FCC SAR Test Report

APPLICANT	:	Motorola Mobility, LLC
EQUIPMENT	:	Mobile Cellular Phone
BRAND NAME	:	Motorola
MODEL NAME	:	7383
FCC ID	:	IHDT56VD4
STANDARD	:	FCC 47 CFR Part 2 (2.1093) ANSI/IEEE C95.1-1992 IEEE 1528-2013

We, SPORTON INTERNATIONAL INC., would like to declare that the tested sample has been evaluated in accordance with the procedures and had been in compliance with the applicable technical standards.

The test results in this report apply exclusively to the tested model / sample. Without written approval of SPORTON INTERNATIONAL INC., the test report shall not be reproduced except in full.

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Revision History

REPORT NO.	VERSION	DESCRIPTION	ISSUED DATE
FA651006	Rev. 01	Initial issue of report	Jun. 03, 2016

1. Statement of Compliance

The maximum results of Specific Absorption Rate (SAR) found during testing for Motorola Mobility, LLC, Mobile Cellular PHONE, 7383 are as follows.

Equipment Class	Frequency Band		Highest 1g SAR Summary			Highest Simultaneous Transmission 1g SAR (W/kg)
			Head (Separation 0mm)	Body-worn (Separation 10mm)	Hotspot (Separation 10mm)	
			1g SAR (W/kg)			
Licensed	GSM	GSM850	0.71	0.92	0.92	1.57
		GSM1900	0.48	0.98	0.98	
	WCDMA	WCDMA II	0.79	1.37	1.37	
		WCDMA IV	0.71	1.40	1.40	
		WCDMA V	0.47	0.72	0.72	
	CDMA	CDMA BC0	0.46	0.83	0.88	
		CDMA BC1	0.72	1.44	1.46	
		CDMA BC10	0.53	0.98	0.99	
	LTE	LTE Band 2	0.67	1.17	1.17	
		LTE Band 4	0.55	1.30	1.30	
		LTE Band 5	0.37	0.61	0.61	
		LTE Band 7	0.74	1.13	1.13	
		LTE Band 12	0.25	0.50	0.50	
		LTE Band 13	0.32	0.68	0.68	
		LTE Band 17				
		LTE Band 25	0.60	1.01	1.01	
		LTE Band 26	0.35	0.61	0.61	
		LTE Band 41	0.60	1.25	1.25	
DTS	WLAN	2.4GHz WLAN	0.39	0.17	0.17	1.57
DSS	2.4GHz Band	Bluetooth		0.07		1.50
Date of Testing:			2016/5/17 ~ 2016/5/26			

This device is in compliance with Specific Absorption Rate (SAR) for general population/uncontrolled exposure limits (1.6 W/kg) specified in FCC 47 CFR part 2 (2.1093) and ANSI/IEEE C95.1-1992, and had been tested in accordance with the measurement methods and procedures specified in IEEE 1528-2013 and FCC KDB publications

2. Administration Data

Testing Laboratory	
Test Site	SPORTON INTERNATIONAL INC.
Test Site Location	No.52, Hwa Ya 1st Rd., Hwa Ya Technology Park, Kwei-Shan District, Taoyuan City, Taiwan (R.O.C.) TEL: +886-3-327-3456 FAX: +886-3-328-4978

Applicant	
Company Name	Motorola Mobility, LLC
Address	222 W. Merchandise Mart Plaza, Chicago IL 60654 USA

Manufacturer	
Company Name	Motorola Mobility, LLC
Address	222 W. Merchandise Mart Plaza, Chicago IL 60654 USA

3. Guidance Standard

The Specific Absorption Rate (SAR) testing specification, method, and procedure for this device is in accordance with the following standards:

- FCC 47 CFR Part 2 (2.1093)
- ANSI/IEEE C95.1-1992
- IEEE 1528-2013
- FCC KDB 865664 D01 SAR Measurement 100 MHz to 6 GHz v01r04
- FCC KDB 865664 D02 SAR Reporting v01r02
- FCC KDB 447498 D01 General RF Exposure Guidance v06
- FCC KDB 648474 D04 SAR Evaluation Considerations for Wireless Handsets v01r03
- FCC KDB 248227 D01 802.11 Wi-Fi SAR v02r02
- FCC KDB 941225 D01 3G SAR Procedures v03r01
- FCC KDB 941225 D05 SAR for LTE Devices v02r05
- FCC KDB 941225 D06 Hotspot Mode SAR v02r01

4. Equipment Under Test (EUT) Information

4.1 General Information

Product Feature & Specification	
Equipment Name	Mobile Cellular Phone
Brand Name	Motorola
Model Name	7383
FCC ID	IHDT56VD4
IMEI Code	354140070005232
Wireless Technology and Frequency Range	GSM850: 824.2 MHz ~ 848.8 MHz GSM1900: 1850.2 MHz ~ 1909.8 MHz WCDMA Band II: 1852.4 MHz ~ 1907.6 MHz WCDMA Band IV: 1712.4 MHz ~ 1752.6 MHz WCDMA Band V: 826.4 MHz ~ 846.6 MHz CDMA2000 BC0: 824.7 MHz ~ 848.31 MHz CDMA 2000 BC1: 1851.25 MHz ~ 1908.75 MHz CDMA 2000 BC10: 815.25 MHz ~ 822.75 MHz LTE Band 2: 1850 MHz ~ 1910 MHz LTE Band 4: 1710 MHz ~ 1755 MHz LTE Band 5: 824 MHz ~ 849 MHz LTE Band 7: 2500 MHz ~ 2570 MHz LTE Band 12: 699 MHz ~ 716 MHz LTE Band 13: 777 MHz ~ 787 MHz LTE Band 17: 704 MHz ~ 716 MHz LTE Band 25: 1850 MHz ~ 1915 MHz LTE Band 26: 814 MHz ~ 849 MHz LTE Band 41: 2496 MHz ~ 2690 MHz WLAN 2.4GHz Band: 2412 MHz ~ 2462 MHz Bluetooth: 2402 MHz ~ 2480 MHz
Mode	· GSM/GPRS/EGPRS · RMC/AMR 12.2Kbps · HSDPA · HSUPA · DC-HSDPA · CDMA2000 : 1xRTT/1xEv-Do(Rev.0)/1xEv-Do(Rev.A) · LTE: QPSK, 16QAM · 802.11b/g/n HT20 · Bluetooth with EDR / LE
HW Version	DVT2-A
SW Version	fastboot_harpia_oem_userdebug_6.0.1_MPI24.223_2173_intcfg-test-keys_oem.tar.gz
GSM / (E)GPRS Transfer mode	Class B – EUT cannot support Packet Switched and Circuit Switched Network simultaneously but can automatically switch between Packet and Circuit Switched Network.
EUT Stage	Identical Prototype
Remark: 1. This device 2.4GHz WLAN supports Hotspot operation and WiFi Direct (Group Client / Group Owner). 2. Selected battery 1 as the main testing and battery 2 will select worst case found in battery 1 performs.	

4.2 General LTE SAR Test and Reporting Considerations

Summarized necessary items addressed in KDB 941225 D05 v02r05	
FCC ID	IHDT56VD4
Equipment Name	Mobile Cellular Phone
Operating Frequency Range of each LTE transmission band	LTE Band 02: 1850 MHz ~ 1910 MHz LTE Band 04: 1710 MHz ~ 1755 MHz LTE Band 05: 824 MHz ~ 849 MHz LTE Band 07: 2500 MHz ~ 2570 MHz LTE Band 12: 699 MHz ~ 716 MHz LTE Band 13: 777 MHz ~ 787 MHz LTE Band 17: 704 MHz ~ 716 MHz LTE Band 25: 1850 MHz ~ 1915 MHz LTE Band 26: 814 MHz ~ 849 MHz LTE Band 41: 2496 MHz ~ 2690 MHz
Channel Bandwidth	LTE Band 02:1.4MHz, 3MHz, 5MHz, 10MHz, 15MHz, 20MHz LTE Band 04:1.4MHz, 3MHz, 5MHz, 10MHz, 15MHz, 20MHz LTE Band 05:1.4MHz, 3MHz, 5MHz, 10MHz LTE Band 07: 5MHz, 10MHz, 15MHz, 20MHz LTE Band 12:1.4MHz, 3MHz, 5MHz, 10MHz LTE Band 13: 5MHz, 10MHz LTE Band 17: 5MHz, 10MHz LTE Band 25:1.4MHz, 3MHz, 5MHz, 10MHz, 15MHz, 20MHz LTE Band 26:1.4MHz, 3MHz, 5MHz, 10MHz, 15MHz LTE Band 41: 5MHz, 10MHz, 15MHz, 20MHz
uplink modulations used	QPSK, and 16QAM
LTE Voice / Data requirements	Voice and Data
LTE MPR permanently built-in by design	Table 6.2.3-1: Maximum Power Reduction (MPR) for Power Class 3

Modulation	Channel bandwidth / Transmission bandwidth (RB)						MPR (dB)
	1.4 MHz	3.0 MHz	5 MHz	10 MHz	15 MHz	20 MHz	
QPSK	> 5	> 4	> 8	> 12	> 16	> 18	≤ 1
16 QAM	≤ 5	≤ 4	≤ 8	≤ 12	≤ 16	≤ 18	≤ 1
16 QAM	> 5	> 4	> 8	> 12	> 16	> 18	≤ 2

LTE A-MPR	In the base station simulator configuration, Network Setting value is set to NS_01 to disable A-MPR during SAR testing and the LTE SAR tests was transmitting on all TTI frames (Maximum TTI)
Spectrum plots for RB configuration	A properly configured base station simulator was used for the SAR and power measurement; therefore, spectrum plots for each RB allocation and offset configuration are not included in the SAR report.

Transmission (H, M, L) channel numbers and frequencies in each LTE band

LTE Band 2

	Bandwidth 1.4 MHz		Bandwidth 3 MHz		Bandwidth 5 MHz		Bandwidth 10 MHz		Bandwidth 15 MHz		Bandwidth 20 MHz	
	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)
L	18607	1850.7	18615	1851.5	18625	1852.5	18650	1855	18675	1857.5	18700	1860
M	18900	1880	18900	1880	18900	1880	18900	1880	18900	1880	18900	1880
H	19193	1909.3	19185	1908.5	19175	1907.5	19150	1905	19125	1902.5	19100	1900

LTE Band 4

	Bandwidth 1.4 MHz		Bandwidth 3 MHz		Bandwidth 5 MHz		Bandwidth 10 MHz		Bandwidth 15 MHz		Bandwidth 20 MHz	
	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)
L	19957	1710.7	19965	1711.5	19975	1712.5	20000	1715	20025	1717.5	20050	1720
M	20175	1732.5	20175	1732.5	20175	1732.5	20175	1732.5	20175	1732.5	20175	1732.5
H	20393	1754.3	20385	1753.5	20375	1752.5	20350	1750	20325	1747.5	20300	1745

LTE Band 5

	Bandwidth 1.4 MHz		Bandwidth 3 MHz		Bandwidth 5 MHz		Bandwidth 10 MHz	
	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)
L	20407	824.7	20415	825.5	20425	826.5	20450	829
M	20525	836.5	20525	836.5	20525	836.5	20525	836.5
H	20643	848.3	20635	847.5	20625	846.5	20600	844

LTE Band 7								
	Bandwidth 5 MHz		Bandwidth 10 MHz		Bandwidth 15 MHz		Bandwidth 20 MHz	
	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)
L	20775	2502.5	20800	2505	20825	2507.5	20850	2510
M	21100	2535	21100	2535	21100	2535	21100	2535
H	21425	2567.5	21400	2565	21375	2562.5	21350	2560

LTE Band 12								
	Bandwidth 1.4 MHz		Bandwidth 3 MHz		Bandwidth 5 MHz		Bandwidth 10 MHz	
	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)
L	23017	699.7	23025	700.5	23035	701.5	23060	704
M	23095	707.5	23095	707.5	23095	707.5	23095	707.5
H	23173	715.3	23165	714.5	23155	713.5	23130	711

LTE Band 13				
	Bandwidth 5 MHz		Bandwidth 10 MHz	
	Channel #	Freq.(MHz)	Channel #	Freq.(MHz)
L	23205	779.5	23230	782
M	23230	782		
H	23255	784.5		

LTE Band 17				
	Bandwidth 5 MHz		Bandwidth 10 MHz	
	Channel #	Freq.(MHz)	Channel #	Freq. (MHz)
L	23755	706.5	23780	709
M	23790	710	23790	710
H	23825	713.5	23800	711

LTE Band 25												
	Bandwidth 1.4 MHz		Bandwidth 3 MHz		Bandwidth 5 MHz		Bandwidth 10 MHz		Bandwidth 15 MHz		Bandwidth 20 MHz	
	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)
L	26047	1850.7	26055	1851.5	26065	1852.5	26090	1855	26115	1857.5	26140	1860
M	26340	1880	26340	1880	26340	1880	26340	1880	26340	1880	26340	1880
H	26683	1914.3	26675	1913.5	26665	1912.5	26640	1910	26615	1907.5	26590	1905

LTE Band 26										
	Bandwidth 1.4 MHz		Bandwidth 3 MHz		Bandwidth 5 MHz		Bandwidth 10 MHz		Bandwidth 15 MHz	
	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)
L	26697	814.7	26705	815.5	26715	816.5	26740	819	26765	821.5
M	26865	831.5	26865	831.5	26865	831.5	26865	831.5	26865	831.5
H	27033	848.3	27025	847.5	27015	846.5	26990	844	26965	841.5

LTE Band 41								
	Bandwidth 5 MHz		Bandwidth 10 MHz		Bandwidth 15 MHz		Bandwidth 20 MHz	
	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)
L	39675	2498.5	39700	2501	39725	2503.5	39750	2506
L M	40148	2545.8	40160	2547	40173	2548.3	40185	2549.5
M	40620	2593	40620	2593	40620	2593	40620	2593
H M	41093	2640.3	41080	2639	41068	2637.8	41055	2636.5
H	41565	2687.5	41540	2685	41515	2682.5	41490	2680

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. The 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.

Limits for Occupational/Controlled Exposure (W/kg)

Whole-Body	Partial-Body	Hands, Wrists, Feet and Ankles
0.4	8.0	20.0

Limits for General Population/Uncontrolled Exposure (W/kg)

Whole-Body	Partial-Body	Hands, Wrists, Feet and Ankles
0.08	1.6	4.0

1. Whole-Body SAR is averaged over the entire body, partial-body SAR is averaged over any 1gram of tissue defined as a tissue volume in the shape of a cube. SAR for hands, wrists, feet and ankles is averaged over any 10 grams of tissue defined as a tissue volume in the shape of a cube.

6. Specific Absorption Rate (SAR)

6.1 Introduction

SAR is related to the rate at which energy is absorbed per unit mass in an object exposed to a radio field. The SAR distribution in a biological body is complicated and is usually carried out by experimental techniques or numerical modeling. The standard recommends limits for two tiers of groups, occupational/controlled and general population/uncontrolled, based on a person's awareness and ability to exercise control over his or her exposure. In general, occupational/controlled exposure limits are higher than the limits for general population/uncontrolled.

6.2 SAR Definition

The SAR definition is the time derivative (rate) of the incremental energy (dW) absorbed by (dissipated in) an incremental mass (dm) contained in a volume element (dv) of a given density (ρ). The equation description is as below:

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

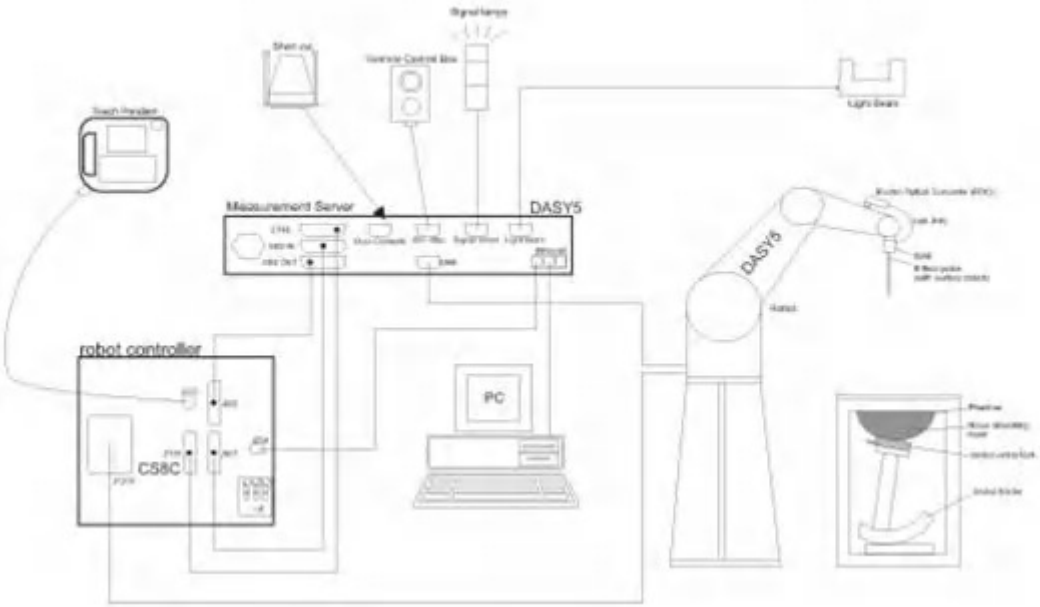
SAR is expressed in units of Watts per kilogram (W/kg)

$$\mathbf{SAR} = \frac{\boldsymbol{\sigma}|\mathbf{E}|^2}{\boldsymbol{\rho}}$$

Where: σ is the conductivity of the tissue, ρ is the mass density of the tissue and E is the RMS electrical field strength.

7. System Description and Setup

The DASY system used for performing compliance tests consists of the following items:



- A standard high precision 6-axis robot with controller, teach pendant and software. An arm extension for accommodating the data acquisition electronics (DAE).
- An isotropic Field probe optimized and calibrated for the targeted measurement.
- A data acquisition electronics (DAE) which performs the signal amplification, signal multiplexing, AD-conversion, offset measurements, mechanical surface detection, collision detection, etc. The unit is battery powered with standard or rechargeable batteries. The signal is optically transmitted to the EOC.
- The Electro-optical converter (EOC) performs the conversion from optical to electrical signals for the digital communication to the DAE. To use optical surface detection, a special version of the EOC is required. The EOC signal is transmitted to the measurement server.
- The function of the measurement server is to perform the time critical tasks such as signal filtering, control of the robot operation and fast movement interrupts.
- The Light Beam used is for probe alignment. This improves the (absolute) accuracy of the probe positioning.
- A computer running WinXP or Win7 and the DASY5 software.
- Remote control and teach pendant as well as additional circuitry for robot safety such as warning lamps, etc.
- The phantom, the device holder and other accessories according to the targeted measurement.

7.1 E-Field Probe

The SAR measurement is conducted with the dosimetric probe (manufactured by SPEAG).The probe is specially designed and calibrated for use in liquid with high permittivity. The dosimetric probe has special calibration in liquid at different frequency. This probe has a built in optical surface detection system to prevent from collision with phantom.

<ES3DV3 Probe>

Construction	Symmetric design with triangular core Interleaved sensors Built-in shielding against static charges PEEK enclosure material (resistant to organic solvents, e.g., DGBE)	
Frequency	10 MHz – 4 GHz; Linearity: ±0.2 dB (30 MHz – 4 GHz)	
Directivity	±0.2 dB in TSL (rotation around probe axis) ±0.3 dB in TSL (rotation normal to probe axis)	
Dynamic Range	5 µW/g – >100 mW/g; Linearity: ±0.2 dB	
Dimensions	Overall length: 337 mm (tip: 20 mm) Tip diameter: 3.9 mm (body: 12 mm) Distance from probe tip to dipole centers: 3.0 mm	

<EX3DV4 Probe>

Construction	Symmetric design with triangular core Built-in shielding against static charges PEEK enclosure material (resistant to organic solvents, e.g., DGBE)	
Frequency	10 MHz – >6 GHz Linearity: ±0.2 dB (30 MHz – 6 GHz)	
Directivity	±0.3 dB in TSL (rotation around probe axis) ±0.5 dB in TSL (rotation normal to probe axis)	
Dynamic Range	10 µW/g – >100 mW/g Linearity: ±0.2 dB (noise: typically <1 µW/g)	
Dimensions	Overall length: 337 mm (tip: 20 mm) Tip diameter: 2.5 mm (body: 12 mm) Typical distance from probe tip to dipole centers: 1 mm	

7.2 Data Acquisition Electronics (DAE)

The data acquisition electronics (DAE) consists of a highly sensitive electrometer-grade preamplifier with auto-zeroing, a channel and gain-switching multiplexer, a fast 16 bit AD-converter and a command decoder and control logic unit. Transmission to the measurement server is accomplished through an optical downlink for data and status information as well as an optical uplink for commands and the clock.

The input impedance of the DAE is 200 MOhm; the inputs are symmetrical and floating. Common mode rejection is above 80 dB.

Fig 5.1 Photo of DAE

7.3 Phantom

<SAM Twin Phantom>

Shell Thickness	2 ± 0.2 mm; Center ear point: 6 ± 0.2 mm	
Filling Volume	Approx. 25 liters	
Dimensions	Length: 1000 mm; Width: 500 mm; Height: adjustable feet	
Measurement Areas	Left Hand, Right Hand, Flat Phantom	

The bottom plate contains three pair of bolts for locking the device holder. The device holder positions are adjusted to the standard measurement positions in the three sections. A white cover is provided to tap the phantom during off-periods to prevent water evaporation and changes in the liquid parameters. On the phantom top, three reference markers are provided to identify the phantom position with respect to the robot.

<ELI Phantom>

Shell Thickness	2 ± 0.2 mm (sagging: <1%)	
Filling Volume	Approx. 30 liters	
Dimensions	Major ellipse axis: 600 mm Minor axis: 400 mm	

The ELI phantom is intended for compliance testing of handheld and body-mounted wireless devices in the frequency range of 30 MHz to 6 GHz. ELI4 is fully compatible with standard and all known tissue simulating liquids.

7.4 Device Holder

<Mounting Device for Hand-Held Transmitter>

In combination with the Twin SAM V5.0/V5.0c or ELI phantoms, the Mounting Device for Hand-Held Transmitters enables rotation of the mounted transmitter device to specified spherical coordinates. At the heads, the rotation axis is at the ear opening. Transmitter devices can be easily and accurately positioned according to IEC 62209-1, IEEE 1528, FCC, or other specifications. The device holder can be locked for positioning at different phantom sections (left head, right head, flat). And upgrade kit to Mounting Device to enable easy mounting of wider devices like big smart-phones, e-books, small tablets, etc. It holds devices with width up to 140 mm.

Mounting Device for Hand-Held Transmitters

Mounting Device Adaptor for Wide-Phones

<Mounting Device for Laptops and other Body-Worn Transmitters>

The extension is lightweight and made of POM, acrylic glass and foam. It fits easily on the upper part of the mounting device in place of the phone positioned. The extension is fully compatible with the SAM Twin and ELI phantoms.

Mounting Device for Laptops

8. Measurement Procedures

The measurement procedures are as follows:

<Conducted power measurement>

(a) For WWAN power measurement, use base station simulator to configure EUT WWAN transmission in conducted connection with RF cable, at maximum power in each supported wireless interface and frequency band.
(b) Read the WWAN RF power level from the base station simulator.
(c) For WLAN/BT power measurement, use engineering software to configure EUT WLAN/BT continuously transmission, at maximum RF power in each supported wireless interface and frequency band
(d) Connect EUT RF port through RF cable to the power meter, and measure WLAN/BT output power

<SAR measurement>

(a) Use base station simulator to configure EUT WWAN transmission in radiated connection, and engineering software to configure EUT WLAN/BT continuously transmission, at maximum RF power, in the highest power channel.
(b) Place the EUT in the positions as Appendix D demonstrates.
(c) Set scan area, grid size and other setting on the DASY software.
(d) Measure SAR results for the highest power channel on each testing position.
(e) Find out the largest SAR result on these testing positions of each band
(f) Measure SAR results for other channels in worst SAR testing position if the reported SAR of highest power channel is larger than 0.8 W/kg

According to the test standard, the recommended procedure for assessing the peak spatial-average SAR value consists of the following steps:

(a) Power reference measurement
(b) Area scan
(c) Zoom scan
(d) Power drift measurement

8.1 Spatial Peak SAR Evaluation

The procedure for spatial peak SAR evaluation has been implemented according to the test standard. It can be conducted for 1g and 10g, as well as for user-specific masses. The DASY software includes all numerical procedures necessary to evaluate the spatial peak SAR value.

The base for the evaluation is a "cube" measurement. The measured volume must include the 1g and 10g cubes with the highest averaged SAR values. For that purpose, the center of the measured volume is aligned to the interpolated peak SAR value of a previously performed area scan.

The entire evaluation of the spatial peak values is performed within the post-processing engine (SEMCAD). The system always gives the maximum values for the 1g and 10g cubes. The algorithm to find the cube with highest averaged SAR is divided into the following stages:

(a) Extraction of the measured data (grid and values) from the Zoom Scan
(b) Calculation of the SAR value at every measurement point based on all stored data (A/D values and measurement parameters)
(c) Generation of a high-resolution mesh within the measured volume
(d) Interpolation of all measured values form the measurement grid to the high-resolution grid
(e) Extrapolation of the entire 3-D field distribution to the phantom surface over the distance from sensor to surface
(f) Calculation of the averaged SAR within masses of 1g and 10g

8.2 Power Reference Measurement

The Power Reference Measurement and Power Drift Measurements are for monitoring the power drift of the device under test in the batch process. The minimum distance of probe sensors to surface determines the closest measurement point to phantom surface. This distance cannot be smaller than the distance of sensor calibration points to probe tip as defined in the probe properties.

8.3 Area Scan

The area scan is used as a fast scan in two dimensions to find the area of high field values, before doing a fine measurement around the hot spot. The sophisticated interpolation routines implemented in DASY software can find the maximum found in the scanned area, within a range of the global maximum. The range (in dB0 is specified in the standards for compliance testing. For example, a 2 dB range is required in IEEE standard 1528 and IEC 62209 standards, whereby 3 dB is a requirement when compliance is assessed in accordance with the ARIB standard (Japan), if only one zoom scan follows the area scan, then only the absolute maximum will be taken as reference. For cases where multiple maximums are detected, the number of zoom scans has to be increased accordingly.

Area scan parameters extracted from FCC KDB 865664 D01v01r04 SAR measurement 100 MHz to 6 GHz.

	≤ 3 GHz	> 3 GHz
Maximum distance from closest measurement point (geometric center of probe sensors) to phantom surface	5 ± 1 mm	½·δ·ln(2) ± 0.5 mm
Maximum probe angle from probe axis to phantom surface normal at the measurement location	30° ± 1°	20° ± 1°
Maximum area scan spatial resolution: Δx_{Area}, Δy_{Area}	≤ 2 GHz: ≤ 15 mm 2 – 3 GHz: ≤ 12 mm	3 – 4 GHz: ≤ 12 mm 4 – 6 GHz: ≤ 10 mm
	When the x or y dimension of the test device, in the measurement plane orientation, is smaller than the above, the measurement resolution must be ≤ the corresponding x or y dimension of the test device with at least one measurement point on the test device.	

8.4 Zoom Scan

Zoom scans are used assess the peak spatial SAR values within a cubic averaging volume containing 1 gram and 10 gram of simulated tissue. The zoom scan measures points (refer to table below) within a cube shoes base faces are centered on the maxima found in a preceding area scan job within the same procedure. When the measurement is done, the zoom scan evaluates the averaged SAR for 1 gram and 10 gram and displays these values next to the job's label.

Zoom scan parameters extracted from FCC KDB 865664 D01v01r04 SAR measurement 100 MHz to 6 GHz.

			≤ 3 GHz	> 3 GHz
Maximum zoom scan spatial resolution: Δx_{Zoom}, Δy_{Zoom}			≤ 2 GHz: ≤ 8 mm 2 – 3 GHz: ≤ 5 mm*	3 – 4 GHz: ≤ 5 mm* 4 – 6 GHz: ≤ 4 mm*
Maximum zoom scan spatial resolution, normal to phantom surface	uniform grid: $\Delta z_{Zoom}(n)$		≤ 5 mm	3 – 4 GHz: ≤ 4 mm 4 – 5 GHz: ≤ 3 mm 5 – 6 GHz: ≤ 2 mm
	graded grid	$\Delta z_{Zoom}(1)$: between 1st two points closest to phantom surface	≤ 4 mm	3 – 4 GHz: ≤ 3 mm 4 – 5 GHz: ≤ 2.5 mm 5 – 6 GHz: ≤ 2 mm
		$\Delta z_{Zoom}(n>1)$: between subsequent points	$\leq 1.5 \cdot \Delta z_{Zoom}(n-1)$	
Minimum zoom scan volume	x, y, z		≥ 30 mm	3 – 4 GHz: ≥ 28 mm 4 – 5 GHz: ≥ 25 mm 5 – 6 GHz: ≥ 22 mm

Note: δ is the penetration depth of a plane-wave at normal incidence to the tissue medium; see draft standard IEEE P1528-2011 for details.

* When zoom scan is required and the *reported* SAR from the *area scan based 1-g SAR estimation* procedures of KDB 447498 is ≤ 1.4 W/kg, ≤ 8 mm, ≤ 7 mm and ≤ 5 mm zoom scan resolution may be applied, respectively, for 2 GHz to 3 GHz, 3 GHz to 4 GHz and 4 GHz to 6 GHz.

8.5 Volume Scan Procedures

The volume scan is used for assess overlapping SAR distributions for antennas transmitting in different frequency bands. It is equivalent to an oversized zoom scan used in standalone measurements. The measurement volume will be used to enclose all the simultaneous transmitting antennas. For antennas transmitting simultaneously in different frequency bands, the volume scan is measured separately in each frequency band. In order to sum correctly to compute the 1g aggregate SAR, the EUT remain in the same test position for all measurements and all volume scan use the same spatial resolution and grid spacing. When all volume scan were completed, the software, SEMCAD postprocessor can combine and subsequently superpose these measurement data to calculating the multiband SAR.

8.6 Power Drift Monitoring

All SAR testing is under the EUT install full charged battery and transmit maximum output power. In DASY measurement software, the power reference measurement and power drift measurement procedures are used for monitoring the power drift of EUT during SAR test. Both these procedures measure the field at a specified reference position before and after the SAR testing. The software will calculate the field difference in dB. If the power drifts more than 5%, the SAR will be retested.

9. Test Equipment List

Manufacturer	Name of Equipment	Type/Model	Serial Number	Calibration	
				Last Cal.	Due Date
SPEAG	750MHz System Validation Kit	D750V3	1078	Jun. 23, 2015	Jun. 22, 2016
SPEAG	835MHz System Validation Kit	D835V2	499	Mar. 21, 2016	Mar. 20, 2017
SPEAG	1750MHz System Validation Kit	D1750V2	1068	Nov. 23, 2015	Nov. 22, 2016
SPEAG	1900MHz System Validation Kit	D1900V2	5d041	Oct. 22, 2015	Oct. 21, 2016
SPEAG	2450MHz System Validation Kit	D2450V2	736	Aug. 20, 2015	Aug. 19, 2016
SPEAG	2600MHz System Validation Kit	D2600V2	1008	Aug. 19, 2015	Aug. 18, 2016
SPEAG	Data Acquisition Electronics	DAE4	916	Dec. 16, 2015	Dec. 15, 2016
SPEAG	Dosimetric E-Field Probe	EX3DV4	7346	Sep. 02, 2015	Sep. 01, 2016
WonDer	Thermometer	WD-5015	TM642	Oct. 16, 2015	Oct. 15, 2016
Anritsu	Radio Communication Analyzer	MT8820C	6201341950	Dec. 18, 2015	Dec. 17, 2016
Agilent	Wireless Communication Test Set	E5515C	MY48360820	Jan. 11, 2016	Jan. 10, 2018
R&S	Radio communication Tester	CMW500	149638	Aug. 04, 2015	Aug. 03, 2016
R&S	BT Base Station	CBT	101136	Sep. 17, 2015	Sep. 16, 2016
SPEAG	Device Holder	N/A	N/A	N/A	N/A
R&S	Signal Generator	MG3710A	6201502524	Dec. 18, 2015	Dec. 17, 2016
Agilent	ENA Network Analyzer	E5071C	MY46316648	Jan. 12, 2016	Jan. 11, 2017
SPEAG	Dielectric Probe Kit	DAK-3.5	1126	Jul. 21, 2015	Jul. 20, 2016
LINE SEIKI	Digital Thermometer	LKMelectronic	DTM3000SPEZIAL/90900	Aug. 26, 2015	Aug. 25, 2016
Anritsu	Power Meter	ML2495A	1419002	May. 10, 2016	May. 09, 2017
Anritsu	Power Sensor	MA2411B	1339124	May. 10, 2016	May. 09, 2017
Agilent	Spectrum Analyzer	E4408B	MY44211028	Aug. 24, 2015	Aug. 23, 2016
ATM	Dual Directional Coupler	C122H-10	P610410z-02	Note 1	
Woken	Attenuator 1	WK0602-XX	N/A	Note 1	
PE	Attenuator 2	PE7005-10	N/A	Note 1	
PE	Attenuator 3	PE7005- 3	N/A	Note 1	
AR	Power Amplifier	5S1G4M2	0328767	Note 1	
Mini-Circuits	Power Amplifier	ZVE-3W	162601250	Note 1	

General Note:

1. Prior to system verification and validation, the path loss from the signal generator to the system check source and the power meter, which includes the amplifier, cable, attenuator and directional coupler, was measured by the network analyzer. The reading of the power meter was offset by the path loss difference between the path to the power meter and the path to the system check source to monitor the actual power level fed to the system check source.

10. System Verification

10.1 Tissue Verification

The following tissue formulations are provided for reference only as some of the parameters have not been thoroughly verified. The composition of ingredients may be modified accordingly to achieve the desired target tissue parameters required for routine SAR evaluation.

Frequency (MHz)	Water (%)	Sugar (%)	Cellulose (%)	Salt (%)	Preventol (%)	DGBE (%)	Conductivity (σ)	Permittivity (εr)
For Head								
750	41.1	57.0	0.2	1.4	0.2	0	0.89	41.9
835	40.3	57.9	0.2	1.4	0.2	0	0.90	41.5
900	40.3	57.9	0.2	1.4	0.2	0	0.97	41.5
1800, 1900, 2000	55.2	0	0	0.3	0	44.5	1.40	40.0
2450	55.0	0	0	0	0	45.0	1.80	39.2
2600	54.8	0	0	0.1	0	45.1	1.96	39.0
For Body								
750	51.7	47.2	0	0.9	0.1	0	0.96	55.5
835	50.8	48.2	0	0.9	0.1	0	0.97	55.2
900	50.8	48.2	0	0.9	0.1	0	1.05	55.0
1800, 1900, 2000	70.2	0	0	0.4	0	29.4	1.52	53.3
2450	68.6	0	0	0	0	31.4	1.95	52.7
2600	68.1	0	0	0.1	0	31.8	2.16	52.5

Simulating Liquid for 5GHz, Manufactured by SPEAG

Ingredients	(% by weight)
Water	64~78%
Mineral oil	11~18%
Emulsifiers	9~15%
Additives and Salt	2~3%

<Tissue Dielectric Parameter Check Results>

Frequency (MHz)	Tissue Type	Liquid Temp. (℃)	Conductivity (σ)	Permittivity (ε_r)	Conductivity Target (σ)	Permittivity Target (ε_r)	Delta (σ) (%)	Delta (ε_r) (%)	Limit (%)	Date
750	HSL	22.2	0.895	41.600	0.89	41.90	0.56	-0.72	±5	2016/5/25
750	MSL	22.5	0.963	55.100	0.96	55.50	0.31	-0.72	±5	2016/5/19
750	MSL	22.3	0.962	55.000	0.96	55.50	0.21	-0.90	±5	2016/5/22
835	HSL	22.1	0.880	42.900	0.90	41.50	-2.22	3.37	±5	2016/5/25
835	MSL	22.5	0.974	57.000	0.97	55.20	0.41	3.26	±5	2016/5/19
835	MSL	22.5	0.978	56.700	0.97	55.20	0.82	2.72	±5	2016/5/21
1750	HSL	22.3	1.360	40.400	1.37	40.10	-0.73	0.75	±5	2016/5/23
1750	MSL	22.5	1.440	52.800	1.49	53.40	-3.36	-1.12	±5	2016/5/19
1750	MSL	22.5	1.430	52.500	1.49	53.40	-4.03	-1.69	±5	2016/5/20
1900	HSL	22.3	1.460	38.300	1.40	40.00	4.29	-4.25	±5	2016/5/24
1900	MSL	22.5	1.560	52.200	1.52	53.30	2.63	-2.06	±5	2016/5/19
1900	MSL	22.5	1.580	53.600	1.52	53.30	3.95	0.56	±5	2016/5/20
2450	HSL	22.5	1.740	38.000	1.80	39.20	-3.33	-3.06	±5	2016/5/17
2450	MSL	22.3	1.940	53.400	1.95	52.70	-0.51	1.33	±5	2016/5/23
2450	MSL	22.4	2.000	54.300	1.95	52.70	2.56	3.04	±5	2016/5/26
2600	HSL	22.5	1.910	37.500	1.96	39.00	-2.55	-3.85	±5	2016/5/17
2600	MSL	22.3	2.200	52.500	2.16	52.50	1.85	0.00	±5	2016/5/18

10.2 System Performance Check Results

Comparing to the original SAR value provided by SPEAG, the verification data should be within its specification of 10 %. Below table shows the target SAR and measured SAR after normalized to 1W input power. The table below indicates the system performance check can meet the variation criterion and the plots can be referred to Appendix A of this report.

Date	Frequency (MHz)	Tissue Type	Input Power (mW)	Dipole S/N	Probe S/N	DAE S/N	Measured 1g SAR (W/kg)	Targeted 1g SAR (W/kg)	Normalized 1g SAR (W/kg)	Deviation (%)
2016/5/25	750	HSL	250	D750V3-1078	EX3DV4 - SN7346	DAE4 Sn916	2.05	8.09	8.20	1.36
2016/5/19	750	MSL	250	D750V3-1078	EX3DV4 - SN7346	DAE4 Sn916	2.22	8.59	8.88	3.38
2016/5/22	750	MSL	250	D750V3-1078	EX3DV4 - SN7346	DAE4 Sn916	2.11	8.59	8.44	-1.75
2016/5/25	835	HSL	250	D835V2-499	EX3DV4 - SN7346	DAE4 Sn916	2.40	9.14	9.60	5.03
2016/5/19	835	MSL	250	D835V2-499	EX3DV4 - SN7346	DAE4 Sn916	2.34	9.52	9.36	-1.68
2016/5/21	835	MSL	250	D835V2-499	EX3DV4 - SN7346	DAE4 Sn916	2.55	9.52	10.20	7.14
2016/5/23	1750	HSL	250	D1750V2-1068	EX3DV4 - SN7346	DAE4 Sn916	8.84	36.80	35.36	-3.91
2016/5/19	1750	MSL	250	D1750V2-1068	EX3DV4 - SN7346	DAE4 Sn916	9.51	35.70	38.04	6.55
2016/5/20	1750	MSL	250	D1750V2-1068	EX3DV4 - SN7346	DAE4 Sn916	9.46	35.70	37.84	5.99
2016/5/24	1900	HSL	250	D1900V2-5d041	EX3DV4 - SN7346	DAE4 Sn916	10.50	39.80	42.00	5.53
2016/5/19	1900	MSL	250	D1900V2-5d041	EX3DV4 - SN7346	DAE4 Sn916	10.80	40.00	43.20	8.00
2016/5/20	1900	MSL	250	D1900V2-5d041	EX3DV4 - SN7346	DAE4 Sn916	10.80	40.00	43.20	8.00
2016/5/17	2450	HSL	250	D2450V2-736	EX3DV4 - SN7346	DAE4 Sn916	12.80	53.40	51.20	-4.12
2016/5/23	2450	MSL	250	D2450V2-736	EX3DV4 - SN7346	DAE4 Sn916	11.70	51.90	46.80	-9.83
2016/5/26	2450	MSL	250	D2450V2-736	EX3DV4 - SN7346	DAE4 Sn916	12.10	51.90	48.40	-6.74
2016/5/17	2600	HSL	250	D2600V2-1008	EX3DV4 - SN7346	DAE4 Sn916	13.80	56.30	55.20	-1.95
2016/5/18	2600	MSL	250	D2600V2-1008	EX3DV4 - SN7346	DAE4 Sn916	14.40	55.80	57.60	3.23

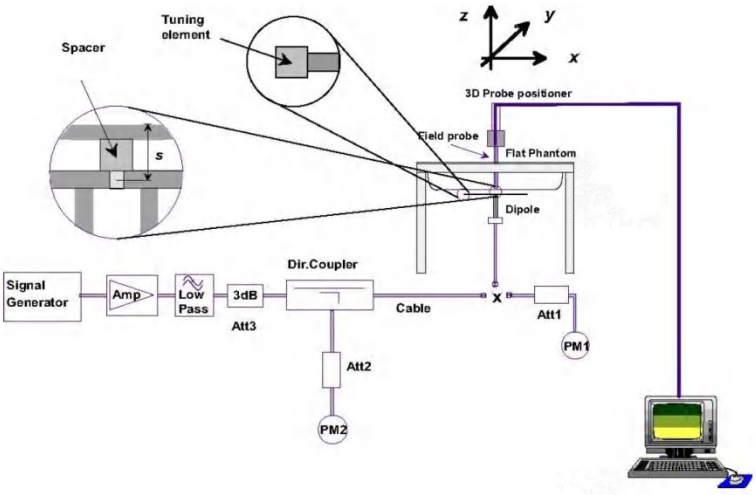


Fig 8.3.1 System Performance Check Setup

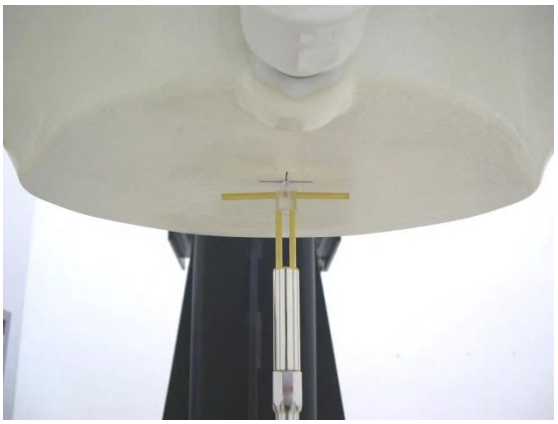


Fig 8.3.2 Setup Photo

11. RF Exposure Positions

11.1 Ear and handset reference point

Figure 9.1.1 shows the front, back, and side views of the SAM phantom. The center-of-mouth reference point is labeled “M,” the left ear reference point (ERP) is marked “LE,” and the right ERP is marked “RE.” Each ERP is 15 mm along the B-M (back-mouth) line behind the entrance-to-ear-canal (EEC) point, as shown in Figure 9.1.2 The Reference Plane is defined as passing through the two ear reference points and point M. The line N-F (neck-front), also called the reference pivoting line, is normal to the Reference Plane and perpendicular to both a line passing through RE and LE and the B-M line (see Figure 9.1.3). Both N-F and B-M lines should be marked on the exterior of the phantom shell to facilitate handset positioning. Posterior to the N-F line the ear shape is a flat surface with 6 mm thickness at each ERP, and forward of the N-F line the ear is truncated, as illustrated in Figure 9.1.2. The ear truncation is introduced to preclude the ear lobe from interfering with handset tilt, which could lead to unstable positioning at the cheek.

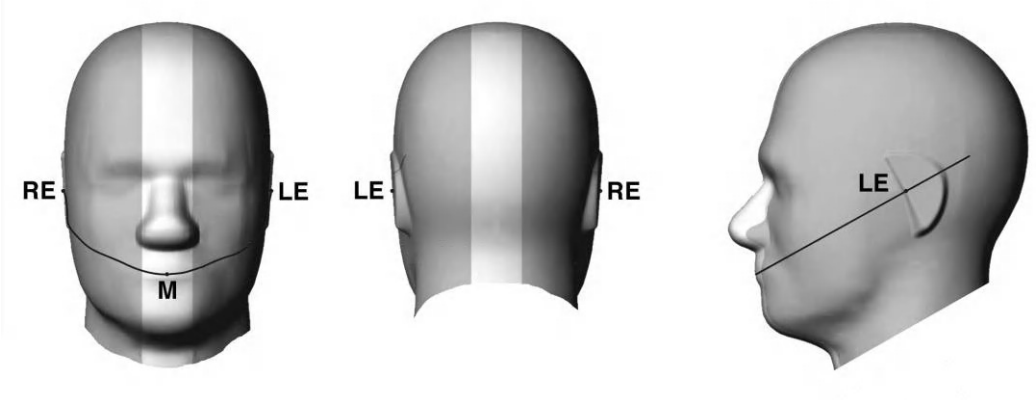


Fig 9.1.1 Front, back, and side views of SAM twin phantom

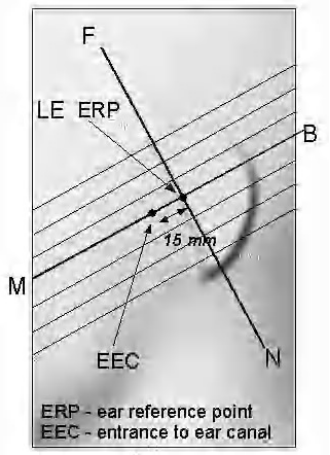


Fig 9.1.2 Close-up side view of phantom showing the ear region.

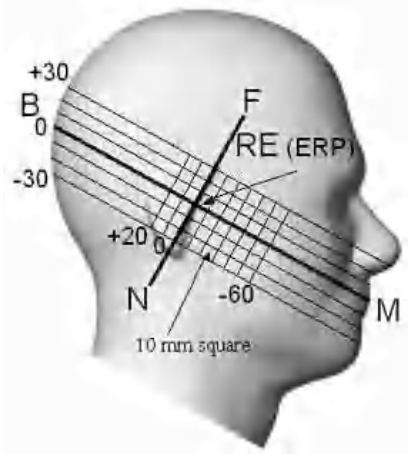


Fig 9.1.3 Side view of the phantom showing relevant markings and seven cross-sectional plane locations

11.2 Definition of the cheek position

1. Ready the handset for talk operation, if necessary. For example, for handsets with a cover piece (flip cover), open the cover. If the handset can transmit with the cover closed, both configurations must be tested.
2. Define two imaginary lines on the handset—the vertical centerline and the horizontal line. The vertical centerline passes through two points on the front side of the handset—the midpoint of the width wt of the handset at the level of the acoustic output (point A in Figure 9.2.1 and Figure 9.2.2), and the midpoint of the width wb of the bottom of the handset (point B). The horizontal line is perpendicular to the vertical centerline and passes through the center of the acoustic output (see Figure 9.2.1). The two lines intersect at point A. Note that for many handsets, point A coincides with the center of the acoustic output; however, the acoustic output may be located elsewhere on the horizontal line. Also note that the vertical centerline is not necessarily parallel to the front face of the handset (see Figure 9.2.2), especially for clamshell handsets, handsets with flip covers, and other irregularly-shaped handsets.
3. Position the handset close to the surface of the phantom such that point A is on the (virtual) extension of the line passing through points RE and LE on the phantom (see Figure 9.2.3), such that the plane defined by the vertical centerline and the horizontal line of the handset is approximately parallel to the sagittal plane of the phantom.
4. Translate the handset towards the phantom along the line passing through RE and LE until handset point A touches the pinna at the ERP.
5. While maintaining the handset in this plane, rotate it around the LE-RE line until the vertical centerline is in the plane normal to the plane containing B-M and N-F lines, i.e., the Reference Plane.
6. Rotate the handset around the vertical centerline until the handset (horizontal line) is parallel to the N-F line.
7. While maintaining the vertical centerline in the Reference Plane, keeping point A on the line passing through RE and LE, and maintaining the handset contact with the pinna, rotate the handset about the N-F line until any point on the handset is in contact with a phantom point below the pinna on the cheek. See Figure 9.2.3. The actual rotation angles should be documented in the test report.

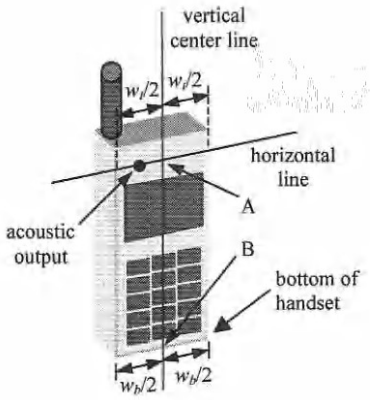


Fig 9.2.1 Handset vertical and horizontal reference lines—"fixed case

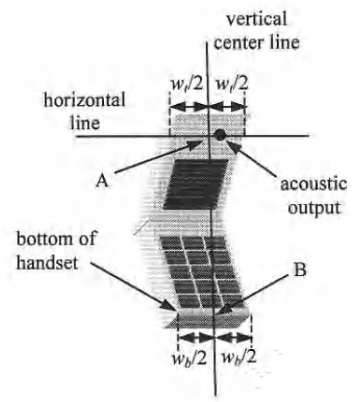


Fig 9.2.2 Handset vertical and horizontal reference lines—"clam-shell case"

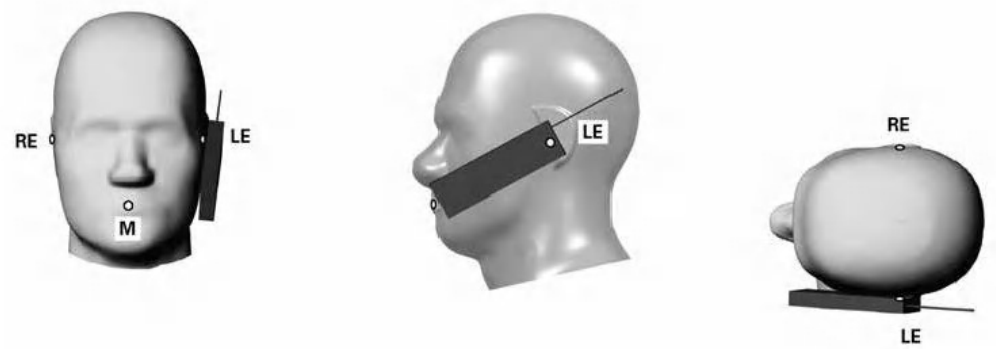


Fig 9.2.3 cheek or touch position. The reference points for the right ear (RE), left ear (LE), and mouth (M), which establish the Reference Plane for handset positioning, are indicated.

11.3 Definition of the tilt position

1. Ready the handset for talk operation, if necessary. For example, for handsets with a cover piece (flip cover), open the cover. If the handset can transmit with the cover closed, both configurations must be tested.
2. While maintaining the orientation of the handset, move the handset away from the pinna along the line passing through RE and LE far enough to allow a rotation of the handset away from the cheek by 15°.
3. Rotate the handset around the horizontal line by 15°.
4. While maintaining the orientation of the handset, move the handset towards the phantom on the line passing through RE and LE until any part of the handset touches the ear. The tilt position is obtained when the contact point is on the pinna. See Figure 9.3.1. If contact occurs at any location other than the pinna, e.g., the antenna at the back of the phantom head, the angle of the handset should be reduced. In this case, the tilt position is obtained if any point on the handset is in contact with the pinna and a second point

Fig 9.3.1 Tilt position. The reference points for the right ear (RE), left ear (LE), and mouth (M), which define the Reference Plane for handset positioning, are indicated.

11.4 Body Worn Accessory

Body-worn operating configurations are tested with the belt-clips and holsters attached to the device and positioned against a flat phantom in a normal use configuration (see Figure 9.4). Per KDB648474 D04v01r03, body-worn accessory exposure is typically related to voice mode operations when handsets are carried in body-worn accessories. The body-worn accessory procedures in FCC KDB 447498 D01v06 should be used to test for body-worn accessory SAR compliance, without a headset connected to it. This enables the test results for such configuration to be compatible with that required for hotspot mode when the body-worn accessory test separation distance is greater than or equal to that required for hotspot mode, when applicable. When the reported SAR for body-worn accessory, measured without a headset connected to the handset is < 1.2 W/kg, the highest reported SAR configuration for that wireless mode and frequency band should be repeated for that body-worn accessory with a handset attached to the handset.

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

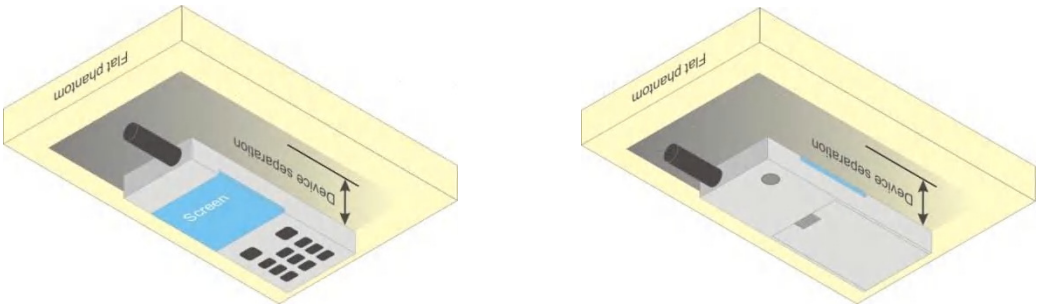


Fig 9.4 Body Worn Position

11.5 Wireless Router

Some battery-operated handsets have the capability to transmit and receive user through simultaneous transmission of WIFI simultaneously with a separate licensed transmitter. The FCC has provided guidance in FCC KDB Publication 941225 D06 v02r01 where SAR test considerations for handsets (L x W ≥ 9 cm x 5 cm) are based on a composite test separation distance of 10mm from the front, back and edges of the device containing transmitting antennas within 2.5cm of their edges, determined form general mixed use conditions for this type of devices. Since the hotspot SAR results may overlap with the body-worn accessory SAR requirements, the more conservative configurations can be considered, thus excluding some body-worn accessory SAR tests.

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

12. Conducted RF Output Power (Unit: dBm)

<GSM Conducted Power>

General Note:

1. Per KDB 447498 D01v06, the maximum output power channel is used for SAR testing and for further SAR test reduction.
2. Per KDB 941225 D01v03r01, for SAR test reduction for GSM / GPRS / EDGE modes is determined by the source-based time-averaged output power including tune-up tolerance. The mode with highest specified time-averaged output power should be tested for SAR compliance in the applicable exposure conditions. For modes with the same specified maximum output power and tolerance, the higher number time-slot configuration should be tested. Therefore, the GPRS (2Tx slots) for GSM850 and GPRS (3Tx slots) for GSM1900 are considered as the primary mode.
3. Other configurations of GSM / GPRS / EDGE are considered as secondary modes. The 3G SAR test reduction procedure is applied, when the maximum output power and tune-up tolerance specified for production units in a secondary mode is ≤ ¼ dB higher than the primary mode, SAR measurement is not required for the secondary mode

Band GSM850	Burst Average Power (dBm)			Tune-up Limit (dBm)	Frame-Average Power (dBm)			Tune-up Limit (dBm)
TX Channel	128	189	251		128	189	251	
Frequency (MHz)	824.2	836.4	848.8		824.2	836.4	848.8	
GSM 1 Tx slot	32.50	32.41	32.12	34.00	23.50	23.41	23.12	25.00
GPRS 1 Tx slot	32.48	32.39	32.10	34.00	23.48	23.39	23.10	25.00
GPRS 2 Tx slots	29.77	29.74	29.72	31.30	23.77	23.74	23.72	25.30
GPRS 3 Tx slots	27.94	28.01	27.94	29.30	23.68	23.75	23.68	25.04
GPRS 4 Tx slots	26.78	26.77	26.71	28.00	23.78	23.77	23.71	25.00
EDGE 1 Tx slot	26.78	26.72	26.69	28.00	17.78	17.72	17.69	19.00
EDGE 2 Tx slots	24.23	24.17	24.17	25.50	18.23	18.17	18.17	19.50
EDGE 3 Tx slots	22.67	22.55	22.56	24.00	18.41	18.29	18.30	19.74
EDGE 4 Tx slots	21.51	21.54	21.31	22.80	18.51	18.54	18.31	19.80

Band GSM1900	Burst Average Power (dBm)			Tune-up Limit (dBm)	Frame-Average Power (dBm)			Tune-up Limit (dBm)
TX Channel	512	661	810		512	661	810	
Frequency (MHz)	1850.2	1880	1909.8		1850.2	1880	1909.8	
GSM 1 Tx slot	29.70	29.76	29.85	31.00	20.70	20.76	20.85	22.00
GPRS 1 Tx slot	29.68	29.74	29.81	31.00	20.68	20.74	20.81	22.00
GPRS 2 Tx slots	27.51	27.66	27.84	28.80	21.51	21.66	21.84	22.80
GPRS 3 Tx slots	25.99	26.30	26.31	27.70	21.73	22.04	22.05	23.44
GPRS 4 Tx slots	24.63	24.78	24.91	26.30	21.63	21.78	21.91	23.30
EDGE 1 Tx slot	25.75	25.79	25.91	27.20	16.75	16.79	16.91	18.20
EDGE 2 Tx slots	23.16	23.90	23.31	24.50	17.16	17.90	17.31	18.50
EDGE 3 Tx slots	22.10	22.16	22.28	23.80	17.84	17.90	18.02	19.54
EDGE 4 Tx slots	20.72	20.83	20.93	22.60	17.72	17.83	17.93	19.60

<WCDMA Conducted Power>

1. The following tests were conducted according to the test requirements outlines in 3GPP TS 34.121 specification.
2. The procedures in KDB 941225 D01v03r01 are applied for 3GPP Rel. 6 HSPA to configure the device in the required sub-test mode(s) to determine SAR test exclusion.
3. For DC-HSDPA, the device was configured according to the H-Set 12, Fixed Reference Channel (FRC) configuration in Table C.8.1.12 of 3GPP TS 34.121-1, with the primary and the secondary serving HS-DSCH Cell enabled during the power measurement.

A summary of these settings are illustrated below:

HSDPA Setup Configuration:

a. The EUT was connected to Base Station Agilent E5515C referred to the Setup Configuration.
b. The RF path losses were compensated into the measurements.
c. A call was established between EUT and Base Station with following setting:
   i. Set Gain Factors (β_c and β_d) and parameters were set according to each
   ii. Specific sub-test in the following table, C10.1.4, quoted from the TS 34.121
   iii. Set RMC 12.2Kbps + HSDPA mode.
   iv. Set Cell Power = -86 dBm
   v. Set HS-DSCH Configuration Type to FRC (H-set 1, QPSK)
   vi. Select HSDPA Uplink Parameters
   vii. Set Delta ACK, Delta NACK and Delta CQI = 8
   viii. Set Ack-Nack Repetition Factor to 3
   ix. Set CQI Feedback Cycle (k) to 4 ms
   x. Set CQI Repetition Factor to 2
   xi. Power Ctrl Mode = All Up bits
d. The transmitted maximum output power was recorded.

Table C.10.1.4: β values for transmitter characteristics tests with HS-DPCCH

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

Note 1: Δ_{ACK}, Δ_{NACK} and Δ_{CQI} = 30/15 with $\beta_{hs} = 30/15 * \beta_c$.

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

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

Note 4: For subtest 2 the β_c/β_d ratio of 12/15 for the TFC during the measurement period (TF1, TF0) is achieved by setting the signalled gain factors for the reference TFC (TF1, TF1) to β_c = 11/15 and β_d = 15/15.

Setup Configuration

HSUPA Setup Configuration:

a. The EUT was connected to Base Station Agilent E5515C referred to the Setup Configuration.
b. The RF path losses were compensated into the measurements.
c. A call was established between EUT and Base Station with following setting * :
   i. Call Configs = 5.2B, 5.9B, 5.10B, and 5.13.2B with QPSK
   ii. Set the Gain Factors (β_c and β_d) and parameters (AG Index) were set according to each specific sub-test in the following table, C11.1.3, quoted from the TS 34.121
   iii. Set Cell Power = -86 dBm
   iv. Set Channel Type = 12.2k + HSPA
   v. Set UE Target Power
   vi. Power Ctrl Mode= Alternating bits
   vii. Set and observe the E-TFCI
   viii. Confirm that E-TFCI is equal to the target E-TFCI of 75 for sub-test 1, and other subtest's E-TFCI
d. The transmitted maximum output power was recorded.

Table C.11.1.3: β values for transmitter characteristics tests with HS-DPCCH and E-DCH

Sub-test	β_c	β_d	β_d (SF)	β_c/β_d	β_{HS} (Note1)	β_{ec}	β_{ed} (Note 5) (Note 6)	β_{ed} (SF)	β_{ed} (Codes)	CM (dB) (Note 2)	MPR (dB) (Note 2)	AG Index (Note 6)	E-TFCI
1	11/15 (Note 3)	15/15 (Note 3)	64	11/15 (Note 3)	22/15	209/225	1309/225	4	1	1.0	0.0	20	75
2	6/15	15/15	64	6/15	12/15	12/15	94/75	4	1	3.0	2.0	12	67
3	15/15	9/15	64	15/9	30/15	30/15	$\beta_{ed}1$: 47/15 $\beta_{ed}2$: 47/15	4 4	2	2.0	1.0	15	92
4	2/15	15/15	64	2/15	4/15	2/15	56/75	4	1	3.0	2.0	17	71
5	15/15 (Note 4)	15/15 (Note 4)	64	15/15 (Note 4)	30/15	24/15	134/15	4	1	1.0	0.0	21	81

Note 1: Δ_{ACK}, Δ_{NACK} and Δ_{CQI} = 30/15 with β_{hs} = 30/15 * β_c .
Note 2: CM = 1 for β_c/β_d =12/15, β_{hs}/β_c=24/15. For all other combinations of DPDCH, DPCCH, HS- DPCCH, E-DPDCH and E-DPCCH the MPR is based on the relative CM difference.
Note 3: For subtest 1 the β_c/β_d ratio of 11/15 for the TFC during the measurement period (TF1, TF0) is achieved by setting the signalled gain factors for the reference TFC (TF1, TF1) to β_c = 10/15 and β_d = 15/15.
Note 4: For subtest 5 the β_c/β_d ratio of 15/15 for the TFC during the measurement period (TF1, TF0) is achieved by setting the signalled gain factors for the reference TFC (TF1, TF1) to β_c = 14/15 and β_d = 15/15.
Note 5: In case of testing by UE using E-DPDCH Physical Layer category 1, Sub-test 3 is omitted according to TS25.306 Table 5.1g.
Note 6: β_{ed} can not be set directly, it is set by Absolute Grant Value.

Setup Configuration

DC-HSDPA 3GPP release 8 Setup Configuration:

a. The EUT was connected to Base Station Agilent E5515C referred to the Setup Configuration below
b. The RF path losses were compensated into the measurements.
c. A call was established between EUT and Base Station with following setting:
   i. Set RMC 12.2Kbps + HSDPA mode.
   ii. Set Cell Power = -25 dBm
   iii. Set HS-DSCH Configuration Type to FRC (H-set 12, QPSK)
   iv. Select HSDPA Uplink Parameters
   v. Set Gain Factors (β_c and β_d) and parameters were set according to each Specific sub-test in the following table, C10.1.4, quoted from the TS 34.121
      a). Subtest 1: β_c/β_d=2/15
      b). Subtest 2: β_c/β_d=12/15
      c). Subtest 3: β_c/β_d=15/8
      d). Subtest 4: β_c/β_d=15/4
   vi. Set Delta ACK, Delta NACK and Delta CQI = 8
   vii. Set Ack-Nack Repetition Factor to 3
   viii. Set CQI Feedback Cycle (k) to 4 ms
   ix. Set CQI Repetition Factor to 2
   x. Power Ctrl Mode = All Up bits
d. The transmitted maximum output power was recorded.

The following tests were conducted according to the test requirements outlines in 3GPP TS 34.121 specification.
A summary of these settings are illustrated below:

C.8.1.12 Fixed Reference Channel Definition H-Set 12

Table C.8.1.12: Fixed Reference Channel H-Set 12

Parameter	Unit	Value
Nominal Avg. Inf. Bit Rate	kbps	60
Inter-TTI Distance	TTI's	1
Number of HARQ Processes	Processes	6
Information Bit Payload (N_{INF})	Bits	120
Number Code Blocks	Blocks	1
Binary Channel Bits Per TTI	Bits	960
Total Available SML's in UE	SML's	19200
Number of SML's per HARQ Proc.	SML's	3200
Coding Rate		0.15
Number of Physical Channel Codes	Codes	1
Modulation		QPSK

Note 1: The RMC is intended to be used for DC-HSDPA mode and both cells shall transmit with identical parameters as listed in the table.
Note 2: Maximum number of transmission is limited to 1, i.e., retransmission is not allowed. The redundancy and constellation version 0 shall be used.

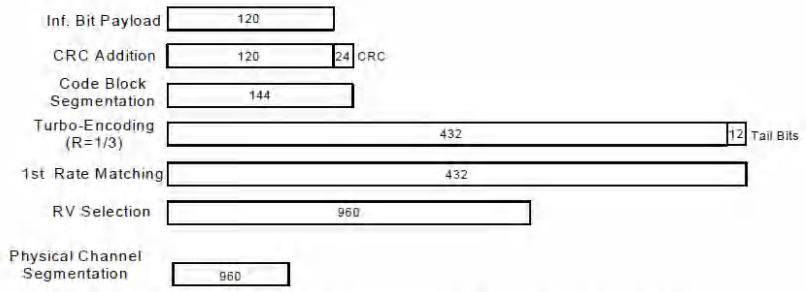


Figure C.8.19: Coding rate for Fixed reference Channel H-Set 12 (QPSK)

Setup Configuration

<WCDMA Conducted Power>

General Note:

1. Per KDB 941225 D01v03r01, for SAR testing is measured using a 12.2 kbps RMC with TPC bits configured to all "1's".
2. Per KDB 941225 D01v03r01, RMC 12.2kbps setting is used to evaluate SAR. If the maximum output power and tune-up tolerance specified for production units in HSDPA / HSUPA / DC-HSDPA is ≤ ¼ dB higher than RMC 12.2Kbps or when the highest reported SAR of the RMC12.2Kbps is scaled by the ratio of specified maximum output power and tune-up tolerance of HSDPA / HSUPA / DC-HSDPA to RMC12.2Kbps and the adjusted SAR is ≤ 1.2 W/kg, SAR measurement is not required for HSDPA / HSUPA / DC-HSDPA.

Band		WCDMA V			Tune-up Limit (dBm)	WCDMA II			Tune-up Limit (dBm)	WCDMA IV			Tune-up Limit (dBm)
TX Channel		4132	4182	4233		9262	9400	9538		1312	1413	1513	
Rx Channel		4357	4407	4458		9662	9800	9938		1537	1638	1738	
Frequency (MHz)		826.4	836.4	846.6		1852.4	1880	1907.6		1712.4	1732.6	1752.6	
3GPP Rel 99	AMR 12.2Kbps	22.80	22.85	22.84	24.00	22.65	22.57	22.55	24.00	22.59	22.42	22.48	24.00
3GPP Rel 99	RMC 12.2Kbps	22.83	22.89	22.87	24.00	22.69	22.61	22.59	24.00	22.61	22.45	22.51	24.00
3GPP Rel 6	HSDPA Subtest-1	21.33	21.58	21.65	23.00	21.66	21.33	21.57	23.00	21.22	21.24	21.48	23.00
3GPP Rel 6	HSDPA Subtest-2	21.59	21.71	21.55	23.00	21.46	21.46	21.76	23.00	21.20	21.40	21.59	23.00
3GPP Rel 6	HSDPA Subtest-3	21.19	21.21	21.27	22.50	21.28	21.05	21.25	22.50	20.70	20.89	20.75	22.50
3GPP Rel 6	HSDPA Subtest-4	21.05	21.38	21.25	22.50	21.29	21.09	21.08	22.50	20.52	20.97	20.72	22.50
3GPP Rel 8	DC-HSDPA Subtest-1	21.78	21.76	21.62	23.00	21.85	21.82	21.85	23.00	21.66	21.44	21.56	23.00
3GPP Rel 8	DC-HSDPA Subtest-2	21.76	21.74	21.56	23.00	21.81	21.84	22.01	23.00	21.64	21.43	21.48	23.00
3GPP Rel 8	DC-HSDPA Subtest-3	21.13	21.22	21.08	22.50	21.19	21.45	21.49	22.50	21.19	20.97	20.98	22.50
3GPP Rel 8	DC-HSDPA Subtest-4	21.11	21.20	21.06	22.50	21.16	21.44	21.40	22.50	21.16	20.96	20.96	22.50
3GPP Rel 6	HSUPA Subtest-1	21.41	21.65	21.14	23.00	21.49	21.03	21.10	23.00	21.17	21.05	21.06	23.00
3GPP Rel 6	HSUPA Subtest-2	20.09	20.54	20.51	21.00	20.26	20.44	20.70	21.00	19.85	20.26	20.52	21.00
3GPP Rel 6	HSUPA Subtest-3	20.38	20.00	20.43	22.00	20.02	20.05	20.31	22.00	20.09	20.47	20.29	22.00
3GPP Rel 6	HSUPA Subtest-4	20.82	20.80	20.80	21.00	20.95	20.52	20.86	21.00	20.85	20.53	20.82	21.00
3GPP Rel 6	HSUPA Subtest-5	21.02	21.06	21.16	23.00	21.23	21.05	21.12	23.00	21.02	21.05	21.13	23.00

<CDMA Conducted Power>

General Note:

1. Per KDB 941225 D01v03r01, SAR for head exposure is measured in RC3 with the handset configured to transmit at full rate in SO55.
2. Per KDB 941225 D01v03r01, in Hotspot mode EUT is treated as data device and SAR is tested with Ev-Do Rev 0 (RTAP 153.6kbps) as the primary mode.
3. Per KDB 941225 D01v03r01, for Body-worn accessory SAR is measured in RC3 with the handset configured in TDSO/SO32 to transmit at full rate on FCH only with all other code channels disabled. The body-worn accessory procedures in KDB Publication 447498 are applied. The 3G SAR test reduction procedure is applied to the multiple code channel configuration (FCH+SCH), with FCH only as the primary mode.

