



**FCC OET BULLETIN 65 SUPPLEMENT C 01-01  
IEEE Std 1528-2003 and IEEE Std 1528a-2005**

**(Class II Permissive Change)**

**SAR EVALUATION REPORT**

*For*

**Cell/PCS GSM/EDGE/WCDMA/CDMA and 700MHz LTE Modem  
(Tested inside of Panasonic Tablet PC FZ-G1)**

**Model: WW12D2**

**FCC ID: ACJ9TGWW12D2**

**Report Number: 12J14675-1G**

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Revision History

<u>Rev.</u>	<u>Issue Date</u>	<u>Revisions</u>	<u>Revised By</u>
--	2/7/2013	Initial Issue	--
A	2/14/2013	<ul style="list-style-type: none"> <li>- Section 8 – Replaced table for required test configurations.</li> <li>- Section 10, 11 and 12 – Added SAR results for additional standalone SAR testing performed on Edge 4. Includes documentation for the required liquid, system and instrument verifications and certificates.</li> <li>- Section 12 – Merged summary of highest measured SAR and measurement variability results, previously under Section 13, into Section 12, and corrected variability result for 850 MHz frequency.</li> <li>- Section 13 – Added additional Simultaneous Transmission SAR analysis tables and related information (This was previously Section 14).</li> <li>- Section 7 – Corrected typo errors in proximity sensor exhibits.</li> <li>- Section 17 – Added setup photo for Edge 4 testing.</li> <li>- Updated contents in the appendixes.</li> </ul>	Ray Su
B	2/18/2013	<ul style="list-style-type: none"> <li>- Section 13 – Updated simultaneous transmission SAR analysis results in correspondence with the changes that took place in the WLAN report.</li> </ul>	Ray Su
C	2/21/2013	<ul style="list-style-type: none"> <li>- Purged previous rear side test results obtained from testing under the SAM phantom and replaced with values measured under the ELI phantom. All associated plots, supporting documents and other analyses have been updated accordingly.</li> </ul>	Ray Su
D	3/8/2013	<p>Restructured multiple aspects of the report in accordance with the changes that were implemented in the related WLAN report; this includes the relocation of various tables for SAR test exclusion and the corresponding estimated SAR value for those configurations eligible for standalone SAR test exclusion in more appropriate sections of the report.</p> <p>Revised Section 13 in accordance with the updated values in the WLAN report.</p> <p>Section 8 – Revised antenna to surface distance on the bottom-side.</p>	Dave Weaver
E	3/13/2013	<ul style="list-style-type: none"> <li>- Section 1.1 – Removed “tablet” designation from Highest Reported SAR table.</li> <li>- Section 7 – Removed SAR coverage test data</li> <li>- Section 7 – Corrected power levels in trigger distance tables and graphs</li> <li>- Section 8 – Added special test considerations</li> <li>- Section 9 – Added notes to the LTE output power tables</li> <li>- Section 15 – Added before and after modification photographs</li> <li>- Section 16 – Clarified antenna and proximity sensor identification and included additional dimensions</li> <li>- Section 17 – Replaced the setup photos and added antenna locations</li> </ul>	Ray Su
F	3/19/2013	<ul style="list-style-type: none"> <li>- Section 9 – Modified LTE output power tables to improve clarity</li> </ul>	Dave Weaver
G	3/28/2013	<ul style="list-style-type: none"> <li>- Section 12 – Corrected typo error in SAR test exclusion and estimated SAR tables</li> <li>- Section 9 – Added statement to clarify target power</li> </ul>	Dave Weaver

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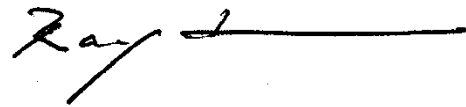
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# 1. Attestation of Test Results

Applicant	Panasonic Corporation of North America	
DUT description	Cell/PCS GSM/EDGE/WCDMA/CDMA and 700MHz LTE Modem (Tested inside of Panasonic Tablet PC FZ-G1)	
Model	WW12D2	
Test device is	An identical prototype	
Device category	Portable	
Exposure category	General Population/Uncontrolled Exposure	
Date tested	1/30/2013 – 3/7/2013	
Applicable Standards		Test Results
Published RF exposure KDB procedures, TCB workshop updates and OET Bulletin 65 Supplement C, IEEE Std 1528-2003 and IEEE Std 1528a-2005		Pass
<p>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.</p> <p><b>Note:</b> 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.</p>		
Approved & Released For UL CCS By:	Tested By:	
		
Dave Weaver Program Manager UL CCS	Ray Su SAR Engineer UL CCS	

## 1.1. Highest Reported SAR

Worst Case SAR data for each Frequency Band

RF Exposure Rule	Freq. Range	Highest Reported SAR	Limit
22	824-849 MHz	Body: 1.08 W/kg (Edge 1)	1.6 W/kg
24	1850-1910 MHz	Body: 1.2 W/kg (Edge 1)	
27 (LTE Band 13)	777 – 787 MHz	Body: 1.28 W/kg (Edge 1)	
Simultaneous transmission condition		1.59 W/kg (highest SAR across exposure conditions)	

### LEGEND:

- Rear = Back
- Edge 1 = Top Edge
- Edge 2 = Right Edge
- Edge 3 = Bottom Edge
- Edge 4 = Left Edge

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## 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, IEEE Std 1528a-2005 and the following published RF exposure KDB procedures:

- 941225 D01 SAR test for 3G devices v02
- 941225 D06 Hot Spot SAR v01
- 941225 D05 SAR for LTE Devices v02
- 865664 D01 SAR Measurement 100 MHz to 6 GHz v01
- 865664 D02 SAR Reporting v01
- 447498 D01 General RF Exposure Guidance v05
- 248227 D01 SAR Meas for 802 11abg v01r02
- 616217 D04 SAR for laptop and tablets v01

## 3. Facilities and Accreditation

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

UL 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 used to perform the tests documented in this report has been calibrated in accordance with the manufacturers' recommendations, and is traceable to recognized national standards.

Name of Equipment	Manufacturer	Type/Model	Serial No.	Cal. Due date		
				MM	DD	Year
S-Parameter Network Analyzer	Agilent	8753ES	MY40001647	6	27	2013
Dielectronic Probe kit	SPEAG	SM DAK 040 CA	1082	9	18	2013
ENA Series Network Analyzer	Agilent	E5071B	MY42100131	2	11	2013
Dielectronic Probe kit	HP	85070E	594	N/A		
Synthesized Signal Generator	HP	8665B	3438A00633	2	22	2013
Power Meter	HP	438A	3513U04320	9	17	2013
Power Sensor A	HP	8481A	2237A31744	8	17	2013
Power Sensor B	HP	8481A	3318A95392	8	17	2013
Amplifier	MITEQ	4D00400600-50-30P	1622052	N/A		
Directional coupler	Werlatone	C8060-102	2149	N/A		
Synthesized Signal Generator	HP	8665B	3744A01084	5	3	2013
Power Meter	HP	438A	2822A05684	10	7	2013
Power Sensor A	HP	8481A	2702A66876	8	1	2013
Power Sensor B	HP	8482A	2349A08568	4	14	2013
Amplifier	MITEQ	4D00400600-50-30P	1620606	N/A		
Directional coupler	Werlatone	C8060-102	2141	N/A		
Base Station Simulator	R & S	CMU200	106301	6	6	2013
Base Station Simulator	R & S	CMU200	118339	5	20	2013
Base Station Simulator	Agilent	8960	GB42361452	4	4	2013
Thermometer	TRACEABLE	4242	122529162	9	19	2013
E-Field Probe	SPEAG	EX3DV4	3686	2	16	2013
E-Field Probe	SPEAG	EX3DV4	3749	1	15	2014
E-Field Probe	SPEAG	EX3DV4	3871	8	20	2013
E-Field Probe	SPEAG	EX3DV4	3885	10	9	2013
Data Acquisition Electronics	SPEAG	DAE4	1258	3	8	2013
Data Acquisition Electronics	SPEAG	DAE4	1259	2	13	2013
Data Acquisition Electronics	SPEAG	DAE4	1343	8	20	2013
Data Acquisition Electronics	SPEAG	DAE3	427	1	9	2017
Data Acquisition Electronics	SPEAG	DAE4	1352	10	8	2013
System Validation Dipole	SPEAG	D750V3	1071	10	5	2013
System Validation Dipole	SPEAG	D835V2	4d117	4	10	2013
System Validation Dipole	SPEAG	D1900V2	5d140	4	12	2013
System Validation Dipole	SPEAG	D1900V2	5d043	11	6	2013
System Validation Dipole	SPEAG	D2450V2	706	4	11	2013
System Validation Dipole	SPEAG	D750V3	1019	2	9	2013
System Validation Dipole	SPEAG	D750V3	1019	3	5	2014
System Validation Dipole	SPEAG	D5GHV2	1003	9	18	2013
Power Meter	Agilent	N1912A	MY52310061	7	5	2013
Power Sensor Ch A	Agilent	N1921A	MY52260009	7	5	2013
Power Sensor Ch B	Agilent	N1921A	MY52270022	7	21	2013

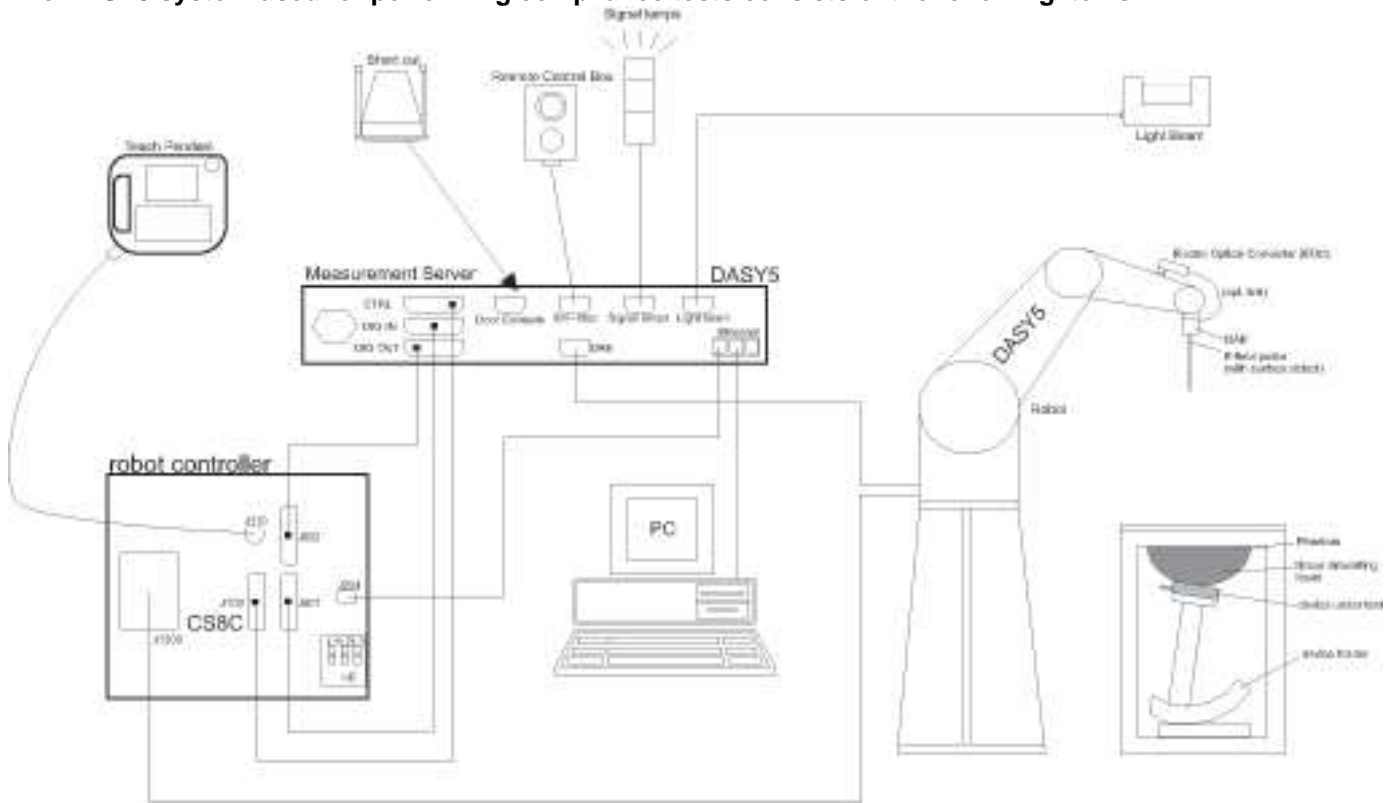
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## 4.2. Measurement Uncertainty

Per KDB 865664, when no measured SAR values exceed 1.5 W/kg, measurement uncertainty analysis does not need to be provided in the test report.

## 5. Measurement System Description and Setup

The DASY5 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.

## 6. SAR Measurement Procedure

### 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.

Area Scan Parameters extracted from KDB 865664 D01 SAR Measurement 100 MHz to 6 GHz v01

	≤ 3 GHz	> 3 GHz
Maximum distance from closest measurement point (geometric center of probe sensors) to phantom surface	5 ± 1 mm	$\frac{1}{2} \cdot \delta \cdot \ln(2) \pm 0.5 \text{ mm}$
Maximum probe angle from probe axis to phantom surface normal at the measurement location	30° ± 1°	20° ± 1°
Maximum area scan spatial resolution: $\Delta x_{Area}$ , $\Delta y_{Area}$	≤ 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.	

**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 points (refer to table below) 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.

Zoom Scan Parameters extracted from KDB 865664 D01 SAR Measurement 100 MHz to 6 GHz v01 (Draft)

		$\leq 3$ GHz	$> 3$ GHz	
Maximum zoom scan spatial resolution: $\Delta x_{Zoom}, \Delta y_{Zoom}$		$\leq 2$ GHz: $\leq 8$ mm 2 – 3 GHz: $\leq 5$ mm*	3 – 4 GHz: $\leq 5$ mm* 4 – 6 GHz: $\leq 4$ mm*	
Maximum zoom scan spatial resolution, normal to phantom surface	uniform grid: $\Delta z_{Zoom}(n)$	$\leq 5$ mm	3 – 4 GHz: $\leq 4$ mm 4 – 5 GHz: $\leq 3$ mm 5 – 6 GHz: $\leq 2$ mm	
	graded grid	$\Delta z_{Zoom}(1)$ : between 1 <sup>st</sup> two points closest to phantom surface	$\leq 4$ mm	3 – 4 GHz: $\leq 3$ mm 4 – 5 GHz: $\leq 2.5$ mm 5 – 6 GHz: $\leq 2$ mm
		$\Delta z_{Zoom}(n>1)$ : between subsequent points	$\leq 1.5 \cdot \Delta z_{Zoom}(n-1)$	
Minimum zoom scan volume	x, y, z	$\geq 30$ mm	3 – 4 GHz: $\geq 28$ mm 4 – 5 GHz: $\geq 25$ mm 5 – 6 GHz: $\geq 22$ mm	
Note: $\delta$ 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 <i>reported</i> SAR from the area scan based <i>1-g SAR estimation</i> 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.				

**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.

## 6.2. Volume Scan Procedures

### Step 1: Repeat Step 1-4 in Section 6.1

### Step 2: 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 3: 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

Cell/PCS GSM/EDGE/WCDMA/CDMA and 700MHz LTE Modem (Tested inside of Panasonic Tablet PC FZ-G1) Model: WW12D2	
Operating Configuration(s)	<ul style="list-style-type: none"> <li>Tablet Mode</li> </ul>
Exposure Condition(s)	<ul style="list-style-type: none"> <li>The device is used in close proximity to the body. Specific details of the required test positions are provided in Section 8 "Exposure Conditions"</li> </ul>
Accessory	<ul style="list-style-type: none"> <li>None</li> </ul>

### 7.1. Band and Air Interfaces

Tx Frequency Bands	<ul style="list-style-type: none"> <li>CDMA BC 0: 824 - 849 MHz</li> <li>CDMA BC 1: 1850 - 1910 MHz</li> <li>LTE Band 13: 777 - 787 MHz</li> <li>802.11ab/g/n: 2412 - 2462 MHz, b / g / HT20</li> <li>5150 - 5250 MHz, a / HT20</li> <li>5250 - 5350 MHz, a / HT20</li> <li>5500 - 5700 MHz, a / HT20</li> <li>5725 - 5850 MHz, a / HT20</li> <li>Bluetooth: 2402 - 2480 MHz</li> </ul>
Duty Cycle	<ul style="list-style-type: none"> <li>CDMA BC0, BC1, BC10: 100%</li> <li>LTE Band 25: 100%</li> <li>802.11b: 98.9%</li> <li>802.11g: 97.7%</li> <li>802.11a: 98.3%</li> <li>802.11n: Not assessed</li> </ul>

### 7.2. Hotspot (Wireless Router) Exposure Condition

N/A

### 7.3. Simultaneous Transmission

Usage Scenario	Modes	Mode of Operation	BAND	CDMA 1xRTT	CDMA 1xEV-DO	LTE	WiFi 2.4GHz Main	WiFi 2.4GHz Aux	WiFi 5 GHz Bands Main	WiFi 5 GHz Bands Aux	BT 2.4 GHz	
Body SAR	WWAN + 2.4GHz WLAN	CDMA 1xRTT	BC0	YES	No	No	YES	No	No	No	No	
		CDMA 1xRTT	BC1	YES	No	No	YES	No	No	No	No	
		CDMA 1xEVDO	BC0	No	YES	No	YES	No	No	No	No	
		CDMA 1xEVDO	BC1	No	YES	No	YES	No	No	No	No	
		LTE	13	No	No	YES	YES	No	No	No	No	
		CDMA 1xRTT	BC0	YES	No	No	No	YES	No	No	No	
		CDMA 1xRTT	BC1	YES	No	No	No	YES	No	No	No	
		CDMA 1xEVDO	BC0	No	YES	No	No	YES	No	No	No	
		CDMA 1xEVDO	BC1	No	YES	No	No	YES	No	No	No	
		DC-HSDPA	1900	No	No	YES	No	YES	No	No	No	
		WWAN + 5 GHz Bands WLAN	CDMA 1xRTT	BC0	YES	No	No	No	No	YES	No	No
			CDMA 1xRTT	BC1	YES	No	No	No	No	YES	No	No
	CDMA 1xEVDO		BC0	No	YES	No	No	No	YES	No	No	
	CDMA 1xEVDO		BC1	No	YES	No	No	No	YES	No	No	
	LTE		13	No	No	YES	No	No	YES	No	No	
	CDMA 1xRTT		BC0	YES	No	No	No	No	YES	YES	No	
	CDMA 1xRTT		BC1	YES	No	No	No	No	YES	YES	No	
	CDMA 1xEVDO		BC0	No	YES	No	No	No	YES	YES	No	
	CDMA 1xEVDO		BC1	No	YES	No	No	No	YES	YES	No	
	LTE		13	No	No	YES	No	No	YES	YES	No	
	WWAN + BT		CDMA 1xRTT	BC0	YES	No	No	No	No	No	No	YES
			CDMA 1xRTT	BC1	YES	No	No	No	No	No	No	YES
		CDMA 1xEVDO	BC0	No	YES	No	No	No	No	No	YES	
		CDMA 1xEVDO	BC1	No	YES	No	No	No	No	No	YES	
	WWAN+ 2.4 GHz+ WLAN + BT	LTE	13	No	No	YES	No	No	No	No	YES	
		CDMA 1xRTT	BC0	YES	No	No	YES	No	No	No	YES	
		CDMA 1xRTT	BC1	YES	No	No	YES	No	No	No	YES	
		CDMA 1xEVDO	BC0	No	YES	No	YES	No	No	No	YES	
	WWAN+ 5 GHz+ WLAN + BT	CDMA 1xEVDO	BC1	No	YES	No	YES	No	No	No	YES	
		LTE	13	No	No	YES	No	No	YES	No	YES	
		CDMA 1xRTT	BC0	YES	No	No	YES	YES	No	No	No	
		CDMA 1xRTT	BC1	YES	No	No	YES	YES	No	No	No	
	WWAN+ 2.4 GHz+ WLAN + BT	CDMA 1xEVDO	BC0	No	YES	No	YES	YES	No	No	No	
		CDMA 1xEVDO	BC1	No	YES	No	YES	YES	No	No	No	
		LTE	13	No	No	YES	YES	YES	No	No	No	
		CDMA 1xRTT	BC0	YES	No	No	No	No	YES	YES	No	
	WWAN+ 5 GHz+ WLAN + BT	CDMA 1xRTT	BC1	YES	No	No	No	No	YES	YES	No	
		CDMA 1xEVDO	BC0	No	YES	No	No	No	YES	YES	No	
		CDMA 1xEVDO	BC1	No	YES	No	No	No	YES	YES	No	
		LTE	13	No	No	YES	No	No	YES	YES	No	

**Notes:**

1. Bluetooth transmits using the WLAN Aux Antenna
2. Bluetooth can transmit simultaneously with the WLAN Main Antenna, in either of the WLAN bands.
3. Bluetooth cannot transmit simultaneously with the WLAN Aux Antenna, in either of the WLAN bands; this also precludes the transmission of Bluetooth when WLAN is in MIMO mode.
4. With a maximum output power of **4.47 mW** (6.5 dBm), Bluetooth qualifies for Standalone SAR test exclusion based on the formula for Standalone SAR test exclusion considerations outlined in KDB 447498 D01 . For the exact value that this formula yields, please refer to **Section 14 “Simultaneous Transmission SAR Analysis”** of this report.

