SAR EVALUATION REPORT

Applicant Name:
Samsung Electronics, Co. Ltd.
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Date of Testing:
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Test Site/Location:
PCTEST Lab, Columbia, MD, USA
Document Serial No.:
0Y1211281716-R1.A3L

FCC ID: **A3LSCHI925U**

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

DUT Type: Portable Tablet Computer
Application Type: Certification
FCC Rule Part(s): CFR §2.1093
Model(s): SCH-I925U

Equipment Class	Band & Mode	Tx Frequency	Measured Conducted Power [dBm]	SAR 1 gm Body (W/kg)
PCB	Cell. CDMA/EVDO	824.70 - 848.31 MHz	24.50	0.72
PCB	AWS CDMA/EVDO	1711.25 - 1753.75 MHz	24.92	0.73
PCB	PCS CDMA/EVDO	1851.25 - 1908.75 MHz	25.15	0.75
PCB	LTE Band 12	701.5 - 713.5 MHz	23.06	0.38
PCB	LTE Band 5 (Cell)	826.5 - 846.5 MHz	23.41	0.46
PCB	LTE Band 4 (AWS)	1712.5 - 1752.5 MHz	23.39	0.61
PCB	LTE Band 2 (PCS)	1852.5 - 1907.5 MHz	23.34	0.67
DTS	2.4 GHz WLAN	2412 - 2462 MHz	13.59	1.03
DTS	5.8 GHz WLAN	5745 - 5825 MHz	13.23	0.69
UNII	5.2 GHz WLAN	5180 - 5240 MHz	13.47	0.62
UNII	5.3 GHz WLAN	5260 - 5320 MHz	13.16	0.78
UNII	5.5 GHz WLAN	5500 - 5700 MHz	12.92	0.88
DSS	Bluetooth	2402 - 2480 MHz	11.21	0.30
Simultaneous SAR per KDB 690783 D01v01r02:				1.55

Note: Powers in the above table represent output powers for the SAR test configurations and may not represent the highest output powers for all configurations for each mode.

Note: This revised test report (S/N: 0Y1211281716-R1.A3L) supersedes and replaces the previously issued test report on the same subject DUT for the same type of testing indicated. Please discard or destroy the previously issued tests report(s) and dispose of accordingly.

This wireless portable device has been shown to be capable of compliance for localized specific absorption rate (SAR) for uncontrolled environment/general population exposure limits specified in ANSI/IEEE C95.1-1992 and has been tested in accordance with the measurement procedures specified in Section 1.7 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.

PCTEST certifies that no party to this application has been subject to a denial of Federal benefits that includes FCC benefits pursuant to Section 5301 of the Anti-Drug Abuse Act of 1988, 21 U.S.C. 862.

Randy Ortanez
President

ACCREDITED
TESTING LABORATORY
CERTIFICATE #2041.01

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1 DEVICE UNDER TEST

1.1 Device Overview

Band & Mode	Operating Modes	Tx Frequency
Cell. CDMA/EVDO	Data	824.70 - 848.31 MHz
AWS CDMA/EVDO	Data	1711.25 - 1753.75 MHz
PCS CDMA/EVDO	Data	1851.25 - 1908.75 MHz
LTE Band 12	Data	701.5 - 713.5 MHz
LTE Band 5 (Cell)	Data	826.5 - 846.5 MHz
LTE Band 4 (AWS)	Data	1712.5 - 1752.5 MHz
LTE Band 2 (PCS)	Data	1852.5 - 1907.5 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.

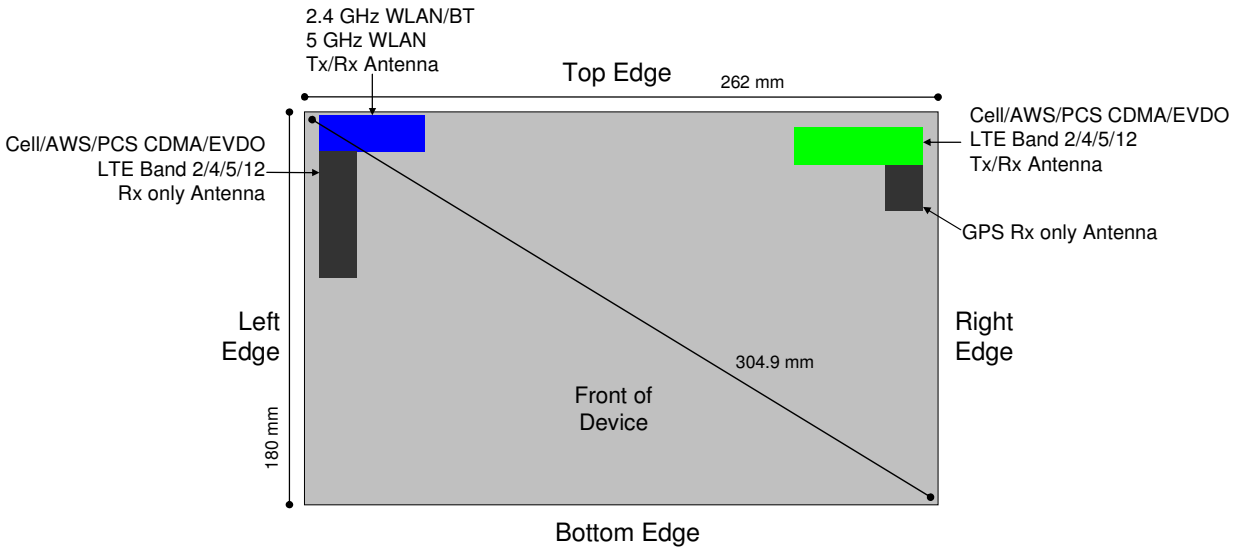
Mode / Band	Proximity Sensor State		Modulated Average (dBm)
Cell. CDMA/EVDO	Inactive	Maximum	**25.2**
		Nominal	**24.7**
	Active	Maximum	**19.5**
		Nominal	**19.0**
AWS CDMA/EVDO	Inactive	Maximum	**25.2**
		Nominal	**24.7**
	Active	Maximum	**15.0**
		Nominal	**14.5**
PCS CDMA/EVDO	Inactive	Maximum	**25.2**
		Nominal	**24.7**
	Active	Maximum	**14.5**
		Nominal	**14.0**

Mode / Band	Proximity Sensor State		Modulated Average (dBm)
LTE Band 12	Inactive	Maximum	23.5
		Nominal	23.0
	Active	Maximum	14.5
		Nominal	14.0
LTE Band 5 (Cell)	Inactive	Maximum	23.7
		Nominal	23.2
	Active	Maximum	15.0
		Nominal	14.5
LTE Band 4 (AWS)	Inactive	Maximum	23.7
		Nominal	23.2
	Active	Maximum	12.6
		Nominal	12.1
LTE Band 2 (PCS)	Inactive	Maximum	23.6
		Nominal	23.1
	Active	Maximum	12.5
		Nominal	12.0

Mode	Band		IEEE 802.11 (in dBm)			
			a	b	g	n
2.4 GHz WIFI	2.4 GHz WIFI	Maximum		14.0	13.5	13.5
		Nominal		13.5	13.0	13.0
5 GHz WIFI (20 MHz BW)	5200 MHz	Maximum	13.5			13.0
		Nominal	13.0			12.5
	5300 MHz	Maximum	13.5			13.5
		Nominal	13.0			13.0
	5500 MHz	Maximum	13.0			13.0
		Nominal	12.5			12.5
	5800 MHz	Maximum	13.5			13.5
		Nominal	13.0			13.0
5 GHz WIFI (40 MHz BW)	5200 MHz	Maximum				13.0
		Nominal				12.5
	5300 MHz	Maximum				13.0
		Nominal				12.5
	5500 MHz	Maximum				13.0
		Nominal				12.5
	5800 MHz	Maximum				13.5
		Nominal				13.0

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

1.3 DUT Antenna Locations



Note: Specific antenna dimensions and separation distances are shown in the antenna distance document.

Figure 1-1
DUT Antenna Locations

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 1-1
Simultaneous Transmission Scenarios

No.	Capable Transmit Configurations	Body	Note
		FCC KDB 616217	
1	CDMA/EVDO Data + Wifi 2.4 GHz	Yes	2G/3G Hotspot or Wifi Direct
2	LTE + Wifi 2.4 GHz	Yes	4G Hotspot or Wifi Direct
3	CDMA/EVDO Data + Wifi 5 GHz	Yes	Wifi Direct
4	LTE + Wifi 5 GHz	Yes	Wifi Direct
5	CDMA/EVDO Data + Bluetooth	Yes	
6	LTE + Bluetooth	Yes	

1.5 SAR Test Exclusions Applied

(A) WIFI/BT

2.4 GHz WLAN and 5 GHz WLAN and Bluetooth share the same antenna path and cannot transmit simultaneously.

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.

1.6 Power Reduction for SAR

Proximity Sensors were utilized in the device for SAR purposes. FCC KDB Publication 616217 D04 v01 was used for guidance for SAR testing. See Appendix G for more information.

1.7 Guidance Applied

- FCC KDB Publication 941225 D01-D06 (2G/3G/4G and Hotspot)
- FCC KDB Publication 248227 D01v01r02 (SAR Considerations for 802.11 Devices)
- FCC KDB Publication 447498 D01v05 (General SAR Guidance)
- FCC KDB Publication 865664 D01-D02 (SAR Measurements up to 6 GHz)
- FCC KDB Publication 616217 D04v01 (SAR for Laptops and Tablets)

1.8 Device Serial Numbers

Six samples with identical hardware were used to facilitate SAR testing. For maximum power devices S/N: 4689-0538, S/N: 4689-0543, and S/N: 4689-0545, power reduction was disabled via software (only available to the manufacturer – end user cannot disable power reduction) to ensure the device was always transmitting at maximum power when testing at a conservative distance. The reduced power devices S/N: 4689-0520, S/N: 4689-0539, and S/N: 4689-0542 were tuned to the reduced power levels. There is no proximity sensor power reduction mechanism applied for 2.4 GHz WLAN, 5 GHz WLAN, and Bluetooth modes.

	Max Power Serial Number	Reduced Power Number
Cell. CDMA/EVDO	4689-0545	4689-0520
AWS CDMA/EVDO	4689-0545	4689-0520
PCS CDMA/EVDO	4689-0545	4689-0520
LTE Band 12	4689-0538	4689-0539
LTE Band 5 (Cell)	4689-0538	4689-0539
LTE Band 4 (AWS)	4689-0543	4689-0542
LTE Band 2 (PCS)	4689-0543	4689-0542
2.4 GHz WLAN	4689-0538	N/A
5 GHz WLAN	4689-0545	N/A
Bluetooth	4689-0538	N/A

2 LTE INFORMATION

LTE Information				
	FCC ID	**A3LSCHI925U**		
	Form Factor	Portable Tablet Computer		
1)	Frequency Range of each LTE transmission band	LTE Band 12 (701.5 - 713.5 MHz)		
		LTE Band 5 (Cell) (826.5 - 846.5 MHz)		
		LTE Band 4 (AWS) (1712.5 - 1752.5 MHz)		
		LTE Band 2 (PCS) (1852.5 - 1907.5 MHz)		
2)	Channel Bandwidths	LTE Band 12: 5 MHz, 10 MHz		
		LTE Band 5 (Cell): 5 MHz, 10 MHz		
		LTE Band 4 (AWS): 5 MHz, 10 MHz		
		LTE Band 2 (PCS): 5 MHz, 10 MHz		
3)	Channel Numbers and Frequencies (MHz)	Low	Mid	High
	LTE Band 12: 5 MHz	701.5 (23025)	707.5 (23085)	713.5 (23145)
	LTE Band 12: 10 MHz	704 (23050)	707.5 (23085)	711 (23120)
	LTE Band 5 (Cell): 5 MHz	826.5 (20425)	836.5 (20525)	846.5 (20625)
	LTE Band 5 (Cell): 10 MHz	829 (20450)	836.5 (20525)	844 (20600)
	LTE Band 4 (AWS): 5 MHz	1712.5 (19975)	1732.5 (20175)	1752.5 (20375)
	LTE Band 4 (AWS): 10 MHz	1715 (20000)	1732.5 (20175)	1750 (20350)
	LTE Band 2 (PCS): 5 MHz	1852.5 (18625)	1880 (18900)	1907.5 (19175)
	LTE Band 2 (PCS): 10 MHz	1855 (18650)	1880 (18900)	1905 (19150)
4)(a)	UE Category	3		
(b)	Modulations Supported in UL	QPSK, 16QAM		
	LTE Transmitter and Antenna Implementation	1 Tx/Rx Antenna and 1 Rx Only antenna		
5)	Description of LTE Tx and Ant. Implementation	CDMA/EVDO and LTE share the same transmission path		
6)	LTE Voice available?	NO		
	Hotspot with LTE+WIFI	YES		
	Hotspot with LTE+WIFI active with 1XVoice sessions?	NO		
7)	LTE MPR Permanently implemented per 3GPP TS	See Section 8.2		
	A-MPR (Additional MPR) disabled for SAR Testing?	YES		
8)	Conducted power Table provided for 1RB (low, mid, and high offset), 50% RB (low, mid, and high offset), 100% RB	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 [24]. 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:

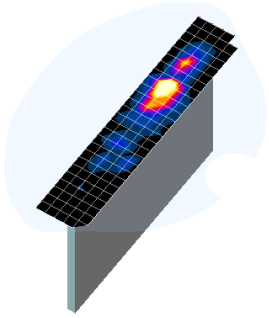


Figure 4-1
Sample SAR Area Scan

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).

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). 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. The data was extrapolated to the surface of the outer-shell of the phantom. The combined distance extrapolated was the combined distance from the center of the dipoles 2.7mm away from the tip of the probe housing plus the 1.2 mm distance between the surface and the lowest measuring point. 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) $\Delta z_{zoom}(n)$	Minimum Zoom Scan Volume (mm) (x,y,z)
≤ 2 GHz	≤ 15	≤ 8	≤ 5	≥ 30
2-3 GHz	≤ 12	≤ 5	≤ 5	≥ 30
3-4 GHz	≤ 12	≤ 5	≤ 4	≥ 28
4-5 GHz	≤ 10	≤ 4	≤ 3	≥ 25
5-6 GHz	≤ 10	≤ 4	≤ 2	≥ 22

5 RF EXPOSURE LIMITS

5.1 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.

5.2 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 5-1
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)
SPATIAL PEAK SAR Brain	1.6	8.0
SPATIAL AVERAGE SAR Whole Body	0.08	0.4
SPATIAL PEAK SAR Hands, Feet, Ankles, Wrists	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.

6 FCC MEASUREMENT PROCEDURES

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

6.1 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.

6.2 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.

6.3 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.

6.3.1 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.

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 6-1 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 6-2 was applied.

Table 6-1
Parameters for Max. Power for RC1

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

Table 6-2
Parameters for Max. Power for RC3

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

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

6.3.2 Body SAR Measurements for EVDO Data Devices

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 terminal target of 16 slots in Subtype 2 Physical layer configurations.

SAR is not required for 1x RTT for Ev-Do devices that also support 1x RTT voice and/or data operations, when the maximum average output of each channel is less than ¼ dB higher than that measured in Subtype 0/1 Physical Layer configurations for Rev. 0.

6.4 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.

6.4.1 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.

6.4.2 MPR

MPR is implemented for this device by the manufacturer when the proximity sensor is not active (maximum power scenarios). 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. See Section 8.4 for MPR targets.

6.4.3 A-MPR

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

6.4.4 Required RB Size and RB Offsets for SAR Testing

According to FCC KDB 941225 D05v02:

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.

6.5 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.

6.5.1 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.

6.5.2 Frequency Channel Configurations [27]

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 0.25 dB or higher 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 or 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.

7 TABLET SAR TESTING PROCEDURES

7.1 SAR Testing for Tablet per KDB Publication 616217 D04v01

Per FCC KDB 616217, the back surface and edges of the tablet should be tested for SAR compliance with the tablet touching the phantom. The SAR Exclusion Threshold in KDB 447498 D01v05 can be applied to determine SAR test exclusion for adjacent edge configurations. The closest distance from the antenna to an adjacent tablet edge is used to determine if SAR testing is required for the adjacent edges, with the adjacent edge positioned against the phantom and the edge containing the antenna positioned perpendicular to the phantom.

Based on the location and output power of the main antenna, back side and top and right edges were required to be evaluated for SAR. Back side and top and left edges were required to be evaluated for the BT/WLAN Antenna. Front side was not required to be evaluated.

7.2 Proximity Sensor Information

The technical description contains information about sensor size and locations. Power reduction levels are provided in Section 8.

FCC KDB 616217 was used as a guideline for selecting SAR test distances for this device. Since the back-off sensor activation distance for back is 13 mm, a conservative distance of 12 mm was tested for the back side at maximum power. Since the back-off sensor activation distance was 11 mm for the top edge, a conservative distance of 10 mm was tested at maximum power. Sensor triggering distance summary data is included in Appendix G.

The sensor is designed to support sufficient detection range and sensitivity to cover regions of the sensors in all applicable directions since the sensor entirely covers the antenna.

7.3 Method of SAR Measurement with Power Reduction

This tablet was tested in accordance with FCC KDB 616217 D04v01 for proximity sensor and power reduction.

Based on the power-reduction activation vs. distance results for the sensors, the samples representative of the device with the sensors activated (reduced power S/N: 4689-0520, S/N: 4689-0539, and S/N: 4689-0542) were tested for SAR at 0 mm. For the additional SAR measurements with the sensors de-activated (max power, no power reduction S/N: 4689-0538, S/N: 4689-0543, and S/N: 4689-0845) when the device is positioned away from the user, SAR evaluation is required at 12 mm (from the back), 10 mm (from the top edge) distances from the phantom. Since the device sensor detection mechanism is active at these distances, the power reduction was disabled via manufacturer test software, and the device was placed in maximum power transmit mode with a base station simulator under the tissue equivalent liquid-filled flat phantom at the required distances for testing.

8 RF CONDUCTED POWERS

8.1 CDMA Conducted Powers

Table 8-1
Maximum CDMA Average RF Power
(Representing Proximity Sensor Inactive)

Band	Channel	Frequency	TDSO SO32 [dBm]	TDSO SO32 [dBm]	1x EvDO Rev. 0 [dBm]	1x EvDO Rev. A [dBm]
	F-RC	MHz	FCH+SCH	FCH	(RTAP)	(RETAP)
Cellular	1013	824.7	24.69	24.72	24.81	24.67
	384	836.52	24.49	24.53	24.50	24.39
	777	848.31	24.60	24.53	24.54	24.47
AWS	25	1711.25	25.11	25.09	25.03	24.79
	450	1732.5	24.88	24.81	24.92	24.73
	875	1753.75	24.79	24.71	24.72	24.69
PCS	25	1851.25	25.12	25.14	25.15	25.09
	600	1880	24.91	25.00	24.91	24.84
	1175	1908.75	24.59	24.42	24.53	24.47

Table 8-2
Reduced CDMA Average RF Power
(Representing Proximity Sensor Active)

Band	Channel	Frequency	TDSO SO32 [dBm]	TDSO SO32 [dBm]	1x EvDO Rev. 0 [dBm]	1x EvDO Rev. A [dBm]
	F-RC	MHz	FCH+SCH	FCH	(RTAP)	(RETAP)
Cellular	1013	824.7	19.36	19.35	19.34	19.33
	384	836.52	19.17	19.15	19.18	19.17
	777	848.31	19.08	19.09	19.11	19.10
AWS	25	1711.25	14.70	14.73	14.56	14.53
	450	1732.5	14.68	14.66	14.46	14.45
	875	1753.75	14.43	14.42	14.65	14.64
PCS	25	1851.25	14.29	14.28	14.06	13.87
	600	1880	13.93	14.04	13.83	13.82
	1175	1908.75	14.14	14.25	14.21	14.10

Per KDB Publication 941225 D01v02, Body SAR was measured using Subtype 0/1 Physical Layer configurations for Rev. 0. Since the average output power of Subtype 2 for Rev. A is less than the Rev. 0 power levels, Rev. A SAR is not required. SAR is not required for 1x RTT since the maximum average output of each channel is less than ¼ dB higher than that measured in Subtype 0/1 Physical Layer configurations for Rev. 0

Figure 8-1
Power Measurement Setup

8.2 LTE Conducted Powers

8.2.1 LTE Band 12

Table 8-3
LTE Band 12 Maximum Conducted Powers – 10 MHz Bandwidth
(Representing Proximity Sensors Inactive)

	Frequency [MHz]	Channel	Bandwidth [MHz]	Modulation	RB Size	RB Offset	Conducted Power [dBm]	Target MPR [dB]	MPR Allowed per 3GPP [dB]
Mid	707.5	23095	10	QPSK	1	0	22.86	0	0
	707.5	23095	10	QPSK	1	25	**23.06**	0	0
	707.5	23095	10	QPSK	1	49	22.89	0	0
	707.5	23095	10	QPSK	25	0	**21.89**	1	0-1
	707.5	23095	10	QPSK	25	12	21.82	1	0-1
	707.5	23095	10	QPSK	25	25	21.75	1	0-1
	707.5	23095	10	QPSK	50	0	21.71	1	0-1
	707.5	23095	10	16QAM	1	0	21.50	1	0-1
	707.5	23095	10	16QAM	1	25	21.56	1	0-1
	707.5	23095	10	16QAM	1	49	21.55	1	0-1
	707.5	23095	10	16QAM	25	0	20.79	2	0-2
	707.5	23095	10	16QAM	25	12	20.80	2	0-2
	707.5	23095	10	16QAM	25	25	20.85	2	0-2
	707.5	23095	10	16QAM	50	0	20.70	2	0-2

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

Table 8-4
LTE Band 12 Maximum Conducted Powers – 5 MHz Bandwidth
(Representing Proximity Sensors Inactive)

	Frequency [MHz]	Channel	Bandwidth [MHz]	Modulation	RB Size	RB Offset	Conducted Power [dBm]	Target MPR [dB]	MPR Allowed per 3GPP [dB]
Low	701.5	23035	5	QPSK	1	0	23.18	0	0
	701.5	23035	5	QPSK	1	12	23.34	0	0
	701.5	23035	5	QPSK	1	24	22.90	0	0
	701.5	23035	5	QPSK	12	0	21.93	1	0-1
	701.5	23035	5	QPSK	12	6	21.88	1	0-1
	701.5	23035	5	QPSK	12	13	21.87	1	0-1
	701.5	23035	5	QPSK	25	0	21.89	1	0-1
	701.5	23035	5	16-QAM	1	0	22.09	1	0-1
	701.5	23035	5	16-QAM	1	12	22.19	1	0-1
	701.5	23035	5	16-QAM	1	24	21.79	1	0-1
	701.5	23035	5	16-QAM	12	0	20.90	2	0-2
	701.5	23035	5	16-QAM	12	6	20.83	2	0-2
	701.5	23035	5	16-QAM	12	13	20.87	2	0-2
	701.5	23035	5	16-QAM	25	0	21.05	2	0-2
Mid	707.5	23095	5	QPSK	1	0	22.98	0	0
	707.5	23095	5	QPSK	1	12	23.23	0	0
	707.5	23095	5	QPSK	1	24	22.98	0	0
	707.5	23095	5	QPSK	12	0	22.08	1	0-1
	707.5	23095	5	QPSK	12	6	22.10	1	0-1
	707.5	23095	5	QPSK	12	13	21.81	1	0-1
	707.5	23095	5	QPSK	25	0	21.86	1	0-1
	707.5	23095	5	16-QAM	1	0	21.77	1	0-1
	707.5	23095	5	16-QAM	1	12	21.92	1	0-1
	707.5	23095	5	16-QAM	1	24	21.73	1	0-1
	707.5	23095	5	16-QAM	12	0	20.93	2	0-2
	707.5	23095	5	16-QAM	12	6	20.95	2	0-2
	707.5	23095	5	16-QAM	12	13	20.89	2	0-2
	707.5	23095	5	16-QAM	25	0	20.87	2	0-2
High	713.5	23155	5	QPSK	1	0	22.70	0	0
	713.5	23155	5	QPSK	1	12	22.71	0	0
	713.5	23155	5	QPSK	1	24	22.94	0	0
	713.5	23155	5	QPSK	12	0	21.80	1	0-1
	713.5	23155	5	QPSK	12	6	21.74	1	0-1
	713.5	23155	5	QPSK	12	13	21.92	1	0-1
	713.5	23155	5	QPSK	25	0	21.79	1	0-1
	713.5	23155	5	16-QAM	1	0	21.63	1	0-1
	713.5	23155	5	16-QAM	1	12	21.50	1	0-1
	713.5	23155	5	16-QAM	1	24	21.73	1	0-1
	713.5	23155	5	16-QAM	12	0	20.74	2	0-2
	713.5	23155	5	16-QAM	12	6	20.75	2	0-2
	713.5	23155	5	16-QAM	12	13	20.85	2	0-2
	713.5	23155	5	16-QAM	25	0	20.78	2	0-2

Table 8-5
LTE Band 12 Reduced Conducted Powers – 10 MHz Bandwidth
(Representing Proximity Sensors Active)

	Frequency [MHz]	Channel	Bandwidth [MHz]	Modulation	RB Size	RB Offset	Conducted Power [dBm]	Target MPR [dB]	MPR Allowed per 3GPP [dB]
Mid	707.5	23095	10	QPSK	1	0	14.38	0	0
	707.5	23095	10	QPSK	1	25	**14.48**	0	0
	707.5	23095	10	QPSK	1	49	13.77	0	0
	707.5	23095	10	QPSK	25	0	13.97	0	0-1
	707.5	23095	10	QPSK	25	12	**14.49**	0	0-1
	707.5	23095	10	QPSK	25	25	14.22	0	0-1
	707.5	23095	10	QPSK	50	0	14.13	0	0-1
	707.5	23095	10	16QAM	1	0	13.85	0	0-1
	707.5	23095	10	16QAM	1	25	13.97	0	0-1
	707.5	23095	10	16QAM	1	49	14.05	0	0-1
	707.5	23095	10	16QAM	25	0	13.88	0	0-2
	707.5	23095	10	16QAM	25	12	14.44	0	0-2
	707.5	23095	10	16QAM	25	25	14.22	0	0-2
	707.5	23095	10	16QAM	50	0	14.03	0	0-2

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

Table 8-6
LTE Band 12 Reduced Conducted Powers – 5 MHz Bandwidth
(Representing Proximity Sensors Active)

	Frequency [MHz]	Channel	Bandwidth [MHz]	Modulation	RB Size	RB Offset	Conducted Power [dBm]	Target MPR [dB]	MPR Allowed per 3GPP [dB]
Low	701.5	23035	5	QPSK	1	0	14.17	0	0
	701.5	23035	5	QPSK	1	12	14.00	0	0
	701.5	23035	5	QPSK	1	24	14.30	0	0
	701.5	23035	5	QPSK	12	0	14.39	0	0-1
	701.5	23035	5	QPSK	12	6	13.82	0	0-1
	701.5	23035	5	QPSK	12	13	13.68	0	0-1
	701.5	23035	5	QPSK	25	0	13.82	0	0-1
	701.5	23035	5	16-QAM	1	0	14.43	0	0-1
	701.5	23035	5	16-QAM	1	12	14.50	0	0-1
	701.5	23035	5	16-QAM	1	24	13.85	0	0-1
	701.5	23035	5	16-QAM	12	0	14.31	0	0-2
	701.5	23035	5	16-QAM	12	6	14.15	0	0-2
	701.5	23035	5	16-QAM	12	13	14.02	0	0-2
	701.5	23035	5	16-QAM	25	0	14.00	0	0-2
Mid	707.5	23095	5	QPSK	1	0	13.81	0	0
	707.5	23095	5	QPSK	1	12	14.44	0	0
	707.5	23095	5	QPSK	1	24	14.35	0	0
	707.5	23095	5	QPSK	12	0	14.31	0	0-1
	707.5	23095	5	QPSK	12	6	14.50	0	0-1
	707.5	23095	5	QPSK	12	13	14.49	0	0-1
	707.5	23095	5	QPSK	25	0	14.41	0	0-1
	707.5	23095	5	16-QAM	1	0	13.95	0	0-1
	707.5	23095	5	16-QAM	1	12	14.48	0	0-1
	707.5	23095	5	16-QAM	1	24	14.50	0	0-1
	707.5	23095	5	16-QAM	12	0	14.32	0	0-2
	707.5	23095	5	16-QAM	12	6	14.44	0	0-2
	707.5	23095	5	16-QAM	12	13	14.47	0	0-2
	707.5	23095	5	16-QAM	25	0	14.35	0	0-2
High	713.5	23155	5	QPSK	1	0	13.54	0	0
	713.5	23155	5	QPSK	1	12	13.85	0	0
	713.5	23155	5	QPSK	1	24	14.40	0	0
	713.5	23155	5	QPSK	12	0	13.76	0	0-1
	713.5	23155	5	QPSK	12	6	13.89	0	0-1
	713.5	23155	5	QPSK	12	13	14.24	0	0-1
	713.5	23155	5	QPSK	25	0	13.90	0	0-1
	713.5	23155	5	16-QAM	1	0	14.03	0	0-1
	713.5	23155	5	16-QAM	1	12	13.75	0	0-1
	713.5	23155	5	16-QAM	1	24	14.50	0	0-1
	713.5	23155	5	16-QAM	12	0	13.76	0	0-2
	713.5	23155	5	16-QAM	12	6	13.80	0	0-2
	713.5	23155	5	16-QAM	12	13	14.27	0	0-2
	713.5	23155	5	16-QAM	25	0	13.78	0	0-2

8.2.2 LTE Band 5 (Cell)

Table 8-7
LTE Band 5 (Cell) Maximum Conducted Powers – 10 MHz Bandwidth
(Representing Proximity Sensors Inactive)

	Frequency [MHz]	Channel	Bandwidth [MHz]	Modulation	RB Size	RB Offset	Conducted Power [dBm]	Target MPR [dB]	MPR Allowed per 3GPP [dB]
Mid	836.5	20525	10	QPSK	1	0	22.99	0	0
	836.5	20525	10	QPSK	1	25	**23.41**	0	0
	836.5	20525	10	QPSK	1	49	23.34	0	0
	836.5	20525	10	QPSK	25	0	22.25	1	0-1
	836.5	20525	10	QPSK	25	12	**22.30**	1	0-1
	836.5	20525	10	QPSK	25	25	22.29	1	0-1
	836.5	20525	10	QPSK	50	0	22.25	1	0-1
	836.5	20525	10	16QAM	1	0	21.87	1	0-1
	836.5	20525	10	16QAM	1	25	21.85	1	0-1
	836.5	20525	10	16QAM	1	49	21.75	1	0-1
	836.5	20525	10	16QAM	25	0	21.20	2	0-2
	836.5	20525	10	16QAM	25	12	21.25	2	0-2
	836.5	20525	10	16QAM	25	25	21.33	2	0-2
	836.5	20525	10	16QAM	50	0	21.22	2	0-2

Table 8-8
LTE Band 5 (Cell) Maximum Conducted Powers – 5 MHz Bandwidth
(Representing Proximity Sensors Inactive)

	Frequency [MHz]	Channel	Bandwidth [MHz]	Modulation	RB Size	RB Offset	Conducted Power [dBm]	Target MPR [dB]	MPR Allowed per 3GPP [dB]
Low	826.5	20425	5	QPSK	1	0	23.58	0	0
	826.5	20425	5	QPSK	1	12	23.70	0	0
	826.5	20425	5	QPSK	1	24	23.52	0	0
	826.5	20425	5	QPSK	12	0	22.55	1	0-1
	826.5	20425	5	QPSK	12	6	22.40	1	0-1
	826.5	20425	5	QPSK	12	13	22.39	1	0-1
	826.5	20425	5	QPSK	25	0	22.32	1	0-1
	826.5	20425	5	16-QAM	1	0	22.41	1	0-1
	826.5	20425	5	16-QAM	1	12	22.39	1	0-1
	826.5	20425	5	16-QAM	1	24	22.28	1	0-1
	826.5	20425	5	16-QAM	12	0	21.00	2	0-2
	826.5	20425	5	16-QAM	12	6	21.45	2	0-2
	826.5	20425	5	16-QAM	12	13	21.30	2	0-2
	826.5	20425	5	16-QAM	25	0	21.40	2	0-2
Mid	836.5	20525	5	QPSK	1	0	23.39	0	0
	836.5	20525	5	QPSK	1	12	23.23	0	0
	836.5	20525	5	QPSK	1	24	23.37	0	0
	836.5	20525	5	QPSK	12	0	22.27	1	0-1
	836.5	20525	5	QPSK	12	6	22.23	1	0-1
	836.5	20525	5	QPSK	12	13	22.39	1	0-1
	836.5	20525	5	QPSK	25	0	22.25	1	0-1
	836.5	20525	5	16-QAM	1	0	22.17	1	0-1
	836.5	20525	5	16-QAM	1	12	22.12	1	0-1
	836.5	20525	5	16-QAM	1	24	22.42	1	0-1
	836.5	20525	5	16-QAM	12	0	21.18	2	0-2
	836.5	20525	5	16-QAM	12	6	21.12	2	0-2
	836.5	20525	5	16-QAM	12	13	21.21	2	0-2
	836.5	20525	5	16-QAM	25	0	21.28	2	0-2
High	846.5	20625	5	QPSK	1	0	23.18	0	0
	846.5	20625	5	QPSK	1	12	22.96	0	0
	846.5	20625	5	QPSK	1	24	23.05	0	0
	846.5	20625	5	QPSK	12	0	22.09	1	0-1
	846.5	20625	5	QPSK	12	6	22.05	1	0-1
	846.5	20625	5	QPSK	12	13	22.16	1	0-1
	846.5	20625	5	QPSK	25	0	22.01	1	0-1
	846.5	20625	5	16-QAM	1	0	22.01	1	0-1
	846.5	20625	5	16-QAM	1	12	22.08	1	0-1
	846.5	20625	5	16-QAM	1	24	21.83	1	0-1
	846.5	20625	5	16-QAM	12	0	21.09	2	0-2
	846.5	20625	5	16-QAM	12	6	21.09	2	0-2
	846.5	20625	5	16-QAM	12	13	21.13	2	0-2
	846.5	20625	5	16-QAM	25	0	21.22	2	0-2

Table 8-9
LTE Band 5 (Cell) Reduced Conducted Powers – 10 MHz Bandwidth
(Representing Proximity Sensors Active)

	Frequency [MHz]	Channel	Bandwidth [MHz]	Modulation	RB Size	RB Offset	Conducted Power [dBm]	Target MPR [dB]	MPR Allowed per 3GPP [dB]
Mid	836.5	20525	10	QPSK	1	0	**14.73**	0	0
	836.5	20525	10	QPSK	1	25	14.56	0	0
	836.5	20525	10	QPSK	1	49	14.28	0	0
	836.5	20525	10	QPSK	25	0	**14.87**	0	0-1
	836.5	20525	10	QPSK	25	12	14.78	0	0-1
	836.5	20525	10	QPSK	25	25	14.69	0	0-1
	836.5	20525	10	QPSK	50	0	14.64	0	0-1
	836.5	20525	10	16QAM	1	0	14.52	0	0-1
	836.5	20525	10	16QAM	1	25	14.76	0	0-1
	836.5	20525	10	16QAM	1	49	14.12	0	0-1
	836.5	20525	10	16QAM	25	0	14.82	0	0-2
	836.5	20525	10	16QAM	25	12	14.77	0	0-2
	836.5	20525	10	16QAM	25	25	14.67	0	0-2
	836.5	20525	10	16QAM	50	0	14.63	0	0-2

Table 8-10
LTE Band 5 (Cell) Reduced Conducted Powers – 5 MHz Bandwidth
(Representing Proximity Sensors Active)

	Frequency [MHz]	Channel	Bandwidth [MHz]	Modulation	RB Size	RB Offset	Conducted Power [dBm]	Target MPR [dB]	MPR Allowed per 3GPP [dB]
Low	826.5	20425	5	QPSK	1	0	14.43	0	0
	826.5	20425	5	QPSK	1	12	14.84	0	0
	826.5	20425	5	QPSK	1	24	14.26	0	0
	826.5	20425	5	QPSK	12	0	14.46	0	0-1
	826.5	20425	5	QPSK	12	6	14.61	0	0-1
	826.5	20425	5	QPSK	12	13	14.63	0	0-1
	826.5	20425	5	QPSK	25	0	14.54	0	0-1
	826.5	20425	5	16-QAM	1	0	14.45	0	0-1
	826.5	20425	5	16-QAM	1	12	14.84	0	0-1
	826.5	20425	5	16-QAM	1	24	14.27	0	0-1
	826.5	20425	5	16-QAM	12	0	14.46	0	0-2
	826.5	20425	5	16-QAM	12	6	14.62	0	0-2
	826.5	20425	5	16-QAM	12	13	14.64	0	0-2
	826.5	20425	5	16-QAM	25	0	14.55	0	0-2
Mid	836.5	20525	5	QPSK	1	0	14.59	0	0
	836.5	20525	5	QPSK	1	12	14.70	0	0
	836.5	20525	5	QPSK	1	24	14.35	0	0
	836.5	20525	5	QPSK	12	0	14.70	0	0-1
	836.5	20525	5	QPSK	12	6	14.83	0	0-1
	836.5	20525	5	QPSK	12	13	14.74	0	0-1
	836.5	20525	5	QPSK	25	0	14.78	0	0-1
	836.5	20525	5	16-QAM	1	0	14.78	0	0-1
	836.5	20525	5	16-QAM	1	12	14.80	0	0-1
	836.5	20525	5	16-QAM	1	24	14.61	0	0-1
	836.5	20525	5	16-QAM	12	0	14.68	0	0-2
	836.5	20525	5	16-QAM	12	6	14.73	0	0-2
	836.5	20525	5	16-QAM	12	13	14.63	0	0-2
	836.5	20525	5	16-QAM	25	0	14.74	0	0-2
High	846.5	20625	5	QPSK	1	0	14.00	0	0
	846.5	20625	5	QPSK	1	12	14.62	0	0
	846.5	20625	5	QPSK	1	24	14.44	0	0
	846.5	20625	5	QPSK	12	0	14.24	0	0-1
	846.5	20625	5	QPSK	12	6	14.59	0	0-1
	846.5	20625	5	QPSK	12	13	14.62	0	0-1
	846.5	20625	5	QPSK	25	0	14.46	0	0-1
	846.5	20625	5	16-QAM	1	0	14.58	0	0-1
	846.5	20625	5	16-QAM	1	12	14.85	0	0-1
	846.5	20625	5	16-QAM	1	24	14.69	0	0-1
	846.5	20625	5	16-QAM	12	0	14.39	0	0-2
	846.5	20625	5	16-QAM	12	6	14.71	0	0-2
	846.5	20625	5	16-QAM	12	13	14.72	0	0-2
	846.5	20625	5	16-QAM	25	0	14.59	0	0-2

8.2.3 LTE Band 4 (AWS)

Table 8-11
LTE Band 4 (AWS) Maximum Conducted Powers – 10 MHz Bandwidth
(Representing Proximity Sensors Inactive)