Band	CDMA2000 BC10			Tune-up Limit (dBm)	CDMA2000 BC0			Tune-up Limit (dBm)	CDMA2000 BC1			Tune-up Limit (dBm)
TX Channel	370	520	670		1013	384	777		25	600	1175	
Frequency (MHz)	815.25	819	822.75		824.7	836.52	848.31		1851.25	1880	1908.75	
RC1 SO55	23.76	23.91	23.90	25.00	23.85	23.86	23.83	25.00	23.38	23.33	23.62	25.00
RC3 SO55	23.89	23.89	23.81	25.00	23.75	23.84	23.73	25.00	23.52	23.48	23.68	25.00
RC3 SO32(F+SCH)	23.87	23.93	23.89	25.00	23.96	23.92	23.91	25.00	23.64	23.46	23.82	25.00
RC3 SO32(+SCH)	23.85	23.81	23.82	25.00	23.86	23.89	23.78	25.00	23.60	23.56	23.74	25.00
RTAP 153.6Kbps	23.81	23.87	23.78	25.00	23.77	23.66	23.76	25.00	23.56	23.52	23.77	25.00
RETAP 4096Bits	23.84	23.85	23.83	25.00	23.62	23.71	23.68	25.00	23.60	23.47	23.64	25.00

<LTE Conducted Power>

General Note:

1. Anritsu MT8820C base station simulator was used to setup the connection with EUT; the frequency band, channel bandwidth, RB allocation configuration, modulation type are set in the base station simulator to configure EUT transmitting at maximum power and at different configurations which are requested to be reported to FCC, for conducted power measurement and SAR testing.
2. Per KDB 941225 D05v02r05, when a properly configured base station simulator is used for the SAR and power measurements, spectrum plots for each RB allocation and offset configuration is not required.
3. Per KDB 941225 D05v02r05, start with the largest channel bandwidth and measure SAR for QPSK with 1 RB allocation, using the RB offset and required test channel combination with the highest maximum output power for RB offsets at the upper edge, middle and lower edge of each required test channel.
4. Per KDB 941225 D05v02r05, 50% RB allocation for QPSK SAR testing follows 1RB QPSK allocation procedure.
5. Per KDB 941225 D05v02r05, For QPSK with 100% RB allocation, SAR is not required when the highest maximum output power for 100 % RB allocation is less than the highest maximum output power in 50% and 1 RB allocations and the highest reported SAR for 1 RB and 50% RB allocation are ≤ 0.8 W/kg. Otherwise, SAR is measured for the highest output power channel; and if the reported SAR is > 1.45 W/kg, the remaining required test channels must also be tested.
6. Per KDB 941225 D05v02r05, 16QAM output power for each RB allocation configuration is > not ½ dB higher than the same configuration in QPSK and the reported SAR for the QPSK configuration is ≤ 1.45 W/kg; Per KDB 941225 D05v02r05, 16QAM SAR testing is not required.
7. Per KDB 941225 D05v02r05, Smaller bandwidth output power for each RB allocation configuration is > not ½ dB higher than the same configuration in the largest supported bandwidth, and the reported SAR for the largest supported bandwidth is ≤ 1.45 W/kg; Per KDB 941225 D05v02r05, smaller bandwidth SAR testing is not required.
8. For LTE B4 / B5 / B12 / B26 the maximum bandwidth does not support three non-overlapping channels, per KDB 941225 D05v02r05, when a device supports overlapping channel assignment in a channel bandwidth configuration, the middle channel of the group of overlapping channels should be selected for testing.
9. LTE band 17 SAR test was covered by Band 12; according to April 2015 TCB workshop, SAR test for overlapping LTE bands can be reduced if
    a. the maximum output power, including tolerance, for the smaller band is ≤ the larger band to qualify for the SAR test exclusion
    b. the channel bandwidth and other operating parameters for the smaller band are fully supported by the larger band

<LTE Band 2>

BW [MHz]	Modulation	RB Size	RB Offset	Power Low Ch. / Freq.	Power Middle Ch. / Freq.	Power High Ch. / Freq.	Tune-up limit (dBm)	MPR (dB)
Channel				18700	18900	19100		
Frequency (MHz)				1860	1880	1900		
20	QPSK	1	0	22.47	22.37	22.45	24	0
20	QPSK	1	49	22.52	22.38	22.60		
20	QPSK	1	99	22.26	22.36	22.48		
20	QPSK	50	0	21.36	21.50	21.52	23	1
20	QPSK	50	24	21.42	21.55	21.57		
20	QPSK	50	50	21.29	21.49	21.52		
20	QPSK	100	0	21.38	21.48	21.43		
20	16QAM	1	0	21.74	21.81	21.36	23	1
20	16QAM	1	49	21.89	21.64	21.98		
20	16QAM	1	99	21.47	21.55	21.52		
20	16QAM	50	0	20.43	20.48	20.40	22	2
20	16QAM	50	24	20.51	20.45	20.47		
20	16QAM	50	50	20.38	20.44	20.51		
20	16QAM	100	0	20.56	20.47	20.51		
Channel				18675	18900	19125	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				1857.5	1880	1902.5		
15	QPSK	1	0	22.38	22.54	22.42	24	0
15	QPSK	1	37	22.31	22.31	22.48		
15	QPSK	1	74	22.48	22.36	22.39		
15	QPSK	36	0	21.45	21.62	21.62	23	1
15	QPSK	36	20	21.49	21.60	21.54		
15	QPSK	36	39	21.53	21.53	21.59		
15	QPSK	75	0	21.53	21.55	21.55		
15	16QAM	1	0	21.82	21.85	21.70	23	1
15	16QAM	1	37	21.70	21.62	21.77		
15	16QAM	1	74	21.79	21.68	21.60		
15	16QAM	36	0	20.53	20.59	20.56	22	2
15	16QAM	36	20	20.42	20.47	20.60		
15	16QAM	36	39	20.52	20.52	20.57		
15	16QAM	75	0	20.48	20.58	20.63		
Channel				18650	18900	19150	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				1855	1880	1905		
10	QPSK	1	0	22.47	22.57	22.50	24	0
10	QPSK	1	25	22.35	22.52	22.54		
10	QPSK	1	49	22.50	22.53	22.37		
10	QPSK	25	0	21.53	21.60	21.57	23	1
10	QPSK	25	12	21.50	21.58	21.57		
10	QPSK	25	25	21.40	21.61	21.53		
10	QPSK	50	0	21.45	21.57	21.55		
10	16QAM	1	0	21.74	21.90	21.92	23	1
10	16QAM	1	25	21.65	21.68	21.85		
10	16QAM	1	49	21.72	21.77	21.72		
10	16QAM	25	0	20.60	20.58	20.75	22	2
10	16QAM	25	12	20.52	20.65	20.69		
10	16QAM	25	25	20.60	20.69	20.70		
10	16QAM	50	0	20.51	20.55	20.52		

Channel				18625	18900	19175	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				1852.5	1880	1907.5		
5	QPSK	1	0	22.19	22.54	22.58	24	0
5	QPSK	1	12	22.30	22.48	22.42		
5	QPSK	1	24	22.36	22.47	22.50		
5	QPSK	12	0	21.44	21.57	21.52	23	1
5	QPSK	12	7	21.49	21.49	21.43		
5	QPSK	12	13	21.48	21.53	21.43		
5	QPSK	25	0	21.55	21.47	21.47		
5	16QAM	1	0	21.75	21.77	21.83	23	1
5	16QAM	1	12	21.68	21.80	21.70		
5	16QAM	1	24	21.51	21.71	21.71		
5	16QAM	12	0	20.41	20.56	20.48	22	2
5	16QAM	12	7	20.46	20.58	20.50		
5	16QAM	12	13	20.47	20.51	20.44		
5	16QAM	25	0	20.52	20.55	20.65		
Channel				18615	18900	19185	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				1851.5	1880	1908.5		
3	QPSK	1	0	22.43	22.36	22.30	24	0
3	QPSK	1	8	22.59	22.55	22.32		
3	QPSK	1	14	22.57	22.47	22.20		
3	QPSK	8	0	21.41	21.55	21.44	23	1
3	QPSK	8	4	21.50	21.55	21.44		
3	QPSK	8	7	21.47	21.57	21.35		
3	QPSK	15	0	21.40	21.51	21.35		
3	16QAM	1	0	21.69	21.67	21.75	23	1
3	16QAM	1	8	21.87	21.71	21.61		
3	16QAM	1	14	21.85	21.79	21.51		
3	16QAM	8	0	20.42	20.68	20.67	22	2
3	16QAM	8	4	20.52	20.68	20.56		
3	16QAM	8	7	20.59	20.68	20.38		
3	16QAM	15	0	20.57	20.66	20.45		
Channel				18607	18900	19193	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				1850.7	1880	1909.3		
1.4	QPSK	1	0	22.15	22.32	22.20	24	0
1.4	QPSK	1	3	22.37	22.53	22.37		
1.4	QPSK	1	5	22.31	22.34	22.24		
1.4	QPSK	3	0	22.38	22.33	22.35		
1.4	QPSK	3	1	22.50	22.37	22.36		
1.4	QPSK	3	3	22.39	22.38	22.35		
1.4	QPSK	6	0	21.41	21.47	21.40	23	1
1.4	16QAM	1	0	21.64	21.64	21.59	23	1
1.4	16QAM	1	3	21.87	21.70	21.44		
1.4	16QAM	1	5	21.62	21.65	21.51		
1.4	16QAM	3	0	21.58	21.43	21.46		
1.4	16QAM	3	1	21.65	21.73	21.53		
1.4	16QAM	3	3	21.57	21.73	21.54		
1.4	16QAM	6	0	20.35	20.59	20.38	22	2

<LTE Band 4>

BW [MHz]	Modulation	RB Size	RB Offset	Power Low Ch. / Freq.	Power Middle Ch. / Freq.	Power High Ch. / Freq.	Tune-up limit (dBm)	MPR (dB)
Channel				20050	20175	20300		
Frequency (MHz)				1720	1732.5	1745		
20	QPSK	1	0	23.38	23.51	23.27	24	0
20	QPSK	1	49	23.16	23.24	23.24		
20	QPSK	1	99	23.06	22.98	23.06		
20	QPSK	50	0	22.27	22.38	22.35	23	1
20	QPSK	50	24	22.19	22.17	22.14		
20	QPSK	50	50	22.18	22.15	22.10		
20	QPSK	100	0	22.22	22.25	22.14		
20	16QAM	1	0	22.62	22.24	22.65	23	1
20	16QAM	1	49	22.47	22.46	22.84		
20	16QAM	1	99	21.90	22.22	22.29		
20	16QAM	50	0	21.21	21.34	21.22	22	2
20	16QAM	50	24	21.25	21.17	21.07		
20	16QAM	50	50	21.13	21.07	21.16		
20	16QAM	100	0	21.21	21.24	21.18		
Channel				20025	20175	20325	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				1717.5	1732.5	1747.5		
15	QPSK	1	0	23.24	23.22	23.30	24	0
15	QPSK	1	37	23.13	22.93	23.11		
15	QPSK	1	74	23.10	22.83	23.06		
15	QPSK	36	0	22.19	22.32	22.21	23	1
15	QPSK	36	20	22.20	22.06	22.25		
15	QPSK	36	39	22.08	22.01	22.14		
15	QPSK	75	0	22.16	22.10	22.15		
15	16QAM	1	0	22.55	22.71	22.60	23	1
15	16QAM	1	37	22.42	22.33	22.39		
15	16QAM	1	74	22.45	22.35	22.30		
15	16QAM	36	0	21.13	21.32	21.23	22	2
15	16QAM	36	20	21.10	21.14	21.10		
15	16QAM	36	39	21.05	20.97	21.09		
15	16QAM	75	0	21.08	21.17	21.19		
Channel				20000	20175	20350	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				1715	1732.5	1750		
10	QPSK	1	0	23.22	23.46	23.29	24	0
10	QPSK	1	25	23.09	23.17	23.21		
10	QPSK	1	49	23.14	22.97	22.89		
10	QPSK	25	0	22.14	22.22	22.11	23	1
10	QPSK	25	12	22.16	22.12	22.12		
10	QPSK	25	25	22.20	22.05	22.10		
10	QPSK	50	0	22.13	22.10	22.12		
10	16QAM	1	0	22.56	22.69	22.56	23	1
10	16QAM	1	25	22.43	22.19	22.48		
10	16QAM	1	49	22.40	22.33	22.28		
10	16QAM	25	0	21.16	21.22	21.15	22	2
10	16QAM	25	12	21.10	21.03	21.05		
10	16QAM	25	25	21.11	21.14	21.15		
10	16QAM	50	0	21.17	21.20	21.27		

Channel				19975	20175	20375	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				1712.5	1732.5	1752.5		
5	QPSK	1	0	22.92	23.23	23.34	24	0
5	QPSK	1	12	23.07	23.21	23.15		
5	QPSK	1	24	23.15	23.08	22.94		
5	QPSK	12	0	22.08	22.18	22.17	23	1
5	QPSK	12	7	22.03	22.09	22.12		
5	QPSK	12	13	22.08	22.12	22.04		
5	QPSK	25	0	22.12	22.09	22.05		
5	16QAM	1	0	22.44	22.42	22.73	23	1
5	16QAM	1	12	22.37	22.35	22.47		
5	16QAM	1	24	22.44	22.29	22.24		
5	16QAM	12	0	21.13	21.10	21.13	22	2
5	16QAM	12	7	21.08	21.14	21.09		
5	16QAM	12	13	21.13	21.11	21.03		
5	16QAM	25	0	20.97	21.09	21.11		
Channel				19965	20175	20385	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				1711.5	1732.5	1753.5		
3	QPSK	1	0	23.04	23.15	23.30	24	0
3	QPSK	1	8	23.04	23.27	23.07		
3	QPSK	1	14	23.22	23.24	22.86		
3	QPSK	8	0	22.08	22.20	22.21	23	1
3	QPSK	8	4	22.08	22.18	22.09		
3	QPSK	8	7	22.15	22.10	22.09		
3	QPSK	15	0	22.08	22.11	22.10		
3	16QAM	1	0	22.48	22.49	22.59	23	1
3	16QAM	1	8	22.38	22.41	22.41		
3	16QAM	1	14	22.43	22.40	22.18		
3	16QAM	8	0	21.09	21.15	21.11	22	2
3	16QAM	8	4	21.08	21.14	21.13		
3	16QAM	8	7	21.05	21.15	21.04		
3	16QAM	15	0	20.90	20.85	20.81		
Channel				19957	20175	20393	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				1710.7	1732.5	1754.3		
1.4	QPSK	1	0	22.87	22.90	23.03	24	0
1.4	QPSK	1	3	22.94	22.99	23.13		
1.4	QPSK	1	5	22.85	22.94	22.94		
1.4	QPSK	3	0	23.09	23.00	23.13		
1.4	QPSK	3	1	23.23	23.09	23.04		
1.4	QPSK	3	3	23.17	23.06	22.98		
1.4	QPSK	6	0	22.08	22.04	22.09	23	1
1.4	16QAM	1	0	22.34	22.35	22.30	23	1
1.4	16QAM	1	3	22.32	22.43	22.37		
1.4	16QAM	1	5	22.33	22.42	22.37		
1.4	16QAM	3	0	22.16	22.14	22.10		
1.4	16QAM	3	1	22.29	22.31	22.17		
1.4	16QAM	3	3	22.30	22.29	22.23		
1.4	16QAM	6	0	20.93	20.93	21.00	22	2

<LTE Band 5>

BW [MHz]	Modulation	RB Size	RB Offset	Power Low Ch. / Freq.	Power Middle Ch. / Freq.	Power High Ch. / Freq.	Tune-up limit (dBm)	MPR (dB)
Channel				20450	20525	20600		
Frequency (MHz)				829	836.5	844		
10	QPSK	1	0	23.09	23.08	23.07	24	0
10	QPSK	1	25	23.17	23.30	23.09		
10	QPSK	1	49	22.97	22.85	22.97		
10	QPSK	25	0	22.21	22.29	22.22	23	1
10	QPSK	25	12	22.15	22.19	22.21		
10	QPSK	25	25	22.15	22.14	22.09		
10	QPSK	50	0	22.14	22.17	22.12		
10	16QAM	1	0	22.48	22.50	22.46	23	1
10	16QAM	1	25	22.03	22.27	22.33		
10	16QAM	1	49	22.40	22.31	22.35		
10	16QAM	25	0	21.32	21.10	21.39	22	2
10	16QAM	25	12	21.24	21.18	21.28		
10	16QAM	25	25	21.24	21.13	21.18		
10	16QAM	50	0	21.16	21.05	21.12		
Channel				20425	20525	20625	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				826.5	836.5	846.5		
5	QPSK	1	0	23.18	23.09	23.07	24	0
5	QPSK	1	12	23.19	22.97	23.06		
5	QPSK	1	24	23.10	22.85	22.84		
5	QPSK	12	0	22.17	22.24	22.19	23	1
5	QPSK	12	7	22.17	22.13	22.11		
5	QPSK	12	13	22.18	22.07	22.09		
5	QPSK	25	0	22.15	22.15	22.11		
5	16QAM	1	0	22.49	22.43	22.40	23	1
5	16QAM	1	12	22.44	22.36	21.91		
5	16QAM	1	24	22.48	22.32	22.31		
5	16QAM	12	0	21.38	21.14	21.10	22	2
5	16QAM	12	7	21.15	21.10	21.06		
5	16QAM	12	13	21.14	21.09	21.07		
5	16QAM	25	0	21.22	21.10	21.01		
Channel				20415	20525	20635	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				825.5	836.5	847.5		
3	QPSK	1	0	23.06	23.17	23.08	24	0
3	QPSK	1	8	22.87	23.08	23.16		
3	QPSK	1	14	23.00	22.97	22.92		
3	QPSK	8	0	22.28	22.33	22.28	23	1
3	QPSK	8	4	22.23	22.21	22.13		
3	QPSK	8	7	22.21	22.13	22.14		
3	QPSK	15	0	22.16	22.15	22.17		
3	16QAM	1	0	22.45	22.49	22.48	23	1
3	16QAM	1	8	22.38	22.34	22.36		
3	16QAM	1	14	22.45	22.39	22.45		
3	16QAM	8	0	21.41	21.40	21.31	22	2
3	16QAM	8	4	21.08	21.26	21.27		
3	16QAM	8	7	21.17	21.29	21.04		
3	16QAM	15	0	21.07	21.37	21.04		

Channel				20407	20525	20643	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				824.7	836.5	848.3		
1.4	QPSK	1	0	23.23	23.06	23.18	24	0
1.4	QPSK	1	3	23.26	23.12	23.24		
1.4	QPSK	1	5	22.97	22.98	23.07		
1.4	QPSK	3	0	23.18	23.10	23.16		
1.4	QPSK	3	1	23.18	23.20	23.10		
1.4	QPSK	3	3	23.08	23.17	23.20		
1.4	QPSK	6	0	22.28	22.18	22.14	23	1
1.4	16QAM	1	0	22.39	22.43	22.47	23	1
1.4	16QAM	1	3	22.42	22.46	22.45		
1.4	16QAM	1	5	22.45	22.42	22.45		
1.4	16QAM	3	0	22.43	22.32	22.31		
1.4	16QAM	3	1	22.43	22.33	22.26		
1.4	16QAM	3	3	22.43	22.30	22.24		
1.4	16QAM	6	0	21.05	21.16	21.21	22	2

<LTE Band 7>

BW [MHz]	Modulation	RB Size	RB Offset	Power Low Ch. / Freq.	Power Middle Ch. / Freq.	Power High Ch. / Freq.	Tune-up limit (dBm)	MPR (dB)
Channel				20850	21100	21350		
Frequency (MHz)				2510	2535	2560		
20	QPSK	1	0	22.93	22.85	22.96	24	0
20	QPSK	1	49	23.00	23.13	23.07		
20	QPSK	1	99	22.61	22.64	22.80		
20	QPSK	50	0	21.86	21.87	21.85	23	1
20	QPSK	50	24	21.61	21.73	21.83		
20	QPSK	50	50	21.59	21.72	21.69		
20	QPSK	100	0	21.70	21.86	21.85		
20	16QAM	1	0	22.28	22.05	22.06	23	1
20	16QAM	1	49	22.09	21.96	21.96		
20	16QAM	1	99	21.98	21.92	21.98		
20	16QAM	50	0	20.73	20.78	20.80	22	2
20	16QAM	50	24	20.58	20.74	20.89		
20	16QAM	50	50	20.66	20.74	20.78		
20	16QAM	100	0	20.85	20.77	20.91		
Channel				20825	21100	21375	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				2507.5	2535	2562.5		
15	QPSK	1	0	23.01	22.89	22.94	24	0
15	QPSK	1	37	22.64	22.77	22.68		
15	QPSK	1	74	22.48	22.67	22.71		
15	QPSK	36	0	21.79	21.78	21.71	23	1
15	QPSK	36	20	21.72	21.77	21.80		
15	QPSK	36	39	21.63	21.74	21.83		
15	QPSK	75	0	21.72	21.74	21.88		
15	16QAM	1	0	22.34	22.16	22.26	23	1
15	16QAM	1	37	22.03	21.94	21.95		
15	16QAM	1	74	21.95	21.98	22.11		
15	16QAM	36	0	20.84	20.81	20.82	22	2
15	16QAM	36	20	20.77	20.79	20.83		
15	16QAM	36	39	20.71	20.73	20.78		
15	16QAM	75	0	20.77	20.80	20.74		
Channel				20800	21100	21400	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				2505	2535	2565		
10	QPSK	1	0	22.91	23.02	22.96	24	0
10	QPSK	1	25	22.81	22.73	22.92		
10	QPSK	1	49	22.67	22.69	22.88		
10	QPSK	25	0	21.94	21.76	21.80	23	1
10	QPSK	25	12	21.87	21.71	21.69		
10	QPSK	25	25	21.79	21.70	21.74		
10	QPSK	50	0	21.86	21.70	21.78		
10	16QAM	1	0	22.24	22.07	21.98	23	1
10	16QAM	1	25	22.09	22.01	21.81		
10	16QAM	1	49	22.15	22.07	22.10		
10	16QAM	25	0	20.70	20.88	20.93	22	2
10	16QAM	25	12	20.88	20.72	20.88		
10	16QAM	25	25	20.83	20.88	20.86		
10	16QAM	50	0	20.68	20.91	20.61		

Channel				20775	21100	21425	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				2502.5	2535	2567.5		
5	QPSK	1	0	22.96	22.88	22.91	24	0
5	QPSK	1	12	23.00	22.91	22.93		
5	QPSK	1	24	22.60	22.88	22.88		
5	QPSK	12	0	21.84	21.74	21.89	23	1
5	QPSK	12	7	21.88	21.80	21.82		
5	QPSK	12	13	21.91	21.76	21.84		
5	QPSK	25	0	21.82	21.77	21.88		
5	16QAM	1	0	22.50	22.15	22.14	23	1
5	16QAM	1	12	22.11	22.05	22.11		
5	16QAM	1	24	22.13	22.05	22.13		
5	16QAM	12	0	20.90	20.75	20.81	22	2
5	16QAM	12	7	20.88	20.81	20.95		
5	16QAM	12	13	20.86	20.78	20.96		
5	16QAM	25	0	20.72	20.68	20.69		

<LTE Band 12>

BW [MHz]	Modulation	RB Size	RB Offset	Power Low Ch. / Freq.	Power Middle Ch. / Freq.	Power High Ch. / Freq.	Tune-up limit (dBm)	MPR (dB)
Channel				23060	23095	23130		
Frequency (MHz)				704	707.5	711		
10	QPSK	1	0	23.03	23.32	23.21	24	0
10	QPSK	1	25	23.26	23.15	23.09		
10	QPSK	1	49	23.29	23.50	23.48		
10	QPSK	25	0	22.21	22.12	22.30	23	1
10	QPSK	25	12	22.25	22.14	22.32		
10	QPSK	25	25	22.27	22.39	22.36		
10	QPSK	50	0	22.18	22.34	22.12		
10	16QAM	1	0	22.43	22.50	22.61	23	1
10	16QAM	1	25	22.10	21.88	22.44		
10	16QAM	1	49	22.21	22.30	22.61		
10	16QAM	25	0	21.20	21.06	21.16	22	2
10	16QAM	25	12	21.07	21.08	21.20		
10	16QAM	25	25	21.18	21.13	21.45		
10	16QAM	50	0	21.17	21.19	21.32		
Channel				23035	23095	23155	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				701.5	707.5	713.5		
5	QPSK	1	0	23.30	23.09	22.89	24	0
5	QPSK	1	12	23.13	23.16	23.30		
5	QPSK	1	24	23.09	23.17	23.02		
5	QPSK	12	0	22.13	22.16	22.11	23	1
5	QPSK	12	7	22.28	22.13	22.21		
5	QPSK	12	13	22.31	22.18	22.29		
5	QPSK	25	0	22.34	22.22	22.27		
5	16QAM	1	0	22.46	22.48	22.41	23	1
5	16QAM	1	12	22.45	22.40	22.56		
5	16QAM	1	24	22.60	22.51	22.47		
5	16QAM	12	0	21.11	21.10	21.08	22	2
5	16QAM	12	7	21.14	21.15	21.19		
5	16QAM	12	13	21.22	21.26	21.28		
5	16QAM	25	0	21.56	21.29	21.34		
Channel				23025	23095	23165	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				700.5	707.5	714.5		
3	QPSK	1	0	23.29	23.29	23.25	24	0
3	QPSK	1	8	23.26	23.18	23.22		
3	QPSK	1	14	23.37	23.26	23.32		
3	QPSK	8	0	22.31	22.32	22.34	23	1
3	QPSK	8	4	22.34	22.19	22.30		
3	QPSK	8	7	22.31	22.23	22.28		
3	QPSK	15	0	22.22	22.23	22.29		
3	16QAM	1	0	22.59	22.60	22.51	23	1
3	16QAM	1	8	22.45	22.40	22.43		
3	16QAM	1	14	22.58	22.55	22.57		
3	16QAM	8	0	21.23	21.40	21.46	22	2
3	16QAM	8	4	21.34	21.30	21.42		
3	16QAM	8	7	21.32	21.45	21.52		
3	16QAM	15	0	21.12	21.07	21.17		

Channel				23017	23095	23173	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				699.7	707.5	715.3		
1.4	QPSK	1	0	23.27	23.25	23.01	24	0
1.4	QPSK	1	3	23.22	23.37	23.19		
1.4	QPSK	1	5	23.24	23.22	23.09		
1.4	QPSK	3	0	23.33	23.32	23.21		
1.4	QPSK	3	1	23.47	23.35	23.40		
1.4	QPSK	3	3	23.35	23.24	23.34		
1.4	QPSK	6	0	22.35	22.28	22.33	23	1
1.4	16QAM	1	0	22.52	22.54	22.52	23	1
1.4	16QAM	1	3	22.54	22.50	22.40		
1.4	16QAM	1	5	22.57	22.44	22.52		
1.4	16QAM	3	0	22.44	22.43	22.30		
1.4	16QAM	3	1	22.48	22.46	22.42		
1.4	16QAM	3	3	22.43	22.37	22.37		
1.4	16QAM	6	0	21.29	21.27	21.27	22	2

<LTE Band 13>

BW [MHz]	Modulation	RB Size	RB Offset	Power Low Ch. / Freq.	Power Middle Ch. / Freq.	Power High Ch. / Freq.	Tune-up limit (dBm)	MPR (dB)
Channel				23230				
Frequency (MHz)				782				
10	QPSK	1	0	23.38			24	0
10	QPSK	1	25	23.29				
10	QPSK	1	49	22.96				
10	QPSK	25	0	22.24			23	1
10	QPSK	25	12	22.26				
10	QPSK	25	25	22.22				
10	QPSK	50	0	22.22				
10	16QAM	1	0	22.46			23	1
10	16QAM	1	25	22.02				
10	16QAM	1	49	21.82				
10	16QAM	25	0	21.22			22	2
10	16QAM	25	12	21.06				
10	16QAM	25	25	21.20				
10	16QAM	50	0	21.20				
Channel				23205	23230	23255	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				779.5	782	784.5		
5	QPSK	1	0	23.35	23.14	23.29	24	0
5	QPSK	1	12	23.22	23.21	23.07		
5	QPSK	1	24	22.91	22.82	22.99		
5	QPSK	12	0	22.17	22.33	22.22	23	1
5	QPSK	12	7	22.23	22.19	22.19		
5	QPSK	12	13	22.29	22.24	22.19		
5	QPSK	25	0	22.17	22.23	22.18		
5	16QAM	1	0	22.49	22.42	22.46	23	1
5	16QAM	1	12	22.45	22.40	22.38		
5	16QAM	1	24	21.87	21.68	22.23		
5	16QAM	12	0	21.15	21.08	21.19	22	2
5	16QAM	12	7	21.22	21.10	21.16		
5	16QAM	12	13	21.13	21.13	21.18		
5	16QAM	25	0	21.25	21.12	21.25		

<LTE Band 17>

BW [MHz]	Modulation	RB Size	RB Offset	Power Low Ch. / Freq.	Power Middle Ch. / Freq.	Power High Ch. / Freq.	Tune-up limit (dBm)	MPR (dB)
Channel				23780	23790	23800		
Frequency (MHz)				709	710	711		
10	QPSK	1	0	23.18	23.50	23.40	24	0
10	QPSK	1	25	23.05	23.03	23.25		
10	QPSK	1	49	23.12	23.34	23.21		
10	QPSK	25	0	22.24	22.29	22.26	23	1
10	QPSK	25	12	22.22	22.10	22.19		
10	QPSK	25	25	22.19	22.23	22.24		
10	QPSK	50	0	22.20	22.23	22.20		
10	16QAM	1	0	22.61	22.66	22.69	23	1
10	16QAM	1	25	22.19	22.43	22.49		
10	16QAM	1	49	22.60	22.59	22.53		
10	16QAM	25	0	21.27	21.27	21.32	22	2
10	16QAM	25	12	21.10	21.17	21.25		
10	16QAM	25	25	21.19	21.21	21.50		
10	16QAM	50	0	21.06	21.27	21.10		
Channel				23755	23790	23825	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				706.5	710	713.5		
5	QPSK	1	0	23.05	23.32	23.23	24	0
5	QPSK	1	12	23.36	23.09	23.24		
5	QPSK	1	24	23.13	23.25	23.20		
5	QPSK	12	0	22.13	22.07	22.16	23	1
5	QPSK	12	7	22.29	22.08	22.15		
5	QPSK	12	13	22.30	22.22	22.25		
5	QPSK	25	0	22.21	22.09	22.12		
5	16QAM	1	0	22.52	22.42	22.38	23	1
5	16QAM	1	12	22.51	22.39	22.42		
5	16QAM	1	24	22.44	22.51	22.38		
5	16QAM	12	0	21.20	21.14	21.14	22	2
5	16QAM	12	7	21.18	21.16	21.15		
5	16QAM	12	13	21.21	21.19	21.23		
5	16QAM	25	0	21.20	20.97	21.10		

<LTE Band 25>

BW [MHz]	Modulation	RB Size	RB Offset	Power Low Ch. / Freq.	Power Middle Ch. / Freq.	Power High Ch. / Freq.	Tune-up limit (dBm)	MPR (dB)
Channel				26140	26340	26590		
Frequency (MHz)				1860	1880	1905		
20	QPSK	1	0	23.04	22.96	22.77	24	0
20	QPSK	1	49	23.05	23.06	23.31		
20	QPSK	1	99	22.81	22.66	23.04		
20	QPSK	50	0	21.86	21.98	22.08	23	1
20	QPSK	50	24	21.77	21.95	21.98		
20	QPSK	50	50	21.78	21.86	22.03		
20	QPSK	100	0	21.80	21.95	21.98		
20	16QAM	1	0	22.29	22.24	22.43	23	1
20	16QAM	1	49	22.35	22.47	22.46		
20	16QAM	1	99	22.12	22.08	22.29		
20	16QAM	50	0	20.80	20.79	21.05	22	2
20	16QAM	50	24	20.67	20.91	20.95		
20	16QAM	50	50	20.63	20.93	21.02		
20	16QAM	100	0	20.76	20.94	21.01		
Channel				26115	26340	26615	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				1857.5	1880	1907.5		
15	QPSK	1	0	22.78	23.04	23.07	24	0
15	QPSK	1	37	22.61	22.86	22.92		
15	QPSK	1	74	22.48	22.76	22.92		
15	QPSK	36	0	21.81	21.89	22.00	23	1
15	QPSK	36	20	21.84	21.88	21.97		
15	QPSK	36	39	21.83	21.81	21.96		
15	QPSK	75	0	21.80	21.82	22.03		
15	16QAM	1	0	21.90	22.35	22.36	23	1
15	16QAM	1	37	22.03	22.08	22.22		
15	16QAM	1	74	21.99	22.11	22.22		
15	16QAM	36	0	20.77	20.84	21.00	22	2
15	16QAM	36	20	20.71	20.86	20.91		
15	16QAM	36	39	20.66	20.81	21.04		
15	16QAM	75	0	20.76	20.90	20.95		
Channel				26090	26340	26640	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				1855	1880	1910		
10	QPSK	1	0	22.90	22.76	23.02	24	0
10	QPSK	1	25	23.04	22.88	23.01		
10	QPSK	1	49	22.86	22.70	23.09		
10	QPSK	25	0	21.86	21.86	22.09	23	1
10	QPSK	25	12	21.83	21.94	22.04		
10	QPSK	25	25	21.77	21.92	22.06		
10	QPSK	50	0	21.78	21.93	22.07		
10	16QAM	1	0	22.34	22.26	22.38	23	1
10	16QAM	1	25	22.00	22.11	22.32		
10	16QAM	1	49	21.99	22.12	22.41		
10	16QAM	25	0	20.93	20.84	21.07	22	2
10	16QAM	25	12	20.86	20.93	21.12		
10	16QAM	25	25	20.95	20.86	21.05		
10	16QAM	50	0	20.76	20.85	21.07		

Channel				26065	26340	26665	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				1852.5	1880	1912.5		
5	QPSK	1	0	22.91	22.88	23.10	24	0
5	QPSK	1	12	22.66	22.85	23.23		
5	QPSK	1	24	22.59	22.90	23.08		
5	QPSK	12	0	21.90	21.78	22.02	23	1
5	QPSK	12	7	21.78	21.90	22.00		
5	QPSK	12	13	21.68	21.84	22.09		
5	QPSK	25	0	21.84	21.88	22.03		
5	16QAM	1	0	22.14	22.03	22.40	23	1
5	16QAM	1	12	21.95	22.14	22.34		
5	16QAM	1	24	21.98	22.13	22.41		
5	16QAM	12	0	20.81	20.74	20.98	22	2
5	16QAM	12	7	20.76	20.79	20.97		
5	16QAM	12	13	20.66	20.82	21.06		
5	16QAM	25	0	20.81	20.86	21.09		
Channel				26055	26340	26675	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				1851.5	1880	1913.5		
3	QPSK	1	0	22.50	22.63	22.60	24	0
3	QPSK	1	8	22.50	22.72	22.76		
3	QPSK	1	14	22.39	22.71	22.78		
3	QPSK	8	0	21.63	21.77	21.79	23	1
3	QPSK	8	4	21.61	21.67	21.83		
3	QPSK	8	7	21.58	21.59	21.81		
3	QPSK	15	0	21.60	21.60	21.83		
3	16QAM	1	0	22.10	21.98	22.08	23	1
3	16QAM	1	8	21.92	21.98	22.13		
3	16QAM	1	14	21.91	21.97	22.22		
3	16QAM	8	0	20.75	20.79	20.75	22	2
3	16QAM	8	4	20.72	20.70	21.02		
3	16QAM	8	7	20.70	20.81	21.04		
3	16QAM	15	0	20.39	20.71	20.77		
Channel				26047	26340	26683	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				1850.7	1880	1914.3		
1.4	QPSK	1	0	22.48	22.52	22.71	24	0
1.4	QPSK	1	3	22.48	22.55	22.89		
1.4	QPSK	1	5	22.51	22.52	22.79		
1.4	QPSK	3	0	22.41	22.62	22.85		
1.4	QPSK	3	1	22.55	22.75	22.95		
1.4	QPSK	3	3	22.58	22.66	22.88		
1.4	QPSK	6	0	21.59	21.62	21.80	23	1
1.4	16QAM	1	0	22.02	21.73	22.08	23	1
1.4	16QAM	1	3	21.82	21.77	22.05		
1.4	16QAM	1	5	21.98	21.86	21.95		
1.4	16QAM	3	0	21.84	21.63	21.95		
1.4	16QAM	3	1	21.91	21.68	21.95		
1.4	16QAM	3	3	21.76	21.77	22.01		
1.4	16QAM	6	0	20.40	20.57	20.60	22	2

<LTE Band 26>

BW [MHz]	Modulation	RB Size	RB Offset	Power Low Ch. / Freq.	Power Middle Ch. / Freq.	Power High Ch. / Freq.	Tune-up limit (dBm)	MPR (dB)
Channel				26765	26865	26965		
Frequency (MHz)				821.5	831.5	841.5		
15	QPSK	1	0	23.40	23.52	23.35	24	0
15	QPSK	1	37	23.23	23.30	23.11		
15	QPSK	1	74	23.12	23.14	23.01		
15	QPSK	36	0	22.32	22.37	22.35	23	1
15	QPSK	36	20	22.31	22.31	22.32		
15	QPSK	36	39	22.27	22.21	22.31		
15	QPSK	75	0	22.33	22.38	22.33		
15	16QAM	1	0	22.81	22.66	22.73	23	1
15	16QAM	1	37	22.57	22.52	22.43		
15	16QAM	1	74	22.53	22.43	22.45		
15	16QAM	36	0	21.37	21.11	21.29	22	2
15	16QAM	36	20	21.30	21.28	21.37		
15	16QAM	36	39	21.27	21.32	21.33		
15	16QAM	75	0	21.23	21.21	21.26		
Channel				26740	26865	26990	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				819	831.5	844		
10	QPSK	1	0	23.32	23.22	23.34	24	0
10	QPSK	1	25	23.33	23.25	23.50		
10	QPSK	1	49	23.16	23.21	23.11		
10	QPSK	25	0	22.42	22.31	22.44	23	1
10	QPSK	25	12	22.28	22.33	22.33		
10	QPSK	25	25	22.25	22.32	22.22		
10	QPSK	50	0	22.30	22.35	22.33		
10	16QAM	1	0	22.69	22.53	22.45	23	1
10	16QAM	1	25	22.54	22.39	22.56		
10	16QAM	1	49	22.54	22.63	22.46		
10	16QAM	25	0	21.31	21.33	21.27	22	2
10	16QAM	25	12	21.26	21.23	21.26		
10	16QAM	25	25	21.24	21.30	20.97		
10	16QAM	50	0	21.16	21.25	21.18		
Channel				26715	26865	27015	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				816.5	831.5	846.5		
5	QPSK	1	0	23.46	23.14	23.33	24	0
5	QPSK	1	12	23.21	23.32	23.20		
5	QPSK	1	24	23.09	23.07	22.94		
5	QPSK	12	0	22.40	22.31	22.34	23	1
5	QPSK	12	7	22.29	22.23	22.18		
5	QPSK	12	13	22.26	22.26	22.13		
5	QPSK	25	0	22.33	22.30	22.17		
5	16QAM	1	0	22.65	22.51	22.69	23	1
5	16QAM	1	12	22.59	22.52	22.37		
5	16QAM	1	24	22.49	22.40	22.37		
5	16QAM	12	0	21.26	21.14	21.25	22	2
5	16QAM	12	7	21.11	21.18	21.12		
5	16QAM	12	13	21.06	21.19	21.04		
5	16QAM	25	0	21.13	21.32	21.26		

Channel				26705	26865	27025	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				815.5	831.5	847.5		
3	QPSK	1	0	23.25	23.36	23.25	24	0
3	QPSK	1	8	23.46	23.34	23.21		
3	QPSK	1	14	23.20	23.09	22.98		
3	QPSK	8	0	22.37	22.36	22.27	23	1
3	QPSK	8	4	22.38	22.26	22.13		
3	QPSK	8	7	22.32	22.31	22.25		
3	QPSK	15	0	22.39	22.28	22.17		
3	16QAM	1	0	22.71	22.57	22.58	23	1
3	16QAM	1	8	22.59	22.59	22.47		
3	16QAM	1	14	22.61	22.63	22.50		
3	16QAM	8	0	21.51	21.50	21.39	22	2
3	16QAM	8	4	21.43	21.47	21.17		
3	16QAM	8	7	21.22	21.47	21.22		
3	16QAM	15	0	21.10	21.34	21.14		
Channel				26697	26865	27033	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				814.7	831.5	848.3		
1.4	QPSK	1	0	23.25	23.15	23.09	24	0
1.4	QPSK	1	3	23.40	23.28	23.12		
1.4	QPSK	1	5	23.28	23.21	23.01		
1.4	QPSK	3	0	23.42	23.23	23.17		
1.4	QPSK	3	1	23.48	23.27	23.20		
1.4	QPSK	3	3	23.38	23.26	23.03		
1.4	QPSK	6	0	22.38	22.32	22.16	23	1
1.4	16QAM	1	0	22.95	22.43	22.45	23	1
1.4	16QAM	1	3	22.56	22.60	22.43		
1.4	16QAM	1	5	22.59	22.54	22.40		
1.4	16QAM	3	0	22.55	22.45	22.41		
1.4	16QAM	3	1	22.50	22.48	22.33		
1.4	16QAM	3	3	22.50	22.48	22.33		
1.4	16QAM	6	0	21.32	21.24	21.05	22	2

<TDD LTE SAR Measurement>

TDD LTE configuration setup for SAR measurement

SAR was tested with a fixed periodic duty factor according to the highest transmission duty factor implemented for the device and supported by 3GPP.

a. 3GPP TS 36.211 section 4.2 for Type 2 Frame Structure and Table 4.2-2 for uplink-downlink configurations
b. "special subframe S" contains both uplink and downlink transmissions, it has been taken into consideration to determine the transmission duty factor according to the worst case uplink and downlink cyclic prefix requirements for UpPTS
c. Establishing connections with base station simulators ensure a consistent means for testing SAR and recommended for evaluating SAR. The Anritsu MT8820C (firmware: #22.52#004) was used for LTE output power measurements and SAR testing.

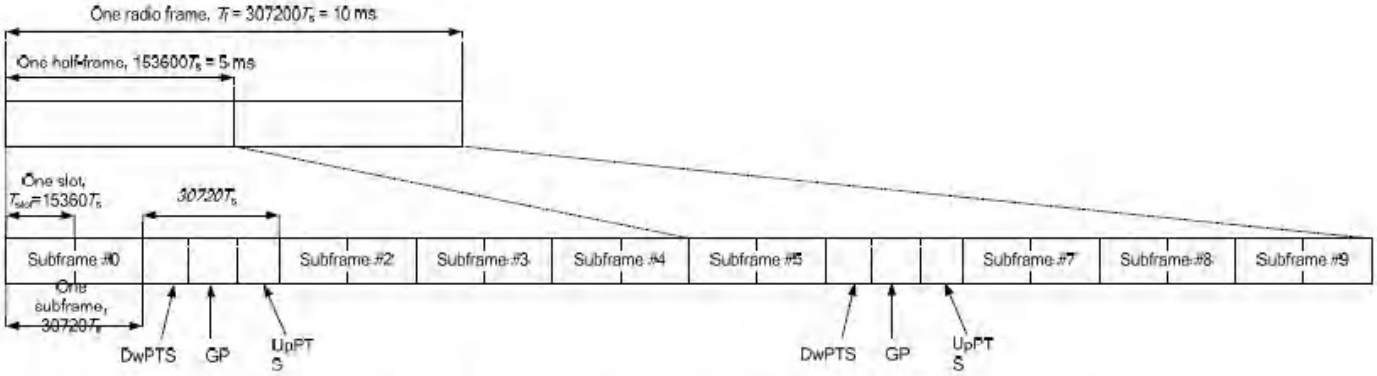


Figure 4.2-1: Frame structure type 2 (for 5 ms switch-point periodicity).

Table 4.2-2: Uplink-downlink configurations.

Uplink-downlink configuration	Downlink-to-Uplink Switch-point periodicity	Subframe number									
		0	1	2	3	4	5	6	7	8	9
0	5 ms	D	S	U	U	U	D	S	U	U	U
1	5 ms	D	S	U	U	D	D	S	U	U	D
2	5 ms	D	S	U	D	D	D	S	U	D	D
3	10 ms	D	S	U	U	U	D	D	D	D	D
4	10 ms	D	S	U	U	D	D	D	D	D	D
5	10 ms	D	S	U	D	D	D	D	D	D	D
6	5 ms	D	S	U	U	U	D	S	U	U	D

Table 4.2-1: Configuration of special subframe (lengths of DwPTS/GP/UpPTS).

Special subframe configuration	Normal cyclic prefix in downlink			Extended cyclic prefix in downlink		
	DwPTS	UpPTS		DwPTS	UpPTS	
		Normal cyclic prefix in uplink	Extended cyclic prefix in uplink		Normal cyclic prefix in uplink	Extended cyclic prefix in uplink
0	$6592 \cdot T_s$	$2192 \cdot T_s$	$2560 \cdot T_s$	$7680 \cdot T_s$	$2192 \cdot T_s$	$2560 \cdot T_s$
1	$19760 \cdot T_s$			$20480 \cdot T_s$		
2	$21952 \cdot T_s$			$23040 \cdot T_s$		
3	$24144 \cdot T_s$			$25600 \cdot T_s$		
4	$26336 \cdot T_s$			$7680 \cdot T_s$	$4384 \cdot T_s$	$5120 \cdot T_s$
5	$6592 \cdot T_s$	$4384 \cdot T_s$	$5120 \cdot T_s$	$20480 \cdot T_s$		
6	$19760 \cdot T_s$			$23040 \cdot T_s$		
7	$21952 \cdot T_s$			$12800 \cdot T_s$		
8	$24144 \cdot T_s$			-	-	-
9	$13168 \cdot T_s$			-	-	-

Special subframe (30720·T_s): Normal cyclic prefix in downlink (UpPTS)			
	Special subframe configuration	**Normal cyclic prefix in uplink**	**Extended cyclic prefix in uplink**
Uplink duty factor in one special subframe	**0~4**	7.13%	8.33%
	5~9	14.3%	16.7%

Special subframe(30720·T_s): Extended cyclic prefix in downlink (UpPTS)			
	Special subframe configuration	**Normal cyclic prefix in uplink**	**Extended cyclic prefix in uplink**
Uplink duty factor in one special subframe	**0~3**	7.13%	8.33%
	4~7	14.3%	16.7%

The highest duty factor is resulted from:

i. Uplink-downlink configuration: 0. In a half-frame consisted of 5 subfames, uplink operation is in 3 uplink subframes and 1 special subframe.

ii. special subframe configuration: 5-9 for normal cyclic prefix in downlink, 4-7 for extended cyclic prefix in downlink

iii. for special subframe with extended cyclic prefix in uplink, the total uplink duty factor in one half-frame is: (3+0.167)/5 = 63.3%

iv. for special subframe with normal cyclic prefix in uplink, the total uplink duty factor in one half-frame is: (3+0.143)/5 = 62.9%

v. For TDD LTE SAR measurement, the duty cycle 1:1.59 (62.9 %) was used perform testing and considering the theoretical duty cycle of 63.3% for extended cyclic prefix in the uplink, and the theoretical duty cycle of 62.9% for normal cyclic prefix in uplink, a scaling factor of extended cyclic prefix 63.3%/62.9% = 1.006 is applied to scale-up the measured SAR result. The scaled TDD LTE SAR = measured SAR (W/kg)* Tune-up Scaling Factor* scaling factor for extended cyclic prefix.

<LTE Band 41>

BW [MHz]	Modulation	RB Size	RB Offset	Power Low Ch. / Freq.	Power Low Middle Ch. / Freq.	Power Middle Ch. / Freq.	Power High Middle Ch. / Freq.	Power High Ch. / Freq.	Tune-up limit (dBm)	MPR (dB)
Channel				39750	40185	40620	41055	41490		
Frequency (MHz)				2506	2549.5	2593	2636.5	2680		
20	QPSK	1	0	22.61	22.61	22.73	22.75	22.73	24	0
20	QPSK	1	49	22.60	22.56	22.67	22.55	22.66		
20	QPSK	1	99	22.30	22.48	22.40	22.36	22.35		
20	QPSK	50	0	21.62	21.67	21.92	21.99	21.98	23	1
20	QPSK	50	24	21.53	21.44	21.56	21.88	21.92		
20	QPSK	50	50	21.48	21.52	21.55	21.88	21.68		
20	QPSK	100	0	21.55	21.56	21.57	21.90	21.85		
20	16QAM	1	0	21.56	21.92	21.46	21.82	21.98	23	1
20	16QAM	1	49	21.44	21.70	21.67	21.66	21.68		
20	16QAM	1	99	21.18	21.22	21.71	21.12	21.50		
20	16QAM	50	0	20.47	20.65	20.53	20.99	20.78	22	2
20	16QAM	50	24	20.49	20.54	20.54	20.63	20.64		
20	16QAM	50	50	20.46	20.42	20.51	20.84	20.59		
20	16QAM	100	0	20.52	20.53	20.53	20.86	20.58		
Channel				39725	40173	40620	41068	41515	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				2503.5	2548.3	2593	2637.8	2682.5		
15	QPSK	1	0	22.55	22.47	22.51	22.64	22.73	24	0
15	QPSK	1	37	22.05	22.03	22.45	22.15	22.13		
15	QPSK	1	74	22.03	22.31	22.40	22.02	22.28		
15	QPSK	36	0	21.50	21.51	21.53	21.74	21.67	23	1
15	QPSK	36	20	21.39	21.40	21.41	21.68	21.55		
15	QPSK	36	39	21.42	21.43	21.47	21.62	21.38		
15	QPSK	75	0	21.38	21.43	21.52	21.69	21.55		
15	16QAM	1	0	21.76	21.89	21.74	21.87	21.94	23	1
15	16QAM	1	37	21.37	21.27	21.62	21.39	21.39		
15	16QAM	1	74	21.26	21.26	21.62	21.15	21.52		
15	16QAM	36	0	20.59	20.55	20.53	20.68	20.64	22	2
15	16QAM	36	20	20.21	20.27	20.42	20.61	20.51		
15	16QAM	36	39	20.28	20.50	20.48	20.53	20.46		
15	16QAM	75	0	20.45	20.44	20.37	20.57	20.55		
Channel				39700	40160	40620	41080	41540	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				2501	2547	2593	2639	2685		
10	QPSK	1	0	22.53	22.64	22.45	22.72	22.67	24	0
10	QPSK	1	25	22.22	22.61	22.28	22.29	22.68		
10	QPSK	1	49	22.39	22.38	22.32	22.24	22.55		
10	QPSK	25	0	21.46	21.44	21.43	21.89	21.48	23	1
10	QPSK	25	12	21.37	21.41	21.49	21.64	21.40		
10	QPSK	25	25	21.43	21.45	21.52	21.55	21.30		
10	QPSK	50	0	21.44	21.42	21.42	21.58	21.45		
10	16QAM	1	0	21.73	21.60	21.68	21.85	21.65	23	1
10	16QAM	1	25	21.43	21.50	21.49	21.42	21.50		
10	16QAM	1	49	21.50	21.18	21.60	21.35	21.54		
10	16QAM	25	0	20.80	20.73	20.71	20.87	20.41	22	2
10	16QAM	25	12	20.73	20.72	20.68	20.82	20.52		
10	16QAM	25	25	20.41	20.45	20.70	20.84	20.61		
10	16QAM	50	0	20.51	20.33	20.51	20.67	20.38		

Channel				39675	40148	40620	41093	41565	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				2498.5	2545.8	2593	2640.30	2687.5		
5	QPSK	1	0	22.47	22.39	22.39	22.61	22.31	24	0
5	QPSK	1	12	22.63	22.69	22.69	22.18	22.77		
5	QPSK	1	24	22.43	22.33	22.33	22.30	22.36		
5	QPSK	12	0	21.45	21.44	21.44	21.90	21.44	23	1
5	QPSK	12	7	21.42	21.38	21.38	21.56	21.35		
5	QPSK	12	13	21.38	21.32	21.32	21.55	21.29		
5	QPSK	25	0	21.44	21.34	21.34	21.63	21.30		
5	16QAM	1	0	21.53	21.52	21.52	21.69	21.56	23	1
5	16QAM	1	12	21.40	21.29	21.29	21.30	21.40		
5	16QAM	1	24	21.51	21.42	21.42	21.46	21.45		
5	16QAM	12	0	20.36	20.29	20.29	20.64	20.50	22	2
5	16QAM	12	7	20.26	20.34	20.34	20.60	20.23		
5	16QAM	12	13	20.29	20.57	20.57	20.82	20.26		
5	16QAM	25	0	20.42	20.63	20.63	20.83	20.62		

<WLAN Conducted Power>

General Note:

1. Per KDB 248227 D01v02r02, SAR test reduction is determined according to 802.11 transmission mode configurations and certain exposure conditions with multiple test positions. In the 2.4 GHz band, separate SAR procedures are applied to DSSS and OFDM configurations to simplify DSSS test requirements. For OFDM, in both 2.4 and 5 GHz bands, an initial test configuration must be determined for each standalone and aggregated frequency band, according to the transmission mode configuration with the highest maximum output power specified for production units to perform SAR measurements. If the same highest maximum output power applies to different combinations of channel bandwidths, modulations and data rates, additional procedures are applied to determine which test configurations require SAR measurement. When applicable, an initial test position may be applied to reduce the number of SAR measurements required for next to the ear, UMPC mini-tablet or hotspot mode configurations with multiple test positions.
2. For 2.4 GHz 802.11b DSSS, either the initial test position procedure for multiple exposure test positions or the DSSS procedure for fixed exposure position is applied; these are mutually exclusive. For 2.4 GHz and 5 GHz OFDM configurations, the initial test configuration is applied to measure SAR using either the initial test position procedure for multiple exposure test position configurations or the initial test configuration procedures for fixed exposure test conditions. Based on the reported SAR of the measured configurations and maximum output power of the transmission mode configurations that are not included in the initial test configuration, the subsequent test configuration and initial test position procedures are applied to determine if SAR measurements are required for the remaining OFDM transmission configurations. In general, the number of test channels that require SAR measurement is minimized based on maximum output power measured for the test sample(s).
3. For OFDM transmission configurations in the 2.4 GHz and 5 GHz bands, When the same maximum power is specified for multiple transmission modes in a frequency band, the largest channel bandwidth, lowest order modulation, lowest data rate and lowest order 802.11a/g/n/ac mode is used for SAR measurement, on the highest measured output power channel for each frequency band.
4. DSSS and OFDM configurations are considered separately according to the required SAR procedures. SAR is measured in the initial test position using the 802.11 transmission mode configuration required by the DSSS procedure or initial test configuration and subsequent test configuration(s) according to the OFDM procedures.18 The initial test position procedure is described in the following:
   a. When the reported SAR of the initial test position is ≤ 0.4 W/kg, further SAR measurement is not required for the other test positions in that exposure configuration and 802.11 transmission mode combinations within the frequency band or aggregated band.
   b. When the reported SAR of the test position is > 0.4 W/kg, SAR is repeated for the 802.11 transmission mode configuration tested in the initial test position to measure the subsequent next closet/smallest test separation distance and maximum coupling test position on the highest maximum output power channel, until the report SAR is ≤ 0.8 W/kg or all required test position are tested.
   c. For all positions/configurations, when the reported SAR is > 0.8 W/kg, SAR is measured for these test positions/configurations on the subsequent next highest measured output power channel(s) until the reported SAR is ≤ 1.2 W/kg or all required channels are tested.

<2.4GHz WLAN>

	Mode	Channel	Frequency (MHz)	Data Rate	Average power (dBm)	Tune-Up Limit	Duty Cycle %
2.4GHz WLAN	802.11b	CH 1	2412	1Mbps	17.82	19.00	97.62
		CH 6	2437		18.73	19.00	
		CH 11	2462		18.55	19.00	
	802.11g	CH 1	2412	6Mbps	15.92	17.00	86.62
		CH 6	2437		16.72	17.00	
		CH 11	2462		16.60	17.00	
	802.11n-HT20	CH 1	2412	MCS0	12.91	14.00	86.49
		CH 6	2437		13.61	14.00	
		CH 11	2462		13.66	14.00	

<Bluetooth Power>

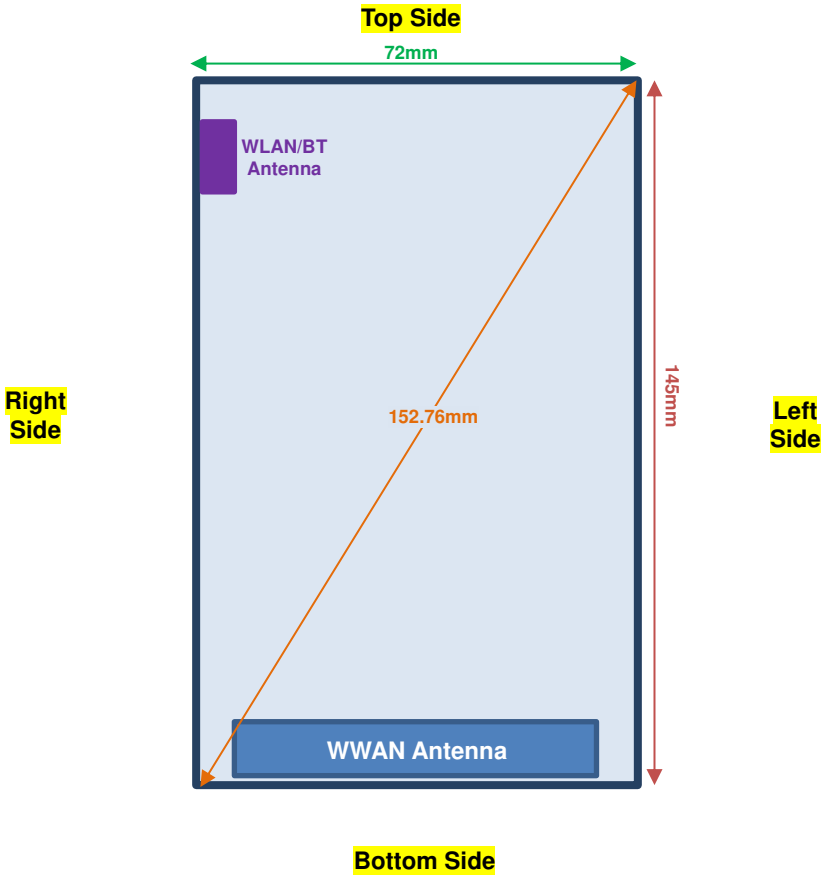
General Note:

1. For 2.4GHz Bluetooth SAR testing was selected 1Mbps, due to its highest average power.
2. The duty factor is selected theoretical 83.3% perform Bluetooth SAR testing.

Mode	Channel	Frequency (MHz)	Average power (dBm)		
			1Mbps	2Mbps	3Mbps
EDR	CH 00	2402	10.36	8.17	8.18
	CH 39	2441	10.68	8.59	8.61
	CH 78	2480	10.01	7.68	7.69
Tune-up Limit			12.00		

Mode	Channel	Frequency (MHz)	Average power (dBm)
			GFSK
LE	CH 00	2402	1.56
	CH 19	2440	1.89
	CH 39	2480	0.68
Tune-up Limit			2.00

13. Antenna Location



Distance of the Antenna to the EUT surface/edge						
Antennas	Back	Front	Top Side	Bottom Side	Right Side	Left Side
WWAN Ant	≤ 25mm	≤ 25mm	> 25mm	≤ 25mm	≤ 25mm	≤ 25mm
BT & WLAN Ant	≤ 25mm	≤ 25mm	≤ 25mm	> 25mm	≤ 25mm	> 25mm

Positions for SAR tests; Hotspot mode						
Antennas	Back	Front	Top Side	Bottom Side	Right Side	Left Side
WWAN Ant	Yes	Yes	No	Yes	Yes	Yes
BT & WLAN Ant	Yes	Yes	Yes	No	Yes	No

General Note:

1. Referring to KDB 941225 D06 v02r01, when the overall device length and width are > 9cm*5cm, the test distance is 10 mm. SAR must be measured for all sides and surfaces.

14. SAR Test Results

General Note:

1. Per KDB 447498 D01v06, the reported SAR is the measured SAR value adjusted for maximum tune-up tolerance.
   a. Tune-up scaling Factor = tune-up limit power (mW) / EUT RF power (mW), where tune-up limit is the maximum rated power among all production units.
   b. For SAR testing of WLAN signal with non-100% duty cycle, the measured SAR is scaled-up by the duty cycle scaling factor which is equal to "1/(duty cycle)"
   c. For WWAN/Bluetooth: Reported SAR(W/kg)= Measured SAR(W/kg)*Tune-up Scaling Factor
   d. For WLAN: Reported SAR(W/kg)= Measured SAR(W/kg)* Duty Cycle scaling factor * Tune-up scaling factor
   e. For TDD LTE SAR measurement, the duty cycle 1:1.59 (62.9 %) was used perform testing and considering the theoretical duty cycle of 63.3% for extended cyclic prefix in the uplink, and the theoretical duty cycle of 62.9% for normal cyclic prefix in uplink, a scaling factor of extended cyclic prefix 63.3%/62.9% = 1.006 is applied to scale-up the measured SAR result. The Reported TDD LTE SAR = measured SAR (W/kg)* Tune-up Scaling Factor* scaling factor for extended cyclic prefix.
2. Per KDB 447498 D01v06, for each exposure position, testing of other required channels within the operating mode of a frequency band is not required when the *reported* 1-g or 10-g SAR for the mid-band or highest output power channel is:
   - ≤ 0.8 W/kg or 2.0 W/kg, for 1-g or 10-g respectively, when the transmission band is ≤ 100 MHz
   - ≤ 0.6 W/kg or 1.5 W/kg, for 1-g or 10-g respectively, when the transmission band is between 100 MHz and 200 MHz
   - ≤ 0.4 W/kg or 1.0 W/kg, for 1-g or 10-g respectively, when the transmission band is ≥ 200 MHz
3. Per KDB 865664 D01v01r04, for each frequency band, repeated SAR measurement is required only when the measured SAR is ≥0.8W/kg.
4. Per KDB 648474 D04v01r03, when the reported SAR for a body-worn accessory measured without a headset connected to the handset is > 1.2 W/kg, SAR testing with a headset connected to the handset is required.
5. Per KDB 648474 D04v01r03, for additional accessories, need repeat SAR testing at the worst position, for each wireless mode and each band.
6. Per KDB 648474 D04v01r03, for test cases where the measured SAR for a handset without the accessory is smaller than 1.2 W/kg, the additional accessories repeated tests is not necessary.

GSM Note:

1. Per KDB 941225 D01v03r01, for SAR test reduction for GSM / GPRS / EDGE modes is determined by the source-based time-averaged output power including tune-up tolerance. The mode with highest specified time-averaged output power should be tested for SAR compliance in the applicable exposure conditions. For modes with the same specified maximum output power and tolerance, the higher number time-slot configuration should be tested. Therefore, the GPRS (2Tx slots) for GSM850 and GPRS (3Tx slots) for GSM1900 are considered as the primary mode.
2. Other configurations of GSM / GPRS / EDGE are considered as secondary modes. The 3G SAR test reduction procedure is applied, when the maximum output power and tune-up tolerance specified for production units in a secondary mode is ≤ ¼ dB higher than the primary mode, SAR measurement is not required for the secondary mode

UMTS Note:

1. Per KDB 941225 D01v03r01, for SAR testing is measured using a 12.2 kbps RMC with TPC bits configured to all “1’s”.
2. Per KDB 941225 D01v03r01, RMC 12.2kbps setting is used to evaluate SAR. If the maximum output power and tune-up tolerance specified for production units in HSDPA / HSUPA / DC-HSDPA is ≤ ¼ dB higher than RMC 12.2Kbps or when the highest reported SAR of the RMC12.2Kbps is scaled by the ratio of specified maximum output power and tune-up tolerance of HSDPA / HSUPA / DC-HSDPA to RMC12.2Kbps and the adjusted SAR is ≤ 1.2 W/kg, SAR measurement is not required for HSDPA / HSUPA / DC-HSDPA.

CDMA Note:

1. Per KDB 941225 D01v03r01, SAR for next to the ear head exposure is measured in RC3 with the handset configured to transmit at full rate in SO55.
2. Per KDB 941225 D01v03r01, in Hotspot mode EUT is treated as data device and SAR is tested with Ev-Do Rev 0 (RTAP 153.6kbps) as the primary mode.
3. Per KDB 941225 D01v03r01, for Body-worn accessory SAR is measured in RC3 with the handset configured in TDSO/SO32 to transmit at full rate on FCH only with all other code channels disabled. The body-worn accessory procedures in KDB Publication 447498 are applied. The 3G SAR test reduction procedure is applied to the multiple code channel configuration (FCH+SCH), with FCH only as the primary mode.

LTE Note:

1. Per KDB 941225 D05v02r05, start with the largest channel bandwidth and measure SAR for QPSK with 1 RB allocation, using the RB offset and required test channel combination with the highest maximum output power for RB offsets at the upper edge, middle and lower edge of each required test channel.
2. Per KDB 941225 D05v02r05, 50% RB allocation for QPSK SAR testing follows 1RB QPSK allocation procedure.
3. Per KDB 941225 D05v02r05, For QPSK with 100% RB allocation, SAR is not required when the highest maximum output power for 100 % RB allocation is less than the highest maximum output power in 50% and 1 RB allocations and the highest reported SAR for 1 RB and 50% RB allocation are ≤ 0.8 W/kg. Otherwise, SAR is measured for the highest output power channel; and if the reported SAR is > 1.45 W/kg, the remaining required test channels must also be tested.
4. Per KDB 941225 D05v02r05, 16QAM output power for each RB allocation configuration is > not ½ dB higher than the same configuration in QPSK and the reported SAR for the QPSK configuration is ≤ 1.45 W/kg; Per KDB 941225 D05v02r05, 16QAM SAR testing is not required.
5. Per KDB 941225 D05v02r05, Smaller bandwidth output power for each RB allocation configuration is > not ½ dB higher than the same configuration in the largest supported bandwidth, and the reported SAR for the largest supported bandwidth is ≤ 1.45 W/kg; Per KDB 941225 D05v02r05, smaller bandwidth SAR testing is not required.
6. For LTE B4 / B5 / B12 / B26 the maximum bandwidth does not support three non-overlapping channels, per KDB 941225 D05v02r05, 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.
7. LTE band 17 SAR test was covered by Band 12; according to April 2015 TCB workshop, SAR test for overlapping LTE bands can be reduced if
   a. the maximum output power, including tolerance, for the smaller band is ≤ the larger band to qualify for the SAR test exclusion
   b. the channel bandwidth and other operating parameters for the smaller band are fully supported by the larger band

WLAN Note:

1. Per KDB 248227 D01v02r02, for 2.4GHz 802.11g/n SAR testing is not required when the highest reported SAR for DSSS is adjusted by the ratio of OFDM to DSSS specified maximum output power and the adjusted SAR is ≤ 1.2 W/kg.
2. When the reported SAR of the test position is > 0.4 W/kg, SAR is repeated for the 802.11 transmission mode configuration tested in the initial test position to measure the subsequent next closet/smallest test separation distance and maximum coupling test position on the highest maximum output power channel, until the report SAR is ≤ 0.8 W/kg or all required test position are tested.
3. For all positions / configurations, when the reported SAR is > 0.8 W/kg, SAR is measured for these test positions / configurations on the subsequent next highest measured output power channel(s) until the reported SAR is ≤ 1.2 W/kg or all required channels are tested.
4. During SAR testing the WLAN transmission was verified using a spectrum analyzer.

14.1 Head SAR

<GSM SAR>

Plot No.	Band	Mode	Test Position	Gap (mm)	Battery	Ch.	Freq. (MHz)	Average Power (dBm)	Tune-Up Limit (dBm)	Tune-up Scaling Factor	Power Drift (dB)	Measured 1g SAR (W/kg)	Reported 1g SAR (W/kg)
	GSM850	GPRS (2 Tx slots)	Right Cheek	0mm	Battery1	128	824.2	29.77	31.30	1.422	0.146	0.336	0.478
	GSM850	GPRS (2 Tx slots)	Right Cheek	0mm	Battery1	189	836.4	29.74	31.30	1.432	-0.114	0.415	0.594
01	GSM850	GPRS (2 Tx slots)	Right Cheek	0mm	Battery1	251	848.8	29.72	31.30	1.439	0.025	0.493	0.709
	GSM850	GPRS (2 Tx slots)	Right Cheek	0mm	Battery2	251	848.8	29.72	31.30	1.439	0.013	0.486	0.699
	GSM850	GPRS (2 Tx slots)	Right Tilted	0mm	Battery1	128	824.2	29.77	31.30	1.422	0.015	0.219	0.311
	GSM850	GPRS (2 Tx slots)	Left Cheek	0mm	Battery1	128	824.2	29.77	31.30	1.422	0.132	0.308	0.438
	GSM850	GPRS (2 Tx slots)	Left Tilted	0mm	Battery1	128	824.2	29.77	31.30	1.422	-0.048	0.215	0.306
	GSM1900	GPRS (3 Tx slots)	Right Cheek	0mm	Battery1	810	1909.8	26.31	27.70	1.377	0.068	0.237	0.326
	GSM1900	GPRS (3 Tx slots)	Right Tilted	0mm	Battery1	810	1909.8	26.31	27.70	1.377	0.125	0.136	0.187
	GSM1900	GPRS (3 Tx slots)	Left Cheek	0mm	Battery1	810	1909.8	26.31	27.70	1.377	0.013	0.338	0.465
02	GSM1900	GPRS (3 Tx slots)	Left Cheek	0mm	Battery1	512	1850.2	25.99	27.70	1.483	0.042	0.321	0.476
	GSM1900	GPRS (3 Tx slots)	Left Cheek	0mm	Battery1	661	1880	26.30	27.70	1.380	-0.156	0.333	0.460
	GSM1900	GPRS (3 Tx slots)	Left Cheek	0mm	Battery2	512	1850.2	25.99	27.70	1.483	-0.148	0.318	0.471
	GSM1900	GPRS (3 Tx slots)	Left Tilted	0mm	Battery1	810	1909.8	26.31	27.70	1.377	-0.129	0.164	0.226

<WCDMA SAR>

Plot No.	Band	Mode	Test Position	Gap (mm)	Battery	Ch.	Freq. (MHz)	Average Power (dBm)	Tune-Up Limit (dBm)	Tune-up Scaling Factor	Power Drift (dB)	Measured 1g SAR (W/kg)	Reported 1g SAR (W/kg)
	WCDMA II	RMC 12.2Kbps	Right Cheek	0mm	Battery1	9262	1852.4	22.69	24.00	1.352	0.048	0.484	0.654
	WCDMA II	RMC 12.2Kbps	Right Tilted	0mm	Battery1	9262	1852.4	22.69	24.00	1.352	-0.033	0.234	0.316
03	WCDMA II	RMC 12.2Kbps	Left Cheek	0mm	Battery1	9262	1852.4	22.69	24.00	1.352	-0.109	0.586	0.792
	WCDMA II	RMC 12.2Kbps	Left Cheek	0mm	Battery1	9400	1880	22.61	24.00	1.377	-0.102	0.522	0.719
	WCDMA II	RMC 12.2Kbps	Left Cheek	0mm	Battery1	9538	1907.6	22.59	24.00	1.384	0.047	0.453	0.627
	WCDMA II	RMC 12.2Kbps	Left Cheek	0mm	Battery2	9262	1852.4	22.69	24.00	1.352	-0.105	0.563	0.761
	WCDMA II	RMC 12.2Kbps	Left Tilted	0mm	Battery1	9262	1852.4	22.69	24.00	1.352	-0.159	0.252	0.341
	WCDMA IV	RMC 12.2Kbps	Right Cheek	0mm	Battery1	1312	1712.4	22.61	24.00	1.377	0.1	0.243	0.335
	WCDMA IV	RMC 12.2Kbps	Right Tilted	0mm	Battery1	1312	1712.4	22.61	24.00	1.377	0.073	0.191	0.263
	WCDMA IV	RMC 12.2Kbps	Left Cheek	0mm	Battery1	1312	1712.4	22.61	24.00	1.377	-0.003	0.424	0.584
	WCDMA IV	RMC 12.2Kbps	Left Cheek	0mm	Battery1	1413	1732.6	22.45	24.00	1.429	-0.102	0.460	0.657
04	WCDMA IV	RMC 12.2Kbps	Left Cheek	0mm	Battery1	1513	1752.6	22.51	24.00	1.409	-0.084	0.502	0.707
	WCDMA IV	RMC 12.2Kbps	Left Cheek	0mm	Battery2	1513	1752.6	22.51	24.00	1.409	-0.144	0.473	0.667
	WCDMA IV	RMC 12.2Kbps	Left Tilted	0mm	Battery1	1312	1712.4	22.61	24.00	1.377	0.136	0.214	0.295
	WCDMA V	RMC 12.2Kbps	Right Cheek	0mm	Battery1	4182	836.4	22.89	24.00	1.291	0.043	0.347	0.448
	WCDMA V	RMC 12.2Kbps	Right Cheek	0mm	Battery1	4132	826.4	22.83	24.00	1.309	0.114	0.327	0.428
05	WCDMA V	RMC 12.2Kbps	Right Cheek	0mm	Battery1	4233	846.6	22.87	24.00	1.297	0.109	0.360	0.467
	WCDMA V	RMC 12.2Kbps	Right Cheek	0mm	Battery2	4233	846.6	22.87	24.00	1.297	0.059	0.359	0.466
	WCDMA V	RMC 12.2Kbps	Right Tilted	0mm	Battery1	4182	836.4	22.89	24.00	1.291	0.029	0.243	0.314
	WCDMA V	RMC 12.2Kbps	Left Cheek	0mm	Battery1	4182	836.4	22.89	24.00	1.291	0.048	0.313	0.404
	WCDMA V	RMC 12.2Kbps	Left Tilted	0mm	Battery1	4182	836.4	22.89	24.00	1.291	-0.079	0.239	0.309

<CDMA SAR>

Plot No.	Band	Mode	Test Position	Gap (mm)	Battery	Ch.	Freq. (MHz)	Average Power (dBm)	Tune-Up Limit (dBm)	Tune-up Scaling Factor	Power Drift (dB)	Measured 1g SAR (W/kg)	Reported 1g SAR (W/kg)
	CDMA BC0	1xRTT RC3 SO55	Right Cheek	0mm	Battery1	384	836.52	23.84	25.00	1.306	-0.086	0.331	0.432
	CDMA BC0	1xRTT RC3 SO55	Right Tilted	0mm	Battery1	384	836.52	23.84	25.00	1.306	0.008	0.241	0.315
06	CDMA BC0	1xRTT RC3 SO55	Left Cheek	0mm	Battery1	384	836.52	23.84	25.00	1.306	0.023	0.353	0.461
	CDMA BC0	1xRTT RC3 SO55	Left Cheek	0mm	Battery2	384	836.52	23.84	25.00	1.306	0.122	0.352	0.460
	CDMA BC0	1xRTT RC3 SO55	Left Cheek	0mm	Battery1	1013	824.7	23.75	25.00	1.334	0.023	0.334	0.445
	CDMA BC0	1xRTT RC3 SO55	Left Cheek	0mm	Battery1	777	848.31	23.73	25.00	1.340	0.023	0.342	0.458
	CDMA BC0	1xRTT RC3 SO55	Left Tilted	0mm	Battery1	384	836.52	23.84	25.00	1.306	-0.009	0.245	0.320
	CDMA BC1	1xRTT RC3 SO55	Right Cheek	0mm	Battery1	1175	1908.75	23.68	25.00	1.355	0.066	0.384	0.520
	CDMA BC1	1xRTT RC3 SO55	Right Tilted	0mm	Battery1	1175	1908.75	23.68	25.00	1.355	0.072	0.185	0.251
07	CDMA BC1	1xRTT RC3 SO55	Left Cheek	0mm	Battery1	1175	1908.75	23.68	25.00	1.355	-0.114	0.534	0.724
	CDMA BC1	1xRTT RC3 SO55	Left Cheek	0mm	Battery2	1175	1908.75	23.68	25.00	1.355	-0.038	0.495	0.671
	CDMA BC1	1xRTT RC3 SO55	Left Cheek	0mm	Battery1	25	1851.25	23.52	25.00	1.406	-0.114	0.461	0.648
	CDMA BC1	1xRTT RC3 SO55	Left Cheek	0mm	Battery1	600	1880	23.48	25.00	1.419	-0.114	0.486	0.690
	CDMA BC1	1xRTT RC3 SO55	Left Tilted	0mm	Battery1	1175	1908.75	23.68	25.00	1.355	-0.019	0.208	0.282
08	CDMA BC10	1xRTT RC3 SO55	Right Cheek	0mm	Battery1	520	819	23.84	25.00	1.306	0.081	0.404	0.528
	CDMA BC10	1xRTT RC3 SO55	Right Cheek	0mm	Battery2	520	819	23.84	25.00	1.306	0.151	0.396	0.517
	CDMA BC10	1xRTT RC3 SO55	Right Tilted	0mm	Battery1	520	819	23.84	25.00	1.306	0.124	0.255	0.333
	CDMA BC10	1xRTT RC3 SO55	Left Cheek	0mm	Battery1	520	819	23.84	25.00	1.306	-0.179	0.370	0.483
	CDMA BC10	1xRTT RC3 SO55	Left Tilted	0mm	Battery1	520	819	23.84	25.00	1.306	-0.022	0.271	0.354

<FDD LTE SAR>

Plot No.	Band	BW (MHz)	Modulation	RB Size	RB offset	Test Position	Gap (mm)	Battery	Ch.	Freq. (MHz)	Average Power (dBm)	Tune-Up Limit (dBm)	Tune-up Scaling Factor	Power Drift (dB)	Measured 1g SAR (W/kg)	Reported 1g SAR (W/kg)
	LTE Band 2	20M	QPSK	1	49	Right Cheek	0mm	Battery1	19100	1900	22.60	24.00	1.380	-0.136	0.369	0.509
	LTE Band 2	20M	QPSK	50	24	Right Cheek	0mm	Battery1	19100	1900	21.57	23.00	1.390	0.004	0.282	0.392
	LTE Band 2	20M	QPSK	1	49	Right Tilted	0mm	Battery1	19100	1900	22.60	24.00	1.380	0.062	0.112	0.155
	LTE Band 2	20M	QPSK	50	24	Right Tilted	0mm	Battery1	19100	1900	21.57	23.00	1.390	0.041	0.091	0.126
	LTE Band 2	20M	QPSK	1	49	Left Cheek	0mm	Battery1	19100	1900	22.60	24.00	1.380	-0.062	0.416	0.574
09	LTE Band 2	20M	QPSK	1	49	Left Cheek	0mm	Battery1	18700	1860	22.52	24.00	1.406	-0.036	0.476	0.669
	LTE Band 2	20M	QPSK	1	49	Left Cheek	0mm	Battery2	18700	1860	22.52	24.00	1.406	-0.111	0.474	0.666
	LTE Band 2	20M	QPSK	1	49	Left Cheek	0mm	Battery1	18900	1880	22.38	24.00	1.452	0.015	0.454	0.659
	LTE Band 2	20M	QPSK	50	24	Left Cheek	0mm	Battery1	19100	1900	21.57	23.00	1.390	-0.036	0.339	0.471
	LTE Band 2	20M	QPSK	1	49	Left Tilted	0mm	Battery1	19100	1900	22.60	24.00	1.380	-0.142	0.126	0.174
	LTE Band 2	20M	QPSK	50	24	Left Tilted	0mm	Battery1	19100	1900	21.57	23.00	1.390	-0.092	0.105	0.146
	LTE Band 4	20M	QPSK	1	0	Right Cheek	0mm	Battery1	20175	1732.5	23.51	24.00	1.119	0.175	0.324	0.363
	LTE Band 4	20M	QPSK	50	0	Right Cheek	0mm	Battery1	20175	1732.5	22.38	23.00	1.153	0.082	0.265	0.306
	LTE Band 4	20M	QPSK	1	0	Right Tilted	0mm	Battery1	20175	1732.5	23.51	24.00	1.119	0.113	0.233	0.261
	LTE Band 4	20M	QPSK	50	0	Right Tilted	0mm	Battery1	20175	1732.5	22.38	23.00	1.153	-0.009	0.183	0.211
10	LTE Band 4	20M	QPSK	1	0	Left Cheek	0mm	Battery1	20175	1732.5	23.51	24.00	1.119	-0.149	0.493	0.552
	LTE Band 4	20M	QPSK	1	0	Left Cheek	0mm	Battery2	20175	1732.5	23.51	24.00	1.119	-0.011	0.474	0.531
	LTE Band 4	20M	QPSK	50	0	Left Cheek	0mm	Battery1	20175	1732.5	22.38	23.00	1.153	-0.155	0.372	0.429
	LTE Band 4	20M	QPSK	1	0	Left Tilted	0mm	Battery1	20175	1732.5	23.51	24.00	1.119	0.027	0.221	0.247
	LTE Band 4	20M	QPSK	50	0	Left Tilted	0mm	Battery1	20175	1732.5	22.38	23.00	1.153	-0.135	0.190	0.219

