FCC SAR Test Report

APPLICANT	**:**	**Unimax Communications**
EQUIPMENT	**:**	**CDMA EVDO REV A 800/1900MHz mobile phone**
BRAND NAME	**:**	**UMX**
MODEL NAME	**:**	**U680**
FCC ID	**:**	**P46-U680**
STANDARD	**:**	**FCC 47 CFR Part 2 (2.1093)** **ANSI/IEEE C95.1-1992** **IEEE 1528-2003** **FCC OET Bulletin 65 Supplement C (Edition 01-01)**

The product was completely tested on Jan. 05, 2013. We, SPORTON INTERNATIONAL (SHENZHEN) INC., would like to declare that the tested sample has been evaluated in accordance with the procedures and shown the 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.

Reviewed by:

Jones Tsai

Jones Tsai / Manager

Testing Laboratory
2353

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Revision History

REPORT NO.	VERSION	DESCRIPTION	ISSUED DATE
FA2D1401	Rev. 01	Initial issue of report	Jan. 06, 2013

1. Statement of Compliance

The maximum results of Specific Absorption Rate (SAR) found during testing for **Unimax Communications, DUT: CDMA EVDO REV A 800/1900MHz mobile phone, Brand Name: UMX, Model Name: U680** are as follows.

<Highest Reported Standalone SAR Summary>

Exposure Position	Frequency Band	Highest Reported 1g-SAR (W/kg)	Equipment Class	Highest Reported 1g-SAR (W/kg)
Head	CDMA2000 BC0	1.01	PCE	1.10
	CDMA2000 BC1	1.10		
	WLAN, 2412 - 2462 MHz	0.03	DTS	0.03
Hotspot (1cm Gap)	CDMA2000 BC0	1.45	PCE	1.45
	CDMA2000 BC1	1.34		
	WLAN, 2412 - 2462 MHz	0.03	DTS	0.03
	Bluetooth, 2402 - 2480 MHz	0.01	DSS	0.01
Body-worn (1cm Gap)	CDMA2000 BC0	1.46	PCE	1.46
	CDMA2000 BC1	1.41		
	WLAN, 2412 - 2462 MHz	0.03	DTS	0.03
	Bluetooth, 2402 - 2480 MHz	0.01	DSS	0.01

<Highest Simultaneous Transmission SAR>

Exposure Position	Frequency Band	Equipment Class	Highest Reported Simultaneous Transmission 1g-SAR (W/kg)
Body-worn (1cm Gap)	CDMA2000 BC0	PCE	1.48
	WLAN, 2412 - 2462 MHz	DTS	

Exposure Position	Frequency Band	Equipment Class	Highest Reported Simultaneous Transmission 1g-SAR (W/kg)
Body-worn (1cm Gap)	CDMA2000 BC0	PCE	1.47
	Bluetooth, 2402 - 2480 MHz	DSS	

Remark:

1. The highest simultaneous transmission SAR is reported multi-band summation of simultaneous transmission SAR measurement.
2. Scalar SAR summation of all possible simultaneous transmission scenarios are < 1.6W/kg.

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 1528-2003 and FCC OET Bulletin 65 Supplement C (Edition 01-01).

2. Administration Data

2.1 Testing Laboratory

Test Site	SPORTON INTERNATIONAL (SHENZHEN) INC.
Test Site Location	No. 101, Complex Building C, Guanglong Village, Xili Town, Nanshan District, Shenzhen, Guangdong, P.R.C. TEL: +86-755-8637-9589 FAX: +86-755-8637-9595

2.2 Applicant

Company Name	Unimax Communications
Address	18201 McDurmott St. West Suite E,Irvine, CA 92614

2.3 Manufacturer

Company Name	Unimax Communications
Address	18201 McDurmott St. West Suite E,Irvine, CA 92614

2.4 Application Details

Date of Start during the Test	Dec. 17, 2012
Date of End during the Test	Jan. 05, 2013

3. General Information

3.1 Description of Equipment Under Test (EUT)

Product Feature & Specification	
EUT	CDMA EVDO REV A 800/1900MHz mobile phone
Brand Name	UMX
Model Name	U680
FCC ID	P46-U680
Tx Frequency	CDMA2000 BC0 : 824.70 MHz ~ 848.31 MHz CDMA2000 BC1 : 1851.25 MHz ~ 1908.75 MHz WLAN2.4G: 2412 MHz ~ 2462 MHz Bluetooth : 2402 MHz ~ 2480 MHz
Antenna Type	WWAN: Fixed Internal Antenna WLAN: PIFA Antenna Bluetooth: PIFA Antenna
HW Version	G3616_V1.1
SW Version	U680_05.03
Uplink Modulations	CDMA2000 1xRTT: QPSK CDMA2000 1xEV-DO: 8PSK 802.11b : DSSS (DBPSK / DQPSK / CCK) 802.11g/n : OFDM (BPSK / QPSK / 16QAM / 64QAM) Bluetooth 3.0 BDR (1Mbps) : GFSK Bluetooth 3.0 EDR (2Mbps) : π /4-DQPSK Bluetooth 3.0 EDR (3Mbps) : 8-DPSK
EUT Stage	Identical Prototype

Remark:

1. The above EUT's information was declared by manufacturer. Please refer to the specifications or user's manual for more detailed description.
2. There are two different types of EUT that only with different logo in the front. The others are the same including circuit design, PCB board, structure and all components. It is special to declare.

3.2 Maximum RF output power among production units

Burst Average Power for Production Unit		
Band	CDMA2000 BC0 (dBm)	CDMA2000 BC1 (dBm)
1xRTT RC1 SO55	24	24.5
1xRTT RC3 SO55	24	24.5
1xRTT RC3 SO32(+ F-SCH)	24	24.5
1xRTT RC3 SO32(+SCH)	24	24.5
1xEV-DO Rev 0	24	24.5
1xEV-DO Rev A	24	24.5

Max Target Average Power for Production Unit				
Mode / Band	IEEE 802.11 (dBm)			
	a	b	g	n-HT20
2.4 GHz WLAN		12	9	9

Max Target Average Power for Production Unit			
Mode / Band	Bluetooth (dBm)		
	1Mbps (GFSK)	2Mbps (π/4-DQPSK)	3Mbps (8-DPSK)
2.4 GHz Bluetooth	9	8	8

3.3 Product Photos

Please refer to Appendix D.

3.4 Applied Standard

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

- FCC 47 CFR Part 2 (2.1093)
- ANSI/IEEE C95.1-1992
- IEEE 1528-2003
- FCC OET Bulletin 65 Supplement C (Edition 01-01)
- FCC KDB 447498 D01 v05
- FCC KDB 648474 D04 v01
- FCC KDB 941225 D01 v02
- FCC KDB 941225 D06 v01
- FCC KDB 865664 D01 v01
- FCC KDB 248227 D01 v01r02

3.5 Device Category and SAR Limits

This device belongs to portable device category because its radiating structure is allowed to be used within 20 centimeters of the body of the user. Limit for General Population/Uncontrolled exposure should be applied for this device, it is 1.6 W/kg as averaged over any 1 gram of tissue.

3.6 Test Conditions

3.5.1 Ambient Condition

Ambient Temperature	20 to 24 ℃
Humidity	< 60 %

3.5.2 Test Configuration

For WWAN SAR testing, the device was controlled by using a base station emulator. Communication between the device and the emulator was established by air link. The distance between the EUT and the antenna of the emulator is larger than 50 cm and the output power radiated from the emulator antenna is at least 30 dB smaller than the output power of EUT.

During WLAN SAR testing EUT is configured with the WLAN continuous TX tool.

The EUT was set from the emulator to radiate maximum WWAN output power during all tests.

4. Specific Absorption Rate (SAR)

4.1 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.

4.2 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)

SAR measurement can be either related to the temperature elevation in tissue by

$$\mathbf{SAR} = \mathbf{C}\left(\frac{\boldsymbol{\delta}\mathbf{T}}{\boldsymbol{\delta}\mathbf{t}}\right)$$

Where: C is the specific heat capacity, δT is the temperature rise and δt is the exposure duration, or related to the electrical field in the tissue by

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

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

However for evaluating SAR of low power transmitter, electrical field measurement is typically applied.

5. SAR Measurement System

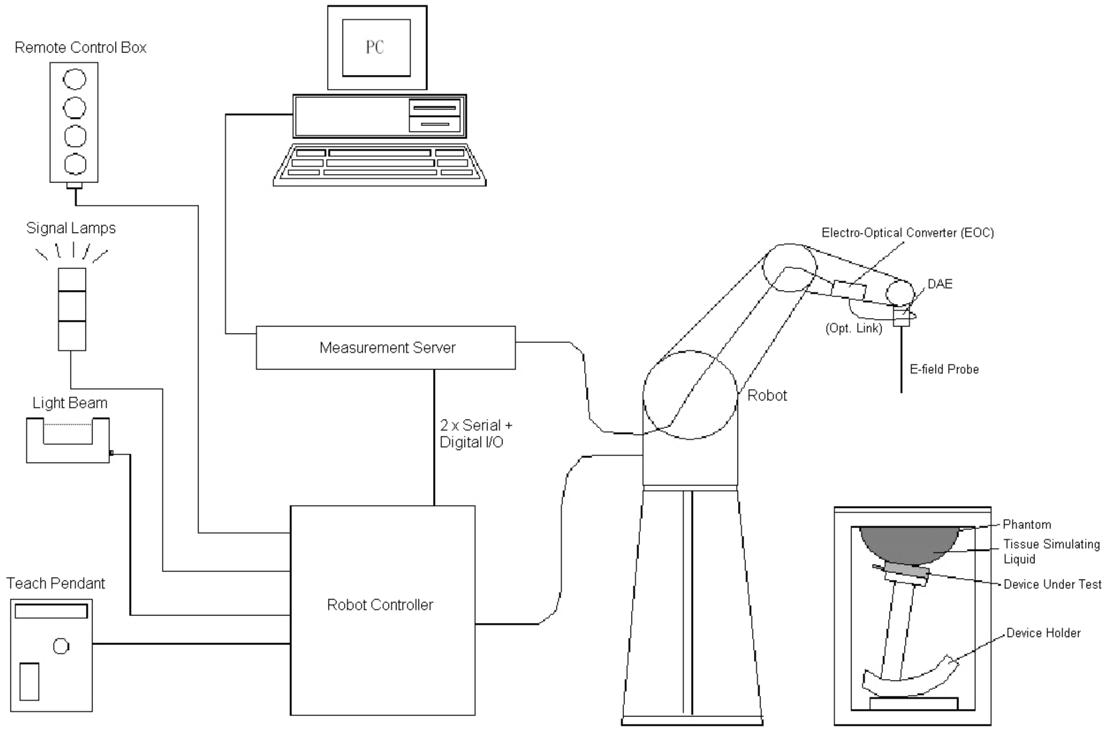


Fig 5.1 SPEAG DASY System Configurations

The DASY system for performance compliance tests is illustrated above graphically. This system consists of the following items:

- A standard high precision 6-axis robot with controller, a teach pendant and software
- A data acquisition electronic (DAE) attached to the robot arm extension
- A dosimetric probe equipped with an optical surface detector system
- The electro-optical converter (EOC) performs the conversion between optical and electrical signals
- A measurement server performs the time critical tasks such as signal filtering, control of the robot operation and fast movement interrupts.
- A probe alignment unit which improves the accuracy of the probe positioning
- A computer operating Windows XP
- DASY software
- Remove control with teach pendant and additional circuitry for robot safety such as warming lamps, etc.
- The SAM twin phantom
- A device holder
- Tissue simulating liquid
- Dipole for evaluating the proper functioning of the system

Component details are described in in the following sub-sections.

5.1 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.

5.1.1 E-Field Probe Specification

<EX3DV4 Probe>

Construction	Symmetrical design with triangular core Built-in shielding against static charges PEEK enclosure material (resistant to organic solvents, e.g., DGBE)	 **Fig 5.2 Photo of EX3DV4**
Frequency	10 MHz to 6 GHz; Linearity: ± 0.2 dB	
Directivity	± 0.3 dB in HSL (rotation around probe axis) ± 0.5 dB in tissue material (rotation normal to probe axis)	
Dynamic Range	10 µW/g to 100 mW/g; Linearity: ± 0.2 dB (noise: typically < 1 µW/g)	
Dimensions	Overall length: 330 mm (Tip: 20 mm) Tip diameter: 2.5 mm (Body: 12 mm) Typical distance from probe tip to dipole centers: 1 mm	

5.1.2 E-Field Probe Calibration

Each probe needs to be calibrated according to a dosimetric assessment procedure with accuracy better than ± 10%. The spherical isotropy shall be evaluated and within ± 0.25 dB. The sensitivity parameters (NormX, NormY, and NormZ), the diode compression parameter (DCP) and the conversion factor (ConvF) of the probe are tested. The calibration data can be referred to appendix C of this report.

5.2 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 5.3 Photo of DAE

5.3 Robot

The SPEAG DASY system uses the high precision robots (DASY5: TX90XL) type from Stäubli SA (France). For the 6-axis controller system, the robot controller version (DASY5: CS8c) from Stäubli is used. The Stäubli robot series have many features that are important for our application:

- High precision (repeatability ±0.035 mm)
- High reliability (industrial design)
- Jerk-free straight movements
- Low ELF interference (the closed metallic construction shields against motor control fields)

Fig 5.4 Photo of DASY5

5.4 Measurement Server

The measurement server is based on a PC/104 CPU board with CPU (DASY5: 400 MHz, Intel Celeron), chipdisk (DASY5: 128 MB), RAM (DASY5: 128 MB). The necessary circuits for communication with the DAE electronic box, as well as the 16 bit AD converter system for optical detection and digital I/O interface are contained on the DASY I/O board, which is directly connected to the PC/104 bus of the CPU board.

The measurement server performs all the real-time data evaluation for field measurements and surface detection, controls robot movements and handles safety operations.

Fig 5.5 Photo of Server for DASY5

5.5 Phantom

<SAM Twin Phantom>

Shell Thickness	2 ± 0.2 mm; Center ear point: 6 ± 0.2 mm	 **Fig 5.6 Photo of SAM Phantom**
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.

5.6 Device Holder

<Device Holder for SAM Twin Phantom>

The SAR in the phantom is approximately inversely proportional to the square of the distance between the source and the liquid surface. For a source at 5 mm distance, a positioning uncertainty of ± 0.5 mm would produce a SAR uncertainty of ± 20 %. Accurate device positioning is therefore crucial for accurate and repeatable measurements. The positions in which the devices must be measured are defined by the standards.

The DASY device holder is designed to cope with different positions given in the standard. It has two scales for the device rotation (with respect to the body axis) and the device inclination (with respect to the line between the ear reference points). The rotation center for both scales is the ear reference point (ERP). Thus the device needs no repositioning when changing the angles.

The DASY device holder is constructed of low-loss POM material having the following dielectric parameters: relative permittivity $\varepsilon = 3$ and loss tangent $\delta = 0.02$. The amount of dielectric material has been reduced in the closest vicinity of the device, since measurements have suggested that the influence of the clamp on the test results could thus be lowered.

Fig 5.7 Device Holder

5.7 Data Storage and Evaluation

5.7.1 Data Storage

The DASY software stores the assessed data from the data acquisition electronics as raw data (in microvolt readings from the probe sensors), together with all the necessary software parameters for the data evaluation (probe calibration data, liquid parameters and device frequency and modulation data) in measurement files. The post-processing software evaluates the desired unit and format for output each time the data is visualized or exported. This allows verification of the complete software setup even after the measurement and allows correction of erroneous parameter settings. For example, if a measurement has been performed with an incorrect crest factor parameter in the device setup, the parameter can be corrected afterwards and the data can be reevaluated.

The measured data can be visualized or exported in different units or formats, depending on the selected probe type (e.g., [V/m], [A/m], [mW/g]). Some of these units are not available in certain situations or give meaningless results, e.g., a SAR-output in a non-lose media, will always be zero. Raw data can also be exported to perform the evaluation with other software packages.

5.7.2 Data Evaluation

The DASY post-processing software (SEMCAD) automatically executes the following procedures to calculate the field units from the microvolt readings at the probe connector. The parameters used in the evaluation are stored in the configuration modules of the software：

Probe parameters：	- Sensitivity	$Norm_i$, a_{i0}, a_{i1}, a_{i2}
	- Conversion factor	$ConvF_i$
	- Diode compression point	dcp_i
Device parameters：	- Frequency	f
	- Crest factor	cf
Media parameters：	- Conductivity	σ
	- Density	ρ

These parameters must be set correctly in the software. They can be found in the component documents or they can be imported into the software from the configuration files issued for the DASY components. In the direct measuring mode of the multi-meter option, the parameters of the actual system setup are used. In the scan visualization and export modes, the parameters stored in the corresponding document files are used.

The first step of the evaluation is a linearization of the filtered input signal to account for the compression characteristics of the detector diode. The compensation depends on the input signal, the diode type and the DC-transmission factor from the diode to the evaluation electronics. If the exciting field is pulsed, the crest factor of the signal must be known to correctly compensate for peak power.

The formula for each channel can be given as：

$$\mathbf{V_i = U_i + U_i^2 \cdot \frac{cf}{dcp_i}}$$

with V_i = compensated signal of channel i, (i = x, y, z)
U_i = input signal of channel i, (i = x, y, z)
cf = crest factor of exciting field (DASY parameter)
dcp_i = diode compression point (DASY parameter)

From the compensated input signals, the primary field data for each channel can be evaluated：

E-field Probes：$\mathbf{E_i = \sqrt{\frac{V_i}{Norm_i \cdot ConvF}}}$

H-field Probes：$\mathbf{H_i = \sqrt{V_i} \cdot \frac{a_{i0} + a_{i1}f + a_{i2}f^2}{f}}$

with V_i = compensated signal of channel i, (i = x, y, z)
$Norm_i$ = sensor sensitivity of channel i, (i = x, y, z), $\mu V/(V/m)^2$ for E-field Probes
ConvF = sensitivity enhancement in solution
a_{ij} = sensor sensitivity factors for H-field probes
f = carrier frequency [GHz]
E_i = electric field strength of channel i in V/m
H_i = magnetic field strength of channel i in A/m

The RSS value of the field components gives the total field strength (Hermitian magnitude)：

$$\mathbf{E_{tot} = \sqrt{E_x^2 + E_y^2 + E_z^2}}$$

The primary field data are used to calculate the derived field units.

$$\mathbf{SAR = E_{tot}^2 \cdot \frac{\sigma}{\rho \cdot 1000}}$$

with SAR = local specific absorption rate in mW/g
E_{tot} = total field strength in V/m
σ = conductivity in [mho/m] or [Siemens/m]
ρ = equivalent tissue density in g/cm^3

Note that the density is set to 1, to account for actual head tissue density rather than the density of the tissue simulating liquid.

