



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

SAR EVALUATION REPORT

For
Cell/PCS GSM/EDGE/WCDMA/CDMA and 700MHz LTE Modem

**Model: WW12D
FCC ID: ACJ9TGWW12D**

**Report Number: 12J14609-1
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--	11/30/2012	Initial Issue	--

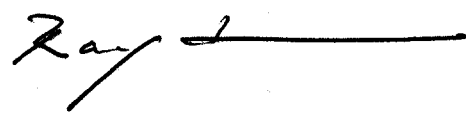
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1. Attestation of Test Results

Applicant	Panasonic Corporation of North America		
DUT description	Cell/PCS GSM/EDGE/WCDMA/CDMA and 700MHz LTE Modem		
Model	WW12D		
Test device is	An identical prototype		
Device category	Portable		
Exposure category	General Population/Uncontrolled Exposure		
Date tested	9/25/2012 – 11/8/2012		
FCC Rule Parts	Freq. Range	Highest 1-g SAR	Limit
22	824-849 MHz	1.26 W/kg (Body Edge 1 w/ 0 mm distance)	1.6 W/kg
24	1850-1910 MHz	1.30 W/kg (Body Edge 1 w/ 0 mm distance)	
27 (LTE Band 13)	777-787 MHz	1.05 W/kg (Body Edge 1 w/ 0 mm distance)	
Simultaneous Transmission Condition:		1.59 W/kg (The highest SAR across exposure conditions)	
Applicable Standards			Test Results
- FCC OET Bulletin 65 Supplement C 01-01, - IEEE Std 1528-2003 and IEEE Std 1528a-2005			Pass
UL CCS tested the above equipment in accordance with the requirements set forth in the above standards. All indications of Pass/Fail in this report are opinions expressed by UL CCS based on interpretations and/or observations of test results. Measurement Uncertainties were not taken into account and are published for informational purposes only. The test results show that the equipment tested is capable of demonstrating compliance with the requirements as documented in this report. Note: The results documented in this report apply only to the tested sample, under the conditions and modes of operation as described herein. This document may not be altered or revised in any way unless done so by UL CCS and all revisions are duly noted in the revisions section. Any alteration of this document not carried out by UL CCS will constitute fraud and shall nullify the document. This report must not be used by the client to claim product certification, approval, or endorsement by NVLAP, NIST, any agency of the Federal Government, or any agency of any government (NIST Handbook 150, Annex A). This report is written to support regulatory compliance of the applicable standards stated above.			
Approved & Released For UL CCS By:		Tested By:	
			
Dave Weaver Program Manager UL CCS		Ray Su SAR Engineer UL CCS	

2. Test Methodology

The tests documented in this report were performed in accordance with FCC OET Bulletin 65 Supplement C Edition 01-01, IEEE STD 1528-2003, IEEE Std 1528a-2005 and the following KDB Procedures:

- 447498 D01 General RF Exposure Guidance v05
- 865664 D01 SAR measurement 100 MHz to 6 GHz v01
- 616217 D04 SAR for laptop and tablets v01
- 941225 D01 SAR test for 3G devices v02
- 941225 D05 SAR for LTE Devices v02

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.

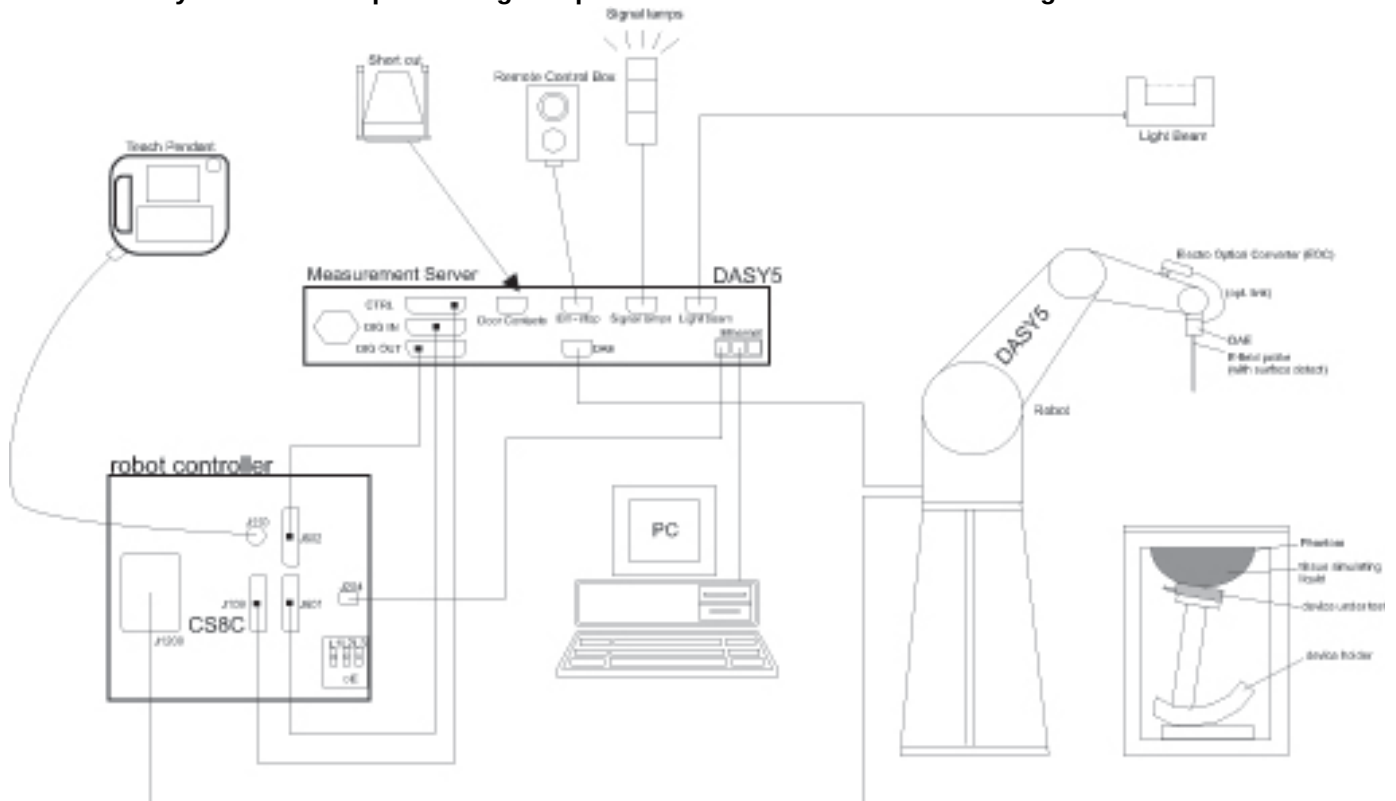
Name of Equipment	Manufacturer	Type/Model	Serial No.	Cal. Due date		
				MM	DD	Year
Dielectronic Probe kit	HP	85070C	N/A	N/A		
Thermometer	ERTCO	639-1S	8350	7	30	2013
Base Station Simulator	Agilent	8960	GB46160222	6	20	2013
Base Station Simulator	R & S	CMU200	106301	6	6	2013
Base Station Simulator	R & S	CMW500	10-300233773	12	14	2012
ESA Series Network Analyzer	Agilent	E5071B	MY42100131	2	11	2013
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		
E-Field Probe	SPEAG	EX3DV4	3749	1	27	2013
E-Field Probe	SPEAG	EX3DV4	3772	2	16	2013
E-Field Probe	SPEAG	EX3DV4	3773	3	14	2013
Data Acquisition Electronics	SPEAG	DAE3	500	6	13	2013
Data Acquisition Electronics	SPEAG	DAE4	1258	3	8	2013
Data Acquisition Electronics	SPEAG	DAE4	1239	6	6	2013
System Validation Dipole	SPEAG	D750V3	1024	4	4	2013
System Validation Dipole	SPEAG	D835V2	4d117	4	10	2013
System Validation Dipole	SPEAG	D1900V2	5d140	4	18	2013

4.2. Measurement Uncertainty

Measurement uncertainty for 300 MHz to 3 GHz averaged over 1 gram					
Component	Error, %	Distribution	Divisor	Sensitivity	U (X), %
Measurement System					
Probe Calibration (k=1)	6.00	Normal	1	1	6.00
Axial Isotropy	1.15	Rectangular	1.732	0.7071	0.47
Hemispherical Isotropy	2.30	Rectangular	1.732	0.7071	0.94
Boundary Effect	0.90	Rectangular	1.732	1	0.52
Probe Linearity	3.45	Rectangular	1.732	1	1.99
System Detection Limits	1.00	Rectangular	1.732	1	0.58
Readout Electronics	0.30	Normal	1	1	0.30
Response Time	0.80	Rectangular	1.732	1	0.46
Integration Time	2.60	Rectangular	1.732	1	1.50
RF Ambient Conditions - Noise	3.00	Rectangular	1.732	1	1.73
RF Ambient Conditions - Reflections	3.00	Rectangular	1.732	1	1.73
Probe Positioner Mechanical Tolerance	0.40	Rectangular	1.732	1	0.23
Probe Positioning with respect to Phantom	2.90	Rectangular	1.732	1	1.67
Extrapolation, Interpolation and Integration	1.00	Rectangular	1.732	1	0.58
Test Sample Related					
Test Sample Positioning	2.90	Normal	1	1	2.90
Device Holder Uncertainty	3.60	Normal	1	1	3.60
Output Power Variation - SAR Drift	5.00	Rectangular	1.732	1	2.89
Phantom and Tissue Parameters					
Phantom Uncertainty (shape and thickness)	4.00	Rectangular	1.732	1	2.31
Liquid Conductivity - deviation from target	5.00	Rectangular	1.732	0.64	1.85
Liquid Conductivity - measurement	4.90	Normal	1	0.64	3.14
Liquid Permittivity - deviation from target	5.00	Rectangular	1.732	0.6	1.73
Liquid Permittivity - measurement uncertainty	-3.71	Normal	1	0.6	-2.23
Combined Standard Uncertainty Uc(y) =					10.47
Expanded Uncertainty U, Coverage Factor = 2, > 95 % Confidence =				20.94 %	
Expanded Uncertainty U, Coverage Factor = 2, > 95 % Confidence =				1.65 dB	

5. Measurement System Description and Setup

The DASY5 system used for performing compliance tests consists of the following items:



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	$\frac{1}{2} \cdot \delta \cdot \ln(2) \pm 0.5$ mm
Maximum probe angle from probe axis to phantom surface normal at the measurement location	$30^\circ \pm 1^\circ$	$20^\circ \pm 1^\circ$
Maximum area scan spatial resolution: Δx_{Area} , Δy_{Area}	≤ 2 GHz: ≤ 15 mm $2 - 3$ GHz: ≤ 12 mm	$3 - 4$ GHz: ≤ 12 mm $4 - 6$ GHz: ≤ 10 mm
	When the x or y dimension of the test device, in the measurement plane orientation, is smaller than the above, the measurement resolution must be $\leq$ 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)

			≤ 3 GHz	> 3 GHz
Maximum zoom scan spatial resolution: $\Delta x_{\text{Zoom}}, \Delta y_{\text{Zoom}}$			≤ 2 GHz: ≤ 8 mm 2 – 3 GHz: ≤ 5 mm*	3 – 4 GHz: ≤ 5 mm* 4 – 6 GHz: ≤ 4 mm*
Maximum zoom scan spatial resolution, normal to phantom surface	uniform grid: $\Delta z_{\text{Zoom}}(n)$		≤ 5 mm	3 – 4 GHz: ≤ 4 mm 4 – 5 GHz: ≤ 3 mm 5 – 6 GHz: ≤ 2 mm
	graded grid	$\Delta z_{\text{Zoom}}(1)$: between 1 st two points closest to phantom surface	≤ 4 mm	3 – 4 GHz: ≤ 3 mm 4 – 5 GHz: ≤ 2.5 mm 5 – 6 GHz: ≤ 2 mm
		$\Delta z_{\text{Zoom}}(n>1)$: between subsequent points	$\leq 1.5 \cdot \Delta z_{\text{Zoom}}(n-1)$	
Minimum zoom scan volume	x, y, z		≥ 30 mm	3 – 4 GHz: ≥ 28 mm 4 – 5 GHz: ≥ 25 mm 5 – 6 GHz: ≥ 22 mm
Note: δ is the penetration depth of a plane-wave at normal incidence to the tissue medium; see draft standard IEEE P1528-2011 for details.				
* When zoom scan is required and the <i>reported</i> SAR from the area scan based <i>1-g SAR estimation</i> procedures of KDB 447498 is ≤ 1.4 W/kg, ≤ 8 mm, ≤ 7 mm and ≤ 5 mm zoom scan resolution may be applied, respectively, for 2 GHz to 3 GHz, 3 GHz to 4 GHz and 4 GHz to 6 GHz.				

Step 4: Power drift measurement

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

Step 5: Z-Scan (FCC only)

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

6.2. Volume Scan Procedures

Step 1: 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 Model: WW12D	
Operating Configuration(s)	- Laptop Mode - Tablet Mode
Exposure Condition(s)	- The device is used in close proximity to the body. Specific details of the required test positions are provided in Section 8 "Summary of Test Configurations"
Accessory	None

7.1. Band and Air Interfaces

Wireless Mode and Frequency Bands	- CDMA BC 0: 824 - 849 MHz - CDMA BC 1: 1850 - 1910 MHz - LTE Band 13: 777 - 787 MHz - 802.11ab/g/n: 2412 - 2462 MHz, b / g / HT20 5150 - 5250 MHz, a / HT20 5250 - 5350 MHz, a / HT20 5500 - 5700 MHz, a / HT20 5725 - 5850 MHz, a / HT20 - Bluetooth: 2402 - 2480 MHz
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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
		CDMA 1xRTT	BC0	YES	No	No	No	No	YES	No	No
		CDMA 1xRTT	BC1	YES	No	No	No	No	YES	No	No
	WWAN + 5 GHz Bands WLAN	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
		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 + BT	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	No	No	No	No	YES
		CDMA 1xEVDO	BC1	No	YES	No	No	No	No	No	YES
	LTE	LTE	13	No	No	YES	No	No	No	No	YES
		LTE	13	No	No	YES	No	No	No	No	YES
		LTE	13	No	No	YES	No	No	No	No	YES
		LTE	13	No	No	YES	No	No	No	No	YES
	WWAN + 2.4 GHz WLAN + BT	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
		CDMA 1xEVDO	BC1	No	YES	No	YES	No	No	No	YES
	LTE	LTE	13	No	No	YES	YES	No	No	No	YES
		LTE	13	No	No	YES	YES	No	No	No	YES
		LTE	13	No	No	YES	YES	No	No	No	YES
		LTE	13	No	No	YES	YES	No	No	No	YES
	WWAN + 5 GHz WLAN + BT	CDMA 1xRTT	BC0	YES	No	No	No	No	YES	No	YES
		CDMA 1xRTT	BC1	YES	No	No	No	No	YES	No	YES
		CDMA 1xEVDO	BC0	No	YES	No	No	No	YES	No	YES
		CDMA 1xEVDO	BC1	No	YES	No	No	No	YES	No	YES
	LTE	LTE	13	No	No	YES	No	No	YES	No	YES
		LTE	13	No	No	YES	No	No	YES	No	YES
		LTE	13	No	No	YES	No	No	YES	No	YES
		LTE	13	No	No	YES	No	No	YES	No	YES
	WWAN + 2.4 GHz WLAN + BT	CDMA 1xRTT	BC0	YES	No	No	YES	YES	No	No	No
		CDMA 1xRTT	BC1	YES	No	No	YES	YES	No	No	No
		CDMA 1xEVDO	BC0	No	YES	No	YES	YES	No	No	No
		CDMA 1xEVDO	BC1	No	YES	No	YES	YES	No	No	No
	LTE	LTE	13	No	No	YES	YES	YES	No	No	No
		LTE	13	No	No	YES	YES	YES	No	No	No
		LTE	13	No	No	YES	YES	YES	No	No	No
		LTE	13	No	No	YES	YES	YES	No	No	No
	WWAN + 5 GHz WLAN + BT	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	LTE	13	No	No	YES	No	No	YES	YES	No
		LTE	13	No	No	YES	No	No	YES	YES	No
		LTE	13	No	No	YES	No	No	YES	YES	No
		LTE	13	No	No	YES	No	No	YES	YES	No

Notes:

- Bluetooth transmits using the WLAN Aux Antenna
- Bluetooth can transmit simultaneously with the WLAN Main Antenna, in either of the WLAN bands.
- 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.
- With a maximum output power of 4.47 mW, 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.

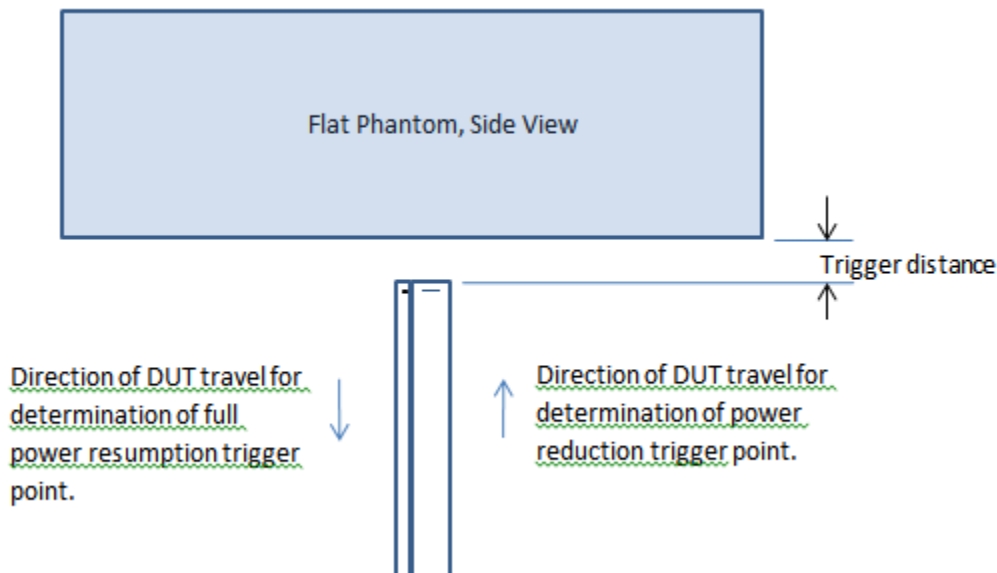
7.4. LTE Parameters

#	Description	Information																																												
A	List the frequency range and channel bandwidths used in each LTE band; 1.4, 3, 5, 10, 15, 20 MHz, etc.	Band 13																																												
		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	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: - Tablet Mode, with Proximity Sensor disabled (Full Power) - Rear and Left-edge of the DUT at 0 mm from the phantom, and Top-edge of the DUT at 16 mm from the flat phantom - Tablet Mode, with Proximity Sensor enabled (Reduced Power) - Top-edge of the DUT at 0 mm from the phantom																																												
E	Identify if Maximum Power Reduction (MPR) is implemented as an optional or permanent feature, i.e., built-in by design: 1. 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. 2. 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. 3. A-MPR (additional MPR) must be disabled during SAR testing.	As per 3GPP TS 36.101 v11.0.0 (2012-03) Table 6.2.3-1: Maximum Power Reduction (MPR) for Power Class 3																																												
		<table><tr><th rowspan="2">Modulation</th><th colspan="6">Channel bandwidth / Transmission bandwidth (RB)</th><th rowspan="2">MPR (dB)</th></tr><tr><th>1.4 MHz</th><th>3.0 MHz</th><th>5 MHz</th><th>10 MHz</th><th>15 MHz</th><th>20 MHz</th></tr><tr><td>QPSK</td><td>> 5</td><td>> 4</td><td>> 8</td><td>> 12</td><td>> 16</td><td>> 18</td><td>≤ 1</td></tr><tr><td>16 QAM</td><td>≤ 5</td><td>≤ 4</td><td>≤ 8</td><td>≤ 12</td><td>≤ 16</td><td>≤ 18</td><td>≤ 1</td></tr><tr><td>16 QAM</td><td>> 5</td><td>> 4</td><td>> 8</td><td>> 12</td><td>> 16</td><td>> 18</td><td>≤ 2</td></tr></table>							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																																							
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.																																														

#	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.

7.6. 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.



Proximity sensor trigger distance assessment (Edge 4) KDB 616217 §6.2

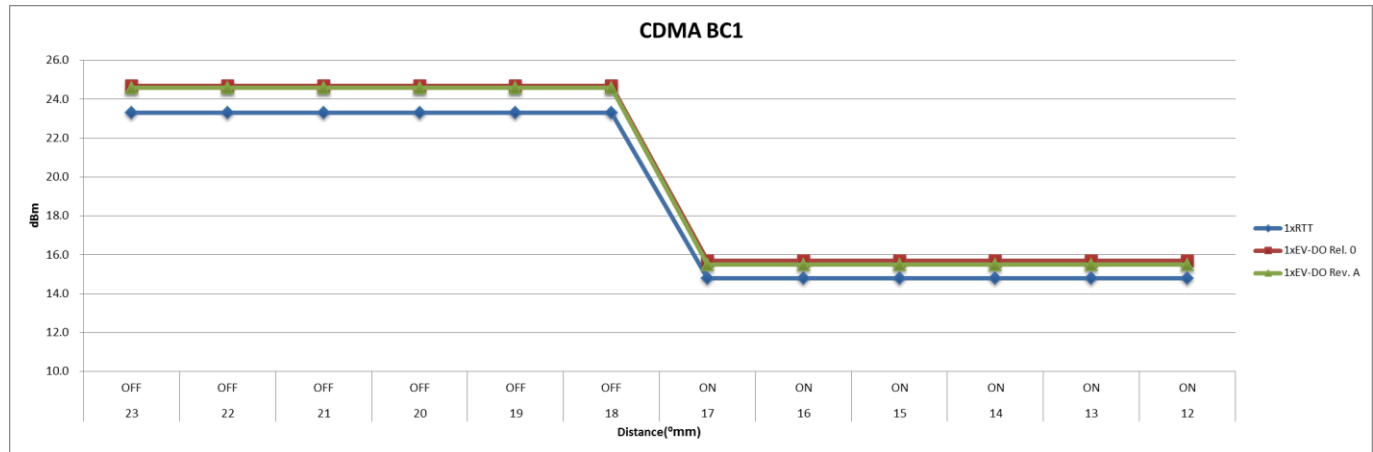
Summary of triggering distances.

Tissue simulating liquid	Trigger distance - edge 1	
	Moving toward phantom	Moving from phantom
850 muscle	19mm	25mm
1750 muscle	19mm	24mm
1900 muscle	17mm	24mm

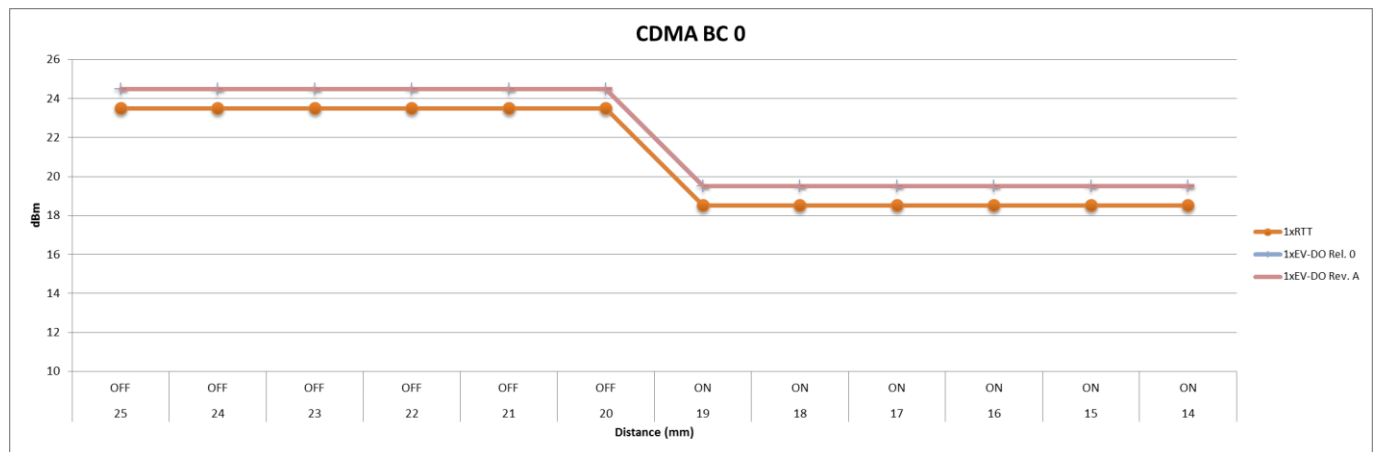
7.7. Triggering distances and power levels

7.7.1. DUT moving toward the phantom

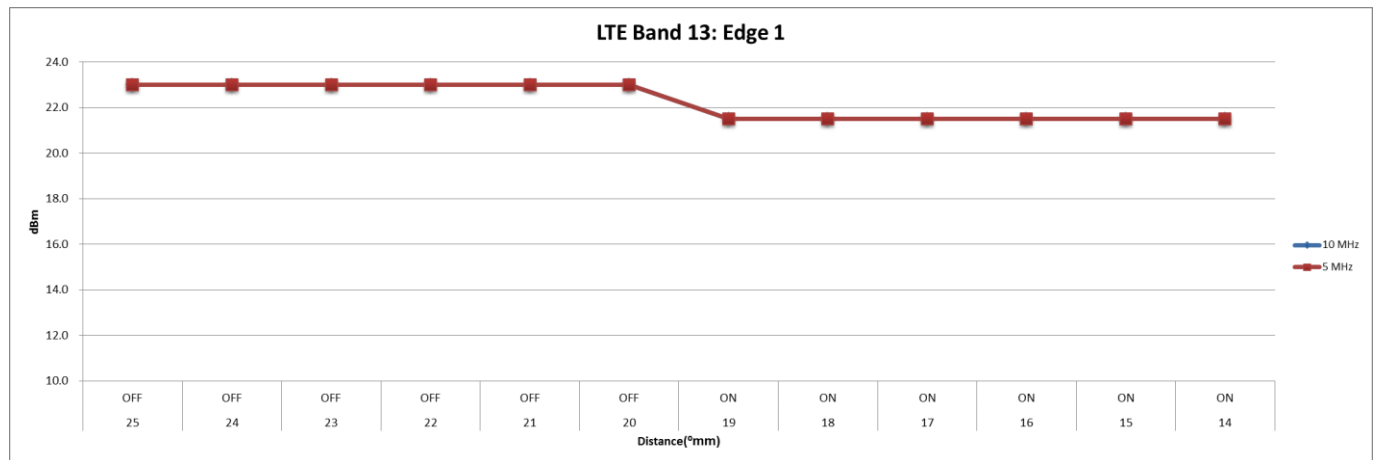
Edge 1, CDMA BC 1												
Distance (mm):	23	22	21	20	19	18	17	16	15	14	13	12
Proximity sensor with reduced power activation:	OFF	OFF	OFF	OFF	OFF	OFF	ON	ON	ON	ON	ON	ON
1xRTT	23.3	23.3	23.3	23.3	23.3	23.3	14.8	14.8	14.8	14.8	14.8	14.8
1xEV-DO Rel. 0	24.7	24.7	24.7	24.7	24.7	24.7	15.7	15.7	15.7	15.7	15.7	15.7
1xEV-DO Rev. A	24.6	24.6	24.6	24.6	24.6	24.6	15.5	15.5	15.5	15.5	15.5	15.5



Edge 1, CDMA BC 0												
Distance (mm):	25	24	23	22	21	20	19	18	17	16	15	14
Proximity sensor with reduced power activation:	OFF	OFF	OFF	OFF	OFF	OFF	ON	ON	ON	ON	ON	ON
1xRTT	23.5	23.5	23.5	23.5	23.5	23.5	18.5	18.5	18.5	18.5	18.5	18.5
1xEV-DO Rel. 0	24.5	24.5	24.5	24.5	24.5	24.5	19.5	19.5	19.5	19.5	19.5	19.5
1xEV-DO Rev. A	24.5	24.5	24.5	24.5	24.5	24.5	19.5	19.5	19.5	19.5	19.5	19.5

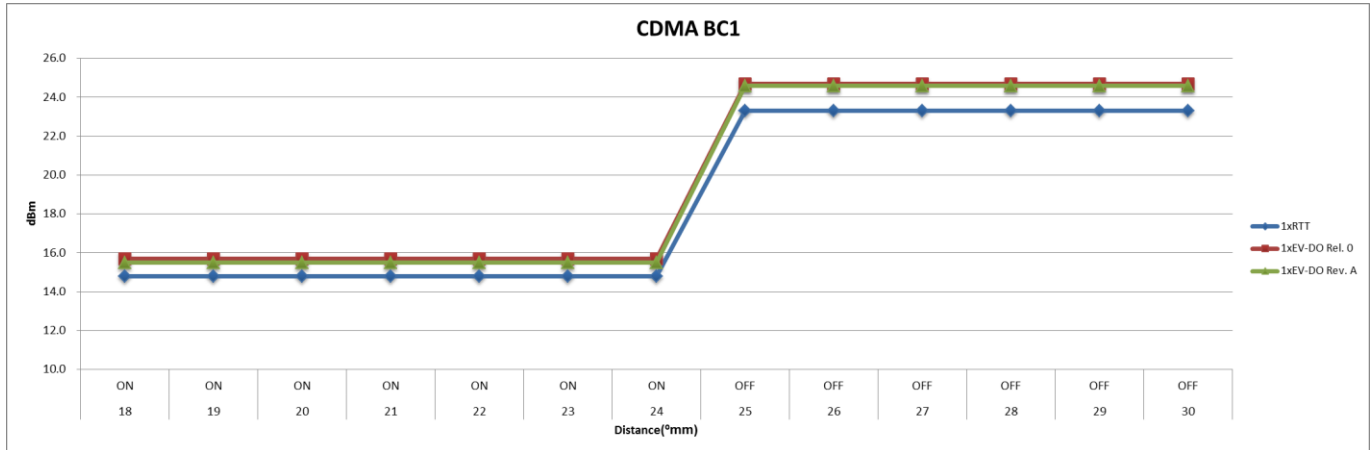


Edge 1, LTE Band 13												
Distance (mm):	25	24	23	22	21	20	19	18	17	16	15	14
Proximity sensor with reduced power activation:	OFF	OFF	OFF	OFF	OFF	OFF	ON	ON	ON	ON	ON	ON
10 MHz	23.0	23.0	23.0	23.0	23.0	23.0	21.5	21.5	21.5	21.5	21.5	21.5
5 MHz	23.0	23.0	23.0	23.0	23.0	23.0	21.5	21.5	21.5	21.5	21.5	21.5

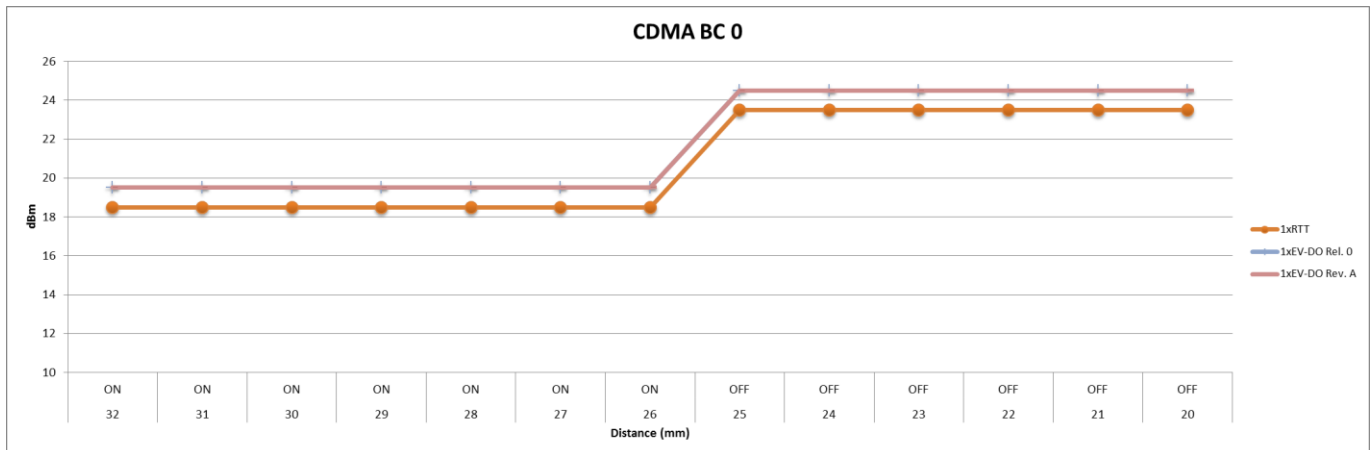


7.7.2. DUT moving away from the phantom

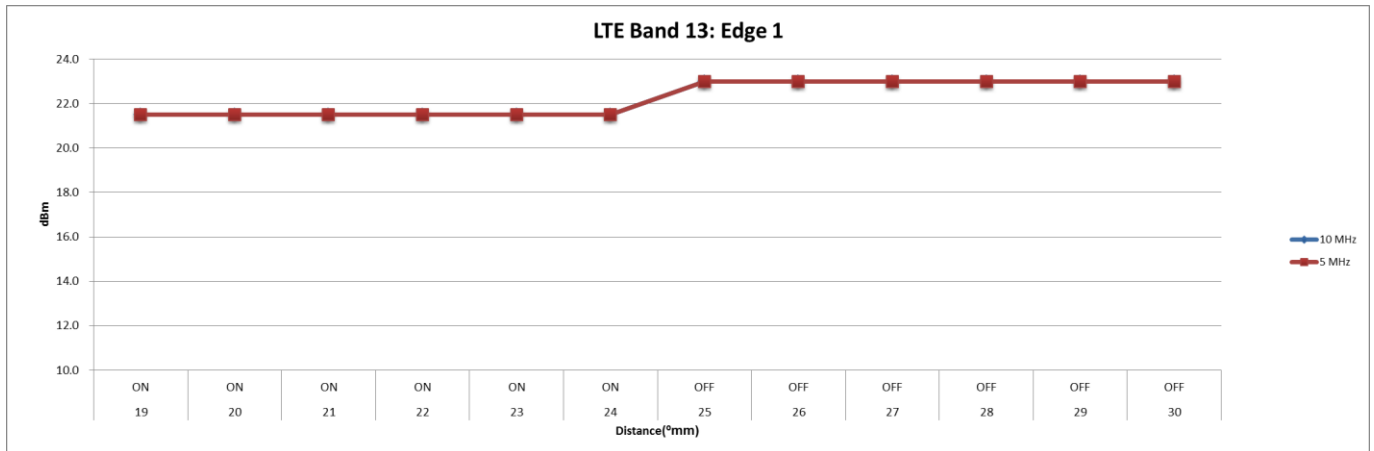
Edge 1, CDMA BC 1													
Distance (mm):	18	19	20	21	22	23	24	25	26	27	28	29	30
Proximity sensor with reduced power activation:	ON	ON	ON	ON	ON	ON	ON	OFF	OFF	OFF	OFF	OFF	OFF
1xRTT	14.8	14.8	14.8	14.8	14.8	14.8	14.8	23.3	23.3	23.3	23.3	23.3	23.3
1xEV-DO Rel. 0	15.7	15.7	15.7	15.7	15.7	15.7	15.7	24.7	24.7	24.7	24.7	24.7	24.7
1xEV-DO Rev. A	15.5	15.5	15.5	15.5	15.5	15.5	15.5	24.6	24.6	24.6	24.6	24.6	24.6



Edge 1 (CDMA BC 0)													
Distance (mm):	32	31	30	29	28	27	26	25	24	23	22	21	20
Proximity sensor with reduced power activation:	ON	ON	ON	ON	ON	ON	ON	OFF	OFF	OFF	OFF	OFF	OFF
1xRTT	18.5	18.5	18.5	18.5	18.5	18.5	18.5	23.5	23.5	23.5	23.5	23.5	23.5
1xEV-DO Rel. 0	19.5	19.5	19.5	19.5	19.5	19.5	19.5	24.5	24.5	24.5	24.5	24.5	24.5
1xEV-DO Rev. A	19.5	19.5	19.5	19.5	19.5	19.5	19.5	24.5	24.5	24.5	24.5	24.5	24.5



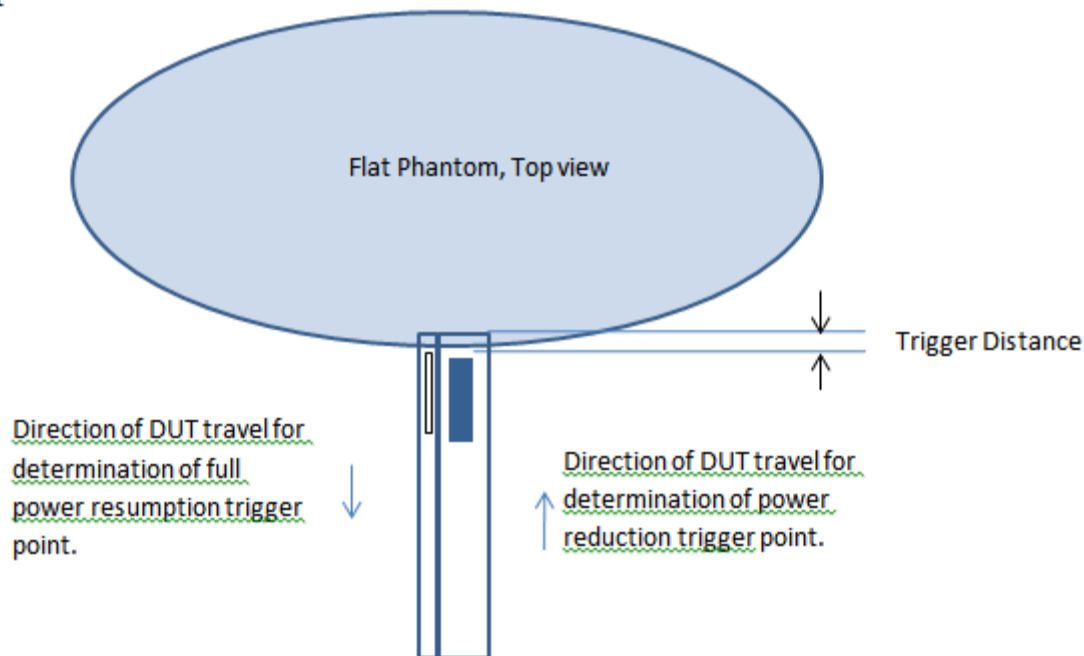
Edge 1, LTE Band 13													
Distance (mm):	19	20	21	22	23	24	25	26	27	28	29	30	
Proximity sensor with reduced power activation:	ON	ON	ON	ON	ON	ON	OFF	OFF	OFF	OFF	OFF	OFF	
10 MHz	21.5	21.5	21.5	21.5	21.5	21.5	23.0	23.0	23.0	23.0	23.0	23.0	
5 MHz	21.5	21.5	21.5	21.5	21.5	21.5	23.0	23.0	23.0	23.0	23.0	23.0	



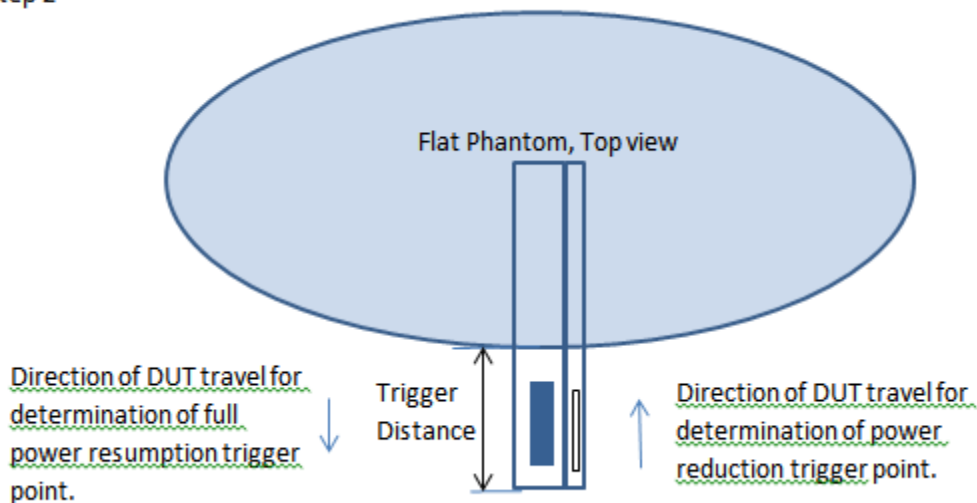
7.8. Proximity Sensor Coverage (KDB 616217 §6.3)

The DUT was positioned at a distance less than 17mm (smallest measured trigger distance) below the phantom. The DUT was held perpendicular to the phantom with edge 4 parallel to the phantom's bottom surface. From a starting position with the DUT >20mm laterally outside the phantom the DUT was moved horizontally toward the phantom as described in KDB 616217 §6.3 to determine the coverage trigger distance. The process was repeated with the DUT positioned directly below the phantom and then moved horizontally away from the phantom. Each edge and face adjacent to edge 1 of the DUT was assessed.

