SAR EVALUATION REPORT

Applicant Name:
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FCC ID: **A3LSMG930US**

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

DUT Type: Portable Handset
Application Type: Certification
FCC Rule Part(s): CFR §2.1093
Model(s): SM-G930A, SM-G930P, SM-G930T, SM-G930V, SM-G930R4

Equipment Class	Band & Mode	Tx Frequency	SAR		
			1 gm Head (W/kg)	1 gm Body-Worn (W/kg)	1 gm Hotspot (W/kg)
PCE	GSM/GPRS/EDGE 850	824.20 - 848.80 MHz	0.15	0.49	0.67
PCE	GSM/GPRS/EDGE 1900	1850.20 - 1909.80 MHz	0.11	0.41	0.68
PCE	UMTS 850	826.40 - 846.60 MHz	0.62	0.48	0.75
PCE	UMTS 1750	1712.4 - 1752.6 MHz	0.29	0.86	1.02
PCE	UMTS 1900	1852.4 - 1907.6 MHz	0.23	0.40	1.04
PCE	CDMA/EVDO BC10 (§90S)	817.90 - 823.10 MHz	0.49	0.44	0.84
PCE	CDMA/EVDO BC0 (§22H)	824.70 - 848.31 MHz	0.56	0.53	1.03
PCE	PCS CDMA/EVDO	1851.25 - 1908.75 MHz	0.23	1.07	1.00
PCE	LTE Band 12	699.7 - 715.3 MHz	0.56	0.39	0.59
PCE	LTE Band 13	779.5 - 784.5 MHz	0.56	0.49	0.69
PCE	LTE Band 26 (Cell)	814.7 - 848.3 MHz	0.56	0.52	0.79
PCE	LTE Band 5 (Cell)	824.7 - 848.3 MHz			
PCE	LTE Band 4 (AWS)	1710.7 - 1754.3 MHz	0.18	0.98	0.92
PCE	LTE Band 2 (PCS)	1850.7 - 1909.3 MHz			
PCE	LTE Band 25 (PCS)	1850.7 - 1914.3 MHz	0.21	0.87	0.96
PCE	LTE Band 30	2307.5 - 2312.5 MHz	0.16	0.42	0.58
PCE	LTE Band 41	2498.5 - 2687.5 MHz	0.27	0.30	0.83
DTS	2.4 GHz WLAN	2412 - 2462 MHz	0.85	0.11	0.20
NII	U-NII-1	5180 - 5240 MHz			
NII	U-NII-2A	5260 - 5320 MHz	0.15	0.12	
NII	U-NII-2C	5500 - 5720 MHz	0.23	0.22	
NII	U-NII-3	5745 - 5825 MHz	0.46	0.18	0.33
DSS/DTS	Bluetooth	2402 - 2480 MHz	N/A		
Simultaneous SAR per KDB 690783 D01v01r03:			1.24	1.41	1.59

Note: This revised Test Report (S/N: 0Y1512012033-R1.A3L) supersedes and replaces the previously issued test report on the same subject device for the same type of testing as indicated. Please discard or destroy the previously issued test report(s) and dispose of it accordingly.

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

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

Randy Ortanez
President

ACCREDITED
TESTING CERT#2041.01

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.

T A B L E O F C O N T E N T S

1 DEVICE UNDER TEST

1.1 Device Overview

Band & Mode	Operating Modes	Tx Frequency
GSM/GPRS/EDGE 850	Voice/Data	824.20 - 848.80 MHz
GSM/GPRS/EDGE 1900	Voice/Data	1850.20 - 1909.80 MHz
UMTS 850	Voice/Data	826.40 - 846.60 MHz
UMTS 1750	Voice/Data	1712.4 - 1752.6 MHz
UMTS 1900	Voice/Data	1852.4 - 1907.6 MHz
CDMA/EVDO BC10 (§90S)	Voice/Data	817.90 - 823.10 MHz
CDMA/EVDO BC0 (§22H)	Voice/Data	824.70 - 848.31 MHz
PCS CDMA/EVDO	Voice/Data	1851.25 - 1908.75 MHz
LTE Band 12	Voice/Data	699.7 - 715.3 MHz
LTE Band 13	Voice/Data	779.5 - 784.5 MHz
LTE Band 26 (Cell)	Voice/Data	814.7 - 848.3 MHz
LTE Band 5 (Cell)	Voice/Data	824.7 - 848.3 MHz
LTE Band 4 (AWS)	Voice/Data	1710.7 - 1754.3 MHz
LTE Band 2 (PCS)	Voice/Data	1850.7 - 1909.3 MHz
LTE Band 25 (PCS)	Voice/Data	1850.7 - 1914.3 MHz
LTE Band 30	Voice/Data	2307.5 - 2312.5 MHz
LTE Band 41	Voice/Data	2498.5 - 2687.5 MHz
2.4 GHz WLAN	Voice/Data	2412 - 2462 MHz
U-NII-1	Voice/Data	5180 - 5240 MHz
U-NII-2A	Voice/Data	5260 - 5320 MHz
U-NII-2C	Voice/Data	5500 - 5720 MHz
U-NII-3	Voice/Data	5745 - 5825 MHz
Bluetooth	Data	2402 - 2480 MHz
NFC	Data	13.56 MHz
ANT+	Data	2402 - 2480 MHz
MST	Data	1 - 8.3 kHz

1.2 Power Reduction for SAR

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

Additionally, This device utilizes independent power reduction mechanisms for SAR compliance for the licensed transmitter Antenna B and the WLAN transmitter for held-to-ear exposure conditions as outlined in Section 1.3. Per FCC Guidance, the held-to-ear exposure conditions were evaluated at reduced power according to the head SAR positions described in IEEE 1528.

The reduced powers for the power reduction mechanisms were confirmed via conducted power measurements at the RF port (See Section 9). Detailed descriptions of the mechanisms are included in the operational description.

1.3 Nominal and Maximum Output Power Specifications

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

1.3.1 Maximum PCE Power

Mode / Band		Voice (dBm)	Burst Average GMSK (dBm)				Burst Average 8-PSK (dBm)			
		1 TX Slot	*1 TX Slots*	*2 TX Slots*	*3 TX Slots*	*4 TX Slots*	*1 TX Slots*	*2 TX Slots*	*3 TX Slots*	*4 TX Slots*
GSM/GPRS/EDGE 850	Maximum	**33.5**	**33.5**	**32.0**	**30.0**	**27.5**	**27.5**	**26.0**	**23.5**	**23.0**
	Nominal	**33.0**	**33.0**	**31.5**	**29.5**	**27.0**	**27.0**	**25.5**	**23.0**	**22.5**
GSM/GPRS/EDGE 1900	Maximum	**30.5**	**30.5**	**29.5**	**27.5**	**26.0**	**26.5**	**25.5**	**23.5**	**22.0**
	Nominal	**30.0**	**30.0**	**29.0**	**27.0**	**25.5**	**26.0**	**25.0**	**23.0**	**21.5**

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

Mode / Band		Modulated Average (dBm)
CDMA/EVDO BC10 (§90S)	Maximum	**25.0**
	Nominal	**24.5**
CDMA/EVDO BC0 (§22H)	Maximum	**25.0**
	Nominal	**24.5**
PCS CDMA/EVDO	Maximum	**25.5**
	Nominal	**25.0**

Mode / Band		Modulated Average (dBm)
LTE Band 12	Maximum	**25.0**
	Nominal	**24.5**
LTE Band 13	Maximum	**25.0**
	Nominal	**24.5**
LTE Band 26 (Cell)	Maximum	**25.0**
	Nominal	**24.5**
LTE Band 5 (Cell)	Maximum	**25.0**
	Nominal	**24.5**
LTE Band 4 (AWS)	Maximum	**25.0**
	Nominal	**24.5**
LTE Band 2 (PCS)	Maximum	**25.0**
	Nominal	**24.5**
LTE Band 25 (PCS)	Maximum	**25.0**
	Nominal	**24.5**
LTE Band 30	Maximum	**22.5**
	Nominal	**22.0**
LTE Band 41	Maximum	**24.5**
	Nominal	**24.0**

1.3.2 Maximum WLAN/BT Power

Mode / Band		Modulated Average - Single Tx Chain (dBm)	
		ch. 1	ch. 2-11
IEEE 802.11b (2.4 GHz)	Maximum	20.5	
	Nominal	20.0	
IEEE 802.11g (2.4 GHz)	Maximum	18.5	
	Nominal	18.0	
IEEE 802.11n (2.4 GHz)	Maximum	16.5	18.5
	Nominal	16.0	18.0

Mode / Band		Modulated Average (dBm)
Bluetooth	Maximum	11.5
	Nominal	11.0
Bluetooth LE	Maximum	6.5
	Nominal	6.0

Mode / Band		Modulated Average - Single Tx Chain (dBm)			
		20 MHz Bandwidth		40 MHz Bandwidth	80 MHz Bandwidth
		ch. 36, 64, 100, 165	ch. 40-60, 120-161		
IEEE 802.11a (5 GHz)	Maximum	15.5	17.5		
	Nominal	15.0	17.0		
IEEE 802.11n (5 GHz)	Maximum	15.5	17.5	15.5	
	Nominal	15.0	17.0	15.0	
IEEE 802.11ac (5 GHz)	Maximum	15.5	17.5	15.5	14.5
	Nominal	15.0	17.0	15.0	14.0

Mode / Band		Modulated Average - MIMO (dBm)	
		Ch.1	Ch.2-11
IEEE 802.11g (2.4 GHz)	Maximum	21.5	
	Nominal	21.0	
IEEE 802.11n (2.4 GHz)	Maximum	19.5	21.5
	Nominal	19.0	21.0

Mode / Band		Modulated Average - MIMO (dBm)			
		20 MHz Bandwidth		40 MHz Bandwidth	80 MHz Bandwidth
		ch. 36, 64, 100, 165	ch. 40-60, 120-161		
IEEE 802.11a (5 GHz)	Maximum	18.5	20.5		
	Nominal	18.0	20.0		
IEEE 802.11n (5 GHz)	Maximum	18.5	20.5	18.5	
	Nominal	18.0	20.0	18.0	
IEEE 802.11ac (5 GHz)	Maximum	18.5	20.5	18.5	17.5
	Nominal	18.0	20.0	18.0	17.0

1.3.3 Reduced PCE Power – Ant B (Held to Ear)

Mode / Band		Modulated Average (dBm) 3GPP WCDMA	3GPP HSDPA	3GPP HSUPA	3GPP DC-HSDPA
UMTS Band 5 (850 MHz)	Maximum	21.5	21.5	21.5	21.5
	Nominal	21.0	21.0	21.0	21.0

Mode / Band		Modulated Average (dBm)
CDMA/EVDO BC10 (§90S)	Maximum	21.0
	Nominal	20.5
CDMA/EVDO BC0 (§22H)	Maximum	21.0
	Nominal	20.5

Mode / Band		Modulated Average (dBm)
LTE Band 12	Maximum	21.5
	Nominal	21.0
LTE Band 13	Maximum	21.5
	Nominal	21.0
LTE Band 26 (Cell)	Maximum	21.5
	Nominal	21.0
LTE Band 5 (Cell)	Maximum	21.5
	Nominal	21.0

1.3.4 Reduced PCE Power – Hotspot Mode Activated

Mode / Band		Burst Average GMSK (dBm)				Burst Average 8-PSK (dBm)			
		1 TX Slots	2 TX Slots	3 TX Slots	4 TX Slots	1 TX Slots	2 TX Slots	3 TX Slots	4 TX Slots
GPRS/EDGE 1900	Maximum	27.5	26.5	24.5	23.0	26.5	25.5	23.5	22.0
	Nominal	27.0	26.0	24.0	22.5	26.0	25.0	23.0	21.5

Mode / Band		Modulated Average (dBm) 3GPP WCDMA	3GPP HSDPA	3GPP HSUPA	3GPP DC-HSDPA
UMTS Band 4 (1750 MHz)	Maximum	21.5	21.5	21.5	21.5
	Nominal	21.0	21.0	21.0	21.0
UMTS Band 2 (1900 MHz)	Maximum	20.5	20.5	20.5	20.5
	Nominal	20.0	20.0	20.0	20.0

Mode / Band		Modulated Average (dBm)
PCS CDMA/EVDO	Maximum	21.5
	Nominal	21.0

Mode / Band		Modulated Average (dBm)
LTE Band 4 (AWS)	Maximum	21.0
	Nominal	20.5
LTE Band 2 (PCS)	Maximum	21.0
	Nominal	20.5
LTE Band 25 (PCS)	Maximum	21.0
	Nominal	20.5
LTE Band 30	Maximum	20.0
	Nominal	19.5
LTE Band 41	Maximum	22.5
	Nominal	22.0

1.3.5 Reduced WLAN Power – Proximity Sensor Active, Airplane Mode Off (Held to Ear)

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

Mode / Band		Modulated Average (dBm)		
		20 MHz Bandwidth	40 MHz Bandwidth	80 MHz Bandwidth
IEEE 802.11a (5 GHz)	Maximum	**10.5**		
	Nominal	**10.0**		
IEEE 802.11n (5 GHz)	Maximum	**10.5**	**9.5**	
	Nominal	**10.0**	**9.0**	
IEEE 802.11ac (5 GHz)	Maximum	**10.5**	**9.5**	**9.5**
	Nominal	**10.0**	**9.0**	**9.0**

Mode / Band		Modulated Average - MIMO (dBm)
IEEE 802.11g (2.4 GHz)	Maximum	**16.5**
	Nominal	**16.0**
IEEE 802.11n (2.4 GHz)	Maximum	**16.5**
	Nominal	**16.0**

Mode / Band		Modulated Average - MIMO (dBm)		
		20 MHz Bandwidth	40 MHz Bandwidth	80 MHz Bandwidth
IEEE 802.11a (5 GHz)	Maximum	**13.5**		
	Nominal	**13.0**		
IEEE 802.11n (5 GHz)	Maximum	**13.5**	**12.5**	
	Nominal	**13.0**	**12.0**	
IEEE 802.11ac (5 GHz)	Maximum	**13.5**	**12.5**	**12.5**
	Nominal	**13.0**	**12.0**	**12.0**

1.3.6 Reduced WLAN Power – Proximity Sensor Active, Airplane Mode On (Held to Ear)

Mode / Band		Modulated Average (dBm)	
		ch. 1	ch. 2-11
IEEE 802.11b (2.4 GHz)	Maximum	**17.5**	
	Nominal	**17.0**	
IEEE 802.11g (2.4 GHz)	Maximum	**17.5**	
	Nominal	**17.0**	
IEEE 802.11n (2.4 GHz)	Maximum	**16.5**	**17.5**
	Nominal	**16.0**	**17.0**

Mode / Band		Modulated Average (dBm)		
		20 MHz Bandwidth	40 MHz Bandwidth	80 MHz Bandwidth
IEEE 802.11a (5 GHz)	Maximum	**10.5**		
	Nominal	**10.0**		
IEEE 802.11n (5 GHz)	Maximum	**10.5**	**9.5**	
	Nominal	**10.0**	**9.0**	
IEEE 802.11ac (5 GHz)	Maximum	**10.5**	**9.5**	**9.5**
	Nominal	**10.0**	**9.0**	**9.0**

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

Mode / Band		Modulated Average - MIMO (dBm)		
		20 MHz Bandwidth	40 MHz Bandwidth	80 MHz Bandwidth
IEEE 802.11a (5 GHz)	Maximum	**13.5**		
	Nominal	**13.0**		
IEEE 802.11n (5 GHz)	Maximum	**13.5**	**12.5**	
	Nominal	**13.0**	**12.0**	
IEEE 802.11ac (5 GHz)	Maximum	**13.5**	**12.5**	**12.5**
	Nominal	**13.0**	**12.0**	**12.0**

1.4 DUT Antenna Locations

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

Table 1-1
Device Edges/Sides for SAR Testing

Mode	Back	Front	Top	Bottom	Right	Left
GPRS 850	Yes	Yes	No	Yes	Yes	Yes
GPRS 1900	Yes	Yes	No	Yes	Yes	Yes
UMTS 850 Ant A	Yes	Yes	No	Yes	Yes	Yes
UMTS 1750	Yes	Yes	No	Yes	Yes	Yes
UMTS 1900	Yes	Yes	No	Yes	Yes	Yes
EVDO BC10 (§90S) Ant A	Yes	Yes	No	Yes	Yes	Yes
EVDO BC0 (§22H) Ant A	Yes	Yes	No	Yes	Yes	Yes
PCS EVDO	Yes	Yes	No	Yes	Yes	Yes
LTE Band 12 Ant A	Yes	Yes	No	Yes	Yes	Yes
LTE Band 13 Ant A	Yes	Yes	No	Yes	Yes	Yes
LTE Band 26 (Cell) Ant A	Yes	Yes	No	Yes	Yes	Yes
LTE Band 4 (AWS)	Yes	Yes	No	Yes	Yes	Yes
LTE Band 25 (PCS)	Yes	Yes	No	Yes	Yes	Yes
LTE Band 30	Yes	Yes	No	Yes	No	Yes
LTE Band 41	Yes	Yes	No	Yes	No	Yes
UMTS 850 Ant B	Yes	Yes	Yes	No	Yes	Yes
EVDO BC10 (§90S) Ant B	Yes	Yes	Yes	No	Yes	Yes
EVDO BC0 (§22H) Ant B	Yes	Yes	Yes	No	Yes	Yes
LTE Band 12 Ant B	Yes	Yes	Yes	No	Yes	Yes
LTE Band 13 Ant B	Yes	Yes	Yes	No	Yes	Yes
LTE Band 26 (Cell) Ant B	Yes	Yes	Yes	No	Yes	Yes
2.4 GHz WLAN Ant 1	Yes	Yes	Yes	No	No	Yes
2.4 GHz WLAN Ant 2	Yes	Yes	Yes	No	No	Yes
5 GHz WLAN Ant 1	Yes	Yes	Yes	No	No	Yes
5 GHz WLAN Ant 2	Yes	Yes	Yes	No	No	Yes

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

1.5 Near Field Communications (NFC) Antenna

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

1.6 Simultaneous Transmission Capabilities

According to FCC KDB Publication 447498 D01v06, transmitters are considered to be transmitting simultaneously when there is overlapping transmission, with the exception of transmissions during network hand-offs with maximum hand-off duration less than 30 seconds. Possible transmission paths for the DUT are shown in Figure 1-1 and are color-coded to indicate communication modes which share the same path. Modes which share the same transmission path cannot transmit simultaneously with one another.

Figure 1-1
Simultaneous Transmission Paths

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

Table 1-2
Simultaneous Transmission Scenarios

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

1. Ant A and Ant B operate in a switched condition only and can not transmit simultaneously.
2. All unlicensed modes cannot transmit from the same antenna simultaneously.
3. When the user utilizes multiple services in UMTS 3G mode it uses multi-Radio Access Bearer or multi-RAB. The power control is based on a physical control channel (Dedicated Physical Control Channel [DPCCH]) and power control will be adjusted to meet the needs of both services. Therefore, the UMTS+WLAN scenario also represents the UMTS Voice/DATA + WLAN Hotspot scenario.
4. Per the manufacturer, WIFI Direct is not expected to be used in conjunction with a held-to-ear or body-worn accessory voice call. Therefore, there are no simultaneous transmission scenarios involving WIFI direct beyond that listed in the above table.
5. 5 GHz Wireless Router is only supported for the U-NII-3 by S/W, therefore U-NII-1, U-NII2A, and U-NII2C were not evaluated for wireless router conditions.
6. This device supports 2x2 MIMO Tx for WLAN 802.11 a/g/n/ac. Each WLAN antenna can transmit independently or together when operating with MIMO.
7. This device supports VOLTE.
8. This device supports VoWIFI.

1.7 Miscellaneous SAR Test Considerations

(A) WIFI/BT

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

Since U-NII-1 and U-NII-2A bands have the same maximum output power and the highest reported SAR for U-NII-2A is less than 1.2 W/kg for 1g SAR, SAR is not required for U-NII-1 band according to FCC KDB 248227 D01v02r01.

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

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

Based on the maximum conducted power of Bluetooth (rounded to the nearest mW) and the antenna to user separation distance, body-worn Bluetooth SAR was not required; [(14/15)* √2.480] = 1.5< 3.0. Per KDB Publication 447498 D01v06, the maximum power of the channel was rounded to the nearest mW before calculation.

This device supports IEEE 802.11ac with the following features:

a) Up to 80 MHz Bandwidth only
b) No aggregate channel configurations
c) 2 Tx antenna output
d) 256 QAM is supported
e) TDWR and Band gap channels are supported

(B) Licensed Transmitter(s)

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

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

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

This device supports both LTE B26 (Cell) and LTE B5 (Cell). Since the supported frequency span for LTE B5 (Cell) falls completely within the supported frequency span for LTE B26 (Cell), both LTE bands have the same target power, and both LTE bands share the same transmission path, SAR was only assessed for LTE B26 (Cell).

This device supports both LTE B25 (PCS) and LTE B2 (PCS). Since the supported frequency span for LTE B2 (PCS) falls completely within the supported frequency span for LTE B25 (PCS), both LTE bands have the same target power, and both LTE bands share the same transmission path, SAR was only assessed for LTE B25 (PCS).

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

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

1.8 Guidance Applied

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

1.9 Device Serial Numbers

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

	Head Serial Number	Body-Worn Serial Number	Hotspot Serial Number
GSM/GPRS/EDGE 850	C3D8C	C3D8C	C3D8C
GSM/GPRS/EDGE 1900	C3D11	C3D11	C3CE8
UMTS 850 Ant A	C3D8C	C3D8C	C3D8C
UMTS 850 Ant B	C3D9A	C3D8C	C3D8C
UMTS 1750	C3D97	C3D41	C3E71
UMTS 1900	C3D97	C3D41	C3E71
CDMA/EVDO BC10 (§90S) Ant A	C3D2E	C3D2E	C3D2E
CDMA/EVDO BC10 (§90S) Ant B	C3D13	C3D2E	C3D2E
CDMA/EVDO BC0 (§22H) Ant A	C3D2E	C3D2E	C3D2E
CDMA/EVDO BC0 (§22H) Ant B	C3D9A	C3D2E	C3D2E
PCS CDMA/EVDO	C3D11	C3D11	C3CE8
LTE Band 12 Ant A	C3D1C	C35C6	C35C6
LTE Band 12 Ant B	C3E25	C35C6	C35C6
LTE Band 13 Ant A	C3D1C	C35C6	C35C6
LTE Band 13 Ant B	C3E25	C35C6	C35C6
LTE Band 26 (Cell) Ant A	C3D8C	C3D8C	C3D8C
LTE Band 26 (Cell) Ant B	C3E25	C3D8C	C3D8C
LTE Band 4 (AWS)	C3D41	C3D41	C3D46
LTE Band 25 (PCS)	C3D11	C3D11	C3D46
LTE Band 30	C3E59	C3E59	C3E5B
LTE Band 41	C3E5B	C3E5B	C3D13
2.4 GHz WLAN	C3E99, C3D00	C3E99	C3E99
5 GHz WLAN	C3D00	C3D00	C3D00

2 LTE INFORMATION

LTE Information					
FCC ID	**A3LSMG930US**				
Form Factor	Portable Handset				
Frequency Range of each LTE transmission band	LTE Band 12 (699.7 - 715.3 MHz)				
	LTE Band 13 (779.5 - 784.5 MHz)				
	LTE Band 26 (Cell) (814.7 - 848.3 MHz)				
	LTE Band 5 (Cell) (824.7 - 848.3 MHz)				
	LTE Band 4 (AWS) (1710.7 - 1754.3 MHz)				
	LTE Band 2 (PCS) (1850.7 - 1909.3 MHz)				
	LTE Band 25 (PCS) (1850.7 - 1914.3 MHz)				
	LTE Band 30 (2307.5 - 2312.5 MHz)				
	LTE Band 41 (2498.5 - 2687.5 MHz)				
Channel Bandwidths	LTE Band 12: 1.4 MHz, 3 MHz, 5 MHz, 10 MHz				
	LTE Band 13: 5 MHz, 10 MHz				
	LTE Band 26 (Cell): 1.4 MHz, 3 MHz, 5 MHz, 10 MHz, 15 MHz				
	LTE Band 5 (Cell): 1.4 MHz, 3 MHz, 5 MHz, 10 MHz				
	LTE Band 4 (AWS): 1.4 MHz, 3 MHz, 5 MHz, 10 MHz, 15 MHz, 20 MHz				
	LTE Band 2 (PCS): 1.4 MHz, 3 MHz, 5 MHz, 10 MHz, 15 MHz, 20 MHz				
	LTE Band 25 (PCS): 1.4 MHz, 3 MHz, 5 MHz, 10 MHz, 15 MHz, 20 MHz				
	LTE Band 30: 5 MHz, 10 MHz				
	LTE Band 41: 5 MHz, 10 MHz, 15 MHz, 20 MHz				
Channel Numbers and Frequencies (MHz)	Low	Low-Mid	Mid	Mid-High	High
LTE Band 12: 1.4 MHz	699.7 (23017)		707.5 (23095)	715.3 (23173)	
LTE Band 12: 3 MHz	700.5 (23025)		707.5 (23095)	714.5 (23165)	
LTE Band 12: 5 MHz	701.5 (23035)		707.5 (23095)	713.5 (23155)	
LTE Band 12: 10 MHz	704 (23060)		707.5 (23095)	711 (23130)	
LTE Band 13: 5 MHz	779.5 (23205)		782 (23230)	784.5 (23255)	
LTE Band 13: 10 MHz	N/A		782 (23230)	N/A	
LTE Band 26 (Cell): 1.4 MHz	814.7 (26697)		831.5 (26865)	848.3 (27033)	
LTE Band 26 (Cell): 3 MHz	815.5 (26705)		831.5 (26865)	847.5 (27025)	
LTE Band 26 (Cell): 5 MHz	816.5 (26715)		831.5 (26865)	846.5 (27015)	
LTE Band 26 (Cell): 10 MHz	819 (26740)		831.5 (26865)	844 (26990)	
LTE Band 26 (Cell): 15 MHz	831.5 (26865)		836.5 (26915)	841.5 (26965)	
LTE Band 5 (Cell): 1.4 MHz	824.7 (20407)		836.5 (20525)	848.3 (20643)	
LTE Band 5 (Cell): 3 MHz	825.5 (20415)		836.5 (20525)	847.5 (20635)	
LTE Band 5 (Cell): 5 MHz	826.5 (20425)		836.5 (20525)	846.5 (20625)	
LTE Band 5 (Cell): 10 MHz	829 (20450)		836.5 (20525)	844 (20600)	
LTE Band 4 (AWS): 1.4 MHz	1710.7 (19957)		1732.5 (20175)	1754.3 (20393)	
LTE Band 4 (AWS): 3 MHz	1711.5 (19965)		1732.5 (20175)	1753.5 (20385)	
LTE Band 4 (AWS): 5 MHz	1712.5 (19975)		1732.5 (20175)	1752.5 (20375)	
LTE Band 4 (AWS): 10 MHz	1715 (20000)		1732.5 (20175)	1750 (20350)	
LTE Band 4 (AWS): 15 MHz	1717.5 (20025)		1732.5 (20175)	1747.5 (20325)	
LTE Band 4 (AWS): 20 MHz	1720 (20050)		1732.5 (20175)	1745 (20300)	
LTE Band 2 (PCS): 1.4 MHz	1850.7 (18607)		1880 (18900)	1909.3 (19193)	
LTE Band 2 (PCS): 3 MHz	1851.5 (18615)		1880 (18900)	1908.5 (19185)	
LTE Band 2 (PCS): 5 MHz	1852.5 (18625)		1880 (18900)	1907.5 (19175)	
LTE Band 2 (PCS): 10 MHz	1855 (18650)		1880 (18900)	1905 (19150)	
LTE Band 2 (PCS): 15 MHz	1857.5 (18675)		1880 (18900)	1902.5 (19125)	
LTE Band 2 (PCS): 20 MHz	1860 (18700)		1880 (18900)	1900 (19100)	
LTE Band 25 (PCS): 1.4 MHz	1850.7 (26047)		1882.5 (26365)	1914.3 (26683)	
LTE Band 25 (PCS): 3 MHz	1851.5 (26055)		1882.5 (26365)	1913.5 (26675)	
LTE Band 25 (PCS): 5 MHz	1852.5 (26065)		1882.5 (26365)	1912.5 (26665)	
LTE Band 25 (PCS): 10 MHz	1855 (26090)		1882.5 (26365)	1910 (26640)	
LTE Band 25 (PCS): 15 MHz	1857.5 (26115)		1882.5 (26365)	1907.5 (26615)	
LTE Band 25 (PCS): 20 MHz	1860 (26140)		1882.5 (26365)	1905 (26590)	
LTE Band 30: 5 MHz	2307.5 (27685)		2310 (27710)	2312.5 (27735)	
LTE Band 30: 10 MHz	N/A		2310 (27710)	N/A	
LTE Band 41: 5 MHz	2506 (39750)	2549.5 (40185)	2593 (40620)	2636.5 (41055)	2680 (41490)
LTE Band 41: 10 MHz	2506 (39750)	2549.5 (40185)	2593 (40620)	2636.5 (41055)	2680 (41490)
LTE Band 41: 15 MHz	2506 (39750)	2549.5 (40185)	2593 (40620)	2636.5 (41055)	2680 (41490)
LTE Band 41: 20 MHz	2506 (39750)	2549.5 (40185)	2593 (40620)	2636.5 (41055)	2680 (41490)
UE Category	6				
Modulations Supported in UL	QPSK, 16QAM				
LTE MPR Permanently implemented per 3GPP TS 36.101 section 6.2.3~6.2.5? (manufacturer attestation to be provided)	YES				
A-MPR (Additional MPR) disabled for SAR Testing?	YES				
LTE Carrier Aggregation Possible Combinations	The technical description includes all the possible carrier aggregation combinations				
LTE Release 10 Additional Information	This device does not support full CA features on 3GPP Release 10. It supports a maximum of 3 carriers in the downlink. All uplink communications are identical to the Release 8 Specifications. Uplink communications are done on the PCC. The following LTE Release 10 Features are not supported: Relay, HetNet, Enhanced MIMO, eICI, WIFI Offloading, MDH, eMBMA, Cross-Carrier Scheduling, Enhanced SC-FDMA.				

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 D01v01r04 and IEEE 1528-2013:

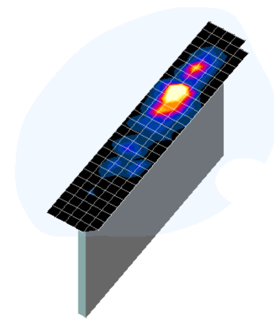

Figure 4-1
Sample SAR Area Scan

1. The SAR distribution at the exposed side of the head or body was measured at a distance no greater than 5.0 mm from the inner surface of the shell. The area covered the entire dimension of the device-head and body interface and the horizontal grid resolution was determined per FCC KDB Publication 865664 D01v01r04 (See Table 4-1) and IEEE 1528-2013.
2. The point SAR measurement was taken at the maximum SAR region determined from Step 1 to enable the monitoring of SAR fluctuations/drifts during the 1g/10g cube evaluation. SAR at this fixed point was measured and used as a reference value.
3. Based on the area scan data, the peak of the region with maximum SAR was determined by spline interpolation. Around this point, a volume was assessed according to the measurement resolution and volume size requirements of FCC KDB Publication 865664 D01v01r04 (See Table 4-1) and IEEE 1528-2013. On the basis of this data set, the spatial peak SAR value was evaluated with the following procedure (see references or the DASY manual online for more details):
    a. SAR values at the inner surface of the phantom are extrapolated from the measured values along the line away from the surface with spacing no greater than that in Table 4-1. The extrapolation was based on a least-squares algorithm. A polynomial of the fourth order was calculated through the points in the z-axis (normal to the phantom shell).
    b. After the maximum interpolated values were calculated between the points in the cube, the SAR was averaged over the spatial volume (1g or 10g) using a 3D-Spline interpolation algorithm. The 3D-spline is composed of three one-dimensional splines with the "Not a knot" condition (in x, y, and z directions). The volume was then integrated with the trapezoidal algorithm. One thousand points (10 x 10 x 10) were obtained through interpolation, in order to calculate the averaged SAR.
    c. All neighboring volumes were evaluated until no neighboring volume with a higher average value was found.
4. The SAR reference value, at the same location as step 2, was re-measured after the zoom scan was complete to calculate the SAR drift. If the drift deviated by more than 5%, the SAR test and drift measurements were repeated.

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

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

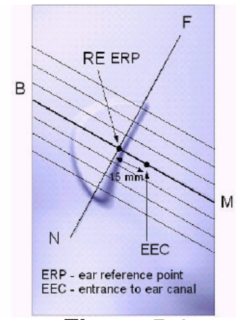

Figure 5-1
Close-Up Side view of ERP

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

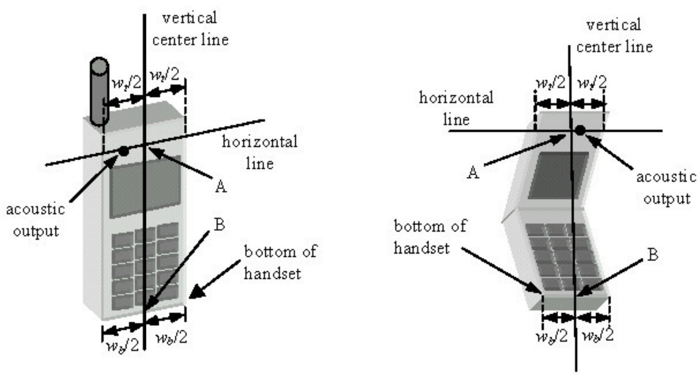

Figure 5-3
Handset Vertical Center & Horizontal Line Reference Points

6 TEST CONFIGURATION POSITIONS

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).

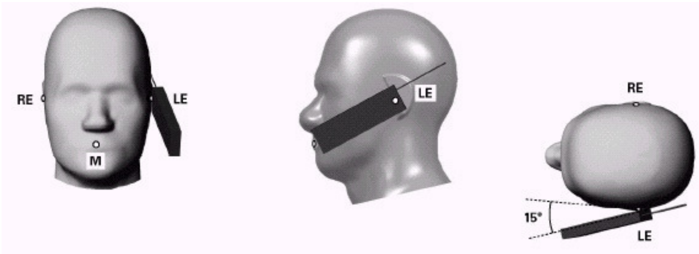

Figure 6-2 Front, Side and Top View of Ear/15º Tilt Position

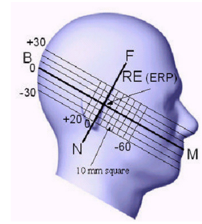

Figure 6-3
Side view w/ relevant markings

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

6.5 Body-Worn Accessory Configurations

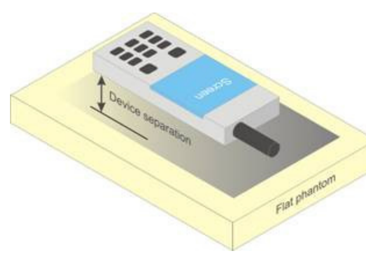

Figure 6-4
Sample Body-Worn Diagram

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 D04v01r03, Body-worn accessory exposure is typically related to voice mode operations when handsets are carried in body-worn accessories. The body-worn accessory procedures in FCC KDB Publication 447498 D01v06 should be used to test for body-worn accessory SAR compliance, without a headset connected to it. This enables the test results for such configuration to be compatible with that required for hotspot mode when the body-worn accessory test separation distance is greater than or equal to that required for hotspot mode, when applicable. When the reported SAR for a body-worn accessory, measured without a headset connected to the handset, is > 1.2 W/kg, the highest reported SAR configuration for that wireless mode and frequency band should be repeated for that body-worn accessory with a headset attached to the handset.

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 447498 D01v06 should be applied to determine SAR test requirements.

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

6.7 Wireless Router Configurations

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

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

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

8.1 Measured and Reported SAR

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

8.2 3G SAR Test Reduction Procedure

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

8.3 Procedures Used to Establish RF Signal for SAR

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

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

8.4 SAR Measurement Conditions for CDMA2000

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

8.4.1 Output Power Verification

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

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

Table 8-1
Parameters for Max. Power for RC1

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

Table 8-2
Parameters for Max. Power for RC3

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

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

8.4.2 Head SAR Measurements

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

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

8.4.3 Body-worn SAR Measurements

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

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

8.4.4 Body-worn SAR Measurements for EVDO Devices

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

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

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

8.4.5 Body SAR Measurements for EVDO Hotspot

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

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

8.4.6 CDMA2000 1x Advanced

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

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

8.5 SAR Measurement Conditions for UMTS

8.5.1 Output Power Verification

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

8.5.2 Head SAR Measurements

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

8.5.3 Body SAR Measurements

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

8.5.4 SAR Measurements with Rel 5 HSDPA

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

8.5.5 SAR Measurements with Rel 6 HSUPA

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

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

8.5.6 SAR Measurement Conditions for DC-HSDPA

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

8.6 SAR Measurement Conditions for LTE

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

8.6.1 Spectrum Plots for RB Configurations

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

8.6.2 MPR

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

8.6.3 A-MPR

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

8.6.4 Required RB Size and RB Offsets for SAR Testing

According to FCC KDB 941225 D05v02r04:

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

8.6.5 TDD

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

8.6.6 Downlink Only Carrier Aggregation

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

8.7 SAR Testing with 802.11 Transmitters

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

8.7.1 General Device Setup

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

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

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

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

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

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

8.7.4 Initial Test Position Procedure

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

8.7.5 2.4 GHz SAR Test Requirements

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

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

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

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

8.7.6 OFDM Transmission Mode and SAR Test Channel Selection

For the 2.4 GHz and 5 GHz bands, when the same maximum output power was specified for multiple OFDM transmission mode configurations in a frequency band or aggregated band, SAR is measured using the configuration with the largest channel bandwidth, lowest order modulation and lowest data rate. When the maximum output power of a channel is the same for equivalent OFDM configurations; for example, 802.11a, 802.11n and 802.11ac or 802.11g and 802.11n with the same channel bandwidth, modulation and data rate etc., the lower order 802.11 mode i.e., 802.11a, then 802.11n and 802.11ac or 802.11g then 802.11n, is used for SAR measurement. When the maximum output power are the same for multiple test channels, either according to the default or additional power measurement requirements, SAR is measured using the channel closest to the middle of the frequency band or aggregated band. When there are multiple channels with the same maximum output power, SAR is measured using the higher number channel.

8.7.7 Initial Test Configuration Procedure

For OFDM, in both 2.4 and 5 GHz bands, an initial test configuration is determined for each frequency band and aggregated band, according to the transmission mode with the highest maximum output power specified for SAR measurements. When the same maximum output power is specified for multiple OFDM transmission mode configurations in a frequency band or aggregated band, SAR is measured using the configuration(s) with the largest channel bandwidth, lowest order modulation, lowest data rate and lowest order IEEE 802.11 mode. The channel of the transmission mode with the highest average RF output conducted power will be the initial test configuration.

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

8.7.8 Subsequent Test Configuration Procedures

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

8.7.9 MIMO SAR considerations

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

9 RF CONDUCTED POWERS

9.1 CDMA Conducted Powers

Table 9-1
Maximum Conducted Powers

Band	Channel	Rule Part	Frequency	SO55 [dBm]	SO55 [dBm]	SO75 [dBm]	TDSO SO32 [dBm]	TDSO SO32 [dBm]	1x EvDO Rev. 0 [dBm]	1x EvDO Rev. A [dBm]
	F-RC		MHz	RC1	RC3	RC11	FCH+SCH	FCH	(RTAP)	(RETAP)
Cellular	564	90S	820.1	23.97	23.87	24.25	23.92	24.14	24.03	23.85
Cellular	1013	22H	824.7	24.30	24.26	24.38	24.26	24.30	24.37	24.11
	384	22H	836.52	24.10	24.06	24.16	24.13	24.21	24.28	24.00
	777	22H	848.31	24.20	24.20	24.20	24.28	24.29	24.23	24.04
PCS	25	24E	1851.25	24.77	24.71	24.68	24.71	24.71	23.70	23.75
	600	24E	1880	24.54	24.50	24.34	24.49	24.48	23.50	23.50
	1175	24E	1908.75	24.61	24.57	24.53	24.65	24.66	23.57	23.63

Table 9-2
Reduced Conducted Powers – Ant B (Held to Ear)

Band	Channel	Rule Part	Frequency	SO55 [dBm]	SO55 [dBm]	SO75 [dBm]	TDSO SO32 [dBm]	TDSO SO32 [dBm]	1x EvDO Rev. 0 [dBm]	1x EvDO Rev. A [dBm]
	F-RC		MHz	RC1	RC3	RC11	FCH+SCH	FCH	(RTAP)	(RETAP)
Cellular	564	90S	820.1	20.54	20.58	20.23	20.65	20.66	20.50	20.74
Cellular	1013	22H	824.7	20.99	21.00	20.95	20.93	20.94	21.00	20.98
	384	22H	836.52	20.32	20.32	20.50	20.56	20.45	20.30	20.51
	777	22H	848.31	20.46	20.40	20.32	20.40	20.34	20.45	20.37

Table 9-3
Reduced Conducted Powers – Hotspot Mode Active

				Data			
Band	**Channel**	**Rule Part**	**Frequency**	**TDSO SO32 [dBm]**	**TDSO SO32 [dBm]**	**1x EvDO Rev. 0 [dBm]**	**1x EvDO Rev. A [dBm]**
	F-RC		MHz	FCH+SCH	FCH	(RTAP)	(RETAP)
PCS	25	24E	1851.25	21.13	21.11	21.25	21.17
	600	24E	1880	21.00	21.01	21.05	20.96
	1175	24E	1908.75	21.14	21.15	21.27	21.18

Note: RC1 is only applicable for IS-95 compatibility. For FCC Rule Part 90S, Per FCC KDB Publication 447498 D01v06 4.1.g), only one channel is required since the device operates within the transmission range of 817.90 – 823.10 MHz.

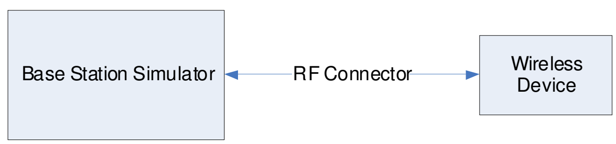

Figure 9-1
Power Measurement Setup

9.2 GSM Conducted Powers

Table 9-4
Maximum Conducted Powers

		Maximum Burst-Averaged Output Power								
		Voice	GPRS/EDGE Data (GMSK)				EDGE Data (8-PSK)			
Band	Channel	GSM [dBm] CS (1 Slot)	GPRS [dBm] 1 Tx Slot	GPRS [dBm] 2 Tx Slot	GPRS [dBm] 3 Tx Slot	GPRS [dBm] 4 Tx Slot	EDGE [dBm] 1 Tx Slot	EDGE [dBm] 2 Tx Slot	EDGE [dBm] 3 Tx Slot	EDGE [dBm] 4 Tx Slot
GSM 850	128	32.04	32.05	31.14	**28.52**	26.67	25.75	24.08	22.20	21.70
	190	32.09	32.07	30.81	**28.22**	26.72	25.68	24.00	22.16	21.30
	251	32.16	32.16	30.94	**28.41**	26.67	25.80	24.00	22.16	21.42
GSM 1900	512	29.17	29.47	28.76	26.58	25.24	25.48	24.44	22.61	21.29
	661	29.26	29.42	28.43	26.41	25.01	25.34	24.22	22.32	21.01
	810	29.02	29.31	28.61	26.42	25.08	25.35	24.29	22.39	21.13

		Calculated Maximum Frame-Averaged Output Power								
		Voice	GPRS/EDGE Data (GMSK)				EDGE Data (8-PSK)			
Band	Channel	GSM [dBm] CS (1 Slot)	GPRS [dBm] 1 Tx Slot	GPRS [dBm] 2 Tx Slot	GPRS [dBm] 3 Tx Slot	GPRS [dBm] 4 Tx Slot	EDGE [dBm] 1 Tx Slot	EDGE [dBm] 2 Tx Slot	EDGE [dBm] 3 Tx Slot	EDGE [dBm] 4 Tx Slot
GSM 850	128	23.01	23.02	25.12	**24.26**	23.66	16.72	18.06	17.94	18.69
	190	23.06	23.04	24.79	**23.96**	23.71	16.65	17.98	17.90	18.29
	251	23.13	23.13	24.92	**24.15**	23.66	16.77	17.98	17.90	18.41
GSM 1900	512	20.14	20.44	22.74	22.32	22.23	16.45	18.42	18.35	18.28
	661	20.23	20.39	22.41	22.15	22.00	16.31	18.20	18.06	18.00
	810	19.99	20.28	22.59	22.16	22.07	16.32	18.27	18.13	18.12
GSM 850	Frame Avg.Targets:	23.97	23.97	25.48	**25.24**	23.99	17.97	19.48	18.74	19.49
GSM 1900		20.97	20.97	22.98	22.74	22.49	16.97	18.98	18.74	18.49

Table 9-5
Reduced Conducted Powers – Hotspot Mode Active

		Maximum Burst-Averaged Output Power							
		GPRS/EDGE Data (GMSK)				*EDGE Data (8-PSK)*			
Band	Channel	GPRS [dBm] 1 Tx Slot	GPRS [dBm] 2 Tx Slot	GPRS [dBm] 3 Tx Slot	GPRS [dBm] 4 Tx Slot	EDGE [dBm] 1 Tx Slot	EDGE [dBm] 2 Tx Slot	EDGE [dBm] 3 Tx Slot	EDGE [dBm] 4 Tx Slot
GSM 1900	512	26.17	25.27	**23.23**	21.95	24.58	23.64	21.93	20.74
	661	26.33	25.30	**23.16**	21.90	24.54	23.78	22.06	20.84
	810	26.91	25.63	**23.80**	22.50	24.90	24.31	22.50	21.27

		Calculated Maximum Frame-Averaged Output Power							
		GPRS/EDGE Data (GMSK)				*EDGE Data (8-PSK)*			
Band	Channel	GPRS [dBm] 1 Tx Slot	GPRS [dBm] 2 Tx Slot	GPRS [dBm] 3 Tx Slot	GPRS [dBm] 4 Tx Slot	EDGE [dBm] 1 Tx Slot	EDGE [dBm] 2 Tx Slot	EDGE [dBm] 3 Tx Slot	EDGE [dBm] 4 Tx Slot
GSM 1900	512	17.14	19.25	**18.97**	18.94	15.55	17.62	17.67	17.73
	661	17.30	19.28	**18.90**	18.89	15.51	17.76	17.80	17.83
	810	17.88	19.61	**19.54**	19.49	15.87	18.29	18.24	18.26
GSM 1900	Frame Avg.Target	17.97	19.98	**19.74**	19.49	16.97	18.98	18.74	18.49

Note:

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

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

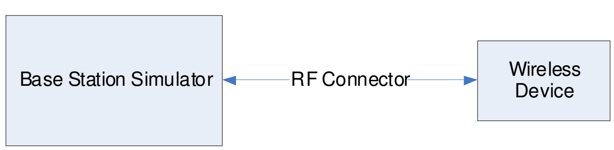

Figure 9-2
Power Measurement Setup

9.3 UMTS Conducted Powers

Table 9-6
Maximum Conducted Powers

3GPP Release Version	Mode	3GPP 34.121 Subtest	Cellular Band [dBm]			AWS Band [dBm]			PCS Band [dBm]			3GPP MPR [dB]
			4132	4183	4233	1312	1412	1513	9262	9400	9538	
99	WCDMA	12.2 kbps RMC	24.98	25.00	24.82	24.07	23.82	23.78	24.01	23.88	24.06	-
99		12.2 kbps AMR	24.82	24.99	24.62	24.00	23.77	23.80	23.99	23.75	23.67	-
6	HSDPA	Subtest 1	24.45	24.47	24.28	23.34	23.36	23.65	23.43	23.26	22.92	0
6		Subtest 2	24.33	24.42	24.22	23.31	23.34	23.56	23.40	23.22	22.93	0
6		Subtest 3	23.97	23.95	23.68	22.91	22.86	23.15	22.98	22.83	22.41	0.5
6		Subtest 4	23.99	23.89	23.65	22.92	22.88	23.17	22.96	22.82	22.45	0.5
6	HSUPA	Subtest 1	24.48	24.39	24.16	23.65	23.52	23.66	23.47	23.27	22.91	0
6		Subtest 2	22.41	22.40	22.32	21.68	21.59	21.67	21.55	21.31	20.96	2
6		Subtest 3	22.41	23.49	23.24	22.64	22.53	21.66	22.55	22.24	21.95	1
6		Subtest 4	22.49	22.47	22.29	21.69	21.60	21.70	21.58	21.28	20.96	2
6		Subtest 5	24.42	24.48	24.23	23.65	23.59	23.33	23.55	23.44	22.94	0
8	DC-HSDPA	Subtest 1	24.42	24.44	24.13	23.39	23.13	23.09	23.00	22.51	22.57	0
8		Subtest 2	24.45	24.42	24.21	23.31	23.18	23.19	22.92	22.48	22.60	0
8		Subtest 3	23.91	23.95	23.99	22.98	22.67	22.66	22.52	21.94	22.01	0.5
8		Subtest 4	23.94	23.99	23.96	22.88	22.73	22.68	22.49	22.09	21.98	0.5

Table 9-7
Reduced Conducted Powers – Ant B (Held to Ear)

3GPP Release Version	Mode	3GPP 34.121 Subtest	Cellular Band [dBm]			3GPP MPR [dB]
			4132	4183	4233	
99	WCDMA	12.2 kbps RMC	21.48	21.45	21.43	-
99		12.2 kbps AMR	21.44	21.30	21.49	-
6	HSDPA	Subtest 1	20.74	20.56	20.68	0
6		Subtest 2	20.80	20.60	20.69	0
6		Subtest 3	20.74	20.63	20.71	0.5
6		Subtest 4	20.68	20.71	20.63	0.5
6	HSUPA	Subtest 1	21.18	21.34	21.06	0
6		Subtest 2	19.50	19.43	19.46	2
6		Subtest 3	20.43	20.21	20.32	1
6		Subtest 4	19.50	19.48	19.42	2
6		Subtest 5	21.17	20.97	21.14	0
8	DC-HSDPA	Subtest 1	21.21	20.95	20.99	0
8		Subtest 2	21.15	20.90	20.93	0
8		Subtest 3	20.73	20.51	20.52	0.5
8		Subtest 4	20.67	20.43	20.47	0.5

Table 9-8
Reduced Conducted Powers –Hotspot Mode Active

3GPP Release Version	Mode	3GPP 34.121 Subtest	AWS Band [dBm]			PCS Band [dBm]			3GPP MPR [dB]
			1312	1412	1513	9262	9400	9538	
99	WCDMA	12.2 kbps RMC	20.74	21.06	21.20	20.37	20.50	20.21	-
99		12.2 kbps AMR	20.65	20.96	21.06	20.48	20.50	20.15	-
6	HSDPA	Subtest 1	20.23	20.34	20.40	20.36	20.37	19.95	0
6		Subtest 2	20.27	20.26	20.43	20.38	20.39	19.88	0
6		Subtest 3	19.77	19.85	19.95	19.92	19.83	19.45	0.5
6		Subtest 4	19.80	19.84	19.93	19.96	19.95	19.43	0.5
6	HSUPA	Subtest 1	20.45	20.41	20.51	20.46	20.39	19.87	0
6		Subtest 2	18.77	18.25	18.21	18.48	18.41	17.97	2
6		Subtest 3	19.45	19.53	19.24	19.44	19.43	18.95	1
6		Subtest 4	18.36	18.35	18.17	18.50	18.49	17.98	2
6		Subtest 5	20.63	20.37	19.71	20.33	20.29	19.84	0
8	DC-HSDPA	Subtest 1	20.23	20.28	20.40	19.63	19.53	19.08	0
8		Subtest 2	20.24	20.27	20.41	19.67	19.54	19.09	0
8		Subtest 3	19.79	19.81	19.92	19.13	19.05	18.60	0.5
8		Subtest 4	19.76	19.80	19.95	19.17	19.03	18.65	0.5

DC-HSDPA considerations

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

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

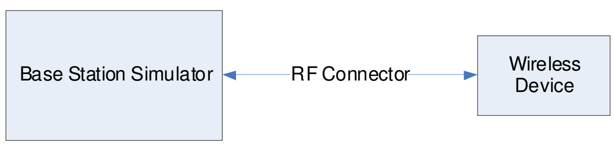

Figure 9-3
Power Measurement Setup

9.4 LTE Conducted Powers

9.4.1 LTE Band 12

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

LTE Band 12 10 MHz Bandwidth					
Modulation	RB Size	RB Offset	Mid Channel 23095 (707.5 MHz) Conducted Power [dBm]	MPR Allowed per 3GPP [dB]	MPR [dB]
QPSK	1	0	**24.86**	0	0
	1	25	24.52		0
	1	49	24.35		0
	25	0	23.60	0-1	1
	25	12	**23.66**		1
	25	25	23.56		1
	50	0	23.54		1
16QAM	1	0	23.89	0-1	1
	1	25	23.72		1
	1	49	23.66		1
	25	0	22.56	0-2	2
	25	12	22.60		2
	25	25	22.49		2
	50	0	22.49		2

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

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

LTE Band 12 5 MHz Bandwidth							
Modulation	RB Size	RB Offset	Low Channel 23035 (701.5 MHz) Conducted Power [dBm]	Mid Channel 23095 (707.5 MHz) Conducted Power [dBm]	High Channel 23155 (713.5 MHz) Conducted Power [dBm]	MPR Allowed per 3GPP [dB]	MPR [dB]
QPSK	1	0	24.62	24.71	24.67	0	0
	1	12	24.75	24.72	24.77		0
	1	24	24.84	24.85	24.58		0
	12	0	23.63	23.55	23.46	0-1	1
	12	6	23.68	23.59	23.47		1
	12	13	23.57	23.51	23.36		1
	25	0	23.64	23.58	23.39		1
16QAM	1	0	23.63	23.95	24.00	0-1	1
	1	12	23.35	23.87	23.95		1
	1	24	23.88	23.99	23.97		1
	12	0	22.46	22.55	22.46	0-2	2
	12	6	22.50	22.68	22.45		2
	12	13	22.56	22.49	22.47		2
	25	0	22.64	22.57	22.42		2

Table 9-11
LTE Band 12 Conducted Powers - 3 MHz Bandwidth

LTE Band 12 3 MHz Bandwidth							
Modulation	RB Size	RB Offset	Low Channel	Mid Channel	High Channel	MPR Allowed per 3GPP [dB]	MPR [dB]
			23025 (700.5 MHz)	23095 (707.5 MHz)	23165 (714.5 MHz)		
			Conducted Power [dBm]				
QPSK	1	0	24.24	24.18	24.09	0	0
	1	7	24.45	24.32	24.11		0
	1	14	24.35	24.16	23.96		0
	8	0	23.38	23.01	23.08	0-1	1
	8	4	23.38	23.11	23.06		1
	8	7	23.32	23.08	23.04		1
	15	0	23.34	23.11	23.09		1
16QAM	1	0	23.23	23.36	23.14	0-1	1
	1	7	23.25	23.57	22.93		1
	1	14	23.22	23.26	22.74		1
	8	0	22.42	21.80	22.12	0-2	2
	8	4	22.45	21.94	22.08		2
	8	7	22.38	21.88	22.06		2
	15	0	22.42	22.16	22.16		2

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

LTE Band 12 1.4 MHz Bandwidth							
Modulation	RB Size	RB Offset	Low Channel	Mid Channel	High Channel	MPR Allowed per 3GPP [dB]	MPR [dB]
			23017 (699.7 MHz)	23095 (707.5 MHz)	23173 (715.3 MHz)		
			Conducted Power [dBm]				
QPSK	1	0	24.23	24.81	24.44	0	0
	1	2	24.30	24.32	24.01		0
	1	5	24.29	24.82	24.34		0
	3	0	24.27	24.13	24.16		0
	3	2	24.34	24.26	24.07		0
	3	3	24.40	24.75	24.33		0
	6	0	23.29	23.23	22.90	0-1	1
16QAM	1	0	23.17	23.41	23.22	0-1	1
	1	2	23.14	23.03	23.02		1
	1	5	23.27	23.29	23.31		1
	3	0	23.53	23.14	23.64		1
	3	2	23.45	23.31	23.20		1
	3	3	23.58	23.73	23.45		1
	6	0	22.47	22.38	21.92	0-2	2

Table 9-13
Reduced LTE Band 12 Conducted Powers - 10 MHz Bandwidth – Ant B (Held to Ear)

LTE Band 12 10 MHz Bandwidth					
Modulation	RB Size	RB Offset	Mid Channel 23095 (707.5 MHz) Conducted Power [dBm]	MPR Allowed per 3GPP [dB]	MPR [dB]
QPSK	1	0	20.59	0	0
	1	25	20.61		0
	1	49	**20.82**		0
	25	0	20.70	0-1	0
	25	12	**20.78**		0
	25	25	20.74		0
	50	0	20.59		0
16QAM	1	0	20.76	0-1	0
	1	25	20.83		0
	1	49	20.86		0
	25	0	20.72	0-2	0
	25	12	20.81		0
	25	25	20.76		0
	50	0	20.62		0

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

Table 9-14
Reduced LTE Band 12 Conducted Powers - 5 MHz Bandwidth – Ant B (Held to Ear)

LTE Band 12 5 MHz Bandwidth							
Modulation	RB Size	RB Offset	Low Channel 23035 (701.5 MHz) Conducted Power [dBm]	Mid Channel 23095 (707.5 MHz) Conducted Power [dBm]	High Channel 23155 (713.5 MHz) Conducted Power [dBm]	MPR Allowed per 3GPP [dB]	MPR [dB]
QPSK	1	0	20.69	20.80	20.84	0	0
	1	12	20.56	20.78	20.74		0
	1	24	20.88	20.91	20.85		0
	12	0	20.54	20.52	20.62	0-1	0
	12	6	20.47	20.60	20.69		0
	12	13	20.52	20.61	20.70		0
	25	0	20.45	20.56	20.63		0
16QAM	1	0	20.97	21.06	21.23	0-1	0
	1	12	20.95	21.01	20.89		0
	1	24	21.01	21.18	21.25		0
	12	0	20.55	20.57	20.63	0-2	0
	12	6	20.53	20.65	20.74		0
	12	13	20.55	20.64	20.73		0
	25	0	20.45	20.57	20.65		0

Table 9-15
Reduced LTE Band 12 Conducted Powers - 3 MHz Bandwidth – Ant B (Held to Ear)

LTE Band 12 3 MHz Bandwidth							
Modulation	RB Size	RB Offset	Low Channel	Mid Channel	High Channel	MPR Allowed per 3GPP [dB]	MPR [dB]
			23025 (700.5 MHz)	23095 (707.5 MHz)	23165 (714.5 MHz)		
			Conducted Power [dBm]				
QPSK	1	0	20.47	20.55	20.67	0	0
	1	7	20.50	21.00	20.94		0
	1	14	20.50	20.69	20.93		0
	8	0	20.42	20.44	20.61	0-1	0
	8	4	20.44	20.54	20.68		0
	8	7	20.47	20.45	20.63		0
	15	0	20.41	20.51	20.69		0
16QAM	1	0	20.71	21.03	20.93	0-1	0
	1	7	20.74	21.30	21.05		0
	1	14	20.68	21.06	20.83		0
	8	0	20.47	20.48	20.67	0-2	0
	8	4	20.50	20.64	20.75		0
	8	7	20.52	20.48	20.73		0
	15	0	20.36	20.49	20.66		0

Table 9-16
Reduced LTE Band 12 Conducted Powers -1.4 MHz Bandwidth – Ant B (Held to Ear)

LTE Band 12 1.4 MHz Bandwidth							
Modulation	RB Size	RB Offset	Low Channel	Mid Channel	High Channel	MPR Allowed per 3GPP [dB]	MPR [dB]
			23017 (699.7 MHz)	23095 (707.5 MHz)	23173 (715.3 MHz)		
			Conducted Power [dBm]				
QPSK	1	0	20.51	20.49	20.75	0	0
	1	2	20.80	20.83	21.13		0
	1	5	20.52	20.51	20.83		0
	3	0	20.52	20.55	20.75		0
	3	2	20.49	20.72	20.75		0
	3	3	20.48	20.51	20.70		0
	6	0	20.48	20.56	20.80	0-1	0
16QAM	1	0	20.72	20.77	20.86	0-1	0
	1	2	21.27	21.29	21.31		0
	1	5	20.75	20.78	20.96		0
	3	0	20.70	20.72	20.94		0
	3	2	20.75	20.79	20.95		0
	3	3	20.64	20.74	20.93		0
	6	0	20.57	20.66	20.85	0-2	0

9.4.2 LTE Band 13

Table 9-17
LTE Band 13 Conducted Powers - 10 MHz Bandwidth

LTE Band 13 10 MHzBandwidth					
Modulation	RB Size	RB Offset	Mid Channel 23230 (782.0 MHz) Conducted Power [dBm]	MPR Allowed per 3GPP [dB]	MPR [dB]
QPSK	1	0	24.00	0	0
	1	25	24.06		0
	1	49	**24.07**		0
	25	0	23.12	0-1	1
	25	12	23.10		1
	25	25	**23.20**		1
	50	0	23.19		1
16QAM	1	0	23.09	0-1	1
	1	25	23.23		1
	1	49	23.25		1
	25	0	22.12	0-2	2
	25	12	22.03		2
	25	25	22.15		2
	50	0	22.09		2

Table 9-18
LTE Band 13 Conducted Powers - 5 MHz Bandwidth

LTE Band 13 5 MHzBandwidth					
Modulation	RB Size	RB Offset	Mid Channel 23230 (782.0 MHz) Conducted Power [dBm]	MPR Allowed per 3GPP [dB]	MPR [dB]
QPSK	1	0	24.04	0	0
	1	12	23.72		0
	1	24	24.06		0
	12	0	22.86	0-1	1
	12	6	22.78		1
	12	13	22.79		1
	25	0	22.81		1
16QAM	1	0	23.30	0-1	1
	1	12	22.82		1
	1	24	23.12		1
	12	0	21.93	0-2	2
	12	6	21.81		2
	12	13	21.82		2
	25	0	21.77		2

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

Table 9-19
Reduced LTE Band 13 Conducted Powers - 10 MHz Bandwidth – Ant B (Held to Ear)

LTE Band 13 10 MHzBandwidth					
Modulation	RB Size	RB Offset	Mid Channel 23230 (782.0 MHz) Conducted Power [dBm]	MPR Allowed per 3GPP [dB]	MPR [dB]
QPSK	1	0	21.06	0	0
	1	25	**21.17**		0
	1	49	21.06		0
	25	0	**21.20**	0-1	0
	25	12	21.16		0
	25	25	21.04		0
	50	0	21.16		0
16QAM	1	0	21.50	0-1	0
	1	25	21.38		0
	1	49	21.49		0
	25	0	21.22	0-2	0
	25	12	21.27		0
	25	25	21.01		0
	50	0	21.19		0

Table 9-20
Reduced LTE Band 13 Conducted Powers - 5 MHz Bandwidth – Ant B (Held to Ear)

LTE Band 13 5 MHzBandwidth					
Modulation	RB Size	RB Offset	Mid Channel 23230 (782.0 MHz) Conducted Power [dBm]	MPR Allowed per 3GPP [dB]	MPR [dB]
QPSK	1	0	21.50	0	0
	1	12	21.31		0
	1	24	21.25		0
	12	0	21.14	0-1	0
	12	6	21.25		0
	12	13	21.04		0
	25	0	21.08		0
16QAM	1	0	21.48	0-1	0
	1	12	21.48		0
	1	24	21.49		0
	12	0	21.17	0-2	0
	12	6	21.13		0
	12	13	21.09		0
	25	0	21.13		0

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

9.4.3 LTE Band 26 (Cell)

Table 9-21
LTE Band 26 (Cell) Conducted Powers - 15 MHz Bandwidth

LTE Band 26 (Cell) 15 MHz Bandwidth					
Modulation	RB Size	RB Offset	Mid Channel 26915 (836.5 MHz) Conducted Power [dBm]	MPR Allowed per 3GPP [dB]	MPR [dB]
QPSK	1	0	**23.89**	0	0
	1	36	23.73		0
	1	74	23.59		0
	36	0	**22.91**	0-1	1
	36	18	22.89		1
	36	37	22.78		1
	75	0	22.80		1
16QAM	1	0	23.18		1
	1	36	23.02		1
	1	74	22.84		1
	36	0	21.93	0-2	2
	36	18	21.92		2
	36	37	21.79		2
	75	0	21.80		2

Note: LTE Band 26 at 15 MHz bandwidth is only supported for FCC Rule Part 22H. There are not three non overlapping channels within FCC Rule Part 22H. Per KDB Publication 941225 D05v02, when a device supports overlapping channel assignment in a channel bandwidth configuration, the middle channel of the group of overlapping channels should be selected for testing.

Table 9-22
LTE Band 26 (Cell) Conducted Powers - 10 MHz Bandwidth

LTE Band 26 (Cell) 10 MHz Bandwidth							
Modulation	RB Size	RB Offset	Low Channel 26740 (819.0 MHz)	Mid Channel 26865 (831.5 MHz)	High Channel 26990 (844.0 MHz)	MPR Allowed per 3GPP [dB]	MPR [dB]
QPSK	1	0	24.13	24.15	23.66	0	0
	1	25	23.87	23.81	23.51		0
	1	49	23.93	23.95	23.75		0
	25	0	22.95	22.96	22.65	0-1	1
	25	12	22.99	22.99	22.67		1
	25	25	23.01	22.88	22.63		1
	50	0	22.97	22.95	22.66		1
16QAM	1	0	23.54	23.60	22.83		1
	1	25	23.21	23.14	22.70		1
	1	49	23.57	23.55	22.75		1
	25	0	21.98	21.98	21.54	0-2	2
	25	12	22.02	21.98	21.65		2
	25	25	22.00	21.90	21.60		2
	50	0	21.98	21.95	21.62		2

Table 9-23
LTE Band 26 (Cell) Conducted Powers - 5 MHz Bandwidth

LTE Band 26 (Cell) 5 MHz Bandwidth							
Modulation	RB Size	RB Offset	Low Channel	Mid Channel	High Channel	MPR Allowed per 3GPP [dB]	MPR [dB]
			26715 (816.5 MHz)	26865 (831.5 MHz)	27015 (846.5 MHz)		
			Conducted Power [dBm]				
QPSK	1	0	24.09	24.11	23.65	0	0
	1	12	23.91	23.79	23.53		0
	1	24	23.89	23.91	23.73		0
	12	0	22.92	22.97	22.62	0-1	1
	12	6	22.96	22.98	22.67		1
	12	13	22.97	22.84	22.65		1
	25	0	22.95	22.91	22.67		1
16QAM	1	0	23.57	23.58	22.83		1
	1	12	23.23	23.18	22.72		1
	1	24	23.59	23.59	22.79		1
	12	0	21.99	21.96	21.52	0-2	2
	12	6	21.99	22.01	21.61		2
	12	13	21.99	21.86	21.61		2
	25	0	22.00	21.94	21.64		2

Table 9-24
LTE Band 26 (Cell) Conducted Powers - 3 MHz Bandwidth

LTE Band 26 (Cell) 3 MHz Bandwidth							
Modulation	RB Size	RB Offset	Low Channel	Mid Channel	High Channel	MPR Allowed per 3GPP [dB]	MPR [dB]
			26705 (815.5 MHz)	26865 (831.5 MHz)	27025 (847.5 MHz)		
			Conducted Power [dBm]				
QPSK	1	0	23.84	23.88	23.95	0	0
	1	7	23.91	23.78	23.50		0
	1	14	23.92	23.90	23.71		0
	8	0	23.04	22.93	22.60	0-1	1
	8	4	22.96	23.01	22.65		1
	8	7	22.93	22.86	22.67		1
	15	0	22.94	22.89	22.63		1
16QAM	1	0	23.58	23.58	22.84		1
	1	7	23.27	23.16	22.68		1
	1	14	23.56	23.63	22.83		1
	8	0	22.00	21.92	21.55	0-2	2
	8	4	22.03	22.03	21.63		2
	8	7	21.96	21.88	21.65		2
	15	0	21.98	21.92	21.62		2

Table 9-25
LTE Band 26 (Cell) Conducted Powers -1.4 MHz Bandwidth

LTE Band 26 (Cell) 1.4 MHz Bandwidth							
Modulation	RB Size	RB Offset	Low Channel	Mid Channel	High Channel	MPR Allowed per 3GPP [dB]	MPR [dB]
			26697 (814.7 MHz)	26865 (831.5 MHz)	27033 (848.3 MHz)		
			Conducted Power [dBm]				
QPSK	1	0	24.11	23.83	23.40	0	0
	1	2	23.94	23.82	23.53		0
	1	5	23.93	23.87	23.69		0
	3	0	24.08	23.87	23.50		0
	3	2	23.98	24.05	23.62		0
	3	3	23.97	23.82	23.68		0
	6	0	22.93	22.85	22.62	0-1	1
16QAM	1	0	23.40	23.25	22.87	0-1	1
	1	2	23.30	23.15	22.66		1
	1	5	23.53	23.20	22.81		1
	3	0	22.96	22.94	22.57		1
	3	2	23.04	23.04	22.62		1
	3	3	22.92	22.91	22.69		1
	6	0	21.94	21.94	21.66	0-2	2

Table 9-26
Reduced LTE Band 26 (Cell) Conducted Powers - 15 MHz Bandwidth – Ant B (Held to Ear)

LTE Band 26 (Cell) 15 MHz Bandwidth					
Modulation	RB Size	RB Offset	Mid Channel 26915 (836.5 MHz) Conducted Power [dBm]	MPR Allowed per 3GPP [dB]	MPR [dB]
QPSK	1	0	**21.18**	0	0
	1	36	20.83		0
	1	74	20.85		0
	36	0	**21.07**	0-1	0
	36	18	20.87		0
	36	37	20.86		0
	75	0	20.91		0
16QAM	1	0	21.32		0
	1	36	21.16		0
	1	74	21.24		0
	36	0	21.04	0-2	0
	36	18	21.07		0
	36	37	21.01		0
	75	0	21.01		0

Note: LTE Band 26 at 15 MHz bandwidth is only supported for FCC Rule Part 22H. There are not three non overlapping channels within FCC Rule Part 22H. Per KDB Publication 941225 D05v02, when a device supports overlapping channel assignment in a channel bandwidth configuration, the middle channel of the group of overlapping channels should be selected for testing.

Table 9-27
Reduced LTE Band 26 (Cell) Conducted Powers - 10 MHz Bandwidth – Ant B (Held to Ear)

LTE Band 26 (Cell) 10 MHz Bandwidth							
Modulation	RB Size	RB Offset	Low Channel 26740 (819.0 MHz)	Mid Channel 26865 (831.5 MHz)	High Channel 26990 (844.0 MHz)	MPR Allowed per 3GPP [dB]	MPR [dB]
QPSK	1	0	21.00	21.14	20.88	0	0
	1	25	20.98	20.89	20.62		0
	1	49	20.89	20.97	20.81		0
	25	0	20.99	20.87	20.70	0-1	0
	25	12	20.98	20.91	20.69		0
	25	25	20.95	20.84	20.67		0
	50	0	20.93	20.90	20.73		0
16QAM	1	0	21.18	21.04	20.66		0
	1	25	21.09	20.70	20.77		0
	1	49	21.15	20.78	20.52		0
	25	0	20.79	20.92	20.72	0-2	0
	25	12	20.95	20.94	20.74		0
	25	25	20.90	20.89	20.63		0
	50	0	20.86	20.89	20.70		0

Table 9-28
Reduced LTE Band 26 (Cell) Conducted Powers - 5 MHz Bandwidth – Ant B (Held to Ear)

LTE Band 26 (Cell) 5 MHz Bandwidth							
Modulation	RB Size	RB Offset	Low Channel	Mid Channel	High Channel	MPR Allowed per 3GPP [dB]	MPR [dB]
			26715 (816.5 MHz)	26865 (831.5 MHz)	27015 (846.5 MHz)		
			Conducted Power [dBm]				
QPSK	1	0	21.23	21.24	21.05	0	0
	1	12	21.05	20.97	20.89		0
	1	24	21.17	20.98	21.00		0
	12	0	20.98	20.89	20.72	0-1	0
	12	6	21.03	20.92	20.82		0
	12	13	20.97	20.85	20.79		0
	25	0	21.03	20.87	20.70		0
16QAM	1	0	21.23	21.09	21.18		0
	1	12	20.94	21.07	21.16		0
	1	24	21.08	21.12	21.20		0
	12	0	20.61	20.95	20.60	0-2	0
	12	6	20.75	20.93	20.68		0
	12	13	20.85	20.96	20.72		0
	25	0	20.63	20.82	20.67		0

Table 9-29
Reduced LTE Band 26 (Cell) Conducted Powers - 3 MHz Bandwidth – Ant B (Held to Ear)

LTE Band 26 (Cell) 3 MHz Bandwidth							
Modulation	RB Size	RB Offset	Low Channel	Mid Channel	High Channel	MPR Allowed per 3GPP [dB]	MPR [dB]
			26705 (815.5 MHz)	26865 (831.5 MHz)	27025 (847.5 MHz)		
			Conducted Power [dBm]				
QPSK	1	0	20.96	21.09	20.96	0	0
	1	7	20.87	20.92	21.22		0
	1	14	20.97	20.90	21.08		0
	8	0	21.05	20.87	20.64	0-1	0
	8	4	21.11	20.86	20.68		0
	8	7	21.01	20.92	20.70		0
	15	0	20.97	20.85	20.69		0
16QAM	1	0	21.24	21.24	21.24		0
	1	7	20.63	21.23	20.65		0
	1	14	21.18	21.22	21.20		0
	8	0	20.52	20.99	20.57	0-2	0
	8	4	20.60	21.00	20.54		0
	8	7	20.62	21.02	20.58		0
	15	0	20.70	20.92	20.66		0

Table 9-30
Reduced LTE Band 26 (Cell) Conducted Powers -1.4 MHz Bandwidth – Ant B (Held to Ear)

LTE Band 26 (Cell) 1.4 MHz Bandwidth							
Modulation	RB Size	RB Offset	Low Channel 26697 (814.7 MHz)	Mid Channel 26865 (831.5 MHz)	High Channel 27033 (848.3 MHz)	MPR Allowed per 3GPP [dB]	MPR [dB]
			Conducted Power [dBm]				
QPSK	1	0	21.23	20.89	20.52	0	0
	1	2	20.96	21.18	20.93		0
	1	5	21.21	20.95	20.54		0
	3	0	21.18	20.87	20.67		0
	3	2	21.16	20.90	20.59		0
	3	3	21.20	20.92	20.69		0
	6	0	20.99	20.82	20.57	0-1	0
16QAM	1	0	21.24	20.86	20.71	0-1	0
	1	2	21.21	21.23	21.08		0
	1	5	21.23	20.94	20.72		0
	3	0	21.01	20.90	20.67		0
	3	2	21.03	20.84	20.68		0
	3	3	21.09	20.80	20.69		0
	6	0	20.39	20.79	20.65	0-2	0

9.4.4 LTE Band 4 (AWS)

Table 9-31
LTE Band 4 (AWS) Conducted Powers - 20 MHz Bandwidth

LTE Band 4 (AWS) 20 MHz Bandwidth					
Modulation	RB Size	RB Offset	Mid Channel 20175 (1732.5 MHz) Conducted Power [dBm]	MPR Allowed per 3GPP [dB]	MPR [dB]
QPSK	1	0	**24.99**	0	0
	1	50	24.49		0
	1	99	24.39		0
	50	0	**23.93**	0-1	1
	50	25	23.61		1
	50	50	23.30		1
	100	0	23.66		1
16QAM	1	0	24.00		1
	1	50	23.79		1
	1	99	23.58		1
	50	0	22.91	0-2	2
	50	25	22.58		2
	50	50	22.38		2
	100	0	22.71		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 9-32
LTE Band 4 (AWS) Conducted Powers - 15 MHz Bandwidth

LTE Band 4 (AWS) 15 MHz Bandwidth							
Modulation	RB Size	RB Offset	Low Channel 20025 (1717.5 MHz)	Mid Channel 20175 (1732.5 MHz)	Frequency [MHz] 20325 (1747.5 MHz)	MPR Allowed per 3GPP [dB]	MPR [dB]
			Conducted Power [dBm]				
QPSK	1	0	24.54	24.55	24.38	0	0
	1	36	24.38	24.26	24.47		0
	1	74	24.36	24.30	24.18		0
	36	0	23.99	23.93	23.76	0-1	1
	36	18	23.95	24.00	23.61		1
	36	37	23.87	23.67	23.65		1
	75	0	23.89	23.72	23.62		1
16QAM	1	0	24.00	24.00	23.97	0-1	1
	1	36	23.98	23.92	23.88		1
	1	74	23.99	23.94	23.98		1
	36	0	22.98	22.89	22.82	0-2	2
	36	18	22.94	22.99	22.70		2
	36	37	22.87	22.68	22.70		2
	75	0	22.96	22.71	22.62		2

Table 9-33
LTE Band 4 (AWS) Conducted Powers - 10 MHz Bandwidth

LTE Band 4 (AWS) 10 MHz Bandwidth							
Modulation	RB Size	RB Offset	Low Channel 20000 (1715.0 MHz)	Mid Channel 20175 (1732.5 MHz)	High Channel 20350 (1750.0 MHz)	MPR Allowed per 3GPP [dB]	MPR [dB]
			Conducted Power [dBm]				
QPSK	1	0	24.35	24.56	24.27	0	0
	1	25	24.50	24.01	24.31		0
	1	49	24.19	24.30	23.97		0
	25	0	23.65	23.61	23.54	0-1	1
	25	12	23.83	23.57	23.75		1
	25	25	23.88	23.48	23.80		1
	50	0	23.82	23.59	23.69		1
16QAM	1	0	23.71	24.00	23.45	0-1	1
	1	25	23.99	23.86	23.90		1
	1	49	23.97	23.96	23.72		1
	25	0	22.79	22.58	22.59	0-2	2
	25	12	22.98	22.55	22.80		2
	25	25	22.86	22.47	22.85		2
	50	0	22.98	22.58	22.66		2

Table 9-34
LTE Band 4 (AWS) Conducted Powers - 5 MHz Bandwidth

LTE Band 4 (AWS) 5 MHz Bandwidth							
Modulation	RB Size	RB Offset	Low Channel 19975 (1712.5 MHz)	Mid Channel 20175 (1732.5 MHz)	High Channel 20375 (1752.5 MHz)	MPR Allowed per 3GPP [dB]	MPR [dB]
			Conducted Power [dBm]				
QPSK	1	0	24.51	24.36	24.13	0	0
	1	12	24.68	23.95	24.52		0
	1	24	24.27	24.22	23.96		0
	12	0	23.59	23.48	23.69	0-1	1
	12	6	23.69	23.50	23.57		1
	12	13	23.75	23.49	23.47		1
	25	0	23.64	23.51	23.51		1
16QAM	1	0	23.85	23.93	23.89	0-1	1
	1	12	23.96	23.67	23.84		1
	1	24	24.00	23.78	23.77		1
	12	0	22.55	22.48	22.73	0-2	2
	12	6	22.66	22.52	22.74		2
	12	13	22.71	22.50	22.61		2
	25	0	22.61	22.48	22.70		2

Table 9-35
LTE Band 4 (AWS) Conducted Powers - 3 MHz Bandwidth

LTE Band 4 (AWS) 3 MHz Bandwidth							
Modulation	RB Size	RB Offset	Frequency [MHz]	Frequency [MHz]	Frequency [MHz]	MPR Allowed per 3GPP [dB]	MPR [dB]
			19965 (1711.5 MHz)	20175 (1732.5 MHz)	20385 (1753.5 MHz)		
			Conducted Power [dBm]				
QPSK	1	0	24.47	24.41	23.89	0	0
	1	7	24.58	24.94	23.93		0
	1	14	24.31	24.38	23.84		0
	8	0	23.53	23.51	23.64	0-1	1
	8	4	23.57	23.54	23.47		1
	8	7	23.60	23.41	23.45		1
	15	0	23.58	23.47	23.55		1
16QAM	1	0	23.64	24.00	23.71	0-1	1
	1	7	23.76	23.86	23.48		1
	1	14	23.77	23.99	23.72		1
	8	0	22.49	22.60	22.61	0-2	2
	8	4	22.54	22.63	22.43		2
	8	7	22.56	22.51	22.43		2
	15	0	22.59	22.49	22.50		2

Table 9-36
LTE Band 4 (AWS) Conducted Powers -1.4 MHz Bandwidth

LTE Band 4 (AWS) 1.4 MHz Bandwidth							
Modulation	RB Size	RB Offset	Low Channel	Mid Channel	Frequency [MHz]	MPR Allowed per 3GPP [dB]	MPR [dB]
			19957 (1710.7 MHz)	20175 (1732.5 MHz)	20393 (1754.3 MHz)		
			Conducted Power [dBm]				
QPSK	1	0	24.37	24.03	23.99	0	0
	1	2	24.98	24.42	24.05		0
	1	5	24.36	23.96	23.98		0
	3	0	24.41	24.09	23.95		0
	3	2	24.49	24.24	24.05		0
	3	3	24.42	24.00	23.96		0
	6	0	23.80	23.42	23.51	0-1	1
16QAM	1	0	23.88	23.41	23.63	0-1	1
	1	2	24.00	23.76	23.95		1
	1	5	23.96	23.35	23.70		1
	3	0	23.92	23.61	23.47		1
	3	2	23.95	23.71	23.46		1
	3	3	23.92	23.69	23.58		1
	6	0	22.87	22.59	22.59	0-2	2

Table 9-37
LTE Band 4 (AWS) Conducted Powers - 20 MHz Bandwidth – Hotspot Mode Active

LTE Band 4 (AWS) 20 MHz Bandwidth					
Modulation	RB Size	RB Offset	Mid Channel 20175 (1732.5 MHz) Conducted Power [dBm]	MPR Allowed per 3GPP [dB]	MPR [dB]
QPSK	1	0	**20.99**	0	0
	1	50	20.19		0
	1	99	20.28		0
	50	0	**20.63**	0-1	0
	50	25	20.30		0
	50	50	20.31		0
	100	0	20.47		0
16QAM	1	0	20.98		0
	1	50	20.74		0
	1	99	20.68		0
	50	0	20.72	0-2	0
	50	25	20.45		0
	50	50	20.41		0
	100	0	20.57		0

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 9-38
LTE Band 4 (AWS) Conducted Powers - 15 MHz Bandwidth – Hotspot Mode Active

LTE Band 4 (AWS) 15 MHz Bandwidth							
Modulation	RB Size	RB Offset	Low Channel 20025 (1717.5 MHz)	Mid Channel 20175 (1732.5 MHz)	Frequency [MHz] 20325 (1747.5 MHz)	MPR Allowed per 3GPP [dB]	MPR [dB]
			Conducted Power [dBm]				
QPSK	1	0	20.97	20.90	20.76	0	0
	1	36	20.57	20.36	20.51		0
	1	74	20.72	20.44	20.31		0
	36	0	20.77	20.57	20.45	0-1	0
	36	18	20.55	20.39	20.12		0
	36	37	20.56	20.27	20.24		0
	75	0	20.58	20.39	20.36		0
16QAM	1	0	20.97	20.98	20.96	0-1	0
	1	36	20.65	20.73	20.70		0
	1	74	20.73	20.90	20.64		0
	36	0	20.68	20.57	20.47	0-2	0
	36	18	20.57	20.38	20.38		0
	36	37	20.54	20.31	20.26		0
	75	0	20.66	20.37	20.33		0

Table 9-39
Reduced LTE Band 4 (AWS) Conducted Powers - 10 MHz Bandwidth – Hotspot Mode Active

LTE Band 4 (AWS) 10 MHzBandwidth							
Modulation	RB Size	RB Offset	Low Channel	Mid Channel	High Channel	MPR Allowed per 3GPP [dB]	MPR [dB]
			20000 (1715.0 MHz)	20175 (1732.5 MHz)	20350 (1750.0 MHz)		
			Conducted Power [dBm]				
QPSK	1	0	20.64	20.76	20.21	0	0
	1	25	20.68	20.18	20.34		0
	1	49	20.44	20.42	20.16		0
	25	0	20.76	20.26	20.61	0-1	0
	25	12	20.48	20.19	20.42		0
	25	25	20.30	20.19	19.91		0
	50	0	20.63	20.20	20.21		0
16QAM	1	0	20.82	20.97	20.60	0-1	0
	1	25	20.96	20.60	20.61		0
	1	49	20.51	20.92	20.32		0
	25	0	20.73	20.24	20.37	0-2	0
	25	12	20.47	20.23	20.20		0
	25	25	20.50	20.19	20.21		0
	50	0	20.52	20.23	20.36		0

Table 9-40
Reduced LTE Band 4 (AWS) Conducted Powers - 5 MHz Bandwidth – Hotspot Mode Active

LTE Band 4 (AWS) 5 MHzBandwidth							
Modulation	RB Size	RB Offset	Low Channel	Mid Channel	High Channel	MPR Allowed per 3GPP [dB]	MPR [dB]
			19975 (1712.5 MHz)	20175 (1732.5 MHz)	20375 (1752.5 MHz)		
			Conducted Power [dBm]				
QPSK	1	0	20.50	20.69	20.25	0	0
	1	12	20.76	20.33	20.52		0
	1	24	20.31	20.61	20.16		0
	12	0	20.71	20.14	20.08	0-1	0
	12	6	20.58	20.16	20.11		0
	12	13	20.40	20.18	20.00		0
	25	0	20.56	20.13	20.05		0
16QAM	1	0	20.68	20.94	20.56	0-1	0
	1	12	20.73	20.44	20.96		0
	1	24	20.51	20.78	20.48		0
	12	0	20.65	20.17	20.61	0-2	0
	12	6	20.53	20.21	20.57		0
	12	13	20.35	20.15	20.42		0
	25	0	20.50	20.19	20.50		0

Table 9-41
Reduced LTE Band 4 (AWS) Conducted Powers - 3 MHz Bandwidth – Hotspot Mode Active

LTE Band 4 (AWS) 3 MHz Bandwidth							
Modulation	RB Size	RB Offset	Frequency [MHz]	Frequency [MHz]	Frequency [MHz]	MPR Allowed per 3GPP [dB]	MPR [dB]
			19965 (1711.5 MHz)	20175 (1732.5 MHz)	20385 (1753.5 MHz)		
			Conducted Power [dBm]				
QPSK	1	0	20.40	20.21	20.17	0	0
	1	7	20.09	20.27	20.26		0
	1	14	20.31	20.26	20.07		0
	8	0	20.62	20.23	19.84	0-1	0
	8	4	20.46	20.20	19.85		0
	8	7	20.35	20.19	19.84		0
	15	0	20.43	20.16	19.83		0
16QAM	1	0	20.98	20.96	20.33	0-1	0
	1	7	20.97	20.47	20.29		0
	1	14	20.94	20.53	20.25		0
	8	0	20.86	20.21	20.13	0-2	0
	8	4	20.68	20.19	20.16		0
	8	7	20.60	20.21	20.14		0
	15	0	20.62	20.18	20.20		0

Table 9-42
Reduced LTE Band 4 (AWS) Conducted Powers -1.4 MHz Bandwidth – Hotspot Mode Active

LTE Band 4 (AWS) 1.4 MHz Bandwidth							
Modulation	RB Size	RB Offset	Low Channel	Mid Channel	Frequency [MHz]	MPR Allowed per 3GPP [dB]	MPR [dB]
			19957 (1710.7 MHz)	20175 (1732.5 MHz)	20393 (1754.3 MHz)		
			Conducted Power [dBm]				
QPSK	1	0	20.34	20.29	19.96	0	0
	1	2	20.71	20.72	20.19		0
	1	5	20.39	20.18	19.93		0
	3	0	20.53	20.27	20.14		0
	3	2	20.68	20.39	20.35		0
	3	3	20.58	20.18	20.23		0
	6	0	20.43	20.04	20.11	0-1	0
16QAM	1	0	20.53	20.03	20.36	0-1	0
	1	2	20.94	20.44	20.83		0
	1	5	20.55	19.94	20.36		0
	3	0	20.51	20.31	20.21		0
	3	2	20.45	20.35	20.26		0
	3	3	20.56	20.28	20.33		0
	6	0	20.52	20.26	20.17	0-2	0

9.4.5 LTE Band 25 (PCS)

Table 9-43
LTE Band 25 (PCS) Conducted Powers - 20 MHz Bandwidth

LTE Band 25 (PCS) 20 MHz Bandwidth							
Modulation	RB Size	RB Offset	Low Channel 26140 (1860.0 MHz)	Mid Channel 26365 (1882.5 MHz)	High Channel 26590 (1905.0 MHz)	MPR Allowed per 3GPP [dB]	MPR [dB]
			Conducted Power [dBm]				
QPSK	1	0	24.92	**24.93**	24.77	0	0
	1	50	24.16	24.04	24.01		0
	1	99	24.31	24.18	24.06		0
	50	0	**23.73**	23.44	23.65	0-1	1
	50	25	23.41	23.09	23.27		1
	50	50	23.32	23.17	23.36		1
	100	0	23.46	23.24	23.56		1
16QAM	1	0	23.82	24.00	24.00		1
	1	50	23.66	23.29	23.37		1
	1	99	23.76	23.56	23.39		1
	50	0	22.68	22.51	22.65	0-2	2
	50	25	22.34	22.19	22.31		2
	50	50	22.32	22.14	22.35		2
	100	0	22.45	22.31	22.60		2

Table 9-44
LTE Band 25 (PCS) Conducted Powers - 15 MHz Bandwidth

LTE Band 25 (PCS) 15 MHz Bandwidth							
Modulation	RB Size	RB Offset	Low Channel 26115 (1857.5 MHz)	Mid Channel 26365 (1882.5 MHz)	High Channel 26615 (1907.5 MHz)	MPR Allowed per 3GPP [dB]	MPR [dB]
			Conducted Power [dBm]				
QPSK	1	0	24.50	24.76	24.80	0	0
	1	36	24.09	23.92	24.11		0
	1	74	24.12	24.24	24.28		0
	36	0	23.34	23.06	23.34	0-1	1
	36	18	23.26	22.96	23.27		1
	36	37	23.12	22.86	23.07		1
	75	0	23.18	22.97	23.25		1
16QAM	1	0	23.98	23.73	23.72		1
	1	36	23.48	23.29	23.13		1
	1	74	23.82	23.41	23.27		1
	36	0	22.36	22.14	22.31	0-2	2
	36	18	22.29	22.02	22.29		2
	36	37	22.16	21.92	22.10		2
	75	0	22.19	22.01	22.32		2

Table 9-45
LTE Band 25 (PCS) Conducted Powers - 10 MHz Bandwidth

LTE Band 25 (PCS) 10 MHz Bandwidth							
Modulation	RB Size	RB Offset	Low Channel	Mid Channel	High Channel	MPR Allowed per 3GPP [dB]	MPR [dB]
			26090 (1855.0 MHz)	26365 (1882.5 MHz)	26640 (1910.0 MHz)		
			Conducted Power [dBm]				
QPSK	1	0	24.12	24.44	24.40	0	0
	1	25	24.36	23.97	24.28		0
	1	49	23.88	24.27	23.97		0
	25	0	22.95	23.07	23.74	0-1	1
	25	12	22.95	23.01	23.76		1
	25	25	22.87	23.00	23.36		1
	50	0	22.91	23.03	23.59		1
16QAM	1	0	23.27	23.54	23.87		1
	1	25	23.61	23.06	23.79		1
	1	49	23.03	23.40	23.17		1
	25	0	22.29	22.11	22.83	0-2	2
	25	12	22.03	22.04	22.78		2
	25	25	21.97	22.02	22.73		2
	50	0	21.97	22.06	22.62		2

Table 9-46
LTE Band 25 (PCS) Conducted Powers - 5 MHz Bandwidth

LTE Band 25 (PCS) 5 MHz Bandwidth							
Modulation	RB Size	RB Offset	Low Channel	Mid Channel	High Channel	MPR Allowed per 3GPP [dB]	MPR [dB]
			26065 (1852.5 MHz)	26365 (1882.5 MHz)	26665 (1912.5 MHz)		
			Conducted Power [dBm]				
QPSK	1	0	24.29	24.15	24.53	0	0
	1	12	24.41	24.12	24.28		0
	1	24	24.15	24.06	24.31		0
	12	0	23.07	22.90	23.08	0-1	1
	12	6	23.08	22.91	23.09		1
	12	13	22.94	22.83	22.97		1
	25	0	23.06	22.92	23.01		1
16QAM	1	0	23.72	23.45	23.73		1
	1	12	23.69	23.30	23.53		1
	1	24	23.59	23.43	23.54		1
	12	0	22.07	21.98	22.09	0-2	2
	12	6	22.08	22.02	22.09		2
	12	13	21.96	21.91	21.97		2
	25	0	22.03	21.98	22.13		2

Table 9-47
LTE Band 25 (PCS) Conducted Powers - 3 MHz Bandwidth

LTE Band 25 (PCS) 3 MHz Bandwidth							
Modulation	RB Size	RB Offset	Low Channel 26055 (1851.5 MHz)	Mid Channel 26365 (1882.5 MHz)	High Channel 26675 (1913.5 MHz)	MPR Allowed per 3GPP [dB]	MPR [dB]
			Conducted Power [dBm]				
QPSK	1	0	24.44	24.27	24.53	0	0
	1	7	24.71	24.51	24.72		0
	1	14	24.32	24.33	24.21		0
	8	0	23.01	22.94	23.02	0-1	1
	8	4	23.09	22.80	23.04		1
	8	7	22.99	22.82	23.02		1
	15	0	23.03	22.92	23.06		1
16QAM	1	0	23.71	23.50	23.89		1
	1	7	23.06	23.71	22.98		1
	1	14	23.61	23.43	23.76		1
	8	0	21.98	22.02	22.14	0-2	2
	8	4	22.00	21.85	22.01		2
	8	7	21.96	21.94	22.16		2
	15	0	22.01	21.99	22.08		2

Table 9-48
LTE Band 25 (PCS) Conducted Powers -1.4 MHz Bandwidth

LTE Band 25 (PCS) 1.4 MHz Bandwidth							
Modulation	RB Size	RB Offset	Low Channel 26047 (1850.7 MHz)	Mid Channel 26365 (1882.5 MHz)	High Channel 26683 (1914.3 MHz)	MPR Allowed per 3GPP [dB]	MPR [dB]
			Conducted Power [dBm]				
QPSK	1	0	24.15	23.97	23.78	0	0
	1	2	24.33	24.07	23.71		0
	1	5	24.09	23.93	23.67		0
	3	0	24.09	24.01	23.69		0
	3	2	24.04	23.89	23.73		0
	3	3	24.03	24.05	23.75		0
	6	0	22.93	22.87	22.97	0-1	1
16QAM	1	0	22.86	23.01	23.10	0-1	1
	1	2	23.26	23.56	23.64		1
	1	5	22.88	23.00	23.03		1
	3	0	23.15	22.93	23.16		1
	3	2	23.23	22.98	23.14		1
	3	3	23.14	22.87	23.20		1
	6	0	22.10	21.98	22.08	0-2	2

Table 9-49
Reduced LTE Band 25 (PCS) Conducted Powers - 20 MHz Bandwidth – Hotspot Mode Active

LTE Band 25 (PCS) 20 MHz Bandwidth							
Modulation	RB Size	RB Offset	Low Channel	Mid Channel	High Channel	MPR Allowed per 3GPP [dB]	MPR [dB]
			26140 (1860.0 MHz)	26365 (1882.5 MHz)	26590 (1905.0 MHz)		
			Conducted Power [dBm]				
QPSK	1	0	20.95	**20.98**	20.96	0	0
	1	50	20.09	20.12	20.24		0
	1	99	20.12	20.21	20.35		0
	50	0	**20.66**	20.61	20.60	0-1	0
	50	25	20.39	20.26	20.34		0
	50	50	20.39	20.29	20.34		0
	100	0	20.56	20.37	20.55		0
16QAM	1	0	20.96	20.97	20.95		0
	1	50	20.57	20.56	20.43		0
	1	99	20.63	20.61	20.59		0
	50	0	20.65	20.58	20.52	0-2	0
	50	25	20.39	20.26	20.31		0
	50	50	20.36	20.24	20.28		0
	100	0	20.44	20.36	20.51		0

Table 9-50
Reduced LTE Band 25 (PCS) Conducted Powers - 15 MHz Bandwidth – Hotspot Mode Active

LTE Band 25 (PCS) 15 MHz Bandwidth							
Modulation	RB Size	RB Offset	Low Channel	Mid Channel	High Channel	MPR Allowed per 3GPP [dB]	MPR [dB]
			26115 (1857.5 MHz)	26365 (1882.5 MHz)	26615 (1907.5 MHz)		
			Conducted Power [dBm]				
QPSK	1	0	20.97	20.70	20.63	0	0
	1	36	20.43	20.23	20.24		0
	1	74	20.57	20.32	20.16		0
	36	0	20.53	20.26	20.53	0-1	0
	36	18	20.71	20.16	20.49		0
	36	37	20.24	20.09	20.18		0
	75	0	20.31	20.15	20.38		0
16QAM	1	0	20.96	20.74	20.95		0
	1	36	20.80	20.18	20.71		0
	1	74	20.69	20.43	20.94		0
	36	0	20.58	20.21	20.54	0-2	0
	36	18	20.45	20.35	20.33		0
	36	37	20.29	20.05	20.20		0
	75	0	20.37	20.23	20.32		0

Table 9-51
Reduced LTE Band 25 (PCS) Conducted Powers - 10 MHz Bandwidth – Hotspot Mode Active

LTE Band 25 (PCS) 10 MHz Bandwidth							
Modulation	RB Size	RB Offset	Low Channel 26090 (1855.0 MHz)	Mid Channel 26365 (1882.5 MHz)	High Channel 26640 (1910.0 MHz)	MPR Allowed per 3GPP [dB]	MPR [dB]
			Conducted Power [dBm]				
QPSK	1	0	20.57	20.57	20.50	0	0
	1	25	20.54	20.07	20.42		0
	1	49	20.17	20.42	20.24		0
	25	0	20.37	20.21	20.83	0-1	0
	25	12	20.65	20.13	20.42		0
	25	25	20.58	20.12	20.10		0
	50	0	20.62	20.14	20.20		0
16QAM	1	0	20.77	20.68	20.96		0
	1	25	20.54	20.17	20.81		0
	1	49	20.42	20.37	20.87		0
	25	0	20.03	20.19	20.97	0-2	0
	25	12	19.98	20.14	20.96		0
	25	25	19.86	20.13	20.84		0
	50	0	19.93	20.11	20.96		0

Table 9-52
Reduced LTE Band 25 (PCS) Conducted Powers - 5 MHz Bandwidth – Hotspot Mode Active

LTE Band 25 (PCS) 5 MHz Bandwidth							
Modulation	RB Size	RB Offset	Low Channel 26065 (1852.5 MHz)	Mid Channel 26365 (1882.5 MHz)	High Channel 26665 (1912.5 MHz)	MPR Allowed per 3GPP [dB]	MPR [dB]
			Conducted Power [dBm]				
QPSK	1	0	20.82	20.58	20.30	0	0
	1	12	20.52	20.11	20.56		0
	1	24	20.67	20.45	20.14		0
	12	0	20.37	20.05	20.63	0-1	0
	12	6	20.29	20.09	20.49		0
	12	13	20.28	20.00	20.18		0
	25	0	20.29	20.06	20.41		0
16QAM	1	0	20.97	20.84	20.48		0
	1	12	20.78	20.38	20.50		0
	1	24	20.88	20.83	20.31		0
	12	0	20.39	20.03	20.95	0-2	0
	12	6	20.28	20.05	20.89		0
	12	13	20.27	20.00	20.56		0
	25	0	20.30	20.04	20.80		0

Table 9-53
Reduced LTE Band 25 (PCS) Conducted Powers - 3 MHz Bandwidth – Hotspot Mode Active

LTE Band 25 (PCS) 3 MHz Bandwidth							
Modulation	RB Size	RB Offset	Low Channel 26055 (1851.5 MHz)	Mid Channel 26365 (1882.5 MHz)	High Channel 26675 (1913.5 MHz)	MPR Allowed per 3GPP [dB]	MPR [dB]
			Conducted Power [dBm]				
QPSK	1	0	20.23	20.35	20.17	0	0
	1	7	20.35	20.17	19.92		0
	1	14	20.16	20.23	20.18		0
	8	0	20.19	20.07	20.26	0-1	0
	8	4	20.28	20.03	20.12		0
	8	7	20.31	19.96	19.98		0
	15	0	20.26	20.03	20.12		0
16QAM	1	0	20.54	20.67	20.86		0
	1	7	20.61	20.34	20.41		0
	1	14	20.44	20.37	20.74		0
	8	0	19.86	20.02	20.62	0-2	0
	8	4	19.93	20.01	20.47		0
	8	7	19.97	19.96	20.34		0
	15	0	19.90	20.04	20.43		0

Table 9-54
Reduced LTE Band 25 (PCS) Conducted Powers -1.4 MHz Bandwidth – Hotspot Mode Active

LTE Band 25 (PCS) 1.4 MHz Bandwidth							
Modulation	RB Size	RB Offset	Low Channel 26047 (1850.7 MHz)	Mid Channel 26365 (1882.5 MHz)	High Channel 26683 (1914.3 MHz)	MPR Allowed per 3GPP [dB]	MPR [dB]
			Conducted Power [dBm]				
QPSK	1	0	20.36	20.01	20.20	0	0
	1	2	20.82	20.19	20.48		0
	1	5	20.31	20.03	20.14		0
	3	0	20.37	20.13	20.37		0
	3	2	20.47	20.00	20.35		0
	3	3	20.35	20.14	20.32		0
	6	0	20.24	19.98	20.21	0-1	0
16QAM	1	0	20.18	20.23	20.37	0-1	0
	1	2	20.60	20.70	20.96		0
	1	5	20.15	20.17	20.40		0
	3	0	20.46	20.08	20.36		0
	3	2	20.61	20.17	20.27		0
	3	3	20.54	20.05	20.32		0
	6	0	20.40	20.07	20.30	0-2	0

9.4.6 LTE Band 30

Table 9-55
LTE Band 30 Conducted Powers - 10 MHz Bandwidth

LTE Band 30 10 MHz Bandwidth					
Modulation	RB Size	RB Offset	Mid Channel 27710 (2310.0 MHz) Conducted Power [dBm]	MPR Allowed per 3GPP [dB]	MPR [dB]
QPSK	1	0	**22.50**	0	0
		25	22.13		0
		49	22.29		0
	25	0	**21.30**	0-1	1
		12	21.23		1
		25	21.18		1
	50	0	21.17		1
16QAM	1	0	21.50		1
		25	21.38		1
		49	21.48		1
	25	0	20.35	0-2	2
		12	20.22		2
		25	20.13		2
	50	0	20.21		2

Table 9-56
LTE Band 30 Conducted Powers - 5 MHz Bandwidth

LTE Band 30 5 MHz Bandwidth					
Modulation	RB Size	RB Offset	Mid Channel 27710 (2310.0 MHz) Conducted Power [dBm]	MPR Allowed per 3GPP [dB]	MPR [dB]
QPSK	1	0	22.49	0	0
		12	22.35		0
		24	22.50		0
	12	0	21.38	0-1	1
		6	21.42		1
		13	21.39		1
	25	0	21.37		1
16QAM	1	0	21.50		1
		12	21.37		1
		24	21.49		1
	12	0	20.32	0-2	2
		6	20.35		2
		13	20.36		2
	25	0	20.31		2

Note: LTE Band 30 at 5 MHz bandwidth does not support three non-overlapping channels. Per KDB Publication 941225 D05v02, when a device supports overlapping channel assignment in a channel bandwidth configuration, the middle channel of the group of overlapping channels should be selected for testing.