### 7.4. LTE Parameters

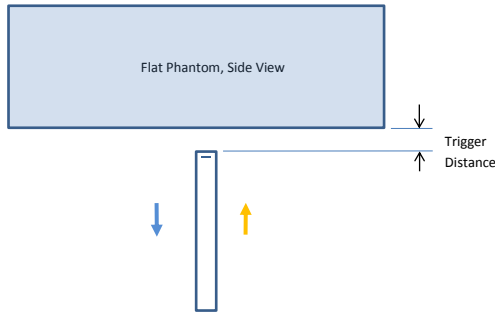
#	Description	Information																																						
A	List the frequency range and channel bandwidths used in each LTE band; 1.4, 3, 5, 10, 15, 20 MHz, etc.	<b>Band 13</b> Tx: 777 – 787 MHz   Rx: 746 – 756 MHz Channel Bandwidths: 5 MHz, 10 MHz																																						
B	Identify the high, middle and low (H, M, L) channel numbers and channel frequencies for each LTE bandwidth and frequency band	<table border="1"> <thead> <tr> <th rowspan="2">Band 13</th> <th colspan="6">Channel Bandwidth</th> </tr> <tr> <th>20 MHz</th> <th>15 MHz</th> <th>10 MHz</th> <th>5 MHz</th> <th>3 MHz</th> <th>1.4 MHz</th> </tr> </thead> <tbody> <tr> <td>Low</td> <td></td> <td></td> <td></td> <td>23205/ 779.5</td> <td></td> <td></td> </tr> <tr> <td>Mid</td> <td></td> <td></td> <td>23230/ 782.0</td> <td>23230/ 782.0</td> <td></td> <td></td> </tr> <tr> <td>High</td> <td></td> <td></td> <td></td> <td>23255/ 7874.5</td> <td></td> <td></td> </tr> </tbody> </table>	Band 13	Channel Bandwidth						20 MHz	15 MHz	10 MHz	5 MHz	3 MHz	1.4 MHz	Low				23205/ 779.5			Mid			23230/ 782.0	23230/ 782.0			High				23255/ 7874.5						
Band 13	Channel Bandwidth																																							
	20 MHz	15 MHz	10 MHz	5 MHz	3 MHz	1.4 MHz																																		
Low				23205/ 779.5																																				
Mid			23230/ 782.0	23230/ 782.0																																				
High				23255/ 7874.5																																				
C	Descriptions of the LTE transmitter and antenna implementation, and identify if the transmitter operates independently of the other wireless transmitters in the device; i.e., whether the LTE hardware, components and/or antenna(s) are shared with other transmitters.	A single antenna (Main) is used for LTE and other wireless modes (CDMA) for both transmit and receive. A second antenna (Auxiliary) is used for LTE and other wireless modes (CDMA) for receive Only. This device does not support DTM.																																						
D	Identify the voice and data transmission requirements for all LTE operating modes and exposure conditions, for standalone and simultaneous transmission, with respect to the required head and body test configurations, antenna locations, handset flip or slide cover positions, antenna diversity requirements, etc.	Data Only Device Exposure Conditions: <ul style="list-style-type: none"> <li>▪ Tablet Mode, with Proximity Sensor deactivated (Full Power)                             <ul style="list-style-type: none"> <li>○ Top-edge of the DUT at 20 mm from the phantom</li> <li>○ Rear side of the DUT bumpers at 6 mm from the phantom</li> </ul> </li> <li>▪ Tablet Mode, with Proximity Sensor activated (Reduced Power)                             <ul style="list-style-type: none"> <li>○ Top-edge of the DUT at 0 mm from the phantom</li> <li>○ Rear side of the DUT at 0 mm from the phantom</li> </ul> </li> </ul>																																						
E	Identify if Maximum Power Reduction (MPR) is implemented as an optional or permanent feature, i.e., built-in by design: <ol style="list-style-type: none"> <li>MPR may be considered during SAR testing only when the maximum output power is permanently limited by the MPR implemented within the device, according to the RB (resource block) configurations specified in 3GPP/LTE standards.</li> <li>Regardless of network requirements, only those RB configurations allowed (see 3GPP standards) for the channel bandwidth and modulation combinations may be tested with MPR active. Configurations with RB allocations less than the RB thresholds required by 3GPP must be tested without MPR.</li> <li>A-MPR (additional MPR) must be disabled during SAR testing.</li> </ol>	As per 3GPP TS 36.101 v11.0.0 (2012-03) <b>Table 6.2.3-1: Maximum Power Reduction (MPR) for Power Class 3</b> <table border="1"> <thead> <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> </thead> <tbody> <tr> <td>QPSK</td> <td>&gt; 5</td> <td>&gt; 4</td> <td>&gt; 8</td> <td>&gt; 12</td> <td>&gt; 16</td> <td>&gt; 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>&gt; 5</td> <td>&gt; 4</td> <td>&gt; 8</td> <td>&gt; 12</td> <td>&gt; 16</td> <td>&gt; 18</td> <td>≤ 2</td> </tr> </tbody> </table> <p>MPR is supported by design and is mandatory.                      A-MPR is supported by design, but is disabled for SAR testing.                      A-MPR is disabled, by using Network Setting value of NS_01.</p>	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
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																																	

#	Description	Information
F	When power reduction is required for one or more LTE modes to satisfy SAR compliance for simultaneous transmission or other equipment certification and operating requirements, maximum average conducted output power measurement results for each power reduction mode applicable to the simultaneous voice/data transmission configurations for such wireless configurations and frequency bands are required.	Yes. A proximity sensor for WWAN power reduction is implemented in the device to address RF exposure compliance when the cellular antenna is positioned close to the user's body or other objects.

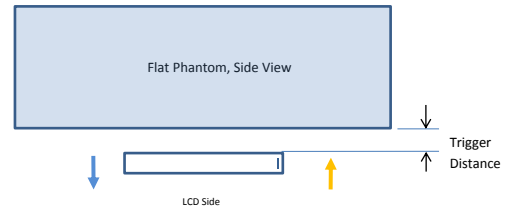
### 7.5. Proximity Sensor Triggering distance (KDB 616217 §6.2)

Edge 1 of the DUT was placed directly below the flat phantom. The DUT was moved toward the phantom in accordance with the steps outlined in KDB 616217 §6.2 to determine the trigger distance for enabling power reduction. The DUT was moved away from the phantom to determine the trigger distance for resuming full power.

The measurement was then repeated for the Rear surface.



Proximity Sensor Trigger Distance Assessment  
 KDB 616217 §6.2, **Edge 1**



Proximity Sensor Trigger Distance Assessment  
 KDB 616217 §6.2, **Rear**

**LEGEND**

- Direction of DUT travel for determination of full power resumption triggering point
- Direction of DUT travel for determination of power reduction triggering point

### Summary of Trigger Distances

Tissue simulating liquid	Trigger distance - Edge 1		Trigger distance - Rear	
	Moving toward phantom	Moving from phantom	Moving toward phantom	Moving from phantom
750 muscle	24 mm	27 mm	11 mm	17 mm
850 muscle	23 mm	25 mm	11 mm	17 mm
1900 muscle	21 mm	26 mm	11 mm	15 mm

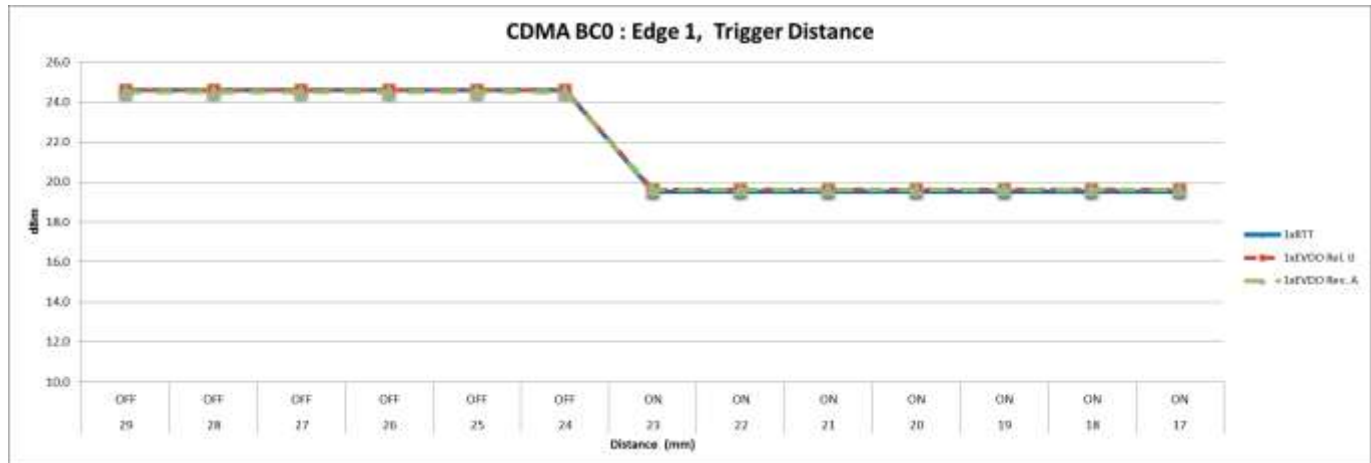
## 7.6. Triggering distances and power levels

### 7.6.1. DUT moving toward the phantom

#### CDMA BC0

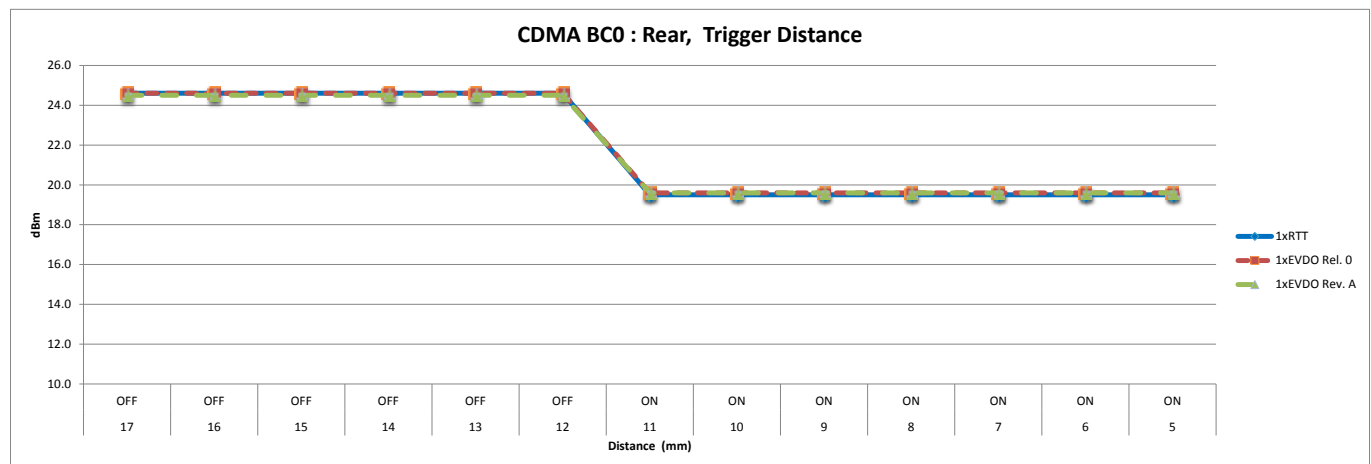
#### Edge 1

Edge 1, CDMA BC0													
Distance (mm):	29	28	27	26	25	24	23	22	21	20	19	18	17
Proximity sensor with reduced power activation:	OFF	OFF	OFF	OFF	OFF	OFF	ON	ON	ON	ON	ON	ON	ON
1xRTT	24.6	24.6	24.6	24.6	24.6	24.6	19.5	19.5	19.5	19.5	19.5	19.5	19.5
1xEVDO Rel. 0	24.6	24.6	24.6	24.6	24.6	24.6	19.6	19.6	19.6	19.6	19.6	19.6	19.6
1xEVDO Rev. A	24.5	24.5	24.5	24.5	24.5	24.5	19.6	19.6	19.6	19.6	19.6	19.6	19.6



#### Rear

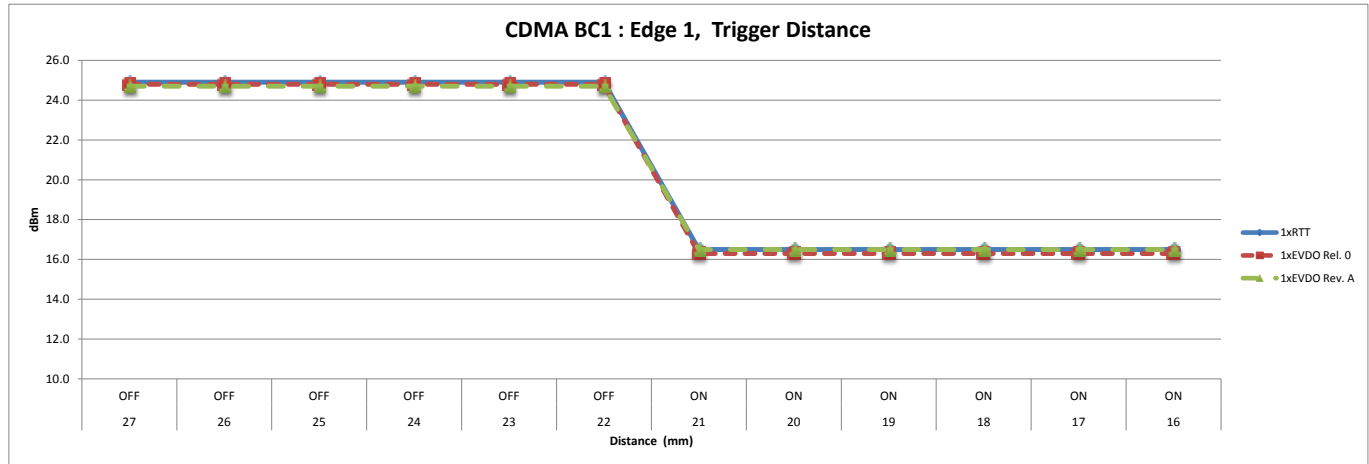
CDMA BC0													
Distance (mm):	17	16	15	14	13	12	11	10	9	8	7	6	5
Proximity sensor with reduced power activation:	OFF	OFF	OFF	OFF	OFF	OFF	ON	ON	ON	ON	ON	ON	ON
1xRTT	24.6	24.6	24.6	24.6	24.6	24.6	19.5	19.5	19.5	19.5	19.5	19.5	19.5
1xEVDO Rel. 0	24.6	24.6	24.6	24.6	24.6	24.6	19.6	19.6	19.6	19.6	19.6	19.6	19.6
1xEVDO Rev. A	24.5	24.5	24.5	24.5	24.5	24.5	19.6	19.6	19.6	19.6	19.6	19.6	19.6



**CDMA BC1**

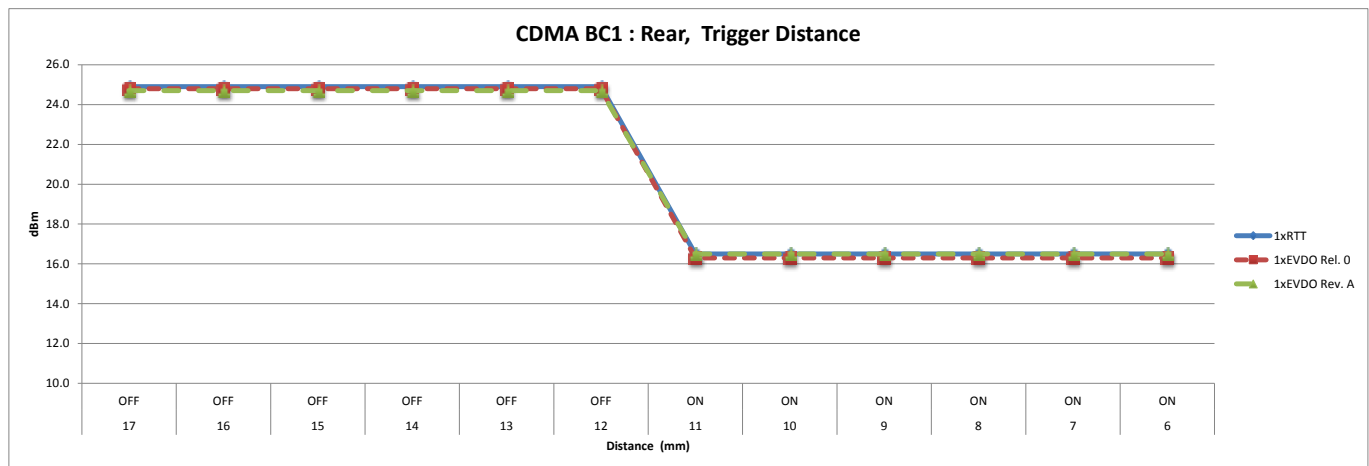
**Edge 1**

Edge 1, CDMA BC1												
Distance (mm):	27	26	25	24	23	22	21	20	19	18	17	16
Proximity sensor with reduced power activation:	OFF	OFF	OFF	OFF	OFF	OFF	ON	ON	ON	ON	ON	ON
1xRTT	24.9	24.9	24.9	24.9	24.9	24.9	16.5	16.5	16.5	16.5	16.5	16.5
1xEVDO Rel. 0	24.8	24.8	24.8	24.8	24.8	24.8	16.3	16.3	16.3	16.3	16.3	16.3
1xEVDO Rev. A	24.7	24.7	24.7	24.7	24.7	24.7	16.5	16.5	16.5	16.5	16.5	16.5



**Rear**

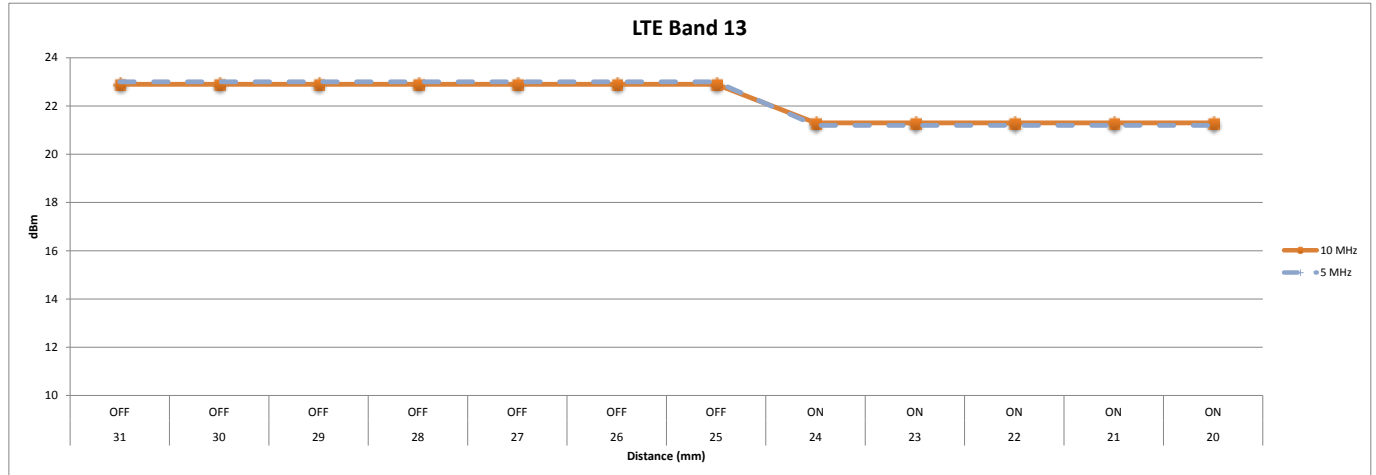
CDMA BC1												
Distance (mm):	17	16	15	14	13	12	11	10	9	8	7	6
Proximity sensor with reduced power activation:	OFF	OFF	OFF	OFF	OFF	OFF	ON	ON	ON	ON	ON	ON
1xRTT	24.9	24.9	24.9	24.9	24.9	24.9	16.5	16.5	16.5	16.5	16.5	16.5
1xEVDO Rel. 0	24.8	24.8	24.8	24.8	24.8	24.8	16.3	16.3	16.3	16.3	16.3	16.3
1xEVDO Rev. A	24.7	24.7	24.7	24.7	24.7	24.7	16.5	16.5	16.5	16.5	16.5	16.5