Plot No.	Band	BW (MHz)	Modulation	RB Size	RB offset	Test Position	Gap (mm)	Battery	Ch.	Freq. (MHz)	Average Power (dBm)	Tune-Up Limit (dBm)	Tune-up Scaling Factor	Power Drift (dB)	Measured 1g SAR (W/kg)	Reported 1g SAR (W/kg)
11	LTE Band 5	10M	QPSK	1	25	Right Cheek	0mm	Battery1	20525	836.5	23.30	24.00	1.175	0.091	0.318	0.374
	LTE Band 5	10M	QPSK	1	25	Right Cheek	0mm	Battery2	20525	836.5	23.30	24.00	1.175	0.14	0.295	0.347
	LTE Band 5	10M	QPSK	25	0	Right Cheek	0mm	Battery1	20525	836.5	22.29	23.00	1.178	0.034	0.261	0.307
	LTE Band 5	10M	QPSK	1	25	Right Tilted	0mm	Battery1	20525	836.5	23.30	24.00	1.175	-0.045	0.196	0.230
	LTE Band 5	10M	QPSK	25	0	Right Tilted	0mm	Battery1	20525	836.5	22.29	23.00	1.178	0.04	0.167	0.197
	LTE Band 5	10M	QPSK	1	25	Left Cheek	0mm	Battery1	20525	836.5	23.30	24.00	1.175	0.183	0.299	0.351
	LTE Band 5	10M	QPSK	25	0	Left Cheek	0mm	Battery1	20525	836.5	22.29	23.00	1.178	-0.068	0.237	0.279
	LTE Band 5	10M	QPSK	1	25	Left Tilted	0mm	Battery1	20525	836.5	23.30	24.00	1.175	0.095	0.221	0.260
	LTE Band 5	10M	QPSK	25	0	Left Tilted	0mm	Battery1	20525	836.5	22.29	23.00	1.178	-0.091	0.187	0.220
	LTE Band 7	20M	QPSK	1	49	Right Cheek	0mm	Battery1	21100	2535	23.13	24.00	1.222	-0.156	0.201	0.246
	LTE Band 7	20M	QPSK	50	0	Right Cheek	0mm	Battery1	21100	2535	21.87	23.00	1.297	0.119	0.196	0.254
	LTE Band 7	20M	QPSK	1	49	Right Tilted	0mm	Battery1	21100	2535	23.13	24.00	1.222	0.038	0.201	0.246
	LTE Band 7	20M	QPSK	50	0	Right Tilted	0mm	Battery1	21100	2535	21.87	23.00	1.297	0.097	0.192	0.249
	LTE Band 7	20M	QPSK	1	49	Left Cheek	0mm	Battery1	21100	2535	23.13	24.00	1.222	0.147	0.453	0.553
	LTE Band 7	20M	QPSK	50	0	Left Cheek	0mm	Battery1	21100	2535	21.87	23.00	1.297	0.14	0.436	0.566
	LTE Band 7	20M	QPSK	50	0	Left Cheek	0mm	Battery1	20850	2510	21.86	23.00	1.300	0.151	0.481	0.625
12	LTE Band 7	20M	QPSK	50	0	Left Cheek	0mm	Battery1	21350	2560	21.85	23.00	1.303	-0.003	0.567	0.739
	LTE Band 7	20M	QPSK	50	0	Left Cheek	0mm	Battery2	21350	2560	21.85	23.00	1.303	-0.107	0.475	0.619
	LTE Band 7	20M	QPSK	1	49	Left Tilted	0mm	Battery1	21100	2535	23.13	24.00	1.222	-0.19	0.131	0.160
	LTE Band 7	20M	QPSK	50	0	Left Tilted	0mm	Battery1	21100	2535	21.87	23.00	1.297	-0.164	0.106	0.138
	LTE Band 12	10M	QPSK	1	49	Right Cheek	0mm	Battery1	23095	707.5	23.50	24.00	1.122	-0.108	0.220	0.247
	LTE Band 12	10M	QPSK	25	25	Right Cheek	0mm	Battery1	23095	707.5	22.39	23.00	1.151	-0.007	0.179	0.206
	LTE Band 12	10M	QPSK	1	49	Right Tilted	0mm	Battery1	23095	707.5	23.50	24.00	1.122	-0.038	0.153	0.172
	LTE Band 12	10M	QPSK	25	25	Right Tilted	0mm	Battery1	23095	707.5	22.39	23.00	1.151	-0.06	0.120	0.138
13	LTE Band 12	10M	QPSK	1	49	Left Cheek	0mm	Battery1	23095	707.5	23.50	24.00	1.122	0.156	0.222	0.249
	LTE Band 12	10M	QPSK	25	25	Left Cheek	0mm	Battery1	23095	707.5	22.39	23.00	1.151	-0.018	0.181	0.208
	LTE Band 12	10M	QPSK	1	49	Left Cheek	0mm	Battery2	23095	707.5	23.50	24.00	1.122	0.12	0.208	0.233
	LTE Band 12	10M	QPSK	1	49	Left Tilted	0mm	Battery1	23095	707.5	23.50	24.00	1.122	-0.131	0.154	0.173
	LTE Band 12	10M	QPSK	25	25	Left Tilted	0mm	Battery1	23095	707.5	22.39	23.00	1.151	-0.116	0.124	0.143
14	LTE Band 13	10M	QPSK	1	0	Right Cheek	0mm	Battery1	23230	782	23.38	24.00	1.153	-0.017	0.277	0.320
	LTE Band 13	10M	QPSK	25	12	Right Cheek	0mm	Battery1	23230	782	22.26	23.00	1.186	0.151	0.224	0.266
	LTE Band 13	10M	QPSK	1	0	Right Cheek	0mm	Battery2	23230	782	23.38	24.00	1.153	-0.101	0.275	0.317
	LTE Band 13	10M	QPSK	1	0	Right Tilted	0mm	Battery1	23230	782	23.38	24.00	1.153	0.123	0.210	0.242
	LTE Band 13	10M	QPSK	25	12	Right Tilted	0mm	Battery1	23230	782	22.26	23.00	1.186	0.149	0.166	0.197
	LTE Band 13	10M	QPSK	1	0	Left Cheek	0mm	Battery1	23230	782	23.38	24.00	1.153	-0.025	0.266	0.307
	LTE Band 13	10M	QPSK	25	12	Left Cheek	0mm	Battery1	23230	782	22.26	23.00	1.186	-0.049	0.209	0.248
	LTE Band 13	10M	QPSK	1	0	Left Tilted	0mm	Battery1	23230	782	23.38	24.00	1.153	0.044	0.204	0.235
	LTE Band 13	10M	QPSK	25	12	Left Tilted	0mm	Battery1	23230	782	22.26	23.00	1.186	-0.051	0.165	0.196
	LTE Band 25	20M	QPSK	1	49	Right Cheek	0mm	Battery1	26590	1905	23.31	24.00	1.172	-0.02	0.334	0.392
	LTE Band 25	20M	QPSK	50	0	Right Cheek	0mm	Battery1	26590	1905	22.08	23.00	1.236	-0.089	0.321	0.397
	LTE Band 25	20M	QPSK	1	49	Right Tilted	0mm	Battery1	26590	1905	23.31	24.00	1.172	-0.19	0.106	0.124
	LTE Band 25	20M	QPSK	50	0	Right Tilted	0mm	Battery1	26590	1905	22.08	23.00	1.236	-0.042	0.096	0.119
	LTE Band 25	20M	QPSK	1	49	Left Cheek	0mm	Battery1	26590	1905	23.31	24.00	1.172	0.073	0.400	0.469
15	LTE Band 25	20M	QPSK	1	49	Left Cheek	0mm	Battery1	26140	1860	23.05	24.00	1.245	0.099	0.480	0.597
	LTE Band 25	20M	QPSK	1	49	Left Cheek	0mm	Battery2	26140	1860	23.05	24.00	1.245	0.115	0.478	0.595
	LTE Band 25	20M	QPSK	1	49	Left Cheek	0mm	Battery1	26340	1880	23.06	24.00	1.242	-0.187	0.475	0.590
	LTE Band 25	20M	QPSK	50	0	Left Cheek	0mm	Battery1	26590	1905	22.08	23.00	1.236	-0.094	0.349	0.431
	LTE Band 25	20M	QPSK	1	49	Left Tilted	0mm	Battery1	26590	1905	23.31	24.00	1.172	-0.135	0.119	0.139
	LTE Band 25	20M	QPSK	50	0	Left Tilted	0mm	Battery1	26590	1905	22.08	23.00	1.236	-0.051	0.111	0.137

Plot No.	Band	BW (MHz)	Modulation	RB Size	RB offset	Test Position	Gap (mm)	Battery	Ch.	Freq. (MHz)	Average Power (dBm)	Tune-Up Limit (dBm)	Tune-up Scaling Factor	Power Drift (dB)	Measured 1g SAR (W/kg)	Reported 1g SAR (W/kg)
16	LTE Band 26	15M	QPSK	1	0	Right Cheek	0mm	Battery1	26865	831.5	23.52	24.00	1.117	0.132	0.317	0.354
	LTE Band 26	15M	QPSK	1	0	Right Cheek	0mm	Battery2	26865	831.5	23.52	24.00	1.117	-0.036	0.306	0.342
	LTE Band 26	15M	QPSK	36	0	Right Cheek	0mm	Battery1	26865	831.5	22.37	23.00	1.156	-0.071	0.245	0.283
	LTE Band 26	15M	QPSK	1	0	Right Tilted	0mm	Battery1	26865	831.5	23.52	24.00	1.117	-0.03	0.204	0.228
	LTE Band 26	15M	QPSK	36	0	Right Tilted	0mm	Battery1	26865	831.5	22.37	23.00	1.156	0.017	0.163	0.188
	LTE Band 26	15M	QPSK	1	0	Left Cheek	0mm	Battery1	26865	831.5	23.52	24.00	1.117	0.013	0.283	0.316
	LTE Band 26	15M	QPSK	36	0	Left Cheek	0mm	Battery1	26865	831.5	22.37	23.00	1.156	-0.108	0.235	0.272
	LTE Band 26	15M	QPSK	1	0	Left Tilted	0mm	Battery1	26865	831.5	23.52	24.00	1.117	-0.095	0.221	0.247
	LTE Band 26	15M	QPSK	36	0	Left Tilted	0mm	Battery1	26865	831.5	22.37	23.00	1.156	-0.056	0.174	0.201

<TDD LTE SAR>

Plot No.	Band	BW (MHz)	Modulation	RB Size	RB offset	Test Position	Gap (mm)	Battery	Ch.	Freq. (MHz)	Average Power (dBm)	Tune-Up Limit (dBm)	Tune-up Scaling Factor	Duty Cycle %	Duty Cycle Scaling Factor	Power Drift (dB)	Measured 1g SAR (W/kg)	Reported 1g SAR (W/kg)
	LTE Band 41	20M	QPSK	1	0	Right Cheek	0mm	Battery1	41055	2636.5	22.75	24.00	1.334	62.9	1.006	0.1	0.145	0.195
	LTE Band 41	20M	QPSK	50	0	Right Cheek	0mm	Battery1	41055	2636.5	21.99	23.00	1.262	62.9	1.006	0.172	0.142	0.180
	LTE Band 41	20M	QPSK	1	0	Right Tilted	0mm	Battery1	41055	2636.5	22.75	24.00	1.334	62.9	1.006	0.133	0.105	0.141
	LTE Band 41	20M	QPSK	50	0	Right Tilted	0mm	Battery1	41055	2636.5	21.99	23.00	1.262	62.9	1.006	-0.189	0.105	0.133
	LTE Band 41	20M	QPSK	1	0	Left Cheek	0mm	Battery1	41055	2636.5	22.75	24.00	1.334	62.9	1.006	0.055	0.406	0.545
	LTE Band 41	20M	QPSK	1	0	Left Cheek	0mm	Battery1	39790	2510	22.55	24.00	1.396	62.9	1.006	0.055	0.358	0.503
	LTE Band 41	20M	QPSK	1	0	Left Cheek	0mm	Battery1	39750	2506	22.61	24.00	1.377	62.9	1.006	0.089	0.366	0.507
	LTE Band 41	20M	QPSK	1	0	Left Cheek	0mm	Battery1	40185	2549.5	22.61	24.00	1.377	62.9	1.006	0.026	0.414	0.574
17	LTE Band 41	20M	QPSK	1	0	Left Cheek	0mm	Battery1	40620	2593	22.73	24.00	1.340	62.9	1.006	0.102	0.444	0.598
	LTE Band 41	20M	QPSK	1	0	Left Cheek	0mm	Battery2	40620	2593	22.73	24.00	1.340	62.9	1.006	0.138	0.378	0.509
	LTE Band 41	20M	QPSK	1	0	Left Cheek	0mm	Battery1	41490	2680	22.73	24.00	1.340	62.9	1.006	0.058	0.405	0.546
	LTE Band 41	20M	QPSK	50	0	Left Cheek	0mm	Battery1	41055	2636.5	21.99	23.00	1.262	62.9	1.006	0.154	0.337	0.428
	LTE Band 41	20M	QPSK	1	0	Left Tilted	0mm	Battery1	41055	2636.5	22.75	24.00	1.334	62.9	1.006	0.02	0.060	0.080
	LTE Band 41	20M	QPSK	50	0	Left Tilted	0mm	Battery1	41055	2636.5	21.99	23.00	1.262	62.9	1.006	0.073	0.055	0.070

<WLAN SAR>

Plot No.	Band	Mode	Test Position	Gap (mm)	Battery	Ch.	Freq. (MHz)	Average Power (dBm)	Tune-Up Limit (dBm)	Tune-up Scaling Factor	Duty Cycle %	Duty Cycle Scaling Factor	Power Drift (dB)	Measured 1g SAR (W/kg)	Reported 1g SAR (W/kg)
	WLAN2.4GHz	802.11b 1Mbps	Right Cheek	0mm	Battery1	6	2437	18.73	19.00	1.064	97.62	1.024	0.139	0.164	0.179
	WLAN2.4GHz	802.11b 1Mbps	Right Tilted	0mm	Battery1	6	2437	18.73	19.00	1.064	97.62	1.024	0.146	0.146	0.159
18	WLAN2.4GHz	802.11b 1Mbps	Left Cheek	0mm	Battery1	6	2437	18.73	19.00	1.064	97.62	1.024	-0.111	0.360	0.392
	WLAN2.4GHz	802.11b 1Mbps	Left Cheek	0mm	Battery1	1	2412	17.82	19.00	1.312	97.62	1.024	0.036	0.229	0.308
	WLAN2.4GHz	802.11b 1Mbps	Left Cheek	0mm	Battery1	11	2462	18.55	19.00	1.109	97.62	1.024	-0.04	0.300	0.341
	WLAN2.4GHz	802.11b 1Mbps	Left Cheek	0mm	Battery2	6	2437	18.73	19.00	1.064	97.62	1.024	-0.106	0.315	0.343
	WLAN2.4GHz	802.11b 1Mbps	Left Tilted	0mm	Battery1	6	2437	18.73	19.00	1.064	97.62	1.024	-0.124	0.292	0.318

14.2 Hotspot SAR

<GSM SAR>

Plot No.	Band	Mode	Test Position	Gap (mm)	Battery	Ch.	Freq. (MHz)	Average Power (dBm)	Tune-Up Limit (dBm)	Tune-up Scaling Factor	Power Drift (dB)	Measured 1g SAR (W/kg)	Reported 1g SAR (W/kg)
	GSM850	GPRS (2 Tx slots)	Front	10mm	Battery1	128	824.2	29.77	31.30	1.422	0.194	0.487	0.693
	GSM850	GPRS (2 Tx slots)	Back	10mm	Battery1	128	824.2	29.77	31.30	1.422	-0.013	0.619	0.880
	GSM850	GPRS (2 Tx slots)	Back	10mm	Battery1	189	836.4	29.74	31.30	1.432	-0.168	0.611	0.875
19	GSM850	GPRS (2 Tx slots)	Back	10mm	Battery1	251	848.8	29.72	31.30	1.439	0.06	0.637	0.917
	GSM850	GPRS (2 Tx slots)	Back	10mm	Battery2	251	848.8	29.72	31.30	1.439	-0.18	0.623	0.896
	GSM850	GPRS (2 Tx slots)	Left Side	10mm	Battery1	128	824.2	29.77	31.30	1.422	0.083	0.547	0.778
	GSM850	GPRS (2 Tx slots)	Right Side	10mm	Battery1	128	824.2	29.77	31.30	1.422	0.126	0.537	0.764
	GSM850	GPRS (2 Tx slots)	Bottom Side	10mm	Battery1	128	824.2	29.77	31.30	1.422	0.024	0.048	0.068
	GSM1900	GPRS (3 Tx slots)	Front	10mm	Battery1	810	1909.8	26.31	27.70	1.377	0.024	0.497	0.684
	GSM1900	GPRS (3 Tx slots)	Back	10mm	Battery1	810	1909.8	26.31	27.70	1.377	0.02	0.586	0.807
20	GSM1900	GPRS (3 Tx slots)	Back	10mm	Battery1	512	1850.2	25.99	27.70	1.483	-0.026	0.661	0.980
	GSM1900	GPRS (3 Tx slots)	Back	10mm	Battery2	512	1850.2	25.99	27.70	1.483	0.035	0.623	0.924
	GSM1900	GPRS (3 Tx slots)	Back	10mm	Battery1	661	1880	26.30	27.70	1.380	-0.031	0.603	0.832
	GSM1900	GPRS (3 Tx slots)	Left Side	10mm	Battery1	810	1909.8	26.31	27.70	1.377	-0.017	0.330	0.454
	GSM1900	GPRS (3 Tx slots)	Right Side	10mm	Battery1	810	1909.8	26.31	27.70	1.377	0.018	0.237	0.326
	GSM1900	GPRS (3 Tx slots)	Bottom Side	10mm	Battery1	810	1909.8	26.31	27.70	1.377	-0.023	0.226	0.311

<WCDMA SAR>

Plot No.	Band	Mode	Test Position	Gap (mm)	Battery	Ch.	Freq. (MHz)	Average Power (dBm)	Tune-Up Limit (dBm)	Tune-up Scaling Factor	Power Drift (dB)	Measured 1g SAR (W/kg)	Reported 1g SAR (W/kg)
	WCDMA II	RMC 12.2Kbps	Front	10mm	Battery1	9262	1852.4	22.69	24.00	1.352	0.035	0.881	1.191
	WCDMA II	RMC 12.2Kbps	Front	10mm	Battery1	9400	1880	22.61	24.00	1.377	0.014	0.809	1.114
	WCDMA II	RMC 12.2Kbps	Front	10mm	Battery1	9538	1907.6	22.59	24.00	1.384	0	0.714	0.988
21	WCDMA II	RMC 12.2Kbps	Back	10mm	Battery1	9262	1852.4	22.69	24.00	1.352	0.05	1.010	1.366
	WCDMA II	RMC 12.2Kbps	Back	10mm	Battery2	9262	1852.4	22.69	24.00	1.352	0.014	1.000	1.352
	WCDMA II	RMC 12.2Kbps	Back	10mm	Battery1	9400	1880	22.61	24.00	1.377	0.057	0.865	1.191
	WCDMA II	RMC 12.2Kbps	Back	10mm	Battery1	9538	1907.6	22.59	24.00	1.384	0.027	0.783	1.083
	WCDMA II	RMC 12.2Kbps	Left Side	10mm	Battery1	9262	1852.4	22.69	24.00	1.352	-0.022	0.511	0.691
	WCDMA II	RMC 12.2Kbps	Right Side	10mm	Battery1	9262	1852.4	22.69	24.00	1.352	-0.162	0.406	0.549
	WCDMA II	RMC 12.2Kbps	Bottom Side	10mm	Battery1	9262	1852.4	22.69	24.00	1.352	0.171	0.349	0.472
	WCDMA IV	RMC 12.2Kbps	Front	10mm	Battery1	1312	1712.4	22.61	24.00	1.377	-0.037	0.653	0.899
	WCDMA IV	RMC 12.2Kbps	Front	10mm	Battery1	1413	1732.6	22.45	24.00	1.429	0.079	0.657	0.939
	WCDMA IV	RMC 12.2Kbps	Front	10mm	Battery1	1513	1752.6	22.51	24.00	1.409	-0.008	0.706	0.995
	WCDMA IV	RMC 12.2Kbps	Back	10mm	Battery1	1312	1712.4	22.61	24.00	1.377	-0.025	0.970	1.336
	WCDMA IV	RMC 12.2Kbps	Back	10mm	Battery1	1413	1732.6	22.45	24.00	1.429	-0.005	0.975	1.393
22	WCDMA IV	RMC 12.2Kbps	Back	10mm	Battery1	1513	1752.6	22.51	24.00	1.409	0.003	0.991	1.397
	WCDMA IV	RMC 12.2Kbps	Back	10mm	Battery2	1513	1752.6	22.51	24.00	1.409	0.096	0.942	1.328
	WCDMA IV	RMC 12.2Kbps	Left Side	10mm	Battery1	1312	1712.4	22.61	24.00	1.377	-0.043	0.305	0.420
	WCDMA IV	RMC 12.2Kbps	Right Side	10mm	Battery1	1312	1712.4	22.61	24.00	1.377	0.02	0.156	0.215
	WCDMA IV	RMC 12.2Kbps	Bottom Side	10mm	Battery1	1312	1712.4	22.61	24.00	1.377	0.109	0.274	0.377
	WCDMA V	RMC 12.2Kbps	Front	10mm	Battery1	4182	836.4	22.89	24.00	1.291	0.068	0.425	0.549
	WCDMA V	RMC 12.2Kbps	Back	10mm	Battery1	4182	836.4	22.89	24.00	1.291	0.084	0.528	0.682
23	WCDMA V	RMC 12.2Kbps	Back	10mm	Battery1	4132	826.4	22.83	24.00	1.309	-0.073	0.550	0.720
	WCDMA V	RMC 12.2Kbps	Back	10mm	Battery2	4132	826.4	22.83	24.00	1.309	0.019	0.526	0.689
	WCDMA V	RMC 12.2Kbps	Back	10mm	Battery1	4233	846.6	22.87	24.00	1.297	-0.037	0.507	0.658
	WCDMA V	RMC 12.2Kbps	Left side	10mm	Battery1	4182	836.4	22.89	24.00	1.291	0.11	0.493	0.637
	WCDMA V	RMC 12.2Kbps	Right side	10mm	Battery1	4182	836.4	22.89	24.00	1.291	0.031	0.518	0.669
	WCDMA V	RMC 12.2Kbps	Bottom Side	10mm	Battery1	4182	836.4	22.89	24.00	1.291	0.042	0.062	0.080

<CDMA SAR>

Plot No.	Band	Mode	Test Position	Gap (mm)	Battery	Ch.	Freq. (MHz)	Average Power (dBm)	Tune-Up Limit (dBm)	Tune-up Scaling Factor	Power Drift (dB)	Measured 1g SAR (W/kg)	Reported 1g SAR (W/kg)
	CDMA BC0	RTAP 153.6Kbps	Front	10mm	Battery1	1013	824.7	23.77	25.00	1.327	-0.099	0.503	0.668
24	CDMA BC0	RTAP 153.6Kbps	Back	10mm	Battery1	1013	824.7	23.77	25.00	1.327	-0.007	0.660	0.876
	CDMA BC0	RTAP 153.6Kbps	Back	10mm	Battery2	1013	824.7	23.77	25.00	1.327	-0.015	0.652	0.865
	CDMA BC0	RTAP 153.6Kbps	Back	10mm	Battery1	384	836.52	23.66	25.00	1.361	0.04	0.642	0.874
	CDMA BC0	RTAP 153.6Kbps	Back	10mm	Battery1	777	848.31	23.76	25.00	1.330	0.09	0.639	0.850
	CDMA BC0	RTAP 153.6Kbps	Left Side	10mm	Battery1	1013	824.7	23.77	25.00	1.327	-0.022	0.590	0.783
	CDMA BC0	RTAP 153.6Kbps	Right Side	10mm	Battery1	1013	824.7	23.77	25.00	1.327	0.002	0.593	0.787
	CDMA BC0	RTAP 153.6Kbps	Bottom Side	10mm	Battery1	1013	824.7	23.77	25.00	1.327	-0.048	0.050	0.066
	CDMA BC1	RTAP 153.6Kbps	Front	10mm	Battery1	1175	1908.75	23.77	25.00	1.327	0.095	0.708	0.940
	CDMA BC1	RTAP 153.6Kbps	Front	10mm	Battery1	25	1851.25	23.56	25.00	1.393	0.041	0.794	1.106
	CDMA BC1	RTAP 153.6Kbps	Front	10mm	Battery1	600	1880	23.52	25.00	1.406	-0.063	0.755	1.062
	CDMA BC1	RTAP 153.6Kbps	Back	10mm	Battery1	1175	1908.75	23.77	25.00	1.327	0.019	0.833	1.106
25	CDMA BC1	RTAP 153.6Kbps	Back	10mm	Battery1	25	1851.25	23.56	25.00	1.393	0.111	1.050	1.463
	CDMA BC1	RTAP 153.6Kbps	Back	10mm	Battery1	600	1880	23.52	25.00	1.406	0.025	0.948	1.333
	CDMA BC1	RTAP 153.6Kbps	Back	10mm	Battery2	25	1851.25	23.56	25.00	1.393	0.127	1.010	1.407
	CDMA BC1	RTAP 153.6Kbps	Left Side	10mm	Battery1	1175	1908.75	23.77	25.00	1.327	0.072	0.347	0.461
	CDMA BC1	RTAP 153.6Kbps	Right Side	10mm	Battery1	1175	1908.75	23.77	25.00	1.327	0.151	0.265	0.352
	CDMA BC1	RTAP 153.6Kbps	Bottom Side	10mm	Battery1	1175	1908.75	23.77	25.00	1.327	0.177	0.321	0.426
	CDMA BC10	RTAP 153.6Kbps	Front	10mm	Battery1	520	819	23.87	25.00	1.297	0.009	0.584	0.758
26	CDMA BC10	RTAP 153.6Kbps	Back	10mm	Battery1	520	819	23.87	25.00	1.297	0.078	0.763	0.990
	CDMA BC10	RTAP 153.6Kbps	Back	10mm	Battery2	520	819	23.87	25.00	1.297	0.164	0.760	0.986
	CDMA BC10	RTAP 153.6Kbps	Left Side	10mm	Battery1	520	819	23.87	25.00	1.297	0.072	0.652	0.846
	CDMA BC10	RTAP 153.6Kbps	Right Side	10mm	Battery1	520	819	23.87	25.00	1.297	-0.002	0.651	0.844
	CDMA BC10	RTAP 153.6Kbps	Bottom Side	10mm	Battery1	520	819	23.87	25.00	1.297	0.061	0.054	0.070

<FDD LTE SAR>

Plot No.	Band	BW (MHz)	Modulation	RB Size	RB offset	Test Position	Gap (mm)	Battery	Ch.	Freq. (MHz)	Average Power (dBm)	Tune-Up Limit (dBm)	Tune-up Scaling Factor	Power Drift (dB)	Measured 1g SAR (W/kg)	Reported 1g SAR (W/kg)
	LTE Band 2	20M	QPSK	1	49	Front	10mm	Battery1	19100	1900	22.60	24.00	1.380	-0.126	0.659	0.910
	LTE Band 2	20M	QPSK	1	49	Front	10mm	Battery1	18700	1860	22.52	24.00	1.406	-0.115	0.724	1.018
	LTE Band 2	20M	QPSK	1	49	Front	10mm	Battery1	18900	1880	22.38	24.00	1.452	0.043	0.684	0.993
	LTE Band 2	20M	QPSK	50	24	Front	10mm	Battery1	19100	1900	21.57	23.00	1.390	-0.032	0.497	0.691
	LTE Band 2	20M	QPSK	100	0	Front	10mm	Battery1	18900	1880	21.48	23.00	1.419	0.022	0.494	0.701
	LTE Band 2	20M	QPSK	1	49	Back	10mm	Battery1	19100	1900	22.60	24.00	1.380	-0.122	0.721	0.995
27	LTE Band 2	20M	QPSK	1	49	Back	10mm	Battery1	18700	1860	22.52	24.00	1.406	0.04	0.829	1.166
	LTE Band 2	20M	QPSK	1	49	Back	10mm	Battery2	18700	1860	22.52	24.00	1.406	0.086	0.819	1.152
	LTE Band 2	20M	QPSK	1	49	Back	10mm	Battery1	18900	1880	22.38	24.00	1.452	-0.017	0.764	1.109
	LTE Band 2	20M	QPSK	50	24	Back	10mm	Battery1	19100	1900	21.57	23.00	1.390	0.052	0.564	0.784
	LTE Band 2	20M	QPSK	100	0	Back	10mm	Battery1	18900	1880	21.48	23.00	1.419	0.041	0.621	0.881
	LTE Band 2	20M	QPSK	1	49	Left Side	10mm	Battery1	19100	1900	22.60	24.00	1.380	0.076	0.308	0.425
	LTE Band 2	20M	QPSK	50	24	Left Side	10mm	Battery1	19100	1900	21.57	23.00	1.390	0.066	0.238	0.331
	LTE Band 2	20M	QPSK	1	49	Right Side	10mm	Battery1	19100	1900	22.60	24.00	1.380	0.005	0.288	0.398
	LTE Band 2	20M	QPSK	50	24	Right Side	10mm	Battery1	19100	1900	21.57	23.00	1.390	-0.109	0.234	0.325
	LTE Band 2	20M	QPSK	1	49	Bottom Side	10mm	Battery1	19100	1900	22.60	24.00	1.380	0.141	0.287	0.396
	LTE Band 2	20M	QPSK	50	24	Bottom Side	10mm	Battery1	19100	1900	21.57	23.00	1.390	0.061	0.227	0.316

Plot No.	Band	BW (MHz)	Modulation	RB Size	RB offset	Test Position	Gap (mm)	Battery	Ch.	Freq. (MHz)	Average Power (dBm)	Tune-Up Limit (dBm)	Tune-up Scaling Factor	Power Drift (dB)	Measured 1g SAR (W/kg)	Reported 1g SAR (W/kg)
	LTE Band 4	20M	QPSK	1	0	Front	10mm	Battery1	20175	1732.5	23.51	24.00	1.119	-0.111	0.767	0.859
	LTE Band 4	20M	QPSK	50	0	Front	10mm	Battery1	20175	1732.5	22.38	23.00	1.153	0.016	0.605	0.698
	LTE Band 4	20M	QPSK	100	0	Front	10mm	Battery1	20175	1732.5	22.25	23.00	1.189	0.024	0.614	0.730
28	LTE Band 4	20M	QPSK	1	0	Back	10mm	Battery1	20175	1732.5	23.51	24.00	1.119	-0.038	1.160	1.299
	LTE Band 4	20M	QPSK	1	0	Back	10mm	Battery2	20175	1732.5	23.51	24.00	1.119	0.136	1.130	1.265
	LTE Band 4	20M	QPSK	50	0	Back	10mm	Battery1	20175	1732.5	22.38	23.00	1.153	0.013	0.870	1.004
	LTE Band 4	20M	QPSK	100	0	Back	10mm	Battery1	20175	1732.5	22.25	23.00	1.189	0.005	0.860	1.022
	LTE Band 4	20M	QPSK	1	0	Left Side	10mm	Battery1	20175	1732.5	23.51	24.00	1.119	-0.103	0.351	0.393
	LTE Band 4	20M	QPSK	50	0	Left Side	10mm	Battery1	20175	1732.5	22.38	23.00	1.153	-0.093	0.293	0.338
	LTE Band 4	20M	QPSK	1	0	Right Side	10mm	Battery1	20175	1732.5	23.51	24.00	1.119	0.118	0.188	0.210
	LTE Band 4	20M	QPSK	50	0	Right Side	10mm	Battery1	20175	1732.5	22.38	23.00	1.153	0.004	0.158	0.182
	LTE Band 4	20M	QPSK	1	0	Bottom Side	10mm	Battery1	20175	1732.5	23.51	24.00	1.119	0.146	0.329	0.368
	LTE Band 4	20M	QPSK	50	0	Bottom Side	10mm	Battery1	20175	1732.5	22.38	23.00	1.153	-0.08	0.238	0.275
	LTE Band 5	10M	QPSK	1	25	Front	10mm	Battery1	20525	836.5	23.30	24.00	1.175	-0.119	0.417	0.490
	LTE Band 5	10M	QPSK	25	0	Front	10mm	Battery1	20525	836.5	22.29	23.00	1.178	-0.004	0.341	0.402
29	LTE Band 5	10M	QPSK	1	25	Back	10mm	Battery1	20525	836.5	23.30	24.00	1.175	-0.018	0.515	0.605
	LTE Band 5	10M	QPSK	1	25	Back	10mm	Battery2	20525	836.5	23.30	24.00	1.175	-0.152	0.482	0.566
	LTE Band 5	10M	QPSK	25	0	Back	10mm	Battery1	20525	836.5	22.29	23.00	1.178	-0.027	0.432	0.509
	LTE Band 5	10M	QPSK	1	25	Left Side	10mm	Battery1	20525	836.5	23.30	24.00	1.175	0.184	0.479	0.563
	LTE Band 5	10M	QPSK	25	0	Left Side	10mm	Battery1	20525	836.5	22.29	23.00	1.178	0.009	0.389	0.458
	LTE Band 5	10M	QPSK	1	25	Right Side	10mm	Battery1	20525	836.5	23.30	24.00	1.175	0.154	0.507	0.596
	LTE Band 5	10M	QPSK	25	0	Right Side	10mm	Battery1	20525	836.5	22.29	23.00	1.178	-0.019	0.419	0.493
	LTE Band 5	10M	QPSK	1	25	Bottom Side	10mm	Battery1	20525	836.5	23.30	24.00	1.175	0.144	0.053	0.062
	LTE Band 5	10M	QPSK	25	0	Bottom Side	10mm	Battery1	20525	836.5	22.29	23.00	1.178	0.15	0.041	0.048
	LTE Band 7	20M	QPSK	1	49	Front	10mm	Battery1	21100	2535	23.13	24.00	1.222	-0.128	0.654	0.799
	LTE Band 7	20M	QPSK	50	0	Front	10mm	Battery1	21100	2535	21.87	23.00	1.297	-0.005	0.643	0.834
	LTE Band 7	20M	QPSK	50	0	Front	10mm	Battery1	20850	2510	21.86	23.00	1.300	-0.019	0.523	0.680
	LTE Band 7	20M	QPSK	50	0	Front	10mm	Battery1	21350	2560	21.85	23.00	1.303	-0.055	0.660	0.860
	LTE Band 7	20M	QPSK	100	0	Front	10mm	Battery1	21100	2535	21.86	23.00	1.300	0.047	0.601	0.781
	LTE Band 7	20M	QPSK	1	49	Back	10mm	Battery1	21100	2535	23.13	24.00	1.222	0.058	0.869	1.062
	LTE Band 7	20M	QPSK	1	49	Back	10mm	Battery1	20850	2510	23.00	24.00	1.259	-0.152	0.701	0.883
	LTE Band 7	20M	QPSK	1	49	Back	10mm	Battery1	21350	2560	23.07	24.00	1.239	0.123	0.739	0.915
30	LTE Band 7	20M	QPSK	50	0	Back	10mm	Battery1	21100	2535	21.87	23.00	1.297	0.072	0.874	1.134
	LTE Band 7	20M	QPSK	50	0	Back	10mm	Battery2	21100	2535	21.87	23.00	1.297	-0.067	0.863	1.119
	LTE Band 7	20M	QPSK	50	0	Back	10mm	Battery1	20850	2510	21.86	23.00	1.300	-0.009	0.835	1.086
	LTE Band 7	20M	QPSK	50	0	Back	10mm	Battery1	21350	2560	21.85	23.00	1.303	-0.136	0.866	1.129
	LTE Band 7	20M	QPSK	100	0	Back	10mm	Battery1	21100	2535	21.86	23.00	1.300	0.045	0.860	1.118
	LTE Band 7	20M	QPSK	1	49	Left Side	10mm	Battery1	21100	2535	23.13	24.00	1.222	0.158	0.355	0.434
	LTE Band 7	20M	QPSK	50	0	Left Side	10mm	Battery1	21100	2535	21.87	23.00	1.297	-0.115	0.338	0.438
	LTE Band 7	20M	QPSK	1	49	Right Side	10mm	Battery1	21100	2535	23.13	24.00	1.222	0.114	0.073	0.089
	LTE Band 7	20M	QPSK	50	0	Right Side	10mm	Battery1	21100	2535	21.87	23.00	1.297	0	0.073	0.095
	LTE Band 7	20M	QPSK	1	49	Bottom Side	10mm	Battery1	21100	2535	23.13	24.00	1.222	-0.001	0.594	0.726
	LTE Band 7	20M	QPSK	50	0	Bottom Side	10mm	Battery1	21100	2535	21.87	23.00	1.297	-0.102	0.613	0.795

Plot No.	Band	BW (MHz)	Modulation	RB Size	RB offset	Test Position	Gap (mm)	Battery	Ch.	Freq. (MHz)	Average Power (dBm)	Tune-Up Limit (dBm)	Tune-up Scaling Factor	Power Drift (dB)	Measured 1g SAR (W/kg)	Reported 1g SAR (W/kg)
	LTE Band 12	10M	QPSK	1	49	Front	10mm	Battery1	23095	707.5	23.50	24.00	1.122	-0.02	0.320	0.359
	LTE Band 12	10M	QPSK	25	25	Front	10mm	Battery1	23095	707.5	22.39	23.00	1.151	0.136	0.258	0.297
31	LTE Band 12	10M	QPSK	1	49	Back	10mm	Battery1	23095	707.5	23.50	24.00	1.122	0.088	0.443	0.497
	LTE Band 12	10M	QPSK	1	49	Back	10mm	Battery2	23095	707.5	23.50	24.00	1.122	-0.005	0.386	0.433
	LTE Band 12	10M	QPSK	25	25	Back	10mm	Battery1	23095	707.5	22.39	23.00	1.151	-0.009	0.365	0.420
	LTE Band 12	10M	QPSK	1	49	Left Side	10mm	Battery1	23095	707.5	23.50	24.00	1.122	0.095	0.229	0.257
	LTE Band 12	10M	QPSK	25	25	Left Side	10mm	Battery1	23095	707.5	22.39	23.00	1.151	-0.033	0.184	0.212
	LTE Band 12	10M	QPSK	1	49	Right Side	10mm	Battery1	23095	707.5	23.50	24.00	1.122	0.007	0.242	0.272
	LTE Band 12	10M	QPSK	25	25	Right Side	10mm	Battery1	23095	707.5	22.39	23.00	1.151	0.189	0.201	0.231
	LTE Band 12	10M	QPSK	1	49	Bottom Side	10mm	Battery1	23095	707.5	23.50	24.00	1.122	0.135	0.051	0.057
	LTE Band 12	10M	QPSK	25	25	Bottom Side	10mm	Battery1	23095	707.5	22.39	23.00	1.151	0.157	0.040	0.046
	LTE Band 13	10M	QPSK	1	0	Front	10mm	Battery1	23230	782	23.38	24.00	1.153	0.192	0.430	0.496
	LTE Band 13	10M	QPSK	25	12	Front	10mm	Battery1	23230	782	22.26	23.00	1.186	-0.007	0.358	0.425
32	LTE Band 13	10M	QPSK	1	0	Back	10mm	Battery1	23230	782	23.38	24.00	1.153	0.103	0.587	0.677
	LTE Band 13	10M	QPSK	1	0	Back	10mm	Battery2	23230	782	23.38	24.00	1.153	0.049	0.585	0.675
	LTE Band 13	10M	QPSK	25	12	Back	10mm	Battery1	23230	782	22.26	23.00	1.186	-0.018	0.495	0.587
	LTE Band 13	10M	QPSK	1	0	Left Side	10mm	Battery1	23230	782	23.38	24.00	1.153	0.016	0.467	0.539
	LTE Band 13	10M	QPSK	25	12	Left Side	10mm	Battery1	23230	782	22.26	23.00	1.186	0.048	0.364	0.432
	LTE Band 13	10M	QPSK	1	0	Right Side	10mm	Battery1	23230	782	23.38	24.00	1.153	0.036	0.471	0.543
	LTE Band 13	10M	QPSK	25	12	Right Side	10mm	Battery1	23230	782	22.26	23.00	1.186	0.163	0.374	0.443
	LTE Band 13	10M	QPSK	1	0	Bottom Side	10mm	Battery1	23230	782	23.38	24.00	1.153	0.147	0.028	0.032
	LTE Band 13	10M	QPSK	25	12	Bottom Side	10mm	Battery1	23230	782	22.26	23.00	1.186	-0.003	0.035	0.042
	LTE Band 25	20M	QPSK	1	49	Front	10mm	Battery1	26590	1905	23.31	24.00	1.172	0.041	0.575	0.674
	LTE Band 25	20M	QPSK	50	0	Front	10mm	Battery1	26590	1905	22.08	23.00	1.236	0.044	0.538	0.665
	LTE Band 25	20M	QPSK	1	49	Back	10mm	Battery1	26590	1905	23.31	24.00	1.172	-0.117	0.714	0.837
33	LTE Band 25	20M	QPSK	1	49	Back	10mm	Battery1	26140	1860	23.05	24.00	1.245	-0.014	0.815	1.014
	LTE Band 25	20M	QPSK	1	49	Back	10mm	Battery2	26140	1860	23.05	24.00	1.245	-0.119	0.811	1.009
	LTE Band 25	20M	QPSK	1	49	Back	10mm	Battery1	26340	1880	23.06	24.00	1.242	0.182	0.738	0.916
	LTE Band 25	20M	QPSK	50	0	Back	10mm	Battery1	26590	1905	22.08	23.00	1.236	-0.129	0.671	0.829
	LTE Band 25	20M	QPSK	50	0	Back	10mm	Battery1	26140	1860	21.86	23.00	1.300	-0.044	0.771	1.002
	LTE Band 25	20M	QPSK	50	0	Back	10mm	Battery1	26340	1880	21.98	23.00	1.265	-0.065	0.705	0.892
	LTE Band 25	20M	QPSK	100	0	Back	10mm	Battery1	26590	1905	21.98	23.00	1.265	-0.023	0.642	0.812
	LTE Band 25	20M	QPSK	1	49	Left Side	10mm	Battery1	26590	1905	23.31	24.00	1.172	-0.097	0.368	0.431
	LTE Band 25	20M	QPSK	50	0	Left Side	10mm	Battery1	26590	1905	22.08	23.00	1.236	0.018	0.362	0.447
	LTE Band 25	20M	QPSK	1	49	Right Side	10mm	Battery1	26590	1905	23.31	24.00	1.172	0.054	0.299	0.350
	LTE Band 25	20M	QPSK	50	0	Right Side	10mm	Battery1	26590	1905	22.08	23.00	1.236	0.005	0.275	0.340
	LTE Band 25	20M	QPSK	1	49	Bottom Side	10mm	Battery1	26590	1905	23.31	24.00	1.172	-0.144	0.301	0.353
	LTE Band 25	20M	QPSK	50	0	Bottom Side	10mm	Battery1	26590	1905	22.08	23.00	1.236	0.152	0.253	0.313
	LTE Band 26	15M	QPSK	1	0	Front	10mm	Battery1	26865	831.5	23.52	24.00	1.117	-0.175	0.415	0.463
	LTE Band 26	15M	QPSK	36	0	Front	10mm	Battery1	26865	831.5	22.37	23.00	1.156	0.02	0.332	0.384
34	LTE Band 26	15M	QPSK	1	0	Back	10mm	Battery1	26865	831.5	23.52	24.00	1.117	0.18	0.542	0.605
	LTE Band 26	10M	QPSK	1	0	Back	10mm	Battery2	26865	831.5	23.52	24.00	1.117	-0.018	0.514	0.574
	LTE Band 26	15M	QPSK	36	0	Back	10mm	Battery1	26865	831.5	22.37	23.00	1.156	-0.012	0.416	0.481
	LTE Band 26	15M	QPSK	1	0	Left Side	10mm	Battery1	26865	831.5	23.52	24.00	1.117	0.114	0.505	0.564
	LTE Band 26	15M	QPSK	36	0	Left Side	10mm	Battery1	26865	831.5	22.37	23.00	1.156	0.128	0.413	0.477
	LTE Band 26	15M	QPSK	1	0	Right Side	10mm	Battery1	26865	831.5	23.52	24.00	1.117	0.025	0.502	0.561
	LTE Band 26	15M	QPSK	36	0	Right Side	10mm	Battery1	26865	831.5	22.37	23.00	1.156	-0.005	0.417	0.482
	LTE Band 26	15M	QPSK	1	0	Bottom Side	10mm	Battery1	26865	831.5	23.52	24.00	1.117	0.152	0.043	0.048
	LTE Band 26	15M	QPSK	36	0	Bottom Side	10mm	Battery1	26865	831.5	22.37	23.00	1.156	0.156	0.035	0.040

<TDD LTE SAR>

Plot No.	Band	BW (MHz)	Modulation	RB Size	RB offset	Test Position	Gap (mm)	Battery	Ch.	Freq. (MHz)	Average Power (dBm)	Tune-Up Limit (dBm)	Tune-up Scaling Factor	Duty Cycle %	Duty Cycle Scaling Factor	Power Drift (dB)	Measured 1g SAR (W/kg)	Reported 1g SAR (W/kg)
	LTE Band 41	20M	QPSK	1	0	Front	10mm	Battery1	41055	2636.5	22.75	24.00	1.334	62.9	1.006	0.018	0.470	0.631
	LTE Band 41	20M	QPSK	1	0	Front	10mm	Battery1	41490	2680	22.73	24.00	1.340	62.9	1.006	0.028	0.441	0.594
	LTE Band 41	20M	QPSK	1	0	Front	10mm	Battery1	39750	2506	22.61	24.00	1.377	62.9	1.006	-0.128	0.300	0.416
	LTE Band 41	20M	QPSK	1	0	Front	10mm	Battery1	40185	2549.5	22.61	24.00	1.377	62.9	1.006	0.049	0.334	0.463
	LTE Band 41	20M	QPSK	1	0	Front	10mm	Battery1	40620	2593	22.73	24.00	1.340	62.9	1.006	-0.121	0.396	0.534
	LTE Band 41	20M	QPSK	50	0	Front	10mm	Battery1	41055	2636.5	21.99	23.00	1.262	62.9	1.006	-0.001	0.437	0.555
	LTE Band 41	20M	QPSK	100	0	Front	10mm	Battery1	41055	2636.5	21.90	23.00	1.288	62.9	1.006	-0.04	0.422	0.547
	LTE Band 41	20M	QPSK	1	0	Back	10mm	Battery1	41055	2636.5	22.75	24.00	1.334	62.9	1.006	0.104	0.769	1.032
35	LTE Band 41	20M	QPSK	1	0	Back	10mm	Battery1	41490	2680	22.73	24.00	1.340	62.9	1.006	-0.009	0.924	1.245
	LTE Band 41	20M	QPSK	1	0	Back	10mm	Battery2	41490	2680	22.73	24.00	1.340	62.9	1.006	-0.153	0.922	1.243
	LTE Band 41	20M	QPSK	1	0	Back	10mm	Battery1	39750	2506	22.61	24.00	1.377	62.9	1.006	-0.113	0.427	0.592
	LTE Band 41	20M	QPSK	1	0	Back	10mm	Battery1	40185	2549.5	22.61	24.00	1.377	62.9	1.006	0.084	0.440	0.610
	LTE Band 41	20M	QPSK	1	0	Back	10mm	Battery1	40620	2593	22.73	24.00	1.340	62.9	1.006	-0.039	0.505	0.681
	LTE Band 41	20M	QPSK	50	0	Back	10mm	Battery1	41055	2636.5	21.99	23.00	1.262	62.9	1.006	-0.072	0.795	1.009
	LTE Band 41	20M	QPSK	50	0	Back	10mm	Battery1	41490	2680	21.98	23.00	1.265	62.9	1.006	-0.007	0.907	1.154
	LTE Band 41	20M	QPSK	50	0	Back	10mm	Battery1	39750	2506	21.62	23.00	1.374	62.9	1.006	0.053	0.464	0.641
	LTE Band 41	20M	QPSK	50	0	Back	10mm	Battery1	40185	2549.5	21.67	23.00	1.358	62.9	1.006	0.01	0.440	0.601
	LTE Band 41	20M	QPSK	50	0	Back	10mm	Battery1	40620	2593	21.92	23.00	1.282	62.9	1.006	0.041	0.509	0.657
	LTE Band 41	20M	QPSK	100	0	Back	10mm	Battery1	41055	2636.5	21.90	23.00	1.288	62.9	1.006	-0.062	0.819	1.061
	LTE Band 41	20M	QPSK	1	0	Left Side	10mm	Battery1	41055	2636.5	22.75	24.00	1.334	62.9	1.006	0.129	0.183	0.245
	LTE Band 41	20M	QPSK	50	0	Left Side	10mm	Battery1	41055	2636.5	21.99	23.00	1.262	62.9	1.006	0.034	0.174	0.221
	LTE Band 41	20M	QPSK	1	0	Right Side	10mm	Battery1	41055	2636.5	22.75	24.00	1.334	62.9	1.006	0.12	0.007	0.009
	LTE Band 41	20M	QPSK	50	0	Right Side	10mm	Battery1	41055	2636.5	21.99	23.00	1.262	62.9	1.006	-0.101	0.007	0.009
	LTE Band 41	20M	QPSK	1	0	Bottom Side	10mm	Battery1	41055	2636.5	22.75	24.00	1.334	62.9	1.006	0.013	0.621	0.833
	LTE Band 41	20M	QPSK	1	0	Bottom Side	10mm	Battery1	39750	2506	22.61	24.00	1.377	62.9	1.006	0.179	0.322	0.446
	LTE Band 41	20M	QPSK	1	0	Bottom Side	10mm	Battery1	40185	2549.5	22.61	24.00	1.377	62.9	1.006	-0.008	0.313	0.434
	LTE Band 41	20M	QPSK	1	0	Bottom Side	10mm	Battery1	40620	2593	22.73	24.00	1.340	62.9	1.006	0.16	0.339	0.457
	LTE Band 41	20M	QPSK	1	0	Bottom Side	10mm	Battery1	41490	2680	22.73	24.00	1.340	62.9	1.006	0.174	0.791	1.066
	LTE Band 41	20M	QPSK	50	0	Bottom Side	10mm	Battery1	41055	2636.5	21.99	23.00	1.262	62.9	1.006	-0.138	0.599	0.760
	LTE Band 41	20M	QPSK	50	0	Bottom Side	10mm	Battery1	39750	2506	21.62	23.00	1.374	62.9	1.006	0.028	0.295	0.408
	LTE Band 41	20M	QPSK	50	0	Bottom Side	10mm	Battery1	40185	2549.5	21.67	23.00	1.358	62.9	1.006	-0.081	0.280	0.383
	LTE Band 41	20M	QPSK	50	0	Bottom Side	10mm	Battery1	40620	2593	21.92	23.00	1.282	62.9	1.006	-0.061	0.344	0.444
	LTE Band 41	20M	QPSK	50	0	Bottom Side	10mm	Battery1	41490	2680	21.98	23.00	1.265	62.9	1.006	0.188	0.828	1.053
	LTE Band 41	20M	QPSK	100	0	Bottom Side	10mm	Battery1	41055	2636.5	21.90	23.00	1.288	62.9	1.006	-0.053	0.644	0.835

<WLAN SAR>

Plot No.	Band	Mode	Test Position	Gap (mm)	Battery	Ch.	Freq. (MHz)	Average Power (dBm)	Tune-Up Limit (dBm)	Tune-up Scaling Factor	Duty Cycle %	Duty Cycle Scaling Factor	Power Drift (dB)	Measured 1g SAR (W/kg)	Reported 1g SAR (W/kg)
	WLAN2.4GHz	802.11b 1Mbps	Front	10mm	Battery1	6	2437	18.73	19.00	1.064	97.62	1.024	0.16	0.102	0.111
36	WLAN2.4GHz	802.11b 1Mbps	Back	10mm	Battery1	6	2437	18.73	19.00	1.064	97.62	1.024	0.067	0.160	0.174
	WLAN2.4GHz	802.11b 1Mbps	Back	10mm	Battery2	6	2437	18.73	19.00	1.064	97.62	1.024	-0.11	0.157	0.171
	WLAN2.4GHz	802.11b 1Mbps	Back	10mm	Battery1	1	2412	17.82	19.00	1.312	97.62	1.024	0.14	0.116	0.156
	WLAN2.4GHz	802.11b 1Mbps	Back	10mm	Battery1	11	2462	18.55	19.00	1.109	97.62	1.024	0.061	0.111	0.126
	WLAN2.4GHz	802.11b 1Mbps	Right Side	10mm	Battery1	6	2437	18.73	19.00	1.064	97.62	1.024	-0.018	0.089	0.097
	WLAN2.4GHz	802.11b 1Mbps	Top Side	10mm	Battery1	6	2437	18.73	19.00	1.064	97.62	1.024	-0.044	0.096	0.105

14.3 Body Worn Accessory SAR

<GSM SAR>

Plot No.	Band	Mode	Test Position	Gap (mm)	Headset	Battery	Ch.	Freq. (MHz)	Average Power (dBm)	Tune-Up Limit (dBm)	Tune-up Scaling Factor	Power Drift (dB)	Measured 1g SAR (W/kg)	Reported 1g SAR (W/kg)
	GSM850	GPRS (2 Tx slots)	Front	10mm	-	Battery1	128	824.2	29.77	31.30	1.422	0.194	0.487	0.693
	GSM850	GPRS (2 Tx slots)	Back	10mm	-	Battery1	128	824.2	29.77	31.30	1.422	-0.013	0.619	0.880
	GSM850	GPRS (2 Tx slots)	Back	10mm	-	Battery1	189	836.4	29.74	31.30	1.432	-0.168	0.611	0.875
37	GSM850	GPRS (2 Tx slots)	Back	10mm	-	Battery1	251	848.8	29.72	31.30	1.439	0.06	0.637	0.917
	GSM850	GPRS (2 Tx slots)	Back	10mm	-	Battery2	251	848.8	29.72	31.30	1.439	-0.18	0.623	0.896
	GSM1900	GPRS (3 Tx slots)	Front	10mm	-	Battery1	810	1909.8	26.31	27.70	1.377	0.024	0.497	0.684
	GSM1900	GPRS (3 Tx slots)	Back	10mm	-	Battery1	810	1909.8	26.31	27.70	1.377	0.02	0.586	0.807
38	GSM1900	GPRS (3 Tx slots)	Back	10mm	-	Battery1	512	1850.2	25.99	27.70	1.483	-0.026	0.661	0.980
	GSM1900	GPRS (3 Tx slots)	Back	10mm	-	Battery2	512	1850.2	25.99	27.70	1.483	0.035	0.623	0.924
	GSM1900	GPRS (3 Tx slots)	Back	10mm	-	Battery1	661	1880	26.30	27.70	1.380	-0.031	0.603	0.832

<WCDMA SAR>

Plot No.	Band	Mode	Test Position	Gap (mm)	Headset	Battery	Ch.	Freq. (MHz)	Average Power (dBm)	Tune-Up Limit (dBm)	Tune-up Scaling Factor	Power Drift (dB)	Measured 1g SAR (W/kg)	Reported 1g SAR (W/kg)
	WCDMA II	RMC 12.2Kbps	Front	10mm	-	Battery1	9262	1852.4	22.69	24.00	1.352	0.035	0.881	1.191
	WCDMA II	RMC 12.2Kbps	Front	10mm	-	Battery1	9400	1880	22.61	24.00	1.377	0.014	0.809	1.114
	WCDMA II	RMC 12.2Kbps	Front	10mm	-	Battery1	9538	1907.6	22.59	24.00	1.384	0	0.714	0.988
39	WCDMA II	RMC 12.2Kbps	Back	10mm	-	Battery1	9262	1852.4	22.69	24.00	1.352	0.05	1.010	1.366
	WCDMA II	RMC 12.2Kbps	Back	10mm	Headset	Battery1	9262	1852.4	22.69	24.00	1.352	0.134	0.970	1.312
	WCDMA II	RMC 12.2Kbps	Back	10mm	-	Battery2	9262	1852.4	22.69	24.00	1.352	0.014	1.000	1.352
	WCDMA II	RMC 12.2Kbps	Back	10mm	-	Battery1	9400	1880	22.61	24.00	1.377	0.057	0.865	1.191
	WCDMA II	RMC 12.2Kbps	Back	10mm	-	Battery1	9538	1907.6	22.59	24.00	1.384	0.027	0.783	1.083
	WCDMA IV	RMC 12.2Kbps	Front	10mm	-	Battery1	1312	1712.4	22.61	24.00	1.377	-0.037	0.653	0.899
	WCDMA IV	RMC 12.2Kbps	Front	10mm	-	Battery1	1413	1732.6	22.45	24.00	1.429	0.079	0.657	0.939
	WCDMA IV	RMC 12.2Kbps	Front	10mm	-	Battery1	1513	1752.6	22.51	24.00	1.409	-0.008	0.706	0.995
	WCDMA IV	RMC 12.2Kbps	Back	10mm	-	Battery1	1312	1712.4	22.61	24.00	1.377	-0.025	0.970	1.336
	WCDMA IV	RMC 12.2Kbps	Back	10mm	-	Battery1	1413	1732.6	22.45	24.00	1.429	-0.005	0.975	1.393
40	WCDMA IV	RMC 12.2Kbps	Back	10mm	-	Battery1	1513	1752.6	22.51	24.00	1.409	0.003	0.991	1.397
	WCDMA IV	RMC 12.2Kbps	Back	10mm	Headset	Battery1	1513	1752.6	22.51	24.00	1.409	-0.025	0.987	1.391
	WCDMA IV	RMC 12.2Kbps	Back	10mm	-	Battery2	1513	1752.6	22.51	24.00	1.409	0.096	0.942	1.328
	WCDMA V	RMC 12.2Kbps	Front	10mm	-	Battery1	4182	836.4	22.89	24.00	1.291	0.068	0.425	0.549
	WCDMA V	RMC 12.2Kbps	Back	10mm	-	Battery1	4182	836.4	22.89	24.00	1.291	0.084	0.528	0.682
41	WCDMA V	RMC 12.2Kbps	Back	10mm	-	Battery1	4132	826.4	22.83	24.00	1.309	-0.073	0.550	0.720
	WCDMA V	RMC 12.2Kbps	Back	10mm	-	Battery2	4132	826.4	22.83	24.00	1.309	0.019	0.526	0.689
	WCDMA V	RMC 12.2Kbps	Back	10mm	-	Battery1	4233	846.6	22.87	24.00	1.297	-0.037	0.507	0.658

<CDMA SAR>

Plot No.	Band	Mode	Test Position	Gap (mm)	Headset	Battery	Ch.	Freq. (MHz)	Average Power (dBm)	Tune-Up Limit (dBm)	Tune-up Scaling Factor	Power Drift (dB)	Measured 1g SAR (W/kg)	Reported 1g SAR (W/kg)
	CDMA BC0	1xRTT RC3 SO32	Front	10mm	-	Battery1	1013	824.7	23.96	25.00	1.271	-0.006	0.504	0.640
42	CDMA BC0	1xRTT RC3 SO32	Back	10mm	-	Battery1	1013	824.7	23.96	25.00	1.271	-0.022	0.653	0.830
	CDMA BC0	1xRTT RC3 SO32	Back	10mm	-	Battery1	384	836.52	23.92	25.00	1.282	-0.08	0.633	0.812
	CDMA BC0	1xRTT RC3 SO32	Back	10mm	-	Battery1	777	848.31	23.91	25.00	1.285	0.07	0.641	0.824
	CDMA BC0	1xRTT RC3 SO32	Back	10mm	-	Battery2	1013	824.7	23.96	25.00	1.271	-0.015	0.652	0.828
	CDMA BC1	1xRTT RC3 SO32	Front	10mm	-	Battery1	1175	1908.75	23.82	25.00	1.312	0.037	0.728	0.955
	CDMA BC1	1xRTT RC3 SO32	Front	10mm	-	Battery1	25	1851.25	23.64	25.00	1.368	0.026	0.843	1.153
	CDMA BC1	1xRTT RC3 SO32	Front	10mm	-	Battery1	600	1880	23.46	25.00	1.426	-0.048	0.781	1.113
	CDMA BC1	1xRTT RC3 SO32	Back	10mm	-	Battery1	1175	1908.75	23.82	25.00	1.312	0.004	0.841	1.104
43	CDMA BC1	1xRTT RC3 SO32	Back	10mm	-	Battery1	25	1851.25	23.64	25.00	1.368	0.001	1.050	1.436
	CDMA BC1	1xRTT RC3 SO32	Back	10mm	Headset	Battery1	25	1851.25	23.64	25.00	1.368	0.011	0.928	1.269
	CDMA BC1	1xRTT RC3 SO32	Back	10mm	-	Battery2	25	1851.25	23.64	25.00	1.368	0.021	0.985	1.347
	CDMA BC1	1xRTT RC3 SO32	Back	10mm	-	Battery1	600	1880	23.46	25.00	1.426	0.014	0.947	1.350
	CDMA BC10	1xRTT RC3 SO32	Front	10mm	-	Battery1	520	819	23.93	25.00	1.016	-0.016	0.588	0.752
44	CDMA BC10	1xRTT RC3 SO32	Back	10mm	-	Battery1	520	819	23.93	25.00	1.016	0.029	0.764	0.977
	CDMA BC10	1xRTT RC3 SO32	Back	10mm	-	Battery2	520	819	23.93	25.00	1.016	0.071	0.760	0.972

<FDD LTE SAR>

Plot No.	Band	BW (MHz)	Modulation	RB Size	RB offset	Test Position	Gap (mm)	Headset	Battery	Ch.	Freq. (MHz)	Average Power (dBm)	Tune-Up Limit (dBm)	Tune-up Scaling Factor	Power Drift (dB)	Measured 1g SAR (W/kg)	Reported 1g SAR (W/kg)
	LTE Band 2	20M	QPSK	1	49	Front	10mm	-	Battery1	19100	1900	22.60	24.00	1.380	-0.126	0.659	0.910
	LTE Band 2	20M	QPSK	1	49	Front	10mm	-	Battery1	18700	1860	22.52	24.00	1.406	-0.115	0.724	1.018
	LTE Band 2	20M	QPSK	1	49	Front	10mm	-	Battery1	18900	1880	22.38	24.00	1.452	0.043	0.684	0.993
	LTE Band 2	20M	QPSK	50	24	Front	10mm	-	Battery1	19100	1900	21.57	23.00	1.390	-0.032	0.497	0.691
	LTE Band 2	20M	QPSK	100	0	Front	10mm	-	Battery1	18900	1880	21.48	23.00	1.419	0.022	0.494	0.701
	LTE Band 2	20M	QPSK	1	49	Back	10mm	-	Battery1	19100	1900	22.60	24.00	1.380	-0.122	0.721	0.995
45	LTE Band 2	20M	QPSK	1	49	Back	10mm	-	Battery1	18700	1860	22.52	24.00	1.406	0.04	0.829	1.166
	LTE Band 2	20M	QPSK	1	49	Back	10mm	-	Battery2	18700	1860	22.52	24.00	1.406	0.086	0.819	1.152
	LTE Band 2	20M	QPSK	1	49	Back	10mm	-	Battery1	18900	1880	22.38	24.00	1.452	-0.017	0.764	1.109
	LTE Band 2	20M	QPSK	50	24	Back	10mm	-	Battery1	19100	1900	21.57	23.00	1.390	0.052	0.564	0.784
	LTE Band 2	20M	QPSK	100	0	Back	10mm	-	Battery1	18900	1880	21.48	23.00	1.419	0.041	0.621	0.881
	LTE Band 4	20M	QPSK	1	0	Front	10mm	-	Battery1	20175	1732.5	23.51	24.00	1.119	-0.111	0.767	0.859
	LTE Band 4	20M	QPSK	50	0	Front	10mm	-	Battery1	20175	1732.5	22.38	23.00	1.153	0.016	0.605	0.698
	LTE Band 4	20M	QPSK	100	0	Front	10mm	-	Battery1	20175	1732.5	22.25	23.00	1.189	0.024	0.614	0.730
46	LTE Band 4	20M	QPSK	1	0	Back	10mm	-	Battery1	20175	1732.5	23.51	24.00	1.119	-0.038	1.160	1.299
	LTE Band 4	20M	QPSK	1	0	Back	10mm	Headset	Battery1	20175	1732.5	23.51	24.00	1.119	0.124	1.110	1.243
	LTE Band 4	20M	QPSK	1	0	Back	10mm	-	Battery2	20175	1732.5	23.51	24.00	1.119	0.136	1.130	1.265
	LTE Band 4	20M	QPSK	50	0	Back	10mm	-	Battery1	20175	1732.5	22.38	23.00	1.153	0.013	0.870	1.004
	LTE Band 4	20M	QPSK	100	0	Back	10mm	-	Battery1	20175	1732.5	22.25	23.00	1.189	0.005	0.860	1.022
	LTE Band 5	10M	QPSK	1	25	Front	10mm	-	Battery1	20525	836.5	23.30	24.00	1.175	-0.119	0.417	0.490
	LTE Band 5	10M	QPSK	25	0	Front	10mm	-	Battery1	20525	836.5	22.29	23.00	1.178	-0.004	0.341	0.402
47	LTE Band 5	10M	QPSK	1	25	Back	10mm	-	Battery1	20525	836.5	23.30	24.00	1.175	-0.018	0.515	0.605
	LTE Band 5	10M	QPSK	1	25	Back	10mm	-	Battery2	20525	836.5	23.30	24.00	1.175	-0.152	0.482	0.566
	LTE Band 5	10M	QPSK	25	0	Back	10mm	-	Battery1	20525	836.5	22.29	23.00	1.178	-0.027	0.432	0.509

Plot No.	Band	BW (MHz)	Modulation	RB Size	RB offset	Test Position	Gap (mm)	Headset	Battery	Ch.	Freq. (MHz)	Average Power (dBm)	Tune-Up Limit (dBm)	Tune-up Scaling Factor	Power Drift (dB)	Measured 1g SAR (W/kg)	Reported 1g SAR (W/kg)
	LTE Band 7	20M	QPSK	1	49	Front	10mm	-	Battery1	21100	2535	23.13	24.00	1.222	-0.128	0.654	0.799
	LTE Band 7	20M	QPSK	50	0	Front	10mm	-	Battery1	21100	2535	21.87	23.00	1.297	-0.005	0.643	0.834
	LTE Band 7	20M	QPSK	50	0	Front	10mm	-	Battery1	20850	2510	21.86	23.00	1.300	-0.019	0.523	0.680
	LTE Band 7	20M	QPSK	50	0	Front	10mm	-	Battery1	21350	2560	21.85	23.00	1.303	-0.055	0.660	0.860
	LTE Band 7	20M	QPSK	100	0	Front	10mm	-	Battery1	21100	2535	21.86	23.00	1.300	0.047	0.601	0.781
	LTE Band 7	20M	QPSK	1	49	Back	10mm	-	Battery1	21100	2535	23.13	24.00	1.222	0.058	0.869	1.062
	LTE Band 7	20M	QPSK	1	49	Back	10mm	-	Battery1	20850	2510	23.00	24.00	1.259	-0.152	0.701	0.883
	LTE Band 7	20M	QPSK	1	49	Back	10mm	-	Battery1	21350	2560	23.07	24.00	1.239	0.123	0.739	0.915
48	LTE Band 7	20M	QPSK	50	0	Back	10mm	-	Battery1	21100	2535	21.87	23.00	1.297	0.072	0.874	1.134
	LTE Band 7	20M	QPSK	50	0	Back	10mm	-	Battery2	21100	2535	21.87	23.00	1.297	-0.067	0.863	1.119
	LTE Band 7	20M	QPSK	50	0	Back	10mm	-	Battery1	20850	2510	21.86	23.00	1.300	-0.009	0.835	1.086
	LTE Band 7	20M	QPSK	50	0	Back	10mm	-	Battery1	21350	2560	21.85	23.00	1.303	-0.136	0.866	1.129
	LTE Band 7	20M	QPSK	100	0	Back	10mm	-	Battery1	21100	2535	21.86	23.00	1.300	0.045	0.860	1.118
	LTE Band 12	10M	QPSK	1	49	Front	10mm	-	Battery1	23095	707.5	23.50	24.00	1.122	-0.02	0.320	0.359
	LTE Band 12	10M	QPSK	25	25	Front	10mm	-	Battery1	23095	707.5	22.39	23.00	1.151	0.136	0.258	0.297
49	LTE Band 12	10M	QPSK	1	49	Back	10mm	-	Battery1	23095	707.5	23.50	24.00	1.122	0.088	0.443	0.497
	LTE Band 12	10M	QPSK	1	49	Back	10mm	-	Battery2	23095	707.5	23.50	24.00	1.122	-0.005	0.386	0.433
	LTE Band 12	10M	QPSK	25	25	Back	10mm	-	Battery1	23095	707.5	22.39	23.00	1.151	-0.009	0.365	0.420
	LTE Band 13	10M	QPSK	1	0	Front	10mm	-	Battery1	23230	782	23.38	24.00	1.153	0.192	0.430	0.496
	LTE Band 13	10M	QPSK	25	12	Front	10mm	-	Battery1	23230	782	22.26	23.00	1.186	-0.007	0.358	0.425
50	LTE Band 13	10M	QPSK	1	0	Back	10mm	-	Battery1	23230	782	23.38	24.00	1.153	0.103	0.587	0.677
	LTE Band 13	10M	QPSK	1	0	Back	10mm	-	Battery2	23230	782	23.38	24.00	1.153	0.049	0.585	0.675
	LTE Band 13	10M	QPSK	25	12	Back	10mm	-	Battery1	23230	782	22.26	23.00	1.186	-0.018	0.495	0.587
	LTE Band 25	20M	QPSK	1	49	Front	10mm	-	Battery1	26590	1905	23.31	24.00	1.172	0.041	0.575	0.674
	LTE Band 25	20M	QPSK	50	0	Front	10mm	-	Battery1	26590	1905	22.08	23.00	1.236	0.044	0.538	0.665
	LTE Band 25	20M	QPSK	1	49	Back	10mm	-	Battery1	26590	1905	23.31	24.00	1.172	-0.117	0.714	0.837
51	LTE Band 25	20M	QPSK	1	49	Back	10mm	-	Battery1	26140	1860	23.05	24.00	1.245	-0.014	0.815	1.014
	LTE Band 25	20M	QPSK	1	49	Back	10mm	-	Battery2	26140	1860	23.05	24.00	1.245	-0.119	0.811	1.009
	LTE Band 25	20M	QPSK	1	49	Back	10mm	-	Battery1	26340	1880	23.06	24.00	1.242	0.182	0.738	0.916
	LTE Band 25	20M	QPSK	50	0	Back	10mm	-	Battery1	26590	1905	22.08	23.00	1.236	-0.129	0.671	0.829
	LTE Band 25	20M	QPSK	50	0	Back	10mm	-	Battery1	26140	1860	21.86	23.00	1.300	-0.044	0.771	1.002
	LTE Band 25	20M	QPSK	50	0	Back	10mm	-	Battery1	26340	1880	21.98	23.00	1.265	-0.065	0.705	0.892
	LTE Band 25	20M	QPSK	100	0	Back	10mm	-	Battery1	26590	1905	21.98	23.00	1.265	-0.023	0.642	0.812
	LTE Band 26	15M	QPSK	1	0	Front	10mm	-	Battery1	26865	831.5	23.52	24.00	1.117	-0.175	0.415	0.463
	LTE Band 26	15M	QPSK	36	0	Front	10mm	-	Battery1	26865	831.5	22.37	23.00	1.156	0.02	0.332	0.384
52	LTE Band 26	15M	QPSK	1	0	Back	10mm	-	Battery1	26865	831.5	23.52	24.00	1.117	0.18	0.542	0.605
	LTE Band 26	10M	QPSK	1	0	Back	10mm	-	Battery2	26865	831.5	23.52	24.00	1.117	-0.018	0.514	0.574
	LTE Band 26	15M	QPSK	36	0	Back	10mm	-	Battery1	26865	831.5	22.37	23.00	1.156	-0.012	0.416	0.481

<TDD LTE SAR>

Plot No.	Band	BW (MHz)	Modulation	RB Size	RB offset	Test Position	Gap (mm)	Headset	Battery	Ch.	Freq. (MHz)	Average Power (dBm)	Tune-Up Limit (dBm)	Tune-up Scaling Factor	Duty Cycle %	Duty Cycle Scaling Factor	Power Drift (dB)	Measured 1g SAR (W/kg)	Reported 1g SAR (W/kg)
	LTE Band 41	20M	QPSK	1	0	Front	10mm	-	Battery1	41055	2636.5	22.75	24.00	1.334	62.9	1.006	0.018	0.470	0.631
	LTE Band 41	20M	QPSK	1	0	Front	10mm	-	Battery1	41490	2680	22.73	24.00	1.340	62.9	1.006	0.028	0.441	0.594
	LTE Band 41	20M	QPSK	1	0	Front	10mm	-	Battery1	39750	2506	22.61	24.00	1.377	62.9	1.006	-0.128	0.300	0.416
	LTE Band 41	20M	QPSK	1	0	Front	10mm	-	Battery1	40185	2549.5	22.61	24.00	1.377	62.9	1.006	0.049	0.334	0.463
	LTE Band 41	20M	QPSK	1	0	Front	10mm	-	Battery1	40620	2593	22.73	24.00	1.340	62.9	1.006	-0.121	0.396	0.534
	LTE Band 41	20M	QPSK	50	0	Front	10mm	-	Battery1	41055	2636.5	21.99	23.00	1.262	62.9	1.006	-0.001	0.437	0.555
	LTE Band 41	20M	QPSK	100	0	Front	10mm	-	Battery1	41055	2636.5	21.90	23.00	1.288	62.9	1.006	-0.04	0.422	0.547
	LTE Band 41	20M	QPSK	1	0	Back	10mm	-	Battery1	41055	2636.5	22.75	24.00	1.334	62.9	1.006	0.104	0.769	1.032
53	LTE Band 41	20M	QPSK	1	0	Back	10mm	-	Battery1	41490	2680	22.73	24.00	1.340	62.9	1.006	-0.009	0.924	1.245
	LTE Band 41	20M	QPSK	1	0	Back	10mm	Headset	Battery1	41490	2680	22.73	24.00	1.340	62.9	1.006	0.151	0.891	1.201
	LTE Band 41	20M	QPSK	1	0	Back	10mm	-	Battery2	41490	2680	22.73	24.00	1.340	62.9	1.006	-0.153	0.922	1.243
	LTE Band 41	20M	QPSK	1	0	Back	10mm	-	Battery1	39750	2506	22.61	24.00	1.377	62.9	1.006	-0.113	0.427	0.592
	LTE Band 41	20M	QPSK	1	0	Back	10mm	-	Battery1	40185	2549.5	22.61	24.00	1.377	62.9	1.006	0.084	0.440	0.610
	LTE Band 41	20M	QPSK	1	0	Back	10mm	-	Battery1	40620	2593	22.73	24.00	1.340	62.9	1.006	-0.039	0.505	0.681
	LTE Band 41	20M	QPSK	50	0	Back	10mm	-	Battery1	41055	2636.5	21.99	23.00	1.262	62.9	1.006	-0.072	0.795	1.009
	LTE Band 41	20M	QPSK	50	0	Back	10mm	-	Battery1	41490	2680	21.98	23.00	1.265	62.9	1.006	-0.007	0.907	1.154
	LTE Band 41	20M	QPSK	50	0	Back	10mm	-	Battery1	39750	2506	21.62	23.00	1.374	62.9	1.006	0.053	0.464	0.641
	LTE Band 41	20M	QPSK	50	0	Back	10mm	-	Battery1	40185	2549.5	21.67	23.00	1.358	62.9	1.006	0.01	0.440	0.601
	LTE Band 41	20M	QPSK	50	0	Back	10mm	-	Battery1	40620	2593	21.92	23.00	1.282	62.9	1.006	0.041	0.509	0.657
	LTE Band 41	20M	QPSK	100	0	Back	10mm	-	Battery1	41055	2636.5	21.90	23.00	1.288	62.9	1.006	-0.062	0.819	1.061

<WLAN SAR>

Plot No.	Band	Mode	Test Position	Gap (mm)	Headset	Battery	Ch.	Freq. (MHz)	Average Power (dBm)	Tune-Up Limit (dBm)	Tune-up Scaling Factor	Duty Cycle %	Duty Cycle Scaling Factor	Power Drift (dB)	Measured 1g SAR (W/kg)	Reported 1g SAR (W/kg)
	WLAN2.4GHz	802.11b 1Mbps	Front	10mm	-	Battery1	6	2437	18.73	19.00	1.064	97.62	1.024	0.16	0.102	0.111
54	WLAN2.4GHz	802.11b 1Mbps	Back	10mm	-	Battery1	6	2437	18.73	19.00	1.064	97.62	1.024	0.067	0.160	0.174
	WLAN2.4GHz	802.11b 1Mbps	Back	10mm	-	Battery2	6	2437	18.73	19.00	1.064	97.62	1.024	-0.11	0.157	0.171
	WLAN2.4GHz	802.11b 1Mbps	Back	10mm	-	Battery1	1	2412	17.82	19.00	1.312	97.62	1.024	0.14	0.116	0.156
	WLAN2.4GHz	802.11b 1Mbps	Back	10mm	-	Battery1	11	2462	18.55	19.00	1.109	97.62	1.024	0.061	0.111	0.126

<Bluetooth SAR>

Plot No.	Band	Mode	Test Position	Gap (mm)	Headset	Battery	Ch.	Freq. (MHz)	Average Power (dBm)	Tune-Up Limit (dBm)	Tune-up Scaling Factor	Power Drift (dB)	Measured 1g SAR (W/kg)	Reported 1g SAR (W/kg)
	Bluetooth	1Mbps	Front	10mm	-	Battery1	39	2441	10.68	12.00	1.355	0.024	0.011	0.015
	Bluetooth	1Mbps	Back	10mm	-	Battery1	39	2441	10.68	12.00	1.355	0.155	0.034	0.046
55	Bluetooth	1Mbps	Back	10mm	-	Battery1	0	2402	10.36	12.00	1.459	0.17	0.046	0.067
	Bluetooth	1Mbps	Back	10mm	-	Battery2	0	2402	10.36	12.00	1.459	0.127	0.043	0.063
	Bluetooth	1Mbps	Back	10mm	-	Battery1	78	2480	10.01	12.00	1.581	-0.123	0.032	0.051

14.4 Repeated SAR Measurement

No.	Band	BW (MHz)	Modulation	RB Size	RB offset	Mode	Test Position	Gap (mm)	Battery	Ch.	Freq. (MHz)	Average Power (dBm)	Tune-Up Limit (dBm)	Tune-up Scaling Factor	Duty Cycle %	Duty Cycle Scaling Factor	Power Drift (dB)	Measured 1g SAR (W/kg)	Ratio	Reported 1g SAR (W/kg)
1st	CDMA BC1					RTAP 153.6Kbps	Back	10mm	Battery1	25	1851.25	23.56	25.00	1.393		1.000	0.111	1.050		1.463
2nd	CDMA BC1					RTAP 153.6Kbps	Back	10mm	Battery1	25	1851.25	23.56	25.00	1.393		1.000	0.05	1.010	1.04	1.407
1st	LTE Band 4	20M	QPSK	1	0		Back	10mm	Battery1	20175	1732.5	23.51	24.00	1.119		1.000	-0.038	1.160		1.299
2nd	LTE Band 4	20M	QPSK	1	0		Back	10mm	Battery1	20175	1732.5	23.51	24.00	1.119		1.000	0.092	1.110	1.05	1.243
1st	LTE Band 41	20M	QPSK	1	0		Back	10mm	Battery1	41490	2680	22.73	24.00	1.340	62.9	1.006	-0.009	0.924		1.245
2nd	LTE Band 41	20M	QPSK	1	0		Back	10mm	Battery1	41490	2680	22.73	24.00	1.340	62.9	1.006	-0.116	0.893	1.03	1.204

General Note:

1. Per KDB 865664 D01v01r04, for each frequency band, repeated SAR measurement is required only when the measured SAR is ≥0.8W/kg.
2. Per KDB 865664 D01v01r04, if the ratio among the repeated measurement is ≤ 1.2 and the measured SAR <1.45W/kg, only one repeated measurement is required.
3. The ratio is the difference in percentage between original and repeated *measured SAR*.
4. All measurement SAR result is scaled-up to account for tune-up tolerance and is compliant.