Table 9-57
Reduced LTE Band 30 Conducted Powers - 10 MHz Bandwidth – Hotspot Mode Active

LTE Band 30 10 MHz Bandwidth					
Modulation	RB Size	RB Offset	Mid Channel 27710 (2310.0 MHz) Conducted Power [dBm]	MPR Allowed per 3GPP [dB]	MPR [dB]
QPSK	1	0	**19.47**	0	0
		25	18.53		0
		49	18.71		0
	25	0	**18.71**	0-1	0
		12	18.64		0
		25	18.63		0
	50	0	18.67		0
16QAM	1	0	19.37		0
		25	19.10		0
		49	19.39		0
	25	0	18.75	0-2	0
		12	18.67		0
		25	18.69		0
	50	0	18.77		0

Table 9-58
Reduced LTE Band 30 Conducted Powers - 5 MHz Bandwidth – Hotspot Mode Active

LTE Band 30 5 MHz Bandwidth					
Modulation	RB Size	RB Offset	Mid Channel 27710 (2310.0 MHz) Conducted Power [dBm]	MPR Allowed per 3GPP [dB]	MPR [dB]
QPSK	1	0	19.28	0	0
		12	19.28		0
		24	18.94		0
	12	0	19.14	0-1	0
		6	19.12		0
		13	19.03		0
	25	0	19.07		0
16QAM	1	0	19.42		0
		12	19.46		0
		24	19.23		0
	12	0	19.31	0-2	0
		6	19.29		0
		13	19.19		0
	25	0	19.12		0

Note: LTE Band 30 at 5 MHz bandwidth does not support three non-overlapping channels. Per KDB Publication 941225 D05v02, when a device supports overlapping channel assignment in a channel bandwidth configuration, the middle channel of the group of overlapping channels should be selected for testing.

9.4.7 LTE Band 41

Table 9-59
LTE Band 41 Conducted Powers - 20 MHz Bandwidth

LTE Band 41 20 MHz Bandwidth									
Modulation	RB Size	RB Offset	Low Channel 39750 (2506.0 MHz)	Low-Mid Channel 40185 (2549.5 MHz)	Mid Channel 40620 (2593.0 MHz)	Mid-High Channel 41055 (2636.5 MHz)	High Channel 41490 (2680.0 MHz)	MPR Allowed per 3GPP [dB]	MPR [dB]
			Conducted Power [dBm]						
QPSK	1	0	24.00	23.71	23.85	24.07	**24.15**	0	0
	1	50	23.34	23.10	23.18	23.48	23.64		0
	1	99	23.40	23.34	23.43	23.72	23.65		0
	50	0	22.69	22.42	22.48	22.79	**22.93**	0-1	1
	50	25	22.51	22.18	22.32	22.52	22.86		1
	50	50	22.43	22.21	22.24	22.59	22.83		1
	100	0	22.58	22.33	22.47	22.58	22.91		1
16QAM	1	0	22.66	22.78	22.49	23.00	22.74	0-1	1
	1	50	22.02	22.02	22.00	22.42	22.25		1
	1	99	22.00	22.19	22.02	22.67	22.44		1
	50	0	21.46	21.45	21.50	21.75	21.94	0-2	2
	50	25	21.71	21.20	21.31	21.54	21.87		2
	50	50	21.40	21.22	21.38	21.58	21.83		2
	100	0	21.52	21.33	21.37	21.65	21.89		2

Table 9-60
LTE Band 41 Conducted Powers - 15 MHz Bandwidth

LTE Band 41 15 MHz Bandwidth									
Modulation	RB Size	RB Offset	Low Channel 39750 (2506.0 MHz)	Low-Mid Channel 40185 (2549.5 MHz)	Mid Channel 40620 (2593.0 MHz)	Mid-High Channel 41055 (2636.5 MHz)	High Channel 41490 (2680.0 MHz)	MPR Allowed per 3GPP [dB]	MPR [dB]
			Conducted Power [dBm]						
QPSK	1	0	23.94	23.70	23.76	23.85	23.87	0	0
	1	36	23.36	23.49	23.28	23.50	23.58		0
	1	74	23.37	23.33	23.41	23.57	23.62		0
	36	0	22.64	22.55	22.48	22.70	22.68	0-1	1
	36	18	22.43	22.33	22.31	22.56	22.62		1
	36	37	22.42	22.22	22.32	22.48	22.58		1
	75	0	22.41	22.45	22.35	22.49	22.60		1
16QAM	1	0	22.90	22.46	22.79	22.89	22.91	0-1	1
	1	36	22.34	22.16	22.30	22.56	22.59		1
	1	74	22.35	22.28	22.36	22.60	22.68		1
	36	0	21.60	21.58	21.36	21.65	21.57	0-2	2
	36	18	21.44	21.43	21.30	21.52	21.56		2
	36	37	21.40	21.39	21.28	21.42	21.51		2
	75	0	21.38	21.45	21.32	21.49	21.60		2

Table 9-61
LTE Band 41 Conducted Powers - 10 MHz Bandwidth

LTE Band 41 10 MHz Bandwidth									
Modulation	RB Size	RB Offset	Low Channel 39750 (2506.0 MHz)	Low-Mid Channel 40185 (2549.5 MHz)	Mid Channel 40620 (2593.0 MHz)	Mid-High Channel 41055 (2636.5 MHz)	High Channel 41490 (2680.0 MHz)	MPR Allowed per 3GPP [dB]	MPR [dB]
			Conducted Power [dBm]						
QPSK	1	0	23.78	23.65	23.67	23.73	23.86	0	0
	1	25	23.50	23.46	23.43	23.53	23.64		0
	1	49	23.56	23.48	23.52	23.50	23.63		0
	25	0	22.66	22.56	22.52	22.67	22.68	0-1	1
	25	12	22.54	22.38	22.46	22.55	22.62		1
	25	25	22.46	22.40	22.48	22.48	22.57		1
	50	0	22.61	22.42	22.49	22.50	22.63		1
16QAM	1	0	22.82	22.45	22.62	22.74	22.66	0-1	1
	1	25	22.50	22.25	22.45	22.55	22.39		1
	1	49	22.59	22.36	22.50	22.56	22.50		1
	25	0	21.51	21.53	21.47	21.61	21.71	0-2	2
	25	12	21.43	21.34	21.39	21.55	21.61		2
	25	25	21.40	21.39	21.42	21.44	21.58		2
	50	0	21.55	21.44	21.49	21.54	21.66		2

Table 9-62
LTE Band 41 Conducted Powers - 5 MHz Bandwidth

LTE Band 41 5 MHz Bandwidth									
Modulation	RB Size	RB Offset	Low Channel 39750 (2506.0 MHz)	Low-Mid Channel 40185 (2549.5 MHz)	Mid Channel 40620 (2593.0 MHz)	Mid-High Channel 41055 (2636.5 MHz)	High Channel 41490 (2680.0 MHz)	MPR Allowed per 3GPP [dB]	MPR [dB]
			Conducted Power [dBm]						
QPSK	1	0	23.60	23.57	23.60	23.64	23.75	0	0
	1	12	23.51	23.38	23.46	23.52	23.65		0
	1	24	23.50	23.44	23.50	23.55	23.67		0
	12	0	22.52	22.38	22.43	22.55	22.60	0-1	1
	12	6	22.49	22.36	22.44	22.56	22.58		1
	12	13	22.51	22.35	22.40	22.40	22.55		1
	25	0	22.48	22.33	22.41	22.52	22.57		1
16QAM	1	0	22.60	22.50	22.59	22.54	22.72	0-1	1
	1	12	22.50	22.35	22.47	22.46	22.61		1
	1	24	22.51	22.32	22.52	22.39	22.66		1
	12	0	21.49	21.55	21.42	21.64	21.62	0-2	2
	12	6	21.43	21.46	21.37	21.65	21.58		2
	12	13	21.45	21.40	21.38	21.55	21.55		2
	25	0	21.39	21.32	21.36	21.51	21.56		2

Table 9-63
Reduced LTE Band 41 Conducted Powers - 20 MHz Bandwidth – Hotspot Mode Active

LTE Band 41 20 MHz Bandwidth									
Modulation	RB Size	RB Offset	Low Channel 39750 (2506.0 MHz)	Low-Mid Channel 40185 (2549.5 MHz)	Mid Channel 40620 (2593.0 MHz)	Mid-High Channel 41055 (2636.5 MHz)	High Channel 41490 (2680.0 MHz)	MPR Allowed per 3GPP [dB]	MPR [dB]
			Conducted Power [dBm]						
QPSK	1	0	21.92	22.06	21.87	21.88	**22.19**	0	0
	1	50	21.37	21.44	21.32	21.35	21.66		0
	1	99	21.54	21.47	21.42	21.41	21.85		0
	50	0	21.78	21.65	21.65	21.71	**21.87**	0-1	0
	50	25	21.62	21.43	21.44	21.59	21.71		0
	50	50	21.66	21.43	21.47	21.58	21.65		0
	100	0	21.61	21.49	21.55	21.68	21.78		0
16QAM	1	0	21.94	22.33	21.87	22.00	22.21	0-1	0
	1	50	21.46	21.89	21.46	21.41	22.07		0
	1	99	21.62	21.92	21.53	21.50	22.17		0
	50	0	21.77	21.68	21.66	21.63	21.90	0-2	0
	50	25	21.56	21.41	21.47	21.60	21.77		0
	50	50	21.51	21.49	21.41	21.53	21.72		0
	100	0	21.69	21.50	21.62	21.67	21.76		0

Table 9-64
Reduced LTE Band 41 Conducted Powers - 15 MHz Bandwidth – Hotspot Mode Active

LTE Band 41 15 MHz Bandwidth									
Modulation	RB Size	RB Offset	Low Channel 39750 (2506.0 MHz)	Low-Mid Channel 40185 (2549.5 MHz)	Mid Channel 40620 (2593.0 MHz)	Mid-High Channel 41055 (2636.5 MHz)	High Channel 41490 (2680.0 MHz)	MPR Allowed per 3GPP [dB]	MPR [dB]
			Conducted Power [dBm]						
QPSK	1	0	22.07	22.20	21.96	21.74	22.13	0	0
	1	36	21.44	21.58	21.20	21.31	21.85		0
	1	74	21.67	21.36	21.37	21.53	21.76		0
	36	0	21.58	21.68	21.53	21.84	21.81	0-1	0
	36	18	21.75	21.62	21.40	21.71	21.67		0
	36	37	21.82	21.41	21.62	21.43	21.65		0
	75	0	21.47	21.58	21.64	21.83	21.61		0
16QAM	1	0	21.93	22.20	21.96	22.14	22.10	0-1	0
	1	36	21.64	21.91	21.57	21.57	21.95		0
	1	74	21.52	22.05	21.64	21.66	22.31		0
	36	0	21.61	21.80	21.66	21.67	21.85	0-2	0
	36	18	21.56	21.50	21.58	21.66	21.58		0
	36	37	21.49	21.44	21.36	21.36	21.80		0
	75	0	21.53	21.60	21.67	21.81	21.69		0

Table 9-65
Reduced LTE Band 41 Conducted Powers - 10 MHz Bandwidth – Hotspot Mode Active

LTE Band 41 10 MHz Bandwidth									
Modulation	RB Size	RB Offset	Low Channel 39750 (2506.0 MHz)	Low-Mid Channel 40185 (2549.5 MHz)	Mid Channel 40620 (2593.0 MHz)	Mid-High Channel 41055 (2636.5 MHz)	High Channel 41490 (2680.0 MHz)	MPR Allowed per 3GPP [dB]	MPR [dB]
			Conducted Power [dBm]						
QPSK	1	0	22.15	22.28	21.77	21.75	22.16	0	0
	1	25	21.51	21.65	21.16	21.40	21.66		0
	1	49	21.66	21.56	21.42	21.52	21.88		0
	25	0	21.47	21.68	21.65	21.80	22.01	0-1	0
	25	12	21.60	21.72	21.41	21.85	21.74		0
	25	25	21.72	21.46	21.80	21.45	21.66		0
	50	0	21.45	21.77	21.49	21.76	21.52		0
16QAM	1	0	22.00	22.31	22.16	22.29	22.23	0-1	0
	1	25	21.66	21.76	21.54	21.43	22.11		0
	1	49	21.72	21.86	21.81	21.73	22.16		0
	25	0	21.66	21.94	21.86	21.79	21.83	0-2	0
	25	12	21.50	21.57	21.74	21.72	21.61		0
	25	25	21.53	21.55	21.28	21.51	21.85		0
	50	0	21.33	21.56	21.69	21.85	21.89		0

Table 9-66
Reduced LTE Band 41 Conducted Powers - 5 MHz Bandwidth – Hotspot Mode Active

LTE Band 41 5 MHz Bandwidth									
Modulation	RB Size	RB Offset	Low Channel 39750 (2506.0 MHz)	Low-Mid Channel 40185 (2549.5 MHz)	Mid Channel 40620 (2593.0 MHz)	Mid-High Channel 41055 (2636.5 MHz)	High Channel 41490 (2680.0 MHz)	MPR Allowed per 3GPP [dB]	MPR [dB]
			Conducted Power [dBm]						
QPSK	1	0	21.98	22.04	21.60	21.65	22.06	0	0
	1	12	21.34	21.62	20.98	21.37	21.50		0
	1	24	21.54	21.47	21.43	21.32	21.72		0
	12	0	21.33	21.72	21.41	21.54	21.98	0-1	0
	12	6	21.47	21.44	21.28	21.69	21.44		0
	12	13	21.65	21.33	21.79	21.38	21.44		0
	25	0	21.17	21.50	21.50	21.54	21.61		0
16QAM	1	0	21.84	22.23	21.88	22.24	22.31	0-1	0
	1	12	21.55	21.55	21.60	21.41	22.10		0
	1	24	21.45	21.91	21.66	21.73	22.31		0
	12	0	21.63	21.68	21.68	21.69	21.89	0-2	0
	12	6	21.59	21.27	21.66	21.62	21.42		0
	12	13	21.63	21.30	21.08	21.47	21.83		0
	25	0	21.04	21.53	21.54	21.62	21.92		0

9.4.8 LTE Carrier Aggregation Conducted Powers

Table 9-67
Two Component Carrier Maximum Conducted Powers

PCC Band	PCC Bandwidth [MHz]	PCC (UL) Channel	PCC (UL) Frequency [MHz]	Modulation	PCC UL# RB	PCC UL RB Offset	PCC (DL) Channel	PCC (DL) Frequency [MHz]	SCC Band	SCC Bandwidth [MHz]	SCC (DL) Channel	SCC (DL) Frequency [MHz]	LTE Rel 10 Tx.Power (dBm)	LTE Rel. 8 Tx.Power (dBm)
LTE B2	20	18925	1882.5	QPSK	1	0	925	1962.5	LTE B4	20	2175	2132.5	24.48	24.93
LTE B2	20	18925	1882.5	QPSK	1	0	925	1962.5	LTE B5	10	2525	881.5	24.35	24.93
LTE B2	20	18925	1882.5	QPSK	1	0	925	1962.5	LTE B12	10	5095	737.5	24.38	24.93
LTE B2	20	18925	1882.5	QPSK	1	0	925	1962.5	LTE B13	10	5230	751	24.45	24.93
LTE B2	20	18925	1882.5	QPSK	1	0	925	1962.5	LTE B29	10	9715	722.5	24.40	24.93
LTE B2	20	18925	1882.5	QPSK	1	0	925	1962.5	LTE B30	10	9820	2355	24.33	24.93
LTE B4	20	20175	1732.5	QPSK	1	0	2175	2132.5	LTE B2	20	900	1960	24.49	24.99
LTE B4	20	20175	1732.5	QPSK	1	0	2175	2132.5	LTE B4	5	1980	2113	23.75	24.99
LTE B4	20	20175	1732.5	QPSK	1	0	2175	2132.5	LTE B5	10	2525	881.5	24.67	24.99
LTE B4	20	20175	1732.5	QPSK	1	0	2175	2132.5	LTE B12	10	5095	737.5	24.59	24.99
LTE B4	20	20175	1732.5	QPSK	1	0	2175	2132.5	LTE B13	10	5230	751	24.58	24.99
LTE B4	20	20175	1732.5	QPSK	1	0	2175	2132.5	LTE B29	10	9715	722.5	24.56	24.99
LTE B4	20	20175	1732.5	QPSK	1	0	2175	2132.5	LTE B30	10	9820	2355	24.51	24.99
LTE B5	10	20475	831.5	QPSK	1	0	2475	876.5	LTE B2	20	900	1960	23.84	24.15
LTE B5	10	20475	831.5	QPSK	1	0	2475	876.5	LTE B4	20	2175	2132.5	23.76	24.15
LTE B5	10	20475	831.5	QPSK	1	0	2475	876.5	LTE B30	10	9820	2355	23.75	24.15
LTE B12	10	23095	707.5	QPSK	1	0	5095	737.5	LTE B2	20	900	1960	23.98	24.86
LTE B12	10	23095	707.5	QPSK	1	0	5095	737.5	LTE B4	20	2175	2132.5	23.96	24.86
LTE B12	10	23095	707.5	QPSK	1	0	5095	737.5	LTE B30	10	9820	2355	23.95	24.86
LTE B13	10	23230	782	QPSK	1	49	5230	751	LTE B2	20	900	1960	23.68	24.07
LTE B13	10	23230	782	QPSK	1	49	5230	751	LTE B4	20	2175	2132.5	23.72	24.07
LTE B25	20	26365	1882.5	QPSK	1	0	8365	1962.5	LTE B25	5	8665	1992.5	24.67	24.93
LTE B30	10	27710	2310	QPSK	1	0	9820	2355	LTE B2	20	900	1960	22.39	22.50
LTE B30	10	27710	2310	QPSK	1	0	9820	2355	LTE B4	20	2175	2132.5	22.43	22.50
LTE B30	10	27710	2310	QPSK	1	0	9820	2355	LTE B5	10	2525	881.5	22.48	22.50
LTE B30	10	27710	2310	QPSK	1	0	9820	2355	LTE B12	10	5095	737.5	22.50	22.50
LTE B30	10	27710	2310	QPSK	1	0	9820	2355	LTE B29	10	9715	722.5	22.47	22.50
LTE B41	20	41490	2680	QPSK	1	0	41490	2680	LTE B41	20	41292	2660.2	23.89	24.15

Table 9-68
Three Component Carrier Maximum Conducted Powers

PCC									SCC				SCC				Power	
PCC Band	PCC Bandwidth [MHz]	PCC (UL) Channel	PCC (UL) Frequency [MHz]	Modulation	PCC UL# RB	PCC UL RB Offset	PCC (DL) Channel	PCC (DL) Frequency [MHz]	SCC Band	SCC Bandwidth [MHz]	SCC (DL) Channel	SCC (DL) Frequency [MHz]	SCC Band	SCC Bandwidth [MHz]	SCC (DL) Channel	SCC (DL) Frequency [MHz]	LTE Rel 10 Tx.Power (dBm)	LTE Rel. 8 Tx.Power (dBm)
LTE B2	20	18925	1882.5	QPSK	1	0	925	1962.5	LTE B4	20	2175	2132.5	LTE B12	10	5095	737.5	24.48	24.93
LTE B2	20	18925	1882.5	QPSK	1	0	925	1962.5	LTE B4	20	2175	2132.5	LTE B13	10	5230	751	24.42	24.93
LTE B2	20	18925	1882.5	QPSK	1	0	925	1962.5	LTE B5	10	2525	881.5	LTE B30	10	9820	2355	24.40	24.93
LTE B2	20	18925	1882.5	QPSK	1	0	925	1962.5	LTE B12	10	5095	737.5	LTE B30	10	9820	2355	24.38	24.93
LTE B2	20	18925	1882.5	QPSK	1	0	925	1962.5	LTE B29	10	9715	722.5	LTE B30	10	9820	2355	24.39	24.93
LTE B4	20	20175	1732.5	QPSK	1	0	2175	2132.5	LTE B2	20	900	1960	LTE B12	10	5095	737.5	24.41	24.99
LTE B4	20	20175	1732.5	QPSK	1	0	2175	2132.5	LTE B2	20	900	1960	LTE B13	10	5230	751	24.32	24.99
LTE B4	20	20175	1732.5	QPSK	1	0	2175	2132.5	LTE B4	5	1980	2113	LTE B12	10	5095	737.5	24.41	24.99
LTE B4	20	20175	1732.5	QPSK	1	0	2175	2132.5	LTE B5	10	2525	881.5	LTE B30	10	9820	2355	24.89	24.99
LTE B4	20	20175	1732.5	QPSK	1	0	2175	2132.5	LTE B12	10	5095	737.5	LTE B30	10	9820	2355	24.85	24.99
LTE B4	20	20175	1732.5	QPSK	1	0	2175	2132.5	LTE B29	10	9715	722.5	LTE B30	10	9820	2355	24.88	24.99
LTE B5	10	20475	831.5	QPSK	1	0	2475	876.5	LTE B2	20	900	1960	LTE B30	10	9820	2355	23.74	24.15
LTE B5	10	20475	831.5	QPSK	1	0	2475	876.5	LTE B4	20	2175	2132.5	LTE B30	10	9820	2355	23.73	24.15
LTE B12	10	23095	707.5	QPSK	1	0	5095	737.5	LTE B2	20	900	1960	LTE B30	10	9820	2355	23.93	24.86
LTE B12	10	23095	707.5	QPSK	1	0	5095	737.5	LTE B4	20	2175	2132.5	LTE B2	20	900	1960	24.04	24.86
LTE B13	10	23230	782	QPSK	1	49	5230	751	LTE B2	20	900	1960	LTE B4	20	2175	2132.5	23.75	24.07
LTE B30	10	27710	2310	QPSK	1	0	9820	2355	LTE B2	20	900	1960	LTE B5	10	2525	881.5	22.28	22.50
LTE B30	10	27710	2310	QPSK	1	0	9820	2355	LTE B2	20	900	1960	LTE B12	10	5095	737.5	22.25	22.50
LTE B30	10	27710	2310	QPSK	1	0	9820	2355	LTE B2	20	900	1960	LTE B29	10	9715	722.5	22.21	22.50
LTE B30	10	27710	2310	QPSK	1	0	9820	2355	LTE B4	20	2175	2132.5	LTE B5	10	2525	881.5	22.26	22.50
LTE B30	10	27710	2310	QPSK	1	0	9820	2355	LTE B4	20	2175	2132.5	LTE B12	10	5095	737.5	22.24	22.50
LTE B30	10	27710	2310	QPSK	1	0	9820	2355	LTE B4	20	2175	737.5	LTE B29	10	9715	722.5	22.25	22.50
LTE B41	20	41490	2680	QPSK	1	0	41490	2680	LTE B41	20	41292	2660.2	LTE B41	20	41094	2640.4	23.81	24.15

Table 9-69
Two Component Carrier Reduced Conducted Powers – Hotspot Mode Active

PCC									SCC				Power	
PCC Band	PCC Bandwidth [MHz]	PCC (UL) Channel	PCC (UL) Frequency [MHz]	Modulation	PCC UL# RB	PCC UL RB Offset	PCC (DL) Channel	PCC (DL) Frequency [MHz]	SCC Band	SCC Bandwidth [MHz]	SCC (DL) Channel	SCC (DL) Frequency [MHz]	LTE Rel 10 Tx.Power (dBm)	LTE Rel. 8 Tx.Power (dBm)
LTE B2	20	18925	1882.5	QPSK	1	0	925	1962.5	LTE B4	20	2175	2132.5	20.50	20.98
LTE B2	20	18925	1882.5	QPSK	1	0	925	1962.5	LTE B5	10	2525	881.5	20.49	20.98
LTE B2	20	18925	1882.5	QPSK	1	0	925	1962.5	LTE B12	10	5095	737.5	20.48	20.98
LTE B2	20	18925	1882.5	QPSK	1	0	925	1962.5	LTE B13	10	5230	751	20.49	20.98
LTE B2	20	18925	1882.5	QPSK	1	0	925	1962.5	LTE B29	10	9715	722.5	20.53	20.98
LTE B2	20	18925	1882.5	QPSK	1	0	925	1962.5	LTE B30	10	9820	2355	20.97	20.98
LTE B4	20	20175	1732.5	QPSK	1	0	2175	2132.5	LTE B2	20	900	1960	20.88	20.99
LTE B4	20	20175	1732.5	QPSK	1	0	2175	2132.5	LTE B4	5	1980	2113	20.89	20.99
LTE B4	20	20175	1732.5	QPSK	1	0	2175	2132.5	LTE B5	10	2525	881.5	20.80	20.99
LTE B4	20	20175	1732.5	QPSK	1	0	2175	2132.5	LTE B12	10	5095	737.5	20.82	20.99
LTE B4	20	20175	1732.5	QPSK	1	0	2175	2132.5	LTE B13	10	5230	751	20.75	20.99
LTE B4	20	20175	1732.5	QPSK	1	0	2175	2132.5	LTE B29	10	9715	722.5	20.93	20.99
LTE B4	20	20175	1732.5	QPSK	1	0	2175	2132.5	LTE B30	10	9820	2355	21.00	20.99
LTE B25	20	26365	1882.5	QPSK	1	0	8365	1962.5	LTE B25	5	8665	1992.5	20.73	20.98
LTE B30	10	27710	2310	QPSK	1	0	9820	2355	LTE B2	20	900	1960	19.53	19.47
LTE B30	10	27710	2310	QPSK	1	0	9820	2355	LTE B4	20	2175	2132.5	19.55	19.47
LTE B30	10	27710	2310	QPSK	1	0	9820	2355	LTE B5	10	2525	881.5	19.58	19.47
LTE B30	10	27710	2310	QPSK	1	0	9820	2355	LTE B12	10	5095	737.5	19.57	19.47
LTE B30	10	27710	2310	QPSK	1	0	9820	2355	LTE B29	10	9715	722.5	19.55	19.47
LTE B41	20	40185	2549.5	16QAM	1	0	40185	2549.5	LTE B41	20	40383	2569.3	21.78	22.33

Table 9-70
Three Component Carrier Reduced Conducted Powers – Hotspot Mode Active

PCC									SCC				SCC				Power	
PCC Band	PCC Bandwidth [MHz]	PCC (UL) Channel	PCC (UL) Frequency [MHz]	Modulation	PCC UL# RB	PCC UL RB Offset	PCC (DL) Channel	PCC (DL) Frequency [MHz]	SCC Band	SCC Bandwidth [MHz]	SCC (DL) Channel	SCC (DL) Frequency [MHz]	SCC Band	SCC Bandwidth [MHz]	SCC (DL) Channel	SCC (DL) Frequency [MHz]	LTE Rel 10 Tx.Power (dBm)	LTE Rel. 8 Tx.Power (dBm)
LTE B2	20	18925	1882.5	QPSK	1	0	925	1962.5	LTE B4	20	2175	2132.5	LTE B12	10	5095	737.5	20.98	20.98
LTE B2	20	18925	1882.5	QPSK	1	0	925	1962.5	LTE B4	20	2175	2132.5	LTE B13	10	5230	751	20.99	20.98
LTE B2	20	18925	1882.5	QPSK	1	0	925	1962.5	LTE B5	10	2525	881.5	LTE B30	10	9820	2355	20.96	20.98
LTE B2	20	18925	1882.5	QPSK	1	0	925	1962.5	LTE B12	10	5095	737.5	LTE B30	10	9820	2355	20.97	20.98
LTE B2	20	18925	1882.5	QPSK	1	0	925	1962.5	LTE B29	10	9715	722.5	LTE B30	10	9820	2355	20.98	20.98
LTE B4	20	20175	1732.5	QPSK	1	0	2175	2132.5	LTE B2	20	900	1960	LTE B12	10	5095	737.5	21.00	20.99
LTE B4	20	20175	1732.5	QPSK	1	0	2175	2132.5	LTE B2	20	900	1960	LTE B13	10	5230	751	21.00	20.99
LTE B4	20	20175	1732.5	QPSK	1	0	2175	2132.5	LTE B4	5	1980	2113	LTE B12	10	5095	737.5	20.89	20.99
LTE B4	20	20175	1732.5	QPSK	1	0	2175	2132.5	LTE B5	10	2525	881.5	LTE B30	10	9820	2355	21.00	20.99
LTE B4	20	20175	1732.5	QPSK	1	0	2175	2132.5	LTE B12	10	5095	737.5	LTE B30	10	9820	2355	20.95	20.99
LTE B4	20	20175	1732.5	QPSK	1	0	2175	2132.5	LTE B29	10	9715	722.5	LTE B30	10	9820	2355	20.91	20.99
LTE B30	10	27710	2310	QPSK	1	0	9820	2355	LTE B2	20	900	1960	LTE B5	10	2525	881.5	19.54	19.47
LTE B30	10	27710	2310	QPSK	1	0	9820	2355	LTE B2	20	900	1960	LTE B12	10	5095	737.5	19.52	19.47
LTE B30	10	27710	2310	QPSK	1	0	9820	2355	LTE B2	20	900	1960	LTE B29	10	9715	722.5	19.55	19.47
LTE B30	10	27710	2310	QPSK	1	0	9820	2355	LTE B4	20	2175	2132.5	LTE B5	10	2525	881.5	19.52	19.47
LTE B30	10	27710	2310	QPSK	1	0	9820	2355	LTE B4	20	2175	2132.5	LTE B12	10	5095	737.5	19.59	19.47
LTE B30	10	27710	2310	QPSK	1	0	9820	2355	LTE B4	20	2175	737.5	LTE B29	10	9715	722.5	19.57	19.47
LTE B41	20	40185	2549.5	16QAM	1	0	40185	2549.5	LTE B41	20	40383	2569.3	LTE B41	20	40581	2589.1	21.86	22.33

Notes:

1. The device only supports downlink Carrier Aggregation. Uplink Carrier Aggregation is not supported. For every supported combination of downlink carrier aggregation, power measurements were performed with the downlink carrier aggregation active for the configuration with highest measured maximum conducted power with downlink carrier aggregation inactive measured among the channel bandwidth, modulation, and RB combinations in each frequency band.
2. All control and acknowledge data is sent on uplink channels that operate identical to specifications when downlink carrier aggregation is inactive.
3. Since the supported frequency span for LTE B2 falls completely within the supported frequency span for LTE B25, both LTE bands have the same target power, and both LTE bands share the same transmission path, the configuration with the highest conducted power from LTE B25 was used to assess LTE CA combinations with LTE B2. The conducted powers for LTE B25(PCC)+LTE B25 (SCC) are used to confirm that no SAR tests were required for the LTE B2 (PCC)+LTE B2 (SCC) scenario.

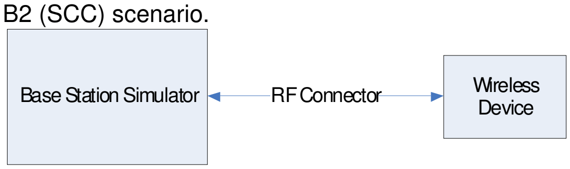

Figure 9-4
Power Measurement Setup

9.5 WLAN Conducted Powers

Table 9-71
2.4 GHz WLAN Maximum Average RF Power – Antenna 1

2.4GHz Conducted Power [dBm]				
Freq [MHz]	Channel	IEEE Transmission Mode		
		802.11b	802.11g	802.11n
2412	1	20.19	17.44	16.12
2437	6	**20.31**	17.43	18.46
2462	11	20.24	17.42	18.36

Table 9-72
2.4 GHz WLAN Maximum Average RF Power – Antenna 2

2.4GHz Conducted Power [dBm]				
Freq [MHz]	Channel	IEEE Transmission Mode		
		802.11b	802.11g	802.11n
2412	1	20.23	17.86	16.17
2437	6	**20.42**	17.78	17.61
2462	11	19.36	17.59	17.98

Table 9-73
2.4 GHz WLAN Reduced Average RF Power – Antenna 1 (Held to Ear, Airplane Mode Off)

2.4GHz Conducted Power [dBm]				
Freq [MHz]	Channel	IEEE Transmission Mode		
		802.11b	802.11g	802.11n
2412	1	13.10	12.95	13.05
2437	6	**13.40**	13.11	13.22
2462	11	13.35	13.02	13.35

Table 9-74
2.4 GHz WLAN Reduced Average RF Power – Antenna 2 (Held to Ear, Airplane Mode Off)

2.4GHz Conducted Power [dBm]				
Freq [MHz]	Channel	IEEE Transmission Mode		
		802.11b	802.11g	802.11n
2412	1	13.39	13.30	13.25
2437	6	**13.40**	13.32	13.36
2462	11	12.52	13.25	13.29

Table 9-75
2.4 GHz WLAN Reduced Average RF Power – Antenna 1 (Held to Ear, Airplane Mode On)

2.4GHz Conducted Power [dBm]				
Freq [MHz]	Channel	IEEE Transmission Mode		
		802.11b	802.11g	802.11n
2412	1	16.89	16.67	15.04
2437	6	**17.23**	16.49	16.74
2462	11	16.70	16.47	17.40

Table 9-76
2.4 GHz WLAN Reduced Average RF Power – Antenna 2 (Held to Ear, Airplane Mode On)

2.4GHz Conducted Power [dBm]				
Freq [MHz]	Channel	IEEE Transmission Mode		
		802.11b	802.11g	802.11n
2412	1	16.79	16.99	14.62
2437	6	16.99	17.02	16.85
2462	11	**17.43**	16.72	17.11

Table 9-77
5 GHz WLAN Maximum Average RF Power – Antenna 1

5GHz (20MHz) Conducted Power [dBm]				
Freq [MHz]	Channel	IEEE Transmission Mode		
		802.11a	802.11n	802.11ac
5180	36	14.74	14.64	14.56
5200	40	16.86	16.73	16.86
5220	44	16.82	16.77	16.93
5240	48	16.90	16.73	16.97
5260	52	**17.48**	16.72	16.83
5280	56	17.43	16.79	16.78
5300	60	17.36	16.73	16.74
5320	64	14.64	14.49	15.40
5500	100	14.66	14.67	15.43
5520	104	16.66	16.76	16.67
5600	120	**17.09**	16.73	16.78
5620	124	16.64	16.76	16.75
5720	144	16.92	17.06	16.80
5745	149	17.11	17.00	17.04
5785	157	**17.22**	17.06	16.99
5805	161	17.21	17.04	16.98
5825	165	15.49	15.44	15.13

Table 9-78
5 GHz WLAN Maximum Average RF Power – Antenna 2

5GHz (20MHz) Conducted Power [dBm]				
Freq [MHz]	Channel	IEEE Transmission Mode		
		802.11a	802.11n	802.11ac
5180	36	14.94	14.95	14.93
5200	40	17.31	17.29	17.31
5220	44	17.28	17.27	17.35
5240	48	17.44	17.34	17.34
5260	52	17.34	17.21	17.18
5280	56	**17.43**	17.22	17.31
5300	60	17.22	17.36	17.30
5320	64	15.35	15.11	15.15
5500	100	15.19	15.05	15.14
5520	104	16.92	16.69	16.65
5600	120	17.05	17.05	17.07
5620	124	17.08	17.06	17.03
5720	144	**17.44**	17.27	17.38
5745	149	16.58	16.48	16.46
5785	157	**16.69**	16.64	16.64
5805	161	16.68	16.60	16.62
5825	165	15.49	15.31	15.32

Table 9-79
5 GHz WLAN Reduced Average RF Power – Antenna 1 (Held to Ear, Airplane Mode On/Off)

5GHz (20MHz) Conducted Power [dBm]				
Freq [MHz]	Channel	IEEE Transmission Mode		
		802.11a	802.11n	802.11ac
5180	36	9.75	9.43	9.47
5200	40	9.65	9.51	9.45
5220	44	9.72	9.49	9.51
5240	48	9.80	9.48	9.45
5260	52	**9.52**	9.39	9.23
5280	56	9.51	9.48	9.45
5300	60	9.43	9.51	9.51
5320	64	9.45	9.45	9.30
5500	100	9.40	9.35	9.31
5600	120	**9.70**	9.52	9.51
5620	124	9.42	9.50	9.30
5720	144	9.59	9.55	9.50
5745	149	10.45	10.40	10.35
5785	157	10.48	10.47	10.42
5825	165	**10.49**	10.40	10.44

Table 9-80
5 GHz WLAN Reduced Average RF Power – Antenna 2 (Held to Ear, Airplane Mode On/Off)

5GHz (20MHz) Conducted Power [dBm]				
Freq [MHz]	Channel	IEEE Transmission Mode		
		802.11a	802.11n	802.11ac
5180	36	10.02	9.88	9.95
5200	40	9.95	9.90	9.91
5220	44	9.90	9.95	9.85
5240	48	10.00	9.93	9.94
5260	52	9.98	9.72	9.94
5280	56	**10.08**	9.80	9.91
5300	60	9.95	9.85	9.88
5320	64	9.90	9.90	9.90
5500	100	9.69	9.40	9.60
5600	120	10.12	9.75	9.80
5620	124	9.90	9.76	9.85
5720	144	**10.20**	9.95	10.00
5745	149	9.38	9.40	9.44
5785	157	**9.52**	9.50	9.45
5825	165	9.51	9.40	9.47

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

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

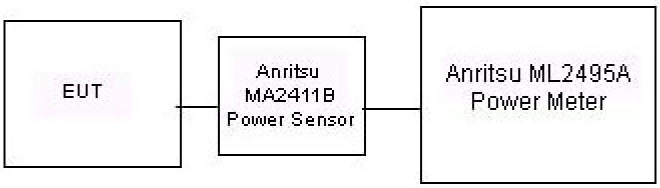

Figure 9-5
Power Measurement Setup

10 SYSTEM VERIFICATION

10.1 Tissue Verification

Table 10-1
Measured Tissue Properties – Head

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
12/24/2015	750H	22.7	700	0.845	42.781	0.889	42.201	-4.95%	1.37%
			710	0.856	42.709	0.890	42.149	-3.82%	1.33%
			740	0.885	42.256	0.893	41.994	-0.90%	0.62%
			755	0.896	42.043	0.894	41.916	0.22%	0.30%
12/26/2015	750H	23.0	740	0.887	41.972	0.893	41.994	-0.67%	-0.05%
			755	0.901	41.791	0.894	41.916	0.78%	-0.30%
			770	0.916	41.603	0.895	41.838	2.35%	-0.56%
			785	0.930	41.385	0.896	41.760	3.79%	-0.90%
12/20/2015	835H	21.0	820	0.890	40.571	0.899	41.578	-1.00%	-2.42%
			835	0.901	40.356	0.900	41.500	0.11%	-2.76%
			850	0.919	40.227	0.916	41.500	0.33%	-3.07%
12/23/2015	835H	22.7	820	0.896	40.019	0.899	41.578	-0.33%	-3.75%
			835	0.912	39.854	0.900	41.500	1.33%	-3.97%
			850	0.925	39.585	0.916	41.500	0.98%	-4.61%
12/09/2015	1750H	22.6	1710	1.310	39.139	1.348	40.142	-2.82%	-2.50%
			1750	1.351	38.950	1.371	40.079	-1.46%	-2.82%
			1790	1.390	38.788	1.394	40.016	-0.29%	-3.07%
12/11/2015	1750H	22.5	1710	1.302	38.926	1.348	40.142	-3.41%	-3.03%
			1750	1.345	38.782	1.371	40.079	-1.90%	-3.24%
			1790	1.383	38.614	1.394	40.016	-0.79%	-3.50%
12/06/2015	1900H	22.3	1850	1.348	38.467	1.400	40.000	-3.71%	-3.83%
			1880	1.358	38.293	1.400	40.000	-3.00%	-4.27%
			1910	1.413	38.136	1.400	40.000	0.93%	-4.66%
12/10/2015	1900H	22.0	1850	1.373	38.534	1.400	40.000	-1.93%	-3.67%
			1880	1.402	38.410	1.400	40.000	0.14%	-3.98%
			1910	1.433	38.276	1.400	40.000	2.36%	-4.31%
12/16/2015	1900H	22.6	1850	1.366	40.651	1.400	40.000	-2.43%	1.63%
			1880	1.401	40.518	1.400	40.000	0.07%	1.30%
			1910	1.431	40.367	1.400	40.000	2.21%	0.92%
12/04/2015	2300H	22.0	2300	1.707	38.971	1.670	39.500	2.22%	-1.34%
			2310	1.719	38.921	1.679	39.480	2.38%	-1.42%
			2320	1.727	38.923	1.687	39.460	2.37%	-1.36%
12/30/2015	2450H	24.2	2400	1.786	39.857	1.756	39.289	1.71%	1.45%
			2450	1.844	39.649	1.800	39.200	2.44%	1.15%
			2500	1.903	39.459	1.855	39.136	2.59%	0.83%
12/18/2015	2600H	24.1	2600	2.036	39.420	1.964	39.009	3.67%	1.05%
			2650	2.094	39.209	2.018	38.945	3.77%	0.68%
			2700	2.153	39.009	2.073	38.882	3.86%	0.33%
12/09/2015	5200H-5800H	21.5	5240	4.506	35.856	4.696	35.940	-4.05%	-0.23%
			5260	4.530	35.804	4.717	35.917	-3.96%	-0.31%
			5280	4.547	35.762	4.737	35.894	-4.01%	-0.37%
			5600	4.874	35.336	5.065	35.529	-3.77%	-0.54%
			5700	4.982	35.197	5.168	35.414	-3.60%	-0.61%
			5745	5.024	35.140	5.214	35.363	-3.64%	-0.63%
			5765	5.044	35.168	5.234	35.340	-3.63%	-0.49%
			5785	5.064	35.122	5.255	35.317	-3.63%	-0.55%
			5825	5.109	35.055	5.296	35.271	-3.53%	-0.61%

Table 10-2
Measured Tissue Properties – Body

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
12/24/2015	750B	24.0	700	0.919	54.789	0.959	55.726	-4.17%	-1.68%
			710	0.928	54.677	0.960	55.687	-3.33%	-1.81%
			740	0.959	54.371	0.963	55.570	-0.42%	-2.16%
			755	0.970	54.246	0.964	55.512	0.62%	-2.28%
12/26/2015	750B	23.0	740	0.947	53.672	0.963	55.570	-1.66%	-3.42%
			755	0.963	53.516	0.964	55.512	-0.10%	-3.60%
			770	0.978	53.349	0.965	55.453	1.35%	-3.79%
			785	0.992	53.173	0.966	55.395	2.69%	-4.01%
12/14/2015	835B	22.0	820	0.969	52.912	0.969	55.258	0.00%	-4.25%
			835	0.988	52.786	0.970	55.200	1.86%	-4.37%
			850	1.000	52.700	0.988	55.154	1.21%	-4.45%
12/24/2015	835B	23.5	820	0.981	54.382	0.969	55.258	1.24%	-1.59%
			835	0.990	54.286	0.970	55.200	2.06%	-1.66%
			850	1.007	54.133	0.988	55.154	1.92%	-1.85%
12/28/2015	835B	22.1	820	0.974	53.110	0.969	55.258	0.52%	-3.89%
			835	0.986	53.157	0.970	55.200	1.65%	-3.70%
			850	1.006	52.976	0.988	55.154	1.82%	-3.95%
12/11/2015	1750B	23.1	1710	1.408	51.767	1.463	53.537	-3.76%	-3.31%
			1750	1.451	51.645	1.488	53.432	-2.49%	-3.34%
			1790	1.494	51.523	1.514	53.326	-1.32%	-3.38%
01/01/2016	1750B	22.4	1710	1.410	51.850	1.463	53.537	-3.62%	-3.15%
			1750	1.455	51.707	1.488	53.432	-2.22%	-3.23%
			1790	1.494	51.570	1.514	53.326	-1.32%	-3.29%
12/06/2015	1900B	22.0	1850	1.502	51.694	1.520	53.300	-1.18%	-3.01%
			1880	1.531	51.519	1.520	53.300	0.72%	-3.34%
			1910	1.574	51.414	1.520	53.300	3.55%	-3.54%
12/09/2015	1900B	23.5	1850	1.445	52.344	1.520	53.300	-4.93%	-1.79%
			1880	1.480	52.333	1.520	53.300	-2.63%	-1.81%
			1910	1.507	52.189	1.520	53.300	-0.86%	-2.08%
12/11/2015	1900B	24.2	1850	1.465	52.327	1.520	53.300	-3.62%	-1.83%
			1880	1.499	52.211	1.520	53.300	-1.38%	-2.04%
			1910	1.535	52.109	1.520	53.300	0.99%	-2.23%
12/13/2015	1900B	22.0	1850	1.459	53.802	1.520	53.300	-4.01%	0.94%
			1880	1.494	53.718	1.520	53.300	-1.71%	0.78%
			1910	1.528	53.586	1.520	53.300	0.53%	0.54%
12/31/2015	1900B	22.8	1850	1.510	52.281	1.520	53.300	-0.66%	-1.91%
			1880	1.547	52.243	1.520	53.300	1.78%	-1.98%
			1910	1.574	52.134	1.520	53.300	3.55%	-2.19%
12/07/2015	2300B	21.6	2300	1.775	51.395	1.809	52.900	-1.88%	-2.84%
			2310	1.797	51.411	1.816	52.887	-1.05%	-2.79%
			2320	1.810	51.406	1.826	52.873	-0.88%	-2.77%
12/16/2015	2300B	23.1	2300	1.739	51.303	1.809	52.900	-3.87%	-3.02%
			2310	1.759	51.275	1.816	52.887	-3.14%	-3.05%
			2320	1.767	51.229	1.826	52.873	-3.23%	-3.11%
12/07/2015	2450B	21.6	2400	1.905	50.985	1.902	52.767	0.16%	-3.38%
			2450	1.987	50.916	1.950	52.700	1.90%	-3.39%
			2500	2.044	50.751	2.021	52.636	1.14%	-3.58%
12/08/2015	2450B	22.9	2400	1.921	51.268	1.902	52.767	1.00%	-2.84%
			2450	2.005	51.127	1.950	52.700	2.82%	-2.98%
			2500	2.063	50.939	2.021	52.636	2.08%	-3.22%
12/17/2015	2600B	22.4	2500	2.049	51.182	2.021	52.636	1.39%	-2.76%
			2550	2.119	50.956	2.092	52.573	1.29%	-3.08%
			2600	2.187	50.802	2.163	52.509	1.11%	-3.25%
			2650	2.256	50.574	2.234	52.445	0.98%	-3.57%
			2700	2.331	50.397	2.305	52.382	1.13%	-3.79%

Table 10-3
Measured Tissue Properties – Body (Cont.)

Calibrated for Tests Performed on:	Tissue Type	Tissue Temp During Calibration (C°)	Measured Frequency (MHz)	Measured Conductivity, σ (S/m)	Measured Dielectric Constant, ε	TARGET Conductivity, σ (S/m)	TARGET Dielectric Constant, ε	% dev σ	% dev ε
01/04/2016	2450B-2600B	21.2	2450	2.016	50.810	1.950	52.700	3.38%	-3.59%
			2500	2.083	50.619	2.021	52.636	3.07%	-3.83%
			2550	2.157	50.425	2.092	52.573	3.11%	-4.09%
			2600	2.224	50.245	2.163	52.509	2.82%	-4.31%
			2650	2.296	50.042	2.234	52.445	2.78%	-4.58%
			2700	2.371	49.851	2.305	52.382	2.86%	-4.83%
12/08/2015	5200B-5800B	23.9	5260	5.299	47.597	5.369	48.933	-1.30%	-2.73%
			5280	5.325	47.579	5.393	48.906	-1.26%	-2.71%
			5300	5.348	47.518	5.416	48.879	-1.26%	-2.78%
			5600	5.731	47.065	5.766	48.471	-0.61%	-2.90%
			5700	5.868	46.919	5.883	48.336	-0.25%	-2.93%
			5745	5.929	46.842	5.936	48.275	-0.12%	-2.97%
			5785	5.975	46.816	5.982	48.220	-0.12%	-2.91%
			5800	6.000	46.734	6.000	48.200	0.00%	-3.04%

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

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 10-4
System Verification Results – Head

System Verification TARGET & MEASURED												
SAR System #	Tissue Frequency (MHz)	Tissue Type	Date:	Amb. Temp (℃)	Liquid Temp (℃)	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)	$Deviation_{1g}$ (%)
K	750	HEAD	12/24/2015	23.8	23.2	0.200	1003	3022	1.570	8.090	7.850	-2.97%
K	750	HEAD	12/26/2015	23.0	23.0	0.200	1003	3022	1.730	8.090	8.650	6.92%
J	835	HEAD	12/20/2015	19.3	20.7	0.200	4d133	3319	1.810	9.130	9.050	-0.88%
J	835	HEAD	12/23/2015	23.5	22.7	0.200	4d133	3319	1.790	9.130	8.950	-1.97%
K	1750	HEAD	12/09/2015	24.5	22.8	0.100	1051	3022	3.490	36.200	34.900	-3.59%
H	1750	HEAD	12/11/2015	23.9	22.5	0.100	1051	3263	3.780	36.200	37.800	4.42%
K	1900	HEAD	12/06/2015	22.8	22.1	0.100	5d149	3022	3.930	40.700	39.300	-3.44%
G	1900	HEAD	12/10/2015	19.8	22.0	0.100	5d141	3334	4.100	39.900	41.000	2.76%
K	1900	HEAD	12/16/2015	22.7	22.6	0.100	5d149	3022	4.210	40.700	42.100	3.44%
H	2300	HEAD	12/04/2015	21.9	22.0	0.100	1008	3263	5.170	49.900	51.700	3.61%
I	2450	HEAD	12/30/2015	24.0	24.2	0.100	719	3333	5.130	54.200	51.300	-5.35%
I	2600	HEAD	12/18/2015	23.9	24.1	0.100	1004	3333	5.440	55.800	54.400	-2.51%
E	5250	HEAD	12/09/2015	23.2	21.4	0.050	1191	7308	3.900	82.500	78.000	-5.45%
E	5600	HEAD	12/09/2015	23.2	21.4	0.050	1191	7308	4.200	84.500	84.000	-0.59%
E	5750	HEAD	12/09/2015	23.2	21.4	0.050	1191	7308	3.760	80.000	75.200	-6.00%

Table 10-5
System Verification Results – Body

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)	$Deviation_{1g}$ (%)
K	750	BODY	12/24/2015	23.5	23.7	0.200	1003	3022	1.680	8.460	8.400	-0.71%
K	750	BODY	12/26/2015	22.3	23.0	0.200	1003	3022	1.690	8.460	8.450	-0.12%
H	835	BODY	12/14/2015	24.0	23.1	0.200	4d119	3263	1.950	9.200	9.750	5.98%
H	835	BODY	12/24/2015	23.7	23.5	0.200	4d133	3263	1.900	9.250	9.500	2.70%
H	835	BODY	12/28/2015	23.7	22.1	0.200	4d133	3263	1.950	9.250	9.750	5.41%
K	1750	BODY	12/11/2015	23.5	23.0	0.100	1051	3022	3.510	37.100	35.100	-5.39%
G	1750	BODY	01/01/2016	23.5	22.4	0.100	1051	3334	3.570	37.100	35.700	-3.77%
I	1900	BODY	12/06/2015	23.7	22.0	0.100	5d149	3333	4.360	40.400	43.600	7.92%
I	1900	BODY	12/09/2015	24.3	23.5	0.100	5d141	3333	4.280	40.000	42.800	7.00%
I	1900	BODY	12/11/2015	24.2	23.0	0.100	5d149	3333	4.060	40.400	40.600	0.50%
I	1900	BODY	12/13/2015	24.4	22.0	0.100	5d141	3333	3.810	40.000	38.100	-4.75%
J	1900	BODY	12/31/2015	23.0	22.8	0.100	5d149	3319	4.030	40.400	40.300	-0.25%
J	2300	BODY	12/07/2015	22.5	22.0	0.100	1008	3319	4.700	48.100	47.000	-2.29%
G	2300	BODY	12/16/2015	21.2	23.2	0.100	1008	3334	4.710	48.100	47.100	-2.08%
J	2450	BODY	12/07/2015	22.5	22.0	0.100	719	3319	5.070	51.900	50.700	-2.31%
G	2450	BODY	12/08/2015	20.3	22.3	0.100	719	3334	5.310	51.900	53.100	2.31%
G	2450	BODY	01/04/2016	23.5	22.0	0.100	719	3334	5.260	51.900	52.600	1.35%
G	2600	BODY	12/17/2015	21.9	22.2	0.100	1004	3334	5.310	56.200	53.100	-5.52%
G	2600	BODY	01/04/2016	23.5	22.0	0.100	1004	3334	5.640	56.200	56.400	0.36%
D	5300	BODY	12/08/2015	24.6	23.7	0.050	1057	7357	3.810	74.200	76.200	2.70%
D	5600	BODY	12/08/2015	24.5	23.7	0.050	1057	7357	3.840	77.700	76.800	-1.16%
D	5800	BODY	12/08/2015	24.5	23.7	0.050	1057	7357	3.690	75.100	73.800	-1.73%

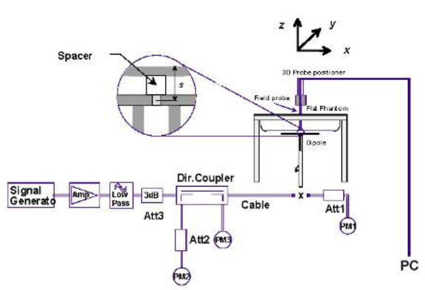

Figure 10-1
System Verification Setup Diagram

Figure 10-2
System Verification Setup Photo

11 SAR DATA SUMMARY

11.1 Standalone Head SAR Data

Table 11-1
GSM 850 Head SAR

MEASUREMENT RESULTS													
FREQUENCY		Mode/Band	Service	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Power Drift [dB]	Side	Test Position	Device Serial Number	Duty Cycle	SAR (1g)	Scaling Factor	Reported SAR (1g)	Plot #
MHz	Ch.										(W/kg)		(W/kg)	
836.60	190	GSM 850	GSM	33.5	32.09	0.10	Right	Cheek	C3D8C	1:8.3	0.110	1.384	0.152	A1
836.60	190	GSM 850	GSM	33.5	32.09	0.01	Right	Tilt	C3D8C	1:8.3	0.059	1.384	0.082	
836.60	190	GSM 850	GSM	33.5	32.09	0.12	Left	Cheek	C3D8C	1:8.3	0.074	1.384	0.102	
836.60	190	GSM 850	GSM	33.5	32.09	0.09	Left	Tilt	C3D8C	1:8.3	0.058	1.384	0.080	
ANSI / IEEE C95.1 1992 - SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population							Head 1.6 W/kg (mW/g) averaged over 1 gram							

Table 11-2
GSM 1900 Head SAR

MEASUREMENT RESULTS														
FREQUENCY		Mode/Band	Service	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Power Drift [dB]	Side	Test Position	Device Serial Number	Duty Cycle	SAR (1g)	Scaling Factor	Reported SAR (1g)	Plot #
MHz	Ch.										(W/kg)		(W/kg)	
1880.00	661	GSM 1900	GSM	30.5	29.26	0.04	Right	Cheek	C3D11	1:8.3	0.084	1.330	0.112	A2
1880.00	661	GSM 1900	GSM	30.5	29.26	-0.13	Right	Tilt	C3D11	1:8.3	0.023	1.330	0.031	
1880.00	661	GSM 1900	GSM	30.5	29.26	-0.12	Left	Cheek	C3D11	1:8.3	0.059	1.330	0.078	
1880.00	661	GSM 1900	GSM	30.5	29.26	0.16	Left	Tilt	C3D11	1:8.3	0.024	1.330	0.032	
ANSI / IEEE C95.1 1992 - SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population							Head 1.6 W/kg (mW/g) averaged over 1 gram							

Table 11-3
UMTS 850 Head SAR

MEASUREMENT RESULTS																
FREQUENCY		Mode/Band	Service	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Power Drift [dB]	Side	Test Position	Antenna Config.	State	Device Serial Number	Duty Cycle	SAR (1g)	Scaling Factor	Reported SAR (1g)	Plot #
MHz	Ch.												(W/kg)		(W/kg)	
836.60	4183	UMTS 850	RMC	25.0	25.00	-0.10	Right	Cheek	Ant A	38	C3D8C	1:1	0.165	1.000	0.165	
836.60	4183	UMTS 850	RMC	25.0	25.00	-0.10	Right	Tilt	Ant A	38	C3D8C	1:1	0.089	1.000	0.089	
836.60	4183	UMTS 850	RMC	25.0	25.00	0.12	Left	Cheek	Ant A	38	C3D8C	1:1	0.160	1.000	0.160	
836.60	4183	UMTS 850	RMC	25.0	25.00	0.13	Left	Tilt	Ant A	38	C3D8C	1:1	0.099	1.000	0.099	
836.60	4183	UMTS 850	RMC	21.5	21.45	0.07	Right	Cheek	Ant B	N/A	C3D9A	1:1	0.549	1.012	0.556	
836.60	4183	UMTS 850	RMC	21.5	21.45	0.06	Right	Tilt	Ant B	N/A	C3D9A	1:1	0.496	1.012	0.502	
836.60	4183	UMTS 850	RMC	21.5	21.45	-0.02	Left	Cheek	Ant B	N/A	C3D9A	1:1	0.610	1.012	**0.617**	A3
836.60	4183	UMTS 850	RMC	21.5	21.45	-0.03	Left	Tilt	Ant B	N/A	C3D9A	1:1	0.422	1.012	0.427	
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 1750 Head SAR

MEASUREMENT RESULTS														
FREQUENCY		Mode/Band	Service	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Power Drift [dB]	Side	Test Position	Device Serial Number	Duty Cycle	SAR (1g)	Scaling Factor	Reported SAR (1g)	Plot #
MHz	Ch.										(W/kg)		(W/kg)	
1732.40	1412	UMTS 1750	RMC	25.0	23.82	-0.02	Right	Cheek	C3D97	1:1	0.152	1.312	0.199	
1732.40	1412	UMTS 1750	RMC	25.0	23.82	0.01	Right	Tilt	C3D97	1:1	0.108	1.312	0.142	
1732.40	1412	UMTS 1750	RMC	25.0	23.82	-0.20	Left	Cheek	C3D97	1:1	0.218	1.312	0.286	A4
1732.40	1412	UMTS 1750	RMC	25.0	23.82	-0.03	Left	Tilt	C3D97	1:1	0.113	1.312	0.148	
ANSI / IEEE C95.1 1992 - SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population							Head 1.6 W/kg (mW/g) averaged over 1 gram							

Table 11-5
UMTS 1900 Head SAR

MEASUREMENT RESULTS														
FREQUENCY		Mode/Band	Service	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Power Drift [dB]	Side	Test Position	Device Serial Number	Duty Cycle	SAR (1g)	Scaling Factor	Reported SAR (1g)	Plot #
MHz	Ch.										(W/kg)		(W/kg)	
1880.00	9400	UMTS 1900	RMC	25.0	23.88	0.03	Right	Cheek	C3D97	1:1	0.180	1.294	0.233	A5
1880.00	9400	UMTS 1900	RMC	25.0	23.88	0.21	Right	Tilt	C3D97	1:1	0.039	1.294	0.050	
1880.00	9400	UMTS 1900	RMC	25.0	23.88	0.09	Left	Cheek	C3D97	1:1	0.167	1.294	0.216	
1880.00	9400	UMTS 1900	RMC	25.0	23.88	0.15	Left	Tilt	C3D97	1:1	0.044	1.294	0.057	
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
CDMA BC10 (§90S) Head SAR

MEASUREMENT RESULTS																
FREQUENCY		Mode/Band	Service	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Power Drift [dB]	Side	Test Position	Antenna Config.	State	Device Serial Number	Duty Cycle	SAR (1g)	Scaling Factor	Reported SAR (1g)	Plot #
MHz	Ch.												(W/kg)		(W/kg)	
820.10	564	CDMA BC10 (§90S)	RC3 / SO55	25.0	23.87	0.16	Right	Cheek	Ant A	39	C3D2E	1:1	0.192	1.297	0.249	
820.10	564	CDMA BC10 (§90S)	RC3 / SO55	25.0	23.87	-0.04	Right	Tilt	Ant A	39	C3D2E	1:1	0.087	1.297	0.113	
820.10	564	CDMA BC10 (§90S)	RC3 / SO55	25.0	23.87	-0.03	Left	Cheek	Ant A	39	C3D2E	1:1	0.120	1.297	0.156	
820.10	564	CDMA BC10 (§90S)	RC3 / SO55	25.0	23.87	0.06	Left	Tilt	Ant A	39	C3D2E	1:1	0.095	1.297	0.123	
820.10	564	CDMA BC10 (§90S)	EVDO Rev. A	25.0	23.85	0.03	Right	Cheek	Ant A	39	C3D2E	1:1	0.191	1.303	0.249	
820.10	564	CDMA BC10 (§90S)	EVDO Rev. A	25.0	23.85	0.00	Right	Tilt	Ant A	39	C3D2E	1:1	0.086	1.303	0.112	
820.10	564	CDMA BC10 (§90S)	EVDO Rev. A	25.0	23.85	0.04	Left	Cheek	Ant A	39	C3D2E	1:1	0.095	1.303	0.124	
820.10	564	CDMA BC10 (§90S)	EVDO Rev. A	25.0	23.85	0.04	Left	Tilt	Ant A	39	C3D2E	1:1	0.100	1.303	0.130	
820.10	564	CDMA BC10 (§90S)	RC3 / SO55	21.0	20.58	0.09	Right	Cheek	Ant B	N/A	C3D13	1:1	0.443	1.102	0.488	
820.10	564	CDMA BC10 (§90S)	RC3 / SO55	21.0	20.58	0.13	Right	Tilt	Ant B	N/A	C3D13	1:1	0.338	1.102	0.372	
820.10	564	CDMA BC10 (§90S)	RC3 / SO55	21.0	20.58	0.01	Left	Cheek	Ant B	N/A	C3D13	1:1	0.400	1.102	0.441	
820.10	564	CDMA BC10 (§90S)	RC3 / SO55	21.0	20.58	-0.04	Left	Tilt	Ant B	N/A	C3D13	1:1	0.263	1.102	0.290	
820.10	564	CDMA BC10 (§90S)	EVDO Rev. A	21.0	20.74	0.07	Right	Cheek	Ant B	N/A	C3D13	1:1	0.422	1.062	0.448	
820.10	564	CDMA BC10 (§90S)	EVDO Rev. A	21.0	20.74	0.01	Right	Tilt	Ant B	N/A	C3D13	1:1	0.331	1.062	0.352	
820.10	564	CDMA BC10 (§90S)	EVDO Rev. A	21.0	20.74	-0.01	Left	Cheek	Ant B	N/A	C3D13	1:1	0.451	1.062	0.479	A6
820.10	564	CDMA BC10 (§90S)	EVDO Rev. A	21.0	20.74	-0.03	Left	Tilt	Ant B	N/A	C3D13	1:1	0.295	1.062	0.313	
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
CDMA BC0 (§22H) Head SAR

MEASUREMENT RESULTS																
FREQUENCY		Mode/Band	Service	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Power Drift [dB]	Side	Test Position	Antenna Config.	State	Device Serial Number	Duty Cycle	SAR (1g)	Scaling Factor	Reported SAR (1g)	Plot #
MHz	Ch.												(W/kg)		(W/kg)	
836.52	384	CDMA BC0 (§22H)	RC3 / SO55	25.0	24.06	0.04	Right	Cheek	Ant A	39	C3D2E	1:1	0.214	1.242	0.266	
836.52	384	CDMA BC0 (§22H)	RC3 / SO55	25.0	24.06	0.03	Right	Tilt	Ant A	39	C3D2E	1:1	0.095	1.242	0.118	
836.52	384	CDMA BC0 (§22H)	RC3 / SO55	25.0	24.06	0.09	Left	Cheek	Ant A	39	C3D2E	1:1	0.142	1.242	0.176	
836.52	384	CDMA BC0 (§22H)	RC3 / SO55	25.0	24.06	0.01	Left	Tilt	Ant A	39	C3D2E	1:1	0.102	1.242	0.127	
836.52	384	CDMA BC0 (§22H)	EVDO Rev. A	25.0	24.00	0.02	Right	Cheek	Ant A	39	C3D2E	1:1	0.221	1.259	0.278	
836.52	384	CDMA BC0 (§22H)	EVDO Rev. A	25.0	24.00	-0.07	Right	Tilt	Ant A	39	C3D2E	1:1	0.087	1.259	0.110	
836.52	384	CDMA BC0 (§22H)	EVDO Rev. A	25.0	24.00	-0.01	Left	Cheek	Ant A	39	C3D2E	1:1	0.126	1.259	0.159	
836.52	384	CDMA BC0 (§22H)	EVDO Rev. A	25.0	24.00	0.06	Left	Tilt	Ant A	39	C3D2E	1:1	0.109	1.259	0.137	
824.70	1013	CDMA BC0 (§22H)	RC3 / SO55	21.0	21.00	-0.04	Right	Cheek	Ant B	N/A	C3D9A	1:1	0.564	1.000	0.564	A7
824.70	1013	CDMA BC0 (§22H)	RC3 / SO55	21.0	21.00	0.08	Right	Tilt	Ant B	N/A	C3D9A	1:1	0.411	1.000	0.411	
824.70	1013	CDMA BC0 (§22H)	RC3 / SO55	21.0	21.00	-0.02	Left	Cheek	Ant B	N/A	C3D9A	1:1	0.476	1.000	0.476	
824.70	1013	CDMA BC0 (§22H)	RC3 / SO55	21.0	21.00	-0.09	Left	Tilt	Ant B	N/A	C3D9A	1:1	0.326	1.000	0.326	
824.70	1013	CDMA BC0 (§22H)	EVDO Rev. A	21.0	20.98	-0.05	Right	Cheek	Ant B	N/A	C3D9A	1:1	0.531	1.005	0.534	
824.70	1013	CDMA BC0 (§22H)	EVDO Rev. A	21.0	20.98	-0.07	Right	Tilt	Ant B	N/A	C3D9A	1:1	0.428	1.005	0.430	
824.70	1013	CDMA BC0 (§22H)	EVDO Rev. A	21.0	20.98	0.14	Left	Cheek	Ant B	N/A	C3D9A	1:1	0.501	1.005	0.504	
824.70	1013	CDMA BC0 (§22H)	EVDO Rev. A	21.0	20.98	-0.09	Left	Tilt	Ant B	N/A	C3D9A	1:1	0.355	1.005	0.357	
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
PCS CDMA Head SAR

MEASUREMENT RESULTS														
FREQUENCY		Mode/Band	Service	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Power Drift [dB]	Side	Test Position	Device Serial Number	Duty Cycle	SAR (1g)	Scaling Factor	Reported SAR (1g)	Plot #
MHz	Ch.										(W/kg)		(W/kg)	
1880.00	600	PCS CDMA	RC3 / SO55	25.5	24.50	-0.03	Right	Cheek	C3D11	1:1	0.158	1.259	0.199	A8
1880.00	600	PCS CDMA	RC3 / SO55	25.5	24.50	0.13	Right	Tilt	C3D11	1:1	0.052	1.259	0.065	
1880.00	600	PCS CDMA	RC3 / SO55	25.5	24.50	0.03	Left	Cheek	C3D11	1:1	0.127	1.259	0.160	
1880.00	600	PCS CDMA	RC3 / SO55	25.5	24.50	-0.06	Left	Tilt	C3D11	1:1	0.054	1.259	0.068	
1880.00	600	PCS CDMA	EVDO Rev. A	25.5	23.50	-0.03	Right	Cheek	C3D11	1:1	0.147	1.585	0.233	
1880.00	600	PCS CDMA	EVDO Rev. A	25.5	23.50	0.16	Right	Tilt	C3D11	1:1	0.045	1.585	0.071	
1880.00	600	PCS CDMA	EVDO Rev. A	25.5	23.50	0.12	Left	Cheek	C3D11	1:1	0.128	1.585	0.203	
1880.00	600	PCS CDMA	EVDO Rev. A	25.5	23.50	0.04	Left	Tilt	C3D11	1:1	0.048	1.585	0.076	
ANSI / IEEE C95.1 1992 - SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population							Head 1.6 W/kg (mW/g) averaged over 1 gram							

Table 11-9
LTE Band 12 Head SAR

MEASUREMENT RESULTS																					
FREQUENCY			Mode	Bandwidth [MHz]	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Power Drift [dB]	MPR [dB]	Side	Test Position	Antenna Config.	State	Modulation	RB Size	RB Offset	Device Serial Number	Duty Cycle	SAR (1g)	Scaling Factor	Reported SAR (1g)	Plot #
MHz	Ch.																	(W/kg)		(W/kg)	
707.50	23095	Mid	LTE Band 12	10	25.0	24.86	0.03	0	Right	Cheek	Ant A	2	QPSK	1	0	C3D1C	1:1	0.197	1.033	0.204	
707.50	23095	Mid	LTE Band 12	10	24.0	23.66	0.09	1	Right	Cheek	Ant A	2	QPSK	25	12	C3D1C	1:1	0.162	1.081	0.175	
707.50	23095	Mid	LTE Band 12	10	25.0	24.86	0.13	0	Right	Tilt	Ant A	2	QPSK	1	0	C3D1C	1:1	0.081	1.033	0.084	
707.50	23095	Mid	LTE Band 12	10	24.0	23.66	0.16	1	Right	Tilt	Ant A	2	QPSK	25	12	C3D1C	1:1	0.066	1.081	0.071	
707.50	23095	Mid	LTE Band 12	10	25.0	24.86	-0.02	0	Left	Cheek	Ant A	2	QPSK	1	0	C3D1C	1:1	0.169	1.033	0.175	
707.50	23095	Mid	LTE Band 12	10	24.0	23.66	0.04	1	Left	Cheek	Ant A	2	QPSK	25	12	C3D1C	1:1	0.146	1.081	0.158	
707.50	23095	Mid	LTE Band 12	10	25.0	24.86	0.21	0	Left	Tilt	Ant A	2	QPSK	1	0	C3D1C	1:1	0.084	1.033	0.087	
707.50	23095	Mid	LTE Band 12	10	24.0	23.66	0.18	1	Left	Tilt	Ant A	2	QPSK	25	12	C3D1C	1:1	0.065	1.081	0.070	
707.50	23095	Mid	LTE Band 12	10	21.5	20.82	-0.02	0	Right	Cheek	Ant B	N/A	QPSK	1	49	C3E25	1:1	0.478	1.169	0.559	A9
707.50	23095	Mid	LTE Band 12	10	21.5	20.78	0.01	0	Right	Cheek	Ant B	N/A	QPSK	25	12	C3E25	1:1	0.388	1.180	0.458	
707.50	23095	Mid	LTE Band 12	10	21.5	20.82	-0.03	0	Right	Tilt	Ant B	N/A	QPSK	1	49	C3E25	1:1	0.382	1.169	0.447	
707.50	23095	Mid	LTE Band 12	10	21.5	20.78	0.02	0	Right	Tilt	Ant B	N/A	QPSK	25	12	C3E25	1:1	0.306	1.180	0.361	
707.50	23095	Mid	LTE Band 12	10	21.5	20.82	0.01	0	Left	Cheek	Ant B	N/A	QPSK	1	49	C3E25	1:1	0.453	1.169	0.530	
707.50	23095	Mid	LTE Band 12	10	21.5	20.78	0.17	0	Left	Cheek	Ant B	N/A	QPSK	25	12	C3E25	1:1	0.368	1.180	0.434	
707.50	23095	Mid	LTE Band 12	10	21.5	20.82	0.02	0	Left	Tilt	Ant B	N/A	QPSK	1	49	C3E25	1:1	0.341	1.169	0.399	
707.50	23095	Mid	LTE Band 12	10	21.5	20.78	-0.01	0	Left	Tilt	Ant B	N/A	QPSK	25	12	C3E25	1:1	0.276	1.180	0.326	
ANSI / IEEE C95.1 1992 - SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population									Head 1.6 W/kg (mW/g) averaged over 1 gram												

Table 11-10
LTE Band 13 Head SAR

MEASUREMENT RESULTS																					
FREQUENCY			Mode	Bandwidth [MHz]	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Power Drift [dB]	MPR [dB]	Side	Test Position	Antenna Config.	State	Modulation	RB Size	RB Offset	Device Serial Number	Duty Cycle	SAR (1g)	Scaling Factor	Reported SAR (1g)	Plot #
MHz	Ch.																	(W/kg)		(W/kg)	
782.00	23230	Mid	LTE Band 13	10	25.0	24.07	-0.05	0	Right	Cheek	Ant A	1	QPSK	1	49	C3D1C	1:1	0.194	1.239	0.240	
782.00	23230	Mid	LTE Band 13	10	24.0	23.20	0.02	1	Right	Cheek	Ant A	1	QPSK	25	25	C3D1C	1:1	0.156	1.202	0.188	
782.00	23230	Mid	LTE Band 13	10	25.0	24.07	0.21	0	Right	Tilt	Ant A	1	QPSK	1	49	C3D1C	1:1	0.088	1.239	0.109	
782.00	23230	Mid	LTE Band 13	10	24.0	23.20	0.06	1	Right	Tilt	Ant A	1	QPSK	25	25	C3D1C	1:1	0.070	1.202	0.084	
782.00	23230	Mid	LTE Band 13	10	25.0	24.07	0.18	0	Left	Cheek	Ant A	1	QPSK	1	49	C3D1C	1:1	0.143	1.239	0.177	
782.00	23230	Mid	LTE Band 13	10	24.0	23.20	0.04	1	Left	Cheek	Ant A	1	QPSK	25	25	C3D1C	1:1	0.113	1.202	0.136	
782.00	23230	Mid	LTE Band 13	10	25.0	24.07	0.15	0	Left	Tilt	Ant A	1	QPSK	1	49	C3D1C	1:1	0.063	1.239	0.078	
782.00	23230	Mid	LTE Band 13	10	24.0	23.20	0.08	1	Left	Tilt	Ant A	1	QPSK	25	25	C3D1C	1:1	0.052	1.202	0.063	
782.00	23230	Mid	LTE Band 13	10	21.5	21.17	0.07	0	Right	Cheek	Ant B	N/A	QPSK	1	25	C3E25	1:1	0.426	1.079	0.460	
782.00	23230	Mid	LTE Band 13	10	21.5	21.20	0.13	0	Right	Cheek	Ant B	N/A	QPSK	25	0	C3E25	1:1	0.441	1.072	0.473	
782.00	23230	Mid	LTE Band 13	10	21.5	21.17	0.06	0	Right	Tilt	Ant B	N/A	QPSK	1	25	C3E25	1:1	0.348	1.079	0.375	
782.00	23230	Mid	LTE Band 13	10	21.5	21.20	0.12	0	Right	Tilt	Ant B	N/A	QPSK	25	0	C3E25	1:1	0.350	1.072	0.375	
782.00	23230	Mid	LTE Band 13	10	21.5	21.17	-0.01	0	Left	Cheek	Ant B	N/A	QPSK	1	25	C3E25	1:1	0.500	1.079	0.540	
782.00	23230	Mid	LTE Band 13	10	21.5	21.20	-0.02	0	Left	Cheek	Ant B	N/A	QPSK	25	0	C3E25	1:1	0.526	1.072	0.564	A10
782.00	23230	Mid	LTE Band 13	10	21.5	21.17	0.00	0	Left	Tilt	Ant B	N/A	QPSK	1	25	C3E25	1:1	0.314	1.079	0.339	
782.00	23230	Mid	LTE Band 13	10	21.5	21.20	0.02	0	Left	Tilt	Ant B	N/A	QPSK	25	0	C3E25	1:1	0.328	1.072	0.352	
ANSI / IEEE C95.1 1992 - SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population									Head 1.6 W/kg (mW/g) averaged over 1 gram												

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

MEASUREMENT RESULTS																					
FREQUENCY			Mode	Bandwidth [MHz]	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Power Drift [dB]	MPR [dB]	Side	Test Position	Antenna Config.	State	Modulation	RB Size	RB Offset	Device Serial Number	Duty Cycle	SAR (1g)	Scaling Factor	Reported SAR (1g)	Plot #
MHz	Ch.																	(W/kg)		(W/kg)	
836.50	26915	Mid	LTE Band 26 (Cell)	15	25.0	23.89	0.03	0	Right	Cheek	Ant A	38	QPSK	1	0	C3D8C	1:1	0.176	1.291	0.227	
836.50	26915	Mid	LTE Band 26 (Cell)	15	24.0	22.91	0.03	1	Right	Cheek	Ant A	38	QPSK	36	0	C3D8C	1:1	0.147	1.285	0.189	
836.50	26915	Mid	LTE Band 26 (Cell)	15	25.0	23.89	0.14	0	Right	Tilt	Ant A	38	QPSK	1	0	C3D8C	1:1	0.078	1.291	0.101	
836.50	26915	Mid	LTE Band 26 (Cell)	15	24.0	22.91	0.08	1	Right	Tilt	Ant A	38	QPSK	36	0	C3D8C	1:1	0.058	1.285	0.075	
836.50	26915	Mid	LTE Band 26 (Cell)	15	25.0	23.89	0.04	0	Left	Cheek	Ant A	38	QPSK	1	0	C3D8C	1:1	0.119	1.291	0.154	
836.50	26915	Mid	LTE Band 26 (Cell)	15	24.0	22.91	0.08	1	Left	Cheek	Ant A	38	QPSK	36	0	C3D8C	1:1	0.099	1.285	0.127	
836.50	26915	Mid	LTE Band 26 (Cell)	15	25.0	23.89	0.06	0	Left	Tilt	Ant A	38	QPSK	1	0	C3D8C	1:1	0.098	1.291	0.127	
836.50	26915	Mid	LTE Band 26 (Cell)	15	24.0	22.91	0.06	1	Left	Tilt	Ant A	38	QPSK	36	0	C3D8C	1:1	0.078	1.285	0.100	
836.50	26915	Mid	LTE Band 26 (Cell)	15	21.5	21.18	-0.04	0	Right	Cheek	Ant B	N/A	QPSK	1	0	C3E25	1:1	0.470	1.076	0.506	
836.50	26915	Mid	LTE Band 26 (Cell)	15	21.5	21.07	0.02	0	Right	Cheek	Ant B	N/A	QPSK	36	0	C3E25	1:1	0.486	1.104	0.537	
836.50	26915	Mid	LTE Band 26 (Cell)	15	21.5	21.18	-0.01	0	Right	Tilt	Ant B	N/A	QPSK	1	0	C3E25	1:1	0.382	1.076	0.411	
836.50	26915	Mid	LTE Band 26 (Cell)	15	21.5	21.07	-0.09	0	Right	Tilt	Ant B	N/A	QPSK	36	0	C3E25	1:1	0.388	1.104	0.428	
836.50	26915	Mid	LTE Band 26 (Cell)	15	21.5	21.18	-0.09	0	Left	Cheek	Ant B	N/A	QPSK	1	0	C3E25	1:1	0.492	1.076	0.529	
836.50	26915	Mid	LTE Band 26 (Cell)	15	21.5	21.07	0.02	0	Left	Cheek	Ant B	N/A	QPSK	36	0	C3E25	1:1	0.503	1.104	0.555	A11
836.50	26915	Mid	LTE Band 26 (Cell)	15	21.5	21.18	-0.04	0	Left	Tilt	Ant B	N/A	QPSK	1	0	C3E25	1:1	0.345	1.076	0.371	
836.50	26915	Mid	LTE Band 26 (Cell)	15	21.5	21.07	-0.03	0	Left	Tilt	Ant B	N/A	QPSK	36	0	C3E25	1:1	0.352	1.104	0.389	
ANSI / IEEE C95.1 1992 - SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population									Head 1.6 W/kg (mW/g) averaged over 1 gram												

Table 11-12
LTE Band 4 (AWS) Head SAR

MEASUREMENT RESULTS																				
FREQUENCY			Mode	Bandwidth [MHz]	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Power Drift [dB]	MPR [dB]	Side	Test Position	Modulation	RB Size	RB Offset	Device Serial Number	Duty Cycle	SAR (1g)	Scaling Factor	Reported SAR (1g)	Plot #
MHz	Ch.															(W/kg)		(W/kg)	
1732.50	20175	Mid	LTE Band 4 (AWS)	20	25.0	24.99	0.06	0	Right	Cheek	QPSK	1	0	C3D41	1:1	0.150	1.002	0.150	
1732.50	20175	Mid	LTE Band 4 (AWS)	20	24.0	23.93	0.03	1	Right	Cheek	QPSK	50	0	C3D41	1:1	0.142	1.016	0.144	
1732.50	20175	Mid	LTE Band 4 (AWS)	20	25.0	24.99	-0.04	0	Right	Tilt	QPSK	1	0	C3D41	1:1	0.093	1.002	0.093	
1732.50	20175	Mid	LTE Band 4 (AWS)	20	24.0	23.93	0.04	1	Right	Tilt	QPSK	50	0	C3D41	1:1	0.082	1.016	0.083	
1732.50	20175	Mid	LTE Band 4 (AWS)	20	25.0	24.99	-0.02	0	Left	Cheek	QPSK	1	0	C3D41	1:1	0.176	1.002	0.176	A12
1732.50	20175	Mid	LTE Band 4 (AWS)	20	24.0	23.93	-0.03	1	Left	Cheek	QPSK	50	0	C3D41	1:1	0.141	1.016	0.143	
1732.50	20175	Mid	LTE Band 4 (AWS)	20	25.0	24.99	0.11	0	Left	Tilt	QPSK	1	0	C3D41	1:1	0.080	1.002	0.080	
1732.50	20175	Mid	LTE Band 4 (AWS)	20	24.0	23.93	-0.01	1	Left	Tilt	QPSK	50	0	C3D41	1:1	0.069	1.016	0.070	
ANSI / IEEE C95.1 1992 - SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population										Head 1.6 W/kg (mW/g) averaged over 1 gram									

Table 11-13
LTE Band 25 (PCS) Head SAR

MEASUREMENT RESULTS																			
FREQUENCY			Mode	Bandwidth [MHz]	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Power Drift [dB]	MPR [dB]	Side	Test Position	Modulation	RB Size	RB Offset	Device Serial Number	Duty Cycle	SAR (1g)	Scaling Factor	Reported SAR (1g)	Plot #
MHz	Ch.															(W/kg)		(W/kg)	
1882.50	26365	Mid	LTE Band 25 (PCS)	20	25.0	24.93	0.04	0	Right	Cheek	QPSK	1	0	C3D11	1:1	0.139	1.016	0.141	
1860.00	26140	Low	LTE Band 25 (PCS)	20	24.0	23.73	0.05	1	Right	Cheek	QPSK	50	0	C3D11	1:1	0.116	1.064	0.123	
1882.50	26365	Mid	LTE Band 25 (PCS)	20	25.0	24.93	-0.19	0	Right	Tilt	QPSK	1	0	C3D11	1:1	0.052	1.016	0.053	
1860.00	26140	Low	LTE Band 25 (PCS)	20	24.0	23.73	0.11	1	Right	Tilt	QPSK	50	0	C3D11	1:1	0.054	1.064	0.057	
1882.50	26365	Mid	LTE Band 25 (PCS)	20	25.0	24.93	0.04	0	Left	Cheek	QPSK	1	0	C3D11	1:1	0.208	1.016	0.211	A13
1860.00	26140	Low	LTE Band 25 (PCS)	20	24.0	23.73	0.10	1	Left	Cheek	QPSK	50	0	C3D11	1:1	0.173	1.064	0.184	
1882.50	26365	Mid	LTE Band 25 (PCS)	20	25.0	24.93	0.20	0	Left	Tilt	QPSK	1	0	C3D11	1:1	0.058	1.016	0.059	
1860.00	26140	Low	LTE Band 25 (PCS)	20	24.0	23.73	0.06	1	Left	Tilt	QPSK	50	0	C3D11	1:1	0.049	1.064	0.052	
ANSI / IEEE C95.1 1992 - SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population										Head 1.6 W/kg (mW/g) averaged over 1 gram									

Table 11-14
LTE Band 30 Head SAR

MEASUREMENT RESULTS																		
FREQUENCY			Mode	Bandwidth [MHz]	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Power Drift [dB]	MPR [dB]	Side	Test Position	Modulation	RB Size	RB Offset	Device Serial Number	Duty Cycle	SAR (1g)	Scaling Factor	Reported SAR (1g)	Plot #
MHz	Ch.															(W/kg)		(W/kg)	
2310.00	27710	Mid	LTE Band 30	10	22.5	22.50	0.09	0	Right	Cheek	QPSK	1	0	C3E59	1:1	0.103	1.000	0.103	
2310.00	27710	Mid	LTE Band 30	10	21.5	21.30	0.17	1	Right	Cheek	QPSK	25	0	C3E59	1:1	0.080	1.047	0.084	
2310.00	27710	Mid	LTE Band 30	10	22.5	22.50	0.06	0	Right	Tilt	QPSK	1	0	C3E59	1:1	0.104	1.000	0.104	
2310.00	27710	Mid	LTE Band 30	10	21.5	21.30	0.03	1	Right	Tilt	QPSK	25	0	C3E59	1:1	0.082	1.047	0.086	
2310.00	27710	Mid	LTE Band 30	10	22.5	22.50	-0.16	0	Left	Cheek	QPSK	1	0	C3E59	1:1	0.159	1.000	0.159	A14
2310.00	27710	Mid	LTE Band 30	10	21.5	21.30	-0.04	1	Left	Cheek	QPSK	25	0	C3E59	1:1	0.126	1.047	0.132	
2310.00	27710	Mid	LTE Band 30	10	22.5	22.50	0.14	0	Left	Tilt	QPSK	1	0	C3E59	1:1	0.067	1.000	0.067	
2310.00	27710	Mid	LTE Band 30	10	21.5	21.30	0.06	1	Left	Tilt	QPSK	25	0	C3E59	1:1	0.048	1.047	0.050	
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 11-15
LTE Band 41 Head SAR

MEASUREMENT RESULTS																		
FREQUENCY			Mode	Bandwidth [MHz]	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Power Drift [dB]	MPR [dB]	Side	Test Position	Modulation	RB Size	RB Offset	Device Serial Number	Duty Cycle	SAR (1g)	Scaling Factor	Reported SAR (1g)	Plot #
MHz	Ch.															(W/kg)		(W/kg)	
2680.00	41490	High	LTE Band 41	20	24.5	24.15	0.08	0	Right	Cheek	QPSK	1	0	C3E5B	1:1.58	0.102	1.084	0.111	
2680.00	41490	High	LTE Band 41	20	23.5	22.93	0.15	1	Right	Cheek	QPSK	50	0	C3E5B	1:1.58	0.086	1.140	0.098	
2680.00	41490	High	LTE Band 41	20	24.5	24.15	-0.01	0	Right	Tilt	QPSK	1	0	C3E5B	1:1.58	0.125	1.084	0.136	
2680.00	41490	High	LTE Band 41	20	23.5	22.93	0.07	1	Right	Tilt	QPSK	50	0	C3E5B	1:1.58	0.100	1.140	0.114	
2680.00	41490	High	LTE Band 41	20	24.5	24.15	0.00	0	Left	Cheek	QPSK	1	0	C3E5B	1:1.58	0.252	1.084	0.273	A15
2680.00	41490	High	LTE Band 41	20	23.5	22.93	0.04	1	Left	Cheek	QPSK	50	0	C3E5B	1:1.58	0.192	1.140	0.219	
2680.00	41490	High	LTE Band 41	20	24.5	24.15	0.15	0	Left	Tilt	QPSK	1	0	C3E5B	1:1.58	0.079	1.084	0.086	
2680.00	41490	High	LTE Band 41	20	23.5	22.93	0.03	1	Left	Tilt	QPSK	50	0	C3E5B	1:1.58	0.054	1.140	0.062	
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 11-16
DTS Head SAR

MEASUREMENT RESULTS

FREQUENCY MHz	Ch.	Mode	Service	Bandwidth [MHz]	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Power Drift [dB]	Side	Test Position	Antenna Config.	Device Serial Number	Data Rate (Mbps)	Duty Cycle (%)	Peak SAR of Area Scan W/kg	SAR (1g) (W/kg)	Scaling Factor (Power)	Scaling Factor (Duty Cycle)	Reported SAR (1g) (W/kg)	Plot #
2437	6	802.11b	DSSS	22	13.5	13.40	0.05	Right	Cheek	1	C3E99	1	99.8	0.353	0.245	1.023	1.002	0.252	
2437	6	802.11b	DSSS	22	13.5	13.40	-	Right	Tilt	1	C3E99	1	99.8	0.252	-	1.023	1.002	-	
2437	6	802.11b	DSSS	22	13.5	13.40	-	Left	Cheek	1	C3E99	1	99.8	0.258	-	1.023	1.002	-	
2437	6	802.11b	DSSS	22	13.5	13.40	-	Left	Tilt	1	C3E99	1	99.8	0.219	-	1.023	1.002	-	
2437	6	802.11b	DSSS	22	13.5	13.40	-	Right	Cheek	2	C3E99	1	99.8	0.172	-	1.023	1.002	-	
2437	6	802.11b	DSSS	22	13.5	13.40	0.10	Right	Tilt	2	C3E99	1	99.8	0.177	0.195	1.023	1.002	0.199	
2437	6	802.11b	DSSS	22	13.5	13.40	-	Left	Cheek	2	C3E99	1	99.8	0.094	-	1.023	1.002	-	
2437	6	802.11b	DSSS	22	13.5	13.40	-	Left	Tilt	2	C3E99	1	99.8	0.100	-	1.023	1.002	-	
2412	1	802.11b	DSSS	22	17.5	16.89	0.07	Right	Cheek	1	C3D00	1	99.8	0.831	0.674	1.151	1.002	0.778	
2437	6	802.11b	DSSS	22	17.5	17.23	-0.16	Right	Cheek	1	C3D00	1	99.8	0.924	0.795	1.064	1.002	0.848	A16
2437	6	802.11b	DSSS	22	17.5	17.23	-0.09	Right	Tilt	1	C3D00	1	99.8	0.653	0.615	1.064	1.002	0.655	
2437	6	802.11b	DSSS	22	17.5	17.23	-	Left	Cheek	1	C3D00	1	99.8	0.503	-	1.064	1.002	-	
2437	6	802.11b	DSSS	22	17.5	17.23	-	Left	Tilt	1	C3D00	1	99.8	0.417	-	1.064	1.002	-	
2462	11	802.11b	DSSS	22	17.5	17.43	0.11	Right	Cheek	2	C3D00	1	99.8	0.432	0.387	1.016	1.002	0.394	
2462	11	802.11b	DSSS	22	17.5	17.43	-	Right	Tilt	2	C3D00	1	99.8	0.420	-	1.016	1.002	-	
2462	11	802.11b	DSSS	22	17.5	17.43	-	Left	Cheek	2	C3D00	1	99.8	0.212	-	1.016	1.002	-	
2462	11	802.11b	DSSS	22	17.5	17.43	-	Left	Tilt	2	C3D00	1	99.8	0.213	-	1.016	1.002	-	

ANSI / IEEE C95.1 1992 - SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population	Head 1.6 W/kg (mW/g) averaged over 1 gram

Table 11-17
NII Head SAR

MEASUREMENT RESULTS

FREQUENCY MHz	Ch.	Mode	Service	Bandwidth [MHz]	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Power Drift [dB]	Side	Test Position	Antenna Config.	Device Serial Number	Data Rate (Mbps)	Duty Cycle (%)	Peak SAR of Area Scan W/kg	SAR (1g) (W/kg)	Scaling Factor (Power)	Scaling Factor (Duty Cycle)	Reported SAR (1g) (W/kg)	Plot #
5260	52	802.11a	OFDM	20	10.5	9.52	0.14	Right	Cheek	1	C3D00	6	98.6	0.295	0.117	1.253	1.014	0.149	
5260	52	802.11a	OFDM	20	10.5	9.52	-	Right	Tilt	1	C3D00	6	98.6	0.232	-	1.253	1.014	-	
5260	52	802.11a	OFDM	20	10.5	9.52	-	Left	Cheek	1	C3D00	6	98.6	0.068	-	1.253	1.014	-	
5260	52	802.11a	OFDM	20	10.5	9.52	-	Left	Tilt	1	C3D00	6	98.6	0.052	-	1.253	1.014	-	
5280	56	802.11a	OFDM	20	10.5	10.08	0.15	Right	Cheek	2	C3D00	6	98.6	0.207	0.125	1.102	1.014	0.140	
5280	56	802.11a	OFDM	20	10.5	10.08	-	Right	Tilt	2	C3D00	6	98.6	0.156	-	1.102	1.014	-	
5280	56	802.11a	OFDM	20	10.5	10.08	-	Left	Cheek	2	C3D00	6	98.6	0.203	-	1.102	1.014	-	
5280	56	802.11a	OFDM	20	10.5	10.08	-	Left	Tilt	2	C3D00	6	98.6	0.199	-	1.102	1.014	-	
5600	120	802.11a	OFDM	20	10.5	9.70	0.19	Right	Cheek	1	C3D00	6	98.6	0.505	0.188	1.202	1.014	0.229	
5600	120	802.11a	OFDM	20	10.5	9.70	-	Right	Tilt	1	C3D00	6	98.6	0.344	-	1.202	1.014	-	
5600	120	802.11a	OFDM	20	10.5	9.70	-	Left	Cheek	1	C3D00	6	98.6	0.138	-	1.202	1.014	-	
5600	120	802.11a	OFDM	20	10.5	9.70	-	Left	Tilt	1	C3D00	6	98.6	0.150	-	1.202	1.014	-	
5720	144	802.11a	OFDM	20	10.5	10.20	0.12	Right	Cheek	2	C3D00	6	98.6	0.419	0.205	1.072	1.014	0.223	
5720	144	802.11a	OFDM	20	10.5	10.20	-	Right	Tilt	2	C3D00	6	98.6	0.347	-	1.072	1.014	-	
5720	144	802.11a	OFDM	20	10.5	10.20	-	Left	Cheek	2	C3D00	6	98.6	0.307	-	1.072	1.014	-	
5720	144	802.11a	OFDM	20	10.5	10.20	-	Left	Tilt	2	C3D00	6	98.6	0.309	-	1.072	1.014	-	
5825	165	802.11a	OFDM	20	10.5	10.49	0.18	Right	Cheek	1	C3D00	6	98.6	1.429	0.449	1.002	1.014	0.456	A17
5825	165	802.11a	OFDM	20	10.5	10.49	-0.06	Right	Tilt	1	C3D00	6	98.6	1.116	0.381	1.002	1.014	0.387	
5825	165	802.11a	OFDM	20	10.5	10.49	-0.02	Left	Cheek	1	C3D00	6	98.6	0.490	0.230	1.002	1.014	0.233	
5825	165	802.11a	OFDM	20	10.5	10.49	-	Left	Tilt	1	C3D00	6	98.6	0.339	-	1.002	1.014	-	
5785	157	802.11a	OFDM	20	10.5	9.52	-	Right	Cheek	2	C3D00	6	98.6	0.276	-	1.253	1.014	-	
5785	157	802.11a	OFDM	20	10.5	9.52	-	Right	Tilt	2	C3D00	6	98.6	0.210	-	1.253	1.014	-	
5785	157	802.11a	OFDM	20	10.5	9.52	0.18	Left	Cheek	2	C3D00	6	98.6	0.309	0.207	1.253	1.014	0.263	
5785	157	802.11a	OFDM	20	10.5	9.52	-	Left	Tilt	2	C3D00	6	98.6	0.201	-	1.253	1.014	-	

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

MEASUREMENT RESULTS																
FREQUENCY		Mode	Service	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Power Drift [dB]	Spacing	Antenna Config.	State	Device Serial Number	# of Time Slots	Duty Cycle	Side	SAR (1g)	Scaling Factor	Reported SAR (1g)	Plot #
MHz	Ch.													(W/kg)		(W/kg)	
836.60	190	GSM 850	GSM	33.5	32.09	-0.02	15 mm	Ant A	N/A	C3D8C	1	1:8.3	back	0.355	1.384	0.491	A18
1880.00	661	GSM 1900	GSM	30.5	29.26	0.05	15 mm	Ant A	N/A	C3D11	1	1:8.3	back	0.305	1.330	0.406	A20
836.60	4183	UMTS 850	RMC	25.0	25.00	0.20	15 mm	Ant A	38	C3D8C	N/A	1:1	back	0.479	1.000	0.479	A22
836.60	4183	UMTS 850	RMC	25.0	25.00	0.03	15 mm	Ant B	N/A	C3D8C	N/A	1:1	back	0.271	1.000	0.271	
1712.40	1312	UMTS 1750	RMC	25.0	24.07	-0.03	15 mm	Ant A	N/A	C3D41	N/A	1:1	back	0.663	1.239	0.821	A24
1732.40	1412	UMTS 1750	RMC	25.0	23.82	-0.02	15 mm	Ant A	N/A	C3D41	N/A	1:1	back	0.655	1.312	0.859	
1752.60	1513	UMTS 1750	RMC	25.0	23.78	-0.14	15 mm	Ant A	N/A	C3D41	N/A	1:1	back	0.637	1.324	0.843	
1880.00	9400	UMTS 1900	RMC	25.0	23.88	-0.12	15 mm	Ant A	N/A	C3D41	N/A	1:1	back	0.307	1.294	0.397	A26
820.10	564	CDMA BC10 (§90S)	TDSO / SO32	25.0	24.14	0.10	15 mm	Ant A	40	C3D2E	N/A	1:1	back	0.360	1.219	0.439	A28
820.10	564	CDMA BC10 (§90S)	TDSO / SO32	25.0	24.14	0.03	15 mm	Ant B	N/A	C3D2E	N/A	1:1	back	0.257	1.219	0.313	
836.52	384	CDMA BC0 (§22H)	TDSO / SO32	25.0	24.21	0.00	15 mm	Ant A	39	C3D2E	N/A	1:1	back	0.438	1.199	0.525	A30
836.52	384	CDMA BC0 (§22H)	TDSO / SO32	25.0	24.21	-0.10	15 mm	Ant B	N/A	C3D2E	N/A	1:1	back	0.236	1.199	0.283	
1851.25	25	PCS CDMA	TDSO / SO32	25.5	24.71	0.17	15 mm	Ant A	N/A	C3D11	N/A	1:1	back	0.817	1.199	0.980	
1880.00	600	PCS CDMA	TDSO / SO32	25.5	24.48	0.09	15 mm	Ant A	N/A	C3D11	N/A	1:1	back	0.785	1.265	0.993	
1908.75	1175	PCS CDMA	TDSO / SO32	25.5	24.66	0.06	15 mm	Ant A	N/A	C3D11	N/A	1:1	back	0.884	1.213	1.072	A32
ANSI / IEEE C95.1 1992 - SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population								Body 1.6 W/kg (mW/g) averaged over 1 gram									

Table 11-19
LTE Body-Worn SAR

MEASUREMENT RESULTS																					
FREQUENCY			Mode	Bandwidth [MHz]	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Power Drift [dB]	MPR [dB]	Antenna Config.	State	Device Serial Number	Modulation	RB Size	RB Offset	Spacing	Side	Duty Cycle	SAR (1g)	Scaling Factor	Reported SAR (1g)	Plot #
MHz	Ch.																	(W/kg)		(W/kg)	
707.50	23095	Mid	LTE Band 12	10	25.0	24.86	0.04	0	Ant A	2	C35C6	QPSK	1	0	15 mm	back	1:1	0.375	1.033	0.387	A34
707.50	23095	Mid	LTE Band 12	10	24.0	23.66	-0.01	1	Ant A	2	C35C6	QPSK	25	12	15 mm	back	1:1	0.295	1.081	0.319	
707.50	23095	Mid	LTE Band 12	10	25.0	24.86	0.02	0	Ant B	N/A	C35C6	QPSK	1	0	15 mm	back	1:1	0.267	1.033	0.276	
707.50	23095	Mid	LTE Band 12	10	24.0	23.66	0.02	1	Ant B	N/A	C35C6	QPSK	25	12	15 mm	back	1:1	0.215	1.081	0.232	
782.00	23230	Mid	LTE Band 13	10	25.0	24.07	-0.04	0	Ant A	1	C35C6	QPSK	1	49	15 mm	back	1:1	0.395	1.239	0.489	A36
782.00	23230	Mid	LTE Band 13	10	24.0	23.20	-0.02	1	Ant A	1	C35C6	QPSK	25	25	15 mm	back	1:1	0.309	1.202	0.371	
782.00	23230	Mid	LTE Band 13	10	25.0	24.07	0.01	0	Ant B	N/A	C35C6	QPSK	1	49	15 mm	back	1:1	0.288	1.239	0.357	
782.00	23230	Mid	LTE Band 13	10	24.0	23.20	0.01	1	Ant B	N/A	C35C6	QPSK	25	25	15 mm	back	1:1	0.228	1.202	0.274	
836.50	26915	Mid	LTE Band 26 (Cell)	15	25.0	23.89	0.00	0	Ant A	38	C3D8C	QPSK	1	0	15 mm	back	1:1	0.402	1.291	0.519	A38
836.50	26915	Mid	LTE Band 26 (Cell)	15	24.0	22.91	0.02	1	Ant A	38	C3D8C	QPSK	36	0	15 mm	back	1:1	0.296	1.285	0.380	
836.50	26915	Mid	LTE Band 26 (Cell)	15	25.0	23.89	0.06	0	Ant B	N/A	C3D8C	QPSK	1	0	15 mm	back	1:1	0.245	1.291	0.316	
836.50	26915	Mid	LTE Band 26 (Cell)	15	24.0	22.91	0.06	1	Ant B	N/A	C3D8C	QPSK	36	0	15 mm	back	1:1	0.190	1.285	0.244	
1732.50	20175	Mid	LTE Band 4 (AWS)	20	25.0	24.99	0.03	0	Ant A	N/A	C3D41	QPSK	1	0	15 mm	back	1:1	0.981	1.002	0.983	A40
1732.50	20175	Mid	LTE Band 4 (AWS)	20	24.0	23.93	0.05	1	Ant A	N/A	C3D41	QPSK	50	0	15 mm	back	1:1	0.770	1.016	0.782	
1732.50	20175	Mid	LTE Band 4 (AWS)	20	24.0	23.66	0.05	1	Ant A	N/A	C3D41	QPSK	100	0	15 mm	back	1:1	0.746	1.081	0.806	
1732.50	20175	Mid	LTE Band 4 (AWS)	20	25.0	24.99	-0.15	0	Ant A	N/A	C3D41	QPSK	1	0	15 mm	back	1:1	0.968	1.002	0.970	
1860.00	26140	Low	LTE Band 25 (PCS)	20	25.0	24.92	-0.07	0	Ant A	N/A	C3D11	QPSK	1	0	15 mm	back	1:1	0.810	1.019	0.825	
1882.50	26365	Mid	LTE Band 25 (PCS)	20	25.0	24.93	-0.01	0	Ant A	N/A	C3D11	QPSK	1	0	15 mm	back	1:1	0.839	1.016	0.852	A42
1905.00	26590	High	LTE Band 25 (PCS)	20	25.0	24.77	-0.07	0	Ant A	N/A	C3D11	QPSK	1	0	15 mm	back	1:1	0.821	1.054	0.865	
1860.00	26140	Low	LTE Band 25 (PCS)	20	24.0	23.73	-0.06	1	Ant A	N/A	C3D11	QPSK	50	0	15 mm	back	1:1	0.790	1.064	0.841	
1882.50	26365	Mid	LTE Band 25 (PCS)	20	24.0	23.44	-0.04	1	Ant A	N/A	C3D11	QPSK	50	0	15 mm	back	1:1	0.711	1.138	0.809	
1905.00	26590	High	LTE Band 25 (PCS)	20	24.0	23.65	-0.06	1	Ant A	N/A	C3D11	QPSK	50	0	15 mm	back	1:1	0.713	1.084	0.773	
1905.00	26590	High	LTE Band 25 (PCS)	20	24.0	23.56	-0.05	1	Ant A	N/A	C3D11	QPSK	100	0	15 mm	back	1:1	0.692	1.107	0.766	
2310.00	27710	Mid	LTE Band 30	10	22.5	22.50	0.04	0	Ant C	N/A	C3E59	QPSK	1	0	15 mm	back	1:1	0.420	1.000	0.420	A44
2310.00	27710	Mid	LTE Band 30	10	21.5	21.30	0.17	1	Ant C	N/A	C3E59	QPSK	25	0	15 mm	back	1:1	0.298	1.047	0.312	
2680.00	41490	High	LTE Band 41	20	24.5	24.15	-0.03	0	Ant C	N/A	C3E5B	QPSK	1	0	15 mm	back	1:1.58	0.280	1.084	0.304	A46
2680.00	41490	High	LTE Band 41	20	23.5	22.93	-0.02	1	Ant C	N/A	C3E5B	QPSK	50	0	15 mm	back	1:1.58	0.199	1.140	0.227	
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
DTS Body-Worn SAR