**LTE Band 13**

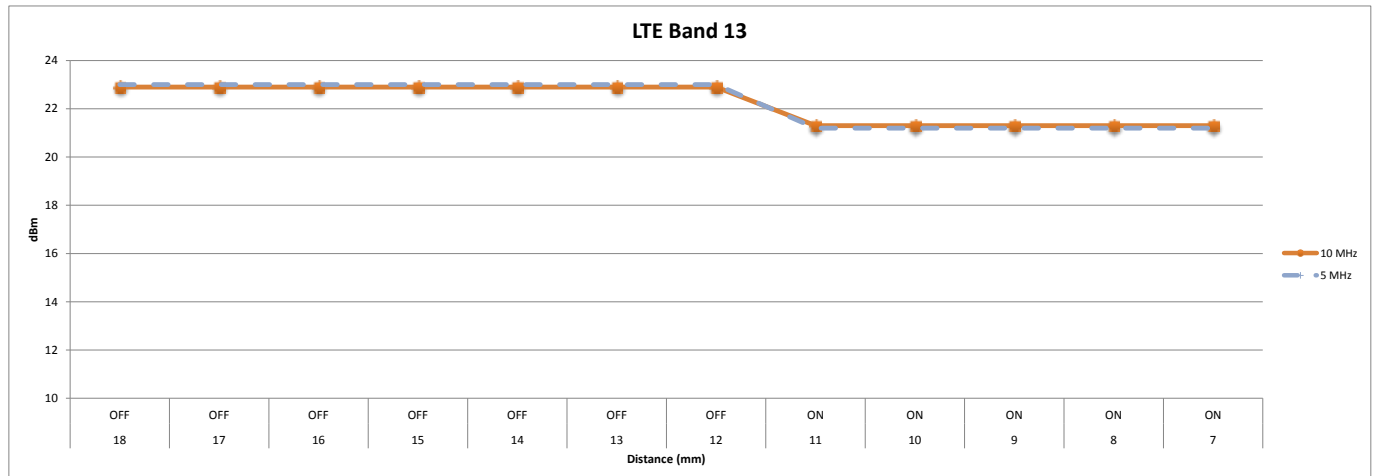
**Edge 1**

Edge 1, LTE Band 13													
Distance (mm):	31	30	29	28	27	26	25	24	23	22	21	20	19
Proximity sensor with reduced power activation:	OFF	OFF	OFF	OFF	OFF	OFF	OFF	ON	ON	ON	ON	ON	ON
10 MHz	22.9	22.9	22.9	22.9	22.9	22.9	22.9	21.3	21.3	21.3	21.3	21.3	21.3
5 MHz	23.0	23.0	23.0	23.0	23.0	23.0	23.0	21.2	21.2	21.2	21.2	21.2	21.2



**Rear**

Rear, LTE Band 13													
Distance (mm):	18	17	16	15	14	13	12	11	10	9	8	7	6
Proximity sensor with reduced power activation:	OFF	OFF	OFF	OFF	OFF	OFF	OFF	ON	ON	ON	ON	ON	ON
10 MHz	22.9	22.9	22.9	22.9	22.9	22.9	22.9	21.3	21.3	21.3	21.3	21.3	21.3
5 MHz	23.0	23.0	23.0	23.0	23.0	23.0	23.0	21.2	21.2	21.2	21.2	21.2	21.2

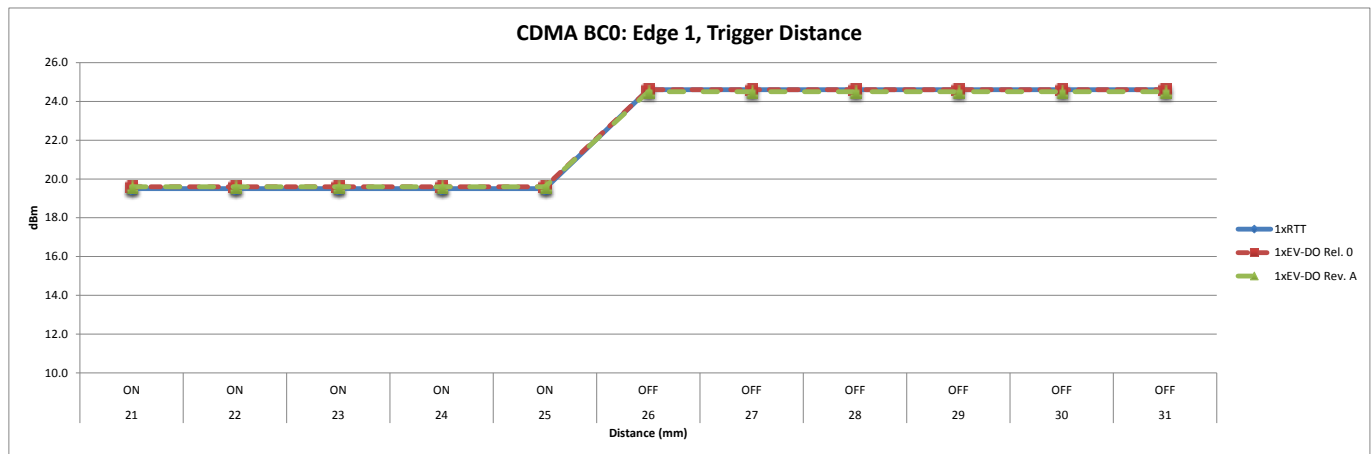


### 7.6.2. DUT moving away from the phantom

#### CDMA BC0

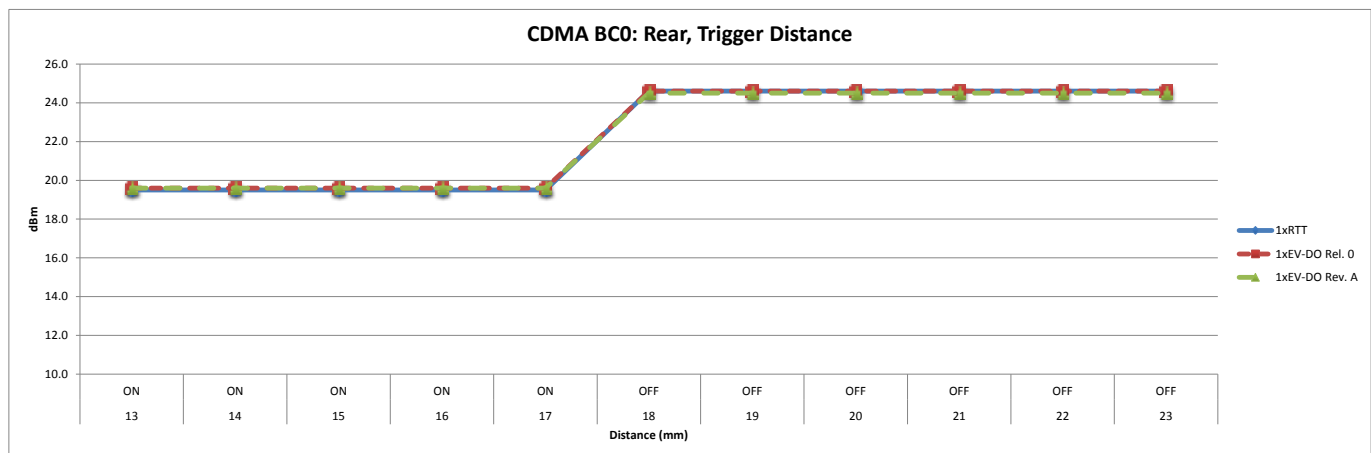
#### Edge 1

Edge 1, CDMA BC0											
Distance (mm):	21	22	23	24	25	26	27	28	29	30	31
Proximity sensor with reduced power activation:	ON	ON	ON	ON	ON	OFF	OFF	OFF	OFF	OFF	OFF
1xRTT	19.5	19.5	19.5	19.5	19.5	24.6	24.6	24.6	24.6	24.6	24.6
1xEV-DO Rel. 0	19.6	19.6	19.6	19.6	19.6	24.6	24.6	24.6	24.6	24.6	24.6
1xEV-DO Rev. A	19.6	19.6	19.6	19.6	19.6	24.5	24.5	24.5	24.5	24.5	24.5



#### Rear

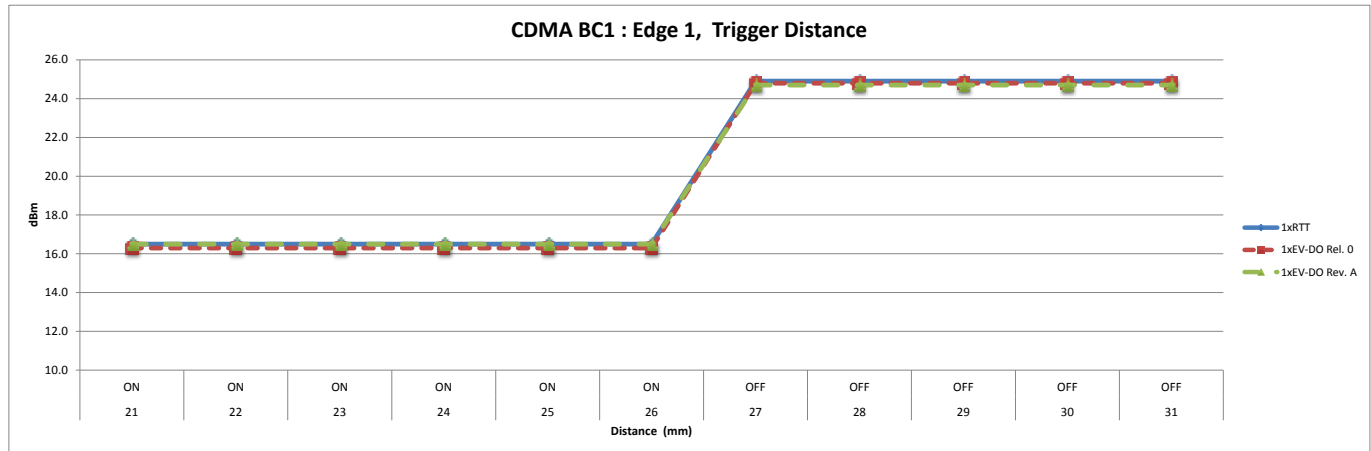
CDMA BC0											
Distance (mm):	13	14	15	16	17	18	19	20	21	22	23
Proximity sensor with reduced power activation:	ON	ON	ON	ON	ON	OFF	OFF	OFF	OFF	OFF	OFF
1xRTT	19.5	19.5	19.5	19.5	19.5	24.6	24.6	24.6	24.6	24.6	24.6
1xEV-DO Rel. 0	19.6	19.6	19.6	19.6	19.6	24.6	24.6	24.6	24.6	24.6	24.6
1xEV-DO Rev. A	19.6	19.6	19.6	19.6	19.6	24.5	24.5	24.5	24.5	24.5	24.5



**CDMA BC1**

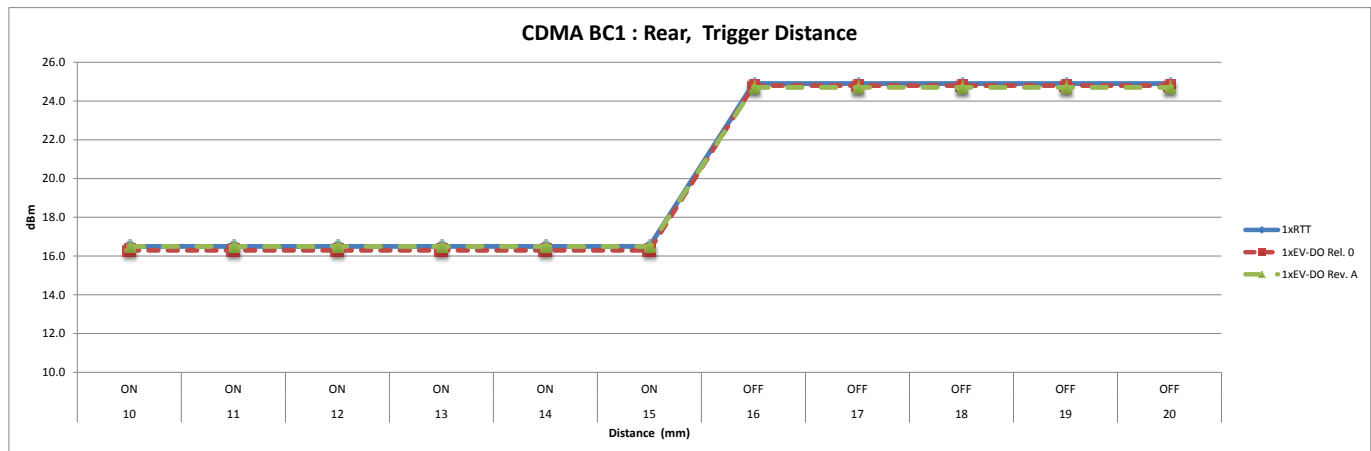
**Edge 1**

Edge 1, CDMA BC1												
Distance (mm):	21	22	23	24	25	26	27	28	29	30	31	
Proximity sensor with reduced power activation:	ON	ON	ON	ON	ON	ON	OFF	OFF	OFF	OFF	OFF	
1xRTT	16.5	16.5	16.5	16.5	16.5	16.5	24.9	24.9	24.9	24.9	24.9	
1xEV-DO Rel. 0	16.3	16.3	16.3	16.3	16.3	16.3	24.8	24.8	24.8	24.8	24.8	
1xEV-DO Rev. A	16.5	16.5	16.5	16.5	16.5	16.5	24.7	24.7	24.7	24.7	24.7	



**Rear**

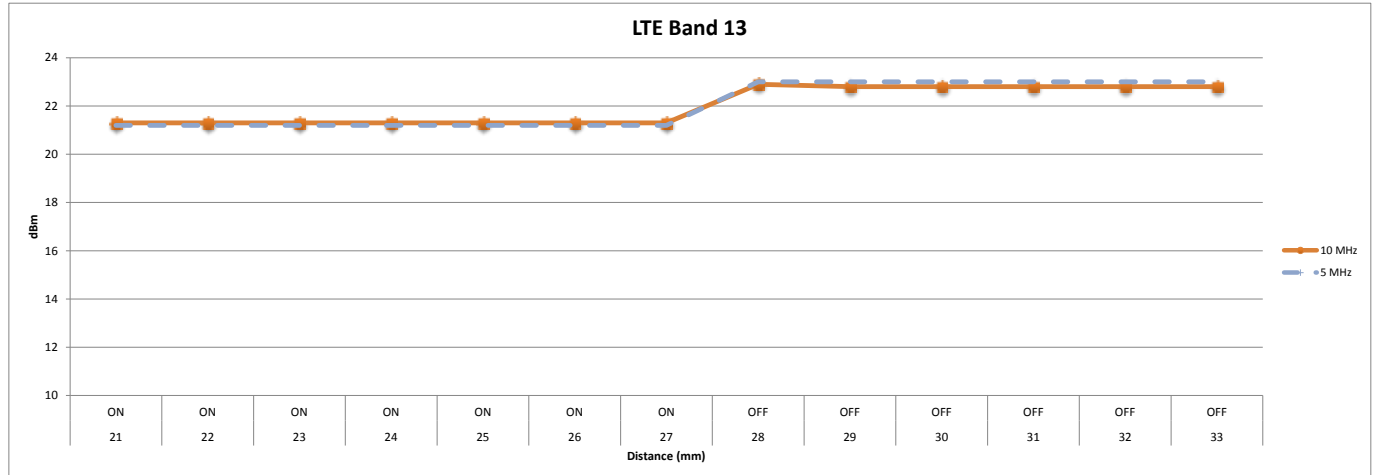
CDMA BC1												
Distance (mm):	10	11	12	13	14	15	16	17	18	19	20	
Proximity sensor with reduced power activation:	ON	ON	ON	ON	ON	ON	OFF	OFF	OFF	OFF	OFF	
1xRTT	16.5	16.5	16.5	16.5	16.5	16.5	24.9	24.9	24.9	24.9	24.9	
1xEV-DO Rel. 0	16.3	16.3	16.3	16.3	16.3	16.3	24.8	24.8	24.8	24.8	24.8	
1xEV-DO Rev. A	16.5	16.5	16.5	16.5	16.5	16.5	24.7	24.7	24.7	24.7	24.7	



**LTE Band 13**

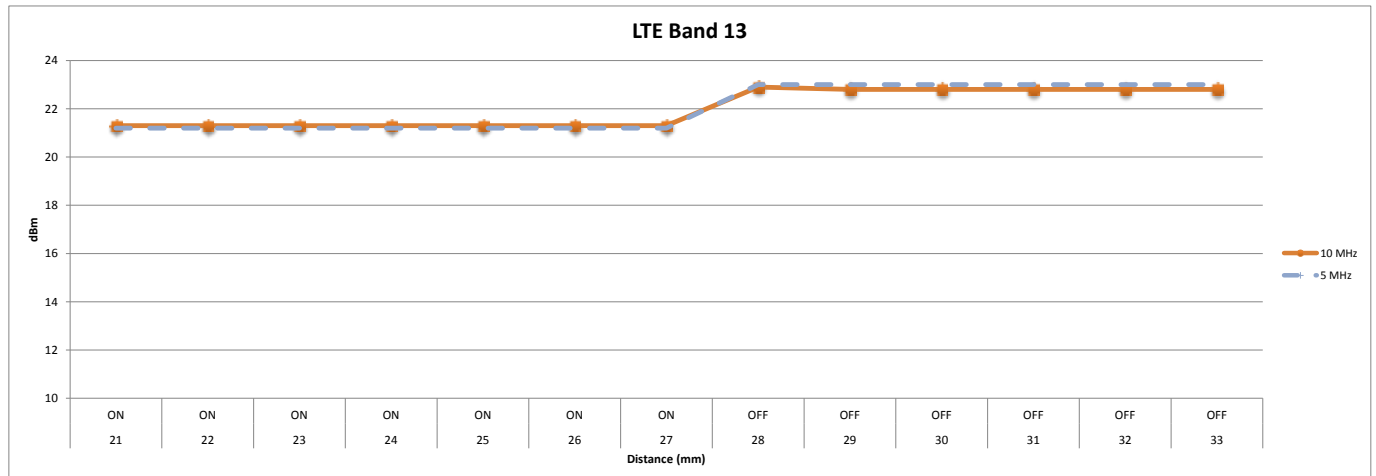
**Edge 1**

Edge 1, LTE Band 13													
Distance (mm):	21	22	23	24	25	26	27	28	29	30	31	32	33
Proximity sensor with reduced power activation:	ON	ON	ON	ON	ON	ON	ON	OFF	OFF	OFF	OFF	OFF	OFF
10 MHz	21.3	21.3	21.3	21.3	21.3	21.3	21.3	22.9	22.8	22.8	22.8	22.8	22.8
5 MHz	21.2	21.2	21.2	21.2	21.2	21.2	21.2	23.0	23.0	23.0	23.0	23.0	23.0



**Rear**

LTE Band 13													
Distance (mm):	11	12	13	14	15	16	17	18	19	20	21	22	23
Proximity sensor with reduced power activation:	ON	ON	ON	ON	ON	ON	ON	OFF	OFF	OFF	OFF	OFF	OFF
10 MHz	21.3	21.3	21.3	21.3	21.3	21.3	21.3	22.9	22.8	22.8	22.8	22.8	22.8
5 MHz	21.2	21.2	21.2	21.2	21.2	21.2	21.2	23.0	22.9	22.9	22.9	22.9	22.9



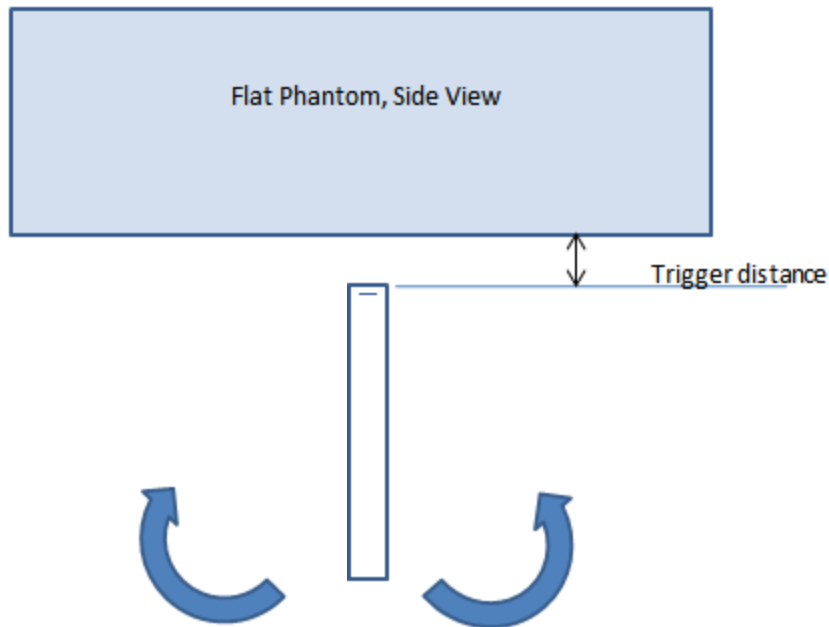
### 7.7. Proximity Sensor Coverage (KDB 616217 §6.3)

As there is no spatial offset between the antenna and the proximity sensor element, except on the display side of the antenna, proximity sensor coverage did not need to be assessed.

### 7.8. Proximity Sensor Tilt Angle (KDB 616217 §6.3)

The DUT was positioned directly below the flat phantom at the minimum measured trigger distance with edge 1 parallel to the base of the flat phantom. The DUT was rotated in both directions about edge 1.