15. Simultaneous Transmission Analysis

NO.	Simultaneous Transmission Configurations	Portable Handset		
		Head	Body-worn	Hotspot
1.	GSM Voice + WLAN2.4GHz	Yes	Yes	
2.	GPRS/EDGE + WLAN2.4GHz	Yes	Yes	Yes
3.	WCDMA + WLAN2.4GHz	Yes	Yes	Yes
4.	LTE + WLAN2.4GHz	Yes	Yes	Yes
5.	GSM Voice + Bluetooth		Yes	
6.	GPRS/EDGE + Bluetooth		Yes	
7.	WCDMA+ Bluetooth		Yes	
8.	LTE + Bluetooth		Yes	

General Note:

1. This device 2.4GHz WLAN supports Hotspot operation and WiFi Direct (Group Client / Group Owner).
2. The worst case WLAN reported SAR for each configuration was used for SAR summation. Therefore, the following summations represent the absolute worst cases for simultaneous transmission with WLAN.
3. 2.4GHz WLAN and Bluetooth cannot transmit simultaneously.
4. The Scaled SAR summation is calculated based on the same configuration and test position.
5. Per KDB 447498 D01v06, simultaneous transmission SAR is compliant if,
   i) Scalar SAR summation < 1.6W/kg.
   ii) SPLSR = (SAR1 + SAR2)^1.5 / (min. separation distance, mm), and the peak separation distance is determined from the square root of [(x1-x2)2 + (y1-y2)2 + (z1-z2)2], where (x1, y1, z1) and (x2, y2, z2) are the coordinates of the extrapolated peak SAR locations in the zoom scan.
   iii) If SPLSR ≤ 0.04, simultaneously transmission SAR measurement is not necessary.
   iv) Simultaneously transmission SAR measurement, and the reported multi-band SAR < 1.6W/kg.
   v) The SPLSR calculated results please refer to section 15.4.

15.1 Head Exposure Conditions

WWAN Band		Exposure Position	1 WWAN 1g SAR (W/kg)	2 2.4GHz WLAN 1g SAR (W/kg)	1+2 Summed 1g SAR (W/kg)
GSM	GSM850	Right Cheek	0.709	0.179	**0.89**
		Right Tilted	0.311	0.159	**0.47**
		Left Cheek	0.438	0.392	**0.83**
		Left Tilted	0.306	0.318	**0.62**
	GSM1900	Right Cheek	0.326	0.179	**0.51**
		Right Tilted	0.187	0.159	**0.35**
		Left Cheek	0.476	0.392	**0.87**
		Left Tilted	0.226	0.318	**0.54**
WCDMA	WCDMA II	Right Cheek	0.654	0.179	**0.83**
		Right Tilted	0.316	0.159	**0.48**
		Left Cheek	0.792	0.392	**1.18**
		Left Tilted	0.341	0.318	**0.66**
	WCDMA IV	Right Cheek	0.335	0.179	**0.51**
		Right Tilted	0.263	0.159	**0.42**
		Left Cheek	0.707	0.392	**1.10**
		Left Tilted	0.295	0.318	**0.61**
	WCDMA V	Right Cheek	0.467	0.179	**0.65**
		Right Tilted	0.314	0.159	**0.47**
		Left Cheek	0.404	0.392	**0.80**
		Left Tilted	0.309	0.318	**0.63**
CDMA	CDMA BC0	Right Cheek	0.432	0.179	**0.61**
		Right Tilted	0.315	0.159	**0.47**
		Left Cheek	0.461	0.392	**0.85**
		Left Tilted	0.320	0.318	**0.64**
	CDMA BC1	Right Cheek	0.520	0.179	**0.70**
		Right Tilted	0.251	0.159	**0.41**
		Left Cheek	0.724	0.392	**1.12**
		Left Tilted	0.282	0.318	**0.60**
	CDMA BC10	Right Cheek	0.528	0.179	**0.71**
		Right Tilted	0.333	0.159	**0.49**
		Left Cheek	0.483	0.392	**0.88**
		Left Tilted	0.354	0.318	**0.67**

WWAN Band		Exposure Position	1 WWAN 1g SAR (W/kg)	2 2.4GHz WLAN 1g SAR (W/kg)	1+2 Summed 1g SAR (W/kg)
LTE	LTE Band 2	Right Cheek	0.509	0.179	**0.69**
		Right Tilted	0.155	0.159	**0.31**
		Left Cheek	0.669	0.392	**1.06**
		Left Tilted	0.174	0.318	**0.49**
	LTE Band 4	Right Cheek	0.363	0.179	**0.54**
		Right Tilted	0.261	0.159	**0.42**
		Left Cheek	0.552	0.392	**0.94**
		Left Tilted	0.247	0.318	**0.57**
	LTE Band 5	Right Cheek	0.374	0.179	**0.55**
		Right Tilted	0.230	0.159	**0.39**
		Left Cheek	0.351	0.392	**0.74**
		Left Tilted	0.260	0.318	**0.58**
	LTE Band 7	Right Cheek	0.254	0.179	**0.43**
		Right Tilted	0.249	0.159	**0.41**
		Left Cheek	0.739	0.392	**1.13**
		Left Tilted	0.160	0.318	**0.48**
	LTE Band 12	Right Cheek	0.247	0.179	**0.43**
		Right Tilted	0.172	0.159	**0.33**
		Left Cheek	0.249	0.392	**0.64**
		Left Tilted	0.173	0.318	**0.49**
	LTE Band 13	Right Cheek	0.320	0.179	**0.50**
		Right Tilted	0.242	0.159	**0.40**
		Left Cheek	0.307	0.392	**0.70**
		Left Tilted	0.235	0.318	**0.55**
	LTE Band 25	Right Cheek	0.397	0.179	**0.58**
		Right Tilted	0.124	0.159	**0.28**
		Left Cheek	0.597	0.392	**0.99**
		Left Tilted	0.139	0.318	**0.46**
	LTE Band 26	Right Cheek	0.354	0.179	**0.53**
		Right Tilted	0.228	0.159	**0.39**
		Left Cheek	0.316	0.392	**0.71**
		Left Tilted	0.247	0.318	**0.57**
	LTE Band 41	Right Cheek	0.195	0.179	**0.37**
		Right Tilted	0.141	0.159	**0.30**
		Left Cheek	0.598	0.392	**0.99**
		Left Tilted	0.080	0.318	**0.40**

15.2 Hotspot Exposure Conditions

WWAN Band		Exposure Position	1 WWAN 1g SAR (W/kg)	2 2.4GHz WLAN 1g SAR (W/kg)	1+2 Summed 1g SAR (W/kg)
GSM	GSM850	Front	0.693	0.111	**0.80**
		Back	0.917	0.174	**1.09**
		Left side	0.778		**0.78**
		Right side	0.764	0.097	**0.86**
		Top side		0.105	**0.11**
		Bottom side	0.068		**0.07**
	GSM1900	Front	0.684	0.111	**0.80**
		Back	0.980	0.174	**1.15**
		Left side	0.454		**0.45**
		Right side	0.326	0.097	**0.42**
		Top side		0.105	**0.11**
		Bottom side	0.311		**0.31**
WCDMA	WCDMA II	Front	1.191	0.111	**1.30**
		Back	1.366	0.174	**1.54**
		Left side	0.691		**0.69**
		Right side	0.549	0.097	**0.65**
		Top side		0.105	**0.11**
		Bottom side	0.472		**0.47**
	WCDMA IV	Front	0.995	0.111	**1.11**
		Back	1.397	0.174	**1.57**
		Left side	0.420		**0.42**
		Right side	0.215	0.097	**0.31**
		Top side		0.105	**0.11**
		Bottom side	0.377		**0.38**
	WCDMA V	Front	0.549	0.111	**0.66**
		Back	0.720	0.174	**0.89**
		Left side	0.637		**0.64**
		Right side	0.669	0.097	**0.77**
		Top side		0.105	**0.11**
		Bottom side	0.080		**0.08**

WWAN Band		Exposure Position	1 WWAN 1g SAR (W/kg)	2 2.4GHz WLAN 1g SAR (W/kg)	1+2 Summed 1g SAR (W/kg)	SPLSR Result	Case No
CDMA	CDMA BC0	Front	0.668	0.111	**0.78**		
		Back	0.876	0.174	**1.05**		
		Left side	0.783		**0.78**		
		Right side	0.787	0.097	**0.88**		
		Top side		0.105	**0.11**		
		Bottom side	0.066		**0.07**		
	CDMA BC1	Front	1.106	0.111	**1.22**		
		Back	1.463	0.174	**1.64**	0.02	Case 1
		Left side	0.461		**0.46**		
		Right side	0.352	0.097	**0.45**		
		Top side		0.105	**0.11**		
		Bottom side	0.426		**0.43**		
	CDMA BC10	Front	0.758	0.111	**0.87**		
		Back	0.990	0.174	**1.16**		
		Left side	0.846		**0.85**		
		Right side	0.844	0.097	**0.94**		
		Top side		0.105	**0.11**		
		Bottom side	0.070		**0.07**		
LTE	LTE Band 2	Front	1.018	0.111	**1.13**		
		Back	1.166	0.174	**1.34**		
		Left side	0.425		**0.43**		
		Right side	0.398	0.097	**0.50**		
		Top side		0.105	**0.11**		
		Bottom side	0.396		**0.40**		
	LTE Band 4	Front	0.859	0.111	**0.97**		
		Back	1.299	0.174	**1.47**		
		Left side	0.393		**0.39**		
		Right side	0.210	0.097	**0.31**		
		Top side		0.105	**0.11**		
		Bottom side	0.368		**0.37**		
	LTE Band 5	Front	0.490	0.111	**0.60**		
		Back	0.605	0.174	**0.78**		
		Left side	0.563		**0.56**		
		Right side	0.596	0.097	**0.69**		
		Top side		0.105	**0.11**		
		Bottom side	0.062		**0.06**		
	LTE Band 7	Front	0.860	0.111	**0.97**		
		Back	1.134	0.174	**1.31**		
		Left side	0.438		**0.44**		
		Right side	0.095	0.097	**0.19**		
		Top side		0.105	**0.11**		
		Bottom side	0.795		**0.80**		

WWAN Band		Exposure Position	1 WWAN 1g SAR (W/kg)	2 2.4GHz WLAN 1g SAR (W/kg)	1+2 Summed 1g SAR (W/kg)
LTE	LTE Band 12	Front	0.359	0.111	**0.47**
		Back	0.497	0.174	**0.67**
		Left side	0.257		**0.26**
		Right side	0.272	0.097	**0.37**
		Top side		0.105	**0.11**
		Bottom side	0.057		**0.06**
	LTE Band 13	Front	0.496	0.111	**0.61**
		Back	0.677	0.174	**0.85**
		Left side	0.539		**0.54**
		Right side	0.543	0.097	**0.64**
		Top side		0.105	**0.11**
		Bottom side	0.042		**0.04**
	LTE Band 25	Front	0.674	0.111	**0.79**
		Back	1.014	0.174	**1.19**
		Left side	0.447		**0.45**
		Right side	0.350	0.097	**0.45**
		Top side		0.105	**0.11**
		Bottom side	0.353		**0.35**
	LTE Band 26	Front	0.463	0.111	**0.57**
		Back	0.605	0.174	**0.78**
		Left side	0.564		**0.56**
		Right side	0.561	0.097	**0.66**
		Top side		0.105	**0.11**
		Bottom side	0.048		**0.05**
	LTE Band 41	Front	0.631	0.111	**0.74**
		Back	1.245	0.174	**1.42**
		Left side	0.245		**0.25**
		Right side	0.009	0.097	**0.11**
		Top side		0.105	**0.11**
		Bottom side	1.066		**1.07**

15.3 Body-Worn Accessory Exposure Conditions

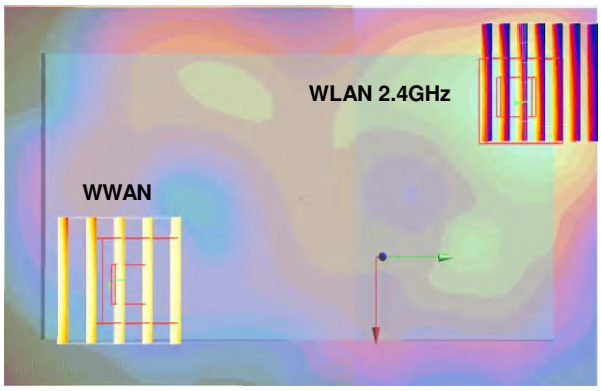
WWAN Band		Exposure Position	1 WWAN 1g SAR (W/kg)	2 2.4GHz WLAN 1g SAR (W/kg)	3 Bluetooth 1g SAR (W/kg)	1+2 Summed 1g SAR (W/kg)	1+3 Summed 1g SAR (W/kg)	SPLSR Result	Case No
GSM	GSM850	Front	0.693	0.111	0.015	**0.80**	**0.71**		
		Back	0.917	0.174	0.067	**1.09**	**0.98**		
	GSM1900	Front	0.684	0.111	0.015	**0.80**	**0.70**		
		Back	0.980	0.174	0.067	**1.15**	**1.05**		
WCDMA	WCDMA II	Front	1.191	0.111	0.015	**1.30**	**1.21**		
		Back	1.366	0.174	0.067	**1.54**	**1.43**		
		Back with Headset	1.312	0.174	0.067	**1.49**	**1.38**		
	WCDMA IV	Front	0.995	0.111	0.015	**1.11**	**1.01**		
		Back	1.397	0.174	0.067	**1.57**	**1.46**		
		Back with Headset	1.391	0.174	0.067	**1.57**	**1.46**		
	WCDMA V	Front	0.549	0.111	0.015	**0.66**	**0.56**		
		Back	0.720	0.174	0.067	**0.89**	**0.79**		
CDMA	CDMA BC0	Front	0.640	0.111	0.015	**0.75**	**0.66**		
		Back	0.830	0.174	0.067	**1.00**	**0.90**		
	CDMA BC1	Front	1.153	0.111	0.015	**1.26**	**1.17**		
		Back	1.436	0.174	0.067	**1.61**	**1.50**	0.02	Case 2
		Back with Headset	1.269	0.174	0.067	**1.44**	**1.34**		
	CDMA BC10	Front	0.752	0.111	0.015	**0.86**	**0.77**		
		Back	0.977	0.174	0.067	**1.15**	**1.04**		
LTE	LTE Band 2	Front	1.018	0.111	0.015	**1.13**	**1.03**		
		Back	1.166	0.174	0.067	**1.34**	**1.23**		
	LTE Band 4	Front	0.859	0.111	0.015	**0.97**	**0.87**		
		Back	1.299	0.174	0.067	**1.47**	**1.37**		
		Back with Headset	1.243	0.174	0.067	**1.42**	**1.31**		
	LTE Band 5	Front	0.490	0.111	0.015	**0.60**	**0.51**		
		Back	0.605	0.174	0.067	**0.78**	**0.67**		
	LTE Band 7	Front	0.860	0.111	0.015	**0.97**	**0.88**		
		Back	1.134	0.174	0.067	**1.31**	**1.20**		
	LTE Band 12	Front	0.359	0.111	0.015	**0.47**	**0.37**		
		Back	0.497	0.174	0.067	**0.67**	**0.56**		
	LTE Band 13	Front	0.496	0.111	0.015	**0.61**	**0.51**		
		Back	0.677	0.174	0.067	**0.85**	**0.74**		
	LTE Band 25	Front	0.674	0.111	0.015	**0.79**	**0.69**		
		Back	1.014	0.174	0.067	**1.19**	**1.08**		
	LTE Band 26	Front	0.463	0.111	0.015	**0.57**	**0.48**		
		Back	0.605	0.174	0.067	**0.78**	**0.67**		
	LTE Band 41	Front	0.631	0.111	0.015	**0.74**	**0.65**		
		Back	1.245	0.174	0.067	**1.42**	**1.31**		
		Back with Headset	1.201	0.174	0.067	**1.38**	**1.27**		

15.4 SPLSR Evaluation and Analysis

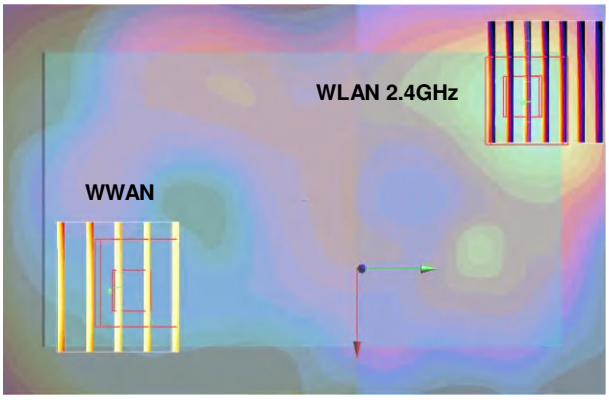
General Note:

1. SPLSR = $(SAR_1 + SAR_2)^{1.5}$ / (*min. separation distance, mm*). If SPLSR ≤ 0.04, simultaneously transmission SAR measurement is not necessary

Case1	Band	Position	SAR (W/kg)	Gap (cm)	SAR peak location (m) X	Y	Z	3D distance (mm)	Summed SAR (W/kg)	SPLSR Results	Simultaneous SAR
	CDMA BC1	Back	1.463	1	2.14	-5.14	0.05	121.6	1.64	0.02	Not required
	WLAN2.4GHz		0.174	1	-2.7	6.02	0.02				



Case 2	Band	Position	SAR (W/kg)	Gap (cm)	SAR peak location (m) X	Y	Z	3D distance (mm)	Summed SAR (W/kg)	SPLSR Results	Simultaneous SAR
	CDMA BC1	Back	1.436	1	2.15	-5.14	0.05	121.7	1.61	0.02	Not required
	WLAN2.4GHz		0.174	1	-2.7	6.02	0.02				



Test Engineer： Jerry Hu, Lawrence Chang, Galen Chang, Iver Zhan, Tommy Chen and Steven Chang

16. Uncertainty Assessment

The component of uncertainly may generally be categorized according to the methods used to evaluate them. The evaluation of uncertainly by the statistical analysis of a series of observations is termed a Type An evaluation of uncertainty. The evaluation of uncertainty by means other than the statistical analysis of a series of observation is termed a Type B evaluation of uncertainty. Each component of uncertainty, however evaluated, is represented by an estimated standard deviation, termed standard uncertainty, which is determined by the positive square root of the estimated variance.

A Type A evaluation of standard uncertainty may be based on any valid statistical method for treating data. This includes calculating the standard deviation of the mean of a series of independent observations; using the method of least squares to fit a curve to the data in order to estimate the parameter of the curve and their standard deviations; or carrying out an analysis of variance in order to identify and quantify random effects in certain kinds of measurement.

A type B evaluation of standard uncertainty is typically based on scientific judgment using all of the relevant information available. These may include previous measurement data, experience, and knowledge of the behavior and properties of relevant materials and instruments, manufacture's specification, data provided in calibration reports and uncertainties assigned to reference data taken from handbooks. Broadly speaking, the uncertainty is either obtained from an outdoor source or obtained from an assumed distribution, such as the normal distribution, rectangular or triangular distributions indicated in table below.

Uncertainty Distributions	Normal	Rectangular	Triangular	U-Shape
Multi-plying Factor[(a)]	1/k[(b)]	$1/\sqrt{3}$	$1/\sqrt{6}$	$1/\sqrt{2}$

(a) standard uncertainty is determined as the product of the multiplying factor and the estimated range of variations in the measured quantity

(b) κ is the coverage factor

Table 16.1. Standard Uncertainty for Assumed Distribution

The combined standard uncertainty of the measurement result represents the estimated standard deviation of the result. It is obtained by combining the individual standard uncertainties of both Type A and Type B evaluation using the usual "root-sum-squares" (RSS) methods of combining standard deviations by taking the positive square root of the estimated variances.

Expanded uncertainty is a measure of uncertainty that defines an interval about the measurement result within which the measured value is confidently believed to lie. It is obtained by multiplying the combined standard uncertainty by a coverage factor. Typically, the coverage factor ranges from 2 to 3. Using a coverage factor allows the true value of a measured quantity to be specified with a defined probability within the specified uncertainty range. For purpose of this document, a coverage factor two is used, which corresponds to confidence interval of about 95 %. The DASY uncertainty Budget is shown in the following tables.

Error Description	Uncertainty Value (±%)	Probability	Divisor	(Ci) 1g	(Ci) 10g	Standard Uncertainty (1g) (±%)	Standard Uncertainty (10g) (±%)
Measurement System							
Probe Calibration	6.0	N	1	1	1	6.0	6.0
Axial Isotropy	4.7	R	1.732	0.7	0.7	1.9	1.9
Hemispherical Isotropy	9.6	R	1.732	0.7	0.7	3.9	3.9
Boundary Effects	1.0	R	1.732	1	1	0.6	0.6
Linearity	4.7	R	1.732	1	1	2.7	2.7
System Detection Limits	1.0	R	1.732	1	1	0.6	0.6
Modulation Response	3.2	R	1.732	1	1	1.8	1.8
Readout Electronics	0.3	N	1	1	1	0.3	0.3
Response Time	0.0	R	1.732	1	1	0.0	0.0
Integration Time	2.6	R	1.732	1	1	1.5	1.5
RF Ambient Noise	3.0	R	1.732	1	1	1.7	1.7
RF Ambient Reflections	3.0	R	1.732	1	1	1.7	1.7
Probe Positioner	0.4	R	1.732	1	1	0.2	0.2
Probe Positioning	2.9	R	1.732	1	1	1.7	1.7
Max. SAR Eval.	2.0	R	1.732	1	1	1.2	1.2
Test Sample Related							
Device Positioning	3.0	N	1	1	1	3.0	3.0
Device Holder	3.6	N	1	1	1	3.6	3.6
Power Drift	5.0	R	1.732	1	1	2.9	2.9
Power Scaling	0.0	R	1.732	1	1	0.0	0.0
Phantom and Setup							
Phantom Uncertainty	6.1	R	1.732	1	1	3.5	3.5
SAR correction	0.0	R	1.732	1	0.84	0.0	0.0
Liquid Conductivity Repeatability	0.2	N	1	0.78	0.71	0.1	0.1
Liquid Conductivity (target)	5.0	R	1.732	0.78	0.71	2.3	2.0
Liquid Conductivity (mea.)	2.5	R	1.732	0.78	0.71	1.1	1.0
Temp. unc. - Conductivity	3.4	R	1.732	0.78	0.71	1.5	1.4
Liquid Permittivity Repeatability	0.15	N	1	0.23	0.26	0.0	0.0
Liquid Permittivity (target)	5.0	R	1.732	0.23	0.26	0.7	0.8
Liquid Permittivity (mea.)	2.5	R	1.732	0.23	0.26	0.3	0.4
Temp. unc. - Permittivity	0.83	R	1.732	0.23	0.26	0.1	0.1
Combined Std. Uncertainty						11.4%	11.4%
Coverage Factor for 95 %						K=2	K=2
Expanded STD Uncertainty						22.9%	22.7%

Table 16.2. Uncertainty Budget for frequency range 300 MHz to 3 GHz

17. References

[1] FCC 47 CFR Part 2 “Frequency Allocations and Radio Treaty Matters; General Rules and Regulations”

[2] ANSI/IEEE Std. C95.1-1992, “IEEE Standard for Safety Levels with Respect to Human Exposure to Radio Frequency Electromagnetic Fields, 3 kHz to 300 GHz”, September 1992

[3] IEEE Std. 1528-2013, “IEEE Recommended Practice for Determining the Peak Spatial-Average Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques”, Sep 2013

[4] SPEAG DASY System Handbook

[5] FCC KDB 248227 D01 v02r02, “SAR Guidance for IEEE 802.11 (WiFi) Transmitters”, Oct 2015.

[6] FCC KDB 447498 D01 v06, “Mobile and Portable Device RF Exposure Procedures and Equipment Authorization Policies”, Oct 2015

[7] FCC KDB 648474 D04 v01r03, “SAR Evaluation Considerations for Wireless Handsets”, Oct 2015.

[8] FCC KDB 941225 D01 v03r01, “3G SAR MEAUREMENT PROCEDURES”, Oct 2015

[9] FCC KDB 941225 D05 v02r05, “SAR Evaluation Considerations for LTE Devices”, Dec 2015

[10] FCC KDB 941225 D06 v02r01, "SAR Evaluation Procedures for Portable Devices with Wireless Router Capabilities", Oct 2015.

[11] FCC KDB 865664 D01 v01r04, "SAR Measurement Requirements for 100 MHz to 6 GHz", Aug 2015.

[12] FCC KDB 865664 D02 v01r02, “RF Exposure Compliance Reporting and Documentation Considerations” Oct 2015.

Appendix A. Plots of System Performance Check

The plots are shown as follows.

Test Laboratory: Sporton International Inc. SAR/HAC Testing Lab Date: 2016/5/25

System Check_Head_750MHz

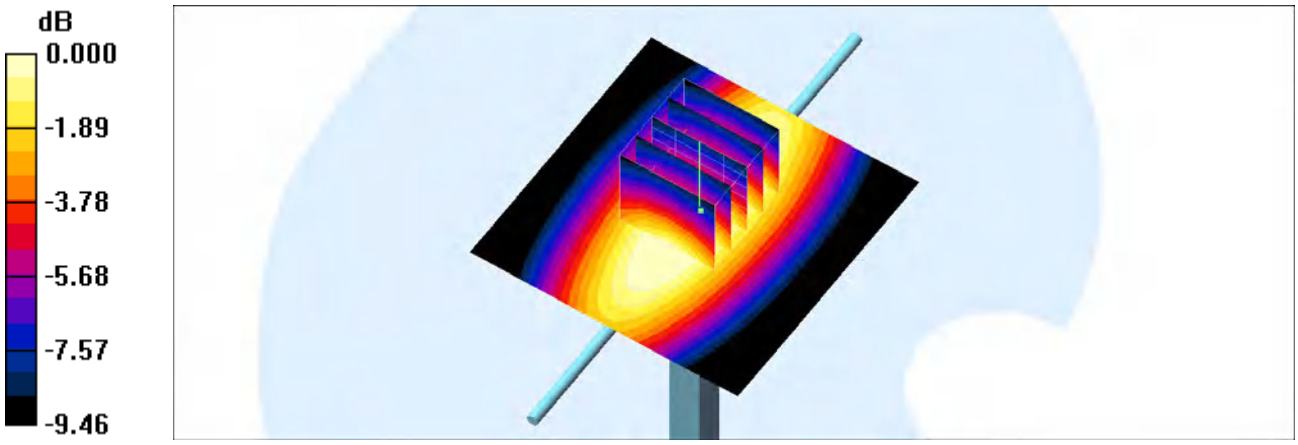
DUT: D750V3-1078

Communication System: CW; Frequency: 750 MHz;Duty Cycle: 1:1
Medium: HSL_750_160525 Medium parameters used: f = 750 MHz; σ = 0.895 mho/m; ε_r = 41.6; ρ = 1000 kg/m^3
Ambient Temperature：23.2 ℃； Liquid Temperature：22.2 ℃

DASY4 Configuration:
- Probe: EX3DV4 - SN7346; ConvF(10.22, 10.22, 10.22); Calibrated: 2015/9/2
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn916; Calibrated: 2015/12/16
- Phantom: SAM_Right; Type: SAM_Right; Serial: TP-1303
- ;Postprocessing SW: SEMCAD, V1.8 Build 159

Pin=250mW/Area Scan (61x61x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 2.90 mW/g

Pin=250mW/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 58.7 V/m; Power Drift = -0.072 dB
Peak SAR (extrapolated) = 2.84 W/kg
SAR(1 g) = 2.05 mW/g; SAR(10 g) = 1.4 mW/g
Maximum value of SAR (measured) = 2.51 mW/g



0 dB = 2.51mW/g

Test Laboratory: Sporton International Inc. SAR/HAC Testing Lab Date: 2016/5/19

System Check_Body_750MHz

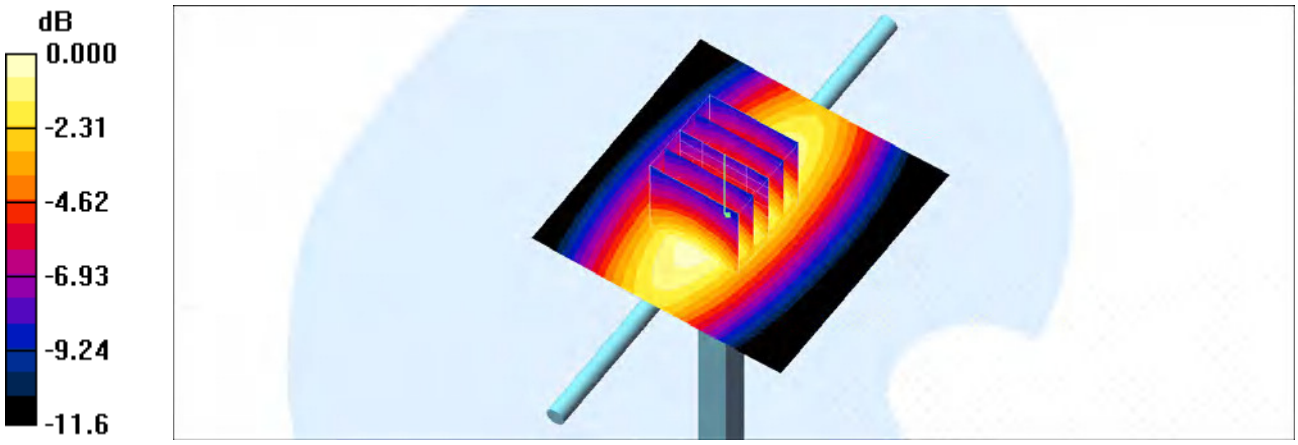
DUT: D750V3-1078

Communication System: CW; Frequency: 750 MHz;Duty Cycle: 1:1
Medium: MSL_750_160519 Medium parameters used: f = 750 MHz; σ = 0.963 mho/m; ε_r = 55.1; ρ = 1000 kg/m^3
Ambient Temperature：23.5 ℃; Liquid Temperature：22.5 ℃

DASY4 Configuration:
- Probe: EX3DV4 - SN7346; ConvF(10.11, 10.11, 10.11); Calibrated: 2015/9/2
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn916; Calibrated: 2015/12/16
- Phantom: SAM_Right; Type: SAM_Right; Serial: TP-1303
- ;Postprocessing SW: SEMCAD, V1.8 Build 159

Pin=250mW/Area Scan (61x61x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 2.72 mW/g

Pin=250mW/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 54.3 V/m; Power Drift = -0.022 dB
Peak SAR (extrapolated) = 3.13 W/kg
SAR(1 g) = 2.22 mW/g; SAR(10 g) = 1.51 mW/g
Maximum value of SAR (measured) = 2.74 mW/g



0 dB = 2.74mW/g

Test Laboratory: Sporton International Inc. SAR/HAC Testing Lab Date: 2016/5/22

System Check_Body_750MHz

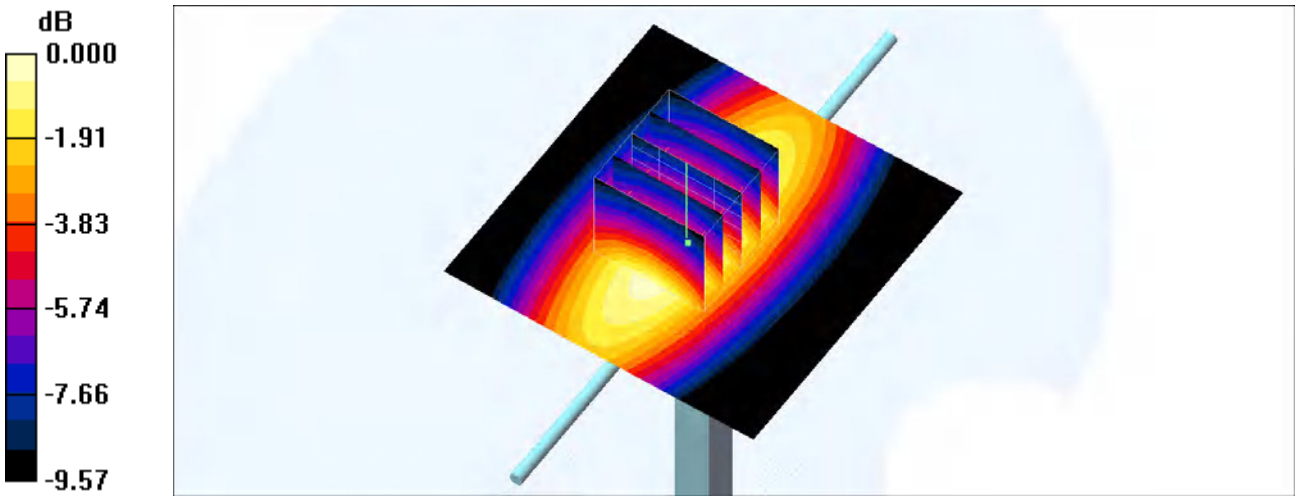
DUT: D750V3-1078

Communication System: CW; Frequency: 750 MHz;Duty Cycle: 1:1
Medium: MSL_750_160522 Medium parameters used: f = 750 MHz; σ = 0.962 mho/m; ε_r = 55; ρ = 1000 kg/m^3
Ambient Temperature：23.3 ℃; Liquid Temperature：22.3 ℃

DASY4 Configuration:
- Probe: EX3DV4 - SN7346; ConvF(10.11, 10.11, 10.11); Calibrated: 2015/9/2
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn916; Calibrated: 2015/12/16
- Phantom: SAM_Right; Type: SAM_Right; Serial: TP-1303
- ;Postprocessing SW: SEMCAD, V1.8 Build 159

Pin=250mW/Area Scan (61x61x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 2.59 mW/g

Pin=250mW/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 52.8 V/m; Power Drift = -0.015 dB
Peak SAR (extrapolated) = 3.00 W/kg
SAR(1 g) = 2.11 mW/g; SAR(10 g) = 1.43 mW/g
Maximum value of SAR (measured) = 2.63 mW/g



0 dB = 2.63mW/g

Test Laboratory: Sporton International Inc. SAR/HAC Testing Lab Date: 2016/5/25

System Check_Head_835MHz

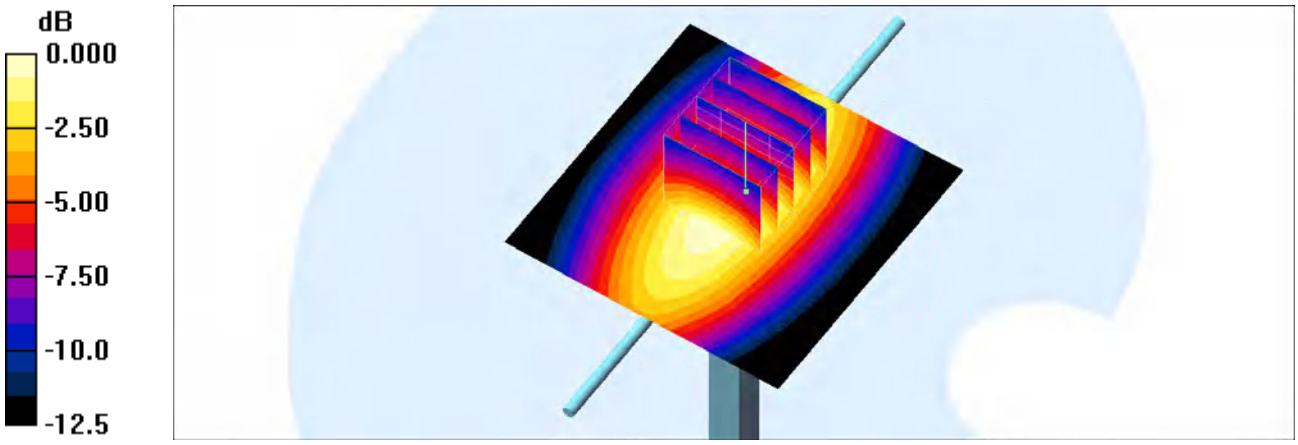
DUT: D835V2-499

Communication System: CW; Frequency: 835 MHz;Duty Cycle: 1:1
Medium: HSL_850_160525 Medium parameters used: f = 835 MHz; σ = 0.88 mho/m; ε_r = 42.9; ρ = 1000 kg/m^3
Ambient Temperature：23.1 ℃; Liquid Temperature：22.1 ℃

DASY4 Configuration:
- Probe: EX3DV4 - SN7346; ConvF(9.8, 9.8, 9.8); Calibrated: 2015/9/2
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn916; Calibrated: 2015/12/16
- Phantom: SAM_Right; Type: SAM_Right; Serial: TP-1303
- ;Postprocessing SW: SEMCAD, V1.8 Build 159

Pin=250mW/Area Scan (61x61x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 3.23 mW/g

Pin=250mW/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 62.8 V/m; Power Drift = -0.020 dB
Peak SAR (extrapolated) = 3.61 W/kg
SAR(1 g) = 2.4 mW/g; SAR(10 g) = 1.58 mW/g
Maximum value of SAR (measured) = 3.20 mW/g



0 dB = 3.20mW/g

Test Laboratory: Sporton International Inc. SAR/HAC Testing Lab Date: 2016/5/19

System Check_Body_835MHz

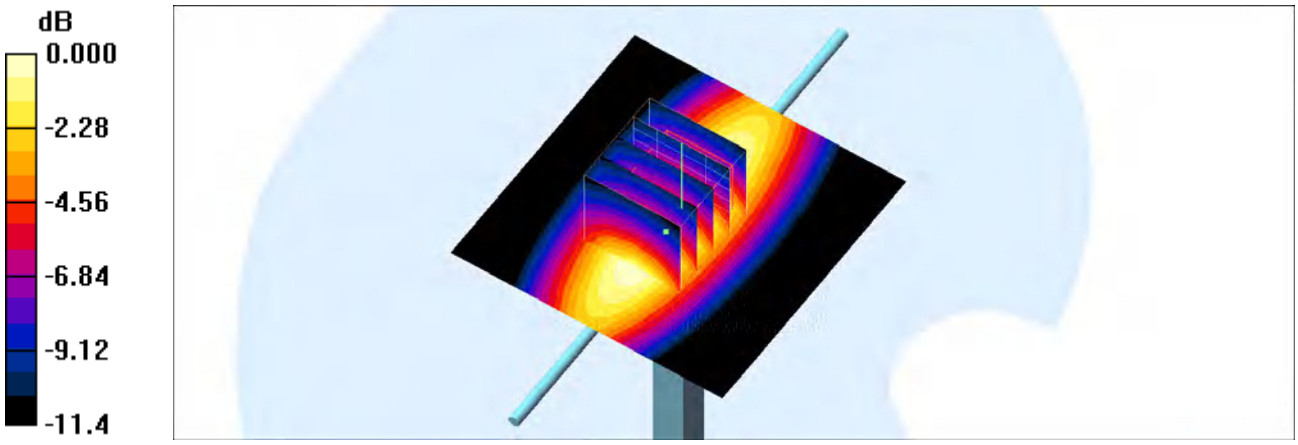
DUT: D835V2-499

Communication System: CW; Frequency: 835 MHz;Duty Cycle: 1:1
Medium: MSL_850_160519 Medium parameters used: f = 835 MHz; σ = 0.974 mho/m; ε_r = 57; ρ = 1000 kg/m^3
Ambient Temperature：23.5 ℃； Liquid Temperature：22.5 ℃

DASY4 Configuration:
- Probe: EX3DV4 - SN7346; ConvF(10.05, 10.05, 10.05); Calibrated: 2015/9/2
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn916; Calibrated: 2015/12/16
- Phantom: SAM_Right; Type: SAM_Right; Serial: TP-1303
- ;Postprocessing SW: SEMCAD, V1.8 Build 159

Pin=250mW/Area Scan (61x61x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 3.55 mW/g

Pin=250mW/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 62.7 V/m; Power Drift = 0.137 dB
Peak SAR (extrapolated) = 3.71 W/kg
SAR(1 g) = 2.34 mW/g; SAR(10 g) = 1.46 mW/g
Maximum value of SAR (measured) = 3.28 mW/g



0 dB = 3.28mW/g

Test Laboratory: Sporton International Inc. SAR/HAC Testing Lab Date: 2016/5/21

System Check_Body_835MHz

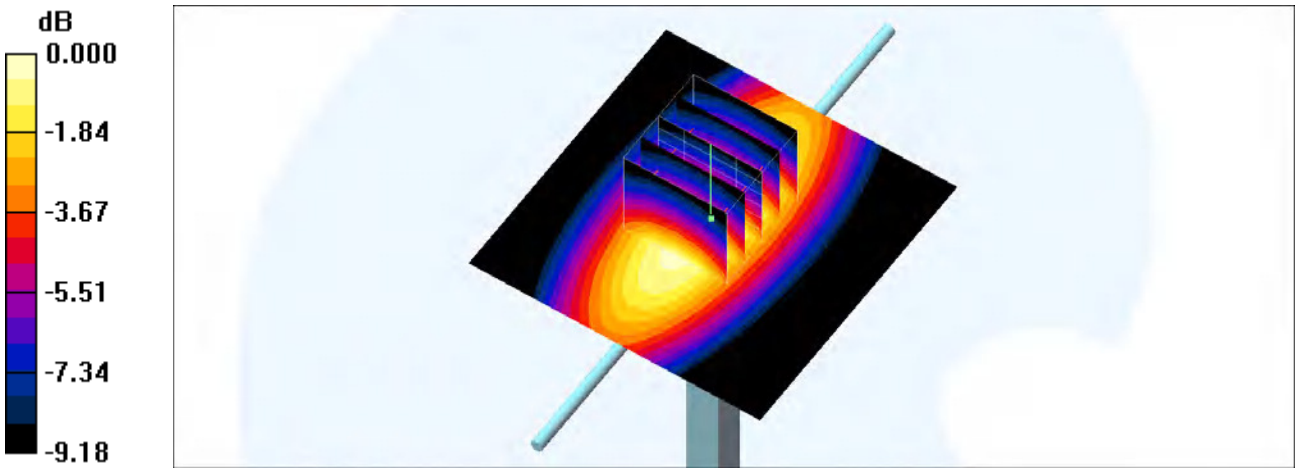
DUT: D835V2-499

Communication System: CW; Frequency: 835 MHz;Duty Cycle: 1:1
Medium: MSL_850_160521 Medium parameters used: f = 835 MHz; σ = 0.978 mho/m; ε_r = 56.7; ρ = 1000 kg/m^3
Ambient Temperature：23.5 ℃； Liquid Temperature：22.5 ℃

DASY4 Configuration:
- Probe: EX3DV4 - SN7346; ConvF(10.05, 10.05, 10.05); Calibrated: 2015/9/2
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn916; Calibrated: 2015/12/16
- Phantom: SAM_Right; Type: SAM_Right; Serial: TP-1303
- ;Postprocessing SW: SEMCAD, V1.8 Build 159

Pin=250mW/Area Scan (61x61x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 3.21 mW/g

Pin=250mW/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 58.2 V/m; Power Drift = -0.002 dB
Peak SAR (extrapolated) = 3.71 W/kg
SAR(1 g) = 2.55 mW/g; SAR(10 g) = 1.69 mW/g
Maximum value of SAR (measured) = 3.20 mW/g



0 dB = 3.20mW/g

System Check_Head_1750MHz

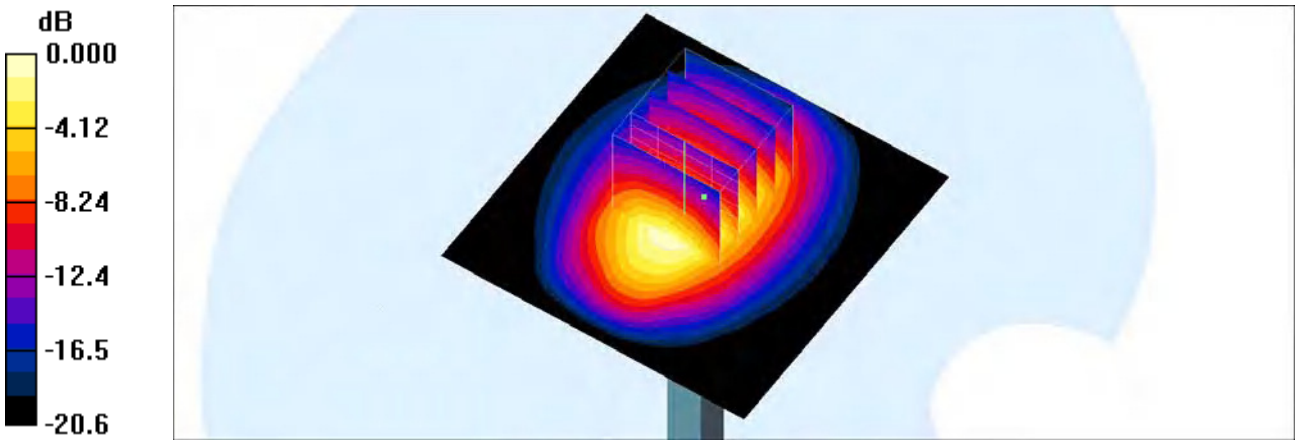
DUT: D1750V2-1068

Communication System: CW; Frequency: 1750 MHz;Duty Cycle: 1:1
Medium: HSL_1750_160523 Medium parameters used: f = 1750 MHz; σ = 1.36 mho/m; ε_r = 40.4; ρ = 1000 kg/m^3
Ambient Temperature：23.3 ℃; Liquid Temperature：22.3 ℃

DASY4 Configuration:
- Probe: EX3DV4 - SN7346; ConvF(8.6, 8.6, 8.6); Calibrated: 2015/9/2
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn916; Calibrated: 2015/12/16
- Phantom: SAM_Right; Type: SAM_Right; Serial: TP-1303
- ;Postprocessing SW: SEMCAD, V1.8 Build 159

Pin=250mW/Area Scan (61x61x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 13.3 mW/g

Pin=250mW/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 96.7 V/m; Power Drift = -0.006 dB
Peak SAR (extrapolated) = 16.1 W/kg
SAR(1 g) = 8.84 mW/g; SAR(10 g) = 4.63 mW/g
Maximum value of SAR (measured) = 12.5 mW/g



0 dB = 12.5mW/g

System Check_Body_1750MHz

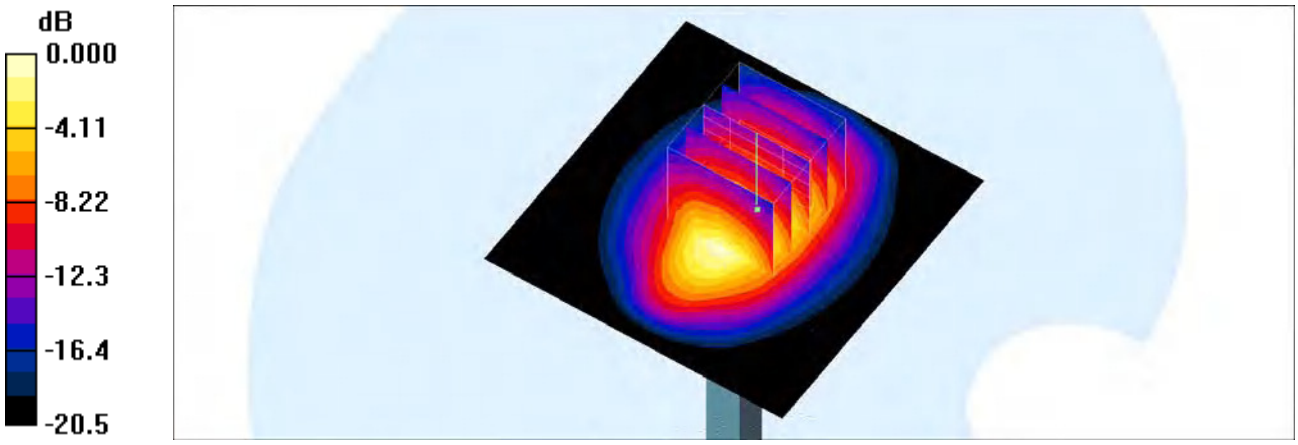
DUT: D1750V2-1068

Communication System: CW; Frequency: 1750 MHz;Duty Cycle: 1:1
Medium: MSL_1750_160519 Medium parameters used: f = 1750 MHz; σ = 1.44 mho/m; ε_r = 52.8; ρ = 1000 kg/m^3
Ambient Temperature：23.5 ℃; Liquid Temperature：22.5 ℃

DASY4 Configuration:
- Probe: EX3DV4 - SN7346; ConvF(8.06, 8.06, 8.06); Calibrated: 2015/9/2
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn916; Calibrated: 2015/12/16
- Phantom: SAM_Right; Type: SAM_Right; Serial: TP-1303
- ;Postprocessing SW: SEMCAD, V1.8 Build 159

Pin=250mW/Area Scan (61x61x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 15.0 mW/g

Pin=250mW/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 99.7 V/m; Power Drift = 0.019 dB
Peak SAR (extrapolated) = 16.7 W/kg
SAR(1 g) = 9.51 mW/g; SAR(10 g) = 5.01 mW/g
Maximum value of SAR (measured) = 14.2 mW/g



0 dB = 14.2mW/g

System Check_Body_1750MHz

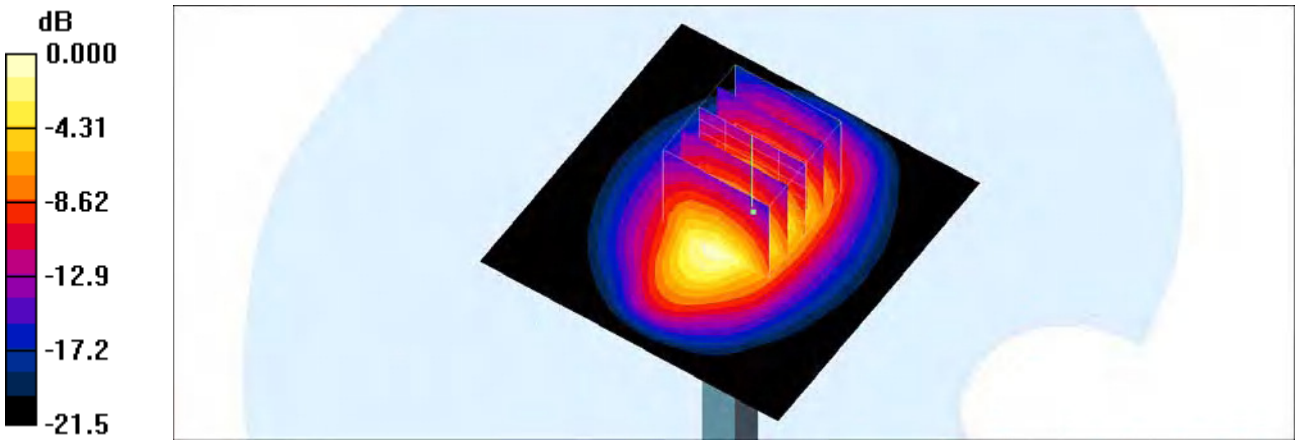
DUT: D1750V2-1068

Communication System: CW; Frequency: 1750 MHz;Duty Cycle: 1:1
Medium: MSL_1750_160520 Medium parameters used: f = 1750 MHz; σ = 1.43 mho/m; ε_r = 52.5; ρ = 1000 kg/m^3
Ambient Temperature：23.5 ℃； Liquid Temperature：22.5 ℃

DASY4 Configuration:
- Probe: EX3DV4 - SN7346; ConvF(8.06, 8.06, 8.06); Calibrated: 2015/9/2
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn916; Calibrated: 2015/12/16
- Phantom: SAM_Right; Type: SAM_Right; Serial: TP-1303
- ;Postprocessing SW: SEMCAD, V1.8 Build 159

Pin=250mW/Area Scan (61x61x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 14.9 mW/g

Pin=250mW/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 99.7 V/m; Power Drift = 0.109 dB
Peak SAR (extrapolated) = 16.6 W/kg
SAR(1 g) = 9.46 mW/g; SAR(10 g) = 4.98 mW/g
Maximum value of SAR (measured) = 14.1 mW/g



0 dB = 14.1mW/g

System Check_Head_1900MHz

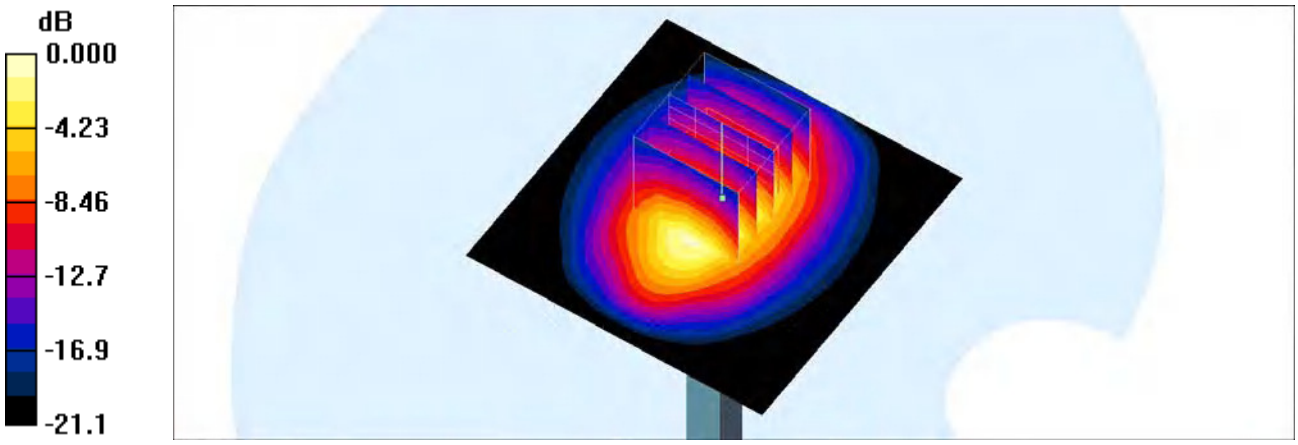
DUT: D1900V2-5d041

Communication System: CW; Frequency: 1900 MHz;Duty Cycle: 1:1
Medium: HSL_1900_160524 Medium parameters used: f = 1900 MHz; σ = 1.46 mho/m; ε_r = 38.3; ρ = 1000 kg/m^3
Ambient Temperature：23.3 ℃; Liquid Temperature：22.3 ℃

DASY4 Configuration:
- Probe: EX3DV4 - SN7346; ConvF(8.33, 8.33, 8.33); Calibrated: 2015/9/2
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn916; Calibrated: 2015/12/16
- Phantom: SAM_Right; Type: SAM_Right; Serial: TP-1303
- ;Postprocessing SW: SEMCAD, V1.8 Build 159

Pin=250mW/Area Scan (61x61x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 17.0 mW/g

Pin=250mW/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 109.1 V/m; Power Drift = -0.001 dB
Peak SAR (extrapolated) = 19.9 W/kg
SAR(1 g) = 10.5 mW/g; SAR(10 g) = 5.37 mW/g
Maximum value of SAR (measured) = 16.3 mW/g



0 dB = 16.3mW/g

Test Laboratory: Sporton International Inc. SAR/HAC Testing Lab Date: 2016/5/19

System Check_Body_1900MHz

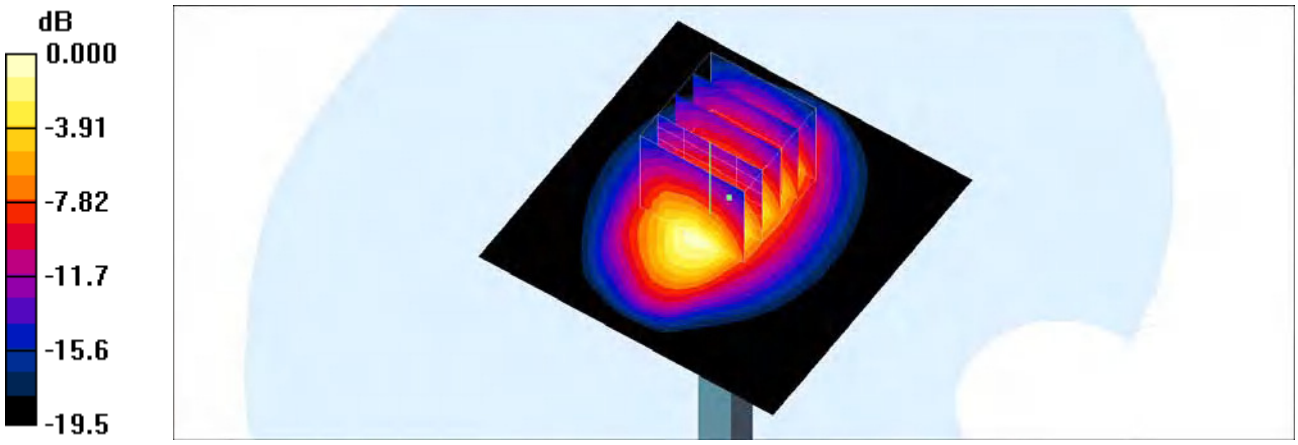
DUT: D1900V2-5d041

Communication System: CW; Frequency: 1900 MHz;Duty Cycle: 1:1
Medium: MSL_1900_160519 Medium parameters used: f = 1900 MHz; σ = 1.56 mho/m; ε_r = 52.2; ρ = 1000 kg/m^3
Ambient Temperature：23.5 ℃; Liquid Temperature：22.5 ℃

DASY4 Configuration:
- Probe: EX3DV4 - SN7346; ConvF(7.77, 7.77, 7.77); Calibrated: 2015/9/2
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn916; Calibrated: 2015/12/16
- Phantom: SAM_Right; Type: SAM_Right; Serial: TP-1303
- ;Postprocessing SW: SEMCAD, V1.8 Build 159

Pin=250mW/Area Scan (61x61x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 17.1 mW/g

Pin=250mW/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 102.3 V/m; Power Drift = -0.019 dB
Peak SAR (extrapolated) = 19.2 W/kg
SAR(1 g) = 10.8 mW/g; SAR(10 g) = 5.71 mW/g
Maximum value of SAR (measured) = 16.0 mW/g



0 dB = 16.0mW/g

Test Laboratory: Sporton International Inc. SAR/HAC Testing Lab Date: 2016/5/20

System Check_Body_1900MHz

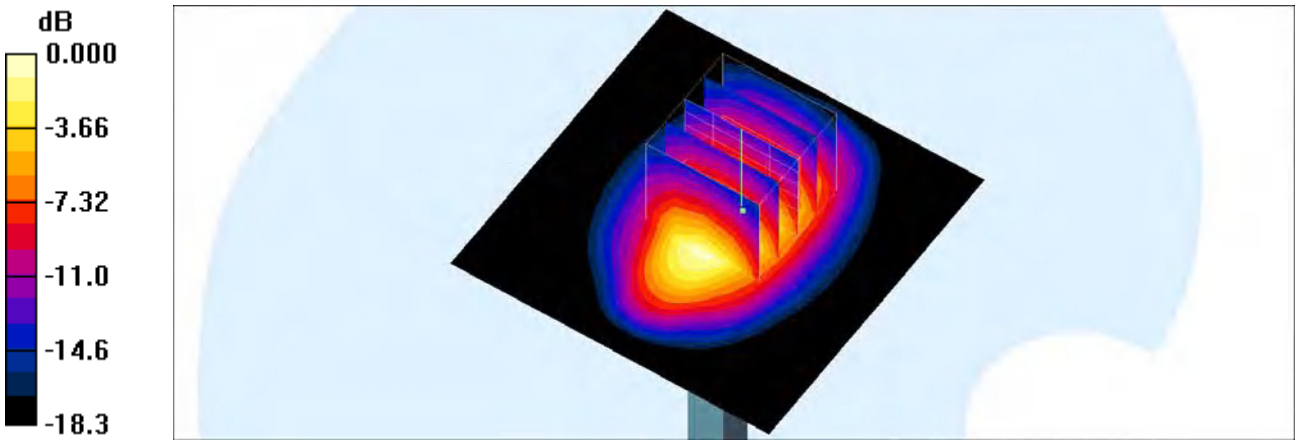
DUT: D1900V2-5d041

Communication System: CW; Frequency: 1900 MHz;Duty Cycle: 1:1
Medium: MSL_1900_160520 Medium parameters used: f = 1900 MHz; σ = 1.58 mho/m; ε_r = 53.6; ρ = 1000 kg/m^3
Ambient Temperature：23.5 ℃; Liquid Temperature：22.5 ℃

DASY4 Configuration:
- Probe: EX3DV4 - SN7346; ConvF(7.77, 7.77, 7.77); Calibrated: 2015/9/2
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn916; Calibrated: 2015/12/16
- Phantom: SAM_Right; Type: SAM_Right; Serial: TP-1303
- ;Postprocessing SW: SEMCAD, V1.8 Build 159

Pin=250mW/Area Scan (61x61x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 17.0 mW/g

Pin=250mW/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 101.5 V/m; Power Drift = 0.045 dB
Peak SAR (extrapolated) = 19.1 W/kg
SAR(1 g) = 10.8 mW/g; SAR(10 g) = 5.7 mW/g
Maximum value of SAR (measured) = 16.2 mW/g



0 dB = 16.2mW/g

System Check_Head_2450MHz

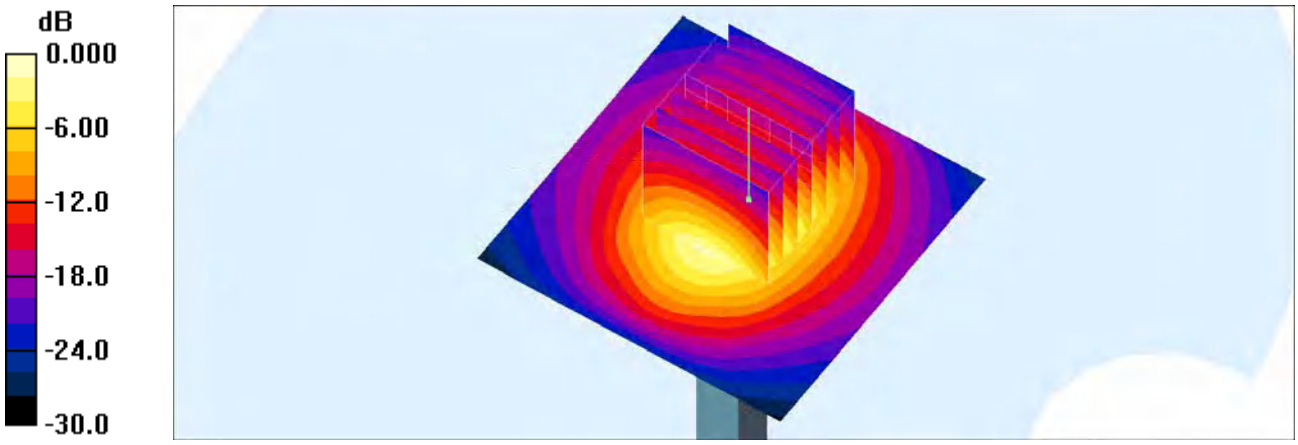
DUT: D2450V2-736

Communication System: CW; Frequency: 2450 MHz;Duty Cycle: 1:1
Medium: HSL_2450_160517 Medium parameters used: f = 2450 MHz; σ = 1.74 mho/m; ε_r = 38; ρ = 1000 kg/m^3
Ambient Temperature：23.5 ℃; Liquid Temperature：22.5 ℃

DASY4 Configuration:
- Probe: EX3DV4 - SN7346; ConvF(7.27, 7.27, 7.27); Calibrated: 2015/9/2
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn916; Calibrated: 2015/12/16
- Phantom: SAM_Right; Type: SAM_Right; Serial: TP-1303
- ;Postprocessing SW: SEMCAD, V1.8 Build 159

Pin=250mW/Area Scan (61x61x1): Measurement grid: dx=12mm, dy=12mm
Maximum value of SAR (interpolated) = 21.2 mW/g

Pin=250mW/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 107.1 V/m; Power Drift = -0.028 dB
Peak SAR (extrapolated) = 27.1 W/kg
SAR(1 g) = 12.8 mW/g; SAR(10 g) = 5.81 mW/g
Maximum value of SAR (measured) = 19.6 mW/g



0 dB = 19.6mW/g

Test Laboratory: Sporton International Inc. SAR/HAC Testing Lab Date: 2016/5/23

System Check_Body_2450MHz

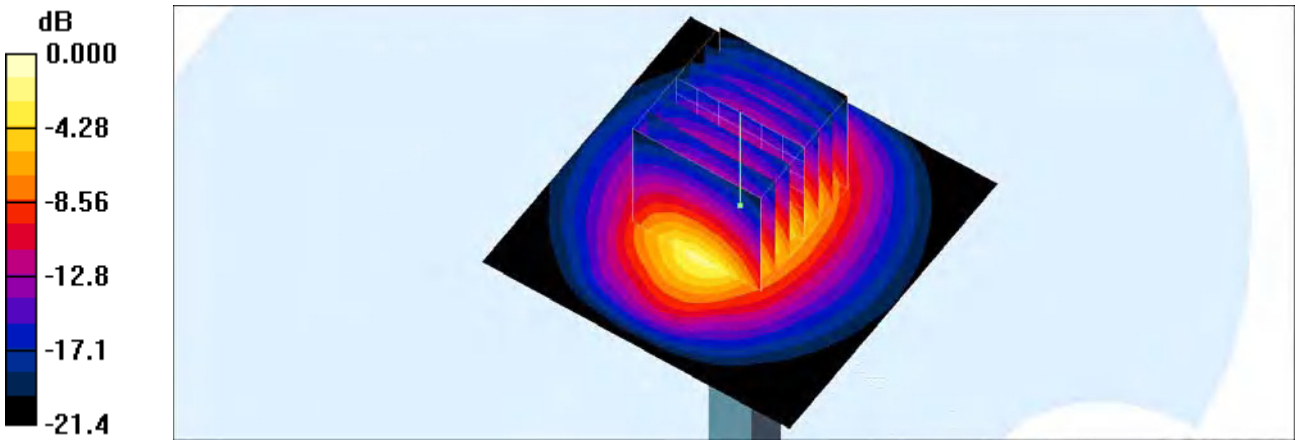
DUT: D2450V2-736

Communication System: CW; Frequency: 2450 MHz;Duty Cycle: 1:1
Medium: MSL_2450_160523 Medium parameters used: f = 2450 MHz; σ = 1.94 mho/m; ε_r = 53.4; ρ = 1000 kg/m^3
Ambient Temperature：23.3 ℃; Liquid Temperature：22.3 ℃

DASY4 Configuration:
- Probe: EX3DV4 - SN7346; ConvF(7.43, 7.43, 7.43); Calibrated: 2015/9/2
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn916; Calibrated: 2015/12/16
- Phantom: SAM_Right; Type: SAM_Right; Serial: TP-1303
- ;Postprocessing SW: SEMCAD, V1.8 Build 159

Pin=250mW/Area Scan (61x61x1): Measurement grid: dx=12mm, dy=12mm
Maximum value of SAR (interpolated) = 18.0 mW/g

Pin=250mW/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 95.1 V/m; Power Drift = 0.054 dB
Peak SAR (extrapolated) = 23.7 W/kg
SAR(1 g) = 11.7 mW/g; SAR(10 g) = 5.49 mW/g
Maximum value of SAR (measured) = 17.8 mW/g



0 dB = 17.8mW/g

System Check_Body_2450MHz

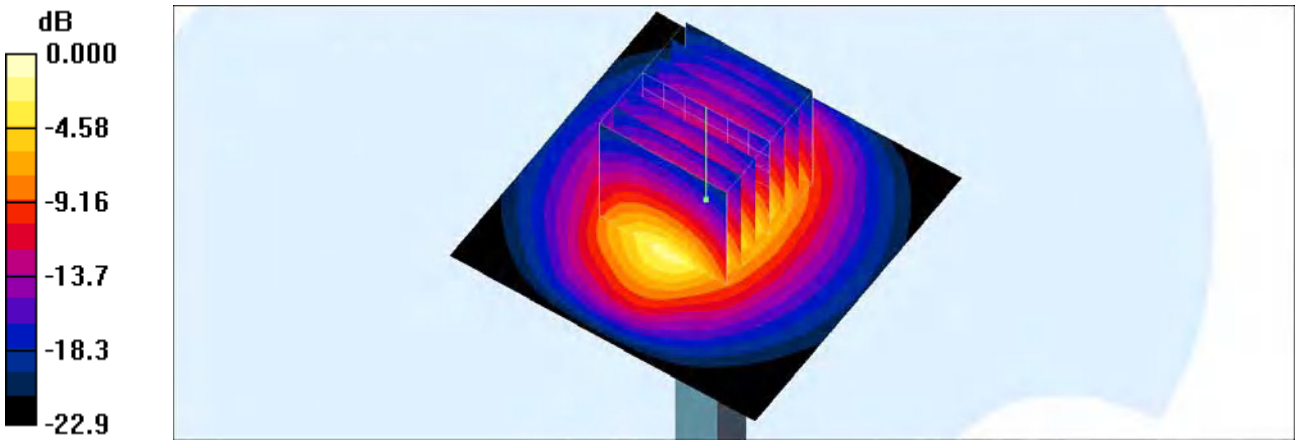
DUT: D2450V2-736

Communication System: CW; Frequency: 2450 MHz;Duty Cycle: 1:1
Medium: MSL_2450_160526 Medium parameters used: f = 2450 MHz; σ = 2 mho/m; ε_r = 54.3; ρ = 1000 kg/m^3
Ambient Temperature：23.4 ℃; Liquid Temperature：22.4 ℃

DASY4 Configuration:
- Probe: EX3DV4 - SN7346; ConvF(7.43, 7.43, 7.43); Calibrated: 2015/9/2
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn916; Calibrated: 2015/12/16
- Phantom: SAM_Right; Type: SAM_Right; Serial: TP-1303
- ;Postprocessing SW: SEMCAD, V1.8 Build 159

Pin=250mW/Area Scan (61x61x1): Measurement grid: dx=12mm, dy=12mm
Maximum value of SAR (interpolated) = 18.5 mW/g

Pin=250mW/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 95.1 V/m; Power Drift = 0.011 dB
Peak SAR (extrapolated) = 24.4 W/kg
SAR(1 g) = 12.1 mW/g; SAR(10 g) = 5.67 mW/g
Maximum value of SAR (measured) = 18.3 mW/g



0 dB = 18.3mW/g

System Check_Head_2600MHz

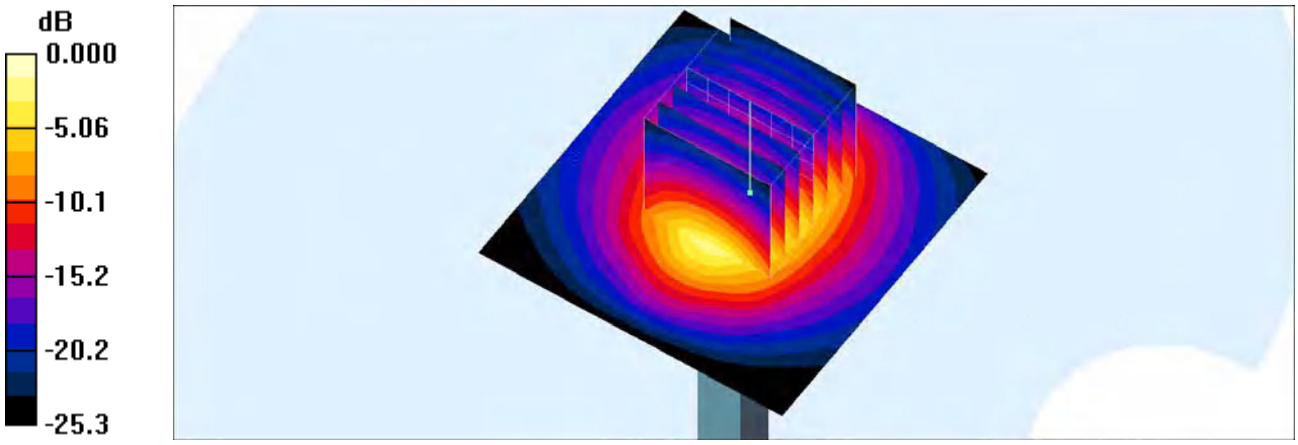
DUT: D2600V2-1008

Communication System: CW; Frequency: 2600 MHz;Duty Cycle: 1:1
Medium: HSL_2600_160517 Medium parameters used: f = 2600 MHz; σ = 1.91 mho/m; ε_r = 37.5; ρ = 1000 kg/m^3
Ambient Temperature：23.5 ℃; Liquid Temperature：22.5 ℃

DASY4 Configuration:
- Probe: EX3DV4 - SN7346; ConvF(7.15, 7.15, 7.15); Calibrated: 2015/9/2
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn916; Calibrated: 2015/12/16
- Phantom: SAM_Right; Type: SAM_Right; Serial: TP-1303
- ;Postprocessing SW: SEMCAD, V1.8 Build 159

Pin=250mW/Area Scan (61x61x1): Measurement grid: dx=12mm, dy=12mm
Maximum value of SAR (interpolated) = 26.5 mW/g

Pin=250mW/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 113.1 V/m; Power Drift = -0.020 dB
Peak SAR (extrapolated) = 31.0 W/kg
SAR(1 g) = 13.8 mW/g; SAR(10 g) = 6 mW/g
Maximum value of SAR (measured) = 24.4 mW/g



0 dB = 24.4mW/g

Test Laboratory: Sporton International Inc. SAR/HAC Testing Lab Date: 2016/5/18

System Check_Body_2600MHz

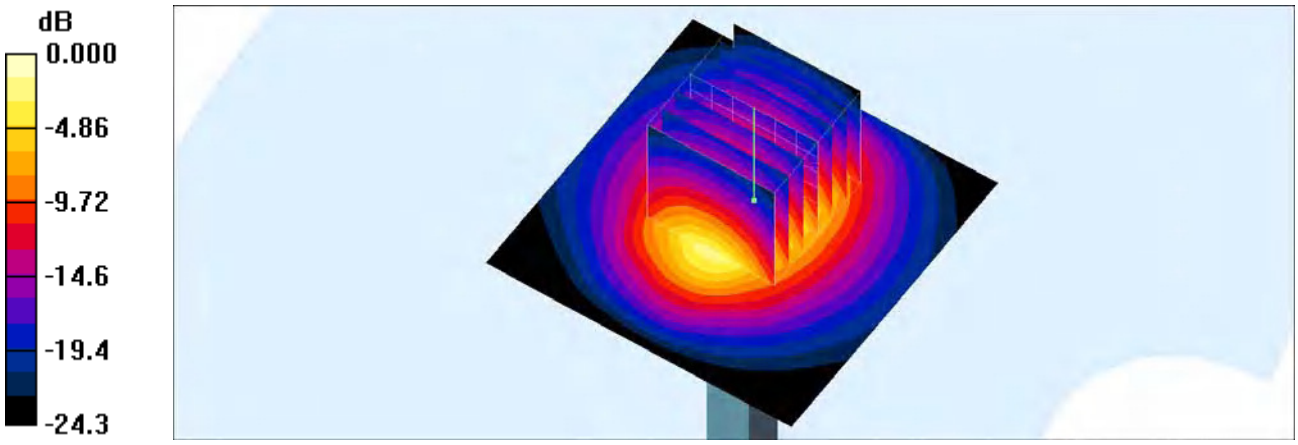
DUT: D2600V2-1008

Communication System: CW; Frequency: 2600 MHz;Duty Cycle: 1:1
Medium: MSL_2600_160518 Medium parameters used: f = 2600 MHz; σ = 2.2 mho/m; ε_r = 52.5; ρ = 1000 kg/m^3
Ambient Temperature：23.3 ℃; Liquid Temperature：22.3 ℃

DASY4 Configuration:
- Probe: EX3DV4 - SN7346; ConvF(7.29, 7.29, 7.29); Calibrated: 2015/9/2
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn916; Calibrated: 2015/12/16
- Phantom: SAM_Right; Type: SAM_Right; Serial: TP-1303
- ;Postprocessing SW: SEMCAD, V1.8 Build 159

Pin=250mW/Area Scan (61x61x1): Measurement grid: dx=12mm, dy=12mm
Maximum value of SAR (interpolated) = 26.9 mW/g

Pin=250mW/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 107.1 V/m; Power Drift = -0.035 dB
Peak SAR (extrapolated) = 31.6 W/kg
SAR(1 g) = 14.4 mW/g; SAR(10 g) = 6.29 mW/g
Maximum value of SAR (measured) = 24.7 mW/g



0 dB = 24.7mW/g

Appendix B. Plots of SAR Measurement

The plots are shown as follows.

