FCC SAR Test Report

APPLICANT	: ZTE CORPORATION
EQUIPMENT	: CDMA 1X&EVDO Multi-Mode Digital Mobile Phone
BRAND NAME	: ZTE
MODEL NAME	: N818S
FCC ID	: SRQ-N818S
STANDARD	: FCC 47 CFR Part 2 (2.1093) ANSI/IEEE C95.1-1992 IEEE 1528-2013

We, Sporton International (XI'AN) 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 (XI'AN) INC., the test report shall not be reproduced except in full.

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Testing Laboratory
2804

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Revision History

REPORT NO.	VERSION	DESCRIPTION	ISSUED DATE
FA760307	Rev. 01	Initial issue of report	Jul. 10, 2017

1. Statement of Compliance

The maximum results of Specific Absorption Rate (SAR) found during testing for ZTE CORPORATION, CDMA 1X&EVDO Multi-Mode Digital Mobile Phone, N818S are as follows.

Equipment Class	Frequency Band		Highest SAR Summary			Highest Simultaneous Transmission 1g SAR (W/kg)
			Head (Separation 0mm)	Hotspot (Separation 10mm)	Body-worn (Separation 15mm)	
			1g SAR (W/kg)			
Licensed	CDMA2000	BC10	0.83	0.89	0.98	1.31
		BC0	**0.97**	0.96	**1.04**	
		BC1	0.93	**1.00**	0.82	
DTS	WLAN	2.4GHz WLAN	0.34	<0.10	<0.10	1.31
Date of Testing:			2017/6/16 ~ 2017/6/22			

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

2. Administration Data

Testing Laboratory	
Test Site	Sporton International (XI'AN) INC.
Test Site Location	No. 39 Building A3, Entrepreneurship Avenue, New industrial park, High-tech district, Xi'an City, Shaanxi Province, P. R. China TEL: +86-029-8860-8767 FAX: +86-029-8860-8791

Applicant	
Company Name	ZTE CORPORATION
Address	ZTE Plaza, Keji Road South, Hi-Tech Industrial Park, Nanshan District, Shenzhen, Guangdong, 518057, P. R. China

Manufacturer	
Company Name	ZTE CORPORATION
Address	ZTE Plaza, Keji Road South, Hi-Tech Industrial Park, Nanshan District, Shenzhen, Guangdong, 518057, P. R. China

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 D06 Hotspot Mode SAR v02r01

4. Equipment Under Test (EUT) Information

4.1 General Information

Product Feature & Specification	
Equipment Name	CDMA 1X&EVDO Multi-Mode Digital Mobile Phone
Brand Name	ZTE
Model Name	N818S
FCC ID	SRQ-N818S
MEID Code	A000006AA90C8D
Wireless Technology and Frequency Range	CDMA2000 BC0: 824.7 MHz ~ 848.31 MHz CDMA 2000 BC1: 1851.25 MHz ~ 1908.75 MHz CDMA 2000 BC10: 817.9 MHz ~ 823.1 MHz WLAN 2.4GHz Band: 2412 MHz ~ 2462 MHz Bluetooth: 2402 MHz ~ 2480 MHz
Mode	CDMA2000 : 1xRTT/1xEv-Do(Rev.0)/1xEv-Do(Rev.A) 802.11b/g/n HT20 Bluetooth v3.0 + EDR, Bluetooth v4.0 LE, Bluetooth v4.1 LE
HW Version	N818SHW1.0
SW Version	N818SV1.0.0B01
EUT Stage	Identical Prototype

Remark:
1. 802.11n-HT40 is not supported in 2.4GHz WLAN and this device 2.4GHz WLAN supports hotspot operation.
2. This device supports VoIP in CDMA2000.
3. When hotspot mode is enabled, power reduction will be activated to limit the maximum power of CDMA2000 BC0/1/10.
4. There are two optional batteries. They have the same model name, brand name and battery capacity. Only different manufacturer , so we only chose one battery to do full SAR testing.

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:

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

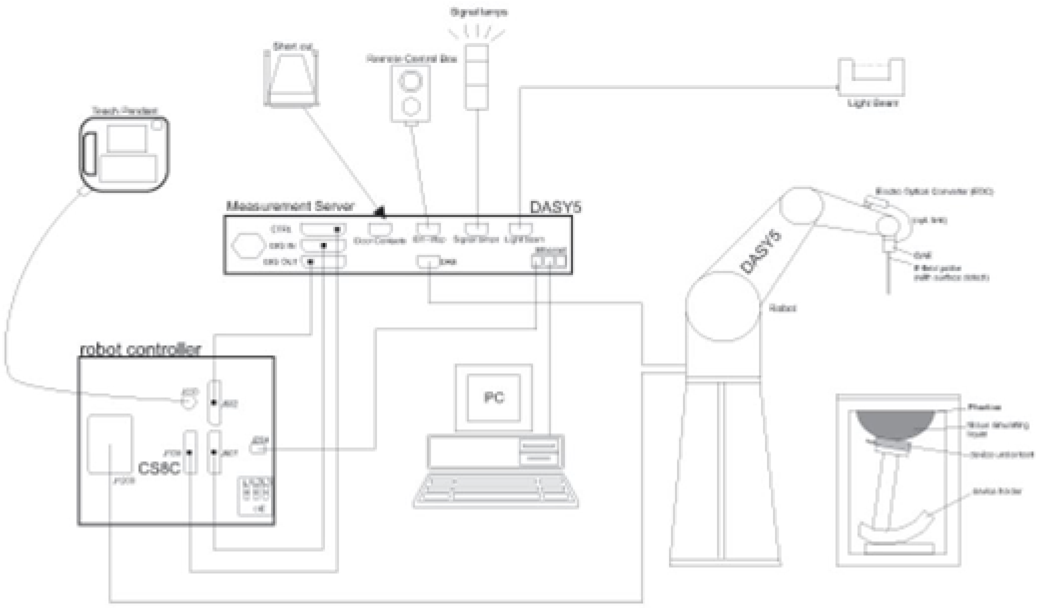
SAR is expressed in units of Watts per kilogram (W/kg)

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

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

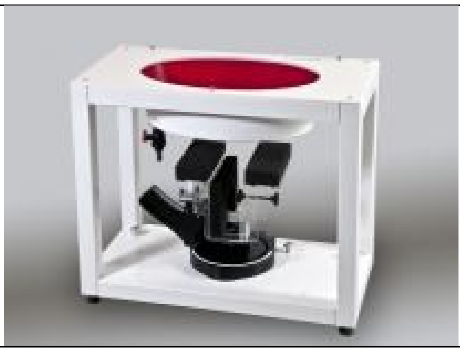
<SAM Twin Phantom>

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



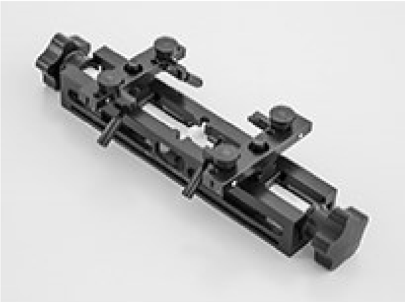
The ELI phantom is intended for compliance testing of handheld and body-mounted wireless devices in the frequency range of 30 MHz to 6 GHz. ELI4 is fully compatible with standard and all known tissue simulating liquids.

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.

<table>
<tr><td colspan="3"></td><td>$\leq$ 3 GHz</td><td>> 3 GHz</td></tr>
<tr><td colspan="3">Maximum zoom scan spatial resolution: Δx_{Zoom}, Δy_{Zoom}</td><td>$\leq$ 2 GHz: $\leq$ 8 mm
2 – 3 GHz: $\leq$ 5 mm*</td><td>3 – 4 GHz: $\leq$ 5 mm*
4 – 6 GHz: $\leq$ 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>$\leq$ 5 mm</td><td>3 – 4 GHz: $\leq$ 4 mm
4 – 5 GHz: $\leq$ 3 mm
5 – 6 GHz: $\leq$ 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>$\leq$ 4 mm</td><td>3 – 4 GHz: $\leq$ 3 mm
4 – 5 GHz: $\leq$ 2.5 mm
5 – 6 GHz: $\leq$ 2 mm</td></tr>
<tr><td>$\Delta z_{Zoom}(n>1)$: between subsequent points</td><td colspan="2">$\leq 1.5 \cdot \Delta z_{Zoom}(n-1)$</td></tr>
<tr><td>Minimum zoom scan volume</td><td colspan="2">x, y, z</td><td>$\geq$ 30 mm</td><td>3 – 4 GHz: $\geq$ 28 mm
4 – 5 GHz: $\geq$ 25 mm
5 – 6 GHz: $\geq$ 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 $\leq$ 1.4 W/kg, $\leq$ 8 mm, $\leq$ 7 mm and $\leq$ 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>

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	4d151	2017/3/20	2018/3/19
SPEAG	1900MHz System Validation Kit	D1900V2	5d170	2017/3/22	2018/3/21
SPEAG	2450MHz System Validation Kit	D2450V2	908	2017/3/21	2018/3/20
SPEAG	Data Acquisition Electronics	DAE4	1358	2016/9/5	2017/9/4
SPEAG	Dosimetric E-Field Probe	EX3DV4	3935	2016/11/28	2017/11/27
SPEAG	Phone Positioner	N/A	N/A	NCR	NCR
SPEAG	SAM Twin Phantom	QD 000 P40 CD	TP-1753	NCR	NCR
SPEAG	SAM Twin Phantom	QD 000 P40 CD	TP-1754	NCR	NCR
Agilent	Wireless Communication Test Set	E5515C	MY52102600	2016/12/5	2017/12/4
Agilent	ENA Series Network Analyzer	E5071C	MY46317418	2016/12/5	2017/12/4
Agilent	Dielectric Probe Kit	85070E	MY44300751	NCR	NCR
Anritsu	Power Senor	MA2411B	1644003	2016/12/23	2017/12/22
Anritsu	Power Meter	ML2495A	1531197	2016/12/23	2017/12/22
Anritsu	Power Senor	MA2411B	1644004	2016/12/23	2017/12/22
Anritsu	Power Meter	ML2495A	1531198	2016/12/23	2017/12/22
R&S	Signal Generator	N5181A	MY50145381	2017/1/3	2018/1/2
R&S	Spectrum Analyzer	FSV 7	101632	2016/12/5	2017/12/4
ARRA	Power Divider	A3200-2	NA	Note	
Agilent	Dual Directional Coupler	778D	50422	Note	
Woken	Attenuation1	WK0602-XX	N/A	Note	
PE	Attenuation2	PE7005-10	N/A	Note	
PE	Attenuation3	PE7005-3	N/A	Note	
AR	Amplifier	5S1G4	342137	Note	

Note:
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.

