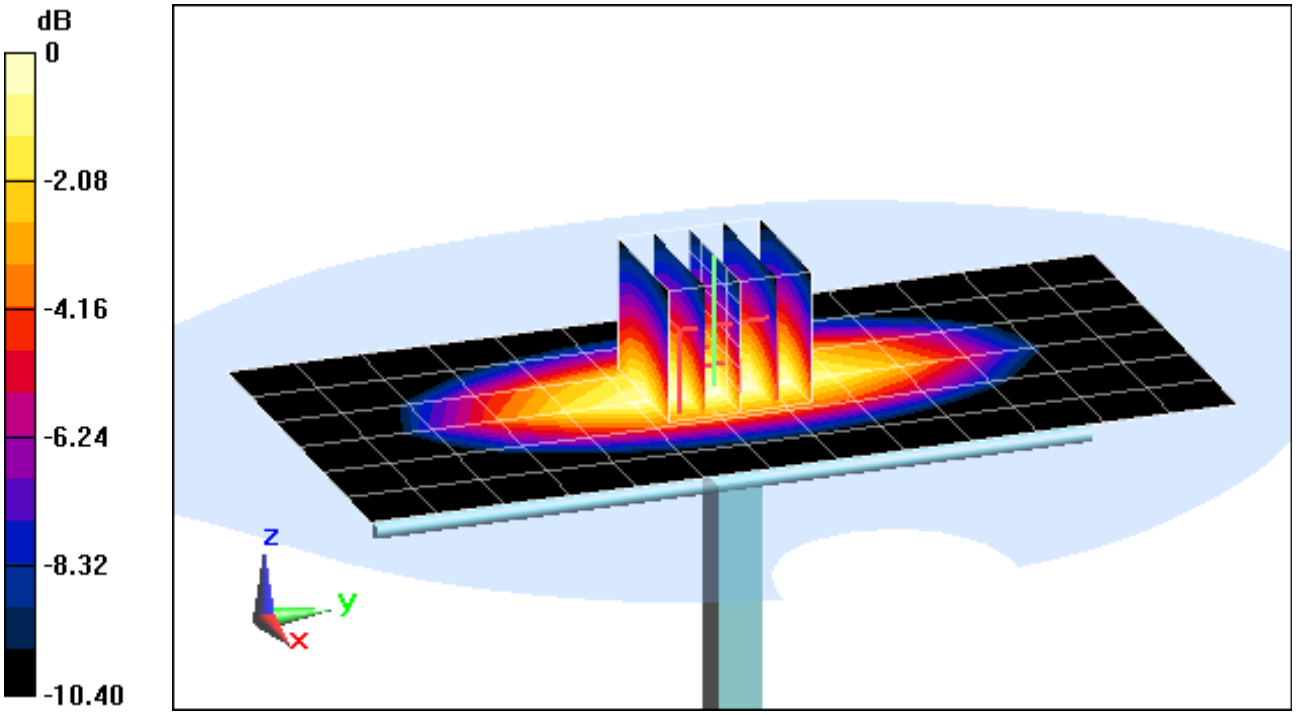
Communication System: UID 0, CW; Frequency: 835 MHz; Duty Cycle: 1:1
Medium: 835 Body, Medium parameters used:
f = 835 MHz; σ = 0.999 S/m; ε_r = 54.166; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.5 cm

Test Date: 10-01-2014; Ambient Temp: 23.6°C; Tissue Temp: 23.4°C

Probe: ES3DV3 - SN3263; ConvF(6.16, 6.16, 6.16); Calibrated: 5/15/2014;
Sensor-Surface: 3mm (Mechanical Surface Detection)
Electronics: DAE4 Sn859; Calibrated: 5/14/2014
Phantom: SAM v5.0 front; Type: QD000P40CD; Serial: TP-1646
Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

835 MHz System Verification

Area Scan (7x14x1): Measurement grid: dx=15mm, dy=15mm
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Input Power = 20.0 dBm (100 mW)
Peak SAR (extrapolated) = 1.46 W/kg
SAR(1 g) = 0.995 W/kg
Deviation (1 g) = 6.53%



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

PCTEST ENGINEERING LABORATORY, INC.

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

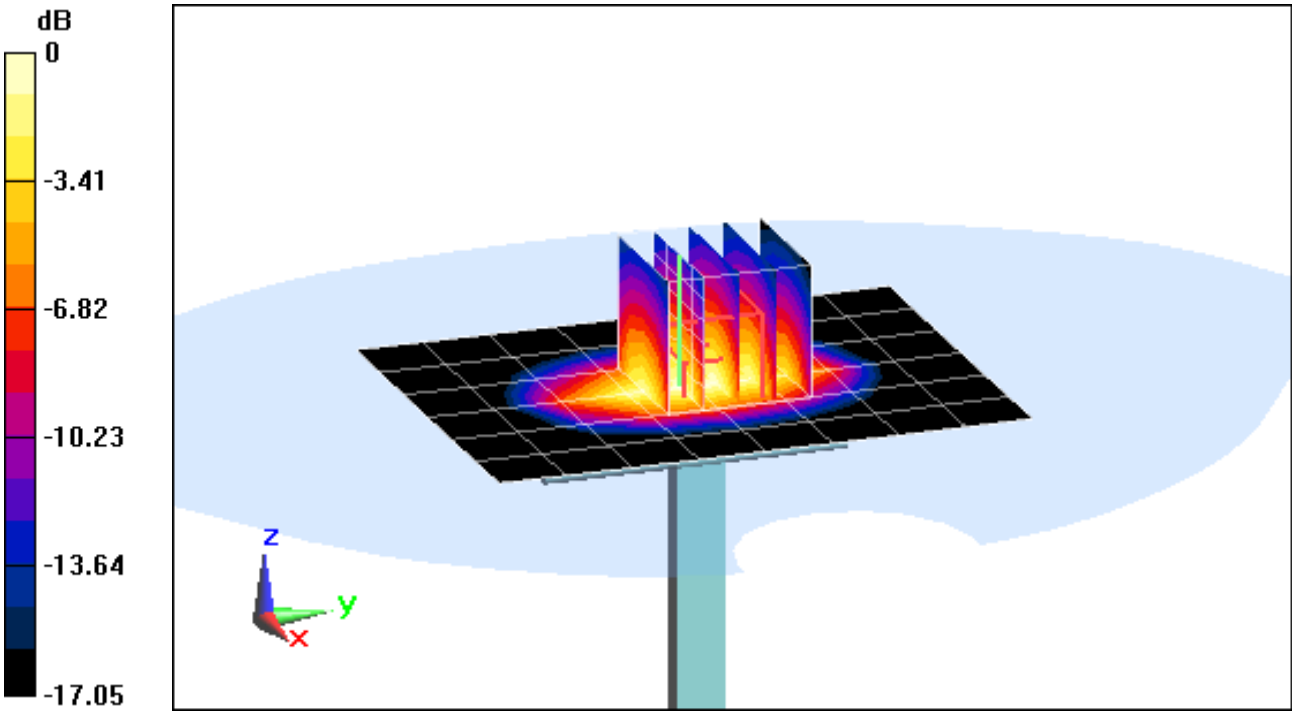
Communication System: UID 0, CW; Frequency: 1750 MHz; Duty Cycle: 1:1
Medium: 1750 Body, Medium parameters used:
f = 1750 MHz; σ = 1.445 S/m; ε_r = 51.879; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 09-18-2014; Ambient Temp: 24.5°C; Tissue Temp: 22.8°C

Probe: ES3DV3 - SN3319; ConvF(4.85, 4.85, 4.85); 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)

1750 MHz System Verification

Area Scan (7x9x1): Measurement grid: dx=15mm, dy=15mm
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Input Power = 20.0 dBm (100 mW)
Peak SAR (extrapolated) = 6.31 W/kg
SAR(1 g) = 3.65 W/kg
Deviation (1 g) = -2.93%



0 dB = 4.47 W/kg = 6.50 dBW/kg

PCTEST ENGINEERING LABORATORY, INC.

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

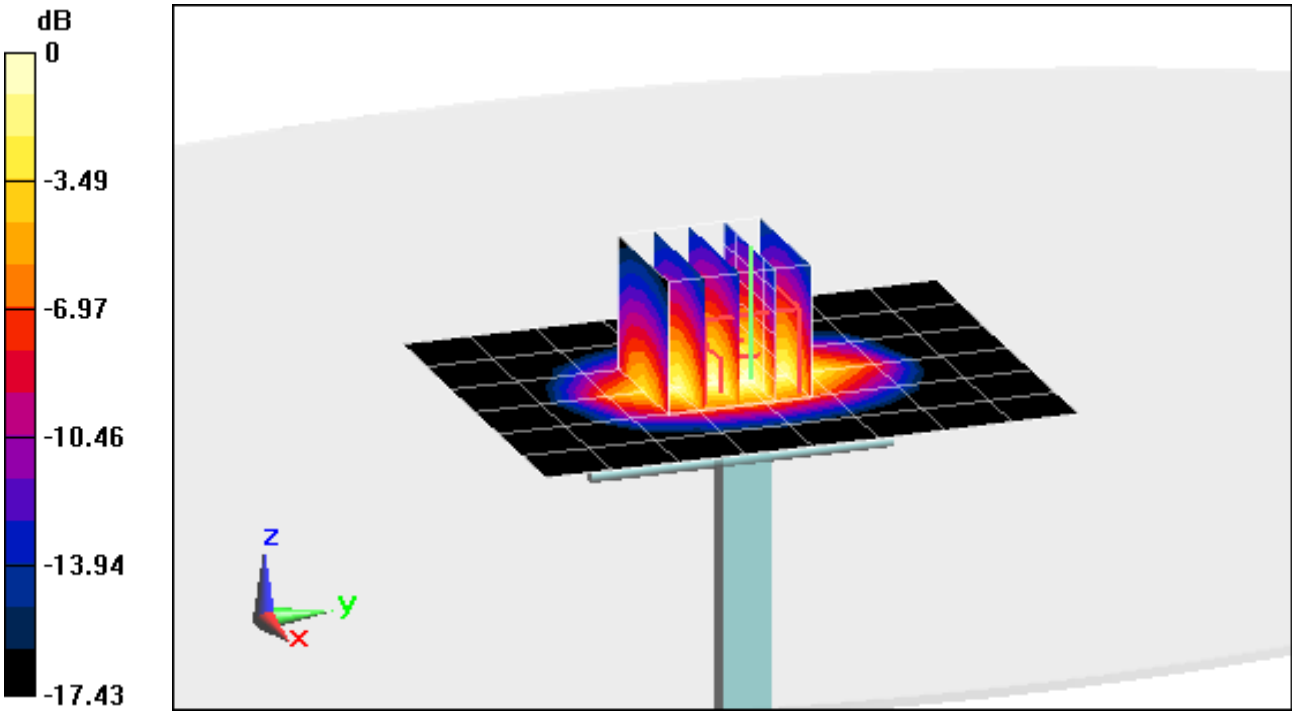
Communication System: UID 0, CW; Frequency: 1750 MHz; Duty Cycle: 1:1
Medium: 1750 Body, Medium parameters used:
f = 1750 MHz; σ = 1.447 S/m; ε_r = 53.197; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 09-24-2014; Ambient Temp: 22.1°C; Tissue Temp: 22.4°C

Probe: ES3DV3 - SN3258; ConvF(4.83, 4.83, 4.83); Calibrated: 2/25/2014;
Sensor-Surface: 3mm (Mechanical Surface Detection)
Electronics: DAE4 Sn665; Calibrated: 2/26/2014
Phantom: ELI v5.0; Type: QDOVA002AA; Serial: TP-1158
Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

1750 MHz System Verification

Area Scan (7x9x1): Measurement grid: dx=15mm, dy=15mm
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Input Power = 20.0 dBm (100 mW)
Peak SAR (extrapolated) = 5.91 W/kg
SAR(1 g) = 3.46 W/kg; SAR(10 g) = 1.85 W/kg
Deviation (1 g) = -7.98%; Deviation (10 g) = -7.96%



0 dB = 4.28 W/kg = 6.31 dBW/kg

PCTEST ENGINEERING LABORATORY, INC.

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

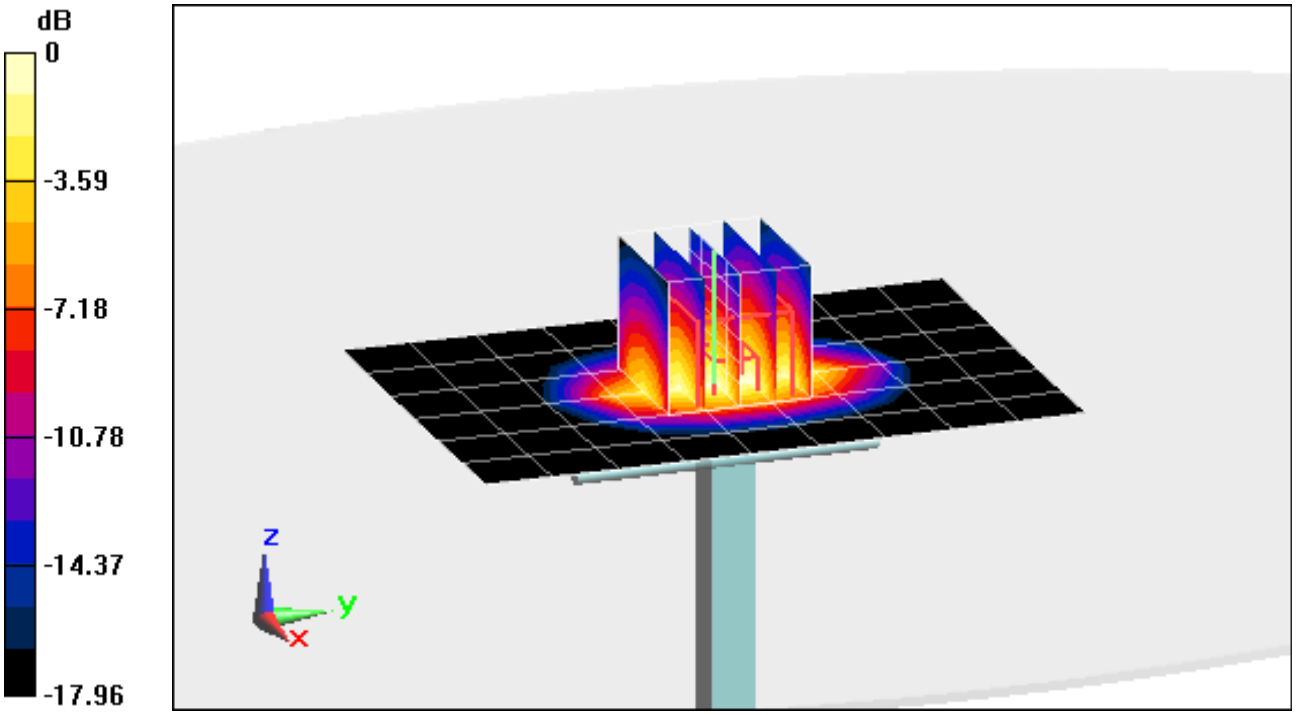
Communication System: UID 0, CW; Frequency: 1900 MHz; Duty Cycle: 1:1
Medium: 1900 Body, Medium parameters used (interpolated):
f = 1900 MHz; σ = 1.527 S/m; ε_r = 50.83; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 09-23-2014; Ambient Temp: 23.8°C; Tissue Temp: 23.7°C

Probe: ES3DV3 - SN3287; ConvF(4.67, 4.67, 4.67); Calibrated: 11/20/2013;
Sensor-Surface: 3mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1408; Calibrated: 11/19/2013
Phantom: ELI v5.0; Type: QDOVA001BB; Serial: 1229
Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

1900 MHz System Verification

Area Scan (7x10x1): Measurement grid: dx=15mm, dy=15mm
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Input Power = 20.0 dBm (100 mW)
Peak SAR (extrapolated) = 7.07 W/kg
SAR(1 g) = 3.96 W/kg; SAR(10 g) = 2.06 W/kg
Deviation (1 g) = -2.46%; Deviation (10 g) = -4.63%



0 dB = 4.97 W/kg = 6.96 dBW/kg

PCTEST ENGINEERING LABORATORY, INC.

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

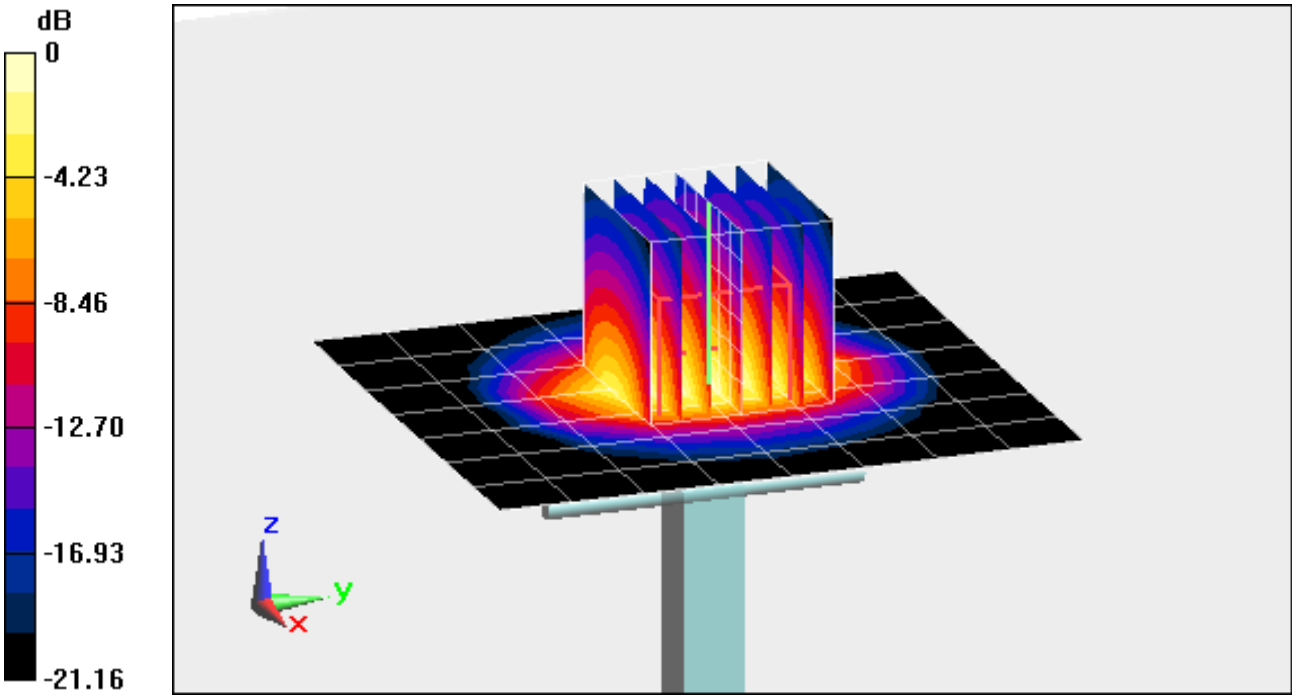
Communication System: UID 0, CW; Frequency: 2450 MHz; Duty Cycle: 1:1
Medium: 2450 Body, Medium parameters used:
f = 2450 MHz; σ = 1.97 S/m; ε_r = 51.213; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 06-12-2014; Ambient Temp: 23.1°C; Tissue Temp: 22.5°C

Probe: ES3DV3 - SN3258; ConvF(4.14, 4.14, 4.14); Calibrated: 2/25/2014;
Sensor-Surface: 3mm (Mechanical Surface Detection)
Electronics: DAE4 Sn665; Calibrated: 2/26/2014
Phantom: ELI v5.0; Type: QDOVA002AA; Serial: TP-1158
Measurement SW: DASY52, Version 52.8 (7); SEMCAD X Version 14.6.10 (7331)

2450 MHz System Verification

Area Scan (8x9x1): Measurement grid: dx=12mm, dy=12mm
Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Input Power = 20.0 dBm (100 mW)
Peak SAR (extrapolated) = 10.1 W/kg
SAR(1 g) = 4.92 W/kg; SAR(10 g) = 2.31 W/kg
Deviation (1 g) = -0.40%; Deviation (10 g) = 0.00%



0 dB = 6.36 W/kg = 8.03 dBW/kg

PCTEST ENGINEERING LABORATORY, INC.