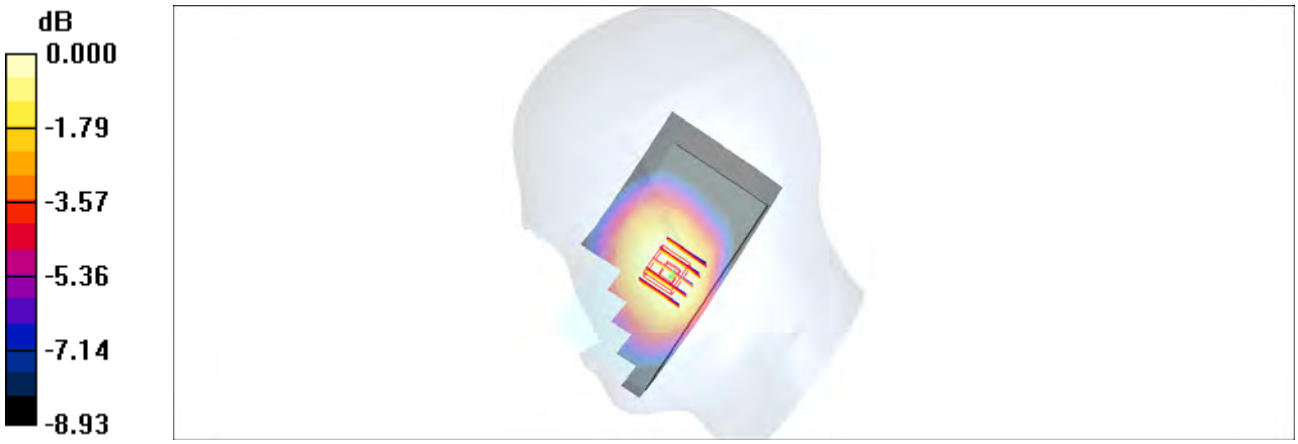
#01_GSM850_GPRS (2 Tx slots)_Right Cheek_Ch251

Communication System: GSM850; Frequency: 848.8 MHz;Duty Cycle: 1:4.15
Medium: HSL_850_160525 Medium parameters used: f = 849 MHz; σ = 0.893 mho/m; ε_r = 42.7; ρ = 1000 kg/m^3
Ambient Temperature：23.1 ℃; Liquid Temperature：22.1 ℃

DASY4 Configuration:
- Probe: EX3DV4 - SN7346; ConvF(9.8, 9.8, 9.8); Calibrated: 2015/9/2
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn916; Calibrated: 2015/12/16
- Phantom: SAM_Right; Type: SAM_Right; Serial: TP-1303
- ;Postprocessing SW: SEMCAD, V1.8 Build 159

Area Scan (61x111x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.554 mW/g

Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 20.9 V/m; Power Drift = 0.025 dB
Peak SAR (extrapolated) = 0.594 W/kg
SAR(1 g) = 0.493 mW/g; SAR(10 g) = 0.388 mW/g
Maximum value of SAR (measured) = 0.570 mW/g



0 dB = 0.570mW/g

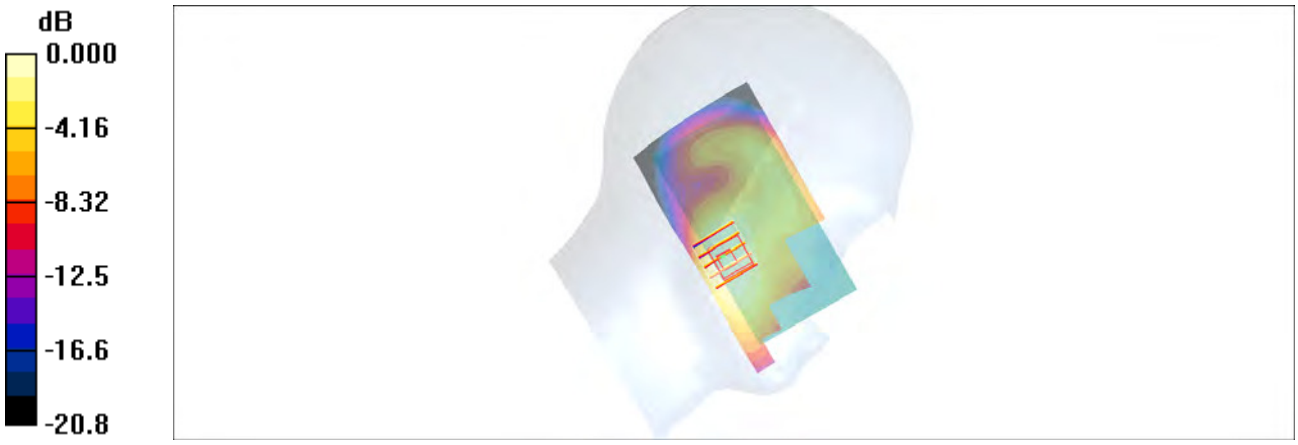
#02_GSM1900_GPRS (3 Tx slots)_Left Cheek_Ch512

Communication System: PCS; Frequency: 1850.2 MHz;Duty Cycle: 1:2.77
Medium: HSL_1900_160524 Medium parameters used : f = 1850.2 MHz; σ = 1.41 mho/m; ε_r = 38.5; ρ = 1000 kg/m^3
Ambient Temperature：23.3 ℃; Liquid Temperature：22.3 ℃

DASY4 Configuration:
- Probe: EX3DV4 - SN7346; ConvF(8.33, 8.33, 8.33); Calibrated: 2015/9/2
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn916; Calibrated: 2015/12/16
- Phantom: SAM_Right; Type: SAM_Right; Serial: TP-1303
- ;Postprocessing SW: SEMCAD, V1.8 Build 159

Area Scan (61x111x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.513 mW/g

Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 9.29 V/m; Power Drift = 0.042 dB
Peak SAR (extrapolated) = 0.488 W/kg
SAR(1 g) = 0.321 mW/g; SAR(10 g) = 0.207 mW/g
Maximum value of SAR (measured) = 0.430 mW/g



0 dB = 0.430mW/g

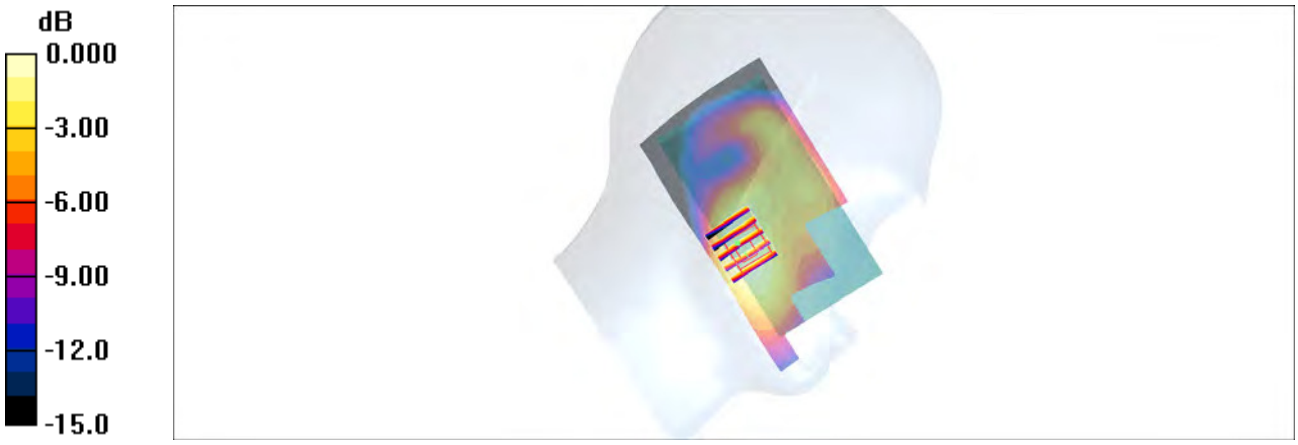
#03_WCDMA II_RMC 12.2Kbps_Left Cheek_Ch9262

Communication System: WCDMA; Frequency: 1852.4 MHz;Duty Cycle: 1:1
Medium: HSL_1900_160524 Medium parameters used : f = 1852.4 MHz; σ = 1.41 mho/m; ε_r = 38.5; ρ = 1000 kg/m^3
Ambient Temperature：23.3 ℃; Liquid Temperature：22.3 ℃

DASY4 Configuration:
- Probe: EX3DV4 - SN7346; ConvF(8.33, 8.33, 8.33); Calibrated: 2015/9/2
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn916; Calibrated: 2015/12/16
- Phantom: SAM_Right; Type: SAM_Right; Serial: TP-1303
- ;Postprocessing SW: SEMCAD, V1.8 Build 159

Area Scan (61x111x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.975 mW/g

Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 13.1 V/m; Power Drift = -0.109 dB
Peak SAR (extrapolated) = 0.949 W/kg
SAR(1 g) = 0.586 mW/g; SAR(10 g) = 0.392 mW/g
Maximum value of SAR (measured) = 0.838 mW/g



0 dB = 0.838mW/g

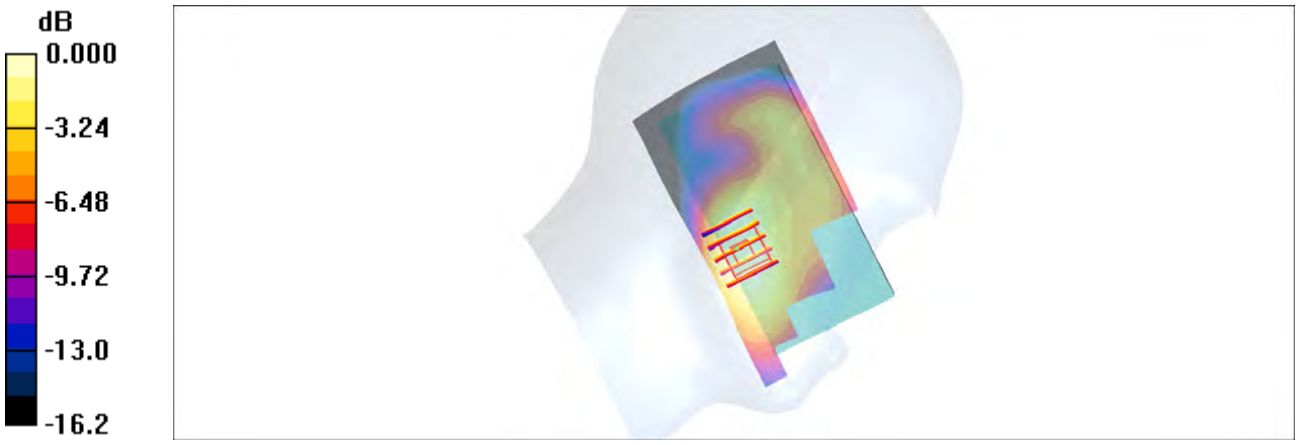
#04_WCDMA IV_RMC 12.2Kbps_Left Cheek_Ch1513

Communication System: WCDMA; Frequency: 1752.6 MHz;Duty Cycle: 1:1
Medium: HSL_1750_160523 Medium parameters used: f = 1753 MHz; σ = 1.36 mho/m; ε_r = 40.4; ρ = 1000 kg/m^3
Ambient Temperature：23.3 ℃; Liquid Temperature：22.3 ℃

DASY4 Configuration:
- Probe: EX3DV4 - SN7346; ConvF(8.6, 8.6, 8.6); Calibrated: 2015/9/2
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn916; Calibrated: 2015/12/16
- Phantom: SAM_Right; Type: SAM_Right; Serial: TP-1303
- ;Postprocessing SW: SEMCAD, V1.8 Build 159

Area Scan (61x111x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.765 mW/g

Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 12.3 V/m; Power Drift = -0.084 dB
Peak SAR (extrapolated) = 0.741 W/kg
SAR(1 g) = 0.502 mW/g; SAR(10 g) = 0.328 mW/g
Maximum value of SAR (measured) = 0.659 mW/g



0 dB = 0.659mW/g

Test Laboratory: Sporton International Inc. SAR/HAC Testing Lab Date: 2016/5/25

#05_WCDMA V_RMC 12.2Kbps_Right Cheek_Ch4233

Communication System: WCDMA; Frequency: 846.6 MHz;Duty Cycle: 1:1
Medium: HSL_850_160525 Medium parameters used: f = 847 MHz; σ = 0.891 mho/m; ε_r = 42.8; ρ = 1000 kg/m^3
Ambient Temperature：23.1 ℃; Liquid Temperature：22.1 ℃

DASY4 Configuration:
- Probe: EX3DV4 - SN7346; ConvF(9.8, 9.8, 9.8); Calibrated: 2015/9/2
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn916; Calibrated: 2015/12/16
- Phantom: SAM_Right; Type: SAM_Right; Serial: TP-1303
- ;Postprocessing SW: SEMCAD, V1.8 Build 159

Area Scan (61x111x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.410 mW/g

Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 17.9 V/m; Power Drift = 0.109 dB
Peak SAR (extrapolated) = 0.438 W/kg
SAR(1 g) = 0.360 mW/g; SAR(10 g) = 0.283 mW/g
Maximum value of SAR (measured) = 0.413 mW/g

0 dB = 0.413mW/g

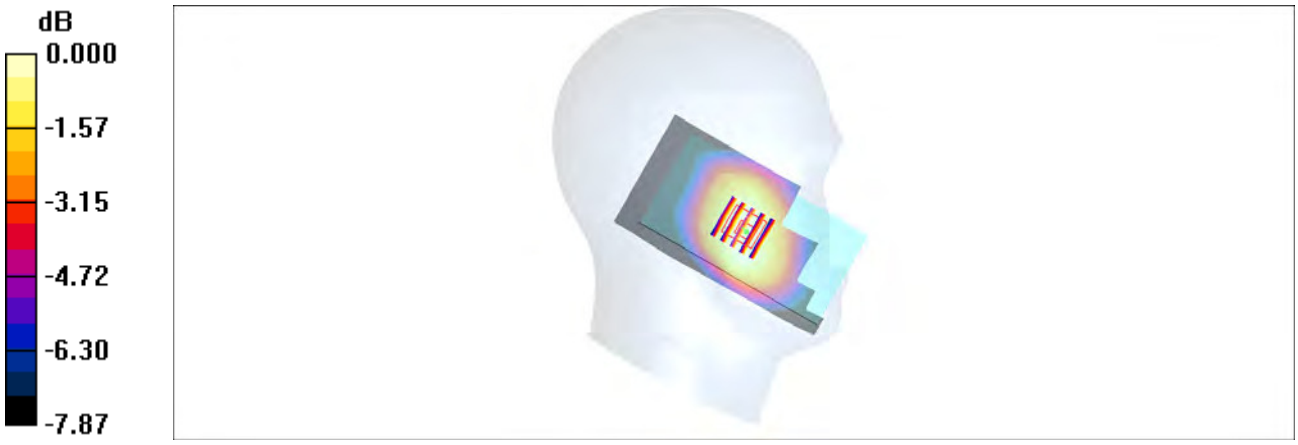
#06_CDMA BC0_1xRTT RC3 SO55_Left Cheek_Ch384

Communication System: CDMA ; Frequency: 836.52 MHz;Duty Cycle: 1:1
Medium: HSL_850_160525 Medium parameters used: f = 837 MHz; σ = 0.881 mho/m; ε_r = 42.9; ρ = 1000 kg/m^3
Ambient Temperature：23.1 ℃; Liquid Temperature：22.1 ℃

DASY4 Configuration:
- Probe: EX3DV4 - SN7346; ConvF(9.8, 9.8, 9.8); Calibrated: 2015/9/2
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn916; Calibrated: 2015/12/16
- Phantom: SAM_Right; Type: SAM_Right; Serial: TP-1303
- ;Postprocessing SW: SEMCAD, V1.8 Build 159

Area Scan (61x111x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.438 mW/g

Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 21.8 V/m; Power Drift = 0.023 dB
Peak SAR (extrapolated) = 0.435 W/kg
SAR(1 g) = 0.353 mW/g; SAR(10 g) = 0.275 mW/g
Maximum value of SAR (measured) = 0.412 mW/g



0 dB = 0.412mW/g

#07_CDMA BC1_1xRTT RC3 SO55_Left Cheek_Ch1175

Communication System: CDMA ; Frequency: 1908.75 MHz;Duty Cycle: 1:1
Medium: HSL_1900_160524 Medium parameters used: f = 1909 MHz; σ = 1.46 mho/m; ε_r = 38.3; ρ = 1000 kg/m^3
Ambient Temperature：23.3 ℃; Liquid Temperature：22.3 ℃

DASY4 Configuration:
- Probe: EX3DV4 - SN7346; ConvF(8.33, 8.33, 8.33); Calibrated: 2015/9/2
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn916; Calibrated: 2015/12/16
- Phantom: SAM_Right; Type: SAM_Right; Serial: TP-1303
- ;Postprocessing SW: SEMCAD, V1.8 Build 159

Area Scan (61x111x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.844 mW/g

Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 11.3 V/m; Power Drift = -0.114 dB
Peak SAR (extrapolated) = 0.833 W/kg
SAR(1 g) = 0.534 mW/g; SAR(10 g) = 0.340 mW/g
Maximum value of SAR (measured) = 0.731 mW/g

0 dB = 0.731mW/g

#08_CDMA BC10_1xRTT RC3 SO55_Right Cheek_Ch520

Communication System: CDMA ; Frequency: 819 MHz;Duty Cycle: 1:1
Medium: HSL_850_160525 Medium parameters used : f = 819 MHz; σ = 0.865 mho/m; ε_r = 43.1; ρ = 1000 kg/m^3
Ambient Temperature：23.1 ℃; Liquid Temperature：22.1 ℃

DASY4 Configuration:
- Probe: EX3DV4 - SN7346; ConvF(9.8, 9.8, 9.8); Calibrated: 2015/9/2
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn916; Calibrated: 2015/12/16
- Phantom: SAM_Right; Type: SAM_Right; Serial: TP-1303
- ;Postprocessing SW: SEMCAD, V1.8 Build 159

Area Scan (61x111x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.443 mW/g

Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 20.3 V/m; Power Drift = 0.081 dB
Peak SAR (extrapolated) = 0.497 W/kg
SAR(1 g) = 0.404 mW/g; SAR(10 g) = 0.318 mW/g
Maximum value of SAR (measured) = 0.463 mW/g

0 dB = 0.463mW/g

#09_LTE Band 2_20M_QPSK_1_49_Left Cheek_Ch18700

Communication System: LTE; Frequency: 1860 MHz;Duty Cycle: 1:1
Medium: HSL_1900_160524 Medium parameters used: f = 1860 MHz; σ = 1.42 mho/m; ε_r = 38.5; ρ = 1000 kg/m^3
Ambient Temperature：23.3 ℃; Liquid Temperature：22.3 ℃

DASY4 Configuration:
- Probe: EX3DV4 - SN7346; ConvF(8.33, 8.33, 8.33); Calibrated: 2015/9/2
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn916; Calibrated: 2015/12/16
- Phantom: SAM_Right; Type: SAM_Right; Serial: TP-1303
- ;Postprocessing SW: SEMCAD, V1.8 Build 159

Area Scan (61x111x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.716 mW/g

Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 11.1 V/m; Power Drift = -0.036 dB
Peak SAR (extrapolated) = 0.739 W/kg
SAR(1 g) = 0.476 mW/g; SAR(10 g) = 0.299 mW/g
Maximum value of SAR (measured) = 0.655 mW/g

0 dB = 0.655mW/g

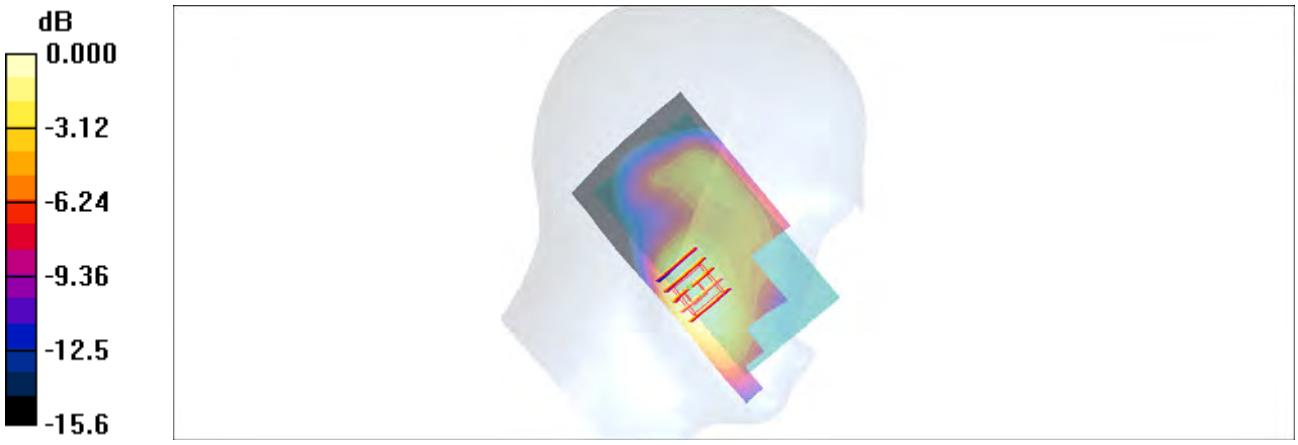
#10_LTE Band 4_20M_QPSK_1_0_Left Cheek_Ch20175

Communication System: LTE; Frequency: 1732.5 MHz;Duty Cycle: 1:1
Medium: HSL_1750_160523 Medium parameters used: f = 1732.5 MHz; σ = 1.34 mho/m; ε_r = 40.5; ρ = 1000 kg/m^3
Ambient Temperature：23.3 ℃; Liquid Temperature：22.3 ℃

DASY4 Configuration:
- Probe: EX3DV4 - SN7346; ConvF(8.6, 8.6, 8.6); Calibrated: 2015/9/2
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn916; Calibrated: 2015/12/16
- Phantom: SAM_Right; Type: SAM_Right; Serial: TP-1303
- ;Postprocessing SW: SEMCAD, V1.8 Build 159

Area Scan (61x111x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.751 mW/g

Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 11.9 V/m; Power Drift = -0.149 dB
Peak SAR (extrapolated) = 0.720 W/kg
SAR(1 g) = 0.493 mW/g; SAR(10 g) = 0.325 mW/g
Maximum value of SAR (measured) = 0.634 mW/g



0 dB = 0.634mW/g

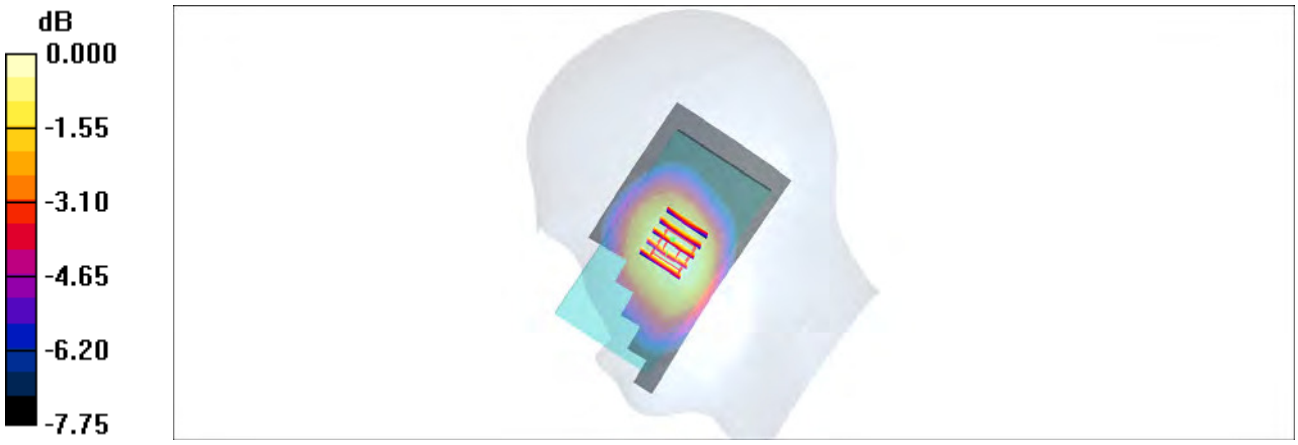
#11_LTE Band 5_10M_QPSK_1_25_Right Cheek_Ch20525

Communication System: LTE; Frequency: 836.5 MHz;Duty Cycle: 1:1
Medium: HSL_850_160525 Medium parameters used: f = 836.5 MHz; σ = 0.881 mho/m; ε_r = 42.9; ρ = 1000 kg/m^3
Ambient Temperature：23.1 ℃； Liquid Temperature：22.1 ℃

DASY4 Configuration:
- Probe: EX3DV4 - SN7346; ConvF(9.8, 9.8, 9.8); Calibrated: 2015/9/2
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn916; Calibrated: 2015/12/16
- Phantom: SAM_Right; Type: SAM_Right; Serial: TP-1303
- ;Postprocessing SW: SEMCAD, V1.8 Build 159

Area Scan (61x111x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.357 mW/g

Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 17.4 V/m; Power Drift = 0.091 dB
Peak SAR (extrapolated) = 0.382 W/kg
SAR(1 g) = 0.318 mW/g; SAR(10 g) = 0.251 mW/g
Maximum value of SAR (measured) = 0.366 mW/g



0 dB = 0.366mW/g

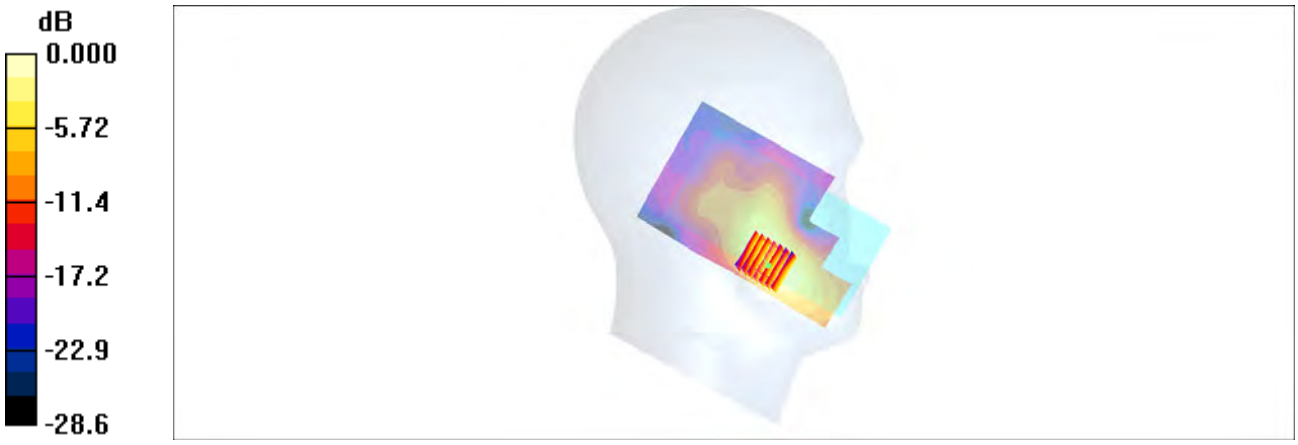
#12_LTE Band 7_20M_QPSK_50_0_Left Cheek_Ch21350

Communication System: LTE; Frequency: 2560 MHz;Duty Cycle: 1:1
Medium: HSL_2600_160517 Medium parameters used: f = 2560 MHz; σ = 1.86 mho/m; ε_r = 37.6; ρ = 1000 kg/m^3
Ambient Temperature：23.5 ℃; Liquid Temperature：22.5 ℃

DASY4 Configuration:
- Probe: EX3DV4 - SN7346; ConvF(7.15, 7.15, 7.15); Calibrated: 2015/9/2
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn916; Calibrated: 2015/12/16
- Phantom: SAM_Right; Type: SAM_Right; Serial: TP-1303
- ;Postprocessing SW: SEMCAD, V1.8 Build 159

Area Scan (81x141x1): Measurement grid: dx=12mm, dy=12mm
Maximum value of SAR (interpolated) = 0.826 mW/g

Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 5.65 V/m; Power Drift = -0.003 dB
Peak SAR (extrapolated) = 1.05 W/kg
SAR(1 g) = 0.567 mW/g; SAR(10 g) = 0.295 mW/g
Maximum value of SAR (measured) = 0.880 mW/g



0 dB = 0.880mW/g

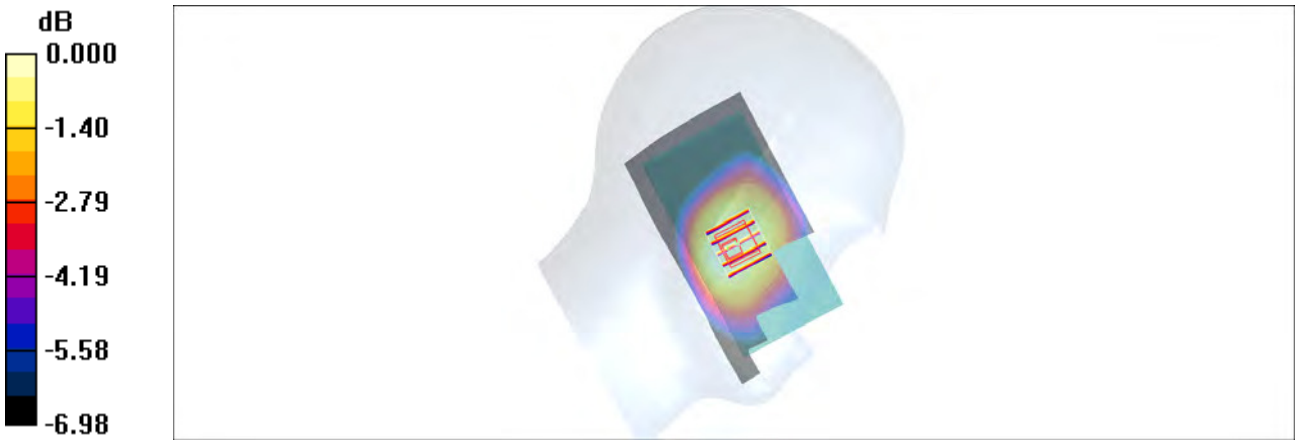
#13_LTE Band 12_10M_QPSK_1_49_Left Cheek_Ch23095

Communication System: LTE; Frequency: 707.5 MHz;Duty Cycle: 1:1
Medium: HSL_750_160525 Medium parameters used : f = 707.5 MHz; σ = 0.859 mho/m; ε_r = 42.2; ρ = 1000 kg/m^3
Ambient Temperature：23.2 ℃； Liquid Temperature：22.2 ℃

DASY4 Configuration:
- Probe: EX3DV4 - SN7346; ConvF(10.22, 10.22, 10.22); Calibrated: 2015/9/2
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn916; Calibrated: 2015/12/16
- Phantom: SAM_Right; Type: SAM_Right; Serial: TP-1303
- ;Postprocessing SW: SEMCAD, V1.8 Build 159

Area Scan (61x111x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.275 mW/g

Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 7.28 V/m; Power Drift = 0.156 dB
Peak SAR (extrapolated) = 0.270 W/kg
SAR(1 g) = 0.222 mW/g; SAR(10 g) = 0.181 mW/g
Maximum value of SAR (measured) = 0.254 mW/g



0 dB = 0.254mW/g

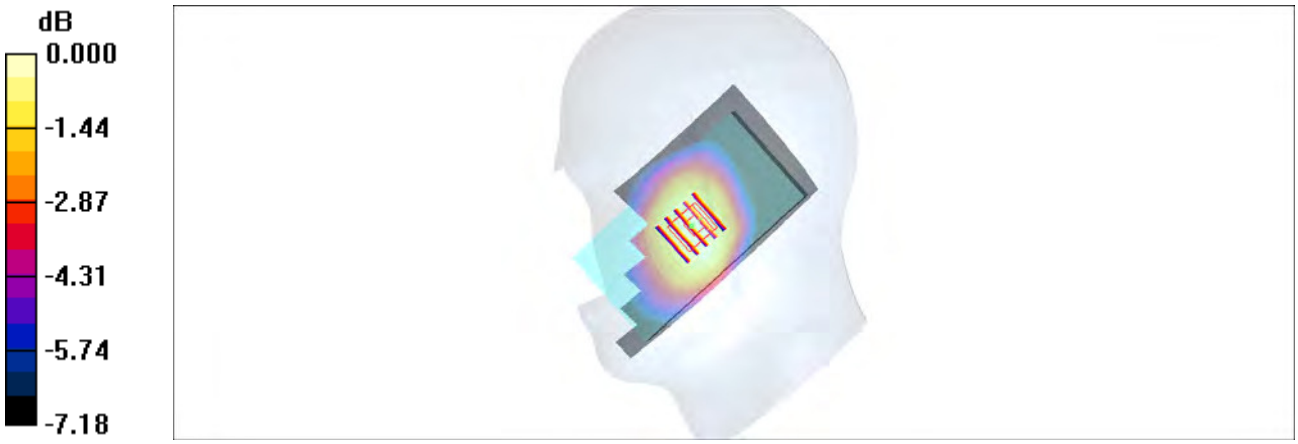
#14_LTE Band 13_10M_QPSK_1_0_Right Cheek_Ch23230

Communication System: LTE; Frequency: 782 MHz;Duty Cycle: 1:1
Medium: HSL_750_160525 Medium parameters used: f = 782 MHz; σ = 0.927 mho/m; ε_r = 41.2; ρ = 1000 kg/m^3
Ambient Temperature：23.2 ℃; Liquid Temperature：22.2 ℃

DASY4 Configuration:
- Probe: EX3DV4 - SN7346; ConvF(10.22, 10.22, 10.22); Calibrated: 2015/9/2
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn916; Calibrated: 2015/12/16
- Phantom: SAM_Right; Type: SAM_Right; Serial: TP-1303
- ;Postprocessing SW: SEMCAD, V1.8 Build 159

Area Scan (61x111x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.307 mW/g

Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 19.2 V/m; Power Drift = -0.017 dB
Peak SAR (extrapolated) = 0.347 W/kg
SAR(1 g) = 0.277 mW/g; SAR(10 g) = 0.223 mW/g
Maximum value of SAR (measured) = 0.322 mW/g



0 dB = 0.322mW/g

Test Laboratory: Sporton International Inc. SAR/HAC Testing Lab Date: 2016/5/24

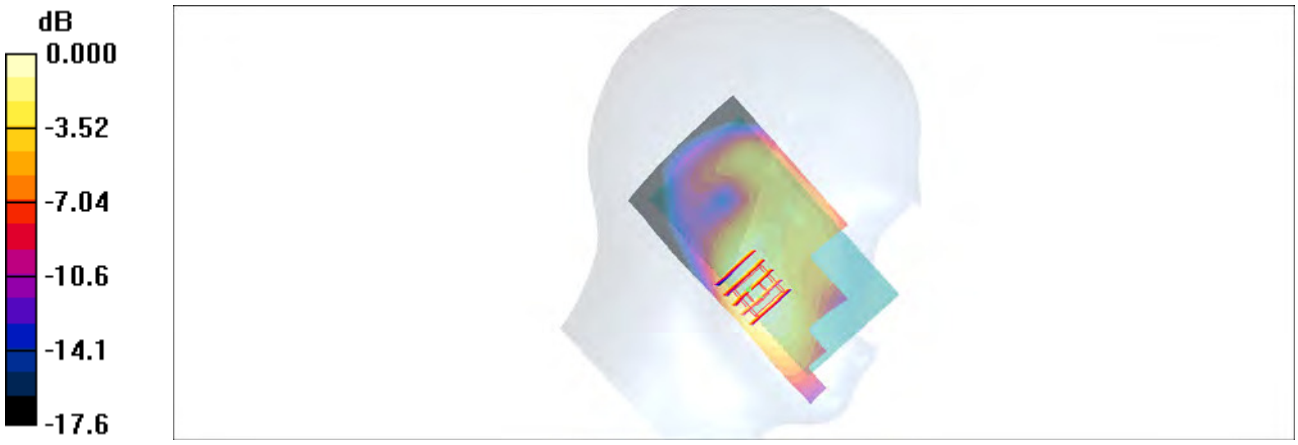
#15_LTE Band 25_20M_QPSK_1_49_Left Cheek_Ch26140

Communication System: LTE; Frequency: 1860 MHz;Duty Cycle: 1:1
Medium: HSL_1900_160524 Medium parameters used: f = 1860 MHz; σ = 1.42 mho/m; ε_r = 38.5; ρ = 1000 kg/m^3
Ambient Temperature：23.3 ℃; Liquid Temperature：22.3 ℃

DASY4 Configuration:
- Probe: EX3DV4 - SN7346; ConvF(8.33, 8.33, 8.33); Calibrated: 2015/9/2
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn916; Calibrated: 2015/12/16
- Phantom: SAM_Right; Type: SAM_Right; Serial: TP-1303
- ;Postprocessing SW: SEMCAD, V1.8 Build 159

Area Scan (61x111x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.754 mW/g

Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 10.9 V/m; Power Drift = 0.099 dB
Peak SAR (extrapolated) = 0.730 W/kg
SAR(1 g) = 0.480 mW/g; SAR(10 g) = 0.305 mW/g
Maximum value of SAR (measured) = 0.648 mW/g



0 dB = 0.648mW/g

#16_LTE Band 26_15M_QPSK_1_0_Right Cheek_Ch26865

Communication System: LTE; Frequency: 831.5 MHz;Duty Cycle: 1:1
Medium: HSL_850_160525 Medium parameters used: f = 831.5 MHz; σ = 0.876 mho/m; ε_r = 42.9; ρ = 1000 kg/m^3
Ambient Temperature：23.1 ℃; Liquid Temperature：22.1 ℃

DASY4 Configuration:
- Probe: EX3DV4 - SN7346; ConvF(9.8, 9.8, 9.8); Calibrated: 2015/9/2
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn916; Calibrated: 2015/12/16
- Phantom: SAM_Right; Type: SAM_Right; Serial: TP-1303
- ;Postprocessing SW: SEMCAD, V1.8 Build 159

Area Scan (61x111x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.345 mW/g

Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 18.0 V/m; Power Drift = 0.132 dB
Peak SAR (extrapolated) = 0.392 W/kg
SAR(1 g) = 0.317 mW/g; SAR(10 g) = 0.252 mW/g
Maximum value of SAR (measured) = 0.365 mW/g

0 dB = 0.365mW/g

Test Laboratory: Sporton International Inc. SAR/HAC Testing Lab Date: 2016/5/17

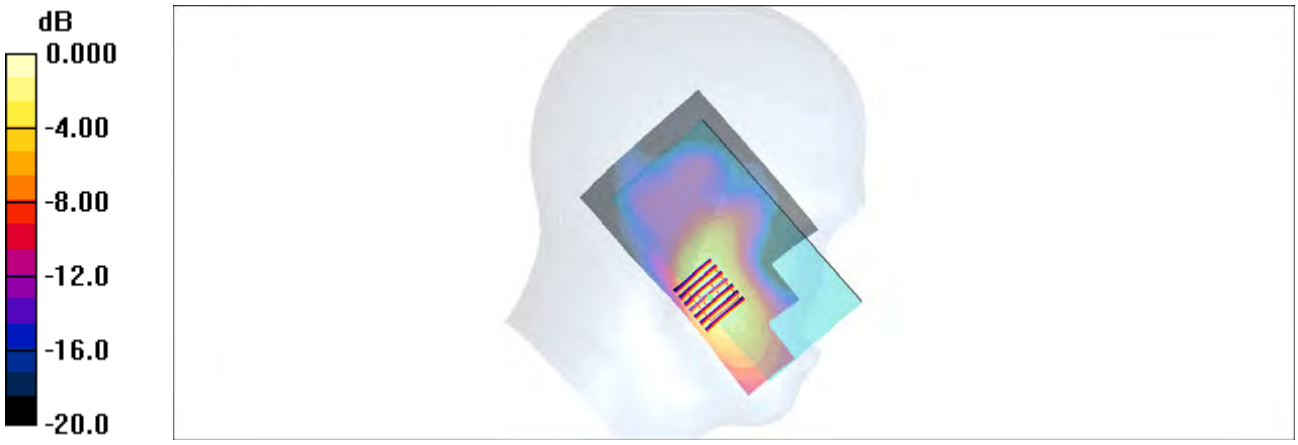
#17_LTE Band 41_20M_QPSK_1_0_Left Cheek_Ch40620

Communication System: LTE; Frequency: 2593 MHz;Duty Cycle: 1:1.59
Medium: HSL_2600_160517 Medium parameters used: f = 2593 MHz; σ = 1.91 mho/m; ε_r = 37.5; ρ = 1000 kg/m^3
Ambient Temperature：23.5 ℃; Liquid Temperature：22.5 ℃

DASY4 Configuration:
- Probe: EX3DV4 - SN7346; ConvF(7.15, 7.15, 7.15); Calibrated: 2015/9/2
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn916; Calibrated: 2015/12/16
- Phantom: SAM_Right; Type: SAM_Right; Serial: TP-1303
- ;Postprocessing SW: SEMCAD, V1.8 Build 159

Area Scan (81x141x1): Measurement grid: dx=12mm, dy=12mm
Maximum value of SAR (interpolated) = 0.660 mW/g

Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 5.52 V/m; Power Drift = 0.102 dB
Peak SAR (extrapolated) = 0.809 W/kg
SAR(1 g) = 0.444 mW/g; SAR(10 g) = 0.230 mW/g
Maximum value of SAR (measured) = 0.679 mW/g



0 dB = 0.679mW/g

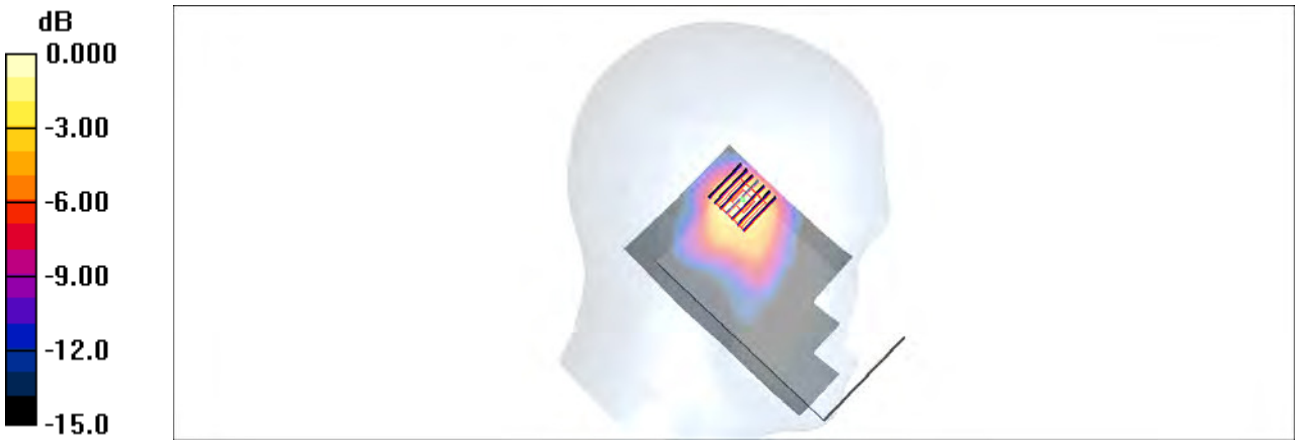
#18_WLAN2.4GHz_802.11b 1Mbps_Left Cheek_Ch6

Communication System: 802.11b ; Frequency: 2437 MHz;Duty Cycle: 1:1.024
Medium: HSL_2450_160517 Medium parameters used: f = 2437 MHz; σ = 1.74 mho/m; ε_r = 38.1; ρ = 1000 kg/m^3
Ambient Temperature：23.5 ℃; Liquid Temperature：22.5 ℃

DASY4 Configuration:
- Probe: EX3DV4 - SN7346; ConvF(7.27, 7.27, 7.27); Calibrated: 2015/9/2
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn916; Calibrated: 2015/12/16
- Phantom: SAM_Right; Type: SAM_Right; Serial: TP-1303
- ;Postprocessing SW: SEMCAD, V1.8 Build 159

Area Scan (81x141x1): Measurement grid: dx=12mm, dy=12mm
Maximum value of SAR (interpolated) = 0.584 mW/g

Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 13.8 V/m; Power Drift = -0.111 dB
Peak SAR (extrapolated) = 0.674 W/kg
SAR(1 g) = 0.360 mW/g; SAR(10 g) = 0.184 mW/g
Maximum value of SAR (measured) = 0.553 mW/g



0 dB = 0.553mW/g

Test Laboratory: Sporton International Inc. SAR/HAC Testing Lab Date: 2016/5/19

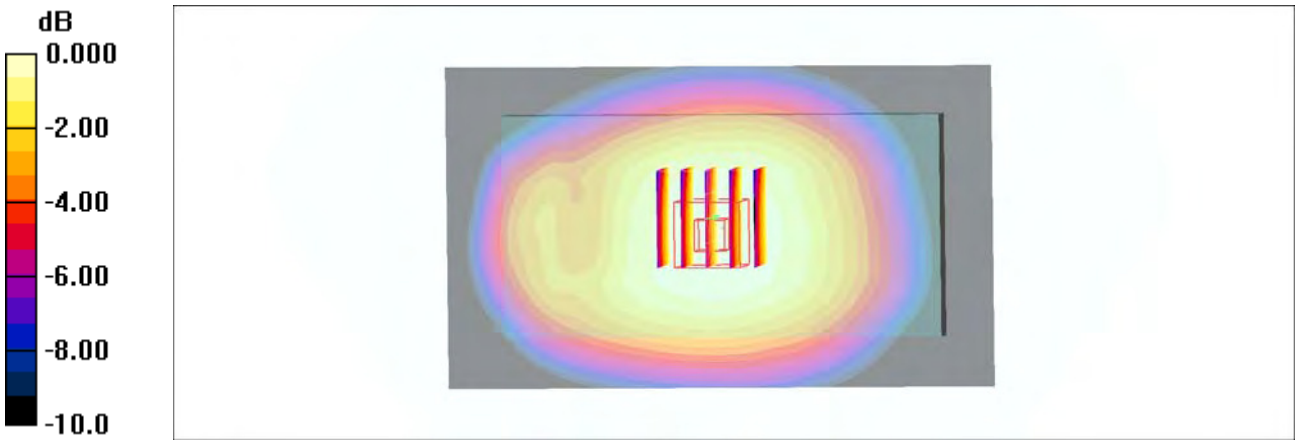
#19_GSM850_GPRS (2 Tx slots)_Back_10mm_Ch251

Communication System: GSM850; Frequency: 848.8 MHz;Duty Cycle: 1:4.15
Medium: MSL_850_160519 Medium parameters used: f = 849 MHz; σ = 0.987 mho/m; ε_r = 56.9; ρ = 1000 kg/m^3
Ambient Temperature：23.5 ℃; Liquid Temperature：22.5 ℃

DASY4 Configuration:
- Probe: EX3DV4 - SN7346; ConvF(10.05, 10.05, 10.05); Calibrated: 2015/9/2
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn916; Calibrated: 2015/12/16
- Phantom: SAM_Right; Type: SAM_Right; Serial: TP-1303
- ;Postprocessing SW: SEMCAD, V1.8 Build 159

Area Scan (71x121x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.780 mW/g

Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 29.1 V/m; Power Drift = 0.060 dB
Peak SAR (extrapolated) = 0.844 W/kg
SAR(1 g) = 0.637 mW/g; SAR(10 g) = 0.496 mW/g
Maximum value of SAR (measured) = 0.773 mW/g



0 dB = 0.773mW/g

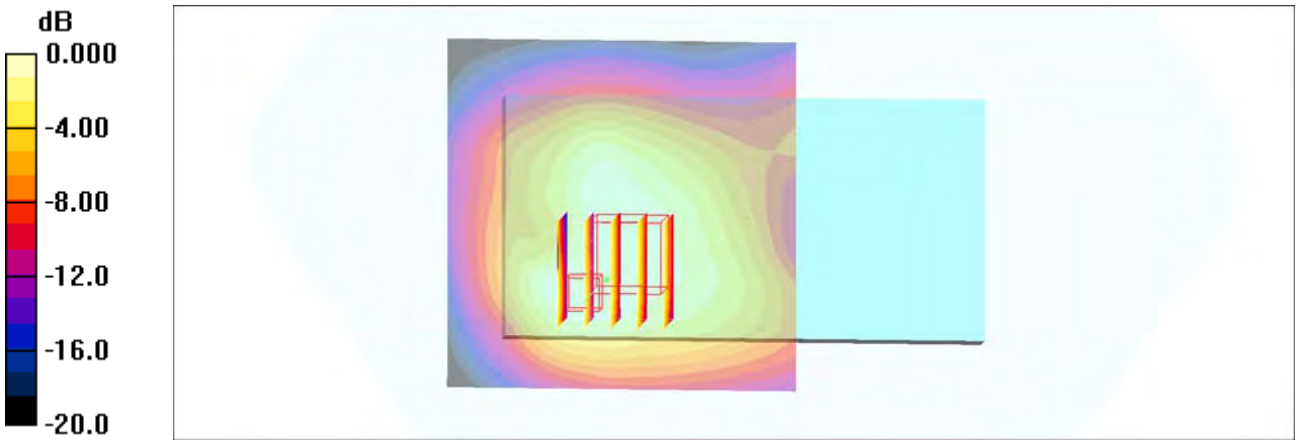
#20_GSM1900_GPRS (3 Tx slots)_Back_10mm_Ch512

Communication System: PCS; Frequency: 1850.2 MHz;Duty Cycle: 1:2.77
Medium: MSL_1900_160520 Medium parameters used: f = 1850.2 MHz; σ = 1.52 mho/m; ε_r = 53.8; ρ = 1000 kg/m^3
Ambient Temperature：23.5 ℃; Liquid Temperature：22.5 ℃

DASY4 Configuration:
- Probe: EX3DV4 - SN7346; ConvF(7.77, 7.77, 7.77); Calibrated: 2015/9/2
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn916; Calibrated: 2015/12/16
- Phantom: SAM_Right; Type: SAM_Right; Serial: TP-1303
- ;Postprocessing SW: SEMCAD, V1.8 Build 159

Area Scan (71x71x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.933 mW/g

Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 23.6 V/m; Power Drift = -0.026 dB
Peak SAR (extrapolated) = 1.11 W/kg
SAR(1 g) = 0.661 mW/g; SAR(10 g) = 0.416 mW/g
Maximum value of SAR (measured) = 0.872 mW/g



0 dB = 0.872mW/g

Test Laboratory: Sporton International Inc. SAR/HAC Testing Lab Date: 2016/5/19

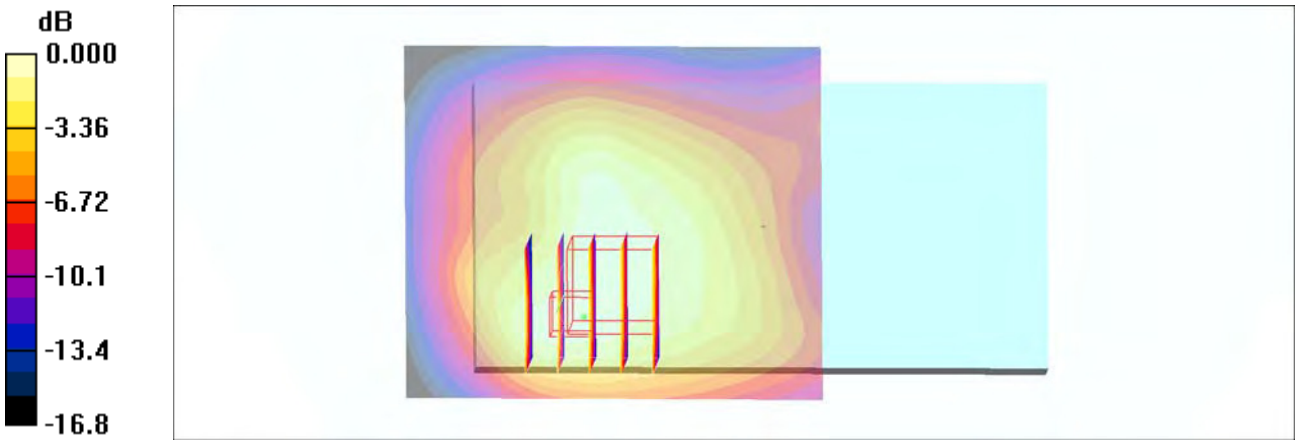
#21_WCDMA II_RMC 12.2Kbps_Back_10mm_Ch9262

Communication System: WCDMA; Frequency: 1852.4 MHz;Duty Cycle: 1:1
Medium: MSL_1900_160519 Medium parameters used: f = 1852.4 MHz; σ = 1.51 mho/m; ε_r = 52.4; ρ = 1000 kg/m^3
Ambient Temperature：23.5 ℃; Liquid Temperature：22.5 ℃

DASY4 Configuration:
- Probe: EX3DV4 - SN7346; ConvF(7.77, 7.77, 7.77); Calibrated: 2015/9/2
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn916; Calibrated: 2015/12/16
- Phantom: SAM_Right; Type: SAM_Right; Serial: TP-1303
- ;Postprocessing SW: SEMCAD, V1.8 Build 159

Area Scan (61x71x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 1.39 mW/g

Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 29.6 V/m; Power Drift = 0.050 dB
Peak SAR (extrapolated) = 1.71 W/kg
SAR(1 g) = 1.01 mW/g; SAR(10 g) = 0.637 mW/g
Maximum value of SAR (measured) = 1.46 mW/g



0 dB = 1.46mW/g

Test Laboratory: Sporton International Inc. SAR/HAC Testing Lab Date: 2016/5/19

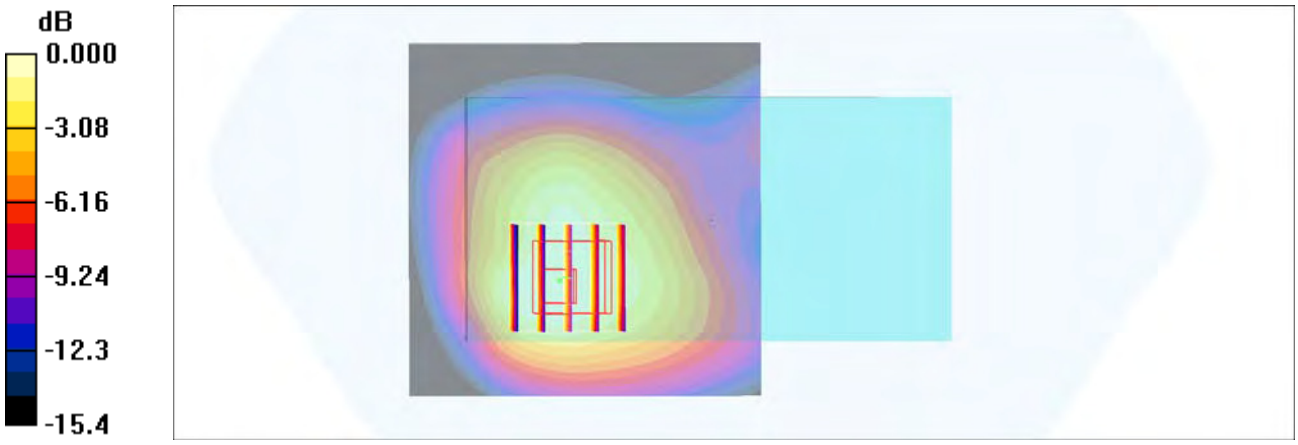
#22_WCDMA IV_RMC 12.2Kbps_Back_10mm_Ch1513

Communication System: WCDMA; Frequency: 1752.6 MHz;Duty Cycle: 1:1
Medium: MSL_1750_160519 Medium parameters used: f = 1753 MHz; σ = 1.45 mho/m; ε_r = 52.8; ρ = 1000 kg/m^3
Ambient Temperature：23.5 ℃; Liquid Temperature：22.5 ℃

DASY4 Configuration:
- Probe: EX3DV4 - SN7346; ConvF(8.06, 8.06, 8.06); Calibrated: 2015/9/2
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn916; Calibrated: 2015/12/16
- Phantom: SAM_Right; Type: SAM_Right; Serial: TP-1303
- ;Postprocessing SW: SEMCAD, V1.8 Build 159

Area Scan (71x71x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 1.43 mW/g

Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 31.4 V/m; Power Drift = 0.003 dB
Peak SAR (extrapolated) = 1.60 W/kg
SAR(1 g) = 0.991 mW/g; SAR(10 g) = 0.662 mW/g
Maximum value of SAR (measured) = 1.35 mW/g



0 dB = 1.35mW/g

Test Laboratory: Sporton International Inc. SAR/HAC Testing Lab Date: 2016/5/21

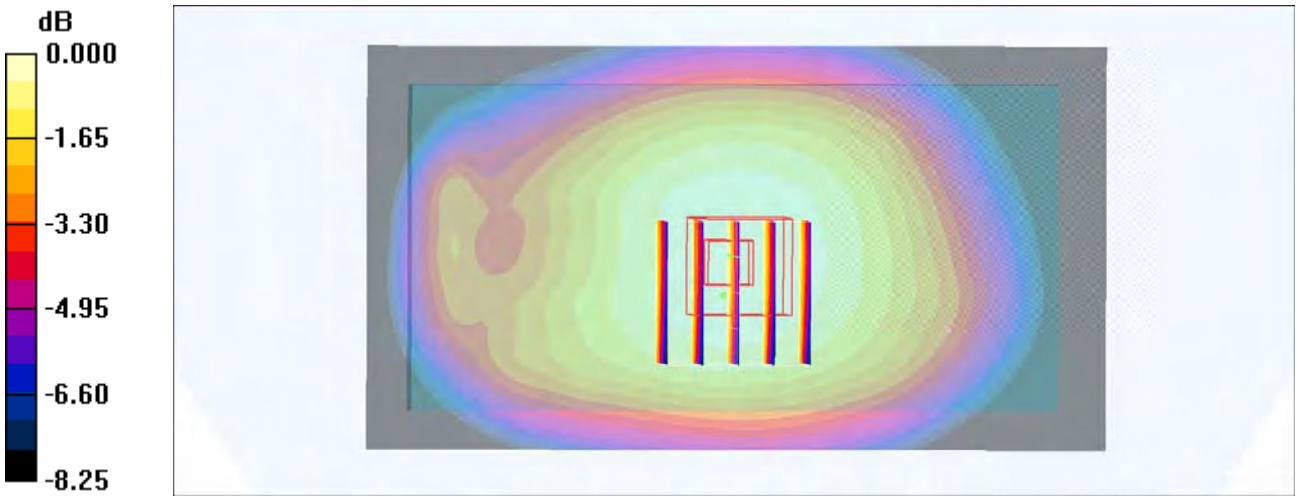
#23_WCDMA V_RMC 12.2Kbps_Back_10mm_Ch4132

Communication System: WCDMA; Frequency: 826.4 MHz;Duty Cycle: 1:1
Medium: MSL_850_160521 Medium parameters used: f = 826.4 MHz; σ = 0.97 mho/m; ε_r = 56.8; ρ = 1000 kg/m^3
Ambient Temperature：23.5 ℃; Liquid Temperature：22.5 ℃

DASY4 Configuration:
- Probe: EX3DV4 - SN7346; ConvF(10.05, 10.05, 10.05); Calibrated: 2015/9/2
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn916; Calibrated: 2015/12/16
- Phantom: SAM_Right; Type: SAM_Right; Serial: TP-1303
- ;Postprocessing SW: SEMCAD, V1.8 Build 159

Area Scan (61x111x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.659 mW/g

Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 26.9 V/m; Power Drift = -0.073 dB
Peak SAR (extrapolated) = 0.737 W/kg
SAR(1 g) = 0.550 mW/g; SAR(10 g) = 0.428 mW/g
Maximum value of SAR (measured) = 0.668 mW/g



0 dB = 0.668mW/g

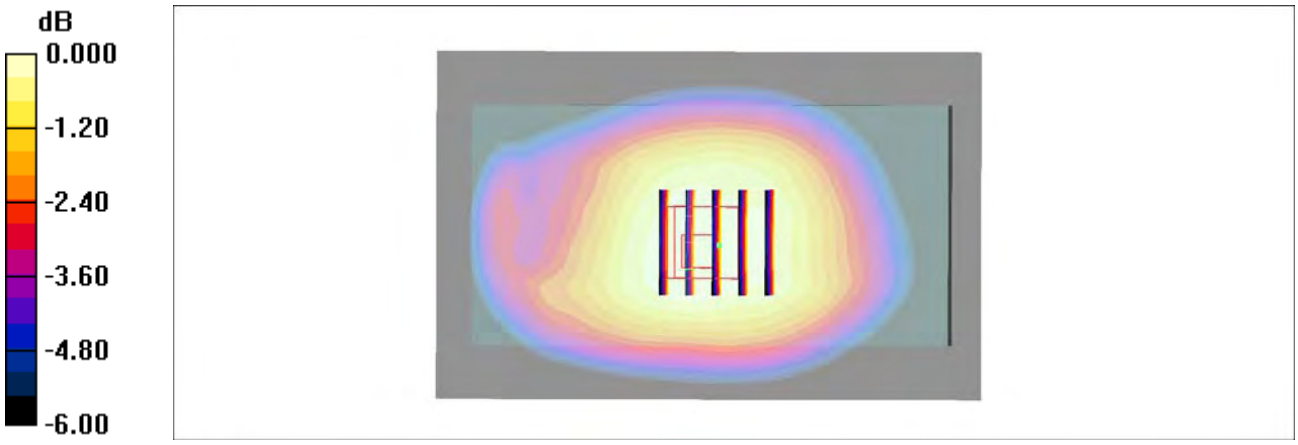
#24_CDMA BC0_RTAP 153.6Kbps_Back_10mm_Ch1013

Communication System: CDMA ; Frequency: 824.7 MHz;Duty Cycle: 1:1
Medium: MSL_850_160519 Medium parameters used: f = 825 MHz; σ = 0.964 mho/m; ε_r = 57.1; ρ = 1000 kg/m^3
Ambient Temperature：23.5 ℃; Liquid Temperature：22.5 ℃

DASY4 Configuration:
- Probe: EX3DV4 - SN7346; ConvF(10.05, 10.05, 10.05); Calibrated: 2015/9/2
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn916; Calibrated: 2015/12/16
- Phantom: SAM_Right; Type: SAM_Right; Serial: TP-1303
- ;Postprocessing SW: SEMCAD, V1.8 Build 159

Area Scan (71x111x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.795 mW/g

Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 29.7 V/m; Power Drift = -0.007 dB
Peak SAR (extrapolated) = 0.856 W/kg
SAR(1 g) = 0.660 mW/g; SAR(10 g) = 0.517 mW/g
Maximum value of SAR (measured) = 0.787 mW/g



0 dB = 0.787mW/g

Test Laboratory: Sporton International Inc. SAR/HAC Testing Lab Date: 2016/5/19

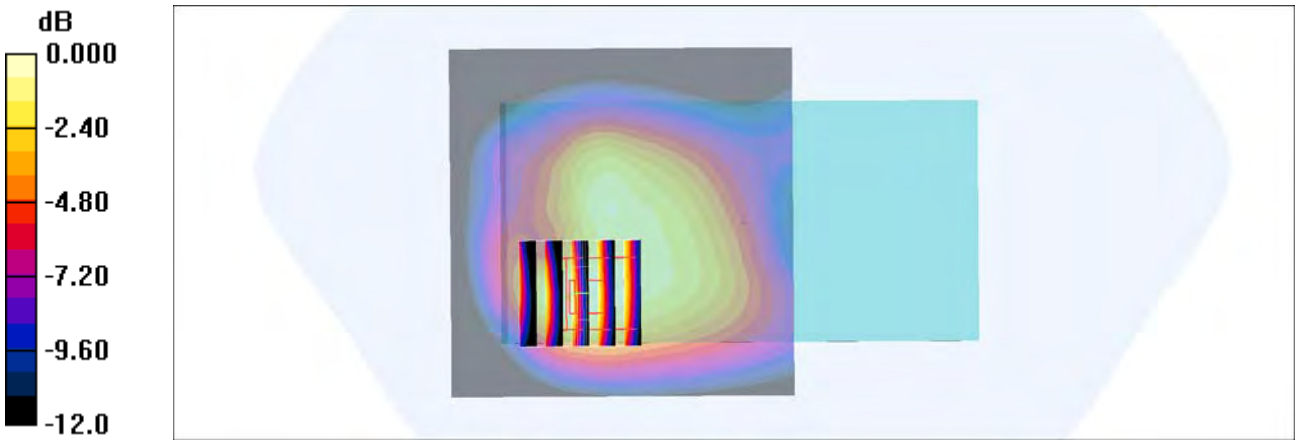
#25_CDMA BC1_RTAP 153.6Kbps_Back_10mm_Ch25

Communication System: CDMA ; Frequency: 1851.25 MHz;Duty Cycle: 1:1
Medium: MSL_1900_160519 Medium parameters used : f = 1851.25 MHz; σ = 1.51 mho/m; ε_r = 52.4; ρ = 1000 kg/m^3
Ambient Temperature：23.5 ℃; Liquid Temperature：22.5 ℃

DASY4 Configuration:
- Probe: EX3DV4 - SN7346; ConvF(7.77, 7.77, 7.77); Calibrated: 2015/9/2
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn916; Calibrated: 2015/12/16
- Phantom: SAM_Right; Type: SAM_Right; Serial: TP-1303
- ;Postprocessing SW: SEMCAD, V1.8 Build 159

Area Scan (71x71x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 1.51 mW/g

Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 28.7 V/m; Power Drift = 0.111 dB
Peak SAR (extrapolated) = 1.79 W/kg
SAR(1 g) = 1.05 mW/g; SAR(10 g) = 0.626 mW/g
Maximum value of SAR (measured) = 1.51 mW/g



0 dB = 1.51mW/g

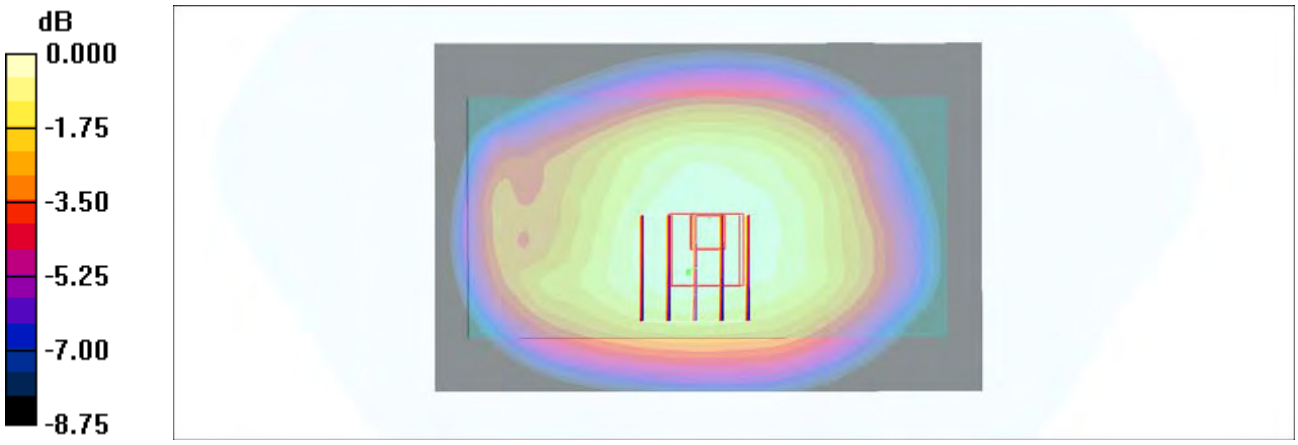
#26_CDMA BC10_RTAP 153.6Kbps_Back_10mm_Ch520