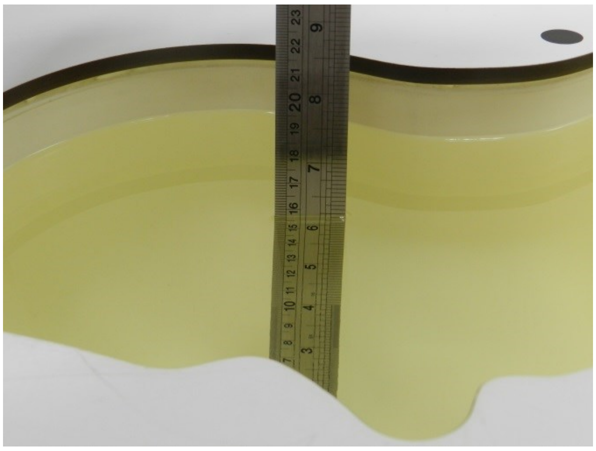


Fig 10.1Photo of Liquid Height for Head SAR

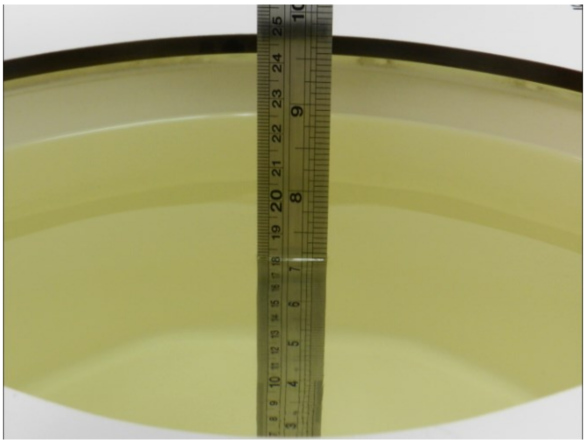


Fig 10.2 Photo of Liquid Height for Body SAR

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
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

<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	22.4	0.899	41.896	0.90	41.50	-0.11	0.95	±5	2017/6/16
1900	Head	22.7	1.434	39.453	1.40	40.00	2.43	-1.37	±5	2017/6/17
2450	Head	22.7	1.824	38.032	1.80	39.20	1.33	-2.98	±5	2017/6/22
835	Body	22.5	1.000	55.524	0.97	55.20	3.09	0.59	±5	2017/6/16
1900	Body	22.4	1.535	52.514	1.52	53.30	0.99	-1.47	±5	2017/6/12
2450	Body	22.6	1.992	51.529	1.95	52.70	2.15	-2.22	±5	2017/6/22

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)	Tissue Type	Input Power (mW)	Dipole S/N	Probe S/N	DAE S/N	Measured 1g SAR (W/kg)	Targeted 1g SAR (W/kg)	Normalized 1g SAR (W/kg)	Deviation (%)
2017/6/16	835	Head	250	4d151	3935	1358	2.41	9.73	9.64	-0.92
2017/6/17	1900	Head	250	5d170	3935	1358	9.81	40.00	39.24	-1.90
2017/6/22	2450	Head	250	908	3935	1358	13.60	53.20	54.4	2.26
2017/6/16	835	Body	250	4d151	3935	1358	2.56	9.72	10.24	5.35
2017/6/12	1900	Body	250	5d170	3935	1358	10.80	40.70	43.2	6.14
2017/6/22	2450	Body	250	908	3935	1358	12.20	50.90	48.8	-4.13

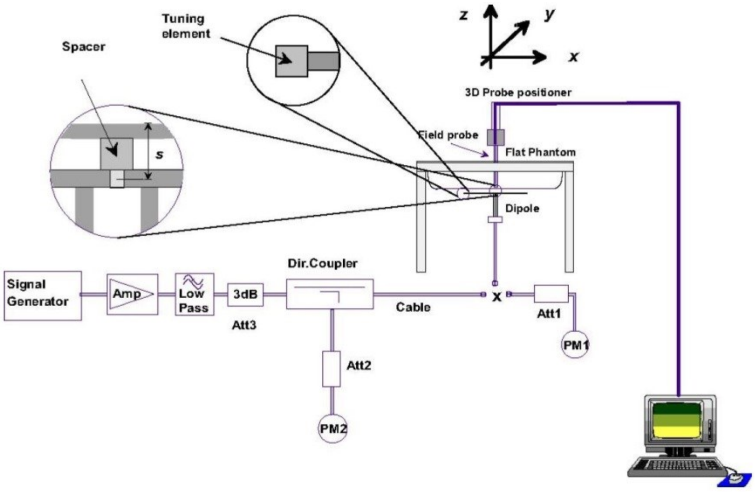


Fig 8.3.1 System Performance Check Setup

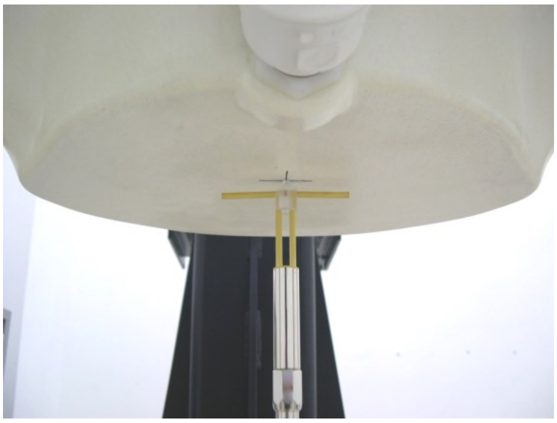


Fig 8.3.2 Setup Photo

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.

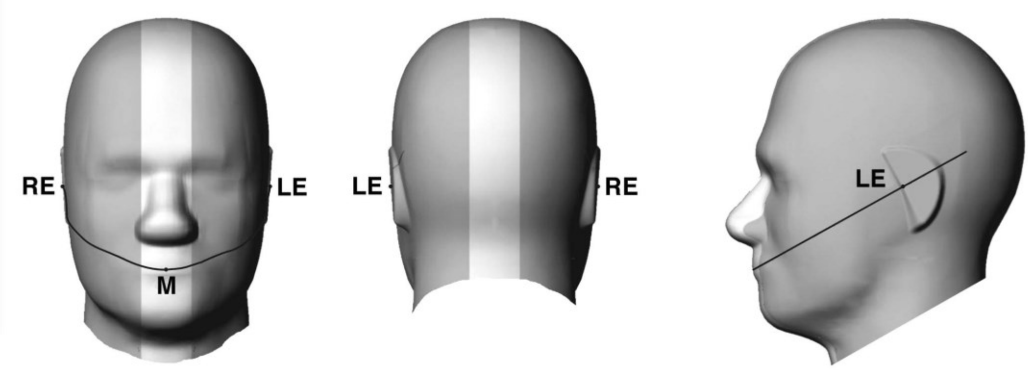


Fig 9.1.1 Front, back, and side views of SAM twin phantom

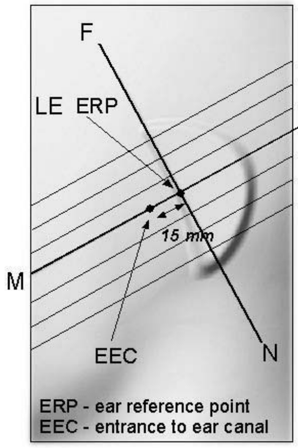


Fig 9.1.2 Close-up side view of phantom showing the ear region.

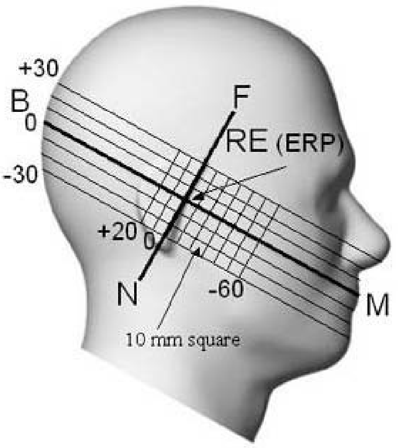


Fig 9.1.3 Side view of the phantom showing relevant markings and seven cross-sectional plane locations

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.

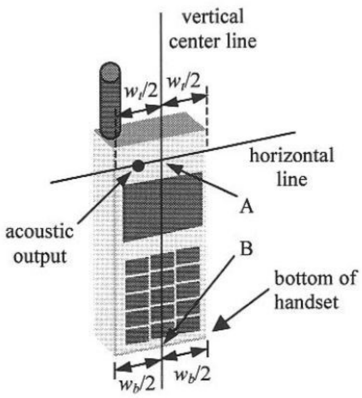


Fig 9.2.1 Handset vertical and horizontal reference lines—"fixed case

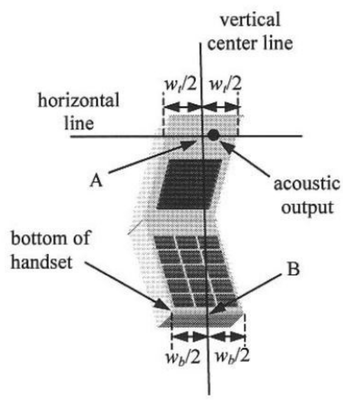


Fig 9.2.2 Handset vertical and horizontal reference lines—"clam-shell case"

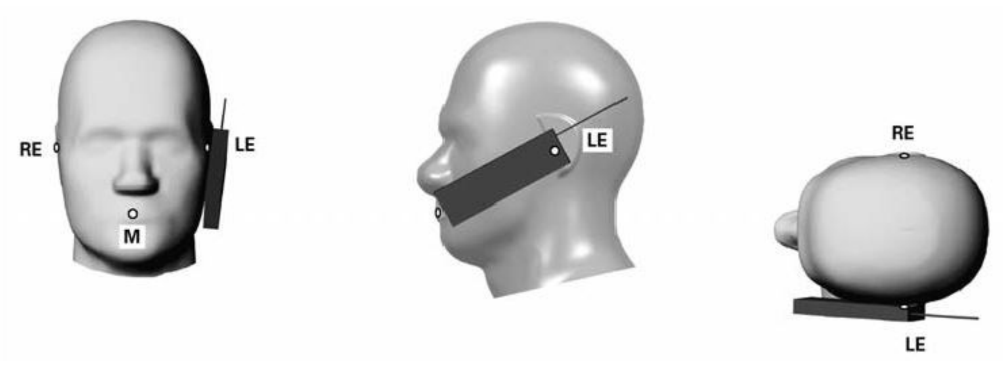


Fig 9.2.3 cheek or touch position. The reference points for the right ear (RE), left ear (LE), and mouth (M), which establish the Reference Plane for handset positioning, are indicated.

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

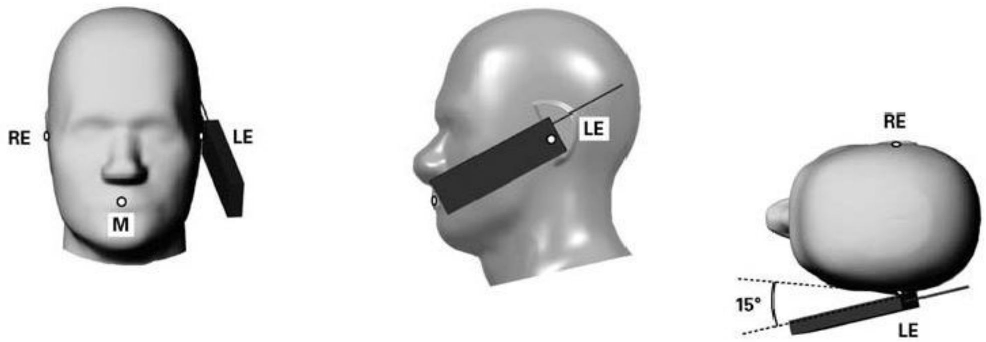


Fig 9.3.1 Tilt position. The reference points for the right ear (RE), left ear (LE), and mouth (M), which define the Reference Plane for handset positioning, are indicated.

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.

