SAR EVALUATION REPORT

FCC 47 CFR § 2.1093
IEEE Std 1528-2013

For
WCDMA/LTE Tablet + BT/BLE and DTS/UNII a/b/g/n/ac and ANT+

FCC ID: A3LSMT818W
Model Name: SM-T818W

Report Number: 16K23786-S1V1
Issue Date: 8/30/2016

Prepared for
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ACCREDITED

TL-637

Revision History

Rev.	Date	Revisions	Revised By
V1	8/30/2016	Initial Issue	Sunghoon Kim

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1. Attestation of Test Results

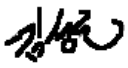
Applicant Name	SAMSUNG ELECTRONICS CO.,LTD.			
FCC ID	A3LSMT818W			
Model Name	SM-T818W			
Applicable Standards	FCC 47 CFR § 2.1093 Published RF exposure KDB procedures IEEE Std 1528-2013			
Exposure Category	SAR Limits (W/Kg)			
	Peak spatial-average(1g of tissue)			
General population / Uncontrolled exposure	1.6			
RF Exposure Conditions	Equipment Class - Highest Reported SAR (W/kg)			
	Licensed	DTS	U-NII	DSS (BT)
Standalone	1.056	1.001	1.092	0.535
Simultaneous TX	1.591	1.591	1.208	1.591
Date Tested	Licensed, DTS and U-NII(Max Power), BT : 6/24/2016 to 8/19/2016 Licensed(LTE Band 7, 13, 17) : 7/29/2016 to 8/26/2016			
Test Results	Pass			

***Note:** The WWAN (WCDMA Band II, V, LTE Band 2, 4, 5, 12), WLAN (DTS, U-NII) and Bluetooth SAR measurement results from the original filling can be found in SAR test report 16K23795-S1V1, FCC ID A3LSMT818T.

The WWAN, WLAN antennas and surrounding circuitry is the same between these two units, and tune up power targets are identical for WWAN, WLAN operations. Therefore, SAR data for WWAN, WLAN from the original filling was used for this model. Spot checks for WWAN, WLAN were performed to ensure that the SAR measurements for both devices are the same.

UL Korea, Ltd. 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 Korea, Ltd. 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 Korea, Ltd. and all revisions are duly noted in the revisions section. Any alteration of this document not carried out by UL Korea, Ltd. 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 IAS, any agency of the Federal Government, or any agency of any government.

Approved & Released By:	Prepared By:
	
Justin Park Senior Engineer UL Korea, Ltd. Suwon Laboratory	Sunghoon Kim Laboratory Engineer UL Korea, Ltd. Suwon Laboratory

1.1. Introduction Of Test Data Reuse

This report referenced from the FCC ID: A3LSMT818T (WCDMA Band II, V, LTE Band 2, 4, 5, 12, DTS, U-NII, Bluetooth (FCC 47 CFR § 2.1093, IEEE 1528-2013).

And the applicant takes full responsibility that the test data as referenced in this report represent compliance for this FCC ID..

1.2. Difference

The WWAN (WCDMA Band II, V, LTE Band 2, 4, 5, 12), WLAN (DTS, U-NII) and Bluetooth SAR measurement results from the original filling can be found in SAR test report 16K23795-S1V1, FCC ID A3LSMT818T.

The WWAN, WLAN antennas and surrounding circuitry is the same between these two units, and tune up power targets are identical for WWAN, WLAN operations. Therefore, SAR data for WWAN, WLAN from the original filling was used for this model. Spot checks for WWAN, WLAN were performed to ensure that the SAR measurements for both devices are the same.

1.3. Spot Check Verification Data

Band		Antenna	RF Exposure Conditions	Mode	Dist. (mm)	Test Position	Ch #.	Freq. (MHz)	RB Allocation	RB offest	Original Model(FCC ID : A3LSMT818T)				Spot Check Model(FCC ID : A3LSMT818W)				Deviation
											Power (dBm)		1-g SAR (W/kg)		Power (dBm)		1-g SAR (W/kg)		
											Tune-up limit	Meas.	Meas.	Scaled	Tune-up limit	Meas.	Meas.	Scaled	
WCDMA	Band II	Main	Standalone	Rel 99 RMC	0	Rear	9262	1852.4	N/A	N/A	14.5	13.5	0.841	1.056	14.5	14.1	0.905	0.992	-6%
WCDMA	Band V	Main	Standalone	Rel 99 RMC	0	Edge 1	4183	836.6	N/A	N/A	17.0	15.6	0.630	0.862	17.0	16.6	0.702	0.773	-10%
LTE	Band 2	Main	Standalone	QPSK	0	Rear	19100	1900.0	50	24	15.0	14.4	0.793	0.908	15.0	13.9	0.812	1.041	15%
	Band 4	Main	Standalone	QPSK	0	Edge 4	20175	1732.5	1	49	25.0	24.5	0.819	0.910	25.0	24.4	0.957	1.099	21%
	Band 5	Main	Standalone	QPSK	0	Edge 1	20525	836.6	50	0	17.5	16.8	0.788	0.921	17.5	17.2	0.884	0.949	3%
	Band 12	Main	Standalone	QPSK	0	Edge 1	23095	707.5	1	25	18.5	17.7	0.750	0.894	18.5	18.0	0.816	0.909	2%
DTS	2.4GHz	Ant.1	Standalone	802.11b	0	Rear	6	2437.0	N/A	N/A	12.5	12.5	0.979	0.979	12.5	11.7	0.719	0.866	-11%
		Ant.2	Standalone	802.11b	0	Rear	6	2437.0	N/A	N/A	12.5	12.3	0.949	1.001	12.5	12.1	0.683	0.744	-26%
U-NII-2A	5.3GHz	Ant.1	Standalone	802.11n (HT40)	0	Edge 2	54	5270.0	N/A	N/A	17.5	17.1	0.153	0.167	17.5	16.6	0.158	0.197	18%
		Ant.2	Standalone	802.11ac (VHT80)	0	Rear	58	5290.0	N/A	N/A	9.5	9.1	0.711	0.785	9.5	9.4	0.649	0.661	-16%
U-NII-2C	5.6GHz	Ant.1	Standalone	802.11ac (VHT80)	0	Rear	106	5530.0	N/A	N/A	9.5	9.0	0.121	0.135	9.5	8.7	0.134	0.161	20%
		Ant.2	Standalone	802.11n (HT40)	0	Edge 3	118	5590.0	N/A	N/A	17.5	17.3	1.040	1.092	17.5	17.2	0.847	0.918	-16%
U-NII-3C	5.8GHz	Ant.1	Standalone	802.11ac (VHT80)	0	Rear	138	5690.0	N/A	N/A	9.5	9.3	0.128	0.135	9.5	9.1	0.126	0.139	3%
		Ant.2	Standalone	802.11n (HT40)	0	Rear	138	5690.0	N/A	N/A	9.5	8.9	0.865	0.991	9.5	9.5	0.770	0.770	-22%
Bluetooth	2.4GHz	Ant.1	Standalone	GFSK	0	Rear	39	2441.0	N/A	N/A	10.5	9.9	0.471	0.535	10.5	10.4	0.602	0.617	15%

Note(s):

Fer KDB 865664 D01, The expanded SAR measurement uncertainty must be ≤ 30%, for a confidence interval of k = 2

1.4. Reference Detail

Reference application that contains the reused reference data.:

Equipment Class	Reference FCC ID	Type Grant/Permissive Change	Reference Application	Folder Test/RF Exposure	Report Tittle / Section
DTS	A3LSMT818T	Grant	16K23624-E1V1	Test	FCC Report DTS WLAN / All sections
			16K23795-S1V1	RF Exposure	FCC Report SAR / Section 9.3, 10.8
DSS	A3LSMT818T	Grant	16K23624-E3V1	Test	FCC Report BT / All sections
			16K23795-S1V1	RF Exposure	FCC Report SAR / Section 9.5, 10.10
NII	A3LSMT818T	Grant	16K23624-E4V1	Test	FCC Report UNII DFS WLAN / All sections
			16K23795-S1V1	RF Exposure	FCC Report SAR / Section 9.4, 10.9
DXX	A3LSMT818T	Grant	16K23624-E5V1	Test	FCC Report ANT+ / All sections
PCB	A3LSMT818T	Grant	16K23624-E6V1	Test	FCC Report WWAN / All sections for WCDMA B2, B5 LTE B2/B4/B5/B12
			16K23795-S1V1	RF Exposure	FCC Report SAR / Section for WCDMA B2 (9.1, 10.1), WCDMA B5 (9.1, 10.3), LTE B2 (9.2, 10.4), LTE B4 (9.2, 10.5), LTE B5 (9.2, 10.6), LTE B12 (9.2, 10.7)

2. Test Specification, Methods and Procedures

The tests documented in this report were performed in accordance with FCC 47 CFR § 2.1093, IEEE STD 1528-2013, the following FCC Published RF exposure KDB procedures:

- 248227 D01 802.11 Wi-Fi SAR v02r02
- 447498 D01 General RF Exposure Guidance v06
- 616217 D04 SAR for laptop and tablets v01r02
- 690783 D01 SAR Listings on Grants v01r03
- 865664 D01 SAR measurement 100 MHz to 6 GHz v01r04
- 865664 D02 RF Exposure Reporting v01r02
- 941225 D01 3G SAR Procedures v03r01
- 941225 D05 SAR for LTE Devices v02r05
- 941225 D05A LTE Rel.10 KDB Inquiry Sheet v01r02
- 941225 D06 Hotspot Mode v02r01

3. Facilities and Accreditation

The test sites and measurement facilities used to collect data are located at

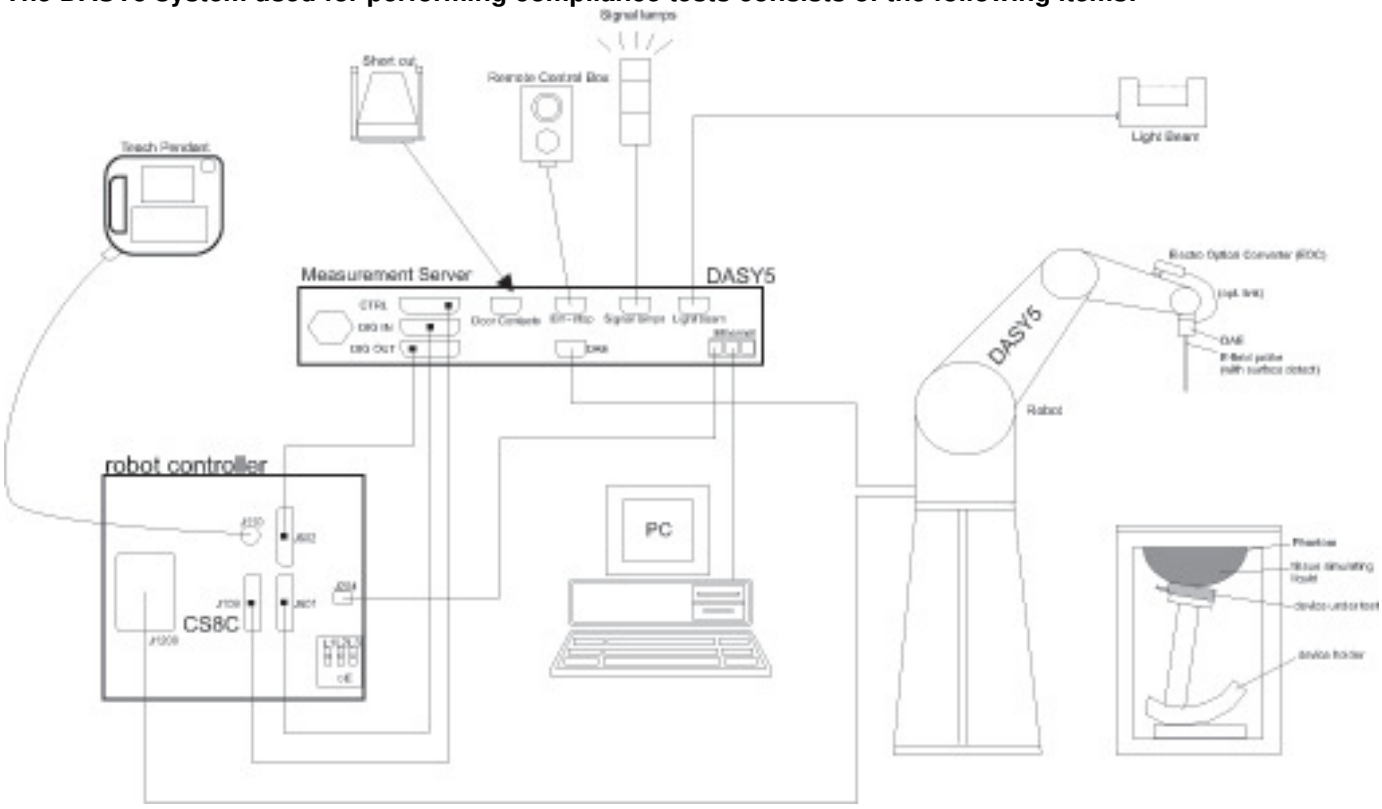
Suwon
SAR 1 Room
SAR 2 Room
SAR 3 Room

UL Korea, Ltd. is accredited by IAS, Laboratory Code TL-637.
The full scope of accreditation can be viewed at http://www.iasonline.org/PDF/TL/TL-637.pdf.

4. SAR Measurement System & Test Equipment

4.1. SAR Measurement System

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.

4.2. SAR Scan Procedures

Step 1: Power Reference Measurement

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

Step 2: Area Scan

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

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

<table>
<tr><td></td><td>≤ 3 GHz</td><td>> 3 GHz</td></tr>
<tr><td>Maximum distance from closest measurement point (geometric center of probe sensors) to phantom surface</td><td>5 ± 1 mm</td><td>½·δ·ln(2) ± 0.5 mm</td></tr>
<tr><td>Maximum probe angle from probe axis to phantom surface normal at the measurement location</td><td>30° ± 1°</td><td>20° ± 1°</td></tr>
<tr><td rowspan="2">Maximum area scan spatial resolution: Δx_{Area}, Δy_{Area}</td><td>≤ 2 GHz: ≤ 15 mm
2 – 3 GHz: ≤ 12 mm</td><td>3 – 4 GHz: ≤ 12 mm
4 – 6 GHz: ≤ 10 mm</td></tr>
<tr><td colspan="2">When the x or y dimension of the test device, in the measurement plane orientation, is smaller than the above, the measurement resolution must be ≤ the corresponding x or y dimension of the test device with at least one measurement point on the test device.</td></tr>
</table>

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

			≤ 3 GHz	> 3 GHz
Maximum zoom scan spatial resolution: Δx_{Zoom}, Δy_{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: $\Delta z_{Zoom}(n)$		≤ 5 mm	3 – 4 GHz: ≤ 4 mm 4 – 5 GHz: ≤ 3 mm 5 – 6 GHz: ≤ 2 mm
	graded grid	$\Delta z_{Zoom}(1)$: between 1st two points closest to phantom surface	≤ 4 mm	3 – 4 GHz: ≤ 3 mm 4 – 5 GHz: ≤ 2.5 mm 5 – 6 GHz: ≤ 2 mm
		$\Delta z_{Zoom}(n>1)$: between subsequent points	≤ 1.5·$\Delta z_{Zoom}(n-1)$	
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 *reported* 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.

4.3. Test Equipment

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.

Dielectric Property Measurements

Name of Equipment	Manufacturer	Type/Model	Serial No.	Cal. Due Date
Network Analyzer	Agilent	E5071C	MY46522054	8-18-2016
				8-18-2017
Dielectric Assessment Kit	SPEAG	DAK-3.5	1196	8-4-2016
				7-26-2017
Dielectric Assessment Kit	SPEAG	DAK-3.5	1031	5-14-2017
Dielectric Assessment Kit	SPEAG	DAKS_VNA R140	0050813	5-14-2017
Shorting block	SPEAG	DAK-3.5 Short	SM DAK 200 BA	N/A
Thermometer	LKM	DTM3000	3424	8-19-2016
				8-17-2017
Thermometer	Lutron	MHB-382SD	AH.91478	8-12-2016
				8-10-2017

System Check

Name of Equipment	Manufacturer	Type/Model	Serial No.	Cal. Due Date
MXG Analog Signal Generator	Agilent	N5181A	MY50145882	8-18-2016
				8-16-2017
Power Sensor	Agilent	U2000A	MY54260010	8-18-2016
				8-17-2017
Power Sensor	Agilent	U2000A	MY54260007	8-18-2016
				8-17-2017
Power Amplifier	EXODUS	1410025-AMP2027-10003	10003	8-18-2016
				8-17-2017
Directional Coupler	Agilent	772D	MY52180193	8-18-2016
				8-17-2017
Directional Coupler	Agilent	778D	MY52180432	8-18-2016
				8-17-2017
Low Pass Filter	MICROLAB	LA-15N	03943	8-18-2016
				8-17-2017
Low Pass Filter	FILTRON	L14012FL	1410003S	8-18-2016
				8-17-2017
Low Pass Filter	MICROLAB	LA-60N	03942	8-18-2016
				8-17-2017
Attenuator	Agilent	8491B/003	MY39269292	8-18-2016
				8-17-2017
Attenuator	Agilent	8491B/010	MY39269315	8-18-2016
				8-17-2017
Attenuator	Agilent	8491B/020	MY39269298	8-18-2016
				8-17-2017
E-Field Probe (SAR1)	SPEAG	EX3DV4	7314	9-25-2016
E-Field Probe (SAR2)	SPEAG	EX3DV4	7376	9-2-2016
E-Field Probe (SAR2)	SPEAG	EX3DV4	7330	2-24-2017
E-Field Probe (SAR3)	SPEAG	EX3DV4	7313	12-30-2016
Data Acquisition Electronics (SAR1)	SPEAG	DAE4	1447	9-23-2016
Data Acquisition Electronics (SAR2)	SPEAG	DAE4	1468	9-15-2016
Data Acquisition Electronics (SAR2)	SPEAG	DAE4	912	11-19-2016
Data Acquisition Electronics (SAR3)	SPEAG	DAE4	614	9-29-2016
Data Acquisition Electronics (SAR3)	SPEAG	DAE4	1494	7-18-2017

System Check (Continued)

Name of Equipment	Manufacturer	Type/Model	Serial No.	Cal. Due Date
System Validation Dipole	SPEAG	D750V3	1122	8-17-2016
System Validation Dipole	SPEAG	D835V2	4d194	9-17-2016
System Validation Dipole	SPEAG	D835V2	4d174	9-30-2016
System Validation Dipole	SPEAG	D1750V2	1125	8-20-2016
System Validation Dipole	SPEAG	D1900V2	5d199	2-19-2017
System Validation Dipole	SPEAG	D2450V2	939	9-28-2016
System Validation Dipole	SPEAG	D2600V2	1097	11-18-2016
System Validation Dipole	SPEAG	D5GHzV2	1184	8-26-2016
System Validation Dipole	SPEAG	D5GHzV2	1209	2-26-2017
Thermometer (SAR1)	Lutron	MHB-382SD	AH.91463	8-12-2016
				8-10-2017
Thermometer (SAR2)	Lutron	MHB-382SD	AH.50215	8-19-2016
				8-17-2017
Thermometer (SAR3)	Lutron	MHB-382SD	AH.50213	8-24-2016
				8-17-2017

Others

Name of Equipment	Manufacturer	Type/Model	Serial No.	Cal. Due Date
Base Station Simulator	R & S	CMW500	150313	8-18-2016
				8-16-2017
Base Station Simulator	R & S	CMW500	150314	8-18-2016
				8-16-2017
Bluetooth Tester	TESCOM	TC-3000C	3000C000546	8-18-2016
				8-18-2017

5. Measurement Uncertainty

Per KDB 865664 D01 SAR Measurement 100 MHz to 6 GHz, when the highest measured 1-g SAR within a frequency band is < 1.5 W/kg, the extensive SAR measurement uncertainty analysis described in IEEE Std 1528-2013 is not required in SAR reports submitted for equipment approval.

6. Device Under Test (DUT) Information

6.1. DUT Description

Device Dimension	Overall (Length x Width): 237.1 mm x 168.8 mm Overall Diagonal: 281.55 mm Display Diagonal: 246.3 mm		
Back Cover	☒ The rechargeable battery is not user accessible.		
Battery Options	☒ The rechargeable battery is not user accessible.		
Wireless Router (Hotspot)	Wi-Fi Hotspot mode permits the device to share its cellular data connection with other Wi-Fi-enabled devices. ☒ Mobile Hotspot (Wi-Fi 2.4 GHz) ☒ Mobile Hotspot (Wi-Fi 5 GHz, Ch.149)		
Wi-Fi Direct	Wi-Fi Direct enabled devices transfer data directly between each other ☒ Wi-Fi Direct (Wi-Fi 2.4 GHz) ☒ Wi-Fi Direct (Wi-Fi 5 GHz, Ch. 36~48, Ch.149 ~165)		
Test sample information	**No.**	**S/N**	**Notes**
	1	R32H5003BLW	Main Conduction (SM-T818T)
	2	R32H5003CBV	Main Conduction (SM-T818T)
	3	R32H5003EJN	WiFi Conduction (SM-T818T)
	4	R32H5003B7P	SAR (SM-T818T)
	5	R32H5002Y5Z	SAR (SM-T818T)
	6	R32H5002Y4F	SAR (SM-T818T)
	7	R32H5002YBR	SAR (SM-T818T)
	8	R32H50037VX	SAR (SM-T818T)
	9	d93f4d90	SAR (SM-T818T)
	10	R32H5003EJN	WiFi Conduction (SM-T818T_C2PC)
	11	a9656dac	SAR (SM-T818T_C2PC)
	12	R52H806NWXN	SAR (SM-T818T_C2PC)
	13	R32H7002XYZ	Main Conduction (SM-T818W)
	14	R32H70038DR	Main Conduction (SM-T818W)
	15	e0d832e6	WiFi Conduction (SM-T818W)
	16	R32H7003R5Y	SAR (SM-T818W)
	17	R32H700332N	SAR (SM-T818W)
	18	e0d836e5	SAR (SM-T818W)
	19	R32H7003DQM	SAR (SM-T818W)
	20	R32H7002XDD	SAR (SM-T818W)

6.2. Wireless Technologies

Wireless technologies	Frequency bands	Operating mode	Duty Cycle used for SAR testing
W-CDMA (UMTS)	Band II Band V	UMTS Rel. 99 (Voice & Data) HSDPA (Rel. 5) HSUPA (Rel. 6) DC-HSDPA (Rel.8) HSPA+ (Rel. 7)	100%
LTE	FDD Band 2 FDD Band 4 FDD Band 5 FDD Band 7 FDD Band 12 FDD Band 13 FDD Band 17 FDD Band 29 (Rx only)	QPSK 16QAM ☒ Rel. 10 Carrier Aggregation (1 Uplink and 2 Downlinks) LTE Band 5,13 are not support to LTE CA configuration.	100 % (FDD)
	Does this device support SV-LTE (1xRTT-LTE)? ☐ Yes ☒ No		
Wi-Fi	2.4 GHz	802.11b 802.11g 802.11n (HT20)	100%
	5 GHz	802.11a 802.11n (HT20) 802.11n (HT40) 802.11ac (VHT20) 802.11ac (VHT40) 802.11ac (VHT80)	100%
	Does this device support bands 5.60 ~ 5.65 GHz? ☒ Yes ☐ No		
	Does this device support Band gap channel? ☒ Yes ☐ No		
Bluetooth	2.4 GHz	Version 4.2 LE	76.88% (DH5)

6.3. Nominal and Maximum Output Power from Tune-up Procedure

KDB 447498 sec.4.1.(3) at the maximum rated output power and within the tune-up tolerance range specified for the product, but not more than 2 dB lower than the maximum tune-up tolerance limit

Upper limit (dB): -1.5 ~ 0.5		Max. RF Output Power (dBm)		Reduce RF Output Power (dBm)	
RF Air interface	Mode	Target	Max. tune-up tolerance limit	Target	Max. tune-up tolerance limit
W-CDMA Band V	R99	23.5	**24.0**	16.5	**17.0**
	HSDPA	22.5	**23.0**	15.5	**16.0**
	HSUPA	22.5	**23.0**	15.5	**16.0**
	DC-HSDPA	22.5	**23.0**	15.5	**16.0**
W-CDMA Band II	R99	24.0	**24.5**	14.0	**14.5**
	HSDPA	23.0	**23.5**	13.0	**13.5**
	HSUPA	23.0	**23.5**	13.0	**13.5**
	DC-HSDPA	23.0	**23.5**	13.0	**13.5**
LTE Band 2	QPSK	24.5	**25.0**	14.5	**15.0**
LTE Band 4	QPSK	24.5	**25.0**	13.5	**14.0**
LTE Band 5	QPSK	23.5	**24.0**	17.0	**17.5**
LTE Band 7	QPSK	23.5	**24.0**	12.0	**12.5**
LTE Band 12	QPSK	23.5	**24.0**	18.0	**18.5**
LTE Band 13	QPSK	24.0	**24.5**	18.0	**18.5**
LTE Band 17	QPSK	23.5	**24.0**	18.0	**18.5**
LTE Band 29	QPSK	**Rx Only**			

Upper limit (dB): ~ 0.5		Max. RF Output Power (dBm)		Reduce RF Output Power (dBm)	
RF Air interface	Mode	Target	Max. tune-up tolerance limit	Target	Max. tune-up tolerance limit
WiFi 2.4 GHz	802.11b	20.0	**20.5**	12.0	**12.5**
	802.11g (Ch.2 ~ Ch.10)	20.0	**20.5**	12.0	**12.5**
	802.11g (Ch.1 & Ch.11)	17.0	**17.5**	12.0	**12.5**
	802.11n HT20 (Ch.2 ~ Ch.10)	20.0	**20.5**	12.0	**12.5**
	802.11n HT20 (Ch.1)	17.0	**17.5**	12.0	**12.5**
	802.11n HT20 (Ch.11)	16.0	**16.5**	12.0	**12.5**
WiFi 5 GHz	802.11a	17.0	**17.5**	9.0	**9.5**
	802.11n HT20	17.0	**17.5**	9.0	**9.5**
	802.11n HT40	17.0	**17.5**	9.0	**9.5**
	802.11ac VHT20	17.0	**17.5**	9.0	**9.5**
	802.11ac VHT40	17.0	**17.5**	9.0	**9.5**
	802.11ac VHT80	16.0	**16.5**	9.0	**9.5**
Bluetooth		10.0	**10.5**	N/A	
Bluetooth LE		3.0	**3.5**	N/A	

6.4. General LTE SAR Test and Reporting Considerations

Item	Description						
Frequency range, Channel Bandwidth, Numbers and Frequencies	Band 2	Frequency range: 1850 - 1910 MHz					
		Channel Bandwidth					
		20 MHz	15 MHz	10 MHz	5 MHz	3 MHz	1.4 MHz
	Low	18700 /1860	18675/ 1857.5	18650/ 1855	18625/ 1852.5	18615/ 1851.5	18607/ 1850.7
	Mid	18900/ 1880	18900/ 1880	18900/ 1880	18900/ 1880	18900/ 1880	18900/ 1880
	High	19100/ 1900	19125/ 1902.5	19150/ 1905	19175/ 1907.5	19185/ 1908.5	19193/ 1909.3
	Band 4	Frequency range: 1710 - 1755 MHz					
		Channel Bandwidth					
		20 MHz	15 MHz	10 MHz	5 MHz	3 MHz	1.4 MHz
	Low	20050/ 1720	20025/ 1717.5	20000/ 1715	19975/ 1712.5	19965/ 1711.5	19957/ 1710.7
	Mid	20175/ 1732.5	20175/ 1732.5	20175/ 1732.5	20175/ 1732.5	20175/ 1732.5	20175/ 1732.5
	High	20300/ 1745	20325/ 1747.5	20350/ 1750	20375/ 1752.5	20385/ 1753.5	20393/ 1754.3
	Band 5	Frequency range: 824 - 849 MHz					
		Channel Bandwidth					
		20 MHz	15 MHz	10 MHz	5 MHz	3 MHz	1.4 MHz
	Low			20450/ 829	20425/ 826.5	20415/ 825.5	20407/ 824.7
	Mid			20525/ 836.5	20525/ 836.5	20525/ 836.5	20525/ 836.5
	High			20600/ 844	20625/ 846.5	20635/ 847.5	20643/ 848.3
	Band 7	Frequency range: 2500 – 2570 MHz					
		Channel Bandwidth					
		20 MHz	15 MHz	10 MHz	5 MHz	3 MHz	1.4 MHz
	Low	20850/ 2510	20825/ 2507.5	20800/ 2505	20775/ 2502.5	20765/ 2501.5	20757/ 2500.7
	Mid	21100/ 2535	21100/ 2535	21100/ 2535	21100/ 2535	21100/ 2535	21100/ 2535
	High	21350/ 2560	21375/ 2562.5	21400/ 2565	21425/ 2567.5	21435/ 2568.5	21443/ 2569.3
	Band 12	Frequency range: 699 – 716 MHz					
		Channel Bandwidth					
		20 MHz	15 MHz	10 MHz	5 MHz	3 MHz	1.4 MHz
	Low			23060/ 704	23035/ 701.5	23025/ 700.5	23017/ 699.7
	Mid			23095/ 707.5	23095/ 707.5	23095/ 707.5	23095/ 707.5
	High			23130/ 711	23155/ 713.5	23165/ 714.5	23173/ 715.3
	Band 13	Frequency range: 777 - 787 MHz					
		Channel Bandwidth					
		20 MHz	15 MHz	10 MHz	5 MHz	3 MHz	1.4 MHz
	Low				23205/ 779.5		
	Mid			23230/ 782	23230/ 782		
	High				23255/ 784.5		
	Band 17	Frequency range: 704 - 716 MHz					
		Channel Bandwidth					
		20 MHz	15 MHz	10 MHz	5 MHz	3 MHz	1.4 MHz
	Low			23750/ 709	23725/ 706.5		
	Mid			23790/ 710	23790/ 710		
	High			23850/ 711	23825/ 713.5		