	Frequency [MHz]	Channel	Bandwidth [MHz]	Modulation	RB Size	RB Offset	Conducted Power [dBm]	Target MPR [dB]	MPR Allowed per 3GPP [dB]
Low	1715	20000	10	QPSK	1	0	23.20	0	0
	1715	20000	10	QPSK	1	25	23.13	0	0
	1715	20000	10	QPSK	1	49	23.04	0	0
	1715	20000	10	QPSK	25	0	22.03	1	0-1
	1715	20000	10	QPSK	25	12	21.95	1	0-1
	1715	20000	10	QPSK	25	25	22.07	1	0-1
	1715	20000	10	QPSK	50	0	21.91	1	0-1
	1715	20000	10	16QAM	1	0	22.51	1	0-1
	1715	20000	10	16QAM	1	25	22.49	1	0-1
	1715	20000	10	16QAM	1	49	22.48	1	0-1
	1715	20000	10	16QAM	25	0	21.11	2	0-2
	1715	20000	10	16QAM	25	12	21.02	2	0-2
	1715	20000	10	16QAM	25	25	20.99	2	0-2
	1715	20000	10	16QAM	50	0	20.93	2	0-2
Mid	1732.5	20175	10	QPSK	1	0	23.14	0	0
	1732.5	20175	10	QPSK	1	25	23.25	0	0
	1732.5	20175	10	QPSK	1	49	23.20	0	0
	1732.5	20175	10	QPSK	25	0	22.08	1	0-1
	1732.5	20175	10	QPSK	25	12	21.98	1	0-1
	1732.5	20175	10	QPSK	25	25	21.96	1	0-1
	1732.5	20175	10	QPSK	50	0	21.89	1	0-1
	1732.5	20175	10	16QAM	1	0	21.77	1	0-1
	1732.5	20175	10	16QAM	1	25	21.81	1	0-1
	1732.5	20175	10	16QAM	1	49	21.79	1	0-1
	1732.5	20175	10	16QAM	25	0	21.14	2	0-2
	1732.5	20175	10	16QAM	25	12	21.07	2	0-2
	1732.5	20175	10	16QAM	25	25	21.05	2	0-2
	1732.5	20175	10	16QAM	50	0	20.78	2	0-2
High	1750	20350	10	QPSK	1	0	23.03	0	0
	1750	20350	10	QPSK	1	25	23.20	0	0
	1750	20350	10	QPSK	1	49	**23.39**	0	0
	1750	20350	10	QPSK	25	0	22.05	1	0-1
	1750	20350	10	QPSK	25	12	21.99	1	0-1
	1750	20350	10	QPSK	25	25	**22.28**	1	0-1
	1750	20350	10	QPSK	50	0	22.03	1	0-1
	1750	20350	10	16QAM	1	0	21.76	1	0-1
	1750	20350	10	16QAM	1	25	21.84	1	0-1
	1750	20350	10	16QAM	1	49	21.99	1	0-1
	1750	20350	10	16QAM	25	0	21.19	2	0-2
	1750	20350	10	16QAM	25	12	21.20	2	0-2
	1750	20350	10	16QAM	25	25	21.35	2	0-2
	1750	20350	10	16QAM	50	0	21.03	2	0-2

Table 8-12
LTE Band 4 (AWS) Maximum Conducted Powers – 5 MHz Bandwidth
(Representing Proximity Sensors Inactive)

	Frequency [MHz]	Channel	Bandwidth [MHz]	Modulation	RB Size	RB Offset	Conducted Power [dBm]	Target MPR [dB]	MPR Allowed per 3GPP [dB]
Low	1712.5	19975	5	QPSK	1	0	23.26	0	0
	1712.5	19975	5	QPSK	1	12	23.13	0	0
	1712.5	19975	5	QPSK	1	24	23.05	0	0
	1712.5	19975	5	QPSK	12	0	22.11	1	0-1
	1712.5	19975	5	QPSK	12	6	22.07	1	0-1
	1712.5	19975	5	QPSK	12	13	22.05	1	0-1
	1712.5	19975	5	QPSK	25	0	22.04	1	0-1
	1712.5	19975	5	16-QAM	1	0	22.06	1	0-1
	1712.5	19975	5	16-QAM	1	12	21.85	1	0-1
	1712.5	19975	5	16-QAM	1	24	22.05	1	0-1
	1712.5	19975	5	16-QAM	12	0	20.86	2	0-2
	1712.5	19975	5	16-QAM	12	6	21.07	2	0-2
	1712.5	19975	5	16-QAM	12	13	20.85	2	0-2
	1712.5	19975	5	16-QAM	25	0	20.88	2	0-2
Mid	1732.5	20175	5	QPSK	1	0	23.37	0	0
	1732.5	20175	5	QPSK	1	12	23.19	0	0
	1732.5	20175	5	QPSK	1	24	23.12	0	0
	1732.5	20175	5	QPSK	12	0	22.17	1	0-1
	1732.5	20175	5	QPSK	12	6	22.07	1	0-1
	1732.5	20175	5	QPSK	12	13	22.23	1	0-1
	1732.5	20175	5	QPSK	25	0	22.08	1	0-1
	1732.5	20175	5	16-QAM	1	0	22.01	1	0-1
	1732.5	20175	5	16-QAM	1	12	22.04	1	0-1
	1732.5	20175	5	16-QAM	1	24	22.00	1	0-1
	1732.5	20175	5	16-QAM	12	0	21.06	2	0-2
	1732.5	20175	5	16-QAM	12	6	21.19	2	0-2
	1732.5	20175	5	16-QAM	12	13	21.09	2	0-2
	1732.5	20175	5	16-QAM	25	0	21.32	2	0-2
High	1752.5	20375	5	QPSK	1	0	23.13	0	0
	1752.5	20375	5	QPSK	1	12	23.35	0	0
	1752.5	20375	5	QPSK	1	24	23.19	0	0
	1752.5	20375	5	QPSK	12	0	22.11	1	0-1
	1752.5	20375	5	QPSK	12	6	22.35	1	0-1
	1752.5	20375	5	QPSK	12	13	22.34	1	0-1
	1752.5	20375	5	QPSK	25	0	22.23	1	0-1
	1752.5	20375	5	16-QAM	1	0	21.96	1	0-1
	1752.5	20375	5	16-QAM	1	12	22.07	1	0-1
	1752.5	20375	5	16-QAM	1	24	22.01	1	0-1
	1752.5	20375	5	16-QAM	12	0	21.07	2	0-2
	1752.5	20375	5	16-QAM	12	6	21.06	2	0-2
	1752.5	20375	5	16-QAM	12	13	21.07	2	0-2
	1752.5	20375	5	16-QAM	25	0	21.24	2	0-2

Table 8-13
LTE Band 4 (AWS) Reduced Conducted Powers – 10 MHz Bandwidth
(Representing Proximity Sensors Active)

	Frequency [MHz]	Channel	Bandwidth [MHz]	Modulation	RB Size	RB Offset	Conducted Power [dBm]	Target MPR [dB]	MPR Allowed per 3GPP [dB]
Low	1715	20000	10	QPSK	1	0	12.24	0	0
	1715	20000	10	QPSK	1	25	**12.47**	0	0
	1715	20000	10	QPSK	1	49	12.06	0	0
	1715	20000	10	QPSK	25	0	12.04	0	0-1
	1715	20000	10	QPSK	25	12	12.08	0	0-1
	1715	20000	10	QPSK	25	25	11.99	0	0-1
	1715	20000	10	QPSK	50	0	11.98	0	0-1
	1715	20000	10	16QAM	1	0	12.00	0	0-1
	1715	20000	10	16QAM	1	25	12.16	0	0-1
	1715	20000	10	16QAM	1	49	11.89	0	0-1
	1715	20000	10	16QAM	25	0	11.97	0	0-2
	1715	20000	10	16QAM	25	12	12.04	0	0-2
	1715	20000	10	16QAM	25	25	12.00	0	0-2
	1715	20000	10	16QAM	50	0	11.96	0	0-2
Mid	1732.5	20175	10	QPSK	1	0	12.02	0	0
	1732.5	20175	10	QPSK	1	25	12.29	0	0
	1732.5	20175	10	QPSK	1	49	12.03	0	0
	1732.5	20175	10	QPSK	25	0	12.17	0	0-1
	1732.5	20175	10	QPSK	25	12	**12.22**	0	0-1
	1732.5	20175	10	QPSK	25	25	12.06	0	0-1
	1732.5	20175	10	QPSK	50	0	12.19	0	0-1
	1732.5	20175	10	16QAM	1	0	11.88	0	0-1
	1732.5	20175	10	16QAM	1	25	12.10	0	0-1
	1732.5	20175	10	16QAM	1	49	11.79	0	0-1
	1732.5	20175	10	16QAM	25	0	12.10	0	0-2
	1732.5	20175	10	16QAM	25	12	12.17	0	0-2
	1732.5	20175	10	16QAM	25	25	12.04	0	0-2
	1732.5	20175	10	16QAM	50	0	12.07	0	0-2
High	1750	20350	10	QPSK	1	0	11.89	0	0
	1750	20350	10	QPSK	1	25	12.32	0	0
	1750	20350	10	QPSK	1	49	11.91	0	0
	1750	20350	10	QPSK	25	0	12.00	0	0-1
	1750	20350	10	QPSK	25	12	12.13	0	0-1
	1750	20350	10	QPSK	25	25	12.04	0	0-1
	1750	20350	10	QPSK	50	0	12.08	0	0-1
	1750	20350	10	16QAM	1	0	11.75	0	0-1
	1750	20350	10	16QAM	1	25	12.04	0	0-1
	1750	20350	10	16QAM	1	49	11.87	0	0-1
	1750	20350	10	16QAM	25	0	11.83	0	0-2
	1750	20350	10	16QAM	25	12	11.93	0	0-2
	1750	20350	10	16QAM	25	25	11.87	0	0-2
	1750	20350	10	16QAM	50	0	11.97	0	0-2

Table 8-14
LTE Band 4 (AWS) Reduced Conducted Powers – 5 MHz Bandwidth
(Representing Proximity Sensors Active)

	Frequency [MHz]	Channel	Bandwidth [MHz]	Modulation	RB Size	RB Offset	Conducted Power [dBm]	Target MPR [dB]	MPR Allowed per 3GPP [dB]
Low	1712.5	19975	5	QPSK	1	0	12.46	0	0
	1712.5	19975	5	QPSK	1	12	12.54	0	0
	1712.5	19975	5	QPSK	1	24	12.37	0	0
	1712.5	19975	5	QPSK	12	0	11.97	0	0-1
	1712.5	19975	5	QPSK	12	6	12.18	0	0-1
	1712.5	19975	5	QPSK	12	13	11.98	0	0-1
	1712.5	19975	5	QPSK	25	0	12.06	0	0-1
	1712.5	19975	5	16-QAM	1	0	11.93	0	0-1
	1712.5	19975	5	16-QAM	1	12	12.31	0	0-1
	1712.5	19975	5	16-QAM	1	24	11.82	0	0-1
	1712.5	19975	5	16-QAM	12	0	11.99	0	0-2
	1712.5	19975	5	16-QAM	12	6	12.14	0	0-2
	1712.5	19975	5	16-QAM	12	13	11.96	0	0-2
	1712.5	19975	5	16-QAM	25	0	11.97	0	0-2
Mid	1732.5	20175	5	QPSK	1	0	12.01	0	0
	1732.5	20175	5	QPSK	1	12	12.43	0	0
	1732.5	20175	5	QPSK	1	24	11.98	0	0
	1732.5	20175	5	QPSK	12	0	12.15	0	0-1
	1732.5	20175	5	QPSK	12	6	12.30	0	0-1
	1732.5	20175	5	QPSK	12	13	12.11	0	0-1
	1732.5	20175	5	QPSK	25	0	12.17	0	0-1
	1732.5	20175	5	16-QAM	1	0	11.86	0	0-1
	1732.5	20175	5	16-QAM	1	12	12.15	0	0-1
	1732.5	20175	5	16-QAM	1	24	11.77	0	0-1
	1732.5	20175	5	16-QAM	12	0	12.06	0	0-2
	1732.5	20175	5	16-QAM	12	6	12.20	0	0-2
	1732.5	20175	5	16-QAM	12	13	12.02	0	0-2
	1732.5	20175	5	16-QAM	25	0	12.00	0	0-2
High	1752.5	20375	5	QPSK	1	0	11.80	0	0
	1752.5	20375	5	QPSK	1	12	12.21	0	0
	1752.5	20375	5	QPSK	1	24	11.82	0	0
	1752.5	20375	5	QPSK	12	0	11.96	0	0-1
	1752.5	20375	5	QPSK	12	6	12.11	0	0-1
	1752.5	20375	5	QPSK	12	13	12.02	0	0-1
	1752.5	20375	5	QPSK	25	0	12.01	0	0-1
	1752.5	20375	5	16-QAM	1	0	11.88	0	0-1
	1752.5	20375	5	16-QAM	1	12	12.31	0	0-1
	1752.5	20375	5	16-QAM	1	24	12.00	0	0-1
	1752.5	20375	5	16-QAM	12	0	12.10	0	0-2
	1752.5	20375	5	16-QAM	12	6	12.11	0	0-2
	1752.5	20375	5	16-QAM	12	13	12.02	0	0-2
	1752.5	20375	5	16-QAM	25	0	11.94	0	0-2

8.2.4 LTE Band 2 (PCS)

Table 8-15
LTE Band 2 (PCS) Maximum Conducted Powers – 10 MHz Bandwidth
(Representing Proximity Sensors Inactive)

	Frequency [MHz]	Channel	Bandwidth [MHz]	Modulation	RB Size	RB Offset	Conducted Power [dBm]	Target MPR [dB]	MPR Allowed per 3GPP [dB]
Low	1855	18650	10	QPSK	1	0	23.02	0	0
	1855	18650	10	QPSK	1	25	23.24	0	0
	1855	18650	10	QPSK	1	49	**23.34**	0	0
	1855	18650	10	QPSK	25	0	22.12	1	0-1
	1855	18650	10	QPSK	25	12	22.07	1	0-1
	1855	18650	10	QPSK	25	25	22.15	1	0-1
	1855	18650	10	QPSK	50	0	22.09	1	0-1
	1855	18650	10	16QAM	1	0	21.88	1	0-1
	1855	18650	10	16QAM	1	25	22.13	1	0-1
	1855	18650	10	16QAM	1	49	22.16	1	0-1
	1855	18650	10	16QAM	25	0	21.31	2	0-2
	1855	18650	10	16QAM	25	12	21.30	2	0-2
	1855	18650	10	16QAM	25	25	21.27	2	0-2
	1855	18650	10	16QAM	50	0	21.26	2	0-2
Mid	1880.0	18900	10	QPSK	1	0	23.24	0	0
	1880.0	18900	10	QPSK	1	25	23.16	0	0
	1880.0	18900	10	QPSK	1	49	23.26	0	0
	1880.0	18900	10	QPSK	25	0	22.11	1	0-1
	1880.0	18900	10	QPSK	25	12	22.22	1	0-1
	1880.0	18900	10	QPSK	25	25	22.12	1	0-1
	1880.0	18900	10	QPSK	50	0	22.15	1	0-1
	1880.0	18900	10	16QAM	1	0	21.79	1	0-1
	1880.0	18900	10	16QAM	1	25	21.63	1	0-1
	1880.0	18900	10	16QAM	1	49	21.84	1	0-1
	1880.0	18900	10	16QAM	25	0	21.16	2	0-2
	1880.0	18900	10	16QAM	25	12	21.08	2	0-2
	1880.0	18900	10	16QAM	25	25	21.17	2	0-2
	1880.0	18900	10	16QAM	50	0	21.00	2	0-2
High	1905	19150	10	QPSK	1	0	22.88	0	0
	1905	19150	10	QPSK	1	25	23.11	0	0
	1905	19150	10	QPSK	1	49	22.87	0	0
	1905	19150	10	QPSK	25	0	21.75	1	0-1
	1905	19150	10	QPSK	25	12	22.03	1	0-1
	1905	19150	10	QPSK	25	25	**22.44**	1	0-1
	1905	19150	10	QPSK	50	0	22.28	1	0-1
	1905	19150	10	16QAM	1	0	21.96	1	0-1
	1905	19150	10	16QAM	1	25	22.23	1	0-1
	1905	19150	10	16QAM	1	49	22.04	1	0-1
	1905	19150	10	16QAM	25	0	20.87	2	0-2
	1905	19150	10	16QAM	25	12	21.09	2	0-2
	1905	19150	10	16QAM	25	25	21.43	2	0-2
	1905	19150	10	16QAM	50	0	21.19	2	0-2

Table 8-16
LTE Band 2 (PCS) Maximum Conducted Powers – 5 MHz Bandwidth
(Representing Proximity Sensors Inactive)

	Frequency [MHz]	Channel	Bandwidth [MHz]	Modulation	RB Size	RB Offset	Conducted Power [dBm]	Target MPR [dB]	MPR Allowed per 3GPP [dB]
Low	1852.5	18625	5	QPSK	1	0	23.01	0	0
	1852.5	18625	5	QPSK	1	12	23.30	0	0
	1852.5	18625	5	QPSK	1	24	23.37	0	0
	1852.5	18625	5	QPSK	12	0	22.08	1	0-1
	1852.5	18625	5	QPSK	12	6	22.07	1	0-1
	1852.5	18625	5	QPSK	12	13	22.16	1	0-1
	1852.5	18625	5	QPSK	25	0	22.15	1	0-1
	1852.5	18625	5	16-QAM	1	0	21.96	1	0-1
	1852.5	18625	5	16-QAM	1	12	22.28	1	0-1
	1852.5	18625	5	16-QAM	1	24	22.26	1	0-1
	1852.5	18625	5	16-QAM	12	0	21.08	2	0-2
	1852.5	18625	5	16-QAM	12	6	21.23	2	0-2
	1852.5	18625	5	16-QAM	12	13	21.21	2	0-2
	1852.5	18625	5	16-QAM	25	0	21.12	2	0-2
Mid	1880.0	18900	5	QPSK	1	0	23.16	0	0
	1880.0	18900	5	QPSK	1	12	23.15	0	0
	1880.0	18900	5	QPSK	1	24	23.20	0	0
	1880.0	18900	5	QPSK	12	0	22.06	1	0-1
	1880.0	18900	5	QPSK	12	6	22.11	1	0-1
	1880.0	18900	5	QPSK	12	13	22.20	1	0-1
	1880.0	18900	5	QPSK	25	0	22.06	1	0-1
	1880.0	18900	5	16-QAM	1	0	21.91	1	0-1
	1880.0	18900	5	16-QAM	1	12	21.89	1	0-1
	1880.0	18900	5	16-QAM	1	24	21.96	1	0-1
	1880.0	18900	5	16-QAM	12	0	21.02	2	0-2
	1880.0	18900	5	16-QAM	12	6	21.08	2	0-2
	1880.0	18900	5	16-QAM	12	13	21.13	2	0-2
	1880.0	18900	5	16-QAM	25	0	21.02	2	0-2
High	1907.5	19175	5	QPSK	1	0	23.11	0	0
	1907.5	19175	5	QPSK	1	12	23.54	0	0
	1907.5	19175	5	QPSK	1	24	22.77	0	0
	1907.5	19175	5	QPSK	12	0	22.35	1	0-1
	1907.5	19175	5	QPSK	12	6	22.57	1	0-1
	1907.5	19175	5	QPSK	12	13	22.15	1	0-1
	1907.5	19175	5	QPSK	25	0	22.44	1	0-1
	1907.5	19175	5	16-QAM	1	0	22.09	1	0-1
	1907.5	19175	5	16-QAM	1	12	22.27	1	0-1
	1907.5	19175	5	16-QAM	1	24	21.72	1	0-1
	1907.5	19175	5	16-QAM	12	0	21.33	2	0-2
	1907.5	19175	5	16-QAM	12	6	21.58	2	0-2
	1907.5	19175	5	16-QAM	12	13	21.40	2	0-2
	1907.5	19175	5	16-QAM	25	0	21.45	2	0-2

Table 8-17
LTE Band 2 (PCS) Reduced Conducted Powers – 10 MHz Bandwidth
(Representing Proximity Sensors Active)

	Frequency [MHz]	Channel	Bandwidth [MHz]	Modulation	RB Size	RB Offset	Conducted Power [dBm]	Target MPR [dB]	MPR Allowed per 3GPP [dB]
Low	1855	18650	10	QPSK	1	0	11.86	0	0
	1855	18650	10	QPSK	1	25	**12.50**	0	0
	1855	18650	10	QPSK	1	49	12.22	0	0
	1855	18650	10	QPSK	25	0	12.06	0	0-1
	1855	18650	10	QPSK	25	12	12.15	0	0-1
	1855	18650	10	QPSK	25	25	12.02	0	0-1
	1855	18650	10	QPSK	50	0	12.09	0	0-1
	1855	18650	10	16QAM	1	0	11.86	0	0-1
	1855	18650	10	16QAM	1	25	12.29	0	0-1
	1855	18650	10	16QAM	1	49	11.84	0	0-1
	1855	18650	10	16QAM	25	0	12.03	0	0-2
	1855	18650	10	16QAM	25	12	12.17	0	0-2
	1855	18650	10	16QAM	25	25	12.08	0	0-2
	1855	18650	10	16QAM	50	0	12.17	0	0-2
Mid	1880.0	18900	10	QPSK	1	0	11.96	0	0
	1880.0	18900	10	QPSK	1	25	12.30	0	0
	1880.0	18900	10	QPSK	1	49	12.02	0	0
	1880.0	18900	10	QPSK	25	0	12.36	0	0-1
	1880.0	18900	10	QPSK	25	12	**12.48**	0	0-1
	1880.0	18900	10	QPSK	25	25	12.43	0	0-1
	1880.0	18900	10	QPSK	50	0	12.38	0	0-1
	1880.0	18900	10	16QAM	1	0	11.92	0	0-1
	1880.0	18900	10	16QAM	1	25	12.42	0	0-1
	1880.0	18900	10	16QAM	1	49	12.22	0	0-1
	1880.0	18900	10	16QAM	25	0	12.18	0	0-2
	1880.0	18900	10	16QAM	25	12	12.40	0	0-2
	1880.0	18900	10	16QAM	25	25	12.37	0	0-2
	1880.0	18900	10	16QAM	50	0	12.24	0	0-2
High	1905	19150	10	QPSK	1	0	11.81	0	0
	1905	19150	10	QPSK	1	25	12.10	0	0
	1905	19150	10	QPSK	1	49	11.65	0	0
	1905	19150	10	QPSK	25	0	11.69	0	0-1
	1905	19150	10	QPSK	25	12	11.80	0	0-1
	1905	19150	10	QPSK	25	25	11.98	0	0-1
	1905	19150	10	QPSK	50	0	11.87	0	0-1
	1905	19150	10	16QAM	1	0	11.64	0	0-1
	1905	19150	10	16QAM	1	25	11.66	0	0-1
	1905	19150	10	16QAM	1	49	11.65	0	0-1
	1905	19150	10	16QAM	25	0	11.60	0	0-2
	1905	19150	10	16QAM	25	12	11.66	0	0-2
	1905	19150	10	16QAM	25	25	11.90	0	0-2
	1905	19150	10	16QAM	50	0	11.78	0	0-2

Table 8-18
LTE Band 2 (PCS) Reduced Conducted Powers – 5 MHz Bandwidth
(Representing Proximity Sensors Active)

	Frequency [MHz]	Channel	Bandwidth [MHz]	Modulation	RB Size	RB Offset	Conducted Power [dBm]	Target MPR [dB]	MPR Allowed per 3GPP [dB]
Low	1852.5	18625	5	QPSK	1	0	11.78	0	0
	1852.5	18625	5	QPSK	1	12	12.45	0	0
	1852.5	18625	5	QPSK	1	24	12.10	0	0
	1852.5	18625	5	QPSK	12	0	11.92	0	0-1
	1852.5	18625	5	QPSK	12	6	12.16	0	0-1
	1852.5	18625	5	QPSK	12	13	11.95	0	0-1
	1852.5	18625	5	QPSK	25	0	12.03	0	0-1
	1852.5	18625	5	16-QAM	1	0	11.60	0	0-1
	1852.5	18625	5	16-QAM	1	12	12.23	0	0-1
	1852.5	18625	5	16-QAM	1	24	11.69	0	0-1
	1852.5	18625	5	16-QAM	12	0	11.85	0	0-2
	1852.5	18625	5	16-QAM	12	6	12.04	0	0-2
	1852.5	18625	5	16-QAM	12	13	11.90	0	0-2
	1852.5	18625	5	16-QAM	25	0	11.94	0	0-2
Mid	1880.0	18900	5	QPSK	1	0	11.88	0	0
	1880.0	18900	5	QPSK	1	12	12.39	0	0
	1880.0	18900	5	QPSK	1	24	12.00	0	0
	1880.0	18900	5	QPSK	12	0	12.16	0	0-1
	1880.0	18900	5	QPSK	12	6	12.47	0	0-1
	1880.0	18900	5	QPSK	12	13	12.28	0	0-1
	1880.0	18900	5	QPSK	25	0	12.31	0	0-1
	1880.0	18900	5	16-QAM	1	0	11.72	0	0-1
	1880.0	18900	5	16-QAM	1	12	12.26	0	0-1
	1880.0	18900	5	16-QAM	1	24	11.92	0	0-1
	1880.0	18900	5	16-QAM	12	0	12.04	0	0-2
	1880.0	18900	5	16-QAM	12	6	12.26	0	0-2
	1880.0	18900	5	16-QAM	12	13	12.12	0	0-2
	1880.0	18900	5	16-QAM	25	0	12.09	0	0-2
High	1907.5	19175	5	QPSK	1	0	11.54	0	0
	1907.5	19175	5	QPSK	1	12	12.09	0	0
	1907.5	19175	5	QPSK	1	24	11.50	0	0
	1907.5	19175	5	QPSK	12	0	11.73	0	0-1
	1907.5	19175	5	QPSK	12	6	12.14	0	0-1
	1907.5	19175	5	QPSK	12	13	11.86	0	0-1
	1907.5	19175	5	QPSK	25	0	11.99	0	0-1
	1907.5	19175	5	16-QAM	1	0	11.65	0	0-1
	1907.5	19175	5	16-QAM	1	12	12.39	0	0-1
	1907.5	19175	5	16-QAM	1	24	11.86	0	0-1
	1907.5	19175	5	16-QAM	12	0	11.65	0	0-2
	1907.5	19175	5	16-QAM	12	6	12.11	0	0-2
	1907.5	19175	5	16-QAM	12	13	11.88	0	0-2
	1907.5	19175	5	16-QAM	25	0	11.94	0	0-2

8.3 802.11 Transmitter Conducted Powers

Table 8-19
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*	**13.37**	13.44	13.43	13.44
802.11b	2437	6*	**13.59**	13.60	13.67	13.65
802.11b	2462	11*	**13.18**	13.12	13.18	13.17

Table 8-20
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	13.20	13.18	13.19	13.17	13.13	13.21	13.09	13.12
802.11g	2437	6	13.40	13.41	13.33	13.37	13.35	13.43	13.36	13.35
802.11g	2462	11	12.88	12.87	12.82	12.91	12.89	12.87	12.87	12.90

Table 8-21
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	13.29	13.30	13.29	13.33	13.31	13.27	13.25	13.31
802.11n	2437	6	13.38	13.44	13.48	13.39	13.37	13.40	13.39	13.34
802.11n	2462	11	13.04	13.03	13.00	12.96	13.06	13.01	13.06	13.15

Table 8-22
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*	**13.47**	13.44	13.46	13.45	13.50	13.43	13.50	13.48
802.11a	5200	40	13.43	13.42	13.35	13.38	13.33	13.40	13.41	13.38
802.11a	5220	44	**13.26**	13.28	13.27	13.30	13.25	13.27	13.31	13.25
802.11a	5240	48*	13.22	13.25	13.20	13.20	13.18	13.23	13.22	13.18
802.11a	5260	52*	**13.16**	13.08	13.13	13.15	13.17	13.19	13.20	13.22
802.11a	5280	56	13.08	13.00	13.10	13.04	13.02	13.10	13.17	13.01
802.11a	5300	60	**12.90**	12.94	12.94	12.97	12.97	13.02	13.10	13.02
802.11a	5320	64*	12.89	12.91	12.95	12.91	12.96	12.93	12.87	13.00
802.11a	5500	100	**12.92**	12.96	12.96	12.93	12.96	12.95	12.96	12.94
802.11a	5520	104*	12.72	12.68	12.71	12.80	12.80	12.81	12.84	12.83
802.11a	5540	108	12.70	12.79	12.69	12.78	12.76	12.75	12.84	12.81
802.11a	5560	112	**12.67**	12.65	12.70	12.73	12.66	12.70	12.76	12.72
802.11a	5580	116*	12.57	12.54	12.56	12.65	12.59	12.71	12.57	12.72
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	**12.41**	12.46	12.40	12.41	12.40	12.45	12.49	12.49
802.11a	5680	136*	12.37	12.37	12.38	12.36	12.43	12.47	12.48	12.47
802.11a	5700	140	12.35	12.32	12.33	12.36	12.39	12.39	12.33	12.39
802.11a	5745	149*	**13.14**	13.17	13.18	13.18	13.29	13.17	13.29	13.20
802.11a	5765	153	**13.23**	13.14	13.11	13.13	13.17	13.22	13.24	13.19
802.11a	5785	157*	13.12	13.13	13.14	13.25	13.18	13.20	13.18	13.22
802.11a	5805	161*	**13.09**	13.15	13.12	13.10	13.15	13.16	13.12	13.19
802.11a	5825	165	13.06	13.19	13.11	13.11	13.20	13.19	13.21	13.18

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 8-23
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	20	26	39	52	58	65
802.11n	5180	36*	12.58	12.62	12.62	12.62	12.63	12.67	12.65	12.67
802.11n	5200	40	12.51	12.60	12.53	12.56	12.58	12.63	12.59	12.65
802.11n	5220	44	12.46	12.47	12.49	12.43	12.49	12.51	12.51	12.54
802.11n	5240	48*	12.38	12.41	12.42	12.42	12.37	12.39	12.40	12.44
802.11n	5260	52*	13.20	13.19	13.21	13.29	13.25	13.27	13.25	13.21
802.11n	5280	56	13.14	13.08	13.16	13.18	13.15	13.18	13.25	13.17
802.11n	5300	60	13.02	13.04	13.05	13.04	13.19	13.10	13.11	13.10
802.11n	5320	64*	12.91	12.95	13.00	12.97	13.00	12.97	13.02	12.96
802.11n	5500	100	12.70	12.71	12.70	12.74	12.69	12.70	12.70	12.78
802.11n	5520	104*	12.64	12.61	12.63	12.64	12.63	12.64	12.69	12.67
802.11n	5540	108	12.56	12.60	12.60	12.53	12.54	12.58	12.63	12.59
802.11n	5560	112	12.52	12.50	12.51	12.51	12.55	12.61	12.53	12.53
802.11n	5580	116*	12.46	12.49	12.42	12.48	12.49	12.47	12.54	12.55
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
802.11n	5660	132	12.25	12.30	12.33	12.29	12.26	12.33	12.28	12.30
802.11n	5680	136*	12.26	12.26	12.34	12.25	12.26	12.31	12.23	12.32
802.11n	5700	140	12.20	12.30	12.26	12.21	12.15	12.26	12.25	12.24
802.11n	5745	149*	13.04	12.99	13.07	13.03	13.06	13.08	13.11	13.11
802.11n	5765	153	12.97	13.00	13.00	13.05	13.07	13.09	13.10	13.14
802.11n	5785	157*	12.99	13.07	13.01	13.06	13.06	13.02	13.07	13.09
802.11n	5805	161*	12.98	12.99	13.01	13.07	13.11	13.04	13.00	13.07
802.11n	5825	165	12.96	13.00	13.01	13.09	12.99	13.04	13.05	13.05

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 8-24
IEEE 802.11n Average RF Power – 40 MHz Bandwidth

Mode	Freq	Channel	40MHz BW 802.11n (5GHz) Conducted Power [dBm]							
			Data Rate [Mbps]							
	[MHz]		13.5/15	27/30	40.5/45	54/60	81/90	108/120	121.5/135	135/150
802.11n	5190	38	12.71	12.82	12.90	12.77	12.74	12.71	12.76	12.84
802.11n	5230	46	12.63	12.59	12.68	12.54	12.61	12.74	12.64	12.74
802.11n	5270	54	12.48	12.46	12.40	12.55	12.43	12.47	12.53	12.57
802.11n	5310	62	12.26	12.24	12.30	12.25	12.31	12.38	12.35	12.35
802.11n	5510	102	12.88	12.81	12.77	12.83	12.99	12.92	12.94	12.94
802.11n	5550	110	12.77	12.77	12.79	12.75	12.82	12.85	12.78	12.71
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	12.45	12.63	12.43	12.47	12.49	12.53	12.57	12.53
802.11n	5755	151	13.29	13.38	13.37	13.33	13.23	13.26	13.44	13.41
802.11n	5795	159	13.26	13.39	13.33	13.26	13.32	13.40	13.38	13.35

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.

Table 8-25
Bluetooth RF Conducted Powers

Frequency [MHz]	Data Rate [Mbps]	Channel No.	Peak Conducted Power		Avg Conducted Power	
			[dBm]	[mW]	[dBm]	[mW]
2402	1.0	0	9.90	9.763	9.72	9.372
2441	1.0	39	**11.37**	**13.709**	**11.21**	**13.204**
2480	1.0	78	10.28	10.668	10.07	10.158
2402	2.0	0	9.34	8.580	7.01	5.028
2441	2.0	39	10.74	11.869	8.40	6.918
2480	2.0	78	9.62	9.154	7.14	5.177
2402	3.0	0	9.80	9.546	7.04	5.060
2441	3.0	39	11.20	13.173	8.43	6.967
2480	3.0	78	10.03	10.079	7.22	5.271

Justification for reduced test configurations for WIFI channels per KDB Publication 248227 D01v01r02 and April 2010 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 Bandwidth and 802.11n 40 MHz Bandwidth) 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 8-2
Power Measurement Setup

9 SYSTEM VERIFICATION

9.1 Tissue Verification

Table 9-1
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
12/04/2012	740B	24.3	695	0.916	54.79	0.957	55.985	-4.28%	-2.13%
			710	0.920	54.69	0.958	55.901	-3.97%	-2.17%
			725	0.935	54.57	0.961	55.629	-2.71%	-1.90%
			740	0.950	54.72	0.963	55.570	-1.35%	-1.53%
			755	0.944	54.59	0.964	55.512	-2.07%	-1.66%
11/29/2012	835B	22.9	820	0.947	53.55	0.969	55.258	-2.27%	-3.09%
			835	0.959	53.32	0.970	55.200	-1.13%	-3.41%
			850	0.973	53.25	0.988	55.154	-1.52%	-3.45%
12/03/2012	835B	20.3	820	0.963	54.97	0.969	55.258	-0.62%	-0.52%
			835	0.983	54.80	0.970	55.200	1.34%	-0.72%
			850	0.991	54.31	0.988	55.154	0.30%	-1.53%
12/03/2012	1750B	23.0	1710	1.472	54.04	1.460	53.540	0.82%	0.93%
			1750	1.519	53.85	1.490	53.430	1.95%	0.79%
			1790	1.557	53.76	1.510	53.330	3.11%	0.81%
12/04/2012	1900B	20.7	1850	1.541	51.31	1.520	53.300	1.38%	-3.73%
			1880	1.560	51.27	1.520	53.300	2.63%	-3.81%
			1910	1.592	51.24	1.520	53.300	4.74%	-3.86%
12/06/2012	2450B	23.4	2401	1.965	50.75	1.903	52.765	3.26%	-3.82%
			2450	2.030	50.62	1.950	52.700	4.10%	-3.95%
			2499	2.098	50.37	2.019	52.638	3.91%	-4.31%
12/03/2012	5200B-5800B	24.7	5180	5.180	48.50	5.276	49.041	-1.82%	-1.10%
			5200	5.207	48.54	5.299	49.014	-1.74%	-0.97%
			5220	5.227	48.39	5.323	48.987	-1.80%	-1.22%
			5260	5.297	48.23	5.369	48.906	-1.34%	-1.38%
			5300	5.378	48.20	5.416	48.851	-0.70%	-1.33%
			5500	5.630	47.75	5.650	48.580	-0.35%	-1.71%
			5560	5.752	47.53	5.720	48.499	0.56%	-2.00%
			5600	5.796	47.51	5.766	48.444	0.52%	-1.93%
			5660	5.890	47.31	5.837	48.363	0.91%	-2.18%
			5745	6.006	47.24	5.936	48.248	1.18%	-2.09%
			5765	6.025	47.11	5.959	48.220	1.11%	-2.30%
			5800	6.103	46.97	6.000	48.200	1.72%	-2.55%
			5805	6.109	46.95	6.005	48.166	1.73%	-2.52%

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 IEEE 1528 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.

9.2 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.

Table 9-2
System Verification Results

System Verification TARGET & MEASURED											
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 (%)
750	BODY	12/04/2012	24.7	24.2	0.100	1054	3288	0.827	8.840	8.270	-6.45%
835	BODY	11/29/2012	24.5	23.5	0.100	4d026	3209	0.992	9.580	9.920	3.55%
835	BODY	12/03/2012	24.9	22.1	0.087	4d132	3263	0.848	9.410	9.747	3.58%
1750	BODY	12/03/2012	24.1	23.2	0.100	1008	3209	3.880	37.400	38.800	3.74%
1900	BODY	12/04/2012	24.7	22.5	0.100	5d148	3263	4.140	39.100	41.400	5.88%
2450	BODY	12/06/2012	22.6	22.4	0.100	719	3209	5.290	51.600	52.900	2.52%
5200	BODY	12/03/2012	23.5	23.0	0.100	1120	3561	7.320	72.200	73.200	1.39%
5300	BODY	12/03/2012	23.8	23.2	0.100	1007	3561	7.470	75.600	74.700	-1.19%
5500	BODY	12/03/2012	23.7	23.3	0.100	1120	3561	8.400	80.000	84.000	5.00%
5600	BODY	12/03/2012	23.9	23.3	0.100	1007	3561	7.860	80.000	78.600	-1.75%
5800	BODY	12/03/2012	23.8	23.1	0.100	1120	3561	7.330	73.800	73.300	-0.68%

Note: Full system validation status and results can be found in Appendix E.

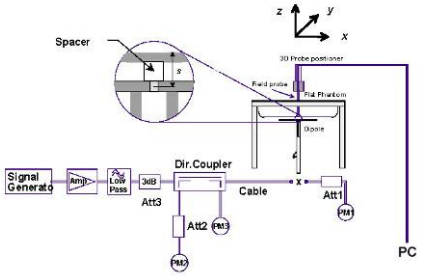


Figure 9-1
System Verification Setup Diagram

Figure 9-2
System Verification Setup Photo

10 SAR DATA SUMMARY

10.1 Standalone Body SAR Data

Table 10-1
PCB Body SAR: CDMA

MEASUREMENT RESULTS														
FREQUENCY		Mode	Service	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Power Drift [dB]	Spacing	Device Serial Number	Duty Cycle	Side	SAR (1g)	Scaling Factor	Scaled SAR (1g)	Plot #
MHz	Ch.										(W/kg)		(W/kg)	
836.52	384	Cell. CDMA	EVDO Rev. 0	25.20	24.50	-0.02	12 mm	4689-0545	1:1	back	0.549	1.175	0.645	
836.52	384	Cell. CDMA	EVDO Rev. 0	25.20	24.50	0.00	10 mm	4689-0545	1:1	top	0.157	1.175	0.184	
836.52	384	Cell. CDMA	EVDO Rev. 0	25.20	24.50	0.01	0 mm	4689-0545	1:1	right	**0.615**	1.175	0.723	A1
836.52	384	Cell. CDMA	EVDO Rev. 0	19.50	19.18	-0.08	0 mm	4689-0520	1:1	back	0.536	1.076	0.577	
836.52	384	Cell. CDMA	EVDO Rev. 0	19.50	19.18	-0.20	0 mm	4689-0520	1:1	top	0.066	1.076	0.071	
1732.50	450	AWS CDMA	EVDO Rev. 0	25.20	24.92	0.14	12 mm	4689-0545	1:1	back	0.630	1.067	0.672	
1732.50	450	AWS CDMA	EVDO Rev. 0	25.20	24.92	-0.05	10 mm	4689-0545	1:1	top	0.510	1.067	0.544	
1732.50	450	AWS CDMA	EVDO Rev. 0	25.20	24.92	0.09	0 mm	4689-0545	1:1	right	0.145	1.067	0.155	
1732.50	450	AWS CDMA	EVDO Rev. 0	15.00	14.46	-0.01	0 mm	4689-0520	1:1	back	**0.644**	1.132	0.729	A2
1732.50	450	AWS CDMA	EVDO Rev. 0	15.00	14.46	-0.04	0 mm	4689-0520	1:1	top	0.346	1.132	0.392	
1851.25	25	PCS CDMA	EVDO Rev. 0	25.20	25.15	0.05	12 mm	4689-0545	1:1	back	0.515	1.012	0.521	
1851.25	25	PCS CDMA	EVDO Rev. 0	25.20	25.15	-0.15	10 mm	4689-0545	1:1	top	0.403	1.012	0.408	
1851.25	25	PCS CDMA	EVDO Rev. 0	25.20	25.15	-0.04	0 mm	4689-0545	1:1	right	0.346	1.012	0.350	
1880.00	600	PCS CDMA	EVDO Rev. 0	14.50	13.83	-0.08	0 mm	4689-0520	1:1	back	**0.644**	1.167	0.752	A3
1880.00	600	PCS CDMA	EVDO Rev. 0	14.50	13.83	-0.03	0 mm	4689-0520	1:1	top	0.287	1.167	0.335	
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: Per FCC KDB 447498, when the output power deviation across the channels is >0.5 dB, the maximum output power channel must be tested; therefore PCS EVDO was tested with low channel.

