FCC OET BULLETIN 65 SUPPLEMENT C 01-01
IEEE STD 1528:2003

SAR EVALUATION REPORT
(CDMA+WIFI+LTE Portion)

For
CDMA+WIMAX+WIFI+LTE MOBILE HOT SPOT

MODEL NUMBER: AC803S

FCC ID: N7NAC803S

REPORT NUMBER: 11U14068-6A

ISSUE DATE: March 26, 2012

Prepared for
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NVLAP LAB CODE 200065-0

Revision History

Rev.	Issue Date	Revisions	Revised By
--	March 8, 2012	Initial Issue	--
A	March 26, 2012	Updated 3GPP TS 36.101 release version form from “Release 10.2” to “Release 9”.	Sunny Shih

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1. Attestation of Test Results

Applicant	Sierra Wireless Inc.		
DUT description	CDMA+WIMAX+WIFI+LTE MOBILE HOT SPOT		
Model number	AC803S		
Test device is	An identical prototype		
Device category	Portable		
Exposure category	General Population/Uncontrolled Exposure		
Date tested	December 13, 2011 – February 15, 2012		
FCC Rule Parts	Freq. Range [MHz]	Highest 1-g SAR	Limit (W/kg)
24E	1850-1910	1.39 W/kg (Front w/ 10 mm distance)	1.6
27 (LTE Band 25)	1850 - 1915	1.27 W/kg (Edge 4 w/ 10 mm distance)	
15.247	2412-2462	0.23 W/kg (Edge 1 w/ 10 mm distance)	
Applicable Standards			Test Results
FCC OET Bulletin 65 Supplement C 01-01, IEEE STD 1528:2003			Pass

Compliance Certification Services, Inc. (UL CCS) tested the above equipment in accordance with the requirements set forth in the above standards. All indications of Pass/Fail in this report are opinions expressed by UL CCS based on interpretations and/or observations of test results. Measurement Uncertainties were not taken into account and are published for informational purposes only. The test results show that the equipment tested is capable of demonstrating compliance with the requirements as documented in this report.

Note: The results documented in this report apply only to the tested sample, under the conditions and modes of operation as described herein. This document may not be altered or revised in any way unless done so by UL CCS and all revisions are duly noted in the revisions section. Any alteration of this document not carried out by UL CCS will constitute fraud and shall nullify the document. This report must not be used by the client to claim product certification, approval, or endorsement by NVLAP, NIST, any agency of the Federal Government, or any agency of any government (NIST Handbook 150, Annex A). This report is written to support regulatory compliance of the applicable standards stated above.

Approved & Released For UL CCS By:

Sunny Shih
Engineering Team Leader
Compliance Certification Services (UL CCS)

Tested By:

Devin Chang
SAR Engineer
Compliance Certification Services (UL CCS)

2. Test Methodology

The tests documented in this report were performed in accordance with FCC OET Bulletin 65 Supplement C Edition 01-01, IEEE STD 1528-2003 and the following KDB Procedures.

- 941225 D01 SAR test for 3G devices v02
- 941225 D05 SAR for LTE Devices v01
- 248227 D01 SAR meas for 802 11abg v01r02
- 941225 D06 Hot Spot SAR v01

3. Facilities and Accreditation

The test sites and measurement facilities used to collect data are located at 47173 Benicia Street, Fremont, California, USA.

CCS is accredited by NVLAP, Laboratory Code 200065-0. The full scope of accreditation can be viewed at http://www.ccsemc.com.

4. Calibration and Uncertainty

4.1. Measuring Instrument Calibration

The measuring equipment utilized to perform the tests documented in this report has been calibrated in accordance with the manufacturer's recommendations, and is traceable to recognized national standards.

Name of Equipment	Manufacturer	Type/Model	Serial No.	Cal. Due date		
				MM	DD	Year
Dielectronic Probe kit	HP	85070C	N/A	N/A		
Synthesized Signal Generator	HP	83732B	US34490599	7	14	2012
E-Field Probe	SPEAG	EX3DV4	3751	12	19	2012
E-Field Probe	SPEAG	EX3DV4	3772	5	3	2012
E-Field Probe	SPEAG	EX3DV4	3773	5	3	2012
Thermometer	ERTCO	639-1S	1718	7	19	2012
Data Acquisition Electronics	SPEAG	DAE4	1239	10	18	2012
Data Acquisition Electronics	SPEAG	DAE3	500	7	14	2012
System Validation Dipole	SPEAG	D1900V2	5d140	4	18	2012
System Validation Dipole	SPEAG	*D2450V2	706	4	19	2012
Power Meter	HP	437B	3125U16345	5	13	2012
Power Sensor	HP	8481A	2702A60780	5	13	2012
Amplifier	MITEQ	4D00400600-50-30P	1620606	N/A		
Directional coupler	Werlatone	C8060-102	2141	N/A		

Notes:

*Per KDB 450824 D02 requirements for dipole calibration, UL CCS has adopted two years calibration intervals. On annual basis, each measurement dipole has been evaluated and is in compliance with the following criteria:

1. There is no physical damage on the dipole
2. System validation with specific dipole is within 10% of calibrated value.
3. Return-loss is within 20% of calibrated measurement. (See Appendix _Calibration Certificate - Validation Dipole D2450V2 - SN 706" with extended cal. data)
4. Impedance is within 5Ω of calibrated measurement (See Appendix _Calibration Certificate - Validation Dipole D2450V2 - SN 706" with extended cal. data)