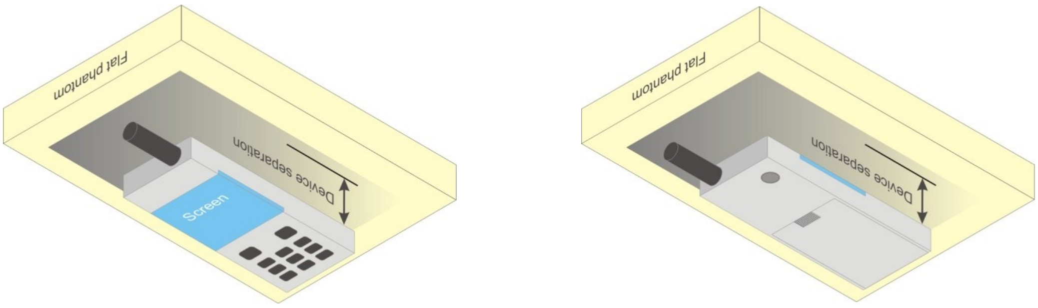


Fig 9.4 Body Worn Position

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)

<CDMA2000 Conducted Power>

General Note:

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

<Full Power>

Band	CDMA2000 BC0			Tune-up Limit (dBm)	CDMA2000 BC1			Tune-up Limit (dBm)	CDMA2000 BC10			Tune-up Limit (dBm)
Tx Channel	1013	384	777		25	600	1175		476	580	684	
Frequency (MHz)	824.7	836.52	848.31		1851.25	1880	1908.75		817.9	820.5	823.1	
RC1 SO55	23.63	23.91	23.42	24.00	23.69	23.84	23.32	24.00	23.81	23.89	23.67	24.00
RC3 SO55	23.62	**23.93**	23.40	24.00	23.45	**23.90**	23.44	24.00	23.80	**23.90**	23.67	24.00
RC3 SO32 (F+SCH)	23.58	23.92	23.39	24.00	23.57	23.88	23.41	24.00	23.78	23.88	23.68	24.00
RC3 SO32 (+SCH)	23.65	23.88	23.34	24.00	23.59	23.87	23.36	24.00	23.82	23.87	23.71	24.00
RTAP 153.6Kbps	23.43	23.65	23.23	24.00	23.62	23.89	23.18	24.00	23.59	23.68	23.47	24.00
RETAP 4096Bits	23.46	23.64	23.24	24.00	23.45	23.87	23.10	24.00	23.51	23.67	23.46	24.00

<Reduced Power for Hotspot On>

Band	CDMA2000 BC0			Tune-up Limit (dBm)	CDMA2000 BC1			Tune-up Limit (dBm)	CDMA2000 BC10			Tune-up Limit (dBm)
Tx Channel	1013	384	777		25	600	1175		476	580	684	
Frequency (MHz)	824.7	836.52	848.31		1851.25	1880	1908.75		817.9	820.5	823.1	
RC1 SO55	21.98	22.24	22.10	22.50	21.64	21.63	21.59	22.50	22.40	22.48	22.46	22.50
RC3 SO55	21.99	**22.25**	22.12	22.50	21.67	**21.71**	21.63	22.50	22.42	**22.49**	22.40	22.50
RC3 SO32 (F+SCH)	22.06	22.24	22.15	22.50	21.61	21.69	21.59	22.50	22.40	22.47	22.36	22.50
RC3 SO32 (+SCH)	22.09	22.20	22.10	22.50	21.66	21.65	21.61	22.50	22.45	22.46	22.40	22.50
RTAP 153.6Kbps	21.95	22.22	22.01	22.50	21.68	21.70	21.62	22.50	22.31	22.46	22.25	22.50
RETAP 4096Bits	21.94	22.21	22.00	22.50	21.67	21.68	21.60	22.50	22.30	22.41	22.18	22.50

<WLAN Conducted Power>

General Note:

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

<2.4GHz WLAN>

	Mode	Channel	Frequency (MHz)	Average power (dBm)	Tune-Up Limit	Duty Cycle %
2.4GHz WLAN	802.11b 1Mbps	1	2412	15.10	15.50	97.59
		6	2437	14.47	15.50	
		11	2462	14.78	15.50	
	802.11g 6Mbps	1	2412	12.82	13.50	87.44
		6	2437	12.96	13.50	
		11	2462	13.11	13.50	
	802.11n-HT20 MCS0	1	2412	10.83	11.50	86.70
		6	2437	11.04	11.50	
		11	2462	11.23	11.50	

13. Bluetooth Exclusions Applied

Mode Band	Average Power(dBm)	
	Bluetooth v3.0+EDR	Bluetooth v4.0/4.1 LE
2.4GHz Bluetooth	10.50	2.00

Note:

Per KDB 447498 D01v06, the 1-g and 10-g SAR test exclusion thresholds for 100 MHz to 6 GHz at *test separation distances* ≤ 50 mm are determined by:

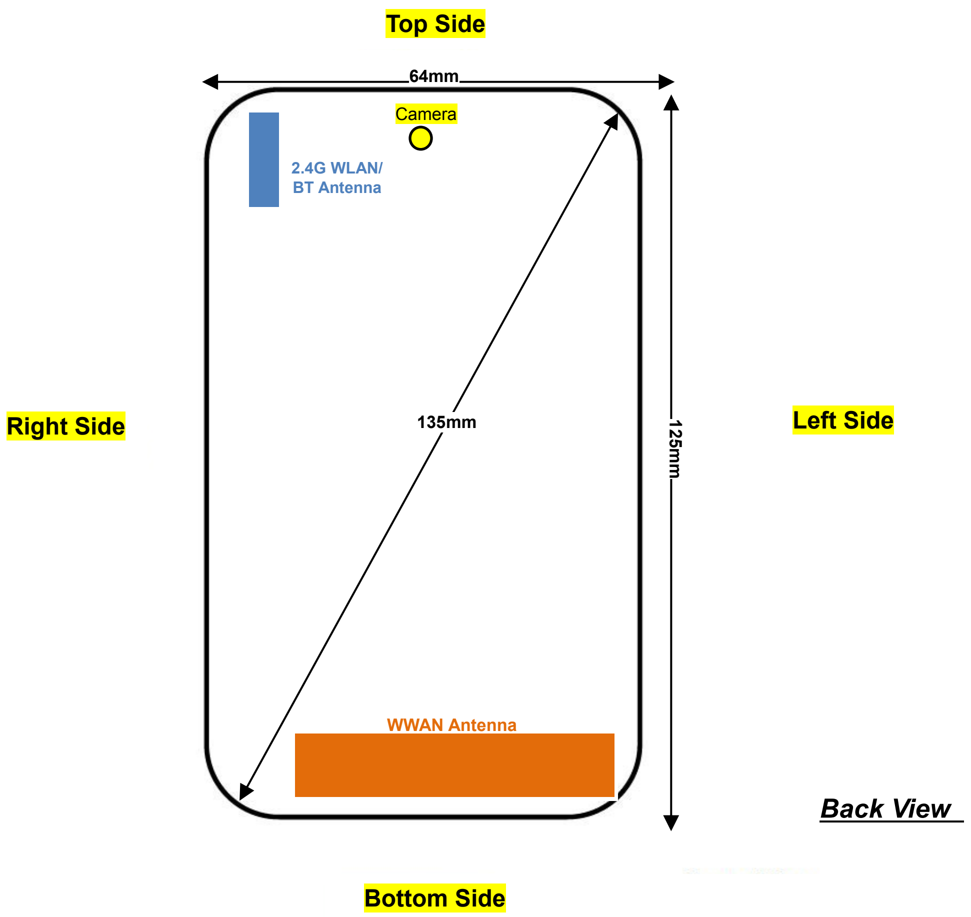
[(*max. power of channel, including tune-up tolerance, mW*)/(*min. test separation distance, mm*)] ·[√f(GHz)] ≤ 3.0 for 1-g SAR and ≤ 7.5 for 10-g extremity SAR

- f(GHz) is the RF channel transmit frequency in GHz
- Power and distance are rounded to the nearest mW and mm before calculation
- The result is rounded to one decimal place for comparison

Bluetooth Max Power (dBm)	Separation Distance (mm)	Frequency (GHz)	Exclusion Thresholds
10.50	10	2.48	1.7

Note: Per KDB 447498 D01v06, the test exclusion threshold is 1.7 which is <= 3, SAR testing is not required.

14. 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	> 25mm	≤ 25mm	≤ 25mm	≤ 25mm
BT&WLAN	≤ 25mm	≤ 25mm	≤ 25mm	> 25mm	≤ 25mm	> 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	Yes	No

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.

15. 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: 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 KDB 648474 D04v01r03, when the reported SAR for a body-worn accessory measured without a headset connected to the handset is ≤ 1.2 W/kg, SAR testing with a headset connected to the handset is not required.
5. When hotspot mode is enabled, power reduction will be activated to limit the maximum power of CDMA2000 BC0/1/10.

CDMA Note:

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

WLAN Note:

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

15.1 Head SAR

<CDMA2000 SAR>

Plot No.	Band	Mode	Test Position	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)
	CDMA2000 BC10	RC3 SO55	Right Cheek	Hotspot Off	580	820.5	23.90	24.00	1.023	0.09	0.783	0.801
	CDMA2000 BC10	RC3 SO55	Right Tilted	Hotspot Off	580	820.5	23.90	24.00	1.023	-0.05	0.592	0.606
	CDMA2000 BC10	RC3 SO55	Left Cheek	Hotspot Off	580	820.5	23.90	24.00	1.023	0.19	0.620	0.634
	CDMA2000 BC10	RC3 SO55	Left Tilted	Hotspot Off	580	820.5	23.90	24.00	1.023	0.04	0.520	0.532
	CDMA2000 BC10	RC3 SO55	Right Cheek	Hotspot Off	476	817.9	23.80	24.00	1.047	0.14	0.767	0.803
01	CDMA2000 BC10	RC3 SO55	Right Cheek	Hotspot Off	684	823.1	23.67	24.00	1.079	0.09	0.769	**0.830**
	CDMA2000 BC0	RC3 SO55	Right Cheek	Hotspot Off	384	836.52	23.93	24.00	1.016	0.09	0.801	0.814
	CDMA2000 BC0	RC3 SO55	Right Tilted	Hotspot Off	384	836.52	23.93	24.00	1.016	0.05	0.610	0.620
	CDMA2000 BC0	RC3 SO55	Left Cheek	Hotspot Off	384	836.52	23.93	24.00	1.016	0.16	0.630	0.640
	CDMA2000 BC0	RC3 SO55	Left Tilted	Hotspot Off	384	836.52	23.93	24.00	1.016	0.01	0.725	0.737
02	CDMA2000 BC0	RC3 SO55	Right Cheek	Hotspot Off	1013	824.7	23.62	24.00	1.091	0.11	0.888	**0.969**
	CDMA2000 BC0	RC3 SO55	Right Cheek	Hotspot Off	777	848.31	23.40	24.00	1.148	0.09	0.775	0.890
	CDMA2000 BC1	RC3 SO55	Right Cheek	Hotspot Off	600	1880	23.90	24.00	1.023	0.11	0.474	0.485
	CDMA2000 BC1	RC3 SO55	Right Tilted	Hotspot Off	600	1880	23.90	24.00	1.023	0.03	0.322	0.330
03	CDMA2000 BC1	RC3 SO55	Left Cheek	Hotspot Off	600	1880	23.90	24.00	1.023	0.07	0.913	**0.934**
	CDMA2000 BC1	RC3 SO55	Left Tilted	Hotspot Off	600	1880	23.90	24.00	1.023	0.17	0.316	0.323
	CDMA2000 BC1	RC3 SO55	Left Cheek	Hotspot Off	25	1851.25	23.45	24.00	1.135	0.18	0.819	0.930
	CDMA2000 BC1	RC3 SO55	Left Cheek	Hotspot Off	1175	1908.75	23.44	24.00	1.138	-0.07	0.817	0.929

<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	Power Drift (dB)	Max Area Scan	Measured 1g SAR (W/kg)	Reported 1g SAR (W/kg)
	WLAN 2.4GHz	802.11b 1Mbps	Right Cheek	1	2412	15.10	15.50	1.096	97.59	1.025		0.164		
	WLAN 2.4GHz	802.11b 1Mbps	Right Tilted	1	2412	15.10	15.50	1.096	97.59	1.025		0.137		
04	WLAN 2.4GHz	802.11b 1Mbps	Left Cheek	1	2412	15.10	15.50	1.096	97.59	1.025	0.04	0.507	0.302	**0.339**
	WLAN 2.4GHz	802.11b 1Mbps	Left Tilted	1	2412	15.10	15.50	1.096	97.59	1.025		0.236		

