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SAR EVALUATION REPORT

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

Date of Testing:
06/09/14 - 06/19/14
Test Site/Location:
PCTEST Lab, Columbia, MD, USA
Document Serial No.:
0Y1406091172.ZNF

FCC ID: ZNFLS885

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

DUT Type: Portable Handset
Application Type: Class II Permissive Change
FCC Rule Part(s): CFR §2.1093
Model(s): LGLS885, LG-LS885, LS885
Permissive Change(s): See FCC Change Document
Date of Original Certification: 06/09/2014

Equipment Class	Band & Mode	Tx Frequency	SAR		
			1 gm Head (W/kg)	1 gm Body-Worn (W/kg)	1 gm Hotspot (W/kg)
PCE	CDMA/EVDO BC10 (§90S)	817.90 - 823.10 MHz	0.51	0.80	0.87
PCE	CDMA/EVDO BC0 (§22H)	824.70 - 848.31 MHz	0.44	0.75	0.74
PCE	PCS CDMA/EVDO	1851.25 - 1908.75 MHz	0.66	0.99	1.03
PCE	LTE Band 26	814.7 - 848.3 MHz	0.32	0.49	0.51
PCE	LTE Band 25 (PCS)	1851.5 - 1913.5 MHz	0.58	0.87	0.87
PCE	LTE Band 41	2501 - 2685 MHz	0.23	0.36	0.36
DTS	2.4 GHz WLAN	2412 - 2462 MHz	0.53	0.15	0.15
DTS	5.8 GHz WLAN	5745 - 5825 MHz	< 0.1	0.11	0.11
NII	5.2 GHz WLAN	5180 - 5240 MHz	0.14	0.15	
NII	5.3 GHz WLAN	5260 - 5320 MHz	0.17	0.18	
NII	5.5 GHz WLAN	5500 - 5700 MHz	0.14	0.20	
DSS/DTS	Bluetooth	2402 - 2480 MHz	N/A		
Simultaneous SAR per KDB 690783 D01v01r02:			1.18	1.26	1.17

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 1.7 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

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1 DEVICE UNDER TEST

1.1 Device Overview

Band & Mode	Operating Modes	Tx Frequency
CDMA/EVDO BC10 (§90S)	Voice/Data	817.90 - 823.10 MHz
CDMA/EVDO BC0 (§22H)	Voice/Data	824.70 - 848.31 MHz
PCS CDMA/EVDO	Voice/Data	1851.25 - 1908.75 MHz
LTE Band 26	Data	814.7 - 848.3 MHz
LTE Band 25 (PCS)	Data	1851.5 - 1913.5 MHz
LTE Band 41	Data	2501 - 2685 MHz
2.4 GHz WLAN	Data	2412 - 2462 MHz
5.8 GHz WLAN	Data	5745 - 5825 MHz
5.2 GHz WLAN	Data	5180 - 5240 MHz
5.3 GHz WLAN	Data	5260 - 5320 MHz
5.5 GHz WLAN	Data	5500 - 5700 MHz
Bluetooth	Data	2402 - 2480 MHz

1.2 Nominal and Maximum Output Power Specifications

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

Mode / Band		Modulated Average (dBm)
CDMA/EVDO BC10 (§90S)	Maximum	**25.4**
	Nominal	**24.9**
CDMA/EVDO BC0 (§22H)	Maximum	**25.2**
	Nominal	**24.7**
PCS CDMA/EVDO	Maximum	**25.0**
	Nominal	**24.5**
Mode / Band		Modulated Average (dBm)
LTE Band 26	Maximum	**24.2**
	Nominal	**23.7**
LTE Band 25 (PCS)	Maximum	**24.2**
	Nominal	**23.7**
LTE Band 41	Maximum	**24.2**
	Nominal	**23.7**
Mode / Band		Modulated Average (dBm)
IEEE 802.11b (2.4 GHz)	Maximum	**17.0**
	Nominal	**16.0**
IEEE 802.11g (2.4 GHz)	Maximum	**14.0**
	Nominal	**13.0**
IEEE 802.11n (2.4 GHz)	Maximum	**12.0**
	Nominal	**11.0**
IEEE 802.11a (5 GHz)	Maximum	**14.0**
	Nominal	**13.0**
IEEE 802.11n (5 GHz)	Maximum	**11.0**
	Nominal	**10.0**
Bluetooth	Maximum	**11.0**
	Nominal	**9.0**
Bluetooth LE	Maximum	**8.0**
	Nominal	**6.0**

1.3 DUT Antenna Locations

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

Figure 1-1
DUT Antenna Locations

Table 1-1
Mobile Hotspot Sides for SAR Testing

Mode	Back	Front	Top	Bottom	Right	Left
EVDO BC10 (§90S)	Yes	Yes	No	Yes	Yes	Yes
EVDO BC0 (§22H)	Yes	Yes	No	Yes	Yes	Yes
PCS EVDO	Yes	Yes	No	Yes	Yes	Yes
LTE Band 26	Yes	Yes	No	Yes	Yes	Yes
LTE Band 25 (PCS)	Yes	Yes	No	Yes	Yes	Yes
LTE Band 41	Yes	Yes	No	Yes	No	Yes
2.4 GHz WLAN	Yes	Yes	Yes	No	No	Yes
5.8 GHz WLAN	Yes	Yes	Yes	No	No	Yes

Note:
1. Particular DUT edges were not required to be evaluated for Wireless Router SAR if the edges were greater than 2.5 cm from the transmitting antenna according to FCC KDB Publication 941225 D06v01 guidance, page 2.
2. 5 GHz WIFI Direct GO is supported in the 5 GHz DTS band only. The manufacturer expects 5 GHz DTS Wifi Direct GO may be used similar to wireless router usage. Therefore, 5 GHz DTS Wifi Direct GO was evaluated for SAR similar to wireless router SAR procedures in FCC KDB Publication 941225.

1.4 Simultaneous Transmission Capabilities

According to FCC KDB Publication 447498 D05v01, transmitters are considered to be transmitting simultaneously when there is overlapping transmission, with the exception of transmissions during network hand-offs with maximum hand-off duration less than 30 seconds. Possible transmission paths for the DUT are shown in Figure 1-2 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 1-2
Simultaneous Transmission Paths

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

Table 1-2
Simultaneous Transmission Scenarios

No.	Capable Transmit Configuration	Head	Body-Worn Accessory	Wireless Router	Notes
1	1x CDMA voice + 2.4 GHz WI-FI	Yes	Yes	N/A	
2	1x CDMA voice + 5 GHz WI-FI	Yes	Yes	N/A	
3	1x CDMA voice + 2.4 GHz Bluetooth	N/A	Yes	N/A	
4	LTE + 2.4 GHz WI-FI	Yes*	Yes*	Yes	
5	LTE + 5 GHz WI-FI	Yes*	Yes*	Yes	
6	LTE + 2.4 GHz Bluetooth	N/A	Yes*	N/A	
7	CDMA/EVDO data + 2.4 GHz WI-FI	Yes*	Yes*	Yes	
8	CDMA/EVDO data + 5 GHz WI-FI	Yes*	Yes*	Yes	
9	CDMA/EVDO data + 2.4 GHz Bluetooth	N/A	Yes*	N/A	
10	1x CDMA voice + CDMA/EVDO data	N/A	N/A	N/A	Not supported by HW
11	CDMA/EVDO data + LTE	N/A	N/A	N/A	Not supported by HW
12	1x CDMA voice + LTE	N/A	N/A	N/A	Not supported by HW
13	1x CDMA voice + LTE + 2.4 GHz WI-FI	N/A	N/A	N/A	Not supported by HW
14	1x CDMA voice + LTE + 5 GHz WI-FI	N/A	N/A	N/A	Not supported by HW

1. 2.4 GHz WIFI supports Hotspot and WIFI-Direct(GO/GC).
2. 5 GHz WIFI does not support Hotspot; supports WIFI-Direct (GC; 5.8 GHz only GO).
3. CDMA/EVDO, LTE supports Hotspot.
4. (*) = for VOLTE or VOIP applications possibly installed and used by end-user.
5. Bluetooth and WiFi can not transmit simultaneously since they share the same chip.
6. CDMA/EVDO, LTE can not transmit simultaneously since they share the same chip.
7. Per the manufacturer, WIFI Direct is expected to be used in conjunction with a held-to-ear or body-worn accessory voice call. Simultaneous transmission scenarios involving WIFI direct are specified above.

1.5 SAR Test Exclusions Applied

(A) WIFI/BT

Since hotspot operations are not allowed by the chipset firmware using 5 GHz WIFI, only 2.4 GHz WIFI Hotspot SAR tests and combinations are considered for SAR with respect to Wireless Router configurations according to FCC KDB 941225 D06v01.

5 GHz WIFI Direct GO is supported in the 5.8 GHz band only. The manufacturer expects 5.8 GHz WIFI Direct GO may be used similar to wireless router usage. Therefore, 5.8 GHz WIFI Direct GO was evaluated for SAR similar to wireless router SAR procedures in FCC KDB Publication 941225.

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

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

Based on the maximum conducted power of Bluetooth (rounded to the nearest mW) and the antenna to user separation distance, Bluetooth SAR was not required; [(13/10)* √2.441] = 2.0 < 3.0. Per KDB Publication 447498 D01v05, the maximum power of the channel was rounded to the nearest mW before calculation.

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

(B) Licensed Transmitter(s)

LTE SAR for the higher modulations and lower bandwidths were not tested since the maximum average output power of all required channels and configurations was not more than 0.5 dB higher than the highest bandwidth; and the reported LTE SAR for the highest bandwidth was less than 1.45 W/kg for all configurations according to FCC KDB 941225 D05v02.

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

1.6 Power Reduction for SAR

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

1.7 Guidance Applied

- IEEE 1528-2003
- FCC KDB Publication 941225 D01v02r02, D02v02r02, D03v01, D04v01, D05v02r02, D06v01r01 (2G/3G/4G, 1x Advanced, and Hotspot)
- FCC KDB Publication 248227 D01v01r02 (SAR Considerations for 802.11 Devices)
- FCC KDB Publication 447498 D01v05r01 (General SAR Guidance)
- FCC KDB Publication 865664 D01v01r01-D02v01r01 (SAR Measurements up to 6 GHz)

1.8 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	Wireless Router Serial Number
CDMA/EVDO BC10 (§90S)	885-1	885-1	885-1
CDMA/EVDO BC0 (§22H)	885-1	885-1	885-1
PCS CDMA/EVDO	885-1	885-1	885-1
LTE Band 26	885-2	885-2	885-2
LTE Band 25 (PCS)	885-2	885-2	885-2
LTE Band 41	885-2	885-2	885-2
2.4 GHz WLAN	885-19	885-19	885-19
5 GHz WLAN	885-19	885-19	885-19

2 LTE INFORMATION

LTE Information					
FCC ID	**ZNFLS885**				
Form Factor	Portable Handset				
Frequency Range of each LTE transmission band	LTE Band 26 (814.7 - 848.3 MHz)				
	LTE Band 25 (PCS) (1851.5 - 1913.5 MHz)				
	LTE Band 41 (2501 - 2685 MHz)				
Channel Bandwidths	LTE Band 26: 1.4 MHz, 3 MHz, 5 MHz, 10 MHz				
	LTE Band 25 (PCS): 3 MHz, 5 MHz, 10 MHz				
	LTE Band 41: 10 MHz, 15 MHz, 20 MHz				
Channel Numbers and Frequencies (MHz)	Low	Low-Mid	Mid	Mid-High	High
LTE Band 26: 1.4 MHz	814.7 (26697)		831.5 (26865)		848.3 (27033)
LTE Band 26: 3 MHz	815.5 (26705)		831.5 (26865)		847.5 (27025)
LTE Band 26: 5 MHz	816.5 (26715)		831.5 (26865)		846.5 (27015)
LTE Band 26: 10 MHz	819 (26740)		831.5 (26865)		844 (26990)
LTE Band 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 41: 10 MHz	2501 (39700)	2547 (40160)	2593 (40620)	2639 (41080)	2685 (41540)
LTE Band 41: 15 MHz	2503.5 (39725)	2548.3 (40173)	2593 (40620)	2637.8 (41068)	2682.5 (41515)
LTE Band 41: 20 MHz	2506 (39750)	2549.5 (40185)	2593 (40620)	2636.5 (41055)	2680 (41490)
UE Category	3				
Modulations Supported in UL	QPSK, 16QAM				
LTE MPR Permanently implemented per 3GPP TS 36.101 section 6.2.3~6.2.5? (manufacturer attestation to be provided)	YES				
A-MPR (Additional MPR) disabled for SAR Testing?	YES				

3 INTRODUCTION

The FCC and Industry Canada have adopted the guidelines for evaluating the environmental effects of radio frequency (RF) radiation in ET Docket 93-62 on Aug. 6, 1996 and Health Canada Safety Code 6 to protect the public and workers from the potential hazards of RF emissions due to FCC-regulated portable devices. [1]

The safety limits used for the environmental evaluation measurements are based on the criteria published by the American National Standards Institute (ANSI) for localized specific absorption rate (SAR) in IEEE/ANSI C95.1-1992 Standard for Safety Levels with Respect to Human Exposure to Radio Frequency Electromagnetic Fields, 3 kHz to 300 GHz [3] and Health Canada RF Exposure Guidelines Safety Code 6 [22]. The measurement procedure described in IEEE/ANSI C95.3-2002 Recommended Practice for the Measurement of Potentially Hazardous Electromagnetic Fields - RF and Microwave [4] is used for guidance in measuring the Specific Absorption Rate (SAR) due to the RF radiation exposure from the Equipment Under Test (EUT). These criteria for SAR evaluation are similar to those recommended by the International Committee for Non-Ionizing Radiation Protection (ICNIRP) in Biological Effects and Exposure Criteria for Radiofrequency Electromagnetic Fields," Report No. Vol 74. SAR is a measure of the rate of energy absorption due to exposure to an RF transmitting source. SAR values have been related to threshold levels for potential biological hazards.

3.1 SAR Definition

Specific Absorption Rate is defined as the time derivative (rate) of the incremental energy (dU) absorbed by (dissipated in) an incremental mass (dm) contained in a volume element (dV) of a given density (ρ). It is also defined as the rate of RF energy absorption per unit mass at a point in an absorbing body (see Equation 3-1).

Equation 3-1
SAR Mathematical Equation

$$SAR = \frac{d}{dt}\left(\frac{dU}{dm}\right) = \frac{d}{dt}\left(\frac{dU}{\rho dv}\right)$$

SAR is expressed in units of Watts per Kilogram (W/kg).

$$SAR = \frac{\sigma \cdot E^2}{\rho}$$

where:

σ = conductivity of the tissue-simulating material (S/m)
ρ = mass density of the tissue-simulating material (kg/m^3)
E = Total RMS electric field strength (V/m)

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

4 DOSIMETRIC ASSESSMENT

4.1 Measurement Procedure

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

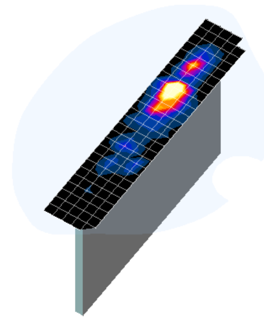

Figure 4-1
Sample SAR Area Scan

1. The SAR distribution at the exposed side of the head or body was measured at a distance no greater than 5.0 mm from the inner surface of the shell. The area covered the entire dimension of the device-head and body interface and the horizontal grid resolution was determined per FCC KDB Publication 865664 D01v01 (See Table 4-1) and IEEE 1528-2013.
2. The point SAR measurement was taken at the maximum SAR region determined from Step 1 to enable the monitoring of SAR fluctuations/drifts during the 1g/10g cube evaluation. SAR at this fixed point was measured and used as a reference value.
3. Based on the area scan data, the peak of the region with maximum SAR was determined by spline interpolation. Around this point, a volume was assessed according to the measurement resolution and volume size requirements of FCC KDB Publication 865664 D01v01 (See Table 4-1) and IEEE 1528-2013. On the basis of this data set, the spatial peak SAR value was evaluated with the following procedure (see references or the DASY manual online for more details):
    a. SAR values at the inner surface of the phantom are extrapolated from the measured values along the line away from the surface with spacing no greater than that in Table 4-1. The extrapolation was based on a least-squares algorithm. A polynomial of the fourth order was calculated through the points in the z-axis (normal to the phantom shell).
    b. After the maximum interpolated values were calculated between the points in the cube, the SAR was averaged over the spatial volume (1g or 10g) using a 3D-Spline interpolation algorithm. The 3D-spline is composed of three one-dimensional splines with the “Not a knot” condition (in x, y, and z directions). The volume was then integrated with the trapezoidal algorithm. One thousand points (10 x 10 x 10) were obtained through interpolation, in order to calculate the averaged SAR.
    c. All neighboring volumes were evaluated until no neighboring volume with a higher average value was found.
4. The SAR reference value, at the same location as step 2, was re-measured after the zoom scan was complete to calculate the SAR drift. If the drift deviated by more than 5%, the SAR test and drift measurements were repeated.

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

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

*Also compliant to IEEE 1528-2013 Table 6

5 DEFINITION OF REFERENCE POINTS

5.1 EAR REFERENCE POINT

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

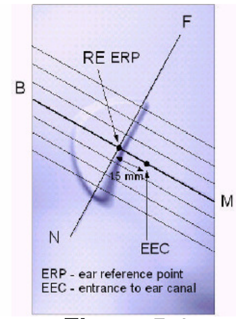

Figure 5-1
Close-Up Side view of ERP

5.2 HANDSET REFERENCE POINTS

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

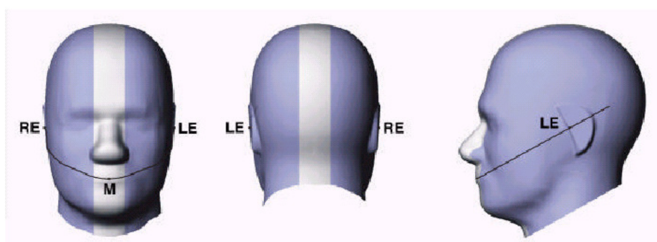

Figure 5-2
Front, back and side view of SAM Twin Phantom

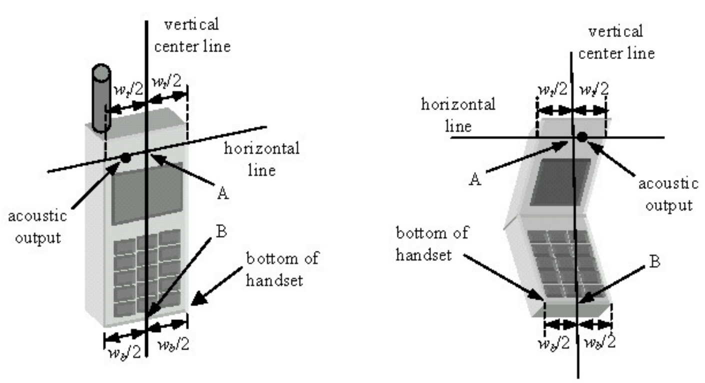

Figure 5-3
Handset Vertical Center & Horizontal Line Reference Points

6 TEST CONFIGURATION POSITIONS FOR HANDSETS

6.1 Device Holder

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

6.2 Positioning for Cheek

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

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

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

6.3 Positioning for Ear / 15º Tilt

With the test device aligned in the "Cheek Position":

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

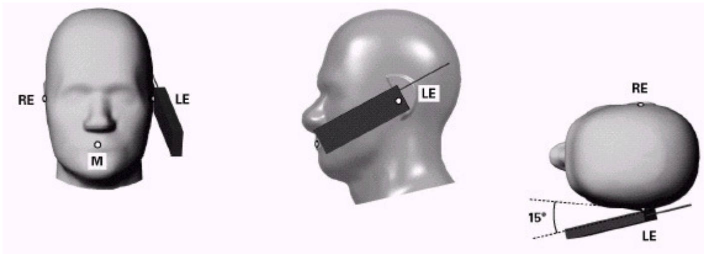

Figure 6-2 Front, Side and Top View of Ear/15º Tilt Position

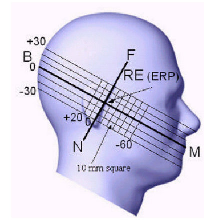

Figure 6-3
Side view w/ relevant markings

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

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

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

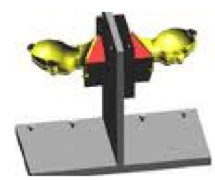

Figure 6-4 Twin SAM Chin20

6.5 Body-Worn Accessory Configurations

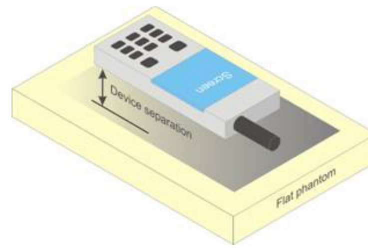

Figure 6-5
Sample Body-Worn Diagram

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 6-5). Per FCC KDB Publication 648474 D04v01, Body-worn accessory exposure is typically related to voice mode operations when handsets are carried in body-worn accessories. The body-worn accessory procedures in FCC KDB Publication 447498 D01v05 should be used to test for body-worn accessory SAR compliance, without a headset connected to it. This enables the test results for such configuration to be compatible with that required for hotspot mode when the body-worn accessory test separation distance is greater than or equal to that required for hotspot mode, when applicable. When the reported SAR for a body-worn accessory, measured without a headset connected to the handset, is > 1.2 W/kg, the highest reported SAR configuration for that wireless mode and frequency band should be repeated for that body-worn accessory with a headset attached to the handset.

Accessories for Body-worn operation configurations are divided into two categories: those that do not contain metallic components and those that do contain metallic components. When multiple accessories that do not contain metallic components are supplied with the device, the device is tested with only the accessory that dictates the closest spacing to the body. Then multiple accessories that contain metallic components are tested with the device with each accessory. If multiple accessories share an identical metallic component (i.e. the same metallic belt-clip used with different holsters with no other metallic components) only the accessory that dictates the closest spacing to the body is tested.

Body-worn accessories may not always be supplied or available as options for some devices intended to be authorized for body-worn use. In this case, a test configuration with a separation distance between the back of the device and the flat phantom is used. Test position spacing was documented. Transmitters that are designed to operate in front of a person's face, as in push-to-talk configurations, are tested for SAR compliance with the front of the device positioned to face the flat phantom in head fluid. For devices that are carried next to the body such as a shoulder, waist or chest-worn transmitters, SAR compliance is tested with the accessories, including headsets and microphones, attached to the device and positioned against a flat phantom in a normal use configuration.

6.6 Extremity Exposure Configurations

Devices that are designed or intended for use on extremities or mainly operated in extremity only exposure conditions; i.e., hands, wrists, feet and ankles, may require extremity SAR evaluation. When the device also operates in close proximity to the user's body, SAR compliance for the body is also required. The 1-g body and 10-g extremity SAR Exclusion Thresholds found in KDB Publication 44798 D01v05 should be applied to determine SAR test requirements.

Per KDB Publication 447498 D01v05, Cell phones (handsets) are not normally designed to be used on extremities or operated in extremity only exposure conditions. The maximum output power levels of handsets generally do not require extremity SAR testing to show compliance. Therefore, extremity SAR was not evaluated for this device.

6.7 Wireless Router Configurations

Some battery-operated handsets have the capability to transmit and receive user data through simultaneous transmission of WIFI simultaneously with a separate licensed transmitter. The FCC has provided guidance in FCC KDB Publication 941225 D06 v01 where SAR test considerations for handsets (L x W ≥ 9 cm x 5 cm) are based on a composite test separation distance of 10 mm from the front, back and edges of the device containing transmitting antennas within 2.5 cm of their edges, determined from general mixed use conditions for this type of devices. Since the hotspot SAR results may overlap with the body-worn accessory SAR requirements, the more conservative configurations can be considered, thus excluding some body-worn accessory SAR tests.

When the user enables the personal wireless router functions for the handset, actual operations include simultaneous transmission of both the WIFI transmitter and another licensed transmitter. Both transmitters often do not transmit at the same transmitting frequency and thus cannot be evaluated for SAR under actual use conditions due to the limitations of the SAR assessment probes. Therefore, SAR must be evaluated for each frequency transmission and mode separately and spatially summed with the WIFI transmitter according to FCC KDB Publication 447498 D01v05 publication procedures. The "Portable Hotspot" feature on the handset was NOT activated during SAR assessments, to ensure the SAR measurements were evaluated for a single transmission frequency RF signal at a time.

7 RF EXPOSURE LIMITS

7.1 Uncontrolled Environment

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

7.2 Controlled Environment

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

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

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

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

8 FCC MEASUREMENT PROCEDURES

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

8.1 Measured and Reported SAR

Per FCC KDB Publication 447498 D01v05, When SAR is not measured at the maximum power level allowed for production units, the results must be scaled to the maximum tune-up tolerance limit according to the power applied to the individual channels tested to determine compliance. For simultaneous transmission, the measured aggregate SAR must be scaled according to the sum of the differences between the maximum tune-up tolerance and actual power used to test each transmitter. When SAR is measured at or scaled to the maximum tune-up tolerance limit, the results are referred to as *reported* SAR. The highest *reported* SAR results are identified on the grant of equipment authorization according to procedures in KDB 690783 D01v01r02.

8.2 Procedures Used to Establish RF Signal for SAR

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

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

8.3 SAR Measurement Conditions for CDMA2000

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

8.3.1 Output Power Verification

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

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

Table 8-1
Parameters for Max. Power for RC1

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

Table 8-2
Parameters for Max. Power for RC3

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

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

8.3.2 CDMA2000 1x Advanced

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

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

8.3.3 Head SAR Measurements

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

8.3.4 Body SAR Measurements

SAR for body exposure configurations is measured in RC3 with the DUT configured to transmit at full rate on FCH with all other code channels disabled using TDSO / SO32. SAR for multiple code channels (FCH + SCH_n) is not required when the maximum average output of each RF channel is less than ¼ dB higher than that measured with FCH only. Otherwise, SAR is measured on the maximum output channel (FCH + SCH_n) with FCH at full rate and SCH_0 enabled at 9600 bps using the exposure configuration that results in the highest SAR for that channel with FCH only. When multiple code channels are enabled, the DUT output may shift by more than 0.5 dB and lead to higher SAR drifts and SCH dropouts. Body SAR was measured using TDSO / SO32 with power control bits in the "All Up"

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

8.3.5 Handsets with EVDO

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

8.3.6 Body SAR Measurements for EVDO Hotspot

Hotspot Body SAR is measured using Subtype 0/1 Physical Layer configurations for Rev. 0 per KDB Publication 941225 D01 procedures for "1x Ev-Do data Devices". SAR for Subtype 2 Physical layer configurations is not required for Rev. A when the maximum average output of each RF channels is less than that measured in Subtype 0/1 Physical layer configurations. Otherwise, SAR is measured on the maximum output channel for Rev. A using the exposure configuration that results in the highest SAR for the RF channels in Rev. 0. The AT is tested with a Reverse Data Channel rate of 153.6 kbps in Subtype 0/1 Physical Layer configurations; and a Reverse Data Channel payload size of 4096 bits and Termination Target of 16 slots in Subtype 2 Physical Layer configurations.

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

8.4 SAR Measurement Conditions for LTE

LTE modes were tested according to FCC KDB 941225 D05v02 publication. Please see notes after the tabulated SAR data for required test configurations. Establishing connections with base station simulators ensure a consistent means for testing SAR and are recommended for evaluating SAR [4]. The R&S CMW500 was used for LTE output power measurements and SAR testing. Closed loop power control was used so the UE transmits with maximum output power during SAR testing. SAR tests were performed with the same number of RB and RB offsets transmitting on all TTI frames (maximum TTI).

8.4.1 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.

8.4.2 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.

8.4.3 A-MPR

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

8.4.4 Required RB Size and RB Offsets for SAR Testing

According to FCC KDB 941225 D05v02r01:

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

8.4.5 TDD

LTE 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. SAR testing was performed using the normal cyclic prefix and then scaling up the measured SAR result to the extended cyclic prefix listed in 3GPP TS 36.211 Section 4.

8.5 SAR Testing with 802.11 Transmitters

Normal network operating configurations are not suitable for measuring the SAR of 802.11 a/b/g/n transmitters. Unpredictable fluctuations in network traffic and antenna diversity conditions can introduce undesirable variations in SAR results. The SAR for these devices should be measured using chipset based test mode software to ensure the results are consistent and reliable. See KDB Publication 248227 D01v01r02 for more details.

8.5.1 General Device Setup

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

8.5.2 Frequency Channel Configurations [24]

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

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

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

9 RF CONDUCTED POWERS

9.1 CDMA 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	25.27	25.33	25.31	25.31	25.32	25.31	25.26
Cellular	1013	22H	824.7	25.16	25.11	25.15	25.15	25.12	25.14	25.08
	384	22H	836.52	25.14	25.07	25.20	25.12	25.11	25.17	25.16
	777	22H	848.31	25.00	25.05	25.13	25.03	25.15	25.17	25.08
PCS	25	24E	1851.25	24.73	24.80	24.72	24.75	24.79	24.81	24.79
	600	24E	1880	24.75	24.79	24.70	24.77	24.78	24.76	24.75
	1175	24E	1908.75	24.72	24.77	24.71	24.79	24.80	24.78	24.76

General Notes:

1. RC1 is only applicable for IS-95 compatibility.
2. For FCC Rule Part 90S, Per FCC KDB Publication 447498 D01v05 4.1.6, only one channel is required since the device operates within the transmission range of 817.90 – 823.10 MHz.

Per KDB Publication 941225 D01v02:

1. Head SAR was tested with SO55 RC3. SO55 RC1 was not required since the average output power was not more than 0.25 dB than the SO55 RC3 powers. Head SAR was additionally evaluated with EVDO Rev. A to determine compliance for held-to-ear VOIP operations.
2. Body-Worn SAR was tested with 1x RTT with TDSO / SO32 FCH Only. Ev-Do and TDSO / SO32 FCH+SCH SAR tests were not required since the average output power was not more than 0.25 dB higher than the TDSO / SO32 FCH only powers.
3. Hotspot SAR is measured using Subtype 0/1 Physical Layer configurations for Rev. 0. If the average output power of Subtype 2 for Rev. A is less than the Rev. 0 power levels, then Rev. A SAR is not required. Otherwise, SAR is measured on the maximum output channel for Rev. A using the exposure configuration that results in the highest SAR for that RF channel in Rev. 0. SAR is not required for 1x RTT for Ev-Do hotspot devices when the maximum average output of each channel is less than 1⁄4 dB higher than that measured in Subtype 0/1 Physical Layer configurations for Rev. 0.

Per KDB Publication 941225 D02v02

1. CDMA 1X Advanced technology was not required for SAR since the maximum output powers for 1x Advanced was not more than 0.25 dB higher than the maximum measured powers for 1x and the measured SAR in any 1x mode exposure conditions was not greater than 1.2 W/kg. See Section 8.3.2 for 1x Advanced test set up.

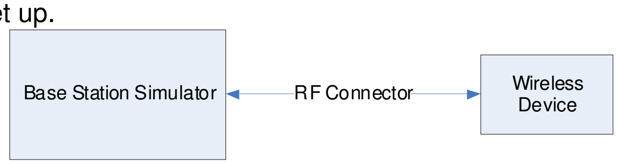

Figure 9-1
Power Measurement Setup

9.2 LTE Conducted Powers

9.2.1 LTE Band 26

Table 9-1
LTE Band 26 Conducted Powers - 10 MHz Bandwidth

	Frequency [MHz]	Channel	Bandwidth [MHz]	Modulation	RB Size	RB Offset	Conducted Power [dBm]	MPR Allowed per 3GPP [dB]	MPR [dB]
Low	819	26740	10	QPSK	1	0	24.00	0	0
	819	26740	10	QPSK	1	25	24.10	0	0
	819	26740	10	QPSK	1	49	24.10	0	0
	819	26740	10	QPSK	25	0	23.05	0-1	1
	819	26740	10	QPSK	25	12	23.09	0-1	1
	819	26740	10	QPSK	25	25	23.09	0-1	1
	819	26740	10	QPSK	50	0	23.12	0-1	1
	819	26740	10	16QAM	1	0	23.02	0-1	1
	819	26740	10	16QAM	1	25	23.01	0-1	1
	819	26740	10	16QAM	1	49	22.99	0-1	1
	819	26740	10	16QAM	25	0	22.14	0-2	2
	819	26740	10	16QAM	25	12	22.03	0-2	2
	819	26740	10	16QAM	25	25	22.04	0-2	2
	819	26740	10	16QAM	50	0	22.03	0-2	2
Mid	831.5	26865	10	QPSK	1	0	**24.19**	0	0
	831.5	26865	10	QPSK	1	25	24.13	0	0
	831.5	26865	10	QPSK	1	49	24.11	0	0
	831.5	26865	10	QPSK	25	0	23.09	0-1	1
	831.5	26865	10	QPSK	25	12	23.07	0-1	1
	831.5	26865	10	QPSK	25	25	23.01	0-1	1
	831.5	26865	10	QPSK	50	0	23.05	0-1	1
	831.5	26865	10	16QAM	1	0	23.00	0-1	1
	831.5	26865	10	16QAM	1	25	22.99	0-1	1
	831.5	26865	10	16QAM	1	49	22.85	0-1	1
	831.5	26865	10	16QAM	25	0	22.18	0-2	2
	831.5	26865	10	16QAM	25	12	22.13	0-2	2
	831.5	26865	10	16QAM	25	25	22.04	0-2	2
	831.5	26865	10	16QAM	50	0	22.01	0-2	2
High	844	26990	10	QPSK	1	0	24.05	0	0
	844	26990	10	QPSK	1	25	**24.19**	0	0
	844	26990	10	QPSK	1	49	24.18	0	0
	844	26990	10	QPSK	25	0	23.14	0-1	1
	844	26990	10	QPSK	25	12	23.18	0-1	1
	844	26990	10	QPSK	25	25	**23.19**	0-1	1
	844	26990	10	QPSK	50	0	23.02	0-1	1
	844	26990	10	16QAM	1	0	23.07	0-1	1
	844	26990	10	16QAM	1	25	23.11	0-1	1
	844	26990	10	16QAM	1	49	23.04	0-1	1
	844	26990	10	16QAM	25	0	22.14	0-2	2
	844	26990	10	16QAM	25	12	22.03	0-2	2
	844	26990	10	16QAM	25	25	21.88	0-2	2
	844	26990	10	16QAM	50	0	21.93	0-2	2

Table 9-2
LTE Band 26 Conducted Powers - 5 MHz Bandwidth

	Frequency [MHz]	Channel	Bandwidth [MHz]	Modulation	RB Size	RB Offset	Conducted Power [dBm]	MPR Allowed per 3GPP [dB]	MPR [dB]
Low	816.5	26715	5	QPSK	1	0	23.95	0	0
	816.5	26715	5	QPSK	1	12	24.00	0	0
	816.5	26715	5	QPSK	1	24	24.02	0	0
	816.5	26715	5	QPSK	12	0	22.85	0-1	1
	816.5	26715	5	QPSK	12	6	22.95	0-1	1
	816.5	26715	5	QPSK	12	13	23.05	0-1	1
	816.5	26715	5	QPSK	25	0	23.00	0-1	1
	816.5	26715	5	16-QAM	1	0	22.84	0-1	1
	816.5	26715	5	16-QAM	1	12	22.90	0-1	1
	816.5	26715	5	16-QAM	1	24	22.93	0-1	1
	816.5	26715	5	16-QAM	12	0	22.14	0-2	2
	816.5	26715	5	16-QAM	12	6	21.98	0-2	2
	816.5	26715	5	16-QAM	12	13	21.79	0-2	2
	816.5	26715	5	16-QAM	25	0	21.77	0-2	2
Mid	831.5	26865	5	QPSK	1	0	23.84	0	0
	831.5	26865	5	QPSK	1	12	24.09	0	0
	831.5	26865	5	QPSK	1	24	23.93	0	0
	831.5	26865	5	QPSK	12	0	23.09	0-1	1
	831.5	26865	5	QPSK	12	6	22.83	0-1	1
	831.5	26865	5	QPSK	12	13	23.02	0-1	1
	831.5	26865	5	QPSK	25	0	22.79	0-1	1
	831.5	26865	5	16-QAM	1	0	22.79	0-1	1
	831.5	26865	5	16-QAM	1	12	23.08	0-1	1
	831.5	26865	5	16-QAM	1	24	22.96	0-1	1
	831.5	26865	5	16-QAM	12	0	21.85	0-2	2
	831.5	26865	5	16-QAM	12	6	21.97	0-2	2
	831.5	26865	5	16-QAM	12	13	22.00	0-2	2
	831.5	26865	5	16-QAM	25	0	22.05	0-2	2
High	846.5	27015	5	QPSK	1	0	24.09	0	0
	846.5	27015	5	QPSK	1	12	23.88	0	0
	846.5	27015	5	QPSK	1	24	24.00	0	0
	846.5	27015	5	QPSK	12	0	23.00	0-1	1
	846.5	27015	5	QPSK	12	6	23.01	0-1	1
	846.5	27015	5	QPSK	12	13	23.03	0-1	1
	846.5	27015	5	QPSK	25	0	22.87	0-1	1
	846.5	27015	5	16-QAM	1	0	22.90	0-1	1
	846.5	27015	5	16-QAM	1	12	22.80	0-1	1
	846.5	27015	5	16-QAM	1	24	22.71	0-1	1
	846.5	27015	5	16-QAM	12	0	21.95	0-2	2
	846.5	27015	5	16-QAM	12	6	22.04	0-2	2
	846.5	27015	5	16-QAM	12	13	22.09	0-2	2
	846.5	27015	5	16-QAM	25	0	22.01	0-2	2

Table 9-3
LTE Band 26 Conducted Powers - 3 MHz Bandwidth

	Frequency [MHz]	Channel	Bandwidth [MHz]	Modulation	RB Size	RB Offset	Conducted Power [dBm]	MPR Allowed per 3GPP [dB]	MPR [dB]
Low	815.5	26705	3	QPSK	1	0	23.95	0	0
	815.5	26705	3	QPSK	1	7	23.92	0	0
	815.5	26705	3	QPSK	1	14	23.94	0	0
	815.5	26705	3	QPSK	8	0	23.19	0-1	1
	815.5	26705	3	QPSK	8	4	23.08	0-1	1
	815.5	26705	3	QPSK	8	7	23.03	0-1	1
	815.5	26705	3	QPSK	15	0	22.99	0-1	1
	815.5	26705	3	16-QAM	1	0	22.76	0-1	1
	815.5	26705	3	16-QAM	1	7	22.76	0-1	1
	815.5	26705	3	16-QAM	1	14	22.71	0-1	1
	815.5	26705	3	16-QAM	8	0	21.74	0-2	2
	815.5	26705	3	16-QAM	8	4	21.70	0-2	2
	815.5	26705	3	16-QAM	8	7	21.93	0-2	2
	815.5	26705	3	16-QAM	15	0	21.86	0-2	2
Mid	831.5	26865	3	QPSK	1	0	24.19	0	0
	831.5	26865	3	QPSK	1	7	24.03	0	0
	831.5	26865	3	QPSK	1	14	24.17	0	0
	831.5	26865	3	QPSK	8	0	23.00	0-1	1
	831.5	26865	3	QPSK	8	4	23.12	0-1	1
	831.5	26865	3	QPSK	8	7	22.93	0-1	1
	831.5	26865	3	QPSK	15	0	22.95	0-1	1
	831.5	26865	3	16-QAM	1	0	23.00	0-1	1
	831.5	26865	3	16-QAM	1	7	22.90	0-1	1
	831.5	26865	3	16-QAM	1	14	22.78	0-1	1
	831.5	26865	3	16-QAM	8	0	22.09	0-2	2
	831.5	26865	3	16-QAM	8	4	22.05	0-2	2
	831.5	26865	3	16-QAM	8	7	22.04	0-2	2
	831.5	26865	3	16-QAM	15	0	22.02	0-2	2
High	847.5	27025	3	QPSK	1	0	23.91	0	0
	847.5	27025	3	QPSK	1	7	24.01	0	0
	847.5	27025	3	QPSK	1	14	23.96	0	0
	847.5	27025	3	QPSK	8	0	22.84	0-1	1
	847.5	27025	3	QPSK	8	4	23.07	0-1	1
	847.5	27025	3	QPSK	8	7	22.97	0-1	1
	847.5	27025	3	QPSK	15	0	23.09	0-1	1
	847.5	27025	3	16-QAM	1	0	22.92	0-1	1
	847.5	27025	3	16-QAM	1	7	22.76	0-1	1
	847.5	27025	3	16-QAM	1	14	22.84	0-1	1
	847.5	27025	3	16-QAM	8	0	21.96	0-2	2
	847.5	27025	3	16-QAM	8	4	21.86	0-2	2
	847.5	27025	3	16-QAM	8	7	21.72	0-2	2
	847.5	27025	3	16-QAM	15	0	21.99	0-2	2

Table 9-4
LTE Band 26 Conducted Powers -1.4 MHz Bandwidth

	Frequency [MHz]	Channel	Bandwidth [MHz]	Modulation	RB Size	RB Offset	Conducted Power [dBm]	MPR Allowed per 3GPP [dB]	MPR [dB]
Low	814.7	26697	1.4	QPSK	1	0	23.90	0	0
	814.7	26697	1.4	QPSK	1	2	23.96	0	0
	814.7	26697	1.4	QPSK	1	5	23.98	0	0
	814.7	26697	1.4	QPSK	3	0	23.91	0	0
	814.7	26697	1.4	QPSK	3	2	23.98	0	0
	814.7	26697	1.4	QPSK	3	3	24.14	0	0
	814.7	26697	1.4	QPSK	6	0	22.87	0-1	1
	814.7	26697	1.4	16-QAM	1	0	23.00	0-1	1
	814.7	26697	1.4	16-QAM	1	2	22.84	0-1	1
	814.7	26697	1.4	16-QAM	1	5	22.77	0-1	1
	814.7	26697	1.4	16-QAM	3	0	22.89	0-1	1
	814.7	26697	1.4	16-QAM	3	2	22.74	0-1	1
	814.7	26697	1.4	16-QAM	3	3	22.95	0-1	1
	814.7	26697	1.4	16-QAM	6	0	21.81	0-2	2
Mid	831.5	26865	1.4	QPSK	1	0	23.95	0	0
	831.5	26865	1.4	QPSK	1	2	24.10	0	0
	831.5	26865	1.4	QPSK	1	5	24.00	0	0
	831.5	26865	1.4	QPSK	3	0	23.83	0	0
	831.5	26865	1.4	QPSK	3	2	24.04	0	0
	831.5	26865	1.4	QPSK	3	3	23.84	0	0
	831.5	26865	1.4	QPSK	6	0	23.14	0-1	1
	831.5	26865	1.4	16-QAM	1	0	23.12	0-1	1
	831.5	26865	1.4	16-QAM	1	2	22.99	0-1	1
	831.5	26865	1.4	16-QAM	1	5	22.82	0-1	1
	831.5	26865	1.4	16-QAM	3	0	22.98	0-1	1
	831.5	26865	1.4	16-QAM	3	2	22.79	0-1	1
	831.5	26865	1.4	16-QAM	3	3	23.14	0-1	1
	831.5	26865	1.4	16-QAM	6	0	22.10	0-2	2
High	848.3	27033	1.4	QPSK	1	0	24.18	0	0
	848.3	27033	1.4	QPSK	1	2	23.91	0	0
	848.3	27033	1.4	QPSK	1	5	23.83	0	0
	848.3	27033	1.4	QPSK	3	0	24.04	0	0
	848.3	27033	1.4	QPSK	3	2	23.90	0	0
	848.3	27033	1.4	QPSK	3	3	23.83	0	0
	848.3	27033	1.4	QPSK	6	0	22.93	0-1	1
	848.3	27033	1.4	16-QAM	1	0	22.97	0-1	1
	848.3	27033	1.4	16-QAM	1	2	23.01	0-1	1
	848.3	27033	1.4	16-QAM	1	5	22.99	0-1	1
	848.3	27033	1.4	16-QAM	3	0	22.99	0-1	1
	848.3	27033	1.4	16-QAM	3	2	22.82	0-1	1
	848.3	27033	1.4	16-QAM	3	3	23.08	0-1	1
	848.3	27033	1.4	16-QAM	6	0	21.92	0-2	2

9.2.2 LTE Band 25 (PCS)

Table 9-5
LTE Band 25 (PCS) Conducted Powers - 10 MHz Bandwidth

	Frequency [MHz]	Channel	Bandwidth [MHz]	Modulation	RB Size	RB Offset	Conducted Power [dBm]	MPR Allowed per 3GPP [dB]	MPR [dB]
Low	1855	26090	10	QPSK	1	0	24.07	0	0
	1855	26090	10	QPSK	1	25	24.04	0	0
	1855	26090	10	QPSK	1	49	23.98	0	0
	1855	26090	10	QPSK	25	0	23.06	0-1	1
	1855	26090	10	QPSK	25	12	23.04	0-1	1
	1855	26090	10	QPSK	25	25	23.00	0-1	1
	1855	26090	10	QPSK	50	0	23.01	0-1	1
	1855	26090	10	16QAM	1	0	23.17	0-1	1
	1855	26090	10	16QAM	1	25	23.18	0-1	1
	1855	26090	10	16QAM	1	49	23.01	0-1	1
	1855	26090	10	16QAM	25	0	22.07	0-2	2
	1855	26090	10	16QAM	25	12	22.15	0-2	2
	1855	26090	10	16QAM	25	25	22.12	0-2	2
	1855	26090	10	16QAM	50	0	22.09	0-2	2
Mid	1882.5	26365	10	QPSK	1	0	23.78	0	0
	1882.5	26365	10	QPSK	1	25	23.92	0	0
	1882.5	26365	10	QPSK	1	49	**24.10**	0	0
	1882.5	26365	10	QPSK	25	0	22.85	0-1	1
	1882.5	26365	10	QPSK	25	12	22.90	0-1	1
	1882.5	26365	10	QPSK	25	25	**23.08**	0-1	1
	1882.5	26365	10	QPSK	50	0	22.94	0-1	1
	1882.5	26365	10	16QAM	1	0	23.10	0-1	1
	1882.5	26365	10	16QAM	1	25	23.15	0-1	1
	1882.5	26365	10	16QAM	1	49	22.94	0-1	1
	1882.5	26365	10	16QAM	25	0	22.08	0-2	2
	1882.5	26365	10	16QAM	25	12	22.04	0-2	2
	1882.5	26365	10	16QAM	25	25	22.10	0-2	2
	1882.5	26365	10	16QAM	50	0	22.10	0-2	2
High	1910	26640	10	QPSK	1	0	23.83	0	0
	1910	26640	10	QPSK	1	25	23.84	0	0
	1910	26640	10	QPSK	1	49	23.96	0	0
	1910	26640	10	QPSK	25	0	23.04	0-1	1
	1910	26640	10	QPSK	25	12	22.96	0-1	1
	1910	26640	10	QPSK	25	25	22.99	0-1	1
	1910	26640	10	QPSK	50	0	22.86	0-1	1
	1910	26640	10	16QAM	1	0	22.94	0-1	1
	1910	26640	10	16QAM	1	25	22.90	0-1	1
	1910	26640	10	16QAM	1	49	22.93	0-1	1
	1910	26640	10	16QAM	25	0	22.05	0-2	2
	1910	26640	10	16QAM	25	12	22.06	0-2	2
	1910	26640	10	16QAM	25	25	22.10	0-2	2
	1910	26640	10	16QAM	50	0	22.01	0-2	2

Table 9-6
LTE Band 25 (PCS) Conducted Powers - 5 MHz Bandwidth

	Frequency [MHz]	Channel	Bandwidth [MHz]	Modulation	RB Size	RB Offset	Conducted Power [dBm]	MPR Allowed per 3GPP [dB]	MPR [dB]
Low	1852.5	26065	5	QPSK	1	0	23.88	0	0
	1852.5	26065	5	QPSK	1	12	24.04	0	0
	1852.5	26065	5	QPSK	1	24	24.10	0	0
	1852.5	26065	5	QPSK	12	0	23.09	0-1	1
	1852.5	26065	5	QPSK	12	6	23.18	0-1	1
	1852.5	26065	5	QPSK	12	13	23.15	0-1	1
	1852.5	26065	5	QPSK	25	0	23.06	0-1	1
	1852.5	26065	5	16-QAM	1	0	23.01	0-1	1
	1852.5	26065	5	16-QAM	1	12	23.06	0-1	1
	1852.5	26065	5	16-QAM	1	24	23.00	0-1	1
	1852.5	26065	5	16-QAM	12	0	22.11	0-2	2
	1852.5	26065	5	16-QAM	12	6	22.05	0-2	2
	1852.5	26065	5	16-QAM	12	13	21.99	0-2	2
	1852.5	26065	5	16-QAM	25	0	22.05	0-2	2
Mid	1882.5	26365	5	QPSK	1	0	24.15	0	0
	1882.5	26365	5	QPSK	1	12	24.12	0	0
	1882.5	26365	5	QPSK	1	24	24.13	0	0
	1882.5	26365	5	QPSK	12	0	23.06	0-1	1
	1882.5	26365	5	QPSK	12	6	23.00	0-1	1
	1882.5	26365	5	QPSK	12	13	22.89	0-1	1
	1882.5	26365	5	QPSK	25	0	22.96	0-1	1
	1882.5	26365	5	16-QAM	1	0	22.94	0-1	1
	1882.5	26365	5	16-QAM	1	12	22.87	0-1	1
	1882.5	26365	5	16-QAM	1	24	22.99	0-1	1
	1882.5	26365	5	16-QAM	12	0	22.01	0-2	2
	1882.5	26365	5	16-QAM	12	6	22.00	0-2	2
	1882.5	26365	5	16-QAM	12	13	22.01	0-2	2
	1882.5	26365	5	16-QAM	25	0	21.98	0-2	2
High	1912.5	26665	5	QPSK	1	0	24.13	0	0
	1912.5	26665	5	QPSK	1	12	24.01	0	0
	1912.5	26665	5	QPSK	1	24	23.96	0	0
	1912.5	26665	5	QPSK	12	0	23.10	0-1	1
	1912.5	26665	5	QPSK	12	6	23.09	0-1	1
	1912.5	26665	5	QPSK	12	13	23.13	0-1	1
	1912.5	26665	5	QPSK	25	0	23.03	0-1	1
	1912.5	26665	5	16-QAM	1	0	22.96	0-1	1
	1912.5	26665	5	16-QAM	1	12	22.99	0-1	1
	1912.5	26665	5	16-QAM	1	24	23.04	0-1	1
	1912.5	26665	5	16-QAM	12	0	21.88	0-2	2
	1912.5	26665	5	16-QAM	12	6	21.83	0-2	2
	1912.5	26665	5	16-QAM	12	13	21.89	0-2	2
	1912.5	26665	5	16-QAM	25	0	21.93	0-2	2

Table 9-7
LTE Band 25 (PCS) Conducted Powers - 3 MHz Bandwidth

	Frequency [MHz]	Channel	Bandwidth [MHz]	Modulation	RB Size	RB Offset	Conducted Power [dBm]	MPR Allowed per 3GPP [dB]	MPR [dB]
Low	1851.5	26055	3	QPSK	1	0	24.13	0	0
	1851.5	26055	3	QPSK	1	7	24.08	0	0
	1851.5	26055	3	QPSK	1	14	24.04	0	0
	1851.5	26055	3	QPSK	8	0	23.11	0-1	1
	1851.5	26055	3	QPSK	8	4	22.96	0-1	1
	1851.5	26055	3	QPSK	8	7	23.03	0-1	1
	1851.5	26055	3	QPSK	15	0	23.00	0-1	1
	1851.5	26055	3	16-QAM	1	0	23.03	0-1	1
	1851.5	26055	3	16-QAM	1	7	23.01	0-1	1
	1851.5	26055	3	16-QAM	1	14	22.94	0-1	1
	1851.5	26055	3	16-QAM	8	0	21.89	0-2	2
	1851.5	26055	3	16-QAM	8	4	21.88	0-2	2
	1851.5	26055	3	16-QAM	8	7	21.95	0-2	2
	1851.5	26055	3	16-QAM	15	0	22.03	0-2	2
Mid	1882.5	26365	3	QPSK	1	0	24.02	0	0
	1882.5	26365	3	QPSK	1	7	24.00	0	0
	1882.5	26365	3	QPSK	1	14	23.96	0	0
	1882.5	26365	3	QPSK	8	0	22.93	0-1	1
	1882.5	26365	3	QPSK	8	4	23.01	0-1	1
	1882.5	26365	3	QPSK	8	7	23.13	0-1	1
	1882.5	26365	3	QPSK	15	0	23.01	0-1	1
	1882.5	26365	3	16-QAM	1	0	23.09	0-1	1
	1882.5	26365	3	16-QAM	1	7	23.05	0-1	1
	1882.5	26365	3	16-QAM	1	14	22.99	0-1	1
	1882.5	26365	3	16-QAM	8	0	21.85	0-2	2
	1882.5	26365	3	16-QAM	8	4	21.89	0-2	2
	1882.5	26365	3	16-QAM	8	7	21.86	0-2	2
	1882.5	26365	3	16-QAM	15	0	21.95	0-2	2
High	1913.5	26675	3	QPSK	1	0	23.86	0	0
	1913.5	26675	3	QPSK	1	7	23.95	0	0
	1913.5	26675	3	QPSK	1	14	24.01	0	0
	1913.5	26675	3	QPSK	8	0	23.09	0-1	1
	1913.5	26675	3	QPSK	8	4	23.10	0-1	1
	1913.5	26675	3	QPSK	8	7	23.04	0-1	1
	1913.5	26675	3	QPSK	15	0	23.10	0-1	1
	1913.5	26675	3	16-QAM	1	0	23.05	0-1	1
	1913.5	26675	3	16-QAM	1	7	23.05	0-1	1
	1913.5	26675	3	16-QAM	1	14	23.00	0-1	1
	1913.5	26675	3	16-QAM	8	0	21.96	0-2	2
	1913.5	26675	3	16-QAM	8	4	21.99	0-2	2
	1913.5	26675	3	16-QAM	8	7	22.04	0-2	2
	1913.5	26675	3	16-QAM	15	0	22.10	0-2	2

9.2.3 LTE Band 41

Table 9-8
LTE Band 41 Conducted Powers - 20 MHz Bandwidth

	Frequency [MHz]	Channel	Bandwidth [MHz]	Modulation	RB Size	RB Offset	Conducted Power [dBm]	MPR Allowed per 3GPP [dB]	MPR [dB]
Low	2506	39750	20	QPSK	1	0	23.92	0	0
	2506	39750	20	QPSK	1	50	23.90	0	0
	2506	39750	20	QPSK	1	99	23.83	0	0
	2506	39750	20	QPSK	50	0	22.87	0-1	1
	2506	39750	20	QPSK	50	25	22.88	0-1	1
	2506	39750	20	QPSK	50	50	22.98	0-1	1
	2506	39750	20	QPSK	100	0	22.89	0-1	1
	2506	39750	20	16QAM	1	0	23.00	0-1	1
	2506	39750	20	16QAM	1	50	22.87	0-1	1
	2506	39750	20	16QAM	1	99	22.85	0-1	1
	2506	39750	20	16QAM	50	0	21.94	0-2	2
	2506	39750	20	16QAM	50	25	21.85	0-2	2
	2506	39750	20	16QAM	50	50	21.83	0-2	2
	2506	39750	20	16QAM	100	0	21.85	0-2	2
Low Mid	2549.5	40185	20	QPSK	1	0	23.89	0	0
	2549.5	40185	20	QPSK	1	50	23.97	0	0
	2549.5	40185	20	QPSK	1	99	23.87	0	0
	2549.5	40185	20	QPSK	50	0	22.97	0-1	1
	2549.5	40185	20	QPSK	50	25	22.83	0-1	1
	2549.5	40185	20	QPSK	50	50	22.95	0-1	1
	2549.5	40185	20	QPSK	100	0	22.91	0-1	1
	2549.5	40185	20	16-QAM	1	0	22.94	0-1	1
	2549.5	40185	20	16-QAM	1	50	22.86	0-1	1
	2549.5	40185	20	16-QAM	1	99	22.85	0-1	1
	2549.5	40185	20	16-QAM	50	0	21.75	0-2	2
	2549.5	40185	20	16-QAM	50	25	21.74	0-2	2
	2549.5	40185	20	16-QAM	50	50	21.77	0-2	2
	2549.5	40185	20	16-QAM	100	0	21.71	0-2	2
Mid	2593	40620	20	QPSK	1	0	24.08	0	0
	2593	40620	20	QPSK	1	50	24.03	0	0
	2593	40620	20	QPSK	1	99	24.03	0	0
	2593	40620	20	QPSK	50	0	23.05	0-1	1
	2593	40620	20	QPSK	50	25	23.00	0-1	1
	2593	40620	20	QPSK	50	50	**23.10**	0-1	1
	2593	40620	20	QPSK	100	0	22.98	0-1	1
	2593	40620	20	16-QAM	1	0	23.12	0-1	1
	2593	40620	20	16-QAM	1	50	23.02	0-1	1
	2593	40620	20	16-QAM	1	99	23.00	0-1	1
	2593	40620	20	16-QAM	50	0	22.08	0-2	2
	2593	40620	20	16-QAM	50	25	22.10	0-2	2
	2593	40620	20	16-QAM	50	50	22.03	0-2	2
	2593	40620	20	16-QAM	100	0	22.01	0-2	2
Mid High	2636.5	41055	20	QPSK	1	0	24.07	0	0
	2636.5	41055	20	QPSK	1	50	23.99	0	0
	2636.5	41055	20	QPSK	1	99	24.05	0	0
	2636.5	41055	20	QPSK	50	0	22.91	0-1	1
	2636.5	41055	20	QPSK	50	25	22.96	0-1	1
	2636.5	41055	20	QPSK	50	50	22.90	0-1	1
	2636.5	41055	20	QPSK	100	0	22.89	0-1	1
	2636.5	41055	20	16-QAM	1	0	23.13	0-1	1
	2636.5	41055	20	16-QAM	1	50	23.07	0-1	1
	2636.5	41055	20	16-QAM	1	99	22.89	0-1	1
	2636.5	41055	20	16-QAM	50	0	21.76	0-2	2
	2636.5	41055	20	16-QAM	50	25	21.96	0-2	2
	2636.5	41055	20	16-QAM	50	50	21.82	0-2	2
	2636.5	41055	20	16-QAM	100	0	21.88	0-2	2
High	2680	41490	20	QPSK	1	0	**24.10**	0	0
	2680	41490	20	QPSK	1	50	24.03	0	0
	2680	41490	20	QPSK	1	99	24.08	0	0
	2680	41490	20	QPSK	50	0	23.01	0-1	1
	2680	41490	20	QPSK	50	25	22.98	0-1	1
	2680	41490	20	QPSK	50	50	22.88	0-1	1
	2680	41490	20	QPSK	100	0	23.07	0-1	1
	2680	41490	20	16-QAM	1	0	23.12	0-1	1
	2680	41490	20	16-QAM	1	50	23.11	0-1	1
	2680	41490	20	16-QAM	1	99	23.17	0-1	1
	2680	41490	20	16-QAM	50	0	22.00	0-2	2
	2680	41490	20	16-QAM	50	25	22.08	0-2	2
	2680	41490	20	16-QAM	50	50	22.05	0-2	2
	2680	41490	20	16-QAM	100	0	22.01	0-2	2