The proximity sensor remained triggered with the DUT positioned 21mm from the phantom for all angles up to 45°.



## 8. Exposure Conditions

Refer to Section 18 “Antenna Dimensions and Separation Distances” for the specific details of the antenna-to-antenna and antenna-to-edge(s) distances.

### 8.1. Test Configurations for WWAN

Test Configurations	Antenna-to-edge/surface	SAR Required	Note
Rear	7.5 mm	<b>YES</b>	
Front	-	No	SAR is not required as this is not a typical use scenario
Edge 1	3.3 mm	<b>YES</b>	
Edge 2	167.6 mm	No	Refer to section 13 for SAR exclusion justification
Edge 3	176.0 mm	No	Refer to section 13 for SAR exclusion justification
Edge 4	47.0 mm	<b>YES</b>	

**LEGEND:**

- Bottom = Back
- Edge 1 = Top Edge
- Edge 2 = Right Edge
- Edge 3 = Bottom Edge
- Edge 4 = Left Edge

### 8.2. Special test considerations

The DUT is a ruggedized tablet computer. A feature of the ruggedization is the inclusion of prominent bumpers at each corner. The antennas are located close to the corners of the DUT. Testing the edges or base against the flat phantom with the bumpers in place did not represent the most conservative usage scenarios. Testing of the base was performed with the bumpers removed. Testing of the edges was also performed with the bumpers removed. Additionally the faceplate in the area of the bumpers was ground down so that the spacers adjacent to the WWAN antenna could be in direct contact with the flat phantom.

### 8.3. Test Configurations for WLAN

All Wi-Fi 1-g SAR values were taken from results recorded in SAR report 12J14673-1F, submitted under FCC ID ACJ9TGWL12A or from the MIMO values in section 12 of this report.

## 9. RF Output Power Measurement

As this device implements proximity sensor-triggered power reduction for SAR compliance, conducted output power was measured for the two different operating power levels. The following serves to clarify and establish the relation between power level and proximity sensor status:

- Full Power = Proximity Sensor Off
- Reduced Power = Proximity Sensor On

Each operating power level has its own set of target power and tune-up limit, and the scaling of SAR values is applied according to the corresponding target for the given operating power level

### 9.1. CDMA BC0

#### Target Power for CDMA BC0

CDMA BC0	Full Power	Reduced Power
1xRTT	24.0 dBm	18.6 dBm
1xEV-DO	24.0 dBm	18.6 dBm

Tune-Up Tolerance: +1.0 dB/- 1.0 dB

Target power indicated above is the nominal value. The measured value shall fall within +/- 1dB of this value.

#### 1xRTT Measurement Results

CDMA			Avg Pwr (dBm)					
Band	Ch	Freq. (MHz)	RC1 - SO55		RC3 - SO55		RC3 - SO32	
			(Loopback)		(Loopback)		(+F-SCH)	
			Full Power	Reduced Power	Full Power	Reduced Power	Full Power	Reduced Power
BC 0	1013	824.70	24.6	19.4	24.5	19.5	24.5	19.5
	384	836.52	24.5	19.4	24.5	19.4	24.5	19.5
	777	848.31	24.2	19.3	24.2	19.3	24.2	19.3

#### 1xEv-Do Rel. 0 Measurement Results

Band	FTAP Rate	RTAP Rate	Channel	f (MHz)	Avg Pwr (dBm)	
					Full Power	Reduced Power
BC 0	307.2 kbps (2 slot, QPSK)	153.6 kbps	1013	824.70	24.6	19.6
			384	836.52	24.5	19.4
			777	848.31	24.2	19.4

#### 1xEv-Do Rev. A Measurement Results

Band	FETAP Traffic Format	RETAP Data Payload Size	Channel	f (MHz)	Avg Pwr (dBm)	
					Full Power	Reduced Power
BC 0	307.2k, QPSK/ ACK channel is transmitted at all the slots	4096	1013	824.70	24.5	19.6
			384	836.52	24.5	19.6
			777	848.31	24.3	19.4

## 9.2. CDMA BC1

### Target Power for CDMA BC1

CDMA BC1	Full Power	Reduced Power
1xRTT	23.7 dBm	15.5 dBm
1xEV-DO	23.8 dBm	15.5 dBm

Tune-Up Tolerance: +1.0 dB/- 1.0 dB

Target power indicated above is the nominal value. The measured value shall fall within +/- 1dB of this value.

### 1xRTT Measurement Results

CDMA			Avg Pwr (dBm)					
Band	Ch	Freq. (MHz)	RC1 - SO55		RC3 - SO55		RC3 - SO32	
			(Loopback)		(Loopback)		(+F-SCH)	
			Full Power	Reduced Power	Full Power	Reduced Power	Full Power	Reduced Power
BC 1	25	1851.25	24.6	16.3	24.7	15.9	24.7	15.9
	600	1880	24.7	16.5	24.7	16.3	24.7	16.3
	1175	1908.75	24.9	16.3	24.7	16.0	24.7	16.1

### 1xEv-Do Rel. 0 Measurement Results

Band	FTAP Rate	RTAP Rate	Channel	f (MHz)	Avg Pwr (dBm)	
					Full Power	Reduced Power
BC 1	307.2 kbps (2 slot, QPSK)	153.6 kbps	25	1851.25	24.5	15.9
			600	1880	24.8	16.3
			1175	1908.75	24.7	16.1

### 1xEv-Do Rev. A Measurement Results

Band	FETAP Traffic Format	RETAP Data Payload Size	Channel	f (MHz)	Avg Pwr (dBm)	
					Full Power	Reduced Power
BC 1	307.2k, QPSK/ ACK channel is transmitted at all the slots	4096	25	1851.25	24.5	16.1
			600	1880	24.7	16.5
			1175	1908.75	24.7	16.2

### 9.3. LTE Band 13

#### Target Power for LTE Band 13, QPSK and 16QAM modulations

LTE Band 13	Full Power	Reduced Power
10 MHz Bandwidth	22.0 dBm	20.2 dBm
5 MHz Bandwidth	22.0 dBm	20.2 dBm

Tune-Up Tolerance: +1.0 dB/- 1.0 dB

Target power indicated above is the nominal value. The measured value shall fall within +/- 1dB of this value.

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
NS_04	6.6.2.2.2	41	20	>10	≤ 1
			5	>6	≤ 1
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	13	10	Table 6.2.4-2	Table 6.2.4-2
	6.6.3.3.2				
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 <sup>1</sup>	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.

**LTE Band 13, 10 MHz Bandwidth Output Power (Proximity sensor not triggered)**

BW	Ch	Freq. (MHz)	Mode	UL RB Allocation	UL RB Start	Target MPR	Meas. MPR	Avg Pwr (dBm)
								Full Power
10	23230	782	QPSK	1	0	0	0	22.7
				1	24	0	0	22.9
				1	49	0	0	22.7
				25	0	1	1	21.9
				25	12	1	1	22.1
				25	24	1	1	22.1
				50	0	1	1	22.0
			16QAM	1	0	1	1	21.8
				1	24	1	1	21.8
				1	49	1	1	21.7
				25	0	2	2	21.1
				25	12	2	2	21.3
				25	24	2	2	21.3
				50	0	2	2	21.0

**LTE Band 13, 10 MHz Bandwidth Output Power (Proximity sensor triggered)**

BW	Ch	Freq. (MHz)	Mode	UL RB Allocation	UL RB Start	Target MPR	Meas. MPR	Avg Pwr (dBm)
								Reduced Power
10	23230	782	QPSK	1	0	MPR is disabled when power reduction is enabled		20.8
				1	24			21.0
				1	49			20.9
				25	0			21.1
				25	12			21.2
				25	24			21.2
				50	0			21.1
			16QAM	1	0			20.9
				1	24			21.1
				1	49			20.9
				25	0			21.1
				25	12			21.3
				25	24			21.3
				50	0			21.0

**LTE Band 13, 5 MHz Bandwidth Output Power (Proximity sensor not triggered)**

BW	Ch	Freq. (MHz)	Mode	UL RB Allocation	UL RB Start	Target MPR	Meas. MPR	Avg Pwr (dBm)
								Full Power
5	23205	779.5	QPSK	1	0	0	0	22.7
				1	12	0	0	22.9
				1	24	0	0	22.7
				12	0	1	1	21.9
				12	6	1	1	22.1
				12	11	1	1	22.1
				25	0	1	1	22.0
			16QAM	1	0	1	1	21.8
				1	12	1	1	21.8
				1	24	1	1	21.7
				12	0	2	2	21.1
				12	6	2	2	21.3
				12	11	2	2	21.3
				25	0	2	2	21.0
	23230	782	QPSK	1	0	0	0	22.8
				1	12	0	0	22.8
				1	24	0	0	23.0
				12	0	1	1	22.0
				12	6	1	1	22.0
				12	11	1	1	22.0
				25	0	1	1	22.0
			16QAM	1	0	1	1	21.7
				1	12	1	1	21.8
				1	24	1	1	21.6
				12	0	2	2	21.0
				12	6	2	2	21.0
				12	11	2	2	21.0
				25	0	2	2	21.0
	23255	784.5	QPSK	1	0	0	0	22.6
				1	12	0	0	22.8
1				24	0	0	22.9	
12				0	1	1	22.0	
12				6	1	1	22.1	
12				11	1	1	22.0	
25				0	1	1	22.0	
16QAM			1	0	1	1	21.8	
			1	12	1	1	21.7	
			1	24	1	1	21.9	
			12	0	2	2	21.3	
			12	6	2	2	21.3	
			12	11	2	2	21.4	
			25	0	2	2	21.2	

**LTE Band 13, 5 MHz Bandwidth Output Power (Proximity sensor triggered)**

BW	Ch	Freq. (MHz)	Mode	UL RB Allocation	UL RB Start	Target MPR	Meas. MPR	Avg Pwr (dBm)		
								Reduced Power		
5	23205	779.5	QPSK	1	0	MPR is disabled when power reduction is enabled		20.8		
				1	12			21.0		
				1	24			20.9		
				12	0			21.1		
				12	6			21.2		
				12	11			21.2		
			25	0	21.1					
			16QAM	1	0			20.9		
				1	12			21.1		
				1	24			20.9		
				12	0			21.1		
				12	6			21.2		
				12	11			21.2		
			23230	782	QPSK			1	0	20.9
								1	12	21.0
								1	24	21.2
								12	0	21.1
								12	6	21.1
	12	11						21.1		
	25	0			21.0					
	16QAM	1			0			21.2		
		1			12			21.2		
		1			24			21.2		
		12			0			21.0		
		12			6			21.0		
		12			11			21.0		
	23255	784.5			QPSK			1	0	20.9
								1	12	20.9
								1	24	21.0
								12	0	21.1
								12	6	21.1
			12	11				21.1		
			25	0	21.1					
			16QAM	1	0			20.9		
				1	12			21.0		
				1	24			21.0		
				12	0			20.9		
				12	6			20.9		
				12	11			21.0		
			25	0	20.9					

### 9.4. Wi-Fi 2.4 GHz and 5 GHz Bands

Additional SAR measurements were performed on the WLAN Main Antenna for each of the Wi-Fi bands under the Edge 4 test position using MIMO (Wi-Fi 2 Tx) transmit mode because the SISO (Wi-Fi 1 Tx) SAR values for WLAN Main were determined to be unnecessarily high to represent the WWAN + WLAN MIMO transmit scenario under this test position and would require simultaneous transmission SAR to be measured.

Although both WLAN antennas were transmitting simultaneously during MIMO mode, additional SAR measurements targeted only the WLAN Main Antenna, as it was the greatest contributor to the SAR summation on Edge 4; SAR measurement for WLAN Aux was not considered because it is covered by its more conservative SISO mode counterpart.

The following tables were extracted UL CCS Report number 12J14673-1F to document the power levels used during this SAR measurement.

#### 2.4 GHz Band

Mode	Number of Transmitters	Ch #	Freq. (MHz)	Target Avg Pwr (dBm)		Measured Avg Pwr (dBm)	
				Main	Aux	Main	Aux
802.11n HT20	2 Tx	1	2412	11.5	11.5	11.3	11.5
		6	2437	12.5	12.5	12.2	12.4
		11	2462	10.5	10.4	10.4	10.3

#### 5.2 GHz Band

Mode	Number of Transmitters	Ch #	Freq. (MHz)	Target Avg Pwr (dBm)		Measured Avg Pwr (dBm)	
				Main	Aux	Main	Aux
802.11n HT20	2 Tx	36	5180	12.0	12.0	11.6	11.7
		40	5200	12.0	12.0	11.8	11.7
		48	5240	12.0	12.0	11.8	11.7

#### 5.3 GHz Band

Mode	Number of Transmitters	Ch #	Freq. (MHz)	Target Avg Pwr (dBm)		Measured Avg Pwr (dBm)	
				Main	Aux	Main	Aux
802.11n HT20	2 Tx	52	5260	12.0	12.0	11.7	11.5
		60	5300	12.0	12.0	11.6	11.7
		64	5320	12.0	12.0	11.7	11.8

#### 5.5 GHz Band

Mode	Number of Transmitters	Ch #	Freq. (MHz)	Target Avg Pwr (dBm)		Measured Avg Pwr (dBm)	
				Main	Aux	Main	Aux
802.11n HT20	2 Tx	100	5500	12.5	12.5	12.4	11.7
		120	5600	12.5	12.5	11.9	11.8
		140	5700	12.4	12.4	12.0	12.3

#### 5.8 GHz Band

Mode	Number of Transmitters	Ch #	Freq. (MHz)	Target Avg Pwr (dBm)		Measured Avg Pwr (dBm)	
				Main	Aux	Main	Aux
802.11n HT20	2 Tx	149	5745	12.0	12.0	12.0	11.6
		157	5785	12.0	12.0	11.9	11.7
		165	5825	12.0	12.0	11.9	11.3

## 10. Tissue Dielectric Properties

IEEE Std 1528-2003 Table 2

Target Frequency (MHz)	Head	
	$\epsilon_r$	$\sigma$ (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

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Target Frequency (MHz)	Head		Body	
	$\epsilon_r$	$\sigma$ (S/m)	$\epsilon_r$	$\sigma$ (S/m)
150	52.3	0.76	61.9	0.80
300	45.3	0.87	58.2	0.92
450	43.5	0.87	56.7	0.94
835	41.5	0.90	55.2	0.97
900	41.5	0.97	55.0	1.05
915	41.5	0.98	55.0	1.06
1450	40.5	1.20	54.0	1.30
1610	40.3	1.29	53.8	1.40
1800 – 2000	40.0	1.40	53.3	1.52
2450	39.2	1.80	52.7	1.95
3000	38.5	2.40	52.0	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



## 10.2. Tissue Dielectric Parameter Check Results

The temperature of the tissue-equivalent medium used during measurement must also be within 18°C to 25°C and within ± 2°C of the temperature when the tissue parameters are characterized.

The dielectric parameters must be measured before the tissue-equivalent medium is used in a series of SAR measurements. The parameters should be re-measured after each 3 – 4 days of use; or earlier if the dielectric parameters can become out of tolerance; for example, when the parameters are marginal at the beginning of the measurement series.

Tissue dielectric parameters were measured at the low, middle and high frequency of each operating frequency range of the test device.

Date	Freq. (MHz)	Liquid Parameters		Measured	Target	Delta (%)	Limit ±(%)	
1/30/2013	Body 750	e'	53.2600	Relative Permittivity (ε <sub>r</sub> ):	53.26	55.55	-4.12	5
		e"	23.1400	Conductivity (σ):	0.96	0.96	0.20	5
	Body 700	e'	53.7400	Relative Permittivity (ε <sub>r</sub> ):	53.74	55.74	-3.59	5
		e"	23.6000	Conductivity (σ):	0.92	0.96	-4.24	5
	Body 790	e'	52.7700	Relative Permittivity (ε <sub>r</sub> ):	52.77	55.39	<b>-4.73</b>	5
		e"	22.8300	Conductivity (σ):	1.00	0.97	3.80	5
1/30/2013	Body 750	e'	53.6500	Relative Permittivity (ε <sub>r</sub> ):	53.65	55.55	-3.41	5
		e"	23.1800	Conductivity (σ):	0.97	0.96	0.37	5
	Body 710	e'	54.0400	Relative Permittivity (ε <sub>r</sub> ):	54.04	55.70	-2.98	5
		e"	23.5300	Conductivity (σ):	0.93	0.96	-3.24	5
	Body 790	e'	53.1800	Relative Permittivity (ε <sub>r</sub> ):	53.18	55.39	-3.99	5
		e"	22.8300	Conductivity (σ):	1.00	0.97	3.80	5
2/4/2013	Body 835	e'	54.0882	Relative Permittivity (ε <sub>r</sub> ):	54.09	55.20	-2.01	5
		e"	21.2718	Conductivity (σ):	0.99	0.97	1.82	5
	Body 820	e'	54.2666	Relative Permittivity (ε <sub>r</sub> ):	54.27	55.28	-1.83	5
		e"	21.3455	Conductivity (σ):	0.97	0.97	0.49	5
	Body 850	e'	53.9407	Relative Permittivity (ε <sub>r</sub> ):	53.94	55.16	-2.21	5
		e"	21.2049	Conductivity (σ):	1.00	0.99	1.53	5
2/4/2013	Body 1900	e'	51.3600	Relative Permittivity (ε <sub>r</sub> ):	51.36	53.30	-3.64	5
		e"	14.8300	Conductivity (σ):	1.57	1.52	3.07	5
	Body 1850	e'	51.5500	Relative Permittivity (ε <sub>r</sub> ):	51.55	53.30	-3.28	5
		e"	14.6800	Conductivity (σ):	1.51	1.52	-0.65	5
	Body 1910	e'	51.3100	Relative Permittivity (ε <sub>r</sub> ):	51.31	53.30	-3.73	5
		e"	14.8800	Conductivity (σ):	1.58	1.52	3.97	5
2/5/2013	Body 835	e'	54.7979	Relative Permittivity (ε <sub>r</sub> ):	54.80	55.20	-0.73	5
		e"	21.4363	Conductivity (σ):	1.00	0.97	2.60	5
	Body 820	e'	55.0063	Relative Permittivity (ε <sub>r</sub> ):	55.01	55.28	-0.49	5
		e"	21.4947	Conductivity (σ):	0.98	0.97	1.20	5
	Body 850	e'	54.6164	Relative Permittivity (ε <sub>r</sub> ):	54.62	55.16	-0.98	5
		e"	21.3817	Conductivity (σ):	1.01	0.99	2.37	5
2/5/2013	Body 1900	e'	53.2200	Relative Permittivity (ε <sub>r</sub> ):	53.22	53.30	-0.15	5
		e"	14.1900	Conductivity (σ):	1.50	1.52	-1.37	5
	Body 1850	e'	53.3900	Relative Permittivity (ε <sub>r</sub> ):	53.39	53.30	0.17	5
		e"	14.0800	Conductivity (σ):	1.45	1.52	-4.71	5
	Body 1910	e'	53.1800	Relative Permittivity (ε <sub>r</sub> ):	53.18	53.30	-0.23	5
		e"	14.2300	Conductivity (σ):	1.51	1.52	-0.58	5