5.8 Test Equipment List

Manufacturer	Name of Equipment	Type/Model	Serial Number	Calibration	
				Last Cal.	Due Date
SPEAG	835MHz System Validation Kit	D835V2	4d091	Nov. 18, 2011	Nov. 16, 2013
SPEAG	1900MHz System Validation Kit	D1900V2	5d118	Nov. 21, 2011	Nov. 16, 2013
SPEAG	2450MHz System Validation Kit	D2450V2	736	Jul. 25, 2011	Jul. 24, 2013
SPEAG	Data Acquisition Electronics	DAE3	360	Nov. 15, 2012	Nov. 14, 2013
SPEAG	Data Acquisition Electronics	DAE4	1303	Nov. 22, 2012	Nov. 21, 2013
SPEAG	Dosimetric E-Field Probe	EX3DV4	3857	Jun. 20, 2012	Jun. 19, 2013
SPEAG	Dosimetric E-Field Probe	EX3DV4	3819	Nov. 26, 2012	Nov. 25, 2013
SPEAG	SAM Twin Phantom	QD 000 P40 CB	TP-1477	NCR	NCR
SPEAG	SAM Twin Phantom	QD 000 P40 CB	TP-1479	NCR	NCR
SPEAG	SAM Twin Phantom	QD 000 P40 CD	TP-1670	NCR	NCR
SPEAG	SAM Twin Phantom	QD 000 P40 CD	TP-1671	NCR	NCR
SPEAG	Test Arch Phantom	Par phantom	1105	NCR	NCR
SPEAG	Phone Positioner	N/A	N/A	NCR	NCR
Agilent	Base Station	E5515C	MY48367160	Oct. 25, 2012	Oct. 24, 2013
Agilent	ENA Series Network Analyzer	E5071C	MY46111157	Apr. 13, 2012	Apr. 12, 2013
Agilent	Power Meter	E4416A	MY45101555	Aug. 22, 2012	Aug. 21, 2013
Agilent	Power Sensor	E9327A	MY44421198	Aug. 22, 2012	Aug. 21, 2013
Agilent	Dual Directional Coupler	778D	50422	Note 4	-
Woken	Attenuator 1	WK0602-XX	N/A	Note 4	-
PE	Attenuator 2	PE7005-10	N/A	Note 4	-
PE	Attenuator 3	PE7005-3	N/A	Note 4	-
Agilent	Dielectric Probe Kit	85070D	US01440205	Note 5	-
AR	Power Amplifier	5S1G4M2	0328767	Note 6	-
R&S	Spectrum Analyzer	FSP30	101400	Jun. 01, 2012	May 31, 2013

Table 5.1 Test Equipment List

Note:

1. The calibration certificate of DASY can be referred to appendix C of this report.
2. Referring to KDB 865664 D01v01, the dipole calibration interval can be extended to 3 years with justification. The dipoles are also not physically damaged, or repaired during the interval.
3. The justification data of dipole D835V2, SN: 4d091, D1900V2, SN: 5d118, D2450V2, SN: 736 can be found in appendix C. The return loss is < -20dB, within 20% of prior calibration, the impedance is within 5 ohm of prior calibration.
4. The Insertion Loss calibration of Dual Directional Coupler and Attenuator were characterized via the network analyzer and compensated during system check.
5. The dielectric probe kit was calibrated via the network analyzer, with the specified procedure (calibrated in pure water) and calibration kit (standard) short circuit, before the dielectric measurement. The specific procedure and calibration kit are provided by Agilent.
6. In system check we need to monitor the level on the power meter, and adjust the power amplifier level to have precise power level to the dipole; the measured SAR will be normalized to 1W input power according to the ratio of 1W to the input power to the dipole. For system check, the calibration of the power amplifier is deemed not critically required for correct measurement; the power meter is critical and we do have calibration for it.

6. 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. 6.1. 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. 6.2.

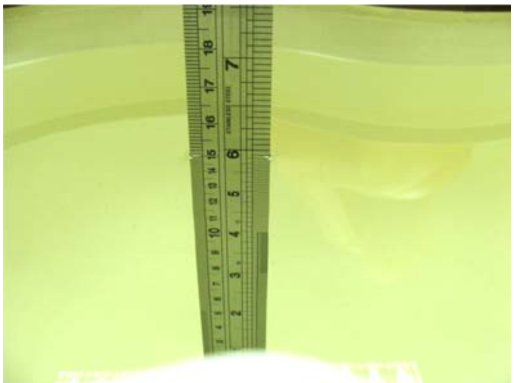


Fig 6.1 Photo of Liquid Height for Head SAR

Fig 6.2 Photo of Liquid Height for Body SAR

The following table gives the recipes for tissue simulating liquid.

Frequency (MHz)	Water (%)	Sugar (%)	Cellulose (%)	Salt (%)	Preventol (%)	DGBE (%)	Conductivity (σ)	Permittivity (ε_r)
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
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

Table 6.1 Recipes of Tissue Simulating Liquid

The dielectric parameters of the liquids were verified prior to the SAR evaluation using an Agilent 85070D Dielectric Probe Kit and an Agilent Network Analyzer.

The following table shows the measuring results for simulating liquid.

Freq. (MHz)	Liquid Type	Temp. (℃)	Conductivity (σ)	Permittivity (ε_r)	Conductivity Target (σ)	Permittivity Target (ε_r)	Delta (σ) (%)	Delta (ε_r) (%)	Limit (%)	Date
835	Head	21.2	0.918	41.297	0.90	41.5	2.00	-0.49	±5	Dec. 18, 2012
1900	Head	21.7	1.419	40.609	1.40	40.0	1.36	1.52	±5	Dec. 18, 2012
2450	Head	21.5	1.823	37.961	1.8	39.2	1.28	-3.16	±5	Jan. 01, 2013
835	Body	21.5	0.994	55.57	0.97	55.2	2.47	0.67	±5	Dec. 17, 2012
835	Body	21.3	0.98	54.484	0.97	55.2	1.03	-1.30	±5	Jan. 05, 2013
1900	Body	21.4	1.531	54.671	1.52	53.3	0.72	2.57	±5	Dec. 17, 2012
2450	Body	21.5	1.939	53.98	1.95	52.7	-0.56	2.43	±5	Dec. 18, 2012
2450	Body	21.3	1.976	54.13	1.95	52.7	1.33	2.71	±5	Dec. 31, 2012

Table 6.2 Measuring Results for Simulating Liquid

7. SAR Measurement Evaluation

Each DASY system is equipped with one or more system validation kits. These units, together with the predefined measurement procedures within the DASY software, enable the user to conduct the system performance check and system validation. System validation kit includes a dipole, tripod holder to fix it underneath the flat phantom and a corresponding distance holder.

7.1 Purpose of System Performance check

The system performance check verifies that the system operates within its specifications. System and operator errors can be detected and corrected. It is recommended that the system performance check be performed prior to any usage of the system in order to guarantee reproducible results. The system performance check uses normal SAR measurements in a simplified setup with a well characterized source. This setup was selected to give a high sensitivity to all parameters that might fail or vary over time. The system check does not intend to replace the calibration of the components, but indicates situations where the system uncertainty is exceeded due to drift or failure.

7.2 System Setup

In the simplified setup for system evaluation, the EUT is replaced by a calibrated dipole and the power source is replaced by a continuous wave that comes from a signal generator. The calibrated dipole must be placed beneath the flat phantom section of the SAR twin phantom with the correct distance holder. The distance holder should touch the phantom surface with a light pressure at the reference marking and be oriented parallel to the long side of the phantom. The equipment setup is shown below:

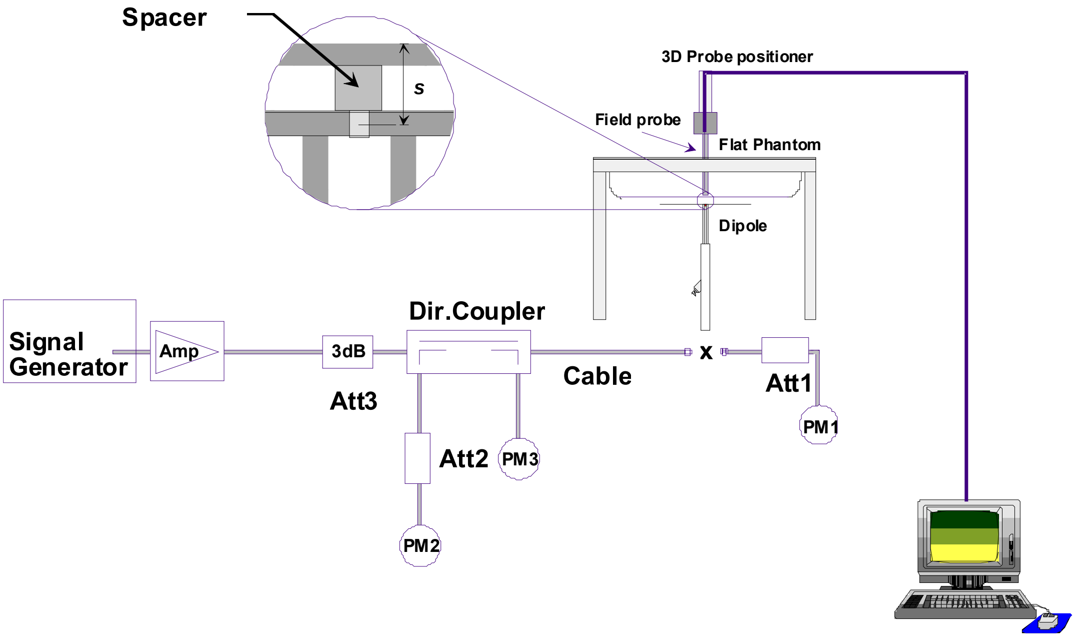


Fig 7.1 System Setup for System Evaluation

1. Signal Generator
2. Amplifier
3. Directional Coupler
4. Power Meter
5. Calibrated Dipole

Fig 7.2 Photo of Dipole Setup

7.3 SAR System Verification Results

Comparing to the original SAR value provided by SPEAG, the verification data should be within its specification of 10 %. Table 7.1 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.

Measurement Date	Frequency (MHz)	Liquid Type	Power fed onto reference dipole (mW)	Targeted SAR_{1g} (W/kg)	Measured SAR_{1g} (W/kg)	Normalized SAR_{1g} (W/kg)	Deviation (%)
Dec. 18, 2012	835	Head	250	9.40	2.32	9.28	-1.28
Dec. 18, 2012	1900	Head	250	40.30	10.7	42.80	6.20
Jan. 01, 2013	2450	Head	250	54.8	13.4	53.60	-2.19
Dec. 17, 2012	835	Body	250	9.42	2.35	9.40	-0.21
Jan. 05, 2013	835	Body	250	9.42	2.26	9.04	-4.03
Dec. 17, 2012	1900	Body	250	41.8	10.2	40.80	-2.39
Dec. 18, 2012	2450	Body	250	52.3	13.1	52.40	0.19
Dec. 31, 2012	2450	Body	250	52.3	13.3	53.20	1.72

Table 7.1 Target and Measurement SAR after Normalized

8. EUT Testing Position

This EUT was tested in ten different positions. They are right cheek, right tilted, left cheek, left tilted, Front of the EUT with phantom 1 cm gap, Back of the EUT with phantom 1 cm gap, Top Side of the EUT with phantom 1 cm gap, Bottom Side of the EUT with phantom 1 cm gap, Right Side of the EUT with phantom 1 cm gap, and Left Side of the EUT with phantom 1 cm gap, as illustrated below:

8.1 Define two imaginary lines on the handset

(a) The vertical centerline passes through two points on the front side of the handset - the midpoint of the width w_t of the handset at the level of the acoustic output, and the midpoint of the width w_b of the bottom of the handset.

(b) The horizontal line is perpendicular to the vertical centerline and passes through the center of the acoustic output. The horizontal line is also tangential to the face of the handset at point A.

(c) 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, especially for clamshell handsets, handsets with flip covers, and other irregularly shaped handsets.

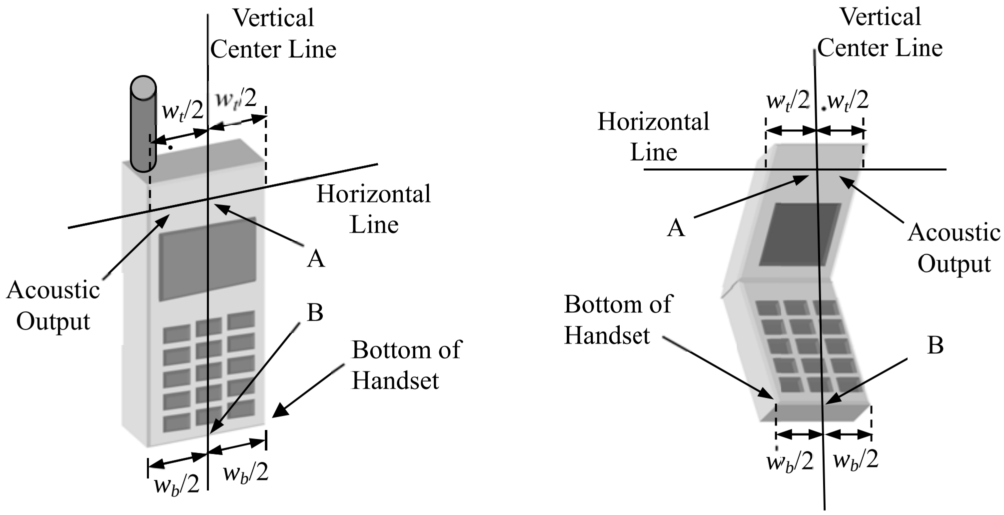


Fig 8.1 Illustration for Handset Vertical and Horizontal Reference Lines

8.2 Cheek Position

(a) To position the device with the vertical center line of the body of the device and the horizontal line crossing the center piece in a plane parallel to the sagittal plane of the phantom. While maintaining the device in this plane, align the vertical center line with the reference plane containing the three ear and mouth reference point (M: Mouth, RE: Right Ear, and LE: Left Ear) and align the center of the ear piece with the line RE-LE.

(b) To move the device towards the phantom with the ear piece aligned with the line LE-RE until the phone touched the ear. While maintaining the device in the reference plane and maintaining the phone contact with the ear, move the bottom of the phone until any point on the front side is in contact with the cheek of the phantom or until contact with the ear is lost (see Fig. 8.2).

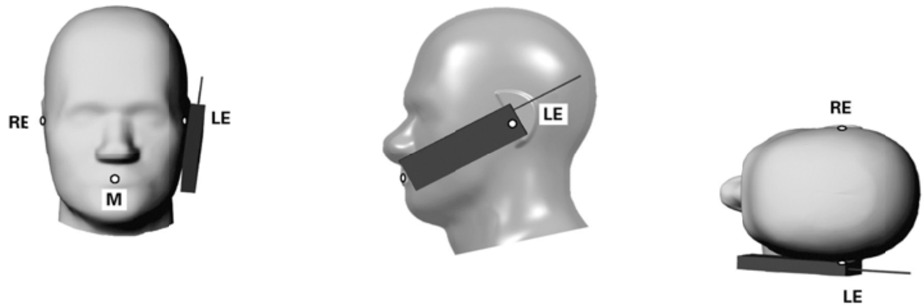


Fig 8.2 Illustration for Cheek Position

8.3 Tilted Position

(a) To position the device in the "cheek" position described above.

(b) While maintaining the device the reference plane described above and pivoting against the ear, moves it outward away from the mouth by an angle of 15 degrees or until contact with the ear is lost (see Fig. 8.3).

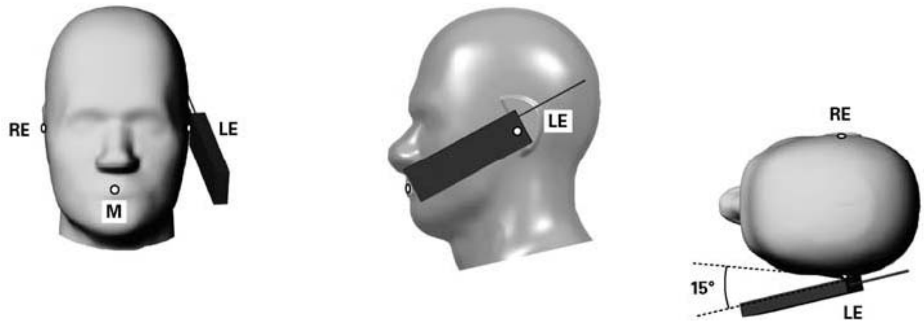


Fig 8.3 Illustration for Tilted Position

8.4 Body Worn Position

(a) To position the device parallel to the phantom surface either keypad up or down.
(b) To adjust the device parallel to the flat phantom.
(c) To adjust the distance between the device surface and the flat phantom to 1.0 cm.

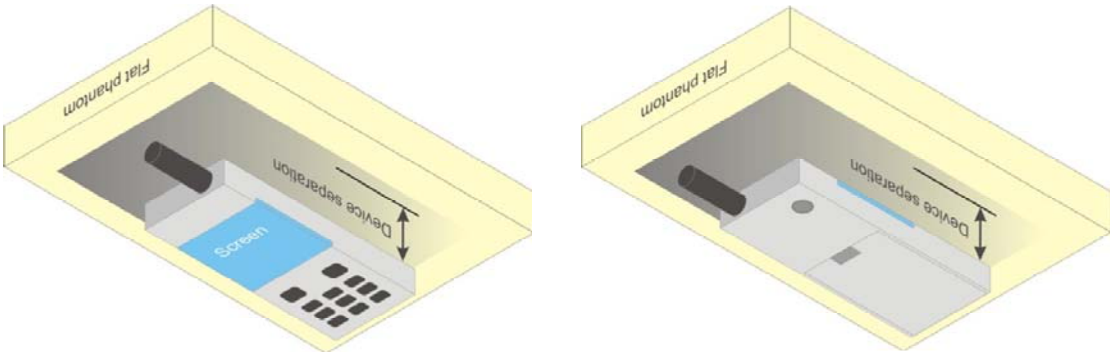


Fig 8.4 Illustration for Body Worn Position

8.5 Hotspot Position

(a) To position the device parallel to the phantom surface with all sides.
(b) To adjust the device parallel to the flat phantom.
(c) To adjust the distance between the device and the flat phantom to 1.0 cm.

<EUT Setup Photos>

Please refer to Appendix E for the test setup photos.

9. 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 E 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

9.1 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

9.2 Area & Zoom Scan Procedures

First Area Scan is used to locate the approximate location(s) of the local peak SAR value(s). The measurement grid within an Area Scan is defined by the grid extent, grid step size and grid offset. Next, in order to determine the EM field distribution in a three-dimensional spatial extension, Zoom Scan is required. The Zoom Scan is performed around the highest E-field value to determine the averaged SAR-distribution over 10 g.
Area scan and zoom scan resolution setting follows KDB 865664 D01v01 quoted below.