MEASUREMENT RESULTS																		
FREQUENCY		Mode	Service	Bandwidth [MHz]	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Power Drift [dB]	Spacing	Antenna Config.	Device Serial Number	Data Rate (Mbps)	Side	Duty Cycle (%)	Peak SAR of Area Scan	SAR (1g)	Scaling Factor (Power)	Scaling Factor (Duty Cycle)	Reported SAR (1g)	Plot #
MHz	Ch.													W/kg	(W/kg)			(W/kg)	
2437	6	802.11b	DSSS	22	20.5	20.31	0.01	15 mm	1	C3E99	1	back	99.8	0.124	0.105	1.045	1.002	0.110	A48
2437	6	802.11b	DSSS	22	20.5	20.42	0.14	15 mm	2	C3E99	1	back	99.8	0.072	0.058	1.019	1.002	0.059	
ANSI / IEEE C95.1 1992 - SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population									Body 1.6 W/kg (mW/g) averaged over 1 gram										

Table 11-21
NII Body-Worn SAR

MEASUREMENT RESULTS																		
FREQUENCY		Mode	Service	Bandwidth [MHz]	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Power Drift [dB]	Spacing	Antenna Config.	Device Serial Number	Data Rate (Mbps)	Side	Duty Cycle (%)	Peak SAR of Area Scan	SAR (1g)	Scaling Factor (Power)	Scaling Factor (Duty Cycle)	Reported SAR (1g)	Plot #
MHz	Ch.													W/kg	(W/kg)			(W/kg)	
5260	52	802.11a	OFDM	20	17.5	17.48	0.11	15 mm	1	C3D00	6	back	98.6	0.221	0.115	1.005	1.014	0.118	
5280	56	802.11a	OFDM	20	17.5	17.43	0.10	15 mm	2	C3D00	6	back	98.6	0.053	0.024	1.016	1.014	0.024	
5600	120	802.11a	OFDM	20	17.5	17.09	0.18	15 mm	1	C3D00	6	back	98.6	0.392	0.193	1.099	1.014	0.215	A50
5720	144	802.11a	OFDM	20	17.5	17.44	0.11	15 mm	2	C3D00	6	back	98.6	0.230	0.114	1.014	1.014	0.118	
5785	157	802.11a	OFDM	20	17.5	17.22	0.13	15 mm	1	C3D00	6	back	98.6	0.366	0.170	1.067	1.014	0.184	
5785	157	802.11a	OFDM	20	17.5	16.69	0.14	15 mm	2	C3D00	6	back	98.6	0.188	0.097	1.205	1.014	0.119	
ANSI / IEEE C95.1 1992 - SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population								Body 1.6 W/kg (mW/g) averaged over 1 gram											

11.3 Standalone Hotspot SAR Data

Table 11-22
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	Reported SAR (1g)	Plot #
MHz	Ch.											(W/kg)		(W/kg)	
836.60	190	GSM 850	GPRS	30.0	28.22	-0.05	10 mm	C3D8C	3	1:2.76	back	0.441	1.507	0.665	A19
836.60	190	GSM 850	GPRS	30.0	28.22	-0.04	10 mm	C3D8C	3	1:2.76	front	0.376	1.507	0.567	
836.60	190	GSM 850	GPRS	30.0	28.22	0.00	10 mm	C3D8C	3	1:2.76	bottom	0.177	1.507	0.267	
836.60	190	GSM 850	GPRS	30.0	28.22	0.01	10 mm	C3D8C	3	1:2.76	right	0.203	1.507	0.306	
836.60	190	GSM 850	GPRS	30.0	28.22	0.00	10 mm	C3D8C	3	1:2.76	left	0.039	1.507	0.059	
1909.80	810	GSM 1900	GPRS	24.5	23.80	-0.12	10 mm	C3CE8	3	1:2.76	back	0.577	1.175	0.678	A21
1909.80	810	GSM 1900	GPRS	24.5	23.80	-0.02	10 mm	C3CE8	3	1:2.76	front	0.508	1.175	0.597	
1909.80	810	GSM 1900	GPRS	24.5	23.80	0.01	10 mm	C3CE8	3	1:2.76	bottom	0.548	1.175	0.644	
1909.80	810	GSM 1900	GPRS	24.5	23.80	-0.01	10 mm	C3CE8	3	1:2.76	right	0.147	1.175	0.173	
1909.80	810	GSM 1900	GPRS	24.5	23.80	0.13	10 mm	C3CE8	3	1:2.76	left	0.021	1.175	0.025	
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
UMTS Hotspot SAR Data

FREQUENCY		Mode	Service	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Power Drift [dB]	Spacing	Antenna Config.	State	Device Serial Number	Duty Cycle	Side	SAR (1g)	Scaling Factor	Reported SAR (1g)	Plot #
MEASUREMENT RESULTS																
MHz	Ch.												(W/kg)		(W/kg)	
836.60	4183	UMTS 850	RMC	25.0	25.00	-0.02	10 mm	Ant A	38	C3D8C	1:1	back	0.753	1.000	0.753	A23
836.60	4183	UMTS 850	RMC	25.0	25.00	-0.01	10 mm	Ant A	38	C3D8C	1:1	front	0.642	1.000	0.642	
836.60	4183	UMTS 850	RMC	25.0	25.00	-0.01	10 mm	Ant A	38	C3D8C	1:1	bottom	0.300	1.000	0.300	
836.60	4183	UMTS 850	RMC	25.0	25.00	0.01	10 mm	Ant A	38	C3D8C	1:1	right	0.325	1.000	0.325	
836.60	4183	UMTS 850	RMC	25.0	25.00	-0.16	10 mm	Ant A	38	C3D8C	1:1	left	0.102	1.000	0.102	
836.60	4183	UMTS 850	RMC	25.0	25.00	0.03	10 mm	Ant B	N/A	C3D8C	1:1	back	0.388	1.000	0.388	
836.60	4183	UMTS 850	RMC	25.0	25.00	0.00	10 mm	Ant B	N/A	C3D8C	1:1	front	0.385	1.000	0.385	
836.60	4183	UMTS 850	RMC	25.0	25.00	-0.07	10 mm	Ant B	N/A	C3D8C	1:1	top	0.189	1.000	0.189	
836.60	4183	UMTS 850	RMC	25.0	25.00	0.06	10 mm	Ant B	N/A	C3D8C	1:1	right	0.103	1.000	0.103	
836.60	4183	UMTS 850	RMC	25.0	25.00	-0.07	10 mm	Ant B	N/A	C3D8C	1:1	left	0.428	1.000	0.428	
1712.40	1312	UMTS 1750	RMC	21.5	20.74	-0.11	10 mm	Ant A	N/A	C3E71	1:1	back	0.804	1.191	0.958	
1732.40	1412	UMTS 1750	RMC	21.5	21.06	-0.07	10 mm	Ant A	N/A	C3E71	1:1	back	0.889	1.107	0.984	
1752.60	1513	UMTS 1750	RMC	21.5	21.20	-0.04	10 mm	Ant A	N/A	C3E71	1:1	back	0.951	1.072	1.019	A25
1712.40	1312	UMTS 1750	RMC	21.5	20.74	-0.10	10 mm	Ant A	N/A	C3E71	1:1	front	0.720	1.191	0.858	
1732.40	1412	UMTS 1750	RMC	21.5	21.06	-0.08	10 mm	Ant A	N/A	C3E71	1:1	front	0.824	1.107	0.912	
1752.60	1513	UMTS 1750	RMC	21.5	21.20	-0.10	10 mm	Ant A	N/A	C3E71	1:1	front	0.856	1.072	0.918	
1712.40	1312	UMTS 1750	RMC	21.5	20.74	-0.07	10 mm	Ant A	N/A	C3E71	1:1	bottom	0.834	1.191	0.993	
1732.40	1412	UMTS 1750	RMC	21.5	21.06	-0.03	10 mm	Ant A	N/A	C3E71	1:1	bottom	0.850	1.107	0.941	
1752.60	1513	UMTS 1750	RMC	21.5	21.20	-0.06	10 mm	Ant A	N/A	C3E71	1:1	bottom	0.854	1.072	0.915	
1732.40	1412	UMTS 1750	RMC	21.5	21.06	-0.04	10 mm	Ant A	N/A	C3E71	1:1	right	0.175	1.107	0.194	
1732.40	1412	UMTS 1750	RMC	21.5	21.06	0.06	10 mm	Ant A	N/A	C3E71	1:1	left	0.036	1.107	0.040	
1852.40	9262	UMTS 1900	RMC	20.5	20.37	0.05	10 mm	Ant A	N/A	C3E71	1:1	back	0.856	1.030	0.882	
1880.00	9400	UMTS 1900	RMC	20.5	20.50	0.06	10 mm	Ant A	N/A	C3E71	1:1	back	1.040	1.000	**1.040**	A27
1907.60	9538	UMTS 1900	RMC	20.5	20.21	0.06	10 mm	Ant A	N/A	C3E71	1:1	back	0.953	1.069	1.019	
1852.40	9262	UMTS 1900	RMC	20.5	20.37	-0.07	10 mm	Ant A	N/A	C3E71	1:1	front	0.671	1.030	0.691	
1880.00	9400	UMTS 1900	RMC	20.5	20.50	-0.06	10 mm	Ant A	N/A	C3E71	1:1	front	0.817	1.000	0.817	
1907.60	9538	UMTS 1900	RMC	20.5	20.21	-0.05	10 mm	Ant A	N/A	C3E71	1:1	front	0.735	1.069	0.786	
1880.00	9400	UMTS 1900	RMC	20.5	20.50	-0.06	10 mm	Ant A	N/A	C3E71	1:1	bottom	0.738	1.000	0.738	
1880.00	9400	UMTS 1900	RMC	20.5	20.50	0.00	10 mm	Ant A	N/A	C3E71	1:1	right	0.188	1.000	0.188	
1880.00	9400	UMTS 1900	RMC	20.5	20.50	0.03	10 mm	Ant A	N/A	C3E71	1:1	left	0.044	1.000	0.044	
1880.00	9400	UMTS 1900	RMC	20.5	20.50	-0.04	10 mm	Ant A	N/A	C3E71	1:1	back	0.974	1.000	0.974	
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 11-24
CDMA Hotspot SAR Data

MEASUREMENT RESULTS																
FREQUENCY		Mode	Service	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Power Drift [dB]	Spacing	Antenna Config.	State	Device Serial Number	Duty Cycle	Side	SAR (1g)	Scaling Factor	Reported SAR (1g)	Plot #
MHz	Ch.												(W/kg)		(W/kg)	
820.10	564	CDMA BC10 (§90S)	EVDO Rev. 0	25.0	24.03	-0.14	10 mm	Ant A	40	C3D2E	1:1	back	0.674	1.250	0.843	A29
820.10	564	CDMA BC10 (§90S)	EVDO Rev. 0	25.0	24.03	0.01	10 mm	Ant A	42	C3D2E	1:1	front	0.544	1.250	0.680	
820.10	564	CDMA BC10 (§90S)	EVDO Rev. 0	25.0	24.03	0.08	10 mm	Ant A	42	C3D2E	1:1	bottom	0.295	1.250	0.369	
820.10	564	CDMA BC10 (§90S)	EVDO Rev. 0	25.0	24.03	-0.06	10 mm	Ant A	42	C3D2E	1:1	right	0.302	1.250	0.378	
820.10	564	CDMA BC10 (§90S)	EVDO Rev. 0	25.0	24.03	0.13	10 mm	Ant A	39	C3D2E	1:1	left	0.098	1.250	0.123	
820.10	564	CDMA BC10 (§90S)	EVDO Rev. 0	25.0	24.03	0.03	10 mm	Ant B	N/A	C3D2E	1:1	back	0.359	1.250	0.449	
820.10	564	CDMA BC10 (§90S)	EVDO Rev. 0	25.0	24.03	0.00	10 mm	Ant B	N/A	C3D2E	1:1	front	0.346	1.250	0.433	
820.10	564	CDMA BC10 (§90S)	EVDO Rev. 0	25.0	24.03	0.00	10 mm	Ant B	N/A	C3D2E	1:1	top	0.192	1.250	0.240	
820.10	564	CDMA BC10 (§90S)	EVDO Rev. 0	25.0	24.03	0.00	10 mm	Ant B	N/A	C3D2E	1:1	right	0.088	1.250	0.110	
820.10	564	CDMA BC10 (§90S)	EVDO Rev. 0	25.0	24.03	-0.04	10 mm	Ant B	N/A	C3D2E	1:1	left	0.527	1.250	0.659	
824.70	1013	CDMA BC0 (§22H)	EVDO Rev. 0	25.0	24.37	0.00	10 mm	Ant A	39	C3D2E	1:1	back	0.851	1.156	0.984	
836.52	384	CDMA BC0 (§22H)	EVDO Rev. 0	25.0	24.28	-0.06	10 mm	Ant A	39	C3D2E	1:1	back	0.833	1.180	0.983	
848.31	777	CDMA BC0 (§22H)	EVDO Rev. 0	25.0	24.23	-0.14	10 mm	Ant A	39	C3D2E	1:1	back	0.638	1.194	0.762	
836.52	384	CDMA BC0 (§22H)	EVDO Rev. 0	25.0	24.28	-0.04	10 mm	Ant A	39	C3D2E	1:1	front	0.649	1.180	0.766	
836.52	384	CDMA BC0 (§22H)	EVDO Rev. 0	25.0	24.28	-0.03	10 mm	Ant A	39	C3D2E	1:1	bottom	0.339	1.180	0.400	
836.52	384	CDMA BC0 (§22H)	EVDO Rev. 0	25.0	24.28	0.00	10 mm	Ant A	39	C3D2E	1:1	right	0.330	1.180	0.389	
836.52	384	CDMA BC0 (§22H)	EVDO Rev. 0	25.0	24.28	0.16	10 mm	Ant A	39	C3D2E	1:1	left	0.148	1.180	0.175	
836.52	384	CDMA BC0 (§22H)	EVDO Rev. 0	25.0	24.28	-0.02	10 mm	Ant B	N/A	C3D2E	1:1	back	0.290	1.180	0.342	
836.52	384	CDMA BC0 (§22H)	EVDO Rev. 0	25.0	24.28	-0.02	10 mm	Ant B	N/A	C3D2E	1:1	front	0.311	1.180	0.367	
836.52	384	CDMA BC0 (§22H)	EVDO Rev. 0	25.0	24.28	0.01	10 mm	Ant B	N/A	C3D2E	1:1	top	0.179	1.180	0.211	
836.52	384	CDMA BC0 (§22H)	EVDO Rev. 0	25.0	24.28	0.07	10 mm	Ant B	N/A	C3D2E	1:1	right	0.038	1.180	0.045	
836.52	384	CDMA BC0 (§22H)	EVDO Rev. 0	25.0	24.28	0.00	10 mm	Ant B	N/A	C3D2E	1:1	left	0.454	1.180	0.536	
824.70	1013	CDMA BC0 (§22H)	EVDO Rev. 0	25.0	24.37	0.04	10 mm	Ant A	N/A	C3D2E	1:1	back	0.893	1.156	1.032	A31
1851.25	25	PCS CDMA	EVDO Rev. 0	21.5	21.25	0.04	10 mm	Ant A	N/A	C3CE8	1:1	back	0.947	1.059	1.003	A33
1880.00	600	PCS CDMA	EVDO Rev. 0	21.5	21.05	0.06	10 mm	Ant A	N/A	C3CE8	1:1	back	0.878	1.109	0.974	
1908.75	1175	PCS CDMA	EVDO Rev. 0	21.5	21.27	0.05	10 mm	Ant A	N/A	C3CE8	1:1	back	0.906	1.054	0.955	
1851.25	25	PCS CDMA	EVDO Rev. 0	21.5	21.25	-0.06	10 mm	Ant A	N/A	C3CE8	1:1	front	0.828	1.059	0.877	
1880.00	600	PCS CDMA	EVDO Rev. 0	21.5	21.05	-0.07	10 mm	Ant A	N/A	C3CE8	1:1	front	0.746	1.109	0.827	
1908.75	1175	PCS CDMA	EVDO Rev. 0	21.5	21.27	-0.08	10 mm	Ant A	N/A	C3CE8	1:1	front	0.723	1.054	0.762	
1851.25	25	PCS CDMA	EVDO Rev. 0	21.5	21.25	0.03	10 mm	Ant A	N/A	C3CE8	1:1	bottom	0.815	1.059	0.863	
1880.00	600	PCS CDMA	EVDO Rev. 0	21.5	21.05	0.02	10 mm	Ant A	N/A	C3CE8	1:1	bottom	0.819	1.109	0.908	
1908.75	1175	PCS CDMA	EVDO Rev. 0	21.5	21.27	0.03	10 mm	Ant A	N/A	C3CE8	1:1	bottom	0.833	1.054	0.878	
1880.00	600	PCS CDMA	EVDO Rev. 0	21.5	21.05	0.00	10 mm	Ant A	N/A	C3CE8	1:1	right	0.196	1.109	0.217	
1880.00	600	PCS CDMA	EVDO Rev. 0	21.5	21.05	0.11	10 mm	Ant A	N/A	C3CE8	1:1	left	0.024	1.109	0.027	
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 11-25
LTE Band 12 Hotspot SAR

MEASUREMENT RESULTS																					
FREQUENCY			Mode	Bandwidth [MHz]	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Power Drift [dB]	MPR [dB]	Antenna Config.	State	Device Serial Number	Modulation	RB Size	RB Offset	Spacing	Side	Duty Cycle	SAR (1g)	Scaling Factor	Reported SAR (1g)	Plot #
MHz	Ch.																	(W/kg)		(W/kg)	
707.50	23095	Mid	LTE Band 12	10	25.0	24.86	-0.01	0	Ant A	2	C35C6	QPSK	1	0	10 mm	back	1:1	0.575	1.033	0.594	A35
707.50	23095	Mid	LTE Band 12	10	24.0	23.66	0.02	1	Ant A	2	C35C6	QPSK	25	12	10 mm	back	1:1	0.452	1.081	0.489	
707.50	23095	Mid	LTE Band 12	10	25.0	24.86	0.00	0	Ant A	2	C35C6	QPSK	1	0	10 mm	front	1:1	0.566	1.033	0.585	
707.50	23095	Mid	LTE Band 12	10	24.0	23.66	0.15	1	Ant A	2	C35C6	QPSK	25	12	10 mm	front	1:1	0.453	1.081	0.490	
707.50	23095	Mid	LTE Band 12	10	25.0	24.86	0.06	0	Ant A	2	C35C6	QPSK	1	0	10 mm	bottom	1:1	0.281	1.033	0.290	
707.50	23095	Mid	LTE Band 12	10	24.0	23.66	0.04	1	Ant A	2	C35C6	QPSK	25	12	10 mm	bottom	1:1	0.226	1.081	0.244	
707.50	23095	Mid	LTE Band 12	10	25.0	24.86	0.00	0	Ant A	2	C35C6	QPSK	1	0	10 mm	right	1:1	0.121	1.033	0.125	
707.50	23095	Mid	LTE Band 12	10	24.0	23.66	0.17	1	Ant A	2	C35C6	QPSK	25	12	10 mm	right	1:1	0.106	1.081	0.115	
707.50	23095	Mid	LTE Band 12	10	25.0	24.86	-0.01	0	Ant A	2	C35C6	QPSK	1	0	10 mm	left	1:1	0.149	1.033	0.154	
707.50	23095	Mid	LTE Band 12	10	24.0	23.66	-0.04	1	Ant A	2	C35C6	QPSK	25	12	10 mm	left	1:1	0.121	1.081	0.131	
707.50	23095	Mid	LTE Band 12	10	25.0	24.86	0.08	0	Ant B	N/A	C35C6	QPSK	1	0	10 mm	back	1:1	0.371	1.033	0.383	
707.50	23095	Mid	LTE Band 12	10	24.0	23.66	0.00	1	Ant B	N/A	C35C6	QPSK	25	12	10 mm	back	1:1	0.293	1.081	0.317	
707.50	23095	Mid	LTE Band 12	10	25.0	24.86	-0.06	0	Ant B	N/A	C35C6	QPSK	1	0	10 mm	front	1:1	0.381	1.033	0.394	
707.50	23095	Mid	LTE Band 12	10	24.0	23.66	-0.03	1	Ant B	N/A	C35C6	QPSK	25	12	10 mm	front	1:1	0.299	1.081	0.323	
707.50	23095	Mid	LTE Band 12	10	25.0	24.86	-0.13	0	Ant B	N/A	C35C6	QPSK	1	0	10 mm	top	1:1	0.167	1.033	0.173	
707.50	23095	Mid	LTE Band 12	10	24.0	23.66	-0.09	1	Ant B	N/A	C35C6	QPSK	25	12	10 mm	top	1:1	0.133	1.081	0.144	
707.50	23095	Mid	LTE Band 12	10	25.0	24.86	0.12	0	Ant B	N/A	C35C6	QPSK	1	0	10 mm	right	1:1	0.115	1.033	0.119	
707.50	23095	Mid	LTE Band 12	10	24.0	23.66	0.10	1	Ant B	N/A	C35C6	QPSK	25	12	10 mm	right	1:1	0.084	1.081	0.091	
707.50	23095	Mid	LTE Band 12	10	25.0	24.86	0.06	0	Ant B	N/A	C35C6	QPSK	1	0	10 mm	left	1:1	0.148	1.033	0.153	
707.50	23095	Mid	LTE Band 12	10	24.0	23.66	0.07	1	Ant B	N/A	C35C6	QPSK	25	12	10 mm	left	1:1	0.116	1.081	0.125	
ANSI / IEEE C95.1 1992 - SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population								Body 1.6 W/kg (mW/g) averaged over 1 gram													

Table 11-26
LTE Band 13 Hotspot SAR

MEASUREMENT RESULTS																					
FREQUENCY			Mode	Bandwidth [MHz]	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Power Drift [dB]	MPR [dB]	Antenna Config.	State	Device Serial Number	Modulation	RB Size	RB Offset	Spacing	Side	Duty Cycle	SAR (1g)	Scaling Factor	Reported SAR (1g)	Plot #
MHz	Ch.																	(W/kg)		(W/kg)	
782.00	23230	Mid	LTE Band 13	10	25.0	24.07	-0.01	0	Ant A	1	C35C6	QPSK	1	49	10 mm	back	1:1	0.556	1.239	0.689	A37
782.00	23230	Mid	LTE Band 13	10	24.0	23.20	-0.02	1	Ant A	1	C35C6	QPSK	25	25	10 mm	back	1:1	0.433	1.202	0.520	
782.00	23230	Mid	LTE Band 13	10	25.0	24.07	-0.01	0	Ant A	1	C35C6	QPSK	1	49	10 mm	front	1:1	0.491	1.239	0.608	
782.00	23230	Mid	LTE Band 13	10	24.0	23.20	0.02	1	Ant A	1	C35C6	QPSK	25	25	10 mm	front	1:1	0.394	1.202	0.474	
782.00	23230	Mid	LTE Band 13	10	25.0	24.07	-0.04	0	Ant A	1	C35C6	QPSK	1	49	10 mm	bottom	1:1	0.249	1.239	0.309	
782.00	23230	Mid	LTE Band 13	10	24.0	23.20	-0.02	1	Ant A	1	C35C6	QPSK	25	25	10 mm	bottom	1:1	0.197	1.202	0.237	
782.00	23230	Mid	LTE Band 13	10	25.0	24.07	0.13	0	Ant A	1	C35C6	QPSK	1	49	10 mm	right	1:1	0.269	1.239	0.333	
782.00	23230	Mid	LTE Band 13	10	24.0	23.20	-0.01	1	Ant A	1	C35C6	QPSK	25	25	10 mm	right	1:1	0.202	1.202	0.243	
782.00	23230	Mid	LTE Band 13	10	25.0	24.07	-0.15	0	Ant A	1	C35C6	QPSK	1	49	10 mm	left	1:1	0.133	1.239	0.165	
782.00	23230	Mid	LTE Band 13	10	24.0	23.20	-0.05	1	Ant A	1	C35C6	QPSK	25	25	10 mm	left	1:1	0.097	1.202	0.117	
782.00	23230	Mid	LTE Band 13	10	25.0	24.07	0.00	0	Ant B	N/A	C35C6	QPSK	1	49	10 mm	back	1:1	0.376	1.239	0.466	
782.00	23230	Mid	LTE Band 13	10	24.0	23.20	0.00	1	Ant B	N/A	C35C6	QPSK	25	25	10 mm	back	1:1	0.299	1.202	0.359	
782.00	23230	Mid	LTE Band 13	10	25.0	24.07	0.05	0	Ant B	N/A	C35C6	QPSK	1	49	10 mm	front	1:1	0.336	1.239	0.416	
782.00	23230	Mid	LTE Band 13	10	24.0	23.20	0.02	1	Ant B	N/A	C35C6	QPSK	25	25	10 mm	front	1:1	0.271	1.202	0.326	
782.00	23230	Mid	LTE Band 13	10	25.0	24.07	0.11	0	Ant B	N/A	C35C6	QPSK	1	49	10 mm	top	1:1	0.178	1.239	0.221	
782.00	23230	Mid	LTE Band 13	10	24.0	23.20	0.12	1	Ant B	N/A	C35C6	QPSK	25	25	10 mm	top	1:1	0.138	1.202	0.166	
782.00	23230	Mid	LTE Band 13	10	25.0	24.07	0.03	0	Ant B	N/A	C35C6	QPSK	1	49	10 mm	right	1:1	0.141	1.239	0.175	
782.00	23230	Mid	LTE Band 13	10	24.0	23.20	-0.01	1	Ant B	N/A	C35C6	QPSK	25	25	10 mm	right	1:1	0.113	1.202	0.136	
782.00	23230	Mid	LTE Band 13	10	25.0	24.07	-0.08	0	Ant B	N/A	C35C6	QPSK	1	49	10 mm	left	1:1	0.296	1.239	0.367	
782.00	23230	Mid	LTE Band 13	10	24.0	23.20	-0.06	1	Ant B	N/A	C35C6	QPSK	25	25	10 mm	left	1:1	0.220	1.202	0.264	
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 11-27
LTE Band 26 (Cell) Hotspot SAR

MEASUREMENT RESULTS																					
FREQUENCY			Mode	Bandwidth [MHz]	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Power Drift [dB]	MPR [dB]	Antenna Config.	State	Device Serial Number	Modulation	RB Size	RB Offset	Spacing	Side	Duty Cycle	SAR (1g)	Scaling Factor	Reported SAR (1g)	Plot #
MHz	Ch.																	(W/kg)		(W/kg)	
836.50	26915	Mid	LTE Band 26 (Cell)	15	25.0	23.89	-0.03	0	Ant A	38	C3D8C	QPSK	1	0	10 mm	back	1:1	0.615	1.291	0.794	A39
836.50	26915	Mid	LTE Band 26 (Cell)	15	24.0	22.91	-0.01	1	Ant A	38	C3D8C	QPSK	36	0	10 mm	back	1:1	0.492	1.285	0.632	
836.50	26915	Mid	LTE Band 26 (Cell)	15	25.0	23.89	0.01	0	Ant A	38	C3D8C	QPSK	1	0	10 mm	front	1:1	0.509	1.291	0.657	
836.50	26915	Mid	LTE Band 26 (Cell)	15	24.0	22.91	0.02	1	Ant A	38	C3D8C	QPSK	36	0	10 mm	front	1:1	0.398	1.285	0.511	
836.50	26915	Mid	LTE Band 26 (Cell)	15	25.0	23.89	0.02	0	Ant A	38	C3D8C	QPSK	1	0	10 mm	bottom	1:1	0.278	1.291	0.359	
836.50	26915	Mid	LTE Band 26 (Cell)	15	24.0	22.91	0.05	1	Ant A	38	C3D8C	QPSK	36	0	10 mm	bottom	1:1	0.234	1.285	0.301	
836.50	26915	Mid	LTE Band 26 (Cell)	15	25.0	23.89	0.01	0	Ant A	38	C3D8C	QPSK	1	0	10 mm	right	1:1	0.232	1.291	0.300	
836.50	26915	Mid	LTE Band 26 (Cell)	15	24.0	22.91	0.13	1	Ant A	38	C3D8C	QPSK	36	0	10 mm	right	1:1	0.188	1.285	0.242	
836.50	26915	Mid	LTE Band 26 (Cell)	15	25.0	23.89	-0.15	0	Ant A	38	C3D8C	QPSK	1	0	10 mm	left	1:1	0.105	1.291	0.136	
836.50	26915	Mid	LTE Band 26 (Cell)	15	24.0	22.91	-0.06	1	Ant A	38	C3D8C	QPSK	36	0	10 mm	left	1:1	0.080	1.285	0.103	
836.50	26915	Mid	LTE Band 26 (Cell)	15	25.0	23.89	-0.04	0	Ant B	N/A	C3D8C	QPSK	1	0	10 mm	back	1:1	0.290	1.291	0.374	
836.50	26915	Mid	LTE Band 26 (Cell)	15	24.0	22.91	-0.02	1	Ant B	N/A	C3D8C	QPSK	36	0	10 mm	back	1:1	0.229	1.285	0.294	
836.50	26915	Mid	LTE Band 26 (Cell)	15	25.0	23.89	0.02	0	Ant B	N/A	C3D8C	QPSK	1	0	10 mm	front	1:1	0.328	1.291	0.423	
836.50	26915	Mid	LTE Band 26 (Cell)	15	24.0	22.91	0.04	1	Ant B	N/A	C3D8C	QPSK	36	0	10 mm	front	1:1	0.276	1.285	0.355	
836.50	26915	Mid	LTE Band 26 (Cell)	15	25.0	23.89	0.10	0	Ant B	N/A	C3D8C	QPSK	1	0	10 mm	top	1:1	0.153	1.291	0.198	
836.50	26915	Mid	LTE Band 26 (Cell)	15	24.0	22.91	0.08	1	Ant B	N/A	C3D8C	QPSK	36	0	10 mm	top	1:1	0.131	1.285	0.168	
836.50	26915	Mid	LTE Band 26 (Cell)	15	25.0	23.89	0.02	0	Ant B	N/A	C3D8C	QPSK	1	0	10 mm	right	1:1	0.121	1.291	0.156	
836.50	26915	Mid	LTE Band 26 (Cell)	15	24.0	22.91	0.08	1	Ant B	N/A	C3D8C	QPSK	36	0	10 mm	right	1:1	0.090	1.285	0.116	
836.50	26915	Mid	LTE Band 26 (Cell)	15	25.0	23.89	0.01	0	Ant B	N/A	C3D8C	QPSK	1	0	10 mm	left	1:1	0.378	1.291	0.488	
836.50	26915	Mid	LTE Band 26 (Cell)	15	24.0	22.91	0.01	1	Ant B	N/A	C3D8C	QPSK	36	0	10 mm	left	1:1	0.306	1.285	0.393	
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 11-28
LTE Band 4 (AWS) Hotspot SAR

MEASUREMENT RESULTS																			
FREQUENCY			Mode	Bandwidth [MHz]	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Power Drift [dB]	MPR [dB]	Device Serial Number	Modulation	RB Size	RB Offset	Spacing	Side	Duty Cycle	SAR (1g)	Scaling Factor	Reported SAR (1g)	Plot #
MHz	Ch.															(W/kg)		(W/kg)	
1732.50	20175	Mid	LTE Band 4 (AWS)	20	21.0	20.99	0.16	0	C3D46	QPSK	1	0	10 mm	back	1:1	0.880	1.002	0.882	A41
1732.50	20175	Mid	LTE Band 4 (AWS)	20	21.0	20.63	0.16	0	C3D46	QPSK	50	0	10 mm	back	1:1	0.821	1.089	0.894	
1732.50	20175	Mid	LTE Band 4 (AWS)	20	21.0	20.47	0.15	0	C3D46	QPSK	100	0	10 mm	back	1:1	0.814	1.130	0.920	
1732.50	20175	Mid	LTE Band 4 (AWS)	20	21.0	20.99	0.09	0	C3D46	QPSK	1	0	10 mm	front	1:1	0.804	1.002	0.806	
1732.50	20175	Mid	LTE Band 4 (AWS)	20	21.0	20.63	0.10	0	C3D46	QPSK	50	0	10 mm	front	1:1	0.746	1.089	0.812	
1732.50	20175	Mid	LTE Band 4 (AWS)	20	21.0	20.47	0.09	0	C3D46	QPSK	100	0	10 mm	front	1:1	0.734	1.130	0.829	
1732.50	20175	Mid	LTE Band 4 (AWS)	20	21.0	20.99	-0.04	0	C3D46	QPSK	1	0	10 mm	bottom	1:1	0.837	1.002	0.839	
1732.50	20175	Mid	LTE Band 4 (AWS)	20	21.0	20.63	-0.01	0	C3D46	QPSK	50	0	10 mm	bottom	1:1	0.787	1.089	0.857	
1732.50	20175	Mid	LTE Band 4 (AWS)	20	21.0	20.47	-0.03	0	C3D46	QPSK	100	0	10 mm	bottom	1:1	0.763	1.130	0.862	
1732.50	20175	Mid	LTE Band 4 (AWS)	20	21.0	20.99	-0.14	0	C3D46	QPSK	1	0	10 mm	right	1:1	0.246	1.002	0.246	
1732.50	20175	Mid	LTE Band 4 (AWS)	20	21.0	20.63	-0.15	0	C3D46	QPSK	50	0	10 mm	right	1:1	0.226	1.089	0.246	
1732.50	20175	Mid	LTE Band 4 (AWS)	20	21.0	20.99	-0.04	0	C3D46	QPSK	1	0	10 mm	left	1:1	0.027	1.002	0.027	
1732.50	20175	Mid	LTE Band 4 (AWS)	20	21.0	20.63	0.21	0	C3D46	QPSK	50	0	10 mm	left	1:1	0.024	1.089	0.026	
ANSI / IEEE C95.1 1992 - SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population									Body 1.6 W/kg (mW/g) averaged over 1 gram										

Table 11-29
LTE Band 25 (PCS) Hotspot SAR

MEASUREMENT RESULTS																			
FREQUENCY			Mode	Bandwidth [MHz]	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Power Drift [dB]	MPR [dB]	Device Serial Number	Modulation	RB Size	RB Offset	Spacing	Side	Duty Cycle	SAR (1g)	Scaling Factor	Reported SAR (1g)	Plot #
MHz	Ch.															(W/kg)		(W/kg)	
1860.00	26140	Low	LTE Band 25 (PCS)	20	21.0	20.95	0.06	0	C3D46	QPSK	1	0	10 mm	back	1:1	0.917	1.012	0.928	
1882.50	26365	Mid	LTE Band 25 (PCS)	20	21.0	20.98	-0.01	0	C3D46	QPSK	1	0	10 mm	back	1:1	0.880	1.005	0.884	
1905.00	26590	High	LTE Band 25 (PCS)	20	21.0	20.96	0.01	0	C3D46	QPSK	1	0	10 mm	back	1:1	0.954	1.009	0.963	A43
1860.00	26140	Low	LTE Band 25 (PCS)	20	21.0	20.66	0.02	0	C3D46	QPSK	50	0	10 mm	back	1:1	0.796	1.081	0.860	
1882.50	26365	Mid	LTE Band 25 (PCS)	20	21.0	20.61	0.02	0	C3D46	QPSK	50	0	10 mm	back	1:1	0.757	1.094	0.828	
1905.00	26590	High	LTE Band 25 (PCS)	20	21.0	20.60	0.02	0	C3D46	QPSK	50	0	10 mm	back	1:1	0.864	1.096	0.947	
1860.00	26140	Low	LTE Band 25 (PCS)	20	21.0	20.56	0.02	0	C3D46	QPSK	100	0	10 mm	back	1:1	0.770	1.107	0.852	
1860.00	26140	Low	LTE Band 25 (PCS)	20	21.0	20.95	-0.06	0	C3D46	QPSK	1	0	10 mm	front	1:1	0.939	1.012	0.950	
1882.50	26365	Mid	LTE Band 25 (PCS)	20	21.0	20.98	-0.05	0	C3D46	QPSK	1	0	10 mm	front	1:1	0.909	1.005	0.914	
1905.00	26590	High	LTE Band 25 (PCS)	20	21.0	20.96	0.03	0	C3D46	QPSK	1	0	10 mm	front	1:1	0.900	1.009	0.908	
1860.00	26140	Low	LTE Band 25 (PCS)	20	21.0	20.66	-0.08	0	C3D46	QPSK	50	0	10 mm	front	1:1	0.787	1.081	0.851	
1882.50	26365	Mid	LTE Band 25 (PCS)	20	21.0	20.61	-0.06	0	C3D46	QPSK	50	0	10 mm	front	1:1	0.730	1.094	0.799	
1905.00	26590	High	LTE Band 25 (PCS)	20	21.0	20.60	-0.08	0	C3D46	QPSK	50	0	10 mm	front	1:1	0.812	1.096	0.890	
1860.00	26140	Low	LTE Band 25 (PCS)	20	21.0	20.56	-0.06	0	C3D46	QPSK	100	0	10 mm	front	1:1	0.759	1.107	0.840	
1882.50	26365	Mid	LTE Band 25 (PCS)	20	21.0	20.98	0.04	0	C3D46	QPSK	1	0	10 mm	bottom	1:1	0.789	1.005	0.793	
1860.00	26140	Low	LTE Band 25 (PCS)	20	21.0	20.66	-0.07	0	C3D46	QPSK	50	0	10 mm	bottom	1:1	0.624	1.081	0.675	
1882.50	26365	Mid	LTE Band 25 (PCS)	20	21.0	20.98	-0.15	0	C3D46	QPSK	1	0	10 mm	right	1:1	0.234	1.005	0.235	
1860.00	26140	Low	LTE Band 25 (PCS)	20	21.0	20.66	-0.13	0	C3D46	QPSK	50	0	10 mm	right	1:1	0.199	1.081	0.215	
1882.50	26365	Mid	LTE Band 25 (PCS)	20	21.0	20.98	0.10	0	C3D46	QPSK	1	0	10 mm	left	1:1	0.029	1.005	0.029	
1860.00	26140	Low	LTE Band 25 (PCS)	20	21.0	20.66	0.09	0	C3D46	QPSK	50	0	10 mm	left	1:1	0.026	1.081	0.028	
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 11-30
LTE Band 30 Hotspot SAR

MEASUREMENT RESULTS																			
FREQUENCY			Mode	Bandwidth [MHz]	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Power Drift [dB]	MPR [dB]	Device Serial Number	Modulation	RB Size	RB Offset	Spacing	Side	Duty Cycle	SAR (1g)	Scaling Factor	Reported SAR (1g)	Plot #
MHz	Ch.															(W/kg)		(W/kg)	
2310.00	27710	Mid	LTE Band 30	10	20.0	19.47	-0.01	0	C3E5B	QPSK	1	0	10 mm	back	1:1	0.512	1.130	0.579	A45
2310.00	27710	Mid	LTE Band 30	10	20.0	18.71	-0.02	0	C3E5B	QPSK	25	0	10 mm	back	1:1	0.421	1.346	0.567	
2310.00	27710	Mid	LTE Band 30	10	20.0	19.47	-0.01	0	C3E5B	QPSK	1	0	10 mm	front	1:1	0.419	1.130	0.473	
2310.00	27710	Mid	LTE Band 30	10	20.0	18.71	-0.05	0	C3E5B	QPSK	25	0	10 mm	front	1:1	0.367	1.346	0.494	
2310.00	27710	Mid	LTE Band 30	10	20.0	19.47	0.00	0	C3E5B	QPSK	1	0	10 mm	bottom	1:1	0.178	1.130	0.201	
2310.00	27710	Mid	LTE Band 30	10	20.0	18.71	-0.03	0	C3E5B	QPSK	25	0	10 mm	bottom	1:1	0.159	1.346	0.214	
2310.00	27710	Mid	LTE Band 30	10	20.0	19.47	-0.06	0	C3E5B	QPSK	1	0	10 mm	left	1:1	0.149	1.130	0.168	
2310.00	27710	Mid	LTE Band 30	10	20.0	18.71	0.03	0	C3E5B	QPSK	25	0	10 mm	left	1:1	0.134	1.346	0.180	
ANSI / IEEE C95.1 1992 - SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population									Body 1.6 W/kg (mW/g) averaged over 1 gram										

Table 11-31
LTE Band 41 Hotspot SAR

MEASUREMENT RESULTS																			
FREQUENCY			Mode	Bandwidth [MHz]	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Power Drift [dB]	MPR [dB]	Device Serial Number	Modulation	RB Size	RB Offset	Spacing	Side	Duty Cycle	SAR (1g)	Scaling Factor	Reported SAR (1g)	Plot #
MHz	Ch.															(W/kg)		(W/kg)	
2680.00	41490	High	LTE Band 41	20	22.5	22.19	-0.12	0	C3D13	QPSK	1	0	10 mm	back	1:1.58	0.542	1.074	0.582	
2680.00	41490	High	LTE Band 41	20	22.5	21.87	-0.05	0	C3D13	QPSK	50	0	10 mm	back	1:1.58	0.395	1.156	0.457	
2680.00	41490	High	LTE Band 41	20	22.5	22.19	-0.12	0	C3D13	QPSK	1	0	10 mm	front	1:1.58	0.486	1.074	0.522	
2680.00	41490	High	LTE Band 41	20	22.5	21.87	-0.05	0	C3D13	QPSK	50	0	10 mm	front	1:1.58	0.350	1.156	0.405	
2506.00	39750	Low	LTE Band 41	20	22.5	21.92	0.04	0	C3D13	QPSK	1	0	10 mm	bottom	1:1.58	0.687	1.143	0.785	
2549.50	40185	Low-Mid	LTE Band 41	20	22.5	22.06	-0.02	0	C3D13	QPSK	1	0	10 mm	bottom	1:1.58	0.685	1.107	0.758	
2593.00	40620	Mid	LTE Band 41	20	22.5	21.87	-0.03	0	C3D13	QPSK	1	0	10 mm	bottom	1:1.58	0.655	1.156	0.757	
2636.50	41055	Mid-High	LTE Band 41	20	22.5	21.88	-0.10	0	C3D13	QPSK	1	0	10 mm	bottom	1:1.58	0.672	1.153	0.775	
2680.00	41490	High	LTE Band 41	20	22.5	22.19	0.03	0	C3D13	QPSK	1	0	10 mm	bottom	1:1.58	0.709	1.074	0.761	A47
2506.00	39750	Low	LTE Band 41	20	22.5	21.78	0.04	0	C3D13	QPSK	50	0	10 mm	bottom	1:1.58	0.706	1.180	0.833	
2549.50	40185	Low-Mid	LTE Band 41	20	22.5	21.65	-0.04	0	C3D13	QPSK	50	0	10 mm	bottom	1:1.58	0.637	1.216	0.775	
2593.00	40620	Mid	LTE Band 41	20	22.5	21.65	-0.05	0	C3D13	QPSK	50	0	10 mm	bottom	1:1.58	0.633	1.216	0.770	
2636.50	41055	Mid-High	LTE Band 41	20	22.5	21.71	-0.05	0	C3D13	QPSK	50	0	10 mm	bottom	1:1.58	0.647	1.199	0.776	
2680.00	41490	High	LTE Band 41	20	22.5	21.87	-0.05	0	C3D13	QPSK	50	0	10 mm	bottom	1:1.58	0.666	1.156	0.770	
2680.00	41490	High	LTE Band 41	20	22.5	21.78	0.00	0	C3D13	QPSK	100	0	10 mm	bottom	1:1.58	0.652	1.180	0.769	
2680.00	41490	High	LTE Band 41	20	22.5	22.19	0.02	0	C3D13	QPSK	1	0	10 mm	left	1:1.58	0.364	1.074	0.391	
2680.00	41490	High	LTE Band 41	20	22.5	21.87	0.06	0	C3D13	QPSK	50	0	10 mm	left	1:1.58	0.262	1.156	0.303	
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 11-32
WLAN Hotspot SAR

MEASUREMENT RESULTS																			
FREQUENCY		Mode	Service	Bandwidth [MHz]	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Power Drift [dB]	Spacing	Antenna Config.	Device Serial Number	Data Rate (Mbps)	Side	Duty Cycle (%)	Peak SAR of Area Scan	SAR (1g)	Scaling Factor (Power)	Scaling Factor (Duty Cycle)	Reported SAR (1g)	Plot #
MHz	Ch.													W/kg	(W/kg)			(W/kg)	
2437	6	802.11b	DSSS	22	20.5	20.31	0.12	10 mm	1	C3E99	1	back	99.8	0.238	0.193	1.045	1.002	0.202	A49
2437	6	802.11b	DSSS	22	20.5	20.31	-	10 mm	1	C3E99	1	front	99.8	0.237	-	1.045	1.002	-	
2437	6	802.11b	DSSS	22	20.5	20.31	-	10 mm	1	C3E99	1	top	99.8	0.131	-	1.045	1.002	-	
2437	6	802.11b	DSSS	22	20.5	20.31	-	10 mm	1	C3E99	1	left	99.8	0.129	-	1.045	1.002	-	
2437	6	802.11b	DSSS	22	20.5	20.42	-	10 mm	2	C3E99	1	back	99.8	0.186	-	1.019	1.002	-	
2437	6	802.11b	DSSS	22	20.5	20.42	-	10 mm	2	C3E99	1	front	99.8	0.161	-	1.019	1.002	-	
2437	6	802.11b	DSSS	22	20.5	20.42	-0.08	10 mm	2	C3E99	1	top	99.8	0.226	0.185	1.019	1.002	0.189	
2437	6	802.11b	DSSS	22	20.5	20.42	-	10 mm	2	C3E99	1	left	99.8	0.060	-	1.019	1.002	-	
5785	157	802.11a	OFDM	20	17.5	17.22	0.18	10 mm	1	C3D00	6	back	98.6	0.617	0.305	1.067	1.014	0.330	A51
5785	157	802.11a	OFDM	20	17.5	17.22	-	10 mm	1	C3D00	6	front	98.6	0.526	-	1.067	1.014	-	
5785	157	802.11a	OFDM	20	17.5	17.22	-	10 mm	1	C3D00	6	top	98.6	0.238	-	1.067	1.014	-	
5785	157	802.11a	OFDM	20	17.5	17.22	-	10 mm	1	C3D00	6	left	98.6	0.130	-	1.067	1.014	-	
5785	157	802.11a	OFDM	20	17.5	16.69	0.14	10 mm	2	C3D00	6	back	98.6	0.401	0.183	1.205	1.014	0.224	
5785	157	802.11a	OFDM	20	17.5	16.69	-	10 mm	2	C3D00	6	front	98.6	0.248	-	1.205	1.014	-	
5785	157	802.11a	OFDM	20	17.5	16.69	-	10 mm	2	C3D00	6	top	98.6	0.102	-	1.205	1.014	-	
5785	157	802.11a	OFDM	20	17.5	16.69	-	10 mm	2	C3D00	6	left	98.6	0.090	-	1.205	1.014	-	
ANSI / IEEE C95.1 1992 - SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population									Body 1.6 W/kg (mW/g) averaged over 1 gram										

11.4 SAR Test Notes

General Notes:

1. The test data reported are the worst-case SAR values according to test procedures specified in IEEE 1528-2013, and FCC KDB Publication 447498 D01v06.
2. Batteries are fully charged at the beginning of the SAR measurements.
3. Liquid tissue depth was at least 15.0 cm for all frequencies.
4. The manufacturer has confirmed that the device(s) tested have the same physical, mechanical and thermal characteristics and are within operational tolerances expected for production units.
5. SAR results were scaled to the maximum allowed power to demonstrate compliance per FCC KDB Publication 447498 D01v06.
6. Device was tested using a fixed spacing for body-worn accessory testing. A separation distance of 15 mm was considered because the manufacturer has determined that there will be body-worn accessories available in the marketplace for users to support this separation distance.
7. Per FCC KDB Publication 648474 D04v01r03, body-worn SAR was evaluated without a headset connected to the device. Since the standalone reported body-worn SAR was ≤ 1.2 W/kg, no additional body-worn SAR evaluations using a headset cable were required.
8. Per FCC KDB 865664 D01v01r04, variability SAR tests were performed when the measured SAR results for a frequency band were greater than or equal to 0.8 W/kg. Repeated SAR measurements are highlighted in the tables above for clarity. Please see Section 13 for variability analysis.
9. During SAR Testing for the Wireless Router conditions per FCC KDB Publication 941225 D06v02r01, the actual Portable Hotspot operation (with actual simultaneous transmission of a transmitter with WIFI) was not activated (See Section 6.7 for more details).
10. This device supports dynamic antenna tuning for some bands on Antenna A. Per FCC Guidance, SAR was measured according to the normally required SAR measurement configurations with the tuner active. The auto-tune state determined by the device was verified before and after each SAR measurement and is listed in the tables above. Please see Section 14 for supplemental data.

GSM Test Notes:

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

CDMA Notes:

1. Head SAR for CDMA2000 mode was tested under RC3/SO55 per FCC KDB Publication 941225 D01v03r01.
2. Body-Worn SAR was tested with 1x RTT with TDSO / SO32 FCH Only. EVDO Rev0 and RevA and TDSO / SO32 FCH+SCH SAR tests were not required per the 3G SAR Test Reduction Procedure in FCC KDB Publication 941225 D01v03r01.
3. CDMA Wireless Router SAR is measured using Subtype 0/1 Physical Layer configurations for Rev. 0 according to KDB 941225 D01v03r01 procedures for data devices. Wireless Router SAR tests for Subtype 2 of Rev.A and 1x RTT configurations were not required per the 3G SAR Test Reduction Policy in KDB Publication 941225 D01v03r01.
4. Head SAR was additionally evaluated using EVDO Rev. A to determine compliance for VoIP operations.
5. Per FCC KDB Publication 447498 D01v06, if the reported (scaled) SAR measured at the middle channel or highest output power channel for each test configuration is ≤ 0.8 W/kg then testing at the other channels is not required for such test configuration(s). When the maximum output power variation across the required test channels is > ½ dB, instead of the middle channel, the highest output power channel was used.

UMTS Notes:

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

LTE Notes:

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

WLAN Notes:

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

12 FCC MULTI-TX AND ANTENNA SAR CONSIDERATIONS

12.1 Introduction

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

12.2 Simultaneous Transmission Procedures

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

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

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

Table 12-1
Estimated SAR

Mode	Frequency	Maximum Allowed Power	Separation Distance (Body)	Estimated SAR (Body)
	[MHz]	[dBm]	[mm]	[W/kg]
Bluetooth	2480	11.50	15	0.196

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

12.3 Head SAR Simultaneous Transmission Analysis

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

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

Exposure Condition	Mode	2G/3G/4G SAR (W/kg)	2.4 GHz WLAN Ant 1 SAR (W/kg)	2.4 GHz WLAN Ant 2 SAR (W/kg)	Σ SAR (W/kg)		
		1	2	3	1+2	1+3	1+2+3
Head SAR	GSM 850	0.152	0.252	0.199	0.404	0.351	0.603
	GSM 1900	0.112	0.252	0.199	0.364	0.311	0.563
	UMTS 850	0.617	0.252	0.199	0.869	0.816	**1.068**
	UMTS 1750	0.286	0.252	0.199	0.538	0.485	0.737
	UMTS 1900	0.233	0.252	0.199	0.485	0.432	0.684
	CDMA/EVDO BC10 (§90S)	0.488	0.252	0.199	0.740	0.687	0.939
	CDMA/EVDO BC0 (§22H)	0.564	0.252	0.199	0.816	0.763	1.015
	PCS CDMA/EVDO	0.233	0.252	0.199	0.485	0.432	0.684
	LTE Band 12	0.559	0.252	0.199	0.811	0.758	1.010
	LTE Band 13	0.564	0.252	0.199	0.816	0.763	1.015
	LTE Band 26 (Cell)	0.555	0.252	0.199	0.807	0.754	1.006
	LTE Band 4 (AWS)	0.176	0.252	0.199	0.428	0.375	0.627
	LTE Band 25 (PCS)	0.211	0.252	0.199	0.463	0.410	0.662
	LTE Band 30	0.159	0.252	0.199	0.411	0.358	0.610
	LTE Band 41	0.273	0.252	0.199	0.525	0.472	0.724

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

Exposure Condition	Mode	2G/3G/4G SAR (W/kg)	5 GHz WLAN Ant 1 SAR (W/kg)	5 GHz WLAN Ant 2 SAR (W/kg)	Σ SAR (W/kg)		
		1	2	3	1+2	1+3	1+2+3
Head SAR	GSM 850	0.152	0.456	0.263	0.608	0.415	0.871
	GSM 1900	0.112	0.456	0.263	0.568	0.375	0.831
	UMTS 850	0.617	0.456	0.263	1.073	0.880	See Table 12-4
	UMTS 1750	0.286	0.456	0.263	0.742	0.549	1.005
	UMTS 1900	0.233	0.456	0.263	0.689	0.496	0.952
	CDMA/EVDO BC10 (§90S)	0.488	0.456	0.263	0.944	0.751	**1.207**
	CDMA/EVDO BC0 (§22H)	0.564	0.456	0.263	1.020	0.827	See Table 12-4
	PCS CDMA/EVDO	0.233	0.456	0.263	0.689	0.496	0.952
	LTE Band 12	0.559	0.456	0.263	1.015	0.822	See Table 12-4
	LTE Band 13	0.564	0.456	0.263	1.020	0.827	See Table 12-4
	LTE Band 26 (Cell)	0.555	0.456	0.263	1.011	0.818	See Table 12-4
	LTE Band 4 (AWS)	0.176	0.456	0.263	0.632	0.439	0.895
	LTE Band 25 (PCS)	0.211	0.456	0.263	0.667	0.474	0.930
	LTE Band 30	0.159	0.456	0.263	0.615	0.422	0.878
	LTE Band 41	0.273	0.456	0.263	0.729	0.536	0.992

Table 12-4
Simultaneous Transmission Scenario with 5 GHz WLAN (Held to Ear)

Simult Tx	Configuration	UMTS 850 Ant B SAR (W/kg)	5 GHz WLAN Ant 1 SAR (W/kg)	5 GHz WLAN Ant 2 SAR (W/kg)	Σ SAR (W/kg)		
		1	2	3	1+2	1+3	1+2+3
Head SAR	Right Cheek	0.556	0.456	0.223	1.012	0.779	**1.235**
	Right Tilt	0.502	0.387	0.263*	0.889	0.765	1.152
	Left Cheek	0.617	0.233	0.263	0.850	0.880	1.113
	Left Tilt	0.427	0.456*	0.263*	0.883	0.690	1.146
Simult Tx	Configuration	CDMA/EVDO BC0 (§22H) Ant B SAR (W/kg)	5 GHz WLAN Ant 1 SAR (W/kg)	5 GHz WLAN Ant 2 SAR (W/kg)	Σ SAR (W/kg)		
		1	2	3	1+2	1+3	1+2+3
Head SAR	Right Cheek	0.564	0.456	0.223	1.020	0.787	**1.243**
	Right Tilt	0.430	0.387	0.263*	0.817	0.693	1.080
	Left Cheek	0.504	0.233	0.263	0.737	0.767	1.000
	Left Tilt	0.357	0.456*	0.263*	0.813	0.620	1.076
Simult Tx	Configuration	LTE Band 12 Ant B SAR (W/kg)	5 GHz WLAN Ant 1 SAR (W/kg)	5 GHz WLAN Ant 2 SAR (W/kg)	Σ SAR (W/kg)		
		1	2	3	1+2	1+3	1+2+3
Head SAR	Right Cheek	0.559	0.456	0.223	1.015	0.782	**1.238**
	Right Tilt	0.447	0.387	0.263*	0.834	0.710	1.097
	Left Cheek	0.530	0.233	0.263	0.763	0.793	1.026
	Left Tilt	0.399	0.456*	0.263*	0.855	0.662	1.118
Simult Tx	Configuration	LTE Band 13 Ant B SAR (W/kg)	5 GHz WLAN Ant 1 SAR (W/kg)	5 GHz WLAN Ant 2 SAR (W/kg)	Σ SAR (W/kg)		
		1	2	3	1+2	1+3	1+2+3
Head SAR	Right Cheek	0.473	0.456	0.223	0.929	0.696	**1.152**
	Right Tilt	0.375	0.387	0.263*	0.762	0.638	1.025
	Left Cheek	0.564	0.233	0.263	0.797	0.827	1.060
	Left Tilt	0.352	0.456*	0.263*	0.808	0.615	1.071
Simult Tx	Configuration	LTE Band 26 (Cell) Ant B SAR (W/kg)	5 GHz WLAN Ant 1 SAR (W/kg)	5 GHz WLAN Ant 2 SAR (W/kg)	Σ SAR (W/kg)		
		1	2	3	1+2	1+3	1+2+3
Head SAR	Right Cheek	0.537	0.456	0.223	0.993	0.760	**1.216**
	Right Tilt	0.428	0.387	0.263*	0.815	0.691	1.078
	Left Cheek	0.555	0.233	0.263	0.788	0.818	1.051
	Left Tilt	0.389	0.456*	0.263*	0.845	0.652	1.108

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

Exposure Condition	Mode	2G/3G/4G SAR (W/kg)	2.4 GHz WLAN Ant 1 SAR (W/kg)	5 GHz WLAN Ant 2 SAR (W/kg)	Σ SAR (W/kg)
		1	2	3	1+2+3
Head SAR	GSM 850	0.152	0.252	0.263	0.667
	GSM 1900	0.112	0.252	0.263	0.627
	UMTS 850	0.617	0.252	0.263	**1.132**
	UMTS 1750	0.286	0.252	0.263	0.801
	UMTS 1900	0.233	0.252	0.263	0.748
	CDMA/EVDO BC10 (§90S)	0.488	0.252	0.263	1.003
	CDMA/EVDO BC0 (§22H)	0.564	0.252	0.263	1.079
	PCS CDMA/EVDO	0.233	0.252	0.263	0.748
	LTE Band 12	0.559	0.252	0.263	1.074
	LTE Band 13	0.564	0.252	0.263	1.079
	LTE Band 26 (Cell)	0.555	0.252	0.263	1.070
	LTE Band 4 (AWS)	0.176	0.252	0.263	0.691
	LTE Band 25 (PCS)	0.211	0.252	0.263	0.726
	LTE Band 30	0.159	0.252	0.263	0.674
	LTE Band 41	0.273	0.252	0.263	0.788

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

Exposure Condition	Mode	2G/3G/4G SAR (W/kg)	2.4 GHz WLAN Ant 2 SAR (W/kg)	5 GHz WLAN Ant 1 SAR (W/kg)	Σ SAR (W/kg)
		1	2	3	1+2+3
Head SAR	GSM 850	0.152	0.199	0.456	0.807
	GSM 1900	0.112	0.199	0.456	0.767
	UMTS 850	0.617	0.199	0.456	See Table 12-7
	UMTS 1750	0.286	0.199	0.456	0.941
	UMTS 1900	0.233	0.199	0.456	0.888
	CDMA/EVDO BC10 (§90S)	0.488	0.199	0.456	1.143
	CDMA/EVDO BC0 (§22H)	0.564	0.199	0.456	**1.219**
	PCS CDMA/EVDO	0.233	0.199	0.456	0.888
	LTE Band 12	0.559	0.199	0.456	1.214
	LTE Band 13	0.564	0.199	0.456	**1.219**
	LTE Band 26 (Cell)	0.555	0.199	0.456	1.210
	LTE Band 4 (AWS)	0.176	0.199	0.456	0.831
	LTE Band 25 (PCS)	0.211	0.199	0.456	0.866
	LTE Band 30	0.159	0.199	0.456	0.814
	LTE Band 41	0.273	0.199	0.456	0.928

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

Simult Tx	Configuration	UMTS 850 Ant B SAR (W/kg)	2.4 GHz WLAN Ant 2 SAR (W/kg)	5 GHz WLAN Ant 1 SAR (W/kg)	Σ SAR (W/kg)
		1	2	3	1+2+3
Head SAR	Right Cheek	0.556	0.199*	0.456	**1.211**
	Right Tilt	0.502	0.199	0.387	1.088
	Left Cheek	0.617	0.199*	0.233	1.049
	Left Tilt	0.427	0.199*	0.456*	1.082

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

Simult Tx	Configuration	2.4 GHz WLAN Ant 1 SAR (W/kg)	2.4 GHz WLAN Ant 2 SAR (W/kg)	Σ SAR (W/kg)
Head SAR	Right Cheek	0.848	0.394	**1.242**
	Right Tilt	0.655	0.394*	1.049
	Left Cheek	0.848*	0.394*	**1.242**
	Left Tilt	0.848*	0.394*	**1.242**

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

Simult Tx	Configuration	5 GHz WLAN Ant 1 SAR (W/kg)	5 GHz WLAN Ant 2 SAR (W/kg)	Σ SAR (W/kg)
Head SAR	Right Cheek	0.456	0.223	0.679
	Right Tilt	0.387	0.263*	0.650
	Left Cheek	0.233	0.263	0.496
	Left Tilt	0.456*	0.263*	**0.719**

Table 12-10
Simultaneous Transmission Scenario with 2.4 GHz Ant 1 and 5 GHz Ant 2 WLAN with Airplane Mode On (Held to Ear)

Simult Tx	Configuration	2.4 GHz WLAN Ant 1 SAR (W/kg)	5 GHz WLAN Ant 2 SAR (W/kg)	Σ SAR (W/kg)
Head SAR	Right Cheek	0.848	0.223	1.071
	Right Tilt	0.655	0.263*	0.918
	Left Cheek	0.848*	0.263	**1.111**
	Left Tilt	0.848*	0.263*	**1.111**

Table 12-11
Simultaneous Transmission Scenario with 2.4 GHz Ant 2 and 5 GHz Ant 1 WLAN with Airplane Mode On (Held to Ear)

Simult Tx	Configuration	2.4 GHz WLAN Ant 2 SAR (W/kg)	5 GHz WLAN Ant 1 SAR (W/kg)	Σ SAR (W/kg)
Head SAR	Right Cheek	0.394	0.456	**0.850**
	Right Tilt	0.394*	0.387	0.781
	Left Cheek	0.394*	0.233	0.627
	Left Tilt	0.394*	0.456*	**0.850**

12.4 Body-Worn Simultaneous Transmission Analysis

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

Exposure Condition	Mode	2G/3G/4G SAR (W/kg)	2.4 GHz WLAN Ant 1 SAR (W/kg)	2.4 GHz WLAN Ant 2 SAR (W/kg)	Σ SAR (W/kg)		
		1	2	3	1+2	1+3	1+2+3
Body-Worn	GSM 850	0.491	0.110	0.059	0.601	0.550	0.660
	GSM 1900	0.406	0.110	0.059	0.516	0.465	0.575
	UMTS 850	0.479	0.110	0.059	0.589	0.538	0.648
	UMTS 1750	0.859	0.110	0.059	0.969	0.918	1.028
	UMTS 1900	0.397	0.110	0.059	0.507	0.456	0.566
	CDMA BC10 (§90S)	0.439	0.110	0.059	0.549	0.498	0.608
	CDMA BC0 (§22H)	0.525	0.110	0.059	0.635	0.584	0.694
	PCS CDMA	1.072	0.110	0.059	1.182	1.131	**1.241**
	LTE Band 12	0.387	0.110	0.059	0.497	0.446	0.556
	LTE Band 13	0.489	0.110	0.059	0.599	0.548	0.658
	LTE Band 26 (Cell)	0.519	0.110	0.059	0.629	0.578	0.688
	LTE Band 4 (AWS)	0.983	0.110	0.059	1.093	1.042	1.152
	LTE Band 25 (PCS)	0.865	0.110	0.059	0.975	0.924	1.034
	LTE Band 30	0.420	0.110	0.059	0.530	0.479	0.589
	LTE Band 41	0.304	0.110	0.059	0.414	0.363	0.473

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

Exposure Condition	Mode	2G/3G/4G SAR (W/kg)	5 GHz WLAN Ant 1 SAR (W/kg)	5 GHz WLAN Ant 2 SAR (W/kg)	Σ SAR (W/kg)		
		1	2	3	1+2	1+3	1+2+3
Body-Worn	GSM 850	0.491	0.215	0.119	0.706	0.610	0.825
	GSM 1900	0.406	0.215	0.119	0.621	0.525	0.740
	UMTS 850	0.479	0.215	0.119	0.694	0.598	0.813
	UMTS 1750	0.859	0.215	0.119	1.074	0.978	1.193
	UMTS 1900	0.397	0.215	0.119	0.612	0.516	0.731
	CDMA BC10 (§90S)	0.439	0.215	0.119	0.654	0.558	0.773
	CDMA BC0 (§22H)	0.525	0.215	0.119	0.740	0.644	0.859
	PCS CDMA	1.072	0.215	0.119	1.287	1.191	**1.406**
	LTE Band 12	0.387	0.215	0.119	0.602	0.506	0.721
	LTE Band 13	0.489	0.215	0.119	0.704	0.608	0.823
	LTE Band 26 (Cell)	0.519	0.215	0.119	0.734	0.638	0.853
	LTE Band 4 (AWS)	0.983	0.215	0.119	1.198	1.102	1.317
	LTE Band 25 (PCS)	0.865	0.215	0.119	1.080	0.984	1.199
	LTE Band 30	0.420	0.215	0.119	0.635	0.539	0.754
	LTE Band 41	0.304	0.215	0.119	0.519	0.423	0.638

Table 12-14
Simultaneous Transmission Scenario with 2.4 GHz Ant 1 and 5 GHz Ant 2 WLAN (Body-Worn at 1.5 cm)

Exposure Condition	Mode	2G/3G/4G SAR (W/kg)	2.4 GHz WLAN Ant 1 SAR (W/kg)	5 GHz WLAN Ant 2 SAR (W/kg)	Σ SAR (W/kg)
		1	2	3	1+2+3
Body-Worn	GSM 850	0.491	0.110	0.119	0.720
	GSM 1900	0.406	0.110	0.119	0.635
	UMTS 850	0.479	0.110	0.119	0.708
	UMTS 1750	0.859	0.110	0.119	1.088
	UMTS 1900	0.397	0.110	0.119	0.626
	CDMA BC10 (§90S)	0.439	0.110	0.119	0.668
	CDMA BC0 (§22H)	0.525	0.110	0.119	0.754
	PCS CDMA	1.072	0.110	0.119	**1.301**
	LTE Band 12	0.387	0.110	0.119	0.616
	LTE Band 13	0.489	0.110	0.119	0.718
	LTE Band 26 (Cell)	0.519	0.110	0.119	0.748
	LTE Band 4 (AWS)	0.983	0.110	0.119	1.212
	LTE Band 25 (PCS)	0.865	0.110	0.119	1.094
	LTE Band 30	0.420	0.110	0.119	0.649
	LTE Band 41	0.304	0.110	0.119	0.533

Table 12-15
Simultaneous Transmission Scenario with 2.4 GHz Ant 2 and 5 GHz Ant 1 WLAN (Body-Worn at 1.5 cm)

Exposure Condition	Mode	2G/3G/4G SAR (W/kg)	2.4 GHz WLAN Ant 2 SAR (W/kg)	5 GHz WLAN Ant 1 SAR (W/kg)	Σ SAR (W/kg)
		1	2	3	1+2+3
Body-Worn	GSM 850	0.491	0.059	0.215	0.765
	GSM 1900	0.406	0.059	0.215	0.680
	UMTS 850	0.479	0.059	0.215	0.753
	UMTS 1750	0.859	0.059	0.215	1.133
	UMTS 1900	0.397	0.059	0.215	0.671
	CDMA BC10 (§90S)	0.439	0.059	0.215	0.713
	CDMA BC0 (§22H)	0.525	0.059	0.215	0.799
	PCS CDMA	1.072	0.059	0.215	**1.346**
	LTE Band 12	0.387	0.059	0.215	0.661
	LTE Band 13	0.489	0.059	0.215	0.763
	LTE Band 26 (Cell)	0.519	0.059	0.215	0.793
	LTE Band 4 (AWS)	0.983	0.059	0.215	1.257
	LTE Band 25 (PCS)	0.865	0.059	0.215	1.139
	LTE Band 30	0.420	0.059	0.215	0.694
	LTE Band 41	0.304	0.059	0.215	0.578

Table 12-16
Simultaneous Transmission Scenario with Bluetooth (Body-Worn at 1.5 cm)

Exposure Condition	Mode	2G/3G/4G SAR (W/kg)	Bluetooth SAR (W/kg)	Σ SAR (W/kg)
		1	2	1+2
Body-Worn	GSM 850	0.491	0.196	0.687
	GSM 1900	0.406	0.196	0.602
	UMTS 850	0.479	0.196	0.675
	UMTS 1750	0.859	0.196	1.055
	UMTS 1900	0.397	0.196	0.593
	CDMA BC10 (§90S)	0.439	0.196	0.635
	CDMA BC0 (§22H)	0.525	0.196	0.721
	PCS CDMA	1.072	0.196	**1.268**
	LTE Band 12	0.387	0.196	0.583
	LTE Band 13	0.489	0.196	0.685
	LTE Band 26 (Cell)	0.519	0.196	0.715
	LTE Band 4 (AWS)	0.983	0.196	1.179
	LTE Band 25 (PCS)	0.865	0.196	1.061
	LTE Band 30	0.420	0.196	0.616
	LTE Band 41	0.304	0.196	0.500

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

12.5 Hotspot SAR Simultaneous Transmission Analysis

Table 12-17
Simultaneous Transmission Scenario (2.4 GHz Hotspot at 1.0 cm)

Exposure Condition	Mode	2G/3G/4G SAR (W/kg)	2.4 GHz WLAN Ant 1 SAR (W/kg)	2.4 GHz WLAN Ant 2 SAR (W/kg)	Σ SAR (W/kg)		
		1	2	3	1+2	1+3	1+2+3
Hotspot SAR	GPRS 850	0.665	0.202	0.189	0.867	0.854	1.056
	GPRS 1900	0.678	0.202	0.189	0.880	0.867	1.069
	UMTS 850	0.753	0.202	0.189	0.955	0.942	1.144
	UMTS 1750	1.019	0.202	0.189	1.221	1.208	1.410
	UMTS 1900	1.040	0.202	0.189	1.242	1.229	**1.431**
	EVDO BC10 (§90S)	0.843	0.202	0.189	1.045	1.032	1.234
	EVDO BC0 (§22H)	1.032	0.202	0.189	1.234	1.221	1.423
	PCS EVDO	1.003	0.202	0.189	1.205	1.192	1.394
	LTE Band 12	0.594	0.202	0.189	0.796	0.783	0.985
	LTE Band 13	0.689	0.202	0.189	0.891	0.878	1.080
	LTE Band 26 (Cell)	0.794	0.202	0.189	0.996	0.983	1.185
	LTE Band 4 (AWS)	0.920	0.202	0.189	1.122	1.109	1.311
	LTE Band 25 (PCS)	0.963	0.202	0.189	1.165	1.152	1.354
	LTE Band 30	0.579	0.202	0.189	0.781	0.768	0.970
	LTE Band 41	0.833	0.202	0.189	1.035	1.022	1.224

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

Exposure Condition	Mode	2G/3G/4G SAR (W/kg)	5 GHz WLAN Ant 1 SAR (W/kg)	5 GHz WLAN Ant 2 SAR (W/kg)	Σ SAR (W/kg)		
		1	2	3	1+2	1+3	1+2+3
Hotspot SAR	GPRS 850	0.665	0.330	0.224	0.995	0.889	1.219
	GPRS 1900	0.678	0.330	0.224	1.008	0.902	1.232
	UMTS 850	0.753	0.330	0.224	1.083	0.977	1.307
	UMTS 1750	1.019	0.330	0.224	1.349	1.243	1.573
	UMTS 1900	1.040	0.330	0.224	1.370	1.264	**1.594**
	EVDO BC10 (§90S)	0.843	0.330	0.224	1.173	1.067	1.397
	EVDO BC0 (§22H)	1.032	0.330	0.224	1.362	1.256	1.586
	PCS EVDO	1.003	0.330	0.224	1.333	1.227	1.557
	LTE Band 12	0.594	0.330	0.224	0.924	0.818	1.148
	LTE Band 13	0.689	0.330	0.224	1.019	0.913	1.243
	LTE Band 26 (Cell)	0.794	0.330	0.224	1.124	1.018	1.348
	LTE Band 4 (AWS)	0.920	0.330	0.224	1.250	1.144	1.474
	LTE Band 25 (PCS)	0.963	0.330	0.224	1.293	1.187	1.517
	LTE Band 30	0.579	0.330	0.224	0.909	0.803	1.133
	LTE Band 41	0.833	0.330	0.224	1.163	1.057	1.387

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

Exposure Condition	Mode	2G/3G/4G SAR (W/kg)	2.4 GHz WLAN Ant 1 SAR (W/kg)	5 GHz WLAN Ant 2 SAR (W/kg)	Σ SAR (W/kg)
		1	2	3	1+2+3
Hotspot SAR	GPRS 850	0.665	0.202	0.224	1.091
	GPRS 1900	0.678	0.202	0.224	1.104
	UMTS 850	0.753	0.202	0.224	1.179
	UMTS 1750	1.019	0.202	0.224	1.445
	UMTS 1900	1.040	0.202	0.224	**1.466**
	EVDO BC10 (§90S)	0.843	0.202	0.224	1.269
	EVDO BC0 (§22H)	1.032	0.202	0.224	1.458
	PCS EVDO	1.003	0.202	0.224	1.429
	LTE Band 12	0.594	0.202	0.224	1.020
	LTE Band 13	0.689	0.202	0.224	1.115
	LTE Band 26 (Cell)	0.794	0.202	0.224	1.220
	LTE Band 4 (AWS)	0.920	0.202	0.224	1.346
	LTE Band 25 (PCS)	0.963	0.202	0.224	1.389
	LTE Band 30	0.579	0.202	0.224	1.005
	LTE Band 41	0.833	0.202	0.224	1.259

Table 12-20
Simultaneous Transmission Scenario with 2.4 GHz Ant 2 and 5 GHz Ant 1 WLAN (Hotspot at 1.0 cm)

Exposure Condition	Mode	2G/3G/4G SAR (W/kg)	2.4 GHz WLAN Ant 2 SAR (W/kg)	5 GHz WLAN Ant 1 SAR (W/kg)	Σ SAR (W/kg)
		1	2	3	1+2+3
Hotspot SAR	GPRS 850	0.665	0.189	0.330	1.184
	GPRS 1900	0.678	0.189	0.330	1.197
	UMTS 850	0.753	0.189	0.330	1.272
	UMTS 1750	1.019	0.189	0.330	1.538
	UMTS 1900	1.040	0.189	0.330	**1.559**
	EVDO BC10 (§90S)	0.843	0.189	0.330	1.362
	EVDO BC0 (§22H)	1.032	0.189	0.330	1.551
	PCS EVDO	1.003	0.189	0.330	1.522
	LTE Band 12	0.594	0.189	0.330	1.113
	LTE Band 13	0.689	0.189	0.330	1.208
	LTE Band 26 (Cell)	0.794	0.189	0.330	1.313
	LTE Band 4 (AWS)	0.920	0.189	0.330	1.439
	LTE Band 25 (PCS)	0.963	0.189	0.330	1.482
	LTE Band 30	0.579	0.189	0.330	1.098
	LTE Band 41	0.833	0.189	0.330	1.352

12.6 Simultaneous Transmission Conclusion

The above numerical summed SAR results for all the worst-case simultaneous transmission conditions were below the SAR limit. Therefore, the above analysis is sufficient to determine that simultaneous transmission cases will not exceed the SAR limit and therefore no measured volumetric simultaneous SAR summation is required per FCC KDB Publication 447498 D01v06 and IEEE 1528-2013 Section 6.3.4.1.2.

13 SAR MEASUREMENT VARIABILITY

13.1 Measurement Variability

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

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

1) When the original highest measured SAR is ≥ 0.80 W/kg, the measurement was repeated once.
2) A second repeated measurement was 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	Antenna Config.	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)	
835	824.70	1013	CDMA BC0 (§22H)	EVDO Rev. 0	Ant A	back	10 mm	0.851	0.893	1.05	N/A	N/A	N/A	N/A
1750	1732.50	20175	LTE Band 4 (AWS), 20 MHz Bandwidth	QPSK, 1 RB, 0 RB Offset	Ant A	back	15 mm	0.981	0.968	1.01	N/A	N/A	N/A	N/A
1900	1880.00	9400	UMTS 1900	RMC	Ant A	back	10 mm	1.040	0.974	1.07	N/A	N/A	N/A	N/A
ANSI / IEEE C95.1 1992 - SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population						Body 1.6 W/kg (mW/g) averaged over 1 gram								

13.2 Measurement Uncertainty

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

14 ADDITIONAL TESTING PER FCC GUIDANCE

The following test procedures were followed to demonstrate that the SAR results in Section 11 represented the appropriate SAR test conditions. For bands with dynamic tuning implemented, SAR was measured according to the required FCC SAR test procedures with the dynamic tuner active to allow the device to automatically tune to the antenna state for the respective RF exposure test configurations. Additional single point SAR time-sweep measurements were evaluated for other tuner states to determine that the other tuner configurations would result in equivalent or lower SAR values. The additional tuner hardware has no influence to the antenna characteristics, other than impedance matching.

To evaluate all of the tuner states, the 144 tuner states were divided evenly among band, mode and exposure combinations so that at least one single point SAR measurement was measured among the configurations. Single point time-sweep measurements were performed at the peak SAR location determined by the zoom scan of the configuration with the highest reported SAR for each combination. The tuner state was able to be established remotely so that the device was not moved for the entire series of single point SAR for the tuner states in each combination. The SAR probe remained stationary at the same position throughout the entire series of single point measurements for each combination.

The operational description contains more information about the design and implementation of the dynamic antenna tuning.

Table 14-1
Supplemental Head SAR Data

Mode	Service/ Modulation	Frequency (MHz)	Channel	RB Size	RB offset	Test Position	Spacing	Measured 1g SAR (W/kg)	Average Value of Time Sweep (W/kg)													
									Auto-Tune (State 38)	Default (State 38)	State 23	State 26	State 29	State 32	State 35	State 74	State 93	State 96	State 99	State 102	State 105	State 108
UMTS B5	RMC	836.6	4183	N/A	N/A	Right Cheek	N/A	0.165	0.198	0.195	0.121	0.097	0.058	0.034	0.017	0.137	0.177	0.157	0.103	0.046	0.018	0.005
Mode	Service/ Modulation	Frequency (MHz)	Channel	RB Size	RB offset	Test Position	Spacing	Measured 1g SAR (W/kg)	Average Value of Time Sweep (W/kg)													
									Auto-Tune (State 39)	Default (State 39)	State 59	State 62	State 65	State 68	State 71	State 92	State 129	State 132	State 135	State 138	State 141	State 144
CDMA BC10	SO55	820.1	564	N/A	N/A	Right Cheek	N/A	0.192	0.227	0.226	0.226	0.206	0.102	0.043	0.015	0.190	0.202	0.221	0.173	0.077	0.027	0.007
Mode	Service/ Modulation	Frequency (MHz)	Channel	RB Size	RB offset	Test Position	Spacing	Measured 1g SAR (W/kg)	Average Value of Time Sweep (W/kg)													
									Auto-Tune (State 39)	Default (State 39)	State 41	State 44	State 47	State 50	State 53	State 91	State 111	State 114	State 117	State 120	State 123	State 126
CDMA BC0	EVDO RevA	836.52	384	N/A	N/A	Right Cheek	N/A	0.221	0.236	0.234	0.226	0.193	0.107	0.046	0.016	0.142	0.159	0.132	0.098	0.062	0.035	0.016
Mode	Service/ Modulation	Frequency (MHz)	Channel	RB Size	RB offset	Test Position	Spacing	Measured 1g SAR (W/kg)	Average Value of Time Sweep (W/kg)													
									Auto-Tune (State 2)	Default (State 2)	State 39	State 42	State 45	State 48	State 51	State 54	State 55	State 112	State 115	State 118	State 121	State 124
LTE B12	QPSK	707.5	23095	1	0	Right Cheek	N/A	0.197	0.227	0.218	0.110	0.117	0.121	0.095	0.053	0.019	0.060	0.110	0.103	0.088	0.061	0.030
Mode	Service/ Modulation	Frequency (MHz)	Channel	RB Size	RB offset	Test Position	Spacing	Measured 1g SAR (W/kg)	Average Value of Time Sweep (W/kg)													
									Auto-Tune (State 1)	Default (State 1)	State 56	State 57	State 60	State 63	State 66	State 69	State 72	State 130	State 133	State 136	State 139	State 142
LTE B13	QPSK	782	23230	1	49	Right Cheek	N/A	0.194	0.224	0.218	0.205	0.207	0.195	0.157	0.090	0.041	0.014	0.199	0.184	0.133	0.066	0.026
Mode	Service/ Modulation	Frequency (MHz)	Channel	RB Size	RB offset	Test Position	Spacing	Measured 1g SAR (W/kg)	Average Value of Time Sweep (W/kg)													
									Auto-Tune (State 38)	Default (State 38)	State 5	State 8	State 11	State 14	State 17	State 73	State 75	State 78	State 81	State 84	State 87	State 90
LTE B26	QPSK	836.5	26915	1	0	Right Cheek	N/A	0.176	0.204	0.203	0.126	0.096	0.057	0.034	0.017	0.184	0.137	0.106	0.074	0.044	0.023	0.010

Table 14-2
Supplemental Body SAR Data

Mode	Service/ Modulation	Frequency (MHz)	Channel	RB Size	RB offset	Test Position	Spacing	Measured 1g SAR (W/kg)	Average Value of Time Sweep (W/kg)													
									Auto-Tune (State 38)	Default (State 38)	State 20	State 58	State 61	State 64	State 67	State 70	State 128	State 131	State 134	State 137	State 140	State 143
UMTS B5	RMC	836.6	4183	N/A	N/A	Back Side	10 mm	0.753	0.892	0.898	0.733	0.876	0.852	0.576	0.245	0.086	0.744	0.870	0.777	0.382	0.156	0.055
Mode	Service/ Modulation	Frequency (MHz)	Channel	RB Size	RB offset	Test Position	Spacing	Measured 1g SAR (W/kg)	Average Value of Time Sweep (W/kg)													
									Auto-Tune (State 40)	Default (State 39)	State 21	State 24	State 27	State 30	State 33	State 36	State 38	State 94	State 97	State 100	State 103	State 106
CDMA BC10	EVDO Rev0	820.1	564	N/A	N/A	Back Side	10 mm	0.674	0.708	0.608	0.534	0.518	0.427	0.283	0.166	0.080	0.635	0.663	0.680	0.495	0.197	0.050
Mode	Service/ Modulation	Frequency (MHz)	Channel	RB Size	RB offset	Test Position	Spacing	Measured 1g SAR (W/kg)	Average Value of Time Sweep (W/kg)													
									Auto-Tune (State 39)	Default (State 39)	State 3	State 6	State 9	State 12	State 15	State 18	State 37	State 76	State 79	State 82	State 85	State 88
CDMA BC0	EVDO Rev0	824.7	1013	N/A	N/A	Back Side	10 mm	0.851	0.880	0.876	0.668	0.572	0.452	0.320	0.196	0.095	0.705	0.504	0.434	0.327	0.215	0.121
Mode	Service/ Modulation	Frequency (MHz)	Channel	RB Size	RB offset	Test Position	Spacing	Measured 1g SAR (W/kg)	Average Value of Time Sweep (W/kg)													
									Auto-Tune (State 2)	Default (State 2)	State 1	State 4	State 7	State 10	State 13	State 16	State 77	State 80	State 83	State 86	State 89	State 109
LTE B12	QPSK	707.5	23095	1	0	Back Side	10 mm	0.575	0.650	0.648	0.633	0.638	0.615	0.560	0.442	0.292	0.396	0.366	0.278	0.192	0.101	0.359
Mode	Service/ Modulation	Frequency (MHz)	Channel	RB Size	RB offset	Test Position	Spacing	Measured 1g SAR (W/kg)	Average Value of Time Sweep (W/kg)													
									Auto-Tune (State 1)	Default (State 1)	State 2	State 22	State 25	State 28	State 31	State 34	State 95	State 98	State 101	State 104	State 107	State 110
LTE B13	QPSK	782	23230	1	49	Back Side	10 mm	0.556	0.600	0.600	0.546	0.424	0.370	0.284	0.184	0.104	0.522	0.477	0.267	0.129	0.049	0.427
Mode	Service/ Modulation	Frequency (MHz)	Channel	RB Size	RB offset	Test Position	Spacing	Measured 1g SAR (W/kg)	Average Value of Time Sweep (W/kg)													
									Auto-Tune (State 38)	Default (State 38)	State 19	State 40	State 43	State 46	State 49	State 52	State 113	State 116	State 119	State 122	State 125	State 127
LTE B26	QPSK	836.5	26915	1	0	Back Side	10 mm	0.615	0.802	0.794	0.735	0.761	0.508	0.483	0.261	0.118	0.478	0.368	0.217	0.129	0.066	0.595

15 EQUIPMENT LIST

Manufacturer	Model	Description	Cal Date	Cal Interval	Cal Due	Serial Number
Agilent	E8257D	(250kHz-20GHz) Signal Generator	3/15/2015	Annual	3/15/2016	MY45470194
Agilent	8594A	(9kHz-2.9GHz) Spectrum Analyzer	N/A	N/A	N/A	3051A00187
Agilent	8648D	(9kHz-4GHz) Signal Generator	3/15/2015	Annual	3/15/2016	3629U00687
Agilent	E4438C	ESG Vector Signal Generator	3/13/2015	Annual	3/13/2016	MY42082385
Agilent	E4438C	ESG Vector Signal Generator	3/12/2015	Annual	3/12/2016	MY45090700
Agilent	N9020A	MXA Signal Analyzer	11/5/2015	Annual	11/5/2016	US46470561
Agilent	N5182A	MXG Vector Signal Generator	3/16/2015	Annual	3/16/2016	MY47420651
Agilent	N5182A	MXG Vector Signal Generator	3/16/2015	Annual	3/16/2016	MY47420800
Agilent	8753ES	Network Analyzer	3/20/2015	Annual	3/20/2016	MY40001472
Agilent	E5515C	Wireless Communications Test Set	6/18/2015	Biennial	6/18/2017	GB41450275
Agilent	E5515C	Wireless Communications Test Set	5/16/2015	Biennial	5/16/2017	GB43304447
Agilent	E5515C	Wireless Communications Test Set	4/13/2015	Annual	4/13/2016	GB43460554
Amplifier Research	15S1G6	Amplifier	N/A	CBT	N/A	433971
Amplifier Research	15S1G6	Amplifier	N/A	CBT	N/A	433972
Amplifier Research	15S1G6	Amplifier	N/A	CBT	N/A	433977
Amplifier Research	15S1G6	Amplifier	N/A	CBT	N/A	433978
Anritsu	ML2438A	Power Meter	3/13/2015	Annual	3/13/2016	1070030
Anritsu	ML2438A	Power Meter	3/13/2015	Annual	3/13/2016	1190013
Anritsu	ML2495A	Power Meter	10/16/2015	Biennial	10/15/2017	941001
Anritsu	MA2481A	Power Sensor	3/10/2015	Annual	3/10/2016	2400
Anritsu	MA2481A	Power Sensor	3/11/2015	Annual	3/11/2016	5318
Anritsu	MA2411B	Pulse Power Sensor	8/3/2015	Annual	8/3/2016	1126066
Anritsu	MA2411B	Pulse Power Sensor	3/13/2015	Annual	3/13/2016	1207470
Anritsu	MT8820C	Radio Communication Analyzer	7/24/2015	Annual	7/24/2016	6200901190
Anritsu	MT8820C	Radio Communication Analyzer	11/12/2015	Annual	11/12/2016	6201144418
Anritsu	MT8820C	Radio Communication Analyzer	12/4/2015	Annual	12/4/2016	6201300731
Anritsu	MA24106A	USB Power Sensor	5/29/2015	Annual	5/29/2016	1231535
Anritsu	MA24106A	USB Power Sensor	5/29/2015	Annual	5/29/2016	1231538
Anritsu	MA24106A	USB Power Sensor	3/11/2015	Annual	3/11/2016	1349509
Anritsu	MA24106A	USB Power Sensor	3/11/2015	Annual	3/11/2016	1349514
COMTech	AR85729-5	Solid State Amplifier	N/A	CBT	N/A	M1S5A00-009
COMTECH	AR85729-5/5759B	Solid State Amplifier	N/A	CBT	N/A	M3W1A00-1002
Control Company	4040	Digital Thermometer	3/18/2015	Biennial	3/18/2017	150194895
Control Company	4040	Digital Thermometer	3/18/2015	Biennial	3/18/2017	150194896
Control Company	4353	Long Stem Thermometer	3/5/2015	Biennial	3/5/2017	150149534
Control Company	4353	Long Stem Thermometer	3/5/2015	Biennial	3/5/2017	150149565
Keysight	772D	Dual Directional Coupler	N/A	CBT	N/A	MY52180215
MCL	BW-N6W5+	6dB Attenuator	N/A	CBT	N/A	1139
MiniCircuits	VLF-6000+	Low Pass Filter	N/A	CBT	N/A	N/A
MiniCircuits	SLP-2400+	Low Pass Filter	N/A	CBT	N/A	R8979500903
Mini-Circuits	BW-N20W5+	DC to 18 GHz Precision Fixed 20 dB Attenuator	N/A	CBT	N/A	N/A
Mini-Circuits	NLP-1200+	Low Pass Filter DC to 1000 MHz	N/A	CBT	N/A	N/A
Mini-Circuits	NLP-2950+	Low Pass Filter DC to 2700 MHz	N/A	CBT	N/A	N/A
Mini-Circuits	BW-N20W5	Power Attenuator	N/A	CBT	N/A	1226
Mitutoyo	CD-6"CSX	Digital Caliper	5/8/2014	Biennial	5/8/2016	13264165
Narda	4014C-6	4 - 8 GHz SMA 6 dB Directional Coupler	N/A	CBT	N/A	N/A
Narda	BW-S3W2	Attenuator (3dB)	N/A	CBT	N/A	120
Narda	4772-3	Attenuator (3dB)	N/A	CBT	N/A	9406
Pasternack	PE2208-6	Bidirectional Coupler	N/A	CBT	N/A	N/A
Pasternack	PE2209-10	Bidirectional Coupler	N/A	CBT	N/A	N/A
Pasternack	NC-100	Torque Wrench	N/A	CBT	N/A	N/A
Pasternack	NC-100	Torque Wrench	5/21/2015	Biennial	5/21/2017	N/A
Rohde & Schwarz	CMU200	Base Station Simulator	6/3/2015	Annual	6/3/2016	109892
Rohde & Schwarz	CMU200	Base Station Simulator	12/2/2015	Annual	12/2/2016	833855/0010
Rohde & Schwarz	NRVD	Dual Channel Power Meter	N/A	CBT	N/A	101695
Rohde & Schwarz	NRV-Z32	Peak Power Sensor	N/A	CBT	N/A	836019/013
Rohde & Schwarz	CMW500	Radio Communication Tester	10/13/2015	Annual	10/13/2016	100976
Rohde & Schwarz	CMW500	Radio Communication Tester	4/22/2015	Annual	4/22/2016	101699
Rohde & Schwarz	CMW500	Radio Communication Tester	3/18/2015	Annual	3/18/2016	128633
Rohde & Schwarz	CMW500	Radio Communication Tester	4/8/2015	Annual	4/8/2016	140148
Rohde & Schwarz	SME06	Signal Generator	N/A	CBT	N/A	832026
Rohde & Schwarz	SMIQ03B	Signal Generator	N/A	CBT	N/A	DE27259
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 SAR Dipole	1/16/2015	Annual	1/16/2016	1003
SPEAG	D835V2	835 MHz SAR Dipole	4/13/2015	Annual	4/13/2016	4d119
SPEAG	D835V2	835 MHz SAR Dipole	7/23/2015	Annual	7/23/2016	4d133
SPEAG	D1750V2	1750 MHz SAR Dipole	4/15/2015	Annual	4/15/2016	1051
SPEAG	D1900V2	1900 MHz SAR Dipole	4/14/2015	Annual	4/14/2016	5d141
SPEAG	D1900V2	1900 MHz SAR Dipole	7/14/2015	Annual	7/14/2016	5d149
SPEAG	D2300V2	2300 MHz SAR Dipole	1/27/2015	Annual	1/27/2016	1008
SPEAG	D2450V2	2450 MHz SAR Dipole	8/20/2015	Annual	8/20/2016	719
SPEAG	D2600V2	2600 MHz SAR Dipole	4/14/2015	Annual	4/14/2016	1004
SPEAG	D5GHzV2	5 GHz SAR Dipole	1/21/2015	Annual	1/21/2016	1057
SPEAG	D5GHzV2	5 GHz SAR Dipole	9/16/2015	Annual	9/16/2016	1191
SPEAG	DAE4	Dasy Data Acquisition Electronics	2/18/2015	Annual	2/18/2016	665
SPEAG	DAE4	Dasy Data Acquisition Electronics	6/17/2015	Annual	6/17/2016	859
SPEAG	DAE4	Dasy Data Acquisition Electronics	8/24/2015	Annual	8/24/2016	1322
SPEAG	DAE4	Dasy Data Acquisition Electronics	10/27/2015	Annual	10/27/2016	1333
SPEAG	DAE4	Dasy Data Acquisition Electronics	3/13/2015	Annual	3/13/2016	1368
SPEAG	DAE4	Dasy Data Acquisition Electronics	4/20/2015	Annual	4/20/2016	1407
SPEAG	DAE4	Dasy Data Acquisition Electronics	11/11/2015	Annual	11/11/2016	1415
SPEAG	DAK-3.5	Dielectric Assessment Kit	5/12/2015	Annual	5/12/2016	1070
SPEAG	DAK-3.5	Dielectric Assessment Kit	10/20/2015	Annual	10/20/2016	1091
SPEAG	Planar R140	Reflectometer	8/2/2015	Annual	8/2/2016	50513
SPEAG	ES3DV2	SAR Probe	8/26/2015	Annual	8/26/2016	3022
SPEAG	ES3DV3	SAR Probe	5/20/2015	Annual	5/20/2016	3263
SPEAG	ES3DV3	SAR Probe	3/19/2015	Annual	3/19/2016	3319
SPEAG	ES3DV3	SAR Probe	10/29/2015	Annual	10/29/2016	3333
SPEAG	ES3DV3	SAR Probe	11/17/2015	Annual	11/17/2016	3334
SPEAG	EX3DV4	SAR Probe	7/21/2015	Annual	7/21/2016	7308
SPEAG	EX3DV4	SAR Probe	4/23/2015	Annual	4/23/2016	7357

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.

