



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

(Class II Permissive Change)

SAR EVALUATION REPORT

For
Modem
(Tested inside of Panasonic Tablet PC FZ-G1)

Model: WW12C2
FCC ID: ACJ9TGWW12C2

Report Number: 12J14674-1I
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Revision History

<u>Rev.</u>	<u>Issue Date</u>	<u>Revisions</u>	<u>Revised By</u>
--	2/4/2013	Initial Issue	--
A	2/7/2013	Section 7 – Amended to include proximity sensor operation related information on the Rear side of the DUT	Ray Su
B	2/13/2013	- Section 8 – Replaced table for required test configurations. - Section 10, 11 and 12 – Added SAR results for additional standalone SAR testing performed on Edge 4. Includes documentation for the required liquid, system and instrument verifications and certificates. - Section 12 – Merged summary of highest measured SAR and measurement variability results, previously under Section 13, into Section 12, and corrected variability result for 850 MHz frequency. - Section 13 – Added additional Simultaneous Transmission SAR analysis tables and related information (This was previously Section 14). - Section 7 – Corrected typo errors in proximity sensor exhibits. - Section 17 – Added setup photo for Edge 4 testing. - Updated contents in the appendixes.	Ray Su
C	2/14/2013	- Replaced certain estimated values in Simultaneous Transmission SAR analysis with measured values. - Revised Separation Distance figures in Section 13.16 to better reflect placement of antennas.	Ray Su
D	2/18/2013	- Section 13 – Updated simultaneous transmission SAR analysis results in correspondence with the changes that took place in the WLAN report.	Ray Su
E	2/21/2013	Purged previous rear side test results obtained from testing under the SAM phantom and replaced with values measured under the ELI phantom. All associated plots, supporting documents and other analyses have been updated accordingly.	Ray Su
F	3/5/2013	- Restructured multiple aspects of the report in accordance with the changes that were implemented in the related WLAN report; this includes the relocation of various tables for SAR test exclusion and the corresponding estimated SAR value for those configurations eligible for standalone SAR test exclusion in more appropriate sections of the report. - Revised Section 13 in accordance with the updated values in the WLAN report. - Section 8 – Revised antenna to surface distance on the bottom-side.	Ray Su
G	3/13/2013	- Section 7 – Removed SAR coverage test data - Section 7 – Corrected power levels in trigger distance tables and graphs - Section 8 – Added special test considerations - Section 9 – Added notes to the LTE output power tables - Section 15 – Added before and after modification photographs - Section 16 – Clarified antenna and proximity sensor identification and included additional dimensions - Section 17 – Replaced the setup photos and added antenna locations	Dave Weaver
H	3/14/2013	- Section 12 – corrected estimated SAR table	
I	3/19/2013	- Section 9 – Reformatted LTE output power tables for clarity	

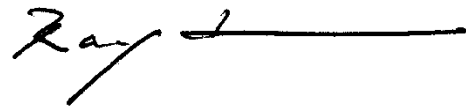
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1. Attestation of Test Results

Applicant	Panasonic Corporation of North America	
DUT description	Modem (Tested inside of Panasonic Tablet PC FZ-G1)	
Model	WW12C2	
Test device is	An identical prototype	
Device category	Portable	
Exposure category	General Population/Uncontrolled Exposure	
Date tested	1/17/2013 – 2/20/2013	
Applicable Standards		Test Results
Published RF exposure KDB procedures, TCB workshop updates and OET Bulletin 65 Supplement C, IEEE Std 1528-2003 and IEEE Std 1528a-2005		Pass
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

1.1. Highest Reported SAR

Worst Case SAR data for each Frequency Band

RF Exposure Rule	Freq. Range	Highest Reported SAR	Limit
22	824-849 MHz	Body & Tablet: 1.28 W/kg (Edge 1)	1.6 W/kg
24	1850-1910 MHz	Body & Tablet: 1.39 W/kg (Edge 1)	
27 (LTE Band 17)	704 – 716 MHz	Body & Tablet: 1.34 W/kg (Edge 1)	
27 (LTE 4)	1710–1755 MHz	Body & Tablet: 1.29 W/kg (Edge 1)	
Simultaneous transmission condition		1.59 W/kg (highest SAR across exposure conditions)	

LEGEND:

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

2. Test Methodology

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

- 941225 D01 SAR test for 3G devices v02
- 941225 D02 Guidance for 3GPP R6 and R7 HSPA v02v01
- 941225 D03 SAR Test Reduction GSM GPRS EDGE v01
- 941225 D06 Hot Spot SAR v01
- 865664 D01 SAR Measurement 100 MHz to 6 GHz v01
- 865664 D02 SAR Reporting v01
- 447498 D01 General RF Exposure Guidance v05
- 248227 D01 SAR Meas for 802 11abg v01r02
- 616217 D04 SAR for laptop and tablets v01

3. Facilities and Accreditation

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

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

4. Calibration and Uncertainty

4.1. Measuring Instrument Calibration

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

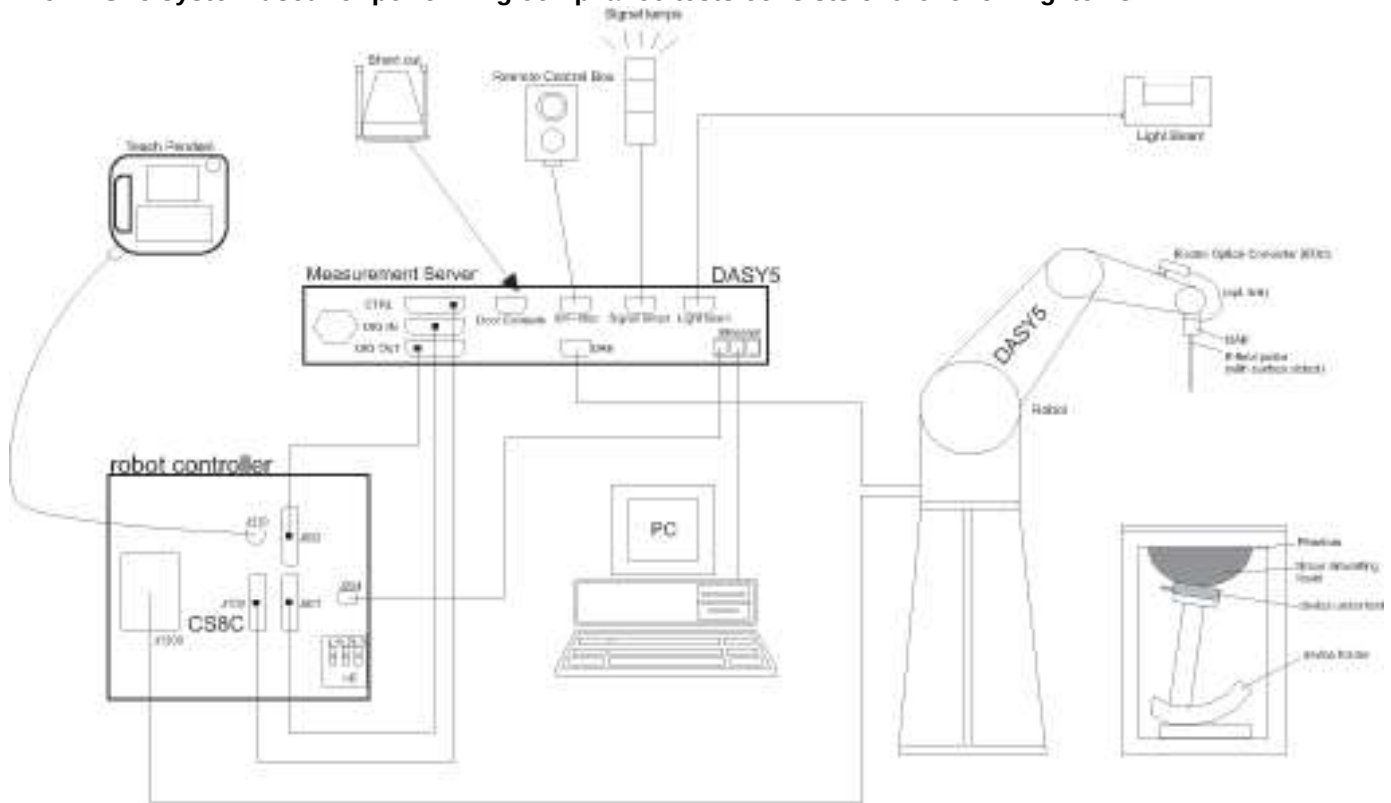
Name of Equipment	Manufacturer	Type/Model	Serial No.	Cal. Due date		
				MM	DD	Year
S-Parameter Network Analyzer	Agilent	8753ES	MY40001647	6	27	2013
Dielectronic Probe kit	SPEAG	SM DAK 040 CA	1082	9	18	2013
ENA Series Network Analyzer	Agilent	E5071B	MY42100131	2	11	2013
Dielectronic Probe kit	HP	85070E	594	N/A		
Synthesized Signal Generator	HP	8665B	3438A00633	2	22	2013
Power Meter	HP	438A	3513U04320	9	17	2013
Power Sensor A	HP	8481A	2237A31744	8	17	2013
Power Sensor B	HP	8481A	3318A95392	8	17	2013
Amplifier	MITEQ	4D00400600-50-30P	1622052	N/A		
Directional coupler	Werlatone	C8060-102	2149	N/A		
Synthesized Signal Generator	HP	8665B	3744A01084	5	3	2013
Power Meter	HP	438A	2822A05684	10	7	2013
Power Sensor A	HP	8481A	2702A66876	8	1	2013
Power Sensor B	HP	8482A	2349A08568	4	14	2013
Amplifier	MITEQ	4D00400600-50-30P	1620606	N/A		
Directional coupler	Werlatone	C8060-102	2141	N/A		
Base Station Simulator	R & S	CMU200	106301	6	6	2013
Base Station Simulator	R & S	CMU200	118339	5	20	2013
Base Station Simulator	Agilent	8960	GB42361452	4	4	2013
Thermometer	TRACEABLE	4242	122529162	9	19	2013
E-Field Probe	SPEAG	EX3DV4	3686	2	16	2013
E-Field Probe	SPEAG	EX3DV4	3749	1	15	2014
E-Field Probe	SPEAG	EX3DV4	3871	8	20	2013
E-Field Probe	SPEAG	EX3DV4	3885	10	9	2013
Data Acquisition Electronics	SPEAG	DAE4	1258	3	8	2013
Data Acquisition Electronics	SPEAG	DAE4	1259	2	13	2013
Data Acquisition Electronics	SPEAG	DAE4	1343	8	20	2013
Data Acquisition Electronics	SPEAG	DAE4	1352	10	8	2013
System Validation Dipole	SPEAG	D750V3	1071	10	5	2013
System Validation Dipole	SPEAG	D835V2	4d117	4	10	2013
System Validation Dipole	SPEAG	D1750V2	1077	10	3	2013
System Validation Dipole	SPEAG	D1900V2	5d140	4	12	2013
System Validation Dipole	SPEAG	D1900V2	5d043	11	6	2013
Power Meter	Agilent	N1912A	MY52310061	7	5	2013
Power Sensor Ch A	Agilent	N1921A	MY52260009	7	5	2013
Power Sensor Ch B	Agilent	N1921A	MY52270022	7	21	2013

4.2. Measurement Uncertainty

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

5. Measurement System Description and Setup

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



- A standard high precision 6-axis robot with controller, teach pendant and software. An arm extension for accommodating the data acquisition electronics (DAE).
- An isotropic Field probe optimized and calibrated for the targeted measurement.
- A data acquisition electronics (DAE) which performs the signal amplification, signal multiplexing, AD-conversion, offset measurements, mechanical surface detection, collision detection, etc. The unit is battery powered with standard or rechargeable batteries. The signal is optically transmitted to the EOC.
- The Electro-optical converter (EOC) performs the conversion from optical to electrical signals for the digital communication to the DAE. To use optical surface detection, a special version of the EOC is required. The EOC signal is transmitted to the measurement server.
- The function of the measurement server is to perform the time critical tasks such as signal filtering, control of the robot operation and fast movement interrupts.
- The Light Beam used is for probe alignment. This improves the (absolute) accuracy of the probe positioning.
- A computer running WinXP or Win7 and the DASY5 software.
- Remote control and teach pendant as well as additional circuitry for robot safety such as warning lamps, etc.
- The phantom, the device holder and other accessories according to the targeted measurement.

6. SAR Measurement Procedure

6.1. Normal SAR Measurement Procedure

Step 1: Power Reference Measurement

The Power Reference Measurement and Power Drift Measurements are for monitoring the power drift of the device under test in the batch process. The minimum distance of probe sensors to surface determines the closest measurement point to phantom surface. The minimum distance of probe sensors to surface is 2.1 mm. This distance cannot be smaller than the distance of sensor calibration points to probe tip as defined in the probe properties.

Step 2: Area Scan

The Area Scan is used as a fast scan in two dimensions to find the area of high field values, before doing a fine measurement around the hot spot. The sophisticated interpolation routines implemented in DASY software can find the maximum locations even in relatively coarse grids. When an Area Scan has measured all reachable points, it computes the field maximal found in the scanned area, within a range of the global maximum. The range (in dB) is specified in the standards for compliance testing. For example, a 2 dB range is required in IEEE Standard 1528 and IEC 62209 standards, whereby 3 dB is a requirement when compliance is assessed in accordance with the ARIB standard (Japan). If only one Zoom Scan follows the Area Scan, then only the absolute maximum will be taken as reference. For cases where multiple maximums are detected, the number of Zoom Scans has to be increased accordingly.

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

	≤ 3 GHz	> 3 GHz
Maximum distance from closest measurement point (geometric center of probe sensors) to phantom surface	5 ± 1 mm	$\frac{1}{2} \cdot \delta \cdot \ln(2) \pm 0.5$ 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 1-g SAR estimation procedures of KDB 447498 is ≤ 1.4 W/kg, ≤ 8 mm, ≤ 7 mm and ≤ 5 mm zoom scan resolution may be applied, respectively, for 2 GHz to 3 GHz, 3 GHz to 4 GHz and 4 GHz to 6 GHz.				

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

Modem (Tested inside of Panasonic Tablet PC FZ-G1) Model: WW12C2	
Operating Configuration(s)	• 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 "Exposure Conditions"
Accessory	• None

7.1. Band and Air Interfaces

Tx Frequency Bands	• GSM850: 824 - 849 MHz • GSM1900: 1850 - 1910 MHz • W-CDMA Band V: 824 - 849 MHz • W-CDMA Band II: 1850 - 1910 MHz • LTE Band 4: 1710 - 1755 MHz • LTE Band 17: 704 - 716 MHz • 802.11ab/g/n: 2412 - 2462 MHz, b / g / HT20 / HT40 5150 - 5250 MHz, a / HT20 / HT40 5250 - 5350 MHz, a / HT20 / HT40 5500 - 5700 MHz, a / HT20 / HT40 5725 - 5850 MHz, a / HT20 / HT40 • Bluetooth: 2402 - 2480 MHz
GPRS Multi-Slot Class:	• GPRS: 10 • EGPRS 12
GPRS Class:	B
Modulation	• GPRS 2 Slots: 25% • EGPRS 3 Slots: 37.5% • W-CDMA: 100% • LTE: 100%

7.2. Hotspot (Wireless Router) Exposure Condition

N/A

7.3. Simultaneous Transmission

Usage Scenario	Modes	Mode of Operation	BAND	GPRS/EDGE	WCDMA	HSDPA	HSUPA	HSPA+	DC-HSPA	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	EDGE	850	YES	No	No	No	No	No	No	YES	No	No	No	No
		EDGE	1900	YES	No	No	No	No	No	No	YES	No	No	No	No
		W-CDMA	850	No	YES	No	No	No	No	No	YES	No	No	No	No
		W-CDMA	1900	No	YES	YES	No	No	No	No	YES	No	No	No	No
		HSDPA	850	No	No	YES	No	No	No	No	YES	No	No	No	No
		HSDPA	1900	No	No	No	YES	No	No	No	YES	No	No	No	No
		HSUPA	850	No	No	No	YES	No	No	No	YES	No	No	No	No
		HSUPA	1900	No	No	No	No	No	No	No	YES	No	No	No	No
		HSPA+	850	No	No	No	No	YES	No	No	YES	No	No	No	No
		HSPA+	1900	No	No	No	No	YES	No	No	YES	No	No	No	No
		DC-HSDPA	850	No	No	No	No	No	YES	No	YES	No	No	No	No
		DC-HSDPA	1900	No	No	No	No	No	YES	No	YES	No	No	No	No
		LTE	4	No	No	No	No	No	No	YES	YES	No	No	No	No
		LTE	17	No	No	No	No	No	No	YES	YES	No	No	No	No
		EDGE	850	YES	No	No	No	No	No	No	No	YES	No	No	No
		EDGE	1900	YES	No	No	No	No	No	No	No	YES	No	No	No
		W-CDMA	850	No	YES	No	No	No	No	No	No	YES	No	No	No
		W-CDMA	1900	No	YES	YES	No	No	No	No	No	YES	No	No	No
		HSDPA	850	No	No	YES	No	No	No	No	No	YES	No	No	No
		HSDPA	1900	No	No	No	YES	No	No	No	No	YES	No	No	No
		HSUPA	850	No	No	No	YES	No	No	No	No	YES	No	No	No
		HSUPA	1900	No	No	No	No	No	No	No	No	YES	No	No	No
		HSPA+	850	No	No	No	No	YES	No	No	No	YES	No	No	No
		HSPA+	1900	No	No	No	No	YES	No	No	No	YES	No	No	No
		DC-HSDPA	850	No	No	No	No	No	YES	No	No	YES	No	No	No
		DC-HSDPA	1900	No	No	No	No	No	YES	No	No	YES	No	No	No
	WWAN + 5 GHz Bands WLAN	LTE	4	No	No	No	No	No	No	YES	No	YES	No	No	No
		LTE	17	No	No	No	No	No	No	YES	No	YES	No	No	No
		EDGE	850	YES	No	No	No	No	No	No	No	No	YES	No	No
		EDGE	1900	YES	No	No	No	No	No	No	No	No	YES	No	No
		W-CDMA	850	No	YES	No	No	No	No	No	No	No	YES	No	No
		W-CDMA	1900	No	YES	No	No	No	No	No	No	No	YES	No	No
		HSDPA	850	No	No	YES	No	No	No	No	No	No	YES	No	No
		HSDPA	1900	No	No	YES	No	No	No	No	No	No	YES	No	No
		HSUPA	850	No	No	No	YES	No	No	No	No	No	YES	No	No
		HSUPA	1900	No	No	No	YES	No	No	No	No	No	YES	No	No
		HSPA+	850	No	No	No	No	YES	No	No	No	No	YES	No	No
		HSPA+	1900	No	No	No	No	YES	No	No	No	No	YES	No	No
		DC-HSDPA	850	No	No	No	No	No	YES	No	No	No	YES	No	No
		DC-HSDPA	1900	No	No	No	No	No	YES	No	No	No	YES	No	No
		LTE	4	No	No	No	No	No	No	YES	No	No	No	YES	No
		LTE	17	No	No	No	No	No	No	YES	No	No	No	YES	No
		EDGE	850	YES	No	No	No	No	No	No	No	No	No	YES	No
		EDGE	1900	YES	No	No	No	No	No	No	No	No	No	YES	No
		W-CDMA	850	No	YES	No	No	No	No	No	No	No	No	YES	No
		W-CDMA	1900	No	YES	No	No	No	No	No	No	No	No	YES	No
		HSDPA	850	No	No	YES	No	No	No	No	No	No	No	YES	No
		HSDPA	1900	No	No	YES	No	No	No	No	No	No	No	YES	No
		HSUPA	850	No	No	No	YES	No	No	No	No	No	No	YES	No
		HSUPA	1900	No	No	No	YES	No	No	No	No	No	No	YES	No
		HSPA+	850	No	No	No	No	YES	No	No	No	No	No	YES	No
		HSPA+	1900	No	No	No	No	YES	No	No	No	No	No	YES	No
		DC-HSDPA	850	No	No	No	No	No	YES	No	No	No	No	YES	No
		DC-HSDPA	1900	No	No	No	No	No	YES	No	No	No	No	YES	No
	WWAN + BT	LTE	4	No	No	No	No	No	No	YES	No	No	No	No	YES
		LTE	17	No	No	No	No	No	No	YES	No	No	No	No	YES
		EDGE	850	YES	No	No	No	No	No	No	No	No	No	No	YES
		EDGE	1900	YES	No	No	No	No	No	No	No	No	No	No	YES
		W-CDMA	850	No	YES	No	No	No	No	No	No	No	No	No	YES
		W-CDMA	1900	No	YES	No	No	No	No	No	No	No	No	No	YES
		HSDPA	850	No	No	YES	No	No	No	No	No	No	No	No	YES
		HSDPA	1900	No	No	YES	No	No	No	No	No	No	No	No	YES
		HSUPA	850	No	No	No	YES	No	No	No	No	No	No	No	YES
		HSUPA	1900	No	No	No	YES	No	No	No	No	No	No	No	YES
		HSPA+	850	No	No	No	No	YES	No	No	No	No	No	No	YES
		HSPA+	1900	No	No	No	No	YES	No	No	No	No	No	No	YES
		DC-HSDPA	850	No	No	No	No	No	YES	No	No	No	No	No	YES
		DC-HSDPA	1900	No	No	No	No	No	YES	No	No	No	No	No	YES
		LTE	4	No	No	No	No	No	No	YES	No	No	No	No	YES
		LTE	17	No	No	No	No	No	No	YES	No	No	No	No	YES

Simultaneous Transmission continued

Usage Scenario	Modes	Mode of Operation	BAND	GPRS/EDGE	WCDMA	HSDPA	HSUPA	HSPA+	DC-HSPA	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 + BT	EDGE	850	YES	No	No	No	No	No	No	YES	No	No	No	YES
		EDGE	1900	YES	No	No	No	No	No	No	YES	No	No	No	YES
		W-CDMA	850	No	YES	No	No	No	No	No	YES	No	No	No	YES
		W-CDMA	1900	No	YES	YES	No	No	No	No	YES	No	No	No	YES
		HSDPA	850	No	No	YES	No	No	No	No	YES	No	No	No	YES
		HSDPA	1900	No	No	No	YES	No	No	No	YES	No	No	No	YES
		HSUPA	850	No	No	No	YES	No	No	No	YES	No	No	No	YES
		HSUPA	1900	No	No	No	No	No	No	No	YES	No	No	No	YES
		HSPA+	850	No	No	No	No	YES	No	No	YES	No	No	No	YES
		HSPA+	1900	No	No	No	No	YES	No	No	YES	No	No	No	YES
		DC-HSDPA	850	No	No	No	No	No	YES	No	YES	No	No	No	YES
		DC-HSDPA	1900	No	No	No	No	No	YES	No	YES	No	No	No	YES
	WWAN + 5 GHz Bands WLAN + BT	LTE	4	No	No	No	No	No	No	YES	YES	No	No	No	YES
		LTE	17	No	No	No	No	No	No	YES	YES	No	No	No	YES
		EDGE	850	YES	No	No	No	No	No	No	No	No	YES	No	YES
		EDGE	1900	YES	No	No	No	No	No	No	No	No	YES	No	YES
		W-CDMA	850	No	YES	No	No	No	No	No	No	No	YES	No	YES
		W-CDMA	1900	No	YES	No	No	No	No	No	No	No	YES	No	YES
		HSDPA	850	No	No	YES	No	No	No	No	No	No	YES	No	YES
		HSDPA	1900	No	No	YES	No	No	No	No	No	No	YES	No	YES
		HSUPA	850	No	No	No	YES	No	No	No	No	No	YES	No	YES
		HSUPA	1900	No	No	No	YES	No	No	No	No	No	YES	No	YES
		HSPA+	850	No	No	No	No	YES	No	No	No	No	YES	No	YES
		HSPA+	1900	No	No	No	No	YES	No	No	No	No	YES	No	YES
	WWAN + 2.4GHz WLAN MIMO (2 Tx on WLAN)	DC-HSDPA	850	No	No	No	No	No	YES	No	YES	No	YES	No	YES
		DC-HSDPA	1900	No	No	No	No	No	YES	No	YES	No	YES	No	YES
		LTE	4	No	No	No	No	No	No	YES	YES	YES	No	No	No
		LTE	17	No	No	No	No	No	No	YES	YES	YES	No	No	No
		EDGE	850	YES	No	No	No	No	No	No	YES	YES	No	No	No
		EDGE	1900	YES	No	No	No	No	No	No	YES	YES	No	No	No
		W-CDMA	850	No	YES	No	No	No	No	No	YES	YES	No	No	No
		W-CDMA	1900	No	YES	No	No	No	No	No	YES	YES	No	No	No
		HSDPA	850	No	No	YES	No	No	No	No	YES	YES	No	No	No
		HSDPA	1900	No	No	YES	No	No	No	No	YES	YES	No	No	No
		HSUPA	850	No	No	No	YES	No	No	No	YES	YES	No	No	No
		HSUPA	1900	No	No	No	YES	No	No	No	YES	YES	No	No	No
	WWAN + 5 GHz Bands WLAN MIMO (2 Tx on WLAN)	HSPA+	850	No	No	No	No	YES	No	No	YES	YES	No	No	No
		HSPA+	1900	No	No	No	No	YES	No	No	YES	YES	No	No	No
		DC-HSDPA	850	No	No	No	No	No	YES	No	YES	YES	No	No	No
		DC-HSDPA	1900	No	No	No	No	No	YES	No	YES	YES	No	No	No
		LTE	4	No	No	No	No	No	No	YES	YES	YES	No	No	No
		LTE	17	No	No	No	No	No	No	YES	YES	YES	No	No	No
		EDGE	850	YES	No	No	No	No	No	No	No	No	YES	YES	No
		EDGE	1900	YES	No	No	No	No	No	No	No	No	YES	YES	No
		W-CDMA	850	No	YES	No	No	No	No	No	No	No	YES	YES	No
		W-CDMA	1900	No	YES	No	No	No	No	No	No	No	YES	YES	No
		HSDPA	850	No	No	YES	No	No	No	No	No	No	YES	YES	No
		HSDPA	1900	No	No	YES	No	No	No	No	No	No	YES	YES	No
		HSUPA	850	No	No	No	YES	No	No	No	No	No	YES	YES	No
		HSUPA	1900	No	No	No	YES	No	No	No	No	No	YES	YES	No
		HSPA+	850	No	No	No	No	YES	No	No	No	No	YES	YES	No
		HSPA+	1900	No	No	No	No	YES	No	No	No	No	YES	YES	No
		DC-HSDPA	850	No	No	No	No	No	YES	No	No	No	YES	YES	No
		DC-HSDPA	1900	No	No	No	No	No	YES	No	No	No	YES	YES	No
		LTE	4	No	No	No	No	No	No	YES	No	No	YES	YES	No
		LTE	17	No	No	No	No	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** (6.5 dBm), Bluetooth qualifies for Standalone SAR test exclusion based on the formula for Standalone SAR test exclusion considerations outlined in KDB 447498 D01 . For the exact value that this formula yields, please refer to **Section 14 “Simultaneous Transmission SAR Analysis”** of this report.

7.4. LTE Parameters

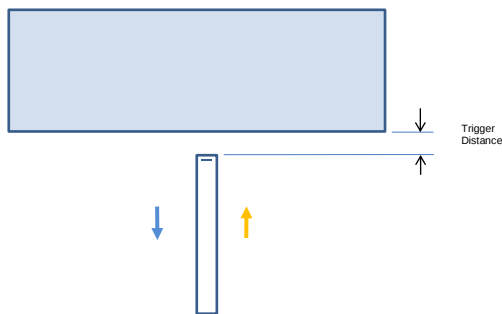
#	Description	Information
A	List the frequency range and channel bandwidths used in each LTE band; 1.4, 3, 5, 10, 15, 20 MHz, etc.	Band 4
		Tx: 1710 – 1755 MHz Rx: 2100 – 2155 MHz
		Band 17
		Tx: 704 – 716 MHz Rx: 734 – 746 MHz
		Channel Bandwidths: 5 MHz, 10 MHz
B	Identify the high, middle and low (H, M, L) channel numbers and channel frequencies for each LTE bandwidth and frequency band	Band 4
		Channel Bandwidth
		20 MHz 15 MHz 10 MHz 5 MHz 3 MHz 1.4 MHz
		Low
		20000/1715 19975/1712.5
		Mid
		20175/1732.5 20175/1732.5
		High
		20350/1750 20375/1752.5
		Band 17
		Channel Bandwidth
		20 MHz 15 MHz 10 MHz 5 MHz 3 MHz 1.4 MHz
		Low
		23780/709 23755/706.5
		Mid
		23790/710 23790/710
		High
		23800/711 23825/713.5
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 (GPRS/EGPRS/W-CDMA/CDMA) for both transmit and receive. A second antenna (Auxiliary) is used for LTE and other wireless modes (GPRS/EGPRS/W-CDMA/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 deactivated (Full Power) ○ Top-edge of the DUT at 20 mm from the phantom ○ Rear side of the DUT at 6 mm from the phantom ▪ Tablet Mode, with Proximity Sensor activated (Reduced Power) ○ Top-edge of the DUT at 0 mm from the phantom ○ Rear side 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: - 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. - 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. - 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>64 QAM</td><td>> 5</td><td>> 4</td><td>> 8</td><td>> 12</td><td>> 16</td><td>> 18</td><td>≤ 2</td></tr></table> MPR is 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.	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	64 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																																	
64 QAM	> 5	> 4	> 8	> 12	> 16	> 18	≤ 2																																	
F	When power reduction is required for one or more LTE modes to satisfy SAR compliance for simultaneous transmission or other equipment certification and operating requirements, maximum average conducted output power measurement results for each power reduction mode applicable to the simultaneous voice/data transmission configurations for such wireless configurations and frequency bands are required.	Yes. A proximity sensor for WWAN power reduction is implemented in the device to address RF exposure compliance when the cellular antenna is positioned close to the user's body or other objects.																																						

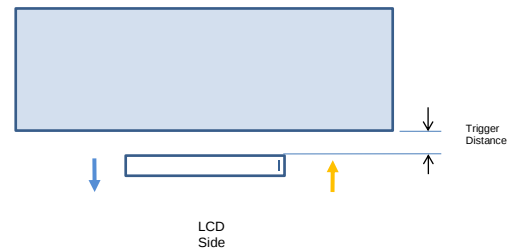
7.5. Proximity Sensor Triggering distance (KDB 616217 §6.2)

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

The measurement was then repeated for the Rear surface.



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



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

LEGEND

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

Summary of Trigger Distances

Tissue simulating liquid	Trigger distance - Edge 1		Trigger distance - Rear	
	Moving toward phantom	Moving from phantom	Moving toward phantom	Moving from phantom
750 muscle	24 mm	27 mm	11 mm	17 mm
850 muscle	23 mm	25 mm	11 mm	17 mm
1750 muscle	21 mm	26 mm	12 mm	15 mm
1900 muscle	21 mm	26 mm	11 mm	15 mm

Full power testing for Edge 1 was performed at 1mm less than the smallest measured trigger distance in accordance with KDB 616217.

Full power testing for the rear was performed at 6mm at the request of the client. This is more conservative than required by KDB 616217.