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

	Frequency [MHz]	Channel	Bandwidth [MHz]	Modulation	RB Size	RB Offset	Conducted Power [dBm]	MPR Allowed per 3GPP [dB]	MPR [dB]
Low	2503.5	39725	15	QPSK	1	0	24.04	0	0
	2503.5	39725	15	QPSK	1	36	23.95	0	0
	2503.5	39725	15	QPSK	1	74	23.93	0	0
	2503.5	39725	15	QPSK	36	0	22.80	0-1	1
	2503.5	39725	15	QPSK	36	18	22.85	0-1	1
	2503.5	39725	15	QPSK	36	37	22.73	0-1	1
	2503.5	39725	15	QPSK	75	0	22.71	0-1	1
	2503.5	39725	15	16QAM	1	0	23.02	0-1	1
	2503.5	39725	15	16QAM	1	36	23.01	0-1	1
	2503.5	39725	15	16QAM	1	74	22.94	0-1	1
	2503.5	39725	15	16QAM	36	0	22.05	0-2	2
	2503.5	39725	15	16QAM	36	18	21.87	0-2	2
	2503.5	39725	15	16QAM	36	37	21.99	0-2	2
	2503.5	39725	15	16QAM	75	0	21.85	0-2	2
Low Mid	2548.25	40173	15	QPSK	1	0	23.96	0	0
	2548.25	40173	15	QPSK	1	36	23.96	0	0
	2548.25	40173	15	QPSK	1	74	23.71	0	0
	2548.25	40173	15	QPSK	36	0	23.00	0-1	1
	2548.25	40173	15	QPSK	36	18	23.02	0-1	1
	2548.25	40173	15	QPSK	36	37	22.80	0-1	1
	2548.25	40173	15	QPSK	75	0	22.93	0-1	1
	2548.25	40173	15	16-QAM	1	0	23.03	0-1	1
	2548.25	40173	15	16-QAM	1	36	23.05	0-1	1
	2548.25	40173	15	16-QAM	1	74	22.87	0-1	1
	2548.25	40173	15	16-QAM	36	0	21.87	0-2	2
	2548.25	40173	15	16-QAM	36	18	22.01	0-2	2
	2548.25	40173	15	16-QAM	36	37	22.05	0-2	2
	2548.25	40173	15	16-QAM	75	0	22.00	0-2	2
Mid	2593	40620	15	QPSK	1	0	24.07	0	0
	2593	40620	15	QPSK	1	36	23.94	0	0
	2593	40620	15	QPSK	1	74	23.99	0	0
	2593	40620	15	QPSK	36	0	23.08	0-1	1
	2593	40620	15	QPSK	36	18	22.88	0-1	1
	2593	40620	15	QPSK	36	37	22.96	0-1	1
	2593	40620	15	QPSK	75	0	22.90	0-1	1
	2593	40620	15	16-QAM	1	0	23.03	0-1	1
	2593	40620	15	16-QAM	1	36	22.73	0-1	1
	2593	40620	15	16-QAM	1	74	23.03	0-1	1
	2593	40620	15	16-QAM	36	0	22.04	0-2	2
	2593	40620	15	16-QAM	36	18	21.77	0-2	2
	2593	40620	15	16-QAM	36	37	21.90	0-2	2
	2593	40620	15	16-QAM	75	0	21.70	0-2	2
Mid High	2637.75	41068	15	QPSK	1	0	24.08	0	0
	2637.75	41068	15	QPSK	1	36	23.87	0	0
	2637.75	41068	15	QPSK	1	74	23.78	0	0
	2637.75	41068	15	QPSK	36	0	22.94	0-1	1
	2637.75	41068	15	QPSK	36	18	23.07	0-1	1
	2637.75	41068	15	QPSK	36	37	23.09	0-1	1
	2637.75	41068	15	QPSK	75	0	22.78	0-1	1
	2637.75	41068	15	16-QAM	1	0	23.00	0-1	1
	2637.75	41068	15	16-QAM	1	36	23.07	0-1	1
	2637.75	41068	15	16-QAM	1	74	23.04	0-1	1
	2637.75	41068	15	16-QAM	36	0	21.95	0-2	2
	2637.75	41068	15	16-QAM	36	18	21.85	0-2	2
	2637.75	41068	15	16-QAM	36	37	21.96	0-2	2
	2637.75	41068	15	16-QAM	75	0	21.92	0-2	2
High	2682.5	41515	15	QPSK	1	0	24.06	0	0
	2682.5	41515	15	QPSK	1	36	24.06	0	0
	2682.5	41515	15	QPSK	1	74	23.88	0	0
	2682.5	41515	15	QPSK	36	0	23.07	0-1	1
	2682.5	41515	15	QPSK	36	18	22.92	0-1	1
	2682.5	41515	15	QPSK	36	37	23.09	0-1	1
	2682.5	41515	15	QPSK	75	0	23.08	0-1	1
	2682.5	41515	15	16-QAM	1	0	23.00	0-1	1
	2682.5	41515	15	16-QAM	1	36	23.07	0-1	1
	2682.5	41515	15	16-QAM	1	74	23.03	0-1	1
	2682.5	41515	15	16-QAM	36	0	22.03	0-2	2
	2682.5	41515	15	16-QAM	36	18	21.98	0-2	2
	2682.5	41515	15	16-QAM	36	37	21.91	0-2	2
	2682.5	41515	15	16-QAM	75	0	21.83	0-2	2

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

	Frequency [MHz]	Channel	Bandwidth [MHz]	Modulation	RB Size	RB Offset	Conducted Power [dBm]	MPR Allowed per 3GPP [dB]	MPR [dB]
Low	2501	39700	10	QPSK	1	0	23.88	0	0
	2501	39700	10	QPSK	1	25	23.91	0	0
	2501	39700	10	QPSK	1	49	23.77	0	0
	2501	39700	10	QPSK	25	0	22.81	0-1	1
	2501	39700	10	QPSK	25	12	23.05	0-1	1
	2501	39700	10	QPSK	25	25	22.97	0-1	1
	2501	39700	10	QPSK	50	0	22.85	0-1	1
	2501	39700	10	16QAM	1	0	22.96	0-1	1
	2501	39700	10	16QAM	1	25	23.01	0-1	1
	2501	39700	10	16QAM	1	49	22.74	0-1	1
	2501	39700	10	16QAM	25	0	21.88	0-2	2
	2501	39700	10	16QAM	25	12	21.87	0-2	2
	2501	39700	10	16QAM	25	25	22.04	0-2	2
	2501	39700	10	16QAM	50	0	22.01	0-2	2
Low Mid	2547	40160	10	QPSK	1	0	23.98	0	0
	2547	40160	10	QPSK	1	25	24.05	0	0
	2547	40160	10	QPSK	1	49	24.02	0	0
	2547	40160	10	QPSK	25	0	22.84	0-1	1
	2547	40160	10	QPSK	25	12	22.95	0-1	1
	2547	40160	10	QPSK	25	25	23.02	0-1	1
	2547	40160	10	QPSK	50	0	22.84	0-1	1
	2547	40160	10	16-QAM	1	0	22.97	0-1	1
	2547	40160	10	16-QAM	1	25	22.99	0-1	1
	2547	40160	10	16-QAM	1	49	22.89	0-1	1
	2547	40160	10	16-QAM	25	0	22.01	0-2	2
	2547	40160	10	16-QAM	25	12	22.03	0-2	2
	2547	40160	10	16-QAM	25	25	21.98	0-2	2
	2547	40160	10	16-QAM	50	0	21.97	0-2	2
Mid	2593	40620	10	QPSK	1	0	24.07	0	0
	2593	40620	10	QPSK	1	25	24.00	0	0
	2593	40620	10	QPSK	1	49	24.04	0	0
	2593	40620	10	QPSK	25	0	23.02	0-1	1
	2593	40620	10	QPSK	25	12	23.04	0-1	1
	2593	40620	10	QPSK	25	25	22.92	0-1	1
	2593	40620	10	QPSK	50	0	22.81	0-1	1
	2593	40620	10	16-QAM	1	0	23.03	0-1	1
	2593	40620	10	16-QAM	1	25	22.85	0-1	1
	2593	40620	10	16-QAM	1	49	22.86	0-1	1
	2593	40620	10	16-QAM	25	0	21.94	0-2	2
	2593	40620	10	16-QAM	25	12	21.94	0-2	2
	2593	40620	10	16-QAM	25	25	21.70	0-2	2
	2593	40620	10	16-QAM	50	0	21.81	0-2	2
Mid High	2639	41080	10	QPSK	1	0	24.00	0	0
	2639	41080	10	QPSK	1	25	23.97	0	0
	2639	41080	10	QPSK	1	49	24.05	0	0
	2639	41080	10	QPSK	25	0	22.95	0-1	1
	2639	41080	10	QPSK	25	12	23.01	0-1	1
	2639	41080	10	QPSK	25	25	23.00	0-1	1
	2639	41080	10	QPSK	50	0	22.74	0-1	1
	2639	41080	10	16-QAM	1	0	23.02	0-1	1
	2639	41080	10	16-QAM	1	25	22.90	0-1	1
	2639	41080	10	16-QAM	1	49	22.92	0-1	1
	2639	41080	10	16-QAM	25	0	21.75	0-2	2
	2639	41080	10	16-QAM	25	12	21.83	0-2	2
	2639	41080	10	16-QAM	25	25	21.75	0-2	2
	2639	41080	10	16-QAM	50	0	21.92	0-2	2
High	2685	41540	10	QPSK	1	0	24.06	0	0
	2685	41540	10	QPSK	1	25	23.92	0	0
	2685	41540	10	QPSK	1	49	24.03	0	0
	2685	41540	10	QPSK	25	0	23.12	0-1	1
	2685	41540	10	QPSK	25	12	23.15	0-1	1
	2685	41540	10	QPSK	25	25	23.13	0-1	1
	2685	41540	10	QPSK	50	0	22.73	0-1	1
	2685	41540	10	16-QAM	1	0	22.85	0-1	1
	2685	41540	10	16-QAM	1	25	23.03	0-1	1
	2685	41540	10	16-QAM	1	49	22.98	0-1	1
	2685	41540	10	16-QAM	25	0	21.99	0-2	2
	2685	41540	10	16-QAM	25	12	21.93	0-2	2
	2685	41540	10	16-QAM	25	25	21.96	0-2	2
	2685	41540	10	16-QAM	50	0	21.75	0-2	2

9.3 WLAN Conducted Powers

Table 9-11
IEEE 802.11b Average RF Power

Mode	Freq	Channel	802.11b (2.4 GHz) Conducted Power [dBm]			
			Data Rate [Mbps]			
	[MHz]		1	2	5.5	11
802.11b	2412	1*	16.05	16.03	16.22	16.18
802.11b	2437	6*	**16.46**	16.58	16.39	16.52
802.11b	2462	11*	15.93	16.22	16.24	16.15

Table 9-12
IEEE 802.11g Average RF Power

Mode	Freq	Channel	802.11g (2.4 GHz) Conducted Power [dBm]							
			Data Rate [Mbps]							
	[MHz]		6	9	12	18	24	36	48	54
802.11g	2412	1	13.08	13.02	13.02	13.06	12.99	13.03	12.93	12.92
802.11g	2437	6	13.51	13.41	13.52	13.46	13.44	13.45	13.44	13.38
802.11g	2462	11	13.10	13.12	13.16	13.21	13.12	13.10	12.93	13.09

Table 9-13
IEEE 802.11n Average RF Power

Mode	Freq	Channel	802.11n (2.4 GHz) Conducted Power [dBm]							
			Data Rate [Mbps]							
	[MHz]		6.5	13	20	26	39	52	58	65
802.11n	2412	1	11.31	11.25	11.33	11.26	11.19	11.23	11.23	11.25
802.11n	2437	6	11.68	11.62	11.71	11.71	11.70	11.74	11.70	11.69
802.11n	2462	11	11.37	11.44	11.35	11.32	11.30	11.42	11.35	11.34

Table 9-14
IEEE 802.11a Average RF Power

Mode	Freq	Channel	802.11a (5GHz) Conducted Power [dBm]							
			Data Rate [Mbps]							
	[MHz]		6	9	12	18	24	36	48	54
802.11a	5180	36*	13.30	13.38	13.23	13.38	13.25	13.11	13.28	13.18
802.11a	5200	40	**13.39**	13.51	13.43	13.33	13.50	13.34	13.53	13.35
802.11a	5220	44	13.22	13.24	13.35	13.20	13.21	13.23	13.22	13.33
802.11a	5240	48*	13.20	13.25	13.09	13.35	13.17	13.08	13.13	13.30
802.11a	5260	52*	**13.19**	13.11	13.08	13.09	13.11	13.09	13.12	13.24
802.11a	5280	56	13.05	13.19	12.98	13.06	13.04	13.20	13.12	12.90
802.11a	5300	60	13.04	13.11	13.18	13.16	12.99	13.10	13.10	13.07
802.11a	5320	64*	13.04	13.08	12.96	13.09	13.12	13.16	13.10	12.90
802.11a	5500	100	13.03	13.21	13.24	13.17	13.25	13.19	13.20	13.19
802.11a	5520	104*	13.03	13.04	12.89	12.90	13.04	13.08	12.99	13.19
802.11a	5540	108	12.99	12.88	12.95	12.90	13.00	12.97	13.04	13.12
802.11a	5560	112	12.96	13.03	12.91	13.04	13.10	13.12	12.96	13.03
802.11a	5580	116*	12.79	12.86	12.87	12.78	12.93	12.81	12.66	12.94
802.11a	5600	120	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
802.11a	5620	124	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
802.11a	5640	128	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
802.11a	5660	132	13.72	13.68	13.79	13.74	13.64	13.71	13.65	13.88
802.11a	5680	136*	**13.73**	13.74	13.74	13.60	13.80	13.78	13.69	13.62
802.11a	5700	140	13.58	13.67	13.60	13.66	13.66	13.61	13.45	13.58
802.11a	5745	149*	13.69	13.89	13.86	13.84	13.81	13.84	13.83	13.75
802.11a	5765	153	13.65	13.57	13.69	13.62	13.57	13.59	13.60	13.75
802.11a	5785	157*	**13.70**	13.77	13.77	13.79	13.55	13.72	13.79	13.70
802.11a	5805	161	13.31	13.28	13.25	13.29	13.25	13.22	13.28	13.32
802.11a	5825	165*	13.16	13.33	13.19	13.23	13.24	13.11	13.34	13.25

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

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

Table 9-15
IEEE 802.11n Average RF Power – 20 MHz Bandwidth

Mode	Freq	Channel	20MHz BW 802.11n (5GHz) Conducted Power [dBm]							
			Data Rate [Mbps]							
	[MHz]		6.5	13	19.5	26	39	52	58.5	65
802.11n	5180	36	10.68	10.80	10.60	10.64	10.65	10.74	10.70	10.62
802.11n	5200	40	10.55	10.50	10.66	10.63	10.41	10.45	10.54	10.46
802.11n	5220	44	10.59	10.45	10.45	10.47	10.59	10.55	10.59	10.61
802.11n	5240	48	10.52	10.50	10.57	10.44	10.55	10.60	10.50	10.49
802.11n	5260	52	10.51	10.43	10.54	10.53	10.58	10.63	10.61	10.64
802.11n	5280	56	10.51	10.44	10.61	10.38	10.52	10.48	10.58	10.41
802.11n	5300	60	10.45	10.34	10.49	10.57	10.39	10.41	10.48	10.53
802.11n	5320	64	10.38	10.50	10.27	10.44	10.38	10.41	10.48	10.27
802.11n	5500	100	10.81	10.90	10.93	10.69	10.82	10.68	10.70	10.81
802.11n	5520	104	10.81	10.84	10.91	10.79	10.87	10.74	10.86	10.92
802.11n	5540	108	10.73	10.67	10.75	10.69	10.70	10.63	10.78	10.61
802.11n	5560	112	10.73	10.84	10.80	10.81	10.76	10.63	10.65	10.87
802.11n	5580	116	10.63	10.50	10.59	10.66	10.71	10.67	10.67	10.50
802.11n	5600	120	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
802.11n	5620	124	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
802.11n	5640	128	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
802.11n	5660	132	10.42	10.54	10.46	10.44	10.35	10.36	10.48	10.33
802.11n	5680	136	10.31	10.41	10.44	10.41	10.18	10.30	10.32	10.31
802.11n	5700	140	10.29	10.19	10.27	10.16	10.22	10.33	10.33	10.18
802.11n	5745	149	10.03	9.90	10.13	9.97	10.14	10.16	10.01	10.05
802.11n	5765	153	10.10	10.14	9.97	10.07	10.07	10.05	10.16	9.98
802.11n	5785	157	10.03	10.02	10.02	10.16	9.95	9.99	9.91	9.95
802.11n	5805	161	9.96	9.87	9.92	10.09	10.02	9.90	10.00	10.07
802.11n	5825	165	9.89	10.01	9.88	9.76	9.76	9.83	9.83	10.01

Table 9-16
IEEE 802.11n Average RF Power – 40 MHz Bandwidth

Mode	Freq	Channel	40MHz BW 802.11n (5GHz) Conducted Power [dBm]							
			Data Rate [Mbps]							
	[MHz]		**13.5**	**27**	**40.5**	**54**	**81**	**108**	**121.5**	**135**
802.11n	5190	38	10.53	10.44	10.47	10.57	10.46	10.58	10.47	10.51
802.11n	5230	46	10.43	10.37	10.45	10.44	10.40	10.42	10.50	10.38
802.11n	5270	54	10.46	10.46	10.41	10.55	10.53	10.37	10.51	10.48
802.11n	5310	62	10.34	10.41	10.32	10.36	10.44	10.38	10.25	10.41
802.11n	5510	102	9.92	9.84	10.00	9.83	10.01	9.93	9.93	9.92
802.11n	5550	110	9.73	9.72	9.79	9.68	9.68	9.71	9.67	9.67
802.11n	5590	118	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
802.11n	5630	126	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
802.11n	5670	134	9.30	9.33	9.37	9.24	9.27	9.34	9.30	9.29
802.11n	5755	151	10.00	10.04	10.10	9.94	10.00	9.98	9.98	9.98
802.11n	5795	159	9.89	9.95	9.83	9.91	9.92	9.85	9.89	9.88

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

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

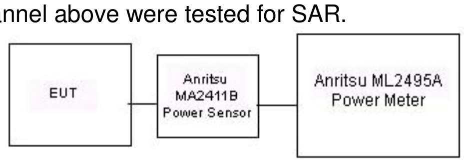

Figure 9-2
Power Measurement Setup

10 SYSTEM VERIFICATION

10.1 Tissue Verification

Table 10-1
Measured Tissue Properties

Calibrated for Tests Performed on:	Tissue Type	Tissue Temp During Calibration (C°)	Measured Frequency (MHz)	Measured Conductivity, σ (S/m)	Measured Dielectric Constant, ε	TARGET Conductivity, σ (S/m)	TARGET Dielectric Constant, ε	% dev σ	% dev ε
6/10/2014	835H	23.4	820	0.904	42.707	0.899	41.578	0.56%	2.72%
			835	0.918	42.483	0.900	41.500	2.00%	2.37%
			850	0.933	42.324	0.916	41.500	1.86%	1.99%
6/11/2014	1900H	23.8	1850	1.337	39.491	1.400	40.000	-4.50%	-1.27%
			1880	1.368	39.402	1.400	40.000	-2.29%	-1.50%
			1910	1.398	39.254	1.400	40.000	-0.14%	-1.87%
6/17/2014	2450H	22.4	2401	1.692	40.138	1.756	39.287	-3.64%	2.17%
			2450	1.743	39.937	1.800	39.200	-3.17%	1.88%
			2499	1.795	39.764	1.853	39.138	-3.13%	1.60%
6/11/2014	2600H	23.3	2500	1.810	39.032	1.855	39.136	-2.43%	-0.27%
			2550	1.864	38.829	1.909	39.073	-2.36%	-0.62%
			2600	1.921	38.694	1.964	39.009	-2.19%	-0.81%
			2650	1.973	38.474	2.018	38.945	-2.23%	-1.21%
			2700	2.032	38.323	2.073	38.882	-1.98%	-1.44%
06/19/2014	5200H-5800H	24.4	5200	4.605	37.601	4.655	35.986	-1.07%	4.49%
			5260	4.695	37.519	4.717	35.917	-0.47%	4.46%
			5300	4.709	37.469	4.758	35.871	-1.03%	4.45%
			5600	5.021	37.076	5.065	35.529	-0.87%	4.35%
			5680	5.100	36.984	5.147	35.437	-0.91%	4.37%
			5785	5.217	36.910	5.255	35.317	-0.72%	4.51%
			5800	5.219	36.822	5.270	35.300	-0.97%	4.31%
6/10/2014	835B	19.8	820	0.959	53.500	0.969	55.258	-1.03%	-3.18%
			835	0.976	53.307	0.970	55.200	0.62%	-3.43%
			850	0.992	53.175	0.988	55.154	0.40%	-3.59%
6/10/2014	1900B	22.3	1850	1.484	52.313	1.520	53.300	-2.37%	-1.85%
			1880	1.515	52.161	1.520	53.300	-0.33%	-2.14%
			1910	1.552	52.057	1.520	53.300	2.11%	-2.33%
6/12/2014	1900B	24.0	1850	1.445	51.657	1.520	53.300	-4.93%	-3.08%
			1880	1.476	51.517	1.520	53.300	-2.89%	-3.35%
			1910	1.510	51.440	1.520	53.300	-0.66%	-3.49%
6/16/2014	2450B	22.8	2401	1.952	52.243	1.903	52.765	2.57%	-0.99%
			2450	2.019	52.059	1.950	52.700	3.54%	-1.22%
			2499	2.086	51.895	2.019	52.638	3.32%	-1.41%
6/9/2014	2600B	23.0	2500	2.034	51.268	2.021	52.636	0.64%	-2.60%
			2550	2.106	51.072	2.092	52.573	0.67%	-2.86%
			2600	2.176	50.896	2.163	52.509	0.60%	-3.07%
			2650	2.244	50.656	2.234	52.445	0.45%	-3.41%
			2700	2.321	50.494	2.305	52.382	0.69%	-3.60%
6/16/2014	5200B-5800B	22.2	5200	5.454	47.504	5.299	49.014	2.93%	-3.08%
			5260	5.511	47.457	5.369	48.933	2.64%	-3.02%
			5300	5.592	47.351	5.416	48.879	3.25%	-3.13%
			5600	6.014	47.230	5.766	48.471	4.30%	-2.56%
			5680	6.090	47.014	5.860	48.363	3.92%	-2.79%
			5785	6.188	46.692	5.982	48.220	3.44%	-3.17%
			5800	6.210	46.638	6.000	48.200	3.50%	-3.24%

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

10.2 Test System Verification

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

Table 10-2
System Verification Results

System Verification TARGET & MEASURED												
SAR System #	Tissue Frequency (MHz)	Tissue Type	Date:	Amb. Temp (°C)	Liquid Temp (°C)	Input Power (W)	Dipole SN	Probe SN	Measured SAR_{1g} (W/kg)	1 W Target SAR_{1g} (W/kg)	1 W Normalized SAR_{1g} (W/kg)	$Deviation_{1g}$ (%)
I	835	HEAD	06/10/2014	24.2	23.7	0.100	4d119	3209	0.853	9.220	8.530	-7.48%
H	1900	HEAD	06/11/2014	23.6	23.9	0.100	5d149	3319	4.040	40.400	40.400	0.00%
G	2450	HEAD	06/17/2014	22.5	21.8	0.100	797	3258	4.990	51.800	49.900	-3.67%
K	2600	HEAD	06/11/2014	24.5	23.3	0.100	1004	3333	5.740	57.300	57.400	0.17%
E	5200	HEAD	06/19/2014	24.5	24.4	0.100	1057	3914	7.510	78.000	75.100	-3.72%
E	5300	HEAD	06/19/2014	24.4	24.4	0.100	1057	3914	7.900	83.000	79.000	-4.82%
E	5600	HEAD	06/19/2014	24.5	24.4	0.100	1057	3914	8.030	83.500	80.300	-3.83%
E	5800	HEAD	06/19/2014	24.5	24.3	0.100	1057	3914	7.470	79.300	74.700	-5.80%
C	835	BODY	06/10/2014	19.8	19.8	0.100	4d133	3213	0.964	9.610	9.640	0.31%
B	1900	BODY	06/10/2014	23.1	22.5	0.100	5d148	3288	4.030	39.300	40.300	2.54%
B	1900	BODY	06/12/2014	24.5	24.0	0.100	5d148	3288	4.030	39.300	40.300	2.54%
H	2450	BODY	06/16/2014	23.2	22.9	0.100	719	3319	5.550	51.700	55.500	7.35%
G	2600	BODY	06/09/2014	24.5	23.9	0.100	1004	3258	5.410	56.700	54.100	-4.59%
A	5200	BODY	06/16/2014	24.4	22.4	0.100	1007	3920	7.400	72.600	74.000	1.93%
A	5300	BODY	06/16/2014	24.4	22.4	0.100	1007	3920	7.530	74.700	75.300	0.80%
A	5600	BODY	06/16/2014	24.5	22.5	0.100	1007	3920	7.650	77.300	76.500	-1.03%
A	5800	BODY	06/16/2014	24.5	22.5	0.100	1007	3920	6.920	72.900	69.200	-5.08%

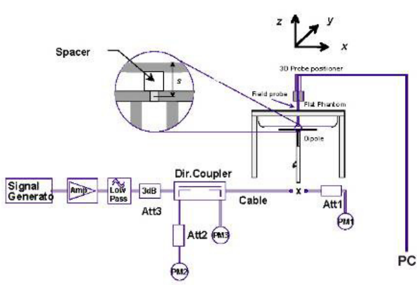

Figure 10-1
System Verification Setup Diagram

Figure 10-2
System Verification Setup Photo

11 SAR DATA SUMMARY

11.1 Standalone Head SAR Data

Table 11-1
CDMA BC10 (§90S) Head SAR

MEASUREMENT RESULTS														
FREQUENCY		Mode/Band	Service	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Power Drift [dB]	Side	Test Position	Device Serial Number	Duty Cycle	SAR (1g)	Scaling Factor	Scaled SAR (1g)	Plot #
MHz	Ch.										(W/kg)		(W/kg)	
820.10	564	CDMA BC10 (§90S)	RC3 / SO55	25.4	25.33	-0.01	Right	Cheek	885-1	1:1	0.472	1.016	0.480	
820.10	564	CDMA BC10 (§90S)	RC3 / SO55	25.4	25.33	0.01	Right	Tilt	885-1	1:1	0.390	1.016	0.396	
820.10	564	CDMA BC10 (§90S)	RC3 / SO55	25.4	25.33	0.02	Left	Cheek	885-1	1:1	0.350	1.016	0.356	
820.10	564	CDMA BC10 (§90S)	RC3 / SO55	25.4	25.33	-0.03	Left	Tilt	885-1	1:1	0.294	1.016	0.299	
820.10	564	CDMA BC10 (§90S)	EVDO Rev. A	25.4	25.26	0.02	Right	Cheek	885-1	1:1	0.495	1.033	0.511	A1
820.10	564	CDMA BC10 (§90S)	EVDO Rev. A	25.4	25.26	-0.03	Right	Tilt	885-1	1:1	0.378	1.033	0.390	
820.10	564	CDMA BC10 (§90S)	EVDO Rev. A	25.4	25.26	0.03	Left	Cheek	885-1	1:1	0.380	1.033	0.393	
820.10	564	CDMA BC10 (§90S)	EVDO Rev. A	25.4	25.26	0.00	Left	Tilt	885-1	1:1	0.335	1.033	0.346	
ANSI / IEEE C95.1 1992 - SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population							Head 1.6 W/kg (mW/g) averaged over 1 gram							

Table 11-2
CDMA BC0 (§22H) Head SAR

MEASUREMENT RESULTS														
FREQUENCY		Mode/Band	Service	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Power Drift [dB]	Side	Test Position	Device Serial Number	Duty Cycle	SAR (1g)	Scaling Factor	Scaled SAR (1g)	Plot #
MHz	Ch.										(W/kg)		(W/kg)	
836.52	384	CDMA BC0 (§22H)	RC3 / SO55	25.2	25.07	0.06	Right	Cheek	885-1	1:1	0.429	1.030	0.442	
836.52	384	CDMA BC0 (§22H)	RC3 / SO55	25.2	25.07	0.03	Right	Tilt	885-1	1:1	0.356	1.030	0.367	
836.52	384	CDMA BC0 (§22H)	RC3 / SO55	25.2	25.07	-0.04	Left	Cheek	885-1	1:1	0.367	1.030	0.378	
836.52	384	CDMA BC0 (§22H)	RC3 / SO55	25.2	25.07	-0.01	Left	Tilt	885-1	1:1	0.301	1.030	0.310	
836.52	384	CDMA BC0 (§22H)	EVDO Rev. A	25.2	25.16	0.03	Right	Cheek	885-1	1:1	0.436	1.009	0.440	A2
836.52	384	CDMA BC0 (§22H)	EVDO Rev. A	25.2	25.16	0.02	Right	Tilt	885-1	1:1	0.338	1.009	0.341	
836.52	384	CDMA BC0 (§22H)	EVDO Rev. A	25.2	25.16	0.03	Left	Cheek	885-1	1:1	0.394	1.009	0.398	
836.52	384	CDMA BC0 (§22H)	EVDO Rev. A	25.2	25.16	0.03	Left	Tilt	885-1	1:1	0.341	1.009	0.344	
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
PCS CDMA Head SAR

MEASUREMENT RESULTS														
FREQUENCY		Mode/Band	Service	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Power Drift [dB]	Side	Test Position	Device Serial Number	Duty Cycle	SAR (1g)	Scaling Factor	Scaled SAR (1g)	Plot #
MHz	Ch.										(W/kg)		(W/kg)	
1880.00	600	PCS CDMA	RC3 / SO55	25.0	24.79	-0.04	Right	Cheek	885-1	1:1	0.578	1.050	0.607	
1880.00	600	PCS CDMA	RC3 / SO55	25.0	24.79	-0.04	Right	Tilt	885-1	1:1	0.263	1.050	0.276	
1880.00	600	PCS CDMA	RC3 / SO55	25.0	24.79	0.04	Left	Cheek	885-1	1:1	0.389	1.050	0.408	
1880.00	600	PCS CDMA	RC3 / SO55	25.0	24.79	0.06	Left	Tilt	885-1	1:1	0.299	1.050	0.314	
1880.00	600	PCS CDMA	EVDO Rev. A	25.0	24.75	-0.05	Right	Cheek	885-1	1:1	0.619	1.059	0.656	A3
1880.00	600	PCS CDMA	EVDO Rev. A	25.0	24.75	-0.04	Right	Tilt	885-1	1:1	0.256	1.059	0.271	
1880.00	600	PCS CDMA	EVDO Rev. A	25.0	24.75	0.09	Left	Cheek	885-1	1:1	0.395	1.059	0.418	
1880.00	600	PCS CDMA	EVDO Rev. A	25.0	24.75	-0.06	Left	Tilt	885-1	1:1	0.346	1.059	0.366	
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
LTE Band 26 Head SAR

MEASUREMENT RESULTS																			
FREQUENCY			Mode	Bandwidth [MHz]	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Power Drift [dB]	MPR [dB]	Side	Test Position	Modulation	RB Size	RB Offset	Device Serial Number	Duty Cycle	SAR (1g)	Scaling Factor	Scaled SAR (1g)	Plot #
MHz	Ch.															(W/kg)		(W/kg)	
844.00	26990	High	LTE Band 26	10	24.2	24.19	0.04	0	Right	Cheek	QPSK	1	25	885-2	1:1	0.320	1.002	0.321	A4
844.00	26990	High	LTE Band 26	10	23.2	23.19	0.04	1	Right	Cheek	QPSK	25	25	885-2	1:1	0.232	1.002	0.232	
844.00	26990	High	LTE Band 26	10	24.2	24.19	-0.06	0	Right	Tilt	QPSK	1	25	885-2	1:1	0.239	1.002	0.239	
844.00	26990	High	LTE Band 26	10	23.2	23.19	0.01	1	Right	Tilt	QPSK	25	25	885-2	1:1	0.175	1.002	0.175	
844.00	26990	High	LTE Band 26	10	24.2	24.19	-0.01	0	Left	Cheek	QPSK	1	25	885-2	1:1	0.256	1.002	0.257	
844.00	26990	High	LTE Band 26	10	23.2	23.19	0.02	1	Left	Cheek	QPSK	25	25	885-2	1:1	0.192	1.002	0.192	
844.00	26990	High	LTE Band 26	10	24.2	24.19	-0.02	0	Left	Tilt	QPSK	1	25	885-2	1:1	0.259	1.002	0.260	
844.00	26990	High	LTE Band 26	10	23.2	23.19	0.05	1	Left	Tilt	QPSK	25	25	885-2	1:1	0.190	1.002	0.190	
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
LTE Band 25 (PCS) Head SAR

MEASUREMENT RESULTS																			
FREQUENCY			Mode	Bandwidth [MHz]	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Power Drift [dB]	MPR [dB]	Side	Test Position	Modulation	RB Size	RB Offset	Device Serial Number	Duty Cycle	SAR (1g)	Scaling Factor	Scaled SAR (1g)	Plot #
MHz	Ch.															(W/kg)		(W/kg)	
1882.50	26365	Mid	LTE Band 25 (PCS)	10	24.2	24.10	0.01	0	Right	Cheek	QPSK	1	49	885-2	1:1	0.563	1.023	0.576	A5
1882.50	26365	Mid	LTE Band 25 (PCS)	10	23.2	23.08	0.00	1	Right	Cheek	QPSK	25	25	885-2	1:1	0.423	1.028	0.435	
1882.50	26365	Mid	LTE Band 25 (PCS)	10	24.2	24.10	-0.07	0	Right	Tilt	QPSK	1	49	885-2	1:1	0.252	1.023	0.258	
1882.50	26365	Mid	LTE Band 25 (PCS)	10	23.2	23.08	0.09	1	Right	Tilt	QPSK	25	25	885-2	1:1	0.198	1.028	0.204	
1882.50	26365	Mid	LTE Band 25 (PCS)	10	24.2	24.10	0.04	0	Left	Cheek	QPSK	1	49	885-2	1:1	0.371	1.023	0.380	
1882.50	26365	Mid	LTE Band 25 (PCS)	10	23.2	23.08	0.07	1	Left	Cheek	QPSK	25	25	885-2	1:1	0.277	1.028	0.285	
1882.50	26365	Mid	LTE Band 25 (PCS)	10	24.2	24.10	0.02	0	Left	Tilt	QPSK	1	49	885-2	1:1	0.338	1.023	0.346	
1882.50	26365	Mid	LTE Band 25 (PCS)	10	23.2	23.08	0.08	1	Left	Tilt	QPSK	25	25	885-2	1:1	0.261	1.028	0.268	
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
LTE Band 41 Head SAR

MEASUREMENT RESULTS																				
FREQUENCY			Mode	Bandwidth [MHz]	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Power Drift [dB]	MPR [dB]	Side	Test Position	Modulation	RB Size	RB Offset	Device Serial Number	Duty Cycle	SAR (1g)	Scaling Factor (Cond. Power)	Scaling Factor (CP Duty)	Scaled SAR (1g)	Plot #
MHz	Ch.															(W/kg)			(W/kg)	
2680.00	41490	High	LTE Band 41	20	24.2	24.10	-0.07	0	Right	Cheek	QPSK	1	0	885-2	1:1.59	0.170	1.023	1.010	0.176	
2593.00	40620	Mid	LTE Band 41	20	23.2	23.10	0.13	1	Right	Cheek	QPSK	50	50	885-2	1:1.59	0.143	1.023	1.010	0.147	
2680.00	41490	High	LTE Band 41	20	24.2	24.10	0.14	0	Right	Tilt	QPSK	1	0	885-2	1:1.59	0.123	1.023	1.010	0.127	
2593.00	40620	Mid	LTE Band 41	20	23.2	23.10	0.07	1	Right	Tilt	QPSK	50	50	885-2	1:1.59	0.108	1.023	1.010	0.111	
2680.00	41490	High	LTE Band 41	20	24.2	24.10	-0.03	0	Left	Cheek	QPSK	1	0	885-2	1:1.59	0.224	1.023	1.010	0.231	A6
2593.00	40620	Mid	LTE Band 41	20	23.2	23.10	0.05	1	Left	Cheek	QPSK	50	50	885-2	1:1.59	0.203	1.023	1.010	0.210	
2680.00	41490	High	LTE Band 41	20	24.2	24.10	-0.02	0	Left	Tilt	QPSK	1	0	885-2	1:1.59	0.067	1.023	1.010	0.070	
2593.00	40620	Mid	LTE Band 41	20	23.2	23.10	0.14	1	Left	Tilt	QPSK	50	50	885-2	1:1.59	0.052	1.023	1.010	0.054	
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
DTS Head SAR

MEASUREMENT RESULTS														
FREQUENCY		Mode	Service	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Power Drift [dB]	Side	Test Position	Device Serial Number	Data Rate (Mbps)	Duty Cycle	SAR (1g)	Scaling Factor	Scaled SAR (1g)	Plot #
MHz	Ch.											(W/kg)		(W/kg)	
2437	6	IEEE 802.11b	DSSS	17.0	16.46	0.07	Right	Cheek	885-19	1	1:1	0.465	1.132	0.526	A7
2437	6	IEEE 802.11b	DSSS	17.0	16.46	0.12	Right	Tilt	885-19	1	1:1	0.380	1.132	0.430	
2437	6	IEEE 802.11b	DSSS	17.0	16.46	0.09	Left	Cheek	885-19	1	1:1	0.284	1.132	0.321	
2437	6	IEEE 802.11b	DSSS	17.0	16.46	-0.14	Left	Tilt	885-19	1	1:1	0.328	1.132	0.371	
5785	157	IEEE 802.11a	OFDM	14.0	13.70	0.12	Right	Cheek	885-19	6	1:1	0.060	1.072	0.064	A8
5785	157	IEEE 802.11a	OFDM	14.0	13.70	-0.03	Right	Tilt	885-19	6	1:1	0.051	1.072	0.055	
5785	157	IEEE 802.11a	OFDM	14.0	13.70	-0.12	Left	Cheek	885-19	6	1:1	0.030	1.072	0.032	
5785	157	IEEE 802.11a	OFDM	14.0	13.70	0.10	Left	Tilt	885-19	6	1:1	0.023	1.072	0.025	
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
NII Head SAR

MEASUREMENT RESULTS															
FREQUENCY		Mode	Service	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Power Drift [dB]	Side	Test Position	Device Serial Number	Data Rate (Mbps)	Duty Cycle	SAR (1g)	Scaling Factor	Scaled SAR (1g)	Plot #
MHz	Ch.											(W/kg)		(W/kg)	
5200	40	IEEE 802.11a	OFDM	14.0	13.39	0.19	Right	Cheek	885-19	6	1:1	0.117	1.151	0.135	
5200	40	IEEE 802.11a	OFDM	14.0	13.39	0.12	Right	Tilt	885-19	6	1:1	0.086	1.151	0.099	
5200	40	IEEE 802.11a	OFDM	14.0	13.39	-0.08	Left	Cheek	885-19	6	1:1	0.041	1.151	0.047	
5200	40	IEEE 802.11a	OFDM	14.0	13.39	-0.02	Left	Tilt	885-19	6	1:1	0.034	1.151	0.039	
5260	52	IEEE 802.11a	OFDM	14.0	13.19	-0.17	Right	Cheek	885-19	6	1:1	0.144	1.205	0.174	A9
5260	52	IEEE 802.11a	OFDM	14.0	13.19	-0.21	Right	Tilt	885-19	6	1:1	0.099	1.205	0.119	
5260	52	IEEE 802.11a	OFDM	14.0	13.19	-0.13	Left	Cheek	885-19	6	1:1	0.045	1.205	0.054	
5260	52	IEEE 802.11a	OFDM	14.0	13.19	-0.03	Left	Tilt	885-19	6	1:1	0.037	1.205	0.045	
5680	136	IEEE 802.11a	OFDM	14.0	13.73	0.03	Right	Cheek	885-19	6	1:1	0.132	1.064	0.140	
5680	136	IEEE 802.11a	OFDM	14.0	13.73	0.19	Right	Tilt	885-19	6	1:1	0.103	1.064	0.110	
5680	136	IEEE 802.11a	OFDM	14.0	13.73	-0.11	Left	Cheek	885-19	6	1:1	0.037	1.064	0.039	
5680	136	IEEE 802.11a	OFDM	14.0	13.73	-0.14	Left	Tilt	885-19	6	1:1	0.023	1.064	0.024	
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 11-9
Body-Worn SAR Data

MEASUREMENT RESULTS														
FREQUENCY		Mode	Service	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Power Drift [dB]	Spacing	Device Serial Number	Duty Cycle	Side	SAR (1g)	Scaling Factor	Scaled SAR (1g)	Plot #
MHz	Ch.										(W/kg)		(W/kg)	
820.10	564	CDMA BC10 (§90S)	TDSO / SO32	25.4	25.32	-0.03	10 mm	885-1	1:1	back	0.783	1.019	0.798	A10
836.52	384	CDMA BC0 (§22H)	TDSO / SO32	25.2	25.11	0.01	10 mm	885-1	1:1	back	0.736	1.021	0.751	A12
1851.25	25	PCS CDMA	TDSO / SO32	25.0	24.79	-0.09	10 mm	885-1	1:1	back	0.733	1.050	0.770	
1880.00	600	PCS CDMA	TDSO / SO32	25.0	24.78	-0.07	10 mm	885-1	1:1	back	0.892	1.052	0.938	
1908.75	1175	PCS CDMA	TDSO / SO32	25.0	24.80	0.09	10 mm	885-1	1:1	back	0.942	1.047	0.986	A14
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 11-10
LTE Body-Worn SAR

MEASUREMENT RESULTS																				
FREQUENCY			Mode	Bandwidth [MHz]	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Power Drift [dB]	MPR [dB]	Device Serial Number	Modulation	RB Size	RB Offset	Spacing	Side	Duty Cycle	SAR (1g)	Scaling Factor (Cond. Power)	Scaling Factor (CP Duty)	Scaled SAR (1g)	Plot #
MHz	Ch.															(W/kg)			(W/kg)	
844.00	26990	High	LTE Band 26	10	24.2	24.19	0.07	0	885-2	QPSK	1	25	10 mm	back	1:1	0.487	1.002	N/A	0.488	A16
844.00	26990	High	LTE Band 26	10	23.2	23.19	-0.04	1	885-2	QPSK	25	25	10 mm	back	1:1	0.382	1.002	N/A	0.383	
1855.00	26090	Low	LTE Band 25 (PCS)	10	24.2	24.07	0.04	0	885-2	QPSK	1	0	10 mm	back	1:1	0.765	1.030	N/A	0.788	
1882.50	26365	Mid	LTE Band 25 (PCS)	10	24.2	24.10	-0.01	0	885-2	QPSK	1	49	10 mm	back	1:1	0.846	1.023	N/A	0.865	A18
1910.00	26640	High	LTE Band 25 (PCS)	10	24.2	23.96	0.07	0	885-2	QPSK	1	49	10 mm	back	1:1	0.663	1.057	N/A	0.701	
1882.50	26365	Mid	LTE Band 25 (PCS)	10	23.2	23.08	0.04	1	885-2	QPSK	25	25	10 mm	back	1:1	0.683	1.028	N/A	0.702	
1855.00	26090	Low	LTE Band 25 (PCS)	10	23.2	23.01	-0.01	1	885-2	QPSK	50	0	10 mm	back	1:1	0.654	1.045	N/A	0.683	
2680.00	41490	High	LTE Band 41	20	24.2	24.10	-0.03	0	885-2	QPSK	1	0	10 mm	back	1:1.59	0.346	1.023	1.010	0.358	A19
2593.00	40620	Mid	LTE Band 41	20	23.2	23.10	0.03	1	885-2	QPSK	50	50	10 mm	back	1:1.59	0.262	1.023	1.010	0.271	
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 11-11
DTS Body-Worn SAR

MEASUREMENT RESULTS														
FREQUENCY		Mode	Service	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Power Drift [dB]	Spacing	Device Serial Number	Data Rate (Mbps)	Side	Duty Cycle	SAR (1g)	Scaling Factor	Scaled SAR (1g)	Plot #
MHz	Ch.											(W/kg)		(W/kg)	
2437	6	IEEE 802.11b	DSSS	17.0	16.46	0.02	10 mm	885-19	1	back	1:1	0.128	1.132	0.145	A20
5785	157	IEEE 802.11a	OFDM	14.0	13.70	0.04	10 mm	885-19	6	back	1:1	0.103	1.072	0.110	A22
ANSI / IEEE C95.1 1992 - SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population							Body 1.6 W/kg (mW/g) averaged over 1 gram								

Table 11-12
NII Body-Worn SAR

MEASUREMENT RESULTS															
FREQUENCY		Mode	Service	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Power Drift [dB]	Spacing	Device Serial Number	Data Rate (Mbps)	Side	Duty Cycle	SAR (1g)	Scaling Factor	Scaled SAR (1g)	Plot #
MHz	Ch.											(W/kg)		(W/kg)	
5200	40	IEEE 802.11a	OFDM	14.0	13.39	0.18	10 mm	885-19	6	back	1:1	0.126	1.151	0.145	
5260	52	IEEE 802.11a	OFDM	14.0	13.19	0.12	10 mm	885-19	6	back	1:1	0.145	1.205	0.175	
5680	136	IEEE 802.11a	OFDM	14.0	13.73	0.13	10 mm	885-19	6	back	1:1	0.184	1.064	0.196	A24
ANSI / IEEE C95.1 1992 - SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population							Body 1.6 W/kg (mW/g) averaged over 1 gram								

11.3 Standalone Wireless Router SAR Data

Table 11-13
CDMA Hotspot SAR Data

MEASUREMENT RESULTS														
FREQUENCY		Mode	Service	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Power Drift [dB]	Spacing	Device Serial Number	Duty Cycle	Side	SAR (1g)	Scaling Factor	Scaled SAR (1g)	Plot #
MHz	Ch.										(W/kg)		(W/kg)	
820.10	564	CDMA BC10 (§90S)	EVDO Rev. 0	25.4	25.31	-0.01	10 mm	885-1	1:1	back	0.792	1.021	0.809	
820.10	564	CDMA BC10 (§90S)	EVDO Rev. 0	25.4	25.31	0.02	10 mm	885-1	1:1	front	0.576	1.021	0.588	
820.10	564	CDMA BC10 (§90S)	EVDO Rev. 0	25.4	25.31	-0.04	10 mm	885-1	1:1	bottom	0.347	1.021	0.354	
820.10	564	CDMA BC10 (§90S)	EVDO Rev. 0	25.4	25.31	0.00	10 mm	885-1	1:1	right	0.830	1.021	0.847	
820.10	564	CDMA BC10 (§90S)	EVDO Rev. 0	25.4	25.31	-0.02	10 mm	885-1	1:1	left	0.527	1.021	0.538	
820.10	564	CDMA BC10 (§90S)	EVDO Rev. 0	25.4	25.31	-0.03	10 mm	885-1	1:1	right	0.851	1.021	0.869	A11
836.52	384	CDMA BC0 (§22H)	EVDO Rev. 0	25.2	25.17	0.02	10 mm	885-1	1:1	back	0.739	1.007	0.744	A13
836.52	384	CDMA BC0 (§22H)	EVDO Rev. 0	25.2	25.17	0.03	10 mm	885-1	1:1	front	0.469	1.007	0.472	
836.52	384	CDMA BC0 (§22H)	EVDO Rev. 0	25.2	25.17	0.01	10 mm	885-1	1:1	bottom	0.318	1.007	0.320	
836.52	384	CDMA BC0 (§22H)	EVDO Rev. 0	25.2	25.17	-0.01	10 mm	885-1	1:1	right	0.673	1.007	0.678	
836.52	384	CDMA BC0 (§22H)	EVDO Rev. 0	25.2	25.17	0.00	10 mm	885-1	1:1	left	0.412	1.007	0.415	
1851.25	25	PCS CDMA	EVDO Rev. 0	25.0	24.81	-0.02	10 mm	885-1	1:1	back	0.758	1.045	0.792	
1880.00	600	PCS CDMA	EVDO Rev. 0	25.0	24.76	-0.13	10 mm	885-1	1:1	back	0.920	1.057	0.972	
1908.75	1175	PCS CDMA	EVDO Rev. 0	25.0	24.78	0.16	10 mm	885-1	1:1	back	0.975	1.052	1.026	A15
1880.00	600	PCS CDMA	EVDO Rev. 0	25.0	24.76	0.00	10 mm	885-1	1:1	front	0.646	1.057	0.683	
1851.25	25	PCS CDMA	EVDO Rev. 0	25.0	24.81	-0.04	10 mm	885-1	1:1	bottom	0.756	1.045	0.790	
1880.00	600	PCS CDMA	EVDO Rev. 0	25.0	24.76	0.01	10 mm	885-1	1:1	bottom	0.889	1.057	0.940	
1908.75	1175	PCS CDMA	EVDO Rev. 0	25.0	24.78	0.08	10 mm	885-1	1:1	bottom	0.910	1.052	0.957	
1880.00	600	PCS CDMA	EVDO Rev. 0	25.0	24.76	0.04	10 mm	885-1	1:1	right	0.310	1.057	0.328	
1880.00	600	PCS CDMA	EVDO Rev. 0	25.0	24.76	0.02	10 mm	885-1	1:1	left	0.191	1.057	0.202	
1908.75	1175	PCS CDMA	EVDO Rev. 0	25.0	24.78	0.05	10 mm	885-1	1:1	back	0.955	1.052	1.005	
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: Variability data are highlighted blue in the table above.

Table 11-14
LTE Band 26 Hotspot SAR

MEASUREMENT RESULTS																			
FREQUENCY			Mode	Bandwidth [MHz]	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Power Drift [dB]	MPR [dB]	Device Serial Number	Modulation	RB Size	RB Offset	Spacing	Side	Duty Cycle	SAR (1g)	Scaling Factor	Scaled SAR (1g)	Plot #
MHz	Ch.															(W/kg)		(W/kg)	
844.00	26990	High	LTE Band 26	10	24.2	24.19	0.07	0	885-2	QPSK	1	25	10 mm	back	1:1	0.487	1.002	0.488	
844.00	26990	High	LTE Band 26	10	23.2	23.19	-0.04	1	885-2	QPSK	25	25	10 mm	back	1:1	0.382	1.002	0.383	
844.00	26990	High	LTE Band 26	10	24.2	24.19	0.01	0	885-2	QPSK	1	25	10 mm	front	1:1	0.304	1.002	0.305	
844.00	26990	High	LTE Band 26	10	23.2	23.19	0.02	1	885-2	QPSK	25	25	10 mm	front	1:1	0.260	1.002	0.261	
844.00	26990	High	LTE Band 26	10	24.2	24.19	0.00	0	885-2	QPSK	1	25	10 mm	bottom	1:1	0.239	1.002	0.239	
844.00	26990	High	LTE Band 26	10	23.2	23.19	-0.07	1	885-2	QPSK	25	25	10 mm	bottom	1:1	0.192	1.002	0.192	
844.00	26990	High	LTE Band 26	10	24.2	24.19	0.00	0	885-2	QPSK	1	25	10 mm	right	1:1	0.505	1.002	0.506	A17
844.00	26990	High	LTE Band 26	10	23.2	23.19	0.02	1	885-2	QPSK	25	25	10 mm	right	1:1	0.424	1.002	0.425	
844.00	26990	High	LTE Band 26	10	24.2	24.19	0.06	0	885-2	QPSK	1	25	10 mm	left	1:1	0.301	1.002	0.302	
844.00	26990	High	LTE Band 26	10	23.2	23.19	0.02	1	885-2	QPSK	25	25	10 mm	left	1:1	0.264	1.002	0.265	
ANSI / IEEE C95.1 1992 - SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population									Body 1.6 W/kg (mW/g) averaged over 1 gram										

Table 11-15
LTE Band 25 (PCS) Hotspot SAR

MEASUREMENT RESULTS

FREQUENCY			Mode	Bandwidth [MHz]	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Power Drift [dB]	MPR [dB]	Device Serial Number	Modulation	RB Size	RB Offset	Spacing	Side	Duty Cycle	SAR (1g)	Scaling Factor	Scaled SAR (1g)	Plot #
MHz	Ch.															(W/kg)		(W/kg)	
1855.00	26090	Low	LTE Band 25 (PCS)	10	24.2	24.07	0.04	0	885-2	QPSK	1	0	10 mm	back	1:1	0.765	1.030	0.788	
1882.50	26365	Mid	LTE Band 25 (PCS)	10	24.2	24.10	-0.01	0	885-2	QPSK	1	49	10 mm	back	1:1	0.846	1.023	0.865	A18
1910.00	26640	High	LTE Band 25 (PCS)	10	24.2	23.96	0.07	0	885-2	QPSK	1	49	10 mm	back	1:1	0.663	1.057	0.701	
1882.50	26365	Mid	LTE Band 25 (PCS)	10	23.2	23.08	0.04	1	885-2	QPSK	25	25	10 mm	back	1:1	0.683	1.028	0.702	
1855.00	26090	Low	LTE Band 25 (PCS)	10	23.2	23.01	-0.01	1	885-2	QPSK	50	0	10 mm	back	1:1	0.654	1.045	0.683	
1882.50	26365	Mid	LTE Band 25 (PCS)	10	24.2	24.10	0.04	0	885-2	QPSK	1	49	10 mm	front	1:1	0.650	1.023	0.665	
1882.50	26365	Mid	LTE Band 25 (PCS)	10	23.2	23.08	0.04	1	885-2	QPSK	25	25	10 mm	front	1:1	0.516	1.028	0.530	
1882.50	26365	Mid	LTE Band 25 (PCS)	10	24.2	24.10	-0.06	0	885-2	QPSK	1	49	10 mm	bottom	1:1	0.781	1.023	0.799	
1882.50	26365	Mid	LTE Band 25 (PCS)	10	23.2	23.08	0.13	1	885-2	QPSK	25	25	10 mm	bottom	1:1	0.694	1.028	0.713	
1882.50	26365	Mid	LTE Band 25 (PCS)	10	24.2	24.10	0.02	0	885-2	QPSK	1	49	10 mm	right	1:1	0.286	1.023	0.293	
1882.50	26365	Mid	LTE Band 25 (PCS)	10	23.2	23.08	-0.01	1	885-2	QPSK	25	25	10 mm	right	1:1	0.221	1.028	0.227	
1882.50	26365	Mid	LTE Band 25 (PCS)	10	24.2	24.10	0.04	0	885-2	QPSK	1	49	10 mm	left	1:1	0.189	1.023	0.193	
1882.50	26365	Mid	LTE Band 25 (PCS)	10	23.2	23.08	0.02	1	885-2	QPSK	25	25	10 mm	left	1:1	0.145	1.028	0.149	

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

Table 11-16
LTE 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 (Cond. Power)	Scaling Factor (CP Duty)	Scaled SAR (1g)	Plot #
MHz	Ch.															(W/kg)			(W/kg)	
2680.00	41490	High	LTE Band 41	20	24.2	24.10	-0.03	0	885-2	QPSK	1	0	10 mm	back	1:1.59	0.346	1.023	1.010	0.358	A19
2593.00	40620	Mid	LTE Band 41	20	23.2	23.10	0.03	1	885-2	QPSK	50	50	10 mm	back	1:1.59	0.262	1.023	1.010	0.271	
2680.00	41490	High	LTE Band 41	20	24.2	24.10	-0.04	0	885-2	QPSK	1	0	10 mm	front	1:1.59	0.313	1.023	1.010	0.323	
2593.00	40620	Mid	LTE Band 41	20	23.2	23.10	0.03	1	885-2	QPSK	50	50	10 mm	front	1:1.59	0.270	1.023	1.010	0.279	
2680.00	41490	High	LTE Band 41	20	24.2	24.10	0.01	0	885-2	QPSK	1	0	10 mm	bottom	1:1.59	0.300	1.023	1.010	0.310	
2593.00	40620	Mid	LTE Band 41	20	23.2	23.10	-0.04	1	885-2	QPSK	50	50	10 mm	bottom	1:1.59	0.279	1.023	1.010	0.288	
2680.00	41490	High	LTE Band 41	20	24.2	24.10	0.00	0	885-2	QPSK	1	0	10 mm	left	1:1.59	0.207	1.023	1.010	0.214	
2593.00	40620	Mid	LTE Band 41	20	23.2	23.10	-0.03	1	885-2	QPSK	50	50	10 mm	left	1:1.59	0.198	1.023	1.010	0.205	

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

Table 11-17
WLAN Hotspot SAR

MEASUREMENT RESULTS

FREQUENCY		Mode	Service	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Power Drift [dB]	Spacing	Device Serial Number	Data Rate (Mbps)	Side	Duty Cycle	SAR (1g)	Scaling Factor	Scaled SAR (1g)	Plot #
MHz	Ch.											(W/kg)		(W/kg)	
2437	6	IEEE 802.11b	DSSS	17.0	16.46	0.02	10 mm	885-19	1	back	1:1	0.128	1.132	0.145	
2437	6	IEEE 802.11b	DSSS	17.0	16.46	0.02	10 mm	885-19	1	front	1:1	0.132	1.132	0.149	A21
2437	6	IEEE 802.11b	DSSS	17.0	16.46	-0.05	10 mm	885-19	1	top	1:1	0.131	1.132	0.148	
2437	6	IEEE 802.11b	DSSS	17.0	16.46	0.07	10 mm	885-19	1	left	1:1	0.111	1.132	0.126	
5785	157	IEEE 802.11a	OFDM	14.0	13.70	0.04	10 mm	885-19	6	back	1:1	0.103	1.072	0.110	
5785	157	IEEE 802.11a	OFDM	14.0	13.70	0.17	10 mm	885-19	6	front	1:1	0.029	1.072	0.031	
5785	157	IEEE 802.11a	OFDM	14.0	13.70	-0.03	10 mm	885-19	6	top	1:1	0.046	1.072	0.049	
5785	157	IEEE 802.11a	OFDM	14.0	13.70	0.16	10 mm	885-19	6	left	1:1	0.104	1.072	0.111	A23

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 1528-2003, and FCC KDB Publication 447498 D01v05.
2. Batteries are fully charged at the beginning of the SAR measurements. A standard battery was used for all SAR measurements.
3. Liquid tissue depth was at least 15.0 cm for all frequencies.
4. The manufacturer has confirmed that the device(s) tested have the same physical, mechanical and thermal characteristics and are within operational tolerances expected for production units.
5. SAR results were scaled to the maximum allowed power to demonstrate compliance per FCC KDB Publication 447498 D01v05.
6. Device was tested using a fixed spacing for body-worn accessory testing. A separation distance of 10 mm was considered because the manufacturer has determined that there will be body-worn accessories available in the marketplace for users to support this separation distance.
7. Per FCC KDB Publication 648474 D04v01, SAR was evaluated without a headset connected to the device. Since the standalone reported SAR was ≤ 1.2 W/kg, no additional SAR evaluations using a headset cable were required.
8. Per FCC KDB 865664 D01 v01, variability SAR tests were performed when the measured SAR results for a frequency band were greater than 0.8 W/kg. Repeated SAR measurements are highlighted in the tables above for clarity. Please see Section 13 for variability analysis.
9. During SAR Testing for the Wireless Router conditions per FCC KDB Publication 941225 D06v01, the actual Portable Hotspot operation (with actual simultaneous transmission of a transmitter with WIFI) was not activated (See Section 6.7 for more details).

CDMA Notes:

1. Head SAR for CDMA2000 mode was tested under RC3/SO55 per FCC KDB Publication 941225 D01v02.
2. Body-Worn SAR was tested with 1x RTT with TDSO / SO32 FCH Only. EVDO and TDSO / SO32 FCH+SCH SAR tests were not required since the average output power was not more than 0.25 dB higher than the TDSO / SO32 FCH only powers, per FCC KDB Publication 941225 D01v02.
3. CDMA Wireless Router SAR is measured using Subtype 0/1 Physical Layer configurations for Rev. 0 according to KDB 941225 D01 procedures for data devices. Since the average output power of Subtype 2 for Rev. A is less than the Rev. 0 power levels, EVDO Rev. A SAR is not required. SAR is not required for 1x RTT for Ev-Do hotspot devices when the maximum average output of each channel is less than 1⁄4 dB higher than that measured in Subtype 0/1 Physical Layer configurations for Rev. 0.
4. Per FCC KDB Publication 447498 D01v05, if the reported (scaled) SAR measured at the middle channel or highest output power channel for each test configuration is ≤ 0.8 W/kg then testing at the other channels is not required for such test configuration(s). When the maximum output power variation across the required test channels is > ½ dB, instead of the middle channel, the highest output power channel was used.
5. Head SAR was additionally evaluated using EVDO Rev. A to determine compliance for VoIP operations.
6. CDMA 1x Advanced technology was not required for SAR since the reported SAR in all 1x mode exposure conditions were < 1.2 W/kg.

LTE Notes:

1. LTE Considerations: LTE test configurations are determined according to SAR Evaluation Considerations for LTE Devices in FCC KDB Publication 941225 D05v02r01. The general test procedures used for testing can be found in Section 8.4.4.

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. TDD LTE was tested using UL-DL configuration 0 with 6 UL subframes and 2 S subframes using normal cyclic prefix only and special subframe configuration 6. Due to equipment setup issues with extended cyclic prefix as a result of test samples configured for normal cyclic prefix, SAR tests were performed at maximum output power and worst-case transmission duty factor in normal cyclic prefix. Results were then scaled to the duty factor required for extended cyclic prefix listed in 3GPP TS 36.211 Section 4. The cyclic prefix scaling factor for LTE Band 41 was calculated by dividing the extended cyclic prefix duty factor by the normal cyclic prefix duty factor. Per 3GPP 36.211 Section 4, the duty factor for special subframe configuration 6 using normal cyclic prefix is 0.629. The duty factor for special subframe configuration 6 using extended cyclic prefix is 0.633.
5. Per FCC KDB Publication 447498 D01v05, if the reported (scaled) LTE Band 41 SAR measured at the highest output power channel for each test configuration is ≤ 0.6 W/kg then testing at the other channels is not required for such test configuration(s).