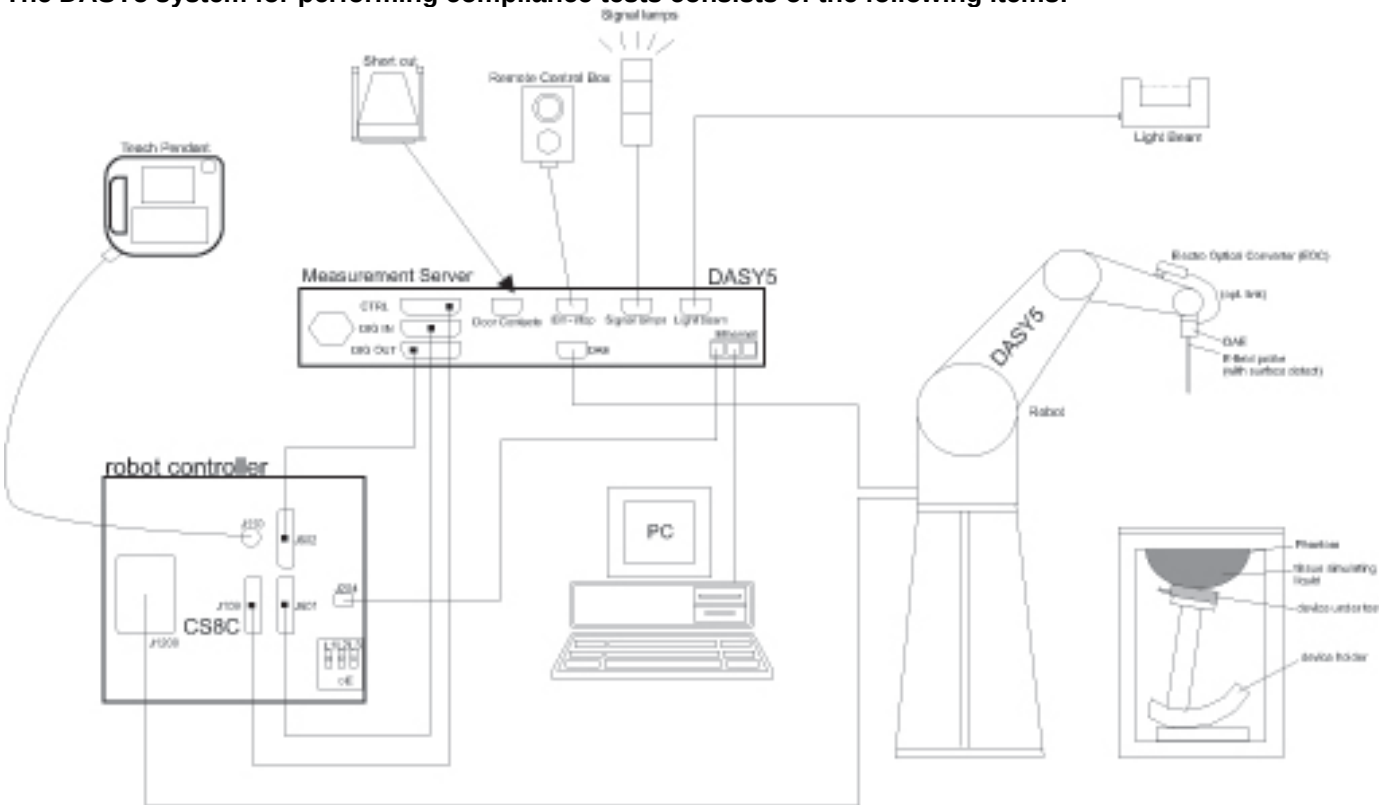
4.2. Measurement Uncertainty

Measurement uncertainty for 300 MHz to 3 GHz averaged over 1 gram

Component	error, %	Probe Distribution	Divisor	Sensitivity	U (Xi), %
Measurement System					
Probe Calibration (k=1)	6.00	Normal	1	1	6.00
Axial Isotropy	1.15	Rectangular	1.732	0.7071	0.47
Hemispherical Isotropy	2.30	Rectangular	1.732	0.7071	0.94
Boundary Effect	0.90	Rectangular	1.732	1	0.52
Probe Linearity	3.45	Rectangular	1.732	1	1.99
System Detection Limits	1.00	Rectangular	1.732	1	0.58
Readout Electronics	0.30	Normal	1	1	0.30
Response Time	0.80	Rectangular	1.732	1	0.46
Integration Time	2.60	Rectangular	1.732	1	1.50
RF Ambient Conditions - Noise	3.00	Rectangular	1.732	1	1.73
RF Ambient Conditions - Reflections	3.00	Rectangular	1.732	1	1.73
Probe Positioner Mechanical Tolerance	0.40	Rectangular	1.732	1	0.23
Probe Positioning with respect to Phantom	2.90	Rectangular	1.732	1	1.67
Extrapolation, Interpolation and Integration	1.00	Rectangular	1.732	1	0.58
Test Sample Related					
Test Sample Positioning	2.90	Normal	1	1	2.90
Device Holder Uncertainty	3.60	Normal	1	1	3.60
Output Power Variation - SAR Drift	5.00	Rectangular	1.732	1	2.89
Phantom and Tissue Parameters					
Phantom Uncertainty (shape and thickness)	4.00	Rectangular	1.732	1	2.31
Liquid Conductivity - deviation from target	5.00	Rectangular	1.732	0.64	1.85
Liquid Conductivity - measurement	-4.18	Normal	1	0.64	-2.68
Liquid Permittivity - deviation from target	5.00	Rectangular	1.732	0.6	1.73
Liquid Permittivity - measurement uncertainty	-4.15	Normal	1	0.6	-2.49
				Combined Standard Uncertainty Uc(y) =	10.40
				Expanded Uncertainty U, Coverage Factor = 2, > 95 % Confidence = 20.81	%
				Expanded Uncertainty U, Coverage Factor = 2, > 95 % Confidence = 1.64	dB

5. Measurement System Description and Setup

The DASY5 system 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.

6. SAR Measurement Procedures

6.1. Normal SAR Measurement Procedure

Step 1: 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. The minimum distance of probe sensors to surface is 2.1 mm. This distance cannot be smaller than the Distance of sensor calibration points to probe tip as defined in the probe properties.

Step 2: 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 locations even in relatively coarse grids. When an Area Scan has measured all reachable points, it computes the field maximal found in the scanned area, within a range of the global maximum. The range (in dB) 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.

Step 3: Zoom Scan
Zoom Scans are used to assess the peak spatial SAR values within a cubic averaging volume containing 1 g and 10 g of simulated tissue. The Zoom Scan measures ≥ 7x7x9 (above 4.5 GHz) or 5x5x7 (below 3 GHz) points within a cube whose 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 g and 10 g and displays these values next to the job's label.

Step 4: Power drift measurement
The Power Drift Measurement measures the field at the same location as the most recent power reference measurement within the same procedure, and with the same settings. The Power Drift Measurement gives the field difference in dB from the reading conducted within the last Power Reference Measurement. This allows a user to monitor the power drift of the device under test within a batch process. The measurement procedure is the same as Step 1.

Step 5: Z-Scan
The Z Scan measures points along a vertical straight line. The line runs along the Z-axis of a one-dimensional grid. In order to get a reasonable extrapolation, the extrapolated distance should not be larger than the step size in Z-direction.

6.2. Volume Scan Procedures

Step 1: 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. The minimum distance of probe sensors to surface is 2.1 mm. This distance cannot be smaller than the Distance of sensor calibration points to probe tip as defined in the probe properties.

Step 2: 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 locations even in relatively coarse grids. When an Area Scan has measured all reachable points, it computes the field maximal found in the scanned area, within a range of the global maximum. The range (in dB) 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.

Step 3: Zoom Scan
Zoom Scans are used to assess the peak spatial SAR values within a cubic averaging volume containing 1 g and 10 g of simulated tissue. The Zoom Scan measures ≥ 7x7x9 (above 4.5 GHz) or 5x5x7 (below 3 GHz) points within a cube whose 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 g and 10 g and displays these values next to the job's label.

Step 4: Volume Scan
Volume Scans are used to assess peak SAR and averaged SAR measurements in largely extended 3-dimensional volumes within any phantom. This measurement does not need any previous area scan. The grid can be anchored to a user specific point or to the current probe location.

Step 5: Power drift measurement
The Power Drift Measurement measures the field at the same location as the most recent power reference measurement within the same procedure, and with the same settings. The Power Drift Measurement gives the field difference in dB from the reading conducted within the last Power Reference Measurement. This allows a user to monitor the power drift of the device under test within a batch process. The measurement procedure is the same as Step 1.

7. Device Under Test

CDMA+WIMAX+WIFI+LTE MOBILE HOT SPOT Model: AC803S	
Normal operation:	Body and Wireless Router (Hotspot) Front, Rear and Edges (Edge 1, 2, 3, and 4): Multiple display orientations supporting both portrait and landscape configurations

7.1. Band and air interlaces

Air Interfaces:	CDMA BC 1: 1850 - 1910 MHz LTE Band 25: 1850 - 1915 MHz WiFi: 802.11bgn: 2.4 GHz WiMAX: 5 MHz BW: 2498.5 - 2687.5 MHz 10 MHz BW:2501 – 2685 MHz

7.2. Personal Hotspot Mode

The device is capable of personal hotspot mode with a form factor > 9 cm x 5 cm (~3.5” x 2”). The hotspot mode can be enabled by the users.

7.3. Simultaneous Transmission Conditions

No	Simultaneous Transmission	Head	Body	Hot-spot
1	CDMA + WiFi 2.4 GHz	☐	☐	☒
2	LTE + WiFi 2.4 GHz	☐	☐	☒
3	WiMAX + WiFi 2.4 GHz	☐	☐	☒

7.4. KDB 941225 D05 SAR for LTE Devices v01

As per 3GPP TS 36.101 Release 9

<table>
<tr><th>Item</th><th>Description</th><th>Information</th></tr>
<tr><td>1</td><td>Identify the operating frequency range of each LTE transmission band used by the device</td><td>Band 25: Tx: 1850 – 1915 MHz</td></tr>
<tr><td>2</td><td>Identify the channel bandwidths used in each frequency band; 1.4, 3, 5, 10, 15, 20 MHz etc</td><td>5 MHz, 10 MHz</td></tr>
<tr><td>3</td><td>Identify the high, middle and low (H, M, L) channel numbers and frequencies in each LTE frequency band</td><td>
<table>
<tr><th rowspan="2">Band 25</th><th colspan="2">Channel Bandwidth</th></tr>
<tr><th>10 MHz</th><th>5 MHz</th></tr>
<tr><th></th><th>Ch. # / Freq. (MHz)</th><th>Ch. # / Freq. (MHz)</th></tr>
<tr><td>Low</td><td>26090/1855</td><td>26065/1852.5</td></tr>
<tr><td>Mid</td><td>26365/1882.5</td><td>26365/1882.5</td></tr>
<tr><td>High</td><td>26640/1910</td><td>26665/1912.5</td></tr>
</table>
</td></tr>
<tr><td>4</td><td>Specify the UE category and uplink modulations used</td><td>UE Category: 3
Uplink Modulations: QPSK, 16QAM</td></tr>
<tr><td>5</td><td>Descriptions of the LTE transmitter and antenna implementation & identify whether it is a standalone transmitter operating independently of other wireless transmitters in the device or sharing hardware components and/or antenna(s) with other transmitters etc.</td><td>A Single antenna is used for LTE and other wireless modes (CDMA/EVDO) Transmitter operation.</td></tr>
<tr><td>6</td><td>Identify the LTE voice/data requirements in each operating mode and exposure condition with respect to head and body test configurations, antenna locations, handset flip-cover or slide positions, antenna diversity conditions, etc.</td><td>Data Only device.
Exposure Conditions:
• Body – Front, Rear, Edge 1, Edge 4 of the DUT at a separation distance of 10 cm from the flat phantom.</td></tr>
<tr><td>7</td><td>Identify if Maximum Power Reduction (MPR) is optional or mandatory, i.e. built-in by design: a) only mandatory MPR may be considered during SAR testing, when the maximum output power is permanently limited by the MPR implemented within the UE; and only for the applicable RB (resource block) configurations specified in LTE standards b) A-MPR (additional MPR) must be disabled.</td><td>As per 3GPP TS 36.101, Release 9
Table 6.2.3-1: Maximum Power Reduction (MPR) for Power Class 3
<table>
<tr><th rowspan="2">Modulation</th><th colspan="6">Channel bandwidth / Transmission bandwidth (RB)</th><th rowspan="2">MPR (dB)</th></tr>
<tr><th>1.4 MHz</th><th>3.0 MHz</th><th>5 MHz</th><th>10 MHz</th><th>15 MHz</th><th>20 MHz</th></tr>
<tr><td>QPSK</td><td>> 5</td><td>> 4</td><td>> 8</td><td>> 12</td><td>> 16</td><td>> 18</td><td>≤ 1</td></tr>
<tr><td>16 QAM</td><td>≤ 5</td><td>≤ 4</td><td>≤ 8</td><td>≤ 12</td><td>≤ 16</td><td>≤ 18</td><td>≤ 1</td></tr>
<tr><td>16 QAM</td><td>> 5</td><td>> 4</td><td>> 8</td><td>> 12</td><td>> 16</td><td>> 18</td><td>≤ 2</td></tr>
</table>
MPR is not implemented within the AC803S device. Sierra has already provided an attestation letter to this affect. For this section recommend adding the following comment: "MPR was not required in this design".</td></tr>
<tr><td>8</td><td>Include the maximum average conducted output power measured on the required test channels for each channel bandwidth and UL modulation used in each frequency band:
a) with 1 RB allocated at the upper edge of a channel
b) with 1 RB allocated at the lower edge of a channel
c) using 50% RB allocation centered within a channel
d) using 100% RB allocation</td><td>Refer to section 6.2.</td></tr>
</table>