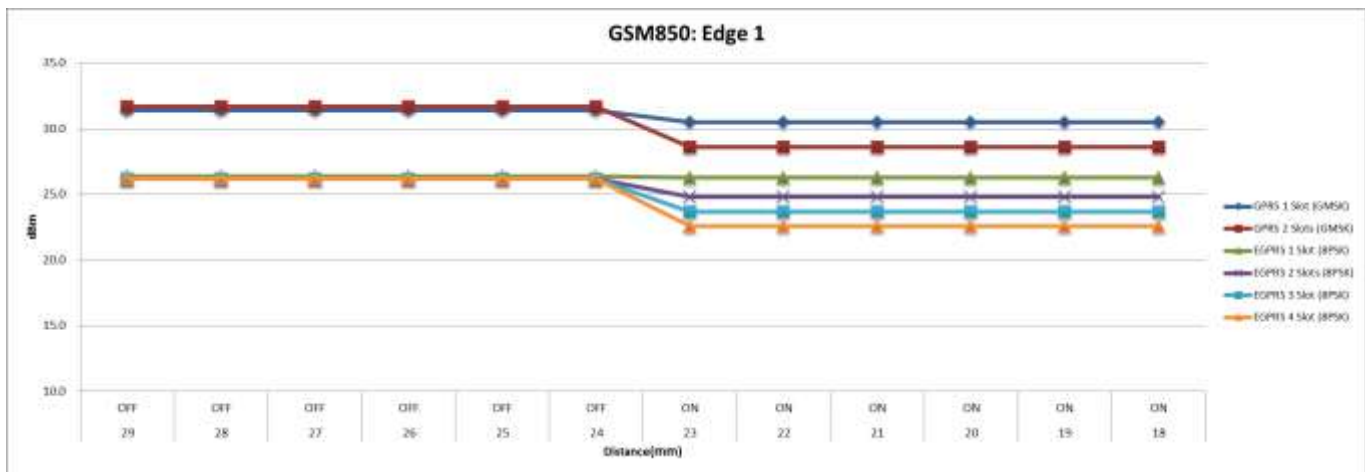
7.6. Triggering distances and power levels

7.6.1. DUT moving toward the phantom

GSM850

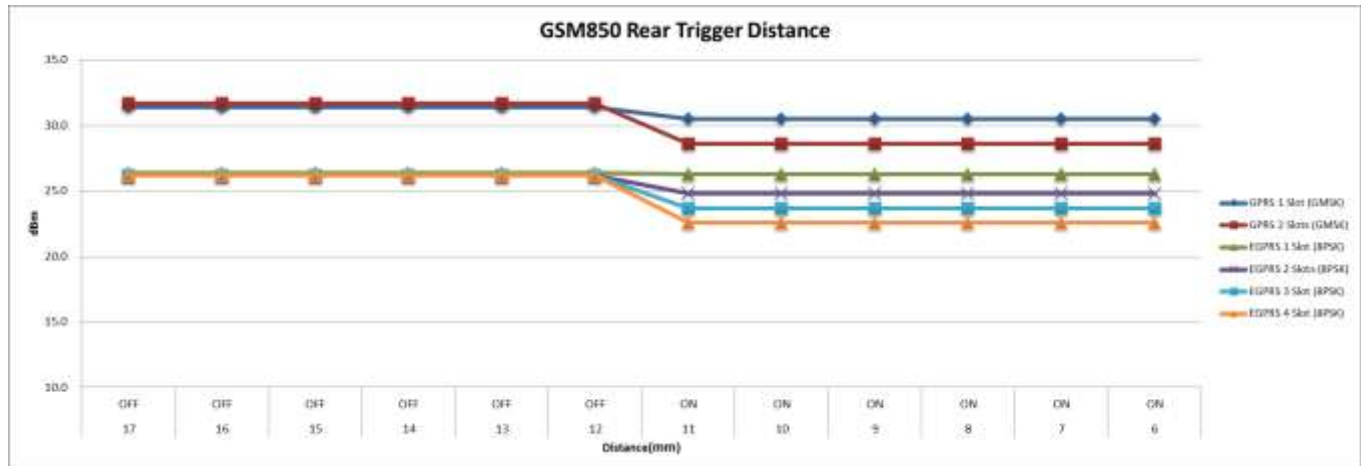
Edge 1

Edge 1, (GSM850)													
Distance (mm):	29	28	27	26	25	24	23	22	21	20	19	18	
Proximity sensor with reduced power activation:	OFF	OFF	OFF	OFF	OFF	OFF	ON	ON	ON	ON	ON	ON	
GPRS 1 Slot (GMSK)	31.4	31.4	31.4	31.4	31.4	31.4	30.5	30.5	30.5	30.5	30.5	30.5	
GPRS 2 Slots (GMSK)	31.7	31.7	31.7	31.7	31.7	31.7	28.6	28.6	28.6	28.6	28.6	28.6	
EGPRS 1 Slot (8PSK)	26.4	26.4	26.4	26.4	26.4	26.4	26.3	26.3	26.3	26.3	26.3	26.3	
EGPRS 2 Slots (8PSK)	26.2	26.2	26.2	26.2	26.2	26.2	24.8	24.8	24.8	24.8	24.8	24.8	
EGPRS 3 Slot (8PSK)	26.2	26.2	26.2	26.2	26.2	26.2	23.7	23.7	23.7	23.7	23.7	23.7	
EGPRS 4 Slot (8PSK)	26.2	26.2	26.2	26.2	26.2	26.2	22.6	22.6	22.6	22.6	22.6	22.6	



Rear

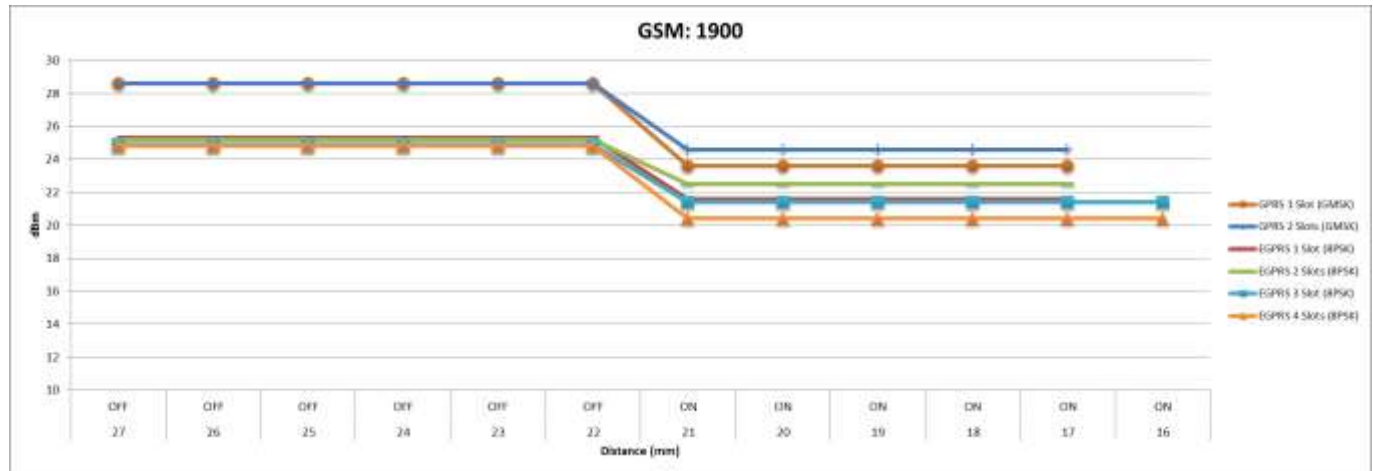
Rear, (GSM850)												
Distance (mm):	17	16	15	14	13	12	11	10	9	8	7	6
Proximity sensor with reduced power activation:	OFF	OFF	OFF	OFF	OFF	OFF	ON	ON	ON	ON	ON	ON
GPRS 1 Slot (GMSK)	31.4	31.4	31.4	31.4	31.4	31.4	30.5	30.5	30.5	30.5	30.5	30.5
GPRS 2 Slots (GMSK)	31.7	31.7	31.7	31.7	31.7	31.7	28.6	28.6	28.6	28.6	28.6	28.6
EGPRS 1 Slot (8PSK)	26.4	26.4	26.4	26.4	26.4	26.4	26.3	26.3	26.3	26.3	26.3	26.3
EGPRS 2 Slots (8PSK)	26.2	26.2	26.2	26.2	26.2	26.2	24.8	24.8	24.8	24.8	24.8	24.8
EGPRS 3 Slot (8PSK)	26.2	26.2	26.2	26.2	26.2	26.2	23.7	23.7	23.7	23.7	23.7	23.7
EGPRS 4 Slot (8PSK)	26.2	26.2	26.2	26.2	26.2	26.2	22.6	22.6	22.6	22.6	22.6	22.6



GSM1900

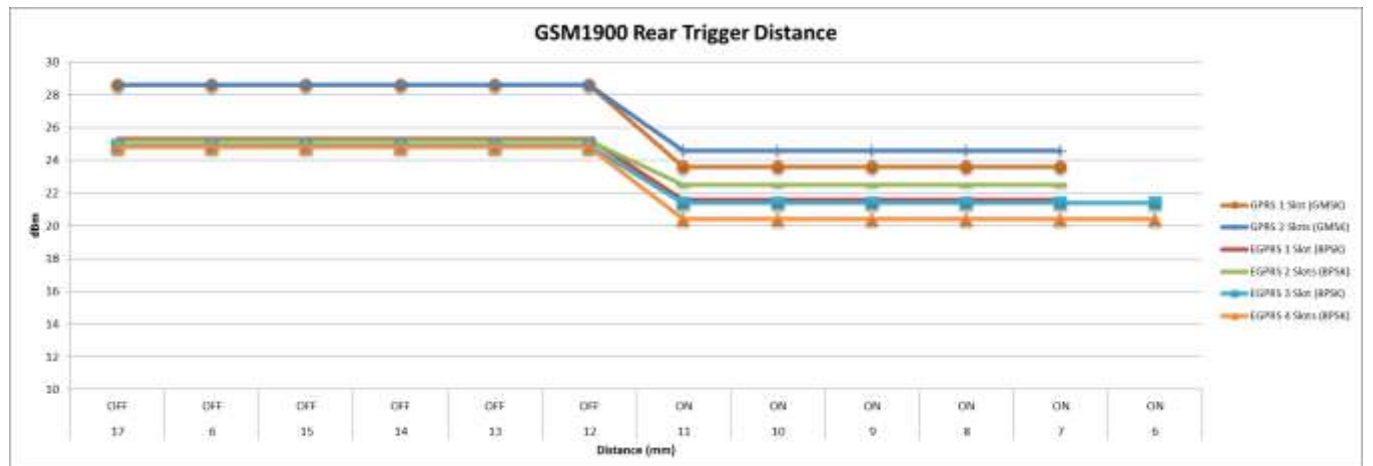
Edge 1

Edge 1, (GSM1900)													
Distance (mm):	27	26	25	24	23	22	21	20	19	18	17	16	
Proximity sensor with reduced power activation:	OFF	OFF	OFF	OFF	OFF	OFF	ON	ON	ON	ON	ON	ON	
GPRS 1 Slot (GMSK)	28.6	28.6	28.6	28.6	28.6	28.6	23.6	23.6	23.6	23.6	23.6	23.6	
GPRS 2 Slots (GMSK)	28.6	28.6	28.6	28.6	28.6	28.6	24.6	24.6	24.6	24.6	24.6	24.6	
EGPRS 1 Slot (8PSK)	25.3	25.3	25.3	25.3	25.3	25.3	21.6	21.6	21.6	21.6	21.6	21.6	
EGPRS 2 Slots (8PSK)	25.2	25.2	25.2	25.2	25.2	25.2	22.5	22.5	22.5	22.5	22.5	22.5	
EGPRS 3 Slot (8PSK)	24.9	24.9	24.9	24.9	24.9	24.9	21.4	21.4	21.4	21.4	21.4	21.4	
EGPRS 4 Slots (8PSK)	24.8	24.8	24.8	24.8	24.8	24.8	20.4	20.4	20.4	20.4	20.4	20.4	



Rear

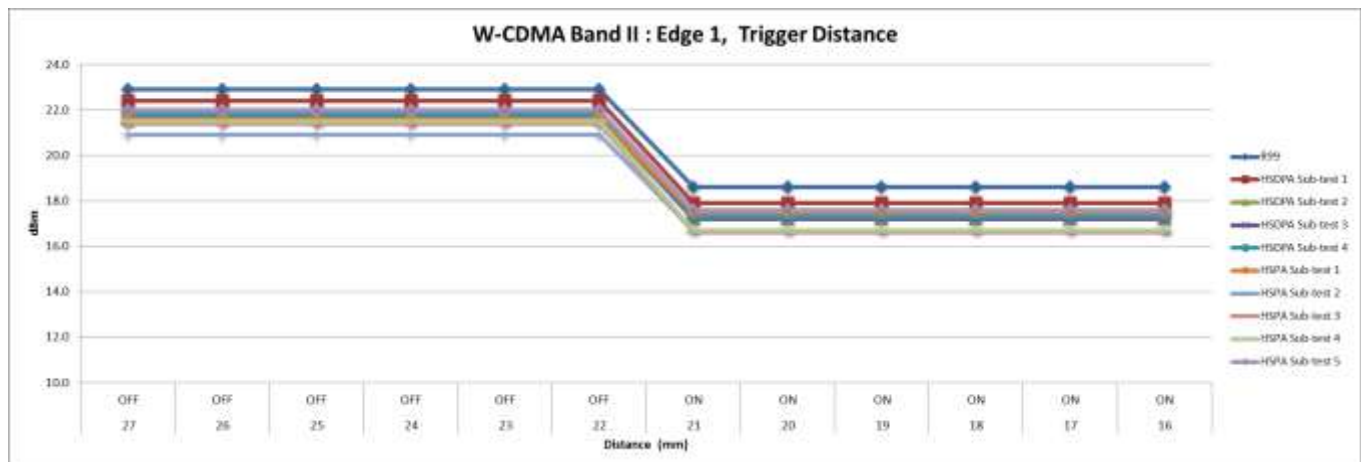
Rear, (GSM1900)													
Distance (mm):	17	6	15	14	13	12	11	10	9	8	7	6	
Proximity sensor with reduced power activation:	OFF	OFF	OFF	OFF	OFF	OFF	ON	ON	ON	ON	ON	ON	
GPRS 1 Slot (GMSK)	28.6	28.6	28.6	28.6	28.6	28.6	23.6	23.6	23.6	23.6	23.6	23.6	
GPRS 2 Slots (GMSK)	28.6	28.6	28.6	28.6	28.6	28.6	24.6	24.6	24.6	24.6	24.6	24.6	
EGPRS 1 Slot (8PSK)	25.3	25.3	25.3	25.3	25.3	25.3	21.6	21.6	21.6	21.6	21.6	21.6	
EGPRS 2 Slots (8PSK)	25.2	25.2	25.2	25.2	25.2	25.2	22.5	22.5	22.5	22.5	22.5	22.5	
EGPRS 3 Slot (8PSK)	24.9	24.9	24.9	24.9	24.9	24.9	21.4	21.4	21.4	21.4	21.4	21.4	
EGPRS 4 Slots (8PSK)	24.8	24.8	24.8	24.8	24.8	24.8	20.4	20.4	20.4	20.4	20.4	20.4	



W-CDMA Band II

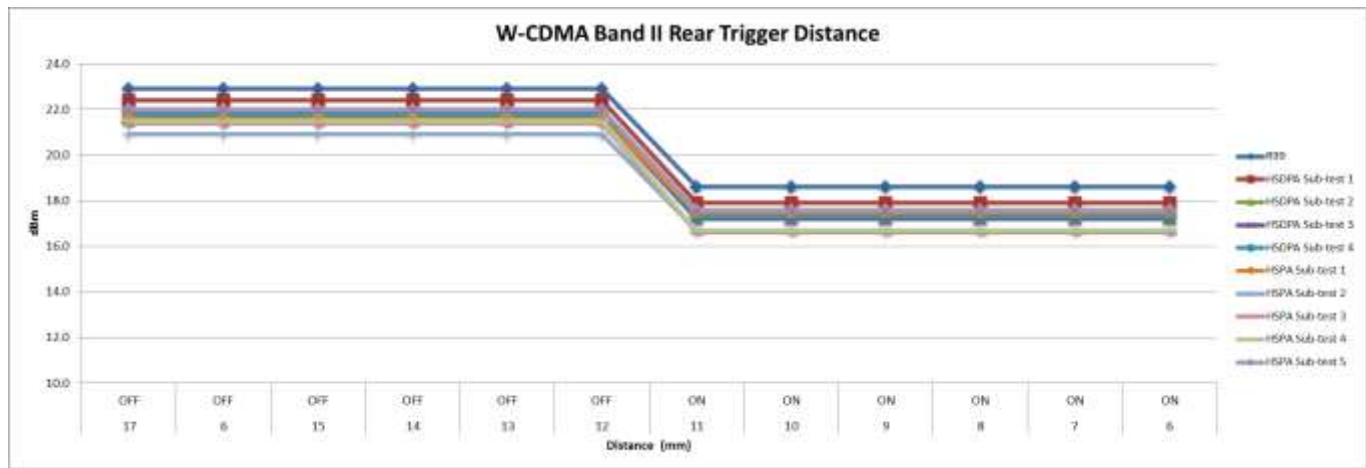
Edge 1

Edge 1, W-CDMA Band II												
Distance (mm):	27	26	25	24	23	22	21	20	19	18	17	16
Proximity sensor with reduced power activation:	OFF	OFF	OFF	OFF	OFF	OFF	ON	ON	ON	ON	ON	ON
R99	22.9	22.9	22.9	22.9	22.9	22.9	18.6	18.6	18.6	18.6	18.6	18.6
HSDPA Sub-test 1	22.4	22.4	22.4	22.4	22.4	22.4	17.9	17.9	17.9	17.9	17.9	17.9
HSDPA Sub-test 2	21.8	21.8	21.8	21.8	21.8	21.8	17.3	17.3	17.3	17.3	17.3	17.3
HSDPA Sub-test 3	21.7	21.7	21.7	21.7	21.7	21.7	17.2	17.2	17.2	17.2	17.2	17.2
HSDPA Sub-test 4	21.8	21.8	21.8	21.8	21.8	21.8	17.3	17.3	17.3	17.3	17.3	17.3
HSPA Sub-test 1	21.6	21.6	21.6	21.6	21.6	21.6	17.5	17.5	17.5	17.5	17.5	17.5
HSPA Sub-test 2	20.9	20.9	20.9	20.9	20.9	20.9	16.7	16.7	16.7	16.7	16.7	16.7
HSPA Sub-test 3	21.4	21.4	21.4	21.4	21.4	21.4	16.6	16.6	16.6	16.6	16.6	16.6
HSPA Sub-test 4	21.5	21.5	21.5	21.5	21.5	21.5	16.7	16.7	16.7	16.7	16.7	16.7
HSPA Sub-test 5	22.0	22.0	22.0	22.0	22.0	22.0	17.6	17.6	17.6	17.6	17.6	17.6



Rear

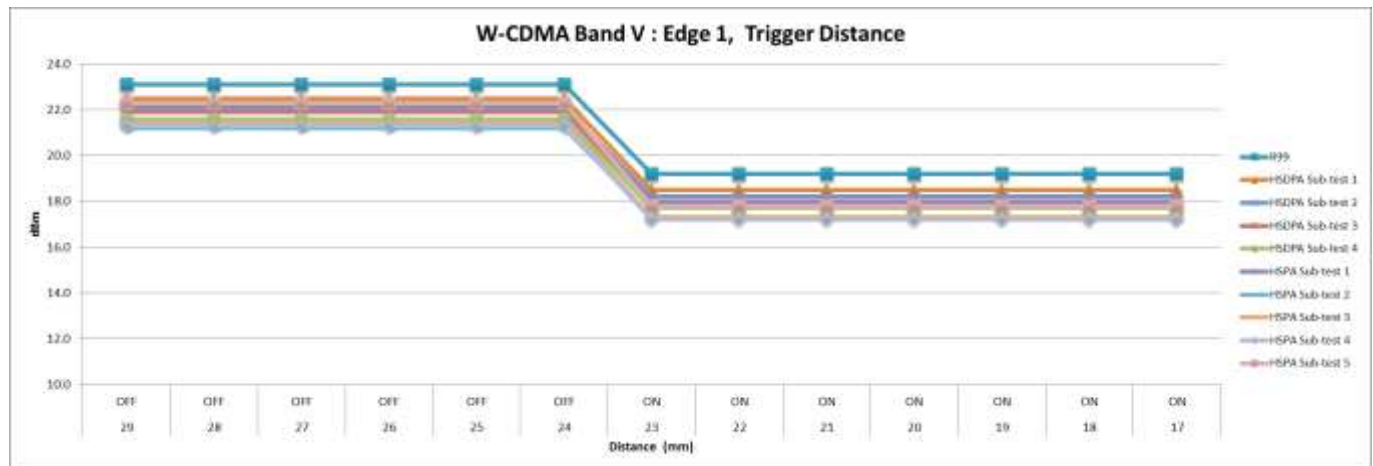
Rear, W-CDMA Band II												
Distance (mm):	17	6	15	14	13	12	11	10	9	8	7	6
Proximity sensor with reduced power activation:	OFF	OFF	OFF	OFF	OFF	OFF	ON	ON	ON	ON	ON	ON
R99	22.9	22.9	22.9	22.9	22.9	22.9	18.6	18.6	18.6	18.6	18.6	18.6
HSDPA Sub-test 1	22.4	22.4	22.4	22.4	22.4	22.4	17.9	17.9	17.9	17.9	17.9	17.9
HSDPA Sub-test 2	21.8	21.8	21.8	21.8	21.8	21.8	17.3	17.3	17.3	17.3	17.3	17.3
HSDPA Sub-test 3	21.7	21.7	21.7	21.7	21.7	21.7	17.2	17.2	17.2	17.2	17.2	17.2
HSDPA Sub-test 4	21.8	21.8	21.8	21.8	21.8	21.8	17.3	17.3	17.3	17.3	17.3	17.3
HSPA Sub-test 1	21.6	21.6	21.6	21.6	21.6	21.6	17.5	17.5	17.5	17.5	17.5	17.5
HSPA Sub-test 2	20.9	20.9	20.9	20.9	20.9	20.9	16.7	16.7	16.7	16.7	16.7	16.7
HSPA Sub-test 3	21.4	21.4	21.4	21.4	21.4	21.4	16.6	16.6	16.6	16.6	16.6	16.6
HSPA Sub-test 4	21.5	21.5	21.5	21.5	21.5	21.5	16.7	16.7	16.7	16.7	16.7	16.7
HSPA Sub-test 5	22.0	22.0	22.0	22.0	22.0	22.0	17.6	17.6	17.6	17.6	17.6	17.6



W-CDMA Band V

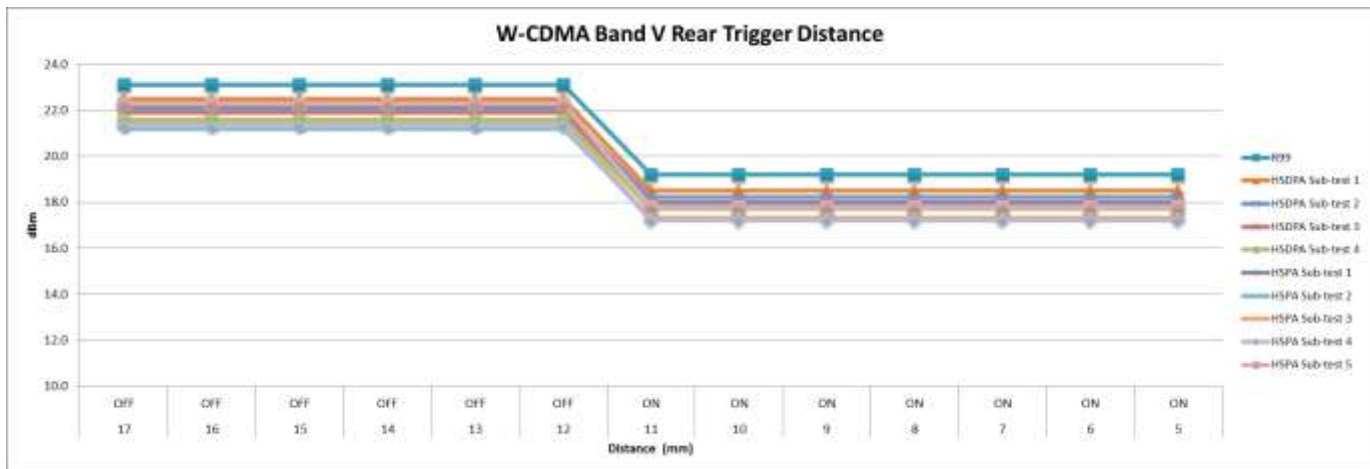
Edge 1

Edge 1, W-CDMA Band V														
Distance (mm):	29	28	27	26	25	24	23	22	21	20	19	18	17	
Proximity sensor with reduced power activation:	OFF	OFF	OFF	OFF	OFF	OFF	ON	ON	ON	ON	ON	ON	ON	
R99	23.1	23.1	23.1	23.1	23.1	23.1	19.2	19.2	19.2	19.2	19.2	19.2	19.2	
HSDPA Sub-test 1	22.5	22.5	22.5	22.5	22.5	22.5	18.5	18.5	18.5	18.5	18.5	18.5	18.5	
HSDPA Sub-test 2	22.1	22.1	22.1	22.1	22.1	22.1	18.2	18.2	18.2	18.2	18.2	18.2	18.2	
HSDPA Sub-test 3	21.9	21.9	21.9	21.9	21.9	21.9	17.9	17.9	17.9	17.9	17.9	17.9	17.9	
HSDPA Sub-test 4	21.6	21.6	21.6	21.6	21.6	21.6	17.7	17.7	17.7	17.7	17.7	17.7	17.7	
HSPA Sub-test 1	22.2	22.2	22.2	22.2	22.2	22.2	18.0	18.0	18.0	18.0	18.0	18.0	18.0	
HSPA Sub-test 2	21.2	21.2	21.2	21.2	21.2	21.2	17.3	17.3	17.3	17.3	17.3	17.3	17.3	
HSPA Sub-test 3	21.4	21.4	21.4	21.4	21.4	21.4	17.3	17.3	17.3	17.3	17.3	17.3	17.3	
HSPA Sub-test 4	21.3	21.3	21.3	21.3	21.3	21.3	17.2	17.2	17.2	17.2	17.2	17.2	17.2	
HSPA Sub-test 5	22.3	22.3	22.3	22.3	22.3	22.3	17.8	17.8	17.8	17.8	17.8	17.8	17.8	



Rear

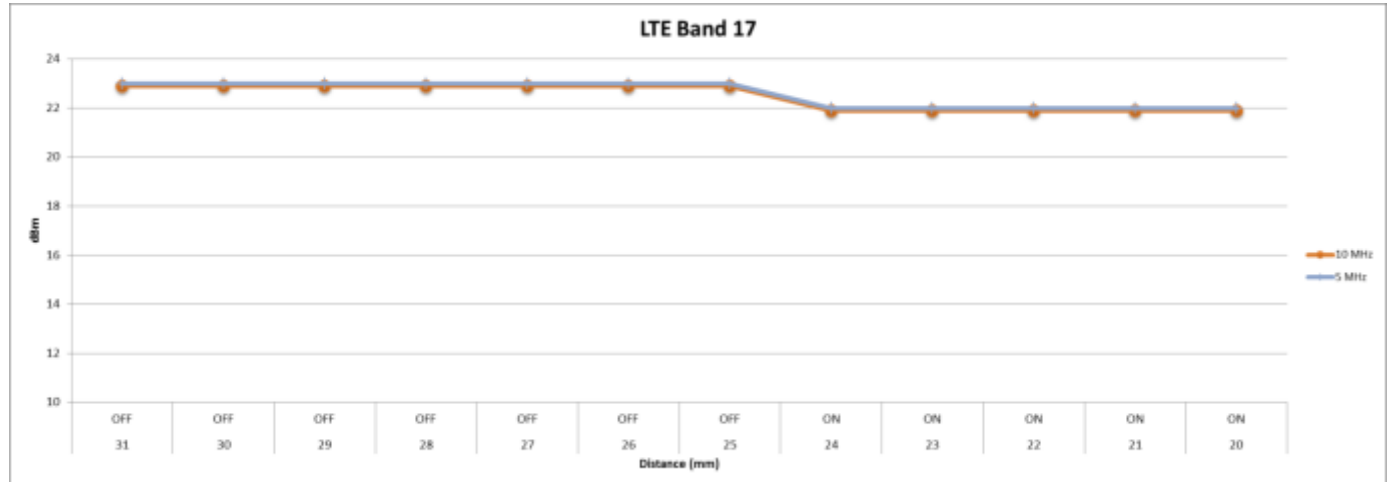
Rear, W-CDMA Band V													
Distance (mm):	17	16	15	14	13	12	11	10	9	8	7	6	5
Proximity sensor with reduced power activation:	OFF	OFF	OFF	OFF	OFF	OFF	ON	ON	ON	ON	ON	ON	ON
R99	23.1	23.1	23.1	23.1	23.1	23.1	19.2	19.2	19.2	19.2	19.2	19.2	19.2
HSDPA Sub-test 1	22.5	22.5	22.5	22.5	22.5	22.5	18.5	18.5	18.5	18.5	18.5	18.5	18.5
HSDPA Sub-test 2	22.1	22.1	22.1	22.1	22.1	22.1	18.2	18.2	18.2	18.2	18.2	18.2	18.2
HSDPA Sub-test 3	21.9	21.9	21.9	21.9	21.9	21.9	17.9	17.9	17.9	17.9	17.9	17.9	17.9
HSDPA Sub-test 4	21.6	21.6	21.6	21.6	21.6	21.6	17.7	17.7	17.7	17.7	17.7	17.7	17.7
HSPA Sub-test 1	22.2	22.2	22.2	22.2	22.2	22.2	18.0	18.0	18.0	18.0	18.0	18.0	18.0
HSPA Sub-test 2	21.2	21.2	21.2	21.2	21.2	21.2	17.3	17.3	17.3	17.3	17.3	17.3	17.3
HSPA Sub-test 3	21.4	21.4	21.4	21.4	21.4	21.4	17.3	17.3	17.3	17.3	17.3	17.3	17.3
HSPA Sub-test 4	21.3	21.3	21.3	21.3	21.3	21.3	17.2	17.2	17.2	17.2	17.2	17.2	17.2
HSPA Sub-test 5	22.3	22.3	22.3	22.3	22.3	22.3	17.8	17.8	17.8	17.8	17.8	17.8	17.8



LTE Band 17

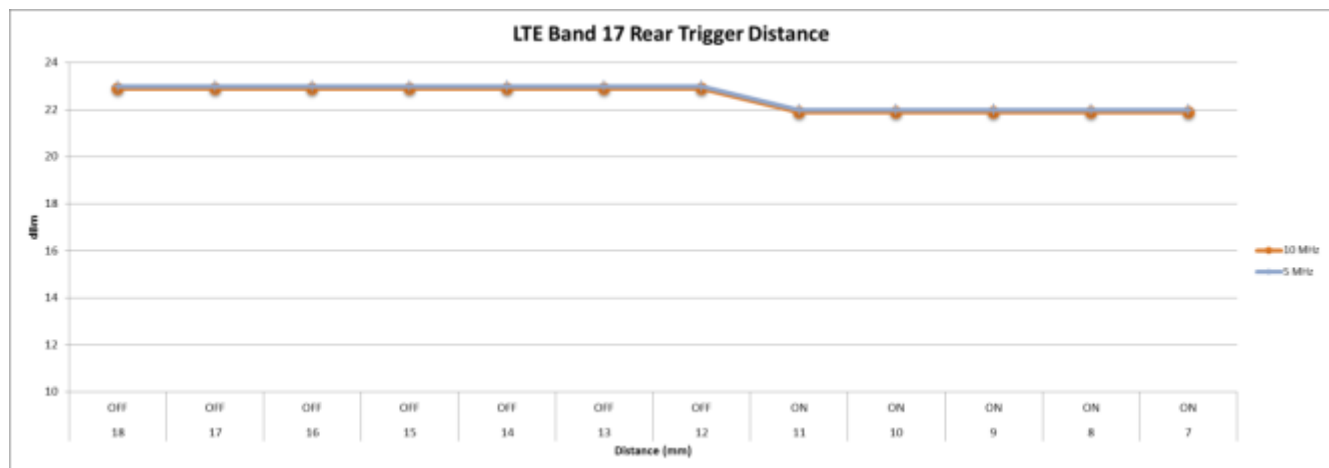
Edge 1

Edge 1, LTE Band 17													
Distance (mm):	31	30	29	28	27	26	25	24	23	22	21	20	19
Proximity sensor with reduced power activation:	OFF	OFF	OFF	OFF	OFF	OFF	OFF	ON	ON	ON	ON	ON	ON
10 MHz	22.9	22.9	22.9	22.9	22.9	22.9	22.9	21.9	21.9	21.9	21.9	21.9	21.9
5 MHz	23.0	23.0	23.0	23.0	23.0	23.0	23.0	22.0	22.0	22.0	22.0	22.0	20.1



Rear

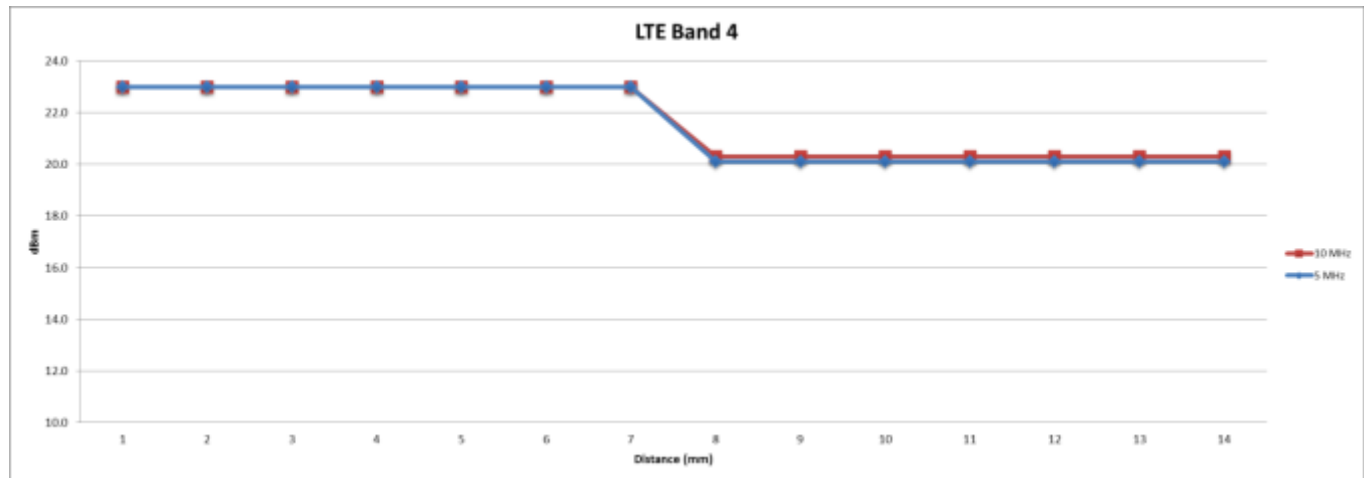
Rear, LTE Band 17													
Distance (mm):	18	17	16	15	14	13	12	11	10	9	8	7	6
Proximity sensor with reduced power activation:	OFF	OFF	OFF	OFF	OFF	OFF	OFF	ON	ON	ON	ON	ON	ON
10 MHz	22.9	22.9	22.9	22.9	22.9	22.9	22.9	21.9	21.9	21.9	21.9	21.9	21.9
5 MHz	23.0	23.0	23.0	23.0	23.0	23.0	23.0	22.0	22.0	22.0	22.0	22.0	20.1