WLAN Notes:
1. Justification for reduced test configurations for WIFI channels per KDB Publication 248227 D01v01r02 and October 2012 FCC/TCB Meeting Notes for 2.4 GHz WIFI: Highest average RF output power channel for the lowest data rate was selected for SAR evaluation in 802.11b. Other IEEE 802.11 modes (including 802.11g/n) were not investigated since the average output powers over all channels and data rates were not more than 0.25 dB higher than the tested channel in the lowest data rate of IEEE 802.11b mode.
2. Justification for reduced test configurations for WIFI channels per KDB Publication 248227 D01v01r02 and October 2012 FCC/TCB Meeting Notes for 5 GHz WIFI: Highest average RF output power channel for the lowest data rate was selected for SAR evaluation in 802.11a. Other IEEE 802.11 modes (including 802.11n 20 MHz and 40 MHz bandwidths) were not investigated since the average output powers over all channels and data rates were not more than 0.25 dB higher than the tested channel in the lowest data rate of IEEE 802.11a mode.
3. When Hotspot is enabled, all 5 GHz bands are disabled. Therefore no 5 GHz WIFI Wireless Router SAR Data was required.
4. WIFI transmission was verified using an uncalibrated spectrum analyzer.
5. Since the maximum extrapolated peak SAR of the zoom scan for the maximum output channel is <1.6 W/kg and the reported 1g averaged SAR is <0.8 W/kg, SAR testing on other default channels was not required.
6. The applicant expects that WIFI Direct may be used in conjunction with a held-to-ear or body-worn voice call.
7. 5 GHz WIFI Direct GO is supported in the 5.8 GHz band only. The manufacturer expects 5.8 GHz WIFI Direct GO may be used similarly to wireless router usage. Therefore, 5.8 GHz WIFI Direct GO was evaluated for SAR similar to wireless router SAR procedures in FCC KDB Publication 941225.

12 FCC MULTI-TX AND ANTENNA SAR CONSIDERATIONS

12.1 Introduction

The following procedures adopted from FCC KDB Publication 447498 D01v05 are applicable to handsets with built-in unlicensed transmitters such as 802.11a/b/g/n and Bluetooth devices which may simultaneously transmit with the licensed transmitter.

12.2 Simultaneous Transmission Procedures

This device contains transmitters that may operate simultaneously. Therefore simultaneous transmission analysis is required. Per FCC KDB 447498 D01v05 IV.C.1.iii and IEEE 1528-2013 Section 6.3.4.1.2, simultaneous transmission SAR test exclusion may be applied when the sum of the 1-g SAR for all the simultaneous transmitting antennas in a specific a physical test configuration is ≤1.6 W/kg. When standalone SAR is not required to be measured, per FCC KDB 447498 D01v05 4.3.2 2), the following equation must be used to estimate the standalone 1g SAR for simultaneous transmission assessment involving that transmitter.

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

Table 12-1
Estimated SAR

Mode	Frequency	Maximum Allowed Power	Separation Distance (Body)	Estimated SAR (Body)
	[MHz]	[dBm]	[mm]	[W/kg]
Bluetooth	2441	11.00	10	**0.271**

Note: Held-to ear configurations are not applicable to Bluetooth operations and therefore were not considered for simultaneous transmission. Per KDB Publication 447498 D01v05, the maximum power of the channel was rounded to the nearest mW before calculation.

12.3 Head SAR Simultaneous Transmission Analysis

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

Simult Tx	Configuration	CDMA BC10 (§90S) SAR (W/kg)	2.4 GHz WLAN SAR (W/kg)	Σ SAR (W/kg)	Simult Tx	Configuration	EVDO BC10 (§90S) SAR (W/kg)	2.4 GHz WLAN SAR (W/kg)	Σ SAR (W/kg)
Head SAR	Right Cheek	0.480	0.526	**1.006**	Head SAR	Right Cheek	0.511	0.526	**1.037**
	Right Tilt	0.396	0.430	0.826		Right Tilt	0.390	0.430	0.820
	Left Cheek	0.356	0.321	0.677		Left Cheek	0.393	0.321	0.714
	Left Tilt	0.299	0.371	0.670		Left Tilt	0.346	0.371	0.717

Simult Tx	Configuration	CDMA BC0 (§22H) SAR (W/kg)	2.4 GHz WLAN SAR (W/kg)	Σ SAR (W/kg)
Head SAR	Right Cheek	0.442	0.526	**0.968**
	Right Tilt	0.367	0.430	0.797
	Left Cheek	0.378	0.321	0.699
	Left Tilt	0.310	0.371	0.681

Simult Tx	Configuration	EVDO BC0 (§22H) SAR (W/kg)	2.4 GHz WLAN SAR (W/kg)	Σ SAR (W/kg)
Head SAR	Right Cheek	0.440	0.526	**0.966**
	Right Tilt	0.341	0.430	0.771
	Left Cheek	0.398	0.321	0.719
	Left Tilt	0.344	0.371	0.715

Simult Tx	Configuration	PCS CDMA SAR (W/kg)	2.4 GHz WLAN SAR (W/kg)	Σ SAR (W/kg)
Head SAR	Right Cheek	0.607	0.526	**1.133**
	Right Tilt	0.276	0.430	0.706
	Left Cheek	0.408	0.321	0.729
	Left Tilt	0.314	0.371	0.685

Simult Tx	Configuration	PCS EVDO SAR (W/kg)	2.4 GHz WLAN SAR (W/kg)	Σ SAR (W/kg)
Head SAR	Right Cheek	0.656	0.526	**1.182**
	Right Tilt	0.271	0.430	0.701
	Left Cheek	0.418	0.321	0.739
	Left Tilt	0.366	0.371	0.737

Simult Tx	Configuration	LTE Band 26 SAR (W/kg)	2.4 GHz WLAN SAR (W/kg)	Σ SAR (W/kg)
Head SAR	Right Cheek	0.321	0.526	**0.847**
	Right Tilt	0.239	0.430	0.669
	Left Cheek	0.257	0.321	0.578
	Left Tilt	0.260	0.371	0.631

Simult Tx	Configuration	LTE Band 25 (PCS) SAR (W/kg)	2.4 GHz WLAN SAR (W/kg)	Σ SAR (W/kg)
Head SAR	Right Cheek	0.576	0.526	**1.102**
	Right Tilt	0.258	0.430	0.688
	Left Cheek	0.380	0.321	0.701
	Left Tilt	0.346	0.371	0.717

Simult Tx	Configuration	LTE Band 41 SAR (W/kg)	2.4 GHz WLAN SAR (W/kg)	Σ SAR (W/kg)
Head SAR	Right Cheek	0.176	0.526	**0.702**
	Right Tilt	0.127	0.430	0.557
	Left Cheek	0.231	0.321	0.552
	Left Tilt	0.070	0.371	0.441

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

Simult Tx	Configuration	CDMA BC10 (§90S) SAR (W/kg)	5 GHz WLAN SAR (W/kg)	Σ SAR (W/kg)
Head SAR	Right Cheek	0.480	0.174	**0.654**
	Right Tilt	0.396	0.119	0.515
	Left Cheek	0.356	0.054	0.410
	Left Tilt	0.299	0.045	0.344

Simult Tx	Configuration	EVDO BC10 (§90S) SAR (W/kg)	5 GHz WLAN SAR (W/kg)	Σ SAR (W/kg)
Head SAR	Right Cheek	0.511	0.174	**0.685**
	Right Tilt	0.390	0.119	0.509
	Left Cheek	0.393	0.054	0.447
	Left Tilt	0.346	0.045	0.391

Simult Tx	Configuration	CDMA BC0 (§22H) SAR (W/kg)	5 GHz WLAN SAR (W/kg)	Σ SAR (W/kg)
Head SAR	Right Cheek	0.442	0.174	**0.616**
	Right Tilt	0.367	0.119	0.486
	Left Cheek	0.378	0.054	0.432
	Left Tilt	0.310	0.045	0.355

Simult Tx	Configuration	EVDO BC0 (§22H) SAR (W/kg)	5 GHz WLAN SAR (W/kg)	Σ SAR (W/kg)
Head SAR	Right Cheek	0.440	0.174	**0.614**
	Right Tilt	0.341	0.119	0.460
	Left Cheek	0.398	0.054	0.452
	Left Tilt	0.344	0.045	0.389

Simult Tx	Configuration	PCS CDMA SAR (W/kg)	5 GHz WLAN SAR (W/kg)	Σ SAR (W/kg)
Head SAR	Right Cheek	0.607	0.174	**0.781**
	Right Tilt	0.276	0.119	0.395
	Left Cheek	0.408	0.054	0.462
	Left Tilt	0.314	0.045	0.359

Simult Tx	Configuration	PCS EVDO SAR (W/kg)	5 GHz WLAN SAR (W/kg)	Σ SAR (W/kg)
Head SAR	Right Cheek	0.656	0.174	**0.830**
	Right Tilt	0.271	0.119	0.390
	Left Cheek	0.418	0.054	0.472
	Left Tilt	0.366	0.045	0.411

Simult Tx	Configuration	LTE Band 26 SAR (W/kg)	5 GHz WLAN SAR (W/kg)	Σ SAR (W/kg)
Head SAR	Right Cheek	0.321	0.174	**0.495**
	Right Tilt	0.239	0.119	0.358
	Left Cheek	0.257	0.054	0.311
	Left Tilt	0.260	0.045	0.305

Simult Tx	Configuration	LTE Band 25 (PCS) SAR (W/kg)	5 GHz WLAN SAR (W/kg)	Σ SAR (W/kg)
Head SAR	Right Cheek	0.576	0.174	**0.750**
	Right Tilt	0.258	0.119	0.377
	Left Cheek	0.380	0.054	0.434
	Left Tilt	0.346	0.045	0.391

Simult Tx	Configuration	LTE Band 41 SAR (W/kg)	5 GHz WLAN SAR (W/kg)	Σ SAR (W/kg)
Head SAR	Right Cheek	0.176	0.174	**0.350**
	Right Tilt	0.127	0.119	0.246
	Left Cheek	0.231	0.054	0.285
	Left Tilt	0.070	0.045	0.115

The manufacturer expects that this device may be used during a held to ear voice call while simultaneously operating with WIFI direct. Therefore, the worst case 5 GHz WIFI reported SAR for each head configuration was considered for simultaneous SAR exclusion via summation of standalone SAR, regardless of whether the WIFI channel has WIFI Direct capability, for simplicity to determine compliance. Please note that the actual simultaneous transmission SAR will not exceed the summed levels indicated.

12.4 Body-Worn Simultaneous Transmission Analysis

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

Configuration	Mode	2G/3G/4G SAR (W/kg)	2.4 GHz WLAN SAR (W/kg)	Σ SAR (W/kg)
Back Side	CDMA BC10 (§90S)	0.798	0.145	0.943
Back Side	CDMA BC0 (§22H)	0.751	0.145	0.896
Back Side	PCS CDMA	0.986	0.145	1.131
Back Side	LTE Band 26	0.488	0.145	0.633
Back Side	LTE Band 25 (PCS)	0.865	0.145	1.010
Back Side	LTE Band 41	0.358	0.145	0.503

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

Configuration	Mode	2G/3G/4G SAR (W/kg)	5 GHz WLAN SAR (W/kg)	Σ SAR (W/kg)
Back Side	CDMA BC10 (§90S)	0.798	0.196	0.994
Back Side	CDMA BC0 (§22H)	0.751	0.196	0.947
Back Side	PCS CDMA	0.986	0.196	1.182
Back Side	LTE Band 26	0.488	0.196	0.684
Back Side	LTE Band 25 (PCS)	0.865	0.196	1.061
Back Side	LTE Band 41	0.358	0.196	0.554

The manufacturer expects that this device may be used during a body-worn voice call while simultaneously operating with WIFI direct. Therefore, the worst case 5 GHz WIFI reported SAR for each body-worn configuration was considered for simultaneous SAR exclusion via summation of standalone SAR, regardless of whether the WIFI channel has WIFI Direct capability, for simplicity to determine compliance. Please note that the actual simultaneous transmission SAR will not exceed the summed levels indicated.

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

Configuration	Mode	2G/3G/4G SAR (W/kg)	Bluetooth SAR (W/kg)	Σ SAR (W/kg)
Back Side	CDMA BC10 (§90S)	0.798	0.271	1.069
Back Side	CDMA BC0 (§22H)	0.751	0.271	1.022
Back Side	PCS CDMA	0.986	0.271	**1.257**
Back Side	LTE Band 26	0.488	0.271	0.759
Back Side	LTE Band 25 (PCS)	0.865	0.271	1.136
Back Side	LTE Band 41	0.358	0.271	0.629

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

12.5 Hotspot SAR Simultaneous Transmission Analysis

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

Table 12-7
Simultaneous Transmission Scenario (2.4 GHz Hotspot at 1.0 cm)

Simult Tx	Configuration	EVDO BC10 (§90S) SAR (W/kg)	2.4 GHz WLAN SAR (W/kg)	Σ SAR (W/kg)	Simult Tx	Configuration	EVDO BC0 (§22H) SAR (W/kg)	2.4 GHz WLAN SAR (W/kg)	Σ SAR (W/kg)
Body SAR	Back	0.809	0.145	**0.954**	Body SAR	Back	0.744	0.145	**0.889**
	Front	0.588	0.149	0.737		Front	0.472	0.149	0.621
	Top	-	0.148	0.148		Top	-	0.148	0.148
	Bottom	0.354	-	0.354		Bottom	0.320	-	0.320
	Right	0.869	-	0.869		Right	0.678	-	0.678
	Left	0.538	0.126	0.664		Left	0.415	0.126	0.541

Simult Tx	Configuration	PCS EVDO SAR (W/kg)	2.4 GHz WLAN SAR (W/kg)	Σ SAR (W/kg)	Simult Tx	Configuration	LTE Band 26 SAR (W/kg)	2.4 GHz WLAN SAR (W/kg)	Σ SAR (W/kg)
Body SAR	Back	1.026	0.145	**1.171**	Body SAR	Back	0.488	0.145	**0.633**
	Front	0.683	0.149	0.832		Front	0.305	0.149	0.454
	Top	-	0.148	0.148		Top	-	0.148	0.148
	Bottom	0.957	-	0.957		Bottom	0.239	-	0.239
	Right	0.328	-	0.328		Right	0.506	-	0.506
	Left	0.202	0.126	0.328		Left	0.302	0.126	0.428

Simult Tx	Configuration	LTE Band 25 (PCS) SAR (W/kg)	2.4 GHz WLAN SAR (W/kg)	Σ SAR (W/kg)	Simult Tx	Configuration	LTE Band 41 SAR (W/kg)	2.4 GHz WLAN SAR (W/kg)	Σ SAR (W/kg)
Body SAR	Back	0.865	0.145	**1.010**	Body SAR	Back	0.358	0.145	**0.503**
	Front	0.665	0.149	0.814		Front	0.323	0.149	0.472
	Top	-	0.148	0.148		Top	-	0.148	0.148
	Bottom	0.799	-	0.799		Bottom	0.310	-	0.310
	Right	0.293	-	0.293		Right	-	-	0.000
	Left	0.193	0.126	0.319		Left	0.214	0.126	0.340

Table 12-8
Simultaneous Transmission Scenario (5.8 GHz WIFI Direct GO at 1.0 cm)

Simult Tx	Configuration	EVDO BC10 (§90S) SAR (W/kg)	5.8 GHz WLAN SAR (W/kg)	Σ SAR (W/kg)	Simult Tx	Configuration	EVDO BC0 (§22H) SAR (W/kg)	5.8 GHz WLAN SAR (W/kg)	Σ SAR (W/kg)
Body SAR	Back	0.809	0.110	**0.919**	Body SAR	Back	0.744	0.110	**0.854**
	Front	0.588	0.031	0.619		Front	0.472	0.031	0.503
	Top	-	0.049	0.049		Top	-	0.049	0.049
	Bottom	0.354	-	0.354		Bottom	0.320	-	0.320
	Right	0.869	-	0.869		Right	0.678	-	0.678
	Left	0.538	0.111	0.649		Left	0.415	0.111	0.526
Simult Tx	Configuration	PCS EVDO SAR (W/kg)	5.8 GHz WLAN SAR (W/kg)	Σ SAR (W/kg)	Simult Tx	Configuration	LTE Band 26 SAR (W/kg)	5.8 GHz WLAN SAR (W/kg)	Σ SAR (W/kg)
Body SAR	Back	1.026	0.110	**1.136**	Body SAR	Back	0.488	0.110	**0.598**
	Front	0.683	0.031	0.714		Front	0.305	0.031	0.336
	Top	-	0.049	0.049		Top	-	0.049	0.049
	Bottom	0.957	-	0.957		Bottom	0.239	-	0.239
	Right	0.328	-	0.328		Right	0.506	-	0.506
	Left	0.202	0.111	0.313		Left	0.302	0.111	0.413
Simult Tx	Configuration	LTE Band 25 (PCS) SAR (W/kg)	5.8 GHz WLAN SAR (W/kg)	Σ SAR (W/kg)	Simult Tx	Configuration	LTE Band 41 SAR (W/kg)	5.8 GHz WLAN SAR (W/kg)	Σ SAR (W/kg)
Body SAR	Back	0.865	0.110	**0.975**	Body SAR	Back	0.358	0.110	**0.468**
	Front	0.665	0.031	0.696		Front	0.323	0.031	0.354
	Top	-	0.049	0.049		Top	-	0.049	0.049
	Bottom	0.799	-	0.799		Bottom	0.310	-	0.310
	Right	0.293	-	0.293		Right	-	-	0.000
	Left	0.193	0.111	0.304		Left	0.214	0.111	0.325

12.6 Simultaneous Transmission Conclusion

The above numerical summed SAR results for all the worst-case simultaneous transmission conditions were below the SAR limit. Therefore, the above analysis is sufficient to determine that simultaneous transmission cases will not exceed the SAR limit and therefore no measured volumetric simultaneous SAR summation is required per FCC KDB Publication 447498 D01v05 and IEEE 1528-2013 Section 6.3.4.1.2.

13 SAR MEASUREMENT VARIABILITY

13.1 Measurement Variability

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

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

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

Table 13-1
Body SAR Measurement Variability Results

BODY VARIABILITY RESULTS													
Band	FREQUENCY		Mode	Service	Side	Spacing	Measured SAR (1g)	1st Repeated SAR (1g)	Ratio	2nd Repeated SAR (1g)	Ratio	3rd Repeated SAR (1g)	Ratio
	MHz	Ch.					(W/kg)	(W/kg)		(W/kg)		(W/kg)	
835	820.10	564	CDMA BC10 (§90S)	EVDO Rev. 0	right	10 mm	0.830	0.851	1.03	N/A	N/A	N/A	N/A
1900	1908.75	1175	PCS CDMA	EVDO Rev. 0	back	10 mm	0.975	0.955	1.02	N/A	N/A	N/A	N/A
ANSI / IEEE C95.1 1992 - SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population						Body 1.6 W/kg (mW/g) averaged over 1 gram							

13.2 Measurement Uncertainty

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

14 EQUIPMENT LIST

Manufacturer	Model	Description	Cal Date	Cal Interval	Cal Due	Serial Number
Agilent	E4438C	ESG Vector Signal Generator	4/15/2014	Annual	4/15/2015	MY45090700
Agilent	8753E	(30kHz-6GHz) Network Analyzer	7/23/2013	Annual	7/23/2014	US37390350
Agilent	E5515C	Wireless Communications Test Set	10/18/2012	Biennial	10/18/2014	GB43193563
Agilent	8753ES	S-Parameter Network Analyzer	10/29/2013	Annual	10/29/2014	US39170122
Agilent	E5515C	Wireless Communications Test Set	5/9/2013	Biennial	5/9/2015	GB43304447
Agilent	N5182A	MXG Vector Signal Generator	4/15/2014	Annual	4/15/2015	MY47420800
Agilent	8648D	(9kHz-4GHz) Signal Generator	4/15/2014	Annual	4/15/2015	3629U00687
Agilent	E5515C	Wireless Communications Test Set	3/28/2014	Annual	3/28/2015	GB44400860
Agilent	8594A	(9kHz-2.9GHz) Spectrum Analyzer	N/A	N/A	N/A	3051A00187
Agilent	E5515C	Wireless Communications Test Set	3/18/2014	Annual	3/18/2015	GB46110872
Agilent	E8257D	(250kHz-20GHz) Signal Generator	4/15/2014	Annual	4/15/2015	MY45470194
Amplifier Research	15S1G6	Amplifier	CBT	N/A	CBT	433975
Amplifier Research	15S1G6	Amplifier	CBT	N/A	CBT	433976
Amplifier Research	15S1G6	Amplifier	CBT	N/A	CBT	433978
Amplifier Research	15S1G6	Amplifier	CBT	N/A	CBT	433971
Anritsu	MA24106A	USB Power Sensor	12/18/2013	Annual	12/18/2014	1344555
Anritsu	MA2411B	Pulse Power Sensor	11/14/2013	Annual	11/14/2014	1126066
Anritsu	MA24106A	USB Power Sensor	12/18/2013	Annual	12/18/2014	1344556
Anritsu	MA24106A	USB Power Sensor	12/18/2013	Annual	12/18/2014	1344545
Anritsu	MT8820C	Radio Communication Analyzer	6/28/2013	Annual	6/28/2014	6201240328
Anritsu	MA24106A	USB Power Sensor	12/18/2013	Annual	12/18/2014	1344559
Anritsu	ML2495A	Power Meter	10/31/2013	Annual	10/31/2014	1039008
Anritsu	MT8820C	Radio Communication Analyzer	5/6/2014	Annual	5/6/2015	6201144419
Anritsu	ML2469A	Power Meter	3/14/2014	Annual	3/14/2015	1306009
Anritsu	MA24106A	USB Power Sensor	1/3/2014	Annual	1/3/2015	1349509
Anritsu	MA24106A	USB Power Sensor	1/3/2014	Annual	1/3/2015	1349514
Anritsu	MA24106A	USB Power Sensor	1/3/2014	Annual	1/3/2015	1344554
Anritsu	MA24106A	USB Power Sensor	1/3/2014	Annual	1/3/2015	1349501
Anritsu	MA2481A	Power Sensor	10/30/2013	Annual	10/30/2014	5605
COMTech	AR85729-5	Solid State Amplifier	CBT	N/A	CBT	M1S5A00-009
COMTECH	AR85729-5/5759B	Solid State Amplifier	CBT	N/A	CBT	M3W1A00-1002
Gigatronics	8651A	Universal Power Meter	10/30/2013	Annual	10/30/2014	8650319
Gigatronics	80701A	(0.05-18GHz) Power Sensor	10/30/2013	Annual	10/30/2014	1833460
MCL	BW-N6W5+	6dB Attenuator	CBT	N/A	CBT	1139
MiniCircuits	VLF-6000+	Low Pass Filter	CBT	N/A	CBT	N/A
MiniCircuits	SLP-2400+	Low Pass Filter	CBT	N/A	CBT	R8979500903
MiniCircuits	VLF-6000+	Low Pass Filter	CBT	N/A	CBT	N/A
Mini-Circuits	NLP-1200+	Low Pass Filter DC to 1000 MHz	CBT	N/A	CBT	N/A
Mini-Circuits	BW-N20W5+	DC to 18 GHz Precision Fixed 20 dB Attenuator	CBT	N/A	CBT	N/A
Mini-Circuits	NLP-2950+	Low Pass Filter DC to 2700 MHz	CBT	N/A	CBT	N/A
Mini-Circuits	BW-N20W5	Power Attenuator	CBT	N/A	CBT	1226
Mitutoyo	CD-6"CSX	Digital Caliper	5/8/2014	Biennial	5/8/2016	13264162
Narda	BW-S3W2	Attenuator (3dB)	CBT	N/A	CBT	120
Narda	4772-3	Attenuator (3dB)	CBT	N/A	CBT	9406
Narda	4014C-6	4 - 8 GHz SMA 6 dB Directional Coupler	CBT	N/A	CBT	N/A
Pasternack	PE2209-10	Bidirectional Coupler	CBT	N/A	CBT	N/A
Pasternack	PE2208-6	Bidirectional Coupler	CBT	N/A	CBT	N/A
Rohde & Schwarz	CMW500	LTE Radio Communication Tester	10/4/2013	Annual	10/4/2014	108798
Rohde & Schwarz	SME06	Signal Generator	10/30/2013	Annual	10/30/2014	832026
Rohde & Schwarz	CMW500	LTE Radio Communication Tester	4/15/2014	Annual	4/15/2015	102060
Rohde & Schwarz	CMW500	LTE Radio Communication Tester	10/18/2013	Annual	10/18/2014	100976
Rohde & Schwarz	NRV-Z32	Peak Power Sensor	10/12/2012	Biennial	10/12/2014	836019/013
Rohde & Schwarz	CMW500	LTE Radio Communication Tester	10/4/2013	Biennial	10/4/2015	103962
Rohde & Schwarz	NRVD	Dual Channel Power Meter	10/12/2012	Biennial	10/12/2014	101695
Rohde & Schwarz	NRVS	Single Channel Power Meter	10/31/2013	Annual	10/31/2014	835360/0079
Rohde & Schwarz	CMU200	Base Station Simulator	6/6/2014	Annual	6/6/2015	109892
Seekonk	NC-100	Torque Wrench	3/18/2014	Biennial	3/18/2016	N/A
Seekonk	NC-100	Torque Wrench	3/18/2014	Biennial	3/18/2016	22313
Tektronix	RSA6114A	Real Time Spectrum Analyzer	4/16/2014	Annual	4/16/2015	B010177
VWR	23226-658	Long Stem Thermometer	7/11/2012	Biennial	7/11/2014	122389330
VWR	23226-658	Long Stem Thermometer	6/27/2012	Biennial	6/27/2014	122363923
VWR	36934-158	Wall-Mounted Thermometer	4/29/2014	Biennial	4/29/2016	111859332
VWR	36934-158	Wall-Mounted Thermometer	4/29/2014	Biennial	4/29/2016	111859323
VWR	36934-158	Wall-Mounted Thermometer	8/8/2013	Biennial	8/8/2015	130477877
VWR	36934-158	Wall-Mounted Thermometer	8/8/2013	Biennial	8/8/2015	130477866

Manufacturer	Model	Description	Cal Date	Cal Interval	Cal Due	Serial Number
SPEAG	DAK-3.5	Dielectric Assessment Kit	5/6/2014	Annual	5/6/2015	1070
SPEAG	DAK-3.5	Dielectric Assessment Kit	11/13/2013	Annual	11/13/2014	1091
SPEAG	DAKS-3.5	Portable Dielectric Assessment Kit	8/18/2013	Annual	8/18/2014	1008
SPEAG	DAKS-3.5	Portable Dielectric Assessment Kit	8/18/2013	Annual	8/18/2014	1009
SPEAG	D835V2	835 MHz SAR Dipole	4/7/2014	Annual	4/7/2015	4d119
SPEAG	D1900V2	1900 MHz SAR Dipole	7/22/2013	Annual	7/22/2014	5d149
SPEAG	D2450V2	2450 MHz SAR Dipole	1/21/2014	Annual	1/21/2015	797
SPEAG	D2600V2	2600 MHz SAR Dipole	4/8/2014	Annual	4/8/2015	1004
SPEAG	D5GHzV2	5 GHz SAR Dipole	1/27/2014	Annual	1/27/2015	1057
SPEAG	D835V2	835 MHz SAR Dipole	7/17/2013	Annual	7/17/2014	4d133
SPEAG	D1900V2	1900 MHz SAR Dipole	2/27/2014	Annual	2/27/2015	5d148
SPEAG	D2450V2	2450 MHz SAR Dipole	8/23/2013	Annual	8/23/2014	719
SPEAG	D5GHzV2	5 GHz SAR Dipole	9/23/2013	Annual	9/23/2014	1007
SPEAG	ES3DV3	SAR Probe	3/19/2014	Annual	3/19/2015	3209
SPEAG	ES3DV3	SAR Probe	4/17/2014	Annual	4/17/2015	3319
SPEAG	ES3DV3	SAR Probe	2/25/2014	Annual	2/25/2015	3258
SPEAG	ES3DV3	SAR Probe	11/22/2013	Annual	11/22/2014	3333
SPEAG	EX3DV4	SAR Probe	10/23/2013	Annual	10/23/2014	3914
SPEAG	ES3DV3	SAR Probe	4/11/2014	Annual	4/11/2015	3213
SPEAG	ES3DV3	SAR Probe	9/23/2013	Annual	9/23/2014	3288
SPEAG	EX3DV4	SAR Probe	12/18/2013	Annual	12/18/2014	3920
SPEAG	DAE4	Dasy Data Acquisition Electronics	3/17/2014	Annual	3/17/2015	1334
SPEAG	DAE4	Dasy Data Acquisition Electronics	4/11/2014	Annual	4/11/2015	1368
SPEAG	DAE4	Dasy Data Acquisition Electronics	2/26/2014	Annual	2/26/2015	665
SPEAG	DAE4	Dasy Data Acquisition Electronics	11/19/2013	Annual	11/19/2014	1408
SPEAG	DAE4	Dasy Data Acquisition Electronics	11/19/2013	Annual	11/19/2014	1333
SPEAG	DAE4	Dasy Data Acquisition Electronics	3/17/2014	Annual	3/17/2015	1364
SPEAG	DAE4	Dasy Data Acquisition Electronics	9/17/2013	Annual	9/17/2014	1323
SPEAG	DAE4	Dasy Data Acquisition Electronics	12/12/2013	Annual	12/12/2014	649

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

15 MEASUREMENT UNCERTAINTIES

Applicable for frequencies less than 3000 MHz.

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

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

Applicable for frequencies up to 6 GHz.

a	b	c	d	e= f(d,k)	f	g	h = c x f/e	i = c x g/e	k
Uncertainty Component	**IEEE 1528 Sec.**	**Tol. (± %)**	**Prob. Dist.**	**Div.**	**c_i 1gm**	**c_i 10 gms**	**1gm u_i (± %)**	**10gms u_i (± %)**	**v_i**
Measurement System									
Probe Calibration	E.2.1	6.55	N	1	1.0	1.0	6.6	6.6	∞
Axial Isotropy	E.2.2	0.25	N	1	0.7	0.7	0.2	0.2	∞
Hemishperical Isotropy	E.2.2	1.3	N	1	1.0	1.0	1.3	1.3	∞
Boundary Effect	E.2.3	0.4	N	1	1.0	1.0	0.4	0.4	∞
Linearity	E.2.4	0.3	N	1	1.0	1.0	0.3	0.3	∞
System Detection Limits	E.2.5	5.1	N	1	1.0	1.0	5.1	5.1	∞
Readout Electronics	E.2.6	1.0	N	1	1.0	1.0	1.0	1.0	∞
Response Time	E.2.7	0.8	R	1.73	1.0	1.0	0.5	0.5	∞
Integration Time	E.2.8	2.6	R	1.73	1.0	1.0	1.5	1.5	∞
RF Ambient Conditions	E.6.1	3.0	R	1.73	1.0	1.0	1.7	1.7	∞
Probe Positioner Mechanical Tolerance	E.6.2	0.4	R	1.73	1.0	1.0	0.2	0.2	∞
Probe Positioning w/ respect to Phantom	E.6.3	2.9	R	1.73	1.0	1.0	1.7	1.7	∞
Extrapolation, Interpolation & Integration algorithms for Max. SAR Evaluation	E.5	1.0	R	1.73	1.0	1.0	0.6	0.6	∞
Test Sample Related									
Test Sample Positioning	E.4.2	6.0	N	1	1.0	1.0	6.0	6.0	287
Device Holder Uncertainty	E.4.1	3.32	R	1.73	1.0	1.0	1.9	1.9	∞
Output Power Variation - SAR drift measurement	6.6.2	5.0	R	1.73	1.0	1.0	2.9	2.9	∞
Phantom & Tissue Parameters									
Phantom Uncertainty (Shape & Thickness tolerances)	E.3.1	4.0	R	1.73	1.0	1.0	2.3	2.3	∞
Liquid Conductivity - deviation from target values	E.3.2	5.0	R	1.73	0.64	0.43	1.8	1.2	∞
Liquid Conductivity - measurement uncertainty	E.3.3	3.8	N	1	0.64	0.43	2.4	1.6	6
Liquid Permittivity - deviation from target values	E.3.2	5.0	R	1.73	0.60	0.49	1.7	1.4	∞
Liquid Permittivity - measurement uncertainty	E.3.3	4.5	N	1	0.60	0.49	2.7	2.2	6
Combined Standard Uncertainty (k=1)			RSS				12.4	12.0	299
Expanded Uncertainty (95% CONFIDENCE LEVEL)			k=2				24.7	24.0	

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

16 CONCLUSION

16.1 Measurement Conclusion

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

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

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APPENDIX A: SAR TEST DATA

PCTEST ENGINEERING LABORATORY, INC.

DUT: ZNFLS885; Type: Portable Handset; Serial: 885-1

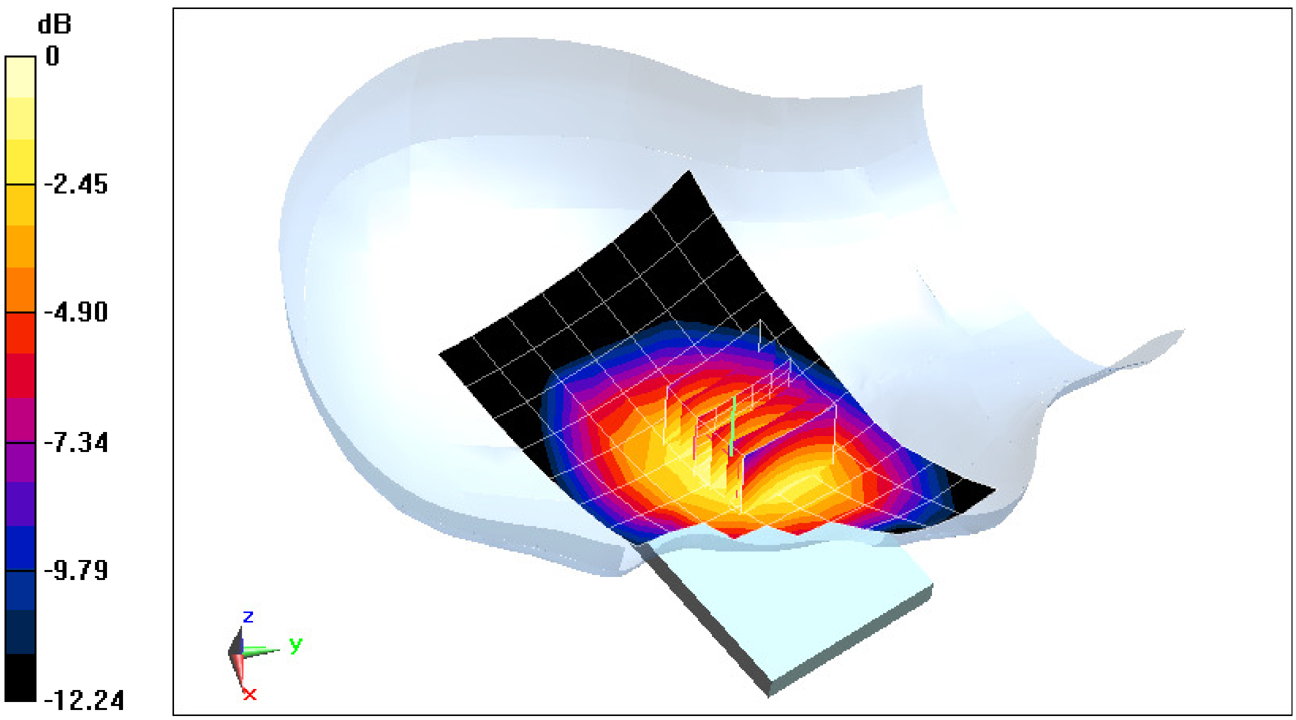
Communication System: UID 0, CDMA; Frequency: 820.1 MHz;Duty Cycle: 1:1
Medium: 835 Head Medium parameters used (interpolated):
f = 820.1 MHz; σ = 0.904 S/m; ε_r = 42.706; ρ = 1000 kg/m^3
Phantom section: Right Section

Test Date: 06-10-2014; Ambient Temp: 24.2°C; Tissue Temp: 23.7°C

Probe: ES3DV3 - SN3209; ConvF(6.23, 6.23, 6.23); Calibrated: 3/19/2014;
Sensor-Surface: 3mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1334; Calibrated: 3/17/2014
Phantom: SAM front; Type: QD000P40CD; Serial: TP:1759
Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Mode: Cell BC10 (§90S) EVDO Rev. A, Right Head, Cheek, Mid.ch

Area Scan (8x13x1): Measurement grid: dx=15mm, dy=15mm
Zoom Scan (6x6x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 24.97 V/m; Power Drift = 0.02 dB
Peak SAR (extrapolated) = 0.629 W/kg
SAR(1 g) = 0.495 W/kg



0 dB = 0.540 W/kg = -2.68 dBW/kg

PCTEST ENGINEERING LABORATORY, INC.

DUT: ZNFLS885; Type: Portable Handset; Serial: 885-1

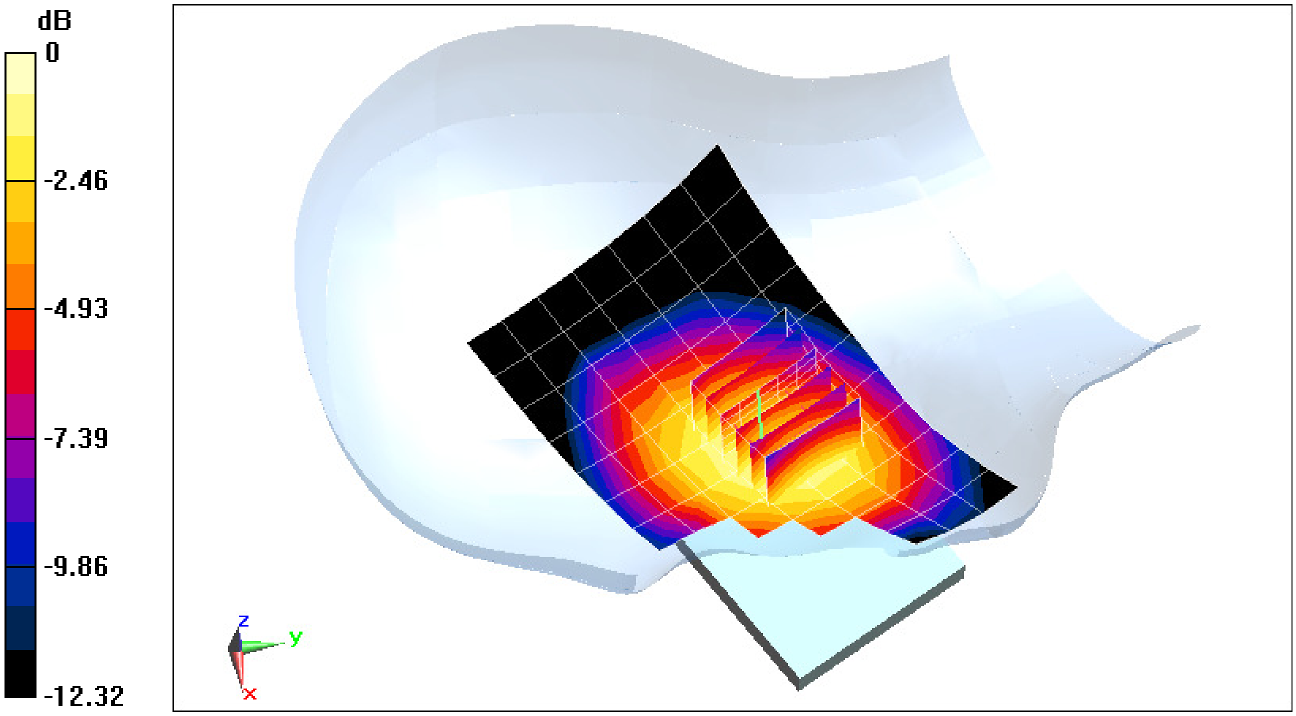
Communication System: UID 0, CDMA; Frequency: 836.52 MHz;Duty Cycle: 1:1
Medium: 835 Head Medium parameters used (interpolated):
f = 836.52 MHz; σ = 0.92 S/m; ε_r = 42.467; ρ = 1000 kg/m^3
Phantom section: Right Section

Test Date: 06-10-2014; Ambient Temp: 24.2°C; Tissue Temp: 23.7°C

Probe: ES3DV3 - SN3209; ConvF(6.23, 6.23, 6.23); Calibrated: 3/19/2014;
Sensor-Surface: 3mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1334; Calibrated: 3/17/2014
Phantom: SAM front; Type: QD000P40CD; Serial: TP:1759
Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Mode: Cell BC0 (§22H) EVDO Rev. A, Right Head, Cheek, Mid.ch

Area Scan (8x13x1): Measurement grid: dx=15mm, dy=15mm
Zoom Scan (6x6x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 23.39 V/m; Power Drift = 0.03 dB
Peak SAR (extrapolated) = 0.557 W/kg
SAR(1 g) = 0.436 W/kg



0 dB = 0.475 W/kg = -3.23 dBW/kg

PCTEST ENGINEERING LABORATORY, INC.

DUT: ZNFLS885; Type: Portable Handset; Serial: 885-1

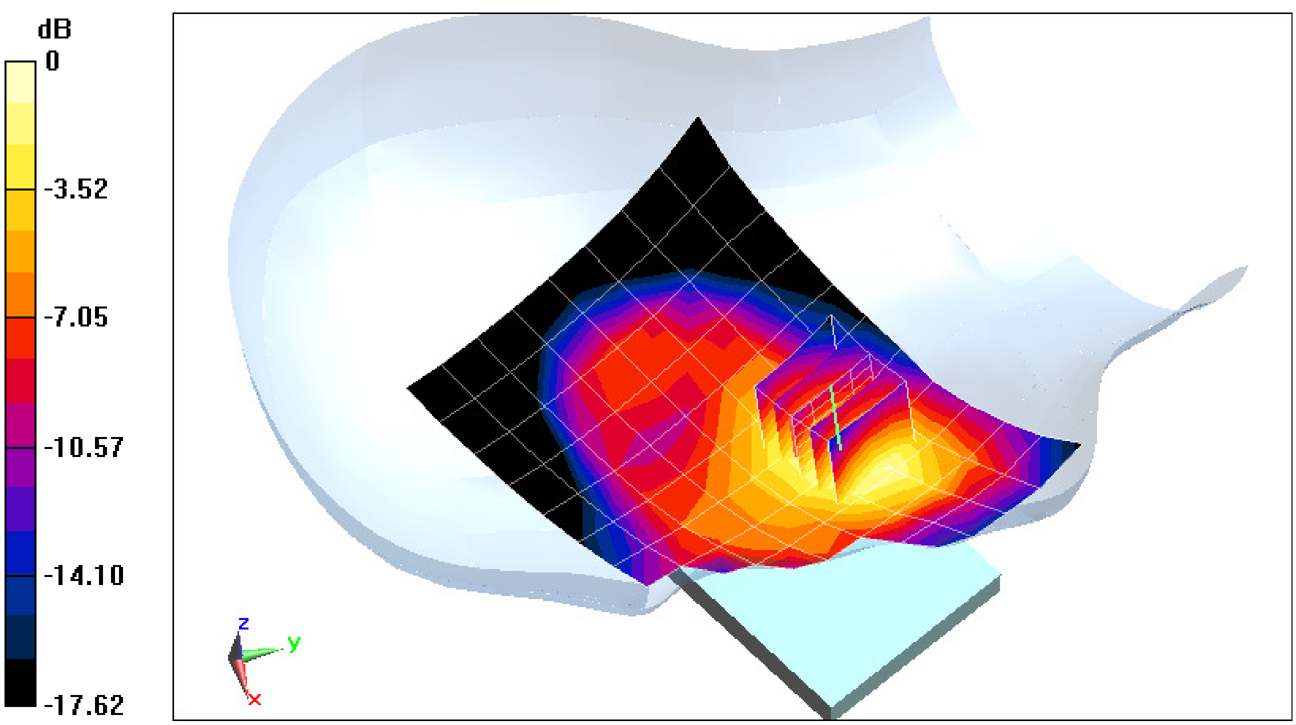
Communication System: UID 0, CDMA; Frequency: 1880 MHz;Duty Cycle: 1:1
Medium: 1900 Head Medium parameters used:
f = 1880 MHz; σ = 1.368 S/m; ε_r = 39.402; ρ = 1000 kg/m^3
Phantom section: Right Section

Test Date: 06-11-2014; Ambient Temp: 23.6°C; Tissue Temp: 23.9°C

Probe: ES3DV3 - SN3319; ConvF(5.05, 5.05, 5.05); Calibrated: 4/17/2014;
Sensor-Surface: 3mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1368; Calibrated: 4/11/2014
Phantom: SAM; Type: QD000P40CD; Serial: TP:1758
Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Mode: PCS EVDO Rev. A, 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 = 22.70 V/m; Power Drift = -0.05 dB
Peak SAR (extrapolated) = 0.937 W/kg
SAR(1 g) = 0.619 W/kg



0 dB = 0.713 W/kg = -1.47 dBW/kg

PCTEST ENGINEERING LABORATORY, INC.

DUT: ZNFLS885; Type: Portable Handset; Serial: 885-2

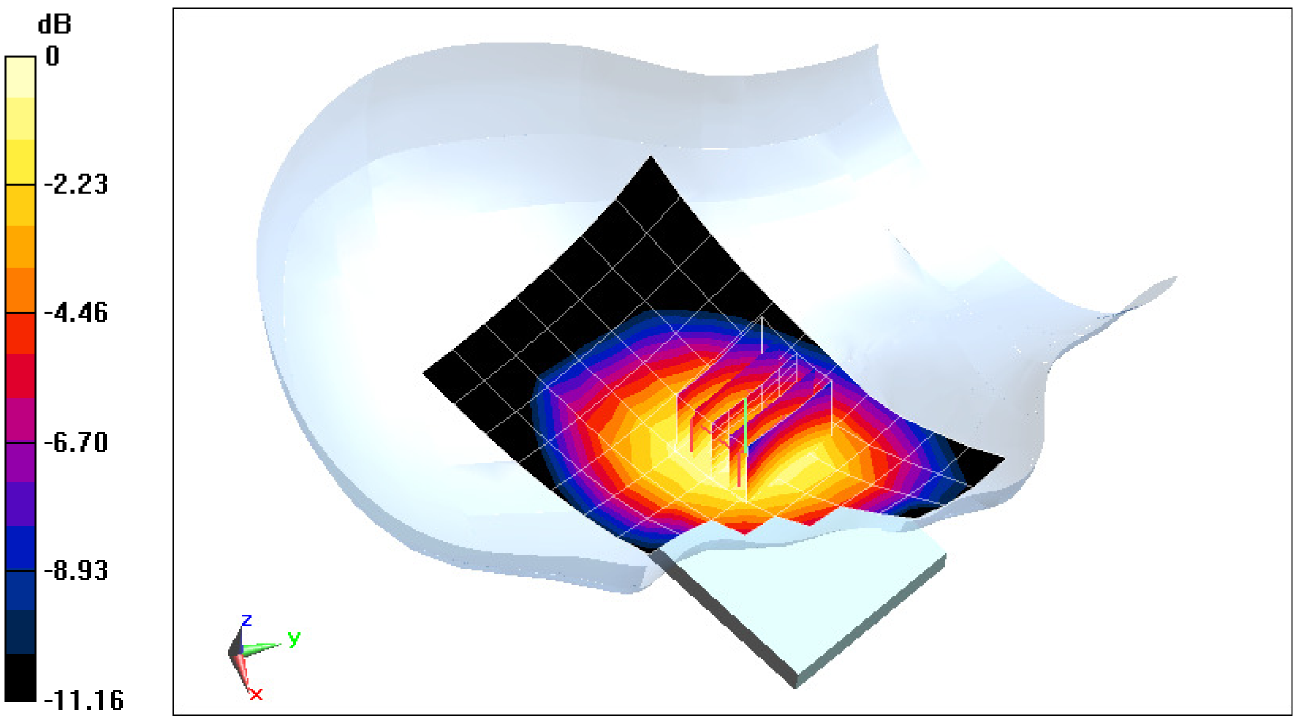
Communication System: UID 0, LTE Band 26; Frequency: 844 MHz;Duty Cycle: 1:1
Medium: 835 Head Medium parameters used (interpolated):
f = 844 MHz; σ = 0.927 S/m; ε_r = 42.388; ρ = 1000 kg/m^3
Phantom section: Right Section

Test Date: 06-10-2014; Ambient Temp: 24.2°C; Tissue Temp: 23.7°C

Probe: ES3DV3 - SN3209; ConvF(6.23, 6.23, 6.23); Calibrated: 3/19/2014;
Sensor-Surface: 3mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1334; Calibrated: 3/17/2014
Phantom: SAM front; Type: QD000P40CD; Serial: TP:1759
Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Mode: LTE Band 26 (Cell.), Right Head, Cheek, High.ch,
10 MHz Bandwidth, QPSK, 1 RB, 25 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 = 19.81 V/m; Power Drift = 0.04 dB
Peak SAR (extrapolated) = 0.411 W/kg
SAR(1 g) = 0.320 W/kg



0 dB = 0.348 W/kg = -4.58 dBW/kg

PCTEST ENGINEERING LABORATORY, INC.

DUT: ZNFLS885; Type: Portable Handset; Serial: 885-2

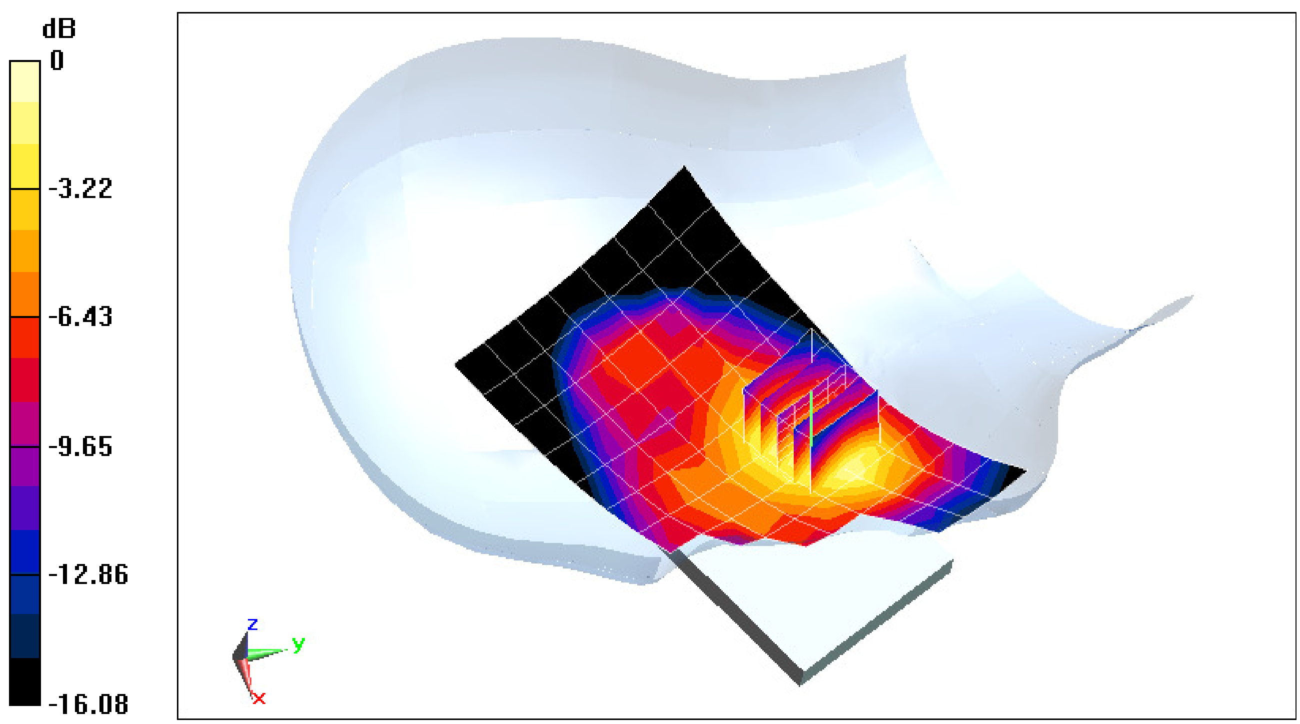
Communication System: UID 0, LTE Band 25 (PCS); Frequency: 1882.5 MHz;Duty Cycle: 1:1
Medium: 1900 Head Medium parameters used (interpolated):
f = 1882.5 MHz; σ = 1.371 S/m; ε_r = 39.39; ρ = 1000 kg/m^3
Phantom section: Right Section

Test Date: 06-11-2014; Ambient Temp: 23.6°C; Tissue Temp: 23.9°C

Probe: ES3DV3 - SN3319; ConvF(5.05, 5.05, 5.05); Calibrated: 4/17/2014;
Sensor-Surface: 3mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1368; Calibrated: 4/11/2014
Phantom: SAM; Type: QD000P40CD; Serial: TP:1758
Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Mode: LTE Band 25 (PCS), 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 (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 22.18 V/m; Power Drift = 0.01 dB
Peak SAR (extrapolated) = 0.843 W/kg
SAR(1 g) = 0.563 W/kg



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

PCTEST ENGINEERING LABORATORY, INC.

DUT: ZNFLS885; Type: Portable Handset; Serial: 885-2

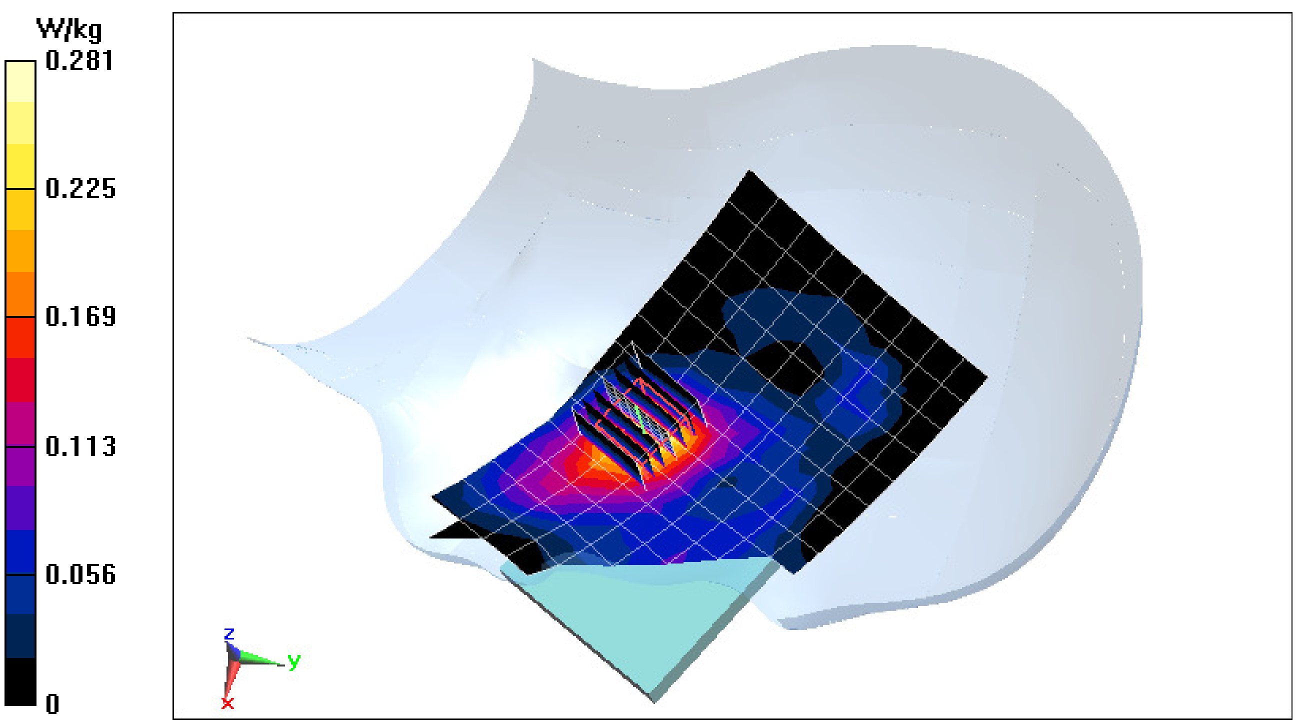
Communication System: UID 0, LTE Band 41; Frequency: 2680 MHz;Duty Cycle: 1:1.59
Medium: 2600 Head Medium parameters used (interpolated):
f = 2680 MHz; σ = 2.008 S/m; ε_r = 38.383; ρ = 1000 kg/m^3
Phantom section: Left Section

Test Date: 06-11-2014; Ambient Temp: 24.5°C; Tissue Temp: 23.3°C

Probe: ES3DV3 - SN3333; ConvF(4.28, 4.28, 4.28); Calibrated: 11/22/2013;
Sensor-Surface: 3mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1408; Calibrated: 11/19/2013
Phantom: SAM with CRP v4.0; Type: QD000P40CD; Serial: TP:1797
Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Mode: 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 (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 12.41 V/m; Power Drift = -0.03 dB
Peak SAR (extrapolated) = 0.389 W/kg
SAR(1 g) = 0.224 W/kg



PCTEST ENGINEERING LABORATORY, INC.

DUT: ZNFLS885; Type: Portable Handset; Serial: 885-19

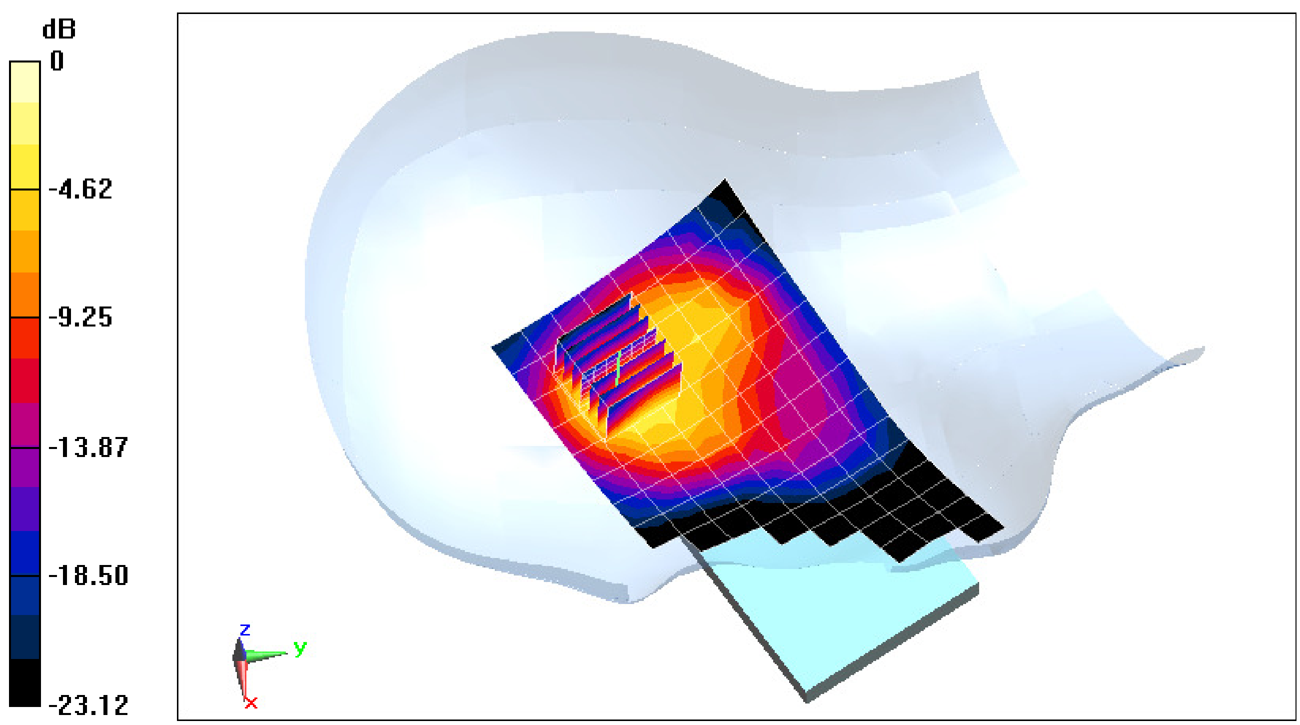
Communication System: UID 0, IEEE 802.11b; Frequency: 2437 MHz;Duty Cycle: 1:1
Medium: 2450 Head Medium parameters used (interpolated):
f = 2437 MHz; σ = 1.729 S/m; ε_r = 39.99; ρ = 1000 kg/m^3
Phantom section: Right Section

Test Date: 06-17-2014; Ambient Temp: 22.5°C; Tissue Temp: 21.8°C

Probe: ES3DV3 - SN3258; ConvF(4.52, 4.52, 4.52); Calibrated: 2/25/2014;
Sensor-Surface: 3mm (Mechanical Surface Detection)
Electronics: DAE4 Sn665; Calibrated: 2/26/2014
Phantom: SAM Front; Type: SAM; Serial: 1686
Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Mode: IEEE 802.11b, Right Head, Cheek, Ch 06, 1 Mbps

Area Scan (9x16x1): Measurement grid: dx=12mm, dy=12mm
Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 16.07 V/m; Power Drift = 0.07 dB
Peak SAR (extrapolated) = 0.917 W/kg
SAR(1 g) = 0.465 W/kg



0 dB = 0.598 W/kg = -2.23 dBW/kg

PCTEST ENGINEERING LABORATORY, INC.