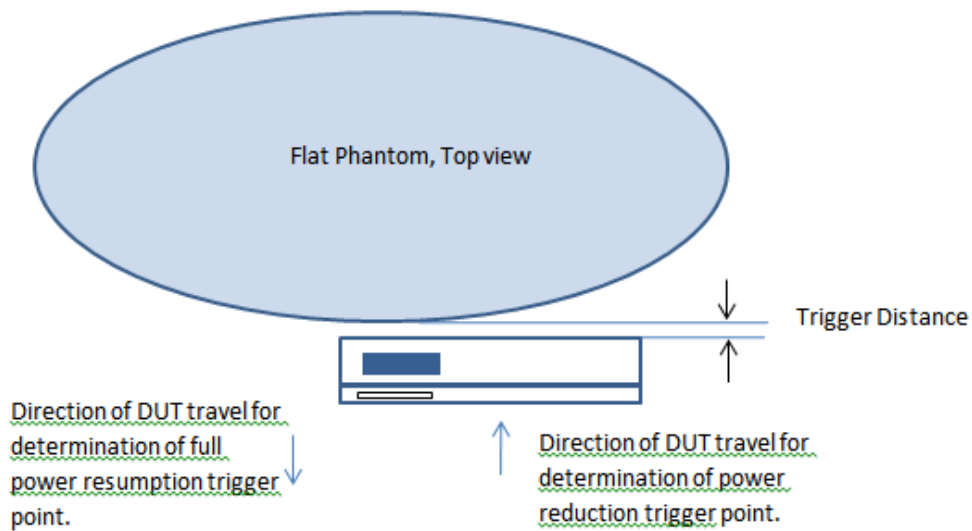
Step 1



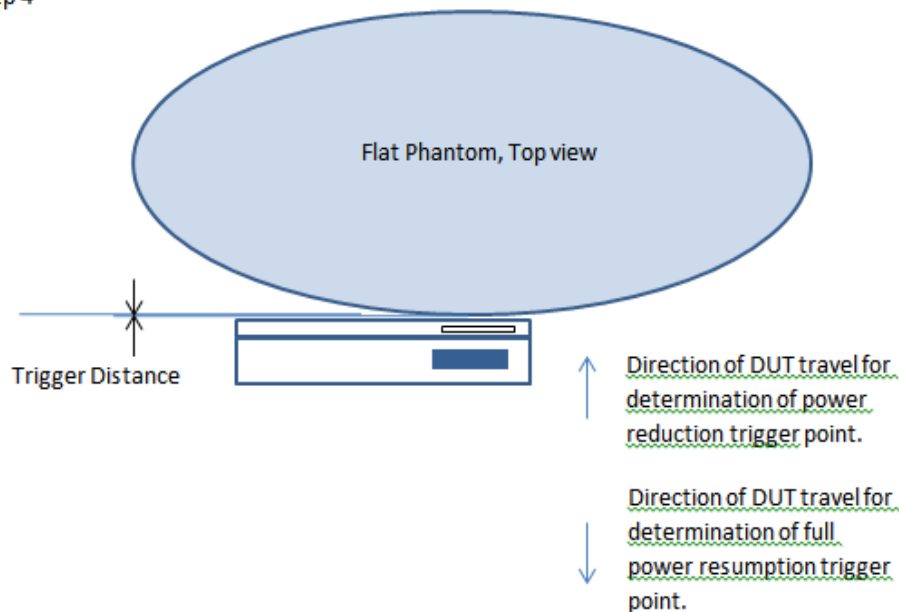
Step 2



Step 3



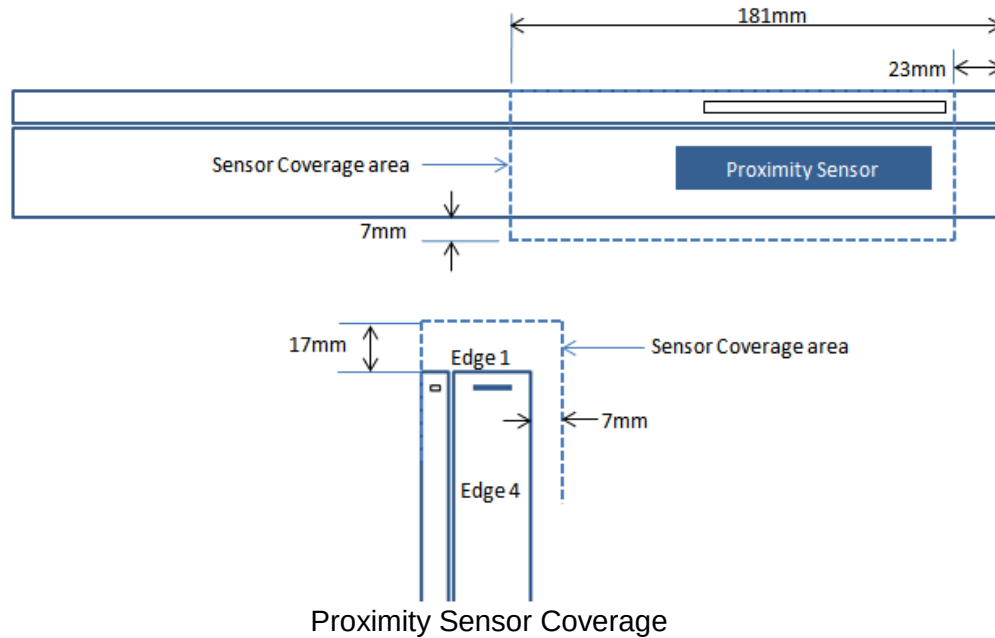
Step 4



Summary of proximity sensor coverage distances.

Tissue simulating liquid	Trigger distance Step 1		Trigger distance Step 2		Trigger distance Step 3		Trigger distance Step 4	
	Moving toward phantom	Moving from phantom	Moving toward phantom	Moving from phantom	Moving toward phantom	Moving from phantom	Moving toward phantom	Moving from phantom
750 muscle	-19mm	-15mm	181mm	189mm	7mm	8mm	0mm	4mm
850 muscle	-19mm	-15mm	181mm	189mm	7mm	8mm	0mm	4mm
1900 muscle	-23mm	-17mm	190mm	195mm	10mm	12mm	0mm	3mm

Note - A negative distance indicates that the DUT's edge had passed under the edge of the phantom

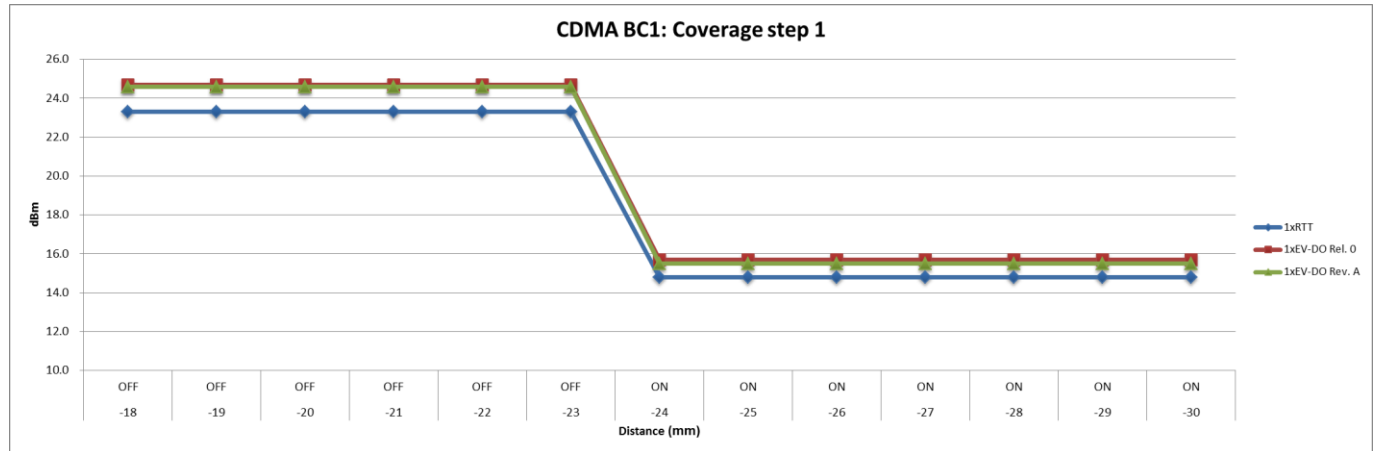


All of the edge 1 WWAN SAR peaks were situated within the boundaries of the proximity sensor coverage area.

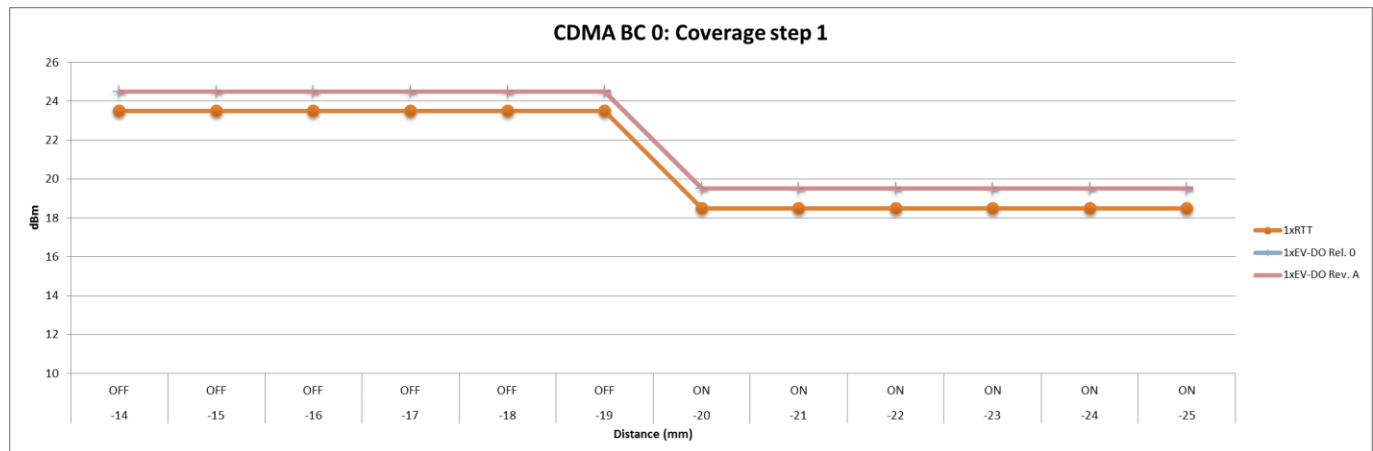
7.9. Proximity Sensor Coverage Measurement Results

7.9.1. DUT Moving Toward the Phantom

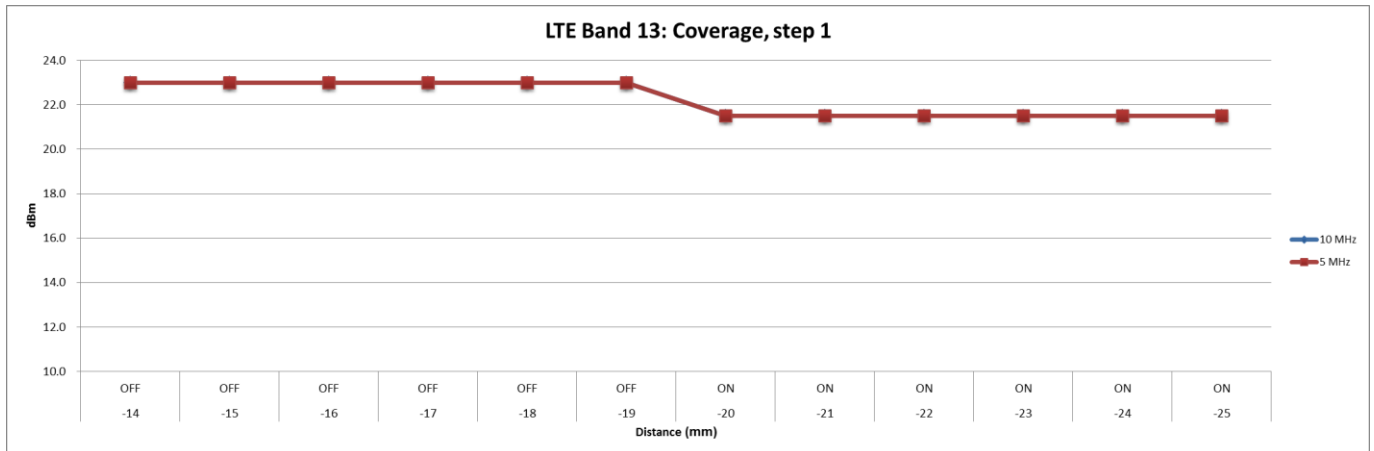
Coverage step 1 CDMA BC 1													
Distance (mm):	-18	-19	-20	-21	-22	-23	-24	-25	-26	-27	-28	-29	-30
Proximity sensor with reduced power activation:	OFF	OFF	OFF	OFF	OFF	OFF	ON	ON	ON	ON	ON	ON	ON
1xRTT	23.3	23.3	23.3	23.3	23.3	23.3	14.8	14.8	14.8	14.8	14.8	14.8	14.8
1xEV-DO Rel. 0	24.7	24.7	24.7	24.7	24.7	24.7	15.7	15.7	15.7	15.7	15.7	15.7	15.7
1xEV-DO Rev. A	24.6	24.6	24.6	24.6	24.6	24.6	15.5	15.5	15.5	15.5	15.5	15.5	15.5



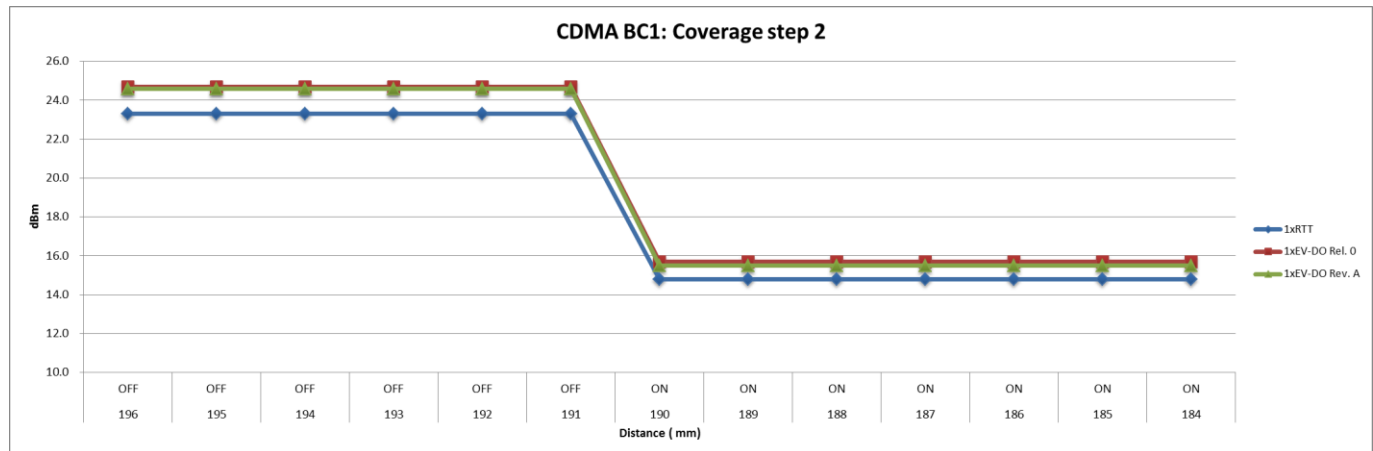
Coverage step 1 CDMA BC 0												
Distance (mm):	-14	-15	-16	-17	-18	-19	-20	-21	-22	-23	-24	-25
Proximity sensor with reduced power activation:	OFF	OFF	OFF	OFF	OFF	OFF	ON	ON	ON	ON	ON	ON
1xRTT	23.5	23.5	23.5	23.5	23.5	23.5	18.5	18.5	18.5	18.5	18.5	18.5
1xEV-DO Rel. 0	24.5	24.5	24.5	24.5	24.5	24.5	19.5	19.5	19.5	19.5	19.5	19.5
1xEV-DO Rev. A	24.5	24.5	24.5	24.5	24.5	24.5	19.5	19.5	19.5	19.5	19.5	19.5



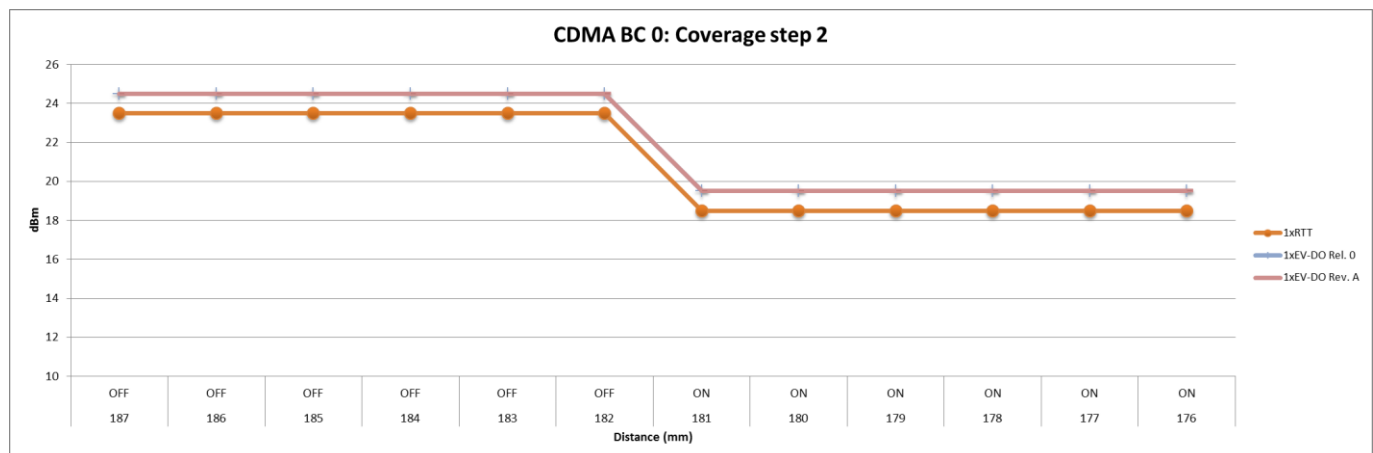
Coverage step 1, LTE Band 13												
Distance (mm):	-14	-15	-16	-17	-18	-19	-20	-21	-22	-23	-24	-25
Proximity sensor with reduced power activation:	OFF	OFF	OFF	OFF	OFF	OFF	ON	ON	ON	ON	ON	ON
10 MHz	23.0	23.0	23.0	23.0	23.0	23.0	21.5	21.5	21.5	21.5	21.5	21.5
5 MHz	23.0	23.0	23.0	23.0	23.0	23.0	21.5	21.5	21.5	21.5	21.5	21.5



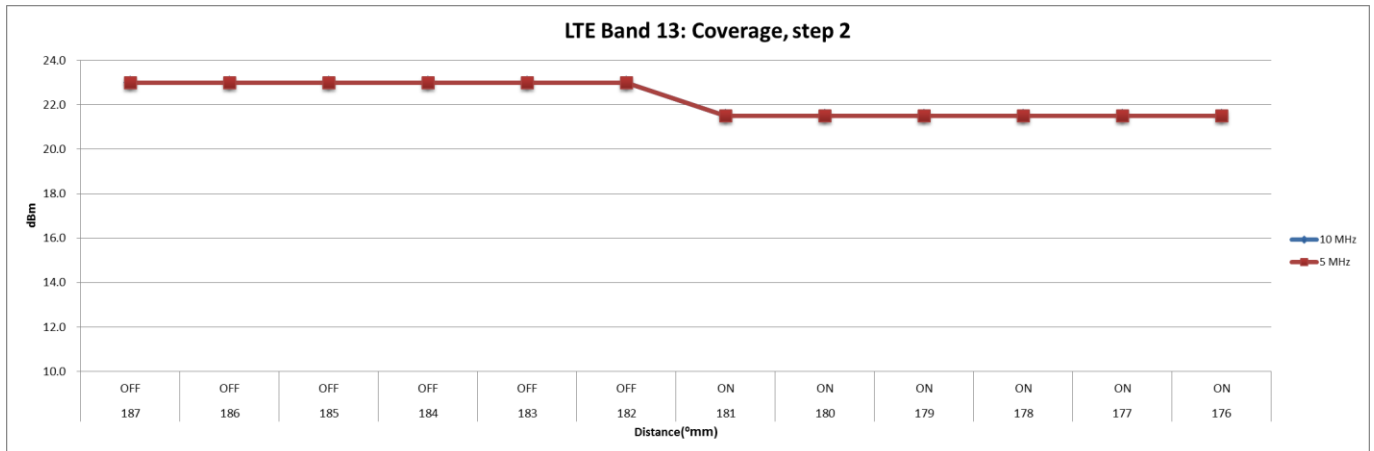
Coverage step 2 CDMA BC 1													
Distance (mm):	196	195	194	193	192	191	190	189	188	187	186	185	184
Proximity sensor with reduced power activation:	OFF	OFF	OFF	OFF	OFF	OFF	ON	ON	ON	ON	ON	ON	ON
1xRTT	23.3	23.3	23.3	23.3	23.3	23.3	14.8	14.8	14.8	14.8	14.8	14.8	14.8
1xEV-DO Rel. 0	24.7	24.7	24.7	24.7	24.7	24.7	15.7	15.7	15.7	15.7	15.7	15.7	15.7
1xEV-DO Rev. A	24.6	24.6	24.6	24.6	24.6	24.6	15.5	15.5	15.5	15.5	15.5	15.5	15.5



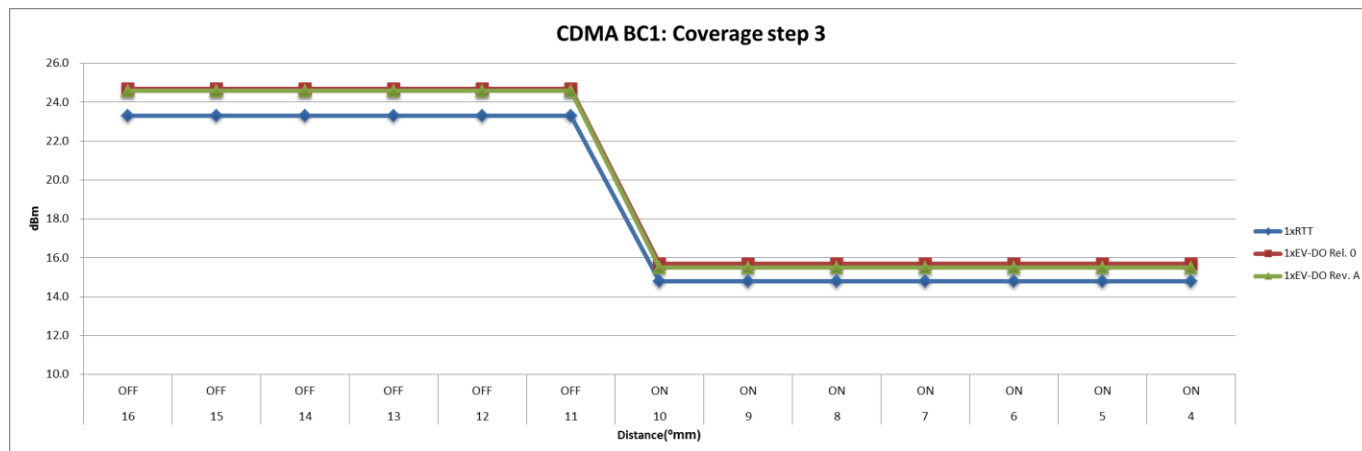
Coverage step 2 CDMA BC 0												
Distance (mm):	187	186	185	184	183	182	181	180	179	178	177	176
Proximity sensor with reduced power activation:	OFF	OFF	OFF	OFF	OFF	OFF	ON	ON	ON	ON	ON	ON
1xRTT	23.5	23.5	23.5	23.5	23.5	23.5	18.5	18.5	18.5	18.5	18.5	18.5
1xEV-DO Rel. 0	24.5	24.5	24.5	24.5	24.5	24.5	19.5	19.5	19.5	19.5	19.5	19.5
1xEV-DO Rev. A	24.5	24.5	24.5	24.5	24.5	24.5	19.5	19.5	19.5	19.5	19.5	19.5



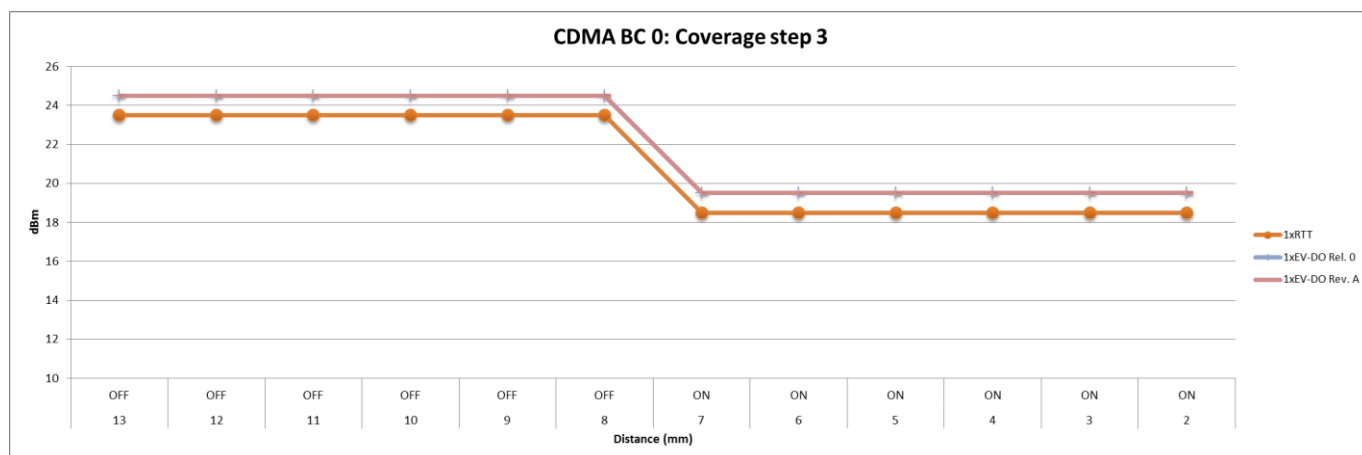
Coverage step 2, LTE Band 13												
Distance (mm):	187	186	185	184	183	182	181	180	179	178	177	176
Proximity sensor with reduced power activation:	OFF	OFF	OFF	OFF	OFF	OFF	ON	ON	ON	ON	ON	ON
10 MHz	23.0	23.0	23.0	23.0	23.0	23.0	21.5	21.5	21.5	21.5	21.5	21.5
5 MHz	23.0	23.0	23.0	23.0	23.0	23.0	21.5	21.5	21.5	21.5	21.5	21.5



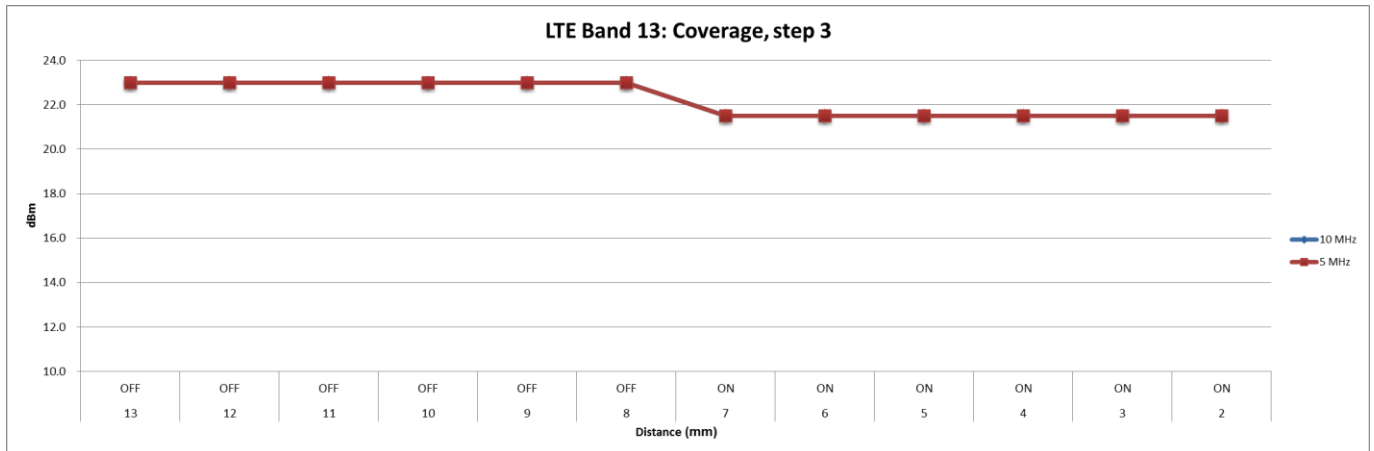
Coverage step 3, CDMA BC 1													
Distance (mm):	16	15	14	13	12	11	10	9	8	7	6	5	4
Proximity sensor with reduced power activation:	OFF	OFF	OFF	OFF	OFF	OFF	ON	ON	ON	ON	ON	ON	ON
1xRTT	23.3	23.3	23.3	23.3	23.3	23.3	14.8	14.8	14.8	14.8	14.8	14.8	14.8
1xEV-DO Rel. 0	24.7	24.7	24.7	24.7	24.7	24.7	15.7	15.7	15.7	15.7	15.7	15.7	15.7
1xEV-DO Rev. A	24.6	24.6	24.6	24.6	24.6	24.6	15.5	15.5	15.5	15.5	15.5	15.5	15.5



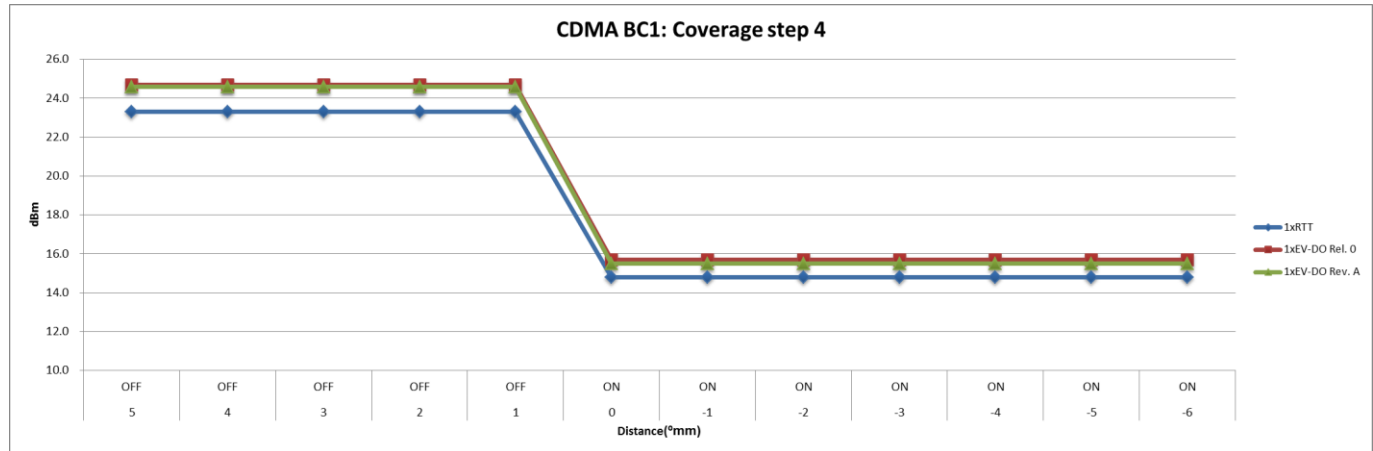
Coverage step 3 CDMA BC 0												
Distance (mm):	13	12	11	10	9	8	7	6	5	4	3	2
Proximity sensor with reduced power activation:	OFF	OFF	OFF	OFF	OFF	OFF	ON	ON	ON	ON	ON	ON
1xRTT	23.5	23.5	23.5	23.5	23.5	23.5	18.5	18.5	18.5	18.5	18.5	18.5
1xEV-DO Rel. 0	24.5	24.5	24.5	24.5	24.5	24.5	19.5	19.5	19.5	19.5	19.5	19.5
1xEV-DO Rev. A	24.5	24.5	24.5	24.5	24.5	24.5	19.5	19.5	19.5	19.5	19.5	19.5