DUT: Dipole 5200 MHz; Type: D5GHzV2; Serial: 1057

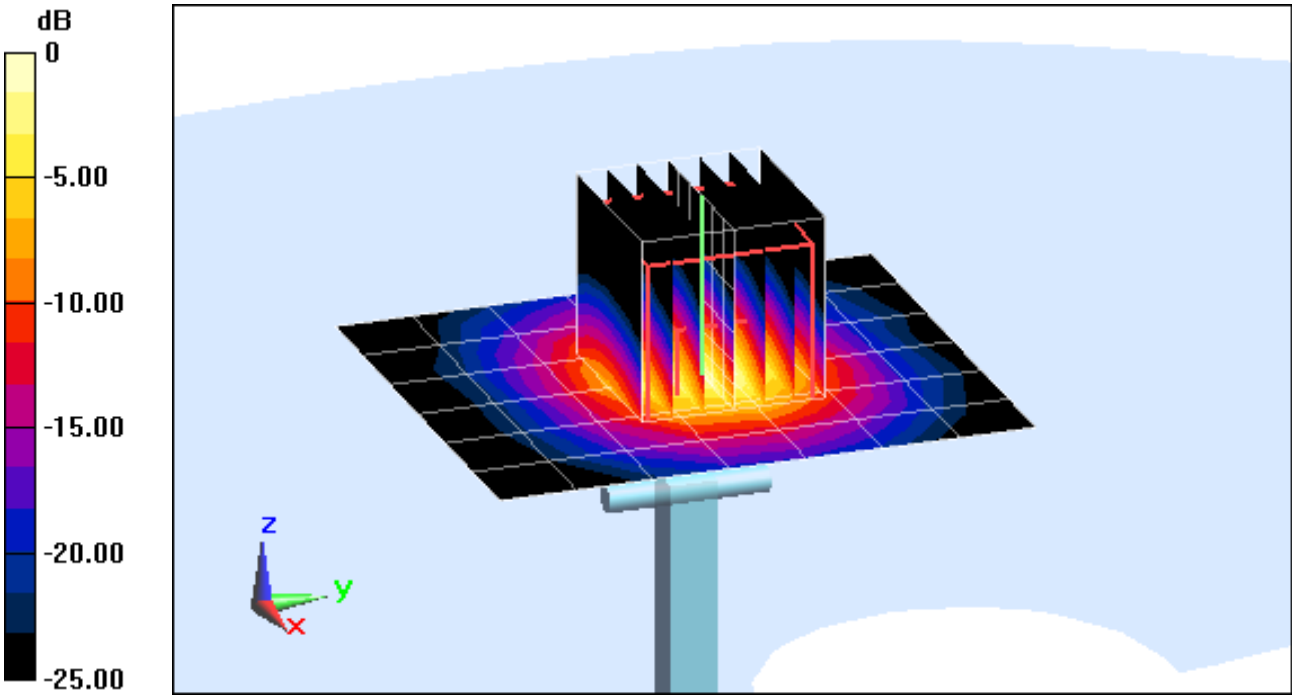
Communication System: UID 0, CW; Frequency: 5200 MHz; Duty Cycle: 1:1
Medium: 5 GHz Body, Medium parameters used:
f = 5200 MHz; σ = 5.248 S/m; ε_r = 48.501; ρ = 1000 kg/m^3
Phantom section: Flat Section ; Space: 1.0 cm

Test Date: 06-16-2014; Ambient Temp: 24.4°C; Tissue Temp: 23.0°C

Probe: EX3DV4 - SN3914; ConvF(4.52, 4.52, 4.52); Calibrated: 10/23/2013;
Sensor-Surface: 1.4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1333; Calibrated: 11/19/2013
Phantom: SAM 5.0 front; Type: QD000P40CD; Serial: TP:-1648
Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

5200 MHz System Verification

Area Scan (7x8x1): Measurement grid: dx=10mm, dy=10mm
Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm; Graded Ratio: 1.4
Input Power = 20.0 dBm (100 mW)
Peak SAR (extrapolated) = 30.1 W/kg
SAR(1 g) = 7.22 W/kg; SAR(10 g) = 2.09 W/kg
Deviation (1 g) = -4.12%; Deviation (10 g) = -0.48%



0 dB = 18.1 W/kg = 12.58 dBW/kg

DUT: Dipole 5300 MHz; Type: D5GHzV2; Serial: 1057

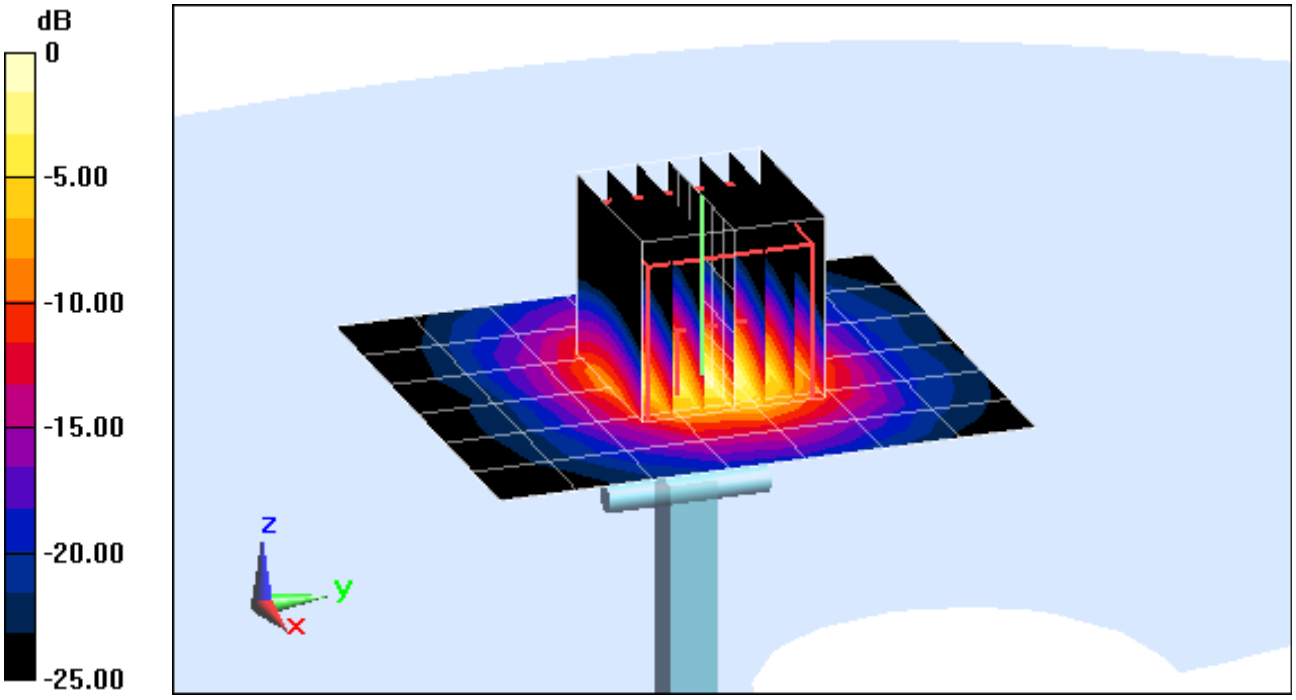
Communication System: UID 0, CW; Frequency: 5300 MHz; Duty Cycle: 1:1
Medium: 5 GHz Body, Medium parameters used:
f = 5300 MHz; σ = 5.412 S/m; ε_r = 48.27; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 06-16-2014; Ambient Temp: 24.4°C; Tissue Temp: 23.0°C

Probe: EX3DV4 - SN3914; ConvF(4.32, 4.32, 4.32); Calibrated: 10/23/2013;
Sensor-Surface: 1.4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1333; Calibrated: 11/19/2013
Phantom: SAM 5.0 front; Type: QD000P40CD; Serial: TP:-1648
Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

5300 MHz System Verification

Area Scan (7x8x1): Measurement grid: dx=10mm, dy=10mm
Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm; Graded Ratio: 1.4
Input Power = 20.0 dBm (100 mW)
Peak SAR (extrapolated) = 32.6 W/kg
SAR(1 g) = 7.50 W/kg; SAR(10 g) = 2.12 W/kg
Deviation (1 g) = -3.10%; Deviation (10 g) = -1.40%



0 dB = 19.3 W/kg = 12.86 dBW/kg

PCTEST ENGINEERING LABORATORY, INC.

DUT: Dipole 5500 MHz; Type: D5GHzV2; Serial: 1057

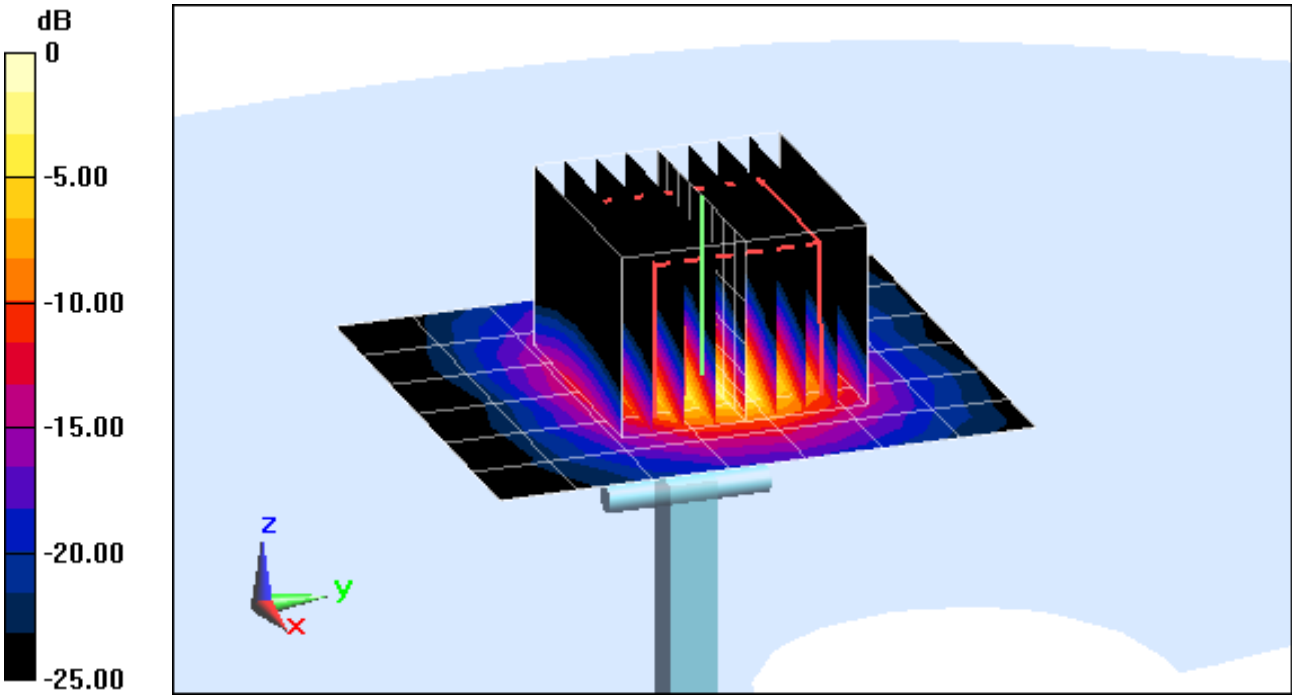
Communication System: UID 0, CW; Frequency: 5500 MHz; Duty Cycle: 1:1
Medium: 5 GHz Body, Medium parameters used:
f = 5500 MHz; σ = 5.714 S/m; ε_r = 47.79; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 06-16-2014; Ambient Temp: 24.1°C; Tissue Temp: 23.1°C

Probe: EX3DV4 - SN3914; ConvF(4.07, 4.07, 4.07); Calibrated: 10/23/2013;
Sensor-Surface: 1.4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1333; Calibrated: 11/19/2013
Phantom: SAM 5.0 front; Type: QD000P40CD; Serial: TP:-1648
Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

5500 MHz System Verification

Area Scan (7x8x1): Measurement grid: dx=10mm, dy=10mm
Zoom Scan (9x9x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm; Graded Ratio: 1.4
Input Power = 20.0 dBm (100 mW)
Peak SAR (extrapolated) = 32.9 W/kg
SAR(1 g) = 7.24 W/kg; SAR(10 g) = 2.05 W/kg
Deviation (1 g) = -8.47%; Deviation (10 g) = -6.82%



0 dB = 18.6 W/kg = 12.70 dBW/kg

PCTEST ENGINEERING LABORATORY, INC.

DUT: Dipole 5600 MHz; Type: D5GHzV2; Serial: 1057

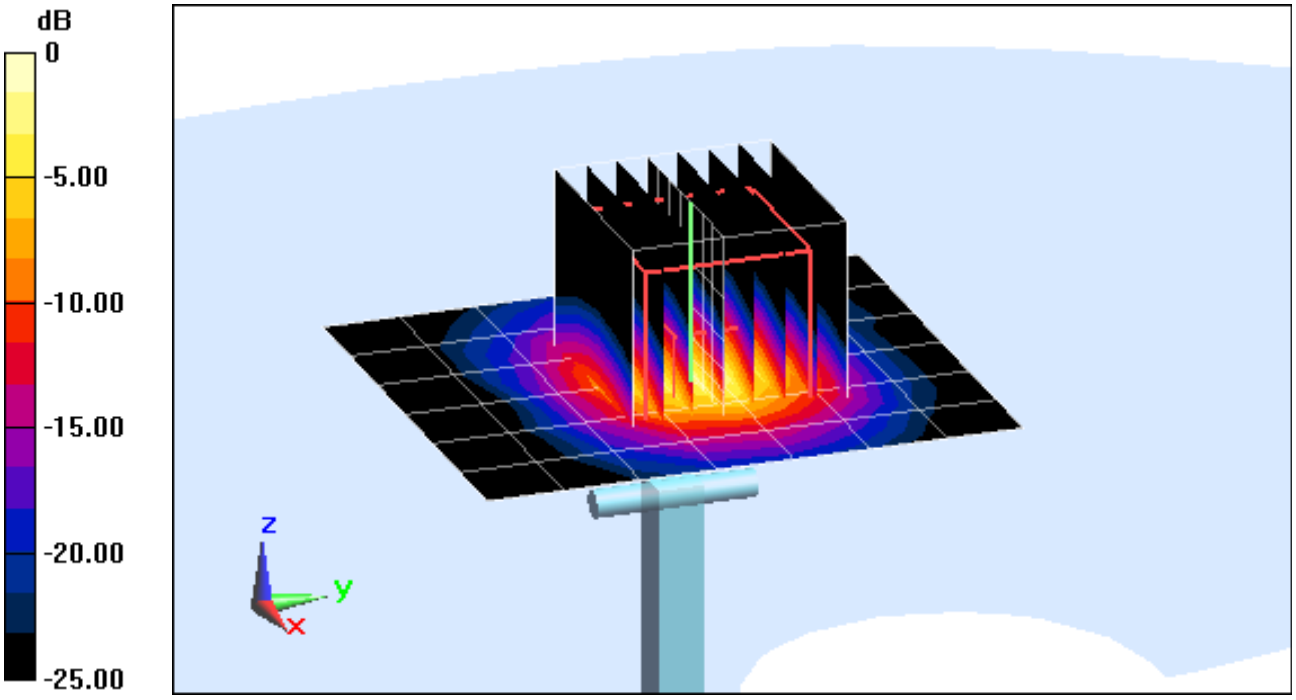
Communication System: UID 0, CW; Frequency: 5600 MHz; Duty Cycle: 1:1
Medium: 5 GHz Body, Medium parameters used:
f = 5600 MHz; σ = 5.865 S/m; ε_r = 47.502; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 06-16-2014; Ambient Temp: 24.1°C; Tissue Temp: 23.0°C

Probe: EX3DV4 - SN3914; ConvF(3.97, 3.97, 3.97); Calibrated: 10/23/2013;
Sensor-Surface: 1.4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1333; Calibrated: 11/19/2013
Phantom: SAM 5.0 front; Type: QD000P40CD; Serial: TP:-1648
Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

5600 MHz System Verification

Area Scan (7x8x1): Measurement grid: dx=10mm, dy=10mm
Zoom Scan (8x8x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm; Graded Ratio: 1.4
Input Power = 20.0 dBm (100 mW)
Peak SAR (extrapolated) = 36.2 W/kg
SAR(1 g) = 7.69 W/kg; SAR(10 g) = 2.16 W/kg
Deviation (1 g) = -4.11%; Deviation (10 g) = -2.70%



0 dB = 20.2 W/kg = 13.05 dBW/kg

PCTEST ENGINEERING LABORATORY, INC.

DUT: Dipole 5800 MHz; Type: D5GHzV2; Serial: 1057

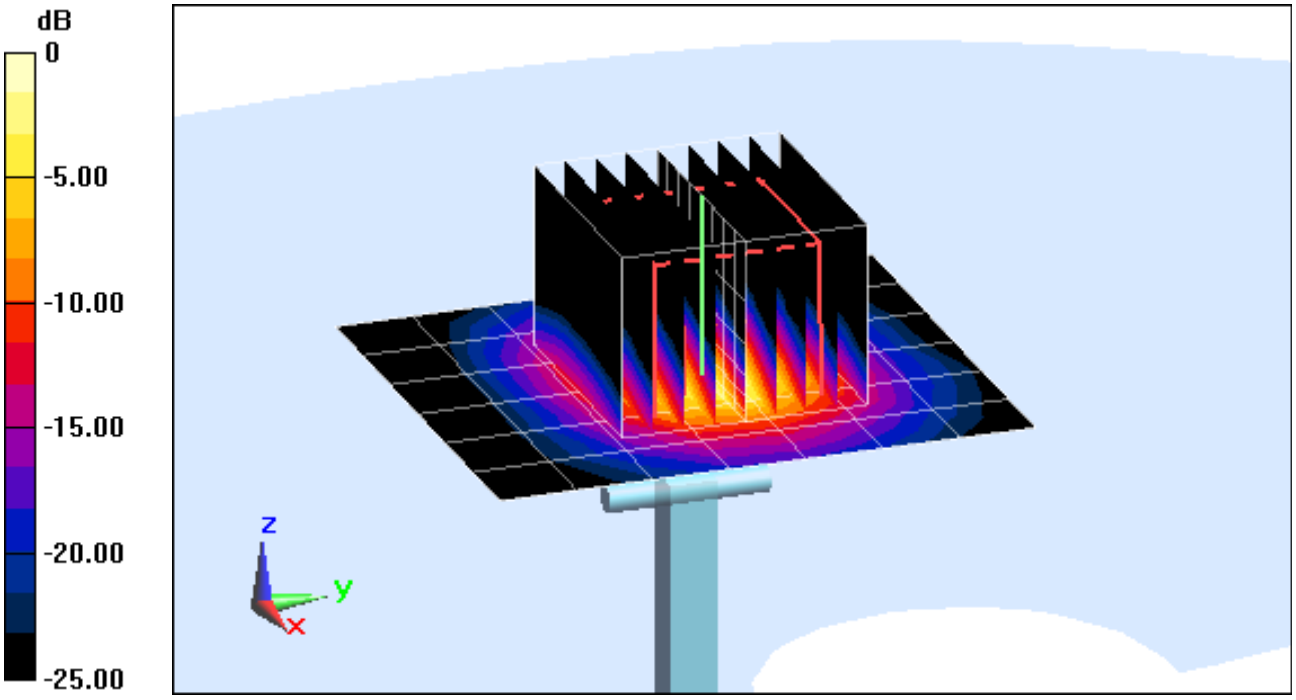
Communication System: UID 0, CW; Frequency: 5800 MHz; Duty Cycle: 1:1
Medium: 5 GHz Body, Medium parameters used:
f = 5800 MHz; σ = 6.168 S/m; ε_r = 47.082; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 06-16-2014; Ambient Temp: 24.1°C; Tissue Temp: 23.0°C

Probe: EX3DV4 - SN3914; ConvF(4.14, 4.14, 4.14); Calibrated: 10/23/2013;
Sensor-Surface: 1.4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1333; Calibrated: 11/19/2013
Phantom: SAM 5.0 front; Type: QD000P40CD; Serial: TP:-1648
Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

5800 MHz System Verification

Area Scan (7x8x1): Measurement grid: dx=10mm, dy=10mm
Zoom Scan (9x9x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm; Graded Ratio: 1.4
Input Power = 20.0 dBm (100 mW)
Peak SAR (extrapolated) = 33.1 W/kg
SAR(1 g) = 6.88 W/kg; SAR(10 g) = 1.95 W/kg
Deviation (1 g) = -7.40%; Deviation (10 g) = -4.41%



0 dB = 18.1 W/kg = 12.58 dBW/kg

APPENDIX C: PROBE CALIBRATION

Calibration Laboratory of
Schmid & Partner
Engineering AG
Zeughausstrasse 43, 8004 Zurich, Switzerland

S Schweizerischer Kalibrierdienst
C Service suisse d'étalonnage
S Servizio svizzero di taratura
S Swiss Calibration Service

Accredited by the Swiss Accreditation Service (SAS)
The Swiss Accreditation Service is one of the signatories to the EA Multilateral Agreement for the recognition of calibration certificates

Accreditation No.: SCS 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 √ 2/5/14

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 ± 3)°C and humidity < 70%.

Calibration Equipment used (M&TE critical for calibration)

Primary Standards	ID #	Cal Date (Certificate No.)	Scheduled Calibration
Power meter EPM-442A	GB37480704	09-Oct-13 (No. 217-01827)	Oct-14
Power sensor HP 8481A	US37292783	09-Oct-13 (No. 217-01827)	Oct-14
Power sensor HP 8481A	MY41092317	09-Oct-13 (No. 217-01828)	Oct-14
Reference 20 dB Attenuator	SN: 5058 (20k)	04-Apr-13 (No. 217-01736)	Apr-14
Type-N mismatch combination	SN: 5047.3 / 06327	04-Apr-13 (No. 217-01739)	Apr-14
Reference Probe ES3DV3	SN: 3205	30-Dec-13 (No. ES3-3205_Dec13)	Dec-14
DAE4	SN: 601	25-Apr-13 (No. DAE4-601_Apr13)	Apr-14

Secondary Standards	ID #	Check Date (in house)	Scheduled Check
RF generator R&S SMT-06	100005	04-Aug-99 (in house check Oct-13)	In house check: Oct-16
Network Analyzer HP 8753E	US37390585 S4206	18-Oct-01 (in house check Oct-13)	In house check: Oct-14

	Name	Function	Signature
Calibrated by:	Israe El-Naouq	Laboratory Technician	Israe El-Naouq
Approved by:	Katja Pokovic	Technical Manager	

Issued: January 21, 2014

PCT# 80200

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 ± 1 MHz	

Head TSL parameters

The following parameters and calculations were applied.

	Temperature	**Permittivity**	**Conductivity**
Nominal Head TSL parameters	22.0 °C	41.9	0.89 mho/m
Measured Head TSL parameters	(22.0 ± 0.2) °C	40.8 ± 6 %	0.92 mho/m ± 6 %
Head TSL temperature change during test	< 0.5 °C	----	----

SAR result with Head TSL

SAR averaged over 1 cm^3 (1 g) of Head TSL	Condition	
SAR measured	250 mW input power	2.16 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**8.37 W/kg ± 17.0 % (k=2)**

SAR averaged over 10 cm^3 (10 g) of Head TSL	condition	
SAR measured	250 mW input power	1.40 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**5.46 W/kg ± 16.5 % (k=2)**

Body TSL parameters

The following parameters and calculations were applied.