For any secondary peaks found in the area scan which are within 2 dB of the maximum peak and are not within this zoom scan, the zoom scan should be repeated.

<table>
<tr><th colspan="3"></th><th>≤ 3 GHz</th><th>> 3 GHz</th></tr>
<tr><td colspan="3">Maximum distance from closest measurement point (geometric center of probe sensors) to phantom surface</td><td>5 ± 1 mm</td><td>½·δ·ln(2) ± 0.5 mm</td></tr>
<tr><td colspan="3">Maximum probe angle from probe axis to phantom surface normal at the measurement location</td><td>30° ± 1°</td><td>20° ± 1°</td></tr>
<tr><td colspan="3" rowspan="2">Maximum area scan spatial resolution: Δx_{Area}, Δy_{Area}</td><td>≤ 2 GHz: ≤ 15 mm
2 – 3 GHz: ≤ 12 mm</td><td>3 – 4 GHz: ≤ 12 mm
4 – 6 GHz: ≤ 10 mm</td></tr>
<tr><td colspan="2">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.</td></tr>
<tr><td colspan="3">Maximum zoom scan spatial resolution: Δx_{Zoom}, Δy_{Zoom}</td><td>≤ 2 GHz: ≤ 8 mm
2 – 3 GHz: ≤ 5 mm*</td><td>3 – 4 GHz: ≤ 5 mm*
4 – 6 GHz: ≤ 4 mm*</td></tr>
<tr><td rowspan="3">Maximum zoom scan spatial resolution, normal to phantom surface</td><td colspan="2">uniform grid: $\Delta z_{Zoom}(n)$</td><td>≤ 5 mm</td><td>3 – 4 GHz: ≤ 4 mm
4 – 5 GHz: ≤ 3 mm
5 – 6 GHz: ≤ 2 mm</td></tr>
<tr><td rowspan="2">graded grid</td><td>$\Delta z_{Zoom}(1)$: between 1st two points closest to phantom surface</td><td>≤ 4 mm</td><td>3 – 4 GHz: ≤ 3 mm
4 – 5 GHz: ≤ 2.5 mm
5 – 6 GHz: ≤ 2 mm</td></tr>
<tr><td>$\Delta z_{Zoom}(n>1)$: between subsequent points</td><td colspan="2">≤ $1.5 \cdot \Delta z_{Zoom}(n-1)$</td></tr>
<tr><td>Minimum zoom scan volume</td><td colspan="2">x, y, z</td><td>≥ 30 mm</td><td>3 – 4 GHz: ≥ 28 mm
4 – 5 GHz: ≥ 25 mm
5 – 6 GHz: ≥ 22 mm</td></tr>
<tr><td colspan="5">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 <u>reported</u> SAR from the area scan based 1-g SAR estimation procedures of KDB 447498 is ≤ 1.4 W/kg, ≤ 8 mm, ≤ 7 mm and ≤ 5 mm zoom scan resolution may be applied, respectively, for 2 GHz to 3 GHz, 3 GHz to 4 GHz and 4 GHz to 6 GHz.</td></tr>
</table>

9.3 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.

9.4 SAR Averaged Methods

In DASY, the interpolation and extrapolation are both based on the modified Quadratic Shepard's method. The interpolation scheme combines a least-square fitted function method and a weighted average method which are the two basic types of computational interpolation and approximation.

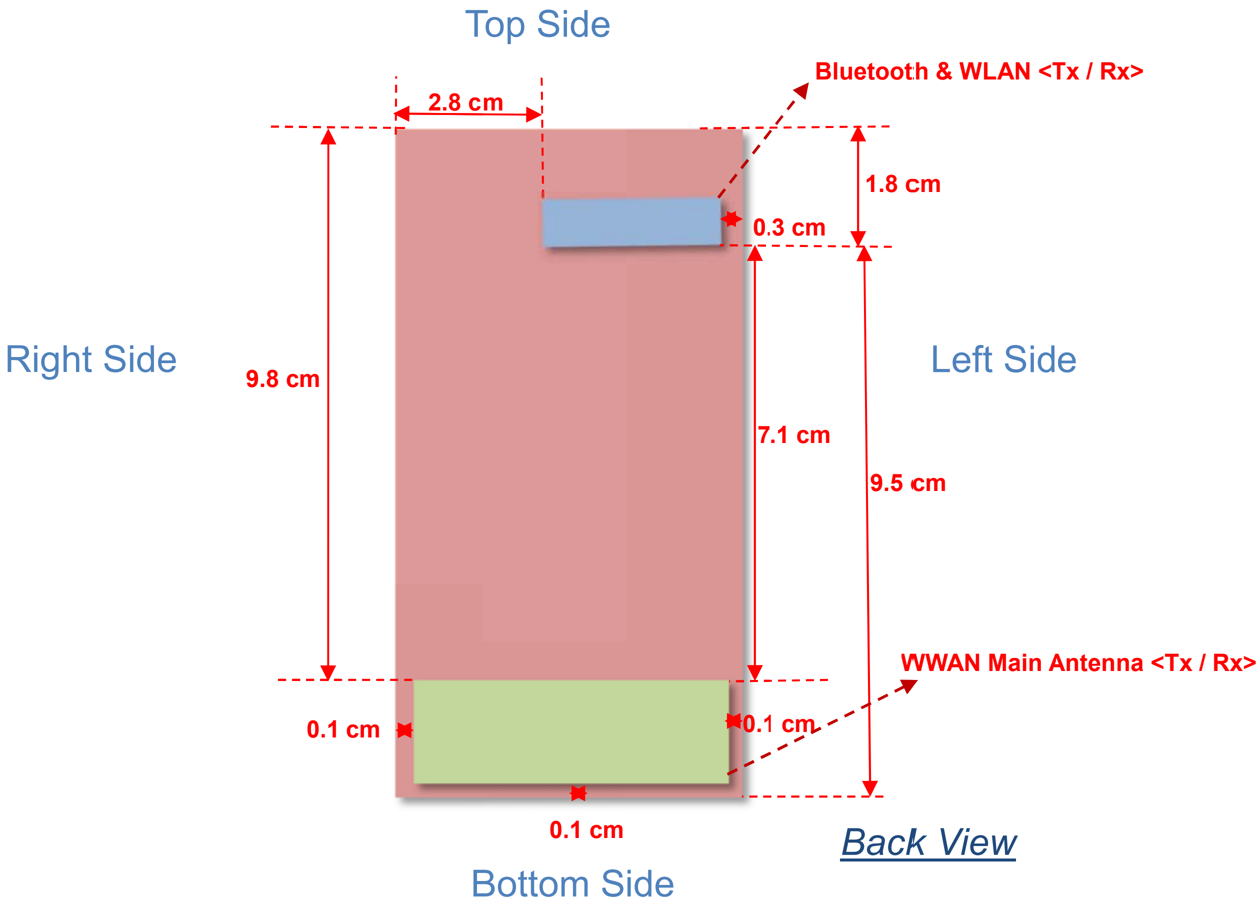
Extrapolation routines are used to obtain SAR values between the lowest measurement points and the inner phantom surface. The extrapolation distance is determined by the surface detection distance and the probe sensor offset. The uncertainty increases with the extrapolation distance. To keep the uncertainty within 1% for the 1 g and 10 g cubes, the extrapolation distance should not be larger than 5 mm.

9.5 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.

10. SAR Test Configurations

10.1 Exposure Positions Consideration



Antennas	Wireless Interface
WWAN Main Antenna (Tx / Rx)	CDMA2000 BC 0 CDMA2000 BC 1
Bluetooth & WLAN Antenna (Tx / Rx)	WLAN 2.4GHz Bluetooth

Sides for SAR tests; Hotspot mode Test distance: 10 mm						
Antennas	**Back**	**Front**	**Top Side**	**Bottom Side**	**Right Side**	**Left Side**
WWAN Main	YES	YES	NO	YES	YES	YES
Bluetooth & WLAN	YES	YES	YES	NO	NO	YES

Note:

1. Head/Body-worn/Hotspot mode SAR assessments are required.
2. Referring to KDB 941225 D06, 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.
3. For WWAN Main antenna, SAR measurements at Top side are not required since the distance between EUT and flat phantom > 25mm.
4. For Bluetooth & WLAN antenna, SAR measurements Bottom/Right sides are not required since the distance between EUT and flat phantom > 25mm.
5. Per KDB 447498 D01v05, for handsets the test separation distance is determined by the smallest distance between the outer surface of the device and the user; which is 0mm for head SAR, 10mm for hotspot SAR, and 10mm for body-worn SAR.
6. If the test separation distance (antenna-user) is < 5mm, 5mm is used for estimated SAR calculation.
7. For minimum test separation distance ≤50mm, Bluetooth standalone SAR is excluded according to [(*max. power of channel, including tune-up tolerance, mW*)/(*min. test separation distance, mm*)] · [√f(GHz)] ≤ 3.0 for 1-g SAR and ≤ 7.5 for 10-g extremity SAR.

	Wireless Interface	Bluetooth
Tune-up Maximum power (dBm)		9
Tune-up Maximum rated power (mW)		7.94
Head	Antenna to user (mm)	5
	SAR exclusion threshold (mW)	10
	SAR testing required?	**NO**
Body	Antenna to user (mm)	10
	SAR exclusion threshold (mW)	19
	SAR testing required?	**NO***

*Means when the Bluetooth body estimated SAR used for SAR summation > 1.6W/kg, thus choose to perform standalone SAR measurements and use the measured SAR to determine simultaneous transmission SAR test exclusion.

11. Conducted RF Output Power (Unit: dBm)

<CDMA2000>

Band	CDMA2000 BC0			CDMA2000 BC1		
Channel	1013	384	777	25	600	1175
Frequency (MHz)	824.70	836.52	848.31	1851.25	1880.00	1908.75
1xRTT RC1 SO55	23.52	23.55	23.60	23.97	23.95	24.03
1xRTT RC3 SO55	23.53	23.59	23.61	24.06	24.04	24.07
1xRTT RC3 SO32(+ F-SCH)	23.50	23.56	23.59	23.95	23.93	24.02
1xRTT RC3 SO32(+SCH)	23.51	23.57	23.58	23.95	23.95	24.01
1xEVDO RTAP 153.6	23.50	23.55	23.56	23.92	23.98	23.99
1xEVDO RETAP 4096	23.51	23.54	23.55	24.02	24.01	24.03

Note:

1. According to KDB 941225 D01, Head SAR for RC1+SO55 is not required because the maximum average output power of RC1 is less than 1/4 dB higher than RC3+SO55.
2. Referring to KDB 941225 D01, the CDMA Handset Body-worn SAR tests based on RC3+SO32. RC1, RTAP (EVDO Rev 0) and RETAP (EVDO Rev A) power are all less than 1/4 dB higher than RC3, thus SAR tests in these mode are not necessary.
3. Referring to KDB 941225 D01, in Hotspot mode EUT is treated as data device and SAR is tested with RTAP 153.6kbps (EVDO Rev0). If 1xRTT and EVDO RevA power is less than 1/4dB higher than Rev0, SAR tests with those settings are not necessary.

<WLAN 2.4GHz>

WLAN 2.4G 802.11b Average Power (dBm)					
Channel	Frequency (MHz)	Data Rate (bps)			
		1M	2M	5.5M	11M
CH 01	2412	11.43	10.48	11.54	11.59
CH 06	2437	11.74	11.82	11.89	**11.94**
CH 11	2462	11.26	11.31	11.35	11.39

WLAN 2.4G 802.11g Average Power (dBm)									
Channel	Frequency (MHz)	Data Rate (bps)							
		6M	9M	12M	18M	24M	36M	48M	54M
CH 01	2412	8.35	8.35	8.37	8.39	7.97	7.93	7.94	7.97
CH 06	2437	8.68	8.70	8.74	8.79	7.95	7.90	7.93	7.95
CH 11	2462	8.84	8.85	8.87	**8.90**	8.55	8.50	8.06	8.07

WLAN 2.4G 802.11n-HT20 Average Power (dBm)									
Channel	Frequency (MHz)	MCS Index							
		MCS0	MCS1	MCS2	MCS3	MCS4	MCS5	MCS6	MCS7
CH 01	2412	8.27	8.23	8.32	8.28	8.25	8.24	7.46	7.37
CH 06	2437	8.69	8.72	8.44	8.44	8.40	8.41	7.61	7.59
CH 11	2462	8.77	8.74	**8.84**	8.49	8.45	8.45	7.57	7.51

Note:
1. Per KDB 248227, choose the highest output power channel to test SAR and determine further SAR exclusion
2. Per KDB 248227, 11g and 11n-HT20 output power is less than 1/4 dB higher than 11b mode, thus the SAR can be excluded.
3. For each frequency band, testing at higher data rates and higher order modulations is not required when the maximum average output power for each of these configurations is less than 1/4 dB higher than those measured at the lowest data rate. 2.4GHz WLAN SAR was tested on CH06 of 802.11b 11Mbps.

<Bluetooth>

Bluetooth Average Power (dBm)										
Channel	Frequency (MHz)	Data Rate								
		DH1	DH3	DH5	2DH1	2DH3	2DH5	3DH1	3DH3	3DH5
CH 00	2402	7.54	7.37	7.02	6.65	6.07	6.32	6.64	5.86	6.18
CH 39	2441	8.07	7.60	7.80	7.18	6.90	6.68	7.21	6.92	6.57
CH 78	2480	**8.62**	8.56	8.33	7.77	7.15	7.26	7.64	7.51	7.33

12. SAR Test Results

General Note:

1. Per KDB 447498 D01v05, the reported SAR is the measured SAR value adjusted for maximum tune-up tolerance.
   Scaling Factor = tune-up limit power (mW) / EUT RF power (mW), where tune-up limit is the maximum rated power among all production units.
   Reported SAR (W/kg) = Measured SAR (W/kg) Scaling Factor*
2. Per KDB 447498 D01v05, for each exposure position, if the highest output channel reported SAR ≤0.8W/kg, other channels SAR testing is not necessary.

12.1 Test Records for Head SAR Test

<CDMA2000>

Plot No.	Band	Mode	Test Position	Ch.	Freq. (MHz)	Burst Average Power (dBm)	Tune-Up Limit (dBm)	Scaling Factor	Power Drift (dB)	SAR_{1g} (W/kg)	Reported SAR_{1g} (W/kg)
39	CDMA2000 BC0	RC3 SO55	Right Cheek	777	848.31	23.61	24	1.094	-0.04	0.835	0.913
40	CDMA2000 BC0	RC3 SO55	Right Tilted	777	848.31	23.61	24	1.094	0.03	0.610	0.667
41	**CDMA2000 BC0**	**RC3 SO55**	**Left Cheek**	**777**	**848.31**	**23.61**	**24**	**1.094**	**0.02**	**0.924**	**1.011**
42	CDMA2000 BC0	RC3 SO55	Left Tilted	777	848.31	23.61	24	1.094	-0.04	0.537	0.587
43	CDMA2000 BC0	RC3 SO55	Right Cheek	1013	824.7	23.53	24	1.114	-0.01	0.583	0.650
44	CDMA2000 BC0	RC3 SO55	Right Cheek	384	836.52	23.59	24	1.099	0.05	0.767	0.843
45	CDMA2000 BC0	RC3 SO55	Left Cheek	1013	824.7	23.53	24	1.114	-0.01	0.655	0.730
46	CDMA2000 BC0	RC3 SO55	Left Cheek	384	836.52	23.59	24	1.099	0.04	0.843	0.926
48	CDMA2000 BC1	RC3 SO55	Right Cheek	1175	1908.75	24.07	24.5	1.104	-0.1	0.911	1.006
49	CDMA2000 BC1	RC3 SO55	Right Tilted	1175	1908.75	24.07	24.5	1.104	-0.12	0.432	0.477
50	**CDMA2000 BC1**	**RC3 SO55**	**Left Cheek**	**1175**	**1908.75**	**24.07**	**24.5**	**1.104**	**-0.1**	**0.993**	**1.096**
51	CDMA2000 BC1	RC3 SO55	Left Tilted	1175	1908.75	24.07	24.5	1.104	-0.06	0.530	0.585
52	CDMA2000 BC1	RC3 SO55	Right Cheek	25	1851.25	24.06	24.5	1.107	-0.11	0.786	0.870
53	CDMA2000 BC1	RC3 SO55	Right Cheek	600	1880	24.04	24.5	1.112	-0.01	0.872	0.969
54	CDMA2000 BC1	RC3 SO55	Left Cheek	25	1851.25	24.06	24.5	1.107	0.01	0.740	0.819
55	CDMA2000 BC1	RC3 SO55	Left Cheek	600	1880	24.04	24.5	1.112	-0.05	0.879	0.977

<WLAN 2.4G>

Plot No.	Band	Mode	Test Position	Ch.	Freq. (MHz)	Burst Average Power (dBm)	Tune-Up Limit (dBm)	Scaling Factor	Power Drift (dB)	SAR_{1g} (W/kg)	Reported SAR_{1g} (W/kg)
57	**WLAN2.4G**	**802.11b**	**Right Cheek**	**6**	**2437**	**11.94**	**12**	**1.014**	**0.078**	**0.026**	**0.026**
58	WLAN2.4G	802.11b	Right Tilted	6	2437	11.94	12	1.014	0.085	0.011	0.011
59	WLAN2.4G	802.11b	Left Cheek	6	2437	11.94	12	1.014	0.046	0.018	0.018
60	WLAN2.4G	802.11b	Left Tilted	6	2437	11.94	12	1.014	0.039	0.011	0.011

12.2 Test Records for Hotspot SAR Test

General Note:

Per KDB 941225 D06, for EUT dimension ≥ 9cm*5cm, the test distance is 1cm. SAR must be measured for all surfaces and sides with a transmitting antenna located within 2.5cm from that surface or edge.