**Tissue Dielectric Parameter Check Results (continued)**

Date	Freq. (MHz)	Liquid Parameters		Measured	Target	Delta (%)	Limit ±(%)	
2/11/2013	Body 750	e'	53.5000	Relative Permittivity ( $\epsilon_r$ ):	53.50	55.55	-3.68	5
		e"	23.2700	Conductivity ( $\sigma$ ):	0.97	0.96	0.76	5
	Body 700	e'	54.1200	Relative Permittivity ( $\epsilon_r$ ):	54.12	55.74	-2.90	5
		e"	23.6800	Conductivity ( $\sigma$ ):	0.92	0.96	-3.91	5
	Body 790	e'	53.0600	Relative Permittivity ( $\epsilon_r$ ):	53.06	55.39	-4.21	5
		e"	22.9400	Conductivity ( $\sigma$ ):	1.01	0.97	4.30	5
2/11/2013	Body 835	e'	53.7860	Relative Permittivity ( $\epsilon_r$ ):	53.79	55.20	-2.56	5
		e"	21.8200	Conductivity ( $\sigma$ ):	1.01	0.97	4.44	5
	Body 820	e'	53.9400	Relative Permittivity ( $\epsilon_r$ ):	53.94	55.28	-2.42	5
		e"	21.8500	Conductivity ( $\sigma$ ):	1.00	0.97	2.87	5
	Body 850	e'	53.4100	Relative Permittivity ( $\epsilon_r$ ):	53.41	55.16	-3.17	5
		e"	21.9200	Conductivity ( $\sigma$ ):	1.04	0.99	<b>4.95</b>	5
2/11/2013	Body 1900	e'	51.0600	Relative Permittivity ( $\epsilon_r$ ):	51.06	53.30	-4.20	5
		e"	14.2700	Conductivity ( $\sigma$ ):	1.51	1.52	-0.82	5
	Body 1850	e'	51.2400	Relative Permittivity ( $\epsilon_r$ ):	51.24	53.30	-3.86	5
		e"	14.1500	Conductivity ( $\sigma$ ):	1.46	1.52	-4.24	5
	Body 1910	e'	51.0300	Relative Permittivity ( $\epsilon_r$ ):	51.03	53.30	-4.26	5
		e"	14.3000	Conductivity ( $\sigma$ ):	1.52	1.52	-0.09	5
2/18/2013	Body 835	e'	52.7700	Relative Permittivity ( $\epsilon_r$ ):	52.77	55.20	-4.40	5
		e"	21.8600	Conductivity ( $\sigma$ ):	1.01	0.97	4.63	5
	Body 820	e'	52.9500	Relative Permittivity ( $\epsilon_r$ ):	52.95	55.28	-4.21	5
		e"	21.9400	Conductivity ( $\sigma$ ):	1.00	0.97	3.29	5
	Body 850	e'	52.5600	Relative Permittivity ( $\epsilon_r$ ):	52.56	55.16	-4.71	5
		e"	21.8100	Conductivity ( $\sigma$ ):	1.03	0.99	4.42	5
2/18/2013	Body 1900	e'	51.1300	Relative Permittivity ( $\epsilon_r$ ):	51.13	53.30	-4.07	5
		e"	14.6600	Conductivity ( $\sigma$ ):	1.55	1.52	1.89	5
	Body 1850	e'	51.3200	Relative Permittivity ( $\epsilon_r$ ):	51.32	53.30	-3.71	5
		e"	14.4600	Conductivity ( $\sigma$ ):	1.49	1.52	-2.14	5
	Body 1910	e'	51.0900	Relative Permittivity ( $\epsilon_r$ ):	51.09	53.30	-4.15	5
		e"	14.7200	Conductivity ( $\sigma$ ):	1.56	1.52	2.85	5
2/19/2013	Body 750	e'	54.0600	Relative Permittivity ( $\epsilon_r$ ):	54.06	55.55	-2.68	5
		e"	23.3100	Conductivity ( $\sigma$ ):	0.97	0.96	0.93	5
	Body 700	e'	54.6100	Relative Permittivity ( $\epsilon_r$ ):	54.61	55.74	-2.02	5
		e"	23.7700	Conductivity ( $\sigma$ ):	0.93	0.96	-3.55	5
	Body 790	e'	53.6200	Relative Permittivity ( $\epsilon_r$ ):	53.62	55.39	-3.20	5
		e"	23.0200	Conductivity ( $\sigma$ ):	1.01	0.97	4.66	5
3/4/2013	Body 2450	e'	50.6900	Relative Permittivity ( $\epsilon_r$ ):	50.69	52.70	-3.81	5
		e"	13.9300	Conductivity ( $\sigma$ ):	1.90	1.95	-2.68	5
	Body 2410	e'	50.8000	Relative Permittivity ( $\epsilon_r$ ):	50.80	52.76	-3.71	5
		e"	13.7900	Conductivity ( $\sigma$ ):	1.85	1.91	-3.12	5
	Body 2475	e'	50.5900	Relative Permittivity ( $\epsilon_r$ ):	50.59	52.67	-3.95	5
		e"	14.0000	Conductivity ( $\sigma$ ):	1.93	1.99	-2.95	5
3/4/2013	Body 5180	e'	47.9500	Relative Permittivity ( $\epsilon_r$ ):	47.95	49.05	-2.24	10
		e"	17.7600	Conductivity ( $\sigma$ ):	5.12	5.27	-2.96	5
	Body 5200	e'	47.9100	Relative Permittivity ( $\epsilon_r$ ):	47.91	49.02	-2.26	10
		e"	17.7700	Conductivity ( $\sigma$ ):	5.14	5.29	-2.96	5
	Body 5600	e'	47.3500	Relative Permittivity ( $\epsilon_r$ ):	47.35	48.48	-2.33	10
		e"	18.1200	Conductivity ( $\sigma$ ):	5.64	5.76	-2.06	5
	Body 5800	e'	47.0600	Relative Permittivity ( $\epsilon_r$ ):	47.06	48.20	-2.37	10
		e"	18.3200	Conductivity ( $\sigma$ ):	5.91	6.00	-1.53	5
	Body 5825	e'	47.0100	Relative Permittivity ( $\epsilon_r$ ):	47.01	48.20	-2.47	10
		e"	18.3200	Conductivity ( $\sigma$ ):	5.93	6.00	-1.11	5

**Tissue Dielectric Parameter Check Results (continued)**

Date	Freq. (MHz)	Liquid Parameters		Measured	Target	Delta (%)	Limit ±(%)	
3/5/2013	Body 1900	e'	52.0800	Relative Permittivity ( $\epsilon_r$ ):	52.08	53.30	-2.29	5
		e"	14.6500	Conductivity ( $\sigma$ ):	1.55	1.52	1.82	5
	Body 1850	e'	52.2700	Relative Permittivity ( $\epsilon_r$ ):	52.27	53.30	-1.93	5
		e"	14.4600	Conductivity ( $\sigma$ ):	1.49	1.52	-2.14	5
	Body 1910	e'	52.0200	Relative Permittivity ( $\epsilon_r$ ):	52.02	53.30	-2.40	5
		e"	14.6600	Conductivity ( $\sigma$ ):	1.56	1.52	2.43	5
3/5/2013	Body 2450	e'	50.4200	Relative Permittivity ( $\epsilon_r$ ):	50.42	52.70	-4.33	5
		e"	14.3800	Conductivity ( $\sigma$ ):	1.96	1.95	0.46	5
	Body 2410	e'	50.5400	Relative Permittivity ( $\epsilon_r$ ):	50.54	52.76	-4.21	5
		e"	14.1900	Conductivity ( $\sigma$ ):	1.90	1.91	-0.31	5
	Body 2475	e'	50.3100	Relative Permittivity ( $\epsilon_r$ ):	50.31	52.67	-4.48	5
		e"	14.4700	Conductivity ( $\sigma$ ):	1.99	1.99	0.31	5

## 11. System Performance Check

SAR system verification is required to confirm measurement accuracy, according to the tissue dielectric media, probe calibration points and other system operating parameters required for measuring the SAR of a test device. The system verification must be performed for each frequency band and within the valid range of each probe calibration point required for testing the device. The same SAR probe(s) and tissue-equivalent media combinations used with each specific SAR system for system verification must be used for device testing. When multiple probe calibration points are required to cover substantially large transmission bands, independent system verifications are required for each probe calibration point. A system verification must be performed before each series of SAR measurements using the same probe calibration point and tissue-equivalent medium. Additional system verification should be considered according to the conditions of the tissue-equivalent medium and measured tissue dielectric parameters, typically every three to four days when the liquid parameters are remeasured or sooner when marginal liquid parameters are used at the beginning of a series of measurements.

### 11.1. 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 depth of tissue-equivalent liquid in a phantom must be ≥ 15.0 cm ± 0.5 cm for SAR measurements ≤ 3 GHz and ≥ 10.0 cm ± 0.5 cm for measurements > 3 GHz.
- 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 (below 3 GHz) and/or 8x8x7 (above 3 GHz) fine cube was chosen for the 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.

### 11.2. 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)	Target SAR Values (mW/g)		
				1g/10g	Head	Body
D750V3	1019	2/9/2012 & 3/5/2013	750	1g	8.44	8.84
				10g	5.53	5.84
D750V3	1071	10/5/2012	750	1g	8.29	8.79
				10g	5.49	5.82
D835V2	4d117	4/10/2012	835	1g	9.38	9.52
				10g	6.15	6.31
D1900V2	5d140	4/12/2012	1900	1g	39.8	40.2
				10g	20.8	21.3
D1900V2	5d043	11/06/12	1900	1g	39.9	40.9
				10g	20.9	21.6
D2450V2	706	4/11/2012	2450	1g	51.2	49.6
				10g	23.9	23.4
D5GHV2	1003	9/18/2012	5.2GHz	1g	76.5	74.8
				10g	21.9	20.9
			5.6GHz	1g	82.8	79.0
				10g	23.6	22.0
			5.8GHz	1g	76.9	77.0
				10g	22.0	21.4

### 11.3. System Performance Check Results

The 1-g and 10-g SAR measured with a reference dipole, using the required tissue-equivalent medium at the test frequency, must be within 10% of the manufacturer calibrated dipole SAR target.

Date Tested	System Dipole		T.S. Liquid	Measured Results			Target (Ref. Value)	Delta ±10 %	Est./Zoom Ratio ±3 %	
	Type	Serial #		Area Scan	Zoom Scan	Normalize to 1 W				
1/29/2013	D750V3	1071	Body	1g	0.890	0.877	8.77	8.79	-0.23	1.46
				10g	0.603	0.583	5.83	5.82	0.17	
1/30/2013	D750V3	1071	Body	1g	0.860	0.852	8.52	8.79	-3.07	0.93
				10g	0.583	0.567	5.67	5.82	-2.58	
2/4/2013	D835V2	4d117	Body	1g	0.987	0.958	9.58	9.52	0.63	2.94
				10g	0.661	0.633	6.33	6.31	0.32	
2/4/2013	D1900V2	5d140	Body	1g	4.12	3.96	39.6	41.2	-3.88	3.88
				10g	2.13	2.08	20.80	21.3	-2.35	
2/5/2013	D835V2	4d117	Body	1g	0.950	1.03	10.3	9.52	8.19	-8.42
				10g	0.639	0.678	6.78	6.31	7.45	
2/5/2013	D1900V2	5d140	Body	1g	3.87	4.03	40.3	41.2	-2.18	-4.13
				10g	1.96	2.11	21.10	21.3	-0.94	
2/11/2013	D750V3	1071	Body	1g	0.957	0.936	9.36	8.79	6.48	2.19
				10g	0.648	0.624	6.24	5.82	7.22	
2/11/2013	D835V2	4d117	Body	1g	1.06	1.04	10.4	9.52	9.24	1.89
				10g	0.712	0.686	6.86	6.31	8.72	
2/11/2013	D1900V2	5d140	Body	1g	4.21	4.19	41.9	41.2	1.70	0.48
				10g	2.14	2.19	21.9	20.3	7.88	
2/18/2013	D835V2	4d117	Body	1g	1.14	0.997	10.0	9.52	4.73	12.54
				10g	0.76	0.654	6.54	6.31	3.65	
2/18/2013	D1900V2	5d043	Body	1g	4.38	4.33	43.3	40.9	5.87	1.14
				10g	2.22	2.26	22.6	21.6	4.63	
2/19/2013	D750V3	1019	Body	1g	0.923	0.906	9.06	8.84	2.49	1.84
				10g	0.627	0.603	6.03	5.84	3.25	
3/4/2013	D2450V2	706	Body	1g	5.31	5.33	53.3	49.6	7.46	-0.38
				10g	2.30	2.46	24.6	23.4	5.13	
3/4/2013	D5GHzV2 5.2 GHz	1003	Body	1g	7.75	8.12	81.2	74.8	8.56	-4.77
				10g	2.15	2.27	22.7	20.9	8.61	
3/4/2013	D5GHzV2 5.6 GHz	1003	Body	1g	7.99	8.42	84.2	79.0	6.58	-5.38
				10g	2.19	2.34	23.4	22.0	6.36	
3/4/2013	D5GHzV2 5.8 GHz	1003	Body	1g	7.51	7.57	75.7	77.0	-1.69	-0.80
				10g	2.06	2.12	21.2	21.4	-0.93	
3/5/2013	D1900V2	5d043	Body	1g	4.18	4.14	41.4	40.9	1.22	0.96
				10g	2.09	2.16	21.6	21.6	0.00	
3/6/2013	D2450V2	706	Body	1g	5.50	5.45	54.5	49.6	9.88	0.91
				10g	2.43	2.49	24.9	23.4	6.41	

## 12. SAR Test Results

### 12.1. Standalone SAR Test Exclusion Considerations

Standalone SAR test exclusion was based upon the following criteria:

1. If the antenna to DUT adjacent edge or bottom separation distance is < 50mm a distance of 5mm is used to determine SAR exclusion and estimated SAR value
2. If the antenna to DUT adjacent edge or bottom separation distance is >50mm the actual antenna to user separation distance is used to determine SAR exclusion and estimated SAR value
3. Reduced power does not apply for edges 2, 3 and 4.

#### 12.1.1. SAR Test Exclusion Calculations for antennas <50mm to adjacent edges

Antenna	Tx	Frequency (MHz)	Output power		Separation distances (mm)						Calculated Threshold Value					
			dBm	mW	Bottom	Edge 1	Edge 2	Edge 3	Edge 4	Front	Bottom	Edge 1	Edge 2	Edge 3	Edge 4	Front
<b>Full Power 3G - distances include sensor triggering distance for rear (6mm) and edge 1 (20mm)</b>																
3G Main	CDMA BC0	848.3	25.00	316	6	20	167.6	176	0		49.0	15.0	> 50 mm	> 50 mm	58.0	N/A
3G Main	CDMA BC1	1908.8	25.00	316	6	20	167.6	176	0		73.0	22.0	> 50 mm	> 50 mm	87.0	N/A
3G Main	LTE 13	784.5	23.00	200	6	20	167.6	176	0		30.0	9.0	> 50 mm	> 50 mm	35.0	N/A
<b>Reduced Power 3G - distances are for device in contact with phantom for right edge and rear face</b>																
3G Main	CDMA BC0	848.3	19.60	91	0	0					17.0	17.0	N/A	N/A	N/A	N/A
3G Main	CDMA BC1	1908.8	16.60	46	0	0					13.0	13.0	N/A	N/A	N/A	N/A
3G Main	LTE 13	784.5	21.20	132	0	0					23.0	23.0	N/A	N/A	N/A	N/A

#### Note(s):

1. According to KDB 447498, if the calculated threshold value is >3 then SAR testing is required.

#### 12.1.2. SAR Test Exclusion Calculations for antennas >50mm to adjacent edges

Antenna	Tx	Frequency (MHz)	Output power		Separation distances (mm)						Calculated Threshold Value					
			dBm	mW	Bottom	Edge 1	Edge 2	Edge 3	Edge 4	Front	Bottom	Edge 1	Edge 2	Edge 3	Edge 4	Front
<b>Full Power 3G - distances include sensor triggering distance for rear (6mm) and edge 1 (20mm)</b>																
3G Main	CDMA BC0	848.3	25.00	316	6	20	167.6	176	0		< 50 mm	< 50 mm	828	875	< 50 mm	N/A
3G Main	CDMA BC1	1908.8	25.00	316	6	20	167.6	176	0		< 50 mm	< 50 mm	1285	1369	< 50 mm	N/A
3G Main	LTE 13	784.5	23.00	200	6	20	167.6	176	0		< 50 mm	< 50 mm	784	828	< 50 mm	N/A
<b>Reduced Power 3G - distances are for device in contact with phantom for right edge and rear face</b>																
3G Main	CDMA BC0	848.3	19.60	91	0	0					< 50 mm	< 50 mm	N/A	N/A	N/A	N/A
3G Main	CDMA BC1	1908.8	16.60	46	0	0					< 50 mm	< 50 mm	N/A	N/A	N/A	N/A
3G Main	LTE 13	784.5	21.20	132	0	0					< 50 mm	< 50 mm	N/A	N/A	N/A	N/A

#### Note(s):

1. According to KDB 447498, if the calculated Power threshold is less than the output power then SAR testing is required.

#### Conclusion:

- As the calculated Power Threshold is greater than the DUT output power for Edge2 and 3 SAR testing is not required for these configurations

## 12.2. Estimated SAR for Simultaneous Transmission SAR Analysis

### Considerations for using estimated SAR values:

1. If the antenna to DUT adjacent edge or bottom separation distance is < 50mm a distance of 5mm is used to determine SAR estimated SAR value.
2. If the antenna to DUT adjacent edge or bottom separation distance is >50mm the actual antenna to user separation distance is used to determine SAR estimated SAR value.
3. Output power is the maximum rated power (including tune-up or manufacturing tolerances) and includes source-based averaging.
4. If the antenna separation distance is > 50mm then the estimated SAR value is the lesser of the estimated value at 50mm or 0.4 W/Kg.
5. Formulas round separation distance to nearest mm and power to nearest mW before calculating estimated SAR

### 12.2.1. Estimated SAR for WWAN

Antenna	Tx	Frequency (MHz)	Output power		Separation distances (mm)						Estimated SAR Value					
			dBm	mW	Bottom	Edge 1	Edge 2	Edge 3	Edge 4	Front	Bottom	Edge 1	Edge 2	Edge 3	Edge 4	Front
<b>Full Power 3G - distances include sensor triggering distance for rear (6mm) and edge 1 (20mm)</b>																
3G Main	CDMA BC0	848.3	25.00	316	6	20	167.6	176	0		Measure	Measure	0.400	0.400	Measure	N/A
3G Main	CDMA BC1	1908.8	25.00	316	6	20	167.6	176	0		Measure	Measure	0.400	0.400	Measure	N/A
3G Main	LTE 13	784.5	23.00	200	6	20	167.6	176	0		Measure	Measure	0.400	0.400	Measure	N/A
<b>Reduced Power 3G - distances are for device in contact with phantom for right edge and rear face</b>																
3G Main	CDMA BC0	848.3	19.60	91	0	0					Measure	Measure	N/A	N/A	N/A	N/A
3G Main	CDMA BC1	1908.8	16.60	46	0	0					Measure	Measure	N/A	N/A	N/A	N/A
3G Main	LTE 13	784.5	21.20	132	0	0					Measure	Measure	N/A	N/A	N/A	N/A

#### Notes:

- Situations that comprised only estimated values (i.e. edge 2) are not reported as they are inherently compliant. The maximum SAR value based on three estimated values would be 1.2 W/Kg. Situations that were justifiably omitted for simultaneous transmission SAR analysis include:
  - a. Rear, Wi-Fi 1 Tx on Aux: This is WWAN + WLAN Aux and is effectively covered by the Wi-Fi 2 Tx scenario that adds the SAR of WLAN Main to the summation.
  - b. Edge 2, for all combinations.
  - c. Edge 3, WWAN + Wi-Fi 1 Tx on Main: This is WWAN + WLAN Main + Bluetooth, all of which qualify for standalone SAR test exclusion under this test position.
  - d. Edge4: WWAN + Wi-Fi 1 Tx on Aux: This is WWAN + WLAN Aux and is effectively covered by WWAN + Wi-Fi 2 Tx, which adds the SAR of WLAN Main at its most conservative edge to this combination.

### 12.2.2. Estimated SAR for Wi-Fi 2 Tx (MIMO)

UL CCS Report number 12J14673-1F does not contain estimated SAR values for Wi-Fi 2Tx (MIMO). For the purpose of the simultaneous transmission analysis Wi-Fi 2Tx (MIMO) has been calculated here using power and separation distances from report number 12J14673-1F. These values have been used for the Edge 1 and Edge 3 WWAN and Wi-Fi 2Tx (MIMO) simultaneous transmission analysis.

Antenna	Tx	Frequency (MHz)	Output power		Separation distances (mm)						Estimated SAR Value					
			dBm	mW	Bottom	Edge 1	Edge 2	Edge 3	Edge 4	Front	Bottom	Edge 1	Edge 2	Edge 3	Edge 4	Front
<b>WiFi - Main Antenna</b>																
WLAN Main	WiFi	2412	12.50	18	5	5	265.5	139	5		Measure	Measure	0.075	0.075	Measure	N/A
WLAN Main	WiFi	5180	12.00	16	5	5	265.5	139	5		Measure	Measure	0.097	0.097	Measure	N/A
WLAN Main	WiFi	5260	12.40	17	5	5	265.5	139	5		Measure	Measure	0.104	0.104	Measure	N/A
WLAN Main	WiFi	5500	12.50	18	5	5	265.5	139	5		Measure	Measure	0.113	0.113	Measure	N/A
WLAN Main	WiFi	5745	12.00	16	5	5	265.5	139	5		Measure	Measure	0.102	0.102	Measure	N/A
<b>Bluetooth / WiFi - Aux Antenna</b>																
WLAN Aux	WiFi	2412	12.50	18	5	184.5	228.3	5	5		Measure	0.075	0.075	Measure	Measure	N/A
WLAN Aux	WiFi	5180	12.00	16	5	184.5	228.3	5	5		Measure	0.097	0.097	Measure	Measure	N/A
WLAN Aux	WiFi	5260	12.30	17	5	184.5	228.3	5	5		Measure	0.104	0.104	Measure	Measure	N/A
WLAN Aux	WiFi	5500	12.50	18	5	184.5	228.3	5	5		Measure	0.113	0.113	Measure	Measure	N/A
WLAN Aux	WiFi	5745	12.00	16	5	184.5	228.3	5	5		Measure	0.102	0.102	Measure	Measure	N/A
WLAN Aux	Bluetooth	2402	6.50	4	5	184.5	228.3	5	5		0.165	0.017	0.017	0.165	0.165	N/A

**Notes:**

- Situations that comprised only estimated values (i.e. edge 2) are not reported as they are inherently compliant. The maximum SAR value based on two estimated values would be 0.8 W/Kg, well below the highest stand-alone SAR value for Edges 3 and 4 and therefore not the most conservative exposure condition for simultaneous transmission analysis. Situations that were justifiably omitted for simultaneous transmission SAR analysis include:
  - Rear, Wi-Fi 1 Tx on Aux: This is WWAN + WLAN Aux and is effectively covered by the Wi-Fi 2 Tx scenario that
  - Edge 2, for all combinations.
  - Edge 3, WWAN + Wi-Fi 1 Tx on Main: This is WWAN + WLAN Main + Bluetooth, all of which qualify for standalone SAR test exclusion under this test position.
  - Edge4: WWAN + Wi-Fi 1 Tx on Aux: This is WWAN + WLAN Aux and is effectively covered by WWAN + Wi-Fi 2 Tx, which adds the SAR of WLAN Main at its most conservative edge to this combination.
- Wherever appropriate, measured or estimated Wi-Fi 1 Tx (SISO) SAR values were used to represent those of Wi-Fi 2 Tx (MIMO); if compliance can be shown with the more conservative Wi-Fi 1 Tx values, then there is no need to perform separate assessment for Wi-Fi 2 Tx.
- However, where estimated Wi-Fi 1 Tx SAR values are overly conservative, then estimated or measured Wi-Fi 2 Tx (MIMO) values are used.