DUT: ZNFLS885; Type: Portable Handset; Serial: 885-19

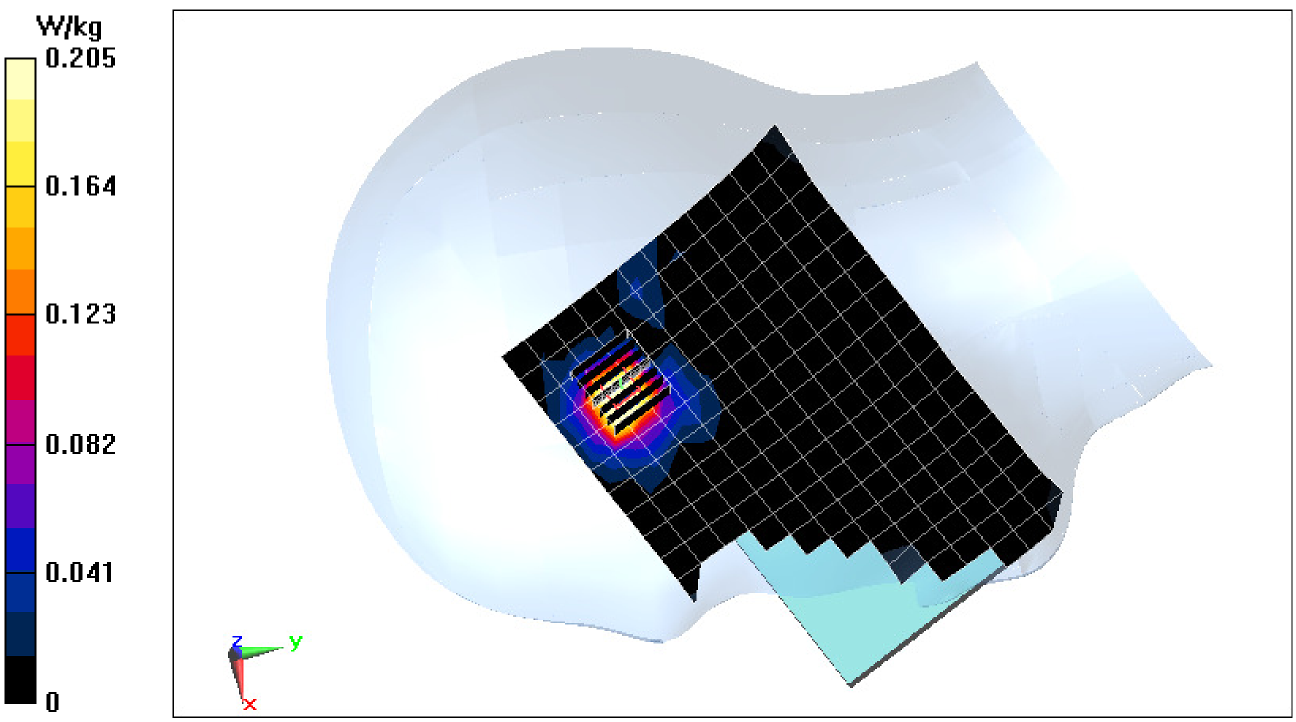
Communication System: UID 0, IEEE 802.11a; Frequency: 5785 MHz;Duty Cycle: 1:1
Medium: 5 GHz Head Medium parameters used:
f = 5785 MHz; σ = 5.217 S/m; ε_r = 36.91; ρ = 1000 kg/m^3
Phantom section: Right Section

Test Date: 06-19-2014; Ambient Temp: 24.5°C; Tissue Temp: 24.3°C

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

Mode: IEEE 802.11a, 5.8 GHz, Right Head, Cheek, Ch 157, 6 Mbps

Area Scan (13x22x1): Measurement grid: dx=10mm, dy=10mm
Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm; Graded Ratio: 1.4
Reference Value = 2.876 V/m; Power Drift = 0.12 dB
Peak SAR (extrapolated) = 0.783 W/kg
SAR(1 g) = 0.060 W/kg



PCTEST ENGINEERING LABORATORY, INC.

DUT: ZNFLS885; Type: Portable Handset; Serial: 885-19

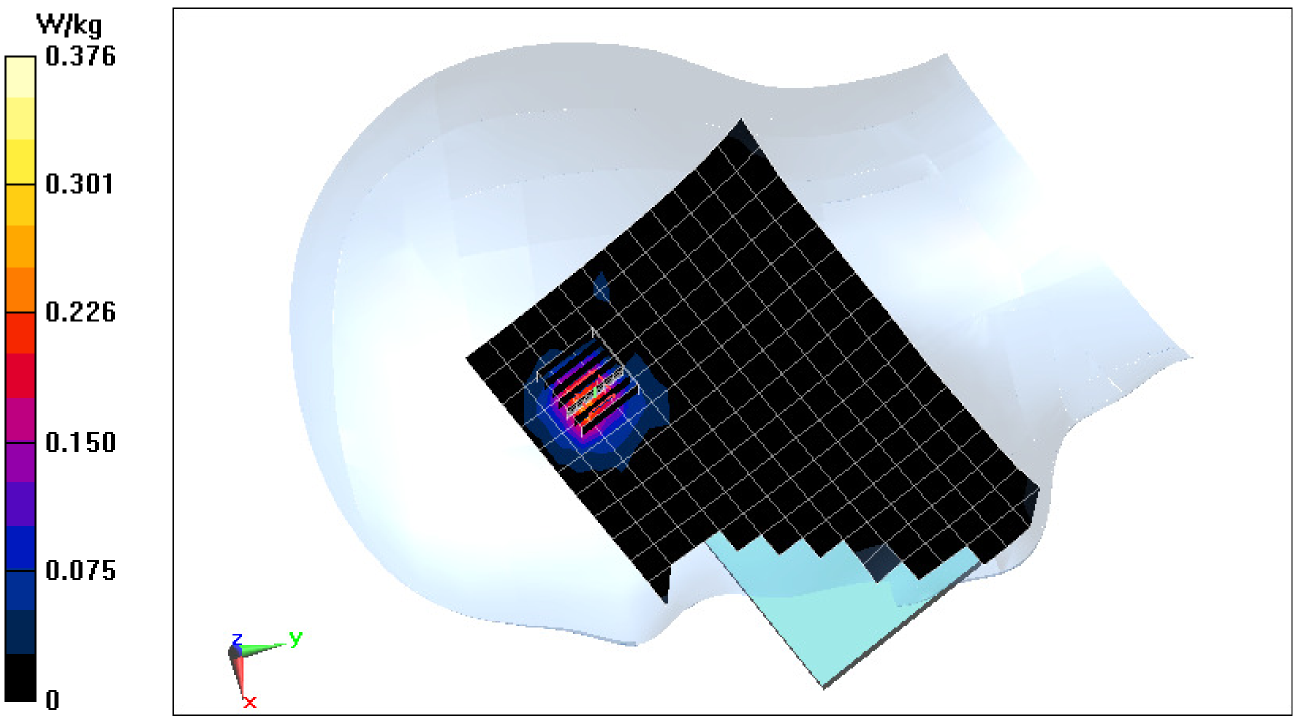
Communication System: UID 0, IEEE 802.11a; Frequency: 5260 MHz;Duty Cycle: 1:1
Medium: 5 GHz Head Medium parameters used:
f = 5260 MHz; σ = 4.695 S/m; ε_r = 37.519; ρ = 1000 kg/m^3
Phantom section: Right Section

Test Date: 06-19-2014; Ambient Temp: 24.4°C; Tissue Temp: 24.4°C

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

Mode: IEEE 802.11a, 5.3 GHz, Right Head, Cheek, Ch 52, 6 Mbps

Area Scan (13x22x1): Measurement grid: dx=10mm, dy=10mm
Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm; Graded Ratio: 1.4
Reference Value = 4.555 V/m; Power Drift = -0.17 dB
Peak SAR (extrapolated) = 0.794 W/kg
SAR(1 g) = 0.144 W/kg



PCTEST ENGINEERING LABORATORY, INC.

DUT: ZNFLS885; Type: Portable Handset; Serial: 885-1

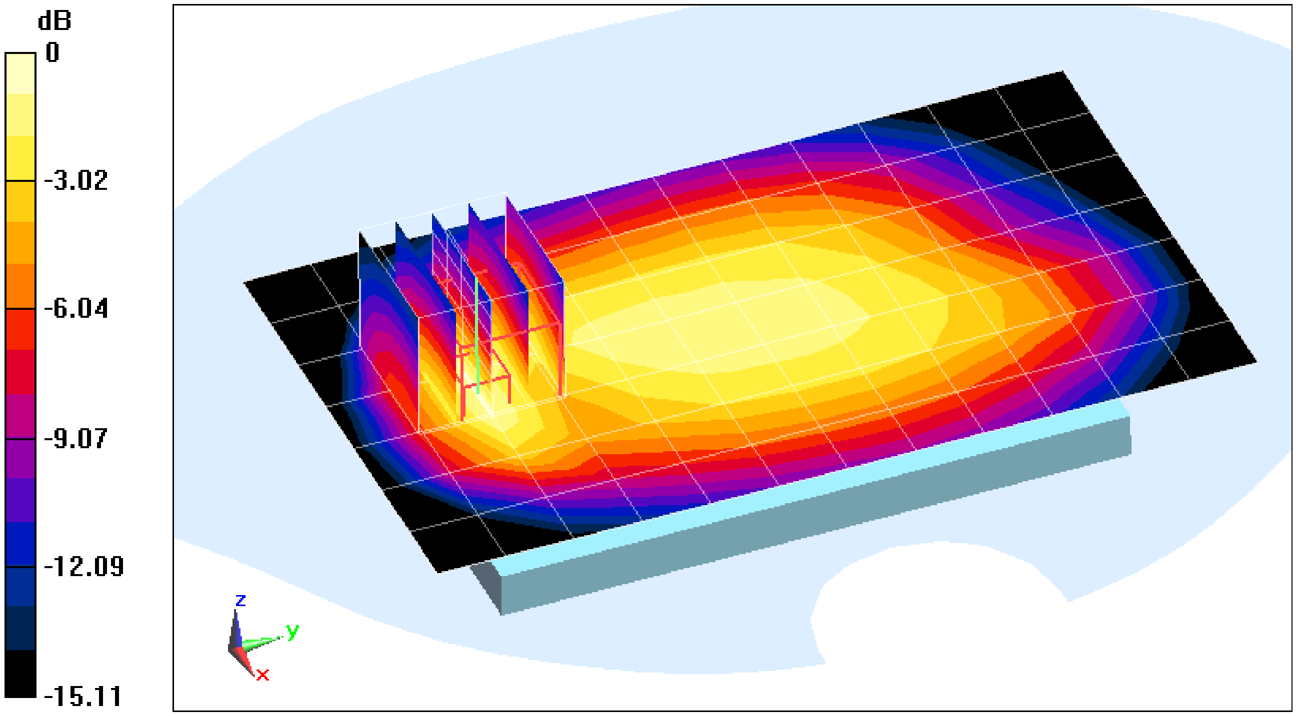
Communication System: UID 0, Cellular CDMA; Frequency: 820.1 MHz;Duty Cycle: 1:1
Medium: 835 Body Medium parameters used (interpolated):
f = 820.1 MHz; σ = 0.959 S/m; ε_r = 53.499; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 06-10-2014; Ambient Temp: 19.8°C; Tissue Temp: 19.8°C

Probe: ES3DV3 - SN3213; ConvF(6.18, 6.18, 6.18); Calibrated: 4/11/2014;
Sensor-Surface: 3mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1364; Calibrated: 3/17/2014
Phantom: SAM Sub; Type: SAM 4.0; Serial: TP-1357
Measurement SW: DASY4, Version 4.7 (80); SEMCAD X Version 14.6.10 (7331)

Mode: Cell BC10 (§90S) CDMA, 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 = 32.26 V/m; Power Drift = -0.03 dB
Peak SAR (extrapolated) = 1.40 W/kg
SAR(1 g) = 0.783 W/kg



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

PCTEST ENGINEERING LABORATORY, INC.

DUT: ZNFLS885; Type: Portable Handset; Serial: 885-1

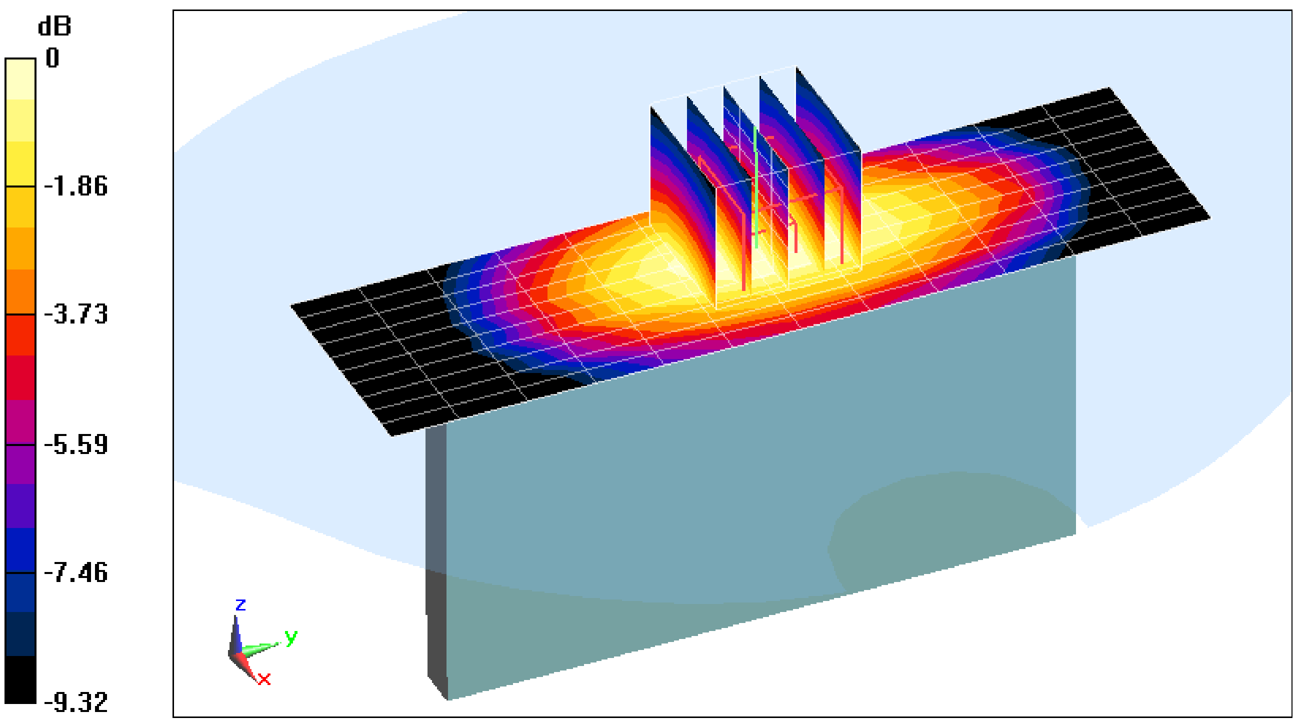
Communication System: UID 0, Cellular CDMA; Frequency: 820.1 MHz;Duty Cycle: 1:1
Medium: 835 Body Medium parameters used (interpolated):
f = 820.1 MHz; σ = 0.959 S/m; ε_r = 53.499; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 06-10-2014; Ambient Temp: 19.8°C; Tissue Temp: 19.8°C

Probe: ES3DV3 - SN3213; ConvF(6.18, 6.18, 6.18); Calibrated: 4/11/2014;
Sensor-Surface: 3mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1364; Calibrated: 3/17/2014
Phantom: SAM Sub; Type: SAM 4.0; Serial: TP-1357
Measurement SW: DASY4, Version 4.7 (80); SEMCAD X Version 14.6.10 (7331)

Mode: Cell BC10 (§90S) EVDO Rev. 0, Body SAR, Right Edge, Mid.ch

Area Scan (11x13x1): Measurement grid: dx=5mm, dy=15mm
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 33.03 V/m; Power Drift = -0.03 dB
Peak SAR (extrapolated) = 1.19 W/kg
SAR(1 g) = 0.851 W/kg



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

PCTEST ENGINEERING LABORATORY, INC.

DUT: ZNFLS885; Type: Portable Handset; Serial: 885-1

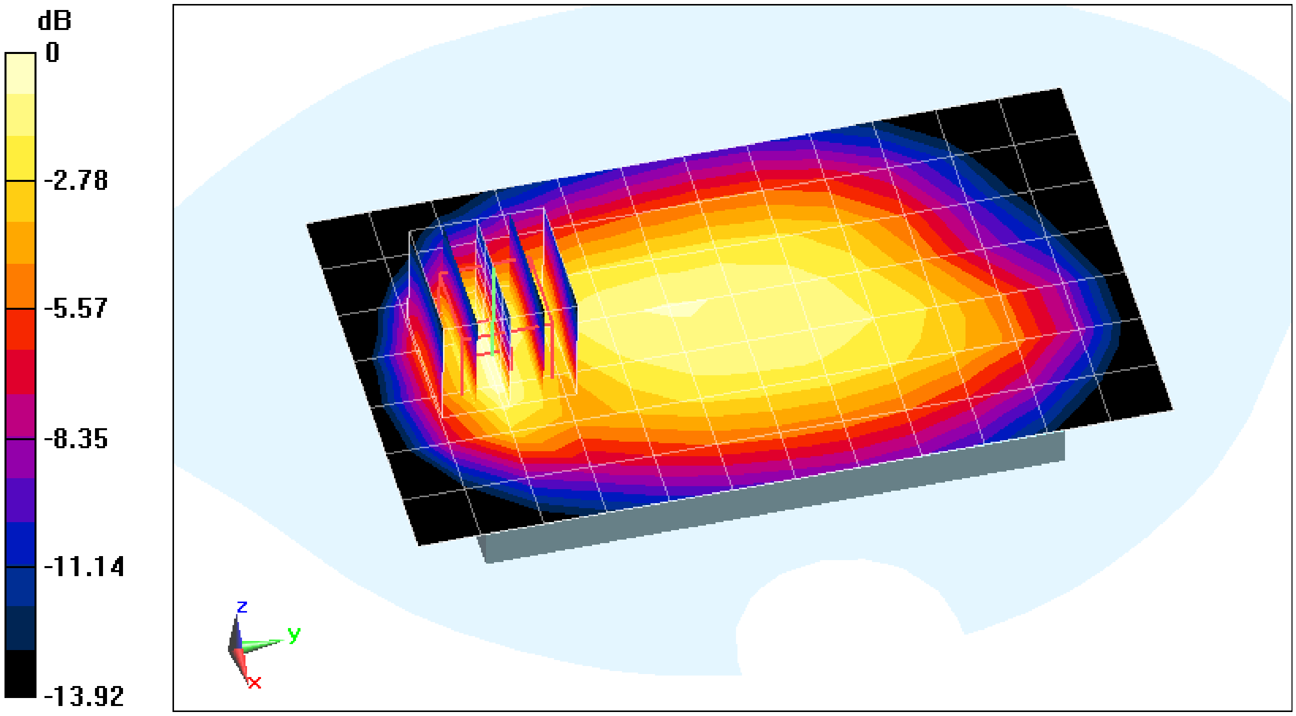
Communication System: UID 0, Cellular CDMA; Frequency: 836.52 MHz;Duty Cycle: 1:1
Medium: 835 Body Medium parameters used (interpolated):
$f = 836.52$ MHz; $\sigma = 0.978$ S/m; $\varepsilon_r = 53.294$; $\rho = 1000$ kg/m^3
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 06-10-2014; Ambient Temp: 19.8°C; Tissue Temp: 19.8°C

Probe: ES3DV3 - SN3213; ConvF(6.18, 6.18, 6.18); Calibrated: 4/11/2014;
Sensor-Surface: 3mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1364; Calibrated: 3/17/2014
Phantom: SAM Sub; Type: SAM 4.0; Serial: TP-1357
Measurement SW: DASY4, Version 4.7 (80); SEMCAD X Version 14.6.10 (7331)

Mode: Cell BC0 (§22H) CDMA, 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 = 30.92 V/m; Power Drift = 0.01 dB
Peak SAR (extrapolated) = 1.31 W/kg
SAR(1 g) = 0.736 W/kg



0 dB = 0.920 W/kg = -0.36 dBW/kg

PCTEST ENGINEERING LABORATORY, INC.

DUT: ZNFLS885; Type: Portable Handset; Serial: 885-1

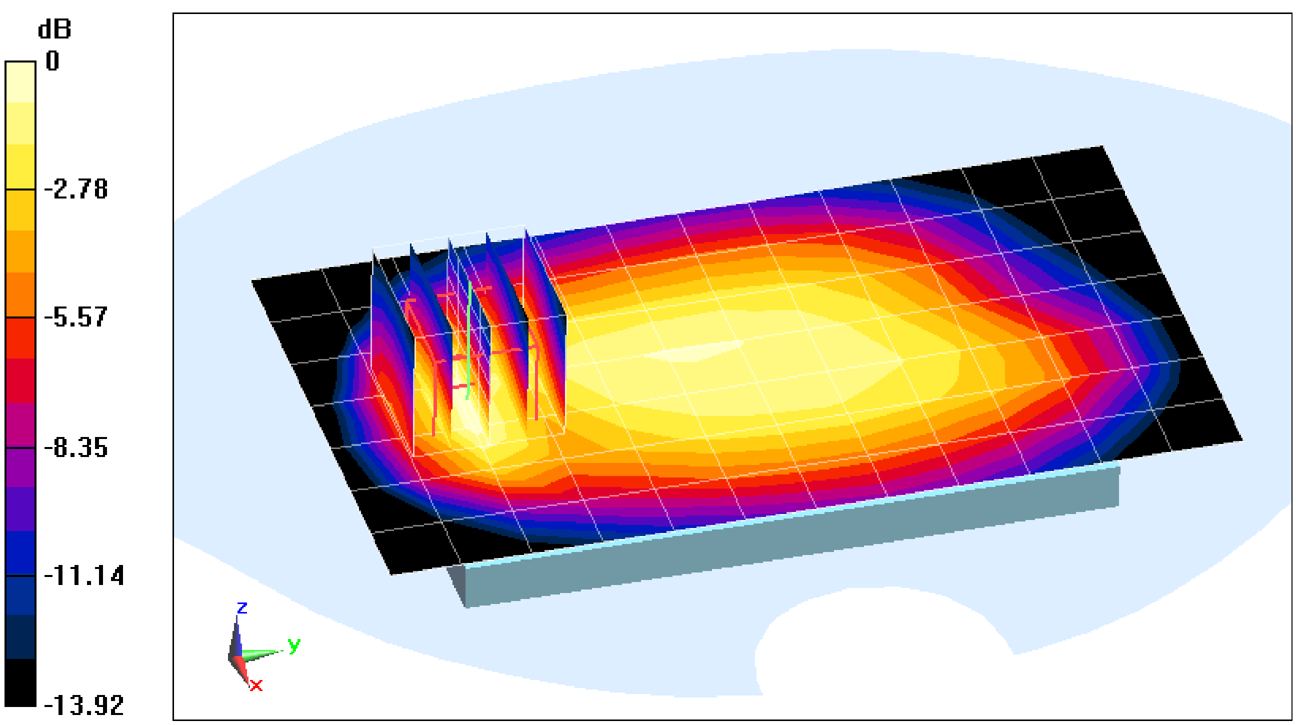
Communication System: UID 0, Cellular CDMA; Frequency: 836.52 MHz;Duty Cycle: 1:1
Medium: 835 Body Medium parameters used (interpolated):
f = 836.52 MHz; σ = 0.978 S/m; ε_r = 53.294; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 06-10-2014; Ambient Temp: 19.8°C; Tissue Temp: 19.8°C

Probe: ES3DV3 - SN3213; ConvF(6.18, 6.18, 6.18); Calibrated: 4/11/2014;
Sensor-Surface: 3mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1364; Calibrated: 3/17/2014
Phantom: SAM Sub; Type: SAM 4.0; Serial: TP-1357
Measurement SW: DASY4, Version 4.7 (80); SEMCAD X Version 14.6.10 (7331)

Mode: Cell BC0 (§22H) EVDO Rev. 0, 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 = 31.03 V/m; Power Drift = 0.02 dB
Peak SAR (extrapolated) = 1.32 W/kg
SAR(1 g) = 0.739 W/kg



0 dB = 0.924 W/kg = -0.34 dBW/kg

PCTEST ENGINEERING LABORATORY, INC.

DUT: ZNFLS885; Type: Portable Handset; Serial: 885-1

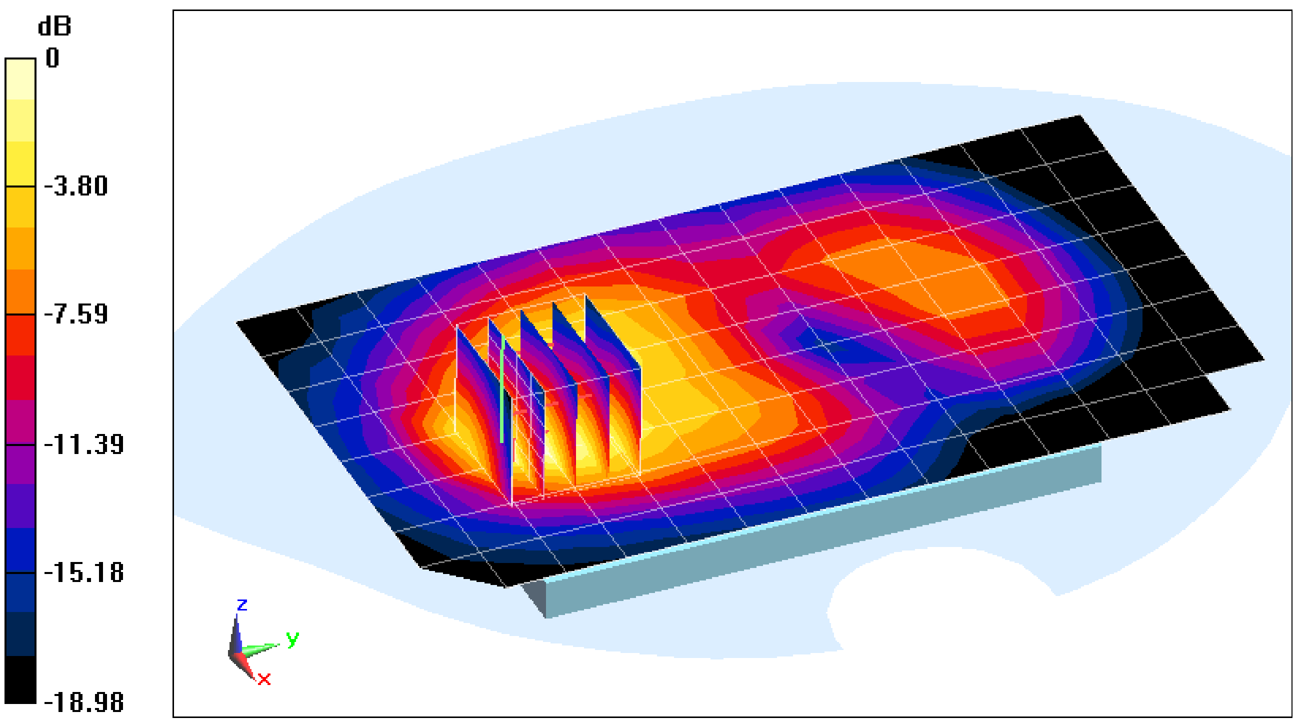
Communication System: UID 0, PCS CDMA; Frequency: Frequency: 1908.75 MHz;Duty Cycle: 1:1
Medium: 1900 Body Medium parameters used (interpolated):
f = 1908.75 MHz; σ = 1.55 S/m; ε_r = 52.061; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 06-10-2014; Ambient Temp: 23.1°C; Tissue Temp: 22.5°C

Probe: ES3DV3 - SN3288; ConvF(4.82, 4.82, 4.82); Calibrated: 9/23/2013;
Sensor-Surface: 4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1323; Calibrated: 9/17/2013
Phantom: SAM Sub Dasy B; Type: SAM 5.0; Serial: TP-1626
Measurement SW: DASY4, Version 4.7 (80); 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 = 26.75 V/m; Power Drift = 0.09 dB
Peak SAR (extrapolated) = 1.83 W/kg
SAR(1 g) = 0.942 W/kg



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

DUT: ZNFLS885; Type: Portable Handset; Serial: 885-1

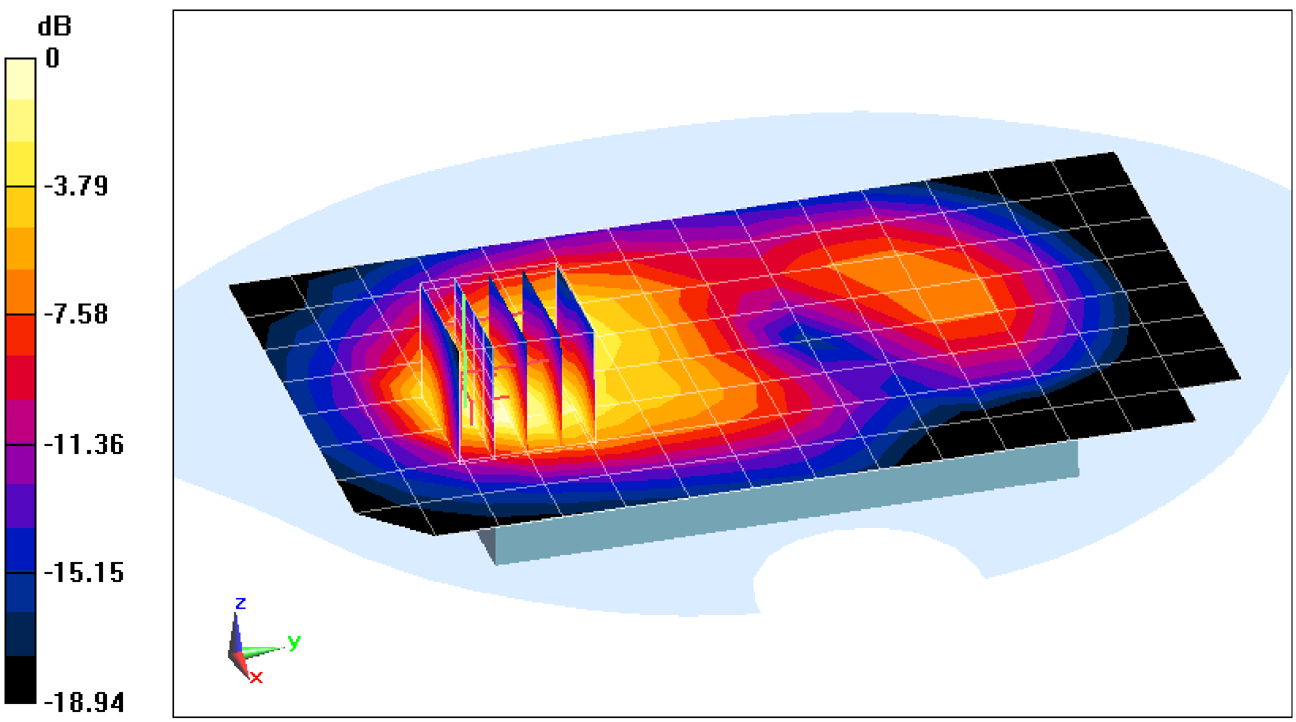
Communication System: UID 0, PCS CDMA; Frequency: 1908.75 MHz;Duty Cycle: 1:1
Medium: 1900 Body Medium parameters used (interpolated):
f = 1908.75 MHz; σ = 1.55 S/m; ε_r = 52.061; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 06-10-2014; Ambient Temp: 23.1°C; Tissue Temp: 22.5°C

Probe: ES3DV3 - SN3288; ConvF(4.82, 4.82, 4.82); Calibrated: 9/23/2013;
Sensor-Surface: 4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1323; Calibrated: 9/17/2013
Phantom: SAM Sub Dasy B; Type: SAM 5.0; Serial: TP-1626
Measurement SW: DASY4, Version 4.7 (80); SEMCAD X Version 14.6.10 (7331)

Mode: PCS EVDO Rev. 0, 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 = 26.85 V/m; Power Drift = 0.16 dB
Peak SAR (extrapolated) = 1.89 W/kg
SAR(1 g) = 0.975 W/kg



0 dB = 1.07 W/kg = 0.29 dBW/kg

PCTEST ENGINEERING LABORATORY, INC.

DUT: ZNFLS885; Type: Portable Handset; Serial: 885-2

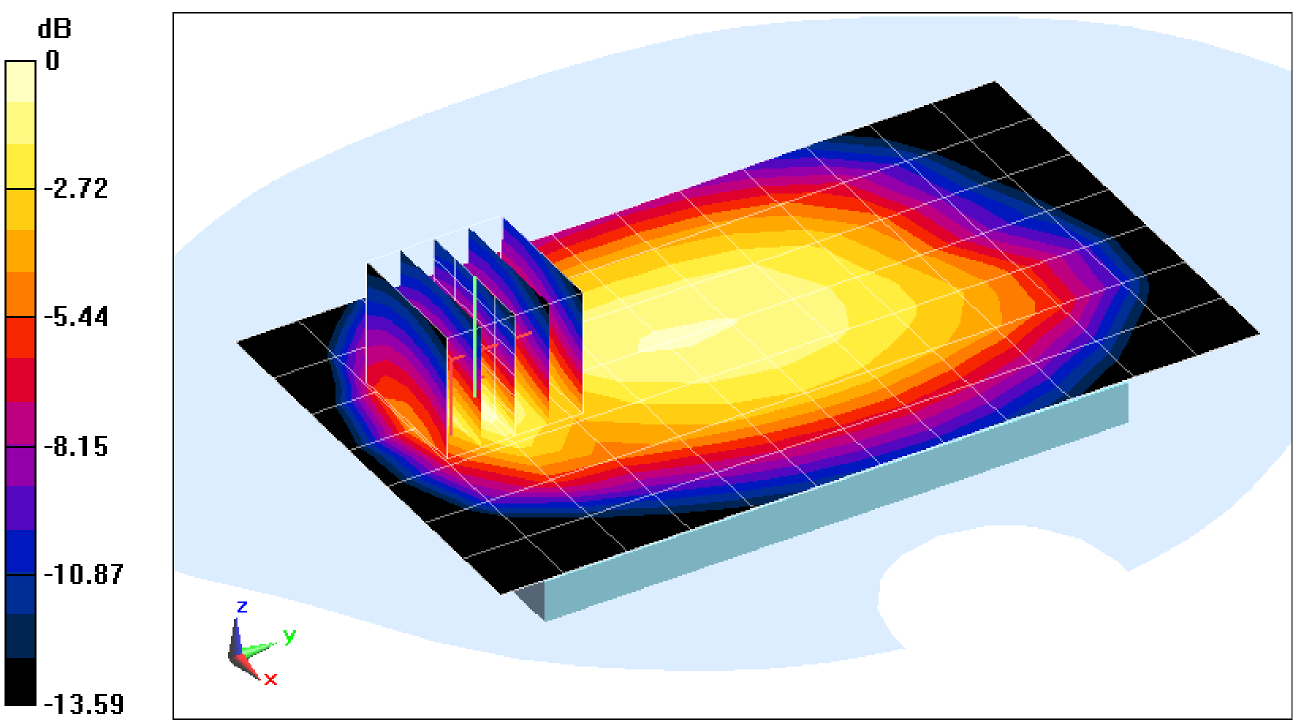
Communication System: UID 0, LTE Band 26; Frequency: 844 MHz;Duty Cycle: 1:1
Medium: 835 Body Medium parameters used (interpolated):
f = 844 MHz; σ = 0.986 S/m; ε_r = 53.228; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 06-10-2014; Ambient Temp: 19.8°C; Tissue Temp: 19.8°C

Probe: ES3DV3 - SN3213; ConvF(6.18, 6.18, 6.18); Calibrated: 4/11/2014;
Sensor-Surface: 3mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1364; Calibrated: 3/17/2014
Phantom: SAM Sub; Type: SAM 4.0; Serial: TP-1357
Measurement SW: DASY4, Version 4.7 (80); SEMCAD X Version 14.6.10 (7331)

Mode: LTE Band 26, Body SAR, Back side, High.ch, 10 MHz Bandwidth, QPSK, 1 RB, 25 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 = 23.55 V/m; Power Drift = 0.07 dB
Peak SAR (extrapolated) = 0.858 W/kg
SAR(1 g) = 0.487 W/kg



0 dB = 0.594 W/kg = -2.26 dBW/kg

PCTEST ENGINEERING LABORATORY, INC.

DUT: ZNFLS885; Type: Portable Handset; Serial: 885-2

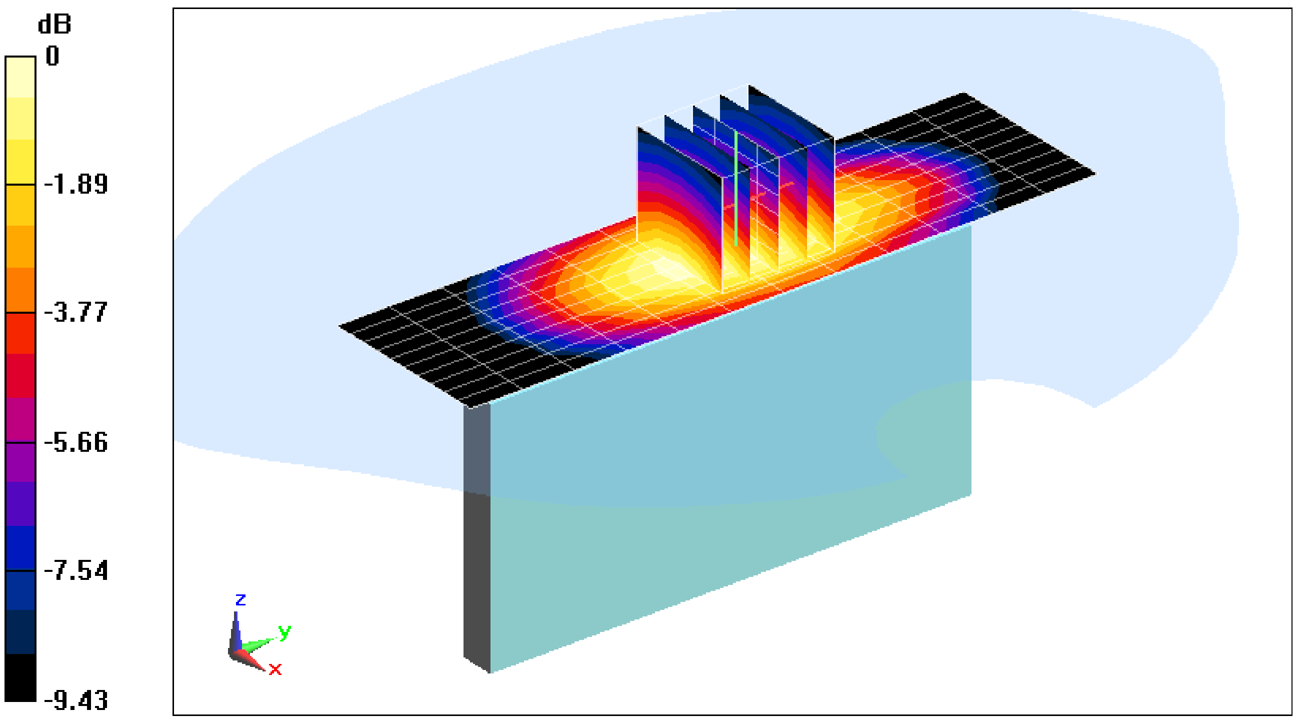
Communication System: UID 0, LTE Band 26; Frequency: 844 MHz;Duty Cycle: 1:1
Medium: 835 Body Medium parameters used (interpolated):
f = 844 MHz; σ = 0.986 S/m; ε_r = 53.228; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 06-10-2014; Ambient Temp: 19.8°C; Tissue Temp: 19.8°C

Probe: ES3DV3 - SN3213; ConvF(6.18, 6.18, 6.18); Calibrated: 4/11/2014;
Sensor-Surface: 3mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1364; Calibrated: 3/17/2014
Phantom: SAM Sub; Type: SAM 4.0; Serial: TP-1357
Measurement SW: DASY4, Version 4.7 (80); SEMCAD X Version 14.6.10 (7331)

Mode: LTE Band 26, Body SAR, Right Edge, High.ch,
10 MHz Bandwidth, QPSK, 1 RB, 25 RB Offset

Area Scan (11x13x1): Measurement grid: dx=5mm, dy=15mm
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 23.75 V/m; Power Drift = 0.00 dB
Peak SAR (extrapolated) = 0.709 W/kg
SAR(1 g) = 0.505 W/kg



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

PCTEST ENGINEERING LABORATORY, INC.

DUT: ZNFLS885; Type: Portable Handset; Serial: 885-2

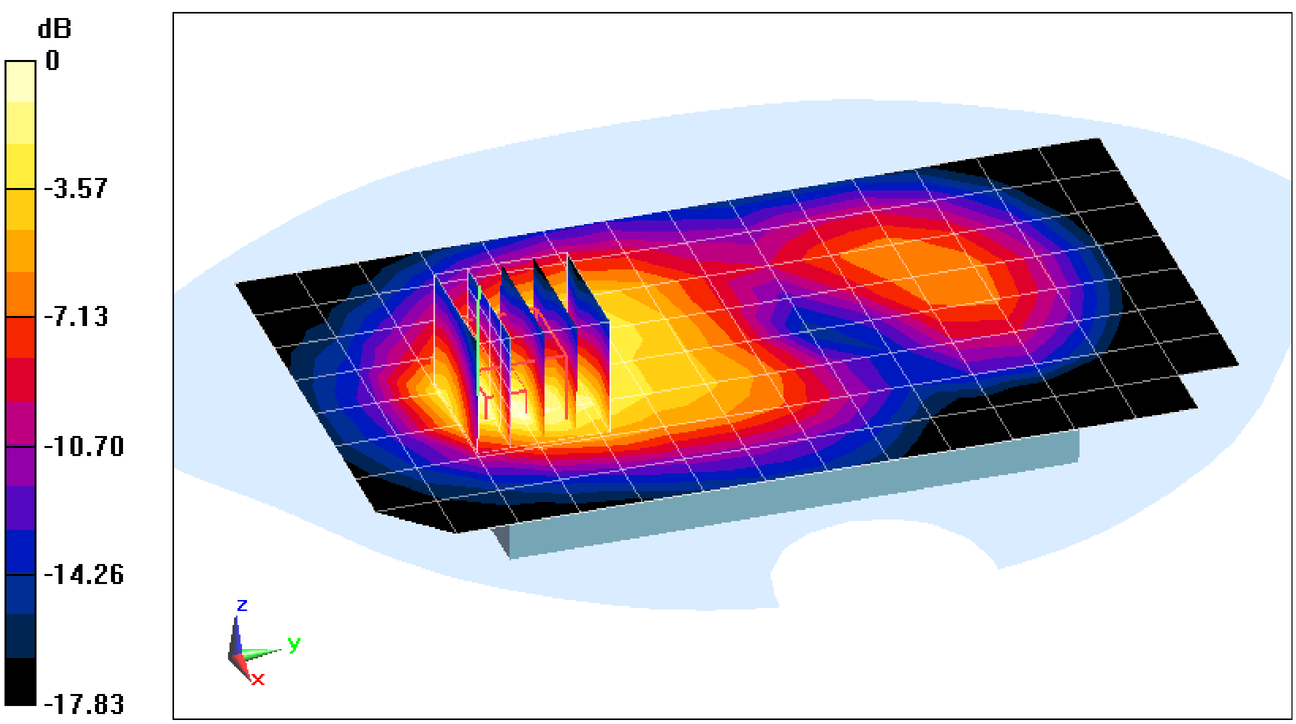
Communication System: UID 0, LTE Band 25; Frequency: 1882.5 MHz;Duty Cycle: 1:1
Medium: 1900 Body Medium parameters used (interpolated):
f = 1882.5 MHz; σ = 1.518 S/m; ε_r = 52.152; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 06-10-2014; Ambient Temp: 23.1°C; Tissue Temp: 22.5°C

Probe: ES3DV3 - SN3288; ConvF(4.82, 4.82, 4.82); Calibrated: 9/23/2013;
Sensor-Surface: 4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1323; Calibrated: 9/17/2013
Phantom: SAM Sub Dasy B; Type: SAM 5.0; Serial: TP-1626
Measurement SW: DASY4, Version 4.7 (80); SEMCAD X Version 14.6.10 (7331)

Mode: LTE Band 25 (PCS), Body SAR, Back side, Mid.ch,
10 MHz Bandwidth, QPSK, 1 RB, 49 RB Offset

Area Scan (9x15x1): Measurement grid: dx=15mm, dy=15mm
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 24.22 V/m; Power Drift = -0.01 dB
Peak SAR (extrapolated) = 1.66 W/kg
SAR(1 g) = 0.846 W/kg



0 dB = 0.931 W/kg = -0.31 dBW/kg

PCTEST ENGINEERING LABORATORY, INC.

DUT: ZNFLS885; Type: Portable Handset; Serial: 885-2

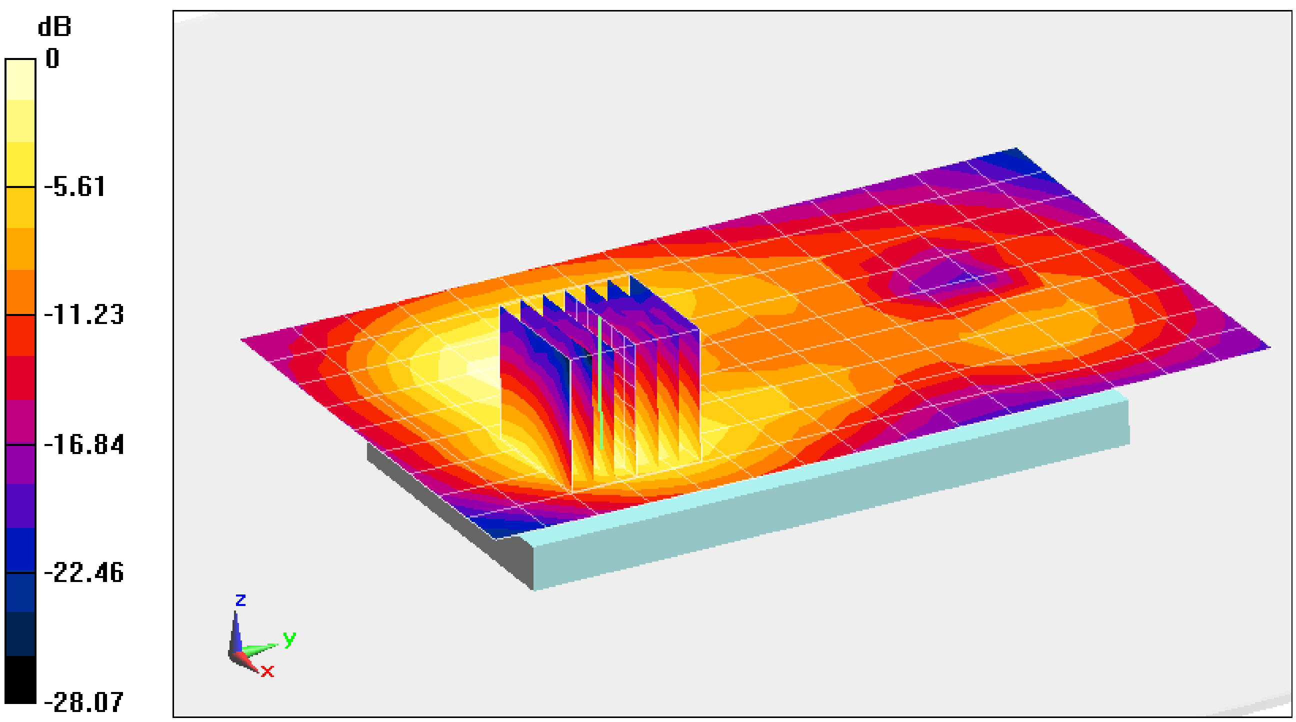
Communication System: UID 0, LTE Band 41; Frequency: 2680 MHz;Duty Cycle: 1:1.59
Medium: 2600 Body Medium parameters used (interpolated):
f = 2680 MHz; σ = 2.29 S/m; ε_r = 50.559; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 06-09-2014; Ambient Temp: 24.5°C; Tissue Temp: 23.9°C

Probe: ES3DV3 - SN3258; ConvF(3.91, 3.91, 3.91); Calibrated: 2/25/2014;
Sensor-Surface: 3mm (Mechanical Surface Detection)
Electronics: DAE4 Sn665; Calibrated: 2/26/2014
Phantom: ELI v5.0; Type: QDOVA002AA; Serial: TP-1158
Measurement SW: DASY52, Version 52.8 (7); SEMCAD X Version 14.6.10 (7331)

Mode: 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 = 13.26 V/m; Power Drift = -0.03 dB
Peak SAR (extrapolated) = 0.769 W/kg
SAR(1 g) = 0.346 W/kg



0 dB = 0.457 W/kg = -3.40 dBW/kg

PCTEST ENGINEERING LABORATORY, INC.

DUT: ZNFLS885; Type: Portable Handset; Serial: 885-19

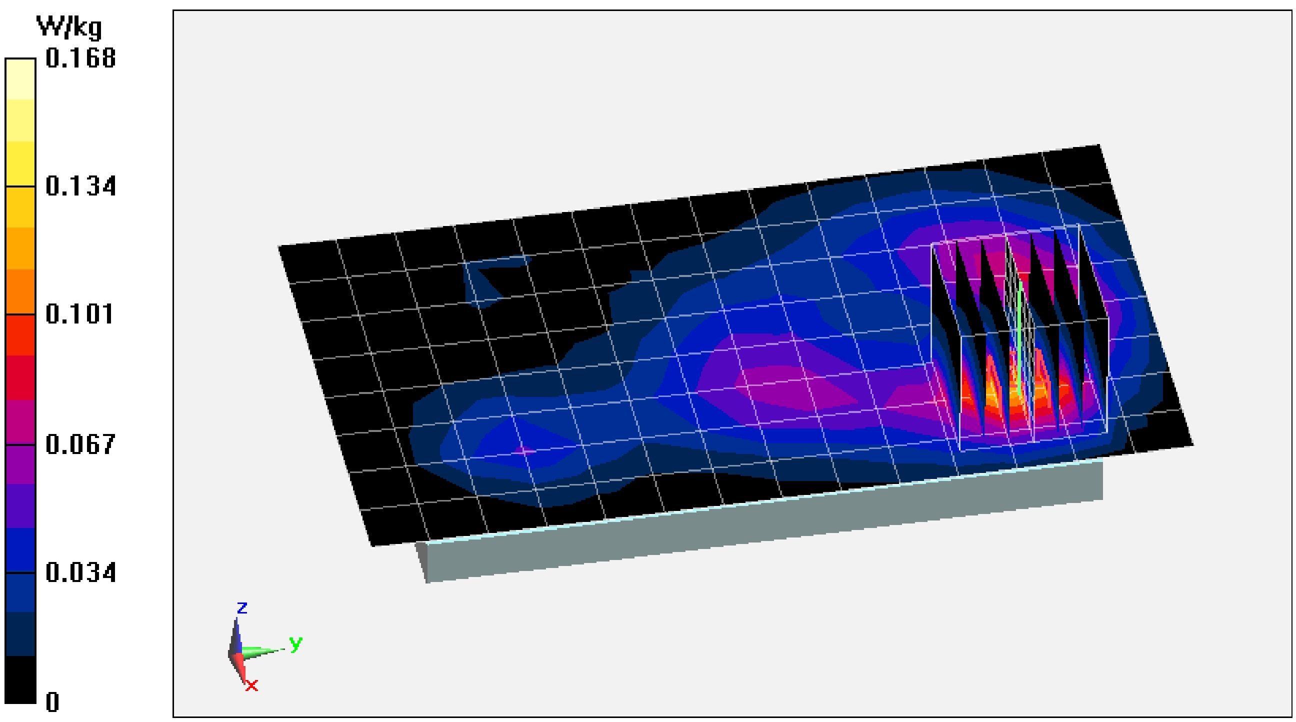
Communication System: UID 0, IEEE 802.11b; Frequency: 2437 MHz;Duty Cycle: 1:1
Medium: 2450 Body Medium parameters used (interpolated):
f = 2437 MHz; σ = 2.001 S/m; ε_r = 52.108; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 06-16-2014; Ambient Temp: 23.2°C; Tissue Temp: 22.9°C

Probe: ES3DV3 - SN3319; ConvF(4.24, 4.24, 4.24); Calibrated: 4/17/2014;
Sensor-Surface: 3mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1368; Calibrated: 4/11/2014
Phantom: ELI left; Type: QDOVA002AA; Serial: TP:1202
Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Mode: IEEE 802.11b, Body SAR, Ch 06, 1 Mbps, Back Side

Area Scan (9x15x1): Measurement grid: dx=12mm, dy=12mm
Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 8.212 V/m; Power Drift = 0.02 dB
Peak SAR (extrapolated) = 0.283 W/kg
SAR(1 g) = 0.128 W/kg



PCTEST ENGINEERING LABORATORY, INC.

DUT: ZNFLS885; Type: Portable Handset; Serial: 885-19

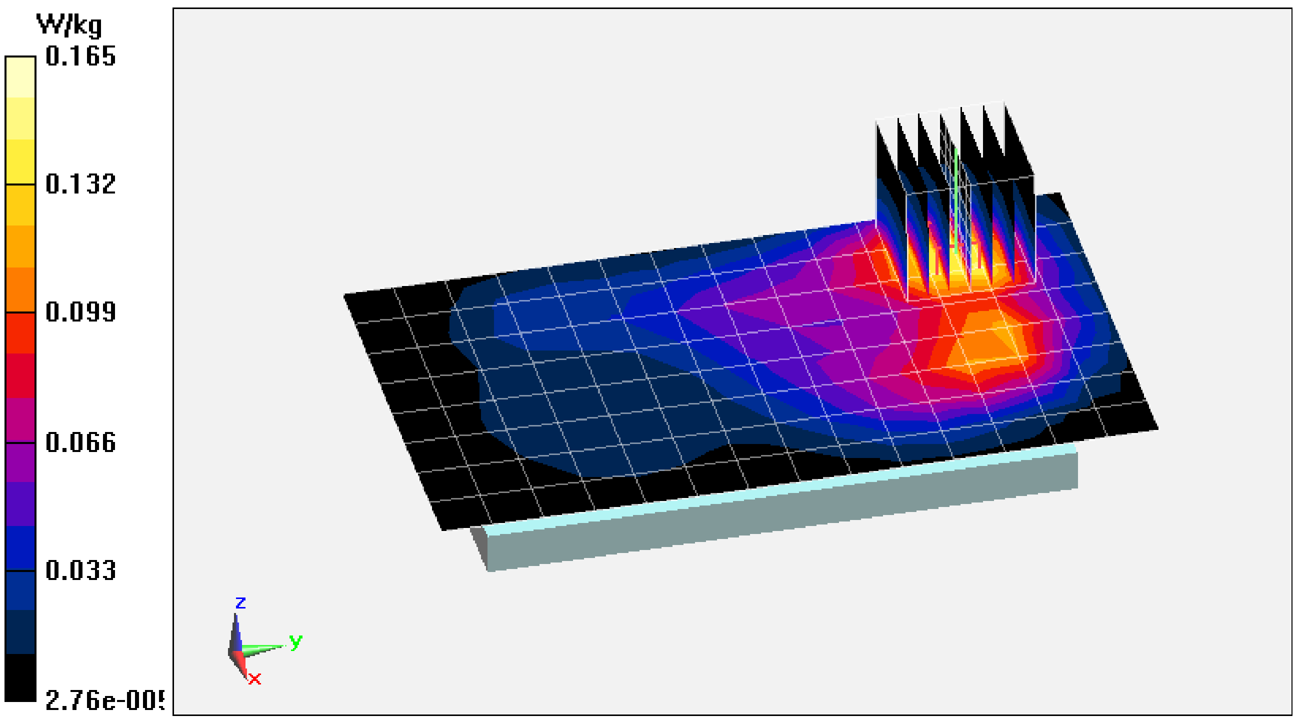
Communication System: UID 0, IEEE 802.11b; Frequency: 2437 MHz;Duty Cycle: 1:1
Medium: 2450 Body Medium parameters used (interpolated):
f = 2437 MHz; σ = 2.001 S/m; ε_r = 52.108; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 06-16-2014; Ambient Temp: 23.2°C; Tissue Temp: 22.9°C

Probe: ES3DV3 - SN3319; ConvF(4.24, 4.24, 4.24); Calibrated: 4/17/2014;
Sensor-Surface: 3mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1368; Calibrated: 4/11/2014
Phantom: ELI left; Type: QDOVA002AA; Serial: TP:1202
Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Mode: IEEE 802.11b, Body SAR, Ch 06, 1 Mbps, Front Side

Area Scan (9x15x1): Measurement grid: dx=12mm, dy=12mm
Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 8.001 V/m; Power Drift = 0.02 dB
Peak SAR (extrapolated) = 0.252 W/kg
SAR(1 g) = 0.132 W/kg



PCTEST ENGINEERING LABORATORY, INC.

DUT: ZNFLS885; Type: Portable Handset; Serial: 885-19

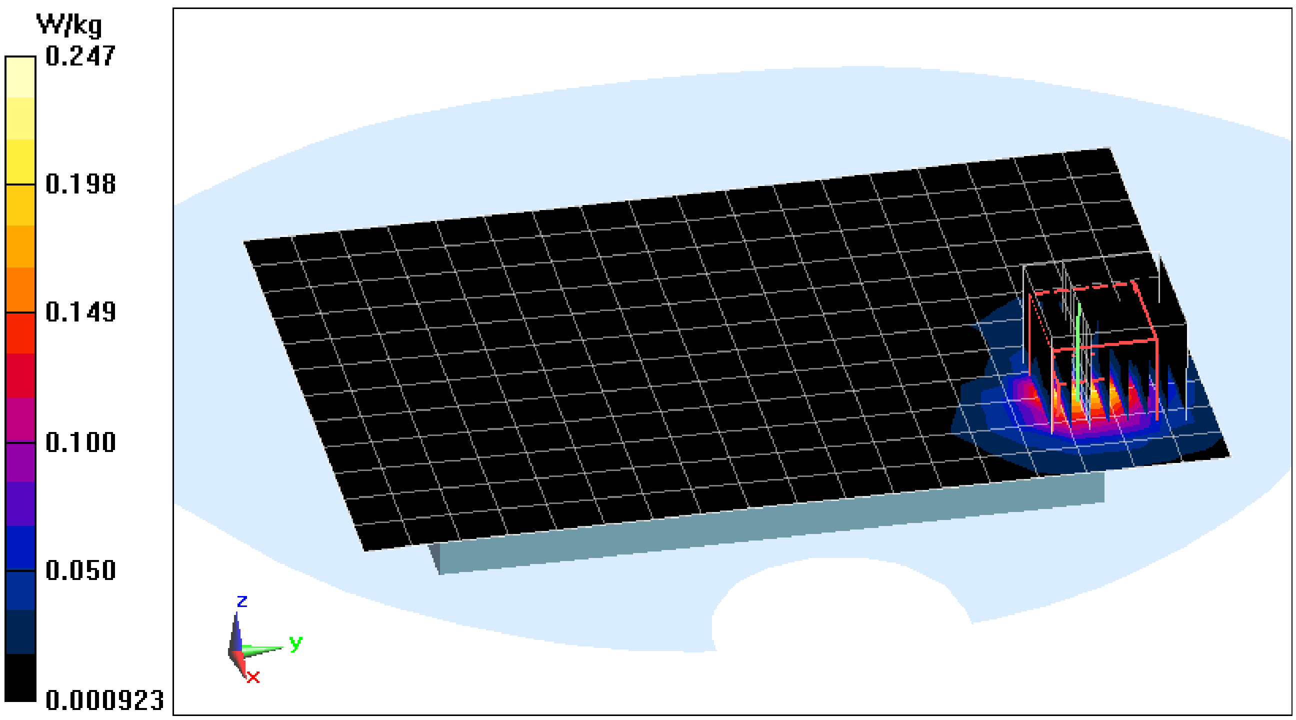
Communication System: UID 0, IEEE 802.11a 5.2-5.8 GHz Band; Frequency: 5785 MHz;Duty Cycle: 1:1
Medium: 5 GHz Body Medium parameters used:
f = 5785 MHz; σ = 6.188 S/m; ε_r = 46.692; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 06-16-2014; Ambient Temp: 24.5°C; Tissue Temp: 22.5°C

Probe: EX3DV4 - SN3920; ConvF(4, 4, 4); Calibrated: 12/18/2013;
Sensor-Surface: 1.4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn649; Calibrated: 12/12/2013
Phantom: SAM Sub; Type: SAM 4.0; Serial: TP-1357
Measurement SW: DASY4, Version 4.7 (80); SEMCAD X Version 14.6.10 (7331)

Mode: IEEE 802.11a, 5.8 GHz, Body SAR, Ch 157, 6 Mbps, Back Side

Area Scan (13x19x1): Measurement grid: dx=10mm, dy=10mm
Zoom Scan (8x8x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm; Graded Ratio: 1.4
Reference Value = 3.705 V/m; Power Drift = 0.04 dB
Peak SAR (extrapolated) = 0.469 W/kg
SAR(1 g) = 0.103 W/kg



PCTEST ENGINEERING LABORATORY, INC.