General LTE SAR Test and Reporting Considerations (Continued)

<table>
<tr><td rowspan="11">Carrier Aggregation Combinations</td><td colspan="2">Primary
Channel Bandwidth(MHz)</td><td colspan="2">Secondary
Channel Bandwidth(MHz)</td></tr>
<tr><td>Band 2</td><td>1.4, 3, 5, 10, 15, 20</td><td>Band 4</td><td>5, 10, 15, 20</td></tr>
<tr><td>Band 2</td><td>5, 10</td><td>Band 17</td><td>5, 10</td></tr>
<tr><td>Band 2</td><td>5, 10, 15, 20</td><td>Band 29</td><td>5, 10</td></tr>
<tr><td>Band 4</td><td>5, 10, 15, 20</td><td>Band 2</td><td>1.4, 3, 5, 10, 15, 20</td></tr>
<tr><td>Band 4</td><td>5, 10</td><td>Band 7</td><td>5, 10,15, 20</td></tr>
<tr><td>Band 4</td><td>1.4, 3, 5, 10, 15, 20</td><td>Band 12</td><td>5, 10</td></tr>
<tr><td>Band 4</td><td>5, 10</td><td>Band 17</td><td>5, 10</td></tr>
<tr><td>Band 4</td><td>5, 10, 15, 20</td><td>Band 29</td><td>5, 10</td></tr>
<tr><td>Band 7</td><td>5, 10, 15, 20</td><td>Band 4</td><td>5, 10</td></tr>
<tr><td>Band 17</td><td>5, 10</td><td>Band 2</td><td>5, 10</td></tr>
<tr><td>LTE transmitter and antenna implementation</td><td colspan="4">LTE Bands (2, 4, 5, 7, 12, 13,17) has one (1)Tx/Rx antenna
LTE Bands (2, 5, 7,12,13,17) has one (1) Rx antenna
LTE Band (4, 29) has two (2) Rx antennas
Refer to Appendix A..</td></tr>
<tr><td>Maximum power reduction (MPR)</td><td colspan="4">Table 6.2.3-1: Maximum Power Reduction (MPR) for Power Class 3
<table><tr><th rowspan="2">Modulation</th><th colspan="6">Channel bandwidth / Transmission bandwidth (RB)</th><th rowspan="2">MPR (dB)</th></tr><tr><th>1.4 MHz</th><th>3.0 MHz</th><th>5 MHz</th><th>10 MHz</th><th>15 MHz</th><th>20 MHz</th></tr><tr><td>QPSK</td><td>> 5</td><td>> 4</td><td>> 8</td><td>> 12</td><td>> 16</td><td>> 18</td><td>≤ 1</td></tr><tr><td>16 QAM</td><td>≤ 5</td><td>≤ 4</td><td>≤ 8</td><td>≤ 12</td><td>≤ 16</td><td>≤ 18</td><td>≤ 1</td></tr><tr><td>16 QAM</td><td>> 5</td><td>> 4</td><td>> 8</td><td>> 12</td><td>> 16</td><td>> 18</td><td>≤ 2</td></tr></table>
MPR Built-in by design
A-MPR (additional MPR) was disabled during SAR testing</td></tr>
<tr><td>Power reduction</td><td colspan="4">Yes</td></tr>
<tr><td>Spectrum plots for RB configurations</td><td colspan="4">A properly configured base station simulator was used for the SAR and power measurements; therefore, spectrum plots for each RB allocation and offset configuration are not included in the SAR report.</td></tr>
</table>

6.5. Power Reduction by Proximity Sensing

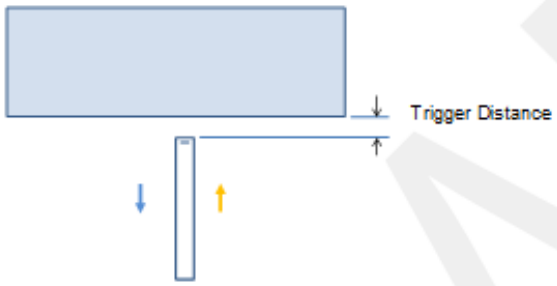
6.5.1. Proximity Sensor Triggering Distance (KDB 616217 §6.2)

Rear 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 surface of Edge 1.

The DUT featured a visual indicator on its display that showed the status of the proximity sensor (Triggered or not triggered). This was used to determine the status of the sensor during the proximity sensor assessment as monitoring the output power directly was not practical without affecting the measurement.

It was confirmed separately that the output power was altered according to the proximity sensor status indication. This was achieved by observing the proximity sensor status at the same time as monitoring the conducted power. Section 9 contains both the full and reduced conducted power measurements.



Proximity Sensor Trigger Distance Assessment
KDB 616219 §6.2, Edge 1

Proximity Sensor Trigger Distance Assessment
KDB 616219 §6.2, Rear

LEGEND

→ Direction of DUT travel for determination of power reduction triggering point

→ Direction of DUT travel for determination of full power resumption triggering point0

Summary of Trigger Distances

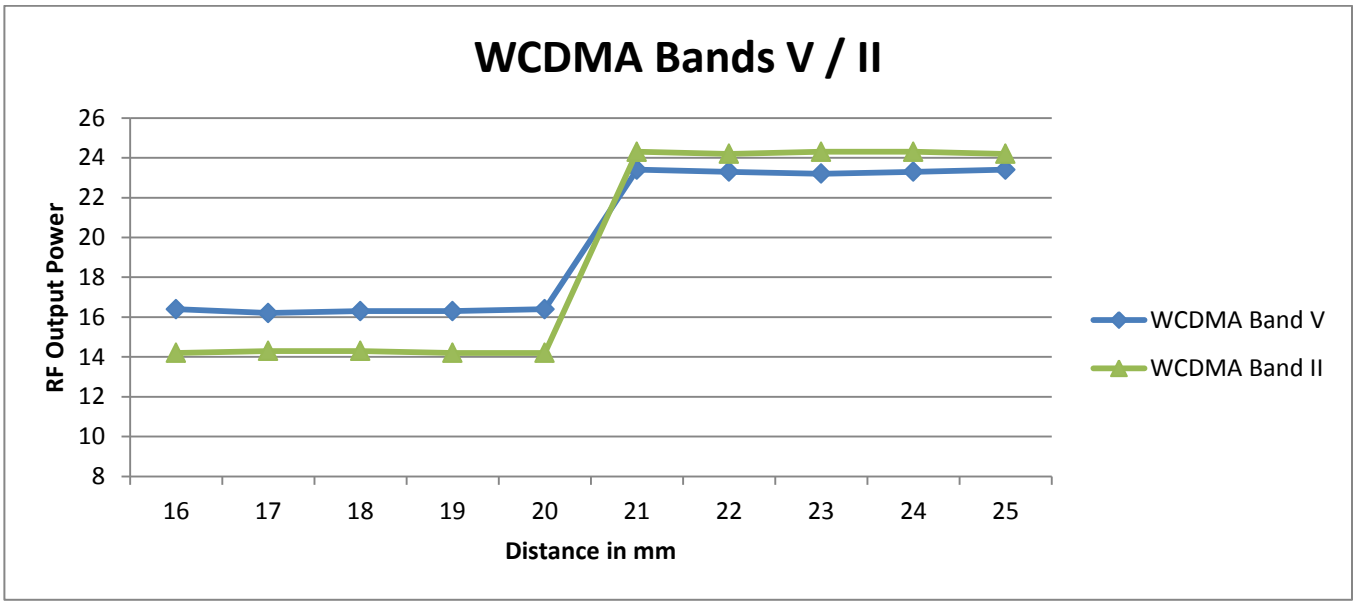
Tissue simulating liquid	Trigger distance - Rear		Trigger distance - Edge 1	
	Moving toward phantom	Moving from phantom	Moving toward phantom	Moving from phantom
750 muscle	20 mm	20 mm	23 mm	23 mm
850 muscle	20 mm	20 mm	23 mm	23 mm
1750 muscle	20 mm	20 mm	23 mm	23 mm
1900 muscle	20 mm	20 mm	23 mm	23 mm
2450 muscle	16 mm	16 mm	N/A	N/A
2600 muscle	20 mm	20 mm	23 mm	23 mm
5000 muscle	16 mm	16 mm	N/A	N/A

Proximity Sensor Triggering Distance Measurement Results

WCDMA Bands II / V

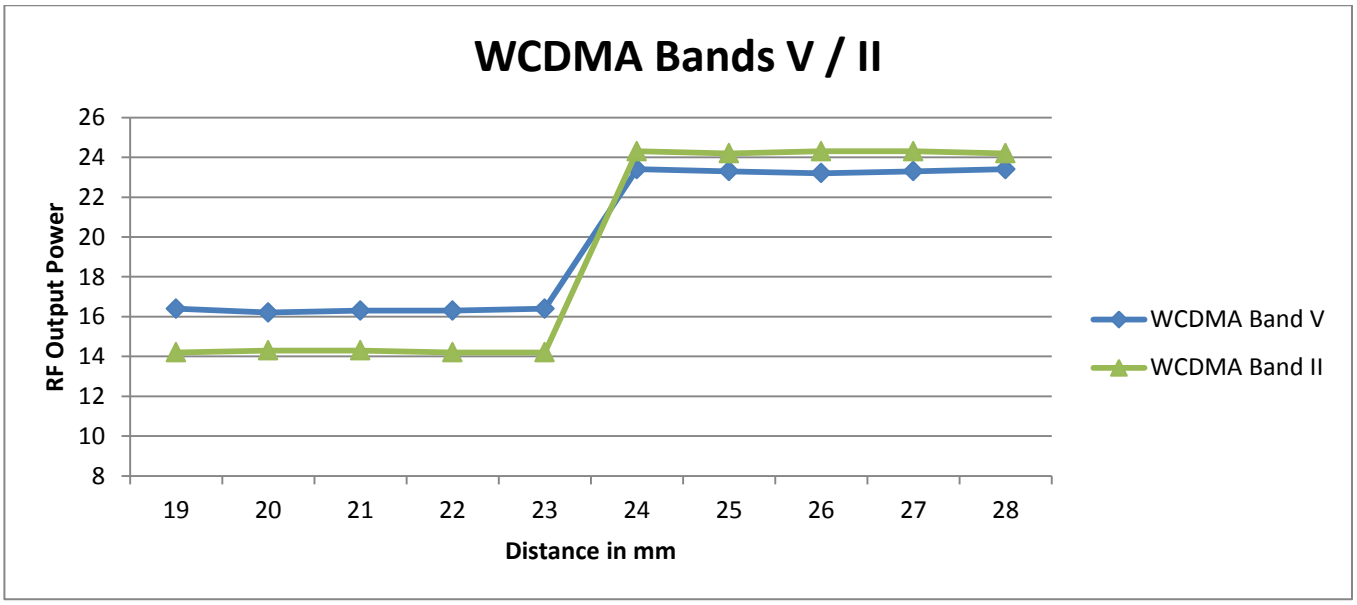
Rear, DUT Moving Toward (Trigger) and Away (Release) from the Phantom

Distance to DUT vs. Output Power in dBm										
Distance (mm)	16	17	18	19	20	21	22	23	24	25
WCDMA Band V	16.4	16.2	16.3	16.3	16.4	23.4	23.3	23.2	23.3	23.4
WCDMA Band II	14.2	14.3	14.3	14.2	14.2	24.3	24.2	24.3	24.3	24.2



Edge 1, DUT Moving Toward (Trigger) and Away (Release) from the Phantom

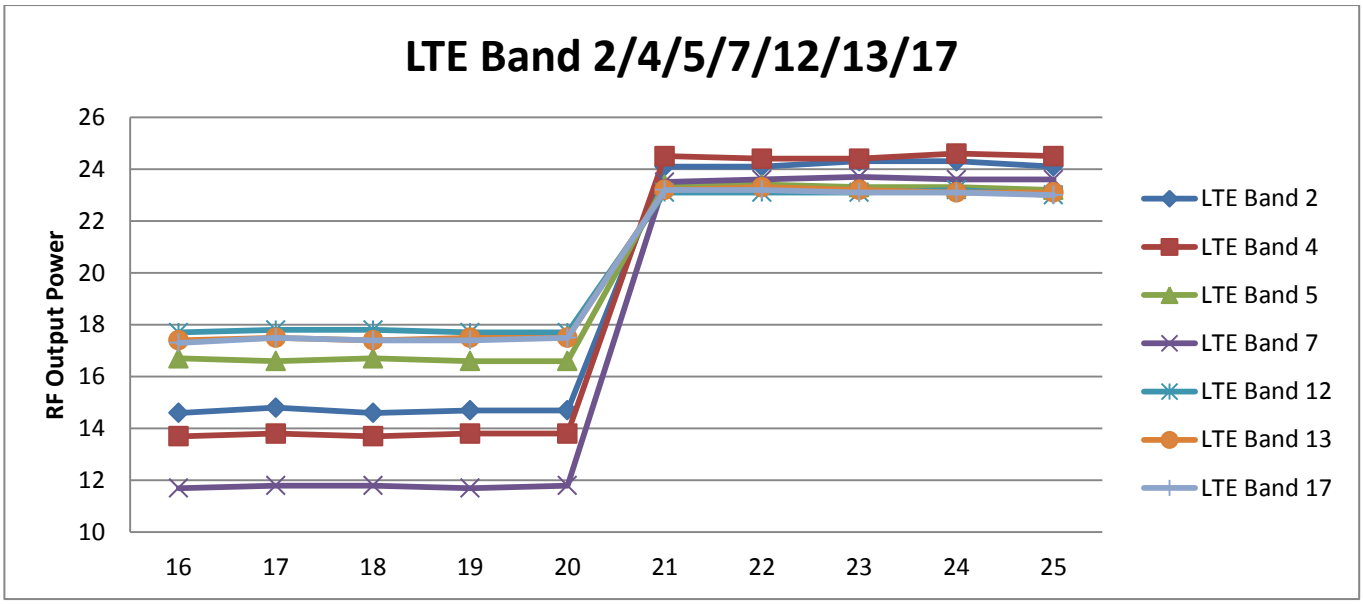
Distance to DUT vs. Output Power in dBm										
Distance (mm)	19	20	21	22	23	24	25	26	27	28
WCDMA Band V	16.4	16.2	16.3	16.3	16.4	23.4	23.3	23.2	23.3	23.4
WCDMA Band II	14.2	14.3	14.3	14.2	14.2	24.3	24.2	24.3	24.3	24.2



LTE Bands 2 / 4 / 5 / 7 / 12 / 13 / 17

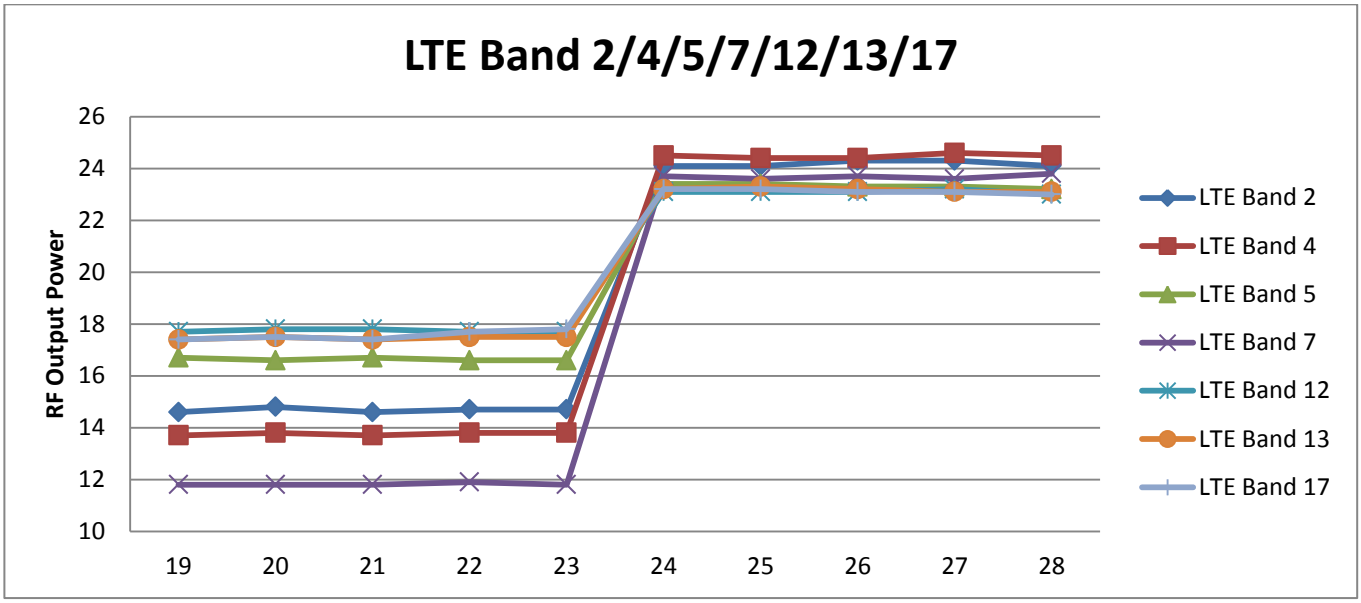
Rear, DUT Moving Toward (Trigger) and Away (Release) from the Phantom

Distance to DUT vs. Output Power in dBm										
Distance (mm)	16	17	18	19	20	21	22	23	24	25
LTE Band 2	14.6	14.8	14.6	14.7	14.7	24.1	24.1	24.3	24.3	24.1
LTE Band 4	13.7	13.8	13.7	13.8	13.8	24.5	24.4	24.4	24.6	24.5
LTE Band 5	16.7	16.6	16.7	16.6	16.6	23.4	23.4	23.3	23.3	23.2
LTE Band 7	11.7	11.8	11.8	11.7	11.8	23.5	23.6	23.7	23.6	23.6
LTE Band 12	17.7	17.8	17.8	17.7	17.7	23.1	23.1	23.1	23.2	23.0
LTE Band 13	17.4	17.5	17.4	17.5	17.5	23.2	23.3	23.2	23.1	23.1
LTE Band 17	17.3	17.5	17.4	17.4	17.5	23.2	23.2	23.1	23.1	23.0



Edge 1, DUT Moving Toward (Trigger) and Away (Release) from the Phantom

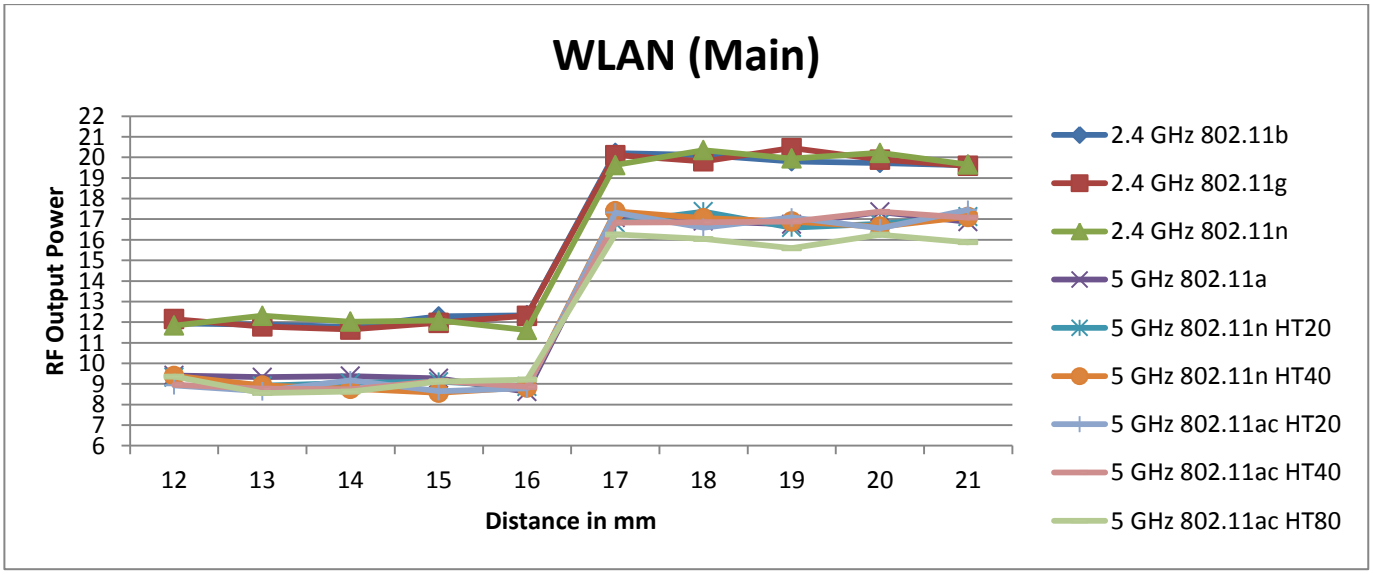
Distance to DUT vs. Output Power in dBm										
Distance (mm)	19	20	21	22	23	24	25	26	27	28
LTE Band 2	14.6	14.8	14.6	14.7	14.7	24.1	24.1	24.3	24.3	24.1
LTE Band 4	13.7	13.8	13.7	13.8	13.8	24.5	24.4	24.4	24.6	24.5
LTE Band 5	16.7	16.6	16.7	16.6	16.6	23.4	23.4	23.3	23.3	23.2
LTE Band 7	11.8	11.8	11.8	11.9	11.8	23.7	23.6	23.7	23.6	23.8
LTE Band 12	17.7	17.8	17.8	17.7	17.7	23.1	23.1	23.1	23.2	23.0
LTE Band 13	17.4	17.5	17.4	17.5	17.5	23.2	23.3	23.2	23.1	23.1
LTE Band 17	17.4	17.5	17.4	17.7	17.8	23.2	23.2	23.1	23.1	23.0



Wi-Fi 2.4GHz and 5GHz (Main)

Rear, DUT Moving Toward (Trigger) and Away (Release) from the Phantom

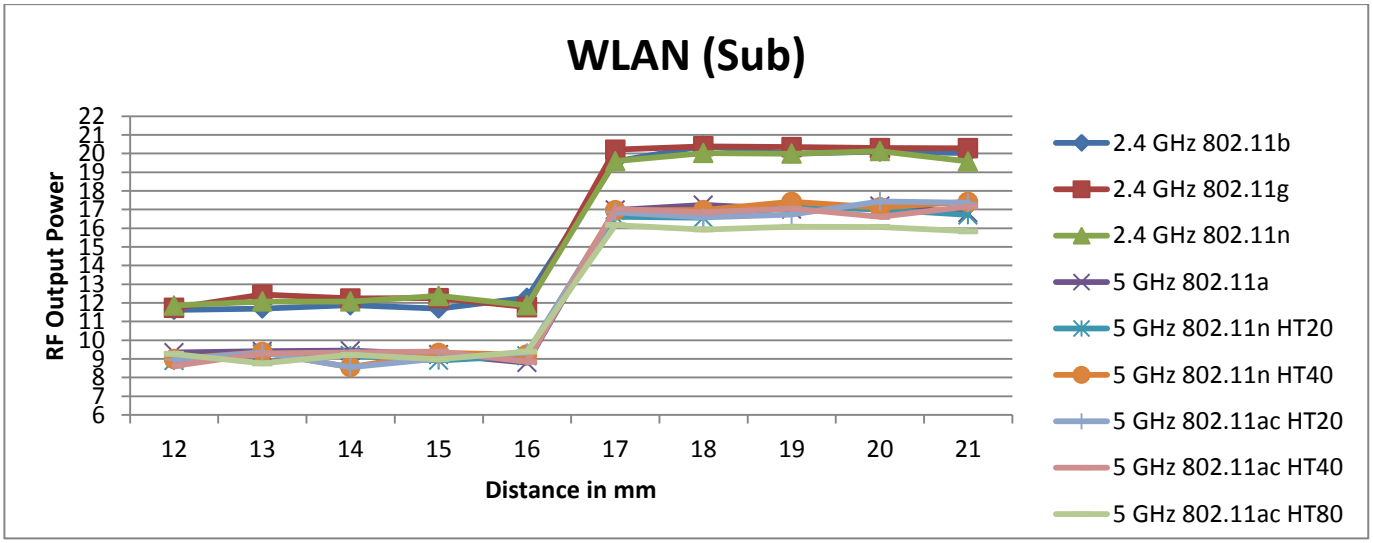
Distance to DUT vs. Output Power in dBm											
Antenna	Distance (mm)	12	13	14	15	16	17	18	19	20	21
Main	2.4 GHz 802.11b	11.9	11.9	11.8	12.3	12.3	20.2	20.1	19.8	19.7	19.6
	2.4 GHz 802.11g	12.2	11.8	11.6	12.0	12.3	20.1	19.8	20.5	19.9	19.6
	2.4 GHz 802.11n	11.8	12.3	12.0	12.1	11.6	19.6	20.4	20.0	20.2	19.7
	5 GHz 802.11a	9.4	9.3	9.4	9.3	8.6	17.1	16.9	16.8	17.4	16.9
	5 GHz 802.11n HT20	9.3	8.9	9.1	9.1	8.9	16.8	17.4	16.6	16.8	17.1
	5 GHz 802.11n HT40	9.4	8.9	8.8	8.6	8.8	17.4	17.1	16.9	16.6	17.1
	5 GHz 802.11ac HT20	8.9	8.6	9.2	8.7	8.8	17.3	16.6	17.1	16.6	17.5
	5 GHz 802.11ac HT40	9.0	8.8	8.7	9.2	8.9	16.8	16.9	16.9	17.4	17.1
	5 GHz 802.11ac HT80	9.4	8.6	8.6	9.1	9.2	16.3	16.0	15.6	16.3	15.9



Wi-Fi 2.4GHz and 5GHz (Sub)

Rear, DUT Moving Toward (Trigger) and Away (Release) from the Phantom

Distance to DUT vs. Output Power in dBm											
Antenna	Distance (mm)	12	13	14	15	16	17	18	19	20	21
Sub	2.4 GHz 802.11b	11.6	11.7	11.9	11.7	12.3	19.6	20.4	20.0	20.1	20.0
	2.4 GHz 802.11g	11.7	12.4	12.2	12.3	11.8	20.2	20.4	20.3	20.3	20.3
	2.4 GHz 802.11n	11.9	12.1	12.1	12.4	11.9	19.6	20.0	20.0	20.1	19.6
	5 GHz 802.11a	9.3	9.4	9.4	9.2	8.8	17.0	17.2	17.0	17.2	16.8
	5 GHz 802.11n HT20	8.9	9.3	9.2	8.9	9.2	16.6	16.6	17.1	17.0	16.7
	5 GHz 802.11n HT40	9.0	9.4	8.6	9.3	9.2	17.0	17.0	17.4	17.1	17.4
	5 GHz 802.11ac HT20	9.0	9.3	8.6	9.0	9.3	16.9	16.6	16.7	17.4	17.4
	5 GHz 802.11ac HT40	8.6	9.3	9.4	9.4	8.8	17.0	16.9	17.1	16.6	17.2
	5 GHz 802.11ac HT80	9.3	8.8	9.2	9.0	9.4	16.2	15.9	16.1	16.1	15.8



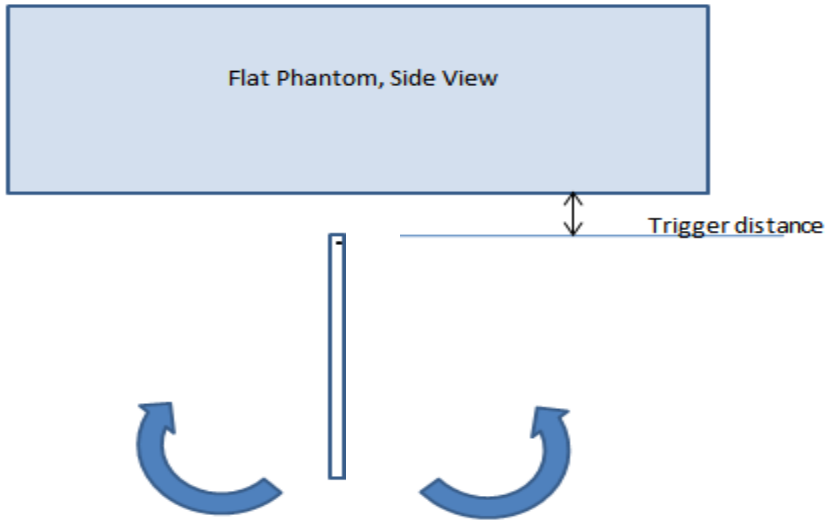
6.5.2. Proximity Sensor Coverage (KDB 616217 §6.3)

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

6.5.3. Proximity Sensor Tilt Angle Assessment (KDB 616217 §6.4)

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 for each band.

