Variant FCC SAR Test Report

APPLICANT	**: Lenovo Mobile Communication Technology Ltd.**
EQUIPMENT	**: Mobile Cellular Phone**
BRAND NAME	**: Lenovo**
MODEL NAME	**: Lenovo K33b36, Lenovo K33b37**
FCC ID	**: YCNK33B36**
STANDARD	**: FCC 47 CFR Part 2 (2.1093) ANSI/IEEE C95.1-1992 IEEE 1528-2013**

This is a variant report which is only valid together with the original test report. We, SPORTON INTERNATIONAL (SHENZHEN) 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 (SHENZHEN) INC., the test report shall not be reproduced except in full.

Prepared by: Mark Qu / Manager

Approved by: Jones Tsai / Manager

ilac-MRA

TAF
Testing Laboratory
2353

SPORTON INTERNATIONAL (SHENZHEN) INC.
1F & 2F, Building A, Morning Business Center, No. 4003 ShiGu Rd., Xili Town, Nanshan District, Shenzhen, Guangdong, P. R. China

Table of Contents

Revision History

REPORT NO.	VERSION	DESCRIPTION	ISSUED DATE
FA662816-04	Rev. 01	This is a variant report for Lenovo K33b36, Lenovo K33b37. The product equality declaration could be referred to Appendix E. All test cases were performed on original report which can be referred to Sporton Report Number FA662816. Based on the original test report, WLAN full SAR test for SAR value changed obviously and WWAN only verified the worst case for the differences.	Dec. 21, 2016

1. Statement of Compliance

The maximum results of Specific Absorption Rate (SAR) found during testing for **Lenovo Mobile Communication Technology Ltd., Mobile Cellular Phone, Lenovo K33b36, Lenovo K33b37** 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	0.60	0.87	0.87	1.55
		GSM1900	0.36	0.52	0.52	
	WCDMA	Band V	0.41	0.62	0.62	
		Band IV	0.43	0.80	0.80	
		Band II	0.40	0.53	0.53	
	LTE	Band 5	0.32	0.52	0.52	
		Band 4	0.34	0.69	0.69	
		Band 2	0.36	0.48	0.48	
		Band 7	0.34	**1.38**	**1.01**	
DTS	WLAN	2.4GHz WLAN	**0.70**	0.17	0.17	1.55
DSS	2.4GHz Band	Bluetooth		<0.10		1.42
Date of Testing:			2016/10/27 ~ 2016/11/01			

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 Site	
Test Site	SPORTON INTERNATIONAL (SHENZHEN) INC.
Test Site Location	1F & 2F, Building A, Morning Business Center, No. 4003 ShiGu Rd., Xili Town, Nanshan District, Shenzhen, Guangdong, P. R. China TEL: +86-755-8637-9589 FAX: +86-755-8637-9595

Applicant	
Company Name	Lenovo Mobile Communication Technology Ltd.
Address	No.999, Qishan North 2nd Road, Information & Optoelectronics Park, Torch Hi-tech Industry Development Zone, Xiamen, P.R.China

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

3. Guidance Applied

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	Lenovo
Model Name	Lenovo K33b36, Lenovo K33b37
FCC ID	YCNK33B36
IMEI Code	SIM1: 861577030041292 SIM2: 861577030041300
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 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 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 · HSPA+(16QAM uplink is not supported) · LTE: QPSK, 16QAM · 802.11b/g/n HT20 · Bluetooth v3.0+EDR, Bluetooth v4.0 LE, Bluetooth v4.2 LE
HW Version	82937_1_13
SW Version	K33_S009_1607022329_ROW
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. 802.11n-HT40 is not supported in 2.4GHz WLAN.
2. This device 2.4GHz WLAN supports Hotspot operation.
3. This device supported VoIP in GPRS, EGRPS, WCDMA and LTE (e.g. 3rd party VoIP).
4. This device supports GRPS/EGRPS mode up to multi-slot class 12.
5. This device does not support DTM operation.
6. There are two different types of EUT. They are single SIM card mobile(Lenovo K33b37) and dual SIM card mobile(Lenovo K33b36). The others are the same including circuit design, PCB board, structure and all components. It is special to declare. After pre-scan two types of EUT, we found test result of the sample that dual SIM was the worst, so we chose dual SIM card mobile to perform all tests.
7. For dual SIM card mobile supports dual SIM dual Standby. The WWAN radio transmission will be enabled by either one SIM at a time (Single active). After pre-scan two SIM cards power, we found test result of the SIM1 was the worse, so we chose dual SIM1 card to perform all tests.
8. When hotspot worked, power reduction active at LTE Band 7.

4.2 Specification of Accessory

Specification of Accessory				
AC Adapter 1	Brand Name	Lenovo (Acbel)	Model Name	C-P35
	Power Rating	I/P: 100-240 Vac, 300mA, O/P: 5.2Vdc, 2000mA		
AC Adapter 2	Brand Name	Lenovo (Huntkey)	Model Name	C-P35
	Power Rating	I/P: 100-240Vac, 500mA, O/P: 5.2Vdc, 2000mA		
Battery	Brand Name	Lenovo (scud)	Model Name	BL267
	Power Rating	4.4Vdc, 3000mAh		
Earphone	Brand Name	Lenovo (cosonic)	Model Name	LS-118M-9
	Signal Line Type	1.1 meter, non-shielded cable, without ferrite core		
USB Cable 1	Brand Name	Lenovo(saibao)	Model Name	SWT-A053A
	Signal Line Type	1.0 meter, non-shielded cable, without ferrite core		
USB Cable 2	Brand Name	Lenovo(starw)	Model Name	XJ-007070
	Signal Line Type	1.0 meter, non-shielded cable, without ferrite core		
LCD Panel	Brand Name	tianma	Model Name	Black: TL050VVMP04-00 Golden: TL050VVMP06-00
Camera	Brand Name	Q Technology	Model Name	Front: FX219BQS Post: FX258BDS
CTP Module	Brand Name	O-FILM	Model Name	Black: MCF-050-2585 Golden: MCF-050-2585-02

4.3 General LTE SAR Test and Reporting Considerations

<table>
<tr><th colspan="2">Summarized necessary items addressed in KDB 941225 D05 v02r05</th></tr>
<tr><td>FCC ID</td><td>YCNK33B36</td></tr>
<tr><td>Equipment Name</td><td>Mobile Cellular Phone</td></tr>
<tr><td>Operating Frequency Range of each LTE transmission band</td><td>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</td></tr>
<tr><td>Channel Bandwidth</td><td>LTE Band 2:1.4MHz, 3MHz, 5MHz, 10MHz, 15MHz, 20MHz
LTE Band 4:1.4MHz, 3MHz, 5MHz, 10MHz, 15MHz, 20MHz
LTE Band 5:1.4MHz, 3MHz, 5MHz, 10MHz
LTE Band 7: 5MHz, 10MHz, 15MHz, 20MHz</td></tr>
<tr><td>uplink modulations used</td><td>QPSK, and 16QAM</td></tr>
<tr><td>LTE Voice / Data requirements</td><td>Data only</td></tr>
<tr><td>LTE MPR permanently built-in by design</td><td>Table 6.2.3-1: Maximum Power Reduction (MPR) for Power Class 3
<table>
<tr><th rowspan="2">Modulation</th><th colspan="6">Channel bandwidth / Transmission bandwidth (RB)</th><th rowspan="2">MPR (dB)</th></tr>
<tr><th>1.4 MHz</th><th>3.0 MHz</th><th>5 MHz</th><th>10 MHz</th><th>15 MHz</th><th>20 MHz</th></tr>
<tr><td>QPSK</td><td>> 5</td><td>> 4</td><td>> 8</td><td>> 12</td><td>> 16</td><td>> 18</td><td>≤ 1</td></tr>
<tr><td>16 QAM</td><td>≤ 5</td><td>≤ 4</td><td>≤ 8</td><td>≤ 12</td><td>≤ 16</td><td>≤ 18</td><td>≤ 1</td></tr>
<tr><td>16 QAM</td><td>> 5</td><td>> 4</td><td>> 8</td><td>> 12</td><td>> 16</td><td>> 18</td><td>≤ 2</td></tr>
</table></td></tr>
<tr><td>LTE A-MPR</td><td>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)</td></tr>
<tr><td>Spectrum plots for RB configuration</td><td>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.</td></tr>
<tr><td>Power reduction applied to satisfy SAR compliance</td><td>Yes, when operating in hotspot mode that LTE 7 power reduction applied to satisfy SAR compliance.</td></tr>
<tr><td>LTE Release</td><td>R9,Cat 4</td></tr>
</table>

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

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

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:

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

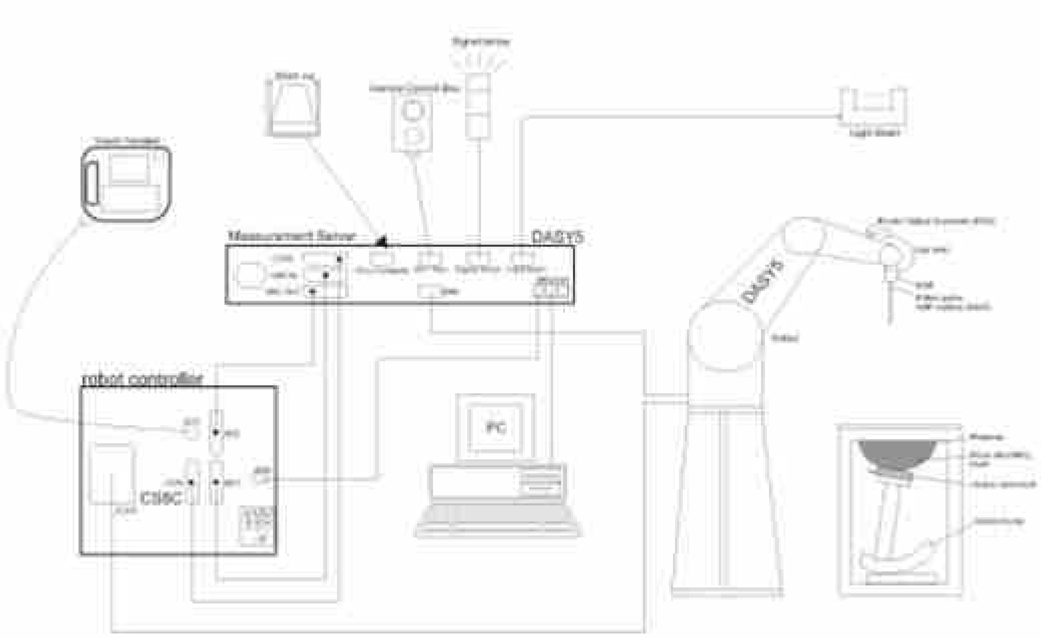
SAR is expressed in units of Watts per kilogram (W/kg)

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

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.

<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

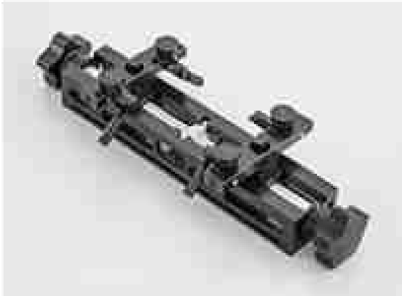
The ELI phantom is intended for compliance testing of handheld and body-mounted wireless devices in the frequency range of 30 MHz to 6 GHz. ELI4 is fully compatible with standard and all known tissue simulating liquids.

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.

			$\le$ 3 GHz	> 3 GHz
Maximum zoom scan spatial resolution: Δx_{Zoom}, Δy_{Zoom}			$\le$ 2 GHz: $\le$ 8 mm 2 – 3 GHz: $\le$ 5 mm*	3 – 4 GHz: $\le$ 5 mm* 4 – 6 GHz: $\le$ 4 mm*
Maximum zoom scan spatial resolution, normal to phantom surface	uniform grid: $\Delta z_{Zoom}(n)$		$\le$ 5 mm	3 – 4 GHz: $\le$ 4 mm 4 – 5 GHz: $\le$ 3 mm 5 – 6 GHz: $\le$ 2 mm
	graded grid	$\Delta z_{Zoom}(1)$: between 1st two points closest to phantom surface	$\le$ 4 mm	3 – 4 GHz: $\le$ 3 mm 4 – 5 GHz: $\le$ 2.5 mm 5 – 6 GHz: $\le$ 2 mm
		$\Delta z_{Zoom}(n>1)$: between subsequent points	$\le 1.5 \cdot \Delta z_{Zoom}(n-1)$	
Minimum zoom scan volume	x, y, z		$\ge$ 30 mm	3 – 4 GHz: $\ge$ 28 mm 4 – 5 GHz: $\ge$ 25 mm 5 – 6 GHz: $\ge$ 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 $\le$ 1.4 W/kg, $\le$ 8 mm, $\le$ 7 mm and $\le$ 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	835MHz System Validation Kit	D835V2	4d162	Nov. 24, 2015	Nov. 23, 2016
SPEAG	1750MHz System Validation Kit	D1750V2	1137	May 18, 2016	May 17, 2017
SPEAG	1900MHz System Validation Kit	D1900V2	5d182	Nov. 23, 2015	Nov. 22, 2016
SPEAG	2450MHz System Validation Kit	D2450V2	924	Feb. 24, 2016	Feb. 23, 2017
SPEAG	2600MHz System Validation Kit	D2600V2	1070	Nov. 25, 2015	Nov. 24, 2016
SPEAG	Data Acquisition Electronics	DAE4	915	Jun. 22, 2016	Jun. 21, 2017
SPEAG	Data Acquisition Electronics	DAE4	1338	Nov. 23, 2015	Nov. 22, 2016
SPEAG	Data Acquisition Electronics	DAE4	1386	Jul. 07, 2016	Jul. 06, 2017
SPEAG	Dosimetric E-Field Probe	EX3DV4	3819	Nov. 27, 2015	Nov. 26, 2016
SPEAG	Dosimetric E-Field Probe	EX3DV4	3911	Sep. 29, 2016	Sep. 28, 2017
SPEAG	Dosimetric E-Field Probe	EX3DV4	3958	Jul. 26, 2016	Jul. 25, 2017
SPEAG	SAM Twin Phantom	QD 000 P40 CD	TP-1670	NCR	NCR
SPEAG	Phone Positioner	N/A	N/A	NCR	NCR
Anritsu	Radio communication analyzer	MT8820C	6201300653	Jul. 16, 2016	Jul. 15, 2017
Agilent	Wireless Communication Test Set	E5515C	MY50267224	Jul. 16, 2016	Jul. 15, 2017
Agilent	Network Analyzer	E5071C	MY46523671	Oct. 11, 2016	Oct. 10, 2017
Speag	Dielectric Assessment Kit	DAK-3.5	1071	Nov. 24, 2015	Nov. 23, 2016
Agilent	Signal Generator	N5181A	MY50145381	Jan. 12, 2016	Jan. 11, 2017
Anritsu	Power Senor	MA2411B	1306099	Jan. 12, 2016	Jan. 11, 2017
Anritsu	Power Meter	ML2495A	1349001	Jan. 12, 2016	Jan. 11, 2017
Anritsu	Power Sensor	MA2411B	1207253	Jan. 12, 2016	Jan. 11, 2017
Anritsu	Power Meter	ML2495A	1218010	Jan. 12, 2016	Jan. 11, 2017
R&S	CBT BLUETOOTH TESTER	CBT	100963	Jan. 12, 2016	Jan. 11, 2017
R&S	Spectrum Analyzer	FSP7	101634	Jul. 16, 2016	Jul. 15, 2017
ARRA	Power Divider	A3200-2	N/A	Note 1	
AR	Amplifier	5S1G4	333096	Note 1	
mini-circuits	Amplifier	ZVE-3W-83+	162601250	Note 1	
MCL	Attenuation1	BW-S10W5	N/A	Note 1	
Weinschel	Attenuation2	3M-20	N/A	Note 1	
Zhongjilianhe	Attenuation3	MVE2214-03	N/A	Note 1	
Agilent	Dual Directional Coupler	778D	50422	Note 1	
PASTERNACK	Dual Directional Coupler	PE2214-10	N/A	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 Simulating Liquids

For the measurement of the field distribution inside the SAM phantom with DASY, the phantom must be filled with around 25 liters of homogeneous body tissue simulating liquid. For head SAR testing, the liquid height from the ear reference point (ERP) of the phantom to the liquid top surface is larger than 15 cm, which is shown in Fig. 10.1. For body SAR testing, the liquid height from the center of the flat phantom to the liquid top surface is larger than 15 cm, which is shown in Fig. 10.2.

Fig 10.1Photo of Liquid Height for Head SAR

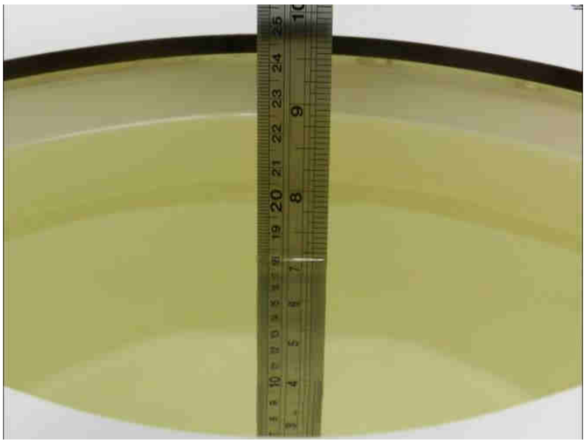


Fig 10.2 Photo of Liquid Height for Body SAR

10.2 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								
835	40.3	57.9	0.2	1.4	0.2	0	0.90	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								
835	50.8	48.2	0	0.9	0.1	0	0.97	55.2
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

<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
835	Head	22.9	0.897	41.605	0.90	41.50	-0.33	0.25	±5	2016/11/1
1750	Head	22.7	1.383	41.300	1.37	40.10	0.95	2.99	±5	2016/10/31
1900	Head	22.8	1.450	40.004	1.40	40.00	3.57	0.01	±5	2016/10/31
2450	Head	22.9	1.809	38.451	1.80	39.20	0.50	-1.91	±5	2016/10/27
2600	Head	22.8	2.009	39.626	1.96	39.00	2.50	1.61	±5	2016/10/31
835	Body	22.6	0.977	54.466	0.97	55.20	0.72	-1.33	±5	2016/10/30
1750	Body	22.7	1.524	52.564	1.49	53.40	2.28	-1.57	±5	2016/10/28
1900	Body	22.5	1.547	53.803	1.52	53.30	1.78	0.94	±5	2016/10/28
2450	Body	22.7	1.991	52.320	1.95	52.70	2.10	-0.72	±5	2016/10/28
2600	Body	22.6	2.209	51.123	2.16	52.50	2.27	-2.62	±5	2016/10/31

10.3 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)2	Tissue Type2	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 (%)
2016/11/1	835	Head	250	4d162	3819	915	2.39	9.14	9.56	4.60
2016/10/31	1750	Head	250	1137	3819	915	8.94	36.50	35.76	-2.03
2016/10/31	1900	Head	250	5d182	3819	915	9.92	39.60	39.68	0.20
2016/10/27	2450	Head	250	924	3911	1338	13.10	52.50	52.4	-0.19
2016/10/31	2600	Head	250	1070	3911	1338	14.30	58.10	57.2	-1.55
2016/10/30	835	Body	250	4d162	3911	1338	2.39	9.51	9.56	0.53
2016/10/28	1750	Body	250	1137	3958	1386	9.36	37.40	37.44	0.11
2016/10/28	1900	Body	250	5d182	3958	1386	9.93	40.60	39.72	-2.17
2016/10/28	2450	Body	250	924	3958	1386	13.70	51.40	54.8	6.61
2016/10/31	2600	Body	250	1070	3819	915	13.80	54.20	55.2	1.85

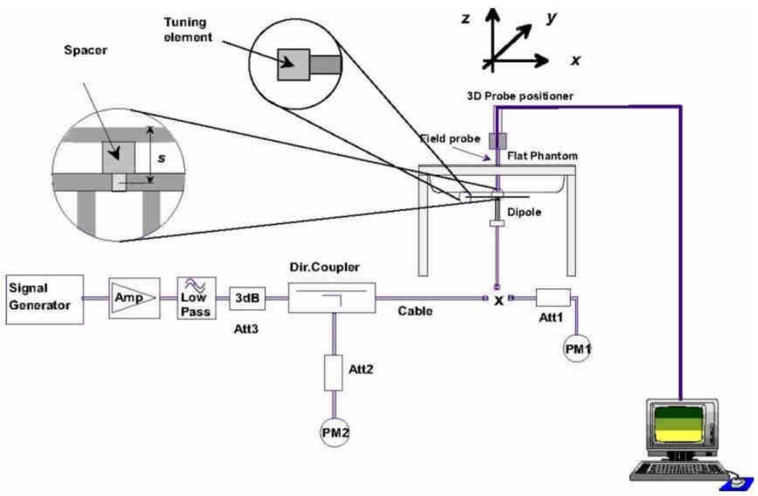


Fig 8.3.1 System Performance Check Setup

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.

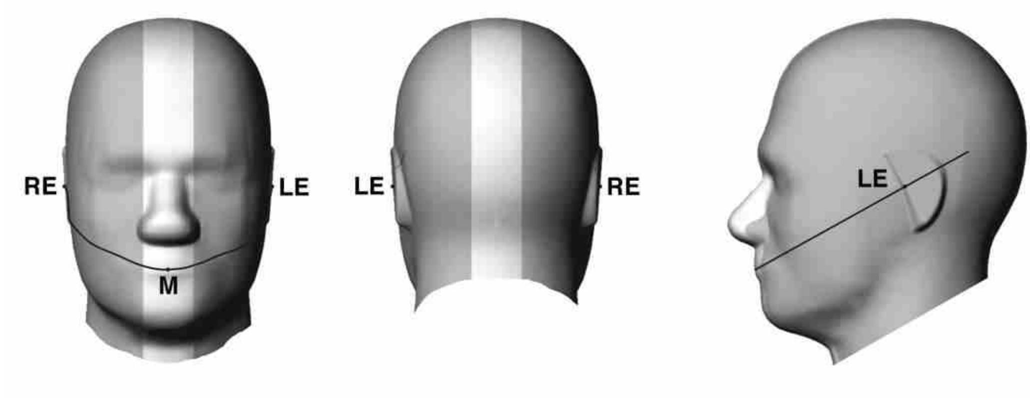


Fig 9.1.1 Front, back, and side views of SAM twin phantom

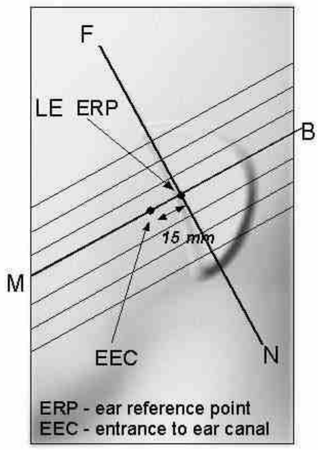


Fig 9.1.2 Close-up side view of phantom showing the ear region.

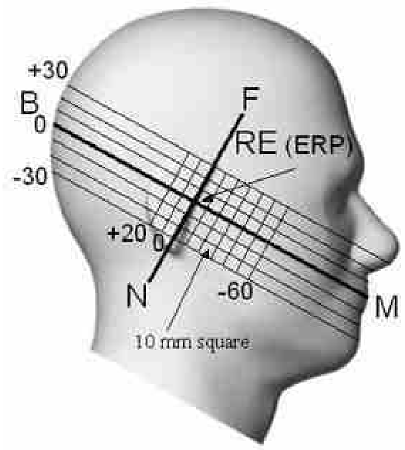


Fig 9.1.3 Side view of the phantom showing relevant markings and seven cross-sectional plane locations

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.

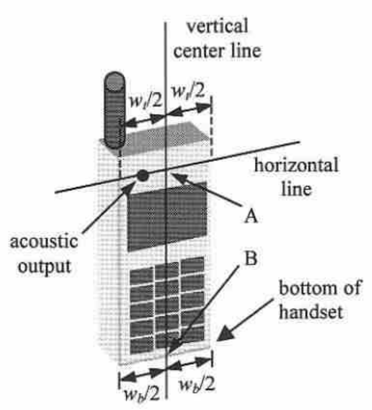


Fig 9.2.1 Handset vertical and horizontal reference lines—"fixed case

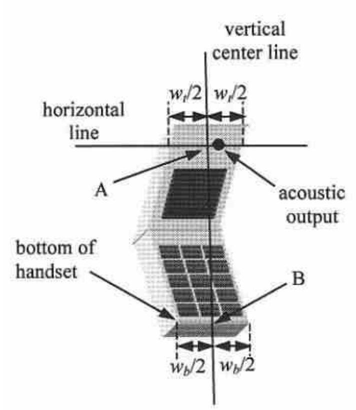


Fig 9.2.2 Handset vertical and horizontal reference lines—"clam-shell case"

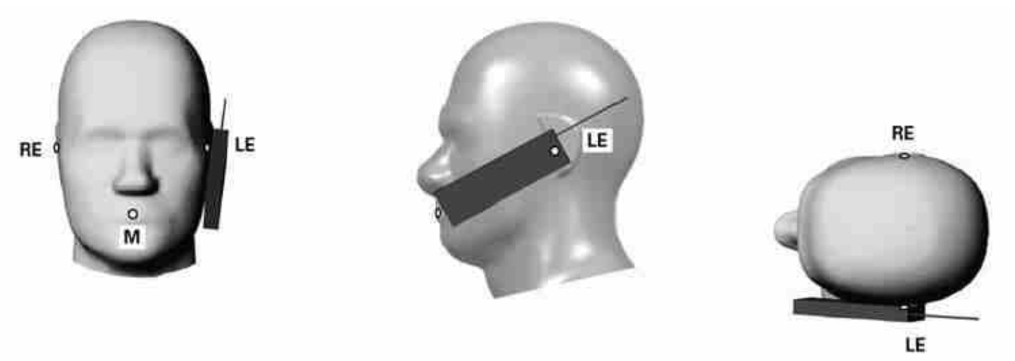


Fig 9.2.3 cheek or touch position. The reference points for the right ear (RE), left ear (LE), and mouth (M), which establish the Reference Plane for handset positioning, are indicated.

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.

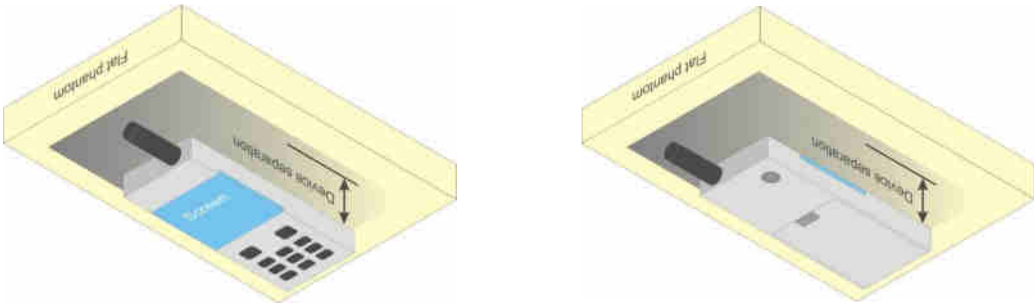


Fig 9.4 Body Worn Position

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>

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	32.69	33.08	**33.09**	33.50	23.69	24.08	24.09	24.50
GPRS 1 Tx slot	32.65	33.06	33.07	33.50	23.65	24.06	24.07	24.50
GPRS 2 Tx slots	31.62	31.63	31.64	32.00	25.62	25.63	25.64	26.00
GPRS 3 Tx slots	30.31	30.31	30.27	30.50	26.05	26.05	26.01	26.24
GPRS 4 Tx slots	28.83	28.95	29.03	29.50	25.83	25.95	**26.03**	26.50
EDGE 1 Tx slot	25.72	25.59	25.63	26.00	16.72	16.59	16.63	17.00
EDGE 2 Tx slots	24.47	24.30	24.29	25.00	18.47	18.30	18.29	19.00
EDGE 3 Tx slots	23.45	23.30	23.33	24.00	19.19	19.04	19.07	19.74
EDGE 4 Tx slots	22.31	21.84	21.86	22.50	19.31	18.84	18.86	19.50

Remark: The frame-averaged power is linearly scaled the maximum burst averaged power over 8 time slots.
The calculated method are shown as below:
Frame-averaged power = Maximum burst averaged power (1 Tx Slot) - 9 dB
Frame-averaged power = Maximum burst averaged power (2 Tx Slots) - 6 dB
Frame-averaged power = Maximum burst averaged power (3 Tx Slots) - 4.26 dB
Frame-averaged power = Maximum burst averaged power (4 Tx Slots) - 3 dB

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	**30.05**	30.01	30.04	30.50	21.05	21.01	21.04	21.50
GPRS 1 Tx slot	30.02	29.97	29.99	30.50	21.02	20.97	20.99	21.50
GPRS 2 Tx slots	29.25	29.27	29.24	29.50	23.25	23.27	23.24	23.50
GPRS 3 Tx slots	28.09	28.07	28.04	28.50	**23.83**	23.81	23.78	24.24
GPRS 4 Tx slots	26.82	26.73	26.84	27.00	23.82	23.73	23.84	24.00
EDGE 1 Tx slot	25.24	25.18	24.95	25.50	16.24	16.18	15.95	16.50
EDGE 2 Tx slots	24.18	23.57	23.42	24.50	18.18	17.57	17.42	18.50
EDGE 3 Tx slots	22.89	22.70	22.58	23.00	18.63	18.44	18.32	18.74
EDGE 4 Tx slots	21.63	21.47	21.26	22.00	18.63	18.47	18.26	19.00

Remark: The frame-averaged power is linearly scaled the maximum burst averaged power over 8 time slots.
The calculated method are shown as below:
Frame-averaged power = Maximum burst averaged power (1 Tx Slot) - 9 dB
Frame-averaged power = Maximum burst averaged power (2 Tx Slots) - 6 dB
Frame-averaged power = Maximum burst averaged power (3 Tx Slots) - 4.26 dB
Frame-averaged power = Maximum burst averaged power (4 Tx Slots) - 3 dB

<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} (Note1, Note 2)	CM (dB) (Note 3)	MPR (dB) (Note 3)
1	2/15	15/15	64	2/15	4/15	0.0	0.0
2	12/15 (Note 4)	15/15 (Note 4)	64	12/15 (Note 4)	24/15	1.0	0.0
3	15/15	8/15	64	15/8	30/15	1.5	0.5
4	15/15	4/15	64	15/4	30/15	1.5	0.5

Note 1: Δ_{ACK}, Δ_{NACK} and 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	β_{ed}1: 47/15 β_{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.		