<CDMA2000>

Plot No.	Band	Mode	Test Position	Gap (cm)	Ch.	Freq. (MHz)	Burst Average Power (dBm)	Tune-Up Limit (dBm)	Scaling Factor	Power Drift (dB)	SAR_{1g} (W/kg)	Reported SAR_{1g} (W/kg)
20	CDMA2000 BC0	RTAP 153.6	Front	1	777	848.31	23.56	24	1.107	0.14	0.806	0.892
21	CDMA2000 BC0	RTAP 153.6	Back	1	777	848.31	23.56	24	1.107	-0.1	1.200	1.328
22	CDMA2000 BC0	RTAP 153.6	Left Side	1	777	848.31	23.56	24	1.107	-0.09	0.692	0.766
23	CDMA2000 BC0	RTAP 153.6	Right Side	1	777	848.31	23.56	24	1.107	-0.01	0.824	0.912
24	CDMA2000 BC0	RTAP 153.6	Bottom Side	1	777	848.31	23.56	24	1.107	0.02	0.146	0.162
25	CDMA2000 BC0	RTAP 153.6	Front	1	1013	824.7	23.5	24	1.122	0.06	0.661	0.742
26	CDMA2000 BC0	RTAP 153.6	Front	1	384	836.52	23.55	24	1.109	-0.01	0.766	0.850
27	**CDMA2000 BC0**	**RTAP 153.6**	**Back**	**1**	**1013**	**824.7**	**23.5**	**24**	**1.122**	**-0.08**	**1.290**	**1.447**
28	CDMA2000 BC0	RTAP 153.6	Back	1	384	836.52	23.55	24	1.109	0.16	1.180	1.309
29	CDMA2000 BC0	RTAP 153.6	Right Side	1	1013	824.7	23.5	24	1.122	-0.1	0.865	0.971
30	CDMA2000 BC0	RTAP 153.6	Right Side	1	384	836.52	23.55	24	1.109	-0.16	0.931	1.033
1	CDMA2000 BC1	RTAP 153.6	Front	1	1175	1908.75	23.99	24.5	1.125	0.06	1.010	1.136
2	CDMA2000 BC1	RTAP 153.6	Back	1	1175	1908.75	23.99	24.5	1.125	-0.05	1.150	1.293
3	CDMA2000 BC1	RTAP 153.6	Left Side	1	1175	1908.75	23.99	24.5	1.125	-0.09	0.337	0.379
4	CDMA2000 BC1	RTAP 153.6	Right Side	1	1175	1908.75	23.99	24.5	1.125	-0.03	0.548	0.616
5	CDMA2000 BC1	RTAP 153.6	Bottom Side	1	1175	1908.75	23.99	24.5	1.125	-0.01	0.710	0.798
6	CDMA2000 BC1	RTAP 153.6	Front	1	25	1851.25	23.92	24.5	1.143	-0.03	0.902	1.031
7	CDMA2000 BC1	RTAP 153.6	Front	1	600	1880	23.98	24.5	1.127	-0.02	0.963	1.085
8	CDMA2000 BC1	RTAP 153.6	Back	1	25	1851.25	23.92	24.5	1.143	0.02	1.170	1.337
9	**CDMA2000 BC1**	**RTAP 153.6**	**Back**	**1**	**600**	**1880**	**23.98**	**24.5**	**1.127**	**0.01**	**1.190**	**1.341**

<WLAN 2.4G>

Plot No.	Band	Mode	Test Position	Gap (cm)	Ch.	Freq. (MHz)	Average Power (dBm)	Tune-Up Limit (dBm)	Scaling Factor	Power Drift (dB)	SAR_{1g} (W/kg)	Reported SAR_{1g} (W/kg)
61	WLAN2.4G	802.11b	Front	1	6	2437	11.94	12	1.014	0.09	0.00548	0.006
62	WLAN2.4G	802.11b	Back	1	6	2437	11.94	12	1.014	0.03	0.025	0.025
63	**WLAN2.4G**	**802.11b**	**Left Side**	**1**	**6**	**2437**	**11.94**	**12**	**1.014**	**-0.09**	**0.026**	**0.026**
64	WLAN2.4G	802.11b	Top Side	1	6	2437	11.94	12	1.014	-0.036	0.00378	0.004

<Bluetooth>

Plot No.	Band	Mode	Test Position	Gap (cm)	Ch.	Freq. (MHz)	Average Power (dBm)	Tune-Up Limit (dBm)	Scaling Factor	Power Drift (dB)	SAR_{1g} (W/kg)	Reported SAR_{1g} (W/kg)
66	Bluetooth	-	Front	1	78	2480	8.62	9	1.091	0.01	0.000967	0.001
67	**Bluetooth**	**-**	**Back**	**1**	**78**	**2480**	**8.62**	**9**	**1.091**	**0.14**	**0.00551**	**0.006**
68	Bluetooth	-	Left Side	1	78	2480	8.62	9	1.091	0.15	0.00395	0.004
69	Bluetooth	-	Top Side	1	78	2480	8.62	9	1.091	0.08	0.00129	0.001

12.3 Test Records for Body-worn SAR Test

General Note:

1. For Body-worn SAR testing: "V" in the Headset column means the Headset is plugged during SAR testing
2. Per KDB 941225 D06, when the same wireless modes and device transmission configurations are required for testing body-worn accessories and hotspot mode, it is not necessary to test body-worn accessory SAR for the same device orientation if the test separation distance for hotspot mode is more conservative than that used for body-worn accessories. In this report, the worst exposure position is the back exposure position of the device.
3. Per KDB 648474 D04v01, when the *reported* SAR for a body-worn accessory measured without a headset connected to the handset is ≤ 1.2 W/kg, SAR testing with a headset connected to the handset is not required.
4. Though per KDB 648474 D04v01, when the reported SAR for a body-worn accessory measured without a headset connected to the handset is ≤ 1.2 W/kg, the SAR testing with a headset connected to the handset is not required, but considered the simultaneous SAR for body-worn, we still perform the WLAN and Bluetooth SAR with headset mode.

<CDMA2000>

Plot No.	Band	Mode	Test Position	Gap (cm)	Headset	Ch.	Freq. (MHz)	Burst Average Power (dBm)	Tune-Up Limit (dBm)	Scaling Factor	Power Drift (dB)	SAR_{1g} (W/kg)	Reported SAR_{1g} (W/kg)
31	CDMA2000 BC0	RC3 SO32	Front	1	-	1013	824.7	23.5	24	1.122	0.1	0.758	0.850
32	**CDMA2000 BC0**	**RC3 SO32**	**Back**	**1**	**-**	**1013**	**824.7**	**23.5**	**24**	**1.122**	**-0.01**	**1.300**	**1.459**
71	CDMA2000 BC0	RC3 SO32	Front	1	-	384	836.5	23.56	24	1.107	-0.15	0.755	0.836
72	CDMA2000 BC0	RC3 SO32	Front	1	-	777	848.3	23.59	24	1.099	-0.19	0.750	0.824
33	CDMA2000 BC0	RC3 SO32	Back	1	-	384	836.52	23.56	24	1.107	-0.06	1.170	1.295
34	CDMA2000 BC0	RC3 SO32	Back	1	-	777	848.31	23.59	24	1.099	-0.01	1.150	1.264
35	CDMA2000 BC0	RC3 SO32	Back	1	V	1013	824.7	23.5	24	1.122	-0.04	1.080	1.212
36	CDMA2000 BC0	RC3 SO32	Back	1	V	384	836.52	23.56	24	1.107	-0.01	1.070	1.184
37	CDMA2000 BC0	RC3 SO32	Back	1	V	777	848.31	23.59	24	1.099	-0.07	1.090	1.198
10	CDMA2000 BC1	RC3 SO32	Front	1	-	600	1880	23.93	24.5	1.140	0.01	1.010	1.152
11	CDMA2000 BC1	RC3 SO32	Back	1	-	600	1880	23.93	24.5	1.140	-0.16	1.230	1.403
12	CDMA2000 BC1	RC3 SO32	Front	1	-	25	1851.25	23.95	24.5	1.135	-0.04	0.924	1.049
13	CDMA2000 BC1	RC3 SO32	Front	1	-	1175	1908.75	24.02	24.5	1.117	-0.04	0.980	1.095
14	**CDMA2000 BC1**	**RC3 SO32**	**Back**	**1**	**-**	**25**	**1851.25**	**23.95**	**24.5**	**1.135**	**0.03**	**1.240**	**1.407**
15	CDMA2000 BC1	RC3 SO32	Back	1	-	1175	1908.75	24.02	24.5	1.117	0.01	1.110	1.240
16	CDMA2000 BC1	RC3 SO32	Back	1	V	25	1851.25	23.95	24.5	1.135	-0.03	1.180	1.339
17	CDMA2000 BC1	RC3 SO32	Back	1	V	600	1880	23.93	24.5	1.140	0.01	1.180	1.345
18	CDMA2000 BC1	RC3 SO32	Back	1	V	1175	1908.75	24.02	24.5	1.117	0.03	1.070	1.195

<WLAN 2.4G>

Plot No.	Band	Mode	Test Position	Gap (cm)	Headset	Ch.	Freq. (MHz)	Average Power (dBm)	Tune-Up Limit (dBm)	Scaling Factor	Power Drift (dB)	SAR_{1g} (W/kg)	Reported SAR_{1g} (W/kg)
61	WLAN2.4G	802.11b	Front	1	-	6	2437	11.94	12	1.014	0.09	0.00548	0.006
62	**WLAN2.4G**	**802.11b**	**Back**	**1**	**-**	**6**	**2437**	**11.94**	**12**	**1.014**	**0.03**	**0.025**	**0.025**
65	WLAN2.4G	802.11b	Back	1	V	6	2437	11.94	12	1.014	0.02	0.024	0.024

<Bluetooth>

Plot No.	Band	Mode	Test Position	Gap (cm)	Headset	Ch.	Freq. (MHz)	Average Power (dBm)	Tune-Up Limit (dBm)	Scaling Factor	Power Drift (dB)	SAR_{1g} (W/kg)	Reported SAR_{1g} (W/kg)
66	Bluetooth	-	Front	1	-	78	2480	8.62	9	1.091	0.01	0.000967	0.001
67	Bluetooth	-	Back	1	-	78	2480	8.62	9	1.091	0.14	0.00551	0.006
70	**Bluetooth**	**-**	**Back**	**1**	**V**	**78**	**2480**	**8.62**	**9**	**1.091**	**0.13**	**0.00604**	**0.007**

12.4 Repeated SAR Measurement

Plot No.	Band	Mode	Test Position	Gap (cm)	Ch.	Freq. (MHz)	Average Power (dBm)	Tune-up Limit (dBm)	Tune-up Scaling Factor	Power Drift (dB)	SAR_{1g} (W/kg)	Reported SAR_{1g} (W/kg)
32	CDMA2000 BC0	RC3 SO32	Back	1	1013	824.7	23.5	24	1.122	-0.01	1.300	1.459
38	CDMA2000 BC0	RC3 SO32	Back	1	1013	824.7	23.5	24	1.122	-0.05	1.300	1.459
14	CDMA2000 BC1	RC3 SO32	Back	1	25	1851.25	23.95	24.5	1.135	0.03	1.240	1.407
19	CDMA2000 BC1	RC3 SO32	Back	1	25	1851.25	23.95	24.5	1.135	-0.1	1.230	1.396

Note:
1. Per KDB 865664 D01v01, for each frequency band, repeated SAR measurement is required only when the measured SAR is ≥0.8W/kg
2. Per KDB 865664 D01v01, if the deviation among the repeated measurement is ≤20% and the measured SAR <1.45W/kg, only one repeated measurement is required. The deviation is the difference in percentage between original and repeated *measured SAR*.
3. The deviation 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.

12.5 Highest SAR Plot

Plot No.	Band	Mode	Test Position	Gap (cm)	Headset	Ch.	Freq. (MHz)	Average Power (dBm)	Tune-up Limit (dBm)	Tune-up Scaling Factor	Power Drift (dB)	SAR_{1g} (W/kg)	Reported SAR_{1g} (W/kg)
41	CDMA2000 BC0	RC3 SO55	Left Cheek	-	-	777	848.31	23.61	24	1.094	0.02	0.924	1.011
50	CDMA2000 BC1	RC3 SO55	Left Cheek	-	-	1175	1908.75	24.07	24.5	1.104	-0.1	0.993	1.096
57	WLAN2.4G	802.11b	Right Cheek	-	-	6	2437	11.94	12	1.014	0.078	0.026	0.026
27	CDMA2000 BC0	RTAP 153.6	Back	1	-	1013	824.7	23.5	24	1.122	-0.08	1.290	1.447
9	CDMA2000 BC1	RTAP 153.6	Back	1	-	600	1880	23.98	24.5	1.127	0.01	1.190	1.341
63	WLAN2.4G	802.11b	Left Side	1	-	6	2437	11.94	12	1.014	-0.09	0.026	0.026
32	CDMA2000 BC0	RC3 SO32	Back	1	-	1013	824.7	23.5	24	1.122	-0.01	1.300	1.459
14	CDMA2000 BC1	RC3 SO32	Back	1	-	25	1851.25	23.95	24.5	1.135	0.03	1.240	1.407
62	WLAN2.4G	802.11b	Back	1	-	6	2437	11.94	12	1.014	0.03	0.025	0.025
70	Bluetooth	-	Back	1	V	78	2480	8.62	9	1.091	0.13	0.00604	0.007

Test Laboratory: Sporton International Inc. SAR/HAC Testing Lab Date: 18.12.2012

41 CDMA2000 BC0_RC3 SO55_Left Cheek_Ch777

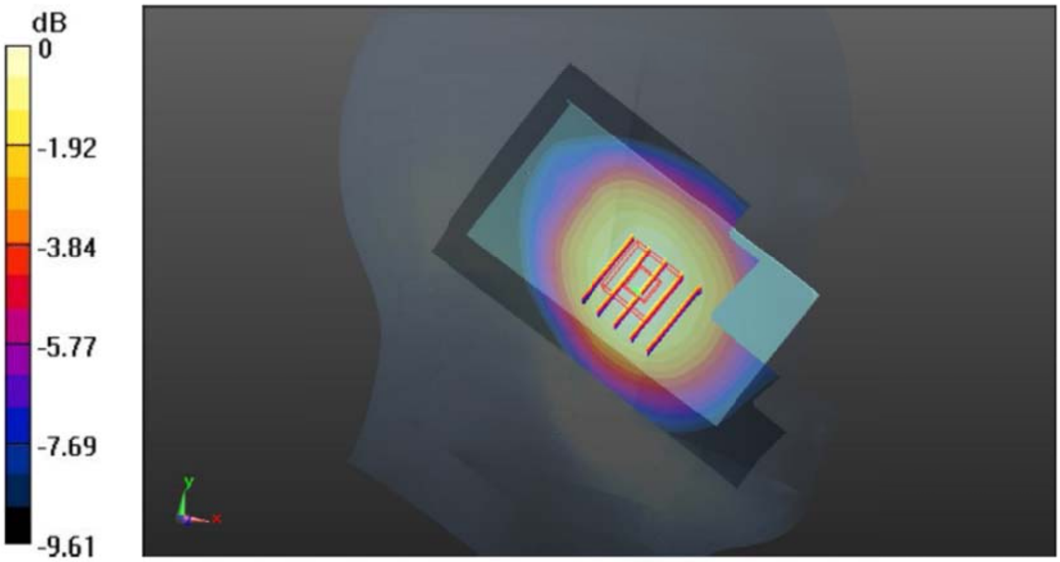
DUT: 2D1401

Communication System: CDMA2000; Frequency: 848.31 MHz;Duty Cycle: 1:1
Medium: HSL_835_121218 Medium parameters used: f = 848.31 MHz; σ = 0.93 mho/m; ε_r = 41.14; ρ = 1000 kg/m^3
Ambient Temperature：23.6 ℃; Liquid Temperature：21.2 ℃

DASY5 Configuration:
- Probe: EX3DV4 - SN3819; ConvF(9.56, 9.56, 9.56); Calibrated: 26.11.2012;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1303; Calibrated: 22.11.2012
- Phantom: SAM1; Type: QD000P40CD; Serial: TP:1670
- Measurement SW: DASY52, Version 52.8 (2); SEMCAD X Version 14.6.6 (6824)

Ch777/Area Scan (61x101x1): Interpolated grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 1.05 W/kg

Ch777/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 34.905 V/m; Power Drift = 0.02 dB
Peak SAR (extrapolated) = 1.144 mW/g
SAR(1 g) = 0.924 mW/g; SAR(10 g) = 0.701 mW/g
Maximum value of SAR (measured) = 1.05 W/kg



0 dB = 1.05 W/kg

Test Laboratory: Sporton International Inc. SAR/HAC Testing Lab Date: 18.12.2012

50 CDMA2000 BC1_RC3 SO55_Left Cheek_Ch1175

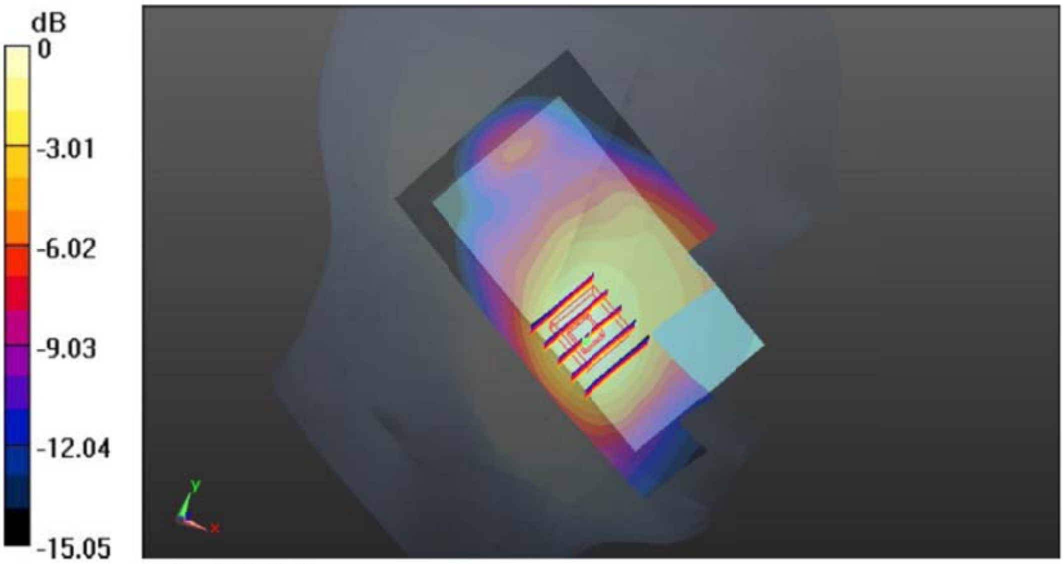
DUT: 2D1401

Communication System: CDMA2000; Frequency: 1908.75 MHz;Duty Cycle: 1:1
Medium: HSL_1900_121218 Medium parameters used: f = 1909 MHz; $\sigma = 1.429$ mho/m; $\varepsilon_r = 40.636$; $\rho = 1000$ kg/m^3
Ambient Temperature：23.5 ℃; Liquid Temperature：21.7 ℃

DASY5 Configuration:
- Probe: EX3DV4 - SN3819; ConvF(7.84, 7.84, 7.84); Calibrated: 26.11.2012;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1303; Calibrated: 22.11.2012
- Phantom: SAM2; Type: QD000P40CD; Serial: TP:1671
- Measurement SW: DASY52, Version 52.8 (2); SEMCAD X Version 14.6.6 (6824)

Ch1175/Area Scan (61x101x1): Interpolated grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 1.23 W/kg

Ch1175/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 30.639 V/m; Power Drift = -0.10 dB
Peak SAR (extrapolated) = 1.519 mW/g
SAR(1 g) = 0.993 mW/g; SAR(10 g) = 0.610 mW/g
Maximum value of SAR (measured) = 1.27 W/kg