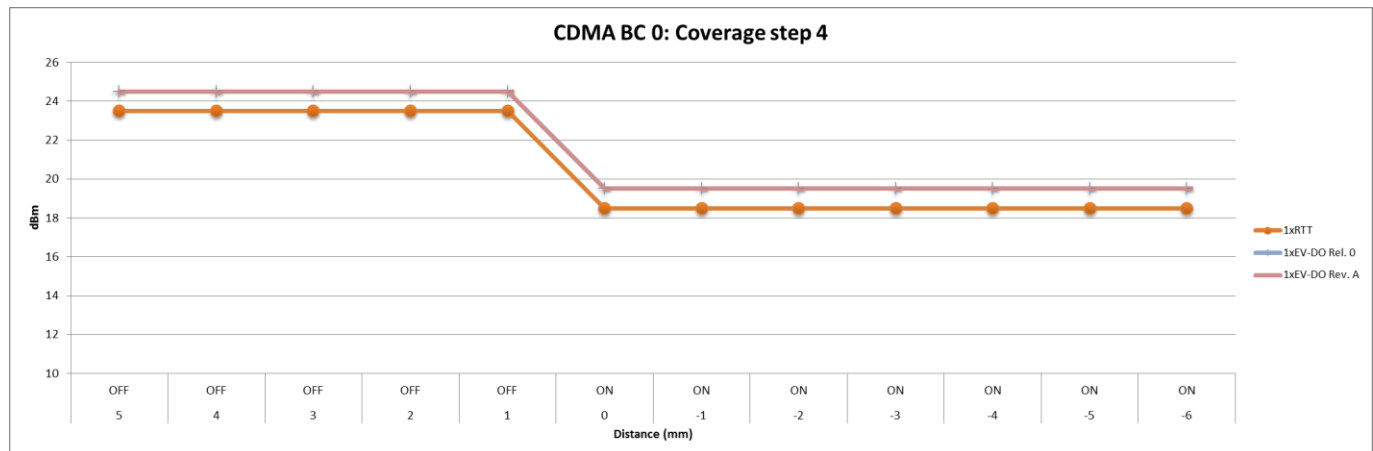
Coverage step 3, LTE Band 13												
Distance (mm):	13	12	11	10	9	8	7	6	5	4	3	2
Proximity sensor with reduced power activation:	OFF	OFF	OFF	OFF	OFF	OFF	ON	ON	ON	ON	ON	ON
10 MHz	23.0	23.0	23.0	23.0	23.0	23.0	21.5	21.5	21.5	21.5	21.5	21.5
5 MHz	23.0	23.0	23.0	23.0	23.0	23.0	21.5	21.5	21.5	21.5	21.5	21.5



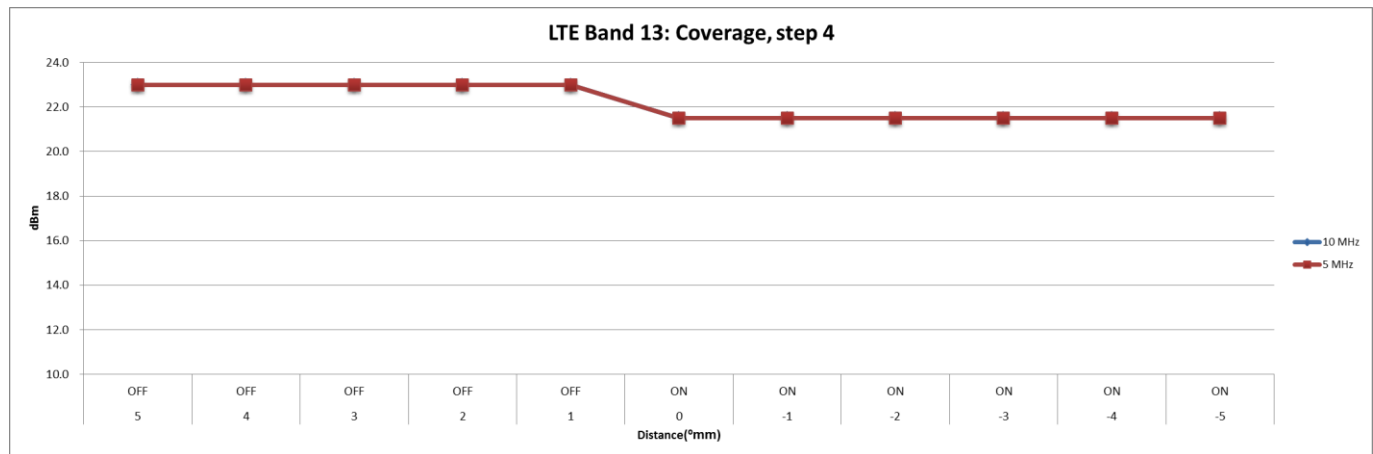
Coverage step 4 CDMA BC 1												
Distance (mm):	5	4	3	2	1	0	-1	-2	-3	-4	-5	-6
Proximity sensor with reduced power activation:	OFF	OFF	OFF	OFF	OFF	ON	ON	ON	ON	ON	ON	ON
1xRTT	23.3	23.3	23.3	23.3	23.3	14.8	14.8	14.8	14.8	14.8	14.8	14.8
1xEV-DO Rel. 0	24.7	24.7	24.7	24.7	24.7	15.7	15.7	15.7	15.7	15.7	15.7	15.7
1xEV-DO Rev. A	24.6	24.6	24.6	24.6	24.6	15.5	15.5	15.5	15.5	15.5	15.5	15.5



Coverage step 4 CDMA BC 0												
Distance (mm):	5	4	3	2	1	0	-1	-2	-3	-4	-5	-6
Proximity sensor with reduced power activation:	OFF	OFF	OFF	OFF	OFF	ON	ON	ON	ON	ON	ON	ON
1xRTT	23.5	23.5	23.5	23.5	23.5	18.5	18.5	18.5	18.5	18.5	18.5	18.5
1xEV-DO Rel. 0	24.5	24.5	24.5	24.5	24.5	19.5	19.5	19.5	19.5	19.5	19.5	19.5
1xEV-DO Rev. A	24.5	24.5	24.5	24.5	24.5	19.5	19.5	19.5	19.5	19.5	19.5	19.5

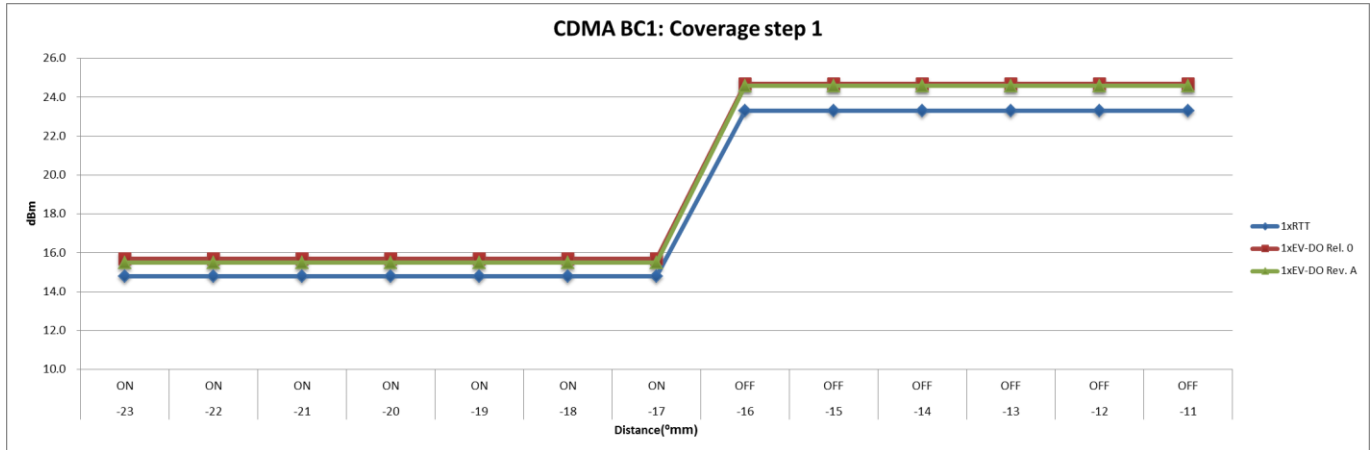


Coverage step 4, LTE Band 13											
Distance (mm):	5	4	3	2	1	0	-1	-2	-3	-4	-5
Proximity sensor with reduced power activation:	OFF	OFF	OFF	OFF	OFF	ON	ON	ON	ON	ON	ON
10 MHz	23.0	23.0	23.0	23.0	23.0	21.5	21.5	21.5	21.5	21.5	21.5
5 MHz	23.0	23.0	23.0	23.0	23.0	21.5	21.5	21.5	21.5	21.5	21.5

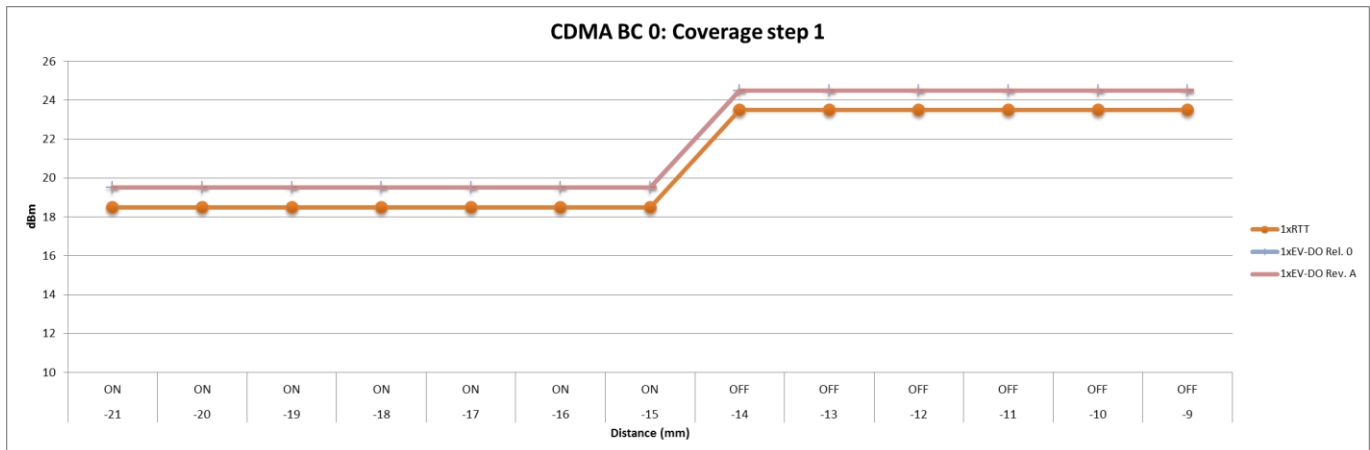


7.9.2. DUT moving away from the Phantom

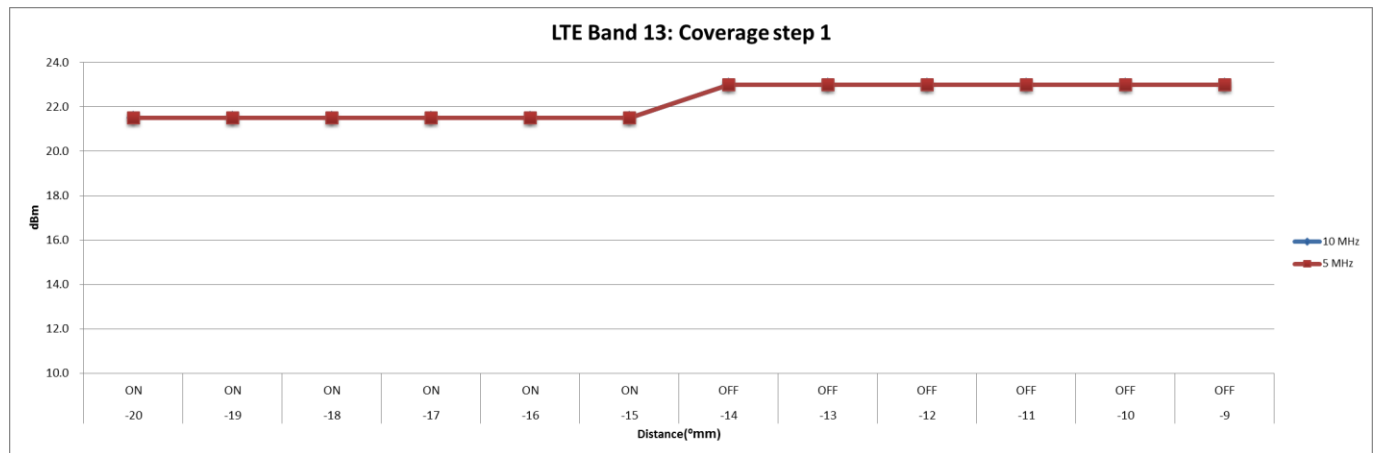
Coverage step 1CDMA BC 1													
Distance (mm):	-23	-22	-21	-20	-19	-18	-17	-16	-15	-14	-13	-12	-11
Proximity sensor with reduced power activation:	ON	ON	ON	ON	ON	ON	ON	OFF	OFF	OFF	OFF	OFF	OFF
1xRTT	14.8	14.8	14.8	14.8	14.8	14.8	14.8	23.3	23.3	23.3	23.3	23.3	23.3
1xEV-DO Rel. 0	15.7	15.7	15.7	15.7	15.7	15.7	15.7	24.7	24.7	24.7	24.7	24.7	24.7
1xEV-DO Rev. A	15.5	15.5	15.5	15.5	15.5	15.5	15.5	24.6	24.6	24.6	24.6	24.6	24.6



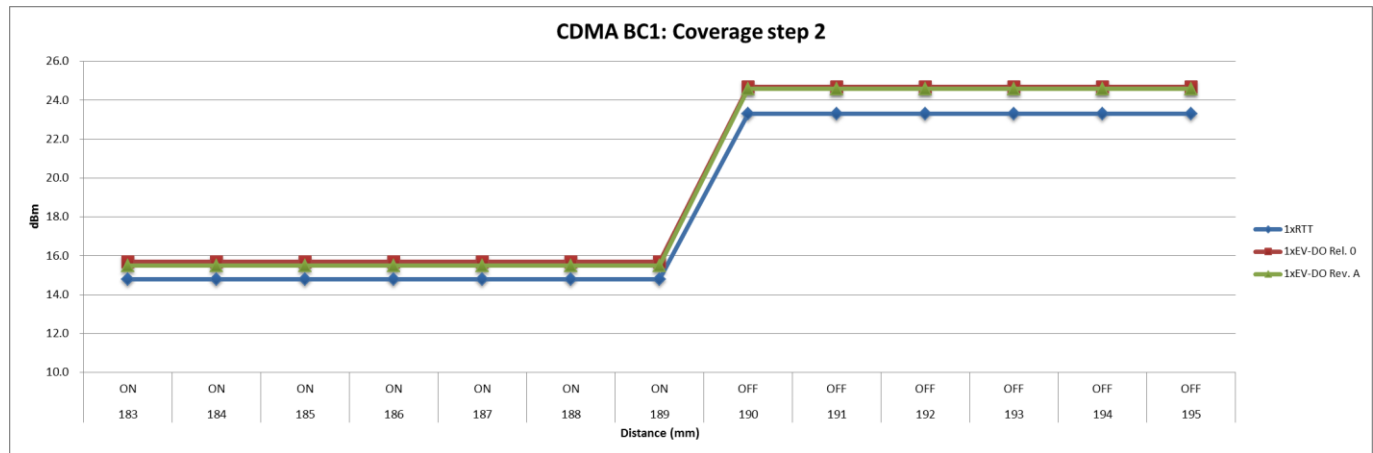
Coverage step 1 (UMTS Band V)													
Distance (mm):	-21	-20	-19	-18	-17	-16	-15	-14	-13	-12	-11	-10	-9
Proximity sensor with reduced power activation:	ON	ON	ON	ON	ON	ON	ON	OFF	OFF	OFF	OFF	OFF	OFF
1xRTT	18.5	18.5	18.5	18.5	18.5	18.5	18.5	23.5	23.5	23.5	23.5	23.5	23.5
1xEV-DO Rel. 0	19.5	19.5	19.5	19.5	19.5	19.5	19.5	24.5	24.5	24.5	24.5	24.5	24.5
1xEV-DO Rev. A	19.5	19.5	19.5	19.5	19.5	19.5	19.5	24.5	24.5	24.5	24.5	24.5	24.5



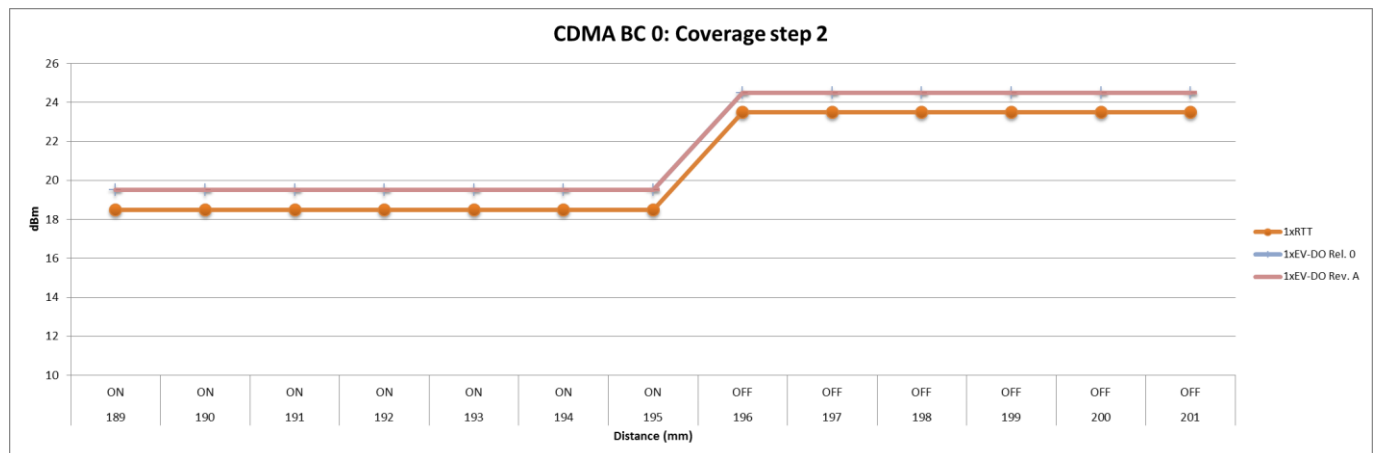
Coverage step 1, LTE Band 13												
Distance (mm):	-20	-19	-18	-17	-16	-15	-14	-13	-12	-11	-10	-9
Proximity sensor with reduced power activation:	ON	ON	ON	ON	ON	ON	OFF	OFF	OFF	OFF	OFF	OFF
10 MHz	21.5	21.5	21.5	21.5	21.5	21.5	23.0	23.0	23.0	23.0	23.0	23.0
5 MHz	21.5	21.5	21.5	21.5	21.5	21.5	23.0	23.0	23.0	23.0	23.0	23.0



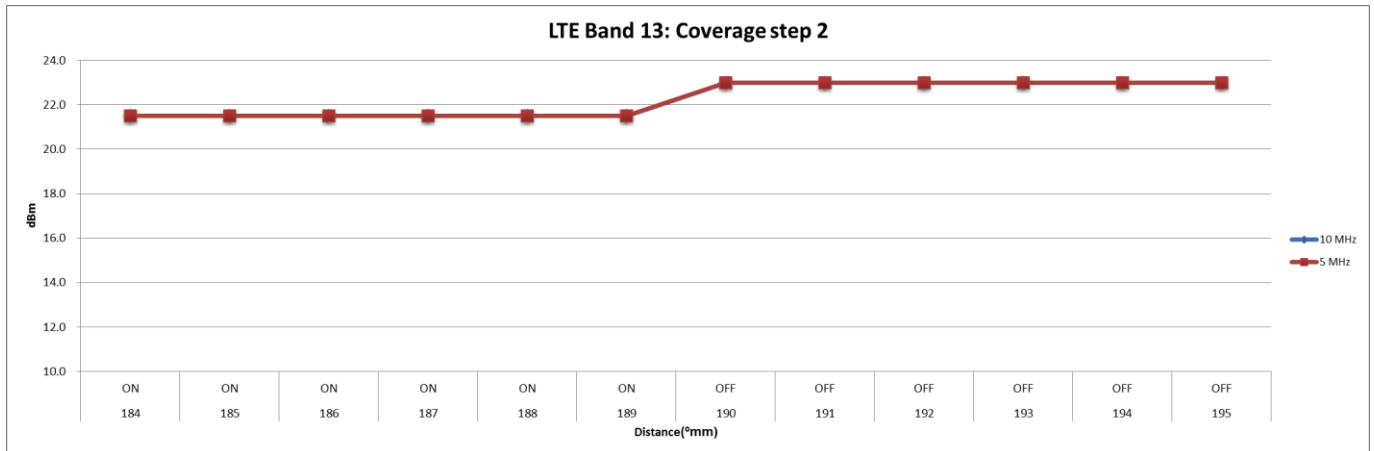
Coverage step 2 CDMA BC 1														
Distance (mm):	183	184	185	186	187	188	189	190	191	192	193	194	195	
Proximity sensor with reduced power activation:	ON	ON	ON	ON	ON	ON	ON	OFF	OFF	OFF	OFF	OFF	OFF	
1xRTT	14.8	14.8	14.8	14.8	14.8	14.8	14.8	23.3	23.3	23.3	23.3	23.3	23.3	
1xEV-DO Rel. 0	15.7	15.7	15.7	15.7	15.7	15.7	15.7	24.7	24.7	24.7	24.7	24.7	24.7	
1xEV-DO Rev. A	15.5	15.5	15.5	15.5	15.5	15.5	15.5	24.6	24.6	24.6	24.6	24.6	24.6	



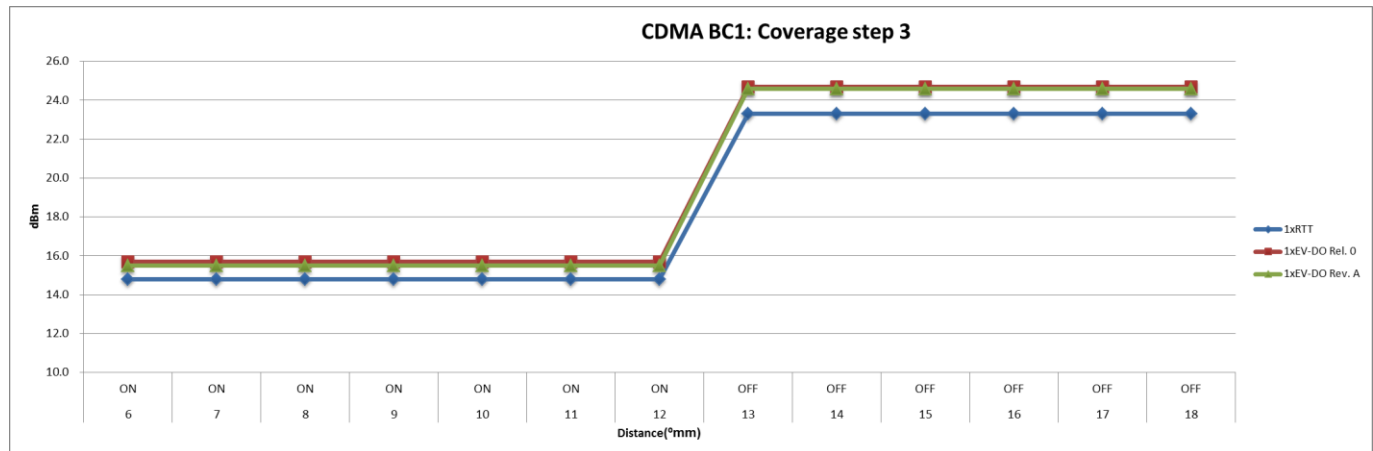
Coverage step 2 (CDMA BC 0)														
Distance (mm):	189	190	191	192	193	194	195	196	197	198	199	200	201	
Proximity sensor with reduced power activation:	ON	ON	ON	ON	ON	ON	ON	OFF	OFF	OFF	OFF	OFF	OFF	
1xRTT	18.5	18.5	18.5	18.5	18.5	18.5	18.5	23.5	23.5	23.5	23.5	23.5	23.5	
1xEV-DO Rel. 0	19.5	19.5	19.5	19.5	19.5	19.5	19.5	24.5	24.5	24.5	24.5	24.5	24.5	
1xEV-DO Rev. A	19.5	19.5	19.5	19.5	19.5	19.5	19.5	24.5	24.5	24.5	24.5	24.5	24.5	



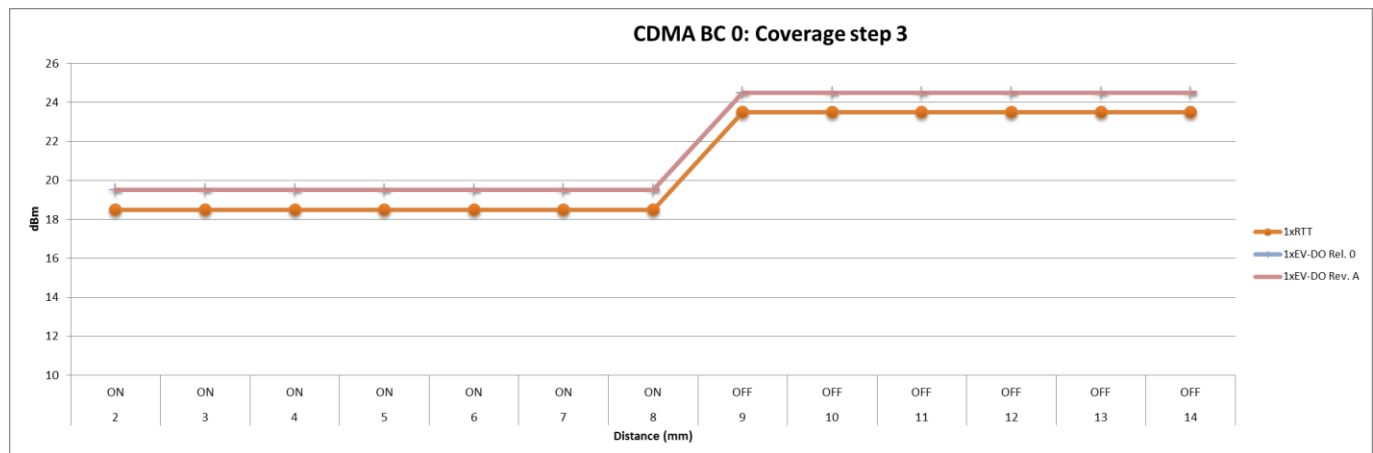
Coverage step 2, LTE Band 13												
Distance (mm):	184	185	186	187	188	189	190	191	192	193	194	195
Proximity sensor with reduced power activation:	ON	ON	ON	ON	ON	ON	OFF	OFF	OFF	OFF	OFF	OFF
10 MHz	21.5	21.5	21.5	21.5	21.5	21.5	23.0	23.0	23.0	23.0	23.0	23.0
5 MHz	21.5	21.5	21.5	21.5	21.5	21.5	23.0	23.0	23.0	23.0	23.0	23.0



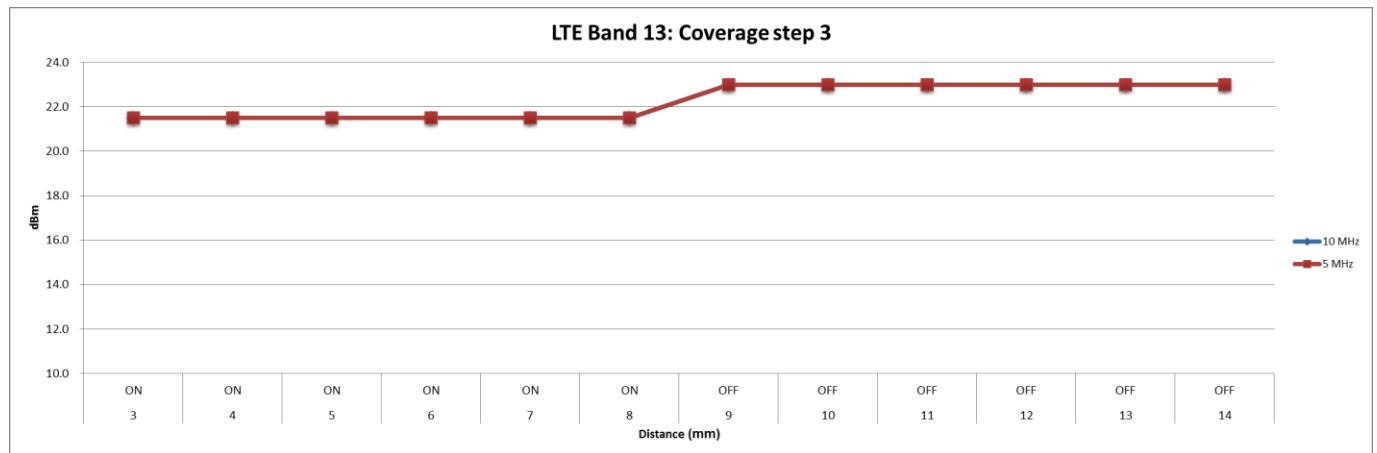
Coverage step 3 CDMA BC 1														
Distance (mm):	6	7	8	9	10	11	12	13	14	15	16	17	18	
Proximity sensor with reduced power activation:	ON	ON	ON	ON	ON	ON	ON	OFF	OFF	OFF	OFF	OFF	OFF	OFF
1xRTT	14.8	14.8	14.8	14.8	14.8	14.8	14.8	23.3	23.3	23.3	23.3	23.3	23.3	23.3
1xEV-DO Rel. 0	15.7	15.7	15.7	15.7	15.7	15.7	15.7	24.7	24.7	24.7	24.7	24.7	24.7	24.7
1xEV-DO Rev. A	15.5	15.5	15.5	15.5	15.5	15.5	15.5	24.6	24.6	24.6	24.6	24.6	24.6	24.6



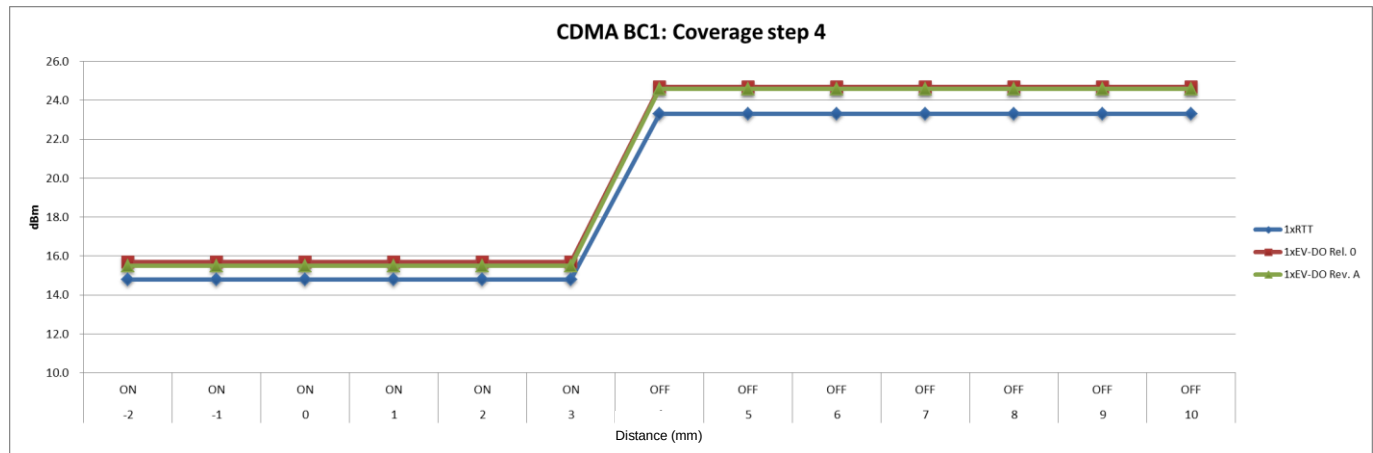
Coverage step 3 (CDMA BC 0)														
Distance (mm):	2	3	4	5	6	7	8	9	10	11	12	13	14	
Proximity sensor with reduced power activation:	ON	ON	ON	ON	ON	ON	ON	OFF	OFF	OFF	OFF	OFF	OFF	OFF
1xRTT	18.5	18.5	18.5	18.5	18.5	18.5	18.5	23.5	23.5	23.5	23.5	23.5	23.5	23.5
1xEV-DO Rel. 0	19.5	19.5	19.5	19.5	19.5	19.5	19.5	24.5	24.5	24.5	24.5	24.5	24.5	24.5
1xEV-DO Rev. A	19.5	19.5	19.5	19.5	19.5	19.5	19.5	24.5	24.5	24.5	24.5	24.5	24.5	24.5



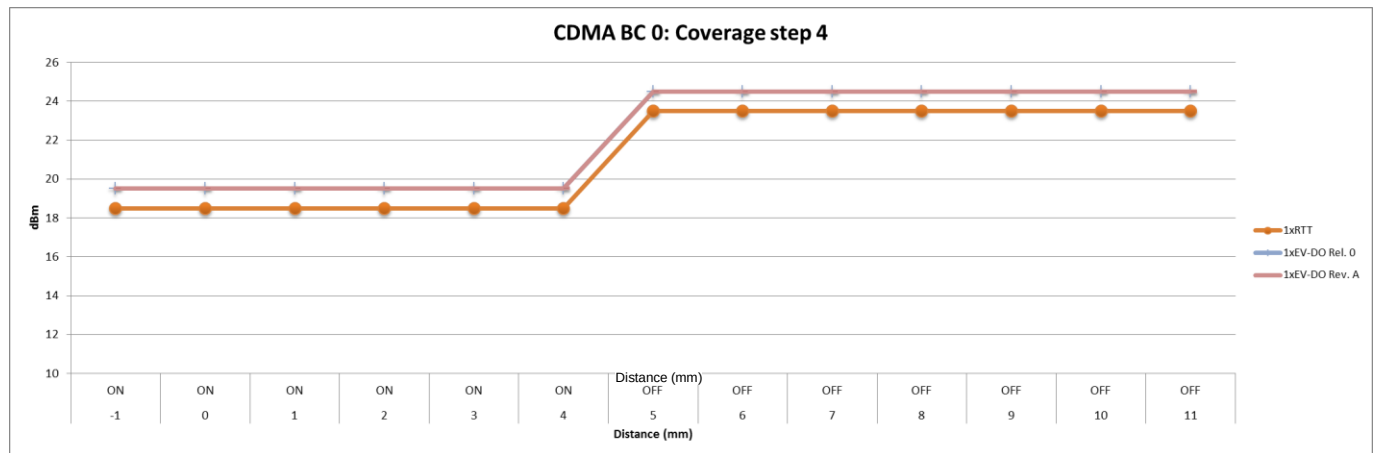
Coverage step 3, LTE Band 13													
Distance (mm):	3	4	5	6	7	8	9	10	11	12	13	14	
Proximity sensor with reduced power activation:	ON	ON	ON	ON	ON	ON	OFF	OFF	OFF	OFF	OFF	OFF	
10 MHz	21.5	21.5	21.5	21.5	21.5	21.5	23.0	23.0	23.0	23.0	23.0	23.0	
5 MHz	21.5	21.5	21.5	21.5	21.5	21.5	23.0	23.0	23.0	23.0	23.0	23.0	



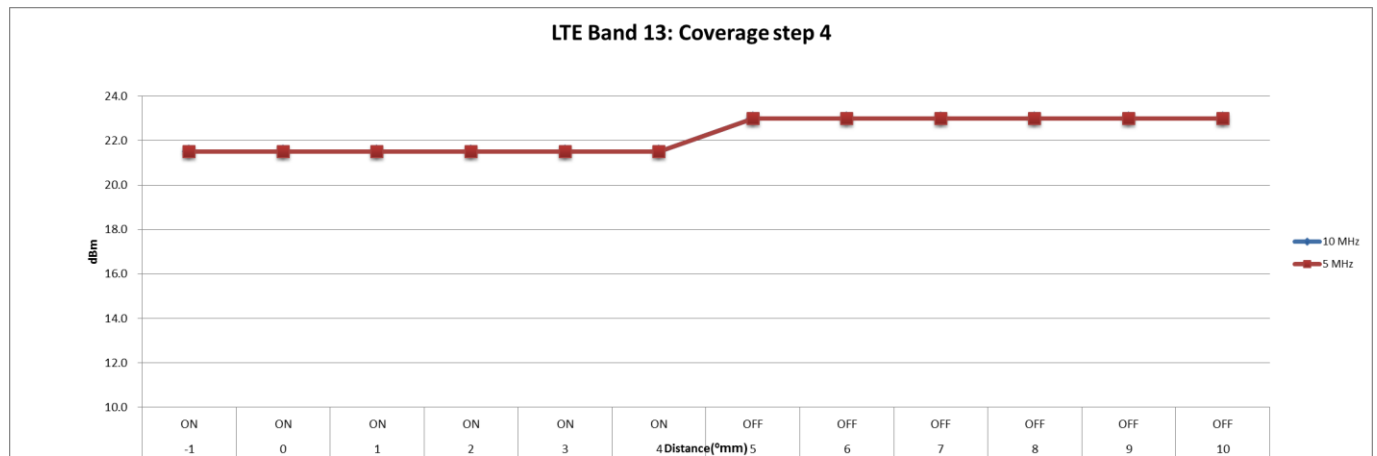
Coverage step 4 CDMA BC 1													
Distance (mm):	-2	-1	0	1	2	3	4	5	6	7	8	9	10
Proximity sensor with reduced power activation:	ON	ON	ON	ON	ON	ON	OFF	OFF	OFF	OFF	OFF	OFF	OFF
1xRTT	14.8	14.8	14.8	14.8	14.8	14.8	23.3	23.3	23.3	23.3	23.3	23.3	23.3
1xEV-DO Rel. 0	15.7	15.7	15.7	15.7	15.7	15.7	24.7	24.7	24.7	24.7	24.7	24.7	24.7
1xEV-DO Rev. A	15.5	15.5	15.5	15.5	15.5	15.5	24.6	24.6	24.6	24.6	24.6	24.6	24.6



Coverage step 4 (UMTS Band V)													
Distance (mm):	-1	0	1	2	3	4	5	6	7	8	9	10	11
Proximity sensor with reduced power activation:	ON	ON	ON	ON	ON	ON	OFF	OFF	OFF	OFF	OFF	OFF	OFF
1xRTT	18.5	18.5	18.5	18.5	18.5	18.5	23.5	23.5	23.5	23.5	23.5	23.5	23.5
1xEV-DO Rel. 0	19.5	19.5	19.5	19.5	19.5	19.5	24.5	24.5	24.5	24.5	24.5	24.5	24.5
1xEV-DO Rev. A	19.5	19.5	19.5	19.5	19.5	19.5	24.5	24.5	24.5	24.5	24.5	24.5	24.5



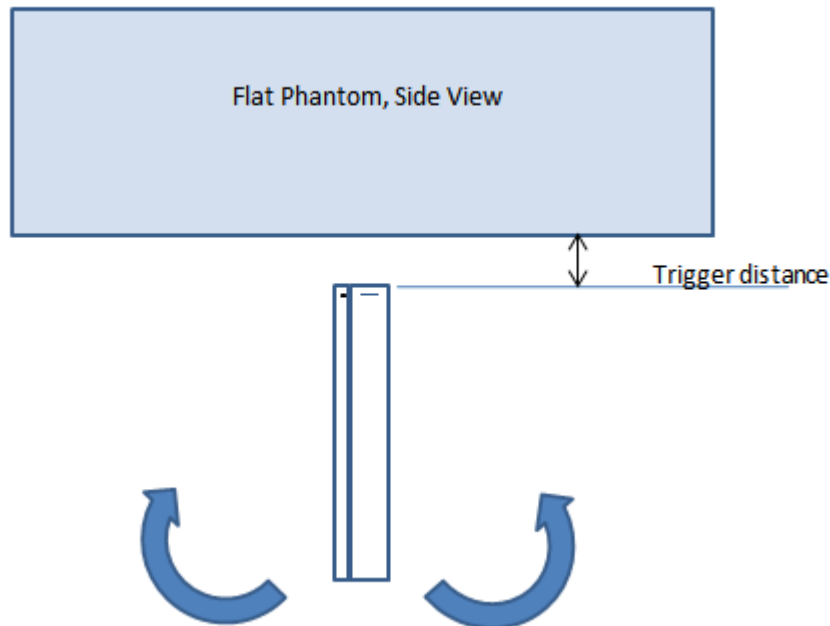
Coverage step 4, LTE Band 13													
Distance (mm):	-1	0	1	2	3	4	5	6	7	8	9	10	
Proximity sensor with reduced power activation:	ON	ON	ON	ON	ON	ON	OFF	OFF	OFF	OFF	OFF	OFF	
10 MHz	21.5	21.5	21.5	21.5	21.5	21.5	23.0	23.0	23.0	23.0	23.0	23.0	
5 MHz	21.5	21.5	21.5	21.5	21.5	21.5	23.0	23.0	23.0	23.0	23.0	23.0	



7.10. 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 17mm from the phantom for all angles up to 45°.