The EUT was rotated about Edge 1 for angles up to +/- 45°. If the output power increased during the rotation the DUT was moved 1mm toward the phantom and the rotation repeated. This procedure was repeated until the power remained reduced for all angles up to +/- 45°.



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

Summary of Tablet Tilt Angle Influence to Proximity Sensor Triggering

Band (MHz)	Minimum trigger distance measured according to KDB 616217 §6.2	Minimum distance at which power reduction was maintained over +/-45°	Power reduction status										
			-45°	-40°	-30°	-20°	-10°	0°	10°	20°	30°	40°	45°
750	23 mm	23 mm	On	On	On	On	On	On	On	On	On	On	On
850	23 mm	23 mm	On	On	On	On	On	On	On	On	On	On	On
1750	23 mm	23 mm	On	On	On	On	On	On	On	On	On	On	On
1900	23 mm	23 mm	On	On	On	On	On	On	On	On	On	On	On
2600	23 mm	23 mm	On	On	On	On	On	On	On	On	On	On	On

6.5.4. Resulting test positions for SAR measurements

Wireless technologies	Position	§6.2 Triggering Distance	§6.3 Coverage	§6.4 Tilt Angle	Worst case distance for SAR
WWAN	Rear	20 mm	N/A	N/A	19 mm
	Edge 1	23 mm	N/A	23 mm	22 mm
WLAN	Rear	16 mm	N/A	N/A	15 mm

7. RF Exposure Conditions (Test Configurations)

Refer to "SAR Photos and Ant locations" Appendix for the specific details of the antenna-to-antenna and antenna-to-edge(s) distances.

7.1. Standalone SAR Test Exclusion Considerations

Since the *Dedicated Host Approach* is applied, the standalone SAR test exclusion procedure in KDB 447498 § 4.3.1 is applied in conjunction with KDB 616217 § 4.3 to determine the minimum test separation distance:

- When the separation distance from the antenna to an adjacent edge is ≤ 5 mm, a distance of 5 mm is applied to determine SAR test exclusion.
- When the separation distance from the antenna to an adjacent edge is > 5 mm, the actual antenna-to-edge separation distance is applied to determine SAR test exclusion.

SAR Test Exclusion Calculations for WWAN

Antennas < 50mm to adjacent edges

Antenna	Tx Interface	Frequency (MHz)	Output Power		Separation Distances (mm)						Calculated Threshold Value					
			dBm	mW	Rear	Edge 1	Edge 2	Edge 3	Edge 4	Front	Rear	Edge 1	Edge 2	Edge 3	Edge 4	Front
Full Power, Proximity Sensor Off																
Cellular	W-CDMA 5	846.6	24.00	251	0	0	43	233	43		46.2 -MEASURE-	46.2 -MEASURE-	5.4 -MEASURE-	> 50 mm	5.4 -MEASURE-	
Cellular	W-CDMA 2	1907.6	24.50	282	0	0	43	233	43		77.9 -MEASURE-	77.9 -MEASURE-	9.1 -MEASURE-	> 50 mm	9.1 -MEASURE-	
Cellular	LTE Band 2	1910	25.00	316	0	0	43	233	43		87.3 -MEASURE-	87.3 -MEASURE-	10.2 -MEASURE-	> 50 mm	10.2 -MEASURE-	
Cellular	LTE Band 4	1754.3	25.00	316	0	0	43	233	43		83.7 -MEASURE-	83.7 -MEASURE-	9.7 -MEASURE-	> 50 mm	9.7 -MEASURE-	
Cellular	LTE Band 5	844	24.00	251	0	0	43	233	43		46.1 -MEASURE-	46.1 -MEASURE-	5.4 -MEASURE-	> 50 mm	5.4 -MEASURE-	
Cellular	LTE Band 7	2560	24.00	251	0	10	25	222	136		80.3 -MEASURE-	40.2 -MEASURE-	16.1 -MEASURE-	> 50 mm	> 50 mm	
Cellular	LTE Band 12	711	24.00	251	0	0	43	233	43		42.3 -MEASURE-	42.3 -MEASURE-	4.9 -MEASURE-	> 50 mm	4.9 -MEASURE-	
Cellular	LTE Band 13	782	24.50	282	0	0	43	233	43		49.9 -MEASURE-	49.9 -MEASURE-	5.8 -MEASURE-	> 50 mm	5.8 -MEASURE-	
Cellular	LTE Band 17	711	24.00	251	0	0	43	233	43		42.3 -MEASURE-	42.3 -MEASURE-	4.9 -MEASURE-	> 50 mm	4.9 -MEASURE-	
Power Back-off, Proximity Sensor On																
Cellular	W-CDMA 5	846.6	17.00	50	0	0					9.2 -MEASURE-	9.2 -MEASURE-				
Cellular	W-CDMA 2	1907.6	14.50	28	0	0					7.7 -MEASURE-	7.7 -MEASURE-				
Cellular	LTE Band 2	1910	15.00	32	0	0					8.8 -MEASURE-	8.8 -MEASURE-				
Cellular	LTE Band 4	1754.3	14.00	25	0	0					6.6 -MEASURE-	6.6 -MEASURE-				
Cellular	LTE Band 5	844	17.50	56	0	0					10.3 -MEASURE-	10.3 -MEASURE-				
Cellular	LTE Band 7	2560	12.50	18	0	10					5.8 -MEASURE-	3 -EXEMPT-				
Cellular	LTE Band 12	711	18.50	71	0	0					12 -MEASURE-	12 -MEASURE-				
Cellular	LTE Band 13	782	18.50	71	0	0					12.6 -MEASURE-	12.6 -MEASURE-				
Cellular	LTE Band 17	711	18.50	71	0	0					12 -MEASURE-	12 -MEASURE-				

Note(s):

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

Antennas > 50mm to adjacent edges

Antenna	Tx Interface	Frequency (MHz)	Output Power		Separation Distances (mm)						Calculated Threshold Value					
			dBm	mW	Rear	Edge 1	Edge 2	Edge 3	Edge 4	Front	Rear	Edge 1	Edge 2	Edge 3	Edge 4	Front
Full Power, Proximity Sensor Off																
Cellular	W-CDMA 5	846.6	24.00	251	0	0	43	233	43		< 50 mm	< 50 mm	< 50 mm	1195.9 mW -EXEMPT-	< 50 mm	
Cellular	W-CDMA 2	1907.6	24.50	282	0	0	43	233	43		< 50 mm	< 50 mm	< 50 mm	1938.6 mW -EXEMPT-	< 50 mm	
Cellular	LTE Band 2	1910	25.00	316	0	0	43	233	43		< 50 mm	< 50 mm	< 50 mm	1938.5 mW -EXEMPT-	< 50 mm	
Cellular	LTE Band 4	1754.3	25.00	316	0	0	43	233	43		< 50 mm	< 50 mm	< 50 mm	1943.3 mW -EXEMPT-	< 50 mm	
Cellular	LTE Band 5	844	24.00	251	0	0	43	233	43		< 50 mm	< 50 mm	< 50 mm	1193 mW -EXEMPT-	< 50 mm	
Cellular	LTE Band 7	2560	24.00	251	0	10	25	222	136		< 50 mm	< 50 mm	< 50 mm	1813.8 mW -EXEMPT-	953.8 mW -EXEMPT-	
Cellular	LTE Band 12	711	24.00	251	0	0	43	233	43		< 50 mm	< 50 mm	< 50 mm	1045.3 mW -EXEMPT-	< 50 mm	
Cellular	LTE Band 13	782	24.50	282	0	0	43	233	43		< 50 mm	< 50 mm	< 50 mm	1123.7 mW -EXEMPT-	< 50 mm	
Cellular	LTE Band 17	711	24.00	251	0	0	43	233	43		< 50 mm	< 50 mm	< 50 mm	1045.3 mW -EXEMPT-	< 50 mm	
Power Back-off, Proximity Sensor On																
Cellular	W-CDMA 5	846.6	17.00	50	0	0					< 50 mm	< 50 mm				
Cellular	W-CDMA 2	1907.6	14.50	28	0	0					< 50 mm	< 50 mm				
Cellular	LTE Band 2	1910	15.00	32	0	0					< 50 mm	< 50 mm				
Cellular	LTE Band 4	1754.3	14.00	25	0	0					< 50 mm	< 50 mm				
Cellular	LTE Band 5	844	17.50	56	0	0					< 50 mm	< 50 mm				
Cellular	LTE Band 7	2560	12.50	18	0	10					< 50 mm	< 50 mm				
Cellular	LTE Band 12	711	18.50	71	0	0					< 50 mm	< 50 mm				
Cellular	LTE Band 13	782	18.50	71	0	0					< 50 mm	< 50 mm				
Cellular	LTE Band 17	711	18.50	71	0	0					< 50 mm	< 50 mm				

Note(s):

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

SAR Test Exclusion Calculations for WLAN

Main Antenna < 50mm to adjacent edges

Tx Interface	Frequency (MHz)	Output Power		Separation Distances (mm)						Calculated Threshold Value					
		dBm	mW	Rear	Edge 1	Edge 2	Edge 3	Edge 4	Front	Rear	Edge 1	Edge 2	Edge 3	Edge 4	Front
Wi-Fi Main Antenna Max Power															
Wi-Fi 2.4 GHz	2462	20.50	112	0.9	180	5.1	28	160.3		35.1 -MEASURE-	> 50 mm	35.1 -MEASURE-	6.3 -MEASURE-	> 50 mm	
Wi-Fi 5.3 GHz	5320	17.50	56	0.9	180	5.1	28	160.3		25.8 -MEASURE-	> 50 mm	25.8 -MEASURE-	4.6 -MEASURE-	> 50 mm	
Wi-Fi 5.5 GHz	5700	17.50	56	0.9	180	5.1	28	160.3		26.7 -MEASURE-	> 50 mm	26.7 -MEASURE-	4.8 -MEASURE-	> 50 mm	
Wi-Fi 5.8 GHz	5825	17.50	56	0.9	180	5.1	28	160.3		27 -MEASURE-	> 50 mm	27 -MEASURE-	4.8 -MEASURE-	> 50 mm	
Bluetooth	2480	10.50	11	0.9	180	5.1	28	160.3		3.5 -MEASURE-	> 50 mm	3.5 -MEASURE-	0.6 -EXEMPT-	> 50 mm	
Wi-Fi Main Antenna Reduced Power															
Wi-Fi 2.4 GHz	2462	12.50	18	0.9						5.6 -MEASURE-					
Wi-Fi 5.3 GHz	5320	9.50	9	0.9						4.2 -MEASURE-					
Wi-Fi 5.5 GHz	5700	9.50	9	0.9						4.3 -MEASURE-					
Wi-Fi 5.8 GHz	5825	9.50	9	0.9						4.3 -MEASURE-					

Sub Antenna < 50mm to adjacent edges

Tx Interface	Frequency (MHz)	Output Power		Separation Distances (mm)						Calculated Threshold Value					
		dBm	mW	Rear	Edge 1	Edge 2	Edge 3	Edge 4	Front	Rear	Edge 1	Edge 2	Edge 3	Edge 4	Front
Wi-Fi Sub Antenna Max Power															
Wi-Fi 2.4 GHz	2462	20.50	112	0.8	221	65.8	4.29	81		35.1 -MEASURE-	> 50 mm	> 50 mm	35.1 -MEASURE-	> 50 mm	
Wi-Fi 5.3 GHz	5320	17.50	56	0.8	221	65.8	4.29	81		25.8 -MEASURE-	> 50 mm	> 50 mm	25.8 -MEASURE-	> 50 mm	
Wi-Fi 5.5 GHz	5700	17.50	56	0.8	221	65.8	4.29	81		26.7 -MEASURE-	> 50 mm	> 50 mm	26.7 -MEASURE-	> 50 mm	
Wi-Fi 5.8 GHz	5825	17.50	56	0.8	221	65.8	4.29	81		27 -MEASURE-	> 50 mm	> 50 mm	27 -MEASURE-	> 50 mm	
Wi-Fi Sub Antenna Reduced Power															
Wi-Fi 2.4 GHz	2462	12.50	18	0.8						5.6 -MEASURE-					
Wi-Fi 5.3 GHz	5320	9.50	9	0.8						4.2 -MEASURE-					
Wi-Fi 5.5 GHz	5700	9.50	9	0.8						4.3 -MEASURE-					
Wi-Fi 5.8 GHz	5825	9.50	9	0.8						4.3 -MEASURE-					

Note(s):

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

Main Antennas > 50mm to adjacent edges

Tx Interface	Frequency (MHz)	Output Power		Separation Distances (mm)						Calculated Threshold Value					
		dBm	mW	Rear	Edge 1	Edge 2	Edge 3	Edge 4	Front	Rear	Edge 1	Edge 2	Edge 3	Edge 4	Front
Wi-Fi Main Antenna Max Power															
Wi-Fi 2.4 GHz	2462	20.50	112	0.9	180	5.1	28	160.3		< 50 mm	1395.6 mW -EXEMPT-	< 50 mm	< 50 mm	1198.6 mW -EXEMPT-	
Wi-Fi 5.3 GHz	5320	17.50	56	0.9	180	5.1	28	160.3		< 50 mm	1365 mW -EXEMPT-	< 50 mm	< 50 mm	1168 mW -EXEMPT-	
Wi-Fi 5.5 GHz	5700	17.50	56	0.9	180	5.1	28	160.3		< 50 mm	1362.8 mW -EXEMPT-	< 50 mm	< 50 mm	1165.8 mW -EXEMPT-	
Wi-Fi 5.8 GHz	5825	17.50	56	0.9	180	5.1	28	160.3		< 50 mm	1362.2 mW -EXEMPT-	< 50 mm	< 50 mm	1165.2 mW -EXEMPT-	
Bluetooth	2480	10.50	11	0.9	180	5.1	28	160.3		< 50 mm	1395.3 mW -EXEMPT-	< 50 mm	< 50 mm	1198.3 mW -EXEMPT-	
Wi-Fi Main Antenna Reduced Power															
Wi-Fi 2.4 GHz	2462	12.50	18	0.9						< 50 mm					
Wi-Fi 5.3 GHz	5320	9.50	9	0.9						< 50 mm					
Wi-Fi 5.5 GHz	5700	9.50	9	0.9						< 50 mm					
Wi-Fi 5.8 GHz	5825	9.50	9	0.9						< 50 mm					

Sub Antennas > 50mm to adjacent edges

Tx Interface	Frequency (MHz)	Output Power		Separation Distances (mm)						Calculated Threshold Value					
		dBm	mW	Rear	Edge 1	Edge 2	Edge 3	Edge 4	Front	Rear	Edge 1	Edge 2	Edge 3	Edge 4	Front
Wi-Fi Sub Antenna Max Power															
Wi-Fi 2.4 GHz	2462	20.50	112	0.8	221	65.8	4.29	81		< 50 mm	1805.6 mW -EXEMPT-	253.6 mW -EXEMPT-	< 50 mm	405.6 mW -EXEMPT-	
Wi-Fi 5.3 GHz	5320	17.50	56	0.8	221	65.8	4.29	81		< 50 mm	1775 mW -EXEMPT-	223 mW -EXEMPT-	< 50 mm	375 mW -EXEMPT-	
Wi-Fi 5.5 GHz	5700	17.50	56	0.8	221	65.8	4.29	81		< 50 mm	1772.8 mW -EXEMPT-	220.8 mW -EXEMPT-	< 50 mm	372.8 mW -EXEMPT-	
Wi-Fi 5.8 GHz	5825	17.50	56	0.8	221	65.8	4.29	81		< 50 mm	1772.2 mW -EXEMPT-	220.2 mW -EXEMPT-	< 50 mm	372.2 mW -EXEMPT-	
Wi-Fi Sub Antenna Reduced Power															
Wi-Fi 2.4 GHz	2462	12.50	18	0.8						< 50 mm					
Wi-Fi 5.3 GHz	5320	9.50	9	0.8						< 50 mm					
Wi-Fi 5.5 GHz	5700	9.50	9	0.8						< 50 mm					
Wi-Fi 5.8 GHz	5825	9.50	9	0.8						< 50 mm					

Note(s):

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

7.2. Required Test Configurations

The table below identifies the standalone test configurations required for this device according to the findings in Section 7.1:

Test Configurations	Pwr Back-off	Rear	Edge 1 (Top Edge)	Edge 2 (Right Edge)	Edge 3 (Bottom Edge)	Edge 4 (Left Edge)
WCDMA Band II	Off	Yes	Yes	Yes	No	Yes
	On	Yes	Yes	No	No	No
WCDMA Band V	Off	Yes	Yes	Yes	No	Yes
	On	Yes	Yes	No	No	No
LTE Band 2	Off	Yes	Yes	Yes	No	Yes
	On	Yes	Yes	No	No	No
LTE Band 4	Off	Yes	Yes	Yes	No	Yes
	On	Yes	Yes	No	No	No
LTE Band 5	Off	Yes	Yes	Yes	No	Yes
	On	Yes	Yes	No	No	No
LTE Band 7	Off	Yes	Yes	Yes	No	No
	On	Yes	Yes	No	No	No
LTE Band 12	Off	Yes	Yes	Yes	No	Yes
	On	Yes	Yes	No	No	No
LTE Band 13	Off	Yes	Yes	Yes	No	Yes
	On	Yes	Yes	No	No	No
LTE Band 17	Off	Yes	Yes	Yes	No	Yes
	On	Yes	Yes	No	No	No
Wi-Fi 2.4 GHz (Main Antenna)	Off	Yes	No	Yes	Yes	No
	On	Yes	No	No	No	No
Wi-Fi 2.4 GHz (Sub Antenna)	Off	Yes	No	No	Yes	No
	On	Yes	No	No	No	No
Wi-Fi 5 GHz (Main Antenna)	Off	Yes	No	Yes	Yes	No
	On	Yes	No	No	No	No
Wi-Fi 5 GHz (Sub Antenna)	Off	Yes	No	No	Yes	No
	On	Yes	No	No	No	No
Bluetooth	Off	Yes	No	Yes	No	No

Note(s):

1. Yes = Testing is required. No = Testing is not required.
2. For Pwr Back-off(Edge 1) modes in LTE band 7, there is not required for SAR testing according to applied SAR test exclusion. But SAR of Pwr Back-off(Edge 1) modes in LTE band 7 was evaluated with reduce power level at 0 mm since this scenario is more conservative.

8. Dielectric Property Measurements & System Check

8.1. Dielectric Property Measurements

The temperature of the tissue-equivalent medium used during measurement must also be within 18°C to 25°C and within ± 2°C of the temperature when the tissue parameters are characterized.
The dielectric parameters must be measured before the tissue-equivalent medium is used in a series of SAR measurements. The parameters should be re-measured after each 3 – 4 days of use; or earlier if the dielectric parameters can become out of tolerance; for example, when the parameters are marginal at the beginning of the measurement series.
Tissue dielectric parameters were measured at the low, middle and high frequency of each operating frequency range of the test device.

Tissue Dielectric Parameters

FCC KDB 865664 D01 SAR Measurement 100 MHz to 6 GHz

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

IEEE Std 1528-2013

Refer to Table 3 within the IEEE Std 1528-2013

Dielectric Property Measurements Results:

SAR 1 Room

Date	Freq. (MHz)	Liquid Parameters			Measured	Target	Delta (%)	Limit ±(%)
6-28-2016	Body 750	e'	55.3600	Relative Permittivity (ϵ_r):	55.36	55.55	-0.34	5
		e"	23.3500	Conductivity (σ):	0.97	0.96	1.11	5
	Body 700	e'	55.9000	Relative Permittivity (ϵ_r):	55.90	55.74	0.29	5
		e"	23.8200	Conductivity (σ):	0.93	0.96	-3.35	5
	Body 790	e'	54.9000	Relative Permittivity (ϵ_r):	54.90	55.39	-0.89	5
		e"	23.0500	Conductivity (σ):	1.01	0.97	4.80	5
7-14-2016	Body 750	e'	55.4900	Relative Permittivity (ϵ_r):	55.49	55.55	-0.10	5
		e"	23.2500	Conductivity (σ):	0.97	0.96	0.68	5
	Body 700	e'	56.0200	Relative Permittivity (ϵ_r):	56.02	55.74	0.51	5
		e"	23.6700	Conductivity (σ):	0.92	0.96	-3.96	5
	Body 790	e'	55.0900	Relative Permittivity (ϵ_r):	55.09	55.39	-0.55	5
		e"	22.9600	Conductivity (σ):	1.01	0.97	4.39	5
7-14-2016	Body 835	e'	53.3500	Relative Permittivity (ϵ_r):	53.35	55.20	-3.35	5
		e"	21.5500	Conductivity (σ):	1.00	0.97	3.15	5
	Body 820	e'	53.4600	Relative Permittivity (ϵ_r):	53.46	55.28	-3.29	5
		e"	21.6400	Conductivity (σ):	0.99	0.97	1.88	5
	Body 850	e'	53.2500	Relative Permittivity (ϵ_r):	53.25	55.16	-3.46	5
		e"	21.4900	Conductivity (σ):	1.02	0.99	2.89	5
7-19-2016	Body 5180	e'	47.4200	Relative Permittivity (ϵ_r):	47.42	49.05	-3.32	10
		e"	18.4100	Conductivity (σ):	5.30	5.27	0.59	5
	Body 5200	e'	47.3400	Relative Permittivity (ϵ_r):	47.34	49.02	-3.43	10
		e"	18.5700	Conductivity (σ):	5.37	5.29	1.41	5
	Body 5600	e'	47.0900	Relative Permittivity (ϵ_r):	47.09	48.48	-2.86	10
		e"	18.6100	Conductivity (σ):	5.79	5.76	0.59	5
	Body 5800	e'	46.5300	Relative Permittivity (ϵ_r):	46.53	48.20	-3.46	10
		e"	18.8500	Conductivity (σ):	6.08	6.00	1.32	5
	Body 5825	e'	46.5300	Relative Permittivity (ϵ_r):	46.53	48.20	-3.46	10
		e"	18.6200	Conductivity (σ):	6.03	6.00	0.51	5
7-25-2016	Body 5180	e'	48.4800	Relative Permittivity (ϵ_r):	48.48	49.05	-1.16	10
		e"	18.5000	Conductivity (σ):	5.33	5.27	1.08	5
	Body 5200	e'	48.3700	Relative Permittivity (ϵ_r):	48.37	49.02	-1.33	10
		e"	18.5900	Conductivity (σ):	5.38	5.29	1.52	5
	Body 5600	e'	47.8900	Relative Permittivity (ϵ_r):	47.89	48.48	-1.21	10
		e"	18.7900	Conductivity (σ):	5.85	5.76	1.56	5
	Body 5800	e'	47.5000	Relative Permittivity (ϵ_r):	47.50	48.20	-1.45	10
		e"	18.8500	Conductivity (σ):	6.08	6.00	1.32	5
	Body 5825	e'	47.4600	Relative Permittivity (ϵ_r):	47.46	48.20	-1.54	10
		e"	18.6500	Conductivity (σ):	6.04	6.00	0.68	5
7-29-2016	Body 750	e'	53.8600	Relative Permittivity (ϵ_r):	53.86	55.55	-3.04	5
		e"	23.3400	Conductivity (σ):	0.97	0.96	1.06	5
	Body 700	e'	54.4100	Relative Permittivity (ϵ_r):	54.41	55.74	-2.38	5
		e"	23.8400	Conductivity (σ):	0.93	0.96	-3.27	5
	Body 790	e'	53.4000	Relative Permittivity (ϵ_r):	53.40	55.39	-3.60	5
		e"	22.9800	Conductivity (σ):	1.01	0.97	4.48	5

SAR 1 Room (Continued)

Date	Freq. (MHz)	Liquid Parameters			Measured	Target	Delta (%)	Limit ±(%)
8-9-2016	Body 5180	e'	47.8600	Relative Permittivity (ε_r):	47.86	49.05	-2.42	10
		e"	17.7500	Conductivity (σ):	5.11	5.27	-3.02	5
	Body 5200	e'	47.7800	Relative Permittivity (ε_r):	47.78	49.02	-2.53	10
		e"	17.8300	Conductivity (σ):	5.16	5.29	-2.63	5
	Body 5600	e'	47.3300	Relative Permittivity (ε_r):	47.33	48.48	-2.37	10
		e"	17.9700	Conductivity (σ):	5.60	5.76	-2.87	5
	Body 5800	e'	47.4200	Relative Permittivity (ε_r):	47.42	48.20	-1.62	10
		e"	18.1900	Conductivity (σ):	5.87	6.00	-2.23	5
	Body 5825	e'	47.1200	Relative Permittivity (ε_r):	47.12	48.20	-2.24	10
		e"	17.9000	Conductivity (σ):	5.80	6.00	-3.37	5
8-16-2016	Body 5180	e'	49.1500	Relative Permittivity (ε_r):	49.15	49.05	0.21	10
		e"	18.2700	Conductivity (σ):	5.26	5.27	-0.17	5
	Body 5200	e'	49.0600	Relative Permittivity (ε_r):	49.06	49.02	0.08	10
		e"	18.2500	Conductivity (σ):	5.28	5.29	-0.34	5
	Body 5600	e'	48.5300	Relative Permittivity (ε_r):	48.53	48.48	0.11	10
		e"	18.7200	Conductivity (σ):	5.83	5.76	1.18	5
	Body 5800	e'	48.0700	Relative Permittivity (ε_r):	48.07	48.20	-0.27	10
		e"	18.7800	Conductivity (σ):	6.06	6.00	0.94	5
	Body 5825	e'	48.1500	Relative Permittivity (ε_r):	48.15	48.20	-0.10	10
		e"	18.9000	Conductivity (σ):	6.12	6.00	2.02	5

SAR 2 Room

Date	Freq. (MHz)	Liquid Parameters			Measured	Target	Delta (%)	Limit ±(%)
2016-06-24	Body 1750	e'	55.0300	Relative Permittivity (ε_r):	55.03	53.44	2.97	5
		e"	14.7800	Conductivity (σ):	1.44	1.49	-3.23	5
	Body 1710	e'	55.1000	Relative Permittivity (ε_r):	55.10	53.54	2.91	5
		e"	14.7400	Conductivity (σ):	1.40	1.46	-4.11	5
	Body 1755	e'	55.0200	Relative Permittivity (ε_r):	55.02	53.43	2.98	5
		e"	14.7800	Conductivity (σ):	1.44	1.49	-3.15	5
2016-06-24	Body 1900	e'	54.5900	Relative Permittivity (ε_r):	54.59	53.30	2.42	5
		e"	14.9700	Conductivity (σ):	1.58	1.52	4.05	5
	Body 1850	e'	54.7900	Relative Permittivity (ε_r):	54.79	53.30	2.80	5
		e"	14.9100	Conductivity (σ):	1.53	1.52	0.90	5
	Body 1910	e'	54.5500	Relative Permittivity (ε_r):	54.55	53.30	2.35	5
		e"	14.9800	Conductivity (σ):	1.59	1.52	4.66	5
2016-06-28	Body 1750	e'	54.0200	Relative Permittivity (ε_r):	54.02	53.44	1.08	5
		e"	14.8800	Conductivity (σ):	1.45	1.49	-2.57	5
	Body 1710	e'	54.1000	Relative Permittivity (ε_r):	54.10	53.54	1.04	5
		e"	14.9000	Conductivity (σ):	1.42	1.46	-3.07	5
	Body 1755	e'	54.0100	Relative Permittivity (ε_r):	54.01	53.43	1.09	5
		e"	14.8800	Conductivity (σ):	1.45	1.49	-2.50	5
2016-06-28	Body 1900	e'	53.6300	Relative Permittivity (ε_r):	53.63	53.30	0.62	5
		e"	15.0200	Conductivity (σ):	1.59	1.52	4.39	5
	Body 1850	e'	53.7900	Relative Permittivity (ε_r):	53.79	53.30	0.92	5
		e"	15.0000	Conductivity (σ):	1.54	1.52	1.51	5
	Body 1910	e'	53.6000	Relative Permittivity (ε_r):	53.60	53.30	0.56	5
		e"	15.0200	Conductivity (σ):	1.60	1.52	4.94	5
2016-07-11	Body 2450	e'	54.0300	Relative Permittivity (ε_r):	54.03	52.70	2.52	5
		e"	13.8100	Conductivity (σ):	1.88	1.95	-3.52	5
	Body 2410	e'	54.1500	Relative Permittivity (ε_r):	54.15	52.76	2.64	5
		e"	13.6300	Conductivity (σ):	1.83	1.91	-4.25	5
	Body 2475	e'	53.9400	Relative Permittivity (ε_r):	53.94	52.67	2.41	5
		e"	13.9300	Conductivity (σ):	1.92	1.99	-3.43	5
2016-07-19	Body 2450	e'	51.4200	Relative Permittivity (ε_r):	51.42	52.70	-2.43	5
		e"	14.2600	Conductivity (σ):	1.94	1.95	-0.38	5
	Body 2410	e'	51.5600	Relative Permittivity (ε_r):	51.56	52.76	-2.27	5
		e"	14.1300	Conductivity (σ):	1.89	1.91	-0.73	5
	Body 2475	e'	51.3500	Relative Permittivity (ε_r):	51.35	52.67	-2.50	5
		e"	14.4000	Conductivity (σ):	1.98	1.99	-0.17	5
2016-07-20	Body 835	e'	53.7100	Relative Permittivity (ε_r):	53.71	55.20	-2.70	5
		e"	21.1600	Conductivity (σ):	0.98	0.97	1.28	5
	Body 820	e'	53.8400	Relative Permittivity (ε_r):	53.84	55.28	-2.60	5
		e"	21.2500	Conductivity (σ):	0.97	0.97	0.04	5
	Body 850	e'	53.5800	Relative Permittivity (ε_r):	53.58	55.16	-2.86	5
		e"	21.1000	Conductivity (σ):	1.00	0.99	1.02	5
2016-07-21	Body 750	e'	55.5600	Relative Permittivity (ε_r):	55.56	55.55	0.02	5
		e"	23.1300	Conductivity (σ):	0.96	0.96	0.16	5
	Body 700	e'	56.0700	Relative Permittivity (ε_r):	56.07	55.74	0.59	5
		e"	23.6600	Conductivity (σ):	0.92	0.96	-4.00	5
	Body 790	e'	55.1700	Relative Permittivity (ε_r):	55.17	55.39	-0.40	5
		e"	22.7800	Conductivity (σ):	1.00	0.97	3.57	5
2016-07-22	Body 2450	e'	52.3600	Relative Permittivity (ε_r):	52.36	52.70	-0.65	5
		e"	14.3700	Conductivity (σ):	1.96	1.95	0.39	5
	Body 2410	e'	52.4600	Relative Permittivity (ε_r):	52.46	52.76	-0.57	5
		e"	14.1800	Conductivity (σ):	1.90	1.91	-0.38	5
	Body 2475	e'	52.2800	Relative Permittivity (ε_r):	52.28	52.67	-0.74	5
		e"	14.5100	Conductivity (σ):	2.00	1.99	0.59	5