	Temperature	**Permittivity**	**Conductivity**
Nominal Body TSL parameters	22.0 °C	55.5	0.96 mho/m
Measured Body TSL parameters	(22.0 ± 0.2) °C	54.0 ± 6 %	0.98 mho/m ± 6 %
Body TSL temperature change during test	< 0.5 °C	----	----

SAR result with Body TSL

SAR averaged over 1 cm^3 (1 g) of Body TSL	Condition	
SAR measured	250 mW input power	2.24 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	**8.77 W/kg ± 17.0 % (k=2)**

SAR averaged over 10 cm^3 (10 g) of Body TSL	condition	
SAR measured	250 mW input power	1.47 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	**5.78 W/kg ± 16.5 % (k=2)**

Appendix

Antenna Parameters with Head TSL

Impedance, transformed to feed point	54.7 Ω - 0.2 jΩ
Return Loss	- 27.0 dB

Antenna Parameters with Body TSL

Impedance, transformed to feed point	49.5 Ω - 2.6 jΩ
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

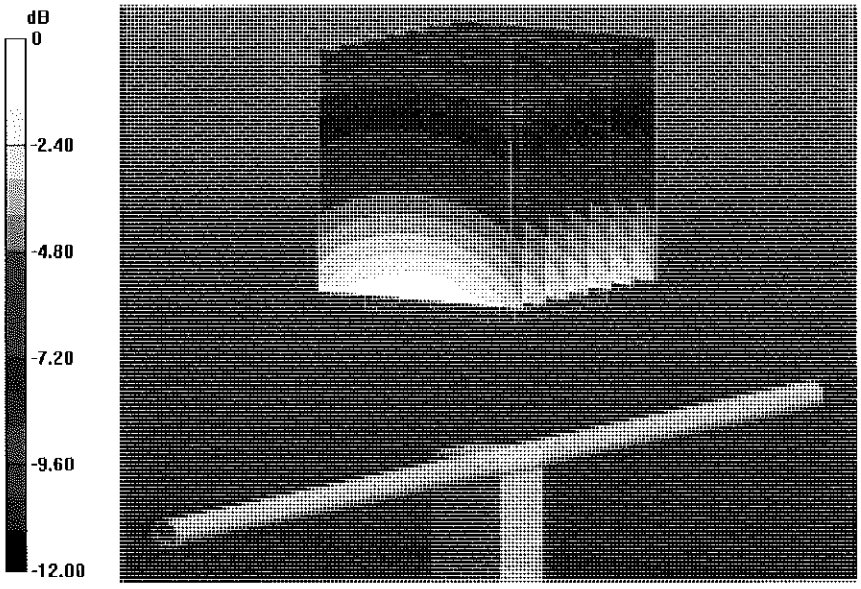
Communication System: UID 0 - CW; Frequency: 750 MHz
Medium parameters used: f = 750 MHz; $\sigma = 0.92$ S/m; $\varepsilon_r = 40.8$; $\rho = 1000$ kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY52 Configuration:

- Probe: ES3DV3 - SN3205; ConvF(6.37, 6.37, 6.37); Calibrated: 30.12.2013;
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 25.04.2013
- Phantom: Flat Phantom 4.9L; Type: QD000P49AA; Serial: 1001
- DASY52 52.8.7(1137); SEMCAD X 14.6.10(7164)

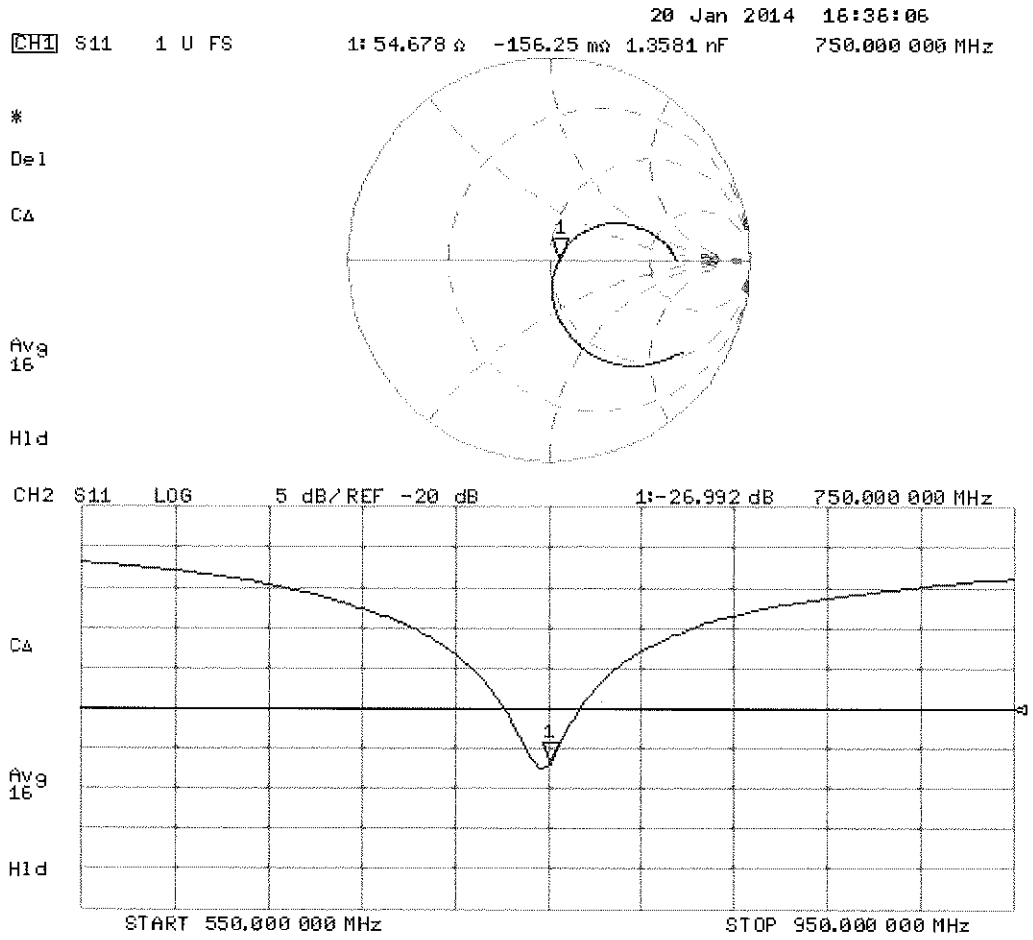
Dipole Calibration for Head Tissue/Pin=250 mW, d=15mm/Zoom Scan (7x7x7)/Cube 0:

Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 53.711 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



0 dB = 2.51 W/kg = 4.00 dBW/kg

Impedance Measurement Plot for Head TSL



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

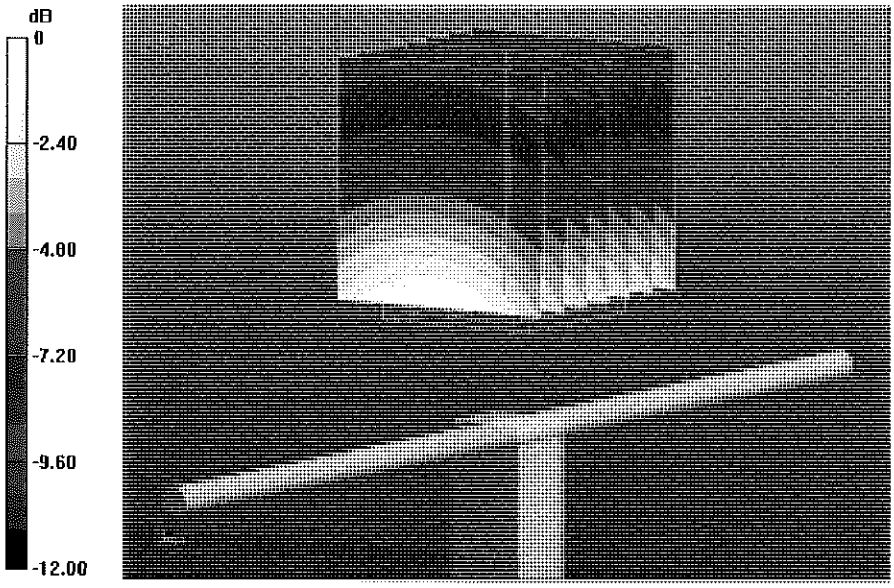
Communication System: UID 0 - CW; Frequency: 750 MHz
Medium parameters used: f = 750 MHz; σ = 0.98 S/m; ε_r = 54; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

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)

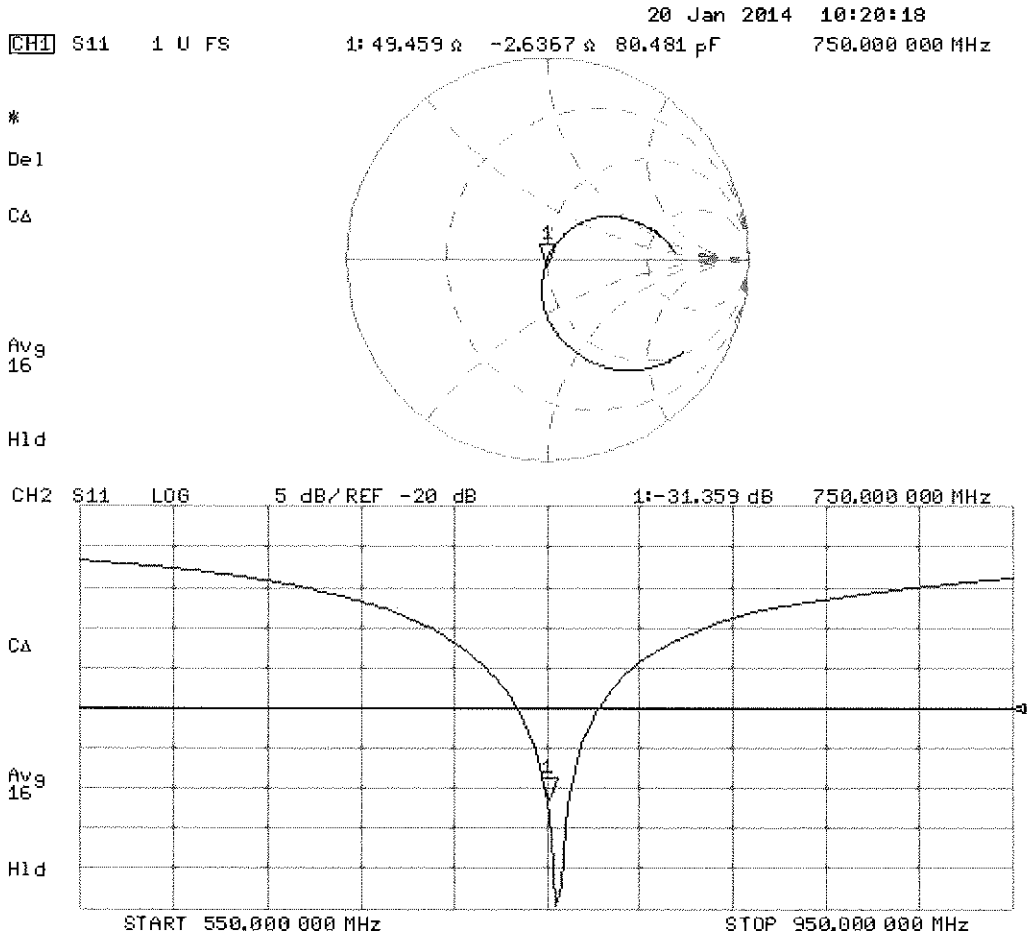
Dipole Calibration for Body Tissue/Pin=250 mW, d=15mm/Zoom Scan (7x7x7)/Cube 0:

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



0 dB = 2.58 W/kg = 4.12 dBW/kg

Impedance Measurement Plot for Body TSL



Calibration Laboratory of
Schmid & Partner
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Zeughausstrasse 43, 8004 Zurich, Switzerland

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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

	Name	Function	Signature
Calibrated by:	Leif Klysner	Laboratory Technician	
Approved by:	Katja Pokovic	Technical Manager	

Issued: April 9, 2014

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	835 MHz ± 1 MHz	

Head TSL parameters

The following parameters and calculations were applied.

	Temperature	**Permittivity**	**Conductivity**
Nominal Head TSL parameters	22.0 °C	41.5	0.90 mho/m
Measured Head TSL parameters	(22.0 ± 0.2) °C	41.6 ± 6 %	0.94 mho/m ± 6 %
Head TSL temperature change during test	< 0.5 °C	----	----

SAR result with Head TSL

SAR averaged over 1 cm^3 (1 g) of Head TSL	Condition	
SAR measured	250 mW input power	2.38 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**9.22 W/kg ± 17.0 % (k=2)**

SAR averaged over 10 cm^3 (10 g) of Head TSL	condition	
SAR measured	250 mW input power	1.53 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**5.97 W/kg ± 16.5 % (k=2)**

Body TSL parameters

The following parameters and calculations were applied.

	Temperature	**Permittivity**	**Conductivity**
Nominal Body TSL parameters	22.0 °C	55.2	0.97 mho/m
Measured Body TSL parameters	(22.0 ± 0.2) °C	53.6 ± 6 %	1.02 mho/m ± 6 %
Body TSL temperature change during test	< 0.5 °C	----	----

SAR result with Body TSL

SAR averaged over 1 cm^3 (1 g) of Body TSL	Condition	
SAR measured	250 mW input power	2.44 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	**9.34 W/kg ± 17.0 % (k=2)**

SAR averaged over 10 cm^3 (10 g) of Body TSL	condition	
SAR measured	250 mW input power	1.59 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	**6.15 W/kg ± 16.5 % (k=2)**

Appendix

Antenna Parameters with Head TSL

Impedance, transformed to feed point	51.2 Ω - 1.6 jΩ
Return Loss	- 34.0 dB

Antenna Parameters with Body TSL

Impedance, transformed to feed point	46.3 Ω - 4.5 jΩ
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

Date: 07.04.2014

Test Laboratory: SPEAG, Zurich, Switzerland

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

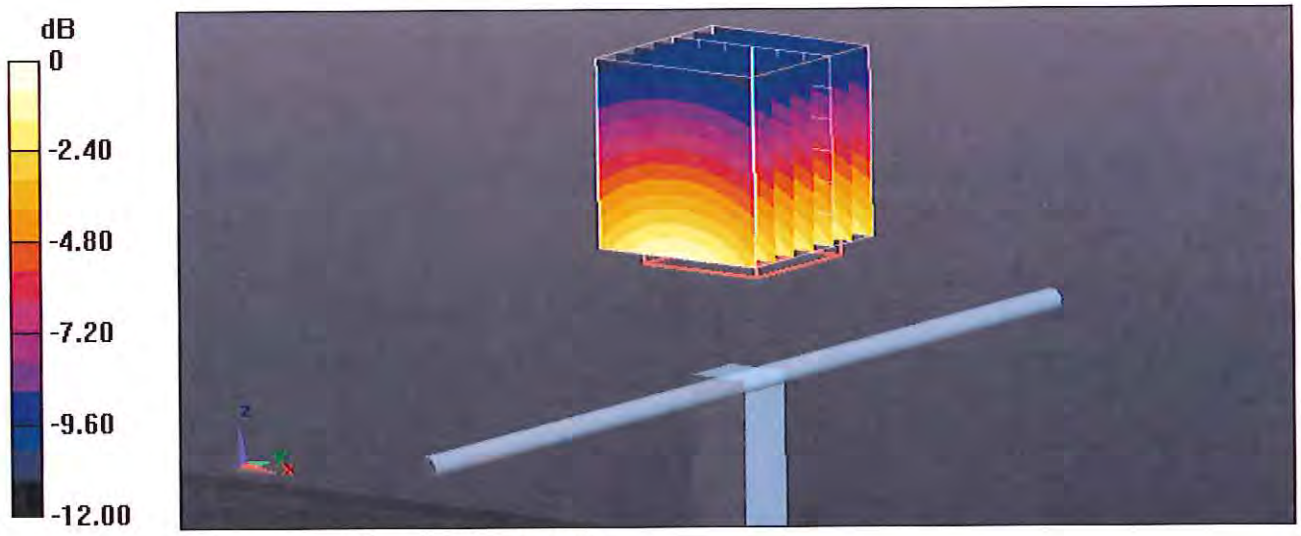
Communication System: UID 0 - CW; Frequency: 835 MHz
Medium parameters used: f = 835 MHz; σ = 0.94 S/m; ε_r = 41.6; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

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)

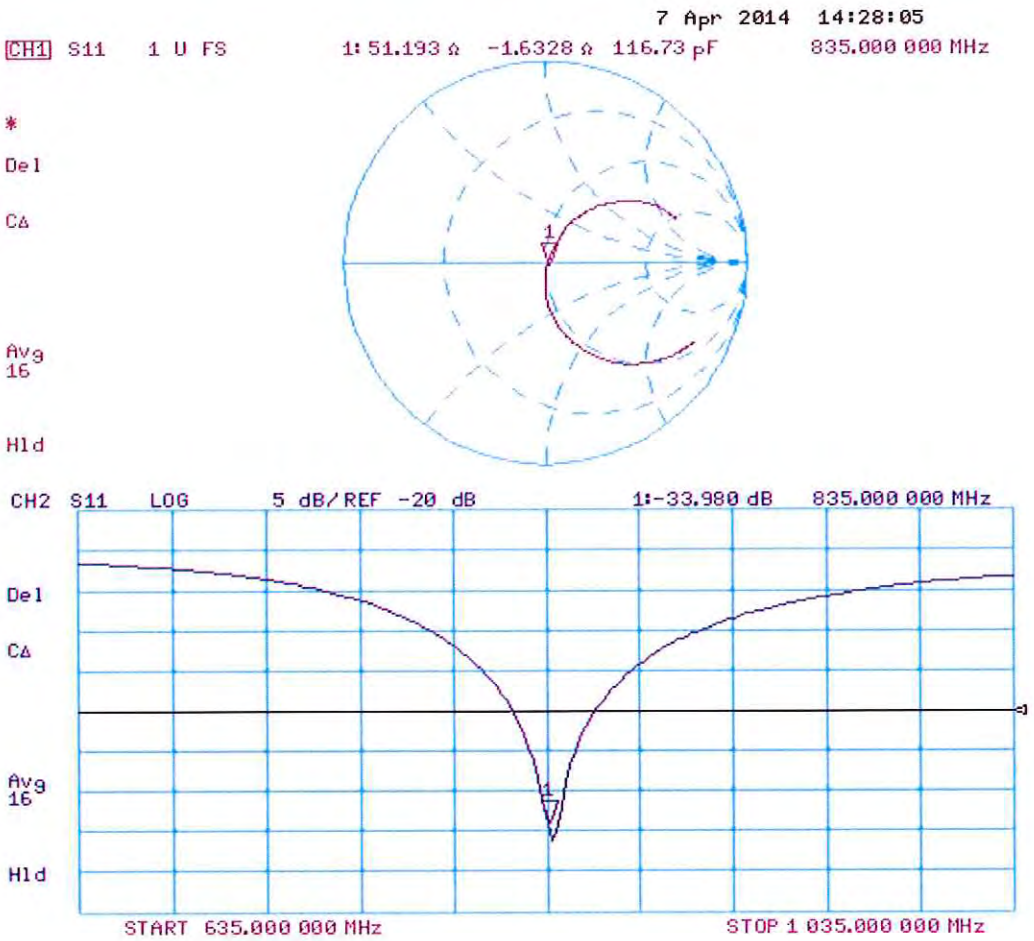
Dipole Calibration for Head Tissue/Pin=250 mW, d=15mm/Zoom Scan (7x7x7)/Cube 0:

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



0 dB = 2.80 W/kg = 4.47 dBW/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

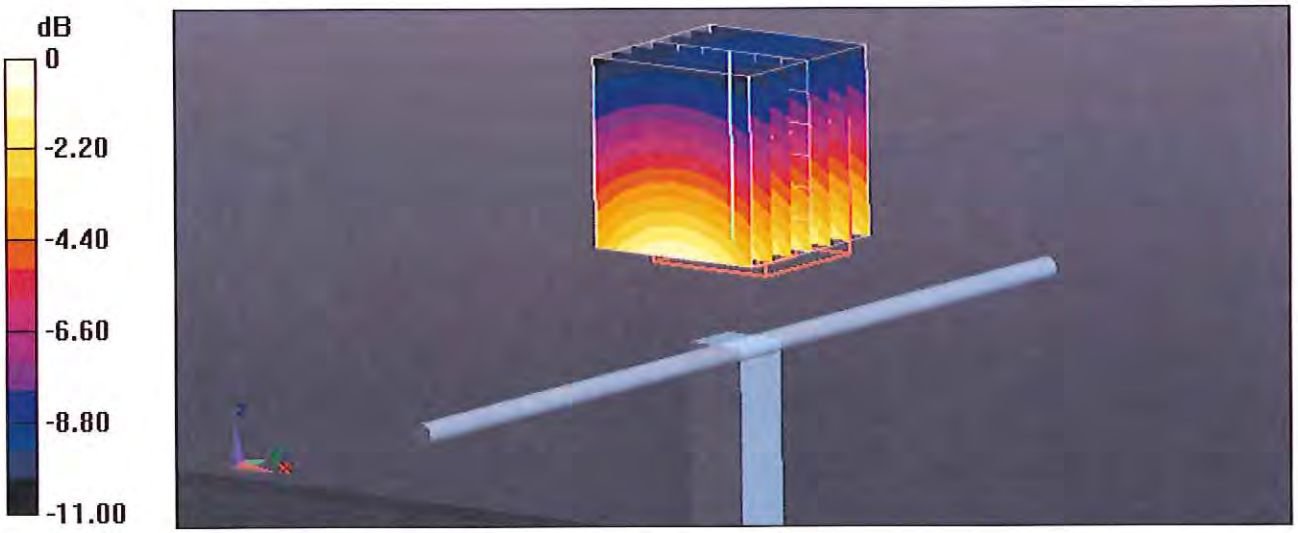
Communication System: UID 0 - CW; Frequency: 835 MHz
Medium parameters used: f = 835 MHz; σ = 1.02 S/m; ε_r = 53.6; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

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)

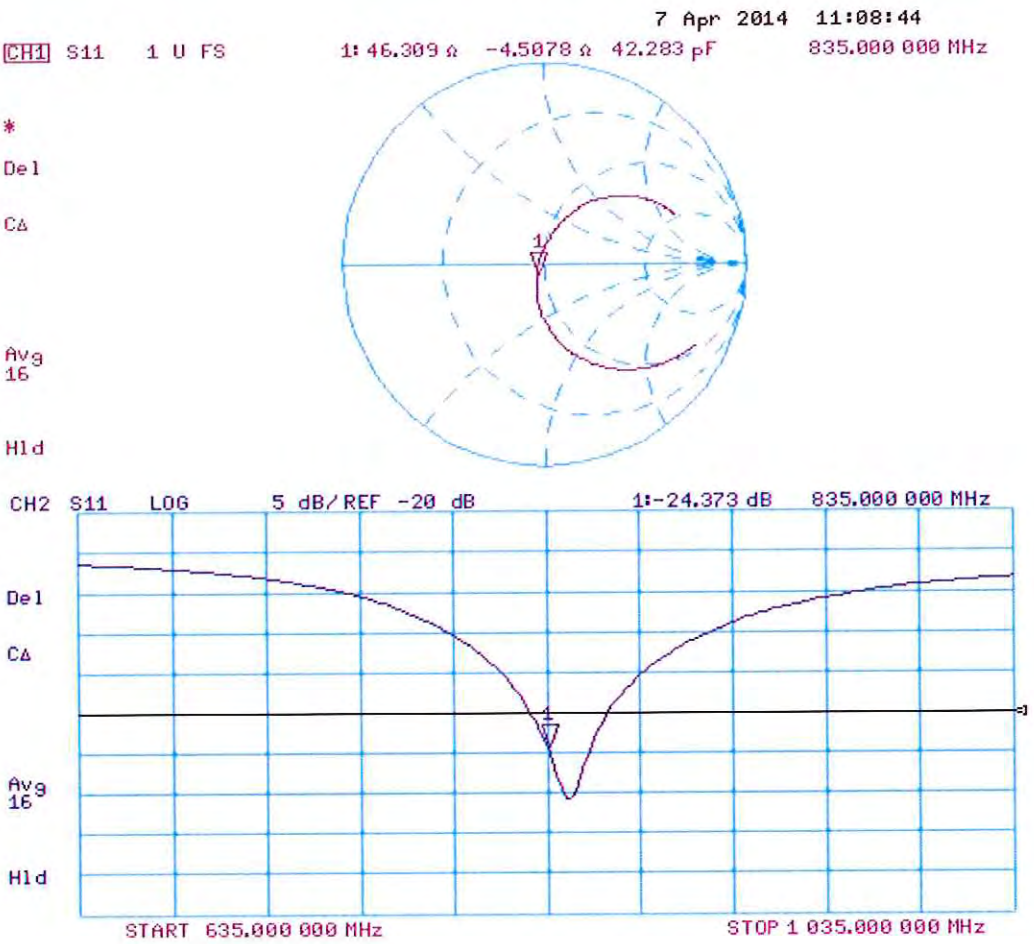
Dipole Calibration for Body Tissue/Pin=250 mW, d=15mm/Zoom Scan (7x7x7)/Cube 0:

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



0 dB = 2.85 W/kg = 4.55 dBW/kg

Impedance Measurement Plot for Body TSL



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Accreditation No.: SCS 108

Client **PC Test**

Certificate No: D1765V2-1008_May14

CALIBRATION CERTIFICATE

Object D1765V2 - SN: 1008

Calibration procedure(s) QA CAL-05.v9
Calibration procedure for dipole validation kits above 700 MHz

CCV
6R/H

Calibration date: May 07, 2014

This calibration certificate documents the traceability to national standards, which realize the physical units of measurements (SI).
The measurements and the uncertainties with confidence probability are given on the following pages and are part of the certificate.