Table 10-2
PCB Body SAR: LTE Band 12

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.	High														(W/kg)		(W/kg)	
707.50	23085	Mid	LTE Band 12	10	23.50	23.06	0.09	0	4689-0538	QPSK	1	25	12 mm	back	1:1	**0.344**	1.107	0.381	A4
707.50	23085	Mid	LTE Band 12	10	22.50	21.89	-0.12	1	4689-0538	QPSK	25	0	12 mm	back	1:1	0.260	1.151	0.299	
707.50	23085	Mid	LTE Band 12	10	23.50	23.06	0.02	0	4689-0538	QPSK	1	25	10 mm	top	1:1	0.124	1.107	0.137	
707.50	23085	Mid	LTE Band 12	10	22.50	21.89	0.12	1	4689-0538	QPSK	25	0	10 mm	top	1:1	0.084	1.151	0.097	
707.50	23085	Mid	LTE Band 12	10	23.50	23.06	-0.15	0	4689-0538	QPSK	1	25	0 mm	right	1:1	0.227	1.107	0.251	
707.50	23085	Mid	LTE Band 12	10	22.50	21.89	-0.10	1	4689-0538	QPSK	25	0	0 mm	right	1:1	0.183	1.151	0.211	
707.50	23085	Mid	LTE Band 12	10	14.50	14.48	-0.04	0	4689-0539	QPSK	1	25	0 mm	back	1:1	0.096	1.005	0.096	
707.50	23085	Mid	LTE Band 12	10	14.50	14.49	-0.02	0	4689-0539	QPSK	25	12	0 mm	back	1:1	0.092	1.002	0.092	
707.50	23085	Mid	LTE Band 12	10	14.50	14.48	0.06	0	4689-0539	QPSK	1	25	0 mm	top	1:1	0.027	1.005	0.028	
707.50	23085	Mid	LTE Band 12	10	14.50	14.49	-0.04	0	4689-0539	QPSK	25	12	0 mm	top	1:1	0.027	1.002	0.027	
ANSI / IEEE C95.1 1992 - SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population									Body 1.6 W/kg (mW/g) averaged over 1 gram										

Table 10-3
PCB Body SAR: LTE Band 5 (Cell)

MEASUREMENT RESULTS																				
FREQUENCY			Mode	Bandwidth [MHz]	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Power Drift [dB]	MPR [dB]	Device Serial Number	Modulation	RB Size	RB Offset	Spacing	Side	Duty Cycle	SAR (1g)	Scaling Factor	Scaled SAR (1g)	Plot #
MHz	Ch.															(W/kg)		(W/kg)	
836.50	20525	Mid	LTE Band 5 (Cell)	10	23.70	23.41	-0.08	0	4689-0538	QPSK	1	25	12 mm	back	1:1	**0.432**	1.069	0.462	A5
836.50	20525	Mid	LTE Band 5 (Cell)	10	22.70	22.30	0.16	1	4689-0538	QPSK	25	12	12 mm	back	1:1	0.322	1.096	0.353	
836.50	20525	Mid	LTE Band 5 (Cell)	10	23.70	23.41	-0.09	0	4689-0538	QPSK	1	25	10 mm	top	1:1	0.141	1.069	0.151	
836.50	20525	Mid	LTE Band 5 (Cell)	10	22.70	22.30	-0.08	1	4689-0538	QPSK	25	12	10 mm	top	1:1	0.104	1.096	0.114	
836.50	20525	Mid	LTE Band 5 (Cell)	10	23.70	23.41	-0.08	0	4689-0538	QPSK	1	25	0 mm	right	1:1	0.420	1.069	0.449	
836.50	20525	Mid	LTE Band 5 (Cell)	10	22.70	22.30	0.07	1	4689-0538	QPSK	25	12	0 mm	right	1:1	0.321	1.096	0.352	
836.50	20525	Mid	LTE Band 5 (Cell)	10	15.00	14.73	-0.06	0	4689-0539	QPSK	1	0	0 mm	back	1:1	0.258	1.064	0.275	
836.50	20525	Mid	LTE Band 5 (Cell)	10	15.00	14.87	-0.03	0	4689-0539	QPSK	25	0	0 mm	back	1:1	0.350	1.030	0.361	
836.50	20525	Mid	LTE Band 5 (Cell)	10	15.00	14.73	0.00	0	4689-0539	QPSK	1	0	0 mm	top	1:1	0.053	1.064	0.057	
836.50	20525	Mid	LTE Band 5 (Cell)	10	15.00	14.87	0.02	0	4689-0539	QPSK	25	0	0 mm	top	1:1	0.065	1.030	0.067	

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 10-4
PCB Body SAR: LTE Band 4 (AWS)

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)	
1750.00	20350	High	LTE Band 4 (AWS)	10	23.70	23.39	0.02	0	4689-0543	QPSK	1	49	12 mm	back	1:1	0.457	1.074	0.491	
1750.00	20350	High	LTE Band 4 (AWS)	10	22.70	22.28	-0.06	1	4689-0543	QPSK	25	25	12 mm	back	1:1	0.350	1.102	0.386	
1750.00	20350	High	LTE Band 4 (AWS)	10	23.70	23.39	0.13	0	4689-0543	QPSK	1	49	10 mm	top	1:1	**0.571**	1.074	0.613	A6
1750.00	20350	High	LTE Band 4 (AWS)	10	22.70	22.28	0.03	1	4689-0543	QPSK	25	25	10 mm	top	1:1	0.447	1.102	0.493	
1750.00	20350	High	LTE Band 4 (AWS)	10	23.70	23.39	0.08	0	4689-0543	QPSK	1	49	0 mm	right	1:1	0.283	1.074	0.304	
1750.00	20350	High	LTE Band 4 (AWS)	10	22.70	22.28	0.13	1	4689-0543	QPSK	25	25	0 mm	right	1:1	0.206	1.102	0.227	
1715.00	20000	Low	LTE Band 4 (AWS)	10	12.60	12.47	0.02	0	4689-0542	QPSK	1	25	0 mm	back	1:1	0.537	1.030	0.553	
1732.50	20175	Mid	LTE Band 4 (AWS)	10	12.60	12.22	-0.11	0	4689-0542	QPSK	25	12	0 mm	back	1:1	0.526	1.091	0.574	
1715.00	20000	Low	LTE Band 4 (AWS)	10	12.60	12.47	-0.01	0	4689-0542	QPSK	1	25	0 mm	top	1:1	0.280	1.030	0.288	
1732.50	20175	Mid	LTE Band 4 (AWS)	10	12.60	12.22	-0.09	0	4689-0542	QPSK	25	12	0 mm	top	1:1	0.266	1.091	0.290	

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 10-5
PCB Body SAR: LTE Band 2 (PCS)

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	18650	Low	LTE Band 2 (PCS)	10	23.60	23.34	-0.01	0	4689-0543	QPSK	1	49	12 mm	back	1:1	**0.627**	1.062	0.666	A7
1905.00	19150	High	LTE Band 2 (PCS)	10	22.60	22.44	0.03	1	4689-0543	QPSK	25	25	12 mm	back	1:1	0.552	1.038	0.573	
1855.00	18650	Low	LTE Band 2 (PCS)	10	23.60	23.34	0.00	0	4689-0543	QPSK	1	49	10 mm	top	1:1	0.563	1.062	0.598	
1905.00	19150	High	LTE Band 2 (PCS)	10	22.60	22.44	0.00	1	4689-0543	QPSK	25	25	10 mm	top	1:1	0.475	1.038	0.493	
1855.00	18650	Low	LTE Band 2 (PCS)	10	23.60	23.34	0.03	0	4689-0543	QPSK	1	49	0 mm	right	1:1	0.500	1.062	0.531	
1905.00	19150	High	LTE Band 2 (PCS)	10	22.60	22.44	-0.02	1	4689-0543	QPSK	25	25	0 mm	right	1:1	0.478	1.038	0.496	
1855.00	18650	Low	LTE Band 2 (PCS)	10	12.50	12.50	0.01	0	4689-0542	QPSK	1	25	0 mm	back	1:1	0.416	1.000	0.416	
1880.00	18900	Mid	LTE Band 2 (PCS)	10	12.50	12.48	0.01	0	4689-0542	QPSK	25	12	0 mm	back	1:1	0.619	1.005	0.622	
1855.00	18650	Low	LTE Band 2 (PCS)	10	12.50	12.50	0.13	0	4689-0542	QPSK	1	25	0 mm	top	1:1	0.219	1.000	0.219	
1880.00	18900	Mid	LTE Band 2 (PCS)	10	12.50	12.48	0.02	0	4689-0542	QPSK	25	12	0 mm	top	1:1	0.304	1.005	0.306	

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 10-6
DTS Body 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) (W/kg)	Scaling Factor	Scaled SAR (1g) (W/kg)	Plot #
MHz	Ch.														
2412	1	IEEE 802.11b	DSSS	14.00	13.37	0.19	0 mm	4689-0538	1	back	1:1	0.888	1.156	1.027	
2437	6	IEEE 802.11b	DSSS	14.00	13.59	0.02	0 mm	4689-0538	1	back	1:1	0.902	1.099	0.991	
2462	11	IEEE 802.11b	DSSS	14.00	13.18	0.02	0 mm	4689-0538	1	back	1:1	0.748	1.208	0.904	
2437	6	IEEE 802.11b	DSSS	14.00	13.59	-0.19	0 mm	4689-0538	1	top	1:1	0.307	1.099	0.337	
2437	6	IEEE 802.11b	DSSS	14.00	13.59	-0.12	0 mm	4689-0538	1	left	1:1	0.124	1.099	0.136	
2437	6	IEEE 802.11b	DSSS	14.00	13.59	-0.18	0 mm	4689-0538	1	back	1:1	**0.903**	1.099	0.992	A8
5745	149	IEEE 802.11a	OFDM	13.50	13.14	0.09	0 mm	4689-0545	6	back	1:1	0.503	1.086	0.546	
5785	153	IEEE 802.11a	OFDM	13.50	13.23	0.05	0 mm	4689-0545	6	back	1:1	0.487	1.064	0.518	
5805	161	IEEE 802.11a	OFDM	13.50	13.09	0.11	0 mm	4689-0545	6	back	1:1	0.452	1.099	0.497	
5745	149	IEEE 802.11a	OFDM	13.50	13.14	-0.15	0 mm	4689-0545	6	top	1:1	**0.634**	1.086	0.689	A9
5785	153	IEEE 802.11a	OFDM	13.50	13.23	0.07	0 mm	4689-0545	6	top	1:1	0.612	1.064	0.651	
5805	161	IEEE 802.11a	OFDM	13.50	13.09	0.08	0 mm	4689-0545	6	top	1:1	0.529	1.099	0.581	
5785	153	IEEE 802.11a	OFDM	13.50	13.23	-0.13	0 mm	4689-0545	6	left	1:1	0.172	1.064	0.183	
ANSI / IEEE C95.1 1992 - SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population								Body 1.6 W/kg (mW/g) averaged over 1 gram							

Note: Blue entries represent repeatability measurements.

Table 10-7
NII Body 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) (W/kg)	Scaling Factor	Scaled SAR (1g) (W/kg)	Plot #
MHz	Ch.														
5180	36	IEEE 802.11a	OFDM	13.50	13.47	0.05	0 mm	4689-0545	6	back	1:1	0.410	1.007	0.413	
5220	44	IEEE 802.11a	OFDM	13.50	13.26	0.14	0 mm	4689-0545	6	back	1:1	0.369	1.057	0.390	
5180	36	IEEE 802.11a	OFDM	13.50	13.47	0.16	0 mm	4689-0545	6	top	1:1	0.549	1.007	0.553	
5220	44	IEEE 802.11a	OFDM	13.50	13.26	0.12	0 mm	4689-0545	6	top	1:1	0.589	1.057	0.623	
5180	36	IEEE 802.11a	OFDM	13.50	13.47	0.10	0 mm	4689-0545	6	left	1:1	0.054	1.007	0.054	
5260	52	IEEE 802.11a	OFDM	13.50	13.16	0.13	0 mm	4689-0545	6	back	1:1	0.394	1.081	0.426	
5300	60	IEEE 802.11a	OFDM	13.50	12.90	0.08	0 mm	4689-0545	6	back	1:1	0.394	1.148	0.452	
5260	52	IEEE 802.11a	OFDM	13.50	13.16	-0.01	0 mm	4689-0545	6	top	1:1	0.629	1.081	0.680	
5300	60	IEEE 802.11a	OFDM	13.50	12.90	-0.04	0 mm	4689-0545	6	top	1:1	0.678	1.148	0.778	
5260	52	IEEE 802.11a	OFDM	13.50	13.16	-0.18	0 mm	4689-0545	6	left	1:1	0.096	1.081	0.104	
5500	100	IEEE 802.11a	OFDM	13.00	12.92	0.06	0 mm	4689-0545	6	back	1:1	0.427	1.019	0.435	
5560	112	IEEE 802.11a	OFDM	13.00	12.67	0.13	0 mm	4689-0545	6	back	1:1	0.445	1.079	0.480	
5660	132	IEEE 802.11a	OFDM	13.00	12.41	-0.21	0 mm	4689-0545	6	back	1:1	0.493	1.146	0.565	
5500	100	IEEE 802.11a	OFDM	13.00	12.92	-0.08	0 mm	4689-0545	6	top	1:1	0.802	1.019	0.817	
5560	112	IEEE 802.11a	OFDM	13.00	12.67	0.00	0 mm	4689-0545	6	top	1:1	**0.816**	1.079	0.880	A10
5660	132	IEEE 802.11a	OFDM	13.00	12.41	0.04	0 mm	4689-0545	6	top	1:1	0.739	1.146	0.847	
5500	100	IEEE 802.11a	OFDM	13.00	12.92	-0.16	0 mm	4689-0545	6	left	1:1	0.297	1.019	0.303	
5560	112	IEEE 802.11a	OFDM	13.00	12.67	-0.17	0 mm	4689-0545	6	left	1:1	0.332	1.079	0.358	
5660	132	IEEE 802.11a	OFDM	13.00	12.41	-0.12	0 mm	4689-0545	6	left	1:1	0.239	1.146	0.274	
5500	100	IEEE 802.11a	OFDM	13.00	12.92	0.01	0 mm	4689-0545	6	top	1:1	0.765	1.019	0.780	
5560	112	IEEE 802.11a	OFDM	13.00	12.67	-0.02	0 mm	4689-0545	6	top	1:1	0.796	1.079	0.859	
ANSI / IEEE C95.1 1992 - SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population								Body 1.6 W/kg (mW/g) averaged over 1 gram							

Note: Blue entries represent repeatability measurements.

Table 10-8
DSS Body 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)	
2441	39	Bluetooth	FHSS	11.50	11.21	-0.19	0 mm	4689-0538	1	back	1:1	**0.282**	1.069	0.301	A11
2441	39	Bluetooth	FHSS	11.50	11.21	0.00	0 mm	4689-0538	1	top	1:1	0.088	1.069	0.094	
2441	39	Bluetooth	FHSS	11.50	11.21	0.09	0 mm	4689-0538	1	left	1:1	0.034	1.069	0.037	
ANSI / IEEE C95.1 1992 - SAFETY LIMIT **Spatial Peak** **Uncontrolled Exposure/General Population**							**Body** **1.6 W/kg (mW/g)** averaged over 1 gram								

10.2 SAR Test Notes

General Notes:

1. The test data reported are the worst-case SAR values according to test procedures specified in FCC KDB Publication 616217 D04.
2. Batteries are fully charged at the beginning of the SAR measurements.
3. Liquid tissue depth was at least 15.0 cm for all frequencies.
4. The manufacturer has confirmed that the device(s) tested have the same physical, mechanical and thermal characteristics and are within operational tolerances expected for production units
5. SAR results were scaled to the maximum allowed power to demonstrate compliance per FCC KDB Publication 447498 D01v05.
6. Per FCC KDB 616217 D04 Section 4.3, SAR tests are required for the the back surface and edges of the tablet with the tablet touching the phantom. The SAR Exclusion Threshold in FCC KDB 447498 D01v05 was applied to determine SAR test exclusion for adjacent edge configurations. SAR tests were required for top and right edge for the main antenna and top and left edge for the BT/WLAN Antenna.

CDMA Notes:

1. CDMA Body SAR was 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, then EVDO Rev. A SAR was 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 since 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.
2. Per FCC KDB Publication 447498 D01v05, if the reported (scaled) SAR measured at the middle channel or highest output power channel for each test configuration is ≤ 0.8 W/kg then testing at the other channels is not required for such test configuration(s).
3. When the maximum output power variation across the required test channels is > ½ dB, instead of the middle channel, the highest output power channel must be used.

LTE Notes:

1. LTE test configurations are determined according to SAR Evaluation Considerations for LTE Devices in FCC KDB Publication 941225 D05v02. Implementation of the general test procedures can be found in Section 6.4.4.
2. MPR is permanently implemented for this device by the manufacturer when the proximity sensor is not active (device at maximum power). 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.

WLAN/BT Notes:

1. Justification for reduced test configurations for WIFI channels per KDB Publication 248227 D01v01r02 and April 2010 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 April 2010 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. WIFI transmission was verified using an uncalibrated spectrum analyzer.
4. When the maximum extrapolated peak SAR of the zoom scan for the maximum output channel is <1.6 W/kg and the reported 1g averaged SAR is <0.8 W/kg, SAR testing on other default channels was not required.
5. There is no proximity sensor power reduction mechanism applied to WLAN/BT modes.

11 FCC MULTI-TX AND ANTENNA SAR CONSIDERATIONS

11.1 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.

11.2 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, 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 when the test separation distance is less than 50mm; otherwise 0.4 W/kg should be used for 1g SAR.

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

11.3 Body Simultaneous Transmission Analysis

Table 11-1
Simultaneous Transmission Scenario with 2.4 GHz WLAN (Body at 0 mm)

Simult Tx	Configuration	Cell. EVDO SAR (W/kg)	2.4 GHz WLAN SAR (W/kg)	Σ SAR (W/kg)	SPLSR
Body SAR	Back	0.577	1.027	see note	0.01
	Top	0.071	0.337	0.408	N/A
	Bottom	0.400	0.400	0.800	N/A
	Right	0.723	0.400	1.123	N/A
	Left	0.400	0.136	0.536	N/A
Simult Tx	Configuration	AWS EVDO SAR (W/kg)	2.4 GHz WLAN SAR (W/kg)	Σ SAR (W/kg)	SPLSR
Body SAR	Back	0.729	1.027	see note	0.01
	Top	0.392	0.337	0.729	N/A
	Bottom	0.400	0.400	0.800	N/A
	Right	0.155	0.400	0.555	N/A
	Left	0.400	0.136	0.536	N/A
Simult Tx	Configuration	PCS EVDO SAR (W/kg)	2.4 GHz WLAN SAR (W/kg)	Σ SAR (W/kg)	SPLSR
Body SAR	Back	0.752	1.027	see note	0.02
	Top	0.335	0.337	0.672	N/A
	Bottom	0.400	0.400	0.800	N/A
	Right	0.350	0.400	0.750	N/A
	Left	0.400	0.136	0.536	N/A

Simult Tx	Configuration	LTE Band 12 SAR (W/kg)	2.4 GHz WLAN SAR (W/kg)	Σ SAR (W/kg)	SPLSR
Body SAR	Back	0.096	1.027	**1.123**	N/A
	Top	0.028	0.337	0.365	N/A
	Bottom	0.400	0.400	0.800	N/A
	Right	0.251	0.400	0.651	N/A
	Left	0.400	0.136	0.536	N/A

Simult Tx	Configuration	LTE Band 5 (Cell) SAR (W/kg)	2.4 GHz WLAN SAR (W/kg)	Σ SAR (W/kg)	SPLSR
Body SAR	Back	0.361	1.027	**1.388**	N/A
	Top	0.067	0.337	0.404	N/A
	Bottom	0.400	0.400	0.800	N/A
	Right	0.449	0.400	0.849	N/A
	Left	0.400	0.136	0.536	N/A

Simult Tx	Configuration	LTE Band 4 (AWS) SAR (W/kg)	2.4 GHz WLAN SAR (W/kg)	Σ SAR (W/kg)	SPLSR
Body SAR	Back	0.574	1.027	see note	0.01
	Top	0.290	0.337	0.627	N/A
	Bottom	0.400	0.400	0.800	N/A
	Right	0.304	0.400	0.704	N/A
	Left	0.400	0.136	0.536	N/A

Simult Tx	Configuration	LTE Band 2 (PCS) SAR (W/kg)	2.4 GHz WLAN SAR (W/kg)	Σ SAR (W/kg)	SPLSR
Body SAR	Back	0.622	1.027	see note	0.01
	Top	0.306	0.337	0.643	N/A
	Bottom	0.400	0.400	0.800	N/A
	Right	0.531	0.400	0.931	N/A
	Left	0.400	0.136	0.536	N/A

Note: For configurations excluded per 447498 D01v05, an estimated SAR of 0.4 W/kg was used to determine simultaneous transmission SAR exclusion since the test separation distance was >50 mm.
Note: No evaluation was performed to determine the aggregate 1g SAR for these configurations as the SPLS ratio between the antenna pairs was below 0.04 per FCC KDB 447498 D01v05. See Section 11.4 for detailed SPLS ratio analysis.

Table 11-2
Simultaneous Transmission Scenario with 5 GHz WLAN (Body at 0 mm)

Simult Tx	Configuration	Cell. EVDO SAR (W/kg)	5 GHz WLAN SAR (W/kg)	Σ SAR (W/kg)
Body SAR	Back	0.577	0.565	**1.142**
	Top	0.071	0.880	0.951
	Bottom	0.400	0.400	0.800
	Right	0.723	0.400	1.123
	Left	0.400	0.358	0.758

Simult Tx	Configuration	AWS EVDO SAR (W/kg)	5 GHz WLAN SAR (W/kg)	Σ SAR (W/kg)
Body SAR	Back	0.729	0.565	**1.294**
	Top	0.392	0.880	1.272
	Bottom	0.400	0.400	0.800
	Right	0.155	0.400	0.555
	Left	0.400	0.358	0.758

Simult Tx	Configuration	PCS EVDO SAR (W/kg)	5 GHz WLAN SAR (W/kg)	Σ SAR (W/kg)
Body SAR	Back	0.752	0.565	**1.317**
	Top	0.335	0.880	1.215
	Bottom	0.400	0.400	0.800
	Right	0.350	0.400	0.750
	Left	0.400	0.358	0.758

Simult Tx	Configuration	LTE Band 12 SAR (W/kg)	5 GHz WLAN SAR (W/kg)	Σ SAR (W/kg)
Body SAR	Back	0.096	0.565	0.661
	Top	0.028	0.880	**0.908**
	Bottom	0.400	0.400	0.800
	Right	0.251	0.400	0.651
	Left	0.400	0.358	0.758

Simult Tx	Configuration	LTE Band 5 (Cell) SAR (W/kg)	5 GHz WLAN SAR (W/kg)	Σ SAR (W/kg)
Body SAR	Back	0.361	0.565	0.926
	Top	0.067	0.880	**0.947**
	Bottom	0.400	0.400	0.800
	Right	0.449	0.400	0.849
	Left	0.400	0.358	0.758

Simult Tx	Configuration	LTE Band 4 (AWS) SAR (W/kg)	5 GHz WLAN SAR (W/kg)	Σ SAR (W/kg)
Body SAR	Back	0.574	0.565	1.139
	Top	0.290	0.880	**1.170**
	Bottom	0.400	0.400	0.800
	Right	0.304	0.400	0.704
	Left	0.400	0.358	0.758

Simult Tx	Configuration	LTE Band 2 (PCS) SAR (W/kg)	5 GHz WLAN SAR (W/kg)	Σ SAR (W/kg)
Body SAR	Back	0.622	0.565	**1.187**
	Top	0.306	0.880	1.186
	Bottom	0.400	0.400	0.800
	Right	0.531	0.400	0.931
	Left	0.400	0.358	0.758

Note: For configurations excluded per 447498 D01v05, an estimated SAR of 0.4 W/kg was used to determine simultaneous transmission SAR exclusion since the test separation distance was >50 mm.
Note: The above table considers the 1g Body SAR in a possible scenario in which 5 GHz Wifi Direct function is operating simultaneously with the CDMA/EVDO/LTE antenna. The reported 5 GHz WLAN SAR is used in the calculation to determine compliance

Table 11-3
Simultaneous Transmission Scenario with Bluetooth (Body at 0 mm)

Simult Tx	Configuration	Cell EVDO SAR (W/kg)	Bluetooth SAR (W/kg)	Σ SAR (W/kg)
Body SAR	Back	0.577	0.301	0.878
	Top	0.071	0.094	0.165
	Bottom	0.400	0.400	0.800
	Right	0.723	0.400	**1.123**
	Left	0.400	0.037	0.437

Simult Tx	Configuration	AWS EVDO SAR (W/kg)	Bluetooth SAR (W/kg)	Σ SAR (W/kg)
Body SAR	Back	0.729	0.301	**1.030**
	Top	0.392	0.094	0.486
	Bottom	0.400	0.400	0.800
	Right	0.155	0.400	0.555
	Left	0.400	0.037	0.437

Simult Tx	Configuration	PCS EVDO SAR (W/kg)	Bluetooth SAR (W/kg)	Σ SAR (W/kg)
Body SAR	Back	0.752	0.301	**1.053**
	Top	0.335	0.094	0.429
	Bottom	0.400	0.400	0.800
	Right	0.350	0.400	0.750
	Left	0.400	0.037	0.437

Simult Tx	Configuration	LTE Band 12 SAR (W/kg)	Bluetooth SAR (W/kg)	Σ SAR (W/kg)
Body SAR	Back	0.096	0.301	0.397
	Top	0.028	0.094	0.122
	Bottom	0.400	0.400	**0.800**
	Right	0.251	0.400	0.651
	Left	0.400	0.037	0.437

Simult Tx	Configuration	LTE Band 5 (Cell) SAR (W/kg)	Bluetooth SAR (W/kg)	Σ SAR (W/kg)
Body SAR	Back	0.361	0.301	0.662
	Top	0.067	0.094	0.161
	Bottom	0.400	0.400	0.800
	Right	0.449	0.400	**0.849**
	Left	0.400	0.037	0.437

Simult Tx	Configuration	LTE Band 4 (AWS) SAR (W/kg)	Bluetooth SAR (W/kg)	Σ SAR (W/kg)
Body SAR	Back	0.574	0.301	**0.875**
	Top	0.290	0.094	0.384
	Bottom	0.400	0.400	0.800
	Right	0.304	0.400	0.704
	Left	0.400	0.037	0.437

Simult Tx	Configuration	LTE Band 2 (PCS) SAR (W/kg)	Bluetooth SAR (W/kg)	Σ SAR (W/kg)
Body SAR	Back	0.622	0.301	0.923
	Top	0.306	0.094	0.400
	Bottom	0.400	0.400	0.800
	Right	0.531	0.400	**0.931**
	Left	0.400	0.037	0.437

Note: For configurations excluded per 447498 D01v05, an estimated SAR of 0.4 W/kg was used to determine simultaneous transmission SAR exclusion since the test separation distance was >50 mm.

Table 11-4
Simultaneous Transmission Scenario with 2.4 GHz WLAN (Body at 12mm)

Configuration	Mode	2G/4G SAR (W/kg)	2.4 GHz WLAN SAR (W/kg)	Σ SAR (W/kg)	SPLS
Back Side	Cell. EVDO	0.645	< 1.027	see note	0.01
Back Side	AWS EVDO	0.672	< 1.027	see note	0.01
Back Side	PCS EVDO	0.521	< 1.027	**< 1.548**	N/A
Back Side	LTE Band 12	0.381	< 1.027	< 1.408	N/A
Back Side	LTE Band 5 (Cell)	0.462	< 1.027	< 1.489	N/A
Back Side	LTE Band 4 (AWS)	0.491	< 1.027	< 1.518	N/A
Back Side	LTE Band 2 (PCS)	0.666	< 1.027	see note	0.02

Note: No evaluation was performed to determine the aggregate 1g SAR for these configurations as the SPLS ratio between the antenna pairs was below 0.04 per FCC KDB 447498 D01v05. See Section 11.4 for detailed SPLS ratio analysis.

Table 11-5
Simultaneous Transmission Scenario with 5 GHz WLAN (Body at 12mm)

Configuration	Mode	2G/4G SAR (W/kg)	5 GHZ WLAN SAR (W/kg)	Σ SAR (W/kg)
Back Side	Cell. EVDO	0.645	< 0.565	< 1.210
Back Side	AWS EVDO	0.672	< 0.565	< 1.237
Back Side	PCS EVDO	0.521	< 0.565	< 1.086
Back Side	LTE Band 12	0.381	< 0.565	< 0.946
Back Side	LTE Band 5 (Cell)	0.462	< 0.565	< 1.027
Back Side	LTE Band 4 (AWS)	0.491	< 0.565	< 1.056
Back Side	LTE Band 2 (PCS)	0.666	< 0.565	< 1.231

Note: The above table considers the 1g Body SAR in a possible scenario in which 5 GHz Wifi Direct function is operating simultaneously with the CDMA/EVDO/LTE antenna. The reported 5 GHz WLAN SAR is used in the calculation to determine compliance

Table 11-6
Simultaneous Transmission Scenario with Bluetooth (Body at 12mm)

Configuration	Mode	2G/4G SAR (W/kg)	Bluetooth SAR (W/kg)	Σ SAR (W/kg)
Back Side	Cell. EVDO	0.645	< 0.301	< 0.946
Back Side	AWS EVDO	0.672	< 0.301	< 0.973
Back Side	PCS EVDO	0.521	< 0.301	< 0.822
Back Side	LTE Band 12	0.381	< 0.301	< 0.682
Back Side	LTE Band 5 (Cell)	0.462	< 0.301	< 0.763
Back Side	LTE Band 4 (AWS)	0.491	< 0.301	< 0.792
Back Side	LTE Band 2 (PCS)	0.666	< 0.301	< 0.967

Table 11-7
Simultaneous Transmission Scenario with 2.4 GHz WLAN (Body at 10mm)

Configuration	Mode	2G/4G SAR (W/kg)	2.4 GHz WLAN SAR (W/kg)	Σ SAR (W/kg)
Top Edge	Cell. EVDO	0.184	< 0.337	< 0.521
Top Edge	AWS EVDO	0.544	< 0.337	< 0.881
Top Edge	PCS EVDO	0.408	< 0.337	< 0.745
Top Edge	LTE Band 12	0.137	< 0.337	< 0.474
Top Edge	LTE Band 5 (Cell)	0.151	< 0.337	< 0.488
Top Edge	LTE Band 4 (AWS)	0.613	< 0.337	< 0.950
Top Edge	LTE Band 2 (PCS)	0.598	< 0.337	< 0.935

Table 11-8
Simultaneous Transmission Scenario with 5 GHz WLAN (Body at 10mm)

Configuration	Mode	2G/4G SAR (W/kg)	5 GHZ WLAN SAR (W/kg)	Σ SAR (W/kg)
Top Edge	Cell. EVDO	0.184	< 0.880	< 1.064
Top Edge	AWS EVDO	0.544	< 0.880	< 1.424
Top Edge	PCS EVDO	0.408	< 0.880	< 1.288
Top Edge	LTE Band 12	0.137	< 0.880	< 1.017
Top Edge	LTE Band 5 (Cell)	0.151	< 0.880	< 1.031
Top Edge	LTE Band 4 (AWS)	0.613	< 0.880	< 1.493
Top Edge	LTE Band 2 (PCS)	0.598	< 0.880	< 1.478

Note: The above table considers the 1g Body SAR in a possible scenario in which 5 GHz Wifi Direct function is operating simultaneously with the CDMA/EVDO/LTE antenna. The reported 5 GHz WLAN SAR is used in the calculation to determine compliance

Table 11-9
Simultaneous Transmission Scenario with Bluetooth (Body at 10mm)

Configuration	Mode	2G/4G SAR (W/kg)	Bluetooth SAR (W/kg)	Σ SAR (W/kg)
Top Edge	Cell. EVDO	0.184	< 0.094	< 0.278
Top Edge	AWS EVDO	0.544	< 0.094	< 0.638
Top Edge	PCS EVDO	0.408	< 0.094	< 0.502
Top Edge	LTE Band 12	0.137	< 0.094	< 0.231
Top Edge	LTE Band 5 (Cell)	0.151	< 0.094	< 0.245
Top Edge	LTE Band 4 (AWS)	0.613	< 0.094	< 0.707
Top Edge	LTE Band 2 (PCS)	0.598	< 0.094	< 0.692

11.4 SPLSR Evaluation Analysis

Per FCC KDB Publication 447498 D01v05, when the sum of the standalone transmitters is more than 1.6 W/kg, the SAR sum to peak locations can be analyzed to determine SAR distribution overlaps. When the SAR peak to location ratio (shown below) for each pair of antennas is ≤ 0.04, simultaneous SAR evaluation is not required. The distance between the transmitters was calculated using the following formula.

$$\text{Distance}_{Tx1\text{-}Tx2} = R_i = \sqrt{(x_1 - x_2)^2 + (y_1 - y_2)^2 + (z_1 - z_2)^2}$$

$$\text{SPLS Ratio} = (SAR_1 + SAR_2)^{1.5}/R_i$$

The sum of the standalone SAR values was above 1.6 W/kg for the Body Back side configuration at a separation distance of 0cm with Cell. EVDO potentially operating with 2.4 GHz WIFI.

Figure 11-1
Peak SAR Location Plot of Cell. EVDO and 2.4 GHz WLAN

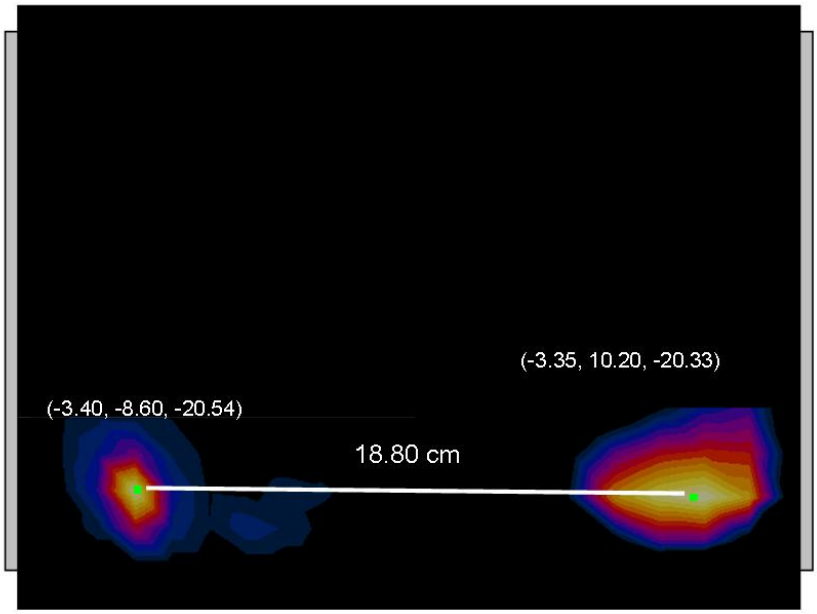


Table 11-10
Peak SAR Locations for Body Back Side Cell. EVDO and 2.4 GHz WLAN

Mode/Band	x (cm)	y (cm)	z (cm)
Cell. EVDO	-3.35	10.20	-20.33
2.4 GHz WLAN	-3.40	-8.60	-20.54

Table 11-11
SAR Sum to Peak Location Separation Ratio Calculation

Antenna Pair		Standalone 1g SAR (W/kg)		Standalone SAR Sum (W/kg)	Peak SAR Separation Distance (mm)	SPLS Ratio
Ant "a"	Ant "b"	a	b	a+b	R_i	$(a+b)^{1.5} / R_i$
Cell. EVDO	2.4 GHz WLAN	0.577	1.027	1.604	188.0	0.01

The sum of the standalone SAR values was above 1.6 W/kg for the Body Back side configuration at a separation distance of 0cm with AWS EVDO potentially operating with 2.4 GHz WIFI.

Figure 11-2
Peak SAR Location Plot of AWS EVDO and 2.4 GHz WLAN

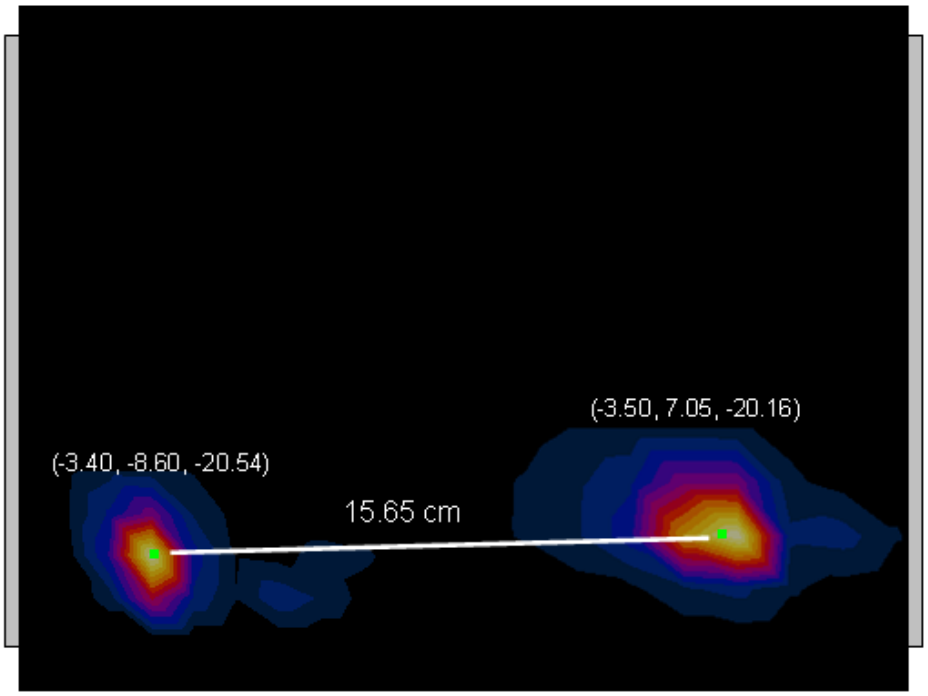


Table 11-12
Peak SAR Locations for Body Back Side AWS EVDO and 2.4 GHz WLAN

Mode/Band	x (cm)	y (cm)	z (cm)
AWS EVDO	-3.50	7.05	-20.16
2.4 GHz WLAN	-3.40	-8.60	-20.54

Table 11-13
SAR Sum to Peak Location Separation Ratio Calculation

Antenna Pair		Standalone 1g SAR (W/kg)		Standalone SAR Sum (W/kg)	Peak SAR Separation Distance (mm)	SPLS Ratio
Ant "a"	Ant "b"	a	b	a+b	R_i	$(a+b)^{1.5} / R_i$
AWS EVDO	2.4 GHz WLAN	0.729	1.027	1.756	156.5	0.01

The sum of the standalone SAR values was above 1.6 W/kg for the Body Back side configuration at a separation distance of 0cm with PCS EVDO potentially operating with 2.4 GHz WIFI.