SAR 2 Room (Continued)

Date	Freq. (MHz)	Liquid Parameters			Measured	Target	Delta (%)	Limit ±(%)
7-26-2016	Body 2450	e'	51.9500	Relative Permittivity (ε_r):	51.95	52.70	-1.42	5
		e"	14.3500	Conductivity (σ):	1.95	1.95	0.25	5
	Body 2410	e'	52.0600	Relative Permittivity (ε_r):	52.06	52.76	-1.33	5
		e"	14.1900	Conductivity (σ):	1.90	1.91	-0.31	5
	Body 2475	e'	51.8700	Relative Permittivity (ε_r):	51.87	52.67	-1.52	5
		e"	14.4900	Conductivity (σ):	1.99	1.99	0.45	5
8-2-2016	Body 2600	e'	51.4900	Relative Permittivity (ε_r):	51.49	52.51	-1.94	5
		e"	15.0800	Conductivity (σ):	2.18	2.16	0.89	5
	Body 2500	e'	51.7500	Relative Permittivity (ε_r):	51.75	52.64	-1.69	5
		e"	14.8500	Conductivity (σ):	2.06	2.02	2.18	5
	Body 2700	e'	51.2100	Relative Permittivity (ε_r):	51.21	52.38	-2.24	5
		e"	15.2900	Conductivity (σ):	2.30	2.30	-0.26	5
8-11-2016	Body 835	e'	54.5909	Relative Permittivity (ε_r):	54.59	55.20	-1.10	5
		e"	21.2326	Conductivity (σ):	0.99	0.97	1.63	5
	Body 820	e'	54.7106	Relative Permittivity (ε_r):	54.71	55.28	-1.02	5
		e"	21.3023	Conductivity (σ):	0.97	0.97	0.29	5
	Body 850	e'	54.4632	Relative Permittivity (ε_r):	54.46	55.16	-1.26	5
		e"	21.1701	Conductivity (σ):	1.00	0.99	1.36	5
8-12-2016	Body 2450	e'	52.1900	Relative Permittivity (ε_r):	52.19	52.70	-0.97	5
		e"	14.9600	Conductivity (σ):	2.04	1.95	4.51	5
	Body 2410	e'	52.2900	Relative Permittivity (ε_r):	52.29	52.76	-0.89	5
		e"	14.8700	Conductivity (σ):	1.99	1.91	4.46	5
	Body 2475	e'	52.1200	Relative Permittivity (ε_r):	52.12	52.67	-1.04	5
		e"	15.0200	Conductivity (σ):	2.07	1.99	4.12	5
8-16-2016	Body 2450	e'	53.2700	Relative Permittivity (ε_r):	53.27	52.70	1.08	5
		e"	14.6100	Conductivity (σ):	1.99	1.95	2.07	5
	Body 2410	e'	53.3400	Relative Permittivity (ε_r):	53.34	52.76	1.10	5
		e"	14.5000	Conductivity (σ):	1.94	1.91	1.87	5
	Body 2475	e'	53.2000	Relative Permittivity (ε_r):	53.20	52.67	1.01	5
		e"	14.6600	Conductivity (σ):	2.02	1.99	1.63	5
8-24-2016	Body 2600	e'	51.7400	Relative Permittivity (ε_r):	51.74	52.51	-1.47	5
		e"	14.7600	Conductivity (σ):	2.13	2.16	-1.25	5
	Body 2500	e'	52.0200	Relative Permittivity (ε_r):	52.02	52.64	-1.17	5
		e"	14.5100	Conductivity (σ):	2.02	2.02	-0.16	5
	Body 2700	e'	51.4600	Relative Permittivity (ε_r):	51.46	52.38	-1.77	5
		e"	15.0100	Conductivity (σ):	2.25	2.30	-2.08	5

SAR 3 Room

Date	Freq. (MHz)	Liquid Parameters			Measured	Target	Delta (%)	Limit ±(%)
6-27-2016	Body 835	e'	52.9500	Relative Permittivity (ϵ_r):	52.95	55.20	-4.08	5
		e"	21.5100	Conductivity (σ):	1.00	0.97	2.96	5
	Body 820	e'	53.0700	Relative Permittivity (ϵ_r):	53.07	55.28	-3.99	5
		e"	21.5700	Conductivity (σ):	0.98	0.97	1.55	5
	Body 850	e'	52.8200	Relative Permittivity (ϵ_r):	52.82	55.16	-4.24	5
		e"	21.4800	Conductivity (σ):	1.02	0.99	2.84	5
7-1-2016	Body 835	e'	53.2600	Relative Permittivity (ϵ_r):	53.26	55.20	-3.51	5
		e"	21.4300	Conductivity (σ):	0.99	0.97	2.57	5
	Body 820	e'	53.3300	Relative Permittivity (ϵ_r):	53.33	55.28	-3.52	5
		e"	21.5100	Conductivity (σ):	0.98	0.97	1.27	5
	Body 850	e'	53.1800	Relative Permittivity (ϵ_r):	53.18	55.16	-3.58	5
		e"	21.4100	Conductivity (σ):	1.01	0.99	2.51	5
7-15-2016	Body 1900	e'	52.4700	Relative Permittivity (ϵ_r):	52.47	53.30	-1.56	5
		e"	14.9800	Conductivity (σ):	1.58	1.52	4.12	5
	Body 1850	e'	52.7000	Relative Permittivity (ϵ_r):	52.70	53.30	-1.13	5
		e"	14.9200	Conductivity (σ):	1.53	1.52	0.97	5
	Body 1910	e'	52.4000	Relative Permittivity (ϵ_r):	52.40	53.30	-1.69	5
		e"	14.9100	Conductivity (σ):	1.58	1.52	4.18	5
7-19-2016	Body 1750	e'	54.2700	Relative Permittivity (ϵ_r):	54.27	53.44	1.55	5
		e"	14.5400	Conductivity (σ):	1.41	1.49	-4.80	5
	Body 1710	e'	54.3300	Relative Permittivity (ϵ_r):	54.33	53.54	1.47	5
		e"	14.6100	Conductivity (σ):	1.39	1.46	-4.95	5
	Body 1755	e'	54.2300	Relative Permittivity (ϵ_r):	54.23	53.43	1.50	5
		e"	14.5000	Conductivity (σ):	1.41	1.49	-4.99	5
7-19-2016	Body 1900	e'	53.9100	Relative Permittivity (ϵ_r):	53.91	53.30	1.14	5
		e"	14.9500	Conductivity (σ):	1.58	1.52	3.91	5
	Body 1850	e'	54.1700	Relative Permittivity (ϵ_r):	54.17	53.30	1.63	5
		e"	14.8200	Conductivity (σ):	1.52	1.52	0.29	5
	Body 1910	e'	53.9100	Relative Permittivity (ϵ_r):	53.91	53.30	1.14	5
		e"	14.9400	Conductivity (σ):	1.59	1.52	4.39	5
8-2-2016	Body 750	e'	54.9800	Relative Permittivity (ϵ_r):	54.98	55.55	-1.02	5
		e"	23.1300	Conductivity (σ):	0.96	0.96	0.16	5
	Body 700	e'	55.4900	Relative Permittivity (ϵ_r):	55.49	55.74	-0.45	5
		e"	23.6600	Conductivity (σ):	0.92	0.96	-4.00	5
	Body 790	e'	54.5600	Relative Permittivity (ϵ_r):	54.56	55.39	-1.50	5
		e"	22.8000	Conductivity (σ):	1.00	0.97	3.66	5
8-11-2016	Body 750	e'	54.9900	Relative Permittivity (ϵ_r):	54.99	55.55	-1.00	5
		e"	22.9900	Conductivity (σ):	0.96	0.96	-0.45	5
	Body 700	e'	55.5400	Relative Permittivity (ϵ_r):	55.54	55.74	-0.36	5
		e"	23.4400	Conductivity (σ):	0.91	0.96	-4.89	5
	Body 790	e'	54.5500	Relative Permittivity (ϵ_r):	54.55	55.39	-1.52	5
		e"	22.6900	Conductivity (σ):	1.00	0.97	3.16	5
8-24-2016	Body 835	e'	56.2200	Relative Permittivity (ϵ_r):	56.22	55.20	1.85	5
		e"	21.4200	Conductivity (σ):	0.99	0.97	2.53	5
	Body 820	e'	56.3300	Relative Permittivity (ϵ_r):	56.33	55.28	1.91	5
		e"	21.5100	Conductivity (σ):	0.98	0.97	1.27	5
	Body 850	e'	56.1200	Relative Permittivity (ϵ_r):	56.12	55.16	1.75	5
		e"	21.3400	Conductivity (σ):	1.01	0.99	2.17	5
8-25-2016	Body 750	e'	55.8800	Relative Permittivity (ϵ_r):	55.88	55.55	0.60	5
		e"	22.0500	Conductivity (σ):	0.92	0.96	-4.52	5
	Body 835	e'	55.0700	Relative Permittivity (ϵ_r):	55.07	55.20	-0.24	5
		e"	21.5200	Conductivity (σ):	1.00	0.97	3.00	5
	Body 850	e'	54.9500	Relative Permittivity (ϵ_r):	54.95	55.16	-0.38	5
		e"	21.4700	Conductivity (σ):	1.01	0.99	2.79	5

8.2. System 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 re-measured or sooner when marginal liquid parameters are used at the beginning of a series of measurements.

System Performance Check Measurement Conditions:

- The measurements were performed in the flat section of the TWIN SAM or ELI phantom, shell thickness: 2.0 ±0.2 mm (bottom plate) filled with Body or Head simulating liquid of the following parameters.
- The depth of tissue-equivalent liquid in a phantom must be ≥ 15.0 cm for SAR measurements ≤ 3 GHz and ≥ 10.0 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.

Reference Target SAR Values

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 (W/kg)		
				1g/10g	Head	Body
D750V3	1122	8-17-2015	750	1g	8.23	8.60
				10g	5.37	5.67
D835V2	4d194	9-17-2015	835	1g	9.38	9.49
				10g	6.09	6.18
D835V2	4d174	9-30-2015	835	1g	9.23	9.49
				10g	6.01	6.22
D1750V2	1125	8-20-2015	1750	1g	36.70	37.20
				10g	19.50	20.00
D1900V2	5d199	2-19-2016	1900	1g	39.80	39.50
				10g	20.70	20.90
D2450V2	939	9-28-2015	2450	1g	51.60	50.70
				10g	23.90	23.70
D2600V2	1097	11-18-2015	2450	1g	58.50	55.80
				10g	26.10	25.00
D5GHzV2	1184	8-26-2015	5200	1g	79.60	76.10
				10g	22.70	21.20
D5GHzV2	1184	8-26-2015	5600	1g	82.80	80.50
				10g	23.60	22.30
D5GHzV2	1184	8-26-2015	5800	1g	80.30	78.70
				10g	22.80	21.70
D5GHzV2	1209	2-26-2016	5200	1g	75.80	73.10
				10g	21.90	20.50
D5GHzV2	1209	2-26-2016	5600	1g	81.60	79.10
				10g	23.40	22.10
D5GHzV2	1209	2-26-2016	5800	1g	77.90	76.00
				10g	22.10	21.20

System 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.

SAR 1 Room

Date Tested	System Dipole		T.S. Liquid		Measured Results		Target (Ref. Value)	Delta ±10 %	Plot No.
	Type	Serial #			Zoom Scan to 100 mW	Normalize to 1 W			
6-28-2016	D750V3	1122	Body	1g	0.86	8.60	8.60	0.00	
				10g	0.57	5.70	5.67	0.53	
7-14-2016	D750V3	1122	Body	1g	0.88	8.80	8.60	2.33	
				10g	0.58	5.80	5.67	2.29	
7-14-2016	D835V2	4d194	Body	1g	1.01	10.10	9.49	6.43	
				10g	0.66	6.60	6.18	6.80	
7-19-2016	D5GHzV2	1184	Body	1g	7.55	75.50	76.10	-0.79	
				10g	2.14	21.40	21.20	0.94	
7-19-2016	D5GHzV2	1184	Body	1g	8.31	83.10	80.50	3.23	
				10g	2.33	23.30	22.30	4.48	
7-19-2016	D5GHzV2	1184	Body	1g	7.57	75.70	78.70	-3.81	
				10g	2.13	21.30	21.70	-1.84	
7-25-2016	D5GHzV2	1184	Body	1g	7.56	75.60	76.10	-0.66	
				10g	2.13	21.30	21.20	0.47	
7-25-2016	D5GHzV2	1184	Body	1g	8.37	83.70	80.50	3.98	
				10g	2.37	23.70	22.30	6.28	
7-25-2016	D5GHzV2	1184	Body	1g	7.38	73.80	78.70	-6.23	1, 2
				10g	2.07	20.70	21.70	-4.61	
7-29-2016	D750V3	1122	Body	1g	0.83	8.27	8.60	-3.84	3, 4
				10g	0.55	5.54	5.67	-2.29	
8-9-2016	D5GHzV2	1184	Body	1g	7.46	74.60	76.10	-1.97	
				10g	2.10	21.00	21.20	-0.94	
8-9-2016	D5GHzV2	1184	Body	1g	8.63	86.30	80.50	7.20	
				10g	2.42	24.20	22.30	8.52	
8-9-2016	D5GHzV2	1184	Body	1g	7.23	72.30	78.70	-8.13	5, 6
				10g	2.03	20.30	21.70	-6.45	
8-16-2016	D5GHzV2	1209	Body	1g	7.37	73.70	73.10	0.82	
				10g	2.10	21.00	20.50	2.44	
8-16-2016	D5GHzV2	1209	Body	1g	8.51	85.10	79.10	7.59	
				10g	2.39	23.90	22.10	8.14	
8-16-2016	D5GHzV2	1209	Body	1g	7.34	73.40	76.00	-3.42	
				10g	2.07	20.70	21.20	-2.36	

SAR 2 Room

Date Tested	System Dipole		T.S. Liquid		Measured Results		Target (Ref. Value)	Delta ±10 %	Plot No.
	Type	Serial #			Zoom Scan to 100 mW	Normalize to 1 W			
6-24-2016	D1750V2	1125	Body	1g	3.63	36.30	37.20	-2.42	
				10g	1.96	19.60	20.00	-2.00	
6-24-2016	D1900V2	5d199	Body	1g	4.17	41.70	39.50	5.57	
				10g	2.16	21.60	20.90	3.35	
6-28-2016	D1750V2	1125	Body	1g	3.59	35.90	37.20	-3.49	
				10g	1.93	19.30	20.00	-3.50	
6-28-2016	D1900V2	5d199	Body	1g	4.20	42.00	39.50	6.33	7, 8
				10g	2.17	21.70	20.90	3.83	
7-11-2016	D2450V2	939	Body	1g	5.32	53.20	50.70	4.93	
				10g	2.31	23.10	23.70	-2.53	
7-19-2016	D2450V2	939	Body	1g	5.32	53.20	50.70	4.93	
				10g	2.33	23.30	23.70	-1.69	
7-20-2016	D835V2	4d174	Body	1g	0.99	9.86	9.49	3.90	
				10g	0.65	6.50	6.22	4.50	
7-21-2016	D750V3	1122	Body	1g	0.84	8.35	8.60	-2.91	9, 10
				10g	0.56	5.58	5.67	-1.59	
7-22-2016	D2450V2	939	Body	1g	5.39	53.90	50.70	6.31	
				10g	2.49	24.90	23.70	5.06	
7-26-2016	D2450V2	939	Body	1g	5.50	55.00	50.70	8.48	11, 12
				10g	2.56	25.60	23.70	8.02	
8-02-2016	D2600V2	1097	Body	1g	6.01	60.10	55.80	7.71	13, 14
				10g	2.60	26.00	25.00	4.00	
8-11-2016	D835V2	4d174	Body	1g	0.99	9.90	9.49	4.32	
				10g	0.65	6.52	6.22	4.82	
8-12-2016	D2450V2	939	Body	1g	5.37	53.70	50.70	5.92	15, 16
				10g	2.45	24.50	23.7	3.38	
8-16-2016	D2450V2	939	Body	1g	5.30	53.00	50.70	4.54	
				10g	2.42	24.20	23.7	2.11	
8-24-2016	D2600V2	1097	Body	1g	5.62	56.20	55.80	0.72	
				10g	2.45	24.50	25.00	-2.00	

SAR 3 Room

Date Tested	System Dipole		T.S. Liquid		Measured Results		Target (Ref. Value)	Delta ±10 %	Plot No.
	Type	Serial #			Zoom Scan to 100 mW	Normalize to 1 W			
6-27-2016	D835V2	4d194	Body	1g	1.03	10.30	9.49	8.54	17, 18
				10g	0.67	6.74	6.18	9.06	
7-1-2016	D835V2	4d194	Body	1g	1.00	10.00	9.49	5.37	
				10g	0.66	6.60	6.18	6.80	
7-15-2016	D1900V2	5d199	Body	1g	4.20	42.00	39.50	6.33	
				10g	2.15	21.50	20.90	2.87	
7-19-2016	D1750V2	1125	Body	1g	3.57	35.70	37.20	-4.03	19, 20
				10g	1.90	19.00	20.00	-5.00	
7-19-2016	D1900V2	5d199	Body	1g	4.20	42.00	39.50	6.33	
				10g	2.17	21.70	20.90	3.83	
8-02-2016	D750V3	1122	Body	1g	0.87	8.73	8.60	1.51	
				10g	0.58	5.81	5.67	2.47	
8-11-2016	D750V3	1122	Body	1g	0.84	8.42	8.60	-2.09	
				10g	0.56	5.63	5.67	-0.71	
8-24-2016	D835V2	4d174	Body	1g	1.02	10.20	9.49	7.48	21, 22
				10g	0.67	6.72	6.22	8.04	
8-25-2016	D835V2	4d174	Body	1g	1.02	10.20	9.49	7.48	
				10g	0.67	6.68	6.22	7.40	

9. Conducted Output Power Measurements

9.1. W-CDMA

Release 99 Setup Procedures used to establish the test signals

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 2
	Rel99 RMC	12.2kbps RMC
	Power Control Algorithm	Algorithm2
	βc/βd	8/15

HSDPA Setup Procedures used to establish the test signals

The following 4 Sub-tests were completed according to Release 5 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-Set 1			
	Power Control Algorithm	Algorithm 2			
	βc	2/15	11/15	15/15	15/15
	βd	15/15	15/15	8/15	4/15
	Bd (SF)	64			
	βc/βd	2/15	11/15	15/8	15/4
	βhs	4/15	24/15	30/15	30/15
	MPR (dB)	0	0	0.5	0.5
HSDPA Specific Settings	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			
	Ahs=βhs/βc	30/15			

HSPA (HSDPA & HSUPA) Setup Procedures used to establish the test signals

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				
	Subtest	1	2	3	4	5
WCDMA General Settings	Loopback Mode	Test Mode 1				
	Rel99 RMC	12.2 kbps RMC				
	HSDPA FRC	H-Set 1				
	HSUPA Test	HSPA				
	Power Control Algorithm	Algorithm 2				Algorithm 1
	βc	11/15	6/15	15/15	2/15	15/15
	βd	15/15	15/15	9/15	15/15	0
	βec	209/225	12/15	30/15	2/15	5/15
	βc/βd	11/15	6/15	15/9	2/15	15/1
	βhs	22/15	12/15	30/15	4/15	5/15
	βed	1309/225	94/75	47/15	56/75	47/15
	CM (dB)	1	3	2	3	1
	MPR (dB)	0	2	1	2	0
HSDPA Specific Settings	DACK	8				0
	DNAK	8				0
	DCQI	8				0
	Ack-Nack repetition factor	3				
	CQI Feedback (Table 5.2B.4)	4ms				
	CQI Repetition Factor (Table 5.2B.4)	2				
	Ahs = βhs/βc	30/15				
HSUPA Specific Settings	E-DPDCCH	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	5	5	2	5	1
	Reference E-TFCI	11	11	11	11	67
	Reference E-TFCI PO	4	4	4	4	18
	Reference E-TFCI	67	67	92	67	67
	Reference E-TFCI PO	18	18	18	18	18
	Reference E-TFCI	71	71	71	71	71
	Reference E-TFCI PO	23	23	23	23	23
	Reference E-TFCI	75	75	75	75	75
	Reference E-TFCI PO	26	26	26	26	26
	Reference E-TFCI	81	81	81	81	81
	Reference E-TFCI PO	27	27	27	27	27
	Maximum Channelization Codes	2xSF2				SF4

DC-HSDPA Setup Procedures used to establish the test signals

The following tests were completed according to procedures in section 7.3.13 of 3GPP TS34.108 v9.5.0. A summary of these settings are illustrated below:

Downlink Physical Channels are set as per 3GPP TS34.121-1 v9.0.0 E.5.0

Table E.5.0: Levels for HSDPA connection setup

Parameter During Connection setup	Unit	Value
P-CPICH_Ec/Ior	dB	-10
P-CCPCH and SCH_Ec/Ior	dB	-12
PICH _Ec/Ior	dB	-15
HS-PDSCH	dB	off
HS-SCCH_1	dB	off
DPCH_Ec/Ior	dB	-5
OCNS_Ec/Ior	dB	-3.1

Call is set up as per 3GPP TS34.108 v9.5.0 sub clause 7.3.13

The configurations of the fixed reference channels for HSDPA RF tests are described in 3GPP TS 34.121, annex C for FDD and 3GPP TS 34.122.

Table C.8.1.12: Fixed Reference Channel H-Set 12

Parameter	Unit	Value
Nominal Avg. Inf. Bit Rate	kbps	60
Inter-TTI Distance	TTI's	1
Number of HARQ Processes	Processes	6
Information Bit Payload (N_{INF})	Bits	120
Number Code Blocks	Blocks	1
Binary Channel Bits Per TTI	Bits	960
Total Available SML's in UE	SML's	19200
Number of SML's per HARQ Proc.	SML's	3200
Coding Rate		0.15
Number of Physical Channel Codes	Codes	1
Modulation		QPSK
Note 1: The RMC is intended to be used for DC-HSDPA mode and both cells shall transmit with identical parameters as listed in the table.		
Note 2: Maximum number of transmission is limited to 1, i.e., retransmission is not allowed. The redundancy and constellation version 0 shall be used.		

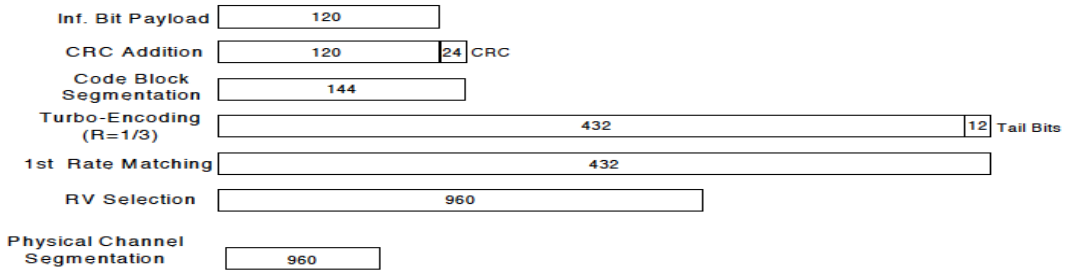


Figure C.8.19: Coding rate for Fixed reference Channel H-Set 12 (QPSK)

The following 4 Sub-tests for HSDPA were completed according to Release 8 procedures in section 5.2 of 3GPP TS34.121. A summary of subtest settings are illustrated below:

	Mode	HSDPA	HSDPA	HSDPA	HSDPA
	Subtest	1	2	3	4
WCDMA General Settings	Loopback Mode	Test Mode 1			
	Rel99 RMC	12.2kbps RMC			
	HSDPA FRC	H-Set 1			
	Power Control Algorithm	Algorithm2			
	βc	2/15	11/15	15/15	15/15
	βd	15/15	15/15	8/15	4/15
	βd (SF)	64			
	βc/βd	2/15	11/15	15/8	15/4
	βhs	4/15	24/15	30/15	30/15
	MPR (dB)	0	0	0.5	0.5
HSDPA Specific Settings	DACK	8			
	DNAK	8			
	DCQI	8			
	Ack-Nack Repetition factor	3			
	CQI Feedback	4ms			
	CQI Repetition Factor	2			
	Ahs = βhs/ βc	30/15			

HSPA+

Since 16QAM is not used for uplink, the uplink Category and release is same as HSUPA, i.e., Rel. 7 Therefore, the RF conducted power is not measured.