Proximity sensor tilt angle assessment (Edge 4) KDB 616217 §6.4

8. Summary of Test Configurations

Refer to Section 17 “Antenna Dimensions and Separation Distances” for the specific details of the antenna-to-antenna and antenna-to-edge(s) distances.

8.1. Body Exposure Test Configurations for WWAN

Laptop Mode

Test Configurations	Antenna-to-edge/surface	SAR Required	Note
Rear	18 mm	No	The Main Antenna does not require testing in this position when operating in Laptop Mode as the same test position for Tablet Mode is far more conservative.
Top Edge of Display Screen against Phantom	2.3 mm	No	The Main Antenna does not require testing in this position as it is accounted for by the Edge 1 test position for Tablet Mode.

Tablet Mode

Test Configurations	Antenna-to-edge/surface	SAR Required	Note
Rear	18 mm	Yes	
Edge 1	2.3 mm	Yes	A proximity sensor is incorporated at this edge that, when triggered, will reduce the transmit power of the WWAN transmitter. As such, two separate sets of evaluations are required for this test position: one with the device operating at a reduced power level and in contact with the phantom, and one with the device operating at full power level and at 16 mm- 1 mm less than the closest distance away from an object the device will operate at full power- away from the phantom
Edge 2	200.6 mm	No	This is not the most conservative antenna-to-user distance at edge mode. According to KDB 447498 4) b) ii) (2)
Edge 3	210.9 mm	No	This is not the most conservative antenna-to-user distance at edge mode. According to KDB 447498 4) b) ii) (2)
Edge 4	24 mm	Yes	

Notes:

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

9. RF Output Power Measurement

9.1. CDMA BC0

Target Power for CDMA BC0

CDMA BC0	Full Power	Reduced Power
1xRTT	Low Channel: 24.0 dBm	Low Channel: 17.5 dBm
	Mid Channel: 24.0 dBm	Mid Channel: 17.5 dBm
	High Channel: 24.0 dBm	High Channel: 17.4 dBm
1xEV-DO	Low Channel: 24.0 dBm	Low Channel: 18.5 dBm
	Mid Channel: 24.0 dBm	Mid Channel: 18.5 dBm
	High Channel: 24.0 dBm	High Channel: 18.4 dBm

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

1xRTT Measurement Results

CDMA			Avg Pwr (dBm)					
			RC1 - SO55		RC3 - SO55		RC3 - SO32	
Band	Ch	Freq. (MHz)	(Loopback)		(Loopback)		(+F-SCH)	
			Full Power	Reduced Power	Full Power	Reduced Power	Full Power	Reduced Power
BC 0	1013	824.7	23.5	18.5	23.5	18.5	23.5	18.5
	384	836.52	23.5	18.5	23.5	18.5	23.5	18.5
	777	848.31	23.2	18.3	23.2	18.3	23.3	18.2

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	824.7	24.5	19.5
			384	836.52	24.4	19.5
			777	848.31	24.3	19.3

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	824.7	24.5	19.5
			384	836.52	24.4	19.4
			777	848.31	24.3	19.2

9.2. CDMA BC1

Target Power for CDMA BC1

CDMA BC1	Full Power	Reduced Power
1xRTT	Low Channel: 24.0 dBm Mid Channel: 24.0 dBm High Channel: 24.0 dBm	Low Channel: 13.8 dBm Mid Channel: 13.8 dBm High Channel: 13.8 dBm
1xEV-DO	Low Channel: 24.0 dBm Mid Channel: 24.0 dBm High Channel: 23.5 dBm	Low Channel: 14.7 dBm Mid Channel: 14.7 dBm High Channel: 14.7 dBm

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

1xRTT Measurement Results

CDMA			Avg Pwr (dBm)					
			RC1 - SO55		RC3 - SO55		RC3 - SO32	
Band	Ch	Freq. (MHz)	(Loopback)		(Loopback)		(+F-SCH)	
			Full Power	Reduced Power	Full Power	Reduced Power	Full Power	Reduced Power
BC 1	25	1851.25	23.4	14.1	23.4	14.3	23.3	14.6
	600	1880	23.2	14.3	23.2	14.4	23.5	14.8
	1175	1908.75	22.8	14.3	22.7	14.4	22.8	14.8

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	15.3
			600	1880	24.7	15.7
			1175	1908.75	24.5	15.4

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 1	307.2k, QPSK/ ACK channel is transmitted at all the slots	4096	25	1851.25	24.5	15.3
			600	1880	24.6	15.5
			1175	1908.75	24.5	15.2

9.1. LTE Band 13

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

LTE Band 13	Full Power	Reduced Power
10 MHz Bandwidth	23.0 dBm	20.5 dBm
5 MHz Bandwidth	23.0 dBm	20.5 dBm

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

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

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

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

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

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

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

Network Signalling value	Requirements (sub-clause)	E-UTRA Band	Channel bandwidth (MHz)	Resources Blocks (N_{RB})	A-MPR (dB)
NS_01	6.6.2.1.1	Table 5.5-1	1.4, 3, 5, 10, 15, 20	Table 5.6-1	NA
NS_03	6.6.2.2.1	2, 4, 10, 23, 25, 35, 36	3	>5	≤ 1
			5	>6	≤ 1
			10	>6	≤ 1
			15	>8	≤ 1
			20	>10	≤ 1
NS_04	6.6.2.2.2	41	5	>6	≤ 1
			10, 15, 20	See Table 6.2.4-4	
NS_05	6.6.3.3.1	1	10,15,20	≥ 50	≤ 1
NS_06	6.6.2.2.3	12, 13, 14, 17	1.4, 3, 5, 10	Table 5.6-1	n/a
NS_07	6.6.2.2.3	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 ¹	1.4, 3, 5, 10	Table 6.2.4-5	Table 6.2.4-5
..					
NS_32	-	-	-	-	-

Note 1: Applies to the lower block of Band 23, i.e. a carrier placed in the 2000-2010 MHz region.

LTE Band 13, 10 MHz Bandwidth

BW	Ch	Freq. (MHz)	Mode	UL RB Allocation	UL RB Start	Target MPR	Meas. MPR	Avg Pwr (dBm)	
								Full Power	Reduced Power
10	23230	782	QPSK	1	0	0	0	22.9	21.0
				1	24	0	0	23.0	21.1
				1	49	0	0	22.8	21.0
				25	0	1	1	22.3	21.3
				25	12	1	1	22.3	21.3
				25	24	1	1	22.3	21.3
				50	0	1	1	22.1	21.2
			16QAM	1	0	1	1	21.8	20.8
				1	24	1	1	21.9	20.9
				1	49	1	1	21.7	20.7
				25	0	2	2	21.3	21.3
				25	12	2	2	21.4	21.4
				25	24	2	2	21.4	21.5
				50	0	2	2	21.3	21.3

LTE Band 13, 5 MHz Bandwidth

BW	Ch	Freq. (MHz)	Mode	UL RB Allocation	UL RB Start	Target MPR	Meas. MPR	Avg Pwr (dBm)	
								Full Power	Reduced Power
5	23205	779.5	QPSK	1	0	0	0	23.1	21.2
				1	12	0	0	22.9	21.2
				1	24	0	0	23.1	21.3
				12	0	1	1	22.1	21.2
				12	6	1	1	22.2	21.2
				12	11	1	1	22.2	21.2
				25	0	1	1	22.1	21.1
			16QAM	1	0	1	1	21.8	21.0
				1	12	1	1	21.7	20.7
				1	24	1	1	21.7	20.9
				12	0	2	2	21.1	21.1
				12	6	2	2	21.1	21.1
				12	11	2	2	21.1	21.1
				25	0	2	2	21.1	21.1
	23230	782	QPSK	1	0	0	0	22.9	21.1
				1	12	0	0	23.0	21.3
				1	24	0	0	23.0	21.3
				12	0	1	1	22.2	21.3
				12	6	1	1	22.3	21.3
				12	11	1	1	22.3	21.3
				25	0	1	1	22.3	21.3
			16QAM	1	0	1	1	21.7	20.9
				1	12	1	1	21.8	20.9
				1	24	1	1	21.7	20.9
				12	0	2	2	21.1	21.1
				12	6	2	2	21.2	21.2
				12	11	2	2	21.3	21.3
				25	0	2	2	21.1	21.1
	23255	784.5	QPSK	1	0	0	0	23.2	21.3
				1	12	0	0	23.2	21.3
				1	24	0	0	22.9	21.1
				12	0	1	1	22.4	21.4
				12	6	1	1	22.3	21.3
				12	11	1	1	22.1	21.2
				25	0	1	1	22.2	21.3
			16QAM	1	0	1	1	21.9	21.0
				1	12	1	1	21.8	20.9
				1	24	1	2	21.5	20.6
				12	0	2	2	21.3	21.3
				12	6	2	2	21.3	21.3
				12	11	2	2	21.1	21.1
				25	0	2	2	21.1	21.1

10. Tissue Dielectric Properties

IEEE Std 1528-2003 Table 2

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

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Target Frequency (MHz)	Head		Body	
	ϵ_r	σ (S/m)	ϵ_r	σ (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

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

The following tissue formulations are provided for reference only as some of the parameters have not been thoroughly verified. The composition of ingredients may be modified accordingly to achieve the desired target tissue parameters required for routine SAR evaluation.

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

Salt: 99+% Pure Sodium Chloride

Sugar: 98+% Pure Sucrose

Water: De-ionized, 16 MΩ+ resistivity

HEC: Hydroxyethyl Cellulose

DGBE: 99+% Di(ethylene glycol) butyl ether, [2-(2-butoxyethoxy)ethanol]

Triton X-100 (ultra pure): Polyethylene glycol mono [4-(1,1, 3, 3-tetramethylbutyl)phenyl]ether

MSL/HSL750 (Body and Head liquids for 700 – 800 MHz)

Item	Head Tissue Simulation Liquids HSL750 Muscle (body) Tissue Simulation Liquids MSL750
Type No	SL AAH 075
Manufacturer	SPEAG
The item is composed of the following ingredients:	
H ₂ O	Water, 35 – 58%
Sucrose	Sugar, white, refined, 40-60%
NaCl	Sodium Chloride, 0-6%
Hydroxyethyl-cellulose	Medium Viscosity (CAS# 9004-62-0), <0.3%
Preventol-D7	Preservative: aqueous preparation, (CAS# 55965-84-9), containing 5-chloro-2-methyl-3(2H)-isothiazolone and 2-methyl-3(2H)-isothiazolone, 0.1-0.7%

Simulating Liquids for 5 GHz, Manufactured by SPEAG

Ingredients	(% by weight)
Water	78
Mineral oil	11
Emulsifiers	9
Additives and Salt	2

10.2. Tissue Dielectric Parameter Check Results

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 ±(%)
9/25/2012	Body 835	e'	54.0545	Relative Permittivity (ε _r):	54.05	55.20	-2.08	5
		e''	21.3814	Conductivity (σ):	0.99	0.97	2.34	5
	Body 815	e'	54.3442	Relative Permittivity (ε _r):	54.34	55.30	-1.72	5
		e''	21.0638	Conductivity (σ):	0.95	0.97	-1.40	5
	Body 820	e'	54.2110	Relative Permittivity (ε _r):	54.21	55.28	-1.93	5
		e''	21.2539	Conductivity (σ):	0.97	0.97	0.06	5
	Body 850	e'	53.9774	Relative Permittivity (ε _r):	53.98	55.16	-2.14	5
		e''	21.1443	Conductivity (σ):	1.00	0.99	1.24	5
10/5/2012	Body 835	e'	54.6020	Relative Permittivity (ε _r):	54.60	55.20	-1.08	5
		e''	21.4566	Conductivity (σ):	1.00	0.97	2.70	5
	Body 815	e'	54.8192	Relative Permittivity (ε _r):	54.82	55.30	-0.86	5
		e''	21.6467	Conductivity (σ):	0.98	0.97	1.33	5
	Body 820	e'	54.7895	Relative Permittivity (ε _r):	54.79	55.28	-0.88	5
		e''	21.5206	Conductivity (σ):	0.98	0.97	1.32	5
	Body 850	e'	54.3457	Relative Permittivity (ε _r):	54.35	55.16	-1.47	5
		e''	21.3124	Conductivity (σ):	1.01	0.99	2.04	5
10/8/2012	Body 750	e'	54.6148	Relative Permittivity (ε _r):	54.61	55.55	-1.68	5
		e''	22.5054	Conductivity (σ):	0.94	0.96	-2.55	5
	Body 775	e'	54.1318	Relative Permittivity (ε _r):	54.13	55.45	-2.38	5
		e''	22.2913	Conductivity (σ):	0.96	0.97	-0.46	5
	Body 780	e'	54.1122	Relative Permittivity (ε _r):	54.11	55.43	-2.38	5
		e''	22.2047	Conductivity (σ):	0.96	0.97	-0.24	5
	Body 790	e'	53.9060	Relative Permittivity (ε _r):	53.91	55.39	-2.68	5
		e''	22.0624	Conductivity (σ):	0.97	0.97	0.31	5
10/24/2012	Body 1900	e'	51.9072	Relative Permittivity (ε _r):	51.91	53.30	-2.61	5
		e''	14.3310	Conductivity (σ):	1.51	1.52	-0.39	5
	Body 1850	e'	52.0201	Relative Permittivity (ε _r):	52.02	53.30	-2.40	5
		e''	14.1981	Conductivity (σ):	1.46	1.52	-3.91	5
	Body 1880	e'	51.8528	Relative Permittivity (ε _r):	51.85	53.30	-2.72	5
		e''	14.2847	Conductivity (σ):	1.49	1.52	-1.76	5
	Body 1910	e'	51.7851	Relative Permittivity (ε _r):	51.79	53.30	-2.84	5
		e''	14.3756	Conductivity (σ):	1.53	1.52	0.44	5
10/30/2012	Body 1900	e'	51.5110	Relative Permittivity (ε _r):	51.51	53.30	-3.36	5
		e''	14.5311	Conductivity (σ):	1.54	1.52	1.00	5
	Body 1850	e'	51.7538	Relative Permittivity (ε _r):	51.75	53.30	-2.90	5
		e''	14.3782	Conductivity (σ):	1.48	1.52	-2.70	5
	Body 1880	e'	51.5869	Relative Permittivity (ε _r):	51.59	53.30	-3.21	5
		e''	14.3914	Conductivity (σ):	1.50	1.52	-1.03	5
	Body 1910	e'	51.5412	Relative Permittivity (ε _r):	51.54	53.30	-3.30	5
		e''	14.4123	Conductivity (σ):	1.53	1.52	0.70	5
11/1/2012	Body 1900	e'	51.3309	Relative Permittivity (ε _r):	51.33	53.30	-3.69	5
		e''	14.2428	Conductivity (σ):	1.50	1.52	-1.01	5
	Body 1850	e'	51.5059	Relative Permittivity (ε _r):	51.51	53.30	-3.37	5
		e''	14.1277	Conductivity (σ):	1.45	1.52	-4.39	5
	Body 1880	e'	51.4043	Relative Permittivity (ε _r):	51.40	53.30	-3.56	5
		e''	14.1765	Conductivity (σ):	1.48	1.52	-2.50	5
	Body 1910	e'	51.3239	Relative Permittivity (ε _r):	51.32	53.30	-3.71	5
		e''	14.2551	Conductivity (σ):	1.51	1.52	-0.40	5

Date	Freq. (MHz)	Liquid Parameters			Measured	Target	Delta (%)	Limit ±(%)
11/1/2012	Body 835	e'	53.4600	Relative Permittivity (ϵ_r):	53.46	55.20	-3.15	5
		e''	21.9000	Conductivity (σ):	1.02	0.97	4.82	5
	Body 820	e'	53.5300	Relative Permittivity (ϵ_r):	53.53	55.28	-3.16	5
		e''	22.0400	Conductivity (σ):	1.00	0.97	3.76	5
	Body 830	e'	53.4900	Relative Permittivity (ϵ_r):	53.49	55.24	-3.17	5
		e''	21.9500	Conductivity (σ):	1.01	0.97	4.52	5
	Body 850	e'	53.3600	Relative Permittivity (ϵ_r):	53.36	55.16	-3.26	5
		e''	21.9100	Conductivity (σ):	1.04	0.99	4.90	5
11/1/2012	Body 750	e'	56.5429	Relative Permittivity (ϵ_r):	56.54	55.55	1.79	5
		e''	23.2741	Conductivity (σ):	0.97	0.96	0.78	5
	Body 775	e'	56.2668	Relative Permittivity (ϵ_r):	56.27	55.45	1.47	5
		e''	23.0639	Conductivity (σ):	0.99	0.97	2.99	5
	Body 780	e'	56.2156	Relative Permittivity (ϵ_r):	56.22	55.43	1.42	5
		e''	23.0147	Conductivity (σ):	1.00	0.97	3.39	5
	Body 790	e'	56.1063	Relative Permittivity (ϵ_r):	56.11	55.39	1.29	5
		e''	22.9350	Conductivity (σ):	1.01	0.97	4.27	5
11/2/2012	Body 1900	e'	53.9915	Relative Permittivity (ϵ_r):	53.99	53.30	1.30	5
		e''	14.3020	Conductivity (σ):	1.51	1.52	-0.60	5
	Body 1850	e'	54.2087	Relative Permittivity (ϵ_r):	54.21	53.30	1.70	5
		e''	14.1400	Conductivity (σ):	1.45	1.52	-4.31	5
	Body 1880	e'	54.0604	Relative Permittivity (ϵ_r):	54.06	53.30	1.43	5
		e''	14.2345	Conductivity (σ):	1.49	1.52	-2.11	5
	Body 1910	e'	53.9655	Relative Permittivity (ϵ_r):	53.97	53.30	1.25	5
		e''	14.3251	Conductivity (σ):	1.52	1.52	0.09	5
11/7/2012	Body 835	e'	54.3031	Relative Permittivity (ϵ_r):	54.30	55.20	-1.62	5
		e''	21.6726	Conductivity (σ):	1.01	0.97	3.73	5
	Body 820	e'	54.4481	Relative Permittivity (ϵ_r):	54.45	55.28	-1.50	5
		e''	21.7368	Conductivity (σ):	0.99	0.97	2.34	5
	Body 830	e'	54.3622	Relative Permittivity (ϵ_r):	54.36	55.24	-1.59	5
		e''	21.6811	Conductivity (σ):	1.00	0.97	3.24	5
	Body 850	e'	54.1748	Relative Permittivity (ϵ_r):	54.17	55.16	-1.78	5
		e''	21.5873	Conductivity (σ):	1.02	0.99	3.36	5
11/7/2012	Body 1900	e'	52.7518	Relative Permittivity (ϵ_r):	52.75	53.30	-1.03	5
		e''	14.3452	Conductivity (σ):	1.52	1.52	-0.30	5
	Body 1850	e'	52.9658	Relative Permittivity (ϵ_r):	52.97	53.30	-0.63	5
		e''	14.1495	Conductivity (σ):	1.46	1.52	-4.24	5
	Body 1880	e'	52.8270	Relative Permittivity (ϵ_r):	52.83	53.30	-0.89	5
		e''	14.2587	Conductivity (σ):	1.49	1.52	-1.94	5
	Body 1910	e'	52.7529	Relative Permittivity (ϵ_r):	52.75	53.30	-1.03	5
		e''	14.3631	Conductivity (σ):	1.53	1.52	0.35	5
11/8/2012	Body 750	e'	55.2936	Relative Permittivity (ϵ_r):	55.29	55.55	-0.45	5
		e''	22.9997	Conductivity (σ):	0.96	0.96	-0.41	5
	Body 775	e'	54.9603	Relative Permittivity (ϵ_r):	54.96	55.45	-0.88	5
		e''	22.8057	Conductivity (σ):	0.98	0.97	1.84	5
	Body 780	e'	54.8821	Relative Permittivity (ϵ_r):	54.88	55.43	-0.99	5
		e''	22.7649	Conductivity (σ):	0.99	0.97	2.27	5
	Body 790	e'	54.7210	Relative Permittivity (ϵ_r):	54.72	55.39	-1.21	5
		e''	22.6918	Conductivity (σ):	1.00	0.97	3.17	5

11. System Performance Check

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

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 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	2/9/12	750	1g	8.44	8.84
				10g	5.53	5.84
D835V2	4d117	4/10/12	835	1g	9.38	9.52
				10g	6.15	6.31
D1750V2	1050	4/19/12	1750	1g	35.9	36.9
				10g	19.1	19.9
D1900V2	5d140	4/12/12	1900	1g	39.8	40.2
				10g	20.8	21.3
D2450V2	748	2/7/12	2450	1g	52.7	49.9
				10g	24.6	23.4
D5GHzV2	1075	2/14/12	5200	1g	79.4	72.7
				10g	22.8	20.5
			5500	1g	85.7	77.7
				10g	24.3	21.7
			5800	1g	78.9	72.5
				10g	22.5	20.2

11.3. System Performance Check Results

Date Tested	System Dipole		T.S. Liquid	SAR Measured (Normalized to 1 W)		Target (Ref. Value)	Delta (%)	Tolerance (%)
	Type	Serial No.						
9/25/2012	D835V2	4d117	Body	1g	10.10	9.52	6.09	±10
				10g	6.68	6.31	5.86	
10/5/2012	D835V2	4d117	Body	1g	9.37	9.52	-1.58	±10
				10g	6.17	6.31	-2.22	
10/8/2012	D750V3	1019	Body	1g	8.39	8.84	-5.09	±10
				10g	5.32	5.84	-8.90	
10/24/2012	D1900V2	5d140	Body	1g	40.3	40.2	0.25	±10
				10g	21.0	21.3	-1.41	
10/30/2012	D1900V2	5d140	Body	1g	41.5	40.2	3.23	±10
				10g	21.8	21.3	2.35	
11/1/2012	D835v2	4d117	Body	1g	10.0	9.52	5.04	±10
				10g	6.6	6.31	4.60	
11/1/2012	D750V3	1019	Body	1g	8.95	8.84	1.24	±10
				10g	5.96	5.84	2.05	
11/1/2012	D1900V2	5d140	Body	1g	43.4	40.2	7.96	±10
				10g	22.7	21.3	6.57	
11/2/2012	D1900V2	5d140	Body	1g	41.4	40.2	2.99	±10
				10g	21.7	21.3	1.88	
11/7/2012	D835V2	4d117	Body	1g	10.10	9.52	6.09	±10
				10g	6.64	6.31	5.23	
11/7/2012	D1900V2	5d140	Body	1g	42.4	40.2	5.47	±10
				10g	22.5	21.3	5.63	
11/8/2012	D750v3	1019	Body	1g	8.72	8.84	-1.36	±10
				10g	5.80	5.84	-0.68	

12. SAR Test Results

12.1. CDMA BC0

Test Position	Dist. (mm)	Prox. Sensor Status	Mode	Ch #.	Freq. (MHz)	Power (dBm)		1-g SAR (W/kg)		Plot No.	Note
						Tune-Up Limit	Meas.	Meas.	Scaled		
Rear	0	Off	1xRTT (RC3 SO32)	1013	824.7	25.0	23.5				1
				384	836.52	25.0	23.5	0.192	0.273	1	
				777	848.31	25.0	23.3				1
Edge 1	16	Off	1xRTT (RC3 SO32)	1013	824.7	25.0	23.5				1
				384	836.52	25.0	23.5	0.380	0.540	2	
				777	848.31	25.0	23.3				1
Edge 1	0	ON	1xRTT (RC3 SO32)	1013	824.7	18.5	18.5	0.819	0.813	3	
				384	836.52	18.5	18.5	0.885	0.891	4	
				777	848.31	18.4	18.2	0.966	1.005	5	
Edge 4	0	Off	1xRTT (RC3 SO32)	1013	824.7	25.0	23.5				1
				384	836.52	25.0	23.5	0.199	0.283	6	
				777	848.31	25.0	23.3				1
Test Position	Dist. (mm)	Prox. Sensor Status	Mode	Ch #.	Freq. (MHz)	Power (dBm)		1-g SAR (W/kg)		Plot No.	Note
						Tune-Up Limit	Meas.	Meas.	Scaled		
Rear	0	Off	1xEVDO (Rel. 0)	1013	824.7	25.0	24.5				1
				384	836.52	25.0	24.4	0.206	0.237	7	
				777	848.31	25.0	24.3				1
Edge 1	16	Off	1xEVDO (Rel. 0)	1013	824.7	25.0	24.5				1
				384	836.52	25.0	24.4	0.391	0.449	8	
				777	848.31	25.0	24.3				1
Edge 1	0	ON	1xEVDO (Rel. 0)	1013	824.7	19.5	19.5	1.130	1.130	9	
				384	836.52	19.5	19.5	1.260	1.260	10	
				777	848.31	19.4	19.3	1.180	1.207	11	
Edge 4	0	Off	1xEVDO (Rel. 0)	1013	824.7	25.0	24.5				1
				384	836.52	25.0	24.4	0.300	0.344	12	
				777	848.31	25.0	24.3				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

12.2. CDMA BC1

Test Position	Dist. (mm)	Prox. Sensor Status	Mode	Ch #.	Freq. (MHz)	Power (dBm)		1-g SAR (W/kg)		Plot No.	Note
						Tune-Up Limit	Meas.	Meas.	Scaled		
Rear	0	Off	1xRTT (RC3 SO32)	25	1851.25	25.0	23.3				1
				600	1880	25.0	23.5	0.135	0.193	1	
				1175	1908.75	25.0	22.8				1
Edge 1	16	Off	1xRTT (RC3 SO32)	25	1851.25	25.0	23.3				1
				600	1880	25.0	23.5	0.498	0.712	2	
				1175	1908.75	25.0	22.8				1
Edge 1	0	ON	1xRTT (RC3 SO32)	25	1851.25	14.8	14.6	1.060	1.110	3	
				600	1880	14.8	14.8	1.260	1.260	4	
				1175	1908.75	14.8	14.8	1.010	1.010	5	
Edge 4	0	Off	1xRTT (RC3 SO32)	25	1851.25	25.0	23.3				1
				600	1880	25.0	23.5	0.186	0.266	6	
				1175	1908.75	25.0	22.8				1
Test Position	Dist. (mm)	Prox. Sensor Status	Mode	Ch #.	Freq. (MHz)	Power (dBm)		1-g SAR (W/kg)		Plot No.	Note
						Tune-Up Limit	Meas.	Meas.	Scaled		
Rear	0	Off	1xEVDO (Rel. 0)	25	1851.25	25.0	24.5				1
				600	1880	25.0	24.7	0.059	0.063	7	
				1175	1908.75	25.0	24.5				1
Edge 1	16	Off	1xEVDO (Rel. 0)	25	1851.25	25.0	24.5				1
				600	1880	25.0	24.7	0.485	0.520	8	
				1175	1908.75	25.0	24.5				1
Edge 1	0	ON	1xEVDO (Rel. 0)	25	1851.25	15.7	15.3	1.120	1.228	9	
				600	1880	15.7	15.7	1.300	1.300	10	
				1175	1908.75	15.7	15.4	1.140	1.222	11	
Edge 4	0	Off	1xEVDO (Rel. 0)	25	1851.25	25.0	24.5				1
				600	1880	25.0	24.7	0.276	0.296	12	
				1175	1908.75	25.0	24.5				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

12.3. LTE Band 13

Test Position	Dist. (mm)	Prox. Sensor Status	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	Off	QPSK	23230	782.0	1	24	24.0	21.0	0.306	0.609	1	
						25	12	24.0	21.4	0.246	0.448	2	
Edge 1	16	Off	QPSK	23230	782.0	1	24	24.0	21.0	0.199	0.396	3	
						25	12	24.0	21.4	0.173	0.315	4	
Edge 1	0	ON	QPSK	23230	782.0	1	0	21.5	21.0	0.727	0.814	5	
						1	24	21.5	21.0	0.868	0.972	6	
						1	49	21.5	21.0	0.811	0.914	7	
						25	0	21.5	21.2	0.858	0.919	8	
						25	12	21.5	21.4	0.892	0.913	9	
						25	24	21.5	20.8	0.888	1.048	10	
						50	0	21.5	20.7	0.865	1.035	11	
Edge 4	0	Off	QPSK	23230	782.0	1	24	24.0	21.0	0.121	0.241	12	
						25	12	24.0	21.4	0.103	0.187	13	

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 ≥ 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.

13. Summary of Highest Measured SAR Values

Results of highest SAR values for each frequency band and mode

Technology/Band	Test configuration		Mode	Highest 1g SAR (W/kg)
CDMA BC0	Body Tablet Mode	Edge 1, 0 mm w/ Power Reduction	1xRTT (RC3, SO32)	0.966
CDMA BC0	Body Tablet Mode	Edge 1, 0 mm w/ Power Reduction	1xEVDO (Rel.0)	1.26
CDMA BC1	Body Tablet Mode	Edge 1, 0 mm w/ Power Reduction	1xRTT (RC3, SO32)	1.26
CDMA BC1	Body Tablet Mode	Edge 1, 0 mm w/ Power Reduction	1xEVDO (Rel.0)	1.3
LTE Band 13	Body Tablet Mode	Edge 1, 0 mm w/ Power Reduction	10 MHz (QPSK) RB 25/12	0.892

13.1. SAR Measurement Variability and Uncertainty

In accordance with published KDB procedure "865664 SAR measurement 100 MHz to 6 GHz DR01". 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.