LTE Band 4

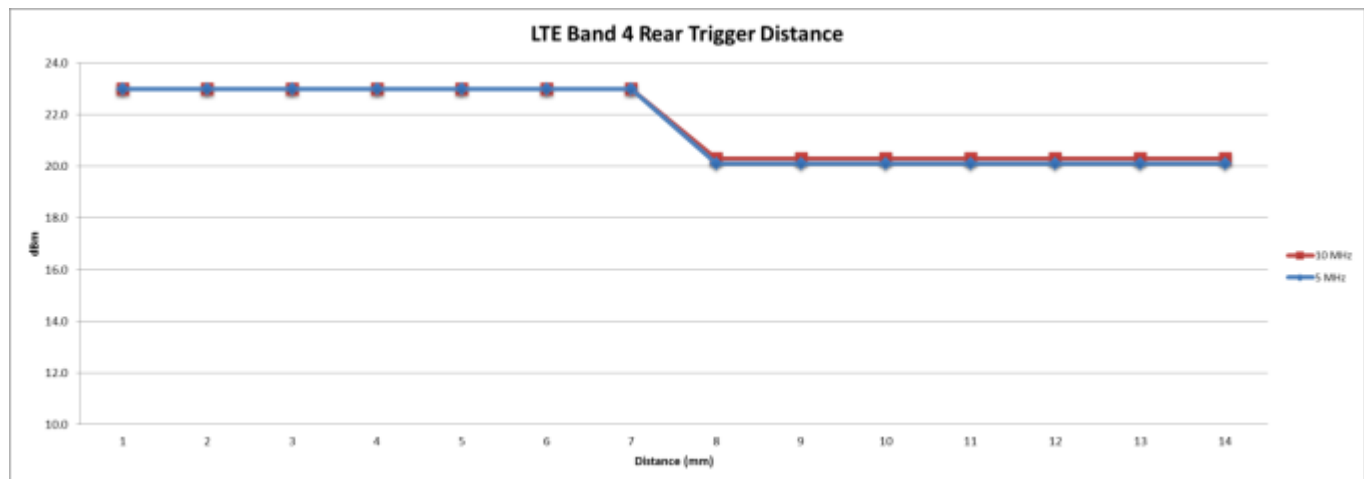
Edge 1

Edge 1, LTE Band 4														
Distance (mm):	28	27	26	25	24	23	22	21	20	19	18	17	16	15
Proximity sensor with reduced power activation:	OFF	OFF	OFF	OFF	OFF	OFF	OFF	ON	ON	ON	ON	ON	ON	ON
10 MHz	23.0	23.0	23.0	23.0	23.0	23.0	23.0	20.3	20.3	20.3	20.3	20.3	20.3	20.3
5 MHz	23.0	23.0	23.0	23.0	23.0	23.0	23.0	20.1	20.1	20.1	20.1	20.1	20.1	20.1



Rear

Edge 1, LTE Band 4														
Distance (mm):	19	18	17	16	15	14	13	12	11	10	9	8	7	6
Proximity sensor with reduced power activation:	OFF	OFF	OFF	OFF	OFF	OFF	OFF	ON	ON	ON	ON	ON	ON	ON
10 MHz	21.2	21.2	21.2	21.2	21.2	21.2	21.2	17.7	17.7	17.7	17.7	17.7	17.7	17.7
5 MHz	21.3	21.3	21.3	21.3	21.3	21.3	21.3	17.7	17.7	17.7	17.7	17.7	17.7	17.7

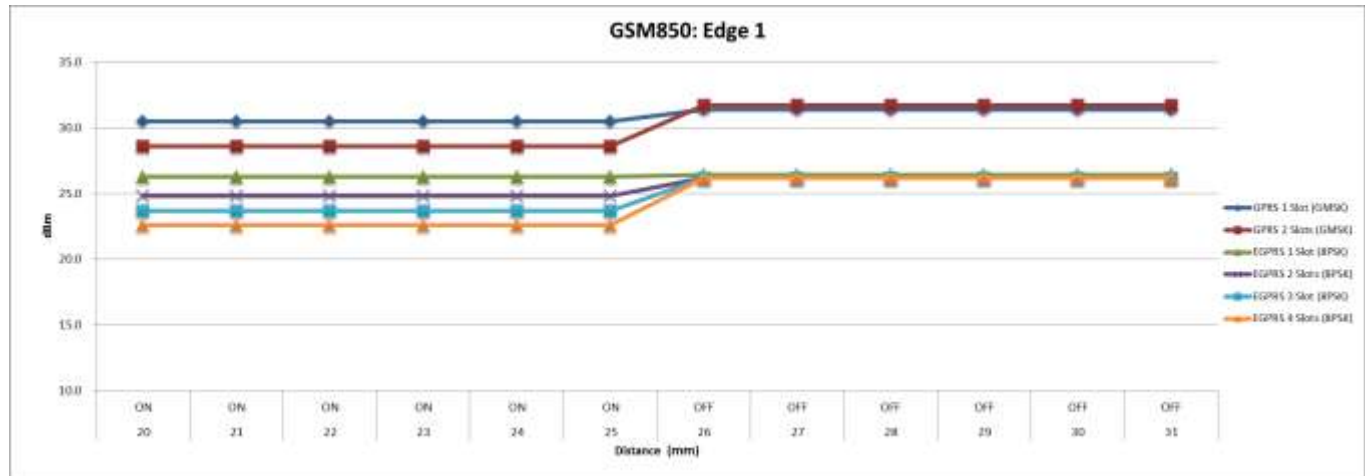


7.6.2. DUT moving away from the phantom

GSM850

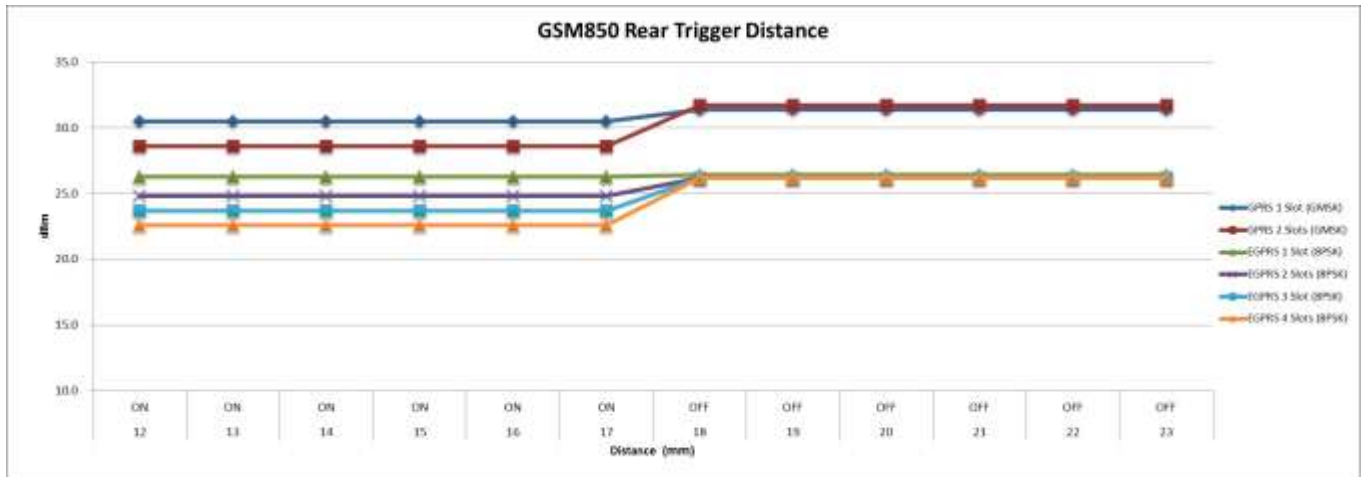
Edge 1

Edge 1,GSM850)												
Distance (mm):	20	21	22	23	24	25	26	27	28	29	30	31
Proximity sensor with reduced power activation:	ON	ON	ON	ON	ON	ON	OFF	OFF	OFF	OFF	OFF	OFF
GPRS 1 Slot (GMSK)	30.5	30.5	30.5	30.5	30.5	30.5	31.4	31.4	31.4	31.4	31.4	31.4
GPRS 2 Slots (GMSK)	28.6	28.6	28.6	28.6	28.6	28.6	31.7	31.7	31.7	31.7	31.7	31.7
EGPRS 1 Slot (8PSK)	26.3	26.3	26.3	26.3	26.3	26.3	26.4	26.4	26.4	26.4	26.4	26.4
EGPRS 2 Slots (8PSK)	24.8	24.8	24.8	24.8	24.8	24.8	26.2	26.2	26.2	26.2	26.2	26.2
EGPRS 3 Slot (8PSK)	23.7	23.7	23.7	23.7	23.7	23.7	26.2	26.2	26.2	26.2	26.2	26.2
EGPRS 4 Slots (8PSK)	22.6	22.6	22.6	22.6	22.6	22.6	26.2	26.2	26.2	26.2	26.2	26.2



Rear

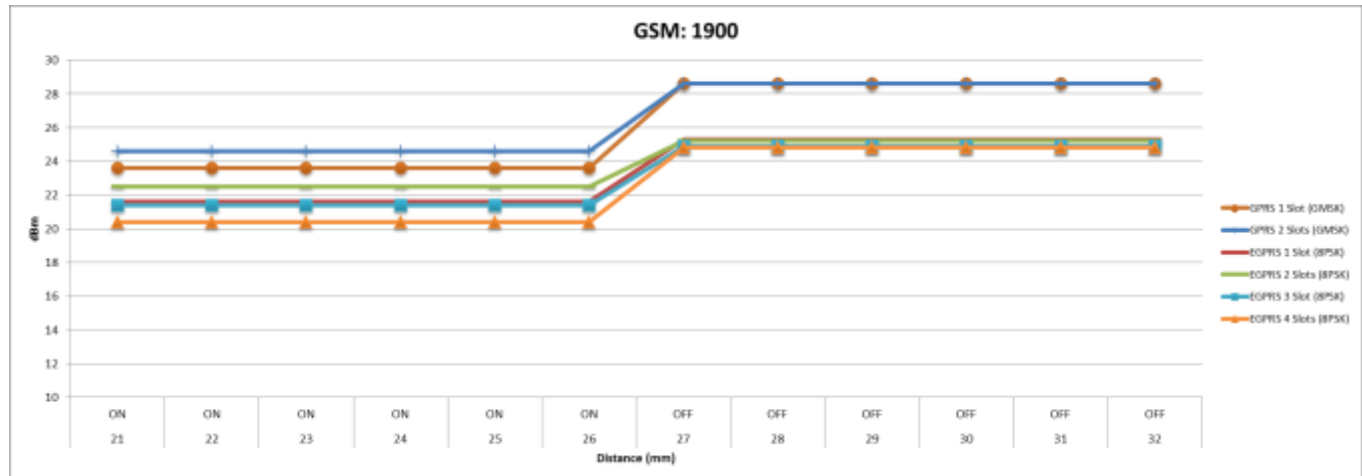
Rear, GSM850												
Distance (mm):	12	13	14	15	16	17	18	19	20	21	22	23
Proximity sensor with reduced power activation:	ON	ON	ON	ON	ON	ON	OFF	OFF	OFF	OFF	OFF	OFF
GPRS 1 Slot (GMSK)	30.5	30.5	30.5	30.5	30.5	30.5	31.4	31.4	31.4	31.4	31.4	31.4
GPRS 2 Slots (GMSK)	28.6	28.6	28.6	28.6	28.6	28.6	31.7	31.7	31.7	31.7	31.7	31.7
EGPRS 1 Slot (8PSK)	26.3	26.3	26.3	26.3	26.3	26.3	26.4	26.4	26.4	26.4	26.4	26.4
EGPRS 2 Slots (8PSK)	24.8	24.8	24.8	24.8	24.8	24.8	26.2	26.2	26.2	26.2	26.2	26.2
EGPRS 3 Slot (8PSK)	23.7	23.7	23.7	23.7	23.7	23.7	26.2	26.2	26.2	26.2	26.2	26.2
EGPRS 4 Slots (8PSK)	22.6	22.6	22.6	22.6	22.6	22.6	26.2	26.2	26.2	26.2	26.2	26.2



GSM1900

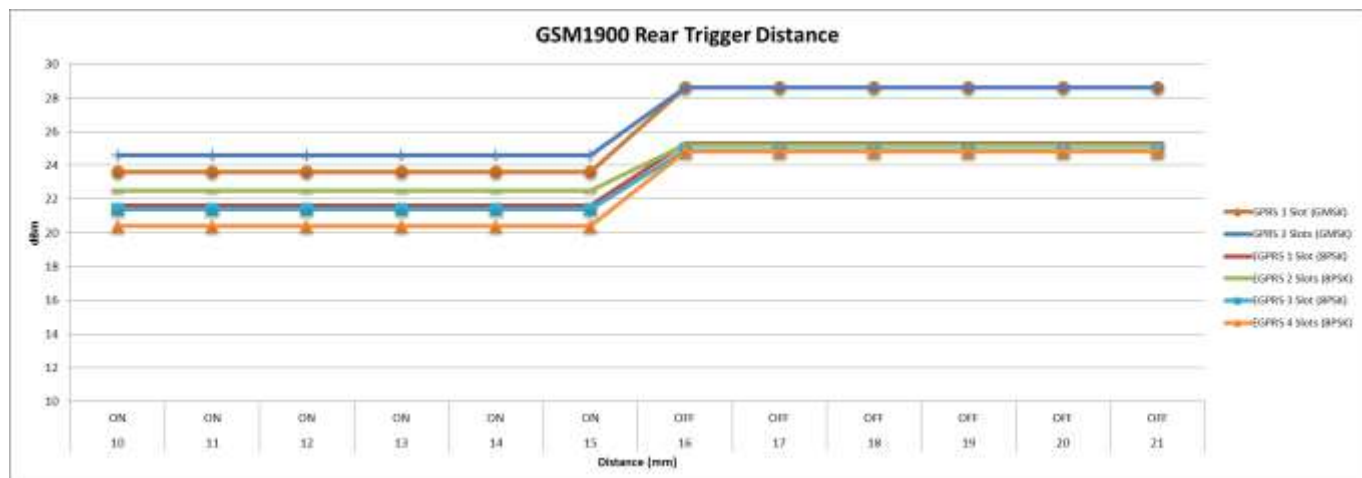
Edge 1

Edge 1 (GSM1900)												
Distance (mm):	21	22	23	24	25	26	27	28	29	30	31	32
Proximity sensor with reduced power activation:	ON	ON	ON	ON	ON	ON	OFF	OFF	OFF	OFF	OFF	OFF
GPRS 1 Slot (GMSK)	23.6	23.6	23.6	23.6	23.6	23.6	28.6	28.6	28.6	28.6	28.6	28.6
GPRS 2 Slots (GMSK)	24.6	24.6	24.6	24.6	24.6	24.6	28.6	28.6	28.6	28.6	28.6	28.6
EGPRS 1 Slot (8PSK)	21.6	21.6	21.6	21.6	21.6	21.6	25.3	25.3	25.3	25.3	25.3	25.3
EGPRS 2 Slots (8PSK)	22.5	22.5	22.5	22.5	22.5	22.5	25.2	25.2	25.2	25.2	25.2	25.2
EGPRS 3 Slot (8PSK)	21.4	21.4	21.4	21.4	21.4	21.4	24.9	24.9	24.9	24.9	24.9	24.9
EGPRS 4 Slots (8PSK)	20.4	20.4	20.4	20.4	20.4	20.4	24.8	24.8	24.8	24.8	24.8	24.8



Rear

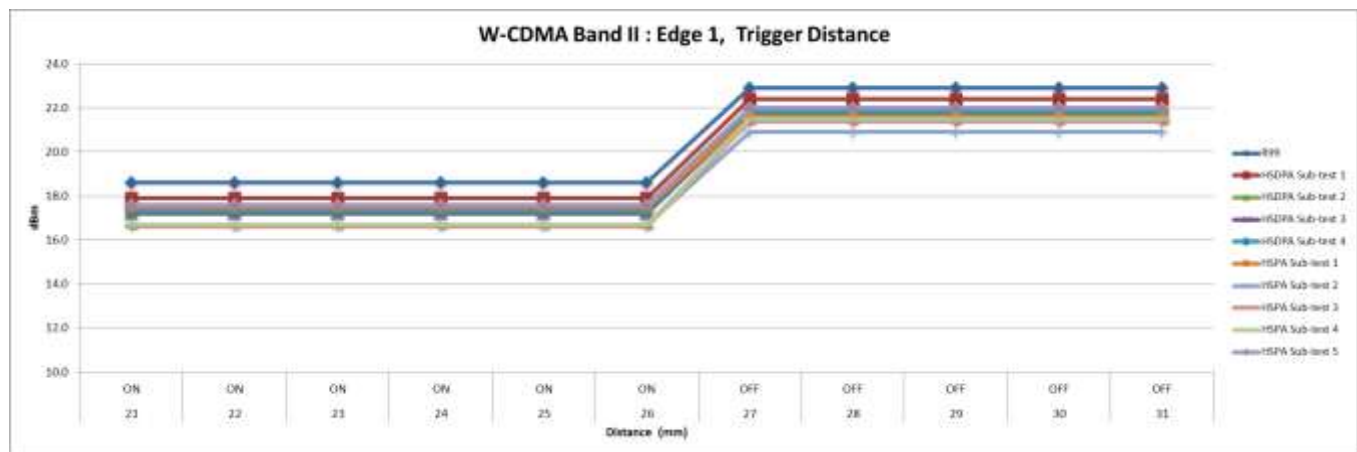
Rear, GSM1900												
Distance (mm):	10	11	12	13	14	15	16	17	18	19	20	21
Proximity sensor with reduced power activation:	ON	ON	ON	ON	ON	ON	OFF	OFF	OFF	OFF	OFF	OFF
GPRS 1 Slot (GMSK)	23.6	23.6	23.6	23.6	23.6	23.6	28.6	28.6	28.6	28.6	28.6	28.6
GPRS 2 Slots (GMSK)	24.6	24.6	24.6	24.6	24.6	24.6	28.6	28.6	28.6	28.6	28.6	28.6
EGPRS 1 Slot (8PSK)	21.6	21.6	21.6	21.6	21.6	21.6	25.3	25.3	25.3	25.3	25.3	25.3
EGPRS 2 Slots (8PSK)	22.5	22.5	22.5	22.5	22.5	22.5	25.2	25.2	25.2	25.2	25.2	25.2
EGPRS 3 Slot (8PSK)	21.4	21.4	21.4	21.4	21.4	21.4	24.9	24.9	24.9	24.9	24.9	24.9
EGPRS 4 Slots (8PSK)	20.4	20.4	20.4	20.4	20.4	20.4	24.8	24.8	24.8	24.8	24.8	24.8



W-CDMA Band II

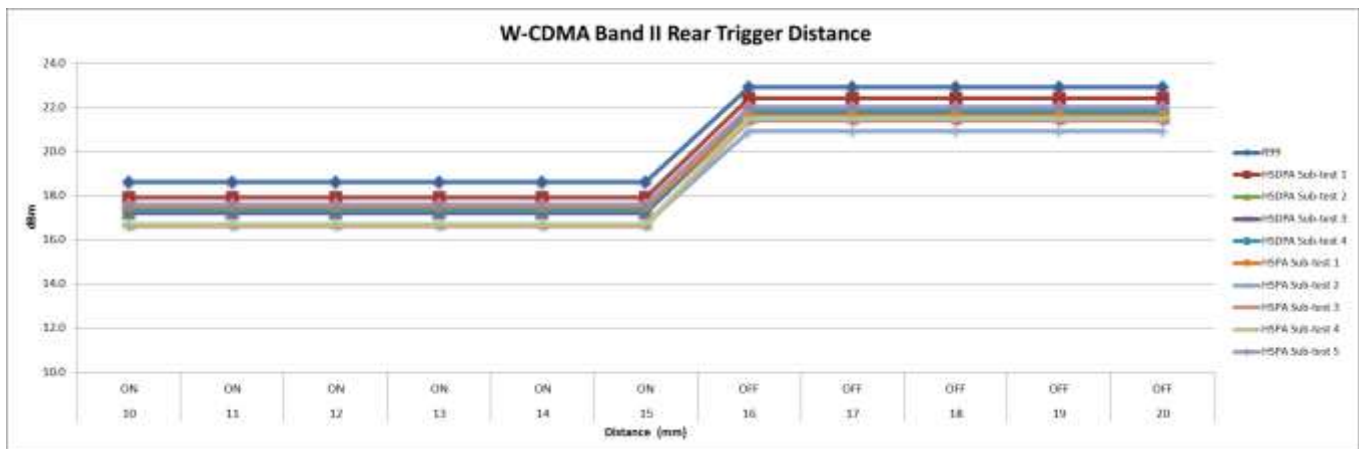
Edge 1

Edge 1, W-CDMA Band II												
Distance (mm):	21	22	23	24	25	26	27	28	29	30	31	
Proximity sensor with reduced power activation:	ON	ON	ON	ON	ON	ON	OFF	OFF	OFF	OFF	OFF	
R99	18.6	18.6	18.6	18.6	18.6	18.6	22.9	22.9	22.9	22.9	22.9	
HSDPA Sub-test 1	17.9	17.9	17.9	17.9	17.9	17.9	22.4	22.4	22.4	22.4	22.4	
HSDPA Sub-test 2	17.3	17.3	17.3	17.3	17.3	17.3	21.8	21.8	21.8	21.8	21.8	
HSDPA Sub-test 3	17.2	17.2	17.2	17.2	17.2	17.2	21.7	21.7	21.7	21.7	21.7	
HSDPA Sub-test 4	17.3	17.3	17.3	17.3	17.3	17.3	21.8	21.8	21.8	21.8	21.8	
HSPA Sub-test 1	17.5	17.5	17.5	17.5	17.5	17.5	21.6	21.6	21.6	21.6	21.6	
HSPA Sub-test 2	16.7	16.7	16.7	16.7	16.7	16.7	20.9	20.9	20.9	20.9	20.9	
HSPA Sub-test 3	16.6	16.6	16.6	16.6	16.6	16.6	21.4	21.4	21.4	21.4	21.4	
HSPA Sub-test 4	16.7	16.7	16.7	16.7	16.7	16.7	21.5	21.5	21.5	21.5	21.5	
HSPA Sub-test 5	17.6	17.6	17.6	17.6	17.6	17.6	22.0	22.0	22.0	22.0	22.0	



Rear

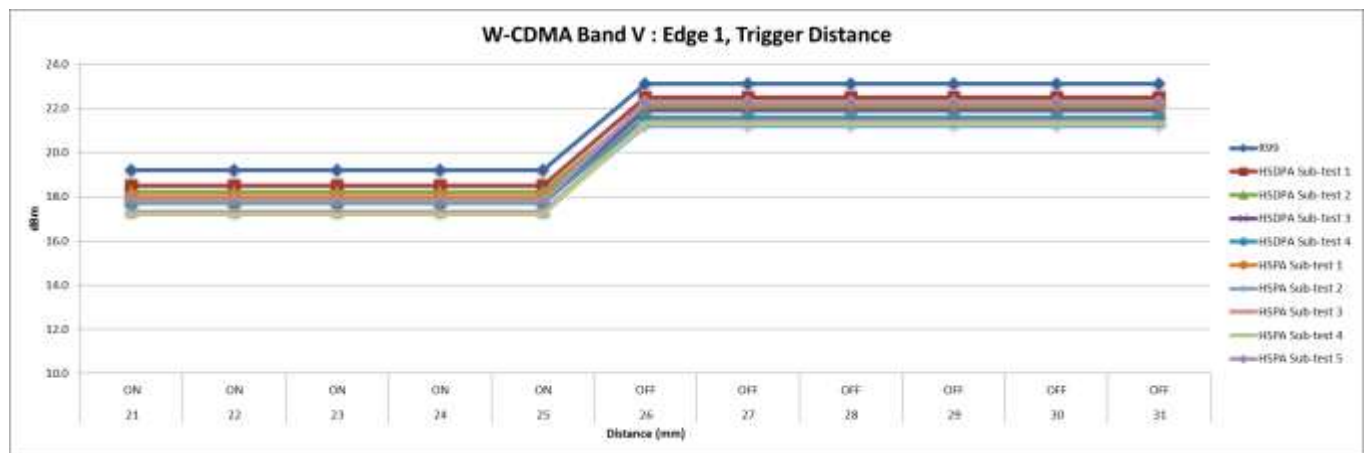
Rear, W-CDMA Band II											
Distance (mm):	10	11	12	13	14	15	16	17	18	19	20
Proximity sensor with reduced power activation:	ON	ON	ON	ON	ON	ON	OFF	OFF	OFF	OFF	OFF
R99	18.6	18.6	18.6	18.6	18.6	18.6	22.9	22.9	22.9	22.9	22.9
HSDPA Sub-test 1	17.9	17.9	17.9	17.9	17.9	17.9	22.4	22.4	22.4	22.4	22.4
HSDPA Sub-test 2	17.3	17.3	17.3	17.3	17.3	17.3	21.8	21.8	21.8	21.8	21.8
HSDPA Sub-test 3	17.2	17.2	17.2	17.2	17.2	17.2	21.7	21.7	21.7	21.7	21.7
HSDPA Sub-test 4	17.3	17.3	17.3	17.3	17.3	17.3	21.8	21.8	21.8	21.8	21.8
HSPA Sub-test 1	17.5	17.5	17.5	17.5	17.5	17.5	21.6	21.6	21.6	21.6	21.6
HSPA Sub-test 2	16.7	16.7	16.7	16.7	16.7	16.7	20.9	20.9	20.9	20.9	20.9
HSPA Sub-test 3	16.6	16.6	16.6	16.6	16.6	16.6	21.4	21.4	21.4	21.4	21.4
HSPA Sub-test 4	16.7	16.7	16.7	16.7	16.7	16.7	21.5	21.5	21.5	21.5	21.5
HSPA Sub-test 5	17.6	17.6	17.6	17.6	17.6	17.6	22.0	22.0	22.0	22.0	22.0



W-CDMA Band V

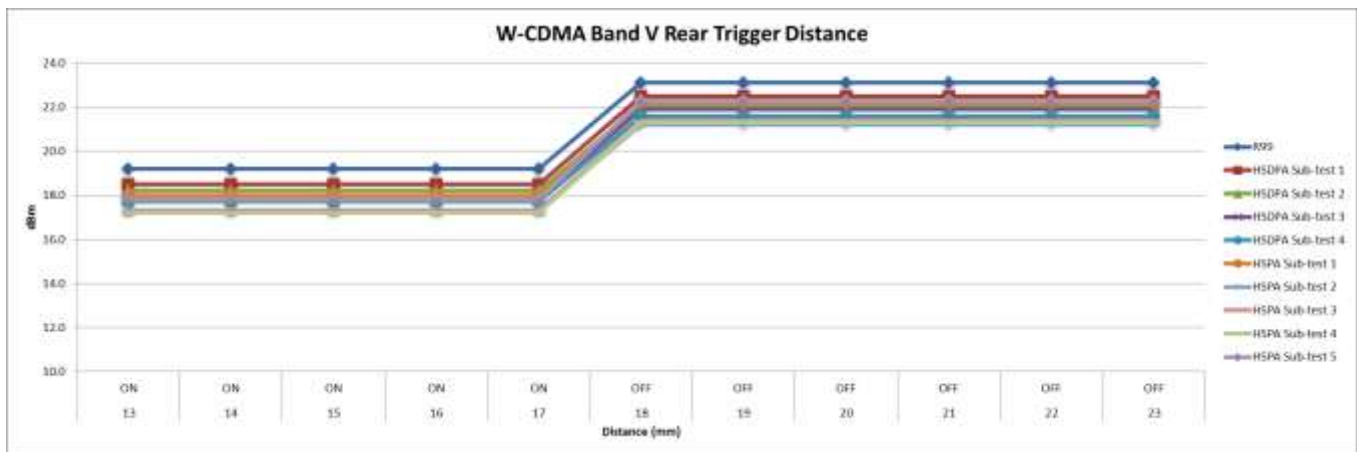
Edge 1

Edge 1, W-CDMA Band V											
Distance (mm):	21	22	23	24	25	26	27	28	29	30	31
Proximity sensor with reduced power activation:	ON	ON	ON	ON	ON	OFF	OFF	OFF	OFF	OFF	OFF
R99	19.2	19.2	19.2	19.2	19.2	23.1	23.1	23.1	23.1	23.1	23.1
HSDPA Sub-test 1	18.5	18.5	18.5	18.5	18.5	22.5	22.5	22.5	22.5	22.5	22.5
HSDPA Sub-test 2	18.2	18.2	18.2	18.2	18.2	22.1	22.1	22.1	22.1	22.1	22.1
HSDPA Sub-test 3	17.9	17.9	17.9	17.9	17.9	21.9	21.9	21.9	21.9	21.9	21.9
HSDPA Sub-test 4	17.7	17.7	17.7	17.7	17.7	21.6	21.6	21.6	21.6	21.6	21.6
HSPA Sub-test 1	18.0	18.0	18.0	18.0	18.0	22.2	22.2	22.2	22.2	22.2	22.2
HSPA Sub-test 2	17.3	17.3	17.3	17.3	17.3	21.2	21.2	21.2	21.2	21.2	21.2
HSPA Sub-test 3	17.3	17.3	17.3	17.3	17.3	21.4	21.4	21.4	21.4	21.4	21.4
HSPA Sub-test 4	17.2	17.2	17.2	17.2	17.2	21.3	21.3	21.3	21.3	21.3	21.3
HSPA Sub-test 5	17.8	17.8	17.8	17.8	17.8	22.3	22.3	22.3	22.3	22.3	22.3



Rear

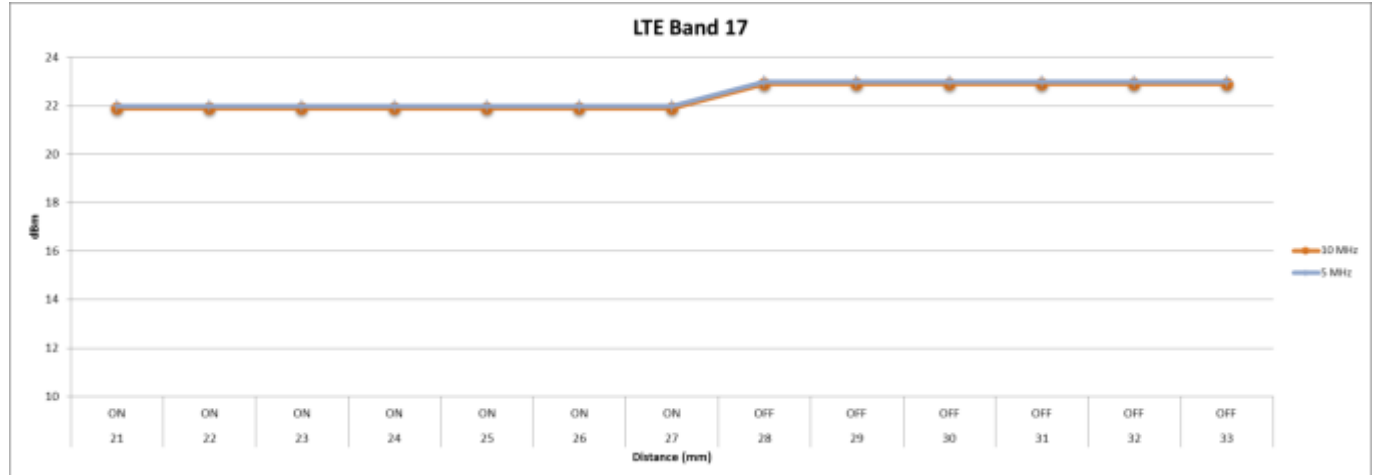
Rear, W-CDMA Band V											
Distance (mm):	13	14	15	16	17	18	19	20	21	22	23
Proximity sensor with reduced power activation:	ON	ON	ON	ON	ON	OFF	OFF	OFF	OFF	OFF	OFF
R99	19.2	19.2	19.2	19.2	19.2	23.1	23.1	23.1	23.1	23.1	23.1
HSDPA Sub-test 1	18.5	18.5	18.5	18.5	18.5	22.5	22.5	22.5	22.5	22.5	22.5
HSDPA Sub-test 2	18.2	18.2	18.2	18.2	18.2	22.1	22.1	22.1	22.1	22.1	22.1
HSDPA Sub-test 3	17.9	17.9	17.9	17.9	17.9	21.9	21.9	21.9	21.9	21.9	21.9
HSDPA Sub-test 4	17.7	17.7	17.7	17.7	17.7	21.6	21.6	21.6	21.6	21.6	21.6
HSPA Sub-test 1	18.0	18.0	18.0	18.0	18.0	22.2	22.2	22.2	22.2	22.2	22.2
HSPA Sub-test 2	17.3	17.3	17.3	17.3	17.3	21.2	21.2	21.2	21.2	21.2	21.2
HSPA Sub-test 3	17.3	17.3	17.3	17.3	17.3	21.4	21.4	21.4	21.4	21.4	21.4
HSPA Sub-test 4	17.2	17.2	17.2	17.2	17.2	21.3	21.3	21.3	21.3	21.3	21.3
HSPA Sub-test 5	17.8	17.8	17.8	17.8	17.8	22.3	22.3	22.3	22.3	22.3	22.3