Figure 11-3
Peak SAR Location Plot of PCS EVDO and 2.4 GHz WLAN

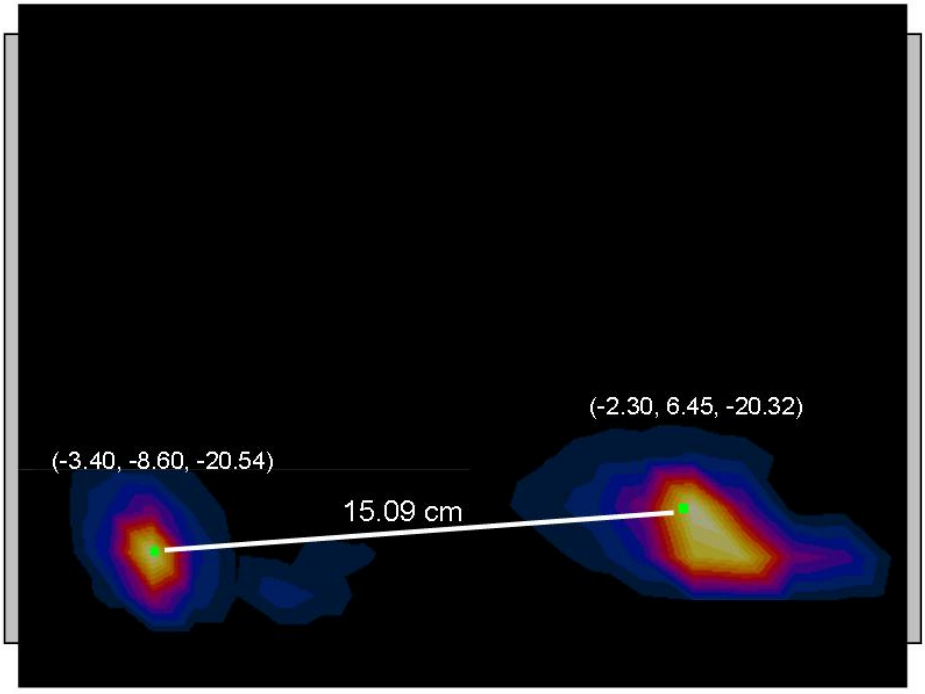


Table 11-14
Peak SAR Locations for Body Back Side PCS EVDO and 2.4 GHz WLAN

Mode/Band	x (cm)	y (cm)	z (cm)
PCS EVDO	-2.30	6.45	-20.32
2.4 GHz WLAN	-3.40	-8.60	-20.54

Table 11-15
SAR Sum to Peak Location Separation Ratio Calculation

Antenna Pair		Standalone 1g SAR (W/kg)		Standalone SAR Sum (W/kg)	Peak SAR Separation Distance (mm)	SPLS Ratio
Ant "a"	Ant "b"	a	b	a+b	R_i	$(a+b)^{1.5} / R_i$
PCS EVDO	2.4 GHz WLAN	0.752	1.027	1.779	150.9	0.02

The sum of the standalone SAR values was above 1.6 W/kg for the Body Back side configuration at a separation distance of 0cm with LTE Band 4 potentially operating with 2.4 GHz WIFI.

Figure 11-4
Peak SAR Location Plot of LTE Band 4 and 2.4 GHz WLAN

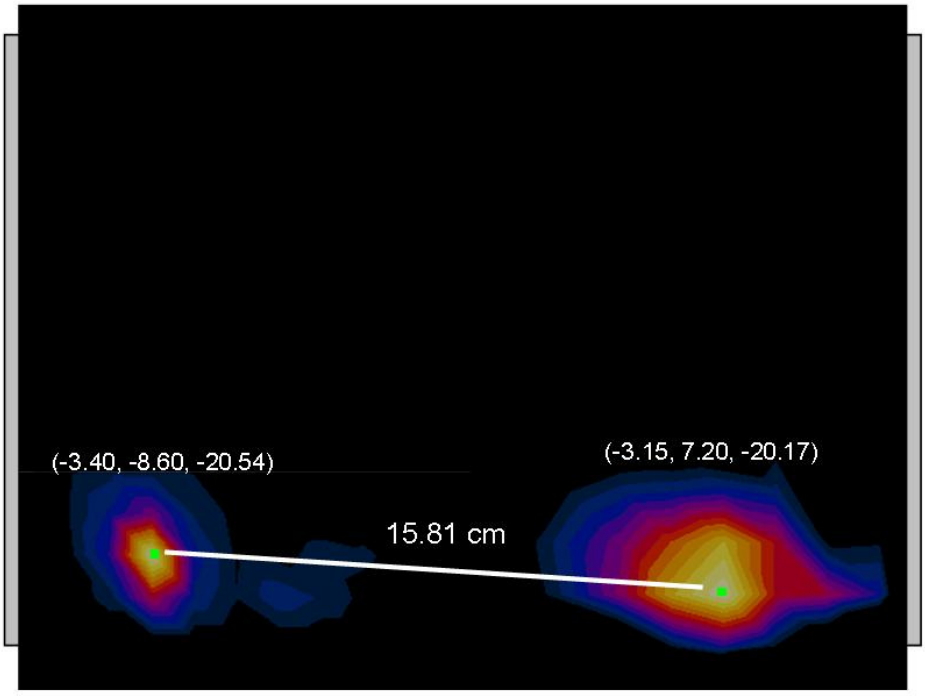


Table 11-16
Peak SAR Locations for Body Back Side LTE Band 4 and 2.4 GHz WLAN

Mode/Band	x (cm)	y (cm)	z (cm)
LTE Band 4	-3.15	7.20	-20.17
2.4 GHz WLAN	-3.40	-8.60	-20.54

Table 11-17
SAR Sum to Peak Location Separation Ratio Calculation

Antenna Pair		Standalone 1g SAR (W/kg)		Standalone SAR Sum (W/kg)	Peak SAR Separation Distance (mm)	SPLS Ratio
Ant "a"	Ant "b"	a	b	a+b	R_i	$(a+b)^{1.5} / R_i$
LTE Band 4	2.4 GHz WLAN	0.574	1.027	1.601	158.1	0.01

The sum of the standalone SAR values was above 1.6 W/kg for the Body Back side configuration at a separation distance of 0cm with LTE Band 2 potentially operating with 2.4 GHz WIFI.

Figure 11-5
Peak SAR Location Plot of LTE Band 2 and 2.4 GHz WLAN

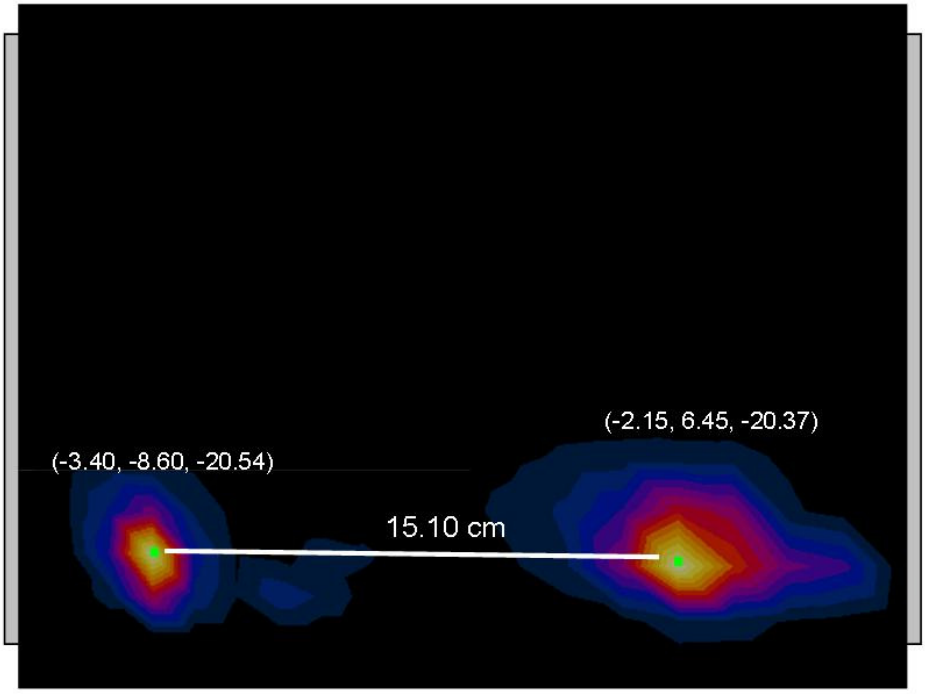


Table 11-18
Peak SAR Locations for Body Back Side LTE Band 2 and 2.4 GHz WLAN

Mode/Band	x (cm)	y (cm)	z (cm)
LTE Band 2	-2.15	6.45	-20.37
2.4 GHz WLAN	-3.40	-8.60	-20.54

Table 11-19
SAR Sum to Peak Location Separation Ratio Calculation

Antenna Pair		Standalone 1g SAR (W/kg)		Standalone SAR Sum (W/kg)	Peak SAR Separation Distance (mm)	SPLS Ratio
Ant "a"	Ant "b"	a	b	a+b	R_i	$(a+b)^{1.5} / R_i$
LTE Band 2	2.4 GHz WLAN	0.622	1.027	1.649	151.0	0.01

The sum of the standalone SAR values was above 1.6 W/kg for the Body Back side configuration at a separation distance of 1.2cm with Cell. EVDO potentially operating with 2.4 GHz WIFI.

Figure 11-6
Peak SAR Location Plot of Cell EVDO and 2.4 GHz WLAN

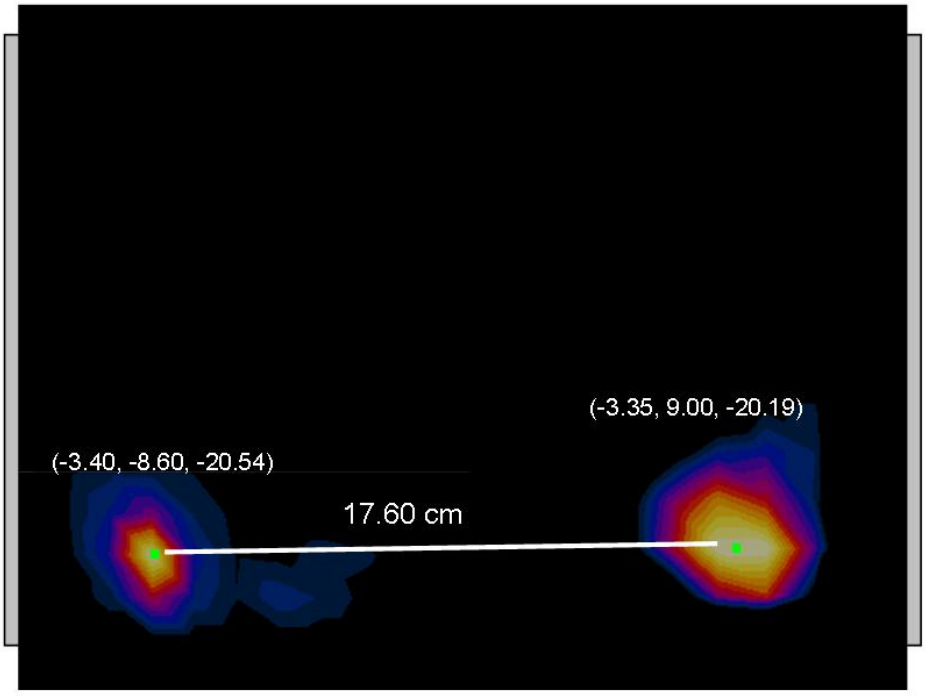


Table 11-20
Peak SAR Locations for Body Back Side Cell EVDO and 2.4 GHz WLAN

Mode/Band	x (cm)	y (cm)	z (cm)
Cell. EVDO	-3.35	9.00	-20.19
2.4 GHz WLAN	-3.40	-8.60	-20.54

Table 11-21
SAR Sum to Peak Location Separation Ratio Calculation

Antenna Pair		Standalone 1g SAR (W/kg)		Standalone SAR Sum (W/kg)	Peak SAR Separation Distance (mm)	SPLS Ratio
Ant "a"	Ant "b"	a	b	a+b	R_i	$(a+b)^{1.5} / R_i$
Cell. EVDO	2.4 GHz WLAN	0.645	1.027	1.672	176.0	0.01

The sum of the standalone SAR values was above 1.6 W/kg for the Body Back side configuration at a separation distance of 1.2cm with AWS EVDO potentially operating with 2.4 GHz WIFI.

Figure 11-7
Peak SAR Location Plot of AWS EVDO and 2.4 GHz WLAN

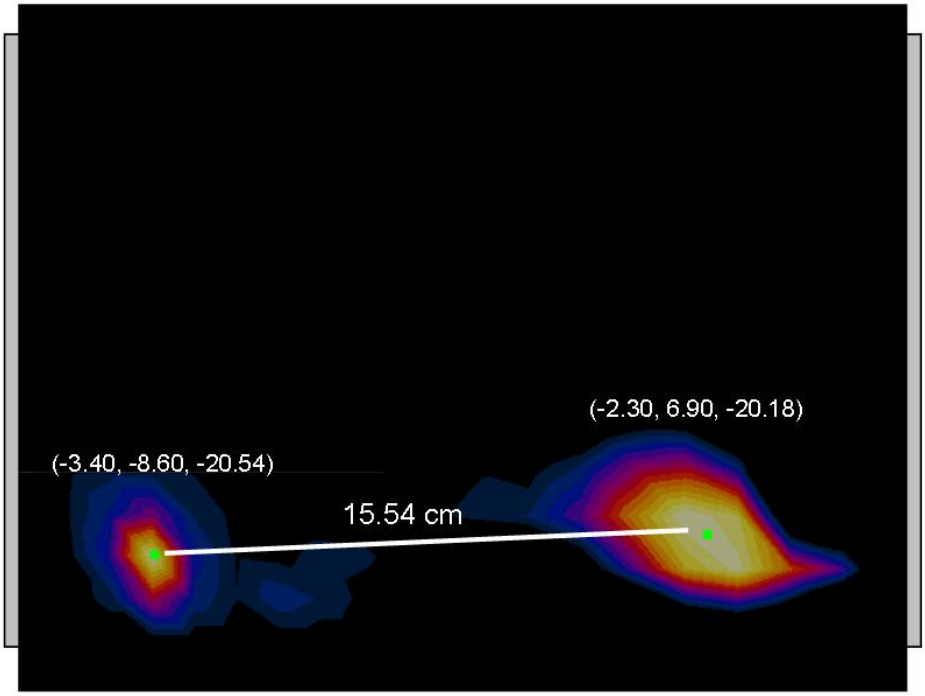


Table 11-22
Peak SAR Locations for Body Back Side AWS EVDO and 2.4 GHz WLAN

Mode/Band	x (cm)	y (cm)	z (cm)
AWS EVDO	-2.30	6.90	-20.18
2.4 GHz WLAN	-3.40	-8.60	-20.54

Table 11-23
SAR Sum to Peak Location Separation Ratio Calculation

Antenna Pair		Standalone 1g SAR (W/kg)		Standalone SAR Sum (W/kg)	Peak SAR Separation Distance (mm)	SPLS Ratio
Ant "a"	Ant "b"	a	b	a+b	R_i	$(a+b)^{1.5} / R_i$
AWS EVDO	2.4 GHz WLAN	0.672	1.027	1.699	155.4	0.01

The sum of the standalone SAR values was above 1.6 W/kg for the Body Back side configuration at a separation distance of 1.2cm with LTE Band 2 potentially operating with 2.4 GHz WIFI.

Figure 11-8
Peak SAR Location Plot of LTE Band 2 and 2.4 GHz WLAN

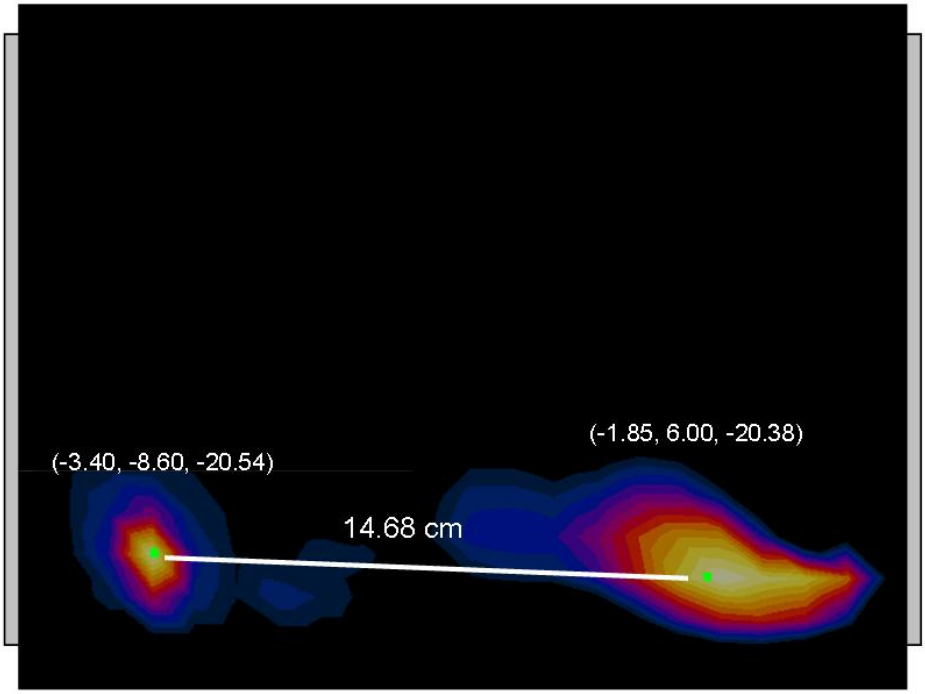


Table 11-24
Peak SAR Locations for Body Back Side LTE Band 2 and 2.4 GHz WLAN

Mode/Band	x (cm)	y (cm)	z (cm)
LTE Band 2	-1.85	6.00	-20.38
2.4 GHz WLAN	-3.40	-8.60	-20.54

Table 11-25
SAR Sum to Peak Location Separation Ratio Calculation

Antenna Pair		Standalone 1g SAR (W/kg)		Standalone SAR Sum (W/kg)	Peak SAR Separation Distance (mm)	SPLS Ratio
Ant "a"	Ant "b"	a	b	a+b	R_i	$(a+b)^{1.5} / R_i$
LTE Band 2	2.4 GHz WLAN	0.666	1.027	1.693	146.8	0.02

11.5 Simultaneous Transmission Conclusion

The above numerical summed SAR results and SPLSR 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.

12 SAR MEASUREMENT VARIABILITY

12.1 Measurement Variability

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

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

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

Table 12-1
Body SAR Measurement Variability Results

BODY VARIABILITY RESULTS															
Band	FREQUENCY		Mode	Service	Data Rate (Mbps)	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)	
2450	2437.00	6	IEEE 802.11b	DSSS	1	back	0 mm	0.902	0.903	1.0	N/A	N/A	N/A	N/A
5500	5500.00	100	IEEE 802.11a	OFDM	6	top	0 mm	0.802	0.765	1.0	N/A	N/A	N/A	N/A
5600	5560.00	112	IEEE 802.11a	OFDM	6	top	0 mm	0.816	0.796	1.0	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						

12.2 Measurement Uncertainty

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

13 EQUIPMENT LIST

Manufacturer	Model	Description	Cal Date	Cal Interval	Cal Due	Serial Number
Agilent	E8257D	(250kHz-20GHz) Signal Generator	4/5/2012	Annual	4/5/2013	MY45470194
Agilent	8753E	(30kHz-6GHz) Network Analyzer	4/4/2012	Annual	4/4/2013	JP38020182
Agilent	8753E	(30kHz-6GHz) Network Analyzer	4/3/2012	Annual	4/3/2013	US37390350
Agilent	8594A	(9kHz-2.9GHz) Spectrum Analyzer	N/A	N/A	N/A	3051A00187
Agilent	8648D	(9kHz-4GHz) Signal Generator	10/10/2012	Annual	10/10/2013	3613A00315
Agilent	85070E	Dielectric Probe Kit	3/8/2012	Annual	3/8/2013	MY44300633
Agilent	8648D	Signal Generator	4/3/2012	Annual	4/3/2013	3629U00687
Agilent	85047A	S-Parameter Test Set	N/A	N/A	N/A	2904A00579
Agilent	E5515C	Wireless Communications Test Set	2/14/2012	Annual	2/14/2013	GB43304447
Amplifier Research	5S1G4	5W, 800MHz-4.2GHz	CBT	N/A	CBT	21910
Anritsu	ML2495A	Power Meter	10/11/2012	Annual	10/11/2013	1039008
Anritsu	ML2438A	Power Meter	10/11/2012	Annual	10/11/2013	1070030
Anritsu	ML2438A	Power Meter	2/14/2012	Annual	2/14/2013	98150041
Anritsu	MA2481A	Power Sensor	2/14/2012	Annual	2/14/2013	2400
Anritsu	MA2481A	Power Sensor	4/5/2012	Annual	4/5/2013	5605
Anritsu	MA2481A	Power Sensor	2/14/2012	Annual	2/14/2013	5821
Anritsu	MA2411B	Pulse Sensor	9/19/2012	Annual	9/19/2013	1027293
Anritsu	MT8820C	Radio Communication Tester	11/6/2012	Annual	11/6/2013	6200901190
Anritsu	MA24106A	USB Power Sensor	8/22/2012	Annual	8/22/2013	1231535
Anritsu	MA24106A	USB Power Sensor	8/22/2012	Annual	8/22/2013	1231538
COMTech	AR85729-5	Solid State Amplifier	CBT	N/A	CBT	M1S5A00-009
COMTECH	AR85729-5/5759B	Solid State Amplifier	CBT	N/A	CBT	M3W1A00-1002
Gigatronics	80701A	(0.05-18GHz) Power Sensor	10/10/2012	Annual	10/10/2013	1833460
Gigatronics	8651A	Universal Power Meter	10/10/2012	Annual	10/10/2013	8650319
Intelligent Weigh	PD-3000	Electronic Balance	3/27/2012	Annual	3/27/2013	11081534
MCL	BW-N6W5+	6dB Attenuator	CBT	N/A	CBT	1139
MiniCircuits	VLF-6000+	Low Pass Filter	CBT	N/A	CBT	N/A
MiniCircuits	SLP-2400+	Low Pass Filter	CBT	N/A	CBT	R8979500903
Mini-Circuits	BW-N20W5+	DC to 18 GHz Precision Fixed 20 dB Attenuator	CBT	N/A	CBT	N/A
Mini-Circuits	NLP-1200+	Low Pass Filter DC to 1000 MHz	CBT	N/A	CBT	N/A
Mini-Circuits	NLP-2950+	Low Pass Filter DC to 2700 MHz	CBT	N/A	CBT	N/A
Mini-Circuits	BW-N20W5	Power Attenuator	CBT	N/A	CBT	1226
Narda	4014C-6	4 - 8 GHz SMA 6 dB Directional Coupler	CBT	N/A	CBT	N/A
Narda	4772-3	Attenuator (3dB)	CBT	N/A	CBT	9406
Pasternack	PE2208-6	Bidirectional Coupler	CBT	N/A	CBT	N/A
Rohde & Schwarz	CMU200	Base Station Simulator	5/22/2012	Annual	5/22/2013	109892
Rohde & Schwarz	NRVD	Dual Channel Power Meter	10/12/2012	Biennial	10/12/2014	101695
Rohde & Schwarz	CMW500	LTE Radio Communication Tester	9/26/2012	Annual	9/26/2013	106084
Rohde & Schwarz	NRV-Z32	Peak Power Sensor	10/12/2012	Biennial	10/12/2014	836019/013
Rohde & Schwarz	SME06	Signal Generator	10/11/2012	Annual	10/11/2013	832026
Rohde & Schwarz	SMIQ03B	Signal Generator	4/5/2012	Annual	4/5/2013	DE27259
Seekonk	NC-100	Torque Wrench (8" lb)	11/29/2011	Triennial	11/29/2014	21053
SPEAG	D1765V2	1765 MHz SAR Dipole	5/18/2012	Annual	5/18/2013	1008
SPEAG	D1900V2	1900 MHz SAR Dipole	2/8/2012	Annual	2/8/2013	5d148
SPEAG	D2450V2	2450 MHz SAR Dipole	8/23/2012	Annual	8/23/2013	719
SPEAG	D5GHzV2	5 GHz SAR Dipole	10/30/2012	Annual	10/30/2013	1007
SPEAG	D5GHzV2	5 GHz SAR Dipole	2/1/2012	Annual	2/1/2013	1120
SPEAG	D750V3	750 MHz Dipole	2/9/2012	Annual	2/9/2013	1054
SPEAG	D835V2	835 MHz SAR Dipole	8/23/2012	Annual	8/23/2013	4d026
SPEAG	D835V2	835 MHz SAR Dipole	2/3/2012	Annual	2/3/2013	4d132
SPEAG	DAE4	Dasy Data Acquisition Electronics	2/20/2012	Annual	2/20/2013	649
SPEAG	DAE4	Dasy Data Acquisition Electronics	8/24/2012	Annual	8/24/2013	1322
SPEAG	DAE4	Dasy Data Acquisition Electronics	9/19/2012	Annual	9/19/2013	1323
SPEAG	DAE4	Dasy Data Acquisition Electronics	5/7/2012	Annual	5/7/2013	1334
SPEAG	ES3DV3	SAR Probe	3/16/2012	Annual	3/16/2013	3209
SPEAG	ES3DV3	SAR Probe	5/18/2012	Annual	5/18/2013	3263
SPEAG	ES3DV3	SAR Probe	9/20/2012	Annual	9/20/2013	3288
SPEAG	EX3DV4	SAR Probe	7/26/2012	Annual	7/26/2013	3561
Tektronix	RSA-6114A	Real Time Spectrum Analyzer	4/5/2012	Annual	4/5/2013	B010177
VWR	23226-658	Long Stem Thermometer	3/30/2012	Biennial	3/30/2014	122179874
VWR	23226-658	Long Stem Thermometer	7/11/2012	Biennial	7/11/2014	122389334
VWR	62344-925	Mini-Thermometer	10/24/2011	Biennial	10/24/2013	111886430
VWR	62344-925	Mini-Thermometer	10/24/2011	Biennial	10/24/2013	111886443
VWR	36934-158	Wall-Mounted Thermometer	9/30/2011	Biennial	9/30/2013	111859323
VWR	36934-158	Wall-Mounted Thermometer	9/30/2011	Biennial	9/30/2013	111859332

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.

14 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

15 CONCLUSION

15.1 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: A3LSCHI925U; Type: Portable Tablet Computer; Serial: 4689-0545

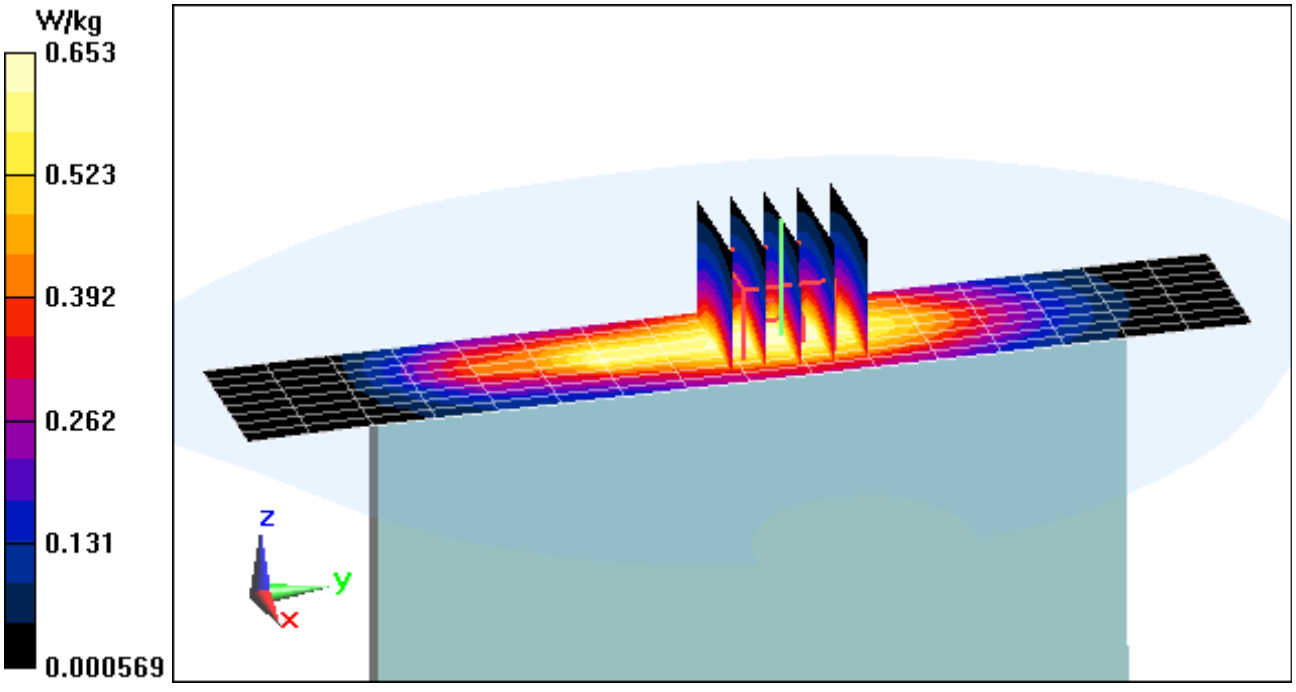
Communication System: Cellular CDMA; Frequency: 836.52 MHz; Duty Cycle: 1:1
Medium: 835 Body Medium parameters used (interpolated):
f = 836.52 MHz; σ = 0.96 mho/m; ε_r = 53.313; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 0.0 cm

Test Date: 11-29-2012; Ambient Temp: 24.5°C; Tissue Temp: 23.5°C

Probe: ES3DV3 - SN3209; ConvF(6.13, 6.13, 6.13); Calibrated: 3/16/2012;
Sensor-Surface: 4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn649; Calibrated: 2/20/2012
Phantom: SAM with CRP; Type: SAM; Serial: TP1375
Measurement SW: DASY4, Version 4.7 (80); SEMCAD X Version 14.6.7 (6848)

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

Area Scan (9x17x1): Measurement grid: dx=5mm, dy=15mm
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 28.074 V/m; Power Drift = 0.01 dB
Peak SAR (extrapolated) = 0.827 W/kg
SAR(1 g) = 0.615 W/kg; SAR(10 g) = 0.429 W/kg



PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LSCHI925U; Type: Portable Tablet Computer; Serial: 4689-0520

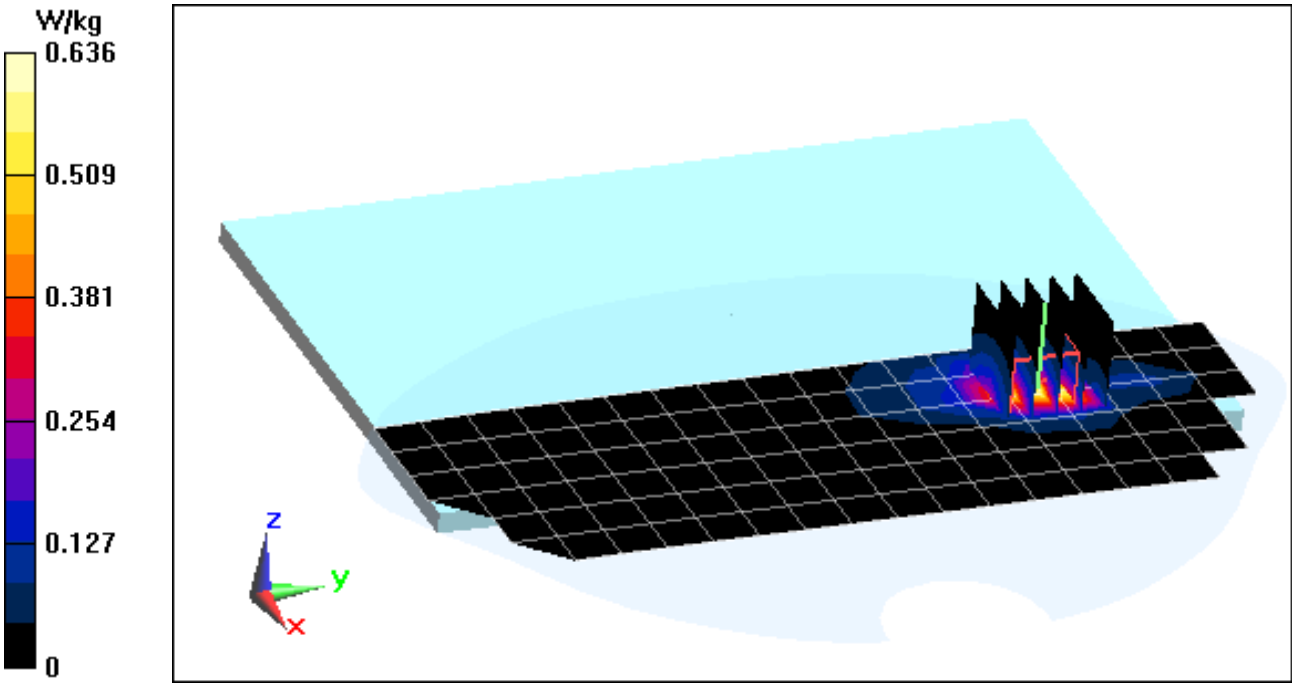
Communication System: AWS CDMA; Frequency: 1732.5 MHz; Duty Cycle: 1:1
Medium: 1750 Body Medium parameters used (interpolated):
f = 1732.5 MHz; σ = 1.498 mho/m; ε_r = 53.933; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 0.0 cm

Test Date: 12-03-2012; Ambient Temp: 24.1°C; Tissue Temp: 23.2°C

Probe: ES3DV3 - SN3209; ConvF(4.83, 4.83, 4.83); Calibrated: 3/16/2012;
Sensor-Surface: 4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn649; Calibrated: 2/20/2012
Phantom: SAM with CRP; Type: SAM; Serial: TP1375
Measurement SW: DASY4, Version 4.7 (80); SEMCAD X Version 14.6.7 (6848)

Mode: AWS EVDO, Body SAR, Back side, Mid.ch

Area Scan (7x21x1): Measurement grid: dx=15mm, dy=15mm
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 22.885 V/m; Power Drift = -0.01 dB
Peak SAR (extrapolated) = 1.44 W/kg
SAR(1 g) = 0.644 W/kg; SAR(10 g) = 0.293 W/kg



PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LSCHI925U; Type: Portable Tablet Computer; Serial: 4689-0520

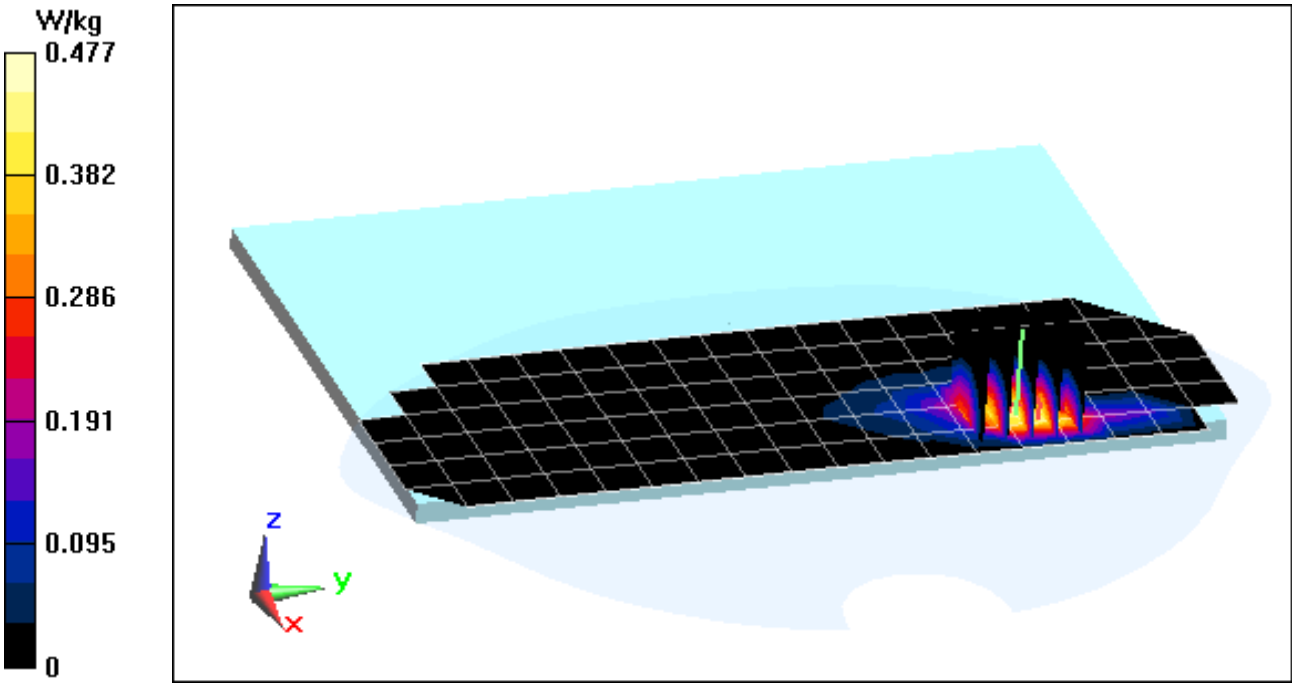
Communication System: PCS CDMA; Frequency: 1880 MHz; Duty Cycle: 1:1
Medium: 1900 Body Medium parameters used:
f = 1880 MHz; σ = 1.56 mho/m; ε_r = 51.27; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 0.0 cm

Test Date: 12-04-2012; Ambient Temp: 24.7°C; Tissue Temp: 22.5°C

Probe: ES3DV3 - SN3263; ConvF(4.76, 4.76, 4.76); Calibrated: 5/18/2012;
Sensor-Surface: 4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1334; Calibrated: 5/7/2012
Phantom: SAM 5.0 front; Type: QD000P40CD; Serial: TP:-1648
Measurement SW: DASY52, Version 52.8 (3); SEMCAD X Version 14.6.7 (6848)

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

Area Scan (7x21x1): Measurement grid: dx=15mm, dy=15mm
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 17.860 V/m; Power Drift = -0.08 dB
Peak SAR (extrapolated) = 1.46 W/kg
SAR(1 g) = 0.644 W/kg



PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LSCHI925U; Type: Portable Tablet Computer; Serial: 4689-0538

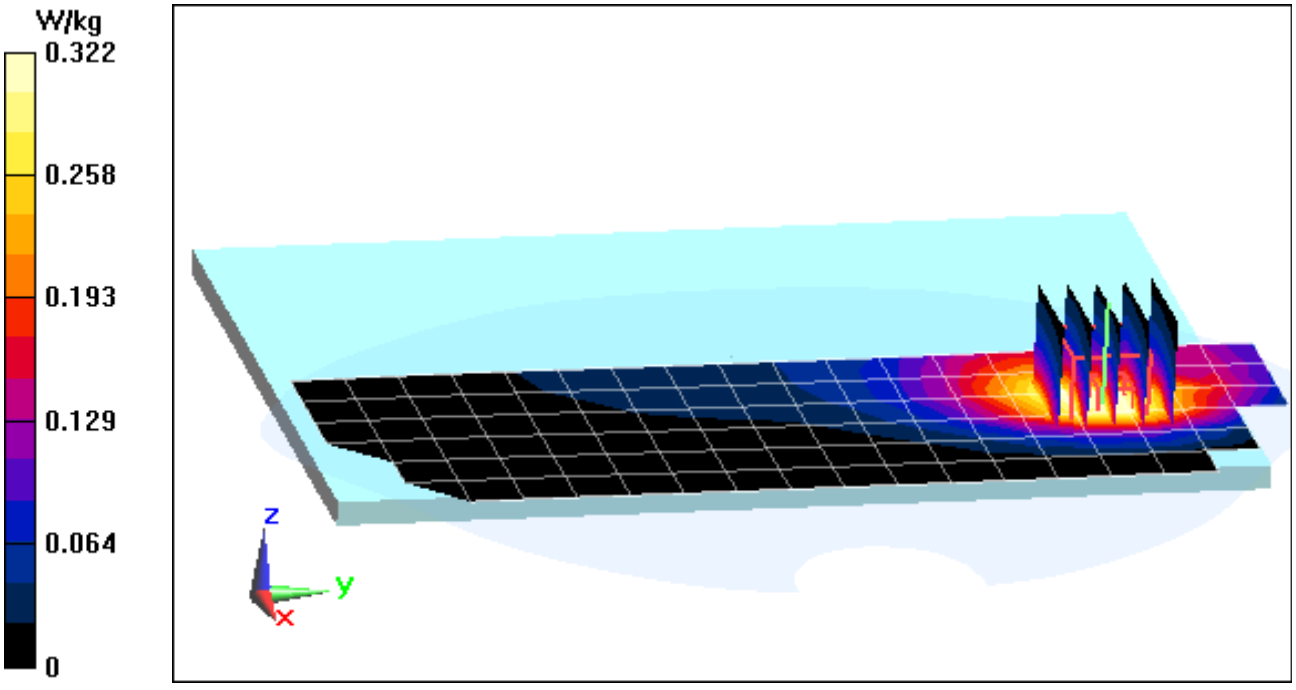
Communication System: LTE Band 12; Frequency: 707.5 MHz; Duty Cycle: 1:1
Medium: 695 Body Medium parameters used (interpolated):
f = 707.5 MHz; σ = 0.919 mho/m; ε_r = 54.707; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.2 cm