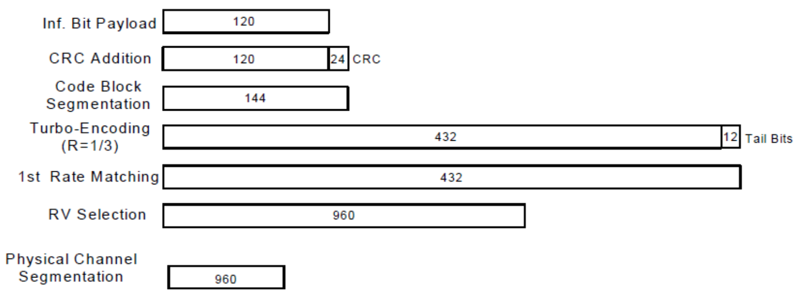


Figure C.8.19: Coding rate for Fixed reference Channel H-Set 12 (QPSK)

Setup Configuration

<WCDMA Conducted Power>

Band		WCDMA Band V			Tune-up Limit (dBm)	WCDMA Band II			Tune-up Limit (dBm)	WCDMA Band 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	22.93	22.94	23.16	23.50	22.96	22.95	23.00	23.50	22.76	22.78	22.81	23.00
3GPP Rel 99	RMC 12.2Kbps	22.96	22.95	**23.19**	23.50	22.98	22.96	**23.01**	23.50	22.78	22.79	**22.83**	23.00
3GPP Rel 6	HSDPA Subtest-1	22.05	22.12	22.03	22.50	21.69	22.11	22.16	22.50	21.32	22.18	22.53	23.00
3GPP Rel 6	HSDPA Subtest-2	22.13	22.28	22.06	22.50	21.83	22.20	22.25	22.50	21.38	22.24	22.61	23.00
3GPP Rel 6	HSDPA Subtest-3	21.64	21.79	21.68	22.00	21.32	21.71	21.78	22.00	20.89	21.77	22.13	22.50
3GPP Rel 6	HSDPA Subtest-4	21.65	21.80	21.69	22.00	21.33	21.71	21.78	22.00	20.89	21.77	22.13	22.50
3GPP Rel 8	DC-HSDPA Subtest-1	22.08	22.17	22.06	22.50	21.98	22.00	21.99	22.50	21.80	21.89	21.94	22.50
3GPP Rel 8	DC-HSDPA Subtest-2	22.07	22.12	21.97	22.50	21.94	22.06	21.99	22.50	21.81	21.92	21.89	22.50
3GPP Rel 8	DC-HSDPA Subtest-3	21.43	21.50	21.44	22.00	21.42	21.49	21.42	22.00	21.35	21.39	21.30	22.00
3GPP Rel 8	DC-HSDPA Subtest-4	21.49	21.56	21.42	22.00	21.38	21.46	21.46	22.00	21.22	21.34	21.30	22.00
3GPP Rel 6	HSUPA Subtest-1	21.75	21.48	21.68	22.50	20.98	21.37	22.15	22.50	21.65	21.75	22.63	23.00
3GPP Rel 6	HSUPA Subtest-2	21.09	21.14	21.11	21.50	20.80	21.13	20.75	21.50	20.39	20.68	21.52	22.00
3GPP Rel 6	HSUPA Subtest-3	20.69	20.72	20.93	21.50	20.59	20.69	20.34	21.00	19.97	21.10	21.23	21.50
3GPP Rel 6	HSUPA Subtest-4	21.27	21.30	21.30	21.50	21.07	21.19	21.69	22.00	20.77	21.11	21.86	22.00
3GPP Rel 6	HSUPA Subtest-5	22.00	22.20	22.00	22.50	21.80	22.10	22.20	22.50	21.40	22.20	22.60	23.00

<u><LTE Conducted Power></u>

<u><Full Power Mode></u>

<u><LTE Band 2></u>

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	22.67	23.02	22.30	23.50	0
20	QPSK	1	49	22.82	23.21	22.81		
20	QPSK	1	99	22.39	22.51	22.50		
20	QPSK	50	0	21.78	21.82	21.75	22.50	1
20	QPSK	50	24	21.86	21.87	21.84		
20	QPSK	50	50	21.68	21.81	21.80		
20	QPSK	100	0	21.74	21.82	21.81		
20	16QAM	1	0	21.43	21.97	21.51	22.50	1
20	16QAM	1	49	21.62	21.63	21.56		
20	16QAM	1	99	21.44	21.47	21.50		
20	16QAM	50	0	20.78	20.87	20.80	21.50	2
20	16QAM	50	24	20.88	20.82	20.89		
20	16QAM	50	50	20.70	20.71	20.86		
20	16QAM	100	0	20.66	20.80	20.77		
Channel				18675	18900	19125	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				1857.5	1880	1902.5		
15	QPSK	1	0	22.56	22.98	22.63	23.50	0
15	QPSK	1	37	22.71	22.89	22.71		
15	QPSK	1	74	22.60	22.53	22.74		
15	QPSK	36	0	21.74	21.94	21.94	22.50	1
15	QPSK	36	20	21.83	21.97	22.00		
15	QPSK	36	39	21.79	21.76	21.90		
15	QPSK	75	0	21.80	21.90	21.85		
15	16QAM	1	0	21.57	22.00	21.94	22.50	1
15	16QAM	1	37	21.74	21.75	22.02		
15	16QAM	1	74	21.52	21.46	21.69		
15	16QAM	36	0	20.73	21.00	21.00	21.50	2
15	16QAM	36	20	20.78	20.89	20.99		
15	16QAM	36	39	20.76	20.75	20.98		
15	16QAM	75	0	20.76	20.85	20.91		

Channel				18650	18900	19150	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				1855	1880	1905		
10	QPSK	1	0	22.47	22.84	22.81	23.50	0
10	QPSK	1	25	22.58	22.81	22.93		
10	QPSK	1	49	22.41	22.57	22.66		
10	QPSK	25	0	21.73	21.91	21.95	22.50	1
10	QPSK	25	12	21.85	22.02	21.97		
10	QPSK	25	25	21.79	21.84	21.95		
10	QPSK	50	0	21.79	21.87	21.95		
10	16QAM	1	0	21.45	21.76	21.71	22.50	1
10	16QAM	1	25	21.93	21.69	21.82		
10	16QAM	1	49	21.55	21.46	21.70		
10	16QAM	25	0	20.70	20.88	21.02	21.50	2
10	16QAM	25	12	20.76	20.86	20.99		
10	16QAM	25	25	20.85	20.80	21.01		
10	16QAM	50	0	20.71	20.84	20.82		
Channel				18625	18900	19175	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				1852.5	1880	1907.5		
5	QPSK	1	0	22.44	22.76	22.84	23.50	0
5	QPSK	1	12	22.64	22.82	22.97		
5	QPSK	1	24	22.73	22.56	22.84		
5	QPSK	12	0	21.68	21.89	21.96	22.50	1
5	QPSK	12	7	21.74	21.86	21.93		
5	QPSK	12	13	21.76	21.94	22.01		
5	QPSK	25	0	21.73	21.97	21.95		
5	16QAM	1	0	21.33	21.58	21.63	22.50	1
5	16QAM	1	12	21.34	21.45	21.73		
5	16QAM	1	24	21.43	21.49	21.68		
5	16QAM	12	0	20.55	20.79	20.76	21.50	2
5	16QAM	12	7	20.50	20.86	20.83		
5	16QAM	12	13	20.54	20.89	20.71		
5	16QAM	25	0	20.70	20.85	20.72		

Channel				18615	18900	19185	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				1851.5	1880	1908.5		
3	QPSK	1	0	22.54	22.78	22.88	23.50	0
3	QPSK	1	8	22.77	22.91	22.77		
3	QPSK	1	14	22.74	22.72	22.95		
3	QPSK	8	0	21.76	21.82	21.97	22.50	1
3	QPSK	8	4	21.61	21.83	21.92		
3	QPSK	8	7	21.61	21.95	21.82		
3	QPSK	15	0	21.66	21.89	21.89		
3	16QAM	1	0	21.73	21.70	21.66	22.50	1
3	16QAM	1	8	21.58	21.68	21.65		
3	16QAM	1	14	21.51	22.10	21.79		
3	16QAM	8	0	20.31	20.92	20.97	21.50	2
3	16QAM	8	4	20.69	20.92	20.93		
3	16QAM	8	7	20.78	20.86	20.93		
3	16QAM	15	0	20.80	20.76	20.98		
Channel				18607	18900	19193	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				1850.7	1880	1909.3		
1.4	QPSK	1	0	22.55	22.77	22.77	23.50	0
1.4	QPSK	1	3	22.38	22.91	22.69		
1.4	QPSK	1	5	22.54	22.72	22.54		
1.4	QPSK	3	0	22.70	22.86	22.83		
1.4	QPSK	3	1	22.88	23.10	22.93		
1.4	QPSK	3	3	22.89	22.91	22.91		
1.4	QPSK	6	0	21.64	21.83	21.94	22.50	1
1.4	16QAM	1	0	21.71	21.61	21.67	22.50	1
1.4	16QAM	1	3	21.79	21.66	21.70		
1.4	16QAM	1	5	21.44	21.66	21.68		
1.4	16QAM	3	0	21.63	21.84	21.89		
1.4	16QAM	3	1	21.70	21.89	21.93		
1.4	16QAM	3	3	21.72	22.04	21.97		
1.4	16QAM	6	0	20.45	20.61	20.87	21.50	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	23.11	23.16	23.47	23.50	0
20	QPSK	1	49	23.10	22.98	23.22		
20	QPSK	1	99	22.81	22.89	23.31		
20	QPSK	50	0	22.29	22.31	22.39	22.50	1
20	QPSK	50	24	22.28	22.24	22.29		
20	QPSK	50	50	22.15	22.18	22.22		
20	QPSK	100	0	22.18	22.30	22.32		
20	16QAM	1	0	22.13	22.13	22.42	22.50	1
20	16QAM	1	49	22.16	22.06	22.12		
20	16QAM	1	99	21.87	21.88	21.93		
20	16QAM	50	0	21.14	21.29	21.37	21.50	2
20	16QAM	50	24	21.06	21.24	21.27		
20	16QAM	50	50	21.12	21.09	21.19		
20	16QAM	100	0	21.23	21.20	21.35		
Channel				20025	20175	20325	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				1717.5	1732.5	1747.5		
15	QPSK	1	0	23.00	23.29	23.26	23.50	0
15	QPSK	1	37	23.22	23.28	23.25		
15	QPSK	1	74	23.31	23.22	23.26		
15	QPSK	36	0	22.39	22.34	22.18	22.50	1
15	QPSK	36	20	22.20	22.26	22.19		
15	QPSK	36	39	22.22	22.21	22.17		
15	QPSK	75	0	22.32	22.28	22.17		
15	16QAM	1	0	22.42	22.23	22.19	22.50	1
15	16QAM	1	37	22.12	22.06	22.04		
15	16QAM	1	74	21.93	21.92	22.01		
15	16QAM	36	0	21.37	21.32	21.02	21.50	2
15	16QAM	36	20	21.27	21.26	21.26		
15	16QAM	36	39	21.19	21.21	21.24		
15	16QAM	75	0	21.35	21.27	21.10		

Channel				20000	20175	20350	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				1715	1732.5	1750		
10	QPSK	1	0	22.96	23.15	23.21	23.50	0
10	QPSK	1	25	23.03	23.12	23.15		
10	QPSK	1	49	22.73	22.95	23.00		
10	QPSK	25	0	22.21	22.32	22.17	22.50	1
10	QPSK	25	12	22.17	22.22	22.16		
10	QPSK	25	25	22.24	22.20	22.28		
10	QPSK	50	0	22.13	22.29	22.26		
10	16QAM	1	0	22.33	22.07	22.03	22.50	1
10	16QAM	1	25	22.42	21.96	21.92		
10	16QAM	1	49	22.16	22.01	22.08		
10	16QAM	25	0	21.36	21.32	21.10	21.50	2
10	16QAM	25	12	21.24	21.23	21.24		
10	16QAM	25	25	21.16	21.17	21.35		
10	16QAM	50	0	21.20	21.30	21.34		
Channel				19975	20175	20375	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				1712.5	1732.5	1752.5		
5	QPSK	1	0	22.96	23.00	23.06	23.50	0
5	QPSK	1	12	23.19	23.18	23.00		
5	QPSK	1	24	22.98	23.06	23.05		
5	QPSK	12	0	22.11	22.17	22.32	22.50	1
5	QPSK	12	7	22.16	22.14	22.22		
5	QPSK	12	13	22.07	22.16	22.37		
5	QPSK	25	0	22.16	22.20	22.32		
5	16QAM	1	0	22.11	22.10	22.08	22.50	1
5	16QAM	1	12	22.10	22.31	21.76		
5	16QAM	1	24	21.93	22.48	22.07		
5	16QAM	12	0	21.06	21.16	21.19	21.50	2
5	16QAM	12	7	21.15	21.06	21.06		
5	16QAM	12	13	21.15	21.07	21.14		
5	16QAM	25	0	21.09	21.19	21.25		

Channel				19965	20175	20385	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				1711.5	1732.5	1753.5		
3	QPSK	1	0	22.95	23.00	23.20	23.50	0
3	QPSK	1	8	23.04	23.24	23.14		
3	QPSK	1	14	22.98	23.14	23.02		
3	QPSK	8	0	22.15	22.39	22.20	22.50	1
3	QPSK	8	4	22.23	22.32	22.30		
3	QPSK	8	7	22.22	22.35	22.25		
3	QPSK	15	0	22.18	22.28	22.18		
3	16QAM	1	0	22.18	22.03	22.03	22.50	1
3	16QAM	1	8	21.76	22.04	21.92		
3	16QAM	1	14	22.03	22.16	22.06		
3	16QAM	8	0	20.97	21.02	21.33	21.50	2
3	16QAM	8	4	21.04	21.28	21.43		
3	16QAM	8	7	20.92	21.04	21.29		
3	16QAM	15	0	21.18	21.21	21.28		
Channel				19957	20175	20393	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				1710.7	1732.5	1754.3		
1.4	QPSK	1	0	23.14	23.05	23.09	23.50	0
1.4	QPSK	1	3	23.10	23.08	23.22		
1.4	QPSK	1	5	23.04	22.97	23.23		
1.4	QPSK	3	0	23.14	23.21	23.25		
1.4	QPSK	3	1	23.23	23.00	23.20		
1.4	QPSK	3	3	23.14	23.00	23.20		
1.4	QPSK	6	0	22.19	22.28	22.34	22.50	1
1.4	16QAM	1	0	22.04	22.08	22.01	22.50	1
1.4	16QAM	1	3	22.00	22.48	22.03		
1.4	16QAM	1	5	22.06	22.38	22.08		
1.4	16QAM	3	0	22.13	22.24	22.17		
1.4	16QAM	3	1	22.19	22.27	22.21		
1.4	16QAM	3	3	21.95	22.26	22.28		
1.4	16QAM	6	0	21.03	21.18	21.05	21.50	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	22.80	22.93	22.96	24.00	0
10	QPSK	1	25	23.56	23.54	23.70		
10	QPSK	1	49	22.91	22.93	22.99		
10	QPSK	25	0	22.36	22.34	22.39	23.00	1
10	QPSK	25	12	22.35	22.29	22.38		
10	QPSK	25	25	22.31	22.30	22.36		
10	QPSK	50	0	22.28	22.31	22.35		
10	16QAM	1	0	21.69	21.97	21.95	23.00	1
10	16QAM	1	25	21.97	21.99	22.03		
10	16QAM	1	49	21.68	21.90	21.98		
10	16QAM	25	0	21.14	21.34	21.23	22.00	2
10	16QAM	25	12	21.45	21.45	21.11		
10	16QAM	25	25	21.38	21.18	21.43		
10	16QAM	50	0	21.37	21.31	21.17		
Channel				20425	20525	20625	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				826.5	836.5	846.5		
5	QPSK	1	0	22.62	23.01	22.91	24.00	0
5	QPSK	1	12	23.11	23.01	23.03		
5	QPSK	1	24	23.36	23.03	23.05		
5	QPSK	12	0	22.15	22.30	22.11	23.00	1
5	QPSK	12	7	22.27	22.21	22.31		
5	QPSK	12	13	22.12	22.96	22.27		
5	QPSK	25	0	22.01	22.24	22.19		
5	16QAM	1	0	22.00	22.04	21.94	23.00	1
5	16QAM	1	12	21.64	21.98	21.36		
5	16QAM	1	24	22.05	22.10	21.98		
5	16QAM	12	0	21.16	21.02	21.21	22.00	2
5	16QAM	12	7	21.36	21.06	21.14		
5	16QAM	12	13	21.11	21.01	21.19		
5	16QAM	25	0	21.26	21.01	21.25		

Channel				20415	20525	20635	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				825.5	836.5	847.5		
3	QPSK	1	0	22.85	23.03	22.91	24.00	0
3	QPSK	1	8	23.21	23.22	23.05		
3	QPSK	1	14	23.16	23.07	23.05		
3	QPSK	8	0	22.15	22.30	22.20	23.00	1
3	QPSK	8	4	22.27	22.27	22.31		
3	QPSK	8	7	22.28	22.36	22.27		
3	QPSK	15	0	22.22	22.24	22.19		
3	16QAM	1	0	22.02	22.04	21.94	23.00	1
3	16QAM	1	8	21.64	21.98	21.95		
3	16QAM	1	14	22.05	22.10	21.98		
3	16QAM	8	0	21.16	21.22	21.21	22.00	2
3	16QAM	8	4	21.28	21.29	21.14		
3	16QAM	8	7	21.29	21.18	21.20		
3	16QAM	15	0	21.20	21.23	21.25		
Channel				20407	20525	20643	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				824.7	836.5	848.3		
1.4	QPSK	1	0	22.84	23.13	23.17	24.00	0
1.4	QPSK	1	3	22.87	23.12	23.20		
1.4	QPSK	1	5	22.81	23.14	23.18		
1.4	QPSK	3	0	23.14	23.17	23.32		
1.4	QPSK	3	1	23.18	23.32	23.29		
1.4	QPSK	3	3	23.08	23.24	23.38		
1.4	QPSK	6	0	22.05	22.17	22.25	23.00	1
1.4	16QAM	1	0	21.95	21.98	22.05	23.00	1
1.4	16QAM	1	3	21.90	22.01	22.02		
1.4	16QAM	1	5	21.94	22.00	21.91		
1.4	16QAM	3	0	22.07	22.15	22.15		
1.4	16QAM	3	1	22.12	22.19	22.19		
1.4	16QAM	3	3	22.12	22.20	22.19		
1.4	16QAM	6	0	21.17	21.13	21.19	22.00	2

<u>**<LTE Band 7>**</u>

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	22.07	22.10	21.96	23.00	0
20	QPSK	1	49	22.65	22.40	22.63		
20	QPSK	1	99	22.39	21.90	22.31		
20	QPSK	50	0	21.38	21.34	21.33	22.00	1
20	QPSK	50	24	21.32	21.33	21.30		
20	QPSK	50	50	21.30	21.25	21.26		
20	QPSK	100	0	21.36	21.35	21.33		
20	16QAM	1	0	21.10	21.20	21.08	22.00	1
20	16QAM	1	49	21.12	21.16	21.02		
20	16QAM	1	99	21.11	20.97	20.89		
20	16QAM	50	0	20.52	20.46	20.49	21.00	2
20	16QAM	50	24	20.45	20.34	20.31		
20	16QAM	50	50	20.42	20.29	20.36		
20	16QAM	100	0	20.38	20.38	20.34		
Channel				20825	21100	21375	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				2507.5	2535	2562.5		
15	QPSK	1	0	22.16	22.08	22.15	23.00	0
15	QPSK	1	37	22.42	22.46	22.38		
15	QPSK	1	74	22.07	22.13	22.19		
15	QPSK	36	0	21.31	21.36	21.35	22.00	1
15	QPSK	36	20	21.32	21.36	21.30		
15	QPSK	36	39	21.32	21.31	21.29		
15	QPSK	75	0	21.31	21.33	21.27		
15	16QAM	1	0	21.16	21.17	21.05	22.00	1
15	16QAM	1	37	21.13	21.05	21.03		
15	16QAM	1	74	20.96	21.01	20.98		
15	16QAM	36	0	20.36	20.35	20.31	21.00	2
15	16QAM	36	20	20.36	20.35	20.33		
15	16QAM	36	39	20.36	20.27	20.30		
15	16QAM	75	0	20.49	20.29	20.29		

Channel				20800	21100	21400	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				2505	2535	2565		
10	QPSK	1	0	22.05	22.03	22.01	23.00	0
10	QPSK	1	25	22.79	22.34	22.33		
10	QPSK	1	49	22.02	21.99	21.99		
10	QPSK	25	0	21.31	21.33	21.24	22.00	1
10	QPSK	25	12	21.26	21.32	21.28		
10	QPSK	25	25	21.26	21.32	21.24		
10	QPSK	50	0	21.25	21.32	21.27		
10	16QAM	1	0	21.08	21.10	20.94	22.00	1
10	16QAM	1	25	21.02	21.07	21.00		
10	16QAM	1	49	21.02	20.93	20.90		
10	16QAM	25	0	20.40	20.55	20.25	21.00	2
10	16QAM	25	12	20.41	20.55	20.60		
10	16QAM	25	25	20.32	20.45	20.25		
10	16QAM	50	0	20.48	20.50	20.34		
Channel				20775	21100	21425	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				2502.5	2535	2567.5		
5	QPSK	1	0	22.02	21.98	21.81	23.00	0
5	QPSK	1	12	22.23	22.32	22.19		
5	QPSK	1	24	22.00	21.98	21.86		
5	QPSK	12	0	21.19	21.25	21.18	22.00	1
5	QPSK	12	7	21.19	21.24	21.14		
5	QPSK	12	13	21.21	21.25	21.13		
5	QPSK	25	0	21.24	21.29	21.13		
5	16QAM	1	0	20.94	21.00	20.99	22.00	1
5	16QAM	1	12	21.29	21.00	20.98		
5	16QAM	1	24	20.89	21.01	20.88		
5	16QAM	12	0	20.31	20.19	20.19	21.00	2
5	16QAM	12	7	20.48	20.53	20.26		
5	16QAM	12	13	20.44	20.47	20.16		
5	16QAM	25	0	20.38	20.29	20.15		

<Reduced Power Mode>

<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	19.00	19.05	18.95	19.50	0
20	QPSK	1	49	19.27	19.37	19.30		
20	QPSK	1	99	18.92	18.91	19.14		
20	QPSK	50	0	19.27	19.36	19.33	19.50	0
20	QPSK	50	24	19.18	19.31	19.27		
20	QPSK	50	50	19.26	19.24	19.24		
20	QPSK	100	0	19.23	19.35	19.22		
20	16QAM	1	0	18.97	19.05	19.06	19.50	0
20	16QAM	1	49	19.07	19.02	19.02		
20	16QAM	1	99	19.00	18.90	18.90		
20	16QAM	50	0	19.32	19.30	19.30	19.50	0
20	16QAM	50	24	19.24	19.39	19.22		
20	16QAM	50	50	19.24	19.29	19.36		
20	16QAM	100	0	19.29	19.23	19.33		
Channel				20825	21100	21375	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				2507.5	2535	2562.5		
15	QPSK	1	0	19.17	19.16	19.12	19.50	0
15	QPSK	1	37	19.47	19.48	19.46		
15	QPSK	1	74	19.11	19.03	19.17		
15	QPSK	36	0	19.28	19.30	19.25	19.50	0
15	QPSK	36	20	19.32	19.36	19.29		
15	QPSK	36	39	19.21	19.27	19.27		
15	QPSK	75	0	19.29	19.36	19.27		
15	16QAM	1	0	19.10	19.22	19.01	19.50	0
15	16QAM	1	37	19.05	19.27	19.15		
15	16QAM	1	74	19.00	18.97	18.95		
15	16QAM	36	0	19.31	19.34	19.27	19.50	0
15	16QAM	36	20	19.38	19.32	19.24		
15	16QAM	36	39	19.27	19.18	19.21		
15	16QAM	75	0	19.33	19.30	19.34		

Channel				20800	21100	21400	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				2505	2535	2565		
10	QPSK	1	0	18.86	18.99	18.95	19.50	0
10	QPSK	1	25	19.23	19.26	19.10		
10	QPSK	1	49	19.04	18.92	18.98		
10	QPSK	25	0	19.30	19.34	19.30	19.50	0
10	QPSK	25	12	19.27	19.29	19.24		
10	QPSK	25	25	19.27	19.22	19.21		
10	QPSK	50	0	19.26	19.36	19.24		
10	16QAM	1	0	19.00	19.08	18.97	19.50	0
10	16QAM	1	25	19.04	19.07	18.96		
10	16QAM	1	49	18.85	18.94	18.95		
10	16QAM	25	0	19.24	19.31	19.34	19.50	0
10	16QAM	25	12	19.33	19.37	19.29		
10	16QAM	25	25	19.31	19.28	19.42		
10	16QAM	50	0	19.31	19.31	19.36		
Channel				20775	21100	21425	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				2502.5	2535	2567.5		
5	QPSK	1	0	18.94	18.83	19.04	19.50	0
5	QPSK	1	12	19.03	19.21	19.25		
5	QPSK	1	24	18.95	18.89	18.76		
5	QPSK	12	0	19.22	19.23	19.14	19.50	0
5	QPSK	12	7	19.19	19.19	19.20		
5	QPSK	12	13	19.14	19.21	19.10		
5	QPSK	25	0	19.18	19.27	19.09		
5	16QAM	1	0	18.93	19.46	18.96	19.50	0
5	16QAM	1	12	18.98	19.07	18.95		
5	16QAM	1	24	18.86	18.85	18.87		
5	16QAM	12	0	19.17	19.36	19.00	19.50	0
5	16QAM	12	7	19.23	19.34	19.06		
5	16QAM	12	13	19.01	19.30	18.95		
5	16QAM	25	0	19.04	19.23	19.03		

<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	14.06	14.50	97.59
		CH 6	2437		14.26	14.50	
		CH 11	2462		13.32	14.50	
	802.11g	CH 1	2412	6Mbps	13.08	13.50	87.44
		CH 6	2437		13.05	13.50	
		CH 11	2462		12.22	13.50	
	802.11n-HT20	CH 1	2412	MCS0	12.74	13.00	86.09
		CH 6	2437		12.71	13.00	
		CH 11	2462		11.79	13.00	

<2.4GHz Bluetooth>

General Note:

1. For 2.4GHz Bluetooth SAR testing was selected 1Mbps, due to its highest average power.
2. The Bluetooth duty cycle is 77.4 % as following figure, according to 2016 Oct. TCB workshop for Bluetooth SAR scaling need further consideration and the theoretical duty cycle is 83.3%, therefore the actual duty cycle will be scaled up to the theoretical value of Bluetooth reported SAR calculation

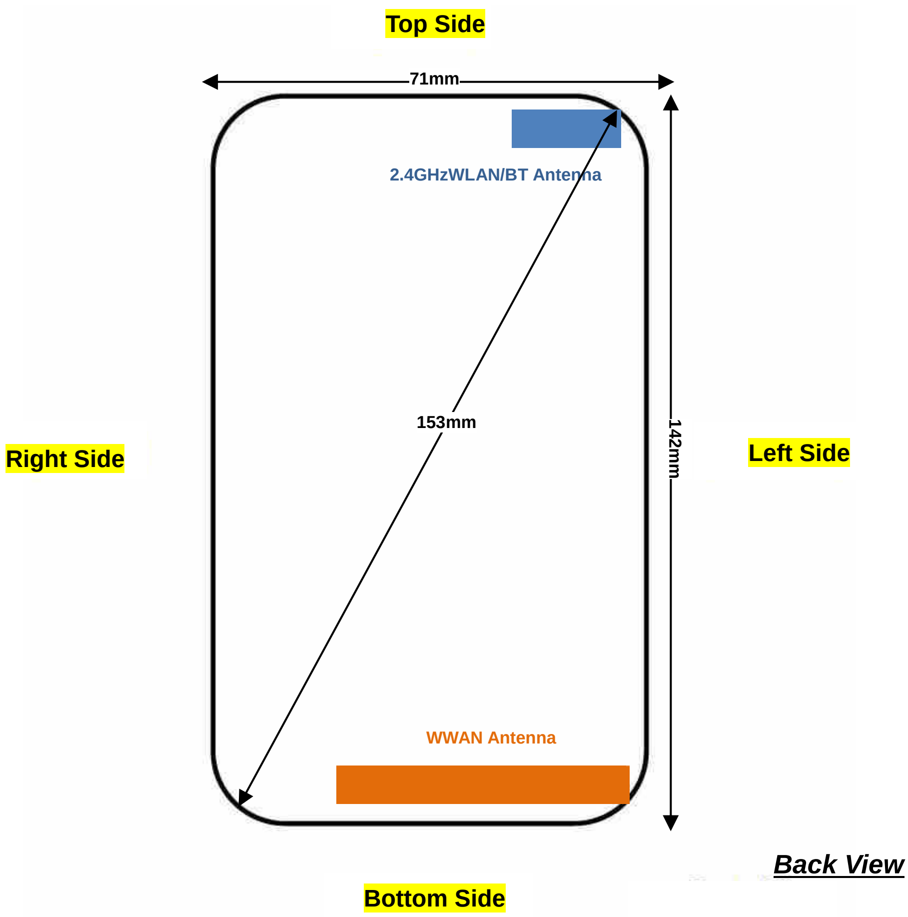
Bluetooth time-domain plot

Mode	Channel	Frequency (MHz)	Average power (dBm)
			GFSK
Bluetooth 3.0+EDR	CH 00	2402	10.36
	CH 39	2441	**10.63**
	CH 78	2480	10.57
Tune-up Limit			11.00

Mode	Channel	Frequency (MHz)	Average power (dBm)
			GFSK
v4.0 with LE	CH 00	2402	0.63
	CH 19	2440	**1.39**
	CH 39	2480	0.55
Tune-up Limit			2.50

Mode	Channel	Frequency (MHz)	Average power (dBm)
			GFSK
v4.2 with LE	CH 00	2402	0.45
	CH 19	2440	**1.39**
	CH 39	2480	0.63
Tune-up Limit			2.50

13. Antenna Location



Distance of the Antenna to the EUT surface/edge						
Antennas	Back	Front	Top Side	Bottom Side	Right Side	Left Side
WWAN Main	≤ 25mm	≤ 25mm	135mm	≤ 25mm	≤ 25mm	≤ 25mm
BT&WLAN	≤ 25mm	≤ 25mm	≤ 25mm	134mm	57mm	≤ 25mm

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

General Note:
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 with a transmitting antenna located within 25mm from that surface or edge.

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
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 KDB648474 D04v01r03, when the reported SAR for a body-worn accessory, measured without a headset connected to the handset, is > 1.2 W/kg, the highest reported SAR configuration for that wireless mode and frequency band should be repeated for that body-worn accessory with a headset attached to the handset.