All calibrations have been conducted in the closed laboratory facility: environment temperature (22 ± 3)°C and humidity < 70%.

Calibration Equipment used (M&TE critical for calibration)

Primary Standards	ID #	Cal Date (Certificate No.)	Scheduled Calibration
Power meter EPM-442A	GB37480704	09-Oct-13 (No. 217-01827)	Oct-14
Power sensor HP 8481A	US37292783	09-Oct-13 (No. 217-01827)	Oct-14
Power sensor HP 8481A	MY41092317	09-Oct-13 (No. 217-01828)	Oct-14
Reference 20 dB Attenuator	SN: 5058 (20k)	03-Apr-14 (No. 217-01918)	Apr-15
Type-N mismatch combination	SN: 5047.2 / 06327	03-Apr-14 (No. 217-01921)	Apr-15
Reference Probe ES3DV3	SN: 3205	30-Dec-13 (No. ES3-3205_Dec13)	Dec-14
DAE4	SN: 601	30-Apr-14 (No. DAE4-601_Apr14)	Apr-15

Secondary Standards	ID #	Check Date (in house)	Scheduled Check
RF generator R&S SMT-06	100005	04-Aug-99 (in house check Oct-13)	In house check: Oct-16
Network Analyzer HP 8753E	US37390585 S4206	18-Oct-01 (in house check Oct-13)	In house check: Oct-14

	Name	Function	Signature
Calibrated by:	Jeton Kastrati	Laboratory Technician	
Approved by:	Katja Pokovic	Technical Manager	

Issued: May 12, 2014

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	V52.8.8
Extrapolation	Advanced Extrapolation	
Phantom	Modular Flat Phantom	
Distance Dipole Center - TSL	10 mm	with Spacer
Zoom Scan Resolution	dx, dy, dz = 5 mm	
Frequency	1750 MHz ± 1 MHz	

Head TSL parameters

The following parameters and calculations were applied.

	Temperature	**Permittivity**	**Conductivity**
Nominal Head TSL parameters	22.0 °C	40.1	1.37 mho/m
Measured Head TSL parameters	(22.0 ± 0.2) °C	39.0 ± 6 %	1.36 mho/m ± 6 %
Head TSL temperature change during test	< 0.5 °C	----	----

SAR result with Head TSL

SAR averaged over 1 cm^3 (1 g) of Head TSL	Condition	
SAR measured	250 mW input power	9.23 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**36.9 W/kg ± 17.0 % (k=2)**

SAR averaged over 10 cm^3 (10 g) of Head TSL	condition	
SAR measured	250 mW input power	4.87 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**19.5 W/kg ± 16.5 % (k=2)**

Body TSL parameters

The following parameters and calculations were applied.

	Temperature	**Permittivity**	**Conductivity**
Nominal Body TSL parameters	22.0 °C	53.4	1.49 mho/m
Measured Body TSL parameters	(22.0 ± 0.2) °C	52.2 ± 6 %	1.48 mho/m ± 6 %
Body TSL temperature change during test	< 0.5 °C	----	----

SAR result with Body TSL

SAR averaged over 1 cm^3 (1 g) of Body TSL	Condition	
SAR measured	250 mW input power	9.41 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	**37.6 W/kg ± 17.0 % (k=2)**

SAR averaged over 10 cm^3 (10 g) of Body TSL	condition	
SAR measured	250 mW input power	5.02 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	**20.1 W/kg ± 16.5 % (k=2)**

Appendix

Antenna Parameters with Head TSL

Impedance, transformed to feed point	47.7 Ω - 6.1 jΩ
Return Loss	- 23.6 dB

Antenna Parameters with Body TSL

Impedance, transformed to feed point	43.7 Ω - 6.4 jΩ
Return Loss	- 20.4 dB

General Antenna Parameters and Design

Electrical Delay (one direction)	1.211 ns

After long term use with 100W radiated power, only a slight warming of the dipole near the feedpoint can be measured.

The dipole is made of standard semirigid coaxial cable. The center conductor of the feeding line is directly connected to the second arm of the dipole. The antenna is therefore short-circuited for DC-signals. On some of the dipoles, small end caps are added to the dipole arms in order to improve matching when loaded according to the position as explained in the "Measurement Conditions" paragraph. The SAR data are not affected by this change. The overall dipole length is still according to the Standard.
No excessive force must be applied to the dipole arms, because they might bend or the soldered connections near the feedpoint may be damaged.

Additional EUT Data

Manufactured by	SPEAG
Manufactured on	October 06, 2005

DASY5 Validation Report for Head TSL

Date: 07.05.2014

Test Laboratory: SPEAG, Zurich, Switzerland

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

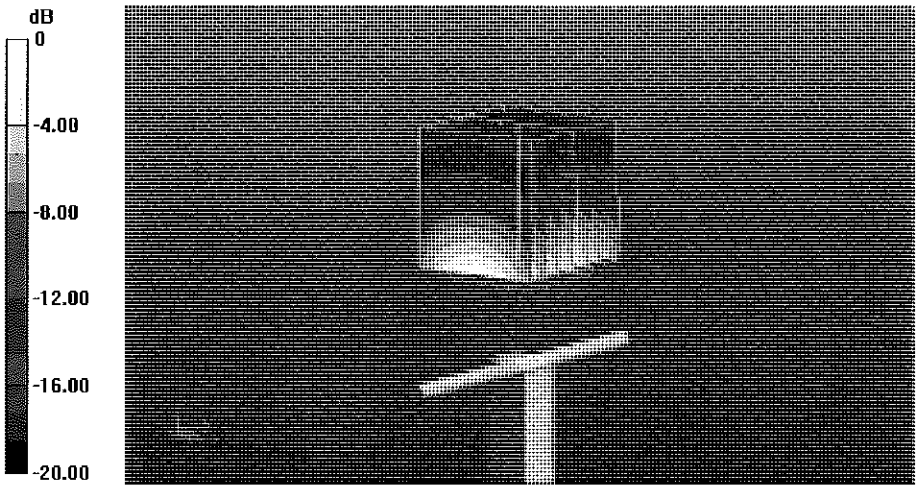
Communication System: UID 0 - CW; Frequency: 1750 MHz
Medium parameters used: f = 1750 MHz; σ = 1.36 S/m; ε_r = 39; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY52 Configuration:

- Probe: ES3DV3 - SN3205; ConvF(5.23, 5.23, 5.23); Calibrated: 30.12.2013;
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 30.04.2014
- Phantom: Flat Phantom 5.0 (front); Type: QD000P50AA; Serial: 1001
- DASY52 52.8.8(1222); SEMCAD X 14.6.10(7331)

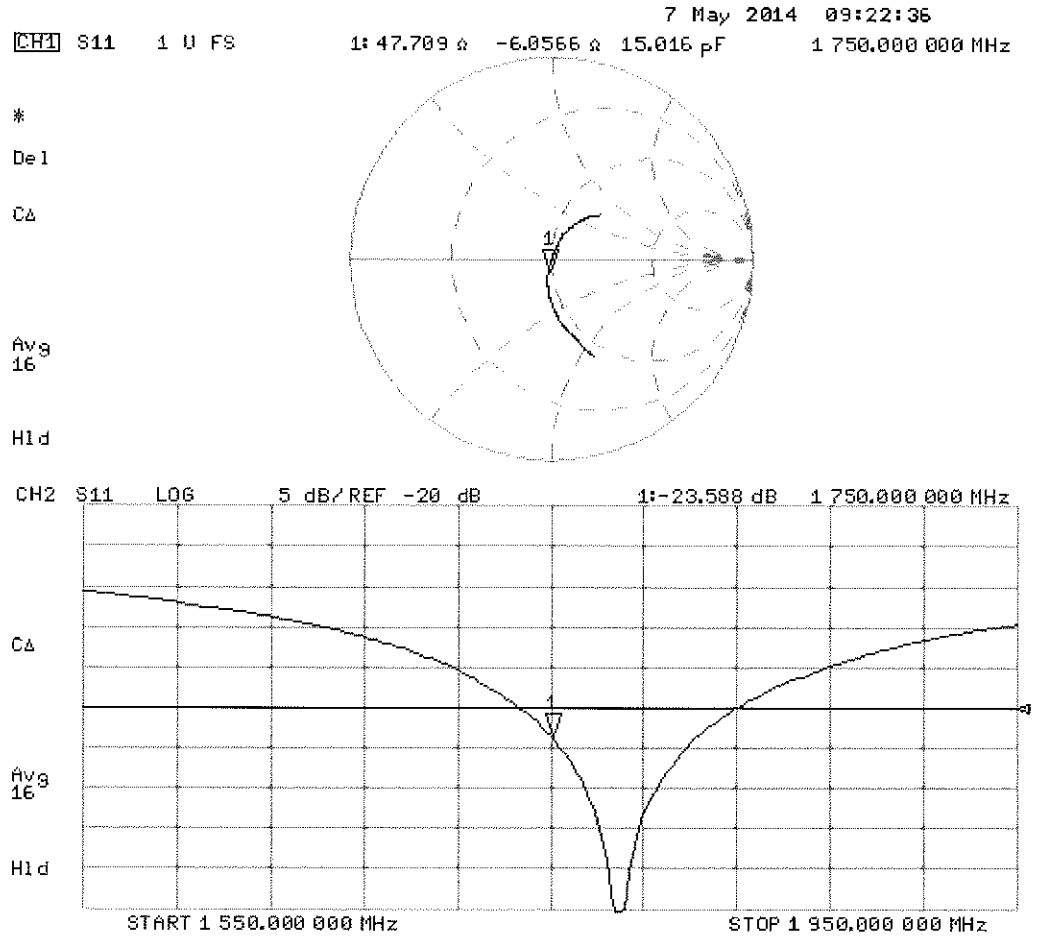
Dipole Calibration for Head Tissue/Pin=250 mW, d=10mm/Zoom Scan (7x7x7)/Cube 0:

Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 96.06 V/m; Power Drift = 0.01 dB
Peak SAR (extrapolated) = 16.7 W/kg
SAR(1 g) = 9.23 W/kg; SAR(10 g) = 4.87 W/kg
Maximum value of SAR (measured) = 11.7 W/kg



0 dB = 11.7 W/kg = 10.68 dBW/kg

Impedance Measurement Plot for Head TSL



DASY5 Validation Report for Body TSL

Date: 07.05.2014

Test Laboratory: SPEAG, Zurich, Switzerland

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

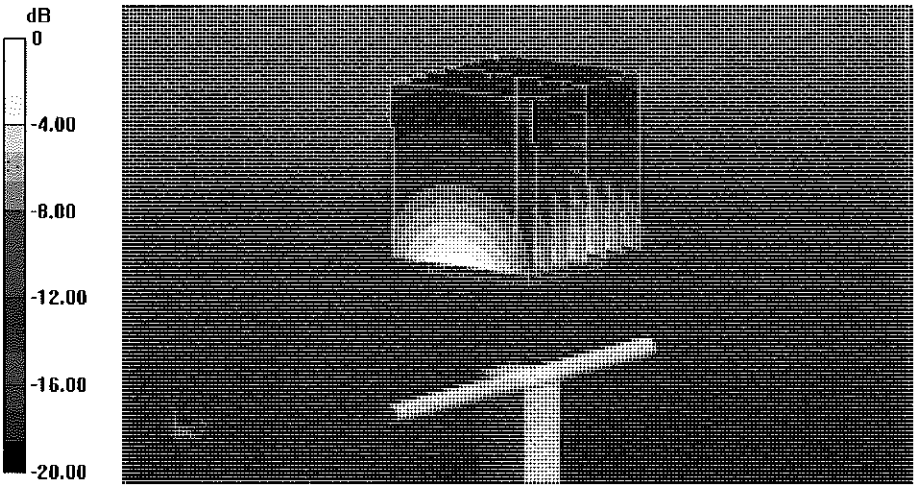
Communication System: UID 0 - CW; Frequency: 1750 MHz
Medium parameters used: f = 1750 MHz; σ = 1.48 S/m; ε_r = 52.2; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY52 Configuration:

- Probe: ES3DV3 - SN3205; ConvF(4.89, 4.89, 4.89); Calibrated: 30.12.2013;
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 30.04.2014
- Phantom: Flat Phantom 5.0 (back); Type: QD000P50AA; Serial: 1002
- DASY52 52.8.8(1222); SEMCAD X 14.6.10(7331)

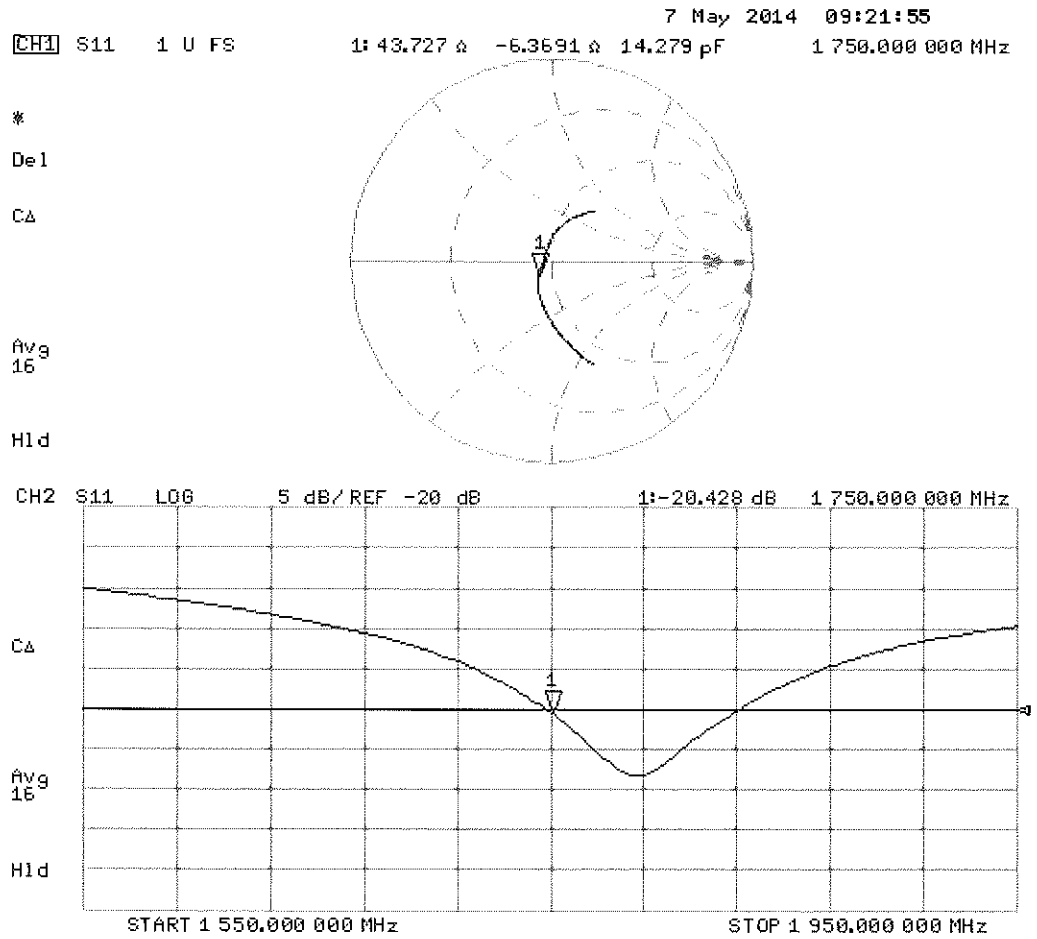
Dipole Calibration for Body Tissue/Pin=250 mW, d=10mm/Zoom Scan (7x7x7)/Cube 0:

Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 93.01 V/m; Power Drift = 0.00 dB
Peak SAR (extrapolated) = 16.3 W/kg
SAR(1 g) = 9.41 W/kg; SAR(10 g) = 5.02 W/kg
Maximum value of SAR (measured) = 11.8 W/kg



0 dB = 11.8 W/kg = 10.72 dBW/kg

Impedance Measurement Plot for Body TSL



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Accreditation No.: SCS 108

Client **PC Test**

Certificate No: D1900V2-5d141_Apr14

CALIBRATION CERTIFICATE

Object	D1900V2 - SN: 5d141
Calibration procedure(s)	QA CAL-05.v9 Calibration procedure for dipole validation kits above 700 MHz
Calibration date:	April 09, 2014

✓ KOK 5/7/14

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 ± 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

	Name	Function	Signature
Calibrated by:	Claudio Leubler	Laboratory Technician	
Approved by:	Katja Pokovic	Technical Manager	

Issued: April 9, 2014

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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	10 mm	with Spacer
Zoom Scan Resolution	dx, dy, dz = 5 mm	
Frequency	1900 MHz ± 1 MHz	

Head TSL parameters

The following parameters and calculations were applied.

	Temperature	**Permittivity**	**Conductivity**
Nominal Head TSL parameters	22.0 °C	40.0	1.40 mho/m
Measured Head TSL parameters	(22.0 ± 0.2) °C	39.1 ± 6 %	1.36 mho/m ± 6 %
Head TSL temperature change during test	< 0.5 °C	----	----

SAR result with Head TSL

SAR averaged over 1 cm^3 (1 g) of Head TSL	Condition	
SAR measured	250 mW input power	9.91 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**40.1 W/kg ± 17.0 % (k=2)**

SAR averaged over 10 cm^3 (10 g) of Head TSL	condition	
SAR measured	250 mW input power	5.17 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**20.8 W/kg ± 16.5 % (k=2)**

Body TSL parameters

The following parameters and calculations were applied.

	Temperature	**Permittivity**	**Conductivity**
Nominal Body TSL parameters	22.0 °C	53.3	1.52 mho/m
Measured Body TSL parameters	(22.0 ± 0.2) °C	52.4 ± 6 %	1.52 mho/m ± 6 %
Body TSL temperature change during test	< 0.5 °C	----	----

SAR result with Body TSL

SAR averaged over 1 cm^3 (1 g) of Body TSL	Condition	
SAR measured	250 mW input power	10.2 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	**40.6 W/kg ± 17.0 % (k=2)**

SAR averaged over 10 cm^3 (10 g) of Body TSL	condition	
SAR measured	250 mW input power	5.41 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	**21.6 W/kg ± 16.5 % (k=2)**

Appendix

Antenna Parameters with Head TSL

Impedance, transformed to feed point	52.8 Ω + 5.5 jΩ
Return Loss	- 24.5 dB

Antenna Parameters with Body TSL

Impedance, transformed to feed point	48.8 Ω + 6.3 jΩ
Return Loss	- 23.7 dB

General Antenna Parameters and Design

Electrical Delay (one direction)	1.199 ns

After long term use with 100W radiated power, only a slight warming of the dipole near the feedpoint can be measured.

The dipole is made of standard semirigid coaxial cable. The center conductor of the feeding line is directly connected to the second arm of the dipole. The antenna is therefore short-circuited for DC-signals. On some of the dipoles, small end caps are added to the dipole arms in order to improve matching when loaded according to the position as explained in the "Measurement Conditions" paragraph. The SAR data are not affected by this change. The overall dipole length is still according to the Standard.
No excessive force must be applied to the dipole arms, because they might bend or the soldered connections near the feedpoint may be damaged.