16 MEASUREMENT UNCERTAINTIES

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

17 CONCLUSION

17.1 Measurement Conclusion

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

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

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APPENDIX A: SAR TEST DATA

PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LSMG930US; Type: Portable Handset; Serial: C3D8C

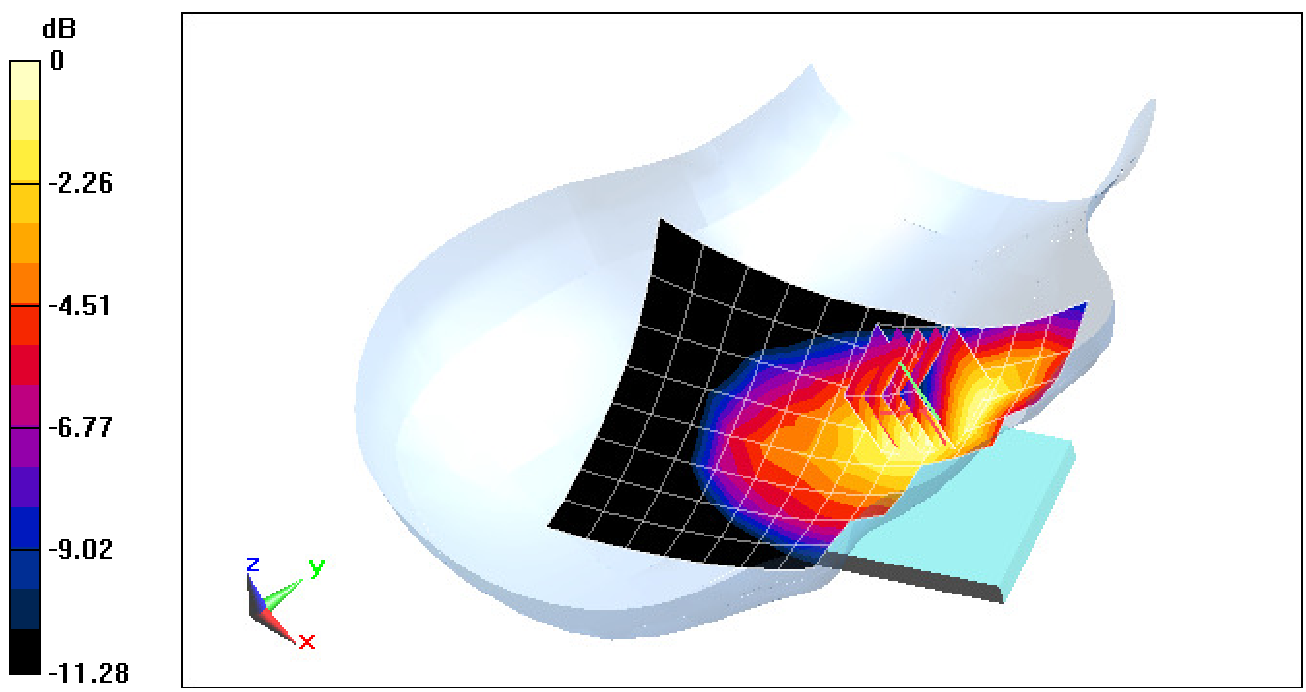
Communication System: UID 0, GSM; Frequency: 836.6 MHz; Duty Cycle: 1:8.3
Medium: 835 Head, Medium parameters used (interpolated):
f = 836.6 MHz; σ = 0.913 S/m; ε_r = 39.825; ρ = 1000 kg/m^3
Phantom section: Right Section

Test Date: 12-23-2015; Ambient Temp: 23.5°C; Tissue Temp: 22.7°C

Probe: ES3DV3 - SN3319; ConvF(6.41, 6.41, 6.41); Calibrated: 3/19/2015;
Sensor-Surface: 3mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1368; Calibrated: 3/13/2015
Phantom: SAM with CRP v4.0; Type: QD000P40CD; Serial: TP:1800
Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

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

Area Scan (9x15x1): Measurement grid: dx=15mm, dy=15mm
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 10.91 V/m; Power Drift = 0.10 dB
Peak SAR (extrapolated) = 0.136 W/kg
SAR(1 g) = 0.110 W/kg



0 dB = 0.120 W/kg = -9.21 dBW/kg

PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LSMG930US; Type: Portable Handset; Serial: C3D11

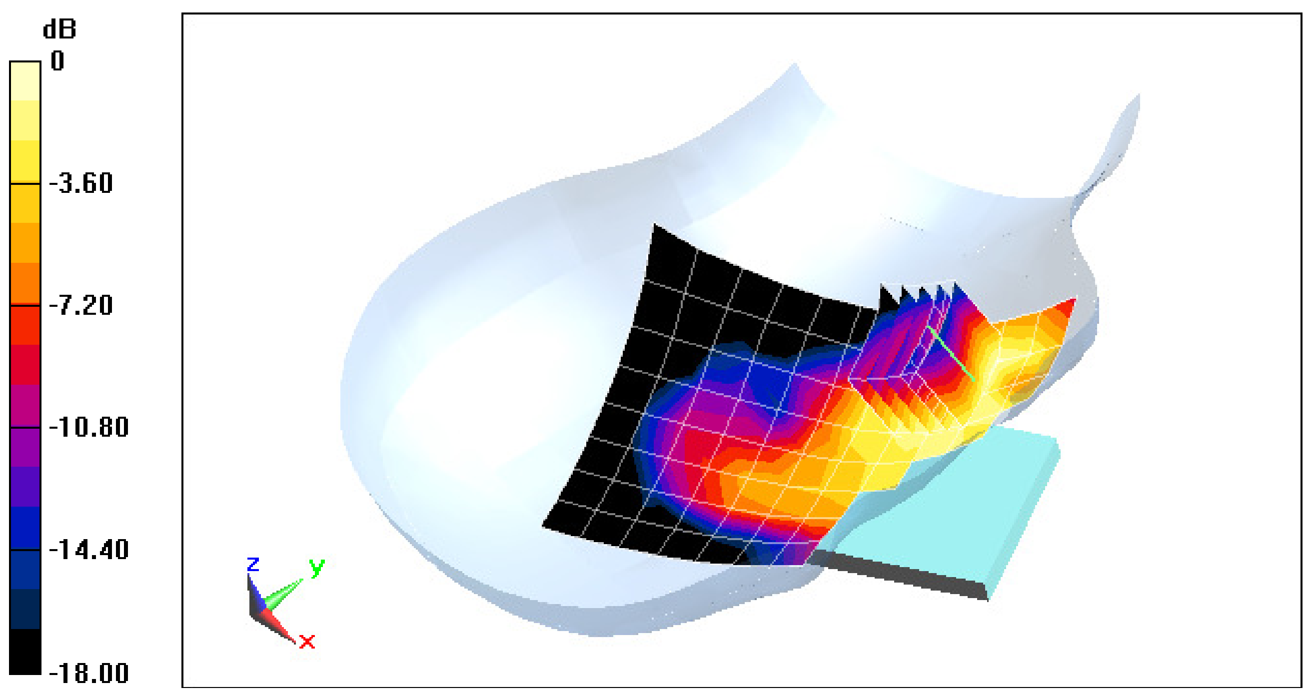
Communication System: UID 0, GSM; Frequency: 1880 MHz; Duty Cycle: 1:8.3
Medium: 1900 Head, Medium parameters used:
f = 1880 MHz; σ = 1.358 S/m; ε_r = 38.293; ρ = 1000 kg/m^3
Phantom section: Right Section

Test Date: 12-06-2015; Ambient Temp: 22.8°C; Tissue Temp: 22.1°C

Probe: ES3DV2 - SN3022; ConvF(4.93, 4.93, 4.93); Calibrated: 8/26/2015;
Sensor-Surface: 3mm (Mechanical Surface Detection)
Electronics: DAE4 Sn665; Calibrated: 2/18/2015
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, Right Head, Cheek, Mid.ch

Area Scan (9x15x1): Measurement grid: dx=15mm, dy=15mm
Zoom Scan (6x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 7.961 V/m; Power Drift = 0.04 dB
Peak SAR (extrapolated) = 0.139 W/kg
SAR(1 g) = 0.084 W/kg



0 dB = 0.100 W/kg = -10.00 dBW/kg

PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LSMG930US; Type: Portable Handset; Serial: C3D9A

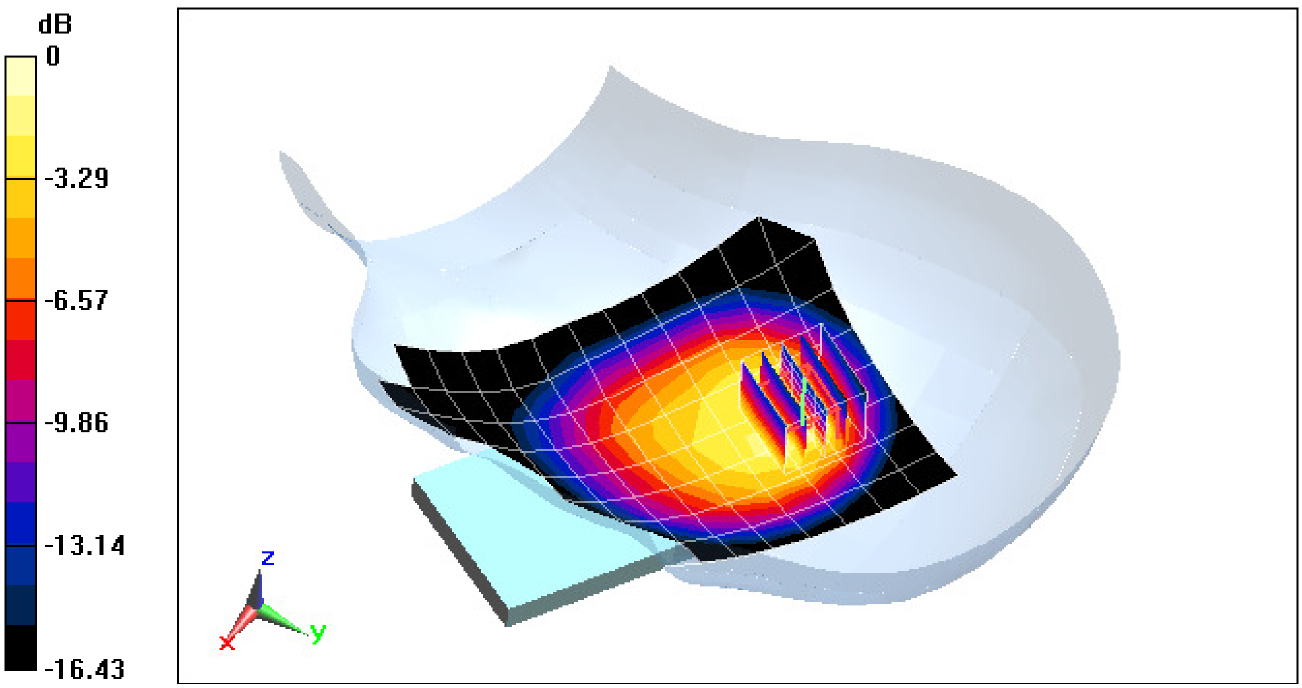
Communication System: UID 0, UMTS; Frequency: 836.6 MHz; Duty Cycle: 1:1
Medium: 835 Head, Medium parameters used (interpolated):
f = 836.6 MHz; σ = 0.903 S/m; ε_r = 40.342; ρ = 1000 kg/m^3
Phantom section: Left Section

Test Date: 12-20-2015; Ambient Temp: 19.3°C; Tissue Temp: 20.7°C

Probe: ES3DV3 - SN3319; ConvF(6.41, 6.41, 6.41); Calibrated: 3/19/2015;
Sensor-Surface: 3mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1368; Calibrated: 3/13/2015
Phantom: SAM with CRP v4.0; Type: QD000P40CD; Serial: TP:1800
Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

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

Area Scan (9x15x1): Measurement grid: dx=15mm, dy=15mm
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 25.60 V/m; Power Drift = -0.02 dB
Peak SAR (extrapolated) = 1.27 W/kg
SAR(1 g) = 0.610 W/kg



0 dB = 0.807 W/kg = -0.93 dBW/kg

PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LSMG930US; Type: Portable Handset; Serial: C3D97

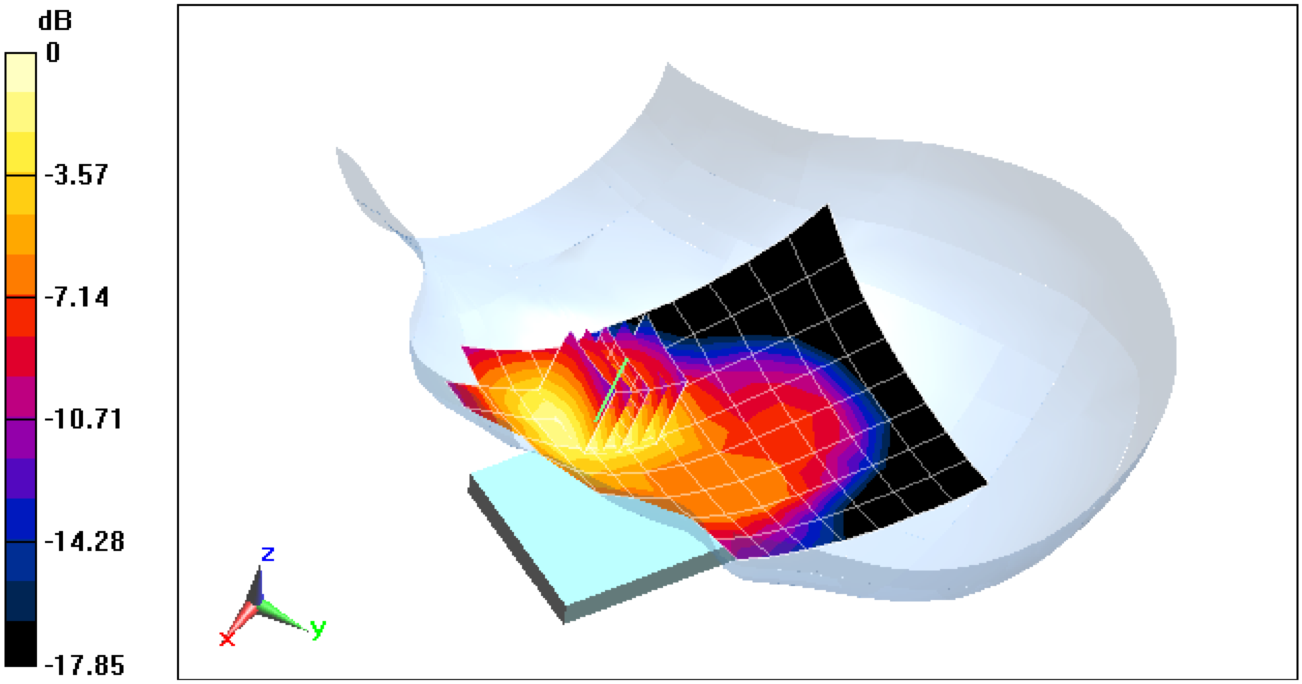
Communication System: UID 0, UMTS; Frequency: 1732.4 MHz; Duty Cycle: 1:1
Medium: 1750 Head, Medium parameters used (interpolated):
f = 1732.4 MHz; σ = 1.333 S/m; ε_r = 39.033; ρ = 1000 kg/m^3
Phantom section: Left Section

Test Date: 12-09-2015; Ambient Temp: 24.5°C; Tissue Temp: 22.8°C

Probe: ES3DV2 - SN3022; ConvF(5.08, 5.08, 5.08); Calibrated: 8/26/2015;
Sensor-Surface: 3mm (Mechanical Surface Detection)
Electronics: DAE4 Sn665; Calibrated: 2/18/2015
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: AWS UMTS, Left Head, Cheek, Mid.ch

Area Scan (9x15x1): Measurement grid: dx=15mm, dy=15mm
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 13.68 V/m; Power Drift = -0.20 dB
Peak SAR (extrapolated) = 0.314 W/kg
SAR(1 g) = 0.218 W/kg



0 dB = 0.249 W/kg = -6.04 dBW/kg

PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LSMG930US; Type: Portable Handset; Serial: C3D97

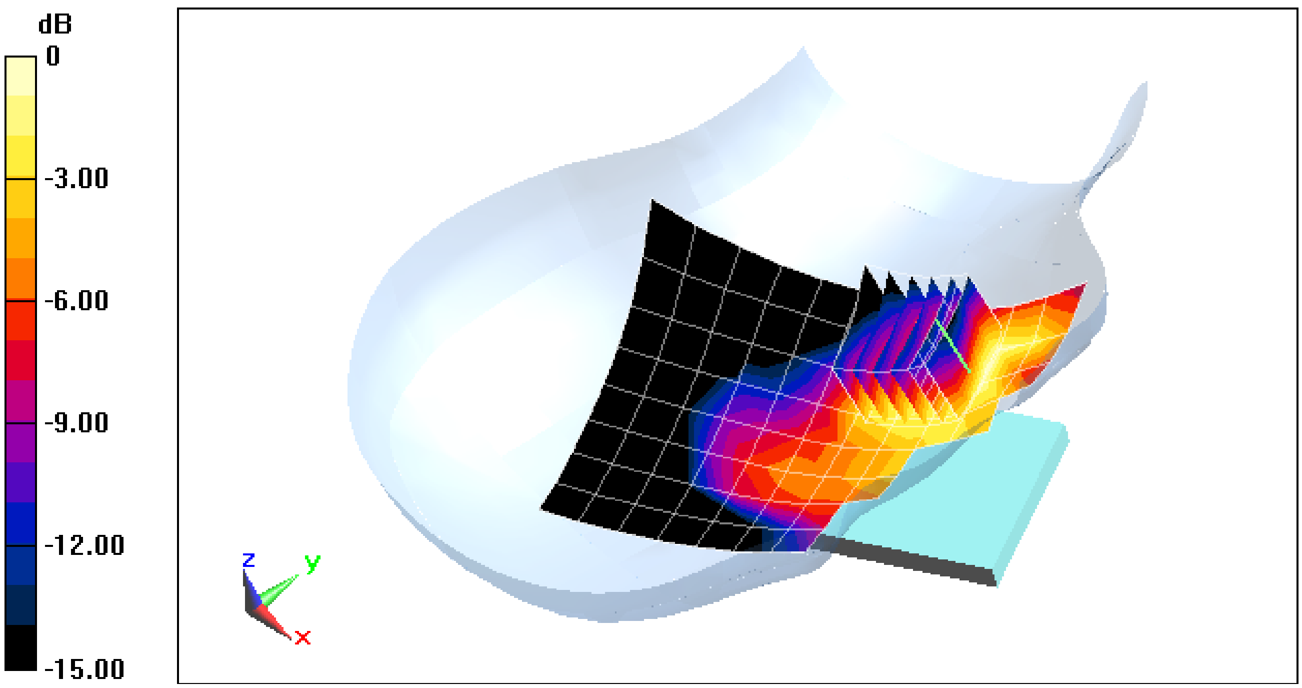
Communication System: UID 0, UMTS; Frequency: 1880 MHz; Duty Cycle: 1:1
Medium: 1900 Head, Medium parameters used:
f = 1880 MHz; σ = 1.402 S/m; ε_r = 38.41; ρ = 1000 kg/m^3
Phantom section: Right Section

Test Date: 12-10-2015; Ambient Temp: 19.8°C; Tissue Temp: 22.0°C

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

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

Area Scan (9x15x1): Measurement grid: dx=15mm, dy=15mm
Zoom Scan (6x6x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 11.77 V/m; Power Drift = 0.03 dB
Peak SAR (extrapolated) = 0.286 W/kg
SAR(1 g) = 0.180 W/kg



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

PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LSMG930US; Type: Portable Handset; Serial: C3D13

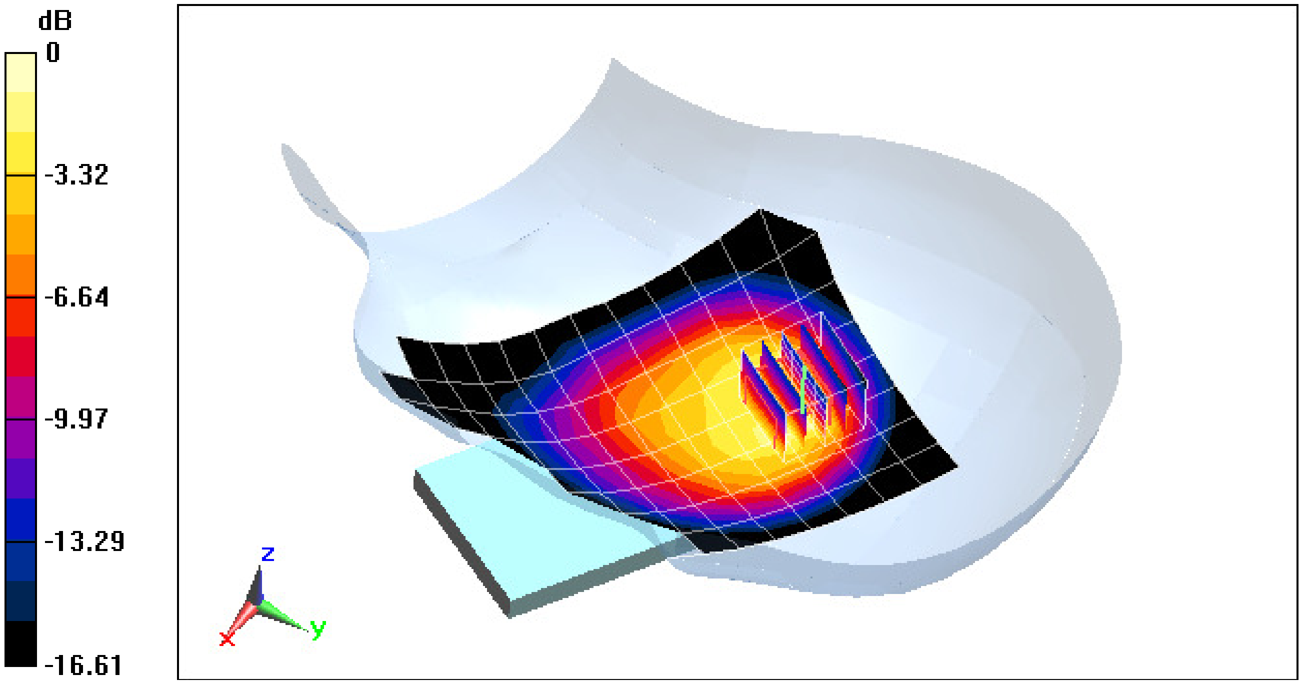
Communication System: UID 0, Cellular CDMA; Frequency: 820.1 MHz; Duty Cycle: 1:1
Medium: 835 Head, Medium parameters used (interpolated):
f = 820.1 MHz; σ = 0.89 S/m; ε_r = 40.57; ρ = 1000 kg/m^3
Phantom section: Left Section

Test Date: 12-20-2015; Ambient Temp: 19.3°C; Tissue Temp: 20.7°C

Probe: ES3DV3 - SN3319; ConvF(6.41, 6.41, 6.41); Calibrated: 3/19/2015;
Sensor-Surface: 3mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1368; Calibrated: 3/13/2015
Phantom: SAM with CRP v4.0; Type: QD000P40CD; Serial: TP:1800
Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Mode: Cell. EVDO Rev. A BC10, Rule Part 90S, Ant B, Left Head, Cheek, Mid.ch

Area Scan (9x15x1): Measurement grid: dx=15mm, dy=15mm
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 21.58 V/m; Power Drift = -0.01 dB
Peak SAR (extrapolated) = 0.928 W/kg
SAR(1 g) = 0.451 W/kg



0 dB = 0.581 W/kg = -2.36 dBW/kg

PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LSMG930US; Type: Portable Handset; Serial: C3D9A

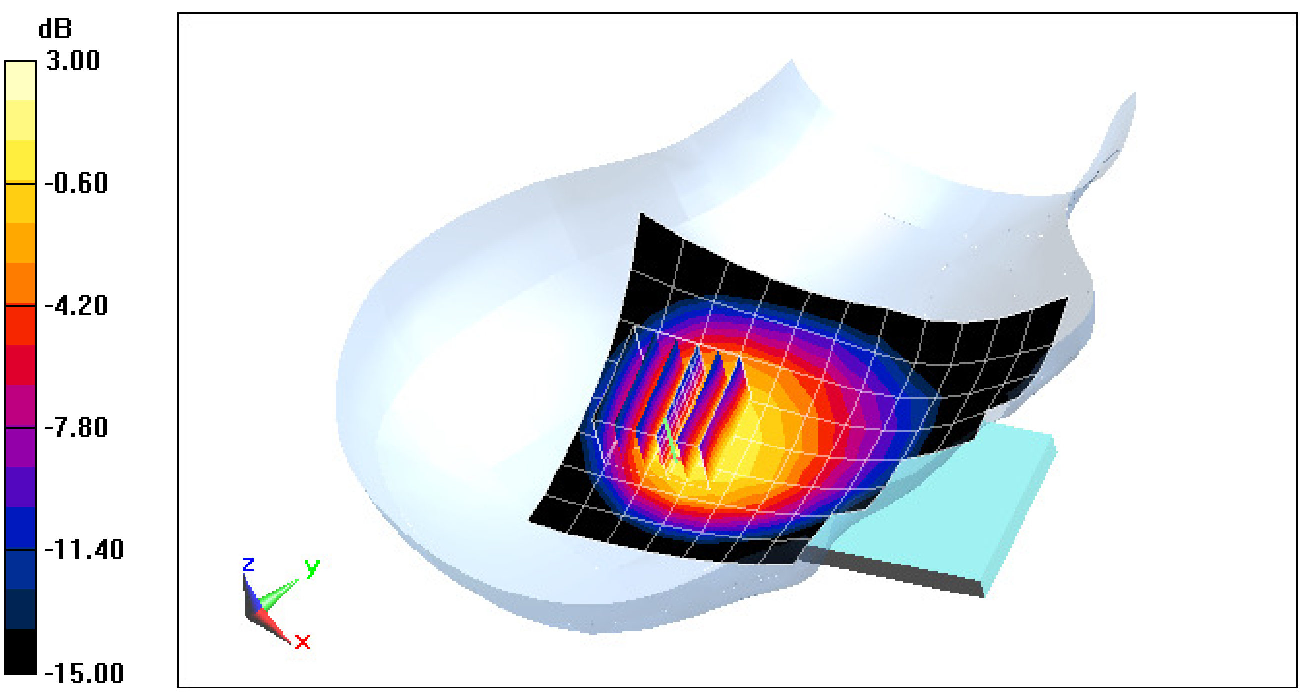
Communication System: UID 0, CDMA; Frequency: 824.7 MHz; Duty Cycle: 1:1
Medium: 835 Head, Medium parameters used (interpolated):
f = 824.7 MHz; σ = 0.893 S/m; ε_r = 40.504; ρ = 1000 kg/m^3
Phantom section: Right Section

Test Date: 12-20-2015; Ambient Temp: 19.3°C; Tissue Temp: 20.7°C

Probe: ES3DV3 - SN3319; ConvF(6.41, 6.41, 6.41); Calibrated: 3/19/2015;
Sensor-Surface: 3mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1368; Calibrated: 3/13/2015
Phantom: SAM with CRP v4.0; Type: QD000P40CD; Serial: TP:1800
Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Mode: Cell. CDMA BC0, Rule Part 22H, Ant B, Right Head, Cheek, Low.ch

Area Scan (9x13x1): Measurement grid: dx=15mm, dy=15mm
Zoom Scan (6x6x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 24.10 V/m; Power Drift = -0.04 dB
Peak SAR (extrapolated) = 1.18 W/kg
SAR(1 g) = 0.564 W/kg



0 dB = 0.747 W/kg = -1.27 dBW/kg

PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LSMG930US; Type: Portable Handset; Serial: C3D11

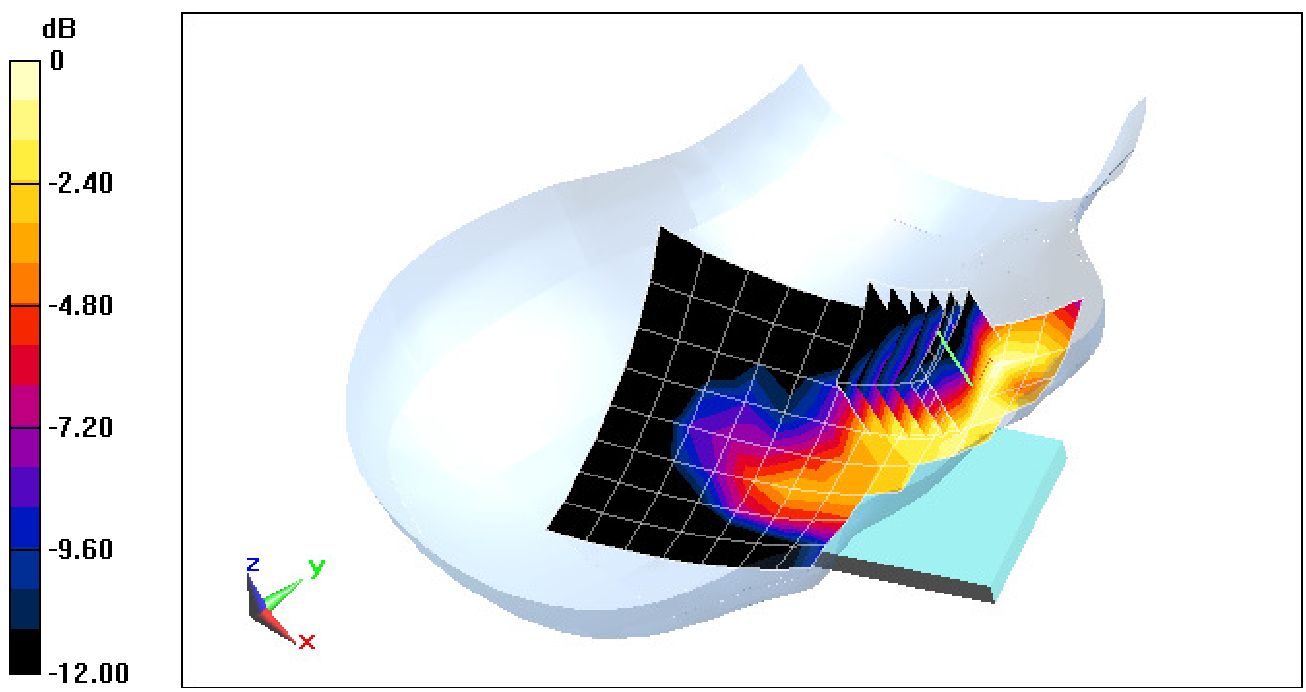
Communication System: UID 0, CDMA; Frequency: 1880 MHz; Duty Cycle: 1:1
Medium: 1900 Head, Medium parameters used:
f = 1880 MHz; σ = 1.358 S/m; ε_r = 38.293; ρ = 1000 kg/m^3
Phantom section: Right Section

Test Date: 12-06-2015; Ambient Temp: 22.8°C; Tissue Temp: 22.1°C

Probe: ES3DV2 - SN3022; ConvF(4.93, 4.93, 4.93); Calibrated: 8/26/2015;
Sensor-Surface: 3mm (Mechanical Surface Detection)
Electronics: DAE4 Sn665; Calibrated: 2/18/2015
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, Right Head, Cheek, Mid.ch

Area Scan (9x15x1): Measurement grid: dx=15mm, dy=15mm
Zoom Scan (6x6x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 11.26 V/m; Power Drift = -0.03 dB
Peak SAR (extrapolated) = 0.252 W/kg
SAR(1 g) = 0.158 W/kg



0 dB = 0.186 W/kg = -7.30 dBW/kg

PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LSMG930US; Type: Portable Handset; Serial: C3E25

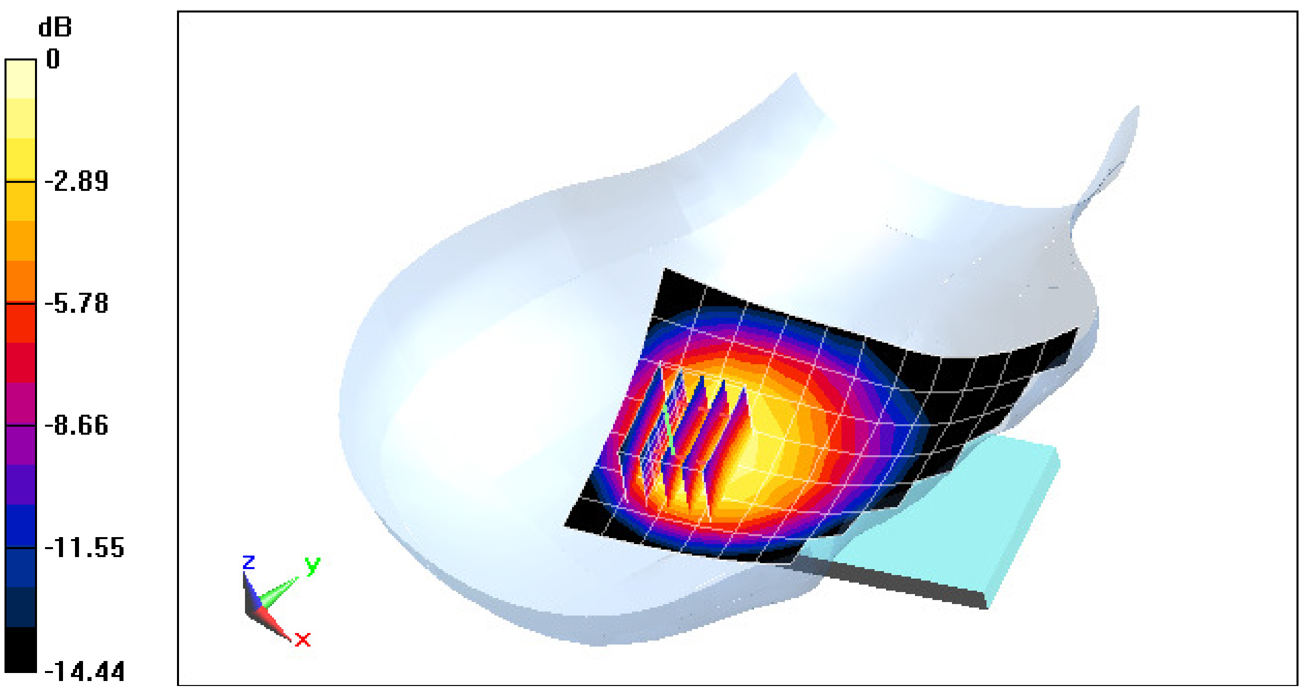
Communication System: UID 0, LTE Band 12; Frequency: 707.5 MHz; Duty Cycle: 1:1
Medium: 750 Head, Medium parameters used (interpolated):
f = 707.5 MHz; σ = 0.853 S/m; ε_r = 42.727; ρ = 1000 kg/m^3
Phantom section: Right Section

Test Date: 12-24-2015; Ambient Temp: 23.8°C; Tissue Temp: 23.2°C

Probe: ES3DV2 - SN3022; ConvF(6.33, 6.33, 6.33); Calibrated: 8/26/2015;
Sensor-Surface: 3mm (Mechanical Surface Detection)
Electronics: DAE4 Sn665; Calibrated: 2/18/2015
Phantom: SAM with CRP v4.0; Type: QD000P40CD; Serial: TP:1797
Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Mode: LTE Band 12, Ant B, Right Head, Cheek, Mid.ch, 10 MHz Bandwidth, QPSK, 1 RB, 49 RB Offset

Area Scan (8x13x1): Measurement grid: dx=15mm, dy=15mm
Zoom Scan (6x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 25.26 V/m; Power Drift = -0.02 dB
Peak SAR (extrapolated) = 1.02 W/kg
SAR(1 g) = 0.478 W/kg



0 dB = 0.600 W/kg = -2.22 dBW/kg

PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LSMG930US; Type: Portable Handset; Serial: C3E25

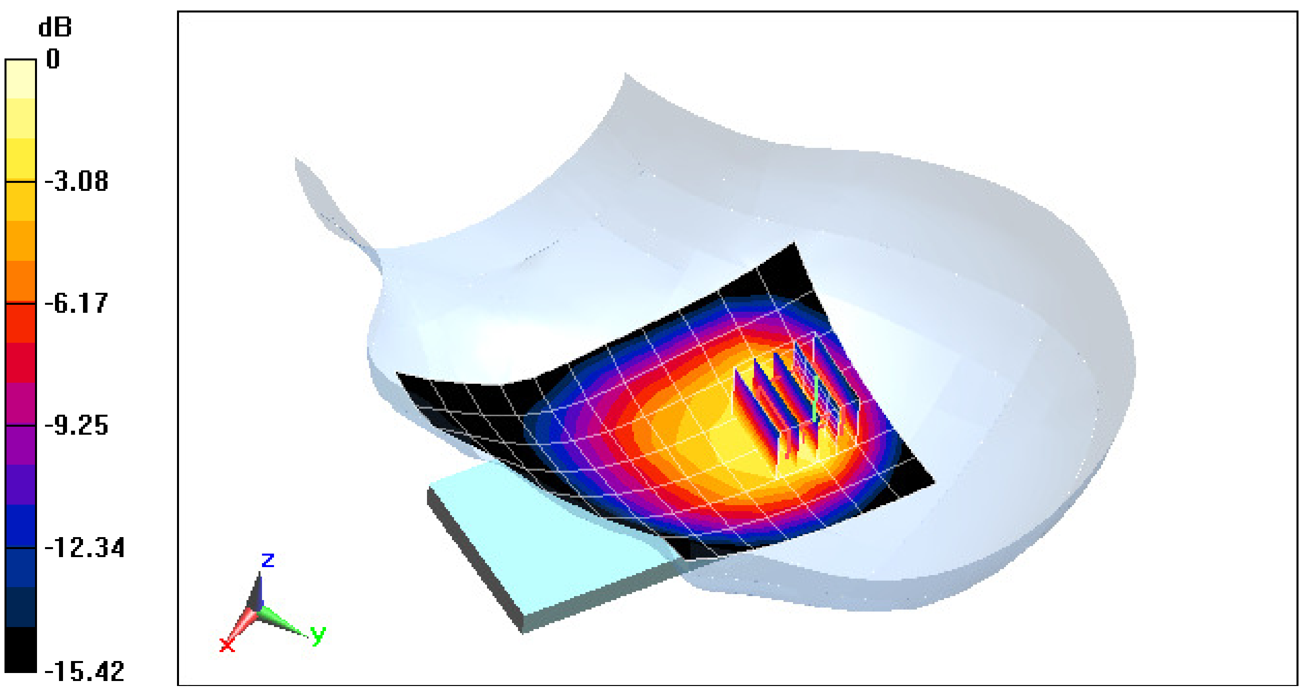
Communication System: UID 0, LTE Band 13; Frequency: 782 MHz; Duty Cycle: 1:1
Medium: 750 Head, Medium parameters used (interpolated):
f = 782 MHz; σ = 0.927 S/m; ε_r = 41.429; ρ = 1000 kg/m^3
Phantom section: Left Section

Test Date: 12-26-2015; Ambient Temp: 23.0°C; Tissue Temp: 23.0°C

Probe: ES3DV2 - SN3022; ConvF(6.33, 6.33, 6.33); Calibrated: 8/26/2015;
Sensor-Surface: 3mm (Mechanical Surface Detection)
Electronics: DAE4 Sn665; Calibrated: 2/18/2015
Phantom: SAM with CRP v4.0; Type: QD000P40CD; Serial: TP:1797
Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Mode: LTE Band 13, Ant B, Left Head, Cheek, Mid.ch,
10 MHz Bandwidth, QPSK, 25 RB, 0 RB Offset

Area Scan (8x13x1): Measurement grid: dx=15mm, dy=15mm
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 26.60 V/m; Power Drift = -0.02 dB
Peak SAR (extrapolated) = 1.07 W/kg
SAR(1 g) = 0.526 W/kg



0 dB = 0.657 W/kg = -1.82 dBW/kg

PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LSMG930US; Type: Portable Handset; Serial: C3E25

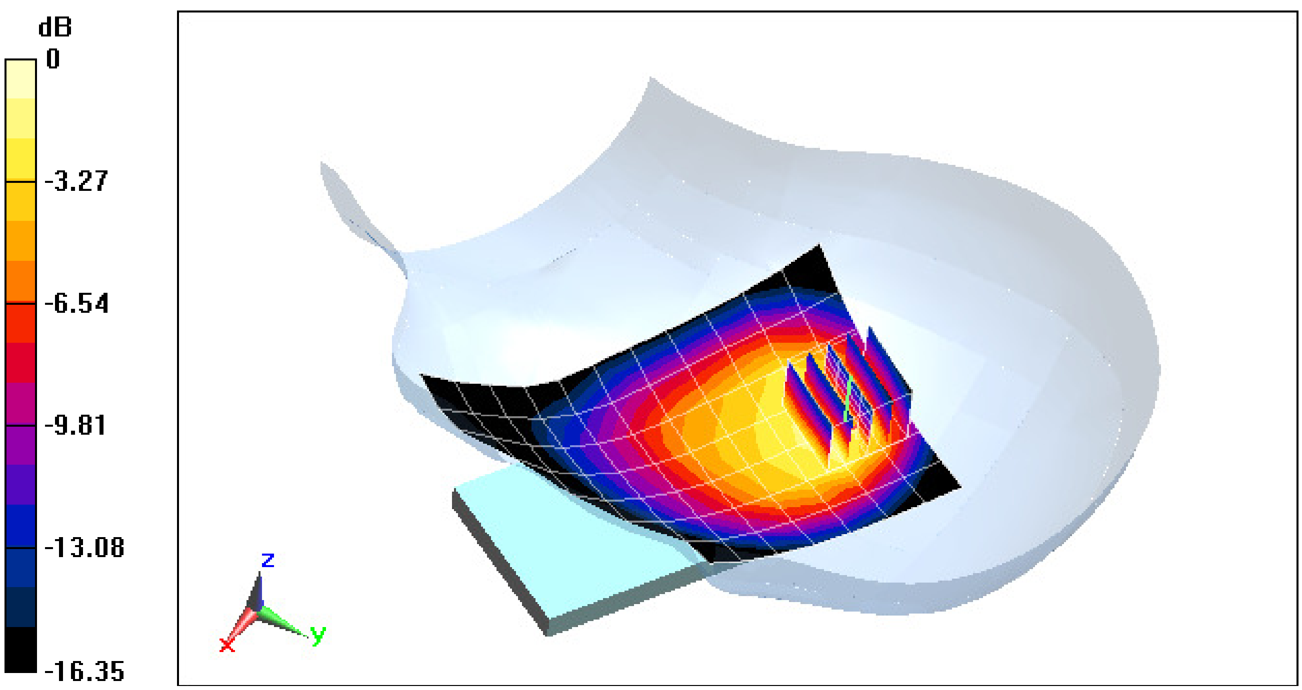
Communication System: UID 0, LTE Band 26; Frequency: 836.5 MHz; Duty Cycle: 1:1
Medium: 835 Head, Medium parameters used (interpolated):
f = 836.5 MHz; σ = 0.913 S/m; ε_r = 39.827; ρ = 1000 kg/m^3
Phantom section: Left Section

Test Date: 12-23-2015; Ambient Temp: 23.5°C; Tissue Temp: 22.7°C

Probe: ES3DV3 - SN3319; ConvF(6.41, 6.41, 6.41); Calibrated: 3/19/2015;
Sensor-Surface: 3mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1368; Calibrated: 3/13/2015
Phantom: SAM with CRP v4.0; Type: QD000P40CD; Serial: TP:1800
Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Mode: LTE Band 26 (Cell.), Ant B, Left Head, Cheek, Mid.ch, 15 MHz Bandwidth, QPSK, 36 RB, 0 RB Offset

Area Scan (8x13x1): Measurement grid: dx=15mm, dy=15mm
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 27.61 V/m; Power Drift = 0.02 dB
Peak SAR (extrapolated) = 1.03 W/kg
SAR(1 g) = 0.503 W/kg



0 dB = 0.653 W/kg = -1.85 dBW/kg

PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LSMG930US; Type: Portable Handset; Serial: C3D41

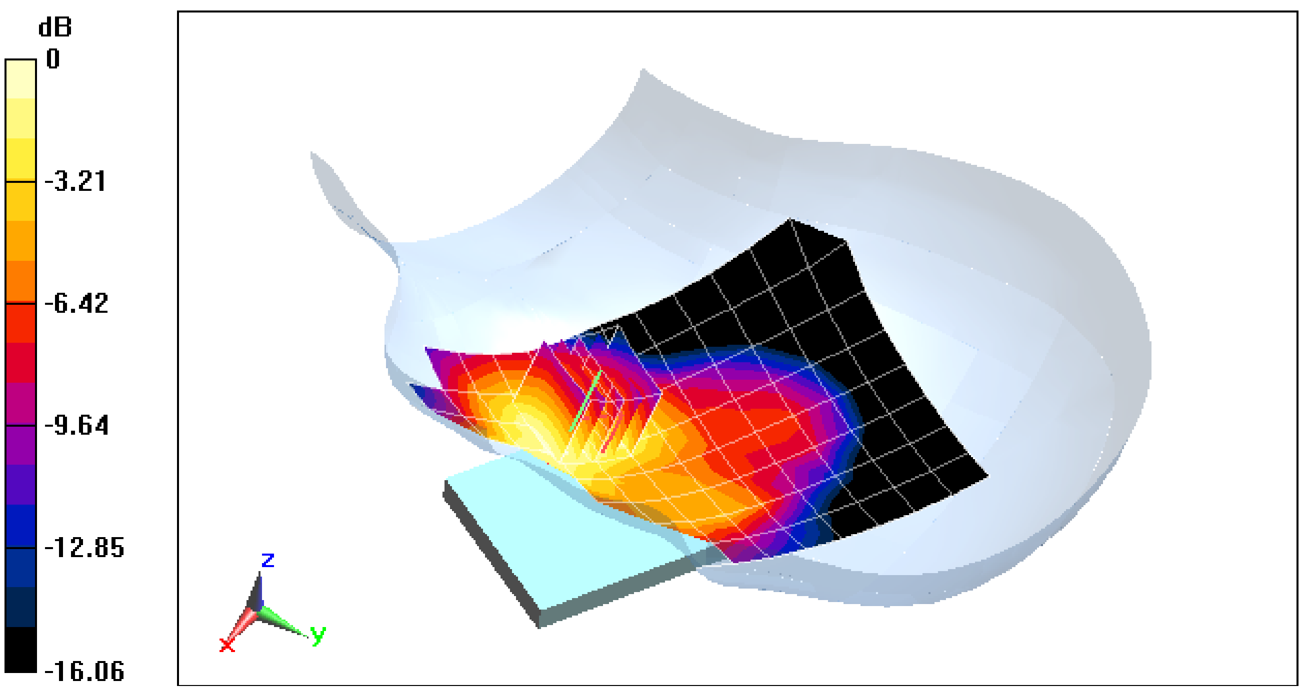
Communication System: UID 0, LTE Band 4 (AWS); Frequency: 1732.5 MHz; Duty Cycle: 1:1
Medium: 1750 Head, Medium parameters used (interpolated):
f = 1732.5 MHz; σ = 1.326 S/m; ε_r = 38.845; ρ = 1000 kg/m^3
Phantom section: Left Section

Test Date: 12-11-2015; Ambient Temp: 23.9°C; Tissue Temp: 22.5°C

Probe: ES3DV3 - SN3263; ConvF(5.27, 5.27, 5.27); Calibrated: 5/20/2015;
Sensor-Surface: 3mm (Mechanical Surface Detection)
Electronics: DAE4 Sn859; Calibrated: 6/17/2015
Phantom: SAM with CRP (Left); Type: SAM; Serial: 1715
Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Mode: LTE Band 4 (AWS), Left Head, Cheek, Mid.ch,
20 MHz Bandwidth, QPSK, 1 RB, 0 RB Offset

Area Scan (9x15x1): Measurement grid: dx=15mm, dy=15mm
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 12.64 V/m; Power Drift = -0.02 dB
Peak SAR (extrapolated) = 0.247 W/kg
SAR(1 g) = 0.176 W/kg



0 dB = 0.202 W/kg = -6.95 dBW/kg

PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LSMG930US; Type: Portable Handset; Serial: C3D11

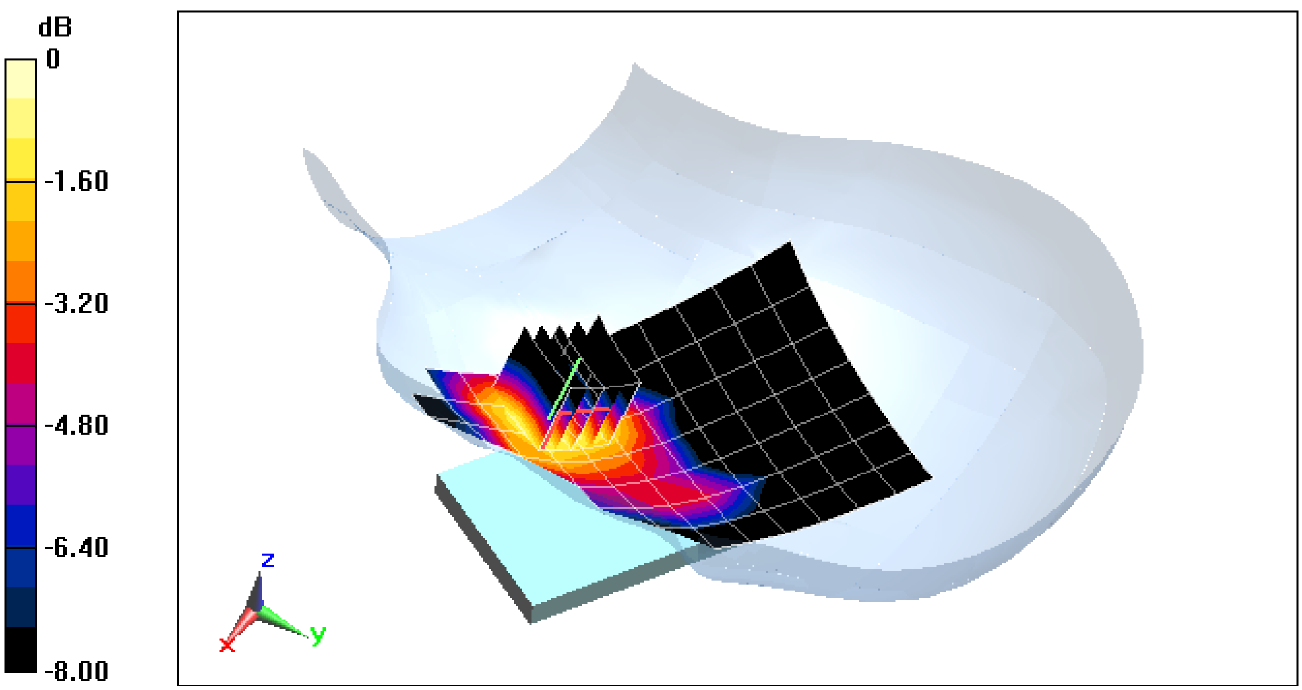
Communication System: UID 0, LTE Band 25 (PCS); Frequency: 1882.5 MHz; Duty Cycle: 1:1
Medium: 1900 Head, Medium parameters used (interpolated):
f = 1882.5 MHz; σ = 1.404 S/m; ε_r = 40.505; ρ = 1000 kg/m^3
Phantom section: Left Section

Test Date: 12-16-2015; Ambient Temp: 22.7°C; Tissue Temp: 22.6°C

Probe: ES3DV2 - SN3022; ConvF(4.93, 4.93, 4.93); Calibrated: 8/26/2015;
Sensor-Surface: 3mm (Mechanical Surface Detection)
Electronics: DAE4 Sn665; Calibrated: 2/18/2015
Phantom: SAM with CRP v4.0; Type: QD000P40CD; Serial: TP:1797
Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

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

Area Scan (8x13x1): Measurement grid: dx=15mm, dy=15mm
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 12.78 V/m; Power Drift = 0.04 dB
Peak SAR (extrapolated) = 0.308 W/kg
SAR(1 g) = 0.208 W/kg



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

PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LSMG930US; Type: Portable Handset; Serial: C3E59

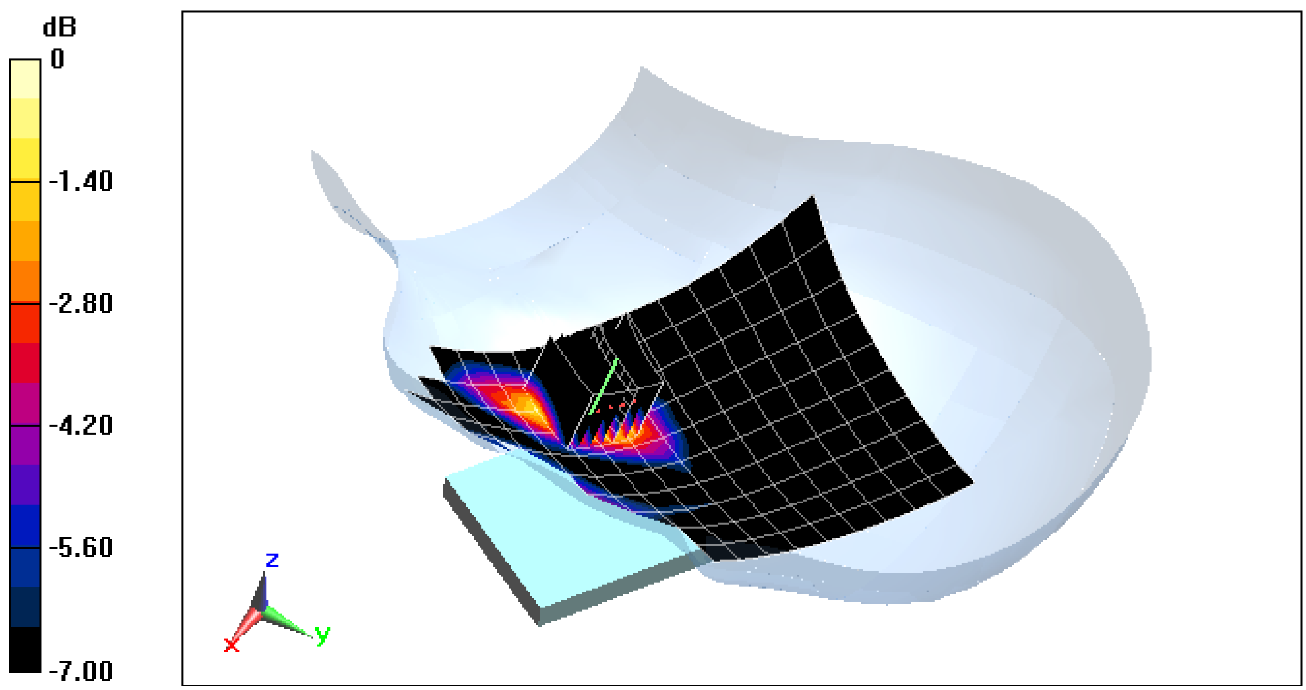
Communication System: UID 0, LTE Band 30; Frequency: 2310 MHz; Duty Cycle: 1:1
Medium: 2300 Head, Medium parameters used:
f = 2310 MHz; σ = 1.719 S/m; ε_r = 38.921; ρ = 1000 kg/m^3
Phantom section: Left Section

Test Date: 12-04-2015; Ambient Temp: 21.9°C; Tissue Temp: 22.0°C

Probe: ES3DV3 - SN3263; ConvF(4.63, 4.63, 4.63); Calibrated: 5/20/2015;
Sensor-Surface: 3mm (Mechanical Surface Detection)
Electronics: DAE4 Sn859; Calibrated: 6/17/2015
Phantom: SAM with CRP v5.0 (Right); Type: QD000P40CD; Serial: TP:1759
Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Mode: LTE Band 30, Left Head, Cheek, Mid.ch,
10 MHz Bandwidth, QPSK, 1 RB, 0 RB Offset

Area Scan (11x18x1): Measurement grid: dx=12mm, dy=12mm
Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 10.85 V/m; Power Drift = -0.16 dB
Peak SAR (extrapolated) = 0.274 W/kg
SAR(1 g) = 0.159 W/kg



0 dB = 0.200 W/kg = -6.99 dBW/kg

PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LSMG930US; Type: Portable Handset; Serial: C3E5B

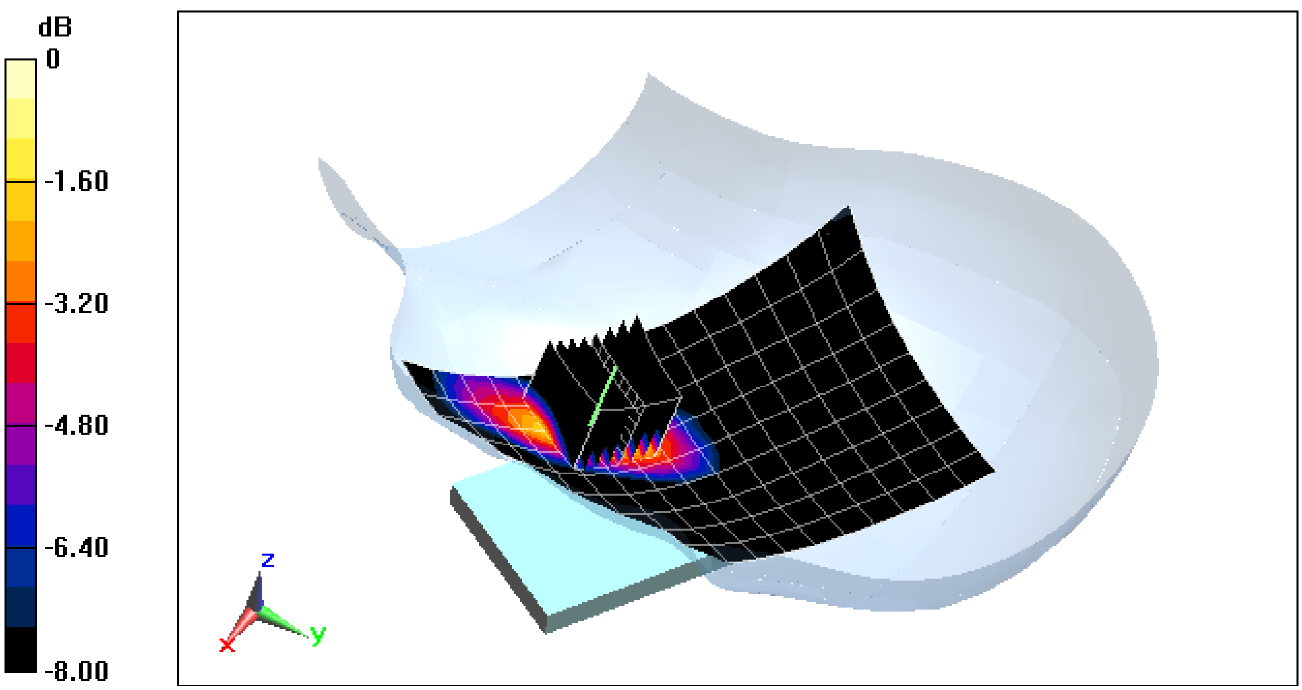
Communication System: UID 0, LTE Band 41; Frequency: 2680 MHz; Duty Cycle: 1:1.58
Medium: 2600 Head, Medium parameters used (interpolated):
f = 2680 MHz; σ = 2.129 S/m; ε_r = 39.089; ρ = 1000 kg/m^3
Phantom section: Left Section

Test Date: 12-18-2015; Ambient Temp: 23.9°C; Tissue Temp: 24.1°C

Probe: ES3DV3 - SN3333; ConvF(4.39, 4.39, 4.39); Calibrated: 10/29/2015;
Sensor-Surface: 3mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1333; Calibrated: 10/27/2015
Phantom: SAM Right; Type: QD000P40CD; Serial: 1757
Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

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

Area Scan (10x17x1): Measurement grid: dx=12mm, dy=12mm
Zoom Scan (8x8x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 12.59 V/m; Power Drift = 0.00 dB
Peak SAR (extrapolated) = 0.503 W/kg
SAR(1 g) = 0.252 W/kg



0 dB = 0.321 W/kg = -4.93 dBW/kg

PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LSMG930US; Type: Portable Handset; Serial: C3D00

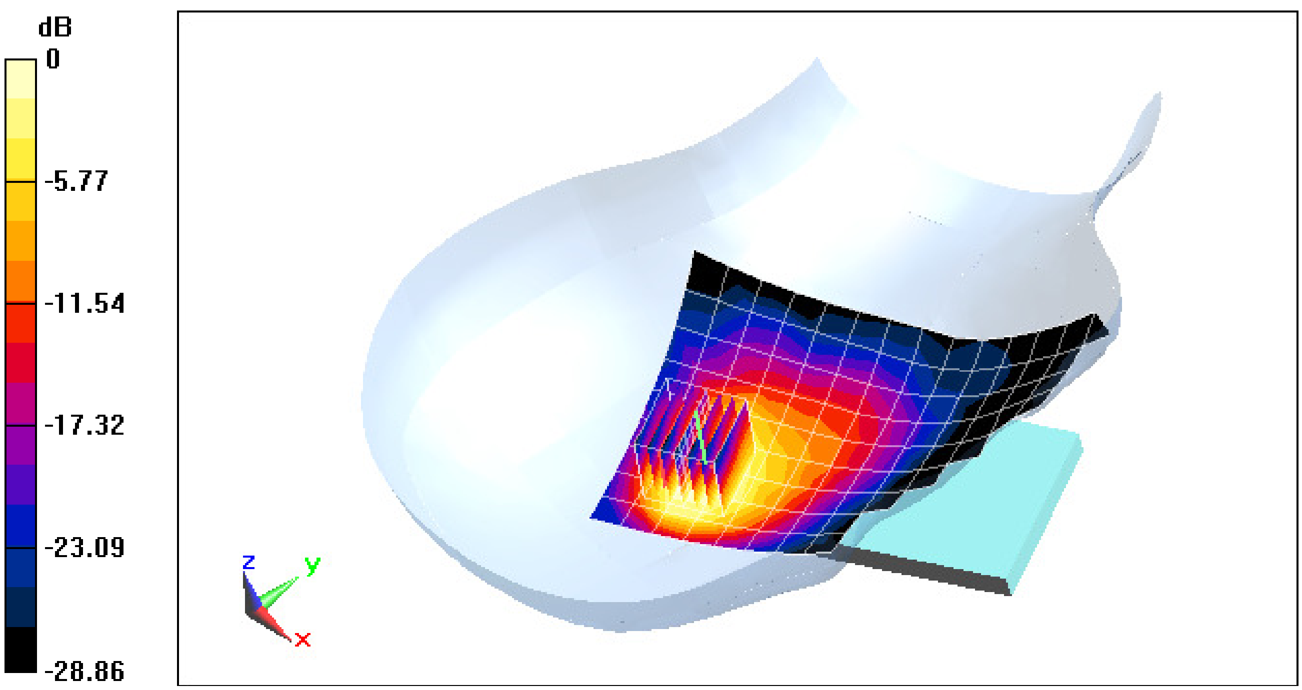
Communication System: UID 0, IEEE 802.11b; Frequency: 2437 MHz; Duty Cycle: 1:1
Medium: 2450 Head, Medium parameters used (interpolated):
f = 2437 MHz; σ = 1.829 S/m; ε_r = 39.703; ρ = 1000 kg/m^3
Phantom section: Right Section

Test Date: 12-30-2015; Ambient Temp: 24.0°C; Tissue Temp: 24.2°C

Probe: ES3DV3 - SN3333; ConvF(4.53, 4.53, 4.53); Calibrated: 10/29/2015;
Sensor-Surface: 3mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1333; Calibrated: 10/27/2015
Phantom: SAM Right; Type: QD000P40CD; Serial: 1757
Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Mode: IEEE 802.11b, Antenna 1, 22 MHz Bandwidth, Right Head, Cheek, Ch 6, 1 Mbps

Area Scan (10x15x1): Measurement grid: dx=12mm, dy=12mm
Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 19.90 V/m; Power Drift = -0.16 dB
Peak SAR (extrapolated) = 1.63 W/kg
SAR(1 g) = 0.795 W/kg



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

PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LSMG930US; Type: Portable Handset; Serial: C3D00

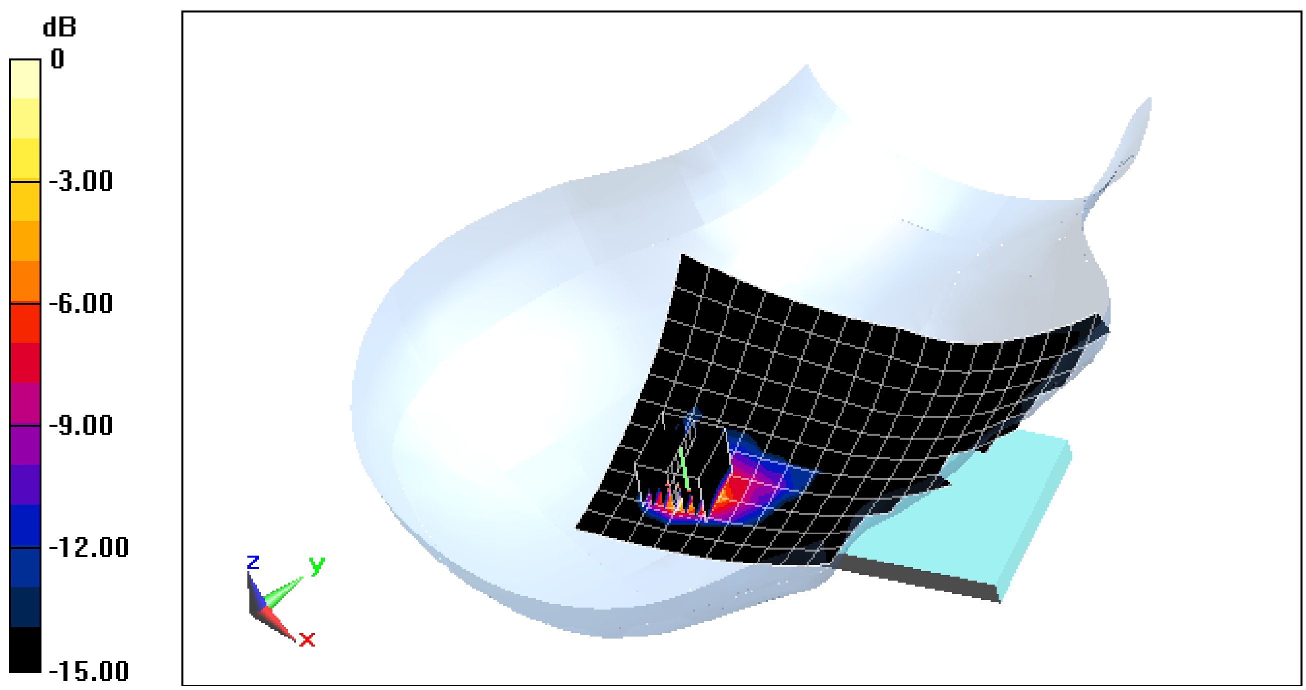
Communication System: UID 0, 802.11a 5.2-5.8 GHz Band; Frequency: 5825 MHz; Duty Cycle: 1:1
Medium: 5 GHz Head, Medium parameters used:
f = 5825 MHz; σ = 5.109 S/m; ε_r = 35.055; ρ = 1000 kg/m^3
Phantom section: Right Section

Test Date: 12-09-2015; Ambient Temp: 23.2°C; Tissue Temp: 21.4°C

Probe: EX3DV4 - SN7308; ConvF(4.86, 4.86, 4.86); Calibrated: 7/21/2015;
Sensor-Surface: 1.4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1322; Calibrated: 8/24/2015
Phantom: SAM 5.0 front; Type: QD000P40CD; Serial: TP:-1648
Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Mode: IEEE 802.11a, U-NII-3, Antenna 1, 20 MHz Bandwidth, Right Head, Cheek, Ch 165, 6 Mbps

Area Scan (12x19x1): Measurement grid: dx=10mm, dy=10mm
Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm; Graded Ratio: 1.4
Reference Value = 10.56 V/m; Power Drift = 0.18 dB
Peak SAR (extrapolated) = 2.41 W/kg
SAR(1 g) = 0.449 W/kg



0 dB = 1.31 W/kg = 1.17 dBW/kg

PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LSMG930US; Type: Portable Handset; Serial: C3D8C

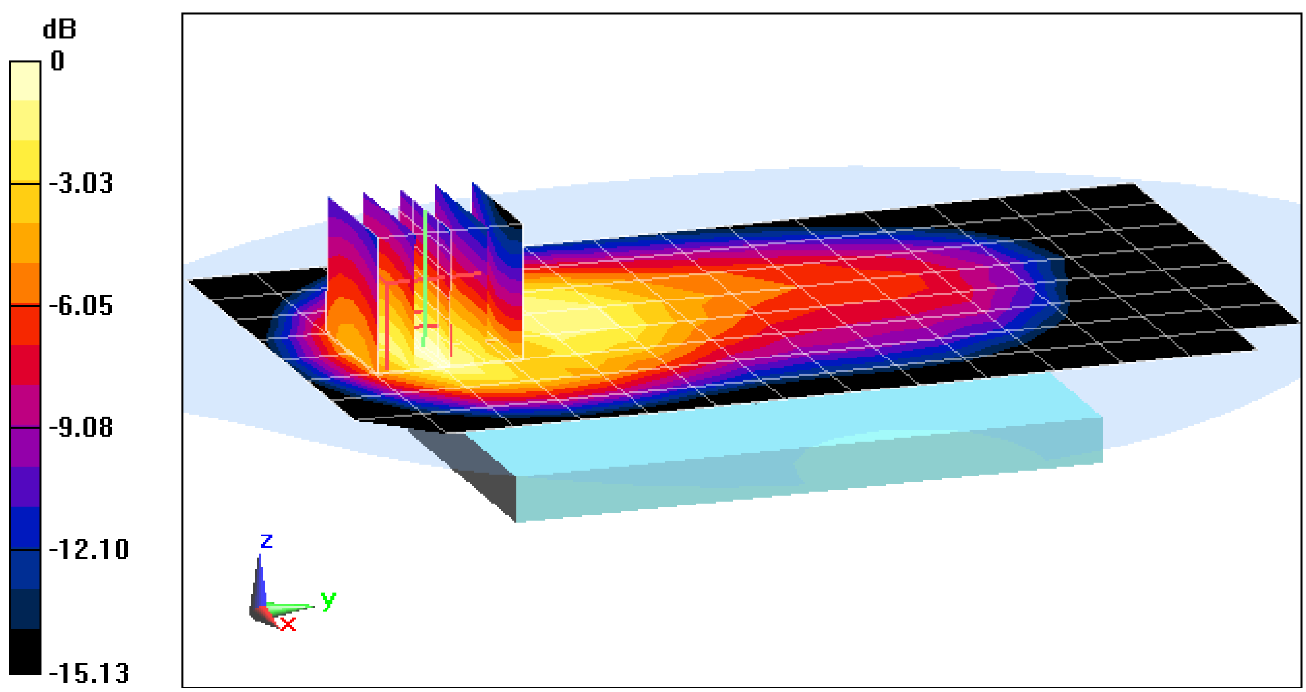
Communication System: UID 0, GSM; Frequency: 836.6 MHz; Duty Cycle: 1:8.3
Medium: 835 Body, Medium parameters used (interpolated):
$f = 836.6$ MHz; $\sigma = 0.992$ S/m; $\varepsilon_r = 54.27$; $\rho = 1000$ kg/m^3
Phantom section: Flat Section; Space: 1.5 cm

Test Date: 12-24-2015; Ambient Temp: 23.7°C; Tissue Temp: 23.5°C

Probe: ES3DV3 - SN3263; ConvF(6.08, 6.08, 6.08); Calibrated: 5/20/2015;
Sensor-Surface: 3mm (Mechanical Surface Detection)
Electronics: DAE4 Sn859; Calibrated: 6/17/2015
Phantom: SAM with CRP (Left); Type: SAM; Serial: 1715
Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

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

Area Scan (9x15x1): Measurement grid: dx=15mm, dy=15mm
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 20.20 V/m; Power Drift = -0.02 dB
Peak SAR (extrapolated) = 0.562 W/kg
SAR(1 g) = 0.355 W/kg



0 dB = 0.429 W/kg = -3.68 dBW/kg

PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LSMG930US; Type: Portable Handset; Serial: C3D8C

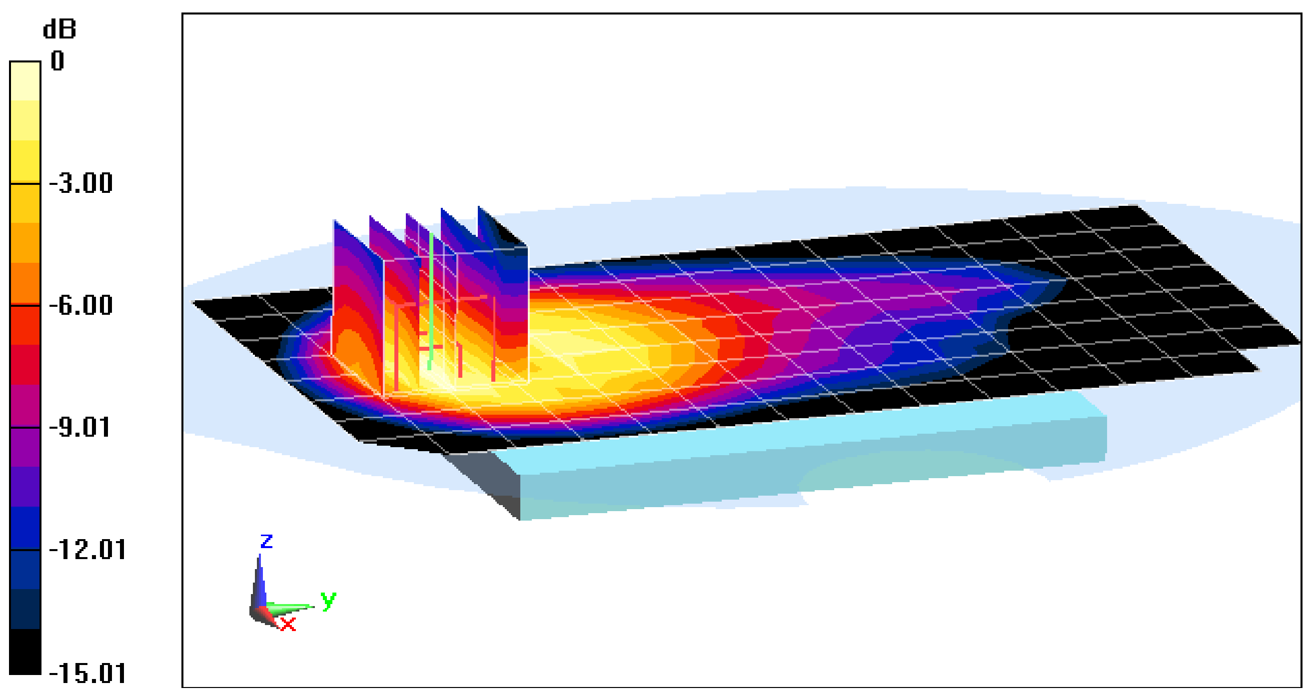
Communication System: UID 0, GSM GPRS; 3 Tx slots; Frequency: 836.6 MHz; Duty Cycle: 1:2.76
Medium: 835 Body, Medium parameters used (interpolated):
f = 836.6 MHz; $\sigma = 0.992$ S/m; $\varepsilon_r = 54.27$; $\rho = 1000$ kg/m^3
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 12-24-2015; Ambient Temp: 23.7°C; Tissue Temp: 23.5°C

Probe: ES3DV3 - SN3263; ConvF(6.08, 6.08, 6.08); Calibrated: 5/20/2015;
Sensor-Surface: 3mm (Mechanical Surface Detection)
Electronics: DAE4 Sn859; Calibrated: 6/17/2015
Phantom: SAM with CRP (Left); Type: SAM; Serial: 1715
Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

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

Area Scan (9x15x1): Measurement grid: dx=15mm, dy=15mm
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 22.35 V/m; Power Drift = -0.05 dB
Peak SAR (extrapolated) = 0.710 W/kg
SAR(1 g) = 0.441 W/kg



0 dB = 0.539 W/kg = -2.68 dBW/kg

PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LSMG930US; Type: Portable Handset; Serial: C3D11

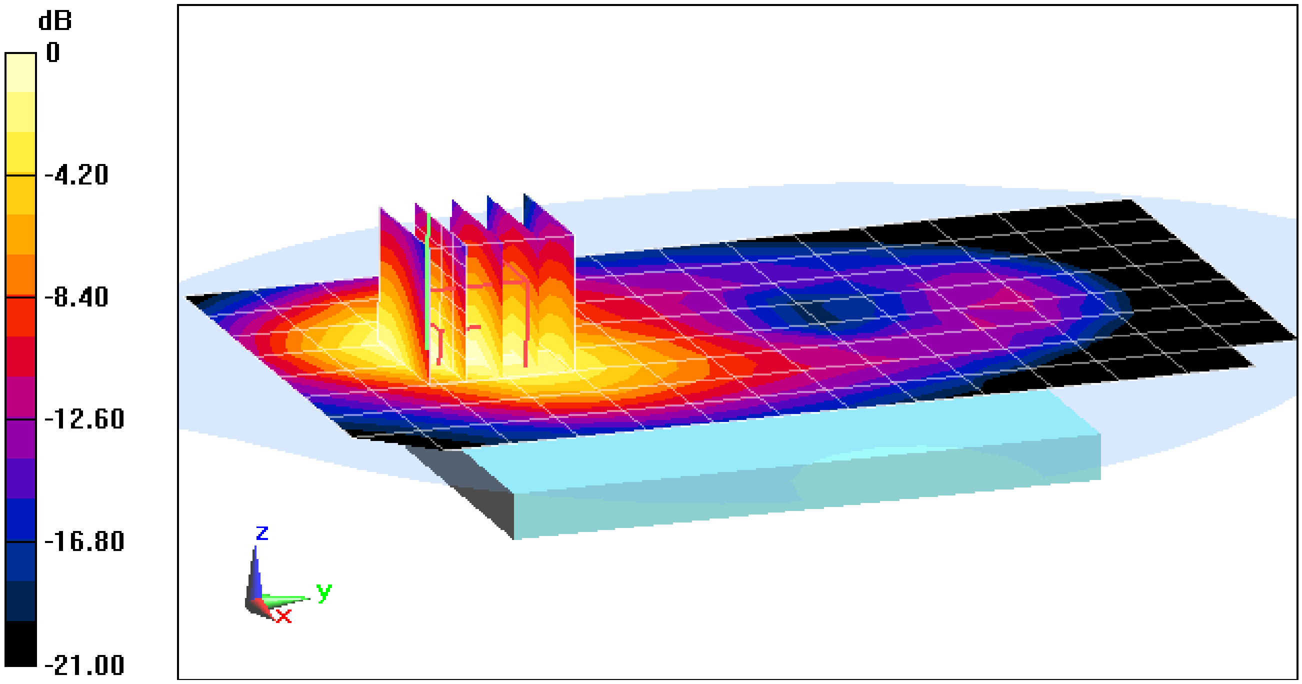
Communication System: UID 0, GSM; Frequency: 1880 MHz; Duty Cycle: 1:8.3
Medium: 1900 Body, Medium parameters used:
f = 1880 MHz; σ = 1.531 S/m; ε_r = 51.519; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.5 cm

Test Date: 12-06-2015; Ambient Temp: 23.7°C; Tissue Temp: 22.0°C

Probe: ES3DV3 - SN3333; ConvF(4.7, 4.7, 4.7); Calibrated: 10/29/2015;
Sensor-Surface: 3mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1333; Calibrated: 10/27/2015
Phantom: SAM Front; Type: QD000P40CD; Serial: TP:1758
Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

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

Area Scan (9x15x1): Measurement grid: dx=15mm, dy=15mm
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 14.70 V/m; Power Drift = 0.05 dB
Peak SAR (extrapolated) = 0.498 W/kg
SAR(1 g) = 0.305 W/kg



0 dB = 0.359 W/kg = -4.45 dBW/kg

PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LSMG930US; Type: Portable Handset; Serial: C3CE8

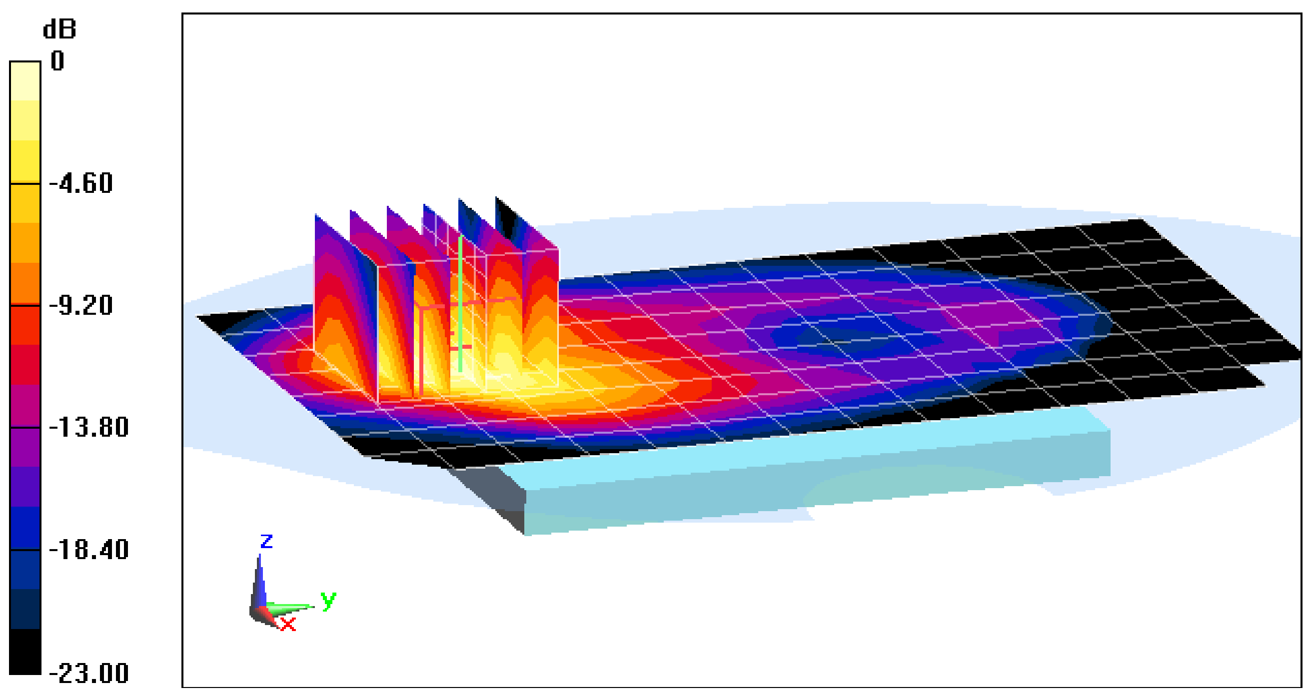
Communication System: UID 0, GSM GPRS; 3 Tx slots; Frequency: 1909.8 MHz; Duty Cycle: 1:2.76
Medium: 1900 Body, Medium parameters used:
f = 1910 MHz; σ = 1.574 S/m; ε_r = 51.414; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 12-06-2015; Ambient Temp: 23.7°C; Tissue Temp: 22.0°C

Probe: ES3DV3 - SN3333; ConvF(4.7, 4.7, 4.7); Calibrated: 10/29/2015;
Sensor-Surface: 3mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1333; Calibrated: 10/27/2015
Phantom: SAM Front; Type: QD000P40CD; Serial: TP:1758
Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Mode: GPRS 1900, Body SAR, Back Side, High.ch, 3 Tx Slots

Area Scan (9x15x1): Measurement grid: dx=15mm, dy=15mm
Zoom Scan (6x6x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 18.62 V/m; Power Drift = -0.12 dB
Peak SAR (extrapolated) = 1.01 W/kg
SAR(1 g) = 0.577 W/kg



0 dB = 0.721 W/kg = -1.42 dBW/kg

PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LSMG930US; Type: Portable Handset; Serial: C3D8C

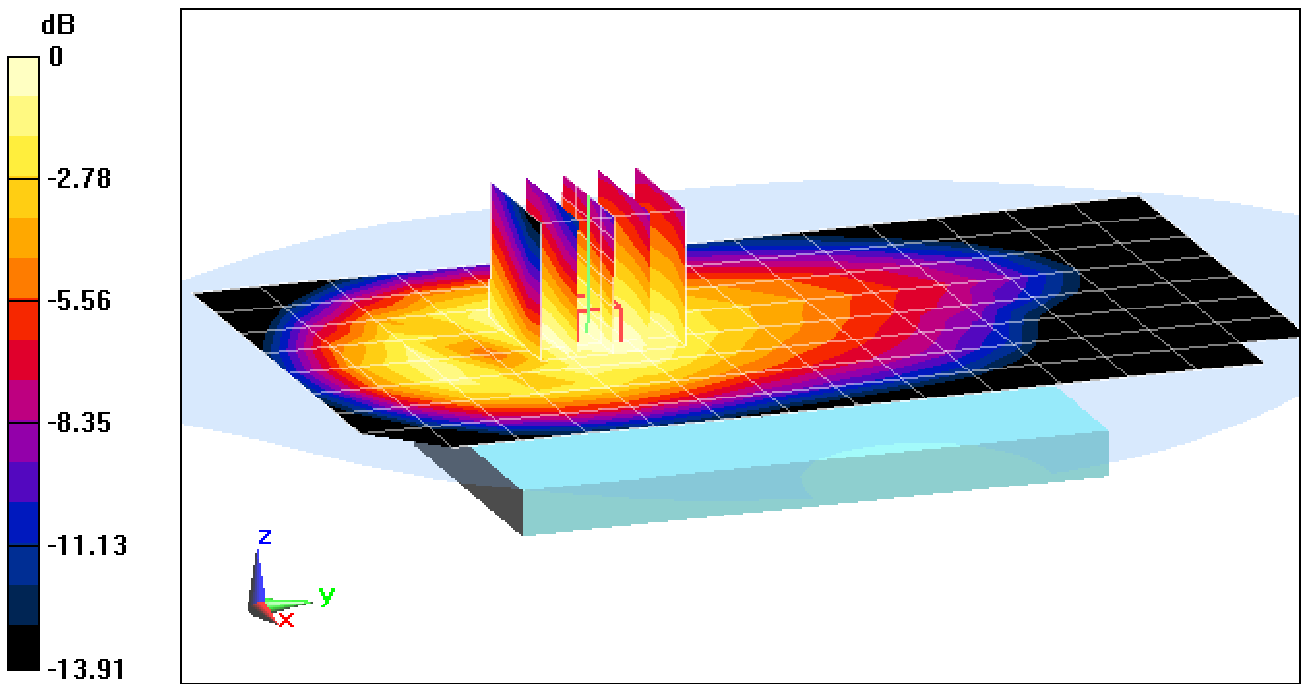
Communication System: UID 0, UMTS; Frequency: 836.6 MHz; Duty Cycle: 1:1
Medium: 835 Body, Medium parameters used (interpolated):
f = 836.6 MHz; σ = 0.992 S/m; ε_r = 54.27; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.5 cm

Test Date: 12-24-2015; Ambient Temp: 23.7°C; Tissue Temp: 23.5°C

Probe: ES3DV3 - SN3263; ConvF(6.08, 6.08, 6.08); Calibrated: 5/20/2015;
Sensor-Surface: 3mm (Mechanical Surface Detection)
Electronics: DAE4 Sn859; Calibrated: 6/17/2015
Phantom: SAM with CRP (Left); Type: SAM; Serial: 1715
Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

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

Area Scan (9x15x1): Measurement grid: dx=15mm, dy=15mm
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 21.96 V/m; Power Drift = 0.20 dB
Peak SAR (extrapolated) = 0.644 W/kg
SAR(1 g) = 0.479 W/kg



0 dB = 0.545 W/kg = -2.64 dBW/kg

PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LSMG930US; Type: Portable Handset; Serial: C3D8C

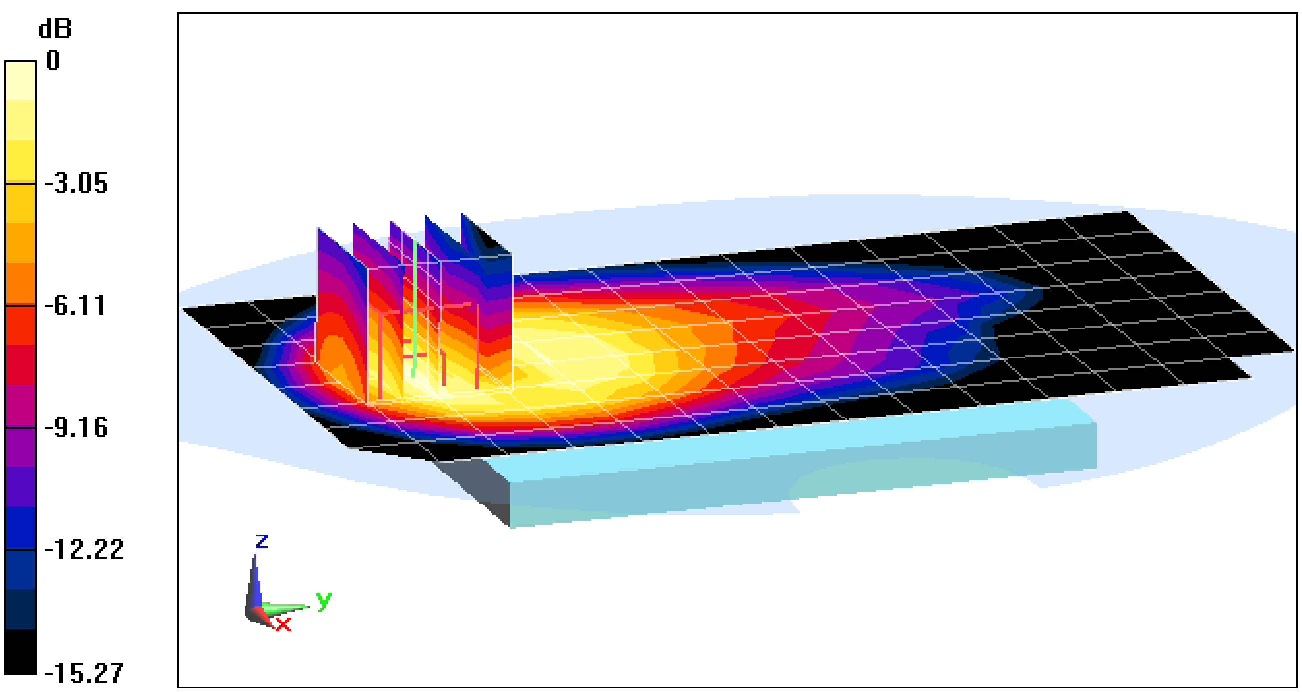
Communication System: UID 0, UMTS; Frequency: 836.6 MHz; Duty Cycle: 1:1
Medium: 835 Body, Medium parameters used (interpolated):
f = 836.6 MHz; σ = 0.992 S/m; ε_r = 54.27; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 12-24-2015; Ambient Temp: 23.7°C; Tissue Temp: 23.5°C

Probe: ES3DV3 - SN3263; ConvF(6.08, 6.08, 6.08); Calibrated: 5/20/2015;
Sensor-Surface: 3mm (Mechanical Surface Detection)
Electronics: DAE4 Sn859; Calibrated: 6/17/2015
Phantom: SAM with CRP (Left); Type: SAM; Serial: 1715
Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

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

Area Scan (9x15x1): Measurement grid: dx=15mm, dy=15mm
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 29.02 V/m; Power Drift = -0.02 dB
Peak SAR (extrapolated) = 1.22 W/kg
SAR(1 g) = 0.753 W/kg



0 dB = 0.929 W/kg = -0.32 dBW/kg

PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LSMG930US; Type: Portable Handset; Serial: C3D41

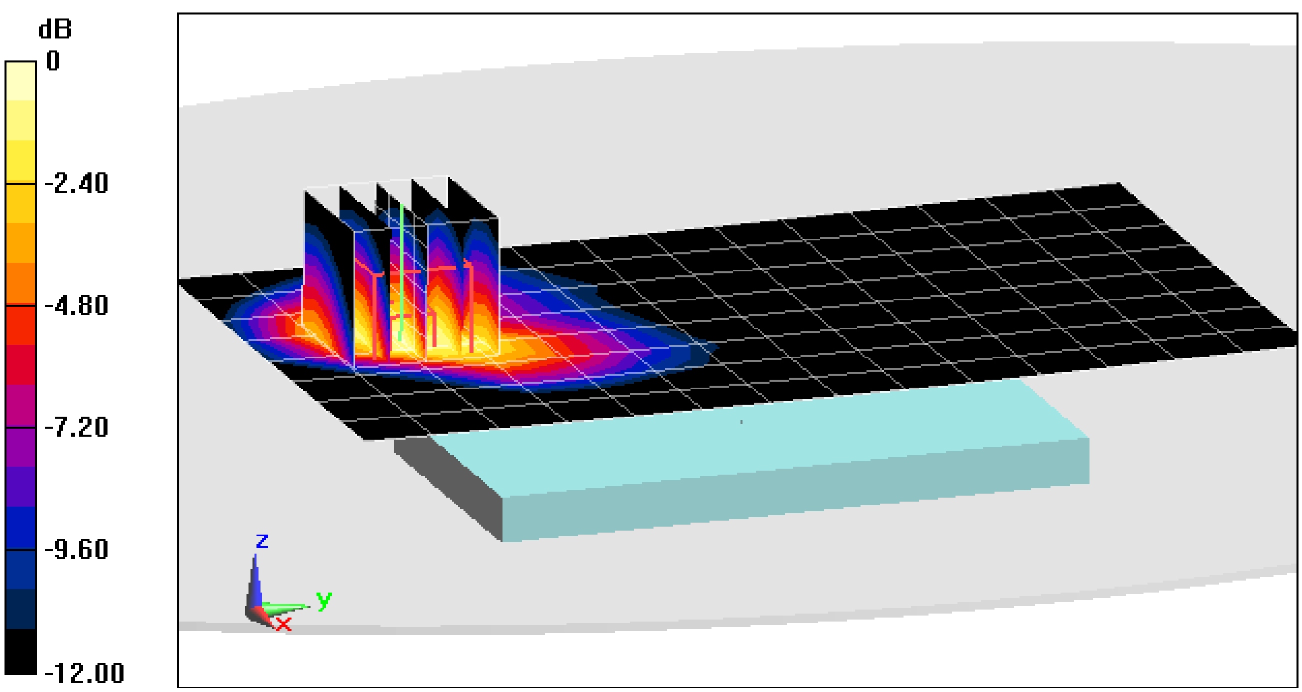
Communication System: UID 0, UMTS; Frequency: 1712.4 MHz; Duty Cycle: 1:1
Medium: 1750 Body, Medium parameters used (interpolated):
f = 1712.4 MHz; σ = 1.413 S/m; εr = 51.841; ρ = 1000 kg/m3
Phantom section: Flat Section; Space: 1.5 cm

Test Date: 01-01-2016; Ambient Temp: 23.5°C; Tissue Temp: 22.4°C

Probe: ES3DV3 - SN3334; ConvF(5.03, 5.03, 5.03); Calibrated: 11/17/2015;
Sensor-Surface: 3mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1415; Calibrated: 11/11/2015
Phantom: ELI v6.0; Type: QDOVA003AA; Serial: TP:2027
Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Mode: AWS UMTS, Body SAR, Back Side, Low.ch

Area Scan (9x15x1): Measurement grid: dx=15mm, dy=15mm
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 23.40 V/m; Power Drift = -0.03 dB
Peak SAR (extrapolated) = 1.07 W/kg
SAR(1 g) = 0.663 W/kg



0 dB = 0.810 W/kg = -0.92 dBW/kg

PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LSMG930US; Type: Portable Handset; Serial: C3E71

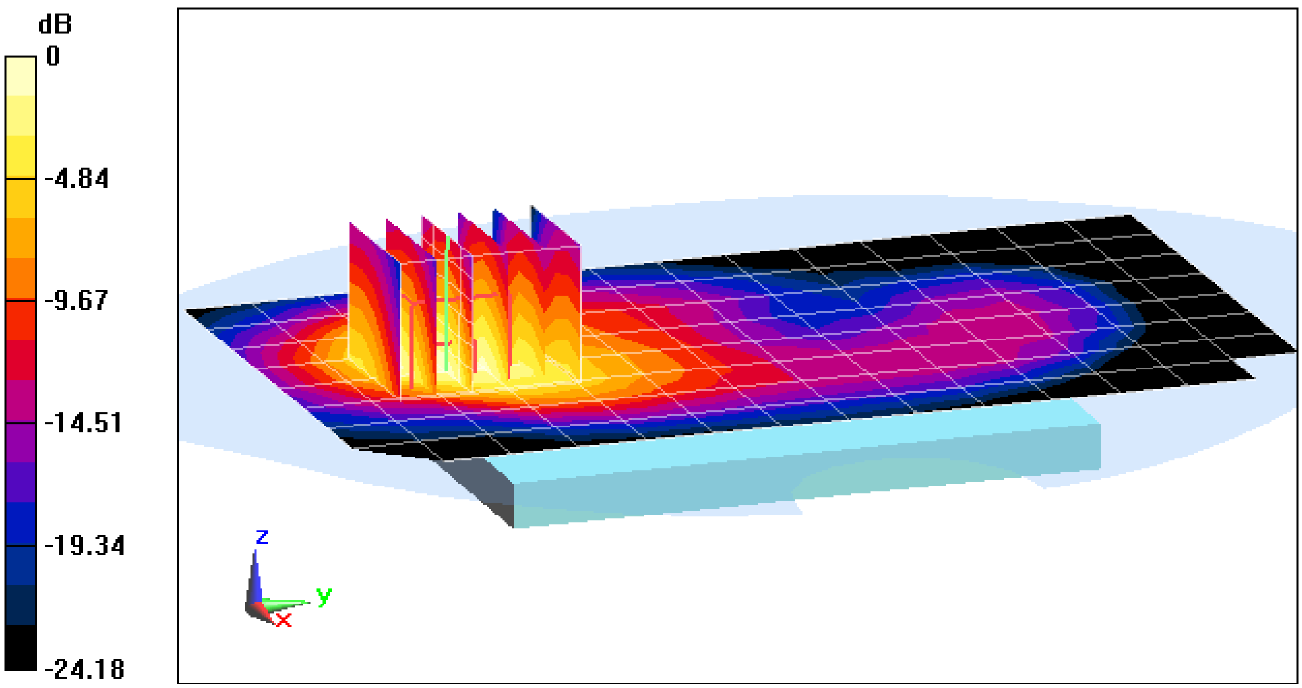
Communication System: UID 0, UMTS; Frequency: 1752.6 MHz; Duty Cycle: 1:1
Medium: 1750 Body, Medium parameters used (interpolated):
f = 1752.6 MHz; σ = 1.454 S/m; ε_r = 51.637; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 12-11-2015; Ambient Temp: 23.5°C; Tissue Temp: 23.0°C

Probe: ES3DV2 - SN3022; ConvF(4.79, 4.79, 4.79); Calibrated: 8/26/2015;
Sensor-Surface: 3mm (Mechanical Surface Detection)
Electronics: DAE4 Sn665; Calibrated: 2/18/2015
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: AWS UMTS, Body SAR, Back Side, High.ch

Area Scan (9x15x1): Measurement grid: dx=15mm, dy=15mm
Zoom Scan (5x6x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 25.67 V/m; Power Drift = -0.04 dB
Peak SAR (extrapolated) = 1.62 W/kg
SAR(1 g) = 0.951 W/kg



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

PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LSMG930US; Type: Portable Handset; Serial: C3D41

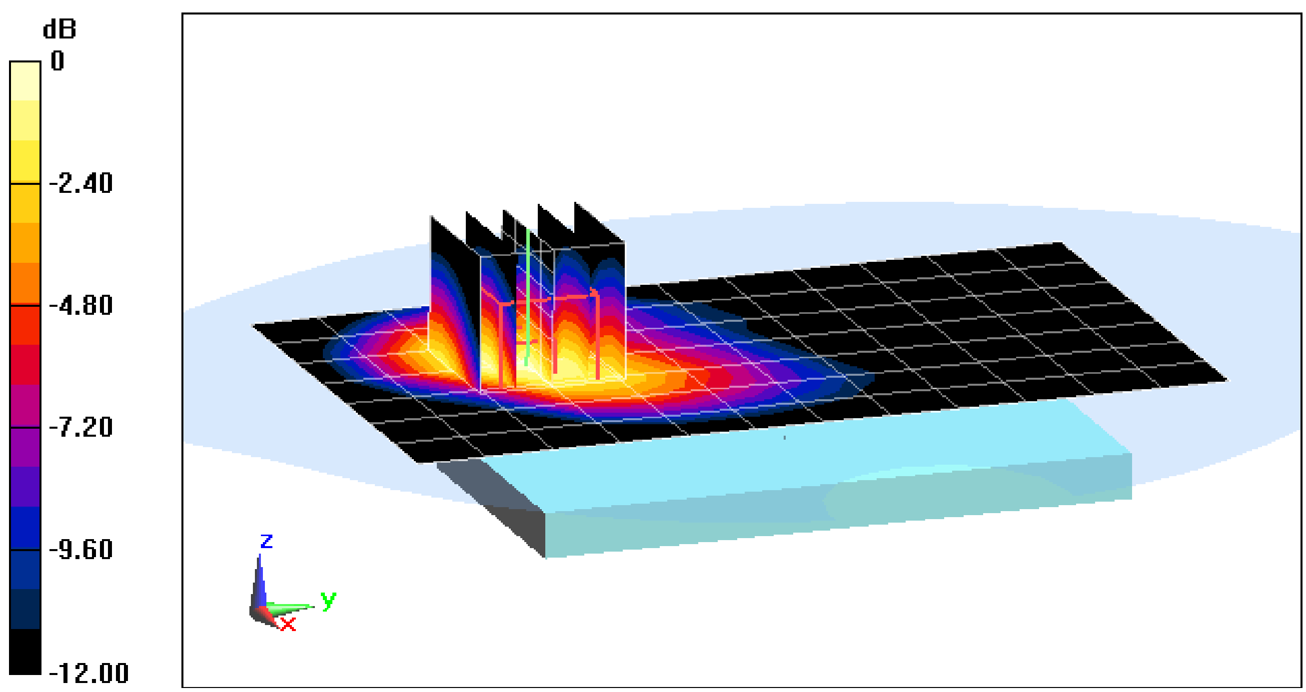
Communication System: UID 0, UMTS; Frequency: 1880 MHz; Duty Cycle: 1:1
Medium: 1900 Body, Medium parameters used:
$f = 1880$ MHz; $\sigma = 1.547$ S/m; $\varepsilon_r = 52.243$; $\rho = 1000$ kg/m^3
Phantom section: Flat Section; Space: 1.5 cm

Test Date: 12-31-2015; Ambient Temp: 23.0°C; Tissue Temp: 22.8°C

Probe: ES3DV3 - SN3319; ConvF(4.53, 4.53, 4.53); Calibrated: 3/19/2015;
Sensor-Surface: 3mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1368; Calibrated: 3/13/2015
Phantom: SAM with CRP v4.0; Type: QD000P40CD; Serial: TP:1800
Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

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

Area Scan (8x13x1): Measurement grid: dx=15mm, dy=15mm
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 15.13 V/m; Power Drift = -0.12 dB
Peak SAR (extrapolated) = 0.511 W/kg
SAR(1 g) = 0.307 W/kg



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

PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LSMG930US; Type: Portable Handset; Serial: C3E71

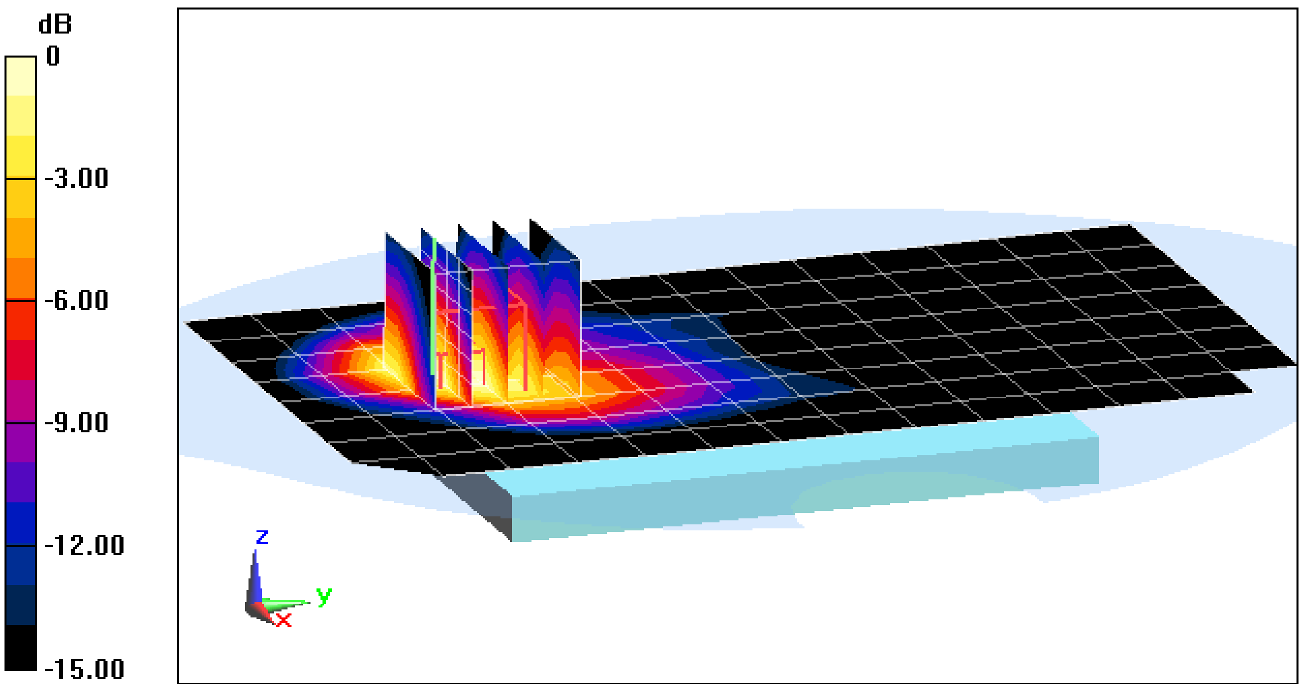
Communication System: UID 0, UMTS; Frequency: 1880 MHz; Duty Cycle: 1:1
Medium: 1900 Body, Medium parameters used:
f = 1880 MHz; σ = 1.48 S/m; ε_r = 52.333; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 12-09-2015; Ambient Temp: 24.3°C; Tissue Temp: 23.5°C

Probe: ES3DV3 - SN3333; ConvF(4.7, 4.7, 4.7); Calibrated: 10/29/2015;
Sensor-Surface: 3mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1333; Calibrated: 10/27/2015
Phantom: SAM Front; Type: QD000P40CD; Serial: TP:1758
Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

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

Area Scan (9x15x1): Measurement grid: dx=15mm, dy=15mm
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 27.96 V/m; Power Drift = 0.06 dB
Peak SAR (extrapolated) = 1.77 W/kg
SAR(1 g) = 1.04 W/kg



0 dB = 1.25 W/kg = 0.97 dBW/kg

PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LSMG930US; Type: Portable Handset; Serial: C3D2E

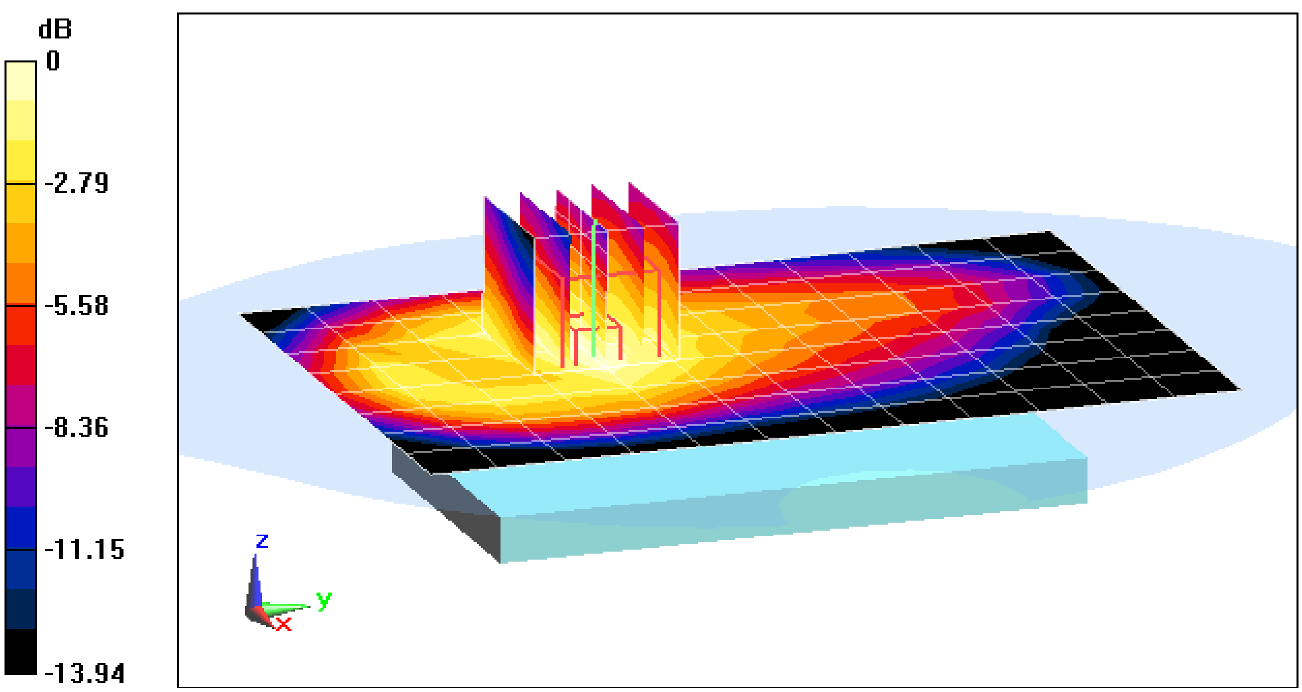
Communication System: UID 0, CDMA; Frequency: 820.1 MHz; Duty Cycle: 1:1
Medium: 835 Body, Medium parameters used (interpolated):
f = 820.1 MHz; σ = 0.969 S/m; ε_r = 52.911; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.5 cm