W-CDMA Band II Measured Results

Band	Mode		UL Ch No.	Freq. (MHz)	MPR (dB)	Max. Pwr (dBm)	Reduced Pwr (dBm)
W-CDMA Band II	Rel 99	RMC, 12.2 kbps	9262	1852.4	N/A	23.5	13.5
			9400	1880.0	N/A	23.7	13.8
			9538	1907.6	N/A	23.4	13.6
	HSDPA	Subtest 1	9262	1852.4	0	22.2	12.5
			9400	1880.0	0	22.5	12.7
			9538	1907.6	0	22.3	12.6
		Subtest 2	9262	1852.4	0	21.9	11.9
			9400	1880.0	0	22.1	12.4
			9538	1907.6	0	21.8	12.2
		Subtest 3	9262	1852.4	0.5	21.8	12.0
			9400	1880.0	0.5	22.0	12.3
			9538	1907.6	0.5	21.7	12.1
		Subtest 4	9262	1852.4	0.5	21.7	12.0
			9400	1880.0	0.5	22.0	12.3
			9538	1907.6	0.5	21.7	12.2
	HSUPA	Subtest 1	9262	1852.4	0	22.3	12.5
			9400	1880.0	0	22.4	12.8
			9538	1907.6	0	22.3	12.6
		Subtest 2	9262	1852.4	2	20.3	10.4
			9400	1880.0	2	20.5	10.7
			9538	1907.6	2	20.3	10.6
		Subtest 3	9262	1852.4	1	21.2	11.5
			9400	1880.0	1	21.5	11.7
			9538	1907.6	1	21.3	11.6
		Subtest 4	9262	1852.4	2	20.3	10.4
			9400	1880.0	2	20.5	10.7
			9538	1907.6	2	20.3	10.6
		Subtest 5	9262	1852.4	0	22.3	12.5
			9400	1880.0	0	22.5	12.8
			9538	1907.6	0	22.3	12.7
	DC-HSDPA	Subtest 1	9262	1852.4	0	22.2	12.4
			9400	1880.0	0	22.5	12.7
			9538	1907.6	0	22.3	12.5
		Subtest 2	9262	1852.4	2	21.9	12.1
			9400	1880.0	2	22.2	12.4
			9538	1907.6	2	21.9	12.2
		Subtest 3	9262	1852.4	1	21.8	12.0
			9400	1880.0	1	22.0	12.3
			9538	1907.6	1	21.8	12.1
		Subtest 4	9262	1852.4	2	21.7	12.0
			9400	1880.0	2	22.0	12.3
			9538	1907.6	2	21.8	12.1

W-CDMA Band V Measured Results

Band	Mode		UL Ch No.	Freq. (MHz)	MPR (dB)	Max. Pwr (dBm)	Reduced Pwr (dBm)
W-CDMA Band V	Rel 99	RMC, 12.2 kbps	4132	826.4	N/A	22.9	15.8
			4183	836.6	N/A	23.1	15.6
			4233	846.6	N/A	23.2	15.9
	HSDPA	Subtest 1	4132	826.4	0	21.4	14.7
			4183	836.6	0	21.7	14.9
			4233	846.6	0	21.7	15.4
		Subtest 2	4132	826.4	0	21.1	14.3
			4183	836.6	0	21.3	14.4
			4233	846.6	0	21.4	15.0
		Subtest 3	4132	826.4	0.5	20.9	14.2
			4183	836.6	0.5	21.2	14.3
			4233	846.6	0.5	21.2	14.8
		Subtest 4	4132	826.4	0.5	20.9	14.2
			4183	836.6	0.5	21.2	14.3
			4233	846.6	0.5	21.2	14.8
	HSUPA	Subtest 1	4132	826.4	0	21.3	14.7
			4183	836.6	0	21.6	14.8
			4233	846.6	0	21.7	15.3
		Subtest 2	4132	826.4	2	19.4	12.6
			4183	836.6	2	19.6	12.8
			4233	846.6	2	19.7	13.3
		Subtest 3	4132	826.4	1	20.4	13.6
			4183	836.6	1	20.6	13.8
			4233	846.6	1	20.7	14.3
		Subtest 4	4132	826.4	2	19.4	12.6
			4183	836.6	2	19.6	12.8
			4233	846.6	2	19.7	13.4
		Subtest 5	4132	826.4	0	21.5	14.6
			4183	836.6	0	21.7	14.7
			4233	846.6	0	21.7	15.3
	DC-HSDPA	Subtest 1	4132	826.4	0	21.4	14.5
			4183	836.6	0	21.6	14.7
			4233	846.6	0	21.6	15.2
		Subtest 2	4132	826.4	2	21.0	14.2
			4183	836.6	2	21.3	14.4
			4233	846.6	2	21.4	14.9
		Subtest 3	4132	826.4	1	20.9	14.1
			4183	836.6	1	21.2	14.2
			4233	846.6	1	21.2	14.8
		Subtest 4	4132	826.4	2	20.9	14.1
			4183	836.6	2	21.2	14.2
			4233	846.6	2	21.2	14.8

9.2. LTE

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

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

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

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

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

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

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

LTE Band 2 Measured Results

Band	BW (MHz)	Mode	RB Allocation	RB offset	Target MPR	Max. Avg Pwr (dBm)			Target MPR	Reduced Avg Pwr (dBm)		
						1860 MHz	1880 MHz	1900 MHz		1860 MHz	1880 MHz	1900 MHz
LTE Band 2	20	QPSK	1	0	0	23.5	23.9	23.7	0	14.2	14.4	14.2
			1	49	0	23.5	24.3	23.7	0	14.3	14.7	14.7
			1	99	0	23.7	23.9	23.7	0	14.4	14.4	14.2
			50	0	1	22.8	22.9	22.8	0	14.2	14.2	14.3
			50	24	1	22.8	22.9	22.7	0	14.1	14.4	14.4
			50	50	1	22.7	22.8	22.7	0	14.0	14.2	14.2
			100	0	1	22.7	22.8	22.8	0	14.2	14.3	14.2
		16QAM	1	0	1	22.5	22.4	22.5	0	14.2	13.7	13.7
			1	49	1	22.6	22.8	22.3	0	14.4	14.5	14.2
			1	99	1	22.0	22.5	22.0	0	13.8	13.6	13.8
			50	0	2	21.6	21.8	21.6	0	14.1	14.2	14.2
			50	24	2	21.8	22.0	21.5	0	14.3	14.3	14.4
			50	50	2	21.7	21.8	21.5	0	14.2	14.3	14.1
			100	0	2	21.7	21.7	21.8	0	14.1	14.2	14.2

Band	BW (MHz)	Mode	RB Allocation	RB offset	Target MPR	Max. Avg Pwr (dBm)			Target MPR	Reduced Avg Pwr (dBm)		
						1857.5 MHz	1880 MHz	1902.5 MHz		1857.5 MHz	1880 MHz	1902.5 MHz
LTE Band 2	15	QPSK	1	0	0	23.7	23.8	23.7	0	14.3	14.1	14.3
			1	36	0	23.9	24.0	23.9	0	14.3	14.5	14.3
			1	74	0	23.5	23.9	23.4	0	14.0	14.2	13.8
			36	0	1	22.6	22.9	22.6	0	14.3	14.3	14.3
			36	18	1	22.6	22.9	22.7	0	14.1	14.3	14.3
			36	37	1	22.7	22.7	22.7	0	14.1	14.3	14.1
			75	0	1	22.7	22.8	22.6	0	14.1	14.3	14.2
		16QAM	1	0	1	22.9	22.7	23.0	0	14.1	14.1	14.4
			1	36	1	23.1	23.1	23.2	0	14.0	14.5	14.3
			1	74	1	23.0	22.4	22.8	0	13.8	13.9	14.4
			36	0	2	21.6	21.8	21.6	0	14.2	14.3	14.3
			36	18	2	21.7	21.8	21.6	0	13.9	14.2	14.2
			36	37	2	21.6	21.7	21.6	0	14.0	14.3	14.1
			75	0	2	21.6	21.8	21.4	0	14.0	14.2	14.2

Band	BW (MHz)	Mode	RB Allocation	RB offset	Target MPR	Max. Avg Pwr (dBm)			Target MPR	Reduced Avg Pwr (dBm)		
						1855 MHz	1880 MHz	1905 MHz		1855 MHz	1880 MHz	1905 MHz
LTE Band 2	10	QPSK	1	0	0	23.9	23.8	23.8	0	14.3	14.3	14.3
			1	25	0	23.8	23.8	23.9	0	14.3	14.6	14.5
			1	49	0	23.9	23.9	23.6	0	14.3	14.3	13.9
			25	0	1	22.6	22.8	22.7	0	14.3	14.2	14.2
			25	12	1	22.6	22.9	22.7	0	14.3	14.4	14.2
			25	25	1	22.6	22.8	22.7	0	14.2	14.3	14.1
			50	0	1	22.6	22.9	22.6	0	14.1	14.3	14.2
		16QAM	1	0	1	23.0	22.2	22.5	0	14.1	14.0	14.2
			1	25	1	23.3	22.7	22.8	0	14.0	14.5	14.4
			1	49	1	23.2	22.7	22.6	0	14.0	14.1	14.0
			25	0	2	21.7	21.7	21.8	0	14.2	14.2	14.3
			25	12	2	21.4	21.8	21.7	0	14.2	14.5	14.2
			25	25	2	21.6	21.7	21.7	0	14.0	14.4	14.2
			50	0	2	21.7	21.7	21.4	0	14.2	14.2	14.1

LTE Band 2 Measured Results (continued)

Band	BW (MHz)	Mode	RB Allocation	RB offset	Target MPR	Max. Avg Pwr (dBm)			Target MPR	Reduced Avg Pwr (dBm)		
						1852.5 MHz	1880 MHz	1907.5 MHz		1852.5 MHz	1880 MHz	1907.5 MHz
LTE Band 2	5	QPSK	1	0	0	23.8	23.8	23.6	0	14.0	14.1	14.2
			1	12	0	23.9	24.0	23.8	0	14.4	14.2	14.6
			1	24	0	23.4	23.9	23.5	0	14.1	14.1	14.1
			12	0	1	22.5	22.9	22.7	0	14.2	14.2	14.2
			12	6	1	22.6	22.8	22.5	0	14.2	14.3	14.1
			12	11	1	22.5	22.8	22.6	0	14.2	14.3	14.1
			25	0	1	22.6	22.9	22.6	0	14.2	14.2	14.1
		16QAM	1	0	1	23.0	22.8	22.0	0	13.6	14.3	13.9
			1	12	1	23.0	23.0	22.0	0	14.2	14.5	13.8
			1	24	1	22.8	22.3	22.0	0	13.8	14.4	13.4
			12	0	2	21.5	21.8	21.5	0	14.2	14.3	13.5
			12	6	2	21.7	21.9	21.4	0	14.3	14.1	13.8
			12	11	2	21.6	21.9	21.3	0	14.2	14.2	13.7
			25	0	2	21.7	21.9	21.6	0	14.1	14.5	13.4
Band	BW (MHz)	Mode	RB Allocation	RB offset	Target MPR	Max. Avg Pwr (dBm)			Target MPR	Reduced Avg Pwr (dBm)		
						1851.5 MHz	1880 MHz	1908.5 MHz		1851.5 MHz	1880 MHz	1908.5 MHz
LTE Band 2	3	QPSK	1	0	0	23.6	24.0	23.8	0	14.2	14.3	14.0
			1	7	0	23.7	24.1	23.5	0	14.3	14.5	14.2
			1	14	0	23.5	24.3	23.5	0	14.1	14.4	14.0
			8	0	1	22.5	22.8	22.6	0	14.2	14.3	14.0
			8	4	1	22.8	22.9	22.6	0	14.2	14.3	14.1
			8	7	1	22.6	22.9	22.6	0	14.2	14.2	14.1
			15	0	1	22.7	22.9	22.6	0	14.2	14.3	14.0
		16QAM	1	0	1	22.9	22.7	22.8	0	13.5	14.4	13.9
			1	7	1	23.0	23.1	22.4	0	14.2	14.5	14.1
			1	14	1	22.6	22.8	22.6	0	13.9	14.2	13.5
			8	0	2	21.3	21.8	21.4	0	14.3	13.9	13.8
			8	4	2	21.4	21.9	21.6	0	14.5	14.2	13.9
			8	7	2	21.3	22.0	21.6	0	14.5	14.2	13.9
			15	0	2	21.5	21.8	21.6	0	14.2	14.3	13.6
Band	BW (MHz)	Mode	RB Allocation	RB offset	Target MPR	Max. Avg Pwr (dBm)			Target MPR	Reduced Avg Pwr (dBm)		
						1850.7 MHz	1880 MHz	1909.3 MHz		1850.7 MHz	1880 MHz	1909.3 MHz
LTE Band 2	1.4	QPSK	1	0	0	23.9	23.9	23.4	0	14.2	14.2	13.5
			1	2	0	23.9	23.8	23.8	0	14.2	14.3	13.6
			1	5	0	23.7	23.7	23.7	0	14.1	14.1	13.4
			3	0	0	23.8	23.9	23.7	0	14.2	14.3	13.6
			3	1	0	23.8	23.9	23.7	0	14.3	14.3	13.6
			3	2	0	23.8	24.0	23.7	0	14.3	14.3	13.6
			6	0	1	22.8	22.8	22.7	0	14.2	14.3	13.6
		16QAM	1	0	1	23.0	22.9	22.3	0	14.0	14.2	13.5
			1	2	1	23.1	22.8	22.8	0	14.2	14.4	13.7
			1	5	1	23.1	22.7	22.7	0	14.0	14.2	13.5
			3	0	1	22.7	22.8	22.8	0	13.8	14.2	13.8
			3	1	1	22.6	22.9	22.9	0	13.8	14.3	13.8
			3	2	1	22.8	22.9	22.9	0	14.1	14.2	13.8
			6	0	2	21.8	21.6	21.7	0	14.2	14.0	13.8

LTE Band 4 Measured Results

Band	BW (MHz)	Mode	RB Allocation	RB offset	Target MPR	Max. Avg Pwr (dBm)			Target MPR	Reduced Avg Pwr (dBm)		
						1720 MHz	1732.5 MHz	1745 MHz		1720 MHz	1732.5 MHz	1745 MHz
LTE Band 4	20	QPSK	1	0	0		24.3		0		12.4	
			1	49	0		24.5		0		13.5	
			1	99	0		24.0		0		13.1	
			50	0	1		23.1		0		12.8	
			50	24	1		23.1		0		13.4	
			50	50	1		23.0		0		13.1	
			100	0	1		23.0		0		13.1	
		16QAM	1	0	1		22.8		0		12.9	
			1	49	1		23.0		0		13.8	
			1	99	1		22.6		0		13.3	
			50	0	2		22.1		0		12.8	
			50	25	2		22.1		0		13.3	
			50	50	2		22.1		0		12.9	
			100	0	2		22.0		0		12.9	

Band	BW (MHz)	Mode	RB Allocation	RB offset	Target MPR	Max. Avg Pwr (dBm)			Target MPR	Reduced Avg Pwr (dBm)		
						1717.5 MHz	1732.5 MHz	1747.5 MHz		1717.5 MHz	1732.5 MHz	1747.5 MHz
LTE Band 4	15	QPSK	1	0	0	24.1	24.0	24.1	0	12.9	12.5	13.0
			1	36	0	23.8	24.2	24.1	0	13.3	13.4	13.3
			1	74	0	24.0	23.8	23.8	0	12.6	12.8	12.4
			36	0	1	23.0	23.1	22.8	0	13.1	12.9	13.3
			36	18	1	22.9	23.1	22.8	0	13.3	13.4	13.4
			36	37	1	23.0	23.0	22.7	0	13.0	13.2	13.0
			75	0	1	22.9	23.0	22.8	0	12.9	13.1	13.1
		16QAM	1	0	1	23.2	22.8	23.1	0	12.6	13.0	13.3
			1	36	1	23.2	23.4	23.0	0	13.1	13.7	13.7
			1	74	1	22.6	22.5	22.6	0	12.4	13.0	12.7
			36	0	2	22.0	22.1	21.7	0	13.1	13.1	13.1
			36	18	2	22.0	22.2	21.6	0	13.2	13.3	13.3
			36	37	2	21.9	22.2	21.7	0	12.8	13.1	12.8
			75	0	2	22.0	22.1	21.8	0	13.0	13.0	12.9

Band	BW (MHz)	Mode	RB Allocation	RB offset	Target MPR	Max. Avg Pwr (dBm)			Target MPR	Reduced Avg Pwr (dBm)		
						1715 MHz	1732.5 MHz	1750 MHz		1715 MHz	1732.5 MHz	1750 MHz
LTE Band 4	10	QPSK	1	0	0	24.1	24.1	23.7	0	13.1	12.8	13.1
			1	25	0	24.0	24.0	24.0	0	13.4	13.4	13.3
			1	49	0	23.8	24.0	23.9	0	12.8	13.0	12.6
			25	0	1	23.0	23.0	22.8	0	13.2	12.9	13.2
			25	12	1	22.9	23.1	22.8	0	13.4	13.4	13.2
			25	25	1	22.9	23.0	22.7	0	13.2	13.3	12.9
			50	0	1	23.0	23.1	22.7	0	13.2	13.2	13.0
		16QAM	1	0	1	23.2	22.9	23.0	0	12.8	13.2	13.1
			1	25	1	23.1	23.0	23.2	0	13.3	13.7	13.3
			1	49	1	23.0	22.8	23.0	0	12.6	13.2	12.5
			25	0	2	22.0	22.3	21.8	0	13.0	13.1	13.1
			25	12	2	21.9	22.3	21.6	0	13.4	13.3	13.2
			25	25	2	22.1	22.0	21.6	0	13.0	13.2	12.9
			50	0	2	22.0	22.0	21.7	0	13.2	13.0	12.9

LTE Band 4 Measured Results (continued)

Band	BW (MHz)	Mode	RB Allocation	RB offset	Target MPR	Max. Avg Pwr (dBm)			Target MPR	Reduced Avg Pwr (dBm)		
						1712.5 MHz	1732.5 MHz	1752.5 MHz		1712.5 MHz	1732.5 MHz	1752.5 MHz
LTE Band 4	5	QPSK	1	0	0	23.9	24.1	23.8	0	13.2	12.8	12.9
			1	12	0	23.9	24.7	23.8	0	13.6	13.4	13.2
			1	24	0	23.9	24.3	23.7	0	13.0	13.1	12.7
			12	0	1	23.0	23.1	22.7	0	13.3	13.0	13.0
			12	6	1	22.9	23.1	22.8	0	13.6	13.4	13.1
			12	11	1	22.9	23.1	22.7	0	13.3	13.4	13.0
			25	0	1	23.0	23.1	22.7	0	13.3	13.2	12.9
		16QAM	1	0	1	23.4	22.7	22.7	0	13.1	13.4	12.9
			1	12	1	23.4	23.0	22.7	0	13.6	13.8	13.2
			1	24	1	23.1	22.7	22.6	0	13.2	13.5	12.7
			12	0	2	22.1	21.8	21.6	0	13.1	13.2	13.0
			12	6	2	22.0	21.8	21.6	0	13.5	13.5	13.1
			12	11	2	21.9	21.8	21.6	0	13.5	13.4	13.0
			25	0	2	22.1	22.1	21.6	0	13.1	13.1	12.7
Band	BW (MHz)	Mode	RB Allocation	RB offset	Target MPR	Max. Avg Pwr (dBm)			Target MPR	Reduced Avg Pwr (dBm)		
						1711.5 MHz	1732.5 MHz	1753.5 MHz		1711.5 MHz	1732.5 MHz	1753.5 MHz
LTE Band 4	3	QPSK	1	0	0	23.9	24.0	23.7	0	13.4	13.1	13.1
			1	7	0	24.0	24.4	23.8	0	13.6	13.5	13.1
			1	14	0	23.9	24.0	23.7	0	13.3	13.4	12.9
			8	0	1	22.9	23.0	22.7	0	13.6	13.4	13.0
			8	4	1	22.9	23.1	22.8	0	13.6	13.5	13.1
			8	7	1	22.9	23.0	22.8	0	13.6	13.5	13.1
			15	0	1	22.9	23.0	22.7	0	13.5	13.4	13.0
		16QAM	1	0	1	23.1	22.9	23.1	0	13.1	13.6	13.1
			1	7	1	23.2	23.2	23.0	0	13.4	13.7	13.1
			1	14	1	23.1	22.9	23.0	0	13.0	13.6	12.8
			8	0	2	21.9	22.1	21.7	0	13.5	13.1	13.1
			8	4	2	21.8	22.3	21.7	0	13.5	13.2	13.2
			8	7	2	21.9	22.3	21.7	0	13.5	13.2	13.2
			15	0	2	21.9	22.1	21.6	0	13.4	13.3	12.9
Band	BW (MHz)	Mode	RB Allocation	RB offset	Target MPR	Max. Avg Pwr (dBm)			Target MPR	Reduced Avg Pwr (dBm)		
						1710.7 MHz	1732.5 MHz	1754.3 MHz		1710.7 MHz	1732.5 MHz	1754.3 MHz
LTE Band 4	1.4	QPSK	1	0	0	24.2	23.8	23.7	0	13.4	13.3	12.9
			1	2	0	24.2	24.0	23.9	0	13.7	13.5	13.0
			1	5	0	24.1	23.9	23.8	0	13.4	13.3	12.9
			3	0	0	24.0	24.1	23.7	0	13.6	13.4	13.0
			3	1	0	24.1	24.2	23.6	0	13.6	13.5	13.1
			3	2	0	24.1	24.2	23.8	0	13.7	13.5	13.0
			6	0	1	23.0	23.1	22.9	0	13.6	13.4	13.0
		16QAM	1	0	1	22.8	22.9	23.2	0	13.6	13.2	13.0
			1	2	1	23.2	23.0	23.4	0	13.8	13.4	13.1
			1	5	1	23.0	22.8	23.2	0	13.6	13.3	13.0
			3	0	1	22.9	22.8	22.8	0	13.5	13.5	13.0
			3	1	1	23.0	22.9	22.6	0	13.6	13.5	13.0
			3	2	1	22.9	22.9	22.4	0	13.6	13.5	13.0
			6	0	2	21.7	22.0	21.6	0	13.3	13.5	13.1

Note(s):

20 MHz Bandwidths does not support at least three non-overlapping channels in certain channel bandwidths. When a device supports overlapping channel assignment in a channel bandwidth configuration, the middle channel of the group of overlapping channels should be selected for testing per KDB 941225 D05 SAR for LTE Devices

LTE Band 5 Measured Results

Band	BW (MHz)	Mode	RB Allocation	RB offset	Target MPR	Max. Avg Pwr (dBm)			Target MPR	Reduced Avg Pwr (dBm)		
						829 MHz	836.5 MHz	844 MHz		829 MHz	836.5 MHz	844 MHz
LTE Band 5	10	QPSK	1	0	0		22.7		0		17.0	
			1	25	0		22.9		0		16.8	
			1	49	0		22.8		0		16.9	
			25	0	1		21.9		0		16.9	
			25	12	1		21.7		0		16.8	
			25	25	1		21.7		0		16.7	
			50	0	1		21.7		0		16.8	
		16QAM	1	0	1		21.3		0		16.3	
			1	25	1		21.4		0		16.7	
			1	49	1		21.0		0		16.2	
			25	0	2		20.7		0		16.9	
			25	12	2		20.8		0		16.9	
			25	25	2		20.9		0		16.8	
			50	0	2		20.8		0		16.7	

Band	BW (MHz)	Mode	RB Allocation	RB offset	Target MPR	Max. Avg Pwr (dBm)			Target MPR	Reduced Avg Pwr (dBm)		
						826.5 MHz	836.5 MHz	846.5 MHz		826.5 MHz	836.5 MHz	846.5 MHz
LTE Band 5	5	QPSK	1	0	0	22.5	22.8	22.8	0	16.7	16.6	16.9
			1	12	0	22.8	23.3	23.2	0	17.2	16.9	17.3
			1	24	0	22.5	22.9	22.7	0	16.6	16.6	16.7
			12	0	1	21.7	21.8	21.8	0	16.8	16.8	17.0
			12	6	1	21.8	21.7	21.8	0	16.8	16.8	16.9
			12	11	1	21.7	21.6	21.8	0	16.9	16.7	16.8
			25	0	1	21.7	21.7	21.7	0	16.8	16.7	16.8
		16QAM	1	0	1	21.4	21.6	21.7	0	16.4	16.8	16.7
			1	12	1	21.7	22.1	22.0	0	16.4	17.2	16.9
			1	24	1	21.5	21.2	21.8	0	16.2	16.4	16.1
			12	0	2	20.7	20.6	20.8	0	16.7	16.8	16.8
			12	6	2	21.0	20.7	20.8	0	16.9	16.7	17.0
			12	11	2	20.7	20.8	20.8	0	16.8	16.7	16.9
			25	0	2	20.7	20.7	20.8	0	16.9	16.8	16.8

Band	BW (MHz)	Mode	RB Allocation	RB offset	Target MPR	Max. Avg Pwr (dBm)			Target MPR	Reduced Avg Pwr (dBm)		
						825.5 MHz	836.5 MHz	847.5 MHz		825.5 MHz	836.5 MHz	847.5 MHz
LTE Band 5	3	QPSK	1	0	0	22.7	22.8	22.7	0	16.7	16.8	16.9
			1	7	0	23.0	23.0	22.9	0	16.9	17.0	16.8
			1	14	0	22.8	22.7	22.7	0	16.8	16.9	16.8
			8	0	1	21.7	21.8	21.8	0	16.8	16.8	16.8
			8	4	1	21.6	21.7	21.8	0	16.8	16.8	16.9
			8	7	1	21.6	21.7	21.8	0	16.8	16.9	16.9
			15	0	1	21.7	21.7	21.8	0	16.8	16.8	16.8
		16QAM	1	0	1	21.8	21.6	21.6	0	17.0	16.7	16.8
			1	7	1	22.2	22.0	21.8	0	17.0	17.0	17.1
			1	14	1	21.9	21.7	21.4	0	16.5	16.8	16.6
			8	0	2	21.2	20.5	20.8	0	16.6	16.7	16.9
			8	4	2	21.1	20.8	20.9	0	16.6	16.6	17.0
			8	7	2	21.2	20.6	20.8	0	16.6	16.6	16.9
			15	0	2	20.9	20.7	20.8	0	16.8	16.7	16.8

LTE Band 5 Measured Results (continued)

Band	BW (MHz)	Mode	RB Allocation	RB offset	Target MPR	Max. Avg Pwr (dBm)			Target MPR	Reduced Avg Pwr (dBm)		
						824.7 MHz	836.5 MHz	848.3 MHz		824.7 MHz	836.5 MHz	848.3 MHz
LTE Band 5	1.4	QPSK	1	0	0	22.7	22.7	22.7	0	16.9	16.7	17.0
			1	2	0	22.8	22.6	22.6	0	16.8	16.8	16.9
			1	5	0	22.8	22.6	22.6	0	16.9	16.8	16.8
			3	0	0	22.8	22.8	22.7	0	16.8	16.8	16.8
			3	1	0	22.8	22.7	22.7	0	16.9	16.8	16.8
			3	2	0	22.8	22.7	22.9	0	17.0	16.8	17.0
			6	0	1	21.7	21.7	21.7	0	16.8	16.8	16.9
		16QAM	1	0	1	21.9	21.7	21.7	0	16.7	16.7	16.8
			1	2	1	22.1	21.6	21.9	0	16.8	16.7	16.8
			1	5	1	22.0	21.6	21.7	0	16.7	16.7	16.8
			3	0	1	21.9	21.4	21.6	0	16.5	16.9	17.1
			3	1	1	21.8	21.8	21.7	0	16.9	16.9	16.7
			3	2	1	21.9	21.8	21.6	0	16.9	16.9	16.7
			6	0	2	20.9	20.5	20.8	0	16.7	16.7	16.9

Note(s):

10 MHz Bandwidths does not support at least three non-overlapping channels in certain channel bandwidths. When a device supports overlapping channel assignment in a channel bandwidth configuration, the middle channel of the group of overlapping channels should be selected for testing per KDB 941225 D05 SAR for LTE Devices

LTE Band 7 Measured Results

Band	BW (MHz)	Mode	RB Allocation	RB offset	Target MPR	Max. Avg Pwr (dBm)			Target MPR	Reduce. Avg Pwr (dBm)		
						2510 MHz	2535 MHz	2560 MHz		2510 MHz	2535 MHz	2560 MHz
LTE Band 7	20	QPSK	1	0	0	23.8	23.1	23.2	0	11.6	11.5	11.4
			1	49	0	23.9	23.5	23.8	0	11.9	11.8	11.8
			1	99	0	23.4	23.3	23.6	0	11.5	11.6	11.7
			50	0	1	22.6	22.2	22.5	0	11.7	11.6	11.9
			50	24	1	22.5	22.3	22.8	0	11.7	11.7	12.1
			50	50	1	22.3	22.1	22.6	0	11.5	11.5	12.1
			100	0	1	22.5	22.2	22.6	0	11.6	11.5	12.1
		16QAM	1	0	1	22.4	21.6	22.0	0	11.8	11.3	11.1
			1	49	1	22.5	21.8	22.7	0	11.5	11.4	11.9
			1	99	1	22.2	21.8	22.3	0	11.3	11.2	11.8
			50	0	2	21.3	21.0	21.5	0	11.8	11.6	11.9
			50	24	2	21.4	21.0	21.6	0	11.6	11.6	12.1
			50	50	2	21.2	20.8	21.5	0	11.5	11.6	12.1
			100	0	2	21.3	21.2	21.5	0	11.7	11.6	12.1

Band	BW (MHz)	Mode	RB Allocation	RB offset	Target MPR	Max. Avg Pwr (dBm)			Target MPR	Reduce. Avg Pwr (dBm)		
						2507.5 MHz	2535 MHz	2562.5 MHz		2507.5 MHz	2535 MHz	2562.5 MHz
LTE Band 7	15	QPSK	1	0	0	23.8	23.1	23.7	0	11.7	11.3	12.0
			1	37	0	23.7	23.2	23.8	0	11.7	11.7	12.2
			1	74	0	23.4	23.2	23.6	0	11.4	11.4	12.0
			36	0	1	22.6	22.1	22.7	0	11.7	11.6	12.2
			36	20	1	22.4	22.2	22.7	0	11.7	11.7	12.1
			36	39	1	22.4	22.1	22.6	0	11.6	11.6	12.0
			75	0	1	22.4	22.1	22.7	0	11.7	11.6	12.1
		16QAM	1	0	1	22.9	22.1	22.7	0	11.6	11.4	12.1
			1	37	1	22.9	22.2	23.0	0	11.4	11.6	12.1
			1	74	1	22.7	21.8	22.5	0	11.3	11.6	12.0
			36	0	2	21.4	21.1	21.7	0	11.7	11.5	12.2
			36	20	2	21.3	21.1	21.8	0	11.6	11.7	12.0
			36	39	2	21.3	21.0	21.7	0	11.6	11.6	12.1
			75	0	2	21.3	21.0	21.6	0	11.7	11.6	12.2