Test Date: 12-04-2012; Ambient Temp: 24.7°C; Tissue Temp: 24.2°C

Probe: ES3DV3 - SN3288; ConvF(6.44, 6.44, 6.44); Calibrated: 9/20/2012;
Sensor-Surface: 4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1323; Calibrated: 9/19/2012
Phantom: SAM v5.0 Left; Type: QD000P40CD; Serial: TP: 1687
Measurement SW: DASY52, Version 52.8 (3); SEMCAD X Version 14.6.7 (6848)

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

Area Scan (7x21x1): Measurement grid: dx=15mm, dy=15mm
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 18.928 V/m; Power Drift = 0.09 dB
Peak SAR (extrapolated) = 0.518 W/kg
SAR(1 g) = 0.344 W/kg; SAR(10 g) = 0.222 W/kg



PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LSCHI925U; Type: Portable Tablet Computer; Serial: 4689-0538

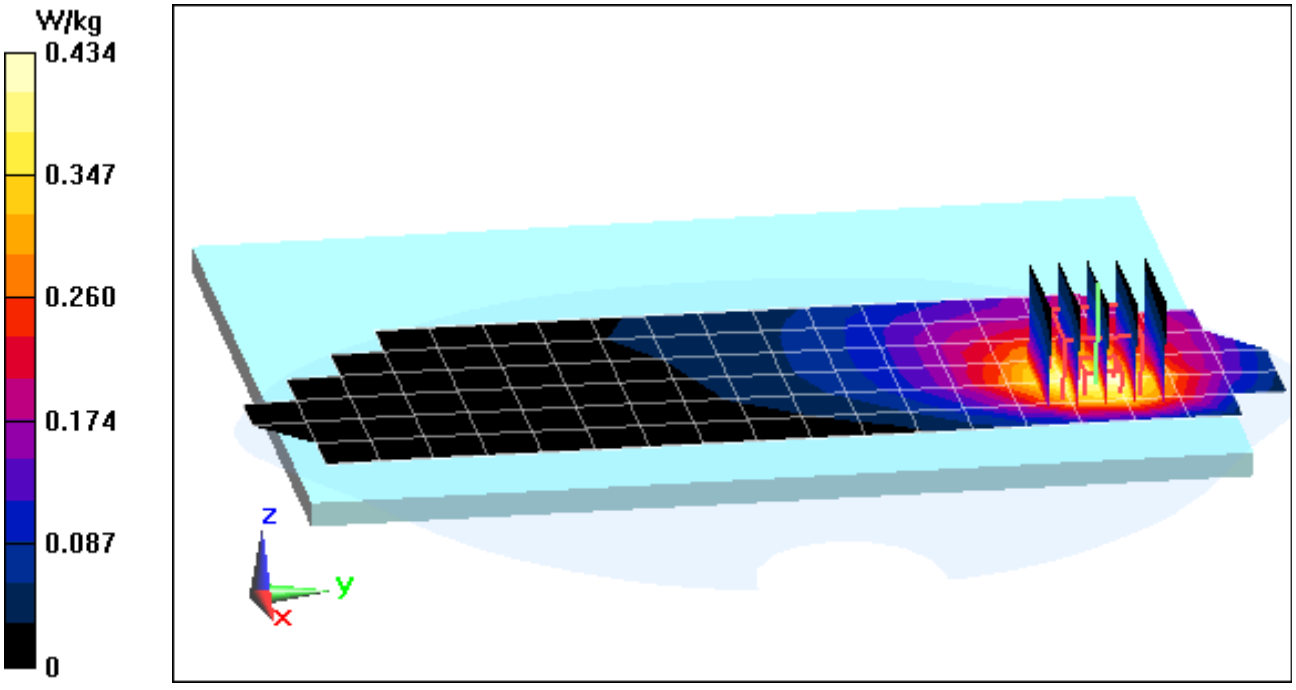
Communication System: LTE Band 5; Frequency: 836.5 MHz; Duty Cycle: 1:1
Medium: 835 Body Medium parameters used (interpolated):
f = 836.5 MHz; σ = 0.984 mho/m; ε_r = 54.751; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.2 cm

Test Date: 12-03-2012; Ambient Temp: 24.9°C; Tissue Temp: 22.1°C

Probe: ES3DV3 - SN3263; ConvF(6.15, 6.15, 6.15); Calibrated: 5/18/2012;
Sensor-Surface: 4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1334; Calibrated: 5/7/2012
Phantom: SAM 5.0 front; Type: QD000P40CD; Serial: TP:-1648
Measurement SW: DASY52, Version 52.8 (3); SEMCAD X Version 14.6.7 (6848)

Mode: LTE Band 5 (Cell.), Body SAR, Back side, Mid.ch,
10 MHz Bandwidth, QPSK, 1 RB, 25 RB Offset

Area Scan (7x20x1): Measurement grid: dx=15mm, dy=15mm
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 22.399 V/m; Power Drift = -0.08 dB
Peak SAR (extrapolated) = 0.644 W/kg
SAR(1 g) = 0.432 W/kg; SAR(10 g) = 0.278 W/kg



DUT: A3LSCHI925U; Type: Portable Tablet Computer; Serial: 4689-0543

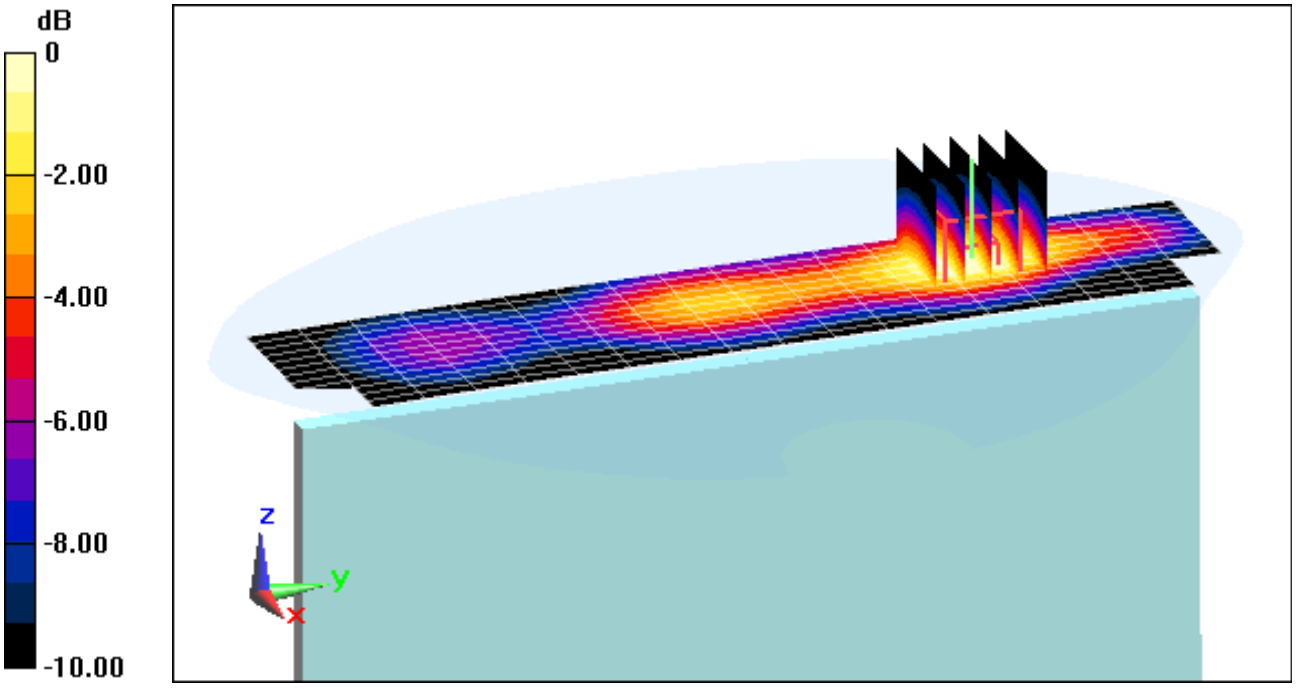
Communication System: LTE Band 4; Frequency: 1750 MHz; Duty Cycle: 1:1
Medium: 1750 Body Medium parameters used:
f = 1750 MHz; σ = 1.519 mho/m; ε_r = 53.85; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 12-03-2012; Ambient Temp: 24.1°C; Tissue Temp: 23.2°C

Probe: ES3DV3 - SN3209; ConvF(4.83, 4.83, 4.83); Calibrated: 3/16/2012;
Sensor-Surface: 4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn649; Calibrated: 2/20/2012
Phantom: SAM with CRP; Type: SAM; Serial: TP1375
Measurement SW: DASY4, Version 4.7 (80); SEMCAD X Version 14.6.7 (6848)

Mode: LTE Band 4 (AWS), Body SAR, Top Edge, High.ch,
10 MHz Bandwidth, QPSK, 1 RB, 49 RB Offset

Area Scan (13x21x1): Measurement grid: dx=5mm, dy=15mm
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 20.572 V/m; Power Drift = 0.13 dB
Peak SAR (extrapolated) = 0.896 W/kg
SAR(1 g) = 0.571 W/kg; SAR(10 g) = 0.345 W/kg



0 dB = 0.595 W/kg = -2.25 dBW/kg

DUT: A3LSCHI925U; Type: Portable Tablet Computer; Serial: 4689-0543

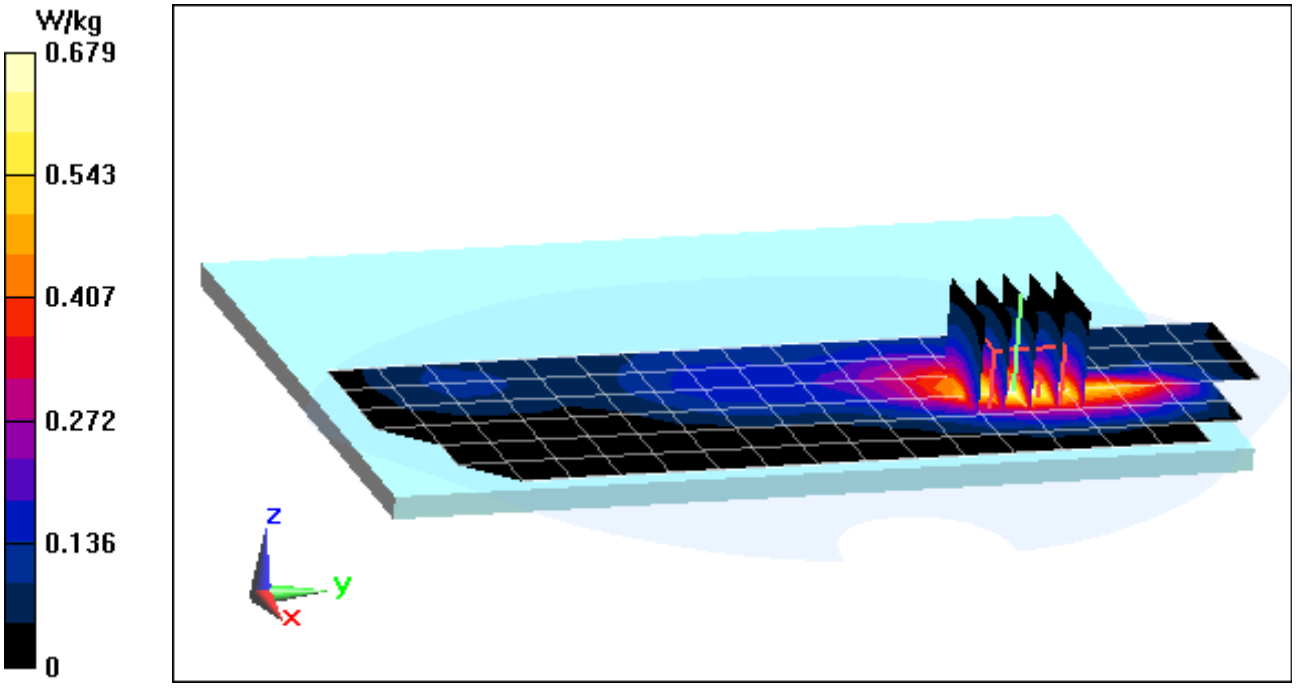
Communication System: LTE Band 2 (PCS); Frequency: 1855 MHz; Duty Cycle: 1:1
Medium: 1900 Body Medium parameters used (interpolated):
f = 1855 MHz; σ = 1.544 mho/m; ε_r = 51.303; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.2 cm

Test Date: 12-04-2012; Ambient Temp: 24.7°C; Tissue Temp: 22.5°C

Probe: ES3DV3 - SN3263; ConvF(4.76, 4.76, 4.76); Calibrated: 5/18/2012;
Sensor-Surface: 4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1334; Calibrated: 5/7/2012
Phantom: SAM 5.0 front; Type: QD000P40CD; Serial: TP:-1648
Measurement SW: DASY52, Version 52.8 (3); SEMCAD X Version 14.6.7 (6848)

Mode: LTE Band 2 (PCS), Body SAR, Back side, Low.ch,
10 MHz Bandwidth, QPSK, 1 RB, 49 RB Offset

Area Scan (7x21x1): Measurement grid: dx=15mm, dy=15mm
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 21.507 V/m; Power Drift = -0.01 dB
Peak SAR (extrapolated) = 1.07 W/kg
SAR(1 g) = 0.627 W/kg; SAR(10 g) = 0.360 W/kg



DUT: A3LSCHI925U; Type: Portable Tablet Computer; Serial: 4689-0538

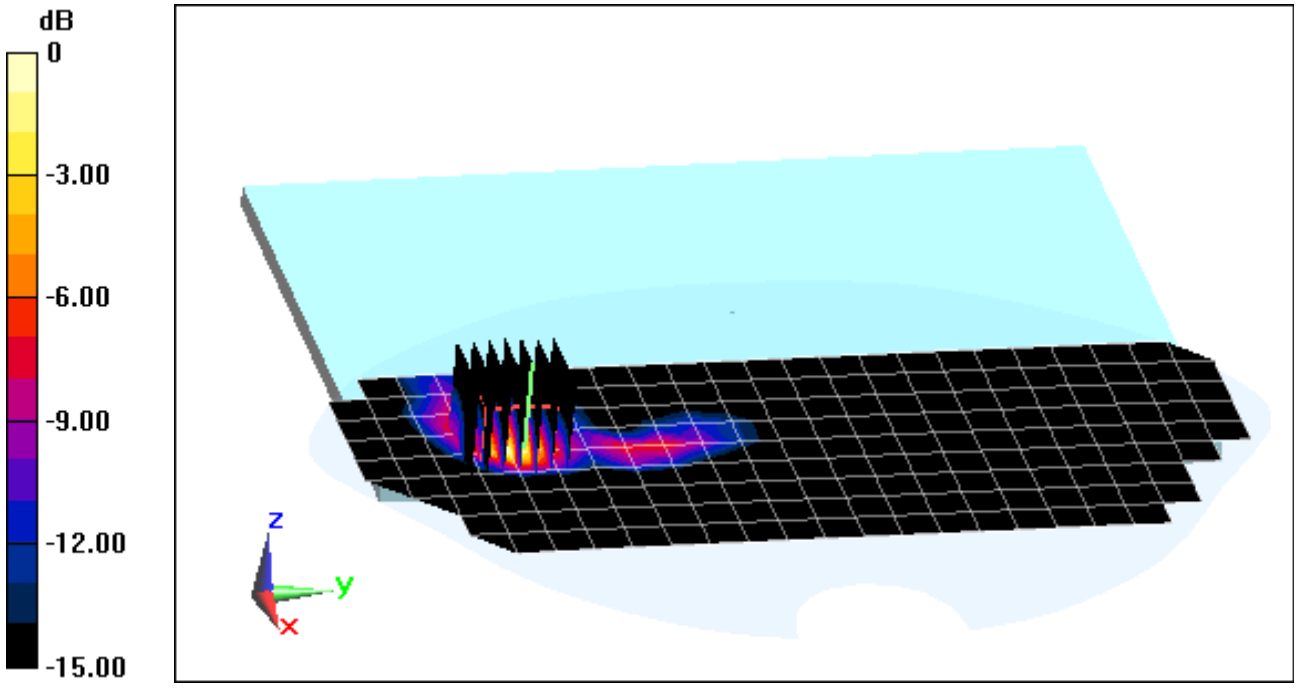
Communication System: IEEE 802.11b; Frequency: 2437 MHz; Duty Cycle: 1:1
Medium: 2450 Body Medium parameters used (interpolated):
f = 2437 MHz; σ = 2.013 mho/m; ε_r = 50.654; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 0.0 cm

Test Date: 12-06-2012; Ambient Temp: 22.6°C; Tissue Temp: 22.4°C

Probe: ES3DV3 - SN3209; ConvF(4.23, 4.23, 4.23); Calibrated: 3/16/2012;
Sensor-Surface: 3mm (Mechanical Surface Detection)
Electronics: DAE4 Sn649; Calibrated: 2/20/2012
Phantom: SAM Sub Dasy B; Type: SAM 5.0; Serial: TP-1626
Measurement SW: DASY4, Version 4.7 (80); SEMCAD X Version 14.6.7 (6848)

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

Area Scan (10x26x1): Measurement grid: dx=12mm, dy=12mm
Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 18.443 V/m; Power Drift = -0.18 dB
Peak SAR (extrapolated) = 3.10 W/kg
SAR(1 g) = 0.903 W/kg; SAR(10 g) = 0.312 W/kg



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

DUT: A3LSCHI925U; Type: Portable Tablet Computer; Serial: 4689-0545

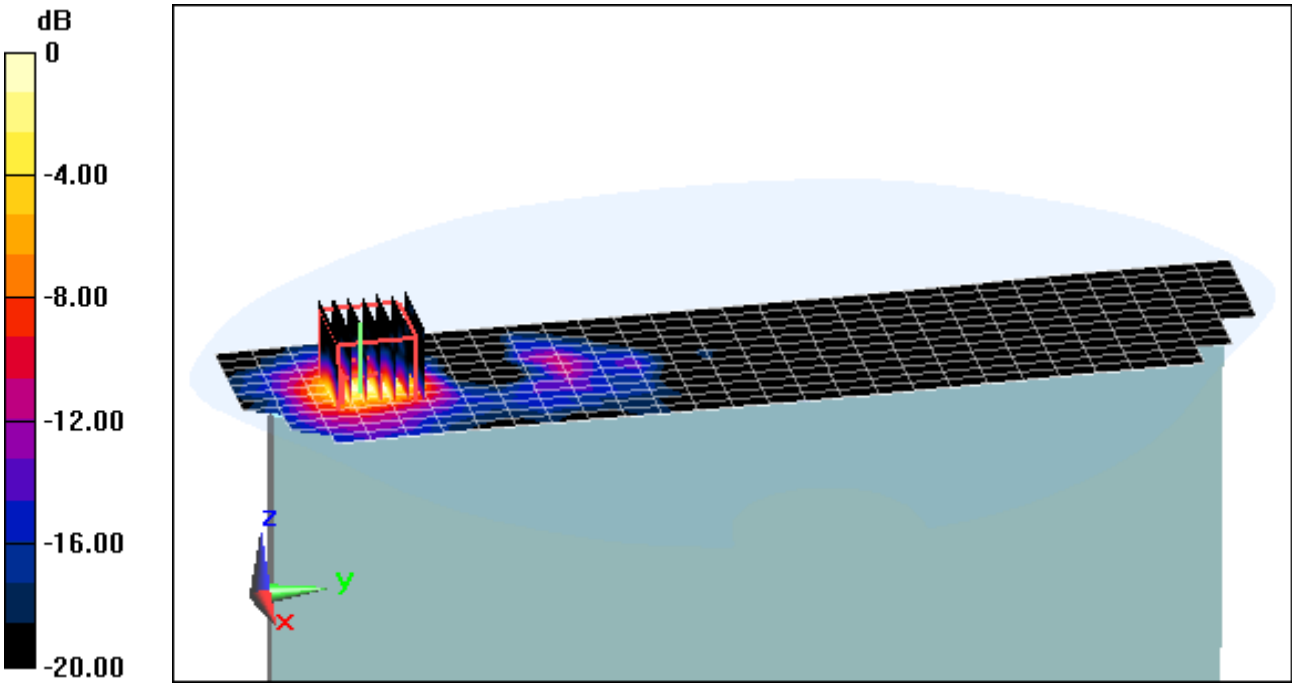
Communication System: IEEE 802.11a 5.2-5.8 GHz Band; 5745 MHz; Duty Cycle: 1:1
Medium: 5 GHz Body Medium parameters used:
f = 5745 MHz; σ = 6.006 mho/m; ε_r = 47.24; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 0.0 cm

Test Date: 12-03-2012; Ambient Temp: 23.8°C; Tissue Temp: 23.1°C

Probe: EX3DV4 - SN3561; ConvF(3.42, 3.42, 3.42); Calibrated: 7/26/2012;
Sensor-Surface: 2mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1322; Calibrated: 8/24/2012
Phantom: SAM Main; Type: SAM 4.0; Serial: TP-1406
Measurement SW: DASY4, Version 4.7 (80); SEMCAD X Version 14.6.7 (6848)

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

Area Scan (13x31x1): Measurement grid: dx=5mm, dy=10mm
Zoom Scan (7x7x12)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=2mm
Reference Value = 9.648 V/m; Power Drift = -0.15 dB
Peak SAR (extrapolated) = 2.76 W/kg
SAR(1 g) = 0.634 W/kg; SAR(10 g) = 0.156 W/kg



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

DUT: A3LSCHI925U; Type: Portable Tablet Computer; Serial: 4689-0545

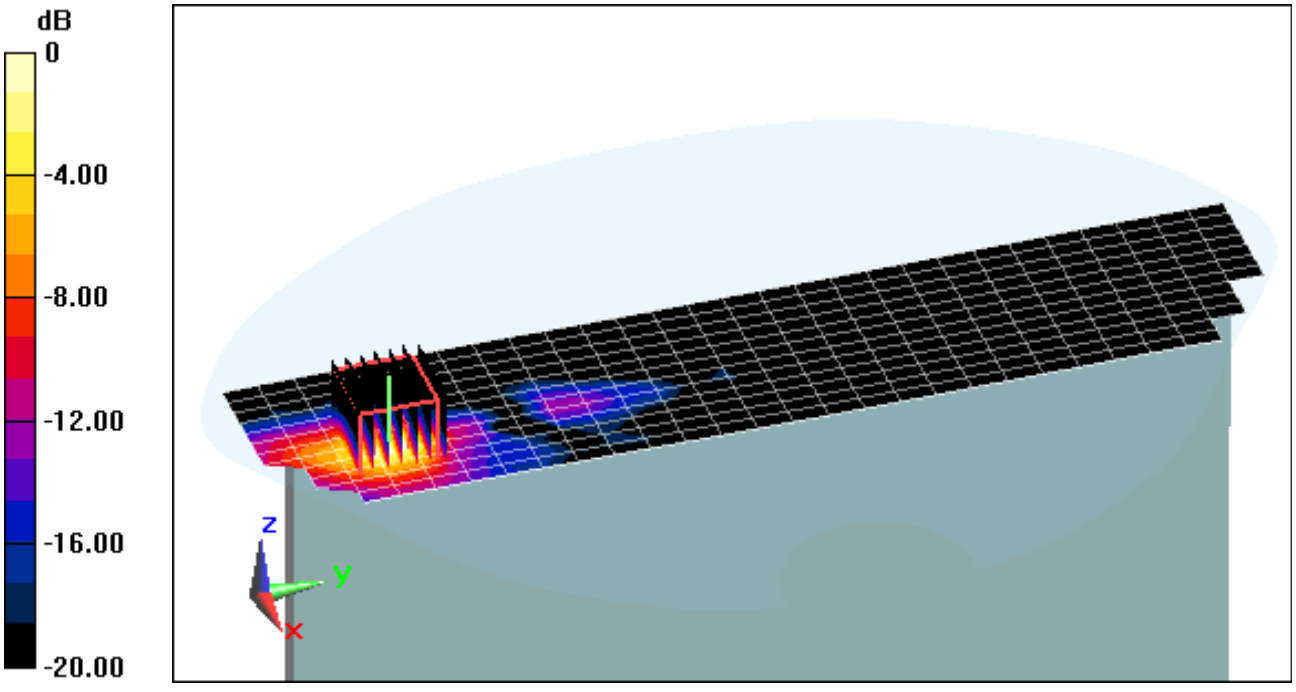
Communication System: IEEE 802.11a 5.2-5.8 GHz Band; Frequency: 5560 MHz; Duty Cycle: 1:1
Medium: 5 GHz Body Medium parameters used:
f = 5560 MHz; σ = 5.752 mho/m; ε_r = 47.53; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 0.0 cm

Test Date: 12-03-2012; Ambient Temp: 23.9°C; Tissue Temp: 23.3°C

Probe: EX3DV4 - SN3561; ConvF(3.17, 3.17, 3.17); Calibrated: 7/26/2012;
Sensor-Surface: 2mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1322; Calibrated: 8/24/2012
Phantom: SAM Main; Type: SAM 4.0; Serial: TP-1406
Measurement SW: DASY4, Version 4.7 (80); SEMCAD X Version 14.6.7 (6848)

Mode: IEEE 802.11a, 5.6 GHz, Body SAR, Ch 112, 6 Mbps, Top Edge

Area Scan (13x31x1): Measurement grid: dx=5mm, dy=10mm
Zoom Scan (7x7x12)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=2mm
Reference Value = 13.550 V/m; Power Drift = 0.00 dB
Peak SAR (extrapolated) = 3.72 W/kg
SAR(1 g) = 0.816 W/kg; SAR(10 g) = 0.224 W/kg



0 dB = 1.39 W/kg = 1.43 dBW/kg

DUT: A3LSCHI925U; Type: Portable Tablet Computer; Serial: 4689-0538

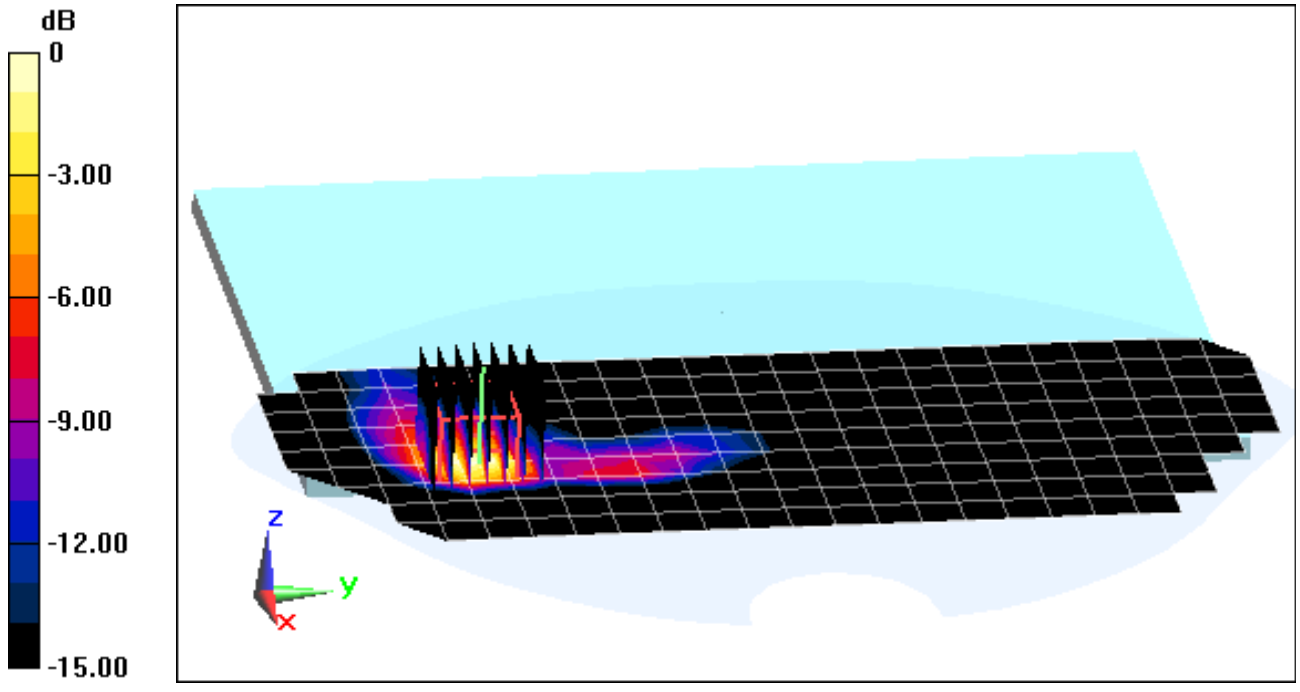
Communication System: Bluetooth; Frequency: 2441 MHz; Duty Cycle: 1:1
Medium: 2450 Body Medium parameters used (interpolated):
f = 2441 MHz; σ = 2.018 mho/m; ε_r = 50.644; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 0.0 cm

Test Date: 12-06-2012; Ambient Temp: 22.6°C; Tissue Temp: 22.4°C

Probe: ES3DV3 - SN3209; ConvF(4.23, 4.23, 4.23); Calibrated: 3/16/2012;
Sensor-Surface: 3mm (Mechanical Surface Detection)
Electronics: DAE4 Sn649; Calibrated: 2/20/2012
Phantom: SAM Sub Dasy B; Type: SAM 5.0; Serial: TP-1626
Measurement SW: DASY4, Version 4.7 (80); SEMCAD X Version 14.6.7 (6848)

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

Area Scan (10x26x1): Measurement grid: dx=12mm, dy=12mm
Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 10.013 V/m; Power Drift = -0.19 dB
Peak SAR (extrapolated) = 0.984 W/kg
SAR(1 g) = 0.282 W/kg; SAR(10 g) = 0.096 W/kg



0 dB = 0.239 W/kg = -6.22 dBW/kg

APPENDIX B: SYSTEM VERIFICATION

PCTEST ENGINEERING LABORATORY, INC.

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

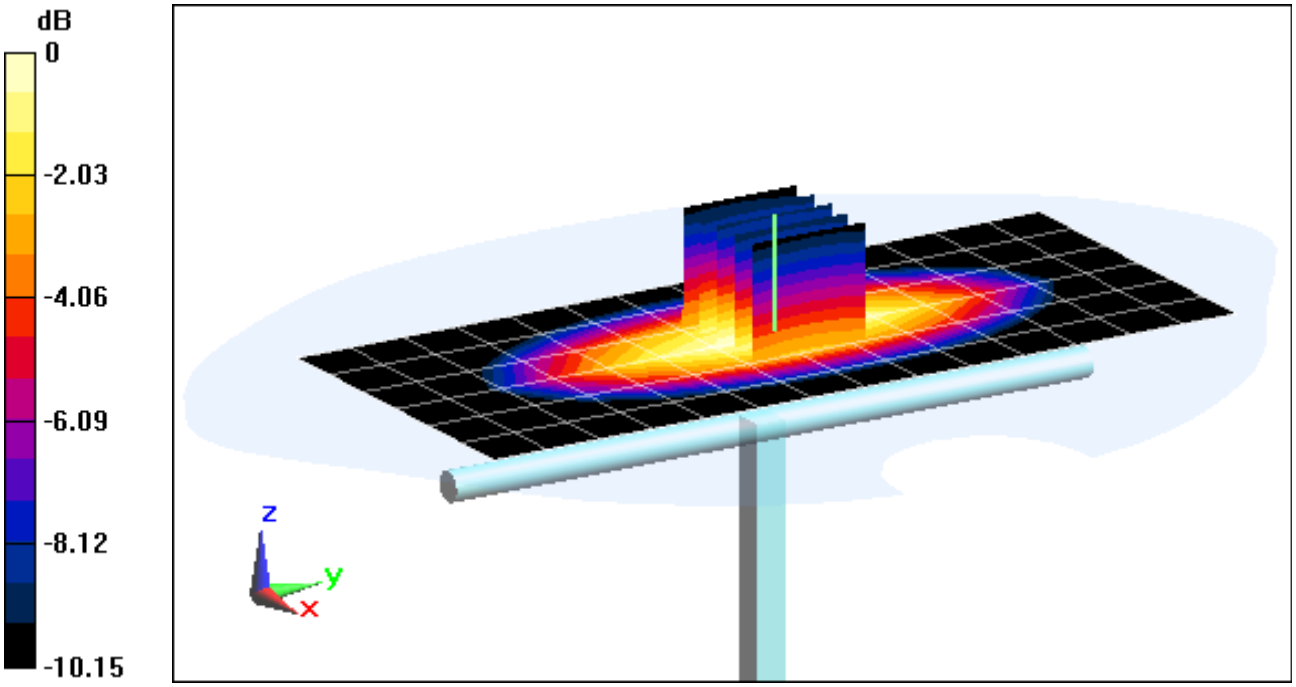
Communication System: CW; Frequency: 750 MHz; Duty Cycle: 1:1
Medium: 740 Body Medium parameters used (interpolated):
f = 750 MHz; σ = 0.946 mho/m; ε_r = 54.633; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.5 cm

Test Date: 12-04-2012; Ambient Temp: 24.7°C; Tissue Temp: 24.2°C

Probe: ES3DV3 - SN3288; ConvF(6.44, 6.44, 6.44); Calibrated: 9/20/2012;
Sensor-Surface: 4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1323; Calibrated: 9/19/2012
Phantom: SAM v5.0 Left; Type: QD000P40CD; Serial: TP: 1687
Measurement SW: DASY52, Version 52.8 (3); SEMCAD X Version 14.6.7 (6848)

750 MHz System Verification

Area Scan (7x15x1): Measurement grid: dx=15mm, dy=15mm
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Input Power = 20.0 dBm (100 mW)
Peak SAR (extrapolated) = 1.20 W/kg
SAR(1 g) = 0.827 W/kg; SAR(10 g) = 0.548 W/kg
Deviation = -6.45%



0 dB = 0.894 W/kg = -0.49 dBW/kg

PCTEST ENGINEERING LABORATORY, INC.

DUT: Dipole 835 MHz; Type: D835V2; Serial: 4d026

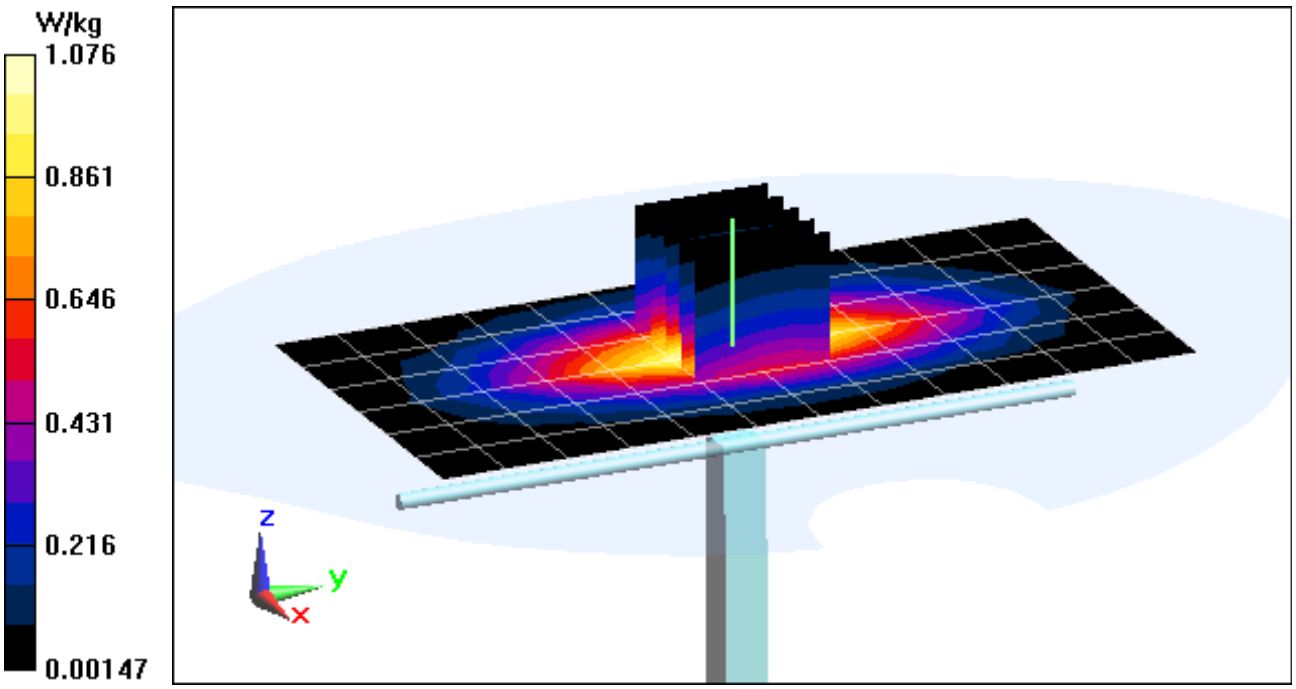
Communication System: CW; Frequency: 835 MHz; Duty Cycle: 1:1
Medium: 835 Body Medium parameters used:
f = 835 MHz; σ = 0.959 mho/m; ε_r = 53.32; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.5 cm

Test Date: 11-29-2012; Ambient Temp: 24.5°C; Tissue Temp: 23.5°C

Probe: ES3DV3 - SN3209; ConvF(6.13, 6.13, 6.13); Calibrated: 3/16/2012;
Sensor-Surface: 4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn649; Calibrated: 2/20/2012
Phantom: SAM with CRP; Type: SAM; Serial: TP1375
Measurement SW: DASY4, Version 4.7 (80); SEMCAD X Version 14.6.7 (6848)

835MHz 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) = 1.41 W/kg
SAR(1 g) = 0.992 W/kg; SAR(10 g) = 0.659 W/kg
Deviation = 3.55%



PCTEST ENGINEERING LABORATORY, INC.

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

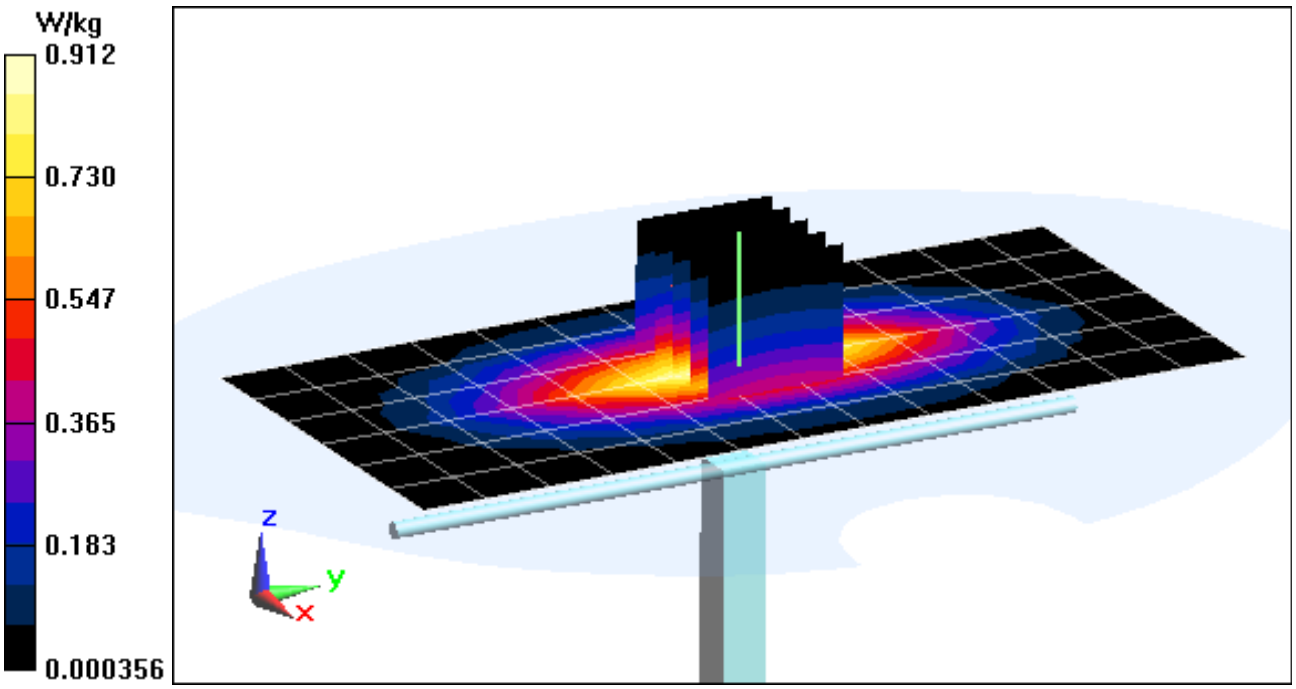
Communication System: CW; Frequency: 835 MHz; Duty Cycle: 1:1
Medium: 835 Body Medium parameters used:
f = 835 MHz; σ = 0.983 mho/m; ε_r = 54.8; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.5 cm

Test Date: 12-03-2012; Ambient Temp: 24.9°C; Tissue Temp: 22.1°C

Probe: ES3DV3 - SN3263; ConvF(6.15, 6.15, 6.15); Calibrated: 5/18/2012;
Sensor-Surface: 4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1334; Calibrated: 5/7/2012
Phantom: SAM 5.0 front; Type: QD000P40CD; Serial: TP:-1648
Measurement SW: DASY52, Version 52.8 (3); SEMCAD X Version 14.6.7 (6848)

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 = 19.4 dBm (87.0 mW)
Peak SAR (extrapolated) = 1.23 W/kg
SAR(1 g) = 0.848 W/kg; SAR(10 g) = 0.557 W/kg
Deviation = 3.58%



PCTEST ENGINEERING LABORATORY, INC.