15.2 Hotspot SAR

<CDMA2000 SAR>

Plot No.	Band	Mode	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)
	CDMA2000 BC10	RTAP 153.6Kbps	Front	10	Hotspot On	580	820.5	22.46	22.5	1.009	0.02	0.628	0.634
	CDMA2000 BC10	RTAP 153.6Kbps	Back	10	Hotspot On	580	820.5	22.46	22.5	1.009	0.04	0.802	0.809
	CDMA2000 BC10	RTAP 153.6Kbps	Left Side	10	Hotspot On	580	820.5	22.46	22.5	1.009	0.04	0.635	0.641
	CDMA2000 BC10	RTAP 153.6Kbps	Right Side	10	Hotspot On	580	820.5	22.46	22.5	1.009	0.01	0.669	0.675
	CDMA2000 BC10	RTAP 153.6Kbps	Bottom Side	10	Hotspot On	580	820.5	22.46	22.5	1.009	0.1	0.114	0.115
	CDMA2000 BC10	RTAP 153.6Kbps	Back	10	Hotspot On	476	817.9	22.31	22.5	1.045	-0.08	0.747	0.780
05	CDMA2000 BC10	RTAP 153.6Kbps	Back	10	Hotspot On	684	823.1	22.25	22.5	1.059	-0.01	0.843	**0.893**
	CDMA2000 BC0	RTAP 153.6Kbps	Front	10	Hotspot On	384	836.52	22.22	22.5	1.067	-0.02	0.635	0.677
	CDMA2000 BC0	RTAP 153.6Kbps	Back	10	Hotspot On	384	836.52	22.22	22.5	1.067	0.01	0.809	0.863
	CDMA2000 BC0	RTAP 153.6Kbps	Left Side	10	Hotspot On	384	836.52	22.22	22.5	1.067	-0.01	0.684	0.730
	CDMA2000 BC0	RTAP 153.6Kbps	Right Side	10	Hotspot On	384	836.52	22.22	22.5	1.067	0.11	0.697	0.743
	CDMA2000 BC0	RTAP 153.6Kbps	Bottom Side	10	Hotspot On	384	836.52	22.22	22.5	1.067	0.19	0.120	0.128
06	CDMA2000 BC0	RTAP 153.6Kbps	Back	10	Hotspot On	1013	824.7	21.95	22.5	1.135	-0.01	0.841	**0.955**
	CDMA2000 BC0	RTAP 153.6Kbps	Back	10	Hotspot On	777	848.31	22.01	22.5	1.119	-0.03	0.817	0.915
	CDMA2000 BC1	RTAP 153.6Kbps	Front	10	Hotspot On	600	1880	21.7	22.5	1.202	0.13	0.538	0.647
	CDMA2000 BC1	RTAP 153.6Kbps	Back	10	Hotspot On	600	1880	21.7	22.5	1.202	0.05	0.804	0.967
	CDMA2000 BC1	RTAP 153.6Kbps	Left Side	10	Hotspot On	600	1880	21.7	22.5	1.202	-0.06	0.224	0.269
	CDMA2000 BC1	RTAP 153.6Kbps	Right Side	10	Hotspot On	600	1880	21.7	22.5	1.202	0.13	0.122	0.147
	CDMA2000 BC1	RTAP 153.6Kbps	Bottom Side	10	Hotspot On	600	1880	21.7	22.5	1.202	0.01	0.473	0.569
	CDMA2000 BC1	RTAP 153.6Kbps	Back	10	Hotspot On	25	1851.25	21.68	22.5	1.208	0.06	0.750	0.906
07	CDMA2000 BC1	RTAP 153.6Kbps	Back	10	Hotspot On	1175	1908.75	21.62	22.5	1.225	0.14	0.817	**1.001**

<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	Power Drift (dB)	Max Area Scan SAR	Measured 1g SAR (W/kg)	Reported 1g SAR (W/kg)
	WLAN 2.4GHz	802.11b 1Mbps	Front	10	1	2412	15.1	15.5	1.096	97.59	1.025		0.046		
	WLAN 2.4GHz	802.11b 1Mbps	Back	10	1	2412	15.1	15.5	1.096	97.59	1.025		0.0734		
	WLAN 2.4GHz	802.11b 1Mbps	Right side	10	1	2412	15.1	15.5	1.096	97.59	1.025		0.0518		
08	WLAN 2.4GHz	802.11b 1Mbps	Top side	10	1	2412	15.1	15.5	1.096	97.59	1.025	0.02	0.101	0.061	**0.069**

15.3 Body Worn Accessory SAR

<CDMA2000 SAR>

Plot No.	Band	Mode	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)
	CDMA2000 BC10	RC3 SO32 (F+SCH)	Front	15	Hotspot Off	580	820.5	23.88	24	1.028	-0.08	0.793	0.815
	CDMA2000 BC10	RC3 SO32 (F+SCH)	Back	15	Hotspot Off	580	820.5	23.88	24	1.028	-0.07	0.859	0.883
	CDMA2000 BC10	RC3 SO32 (F+SCH)	Front	15	Hotspot Off	476	817.9	23.78	24	1.052	-0.02	0.804	0.846
	CDMA2000 BC10	RC3 SO32 (F+SCH)	Front	15	Hotspot Off	684	823.1	23.68	24	1.076	0.05	0.885	0.953
	CDMA2000 BC10	RC3 SO32 (F+SCH)	Back	15	Hotspot Off	476	817.9	23.78	24	1.052	-0.01	0.805	0.847
09	CDMA2000 BC10	RC3 SO32 (F+SCH)	Back	15	Hotspot Off	684	823.1	23.68	24	1.076	-0.02	0.914	**0.984**
	CDMA2000 BC0	RC3 SO32 (F+SCH)	Front	15	Hotspot Off	384	836.52	23.92	24	1.019	0.03	0.736	0.750
	CDMA2000 BC0	RC3 SO32 (F+SCH)	Back	15	Hotspot Off	384	836.52	23.92	24	1.019	-0.04	0.866	0.882
10	CDMA2000 BC0	RC3 SO32 (F+SCH)	Back	15	Hotspot Off	1013	824.7	23.58	24	1.102	-0.02	0.948	**1.044**
	CDMA2000 BC0	RC3 SO32 (F+SCH)	Back	15	Hotspot Off	777	848.31	23.39	24	1.151	-0.05	0.854	0.983
	CDMA2000 BC1	RC3 SO32 (F+SCH)	Front	15	Hotspot Off	600	1880	23.88	24	1.028	0.09	0.534	0.549
11	CDMA2000 BC1	RC3 SO32 (F+SCH)	Back	15	Hotspot Off	600	1880	23.88	24	1.028	0.04	0.794	**0.816**
	CDMA2000 BC1	RC3 SO32 (F+SCH)	Back	15	Hotspot Off	25	1851.25	23.57	24	1.104	0.07	0.590	0.651
	CDMA2000 BC1	RC3 SO32 (F+SCH)	Back	15	Hotspot Off	1175	1908.75	23.41	24	1.146	-0.05	0.587	0.672

<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	Power Drift (dB)	Max Area Scan SAR	Measured 1g SAR (W/kg)	Reported 1g SAR (W/kg)
	WLAN 2.4GHz	802.11b 1Mbps	Front	15	1	2412	15.1	15.5	1.096	97.59	1.025		0.029		
12	WLAN 2.4GHz	802.11b 1Mbps	Back	15	1	2412	15.1	15.5	1.096	97.59	1.025	0.03	0.0333	0.021	**0.024**

15.4 Repeated SAR Measurement

No.	Band	Mode	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	CDMA2000 BC0	RC3 SO32 (F+SCH)	Back	15	Hotspot Off	1013	824.7	23.58	24	1.102	-0.02	0.948	1	1.044
2nd	CDMA2000 BC0	RC3 SO32 (F+SCH)	Back	15	Hotspot Off	1013	824.7	23.58	24	1.102	-0.04	0.946	1.002	1.042
1st	CDMA2000 BC1	RC3 SO55	Left Cheek	-	Hotspot Off	600	1880	23.90	24.00	1.023	0.07	0.913	1	0.934
2nd	CDMA2000 BC1	RC3 SO55	Left Tilted	-	Hotspot Off	600	1880	23.90	24.00	1.023	0.06	0.867	1.053	0.887

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.

16. Simultaneous Transmission Analysis

NO.	Simultaneous Transmission Configurations	Portable Handset			Note
		Head	Body-worn	Hotspot	
1.	CDMA + WLAN2.4GHz	Yes	Yes	Yes	WLAN Hotspot
2.	CDMA + Bluetooth		Yes	Yes	BT Tethering

General Note:

1. This device supports VoIP in CDMA2000.
2. This device 2.4GHz WLAN supports hotspot operation.
3. WLAN and Bluetooth share the same antenna, and cannot transmit simultaneously.
4. Chose the worse zoom scan SAR of WLAN2.4GHz SAR for co-located with WWAN analysis.
5. The reported SAR summation is calculated based on the same configuration and test position.
6. 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.
7. For simultaneous transmission analysis, Bluetooth SAR is estimated per KDB 447498 D01v06 based on the formula below.
   i) (*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.
   ii) When the minimum separation distance is < 5mm, the distance is used 5mm to determine SAR test exclusion.
   iii) 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 Max Power	Exposure Position	Hotspot	Body worn
	Test separation (mm)	10 mm	15 mm
10.5 dBm	Estimated SAR (W/kg)	0.231 W/kg	0.154 W/kg

16.1 Head Exposure Conditions

WWAN Band		Exposure Position	1	2	1+2 Summed 1g SAR (W/kg)
			WWAN	2.4GHz WLAN	
			1g SAR (W/kg)	1g SAR (W/kg)	
CDMA2000	BC10	Right Cheek	0.830	0.339	1.17
		Right Tilted	0.606	0.339	0.95
		Left Cheek	0.634	0.339	0.97
		Left Tilted	0.532	0.339	0.87
	BC0	Right Cheek	0.969	0.339	**1.31**
		Right Tilted	0.620	0.339	0.96
		Left Cheek	0.640	0.339	0.98
		Left Tilted	0.737	0.339	1.08
	BC1	Right Cheek	0.485	0.339	0.82
		Right Tilted	0.330	0.339	0.67
		Left Cheek	0.934	0.339	1.27
		Left Tilted	0.323	0.339	0.66

16.2 Hotspot Exposure Conditions

WWAN Band		Exposure Position	1	2	3	1+2 Summed 1g SAR (W/kg)	1+3 Summed 1g SAR (W/kg)
			WWAN	2.4GHz WLAN	Bluetooth		
			1g SAR (W/kg)	1g SAR (W/kg)	Estimated 1g SAR (W/kg)		
CDMA2000	BC10	Front	0.634	0.069	0.231	0.70	0.87
		Back	0.893	0.069	0.231	0.96	1.12
		Left side	0.641			0.64	0.64
		Right side	0.675	0.069	0.231	0.74	0.91
		Top side		0.069	0.231	0.07	0.23
		Bottom side	0.115			0.12	0.12
	BC0	Front	0.677	0.069	0.231	0.75	0.91
		Back	0.955	0.069	0.231	1.02	1.19
		Left side	0.730			0.73	0.73
		Right side	0.743	0.069	0.231	0.81	0.97
		Top side		0.069	0.231	0.07	0.23
		Bottom side	0.128			0.13	0.13
	BC1	Front	0.647	0.069	0.231	0.72	0.88
		Back	1.001	0.069	0.231	1.07	1.23
		Left side	0.269			0.27	0.27
		Right side	0.147	0.069	0.231	0.22	0.38
		Top side		0.069	0.231	0.07	0.23
		Bottom side	0.569			0.57	0.57

16.3 Body-Worn Accessory Exposure Conditions

WWAN Band		Exposure Position	1 WWAN 1g SAR (W/kg)	2 2.4GHz WLAN 1g SAR (W/kg)	3 Bluetooth Estimated 1g SAR (W/kg)	1+2 Summed 1g SAR (W/kg)	1+3 Summed 1g SAR (W/kg)
CDMA2000	BC10	Front	0.953	0.024	0.154	0.98	1.11
		Back	0.984	0.024	0.154	1.01	1.14
	BC0	Front	0.750	0.024	0.154	0.77	0.90
		Back	1.044	0.024	0.154	1.07	1.20
	BC1	Front	0.549	0.024	0.154	0.57	0.70
		Back	0.816	0.024	0.154	0.84	0.97

Test Engineer： Kat Yin

17. 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 17.1. 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 17.2. Uncertainty Budget for frequency range 300 MHz to 3 GHz

18. 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 D06 v02r01, "SAR Evaluation Procedures for Portable Devices with Wireless Router Capabilities", Oct 2015.

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

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

Appendix A. Plots of System Performance Check

The plots are shown as follows.