Additional EUT Data

Manufactured by	SPEAG
Manufactured on	March 11, 2011

DASY5 Validation Report for Head TSL

Date: 09.04.2014

Test Laboratory: SPEAG, Zurich, Switzerland

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

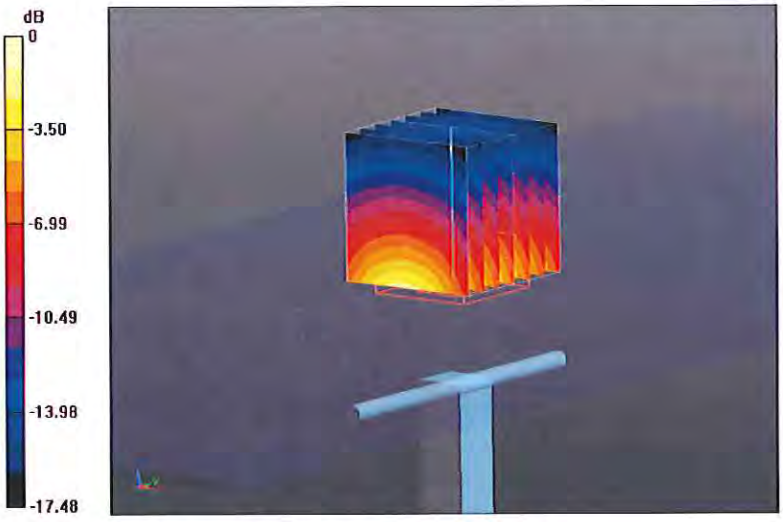
Communication System: UID 0 - CW; Frequency: 1900 MHz
Medium parameters used: f = 1900 MHz; σ = 1.36 S/m; ε_r = 39.1; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY52 Configuration:

- Probe: ES3DV3 - SN3205; ConvF(5.06, 5.06, 5.06); Calibrated: 30.12.2013;
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 25.04.2013
- Phantom: Flat Phantom 5.0 (front); Type: QD000P50AA; Serial: 1001
- DASY52 52.8.7(1137); SEMCAD X 14.6.10(7164)

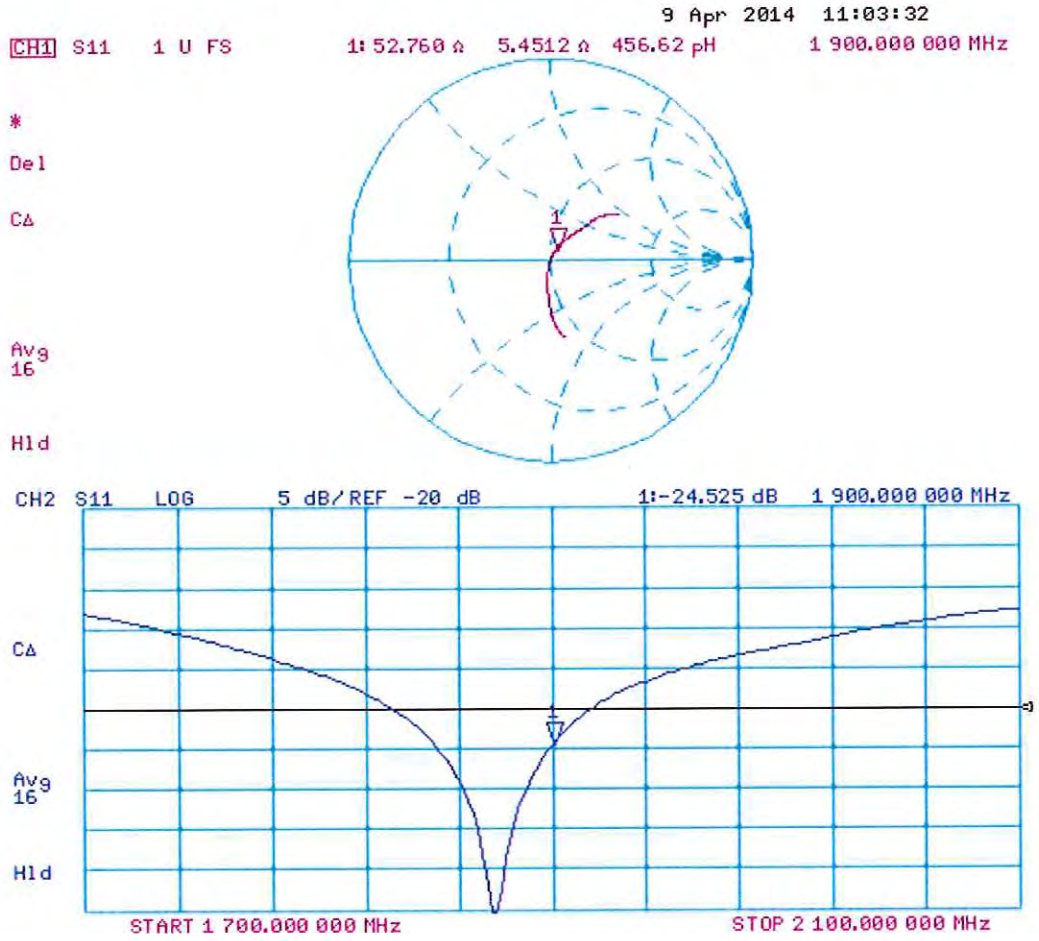
Dipole Calibration for Head Tissue/Pin=250 mW, d=10mm/Zoom Scan (7x7x7)/Cube 0:

Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 99.080 V/m; Power Drift = 0.01 dB
Peak SAR (extrapolated) = 18.2 W/kg
SAR(1 g) = 9.91 W/kg; SAR(10 g) = 5.17 W/kg
Maximum value of SAR (measured) = 12.5 W/kg



0 dB = 12.5 W/kg = 10.97 dBW/kg

Impedance Measurement Plot for Head TSL



DASY5 Validation Report for Body TSL

Date: 09.04.2014

Test Laboratory: SPEAG, Zurich, Switzerland

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

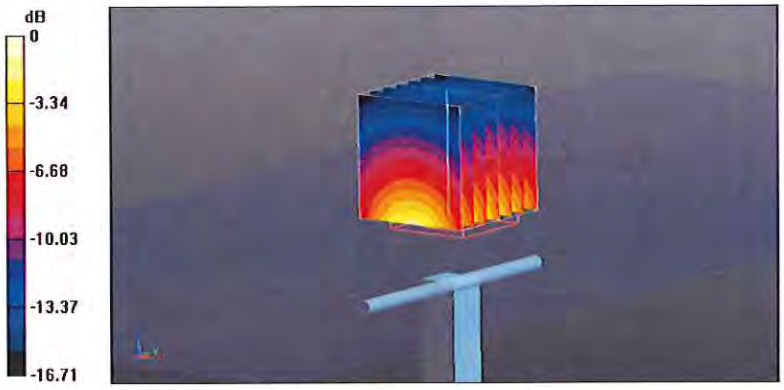
Communication System: UID 0 - CW; Frequency: 1900 MHz
Medium parameters used: f = 1900 MHz; σ = 1.52 S/m; ε_r = 52.4; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY52 Configuration:

- Probe: ES3DV3 - SN3205; ConvF(4.76, 4.76, 4.76); Calibrated: 30.12.2013;
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 25.04.2013
- Phantom: Flat Phantom 5.0 (back); Type: QD000P50AA; Serial: 1002
- DASY52 52.8.7(1137); SEMCAD X 14.6.10(7164)

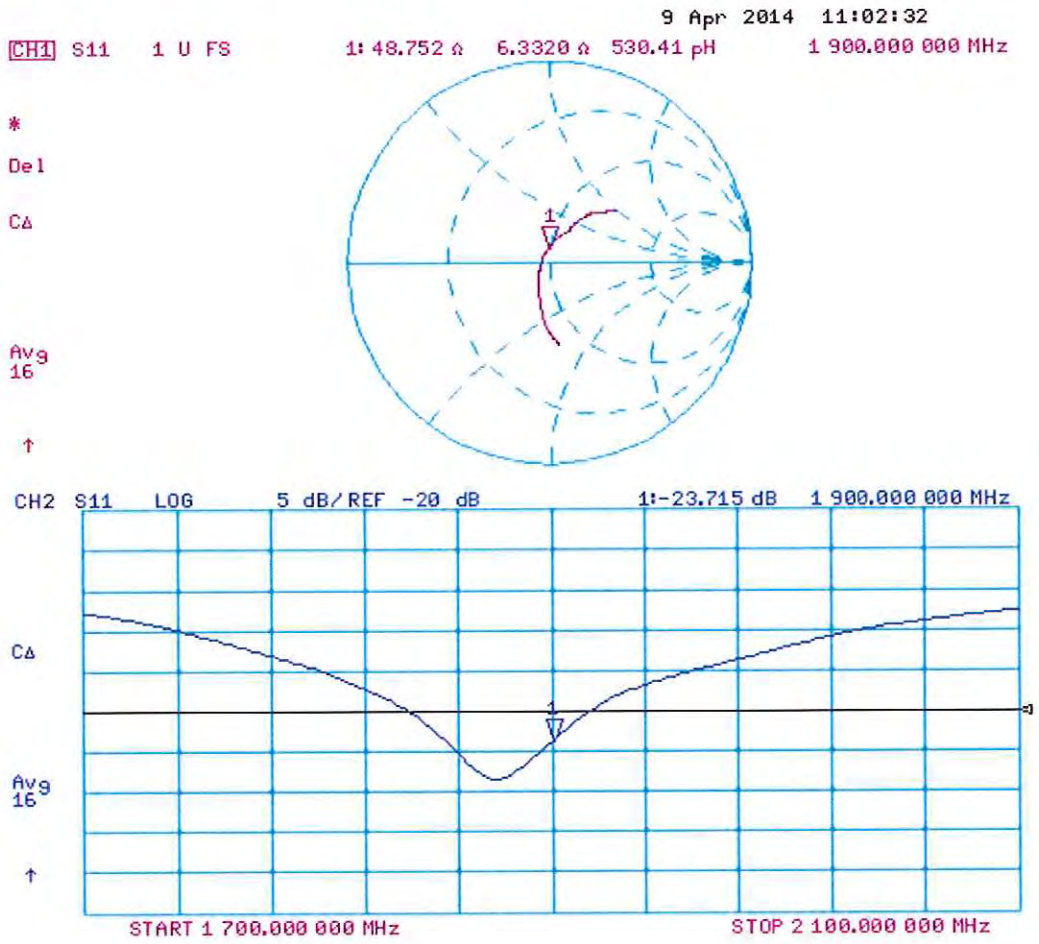
Dipole Calibration for Body Tissue/Pin=250 mW, d=10mm/Zoom Scan (7x7x7)/Cube 0:

Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 95.820 V/m; Power Drift = -0.01 dB
Peak SAR (extrapolated) = 17.9 W/kg
SAR(1 g) = 10.2 W/kg; SAR(10 g) = 5.41 W/kg
Maximum value of SAR (measured) = 12.9 W/kg



0 dB = 12.9 W/kg = 11.11 dBW/kg

Impedance Measurement Plot for Body TSL



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Accreditation No.: SCS 108

Client **PC Test**

Certificate No: D2450V2-797_Jan14

CALIBRATION CERTIFICATE

Object D2450V2 - SN: 797

Calibration procedure(s) QA CAL-05.v9
Calibration procedure for dipole validation kits above 700 MHz

Calibration date: January 21, 2014

CC V
2/5/14

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 ± 3)°C and humidity < 70%.

Calibration Equipment used (M&TE critical for calibration)

Primary Standards	ID #	Cal Date (Certificate No.)	Scheduled Calibration
Power meter EPM-442A	GB37480704	09-Oct-13 (No. 217-01827)	Oct-14
Power sensor HP 8481A	US37292783	09-Oct-13 (No. 217-01827)	Oct-14
Power sensor HP 8481A	MY41092317	09-Oct-13 (No. 217-01828)	Oct-14
Reference 20 dB Attenuator	SN: 5058 (20k)	04-Apr-13 (No. 217-01736)	Apr-14
Type-N mismatch combination	SN: 5047.3 / 06327	04-Apr-13 (No. 217-01739)	Apr-14
Reference Probe ES3DV3	SN: 3205	30-Dec-13 (No. ES3-3205_Dec13)	Dec-14
DAE4	SN: 601	25-Apr-13 (No. DAE4-601_Apr13)	Apr-14

Secondary Standards	ID #	Check Date (in house)	Scheduled Check
RF generator R&S SMT-06	100005	04-Aug-99 (in house check Oct-13)	In house check: Oct-16
Network Analyzer HP 8753E	US37390585 S4206	18-Oct-01 (in house check Oct-13)	In house check: Oct-14

	Name	Function	Signature
Calibrated by:	Israe El-Naouq	Laboratory Technician	Israe El-Naouq
Approved by:	Katja Pokovic	Technical Manager	

Issued: January 21, 2014

PCT# 751

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	10 mm	with Spacer
Zoom Scan Resolution	dx, dy, dz = 5 mm	
Frequency	2450 MHz ± 1 MHz	

Head TSL parameters

The following parameters and calculations were applied.

	Temperature	**Permittivity**	**Conductivity**
Nominal Head TSL parameters	22.0 °C	39.2	1.80 mho/m
Measured Head TSL parameters	(22.0 ± 0.2) °C	38.7 ± 6 %	1.86 mho/m ± 6 %
Head TSL temperature change during test	< 0.5 °C	----	----

SAR result with Head TSL

SAR averaged over 1 cm^3 (1 g) of Head TSL	Condition	
SAR measured	250 mW input power	13.2 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**51.8 W/kg ± 17.0 % (k=2)**

SAR averaged over 10 cm^3 (10 g) of Head TSL	condition	
SAR measured	250 mW input power	6.13 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**24.3 W/kg ± 16.5 % (k=2)**

Body TSL parameters

The following parameters and calculations were applied.

	Temperature	**Permittivity**	**Conductivity**
Nominal Body TSL parameters	22.0 °C	52.7	1.95 mho/m
Measured Body TSL parameters	(22.0 ± 0.2) °C	51.3 ± 6 %	2.04 mho/m ± 6 %
Body TSL temperature change during test	< 0.5 °C	----	----

SAR result with Body TSL

SAR averaged over 1 cm^3 (1 g) of Body TSL	Condition	
SAR measured	250 mW input power	12.7 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	**49.4 W/kg ± 17.0 % (k=2)**

SAR averaged over 10 cm^3 (10 g) of Body TSL	condition	
SAR measured	250 mW input power	5.86 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	**23.1 W/kg ± 16.5 % (k=2)**

Appendix

Antenna Parameters with Head TSL

Impedance, transformed to feed point	53.5 Ω + 3.2 jΩ
Return Loss	- 26.7 dB

Antenna Parameters with Body TSL

Impedance, transformed to feed point	50.0 Ω + 4.9 jΩ
Return Loss	- 26.2 dB

General Antenna Parameters and Design

Electrical Delay (one direction)	1.151 ns

After long term use with 100W radiated power, only a slight warming of the dipole near the feedpoint can be measured.

The dipole is made of standard semirigid coaxial cable. The center conductor of the feeding line is directly connected to the second arm of the dipole. The antenna is therefore short-circuited for DC-signals. On some of the dipoles, small end caps are added to the dipole arms in order to improve matching when loaded according to the position as explained in the "Measurement Conditions" paragraph. The SAR data are not affected by this change. The overall dipole length is still according to the Standard.
No excessive force must be applied to the dipole arms, because they might bend or the soldered connections near the feedpoint may be damaged.

Additional EUT Data

Manufactured by	SPEAG
Manufactured on	January 24, 2006

DASY5 Validation Report for Head TSL

Date: 21.01.2014

Test Laboratory: SPEAG, Zurich, Switzerland

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

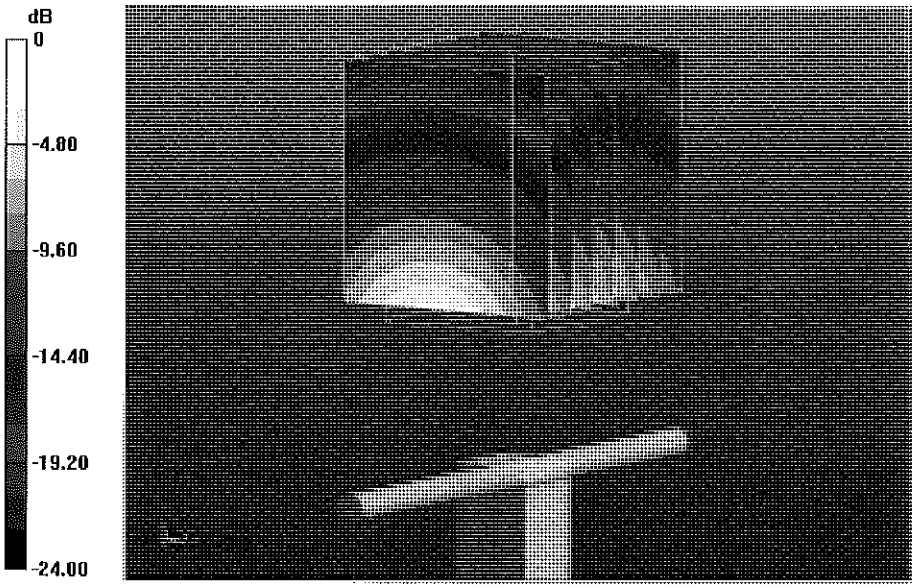
Communication System: UID 0 - CW; Frequency: 2450 MHz
Medium parameters used: f = 2450 MHz; σ = 1.86 S/m; ε_r = 38.7; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY52 Configuration:

- Probe: ES3DV3 - SN3205; ConvF(4.53, 4.53, 4.53); Calibrated: 30.12.2013;
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 25.04.2013
- Phantom: Flat Phantom 5.0 (front); Type: QD000P50AA; Serial: 1001
- DASY52 52.8.7(1137); SEMCAD X 14.6.10(7164)

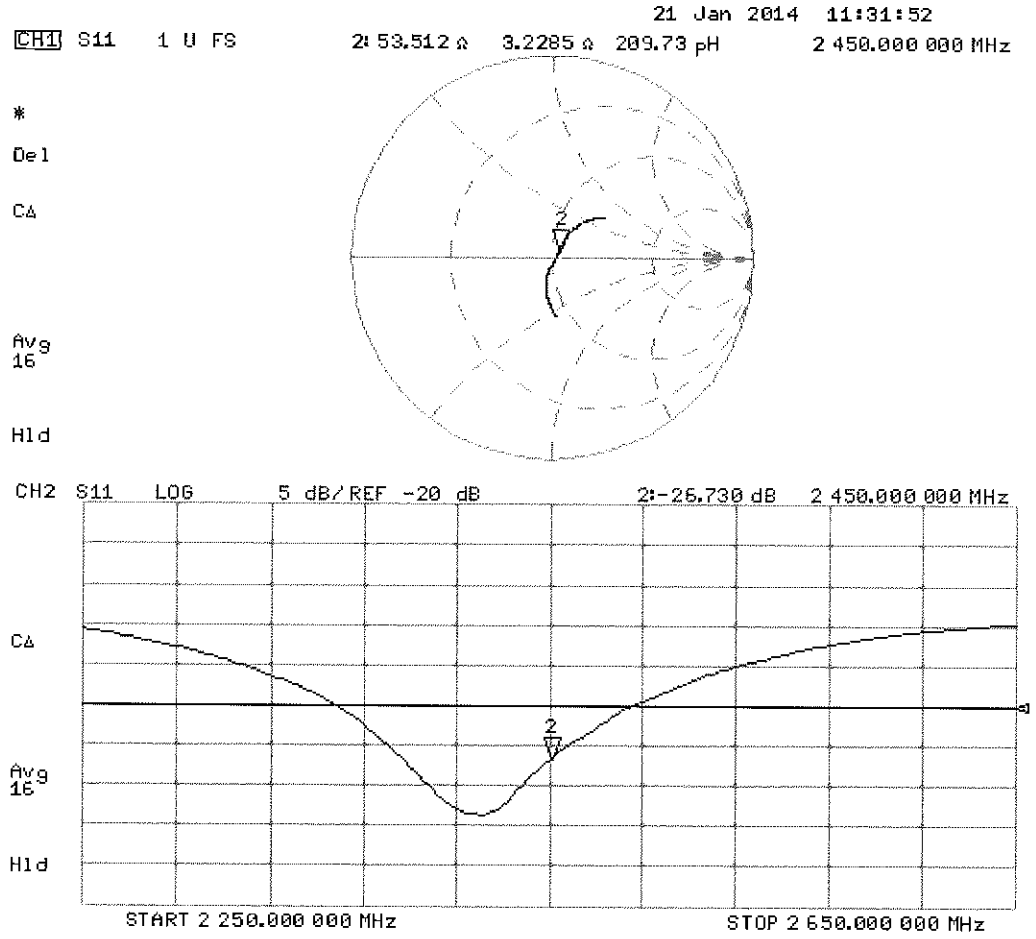
Dipole Calibration for Head Tissue/Pin=250 mW, d=10mm/Zoom Scan (7x7x7)/Cube 0:

Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 99.151 V/m; Power Drift = 0.05 dB
Peak SAR (extrapolated) = 27.5 W/kg
SAR(1 g) = 13.2 W/kg; SAR(10 g) = 6.13 W/kg
Maximum value of SAR (measured) = 16.9 W/kg



0 dB = 16.9 W/kg = 12.28 dBW/kg

Impedance Measurement Plot for Head TSL



DASY5 Validation Report for Body TSL

Date: 21.01.2014

Test Laboratory: SPEAG, Zurich, Switzerland

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

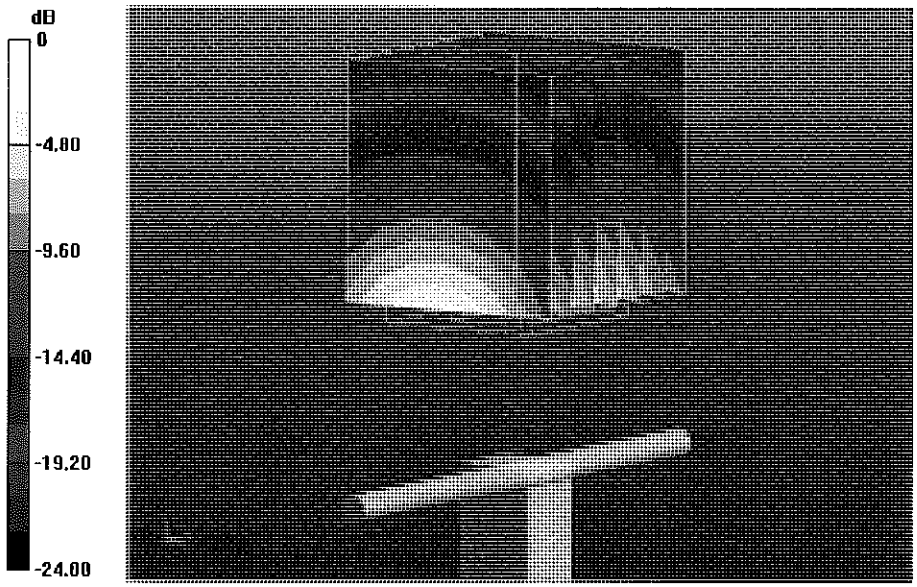
Communication System: UID 0 - CW; Frequency: 2450 MHz
Medium parameters used: f = 2450 MHz; σ = 2.04 S/m; ε_r = 51.3; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY52 Configuration:

- Probe: ES3DV3 - SN3205; ConvF(4.35, 4.35, 4.35); Calibrated: 30.12.2013;
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 25.04.2013
- Phantom: Flat Phantom 5.0 (back); Type: QD000P50AA; Serial: 1002
- DASY52 52.8.7(1137); SEMCAD X 14.6.10(7164)

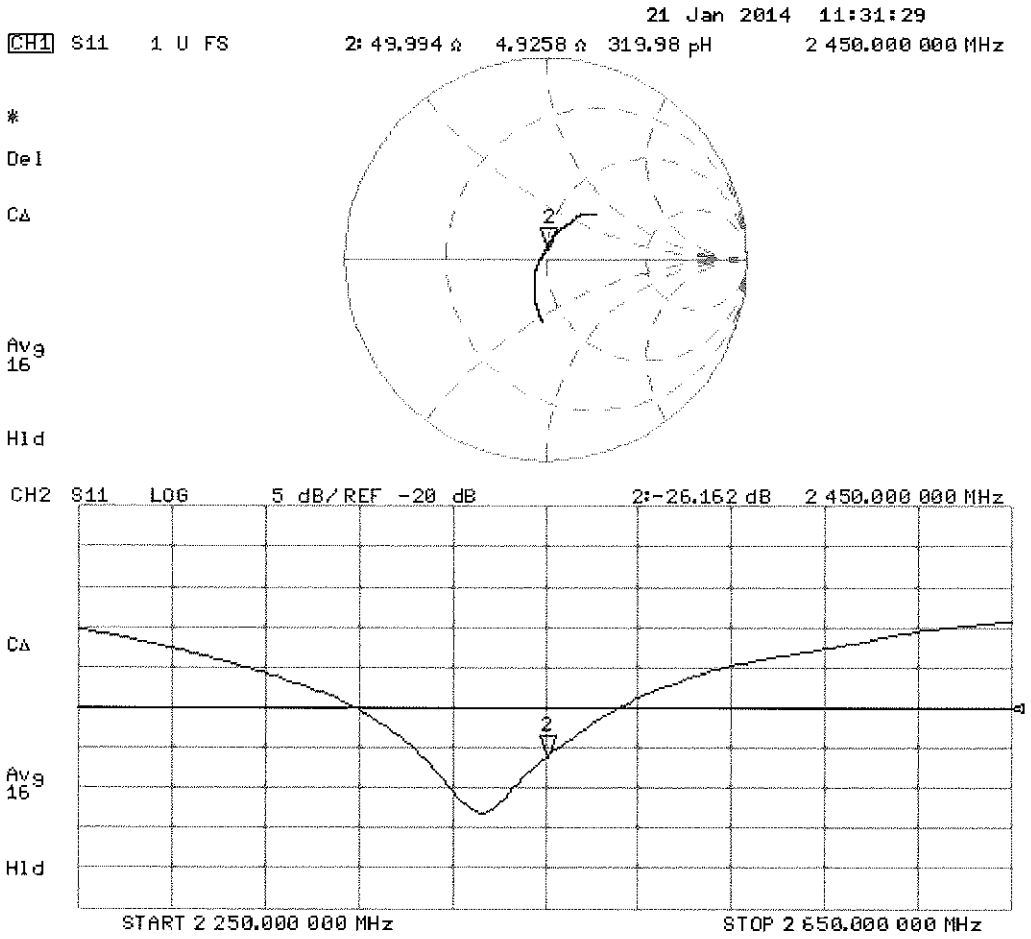
Dipole Calibration for Body Tissue/Pin=250 mW, d=10mm/Zoom Scan (7x7x7)/Cube 0:

Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 93.709 V/m; Power Drift = 0.01 dB
Peak SAR (extrapolated) = 26.4 W/kg
SAR(1 g) = 12.7 W/kg; SAR(10 g) = 5.86 W/kg
Maximum value of SAR (measured) = 16.8 W/kg



0 dB = 16.8 W/kg = 12.25 dBW/kg

Impedance Measurement Plot for Body TSL



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Accreditation No.: SCS 108

Client **PC Test**

Certificate No: D5GHzV2-1057_Jan14

CALIBRATION CERTIFICATE

Object: D5GHzV2 - SN: 1057

Calibration procedure(s): QA CAL-22.v2
Calibration procedure for dipole validation kits between 3-6 GHz

Calibration date: January 27, 2014

CC 2/5/14 ✓

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 ± 3)°C and humidity < 70%.