KDB 941225 D05 SAR for LTE Devices v01 (Continued)

<table>
<tr><th>Item</th><th>Description</th><th colspan="2">Information</th></tr>
<tr><td rowspan="8">9</td><td rowspan="8">Identify all other U.S. wireless operating modes (3G, Wi-Fi, WiMax, Bluetooth etc), device/exposure configurations (head and body, antenna and handset flip-cover or slide positions, antenna diversity conditions etc.) and frequency bands used for these modes</td><td>Band</td><td>Transmit Frequencies</td></tr>
<tr><td>US PCS Band</td><td>1850 – 1910 MHz</td></tr>
<tr><td>802.11b/g/n</td><td>2412 – 2472 MHz</td></tr>
<tr><td>Mode</td><td>Uplink Modulations</td></tr>
<tr><td>CDMA 1xRTT</td><td>QPSK</td></tr>
<tr><td>EVDO Rev. 0, Rev. A</td><td>QPSK</td></tr>
<tr><td>802.11 b/g/n</td><td>DSSS CCK, OFDM</td></tr>
<tr><td>10</td><td>Include the maximum average conducted output power measured for the other wireless mode and frequency bands</td><td colspan="2">Refer to section 6.1 and 6.3.</td></tr>
<tr><td>11</td><td>Identify the simultaneous transmission conditions for the voice and data configurations supported by all wireless modes, device configurations and frequency bands, for the head and body exposure conditions and device operating configurations (handset flip or cover positions, antenna diversity conditions etc.)</td><td colspan="2">• WWAN Radio (CDMA/EVDO/LTE) can transmit simultaneously with WiFi Radio.</td></tr>
<tr><td>12</td><td>When power reduction is applied to certain wireless modes to satisfy SAR compliance for simultaneous transmission conditions, other equipment certification or operating requirements, include the maximum average conducted output power measured in each power reduction mode applicable to the simultaneous voice/data transmission configurations for such wireless configurations and frequency bands; and also include details of the power reduction implementation and measurement setup</td><td colspan="2">Not applicable</td></tr>
<tr><td>13</td><td>Include descriptions of the test equipment, test software, built-in test firmware etc. required to support testing the device when power reduction is applied to one or more transmitters/antennas for simultaneous voice/data transmission</td><td colspan="2">Not applicable</td></tr>
<tr><td>14</td><td>When appropriate, include a SAR test plan proposal with respect to the above</td><td colspan="2">Not applicable</td></tr>
<tr><td>15</td><td>If applicable, include preliminary SAR test data and/or supporting information in laboratory testing inquiries to address specific issues and concerns or for requesting further test reduction considerations appropriate for the device; for example, simultaneous transmission configurations</td><td colspan="2">Not applicable</td></tr>
</table>

8. RF Output Power Measurement

8.1. CDMA BC1

BC1 1xRTT

Radio Configuration (RC)	Service Option (SO)	Conducted Output Power (dBm)		
		Ch. 25 / 1851.25 MHz	Ch. 600 / 1880 MHz	Ch. 1175 / 1908.75 MHz
		Average	Average	Average
RC1	2 (Loopback)	23.7	23.9	23.7
	55 (Loopback)	23.6	23.9	23.5
RC2	9 (Loopback)	23.5	23.8	23.6
	55 (Loopback)	23.6	23.8	23.6
RC3	2 (Loopback)	23.7	23.9	23.6
	55 (Loopback)	23.7	23.9	23.6
	32 (+ F-SCH)	23.7	23.9	23.6
	32 (+ SCH)	23.6	23.9	23.5

1xEv-Do Rel. 0

Band	FTAP Rate	RTAP Rate	Channel	f (MHz)	Conducted power (dBm)	
					Average	Peak
BC1	307.2 kbps (2 slot, QPSK)	153.6 kbps	25	1851.25	23.6	
			600	1880.00	23.8	
			1175	1908.75	23.6	

1xEv-Do Rev. A

Band	FETAP Traffic Format	RETAP Data Payload Size	Channel	f (MHz)	Conducted power (dBm)	
					Average	Peak
BC1	307.2k, QPSK/ ACK channel is transmitted at all the slots	4096	25	1851.25	23.7	
			600	1880.00	24.0	
			1175	1908.75	23.9	

8.2. LTE Band 25

The following tests were conducted according to the test requirements outlined in section 6.2 of the 3GPP TS36.101 specification.

UE Power Class: 3 (23 +/- 2dBm). The allowed Maximum Power Reduction (MPR) for the maximum output power due to higher order modulation and transmit bandwidth configuration (resource blocks) is specified in Table 6.2.3-1 of the 3GPP TS36.101.

Table 6.2.3-1: Maximum Power Reduction (MPR) for Power Class 3

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

The allowed A-MPR values specified below in Table 6.2.4.-1 of 3GPP TS36.101 are in addition to the allowed MPR requirements. All the measurements below were performed with A-MPR disabled, by using Network Signaling Value of "NS_01".

Table 6.2.4-1: Additional Maximum Power Reduction (A-MPR)

Network Signalling value	Requirements (sub-clause)	E-UTRA Band	Channel bandwidth (MHz)	Resources Blocks (N_{RB})	A-MPR (dB)
NS_01	6.6.2.1.1	Table 5.5-1	1.4, 3, 5, 10, 15, 20	Table 5.6-1	NA
NS_03	6.6.2.2.1	2, 4,10, 23, 25, 35, 36	3	>5	≤ 1
			5	>6	≤ 1
			10	>6	≤ 1
			15	>8	≤ 1
			20	>10	≤ 1
NS_04	6.6.2.2.2	41	5	>6	≤ 1
			10, 15, 20	See Table 6.2.4-4	
NS_05	6.6.3.3.1	1	10,15,20	≥ 50	≤ 1
NS_06	6.6.2.2.3	12, 13, 14, 17	1.4, 3, 5, 10	Table 5.6-1	n/a
NS_07	6.6.2.2.3 6.6.3.3.2	13	10	Table 6.2.4-2	Table 6.2.4-2
NS_08	6.6.3.3.3	19	10, 15	> 44	≤ 3
NS_09	6.6.3.3.4	21	10, 15	> 40	≤ 1
				> 55	≤ 2
NS_10		20	15, 20	Table 6.2.4-3	Table 6.2.4-3
NS_11	6.6.2.2.1	23[1]	1.4, 3, 5, 10	Table 6.2.4-5	Table 6.2.4-5
..					
NS_32	-	-	-	-	-
Note 1: Applies to the lower block of Band 23, i.e. a carrier placed in the 2000-2010 MHz region.					

BW	Ch	Freq. (MHz)	Mode	UL RB Allocation	UL RB Start	Avg Pwr (dBm)
10 MHz	26090	1855.0	QPSK	1	0	23.2
				1	49	23.6
				25	12	23.1
				50	0	22.1
			16-QAM	1	0	22.7
				1	49	22.9
				25	12	23.0
				50	0	22.8
	26365	1882.5	QPSK	1	0	23.2
				1	49	23.4
				25	12	22.3
				50	0	22.2
			16-QAM	1	0	23.0
				1	49	23.1
				25	12	23.1
				50	0	22.9
	26640	1910.0	QPSK	1	0	23.2
				1	49	22.1
				25	12	21.8
				50	0	21.5
			16-QAM	1	0	22.9
				1	49	21.9
				25	12	22.8
				50	0	22.5
5 MHz	26065	1852.5	QPSK	1	0	23.3
				1	24	23.6
				12	6	21.9
				25	0	22.1
			16-QAM	1	0	22.6
				1	24	22.9
				12	6	22.9
				25	0	22.9
	26365	1882.5	QPSK	1	0	23.4
				1	24	23.6
				12	6	22.3
				25	0	22.3
			16-QAM	1	0	22.8
				1	24	23.1
				12	6	23.2
				25	0	23.1
	26665	1912.5	QPSK	1	0	23.1
				1	24	22.2
				12	6	21.6
				25	0	21.5
			16-QAM	1	0	22.4
				1	24	21.7
				12	6	22.4
				25	0	22.2

Note(s):

Sierra is providing the following attestation to define the MPR (Maximum Power Reduction) implementation within the AC803 Personal Hot Spot Device.
Specifically;

1. LTE Maximum Power Reduction (“MPR”) is not employed in the AC803 device. Maximum power levels achieved within the AC803 device do not require MPR at the higher data rates & RB allocations to maintain compliance to 3GPP requirements.
2. LTE Max Power limits are set during the manufacturing process and cannot be changed by the LTE network or end user.