LTE Band 17

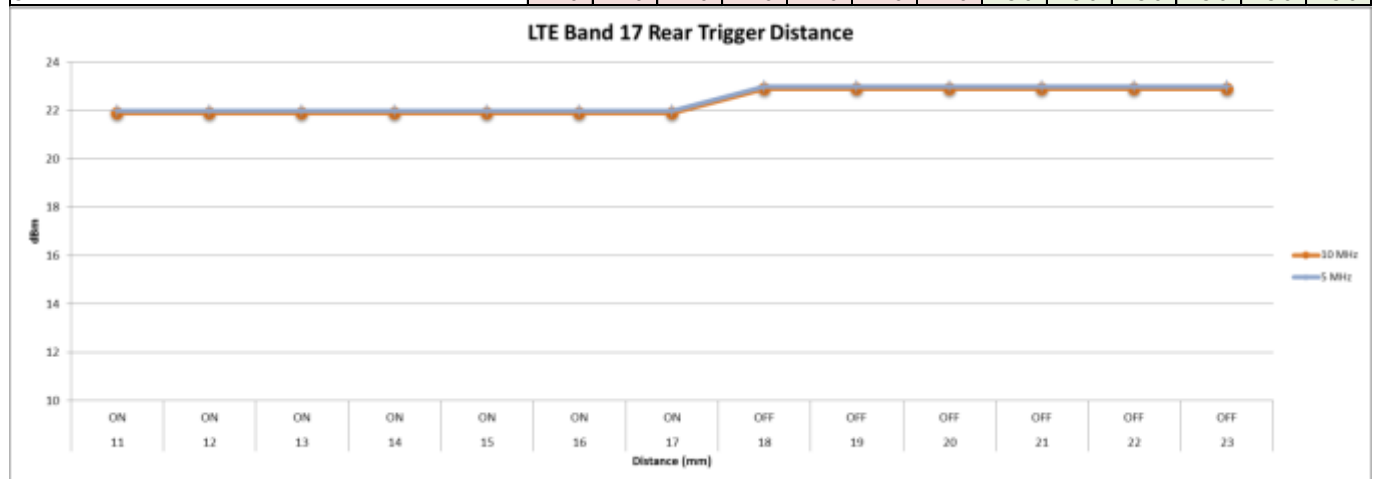
Edge 1

Edge 1, LTE Band 17													
Distance (mm):	21	22	23	24	25	26	27	28	29	30	31	32	33
Proximity sensor with reduced power activation:	ON	ON	ON	ON	ON	ON	ON	OFF	OFF	OFF	OFF	OFF	OFF
10 MHz	21.9	21.9	21.9	21.9	21.9	21.9	21.9	22.9	22.9	22.9	22.9	22.9	22.9
5 MHz	22.0	22.0	22.0	22.0	22.0	22.0	22.0	23.0	23.0	23.0	23.0	23.0	23.0



Rear

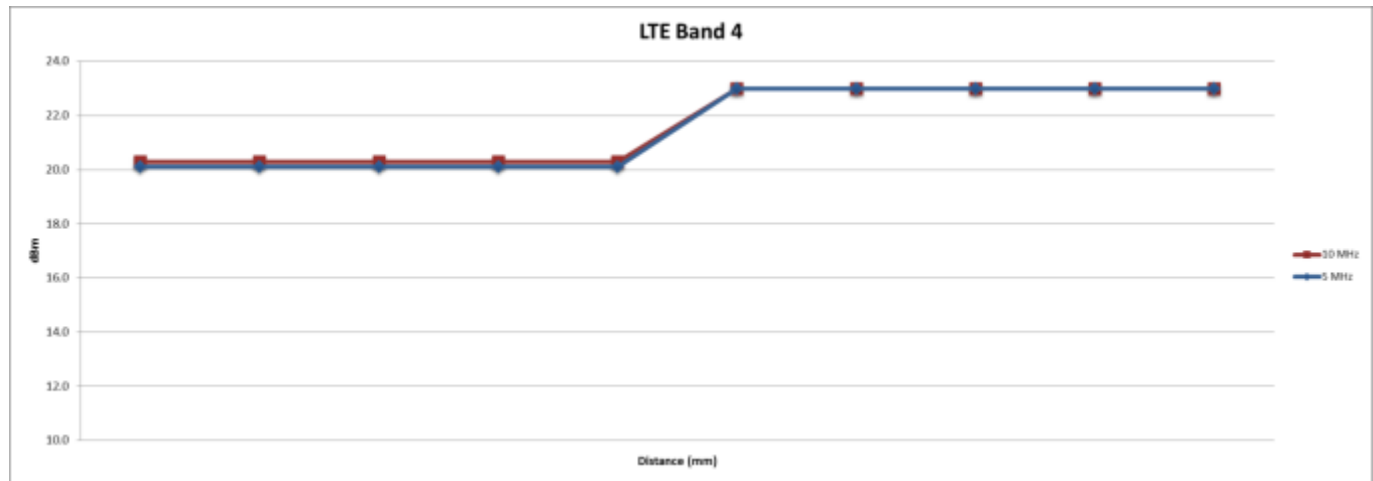
Rear, LTE Band 17													
Distance (mm):	11	12	13	14	15	16	17	18	19	20	21	22	23
Proximity sensor with reduced power activation:	ON	ON	ON	ON	ON	ON	ON	OFF	OFF	OFF	OFF	OFF	OFF
10 MHz	21.9	21.9	21.9	21.9	21.9	21.9	21.9	22.9	22.9	22.9	22.9	22.9	22.9
5 MHz	22.0	22.0	22.0	22.0	22.0	22.0	22.0	23.0	23.0	23.0	23.0	23.0	23.0



LTE Band 4

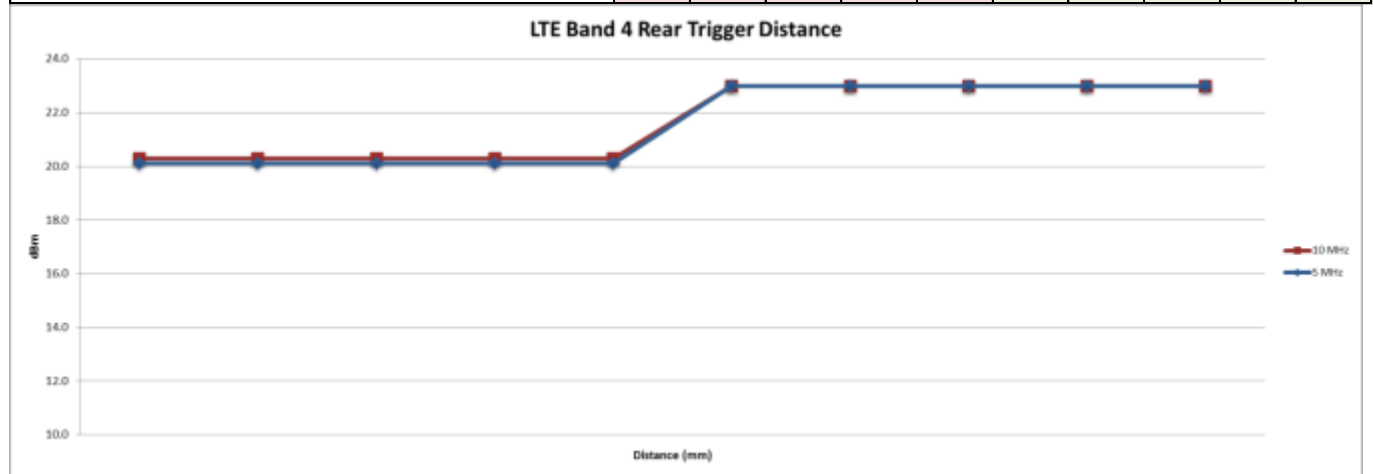
Edge 1

Edge 1, LTE Band 4										
Distance (mm):	22	23	24	25	26	27	28	29	30	31
Proximity sensor with reduced power activation:	ON	ON	ON	ON	ON	OFF	OFF	OFF	OFF	OFF
10 MHz	20.3	20.3	20.3	20.3	20.3	23.0	23.0	23.0	23.0	23.0
5 MHz	20.1	20.1	20.1	20.1	20.1	23.0	23.0	23.0	23.0	23.0



Rear

Rear, LTE Band 4										
Distance (mm):	11	12	13	14	15	16	17	18	19	20
Proximity sensor with reduced power activation:	ON	ON	ON	ON	ON	OFF	OFF	OFF	OFF	OFF
10 MHz	20.3	20.3	20.3	20.3	20.3	23.0	23.0	23.0	23.0	23.0
5 MHz	20.1	20.1	20.1	20.1	20.1	23.0	23.0	23.0	23.0	23.0



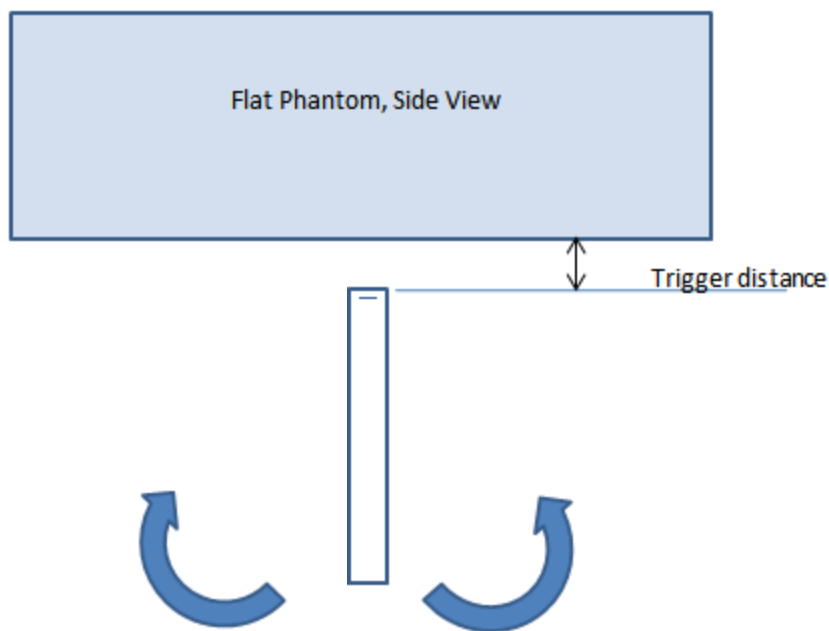
7.7. Proximity Sensor Coverage (KDB 616217 §6.3)

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

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

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

The proximity sensor remained triggered with the DUT positioned at the minimum measured trigger distance from the phantom for all angles up to 45°.



Proximity sensor tilt angle assessment (Edge 1) KDB 616217 §6.4

Tissue simulating liquid	Trigger distance - Edge 1
750 muscle	24 mm
850 muscle	23 mm
1750 muscle	21 mm
1900 muscle	21 mm

8. Exposure Conditions

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

8.1. Test Configurations for WWAN

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

LEGEND:

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

8.2. Special test considerations

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

8.3. Test Configurations for WLAN

All Wi-Fi 1-g SAR values were taken from results recorded in SAR report 12J14673-1F, submitted under FCC ID ACJ9TGWL12A or from the MIMO estimated values in section 12.2.2 of this report.

9. RF Output Power Measurement

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

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

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

9.1. GSM850

Target Power for GSM850

GSM850	Full Power	Reduced Power
GPRS 1 Slot (GMSK)	32.0 dBm	30.0 dBm
GPRS 2 Slots (GMSK)	32.0 dBm	28.0 dBm
EGPRS 1 Slot (8PSK)	26.0 dBm	26.0 dBm
EGPRS 2 Slots (8PSK)	26.0 dBm	24.0 dBm
EGPRS 3 Slots (8PSK)	26.0 dBm	23.0 dBm
EGPRS 4 Slots (8PSK)	26.0 dBm	22.0 dBm

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

Full Power

GPRS (GMSK) - Coding Scheme: CS1										
Band	Ch No.	f (MHz)	Avg burst Pwr (dBm)				Avg burst Pwr (dBm)			
			1 slot	Frame Avg Pwr	2 slots	Frame Avg Pwr	3 slots	Frame Avg Pwr	4 slots	Frame Avg Pwr
850	128	824.2	31.1	22.1	31.3	25.3				
	190	836.6	31.1	22.1	31.7	25.7				
	251	848.8	31.4	22.4	31.6	25.6				
EGPRS (8PSK) - Coding Scheme: MCS5										
Band	Ch No.	f (MHz)	Avg burst Pwr (dBm)				Avg burst Pwr (dBm)			
			1 slot	Frame Avg Pwr	2 slots	Frame Avg Pwr	3 slots	Frame Avg Pwr	4 slots	Frame Avg Pwr
850	128	824.2	26.4	17.4	26.2	20.2	26.2	21.9	26.2	23.2
	190	836.6	26.3	17.3	26.2	20.2	26.2	21.9	26.2	23.2
	251	848.8	26.3	17.3	26.2	20.2	26.2	21.9	26.2	23.2

Reduced Power

GPRS (GMSK) - Coding Scheme: CS1										
Band	Ch No.	f (MHz)	Avg burst Pwr (dBm)				Avg burst Pwr (dBm)			
			1 slot	Frame Avg Pwr	2 slots	Frame Avg Pwr	3 slots	Frame Avg Pwr	4 slots	Frame Avg Pwr
850	128	824.2	30.5	21.5	28.4	22.4				
	190	836.6	30.4	21.4	28.5	22.5				
	251	848.8	30.3	21.3	28.6	22.6				
EGPRS (8PSK) - Coding Scheme: MCS5										
Band	Ch No.	f (MHz)	Avg burst Pwr (dBm)				Avg burst Pwr (dBm)			
			1 slot	Frame Avg Pwr	2 slots	Frame Avg Pwr	3 slots	Frame Avg Pwr	4 slots	Frame Avg Pwr
850	128	824.2	26.3	17.3	24.8	18.8	23.7	19.4	22.6	19.6
	190	836.6	26.3	17.3	24.8	18.8	23.7	19.4	22.6	19.6
	251	848.8	26.3	17.3	24.8	18.8	23.7	19.4	22.6	19.6

Notes:

The worst-case configuration and mode for SAR testing is determined to be as follows:

- Body: GMSK (GPRS) mode with 2 time slots, based on the output power measurements above
- SAR is not required for EGPRS (8PSK) Mode at full or reduced power because its output power is less than that of GPRS Mode under the equivalent operating conditions.

9.2. GSM1900

Target Power for GSM850

GSM850	Full Power	Reduced Power
GPRS 1 Slot (GMSK)	29.0 dBm	23.0 dBm
GPRS 2 Slots (GMSK)	29.0 dBm	24.0 dBm
EGPRS 1 Slot (8PSK)	25.0 dBm	21.0 dBm
EGPRS 2 Slots (8PSK)	25.0 dBm	22.0 dBm
EGPRS 3 Slots (8PSK)	25.0 dBm	21.0 dBm
EGPRS 4 Slots (8PSK)	25.0 dBm	20.0 dBm

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

Full Power

GPRS (GMSK) - Coding Scheme: CS1										
Band	Ch No.	f (MHz)	Avg burst Pwr (dBm)				Avg burst Pwr (dBm)			
			1 slot	Frame Avg Pwr	2 slots	Frame Avg Pwr	3 slots	Frame Avg Pwr	4 slots	Frame Avg Pwr
1900	512	1850.2	28.6	19.6	28.6	22.6				
	661	1880.0	28.6	19.6	28.3	22.3				
	810	1909.8	28.4	19.4	28.5	22.5				
EGPRS (8PSK) - Coding Scheme: MCS5										
Band	Ch No.	f (MHz)	Avg burst Pwr (dBm)				Avg burst Pwr (dBm)			
			1 slot	Frame Avg Pwr	2 slots	Frame Avg Pwr	3 slots	Frame Avg Pwr	4 slots	Frame Avg Pwr
1900	512	1850.2	25.3	16.3	25.2	19.2	24.9	20.6	24.8	21.8
	661	1880.0	25.2	16.2	25.1	19.1	24.9	20.6	24.7	21.7
	810	1909.8	25.2	16.2	25.0	19.0	24.7	20.4	24.5	21.5

Reduced Power

GPRS (GMSK) - Coding Scheme: CS1										
Band	Ch No.	f (MHz)	Avg burst Pwr (dBm)				Avg burst Pwr (dBm)			
			1 slot	Frame Avg Pwr	2 slots	Frame Avg Pwr	3 slots	Frame Avg Pwr	4 slots	Frame Avg Pwr
1900	512	1850.2	23.6	14.6	24.5	18.5				
	661	1880.0	23.3	14.3	24.4	18.4				
	810	1909.8	23.3	14.3	24.6	18.6				
EGPRS (8PSK) - Coding Scheme: MCS5										
Band	Ch No.	f (MHz)	Avg burst Pwr (dBm)				Avg burst Pwr (dBm)			
			1 slot	Frame Avg Pwr	2 slots	Frame Avg Pwr	3 slots	Frame Avg Pwr	4 slots	Frame Avg Pwr
1900	512	1850.2	21.6	12.6	22.4	16.4	21.2	16.9	20.4	17.4
	661	1880.0	21.4	12.4	22.3	16.3	21.2	16.9	20.0	17.0
	810	1909.8	21.4	12.4	22.5	16.5	21.4	17.1	20.3	17.3

Notes:

The worst-case configuration and mode for SAR testing is determined to be as follows:

- Body: GMSK (GPRS) mode with 2 time slots, based on the output power measurements above
- SAR is not required for EGPRS (8PSK) Mode at full or reduced power because its output power is less than that of GPRS Mode under the equivalent operating conditions.

9.3. W-CDMA Band V

Target Power for W-CDMA Band V

W-CDMA Band V	Full Power	Reduced Power
Release 99 RMC	23.0 dBm	18.2 dBm
HSDPA	22.0 dBm	18.2 dBm
HSUPA	22.0 dBm	18.2 dBm

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

Release 99

The following tests were completed according to the test requirements outlined in section 5.2 of the 3GPP TS34.121-1 specification. The DUT supports power Class 3, which has a nominal maximum output power of 24 dBm (+1.7/-3.7).

Mode	Subtest	Rel99
WCDMA General Settings	Loopback Mode	Test Mode 1
	Rel99 RMC	12.2kbps RMC
	Power Control Algorithm	Algorithm2
	β_c/β_d	8/15

Measurement Results

Band	Mode	UL Ch No.	Freq. (MHz)	Avg Pwr (dBm)	
				Full Power	Reduced Power
W-CDMA (UMTS) Band V	Rel 99 (RMC, 12.2 kbps)	4132	826.4	23.1	19.2
		4183	836.6	22.9	19.1
		4233	846.6	22.8	18.9

HSDPA

The following 4 Sub-tests were completed according to Release 6 procedures in section 5.2 of 3GPP TS34.121. A summary of these settings are illustrated below:

	Mode	HSDPA	HSDPA	HSDPA	HSDPA
	Subtest	1	2	3	4
W-CDMA General Settings	Loopback Mode	Test Mode 1			
	Rel99 RMC	12.2kbps RMC			
	HSDPA FRC	H-Set1			
	Power Control Algorithm	Algorithm 2			
	β_c	2/15	12/15	15/15	15/15
	β_d	15/15	15/15	8/15	4/15
	Bd (SF)	64			
	β_c/β_d	2/15	12/15	15/8	15/4
	β_{hs}	4/15	24/15	30/15	30/15
HSDPA Specific Settings	CM (dB)	0	1	1.5	1.5
	D _{ACK}	8			
	D _{NAK}	8			
	DCQI	8			
	Ack-Nack repetition factor	3			
	CQI Feedback (Table 5.2B.4)	4ms			
	CQI Repetition Factor (Table 5.2B.4)	2			
	A _{hs} = β_{hs}/β_c	30/15			

Measurement Results

Band	Mode	UL Ch No.	Freq. (MHz)	Avg Pwr (dBm)	
				Full Power	Reduced Power
W-CDMA (UMTS) Band V	Subtest 1	4132	826.4	22.5	18.6
		4183	836.6	22.5	18.5
		4233	846.6	22.3	18.4
	Subtest 2	4132	826.4	22.1	18.4
		4183	836.6	22.1	18.2
		4233	846.6	22.0	18.2
	Subtest 3	4132	826.4	21.9	17.9
		4183	836.6	21.7	17.7
		4233	846.6	21.7	17.7
	Subtest 4	4132	826.4	21.6	17.8
		4183	836.6	21.6	17.7
		4233	846.6	21.4	17.7

HSPA (HSDPA & HSUPA)

The following 5 Sub-tests were completed according to Release 6 procedures in section 5.2 of 3GPP TS34.121. A summary of these settings are illustrated below:

	Mode	HSPA	HSPA	HSPA	HSPA	HSPA
	Subtest	1	2	3	4	5
WCDMA General Settings	Loopback Mode	Test Mode 1				
	Rel99 RMC	12.2kbps RMC				
	HSDPA FRC	H-Set1				
	HSUPA Test	HSUPA Loopback				
	Power Control Algorithm	Algorithm2				
	β_c	11/15	6/15	15/15	2/15	15/15
	β_d	15/15	15/15	9/15	15/15	15/15
	β_{ec}	209/225	12/15	30/15	2/15	24/15
	β_c/β_d	11/15	6/15	15/9	2/15	15/15
	β_{hs}	22/15	12/15	30/15	4/15	30/15
	β_{ed}	1309/225	94/75	47/15 47/15	56/75	134/15
	CM (dB)	1.0	3.0	2.0	3.0	1.0
	MPR (dB)	0	2	1	2	0
HSDPA Specific Settings	DACK	8				
	DNAK	8				
	DCQI	8				
	Ack-Nack repetition factor	3				
	CQI Feedback (Table 5.2B.4)	4ms				
	CQI Repetition Factor (Table 5.2B.4)	2				
	Ahs = β_{hs}/β_c	30/15				
HSUPA Specific Settings	D E-DPCCH	6	8	8	5	7
	DHARQ	0	0	0	0	0
	AG Index	20	12	15	17	21
	ETFCI (from 34.121 Table C.11.1.3)	75	67	92	71	81
	Associated Max UL Data Rate kbps	242.1	174.9	482.8	205.8	308.9
	Reference E_TFCIs	E-TFCI 11 E-TFCI PO 4 E-TFCI 67 E-TFCI PO 18 E-TFCI 71 E-TFCI PO 23 E-TFCI 75 E-TFCI PO 26 E-TFCI 81 E-TFCI PO 27		E-TFCI 11 E-TFCI PO 4 E-TFCI 92 E-TFCI PO 18		E-TFCI 11 E-TFCI PO 4 E-TFCI 67 E-TFCI PO 18 E-TFCI 71 E-TFCI PO 23 E-TFCI 75 E-TFCI PO 26 E-TFCI 81 E-TFCI PO 27

Measurement Results

Band	Mode	UL Ch No.	Freq. (MHz)	Avg Pwr (dBm)	
				Full Power	w/ Power Reduction
WCDMA (UMTS) Band V	Subtest 1	4132	826.4	22.2	18.0
		4183	836.6	21.9	18.0
		4233	846.6	22.2	17.7
	Subtest 2	4132	826.4	21.2	17.3
		4183	836.6	21.1	17.2
		4233	846.6	21.2	17.3
	Subtest 3	4132	826.4	21.4	17.3
		4183	836.6	21.0	17.2
		4233	846.6	21.1	17.4
	Subtest 4	4132	826.4	21.3	17.2
		4183	836.6	21.0	17.3
		4233	846.6	21.3	17.2
	Subtest 5	4132	826.4	22.3	17.8
		4183	836.6	22.1	17.9
		4233	846.6	22.1	17.7

Note(s):

- KDB 941225 D01 – Body SAR is not required for handsets with HSPA capabilities when the maximum average output of each RF channel with HSUPA/HSDPA active is less than ¼ dB higher than that measured without HSUPA/HSDPA using 12.2 kbps RMC and the maximum SAR for 12.2kbps RMC is ≤ 75% of the SAR limit.

9.4. W-CDMA Band II

Target Power for W-CDMA Band II

W-CDMA Band II	Full Power	Reduced Power
Release 99 RMC	23.0 dBm	17.6 dBm
HSDPA	22.0 dBm	17.6 dBm
HSUPA	21.0 dBm	17.6 dBm

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

Release 99

The following tests were completed according to the test requirements outlined in section 5.2 of the 3GPP TS34.121-1 specification. The DUT supports power Class 3, which has a nominal maximum output power of 24 dBm (+1.7/-3.7).

Mode	Subtest	Rel99
WCDMA General Settings	Loopback Mode	Test Mode 1
	Rel99 RMC	12.2kbps RMC
	Power Control Algorithm	Algorithm2
	β_c/β_d	8/15

Measurement Results

Band	Mode	UL Ch No.	Freq. (MHz)	Avg Pwr (dBm)	
				Full Power	Reduced Power
W-CDMA (UMTS) Band II	Rel 99 (RMC, 12.2 kbps)	9262	1852.4	22.9	18.5
		9400	1880.0	22.9	18.6
		9538	1907.6	22.8	18.4

HSDPA

The following 4 Sub-tests were completed according to Release 6 procedures in section 5.2 of 3GPP TS34.121. A summary of these settings are illustrated below:

	Mode	HSDPA	HSDPA	HSDPA	HSDPA
	Subtest	1	2	3	4
W-CDMA General Settings	Loopback Mode	Test Mode 1			
	Rel99 RMC	12.2kbps RMC			
	HSDPA FRC	H-Set1			
	Power Control Algorithm	Algorithm 2			
	β_c	2/15	12/15	15/15	15/15
	β_d	15/15	15/15	8/15	4/15
	Bd (SF)	64			
	β_c/β_d	2/15	12/15	15/8	15/4
	β_{hs}	4/15	24/15	30/15	30/15
HSDPA Specific Settings	CM (dB)	0	1	1.5	1.5
	D _{ACK}	8			
	D _{NAK}	8			
	DCQI	8			
	Ack-Nack repetition factor	3			
	CQI Feedback (Table 5.2B.4)	4ms			
	CQI Repetition Factor (Table 5.2B.4)	2			
	A _{hs} = β_{hs}/β_c	30/15			

Measurement Results

Band	Mode	UL Ch No.	Freq. (MHz)	Avg Pwr (dBm)	
				Full Power	w/ Power Reduction
W-CDMA (UMTS) Band II	Subtest 1	9262	1852.4	22.4	17.9
		9400	1880.0	22.4	17.9
		9538	1907.6	22.3	17.7
	Subtest 2	9262	1852.4	21.8	17.4
		9400	1880.0	21.7	17.3
		9538	1907.6	21.8	17.3
	Subtest 3	9262	1852.4	21.7	17.2
		9400	1880.0	21.6	17.2
		9538	1907.6	21.6	17.1
	Subtest 4	9262	1852.4	21.8	17.3
		9400	1880.0	21.7	17.1
		9538	1907.6	21.7	17.0

Note(s):

KDB 941225 D01 – Body SAR is not required for HSDPA when the maximum average output of each RF channel with HSDPA active is less than ¼ dB higher than that measured without HSDPA using 12.2 kbps RMC or the maximum SAR for 12.2 kbps RMC is < 75% of the SAR limit.

HSPA (HSDPA & HSUPA)

The following 5 Sub-tests were completed according to Release 6 procedures in section 5.2 of 3GPP TS34.121. A summary of these settings are illustrated below:

	Mode	HSPA	HSPA	HSPA	HSPA	HSPA
	Subtest	1	2	3	4	5
WCDMA General Settings	Loopback Mode	Test Mode 1				
	Rel99 RMC	12.2kbps RMC				
	HSDPA FRC	H-Set1				
	HSUPA Test	HSUPA Loopback				
	Power Control Algorithm	Algorithm2				
	β_c	11/15	6/15	15/15	2/15	15/15
	β_d	15/15	15/15	9/15	15/15	15/15
	β_{ec}	209/225	12/15	30/15	2/15	24/15
	β_c/β_d	11/15	6/15	15/9	2/15	15/15
	β_{hs}	22/15	12/15	30/15	4/15	30/15
	β_{ed}	1309/225	94/75	47/15 47/15	56/75	134/15
	CM (dB)	1.0	3.0	2.0	3.0	1.0
	MPR (dB)	0	2	1	2	0
HSDPA Specific Settings	DACK	8				
	DNAK	8				
	DCQI	8				
	Ack-Nack repetition factor	3				
	CQI Feedback (Table 5.2B.4)	4ms				
	CQI Repetition Factor (Table 5.2B.4)	2				
	Ahs = β_{hs}/β_c	30/15				
HSUPA Specific Settings	D E-DPCCH	6	8	8	5	7
	DHARQ	0	0	0	0	0
	AG Index	20	12	15	17	21
	ETFCI (from 34.121 Table C.11.1.3)	75	67	92	71	81
	Associated Max UL Data Rate kbps	242.1	174.9	482.8	205.8	308.9
	Reference E_TFCIs	E-TFCI 11 E-TFCI PO 4 E-TFCI 67 E-TFCI PO 18 E-TFCI 71 E-TFCI PO 23 E-TFCI 75 E-TFCI PO 26 E-TFCI 81 E-TFCI PO 27		E-TFCI 11 E-TFCI PO 4 E-TFCI 92 E-TFCI PO 18		E-TFCI 11 E-TFCI PO 4 E-TFCI 67 E-TFCI PO 18 E-TFCI 71 E-TFCI PO 23 E-TFCI 75 E-TFCI PO 26 E-TFCI 81 E-TFCI PO 27

Measurement Results

Band	Mode	UL Ch No.	Freq. (MHz)	Avg Pwr (dBm)	
				Full Power	Reduced Power
WCDMA (UMTS) Band II	Subtest 1	9262	1852.4	21.6	17.5
		9400	1880.0	21.6	17.5
		9538	1907.6	21.4	17.8
	Subtest 2	9262	1852.4	20.8	16.6
		9400	1880.0	20.9	16.6
		9538	1907.6	20.9	16.7
	Subtest 3	9262	1852.4	21.4	16.6
		9400	1880.0	21.2	16.8
		9538	1907.6	21.0	16.8
	Subtest 4	9262	1852.4	21.5	16.7
		9400	1880.0	21.2	17.0
		9538	1907.6	21.1	16.9
	Subtest 5	9262	1852.4	21.9	17.4
		9400	1880.0	22.0	17.6
		9538	1907.6	21.9	17.5

Note(s):

- KDB 941225 D01 – Body SAR is not required for handsets with HSPA capabilities when the maximum average output of each RF channel with HSUPA/HSDPA active is less than ¼ dB higher than that measured without HSUPA/HSDPA using 12.2 kbps RMC and the maximum SAR for 12.2kbps RMC is ≤ 75% of the SAR limit.

9.5. LTE Band 4

Target Power for LTE Band 4, QPSK and 16QAM modulations

LTE Band 4	Full Power	Reduced Power
10 MHz Bandwidth	22.5 dBm	19.5 dBm
5 MHz Bandwidth	22.5 dBm	19.5 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 4, 10 MHz Bandwidth Output Power (Proximity sensor not triggered)

BW	Ch	Freq. (MHz)	Mode	UL RB Allocation	UL RB Start	Target MPR	Meas. MPR	Avg Pwr (dBm)
								Full Power
10	20000	1715	QPSK	1	0	0	0	23.0
				1	24	0	0	22.9
				1	49	0	0	23.0
				25	0	1	1	21.9
				25	12	1	1	21.9
				25	24	1	1	21.9
				50	0	1	1	21.8
			16QAM	1	0	1	1	21.9
				1	24	1	1	21.9
				1	49	1	1	21.9
				25	0	2	2	20.8
				25	12	2	2	20.8
				25	24	2	2	20.9
				50	0	2	2	21.0
	20175	1732.5	QPSK	1	0	0	0	23.0
				1	24	0	0	23.0
				1	49	0	0	23.1
				25	0	1	1	22.0
				25	12	1	1	22.0
				25	24	1	1	21.9
				50	0	1	1	21.9
			16QAM	1	0	1	1	21.7
				1	24	1	1	21.9
				1	49	1	1	21.8
				25	0	2	2	21.1
				25	12	2	2	21.0
				25	24	2	2	21.1
				50	0	2	2	21.0
	20350	1750	QPSK	1	0	0	0	22.9
				1	24	0	0	23.0
				1	49	0	0	22.8
				25	0	1	1	21.9
				25	12	1	1	21.9
				25	24	1	1	21.8
				50	0	1	1	21.8
			16QAM	1	0	1	1	21.8
				1	24	1	1	22.1
				1	49	1	1	21.8
				25	0	2	2	21.0
				25	12	2	2	21.0
				25	24	2	2	20.9
				50	0	2	2	21.1

* When the power reduction due to proximity sensor is activated, the maximum conducted power is reduced, but the MPR for different resource block configurations/allocations is disabled.