14.1 Head SAR

<GSM SAR>

Plot No.	Band	Mode	Test Position	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)
01	GSM850	GPRS 4 Tx slots	Left Cheek	251	848.8	29.03	29.50	1.114	0.09	0.538	0.599
02	GSM1900	GPRS 3 Tx slots	Left Cheek	512	1850.2	28.09	28.50	1.099	0.03	0.324	0.356

<WCDMA SAR>

Plot No.	Band	Mode	Test Position	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)
03	WCDMA Band V	RMC 12.2Kbps	Right Cheek	4233	846.6	23.19	23.50	1.074	0.07	0.380	0.408
04	WCDMA Band IV	RMC12.2Kbps	Left Cheek	1513	1752.6	22.83	23.00	1.040	0.06	0.416	0.433
05	WCDMA Band II	RMC12.2Kbps	Left Cheek	9538	1907.6	23.01	23.50	1.119	0.02	0.360	0.403

<LTE SAR>

Plot No.	Band	BW (MHz)	Modulation	RB Size	RB offset	Test Position	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)
06	LTE Band 5	10M	QPSK	1RB	25Offset	Right Cheek	20525	836.5	23.54	24.00	1.112	0.1	0.291	0.324
07	LTE Band 4	20M	QPSK	1RB	0Offset	Left Cheek	20175	1732.5	23.16	23.50	1.081	0.05	0.318	0.344
08	LTE Band 2	20M	QPSK	1RB	49Offset	Left Cheek	18900	1880	23.21	23.50	1.069	0.05	0.332	0.355
09	LTE Band 7	20M	QPSK	1RB	49Offset	Left Cheek	20850	2510	22.65	23.00	1.084	0.17	0.315	0.341

<WLAN SAR>

Plot No.	Band	Mode	Test Position	Ch.	Freq. (MHz)	Average Power (dBm)	Tune-Up Limit (dBm)	Tune-up Scaling Factor	Duty Cycle %	Duty Cycle Scaling Factor	Peak SAR	Power Drift (dB)	Measured 1g SAR (W/kg)	Reported 1g SAR (W/kg)
10	WLAN2.4GHz	802.11b 1Mbps	Right Cheek	6	2437	14.26	14.50	1.057	97.59	1.025	1.17	-0.01	0.650	0.704
	WLAN2.4GHz	802.11b 1Mbps	Right Tilted	6	2437	14.26	14.50	1.057	97.59	1.025	1.06	0.07	0.607	0.658
	WLAN2.4GHz	802.11b 1Mbps	Left Cheek	6	2437	14.26	14.50	1.057	97.59	1.025	0.433			
	WLAN2.4GHz	802.11b 1Mbps	Left Tilted	6	2437	14.26	14.50	1.057	97.59	1.025	0.551			

14.2 Hotspot SAR

<GSM SAR>

Plot No.	Band	Mode	Test Position	Gap (mm)	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	GSM850	GPRS 4 Tx Slots	Back	10	251	848.8	29.03	29.5	1.114	0.09	0.777	**0.866**
	GSM850	GPRS 4 Tx Slots	Back	10	128	824.2	28.83	29.5	1.167	0.05	0.647	0.755
	GSM850	GPRS 4 Tx Slots	Back	10	189	836.4	28.95	29.5	1.135	-0.08	0.735	0.834
12	GSM1900	GPRS 3 Tx Slots	Back	10	512	1850.2	28.09	28.5	1.099	0.01	0.472	**0.519**

<WCDMA SAR>

Plot No.	Band	Mode	Test Position	Gap (mm)	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)
13	WCDMA Band V	RMC 12.2Kbps	Back	10	4233	846.6	23.19	23.50	1.074	-0.16	0.580	**0.623**
14	WCDMA Band IV	RMC 12.2Kbps	Back	10	1513	1752.6	22.83	23	1.040	0.02	0.772	**0.803**
	WCDMA Band IV	RMC 12.2Kbps	Back	10	1312	1712.4	22.78	23	1.052	0.02	0.630	0.663
	WCDMA Band IV	RMC 12.2Kbps	Back	10	1413	1732.6	22.79	23	1.050	0.01	0.703	0.738
15	WCDMA Band II	RMC 12.2Kbps	Back	10	9538	1907.6	23.01	23.5	1.119	0.13	0.473	**0.529**

<LTE SAR>

Plot No.	Band	BW (MHz)	Modulation	RB Size	RB Offset	Test Position	Gap (mm)	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 5	10M	QPSK	1RB	25Offset	Back	10	20525	836.5	23.54	24	1.112	-0.11	0.471	0.524
17	LTE Band 4	20M	QPSK	1RB	0Offset	Back	10	20175	1732.5	23.16	23.5	1.081	0.07	0.637	0.689
18	LTE Band 2	20M	QPSK	1RB	49Offset	Back	10	18900	1880	23.21	23.5	1.069	0.08	0.446	0.477

Plot No.	Band	BW (MHz)	Modulation	RB Size	RB Offset	Test Position	Gap (mm)	Power Reduction	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)
19	LTE Band 7	20M	QPSK	50RB	0Offset	Bottom Side	10	On	21350	2560	19.33	19.5	1.040	-0.05	0.968	1.007
	LTE Band 7	20M	QPSK	50RB	0Offset	Bottom Side	10	On	20850	2510	19.27	19.5	1.054	-0.02	0.713	0.752
	LTE Band 7	20M	QPSK	50RB	0Offset	Bottom Side	10	On	21100	2535	19.36	19.5	1.033	-0.07	0.813	0.840

<WLAN SAR>

Plot No.	Band	Mode	Test Position	Gap (mm)	Ch.	Freq. (MHz)	Average Power (dBm)	Tune-Up Limit (dBm)	Tune-up Scaling Factor	Duty Cycle %	Duty Cycle Scaling Factor	Peak SAR	Power Drift (dB)	Measured 1g SAR (W/kg)	Reported 1g SAR (W/kg)
	WLAN 2.4GHz	802.11b 1Mbps	Front	10	6	2437	14.26	14.5	1.057	97.59	1.025	0.221			
20	WLAN 2.4GHz	802.11b 1Mbps	Back	10	6	2437	14.26	14.5	1.057	97.59	1.025	0.232	-0.09	0.157	0.170
	WLAN 2.4GHz	802.11b 1Mbps	Left Side	10	6	2437	14.26	14.5	1.057	97.59	1.025	0.144			
	WLAN 2.4GHz	802.11b 1Mbps	Top Side	10	6	2437	14.26	14.5	1.057	97.59	1.025	0.223			

14.3 Body Worn Accessory SAR

<GSM SAR>

Plot No.	Band	Mode	Test Position	Gap (mm)	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)
21	GSM850	GPRS 4 Tx Slots	Back	10	251	848.8	29.03	29.5	1.114	0.09	0.777	**0.866**
	GSM850	GPRS 4 Tx Slots	Back	10	128	824.2	28.83	29.5	1.167	0.05	0.647	0.755
	GSM850	GPRS 4 Tx Slots	Back	10	189	836.4	28.95	29.5	1.135	-0.08	0.735	0.834
22	GSM1900	GPRS 3 Tx Slots	Back	10	512	1850.2	28.09	28.5	1.099	0.01	0.472	**0.519**

<WCDMA SAR>

Plot No.	Band	Mode	Test Position	Gap (mm)	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)
23	WCDMA Band V	RMC 12.2Kbps	Back	10	4233	846.6	23.19	23.50	1.074	-0.16	0.580	**0.623**
24	WCDMA Band IV	RMC 12.2Kbps	Back	10	1513	1752.6	22.83	23	1.040	0.02	0.772	**0.803**
	WCDMA Band IV	RMC 12.2Kbps	Back	10	1312	1712.4	22.78	23	1.052	0.02	0.630	0.663
	WCDMA Band IV	RMC 12.2Kbps	Back	10	1413	1732.6	22.79	23	1.050	0.01	0.703	0.738
25	WCDMA Band II	RMC 12.2Kbps	Back	10	9538	1907.6	23.01	23.5	1.119	0.13	0.473	**0.529**

<LTE SAR>

Plot No.	Band	BW (MHz)	Modulation	RB Size	RB Offset	Test Position	Gap (mm)	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)
26	LTE Band 5	10M	QPSK	1RB	25Offset	Back	10	20525	836.5	23.54	24	1.112	-0.11	0.471	0.524
27	LTE Band 4	20M	QPSK	1RB	0Offset	Back	10	20175	1732.5	23.16	23.5	1.081	0.07	0.637	0.689
28	LTE Band 2	20M	QPSK	1RB	49Offset	Back	10	18900	1880	23.21	23.5	1.069	0.08	0.446	0.477

Plot No.	Band	BW (MHz)	Modulation	RB Size	RB Offset	Test Position	Gap (mm)	Power Reduction	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	1RB	49Offset	Back	10	Off	21100	2535	22.4	23	1.148	-0.04	1.190	1.366
	LTE Band 7	20M	QPSK	1RB	49Offset	Back	10	Off	20850	2510	22.65	23	1.084	-0.08	1.100	1.192
29	LTE Band 7	20M	QPSK	1RB	49Offset	Back	10	Off	21350	2560	22.63	23	1.089	0.15	1.270	1.383
	LTE Band 7	20M	QPSK	1RB	49Offset	Back with Headset	10	Off	21350	2560	22.63	23	1.089	-0.1	1.230	1.339
	LTE Band 7	20M	QPSK	1RB	49Offset	Back with Headset	10	Off	20850	2510	22.65	23	1.084	-0.13	1.050	1.138
	LTE Band 7	20M	QPSK	1RB	49Offset	Back with Headset	10	Off	21100	2535	22.40	23	1.148	-0.02	1.170	1.343

<WLAN SAR>

Plot No.	Band	Mode	Test Position	Gap (mm)	Ch.	Freq. (MHz)	Average Power (dBm)	Tune-Up Limit (dBm)	Tune-up Scaling Factor	Duty Cycle %	Duty Cycle Scaling Factor	Peak SAR	Power Drift (dB)	Measured 1g SAR (W/kg)	Reported 1g SAR (W/kg)
	WLAN 2.4GHz	802.11b 1Mbps	Front	10	6	2437	14.26	14.5	1.057	97.59	1.025	0.221			
30	WLAN 2.4GHz	802.11b 1Mbps	Back	10	6	2437	14.26	14.5	1.057	97.59	1.025	0.232	-0.09	0.157	0.170

< Bluetooth SAR>

Plot No.	Band	Mode	Test Position	Gap (mm)	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)
	Bluetooth	1Mbps	Front	10	39	2441	10.63	11	1.089	77.4	1.076	-0.05	0.026	0.030
31	Bluetooth	1Mbps	Back	10	39	2441	10.63	11	1.089	77.4	1.076	-0.01	0.035	0.041

14.4 Repeated SAR Measurement

No.	Band	BW (MHz)	Modulation	RB Size	RB Offset	Test Position	Gap (mm)	Power Reduction	Ch.	Freq. (MHz)	Average Power (dBm)	Tune-Up Limit (dBm)	Tune-up Scaling Factor	Power Drift (dB)	Measured 1g SAR (W/kg)	Ratio	Reported 1g SAR (W/kg)
1st	LTE Band 7	20M	QPSK	1RB	49Offset	Back	10	Off	21350	2560	22.63	23	1.089	0.15	1.270	1	1.383
2nd	LTE Band 7	20M	QPSK	1RB	49Offset	Back	10	Off	21350	2560	22.63	23	1.089	-0.09	1.250	1.016	1.361

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			Note
		Head	Body-worn	Hotspot	
1.	GSM Voice + WLAN2.4GHz	Yes	Yes		
2.	GPRS/EDGE + WLAN2.4GHz	Yes	Yes	Yes	Hotspot
3.	WCDMA + WLAN2.4GHz	Yes	Yes	Yes	Hotspot
4.	LTE + WLAN2.4GHz	Yes	Yes	Yes	Hotspot
5.	GSM Voice + Bluetooth		Yes		
6.	GPRS/EDGE + Bluetooth		Yes		WWAN VoIP
7.	WCDMA+ Bluetooth		Yes		WWAN VoIP
8.	LTE + Bluetooth		Yes		WWAN VoIP

General Note:

1. This device supported VoIP in GPRS, EGPRS, WCDMA and LTE (e.g. 3rd party VoIP).
2. This device 2.4GHz WLAN supports hotspot operation.
3. EUT will choose each GSM, WCDMA and LTE according to the network signal condition; therefore, they will not operate simultaneously at any moment.
4. For head/hotspot/body-worn, WLAN 2.4GHz, chose the worse zoom scan SAR for co-located with WWAN.
5. For simultaneously transmission SAR analysis, SAR values only considered the worst position which we did perform SAR testing on FA662816-04, other test results were leverage from the parent model which referred to the test report number FA662816.
6. EUT will choose each GSM, WCDMA and LTE according to the network signal condition; therefore, they will not operate simultaneously at any moment.
7. WLAN and Bluetooth share the same antenna, and cannot transmit simultaneously.
8. The reported SAR summation is calculated based on the same configuration and test position.
9. 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.

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)	SPLSR	Case No
GSM	GSM850	Right Cheek	0.474	0.704	1.18		
		Right Tilted	0.433	0.704	1.14		
		Left Cheek	0.599	0.704	1.30		
		Left Tilted	0.296	0.704	1.00		
	GSM1900	Right Cheek	0.293	0.704	1.00		
		Right Tilted	0.208	0.704	0.91		
		Left Cheek	0.356	0.704	1.06		
		Left Tilted	0.168	0.704	0.87		
WCDMA	Band V	Right Cheek	0.408	0.704	1.11		
		Right Tilted	0.236	0.704	0.94		
		Left Cheek	0.353	0.704	1.06		
		Left Tilted	0.221	0.704	0.93		
	Band IV	Right Cheek	0.388	0.704	1.09		
		Right Tilted	0.286	0.704	0.99		
		Left Cheek	0.433	0.704	1.14		
		Left Tilted	0.243	0.704	0.95		
	Band II	Right Cheek	0.384	0.704	1.09		
		Right Tilted	0.224	0.704	0.93		
		Left Cheek	0.403	0.704	1.11		
		Left Tilted	0.181	0.704	0.89		
LTE	Band 5	Right Cheek	0.324	0.704	1.03		
		Right Tilted	0.253	0.704	0.96		
		Left Cheek	0.337	0.704	1.04		
		Left Tilted	0.253	0.704	0.96		
	Band 4	Right Cheek	0.307	0.704	1.01		
		Right Tilted	0.238	0.704	0.94		
		Left Cheek	0.344	0.704	1.05		
		Left Tilted	0.201	0.704	0.91		
	Band 2	Right Cheek	0.388	0.704	1.09		
		Right Tilted	0.192	0.704	0.90		
		Left Cheek	0.355	0.704	1.06		
		Left Tilted	0.211	0.704	0.92		
	Band 7	Right Cheek	0.201	0.704	0.91		
		Right Tilted	0.115	0.704	0.82		
		Left Cheek	0.341	0.704	1.05		
		Left Tilted	0.054	0.704	0.76		

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)	SPLSR	Case No
GSM	GSM850	Front	0.714	0.170	0.88		
		Back	0.866	0.170	1.04		
		Left side	0.532	0.170	0.70		
		Top side		0.170	0.17		
	GSM1900	Front	0.655	0.170	0.83		
		Back	0.519	0.170	0.69		
		Left side	0.468	0.170	0.64		
		Top side		0.170	0.17		
WCDMA	Band V	Front	0.479	0.170	0.65		
		Back	0.623	0.170	0.79		
		Left side	0.346	0.170	0.52		
		Top side		0.170	0.17		
	Band IV	Front	0.707	0.170	0.88		
		Back	0.803	0.170	0.97		
		Left side	0.439	0.170	0.61		
		Top side		0.170	0.17		
	Band II	Front	0.580	0.170	0.75		
		Back	0.529	0.170	0.70		
		Left side	0.375	0.170	0.55		
		Top side		0.170	0.17		

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	Case No
LTE	Band 5	Front	0.436	0.170	0.61		
		Back	0.524	0.170	0.69		
		Left side	0.369	0.170	0.54		
		Top side		0.170	0.17		
	Band 4	Front	0.611	0.170	0.78		
		Back	0.689	0.170	0.86		
		Left side	0.481	0.170	0.65		
		Top side		0.170	0.17		
	Band 2	Front	0.561	0.170	0.73		
		Back	0.477	0.170	0.65		
		Left side	0.460	0.170	0.63		
		Top side		0.170	0.17		
	Band 7	Front	0.554	0.170	0.72		
		Back	0.665	0.170	0.84		
		Left side	0.132	0.170	0.30		
		Top side		0.170	0.17		
		Bottom side	1.007		1.01		

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)	1+2 Summed 1g SAR (W/kg)	SPLSR	Case No
GSM	GSM850	Front	0.714	0.170	0.88		
		Back	0.866	0.170	1.04		
	GSM1900	Front	0.655	0.170	0.83		
		Back	0.519	0.170	0.69		
WCDMA	Band V	Front	0.479	0.170	0.65		
		Back	0.623	0.170	0.79		
	Band IV	Front	0.707	0.170	0.88		
		Back	0.803	0.170	0.97		
	Band II	Front	0.580	0.170	0.75		
		Back	0.529	0.170	0.70		
LTE	Band 5	Front	0.436	0.170	0.61		
		Back	0.524	0.170	0.69		
	Band 4	Front	0.611	0.170	0.78		
		Back	0.689	0.170	0.86		
	Band 2	Front	0.561	0.170	0.73		
		Back	0.477	0.170	0.65		
	Band 7	Front	1.274	0.170	1.44		
		Back	1.383	0.170	**1.55**		
		Back with Headset	1.343	0.039	1.38		

WWAN Band		Exposure Position	1 WWAN 1g SAR (W/kg)	3 Bluetooth 1g SAR (W/kg)	1+3 Summed 1g SAR (W/kg)	SPLSR	Case No
GSM	GSM850	Front	0.714	0.030	0.74		
		Back	0.866	0.041	0.91		
	GSM1900	Front	0.655	0.030	0.69		
		Back	0.519	0.041	0.56		
WCDMA	Band V	Front	0.479	0.030	0.51		
		Back	0.623	0.041	0.66		
	Band IV	Front	0.707	0.030	0.74		
		Back	0.803	0.041	0.84		
	Band II	Front	0.580	0.030	0.61		
		Back	0.529	0.041	0.57		
LTE	Band 5	Front	0.436	0.030	0.47		
		Back	0.524	0.041	0.57		
	Band 4	Front	0.611	0.030	0.64		
		Back	0.689	0.041	0.73		
	Band 2	Front	0.561	0.030	0.59		
		Back	0.477	0.041	0.52		
	Band 7	Front	1.274	0.030	1.30		
		Back	1.383	0.041	**1.42**		

Test Engineer：Luke Lu

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.

System Check_Head_835MHz_161101

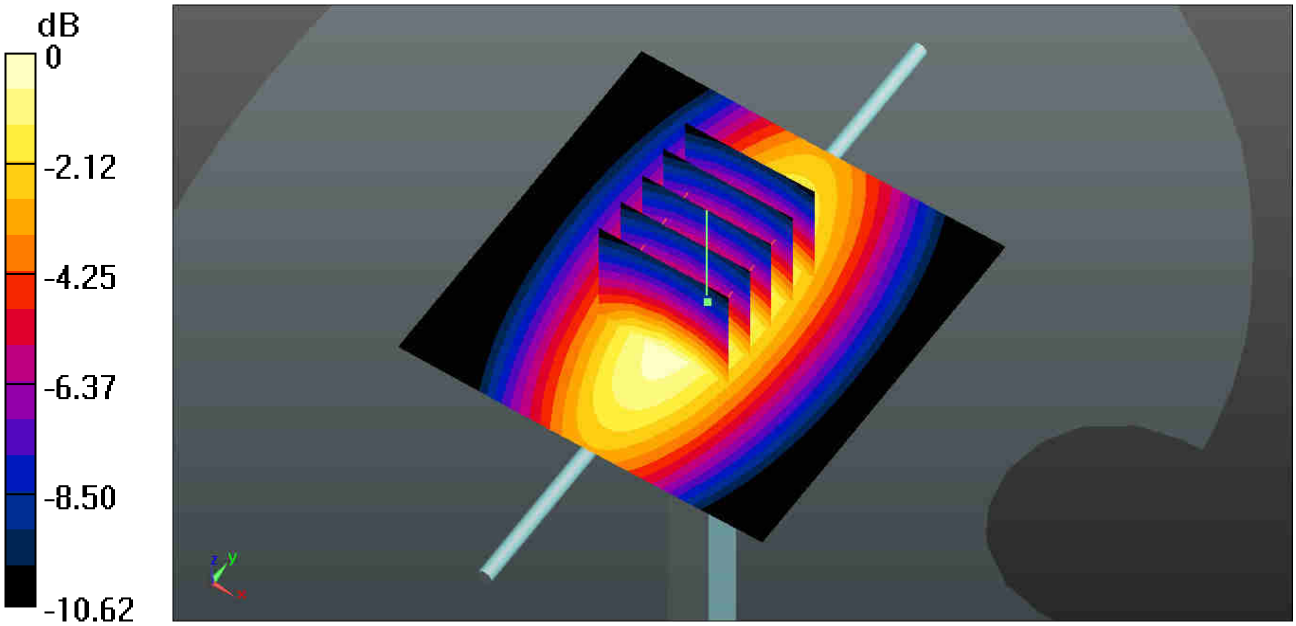
DUT: D835V2-SN:4d162

Communication System: UID 0, CW; Frequency: 835 MHz;Duty Cycle: 1:1
Medium: HSL_835_161101 Medium parameters used: f = 835 MHz; σ = 0.897 S/m; ε_r = 41.605; ρ = 1000 kg/m^3
Ambient Temperature：23.2 ℃; Liquid Temperature：22.9 ℃

DASY5 Configuration:
- Probe: EX3DV4 - SN3819; ConvF(9.41, 9.41, 9.41); Calibrated: 2015.11.27;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn915; Calibrated: 2016.06.22
- Phantom: SAM2; Type: QD000P40CD; Serial: TP:1671
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Pin=250mW/Area Scan (61x61x1): Interpolated grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 3.12 W/kg

Pin=250mW/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 61.17 V/m; Power Drift = -0.04 dB
Peak SAR (extrapolated) = 3.48 W/kg
SAR(1 g) = 2.39 W/kg; SAR(10 g) = 1.58 W/kg
Maximum value of SAR (measured) = 3.01 W/kg



0 dB = 3.12 W/kg

System Check_Head_1750MHz_161031

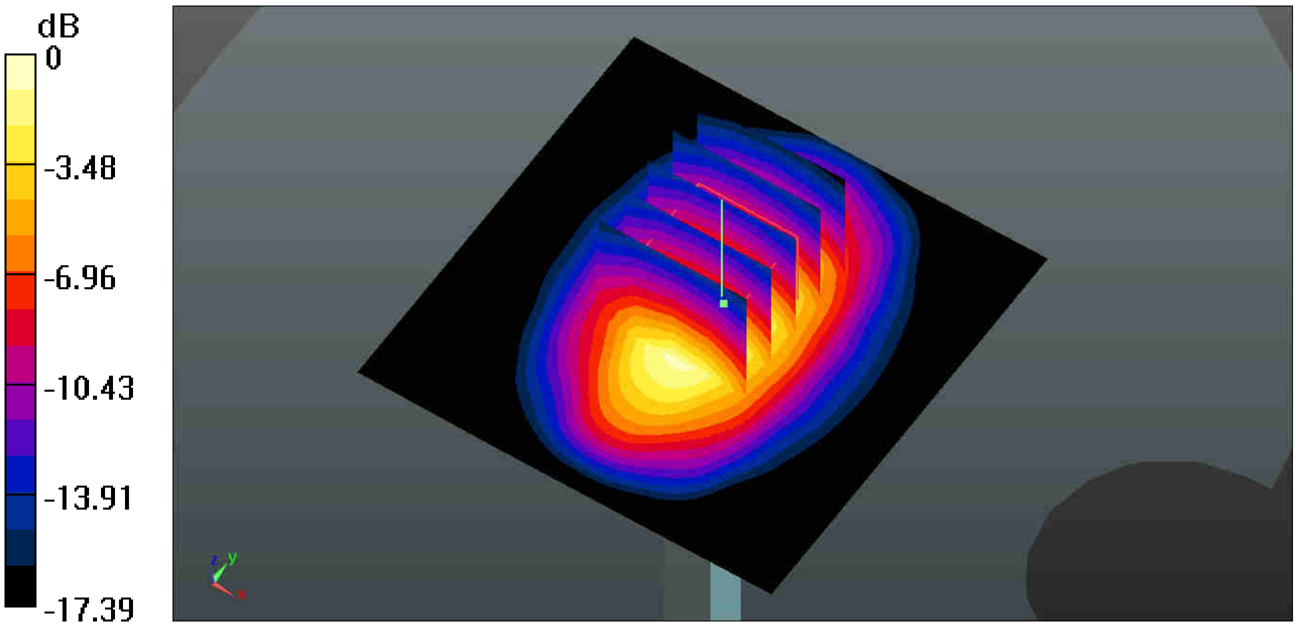
DUT: D1750V2-SN:1137

Communication System: UID 0, CW; Frequency: 1750 MHz;Duty Cycle: 1:1
Medium: HSL_1800_161031 Medium parameters used: f = 1750 MHz; σ = 1.383 S/m; ε_r = 41.3; ρ = 1000 kg/m^3
Ambient Temperature：23.2 ℃; Liquid Temperature：22.7 ℃

DASY5 Configuration:
- Probe: EX3DV4 - SN3819; ConvF(8.12, 8.12, 8.12); Calibrated: 2015.11.27;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn915; Calibrated: 2016.06.22
- Phantom: SAM2; Type: QD000P40CD; Serial: TP:1671
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Pin=250mW/Area Scan (61x61x1): Interpolated grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 12.9 W/kg

Pin=250mW/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 96.59 V/m; Power Drift = -0.01 dB
Peak SAR (extrapolated) = 15.9 W/kg
SAR(1 g) = 8.94 W/kg; SAR(10 g) = 4.82 W/kg
Maximum value of SAR (measured) = 12.3 W/kg



0 dB = 12.9 W/kg

Test Laboratory: Sporton International Inc. SAR/HAC Testing Lab Date: 2016.10.31

System Check_Head_1900MHz_161031

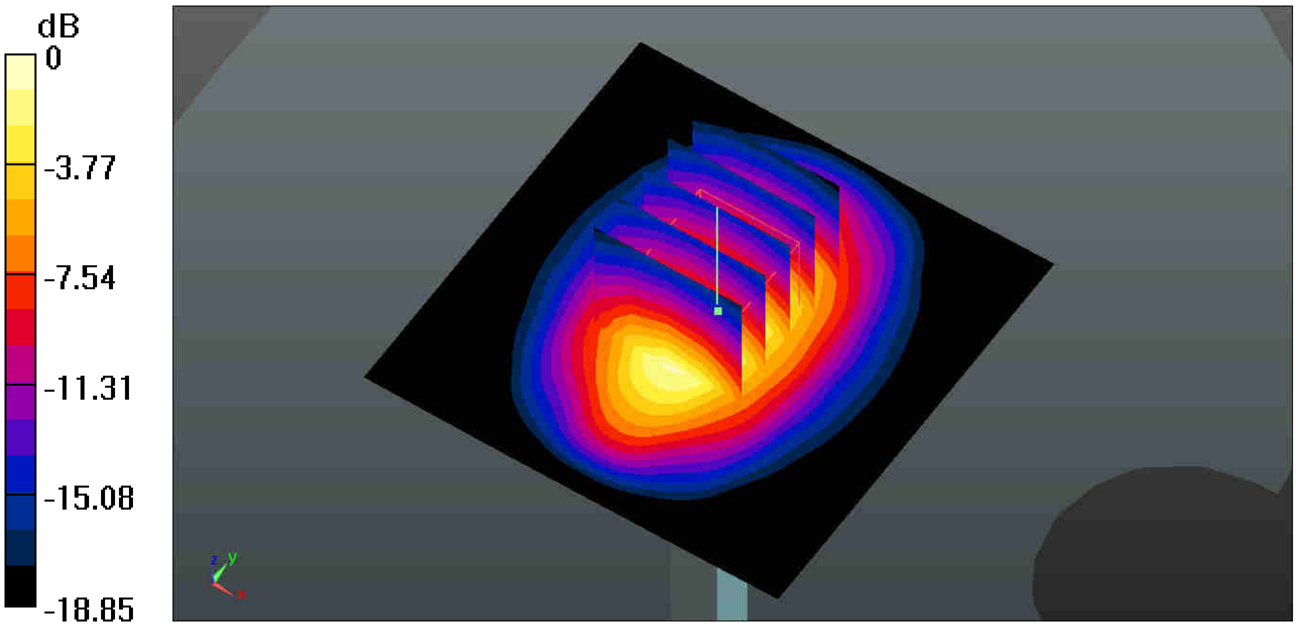
DUT: D1900V2-SN:5d182

Communication System: UID 0, CW; Frequency: 1900 MHz;Duty Cycle: 1:1
Medium: HSL_1900_161031 Medium parameters used: f = 1900 MHz; σ = 1.45 S/m; ε_r = 40.004; ρ = 1000 kg/m^3
Ambient Temperature：23.2 ℃; Liquid Temperature：22.8 ℃

DASY5 Configuration:
- Probe: EX3DV4 - SN3819; ConvF(7.79, 7.79, 7.79); Calibrated: 2015.11.27;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn915; Calibrated: 2016.06.22
- Phantom: SAM2; Type: QD000P40CD; Serial: TP:1671
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Pin=250mW/Area Scan (61x61x1): Interpolated grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 14.7 W/kg

Pin=250mW/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 102.8 V/m; Power Drift = -0.02 dB
Peak SAR (extrapolated) = 18.3 W/kg
SAR(1 g) = 9.92 W/kg; SAR(10 g) = 5.12 W/kg
Maximum value of SAR (measured) = 14.0 W/kg



0 dB = 14.7 W/kg

Test Laboratory: Sporton International Inc. SAR/HAC Testing Lab Date: 2016.10.27

System Check_Head_2450MHz_161027

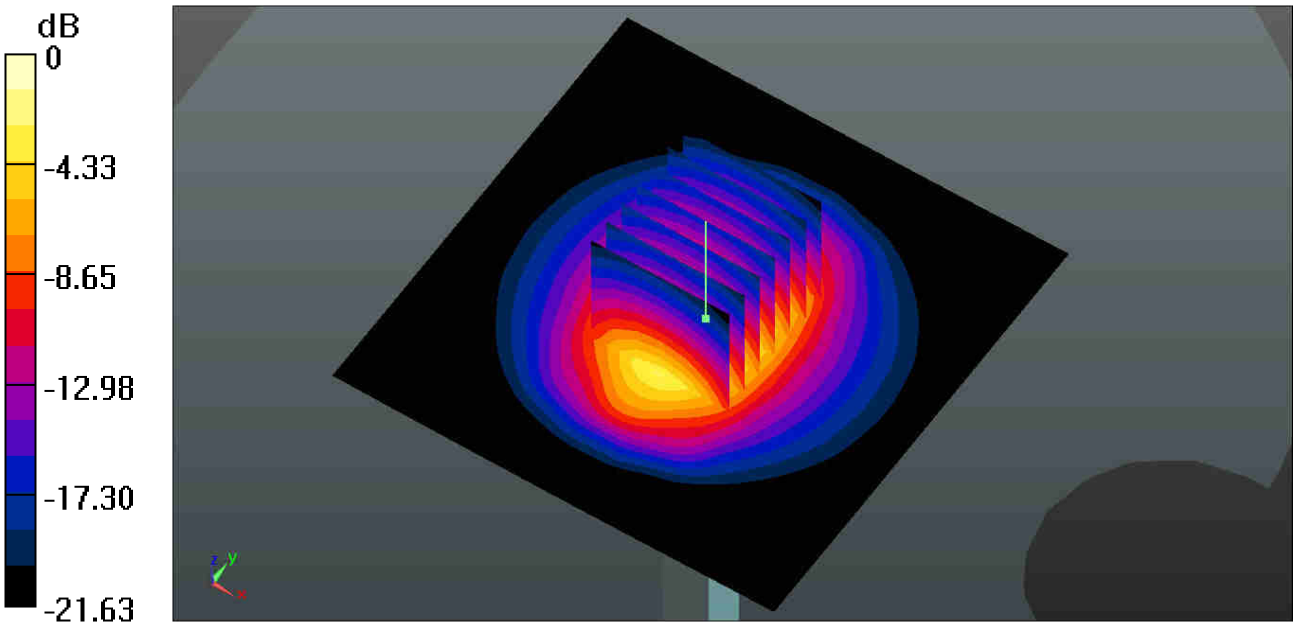
DUT: D2450V2-SN:924

Communication System: UID 0, CW; Frequency: 2450 MHz;Duty Cycle: 1:1
Medium: HSL_2450_161027 Medium parameters used: f = 2450 MHz; σ = 1.809 S/m; ε_r = 38.451; ρ = 1000 kg/m^3
Ambient Temperature：23.4 ℃; Liquid Temperature：22.9 ℃