DUT: ZNFLS885; Type: Portable Handset; Serial: 885-19

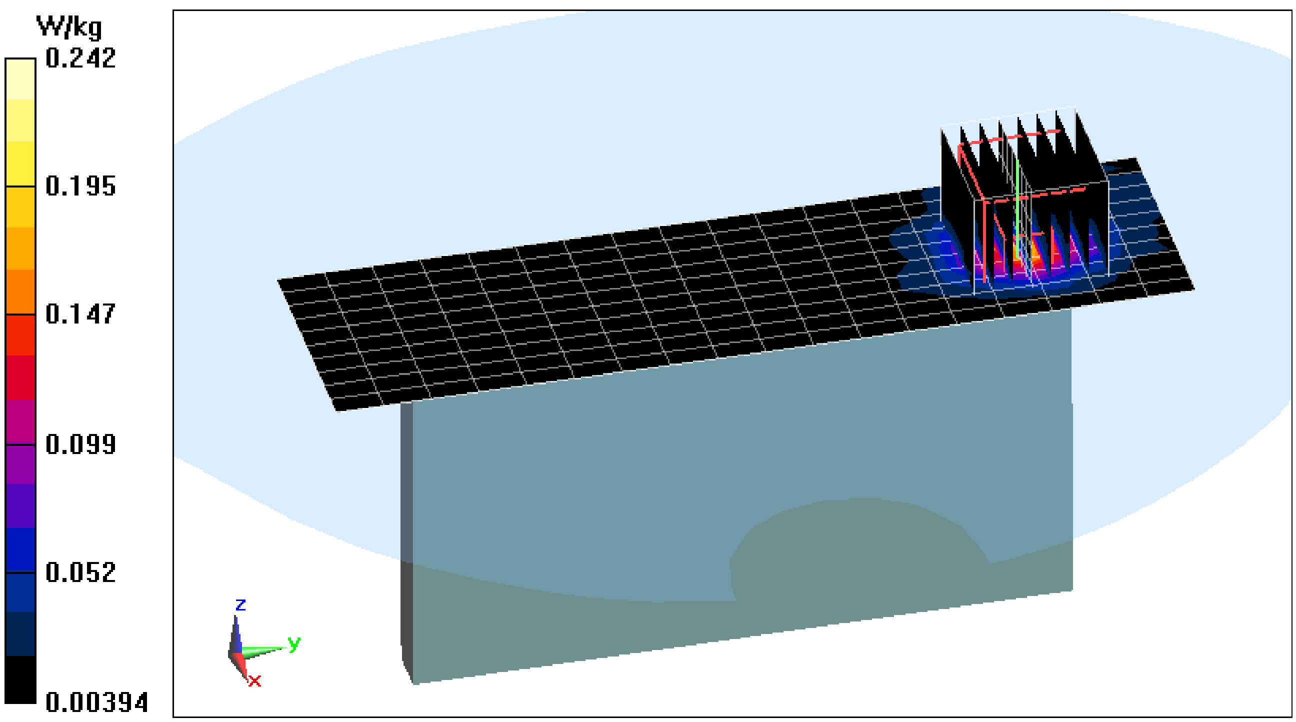
Communication System: UID 0, IEEE 802.11a 5.2-5.8 GHz Band; Frequency: 5785 MHz;Duty Cycle: 1:1
Medium: 5 GHz Body Medium parameters used:
f = 5785 MHz; σ = 6.188 S/m; ε_r = 46.692; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 06-16-2014; Ambient Temp: 24.5°C; Tissue Temp: 22.5°C

Probe: EX3DV4 - SN3920; ConvF(4, 4, 4); Calibrated: 12/18/2013;
Sensor-Surface: 1.4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn649; Calibrated: 12/12/2013
Phantom: SAM Sub; Type: SAM 4.0; Serial: TP-1357
Measurement SW: DASY4, Version 4.7 (80); SEMCAD X Version 14.6.10 (7331)

Mode: IEEE 802.11a, 5.8 GHz, Body SAR, Ch 157, 6 Mbps, Left Edge

Area Scan (11x19x1): Measurement grid: dx=5mm, dy=10mm
Zoom Scan (8x8x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm; Graded Ratio: 1.4
Reference Value = 0.8200 V/m; Power Drift = 0.16 dB
Peak SAR (extrapolated) = 0.543 W/kg
SAR(1 g) = 0.104 W/kg



PCTEST ENGINEERING LABORATORY, INC.

DUT: ZNFLS885; Type: Portable Handset; Serial: 885-19

Communication System: UID 0, IEEE 802.11a 5.2-5.8 GHz Band; Frequency: 5680 MHz;Duty Cycle: 1:1
Medium: 5 GHz Body Medium parameters used:
f = 5680 MHz; σ = 6.09 S/m; ε_r = 47.014; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 06-16-2014; Ambient Temp: 24.5°C; Tissue Temp: 22.5°C

Probe: EX3DV4 - SN3920; ConvF(3.62, 3.62, 3.62); Calibrated: 12/18/2013;
Sensor-Surface: 1.4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn649; Calibrated: 12/12/2013
Phantom: SAM Sub; Type: SAM 4.0; Serial: TP-1357
Measurement SW: DASY4, Version 4.7 (80); SEMCAD X Version 14.6.10 (7331)

Mode: IEEE 802.11a, 5.5 - 5.7 GHz, Body SAR, Ch 136, 6 Mbps, Back Side

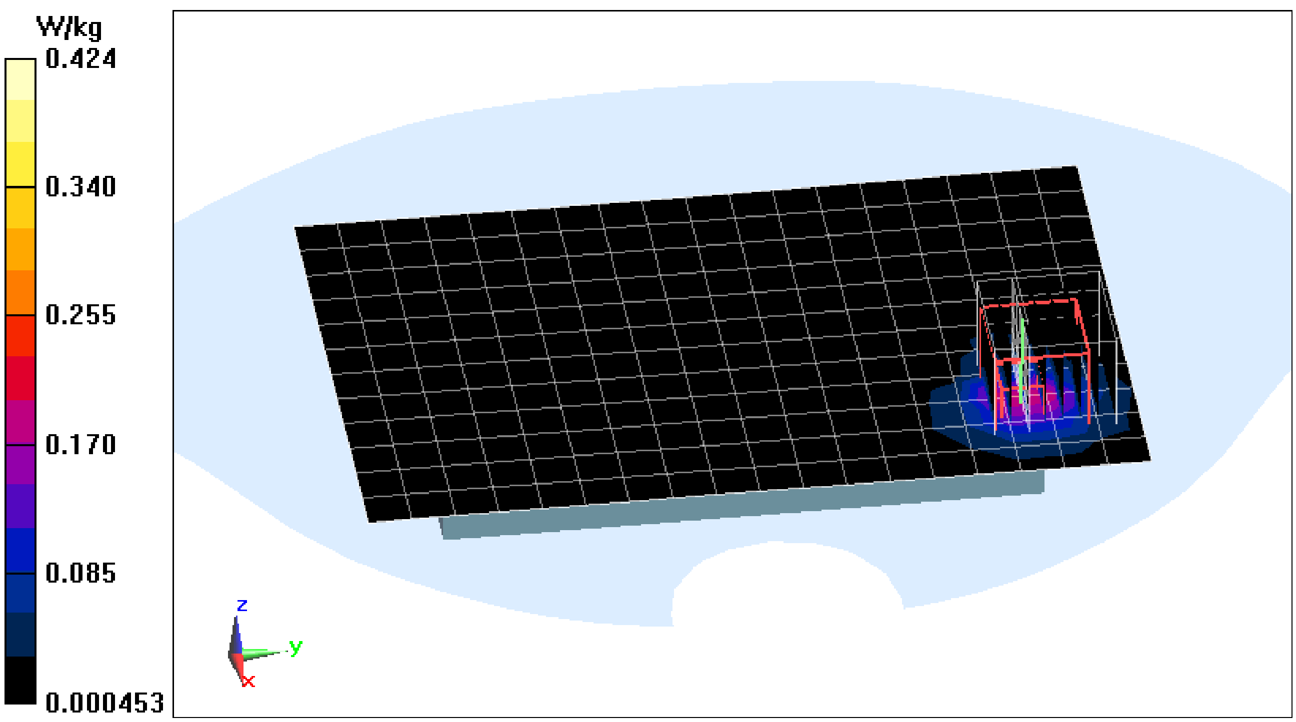
Area Scan (13x19x1): Measurement grid: dx=10mm, dy=10mm

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

Reference Value = 5.028 V/m; Power Drift = 0.13 dB

Peak SAR (extrapolated) = 0.818 W/kg

SAR(1 g) = 0.184 W/kg



APPENDIX B: SYSTEM VERIFICATION

PCTEST ENGINEERING LABORATORY, INC.

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

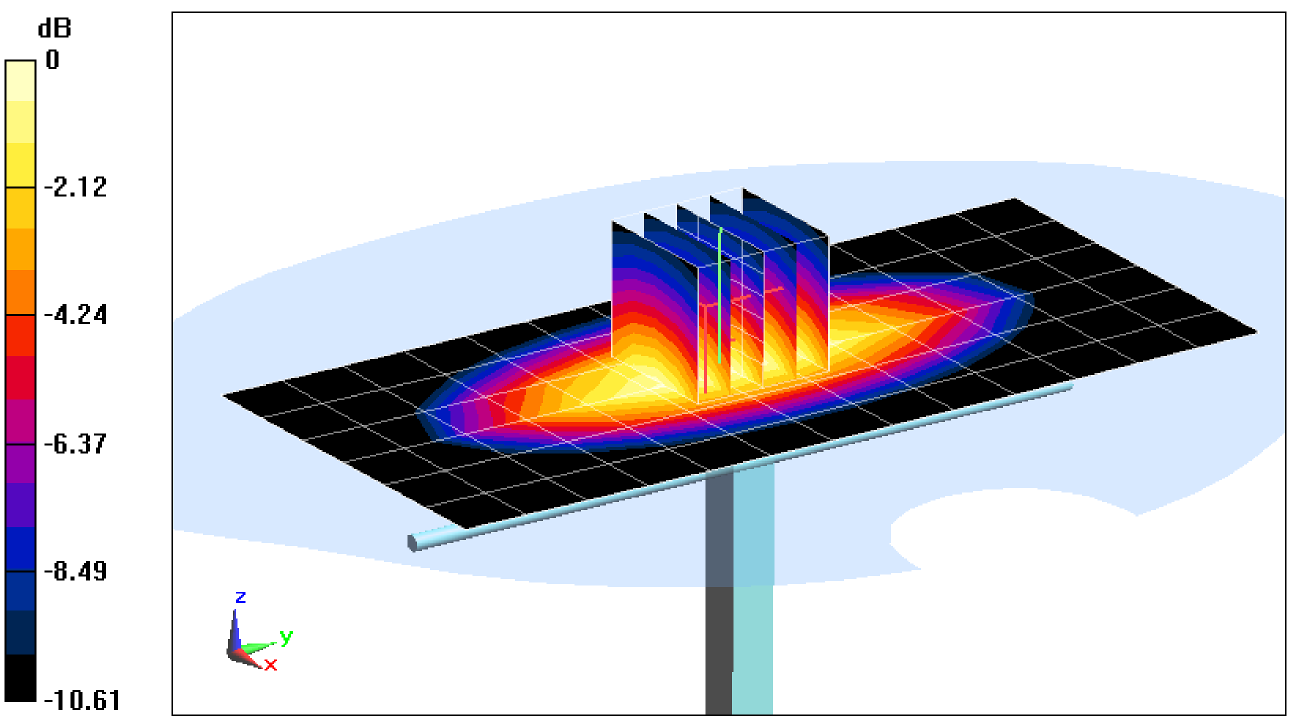
Communication System: UID 0, CW; Frequency: 835 MHz;Duty Cycle: 1:1
Medium: 835 Head Medium parameters used:
f = 835 MHz; σ = 0.918 S/m; ε_r = 42.483; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.5 cm

Test Date: 06-10-2014; Ambient Temp: 24.2°C; Tissue Temp: 23.7°C

Probe: ES3DV3 - SN3209; ConvF(6.23, 6.23, 6.23); Calibrated: 3/19/2014;
Sensor-Surface: 3mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1334; Calibrated: 3/17/2014
Phantom: SAM front; Type: QD000P40CD; Serial: TP:1759
Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

835 MHz System Verification

Area Scan (7x14x1): Measurement grid: dx=15mm, dy=15mm
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Input Power: 20.0 dBm (100 mW)
Peak SAR (extrapolated) = 1.28 W/kg
SAR(1 g) = 0.853 W/kg
Deviation(1 g): -7.48%



0 dB = 1.00 W/kg = 0.00 dBW/kg

PCTEST ENGINEERING LABORATORY, INC.

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

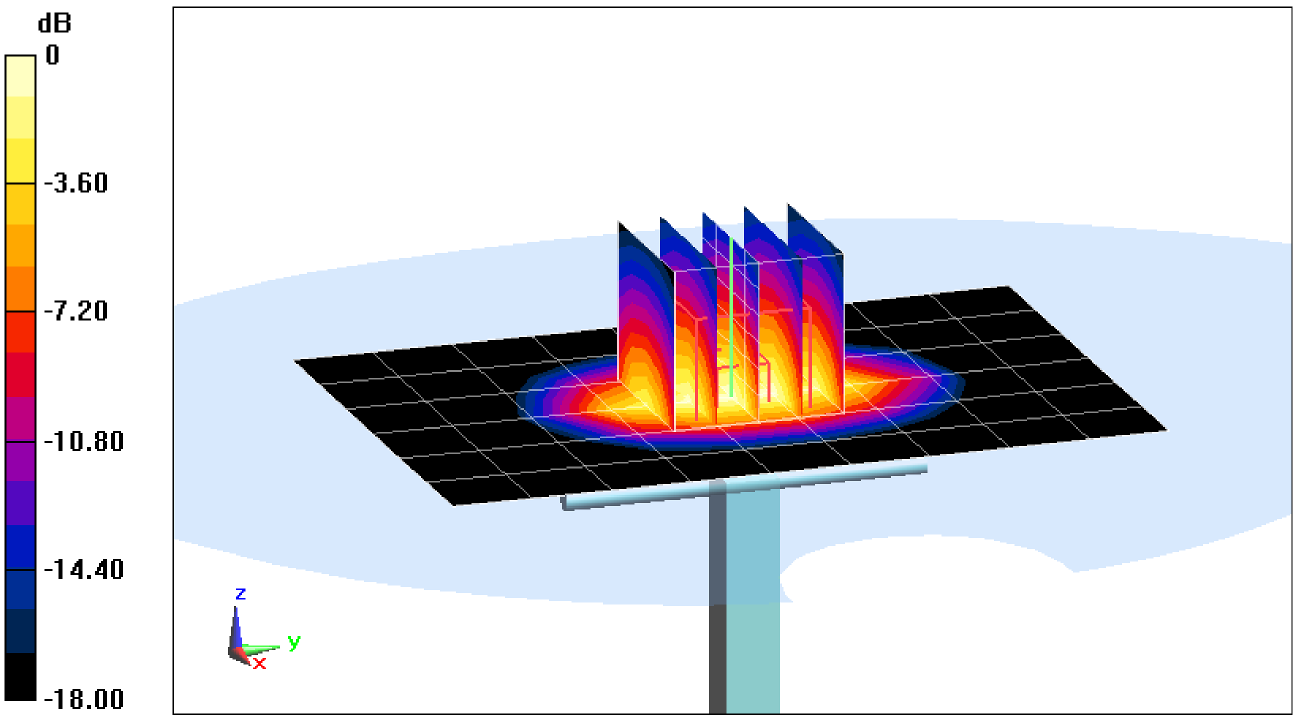
Communication System: UID 0, CW; Frequency: 1900 MHz;Duty Cycle: 1:1
Medium: 1900 Head Medium parameters used (interpolated):
f = 1900 MHz; σ = 1.388 S/m; ε_r = 39.303; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 06-11-2014; Ambient Temp: 23.6°C; Tissue Temp: 23.9°C

Probe: ES3DV3 - SN3319; ConvF(5.05, 5.05, 5.05); Calibrated: 4/17/2014;
Sensor-Surface: 3mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1368; Calibrated: 4/11/2014
Phantom: SAM; Type: QD000P40CD; Serial: TP:1758
Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

1900 MHz System Verification

Area Scan (7x10x1): Measurement grid: dx=15mm, dy=15mm
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Input Power: 20.0 dBm (100 mW)
Peak SAR (extrapolated) = 7.33 W/kg
SAR(1 g) = 4.04 W/kg
Deviation(1 g): 0.00%



0 dB = 5.14 W/kg = 7.11 dBW/kg

PCTEST ENGINEERING LABORATORY, INC.

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

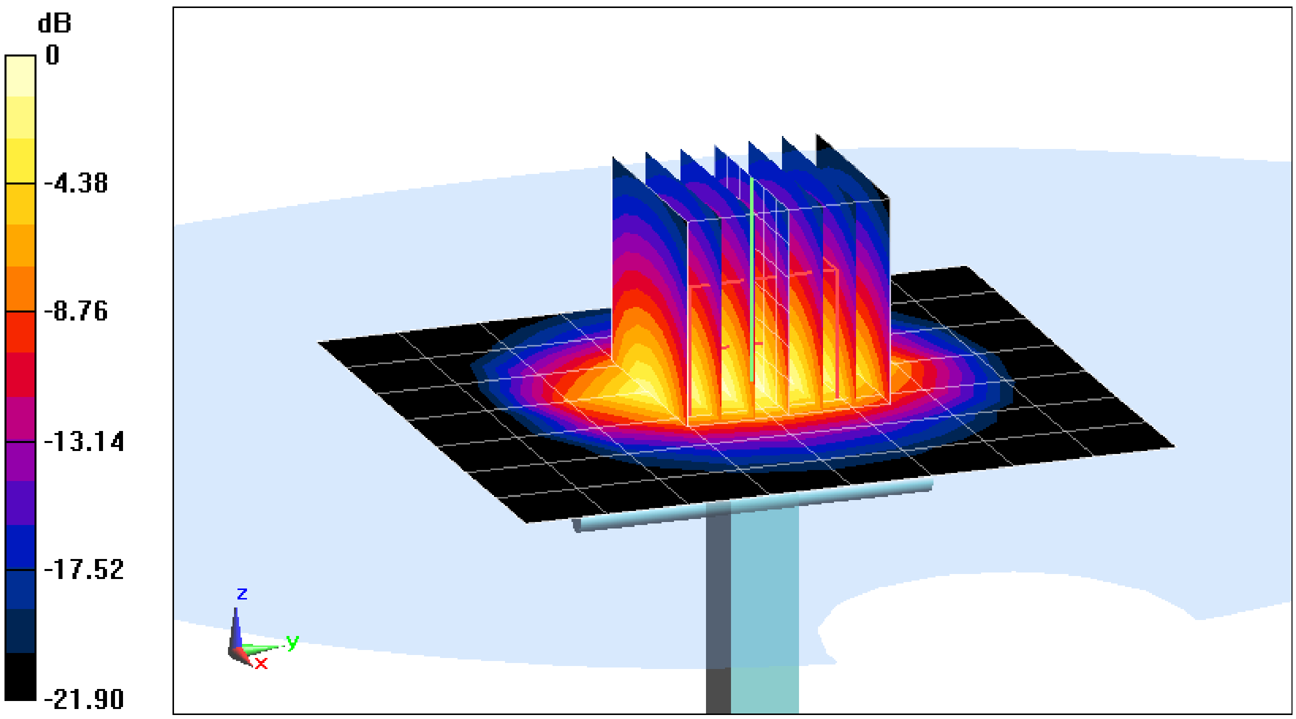
Communication System: UID 0, CW; Frequency: 2450 MHz;Duty Cycle: 1:1
Medium: 2450 Head Medium parameters used:
f = 2450 MHz; σ = 1.743 S/m; ε_r = 39.937; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 06-17-2014; Ambient Temp: 22.5°C; Tissue Temp: 21.8°C

Probe: ES3DV3 - SN3258; ConvF(4.52, 4.52, 4.52); Calibrated: 2/25/2014;
Sensor-Surface: 3mm (Mechanical Surface Detection)
Electronics: DAE4 Sn665; Calibrated: 2/26/2014
Phantom: SAM Front; Type: SAM; Serial: 1686
Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

2450 MHz System Verification

Area Scan (8x9x1): Measurement grid: dx=12mm, dy=12mm
Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Input Power: 20.0 dBm (100 mW)
Peak SAR (extrapolated) = 10.2 W/kg
SAR(1 g) = 4.99 W/kg
Deviation(1 g): -3.67%



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

PCTEST ENGINEERING LABORATORY, INC.

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

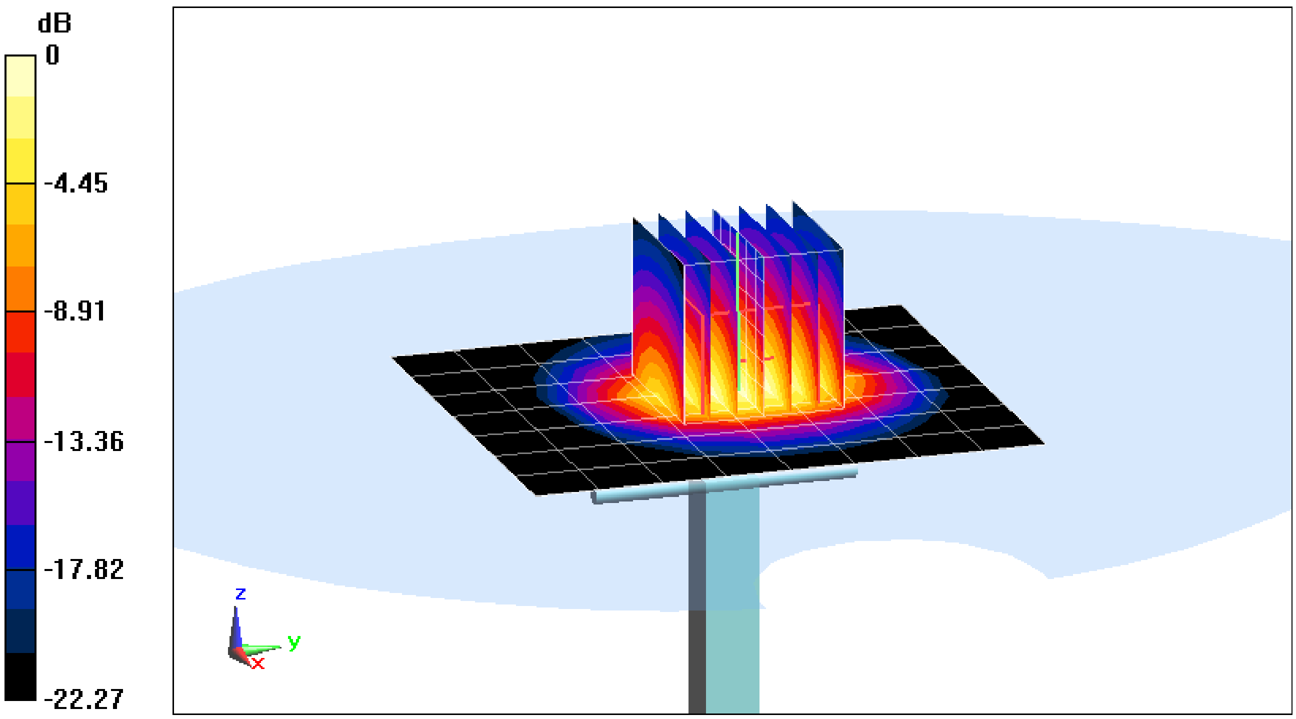
Communication System: UID 0, CW; Frequency: 2600 MHz;Duty Cycle: 1:1
Medium: 2600 Head Medium parameters used:
f = 2600 MHz; σ = 1.921 S/m; ε_r = 38.694; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 06-11-2014; Ambient Temp: 24.5°C; Tissue Temp: 23.3°C

Probe: ES3DV3 - SN3333; ConvF(4.28, 4.28, 4.28); Calibrated: 11/22/2013;
Sensor-Surface: 3mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1408; Calibrated: 11/19/2013
Phantom: SAM with CRP v4.0; Type: QD000P40CD; Serial: TP:1797
Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

2600 MHz System Verification

Area Scan (8x9x1): Measurement grid: dx=12mm, dy=12mm
Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Input Power: 20.0 dBm (100 mW)
Peak SAR (extrapolated) = 11.6 W/kg
SAR(1 g) = 5.74 W/kg
Deviation(1 g): 0.17%



0 dB = 7.59 W/kg = 8.80 dBW/kg

PCTEST ENGINEERING LABORATORY, INC.

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

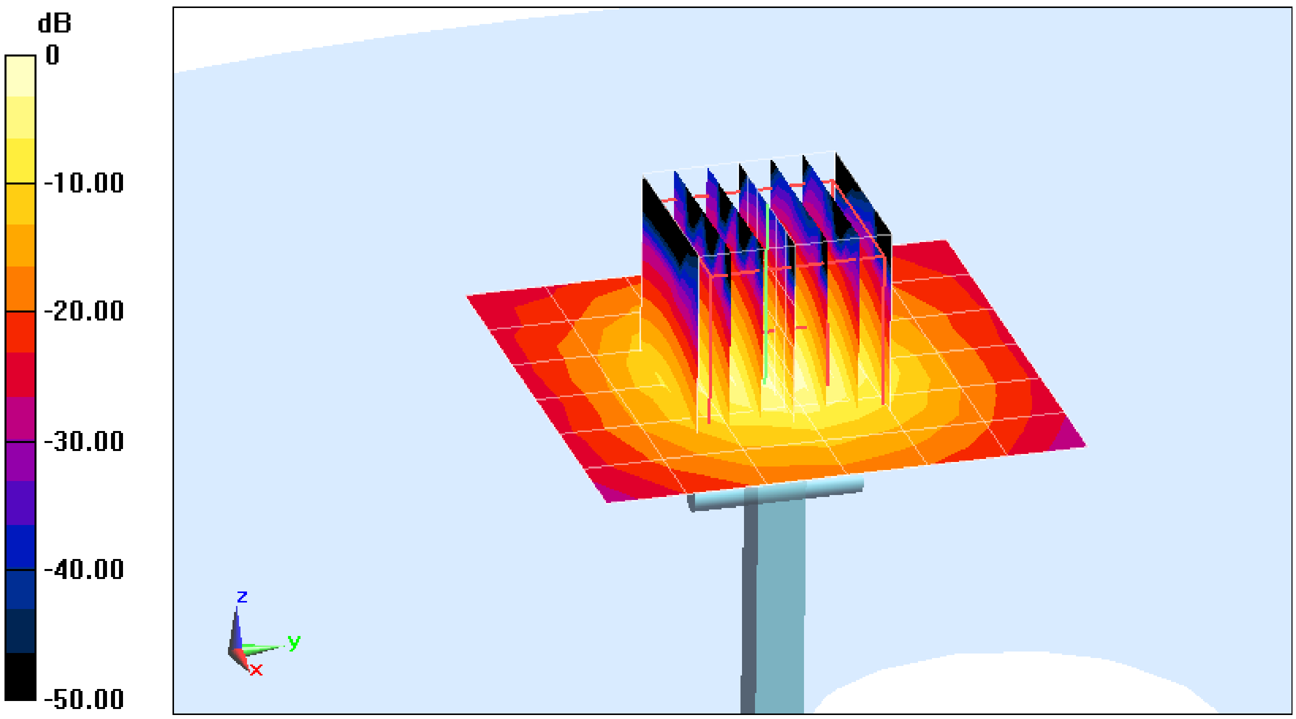
Communication System: UID 0, CW; Frequency: 5200 MHz;Duty Cycle: 1:1
Medium: 5 GHz Head Medium parameters used:
f = 5200 MHz; σ = 4.605 S/m; ε_r = 37.601; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 06-19-2014; Ambient Temp: 24.5°C; Tissue Temp: 24.4°C

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

5200 MHz System Verification

Area Scan (7x7x1): Measurement grid: dx=10mm, dy=10mm
Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm; Graded Ratio: 1.4
Input Power: 20.0 dBm (100 mW)
Peak SAR (extrapolated) = 31.4 W/kg
SAR(1 g) = 7.51 W/kg
Deviation(1 g): -3.72%



0 dB = 17.2 W/kg = 12.36 dBW/kg

PCTEST ENGINEERING LABORATORY, INC.

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

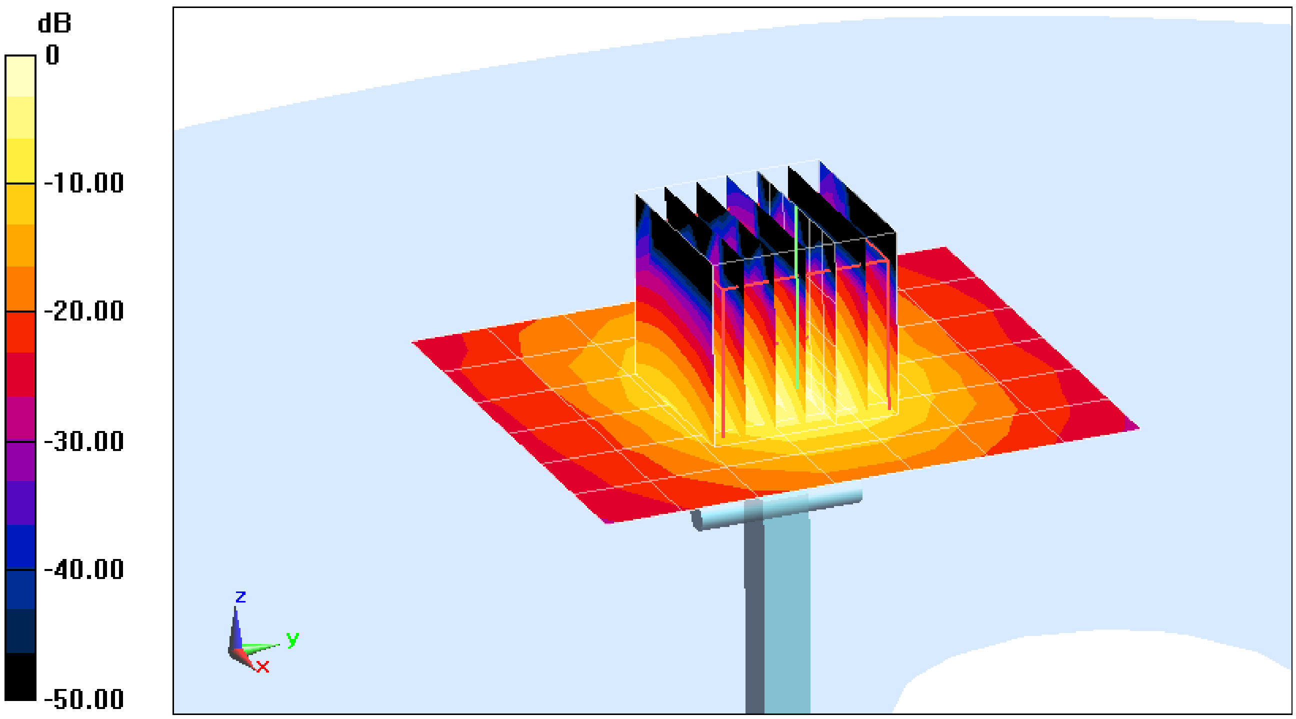
Communication System: UID 0, CW; Frequency: 5300 MHz;Duty Cycle: 1:1
Medium: 5 GHz Head Medium parameters used:
f = 5300 MHz; σ = 4.709 S/m; ε_r = 37.469; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 06-19-2014; Ambient Temp: 24.4°C; Tissue Temp: 24.4°C

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

5300 MHz System Verification

Area Scan (7x8x1): Measurement grid: dx=10mm, dy=10mm
Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm; Graded Ratio: 1.4
Input Power: 20.0 dBm (100 mW)
Peak SAR (extrapolated) = 33.0 W/kg
SAR(1 g) = 7.9 W/kg
Deviation(1 g): -4.82%



0 dB = 15.1 W/kg = 11.79 dBW/kg

PCTEST ENGINEERING LABORATORY, INC.

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

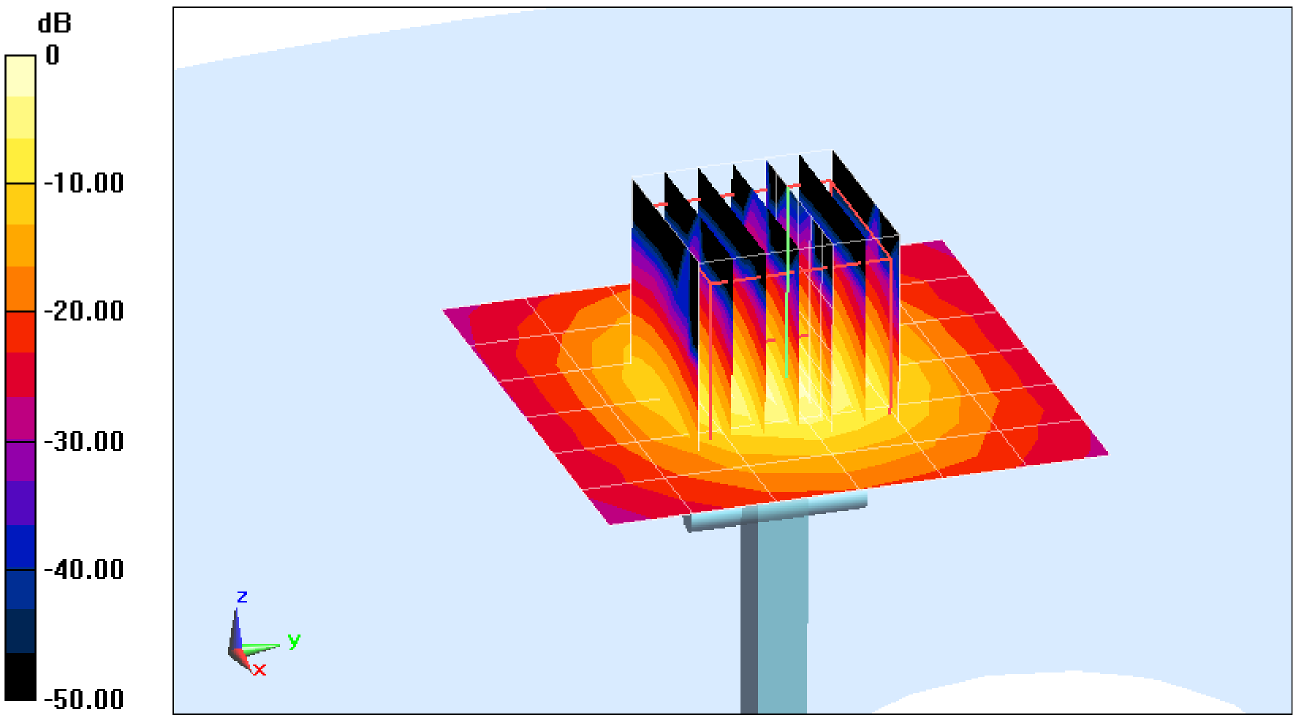
Communication System: UID 0, CW; Frequency: 5600 MHz;Duty Cycle: 1:1
Medium: 5 GHz Head Medium parameters used:
f = 5600 MHz; σ = 5.021 S/m; ε_r = 37.076; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 06-19-2014; Ambient Temp: 24.5°C; Tissue Temp: 24.4°C

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

5600 MHz System Verification

Area Scan (7x7x1): Measurement grid: dx=10mm, dy=10mm
Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm; Graded Ratio: 1.4
Input Power: 20.0 dBm (100 mW)
Peak SAR (extrapolated) = 35.5 W/kg
SAR(1 g) = 8.03 W/kg
Deviation(1 g): -3.83%



0 dB = 18.9 W/kg = 12.76 dBW/kg

PCTEST ENGINEERING LABORATORY, INC.

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

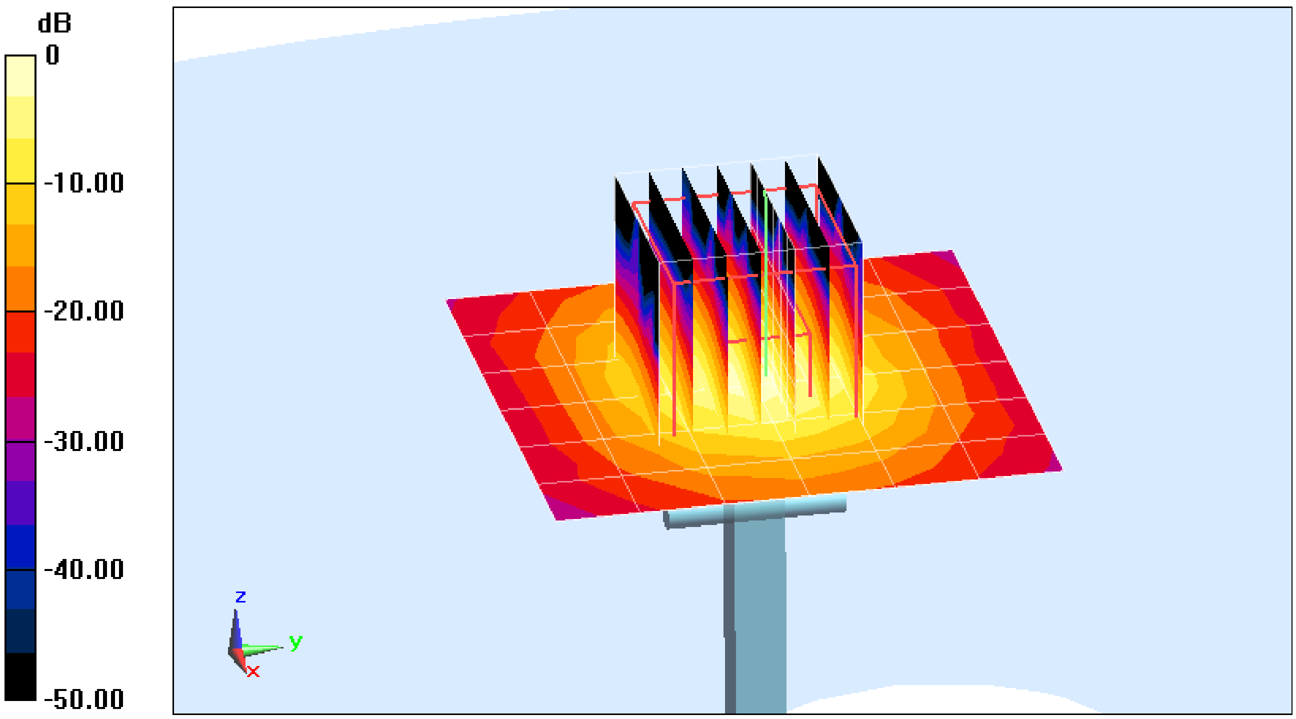
Communication System: UID 0, CW; Frequency: 5800 MHz;Duty Cycle: 1:1
Medium: 5 GHz Head Medium parameters used:
f = 5800 MHz; σ = 5.219 S/m; ε_r = 36.822; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 06-19-2014; Ambient Temp: 24.5°C; Tissue Temp: 24.3°C

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

5800 MHz System Verification

Area Scan (7x7x1): Measurement grid: dx=10mm, dy=10mm
Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm; Graded Ratio: 1.4
Input Power: 20.0 dBm (100 mW)
Peak SAR (extrapolated) = 34.2 W/kg
SAR(1 g) = 7.47 W/kg
Deviation(1 g): -5.80%



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

PCTEST ENGINEERING LABORATORY, INC.

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

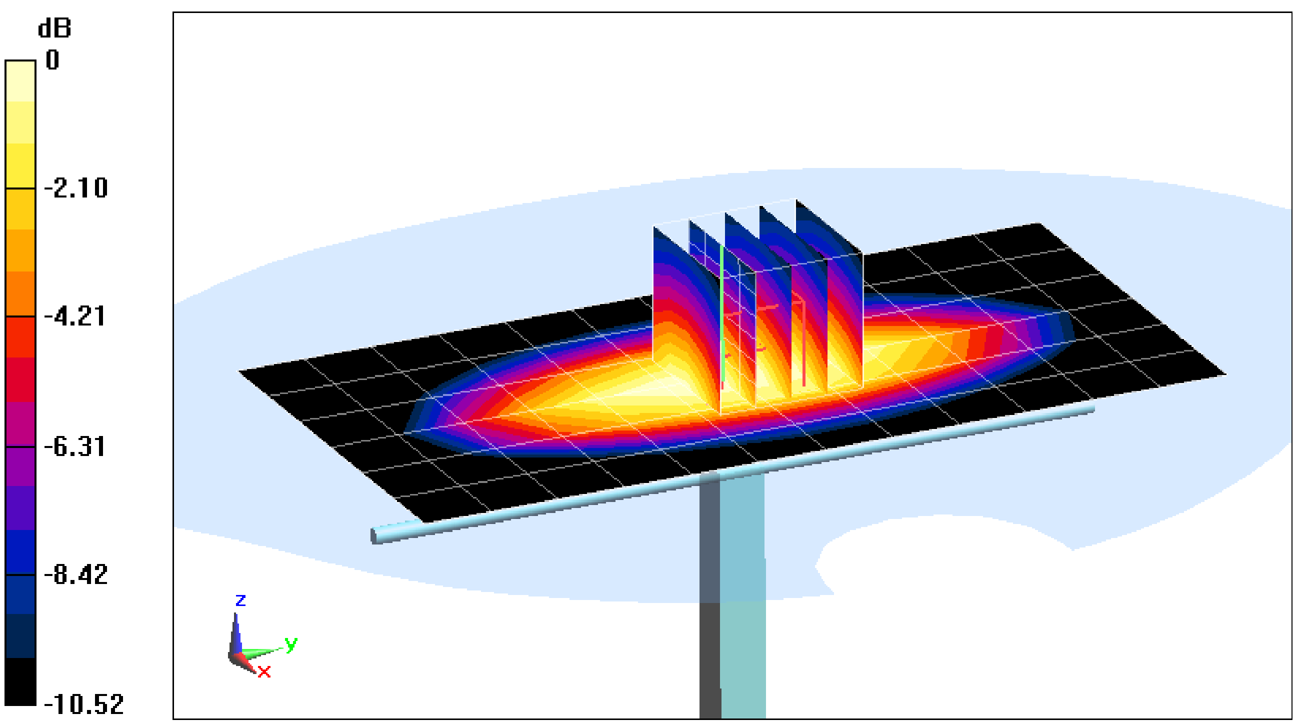
Communication System: UID 0, CW; Frequency: 835 MHz;Duty Cycle: 1:1
Medium: 835 Body Medium parameters used:
f = 835 MHz; $\sigma = 0.976$ S/m; $\varepsilon_r = 53.307$; $\rho = 1000$ kg/m^3
Phantom section: Flat Section; Space: 1.5 cm

Test Date: 06-10-2014; Ambient Temp: 19.8°C; Tissue Temp: 19.8°C

Probe: ES3DV3 - SN3213; ConvF(6.18, 6.18, 6.18); Calibrated: 4/11/2014;
Sensor-Surface: 3mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1364; Calibrated: 3/17/2014
Phantom: SAM Sub; Type: SAM 4.0; Serial: TP-1357
Measurement SW: DASY4, Version 4.7 (80); SEMCAD X Version 14.6.10 (7331)

835 MHz System Verification

Area Scan (7x13x1): Measurement grid: dx=15mm, dy=15mm
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Input Power: 20.0 dBm (100 mW)
Peak SAR (extrapolated) = 1.44 W/kg
SAR(1 g) = 0.964 W/kg
Deviation(1 g): 0.31%



0 dB = 1.11 W/kg = 0.45 dBW/kg

PCTEST ENGINEERING LABORATORY, INC.

DUT: SAR Dipole 1900 MHz; Type: D1900V2; Serial: 5d148

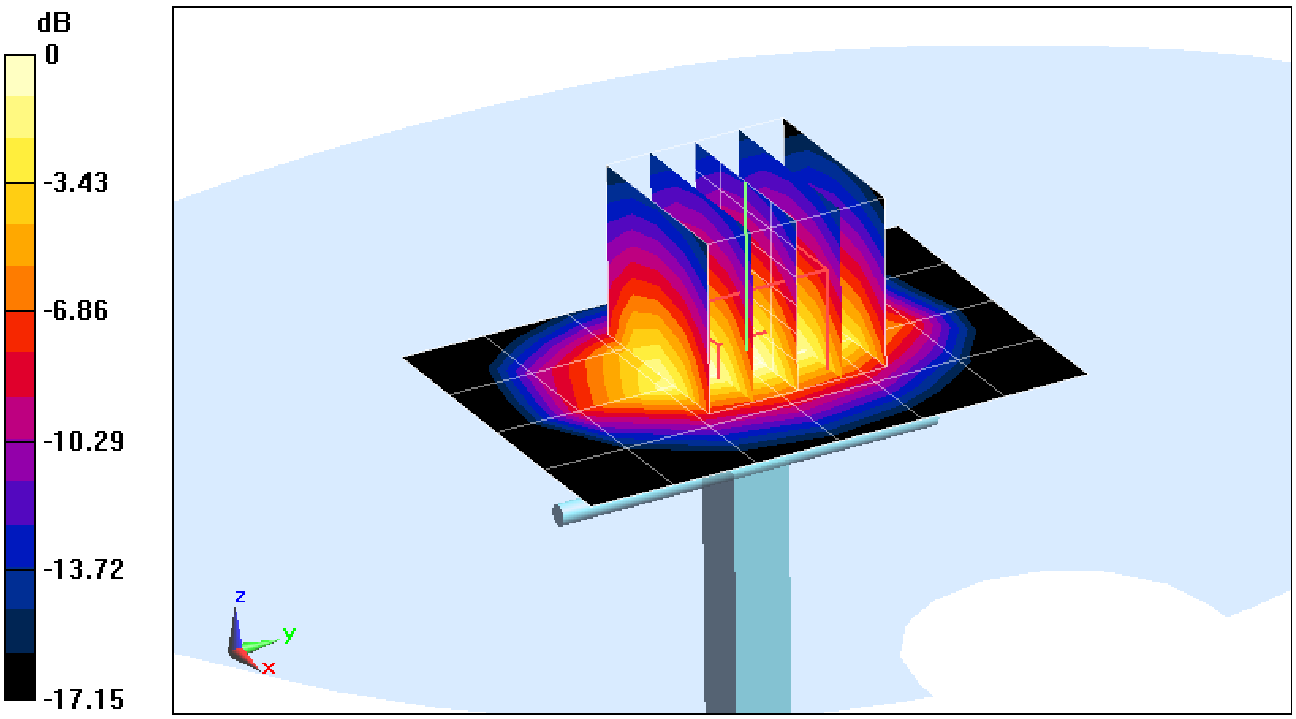
Communication System: UID 0, CW; Frequency: 1900 MHz;Duty Cycle: 1:1
Medium: 1900 Body Medium parameters used (interpolated):
f = 1900 MHz; σ = 1.54 S/m; ε_r = 52.092; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 06-10-2014; Ambient Temp: 23.1°C; Tissue Temp: 22.5°C

Probe: ES3DV3 - SN3288; ConvF(4.82, 4.82, 4.82); Calibrated: 9/23/2013;
Sensor-Surface: 4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1323; Calibrated: 9/17/2013
Phantom: SAM Sub Dasy B; Type: SAM 5.0; Serial: TP-1626
Measurement SW: DASY4, Version 4.7 (80); SEMCAD X Version 14.6.10 (7331)

1900 MHz System Verification

Area Scan (5x7x1): Measurement grid: dx=15mm, dy=15mm
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Input Power: 20.0 dBm (100 mW)
Peak SAR (extrapolated) = 6.99 W/kg
SAR(1 g) = 4.03 W/kg
Deviation(1 g): 2.54%



0 dB = 4.42 W/kg = 6.45 dBW/kg

PCTEST ENGINEERING LABORATORY, INC.

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

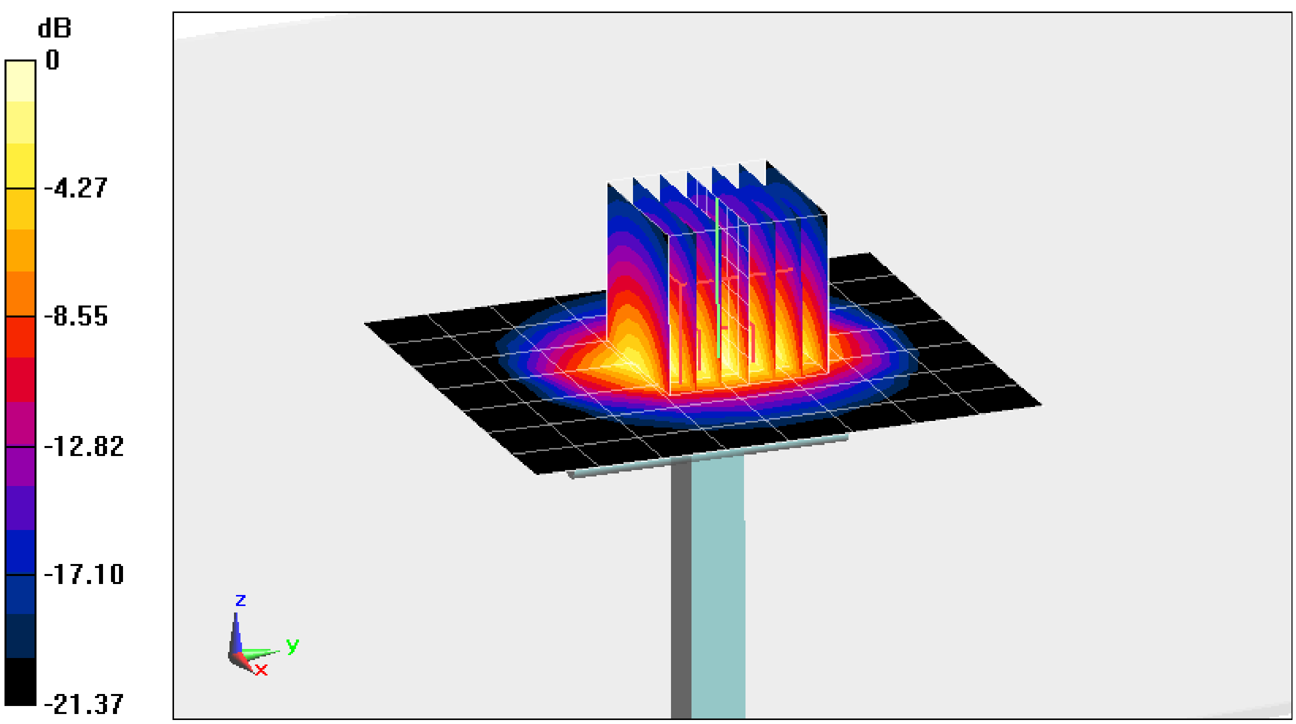
Communication System: UID 0, CW; Frequency: 2450 MHz;Duty Cycle: 1:1
Medium: 2450 Body Medium parameters used:
f = 2450 MHz; σ = 2.019 S/m; ε_r = 52.059; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 06-16-2014; Ambient Temp: 23.2°C; Tissue Temp: 22.9°C

Probe: ES3DV3 - SN3319; ConvF(4.24, 4.24, 4.24); Calibrated: 4/17/2014;
Sensor-Surface: 3mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1368; Calibrated: 4/11/2014
Phantom: ELI left; Type: QDOVA002AA; Serial: TP:1202
Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

2450 MHz System Verification

Area Scan (8x9x1): Measurement grid: dx=12mm, dy=12mm
Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Input Power: 20.0 dBm (100 mW)
Peak SAR (extrapolated) = 11.6 W/kg
SAR(1 g) = 5.55 W/kg
Deviation(1 g): 7.35%



0 dB = 7.29 W/kg = 8.63 dBW/kg

PCTEST ENGINEERING LABORATORY, INC.

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

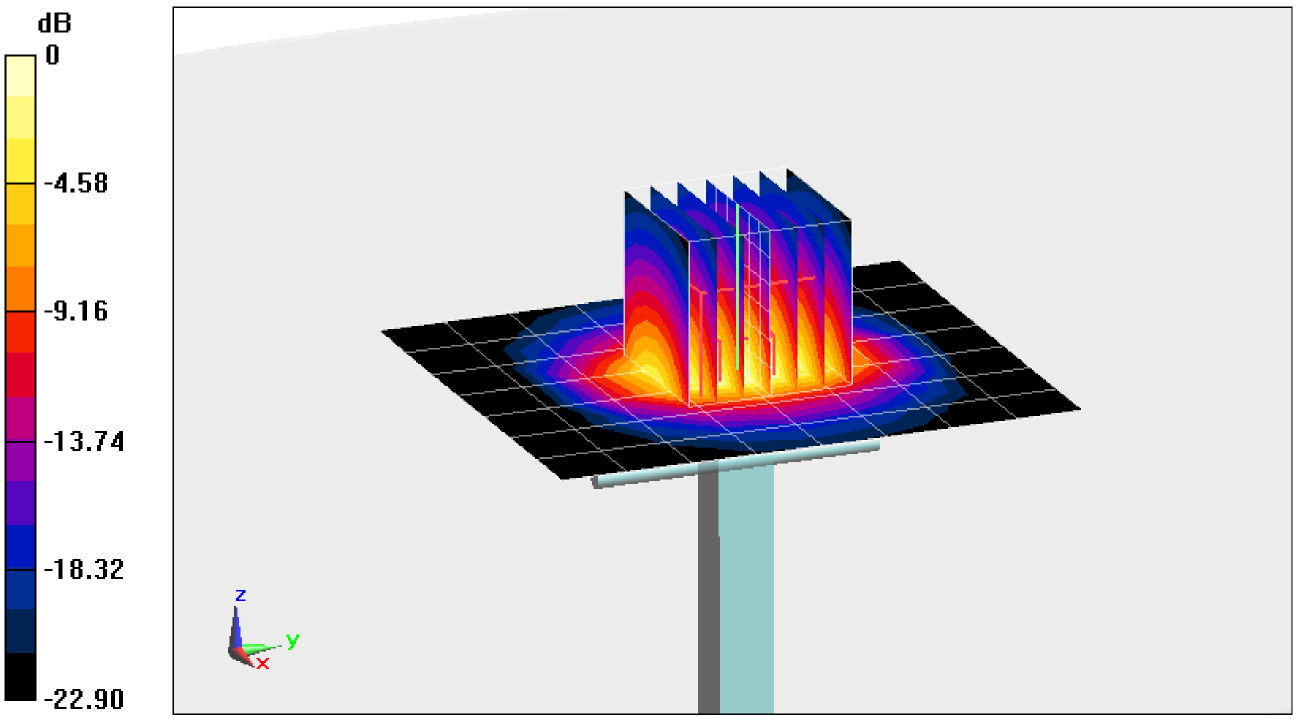
Communication System: UID 0, CW; Frequency: 2600 MHz;Duty Cycle: 1:1
Medium: 2600 Body Medium parameters used:
f = 2600 MHz; σ = 2.176 S/m; ε_r = 50.896; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 06-09-2014; Ambient Temp: 24.5°C; Tissue Temp: 23.9°C

Probe: ES3DV3 - SN3258; ConvF(3.91, 3.91, 3.91); Calibrated: 2/25/2014;
Sensor-Surface: 3mm (Mechanical Surface Detection)
Electronics: DAE4 Sn665; Calibrated: 2/26/2014
Phantom: ELI v5.0; Type: QDOVA002AA; Serial: TP-1158
Measurement SW: DASY52, Version 52.8 (7); SEMCAD X Version 14.6.10 (7331)

2600 MHz System Verification

Area Scan (8x9x1): Measurement grid: dx=12mm, dy=12mm
Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Input Power: 20.0 dBm (100 mW)
Peak SAR (extrapolated) = 12.0 W/kg
SAR(1 g) = 5.41 W/kg
Deviation(1 g): -4.59%



0 dB = 7.17 W/kg = 8.56 dBW/kg

PCTEST ENGINEERING LABORATORY, INC.

DUT: SAR Dipole 5200 MHz; Type: D5GHzV2; Serial: 1007

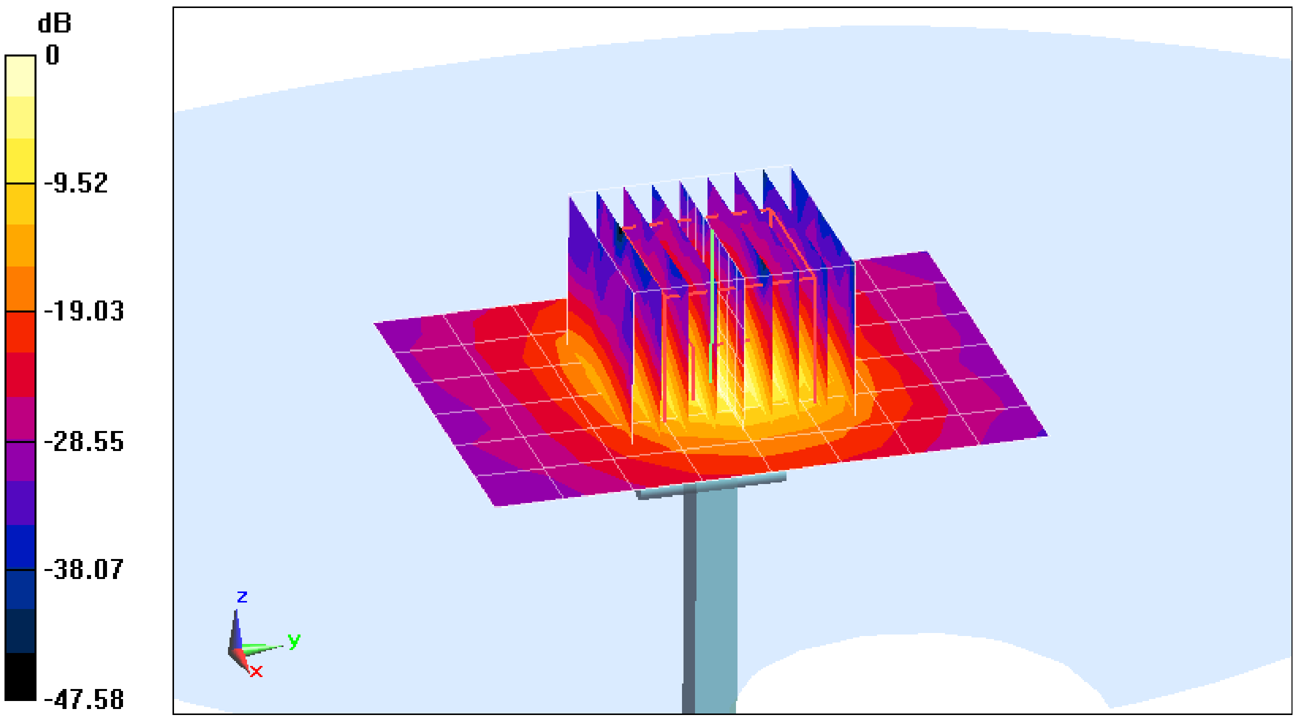
Communication System: UID 0, CW; Frequency: 5200 MHz;Duty Cycle: 1:1
Medium: 5 GHz Body Medium parameters used:
f = 5200 MHz; σ = 5.454 S/m; ε_r = 47.504; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 06-16-2014; Ambient Temp: 24.4°C; Tissue Temp: 22.4°C

Probe: EX3DV4 - SN3920; ConvF(4.23, 4.23, 4.23); Calibrated: 12/18/2013;
Sensor-Surface: 1.4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn649; Calibrated: 12/12/2013
Phantom: SAM Sub; Type: SAM 4.0; Serial: TP-1357
Measurement SW: DASY4, Version 4.7 (80); SEMCAD X Version 14.6.10 (7331)

5200 MHz System Verification

Area Scan (7x9x1): Measurement grid: dx=10mm, dy=10mm
Zoom Scan (9x9x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm; Graded Ratio: 1.4
Input Power: 20.0 dBm (100 mW)
Peak SAR (extrapolated) = 28.3 W/kg
SAR(1 g) = 7.4 W/kg
Deviation(1 g): 1.93%



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

PCTEST ENGINEERING LABORATORY, INC.