LTE Band 4, 10 MHz Bandwidth Output Power (Proximity sensor triggered)

BW	Ch	Freq. (MHz)	Mode	UL RB Allocation	UL RB Start	Target MPR	Meas. MPR	Avg Pwr (dBm)
								Reduced Power
10	20000	1715	QPSK	1	0	MPR is disabled when power reduction is enabled		20.3
				1	24			20.2
				1	49			20.4
				25	0			20.2
				25	12			20.1
				25	24			20.1
				50	0			20.1
			16QAM	1	0			20.2
				1	24			20.1
				1	49			20.2
				25	0			20.2
				25	12			20.2
				25	24			20.1
				50	0			20.3
	20175	1732.5	QPSK	1	0			20.4
				1	24			20.4
				1	49			20.5
				25	0			20.2
				25	12			20.3
				25	24			20.2
				50	0			20.2
			16QAM	1	0			20.1
				1	24			20.0
				1	49			20.0
				25	0			20.3
				25	12			20.3
				25	24			20.3
				50	0			20.3
	20350	1750	QPSK	1	0			20.4
				1	24			20.4
				1	49			20.2
				25	0			20.2
				25	12			20.2
				25	24			20.2
				50	0			20.2
			16QAM	1	0			19.6
				1	24			19.8
				1	49			19.5
				25	0			20.5
				25	12			20.5
				25	24			20.5
				50	0			20.4

LTE Band 4, 5 MHz Bandwidth Output Power (Proximity sensor not triggered)

BW	Ch	Freq. (MHz)	Mode	UL RB Allocation	UL RB Start	Target MPR	Meas. MPR	Avg Pwr (dBm)
								Full Power
5	19975	1712.5	QPSK	1	0	0	0	23.0
				1	12	0	0	22.8
				1	24	0	0	22.8
				12	0	1	1	21.9
				12	6	1	1	21.8
				12	11	1	1	21.8
				25	0	1	1	21.9
			16QAM	1	0	1	1	21.8
				1	12	1	1	21.7
				1	24	1	1	21.7
				12	0	2	2	20.9
				12	6	2	2	20.9
				12	11	2	2	20.9
				25	0	2	2	20.7
	20175	1733.8	QPSK	1	0	0	0	23.1
				1	12	0	0	23.0
				1	24	0	0	23.0
				12	0	1	1	21.9
				12	6	1	1	21.9
				12	11	1	1	21.8
				25	0	1	1	21.8
			16QAM	1	0	1	1	21.7
				1	12	1	1	21.7
				1	24	1	1	21.8
				12	0	2	2	20.9
				12	6	2	2	20.9
				12	11	2	2	20.9
				25	0	2	2	20.7
	20375	1755	QPSK	1	0	0	0	23.0
				1	12	0	0	22.9
				1	24	0	0	22.8
				12	0	1	1	21.9
				12	6	1	1	21.9
				12	11	1	1	21.7
				25	0	1	1	21.8
			16QAM	1	0	1	1	22.0
				1	12	1	1	21.9
				1	24	1	1	21.8
				12	0	2	2	21.0
				12	6	2	2	21.0
				12	11	2	2	21.0
				25	0	2	2	20.7

* When the power reduction due to proximity sensor is activated, the maximum conducted power is reduced, but the MPR for different resource block configurations/allocation is disabled.

LTE Band 4, 5 MHz Bandwidth Output Power (Proximity sensor triggered)

BW	Ch	Freq. (MHz)	Mode	UL RB Allocation	UL RB Start	Target MPR	Meas. MPR	Avg Pwr (dBm)
								Reduced Power
5	19975	1712.5	QPSK	1	0	MPR is disabled when power reduction is enabled		20.1
				1	12			20.1
				1	24			20.1
				12	0			20.1
				12	6			20.1
				12	11			20.0
				25	0			20.1
			16QAM	1	0			20.5
				1	12			20.5
				1	24			20.5
				12	0			20.3
				12	6			20.3
				12	11			20.3
				25	0			20.0
	20175	1733.8	QPSK	1	0			20.2
				1	12			20.2
				1	24			20.2
				12	0			20.2
				12	6			20.2
				12	11			20.2
				25	0			20.2
			16QAM	1	0			20.6
				1	12			20.6
				1	24			20.5
				12	0			20.3
				12	6			20.2
				12	11			20.2
				25	0			19.9
	20375	1755	QPSK	1	0			20.2
				1	12			20.0
				1	24			19.9
				12	0			20.2
				12	6			20.1
				12	11			20.1
				25	0			20.1
			16QAM	1	0			20.3
				1	12			20.2
				1	24			20.1
				12	0			20.4
				12	6			20.3
				12	11			20.2
				25	0			20.1

9.6. LTE Band 17

Target Power for LTE Band 17, QPSK and 16QAM modulations

LTE Band 4	Full Power	Reduced Power
10 MHz Bandwidth	23.0 dBm	21.1 dBm
5 MHz Bandwidth	23.0 dBm	21.1 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 17, 10 MHz Bandwidth Output Power (Proximity sensor not triggered)

BW	Ch	Freq. (MHz)	Mode	UL RB Allocation	UL RB Start	Target MPR	Meas. MPR	Avg Pwr (dBm)
								Full Power
10	23780	709	QPSK	1	0	0	0	22.8
				1	24	0	0	22.8
				1	49	0	0	22.9
				25	0	1	1	21.7
				25	12	1	1	21.7
				25	24	1	1	21.7
				50	0	1	1	21.6
			16QAM	1	0	1	1	21.6
				1	24	1	1	21.5
				1	49	1	1	21.6
				25	0	2	2	20.9
				25	12	2	2	20.9
				25	24	2	2	20.8
				50	0	2	2	20.7
	23790	710	QPSK	1	0	0	0	22.8
				1	24	0	0	22.9
				1	49	0	0	22.8
				25	0	1	1	21.9
				25	12	1	1	21.8
				25	24	1	1	21.8
				50	0	1	1	21.7
			16QAM	1	0	1	1	21.7
				1	24	1	1	21.7
				1	49	1	1	21.8
				25	0	2	2	20.7
				25	12	2	2	20.8
				25	24	2	2	20.7
				50	0	2	2	20.8
	23800	711	QPSK	1	0	0	0	22.9
				1	24	0	0	22.7
				1	49	0	0	22.7
				25	0	1	1	21.7
				25	12	1	1	21.7
				25	24	1	1	21.7
				50	0	1	1	21.7
			16QAM	1	0	1	1	22.1
				1	24	1	1	22.1
				1	49	1	1	22.0
				25	0	2	2	21.0
				25	12	2	2	21.0
				25	24	2	2	21.0
				50	0	2	2	20.8

* When the power reduction due to proximity sensor is activated, the maximum conducted power is reduced, but the MPR for different resource block configurations/allocations is disabled.

LTE Band 17, 10 MHz Bandwidth Output Power (Proximity sensor triggered)

BW	Ch	Freq. (MHz)	Mode	UL RB Allocation	UL RB Start	Target MPR	Meas. MPR	Avg Pwr (dBm)
								Reduced Power
10	23780	709	QPSK	1	0	MPR is disabled when power reduction is enabled		21.8
				1	24			21.8
				1	49			21.9
				25	0			21.7
				25	12			21.7
				25	24			21.7
				50	0			21.6
			16QAM	1	0			21.5
				1	24			21.4
				1	49			21.6
				25	0			20.9
				25	12			20.9
				25	24			20.8
				50	0			20.7
	23790	710	QPSK	1	0			21.9
				1	24			21.7
				1	49			21.9
				25	0			21.9
				25	12			21.8
				25	24			21.7
				50	0			21.7
			16QAM	1	0			21.7
				1	24			21.7
				1	49			21.8
				25	0			20.7
				25	12			20.7
				25	24			20.6
				50	0			20.8
	23800	711	QPSK	1	0			21.9
				1	24			22.0
				1	49			22.0
				25	0			21.7
				25	12			21.7
				25	24			21.6
				50	0			21.7
			16QAM	1	0			22.0
				1	24			22.0
				1	49			22.0
				25	0			21.0
				25	12			21.0
				25	24			20.9
				50	0			20.8

LTE Band 17, 5 MHz Bandwidth Output Power (Proximity sensor not triggered)

BW	Ch	Freq. (MHz)	Mode	UL RB Allocation	UL RB Start	Target MPR	Meas. MPR	Avg Pwr (dBm)
								Full Power
5	23755	706.5	QPSK	1	0	0	0	23.0
				1	12	0	0	23.0
				1	24	0	0	23.0
				12	0	1	1	21.8
				12	6	1	1	21.8
				12	11	1	1	21.8
				25	0	1	1	21.7
			16QAM	1	0	1	1	21.7
				1	12	1	1	21.6
				1	24	1	1	21.6
				12	0	2	2	20.7
				12	6	2	2	20.6
				12	11	2	2	20.6
				25	0	2	2	21.0
	23790	710	QPSK	1	0	0	0	23.0
				1	12	0	0	22.9
				1	24	0	0	22.9
				12	0	1	1	21.7
				12	6	1	1	21.7
				12	11	1	1	21.7
				25	0	1	1	21.7
			16QAM	1	0	1	1	21.6
				1	12	1	1	21.6
				1	24	1	1	21.7
				12	0	2	2	20.6
				12	6	2	2	20.6
				12	11	2	2	20.6
				25	0	2	2	20.9
	23825	713.5	QPSK	1	0	0	0	23.0
				1	12	0	0	23.0
				1	24	0	0	23.0
				12	0	1	1	21.8
				12	6	1	1	21.8
				12	11	1	1	21.8
				25	0	1	1	21.7
			16QAM	1	0	1	1	21.6
				1	12	1	1	21.7
				1	24	1	1	21.6
				12	0	2	2	20.6
				12	6	2	2	20.6
				12	11	2	2	20.7
				25	0	2	2	21.0

* When the power reduction due to proximity sensor is activated, the maximum conducted power is reduced, but the MPR for different resource block configurations/allocations is disabled.

LTE Band 17, 5 MHz Bandwidth Output Power (Proximity sensor triggered)

BW	Ch	Freq. (MHz)	Mode	UL RB Allocation	UL RB Start	Target MPR	Meas. MPR	Avg Pwr (dBm)
								Reduced Power
5	23755	706.5	QPSK	1	0	MPR is disabled when power reduction is enabled		22.0
				1	12			22.1
				1	24			22.0
				12	0			21.8
				12	6			21.8
				12	11			21.8
				25	0			21.7
			16QAM	1	0			21.2
				1	12			21.4
				1	24			21.1
				12	0			20.4
				12	6			20.4
				12	11			20.4
				25	0			21.0
	23790	710	QPSK	1	0			22.1
				1	12			22.1
				1	24			22.0
				12	0			21.7
				12	6			21.7
				12	11			21.7
				25	0			21.7
			16QAM	1	0			21.6
				1	12			21.4
				1	24			21.4
				12	0			20.6
				12	6			20.6
				12	11			20.6
				25	0			20.8
	23825	713.5	QPSK	1	0			22.0
				1	12			22.0
				1	24			22.0
				12	0			21.8
				12	6			21.8
				12	11			21.8
				25	0			21.7
			16QAM	1	0			21.2
				1	12			21.3
				1	24			21.3
				12	0			20.3
				12	6			20.3
				12	11			20.4
				25	0			21.0

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

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

The temperature of the tissue-equivalent medium used during measurement must also be within 18°C to 25°C and within $\pm 2^\circ\text{C}$ of the temperature when the tissue parameters are characterized.

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

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

Date	Freq. (MHz)	Liquid Parameters			Measured	Target	Delta (%)	Limit $\pm$ (%)
1/17/2013	Body 1750	e'	52.7700	Relative Permittivity (ϵ_r):	52.77	53.44	-1.26	5
		e''	15.0600	Conductivity (σ):	1.47	1.49	-1.40	5
	Body 1710	e'	52.9600	Relative Permittivity (ϵ_r):	52.96	53.54	-1.09	5
		e''	14.9700	Conductivity (σ):	1.42	1.46	-2.61	5
	Body 1755	e'	52.7400	Relative Permittivity (ϵ_r):	52.74	53.43	-1.29	5
		e''	15.0800	Conductivity (σ):	1.47	1.49	-1.19	5
1/18/2013	Body 1900	e'	50.6600	Relative Permittivity (ϵ_r):	50.66	53.30	-4.95	5
		e''	14.2400	Conductivity (σ):	1.50	1.52	-1.03	5
	Body 1850	e'	50.8800	Relative Permittivity (ϵ_r):	50.88	53.30	-4.54	5
		e''	14.0700	Conductivity (σ):	1.45	1.52	-4.78	5
	Body 1910	e'	50.6400	Relative Permittivity (ϵ_r):	50.64	53.30	-4.99	5
		e''	14.2400	Conductivity (σ):	1.51	1.52	-0.51	5
1/23/2013	Body 750	e'	55.2200	Relative Permittivity (ϵ_r):	55.22	55.55	-0.59	5
		e''	23.3400	Conductivity (σ):	0.97	0.96	1.06	5
	Body 710	e'	55.6700	Relative Permittivity (ϵ_r):	55.67	55.70	-0.05	5
		e''	23.6100	Conductivity (σ):	0.93	0.96	-2.91	5
	Body 790	e'	54.7400	Relative Permittivity (ϵ_r):	54.74	55.39	-1.18	5
		e''	23.0400	Conductivity (σ):	1.01	0.97	4.75	5
1/25/2013	Body 700	e'	55.5300	Relative Permittivity (ϵ_r):	55.53	55.74	-0.37	5
		e''	24.2400	Conductivity (σ):	0.94	0.96	-1.64	5
	Body 710	e'	55.3900	Relative Permittivity (ϵ_r):	55.39	55.70	-0.56	5
		e''	24.1200	Conductivity (σ):	0.95	0.96	-0.81	5
	Body 720	e'	55.2500	Relative Permittivity (ϵ_r):	55.25	55.66	-0.74	5
		e''	23.8000	Conductivity (σ):	0.95	0.96	-0.83	5
1/25/2013	Body 835	e'	54.1106	Relative Permittivity (ϵ_r):	54.11	55.20	-1.97	5
		e''	21.9047	Conductivity (σ):	1.02	0.97	4.85	5
	Body 820	e'	54.1828	Relative Permittivity (ϵ_r):	54.18	55.28	-1.98	5
		e''	21.9699	Conductivity (σ):	1.00	0.97	3.43	5
	Body 850	e'	53.9120	Relative Permittivity (ϵ_r):	53.91	55.16	-2.26	5
		e''	21.8345	Conductivity (σ):	1.03	0.99	4.54	5
1/28/2013	Body 835	e'	54.0900	Relative Permittivity (ϵ_r):	54.09	55.20	-2.01	5
		e''	21.9000	Conductivity (σ):	1.02	0.97	4.82	5
	Body 820	e'	54.2100	Relative Permittivity (ϵ_r):	54.21	55.28	-1.93	5
		e''	21.9900	Conductivity (σ):	1.00	0.97	3.53	5
	Body 850	e'	53.9400	Relative Permittivity (ϵ_r):	53.94	55.16	-2.21	5
		e''	21.8700	Conductivity (σ):	1.03	0.99	4.71	5

Tissue Dielectric Parameter Check Results (continued)

Date	Freq. (MHz)	Liquid Parameters			Measured	Target	Delta (%)	Limit ±(%)
1/31/2013	Body 1900	e'	51.6900	Relative Permittivity (ε _r):	51.69	53.30	-3.02	5
		e"	14.7600	Conductivity (σ):	1.56	1.52	2.59	5
	Body 1850	e'	51.9500	Relative Permittivity (ε _r):	51.95	53.30	-2.53	5
		e"	14.5900	Conductivity (σ):	1.50	1.52	-1.26	5
	Body 1910	e'	51.6700	Relative Permittivity (ε _r):	51.67	53.30	-3.06	5
		e"	14.8100	Conductivity (σ):	1.57	1.52	3.48	5
2/2/2013	Body 1900	e'	51.4700	Relative Permittivity (ε _r):	51.47	53.30	-3.43	5
		e"	14.8600	Conductivity (σ):	1.57	1.52	3.28	5
	Body 1850	e'	51.6500	Relative Permittivity (ε _r):	51.65	53.30	-3.10	5
		e"	14.7400	Conductivity (σ):	1.52	1.52	-0.25	5
	Body 1910	e'	51.4200	Relative Permittivity (ε _r):	51.42	53.30	-3.53	5
		e"	14.8800	Conductivity (σ):	1.58	1.52	3.97	5
2/11/2013	Body 700	e'	54.1700	Relative Permittivity (ε _r):	54.17	55.74	-2.81	5
		e"	25.2000	Conductivity (σ):	0.98	0.96	2.25	5
	Body 710	e'	53.8900	Relative Permittivity (ε _r):	53.89	55.70	-3.25	5
		e"	25.2000	Conductivity (σ):	0.99	0.96	3.63	5
	Body 715	e'	53.8500	Relative Permittivity (ε _r):	53.85	55.68	-3.29	5
		e"	25.1900	Conductivity (σ):	1.00	0.96	4.28	5
2/11/2013	Body 835	e'	53.7860	Relative Permittivity (ε _r):	53.79	55.20	-2.56	5
		e"	21.8200	Conductivity (σ):	1.01	0.97	4.44	5
	Body 820	e'	53.9400	Relative Permittivity (ε _r):	53.94	55.28	-2.42	5
		e"	21.8500	Conductivity (σ):	1.00	0.97	2.87	5
	Body 850	e'	53.4100	Relative Permittivity (ε _r):	53.41	55.16	-3.17	5
		e"	21.9200	Conductivity (σ):	1.04	0.99	4.95	5
2/11/2013	Body 1750	e'	51.6000	Relative Permittivity (ε _r):	51.60	53.44	-3.44	5
		e"	15.2100	Conductivity (σ):	1.48	1.49	-0.41	5
	Body 1710	e'	51.6300	Relative Permittivity (ε _r):	51.63	53.54	-3.57	5
		e"	15.1500	Conductivity (σ):	1.44	1.46	-1.44	5
	Body 1755	e'	51.5600	Relative Permittivity (ε _r):	51.56	53.43	-3.50	5
		e"	15.2100	Conductivity (σ):	1.48	1.49	-0.33	5
2/11/2013	Body 1900	e'	51.0600	Relative Permittivity (ε _r):	51.06	53.30	-4.20	5
		e"	14.2700	Conductivity (σ):	1.51	1.52	-0.82	5
	Body 1850	e'	51.2400	Relative Permittivity (ε _r):	51.24	53.30	-3.86	5
		e"	14.1500	Conductivity (σ):	1.46	1.52	-4.24	5
	Body 1910	e'	51.0300	Relative Permittivity (ε _r):	51.03	53.30	-4.26	5
		e"	14.3000	Conductivity (σ):	1.52	1.52	-0.09	5
2/18/2013	Body 835	e'	52.7700	Relative Permittivity (ε _r):	52.77	55.20	-4.40	5
		e"	21.8600	Conductivity (σ):	1.01	0.97	4.63	5
	Body 820	e'	52.9500	Relative Permittivity (ε _r):	52.95	55.28	-4.21	5
		e"	21.9400	Conductivity (σ):	1.00	0.97	3.29	5
	Body 850	e'	52.5600	Relative Permittivity (ε _r):	52.56	55.16	-4.71	5
		e"	21.8100	Conductivity (σ):	1.03	0.99	4.42	5
2/18/2013	Body 1750	e'	51.4600	Relative Permittivity (ε _r):	51.46	53.44	-3.71	5
		e"	15.2400	Conductivity (σ):	1.48	1.49	-0.22	5
	Body 1710	e'	51.5300	Relative Permittivity (ε _r):	51.53	53.54	-3.76	5
		e"	15.1800	Conductivity (σ):	1.44	1.46	-1.25	5
	Body 1755	e'	51.4500	Relative Permittivity (ε _r):	51.45	53.43	-3.70	5
		e"	15.2400	Conductivity (σ):	1.49	1.49	-0.14	5

Tissue Dielectric Parameter Check Results (continued)

Date	Freq. (MHz)	Liquid Parameters			Measured	Target	Delta (%)	Limit $\pm$ (%)
2/18/2013	Body 1900	e'	51.1300	Relative Permittivity (ϵ_r):	51.13	53.30	-4.07	5
		e''	14.6600	Conductivity (σ):	1.55	1.52	1.89	5
	Body 1850	e'	51.3200	Relative Permittivity (ϵ_r):	51.32	53.30	-3.71	5
		e''	14.4600	Conductivity (σ):	1.49	1.52	-2.14	5
	Body 1910	e'	51.0900	Relative Permittivity (ϵ_r):	51.09	53.30	-4.15	5
		e''	14.7200	Conductivity (σ):	1.56	1.52	2.85	5
2/19/2013	Body 750	e'	54.0600	Relative Permittivity (ϵ_r):	54.06	55.55	-2.68	5
		e''	23.3100	Conductivity (σ):	0.97	0.96	0.93	5
	Body 700	e'	54.6100	Relative Permittivity (ϵ_r):	54.61	55.74	-2.02	5
		e''	23.7700	Conductivity (σ):	0.93	0.96	-3.55	5
	Body 790	e'	53.6200	Relative Permittivity (ϵ_r):	53.62	55.39	-3.20	5
		e''	23.0200	Conductivity (σ):	1.01	0.97	4.66	5

11. System Performance Check

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

11.1. System Performance Check Measurement Conditions

- The measurements were performed in the flat section of the TWIN SAM or ELI phantom, shell thickness: 2.0 $\pm$ 0.2 mm (bottom plate) filled with Body or Head simulating liquid of the following parameters.
- The depth of tissue-equivalent liquid in a phantom must be ≥ 15.0 cm $\pm$ 0.5 cm for SAR measurements ≤ 3 GHz and ≥ 10.0 cm $\pm$ 0.5 cm for measurements > 3 GHz.
- The DASY system with an E-Field Probe was used for the measurements.
- The dipole was mounted on the small tripod so that the dipole feed point was positioned below the center marking of the flat phantom section and the dipole was oriented parallel to the body axis (the long side of the phantom). The standard measuring distance was 10 mm (above 1 GHz) and 15 mm (below 1 GHz) from dipole center to the simulating liquid surface.
- The coarse grid with a grid spacing of 15 mm was aligned with the dipole.
For 5 GHz band - The coarse grid with a grid spacing of 10 mm was aligned with the dipole.
- Special 7x7x7 (below 3 GHz) and/or 8x8x7 (above 3 GHz) fine cube was chosen for the cube.
- Distance between probe sensors and phantom surface was set to 3 mm.
For 5 GHz band - Distance between probe sensors and phantom surface was set to 2.5 mm
- The dipole input power (forward power) was 100 mW.
- The results are normalized to 1 W input power.

11.2. Reference SAR Values for System Performance Check

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

System Dipole	Serial No.	Cal. Date	Freq. (MHz)	Target SAR Values (mW/g)		
				1g/10g	Head	Body
D750V3	1019	02/09/2012	750	1g	8.44	8.84
				10g	5.53	5.84
D750V3	1071	10/5/2012	750	1g	8.29	8.79
				10g	5.49	5.82
D835V2	4d117	4/10/2012	835	1g	9.38	9.52
				10g	6.15	6.31
D1750V2	1077	10/3/2012	1750	1g	36.1	37.7
				10g	19.3	20.3
D1900V2	5d140	4/12/2012	1900	1g	39.8	40.2
				10g	20.8	21.3
D1900V2	5d043	11/06/12	1900	1g	39.9	40.9
				10g	20.9	21.6

11.3. System Performance Check Results

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

Date Tested	System Dipole		T.S. Liquid		Measured Results			Target (Ref. Value)	Delta ±10 %	Est./Zoom Ratio ±3 %
	Type	Serial #			Area Scan	Zoom Scan	Normalize to 1 W			
1/17/2013	D1750V2	1077	Body	1g	3.68	3.63	36.3	37.7	-3.71	1.36
				10g	1.91	1.95	19.5	20.3	-3.94	
1/18/2013	D1900V2	5d140	Body	1g	3.99	3.93	39.3	41.2	-4.61	1.50
				10g	2.03	2.06	20.6	20.3	1.48	
1/23/2013	D750V3	1071	Body	1g	0.889	0.873	8.73	8.79	-0.68	1.80
				10g	0.603	0.581	5.81	5.82	-0.17	
1/25/2013	D750V3	1071	Body	1g	0.881	0.871	8.71	8.79	-0.91	1.14
				10g	0.597	0.580	5.80	5.82	-0.34	
1/25/2013	D835V2	4d117	Body	1g	1.06	1.03	10.3	9.52	8.19	2.83
				10g	0.707	0.680	6.80	6.31	7.77	
1/25/2013	D835V2	4d117	Body	1g	1.04	1.02	10.2	9.52	7.14	1.92
				10g	0.695	0.669	6.69	6.31	6.02	
1/28/2013	D835V2	4d117	Body	1g	1.04	1.01	10.1	9.52	6.09	2.88
				10g	0.639	0.663	6.63	6.31	5.07	
1/31/2013	D1900V2	5d140	Body	1g	4.21	4.25	42.5	41.2	3.16	-0.95
				10g	2.13	2.19	21.9	20.3	7.88	
2/1/2013	D835V2	4d117	Body	1g	1.01	1.0	10.00	9.52	5.04	0.99
				10g	0.677	0.663	6.63	6.31	5.07	
2/2/2013	D1900V2	5d140	Body	1g	4.33	4.25	42.50	41.2	3.16	1.85
				10g	2.16	2.22	22.20	20.3	9.36	
2/11/2013	D750V3	1071	Body	1g	0.957	0.936	9.36	8.79	6.48	2.19
				10g	0.648	0.624	6.24	5.82	7.22	
2/11/2013	D835V2	4d117	Body	1g	1.06	1.04	10.4	9.52	9.24	1.89
				10g	0.712	0.686	6.86	6.31	8.72	
2/11/2013	D1750V2	1077	Body	1g	3.79	3.70	37.0	37.7	-1.86	2.37
				10g	1.98	1.97	19.7	20.3	-2.96	
2/11/2013	D1900V2	5d140	Body	1g	4.21	4.19	41.9	41.2	1.70	0.48
				10g	2.14	2.19	21.9	20.3	7.88	
2/18/2013	D835V2	4d117	Body	1g	1.14	0.997	10.0	9.52	4.73	12.54
				10g	0.76	0.654	6.54	6.31	3.65	
2/18/2013	D1750V2	1077	Body	1g	3.75	3.68	36.8	37.7	-2.39	1.87
				10g	1.98	1.97	19.7	20.3	-2.96	
2/18/2013	D1900V2	5d043	Body	1g	4.38	4.33	43.3	40.9	5.87	1.14
				10g	2.22	2.26	22.6	21.6	4.63	
2/19/2013	D750V3	1019	Body	1g	0.923	0.906	9.06	8.84	2.49	1.84
				10g	0.627	0.603	6.03	5.84	3.25	

12. SAR Test Results

12.1. Standalone SAR Test Exclusion Considerations

Standalone SAR test exclusion was based upon the following criteria:

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

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

Antenna	Tx	Frequency (MHz)	Output power ^{Note 2, 4}		Separation distances (mm)						Calculated Threshold Value					
			dBm	mW	Bottom	Edge 1	Edge 2	Edge 3	Edge 4	Front	Bottom	Edge 1	Edge 2	Edge 3	Edge 4	Front
Full Power 3G - distances include sensor triggering distance for rear (6mm) and edge 1 (20mm)																
3G Main	GSM	848.8	26.98	499	6	20	167.6	176	0		77.0	23.0	> 50mm	> 50mm	91.9	N/A
3G Main	GSM	1909.8	23.98	250	6	20	167.6	176	0		57.6	17.3	> 50mm	> 50mm	69.1	N/A
3G Main	WCDMA	846.6	24.00	251	6	20	167.6	176	0		38.5	11.5	> 50mm	> 50mm	46.2	N/A
3G Main	WCDMA	1907.6	24.00	251	6	20	167.6	176	0		57.8	17.3	> 50mm	> 50mm	69.3	N/A
3G Main	LTE 17	713.5	24.00	251	6	20	167.6	176	0		35.3	10.6	> 50mm	> 50mm	42.4	N/A
3G Main	LTE 4	1755	23.50	224	6	20	167.6	176	0		49.5	14.8	> 50mm	> 50mm	59.3	N/A
Reduced Power 3G - distances are for device in contact with phantom for right edge and rear face																
3G Main	GSM	850	24.98	315	0	0					58.1	58.1	N/A	N/A	N/A	N/A
3G Main	GSM	1900	18.98	79	0	0					21.8	21.8	N/A	N/A	N/A	N/A
3G Main	WCDMA V	850	19.20	83	0	0					15.3	15.3	N/A	N/A	N/A	N/A
3G Main	WCDMA II	1900	18.60	72	0	0					19.8	19.8	N/A	N/A	N/A	N/A
3G Main	LTE 17	716	22.10	162	0	0					27.4	27.4	N/A	N/A	N/A	N/A
3G Main	LTE 4	1755	20.50	112	0	0					29.7	29.7	N/A	N/A	N/A	N/A

Note(s):

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

Conclusion:

As the calculated threshold value is >3 SAR testing is required for the bottom and Edge 1 at full and reduced power. Testing is required for Edge 4 at full power.

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

Antenna	Tx	Frequency (MHz)	Output power		Separation distances (mm)						Power Threshold (mW)					
			dBm	mW	Bottom	Edge 1	Edge 2	Edge 3	Edge 4	Front	Bottom	Edge 1	Edge 2	Edge 3	Edge 4	Front
Full Power 3G - distances include sensor triggering distance for rear (6mm) and edge 1 (20mm)																
3G Main	GSM	848.8	26.98	499	6	20	167.6	176	0		<50	<50	828	876	<50	N/A
3G Main	GSM	1909.8	23.98	250	6	20	167.6	176	0		<50	<50	1285	1369	<50	N/A
3G Main	WCDMA	846.6	24.00	251	6	20	167.6	176	0		<50	<50	827	874	<50	N/A
3G Main	WCDMA	1907.6	24.00	251	6	20	167.6	176	0		<50	<50	1285	1369	<50	N/A
3G Main	LTE 17	713.5	24.00	251	6	20	167.6	176	0		<50	<50	737	777	<50	N/A
3G Main	LTE 4	1755	23.50	224	6	20	167.6	176	0		<50	<50	1289	1373	<50	N/A
Reduced Power 3G - distances are for device in contact with phantom for right edge and rear face																
3G Main	GSM	850	24.98	315	0	0					<50	<50	N/A	N/A	N/A	N/A
3G Main	GSM	1900	18.98	79	0	0					<50	<50	N/A	N/A	N/A	N/A
3G Main	WCDMA V	850	19.20	83	0	0					<50	<50	N/A	N/A	N/A	N/A
3G Main	WCDMA II	1900	18.60	72	0	0					<50	<50	N/A	N/A	N/A	N/A
3G Main	LTE 17	716	22.10	162	0	0					<50	<50	N/A	N/A	N/A	N/A
3G Main	LTE 4	1755	20.50	112	0	0					<50	<50	N/A	N/A	N/A	N/A

Note(s):

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

Conclusion:

As the calculated Power Threshold is greater than the DUT output power for Edge 2 and 3 SAR testing is not required

12.2. Estimated SAR for Simultaneous Transmission SAR Analysis

Considerations for using estimated SAR values:

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

12.2.1. Estimated SAR for WWAN

Antenna	Tx	Frequency (MHz)	Output power		Separation distances (mm)						Estimated SAR Value					
			dBm	mW	Bottom	Edge 1	Edge 2	Edge 3	Edge 4	Front	Bottom	Edge 1	Edge 2	Edge 3	Edge 4	Front
Full Power 3G - distances include sensor triggering distance for rear (6mm) and edge 1 (20mm)																
3G Main	GSM	848.8	26.98	499	6	20	167.6	176	0		Measure	Measure	0.400	0.400	Measure	N/A
3G Main	GSM	1909.8	23.98	250	6	20	167.6	176	0		Measure	Measure	0.400	0.400	Measure	N/A
3G Main	WCDMA	846.6	24.00	251	6	20	167.6	176	0		Measure	Measure	0.400	0.400	Measure	N/A
3G Main	WCDMA	1907.6	24.00	251	6	20	167.6	176	0		Measure	Measure	0.400	0.400	Measure	N/A
3G Main	LTE 17	713.5	24.00	251	6	20	167.6	176	0		Measure	Measure	0.400	0.400	Measure	N/A
3G Main	LTE 4	1755	23.50	224	6	20	167.6	176	0		Measure	Measure	0.400	0.400	Measure	N/A
Reduced Power 3G - distances are for device in contact with phantom for right edge and rear face																
3G Main	GSM	850	24.98	315	0	0					Measure	Measure	N/A	N/A	N/A	N/A
3G Main	GSM	1900	18.98	79	0	0					Measure	Measure	N/A	N/A	N/A	N/A
3G Main	WCDMA V	850	19.20	83	0	0					Measure	Measure	N/A	N/A	N/A	N/A
3G Main	WCDMA II	1900	18.60	72	0	0					Measure	Measure	N/A	N/A	N/A	N/A
3G Main	LTE 17	716	22.10	162	0	0					Measure	Measure	N/A	N/A	N/A	N/A
3G Main	LTE 4	1755	20.50	112	0	0					Measure	Measure	N/A	N/A	N/A	N/A

Notes:

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

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

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

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

Notes:

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

12.3. GSM850

Usage Scenario: Proximity Sensor Activated, Reduced Power Operation

Test Position	Dist. (mm)	Mode	Ch #.	Freq. (MHz)	Power (dBm)		1-g SAR (W/kg)		Plot No.	Note
					Tune-up limit	Meas.	Meas.	Scaled		
Rear	0	GPRS 2 Slots	128	824.2	29.0	28.4				1
			190	836.6	29.0	28.5	0.518	0.581	1	
			251	848.8	29.0	28.6				1
Edge 1	0	GPRS 2 Slots	128	824.2	29.0	28.4	0.814	0.935	2	
			190	836.6	29.0	28.5	0.952	1.068	3	
			251	848.8	29.0	28.6	1.050	1.151	4	

Usage Scenario: Proximity Sensor Deactivated, Full Power Operation

Test Position	Dist. (mm)	Mode	Ch #.	Freq. (MHz)	Power (dBm)		1-g SAR (W/kg)		Plot No.	Note
					Tune-up limit	Meas.	Meas.	Scaled		
Rear	6	GPRS 2 Slots	128	824.2	33.0	31.3				1
			190	836.6	33.0	31.7	0.555	0.749	5	
			251	848.8	33.0	31.6				1
Edge 1	20	GPRS 2 Slots	128	824.2	33.0	31.3				1
			190	836.6	33.0	31.7	0.276	0.372	6	
			251	848.8	33.0	31.6				1
Edge 4	0	GPRS 2 Slots	128	824.2	33.0	31.3				1
			190	836.6	33.0	31.7	0.066	0.089	7	
			251	848.8	33.0	31.6				1

Note(s):

According to KDB 447498 D01 General RF Exposure Guidance v05, testing of other required channels within the operating mode of a frequency band is not required when the reported 1-g or 10-g SAR for the mid-band or highest output power channel is.