0 dB = 1.27 W/kg

Test Laboratory: Sporton International Inc. SAR/HAC Testing Lab Date: 2013-1-1

57 802.11b_Right Cheek_Ch6

DUT: 2D1401

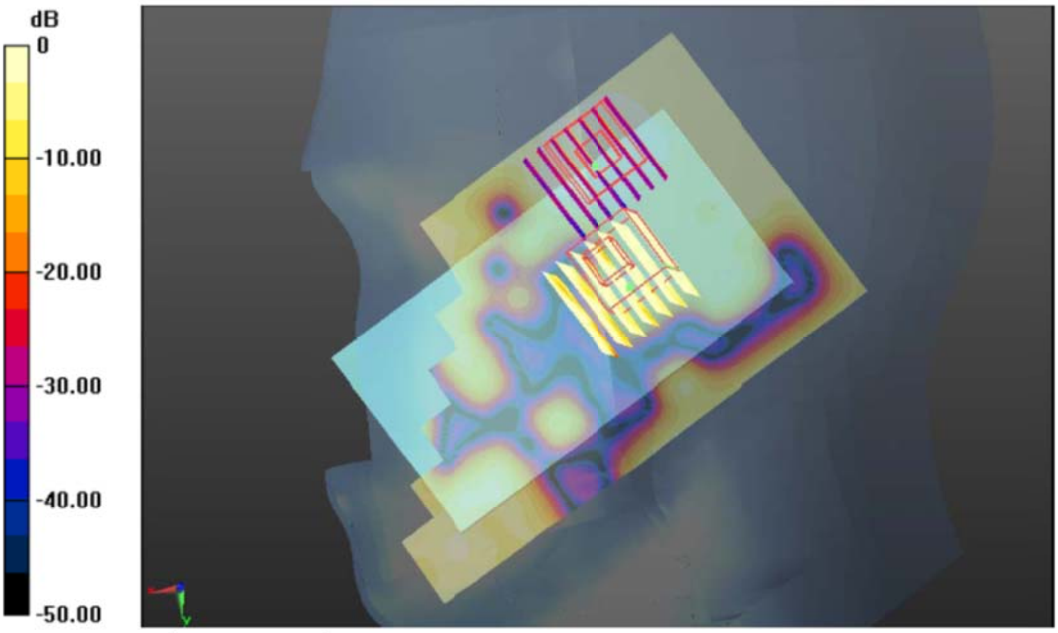
Communication System: WIFI; Frequency: 2437 MHz;Duty Cycle: 1:1
Medium: HSL_2450_130101 Medium parameters used: f = 2437 MHz; σ = 1.809 mho/m; ε_r = 38.036; ρ = 1000 kg/m^3
Ambient Temperature：23.5 ℃; Liquid Temperature：21.5 ℃

DASY5 Configuration:
- Probe: EX3DV4 - SN3857; ConvF(6.87, 6.87, 6.87); Calibrated: 2012-6-20
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1210; Calibrated: 2012-12-5
- Phantom: SAM1; Type: SAM; Serial: TP-1479
- Measurement SW: DASY52, Version 52.8 (2); SEMCAD X Version 14.4.5 (3634)

Ch6/Area Scan (81x131x1): Measurement grid: dx=12mm, dy=12mm
Maximum value of SAR (interpolated) = 0.033 mW/g

Ch6/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 2.219 V/m; Power Drift = 0.078 dB
Peak SAR (extrapolated) = 0.067 W/kg
SAR(1 g) = 0.026 mW/g; SAR(10 g) = 0.016 mW/g
Maximum value of SAR (measured) = 0.039 mW/g

Ch6/Zoom Scan (7x7x7)/Cube 1: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 2.219 V/m; Power Drift = 0.078 dB
Peak SAR (extrapolated) = 0.021 W/kg
SAR(1 g) = 0.012 mW/g; SAR(10 g) = 0.010 mW/g
Maximum value of SAR (measured) = 0.015 mW/g



0 dB = 0.030mW/g

Test Laboratory: Sporton International Inc. SAR/HAC Testing Lab Date: 17.12.2012

27 CDMA2000 BC0_RTAP 153.6_Back_1cm_Ch1013

DUT: 2D1401

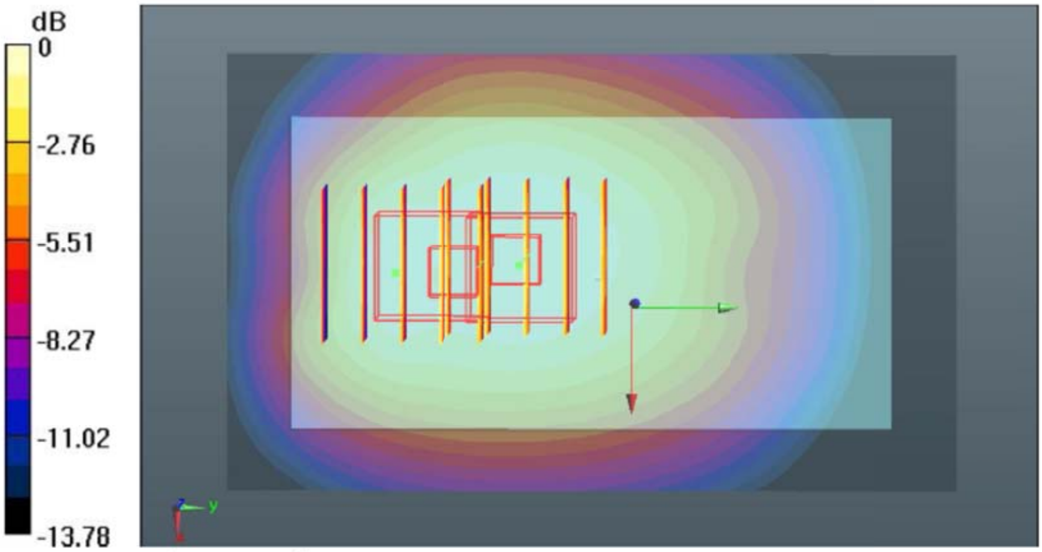
Communication System: CDMA2000; Frequency: 824.7 MHz;Duty Cycle: 1:1
Medium: MSL_835_121217 Medium parameters used: f = 825 MHz; σ = 0.985 mho/m; ε_r = 55.653; ρ = 1000 kg/m^3
Ambient Temperature：23.5 ℃; Liquid Temperature：21.5 ℃

DASY5 Configuration:
- Probe: EX3DV4 - SN3819; ConvF(9.5, 9.5, 9.5); Calibrated: 26.11.2012;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1303; Calibrated: 22.11.2012
- Phantom: SAM2; Type: QD000P40CD; Serial: TP:1671
- Measurement SW: DASY52, Version 52.8 (2); SEMCAD X Version 14.6.6 (6824)

Ch1013/Area Scan (61x101x1): Interpolated grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 1.52 W/kg

Ch1013/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 40.320 V/m; Power Drift = -0.08 dB
Peak SAR (extrapolated) = 1.677 mW/g
SAR(1 g) = 1.29 mW/g; SAR(10 g) = 0.959 mW/g
Maximum value of SAR (measured) = 1.50 W/kg

Ch1013/Zoom Scan (5x5x7)/Cube 1: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 40.320 V/m; Power Drift = -0.08 dB
Peak SAR (extrapolated) = 1.641 mW/g
SAR(1 g) = 1.22 mW/g; SAR(10 g) = 0.845 mW/g
Maximum value of SAR (measured) = 1.47 W/kg



0 dB = 1.47 W/kg

Test Laboratory: Sporton International Inc. SAR/HAC Testing Lab Date: 17.12.2012

09_CDMA2000 BC1_RTAP 153.6_Back_1cm_Ch600

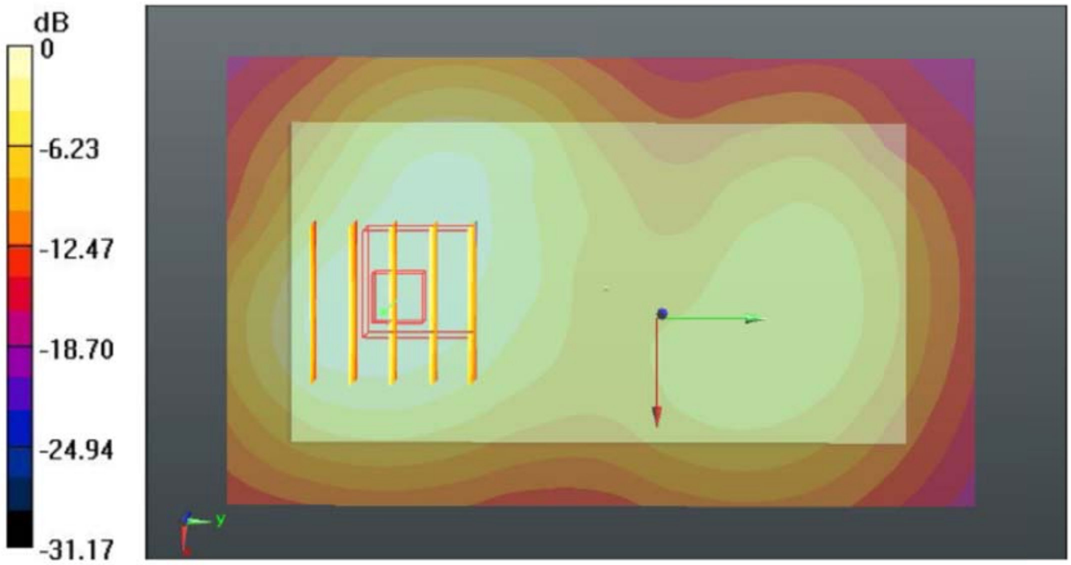
DUT: 2D1401

Communication System: CDMA2000; Frequency: 1880 MHz;Duty Cycle: 1:1
Medium: MSL_1900_121217 Medium parameters used: f = 1880 MHz; σ = 1.509 mho/m; ε_r = 54.703; ρ = 1000 kg/m^3
Ambient Temperature：23.4 ℃; Liquid Temperature：21.4 ℃

DASY5 Configuration:
- Probe: EX3DV4 - SN3819; ConvF(7.67, 7.67, 7.67); Calibrated: 26.11.2012;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1303; Calibrated: 22.11.2012
- Phantom: SAM1; Type: QD000P40CD; Serial: TP:1670
- Measurement SW: DASY52, Version 52.8 (2); SEMCAD X Version 14.6.6 (6824)

Ch600/Area Scan (61x101x1): Interpolated grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 1.49 W/kg

Ch600/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 33.088 V/m; Power Drift = 0.01 dB
Peak SAR (extrapolated) = 1.950 mW/g
SAR(1 g) = 1.19 mW/g; SAR(10 g) = 0.740 mW/g
Maximum value of SAR (measured) = 1.60 W/kg



0 dB = 1.60 W/kg

63 802.11b_Left Side 1cm_Ch6

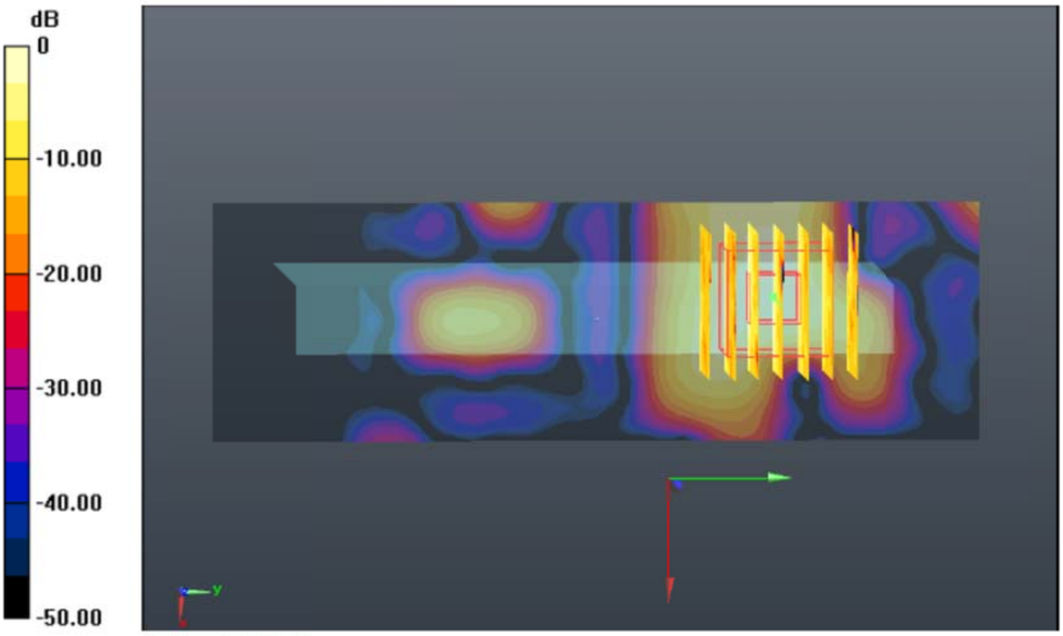
DUT: 2D1401

Communication System: WIFI; Frequency: 2437 MHz;Duty Cycle: 1:1
Medium: MSL_2450_121231 Medium parameters used: f = 2437 MHz; σ = 1.949 mho/m; ε_r = 54.149; ρ = 1000 kg/m^3
Ambient Temperature：23.1 ℃; Liquid Temperature：21.3 ℃

DASY5 Configuration:
- Probe: EX3DV4 - SN3857; ConvF(6.94, 6.94, 6.94); Calibrated: 2012-6-20
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1210; Calibrated: 2012-12-5
- Phantom: SAM2; Type: SAM; Serial: TP-1477
- Measurement SW: DASY52, Version 52.8 (2); SEMCAD X Version 14.4.5 (3634)

Ch6/Area Scan (41x131x1): Measurement grid: dx=12mm, dy=12mm
Maximum value of SAR (interpolated) = 0.052 mW/g

Ch6/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 0.941 V/m; Power Drift = -0.09 dB
Peak SAR (extrapolated) = 0.055 W/kg
SAR(1 g) = 0.026 mW/g; SAR(10 g) = 0.00974 mW/g
Maximum value of SAR (measured) = 0.042 mW/g



0 dB = 0.050mW/g

Test Laboratory: Sporton International Inc. SAR/HAC Testing Lab Date: 17.12.2012

32 CDMA2000 BC0_RC3 SO32_Back_1cm_Ch1013

DUT: 2D1401

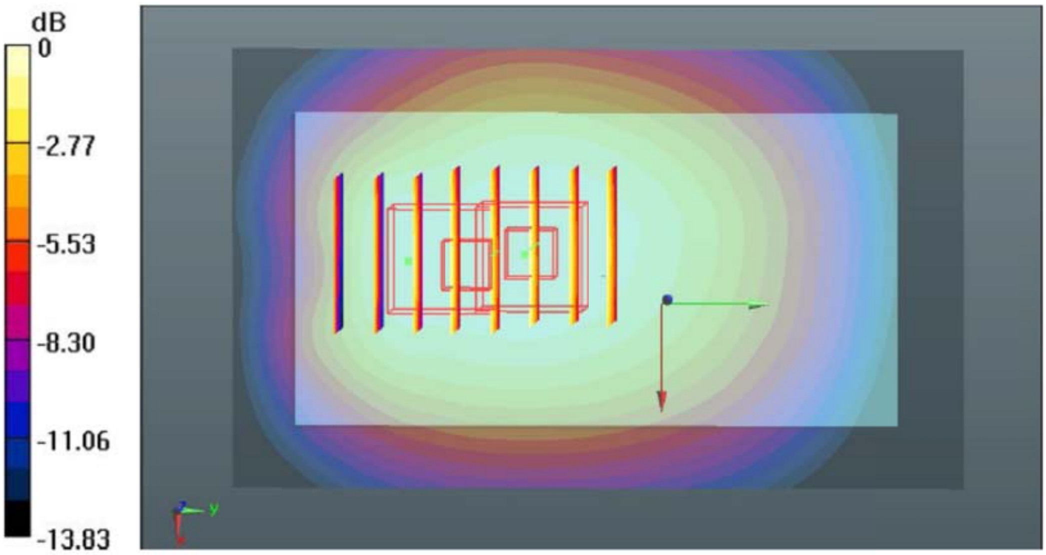
Communication System: CDMA2000; Frequency: 824.7 MHz;Duty Cycle: 1:1
Medium: MSL_835_121217 Medium parameters used: f = 825 MHz; σ = 0.985 mho/m; ε_r = 55.653; ρ = 1000 kg/m^3
Ambient Temperature：23.5 ℃; Liquid Temperature：21.5 ℃

DASY5 Configuration:
- Probe: EX3DV4 - SN3819; ConvF(9.5, 9.5, 9.5); Calibrated: 26.11.2012;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1303; Calibrated: 22.11.2012
- Phantom: SAM2; Type: QD000P40CD; Serial: TP:1671
- Measurement SW: DASY52, Version 52.8 (2); SEMCAD X Version 14.6.6 (6824)

Ch1013/Area Scan (61x101x1): Interpolated grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 1.51 W/kg

Ch1013/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 40.083 V/m; Power Drift = -0.01 dB
Peak SAR (extrapolated) = 1.662 mW/g
SAR(1 g) = 1.3 mW/g; SAR(10 g) = 0.968 mW/g
Maximum value of SAR (measured) = 1.51 W/kg

Ch1013/Zoom Scan (5x5x7)/Cube 1: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 40.083 V/m; Power Drift = -0.01 dB
Peak SAR (extrapolated) = 1.607 mW/g
SAR(1 g) = 1.2 mW/g; SAR(10 g) = 0.848 mW/g
Maximum value of SAR (measured) = 1.46 W/kg