Test Date: 12-14-2015; Ambient Temp: 24.0°C; Tissue Temp: 23.1°C

Probe: ES3DV3 - SN3263; ConvF(6.08, 6.08, 6.08); Calibrated: 5/20/2015;
Sensor-Surface: 3mm (Mechanical Surface Detection)
Electronics: DAE4 Sn859; Calibrated: 6/17/2015
Phantom: SAM with CRP (Left); Type: SAM; Serial: 1715
Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Mode: Cell. CDMA BC10, Rule Part 90S, Ant A, Body SAR, Back Side, 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 = 19.93 V/m; Power Drift = 0.10 dB
Peak SAR (extrapolated) = 0.492 W/kg
SAR(1 g) = 0.360 W/kg



0 dB = 0.421 W/kg = -3.76 dBW/kg

PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LSMG930US; Type: Portable Handset; Serial: C3D2E

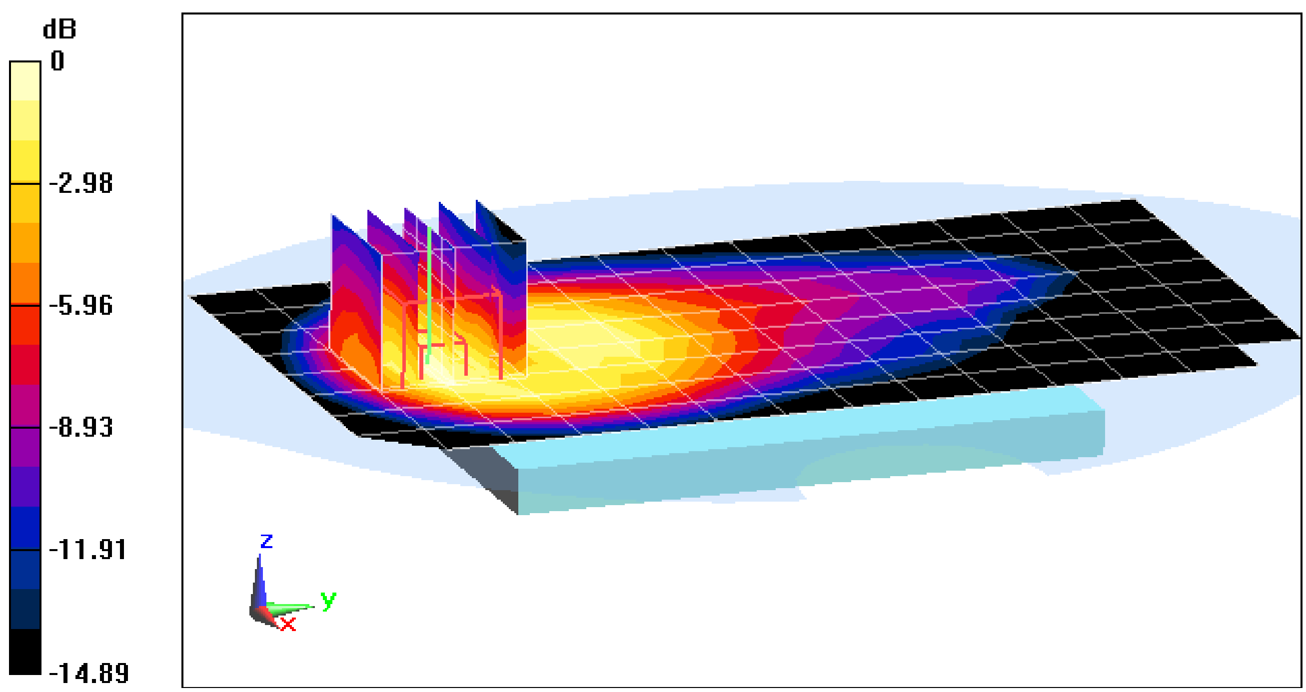
Communication System: UID 0, CDMA; Frequency: 820.1 MHz; Duty Cycle: 1:1
Medium: 835 Body, Medium parameters used (interpolated):
f = 820.1 MHz; σ = 0.969 S/m; ε_r = 52.911; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 12-14-2015; Ambient Temp: 24.0°C; Tissue Temp: 23.1°C

Probe: ES3DV3 - SN3263; ConvF(6.08, 6.08, 6.08); Calibrated: 5/20/2015;
Sensor-Surface: 3mm (Mechanical Surface Detection)
Electronics: DAE4 Sn859; Calibrated: 6/17/2015
Phantom: SAM with CRP (Left); Type: SAM; Serial: 1715
Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Mode: Cell. EVDO BC10, Rule Part 90S, Ant A, Body SAR, Back Side, Mid.ch

Area Scan (9x15x1): Measurement grid: dx=15mm, dy=15mm
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 27.02 V/m; Power Drift = -0.14 dB
Peak SAR (extrapolated) = 1.11 W/kg
SAR(1 g) = 0.674 W/kg



0 dB = 0.811 W/kg = -0.91 dBW/kg

PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LSMG930US; Type: Portable Handset; Serial: C3D2E

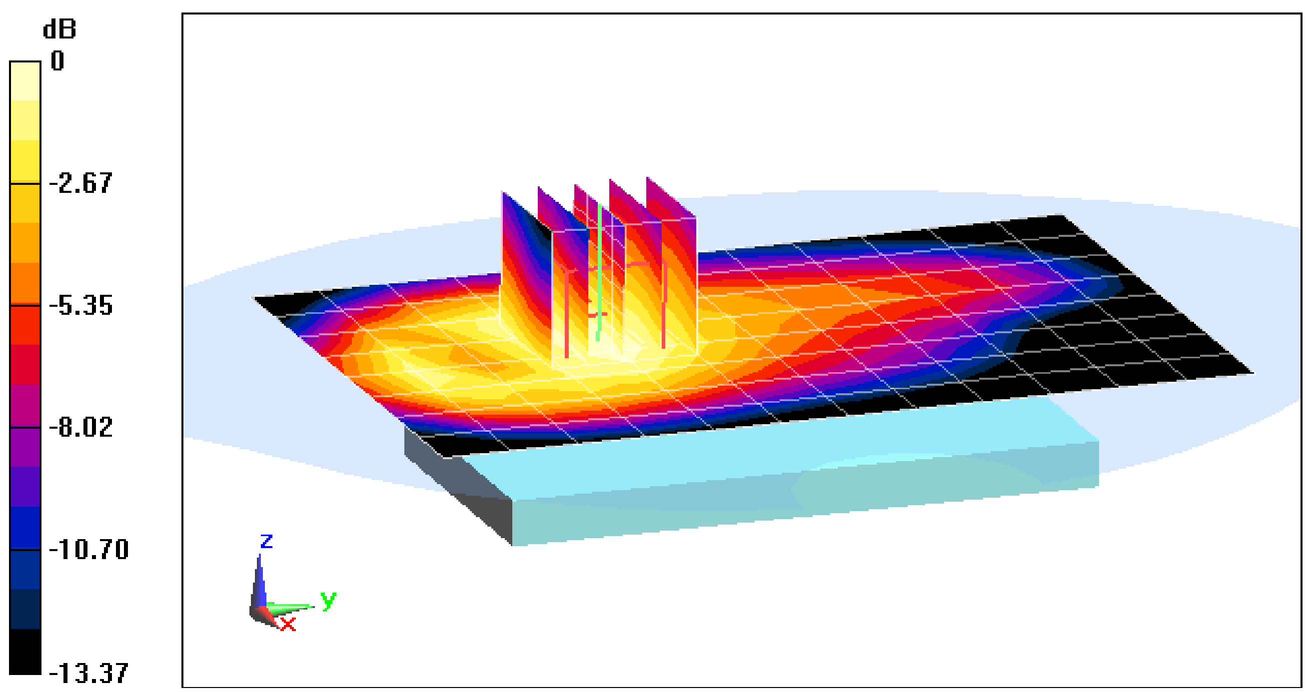
Communication System: UID 0, CDMA; Frequency: 836.52 MHz; Duty Cycle: 1:1
Medium: 835 Body, Medium parameters used (interpolated):
f = 836.52 MHz; σ = 0.989 S/m; ε_r = 52.777; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.5 cm

Test Date: 12-14-2015; Ambient Temp: 24.0°C; Tissue Temp: 23.1°C

Probe: ES3DV3 - SN3263; ConvF(6.08, 6.08, 6.08); Calibrated: 5/20/2015;
Sensor-Surface: 3mm (Mechanical Surface Detection)
Electronics: DAE4 Sn859; Calibrated: 6/17/2015
Phantom: SAM with CRP (Left); Type: SAM; Serial: 1715
Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Mode: Cell. CDMA BC0, Rule Part 22H Ant A, Body SAR, Back Side, 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 = 21.47 V/m; Power Drift = 0.00 dB
Peak SAR (extrapolated) = 0.602 W/kg
SAR(1 g) = 0.438 W/kg



0 dB = 0.493 W/kg = -3.07 dBW/kg

PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LSMG930US; Type: Portable Handset; Serial: C3D2E

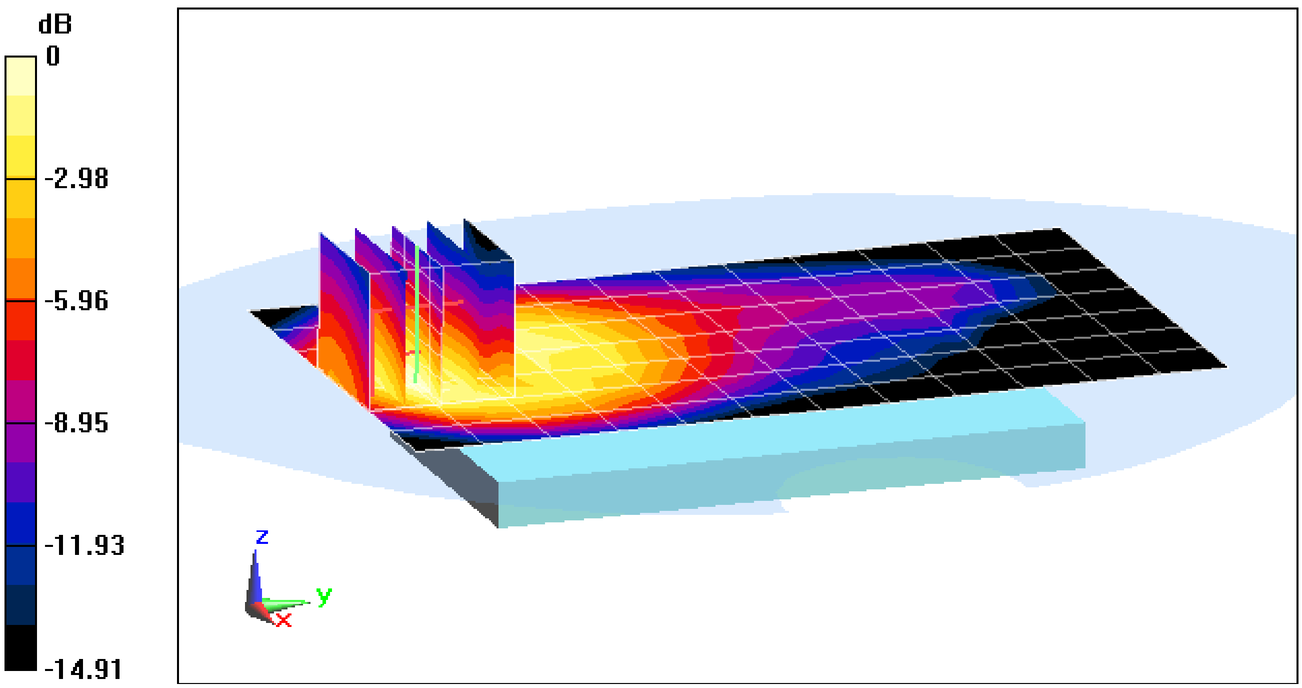
Communication System: UID 0, CDMA; Frequency: 824.7 MHz; Duty Cycle: 1:1
Medium: 835 Body, Medium parameters used (interpolated):
f = 824.7 MHz; σ = 0.984 S/m; ε_r = 54.352; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 12-24-2015; Ambient Temp: 23.7°C; Tissue Temp: 23.5°C

Probe: ES3DV3 - SN3263; ConvF(6.08, 6.08, 6.08); Calibrated: 5/20/2015;
Sensor-Surface: 3mm (Mechanical Surface Detection)
Electronics: DAE4 Sn859; Calibrated: 6/17/2015
Phantom: SAM with CRP (Left); Type: SAM; Serial: 1715
Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Mode: Cell. EVDO BC0, Rule Part 22H, Ant A, Body SAR, Back Side, Low.ch

Area Scan (8x13x1): Measurement grid: dx=15mm, dy=15mm
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 31.62 V/m; Power Drift = 0.04 dB
Peak SAR (extrapolated) = 1.44 W/kg
SAR(1 g) = 0.893 W/kg



0 dB = 1.08 W/kg = 0.33 dBW/kg

PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LSMG930US; Type: Portable Handset; Serial: C3D11

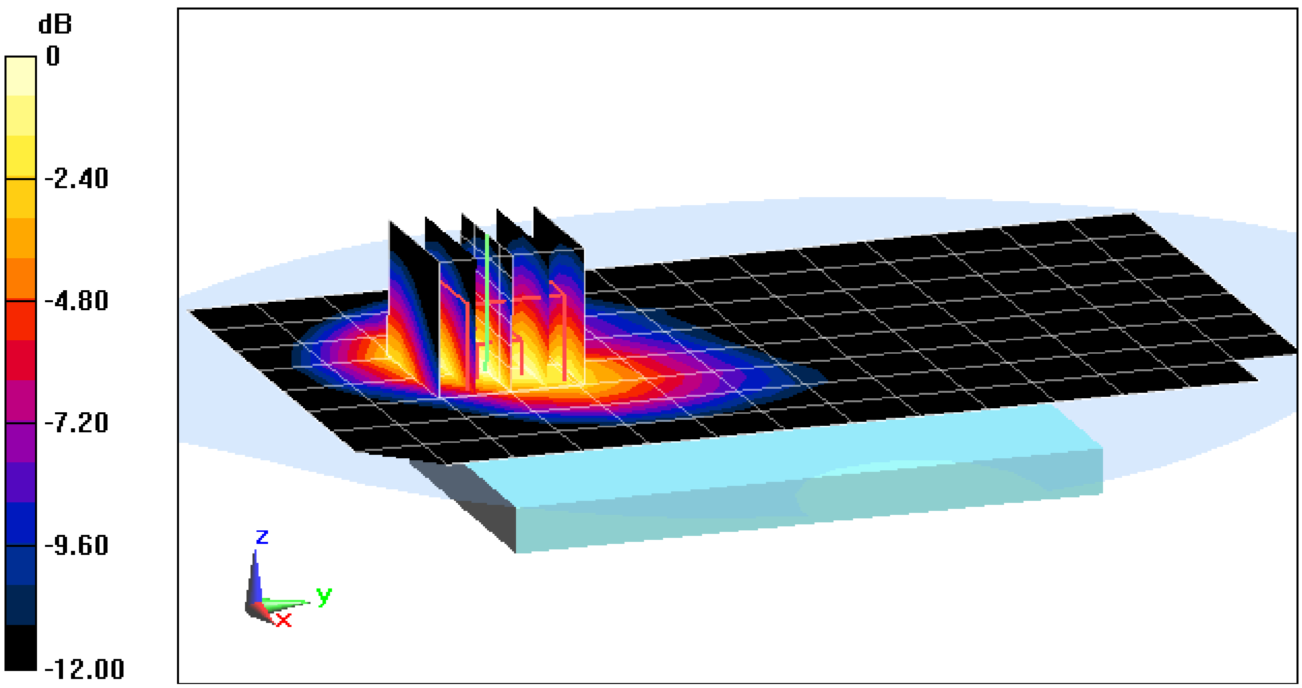
Communication System: UID 0, CDMA; Frequency: 1908.75 MHz; Duty Cycle: 1:1
Medium: 1900 Body, Medium parameters used (interpolated):
$f = 1908.75$ MHz; $\sigma = 1.572$ S/m; $\varepsilon_r = 51.418$; $\rho = 1000$ kg/m^3
Phantom section: Flat Section; Space: 1.5 cm

Test Date: 12-06-2015; Ambient Temp: 23.7°C; Tissue Temp: 22.0°C

Probe: ES3DV3 - SN3333; ConvF(4.7, 4.7, 4.7); Calibrated: 10/29/2015;
Sensor-Surface: 3mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1333; Calibrated: 10/27/2015
Phantom: SAM Front; Type: QD000P40CD; Serial: TP:1758
Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Mode: PCS CDMA, Body SAR, Back Side, High.ch

Area Scan (9x15x1): Measurement grid: dx=15mm, dy=15mm
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 25.05 V/m; Power Drift = 0.06 dB
Peak SAR (extrapolated) = 1.44 W/kg
SAR(1 g) = 0.884 W/kg



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

PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LSMG930US; Type: Portable Handset; Serial: C3CE8

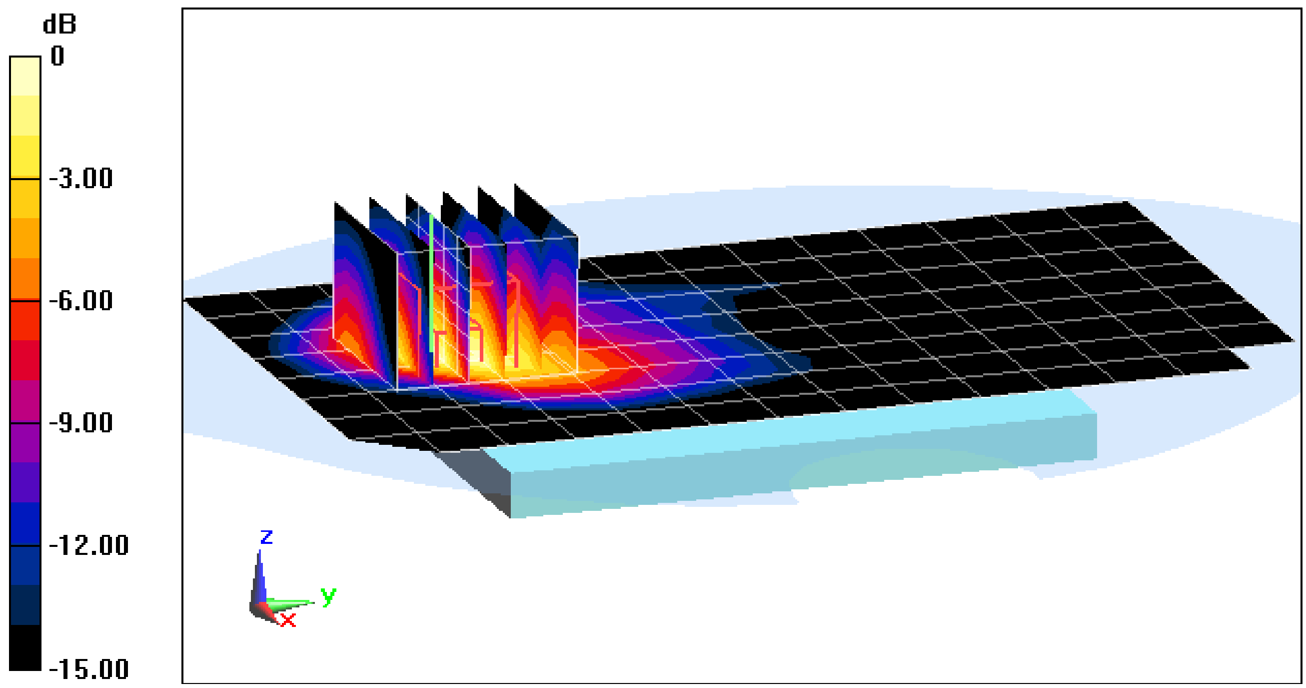
Communication System: UID 0, CDMA; Frequency: 1851.25 MHz; Duty Cycle: 1:1
Medium: 1900 Body, Medium parameters used (interpolated):
f = 1851.25 MHz; σ = 1.503 S/m; ε_r = 51.687; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 12-06-2015; Ambient Temp: 23.7°C; Tissue Temp: 22.0°C

Probe: ES3DV3 - SN3333; ConvF(4.7, 4.7, 4.7); Calibrated: 10/29/2015;
Sensor-Surface: 3mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1333; Calibrated: 10/27/2015
Phantom: SAM Front; Type: QD000P40CD; Serial: TP:1758
Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Mode: PCS EVDO, Body SAR, Back Side, Low.ch

Area Scan (9x15x1): Measurement grid: dx=15mm, dy=15mm
Zoom Scan (6x6x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 26.27 V/m; Power Drift = 0.04 dB
Peak SAR (extrapolated) = 1.63 W/kg
SAR(1 g) = 0.947 W/kg



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

PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LSMG930US; Type: Portable Handset; Serial: C35C6

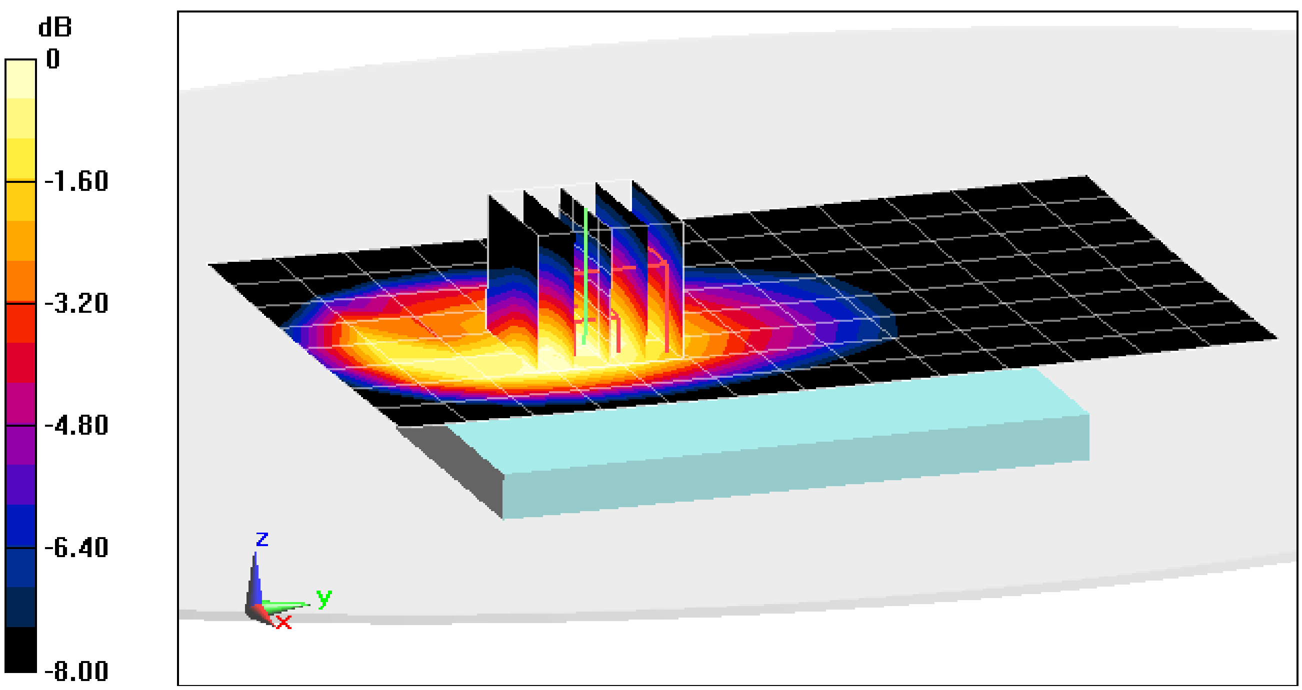
Communication System: UID 0, LTE Band 12; Frequency: 707.5 MHz; Duty Cycle: 1:1
Medium: 750 Body, Medium parameters used (interpolated):
f = 707.5 MHz; σ = 0.926 S/m; ε_r = 54.705; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.5 cm

Test Date: 12-24-2015; Ambient Temp: 23.5°C; Tissue Temp: 23.7°C

Probe: ES3DV2 - SN3022; ConvF(6.16, 6.16, 6.16); Calibrated: 8/26/2015;
Sensor-Surface: 3mm (Mechanical Surface Detection)
Electronics: DAE4 Sn665; Calibrated: 2/18/2015
Phantom: ELI v5.0; Type: QDOVA001BB; Serial: 1229
Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

**Mode: LTE Band 12, Ant A, Body SAR, Back Side, 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 = 20.99 V/m; Power Drift = 0.04 dB
Peak SAR (extrapolated) = 0.523 W/kg
SAR(1 g) = 0.375 W/kg



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

PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LSMG930US; Type: Portable Handset; Serial: C35C6

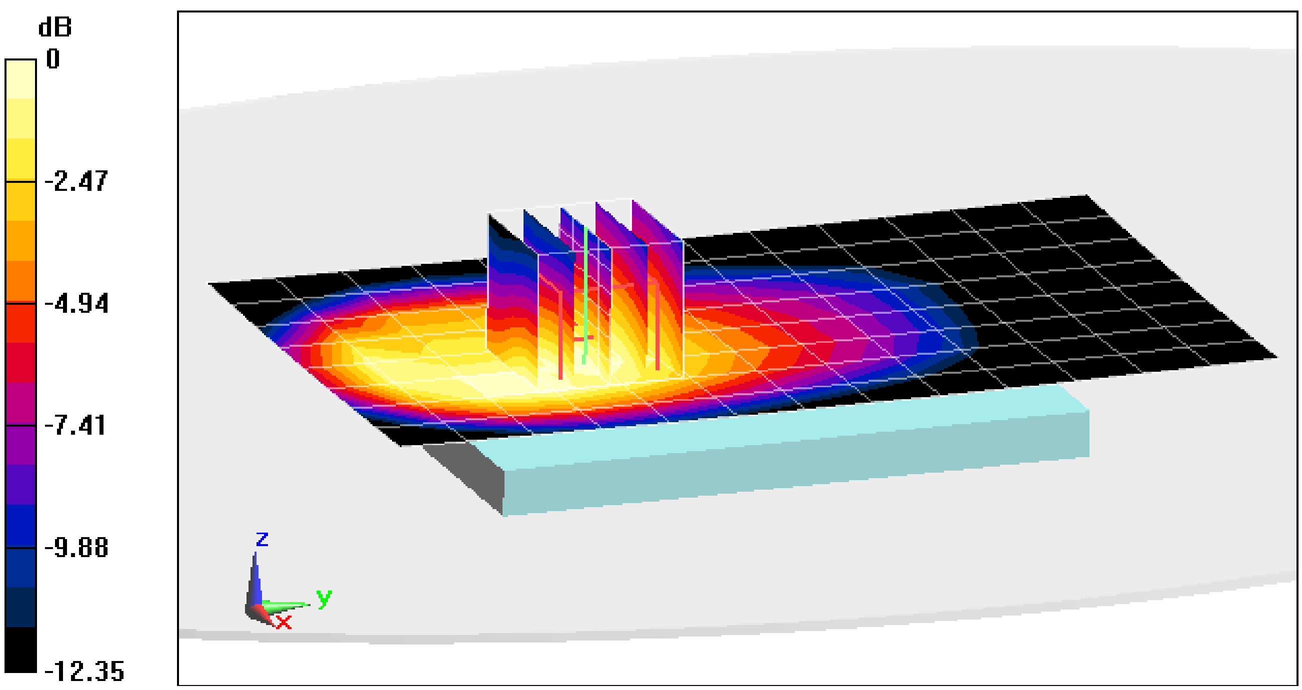
Communication System: UID 0, LTE Band 12; Frequency: 707.5 MHz; Duty Cycle: 1:1
Medium: 750 Body, Medium parameters used (interpolated):
f = 707.5 MHz; σ = 0.926 S/m; ε_r = 54.705; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 12-24-2015; Ambient Temp: 23.5°C; Tissue Temp: 23.7°C

Probe: ES3DV2 - SN3022; ConvF(6.16, 6.16, 6.16); Calibrated: 8/26/2015;
Sensor-Surface: 3mm (Mechanical Surface Detection)
Electronics: DAE4 Sn665; Calibrated: 2/18/2015
Phantom: ELI v5.0; Type: QDOVA001BB; Serial: 1229
Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Mode: LTE Band 12, Ant A, Body SAR, Back Side, 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 = 25.81 V/m; Power Drift = -0.01 dB
Peak SAR (extrapolated) = 0.858 W/kg
SAR(1 g) = 0.575 W/kg



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

PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LSMG930US; Type: Portable Handset; Serial: C35C6

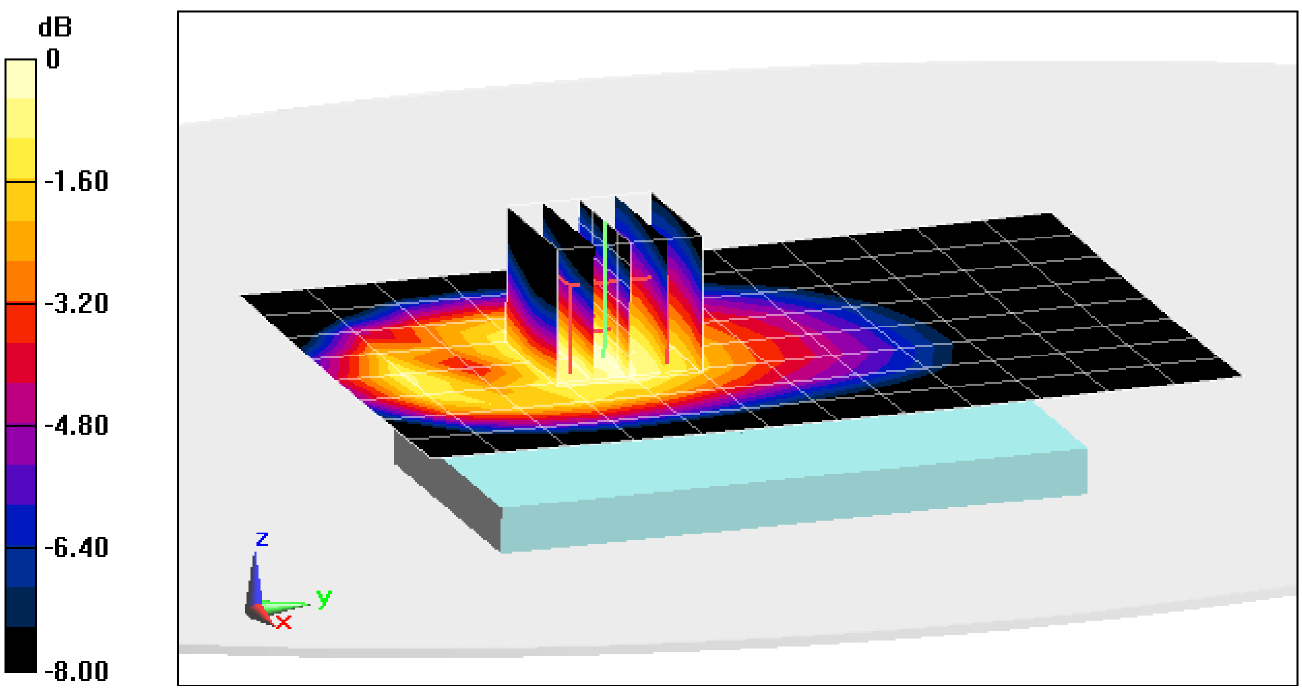
Communication System: UID 0, LTE Band 13; Frequency: 782 MHz; Duty Cycle: 1:1
Medium: 750 Body, Medium parameters used (interpolated):
$f = 782$ MHz; $\sigma = 0.989$ S/m; $\varepsilon_r = 53.208$; $\rho = 1000$ kg/m^3
Phantom section: Flat Section; Space: 1.5 cm

Test Date: 12-26-2015; Ambient Temp: 22.3°C; Tissue Temp: 23.0°C

Probe: ES3DV2 - SN3022; ConvF(6.16, 6.16, 6.16); Calibrated: 8/26/2015;
Sensor-Surface: 3mm (Mechanical Surface Detection)
Electronics: DAE4 Sn665; Calibrated: 2/18/2015
Phantom: ELI v5.0; Type: QDOVA001BB; Serial: 1229
Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Mode: LTE Band 13, Ant A, Body SAR, Back Side, Mid.ch, 10 MHz Bandwidth, QPSK, 1 RB, 49 RB Offset

Area Scan (9x13x1): Measurement grid: dx=15mm, dy=15mm
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 20.73 V/m; Power Drift = -0.04 dB
Peak SAR (extrapolated) = 0.544 W/kg
SAR(1 g) = 0.395 W/kg



0 dB = 0.442 W/kg = -3.55 dBW/kg

PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LSMG930US; Type: Portable Handset; Serial: C35C6

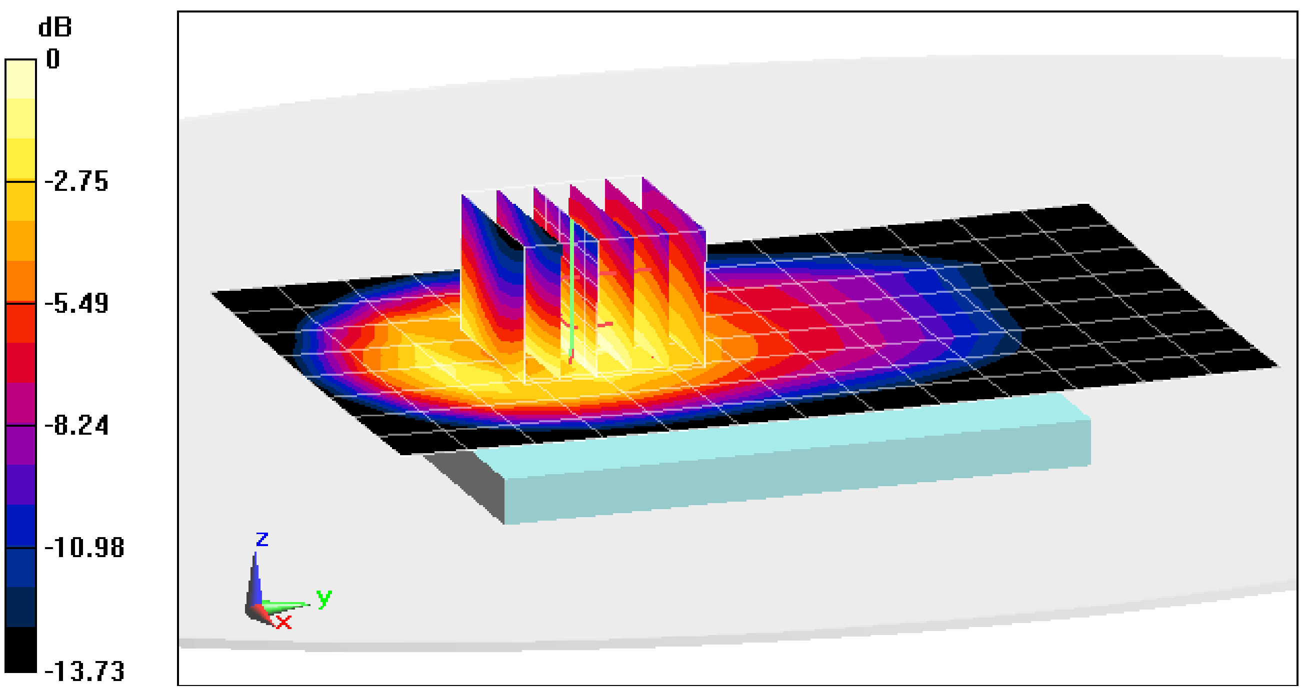
Communication System: UID 0, LTE Band 13; Frequency: 782 MHz; Duty Cycle: 1:1
Medium: 750 Body, Medium parameters used (interpolated):
f = 782 MHz; σ = 0.989 S/m; ε_r = 53.208; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 12-26-2015; Ambient Temp: 22.3°C; Tissue Temp: 23.0°C

Probe: ES3DV2 - SN3022; ConvF(6.16, 6.16, 6.16); Calibrated: 8/26/2015;
Sensor-Surface: 3mm (Mechanical Surface Detection)
Electronics: DAE4 Sn665; Calibrated: 2/18/2015
Phantom: ELI v5.0; Type: QDOVA001BB; Serial: 1229
Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

**Mode: LTE Band 13, Ant A, Body SAR, Back Side, Mid.ch,
10 MHz Bandwidth, QPSK, 1 RB, 49 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 = 23.94 V/m; Power Drift = -0.01 dB
Peak SAR (extrapolated) = 0.805 W/kg
SAR(1 g) = 0.556 W/kg



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

PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LSMG930US; Type: Portable Handset; Serial: C3D8C

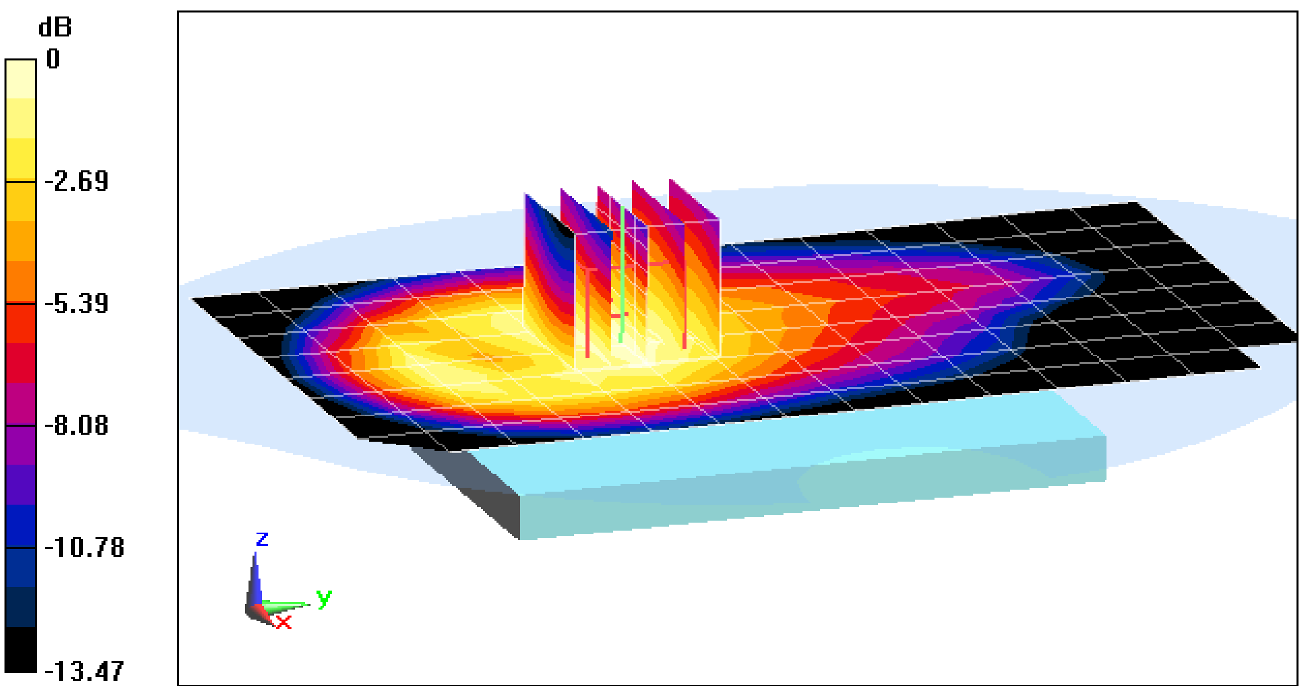
Communication System: UID 0, LTE Band 26; Frequency: 836.5 MHz; Duty Cycle: 1:1
Medium: 835 Body, Medium parameters used (interpolated):
f = 836.5 MHz; σ = 0.992 S/m; ε_r = 54.271; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.5 cm

Test Date: 12-24-2015; Ambient Temp: 23.7°C; Tissue Temp: 23.5°C

Probe: ES3DV3 - SN3263; ConvF(6.08, 6.08, 6.08); Calibrated: 5/20/2015;
Sensor-Surface: 3mm (Mechanical Surface Detection)
Electronics: DAE4 Sn859; Calibrated: 6/17/2015
Phantom: SAM with CRP (Left); Type: SAM; Serial: 1715
Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

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

Area Scan (9x15x1): Measurement grid: dx=15mm, dy=15mm
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 20.99 V/m; Power Drift = 0.00 dB
Peak SAR (extrapolated) = 0.554 W/kg
SAR(1 g) = 0.402 W/kg



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

PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LSMG930US; Type: Portable Handset; Serial: C3D8C

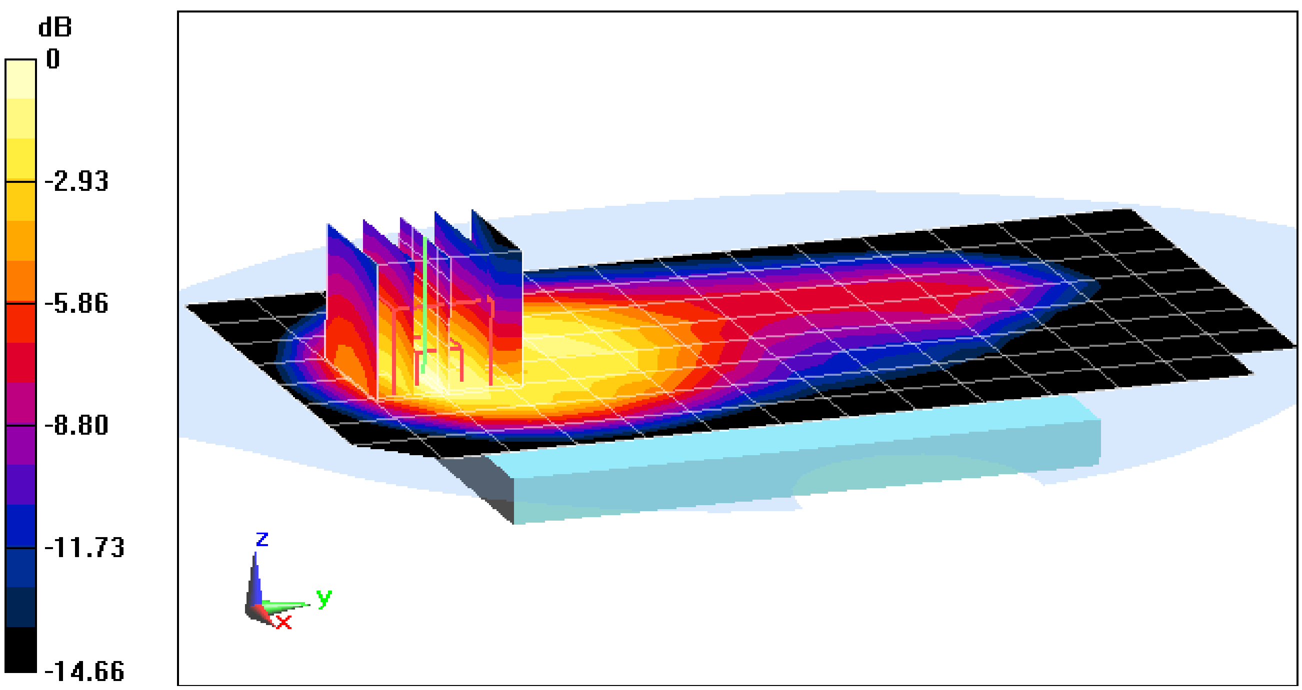
Communication System: UID 0, LTE Band 26; Frequency: 836.5 MHz; Duty Cycle: 1:1
Medium: 835 Body, Medium parameters used (interpolated):
f = 836.5 MHz; σ = 0.988 S/m; ε_r = 53.139; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 12-28-2015; Ambient Temp: 23.7°C; Tissue Temp: 22.1°C

Probe: ES3DV3 - SN3263; ConvF(6.08, 6.08, 6.08); Calibrated: 5/20/2015;
Sensor-Surface: 3mm (Mechanical Surface Detection)
Electronics: DAE4 Sn859; Calibrated: 6/17/2015
Phantom: SAM with CRP (Left); Type: SAM; Serial: 1715
Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

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

Area Scan (9x15x1): Measurement grid: dx=15mm, dy=15mm
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 26.74 V/m; Power Drift = -0.03 dB
Peak SAR (extrapolated) = 0.989 W/kg
SAR(1 g) = 0.615 W/kg



0 dB = 0. 749 W/kg = -1.26 dBW/kg

PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LSMG930US; Type: Portable Handset; Serial: C3D41

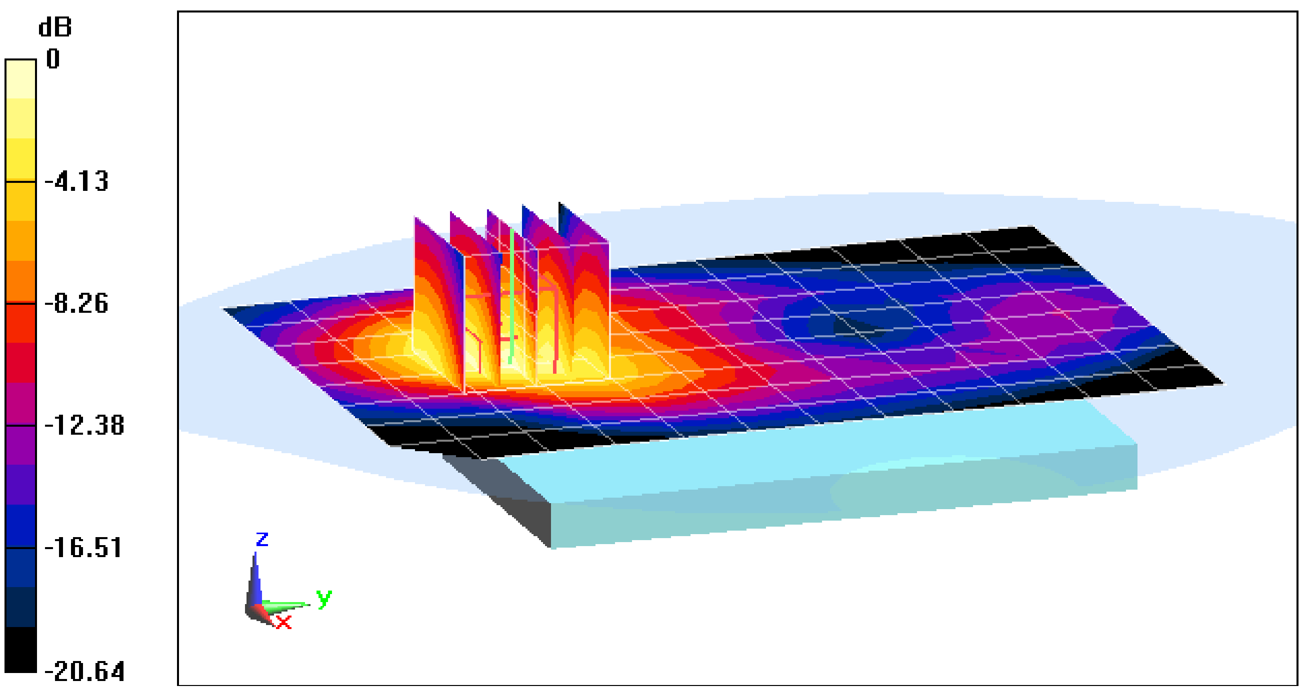
Communication System: UID 0, LTE Band 4 (AWS); Frequency: 1732.5 MHz; Duty Cycle: 1:1
Medium: 1750 Body, Medium parameters used (interpolated):
f = 1732.5 MHz; σ = 1.432 S/m; ε_r = 51.698; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.5 cm

Test Date: 12-11-2015; Ambient Temp: 23.5°C; Tissue Temp: 23.0°C

Probe: ES3DV2 - SN3022; ConvF(4.79, 4.79, 4.79); Calibrated: 8/26/2015;
Sensor-Surface: 3mm (Mechanical Surface Detection)
Electronics: DAE4 Sn665; Calibrated: 2/18/2015
Phantom: SAM with CRP v4.0; Type: QD000P40CD; Serial: TP:1797
Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Mode: LTE Band 4 (AWS), Body SAR, Back Side, Mid.ch, 20 MHz Bandwidth, QPSK, 1 RB, 0 RB Offset

Area Scan (9x13x1): Measurement grid: dx=15mm, dy=15mm
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 27.42 V/m; Power Drift = 0.03 dB
Peak SAR (extrapolated) = 1.59 W/kg
SAR(1 g) = 0.981 W/kg



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

PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LSMG930US; Type: Portable Handset; Serial: C3D46

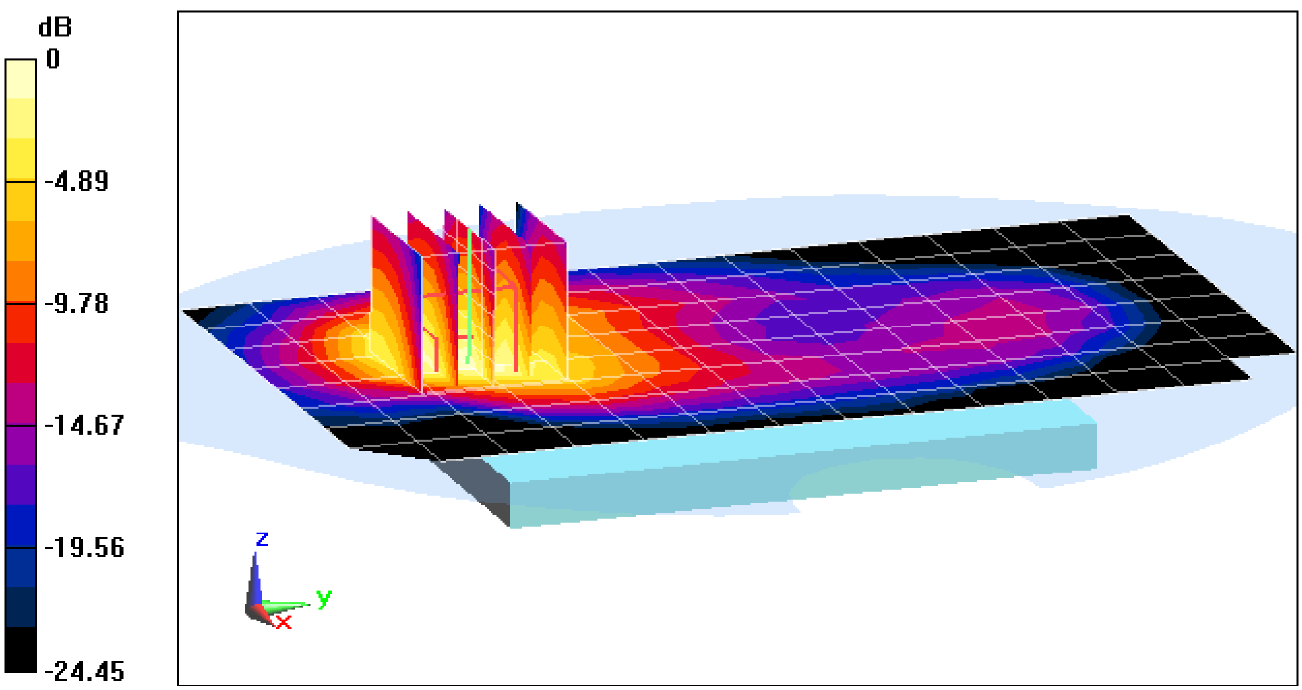
Communication System: UID 0, LTE Band 4 (AWS); Frequency: 1732.5 MHz; Duty Cycle: 1:1
Medium: 1750 Body, Medium parameters used (interpolated):
$f = 1732.5$ MHz; $\sigma = 1.432$ S/m; $\varepsilon_r = 51.698$; $\rho = 1000$ kg/m^3
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 12-11-2015; Ambient Temp: 23.5°C; Tissue Temp: 23.0°C

Probe: ES3DV2 - SN3022; ConvF(4.79, 4.79, 4.79); Calibrated: 8/26/2015;
Sensor-Surface: 3mm (Mechanical Surface Detection)
Electronics: DAE4 Sn665; Calibrated: 2/18/2015
Phantom: SAM with CRP v4.0; Type: QD000P40CD; Serial: TP:1797
Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Mode: LTE Band 4 (AWS), Body SAR, Back Side, Mid.ch, 20 MHz Bandwidth, QPSK, 1 RB, 0 RB Offset

Area Scan (9x15x1): Measurement grid: dx=15mm, dy=15mm
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 25.27 V/m; Power Drift = 0.16 dB
Peak SAR (extrapolated) = 1.51 W/kg
SAR(1 g) = 0.880 W/kg



0 dB = 1.08 W/kg = 0.33 dBW/kg

PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LSMG930US; Type: Portable Handset; Serial: C3D11

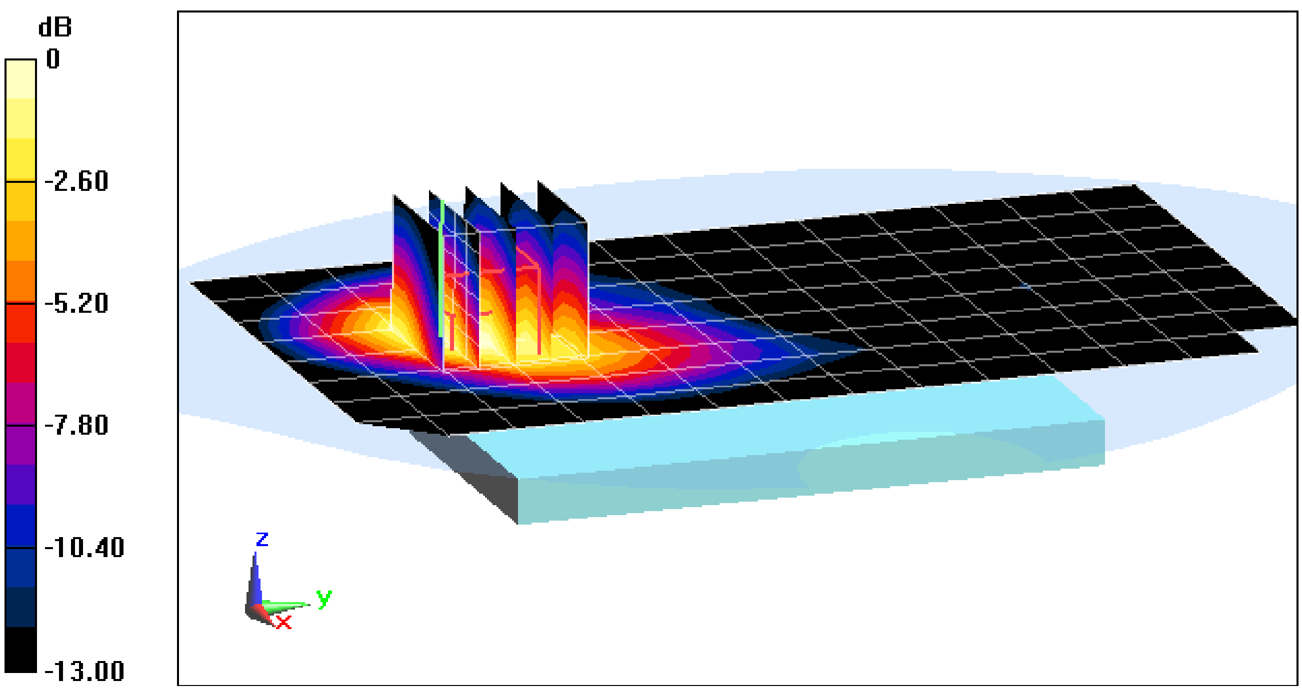
Communication System: UID 0, LTE Band 25 (PCS); Frequency: 1882.5 MHz; Duty Cycle: 1:1
Medium: 1900 Body, Medium parameters used (interpolated):
f = 1882.5 MHz; σ = 1.497 S/m; ε_r = 53.707; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.5 cm

Test Date: 12-13-2015; Ambient Temp: 24.4°C; Tissue Temp: 22.0°C

Probe: ES3DV3 - SN3333; ConvF(4.7, 4.7, 4.7); Calibrated: 10/29/2015;
Sensor-Surface: 3mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1333; Calibrated: 10/27/2015
Phantom: SAM Front; Type: QD000P40CD; Serial: TP:1758
Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

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

Area Scan (9x15x1): Measurement grid: dx=15mm, dy=15mm
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 25.15 V/m; Power Drift = -0.01 dB
Peak SAR (extrapolated) = 1.35 W/kg
SAR(1 g) = 0.839 W/kg



0 dB = 0.989 W/kg = -0.05 dBW/kg

PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LSMG930US; Type: Portable Handset; Serial: C3D46

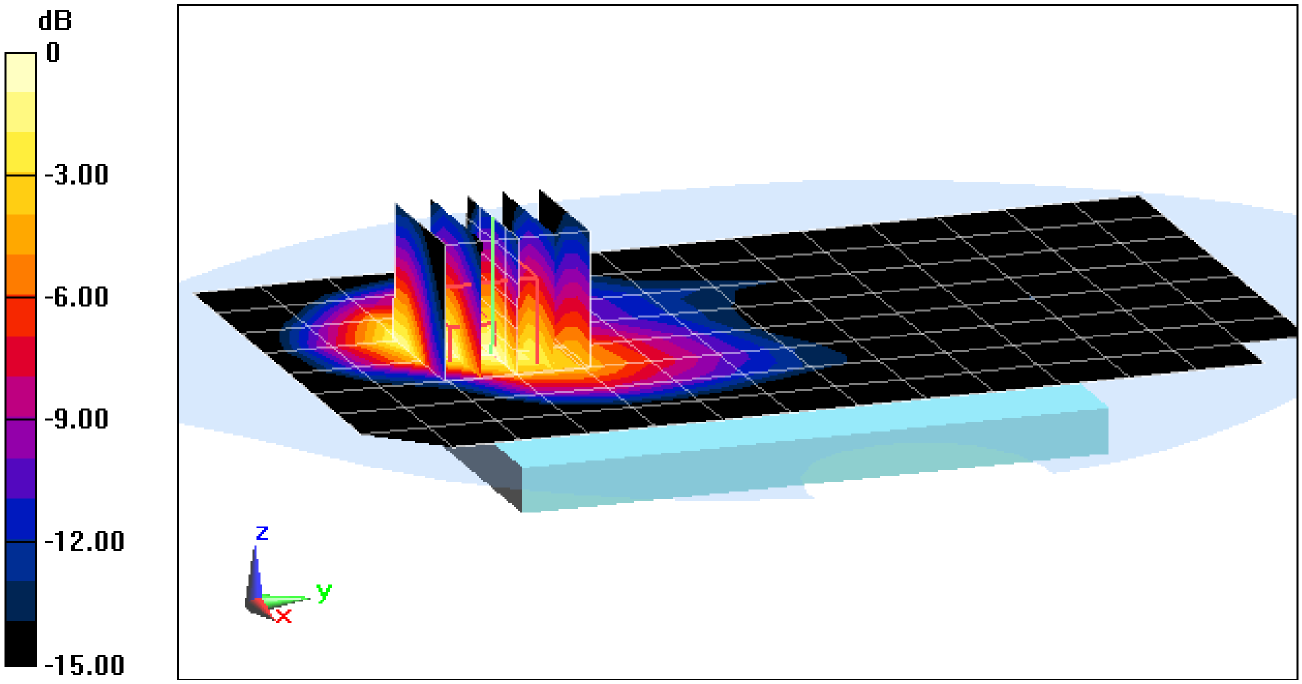
Communication System: UID 0, LTE Band 25 (PCS); Frequency: 1905 MHz; Duty Cycle: 1:1
Medium: 1900 Body, Medium parameters used (interpolated):
f = 1905 MHz; σ = 1.529 S/m; ε_r = 52.126; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 12-11-2015; Ambient Temp: 24.2°C; Tissue Temp: 23.0°C

Probe: ES3DV3 - SN3333; ConvF(4.7, 4.7, 4.7); Calibrated: 10/29/2015;
Sensor-Surface: 3mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1333; Calibrated: 10/27/2015
Phantom: SAM Front; Type: QD000P40CD; Serial: TP:1758
Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

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

Area Scan (9x15x1): Measurement grid: dx=15mm, dy=15mm
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 26.61 V/m; Power Drift = 0.01 dB
Peak SAR (extrapolated) = 1.64 W/kg
SAR(1 g) = 0.954 W/kg



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

PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LSMG930US; Type: Portable Handset; Serial: C3E59

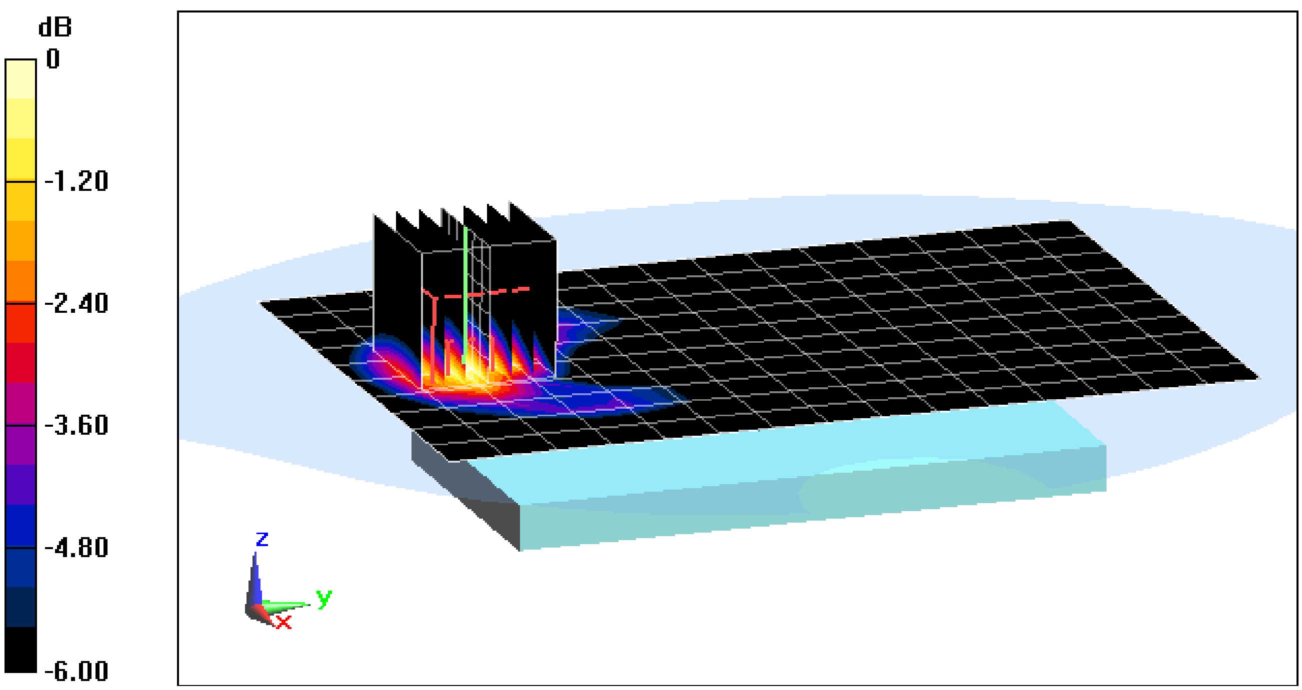
Communication System: UID 0, LTE Band 30; Frequency: 2310 MHz; Duty Cycle: 1:1
Medium: 2300 Body, Medium parameters used:
f = 2310 MHz; σ = 1.797 S/m; ε_r = 51.411; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.5 cm

Test Date: 12-07-2015; Ambient Temp: 22.5°C; Tissue Temp: 22.0°C

Probe: ES3DV3 - SN3319; ConvF(4.24, 4.24, 4.24); Calibrated: 3/19/2015;
Sensor-Surface: 3mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1368; Calibrated: 3/13/2015
Phantom: SAM with CRP v4.0; Type: QD000P40CD; Serial: TP:1800
Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

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

Area Scan (11x16x1): Measurement grid: dx=12mm, dy=12mm
Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 16.35 V/m; Power Drift = 0.04 dB
Peak SAR (extrapolated) = 0.732 W/kg
SAR(1 g) = 0.420 W/kg



0 dB = 0.515 W/kg = -2.88 dBW/kg

PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LSMG930US; Type: Portable Handset; Serial: C3E5B

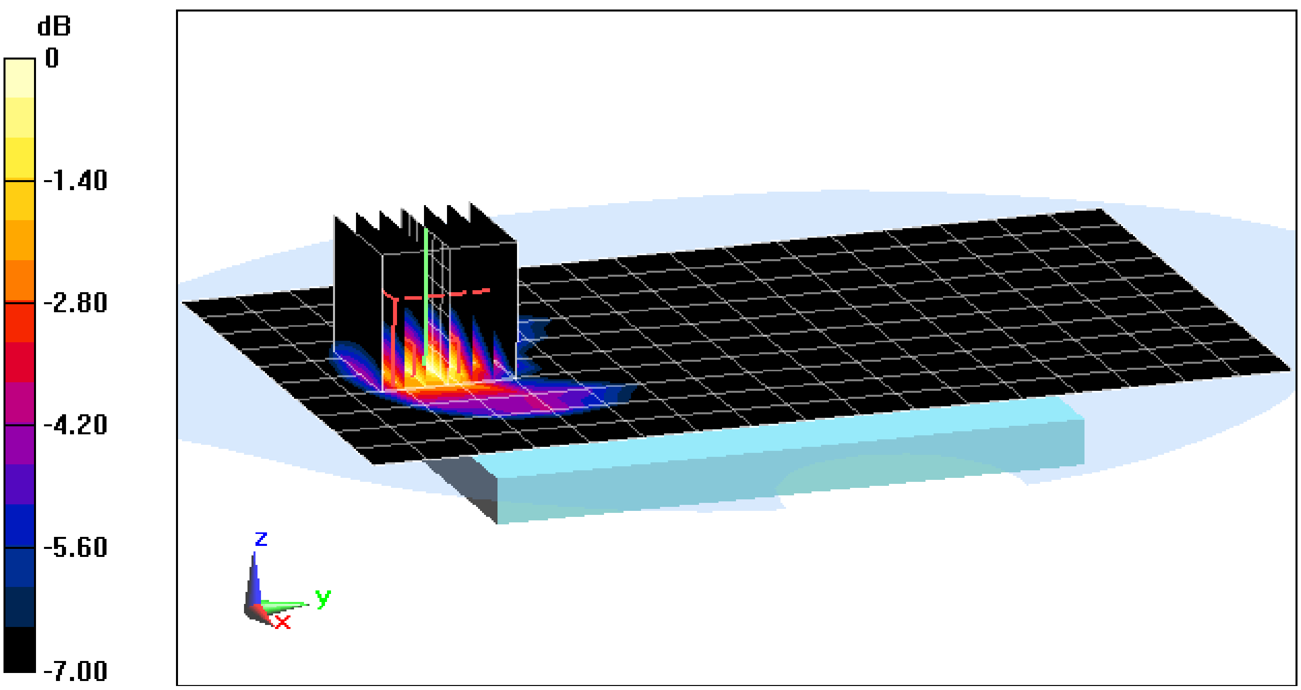
Communication System: UID 0, LTE Band 30; Frequency: 2310 MHz; Duty Cycle: 1:1
Medium: 2300 Body, Medium parameters used:
f = 2310 MHz; σ = 1.759 S/m; ε_r = 51.275; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 12-16-2015; Ambient Temp: 21.2°C; Tissue Temp: 23.2°C

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

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

Area Scan (11x18x1): Measurement grid: dx=12mm, dy=12mm
Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 18.32 V/m; Power Drift = -0.01 dB
Peak SAR (extrapolated) = 0.896 W/kg
SAR(1 g) = 0.512 W/kg



0 dB = 0.628 W/kg = -2.02 dBW/kg

PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LSMG930US; Type: Portable Handset; Serial: C3E5B

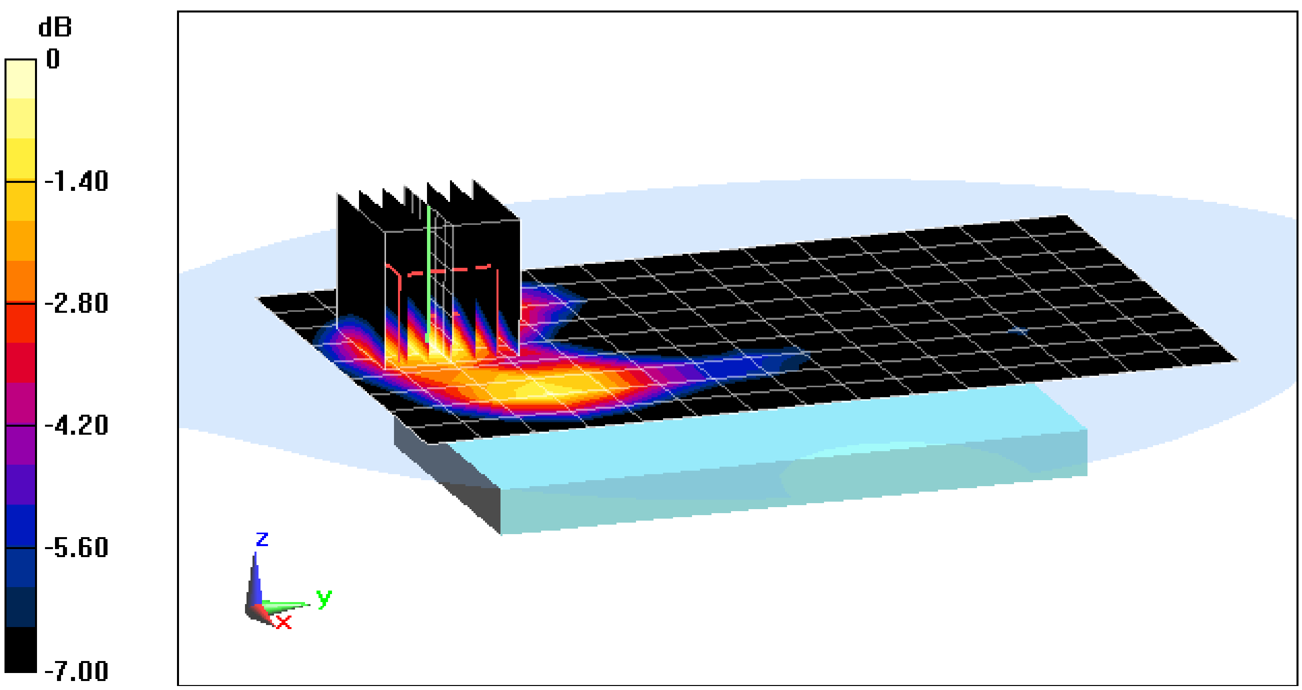
Communication System: UID 0, LTE Band 41; Frequency: 2680 MHz; Duty Cycle: 1:1.58
Medium: 2600 Body, Medium parameters used (interpolated):
f = 2680 MHz; σ = 2.301 S/m; ε_r = 50.468; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.5 cm

Test Date: 12-17-2015; Ambient Temp: 21.9°C; Tissue Temp: 22.2°C

Probe: ES3DV3 - SN3334; ConvF(4.29, 4.29, 4.29); Calibrated: 11/17/2015;
Sensor-Surface: 3mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1415; Calibrated: 11/11/2015
Phantom: SAM Front; Type: SAM; Serial: 1686
Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

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

Area Scan (10x16x1): Measurement grid: dx=12mm, dy=12mm
Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 11.72 V/m; Power Drift = -0.03 dB
Peak SAR (extrapolated) = 0.555 W/kg
SAR(1 g) = 0.280 W/kg



0 dB = 0.353 W/kg = -4.52 dBW/kg

PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LSMG930US; Type: Portable Handset; Serial: C3D13

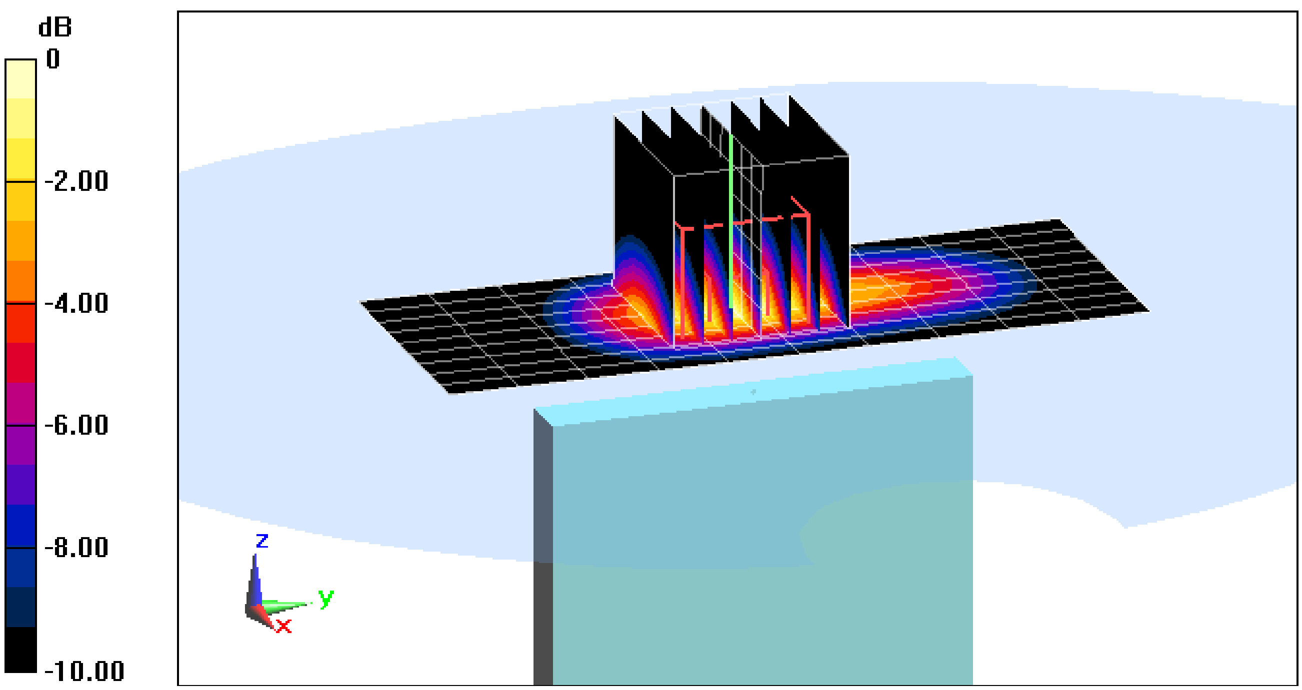
Communication System: UID 0, LTE Band 41; Frequency: 2680 MHz; Duty Cycle: 1:1.58
Medium: 2600 Body, Medium parameters used (Interpolated):
f = 2680 MHz; σ = 2.341 S/m; ε_r = 49.927; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 01-04-2016; Ambient Temp: 23.5°C; Tissue Temp: 22.0°C

Probe: ES3DV3 - SN3334; ConvF(4.29, 4.29, 4.29); Calibrated: 11/17/2015;
Sensor-Surface: 3mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1415; Calibrated: 11/11/2015
Phantom: SAM Front; Type: SAM; Serial: 1686
Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Mode: LTE Band 41, Body SAR, Bottom Edge, High.ch,
20 MHz Bandwidth, QPSK, 1 RB, 0 RB Offset

Area Scan (10x11x1): Measurement grid: dx=5mm, dy=12mm
Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 18.77 V/m; Power Drift = 0.03 dB
Peak SAR (extrapolated) = 1.48 W/kg
SAR(1 g) = 0.709 W/kg



0 dB = 0.929 W/kg = -0.32 dBW/kg

PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LSMG930US; Type: Portable Handset; Serial: C3E99

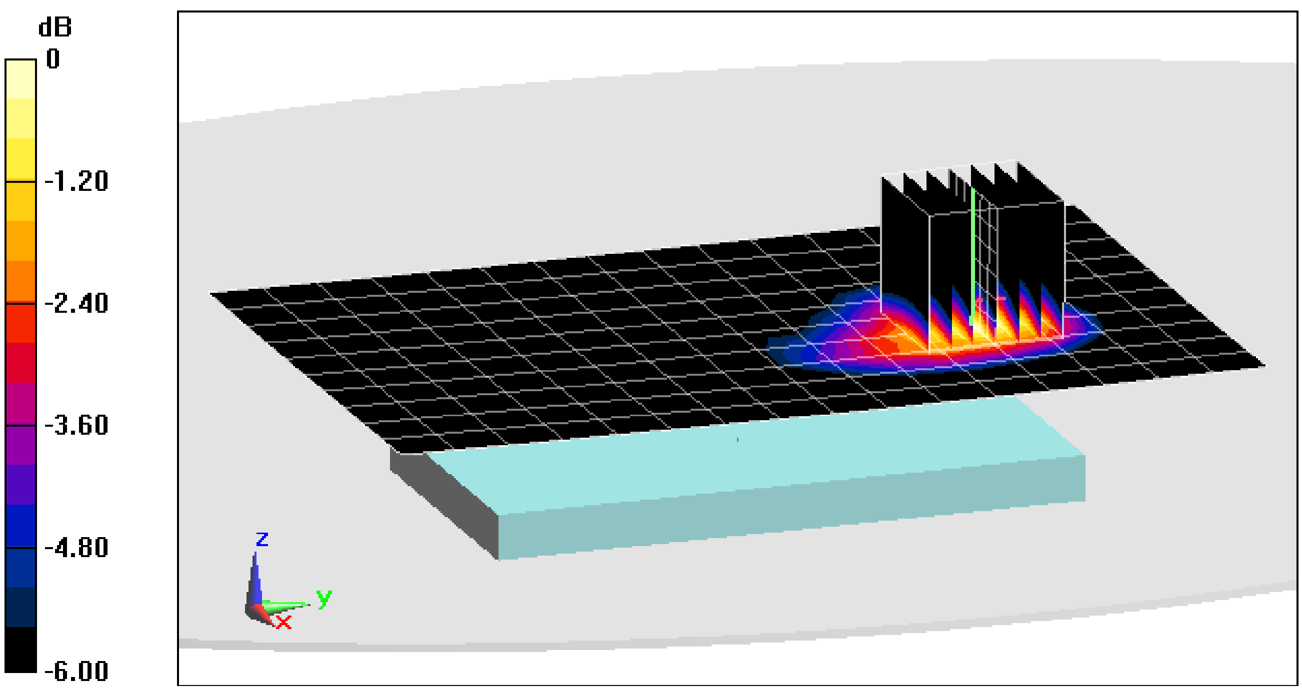
Communication System: UID 0, IEEE 802.11b; Frequency: 2437 MHz; Duty Cycle: 1:1
Medium: 2450 Body, Medium parameters used (interpolated):
f = 2437 MHz; σ = 1.983 S/m; ε_r = 51.164; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.5 cm

Test Date: 12-08-2015; Ambient Temp: 20.3°C; Tissue Temp: 22.3°C

Probe: ES3DV3 - SN3334; ConvF(4.45, 4.45, 4.45); Calibrated: 11/17/2015;
Sensor-Surface: 3mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1415; Calibrated: 11/11/2015
Phantom: ELI v6.0; Type: QDOVA003AA; Serial: TP:2027
Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Mode: IEEE 802.11b, Antenna 1, 22 MHz Bandwidth,
Body SAR, Ch 06, 1 Mbps, Back Side

Area Scan (11x17x1): Measurement grid: dx=12mm, dy=12mm
Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 7.702 V/m; Power Drift = 0.01 dB
Peak SAR (extrapolated) = 0.201 W/kg
SAR(1 g) = 0.105 W/kg



0 dB = 0.129 W/kg = -8.89 dBW/kg

PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LSMG930US; Type: Portable Handset; Serial: C3E99

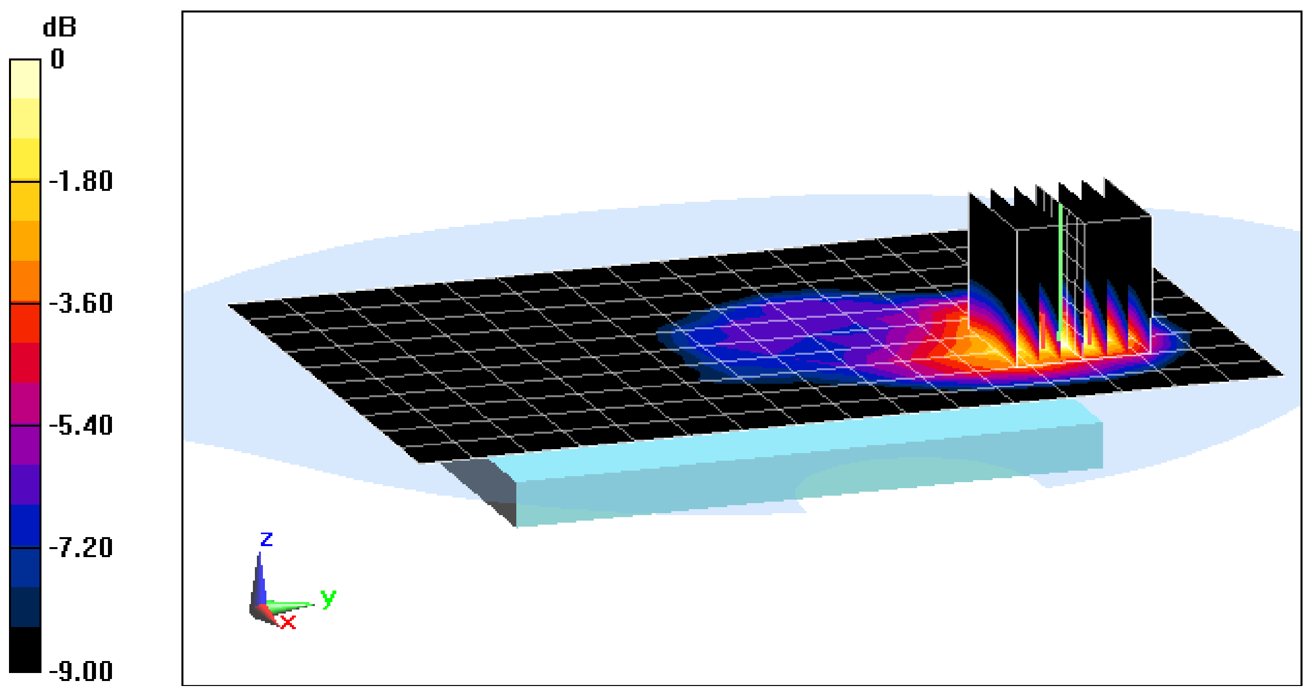
Communication System: UID 0, IEEE 802.11b; Frequency: 2437 MHz; Duty Cycle: 1:1
Medium: 2450 Body, Medium parameters used (interpolated):
f = 2437 MHz; σ = 1.966 S/m; ε_r = 50.934; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 12-07-2015; Ambient Temp: 22.5°C; Tissue Temp: 22.0°C

Probe: ES3DV3 - SN3319; ConvF(4.11, 4.11, 4.11); Calibrated: 3/19/2015;
Sensor-Surface: 3mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1368; Calibrated: 3/13/2015
Phantom: SAM with CRP v4.0; Type: QD000P40CD; Serial: TP:1800
Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

**Mode: IEEE 802.11b, Antenna 1, 22 MHz Bandwidth,
Body SAR, Ch 06, 1 Mbps, Back Side**

Area Scan (11x17x1): Measurement grid: dx=12mm, dy=12mm
Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 10.26 V/m; Power Drift = 0.12 dB
Peak SAR (extrapolated) = 0.385 W/kg
SAR(1 g) = 0.193 W/kg



0 dB = 0.245 W/kg = -6.11 dBW/kg

PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LSMG930US; Type: Portable Handset; Serial: C3D00

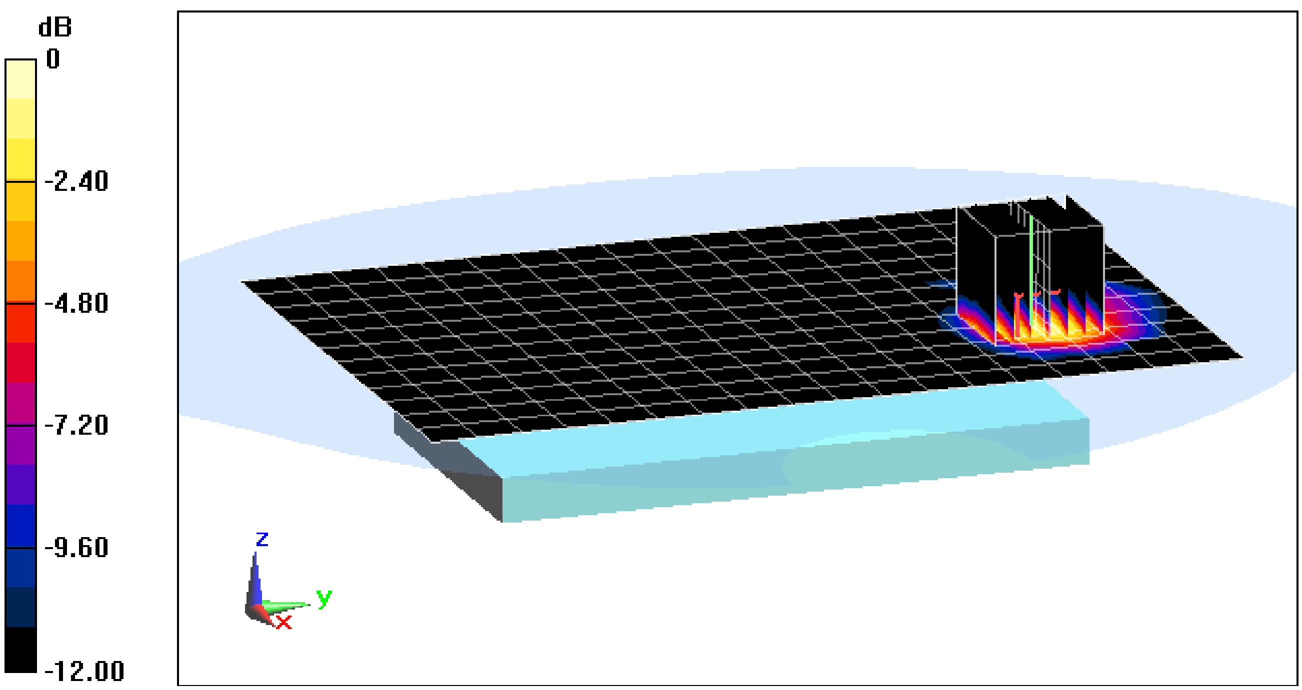
Communication System: UID 0, 802.11a 5.2-5.8 GHz Band; Frequency: 5600 MHz; Duty Cycle: 1:1
Medium: 5 GHz Body, Medium parameters used:
f = 5600 MHz; σ = 5.731 S/m; ε_r = 47.065; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.5 cm

Test Date: 12-08-2015; Ambient Temp: 24.5°C; Tissue Temp: 23.7°C

Probe: EX3DV4 - SN7357; ConvF(3.72, 3.72, 3.72); Calibrated: 4/23/2015;
Sensor-Surface: 1.4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1407; Calibrated: 4/20/2015
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: IEEE 802.11a, U-NII-2C, Antenna 1, 20 MHz Bandwidth, Body SAR, Ch 120, 6 Mbps, Back Side

Area Scan (13x19x1): Measurement grid: dx=10mm, dy=10mm
Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm; Graded Ratio: 1.4
Reference Value = 5.829 V/m; Power Drift = 0.18 dB
Peak SAR (extrapolated) = 0.672 W/kg
SAR(1 g) = 0.193 W/kg



0 dB = 0.436 W/kg = -3.61 dBW/kg

PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LSMG930US; Type: Portable Handset; Serial: C3D00

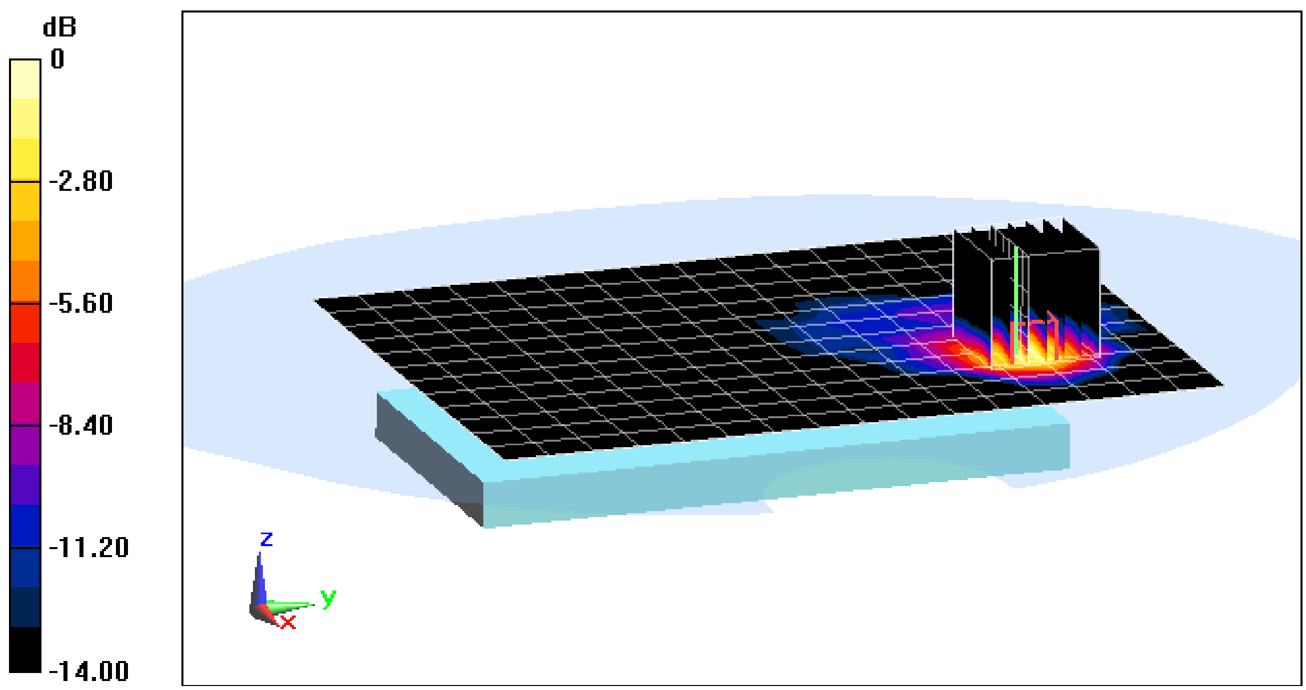
Communication System: UID 0, 802.11a 5.2-5.8 GHz Band; Frequency: 5785 MHz; Duty Cycle: 1:1
Medium: 5 GHz Body, Medium parameters used:
f = 5785 MHz; σ = 5.975 S/m; ε_r = 46.816; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 12-08-2015; Ambient Temp: 24.5°C; Tissue Temp: 23.7°C

Probe: EX3DV4 - SN7357; ConvF(3.82, 3.82, 3.82); Calibrated: 4/23/2015;
Sensor-Surface: 1.4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1407; Calibrated: 4/20/2015
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: IEEE 802.11a, U-NII-3, Antenna 1, 20 MHz Bandwidth,
Body SAR, Ch 157, 6 Mbps, Back Side

Area Scan (13x17x1): 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 = 7.029 V/m; Power Drift = 0.18 dB
Peak SAR (extrapolated) = 1.21 W/kg
SAR(1 g) = 0.305 W/kg



0 dB = 0.724 W/kg = -1.40 dBW/kg

APPENDIX B: SYSTEM VERIFICATION

PCTEST ENGINEERING LABORATORY, INC.

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

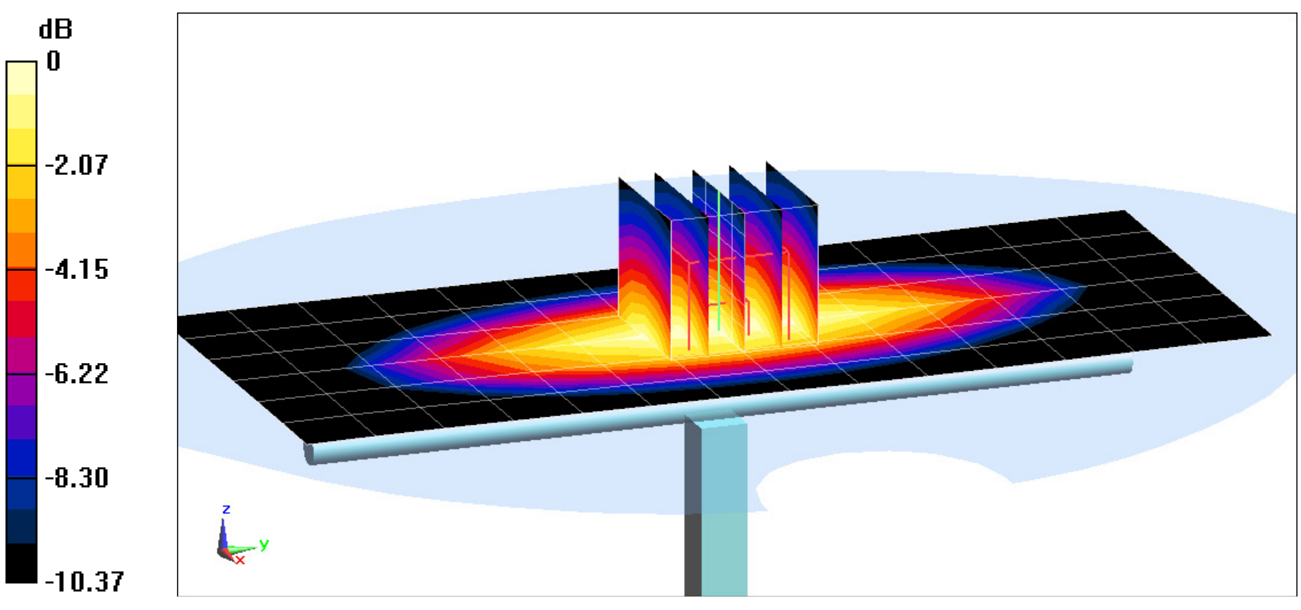
Communication System: UID 0, CW; Frequency: 750 MHz; Duty Cycle: 1:1
Medium: 750 Head, Medium parameters used (interpolated):
f = 750 MHz; σ = 0.896 S/m; ε_r = 41.851; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.5 cm

Test Date: 12-26-2015; Ambient Temp: 23.0°C; Tissue Temp: 23.0°C

Probe: ES3DV2 - SN3022; ConvF(6.33, 6.33, 6.33); Calibrated: 8/26/2015;
Sensor-Surface: 3mm (Mechanical Surface Detection)
Electronics: DAE4 Sn665; Calibrated: 2/18/2015
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)

750 MHz System Verification at 23.0 dBm (200 mW)

Area Scan (7x15x1): Measurement grid: dx=15mm, dy=15mm
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Peak SAR (extrapolated) = 2.58 W/kg
SAR(1 g) = 1.73 W/kg
Deviation(1 g) = 6.92%



0 dB = 2.02 W/kg = 3.05 dBW/kg

PCTEST ENGINEERING LABORATORY, INC.

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

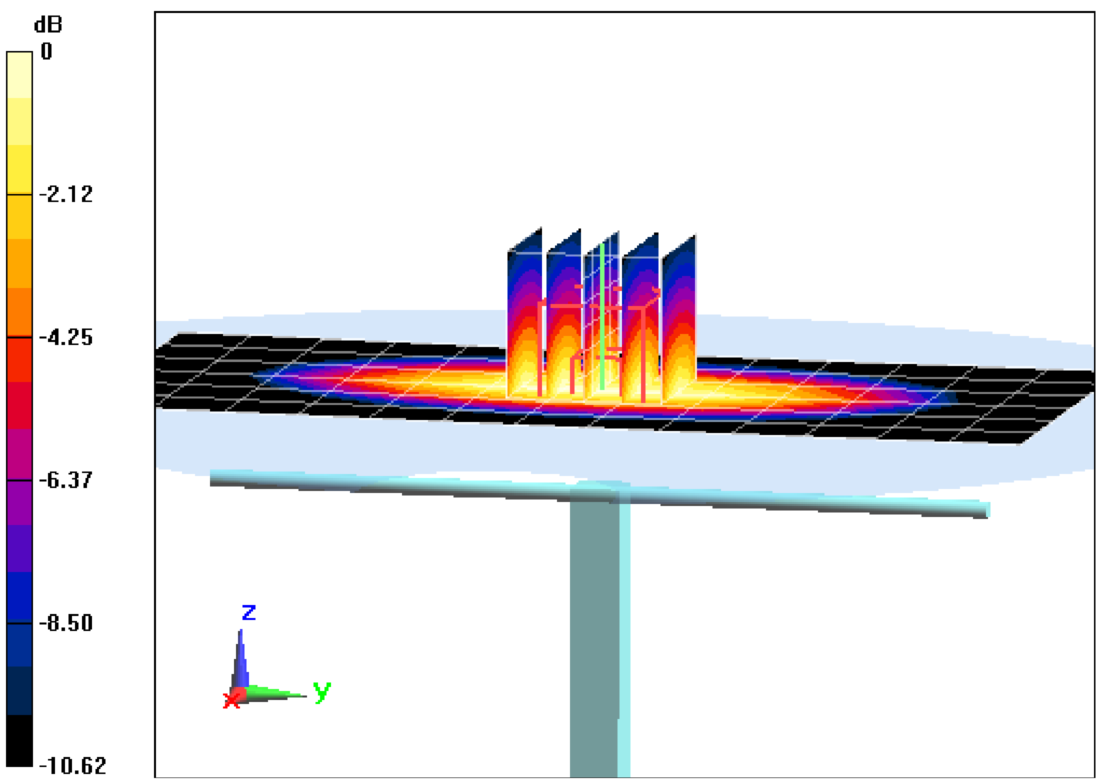
Communication System: UID 0, CW; Frequency: 835 MHz; Duty Cycle: 1:1
Medium: 835 Head, Medium parameters used:
$f = 835$ MHz; $\sigma = 0.912$ S/m; $\varepsilon_r = 39.854$; $\rho = 1000$ kg/m^3
Phantom section: Flat Section; Space: 1.5 cm

Test Date: 12-23-2015; Ambient Temp: 23.5°C; Tissue Temp: 22.7°C

Probe: ES3DV3 - SN3319; ConvF(6.41, 6.41, 6.41); Calibrated: 3/19/2015;
Sensor-Surface: 3mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1368; Calibrated: 3/13/2015
Phantom: SAM with CRP v4.0; Type: QD000P40CD; Serial: TP:1800
Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

835 MHz System Verification at 23.0 dBm (200 mW)

Area Scan (7x14x1): Measurement grid: dx=15mm, dy=15mm
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Peak SAR (extrapolated) = 2.63 W/kg
SAR(1 g) = 1.79 W/kg
Deviation(1 g) = -1.97%



0 dB = 2.09 W/kg = 3.20 dBW/kg

PCTEST ENGINEERING LABORATORY, INC.

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

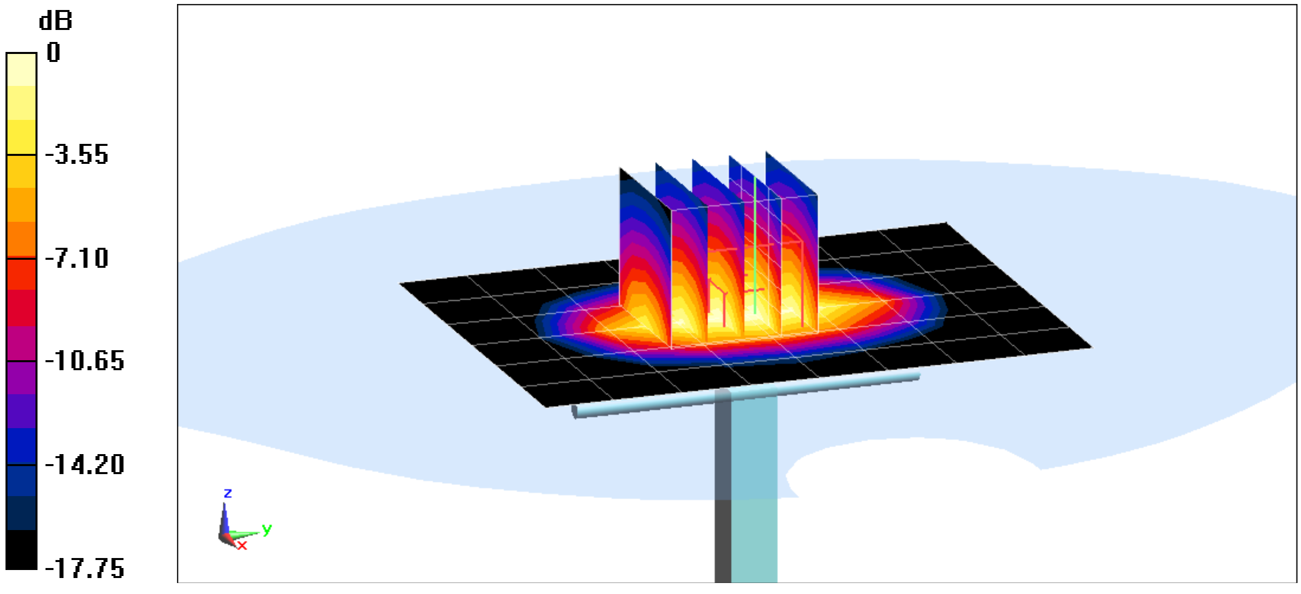
Communication System: UID 0, CW; Frequency: 1750 MHz; Duty Cycle: 1:1
Medium: 1750 Head, Medium parameters used:
f = 1750 MHz; $\sigma = 1.351$ S/m; $\varepsilon_r = 38.95$; $\rho = 1000$ kg/m^3
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 12-09-2015; Ambient Temp: 24.5°C; Tissue Temp: 22.8°C

Probe: ES3DV2 - SN3022; ConvF(5.08, 5.08, 5.08); Calibrated: 8/26/2015;
Sensor-Surface: 3mm (Mechanical Surface Detection)
Electronics: DAE4 Sn665; Calibrated: 2/18/2015
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)

1750 MHz System Verification at 20.0 dBm (100 mW)

Area Scan (7x9x1): Measurement grid: dx=15mm, dy=15mm
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Peak SAR (extrapolated) = 6.23 W/kg
SAR(1 g) = 3.49 W/kg
Deviation(1 g) = -3.59%



0 dB = 4.33 W/kg = 6.36 dBW/kg

PCTEST ENGINEERING LABORATORY, INC.