8.3. WIFI (802.11bgn)

802.11b			
Channel #	Freq. (MHz)	Conducted Avg Power	
		(dBm)	(mW)
1	2412	14.5	28.2
6	2437	14.6	28.8
11	2462	14.6	28.8
802.11g			
1	2412	12.8	19.1
6	2437	12.5	17.8
11	2462	12.3	17.0
802.11n HT20			
1	2412	12.5	17.8
6	2437	12.3	17.0
11	2462	12.0	15.8
802.11n HT40			
3	2422	12.4	17.5
6	2437	12.2	16.7
9	2452	12.0	15.9

9. Tissue Dielectric Properties

IEEE Std 1528-2003 Table 2

Target Frequency (MHz)	Head	
	ε_r	σ (S/m)
300	45.3	0.87
450	43.5	0.87
835	41.5	0.90
900	41.5	0.97
1450	40.5	1.20
1800 – 2000	40.0	1.40
2450	39.2	1.80
2600	39.0	1.96
3000	38.5	2.40

FCC OET Bulletin 65 Supplement C 01-01

Target Frequency (MHz)	Head		Body	
	ε_r	σ (S/m)	ε_r	σ (S/m)
150	52.3	0.76	61.9	0.8
300	45.3	0.87	58.2	0.92
450	43.5	0.87	56.7	0.94
835	41.5	0.9	55.2	0.97
900	41.5	0.97	55	1.05
915	41.5	0.98	55	1.06
1450	40.5	1.2	54	1.3
1610	40.3	1.29	53.8	1.4
1800 – 2000	40	1.4	53.3	1.52
2450	39.2	1.8	52.7	1.95
3000	38.5	2.4	52	2.73
5000	36.2	4.45	49.3	5.07
5100	36.1	4.55	49.1	5.18
5200	36.0	4.66	49.0	5.30
5300	35.9	4.76	48.9	5.42
5400	35.8	4.86	48.7	5.53
5500	35.6	4.96	48.6	5.65
5600	35.5	5.07	48.5	5.77
5700	35.4	5.17	48.3	5.88
5800	35.3	5.27	48.2	6.00

9.1. Composition of Ingredients for the Tissue Material Used in the SAR Tests

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.

Ingredients (% by weight)	Frequency (MHz)									
	450		835		915		1900		2450	
Tissue Type	Head	Body	Head	Body	Head	Body	Head	Body	Head	Body
Water	38.56	51.16	41.45	52.4	41.05	56.0	54.9	40.4	62.7	73.2
Salt (NaCl)	3.95	1.49	1.45	1.4	1.35	0.76	0.18	0.5	0.5	0.04
Sugar	56.32	46.78	56.0	45.0	56.5	41.76	0.0	58.0	0.0	0.0
HEC	0.98	0.52	1.0	1.0	1.0	1.21	0.0	1.0	0.0	0.0
Bactericide	0.19	0.05	0.1	0.1	0.1	0.27	0.0	0.1	0.0	0.0
Triton X-100	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	36.8	0.0
DGBE	0.0	0.0	0.0	0.0	0.0	0.0	44.92	0.0	0.0	26.7
Dielectric Constant	43.42	58.0	42.54	56.1	42.0	56.8	39.9	54.0	39.8	52.5
Conductivity (S/m)	0.85	0.83	0.91	0.95	1.0	1.07	1.42	1.45	1.88	1.78

Salt: 99+% Pure Sodium Chloride Sugar: 98+% Pure Sucrose
Water: De-ionized, 16 MΩ+ resistivity HEC: Hydroxyethyl Cellulose
DGBE: 99+% Di(ethylene glycol) butyl ether, [2-(2-butoxyethoxy)ethanol]
Triton X-100 (ultra pure): Polyethylene glycol mono [4-(1,1, 3, 3-tetramethylbutyl)phenyl]ether

9.2. Tissue Dielectric Parameters Check Results

Date	Freq. (MHz)	Liquid Parameters			Measured	Target	Delta (%)	Limit ±(%)
12/13/2011	Body 2450	e'	52.3142	Relative Permittivity (ε_r):	52.31	52.70	-0.73	5
		e"	14.5094	Conductivity (σ):	1.98	1.95	1.36	5
	Body 2410	e'	52.4382	Relative Permittivity (ε_r):	52.44	52.76	-0.61	5
		e"	14.3510	Conductivity (σ):	1.92	1.91	0.82	5
	Body 2435	e'	52.3614	Relative Permittivity (ε_r):	52.36	52.73	-0.69	5
		e"	14.4482	Conductivity (σ):	1.96	1.93	1.30	5
	Body 2460	e'	52.2817	Relative Permittivity (ε_r):	52.28	52.69	-0.77	5
		e"	14.5509	Conductivity (σ):	1.99	1.96	1.34	5
12/15/2011	Body 2450	e'	51.1302	Relative Permittivity (ε_r):	51.13	52.70	-2.98	5
		e"	14.7933	Conductivity (σ):	2.02	1.95	3.35	5
	Body 2410	e'	51.2615	Relative Permittivity (ε_r):	51.26	52.76	-2.84	5
		e"	14.6421	Conductivity (σ):	1.96	1.91	2.86	5
	Body 2435	e'	51.1823	Relative Permittivity (ε_r):	51.18	52.73	-2.93	5
		e"	14.7342	Conductivity (σ):	1.99	1.93	3.30	5
	Body 2460	e'	51.0945	Relative Permittivity (ε_r):	51.09	52.69	-3.02	5
		e"	14.8344	Conductivity (σ):	2.03	1.96	3.31	5
12/27/2011	Body 1900	e'	51.5728	Relative Permittivity (ε_r):	51.57	53.30	-3.24	5
		e"	14.4558	Conductivity (σ):	1.53	1.52	0.47	5
	Body 1850	e'	51.7336	Relative Permittivity (ε_r):	51.73	53.30	-2.94	5
		e"	14.3158	Conductivity (σ):	1.47	1.52	-3.12	5
	Body 1880	e'	51.6306	Relative Permittivity (ε_r):	51.63	53.30	-3.13	5
		e"	14.4061	Conductivity (σ):	1.51	1.52	-0.93	5
	Body 1910	e'	51.5459	Relative Permittivity (ε_r):	51.55	53.30	-3.29	5
		e"	14.4794	Conductivity (σ):	1.54	1.52	1.17	5
2/10/2012	Body 1900	e'	51.0876	Relative Permittivity (ε_r):	51.09	53.30	-4.15	5
		e"	14.3389	Conductivity (σ):	1.51	1.52	-0.34	5
	Body 1850	e'	51.3160	Relative Permittivity (ε_r):	51.32	53.30	-3.72	5
		e"	14.2039	Conductivity (σ):	1.46	1.52	-3.88	5
	Body 1880	e'	51.2048	Relative Permittivity (ε_r):	51.20	53.30	-3.93	5
		e"	14.2119	Conductivity (σ):	1.49	1.52	-2.26	5
	Body 1910	e'	51.0894	Relative Permittivity (ε_r):	51.09	53.30	-4.15	5
		e"	14.2647	Conductivity (σ):	1.51	1.52	-0.33	5
2/13/2012	Body 1900	e'	52.3276	Relative Permittivity (ε_r):	52.33	53.30	-1.82	5
		e"	14.2819	Conductivity (σ):	1.51	1.52	-0.74	5
	Body 1850	e'	52.5468	Relative Permittivity (ε_r):	52.55	53.30	-1.41	5
		e"	14.1582	Conductivity (σ):	1.46	1.52	-4.18	5
	Body 1880	e'	52.3656	Relative Permittivity (ε_r):	52.37	53.30	-1.75	5
		e"	14.3262	Conductivity (σ):	1.50	1.52	-1.48	5
	Body 1910	e'	52.3246	Relative Permittivity (ε_r):	52.32	53.30	-1.83	5
		e"	14.3240	Conductivity (σ):	1.52	1.52	0.08	5
2/14/2012	Body 1900	e'	52.2929	Relative Permittivity (ε_r):	52.29	53.30	-1.89	5
		e"	14.3972	Conductivity (σ):	1.52	1.52	0.07	5
	Body 1850	e'	52.4268	Relative Permittivity (ε_r):	52.43	53.30	-1.64	5
		e"	14.2184	Conductivity (σ):	1.46	1.52	-3.78	5
	Body 1880	e'	52.3546	Relative Permittivity (ε_r):	52.35	53.30	-1.77	5
		e"	14.3898	Conductivity (σ):	1.50	1.52	-1.04	5
	Body 1910	e'	52.2769	Relative Permittivity (ε_r):	52.28	53.30	-1.92	5
		e"	14.2459	Conductivity (σ):	1.51	1.52	-0.46	5

10. System Performance Check

The system performance check is performed prior to any usage of the system in order to verify SAR system measurement accuracy. The system performance check verifies that the system operates within its specifications of ±10%.

10.1. System Performance Check Measurement Conditions

- The measurements were performed in the flat section of the TWIN SAM or ELI phantom, shell thickness: 2.0 ±0.2 mm (bottom plate) filled with Body or Head simulating liquid of the following parameters.
- The DASY system with an E-Field Probe was used for the measurements.
- The dipole was mounted on the small tripod so that the dipole feed point was positioned below the center marking of the flat phantom section and the dipole was oriented parallel to the body axis (the long side of the phantom). The standard measuring distance was 10 mm (above 1 GHz) and 15 mm (below 1 GHz) from dipole center to the simulating liquid surface.
- The coarse grid with a grid spacing of 15 mm was aligned with the dipole.
  For 5 GHz band - The coarse grid with a grid spacing of 10 mm was aligned with the dipole.
- Special 7x7x7 fine cube was chosen for cube.
- Distance between probe sensors and phantom surface was set to 3 mm.
  For 5 GHz band - Distance between probe sensors and phantom surface was set to 2.5 mm
- The dipole input power (forward power) was 100 mW.
- The results are normalized to 1 W input power.