DUT: SAR Dipole 5300 MHz; Type: D5GHzV2; Serial: 1007

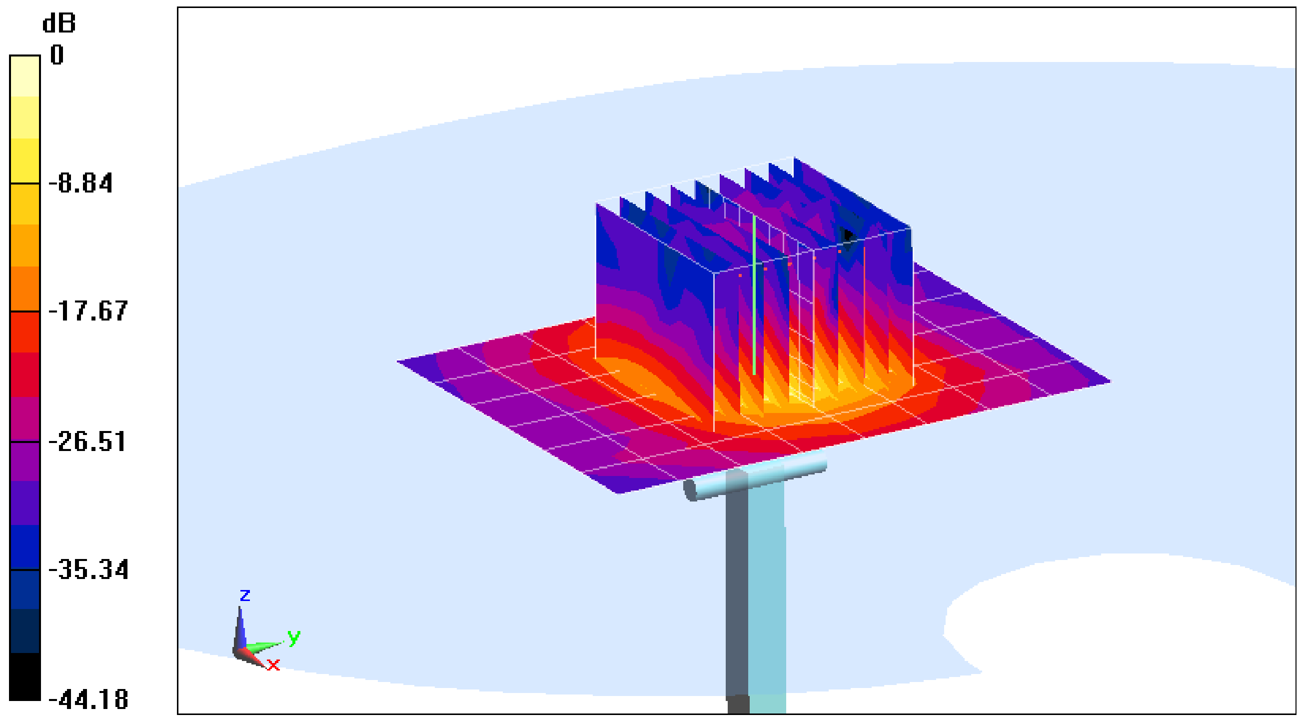
Communication System: UID 0, CW; Frequency: 5300 MHz;Duty Cycle: 1:1
Medium: 5 GHz Body Medium parameters used:
f = 5300 MHz; σ = 5.592 S/m; ε_r = 47.351; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 06-16-2014; Ambient Temp: 24.4°C; Tissue Temp: 22.4°C

Probe: EX3DV4 - SN3920; ConvF(4.11, 4.11, 4.11); Calibrated: 12/18/2013;
Sensor-Surface: 1.4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn649; Calibrated: 12/12/2013
Phantom: SAM Sub; Type: SAM 4.0; Serial: TP-1357
Measurement SW: DASY4, Version 4.7 (80); SEMCAD X Version 14.6.10 (7331)

5300 MHz System Verification

Area Scan (7x9x1): Measurement grid: dx=10mm, dy=10mm
Zoom Scan (9x9x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm; Graded Ratio: 1.4
Input Power: 20.0 dBm (100 mW)
Peak SAR (extrapolated) = 33.0 W/kg
SAR(1 g) = 7.53 W/kg
Deviation(1 g): 0.80%



0 dB = 18.9 W/kg = 12.76 dBW/kg

PCTEST ENGINEERING LABORATORY, INC.

DUT: SAR Dipole 5600 MHz; Type: D5GHzV2; Serial: 1007

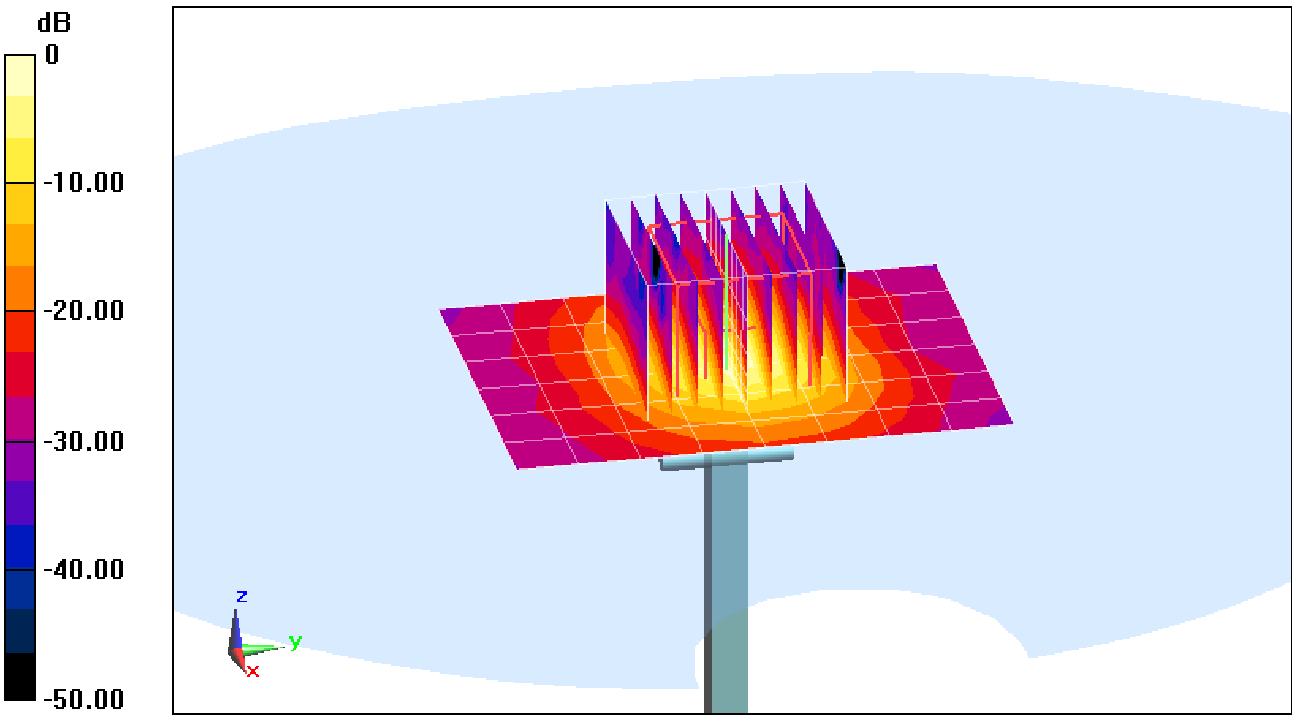
Communication System: UID 0, CW; Frequency: 5600 MHz;Duty Cycle: 1:1
Medium: 5 GHz Body Medium parameters used:
f = 5600 MHz; σ = 6.014 S/m; ε_r = 47.23; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 06-16-2014; Ambient Temp: 24.5°C; Tissue Temp: 22.5°C

Probe: EX3DV4 - SN3920; ConvF(3.62, 3.62, 3.62); Calibrated: 12/18/2013;
Sensor-Surface: 1.4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn649; Calibrated: 12/12/2013
Phantom: SAM Sub; Type: SAM 4.0; Serial: TP-1357
Measurement SW: DASY4, Version 4.7 (80); SEMCAD X Version 14.6.10 (7331)

5600 MHz System Verification

Area Scan (7x9x1): Measurement grid: dx=10mm, dy=10mm
Zoom Scan (9x9x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm; Graded Ratio: 1.4
Input Power: 20.0 dBm (100 mW)
Peak SAR (extrapolated) = 36.5 W/kg
SAR(1 g) = 7.65 W/kg
Deviation(1 g): -1.03%



0 dB = 19.9 W/kg = 12.99 dBW/kg

PCTEST ENGINEERING LABORATORY, INC.

DUT: SAR Dipole 5800 MHz; Type: D5GHzV2; Serial: 1007

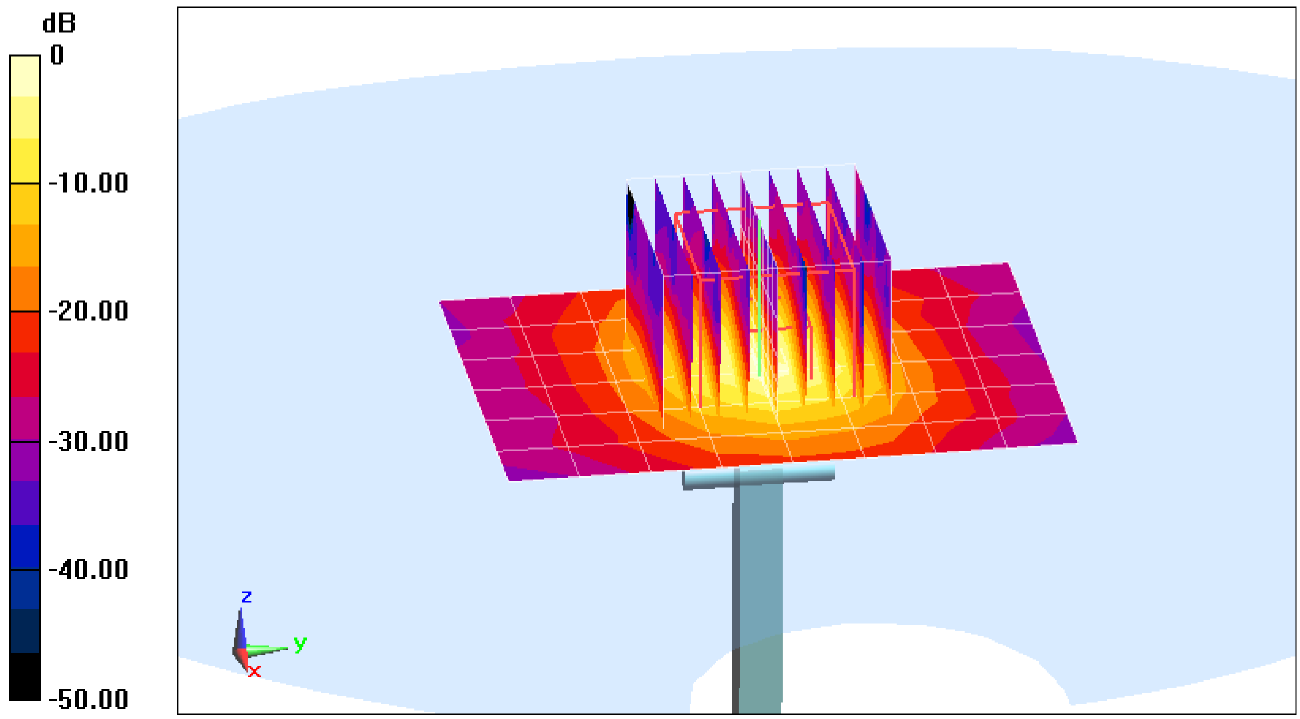
Communication System: UID 0, CW; Frequency: 5800 MHz;Duty Cycle: 1:1
Medium: 5 GHz Body Medium parameters used:
f = 5800 MHz; σ = 6.21 S/m; ε_r = 46.638; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 06-16-2014; Ambient Temp: 24.5°C; Tissue Temp: 22.5°C

Probe: EX3DV4 - SN3920; ConvF(4, 4, 4); Calibrated: 12/18/2013;
Sensor-Surface: 1.4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn649; Calibrated: 12/12/2013
Phantom: SAM Sub; Type: SAM 4.0; Serial: TP-1357
Measurement SW: DASY4, Version 4.7 (80); SEMCAD X Version 14.6.10 (7331)

5800 MHz System Verification

Area Scan (7x9x1): Measurement grid: dx=10mm, dy=10mm
Zoom Scan (9x9x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm; Graded Ratio: 1.4
Input Power: 20.0 dBm (100 mW)
Peak SAR (extrapolated) = 34.8 W/kg
SAR(1 g) = 6.92 W/kg
Deviation(1 g): -5.08%



0 dB = 18.0 W/kg = 12.55 dBW/kg

APPENDIX C: PROBE CALIBRATION

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

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

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

Accreditation No.: SCS 108

Client **PC Test**

Certificate No: D835V2-4d119_Apr14

CALIBRATION CERTIFICATE

Object	D835V2 - SN: 4d119
Calibration procedure(s)	QA CAL-05.v9 Calibration procedure for dipole validation kits above 700 MHz
Calibration date:	April 07, 2014

QC✓ 4/25/14

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

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

Calibration Equipment used (M&TE critical for calibration)

Primary Standards	ID #	Cal Date (Certificate No.)	Scheduled Calibration
Power meter EPM-442A	GB37480704	09-Oct-13 (No. 217-01827)	Oct-14
Power sensor HP 8481A	US37292783	09-Oct-13 (No. 217-01827)	Oct-14
Power sensor HP 8481A	MY41092317	09-Oct-13 (No. 217-01828)	Oct-14
Reference 20 dB Attenuator	SN: 5058 (20k)	03-Apr-14 (No. 217-01918)	Apr-15
Type-N mismatch combination	SN: 5047.2 / 06327	03-Apr-14 (No. 217-01921)	Apr-15
Reference Probe ES3DV3	SN: 3205	30-Dec-13 (No. ES3-3205_Dec13)	Dec-14
DAE4	SN: 601	25-Apr-13 (No. DAE4-601_Apr13)	Apr-14

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

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

Issued: April 9, 2014

Glossary:

TSL	tissue simulating liquid
ConvF	sensitivity in TSL / NORM x,y,z
N/A	not applicable or not measured

Calibration is Performed According to the Following Standards:

a) IEEE Std 1528-2013, "IEEE Recommended Practice for Determining the Peak Spatial-Averaged Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques", June 2013
b) IEC 62209-1, "Procedure to measure the Specific Absorption Rate (SAR) for hand-held devices used in close proximity to the ear (frequency range of 300 MHz to 3 GHz)", February 2005
c) KDB 865664, "SAR Measurement Requirements for 100 MHz to 6 GHz"

Additional Documentation:

d) DASY4/5 System Handbook

Methods Applied and Interpretation of Parameters:

- *Measurement Conditions:* Further details are available from the Validation Report at the end of the certificate. All figures stated in the certificate are valid at the frequency indicated.
- *Antenna Parameters with TSL:* The dipole is mounted with the spacer to position its feed point exactly below the center marking of the flat phantom section, with the arms oriented parallel to the body axis.
- *Feed Point Impedance and Return Loss:* These parameters are measured with the dipole positioned under the liquid filled phantom. The impedance stated is transformed from the measurement at the SMA connector to the feed point. The Return Loss ensures low reflected power. No uncertainty required.
- *Electrical Delay:* One-way delay between the SMA connector and the antenna feed point. No uncertainty required.
- *SAR measured:* SAR measured at the stated antenna input power.
- *SAR normalized:* SAR as measured, normalized to an input power of 1 W at the antenna connector.
- *SAR for nominal TSL parameters:* The measured TSL parameters are used to calculate the nominal SAR result.

The reported uncertainty of measurement is stated as the standard uncertainty of measurement multiplied by the coverage factor k=2, which for a normal distribution corresponds to a coverage probability of approximately 95%.

Measurement Conditions

DASY system configuration, as far as not given on page 1.

DASY Version	DASY5	V52.8.7
Extrapolation	Advanced Extrapolation	
Phantom	Modular Flat Phantom	
Distance Dipole Center - TSL	15 mm	with Spacer
Zoom Scan Resolution	dx, dy, dz = 5 mm	
Frequency	835 MHz ± 1 MHz	

Head TSL parameters

The following parameters and calculations were applied.

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

SAR result with Head TSL

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

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

Body TSL parameters

The following parameters and calculations were applied.

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

SAR result with Body TSL

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

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

Appendix

Antenna Parameters with Head TSL

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

Antenna Parameters with Body TSL

Impedance, transformed to feed point	46.3 Ω - 4.5 jΩ
Return Loss	- 24.4 dB

General Antenna Parameters and Design

Electrical Delay (one direction)	1.386 ns

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

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

Additional EUT Data

Manufactured by	SPEAG
Manufactured on	June 29, 2010

DASY5 Validation Report for Head TSL

Date: 07.04.2014

Test Laboratory: SPEAG, Zurich, Switzerland

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

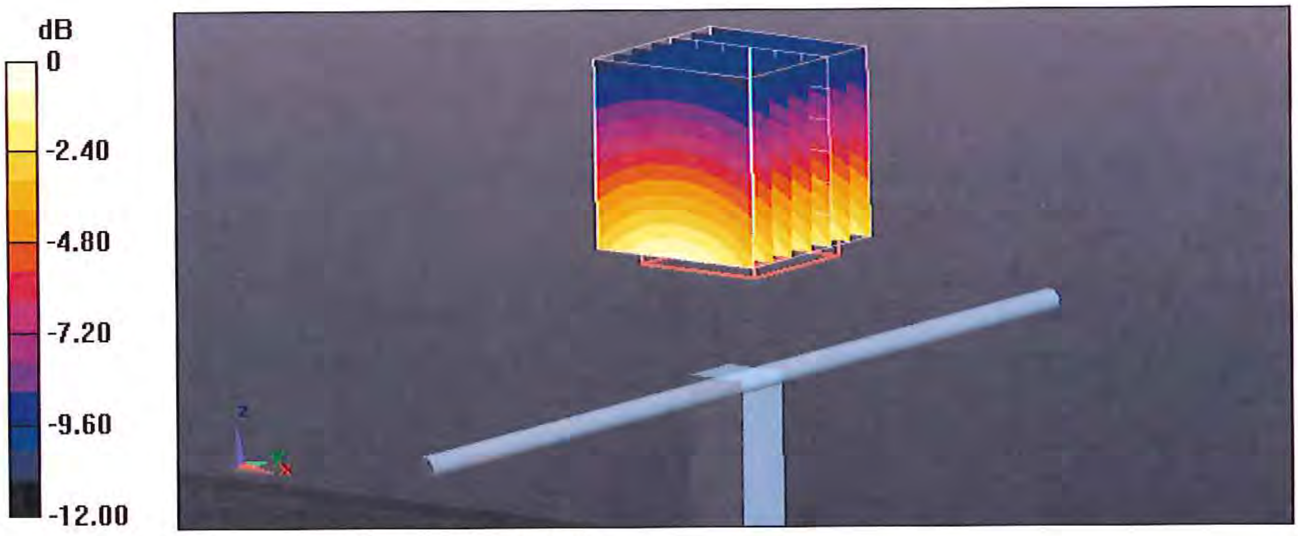
Communication System: UID 0 - CW; Frequency: 835 MHz
Medium parameters used: f = 835 MHz; σ = 0.94 S/m; ε_r = 41.6; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY52 Configuration:

- Probe: ES3DV3 - SN3205; ConvF(6.22, 6.22, 6.22); Calibrated: 30.12.2013;
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 25.04.2013
- Phantom: Flat Phantom 4.9L; Type: QD000P49AA; Serial: 1001
- DASY52 52.8.7(1137); SEMCAD X 14.6.10(7164)

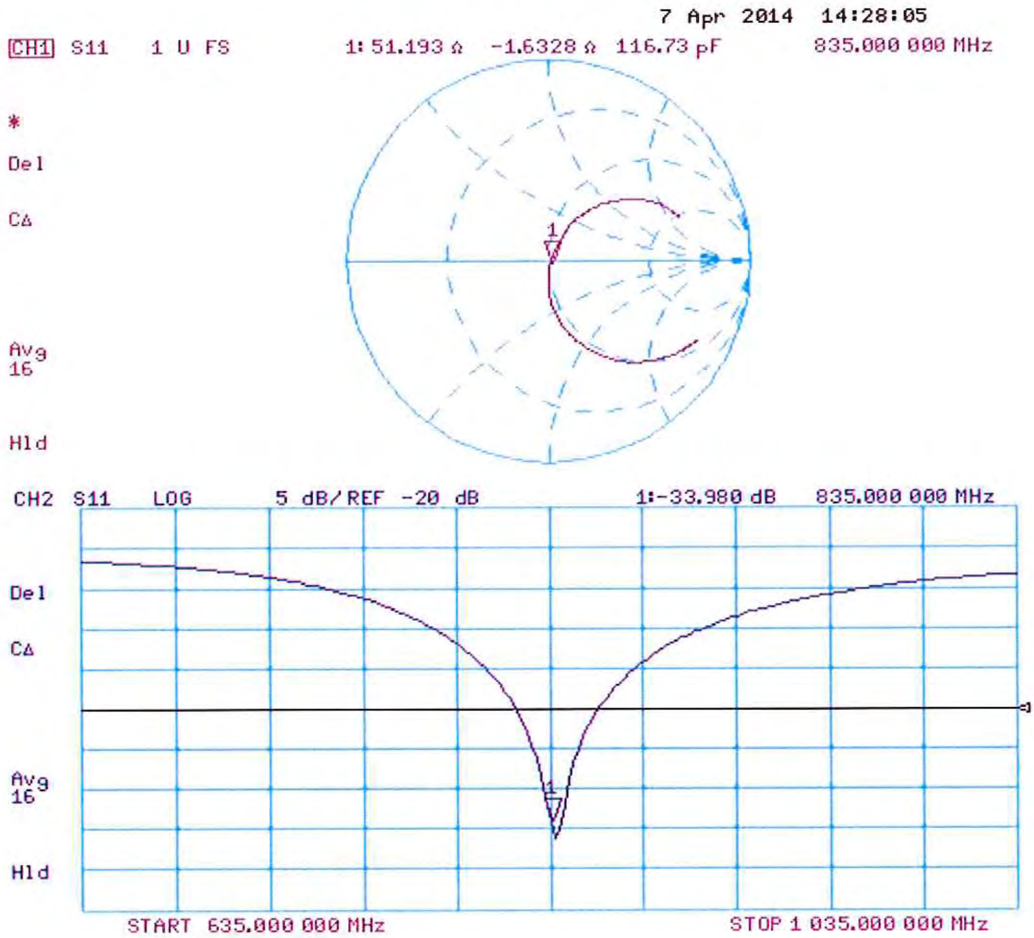
Dipole Calibration for Head Tissue/Pin=250 mW, d=15mm/Zoom Scan (7x7x7)/Cube 0:

Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 56.289 V/m; Power Drift = 0.01 dB
Peak SAR (extrapolated) = 3.59 W/kg
SAR(1 g) = 2.38 W/kg; SAR(10 g) = 1.53 W/kg
Maximum value of SAR (measured) = 2.80 W/kg



0 dB = 2.80 W/kg = 4.47 dBW/kg

Impedance Measurement Plot for Head TSL



DASY5 Validation Report for Body TSL

Date: 07.04.2014

Test Laboratory: SPEAG, Zurich, Switzerland

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

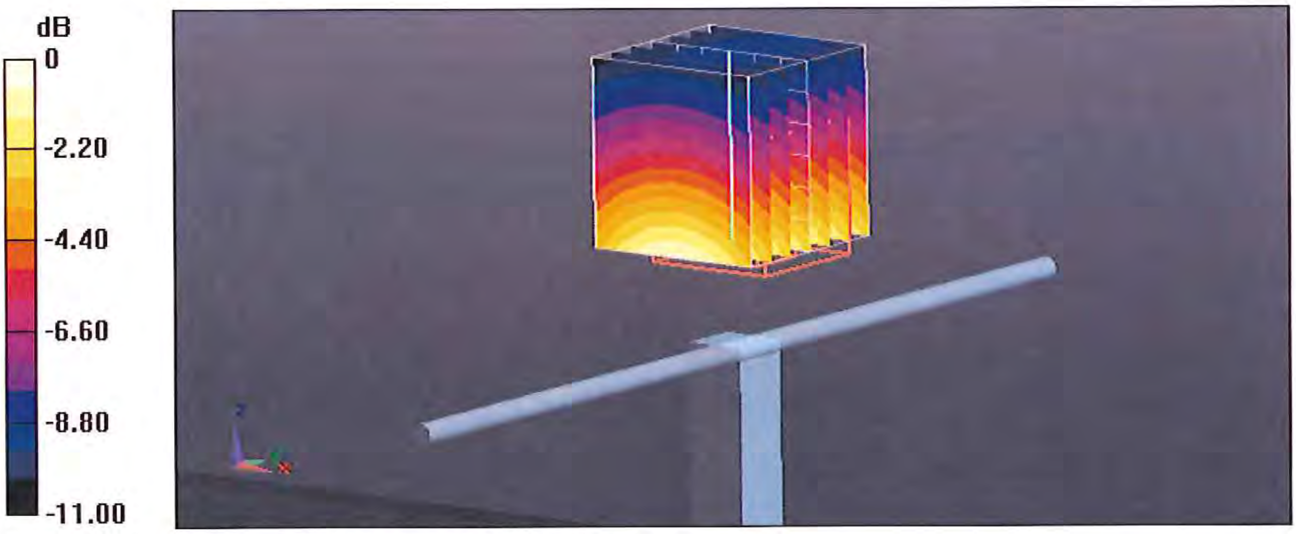
Communication System: UID 0 - CW; Frequency: 835 MHz
Medium parameters used: f = 835 MHz; σ = 1.02 S/m; ε_r = 53.6; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY52 Configuration:

- Probe: ES3DV3 - SN3205; ConvF(6.09, 6.09, 6.09); Calibrated: 30.12.2013;
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 25.04.2013
- Phantom: Flat Phantom 4.9L; Type: QD000P49AA; Serial: 1001
- DASY52 52.8.7(1137); SEMCAD X 14.6.10(7164)

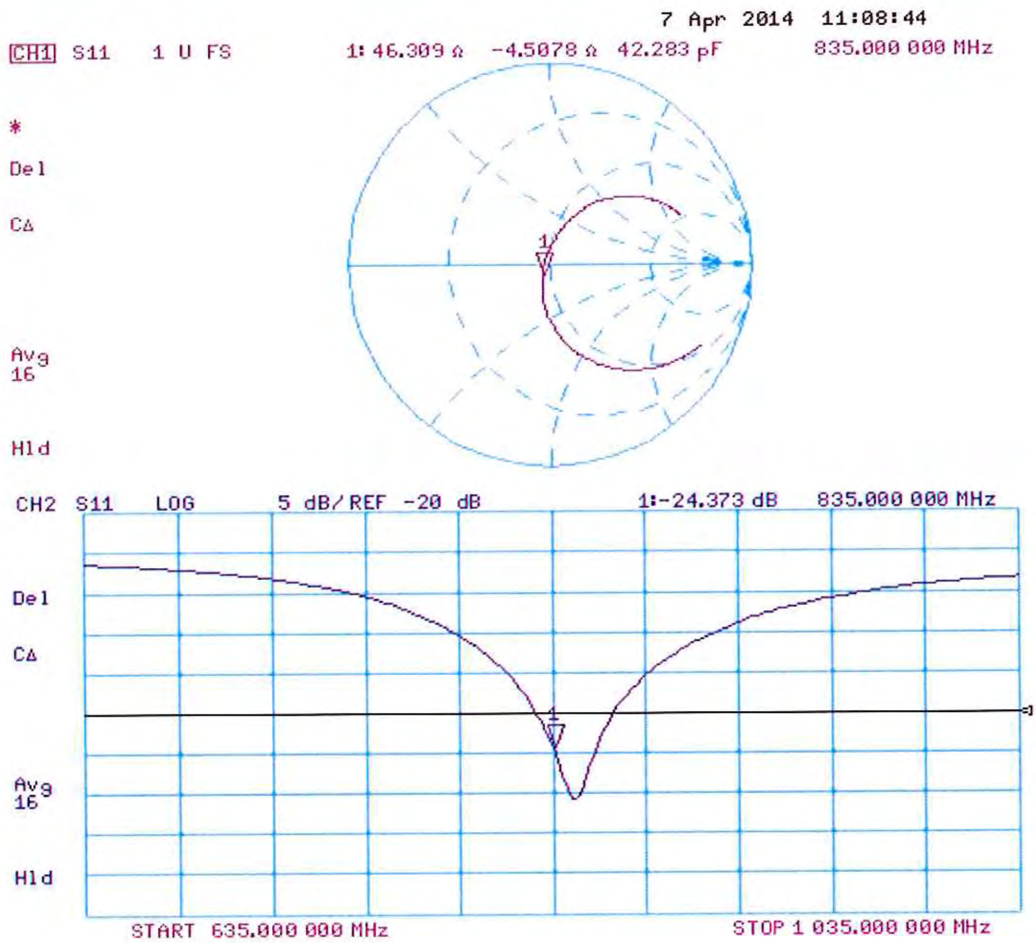
Dipole Calibration for Body Tissue/Pin=250 mW, d=15mm/Zoom Scan (7x7x7)/Cube 0:

Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 54.594 V/m; Power Drift = -0.01 dB
Peak SAR (extrapolated) = 3.61 W/kg
SAR(1 g) = 2.44 W/kg; SAR(10 g) = 1.59 W/kg
Maximum value of SAR (measured) = 2.85 W/kg



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

Impedance Measurement Plot for Body TSL



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Accreditation No.: SCS 108

Client **PC Test**

Certificate No: D1900V2-5d149_Jul13

CALIBRATION CERTIFICATE

Object	D1900V2 - SN: 5d149
Calibration procedure(s)	QA CAL-05.v9 Calibration procedure for dipole validation kits above 700 MHz
Calibration date:	July 22, 2013

KOK 8/19/13

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	01-Nov-12 (No. 217-01640)	Oct-13
Power sensor HP 8481A	US37292783	01-Nov-12 (No. 217-01640)	Oct-13
Reference 20 dB Attenuator	SN: 5058 (20k)	04-Apr-13 (No. 217-01736)	Apr-14
Type-N mismatch combination	SN: 5047.3 / 06327	04-Apr-13 (No. 217-01739)	Apr-14
Reference Probe ES3DV3	SN: 3205	28-Dec-12 (No. ES3-3205_Dec12)	Dec-13
DAE4	SN: 601	25-Apr-13 (No. DAE4-601_Apr13)	Apr-14

Secondary Standards	ID #	Check Date (in house)	Scheduled Check
Power sensor HP 8481A	MY41092317	18-Oct-02 (in house check Oct-11)	In house check: Oct-13
RF generator R&S SMT-06	100005	04-Aug-99 (in house check Oct-11)	In house check: Oct-13
Network Analyzer HP 8753E	US37390585 S4206	18-Oct-01 (in house check Oct-12)	In house check: Oct-13

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

Issued: July 22, 2013

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Engineering AG
Zeughausstrasse 43, 8004 Zurich, Switzerland

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 1528-2003, "IEEE Recommended Practice for Determining the Peak Spatial-Averaged Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques", December 2003
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) Federal Communications Commission Office of Engineering & Technology (FCC OET), "Evaluating Compliance with FCC Guidelines for Human Exposure to Radiofrequency Electromagnetic Fields; Additional Information for Evaluating Compliance of Mobile and Portable Devices with FCC Limits for Human Exposure to Radiofrequency Emissions", Supplement C (Edition 01-01) to Bulletin 65

Additional Documentation:

d) DASY4/5 System Handbook

Methods Applied and Interpretation of Parameters:

- *Measurement Conditions:* Further details are available from the Validation Report at the end of the certificate. All figures stated in the certificate are valid at the frequency indicated.
- *Antenna Parameters with TSL:* The dipole is mounted with the spacer to position its feed point exactly below the center marking of the flat phantom section, with the arms oriented parallel to the body axis.
- *Feed Point Impedance and Return Loss:* These parameters are measured with the dipole positioned under the liquid filled phantom. The impedance stated is transformed from the measurement at the SMA connector to the feed point. The Return Loss ensures low reflected power. No uncertainty required.
- *Electrical Delay:* One-way delay between the SMA connector and the antenna feed point. No uncertainty required.
- *SAR measured:* SAR measured at the stated antenna input power.
- *SAR normalized:* SAR as measured, normalized to an input power of 1 W at the antenna connector.
- *SAR for nominal TSL parameters:* The measured TSL parameters are used to calculate the nominal SAR result.

The reported uncertainty of measurement is stated as the standard uncertainty of measurement multiplied by the coverage factor k=2, which for a normal distribution corresponds to a coverage probability of approximately 95%.

Measurement Conditions

DASY system configuration, as far as not given on page 1.

DASY Version	DASY5	V52.8.7
Extrapolation	Advanced Extrapolation	
Phantom	Modular Flat Phantom	
Distance Dipole Center - TSL	10 mm	with Spacer
Zoom Scan Resolution	dx, dy, dz = 5 mm	
Frequency	1900 MHz ± 1 MHz	

Head TSL parameters

The following parameters and calculations were applied.

	Temperature	**Permittivity**	**Conductivity**
Nominal Head TSL parameters	22.0 °C	40.0	1.40 mho/m
Measured Head TSL parameters	(22.0 ± 0.2) °C	38.9 ± 6 %	1.36 mho/m ± 6 %
Head TSL temperature change during test	< 0.5 °C	----	----

SAR result with Head TSL

SAR averaged over 1 cm^3 (1 g) of Head TSL	Condition	
SAR measured	250 mW input power	9.99 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**40.4 W/kg ± 17.0 % (k=2)**

SAR averaged over 10 cm^3 (10 g) of Head TSL	condition	
SAR measured	250 mW input power	5.28 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**21.3 W/kg ± 16.5 % (k=2)**

Body TSL parameters

The following parameters and calculations were applied.

	Temperature	**Permittivity**	**Conductivity**
Nominal Body TSL parameters	22.0 °C	53.3	1.52 mho/m
Measured Body TSL parameters	(22.0 ± 0.2) °C	53.4 ± 6 %	1.49 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	10.0 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	**40.5 W/kg ± 17.0 % (k=2)**

SAR averaged over 10 cm^3 (10 g) of Body TSL	condition	
SAR measured	250 mW input power	5.36 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	**21.6 W/kg ± 16.5 % (k=2)**

Appendix

Antenna Parameters with Head TSL

Impedance, transformed to feed point	52.9 Ω + 6.0 jΩ
Return Loss	- 23.8 dB

Antenna Parameters with Body TSL

Impedance, transformed to feed point	48.5 Ω + 6.4 jΩ
Return Loss	- 23.5 dB

General Antenna Parameters and Design

Electrical Delay (one direction)	1.196 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: 22.07.2013

Test Laboratory: SPEAG, Zurich, Switzerland

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

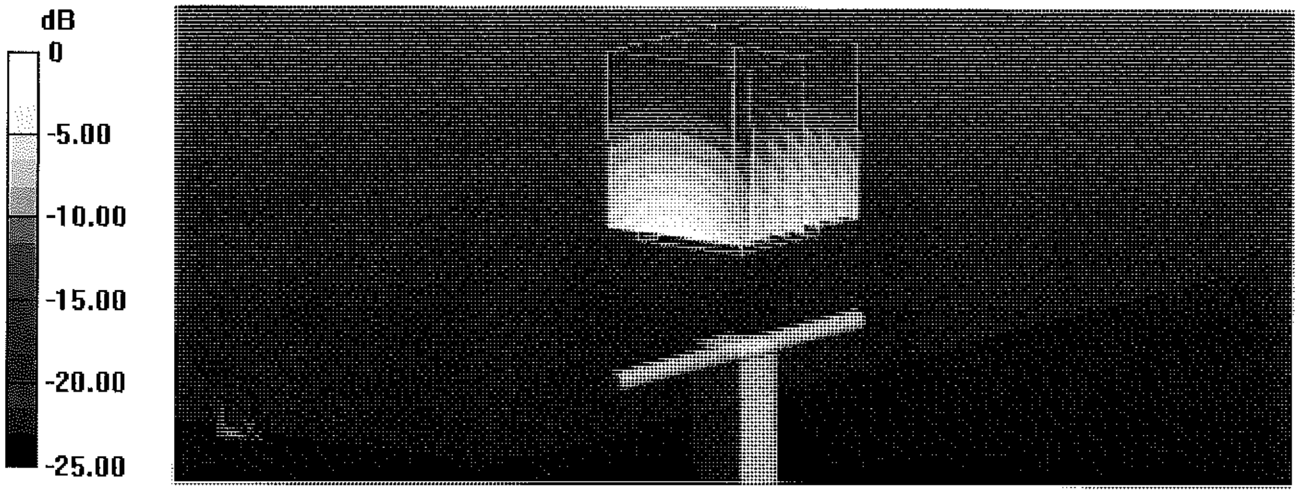
Communication System: UID 0 - CW ; Frequency: 1900 MHz
Medium parameters used: f = 1900 MHz; σ = 1.36 S/m; ε_r = 38.9; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY52 Configuration:

- Probe: ES3DV3 - SN3205; ConvF(4.98, 4.98, 4.98); Calibrated: 28.12.2012;
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 25.04.2013
- Phantom: Flat Phantom 5.0 (front); Type: QD000P50AA; Serial: 1001
- DASY52 52.8.7(1137); SEMCAD X 14.6.10(7164)

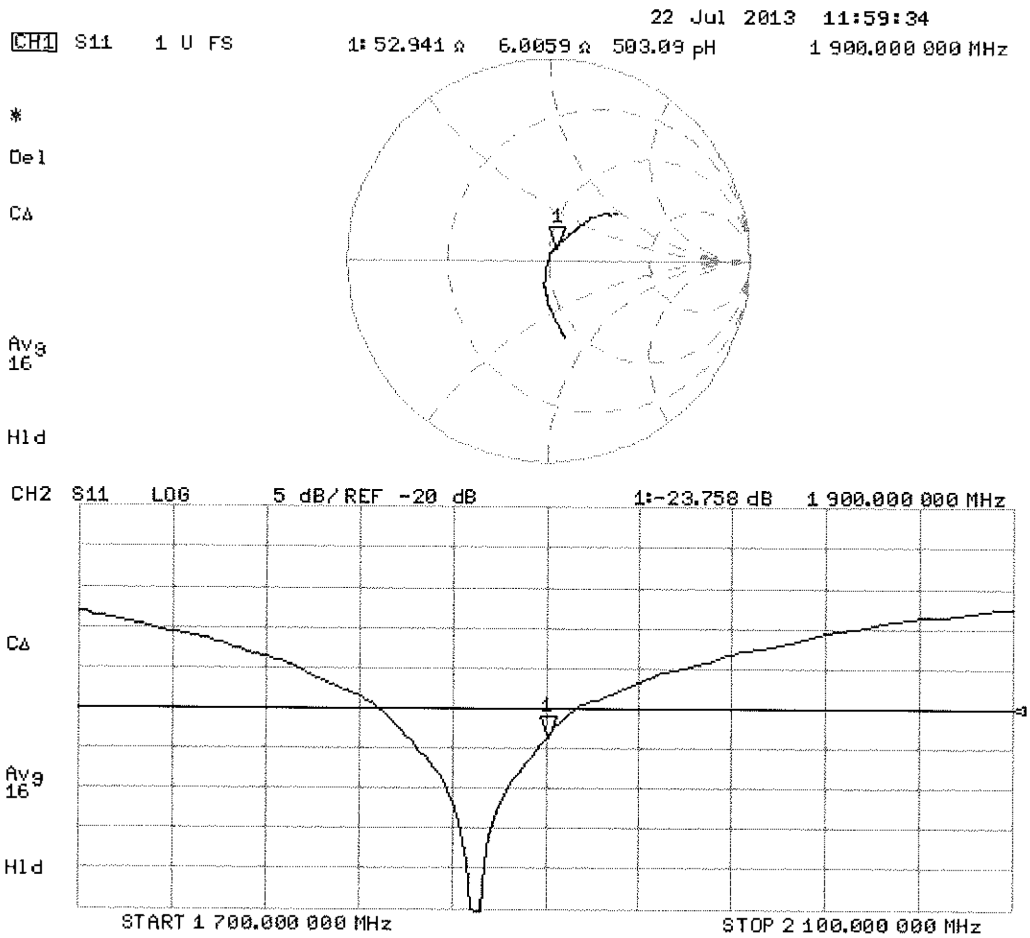
Dipole Calibration for Head Tissue/Pin=250 mW, d=10mm/Zoom Scan (7x7x7)/Cube 0:

Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 96.173 V/m; Power Drift = 0.04 dB
Peak SAR (extrapolated) = 18.0 W/kg
SAR(1 g) = 9.99 W/kg; SAR(10 g) = 5.28 W/kg
Maximum value of SAR (measured) = 12.4 W/kg



0 dB = 12.4 W/kg = 10.93 dBW/kg

Impedance Measurement Plot for Head TSL



DASY5 Validation Report for Body TSL

Date: 22.07.2013

Test Laboratory: SPEAG, Zurich, Switzerland

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

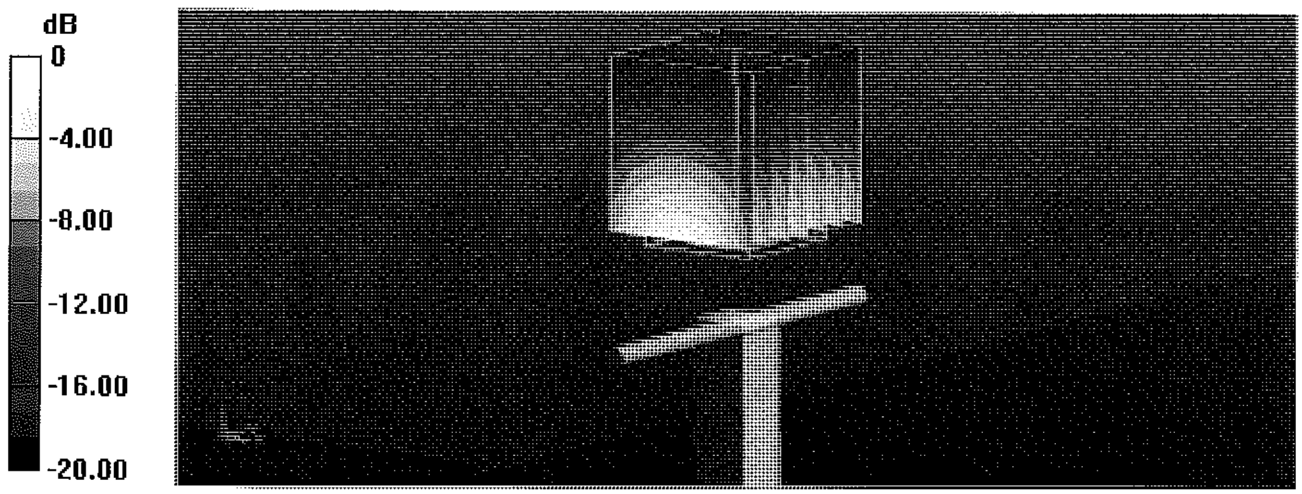
Communication System: UID 0 - CW ; Frequency: 1900 MHz
Medium parameters used: f = 1900 MHz; σ = 1.49 S/m; ε_r = 53.4; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY52 Configuration:

- Probe: ES3DV3 - SN3205; ConvF(4.6, 4.6, 4.6); Calibrated: 28.12.2012;
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 25.04.2013
- Phantom: Flat Phantom 5.0 (back); Type: QD000P50AA; Serial: 1002
- DASY52 52.8.7(1137); SEMCAD X 14.6.10(7164)

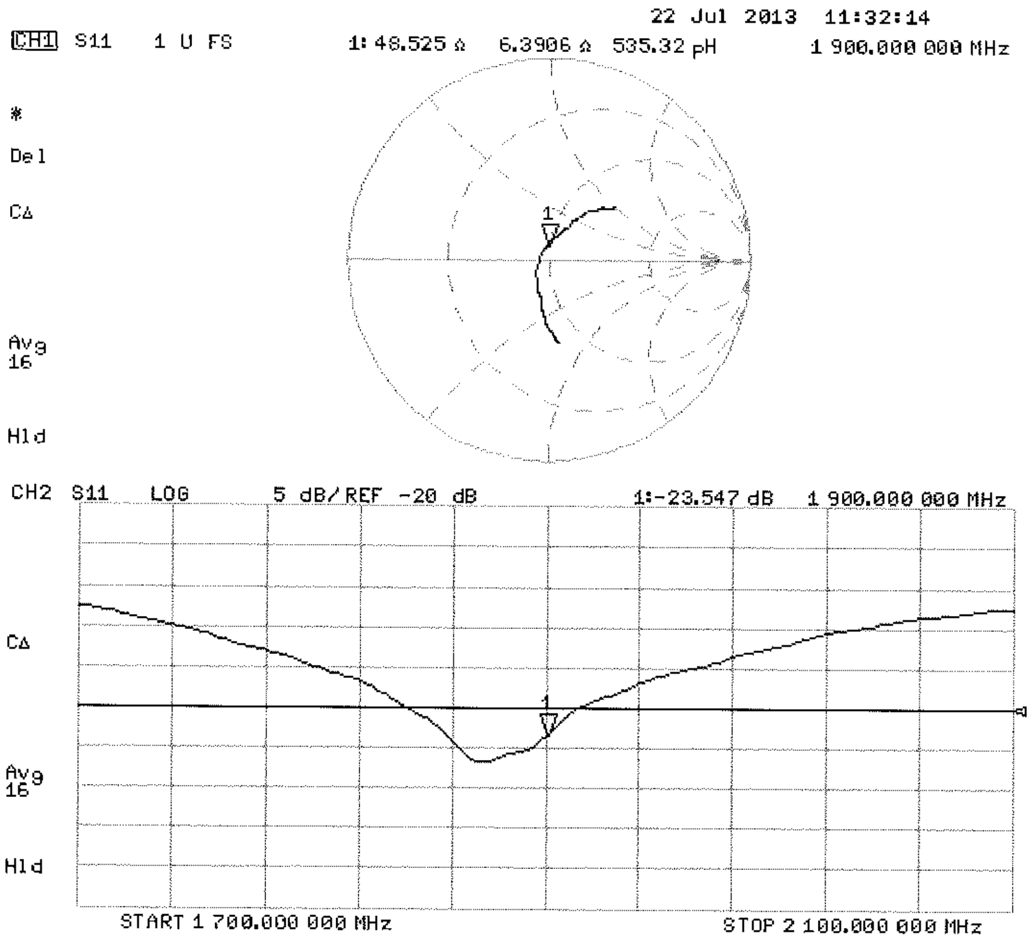
Dipole Calibration for Body Tissue/Pin=250 mW, d=10mm/Zoom Scan (7x7x7)/Cube 0:

Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 96.173 V/m; Power Drift = 0.01 dB
Peak SAR (extrapolated) = 17.0 W/kg
SAR(1 g) = 10 W/kg; SAR(10 g) = 5.36 W/kg
Maximum value of SAR (measured) = 12.6 W/kg



0 dB = 12.6 W/kg = 11.00 dBW/kg

Impedance Measurement Plot for Body TSL



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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 108

Client PC Test

Certificate No: D2450V2-797_Jan14

CALIBRATION CERTIFICATE

Object	D2450V2 - SN: 797
Calibration procedure(s)	QA CAL-05.v9 Calibration procedure for dipole validation kits above 700 MHz
Calibration date:	January 21, 2014

CC ✓ 2/5/14

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

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

Calibration Equipment used (M&TE critical for calibration)

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

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

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

Issued: January 21, 2014

PCT# 751

Glossary:

TSL	tissue simulating liquid
ConvF	sensitivity in TSL / NORM x,y,z
N/A	not applicable or not measured

Calibration is Performed According to the Following Standards:

a) IEEE Std 1528-2013, "IEEE Recommended Practice for Determining the Peak Spatial-Averaged Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques", June 2013
b) IEC 62209-1, "Procedure to measure the Specific Absorption Rate (SAR) for hand-held devices used in close proximity to the ear (frequency range of 300 MHz to 3 GHz)", February 2005
c) KDB 865664, "SAR Measurement Requirements for 100 MHz to 6 GHz"

Additional Documentation:

d) DASY4/5 System Handbook

Methods Applied and Interpretation of Parameters:

- *Measurement Conditions:* Further details are available from the Validation Report at the end of the certificate. All figures stated in the certificate are valid at the frequency indicated.
- *Antenna Parameters with TSL:* The dipole is mounted with the spacer to position its feed point exactly below the center marking of the flat phantom section, with the arms oriented parallel to the body axis.
- *Feed Point Impedance and Return Loss:* These parameters are measured with the dipole positioned under the liquid filled phantom. The impedance stated is transformed from the measurement at the SMA connector to the feed point. The Return Loss ensures low reflected power. No uncertainty required.
- *Electrical Delay:* One-way delay between the SMA connector and the antenna feed point. No uncertainty required.
- *SAR measured:* SAR measured at the stated antenna input power.
- *SAR normalized:* SAR as measured, normalized to an input power of 1 W at the antenna connector.
- *SAR for nominal TSL parameters:* The measured TSL parameters are used to calculate the nominal SAR result.

The reported uncertainty of measurement is stated as the standard uncertainty of measurement multiplied by the coverage factor k=2, which for a normal distribution corresponds to a coverage probability of approximately 95%.

Measurement Conditions

DASY system configuration, as far as not given on page 1.

DASY Version	DASY5	V52.8.7
Extrapolation	Advanced Extrapolation	
Phantom	Modular Flat Phantom	
Distance Dipole Center - TSL	10 mm	with Spacer
Zoom Scan Resolution	dx, dy, dz = 5 mm	
Frequency	2450 MHz ± 1 MHz	

Head TSL parameters

The following parameters and calculations were applied.

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

SAR result with Head TSL

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

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

Body TSL parameters

The following parameters and calculations were applied.

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

SAR result with Body TSL

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

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

Appendix

Antenna Parameters with Head TSL

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

Antenna Parameters with Body TSL

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

General Antenna Parameters and Design

Electrical Delay (one direction)	1.151 ns

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

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

Additional EUT Data

Manufactured by	SPEAG
Manufactured on	January 24, 2006

DASY5 Validation Report for Head TSL

Date: 21.01.2014

Test Laboratory: SPEAG, Zurich, Switzerland

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

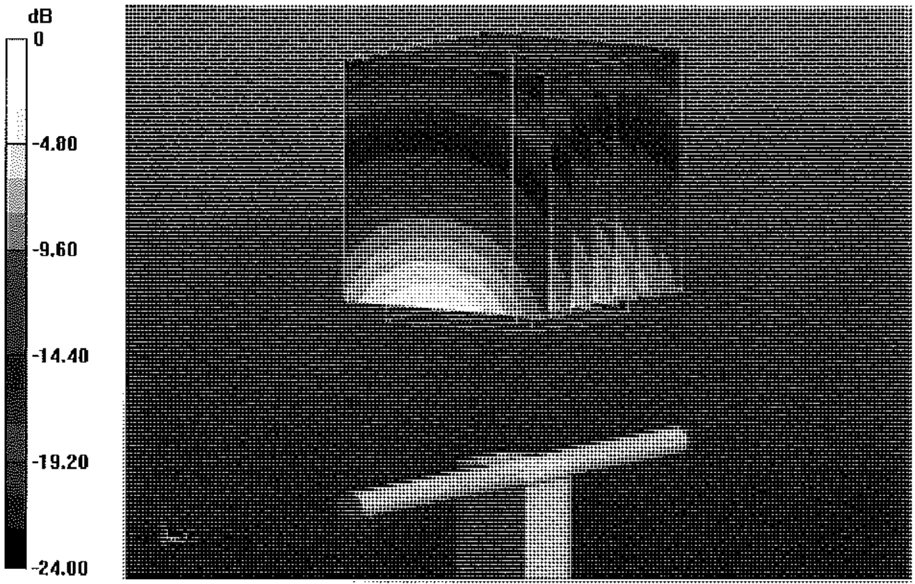
Communication System: UID 0 - CW; Frequency: 2450 MHz
Medium parameters used: f = 2450 MHz; σ = 1.86 S/m; ε_r = 38.7; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY52 Configuration:

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

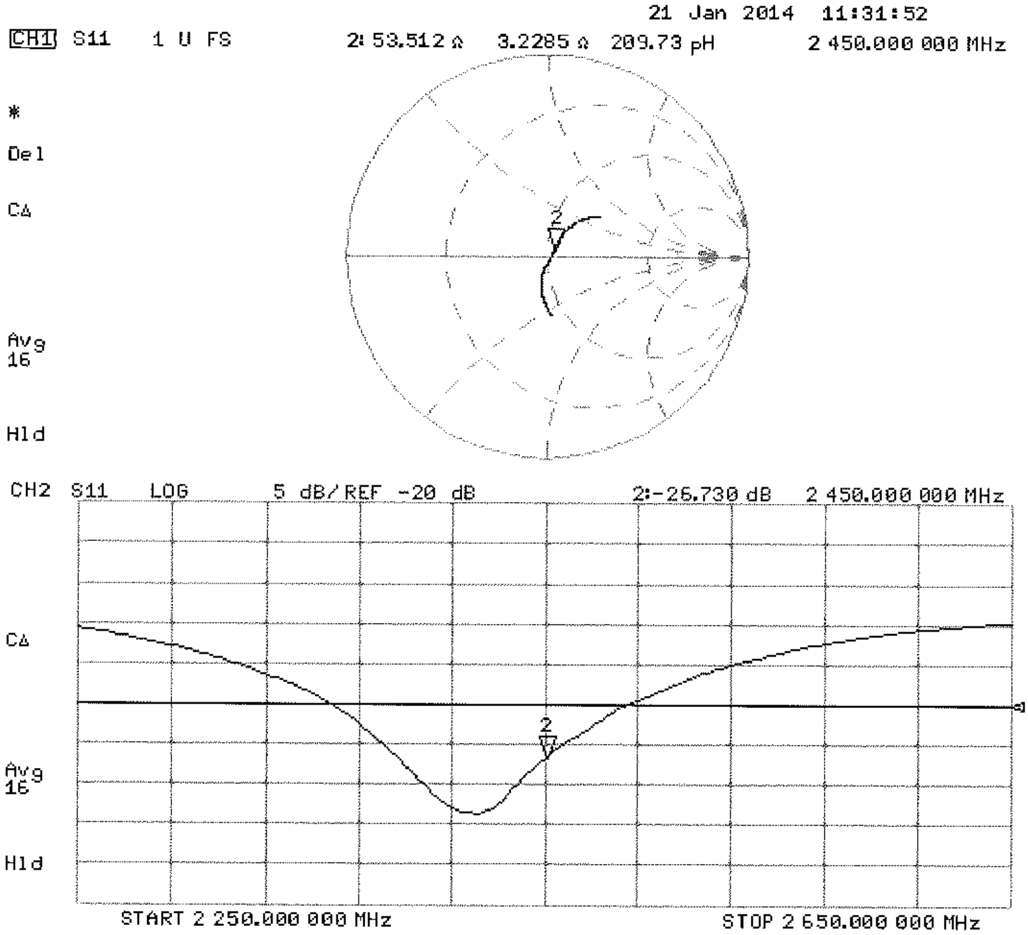
Dipole Calibration for Head Tissue/Pin=250 mW, d=10mm/Zoom Scan (7x7x7)/Cube 0:

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



0 dB = 16.9 W/kg = 12.28 dBW/kg

Impedance Measurement Plot for Head TSL



DASY5 Validation Report for Body TSL

Date: 21.01.2014

Test Laboratory: SPEAG, Zurich, Switzerland

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

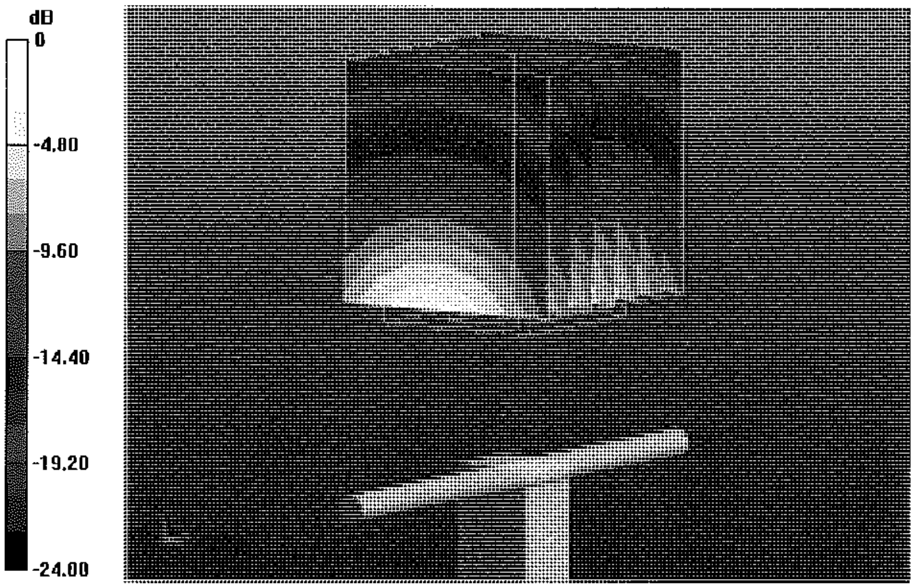
Communication System: UID 0 - CW; Frequency: 2450 MHz
Medium parameters used: f = 2450 MHz; σ = 2.04 S/m; ε_r = 51.3; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY52 Configuration:

- Probe: ES3DV3 - SN3205; ConvF(4.35, 4.35, 4.35); Calibrated: 30.12.2013;
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 25.04.2013
- Phantom: Flat Phantom 5.0 (back); Type: QD000P50AA; Serial: 1002
- DASY52 52.8.7(1137); SEMCAD X 14.6.10(7164)

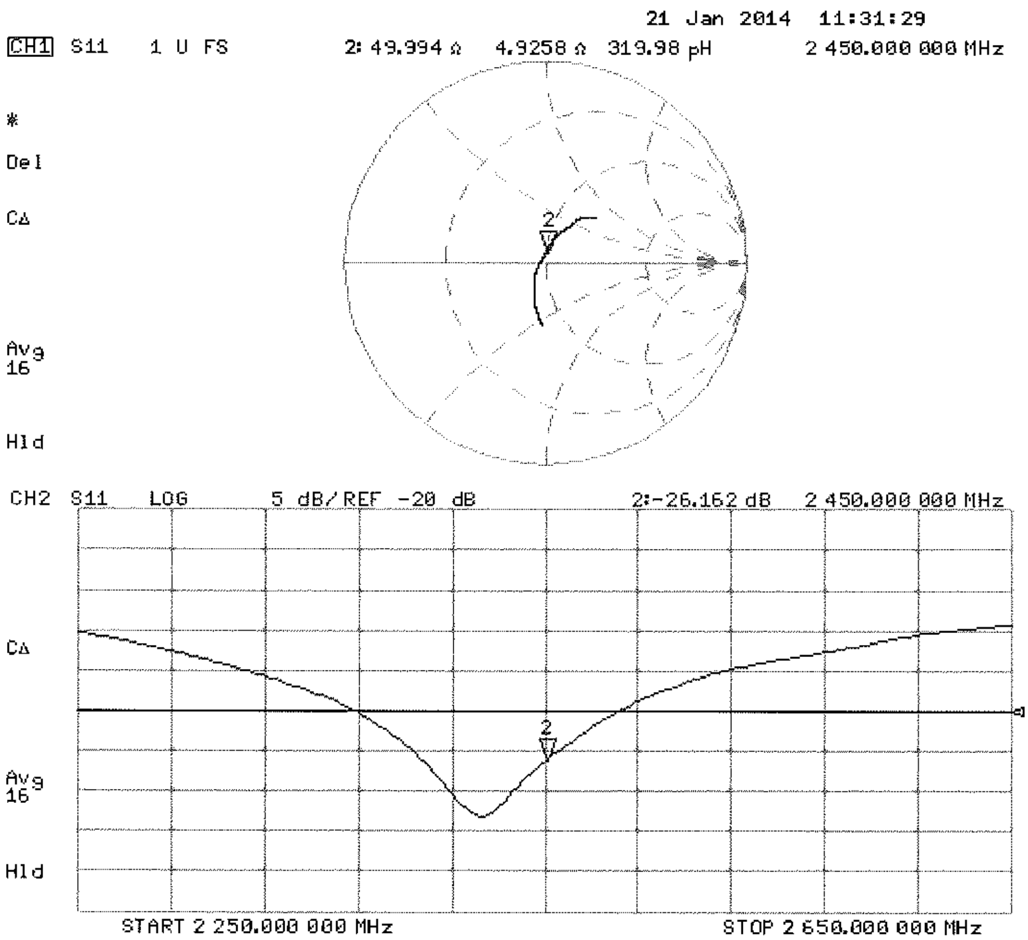
Dipole Calibration for Body Tissue/Pin=250 mW, d=10mm/Zoom Scan (7x7x7)/Cube 0:

Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 93.709 V/m; Power Drift = 0.01 dB
Peak SAR (extrapolated) = 26.4 W/kg
SAR(1 g) = 12.7 W/kg; SAR(10 g) = 5.86 W/kg
Maximum value of SAR (measured) = 16.8 W/kg



0 dB = 16.8 W/kg = 12.25 dBW/kg

Impedance Measurement Plot for Body TSL



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

Accreditation No.: SCS 108

Client **PC Test**

Certificate No: D2600V2-1004_Apr14

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 08, 2014

✓ KOK 5/7/14

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

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

Calibration Equipment used (M&TE critical for calibration)

Primary Standards	ID #	Cal Date (Certificate No.)	Scheduled Calibration
Power meter EPM-442A	GB37480704	09-Oct-13 (No. 217-01827)	Oct-14
Power sensor HP 8481A	US37292783	09-Oct-13 (No. 217-01827)	Oct-14
Power sensor HP 8481A	MY41092317	09-Oct-13 (No. 217-01828)	Oct-14
Reference 20 dB Attenuator	SN: 5058 (20k)	03-Apr-14 (No. 217-01918)	Apr-15
Type-N mismatch combination	SN: 5047.2 / 06327	03-Apr-14 (No. 217-01921)	Apr-15
Reference Probe ES3DV3	SN: 3205	30-Dec-13 (No. ES3-3205_Dec13)	Dec-14
DAE4	SN: 601	25-Apr-13 (No. DAE4-601_Apr13)	Apr-14

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

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

Issued: April 9, 2014

Glossary:

TSL	tissue simulating liquid
ConvF	sensitivity in TSL / NORM x,y,z
N/A	not applicable or not measured

Calibration is Performed According to the Following Standards:

a) IEEE Std 1528-2013, "IEEE Recommended Practice for Determining the Peak Spatial-Averaged Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques", June 2013
b) IEC 62209-1, "Procedure to measure the Specific Absorption Rate (SAR) for hand-held devices used in close proximity to the ear (frequency range of 300 MHz to 3 GHz)", February 2005
c) KDB 865664, "SAR Measurement Requirements for 100 MHz to 6 GHz"

Additional Documentation:

d) DASY4/5 System Handbook

Methods Applied and Interpretation of Parameters:

- *Measurement Conditions:* Further details are available from the Validation Report at the end of the certificate. All figures stated in the certificate are valid at the frequency indicated.
- *Antenna Parameters with TSL:* The dipole is mounted with the spacer to position its feed point exactly below the center marking of the flat phantom section, with the arms oriented parallel to the body axis.
- *Feed Point Impedance and Return Loss:* These parameters are measured with the dipole positioned under the liquid filled phantom. The impedance stated is transformed from the measurement at the SMA connector to the feed point. The Return Loss ensures low reflected power. No uncertainty required.
- *Electrical Delay:* One-way delay between the SMA connector and the antenna feed point. No uncertainty required.
- *SAR measured:* SAR measured at the stated antenna input power.
- *SAR normalized:* SAR as measured, normalized to an input power of 1 W at the antenna connector.
- *SAR for nominal TSL parameters:* The measured TSL parameters are used to calculate the nominal SAR result.