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

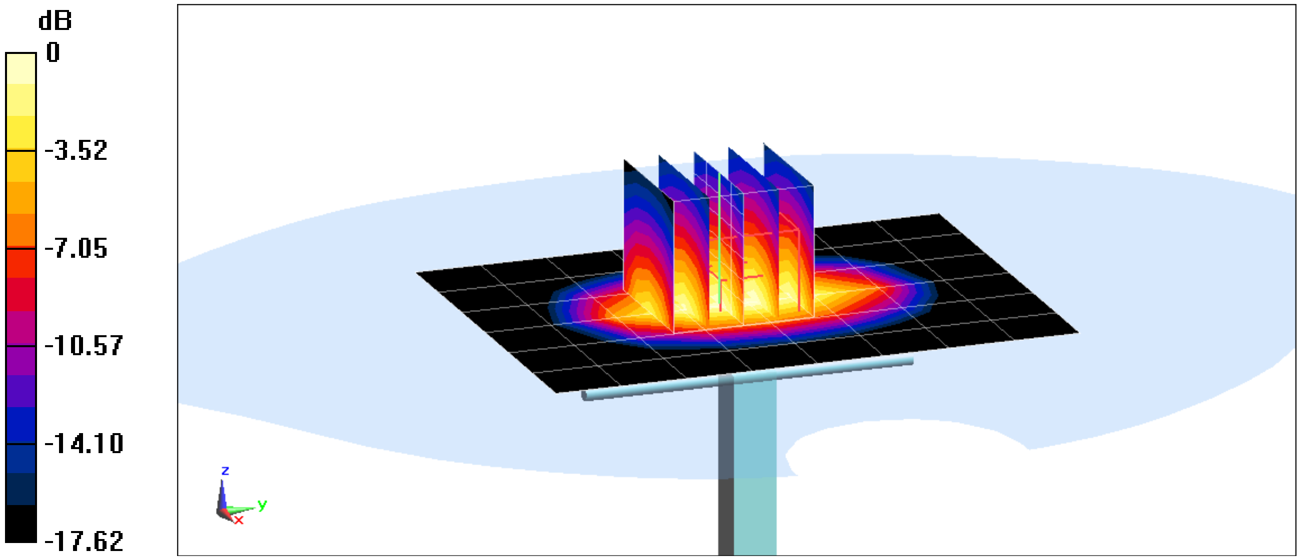
Communication System: UID 0, CW; Frequency: 1750 MHz; Duty Cycle: 1:1
Medium: 1750 Head, Medium parameters used:
f = 1750 MHz; σ = 1.345 S/m; ε_r = 38.782; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 12-11-2015; Ambient Temp: 23.9°C; Tissue Temp: 22.5°C

Probe: ES3DV3 - SN3263; ConvF(5.27, 5.27, 5.27); Calibrated: 5/20/2015;
Sensor-Surface: 3mm (Mechanical Surface Detection)
Electronics: DAE4 Sn859; Calibrated: 6/17/2015
Phantom: SAM with CRP (Left); Type: SAM; Serial: 1715
Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

1750 MHz System Verification at 20.0 dBm (100 mW)

Area Scan (7x9x1): Measurement grid: dx=15mm, dy=15mm
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Peak SAR (extrapolated) = 6.71 W/kg
SAR(1 g) = 3.78 W/kg
Deviation(1 g) = 4.42%



0 dB = 4.69 W/kg = 6.71 dBW/kg

PCTEST ENGINEERING LABORATORY, INC.

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

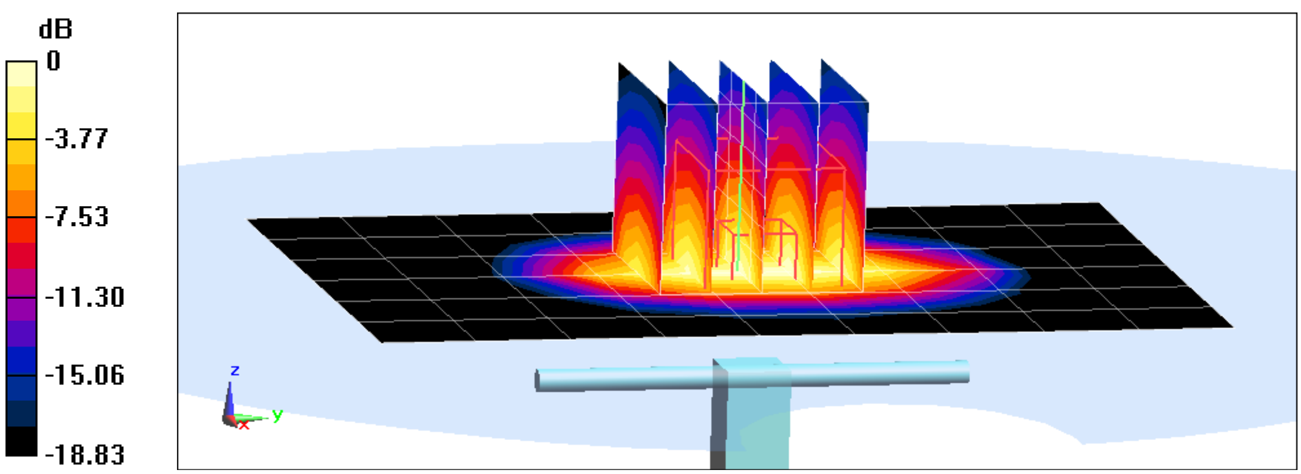
Communication System: UID 0, CW; Frequency: 1900 MHz; Duty Cycle: 1:1
Medium: 1900 Head, Medium parameters used (interpolated):
f = 1900 MHz; σ = 1.395 S/m; ε_r = 38.188; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 12-06-2015; Ambient Temp: 22.8°C; Tissue Temp: 22.1°C

Probe: ES3DV2 - SN3022; ConvF(4.93, 4.93, 4.93); Calibrated: 8/26/2015;
Sensor-Surface: 3mm (Mechanical Surface Detection)
Electronics: DAE4 Sn665; Calibrated: 2/18/2015
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 at 20.0 dBm (100 mW)

Area Scan (7x10x1): Measurement grid: dx=15mm, dy=15mm
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Peak SAR (extrapolated) = 7.31 W/kg
SAR(1 g) = 3.93 W/kg
Deviation(1 g) = -3.44%



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

PCTEST ENGINEERING LABORATORY, INC.

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

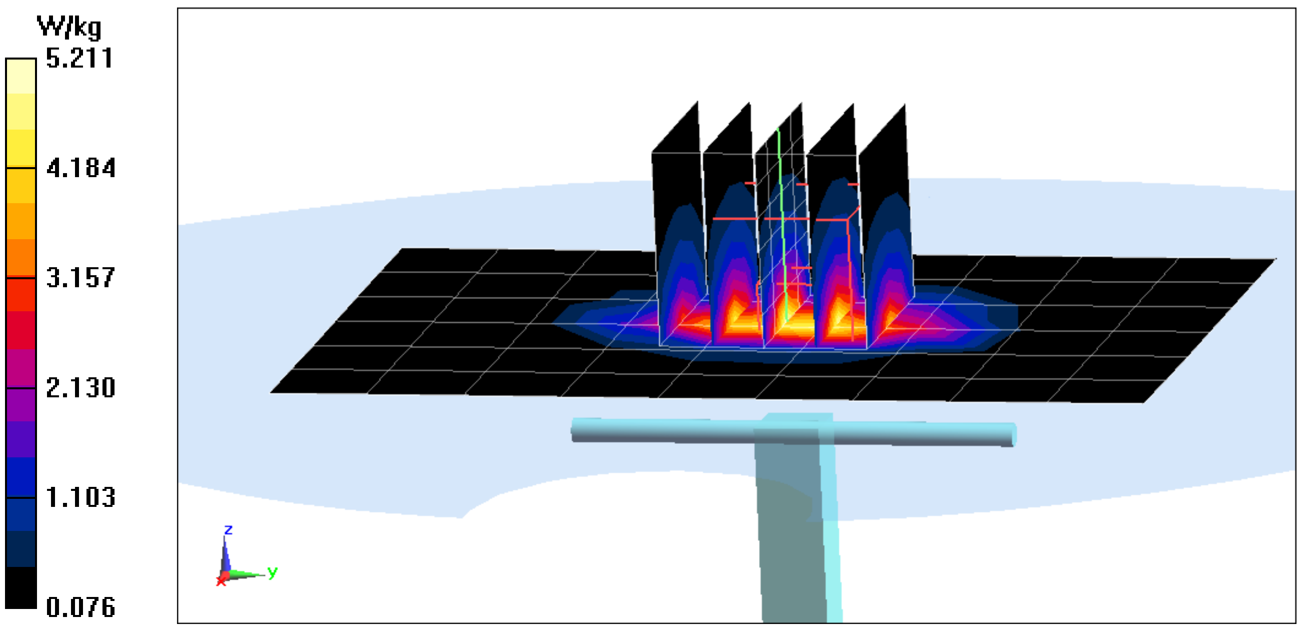
Communication System: UID 0, CW; Frequency: 1900 MHz; Duty Cycle: 1:1
Medium: 1900 Head, Medium parameters used (interpolated):
f = 1900 MHz; σ = 1.423 S/m; ε_r = 38.321; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 12-10-2015; Ambient Temp: 19.8°C; Tissue Temp: 22.0°C

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

1900 MHz System Verification at 20.0 dBm (100 mW)

Area Scan (7x10x1): Measurement grid: dx=15mm, dy=15mm
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Peak SAR (extrapolated) = 7.60 W/kg
SAR(1 g) = 4.10 W/kg
Deviation(1 g) = 2.76%



PCTEST ENGINEERING LABORATORY, INC.

DUT: Dipole 2300 MHz; Type: D2300V2; Serial: 1008

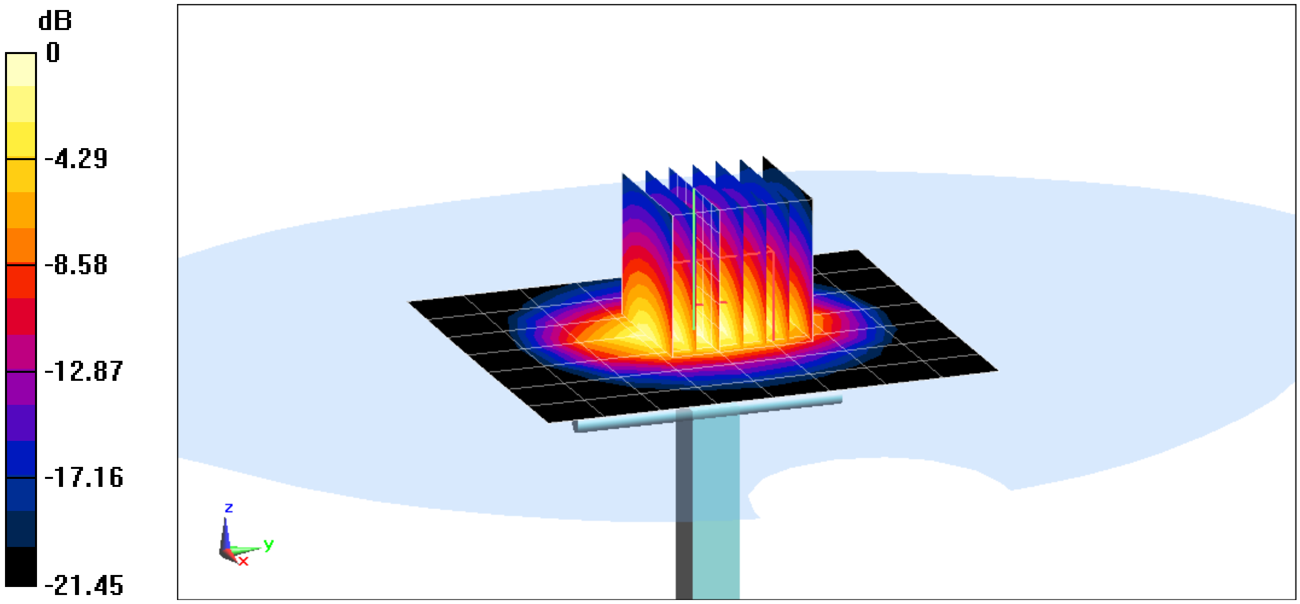
Communication System: UID 0, CW; Frequency: 2300 MHz; Duty Cycle: 1:1
Medium: 2300 Head, Medium parameters used:
f = 2300 MHz; σ = 1.707 S/m; ε_r = 38.971; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 12-04-2015; Ambient Temp: 21.9°C; Tissue Temp: 22.0°C

Probe: ES3DV3 - SN3263; ConvF(4.63, 4.63, 4.63); Calibrated: 5/20/2015;
Sensor-Surface: 3mm (Mechanical Surface Detection)
Electronics: DAE4 Sn859; Calibrated: 6/17/2015
Phantom: SAM with CRP v5.0 (Right); Type: QD000P40CD; Serial: TP:1759
Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

2300 MHz System Verification at 20.0 dBm (100 mW)

Area Scan (8x9x1): Measurement grid: dx=12mm, dy=12mm
Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Peak SAR (extrapolated) = 10.3 W/kg
SAR(1 g) = 5.17 W/kg
Deviation(1 g) = 3.61%



0 dB = 6.74 W/kg = 8.29 dBW/kg

PCTEST ENGINEERING LABORATORY, INC.

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

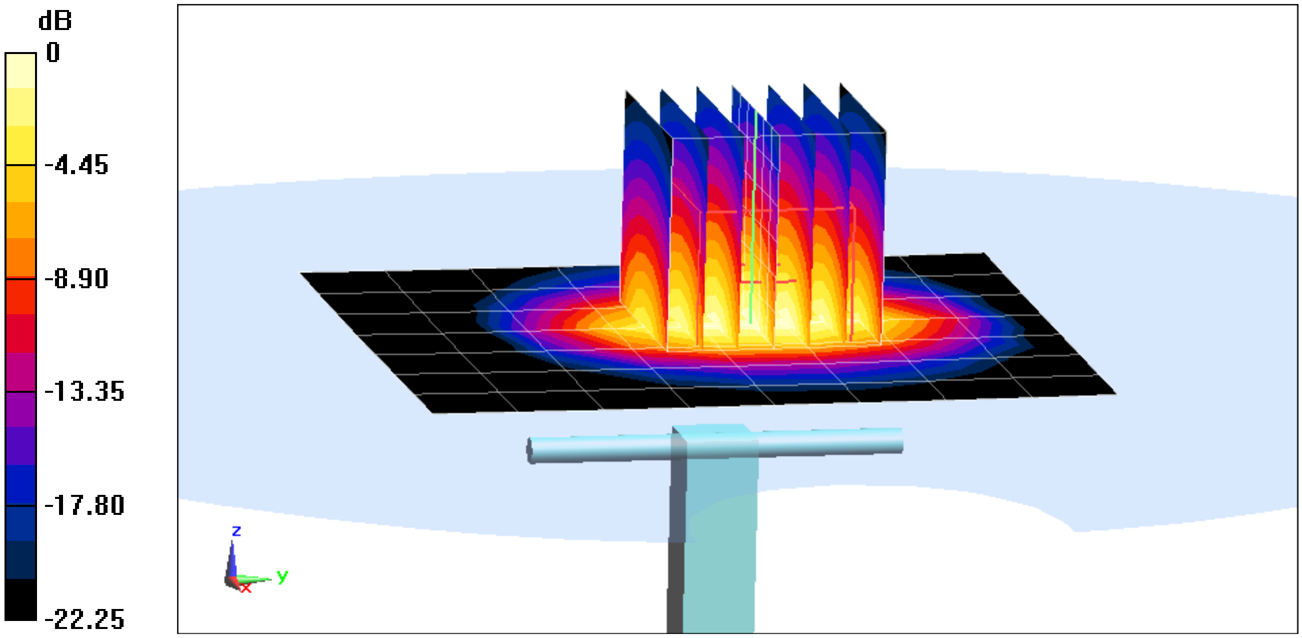
Communication System: UID 0, CW; Frequency: 2450 MHz; Duty Cycle: 1:1
Medium: 2450 Head Medium parameters used:
f = 2450 MHz; σ = 1.844 S/m; ε_r = 39.649; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 12-30-2015; Ambient Temp: 24.0°C; Tissue Temp: 24.2°C

Probe: ES3DV3 - SN3333; ConvF(4.53, 4.53, 4.53); Calibrated: 10/29/2015;
Sensor-Surface: 3mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1333; Calibrated: 10/27/2015
Phantom: SAM Right; Type: QD000P40CD; Serial: 1757
Measurement SW: DASY52, Version 52.8 (8);SEMCAD X Version 14.6.10 (7331)

2450 MHz System Verification at 20.0 dBm (100 mW)

Area Scan (8x9x1): Measurement grid: dx=12mm, dy=12mm
Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Peak SAR (extrapolated) = 10.7 W/kg
SAR(1 g) = 5.13 W/kg
Deviation = -5.35 %



0 dB = 6.80 W/kg = 8.33 dBW/kg

PCTEST ENGINEERING LABORATORY, INC.

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

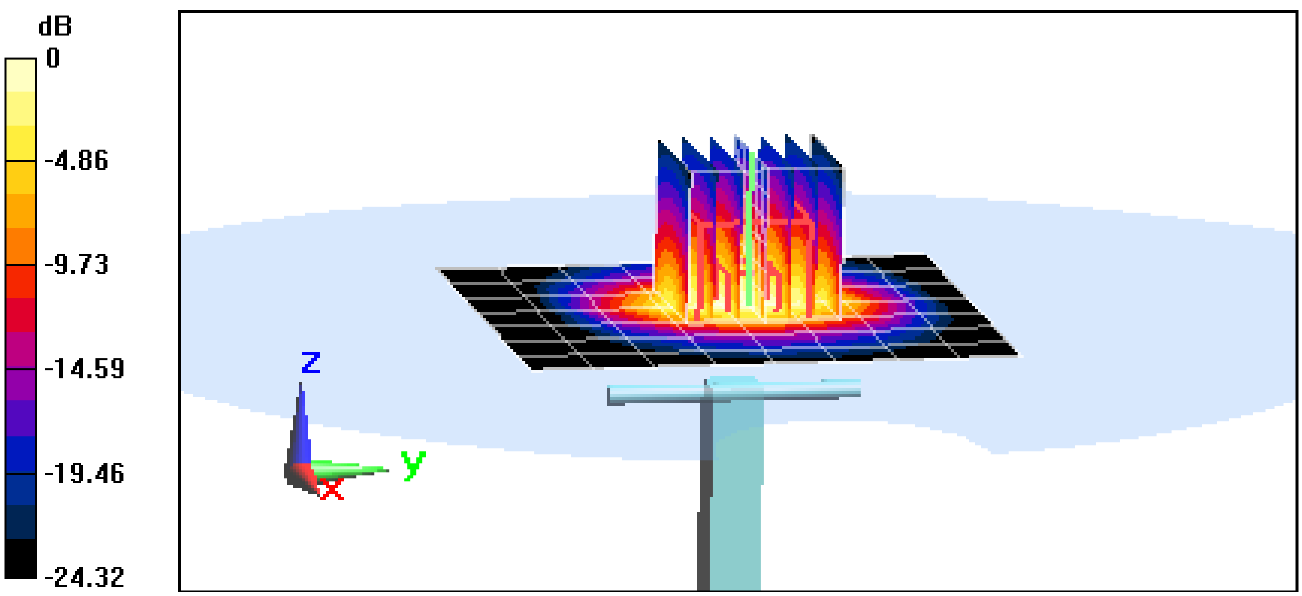
Communication System: UID 0, CW; Frequency: 2600 MHz; Duty Cycle: 1:1
Medium: 2600 Head, Medium parameters used:
f = 2600 MHz; σ = 2.036 S/m; ε_r = 39.42; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 12-18-2015; Ambient Temp: 23.9°C; Tissue Temp: 24.1°C

Probe: ES3DV3 - SN3333; ConvF(4.39, 4.39, 4.39); Calibrated: 10/29/2015;
Sensor-Surface: 3mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1333; Calibrated: 10/27/2015
Phantom: SAM Right; Type: QD000P40CD; Serial: 1757
Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

2600 MHz System Verification at 20.0 dBm (100 mW)

Area Scan (8x9x1): Measurement grid: dx=12mm, dy=12mm
Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Peak SAR (extrapolated) = 11.9 W/kg
SAR(1 g) = 5.44 W/kg
Deviation(1 g) = -2.51%



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

PCTEST ENGINEERING LABORATORY, INC.

DUT: Dipole 5 GHz; Type: D5GHzV2; Serial: 1191

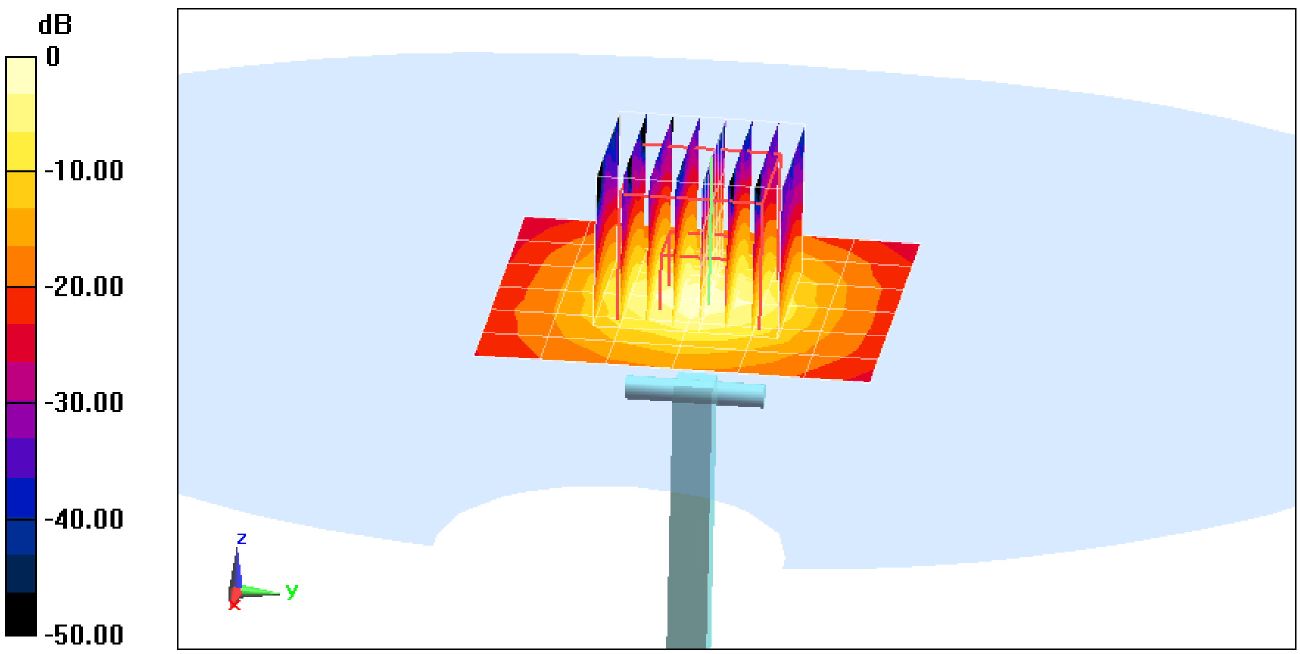
Communication System: UID 0, CW; Frequency: 5250 MHz; Duty Cycle: 1:1
Medium: 5 GHz Head, Medium parameters used (interpolated):
f = 5250 MHz; σ = 4.518 S/m; ε_r = 35.83; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 12-09-2015; Ambient Temp: 23.2°C; Tissue Temp: 21.4°C

Probe: EX3DV4 - SN7308; ConvF(5.2, 5.2, 5.2); Calibrated: 7/21/2015;
Sensor-Surface: 1.4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1322; Calibrated: 8/24/2015
Phantom: SAM 5.0 front; Type: QD000P40CD; Serial: TP:-1648
Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

5250 MHz System Verification at 17.0 dBm (50 mW)

Area Scan (7x7x1): Measurement grid: dx=10mm, dy=10mm
Zoom Scan (8x8x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm; Graded Ratio: 1.4
Peak SAR (extrapolated) = 16.4 W/kg
SAR(1 g) = 3.90 W/kg
Deviation(1 g) = -5.45%



0 dB = 9.28 W/kg = 9.68 dBW/kg

PCTEST ENGINEERING LABORATORY, INC.

DUT: Dipole 5 GHz; Type: D5GHzV2; Serial: 1191

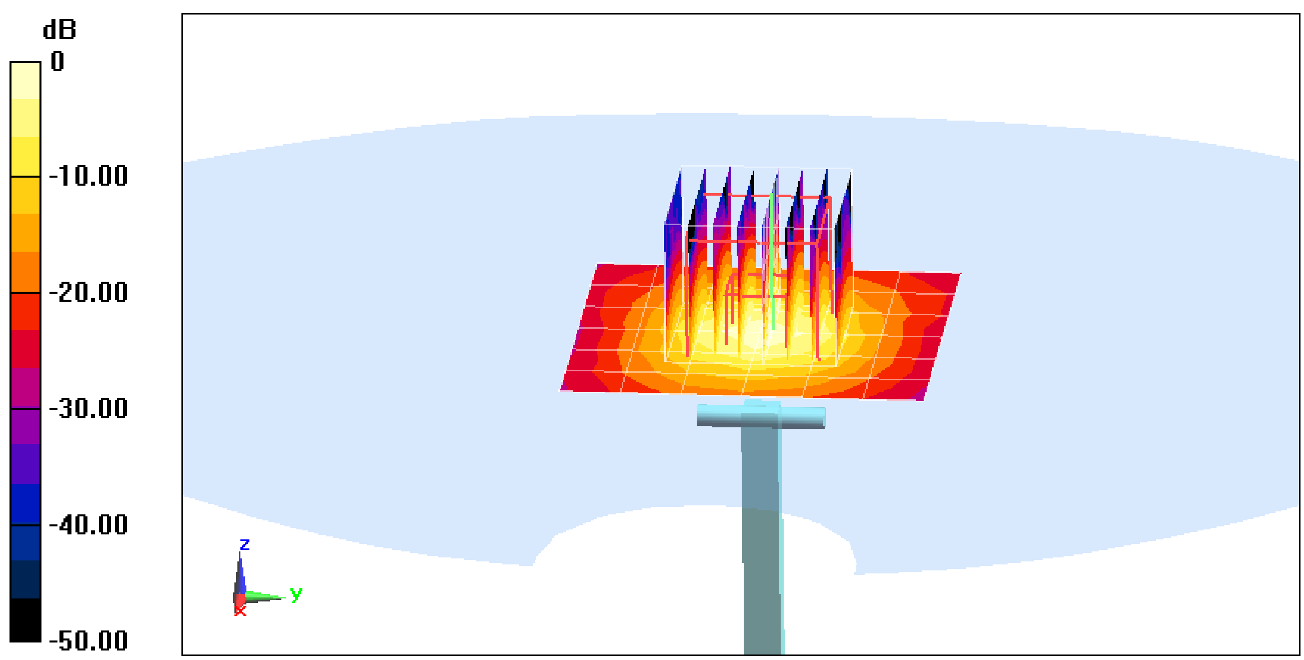
Communication System: UID 0, CW; Frequency: 5600 MHz; Duty Cycle: 1:1
Medium: 5 GHz Head, Medium parameters used:
f = 5600 MHz; σ = 4.874 S/m; ε_r = 35.336; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 12-09-2015; Ambient Temp: 23.2°C; Tissue Temp: 21.4°C

Probe: EX3DV4 - SN7308; ConvF(4.65, 4.65, 4.65); Calibrated: 7/21/2015;
Sensor-Surface: 1.4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1322; Calibrated: 8/24/2015
Phantom: SAM 5.0 front; Type: QD000P40CD; Serial: TP:-1648
Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

5600 MHz System Verification at 17.0 dBm (50 mW)

Area Scan (7x7x1): Measurement grid: dx=10mm, dy=10mm
Zoom Scan (8x8x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm: Graded Ratio: 1.4
Peak SAR (extrapolated) = 17.7 W/kg
SAR(1 g) = 4.20 W/kg
Deviation(1 g) = -0.59%



0 dB = 10.1 W/kg = 10.04 dBW/kg

PCTEST ENGINEERING LABORATORY, INC.

DUT: Dipole 5 GHz; Type: D5GHzV2; Serial: 1191

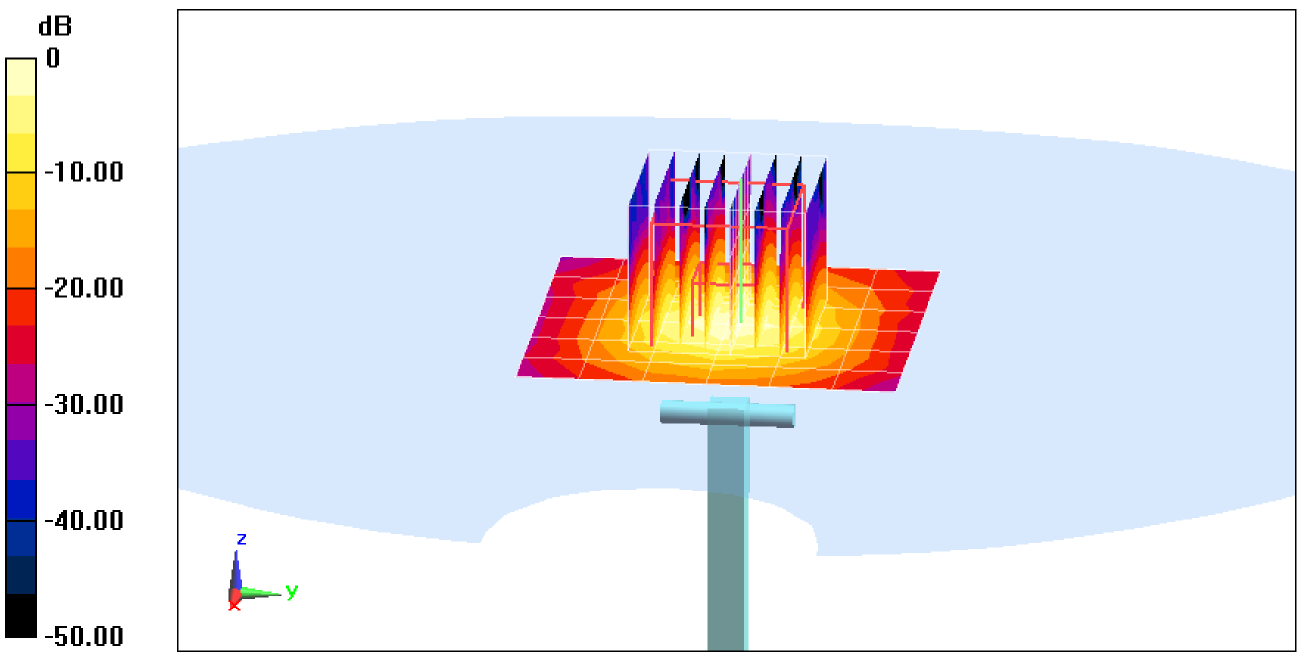
Communication System: UID 0, CW; Frequency: 5750 MHz; Duty Cycle: 1:1
Medium: 5 GHz Head, Medium parameters used (interpolated):
f = 5750 MHz; σ = 5.029 S/m; ε_r = 35.147; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 12-09-2015; Ambient Temp: 23.2°C; Tissue Temp: 21.4°C

Probe: EX3DV4 - SN7308; ConvF(4.86, 4.86, 4.86); Calibrated: 7/21/2015;
Sensor-Surface: 1.4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1322; Calibrated: 8/24/2015
Phantom: SAM 5.0 front; Type: QD000P40CD; Serial: TP:-1648
Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

5750 MHz System Verification at 17.0 dBm (50 mW)

Area Scan (7x7x1): Measurement grid: dx=10mm, dy=10mm
Zoom Scan (8x8x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm; Graded Ratio: 1.4
Peak SAR (extrapolated) = 16.6 W/kg
SAR(1 g) = 3.76 W/kg
Deviation(1 g) = -6.00%



0 dB = 9.16 W/kg = 9.62 dBW/kg

PCTEST ENGINEERING LABORATORY, INC.

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

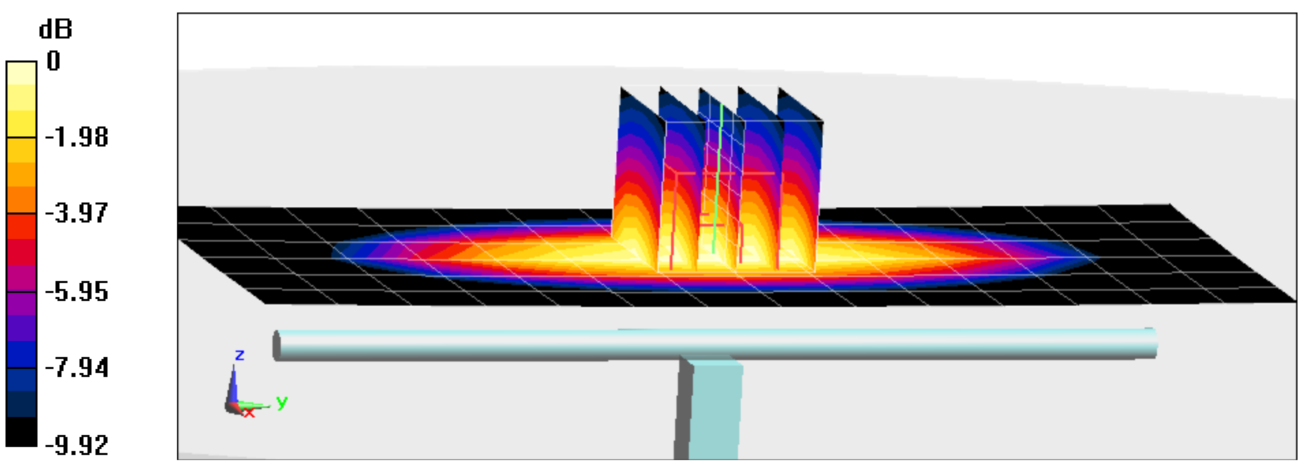
Communication System: UID 0, CW; Frequency: 750 MHz; Duty Cycle: 1:1
Medium: 750 Body, Medium parameters used (interpolated):
f = 750 MHz; σ = 0.966 S/m; ε_r = 54.288; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.5 cm

Test Date: 12-24-2015; Ambient Temp: 23.5°C; Tissue Temp: 23.7°C

Probe: ES3DV2 - SN3022; ConvF(6.16, 6.16, 6.16); Calibrated: 8/26/2015;
Sensor-Surface: 3mm (Mechanical Surface Detection)
Electronics: DAE4 Sn665; Calibrated: 2/18/2015
Phantom: ELI v5.0; Type: QDOVA001BB; Serial: 1229
Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

750 MHz System Verification at 23.0 dBm (200 mW)

Area Scan (7x15x1): Measurement grid: dx=15mm, dy=15mm
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Peak SAR (extrapolated) = 2.42 W/kg
SAR(1 g) = 1.68 W/kg
Deviation(1 g) = -0.71%



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

PCTEST ENGINEERING LABORATORY, INC.

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

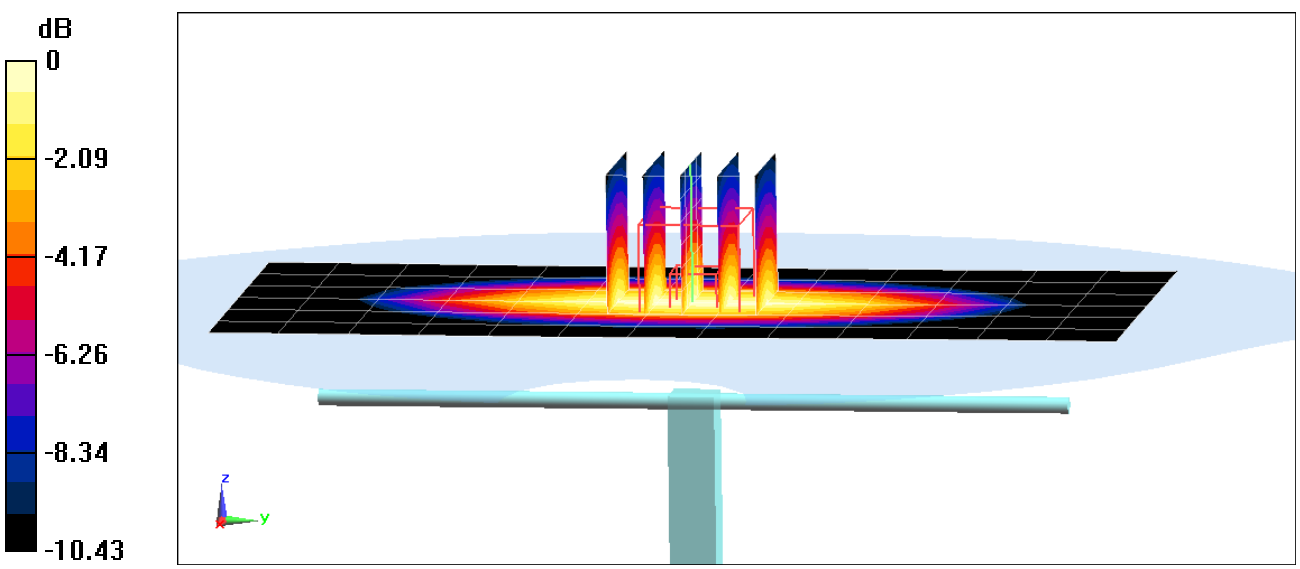
Communication System: UID 0, CW; Frequency: 835 MHz; Duty Cycle: 1:1
Medium: 835 Body, Medium parameters used:
f = 835 MHz; σ = 0.988 S/m; ε_r = 52.786; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.5 cm

Test Date: 12-14-2015; Ambient Temp: 24.0°C; Tissue Temp: 23.1°C

Probe: ES3DV3 - SN3263; ConvF(6.08, 6.08, 6.08); Calibrated: 5/20/2015;
Sensor-Surface: 3mm (Mechanical Surface Detection)
Electronics: DAE4 Sn859; Calibrated: 6/17/2015
Phantom: SAM with CRP (Left); Type: SAM; Serial: 1715
Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

835 MHz System Verification at 23.0 dBm (200 mW)

Area Scan (7x14x1): Measurement grid: dx=15mm, dy=15mm
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Peak SAR (extrapolated) = 2.85 W/kg
SAR(1 g) = 1.95 W/kg
Deviation(1 g) = 5.98 %



0 dB = 2.28 W/kg = 3.58 dBW/kg

PCTEST ENGINEERING LABORATORY, INC.

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

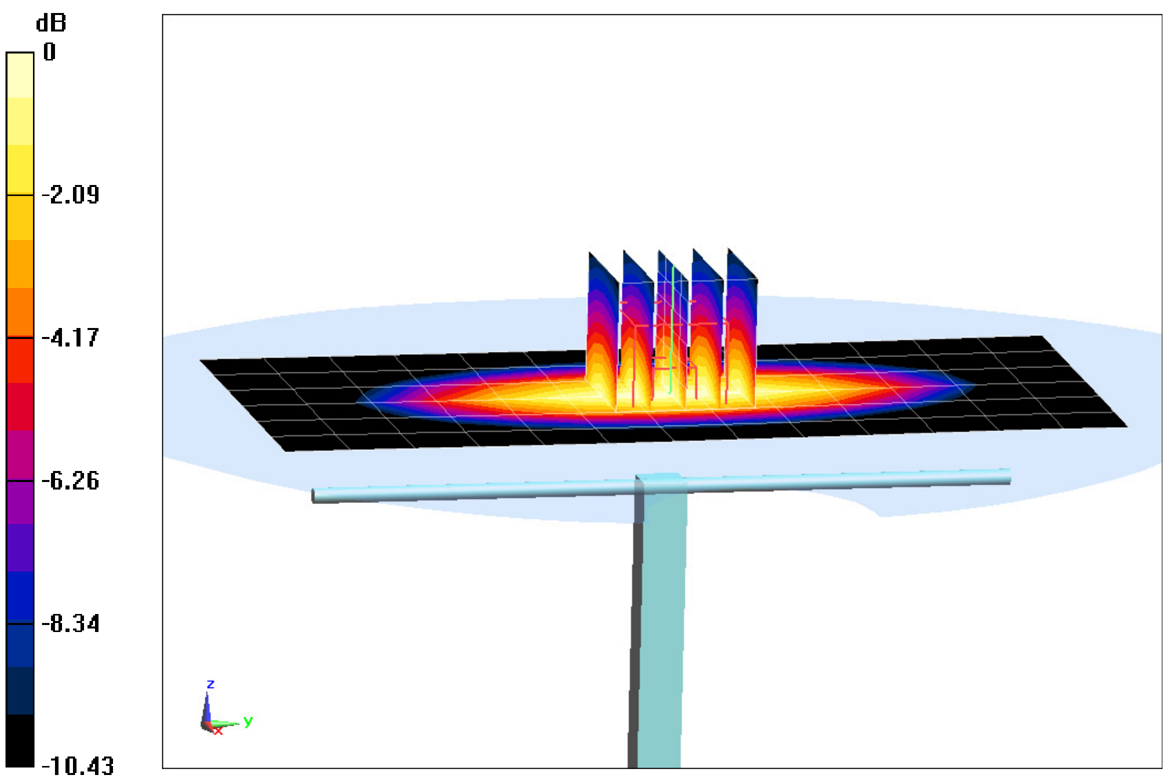
Communication System: UID 0, CW; Frequency: 835 MHz; Duty Cycle: 1:1
Medium: 835 Body, Medium parameters used:
f = 835 MHz; $\sigma = 0.986$ S/m; $\varepsilon_r = 53.157$; $\rho = 1000$ kg/m^3
Phantom section: Flat Section; Space: 1.5 cm

Test Date: 12-28-2015; Ambient Temp: 23.7°C; Tissue Temp: 22.1°C

Probe: ES3DV3 - SN3263; ConvF(6.08, 6.08, 6.08); Calibrated: 5/20/2015;
Sensor-Surface: 3mm (Mechanical Surface Detection)
Electronics: DAE4 Sn859; Calibrated: 6/17/2015
Phantom: SAM with CRP (Left); Type: SAM; Serial: 1715
Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

835 MHz System Verification at 23.0 dBm (200 mW)

Area Scan (7x14x1): Measurement grid: dx=15mm, dy=15mm
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Peak SAR (extrapolated) = 2.86 W/kg
SAR(1 g) = 1.95 W/kg
Deviation(1 g) = 5.41%



0 dB = 2.27 W/kg = 3.56 dBW/kg

PCTEST ENGINEERING LABORATORY, INC.

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

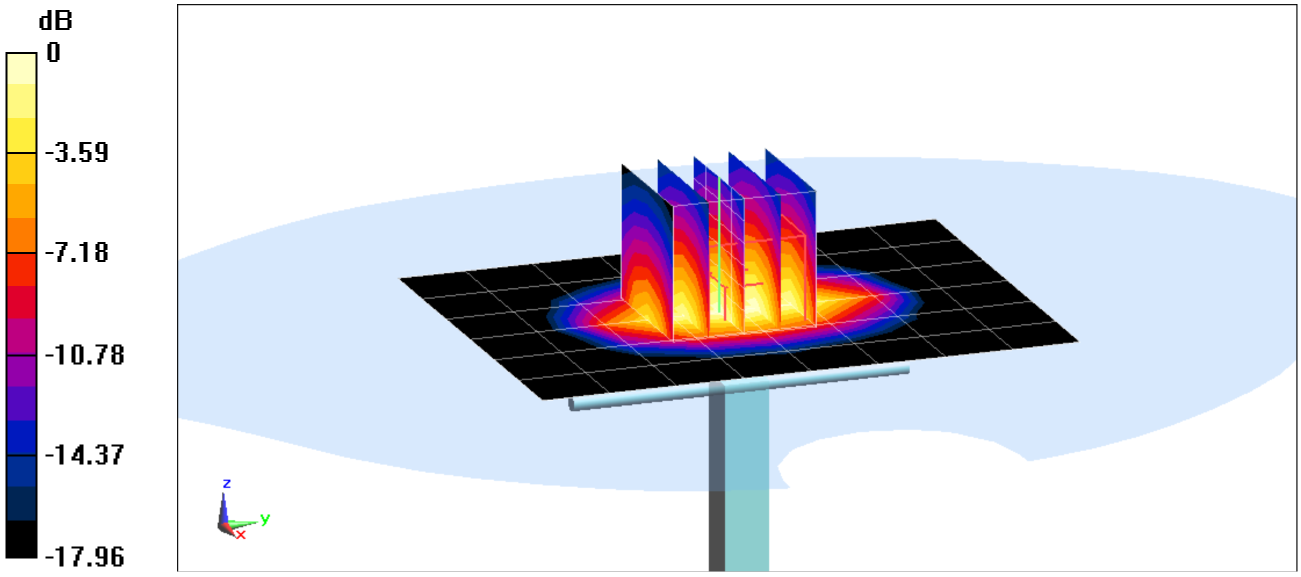
Communication System: UID 0, CW; Frequency: 1750 MHz; Duty Cycle: 1:1
Medium: 1750 Body, Medium parameters used:
f = 1750 MHz; σ = 1.451 S/m; ε_r = 51.645; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 12-11-2015; Ambient Temp: 23.5°C; Tissue Temp: 23.0°C

Probe: ES3DV2 - SN3022; ConvF(4.79, 4.79, 4.79); Calibrated: 8/26/2015;
Sensor-Surface: 3mm (Mechanical Surface Detection)
Electronics: DAE4 Sn665; Calibrated: 2/18/2015
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)

1750 MHz System Verification at 20.0 dBm (100 mW)

Area Scan (7x9x1): Measurement grid: dx=15mm, dy=15mm
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Peak SAR (extrapolated) = 6.20 W/kg
SAR(1 g) = 3.51 W/kg
Deviation(1 g) = -5.39%



0 dB = 4.33 W/kg = 6.36 dBW/kg

PCTEST ENGINEERING LABORATORY, INC.

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

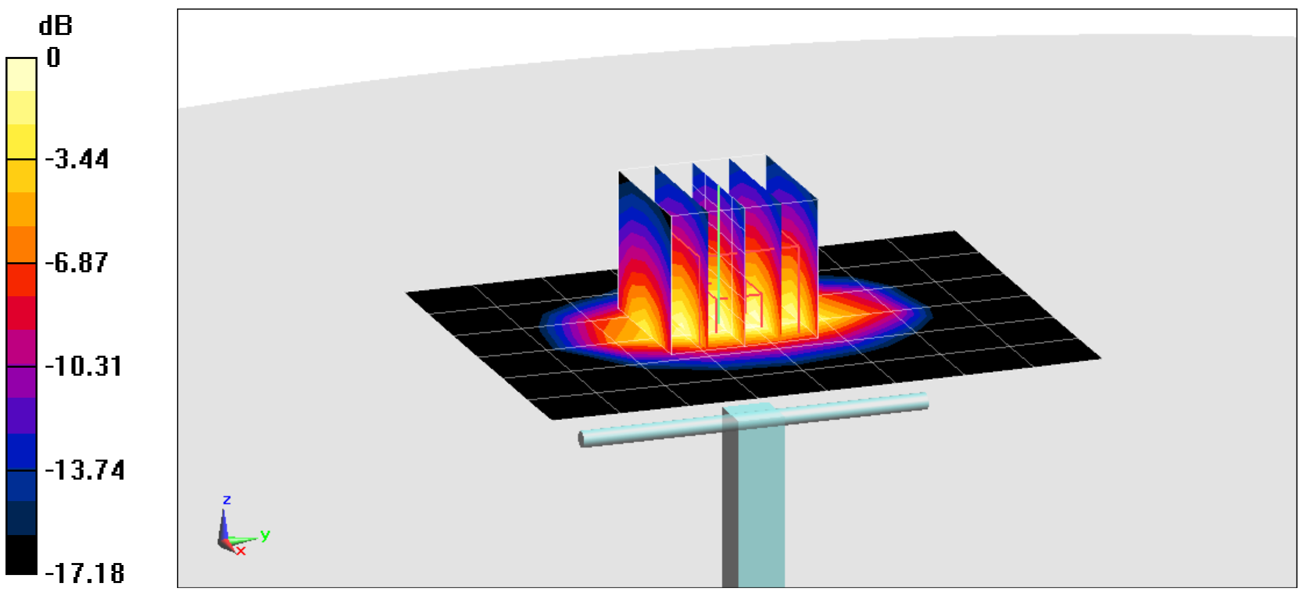
Communication System: UID 0, CW; Frequency: 1750 MHz; Duty Cycle: 1:1
Medium: 1750 Body Medium parameters used:
f = 1750 MHz; σ = 1.455 S/m; ε_r = 51.707; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 01-01-2016; Ambient Temp: 23.5°C; Tissue Temp: 22.4°C

Probe: ES3DV3 - SN3334; ConvF(5.03, 5.03, 5.03); Calibrated: 11/17/2015;
Sensor-Surface: 3mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1415; Calibrated: 11/11/2015
Phantom: ELI v6.0; Type: QDOVA003AA; Serial: TP:2027
Measurement SW: DASY52, Version 52.8 (8);SEMCAD X Version 14.6.10 (7331)

1750 MHz System Verification at 20.0 dBm (100 mW)

Area Scan (7x9x1): Measurement grid: dx=15mm, dy=15mm
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Peak SAR (extrapolated) = 6.27 W/kg
SAR(1 g) = 3.57 W/kg
Deviation(1 g) = -3.77%



0 dB = 4.48 W/kg = 6.51 dBW/kg

PCTEST ENGINEERING LABORATORY, INC.

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

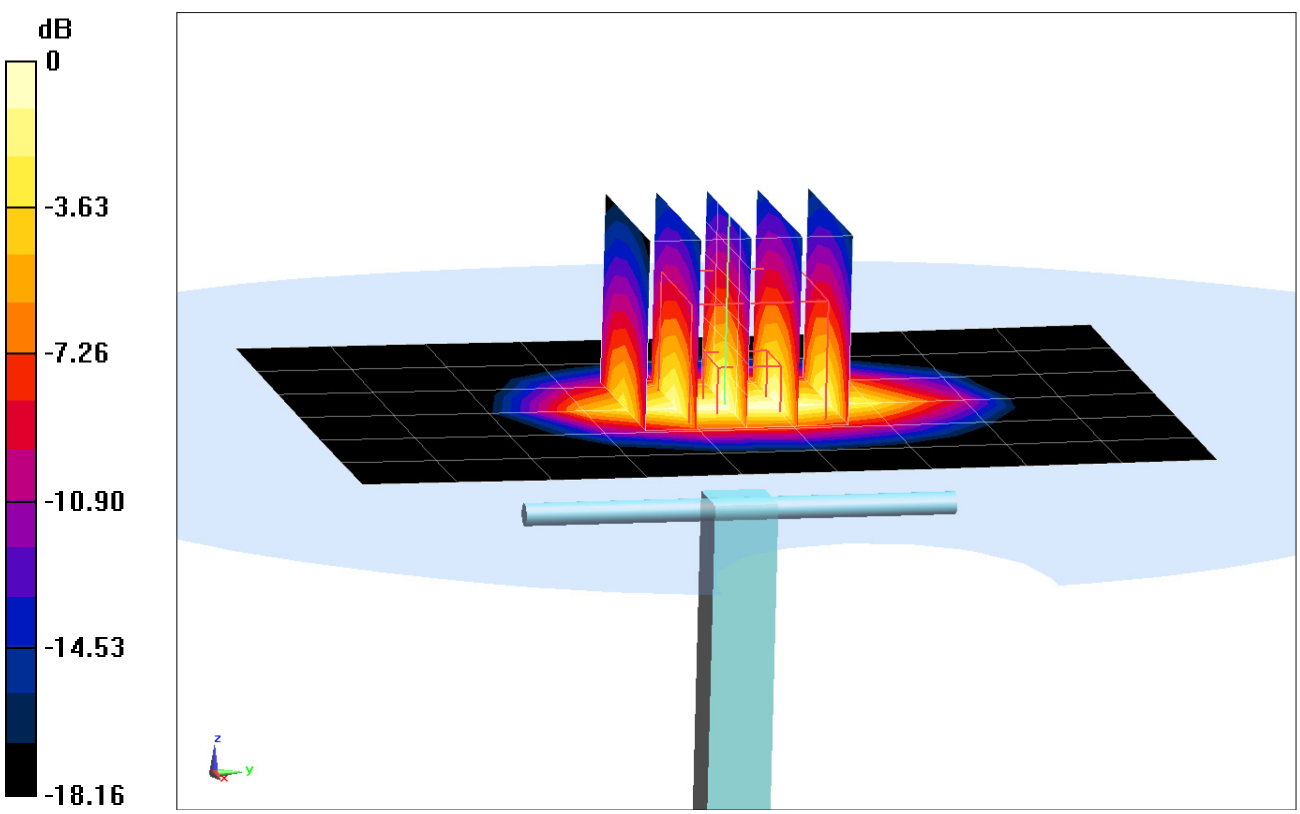
Communication System: UID 0, CW; Frequency: 1900 MHz; Duty Cycle: 1:1
Medium: 1900 Body, Medium parameters used (interpolated):
f = 1900 MHz; σ = 1.56 S/m; ε_r = 51.449; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 12-06-2015; Ambient Temp: 23.7°C; Tissue Temp: 22.0°C

Probe: ES3DV3 - SN3333; ConvF(4.7, 4.7, 4.7); Calibrated: 10/29/2015;
Sensor-Surface: 3mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1333; Calibrated: 10/27/2015
Phantom: SAM Front; Type: QD000P40CD; Serial: TP:1758
Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

1900 MHz System Verification at 20.0 dBm (100 mW)

Area Scan (7x10x1): Measurement grid: dx=15mm, dy=15mm
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Peak SAR (extrapolated) = 7.85 W/kg
SAR(1 g) = 4.36 W/kg
Deviation(1 g) = 7.92%



0 dB = 5.47 W/kg = 7.38 dBW/kg

PCTEST ENGINEERING LABORATORY, INC.

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

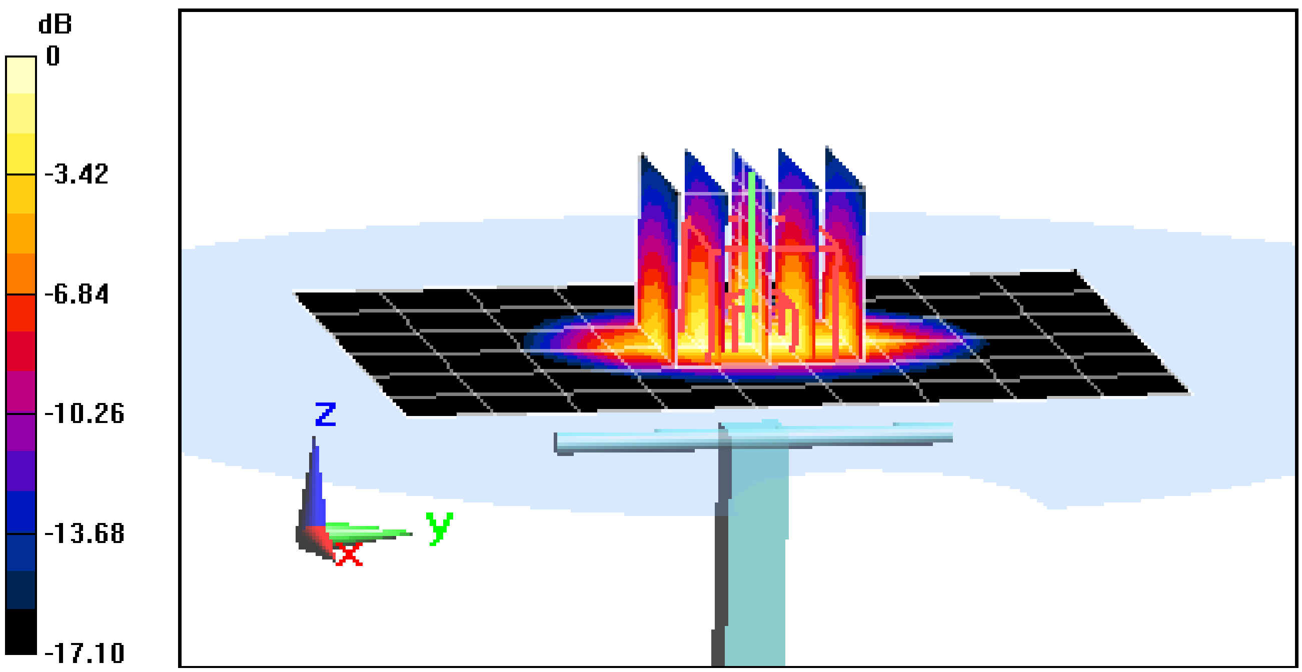
Communication System: UID 0, CW; Frequency: 1900 MHz; Duty Cycle: 1:1
Medium: 1900 Body, Medium parameters used (interpolated):
f = 1900 MHz; σ = 1.498 S/m; ε_r = 52.237; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 12-09-2015; Ambient Temp: 24.3°C; Tissue Temp: 23.5°C

Probe: ES3DV3 - SN3333; ConvF(4.7, 4.7, 4.7); Calibrated: 10/29/2015;
Sensor-Surface: 3mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1333; Calibrated: 10/27/2015
Phantom: SAM Front; Type: QD000P40CD; Serial: TP:1758
Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

1900 MHz System Verification at 20.0 dBm (100 mW)

Area Scan (7x10x1): Measurement grid: dx=15mm, dy=15mm
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Peak SAR (extrapolated) = 7.46 W/kg
SAR(1 g) = 4.28 W/kg
Deviation(1 g) = 7.00%



0 dB = 5.36 W/kg = 7.29 dBW/kg

PCTEST ENGINEERING LABORATORY, INC.

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

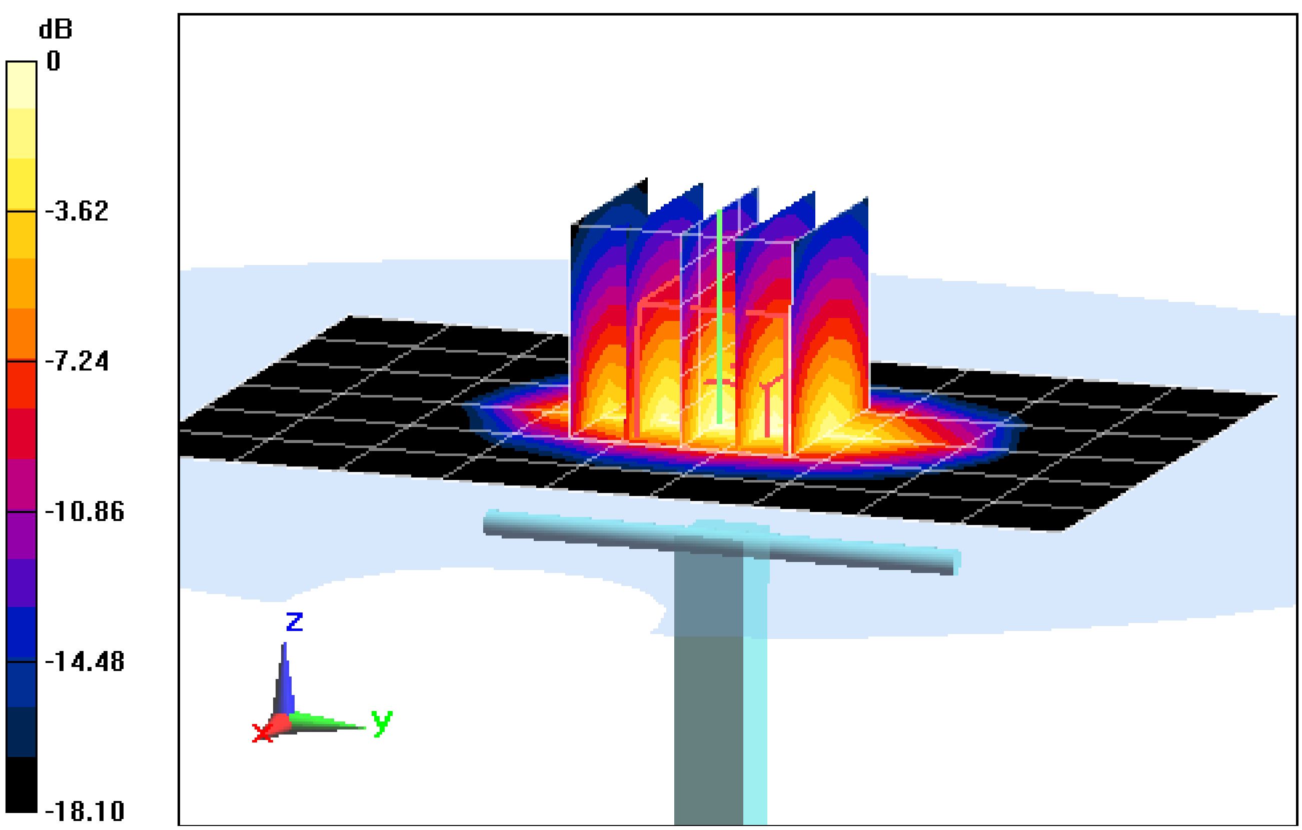
Communication System: UID 0, CW; Frequency: 1900 MHz; Duty Cycle: 1:1
Medium: 1900 Body Medium parameters used (interpolated):
f = 1900 MHz; σ = 1.565 S/m; ε_r = 52.17; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 12-31-2015; Ambient Temp: 23.0°C; Tissue Temp: 22.8°C

Probe: ES3DV3 - SN3319; ConvF(4.53, 4.53, 4.53); Calibrated: 3/19/2015;
Sensor-Surface: 3mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1368; Calibrated: 3/13/2015
Phantom: SAM with CRP v4.0; Type: QD000P40CD; Serial: TP:1800
Measurement SW: DASY52, Version 52.8 (8);SEMCAD X Version 14.6.10 (7331)

1900 MHz System Verification at 20.0 dBm (100 mW)

Area Scan (7x10x1): Measurement grid: dx=15mm, dy=15mm
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Peak SAR (extrapolated) = 7.06 W/kg
SAR(1 g) = 4.03 W/kg
Deviation(1 g) = -0.25%



0 dB = 5.02 W/kg = 7.01 dBW/kg

PCTEST ENGINEERING LABORATORY, INC.

DUT: Dipole 2300 MHz; Type: D2300V2; Serial: 1008

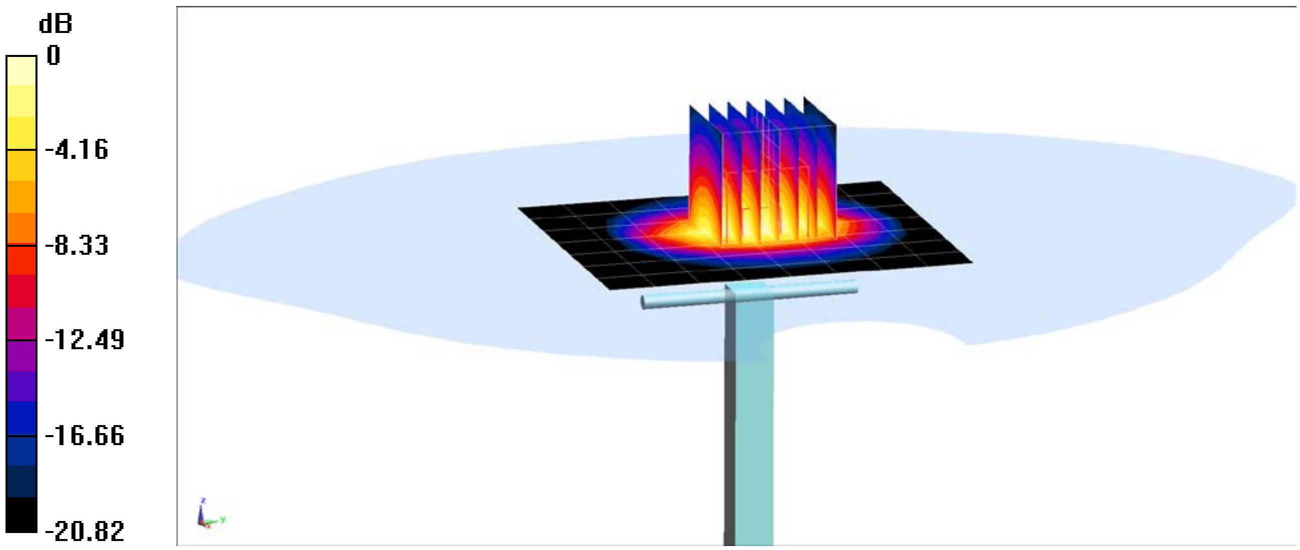
Communication System: UID 0, CW; Frequency: 2300 MHz; Duty Cycle: 1:1
Medium: 2300 Body, Medium parameters used:
f = 2300 MHz; σ = 1.775 S/m; ε_r = 51.395; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 12-07-2015; Ambient Temp: 22.5°C; Tissue Temp: 22.0°C

Probe: ES3DV3 - SN3319; ConvF(4.24, 4.24, 4.24); Calibrated: 3/19/2015;
Sensor-Surface: 3mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1368; Calibrated: 3/13/2015
Phantom: SAM with CRP v4.0; Type: QD000P40CD; Serial: TP:1800
Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

2300 MHz System Verification at 20.0 dBm (100 mW)

Area Scan (8x9x1): Measurement grid: dx=12mm, dy=12mm
Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Peak SAR (extrapolated) = 9.28 W/kg
SAR(1 g) = 4.70 W/kg
Deviation(1 g) = -2.29%



0 dB = 6.14 W/kg = 7.88 dBW/kg

PCTEST ENGINEERING LABORATORY, INC.

DUT: Dipole 2300 MHz; Type: D2300V2; Serial: 1008

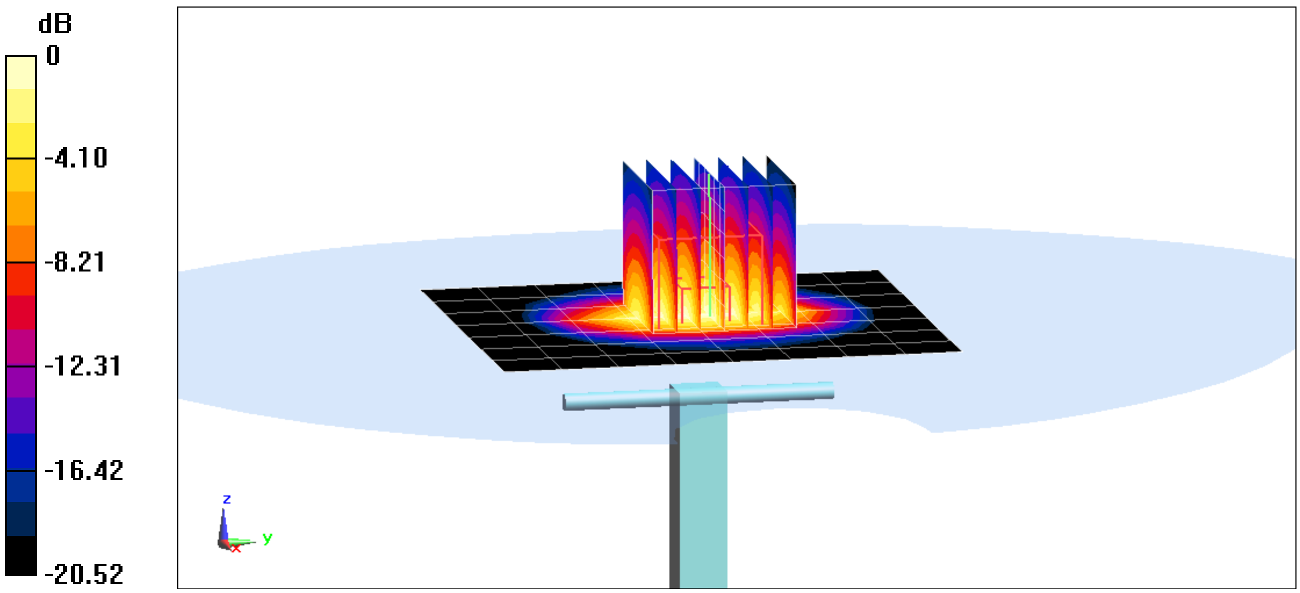
Communication System: UID 0, CW; Frequency: 2300 MHz; Duty Cycle: 1:1
Medium: 2300 Body, Medium parameters used:
f = 2300 MHz; σ = 1.739 S/m; ε_r = 51.303; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 12-16-2015; Ambient Temp: 21.2°C; Tissue Temp: 23.2°C

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

2300 MHz System Verification at 20.0 dBm (100 mW)

Area Scan (8x9x1): Measurement grid: dx=12mm, dy=12mm
Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Peak SAR (extrapolated) = 9.30 W/kg
SAR(1 g) = 4.71 W/kg
Deviation(1 g) = -2.08%



0 dB = 6.18 W/kg = 7.91 dBW/kg

PCTEST ENGINEERING LABORATORY, INC.

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

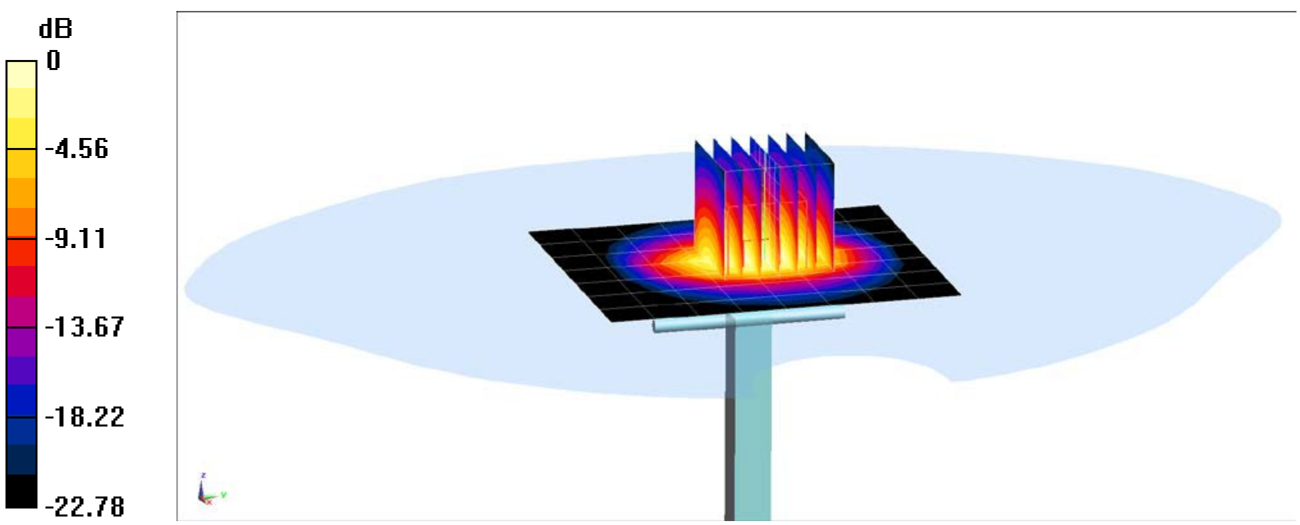
Communication System: UID 0, CW; Frequency: 2450 MHz; Duty Cycle: 1:1
Medium: 2450 Body, Medium parameters used:
f = 2450 MHz; σ = 1.987 S/m; ε_r = 50.916; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 12-07-2015; Ambient Temp: 22.5°C; Tissue Temp: 22.0°C

Probe: ES3DV3 - SN3319; ConvF(4.11, 4.11, 4.11); Calibrated: 3/19/2015;
Sensor-Surface: 3mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1368; Calibrated: 3/13/2015
Phantom: SAM with CRP v4.0; Type: QD000P40CD; Serial: TP:1800
Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

2450 MHz System Verification at 20.0 dBm (100 mW)

Area Scan (8x9x1): Measurement grid: dx=12mm, dy=12mm
Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Peak SAR (extrapolated) = 10.8 W/kg
SAR(1 g) = 5.07 W/kg
Deviation(1 g) = -2.31%



0 dB = 6.62 W/kg = 8.21 dBW/kg

PCTEST ENGINEERING LABORATORY, INC.

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

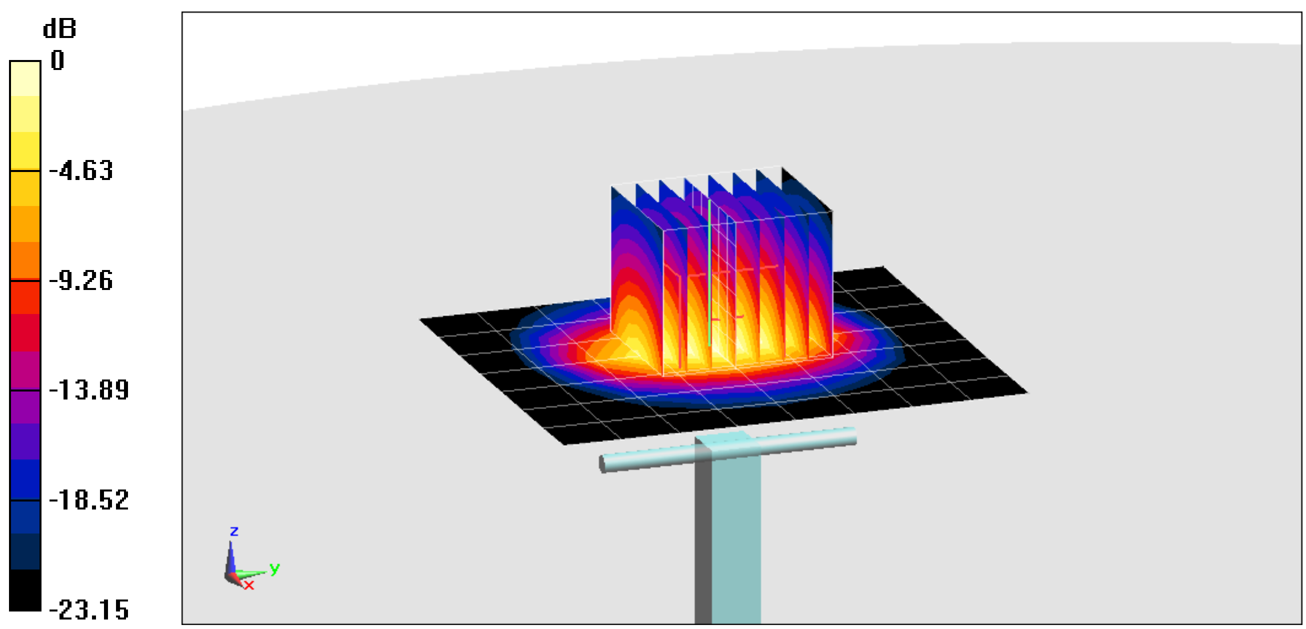
Communication System: UID 0, CW; Frequency: 2450 MHz; Duty Cycle: 1:1
Medium: 2450 Body Medium parameters used:
f = 2450 MHz; $\sigma = 2.005$ S/m; $\varepsilon_r = 51.127$; $\rho = 1000$ kg/m^3
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 12-08-2015; Ambient Temp: 20.3°C; Tissue Temp: 22.3°C

Probe: ES3DV3 - SN3334; ConvF(4.45, 4.45, 4.45); Calibrated: 11/17/2015;
Sensor-Surface: 3mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1415; Calibrated: 11/11/2015
Phantom: ELI v6.0; Type: QDOVA003AA; Serial: TP:2027
Measurement SW: DASY52, Version 52.8 (8);SEMCAD X Version 14.6.10 (7331)

2450 MHz System Verification at 20.0 dBm (100 mW)

Area Scan (8x9x1): Measurement grid: dx=12mm, dy=12mm
Zoom Scan (7x8x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Peak SAR (extrapolated) = 11.0 W/kg
SAR(1 g) = 5.31 W/kg
Deviation(1 g) = 2.31%



0 dB = 7.03 W/kg = 8.47 dBW/kg

PCTEST ENGINEERING LABORATORY, INC.

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

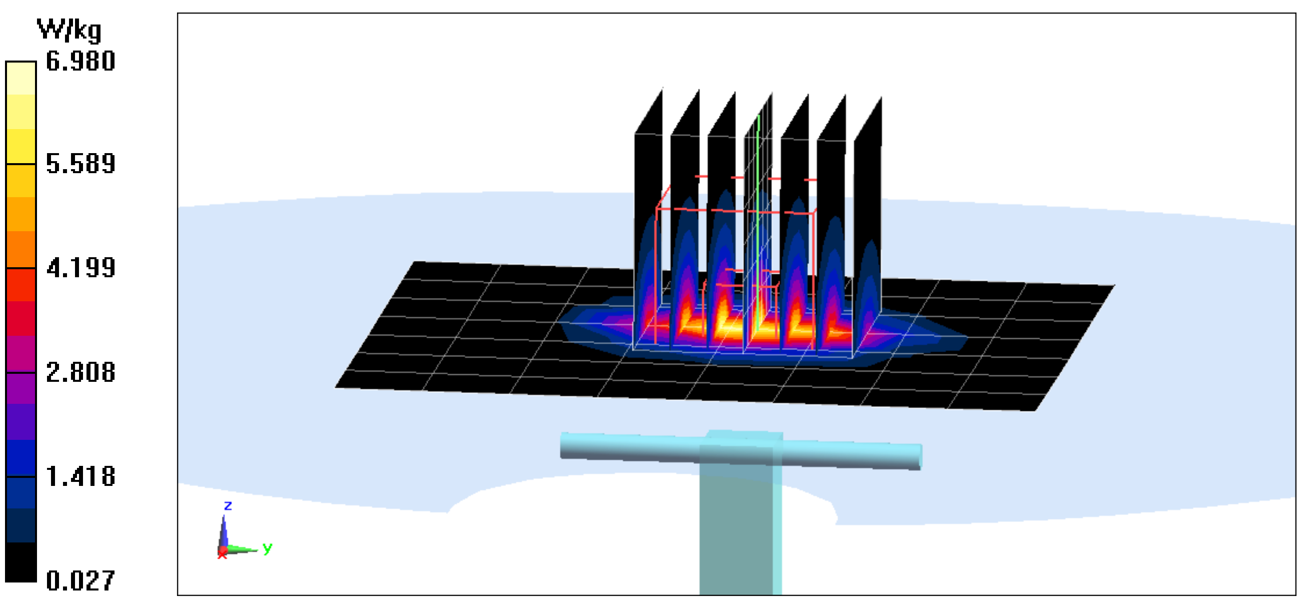
Communication System: UID 0, CW; Frequency: 2600 MHz; Duty Cycle: 1:1
Medium: 2600 Body, Medium parameters used:
f = 2600 MHz; σ = 2.187 S/m; ε_r = 50.802; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 12-17-2015; Ambient Temp: 21.9°C; Tissue Temp: 22.2°C

Probe: ES3DV3 - SN3334; ConvF(4.29, 4.29, 4.29); Calibrated: 11/17/2015;
Sensor-Surface: 3mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1415; Calibrated: 11/11/2015
Phantom: SAM Front; Type: SAM; Serial: 1686
Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

2600 MHz System Verification at 20.0 dBm (100 mW)

Area Scan (8x9x1): Measurement grid: dx=12mm, dy=12mm
Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Peak SAR (extrapolated) = 11.6 W/kg
SAR(1 g) = 5.31 W/kg
Deviation(1 g) = -5.52%



PCTEST ENGINEERING LABORATORY, INC.

DUT: Dipole 5 GHz; Type: D5GHzV2; Serial: 1057

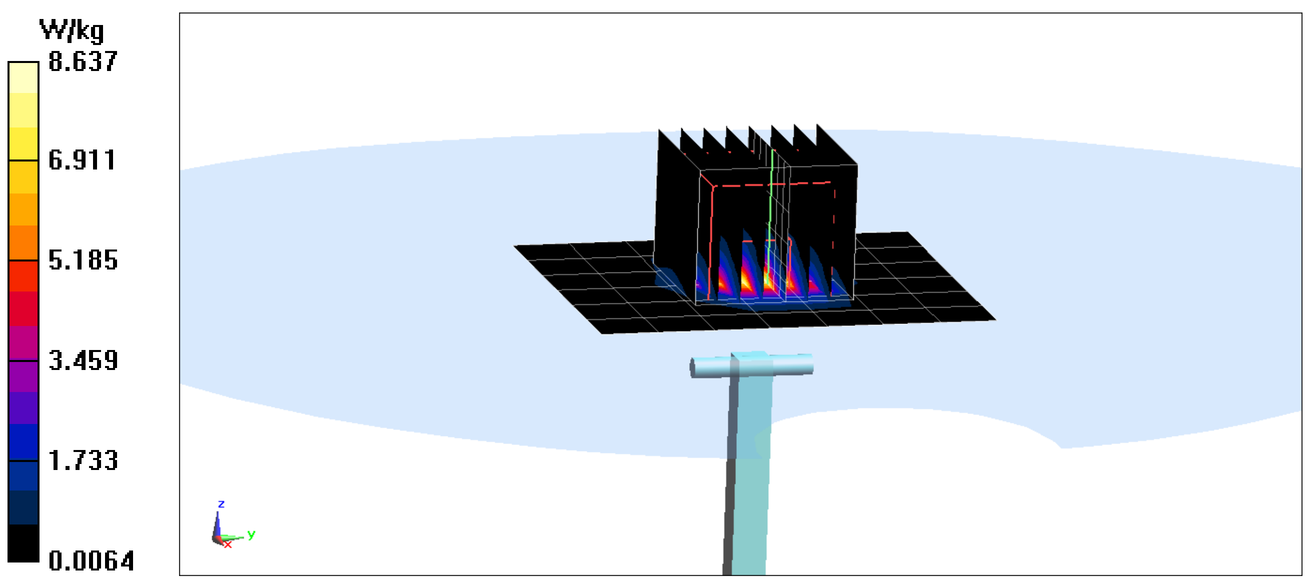
Communication System: UID 0, CW; Frequency: 5300 MHz; Duty Cycle: 1:1
Medium: 5 GHz Body, Medium parameters used:
f = 5300 MHz; σ = 5.348 S/m; ε_r = 47.518; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 12-08-2015; Ambient Temp: 24.6°C; Tissue Temp: 23.7°C

Probe: EX3DV4 - SN7357; ConvF(4.11, 4.11, 4.11); Calibrated: 4/23/2015;
Sensor-Surface: 1.4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1407; Calibrated: 4/20/2015
Phantom: SAM v5.0 Left; Type: QD000P40CD; Serial: TP: 1687
Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

5300 MHz System Verification at 17.0 dBm (50 mW)

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
Peak SAR (extrapolated) = 14.7 W/kg
SAR(1 g) = 3.81 W/kg
Deviation(1 g) = 2.70%



PCTEST ENGINEERING LABORATORY, INC.

DUT: Dipole 5 GHz; Type: D5GHzV2; Serial: 1057

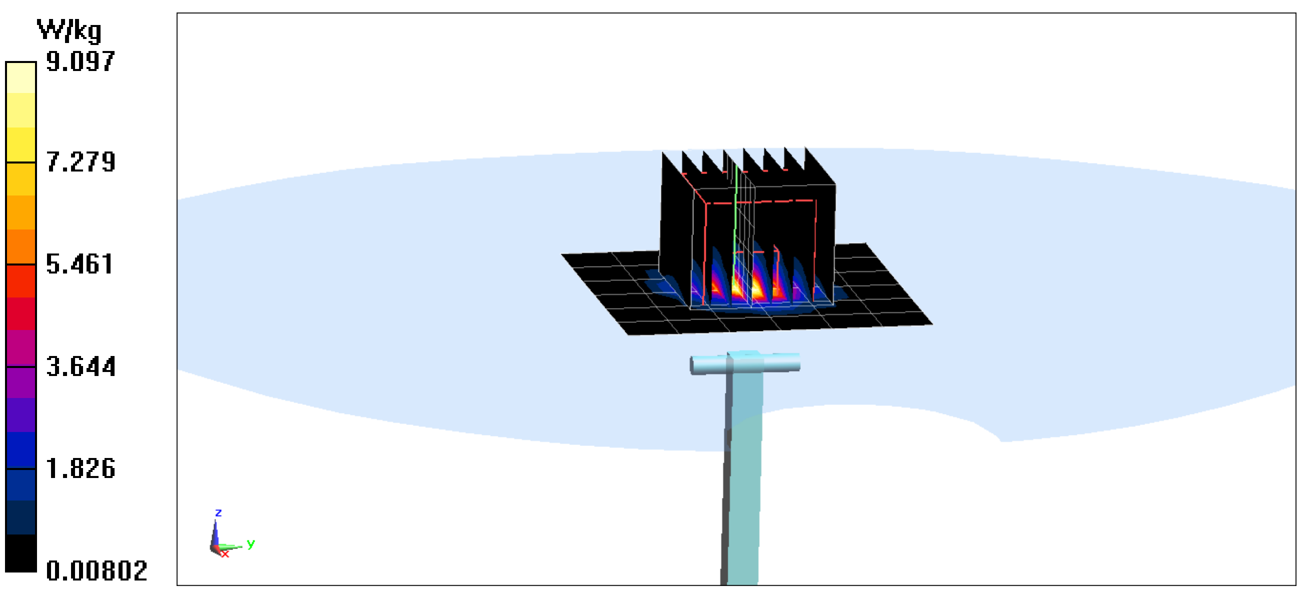
Communication System: UID 0, CW; Frequency: 5600 MHz; Duty Cycle: 1:1
Medium: 5 GHz Body, Medium parameters used:
f = 5600 MHz; σ = 5.731 S/m; ε_r = 47.065; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 12-08-2015; Ambient Temp: 24.5°C; Tissue Temp: 23.7°C

Probe: EX3DV4 - SN7357; ConvF(3.72, 3.72, 3.72); Calibrated: 4/23/2015;
Sensor-Surface: 1.4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1407; Calibrated: 4/20/2015
Phantom: SAM v5.0 Left; Type: QD000P40CD; Serial: TP: 1687
Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

5600 MHz System Verification at 17.0 dBm (50 mW)

Area Scan (7x7x1): Measurement grid: dx=10mm, dy=10mm
Zoom Scan (8x8x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm; Graded Ratio: 1.4
Peak SAR (extrapolated) = 15.5 W/kg
SAR(1 g) = 3.84 W/kg
Deviation(1 g) = -1.16%



PCTEST ENGINEERING LABORATORY, INC.

DUT: Dipole 5 GHz; Type: D5GHzV2; Serial: 1057

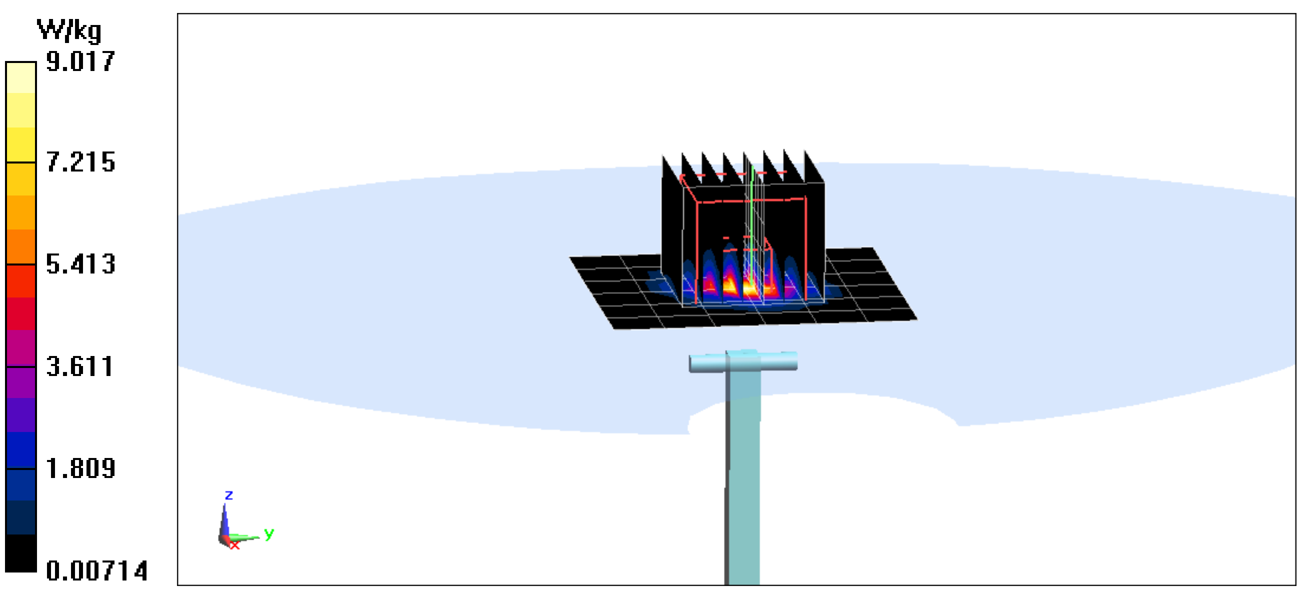
Communication System: UID 0, CW; Frequency: 5800 MHz; Duty Cycle: 1:1
Medium: 5 GHz Body, Medium parameters used:
f = 5800 MHz; σ = 6 S/m; ε_r = 46.734; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 12-08-2015; Ambient Temp: 24.5°C; Tissue Temp: 23.7°C

Probe: EX3DV4 - SN7357; ConvF(3.82, 3.82, 3.82); Calibrated: 4/23/2015;
Sensor-Surface: 1.4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1407; Calibrated: 4/20/2015
Phantom: SAM v5.0 Left; Type: QD000P40CD; Serial: TP: 1687
Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

5800 MHz System Verification at 17.0 dBm (50 mW)

Area Scan (7x7x1): Measurement grid: dx=10mm, dy=10mm
Zoom Scan (8x8x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm; Graded Ratio: 1.4
Peak SAR (extrapolated) = 15.9 W/kg
SAR(1 g) = 3.69 W/kg
Deviation(1 g) = -1.73%



APPENDIX C: PROBE CALIBRATION

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

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

Accreditation No.: **SCS 0108**

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

Client **PC Test**

Certificate No: **D750V3-1003_Jan15**

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 16, 2015

CC
2/3/15

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	07-Oct-14 (No. 217-02020)	Oct-15
Power sensor HP 8481A	US37292783	07-Oct-14 (No. 217-02020)	Oct-15
Power sensor HP 8481A	MY41092317	07-Oct-14 (No. 217-02021)	Oct-15
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-14 (No. ES3-3205_Dec14)	Dec-15
DAE4	SN: 601	18-Aug-14 (No. DAE4-601_Aug14)	Aug-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-14)	In house check: Oct-15

	Name	Function	Signature
Calibrated by:	Michael Weber	Laboratory Technician	M.Weber
Approved by:	Katja Pokovic	Technical Manager	

Issued: January 19, 2015

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	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	41.7 ± 6 %	0.91 mho/m ± 6 %
Head TSL temperature change during test	< 0.5 °C	----	----

SAR result with Head TSL

SAR averaged over 1 cm^3 (1 g) of Head TSL	Condition	
SAR measured	250 mW input power	2.06 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**8.09 W/kg ± 17.0 % (k=2)**

SAR averaged over 10 cm^3 (10 g) of Head TSL	condition	
SAR measured	250 mW input power	1.35 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**5.32 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	56.0 ± 6 %	0.99 mho/m ± 6 %
Body TSL temperature change during test	< 0.5 °C	----	----

SAR result with Body TSL

SAR averaged over 1 cm^3 (1 g) of Body TSL	Condition	
SAR measured	250 mW input power	2.16 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	**8.46 W/kg ± 17.0 % (k=2)**

SAR averaged over 10 cm^3 (10 g) of Body TSL	condition	
SAR measured	250 mW input power	1.42 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	**5.58 W/kg ± 16.5 % (k=2)**

Appendix (Additional assessments outside the scope of SCS0108)

Antenna Parameters with Head TSL

Impedance, transformed to feed point	53.7 Ω - 1.4 jΩ
Return Loss	- 28.5 dB

Antenna Parameters with Body TSL

Impedance, transformed to feed point	48.3 Ω - 3.8 jΩ
Return Loss	- 27.5 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: 16.01.2015

Test Laboratory: SPEAG, Zurich, Switzerland

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

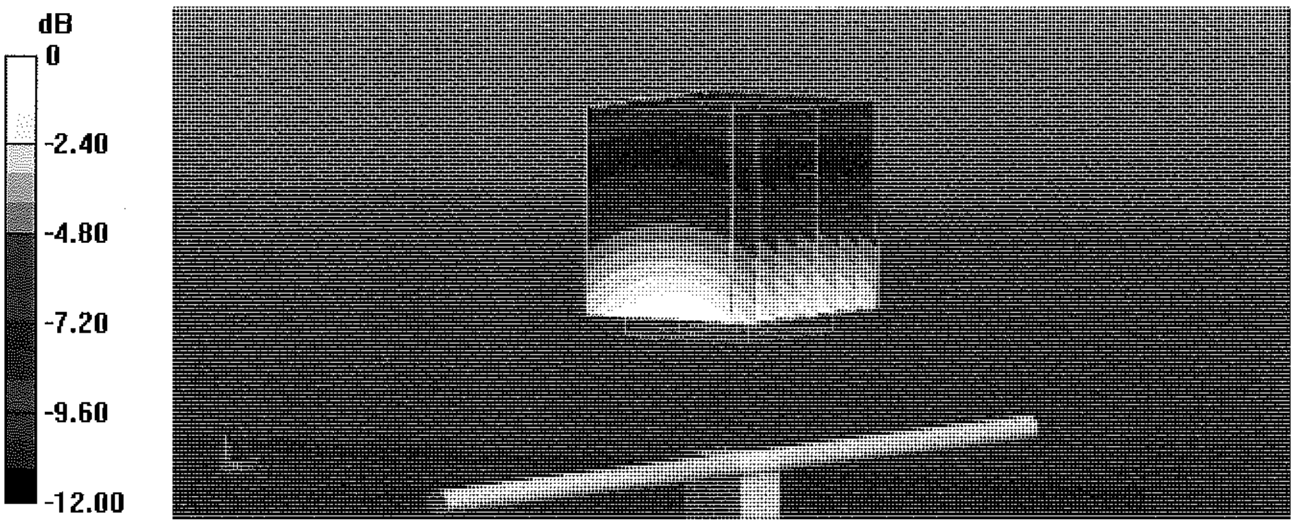
Communication System: UID 0 - CW; Frequency: 750 MHz
Medium parameters used: f = 750 MHz; σ = 0.91 S/m; ε_r = 41.7; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)

DASY52 Configuration:

- Probe: ES3DV3 - SN3205; ConvF(6.44, 6.44, 6.44); Calibrated: 30.12.2014;
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 18.08.2014
- Phantom: Flat Phantom 4.9L; Type: QD000P49AA; Serial: 1001
- DASY52 52.8.8(1222); SEMCAD X 14.6.10(7331)

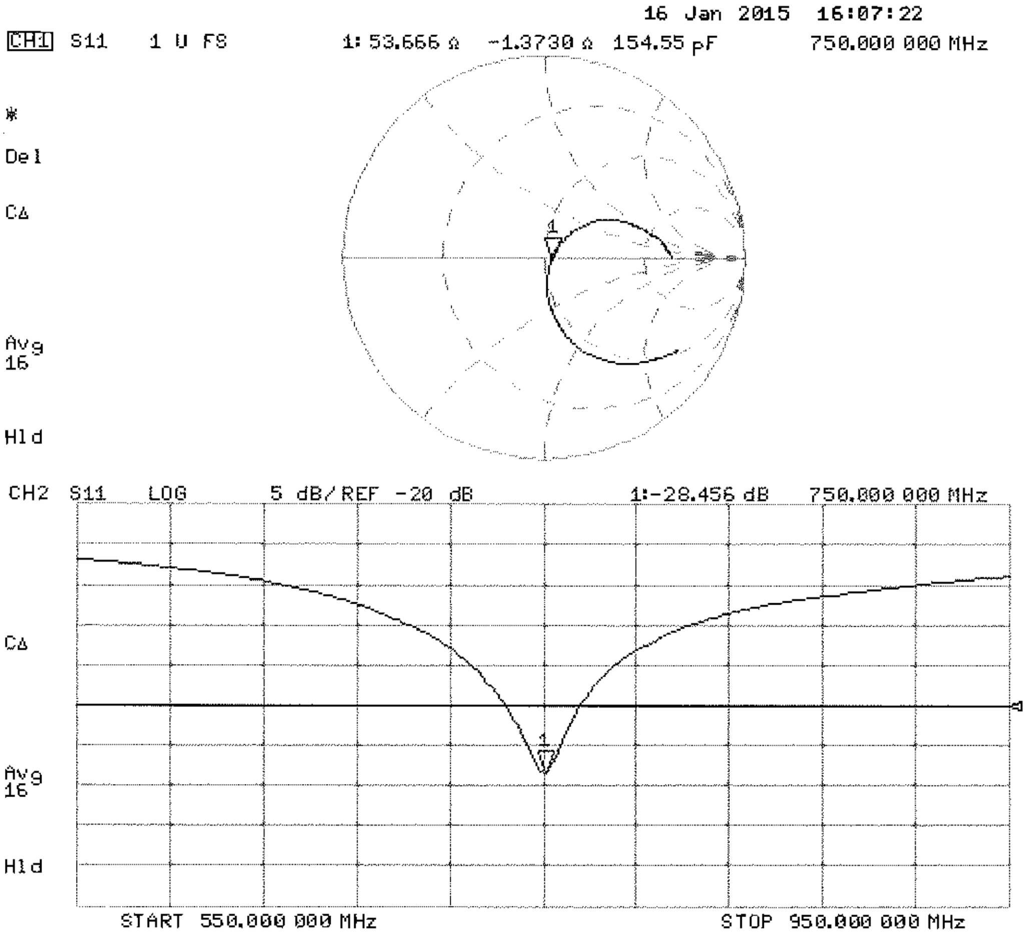
Dipole Calibration for Head Tissue/Pin=250 mW, d=15mm/Zoom Scan (7x7x7)/Cube 0:

Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 53.08 V/m; Power Drift = 0.00 dB
Peak SAR (extrapolated) = 3.05 W/kg
SAR(1 g) = 2.06 W/kg; SAR(10 g) = 1.35 W/kg
Maximum value of SAR (measured) = 2.41 W/kg



0 dB = 2.41 W/kg = 3.82 dBW/kg

Impedance Measurement Plot for Head TSL



DASY5 Validation Report for Body TSL

Date: 16.01.2015

Test Laboratory: SPEAG, Zurich, Switzerland

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

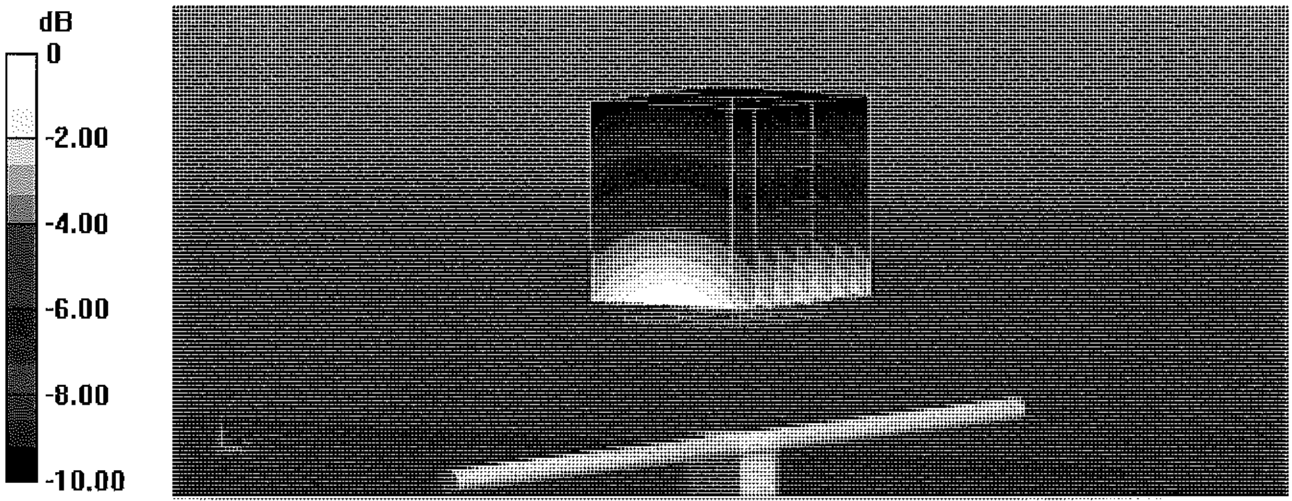
Communication System: UID 0 - CW; Frequency: 750 MHz
Medium parameters used: f = 750 MHz; σ = 0.99 S/m; ε_r = 56; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)

DASY52 Configuration:

- Probe: ES3DV3 - SN3205; ConvF(6.21, 6.21, 6.21); Calibrated: 30.12.2014;
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 18.08.2014
- Phantom: Flat Phantom 4.9L; Type: QD000P49AA; Serial: 1001
- DASY52 52.8.8(1222); SEMCAD X 14.6.10(7331)

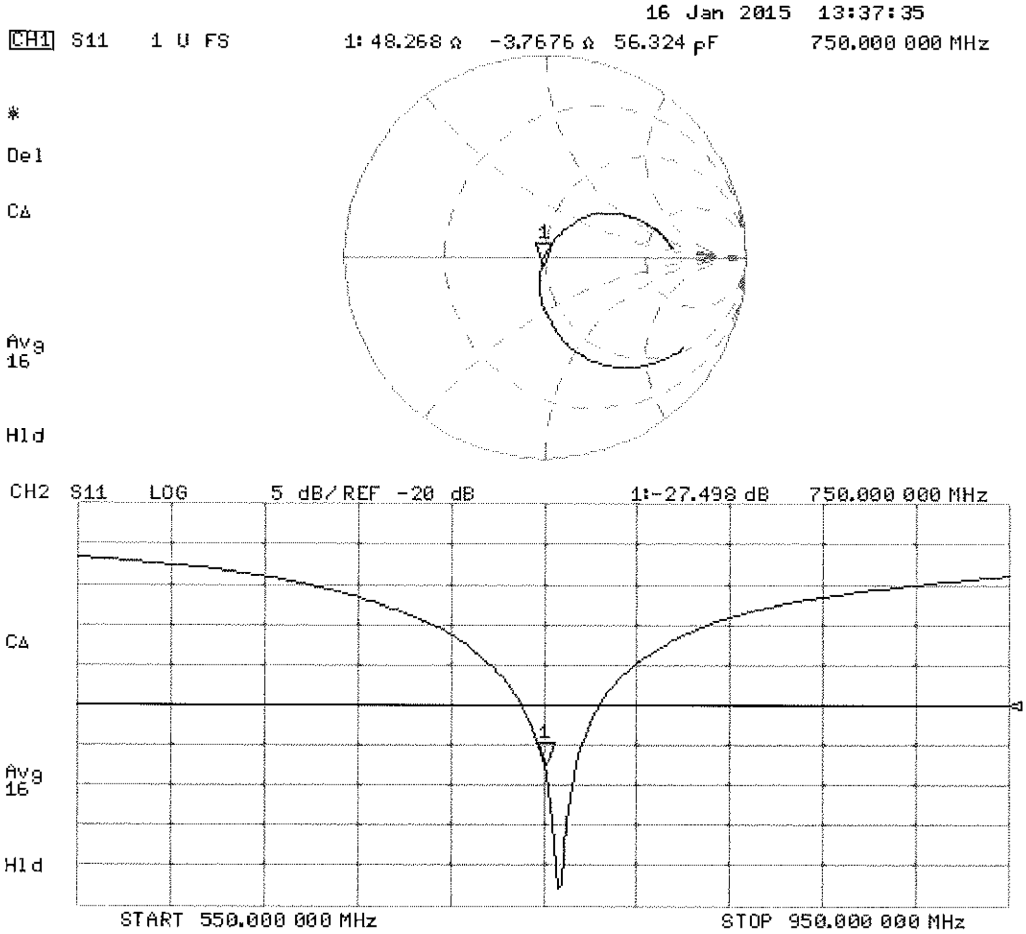
Dipole Calibration for Body Tissue/Pin=250 mW, d=15mm/Zoom Scan (7x7x7)/Cube 0:

Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 52.21 V/m; Power Drift = -0.00 dB
Peak SAR (extrapolated) = 3.16 W/kg
SAR(1 g) = 2.16 W/kg; SAR(10 g) = 1.42 W/kg
Maximum value of SAR (measured) = 2.52 W/kg



0 dB = 2.52 W/kg = 4.01 dBW/kg

Impedance Measurement Plot for Body TSL



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

S Schweizerischer Kalibrierdienst
C Service suisse d'étalonnage
Servizio svizzero di taratura
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Accreditation No.: SCS 0108

Client **PC Test**

Certificate No: D835V2-4d133_Jul15

CALIBRATION CERTIFICATE

Object: D835V2 - SN: 4d133

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

PN ✓ 8/4/15

Calibration date: July 23, 2015

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	07-Oct-14 (No. 217-02020)	Oct-15
Power sensor HP 8481A	US37292783	07-Oct-14 (No. 217-02020)	Oct-15
Power sensor HP 8481A	MY41092317	07-Oct-14 (No. 217-02021)	Oct-15
Reference 20 dB Attenuator	SN: 5058 (20k)	01-Apr-15 (No. 217-02131)	Mar-16
Type-N mismatch combination	SN: 5047.2 / 06327	01-Apr-15 (No. 217-02134)	Mar-16
Reference Probe ES3DV3	SN: 3205	30-Dec-14 (No. ES3-3205_Dec14)	Dec-15
DAE4	SN: 601	18-Aug-14 (No. DAE4-601_Aug14)	Aug-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-14)	In house check: Oct-15

	Name	Function	Signature
Calibrated by:	Michael Weber	Laboratory Technician	M.Weber
Approved by:	Katja Pokovic	Technical Manager	

Issued: July 23, 2015

This calibration certificate shall not be reproduced except in full without written approval of the laboratory.