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

Technology/ Band	Test Configuration		Mode	Dist. (mm)	Ch #.	Freq. (MHz)	Power (dBm)	SAR (W/kg)	Plot No.
	Exposure	Position							
LTE Band 13	Body	Edge 1, w/ Power Reduction	10 MHz QPSK RB 25/12	0	23230	782.0	20.8	0.898	1
CDMA BC0	Body	Edge 1, w/ Power Reduction	1xEVDO (Rel. 0)	0	384	836.5	19.5	1.070	2
CDMA BC1	Body	Edge 1, w/ Power Reduction	1xEVDO (Rel. 0)	0	600	1880.00	17.0	1.150	3

13.2. SAR Plots (from Summary of Highest Measured SAR Values)

Test Laboratory: UL CCS SAR Lab D

Date/Time: 9/25/2012

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; $\sigma = 0.998$ mho/m; $\epsilon_r = 53.9$; $\rho = 1000$ kg/m³;

DASY4 Configuration:

- Area Scan setting - Find Secondary Maximum Within: 2.0 dB and with a peak SAR value greater than 0.0012W/kg
- Electronics: DAE3 Sn500; Calibrated: 6/13/2012
- Probe: EX3DV4 - SN3749; ConvF(8.84, 8.84, 8.84); Calibrated: 1/27/2012
- Sensor-Surface: 2.5mm (Mechanical Surface Detection (Locations From Previous Scan Used))Sensor-Surface: 2.5mm (Mechanical Surface Detection)
- Phantom: Flat Phantom ELI4.0; Type: QDOVA001BB; Serial: SN:1017

Edge 1 Prox On_RC3 SO32_Ch 777/Area Scan (6x21x1): Measurement grid: dx=15mm, dy=15mm

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

Maximum value of SAR (measured) = 0.967 mW/g

Edge 1 Prox On_RC3 SO32_Ch 777/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

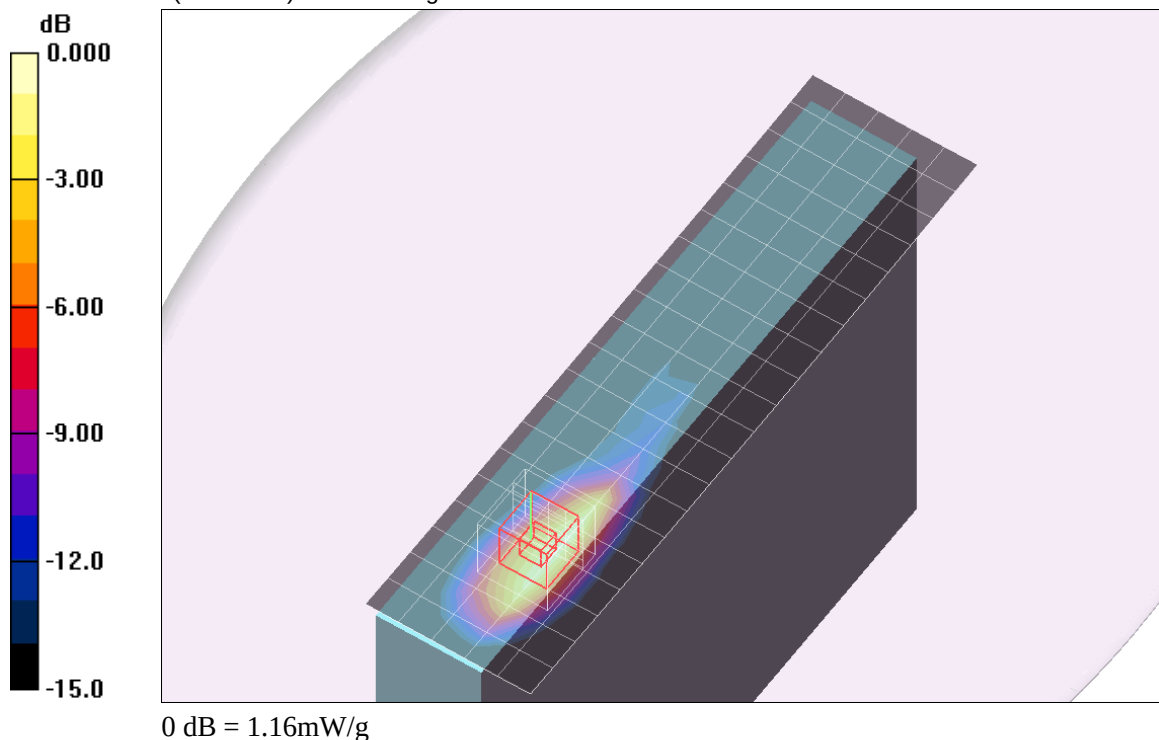
Reference Value = 28.1 V/m; Power Drift = 0.14 dB

Peak SAR (extrapolated) = 1.98 W/kg

SAR(1 g) = 0.966 mW/g; SAR(10 g) = 0.486 mW/g

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

Maximum value of SAR (measured) = 1.16 mW/g



CDMA BC0

Frequency: 836.52 MHz; Duty Cycle: 1:1; Room Ambient Temperature: 24.0°C; Liquid Temperature: 23.0°C
Medium parameters used (interpolated): $f = 836.52$ MHz; $\sigma = 1$ mho/m; $\epsilon_r = 54.616$; $\rho = 1000$ kg/m³

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 Sn1239; Calibrated: 6/6/2012
- Probe: EX3DV4 - SN3773; ConvF(8.74, 8.74, 8.74); Calibrated: 3/14/2012
- 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: QDOVA001BB; Serial: 1117

Edge 1 Prox On/1xEVDO_Rel. 0_Ch 384/Area Scan (6x21x1): Measurement grid: dx=15mm, dy=15mm

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

Maximum value of SAR (measured) = 1.819 mW/g

Edge 1 Prox On/1xEVDO_Rel. 0_Ch 384/Zoom Scan (5x5x7)/Cube 0: Measurement grid:

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

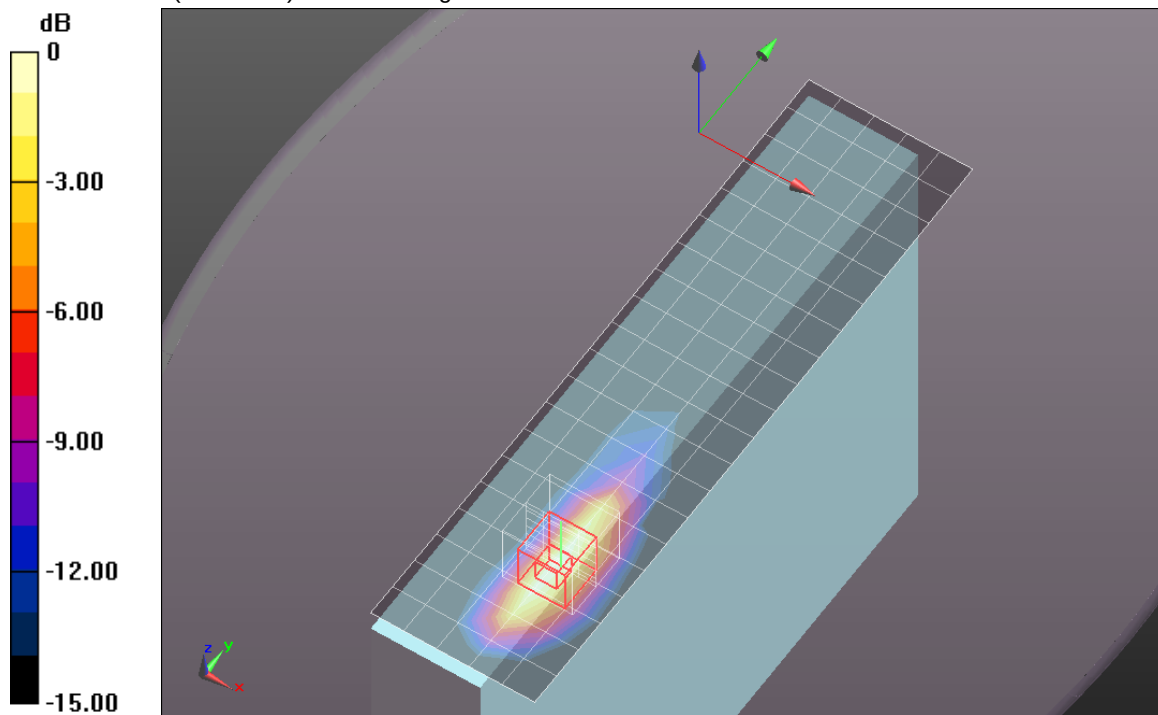
Reference Value = 43.690 V/m; Power Drift = -0.06 dB

Peak SAR (extrapolated) = 2.5010

SAR(1 g) = 1.26 mW/g; SAR(10 g) = 0.639 mW/g

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

Maximum value of SAR (measured) = 1.633 mW/g



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

CDMA BC1

Frequency: 1880 MHz; Duty Cycle: 1:1; Room Ambient Temperature: 24.0°C; Liquid Temperature: 23.0°C
Medium parameters used: $f = 1880$ MHz; $\sigma = 1.489$ mho/m; $\epsilon_r = 54.06$; $\rho = 1000$ kg/m³

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 Sn1239; Calibrated: 6/6/2012
- Probe: EX3DV4 - SN3773; ConvF(7.11, 7.11, 7.11); Calibrated: 3/14/2012;
- Sensor-Surface: 2.5mm (Mechanical Surface Detection)
- Phantom: ELI v5.0 (B); Type: QDOVA001BB; Serial: 1118

Edge 1 Prox. On/1xRTT_SO 32_ Ch 600/Area Scan (6x21x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (measured) = 1.70 W/kg

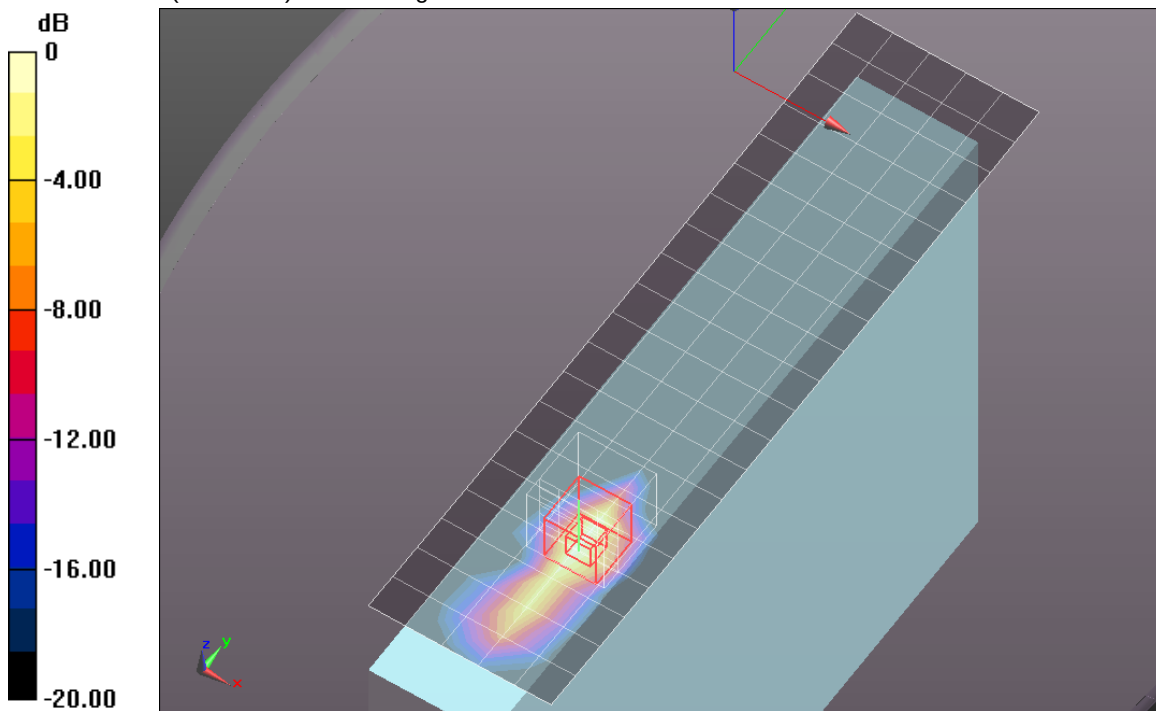
Edge 1 Prox. On/1xRTT_SO 32_ Ch 600/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 32.977 V/m; Power Drift = -0.11 dB

Peak SAR (extrapolated) = 2.89 W/kg

SAR(1 g) = 1.26 W/kg; SAR(10 g) = 0.535 W/kg

Maximum value of SAR (measured) = 1.80 W/kg



0 dB = 1.80 W/kg = 2.55 dBW/kg

CDMA BC1

Frequency: 1880 MHz; Duty Cycle: 1:1; Room Ambient Temperature: 24.0°C; Liquid Temperature: 23.0°C
Medium parameters used: $f = 1880$ MHz; $\sigma = 1.505$ mho/m; $\epsilon_r = 51.587$; $\rho = 1000$ kg/m³

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 Sn1239; Calibrated: 6/6/2012
- Probe: EX3DV4 - SN3773; ConvF(7.11, 7.11, 7.11); Calibrated: 3/14/2012;
- 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_Rel. 0_Ch 600/Area Scan (6x21x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (measured) = 0.877 W/kg

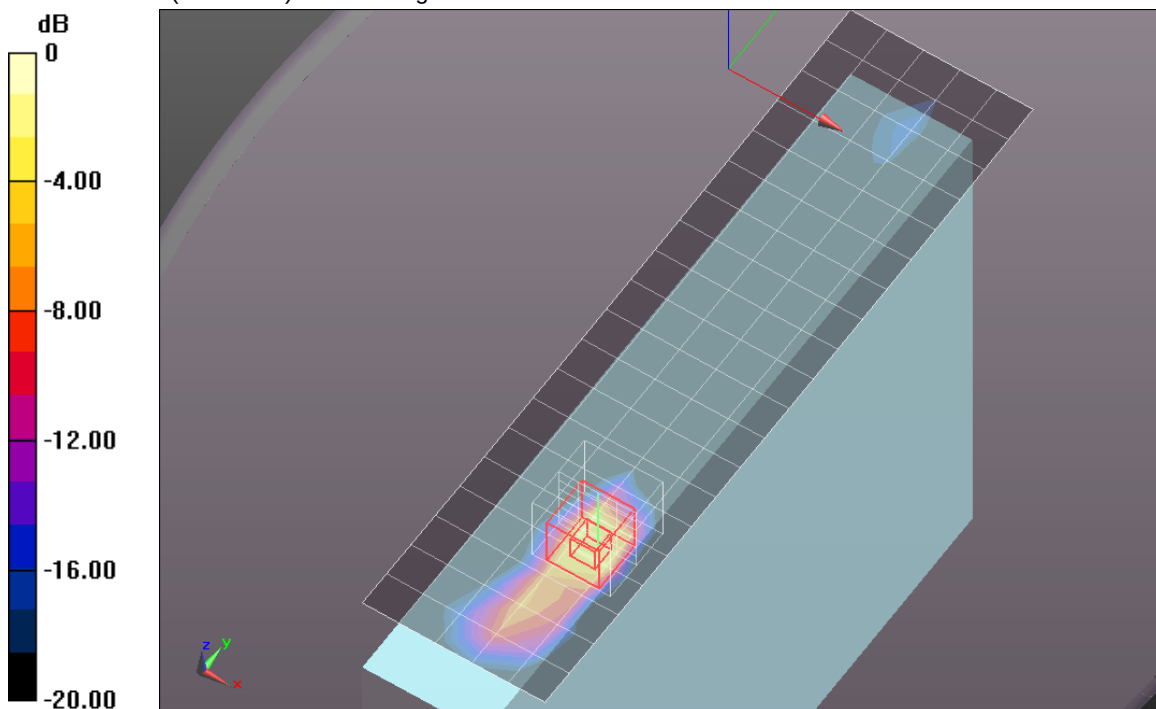
Edge 1 Prox On/1xEVDO_Rel. 0_Ch 600/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 25.550 V/m; Power Drift = -0.09 dB

Peak SAR (extrapolated) = 3.71 W/kg

SAR(1 g) = 1.3 W/kg; SAR(10 g) = 0.553 W/kg

Maximum value of SAR (measured) = 1.95 W/kg



0 dB = 1.95 W/kg = 2.90 dBW/kg

LTE Band 13

Frequency: 782 MHz; Duty Cycle: 1:1; Room Ambient Temperature: 24.0°C; Liquid Temperature: 23.0°C
Medium parameters used (interpolated): $f = 782 \text{ MHz}$; $\sigma = 0.965 \text{ mho/m}$; $\epsilon_r = 54.077$; $\rho = 1000 \text{ kg/m}^3$

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 Sn1258; Calibrated: 3/8/2012
- Probe: EX3DV4 - SN3772; ConvF(8.94, 8.94, 8.94); 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 (A); Type: QDOVA001BB; Serial: 1119

Edge 1 Prox. On/QPSK_RB 25/12_ Ch 23230/Area Scan (6x21x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$

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

Maximum value of SAR (measured) = 1.307 mW/g

Edge 1 Prox. On/QPSK_RB 25/12_ Ch 23230/Zoom Scan (5x5x7)/Cube 0: Measurement grid:

$dx=8\text{mm}$, $dy=8\text{mm}$, $dz=5\text{mm}$

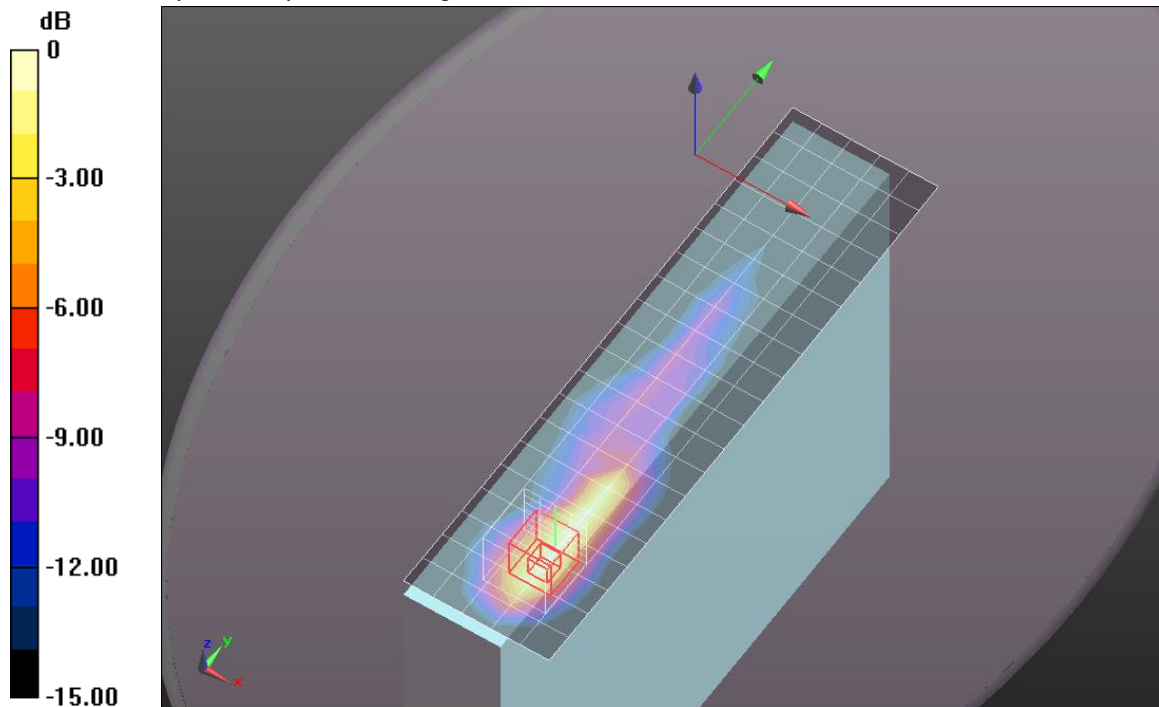
Reference Value = 37.085 V/m; Power Drift = 0.02 dB

Peak SAR (extrapolated) = 2.0060

SAR(1 g) = 0.892 mW/g; SAR(10 g) = 0.445 mW/g

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

Maximum value of SAR (measured) = 1.451 mW/g



0 dB = 1.450mW/g = 3.23 dB mW/g

14. Simultaneous Transmission SAR Analysis

- The only test positions included for simultaneous transmission analysis are those that are shared between WWAN and Wi-Fi.
- All Wi-Fi 1-g SAR values were taken from measurement results recorded in SAR report 12J14611-1A, submitted under FCC ID ACJ9TGWL12A
- 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 (12J14611-1A) with scaling applied (for the WLAN radios).

14.1. Bluetooth SAR in Simultaneous Transmission SAR Analysis

Standalone SAR Test Exclusion

Based on the criteria for Standalone SAR test exclusion listed in Section 4.3.1. of KDB 447498 D01 General RF Exposure Guidance v05:

$$[(\text{max. power of channel, including tune-up tolerance, mW})/(\text{min. test separation distance, mm})] \cdot [\sqrt{f(\text{GHz})}] \leq 3.0, \text{ for 1-g SAR}$$

An assessment was made using the above-stated formula to determine Bluetooth's eligibility for SAR test exclusion, using the following values:

- Power of Channel: 4.47 mW (rounded to 4 for the calculation)
- Min. Test Separation Distance: 2.3 mm (5mm is used for the calculation)
- Frequency: 2.441 GHz

Hence the equation:

$$[(4\text{mW})/(5 \text{ mm})] [\sqrt{2.441(\text{GHz})}] = 1.2$$

The computed value of 1.2 is < 3.0, and so Bluetooth qualifies for Standalone SAR test exclusion.

Estimated SAR for Simultaneous Transmission SAR Analysis

As SAR was not measured for Bluetooth, estimated Standalone SAR values were computed for Bluetooth for the purpose of Simultaneous Transmission SAR Analysis using the following formula:

$$(\text{max. power of channel, including tune-up tolerance, mW})/(\text{min. test separation distance, mm}) \cdot [\sqrt{f(\text{GHz})/x}] \text{ W/kg,}$$

With x = 7.5 for 1-g SAR

This standalone SAR estimation was performed in accordance with the separation distances listed in Section 17.1 "Antenna Locations" and only at the applicable simultaneous transmission test positions. The estimated SAR results are as follow:

Test Position	Power of Channel, with Tune-Up Tolerance, mW	Minimum. Test Separation Distance, mm	Estimated 1-g SAR Values, W/kg
Rear	4	8	0.104
Edge 4	4	5	0.167

Note(s):

1. Power and distance are rounded to the nearest mW and mm before calculation
2. If the minimum test separation distance is <5mm then 5mm is used in the calculation

14.2. Sum of the SAR for CDMA & Wi-Fi 2.4 GHz Band

Test Position	Data							Σ 1-g SAR (mW/g)
	CDMA BC0 1xRTT	CDMA BC1 1xRTT	CDMA BC0 1xEVDO	CDMA BC1 1xEVDO	WiFi 2.4 GHz Main	WiFi 2.4 GHz Aux	Bluetooth	
Rear, Wi-Fi 1 Tx	0.273				0.01094		0.104	0.388
	0.273					0.093		0.366
		0.193			0.01094		0.104	0.308
		0.193				0.093		0.286
			0.237		0.01094		0.104	0.352
			0.237			0.093		0.330
				0.063	0.01094		0.104	0.178
				0.063		0.093		0.156
Rear, Wi-Fi 2 Tx (MIMO)	0.273				0.00319	0.017		0.293
		0.193			0.00319	0.017		0.213
			0.237		0.00319	0.017		0.257
				0.063	0.00319	0.017		0.083
Edge 1, 0 mm, w/ WWAN Power Reduction	1.005				1.425			2.430
		1.257			1.425			2.682
			1.26		1.425			2.685
				1.3	1.425			2.725
Edge 4	0.199					1.29		1.489
	0.199						0.167	0.366
		0.266				1.29		1.556
		0.266					0.167	0.433
			0.344			1.29		1.634
			0.344				0.167	0.511
				0.296		1.29		1.586
				0.296			0.167	0.463

Notes:

1. Simultaneous transmission SAR measurement (Volume Scan) is not required when the sum of the 1-g SAR is < 1.6 W/kg
2. If the sum of the SAR is > 1.6 W/kg an SPLSR calculation is performed. If SPLSR is <0.04 then Simultaneous transmission SAR measurement (Volume Scan) is not required

SAR to Peak Location Separation Ratio (SPLSR)

Case #	Test Position	Worst-case combination					Σ 1-g SAR (mW/g)	Calculated distance (mm)	SPLSR	Figure
		CDMA BC0 1xRTT	CDMA BC1 1xRTT	CDMA BC0 1xEVDO	CDMA BC1 1xEVDO	WiFi 2.4 GHz Main				
1	Edge 1, 0 mm, w/ WWAN Power Reduction	1.005				1.425	2.430	131.26	0.029	1
2			1.257			1.425	2.682	127.41	0.034	2
3				1.26		1.425	2.685	134.72	0.033	3
4					1.3	1.425	2.725	130.64	0.034	4
5	Edge 4			0.344		1.29	1.634	121.45	0.017	5

Conclusion:

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

14.3. Sum of the SAR for LTE Band 13, Wi-Fi 2.4 GHz Band and Bluetooth

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	0.609	0.01094		0.104	0.724
	0.609		0.093		0.702
Rear, Wi-Fi 2 Tx (MIMO)	0.609	0.00319	0.017		0.629
Edge 1, 0 mm, w/ WWAN Power Reduction	1.048	1.425			2.473
Edge 4	0.241		1.29		1.531
	0.241			0.167	0.408

Notes:

1. Simultaneous transmission SAR measurement (Volume Scan) is not required when the sum of the 1-g SAR is < 1.6 W/kg
2. If the sum of the SAR is > 1.6 W/kg an SPLSR calculation is performed. If SPLSR is < 0.04 then Simultaneous transmission SAR measurement (Volume Scan) is not required.

SAR to Peak Location Separation Ratio (SPLSR)

Case #	Test Position	Worst-case combination		Σ 1-g SAR (mW/g)	Calculated distance (mm)	SPLSR	Figure
		LTE Band 13	WiFi 2.4 GHz Main				
6	Edge 1, 0 mm, w/ WWAN Pwr Reduction	1.048	1.425	2.473	155.12	0.025	6

Conclusion:

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

14.4. Sum of the SAR for CDMA & Wi-Fi 5.2 GHz Band

Test Position	Data							Σ 1-g SAR (mW/g)
	CDMA BC0 1xRTT	CDMA BC1 1xRTT	CDMA BC0 1xEVDO	CDMA BC1 1xEVDO	WiFi 5.2 GHz Main	WiFi 5.2 GHz Aux	Bluetooth	
Rear, Wi-Fi 1 Tx	0.273				0.027		0.104	0.404
	0.273					0.134		0.407
		0.193			0.027		0.104	0.324
		0.193				0.134		0.327
			0.237		0.027		0.104	0.368
			0.237			0.134		0.371
				0.063	0.027		0.104	0.194
				0.063		0.134		0.197
Rear, Wi-Fi 2 Tx (MIMO)	0.273				0.004	0.1		0.377
		0.193			0.004	0.1		0.297
			0.237		0.004	0.1		0.341
				0.063	0.004	0.1		0.167
Edge 1, 0 mm, w/ WWAN Power Reduction	1.005				1.11			2.115
		1.257			1.11			2.367
			1.26		1.11			2.370
				1.3	1.11			2.410
Edge 4	0.199					0.721		0.920
	0.199						0.167	0.366
		0.266				0.721		0.987
		0.266					0.167	0.433
			0.344			0.721		1.065
			0.344				0.167	0.511
				0.296		0.721		1.017
				0.296			0.167	0.463

Notes:

1. Simultaneous transmission SAR measurement (Volume Scan) is not required when the sum of the 1-g SAR is < 1.6 W/kg
2. If the sum of the SAR is > 1.6 W/kg an SPLSR calculation is performed. If SPLSR is < 0.04 then Simultaneous transmission SAR measurement (Volume Scan) is not required

SAR to Peak Location Separation Ratio (SPLSR)

Case #	Test Position	Worst-case combination					Σ 1-g SAR (mW/g)	Calculated distance (mm)	SPLSR	Figure
		CDMA BC0 1xRTT	CDMA BC1 1xRTT	CDMA BC0 1xEVDO	CDMA BC1 1xEVDO	WiFi 5.2 GHz Main				
7	Edge 1, 0 mm, w/ WWAN Power Reduction	1.005				1.11	2.115	126.73	0.024	7
8			1.257			1.11	2.367	122.35	0.030	8
9				1.260		1.11	2.370	129.81	0.028	9
10					1.300	1.11	2.410	125.44	0.030	10

Conclusion:

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

14.5. Sum of the SAR for LTE Band 13 & 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	0.609	0.027		0.104	0.740
	0.609		0.134		0.743
Rear, Wi-Fi 2 Tx (MIMO)	0.609	0.004	0.100		0.713
Edge 1, 0 mm, w/ WWAN Power Reduction	1.048	1.11			2.158
Edge 4	0.241		0.721		0.962
	0.241			0.167	0.408

Notes:

1. Simultaneous transmission SAR measurement (Volume Scan) is not required when the sum of the 1-g SAR is < 1.6 W/kg
2. If the sum of the SAR is > 1.6 W/kg an SPLSR calculation is performed. If SPLSR is < 0.04 then Simultaneous transmission SAR measurement (Volume Scan) is not required

SAR to Peak Location Separation Ratio (SPLSR)

Case #	Test Position	Worst-case combination		Σ 1-g SAR (mW/g)	Calculated distance (mm)	SPLSR	Figure
		LTE Band 13	WiFi 5.2 GHz Main				
11	Edge 1, 0 mm, w/ WWAN Pwr Reduction	1.048	1.110	2.158	150.2	0.021	11

Conclusion:

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

14.6. Sum of the SAR for CDMA & Wi-Fi 5.3 GHz Band

Test Position	Data							Σ 1-g SAR (mW/g)
	CDMA BC0 1xRTT	CDMA BC1 1xRTT	CDMA BC0 1xEVDO	CDMA BC1 1xEVDO	WiFi 5.3 GHz Main	WiFi 5.3 GHz Aux	Bluetooth	
Rear, Wi-Fi 1 Tx	0.273				0.023		0.104	0.400
	0.273					0.132		0.405
		0.193			0.023		0.104	0.320
		0.193				0.132		0.325
			0.237		0.023		0.104	0.364
			0.237			0.132		0.369
				0.063	0.023		0.104	0.190
				0.063		0.132		0.195
Rear, Wi-Fi 2 Tx (MIMO)	0.273				0.012	0.108		0.393
		0.193			0.012	0.108		0.313
			0.237		0.012	0.108		0.357
				0.063	0.012	0.108		0.183
Edge 1, 0 mm, w/ WWAN Power Reduction	1.005				1.307			2.312
		1.257			1.307			2.564
			1.26		1.307			2.567
				1.3	1.307			2.607
Edge 4	0.199					0.724		0.923
	0.199						0.167	0.366
		0.266				0.724		0.990
		0.266					0.167	0.433
			0.344			0.724		1.068
			0.344				0.167	0.511
				0.296		0.724		1.020
				0.296			0.167	0.463

Notes:

1. Simultaneous transmission SAR measurement (Volume Scan) is not required when the sum of the 1-g SAR is < 1.6 W/kg
2. If the sum of the SAR is > 1.6 W/kg an SPLSR calculation is performed. If SPLSR is < 0.04 then Simultaneous transmission SAR measurement (Volume Scan) is not required

SAR to Peak Location Separation Ratio (SPLSR)

Case #	Test Position	Worst-case combination					Σ 1-g SAR (mW/g)	Calculated distance (mm)	SPLSR	Figure
		CDMA BC0 1xRTT	CDMA BC1 1xRTT	CDMA BC0 1xEVDO	CDMA BC1 1xEVDO	WiFi 5.3 GHz Main				
12	Edge 1, 0 mm, w/ WWAN Power Reduction	1.005				1.307	2.312	128.04	0.027	12
13			1.257			1.307	2.564	123.42	0.033	13
14				1.260		1.307	2.567	130.95	0.031	14
15					1.300	1.307	2.607	126.45	0.033	15

Conclusion:

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

14.7. Sum of the SAR for LTE Band 13 & 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	0.609	0.024		0.104	0.737
	0.609		0.132		0.741
Rear, Wi-Fi 2 Tx (MIMO)	0.609	0.012	0.108		0.729
Edge 1, 0 mm, w/ WWAN Power Reduction	1.048	1.307			2.355
Edge 4	0.241		0.724		0.965
	0.241			0.167	0.408

Notes:

1. Simultaneous transmission SAR measurement (Volume Scan) is not required when the sum of the 1-g SAR is < 1.6 W/kg
2. If the sum of the SAR is > 1.6 W/kg an SPLSR calculation is performed. If SPLSR is < 0.04 then Simultaneous transmission SAR measurement (Volume Scan) is not required

SAR to Peak Location Separation Ratio (SPLSR)

Case #	Test Position	Worst-case combination		Σ 1-g SAR (mW/g)	Calculated distance (mm)	SPLSR	Figure
		LTE Band 13	WiFi 5.3 GHz Main				
16	Edge 1, 0 mm, w/ WWAN Pwr Reduction	1.048	1.307	2.355	151.31	0.024	16

Conclusion:

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

14.8. Sum of the SAR for CDMA & Wi-Fi 5.5 GHz Band

Test Position	Data							Σ 1-g SAR (mW/g)
	CDMA BC0 1xRTT	CDMA BC1 1xRTT	CDMA BC0 1xEVDO	CDMA BC1 1xEVDO	WiFi 5.5 GHz Main	WiFi 5.5 GHz Aux	Bluetooth	
Rear, Wi-Fi 1 Tx	0.273				0.031		0.104	0.408
	0.273					0.206		0.479
		0.193			0.031		0.104	0.328
		0.193				0.206		0.399
			0.237		0.031		0.104	0.372
			0.237			0.206		0.443
				0.063	0.031		0.104	0.198
				0.063		0.206		0.269
Rear, Wi-Fi 2 Tx (MIMO)	0.273				0.013	0.126		0.412
		0.193			0.013	0.126		0.332
			0.237		0.013	0.126		0.376
				0.063	0.013	0.126		0.202
Edge 1, 0 mm, w/ WWAN Power Reduction	1.005				1.3			2.305
		1.257			1.3			2.557
			1.26		1.3			2.560
				1.3	1.3			2.600
Edge 4	0.199					1.01		1.209
	0.199						0.167	0.366
		0.266				1.01		1.276
		0.266					0.167	0.433
			0.344			1.01		1.354
			0.344				0.167	0.511
				0.296		1.01		1.306
				0.296			0.167	0.463

Notes:

1. Simultaneous transmission SAR measurement (Volume Scan) is not required when the sum of the 1-g SAR is < 1.6 W/kg
2. If the sum of the SAR is > 1.6 W/kg an SPLSR calculation is performed. If SPLSR is < 0.04 then Simultaneous transmission SAR measurement (Volume Scan) is not required

SAR to Peak Location Separation Ratio (SPLSR)

Case #	Test Position	Worst-case combination					Σ 1-g SAR (mW/g)	Calculated distance (mm)	SPLSR	Figure
		CDMA BC0 1xRTT	CDMA BC1 1xRTT	CDMA BC0 1xEVDO	CDMA BC1 1xEVDO	WiFi 5.5 GHz Main				
17	Edge 1, 0 mm, w/ WWAN Power Reduction	1.005				1.30	2.305	129.03	0.027	17
18			1.257			1.30	2.557	124.74	0.033	18
19				1.260		1.30	2.560	132.18	0.031	19
20					1.300	1.30	2.600	127.85	0.033	20

Conclusion:

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

14.9. Sum of the SAR for LTE Band 13 & 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	0.609	0.031		0.104	0.744
	0.609		0.206		0.815
Rear, Wi-Fi 2 Tx (MIMO)	0.609	0.013	0.126		0.748
Edge 1, 0 mm, w/ WWAN Power Reduction	1.048	1.3			2.348
Edge 4	0.241		1.01		1.251
	0.241			0.167	0.408

Notes:

1. Simultaneous transmission SAR measurement (Volume Scan) is not required when the sum of the 1-g SAR is < 1.6 W/kg
2. If the sum of the SAR is > 1.6 W/kg an SPLSR calculation is performed. If SPLSR is < 0.04 then Simultaneous transmission SAR measurement (Volume Scan) is not required

SAR to Peak Location Separation Ratio (SPLSR)

Case #	Test Position	Worst-case combination		Σ 1-g SAR (mW/g)	Calculated distance (mm)	SPLSR	Figure
		LTE Band 13	WiFi 5.5 GHz Main				
21	Edge 1, 0 mm, w/ WWAN Pwr Reduction	1.048	1.3	2.348	152.57	0.024	21

Conclusion:

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

14.10. Sum of the SAR for CDMA & Wi-Fi 5.8 GHz Band

Test Position	Data							Σ 1-g SAR (mW/g)
	CDMA BC0 1xRTT	CDMA BC1 1xRTT	CDMA BC0 1xEVDO	CDMA BC1 1xEVDO	WiFi 5.8 GHz Main	WiFi 5.8 GHz Aux	Bluetooth	
Rear, Wi-Fi 1 Tx	0.273				0.031		0.104	0.408
	0.273					0.189		0.462
		0.193			0.031		0.104	0.328
		0.193				0.189		0.382
			0.237		0.031		0.104	0.372
			0.237			0.189		0.426
				0.063	0.031		0.104	0.198
				0.063		0.189		0.252
Rear, Wi-Fi 2 Tx (MIMO)	0.273				0.013	0.129		0.415
		0.193			0.013	0.129		0.335
			0.237		0.013	0.129		0.379
				0.063	0.013	0.129		0.205
Edge 1, 0 mm, w/ WWAN Power Reduction	1.005				1.231			2.236
		1.257			1.231			2.488
			1.26		1.231			2.491
				1.3	1.231			2.531
Edge 4	0.199					1.152		1.351
	0.199						0.167	0.366
		0.266				1.152		1.418
		0.266					0.167	0.433
			0.344			1.152		1.496
			0.344				0.167	0.511
				0.296		1.152		1.448
				0.296			0.167	0.463

Notes:

1. Simultaneous transmission SAR measurement (Volume Scan) is not required when the sum of the 1-g SAR is < 1.6 W/kg
2. If the sum of the SAR is > 1.6 W/kg an SPLSR calculation is performed. If SPLSR is < 0.04 then Simultaneous transmission SAR measurement (Volume Scan) is not required

SAR to Peak Location Separation Ratio (SPLSR)

Case #	Test Position	Worst-case combination					Σ 1-g SAR (mW/g)	Calculated distance (mm)	SPLSR	Figure
		CDMA BC0 1xRTT	CDMA BC1 1xRTT	CDMA BC0 1xEVDO	CDMA BC1 1xEVDO	WiFi 5.8 GHz Main				
22	Edge 1, 0 mm, w/ WWAN Power Reduction	1.005				1.23	2.236	127.73	0.026	22
23			1.257			1.23	2.488	123.35	0.032	23
24				1.260		1.23	2.491	130.81	0.030	24
25					1.300	1.23	2.531	126.44	0.032	25

Conclusion:

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

14.11. Sum of the SAR for LTE Band 13 & 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	0.609	0.031		0.104	0.744
	0.609		0.189		0.798
Rear, Wi-Fi 2 Tx (MIMO)	0.609	0.013	0.129		0.751
Edge 1, 0 mm, w/ WWAN Power Reduction	1.048	1.231			2.279
Edge 4	0.241		1.152		1.393
	0.241			0.167	0.408

Notes:

1. Simultaneous transmission SAR measurement (Volume Scan) is not required when the sum of the 1-g SAR is < 1.6 W/kg
2. If the sum of the SAR is > 1.6 W/kg an SPLSR calculation is performed. If SPLSR is < 0.04 then Simultaneous transmission SAR measurement (Volume Scan) is not required

SAR to Peak Location Separation Ratio (SPLSR)

Case #	Test Position	Worst-case combination		Σ 1-g SAR (mW/g)	Calculated distance (mm)	SPLSR	Figure
		LTE Band 13	WiFi 5.8 GHz Main				
26	Edge 1, 0 mm, w/ WWAN Pwr Reduction	1.048	1.231	2.279	151.2	0.023	26

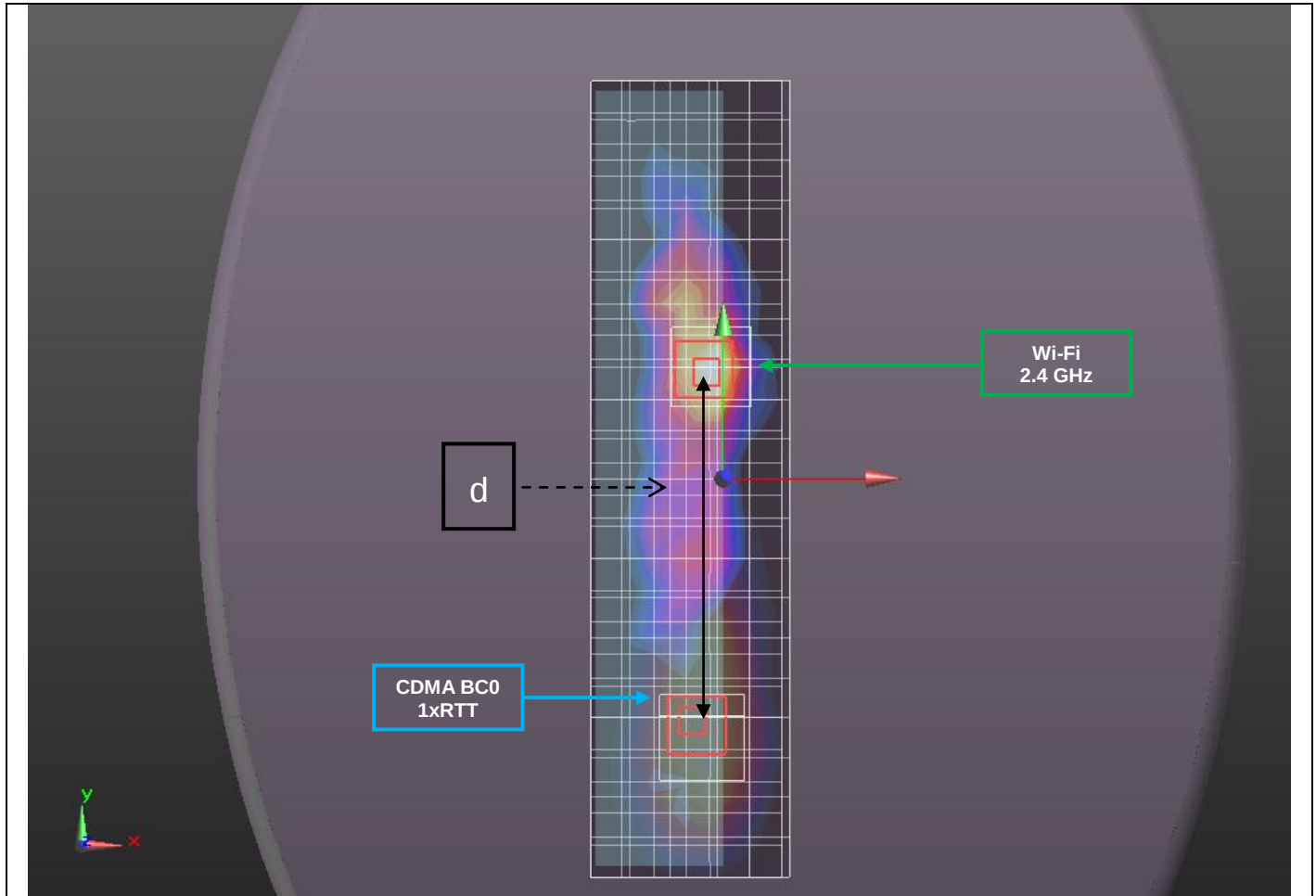
Conclusion:

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

14.12. SAR Peak Location Separation Distance Calculations and Figures

14.12.1. Wi-Fi 2.4 GHz and WWAN

Figure (1)



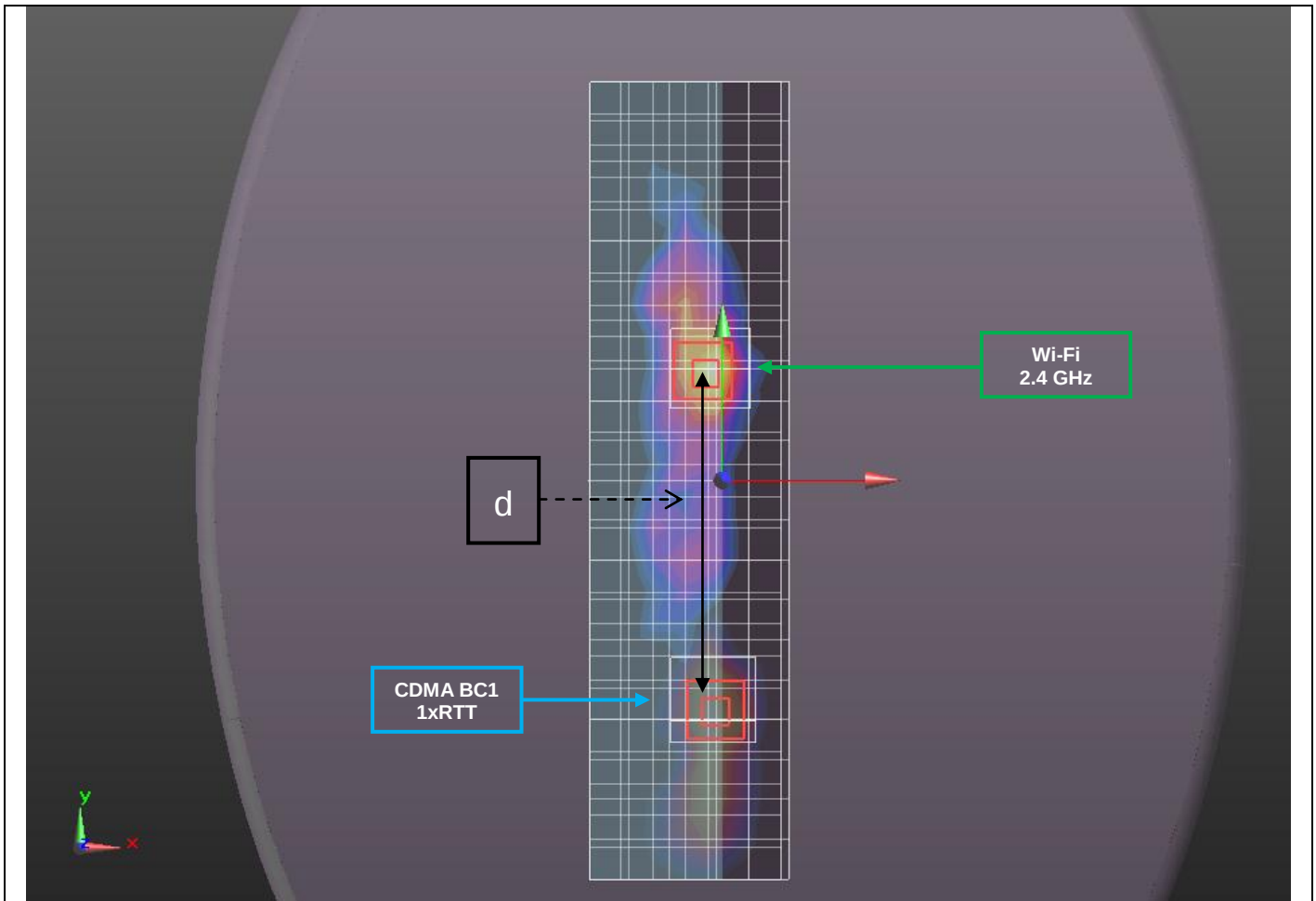
Mode	Peak SAR mW/g	X m	Y m	Z m
CDMA BC0 1xRTT	1.98	-0.0128	-0.0911	-0.182
WiFi 2.4 GHz	3.66	-0.00638	0.04	-0.182

d: Calculated distance (mm)

131.26

Note: $d = \sqrt{(X1-X2)^2 + (Y1-Y2)^2 + (Z1-Z2)^2}$

Figure (2)



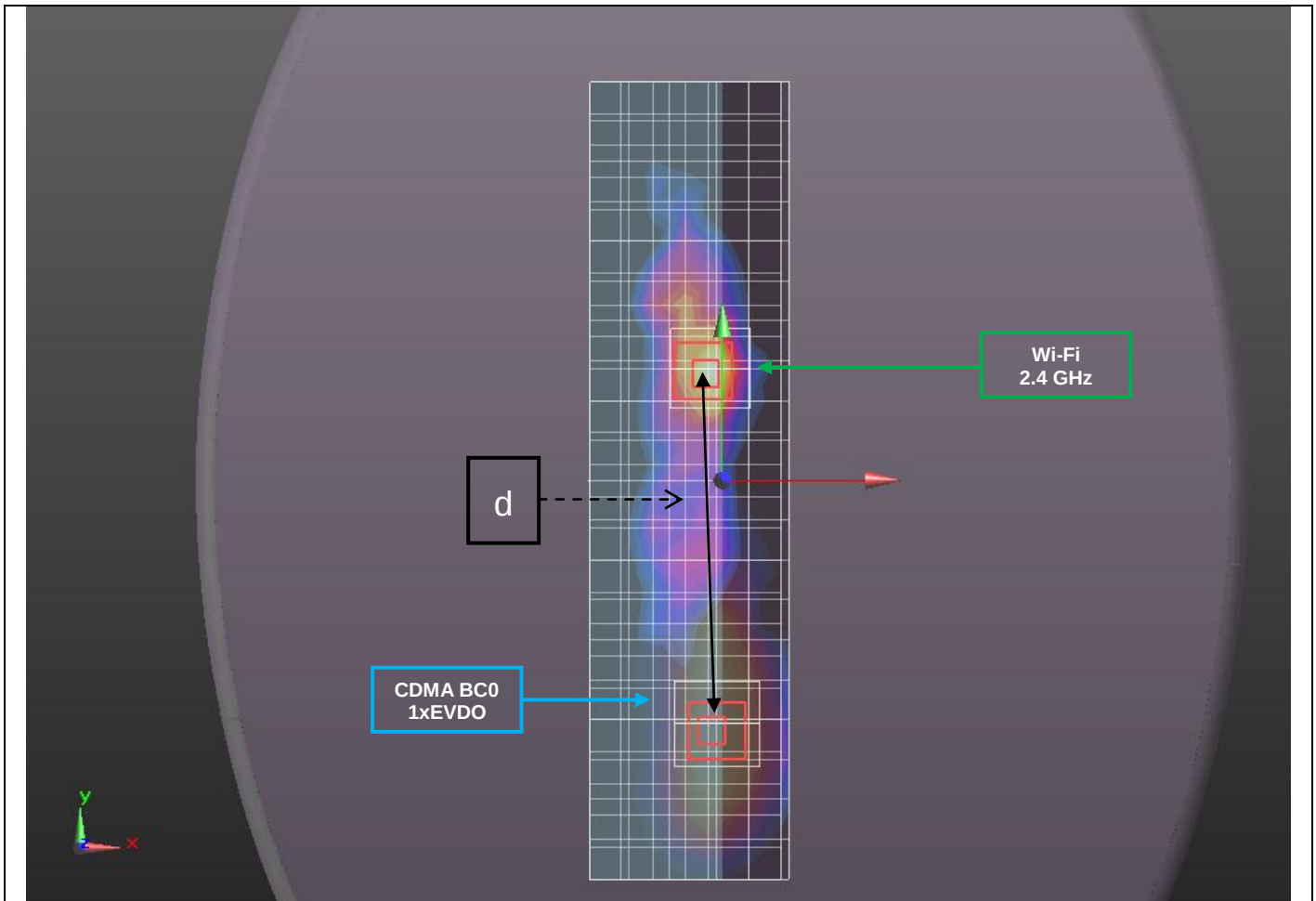
Mode	Peak SAR	X	Y	Z
	mW/g	m	m	m
CDMA BC1 1xRTT	2.88	-0.0019	-0.0873	-0.185
WiFi 2.4 GHz	3.66	-0.00638	0.04	-0.182

d: Calculated distance (mm)

127.41

Note: $d = \text{SQRT}((X1-X2)^2 + (Y1-Y2)^2 + (Z1-Z2)^2)$

Figure (3)

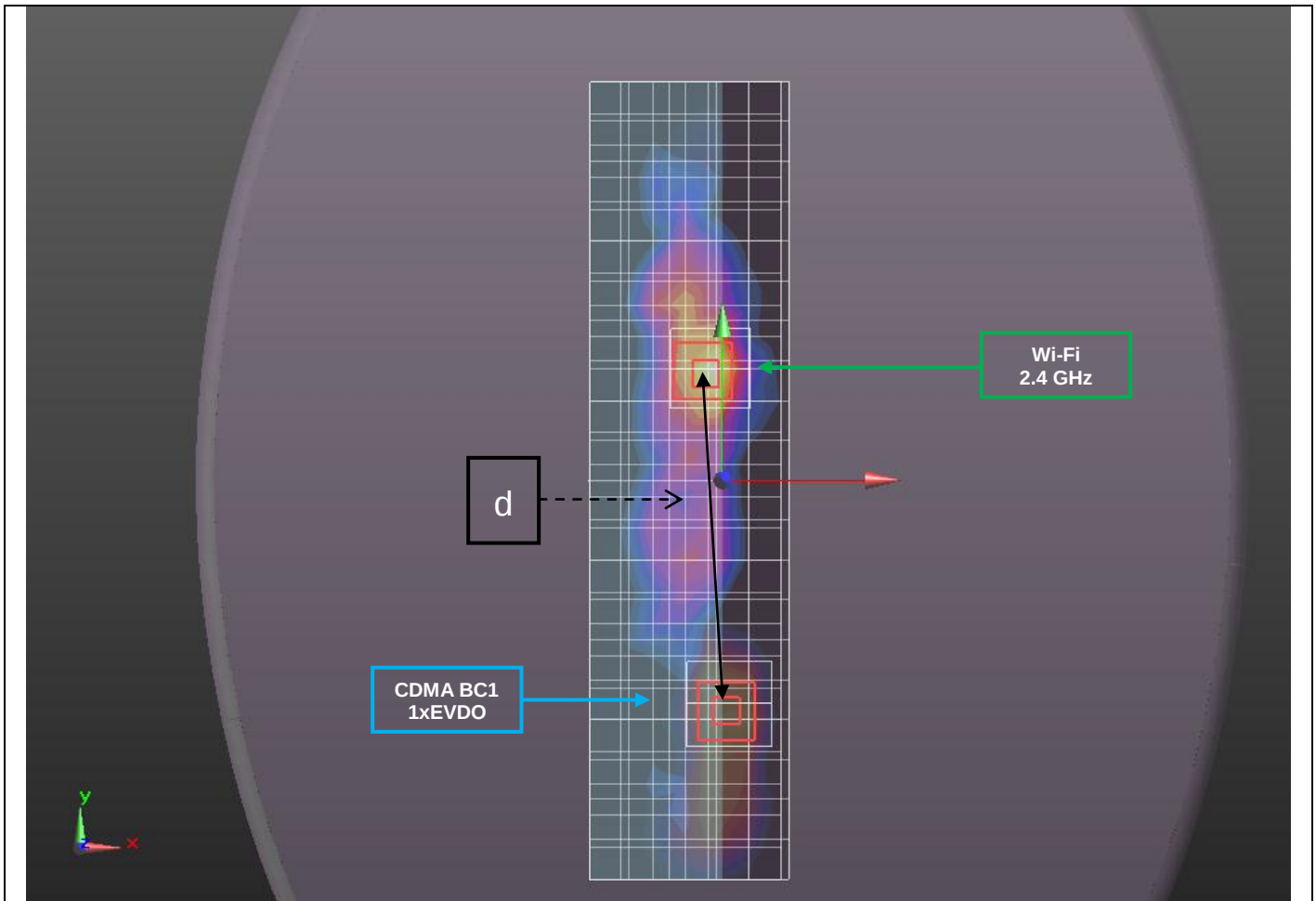


Mode	Peak SAR	X	Y	Z
	mW/g	m	m	m
CDMA BC0 1xEVDO	2.5	-0.0052	-0.0947	-0.184
WiFi 2.4 GHz	3.66	-0.00638	0.04	-0.182

d: Calculated distance (mm)
134.72

Note: $d = \text{SQRT}((X1-X2)^2 + (Y1-Y2)^2 + (Z1-Z2)^2)$

Figure (4)



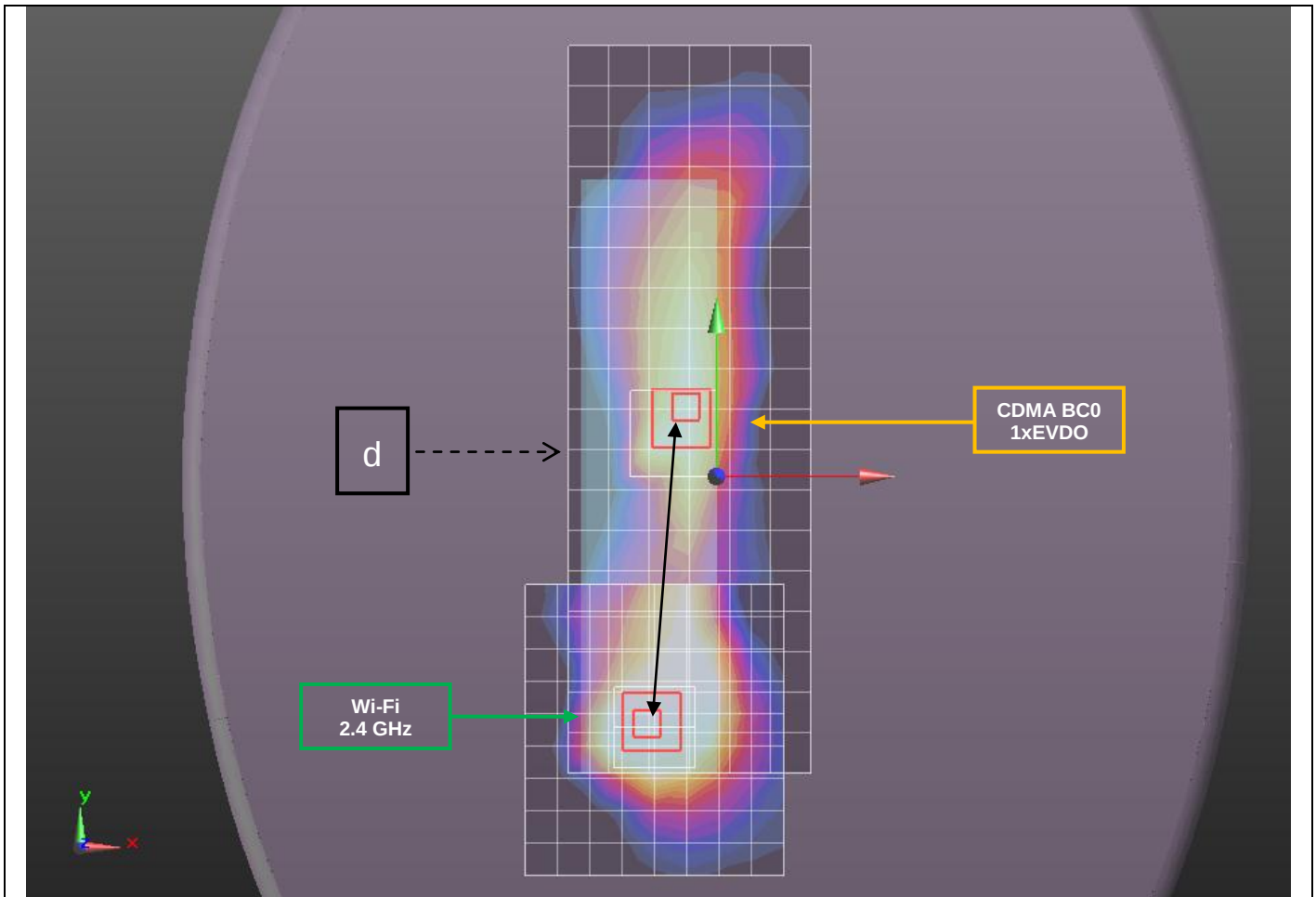
Mode	Peak SAR	X	Y	Z
	mW/g	m	m	m
CDMA BC1 1xEVDO	3.71	0.0009	-0.0904	-0.185
WiFi 2.4 GHz	3.66	-0.00638	0.04	-0.182

d: Calculated distance (mm)

130.64

Note: $d = \text{SQRT}((X1-X2)^2 + (Y1-Y2)^2 + (Z1-Z2)^2)$

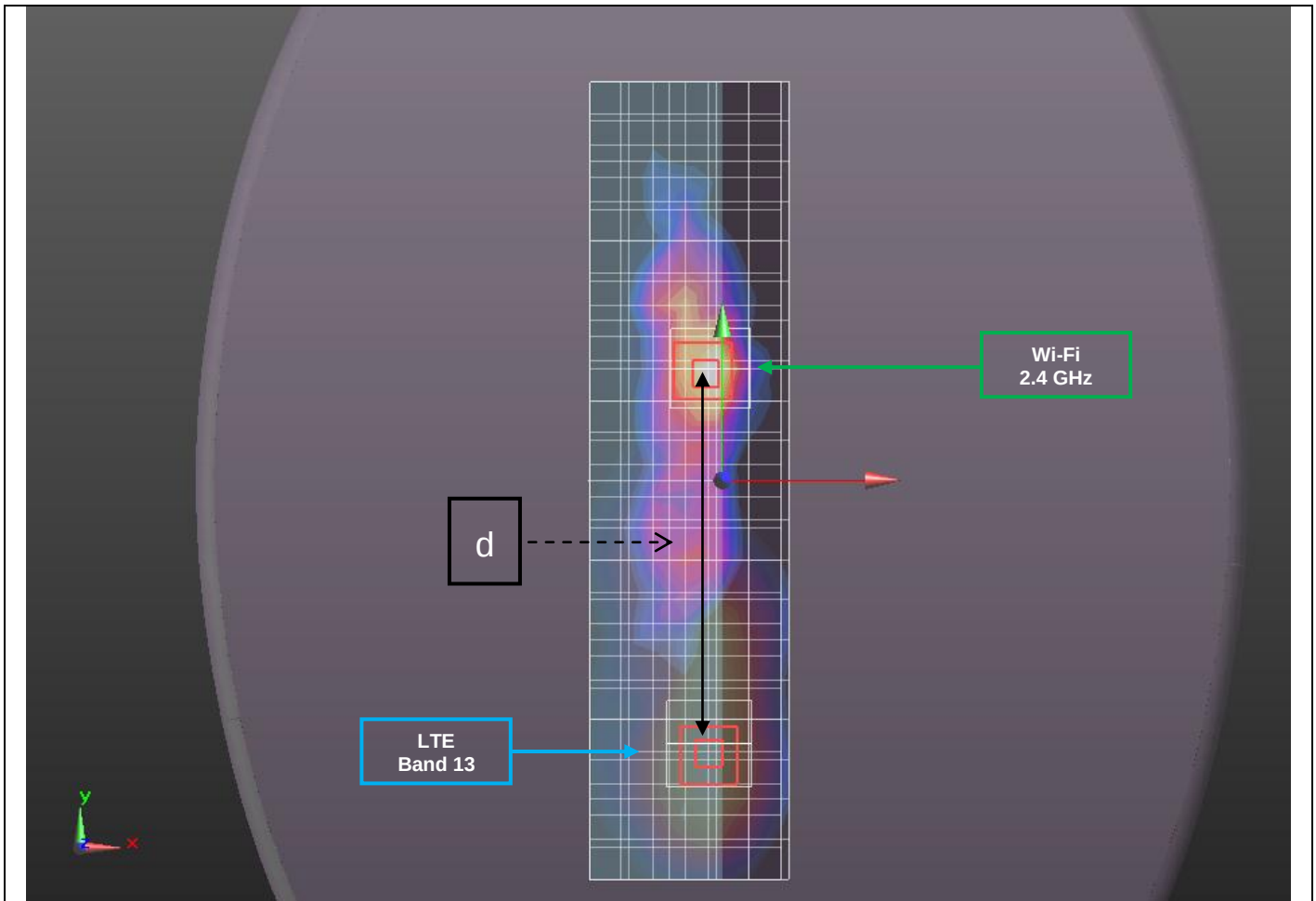
Figure (5)



Mode	Peak SAR	X	Y	Z
	mW/g	m	m	m
CDMA BC0 1xEVDO	0.641	-0.0112	0.0288	-0.185
WiFi 2.4 GHz	2.7	-0.025	-0.0918	-0.181
d: Calculated distance (mm)				
121.45				

Note: $d = \sqrt{(X1-X2)^2 + (Y1-Y2)^2 + (Z1-Z2)^2}$

Figure (6)



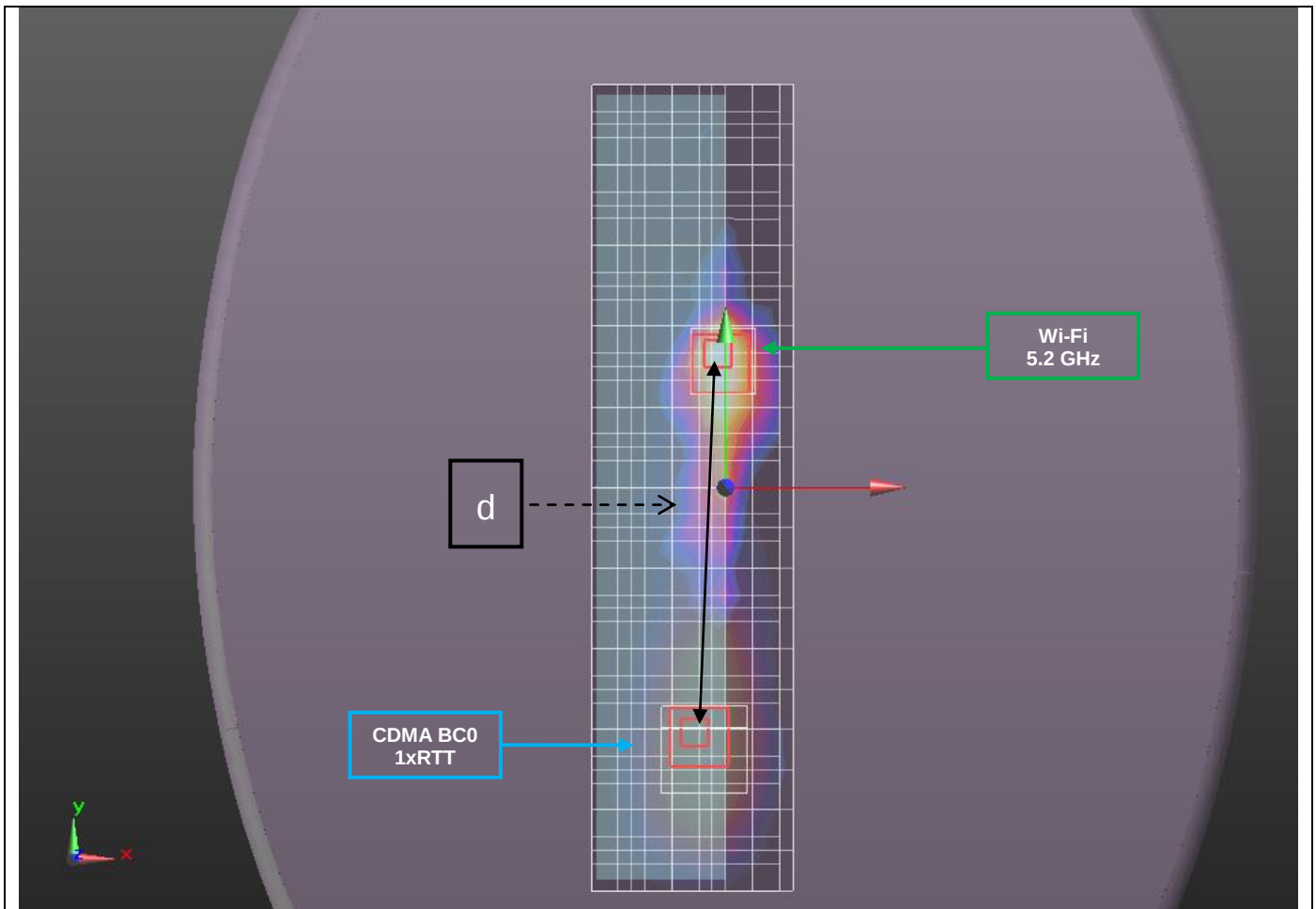
Mode	Peak SAR	X	Y	Z
	mW/g	m	m	m
LTE Band 13	1.94	-0.005	-0.115	-0.188
WiFi 2.4 GHz	3.66	-0.00638	0.04	-0.182

d: Calculated distance (mm)
155.12

Note: $d = \text{SQRT}((X1-X2)^2 + (Y1-Y2)^2 + (Z1-Z2)^2)$

14.12.2. Wi-Fi 5.2 GHz and WWAN

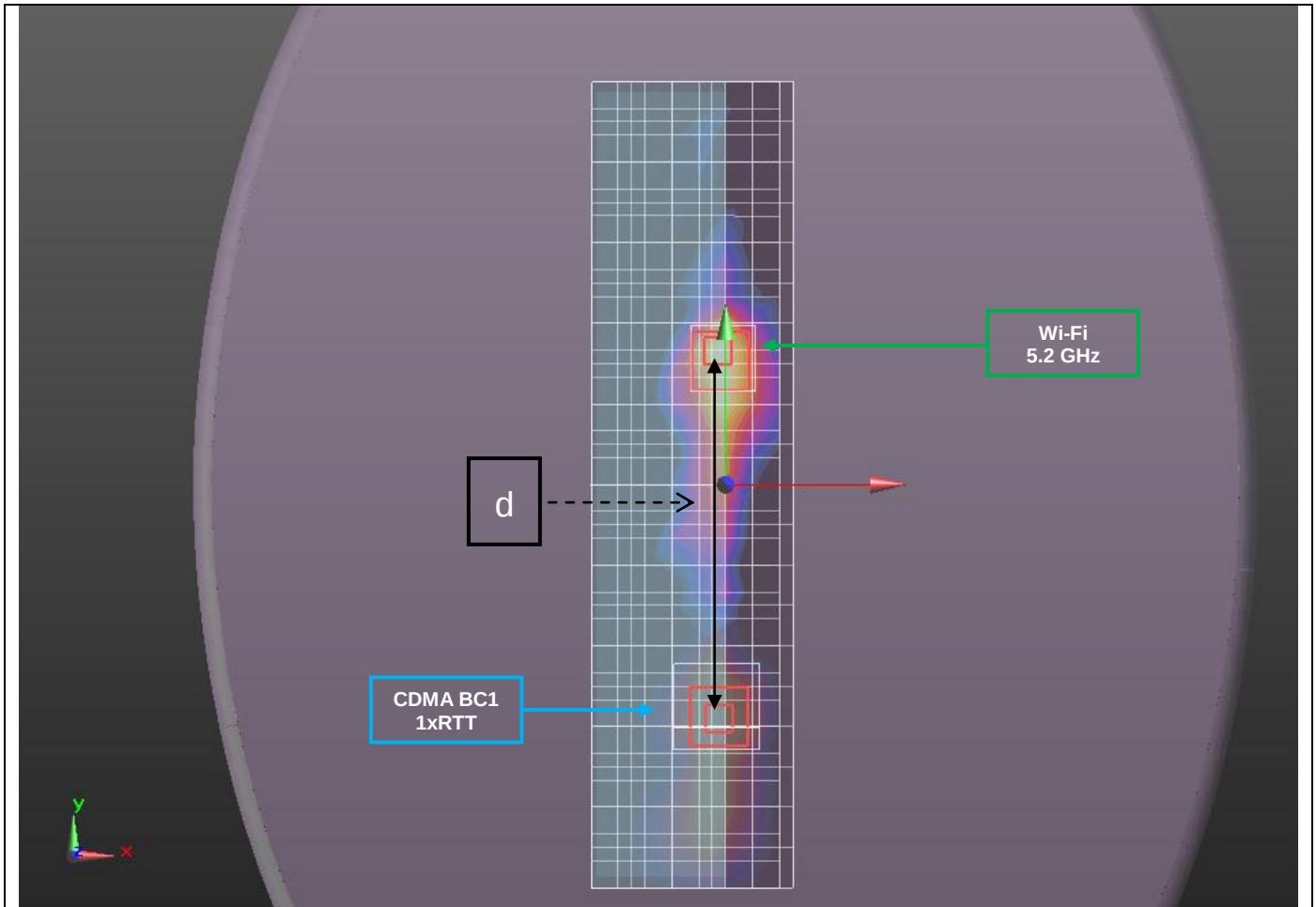
Figure (7)



Mode	Peak SAR	X	Y	Z
	mW/g	m	m	m
CDMA BC0 1xRTT	1.98	-0.0128	-0.0911	-0.182
WiFi 5.2 GHz	7.24	-0.000154	0.035	-0.182
d: Calculated distance (mm)				
126.73				

Note: $d = \text{SQRT}((X1-X2)^2 + (Y1-Y2)^2 + (Z1-Z2)^2)$

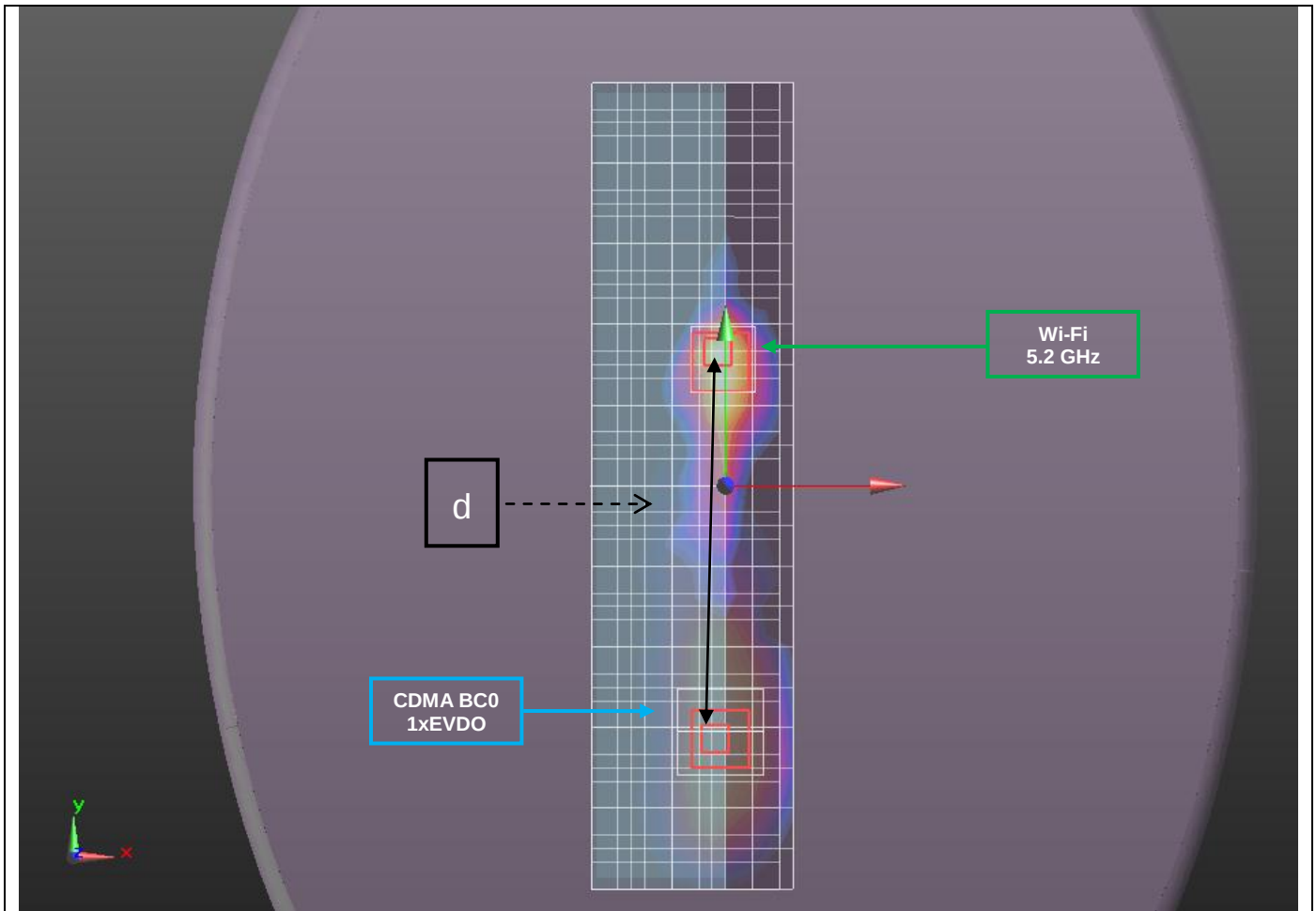
Figure (8)