The reported uncertainty of measurement is stated as the standard uncertainty of measurement multiplied by the coverage factor k=2, which for a normal distribution corresponds to a coverage probability of approximately 95%.

Measurement Conditions

DASY system configuration, as far as not given on page 1.

DASY Version	DASY5	V52.8.7
Extrapolation	Advanced Extrapolation	
Phantom	Modular Flat Phantom	
Distance Dipole Center - TSL	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	37.7 ± 6 %	1.98 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	14.5 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**57.3 W/kg ± 17.0 % (k=2)**

SAR averaged over 10 cm^3 (10 g) of Head TSL	condition	
SAR measured	250 mW input power	6.44 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**25.6 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 %	2.19 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	14.4 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	**56.7 W/kg ± 17.0 % (k=2)**

SAR averaged over 10 cm^3 (10 g) of Body TSL	condition	
SAR measured	250 mW input power	6.38 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	**25.2 W/kg ± 16.5 % (k=2)**

Appendix

Antenna Parameters with Head TSL

Impedance, transformed to feed point	49.4 Ω - 4.8 jΩ
Return Loss	- 26.3 dB

Antenna Parameters with Body TSL

Impedance, transformed to feed point	46.4 Ω - 3.3 jΩ
Return Loss	- 25.9 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	December 23, 2006

DASY5 Validation Report for Head TSL

Date: 08.04.2014

Test Laboratory: SPEAG, Zurich, Switzerland

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

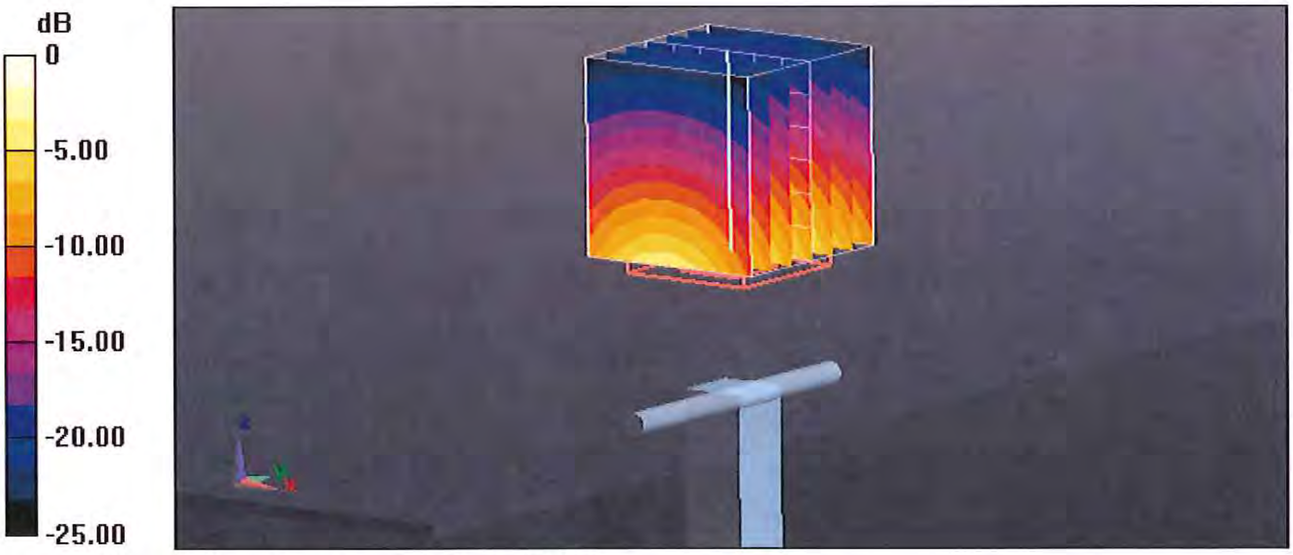
Communication System: UID 0 - CW; Frequency: 2600 MHz
Medium parameters used: f = 2600 MHz; σ = 1.98 S/m; ε_r = 37.7; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY52 Configuration:

- Probe: ES3DV3 - SN3205; ConvF(4.46, 4.46, 4.46); Calibrated: 30.12.2013;
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 25.04.2013
- Phantom: Flat Phantom 5.0 (front); Type: QD000P50AA; Serial: 1001
- DASY52 52.8.7(1137); SEMCAD X 14.6.10(7164)

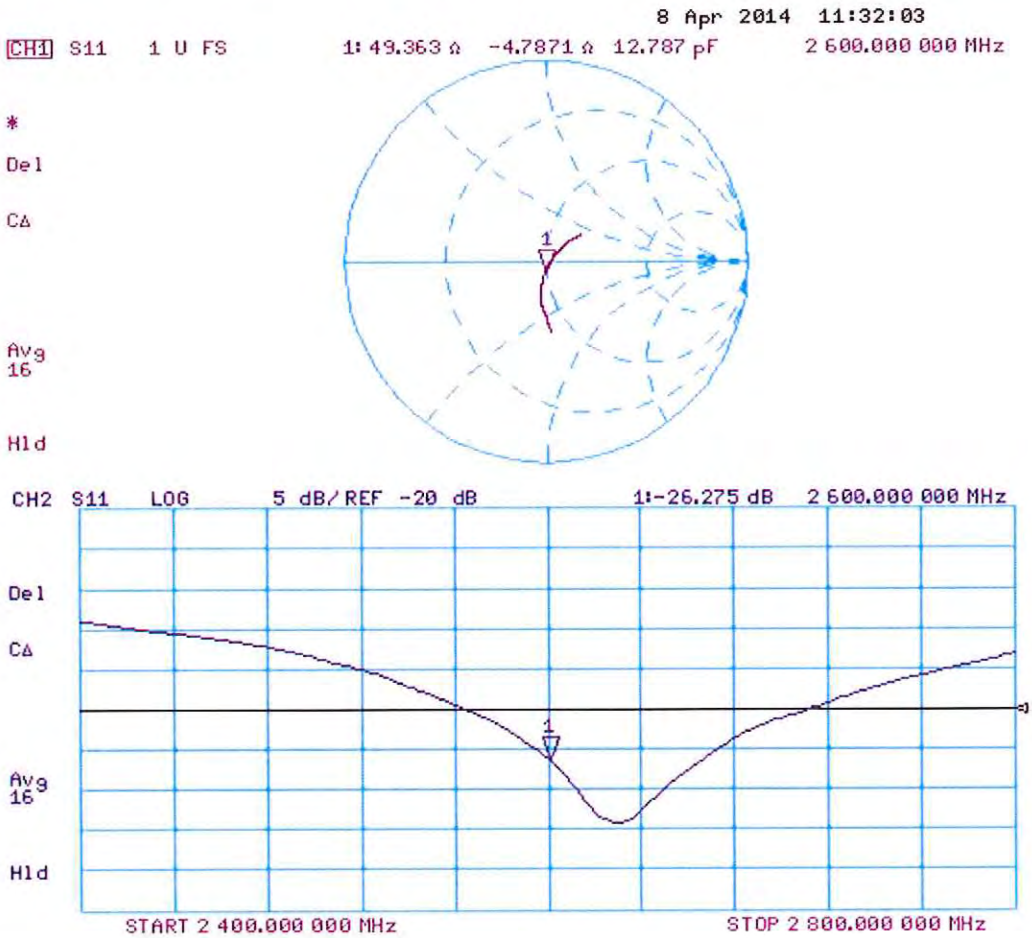
Dipole Calibration for Head Tissue/Pin=250 mW, d=10mm/Zoom Scan (7x7x7)/Cube 0:

Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 103.0 V/m; Power Drift = 0.01 dB
Peak SAR (extrapolated) = 30.7 W/kg
SAR(1 g) = 14.5 W/kg; SAR(10 g) = 6.44 W/kg
Maximum value of SAR (measured) = 19.3 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: 08.04.2014

Test Laboratory: SPEAG, Zurich, Switzerland

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

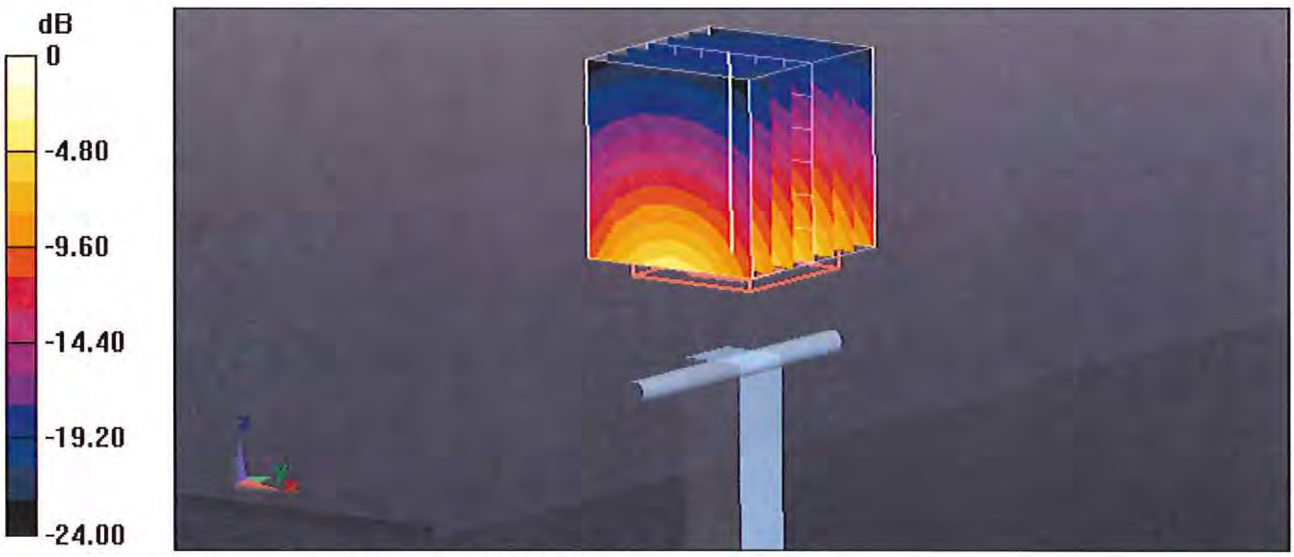
Communication System: UID 0 - CW; Frequency: 2600 MHz
Medium parameters used: f = 2600 MHz; σ = 2.19 S/m; ε_r = 50.2; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY52 Configuration:

- Probe: ES3DV3 - SN3205; ConvF(4.24, 4.24, 4.24); Calibrated: 30.12.2013;
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 25.04.2013
- Phantom: Flat Phantom 5.0 (back); Type: QD000P50AA; Serial: 1002
- DASY52 52.8.7(1137); SEMCAD X 14.6.10(7164)

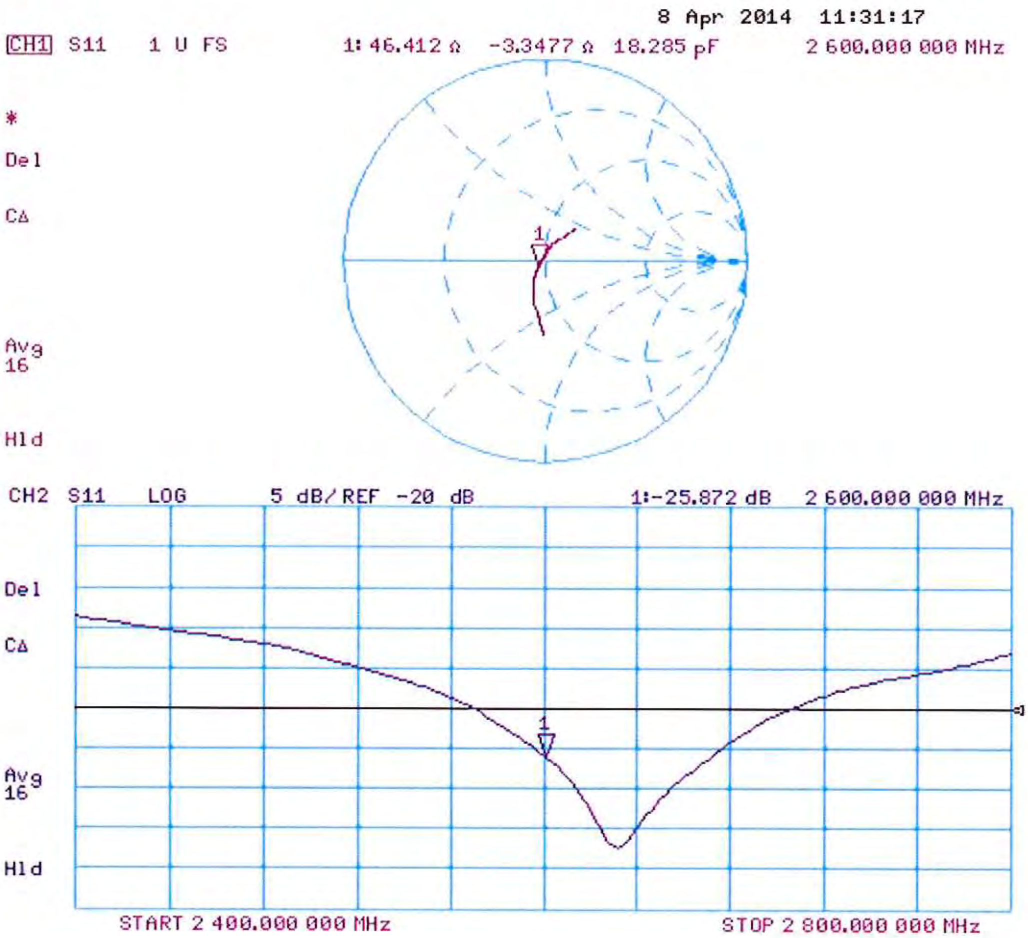
Dipole Calibration for Body Tissue/Pin=250 mW, d=10mm/Zoom Scan (7x7x7)/Cube 0:

Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 97.472 V/m; Power Drift = -0.01 dB
Peak SAR (extrapolated) = 31.1 W/kg
SAR(1 g) = 14.4 W/kg; SAR(10 g) = 6.38 W/kg
Maximum value of SAR (measured) = 19.4 W/kg



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

Impedance Measurement Plot for Body TSL



Calibration Laboratory of
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Zeughausstrasse 43, 8004 Zurich, Switzerland

S Schweizerischer Kalibrierdienst
C Service suisse d'étalonnage
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Accredited by the Swiss Accreditation Service (SAS)
The Swiss Accreditation Service is one of the signatories to the EA Multilateral Agreement for the recognition of calibration certificates

Accreditation No.: SCS 108

Client PC Test

Certificate No: D5GHzV2-1057_Jan14

CALIBRATION CERTIFICATE

Object	D5GHzV2 - SN: 1057
Calibration procedure(s)	QA CAL-22.v2 Calibration procedure for dipole validation kits between 3-6 GHz
Calibration date:	January 27, 2014

CC ✓ 2/5/14

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

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

Calibration Equipment used (M&TE critical for calibration)

Primary Standards	ID #	Cal Date (Certificate No.)	Scheduled Calibration
Power meter EPM-442A	GB37480704	09-Oct-13 (No. 217-01827)	Oct-14
Power sensor HP 8481A	US37292783	09-Oct-13 (No. 217-01827)	Oct-14
Power sensor HP 8481A	MY41092317	09-Oct-13 (No. 217-01828)	Oct-14
Reference 20 dB Attenuator	SN: 5058 (20k)	04-Apr-13 (No. 217-01736)	Apr-14
Type-N mismatch combination	SN: 5047.3 / 06327	04-Apr-13 (No. 217-01739)	Apr-14
Reference Probe EX3DV4	SN: 3503	30-Dec-13 (No. EX3-3503_Dec13)	Dec-14
DAE4	SN: 601	25-Apr-13 (No. DAE4-601_Apr13)	Apr-14

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

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

Issued: January 27, 2014

PCT#753

Glossary:

TSL	tissue simulating liquid
ConvF	sensitivity in TSL / NORM x,y,z
N/A	not applicable or not measured

Calibration is Performed According to the Following Standards:

a) IEC 62209-2, "Evaluation of Human Exposure to Radio Frequency Fields from Handheld and Body-Mounted Wireless Communication Devices in the Frequency Range of 30 MHz to 6 GHz: Human models, Instrumentation, and Procedures"; Part 2: "Procedure to determine the Specific Absorption Rate (SAR) for including accessories and multiple transmitters", March 2010
b) KDB 865664, "SAR Measurement Requirements for 100 MHz to 6 GHz"
c) IEEE Std 1528-2013, "IEEE Recommended Practice for Determining the Peak Spatial-Averaged Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques", June 2013

Additional Documentation:

d) DASY4/5 System Handbook

Methods Applied and Interpretation of Parameters:

- *Measurement Conditions:* Further details are available from the Validation Report at the end of the certificate. All figures stated in the certificate are valid at the frequency indicated.
- *Antenna Parameters with TSL:* The dipole is mounted with the spacer to position its feed point exactly below the center marking of the flat phantom section, with the arms oriented parallel to the body axis.
- *Feed Point Impedance and Return Loss:* These parameters are measured with the dipole positioned under the liquid filled phantom. The impedance stated is transformed from the measurement at the SMA connector to the feed point. The Return Loss ensures low reflected power. No uncertainty required.
- *Electrical Delay:* One-way delay between the SMA connector and the antenna feed point. No uncertainty required.
- *SAR measured:* SAR measured at the stated antenna input power.
- *SAR normalized:* SAR as measured, normalized to an input power of 1 W at the antenna connector.
- *SAR for nominal TSL parameters:* The measured TSL parameters are used to calculate the nominal SAR result.

The reported uncertainty of measurement is stated as the standard uncertainty of measurement multiplied by the coverage factor k=2, which for a normal distribution corresponds to a coverage probability of approximately 95%.

Measurement Conditions

DASY system configuration, as far as not given on page 1.

DASY Version	DASY5	V52.8.7
Extrapolation	Advanced Extrapolation	
Phantom	Modular Flat Phantom V5.0	
Distance Dipole Center - TSL	10 mm	with Spacer
Zoom Scan Resolution	dx, dy = 4.0 mm, dz = 1.4 mm	Graded Ratio = 1.4 (Z direction)
Frequency	5200 MHz ± 1 MHz 5300 MHz ± 1 MHz 5500 MHz ± 1 MHz 5600 MHz ± 1 MHz 5800 MHz ± 1 MHz	

Head TSL parameters at 5200 MHz

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Head TSL parameters	22.0 °C	36.0	4.66 mho/m
Measured Head TSL parameters	(22.0 ± 0.2) °C	35.0 ± 6 %	4.45 mho/m ± 6 %
Head TSL temperature change during test	< 0.5 °C	----	----

SAR result with Head TSL at 5200 MHz

SAR averaged over 1 cm^3 (1 g) of Head TSL	Condition	
SAR measured	100 mW input power	7.85 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**78.0 W/kg ± 19.9 % (k=2)**

SAR averaged over 10 cm^3 (10 g) of Head TSL	condition	
SAR measured	100 mW input power	2.25 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**22.3 W/kg ± 19.5 % (k=2)**

Head TSL parameters at 5300 MHz

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Head TSL parameters	22.0 °C	35.9	4.76 mho/m
Measured Head TSL parameters	(22.0 ± 0.2) °C	34.9 ± 6 %	4.54 mho/m ± 6 %
Head TSL temperature change during test	< 0.5 °C	----	----

SAR result with Head TSL at 5300 MHz

SAR averaged over 1 cm^3 (1 g) of Head TSL	Condition	
SAR measured	100 mW input power	8.36 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**83.0 W / kg ± 19.9 % (k=2)**

SAR averaged over 10 cm^3 (10 g) of Head TSL	condition	
SAR measured	100 mW input power	2.40 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**23.8 W/kg ± 19.5 % (k=2)**

Head TSL parameters at 5500 MHz

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Head TSL parameters	22.0 °C	35.6	4.96 mho/m
Measured Head TSL parameters	(22.0 ± 0.2) °C	34.6 ± 6 %	4.74 mho/m ± 6 %
Head TSL temperature change during test	< 0.5 °C	----	----

SAR result with Head TSL at 5500 MHz

SAR averaged over 1 cm^3 (1 g) of Head TSL	Condition	
SAR measured	100 mW input power	8.50 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**84.3 W/kg ± 19.9 % (k=2)**

SAR averaged over 10 cm^3 (10 g) of Head TSL	condition	
SAR measured	100 mW input power	2.42 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**24.0 W/kg ± 19.5 % (k=2)**

Head TSL parameters at 5600 MHz

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Head TSL parameters	22.0 °C	35.5	5.07 mho/m
Measured Head TSL parameters	(22.0 ± 0.2) °C	34.5 ± 6 %	4.86 mho/m ± 6 %
Head TSL temperature change during test	< 0.5 °C	----	----

SAR result with Head TSL at 5600 MHz

SAR averaged over 1 cm^3 (1 g) of Head TSL	Condition	
SAR measured	100 mW input power	8.42 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**83.5 W/kg ± 19.9 % (k=2)**

SAR averaged over 10 cm^3 (10 g) of Head TSL	condition	
SAR measured	100 mW input power	2.40 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**23.8 W/kg ± 19.5 % (k=2)**

Head TSL parameters at 5800 MHz

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Head TSL parameters	22.0 °C	35.3	5.27 mho/m
Measured Head TSL parameters	(22.0 ± 0.2) °C	34.2 ± 6 %	5.07 mho/m ± 6 %
Head TSL temperature change during test	< 0.5 °C	----	----

SAR result with Head TSL at 5800 MHz

SAR averaged over 1 cm^3 (1 g) of Head TSL	Condition	
SAR measured	100 mW input power	8.00 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**79.3 W/kg ± 19.9 % (k=2)**

SAR averaged over 10 cm^3 (10 g) of Head TSL	condition	
SAR measured	100 mW input power	2.28 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**22.6 W/kg ± 19.5 % (k=2)**

Body TSL parameters at 5200 MHz

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Body TSL parameters	22.0 °C	49.0	5.30 mho/m
Measured Body TSL parameters	(22.0 ± 0.2) °C	47.3 ± 6 %	5.44 mho/m ± 6 %
Body TSL temperature change during test	< 0.5 °C	----	----

SAR result with Body TSL at 5200 MHz

SAR averaged over 1 cm^3 (1 g) of Body TSL	Condition	
SAR measured	100 mW input power	7.58 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	**75.3 W/kg ± 19.9 % (k=2)**

SAR averaged over 10 cm^3 (10 g) of Body TSL	condition	
SAR measured	100 mW input power	2.12 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	**21.0 W/kg ± 19.5 % (k=2)**

Body TSL parameters at 5300 MHz

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Body TSL parameters	22.0 °C	48.9	5.42 mho/m
Measured Body TSL parameters	(22.0 ± 0.2) °C	47.2 ± 6 %	5.57 mho/m ± 6 %
Body TSL temperature change during test	< 0.5 °C	----	----

SAR result with Body TSL at 5300 MHz

SAR averaged over 1 cm^3 (1 g) of Body TSL	Condition	
SAR measured	100 mW input power	7.79 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	**77.4 W/kg ± 19.9 % (k=2)**

SAR averaged over 10 cm^3 (10 g) of Body TSL	condition	
SAR measured	100 mW input power	2.17 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	**21.5 W/kg ± 19.5 % (k=2)**

Body TSL parameters at 5500 MHz

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Body TSL parameters	22.0 °C	48.6	5.65 mho/m
Measured Body TSL parameters	(22.0 ± 0.2) °C	46.8 ± 6 %	5.84 mho/m ± 6 %
Body TSL temperature change during test	< 0.5 °C	----	----

SAR result with Body TSL at 5500 MHz

SAR averaged over 1 cm^3 (1 g) of Body TSL	Condition	
SAR measured	100 mW input power	7.96 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	**79.1 W/kg ± 19.9 % (k=2)**

SAR averaged over 10 cm^3 (10 g) of Body TSL	condition	
SAR measured	100 mW input power	2.22 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	**22.0 W/kg ± 19.5 % (k=2)**

Body TSL parameters at 5600 MHz

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Body TSL parameters	22.0 °C	48.5	5.77 mho/m
Measured Body TSL parameters	(22.0 ± 0.2) °C	46.6 ± 6 %	5.98 mho/m ± 6 %
Body TSL temperature change during test	< 0.5 °C	----	----

SAR result with Body TSL at 5600 MHz

SAR averaged over 1 cm^3 (1 g) of Body TSL	Condition	
SAR measured	100 mW input power	8.07 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	**80.2 W/kg ± 19.9 % (k=2)**

SAR averaged over 10 cm^3 (10 g) of Body TSL	condition	
SAR measured	100 mW input power	2.24 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	**22.2 W/kg ± 19.5 % (k=2)**

Body TSL parameters at 5800 MHz

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Body TSL parameters	22.0 °C	48.2	6.00 mho/m
Measured Body TSL parameters	(22.0 ± 0.2) °C	46.3 ± 6 %	6.23 mho/m ± 6 %
Body TSL temperature change during test	< 0.5 °C	----	----

SAR result with Body TSL at 5800 MHz

SAR averaged over 1 cm^3 (1 g) of Body TSL	Condition	
SAR measured	100 mW input power	7.48 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	**74.3 W/kg ± 19.9 % (k=2)**

SAR averaged over 10 cm^3 (10 g) of Body TSL	condition	
SAR measured	100 mW input power	2.06 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	**20.4 W/kg ± 19.5 % (k=2)**

Appendix

Antenna Parameters with Head TSL at 5200 MHz

Impedance, transformed to feed point	43.1 Ω - 4.6 jΩ
Return Loss	- 21.0 dB

Antenna Parameters with Head TSL at 5300 MHz

Impedance, transformed to feed point	46.5 Ω - 1.3 jΩ
Return Loss	- 28.1 dB

Antenna Parameters with Head TSL at 5500 MHz

Impedance, transformed to feed point	46.2 Ω - 2.5 jΩ
Return Loss	- 26.4 dB

Antenna Parameters with Head TSL at 5600 MHz

Impedance, transformed to feed point	48.9 Ω - 5.7 jΩ
Return Loss	- 24.6 dB

Antenna Parameters with Head TSL at 5800 MHz

Impedance, transformed to feed point	48.7 Ω - 3.1 jΩ
Return Loss	- 29.5 dB

Antenna Parameters with Body TSL at 5200 MHz

Impedance, transformed to feed point	49.4 Ω - 7.7 jΩ
Return Loss	- 22.2 dB

Antenna Parameters with Body TSL at 5300 MHz

Impedance, transformed to feed point	49.6 Ω - 3.0 jΩ
Return Loss	- 30.3 dB

Antenna Parameters with Body TSL at 5500 MHz

Impedance, transformed to feed point	50.8 Ω - 3.9 jΩ
Return Loss	- 28.0 dB

Antenna Parameters with Body TSL at 5600 MHz

Impedance, transformed to feed point	55.4 Ω - 2.5 jΩ
Return Loss	- 25.0 dB

Antenna Parameters with Body TSL at 5800 MHz

Impedance, transformed to feed point	52.3 Ω - 0.7 jΩ
Return Loss	- 32.5 dB

General Antenna Parameters and Design

Electrical Delay (one direction)	1.186 ns

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

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

Additional EUT Data

Manufactured by	SPEAG
Manufactured on	November 27, 2006

DASY5 Validation Report for Head TSL

Date: 27.01.2014

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole 5GHz; Type: D5GHzV2; Serial: D5GHzV2 - SN: 1057

Communication System: UID 0 - CW; Frequency: 5200 MHz, Frequency: 5300 MHz, Frequency: 5500 MHz, Frequency: 5600 MHz, Frequency: 5800 MHz
Medium parameters used: f = 5200 MHz; σ = 4.45 S/m; ε_r = 35; ρ = 1000 kg/m^3 , Medium parameters used: f = 5300 MHz; σ = 4.54 S/m; ε_r = 34.9; ρ = 1000 kg/m^3 , Medium parameters used: f = 5500 MHz; σ = 4.74 S/m; ε_r = 34.6; ρ = 1000 kg/m^3 , Medium parameters used: f = 5600 MHz; σ = 4.86 S/m; ε_r = 34.5; ρ = 1000 kg/m^3 , Medium parameters used: f = 5800 MHz; σ = 5.07 S/m; ε_r = 34.2; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY52 Configuration:

- Probe: EX3DV4 - SN3503; ConvF(5.52, 5.52, 5.52); Calibrated: 30.12.2013, ConvF(5.2, 5.2, 5.2); Calibrated: 30.12.2013, ConvF(5.01, 5.01, 5.01); Calibrated: 30.12.2013, ConvF(4.86, 4.86, 4.86); Calibrated: 30.12.2013, ConvF(4.91, 4.91, 4.91); Calibrated: 30.12.2013;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 25.04.2013
- Phantom: Flat Phantom 5.0 (front); Type: QD000P50AA; Serial: 1001
- DASY52 52.8.7(1137); SEMCAD X 14.6.10(7164)

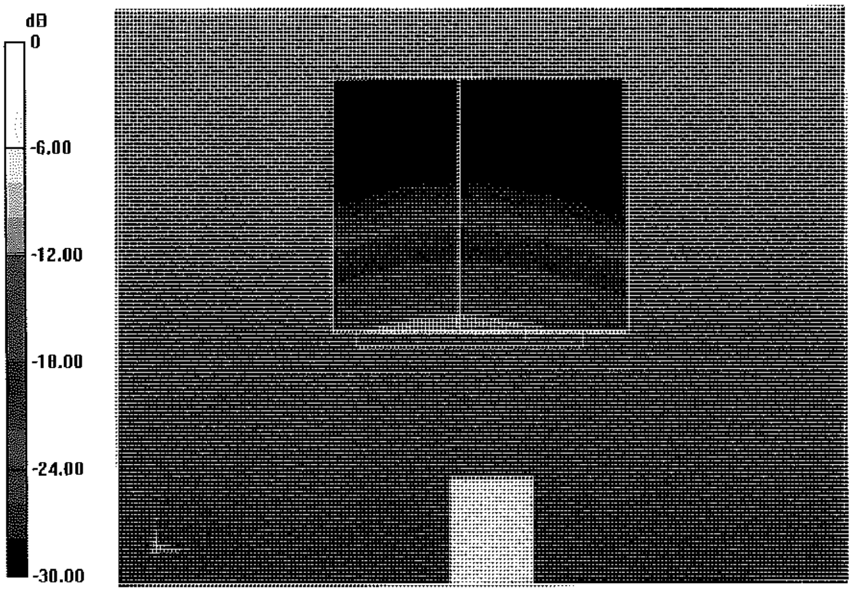
Dipole Calibration for Head Tissue/Pin=100mW, dist=10mm, f=5200 MHz/Zoom Scan, dist=1.4mm (8x8x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm
Reference Value = 63.497 V/m; Power Drift = 0.04 dB
Peak SAR (extrapolated) = 28.2 W/kg
SAR(1 g) = 7.85 W/kg; SAR(10 g) = 2.25 W/kg
Maximum value of SAR (measured) = 18.6 W/kg

Dipole Calibration for Head Tissue/Pin=100mW, dist=10mm, f=5300 MHz/Zoom Scan, dist=1.4mm (8x8x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm
Reference Value = 64.444 V/m; Power Drift = 0.07 dB
Peak SAR (extrapolated) = 31.2 W/kg
SAR(1 g) = 8.36 W/kg; SAR(10 g) = 2.4 W/kg
Maximum value of SAR (measured) = 20.1 W/kg

Dipole Calibration for Head Tissue/Pin=100mW, dist=10mm, f=5500 MHz/Zoom Scan, dist=1.4mm (8x8x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm
Reference Value = 63.807 V/m; Power Drift = 0.07 dB
Peak SAR (extrapolated) = 33.0 W/kg
SAR(1 g) = 8.5 W/kg; SAR(10 g) = 2.42 W/kg
Maximum value of SAR (measured) = 20.8 W/kg

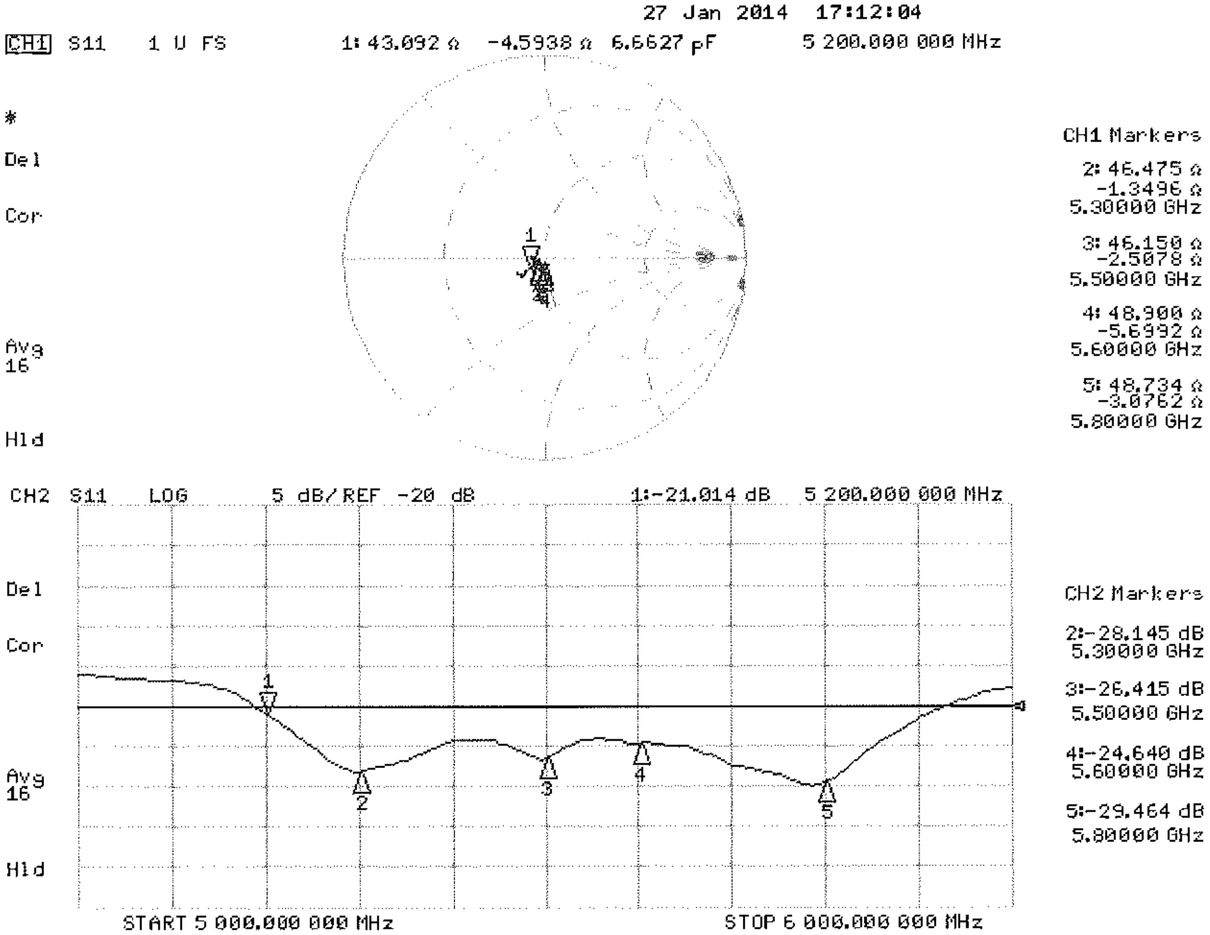
Dipole Calibration for Head Tissue/Pin=100mW, dist=10mm, f=5600 MHz/Zoom Scan, dist=1.4mm (8x8x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm
Reference Value = 63.194 V/m; Power Drift = 0.06 dB
Peak SAR (extrapolated) = 33.2 W/kg
SAR(1 g) = 8.42 W/kg; SAR(10 g) = 2.4 W/kg

Dipole Calibration for Head Tissue/Pin=100mW, dist=10mm, f=5800 MHz/Zoom Scan, dist=1.4mm (8x8x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm
Reference Value = 60.646 V/m; Power Drift = 0.08 dB
Peak SAR (extrapolated) = 32.9 W/kg
SAR(1 g) = 8 W/kg; SAR(10 g) = 2.28 W/kg
Maximum value of SAR (measured) = 19.9 W/kg



0 dB = 19.9 W/kg = 12.99 dBW/kg

Impedance Measurement Plot for Head TSL



DASY5 Validation Report for Body TSL

Date: 24.01.2014

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole 5GHz; Type: D5GHzV2; Serial: D5GHzV2 - SN: 1057

Communication System: UID 0 - CW; Frequency: 5200 MHz, Frequency: 5300 MHz, Frequency: 5500 MHz, Frequency: 5600 MHz, Frequency: 5800 MHz
Medium parameters used: f = 5200 MHz; σ = 5.44 S/m; ε_r = 47.3; ρ = 1000 kg/m^3 , Medium parameters used: f = 5300 MHz; σ = 5.57 S/m; ε_r = 47.2; ρ = 1000 kg/m^3 , Medium parameters used: f = 5500 MHz; σ = 5.84 S/m; ε_r = 46.8; ρ = 1000 kg/m^3 , Medium parameters used: f = 5600 MHz; σ = 5.98 S/m; ε_r = 46.6; ρ = 1000 kg/m^3 , Medium parameters used: f = 5800 MHz; σ = 6.23 S/m; ε_r = 46.3; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY52 Configuration:

- Probe: EX3DV4 - SN3503; ConvF(5.01, 5.01, 5.01); Calibrated: 30.12.2013, ConvF(4.76, 4.76, 4.76); Calibrated: 30.12.2013, ConvF(4.52, 4.52, 4.52); Calibrated: 30.12.2013, ConvF(4.3, 4.3, 4.3); Calibrated: 30.12.2013, ConvF(4.47, 4.47, 4.47); Calibrated: 30.12.2013;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 25.04.2013
- Phantom: Flat Phantom 5.0 (back); Type: QD000P50AA; Serial: 1002
- DASY52 52.8.7(1137); SEMCAD X 14.6.10(7164)

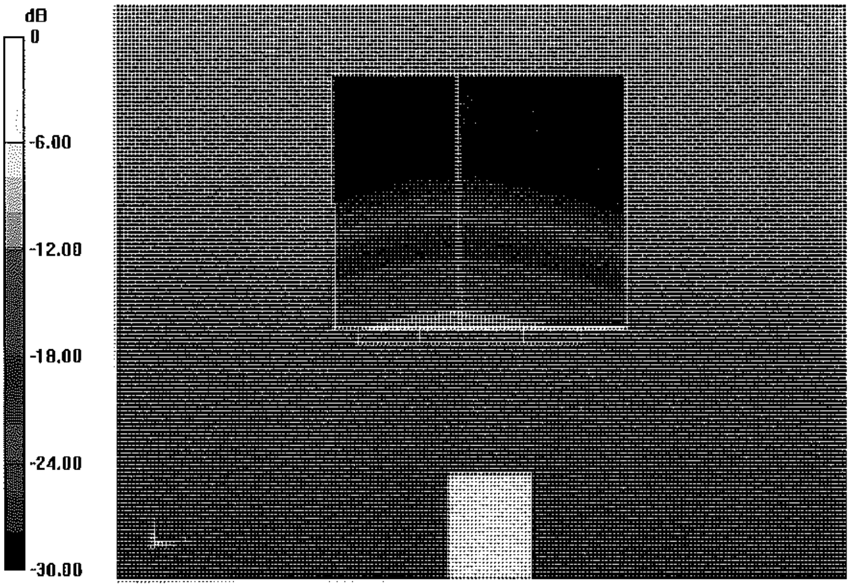
Dipole Calibration for Body Tissue/Pin=100mW, dist=10mm, f=5200 MHz/Zoom Scan, dist=1.4mm (8x8x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm
Reference Value = 58.809 V/m; Power Drift = -0.05 dB
Peak SAR (extrapolated) = 30.1 W/kg
SAR(1 g) = 7.58 W/kg; SAR(10 g) = 2.12 W/kg
Maximum value of SAR (measured) = 18.2 W/kg

Dipole Calibration for Body Tissue/Pin=100mW, dist=10mm, f=5300 MHz/Zoom Scan, dist=1.4mm (8x8x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm
Reference Value = 58.585 V/m; Power Drift = -0.00 dB
Peak SAR (extrapolated) = 32.2 W/kg
SAR(1 g) = 7.79 W/kg; SAR(10 g) = 2.17 W/kg
Maximum value of SAR (measured) = 19.1 W/kg

Dipole Calibration for Body Tissue/Pin=100mW, dist=10mm, f=5500 MHz/Zoom Scan, dist=1.4mm (8x8x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm
Reference Value = 58.364 V/m; Power Drift = -0.01 dB
Peak SAR (extrapolated) = 34.4 W/kg
SAR(1 g) = 7.96 W/kg; SAR(10 g) = 2.22 W/kg
Maximum value of SAR (measured) = 19.4 W/kg

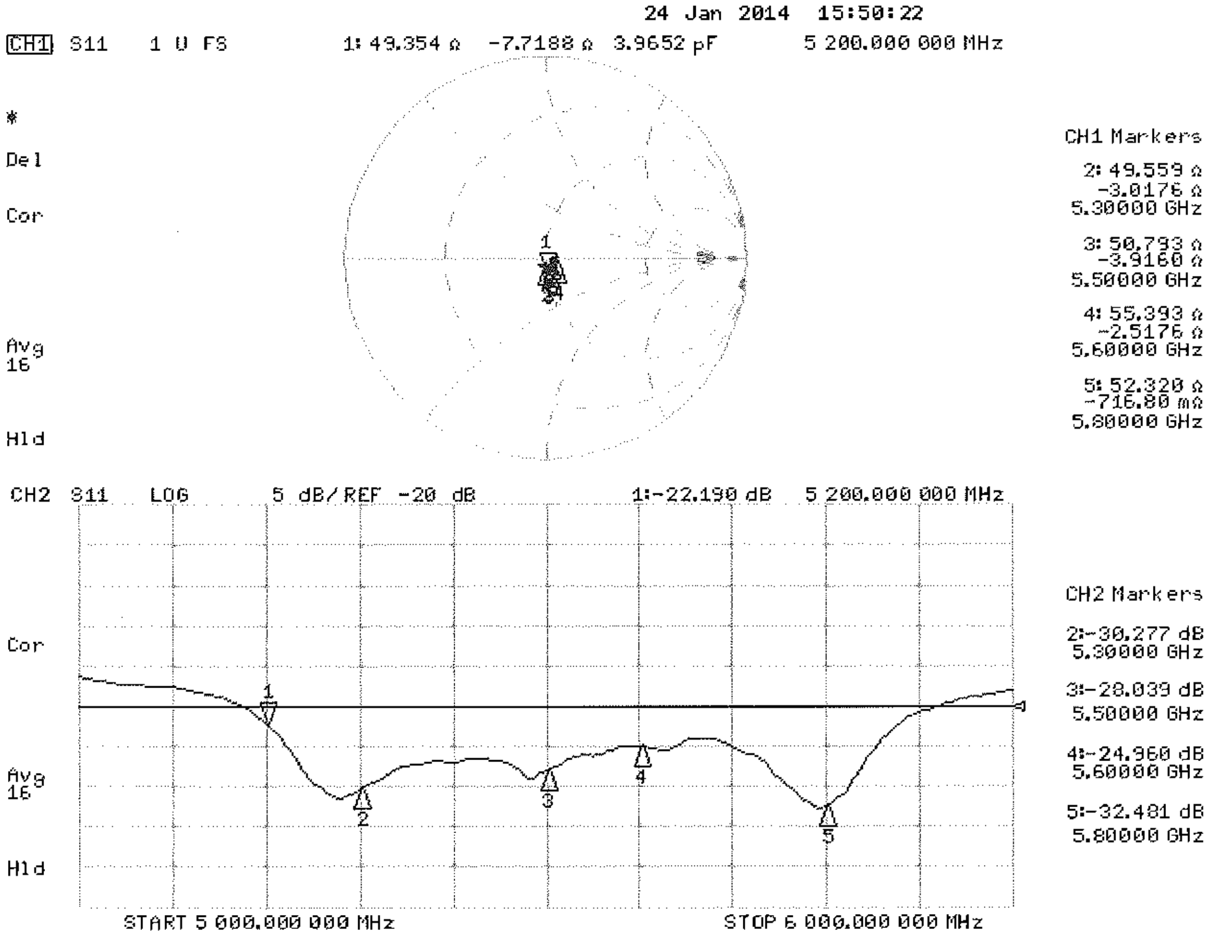
Dipole Calibration for Body Tissue/Pin=100mW, dist=10mm, f=5600 MHz/Zoom Scan, dist=1.4mm (8x8x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm
Reference Value = 57.864 V/m; Power Drift = 0.01 dB
Peak SAR (extrapolated) = 35.8 W/kg
SAR(1 g) = 8.07 W/kg; SAR(10 g) = 2.24 W/kg
Maximum value of SAR (measured) = 19.8 W/kg

Dipole Calibration for Body Tissue/Pin=100mW, dist=10mm, f=5800 MHz/Zoom Scan, dist=1.4mm (8x8x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm
Reference Value = 54.817 V/m; Power Drift = -0.01 dB
Peak SAR (extrapolated) = 35.1 W/kg
SAR(1 g) = 7.48 W/kg; SAR(10 g) = 2.06 W/kg
Maximum value of SAR (measured) = 18.8 W/kg



0 dB = 18.8 W/kg = 12.74 dBW/kg

Impedance Measurement Plot for Body TSL



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

S Schweizerischer Kalibrierdienst
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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 108

Client **PC Test**

Certificate No: D835V2-4d133_Jul13

CALIBRATION CERTIFICATE

Object: D835V2 - SN: 4d133

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

Calibration date: July 17, 2013

✓ KOK 8/12/13

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	01-Nov-12 (No. 217-01640)	Oct-13
Power sensor HP 8481A	US37292783	01-Nov-12 (No. 217-01640)	Oct-13
Reference 20 dB Attenuator	SN: 5058 (20k)	04-Apr-13 (No. 217-01736)	Apr-14
Type-N mismatch combination	SN: 5047.3 / 06327	04-Apr-13 (No. 217-01739)	Apr-14
Reference Probe ES3DV3	SN: 3205	28-Dec-12 (No. ES3-3205_Dec12)	Dec-13
DAE4	SN: 601	25-Apr-13 (No. DAE4-601_Apr13)	Apr-14

Secondary Standards	ID #	Check Date (in house)	Scheduled Check
Power sensor HP 8481A	MY41092317	18-Oct-02 (in house check Oct-11)	In house check: Oct-13
RF generator R&S SMT-06	100005	04-Aug-99 (in house check Oct-11)	In house check: Oct-13
Network Analyzer HP 8753E	US37390585 S4206	18-Oct-01 (in house check Oct-12)	In house check: Oct-13

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

Issued: July 18, 2013

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

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 1528-2003, "IEEE Recommended Practice for Determining the Peak Spatial-Averaged Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques", December 2003
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) Federal Communications Commission Office of Engineering & Technology (FCC OET), "Evaluating Compliance with FCC Guidelines for Human Exposure to Radiofrequency Electromagnetic Fields; Additional Information for Evaluating Compliance of Mobile and Portable Devices with FCC Limits for Human Exposure to Radiofrequency Emissions", Supplement C (Edition 01-01) to Bulletin 65

Additional Documentation:

d) DASY4/5 System Handbook

Methods Applied and Interpretation of Parameters:

- *Measurement Conditions:* Further details are available from the Validation Report at the end of the certificate. All figures stated in the certificate are valid at the frequency indicated.
- *Antenna Parameters with TSL:* The dipole is mounted with the spacer to position its feed point exactly below the center marking of the flat phantom section, with the arms oriented parallel to the body axis.
- *Feed Point Impedance and Return Loss:* These parameters are measured with the dipole positioned under the liquid filled phantom. The impedance stated is transformed from the measurement at the SMA connector to the feed point. The Return Loss ensures low reflected power. No uncertainty required.
- *Electrical Delay:* One-way delay between the SMA connector and the antenna feed point. No uncertainty required.
- *SAR measured:* SAR measured at the stated antenna input power.
- *SAR normalized:* SAR as measured, normalized to an input power of 1 W at the antenna connector.
- *SAR for nominal TSL parameters:* The measured TSL parameters are used to calculate the nominal SAR result.

The reported uncertainty of measurement is stated as the standard uncertainty of measurement multiplied by the coverage factor k=2, which for a normal distribution corresponds to a coverage probability of approximately 95%.

Measurement Conditions

DASY system configuration, as far as not given on page 1.

DASY Version	DASY5	V52.8.7
Extrapolation	Advanced Extrapolation	
Phantom	Modular Flat Phantom	
Distance Dipole Center - TSL	15 mm	with Spacer
Zoom Scan Resolution	dx, dy, dz = 5 mm	
Frequency	835 MHz ± 1 MHz	

Head TSL parameters

The following parameters and calculations were applied.

	Temperature	**Permittivity**	**Conductivity**
Nominal Head TSL parameters	22.0 °C	41.5	0.90 mho/m
Measured Head TSL parameters	(22.0 ± 0.2) °C	41.8 ± 6 %	0.92 mho/m ± 6 %
Head TSL temperature change during test	< 0.5 °C	----	----

SAR result with Head TSL

SAR averaged over 1 cm^3 (1 g) of Head TSL	Condition	
SAR measured	250 mW input power	2.44 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**9.62 W/kg ± 17.0 % (k=2)**

SAR averaged over 10 cm^3 (10 g) of Head TSL	condition	
SAR measured	250 mW input power	1.59 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**6.28 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 cm^3 (1 g) of Body TSL	Condition	
SAR measured	250 mW input power	2.46 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	**9.61 W/kg ± 17.0 % (k=2)**

SAR averaged over 10 cm^3 (10 g) of Body TSL	condition	
SAR measured	250 mW input power	1.62 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	**6.36 W/kg ± 16.5 % (k=2)**

Appendix

Antenna Parameters with Head TSL

Impedance, transformed to feed point	52.0 Ω - 1.8 jΩ
Return Loss	- 31.8 dB

Antenna Parameters with Body TSL

Impedance, transformed to feed point	48.2 Ω - 3.6 jΩ
Return Loss	- 27.7 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: 17.07.2013

Test Laboratory: SPEAG, Zurich, Switzerland

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

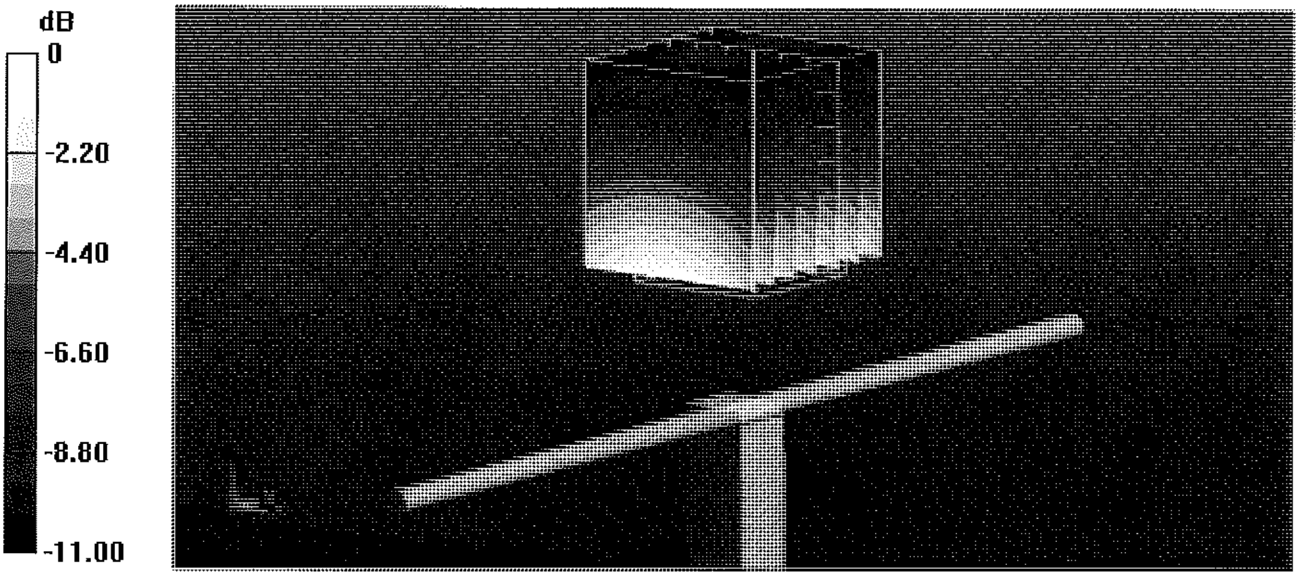
Communication System: UID 0 - CW ; Frequency: 835 MHz
Medium parameters used: f = 835 MHz; $\sigma = 0.92$ S/m; $\varepsilon_r = 41.8$; $\rho = 1000$ kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY52 Configuration:

- Probe: ES3DV3 - SN3205; ConvF(6.05, 6.05, 6.05); Calibrated: 28.12.2012;
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 25.04.2013
- Phantom: Flat Phantom 4.9L; Type: QD000P49AA; Serial: 1001
- DASY52 52.8.7(1137); SEMCAD X 14.6.10(7164)

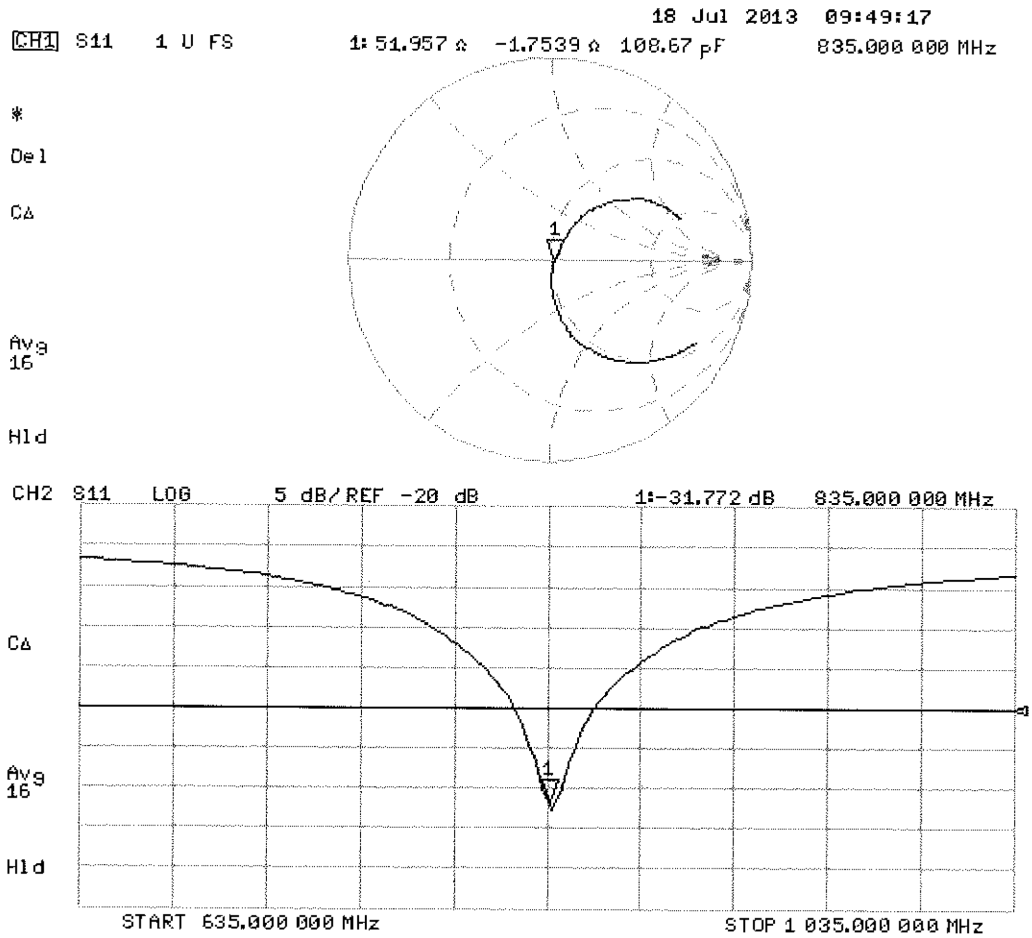
Dipole Calibration for Head Tissue/Pin=250 mW, d=15mm/Zoom Scan (7x7x7)/Cube 0:

Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 57.188 V/m; Power Drift = 0.03 dB
Peak SAR (extrapolated) = 3.66 W/kg
SAR(1 g) = 2.44 W/kg; SAR(10 g) = 1.59 W/kg
Maximum value of SAR (measured) = 2.84 W/kg



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

Impedance Measurement Plot for Head TSL



DASY5 Validation Report for Body TSL

Date: 17.07.2013

Test Laboratory: SPEAG, Zurich, Switzerland

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

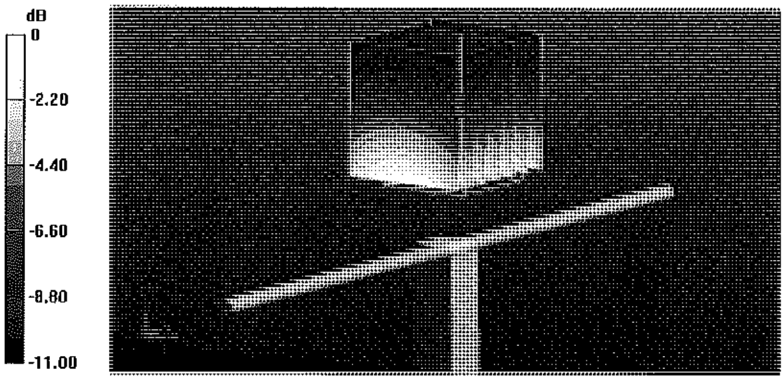
Communication System: UID 0 - CW ; Frequency: 835 MHz
Medium parameters used: f = 835 MHz; σ = 1 S/m; ε_r = 54.9; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY52 Configuration:

- Probe: ES3DV3 - SN3205; ConvF(6.04, 6.04, 6.04); Calibrated: 28.12.2012;
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 25.04.2013
- Phantom: Flat Phantom 4.9L; Type: QD000P49AA; Serial: 1001
- DASY52 52.8.7(1137); SEMCAD X 14.6.10(7164)

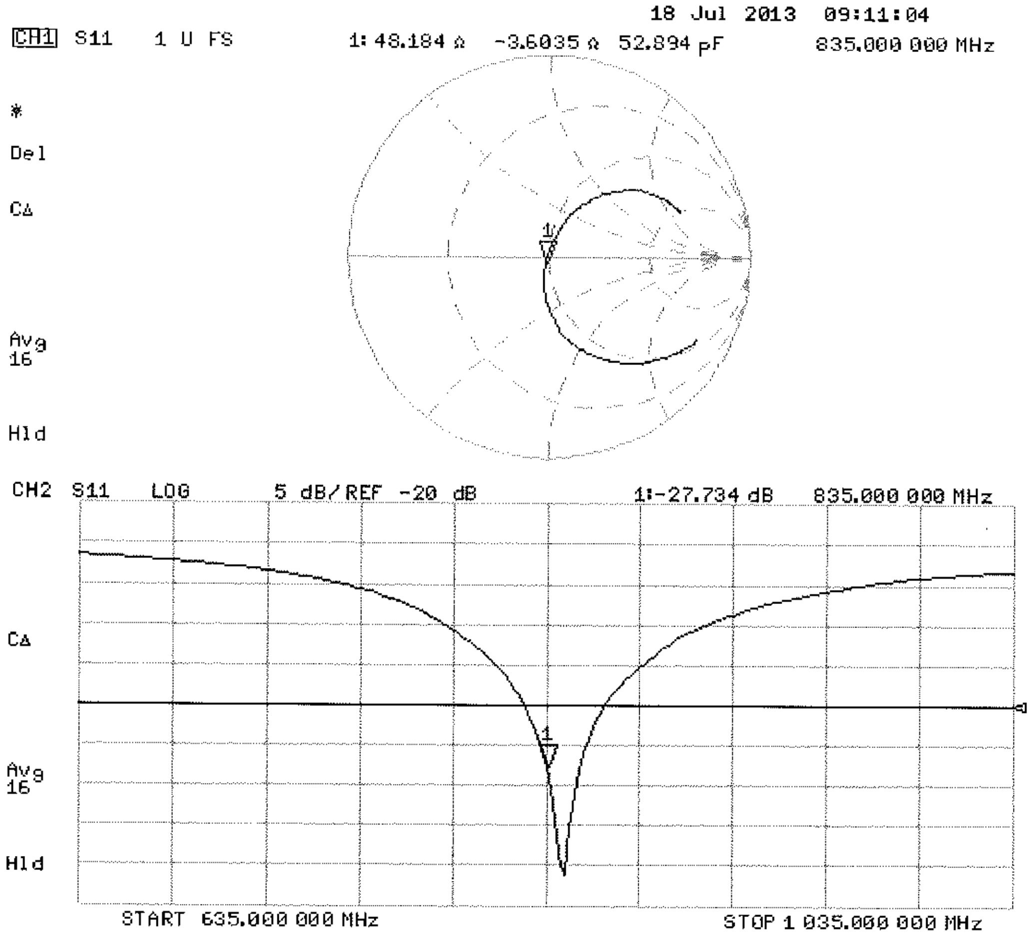
Dipole Calibration for Body Tissue/Pin=250 mW, d=15mm/Zoom Scan (7x7x7)/Cube 0:

Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 55.351 V/m; Power Drift = 0.03 dB
Peak SAR (extrapolated) = 3.59 W/kg
SAR(1 g) = 2.46 W/kg; SAR(10 g) = 1.62 W/kg
Maximum value of SAR (measured) = 2.86 W/kg



0 dB = 2.86 W/kg = 4.56 dBW/kg

Impedance Measurement Plot for Body TSL



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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 108

Client **PC Test**

Certificate No: D1900V2-5d148_Feb14

CALIBRATION CERTIFICATE

Object	D1900V2 - SN: 5d148
Calibration procedure(s)	QA CAL-05.v9 Calibration procedure for dipole validation kits above 700 MHz
Calibration date:	February 27, 2014

CCV 3/4/2014

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

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

Calibration Equipment used (M&TE critical for calibration)

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

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

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

Issued: February 27, 2014

PCT # 80833

Glossary:

TSL	tissue simulating liquid
ConvF	sensitivity in TSL / NORM x,y,z
N/A	not applicable or not measured

Calibration is Performed According to the Following Standards:

a) IEEE Std 1528-2013, "IEEE Recommended Practice for Determining the Peak Spatial-Averaged Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques", June 2013
b) IEC 62209-1, "Procedure to measure the Specific Absorption Rate (SAR) for hand-held devices used in close proximity to the ear (frequency range of 300 MHz to 3 GHz)", February 2005
c) KDB 865664, "SAR Measurement Requirements for 100 MHz to 6 GHz"

Additional Documentation:

d) DASY4/5 System Handbook

Methods Applied and Interpretation of Parameters:

- *Measurement Conditions:* Further details are available from the Validation Report at the end of the certificate. All figures stated in the certificate are valid at the frequency indicated.
- *Antenna Parameters with TSL:* The dipole is mounted with the spacer to position its feed point exactly below the center marking of the flat phantom section, with the arms oriented parallel to the body axis.
- *Feed Point Impedance and Return Loss:* These parameters are measured with the dipole positioned under the liquid filled phantom. The impedance stated is transformed from the measurement at the SMA connector to the feed point. The Return Loss ensures low reflected power. No uncertainty required.
- *Electrical Delay:* One-way delay between the SMA connector and the antenna feed point. No uncertainty required.
- *SAR measured:* SAR measured at the stated antenna input power.
- *SAR normalized:* SAR as measured, normalized to an input power of 1 W at the antenna connector.
- *SAR for nominal TSL parameters:* The measured TSL parameters are used to calculate the nominal SAR result.