0 dB = 1.46 W/kg

Test Laboratory: Sporton International Inc. SAR/HAC Testing Lab Date: 17.12.2012

14 CDMA2000 BC1_RC3 SO32_Back_1cm_Ch25

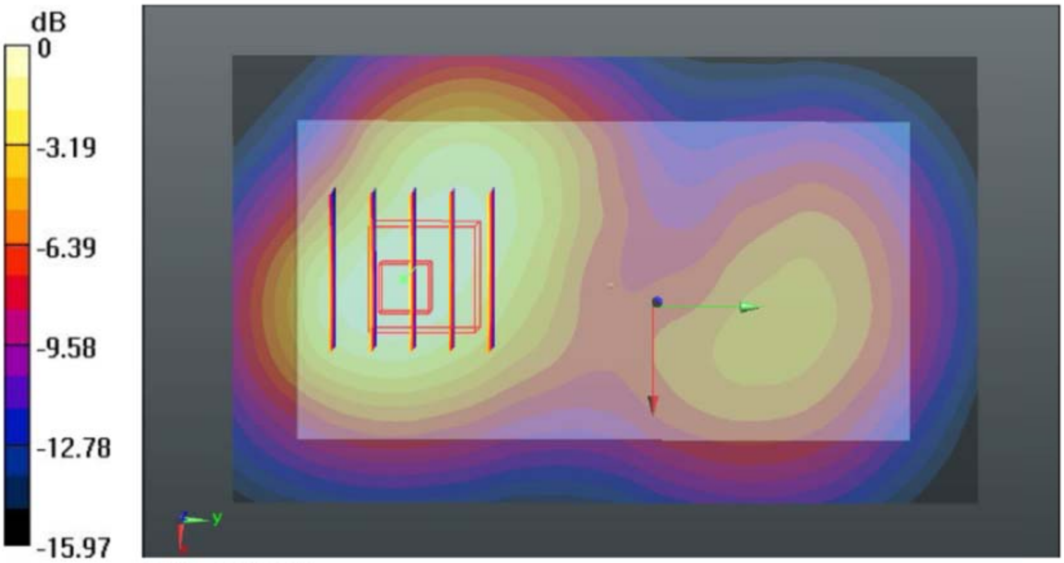
DUT: 2D1401

Communication System: CDMA2000; Frequency: 1851.25 MHz;Duty Cycle: 1:1
Medium: MSL_1900_121217 Medium parameters used: f = 1851.25 MHz; σ = 1.471 mho/m; ε_r = 54.769; ρ = 1000 kg/m^3
Ambient Temperature：23.4 ℃; Liquid Temperature：21.4 ℃

DASY5 Configuration:
- Probe: EX3DV4 - SN3819; ConvF(7.67, 7.67, 7.67); Calibrated: 26.11.2012;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1303; Calibrated: 22.11.2012
- Phantom: SAM1; Type: QD000P40CD; Serial: TP:1670
- Measurement SW: DASY52, Version 52.8 (2); SEMCAD X Version 14.6.6 (6824)

Ch25/Area Scan (61x101x1): Interpolated grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 1.70 W/kg

Ch25/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 34.222 V/m; Power Drift = 0.03 dB
Peak SAR (extrapolated) = 2.050 mW/g
SAR(1 g) = 1.24 mW/g; SAR(10 g) = 0.757 mW/g
Maximum value of SAR (measured) = 1.64 W/kg



0 dB = 1.64 W/kg

Test Laboratory: Sporton International Inc. SAR/HAC Testing Lab Date: 2012-12-31

62 802.11b_Back 1cm_Ch6

DUT: 2D1401

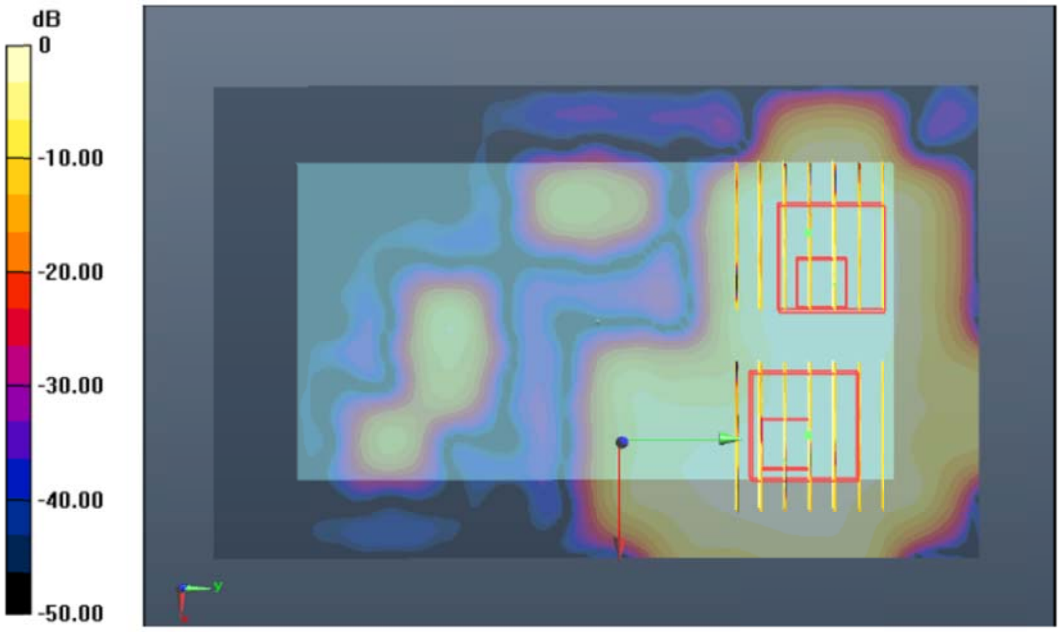
Communication System: WIFI; Frequency: 2437 MHz;Duty Cycle: 1:1
Medium: MSL_2450_121231 Medium parameters used: f = 2437 MHz; $\sigma = 1.949$ mho/m; $\varepsilon_r = 54.149$; $\rho = 1000$ kg/m^3
Ambient Temperature：23.1 ℃; Liquid Temperature：21.3 ℃

DASY5 Configuration:
- Probe: EX3DV4 - SN3857; ConvF(6.94, 6.94, 6.94); Calibrated: 2012-6-20
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn360; Calibrated: 2012-11-15
- Phantom: SAM2; Type: SAM; Serial: TP-1477
- Measurement SW: DASY52, Version 52.8 (2); SEMCAD X Version 14.4.5 (3634)

Ch6/Area Scan (81x131x1): Measurement grid: dx=12mm, dy=12mm
Maximum value of SAR (interpolated) = 0.040 mW/g

Ch6/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 0.717 V/m; Power Drift = 0.03 dB
Peak SAR (extrapolated) = 0.058 W/kg
SAR(1 g) = 0.025 mW/g; SAR(10 g) = 0.00991 mW/g
Maximum value of SAR (measured) = 0.043 mW/g

Ch6/Zoom Scan (7x7x7)/Cube 1: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 0.717 V/m; Power Drift = 0.03 dB
Peak SAR (extrapolated) = 0.034 W/kg
SAR(1 g) = 0.019 mW/g; SAR(10 g) = 0.00911 mW/g
Maximum value of SAR (measured) = 0.028 mW/g



0 dB = 0.030mW/g

Test Laboratory: Sporton International Inc. SAR/HAC Testing Lab Date: 18.12.2012

70 Bluetooth_Back_1cm_Ch78_Headset

DUT: 2D1401

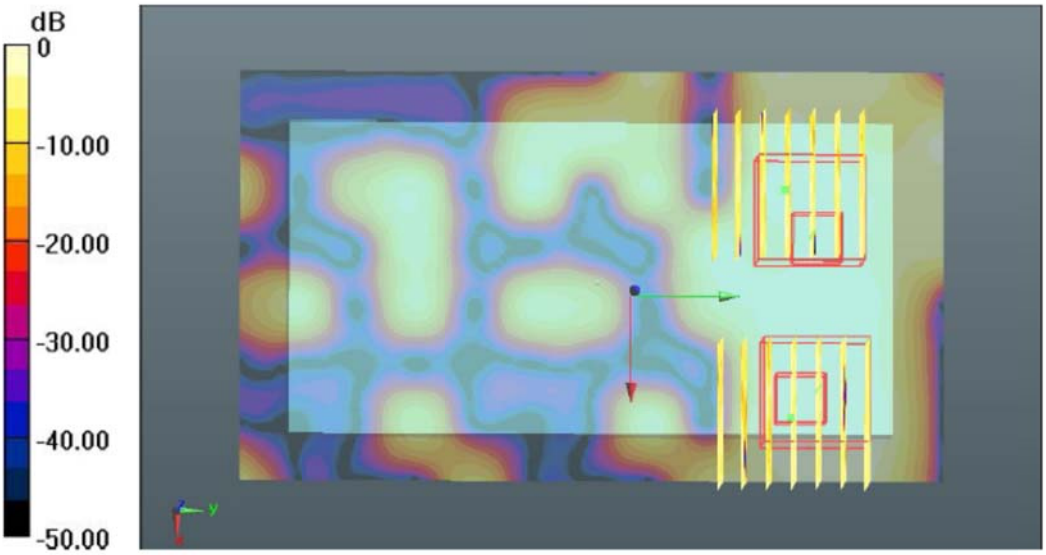
Communication System: Bluetooth; Frequency: 2480 MHz;Duty Cycle: 1:3.28
Medium: MSL_2450_121218 Medium parameters used: f = 2480 MHz; σ = 1.988 mho/m; ε_r = 53.767; ρ = 1000 kg/m^3
Ambient Temperature：23.5 ℃; Liquid Temperature：21.5 ℃

DASY5 Configuration:
- Probe: EX3DV4 - SN3819; ConvF(7.21, 7.21, 7.21); Calibrated: 26.11.2012;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1303; Calibrated: 22.11.2012
- Phantom: SAM2; Type: QD000P40CD; Serial: TP:1671
- Measurement SW: DASY52, Version 52.8 (2); SEMCAD X Version 14.6.6 (6824)

Ch78/Area Scan (71x121x1): Interpolated grid: dx=12mm, dy=12mm
Maximum value of SAR (interpolated) = 0.00857 W/kg

Ch78/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 2.012 V/m; Power Drift = 0.13 dB
Peak SAR (extrapolated) = 0.020 mW/g
SAR(1 g) = 0.00604 mW/g; SAR(10 g) = 0.00269 mW/g
Maximum value of SAR (measured) = 0.00951 W/kg

Ch78/Zoom Scan (7x7x7)/Cube 1: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 2.012 V/m; Power Drift = 0.13 dB
Peak SAR (extrapolated) = 0.0064 mW/g
SAR(1 g) = 0.00411 mW/g; SAR(10 g) = 0.00199 mW/g
Maximum value of SAR (measured) = 0.00611 W/kg



0 dB = 0.00611 W/kg

12.6 Simultaneous Multi-band Transmission Analysis

	Position	Applicable Combination
Simultaneous Transmission	Head	CDMA2000 (voice) + WLAN
		CDMA2000 (voice) + Bluetooth
	Hotspot	EVDO (data) + WLAN
		EVDO (data) + Bluetooth
	Body-worn	CDMA2000 (voice) + WLAN
		CDMA2000 (voice) + Bluetooth

Note:

1. WLAN and Bluetooth share the same antenna, and cannot transmit simultaneously.
2. 1xRTT and EVDO share the same antenna, and no SVDO feature in this device.
3. If 1g-SAR scalar summation ≥1.6 W/kg, SPLSR calculation is necessary.
4. The reported SAR summation is calculated based on the same configuration and test position.
5. For simultaneous transmission analysis, Bluetooth SAR is estimated per KDB 447498 D01v05 based on the formula below.
   - (*max. power of channel, including tune-up tolerance, mW*)/(*min. test separation distance, mm*)]·[√f(GHz)/*x*] W/kg for *test separation distances* ≤ 50 mm; where *x* = 7.5 for 1-g SAR, and *x* = 18.75 for 10-g SAR.
   - 0.4 W/kg for 1-g SAR and 1.0 W/kg for 10-g SAR, when the *test separation distances* is > 50 mm.

Bluetooth	Tune-up Maximum power (dBm)	Head 0mm gap
Estimated SAR (W/kg)	9	0.334 W/kg

6. Per KDB 447498 D01v05, simultaneous transmission SAR is compliant if,
   1) Scalar SAR summation < 1.6W/kg.
   2) SPLSR = $(SAR_1 + SAR_2)^{1.5}$ / (*min. separation distance, mm*), and the peak separation distance is determined from the square root of $[(x_1-x_2)^2 + (y_1-y_2)^2 + (z_1-z_2)^2]$, where (x_1, y_1, z_1) and (x_2, y_2, z_2) are the coordinates of the extrapolated peak SAR locations in the zoom scan.
      If SPLSR ≤ 0.04, simultaneously transmission SAR is compliant.
   3) Simultaneously transmission SAR measurement, and the reported multi-band SAR < 1.6W/kg.

<Head>

Position	WWAN (PCE) WWAN Band	Plot No	Max. WWAN SAR (W/kg)	WLAN (DTS) Plot No	Max. WLAN SAR (W/kg)	WWAN + WLAN (W/kg)	SPLSR ≤ 0.04	Case No
Right Cheek	CDMA2000 BC0	39	0.913	57	0.026	**0.94**	-	-
	CDMA2000 BC1	48	1.006	57	0.026	**1.03**	-	-
Right Tilted	CDMA2000 BC0	40	0.667	58	0.011	**0.68**	-	-
	CDMA2000 BC1	49	0.477	58	0.011	**0.49**	-	-
Left Cheek	CDMA2000 BC0	41	1.011	59	0.018	**1.03**	-	-
	CDMA2000 BC1	50	1.096	59	0.018	**1.11**	-	-
Left Tilted	CDMA2000 BC0	42	0.587	60	0.011	**0.60**	-	-
	CDMA2000 BC1	51	0.585	60	0.011	**0.60**	-	-

Position	WWAN (PCE) WWAN Band	Plot No	Max. WWAN SAR (W/kg)	Bluetooth (DSS) Estimated Bluetooth SAR (W/kg)	WWAN + Bluetooth (W/kg)	SPLSR ≤ 0.04	Case No
Right Cheek	CDMA2000 BC0	39	0.913	0.334	**1.25**	-	-
	CDMA2000 BC1	48	1.006	0.334	**1.34**	-	-
Right Tilted	CDMA2000 BC0	40	0.667	0.334	**1.00**	-	-
	CDMA2000 BC1	49	0.477	0.334	**0.81**	-	-
Left Cheek	CDMA2000 BC0	41	1.011	0.334	**1.35**	-	-
	CDMA2000 BC1	50	1.096	0.334	**1.43**	-	-
Left Tilted	CDMA2000 BC0	42	0.587	0.334	**0.92**	-	-
	CDMA2000 BC1	51	0.585	0.334	**0.92**	-	-

<Hotspot>

	WWAN (PCE)			WLAN (DTS)		WWAN + WLAN (W/kg)	SPLSR ≤ 0.04	Case No
Position	WWAN Band	Plot No	Max. WWAN SAR (W/kg)	Plot No	Max. WLAN SAR (W/kg)			
Front	CDMA2000 BC0	20	0.892	61	0.006	**0.90**	-	-
	CDMA2000 BC1	1	1.136	61	0.006	**1.14**	-	-
Back	CDMA2000 BC0	27	1.447	62	0.025	**1.47**	-	-
	CDMA2000 BC1	9	1.341	62	0.025	**1.37**	-	-
Left Side	CDMA2000 BC0	22	0.766	63	0.026	**0.79**	-	-
	CDMA2000 BC1	3	0.379	63	0.026	**0.41**	-	-
Right Side	CDMA2000 BC0	30	1.033	-	-	**1.03**	-	-
	CDMA2000 BC1	4	0.616	-	-	**0.62**	-	-
Top Side	CDMA2000 BC0	-	-	64	0.004	**0.004**	-	-
	CDMA2000 BC1	-	-	64	0.004	**0.004**	-	-
Bottom Side	CDMA2000 BC0	24	0.162	-	-	**0.16**	-	-
	CDMA2000 BC1	5	0.798	-	-	**0.80**	-	-

	WWAN (PCE)			Bluetooth (DSS)		WWAN + Bluetooth (W/kg)	SPLSR ≤ 0.04	Case No
Position	WWAN Band	Plot No	Max. WWAN SAR (W/kg)	Plot No	Max. Bluetooth SAR (W/kg)			
Front	CDMA2000 BC0	20	0.892	66	0.001	**0.89**	-	-
	CDMA2000 BC1	1	1.136	66	0.001	**1.14**	-	-
Back	CDMA2000 BC0	27	1.447	67	0.006	**1.45**	-	-
	CDMA2000 BC1	9	1.341	67	0.006	**1.35**	-	-
Left Side	CDMA2000 BC0	22	0.766	68	0.004	**0.77**	-	-
	CDMA2000 BC1	3	0.379	68	0.004	**0.38**	-	-
Right Side	CDMA2000 BC0	30	1.033	-	-	**1.03**	-	-
	CDMA2000 BC1	4	0.616	-	-	**0.62**	-	-
Top Side	CDMA2000 BC0	-	-	69	0.001	**0.001**	-	-
	CDMA2000 BC1	-	-	69	0.001	**0.001**	-	-
Bottom Side	CDMA2000 BC0	24	0.162	-	-	**0.16**	-	-
	CDMA2000 BC1	5	0.798	-	-	**0.80**	-	-

<Body-worn>

	WWAN (PCE)			WLAN (DTS)		WWAN + WLAN (W/kg)	SPLSR ≤ 0.04	Case No
Position	WWAN Band	Plot No	Max. WWAN SAR (W/kg)	Plot No	Max. WLAN SAR (W/kg)			
Front	CDMA2000 BC0	31	0.850	61	0.006	**0.86**	-	-
	CDMA2000 BC1	10	1.152	61	0.006	**1.16**	-	-
Back	CDMA2000 BC0	32	1.459	62	0.025	**1.48**	-	-
	CDMA2000 BC1	14	1.407	62	0.025	**1.43**	-	-
Back (w/ Headset)	CDMA2000 BC0	35	1.212	65	0.024	**1.24**	-	-
	CDMA2000 BC1	17	1.345	65	0.024	**1.37**	-	-

	WWAN (PCE)			Bluetooth (DSS)		WWAN + Bluetooth (W/kg)	SPLSR ≤ 0.04	Case No
Position	WWAN Band	Plot No	Max. WWAN SAR (W/kg)	Plot No	Max. Bluetooth SAR (W/kg)			
Front	CDMA2000 BC0	31	0.850	66	0.001	**0.85**	-	-
	CDMA2000 BC1	10	1.152	66	0.001	**1.15**	-	-
Back	CDMA2000 BC0	32	1.459	67	0.006	**1.47**	-	-
	CDMA2000 BC1	14	1.407	67	0.006	**1.41**	-	-
Back (w/ Headset)	CDMA2000 BC0	35	1.212	70	0.007	**1.22**	-	-
	CDMA2000 BC1	17	1.345	70	0.007	**1.35**	-	-