10.2. Reference SAR Values for System Performance Check

The reference SAR values can be obtained from the calibration certificate of system validation dipoles

System Dipole	Serial No.	Cal. Date	Freq. (MHz)	SAR Measured (mW/g)		
				1g/10g	Head	Body
D1900V2	5d140	4/18/11	1900	1g	41.6	41.2
				10g	21.5	21.6
D2450V2	706	4/19/10	2450	1g	51.6	52.4
				10g	24.4	24.5

10.3. System Check Results

Date Tested	System validation dipole	Measured (Normalized to 1 W)		Target	Delta (%)	Tolerance (%)
12/13/11	D2450V2 Body	1g SAR:	50.00	52.4	-4.58	±10
		10g SAR:	23.10	24.5	-5.71	
12/15/11	D2450V2 Body	1g SAR:	53.20	52.4	1.53	±10
		10g SAR:	24.40	24.5	-0.41	
12/27/11	D1900V2 Body	1g SAR:	40.30	41.2	-2.18	±10
		10g SAR:	21.10	21.6	-2.31	
02/10/12	D1900V2 Body	1g SAR:	43.00	41.2	4.37	±10
		10g SAR:	22.70	21.6	5.09	
02/13/12	D1900V2 Body	1g SAR:	40.00	41.2	-2.91	±10
		10g SAR:	21.30	21.6	-1.39	
02/14/12	D1900V2 Body	1g SAR:	41.80	41.2	1.46	±10
		10g SAR:	22.00	21.6	1.85	
12/14/12	D2450V2 Body	1g SAR:	53.20	52.4	1.53	±10
		10g SAR:	24.40	24.5	-0.41	

11. Summary of Test Configurations

The following test configurations are based on 941225 D06 Hot Spot SAR v01

11.1. Exposure conditions for CDMA

Test Configuration	Antenna-to-edge/surface	SAR Required	Note
Front	5.01 mm	Yes	
Rear	15.35 mm	Yes	
Edge 2	4.31 mm	Yes	
Edge 4	86.98 mm	No	SAR is not required due to antenna-to-edge's distance is greater than 25 mm.
Edge 1	4.37 mm	Yes	
Edge 3	21.17 mm	No	This is a less conservative antenna-to-user distance compared with Edge 1 and Edge 2.

11.2. Exposure conditions for LTE

Test Configuration	Antenna-to-edge/surface	SAR Required	Note
Front	5.01 mm	Yes	
Rear	15.35 mm	Yes	
Edge 2	86.98 mm	No	SAR is not required due to antenna-to-edge's distance is greater than 25 mm.
Edge 4	4.31 mm	Yes	
Edge 1	4.37 mm	Yes	
Edge 3	21.17 mm	No	This is a less conservative antenna-to-user distance compared with Edge 1 and Edge 2.

11.3. Exposure conditions for WiFi

Test Configuration	Antenna-to-edge/surface	SAR Required	Note
Front	3.6 mm	Yes	
Rear	19.42 mm	Yes	
Edge 2	43.71 mm	No	SAR is not required due to antenna-to-edge's distance is greater than 25 mm.
Edge 4	43.71 mm	No	SAR is not required due to antenna-to-edge's distance is greater than 25 mm.
Edge 1	2.67 mm	Yes	
Edge 3	51.53 mm	No	SAR is not required due to antenna-to-edge's distance is greater than 25 mm.

12. SAR Test Results

12.1. CDMA BC1

Test mode reduction considerations

Per KDB941225 D01 SAR test for 3G devices v02, Body SAR evaluation for Primary antenna is performed in RC3/SO32 only.

- Body SAR for multiple code channel (FCH+SCH) is not required since the output power is not ¼ dB higher than RC3/SO32.
- Body SAR for 1xEV-DO Rev. 0 and Rev. A is not required since the output power is not ¼ dB higher than RC3.

Hotspot SAR with 10 mm separation distance

Test Position	Mode	Ch #.	Freq. (MHz)	Avg Pwr (dBm)	SAR (mW/g)		Note
					1-g	10-g	
Front	1xRTT (RC3 SO 32)	25	1851.25	23.7	1.320	0.797	
		600	1880.0	23.9	**1.390**	0.835	*
		1175	1908.75	23.6	1.100	0.676	
Rear	1xRTT (RC3 SO 32)	25	1851.25	23.7			1
		600	1880.0	23.9	0.600	0.379	
		1175	1908.75	23.6			1
Edge 2	1xRTT (RC3 SO 32)	25	1851.25	23.7	1.220	0.659	
		600	1880.0	23.9	1.240	0.678	
		1175	1908.75	23.6	1.330	0.710	
Edge 4	1xRTT (RC3 SO 32)	25	1851.25	23.7			2
		600	1880.0	23.9			2
		1175	1908.75	23.6			2
Edge 1	1xRTT (RC3 SO 32)	25	1851.25	23.7	0.812	0.491	
		600	1880.0	23.9	0.997	0.598	
		1175	1908.75	23.6	1.110	0.675	
Edge 3	1xRTT (RC3 SO 32)	25	1851.25	23.7			2
		600	1880.0	23.9			2
		1175	1908.75	23.6			2
Front	1xEVDO (Rel.0)	25	1851.25	23.7	1.180	0.709	
		600	1880.0	24.0	1.180	0.707	
		1175	1908.75	23.9	1.040	0.621	
Rear	1xEVDO (Rel.0)	25	1851.25	23.7			1
		600	1880.0	24.0	0.579	0.363	
		1175	1908.75	23.9			1
Edge 2	1xEVDO (Rel.0)	25	1851.25	23.7	1.160	0.632	
		600	1880.0	24.0	1.180	0.638	
		1175	1908.75	23.9	1.130	0.618	
Edge 4	1xEVDO (Rel.0)	25	1851.25	23.7			2
		600	1880.0	24.0			2
		1175	1908.75	23.9			2
Edge 1	1xEVDO (Rel.0)	25	1851.25	23.7	0.770	0.472	
		600	1880.0	24.0	0.835	0.506	
		1175	1908.75	23.9	1.040	0.638	
Edge 3	1xEVDO (Rel.0)	25	1851.25	23.7			2
		600	1880.0	24.0			2
		1175	1908.75	23.9			2

Note(s):

*: Worst case SAR result.

1. SAR test was performed in the middle channel only as the measured level was < 50% (0.8 mW/g) of the SAR limit as stated in FCC "Public Notice DA 02-1438" by the SCC-34/SC-2. Testing in the low and high channel is optional.
2. SAR is not required due to antenna-to-edge's distance is greater than 2.5 cm.

12.2. LTE Band 25

Test mode reduction considerations

SAR evaluation for 5MHz channel bandwidth is not performed, because the maximum average conducted output power of a 5 MHz channel bandwidth is within 0.5 dB of the average conducted output power measured for the 10 MHz channel bandwidth.

Hotspot SAR with 10 mm separation distance

Test Position	Bandwidth (MHz)	UL Ch #.	Freq. (MHz)	Mode	UL RB Allocati	UL RB Start	Avg Pwr (dBm)	SAR (mW/g) 1-g	SAR (mW/g) 10-g	Note
Front	10	26090	1855.0	QPSK	1	0	23.2	0.917	0.529	
					1	49	23.6	0.967	0.572	
					25	12	23.1	0.748	0.437	
					50	0	22.1			1
				16QAM	1	0	22.7	0.884	0.510	
					1	49	22.9	0.921	0.545	
					25	12	23.0	0.920	0.538	
					50	0	22.8			1
		26365	1882.5	QPSK	1	0	23.2	1.020	0.581	
					1	49	23.4	1.070	0.612	
					25	12	22.3	0.778	0.443	
					50	0	22.2			1
				16QAM	1	0	23.0	0.993	0.564	
					1	49	23.1	1.020	0.585	
					25	12	23.1	0.998	0.569	
					50	0	22.9			1
		26640	1910.0	QPSK	1	0	23.2	0.967	0.544	
					1	49	22.1	0.706	0.402	
					25	12	21.8	0.681	0.384	
					50	0	21.5			1
				16QAM	1	0	22.9	0.915	0.519	
					1	49	21.9	0.687	0.390	
					25	12	22.8	0.807	0.456	
					50	0	22.5			1
Rear	10	26090	1855.0	QPSK	1	0	23.2	0.401	0.243	
					1	49	23.6	0.427	0.263	
					25	12	23.1	0.312	0.190	
					50	0	22.1			1
				16QAM	1	0	22.7	0.358	0.217	
					1	49	22.9	0.380	0.233	
					25	12	23.0	0.372	0.227	
					50	0	22.8			1
		26365	1882.5	QPSK	1	0	23.2			1
					1	49	23.4			1
					25	12	22.3			1
					50	0	22.2			1
				16QAM	1	0	23.0			1
					1	49	23.1			1
					25	12	23.1			1
					50	0	22.9			1
		26640	1910.0	QPSK	1	0	23.2			1
					1	49	22.1			1
					25	12	21.8			1
					50	0	21.5			1
				16QAM	1	0	22.9			1
					1	49	21.9			1
					25	12	22.8			1
					50	0	22.5			1

Note(s):

1. The test reduction for LTE SAR is based on KDB 941225 D05 SAR for LTE Devices v01.
2. SAR is not required due to antenna-to-edge's distance is greater than 2.5 cm.