Calibration Equipment used (M&TE critical for calibration)

Primary Standards	ID #	Cal Date (Certificate No.)	Scheduled Calibration
Power meter EPM-442A	GB37480704	09-Oct-13 (No. 217-01827)	Oct-14
Power sensor HP 8481A	US37292783	09-Oct-13 (No. 217-01827)	Oct-14
Power sensor HP 8481A	MY41092317	09-Oct-13 (No. 217-01828)	Oct-14
Reference 20 dB Attenuator	SN: 5058 (20k)	04-Apr-13 (No. 217-01736)	Apr-14
Type-N mismatch combination	SN: 5047.3 / 06327	04-Apr-13 (No. 217-01739)	Apr-14
Reference Probe EX3DV4	SN: 3503	30-Dec-13 (No. EX3-3503_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

	Name	Function	Signature
Calibrated by:	Israe El-Naouq	Laboratory Technician	Israe El-Naouq
Approved by:	Katja Pokovic	Technical Manager	

Issued: January 27, 2014

PCT# 753

Calibration Laboratory of
Schmid & Partner
Engineering AG
Zeughausstrasse 43, 8004 Zurich, Switzerland

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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:

a) IEC 62209-2, "Evaluation of Human Exposure to Radio Frequency Fields from Handheld and Body-Mounted Wireless Communication Devices in the Frequency Range of 30 MHz to 6 GHz: Human models, Instrumentation, and Procedures"; Part 2: "Procedure to determine the Specific Absorption Rate (SAR) for including accessories and multiple transmitters", March 2010
b) KDB 865664, "SAR Measurement Requirements for 100 MHz to 6 GHz"
c) 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

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 V5.0	
Distance Dipole Center - TSL	10 mm	with Spacer
Zoom Scan Resolution	dx, dy = 4.0 mm, dz = 1.4 mm	Graded Ratio = 1.4 (Z direction)
Frequency	5200 MHz ± 1 MHz 5300 MHz ± 1 MHz 5500 MHz ± 1 MHz 5600 MHz ± 1 MHz 5800 MHz ± 1 MHz	

Head TSL parameters at 5200 MHz

The following parameters and calculations were applied.

	Temperature	**Permittivity**	**Conductivity**
Nominal Head TSL parameters	22.0 °C	36.0	4.66 mho/m
Measured Head TSL parameters	(22.0 ± 0.2) °C	35.0 ± 6 %	4.45 mho/m ± 6 %
Head TSL temperature change during test	< 0.5 °C	----	----

SAR result with Head TSL at 5200 MHz

SAR averaged over 1 cm^3 (1 g) of Head TSL	Condition	
SAR measured	100 mW input power	7.85 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**78.0 W/kg ± 19.9 % (k=2)**

SAR averaged over 10 cm^3 (10 g) of Head TSL	condition	
SAR measured	100 mW input power	2.25 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**22.3 W/kg ± 19.5 % (k=2)**

Head TSL parameters at 5300 MHz

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Head TSL parameters	22.0 °C	35.9	4.76 mho/m
Measured Head TSL parameters	(22.0 ± 0.2) °C	34.9 ± 6 %	4.54 mho/m ± 6 %
Head TSL temperature change during test	< 0.5 °C	----	----

SAR result with Head TSL at 5300 MHz

SAR averaged over 1 cm^3 (1 g) of Head TSL	Condition	
SAR measured	100 mW input power	8.36 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**83.0 W / kg ± 19.9 % (k=2)**

SAR averaged over 10 cm^3 (10 g) of Head TSL	condition	
SAR measured	100 mW input power	2.40 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**23.8 W/kg ± 19.5 % (k=2)**

Head TSL parameters at 5500 MHz

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Head TSL parameters	22.0 °C	35.6	4.96 mho/m
Measured Head TSL parameters	(22.0 ± 0.2) °C	34.6 ± 6 %	4.74 mho/m ± 6 %
Head TSL temperature change during test	< 0.5 °C	----	----

SAR result with Head TSL at 5500 MHz

SAR averaged over 1 cm^3 (1 g) of Head TSL	Condition	
SAR measured	100 mW input power	8.50 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**84.3 W/kg ± 19.9 % (k=2)**

SAR averaged over 10 cm^3 (10 g) of Head TSL	condition	
SAR measured	100 mW input power	2.42 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**24.0 W/kg ± 19.5 % (k=2)**

Head TSL parameters at 5600 MHz

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Head TSL parameters	22.0 °C	35.5	5.07 mho/m
Measured Head TSL parameters	(22.0 ± 0.2) °C	34.5 ± 6 %	4.86 mho/m ± 6 %
Head TSL temperature change during test	< 0.5 °C	----	----

SAR result with Head TSL at 5600 MHz

SAR averaged over 1 cm^3 (1 g) of Head TSL	Condition	
SAR measured	100 mW input power	8.42 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**83.5 W/kg ± 19.9 % (k=2)**

SAR averaged over 10 cm^3 (10 g) of Head TSL	condition	
SAR measured	100 mW input power	2.40 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**23.8 W/kg ± 19.5 % (k=2)**

Head TSL parameters at 5800 MHz

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Head TSL parameters	22.0 °C	35.3	5.27 mho/m
Measured Head TSL parameters	(22.0 ± 0.2) °C	34.2 ± 6 %	5.07 mho/m ± 6 %
Head TSL temperature change during test	< 0.5 °C	-----	-----

SAR result with Head TSL at 5800 MHz

SAR averaged over 1 cm^3 (1 g) of Head TSL	Condition	
SAR measured	100 mW input power	8.00 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**79.3 W/kg ± 19.9 % (k=2)**

SAR averaged over 10 cm^3 (10 g) of Head TSL	condition	
SAR measured	100 mW input power	2.28 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**22.6 W/kg ± 19.5 % (k=2)**

Body TSL parameters at 5200 MHz

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Body TSL parameters	22.0 °C	49.0	5.30 mho/m
Measured Body TSL parameters	(22.0 ± 0.2) °C	47.3 ± 6 %	5.44 mho/m ± 6 %
Body TSL temperature change during test	< 0.5 °C	----	----

SAR result with Body TSL at 5200 MHz

SAR averaged over 1 cm^3 (1 g) of Body TSL	Condition	
SAR measured	100 mW input power	7.58 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	**75.3 W/kg ± 19.9 % (k=2)**

SAR averaged over 10 cm^3 (10 g) of Body TSL	condition	
SAR measured	100 mW input power	2.12 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	**21.0 W/kg ± 19.5 % (k=2)**

Body TSL parameters at 5300 MHz

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Body TSL parameters	22.0 °C	48.9	5.42 mho/m
Measured Body TSL parameters	(22.0 ± 0.2) °C	47.2 ± 6 %	5.57 mho/m ± 6 %
Body TSL temperature change during test	< 0.5 °C	----	----

SAR result with Body TSL at 5300 MHz

SAR averaged over 1 cm^3 (1 g) of Body TSL	Condition	
SAR measured	100 mW input power	7.79 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	**77.4 W/kg ± 19.9 % (k=2)**

SAR averaged over 10 cm^3 (10 g) of Body TSL	condition	
SAR measured	100 mW input power	2.17 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	**21.5 W/kg ± 19.5 % (k=2)**

Body TSL parameters at 5500 MHz

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Body TSL parameters	22.0 °C	48.6	5.65 mho/m
Measured Body TSL parameters	(22.0 ± 0.2) °C	46.8 ± 6 %	5.84 mho/m ± 6 %
Body TSL temperature change during test	< 0.5 °C	----	----

SAR result with Body TSL at 5500 MHz

SAR averaged over 1 cm^3 (1 g) of Body TSL	Condition	
SAR measured	100 mW input power	7.96 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	**79.1 W/kg ± 19.9 % (k=2)**

SAR averaged over 10 cm^3 (10 g) of Body TSL	condition	
SAR measured	100 mW input power	2.22 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	**22.0 W/kg ± 19.5 % (k=2)**

Body TSL parameters at 5600 MHz

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Body TSL parameters	22.0 °C	48.5	5.77 mho/m
Measured Body TSL parameters	(22.0 ± 0.2) °C	46.6 ± 6 %	5.98 mho/m ± 6 %
Body TSL temperature change during test	< 0.5 °C	----	----

SAR result with Body TSL at 5600 MHz

SAR averaged over 1 cm^3 (1 g) of Body TSL	Condition	
SAR measured	100 mW input power	8.07 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	**80.2 W/kg ± 19.9 % (k=2)**

SAR averaged over 10 cm^3 (10 g) of Body TSL	condition	
SAR measured	100 mW input power	2.24 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	**22.2 W/kg ± 19.5 % (k=2)**

Body TSL parameters at 5800 MHz

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Body TSL parameters	22.0 °C	48.2	6.00 mho/m
Measured Body TSL parameters	(22.0 ± 0.2) °C	46.3 ± 6 %	6.23 mho/m ± 6 %
Body TSL temperature change during test	< 0.5 °C	----	----

SAR result with Body TSL at 5800 MHz

SAR averaged over 1 cm^3 (1 g) of Body TSL	Condition	
SAR measured	100 mW input power	7.48 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	**74.3 W/kg ± 19.9 % (k=2)**

SAR averaged over 10 cm^3 (10 g) of Body TSL	condition	
SAR measured	100 mW input power	2.06 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	**20.4 W/kg ± 19.5 % (k=2)**

Appendix

Antenna Parameters with Head TSL at 5200 MHz

Impedance, transformed to feed point	43.1 Ω - 4.6 jΩ
Return Loss	- 21.0 dB

Antenna Parameters with Head TSL at 5300 MHz

Impedance, transformed to feed point	46.5 Ω - 1.3 jΩ
Return Loss	- 28.1 dB

Antenna Parameters with Head TSL at 5500 MHz

Impedance, transformed to feed point	46.2 Ω - 2.5 jΩ
Return Loss	- 26.4 dB

Antenna Parameters with Head TSL at 5600 MHz

Impedance, transformed to feed point	48.9 Ω - 5.7 jΩ
Return Loss	- 24.6 dB

Antenna Parameters with Head TSL at 5800 MHz

Impedance, transformed to feed point	48.7 Ω - 3.1 jΩ
Return Loss	- 29.5 dB

Antenna Parameters with Body TSL at 5200 MHz

Impedance, transformed to feed point	49.4 Ω - 7.7 jΩ
Return Loss	- 22.2 dB

Antenna Parameters with Body TSL at 5300 MHz

Impedance, transformed to feed point	49.6 Ω - 3.0 jΩ
Return Loss	- 30.3 dB

Antenna Parameters with Body TSL at 5500 MHz

Impedance, transformed to feed point	50.8 Ω - 3.9 jΩ
Return Loss	- 28.0 dB

Antenna Parameters with Body TSL at 5600 MHz

Impedance, transformed to feed point	55.4 Ω - 2.5 jΩ
Return Loss	- 25.0 dB

Antenna Parameters with Body TSL at 5800 MHz

Impedance, transformed to feed point	52.3 Ω - 0.7 jΩ
Return Loss	- 32.5 dB

General Antenna Parameters and Design

Electrical Delay (one direction)	1.186 ns

After long term use with 100W radiated power, only a slight warming of the dipole near the feedpoint can be measured.

The dipole is made of standard semirigid coaxial cable. The center conductor of the feeding line is directly connected to the second arm of the dipole. The antenna is therefore short-circuited for DC-signals. On some of the dipoles, small end caps are added to the dipole arms in order to improve matching when loaded according to the position as explained in the "Measurement Conditions" paragraph. The SAR data are not affected by this change. The overall dipole length is still according to the Standard.
No excessive force must be applied to the dipole arms, because they might bend or the soldered connections near the feedpoint may be damaged.

Additional EUT Data

Manufactured by	SPEAG
Manufactured on	November 27, 2006

DASY5 Validation Report for Head TSL

Date: 27.01.2014

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole 5GHz; Type: D5GHzV2; Serial: D5GHzV2 - SN: 1057

Communication System: UID 0 - CW; Frequency: 5200 MHz, Frequency: 5300 MHz, Frequency: 5500 MHz, Frequency: 5600 MHz, Frequency: 5800 MHz
Medium parameters used: f = 5200 MHz; σ = 4.45 S/m; ε_r = 35; ρ = 1000 kg/m^3 , Medium parameters used: f = 5300 MHz; σ = 4.54 S/m; ε_r = 34.9; ρ = 1000 kg/m^3 , Medium parameters used: f = 5500 MHz; σ = 4.74 S/m; ε_r = 34.6; ρ = 1000 kg/m^3 , Medium parameters used: f = 5600 MHz; σ = 4.86 S/m; ε_r = 34.5; ρ = 1000 kg/m^3 , Medium parameters used: f = 5800 MHz; σ = 5.07 S/m; ε_r = 34.2; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY52 Configuration:

- Probe: EX3DV4 - SN3503; ConvF(5.52, 5.52, 5.52); Calibrated: 30.12.2013, ConvF(5.2, 5.2, 5.2); Calibrated: 30.12.2013, ConvF(5.01, 5.01, 5.01); Calibrated: 30.12.2013, ConvF(4.86, 4.86, 4.86); Calibrated: 30.12.2013, ConvF(4.91, 4.91, 4.91); Calibrated: 30.12.2013;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 25.04.2013
- Phantom: Flat Phantom 5.0 (front); Type: QD000P50AA; Serial: 1001
- DASY52 52.8.7(1137); SEMCAD X 14.6.10(7164)

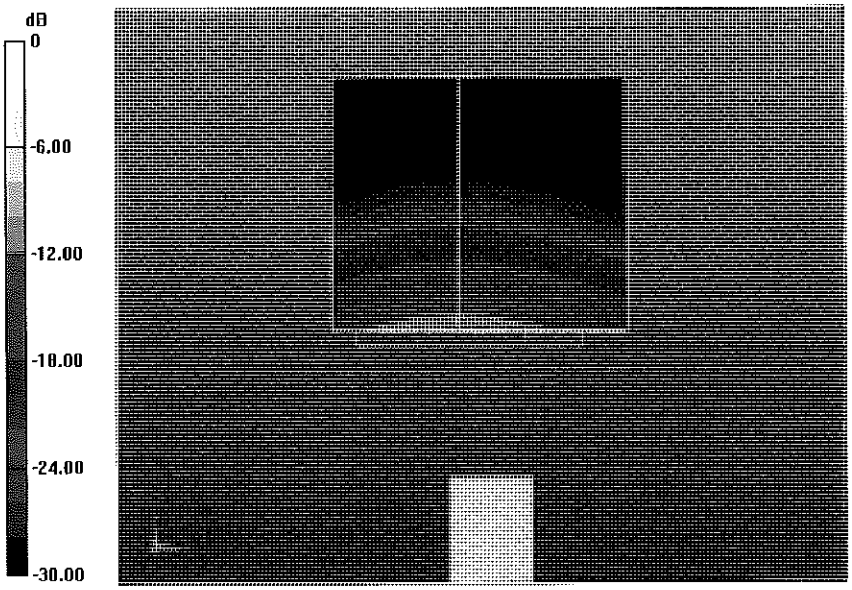
Dipole Calibration for Head Tissue/Pin=100mW, dist=10mm, f=5200 MHz/Zoom Scan, dist=1.4mm (8x8x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm
Reference Value = 63.497 V/m; Power Drift = 0.04 dB
Peak SAR (extrapolated) = 28.2 W/kg
SAR(1 g) = 7.85 W/kg; SAR(10 g) = 2.25 W/kg
Maximum value of SAR (measured) = 18.6 W/kg

Dipole Calibration for Head Tissue/Pin=100mW, dist=10mm, f=5300 MHz/Zoom Scan, dist=1.4mm (8x8x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm
Reference Value = 64.444 V/m; Power Drift = 0.07 dB
Peak SAR (extrapolated) = 31.2 W/kg
SAR(1 g) = 8.36 W/kg; SAR(10 g) = 2.4 W/kg
Maximum value of SAR (measured) = 20.1 W/kg

Dipole Calibration for Head Tissue/Pin=100mW, dist=10mm, f=5500 MHz/Zoom Scan, dist=1.4mm (8x8x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm
Reference Value = 63.807 V/m; Power Drift = 0.07 dB
Peak SAR (extrapolated) = 33.0 W/kg
SAR(1 g) = 8.5 W/kg; SAR(10 g) = 2.42 W/kg
Maximum value of SAR (measured) = 20.8 W/kg

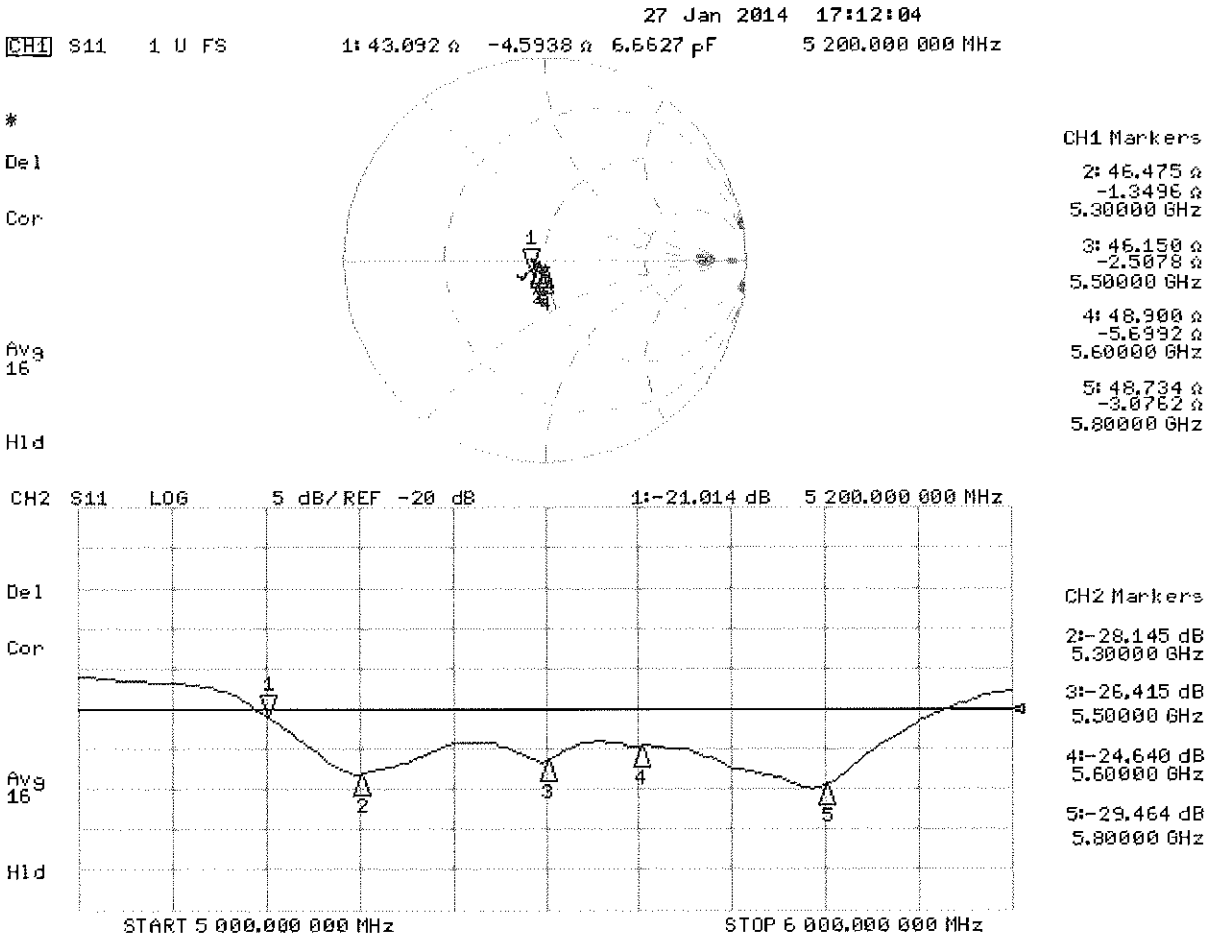
Dipole Calibration for Head Tissue/Pin=100mW, dist=10mm, f=5600 MHz/Zoom Scan, dist=1.4mm (8x8x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm
Reference Value = 63.194 V/m; Power Drift = 0.06 dB
Peak SAR (extrapolated) = 33.2 W/kg
SAR(1 g) = 8.42 W/kg; SAR(10 g) = 2.4 W/kg

Dipole Calibration for Head Tissue/Pin=100mW, dist=10mm, f=5800 MHz/Zoom Scan, dist=1.4mm (8x8x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm
Reference Value = 60.646 V/m; Power Drift = 0.08 dB
Peak SAR (extrapolated) = 32.9 W/kg
SAR(1 g) = 8 W/kg; SAR(10 g) = 2.28 W/kg
Maximum value of SAR (measured) = 19.9 W/kg



0 dB = 19.9 W/kg = 12.99 dBW/kg

Impedance Measurement Plot for Head TSL



DASY5 Validation Report for Body TSL

Date: 24.01.2014

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole 5GHz; Type: D5GHzV2; Serial: D5GHzV2 - SN: 1057