Test Engineer：Jeme Li and Krin Wu

13. 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 12.1

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 12.1 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 Distribution	Divisor	Ci (1g)	Ci (10g)	Standard Uncertainty (1g)	Standard Uncertainty (10g)
Measurement System							
Probe Calibration	6.0	Normal	1	1	1	± 6.0 %	± 6.0 %
Axial Isotropy	4.7	Rectangular	√3	0.7	0.7	± 1.9 %	± 1.9 %
Hemispherical Isotropy	9.6	Rectangular	√3	0.7	0.7	± 3.9 %	± 3.9 %
Boundary Effects	1.0	Rectangular	√3	1	1	± 0.6 %	± 0.6 %
Linearity	4.7	Rectangular	√3	1	1	± 2.7 %	± 2.7 %
System Detection Limits	1.0	Rectangular	√3	1	1	± 0.6 %	± 0.6 %
Readout Electronics	0.3	Normal	1	1	1	± 0.3 %	± 0.3 %
Response Time	0.8	Rectangular	√3	1	1	± 0.5 %	± 0.5 %
Integration Time	2.6	Rectangular	√3	1	1	± 1.5 %	± 1.5 %
RF Ambient Noise	3.0	Rectangular	√3	1	1	± 1.7 %	± 1.7 %
RF Ambient Reflections	3.0	Rectangular	√3	1	1	± 1.7 %	± 1.7 %
Probe Positioner	0.4	Rectangular	√3	1	1	± 0.2 %	± 0.2 %
Probe Positioning	2.9	Rectangular	√3	1	1	± 1.7 %	± 1.7 %
Max. SAR Eval.	1.0	Rectangular	√3	1	1	± 0.6 %	± 0.6 %
Test Sample Related							
Device Positioning	2.9	Normal	1	1	1	± 2.9 %	± 2.9 %
Device Holder	3.6	Normal	1	1	1	± 3.6 %	± 3.6 %
Power Drift	5.0	Rectangular	√3	1	1	± 2.9 %	± 2.9 %
Phantom and Setup							
Phantom Uncertainty	4.0	Rectangular	√3	1	1	± 2.3 %	± 2.3 %
Liquid Conductivity (Target)	5.0	Rectangular	√3	0.64	0.43	± 1.8 %	± 1.2 %
Liquid Conductivity (Meas.)	2.5	Normal	1	0.64	0.43	± 1.6 %	± 1.1 %
Liquid Permittivity (Target)	5.0	Rectangular	√3	0.6	0.49	± 1.7 %	± 1.4 %
Liquid Permittivity (Meas.)	2.5	Normal	1	0.6	0.49	± 1.5 %	± 1.2 %
Combined Standard Uncertainty						± 11.0 %	± 10.8 %
Coverage Factor for 95 %						K=2	
Expanded Uncertainty						**± 22.0 %**	**± 21.5 %**

Table 12.2 Uncertainty Budget of DASY for frequency range 300 MHz to 3 GHz according to IEEE 1528-2003

14. 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. 1528-2003, “Recommended Practice for Determining the Peak Spatial-Average Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques”, December 2003

[4] FCC OET Bulletin 65 (Edition 97-01) Supplement C (Edition 01-01), “Evaluating Compliance with FCC Guidelines for Human Exposure to Radiofrequency Electromagnetic Fields”, June 2001

[5] SPEAG DASY System Handbook

[6] FCC KDB 248227 D01 v01r02, “SAR Measurement Procedures for 802.11 a/b/g Transmitters”, May 2007

[7] FCC KDB 447498 D01 v05, “Mobile and Portable Device RF Exposure Procedures and Equipment Authorization Policies”, October 2012

[8] FCC KDB 865664 D01 v01, “SAR Measurement Requirements for 100MHz to 6 GHz”, October 2012

[9] FCC KDB 648474 D04 v01, “SAR Evaluation Considerations for Handsets with Multiple Transmitters and Antennas”, October 2012

[10] FCC KDB 941225 D01 v02, “SAR Measurement Procedures for 3G Devices – CDMA 2000 / Ev-Do / WCDMA / HSDPA / HSPA”, October 2007

[11] FCC KDB 941225 D06 v01, "SAR Evaluation Procedures for Portable Devices with Wireless Router Capabilities", April 2011

Appendix A. Plots of System Performance Check

The plots are shown as follows.

Test Laboratory: Sporton International Inc. SAR/HAC Testing Lab Date: 18.12.2012

System Check_Head_835MHz_121218

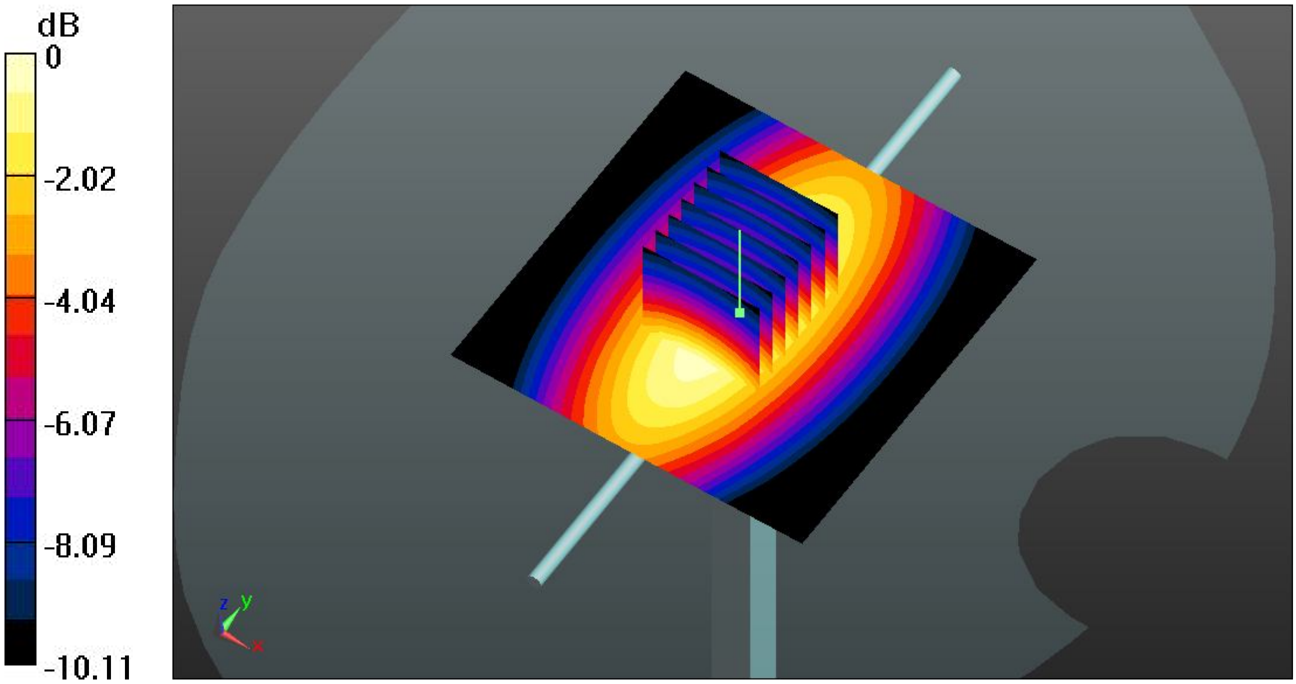
DUT: D835V2 - SN: 4d091

Communication System: CW; Frequency: 835 MHz;Duty Cycle: 1:1
Medium: HSL_835_121218 Medium parameters used: f = 835 MHz; σ = 0.918 mho/m; ε_r = 41.297; ρ = 1000 kg/m^3
Ambient Temperature：23.6 ℃; Liquid Temperature：21.2 ℃

DASY5 Configuration:
- Probe: EX3DV4 - SN3819; ConvF(9.56, 9.56, 9.56); Calibrated: 26.11.2012;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1303; Calibrated: 22.11.2012
- Phantom: SAM1; Type: QD000P40CD; Serial: TP:1670
- Measurement SW: DASY52, Version 52.8 (2); SEMCAD X Version 14.6.6 (6824)

Pin=250mW/Area Scan (61x61x1): Interpolated grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 2.51 W/kg

Pin=250mW/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 52.427 V/m; Power Drift = -0.02 dB
Peak SAR (extrapolated) = 3.464 mW/g
SAR(1 g) = 2.32 mW/g; SAR(10 g) = 1.53 mW/g
Maximum value of SAR (measured) = 2.51 W/kg



0 dB = 2.51 W/kg

Test Laboratory: Sporton International Inc. SAR/HAC Testing Lab Date: 17.12.2012

System Check_Body_835MHz_121217

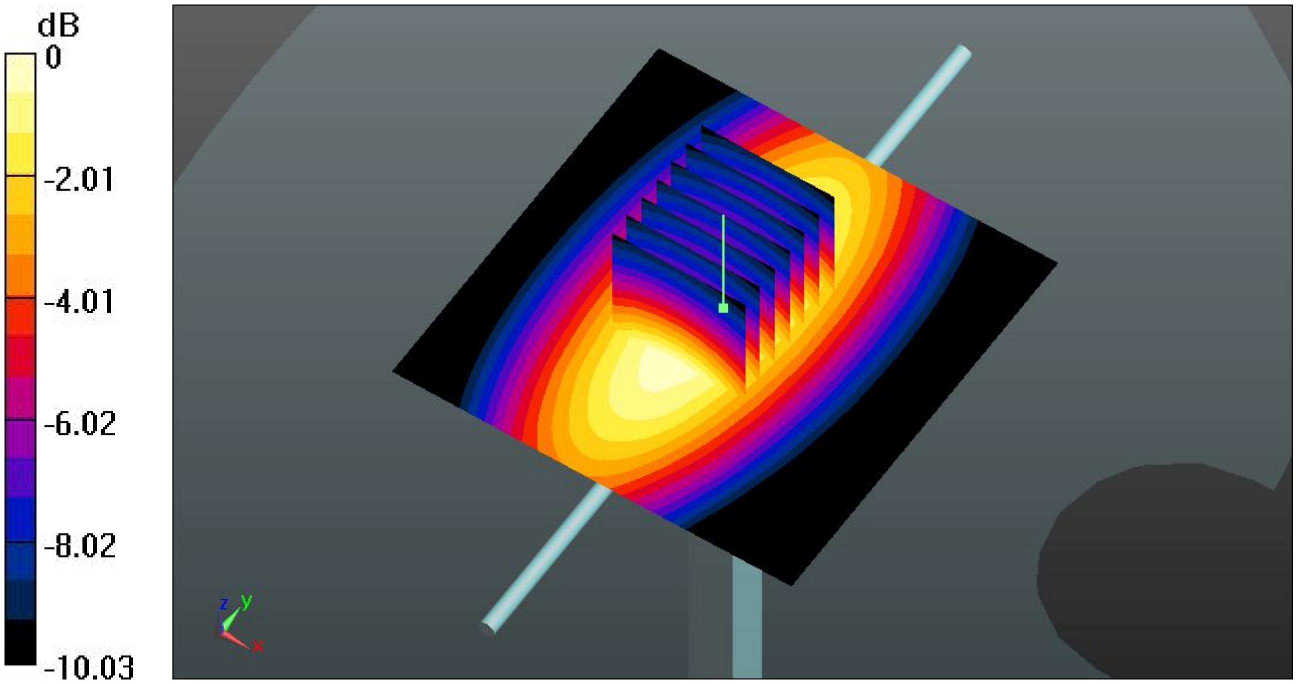
DUT: D835V2 - SN: 4d091

Communication System: CW; Frequency: 835 MHz;Duty Cycle: 1:1
Medium: MSL_835_121217 Medium parameters used: f = 835 MHz; σ = 0.994 mho/m; ε_r = 55.57; ρ = 1000 kg/m^3
Ambient Temperature：23.5 ℃; Liquid Temperature：21.5 ℃

DASY5 Configuration:
- Probe: EX3DV4 - SN3819; ConvF(9.5, 9.5, 9.5); Calibrated: 26.11.2012;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1303; Calibrated: 22.11.2012
- Phantom: SAM2; Type: QD000P40CD; Serial: TP:1671
- Measurement SW: DASY52, Version 52.8 (2); SEMCAD X Version 14.6.6 (6824)

Pin=250mW/Area Scan (61x61x1): Interpolated grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 2.56 W/kg

Pin=250mW/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 50.665 V/m; Power Drift = -0.05 dB
Peak SAR (extrapolated) = 3.468 mW/g
SAR(1 g) = 2.35 mW/g; SAR(10 g) = 1.55 mW/g
Maximum value of SAR (measured) = 2.54 W/kg



0 dB = 2.54 W/kg

Test Laboratory: Sporton International Inc. SAR/HAC Testing Lab Date: 2013-1-5

System Check_Body_835MHz_130105

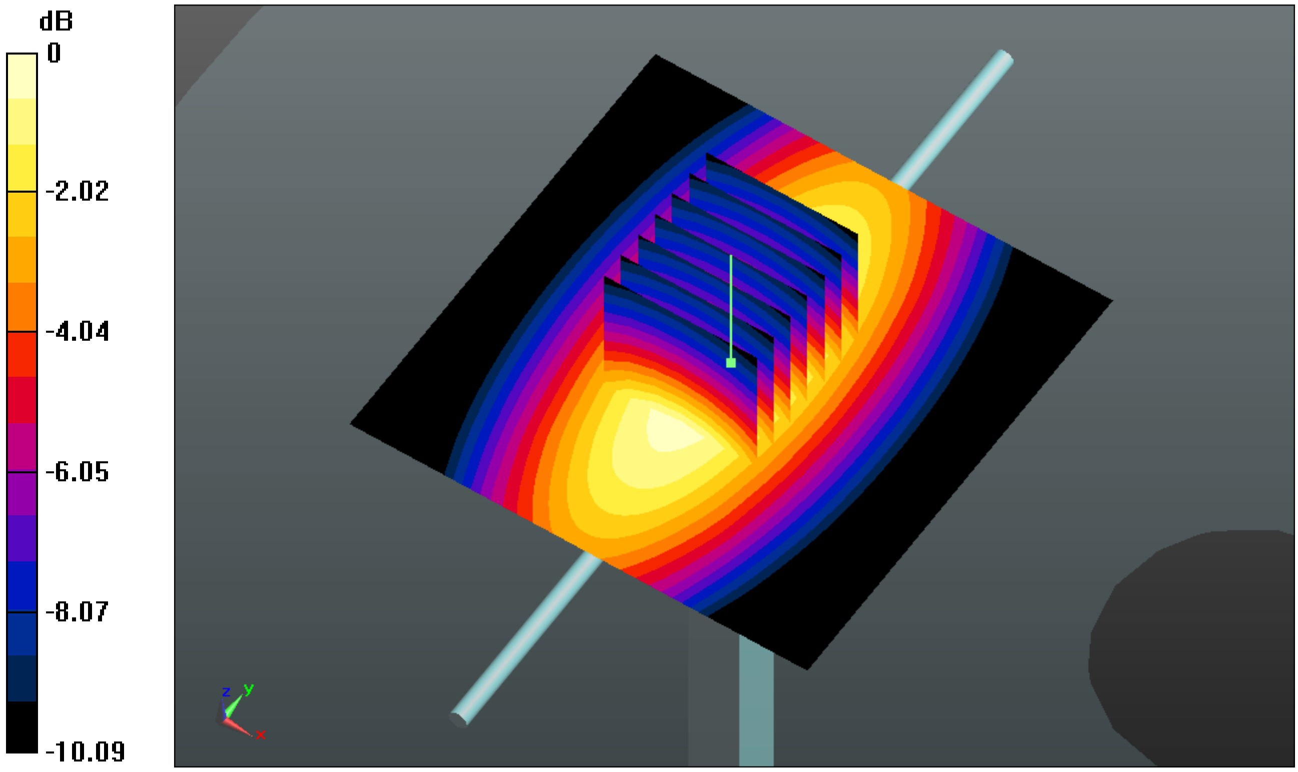
DUT: D835V2 - SN:4d091

Communication System: CW; Frequency: 835 MHz;Duty Cycle: 1:1
Medium: MSL_835_130105 Medium parameters used: f = 835 MHz; σ = 0.98 mho/m; ε_r = 54.484; ρ = 1000 kg/m^3
Ambient Temperature：23.2 ℃; Liquid Temperature：21.3 ℃

DASY5 Configuration:
- Probe: EX3DV4 - SN3857; ConvF(8.98, 8.98, 8.98); Calibrated: 2012-6-20
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn360; Calibrated: 2012-11-15
- Phantom: SAM1; Type: SAM; Serial: TP-1479
- Measurement SW: DASY52, Version 52.8 (2); SEMCAD X Version 14.4.5 (3634)

Pin=250mW/Area Scan (61x61x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 2.439 mW/g

Pin=250mW/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 50.292 V/m; Power Drift = -0.0058 dB
Peak SAR (extrapolated) = 3.260 W/kg
SAR(1 g) = 2.26 mW/g; SAR(10 g) = 1.49 mW/g
Maximum value of SAR (measured) = 2.439 mW/g



0 dB = 2.440mW/g

Test Laboratory: Sporton International Inc. SAR/HAC Testing Lab Date: 18.12.2012

System Check_Head_1900MHz_121218

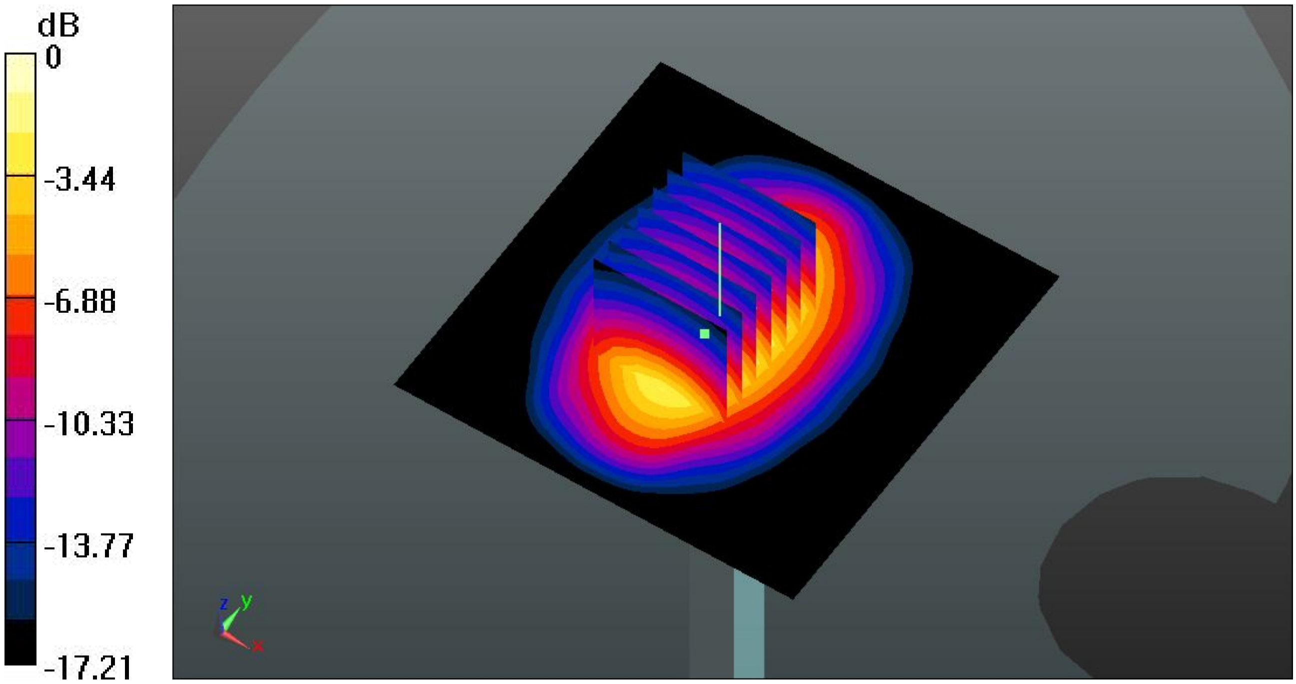
DUT: D1900V2 - SN: 5d118

Communication System: CW; Frequency: 1900 MHz;Duty Cycle: 1:1
Medium: HSL_1900_121218 Medium parameters used: f = 1900 MHz; σ = 1.419 mho/m; ε_r = 40.609; ρ = 1000 kg/m^3
Ambient Temperature：23.5 ℃; Liquid Temperature：21.7 ℃