DASY5 Configuration:
- Probe: EX3DV4 - SN3911; ConvF(7.43, 7.43, 7.43); Calibrated: 2016.09.29;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1338; Calibrated: 2015.11.23
- Phantom: SAM2; Type: QD000P40CD; Serial: TP:1671
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Pin=250mW/Area Scan (81x81x1): Interpolated grid: dx=12mm, dy=12mm
Maximum value of SAR (interpolated) = 20.0 W/kg

Pin=250mW/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 92.87 V/m; Power Drift = -0.03 dB
Peak SAR (extrapolated) = 26.5 W/kg
SAR(1 g) = 13.1 W/kg; SAR(10 g) = 6.09 W/kg
Maximum value of SAR (measured) = 19.9 W/kg



0 dB = 20.0 W/kg

System Check_Head_2600MHz_161031

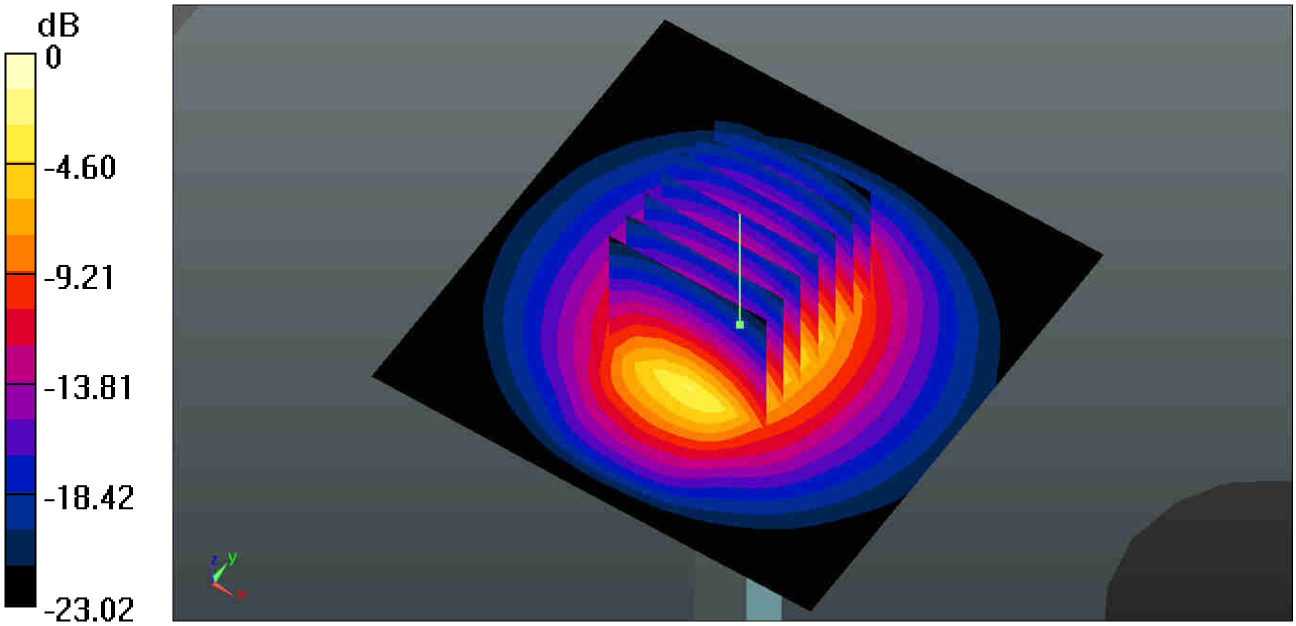
DUT: D2600V2-SN:1070

Communication System: UID 0, CW (0); Frequency: 2600 MHz;Duty Cycle: 1:1
Medium: HSL_2600_161031 Medium parameters used: f = 2600 MHz; σ = 2.009 S/m; ε_r = 39.626; ρ = 1000 kg/m^3
Ambient Temperature：23.4 ℃; Liquid Temperature：22.8 ℃

DASY5 Configuration:
- Probe: EX3DV4 - SN3911; ConvF(7.39, 7.39, 7.39); Calibrated: 2016.09.29;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1338; Calibrated: 2015.11.23
- Phantom: SAM2; Type: QD000P40CD; Serial: TP:1671
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Pin=250mW/Area Scan (71x71x1): Interpolated grid: dx=12mm, dy=12mm
Maximum value of SAR (interpolated) = 22.2 W/kg

Pin=250mW/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 104.8 V/m; Power Drift = -0.17 dB
Peak SAR (extrapolated) = 30.2 W/kg
SAR(1 g) = 14.3 W/kg; SAR(10 g) = 6.39 W/kg
Maximum value of SAR (measured) = 22.2 W/kg



0 dB = 22.2 W/kg

System Check_Body_835MHz_161030

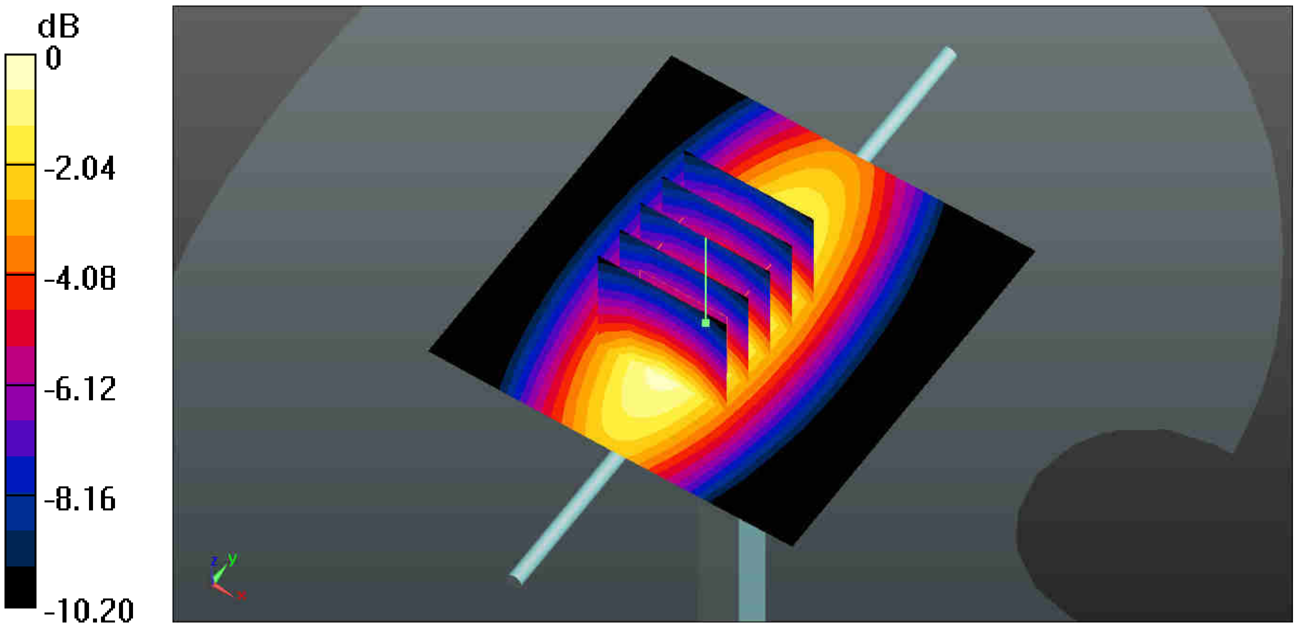
DUT: D835V2-SN:4d162

Communication System: UID 0, CW; Frequency: 835 MHz;Duty Cycle: 1:1
Medium: MSL_835_161030 Medium parameters used: f = 835 MHz; σ = 0.977 S/m; ε_r = 54.466; ρ = 1000 kg/m^3
Ambient Temperature：23.2 ℃; Liquid Temperature：22.6 ℃

DASY5 Configuration:
- Probe: EX3DV4 - SN3911; ConvF(10.19, 10.19, 10.19); Calibrated: 2016.09.29;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1338; Calibrated: 2015.11.23
- Phantom: SAM2; Type: QD000P40CD; Serial: TP:1671
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Pin=250mW/Area Scan (61x61x1): Interpolated grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 3.03 W/kg

Pin=250mW/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 51.34 V/m; Power Drift = -0.11 dB
Peak SAR (extrapolated) = 3.41 W/kg
SAR(1 g) = 2.39 W/kg; SAR(10 g) = 1.6 W/kg
Maximum value of SAR (measured) = 2.97 W/kg



0 dB = 3.03 W/kg

System Check_Body_1750MHz_161028

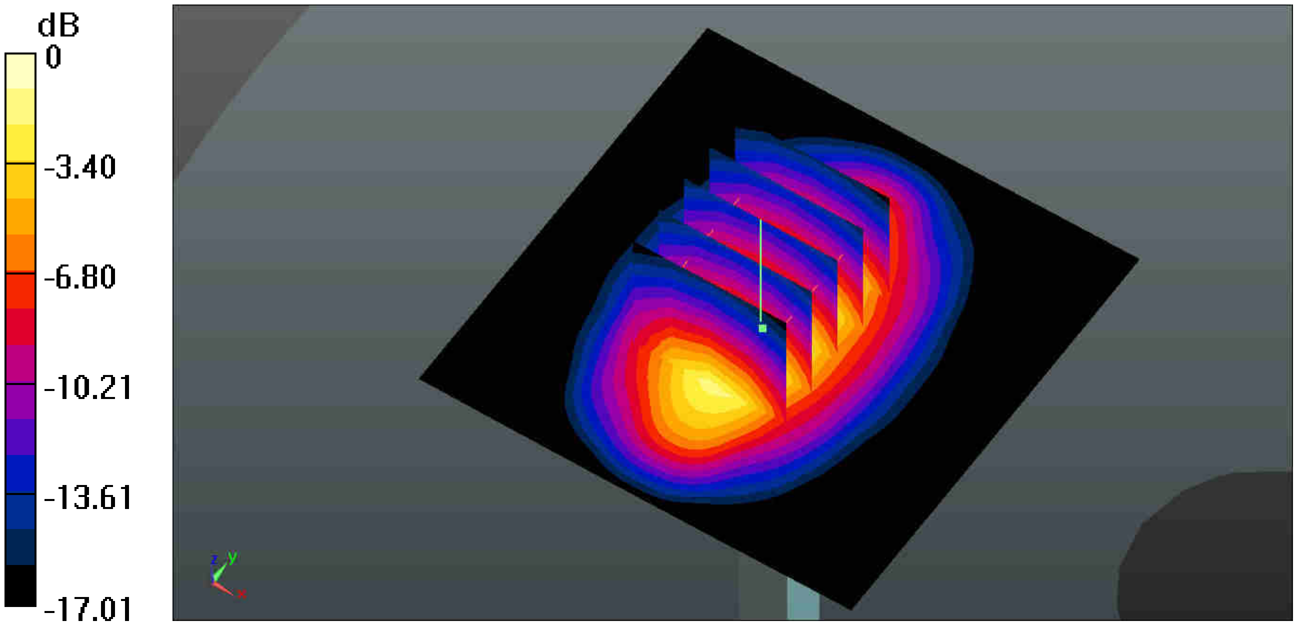
DUT: D1750V2-SN:1137

Communication System: UID 0, CW; Frequency: 1750 MHz;Duty Cycle: 1:1
Medium: MSL_1800_161028 Medium parameters used: f = 1750 MHz; σ = 1.524 S/m; ε_r = 52.564; ρ = 1000 kg/m^3
Ambient Temperature：23.5 ℃; Liquid Temperature：22.7 ℃

DASY5 Configuration:
- Probe: EX3DV4 - SN3958; ConvF(8.58, 8.58, 8.58); Calibrated: 2016.07.26;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1386; Calibrated: 2016.07.07
- Phantom: SAM2; Type: QD000P40CD; Serial: TP:1671
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

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

Pin=250mW/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 94.14 V/m; Power Drift = 0.03 dB
Peak SAR (extrapolated) = 16.7 W/kg
SAR(1 g) = 9.36 W/kg; SAR(10 g) = 4.93 W/kg
Maximum value of SAR (measured) = 13.2 W/kg



0 dB = 13.3 W/kg

Test Laboratory: Sporton International Inc. SAR/HAC Testing Lab Date: 2016.10.28

System Check_Body_1900MHz_161028

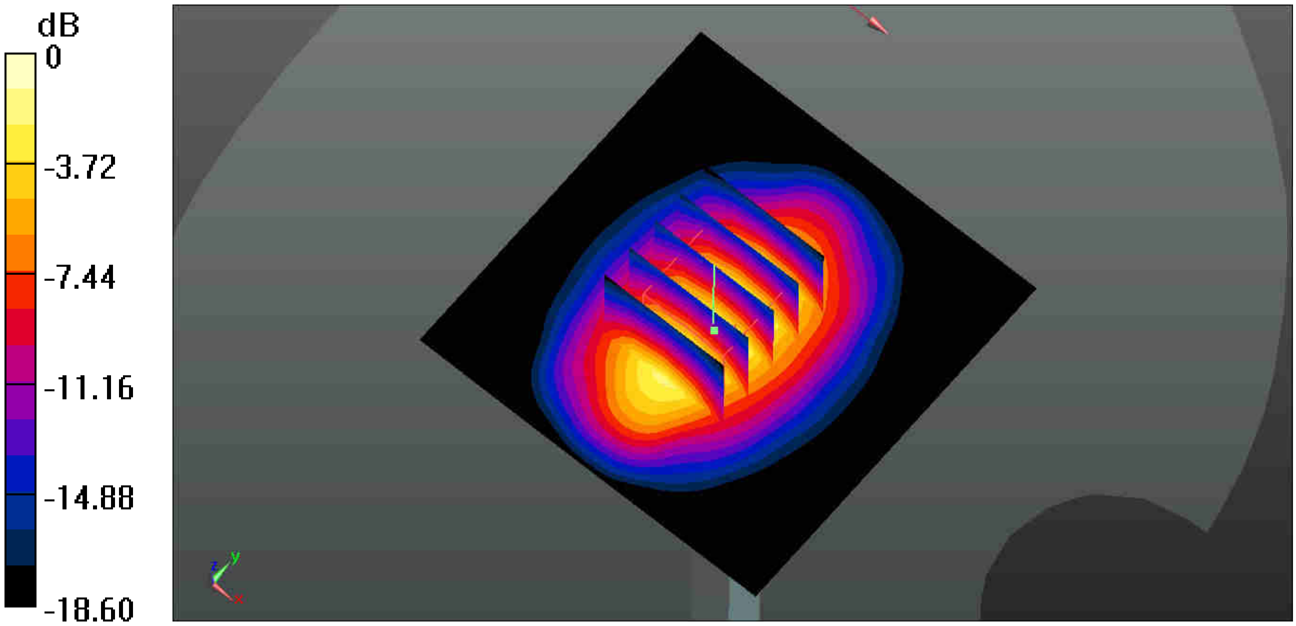
DUT: D1900V2-SN:5d182

Communication System: UID 0, CW; Frequency: 1900 MHz;Duty Cycle: 1:1
Medium: MSL_1900_161028 Medium parameters used: f = 1900 MHz; σ = 1.547 S/m; ε_r = 53.803; ρ = 1000 kg/m^3
Ambient Temperature：23.4 ℃; Liquid Temperature：22.5 ℃

DASY5 Configuration:
- Probe: EX3DV4 - SN3958; ConvF(8.01, 8.01, 8.01); Calibrated: 2016.07.26;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1386; Calibrated: 2016.07.07
- Phantom: SAM2; Type: QD000P40CD; Serial: TP:1671
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Pin=250mW/Area Scan (61x61x1): Interpolated grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 14.5 W/kg

Pin=250mW/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 85.14 V/m; Power Drift = -0.12 dB
Peak SAR (extrapolated) = 18.2 W/kg
SAR(1 g) = 9.93 W/kg; SAR(10 g) = 5.05 W/kg
Maximum value of SAR (measured) = 14.3 W/kg



0 dB = 14.5 W/kg

Test Laboratory: Sporton International Inc. SAR/HAC Testing Lab Date: 2016.10.28

System Check_Body_2450MHz_161028

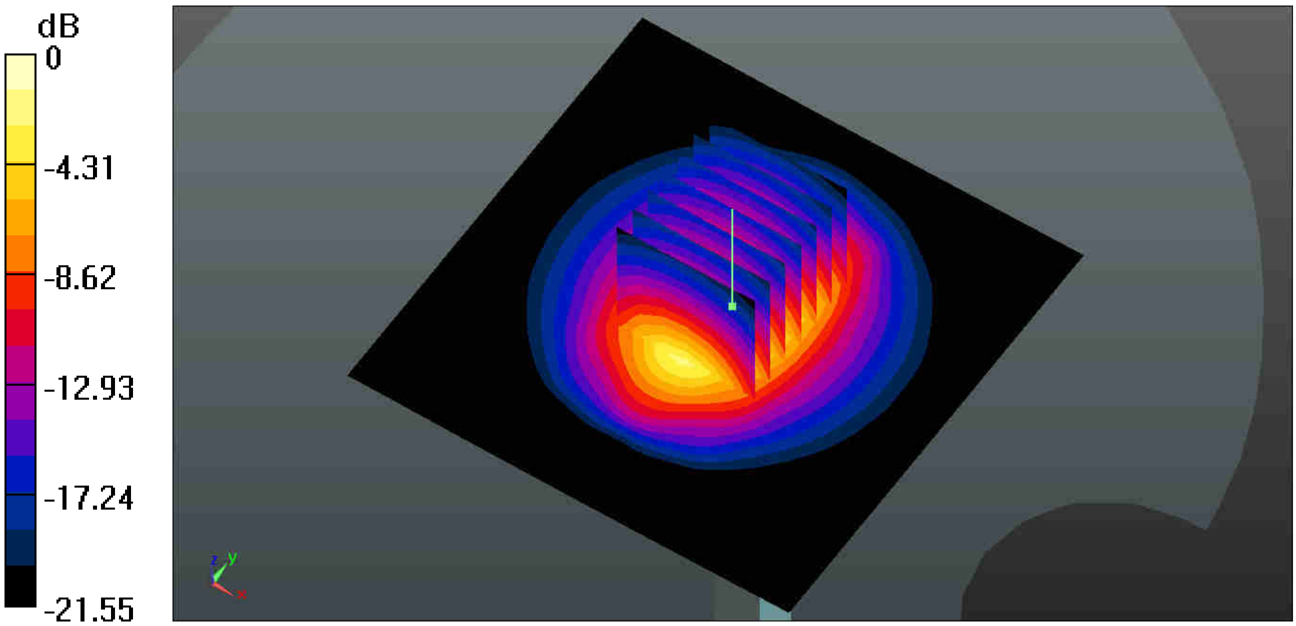
DUT: D2450V2-SN:924

Communication System: UID 0, CW; Frequency: 2450 MHz;Duty Cycle: 1:1
Medium: MSL_2450_161028 Medium parameters used: f = 2450 MHz; σ = 1.991 S/m; ε_r = 52.32; ρ = 1000 kg/m^3
Ambient Temperature：23.4 ℃; Liquid Temperature：22.7 ℃

DASY5 Configuration:
- Probe: EX3DV4 - SN3958; ConvF(7.72, 7.72, 7.72); Calibrated: 2016.07.26;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1386; Calibrated: 2016.07.07
- Phantom: SAM2; Type: QD000P40CD; Serial: TP:1671
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Pin=250mW/Area Scan (81x81x1): Interpolated grid: dx=12mm, dy=12mm
Maximum value of SAR (interpolated) = 21.1 W/kg

Pin=250mW/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 87.87 V/m; Power Drift = -0.07 dB
Peak SAR (extrapolated) = 28.0 W/kg
SAR(1 g) = 13.7 W/kg; SAR(10 g) = 6.35 W/kg
Maximum value of SAR (measured) = 20.9 W/kg



0 dB = 21.1 W/kg

System Check_Body_2600MHz_161031

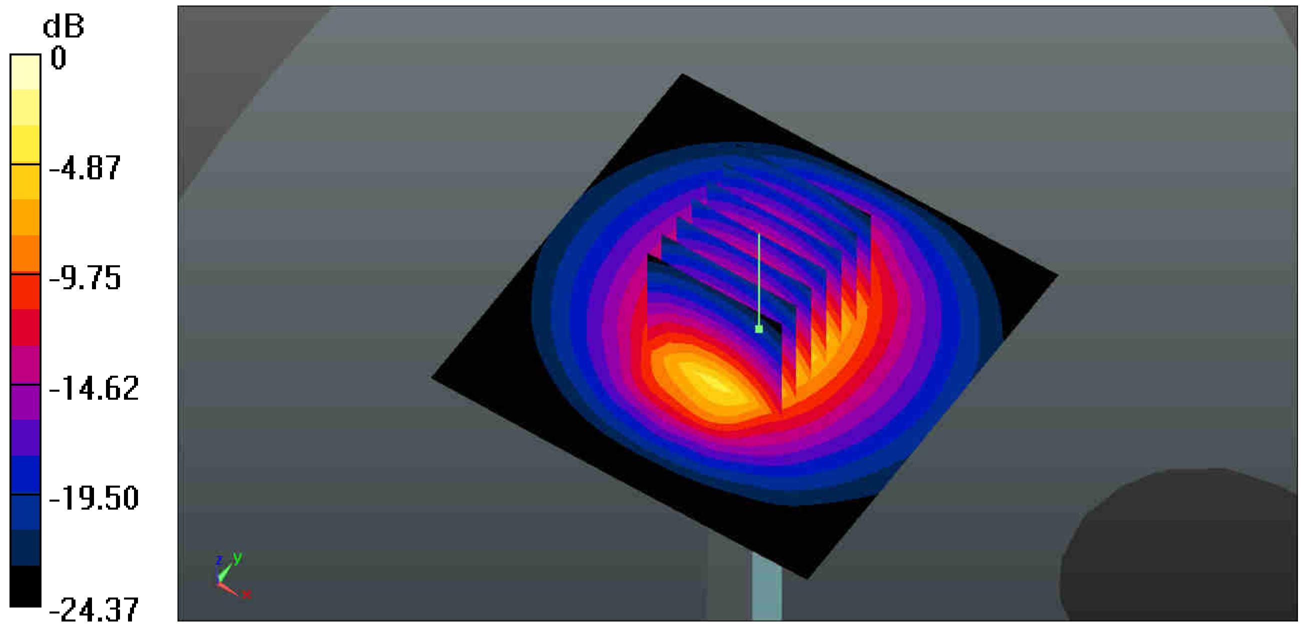
DUT: D2600V2-SN:1070

Communication System: UID 0, CW; Frequency: 2600 MHz;Duty Cycle: 1:1
Medium: MSL_2600_161031 Medium parameters used: f = 2600 MHz; σ = 2.209 S/m; ε_r = 51.123; ρ = 1000 kg/m^3
Ambient Temperature：23.4 ℃; Liquid Temperature：22.6 ℃

DASY5 Configuration:
- Probe: EX3DV4 - SN3819; ConvF(6.79, 6.79, 6.79); Calibrated: 2015.11.27;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn915; Calibrated: 2016.06.22
- Phantom: SAM2; Type: QD000P40CD; Serial: TP:1671
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Pin=250mW/Area Scan (71x71x1): Interpolated grid: dx=12mm, dy=12mm
Maximum value of SAR (interpolated) = 21.7 W/kg

Pin=250mW/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 98.66 V/m; Power Drift = -0.08 dB
Peak SAR (extrapolated) = 29.8 W/kg
SAR(1 g) = 13.8 W/kg; SAR(10 g) = 6.04 W/kg
Maximum value of SAR (measured) = 21.6 W/kg



0 dB = 21.7 W/kg

Appendix B. Plots of High SAR Measurement

The plots are shown as follows.

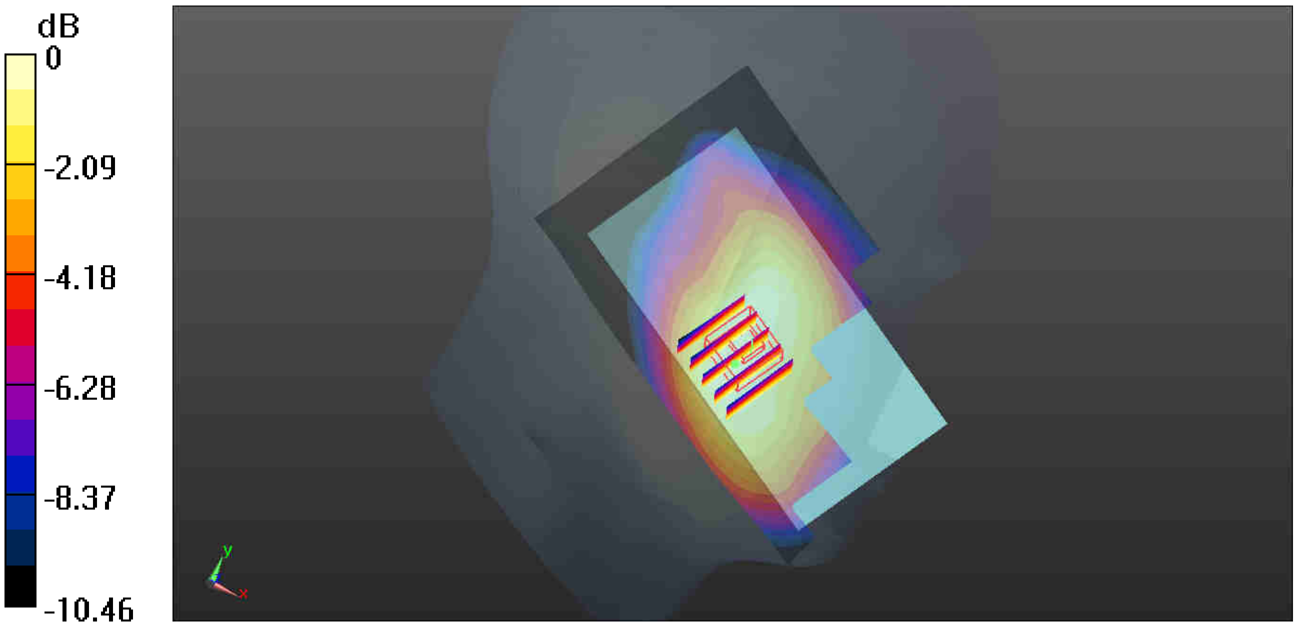
01_GSM850_GPRS (4 Tx slots)_Left Cheek_Ch251

Communication System: UID 0, GPRS/EDGE12 (0); Frequency: 848.8 MHz;Duty Cycle: 1:2.08
Medium: HSL_835_161101 Medium parameters used: f = 848.8 MHz; σ = 0.905 S/m; ε_r = 41.32; ρ =1000 kg/m^3
Ambient Temperature：23.2 ℃; Liquid Temperature：22.9 ℃

DASY5 Configuration:
- Probe: EX3DV4 - SN3819; ConvF(9.41, 9.41, 9.41); Calibrated: 2015.11.27;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn915; Calibrated: 2016.06.22
- Phantom: SAM2; Type: QD000P40CD; Serial: TP:1671
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Ch251/Area Scan (71x121x1): Interpolated grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.651 W/kg

Ch251/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 3.155 V/m; Power Drift = 0.09 dB
Peak SAR (extrapolated) = 0.678 W/kg
SAR(1 g) = 0.538 W/kg; SAR(10 g) = 0.397 W/kg
Maximum value of SAR (measured) = 0.619 W/kg



0 dB = 0.651 W/kg

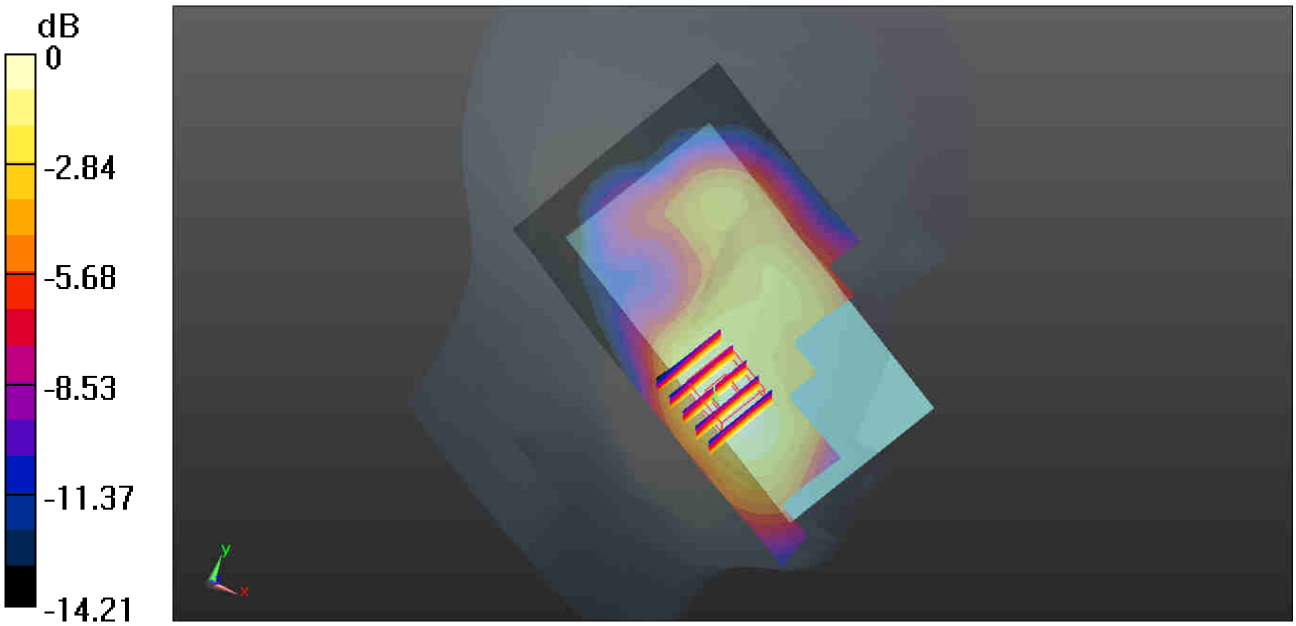
02_GSM1900_GPRS (3 Tx slots)_Left Cheek_Ch512

Communication System: UID 0, GPRS/EDGE11 (0); Frequency: 1850.2 MHz;Duty Cycle: 1:2.77
Medium: HSL_1900_161031 Medium parameters used: f = 1850.2 MHz; σ = 1.398 S/m; ε_r = 40.229; ρ = 1000 kg/m^3
Ambient Temperature：23.2 ℃; Liquid Temperature：22.8 ℃

DASY5 Configuration:
- Probe: EX3DV4 - SN3819; ConvF(7.79, 7.79, 7.79); Calibrated: 2015.11.27;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn915; Calibrated: 2016.06.22
- Phantom: SAM2; Type: QD000P40CD; Serial: TP:1671
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Ch512/Area Scan (71x121x1): Interpolated grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.406 W/kg

Ch512/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 2.021 V/m; Power Drift = 0.03 dB
Peak SAR (extrapolated) = 0.488 W/kg
SAR(1 g) = 0.324 W/kg; SAR(10 g) = 0.210 W/kg
Maximum value of SAR (measured) = 0.401 W/kg