Communication System: UID 0 - CW; Frequency: 5200 MHz, Frequency: 5300 MHz, Frequency: 5500 MHz, Frequency: 5600 MHz, Frequency: 5800 MHz
Medium parameters used: f = 5200 MHz; σ = 5.44 S/m; ε_r = 47.3; ρ = 1000 kg/m^3 , Medium parameters used: f = 5300 MHz; σ = 5.57 S/m; ε_r = 47.2; ρ = 1000 kg/m^3 , Medium parameters used: f = 5500 MHz; σ = 5.84 S/m; ε_r = 46.8; ρ = 1000 kg/m^3 , Medium parameters used: f = 5600 MHz; σ = 5.98 S/m; ε_r = 46.6; ρ = 1000 kg/m^3 , Medium parameters used: f = 5800 MHz; σ = 6.23 S/m; ε_r = 46.3; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY52 Configuration:

- Probe: EX3DV4 - SN3503; ConvF(5.01, 5.01, 5.01); Calibrated: 30.12.2013, ConvF(4.76, 4.76, 4.76); Calibrated: 30.12.2013, ConvF(4.52, 4.52, 4.52); Calibrated: 30.12.2013, ConvF(4.3, 4.3, 4.3); Calibrated: 30.12.2013, ConvF(4.47, 4.47, 4.47); Calibrated: 30.12.2013;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 25.04.2013
- Phantom: Flat Phantom 5.0 (back); Type: QD000P50AA; Serial: 1002
- DASY52 52.8.7(1137); SEMCAD X 14.6.10(7164)

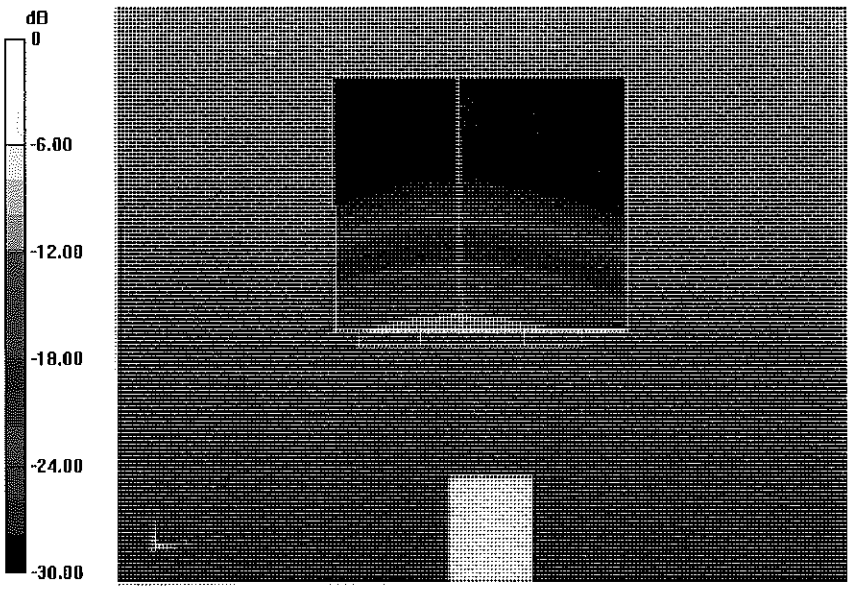
Dipole Calibration for Body Tissue/Pin=100mW, dist=10mm, f=5200 MHz/Zoom Scan, dist=1.4mm (8x8x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm
Reference Value = 58.809 V/m; Power Drift = -0.05 dB
Peak SAR (extrapolated) = 30.1 W/kg
SAR(1 g) = 7.58 W/kg; SAR(10 g) = 2.12 W/kg
Maximum value of SAR (measured) = 18.2 W/kg

Dipole Calibration for Body Tissue/Pin=100mW, dist=10mm, f=5300 MHz/Zoom Scan, dist=1.4mm (8x8x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm
Reference Value = 58.585 V/m; Power Drift = -0.00 dB
Peak SAR (extrapolated) = 32.2 W/kg
SAR(1 g) = 7.79 W/kg; SAR(10 g) = 2.17 W/kg
Maximum value of SAR (measured) = 19.1 W/kg

Dipole Calibration for Body Tissue/Pin=100mW, dist=10mm, f=5500 MHz/Zoom Scan, dist=1.4mm (8x8x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm
Reference Value = 58.364 V/m; Power Drift = -0.01 dB
Peak SAR (extrapolated) = 34.4 W/kg
SAR(1 g) = 7.96 W/kg; SAR(10 g) = 2.22 W/kg
Maximum value of SAR (measured) = 19.4 W/kg

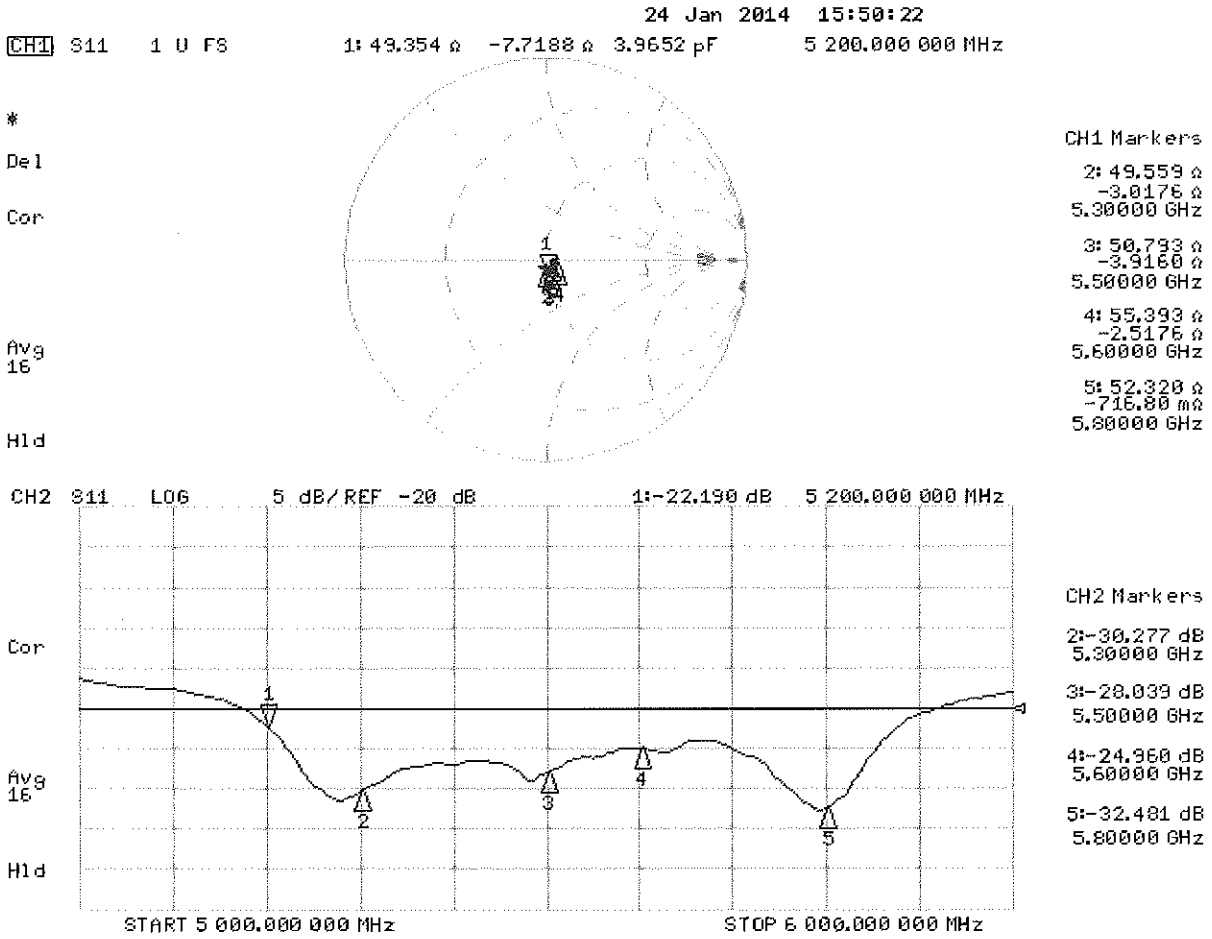
Dipole Calibration for Body Tissue/Pin=100mW, dist=10mm, f=5600 MHz/Zoom Scan, dist=1.4mm (8x8x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm
Reference Value = 57.864 V/m; Power Drift = 0.01 dB
Peak SAR (extrapolated) = 35.8 W/kg
SAR(1 g) = 8.07 W/kg; SAR(10 g) = 2.24 W/kg
Maximum value of SAR (measured) = 19.8 W/kg

Dipole Calibration for Body Tissue/Pin=100mW, dist=10mm, f=5800 MHz/Zoom Scan, dist=1.4mm (8x8x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm
Reference Value = 54.817 V/m; Power Drift = -0.01 dB
Peak SAR (extrapolated) = 35.1 W/kg
SAR(1 g) = 7.48 W/kg; SAR(10 g) = 2.06 W/kg
Maximum value of SAR (measured) = 18.8 W/kg



0 dB = 18.8 W/kg = 12.74 dBW/kg

Impedance Measurement Plot for Body TSL



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Swiss Calibration Service

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Client **PC Test** **Certificate No: ES3-3263_May14**

CALIBRATION CERTIFICATE

Object ES3DV3 - SN:3263

Calibration procedure(s) QA CAL-01.v9, QA CAL-23.v5, QA CAL-25.v6
Calibration procedure for dosimetric E-field probes

CC✓ 7/17/14

Calibration date: May 15, 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 E4419B	GB41293874	03-Apr-14 (No. 217-01911)	Apr-15
Power sensor E4412A	MY41498087	03-Apr-14 (No. 217-01911)	Apr-15
Reference 3 dB Attenuator	SN: S5054 (3c)	03-Apr-14 (No. 217-01915)	Apr-15
Reference 20 dB Attenuator	SN: S5277 (20x)	03-Apr-14 (No. 217-01919)	Apr-15
Reference 30 dB Attenuator	SN: S5129 (30b)	03-Apr-14 (No. 217-01920)	Apr-15
Reference Probe ES3DV2	SN: 3013	30-Dec-13 (No. ES3-3013_Dec13)	Dec-14
DAE4	SN: 660	13-Dec-13 (No. DAE4-660_Dec13)	Dec-14
Secondary Standards	ID	Check Date (in house)	Scheduled Check
RF generator HP 8648C	US3642U01700	4-Aug-99 (in house check Apr-13)	In house check: Apr-16
Network Analyzer HP 8753E	US37390585	18-Oct-01 (in house check Oct-13)	In house check: Oct-14

	Name	Function	Signature
Calibrated by:	Jeton Kastrati	Laboratory Technician	
Approved by:	Katja Pokovic	Technical Manager	

Issued: May 15, 2014

Calibration Laboratory of
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S Schweizerischer Kalibrierdienst
C Service suisse d'étalonnage
S Servizio svizzero di taratura
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Glossary:

TSL	tissue simulating liquid
NORMx,y,z	sensitivity in free space
ConvF	sensitivity in TSL / NORMx,y,z
DCP	diode compression point
CF	crest factor (1/duty_cycle) of the RF signal
A, B, C, D	modulation dependent linearization parameters
Polarization φ	φ rotation around probe axis
Polarization ϑ	ϑ rotation around an axis that is in the plane normal to probe axis (at measurement center), i.e., ϑ = 0 is normal to probe axis
Connector Angle	information used in DASY system to align probe sensor X to the robot coordinate system

Calibration is Performed According to the Following Standards:

a) IEEE Std 1528-2013, "IEEE Recommended Practice for Determining the Peak Spatial-Averaged Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques", June 2013
b) IEC 62209-1, "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

Methods Applied and Interpretation of Parameters:

- *NORMx,y,z:* Assessed for E-field polarization ϑ = 0 (f ≤ 900 MHz in TEM-cell; f > 1800 MHz: R22 waveguide). NORMx,y,z are only intermediate values, i.e., the uncertainties of NORMx,y,z does not affect the E^2-field uncertainty inside TSL (see below *ConvF*).
- *NORM(f)x,y,z = NORMx,y,z * frequency_response* (see Frequency Response Chart). This linearization is implemented in DASY4 software versions later than 4.2. The uncertainty of the frequency response is included in the stated uncertainty of *ConvF*.
- *DCPx,y,z:* DCP are numerical linearization parameters assessed based on the data of power sweep with CW signal (no uncertainty required). DCP does not depend on frequency nor media.
- *PAR:* PAR is the Peak to Average Ratio that is not calibrated but determined based on the signal characteristics
- *Ax,y,z; Bx,y,z; Cx,y,z; Dx,y,z; VRx,y,z: A, B, C, D* are numerical linearization parameters assessed based on the data of power sweep for specific modulation signal. The parameters do not depend on frequency nor media. *VR* is the maximum calibration range expressed in RMS voltage across the diode.
- *ConvF and Boundary Effect Parameters:* Assessed in flat phantom using E-field (or Temperature Transfer Standard for f ≤ 800 MHz) and inside waveguide using analytical field distributions based on power measurements for f > 800 MHz. The same setups are used for assessment of the parameters applied for boundary compensation (alpha, depth) of which typical uncertainty values are given. These parameters are used in DASY4 software to improve probe accuracy close to the boundary. The sensitivity in TSL corresponds to *NORMx,y,z * ConvF* whereby the uncertainty corresponds to that given for *ConvF*. A frequency dependent *ConvF* is used in DASY version 4.4 and higher which allows extending the validity from ± 50 MHz to ± 100 MHz.
- *Spherical isotropy (3D deviation from isotropy)*: in a field of low gradients realized using a flat phantom exposed by a patch antenna.
- *Sensor Offset*: The sensor offset corresponds to the offset of virtual measurement center from the probe tip (on probe axis). No tolerance required.
- *Connector Angle*: The angle is assessed using the information gained by determining the *NORMx* (no uncertainty required).

Probe ES3DV3

SN:3263

Manufactured: January 25, 2010
Calibrated: May 15, 2014

Calibrated for DASY/EASY Systems
(Note: non-compatible with DASY2 system!)

DASY/EASY - Parameters of Probe: ES3DV3 - SN:3263

Basic Calibration Parameters

	Sensor X	Sensor Y	Sensor Z	Unc (k=2)
Norm ($\mu V/(V/m)^2$)[A]	1.21	1.24	1.13	± 10.1 %
DCP (mV)[B]	103.8	102.3	104.7	

Modulation Calibration Parameters

UID	Communication System Name		A dB	B dB√μV	C	D dB	VR mV	Unc[E] (k=2)
0	CW	X	0.0	0.0	1.0	0.00	156.3	±3.5 %
		Y	0.0	0.0	1.0		203.1	
		Z	0.0	0.0	1.0		197.2	
10010-CAA	SAR Validation (Square, 100ms, 10ms)	X	2.33	59.4	10.8	10.00	46.4	±1.4 %
		Y	4.39	63.4	13.6		50.8	
		Z	1.35	55.5	7.8		39.6	
10011-CAB	UMTS-FDD (WCDMA)	X	3.49	68.2	19.1	2.91	126.7	±0.7 %
		Y	3.28	66.9	18.5		120.7	
		Z	2.74	63.1	15.1		113.5	
10012-CAA	IEEE 802.11b WiFi 2.4 GHz (DSSS, 1 Mbps)	X	3.51	72.0	20.3	1.87	127.9	±0.7 %
		Y	3.21	69.4	18.8		124.1	
		Z	1.93	60.6	12.6		113.3	
10013-CAA	IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 6 Mbps)	X	11.30	70.8	23.3	9.46	125.2	±2.5 %
		Y	12.42	72.7	24.4		129.4	
		Z	10.03	67.8	21.1		105.5	
10021-DAB	GSM-FDD (TDMA, GMSK)	X	24.45	99.1	27.6	9.39	141.4	±1.4 %
		Y	29.93	99.5	29.0		124.5	
		Z	4.53	73.0	18.1		111.6	
10023-DAB	GPRS-FDD (TDMA, GMSK, TN 0)	X	25.10	99.7	27.9	9.57	134.2	±1.9 %
		Y	24.85	96.1	28.0		120.2	
		Z	5.99	76.5	19.1		142.5	
10024-DAB	GPRS-FDD (TDMA, GMSK, TN 0-1)	X	24.34	93.0	23.0	6.56	117.1	±1.4 %
		Y	26.49	92.6	24.2		148.7	
		Z	4.00	69.6	13.8		136.6	
10027-DAB	GPRS-FDD (TDMA, GMSK, TN 0-1-2)	X	51.24	99.9	23.5	4.80	131.1	±1.9 %
		Y	56.83	99.5	24.3		101.8	
		Z	1.70	61.4	9.1		107.7	
10028-DAB	GPRS-FDD (TDMA, GMSK, TN 0-1-2-3)	X	60.12	99.6	22.2	3.55	138.7	±1.9 %
		Y	64.73	99.9	23.4		105.5	
		Z	1.13	58.4	6.0		116.0	
10032-CAA	IEEE 802.15.1 Bluetooth (GFSK, DH5)	X	77.27	99.6	19.6	1.16	149.5	±2.5 %
		Y	60.44	99.7	21.0		109.4	
		Z	0.34	55.9	2.9		131.4	
10039-CAB	CDMA2000 (1xRTT, RC1)	X	4.79	66.8	19.0	4.57	124.5	±0.9 %
		Y	4.85	66.4	18.8		125.6	
		Z	4.06	63.4	16.1		108.1	

10081-CAB	CDMA2000 (1xRTT, RC3)	X	3.93	66.1	18.5	3.97	119.8	±0.7 %
		Y	3.90	65.5	18.2		120.1	
		Z	3.29	62.4	15.3		108.5	
10098-CAB	UMTS-FDD (HSUPA, Subtest 2)	X	4.68	66.9	18.7	3.98	131.2	±0.7 %
		Y	4.64	66.6	18.6		130.5	
		Z	4.15	64.5	16.5		118.8	
10100-CAB	LTE-FDD (SC-FDMA, 100% RB, 20 MHz, QPSK)	X	6.61	68.1	20.0	5.67	137.5	±1.7 %
		Y	6.70	68.4	20.2		137.7	
		Z	5.90	65.6	17.9		124.0	
10108-CAB	LTE-FDD (SC-FDMA, 100% RB, 10 MHz, QPSK)	X	6.44	67.5	19.8	5.80	135.1	±1.7 %
		Y	6.60	68.0	20.1		135.4	
		Z	5.75	64.9	17.6		121.8	
10110-CAB	LTE-FDD (SC-FDMA, 100% RB, 5 MHz, QPSK)	X	6.14	67.1	19.7	5.75	131.6	±1.2 %
		Y	6.28	67.4	19.9		132.7	
		Z	5.62	65.5	18.2		118.4	
10114-CAA	IEEE 802.11n (HT Greenfield, 13.5 Mbps, BPSK)	X	10.18	68.8	21.2	8.10	124.3	±1.9 %
		Y	10.60	69.7	21.8		126.2	
		Z	9.38	67.0	19.8		108.4	
10117-CAA	IEEE 802.11n (HT Mixed, 13.5 Mbps, BPSK)	X	10.23	68.9	21.3	8.07	125.0	±1.9 %
		Y	10.56	69.6	21.7		127.1	
		Z	9.37	67.1	19.8		109.1	
10151-CAB	LTE-TDD (SC-FDMA, 50% RB, 20 MHz, QPSK)	X	10.23	75.7	26.0	9.28	125.0	±2.7 %
		Y	14.60	83.3	29.5		147.3	
		Z	8.05	69.7	22.3		106.3	
10154-CAB	LTE-FDD (SC-FDMA, 50% RB, 10 MHz, QPSK)	X	6.12	67.0	19.6	5.75	131.6	±1.4 %
		Y	6.28	67.4	19.9		132.4	
		Z	5.49	64.7	17.4		117.9	
10160-CAB	LTE-FDD (SC-FDMA, 50% RB, 15 MHz, QPSK)	X	6.57	67.5	19.8	5.82	136.0	±1.4 %
		Y	6.71	67.9	20.1		137.1	
		Z	5.89	65.2	17.8		122.4	
10169-CAB	LTE-FDD (SC-FDMA, 1 RB, 20 MHz, QPSK)	X	4.82	66.0	19.3	5.73	113.5	±1.4 %
		Y	5.12	66.3	19.4		116.6	
		Z	4.75	65.9	18.3		142.7	
10172-CAB	LTE-TDD (SC-FDMA, 1 RB, 20 MHz, QPSK)	X	9.53	80.6	28.6	9.21	136.5	±2.2 %
		Y	11.32	81.6	28.8		109.2	
		Z	6.84	72.0	23.8		117.3	
10175-CAB	LTE-FDD (SC-FDMA, 1 RB, 10 MHz, QPSK)	X	4.86	66.2	19.4	5.72	112.9	±1.2 %
		Y	5.10	66.2	19.4		115.9	
		Z	4.55	64.9	17.8		137.7	
10181-CAB	LTE-FDD (SC-FDMA, 1 RB, 15 MHz, QPSK)	X	4.81	66.0	19.2	5.72	111.6	±1.2 %
		Y	5.13	66.4	19.5		116.1	
		Z	4.70	65.7	18.3		137.1	
10193-CAA	IEEE 802.11n (HT Greenfield, 6.5 Mbps, BPSK)	X	9.80	68.3	21.0	8.09	117.2	±2.2 %
		Y	10.23	69.1	21.6		121.5	
		Z	9.85	68.9	20.8		148.4	