DASY5 Configuration:
- Probe: EX3DV4 - SN3819; ConvF(7.84, 7.84, 7.84); Calibrated: 26.11.2012;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1303; Calibrated: 22.11.2012
- Phantom: SAM2; Type: QD000P40CD; Serial: TP:1671
- Measurement SW: DASY52, Version 52.8 (2); SEMCAD X Version 14.6.6 (6824)

Pin=250mW/Area Scan (61x61x1): Interpolated grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 12.1 W/kg

Pin=250mW/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 91.164 V/m; Power Drift = 0.01 dB
Peak SAR (extrapolated) = 19.579 mW/g
SAR(1 g) = 10.7 mW/g; SAR(10 g) = 5.6 mW/g
Maximum value of SAR (measured) = 11.8 W/kg



0 dB = 11.8 W/kg

System Check_Body_1900MHz_121217

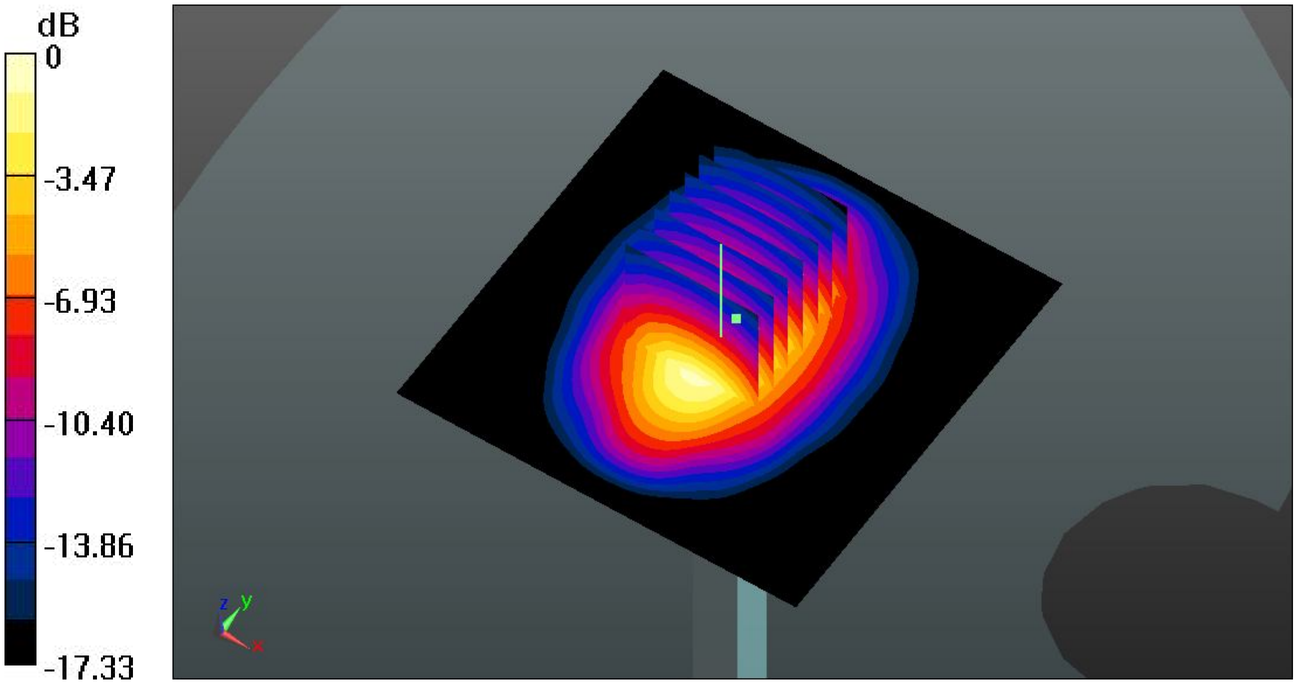
DUT: D1900V2 - SN: 5d118

Communication System: CW; Frequency: 1900 MHz;Duty Cycle: 1:1
Medium: MSL_1900_121217 Medium parameters used: f = 1900 MHz; σ = 1.531 mho/m; ε_r = 54.671; ρ = 1000 kg/m^3
Ambient Temperature：23.4 ℃; Liquid Temperature：21.4 ℃

DASY5 Configuration:
- Probe: EX3DV4 - SN3819; ConvF(7.67, 7.67, 7.67); Calibrated: 26.11.2012;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1303; Calibrated: 22.11.2012
- Phantom: SAM1; Type: QD000P40CD; Serial: TP:1670
- Measurement SW: DASY52, Version 52.8 (2); SEMCAD X Version 14.6.6 (6824)

Pin=250mW/Area Scan (61x61x1): Interpolated grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 11.7 W/kg

Pin=250mW/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 86.753 V/m; Power Drift = -0.01 dB
Peak SAR (extrapolated) = 18.579 mW/g
SAR(1 g) = 10.2 mW/g; SAR(10 g) = 5.31 mW/g
Maximum value of SAR (measured) = 11.4 W/kg



0 dB = 11.4 W/kg

System Check_Head_2450MHz_130101

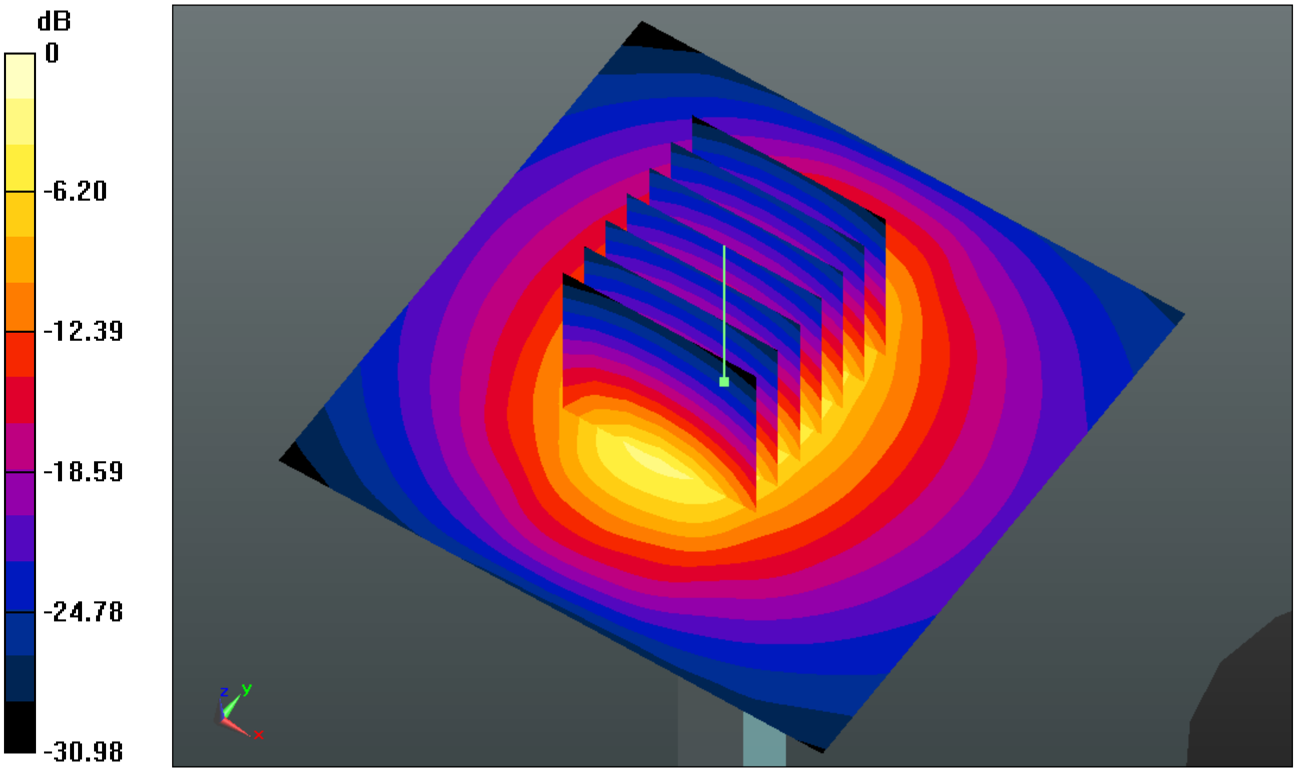
DUT: D2450V2 - SN: 736

Communication System: CW; Frequency: 2450 MHz;Duty Cycle: 1:1
Medium: HSL_2450_130101 Medium parameters used: f = 2450 MHz; σ = 1.823 mho/m; ε_r = 37.961; ρ = 1000 kg/m^3
Ambient Temperature：23.5 ℃; Liquid Temperature：21.5 ℃

DASY5 Configuration:
- Probe: EX3DV4 - SN3857; ConvF(6.87, 6.87, 6.87); Calibrated: 2012-6-20
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn360; Calibrated: 2012-11-15
- Phantom: SAM1; Type: SAM; Serial: TP-1479
- Measurement SW: DASY52, Version 52.8 (2); SEMCAD X Version 14.4.5 (3634)

Pin=250mW/Area Scan (71x71x1): Measurement grid: dx=12mm, dy=12mm
Maximum value of SAR (interpolated) = 21.348 mW/g

Pin=250mW/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 91.914 V/m; Power Drift = 0.04 dB
Peak SAR (extrapolated) = 28.451 W/kg
SAR(1 g) = 13.4 mW/g; SAR(10 g) = 6.02 mW/g
Maximum value of SAR (measured) = 20.842 mW/g



0 dB = 21.350mW/g

Test Laboratory: Sporton International Inc. SAR/HAC Testing Lab   Date: 18.12.2012

System Check_Body_2450MHz_121218

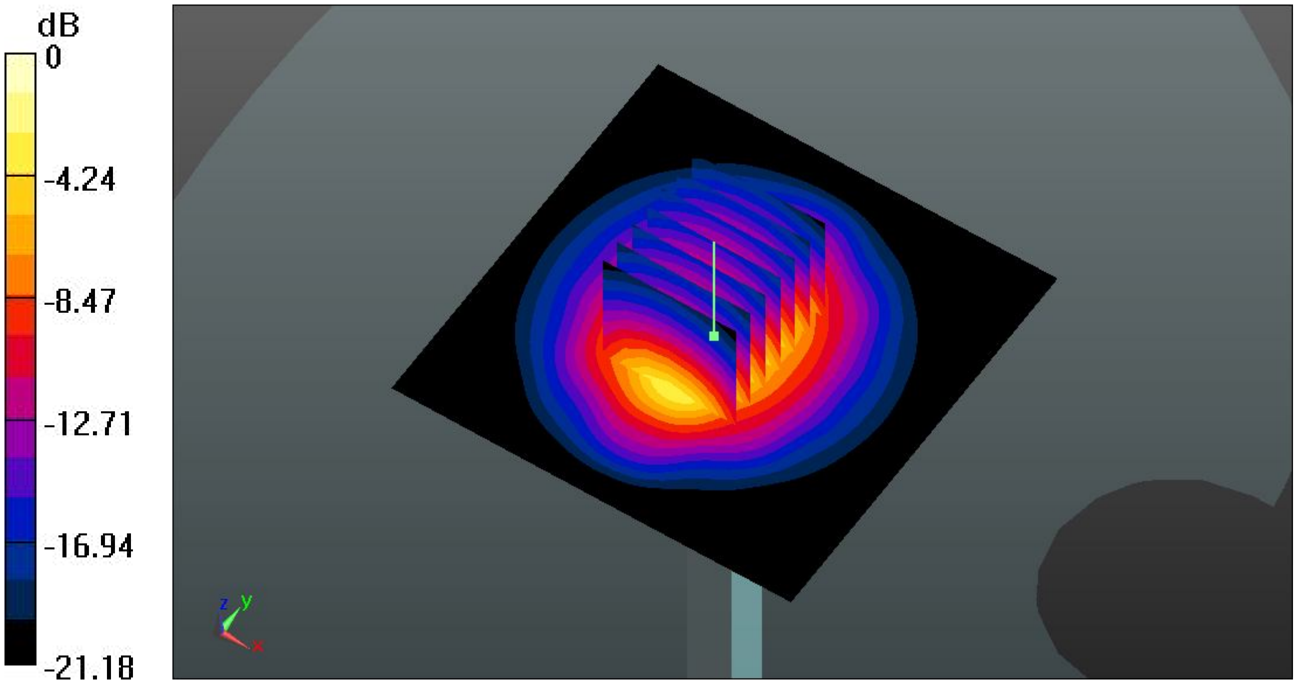
DUT: D2450V2 - SN: 736

Communication System: CW; Frequency: 2450 MHz;Duty Cycle: 1:1
Medium: MSL_2450_121218 Medium parameters used: f = 2450 MHz; σ = 1.939 mho/m; ε_r = 53.98; ρ = 1000 kg/m^3
Ambient Temperature：23.5 ℃; Liquid Temperature：21.5 ℃

DASY5 Configuration:
- Probe: EX3DV4 - SN3819; ConvF(7.21, 7.21, 7.21); Calibrated: 26.11.2012;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1303; Calibrated: 22.11.2012
- Phantom: SAM2; Type: QD000P40CD; Serial: TP:1671
- Measurement SW: DASY52, Version 52.8 (2); SEMCAD X Version 14.6.6 (6824)

Pin=250mW/Area Scan (71x71x1): Interpolated grid: dx=12mm, dy=12mm
Maximum value of SAR (interpolated) = 15.0 W/kg

Pin=250mW/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 87.285 V/m; Power Drift = 0.04 dB
Peak SAR (extrapolated) = 26.712 mW/g
SAR(1 g) = 13.1 mW/g; SAR(10 g) = 6.09 mW/g
Maximum value of SAR (measured) = 15.1 W/kg



0 dB = 15.1 W/kg

System Check_Body_2450MHz_121231

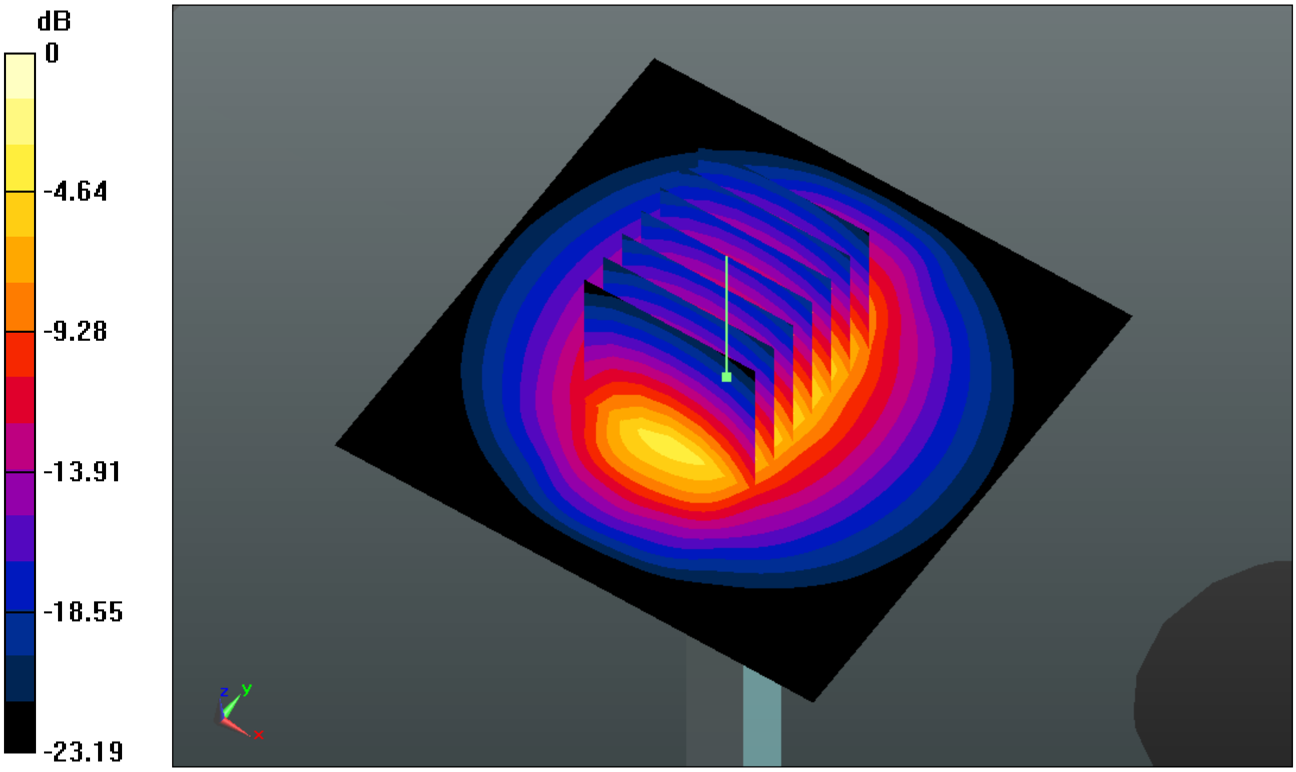
DUT: D2450V2 - SN: 736

Communication System: CW; Frequency: 2450 MHz;Duty Cycle: 1:1
Medium: MSL_2450_121231 Medium parameters used: f = 2450 MHz; σ = 1.976 mho/m; ε_r = 54.13; ρ = 1000 kg/m^3
Ambient Temperature：23.1 ℃; Liquid Temperature：21.3 ℃

DASY5 Configuration:
- Probe: EX3DV4 - SN3857; ConvF(6.94, 6.94, 6.94); Calibrated: 2012-6-20
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn360; Calibrated: 2012-11-15
- Phantom: SAM2; Type: SAM; Serial: TP-1477
- Measurement SW: DASY52, Version 52.8 (2); SEMCAD X Version 14.4.5 (3634)

Pin=250mW/Area Scan (71x71x1): Measurement grid: dx=12mm, dy=12mm
Maximum value of SAR (interpolated) = 20.969 mW/g

Pin=250mW/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 87.401 V/m; Power Drift = 0.02 dB
Peak SAR (extrapolated) = 28.539 W/kg
SAR(1 g) = 13.3 mW/g; SAR(10 g) = 6 mW/g
Maximum value of SAR (measured) = 20.517 mW/g



0 dB = 20.520mW/g