Test Laboratory: Sporton International Inc. SAR/HAC Testing Lab　　　　　Date: 2017/6/16

System Check_Head_835MHz_20170616

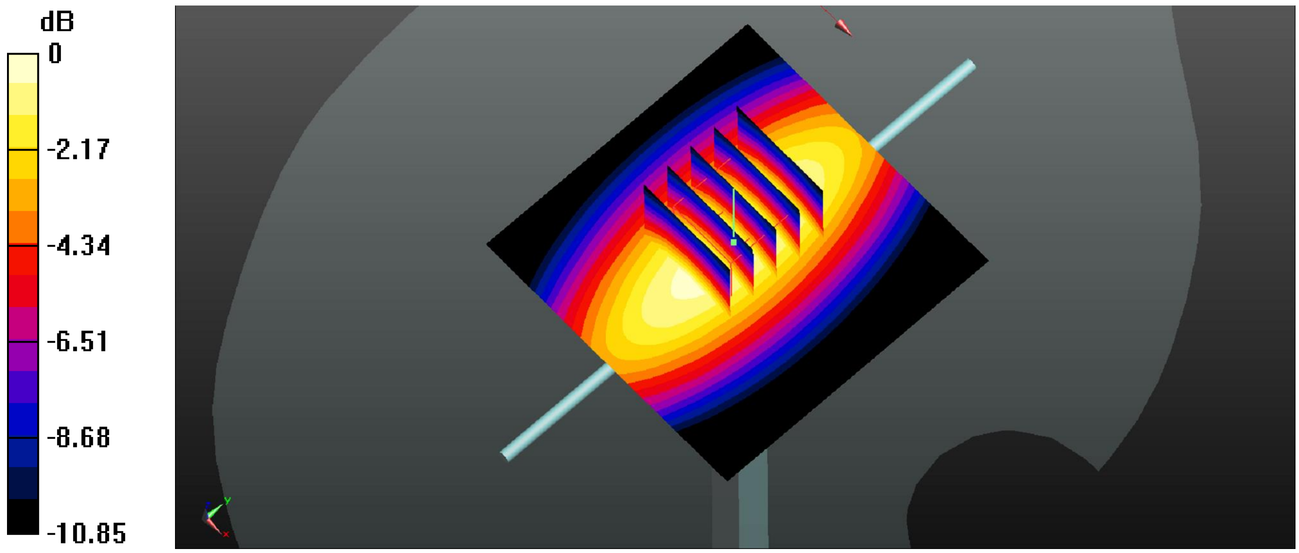
DUT: D835V2-SN: 4d151

Communication System: UID 0, CW; Frequency: 835 MHz;Duty Cycle: 1:1
Medium: HSL_835_2017/06/16 Medium parameters used: f = 835 MHz; σ = 0.899 S/m; ε_r = 41.896; ρ = 1000 kg/m^3
Ambient Temperature：23.3 ℃; Liquid Temperature ：22.4 ℃

DASY5 Configuration:
- Probe: EX3DV4 - SN3935; ConvF(10.61, 10.61, 10.61); Calibrated: 2016/11/28;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1358; Calibrated: 2016/9/5
- Phantom: SAM1; Type: QD000P40CD; Serial: TP:1753
- 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) = 3.19 W/kg

Pin=250mW/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 55.39 V/m; Power Drift = 0.02 dB
Peak SAR (extrapolated) = 3.63 W/kg
SAR(1 g) = 2.41 W/kg; SAR(10 g) = 1.57 W/kg
Maximum value of SAR (measured) = 3.22 W/kg



0 dB = 3.22 W/kg

System Check_Head_1900MHz_20170617

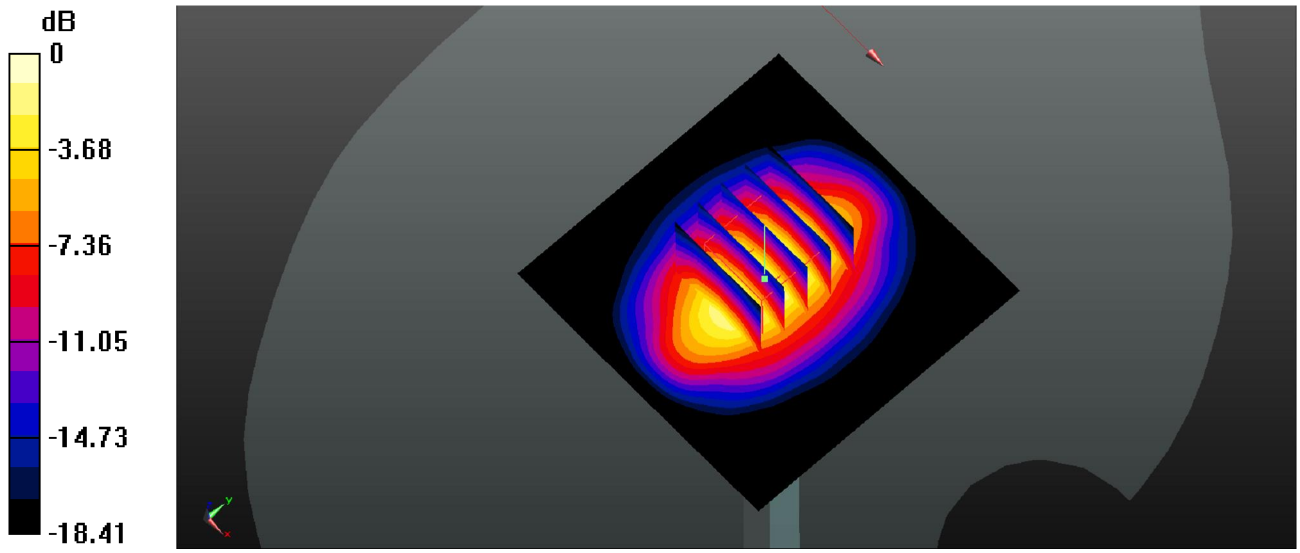
DUT: D1900V2-SN: 5d170

Communication System: UID 0, CW; Frequency: 1900 MHz;Duty Cycle: 1:1
Medium: HSL_1900_2017/06/17 Medium parameters used: f = 1900 MHz; σ = 1.434 S/m; ε_r = 39.453; ρ = 1000 kg/m^3
Ambient Temperature：23.5 ℃; Liquid Temperature ：22.7 ℃

DASY5 Configuration:
- Probe: EX3DV4 - SN3935; ConvF(8.64, 8.64, 8.64); Calibrated: 2016/11/28;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1358; Calibrated: 2016/9/5
- Phantom: SAM2; Type: QD000P40CD; Serial: TP:1754
- 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) = 15.3 W/kg

Pin=250mW/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 98.84 V/m; Power Drift = 0.05 dB
Peak SAR (extrapolated) = 18.7 W/kg
SAR(1 g) = 9.81 W/kg; SAR(10 g) = 5.05 W/kg
Maximum value of SAR (measured) = 15.5 W/kg



0 dB = 15.5 W/kg

Test Laboratory: Sporton International Inc. SAR/HAC Testing Lab Date: 2017/6/22

System Check_Head_2450MHz_20170622

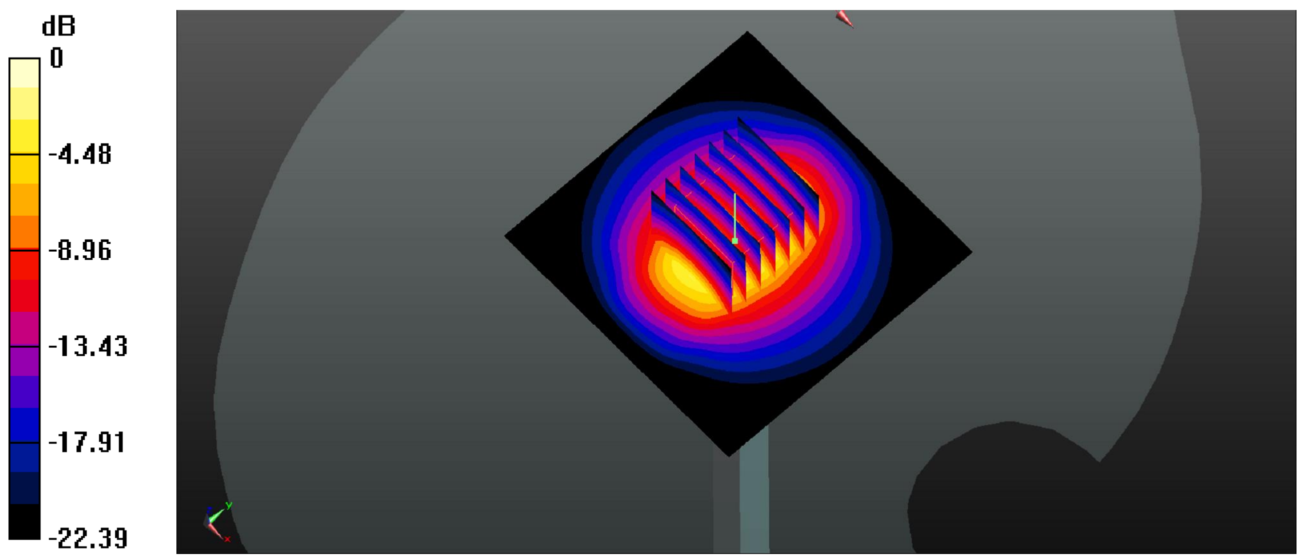
DUT: D2450V2-SN:908

Communication System: UID 0, CW; Frequency: 2450 MHz;Duty Cycle: 1:1
Medium: HSL_2450_2017/06/22 Medium parameters used: f = 2450 MHz; σ = 1.824 S/m; ε_r = 38.032; ρ = 1000 kg/m^3
Ambient Temperature：23.5 ℃; Liquid Temperature ：22.7 ℃

DASY5 Configuration:
- Probe: EX3DV4 - SN3935; ConvF(7.81, 7.81, 7.81); Calibrated: 2016/11/28;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1358; Calibrated: 2016/9/5
- Phantom: SAM2; Type: QD000P40CD; Serial: TP:1754
- 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) = 23.7 W/kg

Pin=250mW/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 92.28 V/m; Power Drift = -0.06 dB
Peak SAR (extrapolated) = 29.2 W/kg
SAR(1 g) = 13.6 W/kg; SAR(10 g) = 6.21 W/kg
Maximum value of SAR (measured) = 23.4 W/kg



0 dB = 23.4 W/kg

Test Laboratory: Sporton International Inc. SAR/HAC Testing Lab Date: 2017/6/16

System Check_Body_835MHz_20170616

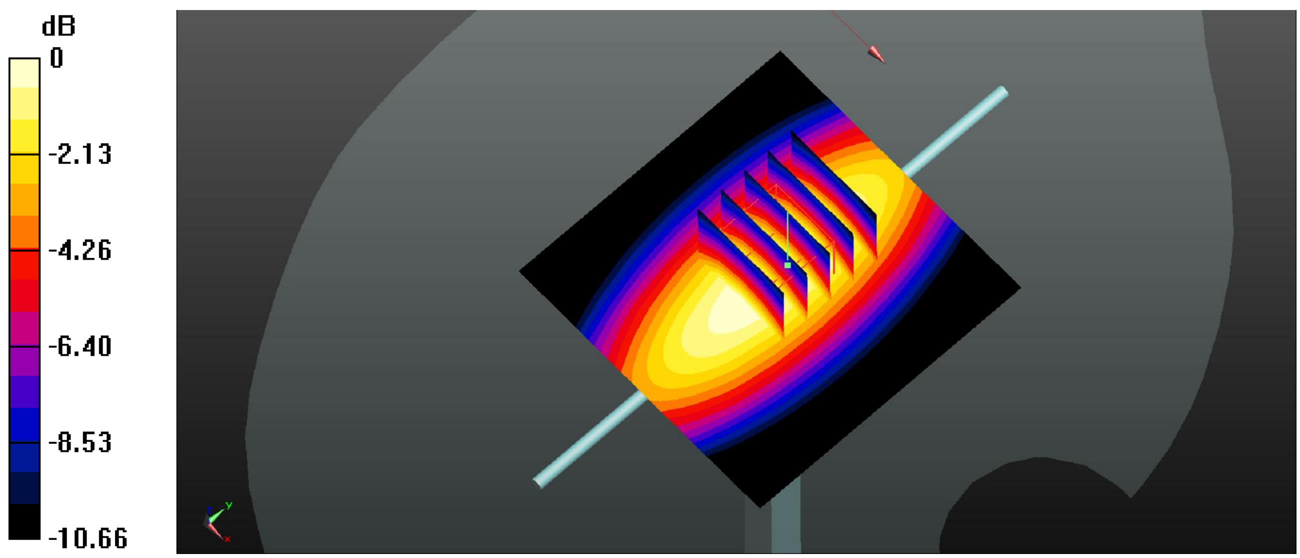
DUT: D835V2-SN: 4d151

Communication System: UID 0, CW; Frequency: 835 MHz;Duty Cycle: 1:1
Medium: MSL_835_2017/06/16 Medium parameters used: f = 835 MHz; σ = 1 S/m; ε_r = 55.524; ρ = 1000 kg/m^3
Ambient Temperature：23.5 ℃; Liquid Temperature ：22.5 ℃