Glossary:

TSL	tissue simulating liquid
ConvF	sensitivity in TSL / NORM x,y,z
N/A	not applicable or not measured

Calibration is Performed According to the Following Standards:

a) IEEE Std 1528-2013, "IEEE Recommended Practice for Determining the Peak Spatial-Averaged Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques", June 2013
b) IEC 62209-1, "Procedure to measure the Specific Absorption Rate (SAR) for hand-held devices used in close proximity to the ear (frequency range of 300 MHz to 3 GHz)", February 2005
c) IEC 62209-2, "Procedure to determine the Specific Absorption Rate (SAR) for wireless communication devices used in close proximity to the human body (frequency range of 30 MHz to 6 GHz)", March 2010
d) KDB 865664, "SAR Measurement Requirements for 100 MHz to 6 GHz"

Additional Documentation:

e) DASY4/5 System Handbook

Methods Applied and Interpretation of Parameters:

- *Measurement Conditions:* Further details are available from the Validation Report at the end of the certificate. All figures stated in the certificate are valid at the frequency indicated.
- *Antenna Parameters with TSL:* The dipole is mounted with the spacer to position its feed point exactly below the center marking of the flat phantom section, with the arms oriented parallel to the body axis.
- *Feed Point Impedance and Return Loss:* These parameters are measured with the dipole positioned under the liquid filled phantom. The impedance stated is transformed from the measurement at the SMA connector to the feed point. The Return Loss ensures low reflected power. No uncertainty required.
- *Electrical Delay:* One-way delay between the SMA connector and the antenna feed point. No uncertainty required.
- *SAR measured:* SAR measured at the stated antenna input power.
- *SAR normalized:* SAR as measured, normalized to an input power of 1 W at the antenna connector.
- *SAR for nominal TSL parameters:* The measured TSL parameters are used to calculate the nominal SAR result.

The reported uncertainty of measurement is stated as the standard uncertainty of measurement multiplied by the coverage factor k=2, which for a normal distribution corresponds to a coverage probability of approximately 95%.

Measurement Conditions

DASY system configuration, as far as not given on page 1.

DASY Version	DASY5	V52.8.8
Extrapolation	Advanced Extrapolation	
Phantom	Modular Flat Phantom	
Distance Dipole Center - TSL	15 mm	with Spacer
Zoom Scan Resolution	dx, dy, dz = 5 mm	
Frequency	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	42.4 ± 6 %	0.92 mho/m ± 6 %
Head TSL temperature change during test	< 0.5 °C	----	----

SAR result with Head TSL

SAR averaged over 1 cm³ (1 g) of Head TSL	Condition	
SAR measured	250 mW input power	2.31 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**9.13 W/kg ± 17.0 % (k=2)**

SAR averaged over 10 cm³ (10 g) of Head TSL	condition	
SAR measured	250 mW input power	1.50 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**5.94 W/kg ± 16.5 % (k=2)**

Body TSL parameters

The following parameters and calculations were applied.

	Temperature	**Permittivity**	**Conductivity**
Nominal Body TSL parameters	22.0 °C	55.2	0.97 mho/m
Measured Body TSL parameters	(22.0 ± 0.2) °C	54.9 ± 6 %	1.00 mho/m ± 6 %
Body TSL temperature change during test	< 0.5 °C	----	----

SAR result with Body TSL

SAR averaged over 1 cm³ (1 g) of Body TSL	Condition	
SAR measured	250 mW input power	2.37 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	**9.25 W/kg ± 17.0 % (k=2)**

SAR averaged over 10 cm³ (10 g) of Body TSL	condition	
SAR measured	250 mW input power	1.55 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	**6.08 W/kg ± 16.5 % (k=2)**

Appendix (Additional assessments outside the scope of SCS 0108)

Antenna Parameters with Head TSL

Impedance, transformed to feed point	51.6 Ω - 1.6 jΩ
Return Loss	- 33.1 dB

Antenna Parameters with Body TSL

Impedance, transformed to feed point	48.0 Ω - 3.7 jΩ
Return Loss	- 27.4 dB

General Antenna Parameters and Design

Electrical Delay (one direction)	1.395 ns

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

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

Additional EUT Data

Manufactured by	SPEAG
Manufactured on	July 22, 2011

DASY5 Validation Report for Head TSL

Date: 22.07.2015

Test Laboratory: SPEAG, Zurich, Switzerland

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

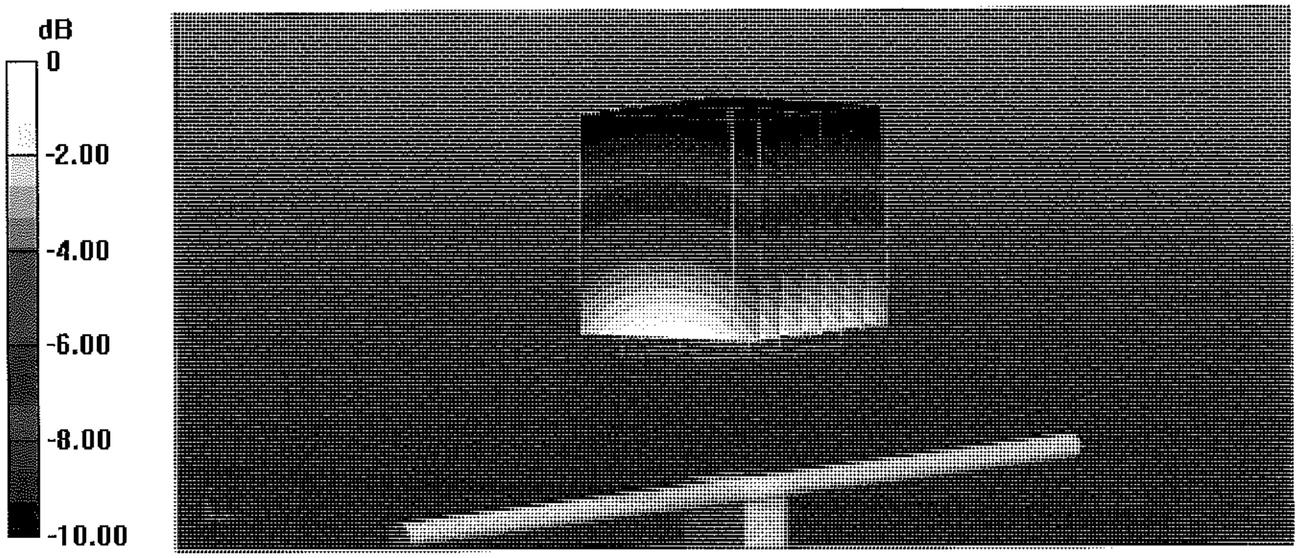
Communication System: UID 0 - CW; Frequency: 835 MHz
Medium parameters used: f = 835 MHz; σ = 0.92 S/m; ε_r = 42.4; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)

DASY52 Configuration:

- Probe: ES3DV3 - SN3205; ConvF(6.2, 6.2, 6.2); Calibrated: 30.12.2014;
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 18.08.2014
- Phantom: Flat Phantom 4.9L; Type: QD000P49AA; Serial: 1001
- DASY52 52.8.8(1222); SEMCAD X 14.6.10(7331)

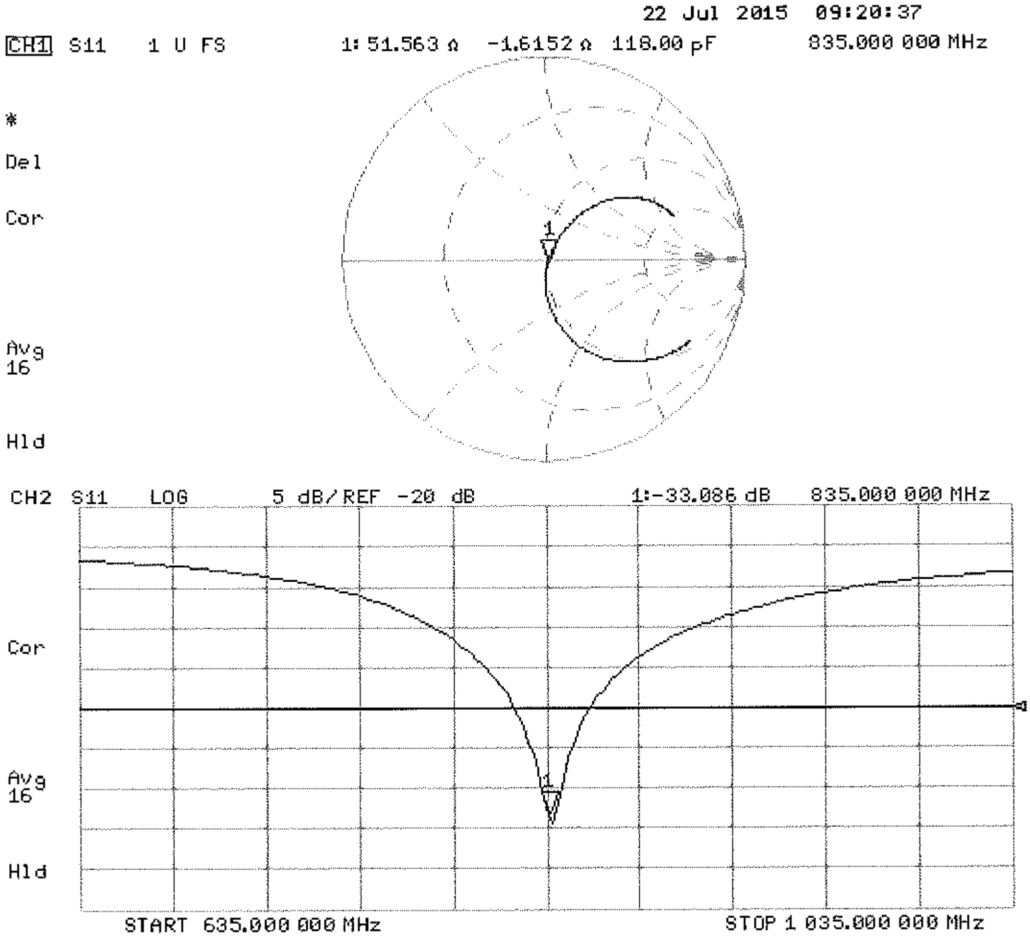
Dipole Calibration for Head Tissue/Pin=250 mW, d=15mm/Zoom Scan (7x7x7)/Cube 0:

Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 56.11 V/m; Power Drift = 0.00 dB
Peak SAR (extrapolated) = 3.44 W/kg
SAR(1 g) = 2.31 W/kg; SAR(10 g) = 1.5 W/kg
Maximum value of SAR (measured) = 2.70 W/kg



0 dB = 2.70 W/kg = 4.31 dBW/kg

Impedance Measurement Plot for Head TSL



DASY5 Validation Report for Body TSL

Date: 23.07.2015

Test Laboratory: SPEAG, Zurich, Switzerland

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

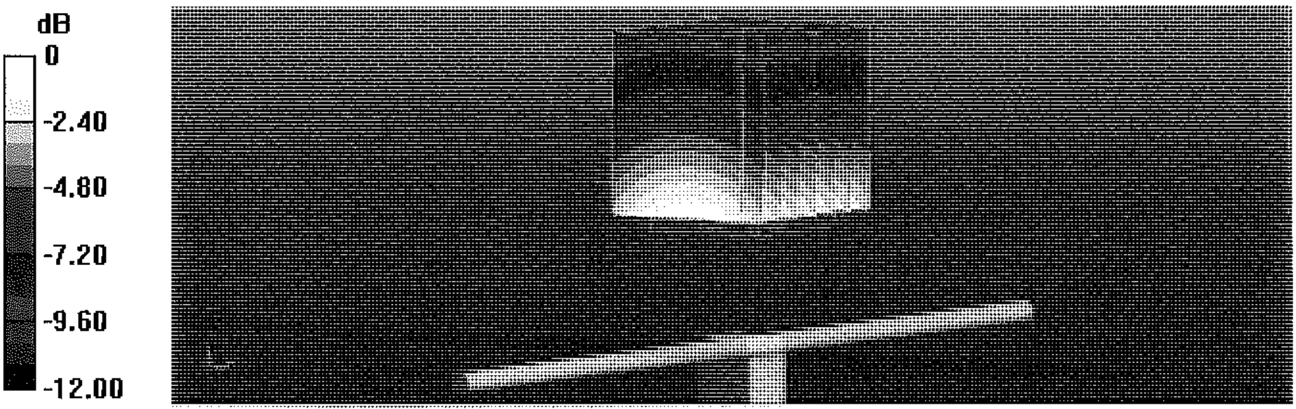
Communication System: UID 0 - CW; Frequency: 835 MHz
Medium parameters used: f = 835 MHz; σ = 1 S/m; ε_r = 54.9; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)

DASY52 Configuration:

- Probe: ES3DV3 - SN3205; ConvF(6.17, 6.17, 6.17); Calibrated: 30.12.2014;
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 18.08.2014
- Phantom: Flat Phantom 4.9L; Type: QD000P49AA; Serial: 1001
- DASY52 52.8.8(1222); SEMCAD X 14.6.10(7331)

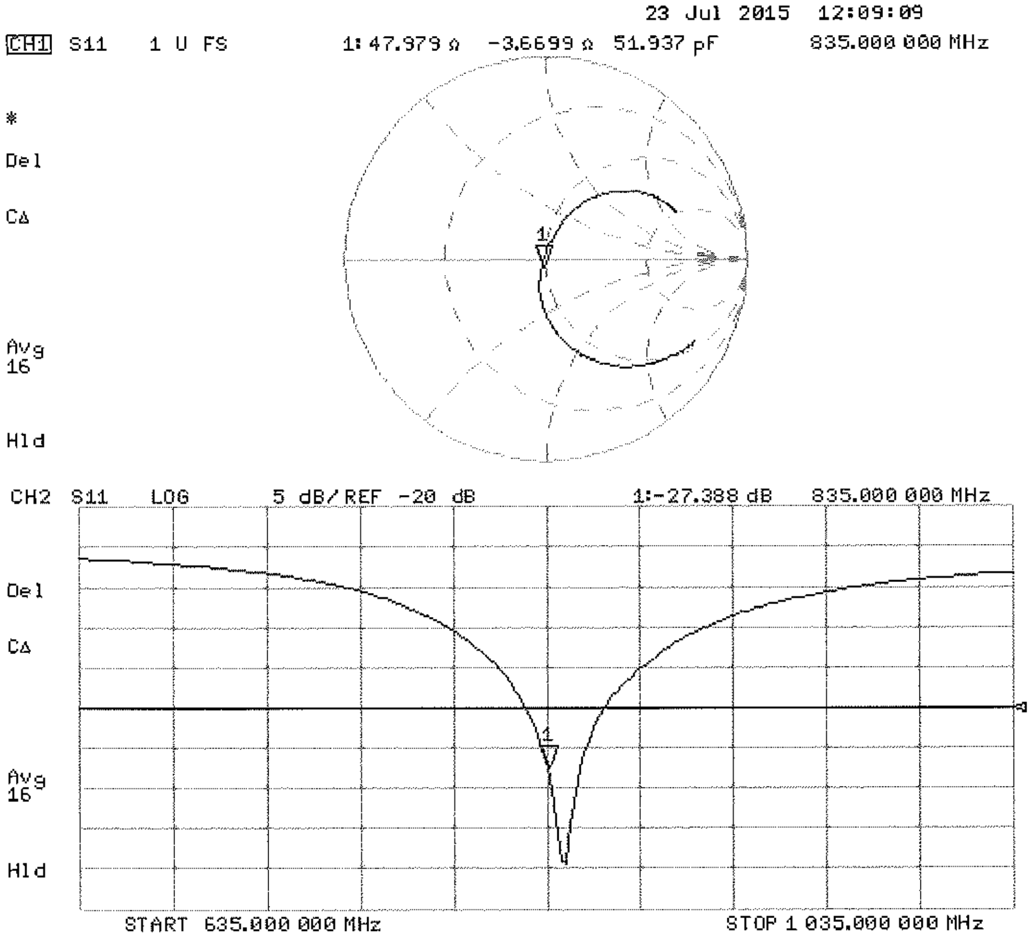
Dipole Calibration for Body Tissue/Pin=250 mW, d=15mm/Zoom Scan (7x7x7)/Cube 0:

Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 54.56 V/m; Power Drift = -0.02 dB
Peak SAR (extrapolated) = 3.50 W/kg
SAR(1 g) = 2.37 W/kg; SAR(10 g) = 1.55 W/kg
Maximum value of SAR (measured) = 2.77 W/kg



0 dB = 2.77 W/kg = 4.42 dBW/kg

Impedance Measurement Plot for Body TSL



Calibration Laboratory of
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Engineering AG
Zeughausstrasse 43, 8004 Zurich, Switzerland

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Accreditation No.: SCS 0108

Client PC Test

Certificate No: D1750V2-1051_Apr15

CALIBRATION CERTIFICATE

Object	D1750V2 - SN:1051
Calibration procedure(s)	QA CAL-05.v9 Calibration procedure for dipole validation kits above 700 MHz
Calibration date:	April 15, 2015

PM ✓
4/29/15

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	07-Oct-14 (No. 217-02020)	Oct-15
Power sensor HP 8481A	US37292783	07-Oct-14 (No. 217-02020)	Oct-15
Power sensor HP 8481A	MY41092317	07-Oct-14 (No. 217-02021)	Oct-15
Reference 20 dB Attenuator	SN: 5058 (20k)	01-Apr-15 (No. 217-02131)	Mar-16
Type-N mismatch combination	SN: 5047.2 / 06327	01-Apr-15 (No. 217-02134)	Mar-16
Reference Probe ES3DV3	SN: 3205	30-Dec-14 (No. ES3-3205_Dec14)	Dec-15
DAE4	SN: 601	18-Aug-14 (No. DAE4-601_Aug14)	Aug-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-14)	In house check: Oct-15

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

Issued: April 15, 2015

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	38.9 ± 6 %	1.35 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	9.04 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**36.2 W/kg ± 17.0 % (k=2)**

SAR averaged over 10 cm^3 (10 g) of Head TSL	condition	
SAR measured	250 mW input power	4.80 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**19.2 W/kg ± 16.5 % (k=2)**

Body TSL parameters

The following parameters and calculations were applied.

	Temperature	**Permittivity**	**Conductivity**
Nominal Body TSL parameters	22.0 °C	53.4	1.49 mho/m
Measured Body TSL parameters	(22.0 ± 0.2) °C	51.5 ± 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	9.32 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	**37.1 W/kg ± 17.0 % (k=2)**

SAR averaged over 10 cm^3 (10 g) of Body TSL	condition	
SAR measured	250 mW input power	5.01 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	**20.0 W/kg ± 16.5 % (k=2)**

Appendix (Additional assessments outside the scope of SCS 0108)

Antenna Parameters with Head TSL

Impedance, transformed to feed point	51.3 Ω - 0.2 jΩ
Return Loss	- 37.5 dB

Antenna Parameters with Body TSL

Impedance, transformed to feed point	46.9 Ω + 0.3 jΩ
Return Loss	- 29.9 dB

General Antenna Parameters and Design

Electrical Delay (one direction)	1.221 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	February 19, 2010

DASY5 Validation Report for Head TSL

Date: 15.04.2015

Test Laboratory: SPEAG, Zurich, Switzerland

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

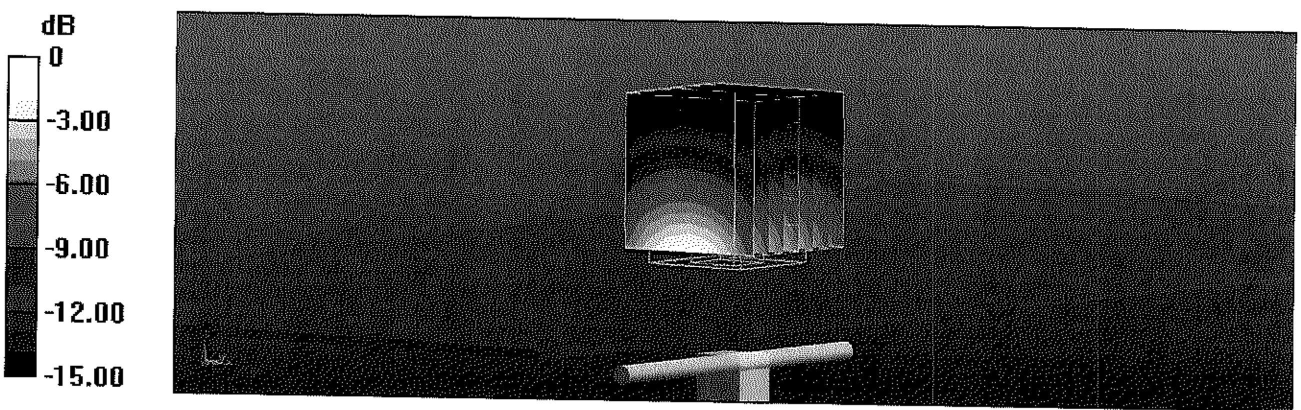
Communication System: UID 0 - CW; Frequency: 1750 MHz
Medium parameters used: f = 1750 MHz; $\sigma = 1.35$ S/m; $\varepsilon_r = 38.9$; $\rho = 1000$ kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)

DASY52 Configuration:

- Probe: ES3DV3 - SN3205; ConvF(5.2, 5.2, 5.2); Calibrated: 30.12.2014;
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 18.08.2014
- Phantom: Flat Phantom 5.0 (front); Type: QD000P50AA; Serial: 1001
- DASY52 52.8.8(1222); SEMCAD X 14.6.10(7331)

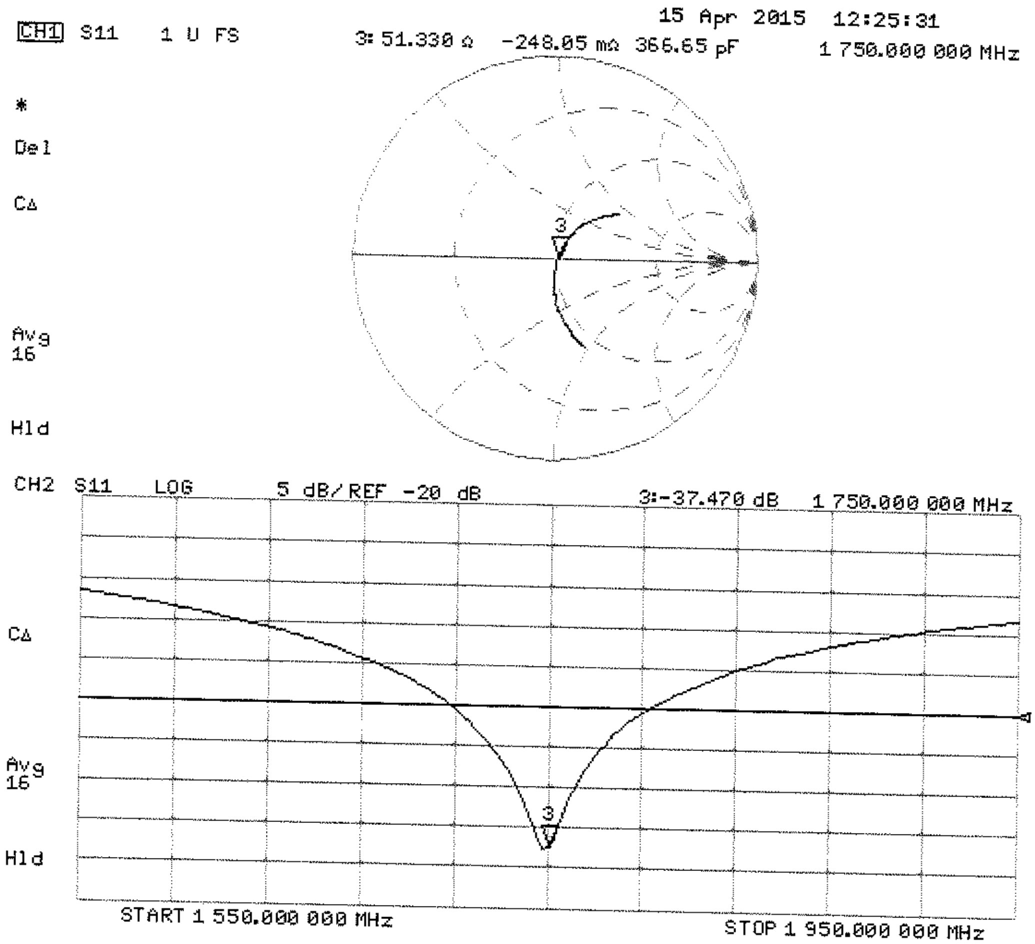
Dipole Calibration for Head Tissue/Pin=250 mW, d=10mm/Zoom Scan (7x7x7)/Cube 0:

Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 94.99 V/m; Power Drift = 0.06 dB
Peak SAR (extrapolated) = 16.3 W/kg
SAR(1 g) = 9.04 W/kg; SAR(10 g) = 4.8 W/kg
Maximum value of SAR (measured) = 11.5 W/kg



0 dB = 11.5 W/kg = 10.61 dBW/kg

Impedance Measurement Plot for Head TSL



DASY5 Validation Report for Body TSL

Date: 15.04.2015

Test Laboratory: SPEAG, Zurich, Switzerland

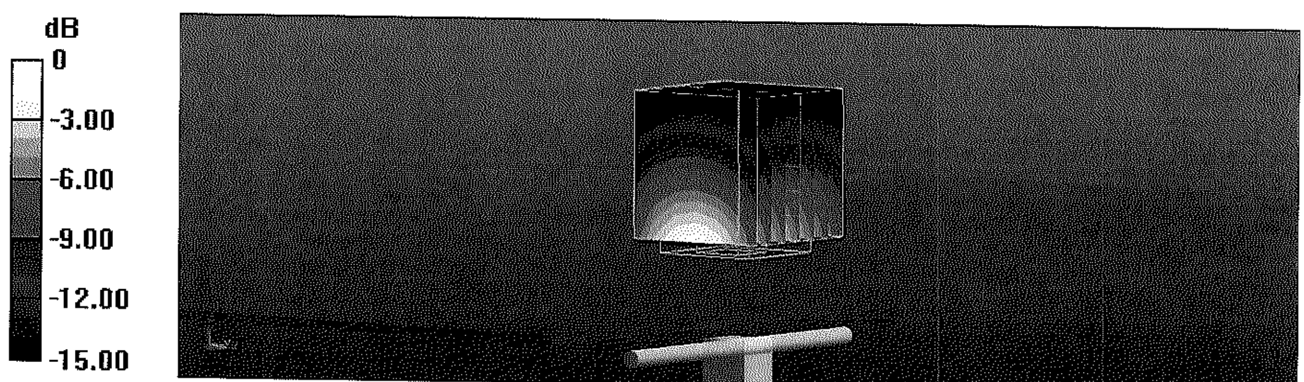
DUT: Dipole 1750 MHz; Type: D1750V2; Serial: D1750V2 - SN:1051

Communication System: UID 0 - CW; Frequency: 1750 MHz
Medium parameters used: f = 1750 MHz; σ = 1.48 S/m; ε_r = 51.5; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)

DASY52 Configuration:

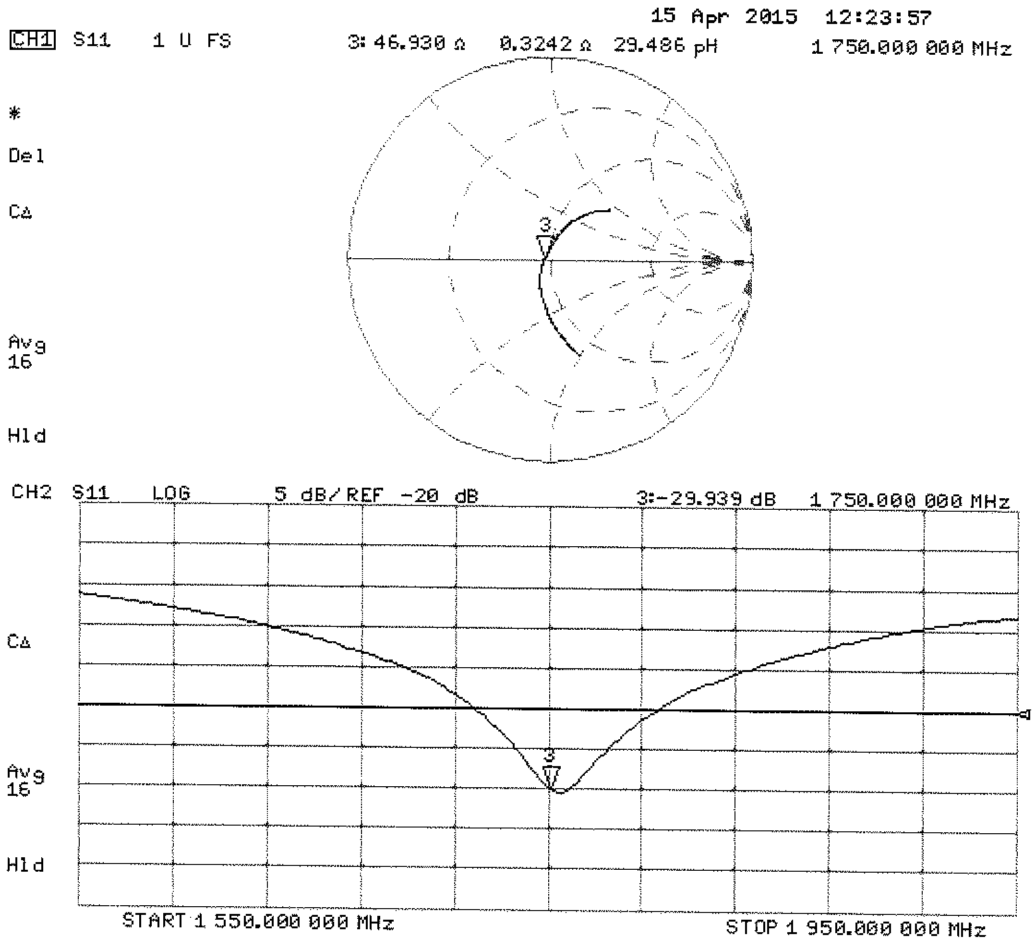
- Probe: ES3DV3 - SN3205; ConvF(4.88, 4.88, 4.88); Calibrated: 30.12.2014;
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 18.08.2014
- Phantom: Flat Phantom 5.0 (back); Type: QD000P50AA; Serial: 1002
- DASY52 52.8.8(1222); SEMCAD X 14.6.10(7331)

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 = 92.87 V/m; Power Drift = 0.01 dB
Peak SAR (extrapolated) = 16.0 W/kg
SAR(1 g) = 9.32 W/kg; SAR(10 g) = 5.01 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 Body TSL



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Accreditation No.: SCS 0108

Client **PC Test**

Certificate No: D1900V2-5d149_Jul15

CALIBRATION CERTIFICATE

Object: D1900V2 - SN:5d149

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

CC✓
8/4/15

Calibration date: July 14, 2015

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	07-Oct-14 (No. 217-02020)	Oct-15
Power sensor HP 8481A	US37292783	07-Oct-14 (No. 217-02020)	Oct-15
Power sensor HP 8481A	MY41092317	07-Oct-14 (No. 217-02021)	Oct-15
Reference 20 dB Attenuator	SN: 5058 (20k)	01-Apr-15 (No. 217-02131)	Mar-16
Type-N mismatch combination	SN: 5047.2 / 06327	01-Apr-15 (No. 217-02134)	Mar-16
Reference Probe ES3DV3	SN: 3205	30-Dec-14 (No. ES3-3205_Dec14)	Dec-15
DAE4	SN: 601	18-Aug-14 (No. DAE4-601_Aug14)	Aug-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-14)	In house check: Oct-15

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

Issued: July 14, 2015

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Accreditation No.: SCS 0108

Glossary:

TSL	tissue simulating liquid
ConvF	sensitivity in TSL / NORM x,y,z
N/A	not applicable or not measured

Calibration is Performed According to the Following Standards:

a) IEEE Std 1528-2013, "IEEE Recommended Practice for Determining the Peak Spatial-Averaged Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques", June 2013
b) IEC 62209-1, "Procedure to measure the Specific Absorption Rate (SAR) for hand-held devices used in close proximity to the ear (frequency range of 300 MHz to 3 GHz)", February 2005
c) IEC 62209-2, "Procedure to determine the Specific Absorption Rate (SAR) for wireless communication devices used in close proximity to the human body (frequency range of 30 MHz to 6 GHz)", March 2010
d) KDB 865664, "SAR Measurement Requirements for 100 MHz to 6 GHz"

Additional Documentation:

e) DASY4/5 System Handbook

Methods Applied and Interpretation of Parameters:

- *Measurement Conditions:* Further details are available from the Validation Report at the end of the certificate. All figures stated in the certificate are valid at the frequency indicated.
- *Antenna Parameters with TSL:* The dipole is mounted with the spacer to position its feed point exactly below the center marking of the flat phantom section, with the arms oriented parallel to the body axis.
- *Feed Point Impedance and Return Loss:* These parameters are measured with the dipole positioned under the liquid filled phantom. The impedance stated is transformed from the measurement at the SMA connector to the feed point. The Return Loss ensures low reflected power. No uncertainty required.
- *Electrical Delay:* One-way delay between the SMA connector and the antenna feed point. No uncertainty required.
- *SAR measured:* SAR measured at the stated antenna input power.
- *SAR normalized:* SAR as measured, normalized to an input power of 1 W at the antenna connector.
- *SAR for nominal TSL parameters:* The measured TSL parameters are used to calculate the nominal SAR result.

The reported uncertainty of measurement is stated as the standard uncertainty of measurement multiplied by the coverage factor k=2, which for a normal distribution corresponds to a coverage probability of approximately 95%.

Measurement Conditions

DASY system configuration, as far as not given on page 1.

DASY Version	DASY5	V52.8.8
Extrapolation	Advanced Extrapolation	
Phantom	Modular Flat Phantom	
Distance Dipole Center - TSL	10 mm	with Spacer
Zoom Scan Resolution	dx, dy, dz = 5 mm	
Frequency	1900 MHz ± 1 MHz	

Head TSL parameters

The following parameters and calculations were applied.

	Temperature	**Permittivity**	**Conductivity**
Nominal Head TSL parameters	22.0 °C	40.0	1.40 mho/m
Measured Head TSL parameters	(22.0 ± 0.2) °C	39.7 ± 6 %	1.38 mho/m ± 6 %
Head TSL temperature change during test	< 0.5 °C	----	----

SAR result with Head TSL

SAR averaged over 1 cm^3 (1 g) of Head TSL	Condition	
SAR measured	250 mW input power	10.1 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**40.7 W/kg ± 17.0 % (k=2)**

SAR averaged over 10 cm^3 (10 g) of Head TSL	condition	
SAR measured	250 mW input power	5.34 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**21.5 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	53.3	1.52 mho/m
Measured Body TSL parameters	(22.0 ± 0.2) °C	52.7 ± 6 %	1.54 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	**40.4 W/kg ± 17.0 % (k=2)**

SAR averaged over 10 cm^3 (10 g) of Body TSL	condition	
SAR measured	250 mW input power	5.49 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	**21.8 W/kg ± 16.5 % (k=2)**

Appendix (Additional assessments outside the scope of SCS 0108)

Antenna Parameters with Head TSL

Impedance, transformed to feed point	51.4 Ω + 5.6 jΩ
Return Loss	- 24.9 dB

Antenna Parameters with Body TSL

Impedance, transformed to feed point	47.7 Ω + 6.1 jΩ
Return Loss	- 23.5 dB

General Antenna Parameters and Design

Electrical Delay (one direction)	1.197 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: 14.07.2015

Test Laboratory: SPEAG, Zurich, Switzerland

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

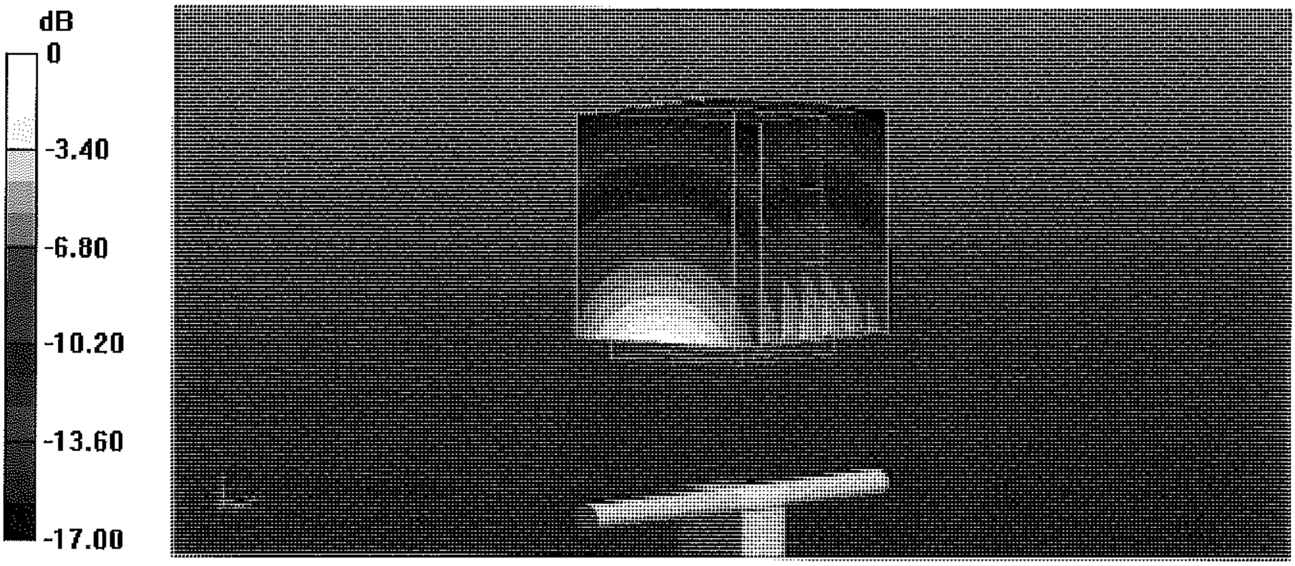
Communication System: UID 0 - CW; Frequency: 1900 MHz
Medium parameters used: f = 1900 MHz; σ = 1.38 S/m; ε_r = 39.7; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)

DASY52 Configuration:

- Probe: ES3DV3 - SN3205; ConvF(5, 5, 5); Calibrated: 30.12.2014;
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 18.08.2014
- Phantom: Flat Phantom 5.0 (front); Type: QD000P50AA; Serial: 1001
- DASY52 52.8.8(1222); SEMCAD X 14.6.10(7331)

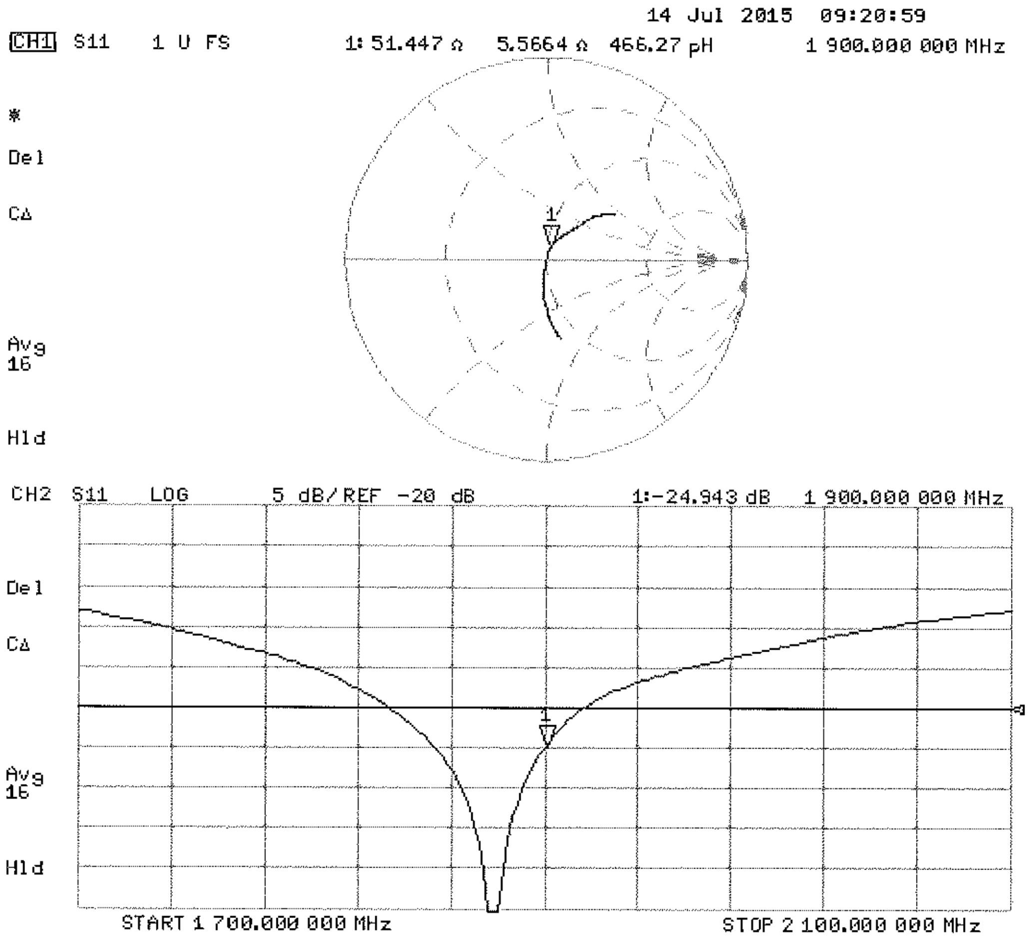
Dipole Calibration for Head Tissue/Pin=250 mW, d=10mm/Zoom Scan (7x7x7)/Cube 0:

Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 99.22 V/m; Power Drift = 0.02 dB
Peak SAR (extrapolated) = 18.3 W/kg
SAR(1 g) = 10.1 W/kg; SAR(10 g) = 5.34 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 Head TSL



DASY5 Validation Report for Body TSL

Date: 14.07.2015

Test Laboratory: SPEAG, Zurich, Switzerland

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

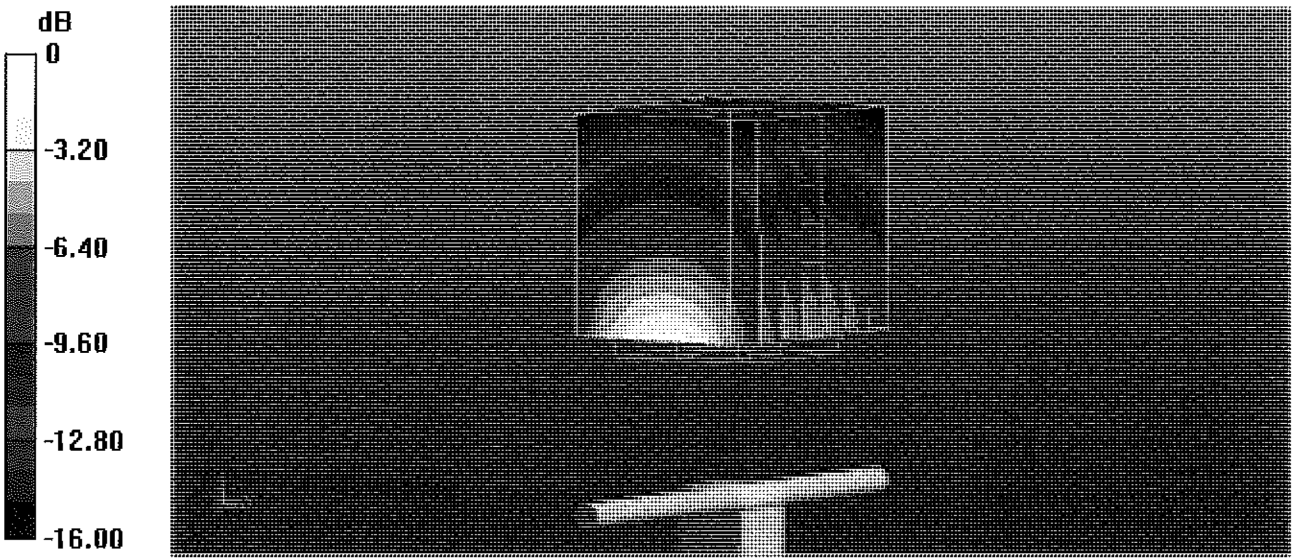
Communication System: UID 0 - CW; Frequency: 1900 MHz
Medium parameters used: f = 1900 MHz; $\sigma = 1.54$ S/m; $\varepsilon_r = 52.7$; $\rho = 1000$ kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)

DASY52 Configuration:

- Probe: ES3DV3 - SN3205; ConvF(4.65, 4.65, 4.65); Calibrated: 30.12.2014;
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 18.08.2014
- Phantom: Flat Phantom 5.0 (back); Type: QD000P50AA; Serial: 1002
- DASY52 52.8.8(1222); SEMCAD X 14.6.10(7331)

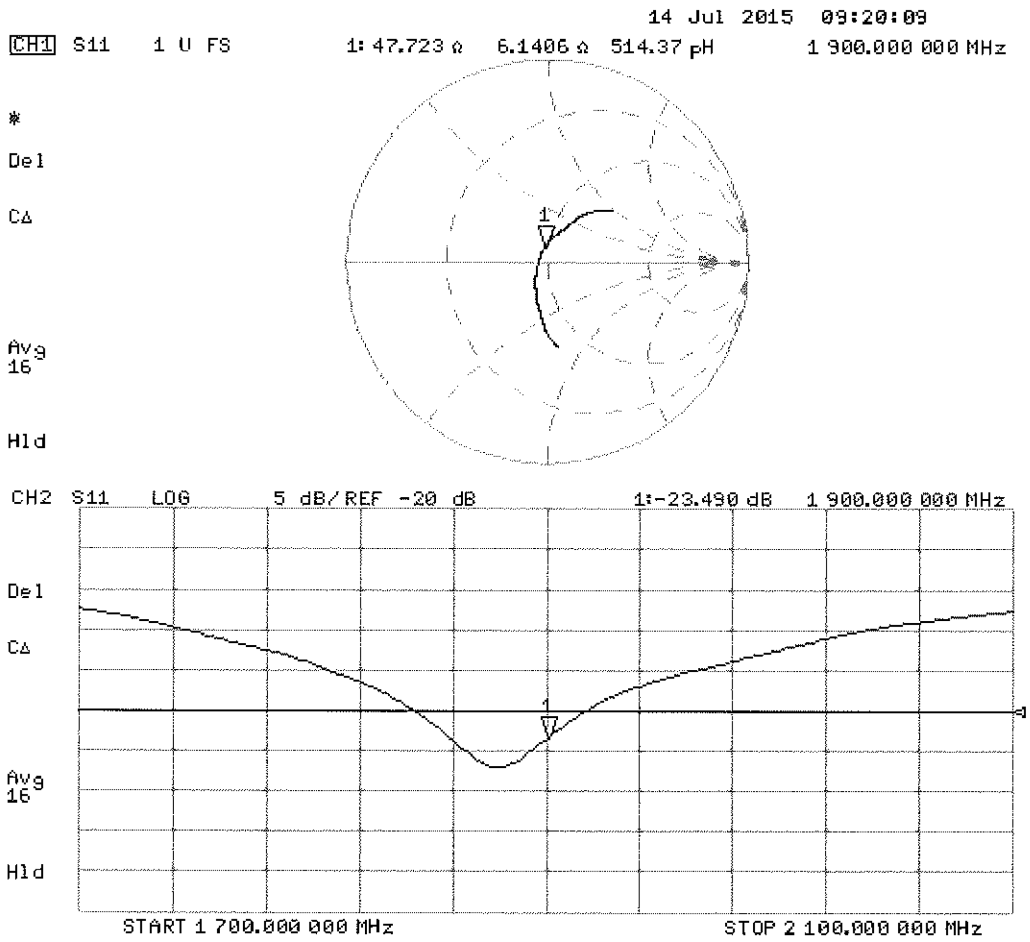
Dipole Calibration for Body Tissue/Pin=250 mW, d=10mm/Zoom Scan (7x7x7)/Cube 0:

Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 95.96 V/m; Power Drift = 0.01 dB
Peak SAR (extrapolated) = 17.2 W/kg
SAR(1 g) = 10.2 W/kg; SAR(10 g) = 5.49 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 0108

Client **PC Test**

Certificate No: D1900V2-5d141_Apr15

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 14, 2015

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	07-Oct-14 (No. 217-02020)	Oct-15
Power sensor HP 8481A	US37292783	07-Oct-14 (No. 217-02020)	Oct-15
Power sensor HP 8481A	MY41092317	07-Oct-14 (No. 217-02021)	Oct-15
Reference 20 dB Attenuator	SN: 5058 (20k)	01-Apr-15 (No. 217-02131)	Mar-16
Type-N mismatch combination	SN: 5047.2 / 06327	01-Apr-15 (No. 217-02134)	Mar-16
Reference Probe ES3DV3	SN: 3205	30-Dec-14 (No. ES3-3205_Dec14)	Dec-15
DAE4	SN: 601	18-Aug-14 (No. DAE4-601_Aug14)	Aug-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-14)	In house check: Oct-15

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

Issued: April 14, 2015

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Accreditation No.: SCS 0108

Glossary:

TSL	tissue simulating liquid
ConvF	sensitivity in TSL / NORM x,y,z
N/A	not applicable or not measured

Calibration is Performed According to the Following Standards:

a) IEEE Std 1528-2013, "IEEE Recommended Practice for Determining the Peak Spatial-Averaged Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques", June 2013
b) IEC 62209-1, "Procedure to measure the Specific Absorption Rate (SAR) for hand-held devices used in close proximity to the ear (frequency range of 300 MHz to 3 GHz)", February 2005
c) 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	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	38.6 ± 6 %	1.37 mho/m ± 6 %
Head TSL temperature change during test	< 0.5 °C	----	----

SAR result with Head TSL

SAR averaged over 1 cm^3 (1 g) of Head TSL	Condition	
SAR measured	250 mW input power	9.93 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**39.9 W/kg ± 17.0 % (k=2)**

SAR averaged over 10 cm^3 (10 g) of Head TSL	condition	
SAR measured	250 mW input power	5.20 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**20.9 W/kg ± 16.5 % (k=2)**

Body TSL parameters

The following parameters and calculations were applied.

	Temperature	**Permittivity**	**Conductivity**
Nominal Body TSL parameters	22.0 °C	53.3	1.52 mho/m
Measured Body TSL parameters	(22.0 ± 0.2) °C	52.8 ± 6 %	1.50 mho/m ± 6 %
Body TSL temperature change during test	< 0.5 °C	----	----

SAR result with Body TSL

SAR averaged over 1 cm^3 (1 g) of Body TSL	Condition	
SAR measured	250 mW input power	9.94 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	**40.0 W/kg ± 17.0 % (k=2)**

SAR averaged over 10 cm^3 (10 g) of Body TSL	condition	
SAR measured	250 mW input power	5.29 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	**21.2 W/kg ± 16.5 % (k=2)**

Appendix (Additional assessments outside the scope of SCS 0108)

Antenna Parameters with Head TSL

Impedance, transformed to feed point	53.0 Ω + 4.6 jΩ
Return Loss	- 25.5 dB

Antenna Parameters with Body TSL

Impedance, transformed to feed point	48.2 Ω + 5.6 jΩ
Return Loss	- 24.5 dB

General Antenna Parameters and Design

Electrical Delay (one direction)	1.198 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

Date: 14.04.2015

Test Laboratory: SPEAG, Zurich, Switzerland

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

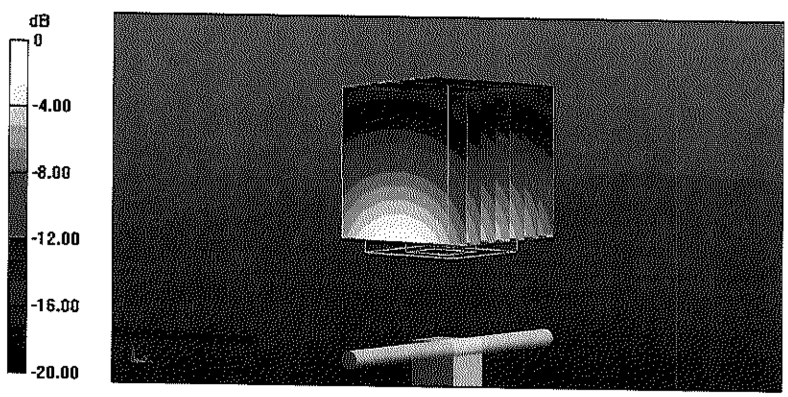
Communication System: UID 0 - CW; Frequency: 1900 MHz
Medium parameters used: f = 1900 MHz; σ = 1.37 S/m; ε_r = 38.6; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)

DASY52 Configuration:

- Probe: ES3DV3 - SN3205; ConvF(5, 5, 5); Calibrated: 30.12.2014;
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 18.08.2014
- Phantom: Flat Phantom 5.0 (front); Type: QD000P50AA; Serial: 1001
- DASY52 52.8.8(1222); SEMCAD X 14.6.10(7331)

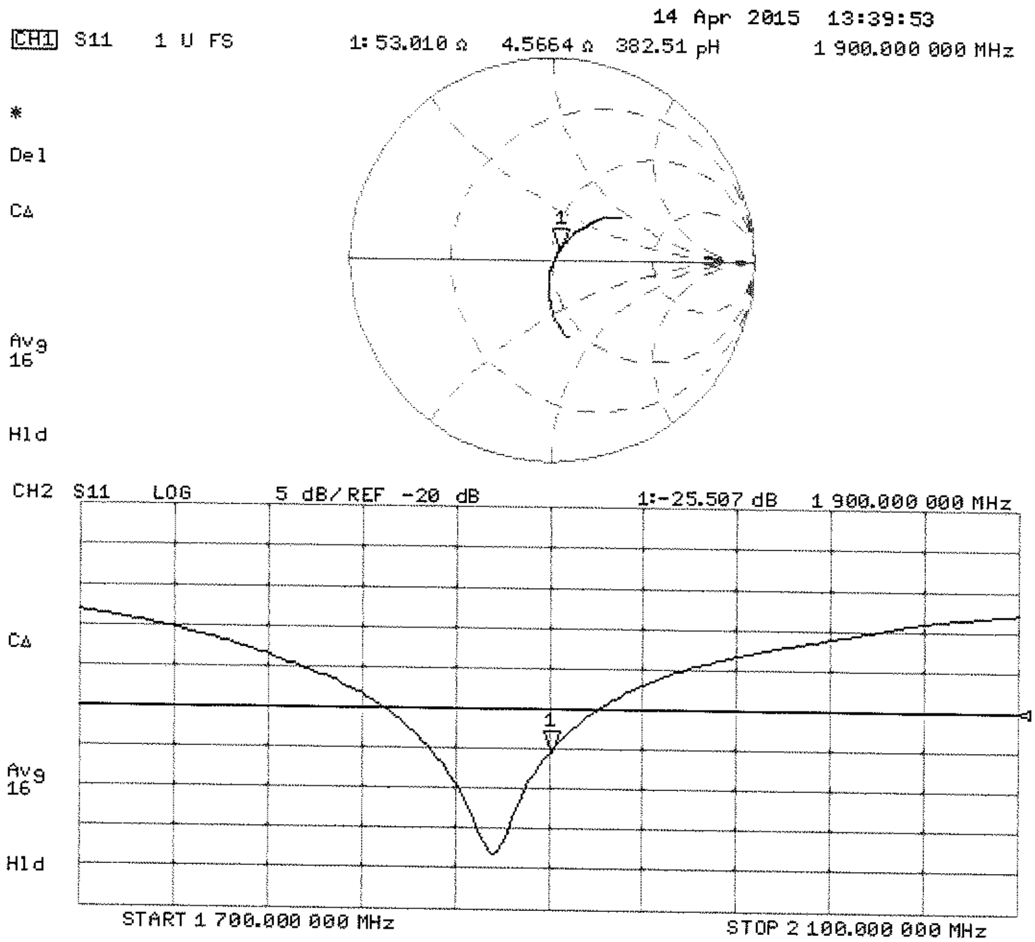
Dipole Calibration for Head Tissue/Pin=250 mW, d=10mm/Zoom Scan (7x7x7)/Cube 0:

Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 98.18 V/m; Power Drift = 0.04 dB
Peak SAR (extrapolated) = 18.2 W/kg
SAR(1 g) = 9.93 W/kg; SAR(10 g) = 5.2 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: 14.04.2015

Test Laboratory: SPEAG, Zurich, Switzerland

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

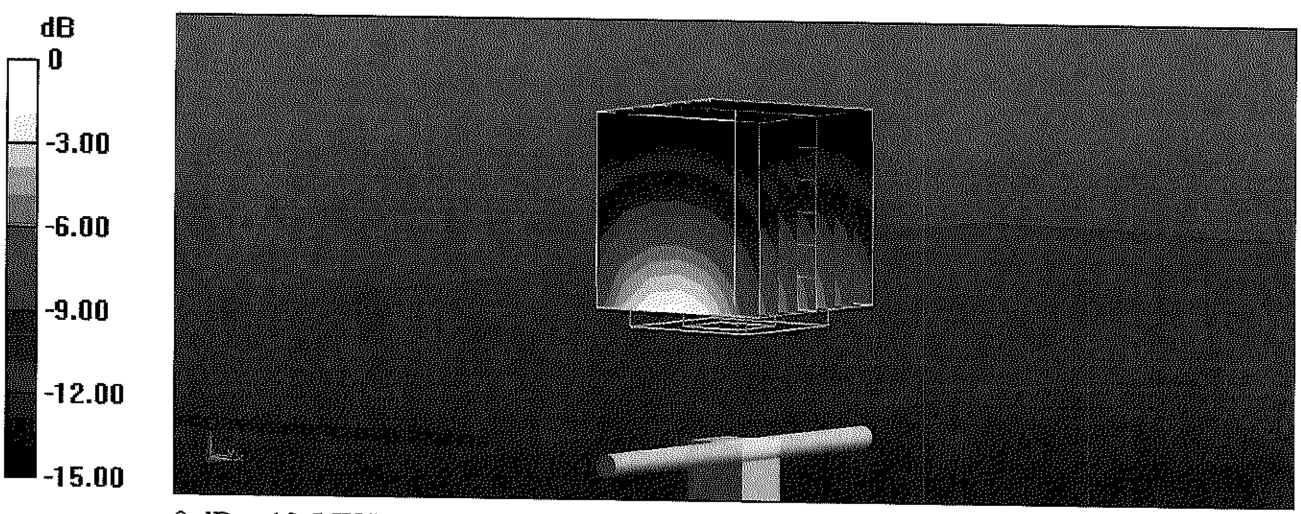
Communication System: UID 0 - CW; Frequency: 1900 MHz
Medium parameters used: f = 1900 MHz; σ = 1.5 S/m; ε_r = 52.8; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)

DASY52 Configuration:

- Probe: ES3DV3 - SN3205; ConvF(4.65, 4.65, 4.65); Calibrated: 30.12.2014;
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 18.08.2014
- Phantom: Flat Phantom 5.0 (back); Type: QD000P50AA; Serial: 1002
- DASY52 52.8.8(1222); SEMCAD X 14.6.10(7331)

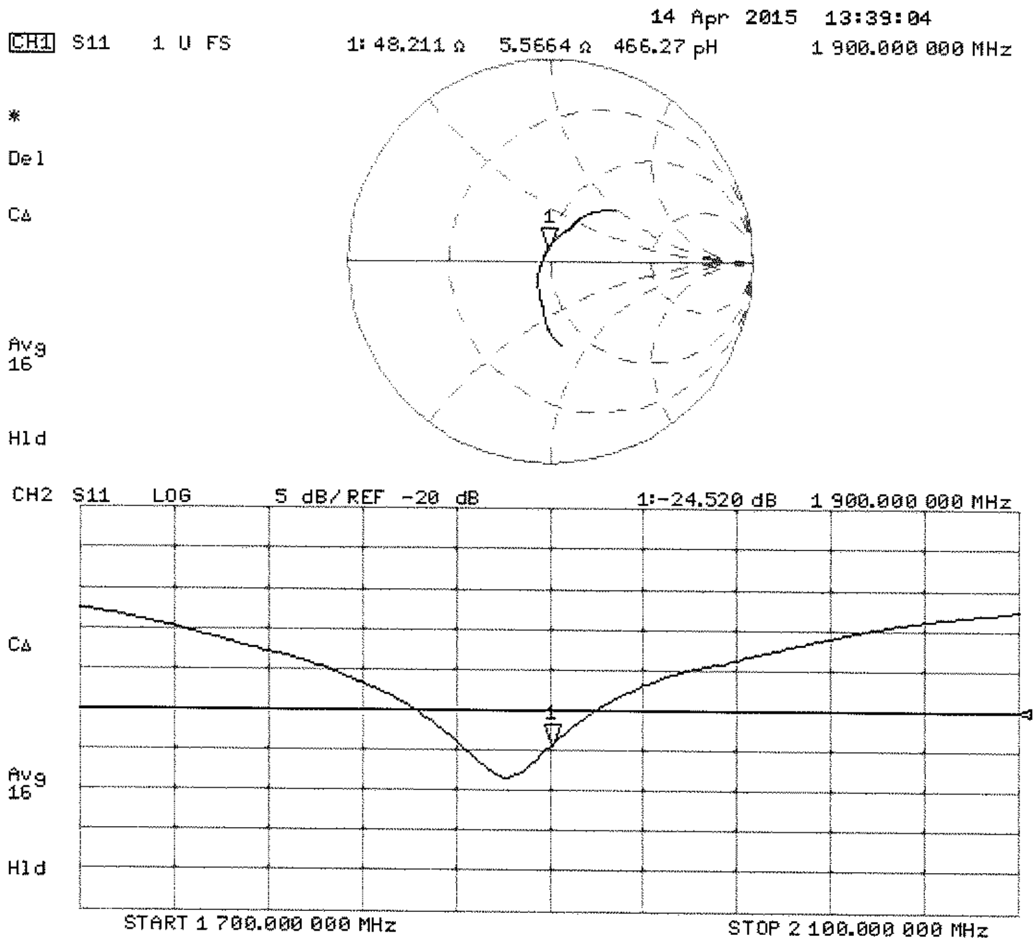
Dipole Calibration for Body Tissue/Pin=250 mW, d=10mm/Zoom Scan (7x7x7)/Cube 0:

Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 95.73 V/m; Power Drift = 0.01 dB
Peak SAR (extrapolated) = 16.9 W/kg
SAR(1 g) = 9.94 W/kg; SAR(10 g) = 5.29 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 Body TSL



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Accreditation No.: SCS 0108

Client **PC Test**

Certificate No: D2300V2-1008_Jan15

CALIBRATION CERTIFICATE

Object	D2300V2 - SN:1008
Calibration procedure(s)	QA CAL-05.v9 Calibration procedure for dipole validation kits above 700 MHz
Calibration date:	January 27, 2015

CC 2/3/15

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	07-Oct-14 (No. 217-02020)	Oct-15
Power sensor HP 8481A	US37292783	07-Oct-14 (No. 217-02020)	Oct-15
Power sensor HP 8481A	MY41092317	07-Oct-14 (No. 217-02021)	Oct-15
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-14 (No. ES3-3205_Dec14)	Dec-15
DAE4	SN: 601	18-Aug-14 (No. DAE4-601_Aug14)	Aug-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-14)	In house check: Oct-15

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

Issued: January 27, 2015

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	2300 MHz ± 1 MHz	

Head TSL parameters

The following parameters and calculations were applied.

	Temperature	**Permittivity**	**Conductivity**
Nominal Head TSL parameters	22.0 °C	39.5	1.67 mho/m
Measured Head TSL parameters	(22.0 ± 0.2) °C	39.9 ± 6 %	1.71 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	12.6 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**49.9 W/kg ± 17.0 % (k=2)**

SAR averaged over 10 cm^3 (10 g) of Head TSL	condition	
SAR measured	250 mW input power	6.04 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**24.0 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	52.9	1.81 mho/m
Measured Body TSL parameters	(22.0 ± 0.2) °C	52.0 ± 6 %	1.85 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	12.2 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	**48.1 W/kg ± 17.0 % (k=2)**

SAR averaged over 10 cm^3 (10 g) of Body TSL	condition	
SAR measured	250 mW input power	5.81 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	**23.0 W/kg ± 16.5 % (k=2)**

Appendix (Additional assessments outside the scope of SCS0108)

Antenna Parameters with Head TSL

Impedance, transformed to feed point	48.8 Ω - 2.0 jΩ
Return Loss	- 32.5 dB

Antenna Parameters with Body TSL

Impedance, transformed to feed point	45.8 Ω - 1.5 jΩ
Return Loss	- 26.6 dB

General Antenna Parameters and Design

Electrical Delay (one direction)	1.169 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 30, 2007

DASY5 Validation Report for Head TSL

Date: 27.01.2015

Test Laboratory: SPEAG, Zurich, Switzerland

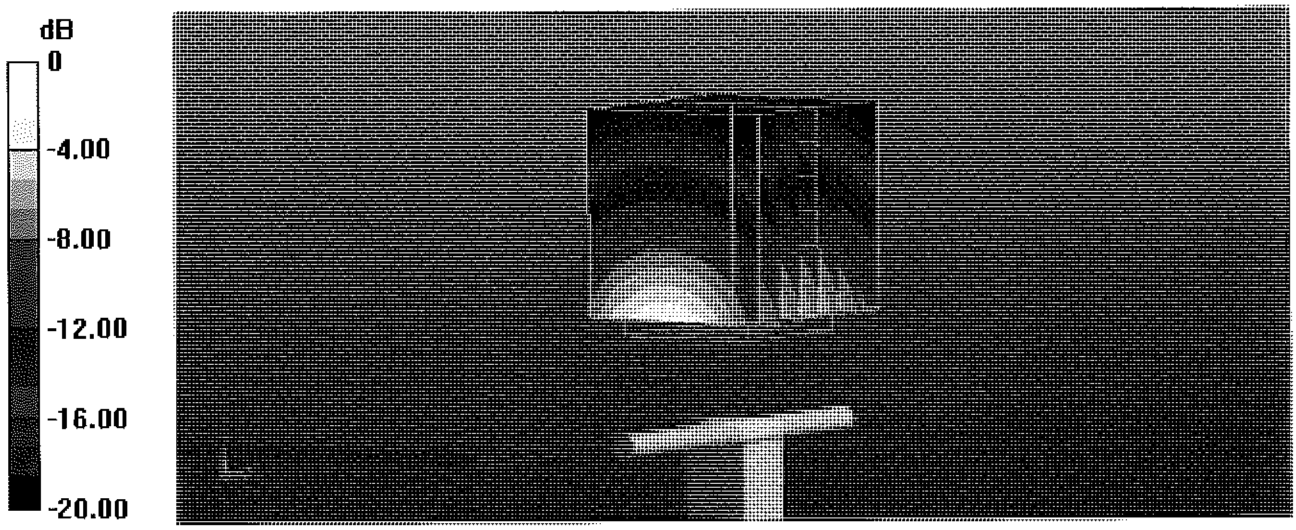
DUT: Dipole 2300 MHz; Type: D2300V2; Serial: D2300V2 - SN:1008

Communication System: UID 0 - CW; Frequency: 2300 MHz
Medium parameters used: f = 2300 MHz; σ = 1.71 S/m; ε_r = 39.9; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)

DASY52 Configuration:

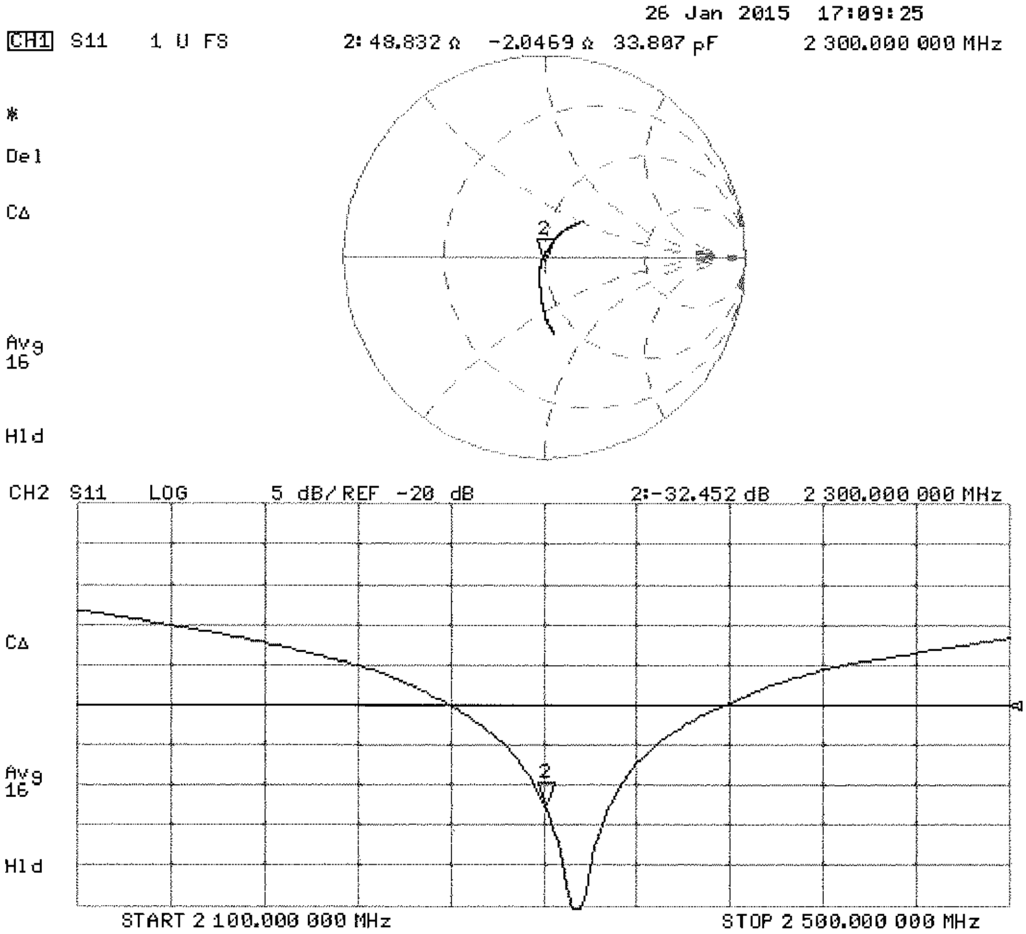
- Probe: ES3DV3 - SN3205; ConvF(4.75, 4.75, 4.75); Calibrated: 30.12.2014;
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 18.08.2014
- Phantom: Flat Phantom 5.0 (front); Type: QD000P50AA; Serial: 1001
- DASY52 52.8.8(1222); SEMCAD X 14.6.10(7331)

Dipole Calibration for Head Tissue/d=10mm, Pin=250 mW, dist=3.0mm (ES-Probe)/Zoom Scan (7x7x7) 2 (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 101.6 V/m; Power Drift = 0.03 dB
Peak SAR (extrapolated) = 24.1 W/kg
SAR(1 g) = 12.6 W/kg; SAR(10 g) = 6.04 W/kg
Maximum value of SAR (measured) = 16.3 W/kg



0 dB = 16.3 W/kg = 12.12 dBW/kg

Impedance Measurement Plot for Head TSL



DASY5 Validation Report for Body TSL

Date: 27.01.2015

Test Laboratory: SPEAG, Zurich, Switzerland

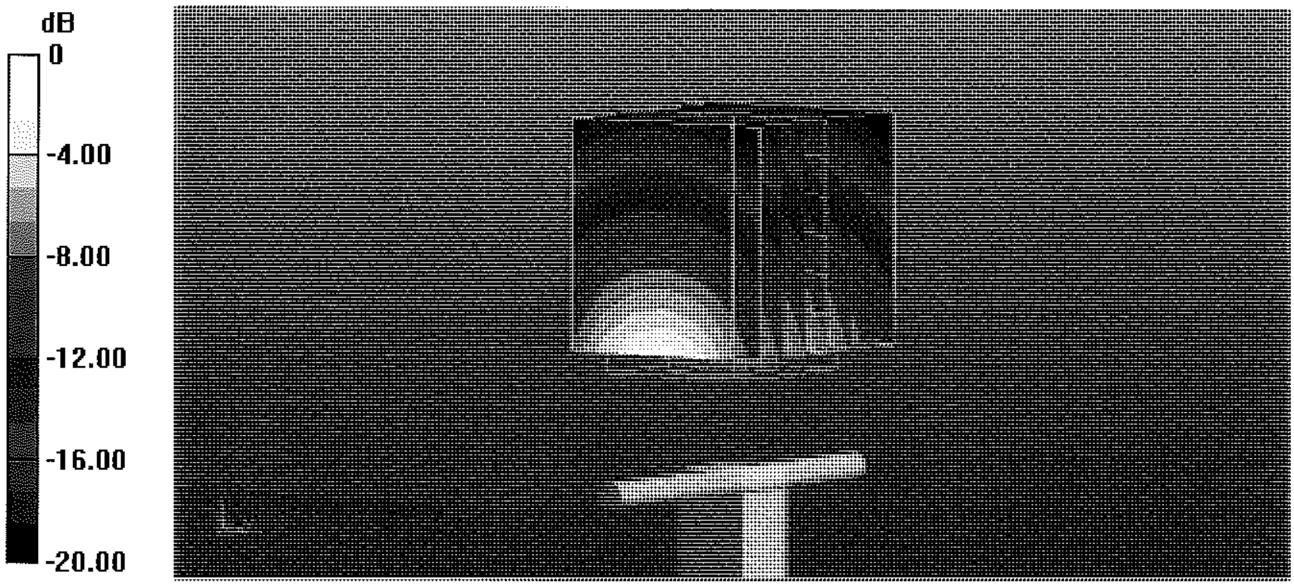
DUT: Dipole 2300 MHz; Type: D2300V2; Serial: D2300V2 - SN:1008

Communication System: UID 0 - CW; Frequency: 2300 MHz
Medium parameters used: f = 2300 MHz; σ = 1.85 S/m; ε_r = 52; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)

DASY52 Configuration:

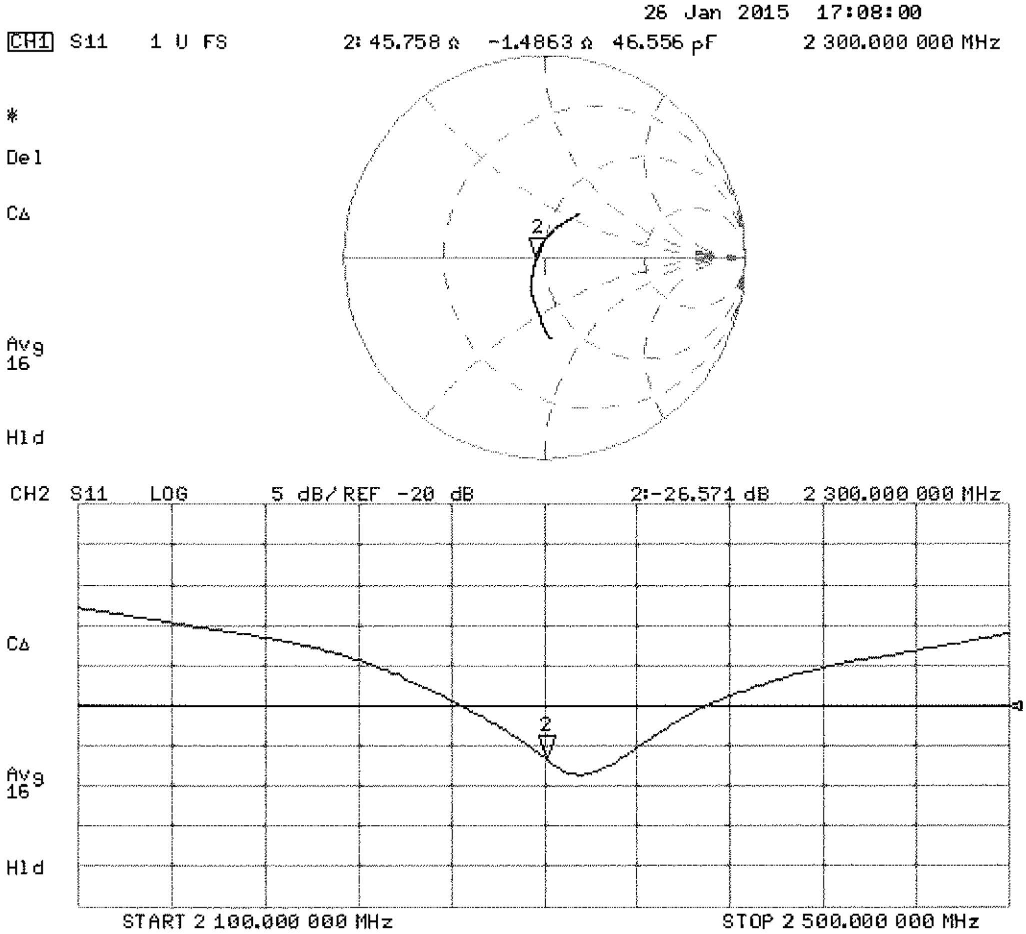
- Probe: ES3DV3 - SN3205; ConvF(4.44, 4.44, 4.44); Calibrated: 30.12.2014;
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 18.08.2014
- Phantom: Flat Phantom 5.0 (back); Type: QD000P50AA; Serial: 1002
- DASY52 52.8.8(1222); SEMCAD X 14.6.10(7331)

Dipole Calibration for Body Tissue/d=10mm, Pin=250 mW, dist=3.0mm (ES-Probe)/Zoom Scan (7x7x7) (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 95.62 V/m; Power Drift = 0.02 dB
Peak SAR (extrapolated) = 24.0 W/kg
SAR(1 g) = 12.2 W/kg; SAR(10 g) = 5.81 W/kg
Maximum value of SAR (measured) = 15.7 W/kg



0 dB = 15.7 W/kg = 11.96 dBW/kg

Impedance Measurement Plot for Body TSL



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Accreditation No.: SCS 0108

Client **PC Test**

Certificate No: D2450V2-719_Aug15

CALIBRATION CERTIFICATE

Object	D2450V2 - SN: 719
Calibration procedure(s)	QA CAL-05.v9 Calibration procedure for dipole validation kits above 700 MHz
Calibration date:	August 20, 2015

BN ✓
9/3/15

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	07-Oct-14 (No. 217-02020)	Oct-15
Power sensor HP 8481A	US37292783	07-Oct-14 (No. 217-02020)	Oct-15
Power sensor HP 8481A	MY41092317	07-Oct-14 (No. 217-02021)	Oct-15
Reference 20 dB Attenuator	SN: 5058 (20k)	01-Apr-15 (No. 217-02131)	Mar-16
Type-N mismatch combination	SN: 5047.2 / 06327	01-Apr-15 (No. 217-02134)	Mar-16
Reference Probe ES3DV3	SN: 3205	30-Dec-14 (No. ES3-3205_Dec14)	Dec-15
DAE4	SN: 601	17-Aug-15 (No. DAE4-601_Aug15)	Aug-16

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-14)	In house check: Oct-15

	Name	Function	Signature
Calibrated by:	Michael Weber	Laboratory Technician	M.Weber
Approved by:	Katja Pokovic	Technical Manager	

Issued: August 21, 2015

Glossary:

TSL	tissue simulating liquid
ConvF	sensitivity in TSL / NORM x,y,z
N/A	not applicable or not measured

Calibration is Performed According to the Following Standards:

a) IEEE Std 1528-2013, "IEEE Recommended Practice for Determining the Peak Spatial-Averaged Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques", June 2013
b) IEC 62209-1, "Procedure to measure the Specific Absorption Rate (SAR) for hand-held devices used in close proximity to the ear (frequency range of 300 MHz to 3 GHz)", February 2005
c) IEC 62209-2, "Procedure to determine the Specific Absorption Rate (SAR) for wireless communication devices used in close proximity to the human body (frequency range of 30 MHz to 6 GHz)", March 2010
d) KDB 865664, "SAR Measurement Requirements for 100 MHz to 6 GHz"

Additional Documentation:

e) DASY4/5 System Handbook

Methods Applied and Interpretation of Parameters:

- *Measurement Conditions:* Further details are available from the Validation Report at the end of the certificate. All figures stated in the certificate are valid at the frequency indicated.
- *Antenna Parameters with TSL:* The dipole is mounted with the spacer to position its feed point exactly below the center marking of the flat phantom section, with the arms oriented parallel to the body axis.
- *Feed Point Impedance and Return Loss:* These parameters are measured with the dipole positioned under the liquid filled phantom. The impedance stated is transformed from the measurement at the SMA connector to the feed point. The Return Loss ensures low reflected power. No uncertainty required.
- *Electrical Delay:* One-way delay between the SMA connector and the antenna feed point. No uncertainty required.
- *SAR measured:* SAR measured at the stated antenna input power.
- *SAR normalized:* SAR as measured, normalized to an input power of 1 W at the antenna connector.
- *SAR for nominal TSL parameters:* The measured TSL parameters are used to calculate the nominal SAR result.

The reported uncertainty of measurement is stated as the standard uncertainty of measurement multiplied by the coverage factor k=2, which for a normal distribution corresponds to a coverage probability of approximately 95%.

Measurement Conditions

DASY system configuration, as far as not given on page 1.

DASY Version	DASY5	V52.8.8
Extrapolation	Advanced Extrapolation	
Phantom	Modular Flat Phantom	
Distance Dipole Center - TSL	10 mm	with Spacer
Zoom Scan Resolution	dx, dy, dz = 5 mm	
Frequency	2450 MHz ± 1 MHz	

Head TSL parameters

The following parameters and calculations were applied.

	Temperature	**Permittivity**	**Conductivity**
Nominal Head TSL parameters	22.0 °C	39.2	1.80 mho/m
Measured Head TSL parameters	(22.0 ± 0.2) °C	39.2 ± 6 %	1.87 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	13.8 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**54.2 W/kg ± 17.0 % (k=2)**

SAR averaged over 10 cm^3 (10 g) of Head TSL	condition	
SAR measured	250 mW input power	6.48 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**25.7 W/kg ± 16.5 % (k=2)**

Body TSL parameters

The following parameters and calculations were applied.

	Temperature	**Permittivity**	**Conductivity**
Nominal Body TSL parameters	22.0 °C	52.7	1.95 mho/m
Measured Body TSL parameters	(22.0 ± 0.2) °C	53.2 ± 6 %	2.00 mho/m ± 6 %
Body TSL temperature change during test	< 0.5 °C	----	----

SAR result with Body TSL

SAR averaged over 1 cm^3 (1 g) of Body TSL	Condition	
SAR measured	250 mW input power	13.1 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	**51.9 W/kg ± 17.0 % (k=2)**

SAR averaged over 10 cm^3 (10 g) of Body TSL	condition	
SAR measured	250 mW input power	6.11 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	**24.3 W/kg ± 16.5 % (k=2)**

Appendix (Additional assessments outside the scope of SCS 0108)

Antenna Parameters with Head TSL

Impedance, transformed to feed point	54.5 Ω + 5.3 jΩ
Return Loss	- 23.5 dB

Antenna Parameters with Body TSL

Impedance, transformed to feed point	50.1 Ω + 6.5 jΩ
Return Loss	- 23.7 dB

General Antenna Parameters and Design

Electrical Delay (one direction)	1.149 ns

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

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

Additional EUT Data

Manufactured by	SPEAG
Manufactured on	September 10, 2002

DASY5 Validation Report for Head TSL

Date: 20.08.2015

Test Laboratory: SPEAG, Zurich, Switzerland

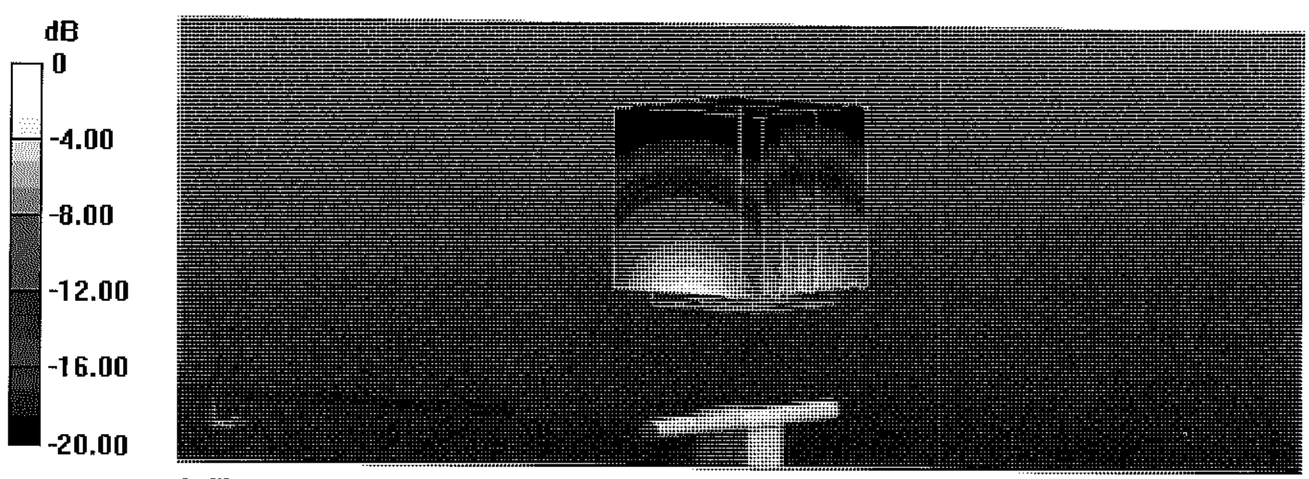
DUT: Dipole 2450 MHz; Type: D2450V2; Serial: D2450V2 - SN: 719

Communication System: UID 0 - CW; Frequency: 2450 MHz
Medium parameters used: f = 2450 MHz; σ = 1.87 S/m; ε_r = 39.2; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)

DASY52 Configuration:

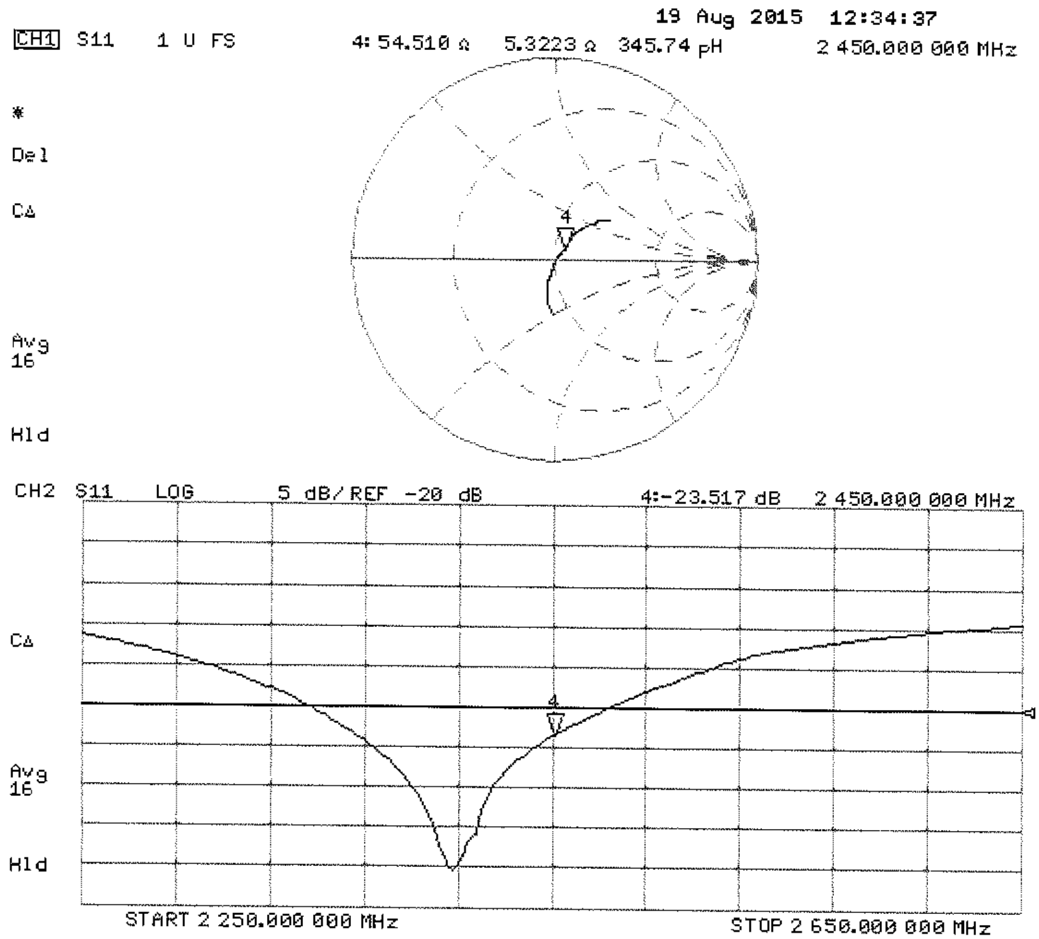
- Probe: ES3DV3 - SN3205; ConvF(4.54, 4.54, 4.54); Calibrated: 30.12.2014;
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 17.08.2015
- Phantom: Flat Phantom 5.0 (front); Type: QD000P50AA; Serial: 1001
- DASY52 52.8.8(1222); SEMCAD X 14.6.10(7331)

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 = 102.2 V/m; Power Drift = -0.01 dB
Peak SAR (extrapolated) = 28.1 W/kg
SAR(1 g) = 13.8 W/kg; SAR(10 g) = 6.48 W/kg
Maximum value of SAR (measured) = 18.2 W/kg



0 dB = 18.2 W/kg = 12.60 dBW/kg

Impedance Measurement Plot for Head TSL



DASY5 Validation Report for Body TSL

Date: 19.08.2015

Test Laboratory: SPEAG, Zurich, Switzerland

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

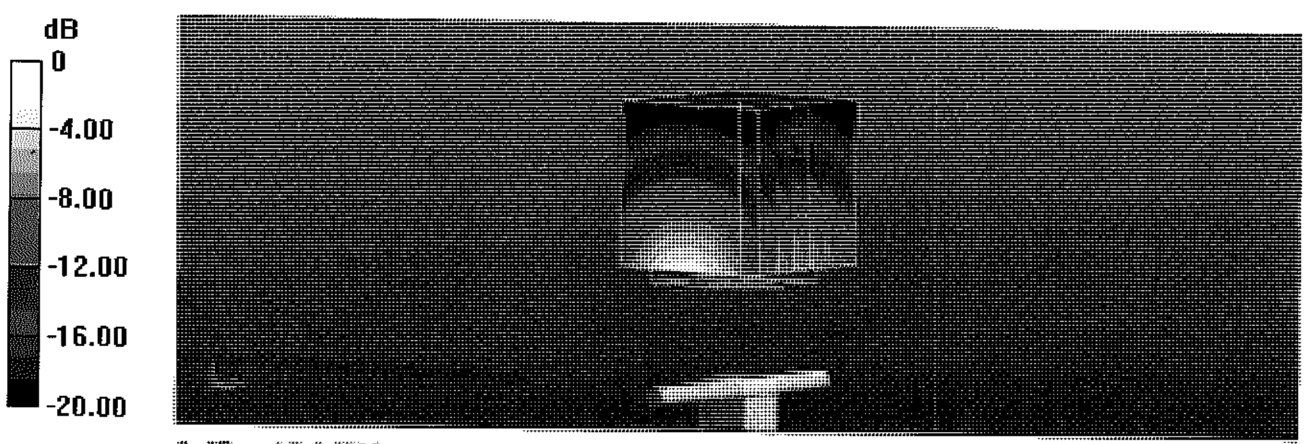
Communication System: UID 0 - CW; Frequency: 2450 MHz
Medium parameters used: f = 2450 MHz; σ = 2 S/m; ε_r = 53.2; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)

DASY52 Configuration:

- Probe: ES3DV3 - SN3205; ConvF(4.32, 4.32, 4.32); Calibrated: 30.12.2014;
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 17.08.2015
- Phantom: Flat Phantom 5.0 (back); Type: QD000P50AA; Serial: 1002
- DASY52 52.8.8(1222); SEMCAD X 14.6.10(7331)

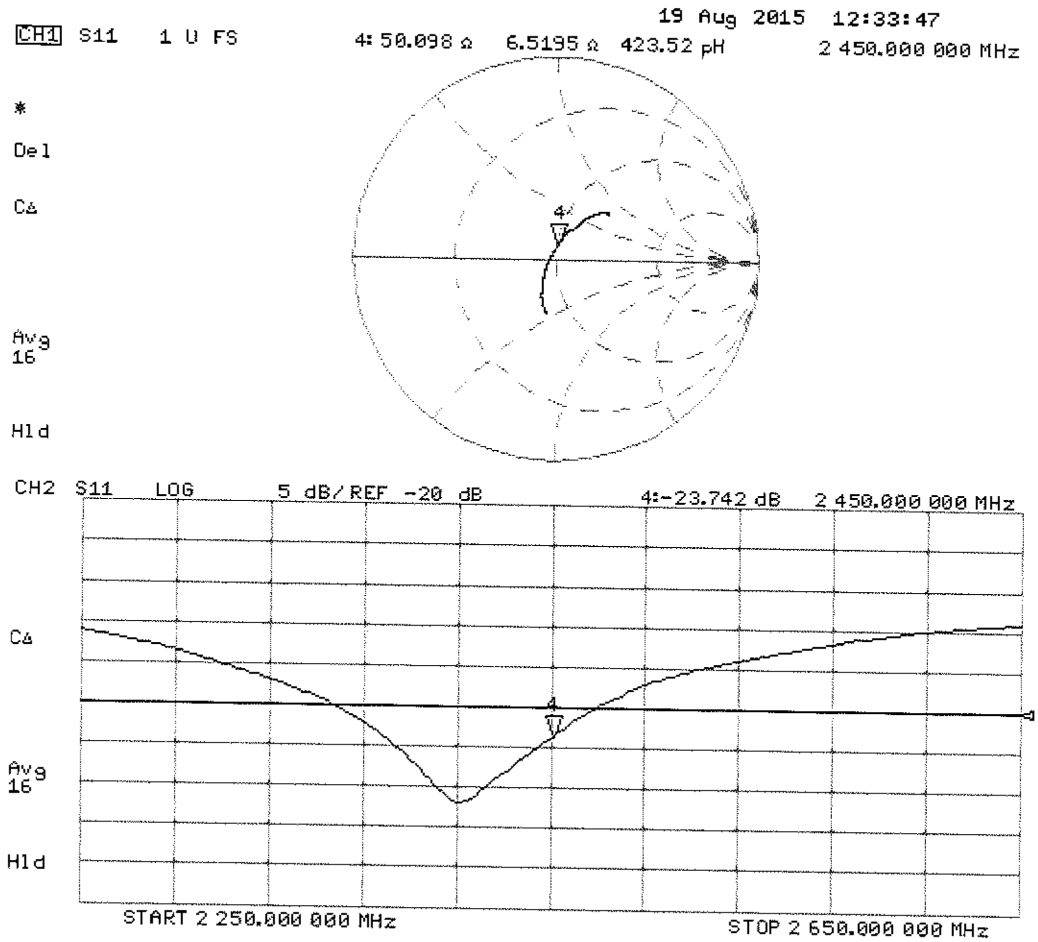
Dipole Calibration for Body Tissue/Pin=250 mW, d=10mm/Zoom Scan (7x7x7)/Cube 0:

Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 95.73 V/m; Power Drift = 0.01 dB
Peak SAR (extrapolated) = 26.9 W/kg
SAR(1 g) = 13.1 W/kg; SAR(10 g) = 6.11 W/kg
Maximum value of SAR (measured) = 17.3 W/kg



0 dB = 17.3 W/kg = 12.38 dBW/kg

Impedance Measurement Plot for Body TSL



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Accreditation No.: SCS 0108

Client PC Test

Certificate No: D2600V2-1004_Apr15

CALIBRATION CERTIFICATE

Object	D2600V2 - SN: 1004
Calibration procedure(s)	QA CAL-05.v9 Calibration procedure for dipole validation kits above 700 MHz
Calibration date:	April 14, 2015

PM ✓
4/29/15

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	07-Oct-14 (No. 217-02020)	Oct-15
Power sensor HP 8481A	US37292783	07-Oct-14 (No. 217-02020)	Oct-15
Power sensor HP 8481A	MY41092317	07-Oct-14 (No. 217-02021)	Oct-15
Reference 20 dB Attenuator	SN: 5058 (20k)	01-Apr-15 (No. 217-02131)	Mar-16
Type-N mismatch combination	SN: 5047.2 / 06327	01-Apr-15 (No. 217-02134)	Mar-16
Reference Probe ES3DV3	SN: 3205	30-Dec-14 (No. ES3-3205_Dec14)	Dec-15
DAE4	SN: 601	18-Aug-14 (No. DAE4-601_Aug14)	Aug-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-14)	In house check: Oct-15

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

Issued: April 14, 2015

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S Swiss Calibration Service

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

Accreditation No.: SCS 0108

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	2600 MHz ± 1 MHz	

Head TSL parameters

The following parameters and calculations were applied.

	Temperature	**Permittivity**	**Conductivity**
Nominal Head TSL parameters	22.0 °C	39.0	1.96 mho/m
Measured Head TSL parameters	(22.0 ± 0.2) °C	37.1 ± 6 %	1.99 mho/m ± 6 %
Head TSL temperature change during test	< 0.5 °C	----	----

SAR result with Head TSL

SAR averaged over 1 cm^3 (1 g) of Head TSL	Condition	
SAR measured	250 mW input power	14.2 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**55.8 W/kg ± 17.0 % (k=2)**

SAR averaged over 10 cm^3 (10 g) of Head TSL	condition	
SAR measured	250 mW input power	6.37 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**25.2 W/kg ± 16.5 % (k=2)**

Body TSL parameters

The following parameters and calculations were applied.