The reported uncertainty of measurement is stated as the standard uncertainty of measurement multiplied by the coverage factor k=2, which for a normal distribution corresponds to a coverage probability of approximately 95%.

Measurement Conditions

DASY system configuration, as far as not given on page 1.

DASY Version	DASY5	V52.8.7
Extrapolation	Advanced Extrapolation	
Phantom	Modular Flat Phantom	
Distance Dipole Center - TSL	10 mm	with Spacer
Zoom Scan Resolution	dx, dy, dz = 5 mm	
Frequency	1900 MHz ± 1 MHz	

Head TSL parameters

The following parameters and calculations were applied.

	Temperature	**Permittivity**	**Conductivity**
Nominal Head TSL parameters	22.0 °C	40.0	1.40 mho/m
Measured Head TSL parameters	(22.0 ± 0.2) °C	38.9 ± 6 %	1.39 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	10.2 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	5.31 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**21.2 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	53.3	1.52 mho/m
Measured Body TSL parameters	(22.0 ± 0.2) °C	52.8 ± 6 %	1.49 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	9.73 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	**39.3 W/kg ± 17.0 % (k=2)**

SAR averaged over 10 cm^3 (10 g) of Body TSL	condition	
SAR measured	250 mW input power	5.15 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	**20.7 W/kg ± 16.5 % (k=2)**

Appendix

Antenna Parameters with Head TSL

Impedance, transformed to feed point	52.5 Ω + 5.5 jΩ
Return Loss	- 24.6 dB

Antenna Parameters with Body TSL

Impedance, transformed to feed point	48.0 Ω + 6.7 jΩ
Return Loss	- 23.0 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: 27.02.2014

Test Laboratory: SPEAG, Zurich, Switzerland

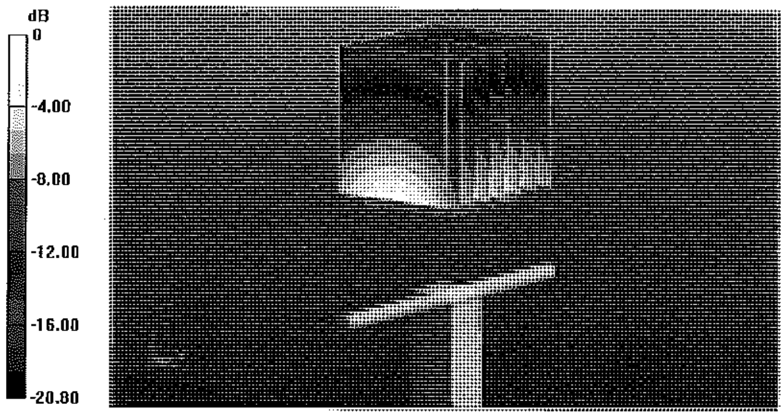
DUT: Dipole 1900 MHz; Type: D1900V2; Serial: D1900V2 - SN: 5d148

Communication System: UID 0 - CW; Frequency: 1900 MHz
Medium parameters used: f = 1900 MHz; σ = 1.39 S/m; ε_r = 38.9; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY52 Configuration:

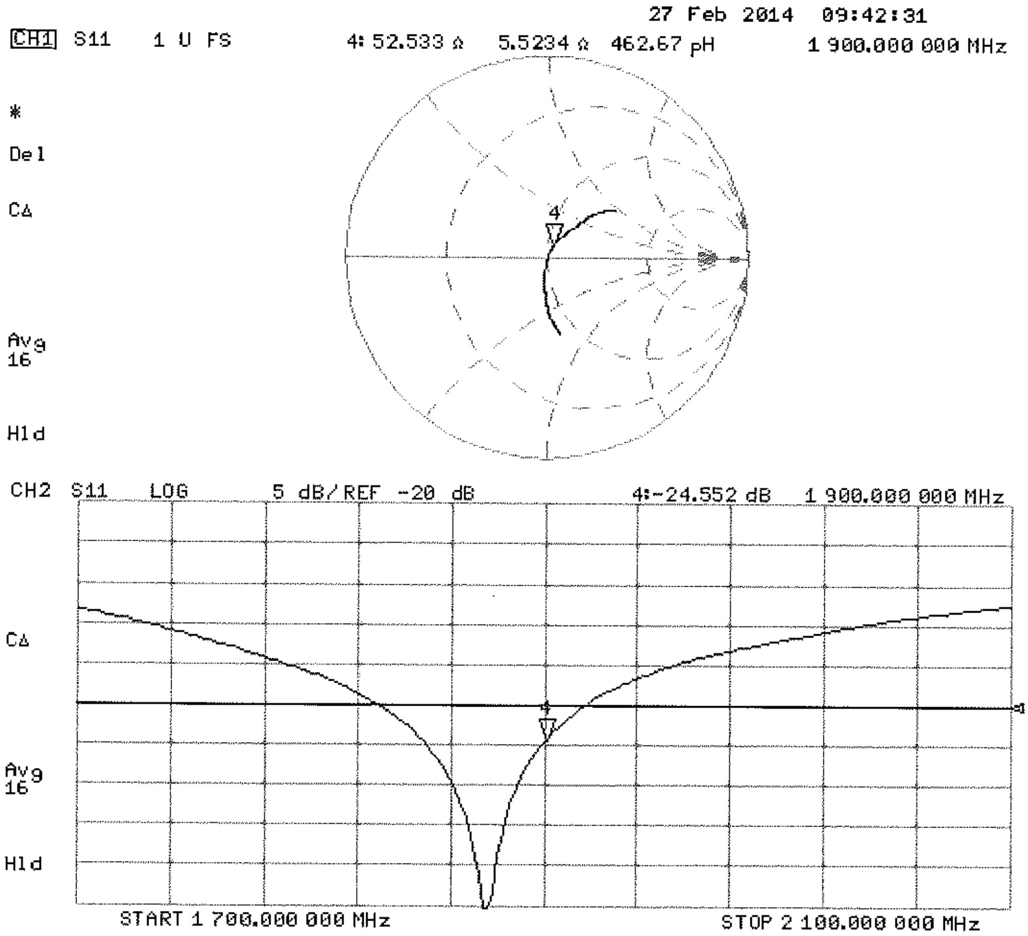
- Probe: ES3DV3 - SN3205; ConvF(5.06, 5.06, 5.06); Calibrated: 30.12.2013;
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 25.04.2013
- Phantom: Flat Phantom 5.0 (front); Type: QD000P50AA; Serial: 1001
- DASY52 52.8.7(1137); SEMCAD X 14.6.10(7164)

Dipole Calibration for Head Tissue/Pin=250 mW, d=10mm/Zoom Scan (7x7x7)/Cube 0:
Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 98.796 V/m; Power Drift = 0.02 dB
Peak SAR (extrapolated) = 18.9 W/kg
SAR(1 g) = 10.2 W/kg; SAR(10 g) = 5.31 W/kg
Maximum value of SAR (measured) = 12.8 W/kg



0 dB = 12.8 W/kg = 11.07 dBW/kg

Impedance Measurement Plot for Head TSL



DASY5 Validation Report for Body TSL

Date: 27.02.2014

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole 1900 MHz; Type: D1900V2; Serial: D1900V2 - SN: 5d148

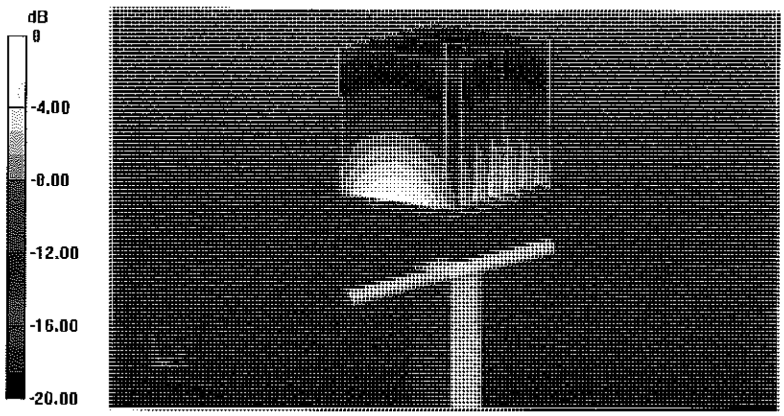
Communication System: UID 0 - CW; Frequency: 1900 MHz
Medium parameters used: f = 1900 MHz; σ = 1.49 S/m; ε_r = 52.8; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY52 Configuration:

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

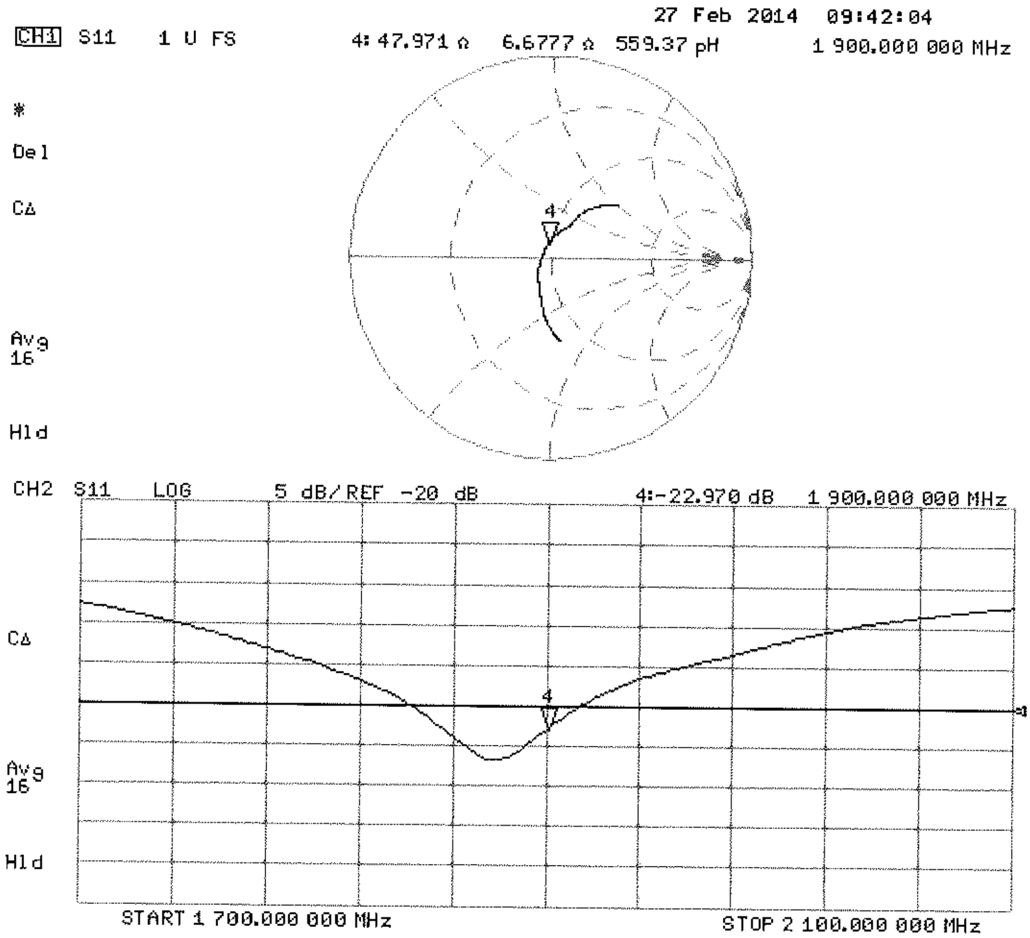
Dipole Calibration for Body Tissue/Pin=250 mW, d=10mm/Zoom Scan (7x7x7)/Cube 0:

Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 94.520 V/m; Power Drift = -0.02 dB
Peak SAR (extrapolated) = 17.0 W/kg
SAR(1 g) = 9.73 W/kg; SAR(10 g) = 5.15 W/kg
Maximum value of SAR (measured) = 12.2 W/kg



0 dB = 12.2 W/kg = 10.86 dBW/kg

Impedance Measurement Plot for Body TSL



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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 108

Client **PC Test**

Certificate No: D2450V2-719_Aug13

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 23, 2013

✓CC 9/13/13

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	01-Nov-12 (No. 217-01640)	Oct-13
Power sensor HP 8481A	US37292783	01-Nov-12 (No. 217-01640)	Oct-13
Reference 20 dB Attenuator	SN: 5058 (20k)	04-Apr-13 (No. 217-01736)	Apr-14
Type-N mismatch combination	SN: 5047.3 / 06327	04-Apr-13 (No. 217-01739)	Apr-14
Reference Probe ES3DV3	SN: 3205	28-Dec-12 (No. ES3-3205_Dec12)	Dec-13
DAE4	SN: 601	25-Apr-13 (No. DAE4-601_Apr13)	Apr-14

Secondary Standards	ID #	Check Date (in house)	Scheduled Check
Power sensor HP 8481A	MY41092317	18-Oct-02 (in house check Oct-11)	In house check: Oct-13
RF generator R&S SMT-06	100005	04-Aug-99 (in house check Oct-11)	In house check: Oct-13
Network Analyzer HP 8753E	US37390585 S4206	18-Oct-01 (in house check Oct-12)	In house check: Oct-13

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

Issued: August 23, 2013

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Accreditation No.: SCS 108

Glossary:

TSL	tissue simulating liquid
ConvF	sensitivity in TSL / NORM x,y,z
N/A	not applicable or not measured

Calibration is Performed According to the Following Standards:

a) IEEE Std 1528-2003, “IEEE Recommended Practice for Determining the Peak Spatial-Averaged Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques”, December 2003
b) IEC 62209-1, "Procedure to measure the Specific Absorption Rate (SAR) for hand-held devices used in close proximity to the ear (frequency range of 300 MHz to 3 GHz)", February 2005
c) KDB 865664, “SAR Measurement Requirements for 100 MHz to 6 GHz”

Additional Documentation:

d) DASY4/5 System Handbook

Methods Applied and Interpretation of Parameters:

- *Measurement Conditions:* Further details are available from the Validation Report at the end of the certificate. All figures stated in the certificate are valid at the frequency indicated.
- *Antenna Parameters with TSL:* The dipole is mounted with the spacer to position its feed point exactly below the center marking of the flat phantom section, with the arms oriented parallel to the body axis.
- *Feed Point Impedance and Return Loss:* These parameters are measured with the dipole positioned under the liquid filled phantom. The impedance stated is transformed from the measurement at the SMA connector to the feed point. The Return Loss ensures low reflected power. No uncertainty required.
- *Electrical Delay:* One-way delay between the SMA connector and the antenna feed point. No uncertainty required.
- *SAR measured:* SAR measured at the stated antenna input power.
- *SAR normalized:* SAR as measured, normalized to an input power of 1 W at the antenna connector.
- *SAR for nominal TSL parameters:* The measured TSL parameters are used to calculate the nominal SAR result.

The reported uncertainty of measurement is stated as the standard uncertainty of measurement multiplied by the coverage factor k=2, which for a normal distribution corresponds to a coverage probability of approximately 95%.

Measurement Conditions

DASY system configuration, as far as not given on page 1.

DASY Version	DASY5	V52.8.7
Extrapolation	Advanced Extrapolation	
Phantom	Modular Flat Phantom	
Distance Dipole Center - TSL	10 mm	with Spacer
Zoom Scan Resolution	dx, dy, dz = 5 mm	
Frequency	2450 MHz ± 1 MHz	

Head TSL parameters

The following parameters and calculations were applied.

	Temperature	**Permittivity**	**Conductivity**
Nominal Head TSL parameters	22.0 °C	39.2	1.80 mho/m
Measured Head TSL parameters	(22.0 ± 0.2) °C	37.8 ± 6 %	1.80 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	13.4 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**53.2 W/kg ± 17.0 % (k=2)**

SAR averaged over 10 cm^3 (10 g) of Head TSL	condition	
SAR measured	250 mW input power	6.23 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**24.8 W/kg ± 16.5 % (k=2)**

Body TSL parameters

The following parameters and calculations were applied.

	Temperature	**Permittivity**	**Conductivity**
Nominal Body TSL parameters	22.0 °C	52.7	1.95 mho/m
Measured Body TSL parameters	(22.0 ± 0.2) °C	50.6 ± 6 %	2.03 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	13.3 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	**51.7 W/kg ± 17.0 % (k=2)**

SAR averaged over 10 cm^3 (10 g) of Body TSL	condition	
SAR measured	250 mW input power	6.14 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	**24.1 W/kg ± 16.5 % (k=2)**

Appendix

Antenna Parameters with Head TSL

Impedance, transformed to feed point	54.6 Ω + 3.5 jΩ
Return Loss	- 25.1 dB

Antenna Parameters with Body TSL

Impedance, transformed to feed point	51.1 Ω + 5.4 jΩ
Return Loss	- 25.3 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: 22.08.2013

Test Laboratory: SPEAG, Zurich, Switzerland

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

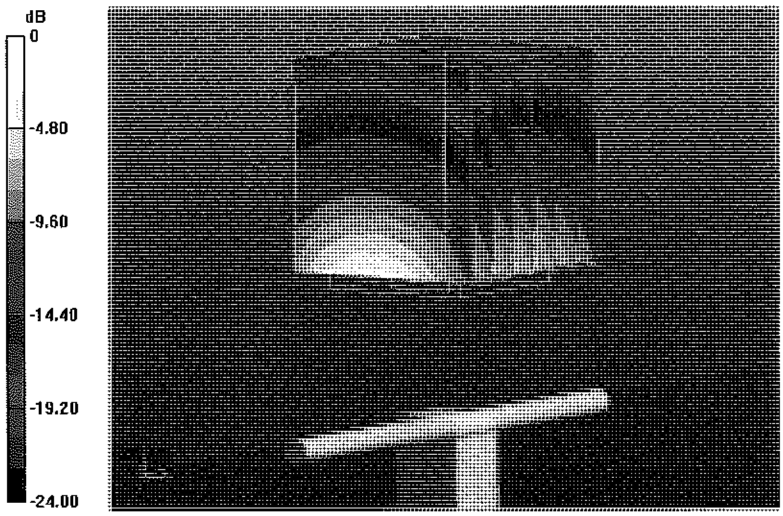
Communication System: UID 0 - CW ; Frequency: 2450 MHz
Medium parameters used: f = 2450 MHz; σ = 1.8 S/m; ε_r = 37.8; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY52 Configuration:

- Probe: ES3DV3 - SN3205; ConvF(4.52, 4.52, 4.52); Calibrated: 28.12.2012;
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 25.04.2013
- Phantom: Flat Phantom 5.0 (front); Type: QD000P50AA; Serial: 1001
- DASY52 52.8.7(1137); SEMCAD X 14.6.10(7164)

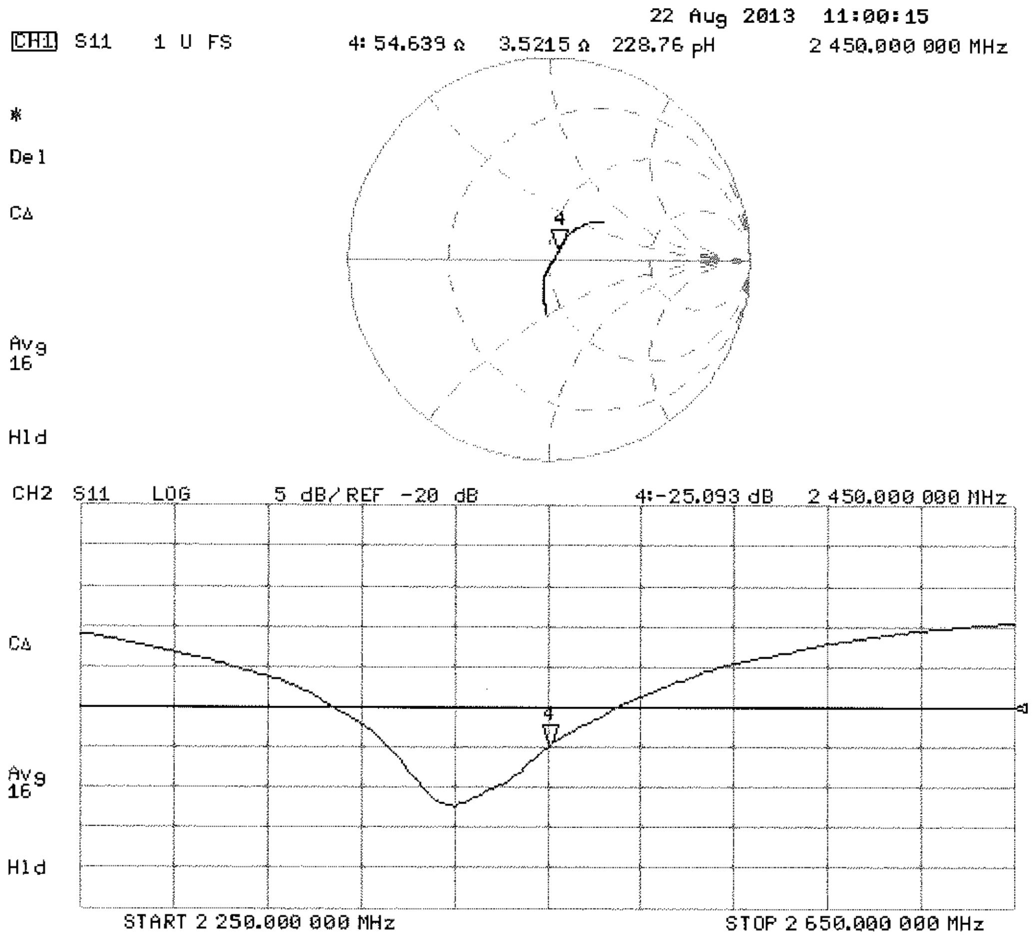
Dipole Calibration for Head Tissue/Pin=250 mW, d=10mm/Zoom Scan (7x7x7)/Cube 0:

Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 100.7 V/m; Power Drift = 0.06 dB
Peak SAR (extrapolated) = 27.9 W/kg
SAR(1 g) = 13.4 W/kg; SAR(10 g) = 6.23 W/kg
Maximum value of SAR (measured) = 17.0 W/kg



0 dB = 17.0 W/kg = 12.30 dBW/kg

Impedance Measurement Plot for Head TSL



DASY5 Validation Report for Body TSL

Date: 23.08.2013

Test Laboratory: SPEAG, Zurich, Switzerland

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

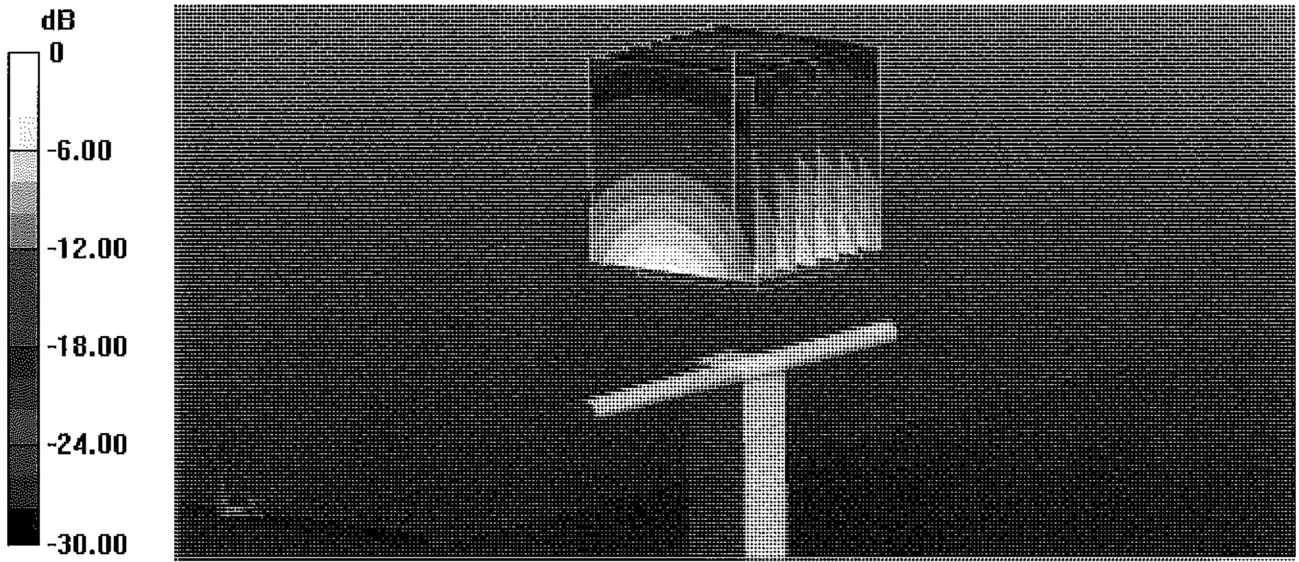
Communication System: UID 0 - CW ; Frequency: 2450 MHz
Medium parameters used: f = 2450 MHz; σ = 2.03 S/m; ε_r = 50.6; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY52 Configuration:

- Probe: ES3DV3 - SN3205; ConvF(4.42, 4.42, 4.42); Calibrated: 28.12.2012;
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 25.04.2013
- Phantom: Flat Phantom 5.0 (back); Type: QD000P50AA; Serial: 1002
- DASY52 52.8.7(1137); SEMCAD X 14.6.10(7164)

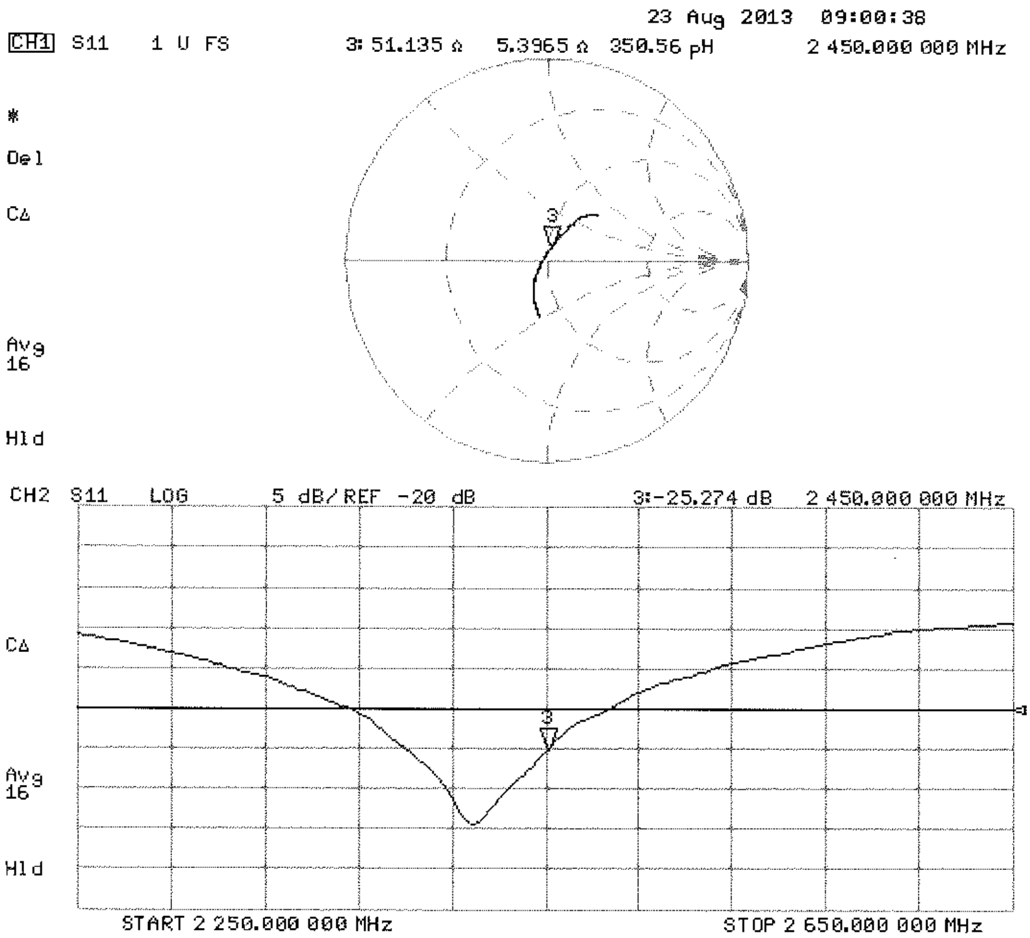
Dipole Calibration for Body Tissue/Pin=250 mW, d=10mm/Zoom Scan (7x7x7)/Cube 0:

Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 94.688 V/m; Power Drift = 0.06 dB
Peak SAR (extrapolated) = 27.9 W/kg
SAR(1 g) = 13.3 W/kg; SAR(10 g) = 6.14 W/kg
Maximum value of SAR (measured) = 17.2 W/kg



0 dB = 17.2 W/kg = 12.36 dBW/kg

Impedance Measurement Plot for Body TSL



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Accreditation No.: SCS 108

Client **PC Test**

Certificate No: **D5GHzV2-1007_Sep13/2**

CALIBRATION CERTIFICATE (Replacement of No: D5GHzV2-1007_Sep13)

Object: D5GHzV2 - SN: 1007

CC✓ 10/5/13

Calibration procedure(s): QA CAL-22.v2
Calibration procedure for dipole validation kits between 3-6 GHz

Calibration date: September 23, 2013

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	01-Nov-12 (No. 217-01640)	Oct-13
Power sensor HP 8481A	US37292783	01-Nov-12 (No. 217-01640)	Oct-13
Reference 20 dB Attenuator	SN: 5058 (20k)	04-Apr-13 (No. 217-01736)	Apr-14
Type-N mismatch combination	SN: 5047.3 / 06327	04-Apr-13 (No. 217-01739)	Apr-14
Reference Probe EX3DV4	SN: 3503	28-Dec-12 (No. EX3-3503_Dec12)	Dec-13
DAE4	SN: 601	25-Apr-13 (No. DAE4-601_Apr13)	Apr-14

Secondary Standards	ID #	Check Date (in house)	Scheduled Check
Power sensor HP 8481A	MY41092317	18-Oct-02 (in house check Oct-11)	In house check: Oct-13
RF generator R&S SMT-06	100005	04-Aug-99 (in house check Oct-11)	In house check: Oct-13
Network Analyzer HP 8753E	US37390585 S4206	18-Oct-01 (in house check Oct-12)	In house check: Oct-13

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

Issued: October 4, 2013

PCT# 685

Glossary:

TSL	tissue simulating liquid
ConvF	sensitivity in TSL / NORM x,y,z
N/A	not applicable or not measured

Calibration is Performed According to the Following Standards:

a) IEC 62209-2, "Evaluation of Human Exposure to Radio Frequency Fields from Handheld and Body-Mounted Wireless Communication Devices in the Frequency Range of 30 MHz to 6 GHz: Human models, Instrumentation, and Procedures"; Part 2: "Procedure to determine the Specific Absorption Rate (SAR) for including accessories and multiple transmitters", March 2010
b) KDB 865664, "SAR Measurement Requirements for 100 MHz to 6 GHz"
c) IEEE Std 1528-2013, "IEEE Recommended Practice for Determining the Peak Spatial-Averaged Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques", June 2013

Additional Documentation:

d) DASY4/5 System Handbook

Methods Applied and Interpretation of Parameters:

- *Measurement Conditions:* Further details are available from the Validation Report at the end of the certificate. All figures stated in the certificate are valid at the frequency indicated.
- *Antenna Parameters with TSL:* The dipole is mounted with the spacer to position its feed point exactly below the center marking of the flat phantom section, with the arms oriented parallel to the body axis.
- *Feed Point Impedance and Return Loss:* These parameters are measured with the dipole positioned under the liquid filled phantom. The impedance stated is transformed from the measurement at the SMA connector to the feed point. The Return Loss ensures low reflected power. No uncertainty required.
- *Electrical Delay:* One-way delay between the SMA connector and the antenna feed point. No uncertainty required.
- *SAR measured:* SAR measured at the stated antenna input power.
- *SAR normalized:* SAR as measured, normalized to an input power of 1 W at the antenna connector.
- *SAR for nominal TSL parameters:* The measured TSL parameters are used to calculate the nominal SAR result.

The reported uncertainty of measurement is stated as the standard uncertainty of measurement multiplied by the coverage factor k=2, which for a normal distribution corresponds to a coverage probability of approximately 95%.

Measurement Conditions

DASY system configuration, as far as not given on page 1.

DASY Version	DASY5	V52.8.7
Extrapolation	Advanced Extrapolation	
Phantom	Modular Flat Phantom V5.0	
Distance Dipole Center - TSL	10 mm	with Spacer
Zoom Scan Resolution	dx, dy = 4.0 mm, dz = 1.4 mm	Graded Ratio = 1.4 (Z direction)
Frequency	5200 MHz ± 1 MHz 5300 MHz ± 1 MHz 5500 MHz ± 1 MHz 5600 MHz ± 1 MHz 5800 MHz ± 1 MHz	

Head TSL parameters at 5200 MHz

The following parameters and calculations were applied.

	Temperature	**Permittivity**	**Conductivity**
Nominal Head TSL parameters	22.0 °C	36.0	4.66 mho/m
Measured Head TSL parameters	(22.0 ± 0.2) °C	35.8 ± 6 %	4.48 mho/m ± 6 %
Head TSL temperature change during test	< 0.5 °C	----	----

SAR result with Head TSL at 5200 MHz

SAR averaged over 1 cm^3 (1 g) of Head TSL	Condition	
SAR measured	100 mW input power	7.77 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**77.5 W/kg ± 19.9 % (k=2)**

SAR averaged over 10 cm^3 (10 g) of Head TSL	condition	
SAR measured	100 mW input power	2.23 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**22.2 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	35.6 ± 6 %	4.62 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	8.04 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**80.2 W / kg ± 19.9 % (k=2)**

SAR averaged over 10 cm^3 (10 g) of Head TSL	condition	
SAR measured	100 mW input power	2.30 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**22.9 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	35.4 ± 6 %	4.76 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	8.17 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**81.4 W/kg ± 19.9 % (k=2)**

SAR averaged over 10 cm^3 (10 g) of Head TSL	condition	
SAR measured	100 mW input power	2.32 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**23.1 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	35.2 ± 6 %	4.86 mho/m ± 6 %
Head TSL temperature change during test	< 0.5 °C	----	----

SAR result with Head TSL at 5600 MHz

SAR averaged over 1 cm^3 (1 g) of Head TSL	Condition	
SAR measured	100 mW input power	8.03 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	2.28 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**22.7 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	35.0 ± 6 %	5.07 mho/m ± 6 %
Head TSL temperature change during test	< 0.5 °C	----	----

SAR result with Head TSL at 5800 MHz

SAR averaged over 1 cm^3 (1 g) of Head TSL	Condition	
SAR measured	100 mW input power	7.78 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**77.5 W/kg ± 19.9 % (k=2)**

SAR averaged over 10 cm^3 (10 g) of Head TSL	condition	
SAR measured	100 mW input power	2.20 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**21.9 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	48.3 ± 6 %	5.36 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	7.28 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	**72.6 W/kg ± 19.9 % (k=2)**

SAR averaged over 10 cm^3 (10 g) of Body TSL	condition	
SAR measured	100 mW input power	2.03 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	**20.2 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	48.1 ± 6 %	5.56 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	7.49 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	**74.7 W/kg ± 19.9 % (k=2)**

SAR averaged over 10 cm^3 (10 g) of Body TSL	condition	
SAR measured	100 mW input power	2.09 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	**20.8 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	47.8 ± 6 %	5.75 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	7.61 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	**75.9 W/kg ± 19.9 % (k=2)**

SAR averaged over 10 cm^3 (10 g) of Body TSL	condition	
SAR measured	100 mW input power	2.11 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	**21.0 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	47.6 ± 6 %	5.88 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	**77.3 W/kg ± 19.9 % (k=2)**

SAR averaged over 10 cm^3 (10 g) of Body TSL	condition	
SAR measured	100 mW input power	2.16 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	47.3 ± 6 %	6.17 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	7.31 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	**72.9 W/kg ± 19.9 % (k=2)**

SAR averaged over 10 cm^3 (10 g) of Body TSL	condition	
SAR measured	100 mW input power	2.02 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	**20.1 W/kg ± 19.5 % (k=2)**

Appendix

Antenna Parameters with Head TSL at 5200 MHz

Impedance, transformed to feed point	52.4 Ω - 11.0 jΩ
Return Loss	- 19.2 dB

Antenna Parameters with Head TSL at 5300 MHz

Impedance, transformed to feed point	56.8 Ω - 4.4 jΩ
Return Loss	- 22.3 dB

Antenna Parameters with Head TSL at 5500 MHz

Impedance, transformed to feed point	48.8 Ω - 5.4 jΩ
Return Loss	- 25.1 dB

Antenna Parameters with Head TSL at 5600 MHz

Impedance, transformed to feed point	57.3 Ω - 8.7 jΩ
Return Loss	- 19.5 dB

Antenna Parameters with Head TSL at 5800 MHz

Impedance, transformed to feed point	56.9 Ω + 1.6 jΩ
Return Loss	- 23.5 dB

Antenna Parameters with Body TSL at 5200 MHz

Impedance, transformed to feed point	53.1 Ω - 10.3 jΩ
Return Loss	- 19.7 dB

Antenna Parameters with Body TSL at 5300 MHz

Impedance, transformed to feed point	54.3 Ω - 1.5 jΩ
Return Loss	- 27.2 dB

Antenna Parameters with Body TSL at 5500 MHz

Impedance, transformed to feed point	49.7 Ω - 3.6 jΩ
Return Loss	- 28.7 dB

Antenna Parameters with Body TSL at 5600 MHz

Impedance, transformed to feed point	58.2 Ω - 5.2 jΩ
Return Loss	- 20.9 dB

Antenna Parameters with Body TSL at 5800 MHz

Impedance, transformed to feed point	58.7 Ω + 3.9 jΩ
Return Loss	- 21.1 dB

General Antenna Parameters and Design

Electrical Delay (one direction)	1.201 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: 23.09.2013

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole 5GHz; Type: D5GHzV2; Serial: D5GHzV2 - SN: 1007

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 = 4.48 S/m; ε_r = 35.8; ρ = 1000 kg/m^3 , Medium parameters used: f = 5300 MHz; σ = 4.62 S/m; ε_r = 35.6; ρ = 1000 kg/m^3 , Medium parameters used: f = 5500 MHz; σ = 4.76 S/m; ε_r = 35.4; ρ = 1000 kg/m^3 , Medium parameters used: f = 5600 MHz; σ = 4.86 S/m; ε_r = 35.2; ρ = 1000 kg/m^3 , Medium parameters used: f = 5800 MHz; σ = 5.07 S/m; ε_r = 35; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY52 Configuration:

- Probe: EX3DV4 - SN3503; ConvF(5.41, 5.41, 5.41); Calibrated: 28.12.2012, ConvF(5.1, 5.1, 5.1); Calibrated: 28.12.2012, ConvF(4.91, 4.91, 4.91); Calibrated: 28.12.2012, ConvF(4.76, 4.76, 4.76); Calibrated: 28.12.2012, ConvF(4.81, 4.81, 4.81); Calibrated: 28.12.2012;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 25.04.2013
- Phantom: Flat Phantom 5.0 (front); Type: QD000P50AA; Serial: 1001
- DASY52 52.8.7(1137); SEMCAD X 14.6.10(7164)

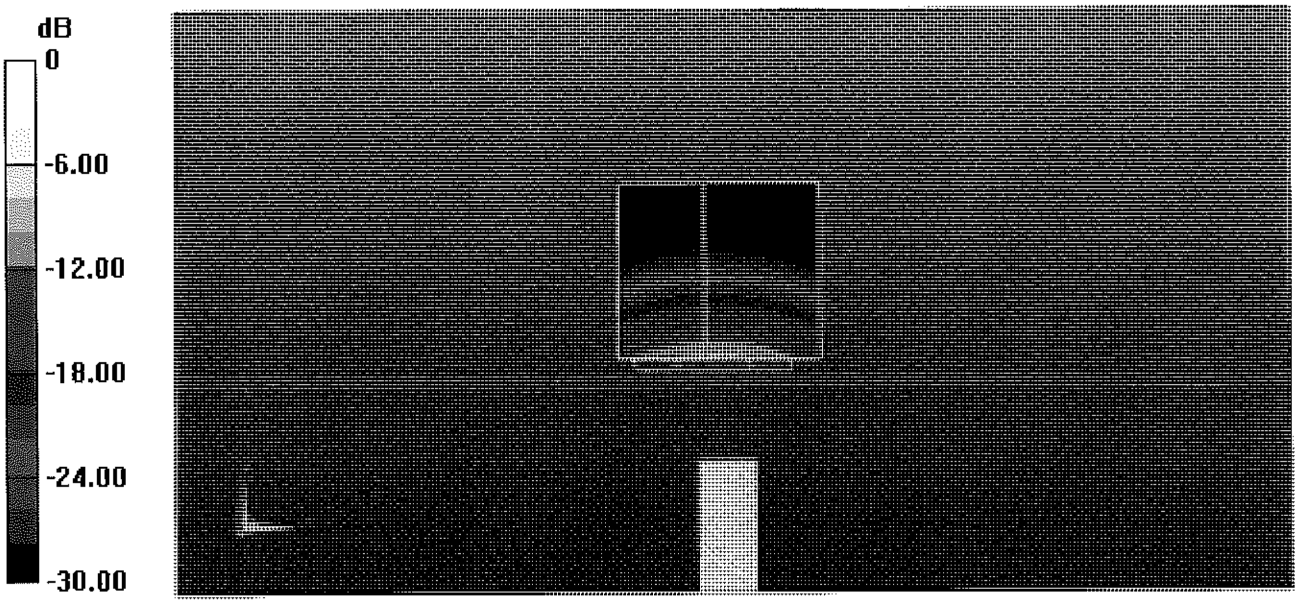
Dipole Calibration for Head Tissue/Pin=100mW, dist=10mm, f=5200 MHz/Zoom Scan, dist=1.4mm (8x8x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm
Reference Value = 63.505 V/m; Power Drift = 0.07 dB
Peak SAR (extrapolated) = 28.1 W/kg
SAR(1 g) = 7.77 W/kg; SAR(10 g) = 2.23 W/kg
Maximum value of SAR (measured) = 18.1 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 = 63.817 V/m; Power Drift = 0.07 dB
Peak SAR (extrapolated) = 29.7 W/kg
SAR(1 g) = 8.04 W/kg; SAR(10 g) = 2.3 W/kg
Maximum value of SAR (measured) = 18.7 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 = 64.029 V/m; Power Drift = 0.07 dB
Peak SAR (extrapolated) = 32.0 W/kg
SAR(1 g) = 8.17 W/kg; SAR(10 g) = 2.32 W/kg
Maximum value of SAR (measured) = 19.7 W/kg

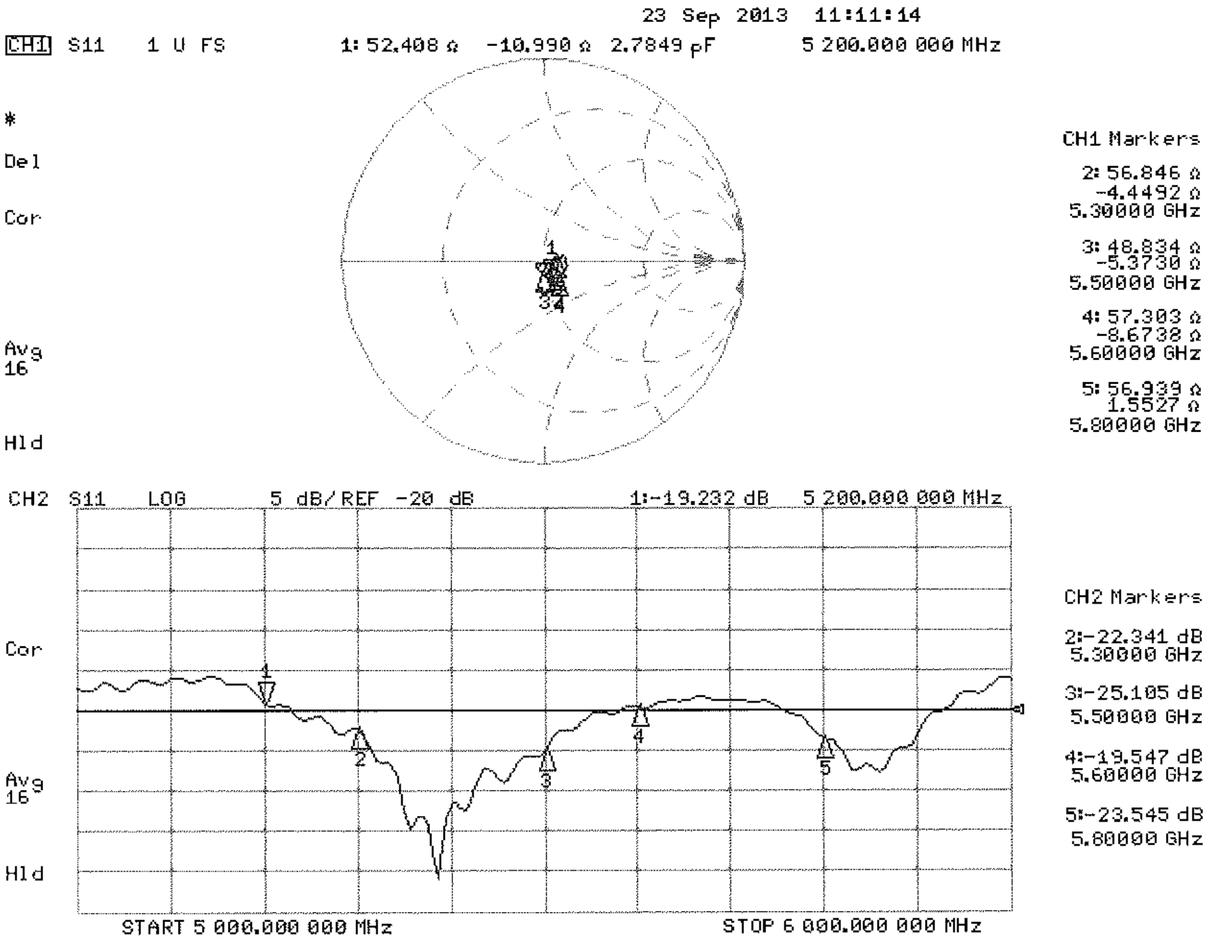
Dipole Calibration for Head Tissue/Pin=100mW, dist=10mm, f=5600 MHz/Zoom Scan, dist=1.4mm (8x8x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm
Reference Value = 63.403 V/m; Power Drift = 0.05 dB
Peak SAR (extrapolated) = 31.3 W/kg
SAR(1 g) = 8.03 W/kg; SAR(10 g) = 2.28 W/kg
Maximum value of SAR (measured) = 19.3 W/kg

Dipole Calibration for Head Tissue/Pin=100mW, dist=10mm, f=5800 MHz/Zoom Scan, dist=1.4mm (8x8x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm
Reference Value = 60.987 V/m; Power Drift = 0.06 dB
Peak SAR (extrapolated) = 31.9 W/kg
SAR(1 g) = 7.78 W/kg; SAR(10 g) = 2.2 W/kg
Maximum value of SAR (measured) = 19.0 W/kg



0 dB = 19.0 W/kg = 12.79 dBW/kg

Impedance Measurement Plot for Head TSL



DASY5 Validation Report for Body TSL

Date: 20.09.2013

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole 5GHz; Type: D5GHzV2; Serial: D5GHzV2 - SN: 1007

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 = 5.36 S/m; ε_r = 48.3; ρ = 1000 kg/m^3 , Medium parameters used: f = 5300 MHz; σ = 5.56 S/m; ε_r = 48.1; ρ = 1000 kg/m^3 , Medium parameters used: f = 5500 MHz; σ = 5.75 S/m; ε_r = 47.8; ρ = 1000 kg/m^3 , Medium parameters used: f = 5600 MHz; σ = 5.88 S/m; ε_r = 47.6; ρ = 1000 kg/m^3 , Medium parameters used: f = 5800 MHz; σ = 6.17 S/m; ε_r = 47.3; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY52 Configuration:

- Probe: EX3DV4 - SN3503; ConvF(4.91, 4.91, 4.91); Calibrated: 28.12.2012, ConvF(4.67, 4.67, 4.67); Calibrated: 28.12.2012, ConvF(4.43, 4.43, 4.43); Calibrated: 28.12.2012, ConvF(4.22, 4.22, 4.22); Calibrated: 28.12.2012, ConvF(4.38, 4.38, 4.38); Calibrated: 28.12.2012;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 25.04.2013
- Phantom: Flat Phantom 5.0 (back); Type: QD000P50AA; Serial: 1002
- DASY52 52.8.7(1137); SEMCAD X 14.6.10(7164)

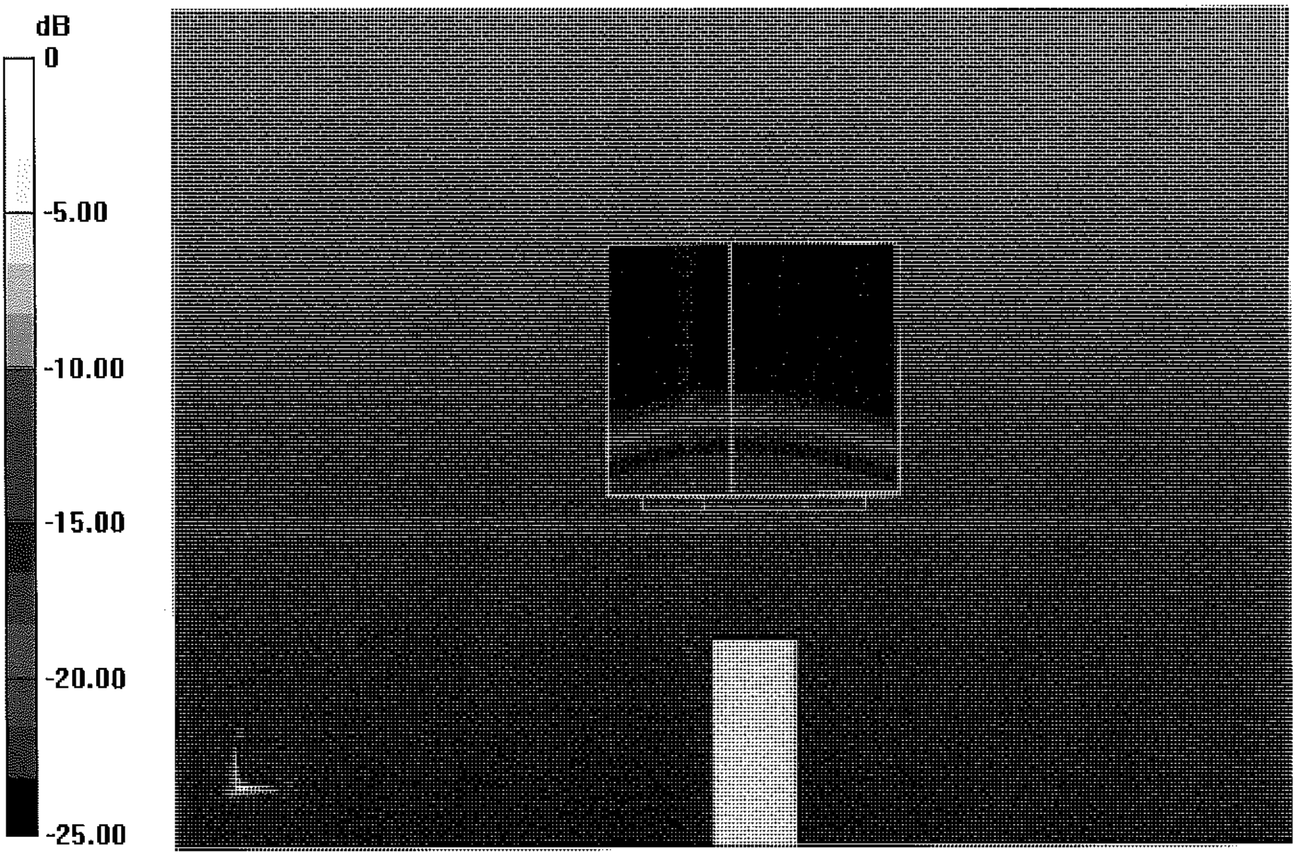
Dipole Calibration for Body Tissue/Pin=100mW, dist=10mm, f=5200 MHz/Zoom Scan, dist=1.4mm (8x8x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm
Reference Value = 58.606 V/m; Power Drift = -0.02 dB
Peak SAR (extrapolated) = 28.6 W/kg
SAR(1 g) = 7.28 W/kg; SAR(10 g) = 2.03 W/kg
Maximum value of SAR (measured) = 17.2 W/kg

Dipole Calibration for Body Tissue/Pin=100mW, dist=10mm, f=5300 MHz/Zoom Scan, dist=1.4mm (8x8x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm
Reference Value = 58.305 V/m; Power Drift = 0.01 dB
Peak SAR (extrapolated) = 30.3 W/kg
SAR(1 g) = 7.49 W/kg; SAR(10 g) = 2.09 W/kg
Maximum value of SAR (measured) = 17.8 W/kg

Dipole Calibration for Body Tissue/Pin=100mW, dist=10mm, f=5500 MHz/Zoom Scan, dist=1.4mm (8x8x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm
Reference Value = 58.471 V/m; Power Drift = -0.00 dB
Peak SAR (extrapolated) = 32.4 W/kg
SAR(1 g) = 7.61 W/kg; SAR(10 g) = 2.11 W/kg
Maximum value of SAR (measured) = 18.5 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 = 58.333 V/m; Power Drift = -0.01 dB
Peak SAR (extrapolated) = 33.8 W/kg
SAR(1 g) = 7.75 W/kg; SAR(10 g) = 2.16 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 = 55.389 V/m; Power Drift = 0.00 dB
Peak SAR (extrapolated) = 34.1 W/kg
SAR(1 g) = 7.31 W/kg; SAR(10 g) = 2.02 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