### 12.3. CDMA BC0

#### Usage Scenario: Proximity Sensor Activated, Reduced Power Operation

Test Position	Dist. (mm)	Mode	Ch #.	Freq. (MHz)	Power (dBm)		1-g SAR (W/kg)		Plot No.	Note
					Tune-up limit	Meas.	Meas.	Scaled		
Rear	0	1xRTT (RC3 SO32)	1013	824.7	19.6	19.5				1
			384	836.5	19.6	19.5	0.336	0.344		
			777	848.3	19.6	19.3				1
Edge 1	0	1xRTT (RC3 SO32)	1013	824.7	19.6	19.5	0.861	0.875	1	
			384	836.5	19.6	19.5	0.888	0.909	2	
			777	848.3	19.6	19.3	<b>1.000</b>	<b>1.076</b>	3	
Test Position	Dist. (mm)	Mode	Ch #.	Freq. (MHz)	Power (dBm)		1-g SAR (W/kg)		Plot No.	Note
					Tune-up limit	Meas.	Meas.	Scaled		
Rear	0	1xEVDO (Rel. 0)	1013	824.7	19.6	19.6				1
			384	836.5	19.6	19.4	0.439	0.460	4	
			777	848.3	19.6	19.4				1
Edge 1	0	1xEVDO (Rel. 0)	1013	824.7	19.6	19.6	0.822	0.828	5	
			384	836.5	19.6	19.4	0.877	0.918	6	
			777	848.3	19.6	19.4	<b>0.995</b>	1.052	7	

**Note(s):**

According to KDB 447498 D01 General RF Exposure Guidance v05, 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.

1. ≤ 0.8 W/kg or 2.0 W/kg, for 1-g or 10-g respectively, when the transmission band is ≤ 100 MHz
2. ≤ 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
3. ≤ 0.4 W/kg or 1.0 W/kg, for 1-g or 10-g respectively, when the transmission band is ≥ 200 MHz

**CDMA BC0 continued**

**Usage Scenario: Proximity Sensor Deactivated, Full Power Operation**

Test Position	Dist. (mm)	Mode	Ch #.	Freq. (MHz)	Power (dBm)		1-g SAR (W/kg)		Plot No.	Note
					Tune-up limit	Meas.	Meas.	Scaled		
Rear	6	1xRTT (RC3 SO32)	1013	824.7	25.0	24.5				1
			384	836.5	25.0	24.5	0.339	0.385	8	
			777	848.3	25.0	24.2				1
Edge 1	20	1xRTT (RC3 SO32)	1013	824.7	25.0	24.5				1
			384	836.5	25.0	24.5	0.315	0.358	9	
			777	848.3	25.0	24.2				1
Edge 4	0	1xRTT (RC3 SO32)	1013	824.7	25.0	24.5				1
			384	836.5	25.0	24.5	0.145	0.165	10	
			777	848.3	25.0	24.2				1
Test Position	Dist. (mm)	Mode	Ch #.	Freq. (MHz)	Power (dBm)		1-g SAR (W/kg)		Plot No.	Note
					Tune-up limit	Meas.	Meas.	Scaled		
Rear	6	1xEVDO (Rel. 0)	1013	824.7	25.0	24.6				1
			384	836.5	25.0	24.5	0.307	0.345	11	
			777	848.3	25.0	24.2				1
Edge 1	20	1xEVDO (Rel. 0)	1013	824.7	25.0	24.6				1
			384	836.5	25.0	24.5	0.305	0.343	12	
			777	848.3	25.0	24.2				1
Edge 4	0	1xEVDO (Rel. 0)	1013	824.7	25.0	24.6				1
			384	836.5	25.0	24.5	0.164	0.184	13	
			777	848.3	25.0	24.2				1

**Note(s):**

According to KDB 447498 D01 General RF Exposure Guidance v05, 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.

1. ≤ 0.8 W/kg or 2.0 W/kg, for 1-g or 10-g respectively, when the transmission band is ≤ 100 MHz
2. ≤ 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
3. ≤ 0.4 W/kg or 1.0 W/kg, for 1-g or 10-g respectively, when the transmission band is ≥ 200 MHz

## 12.4. CDMA BC1

### Usage Scenario: Proximity Sensor Activated, Reduced Power Operation

Test Position	Dist. (mm)	Mode	Ch #.	Freq. (MHz)	Power (dBm)		1-g SAR (W/kg)		Plot No.	Note
					Tune-up limit	Meas.	Meas.	Scaled		
Rear	0	1xRTT (RC3 SO32)	25	1851.25	16.5	15.9				1
			600	1880.0	16.5	16.3	0.348	0.364	1	
			1175	1908.75	16.5	16.1				1
Edge 1	0	1xRTT (RC3 SO32)	25	1851.25	16.5	15.9	0.684	0.785	2	
			600	1880.0	16.5	16.3	0.811	0.849	3	
			1175	1908.75	16.5	16.1	<b>1.090</b>	<b>1.195</b>	4	
Test Position	Dist. (mm)	Mode	Ch #.	Freq. (MHz)	Power (dBm)		1-g SAR (W/kg)		Plot No.	Note
					Tune-up limit	Meas.	Meas.	Scaled		
Rear	0	1xEVDO (Rel. 0)	25	1851.25	16.5	15.9				1
			600	1880.0	16.5	16.3	0.375	0.393	5	
			1175	1908.75	16.5	16.1				1
Edge 1	0	1xEVDO (Rel. 0)	25	1851.25	16.5	15.9				1
			600	1880.0	16.5	16.3	0.687	0.719	6	
			1175	1908.75	16.5	16.1				1

#### Note(s):

According to KDB 447498 D01 General RF Exposure Guidance v05, 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.

1.  $\leq 0.8$  W/kg or  $2.0$  W/kg, for 1-g or 10-g respectively, when the transmission band is  $\leq 100$  MHz
2.  $\leq 0.6$  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
3.  $\leq 0.4$  W/kg or  $1.0$  W/kg, for 1-g or 10-g respectively, when the transmission band is  $\geq 200$  MHz

**CDMA BC1 continued**

**Usage Scenario: Proximity Sensor Deactivated, Full Power Operation**

Test Position	Dist. (mm)	Mode	Ch #.	Freq. (MHz)	Power (dBm)		1-g SAR (W/kg)		Plot No.	Note
					Tune-up limit	Meas.	Meas.	Scaled		
Rear	6	1xRTT (RC3 SO32)	25	1851.25	24.7	24.7				1
			600	1880.0	24.7	24.7	0.521	0.521	7	
			1175	1908.75	24.7	24.7				1
Edge 1	20	1xRTT (RC3 SO32)	25	1851.25	24.7	24.7				1
			600	1880.0	24.7	24.7	0.328	0.328	8	
			1175	1908.75	24.7	24.7				1
Edge 4	0	1xRTT (RC3 SO32)	25	1851.25	24.7	24.7				1
			600	1880.0	24.7	24.7	0.394	0.394	9	
			1175	1908.75	24.7	24.7				1
Test Position	Dist. (mm)	Mode	Ch #.	Freq. (MHz)	Power (dBm)		1-g SAR (W/kg)		Plot No.	Note
					Tune-up limit	Meas.	Meas.	Scaled		
Rear	6	1xEVDO (Rel. 0)	25	1851.25	24.8	24.5				1
			600	1880.0	24.8	24.8	0.509	0.509	10	
			1175	1908.75	24.8	24.7				1
Edge 1	20	1xEVDO (Rel. 0)	25	1851.25	24.8	24.5				1
			600	1880.0	24.8	24.8	0.307	0.307	11	
			1175	1908.75	24.8	24.7				1
Edge 4	0	1xEVDO (Rel. 0)	25	1851.25	24.8	24.5				1
			600	1880.0	24.8	24.8	0.386	0.386	12	
			1175	1908.75	24.8	24.7				1

**Note(s):**

According to KDB 447498 D01 General RF Exposure Guidance v05, 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.

1. ≤ 0.8 W/kg or 2.0 W/kg, for 1-g or 10-g respectively, when the transmission band is ≤ 100 MHz
2. ≤ 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
3. ≤ 0.4 W/kg or 1.0 W/kg, for 1-g or 10-g respectively, when the transmission band is ≥ 200 MHz

## 12.5. LTE Band 13

### Usage Scenario: Proximity Sensor Activated, Reduced Power Operation

Test Position	Dist. (mm)	Mode	UL Ch #.	Freq. (MHz)	UL RB Allocation	UL RB Start	Power (dBm)		1-g SAR (W/kg)		Plot No.	Note
							Tune-up limit	Meas.	Meas.	Scaled		
Rear	0	QPSK	23230	782.0	1	24	21.2	21.0	0.500	0.524	1	
			23230	782.0	1	49	21.2	20.9				
			23230	782.0	1	0	21.2	20.8				
			23230	782.0	25	24	21.2	21.2	0.501	0.501	2	
			23230	782.0	25	0	21.2	21.2				
			23230	782.0	25	12	21.2	21.1				
			23230	782.0	50	0	21.2	21.1				
Edge 1	0	QPSK	23230	782.0	1	24	21.2	21.0	1.090	1.141	3	
			23230	782.0	1	49	21.2	20.9	0.996	1.067	4	
			23230	782.0	1	0	21.2	20.8	1.230	<b>1.349</b>	5	
			23230	782.0	25	24	21.2	21.2	1.040	1.040	6	
			23230	782.0	25	0	21.2	21.2	<b>1.280</b>	1.280	7	
			23230	782.0	25	12	21.2	21.1	1.140	1.167	8	
			23230	782.0	50	0	21.2	21.1	1.130	1.156	9	

#### Note(s):

Per KDB 941225 D05 SAR for LTE Devices v02, SAR test reduction is applied using the following criteria:

- Testing for Low and High Channel is performed at the highest output power level for 1RB, and 50% RB configuration for that channel.
- Testing for 100% RB configuration is performed at the highest output power level for 100% RB configuration across the Low, Mid and High Channel when the highest reported SAR for 1 RB and 50% RB are  $\geq 0.8$  W/kg. Testing for the remaining required channels is not needed because the reported SAR for 100% RB Allocation  $< 1.45$  W/kg.
- Testing for 16-QAM modulation is not required because the reported SAR for QPSK is  $< 1.45$  W/Kg and its output power is not more than 0.5 dB higher than that of QPSK.
- Testing for the other channel bandwidths is not required because the reported SAR for the highest channel bandwidth is  $< 1.45$  W/Kg and its output power is not more than 0.5 dB higher than that of the highest channel bandwidth.

**LTE Band 13 continued**

**Usage Scenario: Proximity Sensor Deactivated, Full Power Operation**

Test Position	Dist. (mm)	Mode	UL Ch #.	Freq. (MHz)	UL RB Allocation	UL RB Start	Power (dBm)		1-g SAR (W/kg)		Plot No.	Note
							Tune-up limit	Meas.	Meas.	Scaled		
Rear	6	QPSK	23230	782.0	1	24	23.0	22.9	0.426	0.436	10	
			23230	782.0	1	0	23.0	22.7				
			23230	782.0	1	49	23.0	22.7				
			23230	782.0	25	12	23.0	22.1	0.363	0.447	11	
			23230	782.0	25	24	23.0	22.1				
			23230	782.0	25	0	23.0	21.9				
			23230	782.0	50	0	23.0	22.0				
Edge 1	20	QPSK	23230	782.0	1	24	23.0	22.9	0.201	0.206	12	
			23230	782.0	1	0	23.0	22.7				
			23230	782.0	1	49	23.0	22.7				
			23230	782.0	25	12	23.0	22.1	0.141	0.173	13	
			23230	782.0	25	24	23.0	22.1				
			23230	782.0	25	0	23.0	21.9				
			23230	782.0	50	0	23.0	22.0				
Edge 4	0	QPSK	23230	782.0	1	24	23.0	22.9	0.078	0.080	14	
			23230	782.0	1	0	23.0	22.7				
			23230	782.0	1	49	23.0	22.7				
			23230	782.0	25	12	23.0	22.1	0.093	0.114	15	
			23230	782.0	25	24	23.0	22.1				
			23230	782.0	25	0	23.0	21.9				
			23230	782.0	50	0	23.0	22.0				

**Note(s):**

Per KDB 941225 D05 SAR for LTE Devices v02, SAR test reduction is applied using the following criteria:

- Testing for Low and High Channel is performed at the highest output power level for 1RB, and 50% RB configuration for that channel.
- Testing for 100% RB configuration is performed at the highest output power level for 100% RB configuration across the Low, Mid and High Channel when the highest reported SAR for 1 RB and 50% RB are  $\geq 0.8$  W/kg. Testing for the remaining required channels is not needed because the reported SAR for 100% RB Allocation  $< 1.45$  W/kg.
- Testing for 16-QAM modulation is not required because the reported SAR for QPSK is  $< 1.45$  W/Kg and its output power is not more than 0.5 dB higher than that of QPSK.
- Testing for the other channel bandwidths is not required because the reported SAR for the highest channel bandwidth is  $< 1.45$  W/Kg and its output power is not more than 0.5 dB higher than that of the highest channel bandwidth.

## 12.6. Wi-Fi 2.4 GHz and 5 GHz Bands

Additional SAR measurements were performed on the WLAN Main Antenna for each of the Wi-Fi bands under the Edge 4 test position using MIMO (Wi-Fi 2 Tx) transmit mode because the SISO (Wi-Fi 1 Tx) SAR values for WLAN Main were determined to be unnecessarily high to represent the WWAN + WLAN MIMO transmit scenario under this test position and would require simultaneous transmission SAR to be measured.

Although both WLAN antennas were transmitting simultaneously during MIMO mode, additional SAR measurements targeted only the WLAN Main Antenna, as it was the greatest contributor to the SAR summation on Edge 4; SAR measurement for WLAN Aux was not considered because it is covered by its more conservative SISO mode counterpart.

Test Position	Mode	Dist. (mm)	Ch #.	Freq. (MHz)	Power (dBm)		1-g SAR (W/kg)		Plot No.	Note
					Tune-up limit	Meas.	Meas.	Scaled		
Edge 4	802.11n, HT20 MIMO	0	1	2412	11.5	11.3	0.585	0.613	1	
			6	2437	12.5	12.2	0.789	<b>0.845</b>	2	
			11	2462	10.5	10.4	0.475	0.486	3	
			40	5200	12.0	11.8	0.363	0.380	4	
			48	5240	12.0	11.8	0.495	<b>0.518</b>	5	
			52	5260	12.0	11.7	0.422	0.452	6	
			64	5320	12.0	11.7	0.545	<b>0.584</b>	7	
			100	5500	12.5	12.4	0.338	0.346	8	
			120	5600	12.5	11.9	0.468	<b>0.537</b>	9	
			140	5700	12.4	12.0	0.190	0.208	10	
			149	5745	12.0	12.0	0.185	0.185	11	
			157	5785	12.0	11.9	0.210	<b>0.215</b>	12	
			165	5825	12.0	11.9	0.205	0.210	13	

## 12.7. Summary of Highest SAR Values

Results for the highest measured SAR values in each frequency band and mode

Technology/Band	Test configuration		Mode	Dist. (mm)	Freq. (Mhz)	Power (dBm)	1g SAR (W/kg)
	Exposure	Position					
CDMA BC0	Body	Edge1 Prox. On	1xRTT (RC3, SO32)	0	848.3	19.3	1.0
CDMA BC0	Body	Edge1 Prox. On	1xEVDO (Rel.0)	0	848.3	19.4	0.995
CDMA BC1	Body	Edge1 Prox. On	1xRTT (RC3, SO32)	0	1908.75	16.1	1.09
CDMA BC1	Body	Edge1 Prox. On	1xEVDO (Rel.0)	0	1880.0	16.3	0.687
LTE Band 13	Body	Edge1 Prox. On	10 MHz (QPSK) RB 25/0	0	782.0	21.2	1.28

## 12.8. SAR Measurement Variability and Uncertainty

In accordance with published RF Exposure KDB procedure 865664 D01 SAR measurement 100 MHz to 6 GHz v01. These additional measurements are repeated after the completion of all measurements requiring the same head or body tissue-equivalent medium in a frequency band. The test device should be returned to ambient conditions (normal room temperature) with the battery fully charged before it is re-mounted on the device holder for the repeated measurement(s) to minimize any unexpected variations in the repeated results.

- 1) Repeated measurement is not required when the original highest measured SAR is < 0.80 W/kg; steps 2) through 4) do not apply.
- 2) When the original highest measured SAR is  $\geq 0.80$  W/kg, repeat that measurement once.
- 3) Perform a second repeated measurement only if the ratio of largest to smallest SAR for the original and first repeated measurements is > 1.20 or when the original or repeated measurement is  $\geq 1.45$  W/kg (~ 10% from the 1-g SAR limit).
- 4) Perform a third repeated measurement only if the original, first or second repeated measurement is  $\geq 1.5$  W/kg and the ratio of largest to smallest SAR for the original, first and second repeated measurements is > 1.20.

Wireless Technologies	Test Configuration		Mode	Dist. (mm)	Ch #.	Freq. (MHz)	Meas. SAR (W/kg)		Largest to Smallest SAR Ratio	Plot No.
	Exposure	Position					Original	Repeated		
CDMA BC0	Body	Edge 1 Prox. On	1xRTT (RC3 SO32)	0	777	848.30	1.000	0.993	1.01	1
CDMA BC1	Body	Edge 1 Prox. On	1xRTT (RC3 SO32)	0	1175	1908.75	1.09	1.00	1.09	2
LTE Band 13	Body	Edge 1 Prox. On	10 MHz (QPSK) RB 25/0	0	23230	782.0	1.28	1.27	1.01	3

### Note(s):

Second Repeated Measurement is not required since the ratio of the largest to smallest SAR for the original and first repeated measurement is not > 1.20.