Hotspot SAR with 10 mm separation distance (Continued)

Test Position	Bandwidth (MHz)	UL Ch #.	Freq. (MHz)	Mode	UL RB Allocati	UL RB Start	Avg Pwr (dBm)	SAR (mW/g) 1-g	SAR (mW/g) 10-g	Note
Edge 2	10	26090	1855.0	QPSK	1	0	23.2			2
					1	49	23.6			2
					25	12	23.1			2
					50	0	22.1			2
				16QAM	1	0	22.7			2
					1	49	22.9			2
					25	12	23.0			2
					50	0	22.8			2
		26365	1882.5	QPSK	1	0	23.2			2
					1	49	23.4			2
					25	12	22.3			2
					50	0	22.2			2
				16QAM	1	0	23.0			2
					1	49	23.1			2
					25	12	23.1			2
					50	0	22.9			2
		26640	1910.0	QPSK	1	0	23.2			2
					1	49	22.1			2
					25	12	21.8			2
					50	0	21.5			2
				16QAM	1	0	22.9			2
					1	49	21.9			2
					25	12	22.8			2
					50	0	22.5			2
Edge 4	10	26090	1855.0	QPSK	1	0	23.2	1.160	0.654	
					1	49	23.6	1.230	0.694	
					25	12	23.1	0.881	0.495	
					50	0	22.1			
				16QAM	1	0	22.7	1.030	0.577	
					1	49	22.9	1.150	0.649	
					25	12	23.0	1.060	0.595	
					50	0	22.8			
		26365	1882.5	QPSK	1	0	23.2	1.260	0.708	
					1	49	23.4	**1.270**	0.715	*
					25	12	22.3	0.976	0.545	
					50	0	22.2			
				16QAM	1	0	23.0	1.160	0.647	
					1	49	23.1	1.170	0.650	
					25	12	23.1	1.170	0.654	
					50	0	22.9			
		26640	1910.0	QPSK	1	0	23.2	1.030	0.570	
					1	49	22.1	0.750	0.416	
					25	12	21.8	0.721	0.399	
					50	0	21.5			
				16QAM	1	0	22.9	0.939	0.521	
					1	49	21.9	0.721	0.398	
					25	12	22.8	0.868	0.478	
					50	0	22.5			

Note(s):

*: Worst case SAR result.

1. The test reduction for LTE SAR is based on KDB 941225 D05 SAR for LTE Devices v01.
2. SAR is not required due to antenna-to-edge's distance is greater than 2.5 cm.

Hotspot SAR with 10 mm separation distance (Continued)

Test Position	Bandwidth (MHz)	UL Ch #.	Freq. (MHz)	Mode	UL RB Allocati	UL RB Start	Avg Pwr (dBm)	SAR (mW/g) 1-g	SAR (mW/g) 10-g	Note
Edge 1	10	26090	1855.0	QPSK	1	0	23.2	0.708	0.432	
					1	49	23.6	0.816	0.493	
					25	12	23.1	0.578	0.350	
					50	0	22.1			1
				16QAM	1	0	22.7	0.687	0.418	
					1	49	22.9	0.768	0.466	
					25	12	23.0	0.692	0.419	
					50	0	22.8			1
		26365	1882.5	QPSK	1	0	23.2			1
					1	49	23.4			1
					25	12	22.3			1
					50	0	22.2			1
				16QAM	1	0	23.0			1
					1	49	23.1			1
					25	12	23.1			1
					50	0	22.9			1
		26640	1910.0	QPSK	1	0	23.2			1
					1	49	22.1			1
					25	12	21.8			1
					50	0	21.5			1
				16QAM	1	0	22.9			1
					1	49	21.9			1
					25	12	22.8			1
					50	0	22.5			1
Edge 3	10	26090	1855.0	QPSK	1	0	23.2			2
					1	49	23.6			2
					25	12	23.1			2
					50	0	22.1			2
				16QAM	1	0	22.7			2
					1	49	22.9			2
					25	12	23.0			2
					50	0	22.8			2
		26365	1882.5	QPSK	1	0	23.2			2
					1	49	23.4			2
					25	12	22.3			2
					50	0	22.2			2
				16QAM	1	0	23.0			2
					1	49	23.1			2
					25	12	23.1			2
					50	0	22.9			2
		26640	1910.0	QPSK	1	0	23.2			2
					1	49	22.1			2
					25	12	21.8			2
					50	0	21.5			2
				16QAM	1	0	22.9			2
					1	49	21.9			2
					25	12	22.8			2
					50	0	22.5			2

Note(s):

1. The test reduction for LTE SAR is based on KDB 941225 D05 SAR for LTE Devices v01.
2. SAR is not required due to antenna-to-edge's distance is greater than 2.5 cm.

12.3. Wi-Fi

Test mode reduction considerations

Per KDB 248227, SAR is not required for 802.11g /n (HT20) channels when the maximum average output power is less than 1/4 dB higher than that measured on the corresponding 802.11b channels.

Hotspot SAR with 10 mm separation distance

Test position	Mode	Ch No.	Freq. (MHz)	Avg Pwr (dBm)	SAR (mW/g)		Note
					1-g	10-g	
Front	802.11b	1	2412	14.5			1
		6	2437	14.6	0.183	0.090	
		11	2462	14.6			1
Rear	802.11b	1	2412	14.5			1
		6	2437	14.6	0.027	0.016	
		11	2462	14.6			1
Edge 2	802.11b	1	2412	14.5			2
		6	2437	14.6			2
		11	2462	14.6			2
Edge 4	802.11b	1	2412	14.5			2
		6	2437	14.6			2
		11	2462	14.6			2
Edge 1	802.11b	1	2412	14.5			1
		6	2437	14.6	**0.230**	0.111	*
		11	2462	14.6			1
Edge 3	802.11b	1	2412	14.5			2
		6	2437	14.6			2
		11	2462	14.6			2

Note(s):

*: Worst case SAR result.

1. Testing was performed on the channel with the highest output power only as the SAR was ≤ 0.8 W/kg with the operating frequency band having a range of < 100 MHz. Per KDB 447498 1) e) i)
2. SAR is not required due to antenna-to-edge's distance is greater than 2.5 cm.

13. Summary of Highest SAR Values

Technology/Band	Test configuration	Mode	Separation distance (mm)	Highest 1g SAR (W/kg)
CDMA BC1	Front	1xRTT (RC3, SO55)	10	**1.39**
LTE band 25	Edge 4	QPSK (RB 1/49)	10	**1.27**
WiFi 2.4 GHz	Edge 1	802.11b	10	**0.23**

14. Highest (Worst-case) SAR Plots

Date: 12/27/2011

Test Laboratory: UL CCS SAR Lab A

CDMA BC1 (RC3 SO32)

Communication System: CDMA2000; Frequency: 1880 MHz; Duty Cycle: 1:1
Medium parameters used: f = 1880 MHz; σ = 1.507 mho/m; ε_r = 51.63; ρ = 1000 kg/m^3
Phantom section: Flat Section

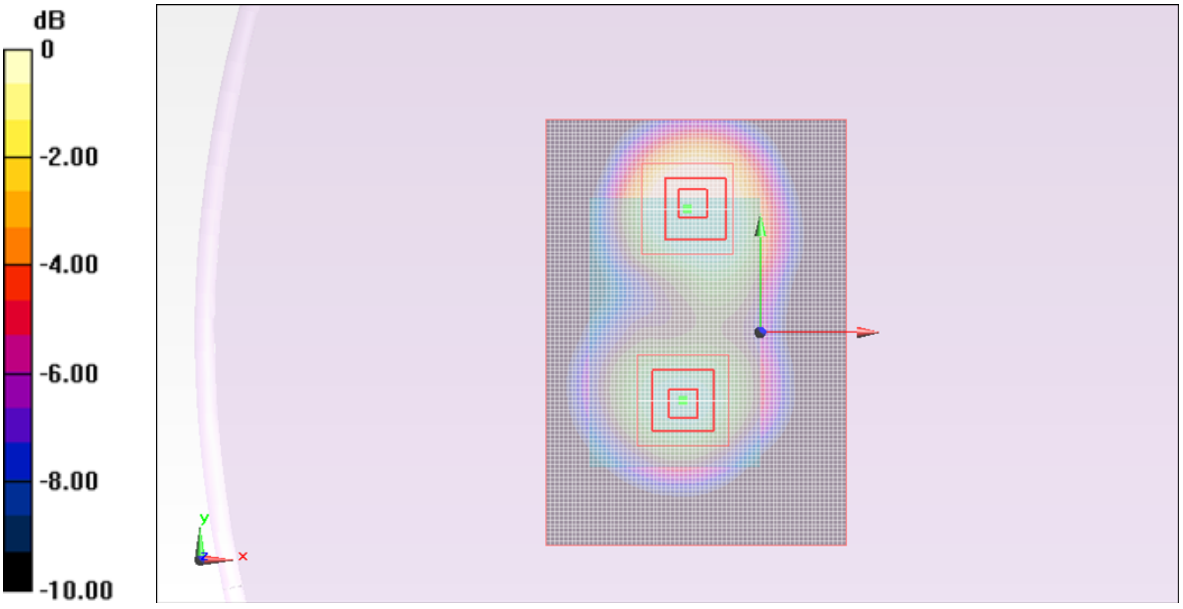
Room Ambient Temperature: 24.0 deg. C; Liquid Temperature: 23.0 deg. C

DASY5 Configuration:
- Area Scan setting - Find Secondary Maximum Within: 2.0 dB and with a peak SAR value greater than 0.0012W/kg
- Probe: EX3DV4 - SN3772; ConvF(6.76, 6.76, 6.76); Calibrated: 5/3/2011
- Sensor-Surface: 2.5mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn500; Calibrated: 7/14/2011
- Phantom: ELI v4.0(B); Type: QDOVA001BB; Serial: 1099
- Measurement SW: DASY52, Version 52.6 (2);SEMCAD X Version 14.4.5 (3634)

Front/M ch/Area Scan (71x101x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 1.903 mW/g

Front/M ch/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 33.175 V/m; Power Drift = -0.20 dB
Peak SAR (extrapolated) = 2.309 W/kg
SAR(1 g) = 1.39 mW/g; SAR(10 g) = 0.835 mW/g
Maximum value of SAR (measured) = 1.716 mW/g