Mode	Peak SAR	X	Y	Z
	mW/g	m	m	m
CDMA BC1 1xRTT	2.88	-0.0019	-0.0873	-0.185
WiFi 5.2 GHz	7.24	-0.000154	0.035	-0.182
d: Calculated distance (mm)				
122.35				

Note: $d = \sqrt{(X1-X2)^2 + (Y1-Y2)^2 + (Z1-Z2)^2}$

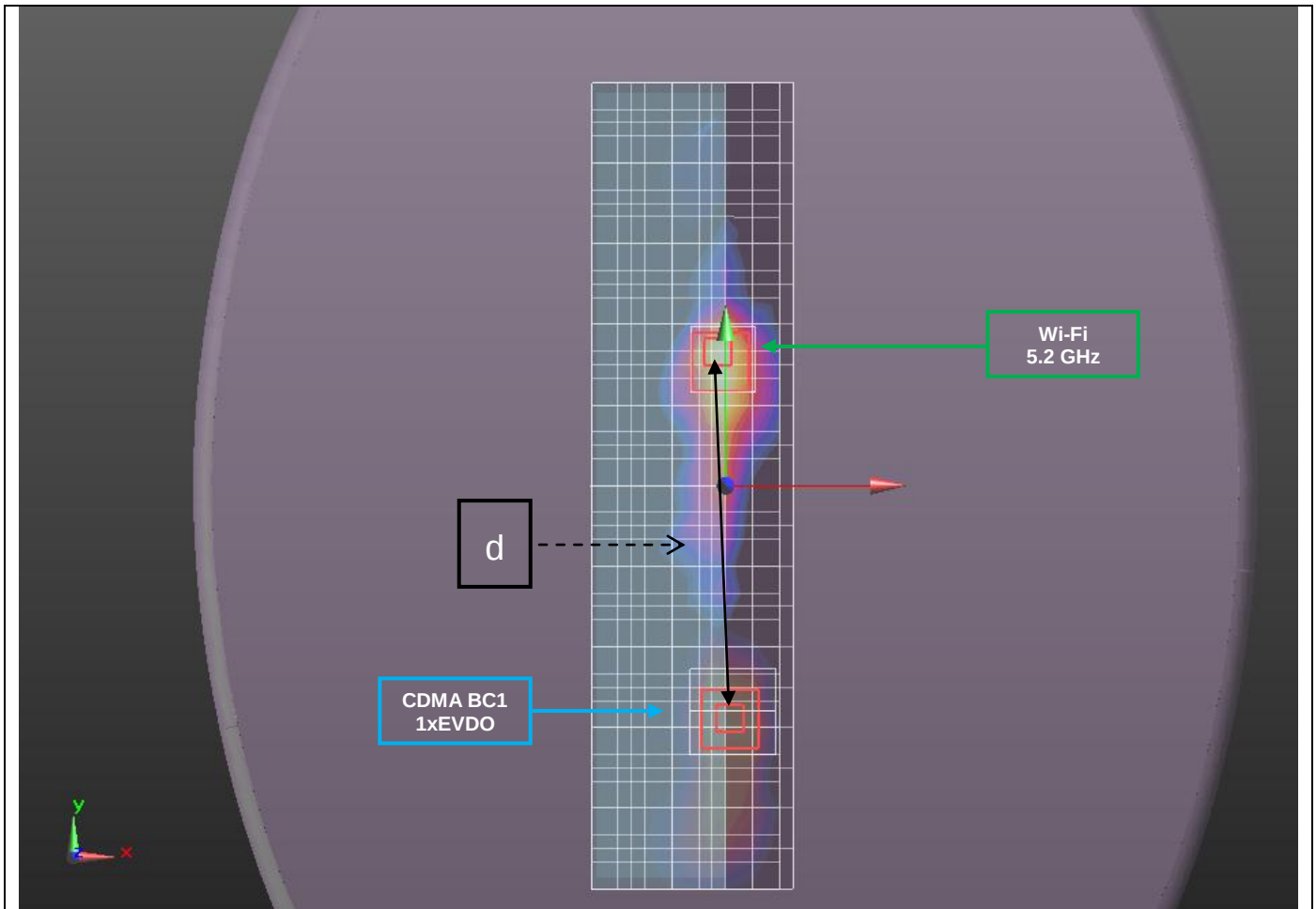
Figure (9)



Mode	Peak SAR	X	Y	Z
	mW/g	m	m	m
CDMA BC0 1xEVDO	2.5	-0.0052	-0.0947	-0.184
WiFi 5.2 GHz	7.24	-0.000154	0.035	-0.182
d: Calculated distance (mm)				
129.81				

Note: $d = \text{SQRT}((X1-X2)^2 + (Y1-Y2)^2 + (Z1-Z2)^2)$

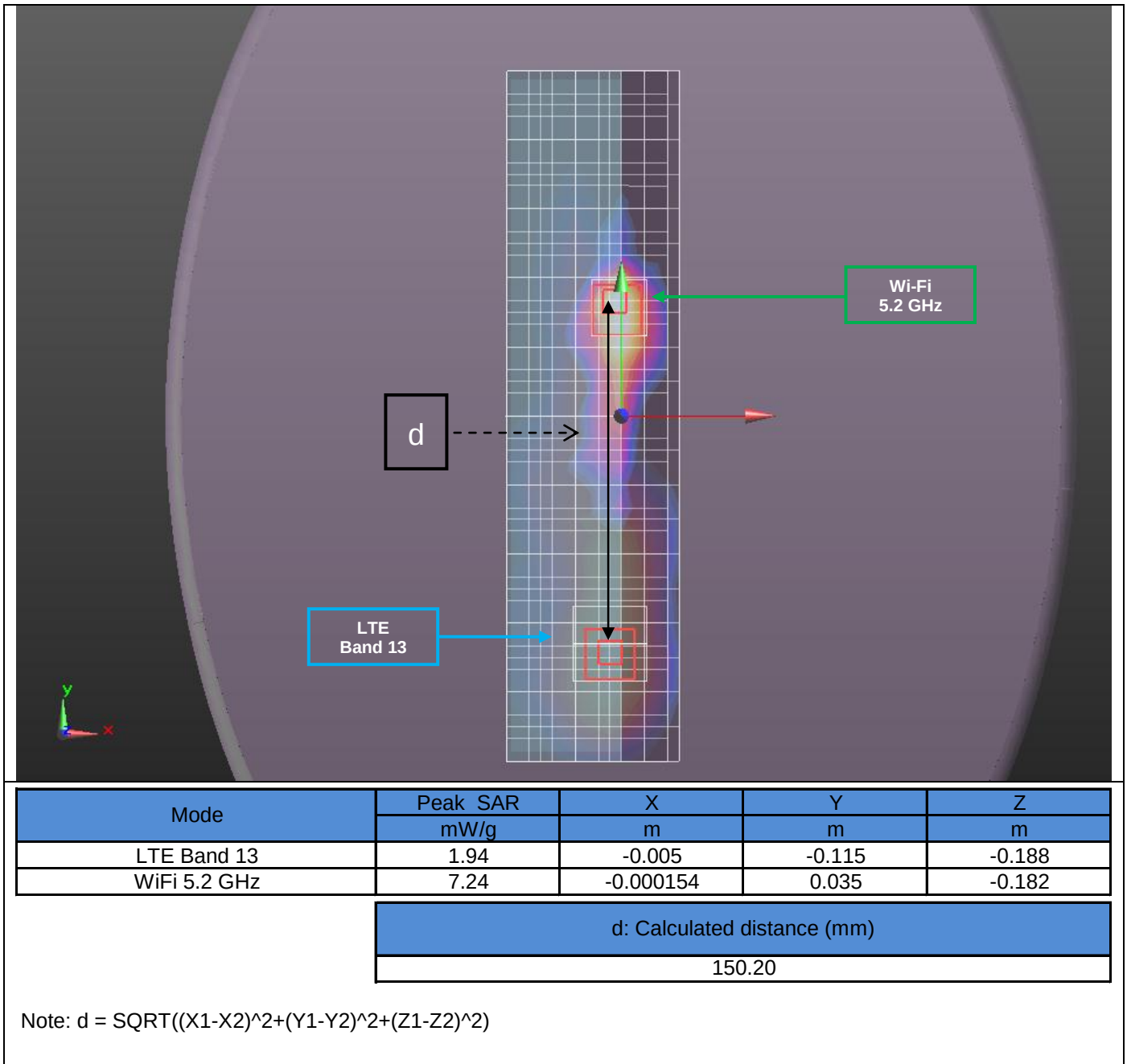
Figure (10)



Mode	Peak SAR	X	Y	Z
	mW/g	m	m	m
CDMA BC1 1xEVDO	3.71	0.0009	-0.0904	-0.185
WiFi 5.2 GHz	7.24	-0.000154	0.035	-0.182
d: Calculated distance (mm)				
125.44				

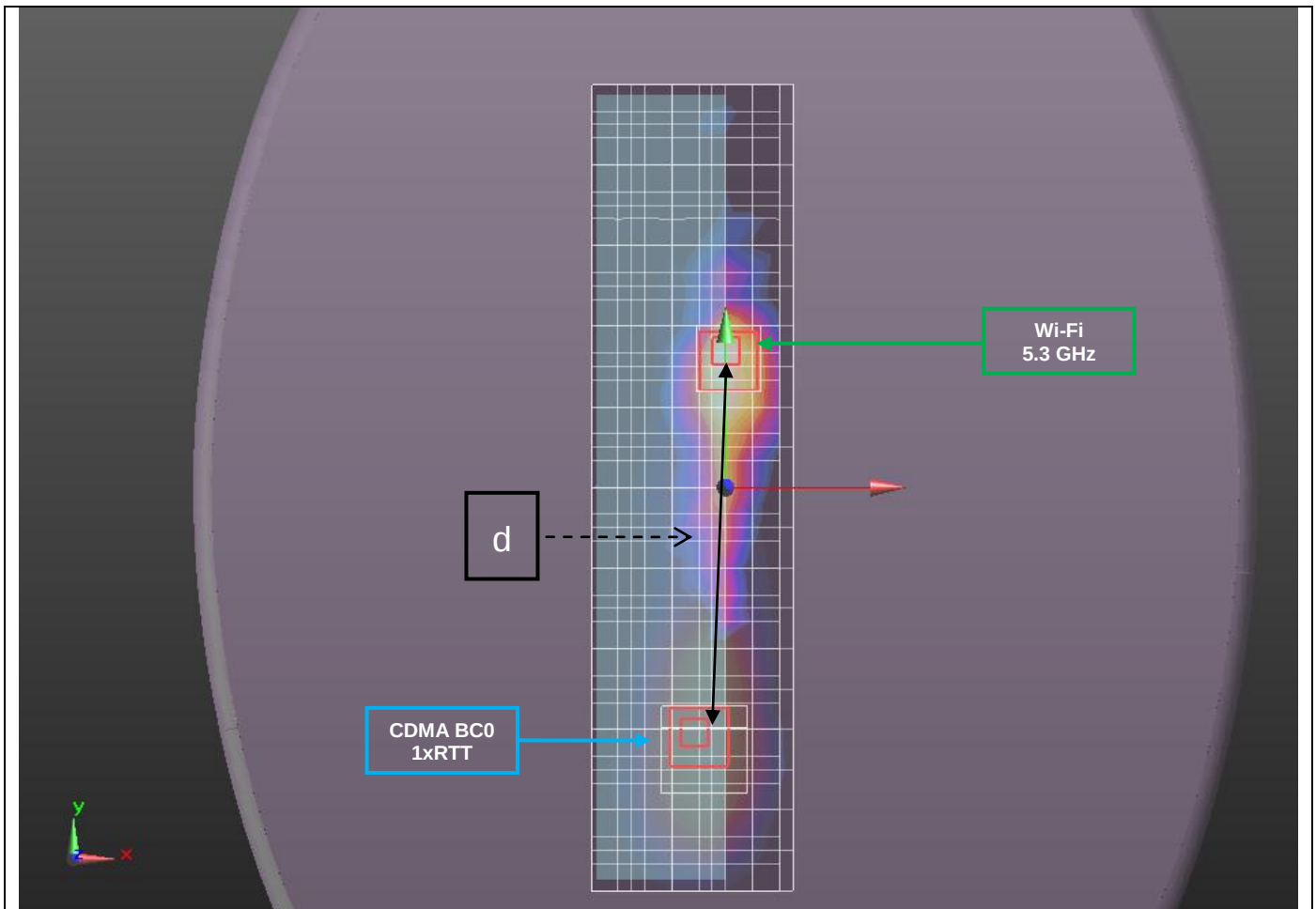
Note: $d = \text{SQRT}((X1-X2)^2+(Y1-Y2)^2+(Z1-Z2)^2)$

Figure (11)



14.12.3. Wi-Fi 5.3 GHz and WWAN

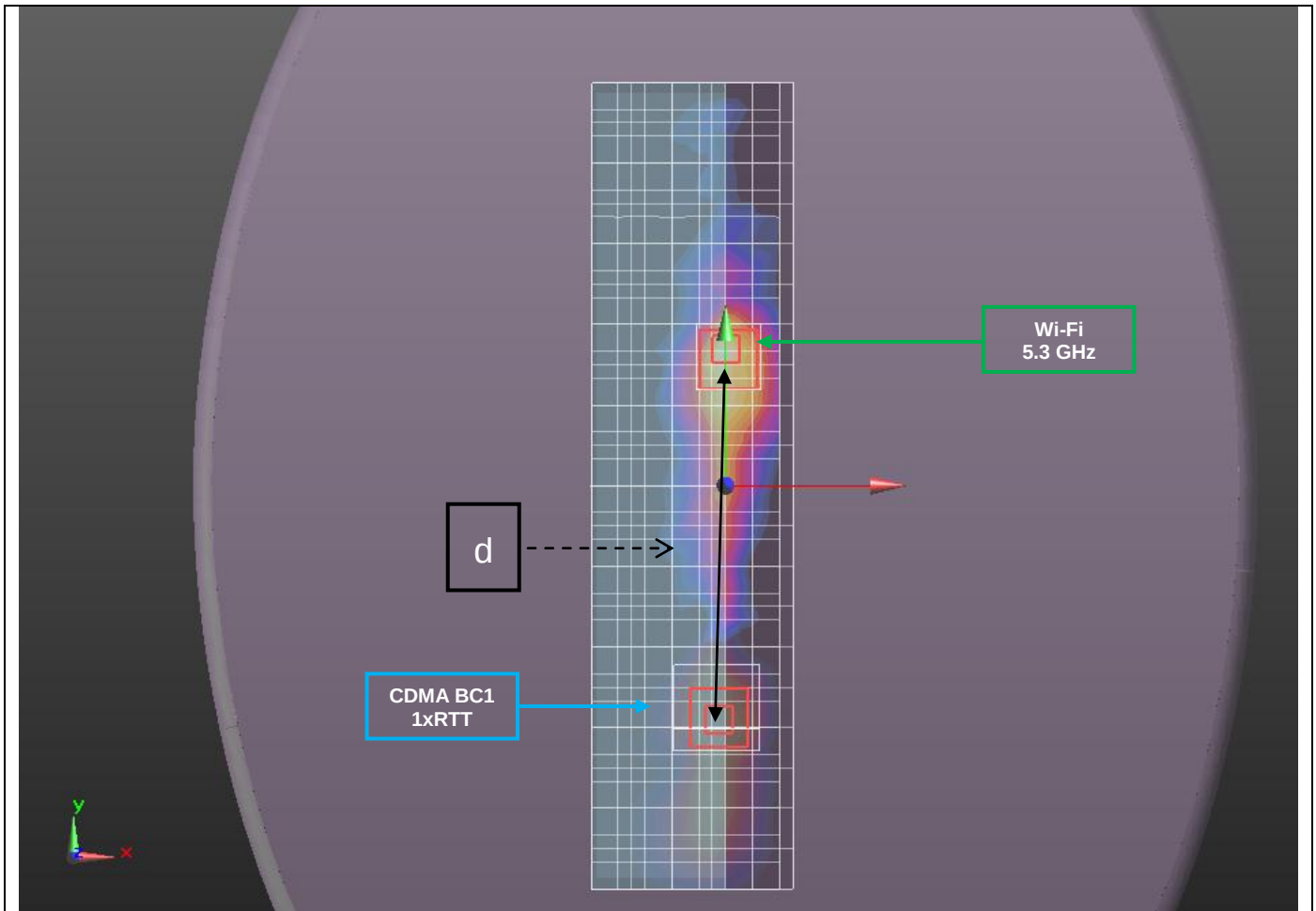
Figure (12)



Mode	Peak SAR	X	Y	Z
	mW/g	m	m	m
CDMA BC0 1xRTT	1.98	-0.0128	-0.0911	-0.182
WiFi 5.3 GHz	8.02	0.00266	0.036	-0.182
d: Calculated distance (mm)				
128.04				

Note: $d = \sqrt{(X1-X2)^2 + (Y1-Y2)^2 + (Z1-Z2)^2}$

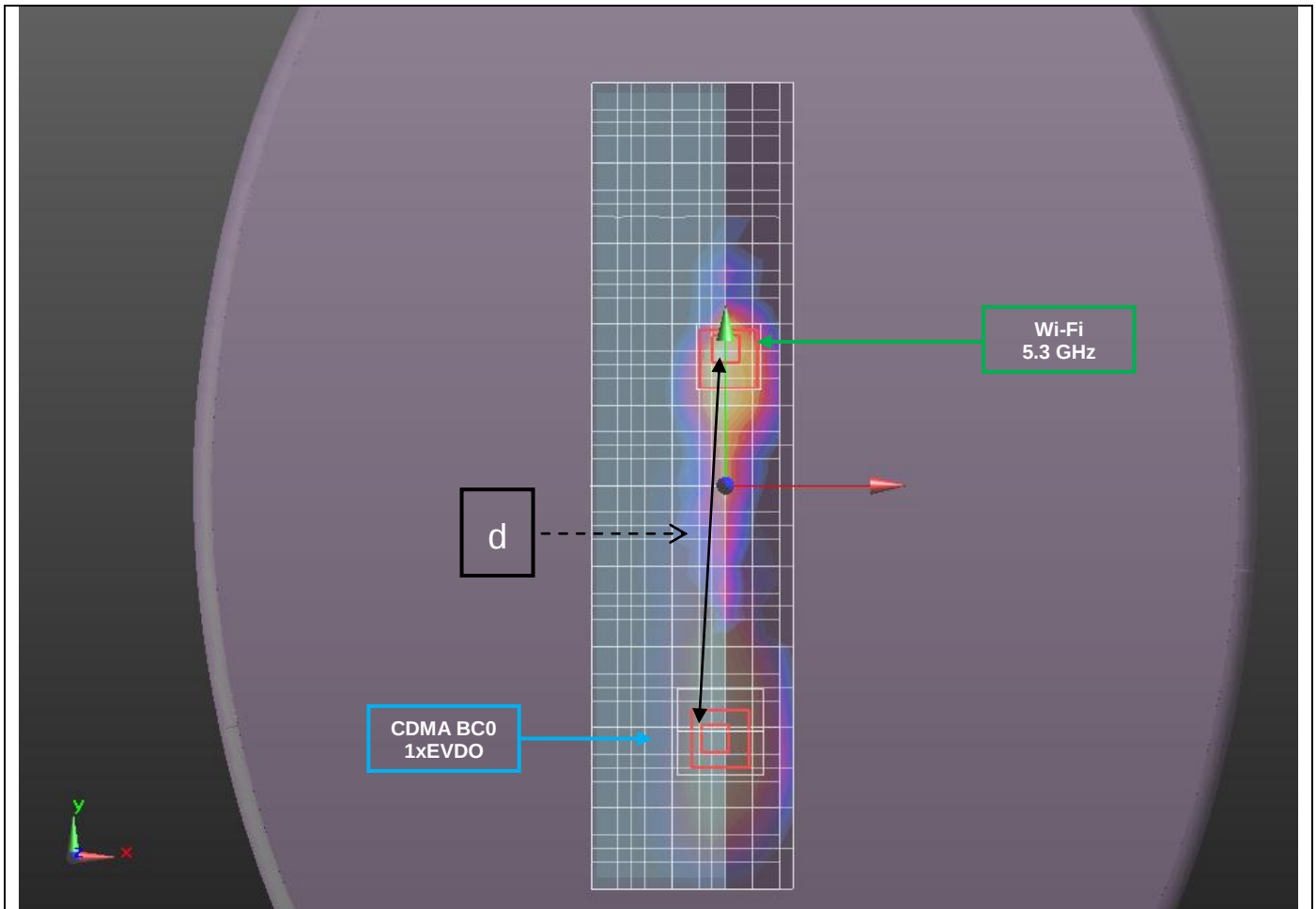
Figure (13)



Mode	Peak SAR	X	Y	Z
	mW/g	m	m	m
CDMA BC1 1xRTT	2.88	-0.0019	-0.0873	-0.185
WiFi 5.3 GHz	8.02	0.00266	0.036	-0.182
d: Calculated distance (mm)				
123.42				

Note: $d = \text{SQRT}((X1-X2)^2+(Y1-Y2)^2+(Z1-Z2)^2)$

Figure (14)

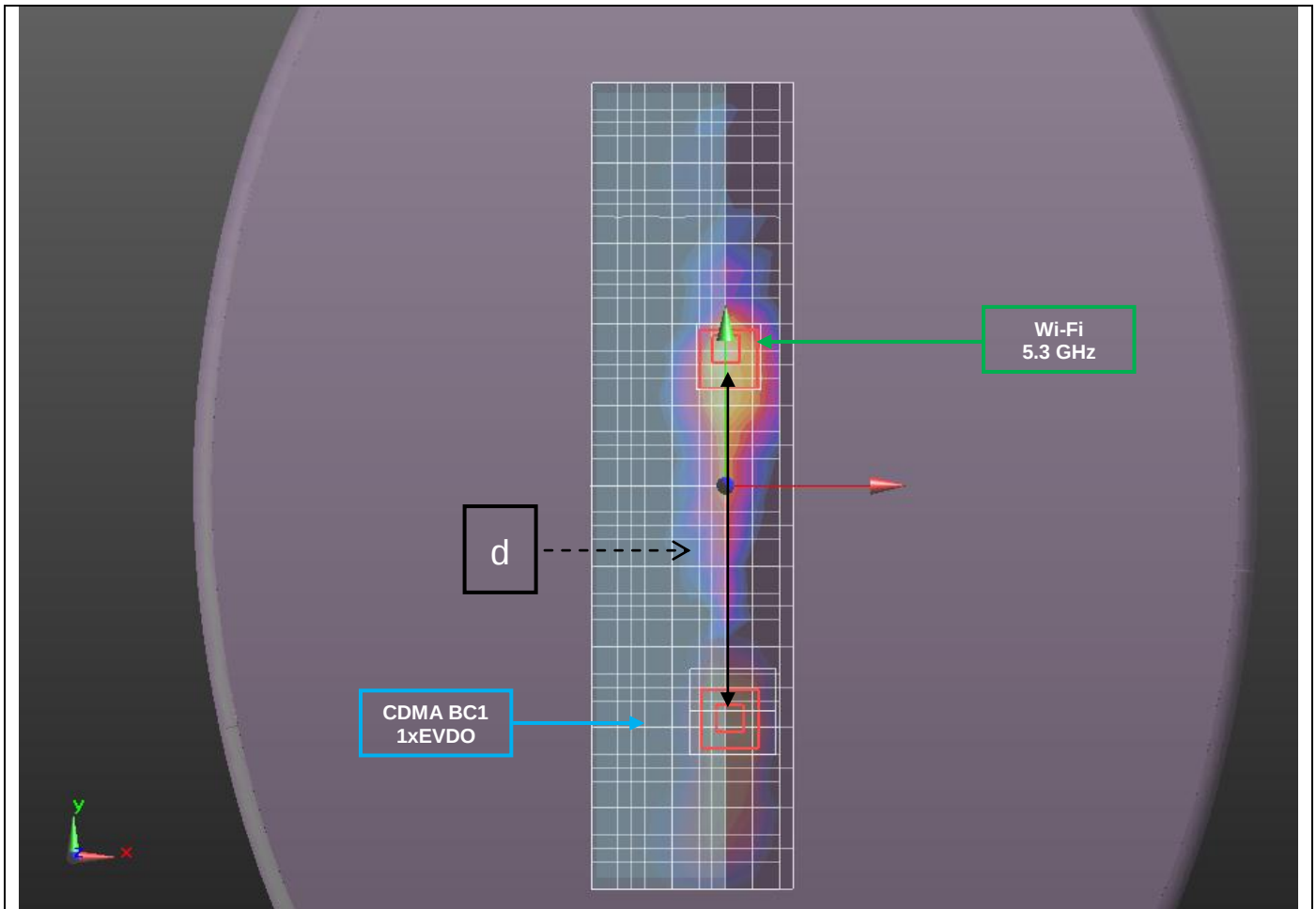


Mode	Peak SAR	X	Y	Z
	mW/g	m	m	m
CDMA BC0 1xEVDO	2.5	-0.0052	-0.0947	-0.184
WiFi 5.3 GHz	8.02	0.00266	0.036	-0.182

d: Calculated distance (mm)
130.95

Note: $d = \text{SQRT}((X1-X2)^2+(Y1-Y2)^2+(Z1-Z2)^2)$

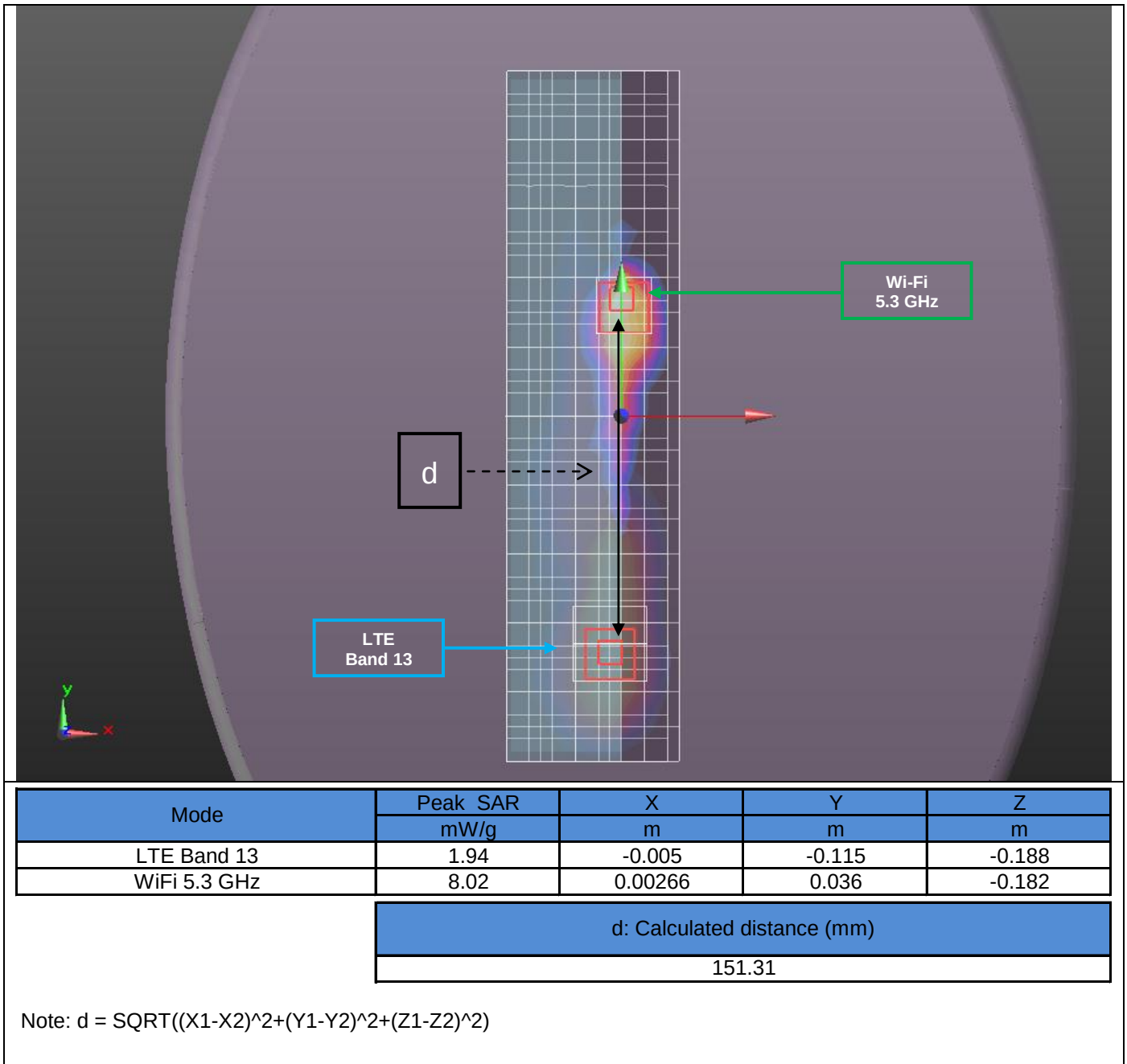
Figure (15)



Mode	Peak SAR	X	Y	Z
	mW/g	m	m	m
CDMA BC1 1xEVDO	3.71	0.0009	-0.0904	-0.185
WiFi 5.3 GHz	8.02	0.00266	0.036	-0.182
d: Calculated distance (mm)				
126.45				

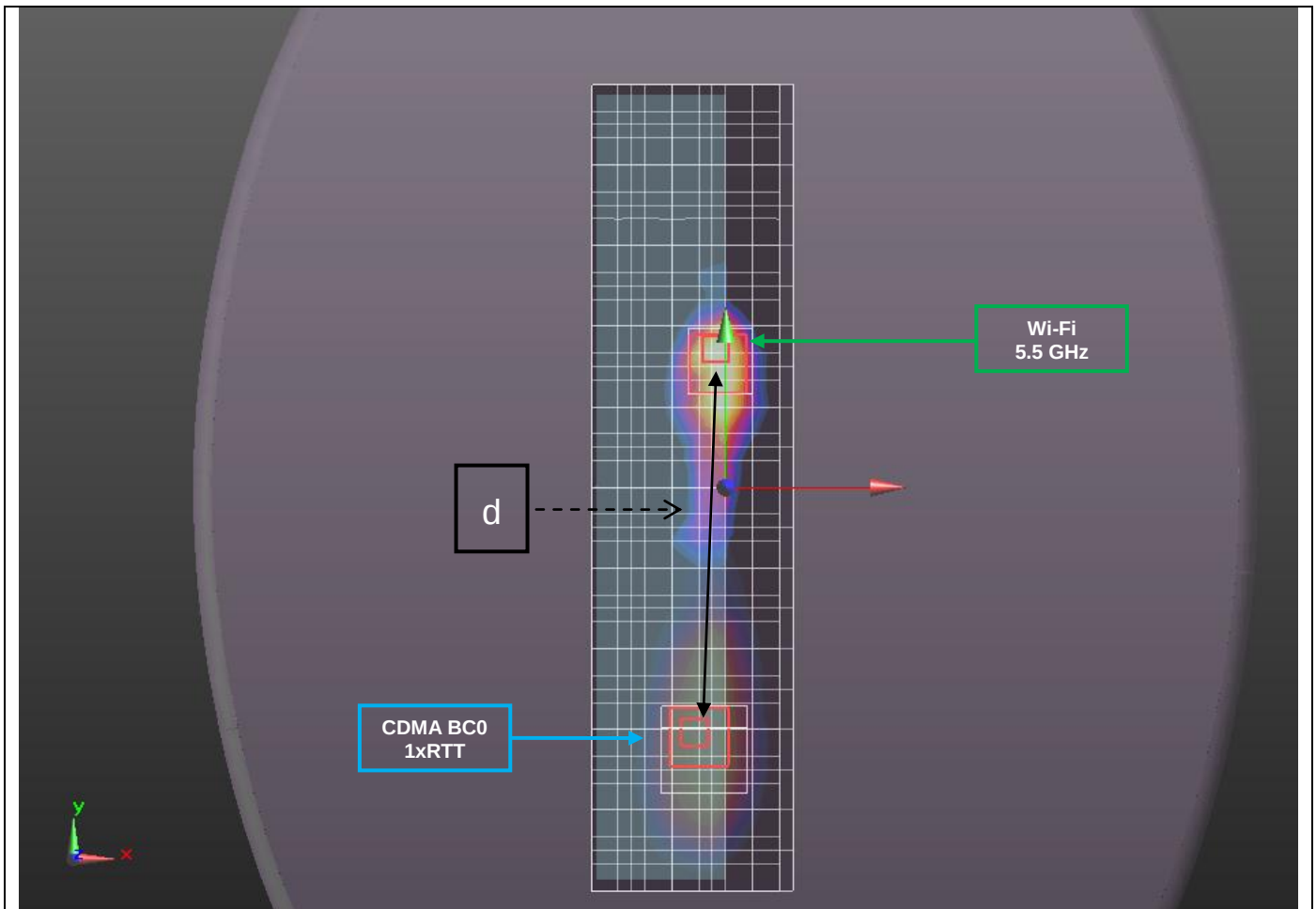
Note: $d = \text{SQRT}((X1-X2)^2 + (Y1-Y2)^2 + (Z1-Z2)^2)$

Figure (16)



14.12.4. Wi-Fi 5.5 GHz and WWAN

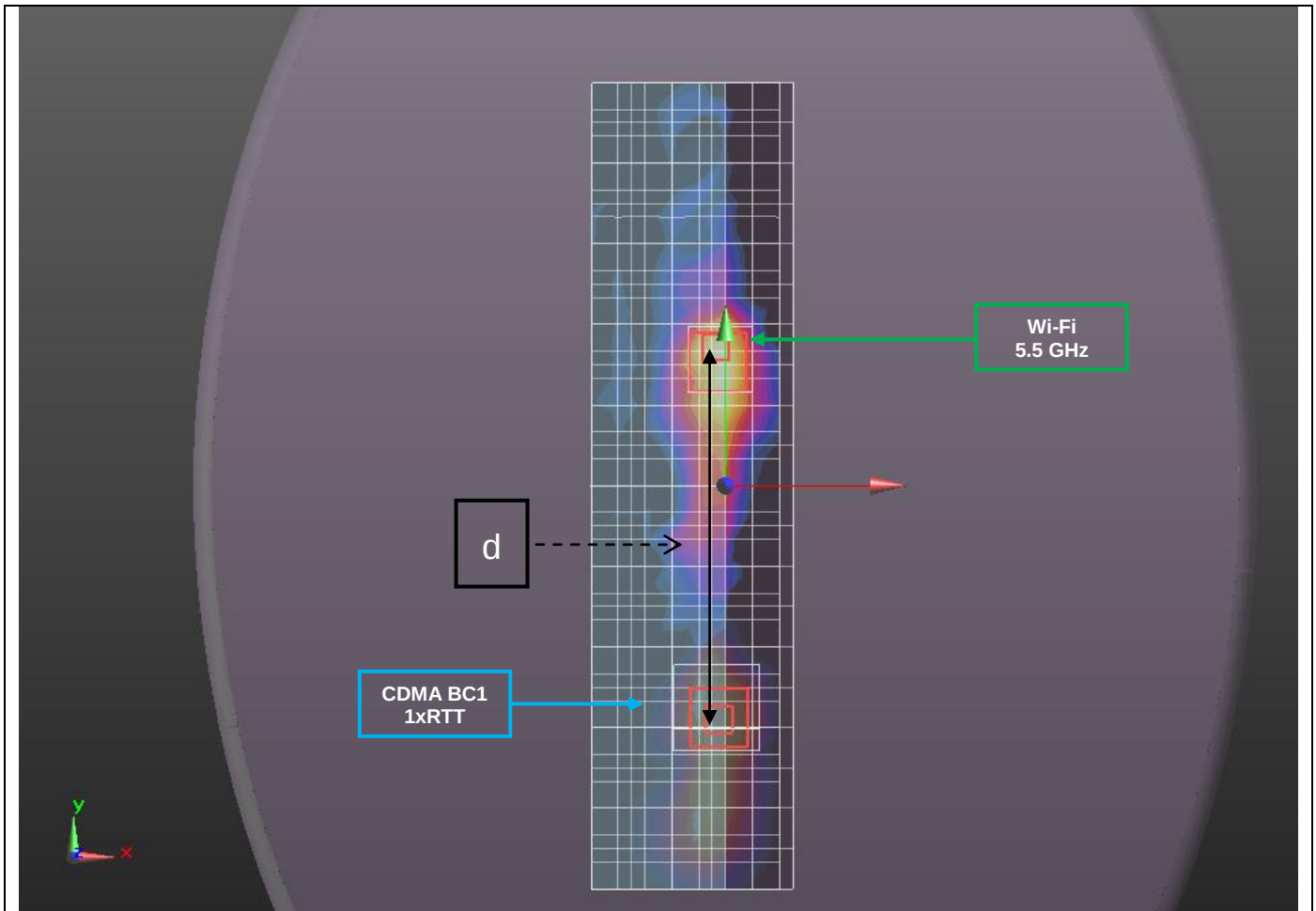
Figure (17)