1. ≤ 0.8 W/kg or 2.0 W/kg, for 1-g or 10-g respectively, when the transmission band is ≤ 100 MHz
2. ≤ 0.6 W/kg or 1.5 W/kg, for 1-g or 10-g respectively, when the transmission band is between 100 MHz and 200 MHz
3. ≤ 0.4 W/kg or 1.0 W/kg, for 1-g or 10-g respectively, when the transmission band is ≥ 200 MHz

12.4. GSM1900

Usage Scenario: Proximity Sensor Activated, Reduced Power Operation

Test Position	Dist. (mm)	Mode	Ch #.	Freq. (MHz)	Power (dBm)		1-g SAR (W/kg)		Plot No.	Note
					Tune-up limit	Meas.	Meas.	Scaled		
Rear	0	GPRS 2 Slots	512	1850.2	25.0	24.5				1
			661	1880.0	25.0	24.4	0.266	0.305	1	
			810	1909.8	25.0	24.6				1
Edge 1	0	GPRS 2 Slots	512	1850.2	25.0	24.5	1.190	1.335	2	
			661	1880.0	25.0	24.4	1.100	1.263	3	
			810	1909.8	25.0	24.6	1.210	1.327	4	

Usage Scenario: Proximity Sensor Deactivated, Full Power Operation

Test Position	Dist. (mm)	Mode	Ch #.	Freq. (MHz)	Power (dBm)		1-g SAR (W/kg)		Plot No.	Note
					Tune-up limit	Meas.	Meas.	Scaled		
Rear	6	GPRS 2 Slots	128	1850.2	30.0	28.6				1
			190	1880.0	30.0	28.3	0.510	0.754	5	
			251	1909.8	30.0	28.5				1
Edge 1	20	GPRS 2 Slots	128	1850.2	30.0	28.6				1
			190	1880.0	30.0	28.3	0.135	0.200	6	
			251	1909.8	30.0	28.5				1
Edge 4	0	GPRS 2 Slots	128	1850.2	30.0	28.6				1
			190	1880.0	30.0	28.3	0.224	0.331	7	
			251	1909.8	30.0	28.5				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

12.5. W-CDMA Band V

Test mode reduction considerations

Per KDB 941225 D01, Body SAR is not required for handsets with HSPA capabilities when the maximum average output of each RF channel with HSUPA/HSDPA active is less than ¼ dB higher than that measured without HSUPA/HSDPA using 12.2 kbps RMC and the maximum SAR for 12.2kbps RMC is ≤ 75% of the SAR limit.

Usage Scenario: Proximity Sensor Activated, Reduced Power Operation

Test Position	Dist. (mm)	Mode	Ch #.	Freq. (MHz)	Power (dBm)		1-g SAR (W/kg)		Plot No.	Note
					Tune-up limit	Meas.	Meas.	Scaled		
Rear	0	Rel 99 RMC 12.2 kbps	4132	826.4	19.2	19.2				1
			4183	836.6	19.2	19.1	0.276	0.282	1	
			4233	846.6	19.2	18.9				1
Edge 1	0	Rel 99 RMC 12.2 kbps	4132	826.4	19.2	19.2	0.820	0.820	2	
			4183	836.6	19.2	19.1	0.880	0.900	3	
			4233	846.6	19.2	18.9	0.981	1.051	4	

Usage Scenario: Proximity Sensor Deactivated, Full Power Operation

Test Position	Dist. (mm)	Mode	Ch #.	Freq. (MHz)	Power (dBm)		1-g SAR (W/kg)		Plot No.	Note
					Tune-up limit	Meas.	Meas.	Scaled		
Rear	6	Rel 99 RMC 12.2 kbps	4132	826.4	24.0	23.1				1
			4183	836.6	24.0	22.9	0.415	0.535	5	
			4233	846.6	24.0	22.8				1
Edge 1	20	Rel 99 RMC 12.2 kbps	4132	826.4	24.0	23.1				1
			4183	836.6	24.0	22.9	0.205	0.264	6	
			4233	846.6	24.0	22.8				1
Edge 4	0	Rel 99 RMC 12.2 kbps	4132	826.4	24.0	23.1				1
			4183	836.6	24.0	22.9	0.049	0.063	7	
			4233	846.6	24.0	22.8				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

12.6. W-CDMA Band II

Test mode reduction considerations

Per KDB 941225 D01, Body SAR is not required for handsets with HSPA capabilities when the maximum average output of each RF channel with HSUPA/HSDPA active is less than ¼ dB higher than that measured without HSUPA/HSDPA using 12.2 kbps RMC and the maximum SAR for 12.2kbps RMC is ≤ 75% of the SAR limit.

Usage Scenario: Proximity Sensor Activated, Reduced Power Operation

Test Position	Dist. (mm)	Mode	Ch #.	Freq. (MHz)	Power (dBm)		1-g SAR (W/kg)		Plot No.	Note
					Tune-up limit	Meas.	Meas.	Scaled		
Rear	0	Rel 99 RMC 12.2 kbps	9262	1852.4	18.6	18.5				1
			9400	1880.0	18.6	18.6	0.680	0.680	1	
			9538	1907.6	18.6	18.4				1
Edge 1	0	Rel 99 RMC 12.2 kbps	9262	1852.4	18.6	18.5	1.150	1.177	2	
			9400	1880.0	18.6	18.6	1.270	1.270	3	
			9538	1907.6	18.6	18.4	1.330	1.393	4	
	0	HSUPA Subtest 5	9262	1852.4	18.6	17.4	0.808	1.065	5	
			9400	1880.0	18.6	17.6	0.883	1.112	6	
			9538	1907.6	18.6	17.5	0.992	1.278	7	

Usage Scenario: Proximity Sensor Deactivated, Full Power Operation

Test Position	Dist. (mm)	Mode	Ch #.	Freq. (MHz)	Power (dBm)		1-g SAR (W/kg)		Plot No.	Note
					Tune-up limit	Meas.	Meas.	Scaled		
Rear	6	Rel 99 RMC 12.2 kbps	9262	1852.4	24.0	22.9	0.621	0.800	8	
			9400	1880.0	24.0	22.9	0.703	0.906	9	
			9538	1907.6	24.0	22.8	0.655	0.863	10	
Edge 1	20	Rel 99 RMC 12.2 kbps	9262	1852.4	24.0	22.9				1
			9400	1880.0	24.0	22.9	0.094	0.121	11	
			9538	1907.6	24.0	22.8				1
Edge 4	0	Rel 99 RMC 12.2 kbps	9262	1852.4	24.0	22.9				1
			9400	1880.0	24.0	22.9	0.282	0.363	12	
			9538	1907.6	24.0	22.8				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

12.7. LTE Band 4

Usage Scenario: Proximity Sensor Activated, Reduced Power Operation

Test Position	Dist. (mm)	Mode	UL Ch #.	Freq. (MHz)	UL RB Allocation	UL RB Start	Power (dBm)		1-g SAR (W/kg)		Plot No.	Note
							Tune-up limit	Meas.	Meas.	Scaled		
Rear	0	QPSK	20175	1732.5	1	49	20.50	20.5	0.685	0.685	1	
			20000	1715.0	1	49	20.50	20.4				
			20350	1750.0	1	0	20.50	20.4				
			20175	1732.5	25	12	20.50	20.3	0.715	0.749	2	
			20000	1715.0	25	0	20.50	20.2				
			20350	1750.0	25	0	20.50	20.2				
Edge 1	0	QPSK	20175	1732.5	50	0	20.50	20.2				
			20175	1732.5	1	49	20.50	20.5	1.260	1.260	3	
			20000	1715.0	1	49	20.50	20.4	1.210	1.238	4	
			20350	1750.0	1	0	20.50	20.4	1.260	1.289	5	
			20175	1732.5	25	12	20.50	20.3	1.210	1.267	6	
			20000	1715.0	25	0	20.50	20.2	1.130	1.211	7	
			20350	1750.0	25	0	20.50	20.2	1.170	1.254	8	
			20175	1732.5	50	0	20.50	20.2	1.190	1.275	9	

Note(s):

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

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

LTE Band 4 Continued

Usage Scenario: Proximity Sensor Deactivated, Full Power Operation

Test Position	Dist. (mm)	Mode	UL Ch #.	Freq. (MHz)	UL RB Allocation	UL RB Start	Power (dBm)		1-g SAR (W/kg)		Plot No.	Note
							Tune-up limit	Meas.	Meas.	Scaled		
Rear	6	QPSK	20175	1732.5	1	49	23.5	23.1	1.100	1.206	10	
			20000	1715.0	1	0	23.5	23.0	1.060	1.189	11	
			20350	1750.0	1	24	23.5	23.0	0.978	1.097	12	
			20175	1732.5	25	0	22.5	22.0	0.940	1.055	13	
			20000	1715.0	25	0	22.5	21.9	0.821	0.943	14	
			20350	1750.0	25	0	22.5	21.9	0.767	0.881	15	
			20175	1732.5	50	0	22.5	21.9	0.901	1.034	16	
Edge 1	20	QPSK	20175	1732.5	1	49	23.5	23.1	0.109	0.120	17	
			20000	1715.0	1	0	23.5	23.0				
			20350	1750.0	1	24	23.5	23.0				
			20175	1732.5	25	0	22.5	22.0	0.125	0.140	18	
			20000	1715.0	25	0	22.5	21.9				
			20350	1750.0	25	0	22.5	21.9				
			20175	1732.5	50	0	22.5	21.9				
Edge 4	0	QPSK	20175	1732.5	1	49	23.5	23.1	0.208	0.228	19	
			20000	1715.0	1	0	23.5	23.0				
			20350	1750.0	1	24	23.5	23.0				
			20175	1732.5	25	0	22.5	22.0	0.169	0.190	20	
			20000	1715.0	25	0	22.5	21.9				
			20350	1750.0	25	0	22.5	21.9				
			20175	1732.5	50	0	22.5	21.9				

Note(s):

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

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

12.8. LTE Band 17

Usage Scenario: Proximity Sensor Activated, Reduced Power Operation

Test Position	Dist. (mm)	Mode	UL Ch #.	Freq. (MHz)	UL RB Allocation	UL RB Start	Power (dBm)		1-g SAR (W/kg)		Plot No.	Note
							Tune-up limit	Meas.	Meas.	Scaled		
Rear	0	QPSK	23800	711.0	1	24	22.1	22.0	0.451	0.462	1	
			23780	709.0	1	49	22.1	21.9				
			23790	710.0	1	0	22.1	21.9				
			23790	710.0	25	0	22.1	21.9	0.373	0.391	2	
			23780	709.0	25	0	22.1	21.7				
			23800	711.0	25	0	22.1	21.7				
			23790	710.0	50	0	22.1	21.7				
Edge 1	0	QPSK	23800	711.0	1	24	22.1	22.0	1.310	1.341	3	
			23780	709.0	1	49	22.1	21.9	1.190	1.246	4	
			23790	710.0	1	0	22.1	21.9	1.210	1.267	5	
			23790	710.0	25	0	22.1	21.9	1.160	1.215	6	
			23780	709.0	25	0	22.1	21.7	1.150	1.261	7	
			23800	711.0	25	0	22.1	21.7	1.200	1.316	8	
			23790	710.0	50	0	22.1	21.7	1.160	1.272	9	

Note(s):

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

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

LTE Band 17 Continued

Usage Scenario: Proximity Sensor Deactivated, Full Power Operation

Test Position	Dist. (mm)	Mode	UL Ch #.	Freq. (MHz)	UL RB Allocation	UL RB Start	Power (dBm)		1-g SAR (W/kg)		Plot No.	Note
							Tune-up limit	Meas.	Meas.	Scaled		
Rear	6	QPSK	23780	709.0	1	49	24.0	22.9	0.527	0.679	10	
			23790	710.0	1	24	24.0	22.9				
			23800	711.0	1	0	24.0	22.9				
			23790	710.0	25	0	23.0	21.9	0.343	0.442	11	
			23780	709.0	25	0	23.0	21.7				
			23800	711.0	25	0	23.0	21.7				
			23790	710.0	50	0	23.0	21.7				
Edge 1	20	QPSK	23780	709.0	1	49	24.0	22.9	0.161	0.207	12	
			23790	710.0	1	24	24.0	22.9				
			23800	711.0	1	0	24.0	22.9				
			23790	710.0	25	0	23.0	21.9	0.118	0.152	13	
			23780	709.0	25	0	23.0	21.7				
			23800	711.0	25	0	23.0	21.7				
			23790	710.0	50	0	23.0	21.7				
Edge 4	0	QPSK	23780	709.0	1	49	24.0	22.9	0.110	0.142	14	
			23790	710.0	1	24	24.0	22.9				
			23800	711.0	1	0	24.0	22.9				
			23790	710.0	25	0	23.0	21.9	0.071	0.091	15	
			23780	709.0	25	0	23.0	21.7				
			23800	711.0	25	0	23.0	21.7				
			23790	710.0	50	0	23.0	21.7				

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.

12.9. Summary of Highest SAR Values

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

Technology/Band	Test configuration		Mode	Dist. (mm)	Freq. (Mhz)	Power (dBm)	1g SAR (W/kg)
	Exposure	Position					
GSM850	Body	Edge1 Prox. On	GPRS 2 slot	0	848.8	28.6	1.05
GSM1900	Body	Edge1 Prox. On	GPRS 2 slot	0	1909.8	24.6	1.21
W-CDMA Band V	Body	Edge1 Prox. On	Rel 99 RMC 12.2kbps	0	846.6	18.9	0.981
W-CDMA Band II	Body	Edge1 Prox. On	Rel 99 RMC 12.2kbps	0	1907.6	18.4	1.33
LTE Band 4	Body	Edge1 Prox. On	10 MHz (QPSK) RB 1/49	0	1732.5	20.4	1.26
LTE Band 17	Body	Edge1 Prox. On	10 MHz (QPSK) RB 1/24	0	711.0	22.0	1.31

12.10. SAR Measurement Variability and Uncertainty

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

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

Wireless Technologies	Test Configuration		Mode	Dist. (mm)	Ch #.	Freq. (MHz)	Meas. SAR (W/kg)		Largest to Smallest SAR Ratio	Plot No.
	Exposure	Position					Original	Repeated		
LTE Band 17	Body	Edge 1 Prox. On	10 MHz (QPSK) RB 1/24	0	23800	711.0	1.31	1.20	1.09	1
GSM850	Body	Edge 1 Prox. On	GPRS 2 Slots	0	251	848.8	1.050	1.170	1.11	2
LTE Band 4	Body	Edge 1 Prox. On	10 MHz (QPSK) RB 1/0	0	20175	1732.5	1.26	1.20	1.05	3
W-CDMA Band II	Body	Edge 1 Prox. On	Rel 99 RMC 12.2kbps	0	9538	1907.6	1.33	1.27	1.05	4

Note(s):

- Second Repeated Measurement is not required since the ratio of the largest to smallest SAR for the original and first repeated measurement is not > 1.20.
- As the repeated value for GSM850 was higher than the original value, it was consequently used to represent GSM850 in Simultaneous Transmission SAR Analysis on the Edge 1 Prox. On test position.
 - Scaling was applied using a factor of 0.4 dB (Tune Up Power Limit – Measured Power, or 29.0 dBm – 28.6 dBm) and results in a reported value of **1.283 W/kg**; this value was used for the grant statement and for Simultaneous Transmission SAR Analysis

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

Test Laboratory: UL CCS SAR Lab B Date: 1/28/2013

GSM 850

Frequency: 848.8 MHz; Duty Cycle: 1:4.00037; Room Ambient Temperature: 23.0°C; Liquid Temperature: 22.0°C

Medium parameters used (interpolated): $f = 848.8$ MHz; $\sigma = 1.032$ mho/m; $\epsilon_r = 53.954$; $\rho = 1000$ 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 Sn1259; Calibrated: 2/13/2012
- Probe: EX3DV4 - SN3686; ConvF(8.73, 8.73, 8.73); 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: 1120

Edge 1 Prox. On/GPRS 2 Slots Ch 251/Area Scan (7x9x1): Measurement grid: dx=15mm, dy=15mm

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

Maximum value of SAR (measured) = 0.983 W/kg

Edge 1 Prox. On/GPRS 2 Slots Ch 251/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

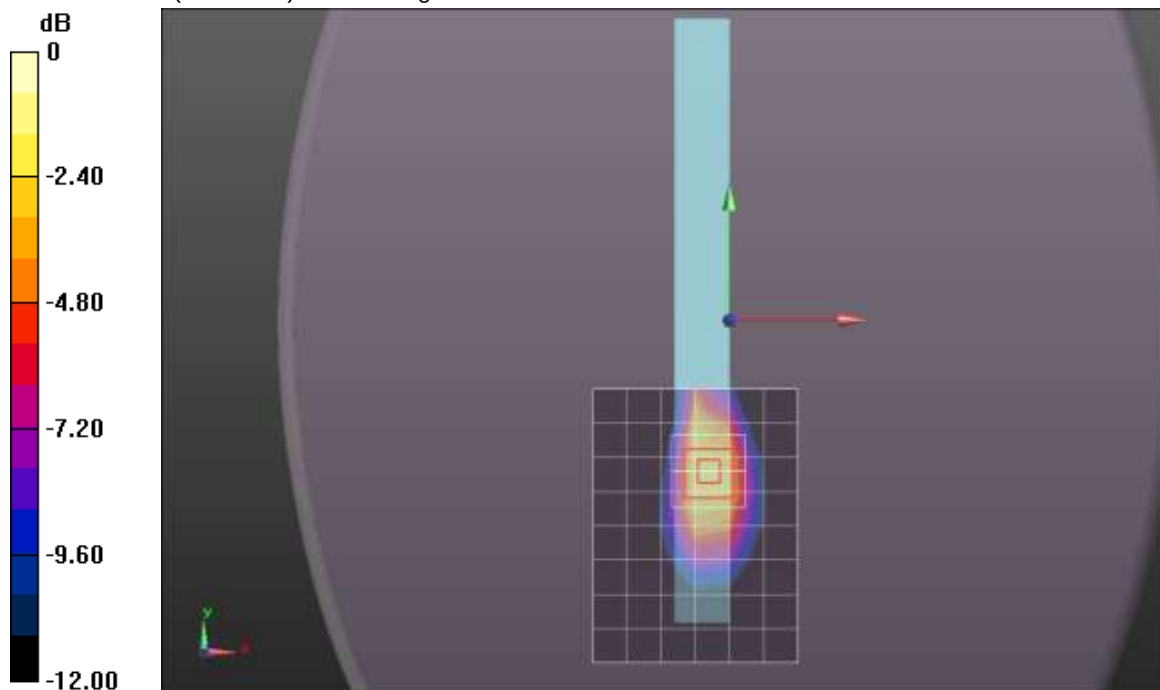
Reference Value = 32.204 V/m; Power Drift = -0.16 dB

Peak SAR (extrapolated) = 1.89 W/kg

SAR(1 g) = 1.05 W/kg; SAR(10 g) = 0.573 W/kg

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

Maximum value of SAR (measured) = 1.41 W/kg



Test Laboratory: UL CCS SAR Lab B Date: 1/31/2013

GSM 1900

Frequency: 1909.8 MHz; Duty Cycle: 1:4.00037; Room Ambient Temperature: 23.0°C; Liquid Temperature: 22.0°C
Medium parameters used: $f = 1910$ MHz; $\sigma = 1.573$ mho/m; $\epsilon_r = 51.674$; $\rho = 1000$ 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 Sn1259; Calibrated: 2/13/2012
- Probe: EX3DV4 - SN3686; ConvF(7.04, 7.04, 7.04); Calibrated: 2/16/2012;
- Sensor-Surface: 2.5mm (Mechanical Surface Detection)
- Phantom: ELI v5.0 (B); Type: QDOVA001BB; Serial: 1118

Edge 1 Prox. On/GPRS 2 Slots Ch 810/Area Scan (7x9x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 1.33 W/kg

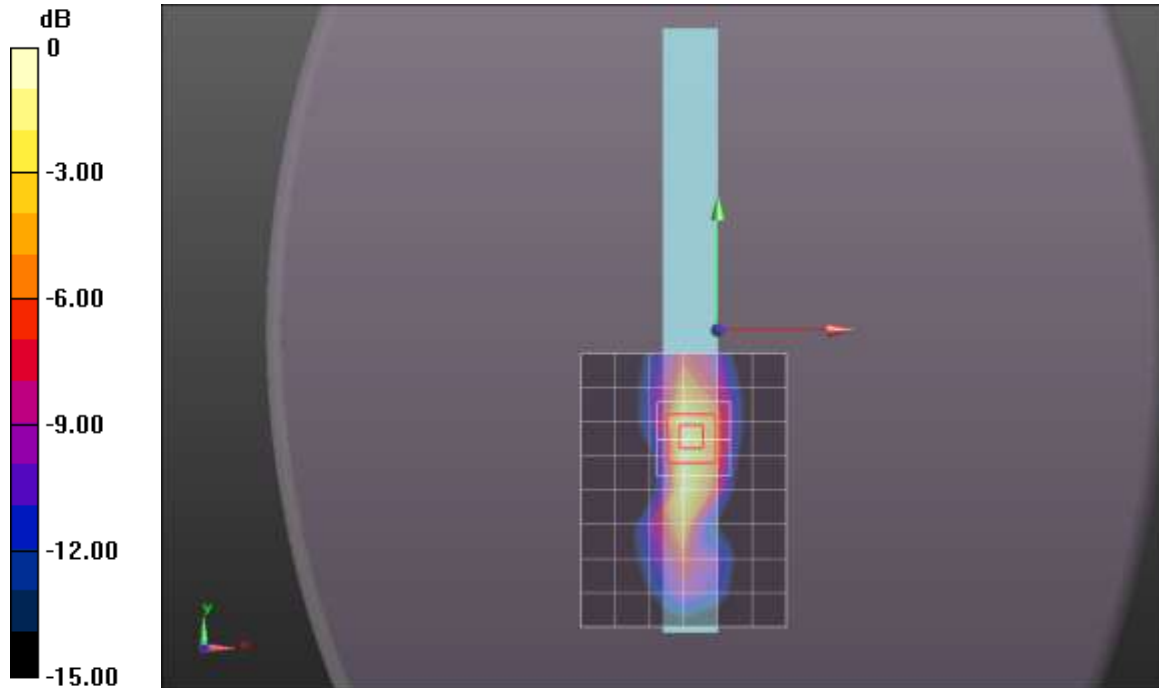
Edge 1 Prox. On/GPRS 2 Slots Ch 810/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 29.587 V/m; Power Drift = -0.04 dB

Peak SAR (extrapolated) = 2.21 W/kg

SAR(1 g) = 1.21 W/kg; SAR(10 g) = 0.598 W/kg

Maximum value of SAR (measured) = 1.64 W/kg



0 dB = 1.64 W/kg = 2.15 dBW/kg

Test Laboratory: UL CCS SAR Lab B Date: 1/26/2013

W-CDMA Band V

Frequency: 846.6 MHz; Duty Cycle: 1:1; Room Ambient Temperature: 23.0°C; Liquid Temperature: 22.0°C
Medium parameters used (interpolated): $f = 846.6$ MHz; $\sigma = 1.029$ mho/m; $\epsilon_r = 53.956$; $\rho = 1000$ 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 Sn1259; Calibrated: 2/13/2012
- Probe: EX3DV4 - SN3686; ConvF(8.73, 8.73, 8.73); 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: 1120

Edge 1 Prox. On/R99 RMC Ch. 4233/Area Scan (7x11x1): Measurement grid: dx=15mm, dy=15mm

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

Maximum value of SAR (measured) = 1.23 W/kg

Edge 1 Prox. On/R99 RMC Ch. 4233/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

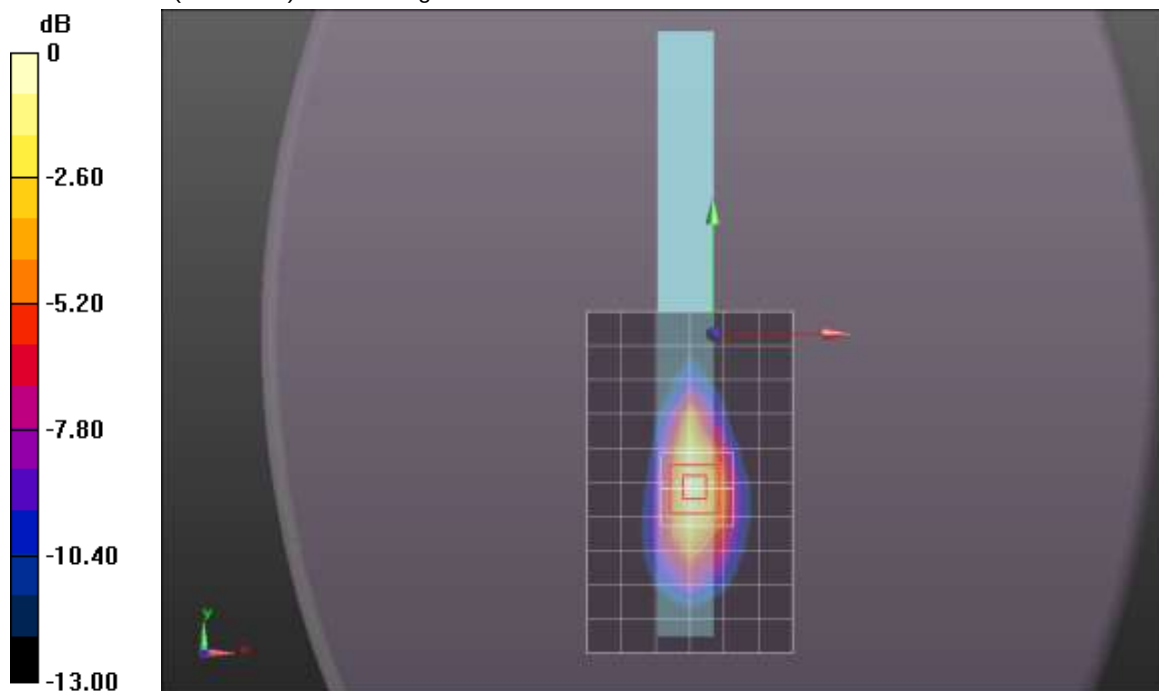
Reference Value = 35.386 V/m; Power Drift = -0.14 dB

Peak SAR (extrapolated) = 1.73 W/kg

SAR(1 g) = 0.981 W/kg; SAR(10 g) = 0.538 W/kg

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

Maximum value of SAR (measured) = 1.30 W/kg



0 dB = 1.30 W/kg = 1.14 dBW/kg

Test Laboratory: UL CCS SAR Lab B Date: 1/31/2013

W-CDMA Band II

Frequency: 1907.6 MHz; Duty Cycle: 1:1; Room Ambient Temperature: 23.0°C; Liquid Temperature: 22.0°C
Medium parameters used (interpolated): $f = 1907.6$ MHz; $\sigma = 1.514$ mho/m; $\epsilon_r = 50.647$; $\rho = 1000$ 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 Sn1259; Calibrated: 2/13/2012
- Probe: EX3DV4 - SN3686; ConvF(7.04, 7.04, 7.04); Calibrated: 2/16/2012;
- Sensor-Surface: 2.5mm (Mechanical Surface Detection (Locations From Previous Scan Used)), Sensor-Surface: 2.5mm (Mechanical Surface Detection)
- Phantom: ELI v5.0 (B); Type: QDOVA001BB; Serial: 1099

Edge 1 Prox. On/R99 RMC Ch 9538/Area Scan (7x11x1): Measurement grid: dx=15mm, dy=15mm

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

Maximum value of SAR (measured) = 1.18 W/kg

Edge 1 Prox. On/R99 RMC Ch 9538/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

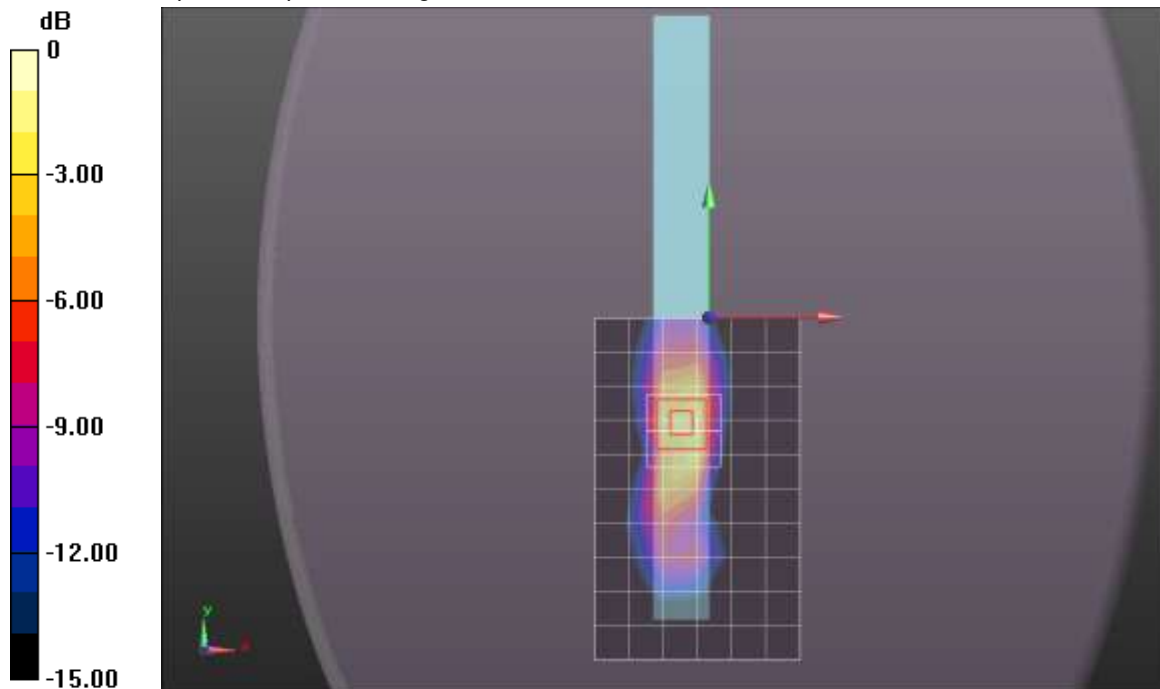
Reference Value = 27.150 V/m; Power Drift = 0.18 dB

Peak SAR (extrapolated) = 2.43 W/kg

SAR(1 g) = 1.33 W/kg; SAR(10 g) = 0.654 W/kg

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

Maximum value of SAR (measured) = 1.75 W/kg



0 dB = 1.75 W/kg = 2.43 dBW/kg

Test Laboratory: UL CCS SAR Lab B Date: 1/17/2013

LTE Band 4

Frequency: 1750 MHz; Duty Cycle: 1:1; Room Ambient Temperature: 23.0°C; Liquid Temperature: 22.0°C

Medium parameters used: $f = 1750$ MHz; $\sigma = 1.467$ mho/m; $\epsilon_r = 52.767$; $\rho = 1000$ 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 Sn1259; Calibrated: 2/13/2012
- Probe: EX3DV4 - SN3686; ConvF(7.44, 7.44, 7.44); Calibrated: 2/16/2012;
- Sensor-Surface: 2.5mm (Mechanical Surface Detection (Locations From Previous Scan Used)), Sensor-Surface: 2.5mm (Mechanical Surface Detection)
- Phantom: ELI v5.0 (B); Type: QDOVA001BB; Serial: 1099