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

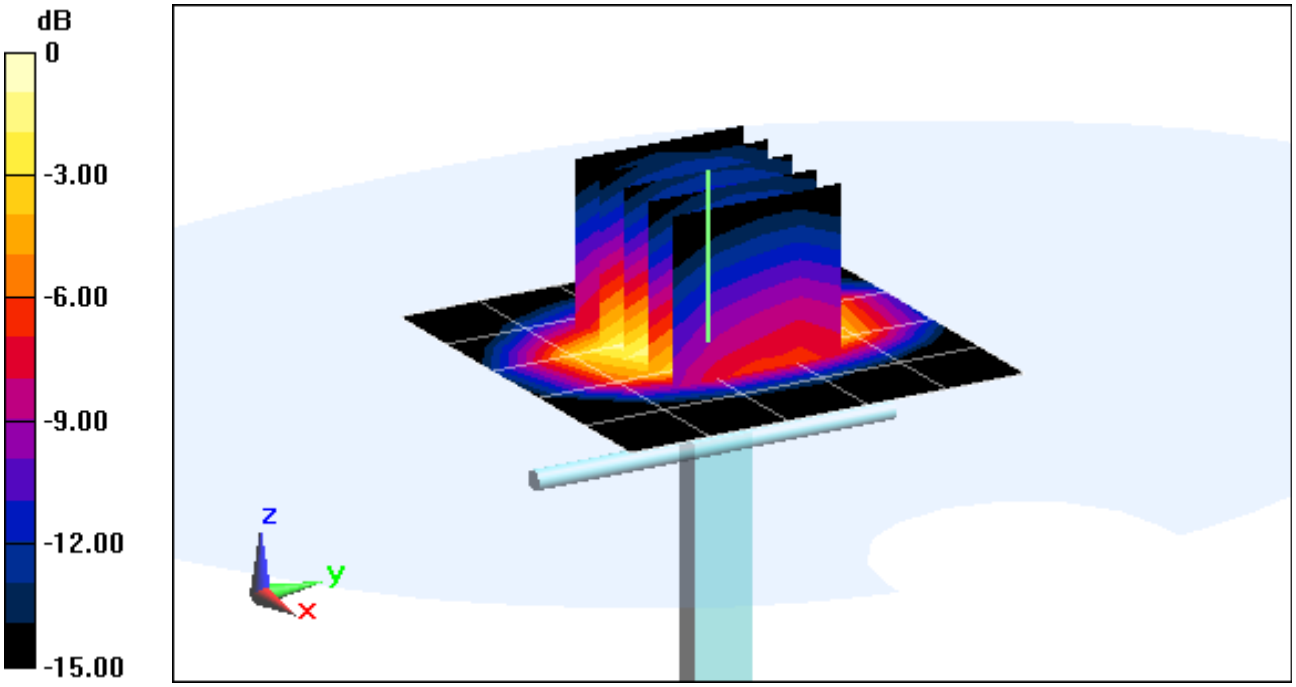
Communication System: CW; Frequency: 1750 MHz; Duty Cycle: 1:1
Medium: 1750 Body Medium parameters used:
f = 1750 MHz; σ = 1.519 mho/m; ε_r = 53.85; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 12-03-2012; Ambient Temp: 24.1°C; Tissue Temp: 23.2°C

Probe: ES3DV3 - SN3209; ConvF(4.83, 4.83, 4.83); Calibrated: 3/16/2012;
Sensor-Surface: 4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn649; Calibrated: 2/20/2012
Phantom: SAM with CRP; Type: SAM; Serial: TP1375
Measurement SW: DASY4, Version 4.7 (80); SEMCAD X Version 14.6.7 (6848)

1750 MHz System Verification

Area Scan (6x6x1): 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) = 6.97 W/kg
SAR(1 g) = 3.88 W/kg; SAR(10 g) = 2.04 W/kg
Deviation = 3.74%



0 dB = 3.63 W/kg = 5.60 dBW/kg

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

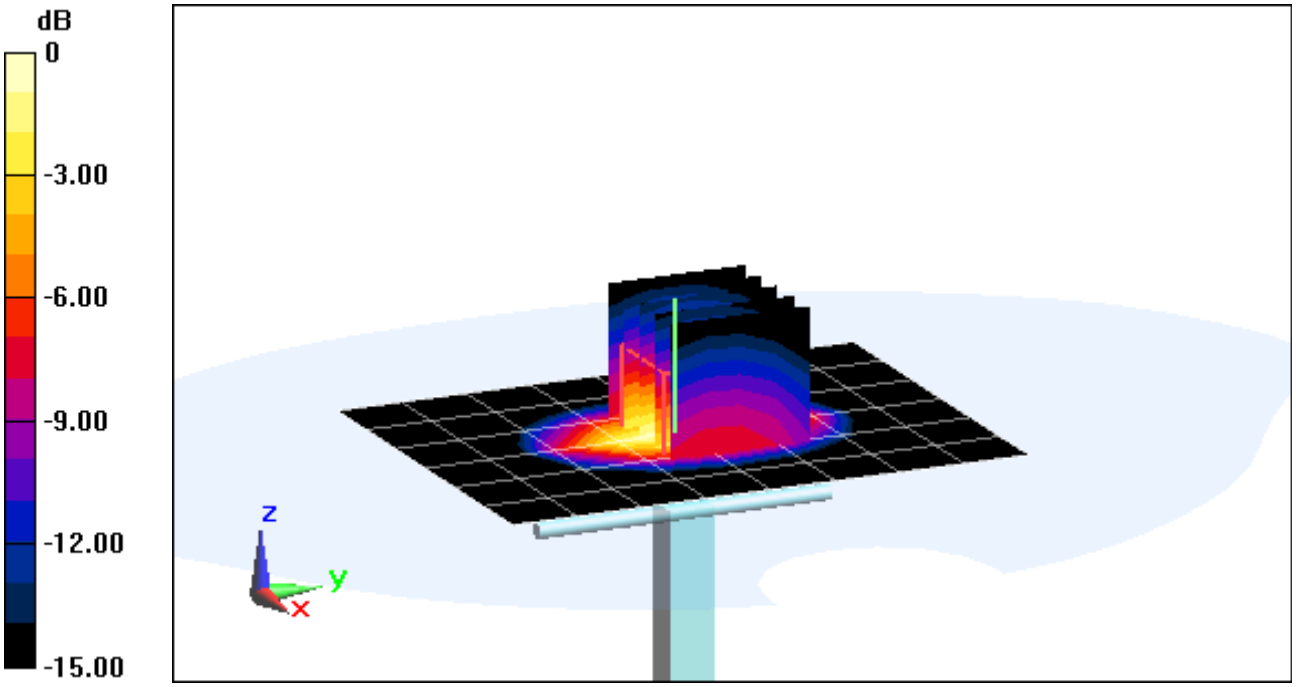
Communication System: CW; Frequency: 1900 MHz; Duty Cycle: 1:1
Medium: 1900 Body Medium parameters used (interpolated):
f = 1900 MHz; σ = 1.581 mho/m; ε_r = 51.25; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 12-04-2012; Ambient Temp: 24.7°C; Tissue Temp: 22.5°C

Probe: ES3DV3 - SN3263; ConvF(4.76, 4.76, 4.76); Calibrated: 5/18/2012;
Sensor-Surface: 4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1334; Calibrated: 5/7/2012
Phantom: SAM 5.0 front; Type: QD000P40CD; Serial: TP:-1648
Measurement SW: DASY52, Version 52.8 (3); SEMCAD X Version 14.6.7 (6848)

1900 MHz System Verification

Area Scan (7x9x1): Measurement grid: dx=15mm, dy=15mm
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Input Power = 20.0 dBm (100 mW)
Peak SAR (extrapolated) = 7.51 W/kg
SAR(1 g) = 4.14 W/kg; SAR(10 g) = 2.16 W/kg
Deviation = 5.88%



0 dB = 4.80 W/kg = 6.81 dBW/kg

PCTEST ENGINEERING LABORATORY, INC.

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

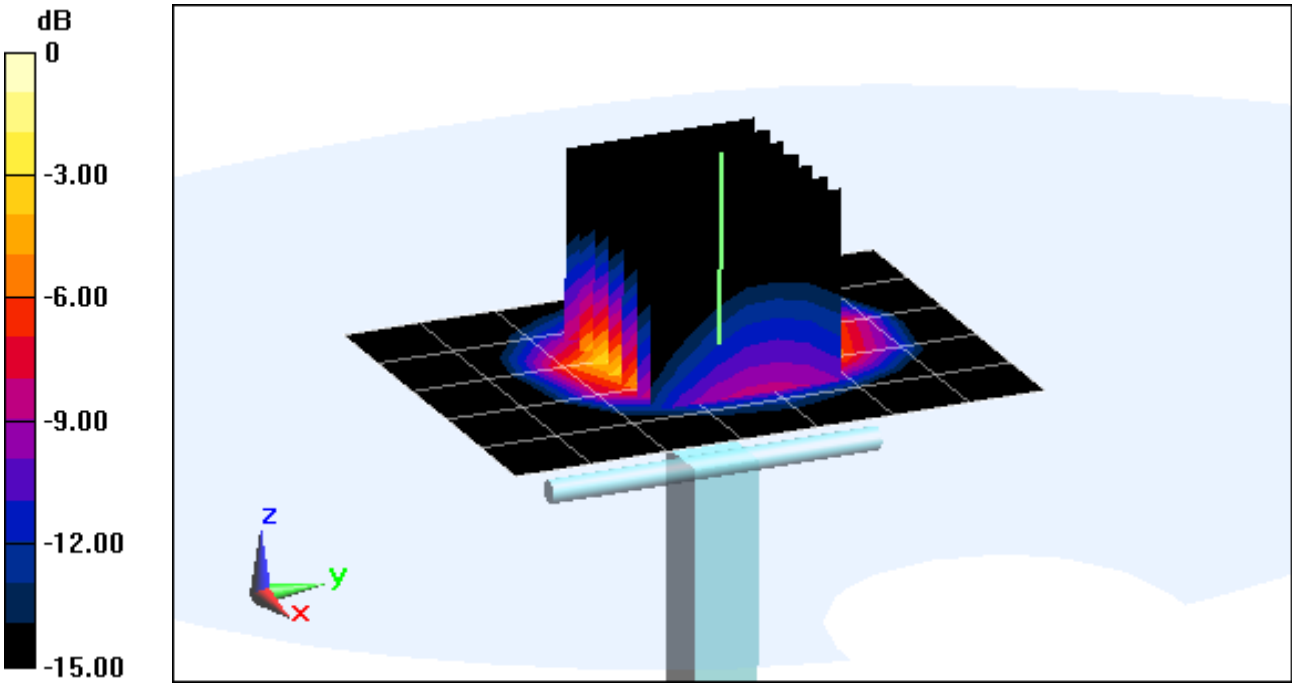
Communication System: CW; Frequency: 2450 MHz; Duty Cycle: 1:1
Medium: 2450 Body Medium parameters used:
f = 2450 MHz; σ = 2.03 mho/m; ε_r = 50.62; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 12-06-2012; Ambient Temp: 22.6°C; Tissue Temp: 22.4°C

Probe: ES3DV3 - SN3209; ConvF(4.23, 4.23, 4.23); Calibrated: 3/16/2012;
Sensor-Surface: 3mm (Mechanical Surface Detection)
Electronics: DAE4 Sn649; Calibrated: 2/20/2012
Phantom: SAM Sub Dasy B; Type: SAM 5.0; Serial: TP-1626
Measurement SW: DASY4, Version 4.7 (80); SEMCAD X Version 14.6.7 (6848)

2450MHz System Verification

Area Scan (6x8x1): 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) = 10.9 W/kg
SAR(1 g) = 5.29 W/kg; SAR(10 g) = 2.5 W/kg
Deviation = 2.52%



0 dB = 6.81 W/kg = 8.33 dBW/kg

PCTEST ENGINEERING LABORATORY, INC.

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

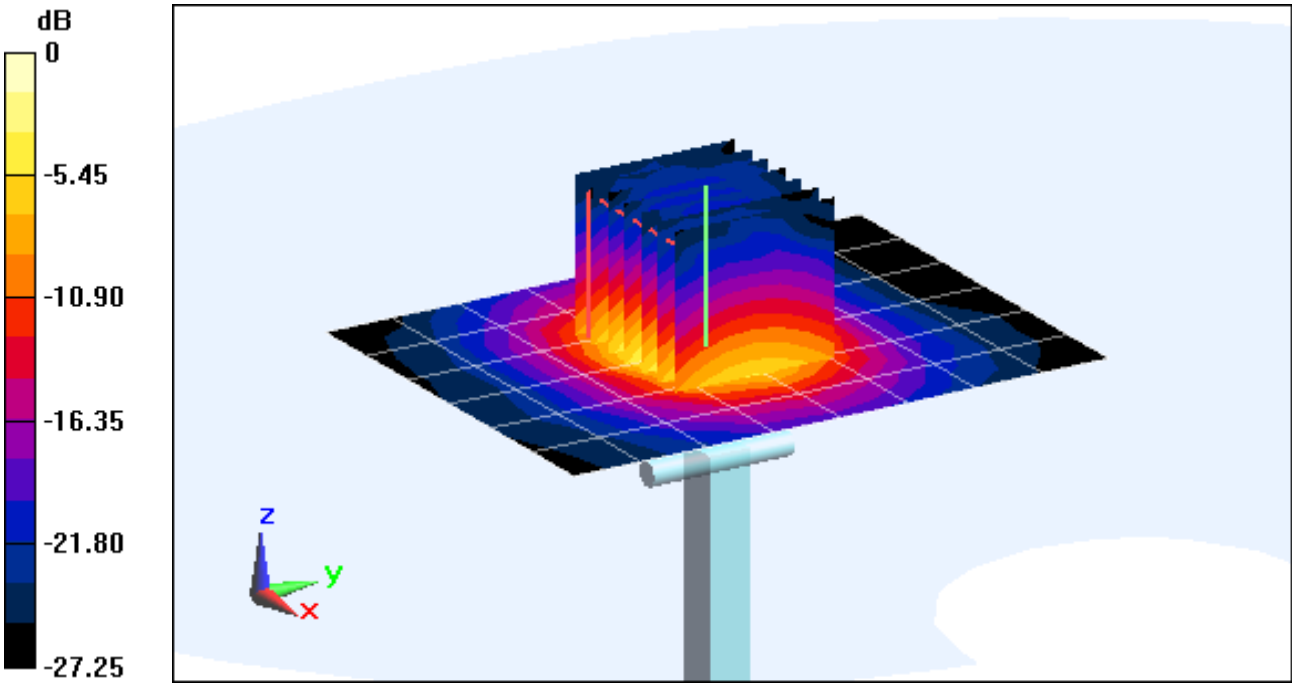
Communication System: CW; Frequency: 5200 MHz; Duty Cycle: 1:1
Medium: 5 GHz Body Medium parameters used:
f = 5200 MHz; σ = 5.207 mho/m; ε_r = 48.54; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 12-03-2012; Ambient Temp: 23.5°C; Tissue Temp: 23.0°C

Probe: EX3DV4 - SN3561; ConvF(3.76, 3.76, 3.76); Calibrated: 7/26/2012;
Sensor-Surface: 2mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1322; Calibrated: 8/24/2012
Phantom: SAM Main; Type: SAM 4.0; Serial: TP-1406
Measurement SW: DASY4, Version 4.7 (80); SEMCAD X Version 14.6.7 (6848)

5200MHz System Verification

Area Scan (7x9x1): Measurement grid: dx=10mm, dy=10mm
Zoom Scan (7x7x12)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=2mm
Input Power = 20.0 dBm (100 mW)
Peak SAR (extrapolated) = 26.7 W/kg
SAR(1 g) = 7.32 W/kg; SAR(10 g) = 2.07 W/kg
Deviation = 1.39%



0 dB = 14.7 W/kg = 11.67 dBW/kg

PCTEST ENGINEERING LABORATORY, INC.

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

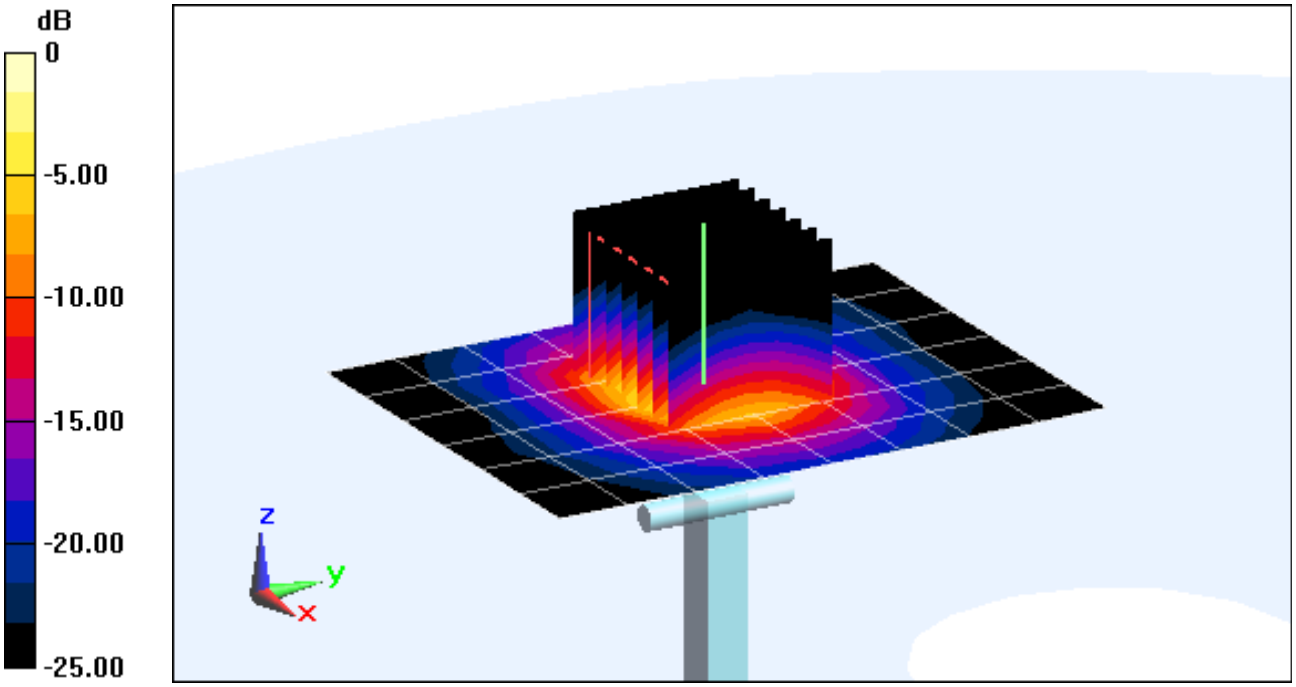
Communication System: CW; Frequency: 5300 MHz; Duty Cycle: 1:1
Medium: 5 GHz Body Medium parameters used:
f = 5300 MHz; σ = 5.378 mho/m; ε_r = 48.2; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 12-03-2012; Ambient Temp: 23.8°C; Tissue Temp: 23.2°C

Probe: EX3DV4 - SN3561; ConvF(3.54, 3.54, 3.54); Calibrated: 7/26/2012;
Sensor-Surface: 2mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1322; Calibrated: 8/24/2012
Phantom: SAM Main; Type: SAM 4.0; Serial: TP-1406
Measurement SW: DASY4, Version 4.7 (80); SEMCAD X Version 14.6.7 (6848)

5300MHz System Verification

Area Scan (7x9x1): Measurement grid: dx=10mm, dy=10mm
Zoom Scan (7x7x12)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=2mm
Input Power = 20.0 dBm (100 mW)
Peak SAR (extrapolated) = 29.3 W/kg
SAR(1 g) = 7.47 W/kg; SAR(10 g) = 2.06 W/kg
Deviation = -1.19%



0 dB = 14.7 W/kg = 11.67 dBW/kg

PCTEST ENGINEERING LABORATORY, INC.

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

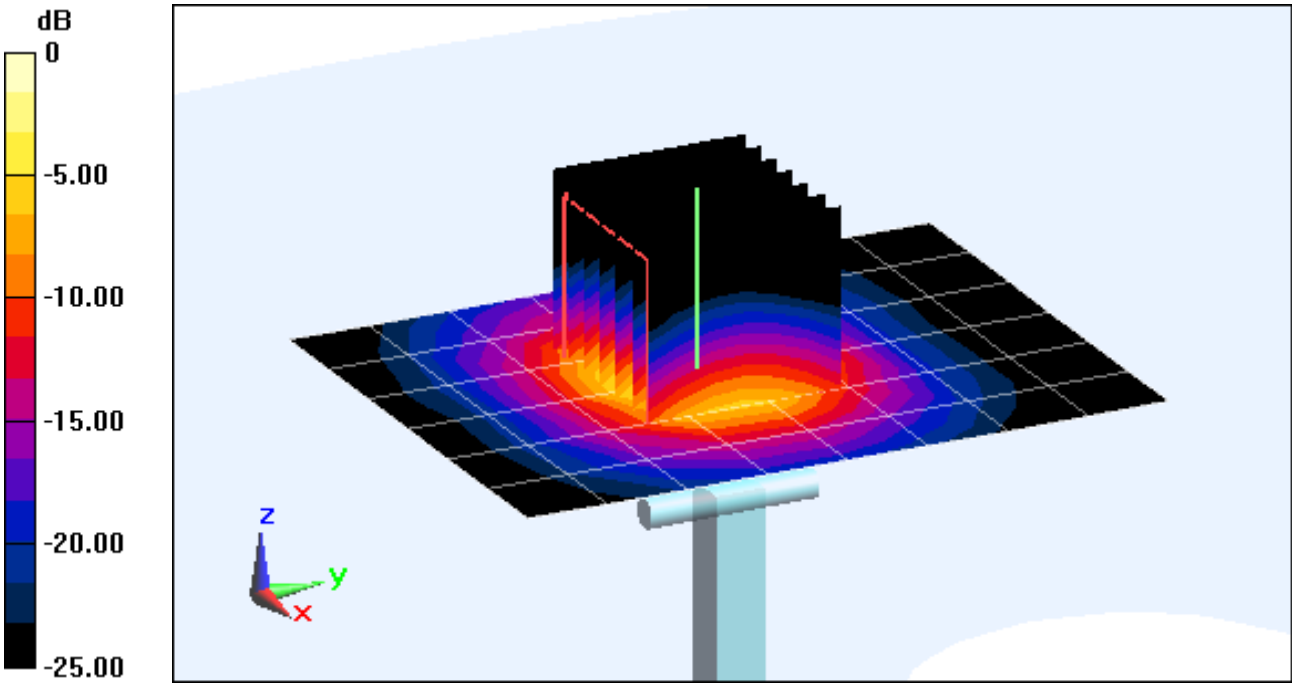
Communication System: CW; Frequency: 5500 MHz; Duty Cycle: 1:1
Medium: 5 GHz Body Medium parameters used:
f = 5500 MHz; σ = 5.63 mho/m; ε_r = 47.75; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 12-03-2012; Ambient Temp: 23.7°C; Tissue Temp: 23.3°C

Probe: EX3DV4 - SN3561; ConvF(3.33, 3.33, 3.33); Calibrated: 7/26/2012;
Sensor-Surface: 2mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1322; Calibrated: 8/24/2012
Phantom: SAM Main; Type: SAM 4.0; Serial: TP-1406
Measurement SW: DASY4, Version 4.7 (80); SEMCAD X Version 14.6.7 (6848)

5500MHz System Verification

Area Scan (7x9x1): Measurement grid: dx=10mm, dy=10mm
Zoom Scan (7x7x12)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=2mm
Input Power = 20.0 dBm (100 mW)
Peak SAR (extrapolated) = 33.2 W/kg
SAR(1 g) = 8.40 W/kg; SAR(10 g) = 2.33 W/kg
Deviation = 5.00 %



0 dB = 15.0 W/kg = 11.76 dBW/kg

PCTEST ENGINEERING LABORATORY, INC.

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

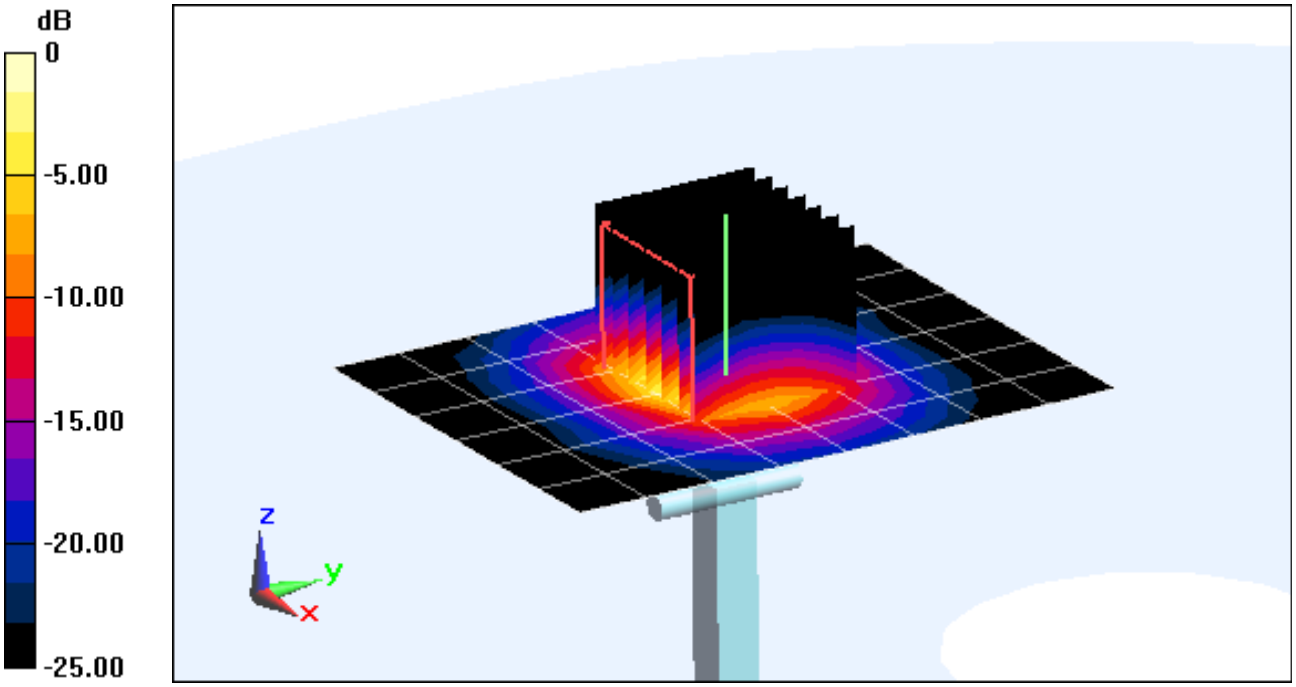
Communication System: CW; Frequency: 5600 MHz; Duty Cycle: 1:1
Medium: 5 GHz Body Medium parameters used:
f = 5600 MHz; σ = 5.796 mho/m; ε_r = 47.51; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 12-03-2012; Ambient Temp: 23.9°C; Tissue Temp: 23.3°C

Probe: EX3DV4 - SN3561; ConvF(3.17, 3.17, 3.17); Calibrated: 7/26/2012;
Sensor-Surface: 2mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1322; Calibrated: 8/24/2012
Phantom: SAM Main; Type: SAM 4.0; Serial: TP-1406
Measurement SW: DASY4, Version 4.7 (80); SEMCAD X Version 14.6.7 (6848)

5600MHz System Verification

Area Scan (7x9x1): Measurement grid: dx=10mm, dy=10mm
Zoom Scan (7x7x12)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=2mm
Input Power = 20.0 dBm (100 mW)
Peak SAR (extrapolated) = 33.7 W/kg
SAR(1 g) = 7.86 W/kg; SAR(10 g) = 2.14 W/kg
Deviation = -1.75%



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

PCTEST ENGINEERING LABORATORY, INC.

DUT: Dipole 5800 MHz; Type: D5GHzV2; Serial: 1120

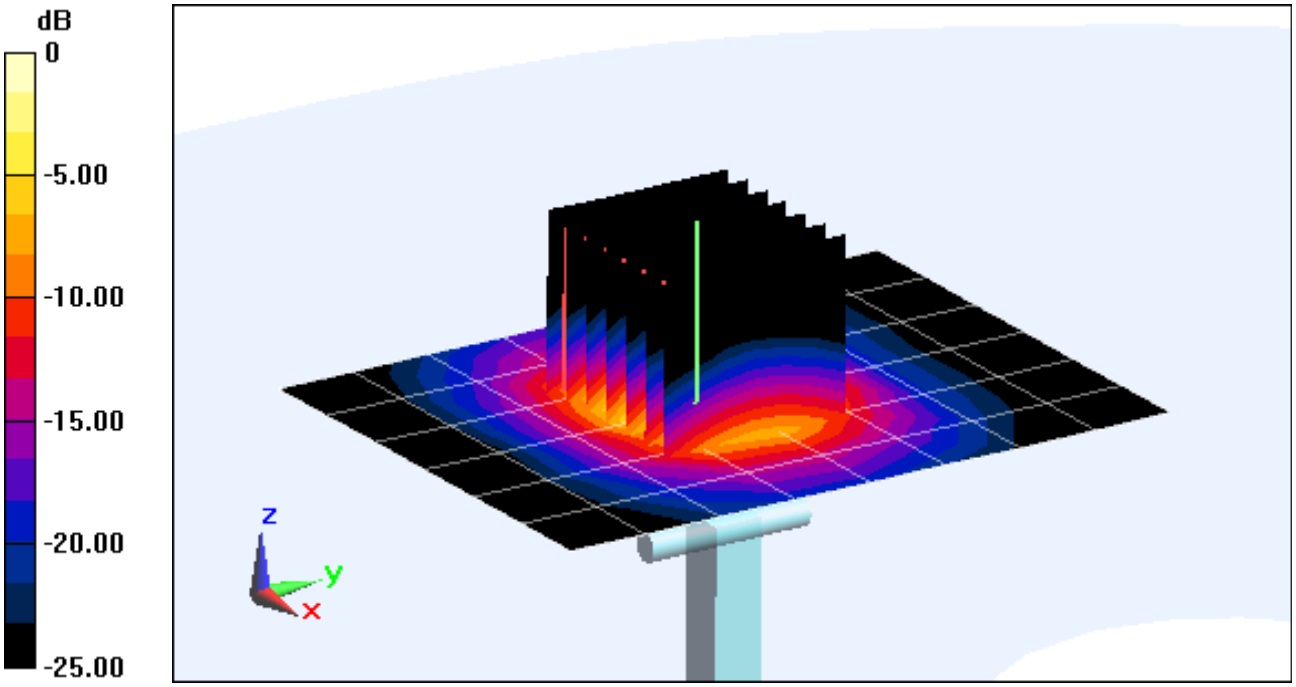
Communication System: CW; Frequency: 5800 MHz; Duty Cycle: 1:1
Medium: 5 GHz Body Medium parameters used:
f = 5800 MHz; σ = 6.103 mho/m; ε_r = 46.97; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 12-03-2012; Ambient Temp: 23.8°C; Tissue Temp: 23.1°C

Probe: EX3DV4 - SN3561; ConvF(3.42, 3.42, 3.42); Calibrated: 7/26/2012;
Sensor-Surface: 2mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1322; Calibrated: 8/24/2012
Phantom: SAM Main; Type: SAM 4.0; Serial: TP-1406
Measurement SW: DASY4, Version 4.7 (80); SEMCAD X Version 14.6.7 (6848)

5800MHz System Verification

Area Scan (7x9x1): Measurement grid: dx=10mm, dy=10mm
Zoom Scan (7x7x12)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=2mm
Input Power = 20.0 dBm (100 mW)
Peak SAR (extrapolated) = 30.2 W/kg
SAR(1 g) = 7.33 W/kg; SAR(10 g) = 2.01 W/kg
Deviation = -0.68%



0 dB = 14.5 W/kg = 11.61 dBW/kg

APPENDIX C: PROBE CALIBRATION

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

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

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

Accreditation No.: SCS 108

Client **PC Test**

Certificate No: D750V3-1054_Feb12

CALIBRATION CERTIFICATE

Object: D750V3 - SN: 1054

Calibration procedure(s): QA CAL-05.v8
Calibration procedure for dipole validation kits above 700 MHz

Calibration date: February 09, 2012

OK 5/14/12

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	05-Oct-11 (No. 217-01451)	Oct-12
Power sensor HP 8481A	US37292783	05-Oct-11 (No. 217-01451)	Oct-12
Reference 20 dB Attenuator	SN: 5086 (20g)	29-Mar-11 (No. 217-01368)	Apr-12
Type-N mismatch combination	SN: 5047.2 / 06327	29-Mar-11 (No. 217-01371)	Apr-12
Reference Probe ES3DV3	SN: 3205	30-Dec-11 (No. ES3-3205_Dec11)	Dec-12
DAE4	SN: 601	04-Jul-11 (No. DAE4-601_Jul11)	Jul-12

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-11)	In house check: Oct-12

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

Issued: February 9, 2012

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.

Measurement Conditions

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

DASY Version	DASY5	V52.8.0
Extrapolation	Advanced Extrapolation	
Phantom	Modular Flat Phantom	
Distance Dipole Center - TSL	15 mm	with Spacer
Zoom Scan Resolution	dx, dy, dz = 5 mm	
Frequency	750 MHz ± 1 MHz	

Head TSL parameters

The following parameters and calculations were applied.

	Temperature	**Permittivity**	**Conductivity**
Nominal Head TSL parameters	22.0 °C	41.9	0.89 mho/m
Measured Head TSL parameters	(22.0 ± 0.2) °C	42.3 ± 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	2.18 mW / g
SAR for nominal Head TSL parameters	normalized to 1W	**8.52 mW /g ± 17.0 % (k=2)**

SAR averaged over 10 cm^3 (10 g) of Head TSL	condition	
SAR measured	250 mW input power	1.42 mW / g
SAR for nominal Head TSL parameters	normalized to 1W	**5.57 mW /g ± 16.5 % (k=2)**

Body TSL parameters

The following parameters and calculations were applied.