Band	BW (MHz)	Mode	RB Allocation	RB offset	Target MPR	Max. Avg Pwr (dBm)			Target MPR	Reduce. Avg Pwr (dBm)		
						2505 MHz	2535 MHz	2565 MHz		2505 MHz	2535 MHz	2565 MHz
LTE Band 7	10	QPSK	1	0	0	24.0	23.3	23.8	0	11.9	11.5	12.2
			1	25	0	23.9	23.4	23.8	0	11.7	11.8	12.1
			1	49	0	23.7	23.4	23.6	0	11.5	11.4	11.9
			25	0	1	22.8	22.3	22.8	0	11.8	11.6	12.3
			25	12	1	22.9	22.3	22.7	0	11.9	11.6	12.3
			25	25	1	22.8	22.2	22.6	0	11.8	11.7	12.3
			50	0	1	22.9	22.3	22.8	0	11.8	11.7	12.3
		16QAM	1	0	1	22.9	22.0	22.7	0	11.6	11.6	12.1
			1	25	1	22.8	22.3	22.8	0	11.6	11.6	12.2
			1	49	1	22.8	22.2	22.5	0	11.3	11.5	11.6
			25	0	2	21.9	21.2	22.0	0	11.9	11.7	12.3
			25	12	2	21.8	21.3	21.6	0	11.9	11.8	12.4
			25	25	2	21.7	21.2	21.6	0	11.7	11.8	12.3
			50	0	2	21.8	21.1	21.6	0	11.8	11.7	12.3

LTE Band 7 Measured Results (continued)

Band	BW (MHz)	Mode	RB Allocation	RB offset	Target MPR	Max. Avg Pwr (dBm)			Target MPR	Reduce. Avg Pwr (dBm)		
						2502.5 MHz	2535 MHz	2567.5 MHz		2502.5 MHz	2535 MHz	2567.5 MHz
LTE Band 7	5	QPSK	1	0	0	23.8	23.2	23.5	0	11.7	11.6	12.0
			1	12	0	23.4	23.4	23.9	0	11.9	12.0	12.3
			1	24	0	23.6	23.2	23.7	0	11.5	11.6	12.1
			12	0	1	23.0	22.2	22.7	0	11.8	11.6	12.2
			12	7	1	22.9	22.3	22.8	0	11.9	11.7	12.2
			12	13	1	22.9	22.2	22.6	0	11.8	11.6	12.2
			25	0	1	22.9	22.1	22.8	0	11.9	11.6	12.2
		16QAM	1	0	1	22.9	22.5	22.5	0	11.7	11.4	12.1
			1	12	1	22.7	22.8	22.2	0	11.8	11.6	12.4
			1	24	1	22.7	22.1	21.9	0	11.6	11.4	12.2
			12	0	2	22.0	21.2	21.7	0	11.9	11.7	12.1
			12	7	2	21.9	21.1	21.5	0	11.9	11.7	12.2
			12	13	2	21.9	21.1	21.5	0	11.8	11.7	12.2
			25	0	2	22.0	21.1	21.6	0	11.9	11.6	12.2

LTE Band 12 Measured Results

Band	BW (MHz)	Mode	RB Allocation	RB offset	Target MPR	Max. Avg Pwr (dBm)			Target MPR	Reduce. Avg Pwr (dBm)		
						704 MHz	707.5 MHz	711 MHz		704 MHz	707.5 MHz	711 MHz
LTE Band 12	10	QPSK	1	0	0		23.1		0		17.6	
			1	25	0		23.1		0		17.7	
			1	49	0		23.1		0		17.7	
			25	0	1		22.1		0		17.7	
			25	12	1		22.2		0		17.7	
			25	25	1		22.2		0		17.7	
			50	0	1		22.1		0		17.7	
		16QAM	1	0	1		22.0		0		17.4	
			1	25	1		22.0		0		17.6	
			1	49	1		22.0		0		17.4	
			25	0	2		21.2		0		17.7	
			25	12	2		21.2		0		17.8	
			25	25	2		21.3		0		17.8	
			50	0	2		21.1		0		17.8	

Band	BW (MHz)	Mode	RB Allocation	RB offset	Target MPR	Max. Avg Pwr (dBm)			Target MPR	Reduce. Avg Pwr (dBm)		
						701.5 MHz	707.5 MHz	713.5 MHz		704 MHz	707.5 MHz	711 MHz
LTE Band 12	5	QPSK	1	0	0	23.0	23.2	23.1	0	17.5	17.8	17.7
			1	12	0	23.1	23.6	23.1	0	17.8	18.0	17.6
			1	24	0	23.0	23.3	23.1	0	17.6	17.7	17.5
			12	0	1	22.2	22.1	22.1	0	17.7	17.7	17.7
			12	7	1	22.1	22.3	22.0	0	17.7	17.8	17.7
			12	13	1	22.2	22.2	22.0	0	17.7	17.8	17.6
			25	0	1	22.3	22.3	22.1	0	17.6	17.7	17.6
		16QAM	1	0	1	22.4	22.1	21.6	0	17.0	17.2	17.4
			1	12	1	22.5	22.1	21.5	0	17.1	17.5	17.1
			1	24	1	22.1	21.7	21.5	0	17.1	17.1	16.7
			12	0	2	21.3	21.0	20.9	0	17.6	17.7	17.7
			12	7	2	21.2	21.1	21.1	0	17.6	17.8	17.7
			12	13	2	21.1	21.0	20.9	0	17.6	17.8	17.6
			25	0	2	21.3	21.2	21.0	0	17.8	17.8	17.7

Band	BW (MHz)	Mode	RB Allocation	RB offset	Target MPR	Max. Avg Pwr (dBm)			Target MPR	Reduce. Avg Pwr (dBm)		
						700.5 MHz	707.5 MHz	714.5 MHz		704 MHz	707.5 MHz	711 MHz
LTE Band 12	3	QPSK	1	0	0	23.0	23.2	22.9	0	17.6	17.8	17.5
			1	8	0	23.1	23.3	22.8	0	17.6	18.0	17.5
			1	14	0	23.0	23.5	23.0	0	17.7	18.1	17.4
			8	0	1	22.1	22.2	22.2	0	17.7	17.9	17.7
			8	4	1	22.2	22.3	22.1	0	17.7	17.9	17.7
			8	7	1	22.1	22.4	22.1	0	17.6	17.7	17.7
			15	0	1	22.2	22.3	22.1	0	17.7	17.7	17.7
		16QAM	1	0	1	22.1	22.0	22.2	0	17.7	17.5	17.4
			1	8	1	22.4	22.5	22.4	0	17.9	17.8	17.5
			1	14	1	22.2	22.0	22.3	0	17.3	17.5	17.3
			8	0	2	20.9	21.4	21.0	0	17.9	17.4	17.6
			8	4	2	20.8	21.4	21.0	0	17.9	17.4	17.6
			8	7	2	21.2	21.5	21.0	0	17.7	17.4	17.6
			15	0	2	20.9	21.3	21.0	0	17.5	17.7	17.5

LTE Band 12 Measured Results (continued)

Band	BW (MHz)	Mode	RB Allocation	RB offset	Target MPR	Max. Avg Pwr (dBm)			Target MPR	Reduce. Avg Pwr (dBm)		
						699.7 MHz	707.5 MHz	715.3 MHz		699.7 MHz	707.5 MHz	715.3 MHz
LTE Band 12	1.4	QPSK	1	0	0	23.2	22.9	22.8	0	17.7	17.6	17.5
			1	3	0	23.3	23.2	22.9	0	17.9	17.8	17.5
			1	5	0	23.4	23.1	22.8	0	17.8	17.7	17.3
			3	0	0	23.1	23.1	22.9	0	17.7	17.7	17.6
			3	1	0	23.2	23.3	23.2	0	17.7	17.8	17.8
			3	3	0	23.3	23.3	23.1	0	17.7	17.8	17.7
			6	0	1	22.3	22.2	22.0	0	17.7	17.7	17.7
		16QAM	1	0	1	22.0	22.1	22.2	0	17.4	17.4	17.4
			1	3	1	22.1	21.9	22.4	0	17.6	17.5	17.4
			1	5	1	22.1	22.1	22.2	0	17.3	17.4	17.0
			3	0	1	21.8	21.6	22.0	0	17.3	17.4	17.3
			3	1	1	22.0	22.0	21.9	0	17.4	17.4	17.2
			3	3	1	22.3	22.1	21.9	0	17.8	17.6	17.1
			6	0	2	21.0	21.2	20.9	0	17.9	17.5	17.7

Note(s):

10 MHz Bandwidths does not support at least three non-overlapping channels in certain channel bandwidths. When a device supports overlapping channel assignment in a channel bandwidth configuration, the middle channel of the group of overlapping channels should be selected for testing per KDB 941225 D05 SAR for LTE Devices

LTE Band 13 Measured Results

Band	BW (MHz)	Mode	RB Allocation	RB offset	Target MPR	Max. Avg Pwr (dBm)			Target MPR	Reduce. Avg Pwr (dBm)		
							782 MHz				782 MHz	
LTE Band 13	10	QPSK	1	0	0		23.8		0		18.2	
			1	25	0		24.0		0		18.0	
			1	49	0		24.2		0		17.9	
			25	0	1		23.1		0		18.2	
			25	12	1		23.0		0		18.1	
			25	25	1		22.9		0		18.1	
			50	0	1		23.1		0		18.1	
		16QAM	1	0	1		22.9		0		17.8	
			1	25	1		23.4		0		18.1	
			1	49	1		23.1		0		17.9	
			25	0	2		22.0		0		18.1	
			25	12	2		22.1		0		18.2	
			25	25	2		21.9		0		18.1	
			50	0	2		22.0		0		18.1	

Band	BW (MHz)	Mode	RB Allocation	RB offset	Target MPR	Max. Avg Pwr (dBm)			Target MPR	Reduce. Avg Pwr (dBm)		
						779.5 MHz	782 MHz	784.5 MHz		779.5 MHz	782 MHz	784.5 MHz
LTE Band 13	5	QPSK	1	0	0		24.0		0		17.9	
			1	12	0		24.2		0		18.3	
			1	24	0		23.9		0		17.9	
			12	0	1		23.0		0		18.1	
			12	7	1		23.0		0		18.2	
			12	13	1		23.0		0		18.1	
			25	0	1		23.0		0		18.1	
		16QAM	1	0	1		22.9		0		17.8	
			1	12	1		22.8		0		17.8	
			1	24	1		22.8		0		17.9	
			12	0	2		21.8		0		18.1	
			12	7	2		21.9		0		18.2	
			12	13	2		22.0		0		18.2	
			25	0	2		22.1		0		18.2	

Note(s):

5/10 MHz Bandwidths does not support at least three non-overlapping channels in certain channel bandwidths. When a device supports overlapping channel assignment in a channel bandwidth configuration, the middle channel of the group of overlapping channels should be selected for testing per KDB 941225 D05 SAR for LTE Devices

LTE Band 17 Measured Results

Band	BW (MHz)	Mode	RB Allocation	RB offset	Target MPR	Max. Avg Pwr (dBm)			Target MPR	Reduce. Avg Pwr (dBm)		
						709 MHz	710 MHz	711 MHz		709 MHz	710 MHz	711 MHz
LTE Band 17	10	QPSK	1	0	0		23.2		0		18.0	
			1	25	0		23.1		0		18.0	
			1	49	0		23.0		0		18.0	
			25	0	1		22.3		0		18.1	
			25	12	1		22.3		0		18.1	
			25	25	1		22.2		0		18.1	
			50	0	1		22.2		0		18.1	
		16QAM	1	0	1		21.9		0		18.2	
			1	25	1		22.4		0		18.1	
			1	49	1		21.9		0		17.6	
			25	0	2		21.3		0		18.2	
			25	12	2		21.1		0		18.1	
			25	25	2		21.2		0		18.1	
			50	0	2		21.2		0		18.1	

Band	BW (MHz)	Mode	RB Allocation	RB offset	Target MPR	Max. Avg Pwr (dBm)			Target MPR	Reduce. Avg Pwr (dBm)		
						706.5 MHz	710 MHz	713.5 MHz		706.5 MHz	710 MHz	713.5 MHz
LTE Band 17	5	QPSK	1	0	0		23.0		0		17.8	
			1	12	0		23.0		0		18.5	
			1	24	0		22.8		0		17.9	
			12	0	1		22.2		0		18.1	
			12	7	1		22.2		0		18.1	
			12	13	1		22.0		0		18.0	
			25	0	1		22.1		0		18.1	
		16QAM	1	0	1		21.8		0		17.7	
			1	12	1		22.0		0		17.9	
			1	24	1		22.0		0		17.8	
			12	0	2		21.2		0		18.1	
			12	7	2		21.2		0		18.1	
			12	13	2		21.1		0		18.0	
			25	0	2		21.2		0		18.1	

Note(s):

5/10 MHz Bandwidths does not support at least three non-overlapping channels in certain channel bandwidths. When a device supports overlapping channel assignment in a channel bandwidth configuration, the middle channel of the group of overlapping channels should be selected for testing per KDB 941225 D05 SAR for LTE Devices

9.2.1. LTE Rel. 10 Carrier Aggregation

LTE Release 10 Carrier Aggregation

The following power measurements were performed with a single carrier uplink; CA for this particular project only supports one (1) uplink and two (2) downlinks.

1) Max power Measured Results

LTE CA combinations			PCC (UL)					SCC (DL)			LTE Rel 8 Tx. Max. Power [dBm]	LTE Rel 10 Tx. Max. Power [dBm]
PCC	+	SCC	Mode	Bandwidth (MHz)	Channel	Frequency (MHz)	RB / Offset	Bandwidth (MHz)	Channel	Frequency (MHz)		
B2 (PCC)	+	B4 (SCC)	QPSK	20	18900	1880.0	1/49	5	2175	2132.5	24.33	23.85
								10				23.83
								15				23.87
								20				23.74
B2 (PCC)	+	B17 (SCC)	QPSK	10	18650	1855.0	1/49	5	5790	740.0	23.93	23.71
								10				23.79
B2 (PCC)	+	B29(SCC)	QPSK	20	18900	1880.0	1/49	5	9715	722.5	24.33	23.80
								10				23.86
B4 (PCC)	+	B2 (SCC)	QPSK	20	20175	1732.5	1/49	1.4	900	1960.0	24.54	24.44
								3				24.40
								5				24.37
								10				24.43
								15				24.51
								20				24.49
B4 (PCC)	+	B7 (SCC)	QPSK	10	20000	1715.0	1/0	5	3102	2655.2	24.14	24.05
								10				24.04
								15				24.07
								20				24.11
B4 (PCC)	+	B12 (SCC)	QPSK	20	20175	1732.5	1/49	5	5095	737.5	24.54	24.47
								10				24.43
B4 (PCC)	+	B17 (SCC)	QPSK	10	20000	1715.0	1/0	5	5790	740.0	24.14	24.06
								10				24.09
B4 (PCC)	+	B29 (SCC)	QPSK	20	20175	1732.5	1/49	5	9715	722.5	24.54	24.53
								10				24.52
B7 (PCC)	+	B4 (SCC)	QPSK	20	20850	2510.0	1/49	5	2175	2132.5	23.89	23.31
								10				23.33
B17 (PCC)	+	B2 (SCC)	QPSK	10	23790	710.0	1/0	5	900	1960.0	23.24	23.06
								10				23.11

2) Reduce power Measured Results

LTE CA combinations			PCC (UL)					SCC (DL)			LTE Rel 8 Tx. Reduce. Power [dBm]	LTE Rel 10 Tx. Reduce. Power [dBm]
PCC	+	SCC	Mode	Bandwidth (MHz)	Channel	Frequency (MHz)	RB / Offset	Bandwidth (MHz)	Channel	Frequency (MHz)		
B2 (PCC)	+	B4 (SCC)	QPSK	20	18900	1880.0	1/49	5	2175	2132.5	14.68	14.02
								10				14.10
								15				14.11
								20				14.13
B2 (PCC)	+	B17 (SCC)	QPSK	10	18900	1880.0	1/25	5	5790	740.0	14.60	14.03
								10				13.91
B2 (PCC)	+	B29(SCC)	QPSK	20	18900	1880.0	1/49	5	9715	722.5	14.68	13.92
								10				14.12
B4 (PCC)	+	B2 (SCC)	16QAM	20	20175	1732.5	1/49	1.4	900	1960.0	13.81	13.96
								3				13.91
								5				14.02
								10				13.79
								15				13.88
								20				14.01
B4 (PCC)	+	B7 (SCC)	16QAM	10	20175	1732.5	1/25	5	3102	2655.2	13.73	13.63
								10				13.62
								15				13.63
								20				13.70
B4 (PCC)	+	B12 (SCC)	16QAM	20	20175	1732.5	1/49	5	5095	737.5	13.81	13.78
								10				13.78
B4 (PCC)	+	B17 (SCC)	16QAM	10	20175	1732.5	1/25	5	5790	740.0	13.73	13.71
								10				13.73
B4 (PCC)	+	B29 (SCC)	16QAM	20	20175	1732.5	1/49	5	9715	722.5	13.81	13.72
								10				13.75
B7 (PCC)	+	B4 (SCC)	QPSK	20	21350	2560.0	50/50	5	2175	2132.5	12.14	11.38
								10				11.29
B17 (PCC)	+	B2 (SCC)	16QAM	10	23790	710.0	25/0	5	900	1960.0	18.21	17.92
								10				18.19

Note:

SAR is excluded for Carrier Aggregation when measured power does not exceed LTE Release 8 by more than a $^{1}/_{4}$ dB.

9.3. Wi-Fi 2.4GHz (DTS Band)

Measured Results

Antenna	Mode	Data Rate	Ch #	Freq. (MHz)	Max Pwr.			Reduced Pwr.		
					Avg Pwr (dBm)	Max Output Power (dBm)	SAR Test (Yes/No)	Avg Pwr (dBm)	Max Output Power (dBm)	SAR Test (Yes/No)
SISO Main	802.11b	1 Mbps	1	2412	20.0	20.5	Yes	12.4	12.5	Yes
			6	2437	20.3			12.5		
			11	2462	20.2			12.4		
	802.11g	6 Mbps	1	2412	16.8	17.5	No	12.1	12.5	No
			6	2437	19.7	20.5		12.2		
			11	2462	16.7	17.5		12.0		
	802.11n	6.5 Mbps	1	2412	17.5	17.5	No	11.9	12.5	No
			6	2437	20.5	20.5		12.0		
			11	2462	15.6	16.5		11.9		
SISO Sub	802.11b	1 Mbps	1	2412	19.8	20.5	Yes	12.1	12.5	Yes
			6	2437	20.0			12.3		
			11	2462	20.1			12.3		
	802.11g	6 Mbps	1	2412	16.6	17.5	No	11.8	12.5	No
			6	2437	20.5	20.5		12.0		
			11	2462	16.9	17.5		12.0		
	802.11n	6.5 Mbps	1	2412	17.4	17.5	No	11.9	12.5	No
			6	2437	20.4	20.5		12.1		
			11	2462	15.8	16.5		12.1		

Measured Results (MIMO)

Antenna	Mode	Data Rate	Ch #	Freq. (MHz)	Max Pwr.			Reduced Pwr.		
					Avg Pwr (dBm)	Max Output Power (dBm)	SAR Test (Yes/No)	Avg Pwr (dBm)	Max Output Power (dBm)	SAR Test (Yes/No)
MIMO Main	802.11n	6.5 Mbps	1	2412	17.5	17.5	Yes	12.2	12.5	Yes
			6	2437	20.4	20.5		12.3		
			11	2462	15.6	16.5		12.0		
MIMO Sub	802.11n	6.5 Mbps	1	2412	17.4	17.5	Yes	11.7	12.5	Yes
			6	2437	20.3	20.5		12.2		
			11	2462	15.8	16.5		12.0		

Note(s):

1. Output Power and SAR is not required for 802.11g/n HT20 channels when the highest *reported* SAR for DSSS is adjusted by the ratio of OFDM to DSSS specified maximum output power and the adjusted SAR is ≤ 1.2 W/kg.

9.4. Wi-Fi 5GHz (U-NII Bands)

Measured Results

Antenna	Band (GHz)	Mode	Data Rate	Ch #	Freq. (MHz)	Max Pwr.			Reduce Pwr		
						Avg Pwr (dBm)	Max Output Power (dBm)	SAR Test (Yes/No)	Avg Pwr (dBm)	Max Output Power (dBm)	SAR Test (Yes/No)
SISO Main	5.3 (U-NII 2A)	802.11a	6 Mbps	52	5260	Not Required	17.5	No	Not Required	9.5	No
				56	5280						
				60	5300						
				64	5320						
		802.11n (HT20)	6.5 Mbps	52	5260		17.5	No		9.5	No
				56	5280						
				60	5300						
				64	5320						
		802.11n (HT40)	13.5 Mbps	54	5270	17.1	17.5	Yes		9.5	No
				62	5310	17.0					
		802.11ac (VHT20)	6.5 Mbps	52	5260	Not Required	17.5	No		9.5	No
				56	5280						
				60	5300						
				64	5320						
		802.11ac (VHT40)	13.5 Mbps	54	5270	16.9	17.5	No		9.5	No
				62	5310	16.8					
		802.11ac (VHT80)	29.3 Mbps	58	5290	Not Required	16.5	No	8.9	9.5	Yes
	5.5 (U-NII 2C) <5.65GHz	802.11a	6 Mbps	100	5500	Not Required	17.5	No	Not Required	9.5	No
				112	5560						
				116	5580						
				128	5640						
		802.11n (HT20)	6.5 Mbps	100	5500		17.5	No		9.5	No
				112	5560						
				116	5580						
				128	5640						
		802.11n (HT40)	13.5 Mbps	102	5510	17.0	17.5	Yes		9.5	No
				110	5550	17.1					
				118	5590	17.4					
				126	5630	17.3					
		802.11ac (VHT20)	6.5 Mbps	100	5500	Not Required	17.5	No		9.5	No
				112	5560						
				116	5580						
				128	5640						
		802.11ac (VHT40)	13.5 Mbps	102	5510	16.9	17.5	No		9.5	No
				110	5550	17.1					
				118	5590	17.2					
				126	5630	17.1					
		802.11ac (VHT80)	29.3 Mbps	106	5530	Not Required	16.5	No	9.0	9.5	Yes
				122	5610				8.9		
	5.5 (U-NII 2C) >5.65GHz + 5.8 (U-NII 3)	802.11a	6 Mbps	132	5660	Not Required	17.5	No	Not Required	9.5	No
				149	5745						
				165	5825						
		802.11n (HT20)	6.5 Mbps	132	5660		17.5	No		9.5	No
				149	5745						
				165	5825						
		802.11n (HT40)	13.5 Mbps	134	5670	16.7	17.5	Yes		9.5	No
				142	5710	17.3					
				151	5755	17.3					
				159	5795	16.8					
		802.11ac (VHT20)	6.5 Mbps	132	5660	Not Required	17.5	No		9.5	No
				149	5745						
				165	5825						
		802.11ac (VHT40)	13.5 Mbps	134	5670	17.4	17.5	No		9.5	No
				142	5710	17.2					
				151	5755	17.3					
				159	5795	16.7					
		802.11ac (VHT80)	29.3 Mbps	138	5790	Not Required	16.5	No	9.3	9.5	Yes
				155	5775				9.2		

Antenna	Band (GHz)	Mode	Data Rate	Ch #	Freq. (MHz)	Max Pwr.			Reduce Pwr		
						Avg Pwr (dBm)	Max Output Power (dBm)	SAR Test (Yes/No)	Avg Pwr (dBm)	Max Output Power (dBm)	SAR Test (Yes/No)
SISO Aux	5.3 (U-NII 2A)	802.11a	6 Mbps	52	5260	Not Required	17.5	No	Not Required	9.5	No
				56	5280						
				60	5300						
				64	5320						
		802.11n (HT20)	6.5 Mbps	52	5260		17.5	No		9.5	No
				56	5280						
				60	5300						
				64	5320						
		802.11n (HT40)	13.5 Mbps	54	5270	17.0	17.5	Yes		9.5	No
				62	5310	17.0					
		802.11ac (VHT20)	6.5 Mbps	52	5260	Not Required	17.5	No		9.5	No
				56	5280						
				60	5300						
				64	5320						
		802.11ac (VHT40)	13.5 Mbps	54	5270	16.6	17.5	No		9.5	No
				62	5310	16.6					
		802.11ac (VHT80)	29.3 Mbps	58	5290	Not Required	16.5	No	9.1	9.5	Yes
	5.5 (U-NII 2C) <5.65GHz	802.11a	6 Mbps	100	5500	Not Required	17.5	No	Not Required	9.5	No
				112	5560						
				116	5580						
				128	5640						
		802.11n (HT20)	6.5 Mbps	100	5500		17.5	No		9.5	No
				112	5560						
				116	5580						
				128	5640						
		802.11n (HT40)	13.5 Mbps	102	5510	17.3	17.5	Yes		9.5	No
				110	5550	17.2					
				118	5590	17.3					
				126	5630	16.9					
		802.11ac (VHT20)	6.5 Mbps	100	5500	Not Required	17.5	No		9.5	No
				112	5560						
				116	5580						
				128	5640						
		802.11ac (VHT40)	13.5 Mbps	102	5510	17.1	17.5	No		9.5	No
				110	5550	17.1					
				118	5590	17.1					
				126	5630	16.8					
		802.11ac (VHT80)	29.3 Mbps	106	5530	Not Required	16.5	No	8.9	9.5	Yes
				122	5610				8.8		
	5.5 (U-NII 2C) >5.65GHz + 5.8 (U-NII 3)	802.11a	6 Mbps	132	5660	Not Required	17.5	No	Not Required	9.5	No
				149	5745						
				165	5825						
		802.11n (HT20)	6.5 Mbps	132	5660		17.5	No		9.5	No
				149	5745						
				165	5825						
		802.11n (HT40)	13.5 Mbps	134	5670	17.0	17.5	Yes		9.5	No
				142	5710	16.9					
				151	5755	16.9					
				159	5795	17.2					
		802.11ac (VHT20)	6.5 Mbps	132	5660	Not Required	17.5	No		9.5	No
				149	5745						
				165	5825						
		802.11ac (VHT40)	13.5 Mbps	134	5670	16.8	17.5	No		9.5	No
				142	5710	16.7					
				151	5755	16.9					
				159	5795	17.0					
		802.11ac (VHT80)	29.3 Mbps	138	5790	Not Required	16.5	No	8.9	9.5	Yes
				155	5775				9.1		

Note(s):

1. Output power measurement is required for multiple configurations of the same channel bandwidth that have the same specified maximum output power according to Appendix C in KDB 248227.
2. When the same transmission mode configurations have the same maximum output power on the same channel for the 802.11 a/g/n/ac modes, the channel in the lower order/sequence 802.11 mode (i.e. a, g, n then ac) is selected.
3. When the specified maximum output power is the same for both UNII band I and UNII band 2A, begin SAR measurement in UNII band 2A; and if the highest *reported* SAR for UNII band 2A is
   - ≤ 1.2 W/kg, SAR is not required for UNII band I
   - > 1.2 W/kg, both bands should be tested independently for SAR.

9.5. Bluetooth

Band (GHz)	Mode	Ch #	Freq. (MHz)	Avg Pwr (dBm)	Avg Pwr (mW)
2.4	V3.0 + EDR, GFSK	0	2402	9.5	8.8
		39	2441	9.9	9.9
		78	2480	9.5	8.8
	V3.0 + EDR, π/4 DQPSK	0	2402	6.6	4.6
		39	2441	7.3	5.4
		78	2480	6.7	4.7
	V3.0 + EDR, 8-DPSK	0	2402	6.6	4.6
		39	2441	7.4	5.4
		78	2480	6.7	4.7
	V4.0 LE, GFSK	0	2402	0.5	1.1
		19	2440	1.9	1.6
		39	2480	1.4	1.4

10. Measured and Reported (Scaled) SAR Results

SAR Test Reduction criteria are as follows:

KDB 447498 D01 General RF Exposure Guidance:

Testing of other required channels within the operating mode of a frequency band is not required when the reported 1-g or 10-g SAR for the mid-band or highest output power channel is:

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

KDB 941225 D01 SAR test for 3G devices:

When the maximum output power and tune-up tolerance specified for production units in a secondary mode is ≤ ¼ dB higher than the primary mode or when the highest reported SAR of the primary mode is scaled by the ratio of specified maximum output power and tune-up tolerance of secondary to primary mode and the adjusted SAR is ≤ 1.2 W/kg, SAR measurement is not required for the secondary mode

KDB 941225 D05 SAR for LTE Devices:

SAR test reduction is applied using the following criteria:

- Start with the largest channel bandwidth and measure SAR for QPSK with 1 RB, and 50% RB allocation, using the RB offset and required test channel combination with the highest maximum output power among RB offsets at the upper edge, middle and lower edge of each required test channel.
- When the reported SAR is > 0.8 W/kg, testing for other Channels 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.