Communication System: CDMA ; Frequency: 819 MHz;Duty Cycle: 1:1
Medium: MSL_850_160519 Medium parameters used: f = 819 MHz; σ = 0.958 mho/m; ε_r = 57.2; ρ = 1000 kg/m^3
Ambient Temperature：23.5 ℃; Liquid Temperature：22.5 ℃

DASY4 Configuration:
- Probe: EX3DV4 - SN7346; ConvF(10.05, 10.05, 10.05); Calibrated: 2015/9/2
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn916; Calibrated: 2015/12/16
- Phantom: SAM_Right; Type: SAM_Right; Serial: TP-1303
- ;Postprocessing SW: SEMCAD, V1.8 Build 159

Area Scan (71x111x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.902 mW/g

Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 32.0 V/m; Power Drift = 0.078 dB
Peak SAR (extrapolated) = 1.01 W/kg
SAR(1 g) = 0.763 mW/g; SAR(10 g) = 0.590 mW/g
Maximum value of SAR (measured) = 0.911 mW/g



0 dB = 0.911mW/g

Test Laboratory: Sporton International Inc. SAR/HAC Testing Lab Date: 2016/5/20

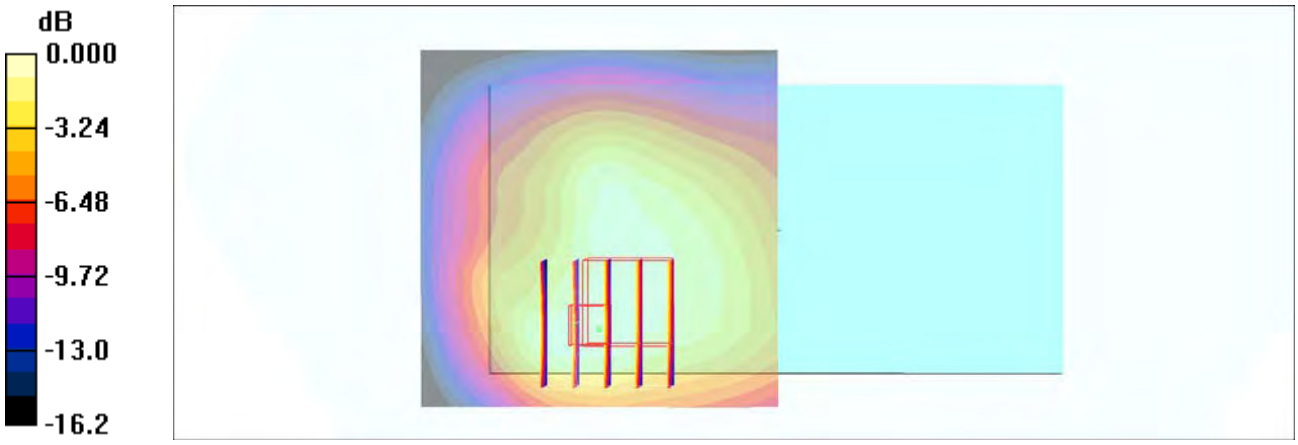
#27_LTE Band 2_20M_QPSK_1_49_Back_10mm_Ch18700

Communication System: LTE; Frequency: 1860 MHz;Duty Cycle: 1:1
Medium: MSL_1900_160520 Medium parameters used: f = 1860 MHz; σ = 1.53 mho/m; ε_r = 53.7; ρ = 1000 kg/m^3
Ambient Temperature：23.5 ℃; Liquid Temperature：22.5 ℃

DASY4 Configuration:
- Probe: EX3DV4 - SN7346; ConvF(7.77, 7.77, 7.77); Calibrated: 2015/9/2
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn916; Calibrated: 2015/12/16
- Phantom: SAM_Right; Type: SAM_Right; Serial: TP-1303
- ;Postprocessing SW: SEMCAD, V1.8 Build 159

Area Scan (61x61x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 1.19 mW/g

Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 26.9 V/m; Power Drift = 0.040 dB
Peak SAR (extrapolated) = 1.38 W/kg
SAR(1 g) = 0.829 mW/g; SAR(10 g) = 0.533 mW/g
Maximum value of SAR (measured) = 1.18 mW/g



0 dB = 1.18mW/g

Test Laboratory: Sporton International Inc. SAR/HAC Testing Lab Date: 2016/5/19

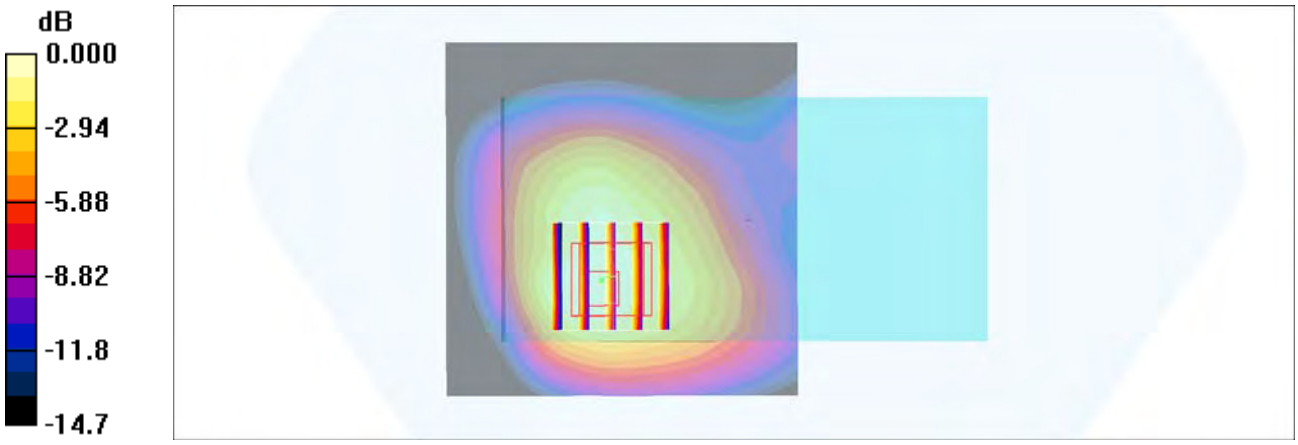
#28_LTE Band 4_20M_QPSK_1_0_Back_10mm_Ch20175

Communication System: LTE; Frequency: 1732.5 MHz;Duty Cycle: 1:1
Medium: MSL_1750_160519 Medium parameters used: f = 1732.5 MHz; σ = 1.43 mho/m; ε_r = 52.8; ρ = 1000 kg/m^3
Ambient Temperature：23.5 ℃; Liquid Temperature：22.5 ℃

DASY4 Configuration:
- Probe: EX3DV4 - SN7346; ConvF(8.06, 8.06, 8.06); Calibrated: 2015/9/2
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn916; Calibrated: 2015/12/16
- Phantom: SAM_Right; Type: SAM_Right; Serial: TP-1303
- ;Postprocessing SW: SEMCAD, V1.8 Build 159

Area Scan (71x71x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 1.61 mW/g

Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 31.7 V/m; Power Drift = -0.038 dB
Peak SAR (extrapolated) = 1.79 W/kg
SAR(1 g) = 1.16 mW/g; SAR(10 g) = 0.747 mW/g
Maximum value of SAR (measured) = 1.49 mW/g



0 dB = 1.49mW/g

Test Laboratory: Sporton International Inc. SAR/HAC Testing Lab Date: 2016/5/19

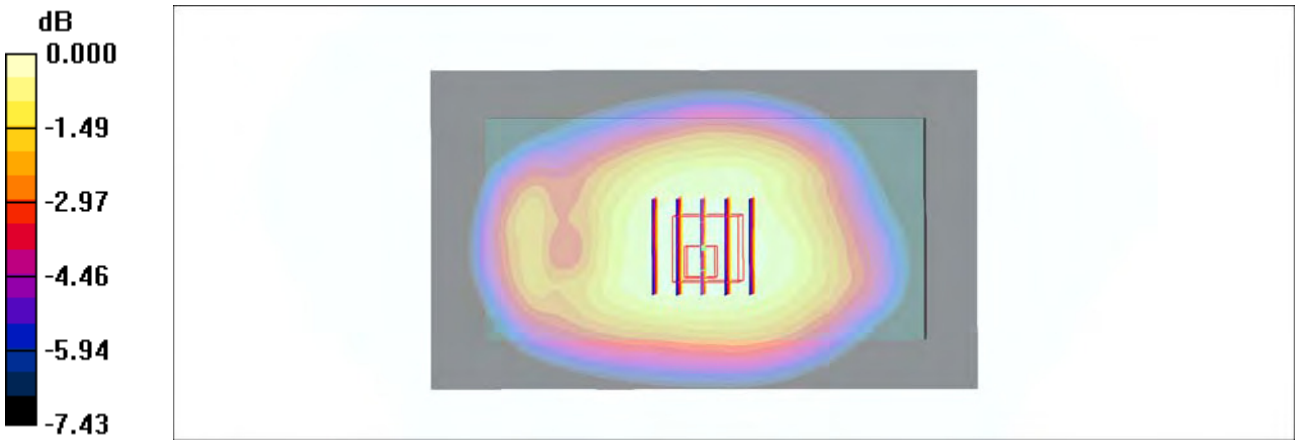
#29_LTE Band 5_10M_QPSK_1_25_Back_10mm_Ch20525

Communication System: LTE; Frequency: 836.5 MHz;Duty Cycle: 1:1
Medium: MSL_850_160519 Medium parameters used : f = 836.5 MHz; σ = 0.975 mho/m; ε_r = 57; ρ = 1000 kg/m^3
Ambient Temperature：23.5 ℃； Liquid Temperature：22.5 ℃

DASY4 Configuration:
- Probe: EX3DV4 - SN7346; ConvF(10.05, 10.05, 10.05); Calibrated: 2015/9/2
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn916; Calibrated: 2015/12/16
- Phantom: SAM_Right; Type: SAM_Right; Serial: TP-1303
- ;Postprocessing SW: SEMCAD, V1.8 Build 159

Area Scan (71x121x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.634 mW/g

Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 26.2 V/m; Power Drift = -0.018 dB
Peak SAR (extrapolated) = 0.695 W/kg
SAR(1 g) = 0.515 mW/g; SAR(10 g) = 0.402 mW/g
Maximum value of SAR (measured) = 0.628 mW/g



0 dB = 0.628mW/g

Test Laboratory: Sporton International Inc. SAR/HAC Testing Lab Date: 2016/5/18

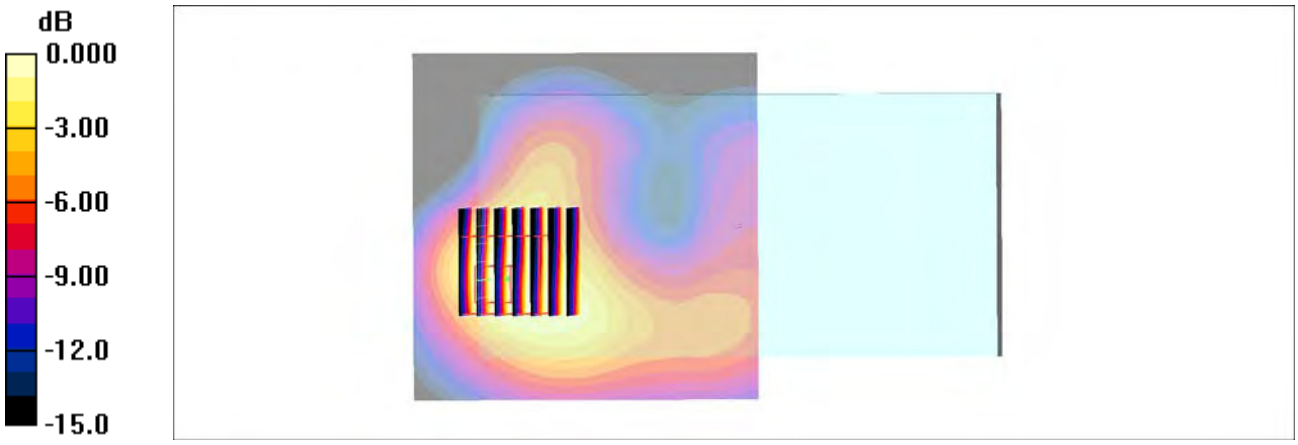
#30_LTE Band 7_20M_QPSK_50_0_Back_10mm_Ch21100

Communication System: LTE; Frequency: 2535 MHz;Duty Cycle: 1:1
Medium: MSL_2600_160518 Medium parameters used: f = 2535 MHz; σ = 2.11 mho/m; ε_r = 52.7; ρ = 1000 kg/m^3
Ambient Temperature：23.3 ℃; Liquid Temperature：22.3 ℃

DASY4 Configuration:
- Probe: EX3DV4 - SN7346; ConvF(7.29, 7.29, 7.29); Calibrated: 2015/9/2
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn916; Calibrated: 2015/12/16
- Phantom: SAM_Right; Type: SAM_Right; Serial: TP-1303
- ;Postprocessing SW: SEMCAD, V1.8 Build 159

Area Scan (81x81x1): Measurement grid: dx=12mm, dy=12mm
Maximum value of SAR (interpolated) = 1.32 mW/g

Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 24.2 V/m; Power Drift = 0.072 dB
Peak SAR (extrapolated) = 1.74 W/kg
SAR(1 g) = 0.874 mW/g; SAR(10 g) = 0.430 mW/g
Maximum value of SAR (measured) = 1.40 mW/g



0 dB = 1.40mW/g

Test Laboratory: Sporton International Inc. SAR/HAC Testing Lab Date: 2016/5/19

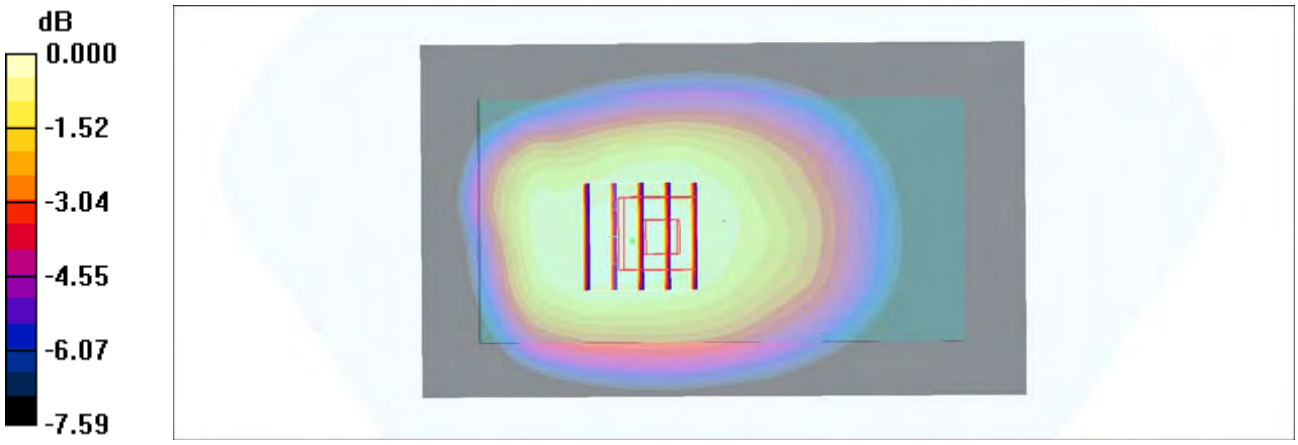
#31_LTE Band 12_10M_QPSK_1_49_Back_10mm_Ch23095

Communication System: LTE; Frequency: 707.5 MHz;Duty Cycle: 1:1
Medium: MSL_750_160519 Medium parameters used: f = 707.5 MHz; σ = 0.924 mho/m; ε_r = 55.5; ρ = 1000 kg/m^3
Ambient Temperature：23.5 ℃; Liquid Temperature：22.5 ℃

DASY4 Configuration:
- Probe: EX3DV4 - SN7346; ConvF(10.11, 10.11, 10.11); Calibrated: 2015/9/2
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn916; Calibrated: 2015/12/16
- Phantom: SAM_Right; Type: SAM_Right; Serial: TP-1303
- ;Postprocessing SW: SEMCAD, V1.8 Build 159

Area Scan (71x121x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.527 mW/g

Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 23.3 V/m; Power Drift = 0.088 dB
Peak SAR (extrapolated) = 0.596 W/kg
SAR(1 g) = 0.443 mW/g; SAR(10 g) = 0.348 mW/g
Maximum value of SAR (measured) = 0.542 mW/g



0 dB = 0.542mW/g

Test Laboratory: Sporton International Inc. SAR/HAC Testing Lab Date: 2016/5/19

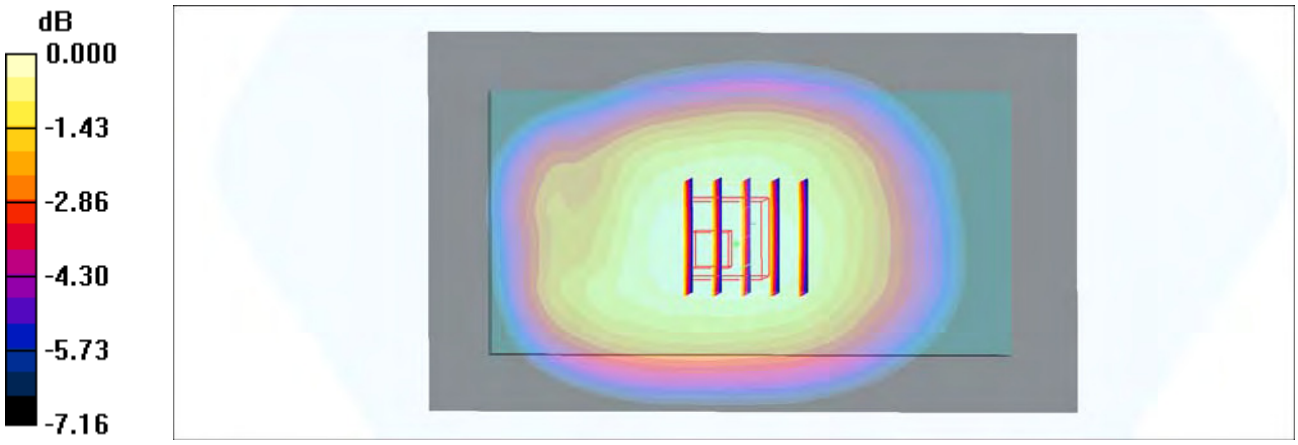
#32_LTE Band 13_10M_QPSK_1_0_Back_10mm_Ch23230

Communication System: LTE; Frequency: 782 MHz;Duty Cycle: 1:1
Medium: MSL_750_160519 Medium parameters used: f = 782 MHz; σ = 0.993 mho/m; ε_r = 54.8; ρ = 1000 kg/m^3
Ambient Temperature：23.5 ℃; Liquid Temperature：22.5 ℃

DASY4 Configuration:
- Probe: EX3DV4 - SN7346; ConvF(10.11, 10.11, 10.11); Calibrated: 2015/9/2
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn916; Calibrated: 2015/12/16
- Phantom: SAM_Right; Type: SAM_Right; Serial: TP-1303
- ;Postprocessing SW: SEMCAD, V1.8 Build 159

Area Scan (71x121x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.706 mW/g

Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 27.4 V/m; Power Drift = 0.103 dB
Peak SAR (extrapolated) = 0.776 W/kg
SAR(1 g) = 0.587 mW/g; SAR(10 g) = 0.462 mW/g
Maximum value of SAR (measured) = 0.704 mW/g



0 dB = 0.704mW/g

Test Laboratory: Sporton International Inc. SAR/HAC Testing Lab Date: 2016/5/19

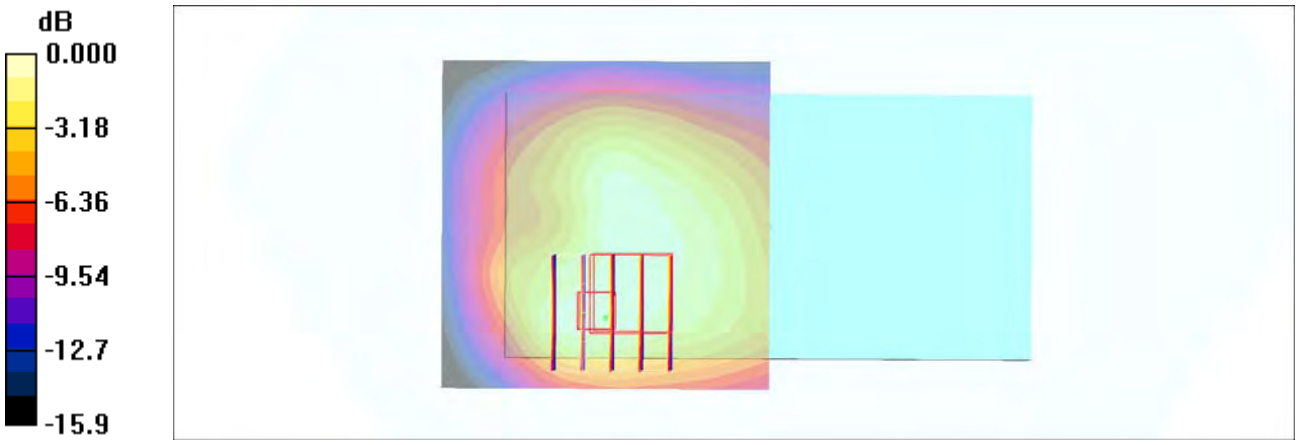
#33_LTE Band 25_20M_QPSK_1_49_Back_10mm_Ch26140

Communication System: LTE; Frequency: 1860 MHz;Duty Cycle: 1:1
Medium: MSL_1900_160519 Medium parameters used: f = 1860 MHz; σ = 1.52 mho/m; ε_r = 52.4; ρ = 1000 kg/m^3
Ambient Temperature：23.5 ℃; Liquid Temperature：22.5 ℃

DASY4 Configuration:
- Probe: EX3DV4 - SN7346; ConvF(7.77, 7.77, 7.77); Calibrated: 2015/9/2
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn916; Calibrated: 2015/12/16
- Phantom: SAM_Right; Type: SAM_Right; Serial: TP-1303
- ;Postprocessing SW: SEMCAD, V1.8 Build 159

Area Scan (61x61x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 1.12 mW/g

Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 24.5 V/m; Power Drift = -0.014 dB
Peak SAR (extrapolated) = 1.37 W/kg
SAR(1 g) = 0.815 mW/g; SAR(10 g) = 0.516 mW/g
Maximum value of SAR (measured) = 1.16 mW/g



0 dB = 1.16mW/g

Test Laboratory: Sporton International Inc. SAR/HAC Testing Lab Date: 2016/5/21

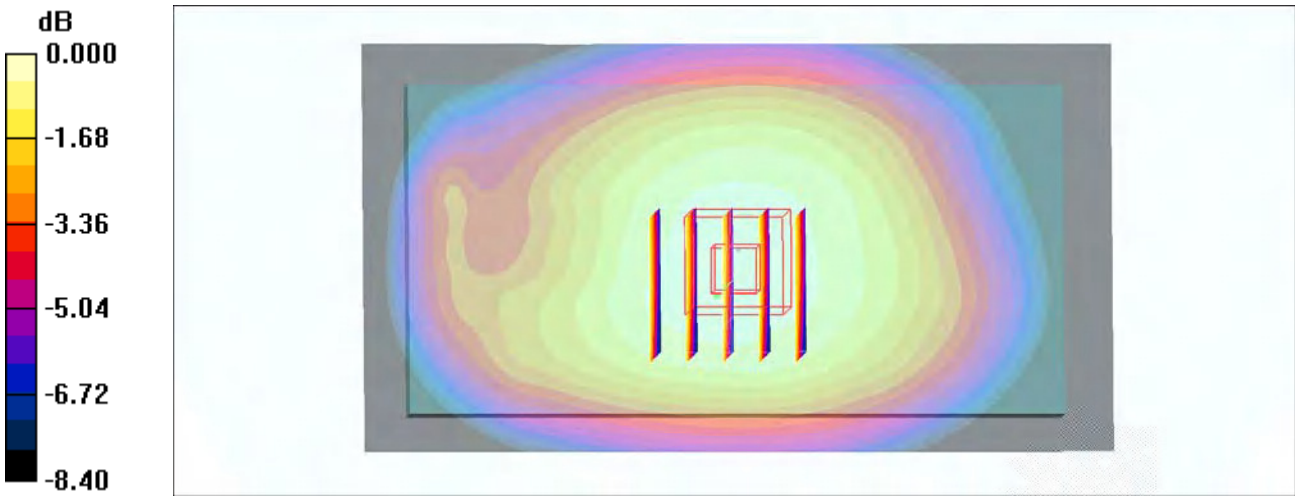
#34_LTE Band 26_15M_QPSK_1_0_Back_10mm_Ch26865

Communication System: LTE; Frequency: 831.5 MHz;Duty Cycle: 1:1
Medium: MSL_850_160521 Medium parameters used: f = 831.5 MHz; σ = 0.975 mho/m; ε_r = 56.7; ρ = 1000 kg/m^3
Ambient Temperature：23.5 ℃; Liquid Temperature：22.5 ℃

DASY4 Configuration:
- Probe: EX3DV4 - SN7346; ConvF(10.05, 10.05, 10.05); Calibrated: 2015/9/2
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn916; Calibrated: 2015/12/16
- Phantom: SAM_Right; Type: SAM_Right; Serial: TP-1303
- ;Postprocessing SW: SEMCAD, V1.8 Build 159

Area Scan (61x111x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.641 mW/g

Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 26.8 V/m; Power Drift = 0.180 dB
Peak SAR (extrapolated) = 0.728 W/kg
SAR(1 g) = 0.542 mW/g; SAR(10 g) = 0.422 mW/g
Maximum value of SAR (measured) = 0.661 mW/g



0 dB = 0.661mW/g

Test Laboratory: Sporton International Inc. SAR/HAC Testing Lab Date: 2016/5/18

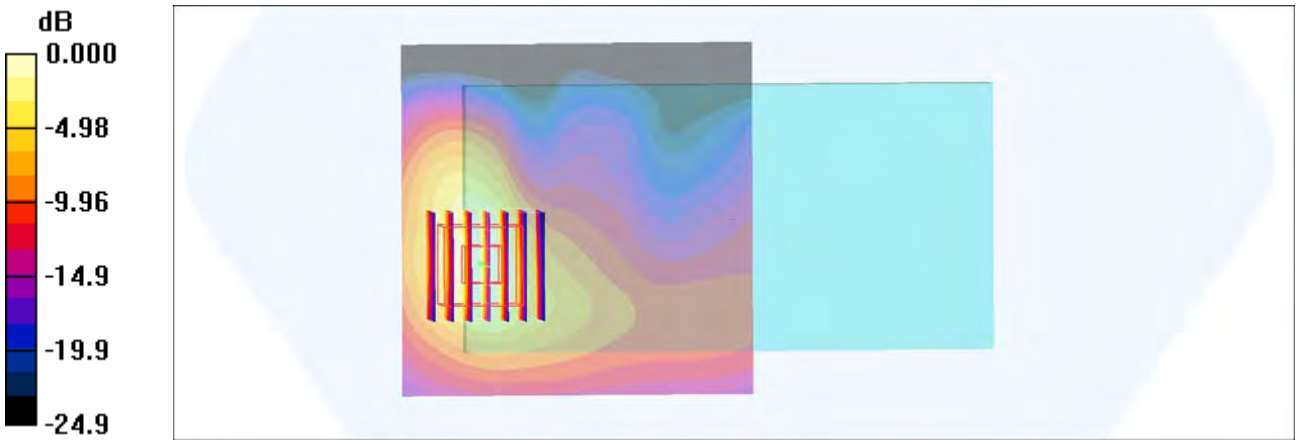
#35_LTE Band 41_20M_QPSK_1_0_Back_10mm_Ch41490

Communication System: LTE; Frequency: 2680 MHz;Duty Cycle: 1:1.59
Medium: MSL_2600_160518 Medium parameters used: f = 2680 MHz; σ = 2.32 mho/m; ε_r = 52.1; ρ = 1000 kg/m^3
Ambient Temperature：23.3 ℃; Liquid Temperature：22.3 ℃

DASY4 Configuration:
- Probe: EX3DV4 - SN7346; ConvF(7.29, 7.29, 7.29); Calibrated: 2015/9/2
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn916; Calibrated: 2015/12/16
- Phantom: SAM_Right; Type: SAM_Right; Serial: TP-1303
- ;Postprocessing SW: SEMCAD, V1.8 Build 159

Area Scan (81x81x1): Measurement grid: dx=12mm, dy=12mm
Maximum value of SAR (interpolated) = 1.55 mW/g

Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 25.2 V/m; Power Drift = -0.009 dB
Peak SAR (extrapolated) = 1.87 W/kg
SAR(1 g) = 0.924 mW/g; SAR(10 g) = 0.429 mW/g
Maximum value of SAR (measured) = 1.50 mW/g



0 dB = 1.50mW/g

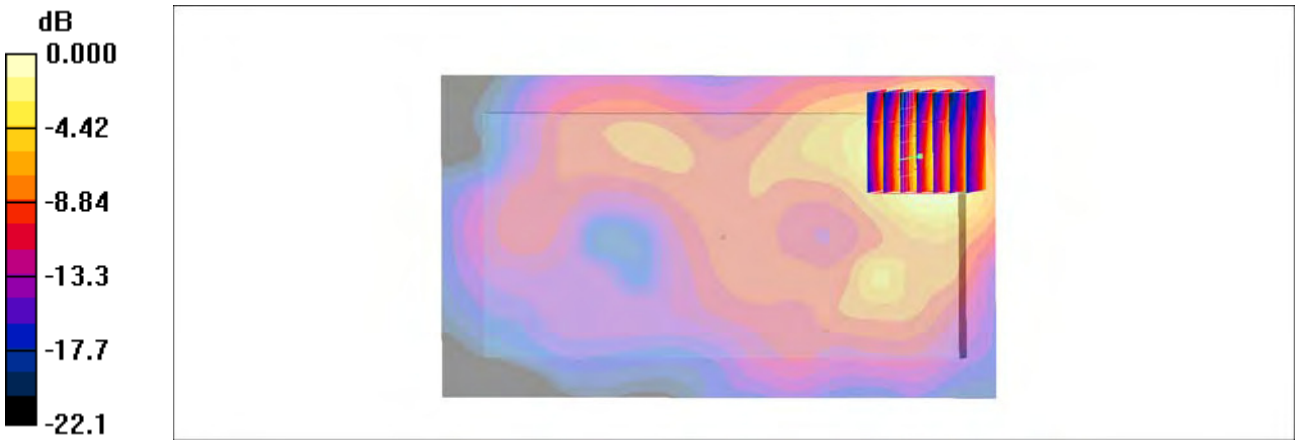
#36_WLAN2.4GHz_802.11b 1Mbps_Back_10mm_Ch6

Communication System: 802.11b ; Frequency: 2437 MHz;Duty Cycle: 1:1.024
Medium: MSL_2450_160523 Medium parameters used: f = 2437 MHz; σ = 1.92 mho/m; ε_r = 53.4; ρ = 1000 kg/m^3
Ambient Temperature：23.3 ℃; Liquid Temperature：22.3 ℃

DASY4 Configuration:
- Probe: EX3DV4 - SN7346; ConvF(7.43, 7.43, 7.43); Calibrated: 2015/9/2
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn916; Calibrated: 2015/12/16
- Phantom: SAM_Right; Type: SAM_Right; Serial: TP-1303
- ;Postprocessing SW: SEMCAD, V1.8 Build 159

Area Scan (81x141x1): Measurement grid: dx=12mm, dy=12mm
Maximum value of SAR (interpolated) = 0.260 mW/g

Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 3.92 V/m; Power Drift = 0.067 dB
Peak SAR (extrapolated) = 0.326 W/kg
SAR(1 g) = 0.160 mW/g; SAR(10 g) = 0.079 mW/g
Maximum value of SAR (measured) = 0.255 mW/g



0 dB = 0.255mW/g

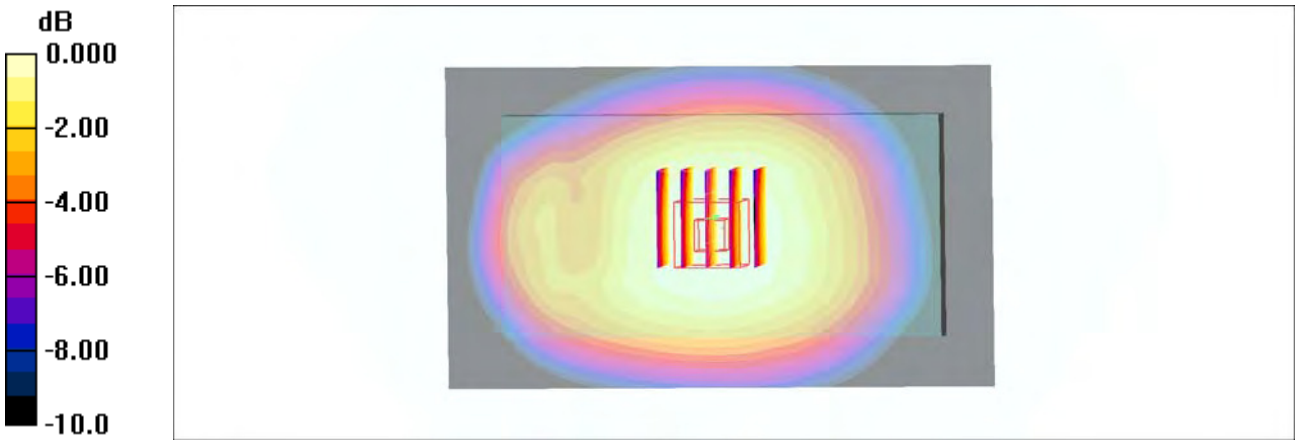
#37_GSM850_GPRS (2 Tx slots)_Back_10mm_Ch251

Communication System: GSM850; Frequency: 848.8 MHz;Duty Cycle: 1:4.15
Medium: MSL_850_160519 Medium parameters used: f = 849 MHz; σ = 0.987 mho/m; ε_r = 56.9; ρ = 1000 kg/m^3
Ambient Temperature：23.5 ℃; Liquid Temperature：22.5 ℃

DASY4 Configuration:
- Probe: EX3DV4 - SN7346; ConvF(10.05, 10.05, 10.05); Calibrated: 2015/9/2
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn916; Calibrated: 2015/12/16
- Phantom: SAM_Right; Type: SAM_Right; Serial: TP-1303
- ;Postprocessing SW: SEMCAD, V1.8 Build 159

Area Scan (71x121x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.780 mW/g

Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 29.1 V/m; Power Drift = 0.060 dB
Peak SAR (extrapolated) = 0.844 W/kg
SAR(1 g) = 0.637 mW/g; SAR(10 g) = 0.496 mW/g
Maximum value of SAR (measured) = 0.773 mW/g



0 dB = 0.773mW/g

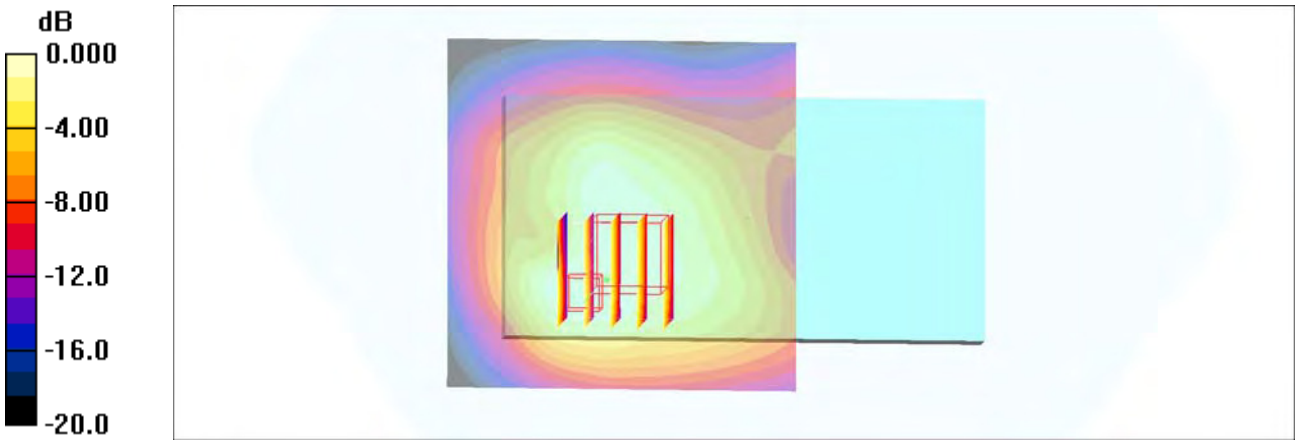
#38_GSM1900_GPRS (3 Tx slots)_Back_10mm_Ch512

Communication System: PCS; Frequency: 1850.2 MHz;Duty Cycle: 1:2.77
Medium: MSL_1900_160520 Medium parameters used: f = 1850.2 MHz; σ = 1.52 mho/m; ε_r = 53.8; ρ = 1000 kg/m^3
Ambient Temperature：23.5 ℃; Liquid Temperature：22.5 ℃

DASY4 Configuration:
- Probe: EX3DV4 - SN7346; ConvF(7.77, 7.77, 7.77); Calibrated: 2015/9/2
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn916; Calibrated: 2015/12/16
- Phantom: SAM_Right; Type: SAM_Right; Serial: TP-1303
- ;Postprocessing SW: SEMCAD, V1.8 Build 159

Area Scan (71x71x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.933 mW/g

Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 23.6 V/m; Power Drift = -0.026 dB
Peak SAR (extrapolated) = 1.11 W/kg
SAR(1 g) = 0.661 mW/g; SAR(10 g) = 0.416 mW/g
Maximum value of SAR (measured) = 0.872 mW/g



0 dB = 0.872mW/g

Test Laboratory: Sporton International Inc. SAR/HAC Testing Lab Date: 2016/5/19

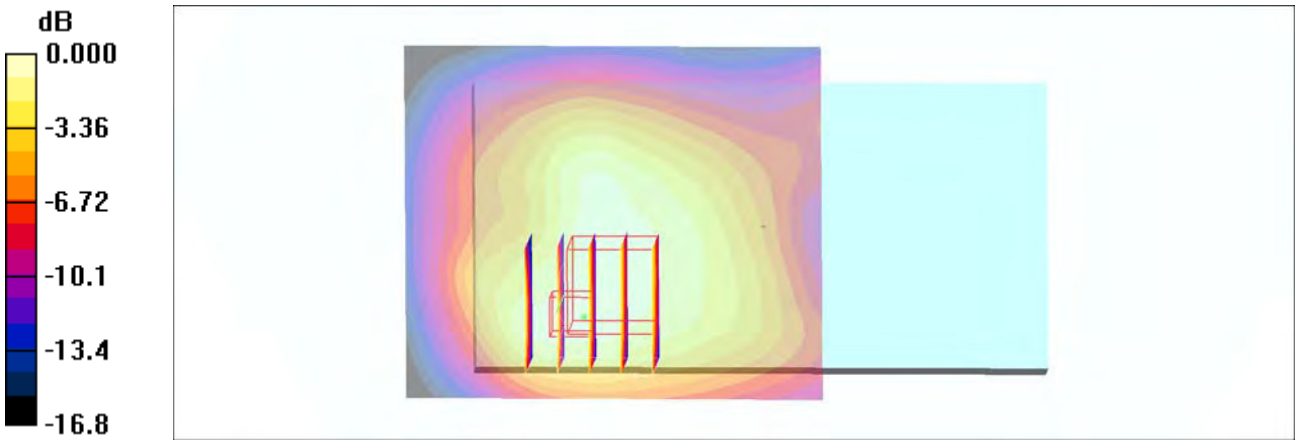
#39_WCDMA II_RMC 12.2Kbps_Back_10mm_Ch9262

Communication System: WCDMA; Frequency: 1852.4 MHz;Duty Cycle: 1:1
Medium: MSL_1900_160519 Medium parameters used: f = 1852.4 MHz; σ = 1.51 mho/m; ε_r = 52.4; ρ = 1000 kg/m^3
Ambient Temperature：23.5 ℃; Liquid Temperature：22.5 ℃

DASY4 Configuration:
- Probe: EX3DV4 - SN7346; ConvF(7.77, 7.77, 7.77); Calibrated: 2015/9/2
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn916; Calibrated: 2015/12/16
- Phantom: SAM_Right; Type: SAM_Right; Serial: TP-1303
- ;Postprocessing SW: SEMCAD, V1.8 Build 159

Area Scan (61x71x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 1.39 mW/g

Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 29.6 V/m; Power Drift = 0.050 dB
Peak SAR (extrapolated) = 1.71 W/kg
SAR(1 g) = 1.01 mW/g; SAR(10 g) = 0.637 mW/g
Maximum value of SAR (measured) = 1.46 mW/g



0 dB = 1.46mW/g

Test Laboratory: Sporton International Inc. SAR/HAC Testing Lab Date: 2016/5/19

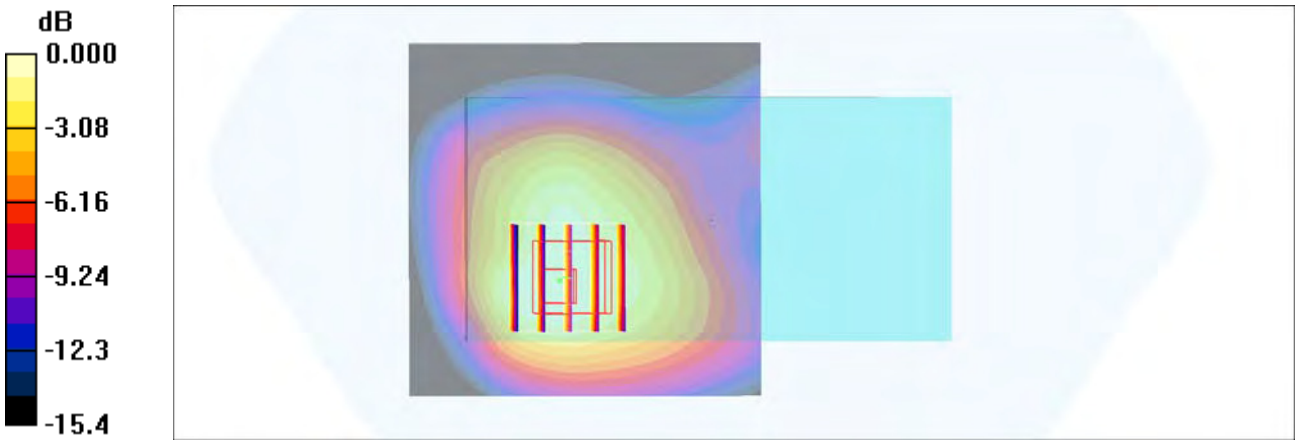
#40_WCDMA IV_RMC 12.2Kbps_Back_10mm_Ch1513

Communication System: WCDMA; Frequency: 1752.6 MHz;Duty Cycle: 1:1
Medium: MSL_1750_160519 Medium parameters used: f = 1753 MHz; σ = 1.45 mho/m; ε_r = 52.8; ρ = 1000 kg/m^3
Ambient Temperature：23.5 ℃; Liquid Temperature：22.5 ℃

DASY4 Configuration:
- Probe: EX3DV4 - SN7346; ConvF(8.06, 8.06, 8.06); Calibrated: 2015/9/2
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn916; Calibrated: 2015/12/16
- Phantom: SAM_Right; Type: SAM_Right; Serial: TP-1303
- ;Postprocessing SW: SEMCAD, V1.8 Build 159

Area Scan (71x71x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 1.43 mW/g

Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 31.4 V/m; Power Drift = 0.003 dB
Peak SAR (extrapolated) = 1.60 W/kg
SAR(1 g) = 0.991 mW/g; SAR(10 g) = 0.662 mW/g
Maximum value of SAR (measured) = 1.35 mW/g



0 dB = 1.35mW/g

Test Laboratory: Sporton International Inc. SAR/HAC Testing Lab Date: 2016/5/21

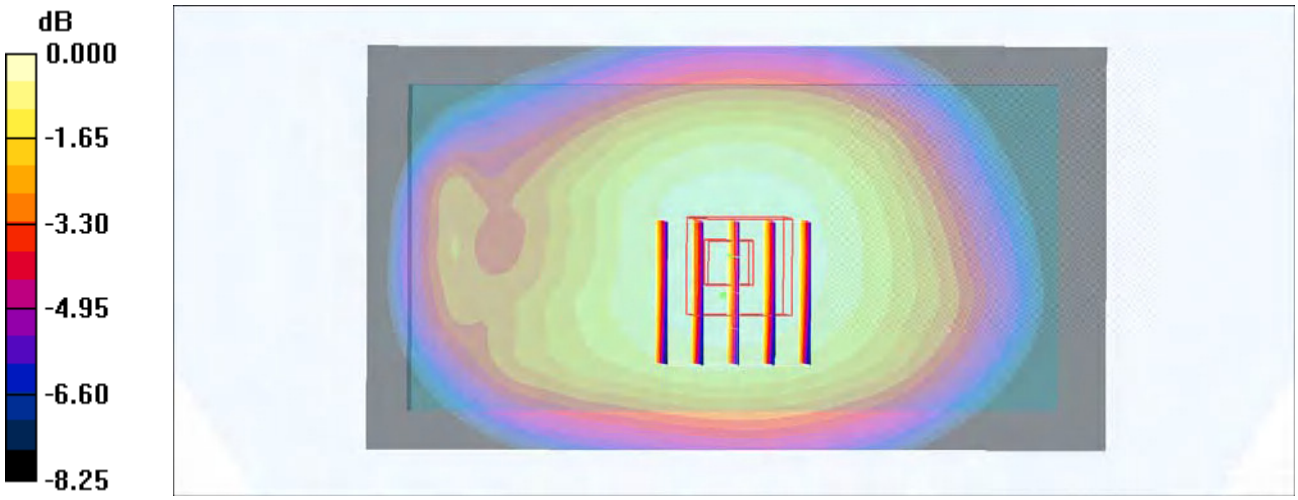
#41_WCDMA V_RMC 12.2Kbps_Back_10mm_Ch4132

Communication System: WCDMA; Frequency: 826.4 MHz;Duty Cycle: 1:1
Medium: MSL_850_160521 Medium parameters used: f = 826.4 MHz; σ = 0.97 mho/m; ε_r = 56.8; ρ = 1000 kg/m^3
Ambient Temperature：23.5 ℃; Liquid Temperature：22.5 ℃

DASY4 Configuration:
- Probe: EX3DV4 - SN7346; ConvF(10.05, 10.05, 10.05); Calibrated: 2015/9/2
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn916; Calibrated: 2015/12/16
- Phantom: SAM_Right; Type: SAM_Right; Serial: TP-1303
- ;Postprocessing SW: SEMCAD, V1.8 Build 159

Area Scan (61x111x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.659 mW/g

Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 26.9 V/m; Power Drift = -0.073 dB
Peak SAR (extrapolated) = 0.737 W/kg
SAR(1 g) = 0.550 mW/g; SAR(10 g) = 0.428 mW/g
Maximum value of SAR (measured) = 0.668 mW/g



0 dB = 0.668mW/g

Test Laboratory: Sporton International Inc. SAR/HAC Testing Lab Date: 2016/5/19

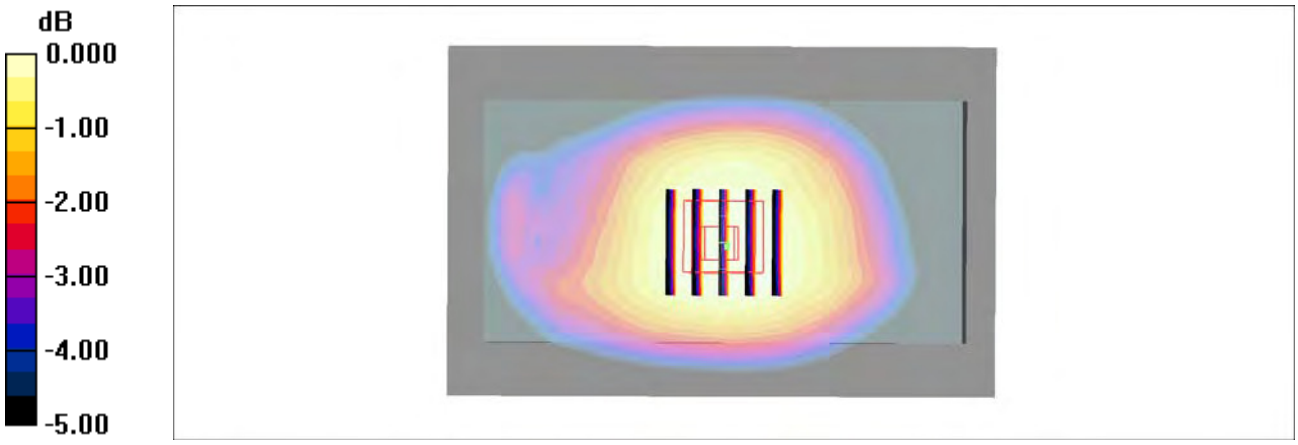
#42_CDMA BC0_1xRTT RC3 SO32_Back_10mm_Ch1013

Communication System: CDMA ; Frequency: 824.7 MHz;Duty Cycle: 1:1
Medium: MSL_850_160519 Medium parameters used: f = 825 MHz; σ = 0.964 mho/m; ε_r = 57.1; ρ = 1000 kg/m^3
Ambient Temperature：23.5 ℃; Liquid Temperature：22.5 ℃

DASY4 Configuration:
- Probe: EX3DV4 - SN7346; ConvF(10.05, 10.05, 10.05); Calibrated: 2015/9/2
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn916; Calibrated: 2015/12/16
- Phantom: SAM_Right; Type: SAM_Right; Serial: TP-1303
- ;Postprocessing SW: SEMCAD, V1.8 Build 159

Area Scan (71x111x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.791 mW/g

Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 29.8 V/m; Power Drift = -0.022 dB
Peak SAR (extrapolated) = 0.856 W/kg
SAR(1 g) = 0.653 mW/g; SAR(10 g) = 0.509 mW/g
Maximum value of SAR (measured) = 0.778 mW/g



0 dB = 0.778mW/g

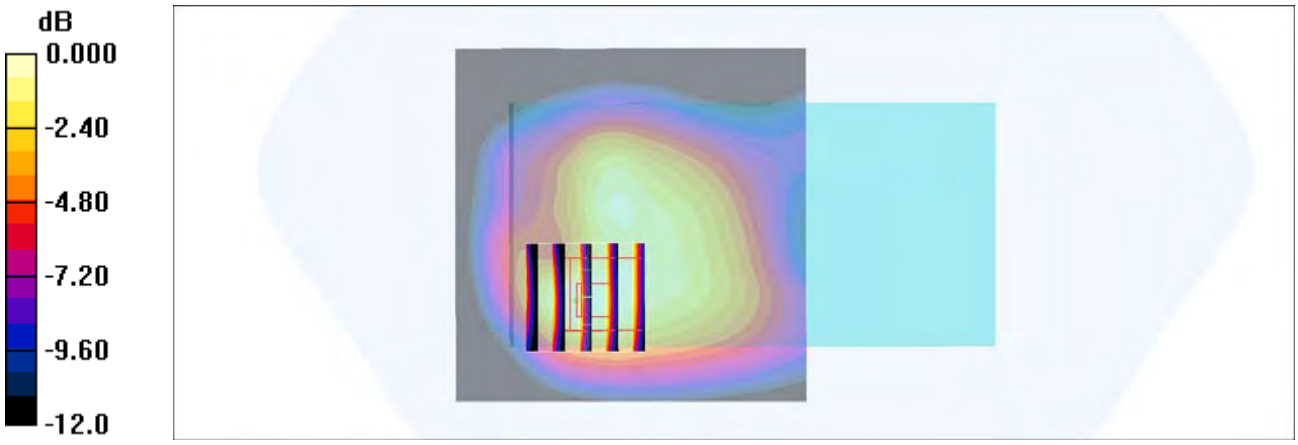
#43_CDMA BC1_1xRTT RC3 SO32_Back_10mm_Ch25

Communication System: CDMA ; Frequency: 1851.25 MHz;Duty Cycle: 1:1
Medium: MSL_1900_160519 Medium parameters used : f = 1851.25 MHz; σ = 1.51 mho/m; ε_r = 52.4; ρ = 1000 kg/m^3
Ambient Temperature：23.5 ℃; Liquid Temperature：22.5 ℃

DASY4 Configuration:
- Probe: EX3DV4 - SN7346; ConvF(7.77, 7.77, 7.77); Calibrated: 2015/9/2
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn916; Calibrated: 2015/12/16
- Phantom: SAM_Right; Type: SAM_Right; Serial: TP-1303
- ;Postprocessing SW: SEMCAD, V1.8 Build 159

Area Scan (71x71x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 1.54 mW/g

Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 29.4 V/m; Power Drift = 0.001 dB
Peak SAR (extrapolated) = 1.77 W/kg
SAR(1 g) = 1.05 mW/g; SAR(10 g) = 0.630 mW/g
Maximum value of SAR (measured) = 1.50 mW/g



0 dB = 1.50mW/g

Test Laboratory: Sporton International Inc. SAR/HAC Testing Lab Date: 2016/5/19

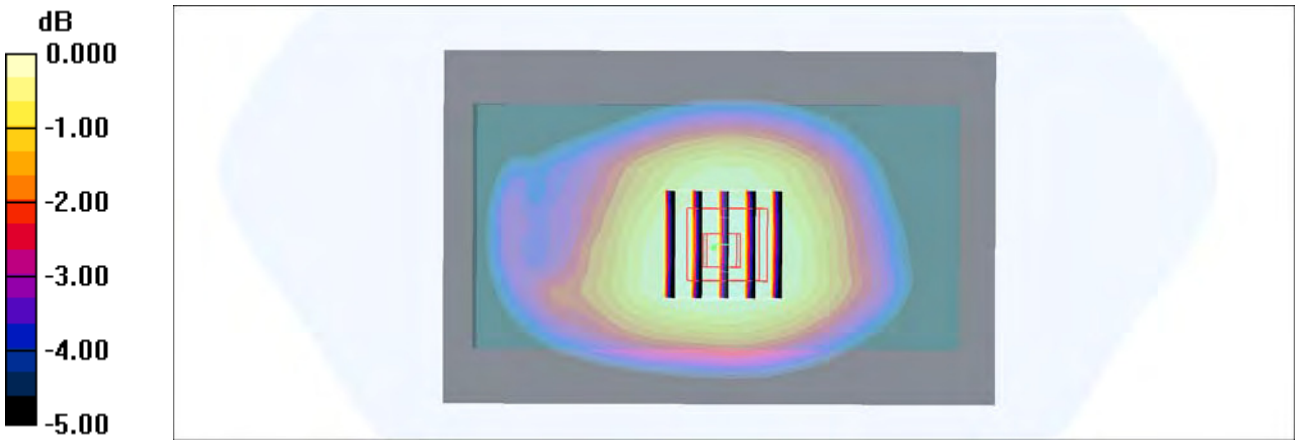
#44_CDMA BC10_1xRTT RC3 SO32_Back_10mm_Ch520

Communication System: CDMA ; Frequency: 819 MHz;Duty Cycle: 1:1
Medium: MSL_850_160519 Medium parameters used: f = 819 MHz; σ = 0.958 mho/m; ε_r = 57.2; ρ = 1000 kg/m^3
Ambient Temperature：23.5 ℃; Liquid Temperature：22.5 ℃

DASY4 Configuration:
- Probe: EX3DV4 - SN7346; ConvF(10.05, 10.05, 10.05); Calibrated: 2015/9/2
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn916; Calibrated: 2015/12/16
- Phantom: SAM_Right; Type: SAM_Right; Serial: TP-1303
- ;Postprocessing SW: SEMCAD, V1.8 Build 159

Area Scan (71x111x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.910 mW/g

Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 32.0 V/m; Power Drift = 0.029 dB
Peak SAR (extrapolated) = 1.00 W/kg
SAR(1 g) = 0.764 mW/g; SAR(10 g) = 0.600 mW/g
Maximum value of SAR (measured) = 0.918 mW/g



0 dB = 0.918mW/g

Test Laboratory: Sporton International Inc. SAR/HAC Testing Lab Date: 2016/5/20

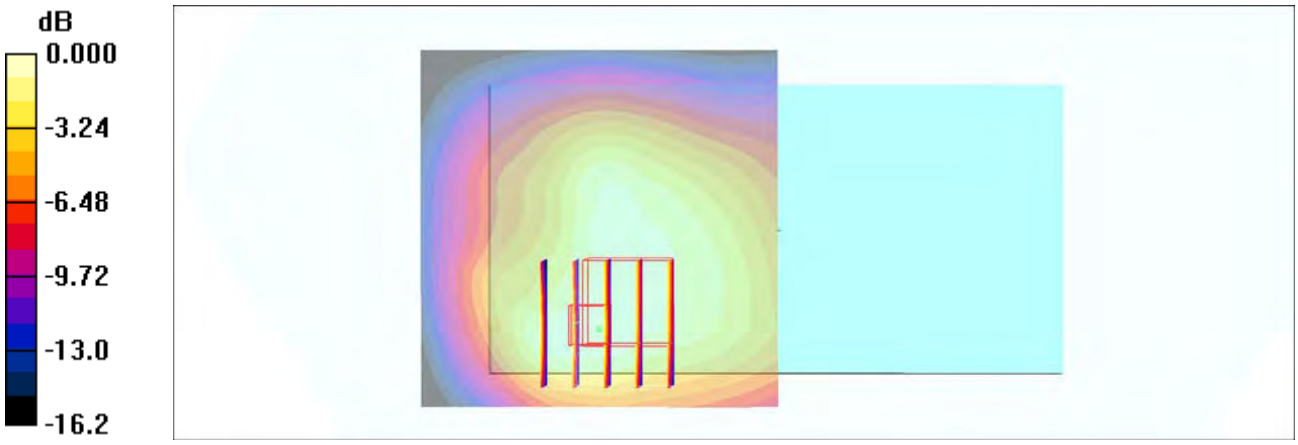
#45_LTE Band 2_20M_QPSK_1_49_Back_10mm_Ch18700

Communication System: LTE; Frequency: 1860 MHz;Duty Cycle: 1:1
Medium: MSL_1900_160520 Medium parameters used: f = 1860 MHz; σ = 1.53 mho/m; ε_r = 53.7; ρ = 1000 kg/m^3
Ambient Temperature：23.5 ℃; Liquid Temperature：22.5 ℃

DASY4 Configuration:
- Probe: EX3DV4 - SN7346; ConvF(7.77, 7.77, 7.77); Calibrated: 2015/9/2
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn916; Calibrated: 2015/12/16
- Phantom: SAM_Right; Type: SAM_Right; Serial: TP-1303
- ;Postprocessing SW: SEMCAD, V1.8 Build 159

Area Scan (61x61x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 1.19 mW/g

Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 26.9 V/m; Power Drift = 0.040 dB
Peak SAR (extrapolated) = 1.38 W/kg
SAR(1 g) = 0.829 mW/g; SAR(10 g) = 0.533 mW/g
Maximum value of SAR (measured) = 1.18 mW/g



0 dB = 1.18mW/g

Test Laboratory: Sporton International Inc. SAR/HAC Testing Lab Date: 2016/5/19

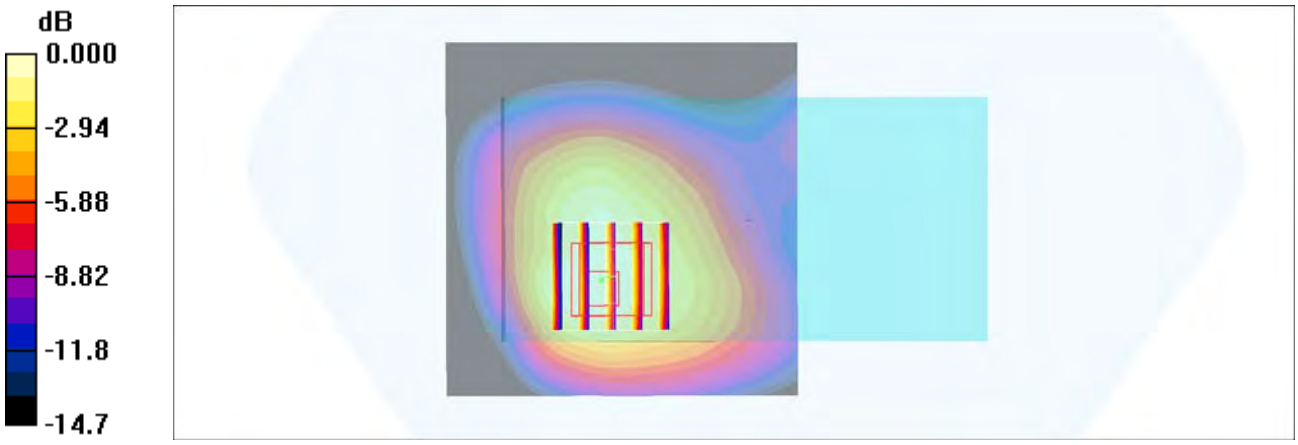
#46_LTE Band 4_20M_QPSK_1_0_Back_10mm_Ch20175

Communication System: LTE; Frequency: 1732.5 MHz;Duty Cycle: 1:1
Medium: MSL_1750_160519 Medium parameters used: f = 1732.5 MHz; σ = 1.43 mho/m; ε_r = 52.8; ρ = 1000 kg/m^3
Ambient Temperature：23.5 ℃; Liquid Temperature：22.5 ℃

DASY4 Configuration:
- Probe: EX3DV4 - SN7346; ConvF(8.06, 8.06, 8.06); Calibrated: 2015/9/2
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn916; Calibrated: 2015/12/16
- Phantom: SAM_Right; Type: SAM_Right; Serial: TP-1303
- ;Postprocessing SW: SEMCAD, V1.8 Build 159

Area Scan (71x71x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 1.61 mW/g

Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 31.7 V/m; Power Drift = -0.038 dB
Peak SAR (extrapolated) = 1.79 W/kg
SAR(1 g) = 1.16 mW/g; SAR(10 g) = 0.747 mW/g
Maximum value of SAR (measured) = 1.49 mW/g



0 dB = 1.49mW/g

Test Laboratory: Sporton International Inc. SAR/HAC Testing Lab Date: 2016/5/19

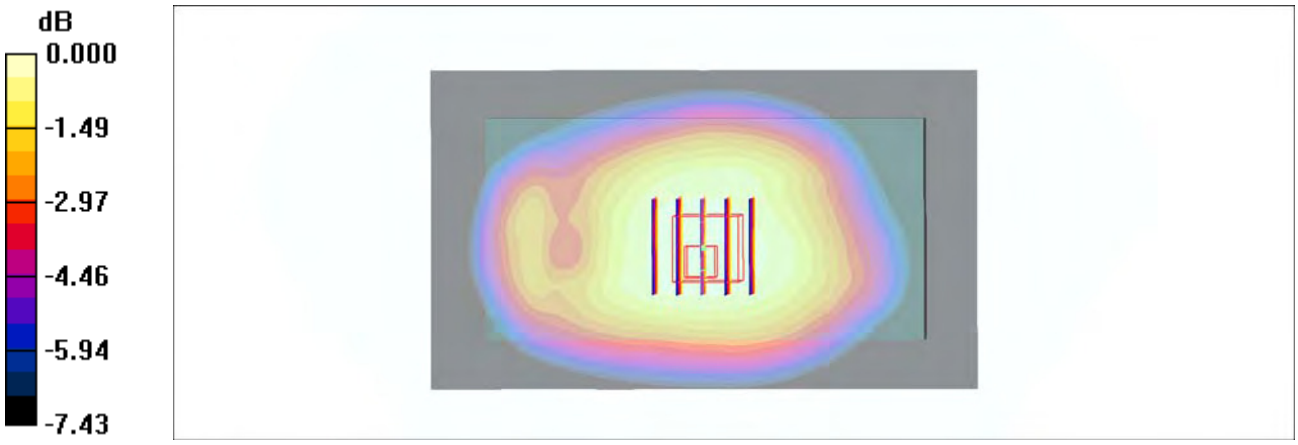
#47_LTE Band 5_10M_QPSK_1_25_Back_10mm_Ch20525

Communication System: LTE; Frequency: 836.5 MHz;Duty Cycle: 1:1
Medium: MSL_850_160519 Medium parameters used : f = 836.5 MHz; σ = 0.975 mho/m; ε_r = 57; ρ = 1000 kg/m^3
Ambient Temperature：23.5 ℃； Liquid Temperature：22.5 ℃

DASY4 Configuration:
- Probe: EX3DV4 - SN7346; ConvF(10.05, 10.05, 10.05); Calibrated: 2015/9/2
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn916; Calibrated: 2015/12/16
- Phantom: SAM_Right; Type: SAM_Right; Serial: TP-1303
- ;Postprocessing SW: SEMCAD, V1.8 Build 159

Area Scan (71x121x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.634 mW/g

Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 26.2 V/m; Power Drift = -0.018 dB
Peak SAR (extrapolated) = 0.695 W/kg
SAR(1 g) = 0.515 mW/g; SAR(10 g) = 0.402 mW/g
Maximum value of SAR (measured) = 0.628 mW/g



0 dB = 0.628mW/g

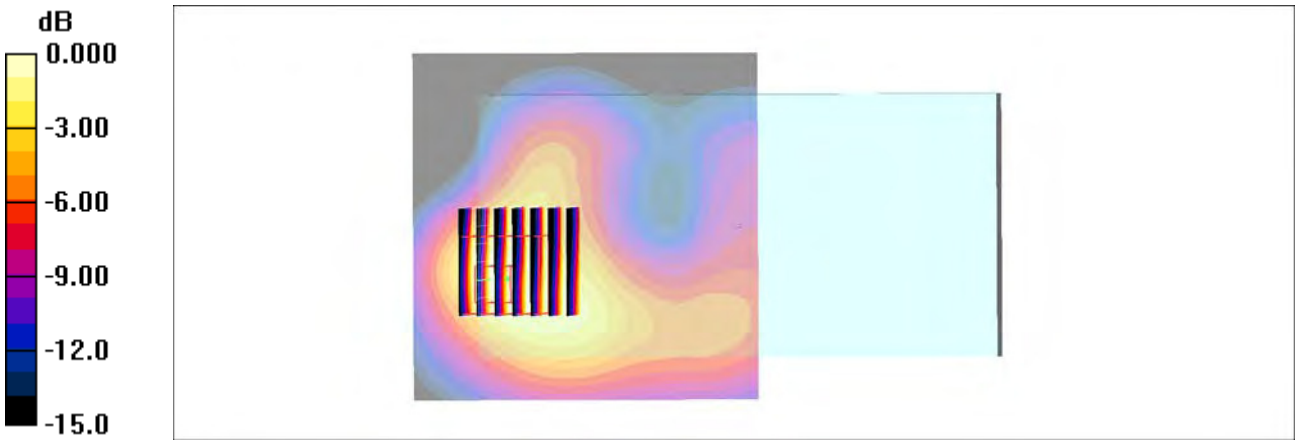
#48_LTE Band 7_20M_QPSK_50_0_Back_10mm_Ch21100

Communication System: LTE; Frequency: 2535 MHz;Duty Cycle: 1:1
Medium: MSL_2600_160518 Medium parameters used: f = 2535 MHz; σ = 2.11 mho/m; ε_r = 52.7; ρ = 1000 kg/m^3
Ambient Temperature：23.3 ℃; Liquid Temperature：22.3 ℃

DASY4 Configuration:
- Probe: EX3DV4 - SN7346; ConvF(7.29, 7.29, 7.29); Calibrated: 2015/9/2
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn916; Calibrated: 2015/12/16
- Phantom: SAM_Right; Type: SAM_Right; Serial: TP-1303
- ;Postprocessing SW: SEMCAD, V1.8 Build 159

Area Scan (81x81x1): Measurement grid: dx=12mm, dy=12mm
Maximum value of SAR (interpolated) = 1.32 mW/g

Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 24.2 V/m; Power Drift = 0.072 dB
Peak SAR (extrapolated) = 1.74 W/kg
SAR(1 g) = 0.874 mW/g; SAR(10 g) = 0.430 mW/g
Maximum value of SAR (measured) = 1.40 mW/g



0 dB = 1.40mW/g

Test Laboratory: Sporton International Inc. SAR/HAC Testing Lab Date: 2016/5/19

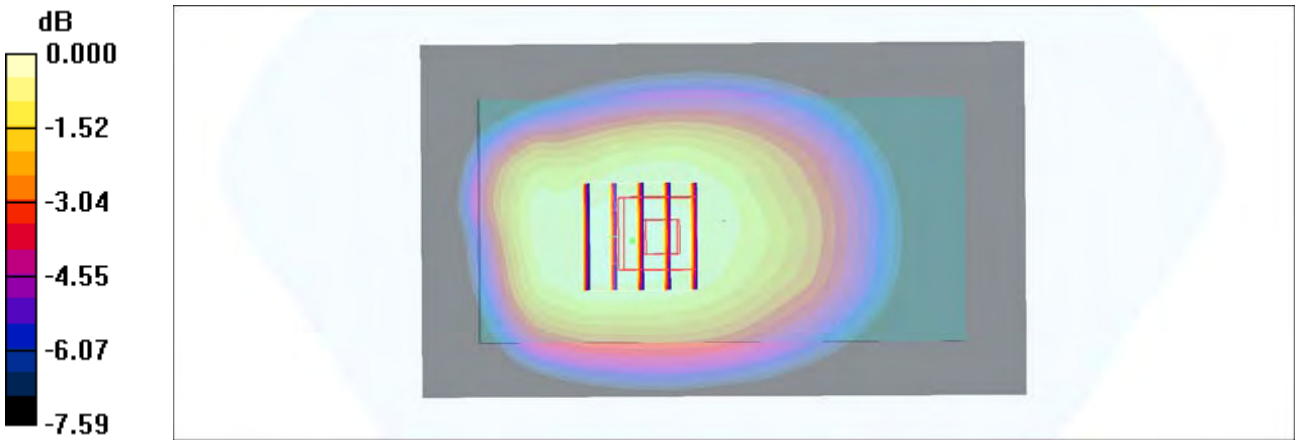
#49_LTE Band 12_10M_QPSK_1_49_Back_10mm_Ch23095

Communication System: LTE; Frequency: 707.5 MHz;Duty Cycle: 1:1
Medium: MSL_750_160519 Medium parameters used: f = 707.5 MHz; σ = 0.924 mho/m; ε_r = 55.5; ρ = 1000 kg/m^3
Ambient Temperature：23.5 ℃; Liquid Temperature：22.5 ℃

DASY4 Configuration:
- Probe: EX3DV4 - SN7346; ConvF(10.11, 10.11, 10.11); Calibrated: 2015/9/2
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn916; Calibrated: 2015/12/16
- Phantom: SAM_Right; Type: SAM_Right; Serial: TP-1303
- ;Postprocessing SW: SEMCAD, V1.8 Build 159

Area Scan (71x121x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.527 mW/g

Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 23.3 V/m; Power Drift = 0.088 dB
Peak SAR (extrapolated) = 0.596 W/kg
SAR(1 g) = 0.443 mW/g; SAR(10 g) = 0.348 mW/g
Maximum value of SAR (measured) = 0.542 mW/g



0 dB = 0.542mW/g

Test Laboratory: Sporton International Inc. SAR/HAC Testing Lab Date: 2016/5/19

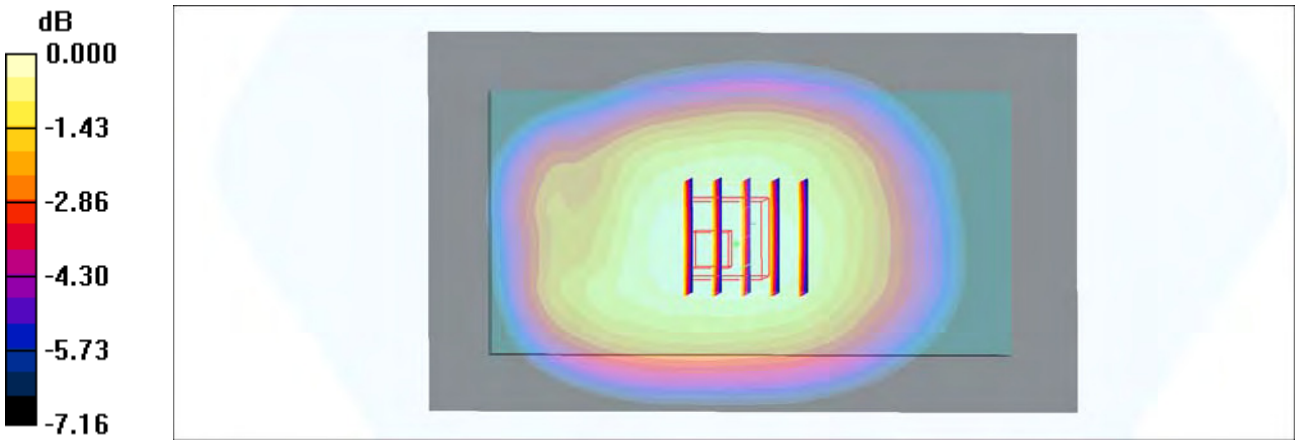
#50_LTE Band 13_10M_QPSK_1_0_Back_10mm_Ch23230

Communication System: LTE; Frequency: 782 MHz;Duty Cycle: 1:1
Medium: MSL_750_160519 Medium parameters used: f = 782 MHz; σ = 0.993 mho/m; ε_r = 54.8; ρ = 1000 kg/m^3
Ambient Temperature：23.5 ℃; Liquid Temperature：22.5 ℃

DASY4 Configuration:
- Probe: EX3DV4 - SN7346; ConvF(10.11, 10.11, 10.11); Calibrated: 2015/9/2
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn916; Calibrated: 2015/12/16
- Phantom: SAM_Right; Type: SAM_Right; Serial: TP-1303
- ;Postprocessing SW: SEMCAD, V1.8 Build 159

Area Scan (71x121x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.706 mW/g

Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 27.4 V/m; Power Drift = 0.103 dB
Peak SAR (extrapolated) = 0.776 W/kg
SAR(1 g) = 0.587 mW/g; SAR(10 g) = 0.462 mW/g
Maximum value of SAR (measured) = 0.704 mW/g