	Temperature	**Permittivity**	**Conductivity**
Nominal Body TSL parameters	22.0 °C	55.5	0.96 mho/m
Measured Body TSL parameters	(22.0 ± 0.2) °C	55.6 ± 6 %	0.96 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	2.21 mW / g
SAR for nominal Body TSL parameters	normalized to 1W	**8.84 mW / g ± 17.0 % (k=2)**

SAR averaged over 10 cm^3 (10 g) of Body TSL	condition	
SAR measured	250 mW input power	1.46 mW / g
SAR for nominal Body TSL parameters	normalized to 1W	**5.84 mW / g ± 16.5 % (k=2)**

Appendix

Antenna Parameters with Head TSL

Impedance, transformed to feed point	54.0 Ω - 1.5 jΩ
Return Loss	- 27.8 dB

Antenna Parameters with Body TSL

Impedance, transformed to feed point	49.6 Ω - 3.4 jΩ
Return Loss	- 29.2 dB

General Antenna Parameters and Design

Electrical Delay (one direction)	1.041 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 08, 2011

DASY5 Validation Report for Head TSL

Date: 09.02.2012

Test Laboratory: SPEAG, Zurich, Switzerland

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

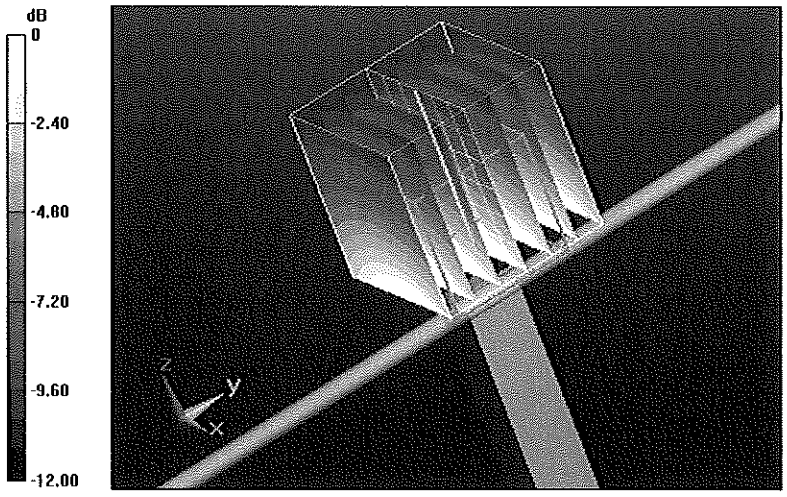
Communication System: CW; Frequency: 750 MHz
Medium parameters used: f = 750 MHz; σ = 0.92 mho/m; ε_r = 42.3; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY52 Configuration:

- Probe: ES3DV3 - SN3205; ConvF(6.33, 6.33, 6.33); Calibrated: 30.12.2011
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 04.07.2011
- Phantom: Flat Phantom 4.9L; Type: QD000P49AA; Serial: 1001
- DASY52 52.8.0(692); SEMCAD X 14.6.4(4989)

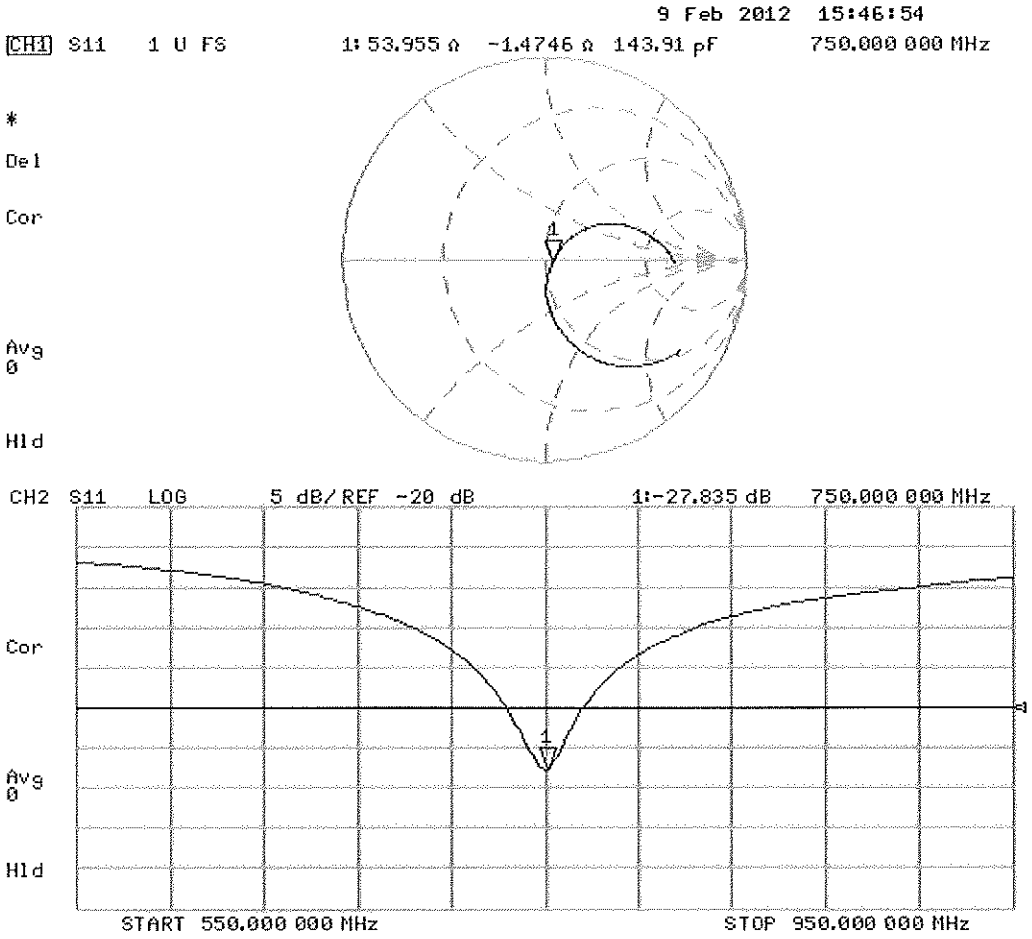
Dipole Calibration for Head Tissue/Pin=250mW, d=15mm/Zoom Scan (7x7x7)/Cube 0:

Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 53.659 V/m; Power Drift = 0.02 dB
Peak SAR (extrapolated) = 3.2940
SAR(1 g) = 2.18 mW/g; SAR(10 g) = 1.42 mW/g
Maximum value of SAR (measured) = 2.552 mW/g



0 dB = 2.550mW/g = 8.13 dB mW/g

Impedance Measurement Plot for Head TSL



DASY5 Validation Report for Body TSL

Date: 09.02.2012

Test Laboratory: SPEAG, Zurich, Switzerland

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

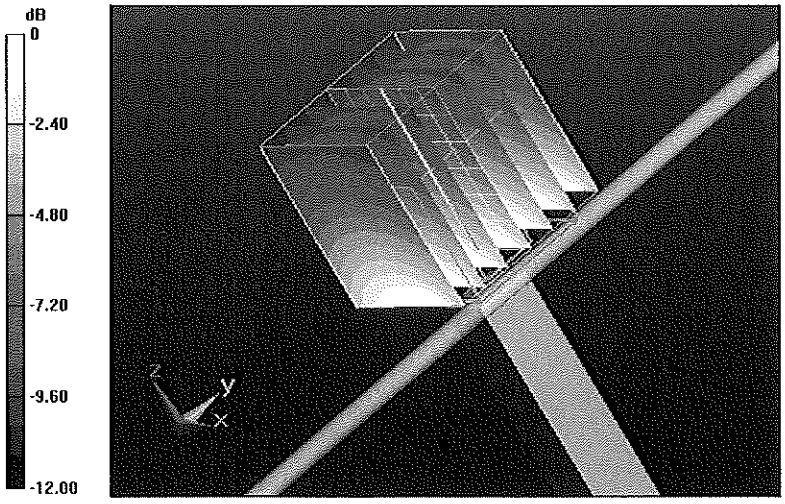
Communication System: CW; Frequency: 750 MHz
Medium parameters used: f = 750 MHz; σ = 0.96 mho/m; ε_r = 55.6; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY52 Configuration:

- Probe: ES3DV3 - SN3205; ConvF(6.12, 6.12, 6.12); Calibrated: 30.12.2011
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 04.07.2011
- Phantom: Flat Phantom 4.9L; Type: QD000P49AA; Serial: 1001
- DASY52 52.8.0(692); SEMCAD X 14.6.4(4989)

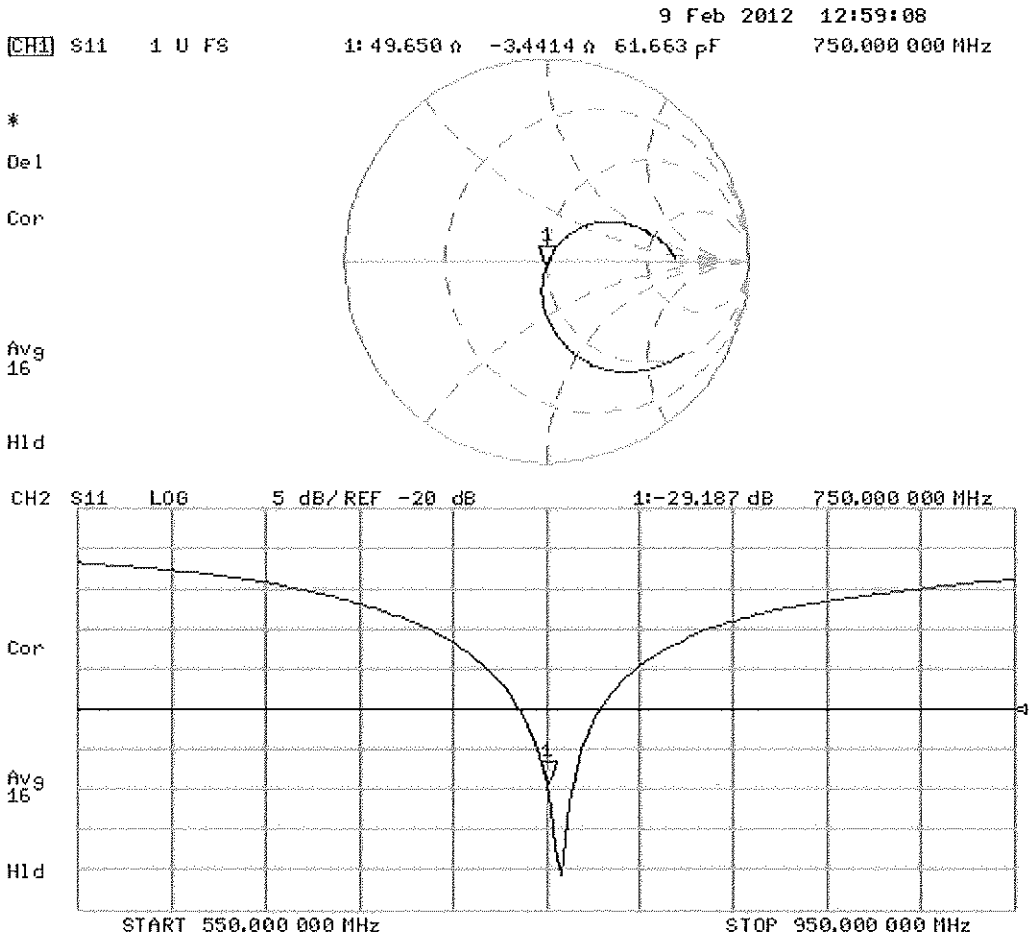
Dipole Calibration for Body Tissue/Pin=250mW, d=15mm/Zoom Scan (7x7x7)/Cube 0:

Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 53.016 V/m; Power Drift = 0.03 dB
Peak SAR (extrapolated) = 3.2860
SAR(1 g) = 2.21 mW/g; SAR(10 g) = 1.46 mW/g
Maximum value of SAR (measured) = 2.576 mW/g



0 dB = 2.580mW/g = 8.23 dB mW/g

Impedance Measurement Plot for Body TSL



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Accreditation No.: SCS 108

Client **PC Test**

Certificate No: D835V2-4d026_Aug12

CALIBRATION CERTIFICATE

Object	D835V2 - SN: 4d026
Calibration procedure(s)	QA CAL-05.v8 Calibration procedure for dipole validation kits above 700 MHz
Calibration date:	August 23, 2012

OK 9/17/12

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	05-Oct-11 (No. 217-01451)	Oct-12
Power sensor HP 8481A	US37292783	05-Oct-11 (No. 217-01451)	Oct-12
Reference 20 dB Attenuator	SN: 5058 (20k)	27-Mar-12 (No. 217-01530)	Apr-13
Type-N mismatch combination	SN: 5047.2 / 06327	27-Mar-12 (No. 217-01533)	Apr-13
Reference Probe ES3DV3	SN: 3205	30-Dec-11 (No. ES3-3205_Dec11)	Dec-12
DAE4	SN: 601	27-Jun-12 (No. DAE4-601_Jun12)	Jun-13

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-11)	In house check: Oct-12

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

Issued: August 23, 2012

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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) 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	V52.8.2
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	41.3 ± 6 %	0.90 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	2.35 mW / g
SAR for nominal Head TSL parameters	normalized to 1W	**9.39 mW /g ± 17.0 % (k=2)**

SAR averaged over 10 cm^3 (10 g) of Head TSL	condition	
SAR measured	250 mW input power	1.53 mW / g
SAR for nominal Head TSL parameters	normalized to 1W	**6.12 mW /g ± 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	53.2 ± 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	2.47 mW / g
SAR for nominal Body TSL parameters	normalized to 1W	**9.58 mW / g ± 17.0 % (k=2)**

SAR averaged over 10 cm^3 (10 g) of Body TSL	condition	
SAR measured	250 mW input power	1.62 mW / g
SAR for nominal Body TSL parameters	normalized to 1W	**6.33 mW / g ± 16.5 % (k=2)**

Appendix

Antenna Parameters with Head TSL

Impedance, transformed to feed point	53.7 Ω - 3.4 jΩ
Return Loss	- 26.4 dB

Antenna Parameters with Body TSL

Impedance, transformed to feed point	49.6 Ω - 4.8 jΩ
Return Loss	- 26.4 dB

General Antenna Parameters and Design

Electrical Delay (one direction)	1.389 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 17, 2004

DASY5 Validation Report for Head TSL

Date: 23.08.2012

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole 835 MHz; Type: D835V2; Serial: D835V2 - SN: 4d026

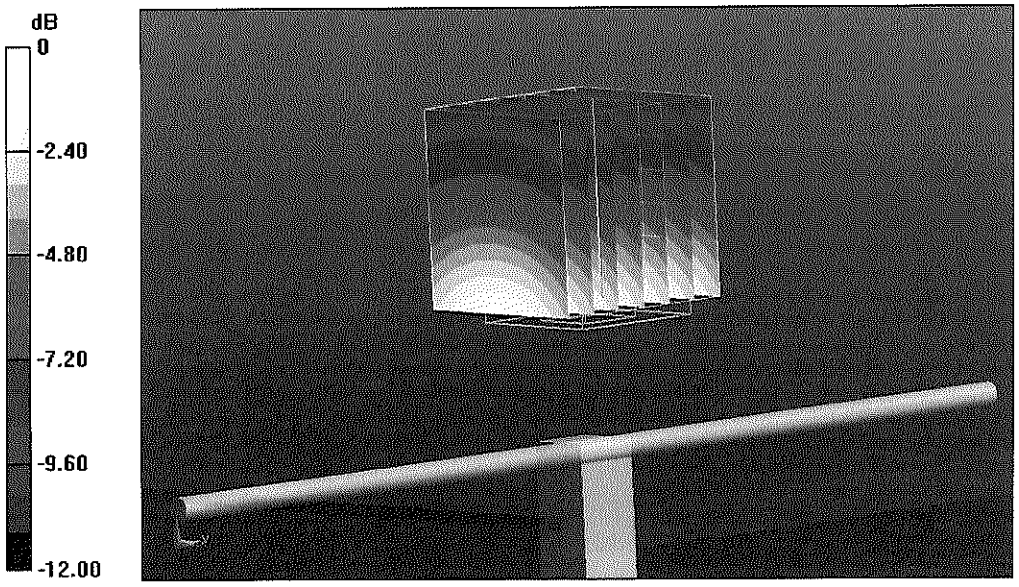
Communication System: CW; Frequency: 835 MHz
Medium parameters used: f = 835 MHz; σ = 0.9 mho/m; ε_r = 41.3; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY52 Configuration:

- Probe: ES3DV3 - SN3205; ConvF(6.07, 6.07, 6.07); Calibrated: 30.12.2011;
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 27.06.2012
- Phantom: Flat Phantom 4.9L; Type: QD000P49AA; Serial: 1001
- DASY52 52.8.2(969); SEMCAD X 14.6.6(6824)

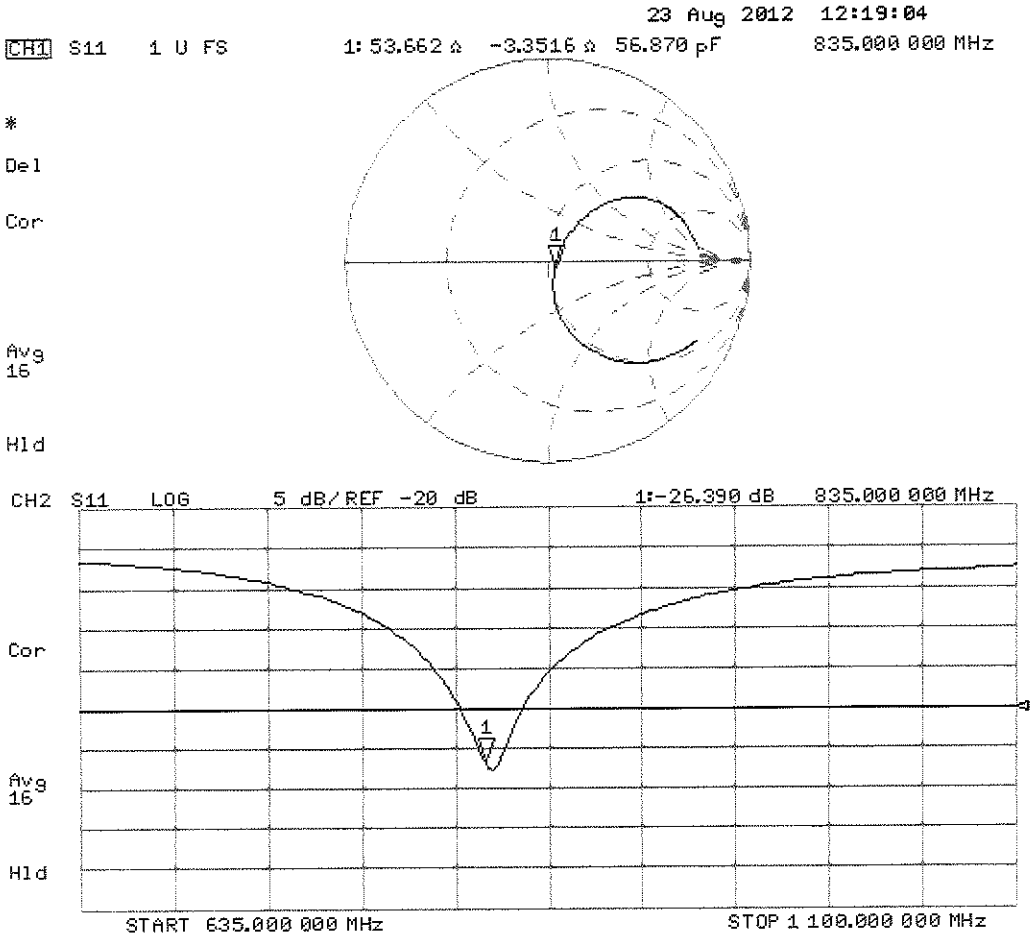
Dipole Calibration for Head Tissue/Pin=250 mW, d=15mm 2/Zoom Scan (7x7x7)/Cube 0:

Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 56.824 V/m; Power Drift = 0.01 dB
Peak SAR (extrapolated) = 3.482 mW/g
SAR(1 g) = 2.35 mW/g; SAR(10 g) = 1.53 mW/g
Maximum value of SAR (measured) = 2.72 W/kg



0 dB = 2.72 W/kg = 8.69 dB W/kg

Impedance Measurement Plot for Head TSL



DASY5 Validation Report for Body TSL

Date: 23.08.2012

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole 835 MHz; Type: D835V2; Serial: D835V2 - SN: 4d026

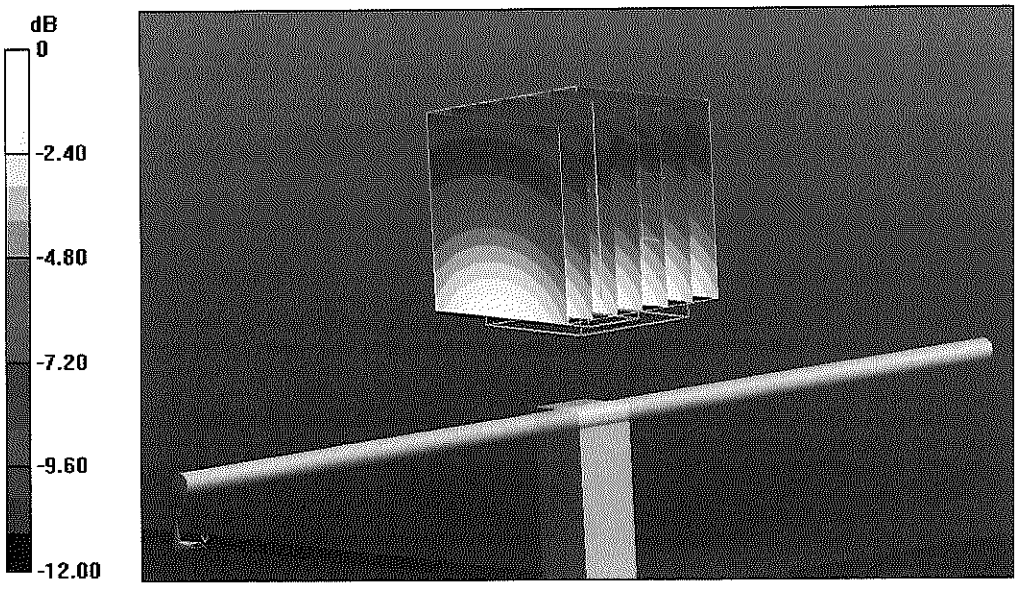
Communication System: CW; Frequency: 835 MHz
Medium parameters used: f = 835 MHz; σ = 1 mho/m; ε_r = 53.2; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY52 Configuration:

- Probe: ES3DV3 - SN3205; ConvF(6.02, 6.02, 6.02); Calibrated: 30.12.2011;
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 27.06.2012
- Phantom: Flat Phantom 4.9L; Type: QD000P49AA; Serial: 1001
- DASY52 52.8.2(969); SEMCAD X 14.6.6(6824)

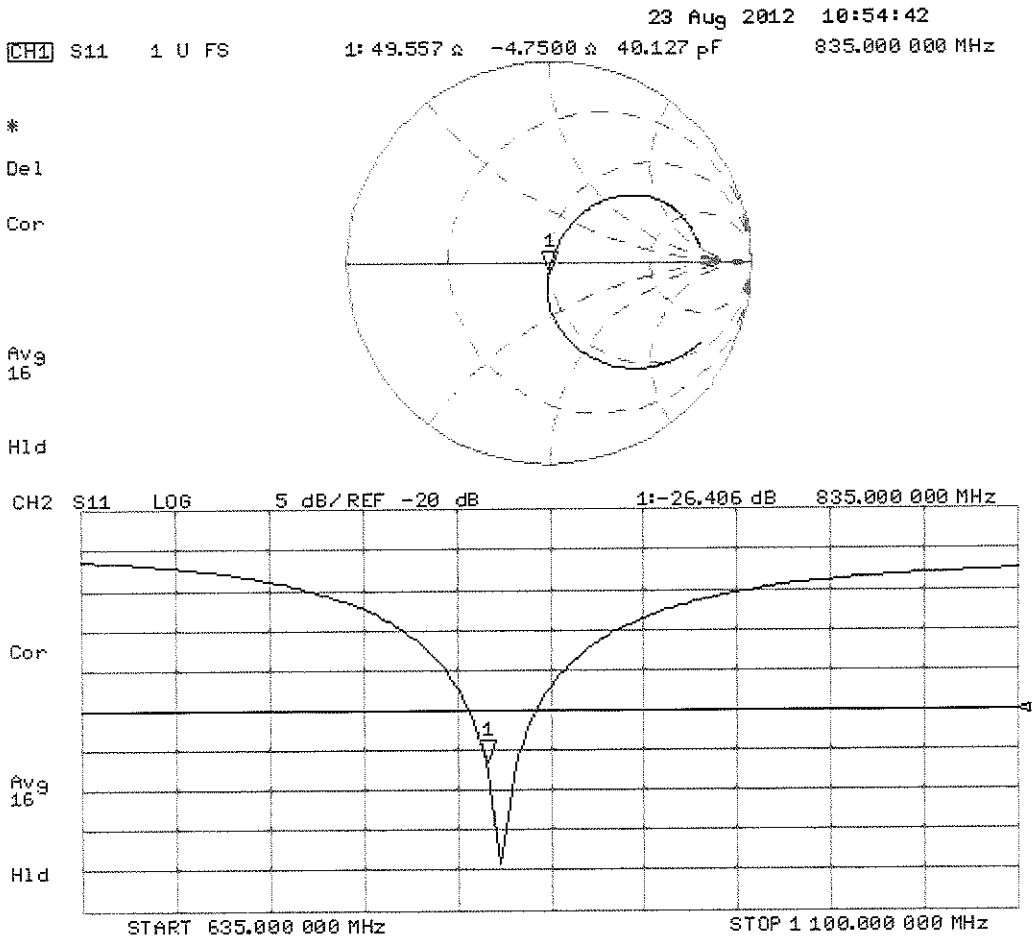
Dipole Calibration for Body Tissue/Pin=250 mW, d=15mm/Zoom Scan (7x7x7)/Cube 0:

Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 55.339 V/m; Power Drift = 0.04 dB
Peak SAR (extrapolated) = 3.592 mW/g
SAR(1 g) = 2.47 mW/g; SAR(10 g) = 1.62 mW/g
Maximum value of SAR (measured) = 2.87 W/kg



0 dB = 2.87 W/kg = 9.16 dB W/kg

Impedance Measurement Plot for Body TSL



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Accreditation No.: SCS 108

Client **PC Test**

Certificate No: D835V2-4d132_Feb12

CALIBRATION CERTIFICATE

Object	D835V2 - SN: 4d132
Calibration procedure(s)	QA CAL-05.v8 Calibration procedure for dipole validation kits above 700 MHz
Calibration date:	February 03, 2012

✓ OK 5/14/12

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	05-Oct-11 (No. 217-01451)	Oct-12
Power sensor HP 8481A	US37292783	05-Oct-11 (No. 217-01451)	Oct-12
Reference 20 dB Attenuator	SN: 5086 (20g)	29-Mar-11 (No. 217-01368)	Apr-12
Type-N mismatch combination	SN: 5047.2 / 06327	29-Mar-11 (No. 217-01371)	Apr-12
Reference Probe ES3DV3	SN: 3205	30-Dec-11 (No. ES3-3205_Dec11)	Dec-12
DAE4	SN: 601	04-Jul-11 (No. DAE4-601_Jul11)	Jul-12

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-11)	In house check: Oct-12

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

Issued: February 3, 2012

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.

Measurement Conditions

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

DASY Version	DASY5	V52.8.0
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 %	0.89 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	2.34 mW / g
SAR for nominal Head TSL parameters	normalized to 1W	**9.45 mW /g ± 17.0 % (k=2)**

SAR averaged over 10 cm^3 (10 g) of Head TSL	condition	
SAR measured	250 mW input power	1.53 mW / g
SAR for nominal Head TSL parameters	normalized to 1W	**6.17 mW /g ± 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	53.3 ± 6 %	0.98 mho/m ± 6 %
Body TSL temperature change during test	< 0.5 °C	----	----

SAR result with Body TSL

SAR averaged over 1 cm^3 (1 g) of Body TSL	Condition	
SAR measured	250 mW input power	2.39 mW / g
SAR for nominal Body TSL parameters	normalized to 1W	**9.41 mW / g ± 17.0 % (k=2)**

SAR averaged over 10 cm^3 (10 g) of Body TSL	condition	
SAR measured	250 mW input power	1.57 mW / g
SAR for nominal Body TSL parameters	normalized to 1W	**6.21 mW / g ± 16.5 % (k=2)**

Appendix

Antenna Parameters with Head TSL

Impedance, transformed to feed point	52.7 Ω - 2.3 jΩ
Return Loss	- 29.2 dB

Antenna Parameters with Body TSL

Impedance, transformed to feed point	48.9 Ω - 3.5 jΩ
Return Loss	- 28.7 dB

General Antenna Parameters and Design

Electrical Delay (one direction)	1.392 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: 03.02.2012

Test Laboratory: SPEAG, Zurich, Switzerland

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

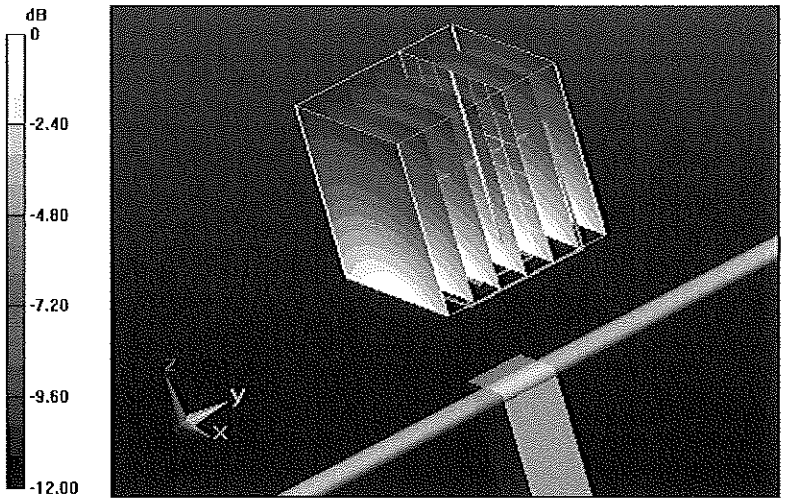
Communication System: CW; Frequency: 835 MHz
Medium parameters used: f = 835 MHz; σ = 0.89 mho/m; ε_r = 41.8; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY52 Configuration:

- Probe: ES3DV3 - SN3205; ConvF(6.07, 6.07, 6.07); Calibrated: 30.12.2011
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 04.07.2011
- Phantom: Flat Phantom 4.9L; Type: QD000P49AA; Serial: 1001
- DASY52 52.8.0(692); SEMCAD X 14.6.4(4989)

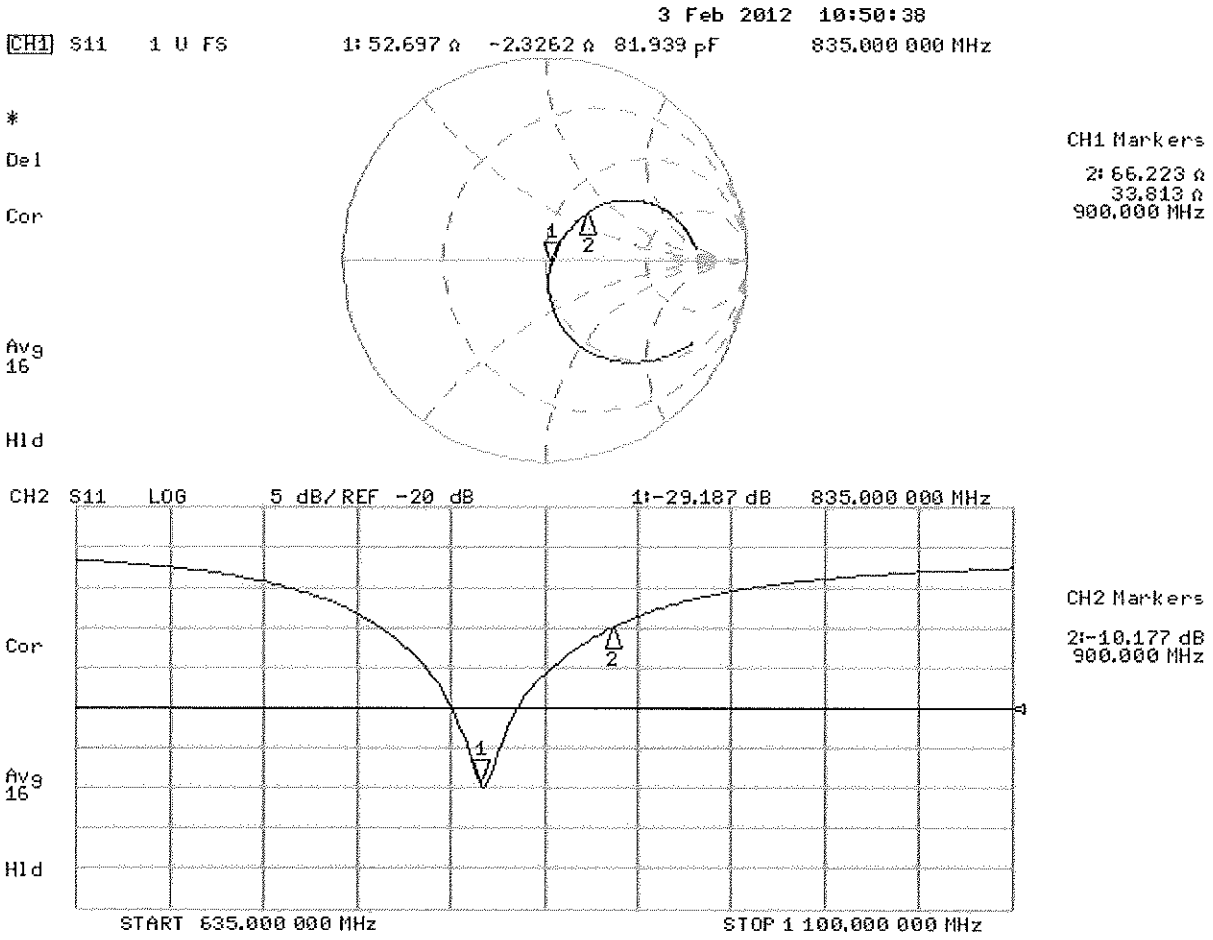
Dipole Calibration for Head Tissue/Pin=250 mW, d=15mm/Zoom Scan (7x7x7)/Cube 0:

Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 56.867 V/m; Power Drift = 0.05 dB
Peak SAR (extrapolated) = 3.4300
SAR(1 g) = 2.34 mW/g; SAR(10 g) = 1.53 mW/g
Maximum value of SAR (measured) = 2.701 mW/g



0 dB = 2.700mW/g = 8.63 dB mW/g

Impedance Measurement Plot for Head TSL



DASY5 Validation Report for Body TSL

Date: 02.02.2012

Test Laboratory: SPEAG, Zurich, Switzerland

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

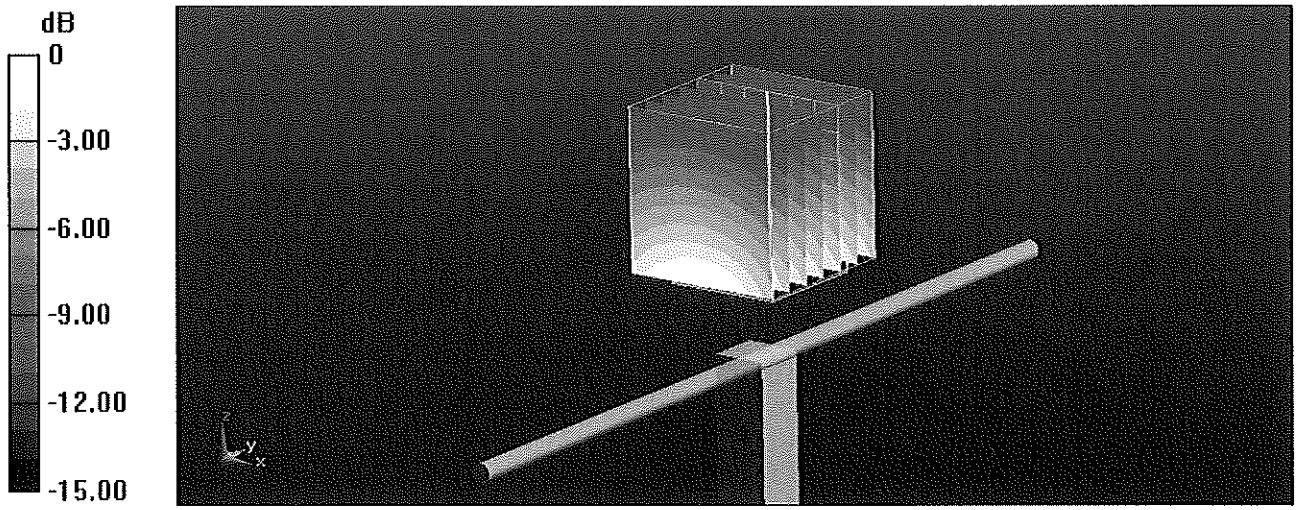
Communication System: CW; Frequency: 835 MHz
Medium parameters used: f = 835 MHz; σ = 0.98 mho/m; ε_r = 53.3; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY52 Configuration:

- Probe: ES3DV3 - SN3205; ConvF(6.02, 6.02, 6.02); Calibrated: 30.12.2011
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 04.07.2011
- Phantom: Flat Phantom 4.9L; Type: QD000P49AA; Serial: 1001
- DASY52 52.8.0(692); SEMCAD X 14.6.4(4989)

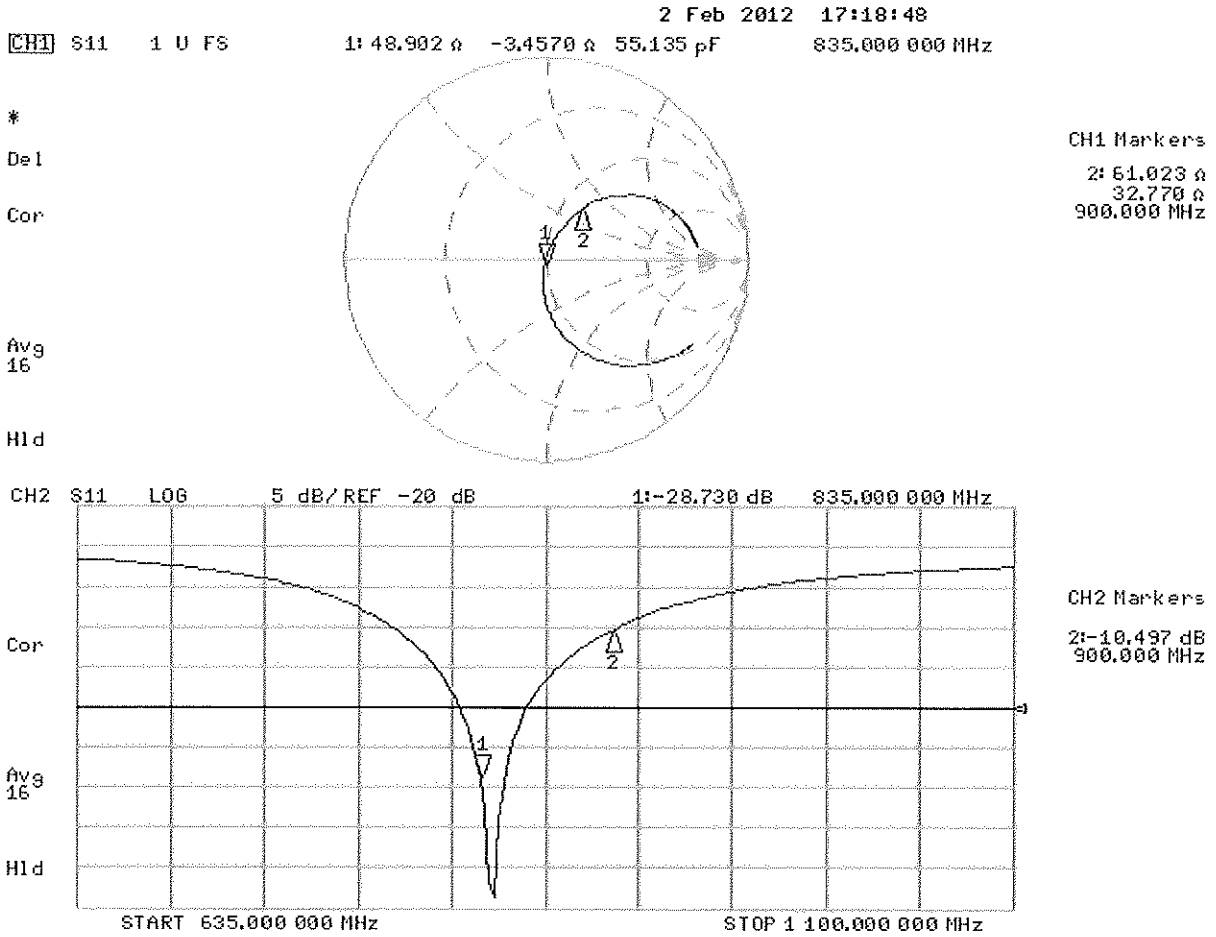
Dipole Calibration for Body Tissue/Pin=250 mW, d=15mm/Zoom Scan (7x7x7)/Cube 0:

Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 55.137 V/m; Power Drift = 0.01 dB
Peak SAR (extrapolated) = 3.4770
SAR(1 g) = 2.39 mW/g; SAR(10 g) = 1.57 mW/g
Maximum value of SAR (measured) = 2.781 mW/g



0 dB = 2.780mW/g = 8.88 dB mW/g

Impedance Measurement Plot for Body TSL



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Accreditation No.: SCS 108

Client PC Test

Certificate No: D1765V2-1008_May12

CALIBRATION CERTIFICATE

Object: D1765V2 - SN 1008

Calibration procedure(s): QA CAL-05.v8
Calibration procedure for dipole validation kits above 700 MHz

Calibration date: May 18, 2012

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	05-Oct-11 (No. 217-01451)	Oct-12
Power sensor HP 8481A	US37292783	05-Oct-11 (No. 217-01451)	Oct-12
Reference 20 dB Attenuator	SN: 5058 (20k)	27-Mar-12 (No. 217-01530)	Apr-13
Type-N mismatch combination	SN: 5047.2 / 06327	27-Mar-12 (No. 217-01533)	Apr-13
Reference Probe ES3DV3	SN: 3205	30-Dec-11 (No. ES3-3205_Dec11)	Dec-12
DAE4	SN: 601	04-Jul-11 (No. DAE4-601_Jul11)	Jul-12

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-11)	In house check: Oct-12

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

Issued: May 18, 2012

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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) 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	V52.8.1
Extrapolation	Advanced Extrapolation	
Phantom	Modular Flat Phantom	
Distance Dipole Center - TSL	10 mm	with Spacer
Zoom Scan Resolution	dx, dy, dz = 5 mm	
Frequency	1750 MHz ± 1 MHz	

Head TSL parameters

The following parameters and calculations were applied.

	Temperature	**Permittivity**	**Conductivity**
Nominal Head TSL parameters	22.0 °C	40.1	1.38 mho/m
Measured Head TSL parameters	(22.0 ± 0.2) °C	40.5 ± 6 %	1.34 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	8.92 mW / g
SAR for nominal Head TSL parameters	normalized to 1W	**36.4 mW /g ± 17.0 % (k=2)**

SAR averaged over 10 cm^3 (10 g) of Head TSL	condition	
SAR measured	250 mW input power	4.77 mW / g
SAR for nominal Head TSL parameters	normalized to 1W	**19.3 mW /g ± 16.5 % (k=2)**

Body TSL parameters

The following parameters and calculations were applied.