KDB 248227 D01 SAR meas for 802.11 v02r02:

SAR test reduction for 802.11 Wi-Fi transmission mode configurations are considered separately for DSSS and OFDM. An initial test position is determined to reduce the number of tests required for certain exposure configurations with multiple test positions. An initial test configuration is determined for each frequency band and aggregated band according to maximum output power, channel bandwidth, wireless mode configurations and other operating parameters to streamline the measurement requirements. For 2.4 GHz DSSS, either the initial test position or DSSS procedure is applied to reduce the number of SAR tests; these are mutually exclusive. For OFDM, an initial test position is only applicable to next to the ear, UMPC mini-tablet and hotspot mode configurations, which is tested using the initial test configuration to facilitate test reduction. For other exposure conditions with a fixed test position, SAR test reduction is determined using only the initial test configuration.

The multiple test positions require SAR measurements in head, hotspot mode or UMPC mini-tablet configurations may be reduced according to the highest reported SAR determined using the *initial test position(s)* by applying the DSSS or OFDM SAR measurement procedures in the required wireless mode test configuration(s). The *initial test position(s)* is measured using the highest measured maximum output power channel in the required wireless mode test configuration(s). When the *reported* SAR for the *initial test position* is:

- ≤ 0.4 W/kg, further SAR measurement is not required for the other test positions in that exposure configuration and wireless mode combination within the frequency band or aggregated band. DSSS and OFDM configurations are considered separately according to the required SAR procedures.
- > 0.4 W/kg, SAR is repeated using the same wireless mode test configuration tested in the *initial test position* to measure the subsequent next closet/smallest test separation distance and maximum coupling test position, on the highest maximum output power channel, until the *reported* SAR is ≤ 0.8 W/kg or all required test positions are tested.
  - For subsequent test positions with equivalent test separation distance or when exposure is dominated by coupling conditions, the position for maximum coupling condition should be tested.
  - When it is unclear, all equivalent conditions must be tested.
- For all positions/configurations tested using the *initial test position* and subsequent test positions, when the *reported* SAR is > 0.8 W/kg, measure the SAR for these positions/configurations on the subsequent next highest measured output power channel(s) until the *reported* SAR is ≤ 1.2 W/kg or all required test channels are considered.
  - The additional power measurements required for this step should be limited to those necessary for identifying subsequent highest output power channels to apply the test reduction.
- When the specified maximum output power is the same for both UNII 1 and UNII 2A, begin SAR measurements in UNII 2A with the channel with the highest measured output power. If the reported SAR for UNII 2A is ≤ 1.2 W/kg, SAR is not required for UNII 1; otherwise treat the remaining bands separately and test them independently for SAR.
- When the specified maximum output power is different between UNII 1 and UNII 2A, begin SAR with the band that has the higher specified maximum output. If the highest reported SAR for the band with the highest specified power is ≤ 1.2 W/kg, testing for the band with the lower specified output power is not required; otherwise test the remaining bands independently for SAR.

To determine the *initial test position*, Area Scans were performed to determine the position with the *Maximum Value of SAR (measured)*. The position that produced the highest *Maximum Value of SAR* is considered the worst case position; thus used as the *initial test position*.

10.1. W-CDMA Band II

RF Exposure Conditins	Mode	Pwr Back-off	Dist. (mm)	Test Position	Ch #.	Freq. (MHz)	Power (dBm)		1-g SAR (W/kg)		Plot No.
							Tune-up limit	Meas.	Meas.	Scaled	
Standalone	Rel 99 RMC	ON	0	Rear	9262	1852.4	14.5	13.5	0.841	1.056	1
					9400	1880.0	14.5	13.8	0.830	0.975	
					9538	1907.6	14.5	13.6	0.849	1.034	
				Edge 1	9400	1880.0	14.5	13.8	0.469	0.551	
	Rel 99 RMC	OFF	19	Rear	9400	1880.0	24.5	23.7	0.375	0.454	
			22	Edge 1	9400	1880.0	24.5	23.7	0.359	0.435	
			0	Edge 2	9400	1880.0	24.5	23.7	0.095	0.115	
				Edge 3	9400	1880.0	24.5	23.7	0.027	0.032	
				Edge 4	9400	1880.0	24.5	23.7	0.413	0.500	

Note(s):

SAR data of WCDMA Band II used in this report were taken from SAR report 16K23795-S1V1, submitted under FCC ID A3LSMT818T.

10.2. W-CDMA Band V

RF Exposure Conditins	Mode	Pwr Back-off	Dist. (mm)	Test Position	Ch #.	Freq. (MHz)	Power (dBm)		1-g SAR (W/kg)		Plot No.
							Tune-up limit	Meas.	Meas.	Scaled	
Standalone	Rel 99 RMC	ON	0	Rear	4132	826.4	17.0	15.8	0.603	0.795	
					4183	836.6	17.0	15.6	0.620	0.848	
					4233	846.6	17.0	15.9	0.590	0.760	
				Edge 1	4132	826.4	17.0	15.8	0.602	0.794	
					4183	836.6	17.0	15.6	0.630	0.862	2
					4233	846.6	17.0	15.9	0.662	0.853	
	Rel 99 RMC	OFF	19	Rear	4183	836.6	24.0	23.1	0.424	0.528	
			22	Edge 1	4183	836.6	24.0	23.1	0.463	0.576	
			0	Edge 2	4183	836.6	24.0	23.1	0.129	0.161	
				Edge 3	4183	836.6	24.0	23.1	0.022	0.028	
				Edge 4	4183	836.6	24.0	23.1	0.193	0.240	

Note(s):

SAR data of WCDMA Band V used in this report were taken from SAR report 16K23795-S1V1, submitted under FCC ID A3LSMT818T.

10.3. LTE Band 2 (20MHz Bandwidth)

RF Exposure Conditions	Mode	Pwr Back-off	Dist. (mm)	Test Position	Ch #.	Freq. (MHz)	RB Allocation	RB offset	Power (dBm)		1-g SAR (W/kg)		Plot No.
									Tune-up limit	Meas.	Meas.	Scaled	
Standalone	QPSK	On	0	Rear	18700	1860.0	50	24	15.0	14.1	0.724	0.882	
					18900	1880.0	1	49	15.0	14.7	0.733	0.789	
							50	24	15.0	14.4	0.783	0.899	
					19100	1900.0	50	24	15.0	14.4	0.793	0.908	3
				Edge 1	18900	1880.0	1	49	15.0	14.7	0.476	0.512	
							50	24	15.0	14.4	0.513	0.589	
	QPSK	OFF	19	Rear	18900	1880.0	1	49	25.0	24.3	0.394	0.459	
							50	24	24.0	22.9	0.315	0.403	
			22	Edge 1	18900	1880.0	1	49	25.0	24.3	0.434	0.506	
							50	24	24.0	22.9	0.346	0.443	
			0	Edge 2	18900	1880.0	1	49	25.0	24.3	0.162	0.189	
							50	24	24.0	22.9	0.129	0.165	
				Edge 3	18900	1880.0	1	49	25.0	24.3	0.038	0.044	
							50	24	24.0	22.9	0.028	0.035	
				Edge 4	18900	1880.0	1	49	25.0	24.3	0.594	0.693	
							50	24	24.0	22.9	0.489	0.625	

Note(s):
SAR data of LTE Band 2 used in this report were taken from SAR report 16K23795-S1V1, submitted under FCC ID A3LSMT818T.

10.4. LTE Band 4 (20MHz Bandwidth)

RF Exposure Conditions	Mode	Pwr Back-off	Dist. (mm)	Test Position	Ch #.	Freq. (MHz)	RB Allocation	RB offset	Power (dBm)		1-g SAR (W/kg)		Plot No.
									Tune-up limit	Meas.	Meas.	Scaled	
Standalone	QPSK	On	0	Rear	20175	1732.5	1	49	14.0	13.5	0.677	0.757	
							50	24	14.0	13.4	0.590	0.684	
				Edge 1	20175	1732.5	1	49	14.0	13.5	0.363	0.406	
							50	24	14.0	13.4	0.353	0.409	
	QPSK	OFF	19	Rear	20175	1732.5	1	49	25.0	24.5	0.420	0.467	
							50	24	24.0	23.1	0.318	0.392	
			22	Edge 1	20175	1732.5	1	49	25.0	24.5	0.334	0.371	
							50	24	24.0	23.1	0.273	0.336	
			0	Edge 2	20175	1732.5	1	49	25.0	24.5	0.183	0.203	
							50	24	24.0	23.1	0.152	0.187	
				Edge 3	20175	1732.5	1	49	25.0	24.5	<0.001	<0.001	
							50	24	24.0	23.1	<0.001	<0.001	
				Edge 4	20175	1732.5	1	49	25.0	24.5	0.819	0.910	4
							50	24	24.0	23.1	0.720	0.887	
							100	0	24.0	23.0	0.567	0.706	

Note(s):
SAR data of LTE Band 4 used in this report were taken from SAR report 16K23795-S1V1, submitted under FCC ID A3LSMT818T.

10.5. LTE Band 5 (10MHz Bandwidth)

RF Exposure Conditions	Mode	Pwr Back-off	Dist. (mm)	Test Position	Ch #.	Freq. (MHz)	RB Allocation	RB offset	Power (dBm)		1-g SAR (W/kg)		Plot No.
									Tune-up limit	Meas.	Meas.	Scaled	
Standalone	QPSK	On	0	Rear	20525	836.5	1	0	17.5	17.0	0.806	0.915	
							25	0	17.5	16.9	0.781	0.902	
							50	0	17.5	16.8	0.755	0.882	
				Edge 1	20525	836.5	1	0	17.5	17.0	0.788	0.894	
							25	0	17.5	16.9	0.788	0.910	
							50	0	17.5	16.8	0.788	0.921	5
	QPSK	OFF	19	Rear	20525	836.5	1	25	24.0	22.9	0.486	0.627	
							25	0	23.0	21.9	0.365	0.475	
			22	Edge 1	20525	836.5	1	25	24.0	22.9	0.508	0.656	
							25	0	23.0	21.9	0.402	0.523	
			0	Edge 2	20525	836.5	1	25	24.0	22.9	0.257	0.332	
							25	0	23.0	21.9	0.200	0.260	
				Edge 3	20525	836.5	1	25	24.0	22.9	0.026	0.034	
							25	0	23.0	21.9	0.019	0.024	
				Edge 4	20525	836.5	1	25	24.0	22.9	0.275	0.355	
							25	0	23.0	21.9	0.211	0.274	

Note(s):

SAR data of LTE Band 5 used in this report were taken from SAR report 16K23795-S1V1, submitted under FCC ID A3LSMT818T.

10.6. LTE Band 7 (20MHz Bandwidth)

RF Exposure Conditions	Mode	Pwr Back-off	Dist. (mm)	Test Position	Ch #.	Freq. (MHz)	RB Allocation	RB offset	Power (dBm)		1-g SAR (W/kg)		Plot No.
									Tune-up limit	Meas.	Meas.	Scaled	
Standalone	QPSK	On	0	Rear	21100	2535.0	1	49	12.5	11.8	0.614	0.721	
							50	24	12.5	11.7	0.611	0.735	
				Edge 1	21100	2535.0	1	49	12.5	11.8	0.110	0.129	
							50	24	12.5	11.7	0.106	0.128	
	QPSK	OFF	19	Rear	21100	2535.0	1	49	24.0	23.5	0.266	0.295	
							50	24	23.0	22.3	0.167	0.197	
			22	Edge 1	21100	2535.0	1	49	24.0	23.5	0.065	0.072	
							50	24	23.0	22.3	0.042	0.050	
			0	Edge 2	21100	2535.0	1	49	24.0	23.5	0.712	0.791	6
							50	24	23.0	22.3	0.475	0.561	
				Edge 3	21100	2535.0	1	49	24.0	23.5	0.040	0.045	
							50	24	23.0	22.3	0.026	0.030	

10.7. LTE Band 12 (10MHz Bandwidth)

RF Exposure Conditions	Mode	Pwr Back-off	Dist. (mm)	Test Position	Ch #.	Freq. (MHz)	RB Allocation	RB offset	Power (dBm)		1-g SAR (W/kg)		Plot No.
									Tune-up limit	Meas.	Meas.	Scaled	
Standalone	QPSK	On	0	Rear	23095	707.5	1	25	18.5	17.7	0.700	0.834	
							25	25	18.5	17.7	0.661	0.788	
				Edge 1	23095	707.5	1	25	18.5	17.7	0.750	0.894	7
							25	25	18.5	17.7	0.745	0.888	
							50	0	18.5	17.7	0.736	0.885	
	QPSK	OFF	19	Rear	23095	707.5	1	0	24.0	23.1	0.243	0.296	
							25	25	23.0	22.2	0.183	0.220	
			22	Edge 1	23095	707.5	1	0	24.0	23.1	0.194	0.236	
							25	25	23.0	22.2	0.161	0.193	
			0	Edge 2	23095	707.5	1	0	24.0	23.1	0.148	0.180	
							25	25	23.0	22.2	0.092	0.110	
				Edge 3	23095	707.5	1	0	24.0	23.1	0.030	0.036	
							25	25	23.0	22.2	0.022	0.027	
				Edge 4	23095	707.5	1	0	24.0	23.1	0.189	0.230	
							25	25	23.0	22.2	0.137	0.164	

Note(s):

SAR data of LTE Band 12 used in this report were taken from SAR report 16K23795-S1V1, submitted under FCC ID A3LSMT818T.

10.8. LTE Band 13 (10MHz Bandwidth)

RF Exposure Conditions	Mode	Pwr Back-off	Dist. (mm)	Test Position	Ch #.	Freq. (MHz)	RB Allocation	RB offset	Power (dBm)		1-g SAR (W/kg)		Plot No.
									Tune-up limit	Meas.	Meas.	Scaled	
Standalone	QPSK	On	0	Rear	23230	782.0	1	0	18.5	18.2	0.936	1.014	
							25	0	18.5	18.2	0.897	0.964	
							50	0	18.5	18.1	0.916	1.007	
				Edge 1	23230	782.0	1	0	18.5	18.2	0.945	1.024	8
							25	0	18.5	18.2	0.902	0.969	
							50	0	18.5	18.1	0.872	0.959	
	QPSK	OFF	19	Rear	23230	782.0	1	49	24.5	24.2	0.486	0.520	
							25	0	23.5	23.1	0.389	0.431	
			22	Edge 1	23230	782.0	1	49	24.5	24.2	0.612	0.655	
							25	0	23.5	23.1	0.470	0.521	
			0	Edge 2	23230	782.0	1	49	24.5	24.2	0.333	0.356	
							25	0	23.5	23.1	0.278	0.308	
				Edge 3	23230	782.0	1	49	24.5	24.2	0.035	0.037	
							25	0	23.5	23.1	0.033	0.037	
				Edge 4	23230	782.0	1	49	24.5	24.2	0.312	0.334	
							25	0	23.5	23.1	0.273	0.303	

10.9. LTE Band 17 (10MHz Bandwidth)

RF Exposure Conditions	Mode	Pwr Back-off	Dist. (mm)	Test Position	Ch #.	Freq. (MHz)	RB Allocation	RB offset	Power (dBm)		1-g SAR (W/kg)		Plot No.
									Tune-up limit	Meas.	Meas.	Scaled	
Standalone	QPSK	On	0	Rear	23790	710.0	1	49	18.5	18.0	0.775	0.860	
							25	0	18.5	18.1	0.712	0.776	
				Edge 1	23790	710.0	1	49	18.5	18.0	0.890	0.988	9
							25	0	18.5	18.1	0.840	0.915	
							50	0	18.5	18.1	0.778	0.844	
	QPSK	OFF	19	Rear	23790	710.0	1	0	24.0	23.2	0.258	0.307	
							25	12	23.0	22.3	0.195	0.231	
			22	Edge 1	23790	710.0	1	0	24.0	23.2	0.187	0.223	
							25	12	23.0	22.3	0.142	0.168	
			0	Edge 2	23790	710.0	1	0	24.0	23.2	0.171	0.204	
							25	12	23.0	22.3	0.106	0.126	
				Edge 3	23790	710.0	1	0	24.0	23.2	0.069	0.083	
							25	12	23.0	22.3	0.050	0.059	
				Edge 4	23790	710.0	1	0	24.0	23.2	0.214	0.255	
							25	12	23.0	22.3	0.161	0.191	

10.10. Wi-Fi (DTS Band)

Mode	Mode	Pwr. Back-off	Dist. (mm)	Antenna	Test Position	Ch #.	Freq. (MHz)	Area Scan Max. SAR (W/kg)	Power (dBm)		1-g SAR (W/kg)		Plot No.
									Tune-up limit	Meas.	Meas.	Scaled	
Standalone	802.11b 1 Mbps	On	0	SISO Main	Rear	1	2412.0	1.133	12.5	12.4	0.943	0.967	
						6	2437.0	1.345	12.5	12.5	0.979	0.979	
				SISO Sub	Rear	6	2437.0	1.031	12.5	12.3	0.949	1.001	10
						11	2462.0	1.135	12.5	12.3	0.922	0.961	
		Off	15	SISO Main	Rear	6	2437.0	0.469	20.5	20.3	0.353	0.370	
			0		Edge 1	6	2437.0	0.031	20.5	20.3	0.024	0.025	
					Edge 2	6	2437.0	1.193	20.5	20.3	0.828	0.867	
						11	2462.0	1.165	20.5	20.2	0.826	0.885	
					Edge 3	6	2437.0	1.271	20.5	20.3	0.702	0.735	
					Edge 4	6	2437.0	0.107	20.5	20.3	0.096	0.100	
			15	SISO Sub	Rear	11	2462.0	0.338	20.5	20.1	0.098	0.107	
			0		Edge 2	11	2462.0	0.141	20.5	20.1	0.15	0.164	
					Edge 3	11	2462.0	0.766	20.5	20.1	0.541	0.590	
	802.11n HT20 6.5 Mbps	On	0	MIMO Main + Sub	Rear	1	2412.0	1.177	12.5	12.2	0.73	0.784	
						6	2437.0	1.173	12.5	12.3	0.81	0.856	11
		Off	15	MIMO Main + Sub	Rear	6	2437.0	0.416	20.5	20.3	0.353	0.367	
			0		Edge 2	6	2437.0	0.633	20.5	20.4	0.463	0.472	
					Edge 3	6	2437.0	0.842	20.5	20.3	0.604	0.628	

Note(s):

1. Highest *reported* SAR is ≤ 0.4 W/kg. Therefore, further SAR measurements within this exposure condition are not required.
2. Highest *reported* SAR is > 0.4 W/kg. Due to the highest *reported* SAR for this test position, other test positions in this exposure condition were evaluated until a SAR ≤ 0.8 W/kg was *reported*.
3. Testing for a second channel was required because the *reported* SAR for this test position was >0.8 W/kg.
4. Additional testing required in order satisfying FCC simultaneous transmission limit criteria.
5. MIMO mode was additional tested for determine simultaneous transmission SAR test exclusion.
6. SAR data of DTS Band used in this report were taken from SAR report 16K23795-S1V1, submitted under FCC ID A3LSMT818T.

10.11. Wi-Fi (U-NII Band)

Mode	Frequency Band	Mode	Pwr. Back-off	Dist. (mm)	Antenna	Test Position	Ch #.	Freq. (MHz)	Area Scan Max. SAR (W/kg)	Power (dBm)		1-g SAR (W/kg)		Plot No.
										Tune-up limit	Meas.	Meas.	Scaled	
Standalone	5.3 GHz U-NII 2A	802.11ac (VHT80) 29.3 Mbps	On	0	SISO Main	Rear	58	5290.0	0.525	9.5	8.9	0.133	0.152	
					SISO Sub	Rear	58	5290.0	1.886	9.5	9.1	0.711	0.785	12
		802.11n (HT40) 13.5 Mbps	Off	15	SISO Main	Rear	54	5270.0	0.063	17.5	17.1	0.026	0.028	
				0		Edge 1	54	5270.0	0.024	17.5	17.1	<0.001	<0.001	
						Edge 2	54	5270.0	0.319	17.5	17.1	0.153	0.167	
						Edge 3	54	5270.0	0.178	17.5	17.1			
						Edge 4	54	5270.0	0.016	17.5	17.1	0.003	0.003	
				15	SISO Sub	Rear	62	5310.0	0.348	17.5	17.0	0.193	0.215	
				0		Edge 3	62	5310.0	0.906	17.5	17.0	0.409	0.456	

Mode	Frequency Band	Mode	Pwr. Back-off	Dist. (mm)	Antenna	Test Position	Ch #.	Freq. (MHz)	Area Scan Max. SAR (W/kg)	Power (dBm)		1-g SAR (W/kg)		Plot No.
										Tune-up limit	Meas.	Meas.	Scaled	
Standalone	5.5 GHz U-NII 2C < 5.65GHz	802.11ac (VHT80) 29.3 Mbps	On	0	SISO Main	Rear	106	5530.0	0.398	9.5	9.0	0.121	0.135	
					SISO Sub	Rear	106	5530.0	2.161	9.5	8.9	0.796	0.914	
							122	5610.0	1.228	9.5	8.8	0.932	1.087	
		802.11n (HT40) 13.5 Mbps	Off	15	SISO Main	Rear	118	5590.0	0.059	17.5	17.4	0.019	0.019	
				0		Edge 1	118	5590.0	0.026	17.5	17.4	0.003	0.003	
						Edge 2	118	5590.0	0.161	17.5	17.4	0.063	0.064	
						Edge 3	118	5590.0	0.051	17.5	17.4			
						Edge 4	118	5590.0	0.020	17.5	17.4	0.002	0.002	
				15	SISO Sub	Rear	102	5510.0	0.734	17.5	17.3	0.425	0.443	
				0		Edge 3	102	5510.0	2.270	17.5	17.3	1.030	1.074	
							118	5590.0	2.064	17.5	17.3	1.040	1.092	13

Mode	Frequency Band	Mode	Pwr. Back-off	Dist. (mm)	Antenna	Test Position	Ch #.	Freq. (MHz)	Area Scan Max. SAR (W/kg)	Power (dBm)		1-g SAR (W/kg)		Plot No.
										Tune-up limit	Meas.	Meas.	Scaled	
Standalone	5.5 GHz U-NII 2C > 5.65GHz + 5.8 GHz U-NII 3	802.11ac (VHT80) 29.3 Mbps	On	0	SISO Main	Rear	138	5690.0	0.180	9.5	9.3	0.128	0.135	
					SISO Sub	Rear	138	5690.0	2.468	9.5	8.9	0.865	0.991	14
							155	5775.0	1.319	9.5	9.1	0.796	0.869	
		802.11n (HT40) 13.5 Mbps	Off	15	SISO Main	Rear	151	5755.0	0.053	17.5	17.3	0.018	0.018	
				0		Edge 1	151	5755.0	0.020	17.5	17.3	<0.001	<0.001	
						Edge 2	151	5755.0	0.085	17.5	17.3	0.038	0.040	
						Edge 3	151	5755.0	0.042	17.5	17.3			
						Edge 4	151	5755.0	0.014	17.5	17.3	0.001	0.001	
				15	SISO Sub	Rear	159	5795.0	0.369	17.5	17.2	0.182	0.194	
				0		Edge 3	159	5795.0	1.417	17.5	17.2	0.709	0.754	

Note(s):

1. Highest *reported* SAR is ≤ 0.4 W/kg. Therefore, further SAR measurements within this exposure condition are not required.
2. Highest *reported* SAR is > 0.4 W/kg. Due to the highest *reported* SAR for this test position, other test positions in this exposure condition were evaluated until a SAR ≤ 0.8 W/kg was *reported*.
3. Testing for a second channel was required because the *reported* SAR for this test position was >0.8 W/kg.
4. Additional testing required in order satisfying FCC simultaneous transmission limit criteria.
5. SAR data of UNII Band used in this report were taken from SAR report 16K23795-S1V1, submitted under FCC ID A3LSMT818T.

10.12. Bluetooth

Frequency Band	Mode	Dist. (mm)	Test Position	Ch #.	Freq. (MHz)	Power (dBm)		1-g SAR (W/kg)		Plot No.
						Tune-up limit	Meas.	Meas.	Scaled	
2.4 GHz	GFSK	0	Rear	39	2441.0	10.5	9.9	0.471	0.535	15
			Edge 2	39	2441.0	10.5	9.9	0.078	0.088	

Note(s):

SAR data of Bluetooth used in this report were taken from SAR report 16K23795-S1V1, submitted under FCC ID A3LSMT818T.

11. SAR Measurement Variability

In accordance with published RF Exposure KDB 865664 D01 SAR measurement 100 MHz to 6 GHz. 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.

Frequency Band (MHz)	Air Interface	RF Exposure Conditions	Test Position	Repeated SAR (Yes/No)	Highest Measured SAR (W/kg)	First Repeated	
						Measured SAR (W/kg)	Largest to Smallest SAR Ratio
750	LTE Band 12	Standalone	Edge 1	No	0.750	N/A	N/A
	LTE Band 17	Standalone	Edge 1	Yes	0.890	0.881	1.01
850	WCDMA Band V	Standalone	Edge 1	No	0.662	N/A	N/A
	LTE Band 5	Standalone	Rear	No	0.806	N/A	N/A
	LTE Band 13	Standalone	Edge 1	Yes	0.945	0.913	1.04
1750	LTE Band 4	Standalone	Edge 4	Yes	0.819	0.844	1.03
1900	WCDMA Band II	Standalone	Rear	Yes	0.849	0.863	1.02
	LTE Band 2	Standalone	Rear	No	0.793	N/A	N/A
2400	Wi-Fi 802.11b/g/n	Standalone	Rear	Yes	0.979	1.010	1.03
	Bluetooth	Standalone	Rear	No	0.471	N/A	N/A
2600	LTE Band 7	Standalone	Edge 2	No	0.712	N/A	N/A
5300	Wi-Fi 802.11a/n/ac	Standalone	Rear	No	0.711	N/A	N/A
5500	Wi-Fi 802.11a/n/ac	Standalone	Edge 3	Yes	1.04	1.04	1.00
5800	Wi-Fi 802.11a/n/ac	Standalone	Rear	Yes	0.865	0.87	1.01

Note(s):

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

12. Simultaneous Transmission SAR Analysis

KDB 447498 D01 General RF Exposure Guidance introduces a new formula for calculating the SAR to Peak Location Ratio (SPLSR) between pairs of simultaneously transmitting antennas:

$$SPLSR = (SAR_1 + SAR_2)^{1.5} / Ri$$

Where:

SAR_1 is the highest measured or estimated SAR for the first of a pair of simultaneous transmitting antennas, in a specific test operating mode and exposure condition

SAR_2 is the highest measured or estimated SAR for the second of a pair of simultaneous transmitting antennas, in the same test operating mode and exposure condition as the first

Ri is the separation distance between the pair of simultaneous transmitting antennas. When the SAR is measured, for both antennas in the pair, it is determined by the actual x, y and z coordinates in the 1-g SAR for each SAR peak location, based on the extrapolated and interpolated result in the zoom scan measurement, using the formula of $[(x_1-x_2)^2 + (y_1-y_2)^2 + (z_1-z_2)^2]$

In order for a pair of simultaneous transmitting antennas with the sum of 1-g SAR > 1.6 W/kg to qualify for exemption from Simultaneous Transmission SAR measurements, it has to satisfy the condition of:

$$(SAR_1 + SAR_2)^{1.5} / Ri \leq 0.04$$

Simultaneous Transmission Condition

RF Exposure Condition	Item	Capable Transmit Configurations		
Standalone	1	W-CDMA	+	DTS
	2	W-CDMA	+	U-NII
	3	W-CDMA	+	BT
	4	LTE	+	DTS
	5	LTE	+	U-NII
	6	LTE	+	BT

Notes:

1. DTS, U-NII supports Hotspot and Wi-Fi Direct.
2. W-CDMA and LTE supports Hotspot.
3. VoIP is supported in W-CDMA and LTE.
4. DTS Radio cannot transmit simultaneously with Bluetooth Radio.
5. U-NII Radio cannot transmit simultaneously with Bluetooth Radio.
6. U-NII Radio cannot transmit simultaneously with DTS Radio.

Estimated SAR for Simultaneous Transmission SAR Analysis

Considerations for SAR estimation

1. When standalone SAR test exclusion applies, standalone SAR must also be estimated to determine simultaneous transmission SAR test exclusion.
2. Dedicated Host Approach criteria for SAR test exclusion is likewise applied to SAR estimation, with certain distinctions between test exclusion and SAR estimation:
   - When the separation distance from the antenna to an adjacent edge is ≤ 5 mm, a distance of 5 mm is applied for SAR estimation; this is the same between test exclusion and SAR estimation calculations.
   - When the separation distance from the antenna to an adjacent edge is > 5 mm but ≤ 50 mm, the actual antenna-to-edge separation distance is applied for SAR estimation.
   - When the minimum test separation distance is > 50 mm, the estimated SAR value is 0.4 W/kg
3. Please refer to Estimated SAR Tables to see which test positions are inherently compliant as they consist of only estimated SAR values for all applicable transmitters and consequently will always have sum of SAR values < 1.2 W/kg. Simultaneous transmission SAR analysis was therefore not performed for these test positions.