Front/M ch/Zoom Scan (5x5x7)/Cube 1: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 33.175 V/m; Power Drift = -0.20 dB
Peak SAR (extrapolated) = 1.572 W/kg
SAR(1 g) = 1.02 mW/g; SAR(10 g) = 0.635 mW/g
Maximum value of SAR (measured) = 1.262 mW/g



0 dB = 1.260mW/g

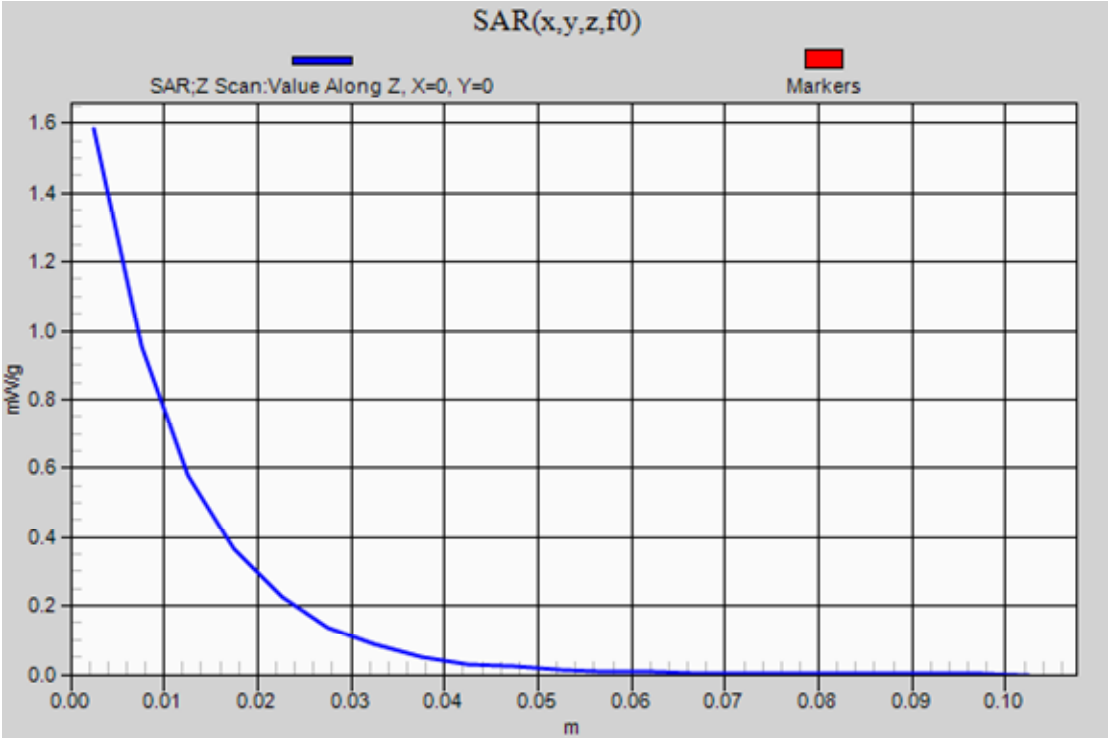
Date: 12/27/2011

Test Laboratory: UL CCS SAR Lab A

CDMA BC1 (RC3 SO32)

Communication System: CDMA2000; Frequency: 1880 MHz; Duty Cycle: 1:1

Front/M ch/Z Scan (1x1x21): Measurement grid: dx=20mm, dy=20mm, dz=5mm
Maximum value of SAR (measured) = 1.584 mW/g



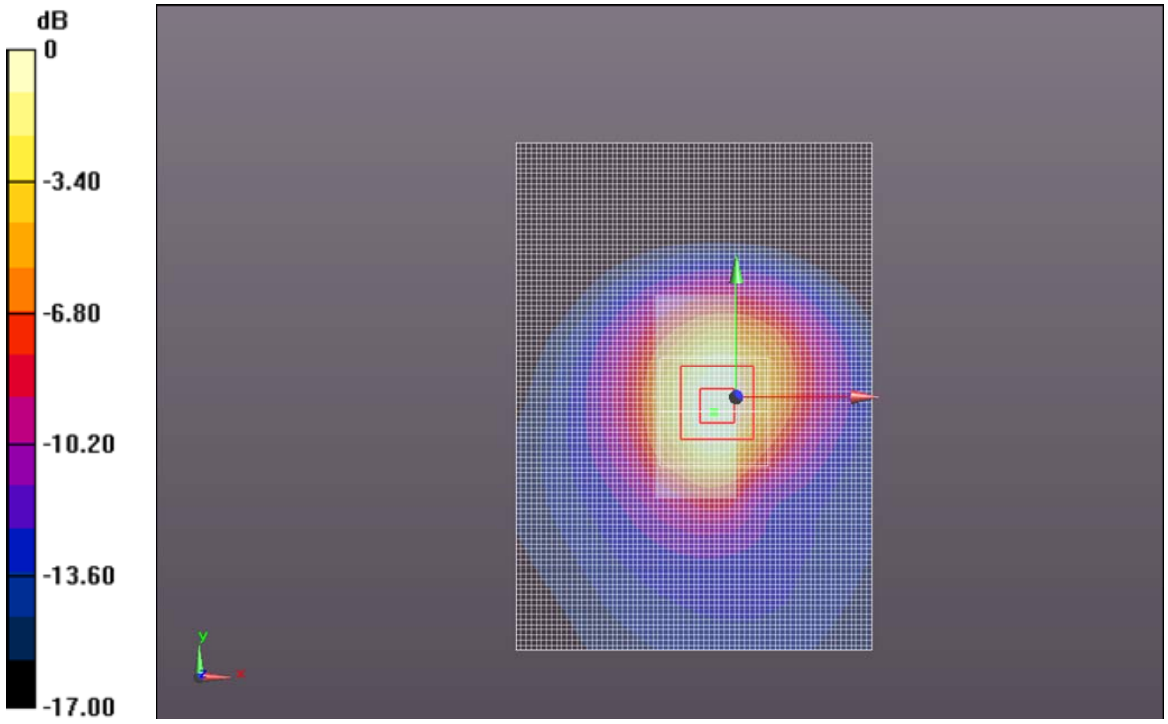
Test Laboratory: UL CCS SAR Lab C Date: 2/10/2012

LTE Band 25

Frequency: 1882.5 MHz; Duty Cycle: 1:1; Room Ambient Temperature: 24.0°C; Liquid Temperature: 23.0°C
Medium parameters used (interpolated): f = 1882.5 MHz; σ = 1.491 mho/m; ε_r = 51.212; ρ = 1000 kg/m^3
DASY5 Configuration:
- Electronics: DAE4 Sn1239; Calibrated: 10/18/2011
- Probe: EX3DV4 - SN3751; ConvF(6.83, 6.83, 6.83); Calibrated: 12/19/2011
- Sensor-Surface: 2.5mm (Mechanical Surface Detection (Locations From Previous Scan Used)), Sensor-Surface: 2.5mm (Mechanical Surface Detection)
- Phantom: ELI v5.0 (A); Type: QDOVA001BB; Serial: 1117

Edge 4/10MHz QPSK_RB 1/49_M ch/Area Scan (71x101x1): Measurement grid: dx=15mm, dy=15mm
Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (interpolated) = 1.670 mW/g

Edge 4/10MHz QPSK_RB 1/49_M ch/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 33.549 V/m; Power Drift = -0.009 dB
Peak SAR (extrapolated) = 2.0580
SAR(1 g) = 1.27 mW/g; SAR(10 g) = 0.715 mW/g
Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (measured) = 1.628 mW/g



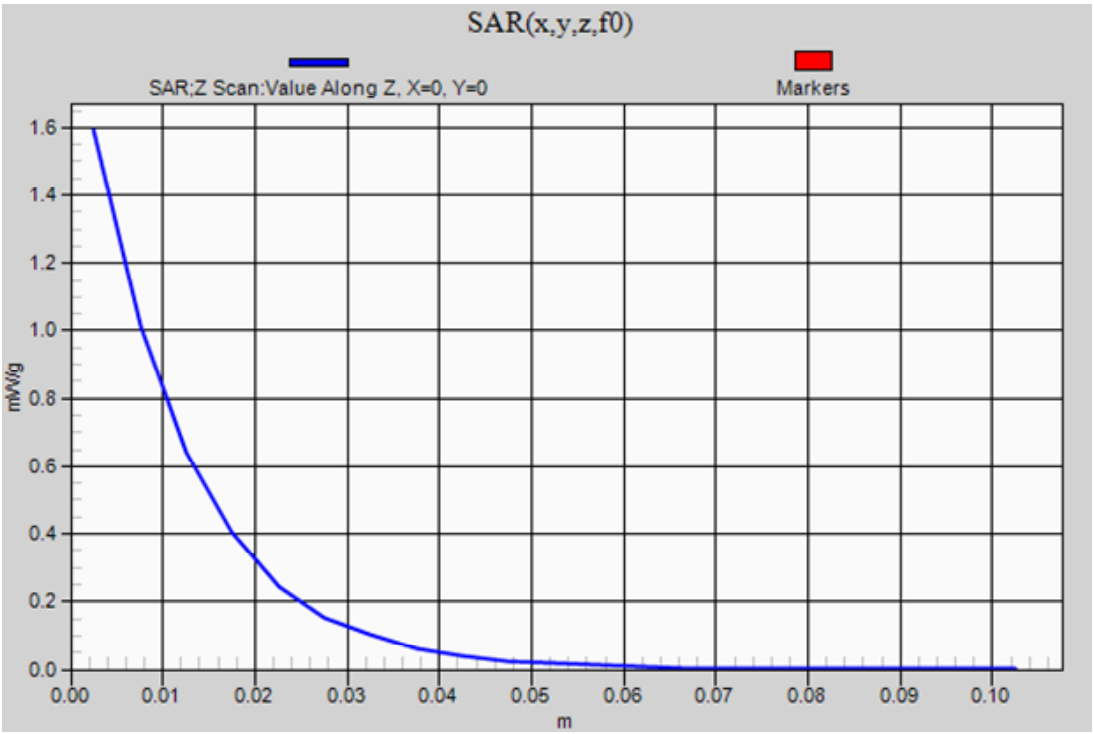
0 dB = 1.630mW/g = 4.24 dB mW/g

Test Laboratory: UL CCS SAR Lab C Date: 2/10/2012

LTE Band 25

Frequency: 1882.5 MHz; Duty Cycle: 1:1

Edge 4/10MHz QPSK_RB 1/49_M ch/Z Scan (1x1x21): Measurement grid: dx=20mm, dy=20mm, dz=5mm
Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (measured) = 1.592 mW/g