	Temperature	**Permittivity**	**Conductivity**
Nominal Body TSL parameters	22.0 °C	52.5	2.16 mho/m
Measured Body TSL parameters	(22.0 ± 0.2) °C	50.2 ± 6 %	2.20 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	14.3 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	**56.2 W/kg ± 17.0 % (k=2)**

SAR averaged over 10 cm^3 (10 g) of Body TSL	condition	
SAR measured	250 mW input power	6.39 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	**25.3 W/kg ± 16.5 % (k=2)**

Appendix (Additional assessments outside the scope of SCS 0108)

Antenna Parameters with Head TSL

Impedance, transformed to feed point	49.6 Ω - 4.7 jΩ
Return Loss	- 26.5 dB

Antenna Parameters with Body TSL

Impedance, transformed to feed point	46.5 Ω - 3.6 jΩ
Return Loss	- 25.6 dB

General Antenna Parameters and Design

Electrical Delay (one direction)	1.150 ns

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

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

Additional EUT Data

Manufactured by	SPEAG
Manufactured on	December 23, 2006

DASY5 Validation Report for Head TSL

Date: 14.04.2015

Test Laboratory: SPEAG, Zurich, Switzerland

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

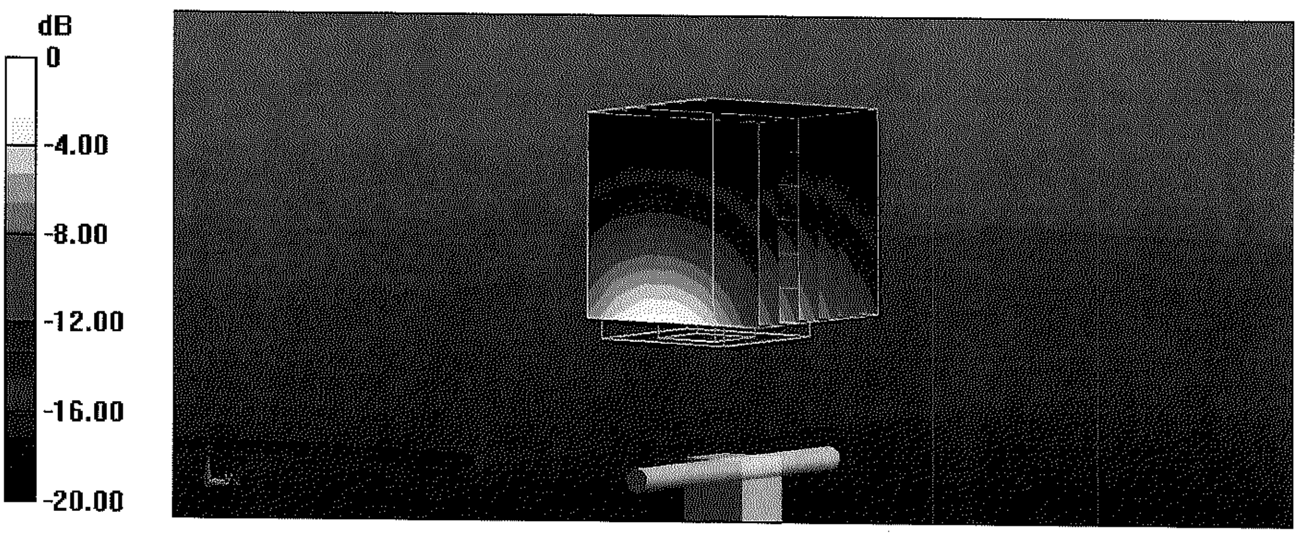
Communication System: UID 0 - CW; Frequency: 2600 MHz
Medium parameters used: f = 2600 MHz; σ = 1.99 S/m; ε_r = 37.1; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)

DASY52 Configuration:

- Probe: ES3DV3 - SN3205; ConvF(4.49, 4.49, 4.49); Calibrated: 30.12.2014;
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 18.08.2014
- Phantom: Flat Phantom 5.0 (front); Type: QD000P50AA; Serial: 1001
- DASY52 52.8.8(1222); SEMCAD X 14.6.10(7331)

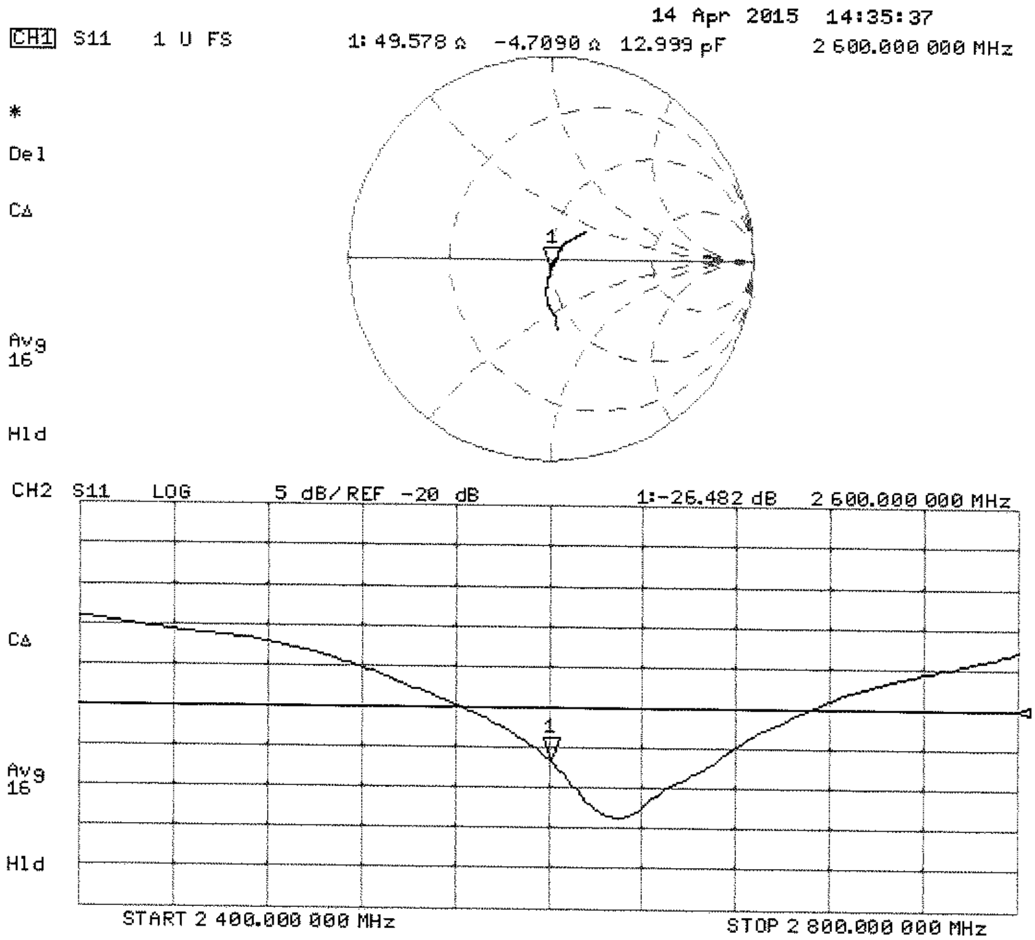
Dipole Calibration for Head/Pin=250 mW, d=10mm/Zoom Scan (7x7x7)/Cube 0:

Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 99.70 V/m; Power Drift = 0.06 dB
Peak SAR (extrapolated) = 29.8 W/kg
SAR(1 g) = 14.2 W/kg; SAR(10 g) = 6.37 W/kg
Maximum value of SAR (measured) = 17.9 W/kg



0 dB = 17.9 W/kg = 12.53 dBW/kg

Impedance Measurement Plot for Head TSL



Date: 14.04.2015

Test Laboratory: SPEAG, Zurich, Switzerland

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

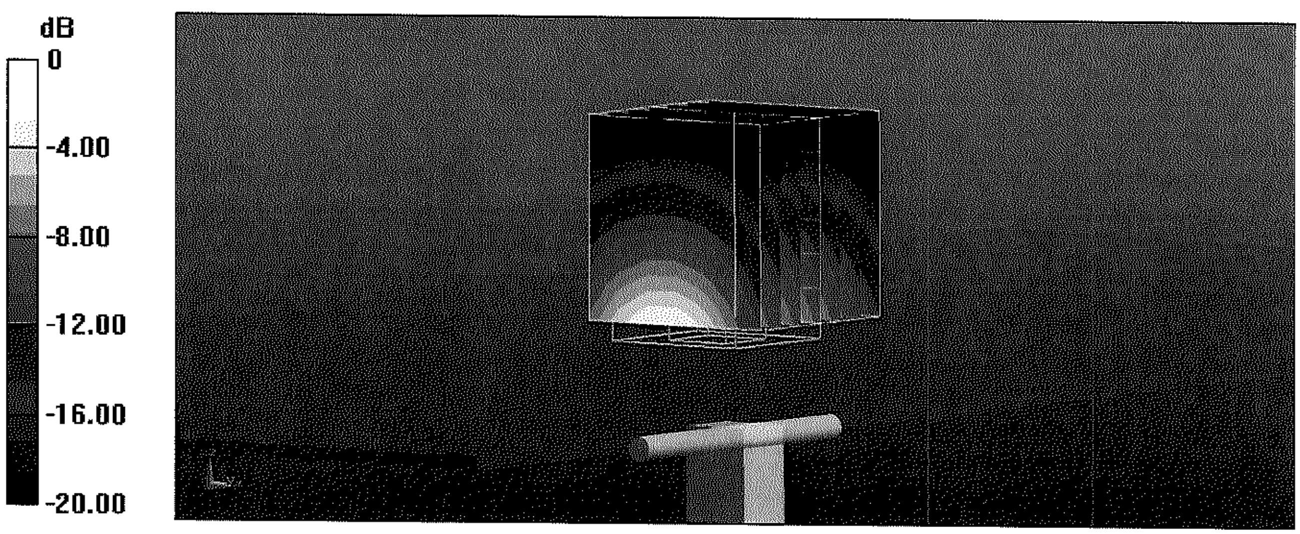
Communication System: UID 0 - CW; Frequency: 2600 MHz
Medium parameters used: f = 2600 MHz; σ = 2.2 S/m; ε_r = 50.2; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)

DASY52 Configuration:

- Probe: ES3DV3 - SN3205; ConvF(4.13, 4.13, 4.13); Calibrated: 30.12.2014;
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 18.08.2014
- Phantom: Flat Phantom 5.0 (back); Type: QD000P50AA; Serial: 1002
- DASY52 52.8.8(1222); SEMCAD X 14.6.10(7331)

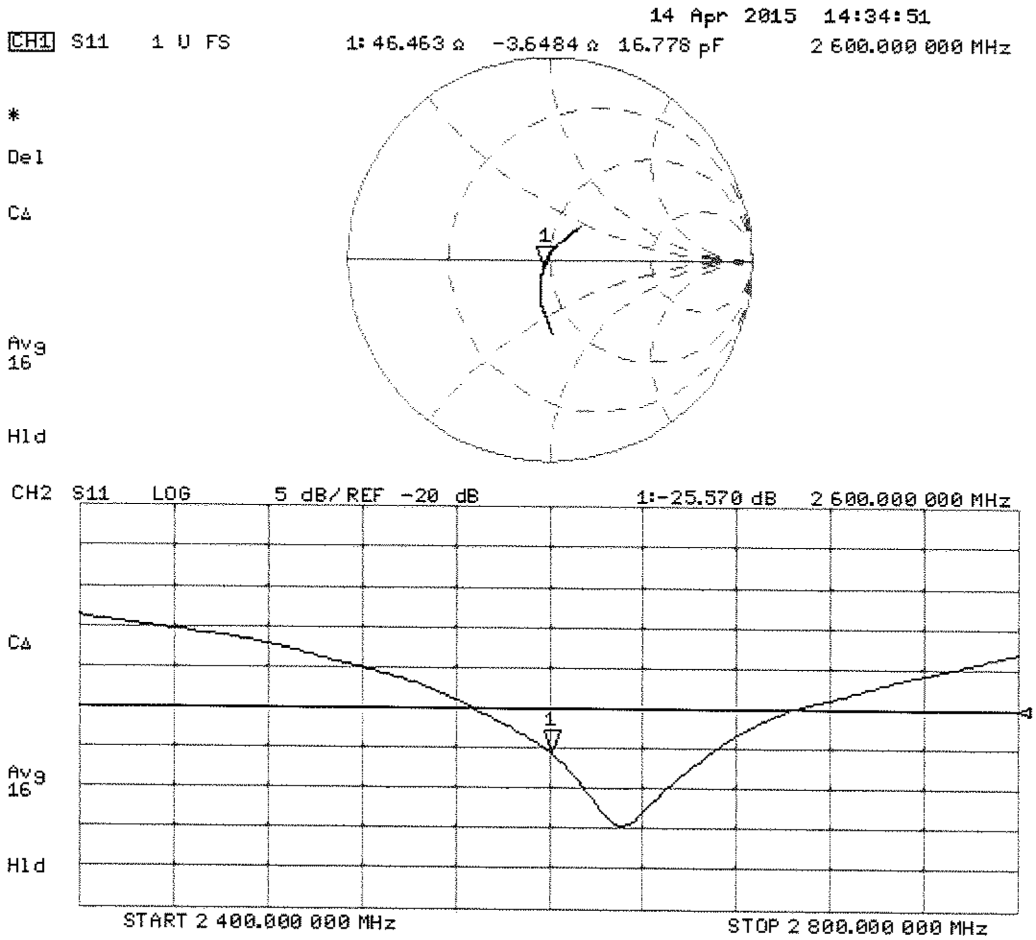
Dipole Calibration for Body/Pin=250 mW, d=10mm/Zoom Scan (7x7x7)/Cube 0:

Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 95.83 V/m; Power Drift = 0.06 dB
Peak SAR (extrapolated) = 29.6 W/kg
SAR(1 g) = 14.3 W/kg; SAR(10 g) = 6.39 W/kg
Maximum value of SAR (measured) = 18.3 W/kg



0 dB = 18.3 W/kg = 12.62 dBW/kg

Impedance Measurement Plot for Body TSL



Calibration Laboratory of
Schmid & Partner
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S Schweizerischer Kalibrierdienst
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Accreditation No.: **SCS 0108**

Client **PC Test**

Certificate No: **D5GHzV2-1191_Sep15**

CALIBRATION CERTIFICATE

Object	D5GHzV2 - SN: 1191
Calibration procedure(s)	QA CAL-22.v2 Calibration procedure for dipole validation kits between 3-6 GHz
Calibration date:	September 16, 2015

BN ✓ 10/02/15

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	07-Oct-14 (No. 217-02020)	Oct-15
Power sensor HP 8481A	US37292783	07-Oct-14 (No. 217-02020)	Oct-15
Power sensor HP 8481A	MY41092317	07-Oct-14 (No. 217-02021)	Oct-15
Reference 20 dB Attenuator	SN: 5058 (20k)	01-Apr-15 (No. 217-02131)	Mar-16
Type-N mismatch combination	SN: 5047.2 / 06327	01-Apr-15 (No. 217-02134)	Mar-16
Reference Probe EX3DV4	SN: 3503	30-Dec-14 (No. EX3-3503_Dec14)	Dec-15
DAE4	SN: 601	17-Aug-15 (No. DAE4-601_Aug15)	Aug-16

Secondary Standards	ID #	Check Date (in house)	Scheduled Check
RF generator R&S SMT-06	100972	15-Jun-15 (in house check Jun-15)	In house check: Jun-18
Network Analyzer HP 8753E	US37390585 S4206	18-Oct-01 (in house check Oct-14)	In house check: Oct-15

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

Issued: September 18, 2015

Glossary:

TSL	tissue simulating liquid
ConvF	sensitivity in TSL / NORM x,y,z
N/A	not applicable or not measured

Calibration is Performed According to the Following Standards:

a) IEEE Std 1528-2013, "IEEE Recommended Practice for Determining the Peak Spatial-Averaged Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques", June 2013
b) IEC 62209-2, "Procedure to determine the Specific Absorption Rate (SAR) for wireless communication devices used in close proximity to the human body (frequency range of 30 MHz to 6 GHz)", March 2010
c) KDB 865664, "SAR Measurement Requirements for 100 MHz to 6 GHz"

Additional Documentation:

d) DASY4/5 System Handbook

Methods Applied and Interpretation of Parameters:

- *Measurement Conditions:* Further details are available from the Validation Report at the end of the certificate. All figures stated in the certificate are valid at the frequency indicated.
- *Antenna Parameters with TSL:* The dipole is mounted with the spacer to position its feed point exactly below the center marking of the flat phantom section, with the arms oriented parallel to the body axis.
- *Feed Point Impedance and Return Loss:* These parameters are measured with the dipole positioned under the liquid filled phantom. The impedance stated is transformed from the measurement at the SMA connector to the feed point. The Return Loss ensures low reflected power. No uncertainty required.
- *Electrical Delay:* One-way delay between the SMA connector and the antenna feed point. No uncertainty required.
- *SAR measured:* SAR measured at the stated antenna input power.
- *SAR normalized:* SAR as measured, normalized to an input power of 1 W at the antenna connector.
- *SAR for nominal TSL parameters:* The measured TSL parameters are used to calculate the nominal SAR result.

The reported uncertainty of measurement is stated as the standard uncertainty of measurement multiplied by the coverage factor k=2, which for a normal distribution corresponds to a coverage probability of approximately 95%.

Measurement Conditions

DASY system configuration, as far as not given on page 1.

DASY Version	DASY5	V52.8.8
Extrapolation	Advanced Extrapolation	
Phantom	Modular Flat Phantom V5.0	
Distance Dipole Center - TSL	10 mm	with Spacer
Zoom Scan Resolution	dx, dy = 4.0 mm, dz = 1.4 mm	Graded Ratio = 1.4 (Z direction)
Frequency	5250 MHz ± 1 MHz 5600 MHz ± 1 MHz 5750 MHz ± 1 MHz	

Head TSL parameters at 5250 MHz

The following parameters and calculations were applied.

	Temperature	**Permittivity**	**Conductivity**
Nominal Head TSL parameters	22.0 °C	35.9	4.71 mho/m
Measured Head TSL parameters	(22.0 ± 0.2) °C	34.9 ± 6 %	4.54 mho/m ± 6 %
Head TSL temperature change during test	< 0.5 °C	----	----

SAR result with Head TSL at 5250 MHz

SAR averaged over 1 cm^3 (1 g) of Head TSL	Condition	
SAR measured	100 mW input power	8.31 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**82.5 W/kg ± 19.9 % (k=2)**

SAR averaged over 10 cm^3 (10 g) of Head TSL	condition	
SAR measured	100 mW input power	2.38 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**23.6 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	34.4 ± 6 %	4.88 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	8.52 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**84.5 W/kg ± 19.9 % (k=2)**

SAR averaged over 10 cm^3 (10 g) of Head TSL	condition	
SAR measured	100 mW input power	2.43 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**24.1 W/kg ± 19.5 % (k=2)**

Head TSL parameters at 5750 MHz

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Head TSL parameters	22.0 °C	35.4	5.22 mho/m
Measured Head TSL parameters	(22.0 ± 0.2) °C	34.2 ± 6 %	5.04 mho/m ± 6 %
Head TSL temperature change during test	< 0.5 °C	----	----

SAR result with Head TSL at 5750 MHz

SAR averaged over 1 cm^3 (1 g) of Head TSL	Condition	
SAR measured	100 mW input power	8.07 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**80.0 W/kg ± 19.9 % (k=2)**

SAR averaged over 10 cm^3 (10 g) of Head TSL	condition	
SAR measured	100 mW input power	2.31 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**22.9 W/kg ± 19.5 % (k=2)**

Body TSL parameters at 5250 MHz

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Body TSL parameters	22.0 °C	48.9	5.36 mho/m
Measured Body TSL parameters	(22.0 ± 0.2) °C	47.3 ± 6 %	5.53 mho/m ± 6 %
Body TSL temperature change during test	< 0.5 °C	----	----

SAR result with Body TSL at 5250 MHz

SAR averaged over 1 cm^3 (1 g) of Body TSL	Condition	
SAR measured	100 mW input power	7.77 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	**77.2 W/kg ± 19.9 % (k=2)**

SAR averaged over 10 cm^3 (10 g) of Body TSL	condition	
SAR measured	100 mW input power	2.17 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	**21.5 W/kg ± 19.5 % (k=2)**

Body TSL parameters at 5600 MHz

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Body TSL parameters	22.0 °C	48.5	5.77 mho/m
Measured Body TSL parameters	(22.0 ± 0.2) °C	46.7 ± 6 %	5.99 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	8.24 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	**81.9 W/kg ± 19.9 % (k=2)**

SAR averaged over 10 cm^3 (10 g) of Body TSL	condition	
SAR measured	100 mW input power	2.30 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	**22.8 W/kg ± 19.5 % (k=2)**

Body TSL parameters at 5750 MHz

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Body TSL parameters	22.0 °C	48.3	5.94 mho/m
Measured Body TSL parameters	(22.0 ± 0.2) °C	46.5 ± 6 %	6.20 mho/m ± 6 %
Body TSL temperature change during test	< 0.5 °C	----	----

SAR result with Body TSL at 5750 MHz

SAR averaged over 1 cm^3 (1 g) of Body TSL	Condition	
SAR measured	100 mW input power	7.76 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	**77.1 W/kg ± 19.9 % (k=2)**

SAR averaged over 10 cm^3 (10 g) of Body TSL	condition	
SAR measured	100 mW input power	2.16 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	**21.4 W/kg ± 19.5 % (k=2)**

Appendix (Additional assessments outside the scope of SCS 0108)

Antenna Parameters with Head TSL at 5250 MHz

Impedance, transformed to feed point	54.1 Ω - 5.2 jΩ
Return Loss	- 24.0 dB

Antenna Parameters with Head TSL at 5600 MHz

Impedance, transformed to feed point	58.0 Ω - 3.2 jΩ
Return Loss	- 22.0 dB

Antenna Parameters with Head TSL at 5750 MHz

Impedance, transformed to feed point	59.2 Ω + 3.7 jΩ
Return Loss	- 20.8 dB

Antenna Parameters with Body TSL at 5250 MHz

Impedance, transformed to feed point	54.5 Ω - 3.9 jΩ
Return Loss	- 24.8 dB

Antenna Parameters with Body TSL at 5600 MHz

Impedance, transformed to feed point	59.0 Ω - 2.5 jΩ
Return Loss	- 21.3 dB

Antenna Parameters with Body TSL at 5750 MHz

Impedance, transformed to feed point	59.9 Ω + 4.8 jΩ
Return Loss	- 20.0 dB

General Antenna Parameters and Design

Electrical Delay (one direction)	1.203 ns

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

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

Additional EUT Data

Manufactured by	SPEAG
Manufactured on	August 28, 2003

DASY5 Validation Report for Head TSL

Date: 15.09.2015

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole 5GHz; Type: D5GHzV2; Serial: D5GHzV2 - SN: 1191

Communication System: UID 0 - CW; Frequency: 5250 MHz, Frequency: 5600 MHz, Frequency: 5750 MHz
Medium parameters used: f = 5250 MHz; σ = 4.54 S/m; ε_r = 34.9; ρ = 1000 kg/m^3 ,
Medium parameters used: f = 5600 MHz; σ = 4.88 S/m; ε_r = 34.4; ρ = 1000 kg/m^3 ,
Medium parameters used: f = 5750 MHz; σ = 5.04 S/m; ε_r = 34.2; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)

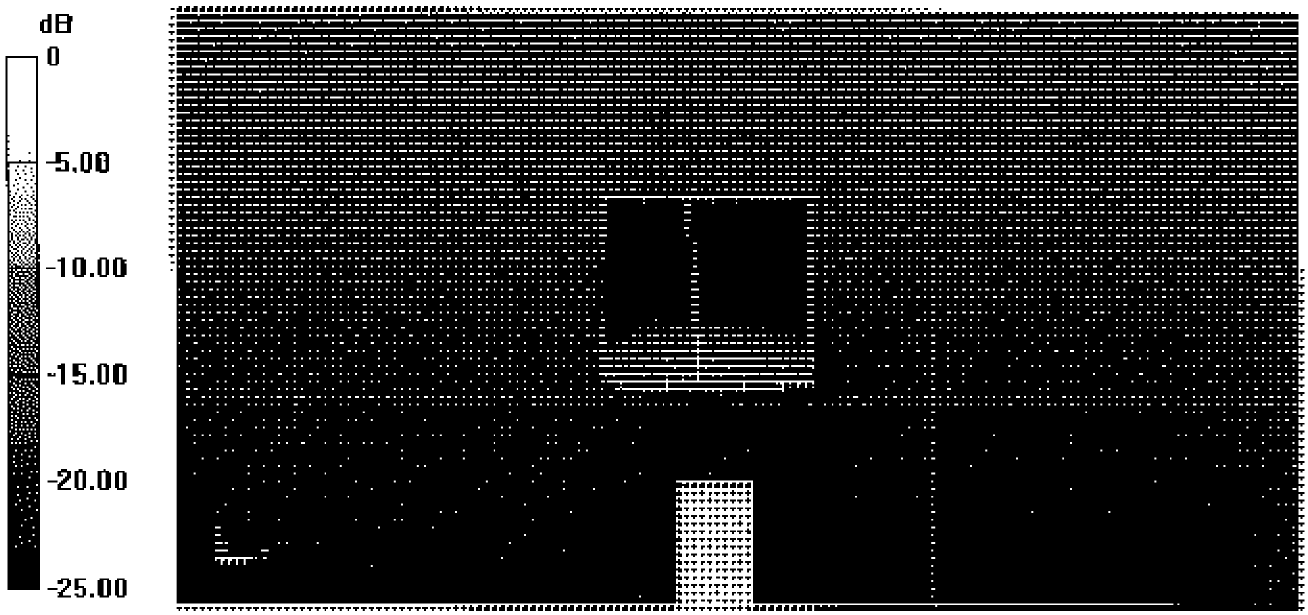
DASY52 Configuration:

- Probe: EX3DV4 - SN3503; ConvF(5.45, 5.45, 5.45); Calibrated: 30.12.2014, ConvF(4.92, 4.92, 4.92); Calibrated: 30.12.2014, ConvF(4.91, 4.91, 4.91); Calibrated: 30.12.2014;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 17.08.2015
- 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=100mW, dist=10mm, f=5250 MHz/Zoom Scan, dist=1.4mm (8x8x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm
Reference Value = 64.94 V/m; Power Drift = 0.02 dB
Peak SAR (extrapolated) = 30.7 W/kg
SAR(1 g) = 8.31 W/kg; SAR(10 g) = 2.38 W/kg
Maximum value of SAR (measured) = 19.5 W/kg

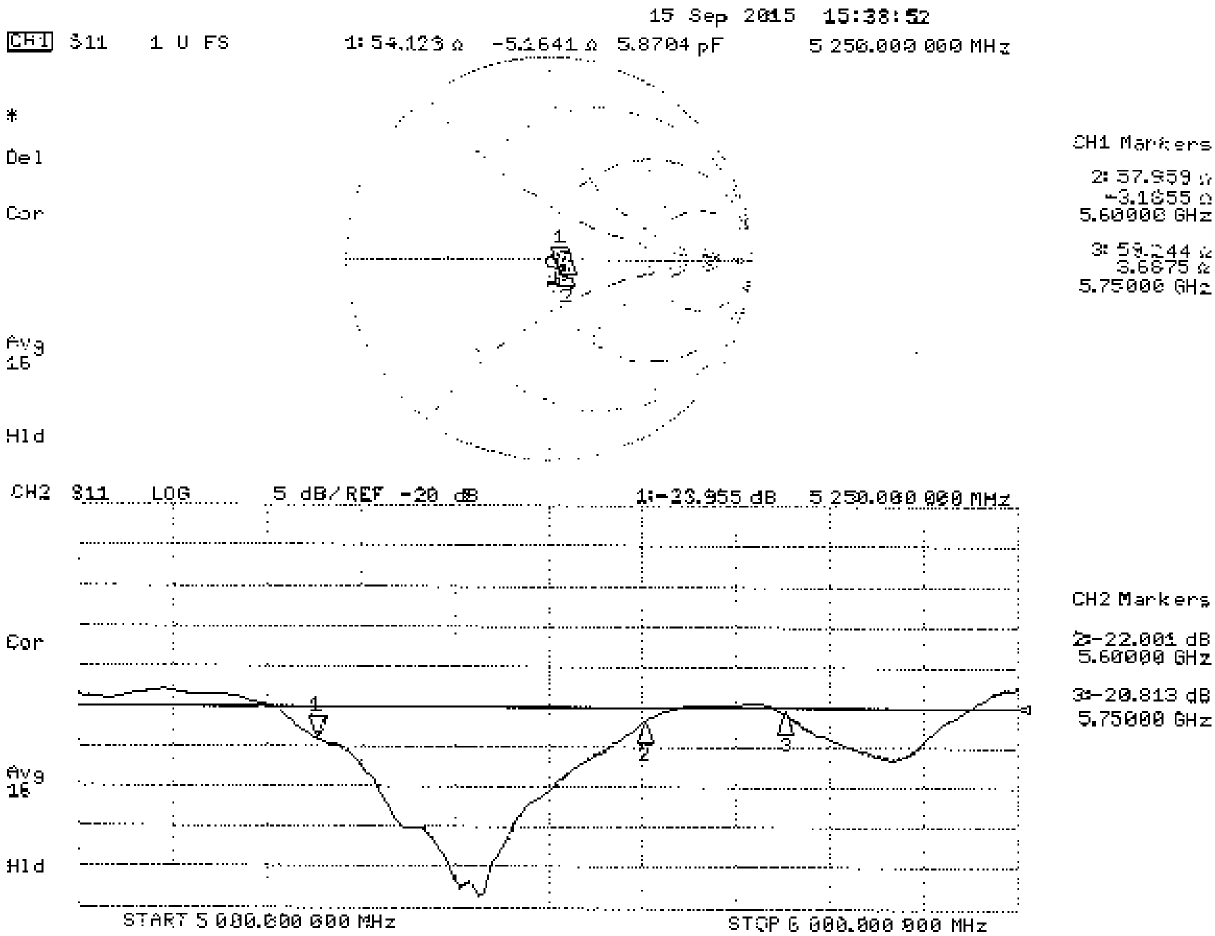
Dipole Calibration for Head Tissue/Pin=100mW, dist=10mm, f=5600 MHz/Zoom Scan, dist=1.4mm (8x8x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm
Reference Value = 63.94 V/m; Power Drift = 0.03 dB
Peak SAR (extrapolated) = 33.8 W/kg
SAR(1 g) = 8.52 W/kg; SAR(10 g) = 2.43 W/kg
Maximum value of SAR (measured) = 20.7 W/kg

Dipole Calibration for Head Tissue/Pin=100mW, dist=10mm, f=5750 MHz/Zoom Scan, dist=1.4mm (8x8x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm
Reference Value = 61.52 V/m; Power Drift = 0.06 dB
Peak SAR (extrapolated) = 33.4 W/kg
SAR(1 g) = 8.07 W/kg; SAR(10 g) = 2.31 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: 16.09.2015

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole 5GHz; Type: D5GHzV2; Serial: D5GHzV2 - SN: 1191

Communication System: UID 0 - CW; Frequency: 5250 MHz, Frequency: 5600 MHz, Frequency: 5750 MHz
Medium parameters used: f = 5250 MHz; σ = 5.53 S/m; ε_r = 47.3; ρ = 1000 kg/m^3 ,
Medium parameters used: f = 5600 MHz; σ = 5.99 S/m; ε_r = 46.7; ρ = 1000 kg/m^3 ,
Medium parameters used: f = 5750 MHz; σ = 6.2 S/m; ε_r = 46.5; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)

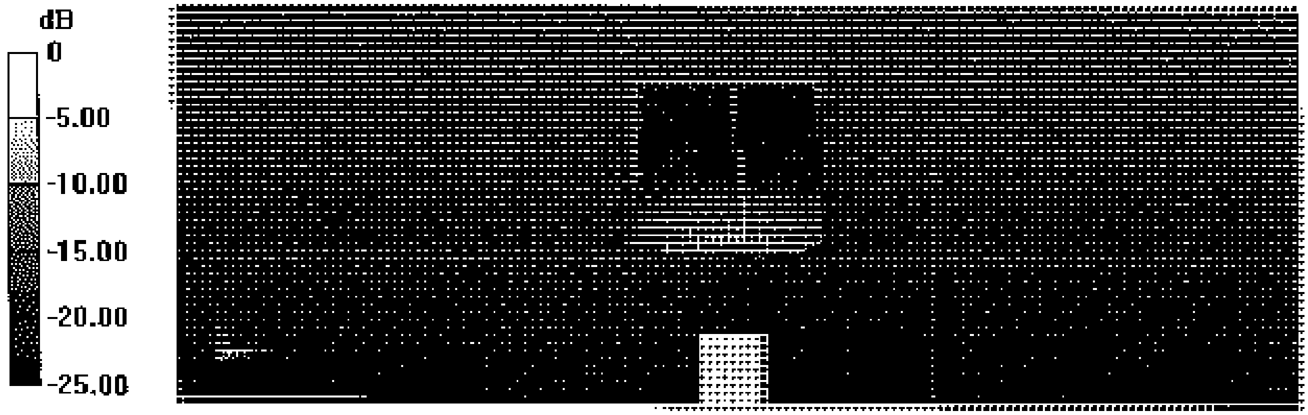
DASY52 Configuration:

- Probe: EX3DV4 - SN3503; ConvF(4.9, 4.9, 4.9); Calibrated: 30.12.2014, ConvF(4.35, 4.35, 4.35); Calibrated: 30.12.2014, ConvF(4.35, 4.35, 4.35); Calibrated: 30.12.2014;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 17.08.2015
- 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=100mW, dist=10mm, f=5250 MHz/Zoom Scan, dist=1.4mm (8x8x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm
Reference Value = 58.40 V/m; Power Drift = 0.09 dB
Peak SAR (extrapolated) = 30.8 W/kg
SAR(1 g) = 7.77 W/kg; SAR(10 g) = 2.17 W/kg
Maximum value of SAR (measured) = 19.0 W/kg

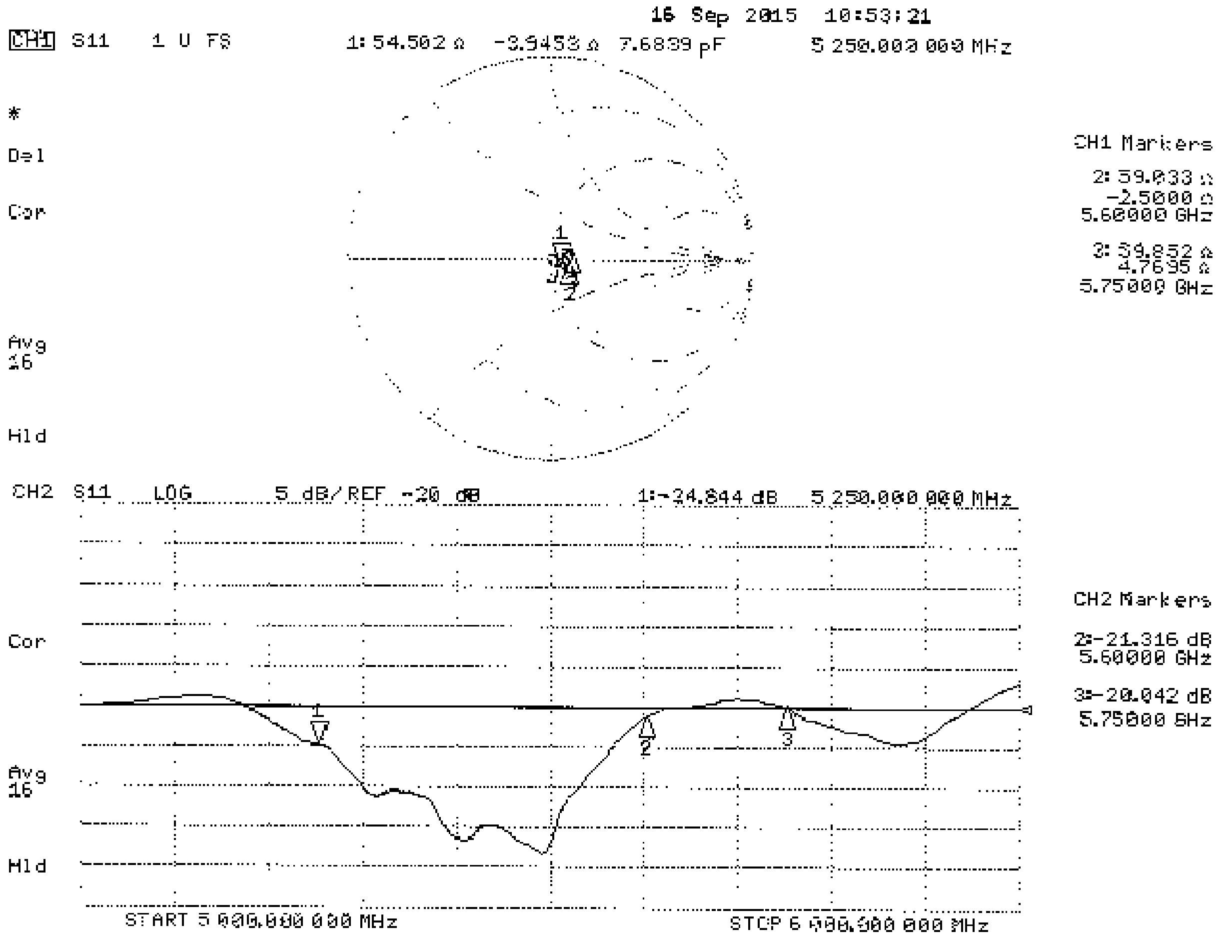
Dipole Calibration for Body Tissue/Pin=100mW, dist=10mm, f=5600 MHz/Zoom Scan, dist=1.4mm (8x8x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm
Reference Value = 59.20 V/m; Power Drift = -0.02 dB
Peak SAR (extrapolated) = 36.1 W/kg
SAR(1 g) = 8.24 W/kg; SAR(10 g) = 2.3 W/kg
Maximum value of SAR (measured) = 21.0 W/kg

Dipole Calibration for Body Tissue/Pin=100mW, dist=10mm, f=5750 MHz/Zoom Scan, dist=1.4mm (8x8x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm
Reference Value = 56.52 V/m; Power Drift = 0.01 dB
Peak SAR (extrapolated) = 35.5 W/kg
SAR(1 g) = 7.76 W/kg; SAR(10 g) = 2.16 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 Body TSL



Calibration Laboratory of
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Engineering AG
Zeughausstrasse 43, 8004 Zurich, Switzerland

S Schweizerischer Kalibrierdienst
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The Swiss Accreditation Service is one of the signatories to the EA Multilateral Agreement for the recognition of calibration certificates

Accreditation No.: SCS 0108

Client PC Test

Certificate No: D835V2-4d119_Apr15

CALIBRATION CERTIFICATE

Object	D835V2 - SN:4d119
Calibration procedure(s)	QA CAL-05.v9 Calibration procedure for dipole validation kits above 700 MHz
Calibration date:	April 13, 2015

RN ✓ 4/29/15

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	07-Oct-14 (No. 217-02020)	Oct-15
Power sensor HP 8481A	US37292783	07-Oct-14 (No. 217-02020)	Oct-15
Power sensor HP 8481A	MY41092317	07-Oct-14 (No. 217-02021)	Oct-15
Reference 20 dB Attenuator	SN: 5058 (20k)	01-Apr-15 (No. 217-02131)	Mar-16
Type-N mismatch combination	SN: 5047.2 / 06327	01-Apr-15 (No. 217-02134)	Mar-16
Reference Probe ES3DV3	SN: 3205	30-Dec-14 (No. ES3-3205_Dec14)	Dec-15
DAE4	SN: 601	18-Aug-14 (No. DAE4-601_Aug14)	Aug-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-14)	In house check: Oct-15

	Name	Function	Signature
Calibrated by:	Israe Elnaouq	Laboratory Technician	
Approved by:	Katja Pokovic	Technical Manager	

Issued: April 13, 2015

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	15 mm	with Spacer
Zoom Scan Resolution	dx, dy, dz = 5 mm	
Frequency	835 MHz ± 1 MHz	

Head TSL parameters

The following parameters and calculations were applied.

	Temperature	**Permittivity**	**Conductivity**
Nominal Head TSL parameters	22.0 °C	41.5	0.90 mho/m
Measured Head TSL parameters	(22.0 ± 0.2) °C	40.9 ± 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	2.43 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**9.38 W/kg ± 17.0 % (k=2)**

SAR averaged over 10 cm^3 (10 g) of Head TSL	condition	
SAR measured	250 mW input power	1.57 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**6.11 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	55.4 ± 6 %	1.01 mho/m ± 6 %
Body TSL temperature change during test	< 0.5 °C	----	----

SAR result with Body TSL

SAR averaged over 1 cm^3 (1 g) of Body TSL	Condition	
SAR measured	250 mW input power	2.37 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	**9.20 W/kg ± 17.0 % (k=2)**

SAR averaged over 10 cm^3 (10 g) of Body TSL	condition	
SAR measured	250 mW input power	1.55 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	**6.06 W/kg ± 16.5 % (k=2)**

Appendix (Additional assessments outside the scope of SCS 0108)

Antenna Parameters with Head TSL

Impedance, transformed to feed point	50.2 Ω - 2.2 jΩ
Return Loss	- 33.3 dB

Antenna Parameters with Body TSL

Impedance, transformed to feed point	47.7 Ω - 4.9 jΩ
Return Loss	- 25.1 dB

General Antenna Parameters and Design

Electrical Delay (one direction)	1.386 ns

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

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

Additional EUT Data

Manufactured by	SPEAG
Manufactured on	June 29, 2010

DASY5 Validation Report for Head TSL

Date: 13.04.2015

Test Laboratory: SPEAG, Zurich, Switzerland

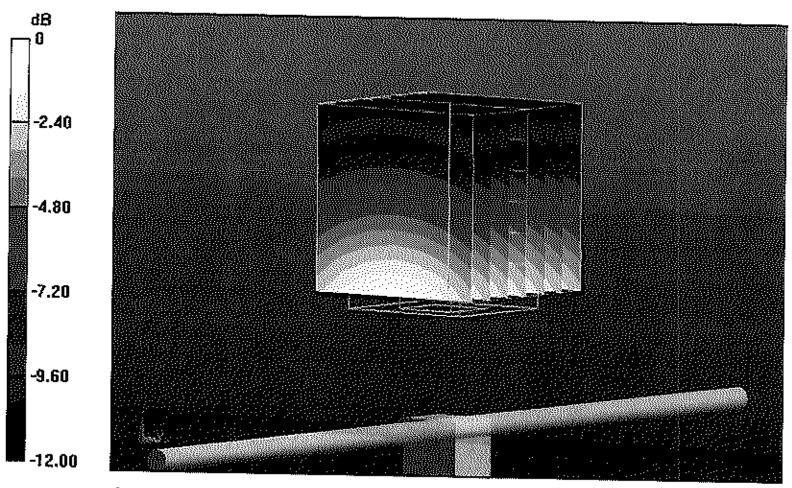
DUT: Dipole 835 MHz; Type: D835V2; Serial: D835V2 - SN:4d119

Communication System: UID 0 - CW; Frequency: 835 MHz
Medium parameters used: f = 835 MHz; σ = 0.94 S/m; ε_r = 40.9; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)

DASY52 Configuration:

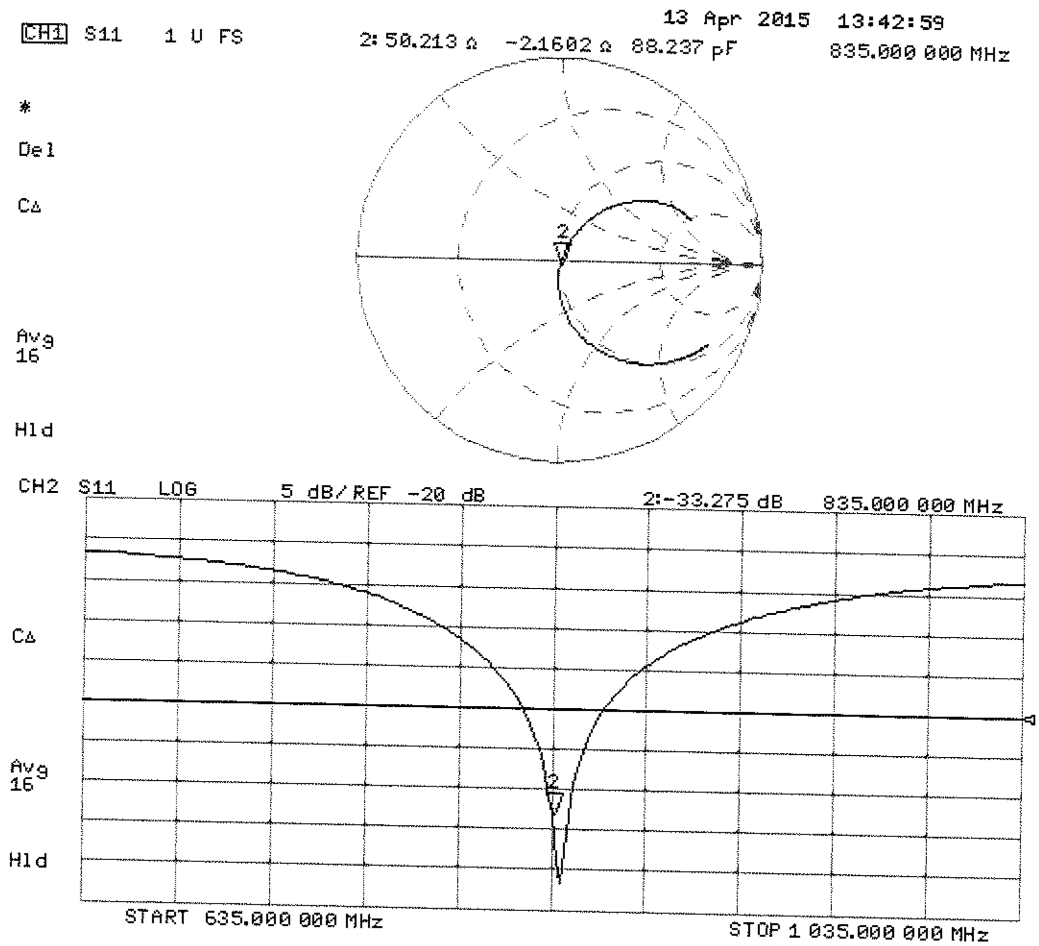
- Probe: ES3DV3 - SN3205; ConvF(6.2, 6.2, 6.2); Calibrated: 30.12.2014;
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 18.08.2014
- Phantom: Flat Phantom 4.9L; Type: QD000P49AA; Serial: 1001
- DASY52 52.8.8(1222); SEMCAD X 14.6.10(7331)

Dipole Calibration for Head Tissue/Pin=250 mW, d=15mm/Zoom Scan (7x7x7)/Cube 0:
Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 56.77 V/m; Power Drift = 0.01 dB
Peak SAR (extrapolated) = 3.64 W/kg
SAR(1 g) = 2.43 W/kg; SAR(10 g) = 1.57 W/kg
Maximum value of SAR (measured) = 2.85 W/kg



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

Impedance Measurement Plot for Head TSL



DASY5 Validation Report for Body TSL

Date: 13.04.2015

Test Laboratory: SPEAG, Zurich, Switzerland

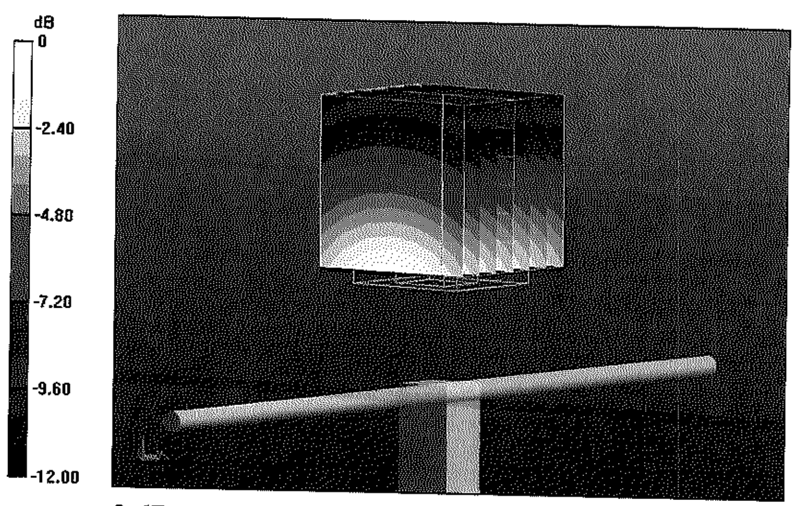
DUT: Dipole 835 MHz; Type: D835V2; Serial: D835V2 - SN:4d119

Communication System: UID 0 - CW; Frequency: 835 MHz
Medium parameters used: f = 835 MHz; σ = 1.01 S/m; ε_r = 55.4; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)

DASY52 Configuration:

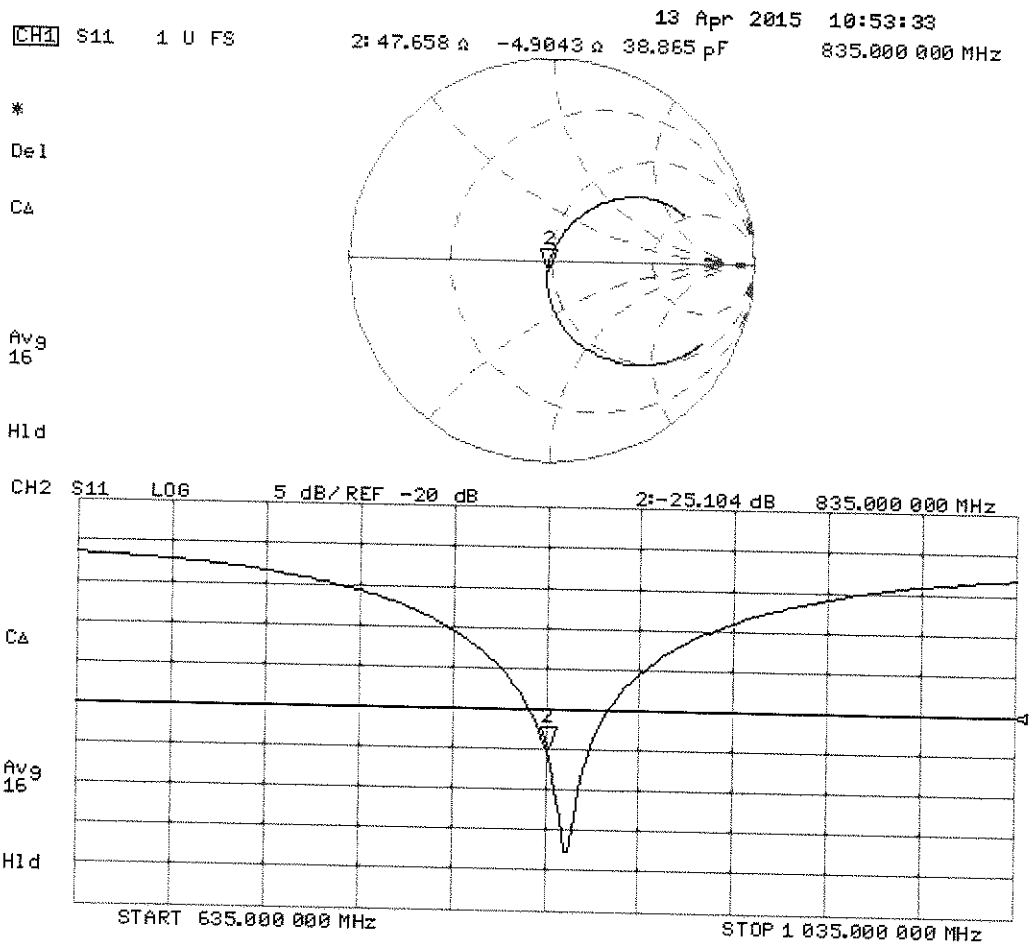
- Probe: ES3DV3 - SN3205; ConvF(6.17, 6.17, 6.17); Calibrated: 30.12.2014;
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 18.08.2014
- Phantom: Flat Phantom 4.9L; Type: QD000P49AA; Serial: 1001
- DASY52 52.8.8(1222); SEMCAD X 14.6.10(7331)

Dipole Calibration for Body Tissue/Pin=250 mW, d=15mm/Zoom Scan (7x7x7)/Cube 0:
Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 54.44 V/m; Power Drift = -0.06 dB
Peak SAR (extrapolated) = 3.52 W/kg
SAR(1 g) = 2.37 W/kg; SAR(10 g) = 1.55 W/kg
Maximum value of SAR (measured) = 2.77 W/kg



0 dB = 2.77 W/kg = 4.42 dBW/kg

Impedance Measurement Plot for Body TSL



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Accreditation No.: SCS 0108

Client **PC Test**

Certificate No: D5GHzV2-1057_Jan15

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 21, 2015

CC 2/3/15

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	07-Oct-14 (No. 217-02020)	Oct-15
Power sensor HP 8481A	US37292783	07-Oct-14 (No. 217-02020)	Oct-15
Power sensor HP 8481A	MY41092317	07-Oct-14 (No. 217-02021)	Oct-15
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 EX3DV4	SN: 3503	30-Dec-14 (No. EX3-3503_Dec14)	Dec-15
DAE4	SN: 601	18-Aug-14 (No. DAE4-601_Aug14)	Aug-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-14)	In house check: Oct-15

	Name	Function	Signature
Calibrated by:	Michael Weber	Laboratory Technician	M. Weber
Approved by:	Katja Pokovic	Technical Manager	

Issued: January 22, 2015

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	V52.8.8
Extrapolation	Advanced Extrapolation	
Phantom	Modular Flat Phantom V5.0	
Distance Dipole Center - TSL	10 mm	with Spacer
Zoom Scan Resolution	dx, dy = 4.0 mm, dz = 1.4 mm	Graded Ratio = 1.4 (Z direction)
Frequency	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	36.3 ± 6 %	4.56 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	8.14 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**81.5 W/kg ± 19.9 % (k=2)**

SAR averaged over 10 cm^3 (10 g) of Head TSL	condition	
SAR measured	100 mW input power	2.31 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**23.1 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	36.1 ± 6 %	4.66 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	8.47 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**84.7 W / kg ± 19.9 % (k=2)**

SAR averaged over 10 cm^3 (10 g) of Head TSL	condition	
SAR measured	100 mW input power	2.41 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**24.1 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	35.9 ± 6 %	4.86 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	8.43 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	2.38 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**23.8 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	35.6 ± 6 %	4.97 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	8.38 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**83.8 W/kg ± 19.9 % (k=2)**

SAR averaged over 10 cm^3 (10 g) of Head TSL	condition	
SAR measured	100 mW input power	2.37 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**23.7 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	35.4 ± 6 %	5.18 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	8.11 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**81.1 W/kg ± 19.9 % (k=2)**

SAR averaged over 10 cm^3 (10 g) of Head TSL	condition	
SAR measured	100 mW input power	2.29 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**22.9 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	49.4 ± 6 %	5.42 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	7.37 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	**73.9 W/kg ± 19.9 % (k=2)**

SAR averaged over 10 cm^3 (10 g) of Body TSL	condition	
SAR measured	100 mW input power	2.05 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	**20.6 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	49.2 ± 6 %	5.55 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	7.41 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	**74.2 W/kg ± 19.9 % (k=2)**

SAR averaged over 10 cm^3 (10 g) of Body TSL	condition	
SAR measured	100 mW input power	2.08 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	**20.9 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	48.9 ± 6 %	5.82 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	7.90 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	**79.2 W/kg ± 19.9 % (k=2)**

SAR averaged over 10 cm^3 (10 g) of Body TSL	condition	
SAR measured	100 mW input power	2.19 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	48.7 ± 6 %	5.96 mho/m ± 6 %
Body TSL temperature change during test	< 0.5 °C	----	----

SAR result with Body TSL at 5600 MHz

SAR averaged over 1 cm^3 (1 g) of Body TSL	Condition	
SAR measured	100 mW input power	7.75 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	**77.7 W/kg ± 19.9 % (k=2)**

SAR averaged over 10 cm^3 (10 g) of Body TSL	condition	
SAR measured	100 mW input power	2.14 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	**21.5 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	48.4 ± 6 %	6.25 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	7.49 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	**75.1 W/kg ± 19.9 % (k=2)**

SAR averaged over 10 cm^3 (10 g) of Body TSL	condition	
SAR measured	100 mW input power	2.06 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	**20.6 W/kg ± 19.5 % (k=2)**

Appendix (Additional assessments outside the scope of SCS0108)

Antenna Parameters with Head TSL at 5200 MHz

Impedance, transformed to feed point	49.0 Ω - 9.4 jΩ
Return Loss	- 20.4 dB

Antenna Parameters with Head TSL at 5300 MHz

Impedance, transformed to feed point	48.3 Ω - 4.2 jΩ
Return Loss	- 26.8 dB

Antenna Parameters with Head TSL at 5500 MHz

Impedance, transformed to feed point	49.2 Ω - 5.0 jΩ
Return Loss	- 25.9 dB

Antenna Parameters with Head TSL at 5600 MHz

Impedance, transformed to feed point	54.4 Ω - 4.8 jΩ
Return Loss	- 24.1 dB

Antenna Parameters with Head TSL at 5800 MHz

Impedance, transformed to feed point	51.8 Ω - 2.6 jΩ
Return Loss	- 30.1 dB

Antenna Parameters with Body TSL at 5200 MHz

Impedance, transformed to feed point	48.2 Ω - 8.4 jΩ
Return Loss	- 21.2 dB

Antenna Parameters with Body TSL at 5300 MHz

Impedance, transformed to feed point	48.6 Ω - 3.6 jΩ
Return Loss	- 28.2 dB

Antenna Parameters with Body TSL at 5500 MHz

Impedance, transformed to feed point	49.4 Ω - 4.1 jΩ
Return Loss	- 27.6 dB

Antenna Parameters with Body TSL at 5600 MHz

Impedance, transformed to feed point	55.1 Ω - 4.0 jΩ
Return Loss	- 24.2 dB

Antenna Parameters with Body TSL at 5800 MHz

Impedance, transformed to feed point	51.6 Ω - 1.6 jΩ
Return Loss	- 33.0 dB

General Antenna Parameters and Design

Electrical Delay (one direction)	1.202 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: 21.01.2015

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 = 4.56 S/m; ε_r = 36.3; ρ = 1000 kg/m^3 , Medium parameters used: f = 5300 MHz; σ = 4.66 S/m; ε_r = 36.1; ρ = 1000 kg/m^3 , Medium parameters used: f = 5500 MHz; σ = 4.86 S/m; ε_r = 35.9; ρ = 1000 kg/m^3 , Medium parameters used: f = 5600 MHz; σ = 4.97 S/m; ε_r = 35.6; ρ = 1000 kg/m^3 , Medium parameters used: f = 5800 MHz; σ = 5.18 S/m; ε_r = 35.4; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)

DASY52 Configuration:

- Probe: EX3DV4 - SN3503; ConvF(5.51, 5.51, 5.51); Calibrated: 30.12.2014, ConvF(5.21, 5.21, 5.21); Calibrated: 30.12.2014, ConvF(5.12, 5.12, 5.12); Calibrated: 30.12.2014, ConvF(4.92, 4.92, 4.92); Calibrated: 30.12.2014, ConvF(4.9, 4.9, 4.9); Calibrated: 30.12.2014;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 18.08.2014
- Phantom: Flat Phantom 5.0 (front); Type: QD000P50AA; Serial: 1001
- DASY52 52.8.8(1222); SEMCAD X 14.6.10(7331)

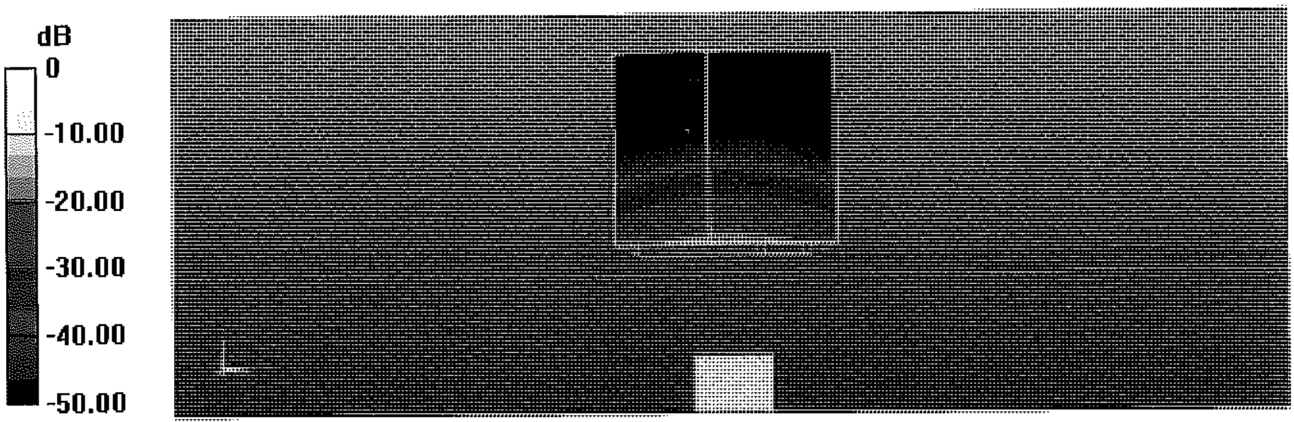
Dipole Calibration for Head Tissue/Pin=100mW, dist=10mm, f=5200 MHz/Zoom Scan, dist=1.4mm (8x8x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm
Reference Value = 65.51 V/m; Power Drift = -0.02 dB
Peak SAR (extrapolated) = 29.8 W/kg
SAR(1 g) = 8.14 W/kg; SAR(10 g) = 2.31 W/kg
Maximum value of SAR (measured) = 19.3 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 = 65.30 V/m; Power Drift = 0.06 dB
Peak SAR (extrapolated) = 32.1 W/kg
SAR(1 g) = 8.47 W/kg; SAR(10 g) = 2.41 W/kg
Maximum value of SAR (measured) = 20.4 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 = 64.33 V/m; Power Drift = 0.07 dB
Peak SAR (extrapolated) = 33.5 W/kg
SAR(1 g) = 8.43 W/kg; SAR(10 g) = 2.38 W/kg
Maximum value of SAR (measured) = 20.6 W/kg

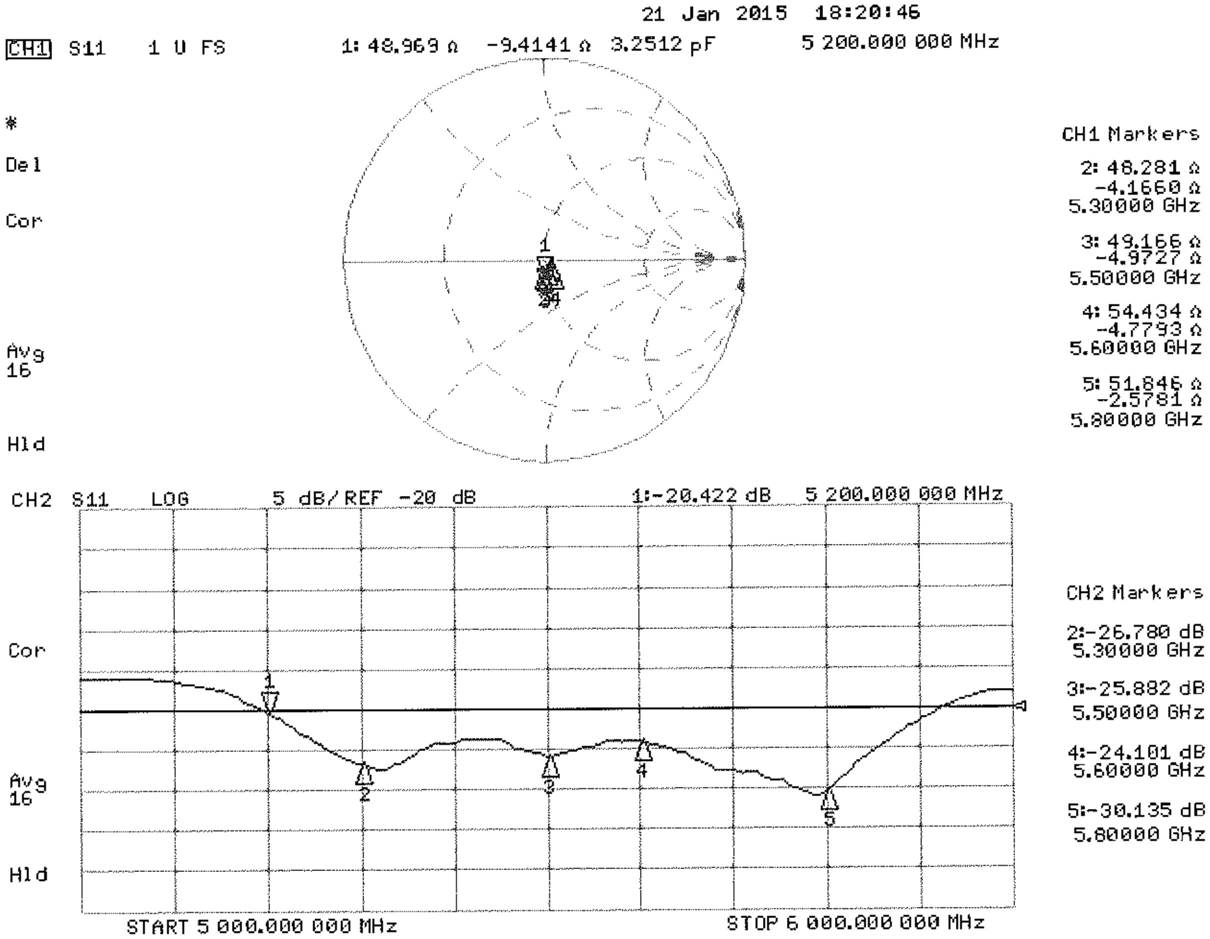
Dipole Calibration for Head Tissue/Pin=100mW, dist=10mm, f=5600 MHz/Zoom Scan, dist=1.4mm (8x8x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm
Reference Value = 64.47 V/m; Power Drift = 0.09 dB
Peak SAR (extrapolated) = 33.5 W/kg
SAR(1 g) = 8.38 W/kg; SAR(10 g) = 2.37 W/kg
Maximum value of SAR (measured) = 20.2 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 = 62.34 V/m; Power Drift = 0.06 dB
Peak SAR (extrapolated) = 33.8 W/kg
SAR(1 g) = 8.11 W/kg; SAR(10 g) = 2.29 W/kg
Maximum value of SAR (measured) = 19.8 W/kg



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

Impedance Measurement Plot for Head TSL



DASY5 Validation Report for Body TSL

Date: 20.01.2015

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 = 5.42 S/m; ε_r = 49.4; ρ = 1000 kg/m^3 , Medium parameters used: f = 5300 MHz; σ = 5.55 S/m; ε_r = 49.2; ρ = 1000 kg/m^3 , Medium parameters used: f = 5500 MHz; σ = 5.82 S/m; ε_r = 48.9; ρ = 1000 kg/m^3 , Medium parameters used: f = 5600 MHz; σ = 5.96 S/m; ε_r = 48.7; ρ = 1000 kg/m^3 , Medium parameters used: f = 5800 MHz; σ = 6.25 S/m; ε_r = 48.4; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)

DASY52 Configuration:

- Probe: EX3DV4 - SN3503; ConvF(4.95, 4.95, 4.95); Calibrated: 30.12.2014, ConvF(4.78, 4.78, 4.78); Calibrated: 30.12.2014, ConvF(4.45, 4.45, 4.45); Calibrated: 30.12.2014, ConvF(4.35, 4.35, 4.35); Calibrated: 30.12.2014, ConvF(4.32, 4.32, 4.32); Calibrated: 30.12.2014;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 18.08.2014
- Phantom: Flat Phantom 5.0 (back); Type: QD000P50AA; Serial: 1002
- DASY52 52.8.8(1222); SEMCAD X 14.6.10(7331)

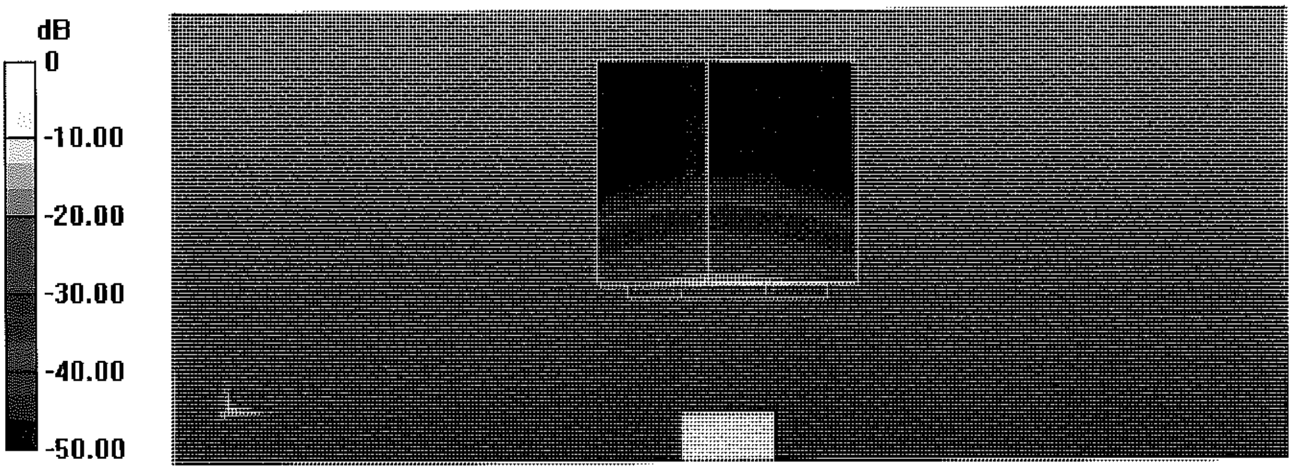
Dipole Calibration for Body Tissue/Pin=100mW, dist=10mm, f=5200 MHz/Zoom Scan, dist=1.4mm (8x8x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm
Reference Value = 58.76 V/m; Power Drift = -0.03 dB
Peak SAR (extrapolated) = 28.9 W/kg
SAR(1 g) = 7.37 W/kg; SAR(10 g) = 2.05 W/kg
Maximum value of SAR (measured) = 17.4 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 = 58.35 V/m; Power Drift = 0.01 dB
Peak SAR (extrapolated) = 29.8 W/kg
SAR(1 g) = 7.41 W/kg; SAR(10 g) = 2.08 W/kg
Maximum value of SAR (measured) = 17.6 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 = 59.04 V/m; Power Drift = 0.01 dB
Peak SAR (extrapolated) = 33.7 W/kg
SAR(1 g) = 7.9 W/kg; SAR(10 g) = 2.19 W/kg
Maximum value of SAR (measured) = 19.2 W/kg

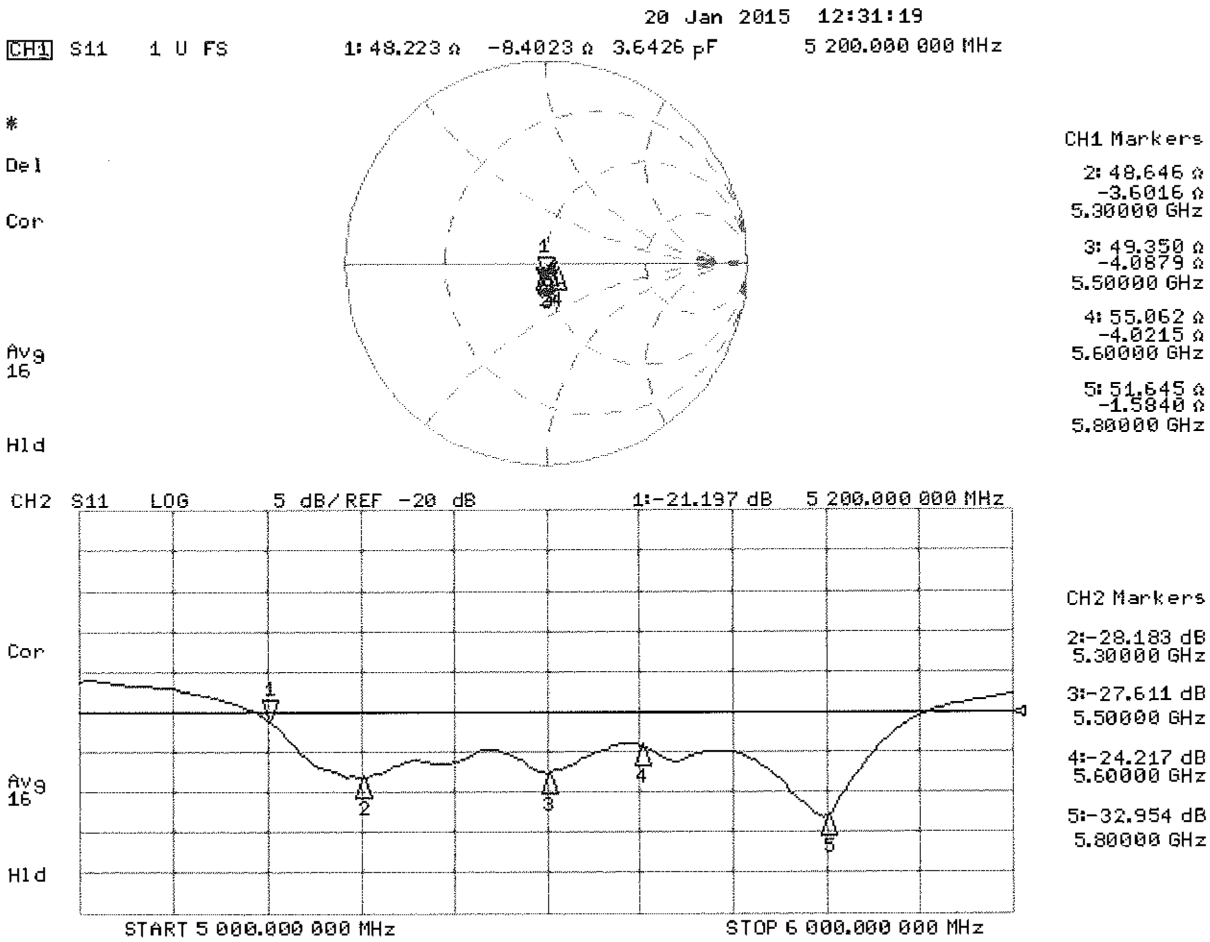
Dipole Calibration for Body Tissue/Pin=100mW, dist=10mm, f=5600 MHz/Zoom Scan, dist=1.4mm (8x8x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm
Reference Value = 57.74 V/m; Power Drift = 0.01 dB
Peak SAR (extrapolated) = 34.1 W/kg
SAR(1 g) = 7.75 W/kg; SAR(10 g) = 2.14 W/kg
Maximum value of SAR (measured) = 19.1 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 = 55.86 V/m; Power Drift = -0.01 dB
Peak SAR (extrapolated) = 34.7 W/kg
SAR(1 g) = 7.49 W/kg; SAR(10 g) = 2.06 W/kg
Maximum value of SAR (measured) = 18.6 W/kg



0 dB = 17.4 W/kg = 12.41 dBW/kg

Impedance Measurement Plot for Body TSL



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Accreditation No.: **SCS 0108**

Client **PC Test**

Certificate No: **ES3-3022_Aug15**

CALIBRATION CERTIFICATE

Object	ES3DV2 - SN:3022
Calibration procedure(s)	QA CAL-01.v9, QA CAL-23.v5, QA CAL-25.v6 Calibration procedure for dosimetric E-field probes
Calibration date:	August 26, 2015

BN ✓ 9/3/2015

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	01-Apr-15 (No. 217-02128)	Mar-16
Power sensor E4412A	MY41498087	01-Apr-15 (No. 217-02128)	Mar-16
Reference 3 dB Attenuator	SN: S5054 (3c)	01-Apr-15 (No. 217-02129)	Mar-16
Reference 20 dB Attenuator	SN: S5277 (20x)	01-Apr-15 (No. 217-02132)	Mar-16
Reference 30 dB Attenuator	SN: S5129 (30b)	01-Apr-15 (No. 217-02133)	Mar-16
Reference Probe ES3DV2	SN: 3013	30-Dec-14 (No. ES3-3013_Dec14)	Dec-15
DAE4	SN: 660	14-Jan-15 (No. DAE4-660_Jan15)	Jan-16
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-14)	In house check: Oct-15

	Name	Function	Signature
Calibrated by:	Michael Weber	Laboratory Technician	M.Weber
Approved by:	Katja Pokovic	Technical Manager	[signature]

Issued: August 27, 2015

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Accreditation No.: **SCS 0108**

Glossary:

TSL	tissue simulating liquid
NORMx,y,z	sensitivity in free space
ConvF	sensitivity in TSL / NORMx,y,z
DCP	diode compression point
CF	crest factor (1/duty_cycle) of the RF signal
A, B, C, D	modulation dependent linearization parameters
Polarization φ	φ rotation around probe axis
Polarization ϑ	ϑ rotation around an axis that is in the plane normal to probe axis (at measurement center), i.e., ϑ = 0 is normal to probe axis
Connector Angle	information used in DASY system to align probe sensor X to the robot coordinate system

Calibration is Performed According to the Following Standards:

a) IEEE Std 1528-2013, "IEEE Recommended Practice for Determining the Peak Spatial-Averaged Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques", June 2013
b) IEC 62209-1, "Procedure to measure the Specific Absorption Rate (SAR) for hand-held devices used in close proximity to the ear (frequency range of 300 MHz to 3 GHz)", February 2005
c) IEC 62209-2, "Procedure to determine the Specific Absorption Rate (SAR) for wireless communication devices used in close proximity to the human body (frequency range of 30 MHz to 6 GHz)", March 2010
d) KDB 865664, "SAR Measurement Requirements for 100 MHz to 6 GHz"

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 ES3DV2

SN:3022

Manufactured: April 15, 2003
Calibrated: August 26, 2015

Calibrated for DASY/EASY Systems
(Note: non-compatible with DASY2 system!)

DASY/EASY - Parameters of Probe: ES3DV2 - SN:3022

Basic Calibration Parameters

	Sensor X	Sensor Y	Sensor Z	Unc (k=2)
Norm (µV/(V/m)²)[A]	1.00	1.03	0.95	± 10.1 %
DCP (mV)[B]	99.9	99.7	100.9	

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	179.6	±3.3 %
		Y	0.0	0.0	1.0		183.9	
		Z	0.0	0.0	1.0		179.0	
10010-CAA	SAR Validation (Square, 100ms, 10ms)	X	3.60	65.9	14.2	10.00	43.5	±2.2 %
		Y	2.84	63.5	13.0		43.3	
		Z	2.76	63.7	12.7		41.7	
10011-CAB	UMTS-FDD (WCDMA)	X	3.32	67.0	18.7	2.91	144.4	±0.7 %
		Y	3.24	66.3	18.0		147.3	
		Z	3.19	66.3	18.0		143.5	
10012-CAB	IEEE 802.11b WiFi 2.4 GHz (DSSS, 1 Mbps)	X	3.15	69.9	19.5	1.87	146.1	±0.7 %
		Y	2.88	67.7	18.0		147.9	
		Z	2.78	67.4	17.8		145.6	
10013-CAB	IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 6 Mbps)	X	11.40	71.3	23.8	9.46	144.9	±3.3 %
		Y	11.15	70.5	23.1		146.9	
		Z	10.95	70.5	23.3		140.3	
10021-DAB	GSM-FDD (TDMA, GMSK)	X	20.66	99.8	29.2	9.39	132.6	±2.2 %
		Y	14.36	93.3	26.6		145.3	
		Z	17.17	97.2	27.8		145.4	
10023-DAB	GPRS-FDD (TDMA, GMSK, TN 0)	X	17.22	96.5	28.2	9.57	125.4	±1.9 %
		Y	11.06	88.6	25.0		136.0	
		Z	8.71	84.6	23.4		130.7	
10024-DAB	GPRS-FDD (TDMA, GMSK, TN 0-1)	X	31.05	99.5	25.9	6.56	135.2	±2.2 %
		Y	25.28	97.4	25.0		132.5	
		Z	21.58	95.7	24.5		144.4	
10027-DAB	GPRS-FDD (TDMA, GMSK, TN 0-1-2)	X	42.88	99.9	24.0	4.80	129.5	±1.9 %
		Y	40.80	99.6	23.7		124.9	
		Z	38.42	99.7	23.7		137.8	
10028-DAB	GPRS-FDD (TDMA, GMSK, TN 0-1-2-3)	X	44.48	100.0	23.2	3.55	138.2	±1.9 %
		Y	44.03	99.7	22.8		133.0	
		Z	41.36	99.8	22.8		147.5	
10032-CAA	IEEE 802.15.1 Bluetooth (GFSK, DH5)	X	16.08	99.5	23.3	1.16	127.5	±1.4 %
		Y	79.69	99.6	19.3		146.2	
		Z	45.81	99.9	20.4		138.2	
10100-CAB	LTE-FDD (SC-FDMA, 100% RB, 20 MHz, QPSK)	X	6.43	67.4	19.8	5.67	138.7	±1.4 %
		Y	6.27	66.8	19.2		134.9	
		Z	6.16	66.6	19.2		127.6	

10103-CAB	LTE-TDD (SC-FDMA, 100% RB, 20 MHz, QPSK)	X	10.13	75.0	25.9	9.29	129.4	±3.3 %
		Y	9.46	73.0	24.5		131.8	
		Z	9.52	74.0	25.4		137.0	
10108-CAC	LTE-FDD (SC-FDMA, 100% RB, 10 MHz, QPSK)	X	6.27	66.9	19.7	5.80	137.0	±1.7 %
		Y	6.24	66.7	19.3		140.0	
		Z	6.06	66.3	19.2		127.1	
10117-CAB	IEEE 802.11n (HT Mixed, 13.5 Mbps, BPSK)	X	10.16	68.7	21.3	8.07	127.7	±2.2 %
		Y	9.99	68.2	20.9		131.5	
		Z	10.22	69.1	21.4		141.6	
10151-CAB	LTE-TDD (SC-FDMA, 50% RB, 20 MHz, QPSK)	X	9.34	73.4	25.2	9.28	125.0	±3.3 %
		Y	8.92	72.2	24.3		127.2	
		Z	8.95	73.1	25.1		131.9	
10154-CAC	LTE-FDD (SC-FDMA, 50% RB, 10 MHz, QPSK)	X	5.95	66.4	19.4	5.75	134.4	±1.4 %
		Y	5.92	66.2	19.1		137.0	
		Z	5.98	66.7	19.5		146.8	
10160-CAB	LTE-FDD (SC-FDMA, 50% RB, 15 MHz, QPSK)	X	6.39	66.9	19.6	5.82	139.9	±1.7 %
		Y	6.35	66.7	19.3		141.9	
		Z	6.15	66.2	19.2		128.4	
10169-CAB	LTE-FDD (SC-FDMA, 1 RB, 20 MHz, QPSK)	X	4.96	66.6	19.8	5.73	137.3	±1.4 %
		Y	4.85	66.1	19.3		139.8	
		Z	4.85	66.6	19.7		146.7	
10172-CAB	LTE-TDD (SC-FDMA, 1 RB, 20 MHz, QPSK)	X	8.75	78.7	28.3	9.21	138.9	±3.0 %
		Y	7.69	75.1	26.1		140.1	
		Z	7.80	76.6	27.2		144.0	
10175-CAC	LTE-FDD (SC-FDMA, 1 RB, 10 MHz, QPSK)	X	4.88	66.2	19.6	5.72	132.0	±1.4 %
		Y	4.77	65.8	19.1		132.6	
		Z	4.83	66.5	19.6		146.0	
10181-CAB	LTE-FDD (SC-FDMA, 1 RB, 15 MHz, QPSK)	X	4.91	66.3	19.7	5.72	131.7	±1.4 %
		Y	4.82	66.0	19.2		138.4	
		Z	4.86	66.7	19.7		145.7	
10196-CAB	IEEE 802.11n (HT Mixed, 6.5 Mbps, BPSK)	X	10.04	69.1	21.7	8.10	140.9	±2.2 %
		Y	9.62	67.9	20.8		125.2	
		Z	9.74	68.6	21.3		133.3	
10225-CAB	UMTS-FDD (HSPA+)	X	7.01	67.1	19.6	5.97	143.7	±1.4 %
		Y	6.78	66.2	19.0		129.3	
		Z	6.80	66.7	19.3		136.5	
10237-CAB	LTE-TDD (SC-FDMA, 1 RB, 10 MHz, QPSK)	X	8.55	78.0	27.9	9.21	134.6	±3.0 %
		Y	7.79	75.6	26.3		141.6	
		Z	7.89	76.9	27.4		145.2	
10252-CAB	LTE-TDD (SC-FDMA, 50% RB, 10 MHz, QPSK)	X	9.30	74.8	26.1	9.24	134.8	±3.3 %
		Y	8.65	72.5	24.5		136.4	
		Z	8.33	72.3	24.8		126.6	
10267-CAB	LTE-TDD (SC-FDMA, 100% RB, 10 MHz, QPSK)	X	10.20	76.2	26.8	9.30	144.8	±3.3 %
		Y	9.41	73.7	25.1		145.9	
		Z	9.18	73.9	25.6		138.6	

10275-CAB	UMTS-FDD (HSUPA, Subtest 5, 3GPP Rel8.4)	X	4.45	66.7	18.9	3.96	147.0	±0.9 %
		Y	4.21	65.5	17.9		126.5	
		Z	4.36	66.5	18.5		148.0	
10291-AAB	CDMA2000, RC3, SO55, Full Rate	X	3.57	66.3	18.5	3.46	134.3	±0.7 %
		Y	3.48	65.6	17.8		136.8	
		Z	3.51	66.2	18.3		136.4	
10292-AAB	CDMA2000, RC3, SO32, Full Rate	X	3.53	66.4	18.6	3.39	135.8	±0.7 %
		Y	3.45	65.8	17.9		140.4	
		Z	3.50	66.5	18.5		137.0	
10297-AAA	LTE-FDD (SC-FDMA, 50% RB, 20 MHz, QPSK)	X	6.18	66.5	19.5	5.81	129.4	±1.4 %
		Y	6.15	66.3	19.1		133.6	
		Z	6.13	66.5	19.3		131.2	
10311-AAA	LTE-FDD (SC-FDMA, 100% RB, 15 MHz, QPSK)	X	6.77	67.2	19.9	6.06	134.8	±1.7 %
		Y	6.81	67.3	19.7		144.8	
		Z	6.68	67.1	19.7		136.7	
10400-AAC	IEEE 802.11ac WiFi (20MHz, 64-QAM, 99pc duty cycle)	X	10.30	69.4	22.0	8.37	142.0	±2.5 %
		Y	9.90	68.2	21.1		126.8	
		Z	10.15	69.3	21.9		142.6	
10403-AAB	CDMA2000 (1xEV-DO, Rev. 0)	X	4.72	68.1	18.9	3.76	147.8	±0.7 %
		Y	4.56	67.5	18.2		133.6	
		Z	4.61	68.2	18.7		147.4	
10404-AAB	CDMA2000 (1xEV-DO, Rev. A)	X	4.57	67.8	18.8	3.77	144.3	±0.7 %
		Y	4.43	67.3	18.1		131.3	
		Z	4.57	68.3	18.8		145.0	
10415-AAA	IEEE 802.11b WiFi 2.4 GHz (DSSS, 1 Mbps, 99pc duty cycle)	X	2.64	67.9	18.7	1.54	142.1	±0.5 %
		Y	2.36	65.4	16.8		130.3	
		Z	2.50	66.7	17.7		145.0	
10416-AAA	IEEE 802.11g WiFi 2.4 GHz (ERP-OFDM, 6 Mbps, 99pc duty cycle)	X	10.04	69.0	21.7	8.23	138.8	±2.2 %
		Y	9.71	68.0	20.9		125.6	
		Z	9.94	69.0	21.6		140.4	

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 Norm X,Y,Z do not affect the E^2-field uncertainty inside TSL (see Pages 7 and 8).
[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: ES3DV2 - SN:3022

Calibration Parameter Determined in Head Tissue Simulating Media

f (MHz) [C]	Relative Permittivity [F]	Conductivity (S/m) [F]	ConvF X	ConvF Y	ConvF Z	Alpha [G]	Depth [G] (mm)	Unc (k=2)
750	41.9	0.89	6.33	6.33	6.33	0.46	1.43	± 12.0 %
835	41.5	0.90	6.11	6.11	6.11	0.24	2.08	± 12.0 %
1750	40.1	1.37	5.08	5.08	5.08	0.45	1.47	± 12.0 %
1900	40.0	1.40	4.93	4.93	4.93	0.59	1.25	± 12.0 %
2300	39.5	1.67	4.63	4.63	4.63	0.55	1.39	± 12.0 %
2450	39.2	1.80	4.30	4.30	4.30	0.51	1.47	± 12.0 %
2600	39.0	1.96	4.12	4.12	4.12	0.57	1.46	± 12.0 %

[C] Frequency validity above 300 MHz of ± 100 MHz only applies for DASY v4.4 and higher (see Page 2), else it is restricted to ± 50 MHz. The uncertainty is the RSS of the ConvF uncertainty at calibration frequency and the uncertainty for the indicated frequency band. Frequency validity below 300 MHz is ± 10, 25, 40, 50 and 70 MHz for ConvF assessments at 30, 64, 128, 150 and 220 MHz respectively. Above 5 GHz frequency validity can be extended to ± 110 MHz.

[F] At frequencies below 3 GHz, the validity of tissue parameters (ε and σ) can be relaxed to ± 10% if liquid compensation formula is applied to measured SAR values. At frequencies above 3 GHz, the validity of tissue parameters (ε and σ) is restricted to ± 5%. The uncertainty is the RSS of the ConvF uncertainty for indicated target tissue parameters.

[G] Alpha/Depth are determined during calibration. SPEAG warrants that the remaining deviation due to the boundary effect after compensation is always less than ± 1% for frequencies below 3 GHz and below ± 2% for frequencies between 3-6 GHz at any distance larger than half the probe tip diameter from the boundary.

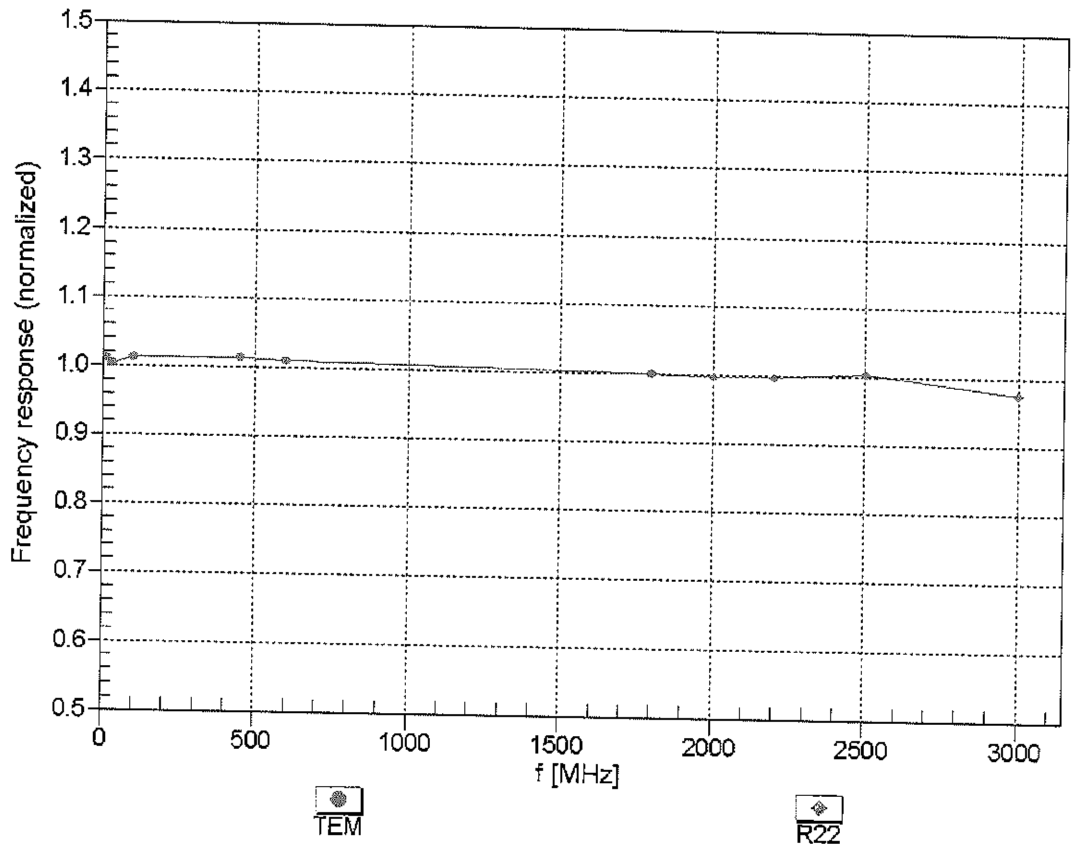
DASY/EASY - Parameters of Probe: ES3DV2 - SN:3022

Calibration Parameter Determined in Body Tissue Simulating Media

f (MHz) [C]	Relative Permittivity [F]	Conductivity (S/m) [F]	ConvF X	ConvF Y	ConvF Z	Alpha [G]	Depth [G] (mm)	Unc (k=2)
750	55.5	0.96	6.16	6.16	6.16	0.50	1.34	± 12.0 %
835	55.2	0.97	6.13	6.13	6.13	0.25	2.16	± 12.0 %
1750	53.4	1.49	4.79	4.79	4.79	0.61	1.33	± 12.0 %
1900	53.3	1.52	4.56	4.56	4.56	0.31	2.02	± 12.0 %
2300	52.9	1.81	4.32	4.32	4.32	0.79	1.19	± 12.0 %
2450	52.7	1.95	4.08	4.08	4.08	0.80	1.12	± 12.0 %
2600	52.5	2.16	3.96	3.96	3.96	0.80	1.10	± 12.0 %

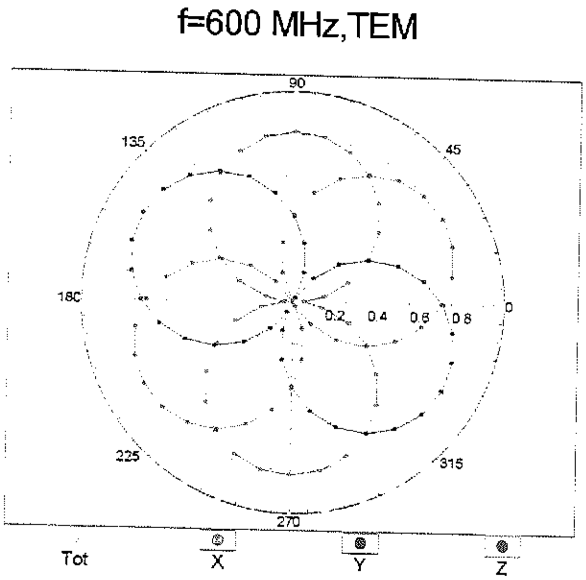
[C] Frequency validity above 300 MHz of ± 100 MHz only applies for DASY v4.4 and higher (see Page 2), else it is restricted to ± 50 MHz. The uncertainty is the RSS of the ConvF uncertainty at calibration frequency and the uncertainty for the indicated frequency band. Frequency validity below 300 MHz is ± 10, 25, 40, 50 and 70 MHz for ConvF assessments at 30, 64, 128, 150 and 220 MHz respectively. Above 5 GHz frequency validity can be extended to ± 110 MHz.
[F] At frequencies below 3 GHz, the validity of tissue parameters (ε and σ) can be relaxed to ± 10% if liquid compensation formula is applied to measured SAR values. At frequencies above 3 GHz, the validity of tissue parameters (ε and σ) is restricted to ± 5%. The uncertainty is the RSS of the ConvF uncertainty for indicated target tissue parameters.
[G] Alpha/Depth are determined during calibration. SPEAG warrants that the remaining deviation due to the boundary effect after compensation is always less than ± 1% for frequencies below 3 GHz and below ± 2% for frequencies between 3-6 GHz at any distance larger than half the probe tip diameter from the boundary.

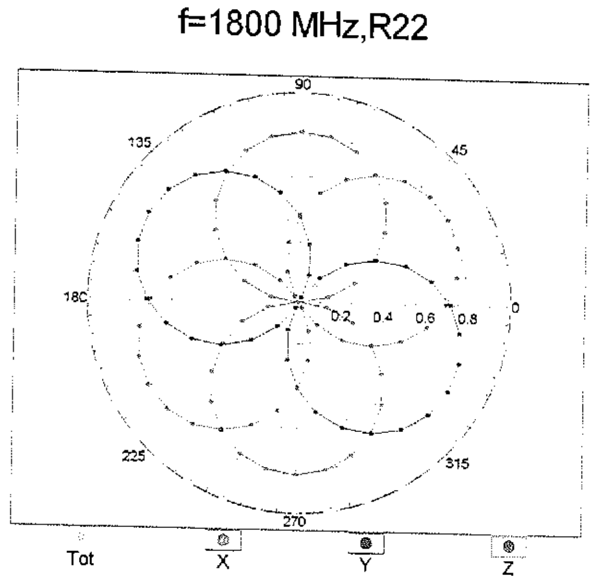
Frequency Response of E-Field
(TEM-Cell:ifi110 EXX, Waveguide: R22)

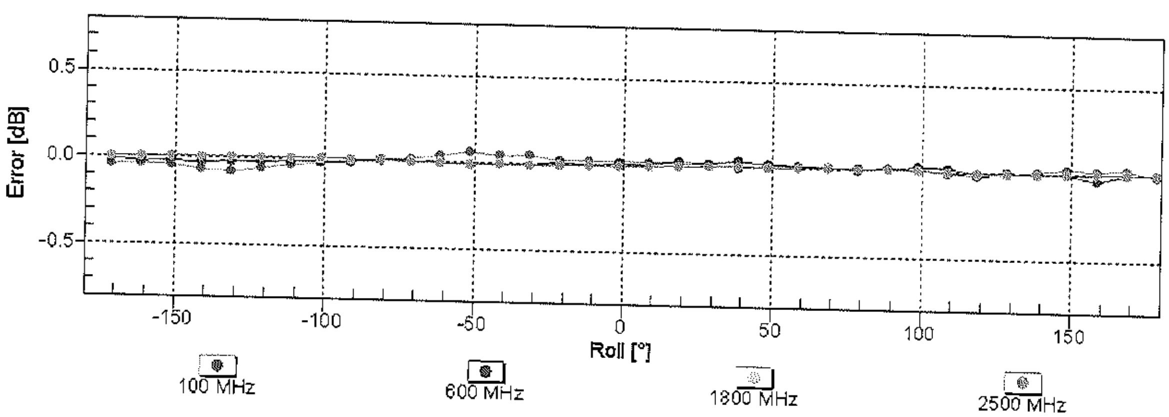


Uncertainty of Frequency Response of E-field: ± 6.3% (k=2)

Receiving Pattern (ϕ), $\vartheta = 0°$

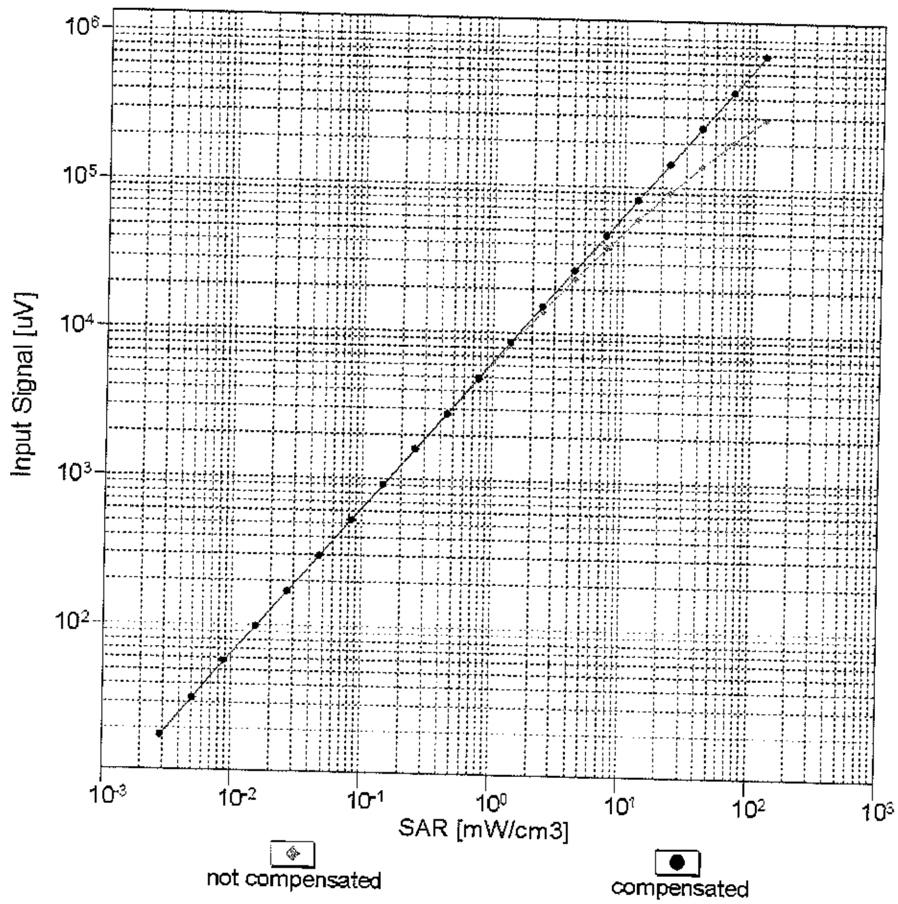


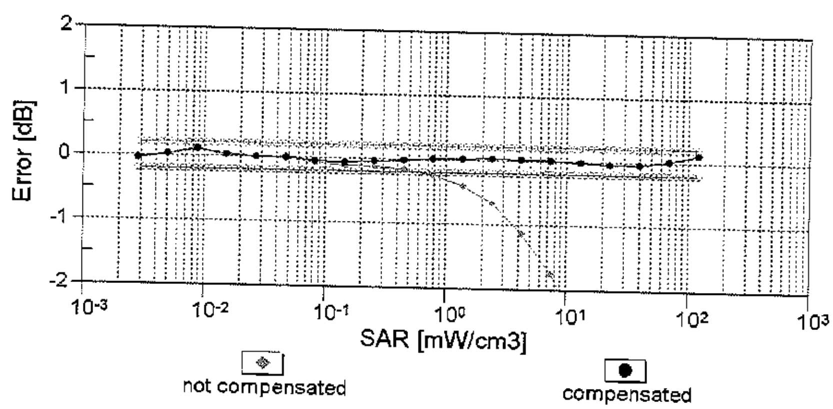




Uncertainty of Axial Isotropy Assessment: ± 0.5% (k=2)

Dynamic Range f(SAR_{head})
(TEM cell , f_{eval}= 1900 MHz)

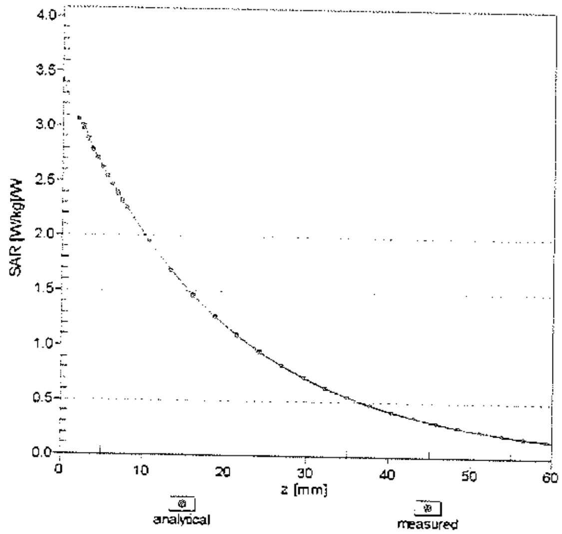




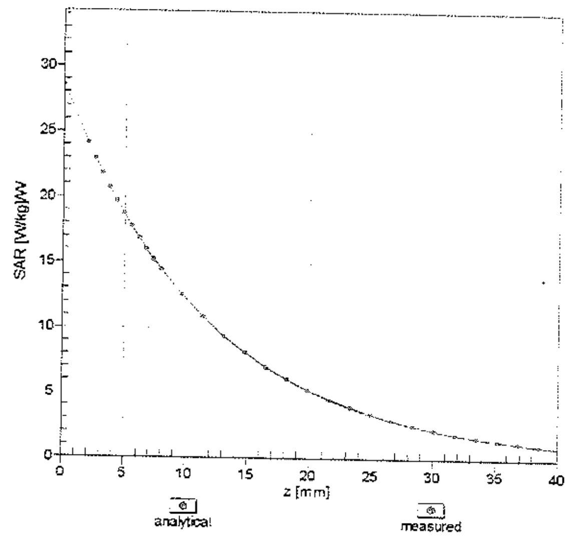
Uncertainty of Linearity Assessment: ± 0.6% (k=2)

Conversion Factor Assessment

f = 835 MHz,WGLS R9 (H_convF)

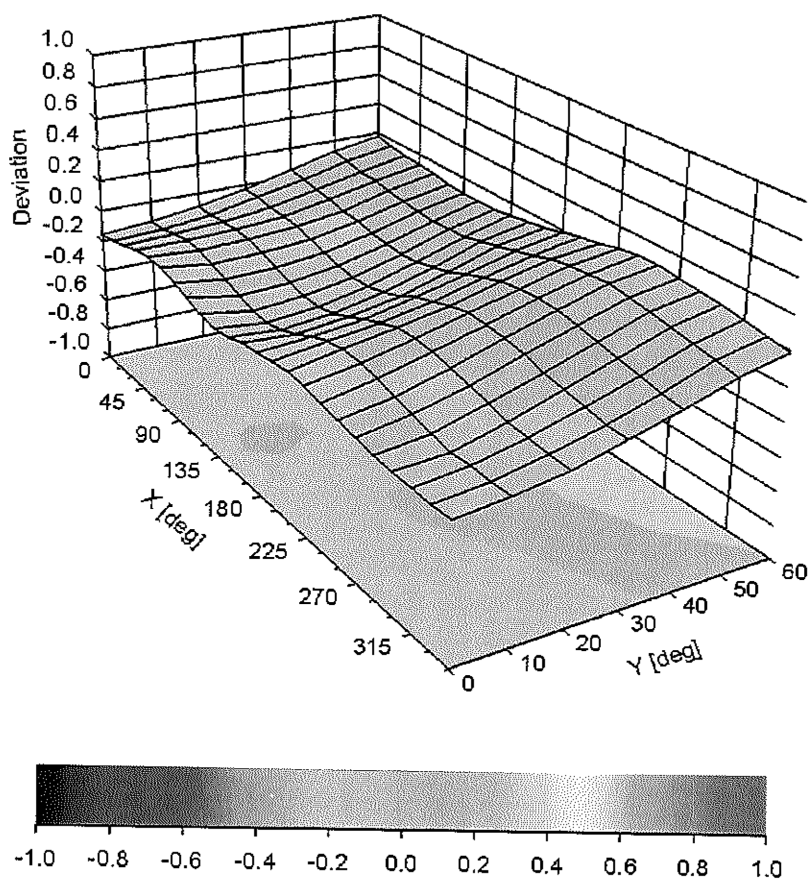


f = 1900 MHz,WGLS R22 (H_convF)



Deviation from Isotropy in Liquid

Error (ϕ, ϑ), f = 900 MHz



Uncertainty of Spherical Isotropy Assessment: ± 2.6% (k=2)

DASY/EASY - Parameters of Probe: ES3DV2 - SN:3022

Other Probe Parameters

Sensor Arrangement	Triangular
Connector Angle (°)	98.5
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