Mode	Peak SAR	X	Y	Z
	mW/g	m	m	m
CDMA BC0 1xRTT	1.98	-0.0128	-0.0911	-0.182
WiFi 5.5 GHz	9.92	-0.00112	0.0374	-0.182
d: Calculated distance (mm)				
129.03				

Note: $d = \text{SQRT}((X1-X2)^2 + (Y1-Y2)^2 + (Z1-Z2)^2)$

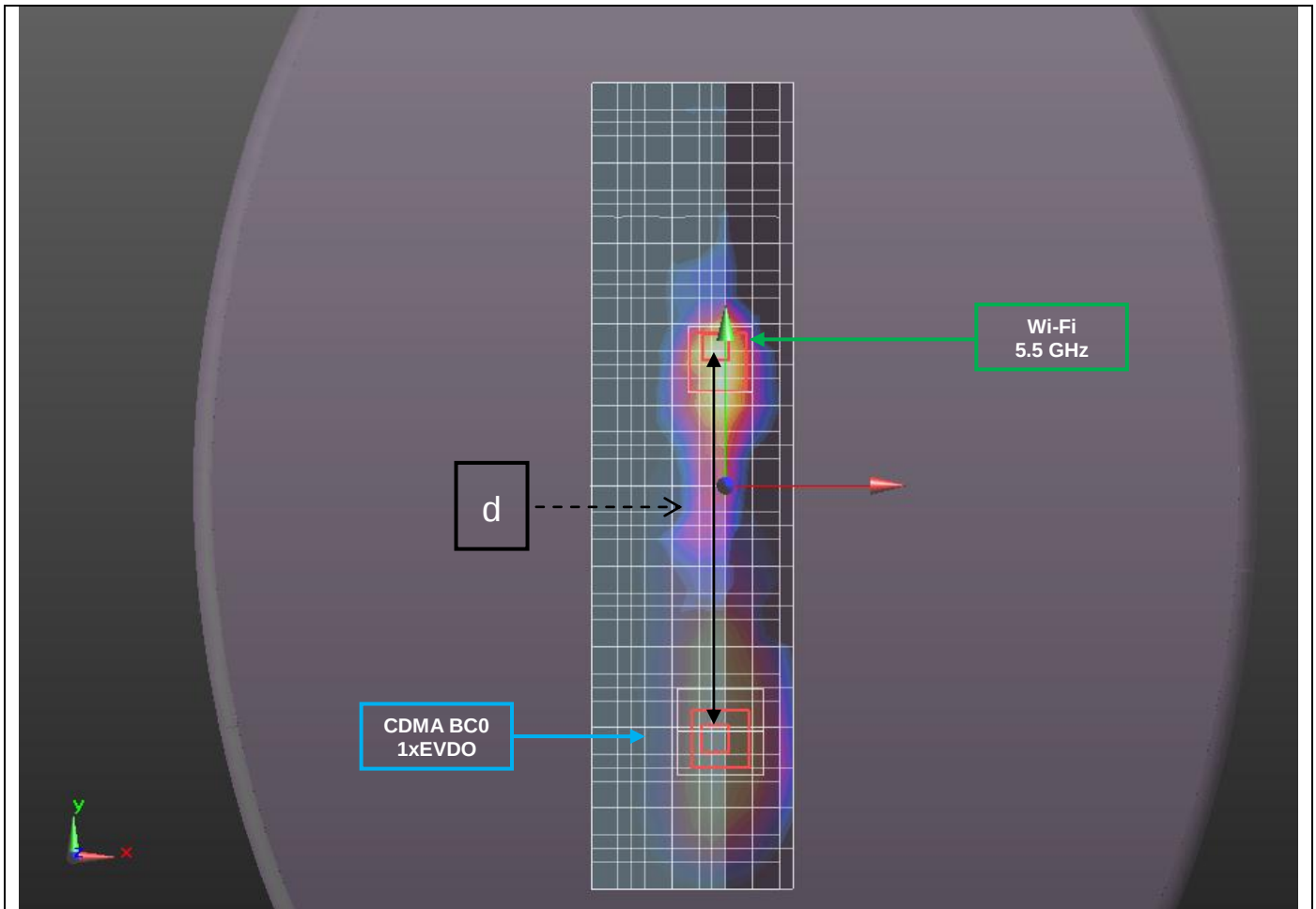
Figure (18)



Mode	Peak SAR	X	Y	Z
	mW/g	m	m	m
CDMA BC1 1xRTT	2.88	-0.0019	-0.0873	-0.185
WiFi 5.5 GHz	9.92	-0.00112	0.0374	-0.182
d: Calculated distance (mm)				
124.74				

Note: $d = \text{SQRT}((X1-X2)^2 + (Y1-Y2)^2 + (Z1-Z2)^2)$

Figure (19)

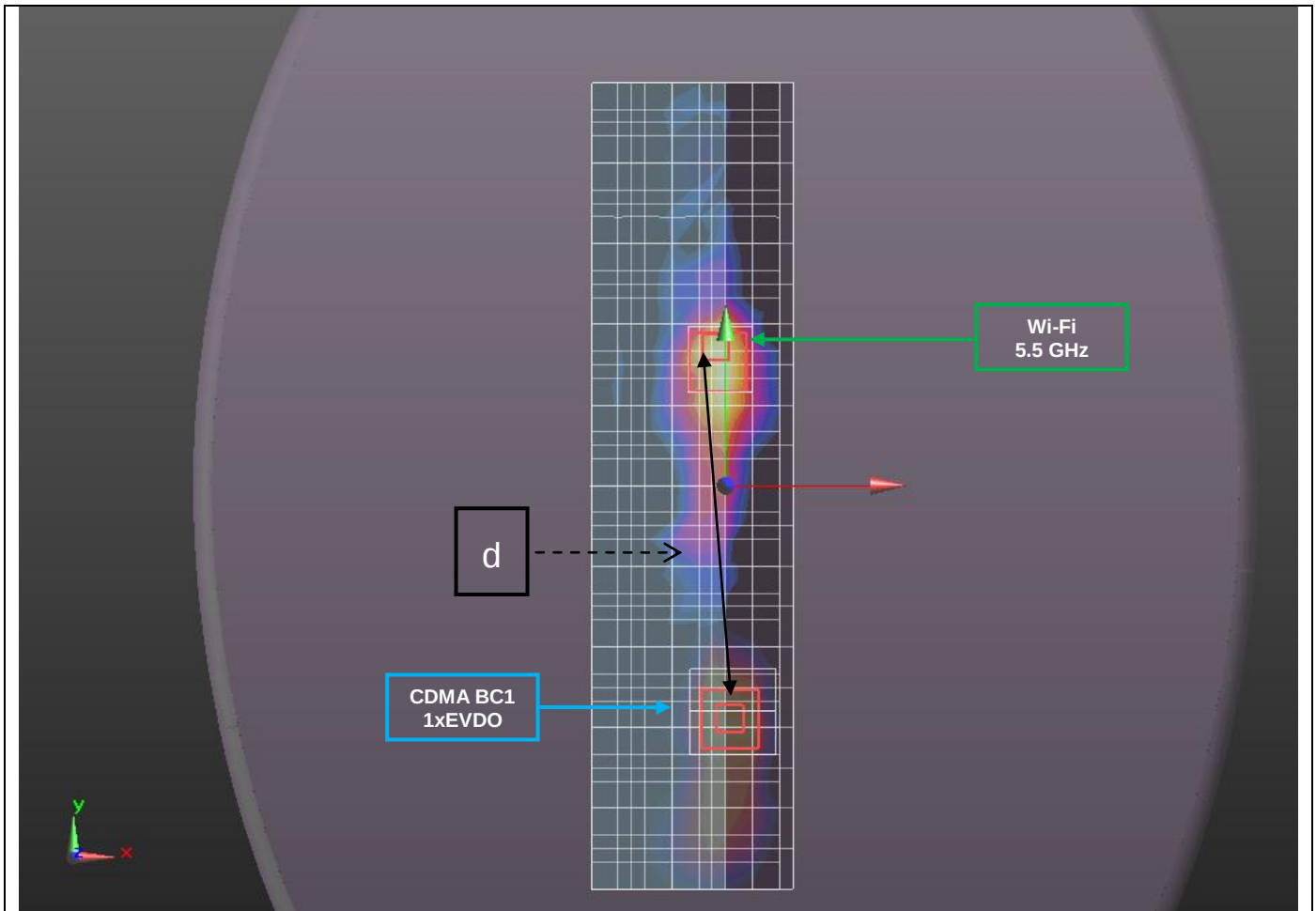


Mode	Peak SAR	X	Y	Z
	mW/g	m	m	m
CDMA BC0 1xEVDO	2.5	-0.0052	-0.0947	-0.184
WiFi 5.5 GHz	9.92	-0.00112	0.0374	-0.182

d: Calculated distance (mm)
132.18

Note: $d = \text{SQRT}((X1-X2)^2 + (Y1-Y2)^2 + (Z1-Z2)^2)$

Figure (20)

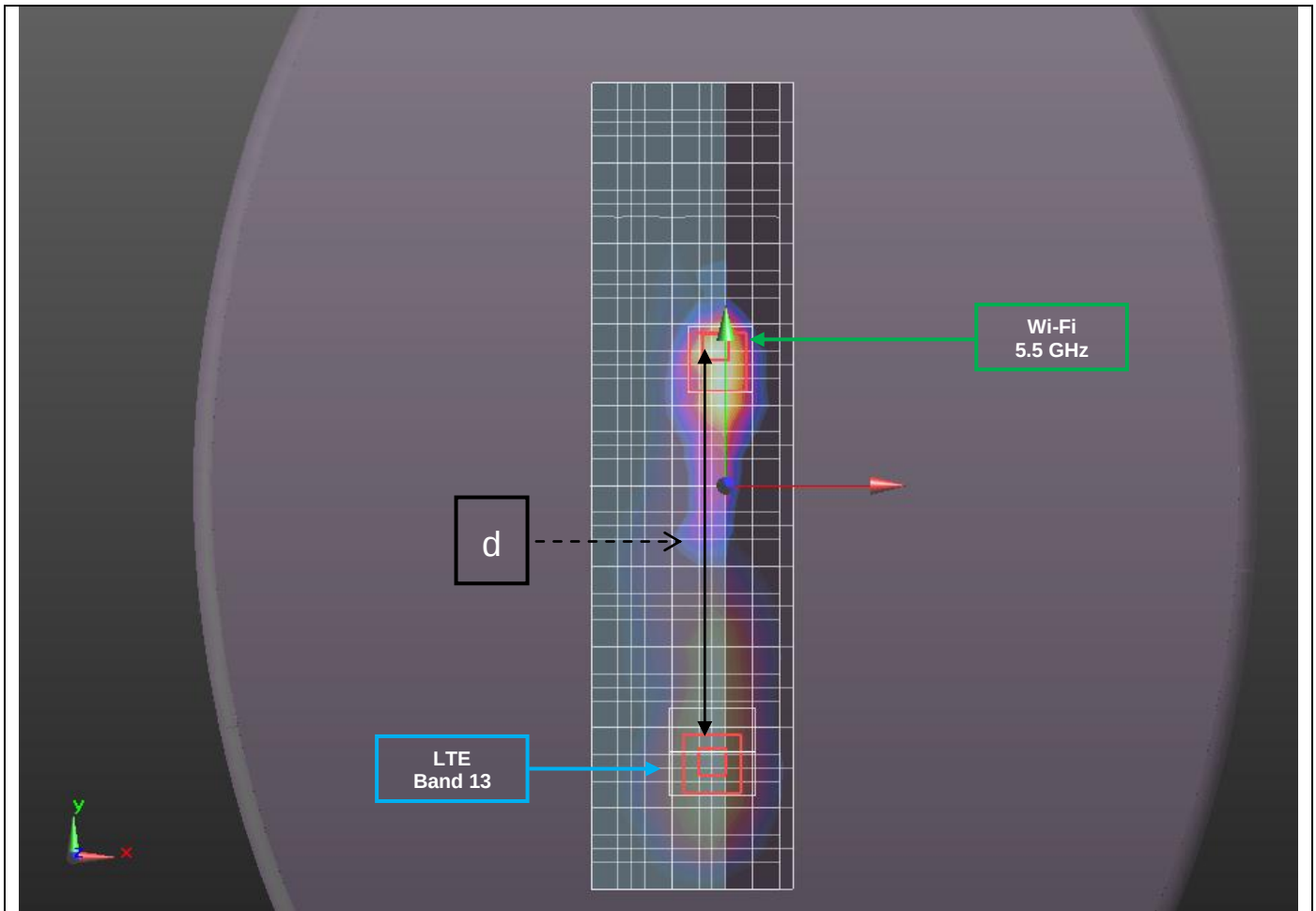


Mode	Peak SAR	X	Y	Z
	mW/g	m	m	m
CDMA BC1 1xEVDO	3.71	0.0009	-0.0904	-0.185
WiFi 5.5 GHz	9.92	-0.00112	0.0374	-0.182

d: Calculated distance (mm)
127.85

Note: $d = \text{SQRT}((X1-X2)^2 + (Y1-Y2)^2 + (Z1-Z2)^2)$

Figure (21)



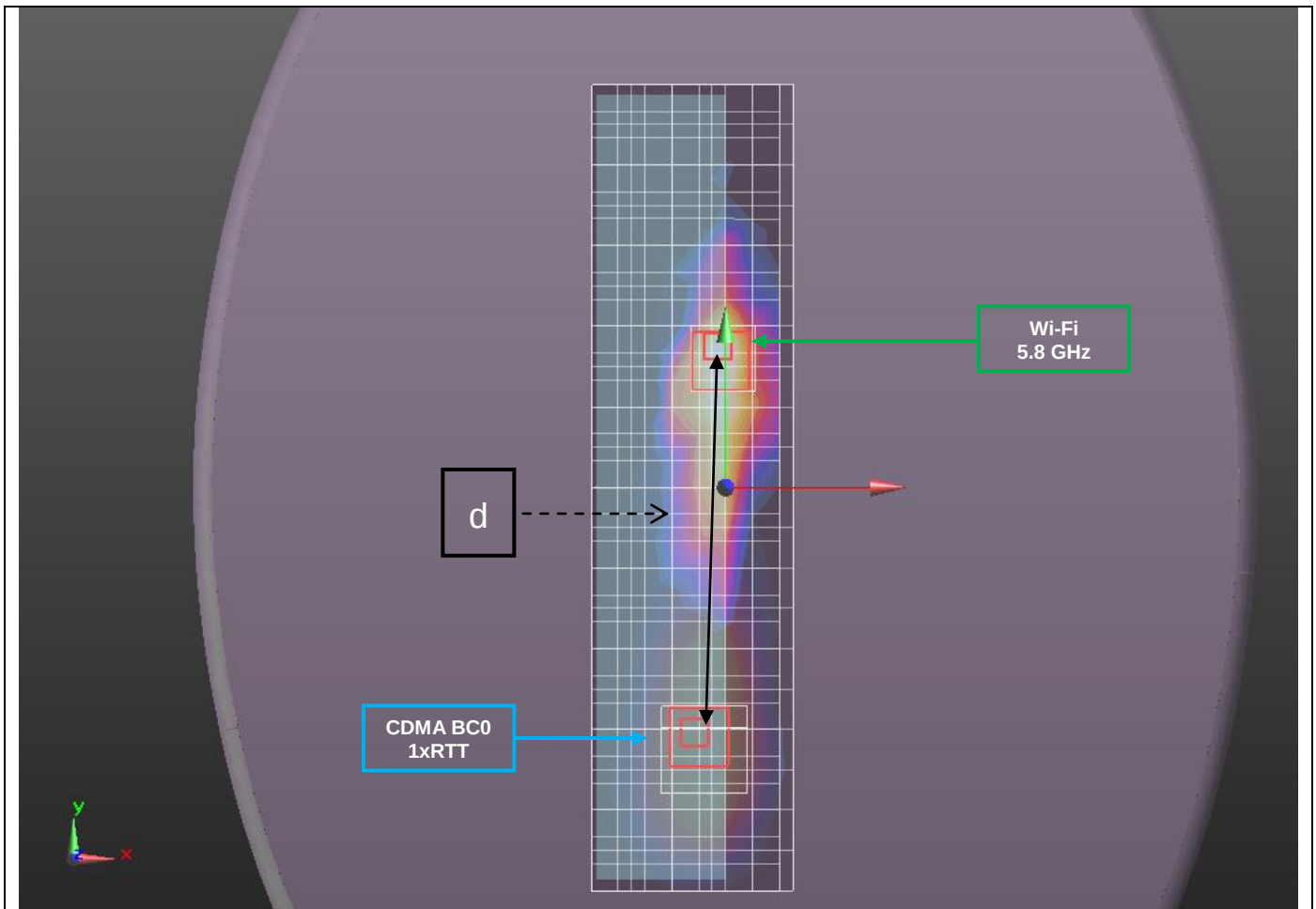
Mode	Peak SAR	X	Y	Z
	mW/g	m	m	m
LTE Band 13	1.94	-0.005	-0.115	-0.188
WiFi 5.5 GHz	9.92	-0.00112	0.0374	-0.182

d: Calculated distance (mm)
152.57

Note: $d = \text{SQRT}((X1-X2)^2 + (Y1-Y2)^2 + (Z1-Z2)^2)$

14.12.5. Wi-Fi 5.8 GHz and WWAN

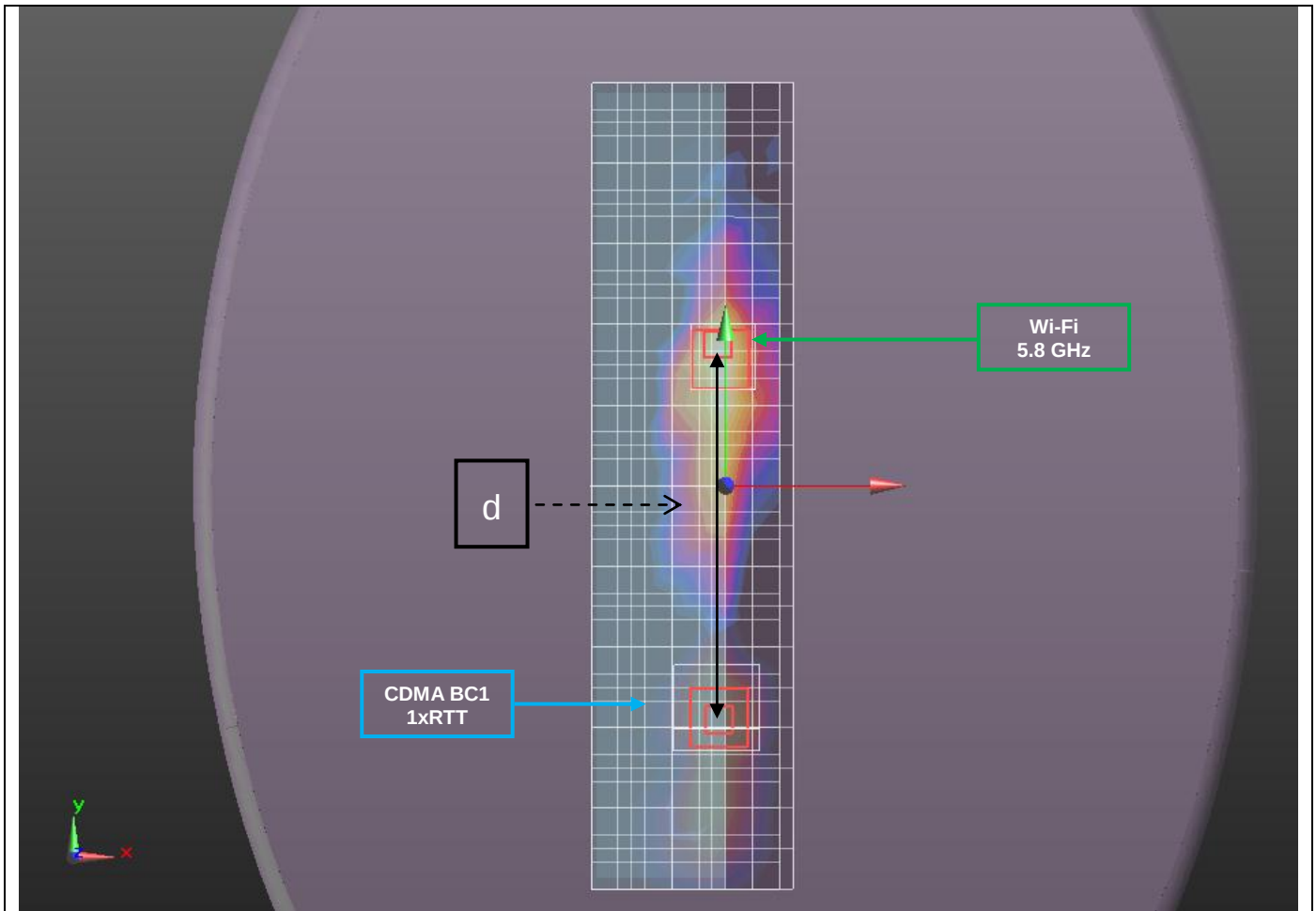
Figure (22)



Mode	Peak SAR	X	Y	Z
	mW/g	m	m	m
CDMA BC0 1xRTT	1.98	-0.0128	-0.0911	-0.182
WiFi 5.8 GHz	9.55	-0.000155	0.036	-0.182
d: Calculated distance (mm)				
127.73				

Note: $d = \text{SQRT}((X1-X2)^2+(Y1-Y2)^2+(Z1-Z2)^2)$

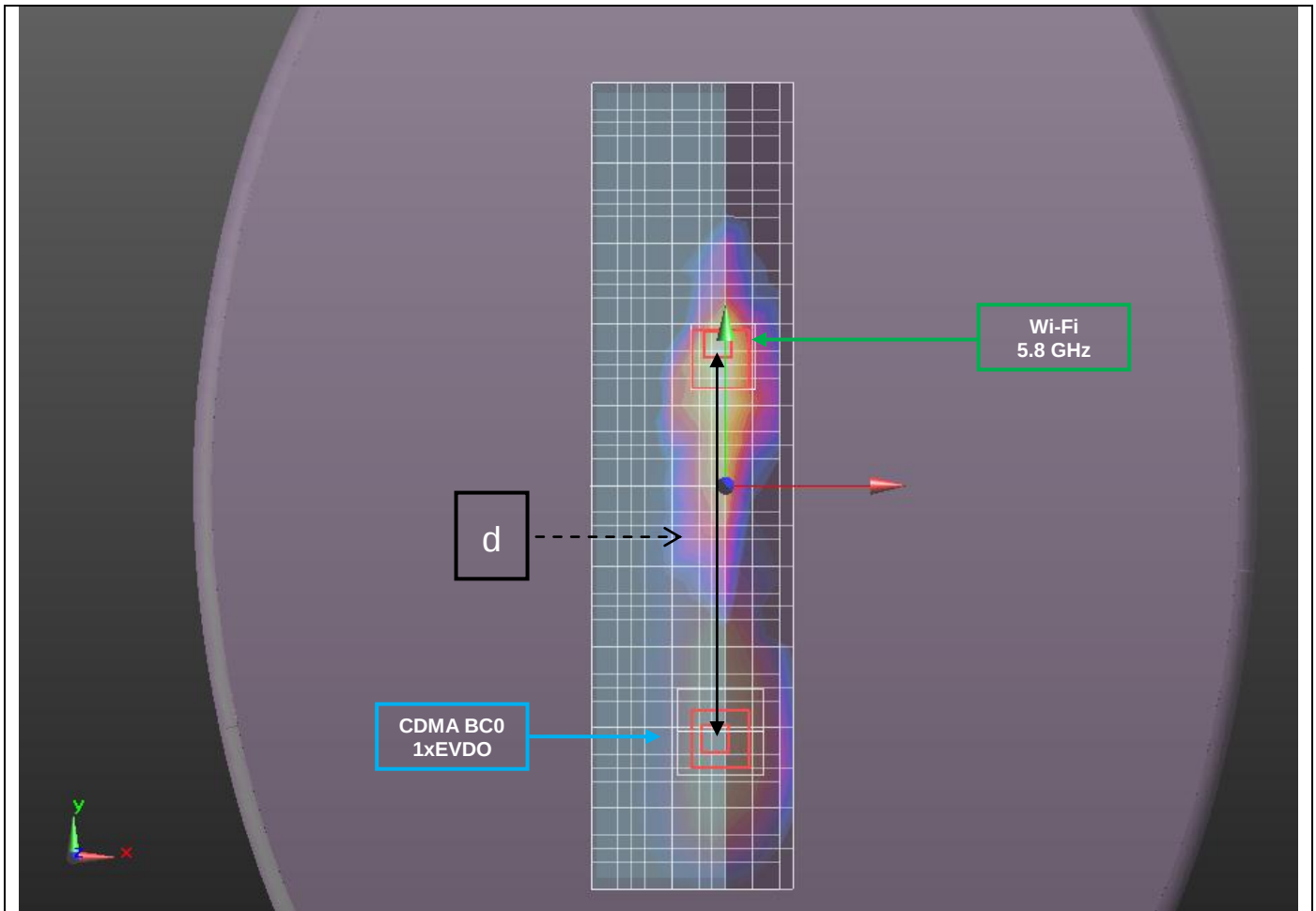
Figure (23)



Mode	Peak SAR	X	Y	Z
	mW/g	m	m	m
CDMA BC1 1xRTT	2.88	-0.0019	-0.0873	-0.185
WiFi 5.8 GHz	9.55	-0.000155	0.036	-0.182
d: Calculated distance (mm)				
123.35				

Note: $d = \text{SQRT}((X1-X2)^2+(Y1-Y2)^2+(Z1-Z2)^2)$

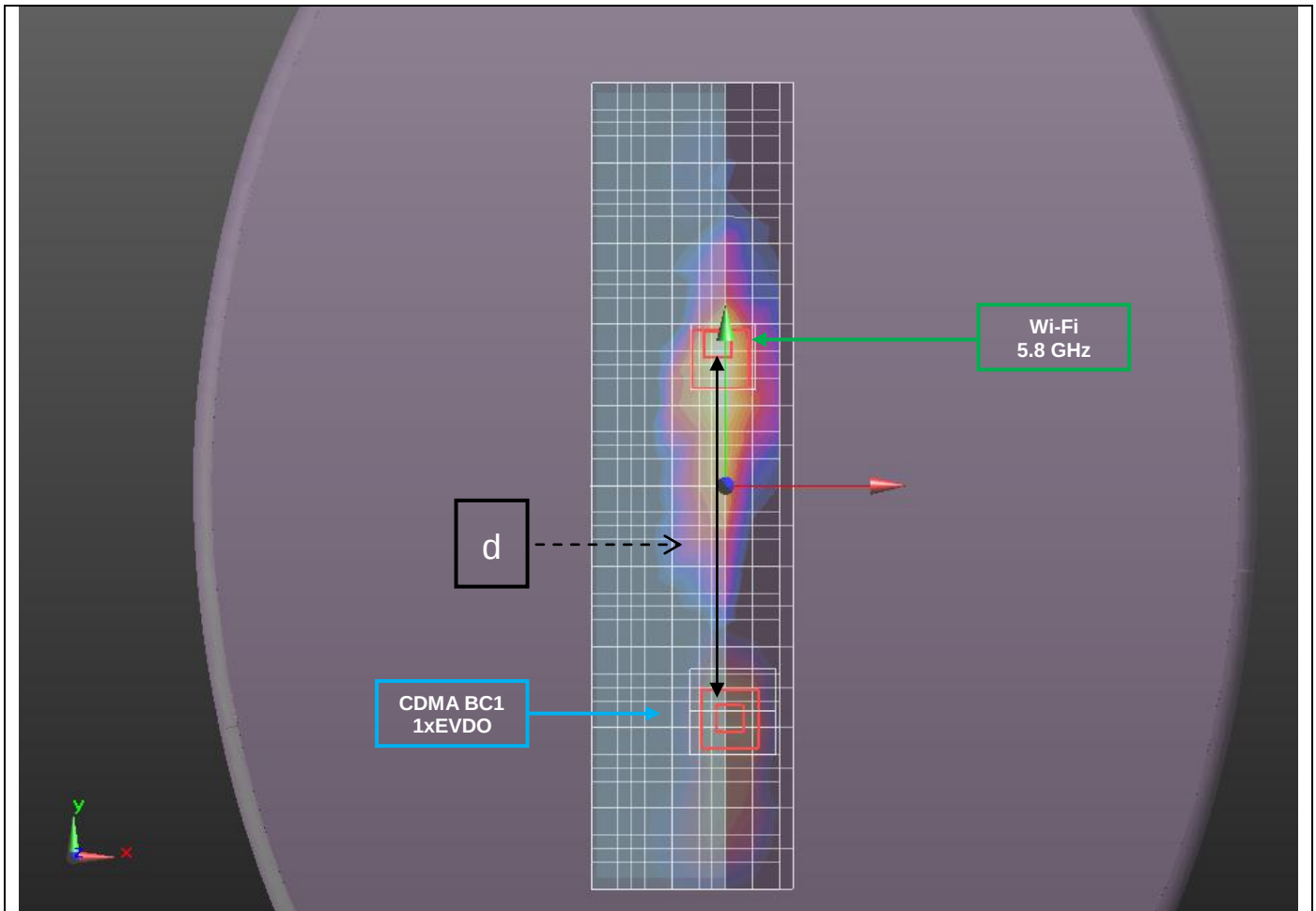
Figure (24)



Mode	Peak SAR	X	Y	Z
	mW/g	m	m	m
CDMA BC0 1xEVDO	2.5	-0.0052	-0.0947	-0.184
WiFi 5.8 GHz	9.55	-0.000155	0.036	-0.182
d: Calculated distance (mm)				
130.81				

Note: $d = \text{SQRT}((X1-X2)^2+(Y1-Y2)^2+(Z1-Z2)^2)$

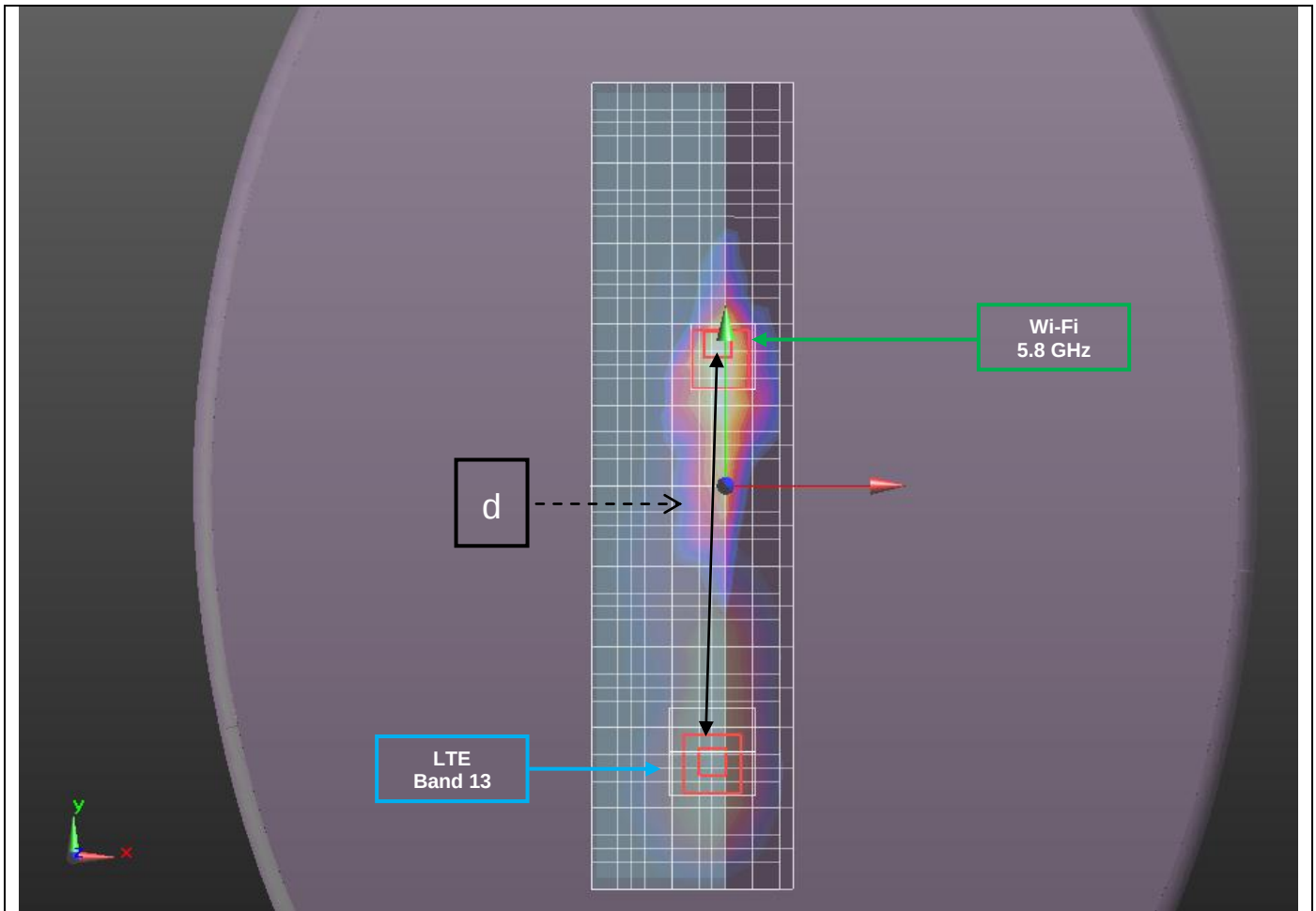
Figure (25)



Mode	Peak SAR	X	Y	Z
	mW/g	m	m	m
CDMA BC1 1xEVDO	3.71	0.0009	-0.0904	-0.185
WiFi 5.8 GHz	9.55	-0.000155	0.036	-0.182
d: Calculated distance (mm)				
126.44				

Note: $d = \text{SQRT}((X1-X2)^2 + (Y1-Y2)^2 + (Z1-Z2)^2)$

Figure (26)



Mode	Peak SAR	X	Y	Z
	mW/g	m	m	m
LTE Band 13	1.94	-0.005	-0.115	-0.188
WiFi 5.8 GHz	9.55	-0.000155	0.036	-0.182

d: Calculated distance (mm)
151.20

Note: $d = \text{SQRT}((X1-X2)^2+(Y1-Y2)^2+(Z1-Z2)^2)$

15. Appendixes

Refer to separated files for the following appendixes.

- 15.1. System Performance Check Plots
- 15.2. SAR Test Plots for CDMA BC0
- 15.3. SAR Test Plots for CDMA BC1
- 15.4. SAR Test Plots for LTE Band 13
- 15.5. SAR Test Plots for Measurement Variability and Uncertainty
- 15.6. Calibration Certificate for E-Field Probe EX3DV4 - SN 3749
- 15.7. Calibration Certificate for E-Field Probe EX3DV4 - SN 3772
- 15.8. Calibration Certificate for E-Field Probe EX3DV4 - SN 3773
- 15.9. Calibration Certificate for D750V3 - SN 1024
- 15.10. Calibration Certificate for D835V2 - SN 4d117
- 15.11. Calibration Certificate for D1900V2 - SN 5d140