0 dB = 0.406 W/kg

Test Laboratory: Sporton International Inc. SAR/HAC Testing Lab Date: 2016.11.01

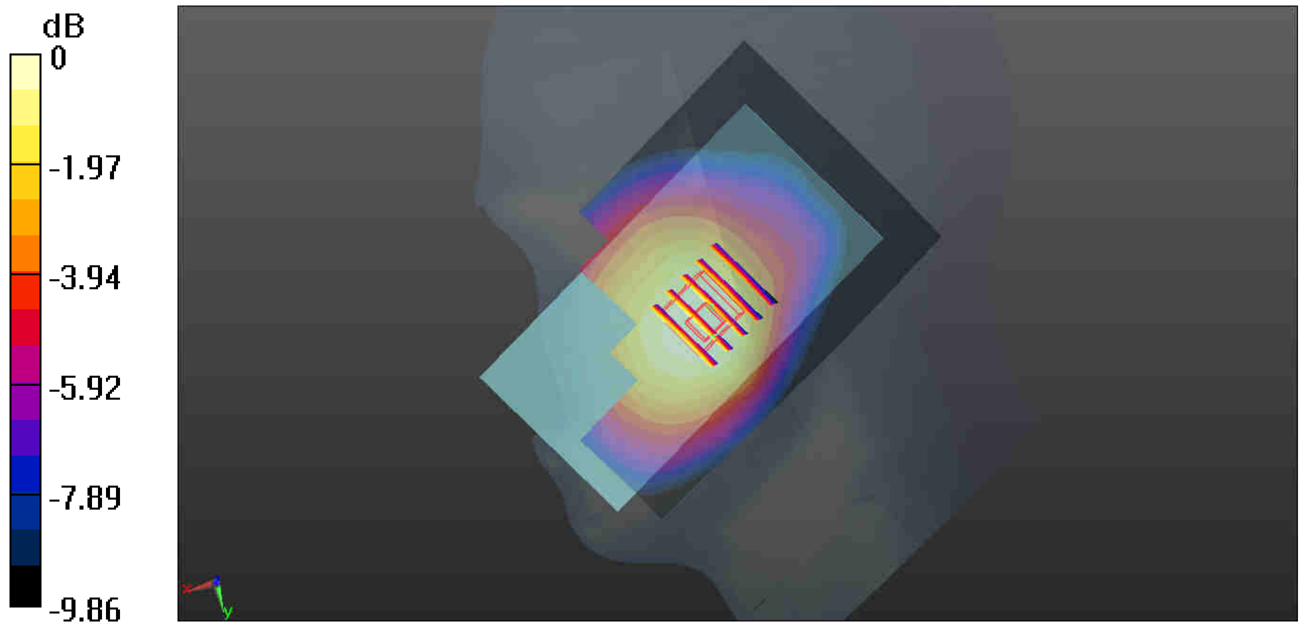
03_WCDMA Band V_RMC 12.2Kbps_Right Cheek_Ch4233

Communication System: UID 0, UMTS (0); Frequency: 846.6 MHz;Duty Cycle: 1:1
Medium: HSL_835_161101 Medium parameters used: f = 846.6 MHz; σ = 0.904 S/m; ε_r = 41.367; ρ =1000 kg/m^3
Ambient Temperature：23.2 ℃; Liquid Temperature：22.9 ℃

DASY5 Configuration:
- Probe: EX3DV4 - SN3819; ConvF(9.41, 9.41, 9.41); Calibrated: 2015.11.27;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn915; Calibrated: 2016.06.22
- Phantom: SAM2; Type: QD000P40CD; Serial: TP:1671
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Ch4233/Area Scan (71x121x1): Interpolated grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.466 W/kg

Ch4233/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 2.849 V/m; Power Drift = 0.07 dB
Peak SAR (extrapolated) = 0.480 W/kg
SAR(1 g) = 0.380 W/kg; SAR(10 g) = 0.287 W/kg
Maximum value of SAR (measured) = 0.428 W/kg



0 dB = 0.466 W/kg

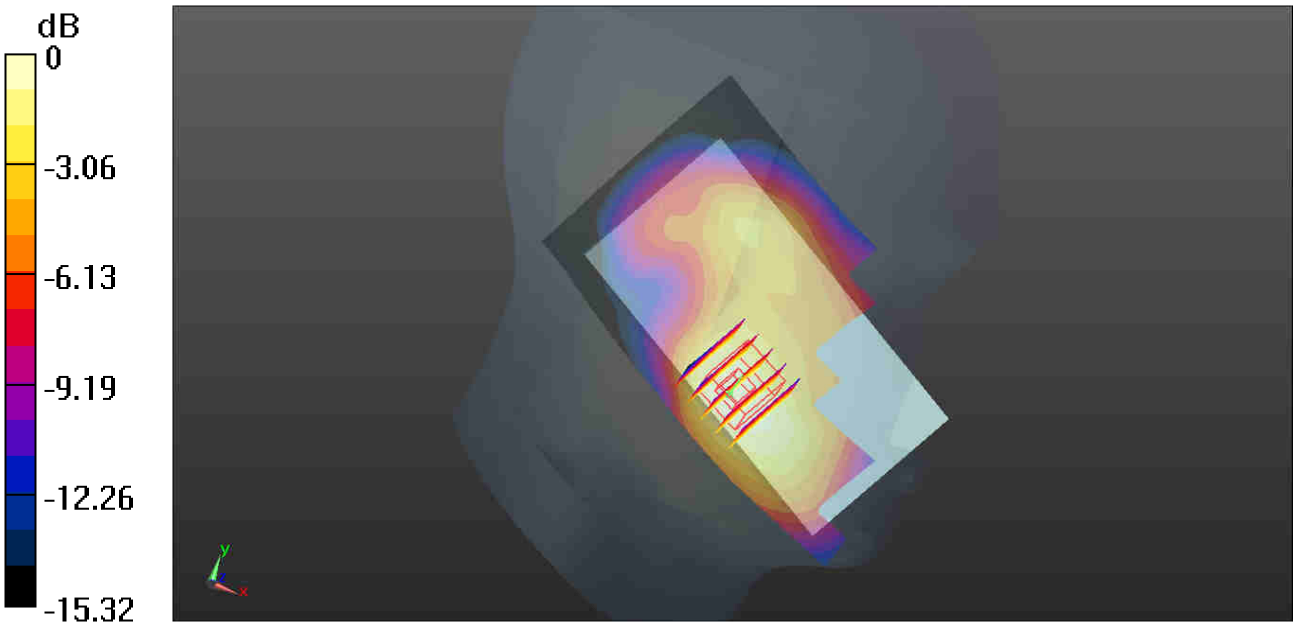
04_WCDMA Band IV_RMC12.2Kbps_Left Cheek_Ch1513

Communication System: UID 0, UMTS (0); Frequency: 1752.6 MHz;Duty Cycle: 1:1
Medium: HSL_1800_161031 Medium parameters used: f = 1752.6 MHz; σ = 1.386 S/m; ε_r = 41.285; ρ = 1000 kg/m^3
Ambient Temperature：23.2 ℃; Liquid Temperature：22.7 ℃

DASY5 Configuration:
- Probe: EX3DV4 - SN3819; ConvF(8.12, 8.12, 8.12); Calibrated: 2015.11.27;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn915; Calibrated: 2016.06.22
- Phantom: SAM2; Type: QD000P40CD; Serial: TP:1671
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Ch1513/Area Scan (71x121x1): Interpolated grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.516 W/kg

Ch1513/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 2.473 V/m; Power Drift = 0.06 dB
Peak SAR (extrapolated) = 0.597 W/kg
SAR(1 g) = 0.416 W/kg; SAR(10 g) = 0.277 W/kg
Maximum value of SAR (measured) = 0.509 W/kg



0 dB = 0.516 W/kg

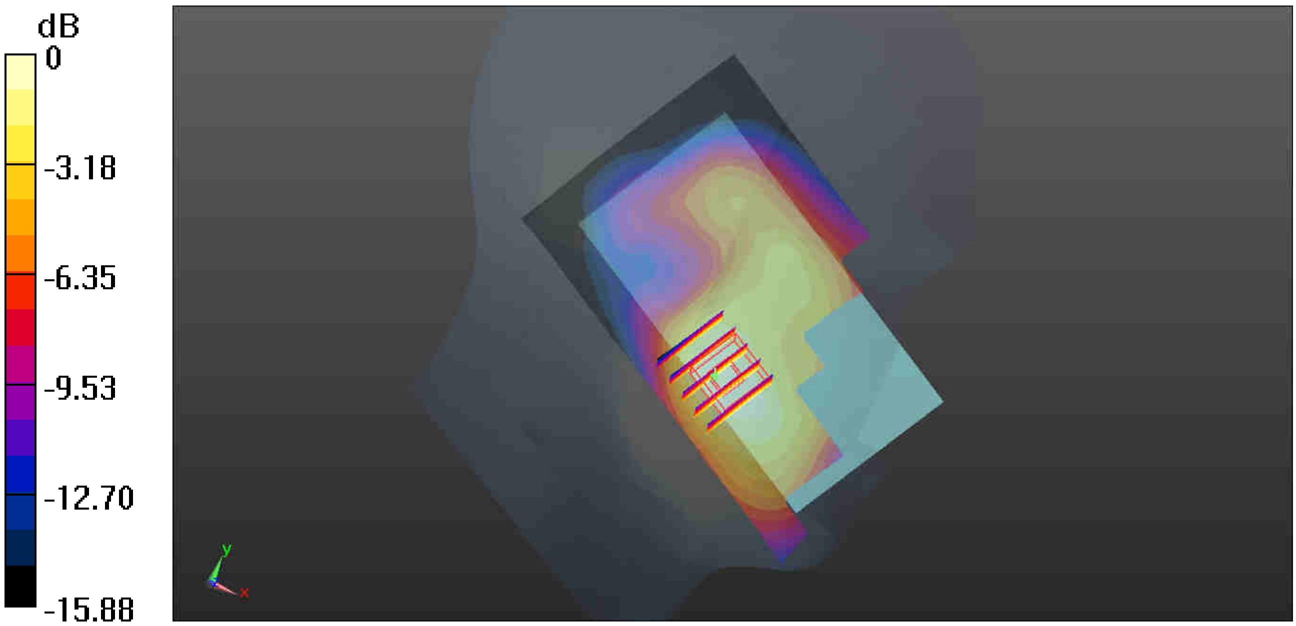
05_WCDMA Band II_RMC12.2Kbps_Left Cheek_Ch9538

Communication System: UID 0, UMTS (0); Frequency: 1907.6 MHz;Duty Cycle: 1:1
Medium: HSL_1900_161031 Medium parameters used: f = 1907.6 MHz; σ = 1.458 S/m; ε_r = 39.969; ρ= 1000 kg/m^3
Ambient Temperature：23.2 ℃; Liquid Temperature：22.8 ℃

DASY5 Configuration:
- Probe: EX3DV4 - SN3819; ConvF(7.79, 7.79, 7.79); Calibrated: 2015.11.27;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn915; Calibrated: 2016.06.22
- Phantom: SAM2; Type: QD000P40CD; Serial: TP:1671
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Ch9538/Area Scan (71x121x1): Interpolated grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.462 W/kg

Ch9538/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 1.984 V/m; Power Drift = 0.02 dB
Peak SAR (extrapolated) = 0.564 W/kg
SAR(1 g) = 0.360 W/kg; SAR(10 g) = 0.227 W/kg
Maximum value of SAR (measured) = 0.456 W/kg



0 dB = 0.462 W/kg

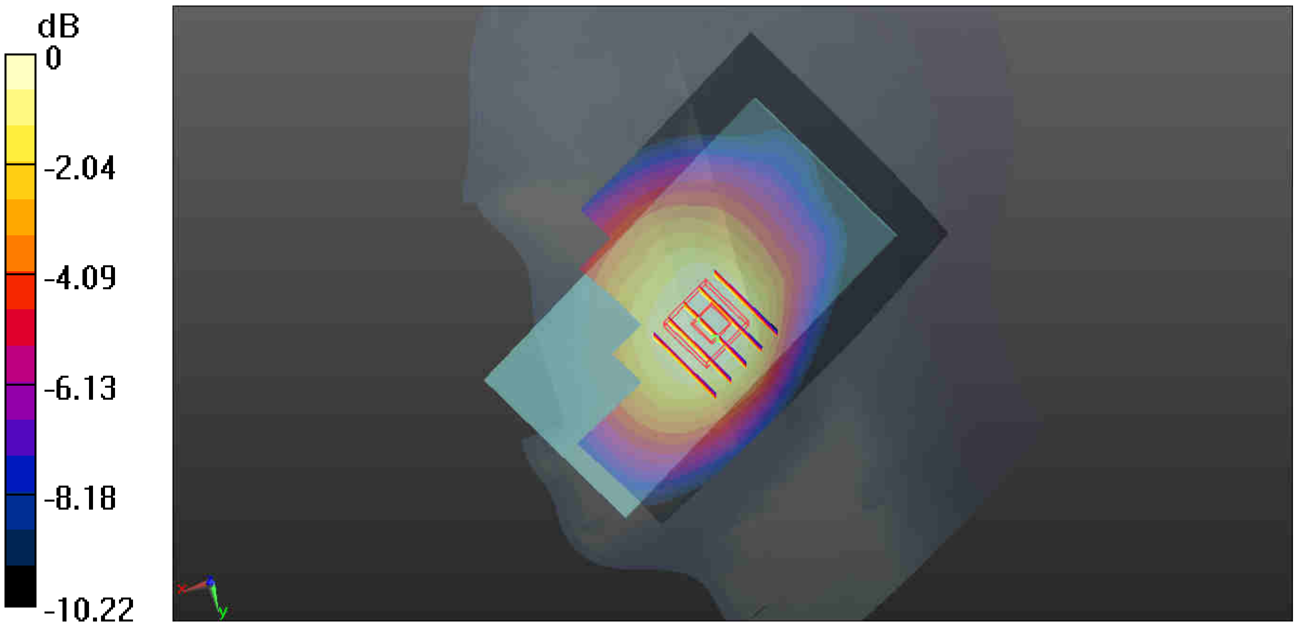
06_LTE Band 5_10M_QPSK_1RB_25Offset_Right Cheek_Ch20525

Communication System: UID 0, LTE (0); Frequency: 836.5 MHz;Duty Cycle: 1:1
Medium: HSL_835_161101 Medium parameters used: f = 836.5 MHz; σ = 0.898 S/m; ε_r = 41.584; ρ = 1000 kg/m^3
Ambient Temperature：23.2 ℃; Liquid Temperature：22.9 ℃

DASY5 Configuration:
- Probe: EX3DV4 - SN3819; ConvF(9.41, 9.41, 9.41); Calibrated: 2015.11.27;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn915; Calibrated: 2016.06.22
- Phantom: SAM2; Type: QD000P40CD; Serial: TP:1671
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Ch20525/Area Scan (71x121x1): Interpolated grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.341 W/kg

Ch20525/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 2.499 V/m; Power Drift = 0.10 dB
Peak SAR (extrapolated) = 0.362 W/kg
SAR(1 g) = 0.291 W/kg; SAR(10 g) = 0.221 W/kg
Maximum value of SAR (measured) = 0.327 W/kg



0 dB = 0.341 W/kg

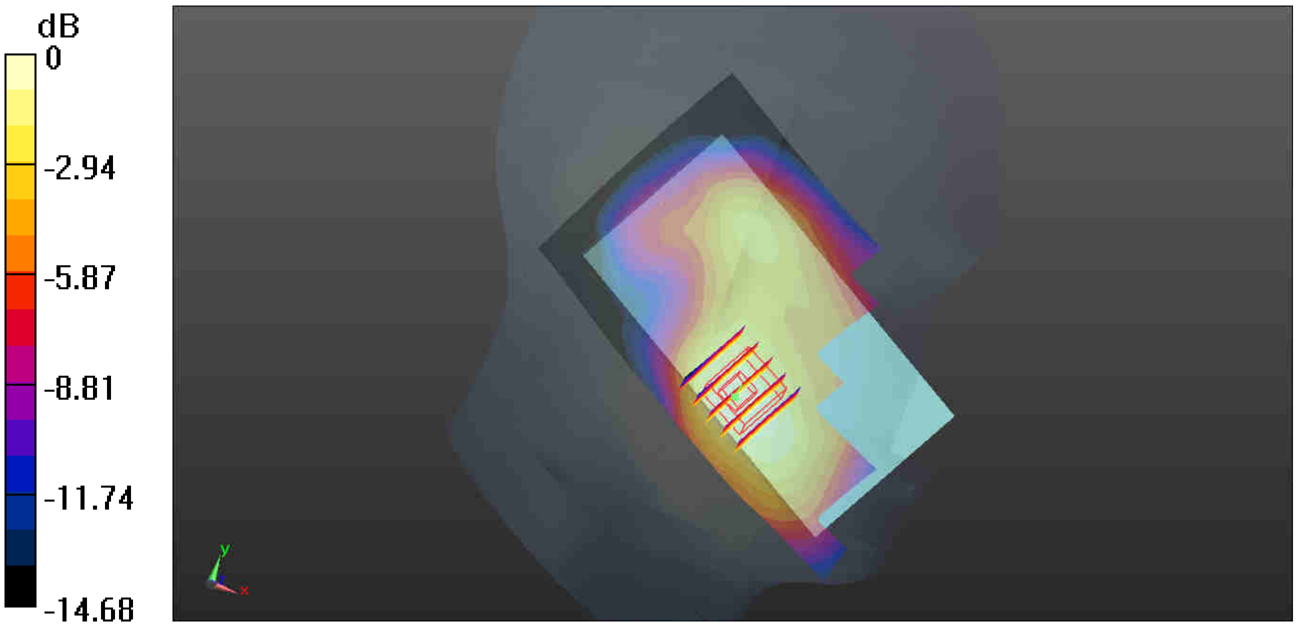
07_LTE Band 4_20M_QPSK_1RB_0Offset_Left Cheek_Ch20175

Communication System: UID 0, LTE (0); Frequency: 1732.5 MHz;Duty Cycle: 1:1
Medium: HSL_1800_161031 Medium parameters used: f = 1732.5 MHz; σ = 1.364 S/m; ε_r = 41.388; ρ = 1000 kg/m^3
Ambient Temperature：23.2 ℃; Liquid Temperature：22.7 ℃

DASY5 Configuration:
- Probe: EX3DV4 - SN3819; ConvF(8.12, 8.12, 8.12); Calibrated: 2015.11.27;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn915; Calibrated: 2016.06.22
- Phantom: SAM2; Type: QD000P40CD; Serial: TP:1671
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Ch20175/Area Scan (71x121x1): Interpolated grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.402 W/kg

Ch20175/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 2.328 V/m; Power Drift = 0.05 dB
Peak SAR (extrapolated) = 0.446 W/kg
SAR(1 g) = 0.318 W/kg; SAR(10 g) = 0.216 W/kg
Maximum value of SAR (measured) = 0.389 W/kg



0 dB = 0.402 W/kg

Test Laboratory: Sporton International Inc. SAR/HAC Testing Lab Date: 2016.10.31

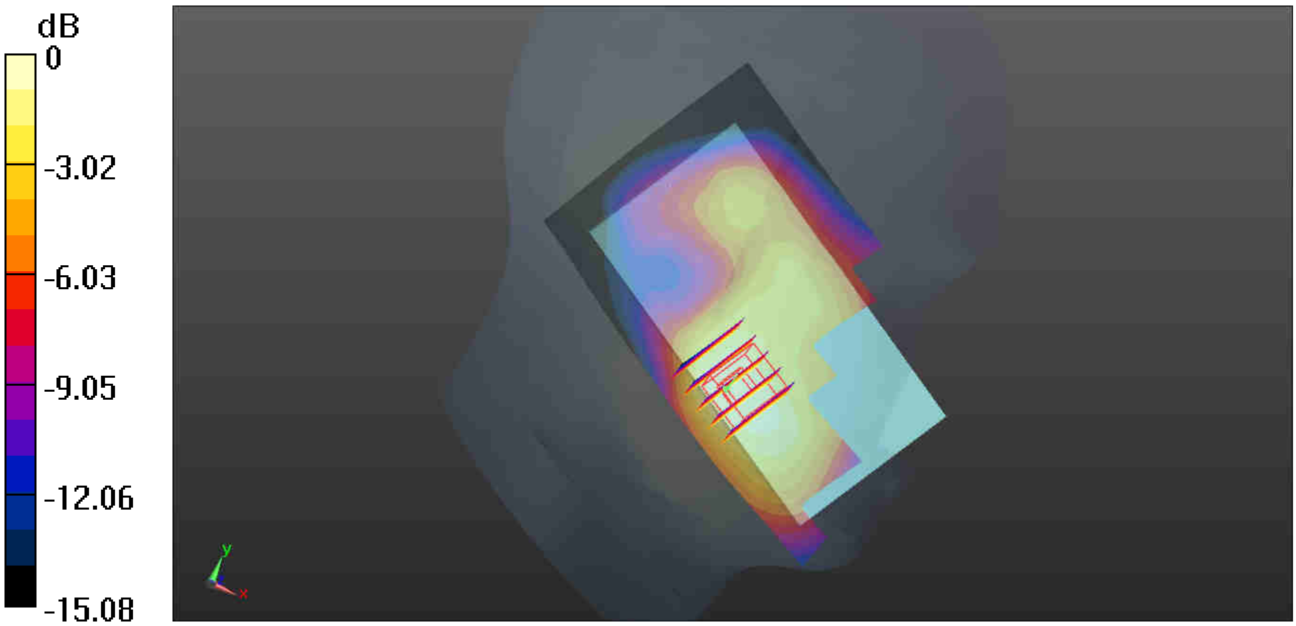
08_LTE Band 2_20M_QPSK_1RB_49Offset_Left Cheek_Ch18900

Communication System: UID 0, LTE (0); Frequency: 1880 MHz;Duty Cycle: 1:1
Medium: HSL_1900_161031 Medium parameters used: f = 1880 MHz; σ = 1.43 S/m; ε_r = 40.097; ρ = 1000 kg/m^3
Ambient Temperature：23.2 ℃; Liquid Temperature：22.8 ℃

DASY5 Configuration:
- Probe: EX3DV4 - SN3819; ConvF(7.79, 7.79, 7.79); Calibrated: 2015.11.27;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn915; Calibrated: 2016.06.22
- Phantom: SAM2; Type: QD000P40CD; Serial: TP:1671
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Ch18900/Area Scan (71x121x1): Interpolated grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.420 W/kg

Ch18900/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 2.120 V/m; Power Drift = 0.05 dB
Peak SAR (extrapolated) = 0.510 W/kg
SAR(1 g) = 0.332 W/kg; SAR(10 g) = 0.215 W/kg
Maximum value of SAR (measured) = 0.419 W/kg



0 dB = 0.420 W/kg

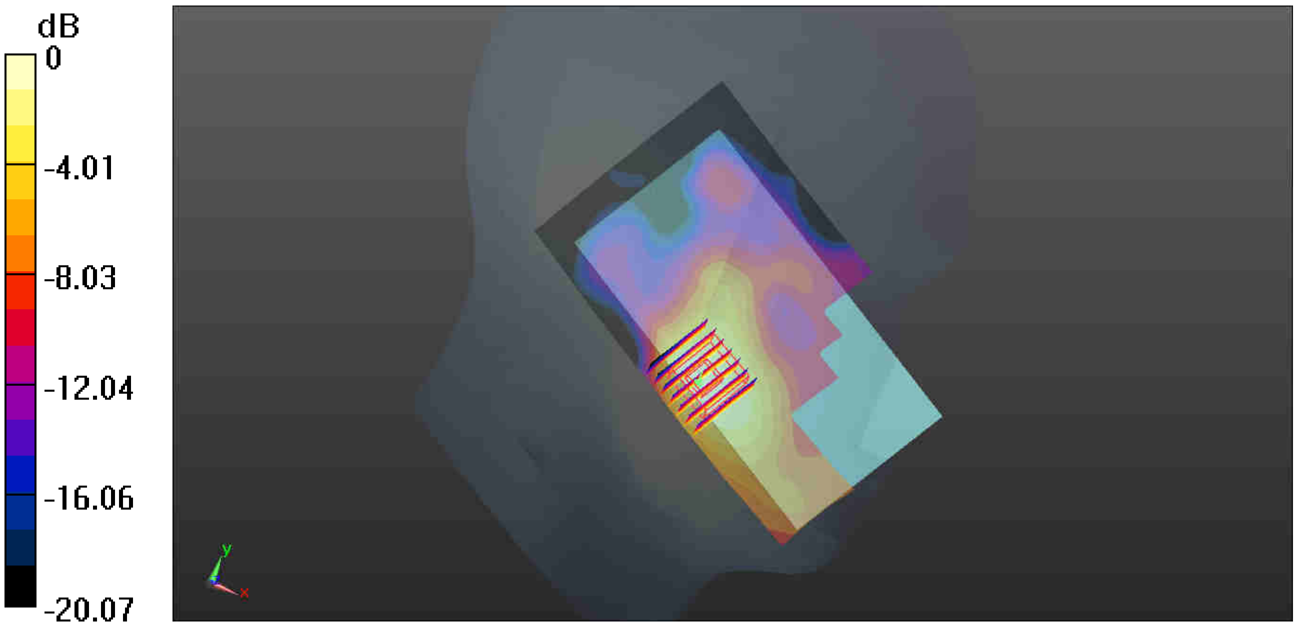
09_LTE Band 7_20M_QPSK_1RB_49Offset_Left Cheek_Ch20850

Communication System: UID 0, LTE (0); Frequency: 2510 MHz;Duty Cycle: 1:1
Medium: HSL_2600_161031 Medium parameters used: f = 2510 MHz; σ = 1.9 S/m; ε_r = 39.947; ρ = 1000 kg/m^3
Ambient Temperature：23.4 ℃; Liquid Temperature：22.8 ℃

DASY5 Configuration:
- Probe: EX3DV4 - SN3911; ConvF(7.39, 7.39, 7.39); Calibrated: 2016.09.29;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1338; Calibrated: 2015.11.23
- Phantom: SAM2; Type: QD000P40CD; Serial: TP:1671
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Ch20850/Area Scan (81x141x1): Interpolated grid: dx=12mm, dy=12mm
Maximum value of SAR (interpolated) = 0.461 W/kg

Ch20850/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 3.763 V/m; Power Drift = 0.17 dB
Peak SAR (extrapolated) = 0.543 W/kg
SAR(1 g) = 0.315 W/kg; SAR(10 g) = 0.177 W/kg
Maximum value of SAR (measured) = 0.426 W/kg



0 dB = 0.461 W/kg

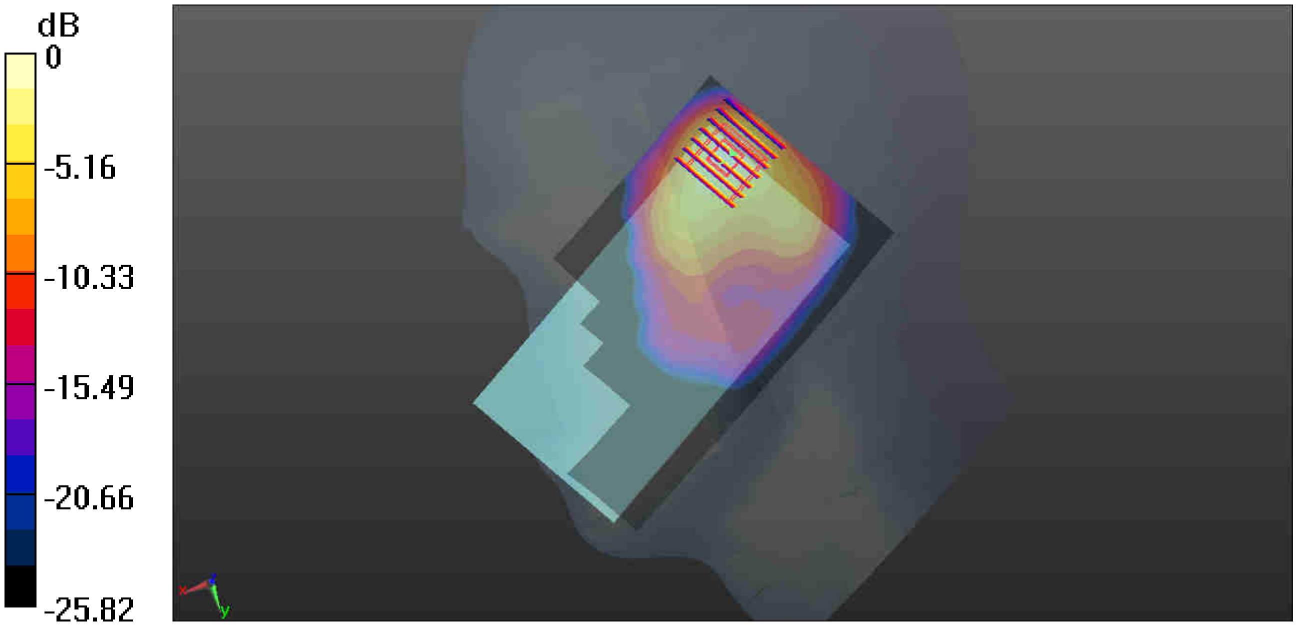
10_WLAN2.4GHz_802.11b 1Mbps_Right Cheek_Ch6

Communication System: UID 0, WIFI (0); Frequency: 2437 MHz;Duty Cycle: 1:1.025
Medium: HSL_2450_161027 Medium parameters used: f = 2437 MHz; σ = 1.796 S/m; ε_r = 38.527; ρ = 1000 kg/m^3
Ambient Temperature：23.4 ℃; Liquid Temperature：22.9 ℃

DASY5 Configuration:
- Probe: EX3DV4 - SN3911; ConvF(7.43, 7.43, 7.43); Calibrated: 2016.09.29;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1338; Calibrated: 2015.11.23
- Phantom: SAM2; Type: QD000P40CD; Serial: TP:1671
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Ch6/Area Scan (81x141x1): Interpolated grid: dx=12mm, dy=12mm
Maximum value of SAR (interpolated) = 1.17 W/kg

Ch6/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 0.2460 V/m; Power Drift = -0.01 dB
Peak SAR (extrapolated) = 1.41 W/kg
SAR(1 g) = 0.650 W/kg; SAR(10 g) = 0.319 W/kg
Maximum value of SAR (measured) = 0.976 W/kg