## 12.9. SAR Plots (from Summary of Highest Measured SAR Values)

Test Laboratory: UL CCS SAR Lab E Date: 2/5/2013

### CDMA BC0

Frequency: 848.31 MHz; Duty Cycle: 1:1; Room Ambient Temperature: 24.0°C; Liquid Temperature: 23.0°C

Medium parameters used (interpolated):  $f = 848.31$  MHz;  $\sigma = 1.001$  mho/m;  $\epsilon_r = 53.957$ ;  $\rho = 1000$  kg/m<sup>3</sup>

DASY5 Configuration:

- Area Scan Setting: Find Secondary Maximum Within: 2.0 dB and with a peak SAR value greater than 0.0012W/kg
- Electronics: DAE4 Sn1343; Calibrated: 8/20/2012
- Probe: EX3DV4 - SN3871; ConvF(9.68, 9.68, 9.68); Calibrated: 8/20/2012;
- 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: QDOVA002AA; Serial: 1180

**Edge 1 Prox. On /1xRTT RC3 SO32, Ch 777/Area Scan (6x14x1):** Measurement grid: dx=15mm, dy=15mm

[Info: Interpolated medium parameters used for SAR evaluation.](#)

Maximum value of SAR (measured) = 1.15 W/kg

**Edge 1 Prox. On/1xRTT RC3 SO32, Ch 777/Zoom Scan (5x5x7)/Cube 0:** Measurement grid: dx=8mm, dy=8mm, dz=5mm

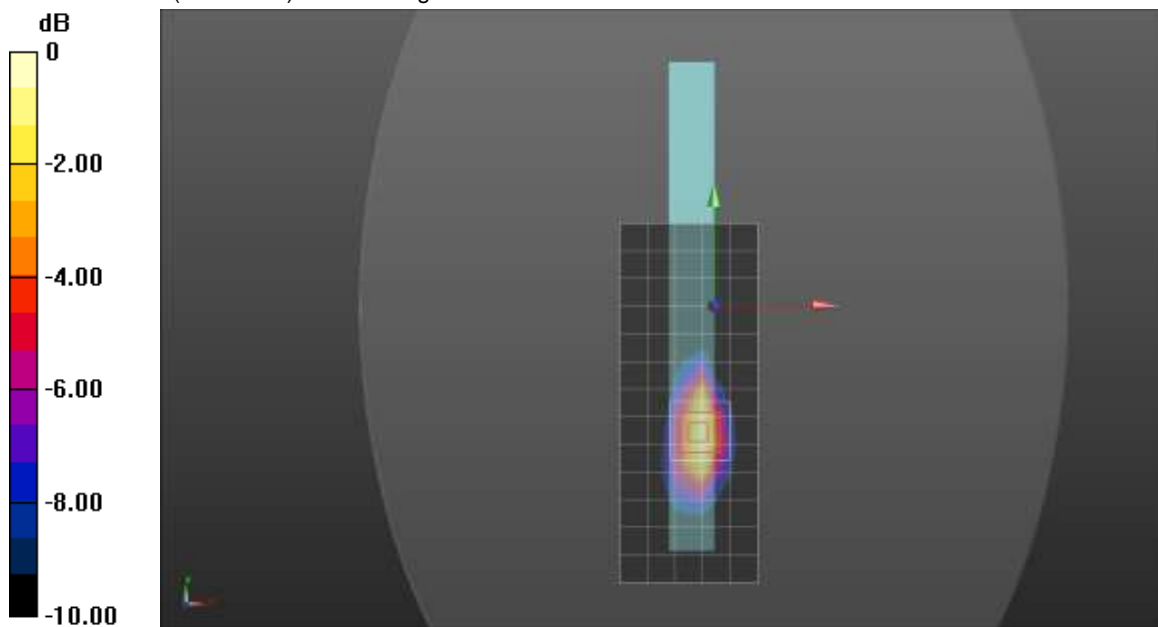
Reference Value = 35.271 V/m; Power Drift = -0.00 dB

Peak SAR (extrapolated) = 1.75 W/kg

**SAR(1 g) = 1.000 W/kg; SAR(10 g) = 0.549 W/kg**

[Info: Interpolated medium parameters used for SAR evaluation.](#)

Maximum value of SAR (measured) = 1.31 W/kg



0 dB = 1.31 W/kg = 1.17 dBW/kg

Test Laboratory: UL CCS SAR Lab E Date: 2/5/2013

### CDMA BC0

Frequency: 848.31 MHz; Duty Cycle: 1:1; Room Ambient Temperature: 24.0°C; Liquid Temperature: 23.0°C  
Medium parameters used (interpolated):  $f = 848.31$  MHz;  $\sigma = 1.001$  mho/m;  $\epsilon_r = 53.957$ ;  $\rho = 1000$  kg/m<sup>3</sup>

DASY5 Configuration:

- Area Scan Setting: Find Secondary Maximum Within: 2.0 dB and with a peak SAR value greater than 0.0012W/kg
- Electronics: DAE4 Sn1343; Calibrated: 8/20/2012
- Probe: EX3DV4 - SN3871; ConvF(9.68, 9.68, 9.68); Calibrated: 8/20/2012;
- 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: QDOVA002AA; Serial: 1180

**Edge 1 Prox. On/1xEVDO Rel. 0, Ch 777/Area Scan (6x14x1):** Measurement grid: dx=15mm, dy=15mm

[Info: Interpolated medium parameters used for SAR evaluation.](#)

Maximum value of SAR (measured) = 1.24 W/kg

**Edge 1 Prox. On/1xEVDO Rel. 0, Ch 777/Zoom Scan (5x5x7)/Cube 0:** Measurement grid: dx=8mm, dy=8mm, dz=5mm

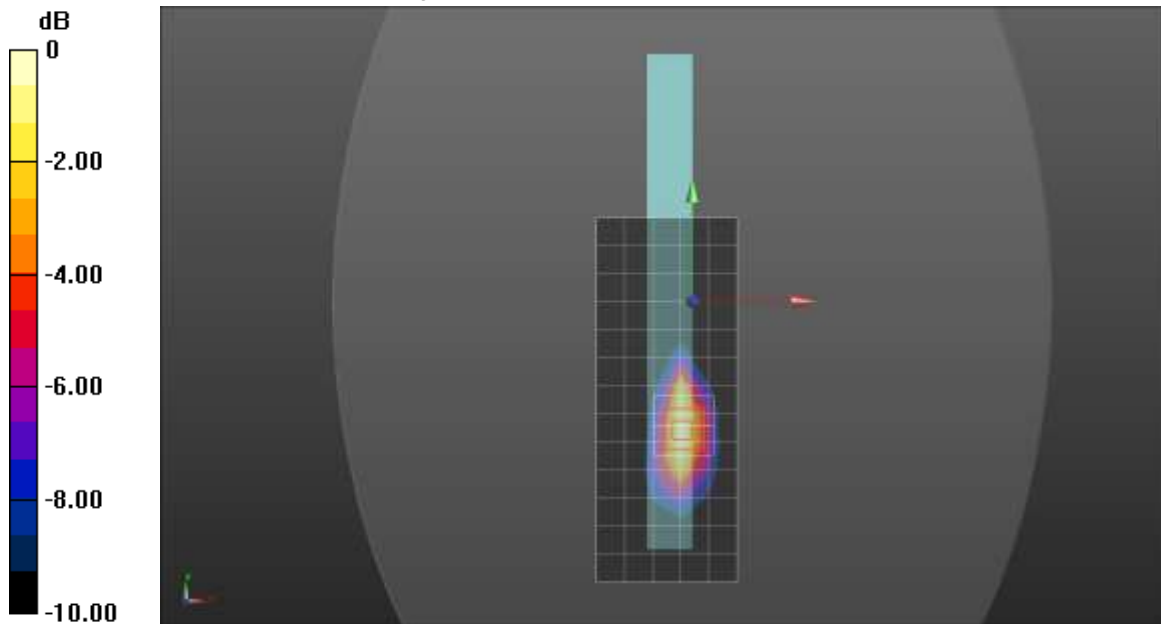
Reference Value = 34.799 V/m; Power Drift = 0.11 dB

Peak SAR (extrapolated) = 1.89 W/kg

**SAR(1 g) = 0.995 W/kg; SAR(10 g) = 0.540 W/kg**

[Info: Interpolated medium parameters used for SAR evaluation.](#)

Maximum value of SAR (measured) = 1.31 W/kg



0 dB = 1.31 W/kg = 1.17 dBW/kg

Test Laboratory: UL CCS SAR Lab B Date: 2/5/2013

## CDMA BC1

Frequency: 1908.75 MHz; Duty Cycle: 1:1; Room Ambient Temperature: 23.0°C; Liquid Temperature: 22.0°C  
Medium parameters used (interpolated):  $f = 1908.75$  MHz;  $\sigma = 1.58$  mho/m;  $\epsilon_r = 51.32$ ;  $\rho = 1000$  kg/m<sup>3</sup>

DASY5 Configuration:

- Area Scan Setting: Find Secondary Maximum Within: 2.0 dB and with a peak SAR value greater than 0.0012W/kg
- Electronics: DAE3 Sn427; Calibrated: 1/9/2013
- Probe: EX3DV4 - SN3686; ConvF(7.04, 7.04, 7.04); Calibrated: 2/16/2012;
- Sensor-Surface: 2.5mm (Mechanical Surface Detection (Locations From Previous Scan Used)), Sensor-Surface: 2.5mm (Mechanical Surface Detection)
- Phantom: ELI v5.0 (B); Type: QDOVA001BB; Serial: 1118

**Edge 1 Prox. On/1xRTT RC3 SO32, Ch 1175/Area Scan (6x14x1):** Measurement grid: dx=15mm, dy=15mm

[Info: Interpolated medium parameters used for SAR evaluation.](#)

Maximum value of SAR (measured) = 1.22 W/kg

**Edge 1 Prox. On/1xRTT RC3 SO32, Ch 1175/Zoom Scan (5x5x7)/Cube 0:** Measurement grid:

dx=8mm, dy=8mm, dz=5mm

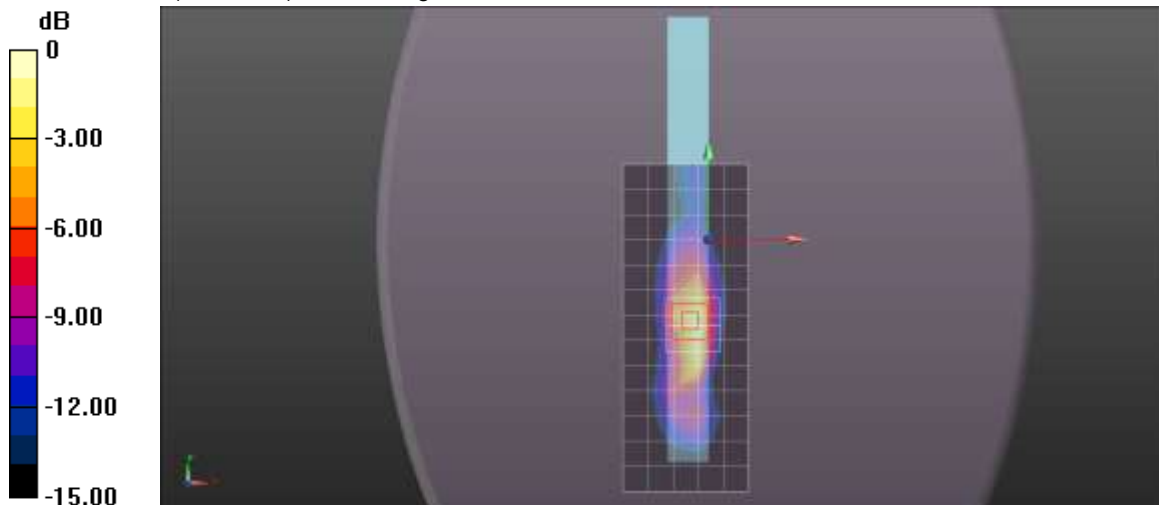
Reference Value = 27.298 V/m; Power Drift = 0.13 dB

Peak SAR (extrapolated) = 1.98 W/kg

**SAR(1 g) = 1.09 W/kg; SAR(10 g) = 0.533 W/kg**

[Info: Interpolated medium parameters used for SAR evaluation.](#)

Maximum value of SAR (measured) = 1.43 W/kg



0 dB = 1.43 W/kg = 1.55 dBW/kg

Test Laboratory: UL CCS SAR Lab B Date: 2/4/2013

### CDMA BC1

Frequency: 1908.75 MHz; Duty Cycle: 1:1; Room Ambient Temperature: 23.0°C; Liquid Temperature: 22.0°C  
Medium parameters used (interpolated):  $f = 1908.75$  MHz;  $\sigma = 1.58$  mho/m;  $\epsilon_r = 51.32$ ;  $\rho = 1000$  kg/m<sup>3</sup>

DASY5 Configuration:

- Area Scan Setting: Find Secondary Maximum Within: 2.0 dB and with a peak SAR value greater than 0.0012W/kg
- Electronics: DAE3 Sn427; Calibrated: 1/9/2013
- Probe: EX3DV4 - SN3686; ConvF(7.04, 7.04, 7.04); Calibrated: 2/16/2012;
- Sensor-Surface: 2.5mm (Mechanical Surface Detection (Locations From Previous Scan Used)), Sensor-Surface: 2.5mm (Mechanical Surface Detection)
- Phantom: ELI v5.0 (B); Type: QDOVA001BB; Serial: 1118

#### Edge 1 Prox. On/1xEVDO Ch 1175/Area Scan (6x14x1):

Measurement grid: dx=15mm, dy=15mm

[Info: Interpolated medium parameters used for SAR evaluation.](#)

Maximum value of SAR (measured) = 0.875 W/kg

#### Edge 1 Prox. On/1xEVDO Ch 1175/Zoom Scan (5x5x7)/Cube 0:

Measurement grid: dx=8mm,

dy=8mm, dz=5mm

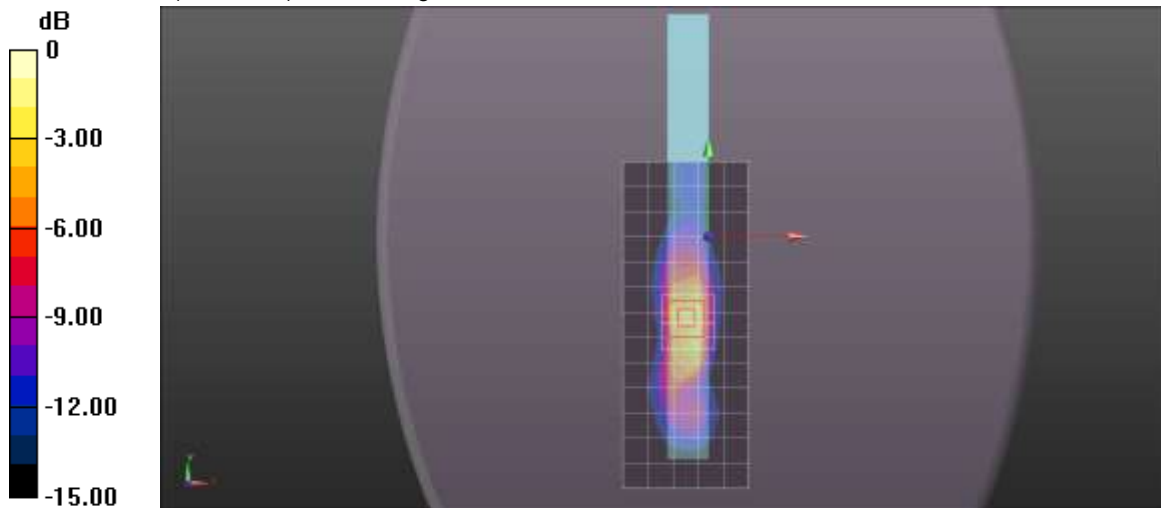
Reference Value = 22.748 V/m; Power Drift = -0.07 dB

Peak SAR (extrapolated) = 1.74 W/kg

**SAR(1 g) = 0.962 W/kg; SAR(10 g) = 0.470 W/kg**

[Info: Interpolated medium parameters used for SAR evaluation.](#)

Maximum value of SAR (measured) = 1.29 W/kg



0 dB = 1.29 W/kg = 1.11 dBW/kg

Test Laboratory: UL CCS SAR Lab B Date: 1/30/2013

## LTE Band 13

Frequency: 782 MHz; Duty Cycle: 1:1; Room Ambient Temperature: 23.0°C; Liquid Temperature: 22.0°C  
Medium parameters used (interpolated):  $f = 782$  MHz;  $\sigma = 0.995$  mho/m;  $\epsilon_r = 52.858$ ;  $\rho = 1000$  kg/m<sup>3</sup>

DASY5 Configuration:

- Area Scan Setting: Find Secondary Maximum Within: 2.0 dB and with a peak SAR value greater than 0.0012W/kg
- Electronics: DAE4 Sn1259; Calibrated: 2/13/2012
- Probe: EX3DV4 - SN3686; ConvF(8.87, 8.87, 8.87); Calibrated: 2/16/2012;
- Sensor-Surface: 2.5mm (Mechanical Surface Detection (Locations From Previous Scan Used)), Sensor-Surface: 2.5mm (Mechanical Surface Detection)
- Phantom: ELI v5.0 (B); Type: QDOVA001BB; Serial: 1099

**Edge 1 Prox. On/QPSK RB 25, 0/ Ch 23230/Area Scan (7x11x1):** Measurement grid: dx=15mm, dy=15mm

[Info: Interpolated medium parameters used for SAR evaluation.](#)

Maximum value of SAR (measured) = 1.49 W/kg

**Edge 1 Prox. On/QPSK RB 25, 0/ Ch 23230/Zoom Scan (5x5x7)/Cube 0:** Measurement grid:

dx=8mm, dy=8mm, dz=5mm

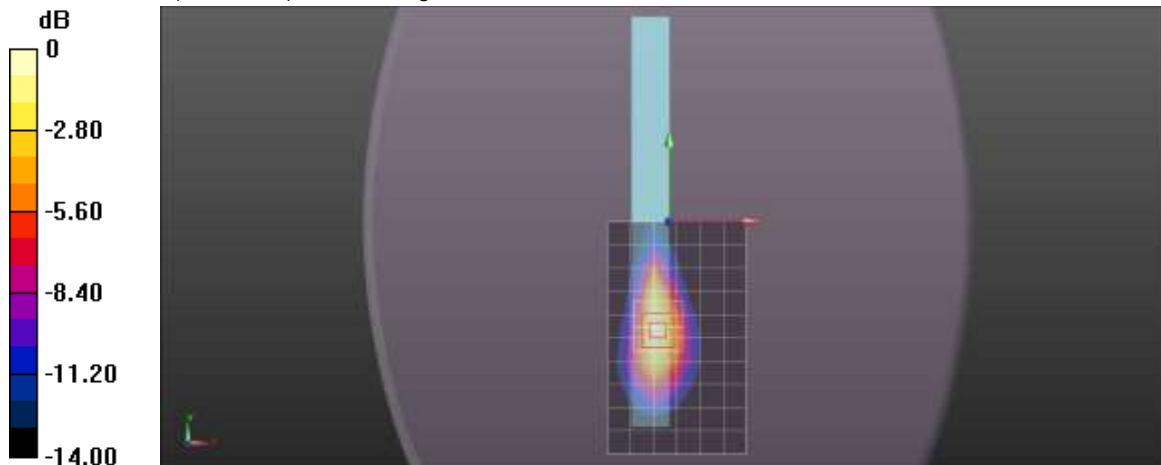
Reference Value = 40.123 V/m; Power Drift = -0.15 dB

Peak SAR (extrapolated) = 2.28 W/kg

**SAR(1 g) = 1.28 W/kg; SAR(10 g) = 0.701 W/kg**

[Info: Interpolated medium parameters used for SAR evaluation.](#)

Maximum value of SAR (measured) = 1.68 W/kg



0 dB = 1.68 W/kg = 2.25 dBW/kg

### 13. Simultaneous Transmission SAR Analysis

All Wi-Fi 1-g SAR values were taken from results recorded in SAR report 12J14673-1F, submitted under FCC ID ACJ9TGWL12A, from the MIMO estimated values in section 12.2.2 of this report, or, in the case of Edge 4 Wi-Fi 2 Tx (MIMO), the values documented in Section 12.6 of this report.

All Simultaneous Transmission SAR analysis applies scaling in accordance with the scaled values documented in this report (for the WWAN radios) and the aforementioned SAR report (12J14673-1F) with scaling applied (for the WLAN radios).

#### 13.1. Sum of the SAR for CDMA BC0 & Wi-Fi 2.4 GHz Band

Test Position	Data					Σ 1-g SAR (mW/g)
	CDMA BC0 1xRTT	CDMA BC0 1xEVDO	WiFi 2.4 GHz Main	WiFi 2.4 GHz Aux	Bluetooth	
Rear, Wi-Fi 1 Tx	0.385		0.196		0.165	0.746
		0.460	0.196		0.165	0.821
Rear, Wi-Fi 2 Tx	0.385		0.196	0.062		0.643
		0.460	0.196	0.062		0.718
Edge 1, Wi-Fi 1 Tx	1.076		0.084		0.017	1.177
	1.076			0.133		1.209
		1.052	0.084		0.017	1.153
		1.052		0.133		1.185
Edge 1, Wi-Fi 2 Tx	1.076		0.084	0.075		1.235
		1.052	0.084	0.075		1.211
Edge 3, Wi-Fi 2 Tx	0.400		0.075	0.418		0.893
		0.400	0.075	0.418		0.893
Edge 4, Wi-Fi 1 Tx	0.165		1.093		0.0089	1.267
		0.184	1.093		0.0089	1.286
Edge 4, Wi-Fi 2 Tx	0.165		0.845	0.126		1.136
		0.184	0.845	0.126		1.155

- As there were only estimated values for edge 2 it was not assessed as it is inherently compliant
- Values shaded green are estimated SAR

**Conclusion:**

Simultaneous transmission SAR measurement (Volume Scan) is not required because either sum of the 1-g SAR is < 1.6 W/kg or the SPLSR is < 0.04 for all circumstances that require SPLSR calculation.

### 13.2. Sum of the SAR for CDMA BC1 & Wi-Fi 2.4 GHz Band

Test Position	Data					Σ 1-g SAR (mW/g)
	CDMA BC1 1xRTT	CDMA BC1 1xEVDO	WiFi 2.4 GHz Main	WiFi 2.4 GHz Aux	Bluetooth	
Rear, Wi-Fi 1 Tx	0.521		0.196		0.165	0.882
		0.509	0.196		0.165	0.870
Rear, Wi-Fi 2 Tx	0.521		0.196	0.062		0.779
		0.509	0.196	0.062		0.767
Edge 1, Wi-Fi 1 Tx	1.195		0.084		0.017	1.296
	1.195			0.133		1.328
		0.719	0.084		0.017	0.820
		0.719		0.133		0.852
Edge 1, Wi-Fi 2 Tx	1.195		0.084	0.075		1.354
		0.719	0.084	0.075		0.878
Edge 3, Wi-Fi 2 Tx	0.400		0.075	0.418		0.893
		0.400	0.075	0.418		0.893
Edge 4, Wi-Fi 1 Tx	0.394		1.093		0.0089	1.496
		0.386	1.093		0.0089	1.488
Edge 4, Wi-Fi 2 Tx	0.394		0.845	0.126		1.365
		0.386	0.845	0.126		1.357

1. As there were only estimated values for edge 2 it was not assessed as it is inherently compliant
2. Values shaded green are estimated SAR

**Conclusion:**

Simultaneous transmission SAR measurement (Volume Scan) is not required because either sum of the 1-g SAR is < 1.6 W/kg or the SPLSR is < 0.04 for all circumstances that require SPLSR calculation.