Edge 1 Prox. On/QPSK RB 1, 0/ Ch 20350/Area Scan (7x11x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (measured) = 1.87 W/kg

Edge 1 Prox. On/QPSK RB 1, 0/ Ch 20350/Zoom Scan (5x5x7)/Cube 0: Measurement grid:

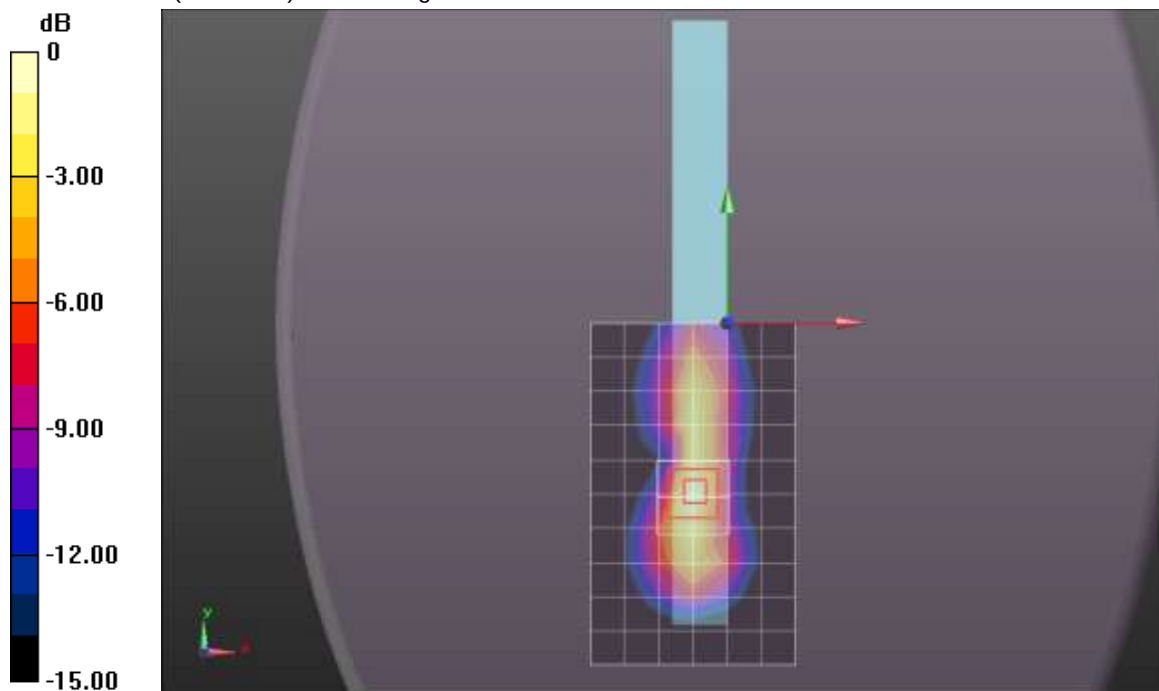
dx=8mm, dy=8mm, dz=5mm

Reference Value = 36.795 V/m; Power Drift = -0.07 dB

Peak SAR (extrapolated) = 2.49 W/kg

SAR(1 g) = 1.26 W/kg; SAR(10 g) = 0.579 W/kg

Maximum value of SAR (measured) = 1.89 W/kg



Test Laboratory: UL CCS SAR Lab B Date: 1/24/2013

LTE Band 17

Frequency: 711 MHz; Duty Cycle: 1:1; Room Ambient Temperature: 23.0°C; Liquid Temperature: 22.0°C
Medium parameters used (interpolated): $f = 711$ MHz; $\sigma = 0.934$ mho/m; $\epsilon_r = 55.661$; $\rho = 1000$ 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 Sn1259; Calibrated: 2/13/2012
- Probe: EX3DV4 - SN3686; ConvF(8.87, 8.87, 8.87); Calibrated: 2/16/2012;
- Sensor-Surface: 2.5mm (Mechanical Surface Detection)
- Phantom: ELI v5.0 (B); Type: QDOVA001BB; Serial: 1118

Edge 1 Prox. On/QPSK RB 1, 24 Ch 23800/Area Scan (7x11x1): Measurement grid: dx=15mm, dy=15mm

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

Maximum value of SAR (measured) = 1.64 W/kg

Edge 1 Prox. On/QPSK RB 1, 24 Ch 23800/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

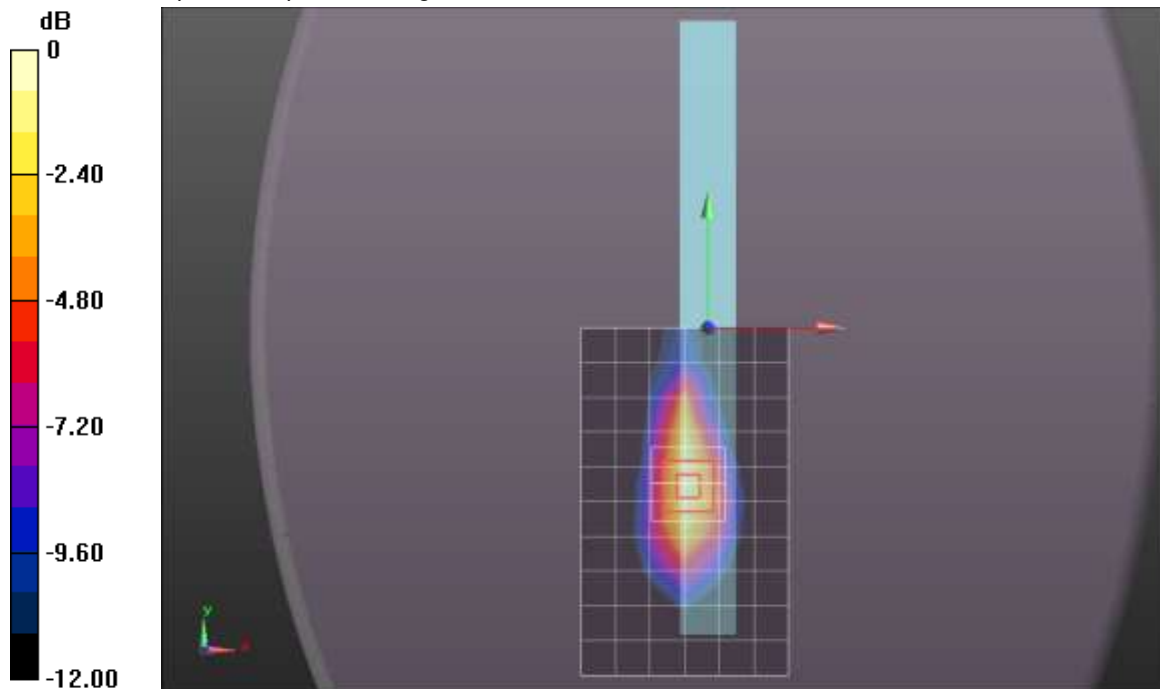
Reference Value = 42.810 V/m; Power Drift = -0.11 dB

Peak SAR (extrapolated) = 2.30 W/kg

SAR(1 g) = 1.31 W/kg; SAR(10 g) = 0.732 W/kg

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

Maximum value of SAR (measured) = 1.75 W/kg



0 dB = 1.75 W/kg = 2.43 dBW/kg

13. Simultaneous Transmission SAR Analysis

All Wi-Fi 1-g SAR values were taken from results recorded in SAR report 12J14673-1F, submitted under FCC ID ACJ9TGWL12A or from the MIMO estimated values in section 12.2.2 of this report.

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

13.1. Sum of the SAR for GSM & Wi-Fi 2.4 GHz Band

Test Position	Data					Σ 1-g SAR (mW/g)
	GSM850	GSM1900	WiFi 2.4 GHz Main	WiFi 2.4 GHz Aux	Bluetooth	
Rear, Wi-Fi 1 Tx	0.749		0.196		0.165	1.110
	0.749			0.062		0.811
		0.754	0.196		0.165	1.115
		0.754		0.062		0.816
Rear, Wi-Fi 2 Tx	0.749		0.196	0.062		1.007
		0.754	0.196	0.062		1.012
Edge 1, Wi-Fi 1 Tx	1.283		0.084		0.017	1.384
	1.283			0.133		1.416
		1.335	0.084		0.017	1.436
		1.335		0.133		1.468
Edge 1, Wi-Fi 2 Tx	1.283		0.084	0.075		1.442
		1.335	0.084	0.075		1.494
Edge 3, Wi-Fi 2 Tx	0.400		0.075	0.418		0.893
		0.400	0.075	0.418		0.893
Edge 4, Wi-Fi 1 Tx	0.089		1.093		0.0089	1.191
		0.331	1.093		0.0089	1.433
Edge 4, Wi-Fi 2 Tx	0.089		1.093	0.126		1.308
		0.331	1.093	0.126		1.550

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

Conclusion:

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

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

Test Position	Data					Σ 1-g SAR (mW/g)
	W-CDMA Band V	W-CDMA Band II	WiFi 2.4 GHz Main	WiFi 2.4 GHz Aux	Bluetooth	
Rear, Wi-Fi 1 Tx	0.535		0.196		0.165	0.896
	0.535			0.062		0.597
		0.906	0.196		0.165	1.267
		0.906		0.062		0.968
Rear, Wi-Fi 2 Tx	0.535		0.196	0.062		0.793
		0.906	0.196	0.062		1.164
Edge 1, Wi-Fi 1 Tx	1.051		0.084		0.017	1.152
	1.051			0.133		1.184
		1.393	0.084		0.017	1.494
		1.393		0.133		1.526
Edge 1, Wi-Fi 2 Tx	1.051		0.084	0.075		1.210
		1.393	0.084	0.075		1.552
Edge 3, Wi-Fi 2 Tx	0.400		0.075	0.418		0.893
		0.400	0.075	0.418		0.893
Edge 4, Wi-Fi 1 Tx	0.063		1.093		0.0089	1.165
		0.363	1.093		0.0089	1.465
Edge 4, Wi-Fi 2 Tx	0.063		1.093	0.126		1.282
		0.363	1.093	0.126		1.582

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

Conclusion:

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

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

Test Position	Data					Σ 1-g SAR (mW/g)
	LTE Band 4	LTE Band 17	WiFi 2.4 GHz Main	WiFi 2.4 GHz Aux	Bluetooth	
Rear, Wi-Fi 1 Tx	1.206		0.196		0.165	1.567
	1.206			0.062		1.268
		0.679	0.196		0.165	1.040
		0.679		0.062		0.741
Rear, Wi-Fi 2 Tx	1.206		0.196	0.062		1.464
		0.679	0.196	0.062		0.937
Edge 1, Wi-Fi 1 Tx	1.289		0.084		0.017	1.390
	1.289			0.133		1.422
		1.341	0.084		0.017	1.442
		1.341		0.133		1.474
Edge 1, Wi-Fi 2 Tx	1.289		0.084	0.075		1.448
		1.341	0.084	0.075		1.500
Edge 3, Wi-Fi 2 Tx	0.400		0.075	0.418		0.893
		0.400	0.075	0.418		0.893
Edge 4, Wi-Fi 1 Tx	0.228		1.093		0.0089	1.330
		0.142	1.093		0.0089	1.244
Edge 4, Wi-Fi 2 Tx	0.228		1.093	0.126		1.447
		0.142	1.093	0.126		1.361

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

Conclusion:

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

13.4. Sum of the SAR for GSM & Wi-Fi 5.2 GHz Band

Test Position	Data					Σ 1-g SAR (mW/g)
	GSM850	GSM1900	WiFi 5.2 GHz Main	WiFi 5.2 GHz Aux	Bluetooth	
Rear, Wi-Fi 1 Tx	0.749		0.136		0.165	1.050
	0.749			0.149		0.898
		0.754	0.136		0.165	1.055
		0.754		0.149		0.903
Rear, Wi-Fi 2 Tx	0.749		0.136	0.149		1.034
		0.754	0.136	0.149		1.039
Edge 1, Wi-Fi 1 Tx	1.283		0.061		0.017	1.361
	1.283			0.194		1.477
		1.335	0.061		0.017	1.413
		1.335		0.194		1.529
Edge 1, Wi-Fi 2 Tx	1.283		0.061	0.097		1.441
		1.335	0.061	0.097		1.493
Edge 3, Wi-Fi 2 Tx	0.400		0.097	0.545		1.042
		0.400	0.097	0.545		1.042
Edge 4, Wi-Fi 1 Tx	0.089		0.797		0.0089	0.895
		0.331	0.797		0.0089	1.137
Edge 4, Wi-Fi 2 Tx	0.089		0.797	0.057		0.943
		0.331	0.797	0.057		1.185

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

Conclusion:

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

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

Test Position	Data					Σ 1-g SAR (mW/g)
	W-CDMA Band V	W-CDMA Band II	WiFi 5.2 GHz Main	WiFi 5.2 GHz Aux	Bluetooth	
Rear, Wi-Fi 1 Tx	0.535		0.136		0.165	0.836
	0.535			0.149		0.684
		0.906	0.136		0.165	1.207
		0.906		0.149		1.055
Rear, Wi-Fi 2 Tx	0.535		0.136	0.149		0.820
		0.906	0.136	0.149		1.191
Edge 1, Wi-Fi 1 Tx	1.051		0.061		0.017	1.129
	1.051			0.194		1.245
		1.393	0.061		0.017	1.471
		1.393		0.194		1.587
Edge 1, Wi-Fi 2 Tx	1.051		0.061	0.097		1.209
		1.393	0.061	0.097		1.551
Edge 3, Wi-Fi 2 Tx	0.400		0.097	0.545		1.042
		0.400	0.097	0.545		1.042
Edge 4, Wi-Fi 1 Tx	0.063		0.797		0.0089	0.869
		0.363	0.797		0.0089	1.169
Edge 4, Wi-Fi 2 Tx	0.063		0.797	0.057		0.917
		0.363	0.797	0.057		1.217

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

Conclusion:

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

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

Test Position	Data					Σ 1-g SAR (mW/g)
	LTE Band 4	LTE Band 17	WiFi 5.2 GHz Main	WiFi 5.2 GHz Aux	Bluetooth	
Rear, Wi-Fi 1 Tx	1.206		0.136		0.165	1.507
	1.206			0.149		1.355
		0.679	0.136		0.165	0.980
		0.679		0.149		0.828
Rear, Wi-Fi 2 Tx	1.206		0.136	0.149		1.491
		0.679	0.136	0.149		0.964
Edge 1, Wi-Fi 1 Tx	1.289		0.061		0.017	1.367
	1.289			0.194		1.483
		1.341	0.061		0.017	1.419
		1.341		0.194		1.535
Edge 1, Wi-Fi 2 Tx	1.289		0.061	0.097		1.447
		1.341	0.061	0.097		1.499
Edge 3, Wi-Fi 2 Tx	0.400		0.097	0.545		1.042
		0.400	0.097	0.545		1.042
Edge 4, Wi-Fi 1 Tx	0.228		0.797		0.0089	1.034
		0.142	0.797		0.0089	0.948
Edge 4, Wi-Fi 2 Tx	0.228		0.797	0.057		1.082
		0.142	0.797	0.057		0.996

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

Conclusion:

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

13.7. Sum of the SAR for GSM & Wi-Fi 5.3 GHz Band

Test Position	Data					Σ 1-g SAR (mW/g)
	GSM850	GSM1900	WiFi 5.3 GHz Main	WiFi 5.3 GHz Aux	Bluetooth	
Rear, Wi-Fi 1 Tx	0.749		0.206		0.165	1.120
	0.749			0.254		1.003
		0.754	0.206		0.165	1.125
		0.754		0.254		1.008
Rear, Wi-Fi 2 Tx	0.749		0.206	0.254		1.209
		0.754	0.206	0.254		1.214
Edge 1, Wi-Fi 1 Tx	1.283		0.138		0.017	1.438
	1.283			0.196		1.479
		1.335	0.138		0.017	1.490
		1.335		0.196		1.531
Edge 1, Wi-Fi 2 Tx	1.283		0.138	0.104		1.525
		1.335	0.138	0.104		1.577
Edge 3, Wi-Fi 2 Tx	0.400		0.104	0.938		1.442
		0.400	0.104	0.938		1.442
Edge 4, Wi-Fi 1 Tx	0.089		1.19		0.0089	1.288
		0.331	1.19		0.0089	1.530
Edge 4, Wi-Fi 2 Tx	0.089		1.19	0.124		1.403
		0.331	1.19	0.124		1.645

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

SAR to Peak Location Separation Ratio (SPLSR)

Case #	Test Position	Worst-case combination			Σ 1-g SAR (mW/g)	Calculated distance (mm)	SPLSR	Figure
		GSM1900	WiFi 5.3 GHz Main	WiFi 5.3 GHz Aux				
1	Edge 4 Wi-Fi 2 Tx	0.331	1.190	0.124	1.645			
		0.331	1.190		1.521	48.8	0.038	1
		0.331		0.124	0.455	175.1	0.002	2
			1.190	0.124	1.314	127.6	0.012	3

Conclusion:

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

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

Test Position	Data					Σ 1-g SAR (mW/g)
	W-CDMA Band V	W-CDMA Band II	WiFi 5.3 GHz Main	WiFi 5.3 GHz Aux	Bluetooth	
Rear, Wi-Fi 1 Tx	0.535		0.206		0.165	0.906
	0.535			0.254		0.789
		0.906	0.206		0.165	1.277
		0.906		0.254		1.160
Rear, Wi-Fi 2 Tx	0.535		0.206	0.254		0.995
		0.906	0.206	0.254		1.366
Edge 1, Wi-Fi 1 Tx	1.051		0.138		0.017	1.206
	1.051			0.196		1.247
		1.393	0.138		0.017	1.548
		1.393		0.196		1.589
Edge 1, Wi-Fi 2 Tx	1.051		0.138	0.104		1.293
		1.393	0.138	0.104		1.635
Edge 3, Wi-Fi 2 Tx	0.400		0.104	0.938		1.442
		0.400	0.104	0.938		1.442
Edge 4, Wi-Fi 1 Tx	0.063		1.19		0.0089	1.262
		0.363	1.19		0.0089	1.562
Edge 4, Wi-Fi 2 Tx	0.063		1.19	0.124		1.377
		0.363	1.19	0.124		1.677

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

SAR to Peak Location Separation Ratio (SPLSR)

Case #	Test Position	Worst-case combination			Σ 1-g SAR (mW/g)	Calculated distance (mm)	SPLSR	Figure
		W-CDMA Band II	WiFi 5.3 GHz Main	WiFi 5.3 GHz Aux				
2	Edge 1 Wi-Fi 2 Tx	1.393	0.138	0.104	1.635			
		1.393	0.138		1.531	50.4	0.038	4
		1.393		0.104	1.497	181.3	0.010	5
			0.138	0.104	0.242	176.1	0.001	6
3	Edge 4 Wi-Fi 2 Tx	0.363	1.190	0.124	1.677			
		0.363	1.190		1.553	49.4	0.039	7
		0.363		0.124	0.487	175.8	0.002	8
			1.190	0.124	1.314	127.6	0.012	3

Conclusion:

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

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

Test Position	Data					Σ 1-g SAR (mW/g)
	LTE Band 4	LTE Band 17	WiFi 5.3 GHz Main	WiFi 5.3 GHz Aux	Bluetooth	
Rear, Wi-Fi 1 Tx	1.206		0.206		0.165	1.577
	1.206			0.254		1.460
		0.679	0.206		0.165	1.050
		0.679		0.254		0.933
Rear, Wi-Fi 2 Tx	1.206		0.206	0.254		1.666
		0.679	0.206	0.254		1.139
Edge 1, Wi-Fi 1 Tx	1.289		0.138		0.017	1.444
	1.289			0.196		1.485
		1.341	0.138		0.017	1.496
		1.341		0.196		1.537
Edge 1, Wi-Fi 2 Tx	1.289		0.138	0.104		1.531
		1.341	0.138	0.104		1.583
Edge 3, Wi-Fi 2 Tx	0.400		0.104	0.938		1.442
		0.400	0.104	0.938		1.442
Edge 4, Wi-Fi 1 Tx	0.228		1.19		0.0089	1.427
		0.142	1.19		0.0089	1.341
Edge 4, Wi-Fi 2 Tx	0.228		1.19	0.124		1.542
		0.142	1.19	0.124		1.456

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

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 4	WiFi 5.3 GHz Main	WiFi 5.3 GHz Aux				
4	Rear Wi-Fi 2 Tx	1.206	0.206	0.254	1.666			
		1.206	0.206		1.412	70.3	0.024	9
		1.206		0.254	1.460	177.4	0.010	9
			0.206	0.254	0.460	149.5	0.002	9

Conclusion:

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

13.10. Sum of the SAR for GSM & Wi-Fi 5.5 GHz Band

Test Position	Data					Σ 1-g SAR (mW/g)
	GSM850	GSM1900	WiFi 5.5 GHz Main	WiFi 5.5 GHz Aux	Bluetooth	
Rear, Wi-Fi 1 Tx	0.749		0.220		0.165	1.134
	0.749			0.229		0.978
		0.754	0.220		0.165	1.139
		0.754		0.229		0.983
Rear, Wi-Fi 2 Tx	0.749		0.220	0.229		1.198
		0.754	0.220	0.229		1.203
Edge 1, Wi-Fi 1 Tx	1.283		0.082		0.017	1.382
	1.283			0.200		1.483
		1.335	0.082		0.017	1.434
		1.335		0.200		1.535
Edge 1, Wi-Fi 2 Tx	1.283		0.082	0.113		1.478
		1.335	0.082	0.113		1.530
Edge 3, Wi-Fi 2 Tx	0.400		0.113	1.030		1.543
		0.400	0.113	1.030		1.543
Edge 4, Wi-Fi 1 Tx	0.089		1.099		0.0089	1.197
		0.331	1.099		0.0089	1.439
Edge 4, Wi-Fi 2 Tx	0.089		1.099	0.094		1.282
		0.331	1.099	0.094		1.524

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

Conclusion:

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

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

Test Position	Data					Σ 1-g SAR (mW/g)
	W-CDMA Band V	W-CDMA Band II	WiFi 5.5 GHz Main	WiFi 5.5 GHz Aux	Bluetooth	
Rear, Wi-Fi 1 Tx	0.535		0.220		0.165	0.920
	0.535			0.229		0.764
		0.906	0.220		0.165	1.291
		0.906		0.229		1.135
Rear, Wi-Fi 2 Tx	0.535		0.220	0.229		0.984
		0.906	0.220	0.229		1.355
Edge 1, Wi-Fi 1 Tx	1.051		0.082		0.017	1.150
	1.051			0.200		1.251
		1.393	0.082		0.017	1.492
		1.393		0.200		1.593
Edge 1, Wi-Fi 2 Tx	1.051		0.082	0.113		1.246
		1.393	0.082	0.113		1.588
Edge 3, Wi-Fi 2 Tx	0.400		0.113	1.03		1.543
		0.400	0.113	1.03		1.543
Edge 4, Wi-Fi 1 Tx	0.063		1.099		0.0089	1.171
		0.363	1.099		0.0089	1.471
Edge 4, Wi-Fi 2 Tx	0.063		1.099	0.094		1.256
		0.363	1.099	0.094		1.556

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

Conclusion:

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

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

Test Position	Data					Σ 1-g SAR (mW/g)
	LTE Band 4	LTE Band 17	WiFi 5.5 GHz Main	WiFi 5.5 GHz Aux	Bluetooth	
Rear, Wi-Fi 1 Tx	1.206		0.220		0.165	1.591
	1.206			0.229		1.435
		0.679	0.220		0.165	1.064
		0.679		0.229		0.908
Rear, Wi-Fi 2 Tx	1.206		0.220	0.229		1.655
		0.679	0.220	0.229		1.128
Edge 1, Wi-Fi 1 Tx	1.289		0.082		0.017	1.388
	1.289			0.200		1.489
		1.341	0.082		0.017	1.440
		1.341		0.200		1.541
Edge 1, Wi-Fi 2 Tx	1.289		0.082	0.113		1.484
		1.341	0.082	0.113		1.536
Edge 3, Wi-Fi 2 Tx	0.400		0.113	1.03		1.543
		0.400	0.113	1.03		1.543
Edge 4, Wi-Fi 1 Tx	0.228		1.099		0.0089	1.336
		0.142	1.099		0.0089	1.250
Edge 4, Wi-Fi 2 Tx	0.228		1.099	0.094		1.421
		0.142	1.099	0.094		1.335

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

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 4	WiFi 5.5 GHz Main	WiFi 5.5 GHz Aux				
5	Rear Wi-Fi 2 Tx	1.206	0.220	0.229	1.655			
		1.206	0.220		1.426	68.2	0.025	10
		1.206		0.229	1.435	183.1	0.009	10
			0.220	0.229	0.449	150.4	0.002	10

Conclusion:

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

13.13. Sum of the SAR for GSM & Wi-Fi 5.8 GHz Band

Test Position	Data					Σ 1-g SAR (mW/g)
	GSM850	GSM1900	WiFi 5.8 GHz Main	WiFi 5.8 GHz Aux	Bluetooth	
Rear, Wi-Fi 1 Tx	0.749		0.090		0.165	1.004
	0.749			0.148		0.897
		0.754	0.090		0.165	1.009
		0.754		0.148		0.902
Rear, Wi-Fi 2 Tx	0.749		0.090	0.148		0.987
		0.754	0.090	0.148		0.992
Edge 1, Wi-Fi 1 Tx	1.283		0.038		0.017	1.338
	1.283			0.205		1.488
		1.335	0.038		0.017	1.390
		1.335		0.205		1.540
Edge 1, Wi-Fi 2 Tx	1.283		0.038	0.102		1.423
		1.335	0.038	0.102		1.475
Edge 3, Wi-Fi 2 Tx	0.400		0.102	0.754		1.256
		0.400	0.102	0.754		1.256
Edge 4, Wi-Fi 1 Tx	0.089		0.414		0.0089	0.512
		0.331	0.414		0.0089	0.754
Edge 4, Wi-Fi 2 Tx	0.089		0.414	0.043		0.546
		0.331	0.414	0.043		0.788

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

Conclusion:

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

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

Test Position	Data					Σ 1-g SAR (mW/g)
	W-CDMA Band V	W-CDMA Band II	WiFi 5.8 GHz Main	WiFi 5.8 GHz Aux	Bluetooth	
Rear, Wi-Fi 1 Tx	0.535		0.090		0.165	0.790
	0.535			0.148		0.683
		0.906	0.090		0.165	1.161
		0.906		0.148		1.054
Rear, Wi-Fi 2 Tx	0.535		0.090	0.148		0.773
		0.906	0.090	0.148		1.144
Edge 1, Wi-Fi 1 Tx	1.051		0.038		0.017	1.106
	1.051			0.205		1.256
		1.393	0.038		0.017	1.448
		1.393		0.205		1.598
Edge 1, Wi-Fi 2 Tx	1.051		0.038	0.102		1.191
		1.393	0.038	0.102		1.533
Edge 3, Wi-Fi 2 Tx	0.400		0.102	0.754		1.256
		0.400	0.102	0.754		1.256
Edge 4, Wi-Fi 1 Tx	0.063		0.414		0.0089	0.486
		0.363	0.414		0.0089	0.786
Edge 4, Wi-Fi 2 Tx	0.063		0.414	0.043		0.520
		0.363	0.414	0.043		0.820

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

SAR to Peak Location Separation Ratio (SPLSR)

Case #	Test Position	Worst-case combination				Σ 1-g SAR (mW/g)	Calculated distance (mm)	SPLSR	Figure
		W-CDMA Band II	WiFi 5.8 GHz Main	WiFi 5.8 GHz Aux	Bluetooth				
4	Edge 1 Wi-Fi 1 Tx	1.393		0.205		1.598	181.3	0.011	5

Conclusion:

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

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

Test Position	Data					Σ 1-g SAR (mW/g)
	LTE Band 4	LTE Band 17	WiFi 5.8 GHz Main	WiFi 5.8 GHz Aux	Bluetooth	
Rear, Wi-Fi 1 Tx	1.206		0.090		0.165	1.461
	1.206			0.148		1.354
		0.679	0.090		0.165	0.934
		0.679		0.148		0.827
Rear, Wi-Fi 2 Tx	1.206		0.090	0.148		1.444
		0.679	0.090	0.148		0.917
Edge 1, Wi-Fi 1 Tx	1.289		0.038		0.017	1.344
	1.289			0.205		1.494
		1.341	0.038		0.017	1.396
		1.341		0.205		1.546
Edge 1, Wi-Fi 2 Tx	1.289		0.038	0.102		1.429
		1.341	0.038	0.102		1.481
Edge 3, Wi-Fi 2 Tx	0.400		0.102	0.754		1.256
		0.400	0.102	0.754		1.256
Edge 4, Wi-Fi 1 Tx	0.228		0.414		0.0089	0.651
		0.142	0.414		0.0089	0.565
Edge 4, Wi-Fi 2 Tx	0.228		0.414	0.043		0.685
		0.142	0.414	0.043		0.599

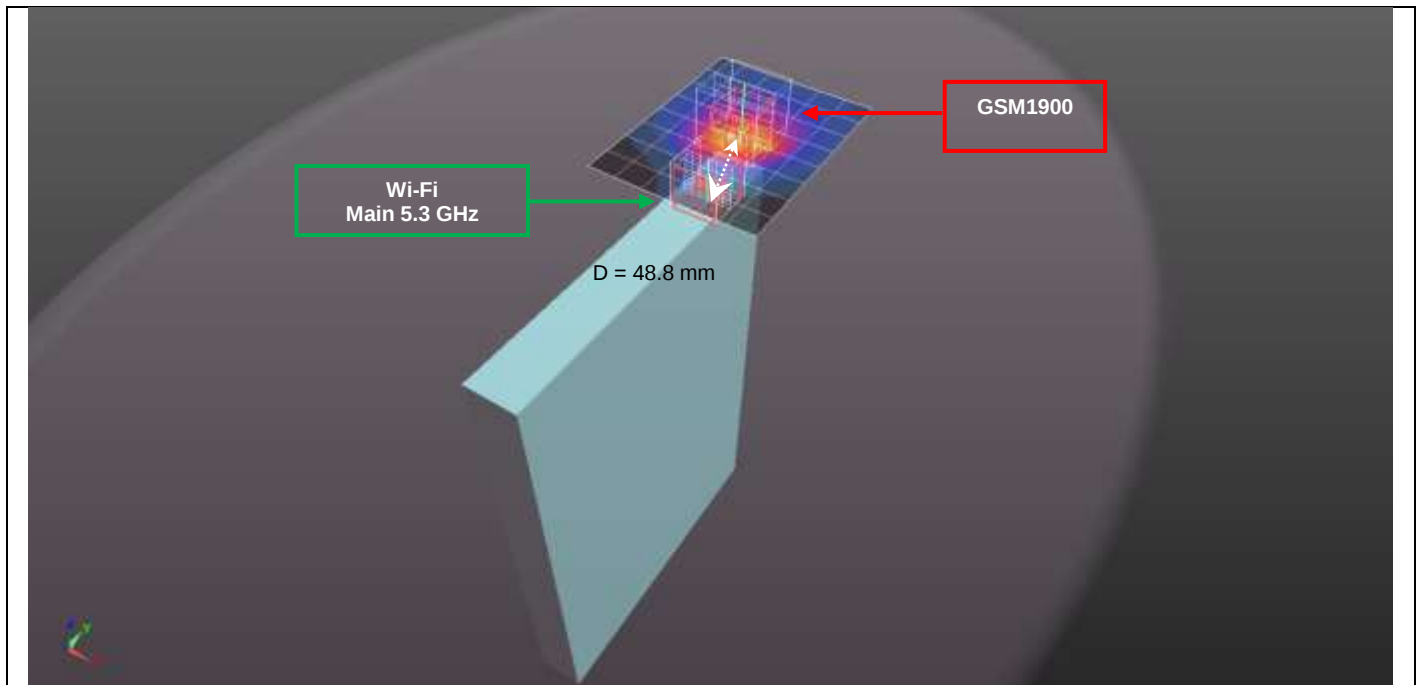
1. As there were only estimated values for edge 2 it was not assessed as it is inherently compliant
2. Values shaded green are estimated SAR

Conclusion:

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

13.16. Separation Distance Calculations and Figures

Figure (1)