0 dB = 1.17 W/kg

Test Laboratory: Sporton International Inc. SAR/HAC Testing Lab Date: 2016.10.30

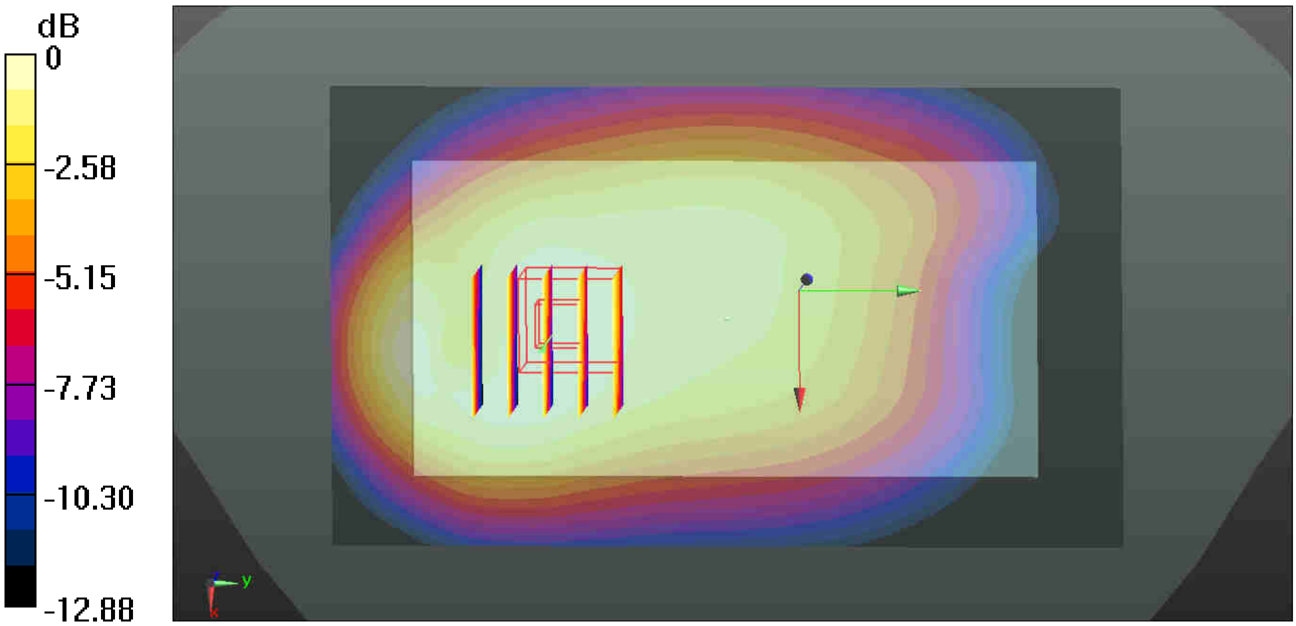
11_GSM850_GPRS(4 Tx slots)_Back_10mm_Ch251

Communication System: UID 0, GPRS/EDGE12 (0); Frequency: 848.8 MHz;Duty Cycle: 1:2.08
Medium: MSL_835_161030 Medium parameters used: f = 848.8 MHz; σ = 0.994 S/m; ε_r = 54.359; ρ =1000 kg/m^3
Ambient Temperature：23.2 ℃; Liquid Temperature：22.6 ℃

DASY5 Configuration:
- Probe: EX3DV4 - SN3911; ConvF(10.19, 10.19, 10.19); Calibrated: 2016.09.29;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1338; Calibrated: 2015.11.23
- Phantom: SAM2; Type: QD000P40CD; Serial: TP:1671
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Ch251/Area Scan (71x121x1): Interpolated grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.934 W/kg

Ch251/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 2.799 V/m; Power Drift = 0.09 dB
Peak SAR (extrapolated) = 1.07 W/kg
SAR(1 g) = 0.777 W/kg; SAR(10 g) = 0.559 W/kg
Maximum value of SAR (measured) = 0.935 W/kg



0 dB = 0.934 W/kg

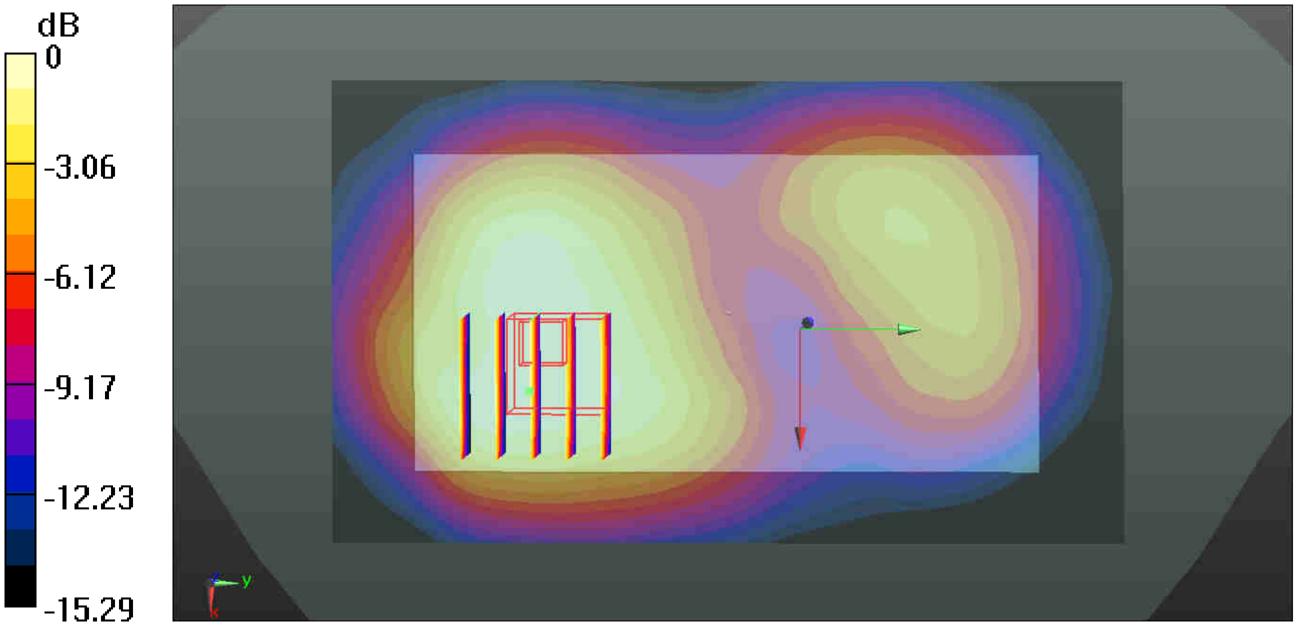
12_GSM1900_GPRS(3 Tx slots)_Back_10mm_Ch512

Communication System: UID 0, GPRS/EDGE11 (0); Frequency: 1850.2 MHz;Duty Cycle: 1:2.77
Medium: MSL_1900_161028 Medium parameters used: f = 1850.2 MHz; σ = 1.489 S/m; ε_r = 53.881; ρ = 1000 kg/m^3
Ambient Temperature：23.4 ℃; Liquid Temperature：22.5 ℃

DASY5 Configuration:
- Probe: EX3DV4 - SN3958; ConvF(8.01, 8.01, 8.01); Calibrated: 2016.07.26;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1386; Calibrated: 2016.07.07
- Phantom: SAM2; Type: QD000P40CD; Serial: TP:1671
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Ch512/Area Scan (71x121x1): Interpolated grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.633 W/kg

Ch512/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 2.657 V/m; Power Drift = 0.01 dB
Peak SAR (extrapolated) = 0.722 W/kg
SAR(1 g) = 0.472 W/kg; SAR(10 g) = 0.315 W/kg
Maximum value of SAR (measured) = 0.602 W/kg



0 dB = 0.633 W/kg

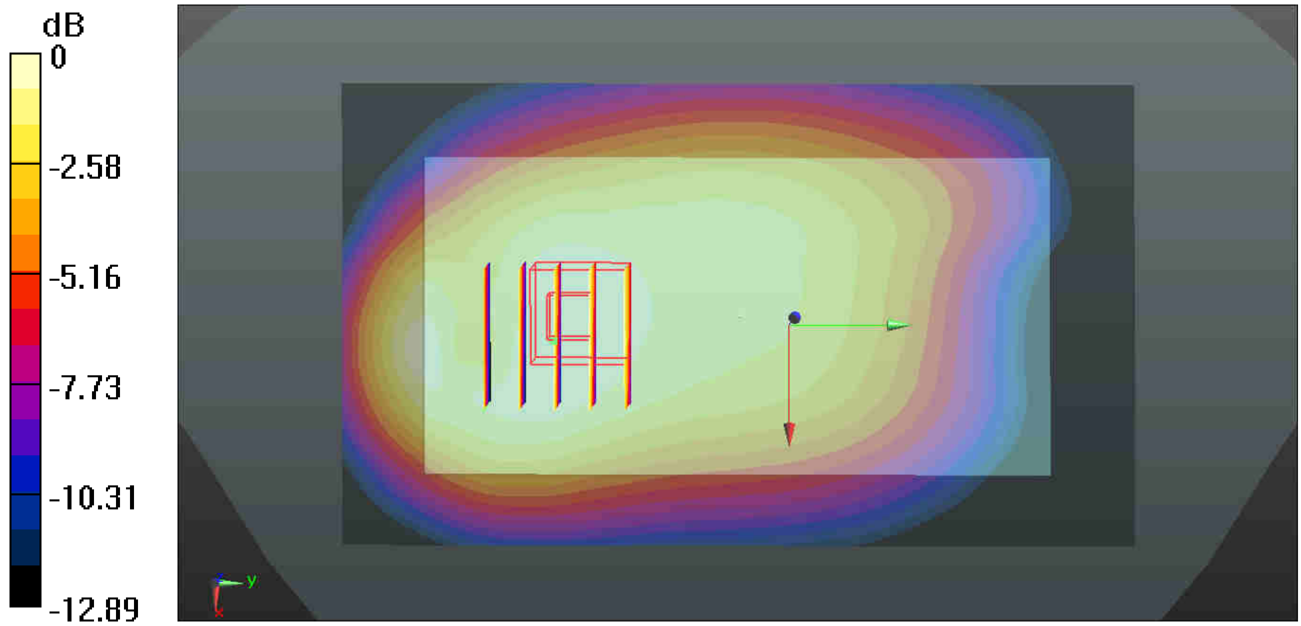
13_WCDMA Band V_RMC12.2Kbps_Back_10mm_Ch4233

Communication System: UID 0, UMTS (0); Frequency: 846.6 MHz;Duty Cycle: 1:1
Medium: MSL_835_161030 Medium parameters used: f = 846.6 MHz; σ = 0.992 S/m; ε = 54.371; ρ = 1000 kg/m^3
Ambient Temperature：23.2 ℃; Liquid Temperature：22.6 ℃

DASY5 Configuration:
- Probe: EX3DV4 - SN3911; ConvF(10.19, 10.19, 10.19); Calibrated: 2016.09.29;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1338; Calibrated: 2015.11.23
- Phantom: SAM2; Type: QD000P40CD; Serial: TP:1671
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Ch4233/Area Scan (71x121x1): Interpolated grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.698 W/kg

Ch4233/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 2.446 V/m; Power Drift = -0.16 dB
Peak SAR (extrapolated) = 0.800 W/kg
SAR(1 g) = 0.580 W/kg; SAR(10 g) = 0.419 W/kg
Maximum value of SAR (measured) = 0.695 W/kg



0 dB = 0.698 W/kg

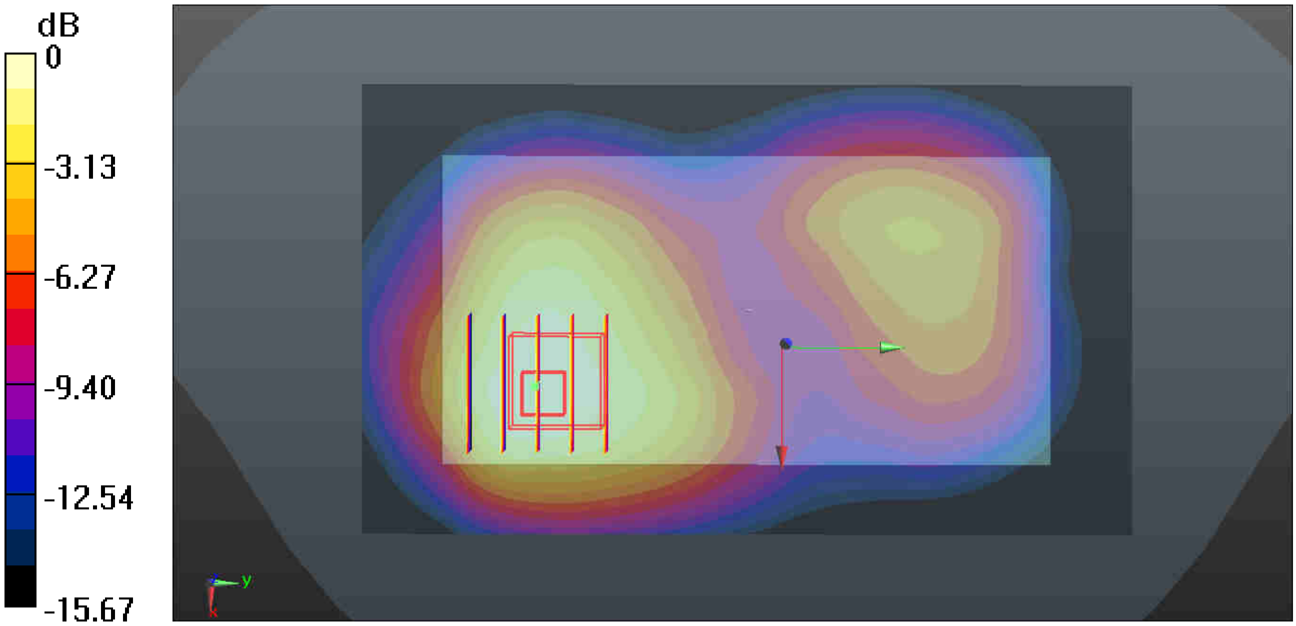
14_WCDMA Band IV_RMC12.2Kbps_Back_10mm_Ch1513

Communication System: UID 0, UMTS (0); Frequency: 1752.6 MHz;Duty Cycle: 1:1
Medium: MSL_1800_161028 Medium parameters used: f = 1752.6 MHz; $\sigma = 1.527$ S/m; $\varepsilon_r = 52.557$; $\rho = 1000$ kg/m^3
Ambient Temperature：23.5 ℃; Liquid Temperature：22.7 ℃

DASY5 Configuration:
- Probe: EX3DV4 - SN3958; ConvF(8.58, 8.58, 8.58); Calibrated: 2016.07.26;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1386; Calibrated: 2016.07.07
- Phantom: SAM2; Type: QD000P40CD; Serial: TP:1671
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Ch1513/Area Scan (71x121x1): Interpolated grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.999 W/kg

Ch1513/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 2.122 V/m; Power Drift = 0.02 dB
Peak SAR (extrapolated) = 1.14 W/kg
SAR(1 g) = 0.772 W/kg; SAR(10 g) = 0.509 W/kg
Maximum value of SAR (measured) = 0.956 W/kg



0 dB = 0.999 W/kg

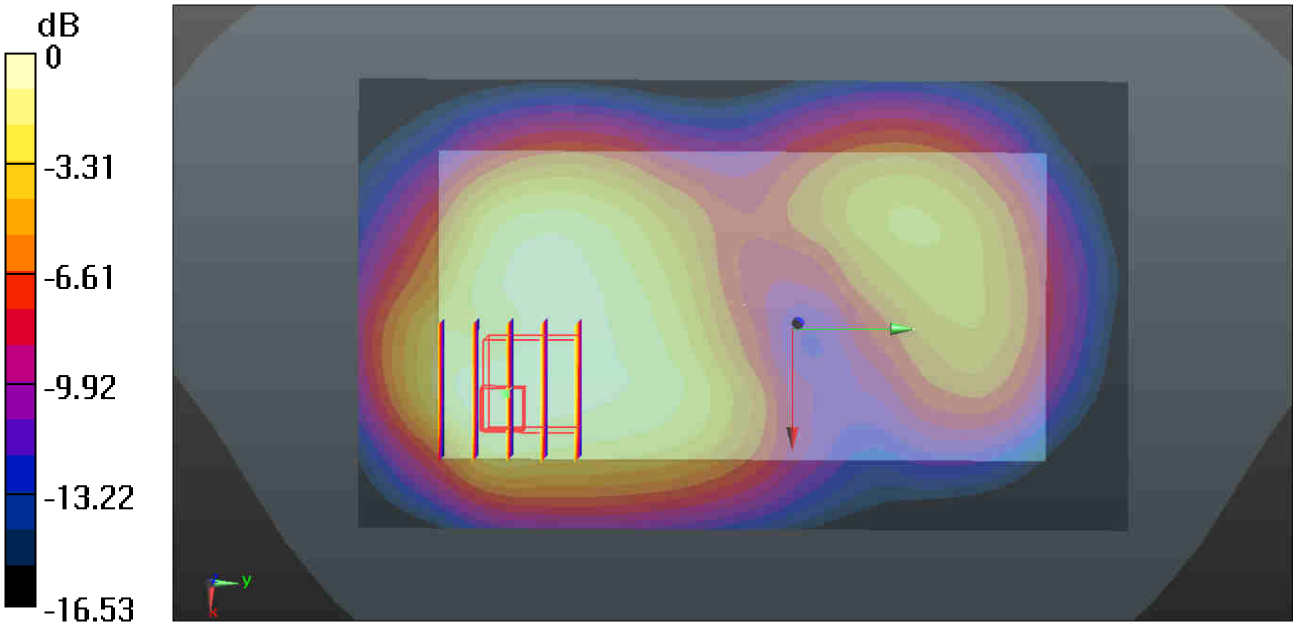
15_WCDMA Band II_RMC12.2Kbps_Back_10mm_Ch9538

Communication System: UID 0, UMTS (0); Frequency: 1907.6 MHz;Duty Cycle: 1:1
Medium: MSL_1900_161028 Medium parameters used: f = 1907.6 MHz; σ = 1.555 S/m; ε_r = 53.787; ρ= 1000 kg/m^3
Ambient Temperature：23.4 ℃; Liquid Temperature：22.5 ℃

DASY5 Configuration:
- Probe: EX3DV4 - SN3958; ConvF(8.01, 8.01, 8.01); Calibrated: 2016.07.26;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1386; Calibrated: 2016.07.07
- Phantom: SAM2; Type: QD000P40CD; Serial: TP:1671
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Ch9538/Area Scan (71x121x1): Interpolated grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.666 W/kg

Ch9538/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 1.979 V/m; Power Drift = 0.13 dB
Peak SAR (extrapolated) = 0.807 W/kg
SAR(1 g) = 0.473 W/kg; SAR(10 g) = 0.294 W/kg
Maximum value of SAR (measured) = 0.605 W/kg



0 dB = 0.666 W/kg

Test Laboratory: Sporton International Inc. SAR/HAC Testing Lab   Date: 2016.10.30

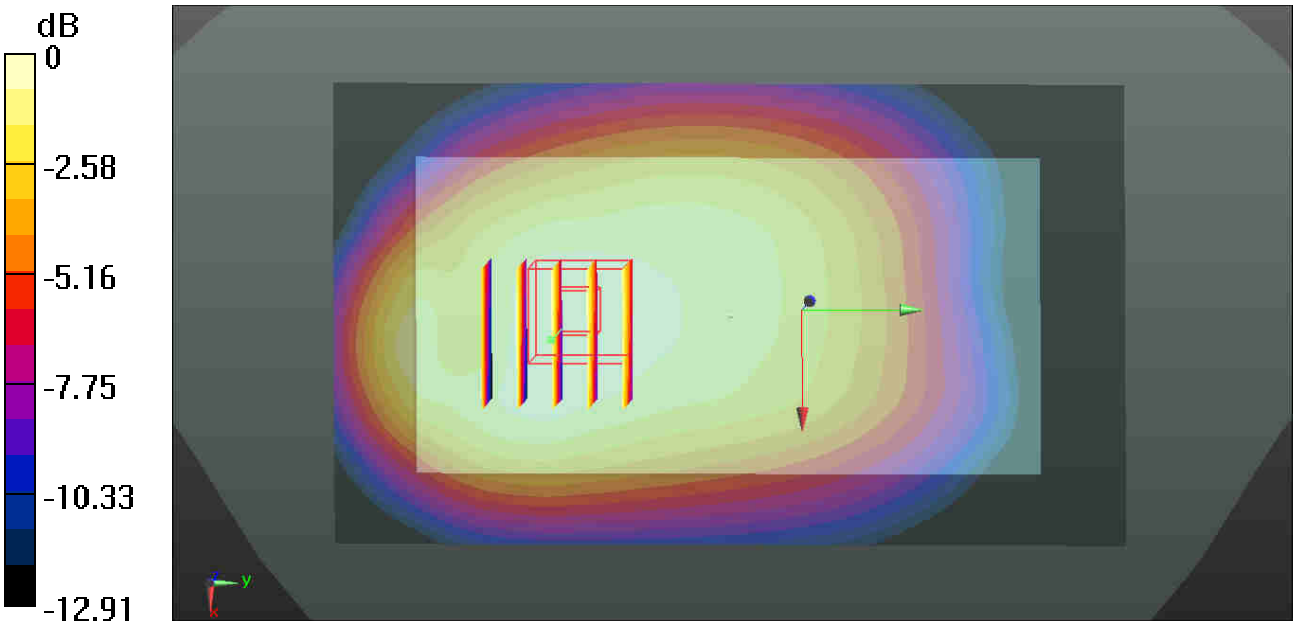
16_LTE Band 5_10M_QPSK_1RB_25Offset_Back_10mm_Ch20525

Communication System: UID 0, LTE (0); Frequency: 836.5 MHz;Duty Cycle: 1:1
Medium: MSL_835_161030 Medium parameters used: f = 836.5 MHz; σ = 0.979 S/m; ε_r = 54.452; ρ = 1000 kg/m^3
Ambient Temperature：23.2 ℃; Liquid Temperature：22.6 ℃

DASY5 Configuration:
- Probe: EX3DV4 - SN3911; ConvF(10.19, 10.19, 10.19); Calibrated: 2016.09.29;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1338; Calibrated: 2015.11.23
- Phantom: SAM2; Type: QD000P40CD; Serial: TP:1671
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Ch20525/Area Scan (71x121x1): Interpolated grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.559 W/kg

Ch20525/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 2.248 V/m; Power Drift = -0.11 dB
Peak SAR (extrapolated) = 0.632 W/kg
SAR(1 g) = 0.471 W/kg; SAR(10 g) = 0.349 W/kg
Maximum value of SAR (measured) = 0.553 W/kg



0 dB = 0.559 W/kg

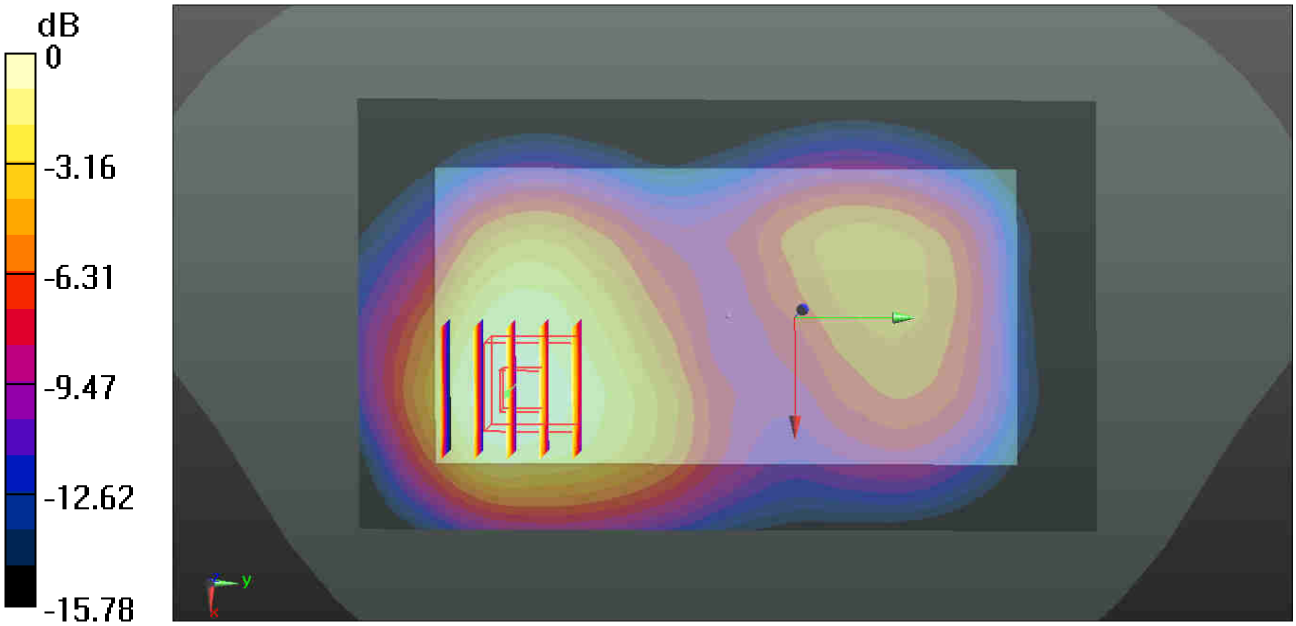
17_LTE Band 4_20M_QPSK_1RB_0Offset_Back_10mm_Ch20175

Communication System: UID 0, LTE (0); Frequency: 1732.5 MHz;Duty Cycle: 1:1
Medium: MSL_1800_161028 Medium parameters used: f = 1732.5 MHz; σ = 1.504 S/m; ε_r = 52.599; ρ = 1000 kg/m^3
Ambient Temperature：23.5 ℃; Liquid Temperature：22.7 ℃

DASY5 Configuration:
- Probe: EX3DV4 - SN3958; ConvF(8.58, 8.58, 8.58); Calibrated: 2016.07.26;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1386; Calibrated: 2016.07.07
- Phantom: SAM2; Type: QD000P40CD; Serial: TP:1671
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Ch20175/Area Scan (71x121x1): Interpolated grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.785 W/kg

Ch20175/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 1.968 V/m; Power Drift = 0.07 dB
Peak SAR (extrapolated) = 0.927 W/kg
SAR(1 g) = 0.637 W/kg; SAR(10 g) = 0.426 W/kg
Maximum value of SAR (measured) = 0.780 W/kg



0 dB = 0.785 W/kg

Test Laboratory: Sporton International Inc. SAR/HAC Testing Lab Date: 2016.10.28

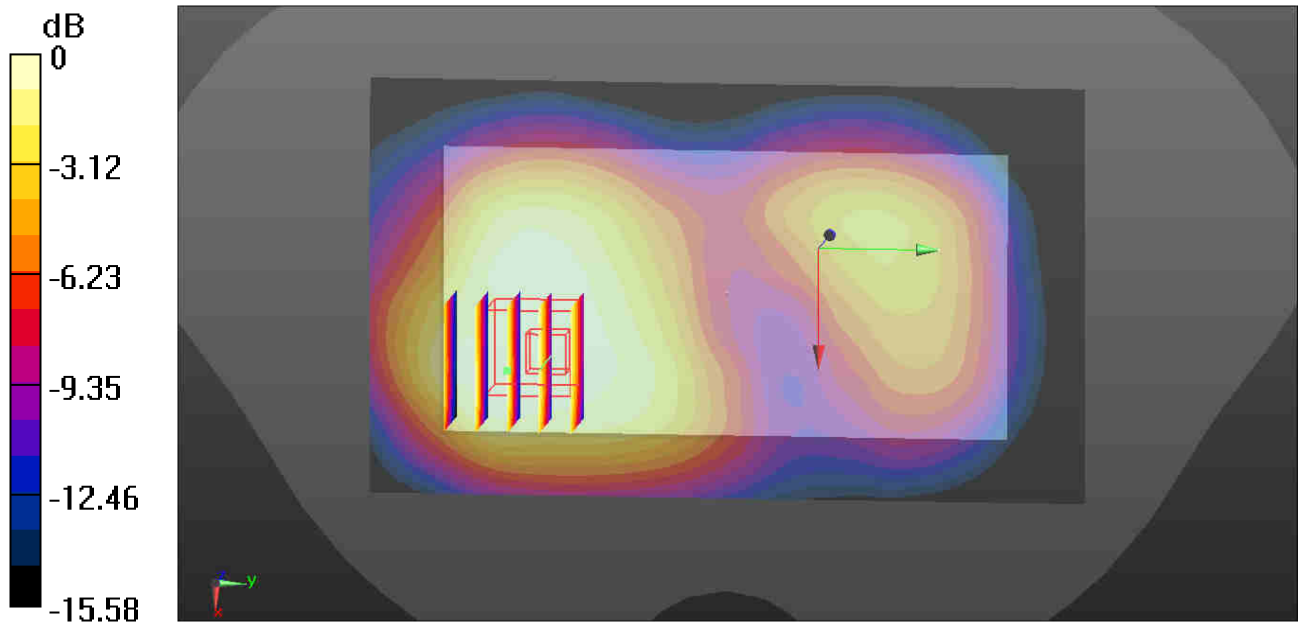
18_LTE Band 2_20M_QPSK_1RB_49Offset_Back_10mm_Ch18900

Communication System: UID 0, LTE (0); Frequency: 1880 MHz;Duty Cycle: 1:1
Medium: MSL_1900_161028 Medium parameters used: f = 1880 MHz; σ = 1.525 S/m; ε_r = 53.834; ρ = 1000 kg/m^3
Ambient Temperature：23.4 ℃; Liquid Temperature：22.5 ℃

DASY5 Configuration:
- Probe: EX3DV4 - SN3958; ConvF(8.01, 8.01, 8.01); Calibrated: 2016.07.26;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1386; Calibrated: 2016.07.07
- Phantom: SAM2; Type: QD000P40CD; Serial: TP:1671
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Ch18900/Area Scan (71x121x1): Interpolated grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.583 W/kg

Ch18900/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 2.165 V/m; Power Drift = 0.08 dB
Peak SAR (extrapolated) = 0.694 W/kg
SAR(1 g) = 0.446 W/kg; SAR(10 g) = 0.291 W/kg
Maximum value of SAR (measured) = 0.549 W/kg



0 dB = 0.583 W/kg

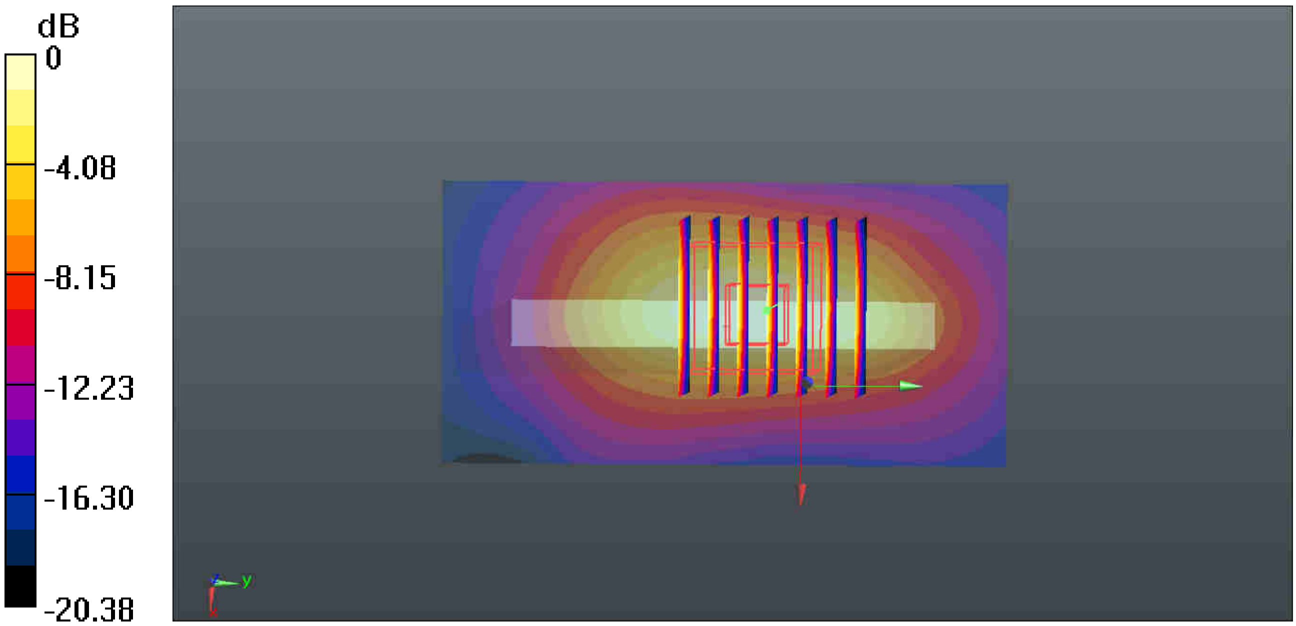
19_LTE Band 7_20M_QPSK_50RB_0Offset_Bottom Side_10mm_Ch21350