### 13.3. Sum of the SAR for LTE & Wi-Fi 2.4 GHz Band

Test Position	Data				Σ 1-g SAR (mW/g)
	LTE Band 13	WiFi 2.4 GHz Main	WiFi 2.4 GHz Aux	Bluetooth	
Rear, Wi-Fi 1 Tx	0.524	0.196		0.165	0.885
Rear, Wi-Fi 2 Tx	0.524	0.196	0.062		0.782
Edge 1, Wi-Fi 1 Tx	1.349	0.084		0.017	1.450
	1.349		0.133		1.482
Edge 1, Wi-Fi 2 Tx	1.349	0.084	0.075		1.508
Edge 3, Wi-Fi 2 Tx	0.400	0.075	0.418		0.893
Edge 4, Wi-Fi 1 Tx	0.114	0.845		0.0089	0.968
Edge 4, Wi-Fi 2 Tx	0.114	0.845	0.126		1.085

1. As there were only estimated values for edge 2 it was not assessed as it is inherently compliant
2. Values shaded green are estimated SAR

**Conclusion:**

Simultaneous transmission SAR measurement (Volume Scan) is not required because either sum of the 1-g SAR is < 1.6 W/kg or the SPLSR is < 0.04 for all circumstances that require SPLSR calculation.

### 13.4. Sum of the SAR for CDMA BC0 & Wi-Fi 5.2 GHz Band

Test Position	Data					Σ 1-g SAR (mW/g)
	CDMA BC0 1xRTT	CDMA BC0 1xEVDO	WiFi 5.2 GHz Main	WiFi 5.2 GHz Aux	Bluetooth	
Rear, Wi-Fi 1 Tx	0.385		0.136		0.165	0.686
		0.460	0.136		0.165	0.761
Rear, Wi-Fi 2 Tx	0.385		0.136	0.149		0.670
		0.460	0.136	0.149		0.745
Edge 1, Wi-Fi 1 Tx	1.076		0.061		0.017	1.154
	1.076			0.194		1.270
		1.052	0.061		0.017	1.130
Edge 1, Wi-Fi 2 Tx		1.052		0.194		1.246
	1.076		0.061	0.097		1.234
		1.052	0.061	0.097		1.210
Edge 3, Wi-Fi 2 Tx	0.400		0.097	0.545		1.042
		0.400	0.097	0.545		1.042
Edge 4, Wi-Fi 1 Tx	0.165		0.797		0.0089	0.971
		0.184	0.797		0.0089	0.990
Edge 4, Wi-Fi 2 Tx	0.165		0.518	0.057		0.740
		0.184	0.518	0.057		0.759

1. As there were only estimated values for edge 2 it was not assessed as it is inherently compliant
2. Values shaded green are estimated SAR

**Conclusion:**

Simultaneous transmission SAR measurement (Volume Scan) is not required because either sum of the 1-g SAR is < 1.6 W/kg or the SPLSR is < 0.04 for all circumstances that require SPLSR calculation.

### 13.5. Sum of the SAR for CDMA BC1 & Wi-Fi 5.2 GHz Band

Test Position	Data					Σ 1-g SAR (mW/g)
	CDMA BC1 1xRTT	CDMA BC1 1xEVDO	WiFi 5.2 GHz Main	WiFi 5.2 GHz Aux	Bluetooth	
Rear, Wi-Fi 1 Tx	0.521		0.136		0.165	0.822
		0.509	0.136		0.165	0.810
Rear, Wi-Fi 2 Tx	0.521		0.136	0.149		0.806
		0.509	0.136	0.149		0.794
Edge 1, Wi-Fi 1 Tx	1.195		0.061		0.017	1.273
	1.195			0.194		1.389
		0.719	0.061		0.017	0.797
		0.719		0.194		0.913
Edge 1, Wi-Fi 2 Tx	1.195		0.061	0.097		1.353
		0.719	0.061	0.097		0.877
Edge 3, Wi-Fi 2 Tx	0.400		0.097	0.545		1.042
		0.400	0.097	0.545		1.042
Edge 4, Wi-Fi 1 Tx	0.394		0.797		0.0089	1.200
		0.386	0.797		0.0089	1.192
Edge 4, Wi-Fi 2 Tx	0.394		0.518	0.057		0.969
		0.386	0.518	0.057		0.961

1. As there were only estimated values for edge 2 it was not assessed as it is inherently compliant
2. Values shaded green are estimated SAR

**Conclusion:**

Simultaneous transmission SAR measurement (Volume Scan) is not required because either sum of the 1-g SAR is < 1.6 W/kg or the SPLSR is < 0.04 for all circumstances that require SPLSR calculation.

### 13.6. Sum of the SAR for LTE & Wi-Fi 5.2 GHz Band

Test Position	Data				Σ 1-g SAR (mW/g)
	LTE Band 13	WiFi 5.2 GHz Main	WiFi 5.2 GHz Aux	Bluetooth	
Rear, Wi-Fi 1 Tx	0.524	0.136		0.165	0.825
Rear, Wi-Fi 2 Tx	0.524	0.136	0.149		0.809
Edge 1, Wi-Fi 1 Tx	1.349	0.061		0.017	1.427
	1.349		0.194		1.543
Edge 1, Wi-Fi 2 Tx	1.349	0.061	0.097		1.507
Edge 3, Wi-Fi 2 Tx	0.400	0.097	0.545		1.042
Edge 4, Wi-Fi 1 Tx	0.114	0.797		0.0089	0.920
Edge 4, Wi-Fi 2 Tx	0.114	0.518	0.057		0.689

1. As there were only estimated values for edge 2 it was not assessed as it is inherently compliant
2. Values shaded green are estimated SAR

**Conclusion:**

Simultaneous transmission SAR measurement (Volume Scan) is not required because either sum of the 1-g SAR is < 1.6 W/kg or the SPLSR is < 0.04 for all circumstances that require SPLSR calculation.

### 13.7. Sum of the SAR for CDMA BC0 & Wi-Fi 5.3 GHz Band

Test Position	Data					Σ 1-g SAR (mW/g)
	CDMA BC0 1xRTT	CDMA BC0 1xEVDO	WiFi 5.3 GHz Main	WiFi 5.3 GHz Aux	Bluetooth	
Rear, Wi-Fi 1 Tx	0.385		0.206		0.165	0.756
		0.460	0.206		0.165	0.831
Rear, Wi-Fi 2 Tx	0.385		0.206	0.254		0.845
		0.460	0.206	0.254		0.920
Edge 1, Wi-Fi 1 Tx	1.076		0.138		0.017	1.231
	1.076			0.196		1.272
		1.052	0.138		0.017	1.207
Edge 1, Wi-Fi 2 Tx		1.052		0.196		1.248
	1.076		0.138	0.104		1.318
Edge 3, Wi-Fi 2 Tx		1.052	0.138	0.104		1.294
	0.400		0.104	0.938		1.442
Edge 4, Wi-Fi 1 Tx		0.400	0.104	0.938		1.442
	0.165		1.19		0.0089	1.364
Edge 4, Wi-Fi 2 Tx		0.184	1.19		0.0089	1.383
	0.165		0.584	0.124		0.873
		0.184	0.584	0.124		0.892

1. As there were only estimated values for edge 2 it was not assessed as it is inherently compliant
2. Values shaded green are estimated SAR

**Conclusion:**

Simultaneous transmission SAR measurement (Volume Scan) is not required because either sum of the 1-g SAR is < 1.6 W/kg or the SPLSR is < 0.04 for all circumstances that require SPLSR calculation.

### 13.8. Sum of the SAR for CDMA BC1 & Wi-Fi 5.3 GHz Band

Test Position	Data					Σ 1-g SAR (mW/g)
	CDMA BC1 1xRTT	CDMA BC1 1xEVDO	WiFi 5.3 GHz Main	WiFi 5.3 GHz Aux	Bluetooth	
Rear, Wi-Fi 1 Tx	0.521		0.206		0.165	0.892
		0.509	0.206		0.165	0.880
Rear, Wi-Fi 2 Tx	0.521		0.206	0.254		0.981
		0.509	0.206	0.254		0.969
Edge 1, Wi-Fi 1 Tx	1.195		0.138		0.017	1.350
	1.195			0.196		1.391
		0.719	0.138		0.017	0.874
		0.719		0.196		0.915
Edge 1, Wi-Fi 2 Tx	1.195		0.138	0.104		1.437
		0.719	0.138	0.104		0.961
Edge 3, Wi-Fi 2 Tx	0.400		0.104	0.938		1.442
		0.400	0.104	0.938		1.442
Edge 4, Wi-Fi 1 Tx	0.394		1.190		0.0089	<b>1.593</b>
		0.386	1.190		0.0089	1.585
Edge 4, Wi-Fi 2 Tx	0.394		0.584	0.124		1.102
		0.386	0.584	0.124		1.094

1. As there were only estimated values for edge 2 it was not assessed as it is inherently compliant
2. Values shaded green are estimated SAR

**Conclusion:**

Simultaneous transmission SAR measurement (Volume Scan) is not required because either sum of the 1-g SAR is < 1.6 W/kg or the SPLSR is < 0.04 for all circumstances that require SPLSR calculation.

### 13.9. Sum of the SAR for LTE & Wi-Fi 5.3 GHz Band

Test Position	Data				Σ 1-g SAR (mW/g)
	LTE Band 13	WiFi 5.3 GHz Main	WiFi 5.3 GHz Aux	Bluetooth	
Rear, Wi-Fi 1 Tx	0.524	0.206		0.165	0.895
Rear, Wi-Fi 2 Tx	0.524	0.206	0.254		0.984
Edge 1, Wi-Fi 1 Tx	1.349	0.138		0.017	1.504
	1.349		0.196		1.545
Edge 1, Wi-Fi 2 Tx	1.349	0.138	0.104		1.591
Edge 3, Wi-Fi 2 Tx	0.400	0.104	0.938		1.442
Edge 4, Wi-Fi 1 Tx	0.114	1.19		0.0089	1.313
Edge 4, Wi-Fi 2 Tx	0.114	0.584	0.057		0.755

1. As there were only estimated values for edge 2 it was not assessed as it is inherently compliant
2. Values shaded green are estimated SAR

#### Conclusion:

Simultaneous transmission SAR measurement (Volume Scan) is not required because either sum of the 1-g SAR is < 1.6 W/kg or the SPLSR is < 0.04 for all circumstances that require SPLSR calculation.

### 13.10. Sum of the SAR for CDMA BC0 & Wi-Fi 5.5 GHz Band

Test Position	Data					Σ 1-g SAR (mW/g)
	CDMA BC0 1xRTT	CDMA BC0 1xEVDO	WiFi 5.5 GHz Main	WiFi 5.5 GHz Aux	Bluetooth	
Rear, Wi-Fi 1 Tx	0.385		0.220		0.165	0.770
		0.460	0.220		0.165	0.845
Rear, Wi-Fi 2 Tx	0.385		0.220	0.229		0.834
		0.460	0.220	0.229		0.909
Edge 1, Wi-Fi 1 Tx	1.076		0.082		0.017	1.175
	1.076			0.200		1.276
		1.052	0.082		0.017	1.151
Edge 1, Wi-Fi 2 Tx		1.052		0.200		1.252
	1.076		0.082	0.113		1.271
Edge 3, Wi-Fi 2 Tx		1.052	0.082	0.113		1.247
	0.400		0.113	1.030		1.543
Edge 4, Wi-Fi 1 Tx		0.400	0.113	1.030		1.543
	0.165		1.099		0.0089	1.273
Edge 4, Wi-Fi 2 Tx		0.184	1.099		0.0089	1.292
	0.165		0.537	0.094		0.796
		0.184	0.537	0.094		0.815

1. As there were only estimated values for edge 2 it was not assessed as it is inherently compliant
2. Values shaded green are estimated SAR

**Conclusion:**

Simultaneous transmission SAR measurement (Volume Scan) is not required because either sum of the 1-g SAR is < 1.6 W/kg or the SPLSR is < 0.04 for all circumstances that require SPLSR calculation.

### 13.11. Sum of the SAR for CDMA BC1 & Wi-Fi 5.5 GHz Band

Test Position	Data					Σ 1-g SAR (mW/g)
	CDMA BC1 1xRTT	CDMA BC1 1xEVDO	WiFi 5.5 GHz Main	WiFi 5.5 GHz Aux	Bluetooth	
Rear, Wi-Fi 1 Tx	0.521		0.220		0.165	0.906
		0.509	0.220		0.165	0.894
Rear, Wi-Fi 2 Tx	0.521		0.220	0.229		0.970
		0.509	0.220	0.229		0.958
Edge 1, Wi-Fi 1 Tx	1.195		0.082		0.017	1.294
	1.195			0.200		1.395
		0.719	0.082		0.017	0.818
		0.719		0.200		0.919
Edge 1, Wi-Fi 2 Tx	1.195		0.082	0.113		1.390
		0.719	0.082	0.113		0.914
Edge 3, Wi-Fi 2 Tx	0.400		0.113	1.030		1.543
		0.400	0.113	1.030		1.543
Edge 4, Wi-Fi 1 Tx	0.394		1.099		0.0089	1.502
		0.386	1.099		0.0089	1.494
Edge 4, Wi-Fi 2 Tx	0.394		0.537	0.094		1.025
		0.386	0.537	0.094		1.017

1. As there were only estimated values for edge 2 it was not assessed as it is inherently compliant
2. Values shaded green are estimated SAR

**Conclusion:**

Simultaneous transmission SAR measurement (Volume Scan) is not required because either sum of the 1-g SAR is < 1.6 W/kg or the SPLSR is < 0.04 for all circumstances that require SPLSR calculation.

### 13.12. Sum of the SAR for LTE & Wi-Fi 5.5 GHz Band

Test Position	Data				Σ 1-g SAR (mW/g)
	LTE Band 13	WiFi 5.5 GHz Main	WiFi 5.5 GHz Aux	Bluetooth	
Rear, Wi-Fi 1 Tx	0.524	0.220		0.165	0.909
Rear, Wi-Fi 2 Tx	0.524	0.220	0.229		0.973
Edge 1, Wi-Fi 1 Tx	1.349	0.082		0.017	1.448
	1.349		0.200		1.549
Edge 1, Wi-Fi 2 Tx	1.349	0.082	0.113		1.544
Edge 3, Wi-Fi 2 Tx	0.400	0.113	1.030		1.543
Edge 4, Wi-Fi 1 Tx	0.114	1.099		0.0089	1.222
Edge 4, Wi-Fi 2 Tx	0.114	0.537	0.094		0.745

1. As there were only estimated values for edge 2 it was not assessed as it is inherently compliant
2. Values shaded green are estimated SAR

#### Conclusion:

Simultaneous transmission SAR measurement (Volume Scan) is not required because either sum of the 1-g SAR is < 1.6 W/kg or the SPLSR is < 0.04 for all circumstances that require SPLSR calculation.

### 13.13. Sum of the SAR for CDMA BC0 & Wi-Fi 5.8 GHz Band

Test Position	Data					Σ 1-g SAR (mW/g)
	CDMA BC0 1xRTT	CDMA BC0 1xEVDO	WiFi 5.8 GHz Main	WiFi 5.8 GHz Aux	Bluetooth	
Rear, Wi-Fi 1 Tx	0.385		0.090		0.165	0.640
		0.460	0.090		0.165	0.715
Rear, Wi-Fi 2 Tx	0.385		0.090	0.148		0.623
		0.460	0.090	0.148		0.698
Edge 1, Wi-Fi 1 Tx	1.076		0.038		0.017	1.131
	1.076			0.205		1.281
		1.052	0.038		0.017	1.107
		1.052		0.205		1.257
Edge 1, Wi-Fi 2 Tx	1.076		0.038	0.102		1.216
		1.052	0.038	0.102		1.192
Edge 3, Wi-Fi 2 Tx	0.400		0.102	0.754		1.256
		0.400	0.102	0.754		1.256
Edge 4, Wi-Fi 1 Tx	0.165		0.414		0.0089	0.588
		0.184	0.414		0.0089	0.607
Edge 4, Wi-Fi 2 Tx	0.165		0.215	0.043		0.423
		0.184	0.215	0.043		0.442

1. As there were only estimated values for edge 2 it was not assessed as it is inherently compliant
2. Values shaded green are estimated SAR

#### Conclusion:

Simultaneous transmission SAR measurement (Volume Scan) is not required because either sum of the 1-g SAR is < 1.6 W/kg or the SPLSR is < 0.04 for all circumstances that require SPLSR calculation.

### 13.14. Sum of the SAR for CDMA BC1 & Wi-Fi 5.8 GHz Band

Test Position	Data					Σ 1-g SAR (mW/g)
	CDMA BC1 1xRTT	CDMA BC1 1xEVDO	WiFi 5.8 GHz Main	WiFi 5.8 GHz Aux	Bluetooth	
Rear, Wi-Fi 1 Tx	0.521		0.090		0.165	0.776
		0.509	0.090		0.165	0.764
Rear, Wi-Fi 2 Tx	0.521		0.090	0.148		0.759
		0.509	0.090	0.148		0.747
Edge 1, Wi-Fi 1 Tx	1.195		0.038		0.017	1.250
	1.195			0.205		1.400
		0.719	0.038		0.017	0.774
		0.719		0.205		0.924
Edge 1, Wi-Fi 2 Tx	1.195		0.038	0.102		1.335
		0.719	0.038	0.102		0.859
Edge 3, Wi-Fi 2 Tx	0.400		0.102	0.754		1.256
		0.400	0.102	0.754		1.256
Edge 4, Wi-Fi 1 Tx	0.394		0.414		0.0089	0.817
		0.386	0.414		0.0089	0.809
Edge 4, Wi-Fi 2 Tx	0.394		0.215	0.043		0.652
		0.386	0.215	0.043		0.644

1. As there were only estimated values for edge 2 it was not assessed as it is inherently compliant
2. Values shaded green are estimated SAR

**Conclusion:**

Simultaneous transmission SAR measurement (Volume Scan) is not required because either sum of the 1-g SAR is < 1.6 W/kg or the SPLSR is < 0.04 for all circumstances that require SPLSR calculation.

### 13.15. Sum of the for SAR LTE & Wi-Fi 5.8 GHz Band

Test Position	Data				Σ 1-g SAR (mW/g)
	LTE Band 13	WiFi 5.8 GHz Main	WiFi 5.8 GHz Aux	Bluetooth	
Rear, Wi-Fi 1 Tx	0.524	0.090		0.165	0.779
Rear, Wi-Fi 2 Tx	0.524	0.090	0.148		0.762
Edge 1, Wi-Fi 1 Tx	1.280	0.038		0.017	1.335
	1.280		0.205		1.485
Edge 1, Wi-Fi 2 Tx	1.280	0.038	0.102		1.420
Edge 3, Wi-Fi 2 Tx	0.400	0.102	0.754		1.256
Edge 4, Wi-Fi 1 Tx	0.114	0.414		0.0089	0.537
Edge 4, Wi-Fi 2 Tx	0.114	0.215	0.043		0.372

1. As there were only estimated values for edge 2 it was not assessed as it is inherently compliant
2. Values shaded green are estimated SAR

**Conclusion:**

Simultaneous transmission SAR measurement (Volume Scan) is not required because either sum of the 1-g SAR is < 1.6 W/kg or the SPLSR is < 0.04 for all circumstances that require SPLSR calculation.

## **14. Appendixes**

**Refer to separated files for the following appendixes.**

- 14.1. System Performance Check Plots**
- 14.2. SAR Test Plots for CDMA BC0**
- 14.3. SAR Test Plots for CDMA BC1**
- 14.4. SAR Test Plots for LTE Band 13**
- 14.5. SAR Test Plots for Wi-Fi 2.4 GHz and 5 GHz Bands**
- 14.6. SAR Test Plots for Repeated Test**
- 14.7. Calibration Certificate for E-Field Probe EX3DV4 - SN 3686**
- 14.8. Calibration Certificate for E-Field Probe EX3DV4 - SN 3749**
- 14.9. Calibration Certificate for E-Field Probe EX3DV4 - SN 3871**
- 14.10. Calibration Certificate for E-Field Probe EX3DV4 - SN 3885**
- 14.11. Calibration Certificate for E-Field Probe EX3DV4 - SN 3751**
- 14.12. Calibration Certificate for D750V3 - SN 1019 (2-9-2012)**
- 14.13. Calibration Certificate for D750V3 - SN 1071**
- 14.14. Calibration Certificate for D835V2 - SN 4d117**
- 14.15. Calibration Certificate for D1900V2 - SN 5d140**
- 14.16. Calibration Certificate for D1900V2 - SN 5d043**
- 14.17. Calibration Certificate for D2450V2 - SN 706**
- 14.18. Calibration Certificate for D5GHV2 - SN 1003**
- 14.19. Calibration Certificate for D750V3 - SN 1019 (3-5-2013)**