0 dB = 0.704mW/g

Test Laboratory: Sporton International Inc. SAR/HAC Testing Lab Date: 2016/5/19

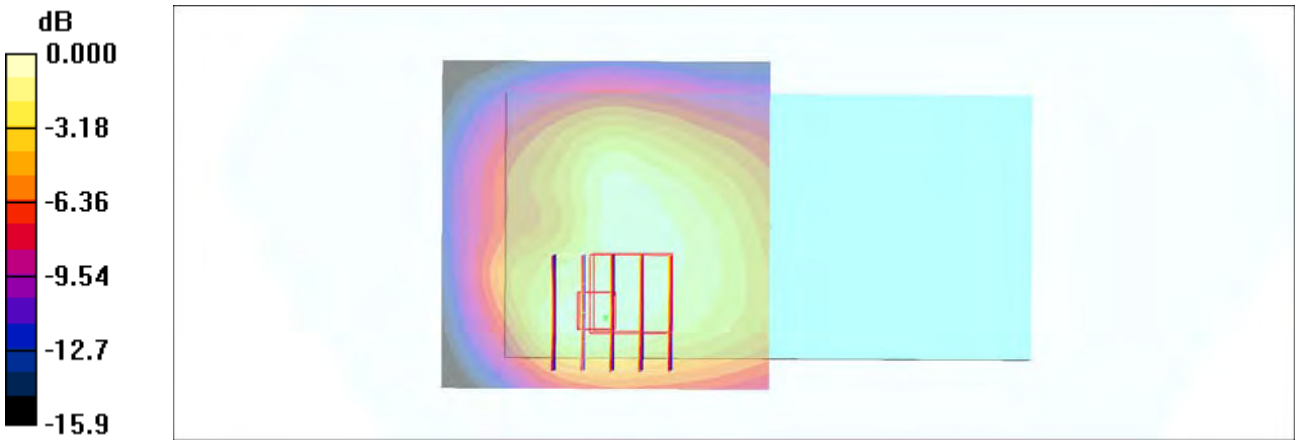
#51_LTE Band 25_20M_QPSK_1_49_Back_10mm_Ch26140

Communication System: LTE; Frequency: 1860 MHz;Duty Cycle: 1:1
Medium: MSL_1900_160519 Medium parameters used: f = 1860 MHz; σ = 1.52 mho/m; ε_r = 52.4; ρ = 1000 kg/m^3
Ambient Temperature：23.5 ℃； Liquid Temperature：22.5 ℃

DASY4 Configuration:
- Probe: EX3DV4 - SN7346; ConvF(7.77, 7.77, 7.77); Calibrated: 2015/9/2
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn916; Calibrated: 2015/12/16
- Phantom: SAM_Right; Type: SAM_Right; Serial: TP-1303
- ;Postprocessing SW: SEMCAD, V1.8 Build 159

Area Scan (61x61x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 1.12 mW/g

Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 24.5 V/m; Power Drift = -0.014 dB
Peak SAR (extrapolated) = 1.37 W/kg
SAR(1 g) = 0.815 mW/g; SAR(10 g) = 0.516 mW/g
Maximum value of SAR (measured) = 1.16 mW/g



0 dB = 1.16mW/g

Test Laboratory: Sporton International Inc. SAR/HAC Testing Lab Date: 2016/5/21

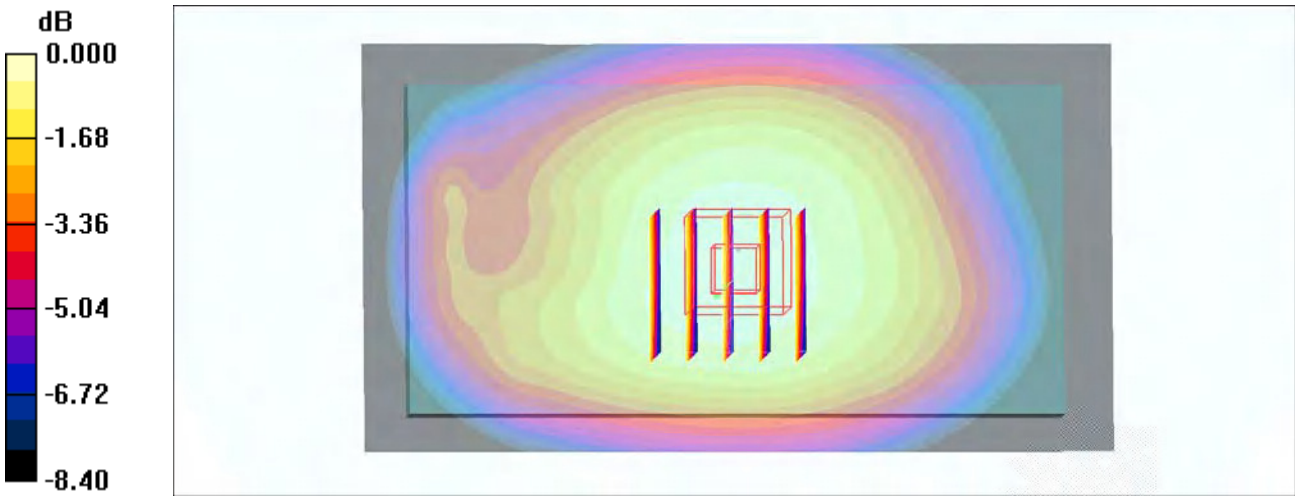
#52_LTE Band 26_15M_QPSK_1_0_Back_10mm_Ch26865

Communication System: LTE; Frequency: 831.5 MHz;Duty Cycle: 1:1
Medium: MSL_850_160521 Medium parameters used: f = 831.5 MHz; σ = 0.975 mho/m; ε_r = 56.7; ρ = 1000 kg/m^3
Ambient Temperature：23.5 ℃; Liquid Temperature：22.5 ℃

DASY4 Configuration:
- Probe: EX3DV4 - SN7346; ConvF(10.05, 10.05, 10.05); Calibrated: 2015/9/2
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn916; Calibrated: 2015/12/16
- Phantom: SAM_Right; Type: SAM_Right; Serial: TP-1303
- ;Postprocessing SW: SEMCAD, V1.8 Build 159

Area Scan (61x111x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.641 mW/g

Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 26.8 V/m; Power Drift = 0.180 dB
Peak SAR (extrapolated) = 0.728 W/kg
SAR(1 g) = 0.542 mW/g; SAR(10 g) = 0.422 mW/g
Maximum value of SAR (measured) = 0.661 mW/g



0 dB = 0.661mW/g

Test Laboratory: Sporton International Inc. SAR/HAC Testing Lab Date: 2016/5/18

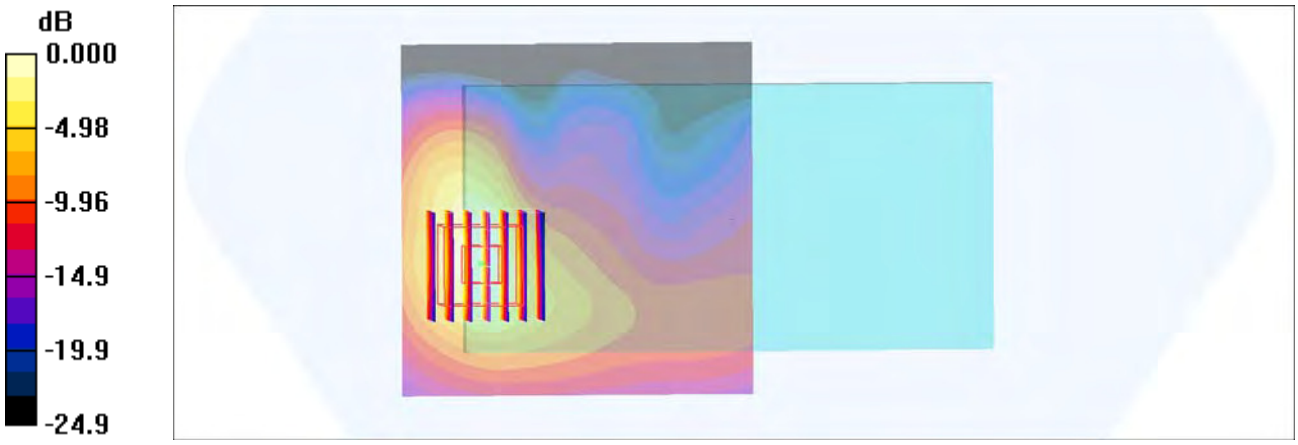
#53_LTE Band 41_20M_QPSK_1_0_Back_10mm_Ch41490

Communication System: LTE; Frequency: 2680 MHz;Duty Cycle: 1:1.59
Medium: MSL_2600_160518 Medium parameters used: f = 2680 MHz; σ = 2.32 mho/m; ε_r = 52.1; ρ = 1000 kg/m^3
Ambient Temperature：23.3 ℃; Liquid Temperature：22.3 ℃

DASY4 Configuration:
- Probe: EX3DV4 - SN7346; ConvF(7.29, 7.29, 7.29); Calibrated: 2015/9/2
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn916; Calibrated: 2015/12/16
- Phantom: SAM_Right; Type: SAM_Right; Serial: TP-1303
- ;Postprocessing SW: SEMCAD, V1.8 Build 159

Area Scan (81x81x1): Measurement grid: dx=12mm, dy=12mm
Maximum value of SAR (interpolated) = 1.55 mW/g

Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 25.2 V/m; Power Drift = -0.009 dB
Peak SAR (extrapolated) = 1.87 W/kg
SAR(1 g) = 0.924 mW/g; SAR(10 g) = 0.429 mW/g
Maximum value of SAR (measured) = 1.50 mW/g



0 dB = 1.50mW/g

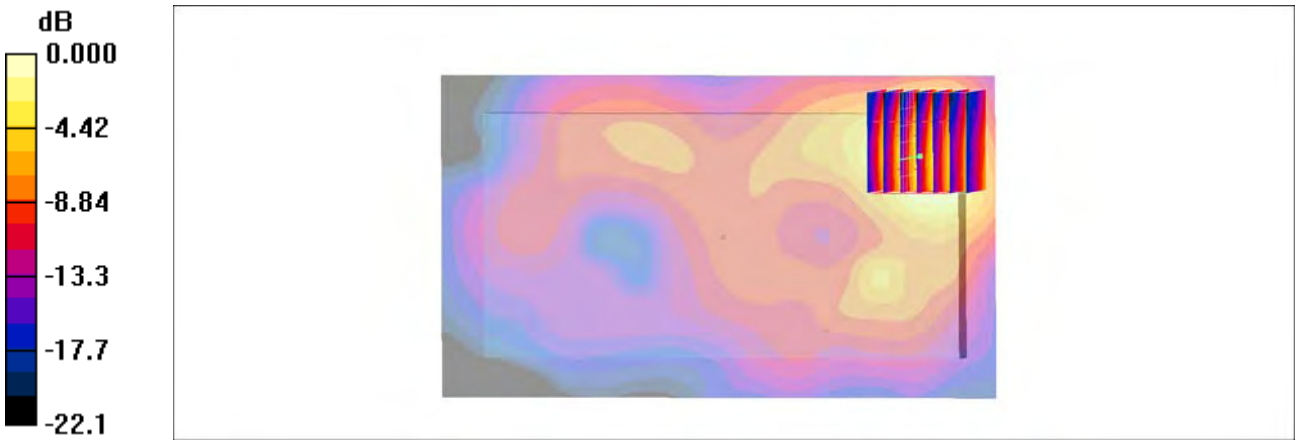
#54_WLAN2.4GHz_802.11b 1Mbps_Back_10mm_Ch6

Communication System: 802.11b ; Frequency: 2437 MHz;Duty Cycle: 1:1.024
Medium: MSL_2450_160523 Medium parameters used: f = 2437 MHz; σ = 1.92 mho/m; ε_r = 53.4; ρ = 1000 kg/m^3
Ambient Temperature：23.3 ℃; Liquid Temperature：22.3 ℃

DASY4 Configuration:
- Probe: EX3DV4 - SN7346; ConvF(7.43, 7.43, 7.43); Calibrated: 2015/9/2
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn916; Calibrated: 2015/12/16
- Phantom: SAM_Right; Type: SAM_Right; Serial: TP-1303
- ;Postprocessing SW: SEMCAD, V1.8 Build 159

Area Scan (81x141x1): Measurement grid: dx=12mm, dy=12mm
Maximum value of SAR (interpolated) = 0.260 mW/g

Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 3.92 V/m; Power Drift = 0.067 dB
Peak SAR (extrapolated) = 0.326 W/kg
SAR(1 g) = 0.160 mW/g; SAR(10 g) = 0.079 mW/g
Maximum value of SAR (measured) = 0.255 mW/g



0 dB = 0.255mW/g

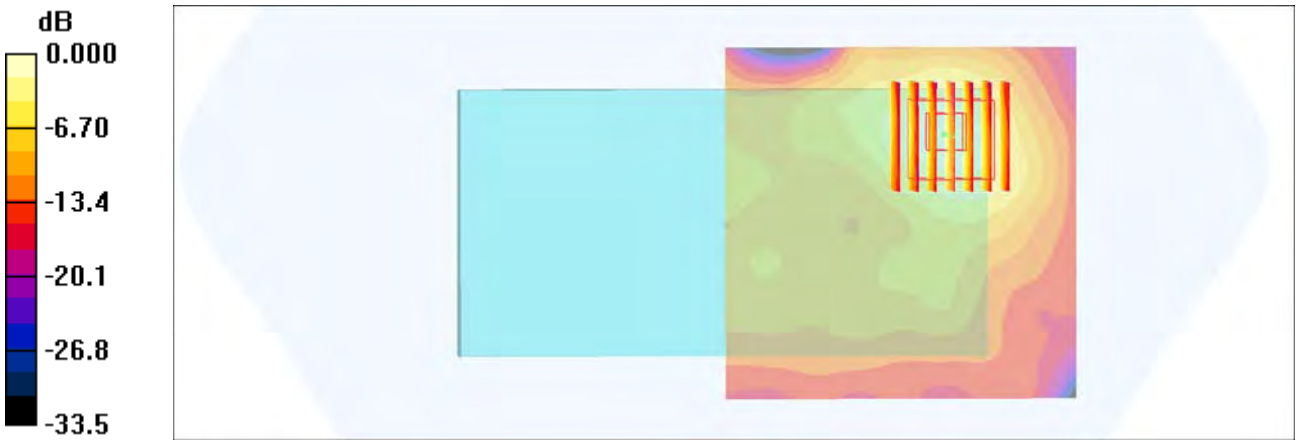
#55_ Bluetooth_1Mbps_Back_10mm_Ch0

Communication System: Bluetooth; Frequency: 2402 MHz;Duty Cycle: 1:1.2
Medium: MSL_2450_160526 Medium parameters used: f = 2402 MHz; σ = 1.93 mho/m; ε_r = 54.5; ρ = 1000 kg/m^3
Ambient Temperature：23.4 ℃; Liquid Temperature：22.4 ℃

DASY4 Configuration:
- Probe: EX3DV4 - SN7346; ConvF(7.43, 7.43, 7.43); Calibrated: 2015/9/2
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn916; Calibrated: 2015/12/16
- Phantom: SAM_Right; Type: SAM_Right; Serial: TP-1303
- ;Postprocessing SW: SEMCAD, V1.8 Build 159

Area Scan (81x81x1): Measurement grid: dx=12mm, dy=12mm
Maximum value of SAR (interpolated) = 0.076 mW/g

Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 4.90 V/m; Power Drift = 0.170 dB
Peak SAR (extrapolated) = 0.096 W/kg
SAR(1 g) = 0.046 mW/g; SAR(10 g) = 0.022 mW/g
Maximum value of SAR (measured) = 0.074 mW/g



0 dB = 0.074mW/g

Appendix C. DASY Calibration Certificate

The DASY calibration certificates are shown as follows.

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

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

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

Accreditation No.: SCS 0108

Client **Auden**

Certificate No: D750V3-1078_Jun15

CALIBRATION CERTIFICATE

Object	D750V3 - SN:1078
Calibration procedure(s)	QA CAL-05.v9 Calibration procedure for dipole validation kits above 700 MHz
Calibration date:	June 23, 2015

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

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

Calibration Equipment used (M&TE critical for calibration)

Primary Standards	ID #	Cal Date (Certificate No.)	Scheduled Calibration
Power meter EPM-442A	GB37480704	07-Oct-14 (No. 217-02020)	Oct-15
Power sensor HP 8481A	US37292783	07-Oct-14 (No. 217-02020)	Oct-15
Power sensor HP 8481A	MY41092317	07-Oct-14 (No. 217-02021)	Oct-15
Reference 20 dB Attenuator	SN: 5058 (20k)	01-Apr-15 (No. 217-02131)	Mar-16
Type-N mismatch combination	SN: 5047.2 / 06327	01-Apr-15 (No. 217-02134)	Mar-16
Reference Probe ES3DV3	SN: 3205	30-Dec-14 (No. ES3-3205_Dec14)	Dec-15
DAE4	SN: 601	18-Aug-14 (No. DAE4-601_A[illegible]4)	Aug-15

Secondary Standards	ID #	Check Date (in house)	Scheduled Check
RF generator R&S SMT-06	100005	04-Aug-99 (in house check Oct-13)	In house check: Oct-16
Network Analyzer HP 8753E	US37390585 S4206	18-Oct-01 (in house check Oct-14)	In house check: Oct-15

	Name	Function	Signature
Calibrated by:	Michael Weber	Laboratory Technician	M. Weber
Approved by:	Katja Pokovic	Technical Manager	

Issued: June 23, 2015

This calibration certificate shall not be reproduced except in full without written approval of the laboratory.

Glossary:

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

Calibration is Performed According to the Following Standards:

a) IEEE Std 1528-2013, "IEEE Recommended Practice for Determining the Peak Spatial-Averaged Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques", June 2013
b) IEC 62209-1, "Procedure to measure the Specific Absorption Rate (SAR) for hand-held devices used in close proximity to the ear (frequency range of 300 MHz to 3 GHz)", February 2005
c) IEC 62209-2, "Procedure to determine the Specific Absorption Rate (SAR) for wireless communication devices used in close proximity to the human body (frequency range of 30 MHz to 6 GHz)", March 2010
d) KDB 865664, "SAR Measurement Requirements for 100 MHz to 6 GHz"

Additional Documentation:

e) DASY4/5 System Handbook

Methods Applied and Interpretation of Parameters:

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

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

Measurement Conditions

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

DASY Version	DASY5	V52.8.8
Extrapolation	Advanced Extrapolation	
Phantom	Modular Flat Phantom	
Distance Dipole Center - TSL	15 mm	with Spacer
Zoom Scan Resolution	dx, dy, dz = 5 mm	
Frequency	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	42.7 ± 6 %	0.91 mho/m ± 6 %
Head TSL temperature change during test	< 0.5 °C	----	----

SAR result with Head TSL

SAR averaged over 1 cm^3 (1 g) of Head TSL	Condition	
SAR measured	250 mW input power	2.05 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**8.09 W/kg ± 17.0 % (k=2)**

SAR averaged over 10 cm^3 (10 g) of Head TSL	condition	
SAR measured	250 mW input power	1.34 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**5.30 W/kg ± 16.5 % (k=2)**

Body TSL parameters

The following parameters and calculations were applied.

	Temperature	**Permittivity**	**Conductivity**
Nominal Body TSL parameters	22.0 °C	55.5	0.96 mho/m
Measured Body TSL parameters	(22.0 ± 0.2) °C	55.8 ± 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	2.18 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	**8.59 W/kg ± 17.0 % (k=2)**

SAR averaged over 10 cm^3 (10 g) of Body TSL	condition	
SAR measured	250 mW input power	1.44 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	**5.69 W/kg ± 16.5 % (k=2)**

Appendix (Additional assessments outside the scope of SCS 0108)

Antenna Parameters with Head TSL

Impedance, transformed to feed point	53.6 Ω - 1.8 jΩ
Return Loss	- 28.2 dB

Antenna Parameters with Body TSL

Impedance, transformed to feed point	48.3 Ω - 3.2 jΩ
Return Loss	- 28.7 dB

General Antenna Parameters and Design

Electrical Delay (one direction)	1.033 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 15, 2012

DASY5 Validation Report for Head TSL

Date: 23.06.2015

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole 750 MHz; Type: D750V3; Serial: D750V3 - SN:1078

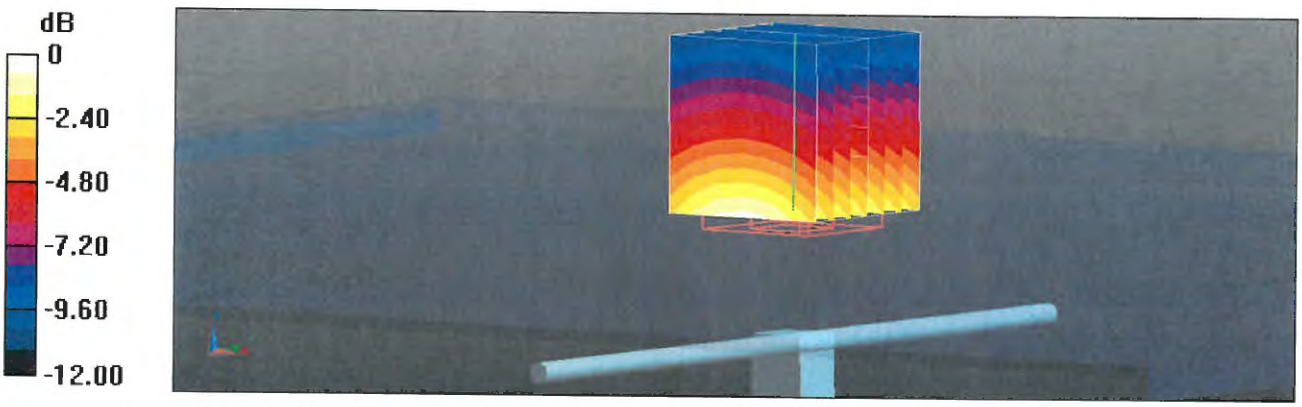
Communication System: UID 0 - CW; Frequency: 750 MHz
Medium parameters used: f = 750 MHz; σ = 0.91 S/m; ε_r = 42.7; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)

DASY52 Configuration:

- Probe: ES3DV3 - SN3205; ConvF(6.44, 6.44, 6.44); Calibrated: 30.12.2014;
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 18.08.2014
- Phantom: Flat Phantom 4.9L; Type: QD000P49AA; Serial: 1001
- DASY52 52.8.8(1222); SEMCAD X 14.6.10(7331)

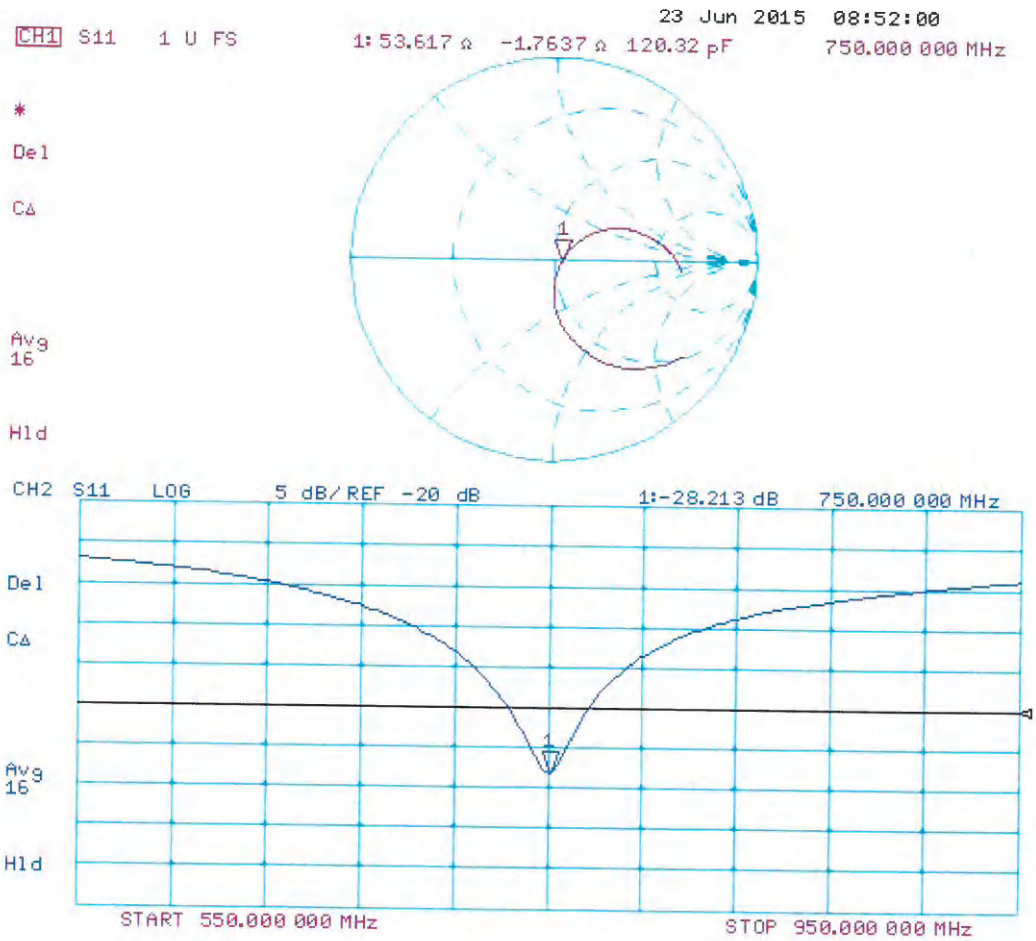
Dipole Calibration for Head Tissue/Pin=250 mW, d=15mm/Zoom Scan (7x7x7)/Cube 0:

Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 53.08 V/m; Power Drift = 0.01 dB
Peak SAR (extrapolated) = 3.07 W/kg
SAR(1 g) = 2.05 W/kg; SAR(10 g) = 1.34 W/kg
Maximum value of SAR (measured) = 2.40 W/kg



0 dB = 2.40 W/kg = 3.80 dBW/kg

Impedance Measurement Plot for Head TSL



DASY5 Validation Report for Body TSL

Date: 19.06.2015

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole 750 MHz; Type: D750V3; Serial: D750V3 - SN: 1078

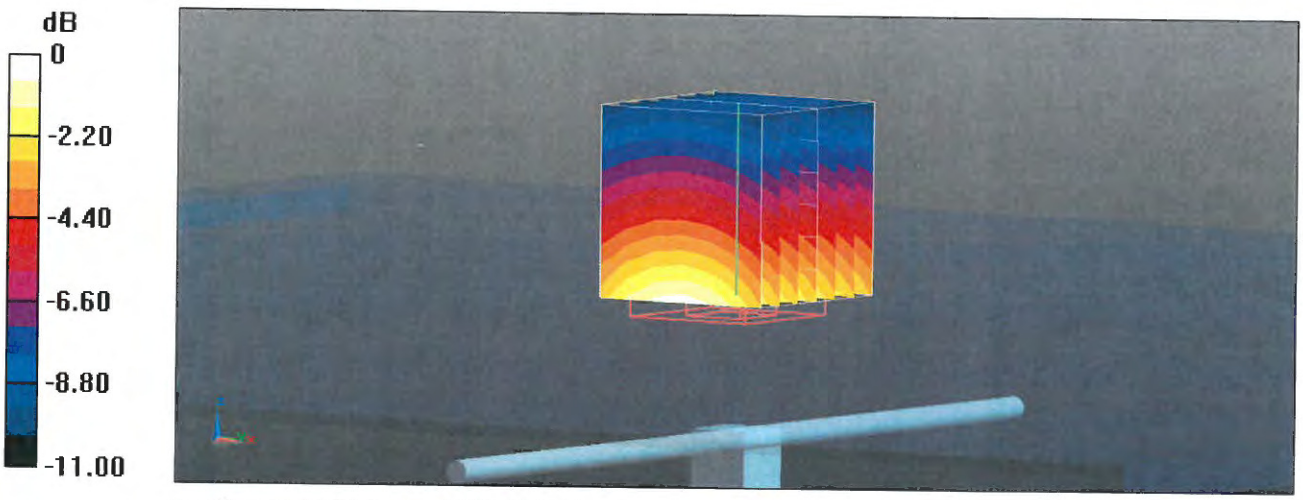
Communication System: UID 0 - CW; Frequency: 750 MHz
Medium parameters used: f = 750 MHz; σ = 0.98 S/m; ε_r = 55.8; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)

DASY52 Configuration:

- Probe: ES3DV3 - SN3205; ConvF(6.21, 6.21, 6.21); Calibrated: 30.12.2014;
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 18.08.2014
- Phantom: Flat Phantom 4.9L; Type: QD000P49AA; Serial: 1001
- DASY52 52.8.8(1222); SEMCAD X 14.6.10(7331)

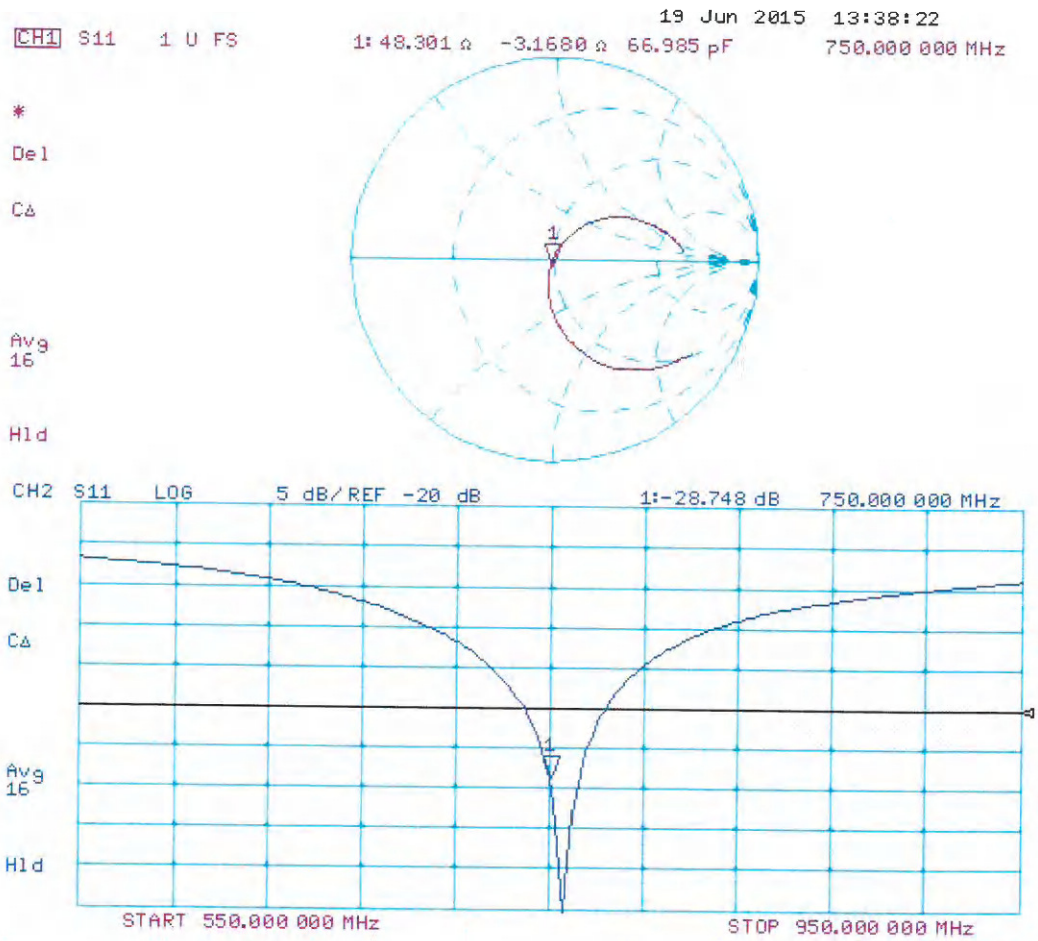
Dipole Calibration for Body Tissue/Pin=250 mW, d=15mm/Zoom Scan (7x7x7)/Cube 0:

Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 52.73 V/m; Power Drift = 0.00 dB
Peak SAR (extrapolated) = 3.18 W/kg
SAR(1 g) = 2.18 W/kg; SAR(10 g) = 1.44 W/kg
Maximum value of SAR (measured) = 2.54 W/kg



0 dB = 2.54 W/kg = 4.05 dBW/kg

Impedance Measurement Plot for Body TSL



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The Swiss Accreditation Service is one of the signatories to the EA Multilateral Agreement for the recognition of calibration certificates

Accreditation No.: SCS 0108

Client **Sporton-TW (Auden)**

Certificate No: D835V2-499_Mar16

CALIBRATION CERTIFICATE

Object	D835V2 - SN: 499
Calibration procedure(s)	QA CAL-05.v9 Calibration procedure for dipole validation kits above 700 MHz
Calibration date:	March 21, 2016

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

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

Calibration Equipment used (M&TE critical for calibration)

Primary Standards	ID #	Cal Date (Certificate No.)	Scheduled Calibration
Power meter EPM-442A	GB37480704	07-Oct-15 (No. 217-02222)	Oct-16
Power sensor HP 8481A	US37292783	07-Oct-15 (No. 217-02222)	Oct-16
Power sensor HP 8481A	MY41092317	07-Oct-15 (No. 217-02223)	Oct-16
Reference 20 dB Attenuator	SN: 5058 (20k)	01-Apr-15 (No. 217-02131)	Mar-16
Type-N mismatch combination	SN: 5047.2 / 06327	01-Apr-15 (No. 217-02134)	Mar-16
Reference Probe EX3DV4	SN: 7349	31-Dec-15 (No. EX3-7349_Dec15)	Dec-16
DAE4	SN: 601	30-Dec-15 (No. DAE4-601_Dec15)	Dec-16

Secondary Standards	ID #	Check Date (in house)	Scheduled Check
RF generator R&S SMT-06	100972	15-Jun-15 (in house check Jun-15)	In house check: Jun-18
Network Analyzer HP 8753E	US37390585 S4206	18-Oct-01 (in house check Oct-15)	In house check: Oct-16

	Name	Function	Signature
Calibrated by:	Michael Weber	Laboratory Technician	M. Weber
Approved by:	Katja Pokovic	Technical Manager	

Issued: March 21, 2016

This calibration certificate shall not be reproduced except in full without written approval of the laboratory.

Glossary:

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

Calibration is Performed According to the Following Standards:

a) IEEE Std 1528-2013, "IEEE Recommended Practice for Determining the Peak Spatial-Averaged Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques", June 2013
b) IEC 62209-1, "Procedure to measure the Specific Absorption Rate (SAR) for hand-held devices used in close proximity to the ear (frequency range of 300 MHz to 3 GHz)", February 2005
c) IEC 62209-2, "Procedure to determine the Specific Absorption Rate (SAR) for wireless communication devices used in close proximity to the human body (frequency range of 30 MHz to 6 GHz)", March 2010
d) KDB 865664, "SAR Measurement Requirements for 100 MHz to 6 GHz"

Additional Documentation:

e) DASY4/5 System Handbook

Methods Applied and Interpretation of Parameters:

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

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

Measurement Conditions

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

DASY Version	DASY5	V52.8.8
Extrapolation	Advanced Extrapolation	
Phantom	Modular Flat Phantom	
Distance Dipole Center - TSL	15 mm	with Spacer
Zoom Scan Resolution	dx, dy, dz = 5 mm	
Frequency	835 MHz ± 1 MHz	

Head TSL parameters

The following parameters and calculations were applied.

	Temperature	**Permittivity**	**Conductivity**
Nominal Head TSL parameters	22.0 °C	41.5	0.90 mho/m
Measured Head TSL parameters	(22.0 ± 0.2) °C	41.7 ± 6 %	0.93 mho/m ± 6 %
Head TSL temperature change during test	< 0.5 °C	----	----

SAR result with Head TSL

SAR averaged over 1 cm³ (1 g) of Head TSL	Condition	
SAR measured	250 mW input power	2.34 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**9.14 W/kg ± 17.0 % (k=2)**

SAR averaged over 10 cm³ (10 g) of Head TSL	condition	
SAR measured	250 mW input power	1.52 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**5.97 W/kg ± 16.5 % (k=2)**

Body TSL parameters

The following parameters and calculations were applied.

	Temperature	**Permittivity**	**Conductivity**
Nominal Body TSL parameters	22.0 °C	55.2	0.97 mho/m
Measured Body TSL parameters	(22.0 ± 0.2) °C	54.5 ± 6 %	1.01 mho/m ± 6 %
Body TSL temperature change during test	< 0.5 °C	----	----

SAR result with Body TSL

SAR averaged over 1 cm³ (1 g) of Body TSL	Condition	
SAR measured	250 mW input power	2.46 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	**9.52 W/kg ± 17.0 % (k=2)**

SAR averaged over 10 cm³ (10 g) of Body TSL	condition	
SAR measured	250 mW input power	1.61 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	**6.28 W/kg ± 16.5 % (k=2)**

Appendix (Additional assessments outside the scope of SCS 0108)

Antenna Parameters with Head TSL

Impedance, transformed to feed point	53.1 Ω - 3.2 jΩ
Return Loss	- 27.3 dB

Antenna Parameters with Body TSL

Impedance, transformed to feed point	49.0 Ω - 5.3 jΩ
Return Loss	- 25.3 dB

General Antenna Parameters and Design

Electrical Delay (one direction)	1.390 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 10, 2003

DASY5 Validation Report for Head TSL

Date: 21.03.2016

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole 835 MHz; Type: D835V2; Serial: D835V2 - SN: 499

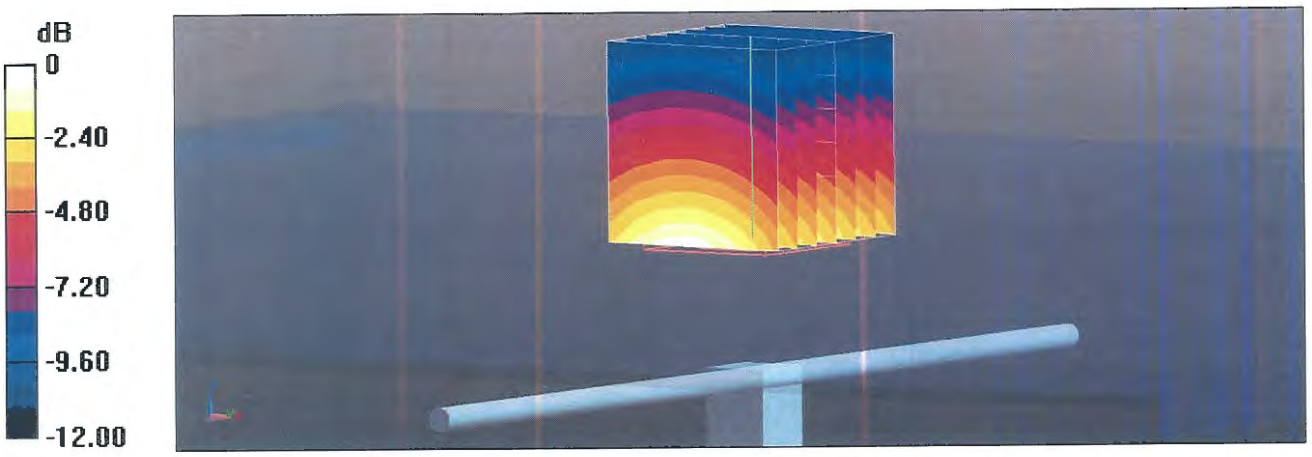
Communication System: UID 0 - CW; Frequency: 835 MHz
Medium parameters used: f = 835 MHz; σ = 0.93 S/m; ε_r = 41.7; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)

DASY52 Configuration:

- Probe: EX3DV4 - SN7349; ConvF(9.83, 9.83, 9.83); Calibrated: 31.12.2015;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 30.12.2015
- Phantom: Flat Phantom 4.9L; Type: QD000P49AA; Serial: 1001
- DASY52 52.8.8(1258); SEMCAD X 14.6.10(7372)

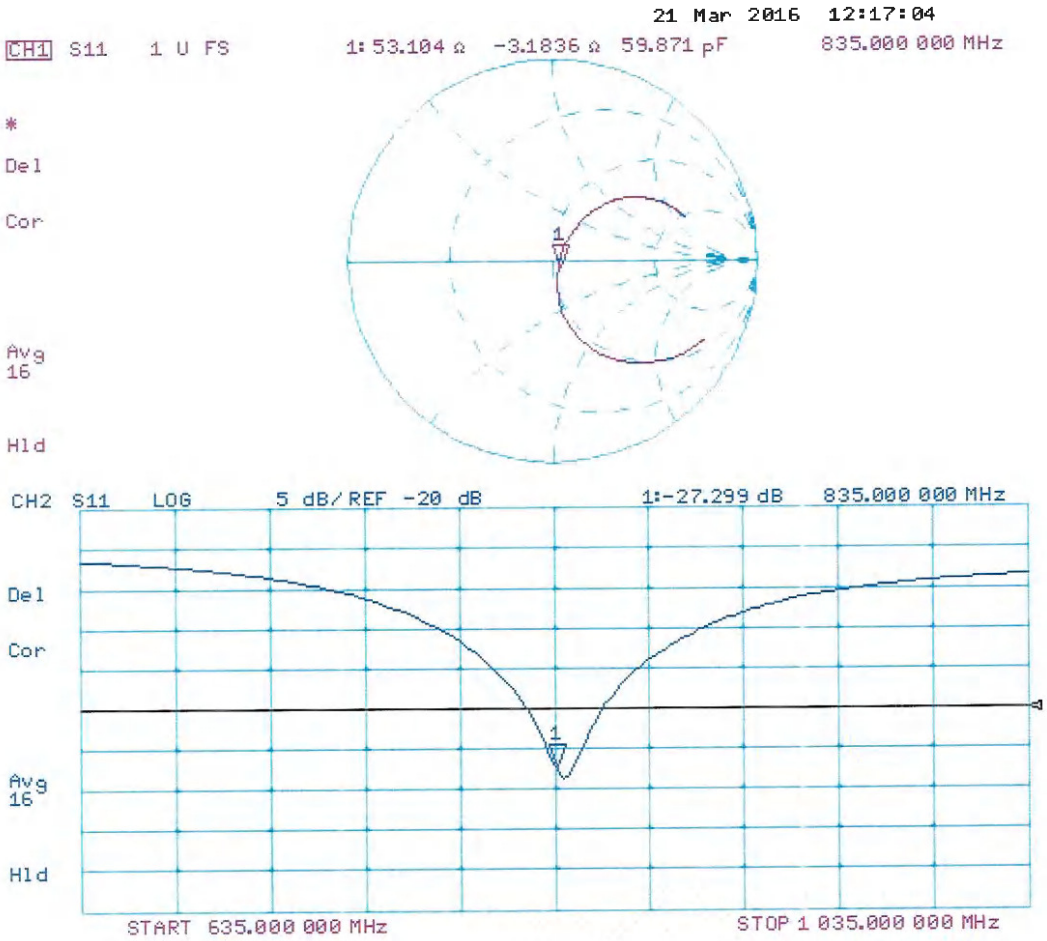
Dipole Calibration for Head Tissue EX-Probe/Pin=250 mW, d=15mm/Zoom Scan (7x7x7)/Cube 0:

Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 60.98 V/m; Power Drift = 0.01 dB
Peak SAR (extrapolated) = 3.47 W/kg
SAR(1 g) = 2.34 W/kg; SAR(10 g) = 1.52 W/kg
Maximum value of SAR (measured) = 3.09 W/kg



0 dB = 3.09 W/kg = 4.90 dBW/kg

Impedance Measurement Plot for He[redacted]



DASY5 Validation Report for Body TSL

Date: 21.03.2016

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole 835 MHz; Type: D835V2; Serial: D835V2 - SN: 499

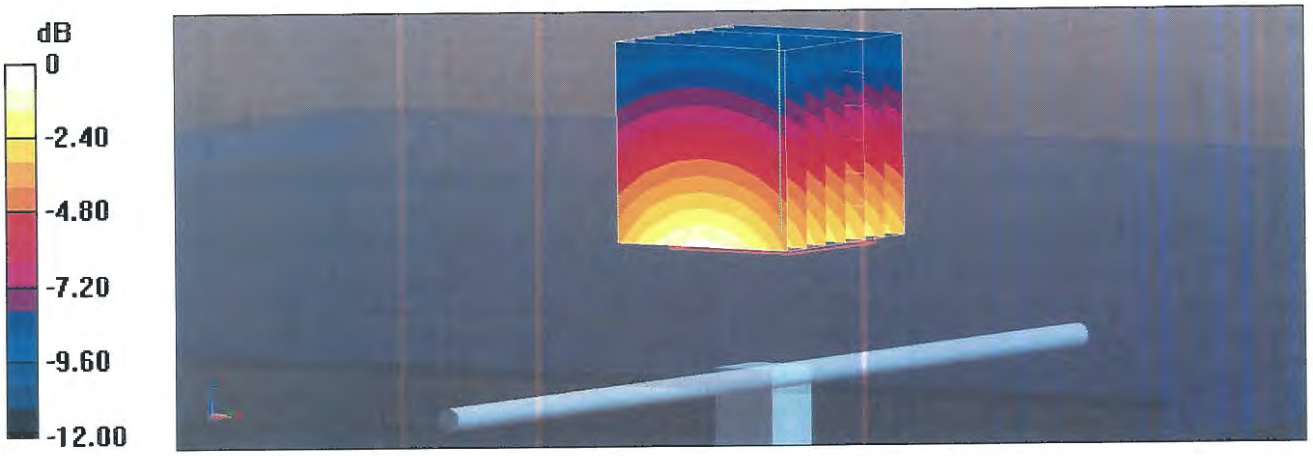
Communication System: UID 0 - CW; Frequency: 835 MHz
Medium parameters used: f = 835 MHz; σ = 1.01 S/m; ε_r = 54.5; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)

DASY52 Configuration:

- Probe: EX3DV4 - SN7349; ConvF(9.73, 9.73, 9.73); Calibrated: 31.12.2015;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 30.12.2015
- Phantom: Flat Phantom 4.9L; Type: QD000P49AA; Serial: 1001
- DASY52 52.8.8(1258); SEMCAD X 14.6.10(7372)

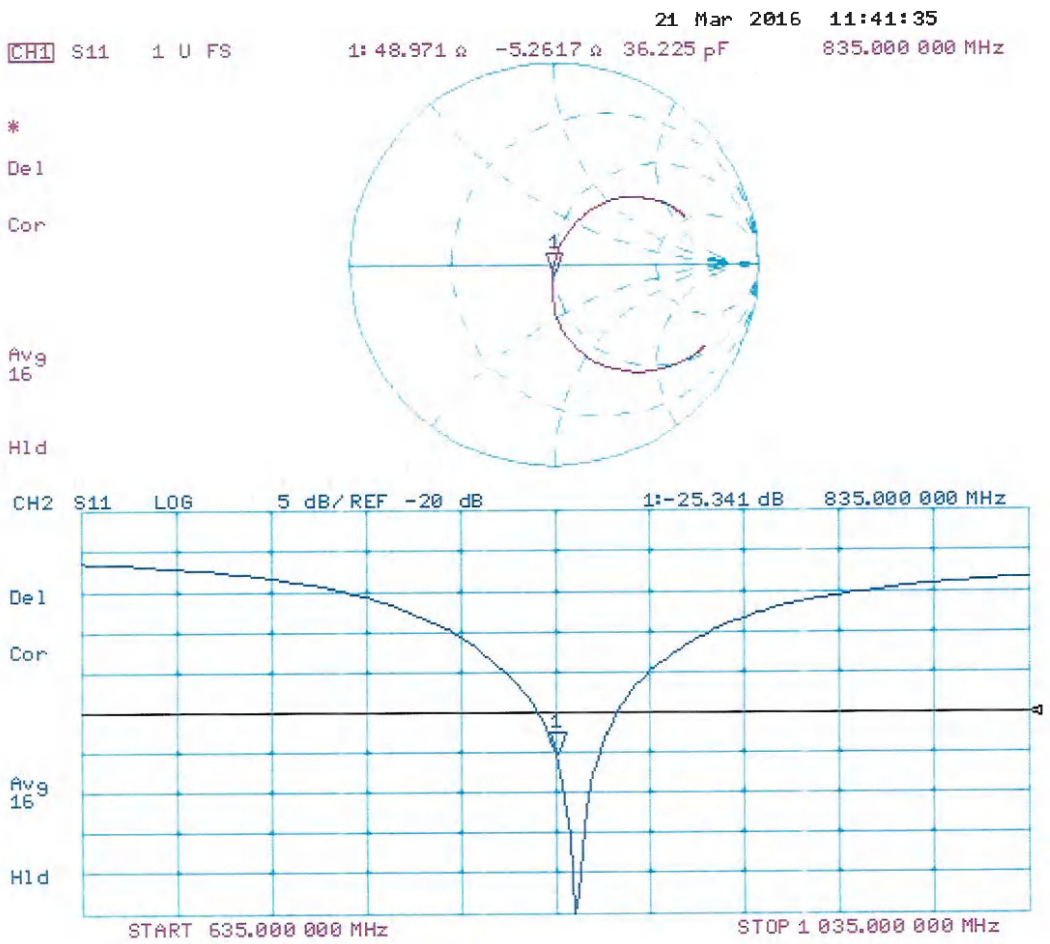
Dipole Calibration for Body Tissue EX-Probe/Pin=250 mW, d=15mm/Zoom Scan (7x7x7)/Cube 0:

Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 60.24 V/m; Power Drift = -0.04 dB
Peak SAR (extrapolated) = 3.63 W/kg
SAR(1 g) = 2.46 W/kg; SAR(10 g) = 1.61 W/kg
Maximum value of SAR (measured) = 3.26 W/kg



0 dB = 3.26 W/kg = 5.13 dBW/kg

Impedance Measurement Plot for Body TSL



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Accreditation No.: SCS 0108

Client **Sporton-TW (Auden)**

Certificate No: D1750V2-1068_Nov15

CALIBRATION CERTIFICATE

Object	D1750V2 - SN: 1068
Calibration procedure(s)	QA CAL-05.v9 Calibration procedure for dipole validation kits above 700 MHz
Calibration date:	November 23, 2015

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

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

Calibration Equipment used (M&TE critical for calibration)

Primary Standards	ID #	Cal Date (Certificate No.)	Scheduled Calibration
Power meter EPM-442A	GB37480704	07-Oct-15 (No. 217-02222)	Oct-16
Power sensor HP 8481A	US37292783	07-Oct-15 (No. 217-02222)	Oct-16
Power sensor HP 8481A	MY41092317	07-Oct-15 (No. 217-02223)	Oct-16
Reference 20 dB Attenuator	SN: 5058 (20k)	01-Apr-15 (No. 217-02131)	Mar-16
Type-N mismatch combination	SN: 5047.2 / 06327	01-Apr-15 (No. 217-02134)	Mar-16
Reference Probe EX3DV4	SN: 7349	30-Dec-14 (No. EX3-7349_Dec14)	Dec-15
DAE4	SN: 601	17-Aug-15 (No. DAE4-601_Aug15)	Aug-16

Secondary Standards	ID #	Check Date (in house)	Scheduled Check
RF generator R&S SMT-06	100972	15-Jun-15 (in house check Jun-15)	In house check: Jun-18
Network Analyzer HP 8753E	US37390585 S4206	18-Oct-01 (in house check Oct-15)	In house check: Oct-16

	Name	Function	Signature
Calibrated by:	Michael Weber	Laboratory Technician	M. Weber
Approved by:	Katja Pokovic	Technical Manager	

Issued: November 24, 2015

This calibration certificate shall not be reproduced except in full without written approval of the laboratory.

Glossary:

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

Calibration is Performed According to the Following Standards:

a) IEEE Std 1528-2013, "IEEE Recommended Practice for Determining the Peak Spatial-Averaged Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques", June 2013
b) IEC 62209-1, "Procedure to measure the Specific Absorption Rate (SAR) for hand-held devices used in close proximity to the ear (frequency range of 300 MHz to 3 GHz)", February 2005
c) IEC 62209-2, "Procedure to determine the Specific Absorption Rate (SAR) for wireless communication devices used in close proximity to the human body (frequency range of 30 MHz to 6 GHz)", March 2010
d) KDB 865664, "SAR Measurement Requirements for 100 MHz to 6 GHz"

Additional Documentation:

e) DASY4/5 System Handbook

Methods Applied and Interpretation of Parameters:

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

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

Measurement Conditions

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

DASY Version	DASY5	V52.8.8
Extrapolation	Advanced Extrapolation	
Phantom	Modular Flat Phantom	
Distance Dipole Center - TSL	10 mm	with Spacer
Zoom Scan Resolution	dx, dy, dz = 5 mm	
Frequency	1750 MHz ± 1 MHz	

Head TSL parameters

The following parameters and calculations were applied.

	Temperature	**Permittivity**	**Conductivity**
Nominal Head TSL parameters	22.0 °C	40.1	1.37 mho/m
Measured Head TSL parameters	(22.0 ± 0.2) °C	40.8 ± 6 %	1.35 mho/m ± 6 %
Head TSL temperature change during test	< 0.5 °C	----	----

SAR result with Head TSL

SAR averaged over 1 cm³ (1 g) of Head TSL	Condition	
SAR measured	250 mW input power	9.07 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**36.8 W/kg ± 17.0 % (k=2)**

SAR averaged over 10 cm³ (10 g) of Head TSL	condition	
SAR measured	250 mW input power	4.79 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**19.3 W/kg ± 16.5 % (k=2)**

Body TSL parameters

The following parameters and calculations were applied.

	Temperature	**Permittivity**	**Conductivity**
Nominal Body TSL parameters	22.0 °C	53.4	1.49 mho/m
Measured Body TSL parameters	(22.0 ± 0.2) °C	54.2 ± 6 %	1.48 mho/m ± 6 %
Body TSL temperature change during test	< 0.5 °C	----	----

SAR result with Body TSL

SAR averaged over 1 cm³ (1 g) of Body TSL	Condition	
SAR measured	250 mW input power	8.85 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	**35.7 W/kg ± 17.0 % (k=2)**

SAR averaged over 10 cm³ (10 g) of Body TSL	condition	
SAR measured	250 mW input power	4.72 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	**19.0 W/kg ± 16.5 % (k=2)**

Appendix (Additional assessments outside the scope of SCS 0108)

Antenna Parameters with Head TSL

Impedance, transformed to feed point	48.8 Ω - 1.4 jΩ
Return Loss	- 34.4 dB

Antenna Parameters with Body TSL

Impedance, transformed to feed point	46.4 Ω - 1.2 jΩ
Return Loss	- 28.1 dB

General Antenna Parameters and Design

Electrical Delay (one direction)	1.221 ns

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

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

Additional EUT Data

Manufactured by	SPEAG
Manufactured on	June 15, 2010

DASY5 Validation Report for Head TSL

Date: 23.11.2015

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole 1750 MHz; Type: D1750V2; Serial: D1750V2 - SN: 1068

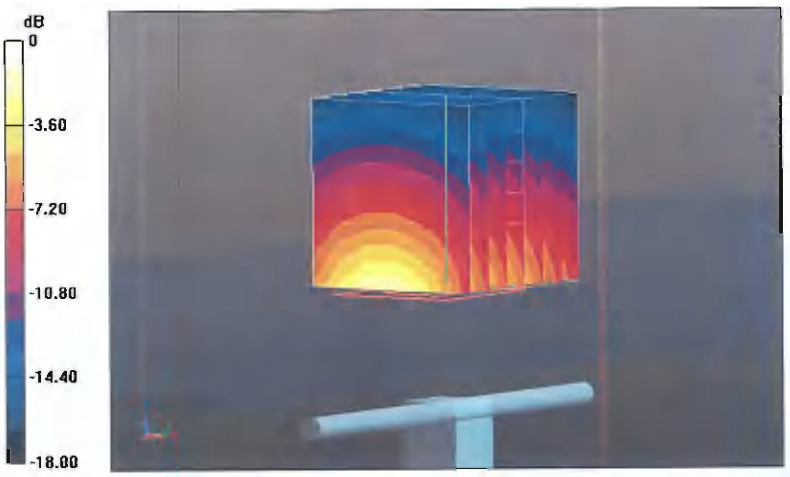
Communication System: UID 0 - CW; Frequency: 1750 MHz
Medium parameters used: f = 1750 MHz; σ = 1.35 S/m; ε_r = 40.8; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)

DASY52 Configuration:

- Probe: EX3DV4 - SN7349; ConvF(8.38, 8.38, 8.38); Calibrated: 30.12.2014;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 17.08.2015
- Phantom: Flat Phantom 5.0 (front); Type: QD000P50AA; Serial: 1001
- DASY52 52.8.8(1222); SEMCAD X 14.6.10(7331)

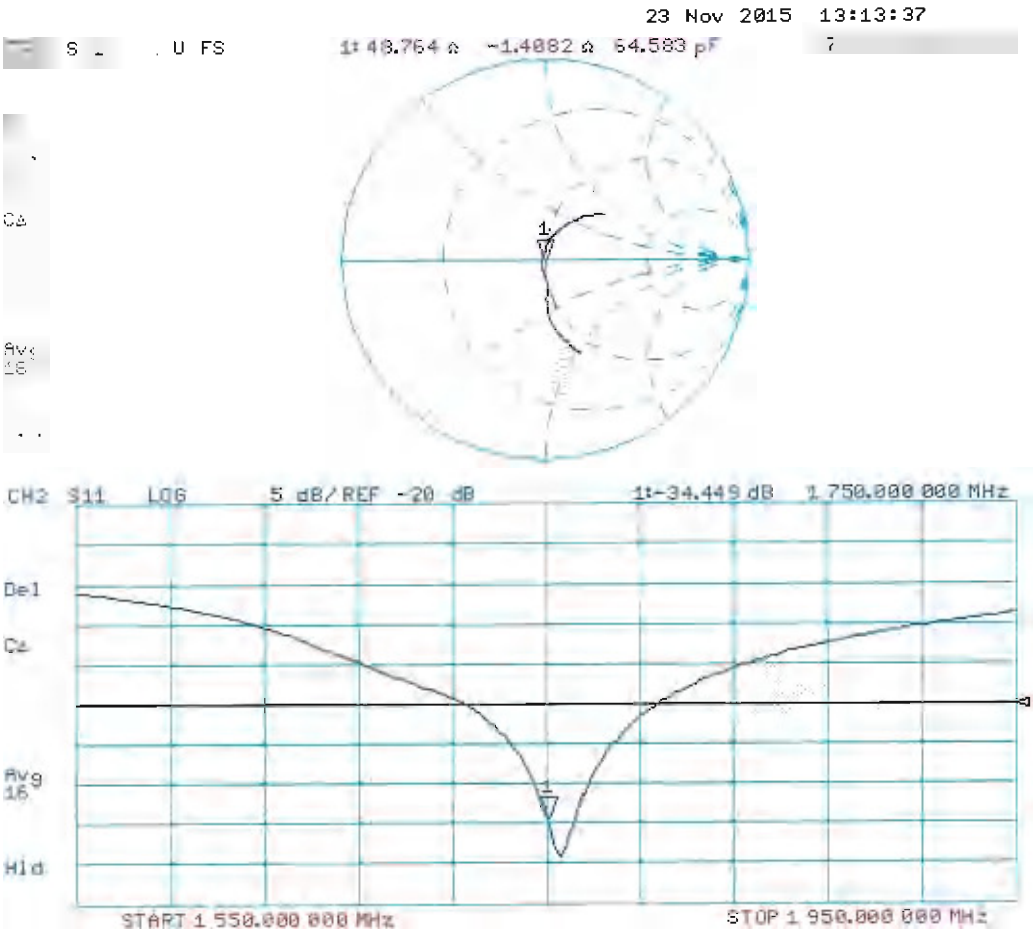
Dipole Calibration for Head Tissue/Pin=250 mW, d=10mm/Zoom Scan (7x7x7)/Cube 0:

Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 104.3 V/m; Power Drift = 0.03 dB
Peak SAR (extrapolated) = 16.9 W/kg
SAR(1 g) = 9.07 W/kg; SAR(10 g) = 4.79 W/kg
Maximum value of SAR (measured) = 13.8 W/kg



0 dB = 13.8 W/kg = 11.40 dBW/kg

Impedance Measurement Plot for Head TSL



DASY5 Validation Report for Body TSL

Date: 23.11.2015

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole 1750 MHz; Type: D1750V2; Serial: D1750V2 - SN: 1068

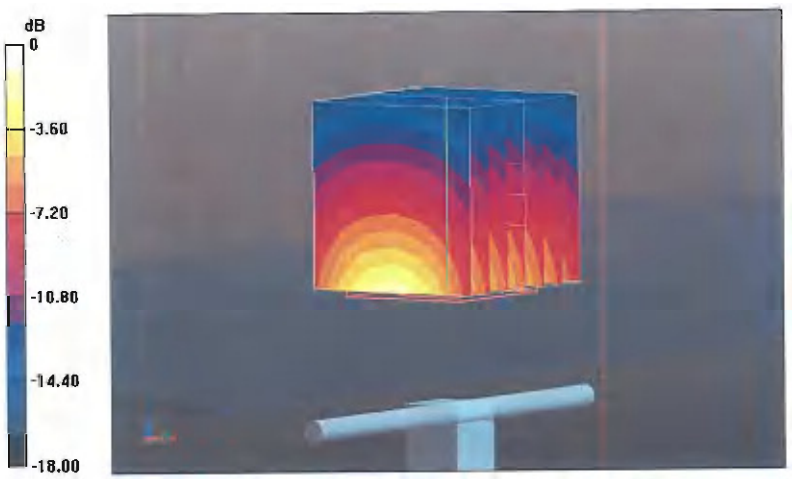
Communication System: UID 0 - CW; Frequency: 1750 MHz
Medium parameters used: f = 1750 MHz; σ = 1.48 S/m; ε_r = 54.2; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)

DASY52 Configuration:

- Probe: EX3DV4 - SN7349; ConvF(8.25, 8.25, 8.25); Calibrated: 30.12.2014;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 17.08.2015
- Phantom: Flat Phantom 5.0 (back); Type: QD000P50AA; Serial: 1002
- DASY52 52.8.8(1222); SEMCAD X 14.6.10(7331)

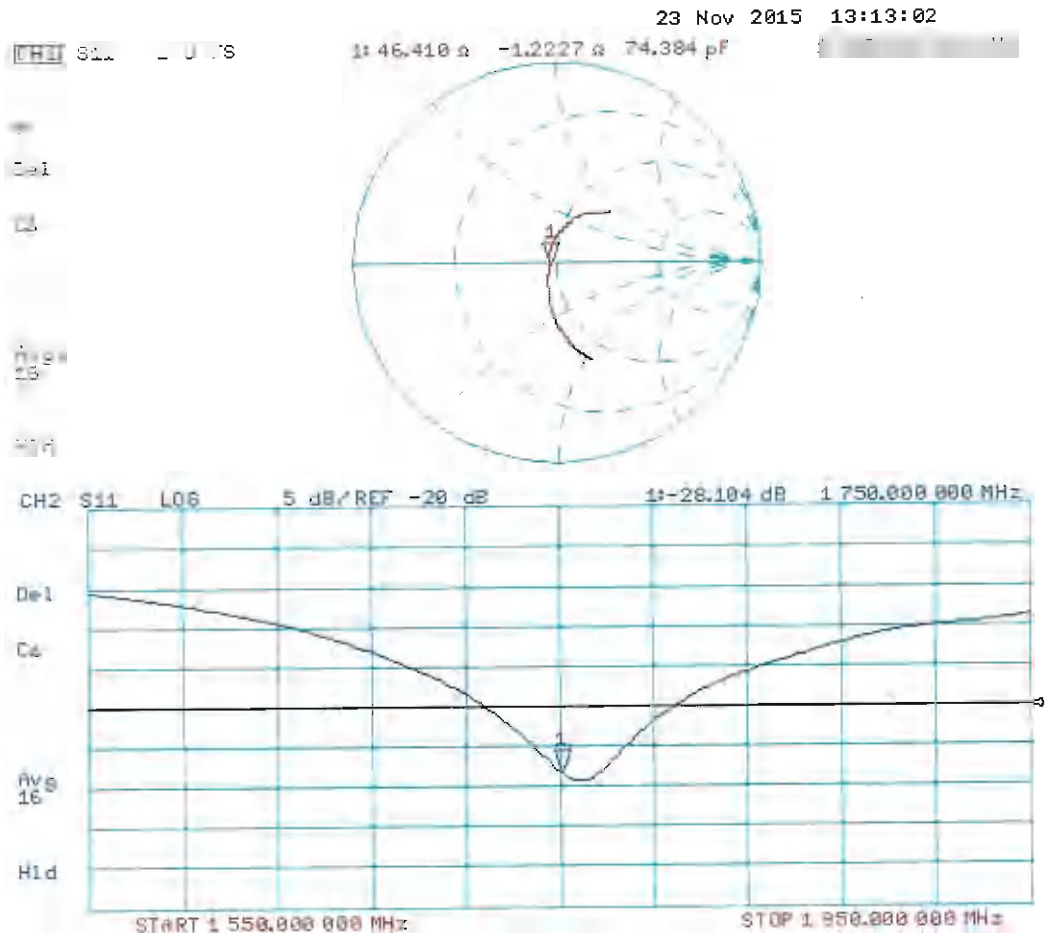
Dipole Calibration for Body Tissue/Pin=250 mW, d=10mm/Zoom Scan (7x7x7)/Cube 0:

Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 98.87 V/m; Power Drift = -0.01 dB
Peak SAR (extrapolated) = 15.7 W/kg
SAR(1 g) = 8.85 W/kg; SAR(10 g) = 4.72 W/kg
Maximum value of SAR (measured) = 13.3 W/kg



0 dB = 13.3 W/kg = 11.24 dBW/kg

Impedance Measurement Plot for Body TSL



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

S Schweizerischer Kalibrierdienst
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Accreditation No.: SCS 0108

Client **Sporton-TW (Auden)**

Certificate No: D1900V2-5d041_Oct15

CALIBRATION CERTIFICATE

Object	D1900V2 - SN: 5d041
Calibration procedure(s)	QA CAL-05.v9 Calibration procedure for dipole validation kits above 700 MHz
Calibration date:	October 22, 2015

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

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

Calibration Equipment used (M&TE critical for calibration)

Primary Standards	ID #	Cal Date (Certificate No.)	Scheduled Calibration
Power meter EPM-442A	GB37480704	07-Oct-15 (No. 217-02222)	Oct-16
Power sensor HP 8481A	US37292783	07-Oct-15 (No. 217-02222)	Oct-16
Power sensor HP 8481A	MY41092317	07-Oct-15 (No. 217-02223)	Oct-16
Reference 20 dB Attenuator	SN: 5058 (20k)	01-Apr-15 (No. 217-02131)	Mar-16
Type-N mismatch combination	SN: 5047.2 / 06327	01-Apr-15 (No. 217-02134)	Mar-16
Reference Probe EX3DV4	SN: 7349	30-Dec-14 (No. EX3-7349_Dec14)	Dec-15
DAE4	SN: 601	17-Aug-15 (No. DAE4-601_Aug15)	Aug-16

Secondary Standards	ID #	Check Date (in house)	Scheduled Check
RF generator R&S SMT-06	100972	15-Jun-15 (in house check Jun-15)	In house check: Jun-18
Network Analyzer HP 8753E	US37390585 S4206	18-Oct-01 (in house check Oct-15)	In house check: Oct-16

	Name	Function	Signature
Calibrated by:	Israe Elnaouq	Laboratory Technician	
Approved by:	Katja Pokovic	Technical Manager	

Issued: October 22, 2015

This calibration certificate shall not be reproduced except in full without written approval of the laboratory.

Glossary:

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

Calibration is Performed According to the Following Standards:

a) IEEE Std 1528-2013, "IEEE Recommended Practice for Determining the Peak Spatial-Averaged Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques", June 2013
b) IEC 62209-1, "Procedure to measure the Specific Absorption Rate (SAR) for hand-held devices used in close proximity to the ear (frequency range of 300 MHz to 3 GHz)", February 2005
c) IEC 62209-2, "Procedure to determine the Specific Absorption Rate (SAR) for wireless communication devices used in close proximity to the human body (frequency range of 30 MHz to 6 GHz)", March 2010
d) KDB 865664, "SAR Measurement Requirements for 100 MHz to 6 GHz"

Additional Documentation:

e) DASY4/5 System Handbook

Methods Applied and Interpretation of Parameters:

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

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

Measurement Conditions

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

DASY Version	DASY5	V52.8.8
Extrapolation	Advanced Extrapolation	
Phantom	Modular Flat Phantom	
Distance Dipole Center - TSL	10 mm	with Spacer
Zoom Scan Resolution	dx, dy, dz = 5 mm	
Frequency	1900 MHz ± 1 MHz	

Head TSL parameters

The following parameters and calculations were applied.

	Temperature	**Permittivity**	**Conductivity**
Nominal Head TSL parameters	22.0 °C	40.0	1.40 mho/m
Measured Head TSL parameters	(22.0 ± 0.2) °C	38.9 ± 6 %	1.38 mho/m ± 6 %
Head TSL temperature change during test	< 0.5 °C	----	----

SAR result with Head TSL

SAR averaged over 1 cm^3 (1 g) of Head TSL	Condition	
SAR measured	250 mW input power	9.92 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**39.8 W/kg ± 17.0 % (k=2)**

SAR averaged over 10 cm^3 (10 g) of Head TSL	condition	
SAR measured	250 mW input power	5.19 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**20.8 W/kg ± 16.5 % (k=2)**

Body TSL parameters

The following parameters and calculations were applied.