Communication System: UID 0, LTE (0); Frequency: 2560 MHz;Duty Cycle: 1:1
Medium: MSL_2600_161031 Medium parameters used: f = 2560 MHz; σ = 2.156 S/m; ε_r = 51.082; ρ = 1000 kg/m^3
Ambient Temperature：23.4 ℃; Liquid Temperature：22.6 ℃

DASY5 Configuration:
- Probe: EX3DV4 - SN3819; ConvF(6.79, 6.79, 6.79); Calibrated: 2015.11.27;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn915; Calibrated: 2016.06.22
- Phantom: SAM2; Type: QD000P40CD; Serial: TP:1671
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Ch21350/Area Scan (41x81x1): Interpolated grid: dx=12mm, dy=12mm
Maximum value of SAR (interpolated) = 1.53 W/kg

Ch21350/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 4.244 V/m; Power Drift = -0.05 dB
Peak SAR (extrapolated) = 1.94 W/kg
SAR(1 g) = 0.968 W/kg; SAR(10 g) = 0.459 W/kg
Maximum value of SAR (measured) = 1.45 W/kg



0 dB = 1.53 W/kg

Test Laboratory: Sporton International Inc. SAR/HAC Testing Lab Date: 2016.10.28

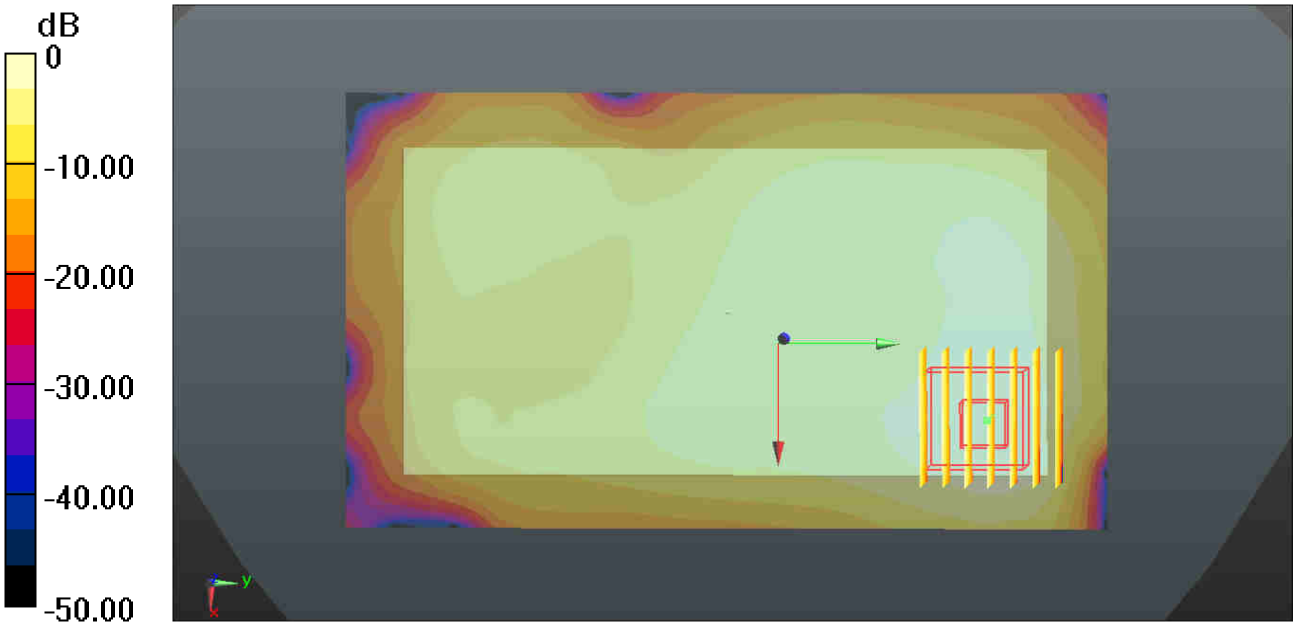
20_WLAN2.4GHz_802.11b 1Mbps_Back_10mm_Ch6

Communication System: UID 0, WIFI (0); Frequency: 2437 MHz;Duty Cycle: 1:1.025
Medium: MSL_2450_161028 Medium parameters used: f = 2437 MHz; σ = 1.973 S/m; ε_r = 52.403; ρ = 1000 kg/m^3
Ambient Temperature：23.4 ℃; Liquid Temperature：22.7 ℃

DASY5 Configuration:
- Probe: EX3DV4 - SN3958; ConvF(7.72, 7.72, 7.72); Calibrated: 2016.07.26;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1386; Calibrated: 2016.07.07
- Phantom: SAM2; Type: QD000P40CD; Serial: TP:1671
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Ch6/Area Scan (81x141x1): Interpolated grid: dx=12mm, dy=12mm
Maximum value of SAR (interpolated) = 0.232 W/kg

Ch6/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 0.9140 V/m; Power Drift = -0.09 dB
Peak SAR (extrapolated) = 0.306 W/kg
SAR(1 g) = 0.157 W/kg; SAR(10 g) = 0.082 W/kg
Maximum value of SAR (measured) = 0.227 W/kg



0 dB = 0.232 W/kg

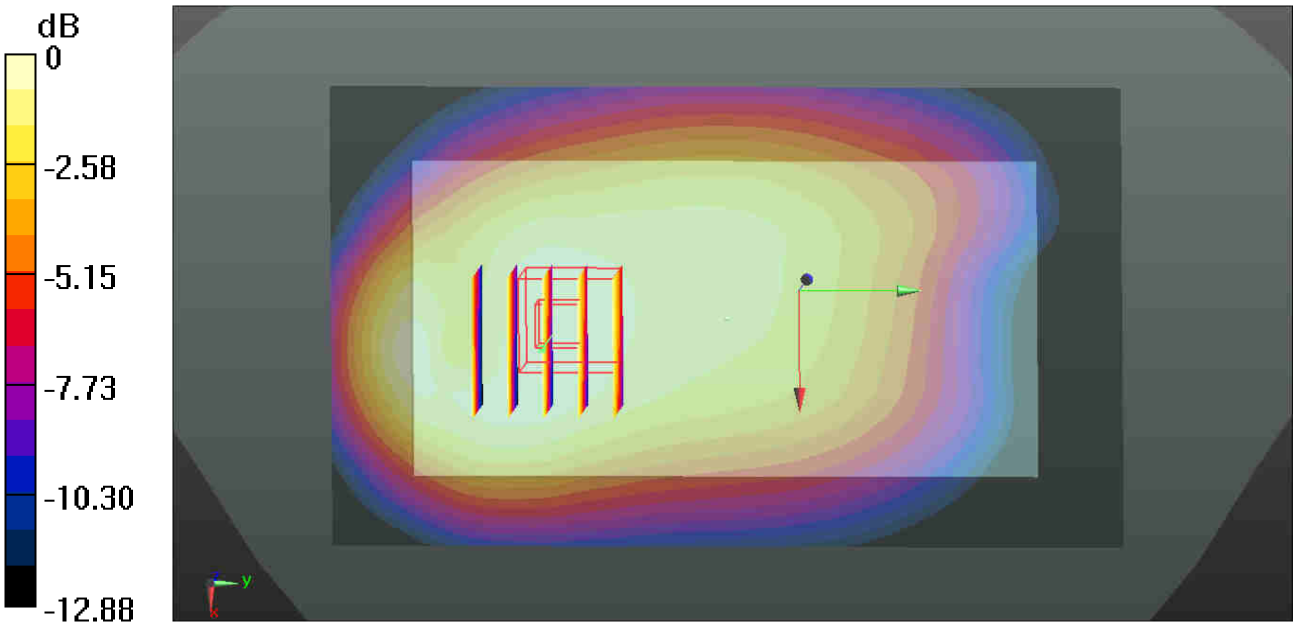
21_GSM850_GPRS(4 Tx slots)_Back_10mm_Ch251

Communication System: UID 0, GPRS/EDGE12 (0); Frequency: 848.8 MHz;Duty Cycle: 1:2.08
Medium: MSL_835_161030 Medium parameters used: f = 848.8 MHz; σ = 0.994 S/m; ε_r = 54.359; ρ =1000 kg/m^3
Ambient Temperature：23.2 ℃; Liquid Temperature：22.6 ℃

DASY5 Configuration:
- Probe: EX3DV4 - SN3911; ConvF(10.19, 10.19, 10.19); Calibrated: 2016.09.29;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1338; Calibrated: 2015.11.23
- Phantom: SAM2; Type: QD000P40CD; Serial: TP:1671
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Ch251/Area Scan (71x121x1): Interpolated grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.934 W/kg

Ch251/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 2.799 V/m; Power Drift = 0.09 dB
Peak SAR (extrapolated) = 1.07 W/kg
SAR(1 g) = 0.777 W/kg; SAR(10 g) = 0.559 W/kg
Maximum value of SAR (measured) = 0.935 W/kg



0 dB = 0.934 W/kg

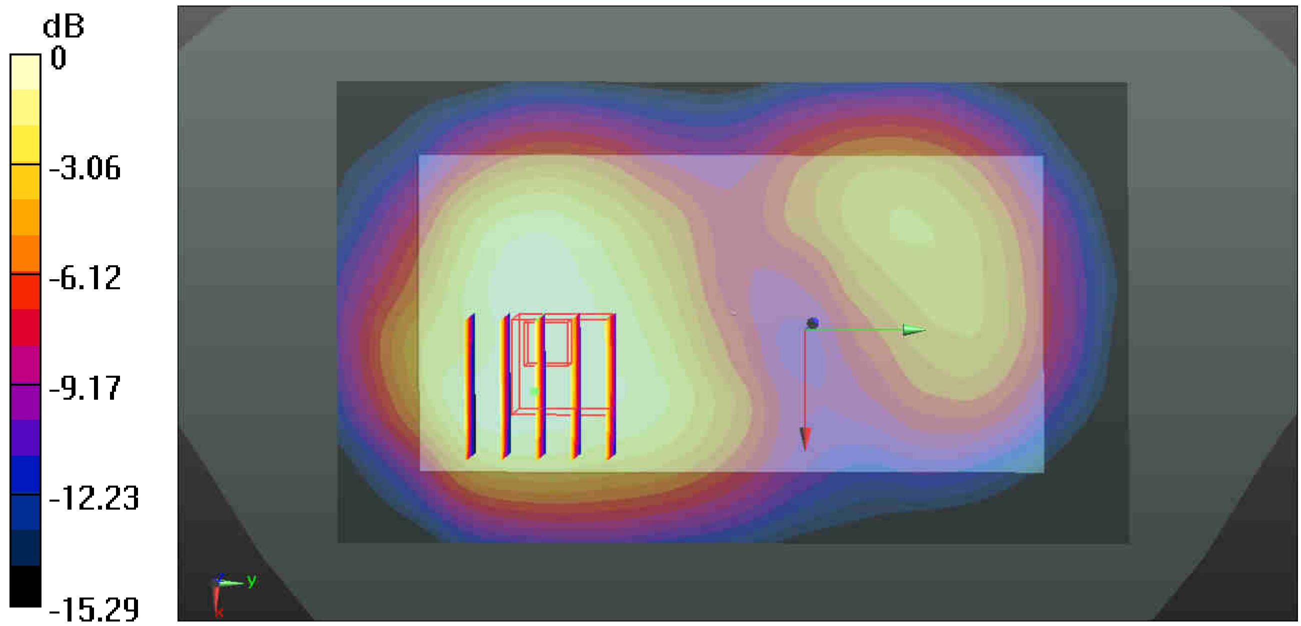
22_GSM1900_GPRS(3 Tx slots)_Back_10mm_Ch512

Communication System: UID 0, GPRS/EDGE11 (0); Frequency: 1850.2 MHz;Duty Cycle: 1:2.77
Medium: MSL_1900_161028 Medium parameters used: f = 1850.2 MHz; σ = 1.489 S/m; ε_r = 53.881; ρ = 1000 kg/m^3
Ambient Temperature：23.4 ℃; Liquid Temperature：22.5 ℃

DASY5 Configuration:
- Probe: EX3DV4 - SN3958; ConvF(8.01, 8.01, 8.01); Calibrated: 2016.07.26;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1386; Calibrated: 2016.07.07
- Phantom: SAM2; Type: QD000P40CD; Serial: TP:1671
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Ch512/Area Scan (71x121x1): Interpolated grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.633 W/kg

Ch512/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 2.657 V/m; Power Drift = 0.01 dB
Peak SAR (extrapolated) = 0.722 W/kg
SAR(1 g) = 0.472 W/kg; SAR(10 g) = 0.315 W/kg
Maximum value of SAR (measured) = 0.602 W/kg



0 dB = 0.633 W/kg

Test Laboratory: Sporton International Inc. SAR/HAC Testing Lab　　　　　　Date: 2016.10.30

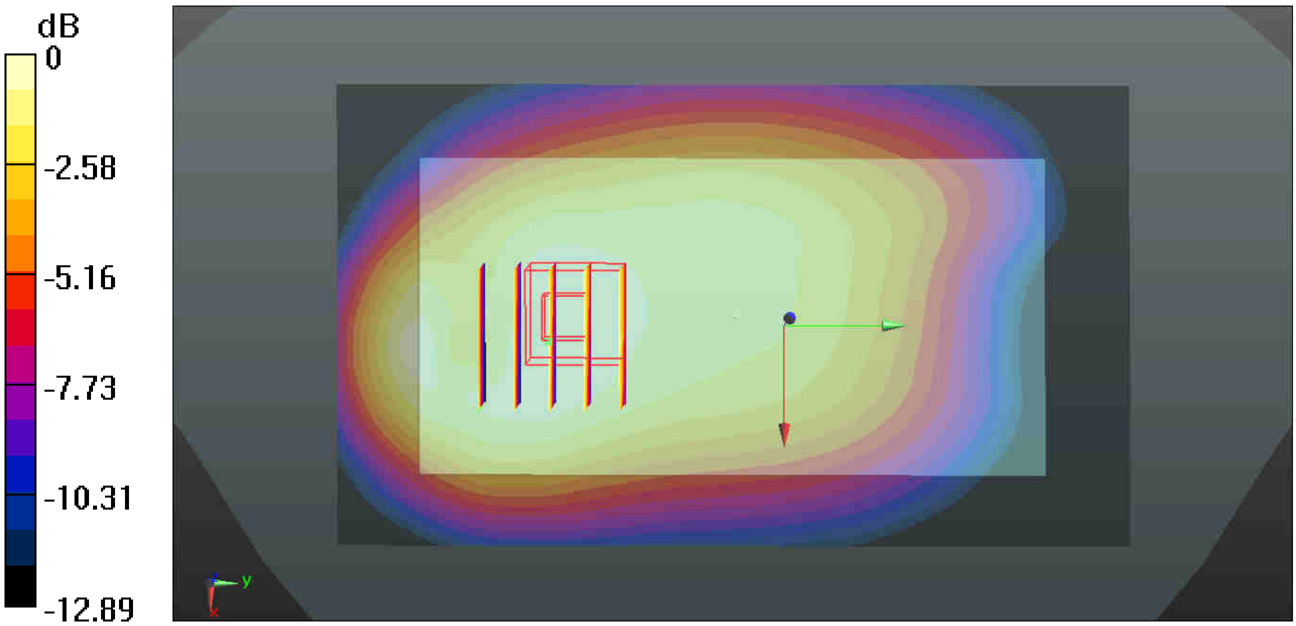
23_WCDMA Band V_RMC12.2Kbps_Back_10mm_Ch4233

Communication System: UID 0, UMTS (0); Frequency: 846.6 MHz;Duty Cycle: 1:1
Medium: MSL_835_161030 Medium parameters used: f = 846.6 MHz; σ = 0.992 S/m; ε = 54.371; ρ = 1000 kg/m^3
Ambient Temperature：23.2 ℃; Liquid Temperature：22.6 ℃

DASY5 Configuration:
- Probe: EX3DV4 - SN3911; ConvF(10.19, 10.19, 10.19); Calibrated: 2016.09.29;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1338; Calibrated: 2015.11.23
- Phantom: SAM2; Type: QD000P40CD; Serial: TP:1671
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Ch4233/Area Scan (71x121x1): Interpolated grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.698 W/kg

Ch4233/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 2.446 V/m; Power Drift = -0.16 dB
Peak SAR (extrapolated) = 0.800 W/kg
SAR(1 g) = 0.580 W/kg; SAR(10 g) = 0.419 W/kg
Maximum value of SAR (measured) = 0.695 W/kg



0 dB = 0.698 W/kg

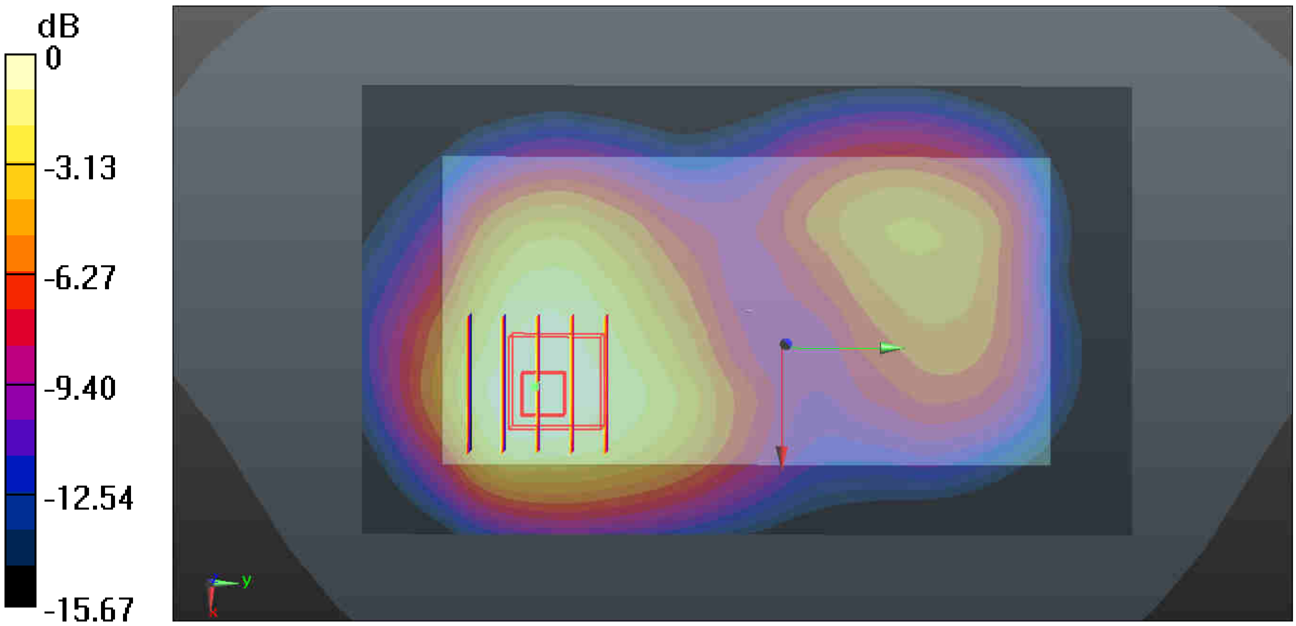
24_WCDMA Band IV_RMC12.2Kbps_Back_10mm_Ch1513

Communication System: UID 0, UMTS (0); Frequency: 1752.6 MHz;Duty Cycle: 1:1
Medium: MSL_1800_161028 Medium parameters used: f = 1752.6 MHz; σ = 1.527 S/m; ε_r = 52.557; ρ= 1000 kg/m^3
Ambient Temperature：23.5 ℃; Liquid Temperature：22.7 ℃

DASY5 Configuration:
- Probe: EX3DV4 - SN3958; ConvF(8.58, 8.58, 8.58); Calibrated: 2016.07.26;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1386; Calibrated: 2016.07.07
- Phantom: SAM2; Type: QD000P40CD; Serial: TP:1671
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Ch1513/Area Scan (71x121x1): Interpolated grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.999 W/kg

Ch1513/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 2.122 V/m; Power Drift = 0.02 dB
Peak SAR (extrapolated) = 1.14 W/kg
SAR(1 g) = 0.772 W/kg; SAR(10 g) = 0.509 W/kg
Maximum value of SAR (measured) = 0.956 W/kg



0 dB = 0.999 W/kg

Test Laboratory: Sporton International Inc. SAR/HAC Testing Lab Date: 2016.10.28

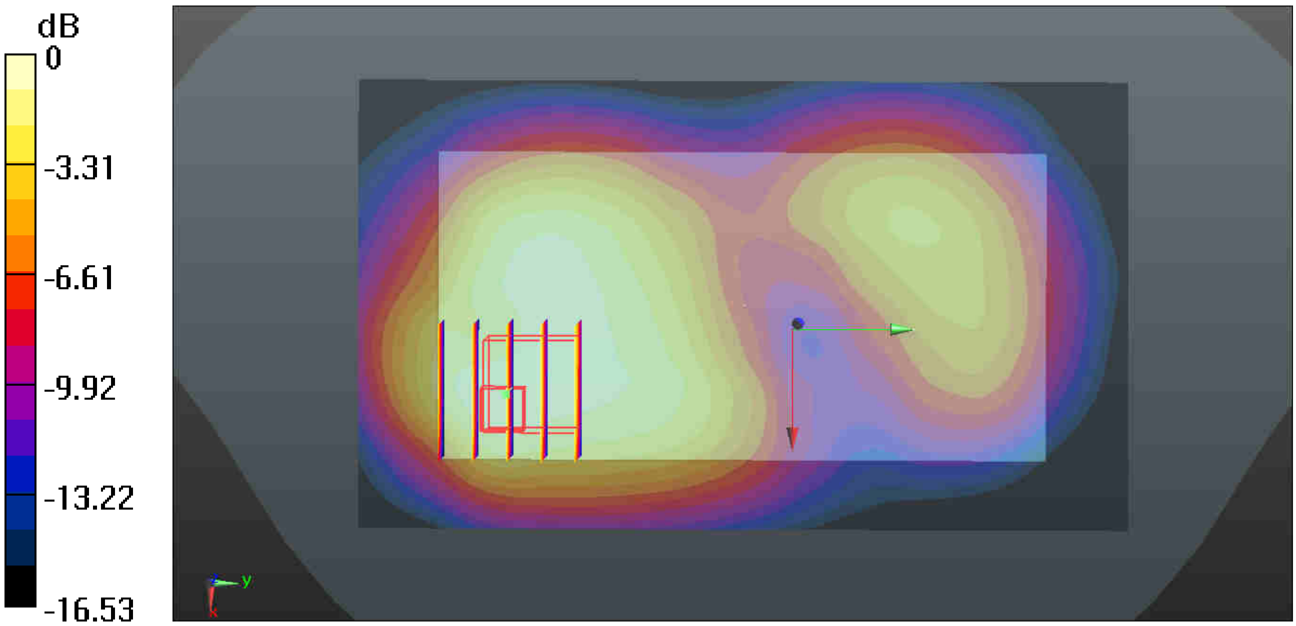
25_WCDMA Band II_RMC12.2Kbps_Back_10mm_Ch9538

Communication System: UID 0, UMTS (0); Frequency: 1907.6 MHz;Duty Cycle: 1:1
Medium: MSL_1900_161028 Medium parameters used: f = 1907.6 MHz; σ = 1.555 S/m; ε_r = 53.787; ρ= 1000 kg/m^3
Ambient Temperature：23.4 ℃; Liquid Temperature：22.5 ℃

DASY5 Configuration:
- Probe: EX3DV4 - SN3958; ConvF(8.01, 8.01, 8.01); Calibrated: 2016.07.26;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1386; Calibrated: 2016.07.07
- Phantom: SAM2; Type: QD000P40CD; Serial: TP:1671
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Ch9538/Area Scan (71x121x1): Interpolated grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.666 W/kg

Ch9538/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 1.979 V/m; Power Drift = 0.13 dB
Peak SAR (extrapolated) = 0.807 W/kg
SAR(1 g) = 0.473 W/kg; SAR(10 g) = 0.294 W/kg
Maximum value of SAR (measured) = 0.605 W/kg



0 dB = 0.666 W/kg

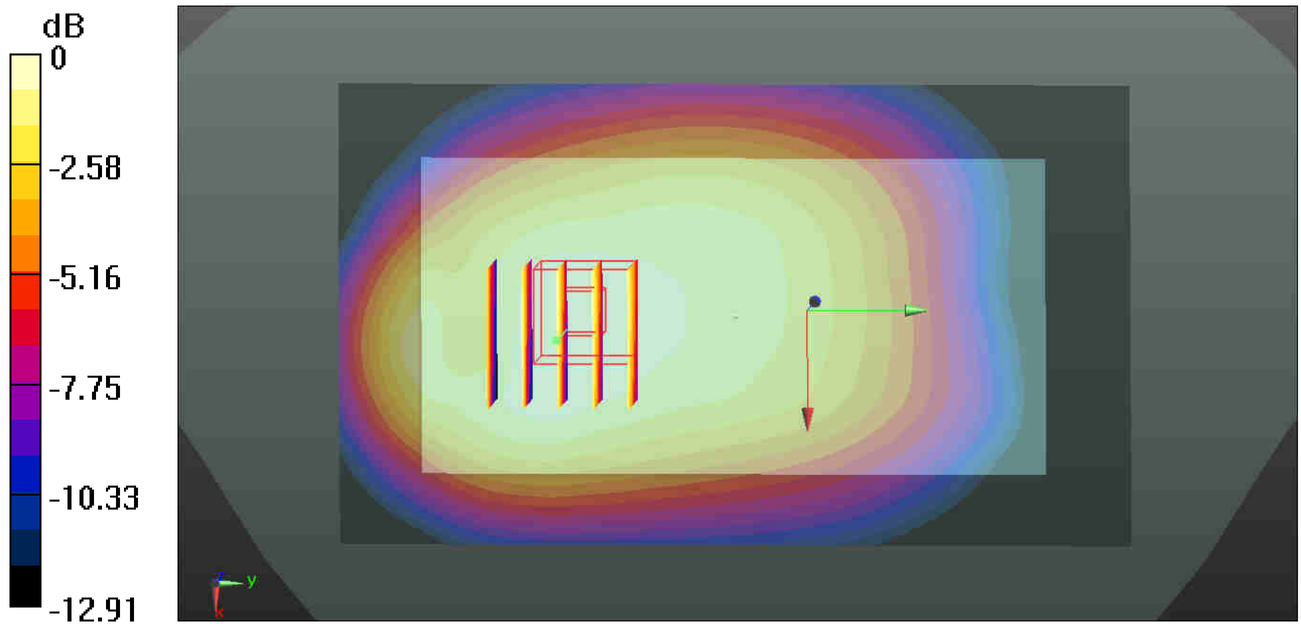
26_LTE Band 5_10M_QPSK_1RB_25Offset_Back_10mm_Ch20525

Communication System: UID 0, LTE (0); Frequency: 836.5 MHz;Duty Cycle: 1:1
Medium: MSL_835_161030 Medium parameters used: f = 836.5 MHz; σ = 0.979 S/m; ε_r = 54.452; ρ = 1000 kg/m^3
Ambient Temperature：23.2 ℃; Liquid Temperature：22.6 ℃

DASY5 Configuration:
- Probe: EX3DV4 - SN3911; ConvF(10.19, 10.19, 10.19); Calibrated: 2016.09.29;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1338; Calibrated: 2015.11.23
- Phantom: SAM2; Type: QD000P40CD; Serial: TP:1671
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Ch20525/Area Scan (71x121x1): Interpolated grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.559 W/kg

Ch20525/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 2.248 V/m; Power Drift = -0.11 dB
Peak SAR (extrapolated) = 0.632 W/kg
SAR(1 g) = 0.471 W/kg; SAR(10 g) = 0.349 W/kg
Maximum value of SAR (measured) = 0.553 W/kg



0 dB = 0.559 W/kg

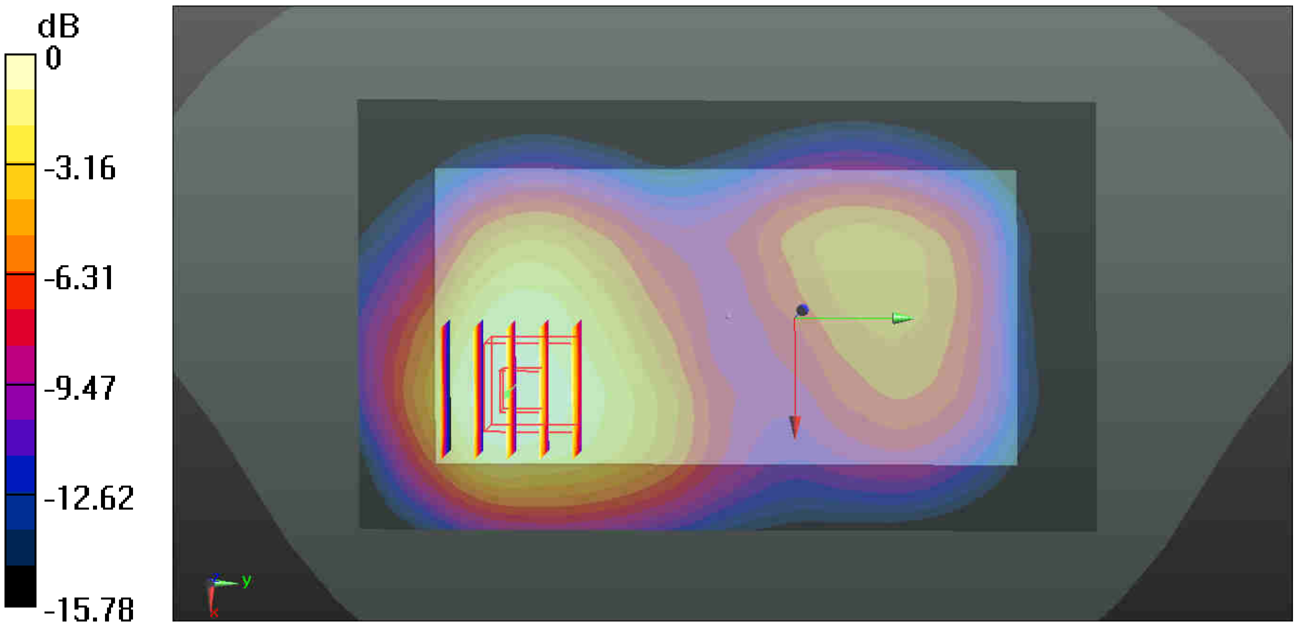
27_LTE Band 4_20M_QPSK_1RB_0Offset_Back_10mm_Ch20175

Communication System: UID 0, LTE (0); Frequency: 1732.5 MHz;Duty Cycle: 1:1
Medium: MSL_1800_161028 Medium parameters used: f = 1732.5 MHz; σ = 1.504 S/m; ε_r = 52.599; ρ = 1000 kg/m^3
Ambient Temperature：23.5 ℃; Liquid Temperature：22.7 ℃