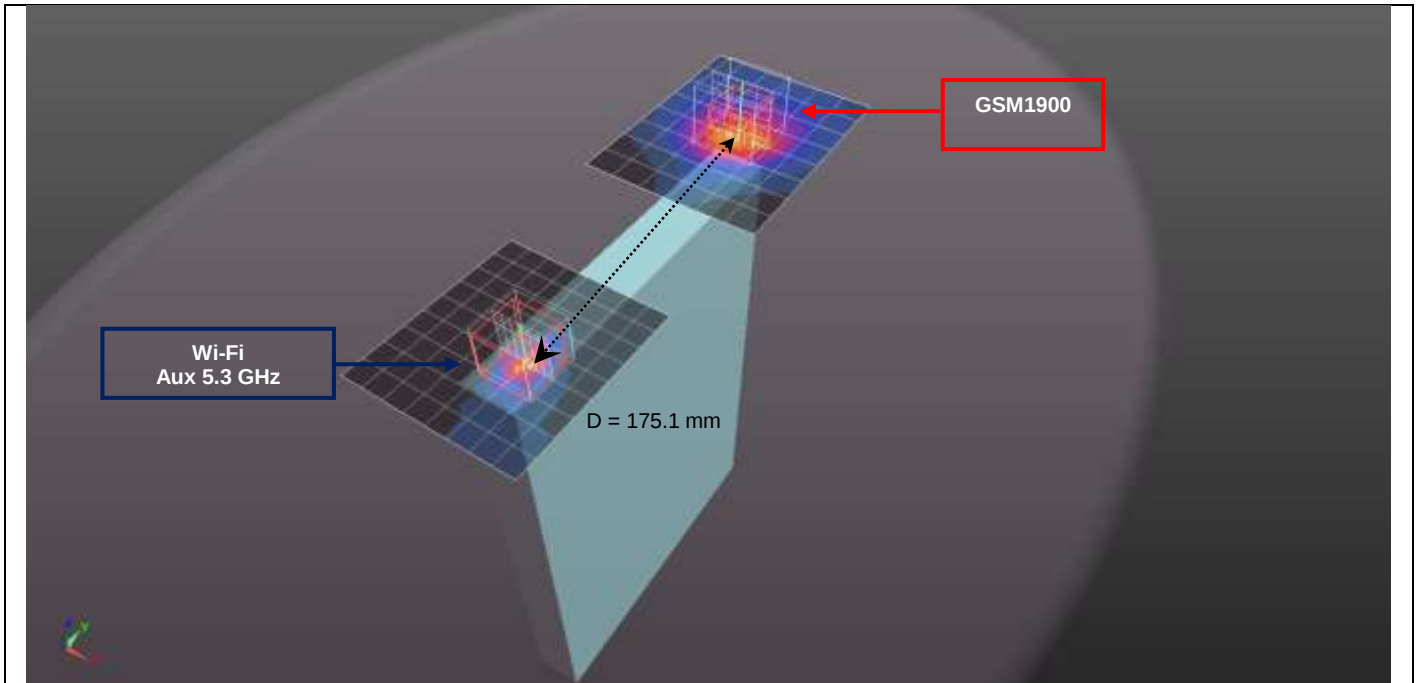
Mode	Peak SAR mW/g	X m	Y m	Z m
GSM1900	0.393	-0.018	0.0873	-0.185
Wi-Fi Main 5.3 GHz	4.92	-0.001	0.0416	-0.184

d: Calculated distance (mm)
48.8

The Peak Location Separation Distance is computed by using the formula below:

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

Figure (2)

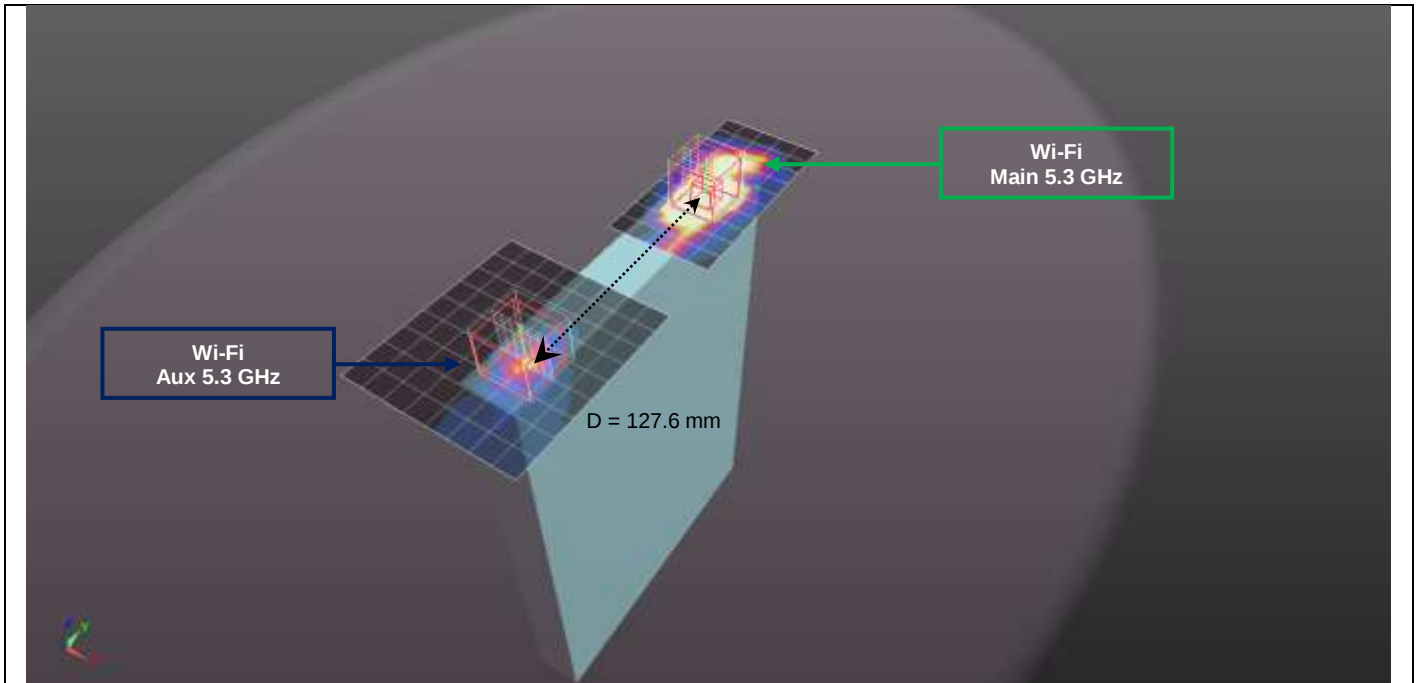


Mode	Peak SAR	X	Y	Z
	mW/g	m	m	m
GSM1900	0.393	-0.018	0.0873	-0.185
Wi-Fi Aux 5.3 GHz	0.781	0.0095	-0.0856	-0.183
d: Calculated distance (mm)				
175.1				

The Peak Location Separation Distance is computed by using the formula below:

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

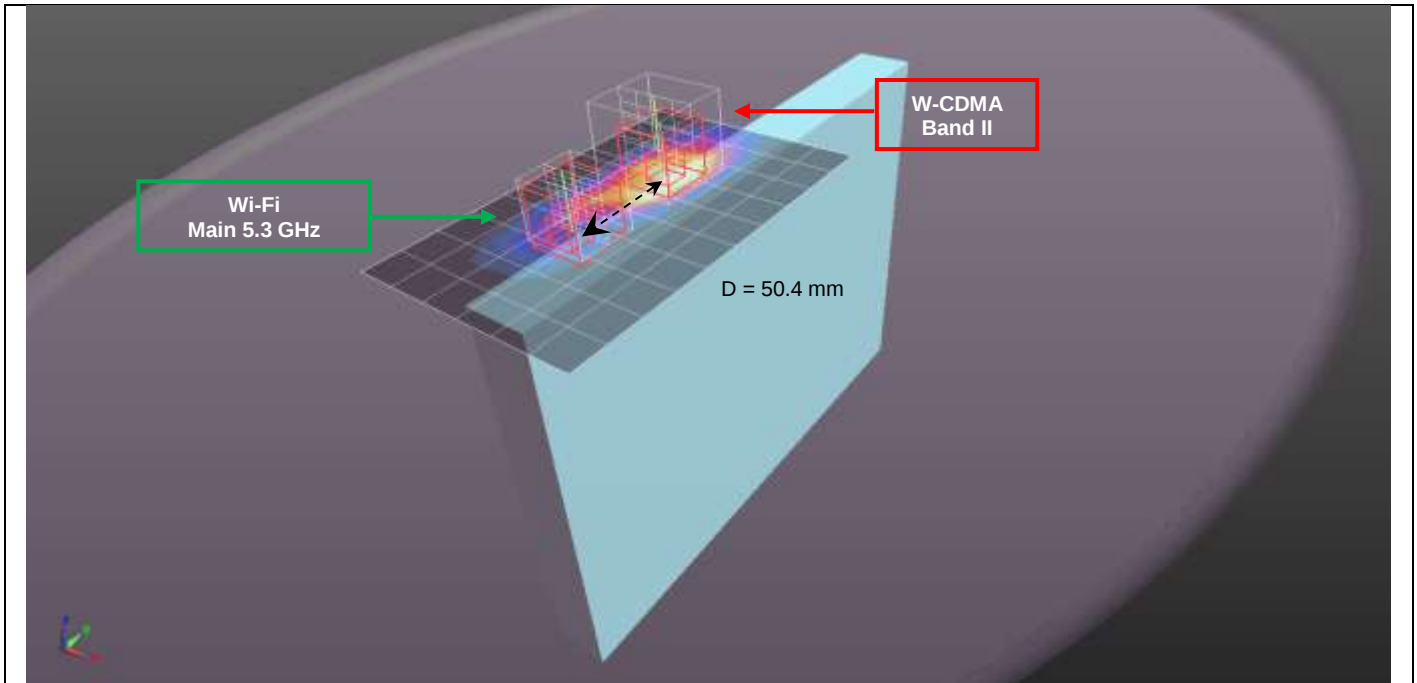
Figure (3)



Mode	Peak SAR	X	Y	Z
	mW/g	m	m	m
Wi-Fi Main 5.3 GHz	4.92	-0.001	0.0416	-0.184
Wi-Fi Aux 5.3 GHz	0.781	0.0095	-0.0856	-0.183
d: Calculated distance (mm)				
127.6				

The Peak Location Separation Distance is computed by using the formula below:
 $\text{SQRT}((X1-X2)^2+(Y1-Y2)^2+(Z1-Z2)^2)$

Figure (4)



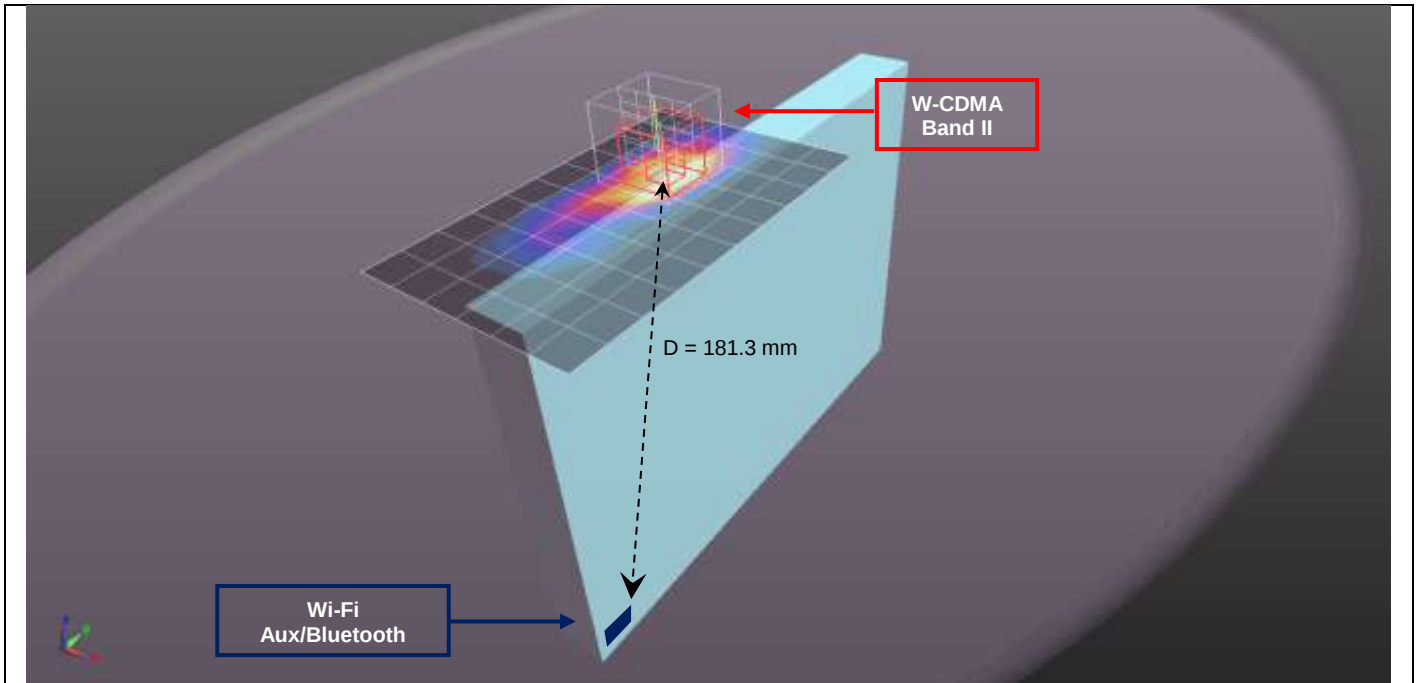
Mode	Peak SAR	X	Y	Z
	mW/g	m	m	m
W-CDMA Band II	2.43	-0.0126	-0.0463	-0.184
Wi-Fi Main 5.3 GHz	0.458	-0.0104	-0.0966	-0.183

d: Calculated distance (mm)
50.4

The Peak Location Separation Distance is computed by using the formula below:

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

Figure (5)



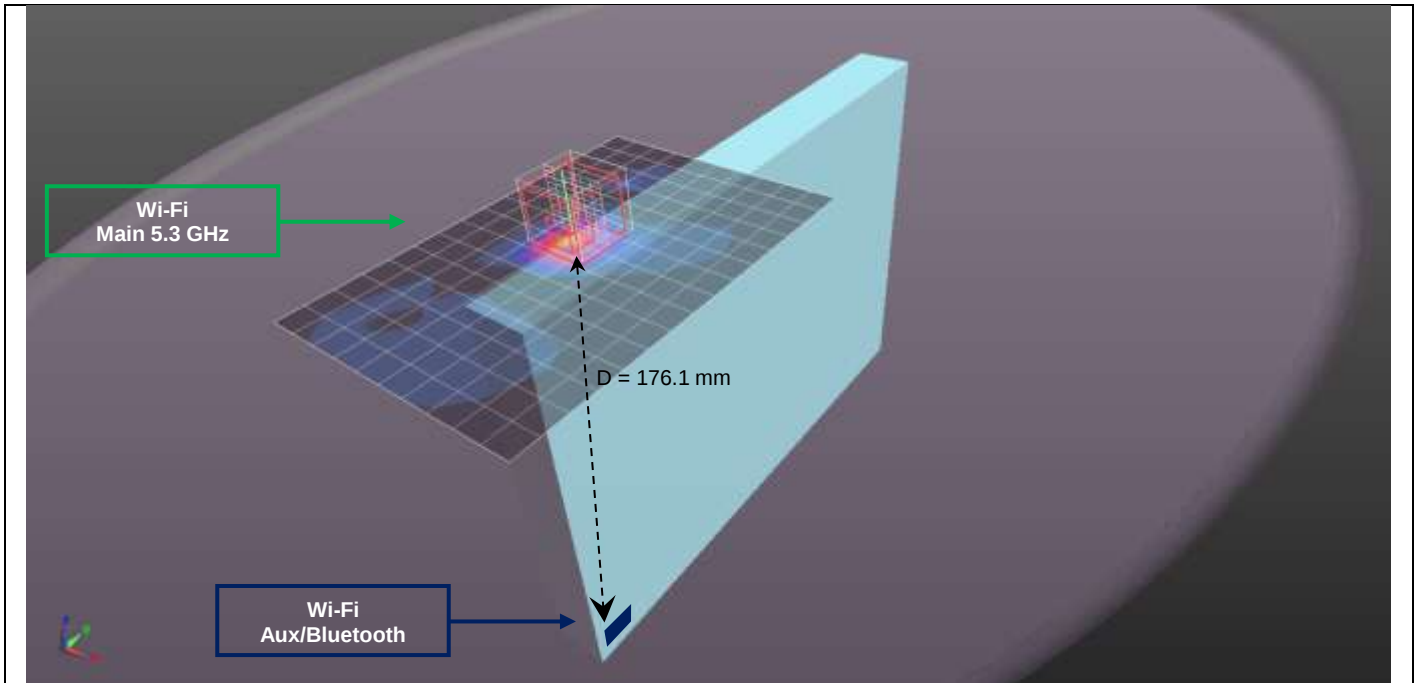
Mode	Peak SAR	X	Y	Z
	mW/g	m	m	m
W-CDMA Band II	2.43	-0.0126	-0.0463	-0.184
Wi-Fi Aux/Bluetooth		-0.0062	-0.0933	-0.359

d: Calculated distance (mm)	
181.3	

The Peak Location Separation Distance is computed by using the formula below:

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

Figure (6)



Mode	Peak SAR	X	Y	Z
	mW/g	m	m	m
Wi-Fi Main 5.3 GHz	0.458	-0.0104	-0.0966	-0.183
Wi-Fi Aux/Bluetooth		-0.0062	-0.0933	-0.359

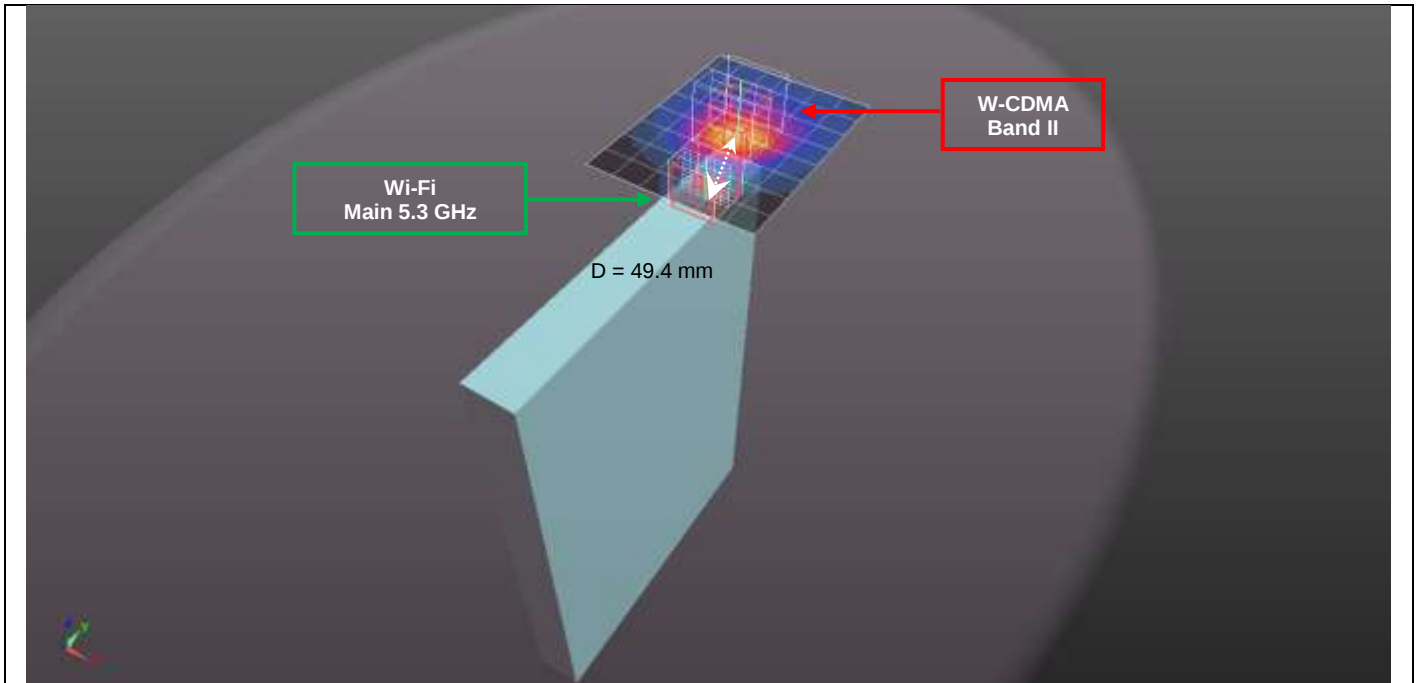
d: Calculated distance (mm)

176.1

The Peak Location Separation Distance is computed by using the formula below:

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

Figure (7)

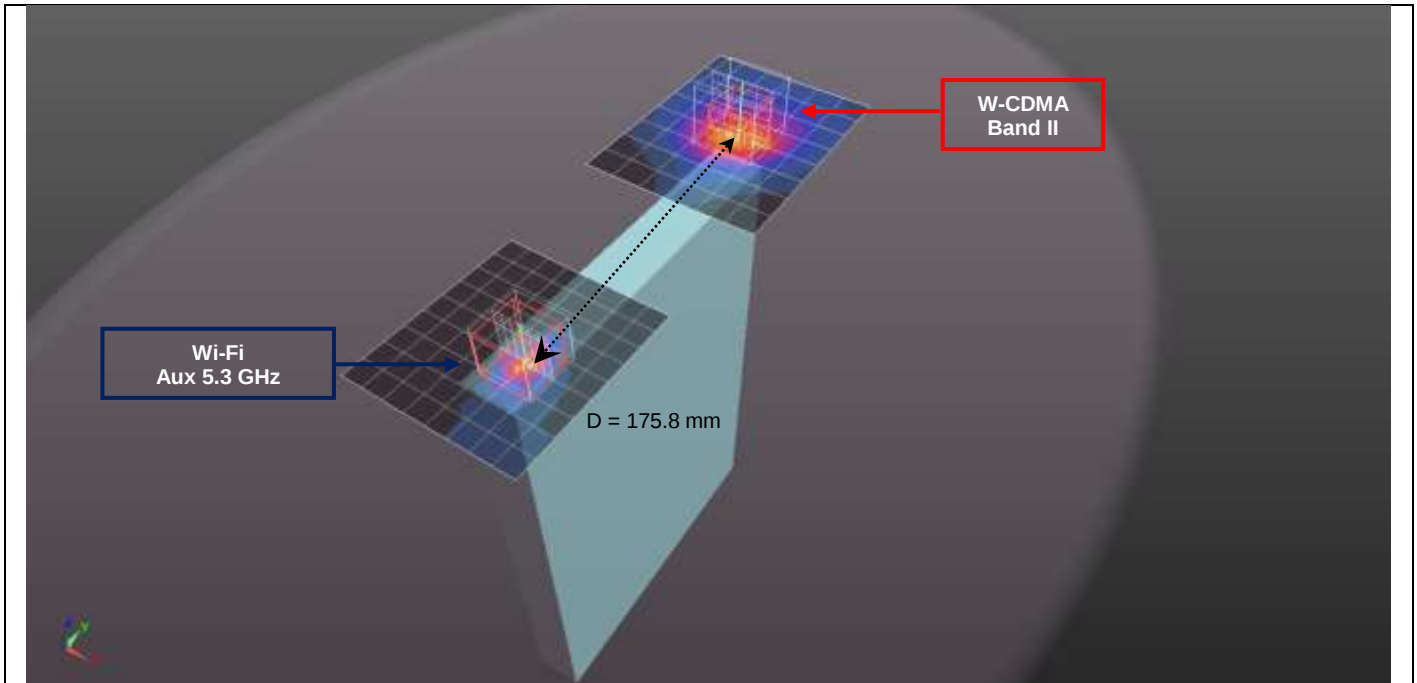


Mode	Peak SAR	X	Y	Z
	mW/g	m	m	m
W-CDMA Band II	0.485	-0.0176	0.0881	-0.185
Wi-Fi Main 5.3 GHz	4.92	-0.001	0.0416	-0.184
d: Calculated distance (mm)				
49.4				

The Peak Location Separation Distance is computed by using the formula below:

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

Figure (8)

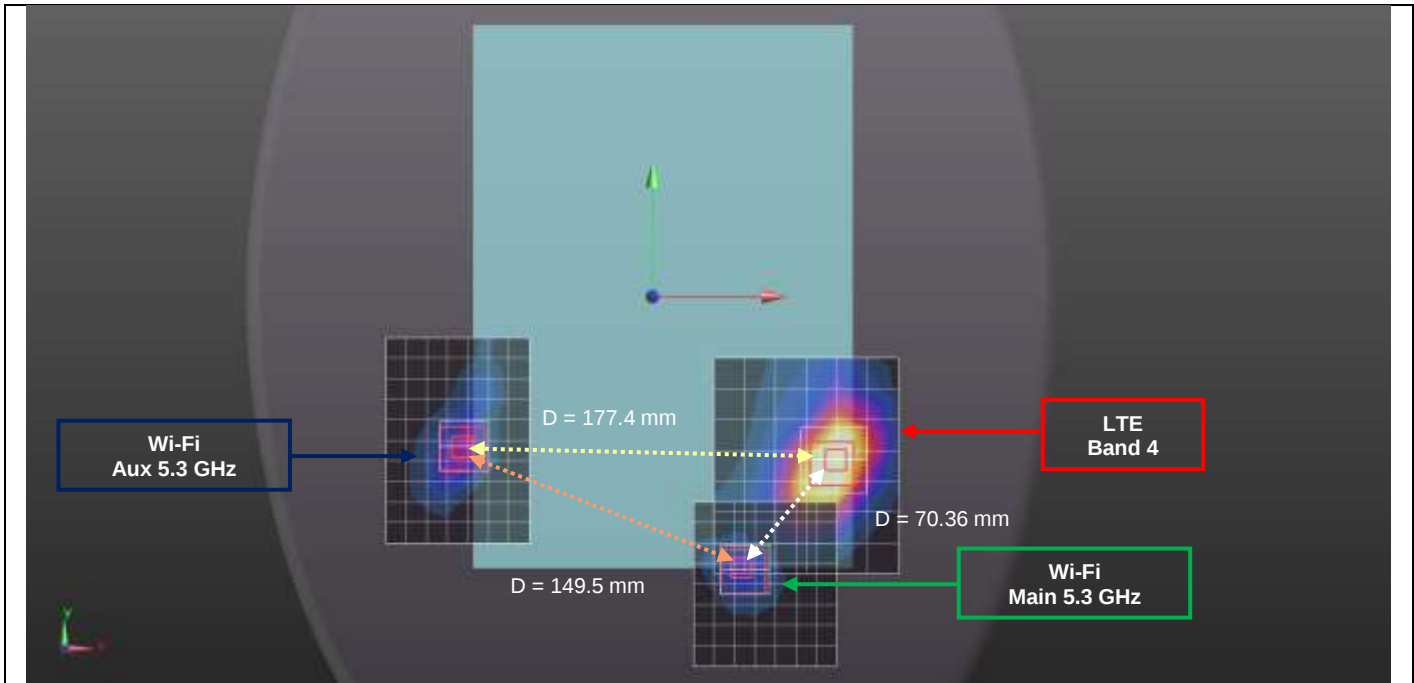


Mode	Peak SAR	X	Y	Z
	mW/g	m	m	m
W-CDMA Band II	0.485	-0.0176	0.0881	-0.185
Wi-Fi Aux 5.3 GHz	0.781	0.0095	-0.0856	-0.183
d: Calculated distance (mm)				
175.8				

The Peak Location Separation Distance is computed by using the formula below:

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

Figure (9)



Mode	Peak SAR mW/g	X m	Y m	Z m
LTE Band 4	1.89	0.0901	-0.0795	-0.183
Wi-Fi Main 5.3 GHz	0.75	0.0434	-0.132	-0.182

d: Calculated distance (mm)
70.3

Mode	Peak SAR mW/g	X m	Y m	Z m
LTE Band 4	0.485	-0.0176	0.0881	-0.185
Wi-Fi Aux 5.3 GHz	0.854	-0.0936	-0.0722	-0.182

d: Calculated distance (mm)
177.4

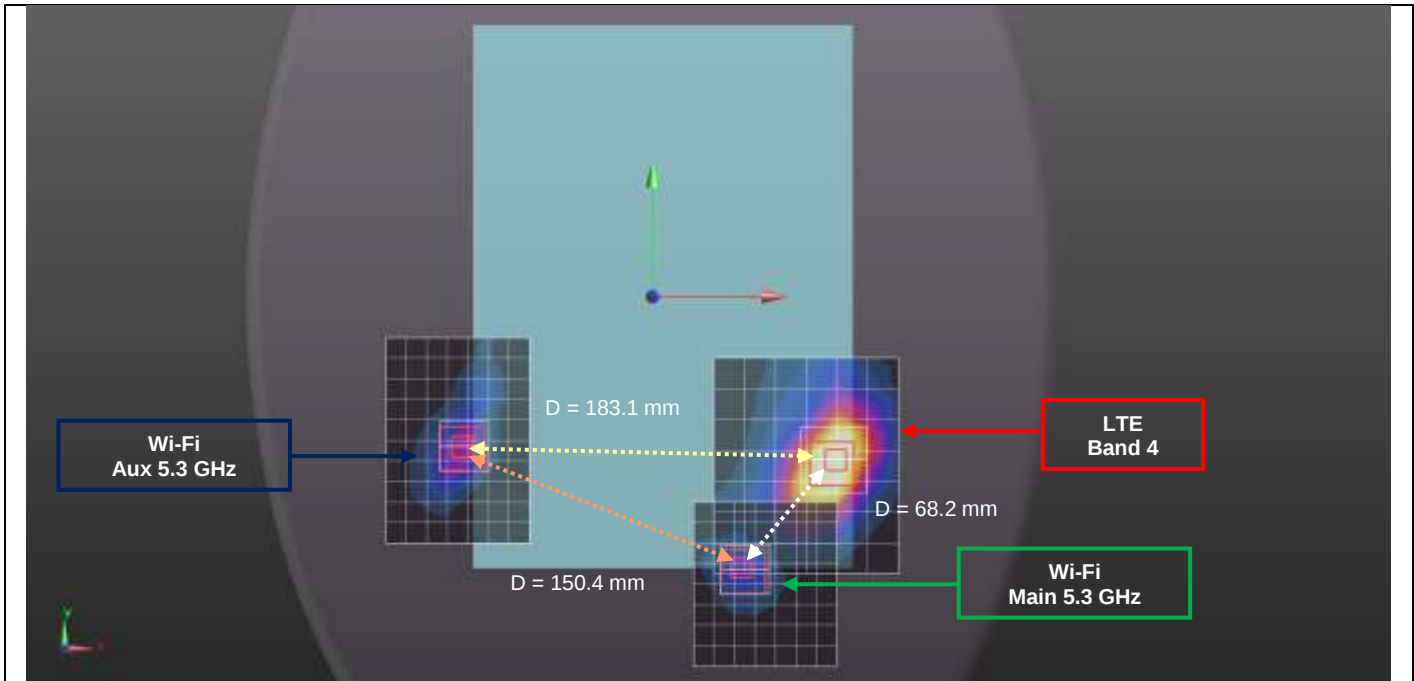
Mode	Peak SAR mW/g	X m	Y m	Z m
Wi-Fi Main 5.3 GHz	0.75	0.0434	-0.132	-0.182
Wi-Fi Aux 5.3 GHz	0.854	-0.0936	-0.0722	-0.182

d: Calculated distance (mm)
149.5

The Peak Location Separation Distance is computed by using the formula below:

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

Figure (10)



Mode	Peak SAR mW/g	X m	Y m	Z m
LTE Band 4	1.89	0.0901	-0.0795	-0.183
Wi-Fi Main 5.5 GHz	0.792	0.0568	-0.139	-0.181

d: Calculated distance (mm)
68.2

Mode	Peak SAR mW/g	X m	Y m	Z m
LTE Band 4	0.485	-0.0176	0.0881	-0.185
Wi-Fi Aux 5.5 GHz	0.791	-0.0828	-0.083	-0.182

d: Calculated distance (mm)
183.1

Mode	Peak SAR mW/g	X m	Y m	Z m
Wi-Fi Main 5.5 GHz	0.792	0.0568	-0.139	-0.181
Wi-Fi Aux 5.5 GHz	0.791	-0.0828	-0.083	-0.182

d: Calculated distance (mm)
150.4

The Peak Location Separation Distance is computed by using the formula below:

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

14. Appendixes

Refer to separated files for the following appendixes.

- 14.1. System Performance Check Plots**
- 14.2. SAR Test Plots for GSM850**
- 14.3. SAR Test Plots for GSM1900**
- 14.4. SAR Test Plots for W-CDMA Band V**
- 14.5. SAR Test Plots for W-CDMA Band II**
- 14.6. SAR Test Plots for LTE Band 4**
- 14.7. SAR Test Plots for LTE Band 17**
- 14.8. SAR Test Plots for Repeated Test**
- 14.9. Calibration Certificate for E-Field Probe EX3DV4 - SN 3686**
- 14.10. Calibration Certificate for E-Field Probe EX3DV4 - SN 3749**
- 14.11. Calibration Certificate for E-Field Probe EX3DV4 - SN 3871**
- 14.12. Calibration Certificate for E-Field Probe EX3DV4 - SN 3885**
- 14.13. Calibration Certificate for D750V3 - SN 1071**
- 14.14. Calibration Certificate for D835V2 - SN 4d117**
- 14.15. Calibration Certificate for D1750V2 - SN 1077**
- 14.16. Calibration Certificate for D1900V2 - SN 5d140**
- 14.17. Calibration Certificate for D1900V2 - SN 5d043**
- 14.18. Calibration Certificate for D750V3 - SN 1019**