	Temperature	**Permittivity**	**Conductivity**
Nominal Body TSL parameters	22.0 °C	53.4	1.50 mho/m
Measured Body TSL parameters	(22.0 ± 0.2) °C	52.9 ± 6 %	1.46 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	9.22 mW / g
SAR for nominal Body TSL parameters	normalized to 1W	**37.4 mW / g ± 17.0 % (k=2)**

SAR averaged over 10 cm^3 (10 g) of Body TSL	condition	
SAR measured	250 mW input power	4.95 mW / g
SAR for nominal Body TSL parameters	normalized to 1W	**20.0 mW / g ± 16.5 % (k=2)**

Appendix

Antenna Parameters with Head TSL

Impedance, transformed to feed point	47.7 Ω - 5.9 jΩ
Return Loss	- 23.8 dB

Antenna Parameters with Body TSL

Impedance, transformed to feed point	43.4 Ω - 6.0 jΩ
Return Loss	- 20.4 dB

General Antenna Parameters and Design

Electrical Delay (one direction)	1.212 ns

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

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

Additional EUT Data

Manufactured by	SPEAG
Manufactured on	October 06, 2005

DASY5 Validation Report for Head TSL

Date: 18.05.2012

Test Laboratory: SPEAG, Zurich, Switzerland

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

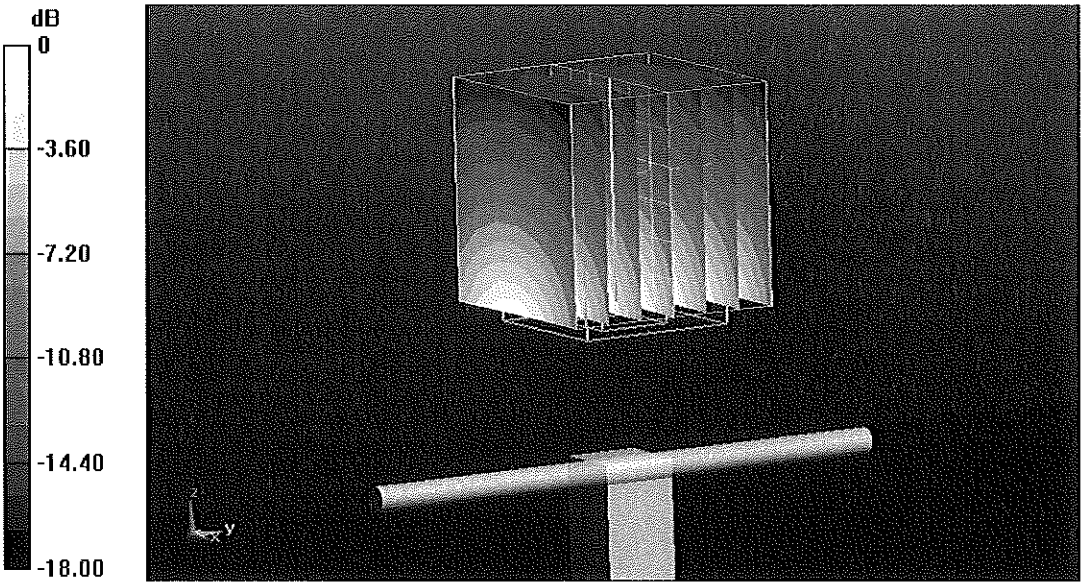
Communication System: CW; Frequency: 1750 MHz
Medium parameters used: f = 1750 MHz; σ = 1.34 mho/m; ε_r = 40.5; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY52 Configuration:

- Probe: ES3DV3 - SN3205; ConvF(5.22, 5.22, 5.22); Calibrated: 30.12.2011;
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 04.07.2011
- Phantom: Flat Phantom 5.0 (front); Type: QD000P50AA; Serial: 1001
- DASY52 52.8.1(838); SEMCAD X 14.6.5(6469)

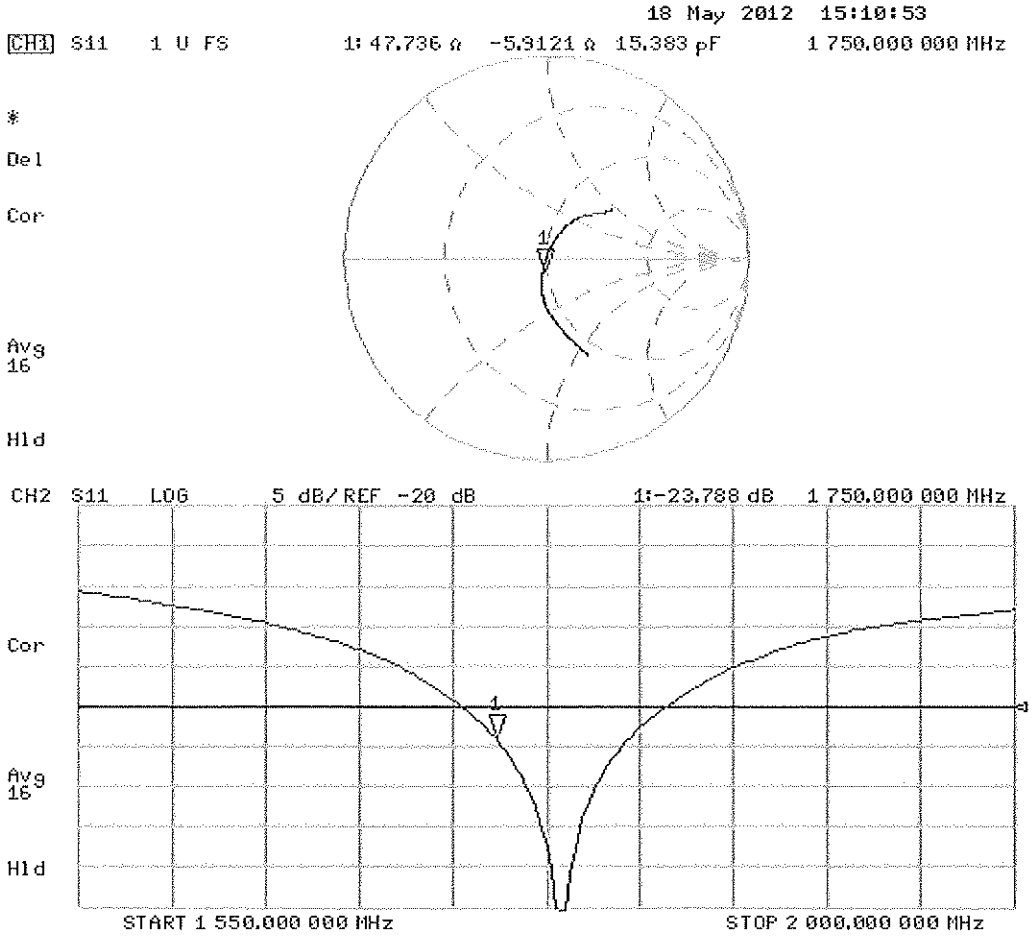
Dipole Calibration for Head Tissue/Pin=250 mW, d=10mm/Zoom Scan (7x7x7)/Cube 0:

Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 93.890 V/m; Power Drift = 0.05 dB
Peak SAR (extrapolated) = 15.761 mW/g
SAR(1 g) = 8.92 mW/g; SAR(10 g) = 4.77 mW/g
Maximum value of SAR (measured) = 11.0 mW/g



0 dB = 11.0 mW/g = 20.83 dB mW/g

Impedance Measurement Plot for Head TSL



DASY5 Validation Report for Body TSL

Date: 18.05.2012

Test Laboratory: SPEAG, Zurich, Switzerland

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

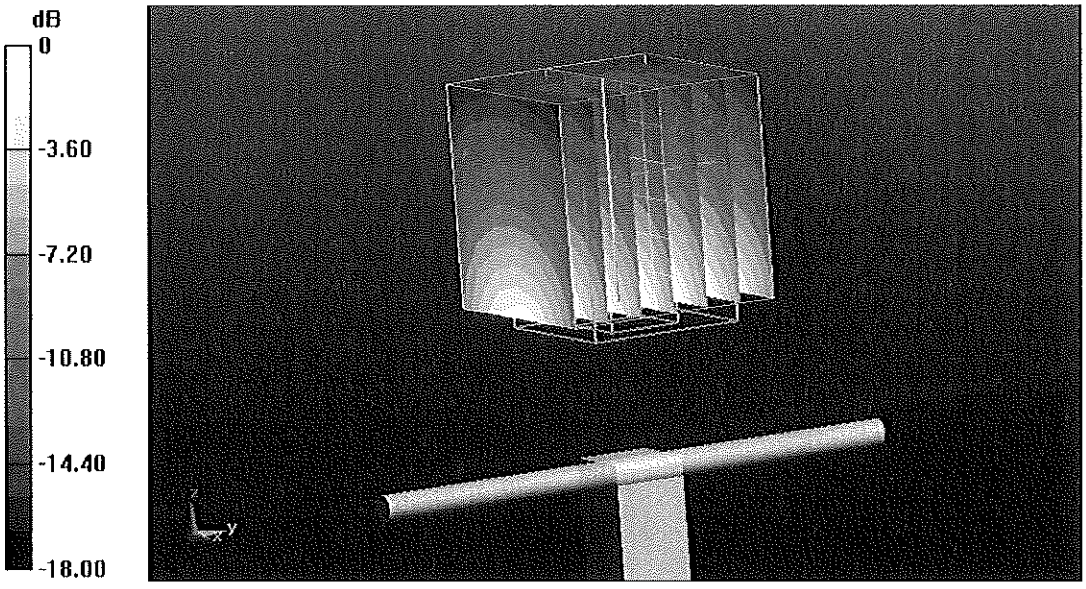
Communication System: CW; Frequency: 1750 MHz
Medium parameters used: f = 1750 MHz; σ = 1.46 mho/m; ε_r = 52.9; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY52 Configuration:

- Probe: ES3DV3 - SN3205; ConvF(4.85, 4.85, 4.85); Calibrated: 30.12.2011;
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 04.07.2011
- Phantom: Flat Phantom 5.0 (back); Type: QD000P50AA; Serial: 1002
- DASY52 52.8.1(838); SEMCAD X 14.6.5(6469)

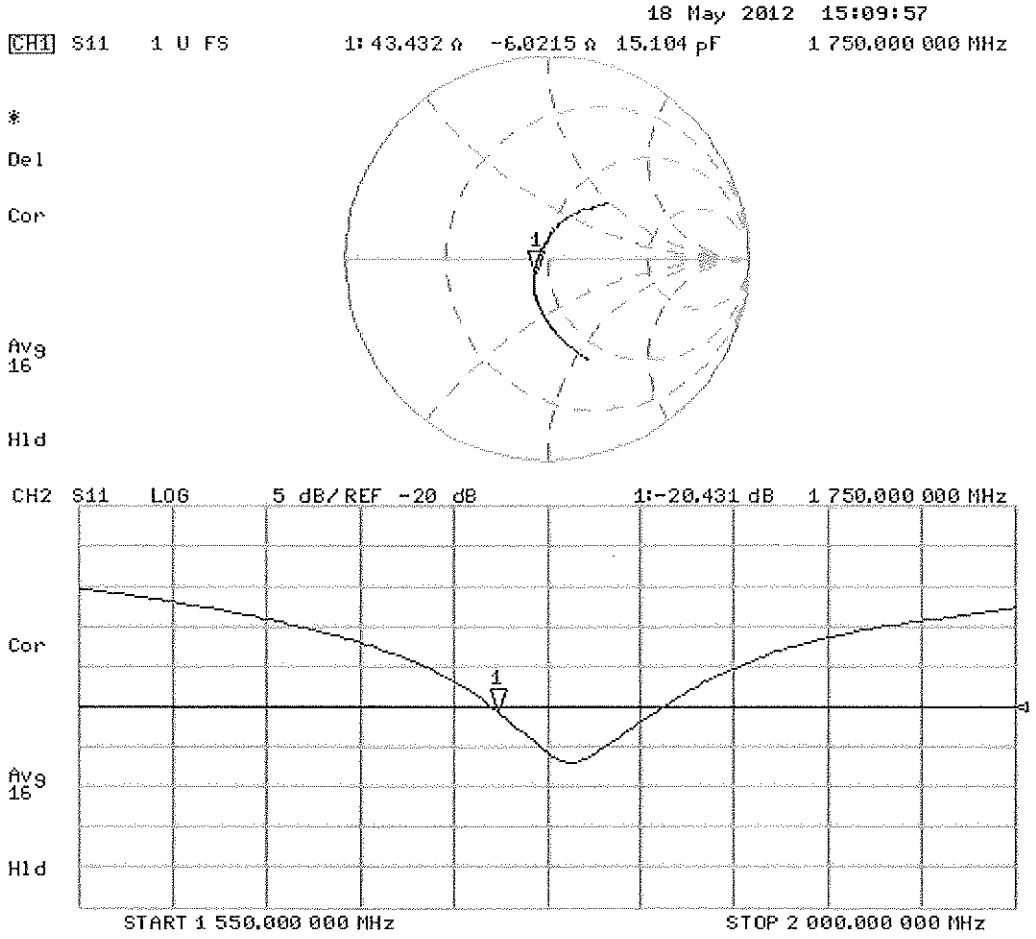
Dipole Calibration for Body Tissue/Pin=250 mW, d=10mm/Zoom Scan (7x7x7)/Cube 0:

Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 93.032 V/m; Power Drift = 0.01 dB
Peak SAR (extrapolated) = 15.840 mW/g
SAR(1 g) = 9.22 mW/g; SAR(10 g) = 4.95 mW/g
Maximum value of SAR (measured) = 11.6 mW/g



0 dB = 11.6 mW/g = 21.29 dB mW/g

Impedance Measurement Plot for Body TSL



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Accreditation No.: SCS 108

Client **PC Test**

Certificate No: D1900V2-5d148_Feb12

CALIBRATION CERTIFICATE

Object	D1900V2 - SN: 5d148
Calibration procedure(s)	QA CAL-05.v8 Calibration procedure for dipole validation kits above 700 MHz
Calibration date:	February 08, 2012

✓ 5/4/12
100K

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	05-Oct-11 (No. 217-01451)	Oct-12
Power sensor HP 8481A	US37292783	05-Oct-11 (No. 217-01451)	Oct-12
Reference 20 dB Attenuator	SN: 5086 (20g)	29-Mar-11 (No. 217-01368)	Apr-12
Type-N mismatch combination	SN: 5047.2 / 06327	29-Mar-11 (No. 217-01371)	Apr-12
Reference Probe ES3DV3	SN: 3205	30-Dec-11 (No. ES3-3205_Dec11)	Dec-12
DAE4	SN: 601	04-Jul-11 (No. DAE4-601_Jul11)	Jul-12

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-11)	In house check: Oct-12

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

Issued: February 8, 2012

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.

Measurement Conditions

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

DASY Version	DASY5	V52.8.0
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	40.4 ± 6 %	1.40 mho/m ± 6 %
Head TSL temperature change during test	< 0.5 °C	----	----

SAR result with Head TSL

SAR averaged over 1 cm^3 (1 g) of Head TSL	Condition	
SAR measured	250 mW input power	10.1 mW / g
SAR for nominal Head TSL parameters	normalized to 1W	**40.5 mW /g ± 17.0 % (k=2)**

SAR averaged over 10 cm^3 (10 g) of Head TSL	condition	
SAR measured	250 mW input power	5.35 mW / g
SAR for nominal Head TSL parameters	normalized to 1W	**21.4 mW /g ± 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	53.0 ± 6 %	1.56 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	9.95 mW / g
SAR for nominal Body TSL parameters	normalized to 1W	**39.1 mW / g ± 17.0 % (k=2)**

SAR averaged over 10 cm^3 (10 g) of Body TSL	condition	
SAR measured	250 mW input power	5.25 mW / g
SAR for nominal Body TSL parameters	normalized to 1W	**20.8 mW / g ± 16.5 % (k=2)**

Appendix

Antenna Parameters with Head TSL

Impedance, transformed to feed point	51.7 Ω + 4.9 jΩ
Return Loss	- 25.9 dB

Antenna Parameters with Body TSL

Impedance, transformed to feed point	47.9 Ω + 6.3 jΩ
Return Loss	- 23.4 dB

General Antenna Parameters and Design

Electrical Delay (one direction)	1.199 ns

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

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

Additional EUT Data

Manufactured by	SPEAG
Manufactured on	March 11, 2011

DASY5 Validation Report for Head TSL

Date: 08.02.2012

Test Laboratory: SPEAG, Zurich, Switzerland

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

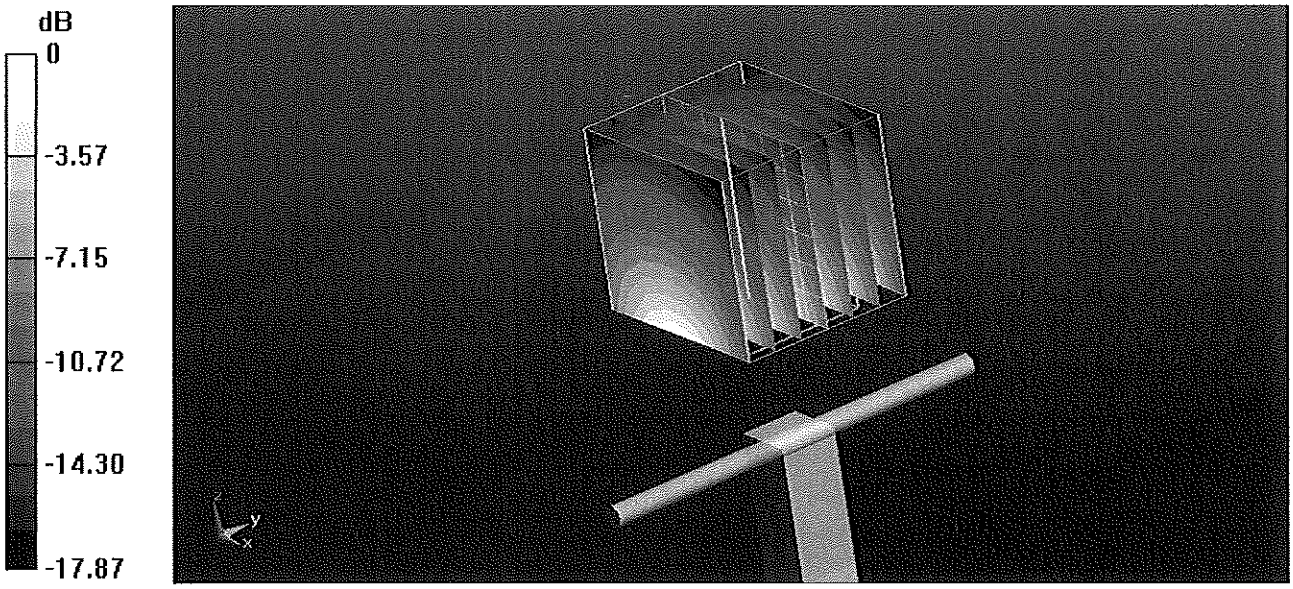
Communication System: CW; Frequency: 1900 MHz
Medium parameters used: f = 1900 MHz; σ = 1.4 mho/m; ε_r = 40.4; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY52 Configuration:

- Probe: ES3DV3 - SN3205; ConvF(5.01, 5.01, 5.01); Calibrated: 30.12.2011
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 04.07.2011
- Phantom: Flat Phantom 5.0 (front); Type: QD000P50AA; Serial: 1001
- DASY52 52.8.0(692); SEMCAD X 14.6.4(4989)

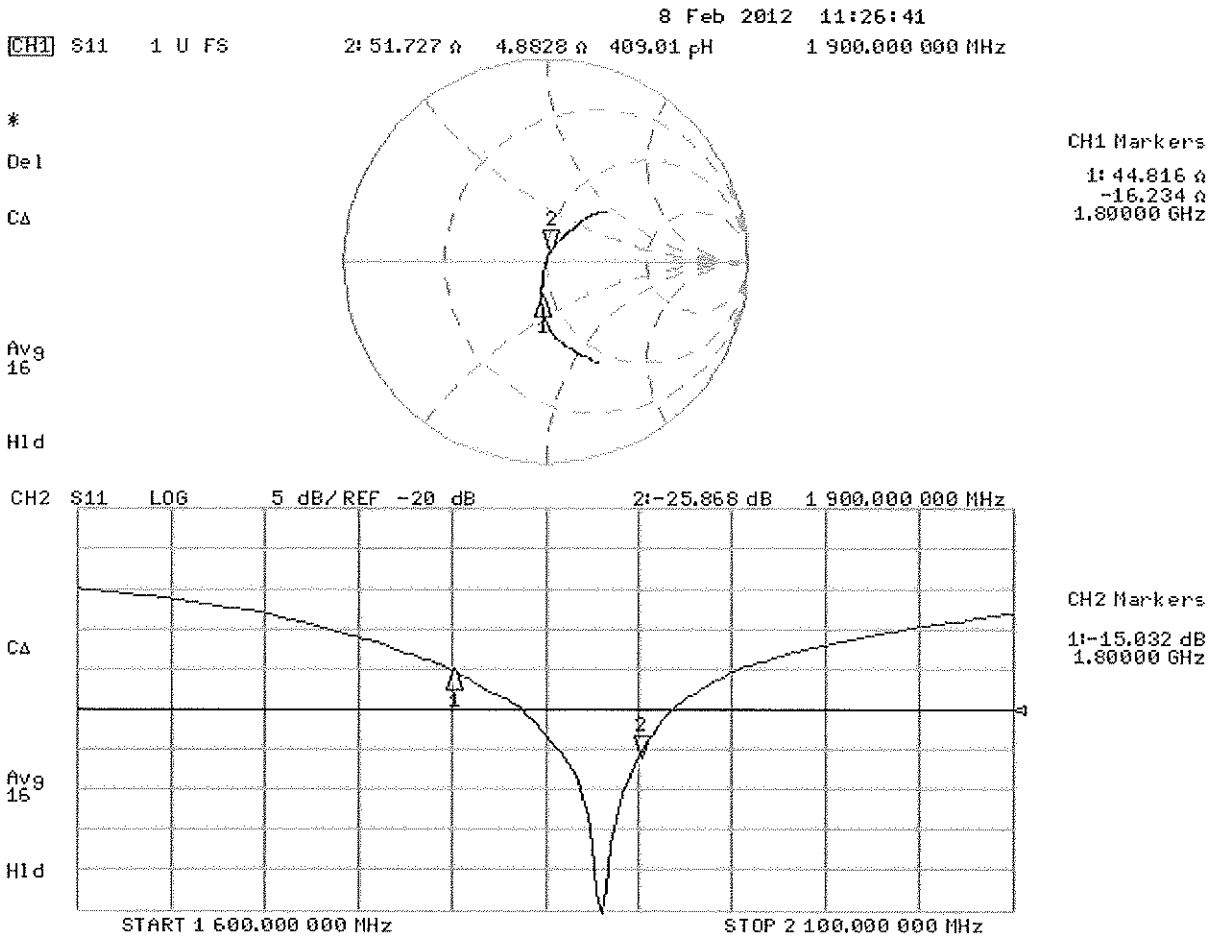
Dipole Calibration for Head Tissue/Pin=250 mW, d=10mm/Zoom Scan (8x7x7)/Cube 0:

Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 93.284 V/m; Power Drift = 0.09 dB
Peak SAR (extrapolated) = 18.0570
SAR(1 g) = 10.1 mW/g; SAR(10 g) = 5.35 mW/g
Maximum value of SAR (measured) = 12.808 mW/g



0 dB = 12.810mW/g = 22.15 dB mW/g

Impedance Measurement Plot for Head TSL



DASY5 Validation Report for Body TSL

Date: 06.02.2012

Test Laboratory: SPEAG, Zurich, Switzerland

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

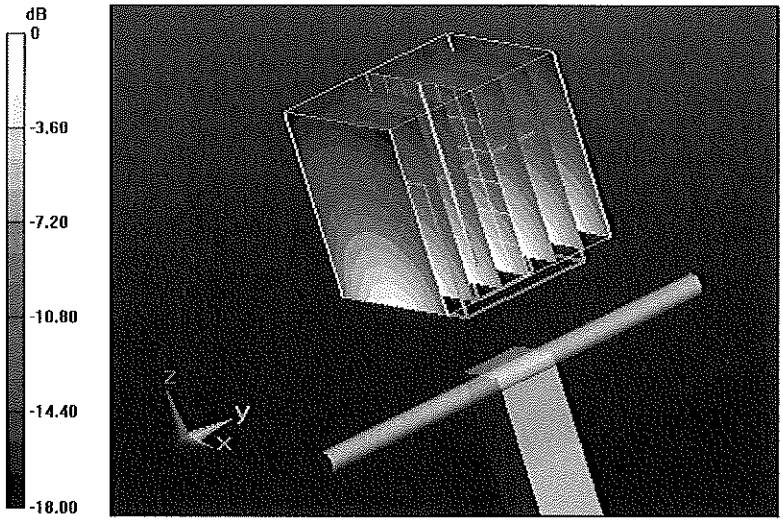
Communication System: CW; Frequency: 1900 MHz
Medium parameters used: f = 1900 MHz; σ = 1.56 mho/m; ε_r = 53; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY52 Configuration:

- Probe: ES3DV3 - SN3205; ConvF(4.62, 4.62, 4.62); Calibrated: 30.12.2011
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 04.07.2011
- Phantom: Flat Phantom 5.0 (back); Type: QD000P50AA; Serial: 1002
- DASY52 52.8.0(692); SEMCAD X 14.6.4(4989)

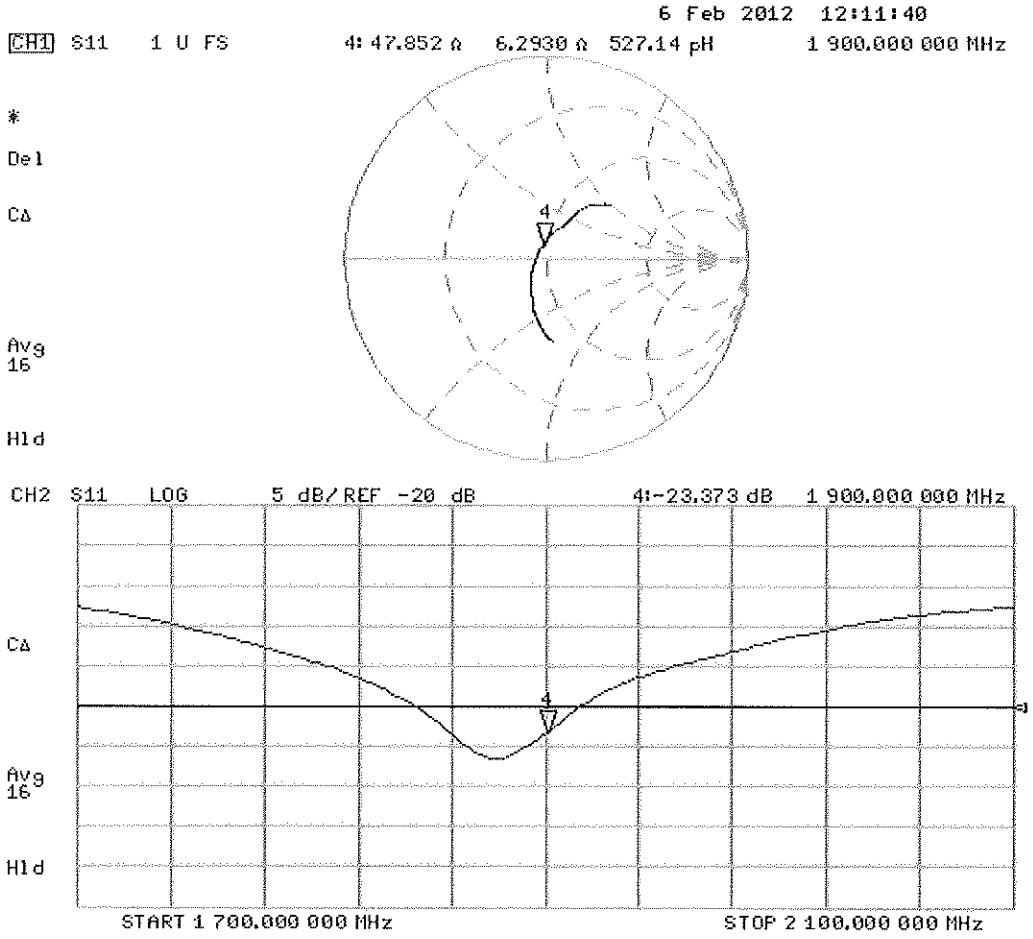
Dipole Calibration for Body Tissue/Pin=250 mW, d=10mm/Zoom Scan (7x7x7)/Cube 0:

Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 93.855 V/m; Power Drift = 0.006 dB
Peak SAR (extrapolated) = 17.7160
SAR(1 g) = 9.95 mW/g; SAR(10 g) = 5.25 mW/g
Maximum value of SAR (measured) = 12.606 mW/g



0 dB = 12.610mW/g = 22.01 dB mW/g

Impedance Measurement Plot for Body TSL



Calibration Laboratory of
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S Schweizerischer Kalibrierdienst
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Accreditation No.: SCS 108

Client **PC Test**

Certificate No: D2450V2-719_Aug12

CALIBRATION CERTIFICATE

Object	D2450V2 - SN: 719
Calibration procedure(s)	QA CAL-05.v8 Calibration procedure for dipole validation kits above 700 MHz
Calibration date:	August 23, 2012

kot 9/17/12

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	05-Oct-11 (No. 217-01451)	Oct-12
Power sensor HP 8481A	US37292783	05-Oct-11 (No. 217-01451)	Oct-12
Reference 20 dB Attenuator	SN: 5058 (20k)	27-Mar-12 (No. 217-01530)	Apr-13
Type-N mismatch combination	SN: 5047.2 / 06327	27-Mar-12 (No. 217-01533)	Apr-13
Reference Probe ES3DV3	SN: 3205	30-Dec-11 (No. ES3-3205_Dec11)	Dec-12
DAE4	SN: 601	27-Jun-12 (No. DAE4-601_Jun12)	Jun-13

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-11)	In house check: Oct-12

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

Issued: August 23, 2012

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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) 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	V52.8.2
Extrapolation	Advanced Extrapolation	
Phantom	Modular Flat Phantom	
Distance Dipole Center - TSL	10 mm	with Spacer
Zoom Scan Resolution	dx, dy, dz = 5 mm	
Frequency	2450 MHz ± 1 MHz	

Head TSL parameters

The following parameters and calculations were applied.

	Temperature	**Permittivity**	**Conductivity**
Nominal Head TSL parameters	22.0 °C	39.2	1.80 mho/m
Measured Head TSL parameters	(22.0 ± 0.2) °C	39.2 ± 6 %	1.81 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 mW / g
SAR for nominal Head TSL parameters	normalized to 1W	**52.7 mW /g ± 17.0 % (k=2)**

SAR averaged over 10 cm^3 (10 g) of Head TSL	condition	
SAR measured	250 mW input power	6.19 mW / g
SAR for nominal Head TSL parameters	normalized to 1W	**24.7 mW /g ± 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 %	1.99 mho/m ± 6 %
Body TSL temperature change during test	< 0.5 °C	----	----

SAR result with Body TSL

SAR averaged over 1 cm^3 (1 g) of Body TSL	Condition	
SAR measured	250 mW input power	13.1 mW / g
SAR for nominal Body TSL parameters	normalized to 1W	**51.6 mW / g ± 17.0 % (k=2)**

SAR averaged over 10 cm^3 (10 g) of Body TSL	condition	
SAR measured	250 mW input power	6.16 mW / g
SAR for nominal Body TSL parameters	normalized to 1W	**24.4 mW / g ± 16.5 % (k=2)**

Appendix

Antenna Parameters with Head TSL

Impedance, transformed to feed point	54.4 Ω + 3.8 jΩ
Return Loss	- 25.1 dB

Antenna Parameters with Body TSL

Impedance, transformed to feed point	50.7 Ω + 5.9 jΩ
Return Loss	- 24.6 dB

General Antenna Parameters and Design

Electrical Delay (one direction)	1.150 ns

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

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

Additional EUT Data

Manufactured by	SPEAG
Manufactured on	September 10, 2002

DASY5 Validation Report for Head TSL

Date: 23.08.2012

Test Laboratory: SPEAG, Zurich, Switzerland

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

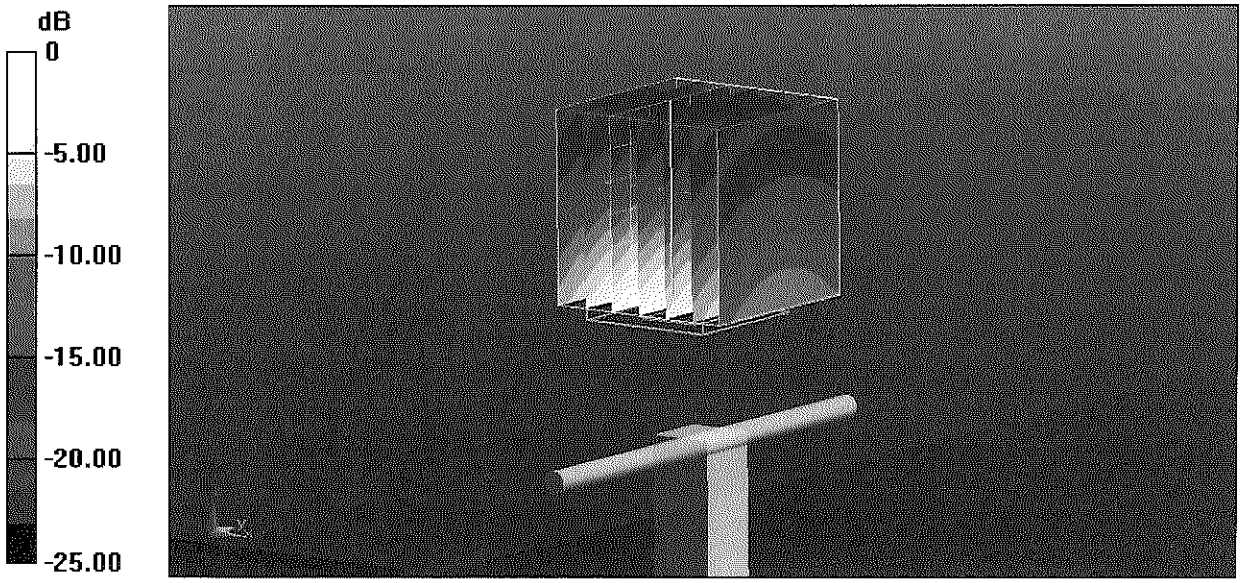
Communication System: CW; Frequency: 2450 MHz
Medium parameters used: f = 2450 MHz; σ = 1.81 mho/m; ε_r = 39.2; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY52 Configuration:

- Probe: ES3DV3 - SN3205; ConvF(4.45, 4.45, 4.45); Calibrated: 30.12.2011;
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 27.06.2012
- Phantom: Flat Phantom 5.0 (front); Type: QD000P50AA; Serial: 1001
- DASY52 52.8.2(969); SEMCAD X 14.6.6(6824)

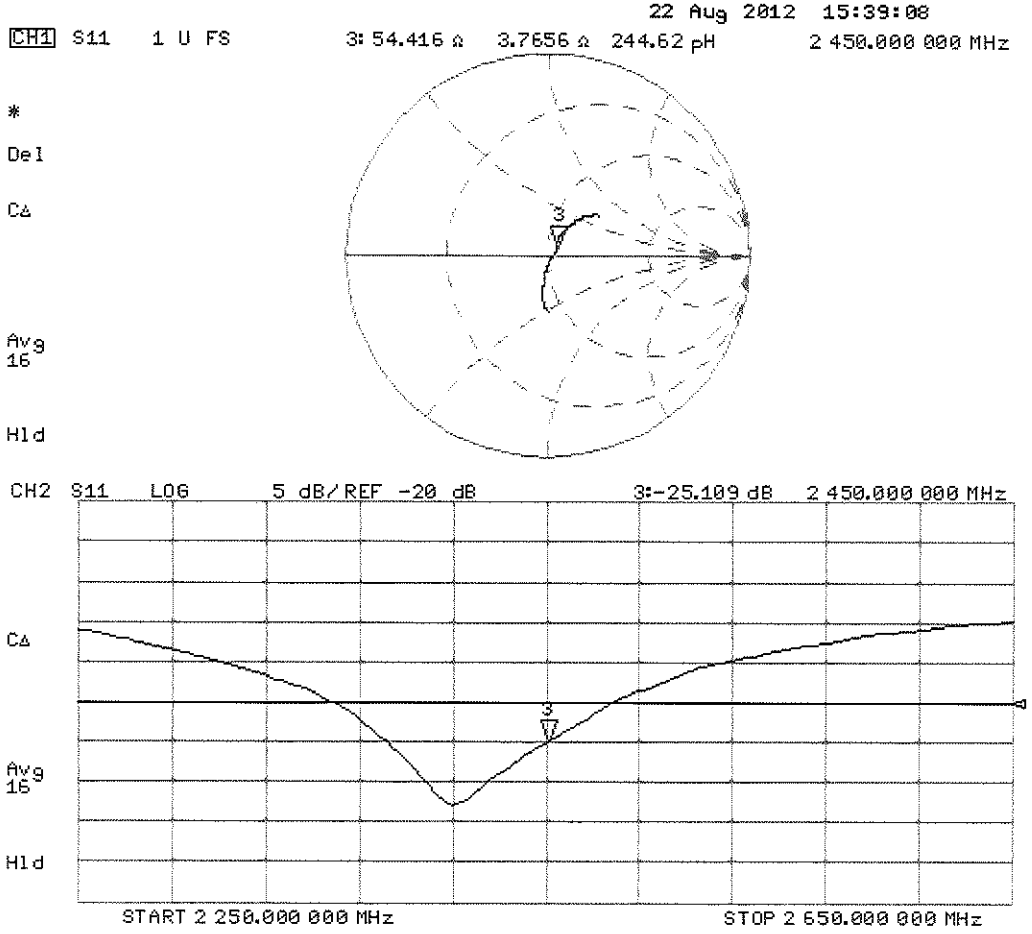
Dipole Calibration for Head Tissue/Pin=250 mW, d=10mm/Zoom Scan (7x7x7)/Cube 0:

Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 99.219 V/m; Power Drift = 0.03 dB
Peak SAR (extrapolated) = 26.633 mW/g
SAR(1 g) = 13.2 mW/g; SAR(10 g) = 6.19 mW/g
Maximum value of SAR (measured) = 16.5 W/kg



0 dB = 16.5 W/kg = 24.35 dB W/kg

Impedance Measurement Plot for Head TSL



DASY5 Validation Report for Body TSL

Date: 22.08.2012

Test Laboratory: SPEAG, Zurich, Switzerland

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

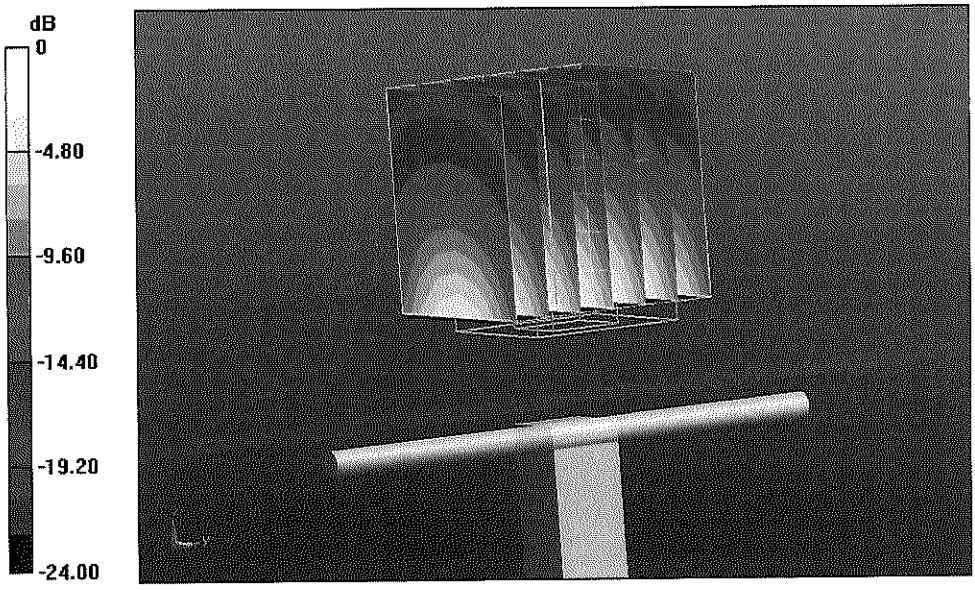
Communication System: CW; Frequency: 2450 MHz
Medium parameters used: f = 2450 MHz; σ = 1.99 mho/m; ε_r = 51.3; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY52 Configuration:

- Probe: ES3DV3 - SN3205; ConvF(4.26, 4.26, 4.26); Calibrated: 30.12.2011;
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 27.06.2012
- Phantom: Flat Phantom 5.0 (back); Type: QD000P50AA; Serial: 1002
- DASY52 52.8.2(969); SEMCAD X 14.6.6(6824)

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

Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 95.970 V/m; Power Drift = 0.03 dB
Peak SAR (extrapolated) = 26.692 mW/g
SAR(1 g) = 13.1 mW/g; SAR(10 g) = 6.16 mW/g
Maximum value of SAR (measured) = 17.1 W/kg



0 dB = 17.1 W/kg = 24.66 dB W/kg

Impedance Measurement Plot for Body TSL