DASY5 Configuration:
- Probe: EX3DV4 - SN3958; ConvF(8.58, 8.58, 8.58); Calibrated: 2016.07.26;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1386; Calibrated: 2016.07.07
- Phantom: SAM2; Type: QD000P40CD; Serial: TP:1671
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Ch20175/Area Scan (71x121x1): Interpolated grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.785 W/kg

Ch20175/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 1.968 V/m; Power Drift = 0.07 dB
Peak SAR (extrapolated) = 0.927 W/kg
SAR(1 g) = 0.637 W/kg; SAR(10 g) = 0.426 W/kg
Maximum value of SAR (measured) = 0.780 W/kg



0 dB = 0.785 W/kg

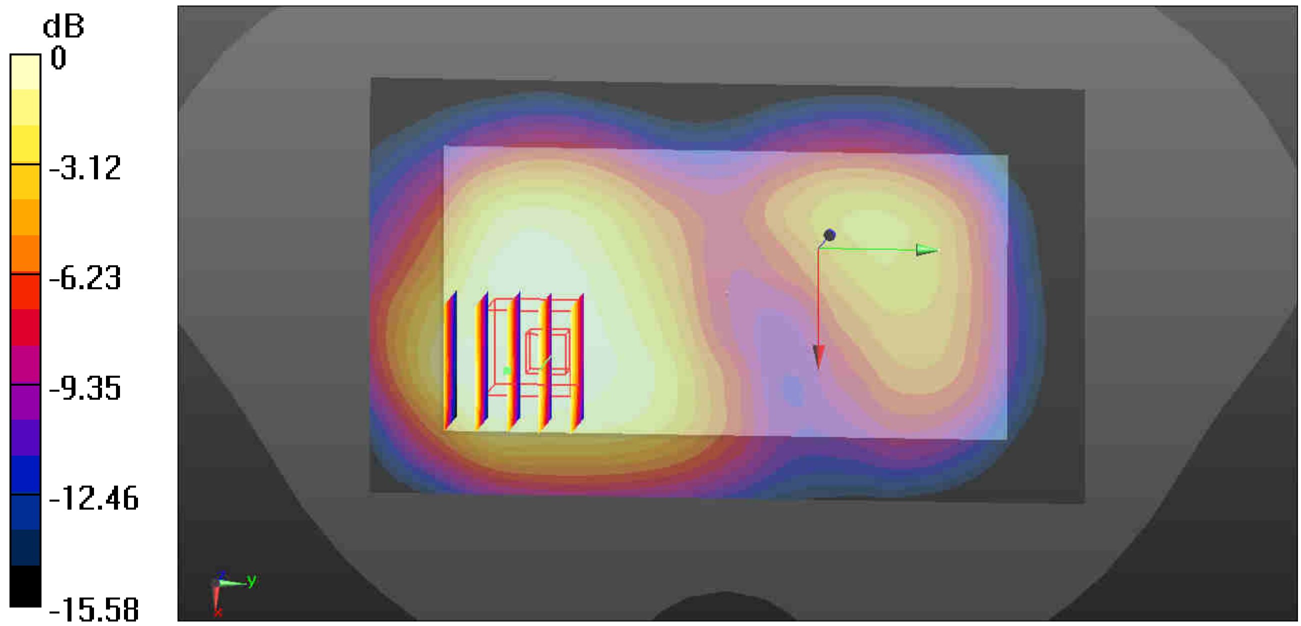
28_LTE Band 2_20M_QPSK_1RB_49Offset_Back_10mm_Ch18900

Communication System: UID 0, LTE (0); Frequency: 1880 MHz;Duty Cycle: 1:1
Medium: MSL_1900_161028 Medium parameters used: f = 1880 MHz; σ = 1.525 S/m; ε_r = 53.834; ρ = 1000 kg/m^3
Ambient Temperature：23.4 ℃; Liquid Temperature：22.5 ℃

DASY5 Configuration:
- Probe: EX3DV4 - SN3958; ConvF(8.01, 8.01, 8.01); Calibrated: 2016.07.26;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1386; Calibrated: 2016.07.07
- Phantom: SAM2; Type: QD000P40CD; Serial: TP:1671
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Ch18900/Area Scan (71x121x1): Interpolated grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.583 W/kg

Ch18900/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 2.165 V/m; Power Drift = 0.08 dB
Peak SAR (extrapolated) = 0.694 W/kg
SAR(1 g) = 0.446 W/kg; SAR(10 g) = 0.291 W/kg
Maximum value of SAR (measured) = 0.549 W/kg



0 dB = 0.583 W/kg

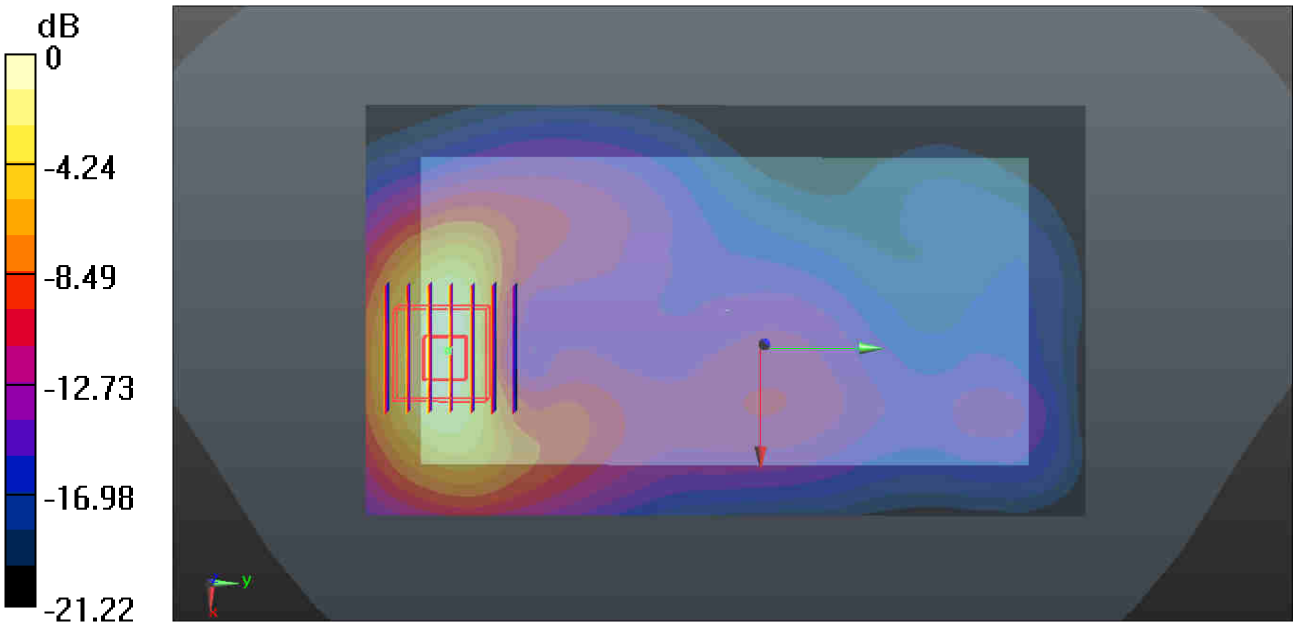
29_LTE Band 7_20M_QPSK_1RB_49Offset_Back_10mm_Ch21350

Communication System: UID 0, LTE (0); Frequency: 2560 MHz;Duty Cycle: 1:1
Medium: MSL_2600_161031 Medium parameters used: f = 2560 MHz; σ = 2.156 S/m; ε_r = 51.082; ρ = 1000 kg/m^3
Ambient Temperature：23.4 ℃; Liquid Temperature：22.6 ℃

DASY5 Configuration:
- Probe: EX3DV4 - SN3819; ConvF(6.79, 6.79, 6.79); Calibrated: 2015.11.27;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn915; Calibrated: 2016.06.22
- Phantom: SAM2; Type: QD000P40CD; Serial: TP:1671
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Ch21350/Area Scan (81x141x1): Interpolated grid: dx=12mm, dy=12mm
Maximum value of SAR (interpolated) = 2.05 W/kg

Ch21350/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 1.980 V/m; Power Drift = 0.15 dB
Peak SAR (extrapolated) = 2.66 W/kg
SAR(1 g) = 1.27 W/kg; SAR(10 g) = 0.608 W/kg
Maximum value of SAR (measured) = 2.07 W/kg



0 dB = 2.05 W/kg

Test Laboratory: Sporton International Inc. SAR/HAC Testing Lab Date: 2016.10.28

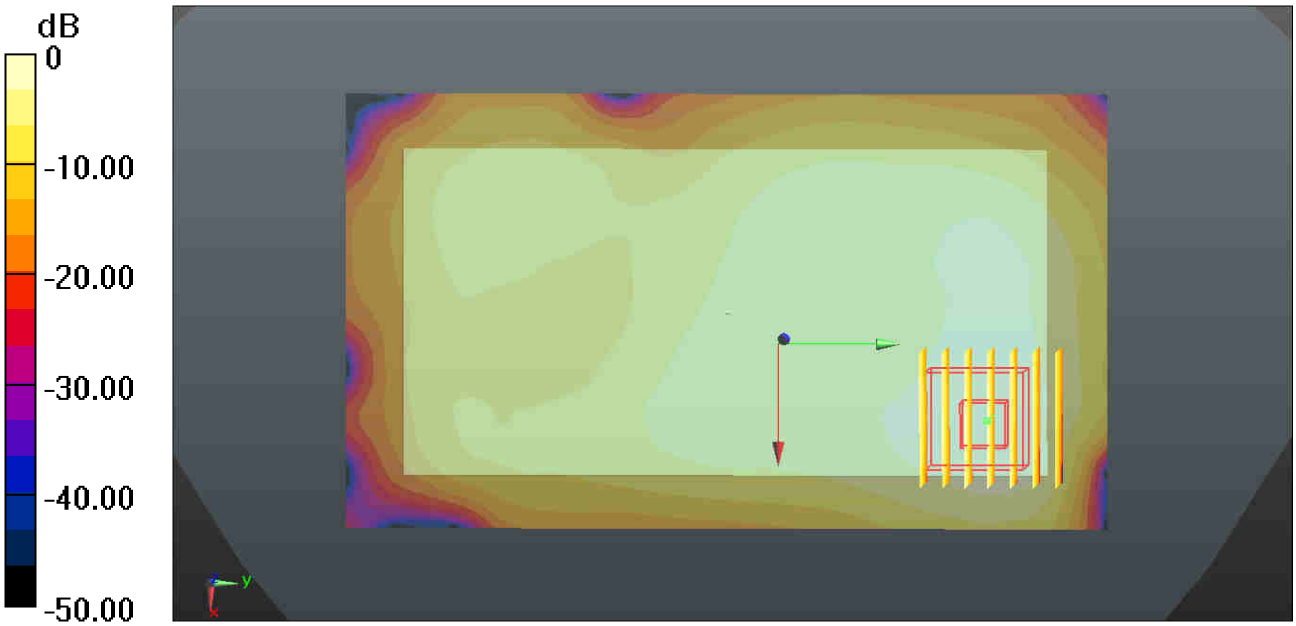
30_WLAN2.4GHz_802.11b 1Mbps_Back_10mm_Ch6

Communication System: UID 0, WIFI (0); Frequency: 2437 MHz;Duty Cycle: 1:1.025
Medium: MSL_2450_161028 Medium parameters used: f = 2437 MHz; $\sigma = 1.973$ S/m; $\varepsilon_r = 52.403$; $\rho = 1000$ kg/m^3
Ambient Temperature：23.4 ℃; Liquid Temperature：22.7 ℃

DASY5 Configuration:
- Probe: EX3DV4 - SN3958; ConvF(7.72, 7.72, 7.72); Calibrated: 2016.07.26;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1386; Calibrated: 2016.07.07
- Phantom: SAM2; Type: QD000P40CD; Serial: TP:1671
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Ch6/Area Scan (81x141x1): Interpolated grid: dx=12mm, dy=12mm
Maximum value of SAR (interpolated) = 0.232 W/kg

Ch6/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 0.9140 V/m; Power Drift = -0.09 dB
Peak SAR (extrapolated) = 0.306 W/kg
SAR(1 g) = 0.157 W/kg; SAR(10 g) = 0.082 W/kg
Maximum value of SAR (measured) = 0.227 W/kg



0 dB = 0.232 W/kg

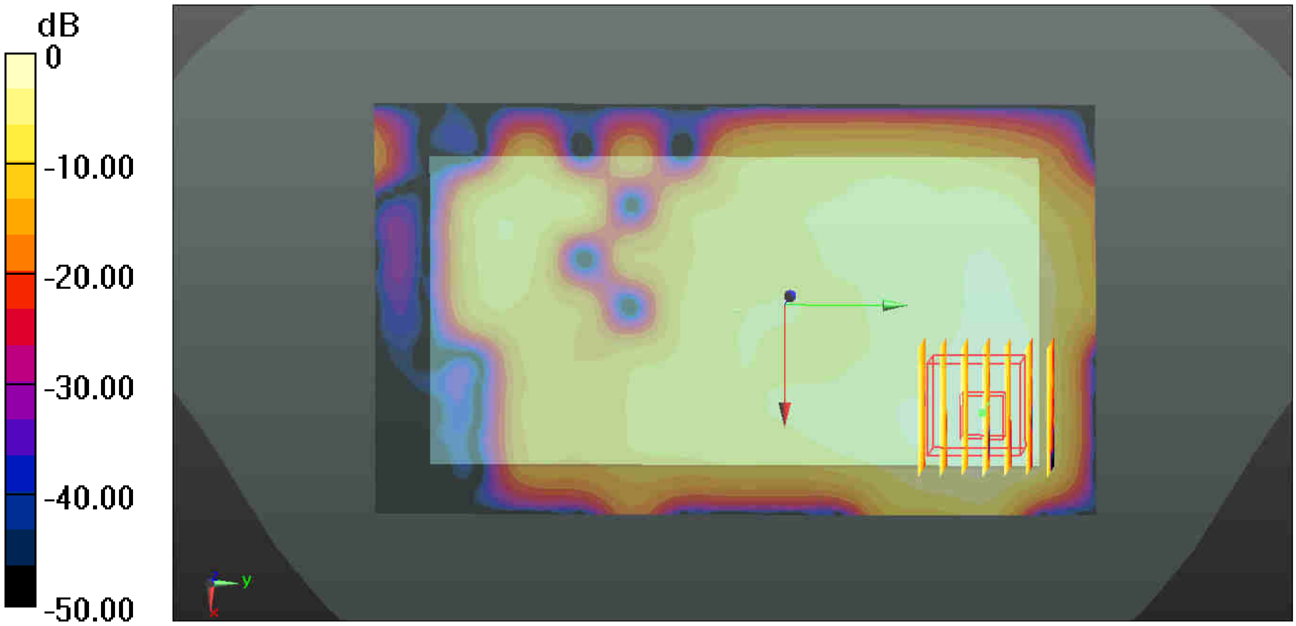
31_Bluetooth_1Mbps_Back_10mm_Ch39

Communication System: UID 0, Bluetooth (0); Frequency: 2441 MHz;Duty Cycle: 1:1.29
Medium: MSL_2450_161028 Medium parameters used: f = 2441 MHz; σ = 1.978 S/m; ε_r = 52.377; ρ = 1000 kg/m^3
Ambient Temperature：23.4 ℃; Liquid Temperature：22.7 ℃

DASY5 Configuration:
- Probe: EX3DV4 - SN3958; ConvF(7.72, 7.72, 7.72); Calibrated: 2016.07.26;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1386; Calibrated: 2016.07.07
- Phantom: SAM2; Type: QD000P40CD; Serial: TP:1671
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Ch39/Area Scan (81x141x1): Interpolated grid: dx=12mm, dy=12mm
Maximum value of SAR (interpolated) = 0.0525 W/kg

Ch39/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 0.5460 V/m; Power Drift = -0.01 dB
Peak SAR (extrapolated) = 0.0760 W/kg
SAR(1 g) = 0.035 W/kg; SAR(10 g) = 0.017 W/kg
Maximum value of SAR (measured) = 0.0513 W/kg



0 dB = 0.0525 W/kg

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 **Sporton-SZ (Auden)**

Certificate No: D835V2-4d162_Nov15

CALIBRATION CERTIFICATE

Object	D835V2 - SN: 4d162
Calibration procedure(s)	QA CAL-05.v9 Calibration procedure for dipole validation kits above 700 MHz
Calibration date:	November 24, 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:	Claudio Leubler	Laboratory Technician	
Approved by:	Katja Pokovic	Technical Manager	

Issued: November 24, 2015

Glossary:

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

Calibration is Performed According to the Following Standards:

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

Additional Documentation:

e) DASY4/5 System Handbook

Methods Applied and Interpretation of Parameters:

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

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

Measurement Conditions

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

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

Head TSL parameters

The following parameters and calculations were applied.

	Temperature	**Permittivity**	**Conductivity**
Nominal Head TSL parameters	22.0 °C	41.5	0.90 mho/m
Measured Head TSL parameters	(22.0 ± 0.2) °C	42.6 ± 6 %	0.92 mho/m ± 6 %
Head TSL temperature change during test	< 0.5 °C	----	----

SAR result with Head TSL

SAR averaged over 1 cm^3 (1 g) of Head TSL	Condition	
SAR measured	250 mW input power	2.31 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**9.14 W/kg ± 17.0 % (k=2)**

SAR averaged over 10 cm^3 (10 g) of Head TSL	condition	
SAR measured	250 mW input power	1.50 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**5.94 W/kg ± 16.5 % (k=2)**

Body TSL parameters

The following parameters and calculations were applied.

	Temperature	**Permittivity**	**Conductivity**
Nominal Body TSL parameters	22.0 °C	55.2	0.97 mho/m
Measured Body TSL parameters	(22.0 ± 0.2) °C	55.6 ± 6 %	0.99 mho/m ± 6 %
Body TSL temperature change during test	< 0.5 °C	----	----

SAR result with Body TSL

SAR averaged over 1 cm^3 (1 g) of Body TSL	Condition	
SAR measured	250 mW input power	2.41 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	**9.51 W/kg ± 17.0 % (k=2)**

SAR averaged over 10 cm^3 (10 g) of Body TSL	condition	
SAR measured	250 mW input power	1.58 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	**6.25 W/kg ± 16.5 % (k=2)**

Appendix (Additional assessments outside the scope of SCS 0108)

Antenna Parameters with Head TSL

Impedance, transformed to feed point	51.7 Ω - 5.5 jΩ
Return Loss	- 24.9 dB

Antenna Parameters with Body TSL

Impedance, transformed to feed point	47.5 Ω - 7.4 jΩ
Return Loss	- 21.9 dB

General Antenna Parameters and Design

Electrical Delay (one direction)	1.440 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 28, 2012

DASY5 Validation Report for Head TSL

Date: 24.11.2015

Test Laboratory: SPEAG, Zurich, Switzerland

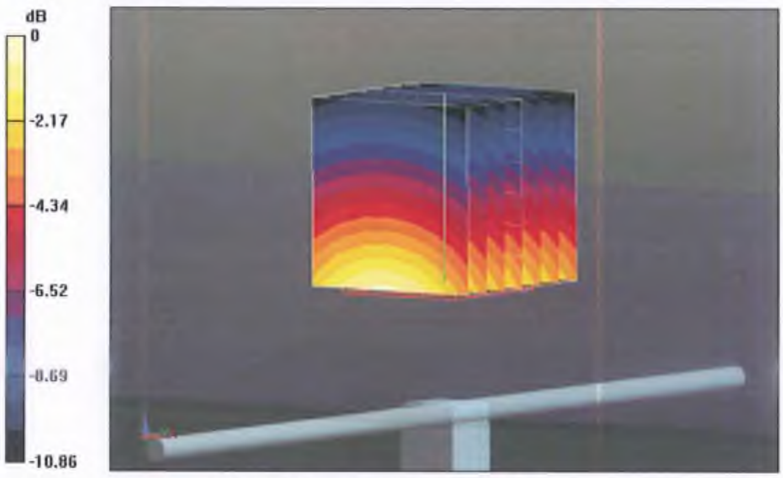
DUT: Dipole 835 MHz; Type: D835V2; Serial: D835V2 - SN: 4d162

Communication System: UID 0 - CW; Frequency: 835 MHz
Medium parameters used: f = 835 MHz; σ = 0.92 S/m; ε_r = 42.6; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)

DASY52 Configuration:

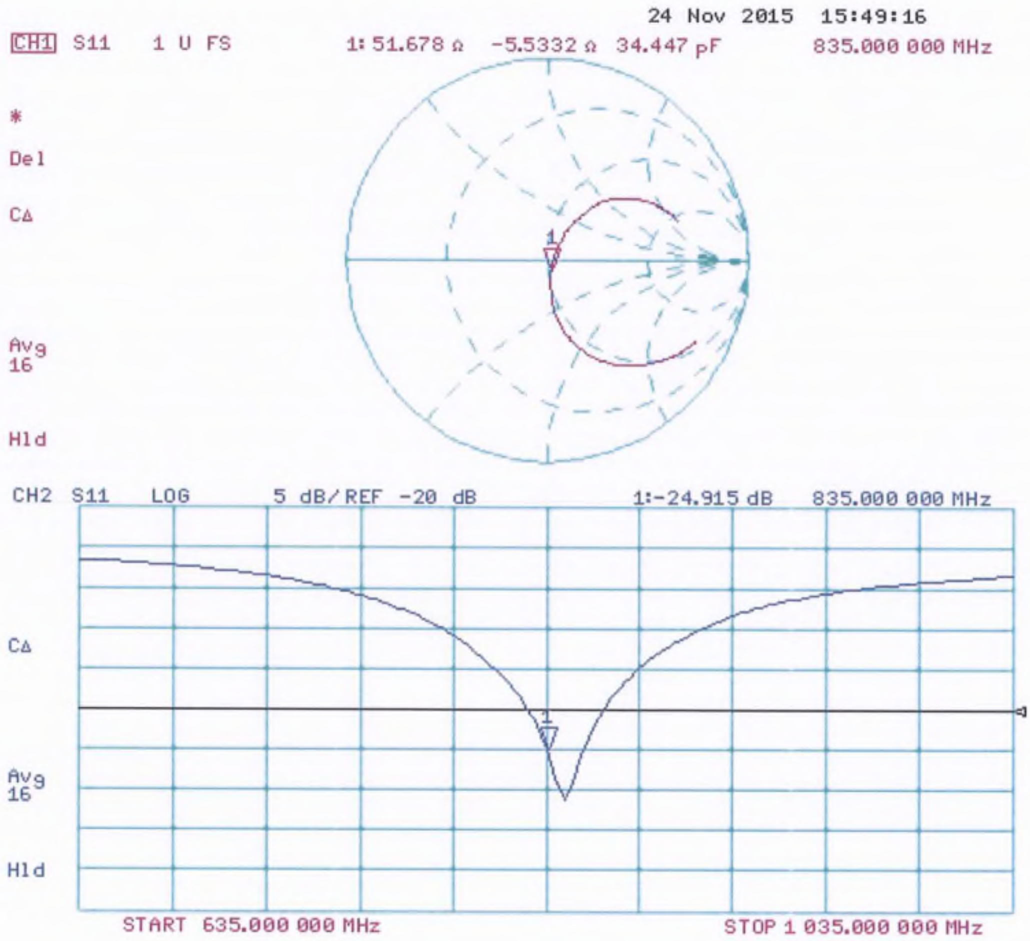
- Probe: EX3DV4 - SN7349; ConvF(9.77, 9.77, 9.77); Calibrated: 30.12.2014;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 17.08.2015
- Phantom: Flat Phantom 4.9L; Type: QD000P49AA; Serial: 1001
- DASY52 52.8.8(1222); SEMCAD X 14.6.10(7331)

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 = 60.52 V/m; Power Drift = 0.02 dB
Peak SAR (extrapolated) = 3.43 W/kg
SAR(1 g) = 2.31 W/kg; SAR(10 g) = 1.5 W/kg
Maximum value of SAR (measured) = 3.03 W/kg



0 dB = 3.03 W/kg = 4.81 dBW/kg

Impedance Measurement Plot for Head TSL



DASY5 Validation Report for Body TSL

Date: 24.11.2015

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole 835 MHz; Type: D835V2; Serial: D835V2 - SN: 4d162

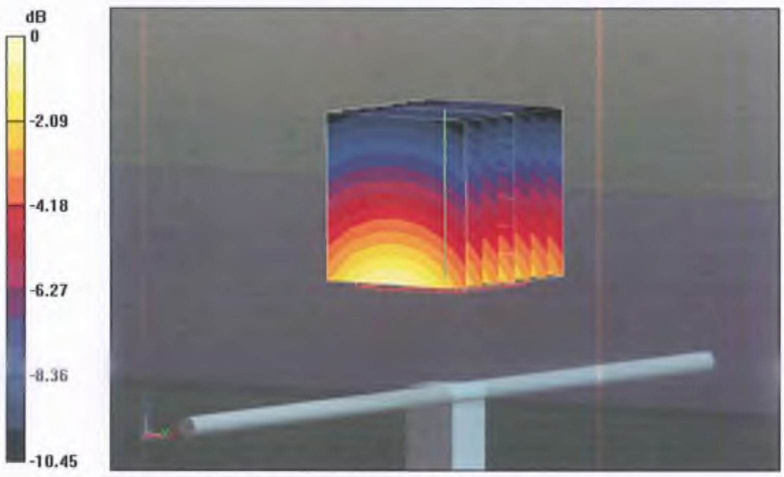
Communication System: UID 0 - CW; Frequency: 835 MHz
Medium parameters used: f = 835 MHz; $\sigma = 0.99$ S/m; $\varepsilon_r = 55.6$; $\rho = 1000$ kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)

DASY52 Configuration:

- Probe: EX3DV4 - SN7349; ConvF(9.72, 9.72, 9.72); Calibrated: 30.12.2014;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 17.08.2015
- Phantom: Flat Phantom 4.9L; Type: QD000P49AA; Serial: 1001
- DASY52 52.8.8(1222); SEMCAD X 14.6.10(7331)

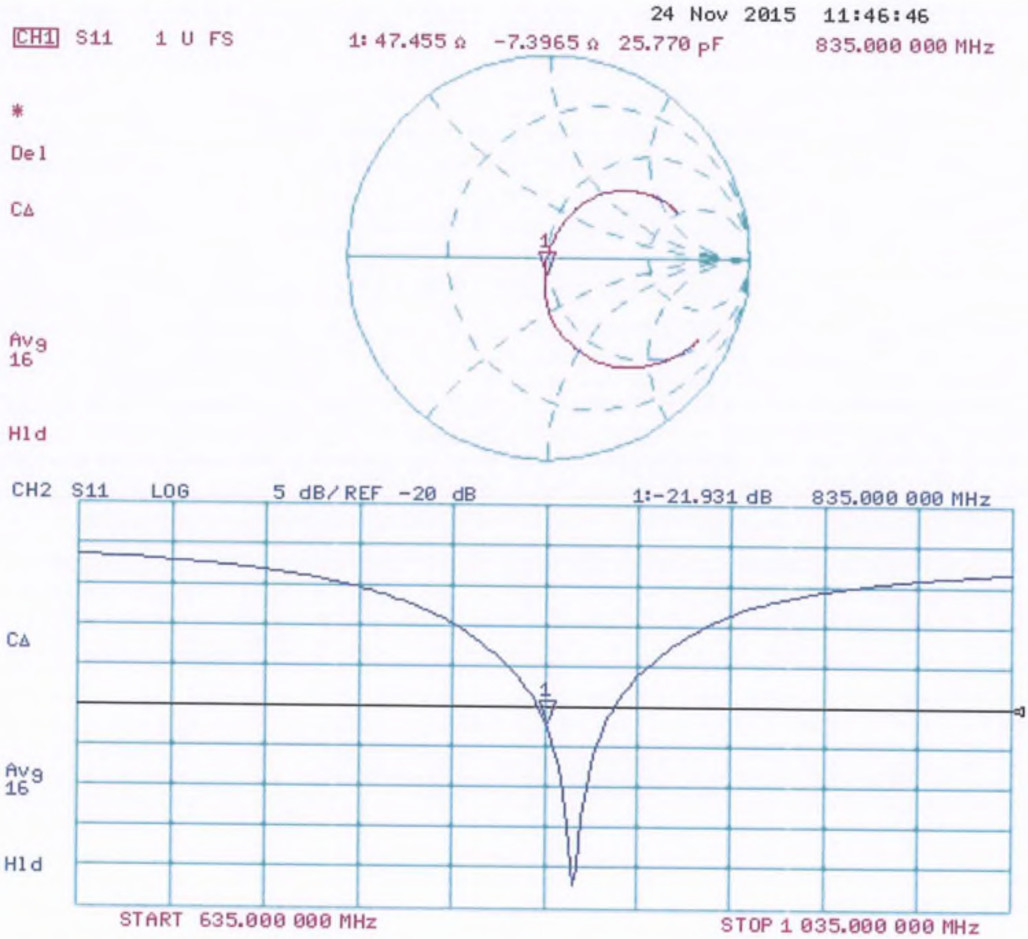
Dipole Calibration for Body Tissue/Pin=250 mW, d=15mm/Zoom Scan (7x7x7)/Cube 0:

Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 59.66 V/m; Power Drift = 0.02 dB
Peak SAR (extrapolated) = 3.56 W/kg
SAR(1 g) = 2.41 W/kg; SAR(10 g) = 1.58 W/kg
Maximum value of SAR (measured) = 3.17 W/kg



0 dB = 3.17 W/kg = 5.01 dBW/kg

Impedance Measurement Plot for Body TSL



In Collaboration with
speag
CALIBRATION LABORATORY
Add: No.51 Xueyuan Road, Haidian District, Beijing, 100191, China
Tel: +86-10-62304633-2079 Fax: +86-10-62304633-2504
E-mail: cttl@chinattl.com Http://www.chinattl.cn

中国认可
国际互认
校准
CALIBRATION
CNAS L0570

Client: Sporton_CN — Certificate No: Z16-97070

CALIBRATION CERTIFICATE

Object	D1750V2 - SN: 1137
Calibration Procedure(s)	FD-Z11-2-003-01 Calibration Procedures for dipole validation kits
Calibration date:	May 18, 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)℃ and humidity<70%.

Calibration Equipment used (M&TE critical for calibration)

Primary Standards	ID #	Cal Date(Calibrated by, Certificate No.)	Scheduled Calibration
Power Meter NRP2	101919	01-Jul-15 (CTTL, No.J15X04256)	Jun-16
Power sensor NRP-Z91	101547	01-Jul-15 (CTTL, No.J15X04256)	Jun-16
Reference Probe EX3DV4	SN 7307	19-Feb-16(SPEAG,No.EX3-7307_Feb16)	Feb-17
DAE4	SN 771	02-Feb-16(CTTL-SPEAG,No.Z16-97011)	Feb-17
Secondary Standards	**ID #**	**Cal Date(Calibrated by, Certificate No.)**	**Scheduled Calibration**
Signal Generator E4438C	MY49071430	01-Feb-16 (CTTL, No.J16X00893)	Jan-17
Network Analyzer E5071C	MY46110673	26-Jan-16 (CTTL, No.J16X00894)	Jan-17

	Name	Function	Signature
Calibrated by:	Zhao Jing	SAR Test Engineer	
Reviewed by:	Qi Dianyuan	SAR Project Leader	
Approved by:	Lu Bingsong	Deputy Director of the laboratory	

Issued: May 20, 2016