DASY5 Configuration:
- Probe: EX3DV4 - SN3935; ConvF(10.48, 10.48, 10.48); Calibrated: 2016/11/28;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1358; Calibrated: 2016/9/5
- Phantom: SAM2; Type: QD000P40CD; Serial: TP:1754
- 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) = 3.56 W/kg

Pin=250mW/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 53.28 V/m; Power Drift = -0.04 dB
Peak SAR (extrapolated) = 4.04 W/kg
SAR(1 g) = 2.56 W/kg; SAR(10 g) = 1.75 W/kg
Maximum value of SAR (measured) = 3.55 W/kg



0 dB = 3.55 W/kg

Test Laboratory: Sporton International Inc. SAR/HAC Testing Lab Date: 2017/6/12

System Check_Body_1900MHz_20170612

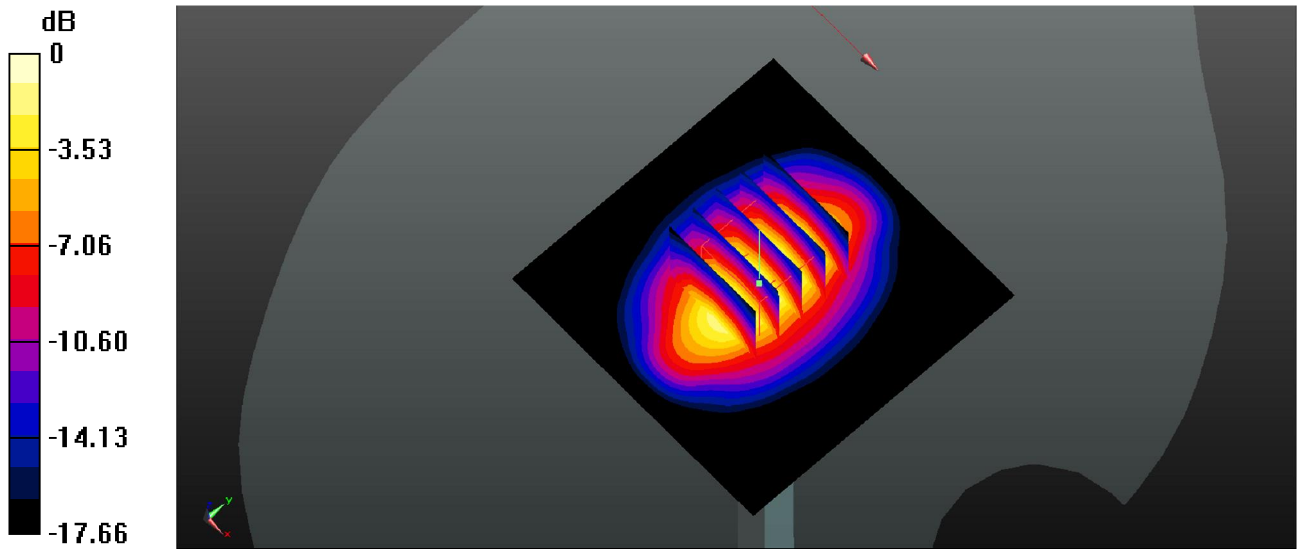
DUT: D1900V2-SN: 5d170

Communication System: UID 0, CW; Frequency: 1900 MHz;Duty Cycle: 1:1
Medium: MSL_1900_2017/06/12 Medium parameters used: f = 1900 MHz; σ = 1.535 S/m; ε_r = 52.514; ρ = 1000 kg/m^3
Ambient Temperature：23.7 ℃; Liquid Temperature ：22.4 ℃

DASY5 Configuration:
- Probe: EX3DV4 - SN3935; ConvF(8.18, 8.18, 8.18); Calibrated: 2016/11/28;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1358; Calibrated: 2016/9/5
- Phantom: SAM2; Type: QD000P40CD; Serial: TP:1754
- 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) = 16.4 W/kg

Pin=250mW/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 87.98 V/m; Power Drift = 0.04 dB
Peak SAR (extrapolated) = 19.5 W/kg
SAR(1 g) = 10.8 W/kg; SAR(10 g) = 5.61 W/kg
Maximum value of SAR (measured) = 16.6 W/kg



0 dB = 16.6 W/kg

System Check_Body_2450MHz_20170622

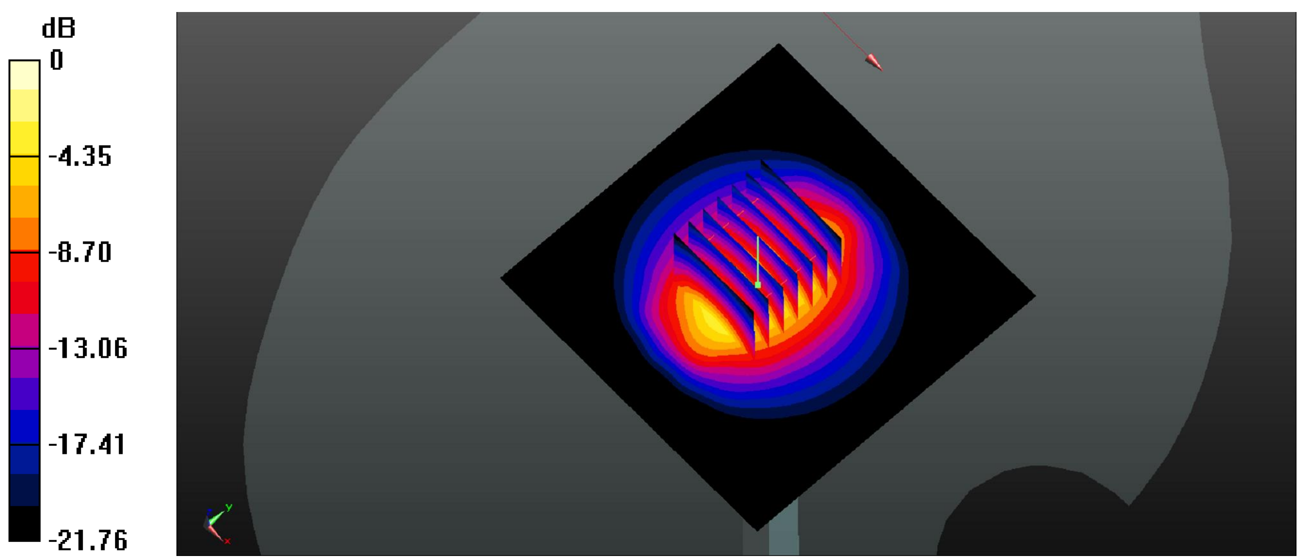
DUT: D2450V2-SN:908

Communication System: UID 0, CW; Frequency: 2450 MHz;Duty Cycle: 1:1
Medium: MSL_2450_2017/06/22 Medium parameters used: f = 2450 MHz; σ = 1.992 S/m; ε_r = 51.529; ρ = 1000 kg/m^3
Ambient Temperature：23.3 ℃; Liquid Temperature ：22.6 ℃

DASY5 Configuration:
- Probe: EX3DV4 - SN3935; ConvF(7.89, 7.89, 7.89); Calibrated: 2016/11/28;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1358; Calibrated: 2016/9/5
- Phantom: SAM1; Type: QD000P40CD; Serial: TP:1753
- 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 = 81.84 V/m; Power Drift = 0.07 dB
Peak SAR (extrapolated) = 25.3 W/kg
SAR(1 g) = 12.2 W/kg; SAR(10 g) = 5.61 W/kg
Maximum value of SAR (measured) = 20.5 W/kg



0 dB = 20.5 W/kg

Appendix B. Plots of High SAR Measurement

The plots are shown as follows.

Test Laboratory: Sporton International Inc. SAR/HAC Testing Lab Date: 2017/6/16

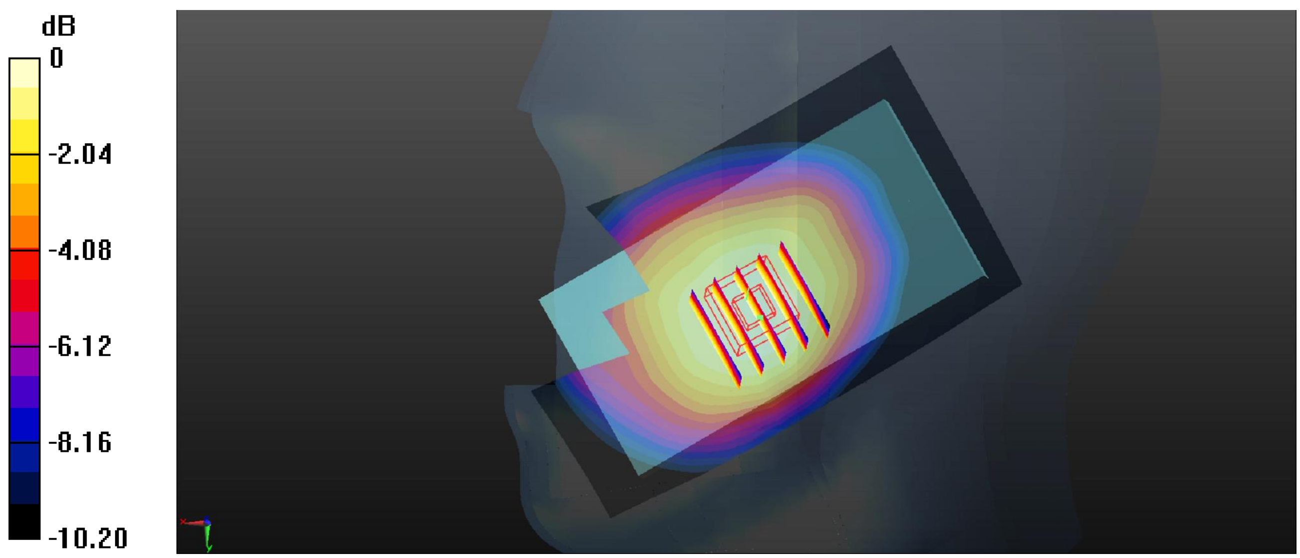
01_CDMA2000 BC10_RC3 SO55_Right Cheek_0mm_Ch684_Hotspot off

Communication System: UID 0, CDMA2000 (0); Frequency: 823.1 MHz;Duty Cycle: 1:1
Medium: HSL_835_2017/06/16 Medium parameters used: f = 823.1 MHz; σ = 0.888 S/m; ε_r = 42.044; ρ = 1000 kg/m^3
Ambient Temperature：23.3 ℃; Liquid Temperature ：22.4 ℃

DASY5 Configuration:
- Probe: EX3DV4 - SN3935; ConvF(10.61, 10.61, 10.61); Calibrated: 2016/11/28;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1358; Calibrated: 2016/9/5
- Phantom: SAM1; Type: QD000P40CD; Serial: TP:1753
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Ch684/Area Scan (61x101x1): Interpolated grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.920 W/kg

Ch684/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 7.948 V/m; Power Drift = 0.09 dB
Peak SAR (extrapolated) = 0.964 W/kg
SAR(1 g) = 0.769 W/kg; SAR(10 g) = 0.587 W/kg
Maximum value of SAR (measured) = 0.891 W/kg