10196-CAA	IEEE 802.11n (HT Mixed, 6.5 Mbps, BPSK)	X	9.81	68.4	21.1	8.10	117.7	±2.2 %
		Y	10.23	69.2	21.6		121.7	
		Z	9.87	69.0	20.9		149.9	
10219-CAA	IEEE 802.11n (HT Mixed, 7.2 Mbps, BPSK)	X	9.71	68.3	21.0	8.03	117.8	±2.2 %
		Y	10.12	69.1	21.6		121.0	
		Z	8.90	66.6	19.6		104.1	
10222-CAA	IEEE 802.11n (HT Mixed, 15 Mbps, BPSK)	X	10.14	68.7	21.2	8.06	122.3	±1.9 %
		Y	10.52	69.5	21.7		125.4	
		Z	9.28	66.8	19.6		108.5	
10225-CAB	UMTS-FDD (HSPA+)	X	7.25	67.8	19.9	5.97	146.3	±1.7 %
		Y	7.32	67.5	19.8		149.3	
		Z	6.52	65.7	18.0		130.7	
10237-CAB	LTE-TDD (SC-FDMA, 1 RB, 10 MHz, QPSK)	X	9.55	80.7	28.7	9.21	137.2	±2.5 %
		Y	11.34	81.7	28.9		109.9	
		Z	6.98	72.5	24.0		119.5	
10252-CAB	LTE-TDD (SC-FDMA, 50% RB, 10 MHz, QPSK)	X	9.26	74.1	25.3	9.24	115.6	±3.3 %
		Y	13.72	82.5	29.3		137.9	
		Z	8.83	73.3	24.4		144.1	
10267-CAB	LTE-TDD (SC-FDMA, 100% RB, 10 MHz, QPSK)	X	10.06	75.2	25.8	9.30	122.9	±2.7 %
		Y	14.69	83.4	29.6		147.6	
		Z	8.02	69.6	22.3		103.4	
10274-CAB	UMTS-FDD (HSUPA, Subtest 5, 3GPP Rel8.10)	X	6.08	67.2	19.0	4.87	140.2	±1.2 %
		Y	6.23	67.5	19.2		143.5	
		Z	5.52	65.4	17.4		125.1	
10275-CAB	UMTS-FDD (HSUPA, Subtest 5, 3GPP Rel8.4)	X	4.44	66.7	18.7	3.96	122.1	±0.7 %
		Y	4.39	66.3	18.5		124.4	
		Z	3.83	63.7	16.0		114.0	
10291-AAB	CDMA2000, RC3, SO55, Full Rate	X	3.64	66.7	18.6	3.46	115.7	±0.7 %
		Y	3.60	66.0	18.2		118.0	
		Z	3.17	64.2	16.3		108.4	
10292-AAB	CDMA2000, RC3, SO32, Full Rate	X	3.62	67.0	18.8	3.39	116.9	±0.9 %
		Y	3.54	66.1	18.2		119.1	
		Z	3.24	64.2	15.8		145.6	
10297-AAA	LTE-FDD (SC-FDMA, 50% RB, 20 MHz, QPSK)	X	6.43	67.5	19.8	5.81	132.0	±1.4 %
		Y	6.60	68.0	20.1		134.9	
		Z	5.81	65.4	18.0		115.0	
10311-AAA	LTE-FDD (SC-FDMA, 100% RB, 15 MHz, QPSK)	X	7.04	68.1	20.2	6.06	137.5	±1.4 %
		Y	7.19	68.6	20.5		140.3	
		Z	6.26	65.7	18.2		119.6	
10315-AAA	IEEE 802.11b WiFi 2.4 GHz (DSSS, 1 Mbps, 96pc duty cycle)	X	3.05	70.0	19.4	1.71	121.7	±0.7 %
		Y	2.91	68.7	18.7		123.4	
		Z	1.83	60.2	12.3		108.4	
10316-AAA	IEEE 802.11g WiFi 2.4 GHz (ERP-OFDM, 6 Mbps, 96pc duty cycle)	X	10.05	68.7	21.4	8.36	117.3	±1.9 %
		Y	10.57	69.7	22.0		122.8	
		Z	9.11	66.5	19.7		103.1	

10403-AAB	CDMA2000 (1xEV-DO, Rev. 0)	X	4.81	68.3	18.8	3.76	125.8	±0.7 %
		Y	4.65	66.5	18.1		130.8	
		Z	3.98	64.7	16.0		114.7	
10404-AAB	CDMA2000 (1xEV-DO, Rev. A)	X	4.91	69.1	19.2	3.77	123.3	±0.7 %
		Y	4.60	66.6	18.1		128.5	
		Z	3.73	64.0	15.4		112.0	
10415-AAA	IEEE 802.11b WiFi 2.4 GHz (DSSS, 1 Mbps, 99pc duty cycle)	X	2.78	69.0	19.0	1.54	121.9	±0.7 %
		Y	2.46	66.8	17.9		122.5	
		Z	1.83	60.9	13.0		112.4	
10416-AAA	IEEE 802.11g WiFi 2.4 GHz (ERP-OFDM, 6 Mbps, 99pc duty cycle)	X	9.88	68.4	21.2	8.23	116.6	±1.7 %
		Y	10.29	69.2	21.7		121.5	
		Z	9.25	67.3	20.2		103.4	

The reported uncertainty of measurement is stated as the standard uncertainty of measurement multiplied by the coverage factor k=2, which for a normal distribution corresponds to a coverage probability of approximately 95%.

[A] The uncertainties of NormX,Y,Z do not affect the E^2-field uncertainty inside TSL (see Pages 8 and 9).
[B] Numerical linearization parameter: uncertainty not required.
[E] Uncertainty is determined using the max. deviation from linear response applying rectangular distribution and is expressed for the square of the field value.

DASY/EASY - Parameters of Probe: ES3DV3 - SN:3263

Calibration Parameter Determined in Head Tissue Simulating Media

f (MHz) [C]	Relative Permittivity [F]	Conductivity (S/m) [F]	ConvF X	ConvF Y	ConvF Z	Alpha [G]	Depth [G] (mm)	Unct. (k=2)
750	41.9	0.89	6.42	6.42	6.42	0.72	1.18	± 12.0 %
835	41.5	0.90	6.23	6.23	6.23	0.27	2.02	± 12.0 %
1750	40.1	1.37	5.41	5.41	5.41	0.74	1.23	± 12.0 %
1900	40.0	1.40	5.08	5.08	5.08	0.80	1.16	± 12.0 %
2450	39.2	1.80	4.47	4.47	4.47	0.80	1.22	± 12.0 %
2600	39.0	1.96	4.33	4.33	4.33	0.66	1.41	± 12.0 %

[C] Frequency validity of ± 100 MHz only applies for DASY v4.4 and higher (see Page 2), else it is restricted to ± 50 MHz. The uncertainty is the RSS of the ConvF uncertainty at calibration frequency and the uncertainty for the indicated frequency band.
[F] At frequencies below 3 GHz, the validity of tissue parameters (ε and σ) can be relaxed to ± 10% if liquid compensation formula is applied to measured SAR values. At frequencies above 3 GHz, the validity of tissue parameters (ε and σ) is restricted to ± 5%. The uncertainty is the RSS of the ConvF uncertainty for indicated target tissue parameters.
[G] Alpha/Depth are determined during calibration. SPEAG warrants that the remaining deviation due to the boundary effect after compensation is always less than ± 1% for frequencies below 3 GHz and below ± 2% for frequencies between 3-6 GHz at any distance larger than half the probe tip diameter from the boundary.

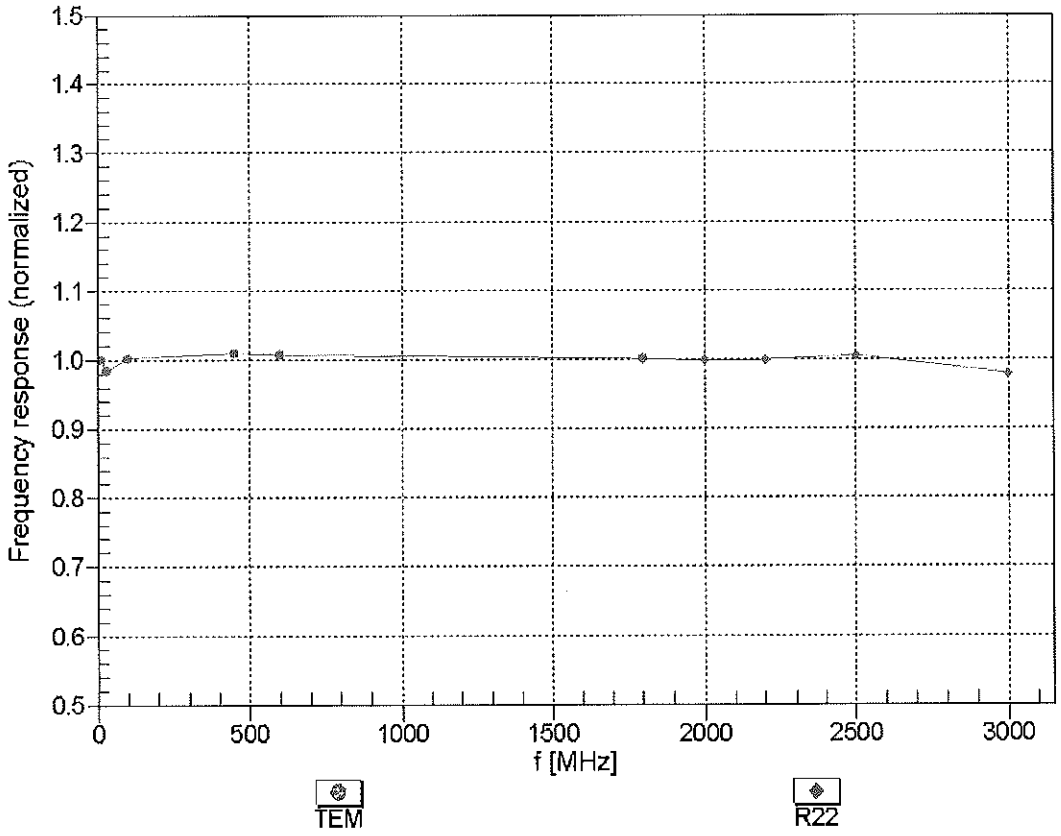
DASY/EASY - Parameters of Probe: ES3DV3 - SN:3263

Calibration Parameter Determined in Body Tissue Simulating Media

f (MHz) [C]	Relative Permittivity [F]	Conductivity (S/m) [F]	ConvF X	ConvF Y	ConvF Z	Alpha [G]	Depth [G] (mm)	Unct. (k=2)
750	55.5	0.96	6.19	6.19	6.19	0.52	1.41	± 12.0 %
835	55.2	0.97	6.16	6.16	6.16	0.68	1.28	± 12.0 %
1750	53.4	1.49	4.98	4.98	4.98	0.38	1.91	± 12.0 %
1900	53.3	1.52	4.78	4.78	4.78	0.66	1.35	± 12.0 %
2450	52.7	1.95	4.27	4.27	4.27	0.72	1.13	± 12.0 %
2600	52.5	2.16	4.11	4.11	4.11	0.74	1.07	± 12.0 %

[C] Frequency validity of ± 100 MHz only applies for DASY v4.4 and higher (see Page 2), else it is restricted to ± 50 MHz. The uncertainty is the RSS of the ConvF uncertainty at calibration frequency and the uncertainty for the indicated frequency band.
[F] At frequencies below 3 GHz, the validity of tissue parameters (ε and σ) can be relaxed to ± 10% if liquid compensation formula is applied to measured SAR values. At frequencies above 3 GHz, the validity of tissue parameters (ε and σ) is restricted to ± 5%. The uncertainty is the RSS of the ConvF uncertainty for indicated target tissue parameters.
[G] Alpha/Depth are determined during calibration. SPEAG warrants that the remaining deviation due to the boundary effect after compensation is always less than ± 1% for frequencies below 3 GHz and below ± 2% for frequencies between 3-6 GHz at any distance larger than half the probe tip diameter from the boundary.

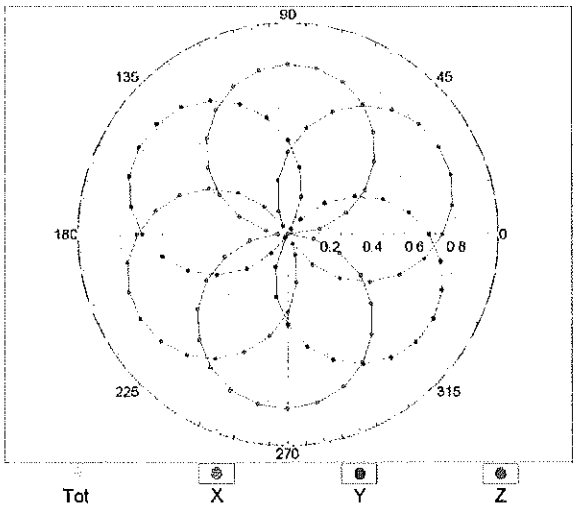
Frequency Response of E-Field
(TEM-Cell:ifi110 EXX, Waveguide: R22)



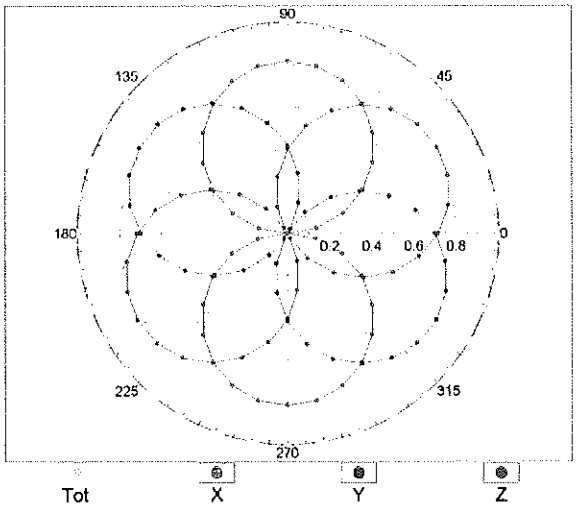
Uncertainty of Frequency Response of E-field: ± 6.3% (k=2)

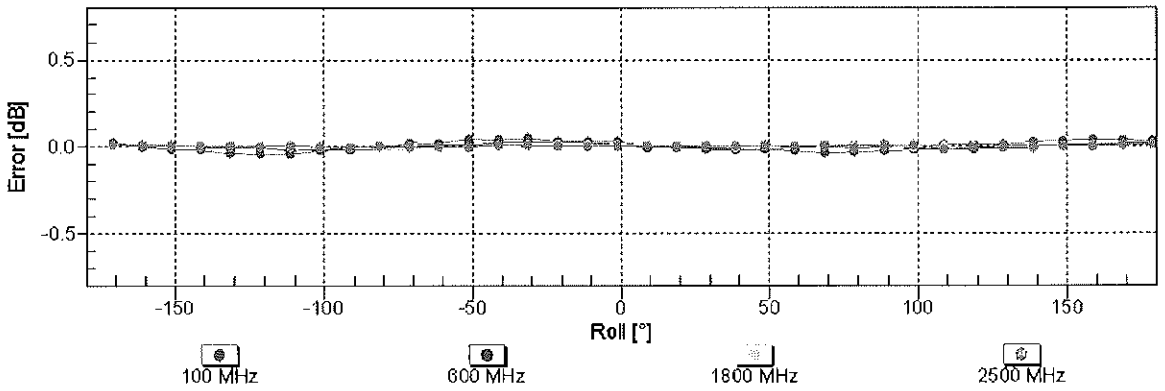
Receiving Pattern (ϕ), ϑ = 0°

f=600 MHz,TEM



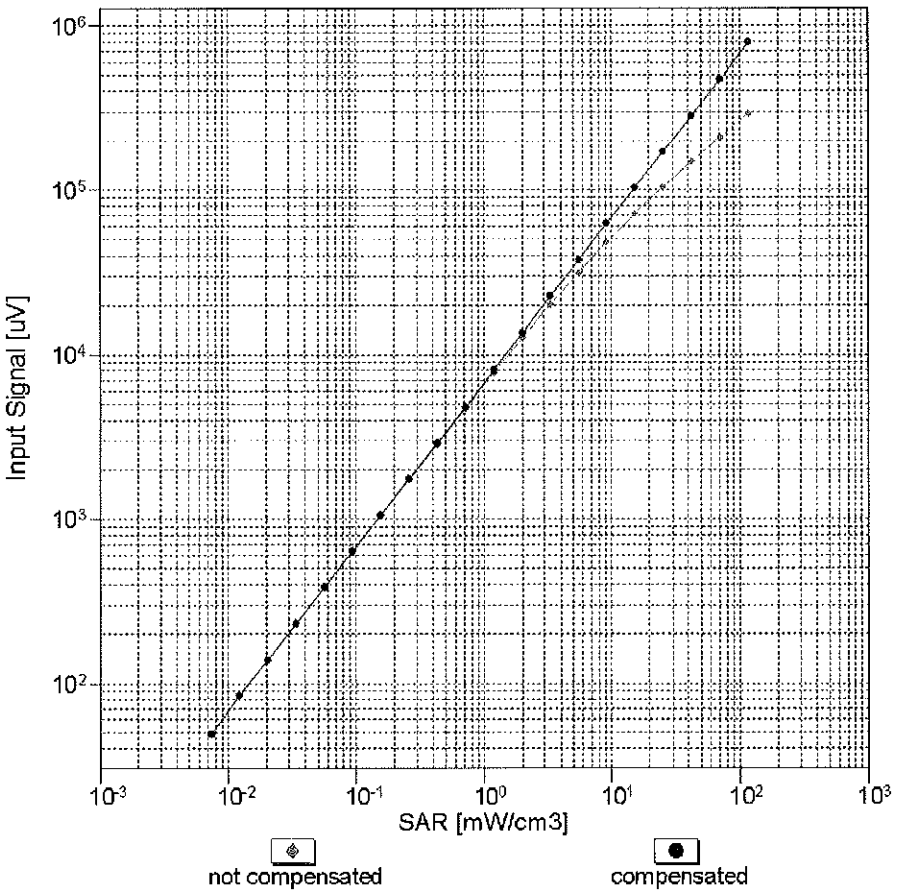
f=1800 MHz,R22

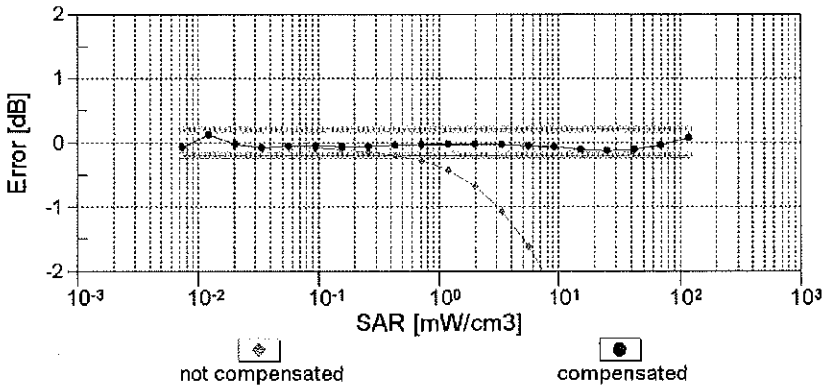




Uncertainty of Axial Isotropy Assessment: ± 0.5% (k=2)

Dynamic Range f(SAR_{head})
(TEM cell , f_{eval}= 1900 MHz)

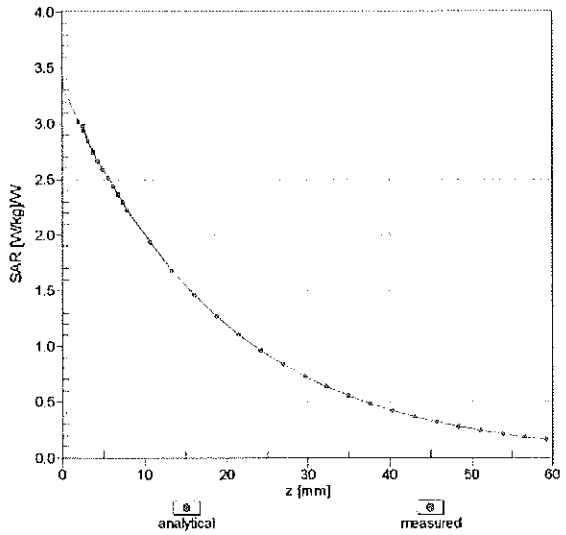




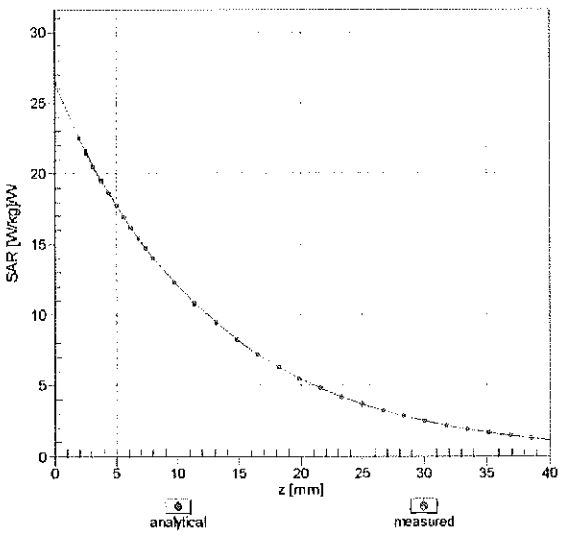
Uncertainty of Linearity Assessment: ± 0.6% (k=2)

Conversion Factor Assessment

f = 835 MHz,WGLS R9 (H_convF)

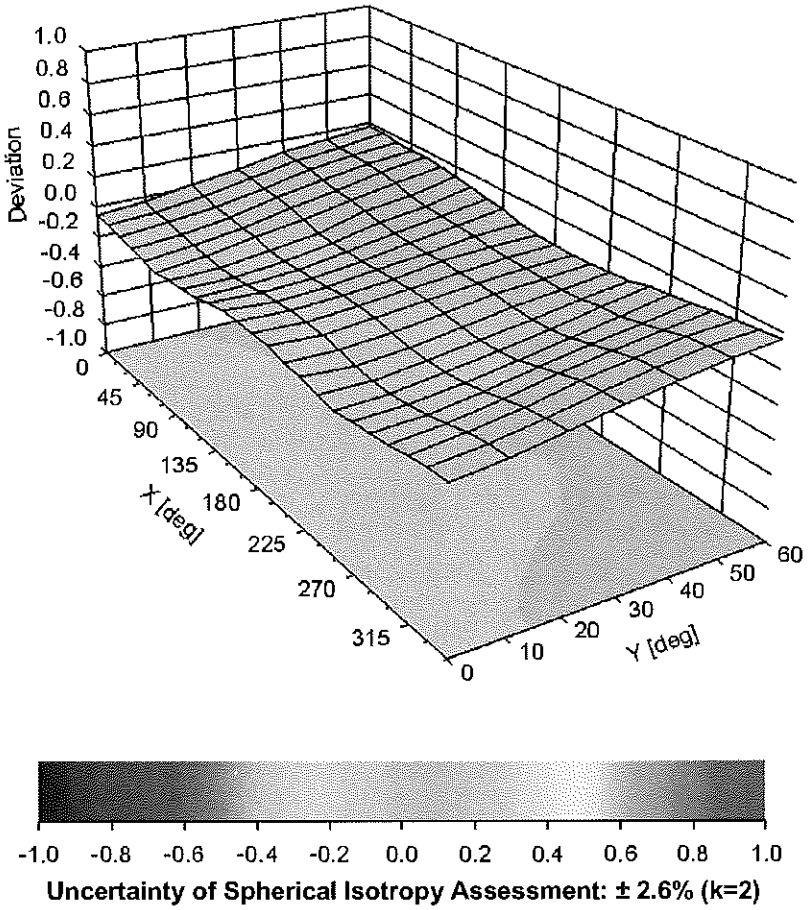


f = 1750 MHz,WGLS R22 (H_convF)



Deviation from Isotropy in Liquid

Error (ϕ, ϑ), f = 900 MHz



Uncertainty of Spherical Isotropy Assessment: ± 2.6% (k=2)

DASY/EASY - Parameters of Probe: ES3DV3 - SN:3263

Other Probe Parameters

Sensor Arrangement	Triangular
Connector Angle (°)	-111.2
Mechanical Surface Detection Mode	enabled
Optical Surface Detection Mode	disabled
Probe Overall Length	337 mm
Probe Body Diameter	10 mm
Tip Length	10 mm
Tip Diameter	4 mm
Probe Tip to Sensor X Calibration Point	2 mm
Probe Tip to Sensor Y Calibration Point	2 mm
Probe Tip to Sensor Z Calibration Point	2 mm
Recommended Measurement Distance from Surface	3 mm