Date: 12/13/2011

Test Laboratory: UL CCS SAR Lab C

WiFi

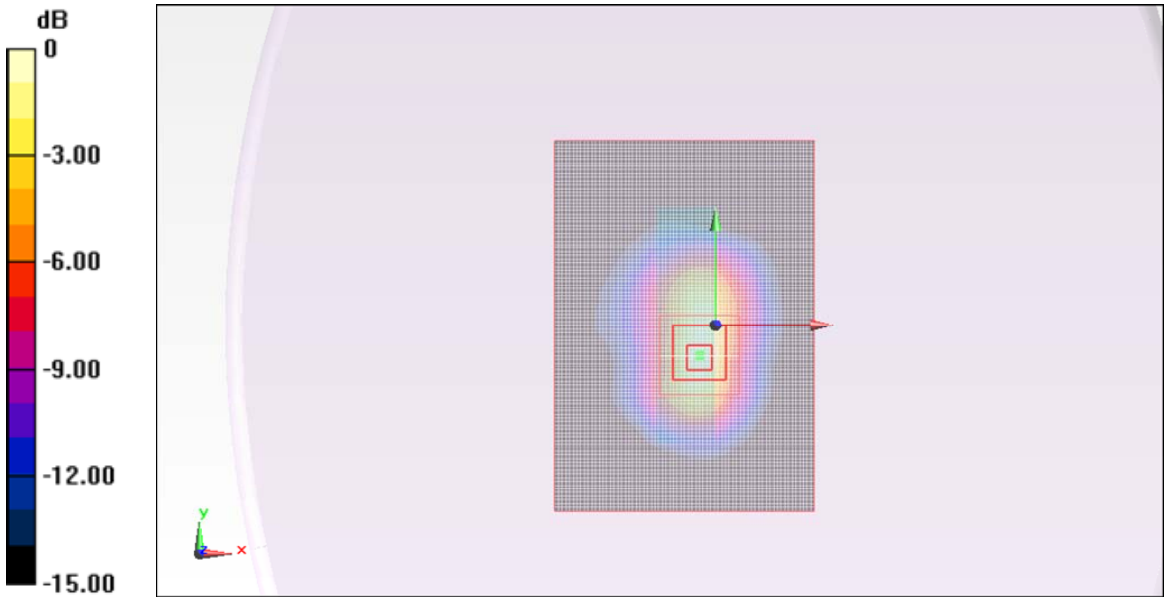
Communication System: IEEE 802.11b/g/n 2.4 GHz Band; Frequency: 2437 MHz; Duty Cycle: 1:1
Medium parameters used (interpolated): f = 2437 MHz; σ = 1.96 mho/m; ε_r = 52.355; ρ = 1000 kg/m^3
Phantom section: Flat Section

Room Ambient Temperature: 24.0 deg. C; Liquid Temperature: 23.0 deg. C

DASY5 Configuration:
- Area Scan setting - Find Secondary Maximum Within: 2.0 dB and with a peak SAR value greater than 0.0012W/kg
- Probe: EX3DV4 - SN3772; ConvF(6.41, 6.41, 6.41); Calibrated: 5/3/2011
- Sensor-Surface: 2.5mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1239; Calibrated: 10/18/2011
- Phantom: ELI v4.0 (B); Type: QDOVA001BB; Serial: 1121
- Measurement SW: DASY52, Version 52.6 (2);SEMCAD X Version 14.4.5 (3634)

Edge 1/M ch/Area Scan (71x101x1): Measurement grid: dx=15mm, dy=15mm
Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (interpolated) = 0.320 mW/g

Edge 1/M ch/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 12.749 V/m; Power Drift = -0.04 dB
Peak SAR (extrapolated) = 0.475 W/kg
SAR(1 g) = 0.230 mW/g; SAR(10 g) = 0.111 mW/g
Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (measured) = 0.330 mW/g



0 dB = 0.330mW/g

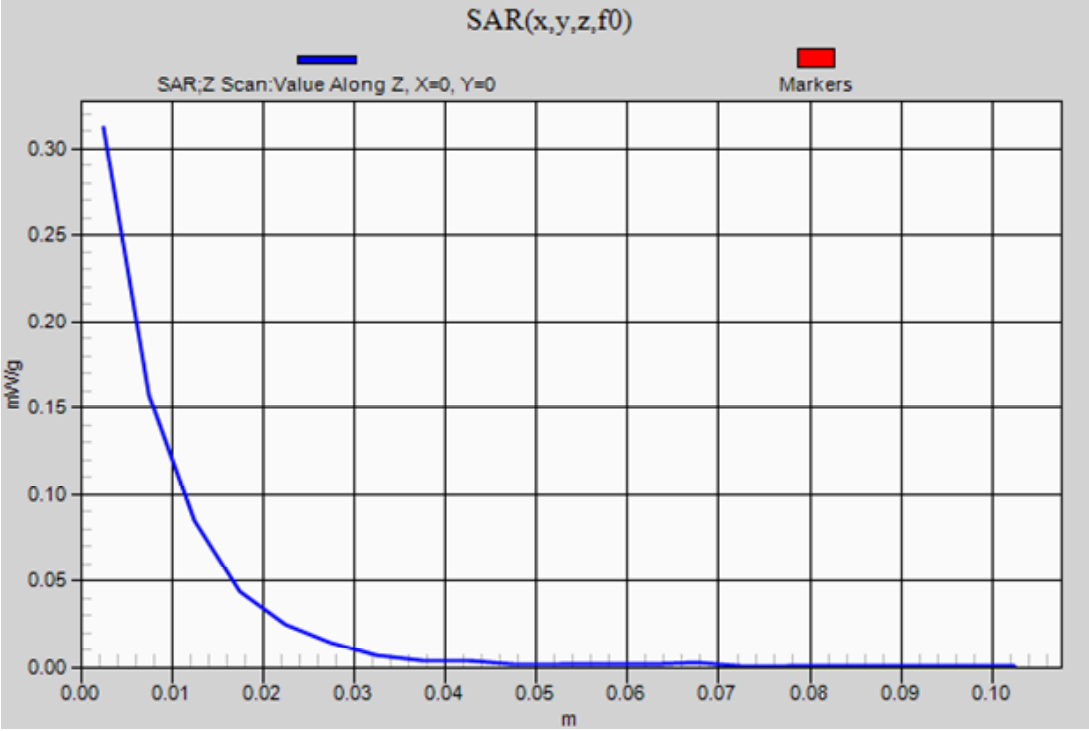
Date: 12/13/2011

Test Laboratory: UL CCS SAR Lab C

WiFi

Communication System: IEEE 802.11b/g/n 2.4 GHz Band; Frequency: 2437 MHz; Duty Cycle: 1:1

Edge 1/M ch/Z Scan (1x1x21): Measurement grid: dx=20mm, dy=20mm, dz=5mm
Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (measured) = 0.312 mW/g



15. Simultaneous Transmission SAR Analysis

15.1. Body exposure condition (3G + WiFi)

Test Position	Data CDMA BC1	Data WiFi 2.4G	Sum of 1g SAR (mW/g)
Front	1.39	0.183	1.573
Rear	0.6	0.027	0.627
Edge 2	1.33	0.013	1.343
Edge 4	0	0.011	0.011
Edge 1	1.04	0.023	1.063
Edge 3	0	0	0.000

Conclusions:
Simultaneous transmission SAR measurement (volume scan) is not required due to the sum of the 1-g SAR is < 1.6 W/kg.

15.2. Body exposure condition (LTE + WiFi)

Test Position	Data LTE Band 25	Data WiFi 2.4G	Sum of 1g SAR (mW/g)
Front	1.07	0.183	1.253
Rear	0.427	0.027	0.454
Edge 2	0	0.013	0.013
Edge 4	1.27	0.011	1.281
Edge 1	0.816	0.023	0.839
Edge 3	0	0	0.000

Conclusions:
Simultaneous transmission SAR measurement (volume scan) is not required due to the sum of the 1-g SAR is < 1.6 W/kg.

16. Appendixes

Refer to separated files for the following appendixes.

16.1. System performance check plots

16.2. SAR test plots for CDMA2000 BC1

16.3. SAR test plots for LTE Band 25

16.4. SAR test plots for WiFi 2.4 GHz

16.5. Calibration certificate for E-Field Probe EX3DV4 SN 3772

16.6. Calibration certificate for E-Field Probe EX3DV4 SN 3773

16.7. Calibration Certificate for E-Field Probe EX3DV4 SN 3751

16.8. Calibration certificate for D1900V2 SN 5d140

16.9. Calibration certificate for D2450V2 SN: 706 with extended cal. data