0 dB = 0.891 W/kg

Test Laboratory: Sporton International Inc. SAR/HAC Testing Lab Date: 2017/6/16

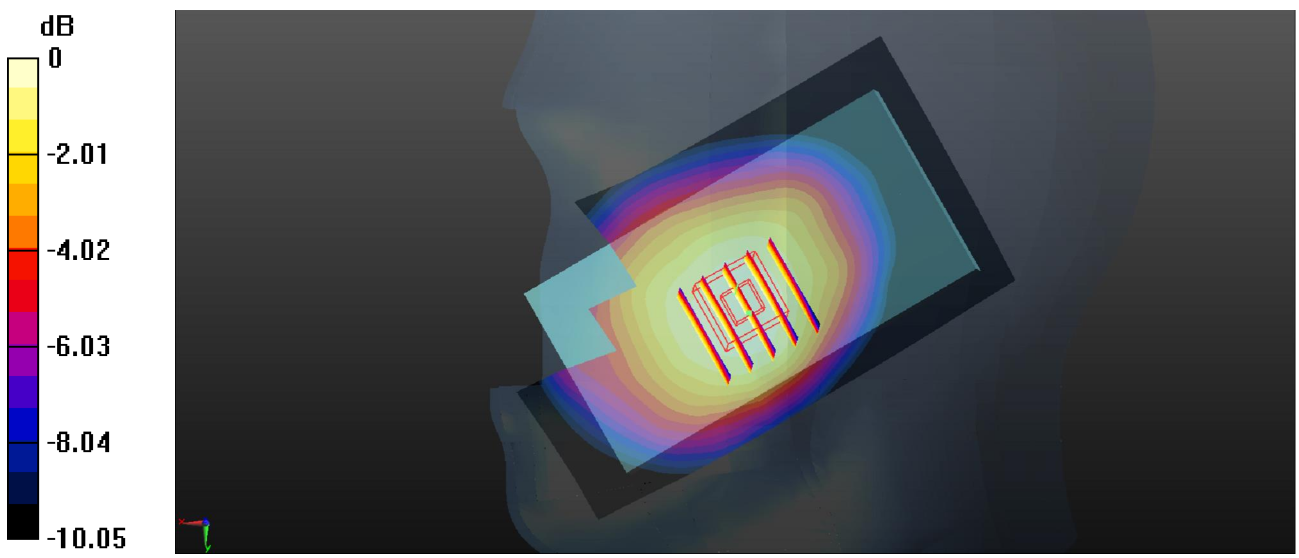
02_CDMA2000 BC0_RC3 SO55_Right Cheek_0mm_Ch1013_Hotspot off

Communication System: UID 0, CDMA2000 (0); Frequency: 824.7 MHz;Duty Cycle: 1:1
Medium: HSL_835_2017/06/16 Medium parameters used: f = 824.7 MHz; σ = 0.89 S/m; ε_r = 42.017; ρ= 1000 kg/m^3
Ambient Temperature：23.3 ℃; Liquid Temperature ：22.4 ℃

DASY5 Configuration:
- Probe: EX3DV4 - SN3935; ConvF(10.61, 10.61, 10.61); Calibrated: 2016/11/28;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1358; Calibrated: 2016/9/5
- Phantom: SAM1; Type: QD000P40CD; Serial: TP:1753
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Ch1013/Area Scan (61x101x1): Interpolated grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 1.04 W/kg

Ch1013/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 8.849 V/m; Power Drift = 0.11 dB
Peak SAR (extrapolated) = 1.09 W/kg
SAR(1 g) = 0.888 W/kg; SAR(10 g) = 0.679 W/kg
Maximum value of SAR (measured) = 1.02 W/kg



0 dB = 1.02 W/kg

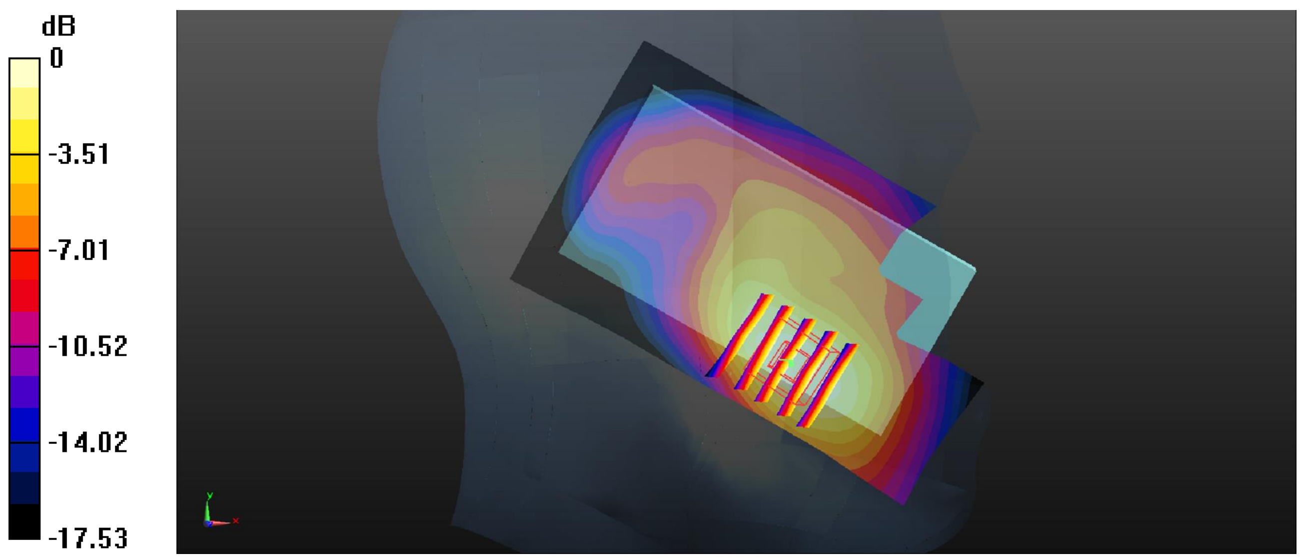
03_CDMA2000 BC1_RC3 SO55_Left Cheek_0mm_Ch600_Hotspot off

Communication System: UID 0, CDMA2000 (0); Frequency: 1880 MHz;Duty Cycle: 1:1
Medium: HSL_1900_2017/06/17 Medium parameters used: f = 1880 MHz; σ = 1.414 S/m; ε_r = 39.531; ρ = 1000 kg/m^3
Ambient Temperature：23.5 ℃; Liquid Temperature ：22.7 ℃

DASY5 Configuration:
- Probe: EX3DV4 - SN3935; ConvF(8.64, 8.64, 8.64); Calibrated: 2016/11/28;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1358; Calibrated: 2016/9/5
- Phantom: SAM2; Type: QD000P40CD; Serial: TP:1754
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Ch600/Area Scan (61x101x1): Interpolated grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 1.29 W/kg

Ch600/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 11.05 V/m; Power Drift = 0.07 dB
Peak SAR (extrapolated) = 1.46 W/kg
SAR(1 g) = 0.913 W/kg; SAR(10 g) = 0.553 W/kg
Maximum value of SAR (measured) = 1.28 W/kg



0 dB = 1.28 W/kg

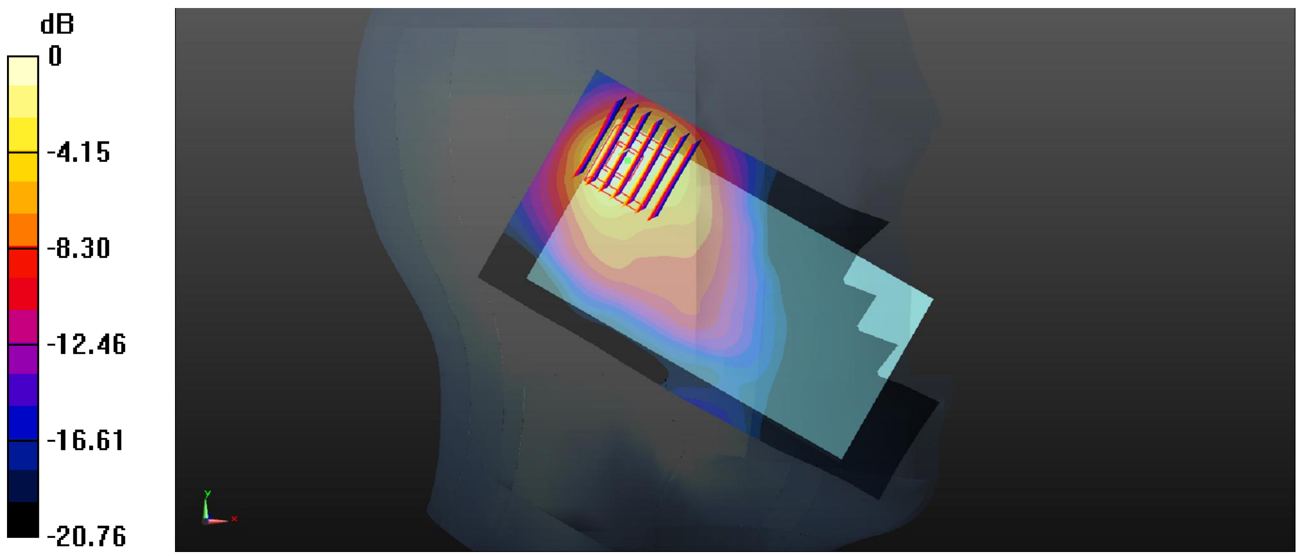
04_WLAN2.4GHz_802.11b 1Mbps_Left Cheek_0mm_Ch1_Hotspot off

Communication System: UID 0, 802.11b (0); Frequency: 2412 MHz;Duty Cycle: 1:1.025
Medium: HSL_2450_2017/06/22 Medium parameters used: f = 2412 MHz; σ = 1.788 S/m; ε_r = 38.181; ρ = 1000 kg/m^3
Ambient Temperature：23.5 ℃; Liquid Temperature ：22.7 ℃

DASY5 Configuration:
- Probe: EX3DV4 - SN3935; ConvF(7.81, 7.81, 7.81); Calibrated: 2016/11/28;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1358; Calibrated: 2016/9/5
- Phantom: SAM2; Type: QD000P40CD; Serial: TP:1754
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Ch1/Area Scan (71x131x1): Interpolated grid: dx=12mm, dy=12mm
Maximum value of SAR (interpolated) = 0.507 W/kg

Ch1/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 8.033 V/m; Power Drift = 0.04 dB
Peak SAR (extrapolated) = 0.634 W/kg
SAR(1 g) = 0.302 W/kg; SAR(10 g) = 0.138 W/kg
Maximum value of SAR (measured) = 0.491 W/kg



0 dB = 0.491 W/kg

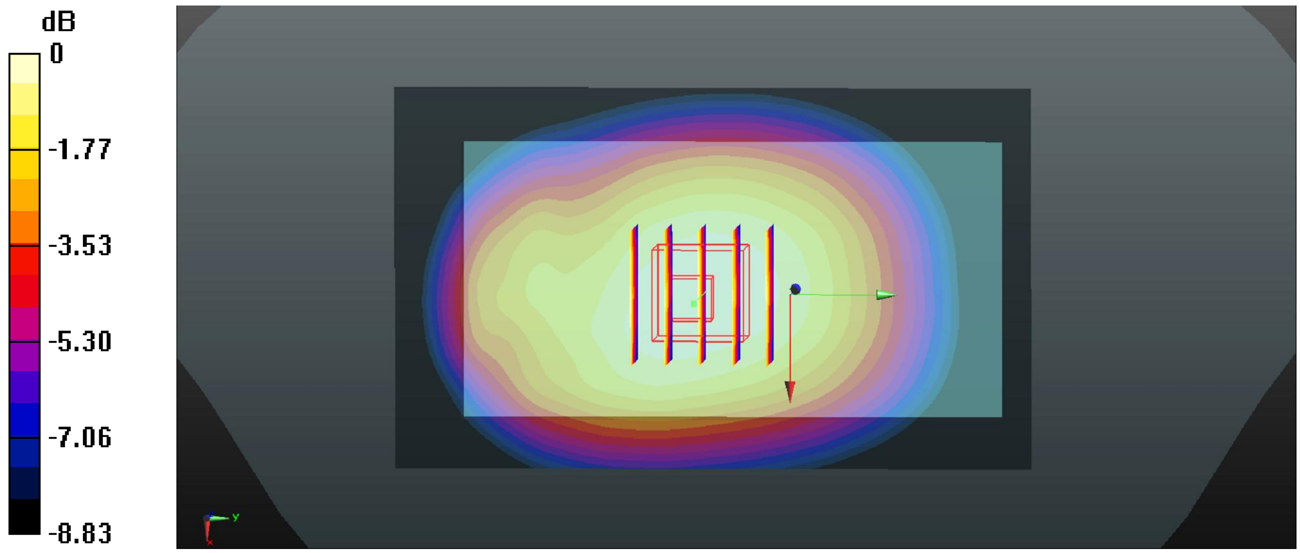
05_CDMA2000 BC10_RTAP 153.6Kbps_Back_10mm_Ch684_Hotspot on