	Temperature	**Permittivity**	**Conductivity**
Nominal Body TSL parameters	22.0 °C	53.3	1.52 mho/m
Measured Body TSL parameters	(22.0 ± 0.2) °C	52.3 ± 6 %	1.51 mho/m ± 6 %
Body TSL temperature change during test	< 0.5 °C	----	----

SAR result with Body TSL

SAR averaged over 1 cm^3 (1 g) of Body TSL	Condition	
SAR measured	250 mW input power	10.0 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	**40.0 W/kg ± 17.0 % (k=2)**

SAR averaged over 10 cm^3 (10 g) of Body TSL	condition	
SAR measured	250 mW input power	5.30 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	**21.2 W/kg ± 16.5 % (k=2)**

Appendix (Additional assessments outside the scope of SCS 0108)

Antenna Parameters with Head TSL

Impedance, transformed to feed point	53.0 Ω + 7.1 jΩ
Return Loss	- 22.5 dB

Antenna Parameters with Body TSL

Impedance, transformed to feed point	48.8 Ω + 7.7 jΩ
Return Loss	- 22.1 dB

General Antenna Parameters and Design

Electrical Delay (one direction)	1.203 ns

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

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

Additional EUT Data

Manufactured by	SPEAG
Manufactured on	July 04, 2003

DASY5 Validation Report for Head TSL

Date: 22.10.2015

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole 1900 MHz; Type: D1900V2; Serial: D1900V2 - SN: 5d041

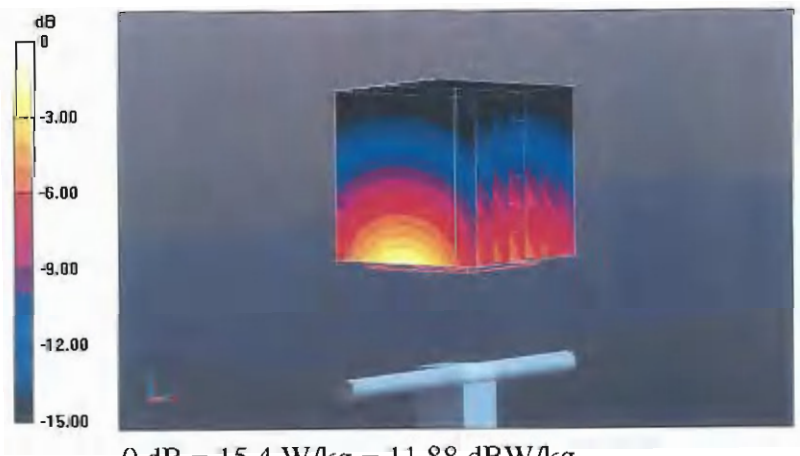
Communication System: UID 0 - CW; Frequency: 1900 MHz
Medium parameters used: f = 1900 MHz; σ = 1.38 S/m; ε_r = 38.9; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)

DASY52 Configuration:

- Probe: EX3DV4 - SN7349; ConvF(8.14, 8.14, 8.14); Calibrated: 30.12.2014;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 17.08.2015
- Phantom: Flat Phantom 5.0 (front); Type: QD000P50AA; Serial: 1001
- DASY52 52.8.8(1222); SEMCAD X 14.6.10(7331)

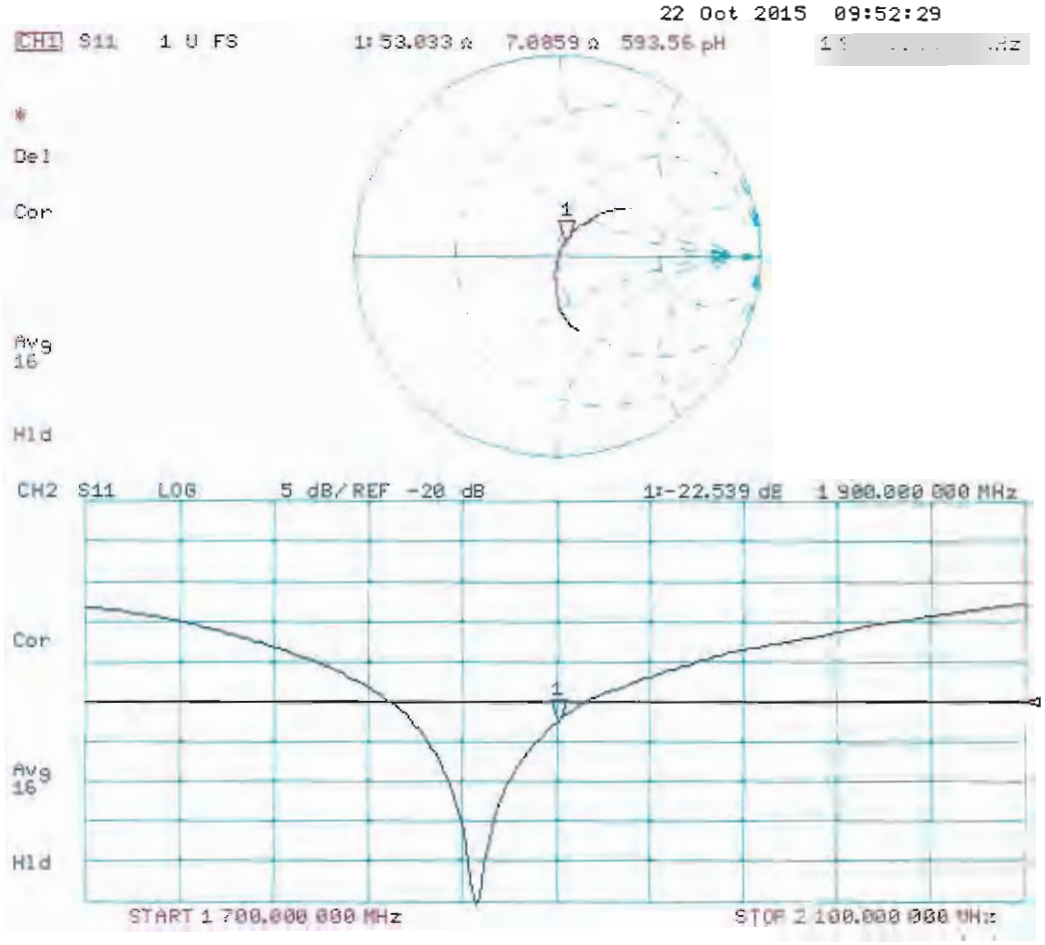
Dipole Calibration for Head Tissue/Pin=250 mW, d=10mm/Zoom Scan (7x7x7)/Cube 0:

Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 109.2 V/m; Power Drift = 0.04 dB
Peak SAR (extrapolated) = 18.6 W/kg
SAR(1 g) = 9.92 W/kg; SAR(10 g) = 5.19 W/kg
Maximum value of SAR (measured) = 15.4 W/kg



0 dB = 15.4 W/kg = 11.88 dBW/kg

Impedance Measurement Plot for Head TSL



DASY5 Validation Report for Body TSL

Date: 22.10.2015

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole 1900 MHz; Type: D1900V2; Serial: D1900V2 - SN: 5d041

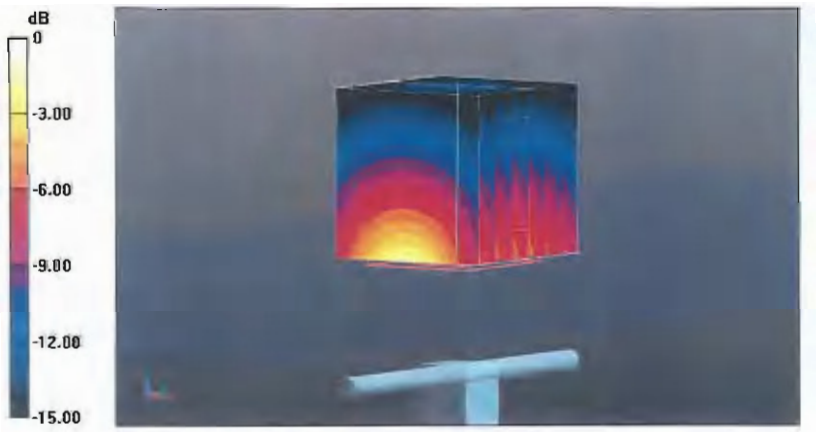
Communication System: UID 0 - CW; Frequency: 1900 MHz
Medium parameters used: f = 1900 MHz; σ = 1.51 S/m; ε_r = 52.3; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)

DASY52 Configuration:

- Probe: EX3DV4 - SN7349; ConvF(7.9, 7.9, 7.9); Calibrated: 30.12.2014;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 17.08.2015
- Phantom: Flat Phantom 5.0 (back); Type: QD000P50AA; Serial: 1002
- DASY52 52.8.8(1222); SEMCAD X 14.6.10(7331)

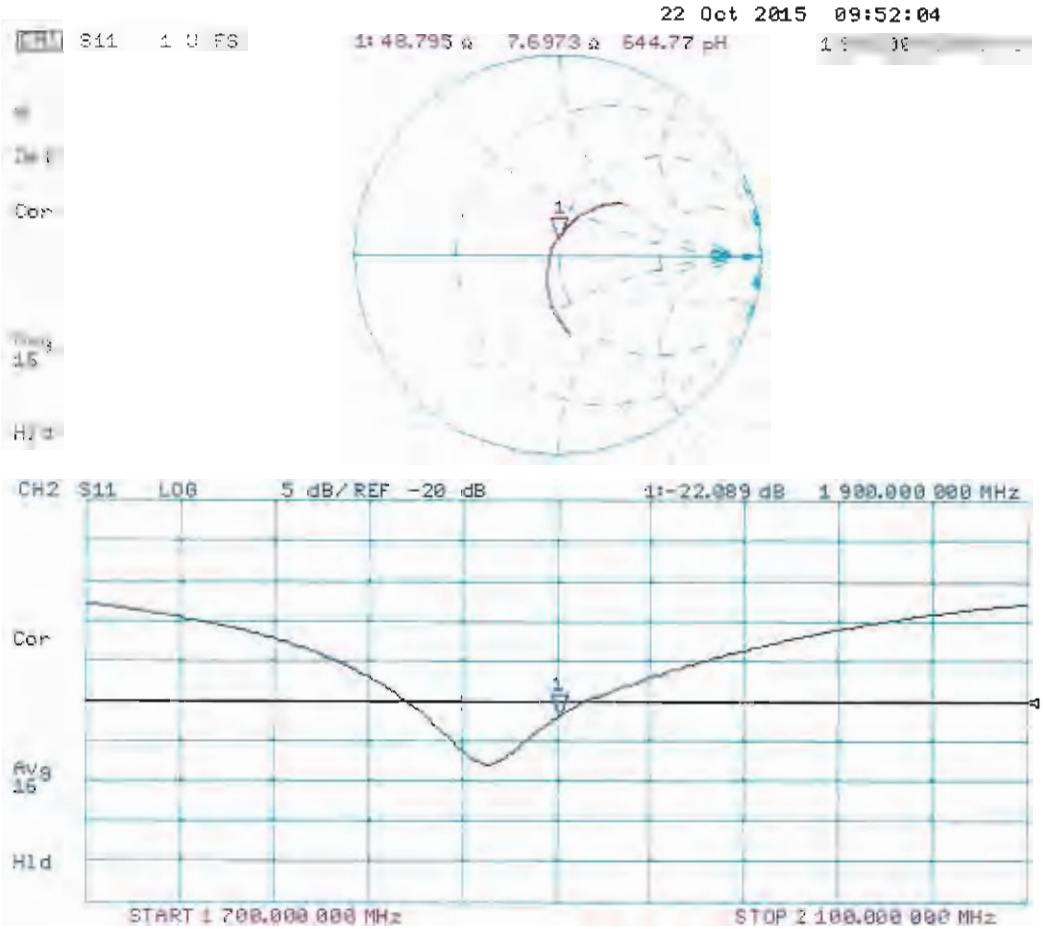
Dipole Calibration for Body Tissue/Pin=250 mW, d=10mm/Zoom Scan (7x7x7)/Cube 0:

Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 104.2 V/m; Power Drift = 0.02 dB
Peak SAR (extrapolated) = 17.9 W/kg
SAR(1 g) = 10 W/kg; SAR(10 g) = 5.3 W/kg
Maximum value of SAR (measured) = 15.2 W/kg



0 dB = 15.2 W/kg = 11.82 dBW/kg

Impedance Measurement Plot for Body TSL



Calibration Laboratory of
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Accreditation No.: SCS 0108

Client **Sporton-TW (Auden)**

Certificate No: D2450V2-736_Aug15

CALIBRATION CERTIFICATE

Object	D2450V2 - SN: 736
Calibration procedure(s)	QA CAL-05.v9 Calibration procedure for dipole validation kits above 700 MHz
Calibration date:	August 20, 2015

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

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

Calibration Equipment used (M&TE critical for calibration)

Primary Standards	ID #	Cal Date (Certificate No.)	Scheduled Calibration
Power meter EPM-442A	GB37480704	07-Oct-14 (No. 217-02020)	Oct-15
Power sensor HP 8481A	US37292783	07-Oct-14 (No. 217-02020)	Oct-15
Power sensor HP 8481A	MY41092317	07-Oct-14 (No. 217-02021)	Oct-15
Reference 20 dB Attenuator	SN: 5058 (20k)	01-Apr-15 (No. 217-02131)	Mar-16
Type-N mismatch combination	SN: 5047.2 / 06327	01-Apr-15 (No. 217-02134)	Mar-16
Reference Probe ES3DV3	SN: 3205	30-Dec-14 (No. ES3-3205_Dec14)	Dec-15
DAE4	SN: 601	17-Aug-15 (No. DAE4-601_Aug15)	Aug-16

Secondary Standards	ID #	Check Date (in house)	Scheduled Check
RF generator R&S SMT-06	100005	04-Aug-99 (in house check Oct-13)	In house check: Oct-16
Network Analyzer HP 8753E	US37390585 S4206	18-Oct-01 (in house check Oct-14)	In house check: Oct-15

	Name	Function	Signature
Calibrated by:	Michael Weber	Laboratory Technician	M. Weber
Approved by:	Katja Pokovic	Technical Manager	

Issued: August 21, 2015

This calibration certificate shall not be reproduced except in full without written approval of the laboratory.

Glossary:

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

Calibration is Performed According to the Following Standards:

a) IEEE Std 1528-2013, "IEEE Recommended Practice for Determining the Peak Spatial-Averaged Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques", June 2013
b) IEC 62209-1, "Procedure to measure the Specific Absorption Rate (SAR) for hand-held devices used in close proximity to the ear (frequency range of 300 MHz to 3 GHz)", February 2005
c) IEC 62209-2, "Procedure to determine the Specific Absorption Rate (SAR) for wireless communication devices used in close proximity to the human body (frequency range of 30 MHz to 6 GHz)", March 2010
d) KDB 865664, "SAR Measurement Requirements for 100 MHz to 6 GHz"

Additional Documentation:

e) DASY4/5 System Handbook

Methods Applied and Interpretation of Parameters:

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

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

Measurement Conditions

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

DASY Version	DASY5	V52.8.8
Extrapolation	Advanced Extrapolation	
Phantom	Modular Flat Phantom	
Distance Dipole Center - TSL	10 mm	with Spacer
Zoom Scan Resolution	dx, dy, dz = 5 mm	
Frequency	2450 MHz ± 1 MHz	

Head TSL parameters

The following parameters and calculations were applied.

	Temperature	**Permittivity**	**Conductivity**
Nominal Head TSL parameters	22.0 °C	39.2	1.80 mho/m
Measured Head TSL parameters	(22.0 ± 0.2) °C	39.2 ± 6 %	1.87 mho/m ± 6 %
Head TSL temperature change during test	< 0.5 °C	----	----

SAR result with Head TSL

SAR averaged over 1 cm³ (1 g) of Head TSL	Condition	
SAR measured	250 mW input power	13.6 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**53.4 W/kg ± 17.0 % (k=2)**

SAR averaged over 10 cm³ (10 g) of Head TSL	condition	
SAR measured	250 mW input power	6.35 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**25.2 W/kg ± 16.5 % (k=2)**

Body TSL parameters

The following parameters and calculations were applied.

	Temperature	**Permittivity**	**Conductivity**
Nominal Body TSL parameters	22.0 °C	52.7	1.95 mho/m
Measured Body TSL parameters	(22.0 ± 0.2) °C	53.2 ± 6 %	2.00 mho/m ± 6 %
Body TSL temperature change during test	< 0.5 °C	----	----

SAR result with Body TSL

SAR averaged over 1 cm³ (1 g) of Body TSL	Condition	
SAR measured	250 mW input power	13.1 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	**51.9 W/kg ± 17.0 % (k=2)**

SAR averaged over 10 cm³ (10 g) of Body TSL	condition	
SAR measured	250 mW input power	6.08 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	**24.2 W/kg ± 16.5 % (k=2)**

Appendix (Additional assessments outside the scope of SCS 0108)

Antenna Parameters with Head TSL

Impedance, transformed to feed point	54.1 Ω + 2.3 jΩ
Return Loss	- 27.0 dB

Antenna Parameters with Body TSL

Impedance, transformed to feed point	49.6 Ω + 3.8 jΩ
Return Loss	- 28.3 dB

General Antenna Parameters and Design

Electrical Delay (one direction)	1.158 ns

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

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

Additional EUT Data

Manufactured by	SPEAG
Manufactured on	August 26, 2003

DASY5 Validation Report for Head TSL

Date: 20.08.2015

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole 2450 MHz; Type: D2450V2; Serial: D2450V2 - SN: 736

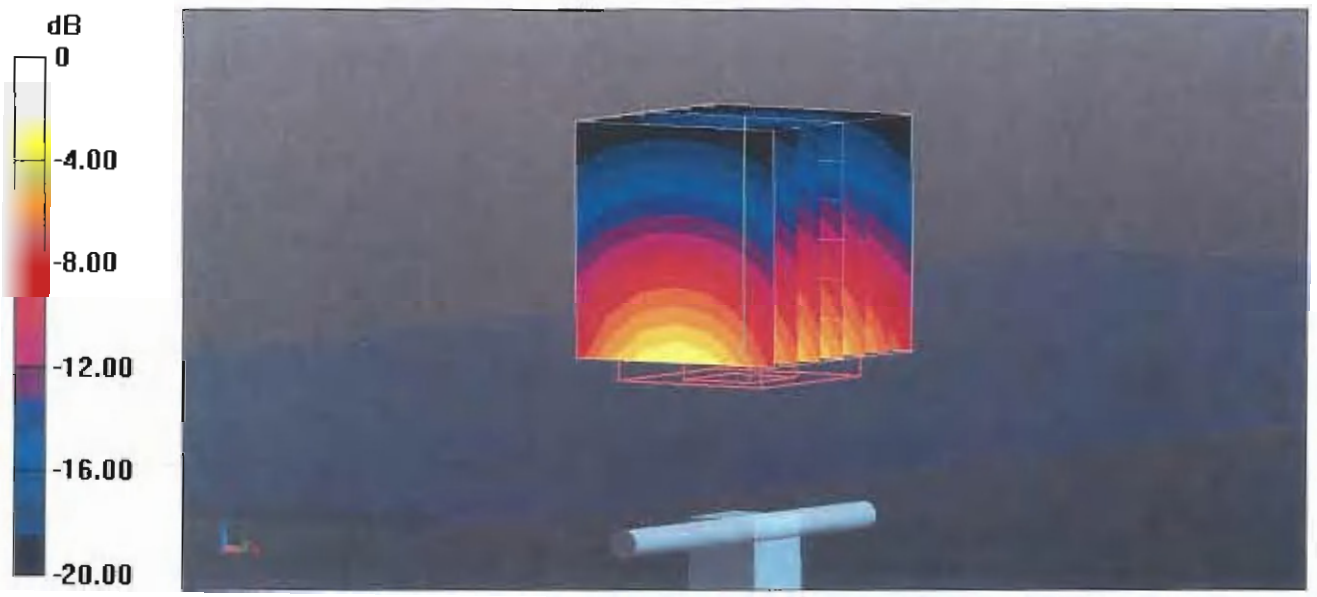
Communication System: UID 0 - CW; Frequency: 2450 MHz
Medium parameters used: f = 2450 MHz; σ = 1.87 S/m; ε_r = 39.2; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)

DASY52 Configuration:

- Probe: ES3DV3 - SN3205; ConvF(4.54, 4.54, 4.54); Calibrated: 30.12.2014;
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 17.08.2015
- Phantom: Flat Phantom 5.0 (front); Type: QD000P50AA; Serial: 1001
- DASY52 52.8.8(1222); SEMCAD X 14.6.10(7331)

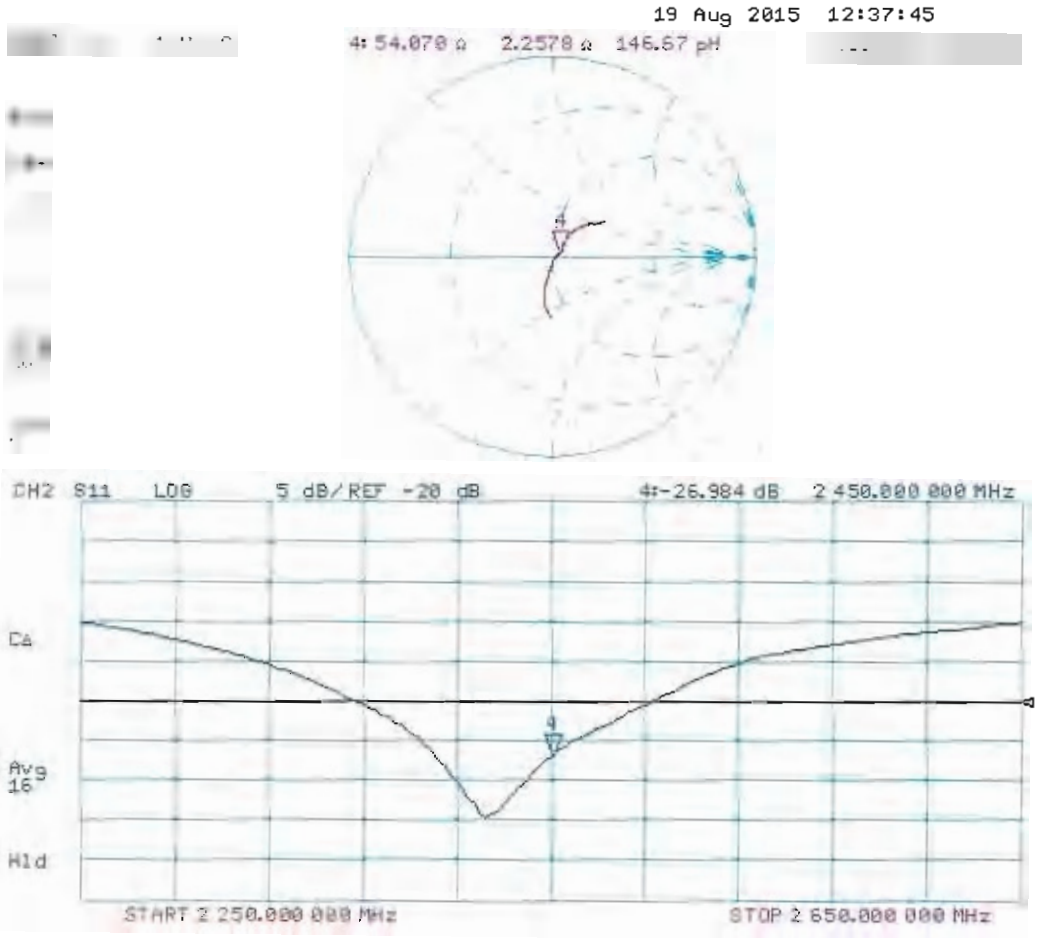
Dipole Calibration for Head Tissue/Pin=250 mW, d=10mm/Zoom Scan (7x7x7)/Cube 0:

Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 101.5 V/m; Power Drift = -0.00 dB
Peak SAR (extrapolated) = 27.7 W/kg
SAR(1 g) = 13.6 W/kg; SAR(10 g) = 6.35 W/kg
Maximum value of SAR (measured) = 18.0 W/kg



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

Impedance Measurement Plot for Head TSL



DASY5 Validation Report for Body TSL

Date: 19.08.2015

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole 2450 MHz; Type: D2450V2; Serial: D2450V2 - SN: 736

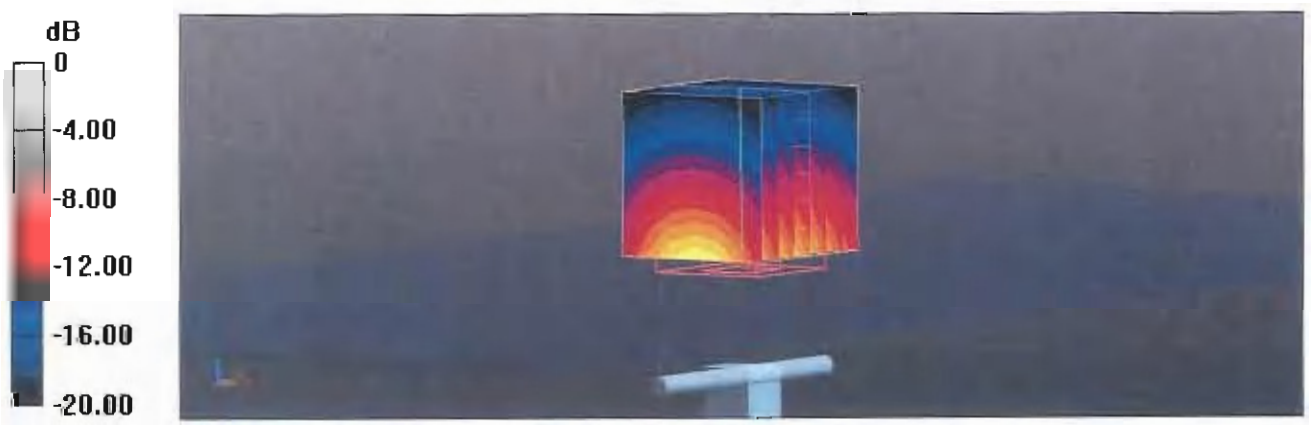
Communication System: UID 0 - CW; Frequency: 2450 MHz
Medium parameters used: f = 2450 MHz; σ = 2 S/m; ε_r = 53.2; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)

DASY52 Configuration:

- Probe: ES3DV3 - SN3205; ConvF(4.32, 4.32, 4.32); Calibrated: 30.12.2014;
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 17.08.2015
- Phantom: Flat Phantom 5.0 (back); Type: QD000P50AA; Serial: 1002
- DASY52 52.8.8(1222); SEMCAD X 14.6.10(7331)

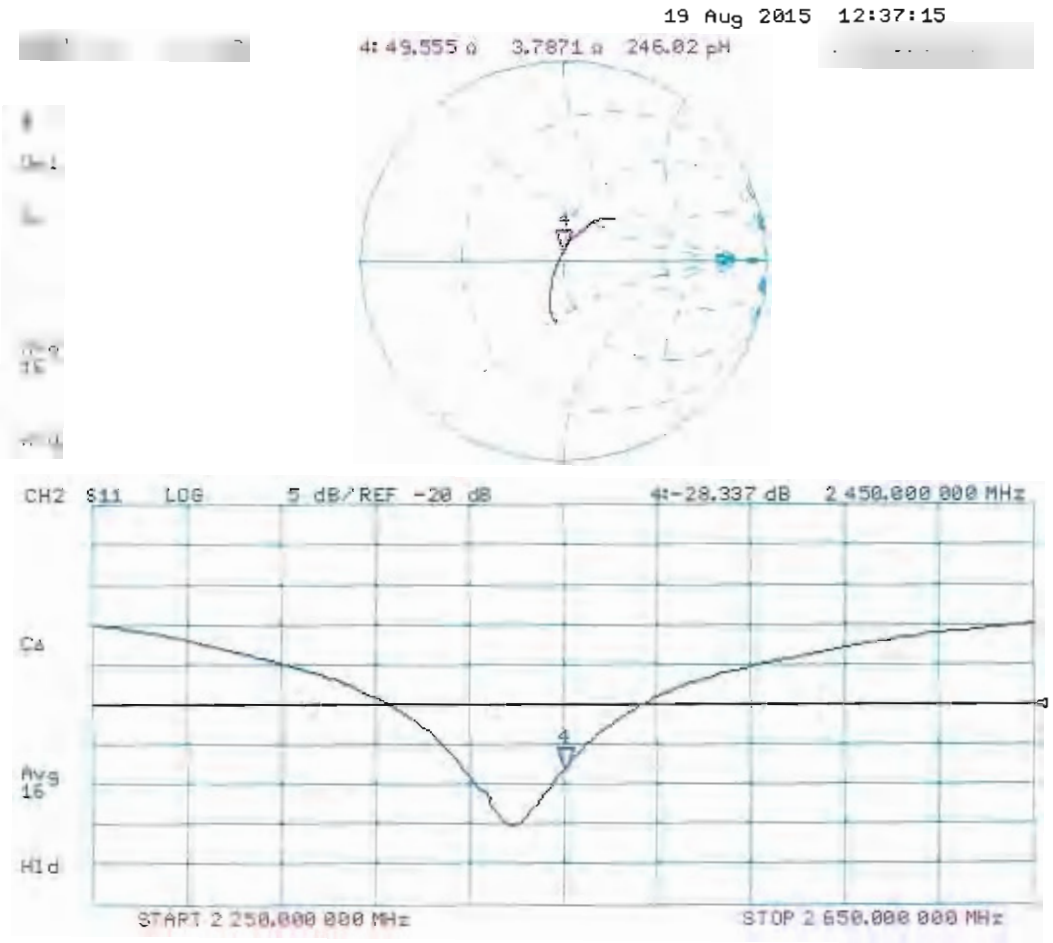
Dipole Calibration for Body Tissue/Pin=250 mW, d=10mm/Zoom Scan (7x7x7)/Cube 0:

Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 95.81 V/m; Power Drift = 0.00 dB
Peak SAR (extrapolated) = 26.8 W/kg
SAR(1 g) = 13.1 W/kg; SAR(10 g) = 6.08 W/kg
Maximum value of SAR (measured) = 17.3 W/kg



0 dB = 17.3 W/kg = 12.38 dBW/kg

Impedance Measurement Plot for Body TSL



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Accreditation No.: SCS 0108

Client **Sporton-TW (Auden)** **Certificate No: D2600V2-1008_Aug15**

CALIBRATION CERTIFICATE

Object	D2600V2 - SN: 1008
Calibration procedure(s)	QA CAL-05.v9 Calibration procedure for dipole validation kits above 700 MHz
Calibration date:	August 19, 2015

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

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

Calibration Equipment used (M&TE critical for calibration)

Primary Standards	ID #	Cal Date (Certificate No.)	Scheduled Calibration
Power meter EPM-442A	GB37480704	07-Oct-14 (No. 217-02020)	Oct-15
Power sensor HP 8481A	US37292783	07-Oct-14 (No. 217-02020)	Oct-15
Power sensor HP 8481A	MY41092317	07-Oct-14 (No. 217-02021)	Oct-15
Reference 20 dB Attenuator	SN: 5058 (20k)	01-Apr-15 (No. 217-02131)	Mar-16
Type-N mismatch combination	SN: 5047.2 / 06327	01-Apr-15 (No. 217-02134)	Mar-16
Reference Probe ES3DV3	SN: 3205	30-Dec-14 (No. ES3-3205_Dec14)	Dec-15
DAE4	SN: 601	17-Aug-15 (No. DAE4-601_Aug15)	Aug-16

Secondary Standards	ID #	Check Date (in house)	Scheduled Check
RF generator R&S SMT-06	100005	04-Aug-99 (in house check Oct-13)	In house check: Oct-16
Network Analyzer HP 8753E	US37390585 S4206	18-Oct-01 (in house check Oct-14)	In house check: Oct-15

	Name	Function	Signature
Calibrated by:	Michael Weber	Laboratory Technician	
Approved by:	Katja Pokovic	Technical Manager	

Issued: August 26, 2015

This calibration certificate shall not be reproduced except in full without written approval of the laboratory.

Glossary:

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

Calibration is Performed According to the Following Standards:

a) IEEE Std 1528-2013, "IEEE Recommended Practice for Determining the Peak Spatial-Averaged Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques", June 2013
b) IEC 62209-1, "Procedure to measure the Specific Absorption Rate (SAR) for hand-held devices used in close proximity to the ear (frequency range of 300 MHz to 3 GHz)", February 2005
c) IEC 62209-2, "Procedure to determine the Specific Absorption Rate (SAR) for wireless communication devices used in close proximity to the human body (frequency range of 30 MHz to 6 GHz)", March 2010
d) KDB 865664, "SAR Measurement Requirements for 100 MHz to 6 GHz"

Additional Documentation:

e) DASY4/5 System Handbook

Methods Applied and Interpretation of Parameters:

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

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

Measurement Conditions

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

DASY Version	DASY5	V52.8.8
Extrapolation	Advanced Extrapolation	
Phantom	Modular Flat Phantom	
Distance Dipole Center - TSL	10 mm	with Spacer
Zoom Scan Resolution	dx, dy, dz = 5 mm	
Frequency	2600 MHz ± 1 MHz	

Head TSL parameters

The following parameters and calculations were applied.

	Temperature	**Permittivity**	**Conductivity**
Nominal Head TSL parameters	22.0 °C	39.0	1.96 mho/m
Measured Head TSL parameters	(22.0 ± 0.2) °C	38.6 ± 6 %	2.05 mho/m ± 6 %
Head TSL temperature change during test	< 0.5 °C	----	----

SAR result with Head TSL

SAR averaged over 1 cm³ (1 g) of Head TSL	Condition	
SAR measured	250 mW input power	14.4 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**56.3 W/kg ± 17.0 % (k=2)**

SAR averaged over 10 cm³ (10 g) of Head TSL	condition	
SAR measured	250 mW input power	6.47 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**25.6 W/kg ± 16.5 % (k=2)**

Body TSL parameters

The following parameters and calculations were applied.

	Temperature	**Permittivity**	**Conductivity**
Nominal Body TSL parameters	22.0 °C	52.5	2.16 mho/m
Measured Body TSL parameters	(22.0 ± 0.2) °C	52.8 ± 6 %	2.18 mho/m ± 6 %
Body TSL temperature change during test	< 0.5 °C	----	----

SAR result with Body TSL

SAR averaged over 1 cm³ (1 g) of Body TSL	Condition	
SAR measured	250 mW input power	14.0 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	**55.8 W/kg ± 17.0 % (k=2)**

SAR averaged over 10 cm³ (10 g) of Body TSL	condition	
SAR measured	250 mW input power	6.29 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	**25.1 W/kg ± 16.5 % (k=2)**

Appendix (Additional assessments outside the scope of SCS 0108)

Antenna Parameters with Head TSL

Impedance, transformed to feed point	49.6 Ω - 2.1 jΩ
Return Loss	- 33.2 dB

Antenna Parameters with Body TSL

Impedance, transformed to feed point	45.8 Ω - 1.7 jΩ
Return Loss	- 26.5 dB

General Antenna Parameters and Design

Electrical Delay (one direction)	1.154 ns

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

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

Additional EUT Data

Manufactured by	SPEAG
Manufactured on	December 23, 2006

DASY5 Validation Report for Head TSL

Date: 19.08.2015

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole 2600 MHz; Type: D2600V2; Serial: D2600V2 - SN: 1008

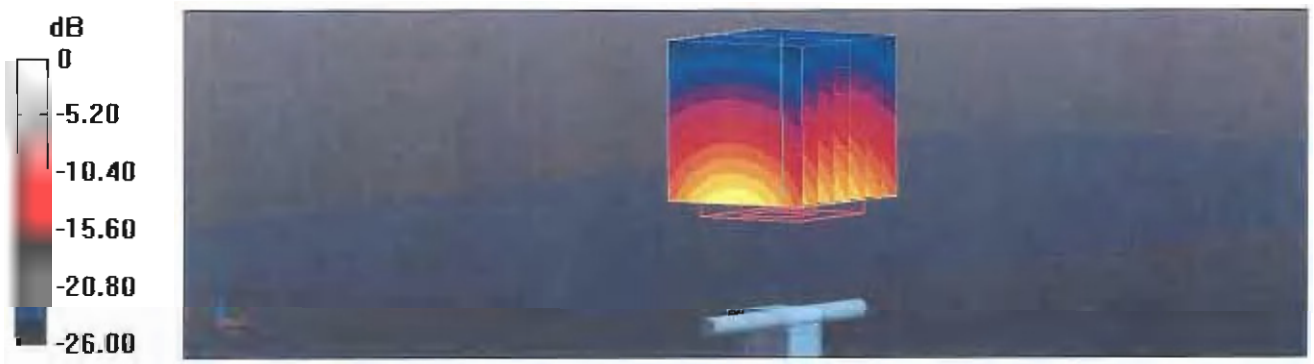
Communication System: UID 0 - CW; Frequency: 2600 MHz
Medium parameters used: f = 2600 MHz; σ = 2.05 S/m; ε_r = 38.6; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)

DASY52 Configuration:

- Probe: ES3DV3 - SN3205; ConvF(4.49, 4.49, 4.49); Calibrated: 30.12.2014;
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 17.08.2015
- Phantom: Flat Phantom 5.0 (front); Type: QD000P50AA; Serial: 1001
- DASY52 52.8.8(1222); SEMCAD X 14.6.10(7331)

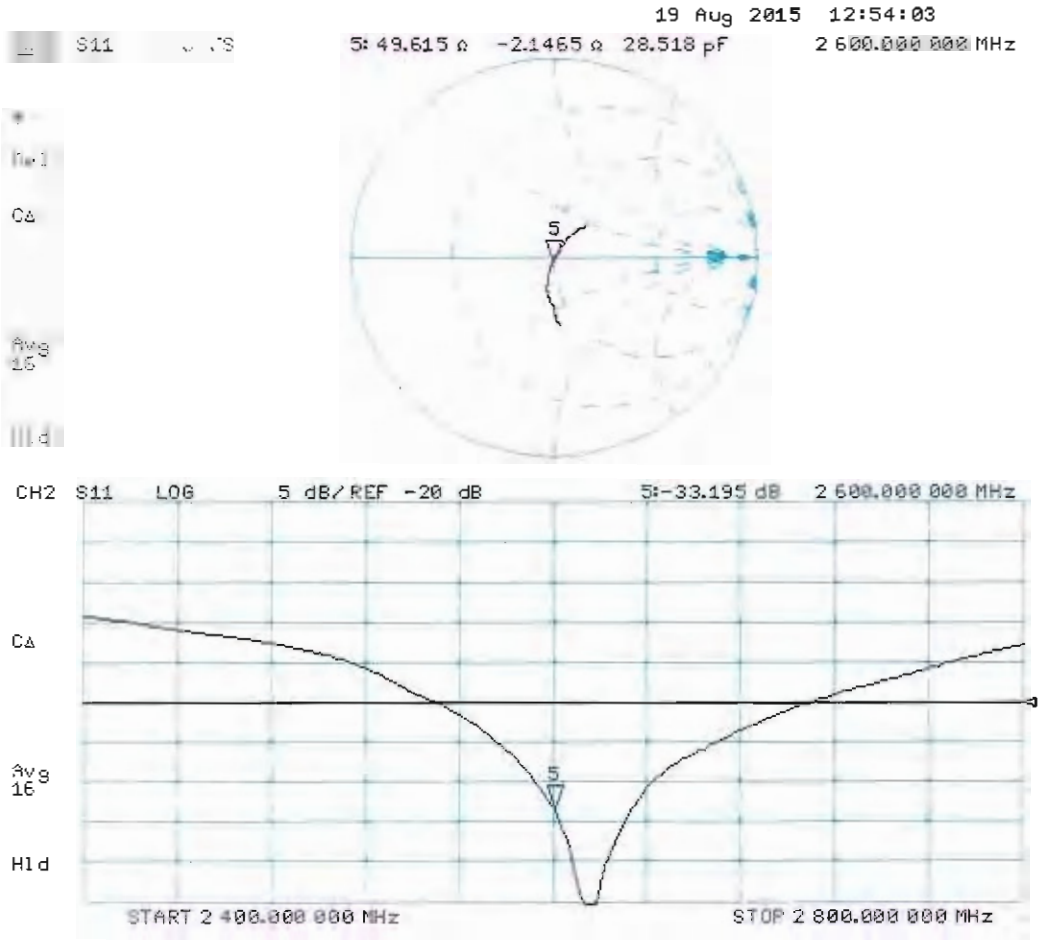
Dipole Calibration for Head Tissue/Pin=250 mW, d=10mm/Zoom Scan (7x7x7)/Cube 0:

Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 102.2 V/m; Power Drift = 0.03 dB
Peak SAR (extrapolated) = 30.4 W/kg
SAR(1 g) = 14.4 W/kg; SAR(10 g) = 6.47 W/kg
Maximum value of SAR (measured) = 19.5 W/kg



0 dB = 19.5 W/kg = 12.90 dBW/kg

Impedance Measurement Plot for Head TSL



DASY5 Validation Report for Body TSL

Date: 19.08.2015

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole 2600 MHz; Type: D2600V2; Serial: D2600V2 - SN: 1008

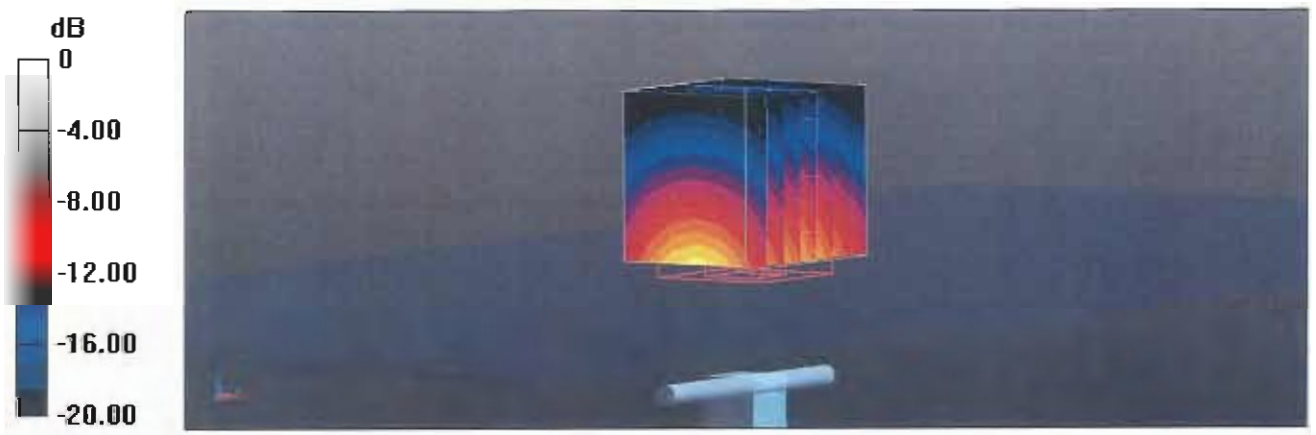
Communication System: UID 0 - CW; Frequency: 2600 MHz
Medium parameters used: f = 2600 MHz; σ = 2.18 S/m; ε_r = 52.8; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)

DASY52 Configuration:

- Probe: ES3DV3 - SN3205; ConvF(4.13, 4.13, 4.13); Calibrated: 30.12.2014;
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 17.08.2015
- Phantom: Flat Phantom 5.0 (back); Type: QD000P50AA; Serial: 1002
- DASY52 52.8.8(1222); SEMCAD X 14.6.10(7331)

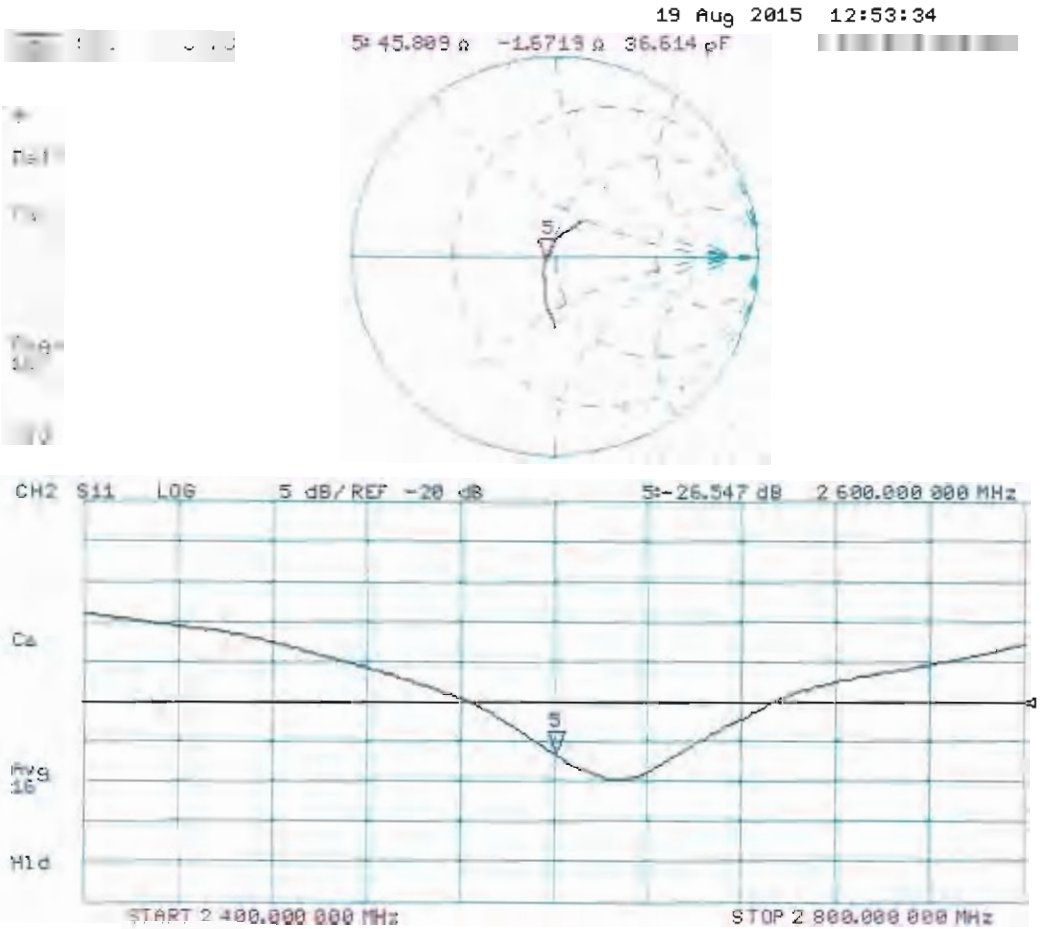
Dipole Calibration for Body Tissue/Pin=250 mW, d=10mm/Zoom Scan (7x7x7)/Cube 0:

Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 97.30 V/m; Power Drift = -0.01 dB
Peak SAR (extrapolated) = 28.6 W/kg
SAR(1 g) = 14 W/kg; SAR(10 g) = 6.29 W/kg
Maximum value of SAR (measured) = 18.7 W/kg



0 dB = 18.7 W/kg = 12.72 dBW/kg

Impedance Measurement Plot for Body TSL



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Accreditation No.: SCS 0108

Client **Auden**

Certificate No: DAE4-916_Dec15

CALIBRATION CERTIFICATE

Object	DAE4 - SD 000 D04 BK - SN: 916
Calibration procedure(s)	QA CAL-06.v29 Calibration procedure for the data acquisition electronics (DAE)
Calibration date:	December 16, 2015

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

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

Calibration Equipment used (M&TE critical for calibration)

Primary Standards	ID #	Cal Date (Certificate No.)	Scheduled Calibration
Keithley Multimeter Type 2001	SN: 0810278	09-Sep-15 (No:17153)	Sep-16
Secondary Standards	**ID #**	**Check Date (in house)**	**Scheduled Check**
Auto DAE Calibration Unit	SE UWS 053 AA 1001	06-Jan-15 (in house check)	In house check: Jan-16
Calibrator Box V2.1	SE UMS 006 AA 1002	06-Jan-15 (in house check)	In house check: Jan-16

	Name	Function	Signature
Calibrated by:	Dominique Steffen	Technician	
Approved by:	Fin Bomholt	Deputy Technical Manager	i.V.

Issued: December 16, 2015

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Glossary

DAE	data acquisition electronics
Connector angle	information used in DASY system to align probe sensor X to the robot coordinate system.

Methods Applied and Interpretation of Parameters

- *DC Voltage Measurement:* Calibration Factor assessed for use in DASY system by comparison with a calibrated instrument traceable to national standards. The figure given corresponds to the full scale range of the voltmeter in the respective range.
- *Connector angle*: The angle of the connector is assessed measuring the angle mechanically by a tool inserted. Uncertainty is not required.
- The following parameters as documented in the Appendix contain technical information as a result from the performance test and require no uncertainty.
  - *DC Voltage Measurement Linearity:* Verification of the Linearity at +10% and -10% of the nominal calibration voltage. Influence of offset voltage is included in this measurement.
  - *Common mode sensitivity:* Influence of a positive or negative common mode voltage on the differential measurement.
  - *Channel separation:* Influence of a voltage on the neighbor channels not subject to an input voltage.
  - *AD Converter Values with inputs shorted:* Values on the internal AD converter corresponding to zero input voltage
  - *Input Offset Measurement*: Output voltage and statistical results over a large number of zero voltage measurements.
  - *Input Offset Current:* Typical value for information; Maximum channel input offset current, not considering the input resistance.
  - *Input resistance:* Typical value for information: DAE input resistance at the connector, during internal auto-zeroing and during measurement.
  - *Low Battery Alarm Voltage:* Typical value for information. Below this voltage, a battery alarm signal is generated.
  - *Power consumption:* Typical value for information. Supply currents in various operating modes.

DC Voltage Measurement

A/D - Converter Resolution nominal

High Range:	1LSB =	6.1μV ,	full range =	-100...+300 mV
Low Range:	1LSB =	61nV ,	full range =	-1.....+3mV

DASY measurement parameters: Auto Zero Time: 3 sec; Measuring time: 3 sec

Calibration Factors	X	Y	Z
High Range	403.872 ± 0.02% (k=2)	403.658 ± 0.02% (k=2)	403.787 ± 0.02% (k=2)
Low Range	3.97309 ± 1.50% (k=2)	3.98670 ± 1.50% (k=2)	3.98020 ± 1.50% (k=2)

Connector Angle

Connector Angle to be used in DASY system	237.5 ° ± 1 °

Appendix (Additional assessments outside the scope of SCS0108)

1. DC Voltage Linearity

High Range		Reading (µV)	Difference (µV)	Error (%)
Channel X	+ Input	200030.55	-1.38	-0.00
Channel X	+ Input	20007.80	3.85	0.02
Channel X	- Input	-20002.99	2.15	-0.01
Channel Y	+ Input	200030.39	-1.74	-0.00
Channel Y	+ Input	20005.85	1.87	0.01
Channel Y	- Input	-20004.60	0.77	-0.00
Channel Z	+ Input	200030.93	-1.37	-0.00
Channel Z	+ Input	20003.67	-0.26	-0.00
Channel Z	- Input	-20007.07	-1.73	0.01

Low Range		Reading (µV)	Difference (µV)	Error (%)
Channel X	+ Input	2000.63	0.02	0.00
Channel X	+ Input	200.53	-0.21	-0.10
Channel X	- Input	-199.49	-0.20	0.10
Channel Y	+ Input	2000.95	0.45	0.02
Channel Y	+ Input	199.89	-0.68	-0.34
Channel Y	- Input	-200.17	-0.73	0.37
Channel Z	+ Input	2000.41	-0.10	-0.01
Channel Z	+ Input	199.38	-1.20	-0.60
Channel Z	- Input	-200.57	-1.09	0.55

2. Common mode sensitivity

DASY measurement parameters: Auto Zero Time: 3 sec; Measuring time: 3 sec

	Common mode Input Voltage (mV)	High Range Average Reading (µV)	Low Range Average Reading (µV)
Channel X	200	3.88	2.49
	- 200	-1.75	-3.33
Channel Y	200	-16.49	-16.75
	- 200	15.84	15.21
Channel Z	200	-23.05	-22.82
	- 200	21.32	21.11

3. Channel separation

DASY measurement parameters: Auto Zero Time: 3 sec; Measuring time: 3 sec

	Input Voltage (mV)	Channel X (µV)	Channel Y (µV)	Channel Z (µV)
Channel X	200	-	-1.09	-3.01
Channel Y	200	4.79	-	0.67
Channel Z	200	8.06	3.10	-

4. AD-Converter Values with inputs shorted

DASY measurement parameters: Auto Zero Time: 3 sec; Measuring time: 3 sec

	High Range (LSB)	Low Range (LSB)
Channel X	15879	14636
Channel Y	16103	16253
Channel Z	15949	14328

5. Input Offset Measurement

DASY measurement parameters: Auto Zero Time: 3 sec; Measuring time: 3 sec
Input 10MΩ

	Average (μV)	min. Offset (μV)	max. Offset (μV)	Std. Deviation (μV)
Channel X	0.23	-0.60	0.95	0.33
Channel Y	0.00	-1.64	1.23	0.38
Channel Z	-0.98	-2.30	0.94	0.49

6. Input Offset Current

Nominal Input circuitry offset current on all channels: <25fA

7. Input Resistance (Typical values for information)

	Zeroing (kOhm)	Measuring (MOhm)
Channel X	200	200
Channel Y	200	200
Channel Z	200	200

8. Low Battery Alarm Voltage (Typical values for information)

Typical values	Alarm Level (VDC)
Supply (+ Vcc)	+7.9
Supply (- Vcc)	-7.6

9. Power Consumption (Typical values for information)

Typical values	Switched off (mA)	Stand by (mA)	Transmitting (mA)
Supply (+ Vcc)	+0.01	+6	+14
Supply (- Vcc)	-0.01	-8	-9

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Accreditation No.: SCS 0108

Client **Auden**

Certificate No: EX3-7346_Sep15

CALIBRATION CERTIFICATE

Object	EX3DV4 - SN:7346
Calibration procedure(s)	QA CAL-01.v9, QA CAL-14.v4, QA CAL-23.v5, QA CAL-25.v6 Calibration procedure for dosimetric E-field probes
Calibration date:	September 2, 2015

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

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

Calibration Equipment used (M&TE critical for calibration)

Primary Standards	ID	Cal Date (Certificate No.)	Scheduled Calibration
Power meter E4419B	GB41293874	01-Apr-15 (No. 217-02128)	Mar-16
Power sensor E4412A	MY41498087	01-Apr-15 (No. 217-02128)	Mar-16
Reference 3 dB Attenuator	SN: S5054 (3c)	01-Apr-15 (No. 217-02129)	Mar-16
Reference 20 dB Attenuator	SN: S5277 (20x)	01-Apr-15 (No. 217-02132)	Mar-16
Reference 30 dB Attenuator	SN: S5129 (30b)	01-Apr-15 (No. 217-02133)	Mar-16
Reference Probe ES3DV2	SN: 3013	30-Dec-14 (No. ES3-3013_Dec14)	Dec-15
DAE4	SN: 660	14-Jan-15 (No. DAE4-660_Jan15)	Jan-16
Secondary Standards	ID	Check Date (in house)	Scheduled Check
RF generator HP 8648C	US3642U01700	4-Aug-99 (in house check Apr-13)	In house check: Apr-16
Network Analyzer HP 8753E	US37390585	18-Oct-01 (in house check Oct-14)	In house check: Oct-15

	Name	Function	Signature
Calibrated by:	Israe Elnaouq	Laboratory Technician	
Approved by:	Katja Pokovic	Technical Manager	

Issued: September 2, 2015

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Glossary:

TSL	tissue simulating liquid
NORMx,y,z	sensitivity in free space
ConvF	sensitivity in TSL / NORMx,y,z
DCP	diode compression point
CF	crest factor (1/duty_cycle) of the RF signal
A, B, C, D	modulation dependent linearization parameters
Polarization φ	φ rotation around probe axis
Polarization ϑ	ϑ rotation around an axis that is in the plane normal to probe axis (at measurement center), i.e., ϑ = 0 is normal to probe axis
Connector Angle	information used in DASY system to align probe sensor X to the robot coordinate system

Calibration is Performed According to the Following Standards:

a) IEEE Std 1528-2013, "IEEE Recommended Practice for Determining the Peak Spatial-Averaged Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques", June 2013
b) IEC 62209-1, "Procedure to measure the Specific Absorption Rate (SAR) for hand-held devices used in close proximity to the ear (frequency range of 300 MHz to 3 GHz)", February 2005
c) IEC 62209-2, "Procedure to determine the Specific Absorption Rate (SAR) for wireless communication devices used in close proximity to the human body (frequency range of 30 MHz to 6 GHz)", March 2010
d) KDB 865664, "SAR Measurement Requirements for 100 MHz to 6 GHz"

Methods Applied and Interpretation of Parameters:

- *NORMx,y,z:* Assessed for E-field polarization ϑ = 0 (f ≤ 900 MHz in TEM-cell; f > 1800 MHz: R22 waveguide). NORMx,y,z are only intermediate values, i.e., the uncertainties of NORMx,y,z does not affect the E^2-field uncertainty inside TSL (see below *ConvF*).
- *NORM(f)x,y,z = NORMx,y,z * frequency_response* (see Frequency Response Chart). This linearization is implemented in DASY4 software versions later than 4.2. The uncertainty of the frequency response is included in the stated uncertainty of *ConvF*.
- *DCPx,y,z:* DCP are numerical linearization parameters assessed based on the data of power sweep with CW signal (no uncertainty required). DCP does not depend on frequency nor media.
- *PAR:* PAR is the Peak to Average Ratio that is not calibrated but determined based on the signal characteristics
- *Ax,y,z; Bx,y,z; Cx,y,z; Dx,y,z; VRx,y,z: A, B, C, D* are numerical linearization parameters assessed based on the data of power sweep for specific modulation signal. The parameters do not depend on frequency nor media. *VR* is the maximum calibration range expressed in RMS voltage across the diode.
- *ConvF and Boundary Effect Parameters:* Assessed in flat phantom using E-field (or Temperature Transfer Standard for f ≤ 800 MHz) and inside waveguide using analytical field distributions based on power measurements for f > 800 MHz. The same setups are used for assessment of the parameters applied for boundary compensation (alpha, depth) of which typical uncertainty values are given. These parameters are used in DASY4 software to improve probe accuracy close to the boundary. The sensitivity in TSL corresponds to *NORMx,y,z * ConvF* whereby the uncertainty corresponds to that given for *ConvF*. A frequency dependent *ConvF* is used in DASY version 4.4 and higher which allows extending the validity from ± 50 MHz to ± 100 MHz.
- *Spherical isotropy (3D deviation from isotropy)*: in a field of low gradients realized using a flat phantom exposed by a patch antenna.
- *Sensor Offset*: The sensor offset corresponds to the offset of virtual measurement center from the probe tip (on probe axis). No tolerance required.
- *Connector Angle*: The angle is assessed using the information gained by determining the *NORMx* (no uncertainty required).

Probe EX3DV4

SN:7346

Manufactured:	October 13, 2014
Repaired:	August 21, 2015
Calibrated:	September 2, 2015

Calibrated for DASY/EASY Systems
(Note: non-compatible with DASY2 system!)

DASY/EASY - Parameters of Probe: EX3DV4 - SN:7346

Basic Calibration Parameters

	Sensor X	Sensor Y	Sensor Z	Unc (k=2)
Norm ($\mu V/(V/m)^2$)[A]	0.53	0.52	0.49	± 10.1 %
DCP (mV)[B]	98.0	101.9	98.6	

Modulation Calibration Parameters

UID	Communication System Name		A dB	B dB$\sqrt{\mu V}$	C	D dB	VR mV	Unc[E] (k=2)
0	CW	X	0.0	0.0	1.0	0.00	158.9	±2.7 %
		Y	0.0	0.0	1.0		166.0	
		Z	0.0	0.0	1.0		163.9	

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

[A] The uncertainties of Norm X,Y,Z do not affect the E^2-field uncertainty inside TSL (see Pages 5 and 6).
[B] Numerical linearization parameter: uncertainty not required.
[E] Uncertainty is determined using the max. deviation from linear response applying rectangular distribution and is expressed for the square of the field value.

DASY/EASY - Parameters of Probe: EX3DV4 - SN:7346

Calibration Parameter Determined in Head Tissue Simulating Media

f (MHz) [C]	Relative Permittivity [F]	Conductivity (S/m) [F]	ConvF X	ConvF Y	ConvF Z	Alpha [G]	Depth [G] (mm)	Unc (k=2)
750	41.9	0.89	10.22	10.22	10.22	0.22	1.49	± 12.0 %
835	41.5	0.90	9.80	9.80	9.80	0.20	1.81	± 12.0 %
1750	40.1	1.37	8.60	8.60	8.60	0.42	0.80	± 12.0 %
1900	40.0	1.40	8.33	8.33	8.33	0.41	0.80	± 12.0 %
2000	40.0	1.40	8.13	8.13	8.13	0.38	0.80	± 12.0 %
2300	39.5	1.67	7.82	7.82	7.82	0.36	0.80	± 12.0 %
2450	39.2	1.80	7.27	7.27	7.27	0.42	0.80	± 12.0 %
2600	39.0	1.96	7.15	7.15	7.15	0.35	0.91	± 12.0 %
5200	36.0	4.66	5.29	5.29	5.29	0.35	1.80	± 13.1 %
5300	35.9	4.76	5.09	5.09	5.09	0.35	1.80	± 13.1 %
5500	35.6	4.96	4.66	4.66	4.66	0.40	1.80	± 13.1 %
5600	35.5	5.07	4.48	4.48	4.48	0.40	1.80	± 13.1 %
5800	35.3	5.27	4.59	4.59	4.59	0.40	1.80	± 13.1 %

[C] Frequency validity above 300 MHz of ± 100 MHz only applies for DASY v4.4 and higher (see Page 2), else it is restricted to ± 50 MHz. The uncertainty is the RSS of the ConvF uncertainty at calibration frequency and the uncertainty for the indicated frequency band. Frequency validity below 300 MHz is ± 10, 25, 40, 50 and 70 MHz for ConvF assessments at 30, 64, 128, 150 and 220 MHz respectively. Above 5 GHz frequency validity can be extended to ± 110 MHz.

[F] At frequencies below 3 GHz, the validity of tissue parameters (ε and σ) can be relaxed to ± 10% if liquid compensation formula is applied to measured SAR values. At frequencies above 3 GHz, the validity of tissue parameters (ε and σ) is restricted to ± 5%. The uncertainty is the RSS of the ConvF uncertainty for indicated target tissue parameters.

[G] Alpha/Depth are determined during calibration. SPEAG warrants that the remaining deviation due to the boundary effect after compensation is always less than ± 1% for frequencies below 3 GHz and below ± 2% for frequencies between 3-6 GHz at any distance larger than half the probe tip diameter from the boundary.

DASY/EASY - Parameters of Probe: EX3DV4 - SN:7346

Calibration Parameter Determined in Body Tissue Simulating Media

f (MHz) [C]	Relative Permittivity [F]	Conductivity (S/m) [F]	ConvF X	ConvF Y	ConvF Z	Alpha [G]	Depth [G] (mm)	Unc (k=2)
750	55.5	0.96	10.11	10.11	10.11	0.29	1.18	± 12.0 %
835	55.2	0.97	10.05	10.05	10.05	0.45	0.88	± 12.0 %
1750	53.4	1.49	8.06	8.06	8.06	0.29	1.03	± 12.0 %
1900	53.3	1.52	7.77	7.77	7.77	0.41	0.80	± 12.0 %
2000	53.3	1.52	7.99	7.99	7.99	0.41	0.83	± 12.0 %
2300	52.9	1.81	7.57	7.57	7.57	0.32	0.80	± 12.0 %
2450	52.7	1.95	7.43	7.43	7.43	0.44	0.80	± 12.0 %
2600	52.5	2.16	7.29	7.29	7.29	0.32	0.80	± 12.0 %
5200	49.0	5.30	4.64	4.64	4.64	0.45	1.90	± 13.1 %
5300	48.9	5.42	4.42	4.42	4.42	0.45	1.90	± 13.1 %
5500	48.6	5.65	3.95	3.95	3.95	0.50	1.90	± 13.1 %
5600	48.5	5.77	3.90	3.90	3.90	0.50	1.90	± 13.1 %
5800	48.2	6.00	4.08	4.08	4.08	0.50	1.90	± 13.1 %

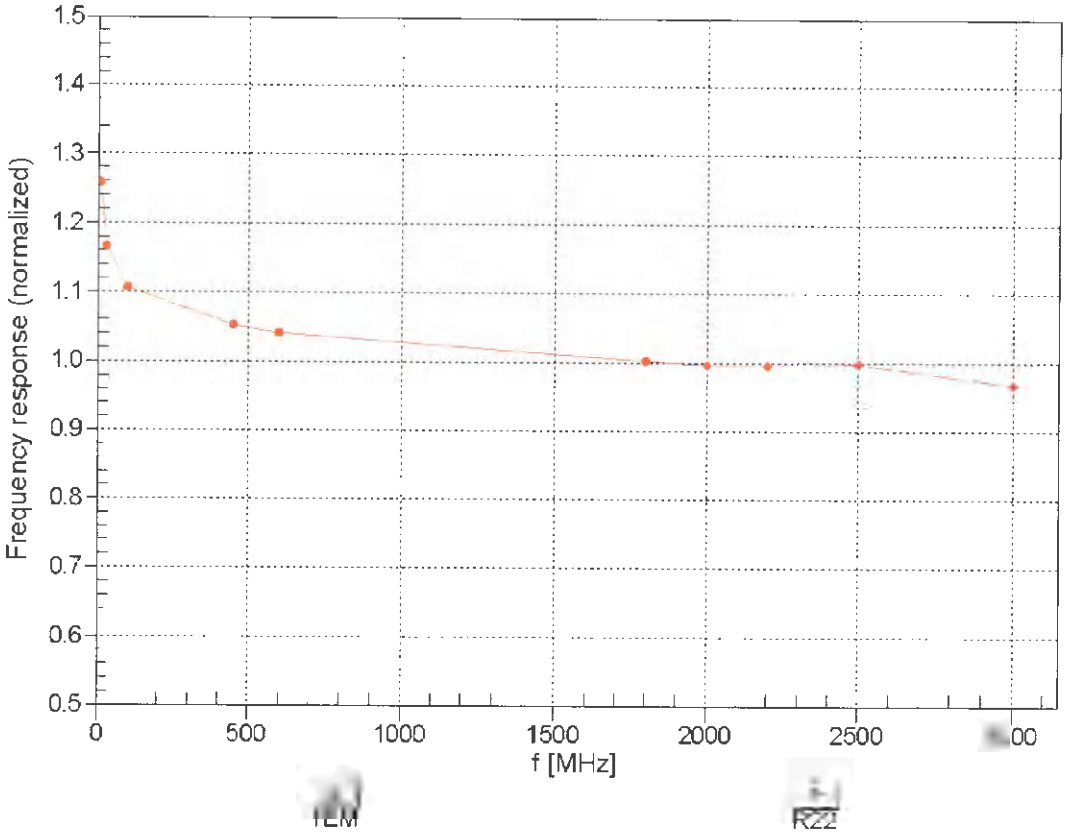
[C] Frequency validity above 300 MHz of ± 100 MHz only applies for DASY v4.4 and higher (see Page 2), else it is restricted to ± 50 MHz. The uncertainty is the RSS of the ConvF uncertainty at calibration frequency and the uncertainty for the indicated frequency band. Frequency validity below 300 MHz is ± 10, 25, 40, 50 and 70 MHz for ConvF assessments at 30, 64, 128, 150 and 220 MHz respectively. Above 5 GHz frequency validity can be extended to ± 110 MHz.

[F] At frequencies below 3 GHz, the validity of tissue parameters (ε and σ) can be relaxed to ± 10% if liquid compensation formula is applied to measured SAR values. At frequencies above 3 GHz, the validity of tissue parameters (ε and σ) is restricted to ± 5%. The uncertainty is the RSS of the ConvF uncertainty for indicated target tissue parameters.

[G] Alpha/Depth are determined during calibration. SPEAG warrants that the remaining deviation due to the boundary effect after compensation is always less than ± 1% for frequencies below 3 GHz and below ± 2% for frequencies between 3-6 GHz at any distance larger than half the probe tip diameter from the boundary.

Frequency Response of E-Field

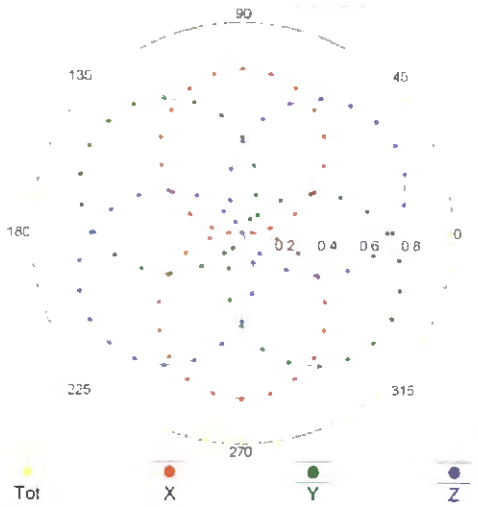
(TEM-Cell:ifi110 EXX, Waveguide: R22)



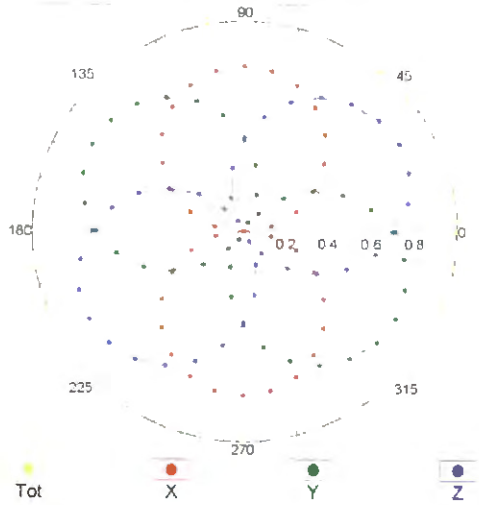
Uncertainty of Frequency Response of E-field: ± 6.3% (k=2)

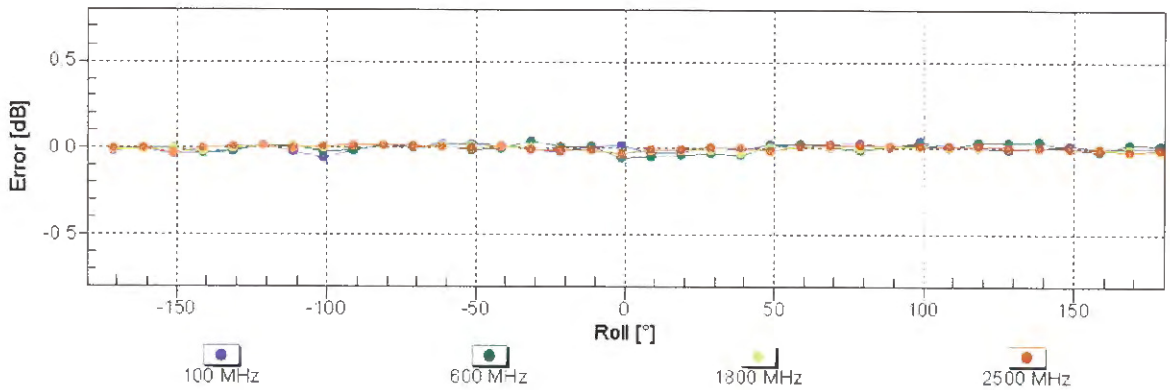
Receiving Pattern (ϕ), ϑ = 0°

f=600 MHz,TEM



f=1800 MHz,R22

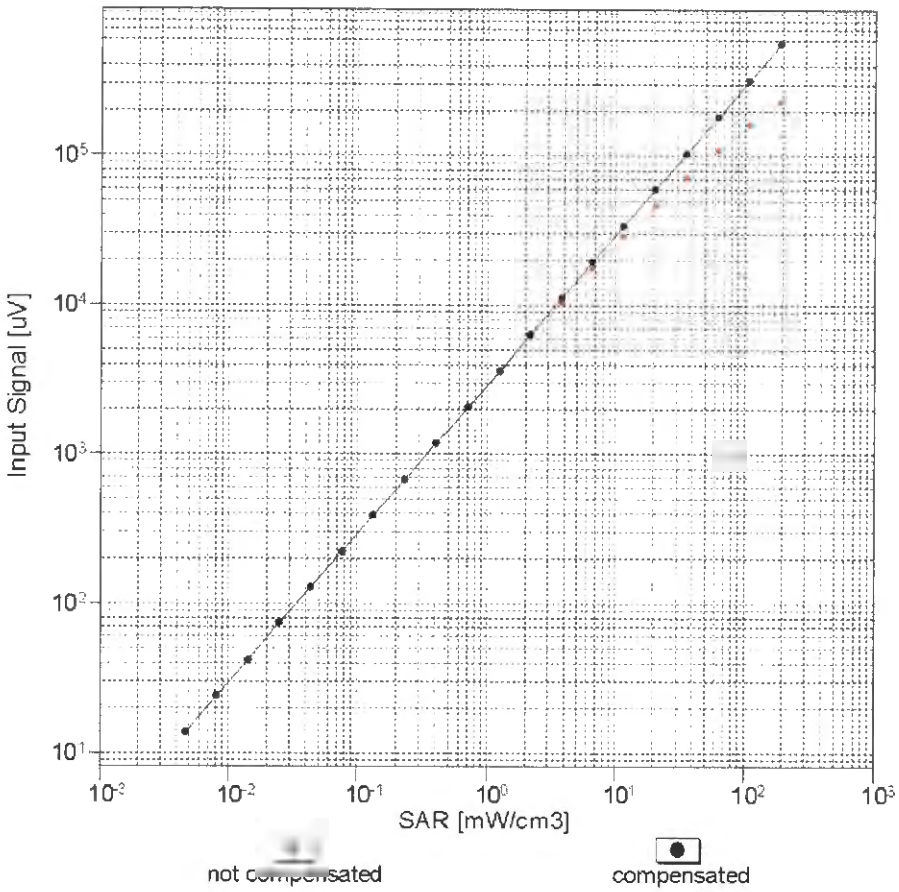


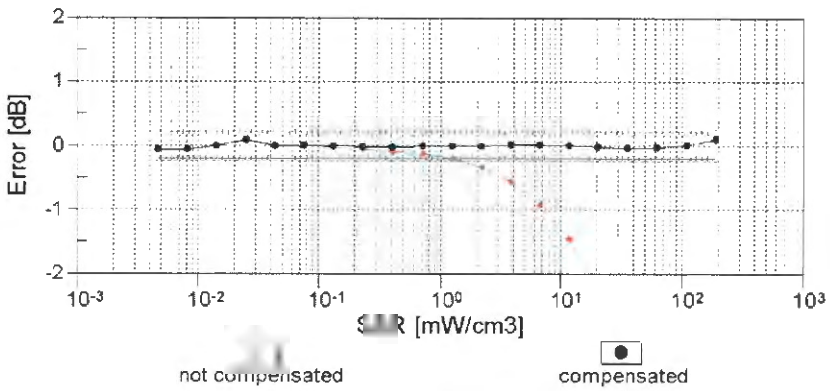


Uncertainty of Axial Isotropy Assessment: ± 0.5% (k=2)

Dynamic Range f(SAR_{head})

(TEM cell , f_{eval}= 1900 MHz)

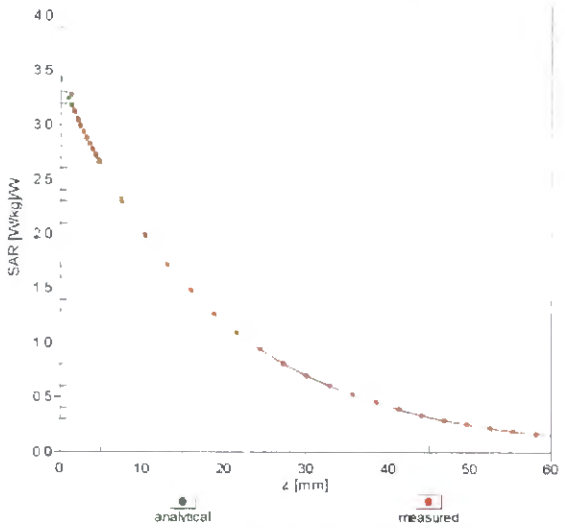




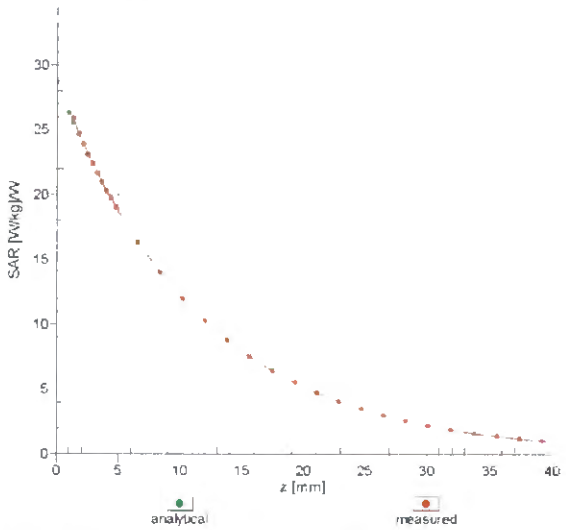
Uncertainty of Linearity Assessment: ± 0.6% (k=2)

Conversion Factor Assessment

f = 835 MHz,WGLS R9 (H_convF)

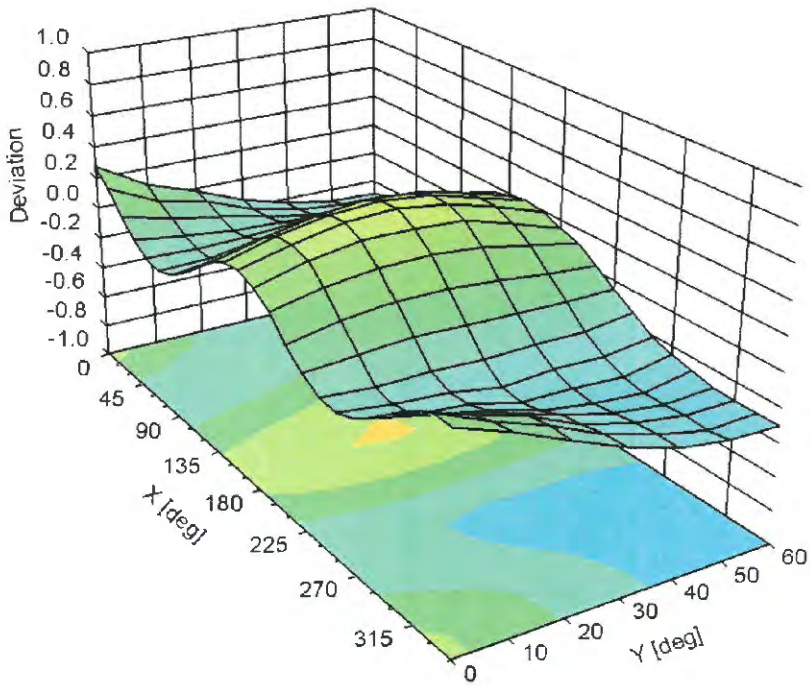


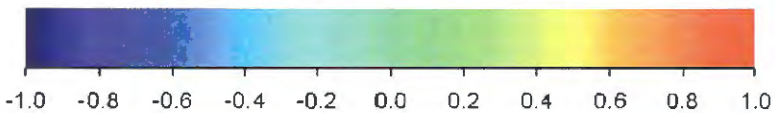
f = 1900 MHz,WGLS R22 (H_convF)



Deviation from Isotropy in Liquid

Error (ϕ, ϑ), f = 900 MHz





Uncertainty of Spherical Isotropy Assessment: ± 2.6% (k=2)

DASY/EASY - Parameters of Probe: EX3DV4 - SN:7346

Other Probe Parameters

Sensor Arrangement	Triangular
Connector Angle (°)	-1.3
Mechanical Surface Detection Mode	enabled
Optical Surface Detection Mode	disabled
Probe Overall Length	337 mm
Probe Body Diameter	10 mm
Tip Length	9 mm
Tip Diameter	2.5 mm
Probe Tip to Sensor X Calibration Point	1 mm
Probe Tip to Sensor Y Calibration Point	1 mm
Probe Tip to Sensor Z Calibration Point	1 mm
Recommended Measurement Distance from Surface	1.4 mm