Communication System: UID 0, CDMA2000 (0); Frequency: 823.1 MHz;Duty Cycle: 1:1
Medium: MSL_835_2017/06/16 Medium parameters used: f = 823.1 MHz; σ = 0.988 S/m; ε_r = 55.595; ρ = 1000 kg/m^3
Ambient Temperature：23.5 ℃; Liquid Temperature ：22.5 ℃

DASY5 Configuration:
- Probe: EX3DV4 - SN3935; ConvF(10.48, 10.48, 10.48); Calibrated: 2016/11/28;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1358; Calibrated: 2016/9/5
- Phantom: SAM2; Type: QD000P40CD; Serial: TP:1754
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Ch684/Area Scan (61x101x1): Interpolated grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 1.01 W/kg

Ch684/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 29.07 V/m; Power Drift = -0.01 dB
Peak SAR (extrapolated) = 1.11 W/kg
SAR(1 g) = 0.843 W/kg; SAR(10 g) = 0.639 W/kg
Maximum value of SAR (measured) = 1.02 W/kg



0 dB = 1.02 W/kg

Test Laboratory: Sporton International Inc. SAR/HAC Testing Lab Date: 2017/6/16

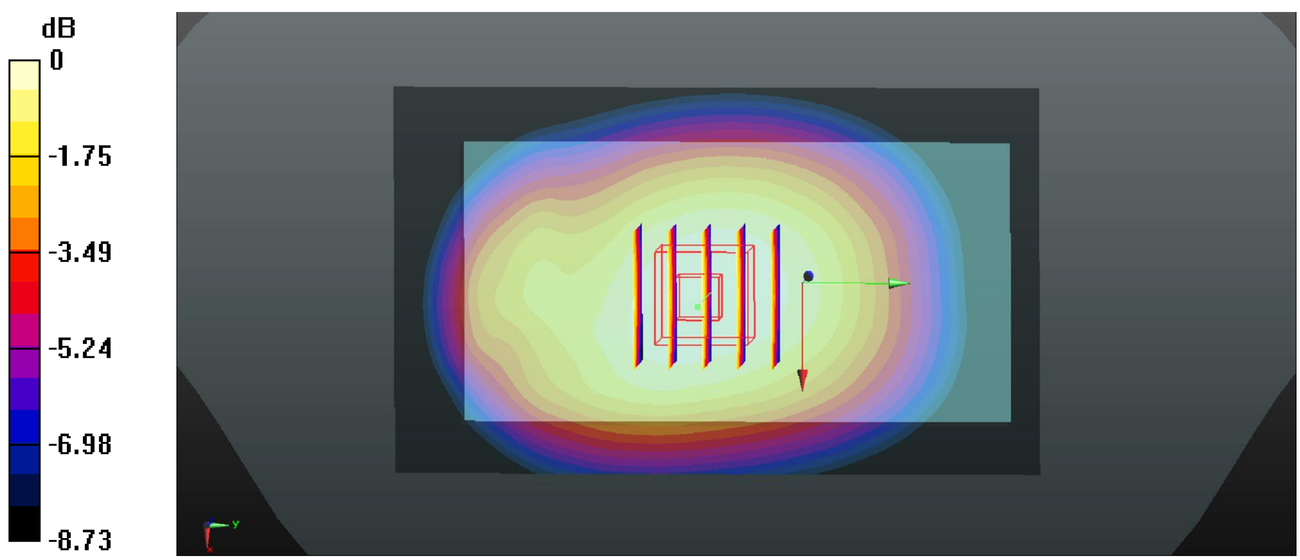
06_CDMA2000 BC0_RTAP 153.6Kbps_Back_10mm_Ch1013_Hotspot on

Communication System: UID 0, CDMA2000 (0); Frequency: 824.7 MHz;Duty Cycle: 1:1
Medium: MSL_835_2017/06/16 Medium parameters used: f = 824.7 MHz; σ = 0.991 S/m; ε_r = 55.578;ρ = 1000 kg/m^3
Ambient Temperature：23.5 ℃; Liquid Temperature ：22.5 ℃

DASY5 Configuration:
- Probe: EX3DV4 - SN3935; ConvF(10.48, 10.48, 10.48); Calibrated: 2016/11/28;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1358; Calibrated: 2016/9/5
- Phantom: SAM2; Type: QD000P40CD; Serial: TP:1754
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Ch1013/Area Scan (61x101x1): Interpolated grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 1.01 W/kg

Ch1013/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 29.01 V/m; Power Drift = -0.01 dB
Peak SAR (extrapolated) = 1.11 W/kg
SAR(1 g) = 0.841 W/kg; SAR(10 g) = 0.640 W/kg
Maximum value of SAR (measured) = 1.01 W/kg



0 dB = 1.01 W/kg

Test Laboratory: Sporton International Inc. SAR/HAC Testing Lab Date: 2017/6/12

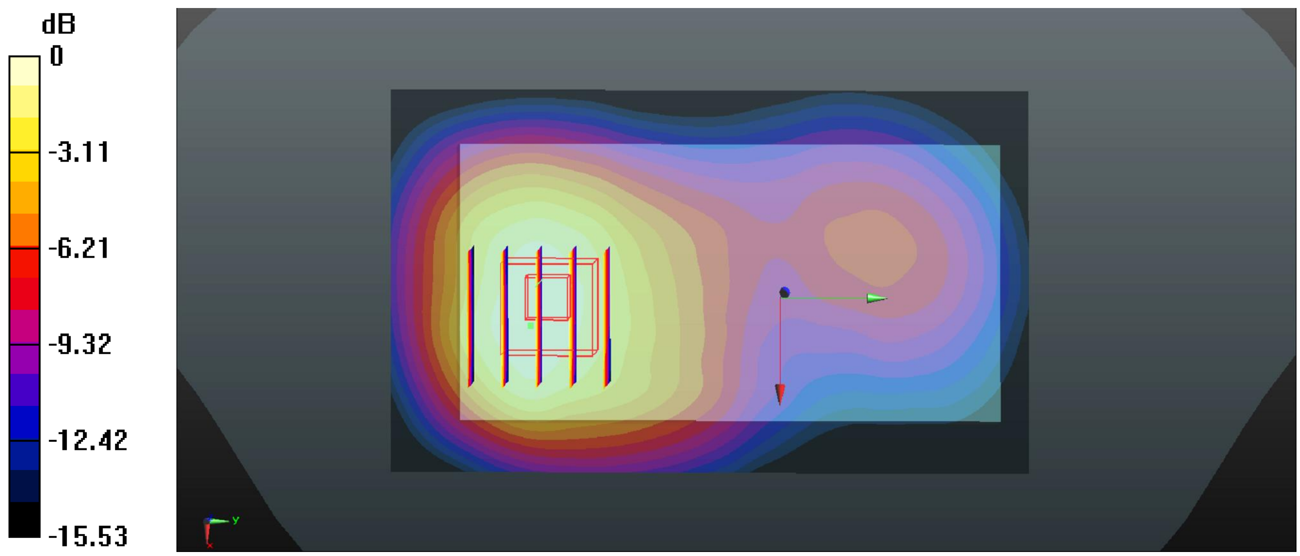
07_CDMA2000 BC1_RTAP 153.6Kbps_Back_10mm_Ch1175_Hotspot on

Communication System: UID 0, CDMA2000 (0); Frequency: 1908.75 MHz;Duty Cycle: 1:1
Medium: MSL_1900_2017/06/12 Medium parameters used: f = 1908.75 MHz; σ = 1.545 S/m; ε_r =52.407; ρ = 1000 kg/m^3
Ambient Temperature：23.7 ℃; Liquid Temperature ：22.4 ℃

DASY5 Configuration:
- Probe: EX3DV4 - SN3935; ConvF(8.18, 8.18, 8.18); Calibrated: 2016/11/28;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1358; Calibrated: 2016/9/5
- Phantom: SAM2; Type: QD000P40CD; Serial: TP:1754
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Ch1175/Area Scan (61x101x1): Interpolated grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 1.17 W/kg

Ch1175/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 10.47 V/m; Power Drift = 0.14 dB
Peak SAR (extrapolated) = 1.35 W/kg
SAR(1 g) = 0.817 W/kg; SAR(10 g) = 0.495 W/kg
Maximum value of SAR (measured) = 1.15 W/kg



0 dB = 1.15 W/kg

Test Laboratory: Sporton International Inc. SAR/HAC Testing Lab Date: 2017/6/22

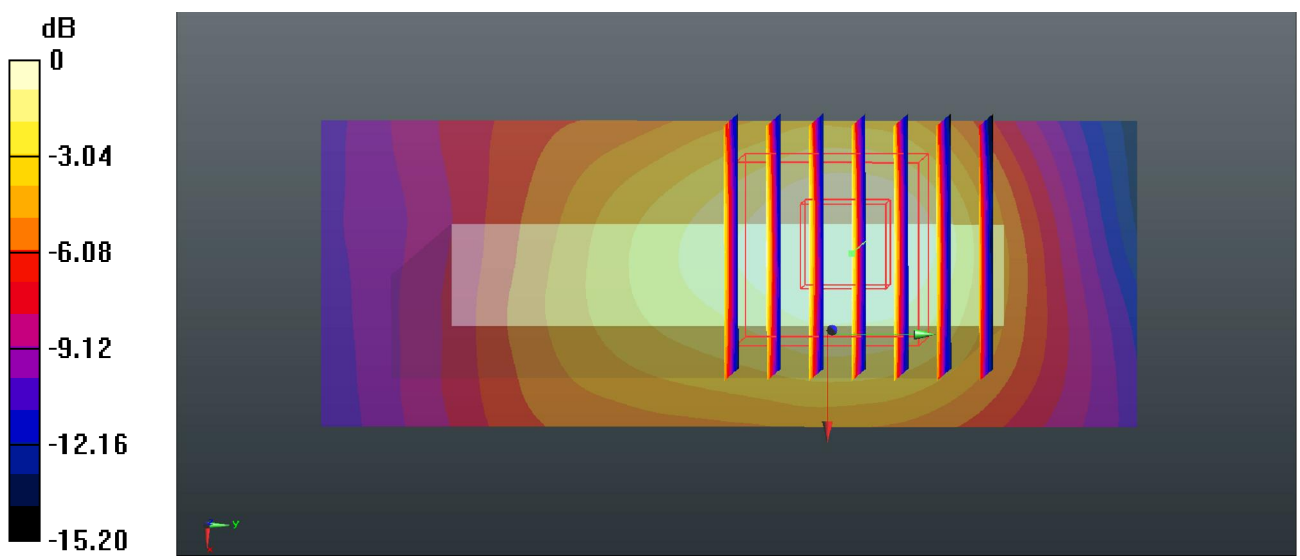
08_WLAN2.4GHz_802.11b 1Mbps_Top side_10mm_Ch1_Hotspot off

Communication System: UID 0, 802.11b (0); Frequency: 2412 MHz;Duty Cycle: 1:1.025
Medium: MSL_2450_2017/06/22 Medium parameters used: f = 2412 MHz; $\sigma = 1.941$ S/m; $\varepsilon_r = 51.678$; $\rho = 1000$ kg/m^3
Ambient Temperature：23.3 ℃; Liquid Temperature ：22.6 ℃

DASY5 Configuration:
- Probe: EX3DV4 - SN3935; ConvF(7.89, 7.89, 7.89); Calibrated: 2016/11/28;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1358; Calibrated: 2016/9/5
- Phantom: SAM1; Type: QD000P40CD; Serial: TP:1753
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Ch1/Area Scan (31x81x1): Interpolated grid: dx=12mm, dy=12mm
Maximum value of SAR (interpolated) = 0.101 W/kg

Ch1/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 5.043 V/m; Power Drift = 0.02 dB
Peak SAR (extrapolated) = 0.112 W/kg
SAR(1 g) = 0.061 W/kg; SAR(10 g) = 0.034 W/kg
Maximum value of SAR (measured) = 0.0923 W/kg



0 dB = 0.0923 W/kg