Estimated SAR for WWAN

Antenna	Tx Interface	Frequency (MHz)	Output Power		Separation Distances (mm)						Estimated 1-g SAR Value (W/kg)					
			dBm	mW	Rear	Edge 1	Edge 2	Edge 3	Edge 4	Front	Rear	Edge 1	Edge 2	Edge 3	Edge 4	Front
Full Power, Proximity Sensor Off																
Cellular	W-CDMA 5	846.6	24.00	251	0	0	43	233	43		-MEASURE-	-MEASURE-	-MEASURE-	0.400	-MEASURE-	
Cellular	W-CDMA 2	1907.6	24.50	282	0	0	43	233	43		-MEASURE-	-MEASURE-	-MEASURE-	0.400	-MEASURE-	
Cellular	LTE Band 2	1910	25.00	316	0	0	43	233	43		-MEASURE-	-MEASURE-	-MEASURE-	0.400	-MEASURE-	
Cellular	LTE Band 4	1754.3	25.00	316	0	0	43	233	43		-MEASURE-	-MEASURE-	-MEASURE-	0.400	-MEASURE-	
Cellular	LTE Band 5	844	24.00	251	0	0	43	233	43		-MEASURE-	-MEASURE-	-MEASURE-	0.400	-MEASURE-	
Cellular	LTE Band 7	2560	24.00	251	0	10	25	222	136		-MEASURE-	-MEASURE-	-MEASURE-	0.400	0.400	
Cellular	LTE Band 12	711	24.00	251	0	0	43	233	43		-MEASURE-	-MEASURE-	-MEASURE-	0.400	-MEASURE-	
Cellular	LTE Band 13	782	24.50	282	0	0	43	233	43		-MEASURE-	-MEASURE-	-MEASURE-	0.400	-MEASURE-	
Cellular	LTE Band 17	711	24.00	251	0	0	43	233	43		-MEASURE-	-MEASURE-	-MEASURE-	0.400	-MEASURE-	
Power Back-off, Proximity Sensor On																
Cellular	W-CDMA 5	846.6	17.00	50	0	0					-MEASURE-	-MEASURE-				
Cellular	W-CDMA 2	1907.6	14.50	28	0	0					-MEASURE-	-MEASURE-				
Cellular	LTE Band 2	1910	15.00	32	0	0					-MEASURE-	-MEASURE-				
Cellular	LTE Band 4	1754.3	14.00	25	0	0					-MEASURE-	-MEASURE-				
Cellular	LTE Band 5	844	17.50	56	0	0					-MEASURE-	-MEASURE-				
Cellular	LTE Band 7	2560	12.50	18	0	10					-MEASURE-	0.384				
Cellular	LTE Band 12	711	18.50	71	0	0					-MEASURE-	-MEASURE-				
Cellular	LTE Band 13	782	18.50	71	0	0					-MEASURE-	-MEASURE-				
Cellular	LTE Band 17	711	18.50	71	0	0					-MEASURE-	-MEASURE-				

Estimated SAR for WLAN

Main Antenna

Tx Interface	Frequency (MHz)	Output Power dBm	Output Power mW	Separation Distances (mm) Rear	Edge 1	Edge 2	Edge 3	Edge 4	Front	Estimated 1-g SAR Value (W/kg) Rear	Edge 1	Edge 2	Edge 3	Edge 4	Front
Wi-Fi Main Antenna Max.															
Wi-Fi 2.4 GHz	2462	20.50	112	0.9	180	5.1	28	160.3		-MEASURE-	0.400	-MEASURE-	-MEASURE-	0.400	
Wi-Fi 5.3 GHz	5320	17.50	56	0.9	180	5.1	28	160.3		-MEASURE-	0.400	-MEASURE-	-MEASURE-	0.400	
Wi-Fi 5.5 GHz	5700	17.50	56	0.9	180	5.1	28	160.3		-MEASURE-	0.400	-MEASURE-	-MEASURE-	0.400	
Wi-Fi 5.8 GHz	5825	17.50	56	0.9	180	5.1	28	160.3		-MEASURE-	0.400	-MEASURE-	-MEASURE-	0.400	
Bluetooth	2480	10.50	11	0.9	180	5.1	28	160.3		-MEASURE-	0.400	-MEASURE-	0.082	0.400	
Wi-Fi Main Antenna Reduced.															
Wi-Fi 2.4 GHz	2462	12.50	18	0.9						-MEASURE-					
Wi-Fi 5.3 GHz	5320	9.50	9	0.9						-MEASURE-					
Wi-Fi 5.5 GHz	5700	9.50	9	0.9						-MEASURE-					
Wi-Fi 5.8 GHz	5825	9.50	9	0.9						-MEASURE-					

Sub Antenna

Tx Interface	Frequency (MHz)	Output Power dBm	Output Power mW	Separation Distances (mm) Rear	Edge 1	Edge 2	Edge 3	Edge 4	Front	Estimated 1-g SAR Value (W/kg) Rear	Edge 1	Edge 2	Edge 3	Edge 4	Front
Wi-Fi Main Antenna Max.															
Wi-Fi 2.4 GHz	2462	20.50	112	0.8	221	65.8	4.29	81		-MEASURE-	0.400	0.400	-MEASURE-	0.400	
Wi-Fi 5.3 GHz	5320	17.50	56	0.8	221	65.8	4.29	81		-MEASURE-	0.400	0.400	-MEASURE-	0.400	
Wi-Fi 5.5 GHz	5700	17.50	56	0.8	221	65.8	4.29	81		-MEASURE-	0.400	0.400	-MEASURE-	0.400	
Wi-Fi 5.8 GHz	5825	17.50	56	0.8	221	65.8	4.29	81		-MEASURE-	0.400	0.400	-MEASURE-	0.400	
Wi-Fi Main Antenna Reduced.															
Wi-Fi 2.4 GHz	2462	12.50	18	0.8						-MEASURE-					
Wi-Fi 5.3 GHz	5320	9.50	9	0.8						-MEASURE-					
Wi-Fi 5.5 GHz	5700	9.50	9	0.8						-MEASURE-					
Wi-Fi 5.8 GHz	5825	9.50	9	0.8						-MEASURE-					

12.1. Sum of the SAR for WCDMA Band II & Wi-Fi & BT

Test Position	Standalone SAR (W/kg)				∑ 1-g SAR (W/kg)		
	WWAN ①	DTS Main ②	DTS Sub ③	DTS MIMO ④	WWAN + DTS Main ① + ②	WWAN + DTS Sub ① + ③	WWAN + DTS MIMO ① + ④
Rear	1.056	0.979	1.001	0.856	2.035	2.057	1.912
Edge 1	0.551	0.025	0.400	0.400	0.576	0.951	0.951
Edge 2	0.115	0.885	0.164	0.472	1.000	0.279	0.587
Edge 3	0.032	0.735	0.590	0.628	0.767	0.622	0.660
Edge 4	0.500	0.100	0.400	0.400	0.600	0.900	0.900

Test Position	Standalone SAR (W/kg)				∑ 1-g SAR (W/kg)			
	WWAN ①	U-NII Main ②	U-NII Sub ③	BT ④	WWAN + U-Nii Main ① + ②	WWAN + U-NII Sub ① + ③	WWAN + U-NII MIMO ① + ② + ③	WWAN + BT ① + ④
Rear	1.056	0.152	1.087	0.535	1.208	2.143	2.295	1.591
Edge 1	0.551	0.003	0.400	0.400	0.554	0.951	0.954	0.951
Edge 2	0.115	0.167	0.400	0.088	0.282	0.515	0.682	0.203
Edge 3	0.032	0.400	1.092	0.082	0.432	1.124	1.524	0.114
Edge 4	0.500	0.003	0.400	0.400	0.503	0.900	0.903	0.900

SAR to Peak Location Separation Ratio (SPLSR)

Test Position	Standalone SAR (W/kg)				∑ 1-g SAR (W/kg)		Calculated distance (mm)	SPLSR (≤ 0.04)	Volume Scan (Yes/ No)	Figure
	① WWAN	② DTS Main	③ DTS Sub	④ DTS MIMO						
Rear	1.056	0.979			① + ②	2.035	219.1	0.01	No	1
	1.056		1.001		① + ③	2.057	225.3	0.01	No	2
	1.056			0.856	① + ④	1.912	218.6	0.01	No	3

Test Position	Standalone SAR (W/kg)			∑ 1-g SAR (W/kg)		Calculated distance (mm)	SPLSR (≤ 0.04)	Volume Scan (Yes/ No)	Figure
	① WWAN	② U-NII Main	③ U-NII Sub						
Rear	1.056	0.152	1.087	① + ② + ③	2.295				
	1.056	0.152		① + ②	1.208	215.2	0.01	No	4
	1.056		1.087	① + ③	2.143	224.7	0.01	No	
		0.152	1.087	② + ③	1.239	66.7	0.02	No	

12.2. Sum of the SAR for WCDMA Band V & Wi-Fi & BT

Test Position	Standalone SAR (W/kg)				∑ 1-g SAR (W/kg)		
	WWAN ①	DTS Main ②	DTS Sub ③	DTS MIMO ④	WWAN + DTS Main ① + ②	WWAN + DTS Sub ① + ③	WWAN + DTS MIMO ① + ④
Rear	0.848	0.979	1.001	0.856	1.827	1.849	1.704
Edge 1	0.862	0.025	0.400	0.400	0.887	1.262	1.262
Edge 2	0.161	0.885	0.164	0.472	1.046	0.325	0.633
Edge 3	0.028	0.735	0.590	0.628	0.763	0.618	0.656
Edge 4	0.240	0.100	0.400	0.400	0.340	0.640	0.640

Test Position	Standalone SAR (W/kg)				∑ 1-g SAR (W/kg)			
	WWAN ①	U-NII Main ②	U-NII Sub ③	BT ④	WWAN + U-Nii Main ① + ②	WWAN + U-NII Sub ① + ③	WWAN + U-NII MIMO ① + ② + ③	WWAN + BT ① + ④
Rear	0.848	0.152	1.087	0.535	1.000	1.935	2.087	1.383
Edge 1	0.862	0.003	0.400	0.400	0.865	1.262	1.265	1.262
Edge 2	0.161	0.167	0.400	0.088	0.328	0.561	0.728	0.249
Edge 3	0.028	0.400	1.092	0.082	0.428	1.120	1.520	0.110
Edge 4	0.240	0.003	0.400	0.400	0.243	0.640	0.643	0.640

SAR to Peak Location Separation Ratio (SPLSR)

Test Position	Standalone SAR (W/kg)				∑ 1-g SAR (W/kg)		Calculated distance (mm)	SPLSR (≤ 0.04)	Volume Scan (Yes/ No)	Figure
	① WWAN	② DTS Main	③ DTS Sub	④ DTS MIMO						
Rear	0.848	0.979			① + ②	1.827	214.1	0.01	No	5
	0.848		1.001		① + ③	1.849	230.6	0.01	No	6
	0.848			0.856	① + ④	1.704	214.3	0.01	No	7

Test Position	Standalone SAR (W/kg)			∑ 1-g SAR (W/kg)		Calculated distance (mm)	SPLSR (≤ 0.04)	Volume Scan (Yes/ No)	Figure
	① WWAN	② U-NII Main	③ U-NII Sub						
Rear	0.848	0.152	1.087	① + ② + ③	2.087				8
	0.848	0.152		① + ②	1.000	209.6	0.00	No	
	0.848		1.087	① + ③	1.935	230.0	0.01	No	
		0.152	1.087	② + ③	1.239	66.7	0.02	No	

12.3. Sum of the SAR for LTE Band 2 & Wi-Fi & BT

Test Position	Standalone SAR (W/kg)				∑ 1-g SAR (W/kg)		
	WWAN ①	DTS Main ②	DTS Sub ③	DTS MIMO ④	WWAN + DTS Main ① + ②	WWAN + DTS Sub ① + ③	WWAN + DTS MIMO ① + ④
Rear	0.908	0.979	1.001	0.856	1.887	1.909	1.764
Edge 1	0.589	0.025	0.400	0.400	0.614	0.989	0.989
Edge 2	0.189	0.885	0.164	0.472	1.074	0.353	0.661
Edge 3	0.044	0.735	0.590	0.628	0.779	0.634	0.672
Edge 4	0.693	0.100	0.400	0.400	0.793	1.093	1.093

Test Position	Standalone SAR (W/kg)				∑ 1-g SAR (W/kg)			
	WWAN ①	U-NII Main ②	U-NII Sub ③	BT ④	WWAN + U-Nii Main ① + ②	WWAN + U-NII Sub ① + ③	WWAN + U-NII MIMO ① + ② + ③	WWAN + BT ① + ④
Rear	0.908	0.152	1.087	0.535	1.060	1.995	2.147	1.443
Edge 1	0.589	0.003	0.400	0.400	0.592	0.989	0.992	0.989
Edge 2	0.189	0.167	0.400	0.088	0.356	0.589	0.756	0.277
Edge 3	0.044	0.400	1.092	0.082	0.444	1.136	1.536	0.126
Edge 4	0.693	0.003	0.400	0.400	0.696	1.093	1.096	1.093

SAR to Peak Location Separation Ratio (SPLSR)

Test Position	Standalone SAR (W/kg)				∑ 1-g SAR (W/kg)		Calculated distance (mm)	SPLSR (≤ 0.04)	Volume Scan (Yes/ No)	Figure
	① WWAN	② DTS Main	③ DTS Sub	④ DTS MIMO						
Rear	0.908	0.979			① + ②	1.887	223.1	0.01	No	9
	0.908		1.001		① + ③	1.909	229.6	0.01	No	10
	0.908			0.856	① + ④	1.764	222.6	0.01	No	11

Test Position	Standalone SAR (W/kg)			∑ 1-g SAR (W/kg)		Calculated distance (mm)	SPLSR (≤ 0.04)	Volume Scan (Yes/ No)	Figure
	① WWAN	② U-NII Main	③ U-NII Sub						
Rear	0.908	0.152	1.087	① + ② + ③	2.147				
	0.908	0.152		① + ②	1.060	219.2	0.00	No	12
	0.908		1.087	① + ③	1.995	228.9	0.01	No	
		0.152	1.087	② + ③	1.239	66.7	0.02	No	

12.4. Sum of the SAR for LTE Band 4 & Wi-Fi & BT

Test Position	Standalone SAR (W/kg)				∑ 1-g SAR (W/kg)		
	WWAN ①	DTS Main ②	DTS Sub ③	DTS MIMO ④	WWAN + DTS Main ① + ②	WWAN + DTS Sub ① + ③	WWAN + DTS MIMO ① + ④
Rear	0.757	0.979	1.001	0.856	1.736	1.758	1.613
Edge 1	0.409	0.025	0.400	0.400	0.434	0.809	0.809
Edge 2	0.203	0.885	0.164	0.472	1.088	0.367	0.675
Edge 3	0.001	0.735	0.590	0.628	0.736	0.591	0.629
Edge 4	0.910	0.100	0.400	0.400	1.010	1.310	1.310

Test Position	Standalone SAR (W/kg)				∑ 1-g SAR (W/kg)			
	WWAN ①	U-NII Main ②	U-NII Sub ③	BT ④	WWAN + U-Nii Main ① + ②	WWAN + U-NII Sub ① + ③	WWAN + U-NII MIMO ① + ② + ③	WWAN + BT ① + ④
Rear	0.757	0.152	1.087	0.535	0.909	1.844	1.996	1.292
Edge 1	0.409	0.003	0.400	0.400	0.412	0.809	0.812	0.809
Edge 2	0.203	0.167	0.400	0.088	0.370	0.603	0.770	0.291
Edge 3	0.001	0.400	1.092	0.082	0.401	1.093	1.493	0.083
Edge 4	0.910	0.003	0.400	0.400	0.913	1.310	1.313	1.310

SAR to Peak Location Separation Ratio (SPLSR)

Test Position	Standalone SAR (W/kg)				∑ 1-g SAR (W/kg)		Calculated distance (mm)	SPLSR (≤ 0.04)	Volume Scan (Yes/ No)	Figure
	① WWAN	② DTS Main	③ DTS Sub	④ DTS MIMO						
Rear	0.757	0.979			① + ②	1.736	221.8	0.01	No	13
	0.757		1.001		① + ③	1.758	228.0	0.01	No	14
	0.757			0.856	① + ④	1.613	221.2	0.01	No	15

Test Position	Standalone SAR (W/kg)			∑ 1-g SAR (W/kg)		Calculated distance (mm)	SPLSR (≤ 0.04)	Volume Scan (Yes/ No)	Figure
	① WWAN	② U-NII Main	③ U-NII Sub						
Rear	0.757	0.152	1.087	① + ② + ③	1.996				16
	0.757	0.152		① + ②	0.909	217.8	0.00	No	
	0.757		1.087	① + ③	1.844	227.3	0.01	No	
		0.152	1.087	② + ③	1.239	66.7	0.02	No	

12.5. Sum of the SAR for LTE Band 5 & Wi-Fi & BT

Test Position	Standalone SAR (W/kg)				∑ 1-g SAR (W/kg)		
	WWAN ①	DTS Main ②	DTS Sub ③	DTS MIMO ④	WWAN + DTS Main ① + ②	WWAN + DTS Sub ① + ③	WWAN + DTS MIMO ① + ④
Rear	0.915	0.979	1.001	0.856	1.894	1.916	1.771
Edge 1	0.921	0.025	0.400	0.400	0.946	1.321	1.321
Edge 2	0.332	0.885	0.164	0.472	1.217	0.496	0.804
Edge 3	0.034	0.735	0.590	0.628	0.769	0.624	0.662
Edge 4	0.355	0.100	0.400	0.400	0.455	0.755	0.755

Test Position	Standalone SAR (W/kg)				∑ 1-g SAR (W/kg)			
	WWAN ①	U-NII Main ②	U-NII Sub ③	BT ④	WWAN + U-Nii Main ① + ②	WWAN + U-NII Sub ① + ③	WWAN + U-NII MIMO ① + ② + ③	WWAN + BT ① + ④
Rear	0.915	0.152	1.087	0.535	1.067	2.002	2.154	1.450
Edge 1	0.921	0.003	0.400	0.400	0.924	1.321	1.324	1.321
Edge 2	0.332	0.167	0.400	0.088	0.499	0.732	0.899	0.420
Edge 3	0.034	0.400	1.092	0.082	0.434	1.126	1.526	0.116
Edge 4	0.355	0.003	0.400	0.400	0.358	0.755	0.758	0.755

SAR to Peak Location Separation Ratio (SPLSR)

Test Position	Standalone SAR (W/kg)				∑ 1-g SAR (W/kg)		Calculated distance (mm)	SPLSR (≤ 0.04)	Volume Scan (Yes/ No)	Figure
	① WWAN	② DTS Main	③ DTS Sub	④ DTS MIMO						
Rear	0.915	0.979			① + ②	1.894	216.7	0.01	No	17
	0.915		1.001		① + ③	1.916	232.3	0.01	No	18
	0.915			0.856	① + ④	1.771	216.7	0.01	No	19

Test Position	Standalone SAR (W/kg)			∑ 1-g SAR (W/kg)		Calculated distance (mm)	SPLSR (≤ 0.04)	Volume Scan (Yes/ No)	Figure
	① WWAN	② U-NII Main	③ U-NII Sub						
Rear	0.915	0.152	1.087	① + ② + ③	2.154				
	0.915	0.152		① + ②	1.067	212.2	0.01	No	20
	0.915		1.087	① + ③	2.002	231.7	0.01	No	
		0.152	1.087	② + ③	1.239	66.7	0.02	No	

12.6. Sum of the SAR for LTE Band 7 & Wi-Fi & BT

Test Position	Standalone SAR (W/kg)				∑ 1-g SAR (W/kg)		
	WWAN ①	DTS Main ②	DTS Sub ③	DTS MIMO ④	WWAN + DTS Main ① + ②	WWAN + DTS Sub ① + ③	WWAN + DTS MIMO ① + ④
Rear	0.735	0.979	1.001	0.856	1.714	1.736	1.591
Edge 1	0.129	0.025	0.400	0.400	0.154	0.529	0.529
Edge 2	0.791	0.885	0.164	0.472	1.676	0.955	1.263
Edge 3	0.045	0.735	0.590	0.628	0.780	0.635	0.673
Edge 4	0.400	0.100	0.400	0.400	0.500	0.800	0.800

Test Position	Standalone SAR (W/kg)				∑ 1-g SAR (W/kg)			
	WWAN ①	U-NII Main ②	U-NII Sub ③	BT ④	WWAN + U-Nii Main ① + ②	WWAN + U-NII Sub ① + ③	WWAN + U-NII MIMO ① + ② + ③	WWAN + BT ① + ④
Rear	0.735	0.152	1.087	0.535	0.887	1.822	1.974	1.270
Edge 1	0.129	0.003	0.400	0.400	0.132	0.529	0.532	0.529
Edge 2	0.791	0.167	0.400	0.088	0.958	1.191	1.358	0.879
Edge 3	0.045	0.400	1.092	0.082	0.445	1.137	1.537	0.127
Edge 4	0.400	0.003	0.400	0.400	0.403	0.800	0.803	0.800

SAR to Peak Location Separation Ratio (SPLSR)

Test Position	Standalone SAR (W/kg)				∑ 1-g SAR (W/kg)		Calculated distance (mm)	SPLSR (≤ 0.04)	Volume Scan (Yes/ No)	Figure
	① WWAN	② DTS Main	③ DTS Sub	④ DTS MIMO						
Rear	0.735	0.979			① + ②	1.714	191.7	0.01	No	21
	0.735		1.001		① + ③	1.736	222.9	0.01	No	22
Edge 2	0.791	0.885			① + ②	1.676	165.2	0.01	No	23

Test Position	Standalone SAR (W/kg)			∑ 1-g SAR (W/kg)		Calculated distance (mm)	SPLSR (≤ 0.04)	Volume Scan (Yes/ No)	Figure
	① WWAN	② U-NII Main	③ U-NII Sub						
Rear	0.735	0.152	1.087	① + ② + ③	1.974				24
	0.735	0.152		① + ②	0.887	186.5	0.00	No	
	0.735		1.087	① + ③	1.822	222.5	0.01	No	
		0.152	1.087	② + ③	1.239	66.7	0.02	No	

12.7. Sum of the SAR for LTE Band 12 & Wi-Fi & BT

Test Position	Standalone SAR (W/kg)				∑ 1-g SAR (W/kg)		
	WWAN ①	DTS Main ②	DTS Sub ③	DTS MIMO ④	WWAN + DTS Main ① + ②	WWAN + DTS Sub ① + ③	WWAN + DTS MIMO ① + ④
Rear	0.834	0.979	1.001	0.856	1.813	1.835	1.690
Edge 1	0.894	0.025	0.400	0.400	0.919	1.294	1.294
Edge 2	0.180	0.885	0.164	0.472	1.065	0.344	0.652
Edge 3	0.036	0.735	0.590	0.628	0.771	0.626	0.664
Edge 4	0.230	0.100	0.400	0.400	0.330	0.630	0.630

Test Position	Standalone SAR (W/kg)				∑ 1-g SAR (W/kg)			
	WWAN ①	U-NII Main ②	U-NII Sub ③	BT ④	WWAN + U-Nii Main ① + ②	WWAN + U-NII Sub ① + ③	WWAN + U-NII MIMO ① + ② + ③	WWAN + BT ① + ④
Rear	0.834	0.152	1.087	0.535	0.986	1.921	2.073	1.369
Edge 1	0.894	0.003	0.400	0.400	0.897	1.294	1.297	1.294
Edge 2	0.180	0.167	0.400	0.088	0.347	0.580	0.747	0.268
Edge 3	0.036	0.400	1.092	0.082	0.436	1.128	1.528	0.118
Edge 4	0.230	0.003	0.400	0.400	0.233	0.630	0.633	0.630

SAR to Peak Location Separation Ratio (SPLSR)

Test Position	Standalone SAR (W/kg)				∑ 1-g SAR (W/kg)		Calculated distance (mm)	SPLSR (≤ 0.04)	Volume Scan (Yes/ No)	Figure
	① WWAN	② DTS Main	③ DTS Sub	④ DTS MIMO						
Rear	0.834	0.979			① + ②	1.813	218.5	0.01	No	25
	0.834		1.001		① + ③	1.835	232.5	0.01	No	26
	0.834			0.856	① + ④	1.690	218.5	0.01	No	27

Test Position	Standalone SAR (W/kg)			∑ 1-g SAR (W/kg)		Calculated distance (mm)	SPLSR (≤ 0.04)	Volume Scan (Yes/ No)	Figure
	① WWAN	② U-NII Main	③ U-NII Sub						
Rear	0.834	0.152	1.087	① + ② + ③	2.073				28
	0.834	0.152		① + ②	0.986	214.1	0.00	No	
	0.834		1.087	① + ③	1.921	231.9	0.01	No	
		0.152	1.087	② + ③	1.239	66.7	0.02	No	

12.8. Sum of the SAR for LTE Band 13 & Wi-Fi & BT

Test Position	Standalone SAR (W/kg)				∑ 1-g SAR (W/kg)		
	WWAN ①	DTS Main ②	DTS Sub ③	DTS MIMO ④	WWAN + DTS Main ① + ②	WWAN + DTS Sub ① + ③	WWAN + DTS MIMO ① + ④
Rear	1.014	0.979	1.001	0.856	1.993	2.015	1.870
Edge 1	1.024	0.025	0.400	0.400	1.049	1.424	1.424
Edge 2	0.356	0.885	0.164	0.472	1.241	0.520	0.828
Edge 3	0.037	0.735	0.590	0.628	0.772	0.627	0.665
Edge 4	0.334	0.100	0.400	0.400	0.434	0.734	0.734

Test Position	Standalone SAR (W/kg)				∑ 1-g SAR (W/kg)			
	WWAN ①	U-NII Main ②	U-NII Sub ③	BT ④	WWAN + U-Nii Main ① + ②	WWAN + U-NII Sub ① + ③	WWAN + U-NII MIMO ① + ② + ③	WWAN + BT ① + ④
Rear	1.014	0.152	1.087	0.535	1.166	2.101	2.253	1.549
Edge 1	1.024	0.003	0.400	0.400	1.027	1.424	1.427	1.424
Edge 2	0.356	0.167	0.400	0.088	0.523	0.756	0.923	0.444
Edge 3	0.037	0.400	1.092	0.082	0.437	1.129	1.529	0.119
Edge 4	0.334	0.003	0.400	0.400	0.337	0.734	0.737	0.734

SAR to Peak Location Separation Ratio (SPLSR)

Test Position	Standalone SAR (W/kg)				∑ 1-g SAR (W/kg)		Calculated distance (mm)	SPLSR (≤ 0.04)	Volume Scan (Yes/ No)	Figure
	① WWAN	② DTS Main	③ DTS Sub	④ DTS MIMO						
Rear	1.014	0.979			① + ②	1.993	218.0	0.01	No	29
	1.014		1.001		① + ③	2.015	232.4	0.01	No	30
	1.014			0.856	① + ④	1.870	218.0	0.01	No	31

Test Position	Standalone SAR (W/kg)			∑ 1-g SAR (W/kg)		Calculated distance (mm)	SPLSR (≤ 0.04)	Volume Scan (Yes/ No)	Figure
	① WWAN	② U-NII Main	③ U-NII Sub						
Rear	1.014	0.152	1.087	① + ② + ③	2.253				32
	1.014	0.152		① + ②	1.166	213.6	0.01	No	
	1.014		1.087	① + ③	2.101	231.8	0.01	No	
		0.152	1.087	② + ③	1.239	66.7	0.02	No	

12.9. Sum of the SAR for LTE Band 17 & Wi-Fi & BT

Test Position	Standalone SAR (W/kg)				∑ 1-g SAR (W/kg)		
	WWAN ①	DTS Main ②	DTS Sub ③	DTS MIMO ④	WWAN + DTS Main ① + ②	WWAN + DTS Sub ① + ③	WWAN + DTS MIMO ① + ④
Rear	0.860	0.979	1.001	0.856	1.839	1.861	1.716
Edge 1	0.988	0.025	0.400	0.400	1.013	1.388	1.388
Edge 2	0.204	0.885	0.164	0.472	1.089	0.368	0.676
Edge 3	0.083	0.735	0.590	0.628	0.818	0.673	0.711
Edge 4	0.255	0.100	0.400	0.400	0.355	0.655	0.655

Test Position	Standalone SAR (W/kg)				∑ 1-g SAR (W/kg)			
	WWAN ①	U-NII Main ②	U-NII Sub ③	BT ④	WWAN + U-Nii Main ① + ②	WWAN + U-NII Sub ① + ③	WWAN + U-NII MIMO ① + ② + ③	WWAN + BT ① + ④
Rear	0.860	0.152	1.087	0.535	1.012	1.947	2.099	1.395
Edge 1	0.988	0.003	0.400	0.400	0.991	1.388	1.391	1.388
Edge 2	0.204	0.167	0.400	0.088	0.371	0.604	0.771	0.292
Edge 3	0.083	0.400	1.092	0.082	0.483	1.175	1.575	0.165
Edge 4	0.255	0.003	0.400	0.400	0.258	0.655	0.658	0.655

SAR to Peak Location Separation Ratio (SPLSR)

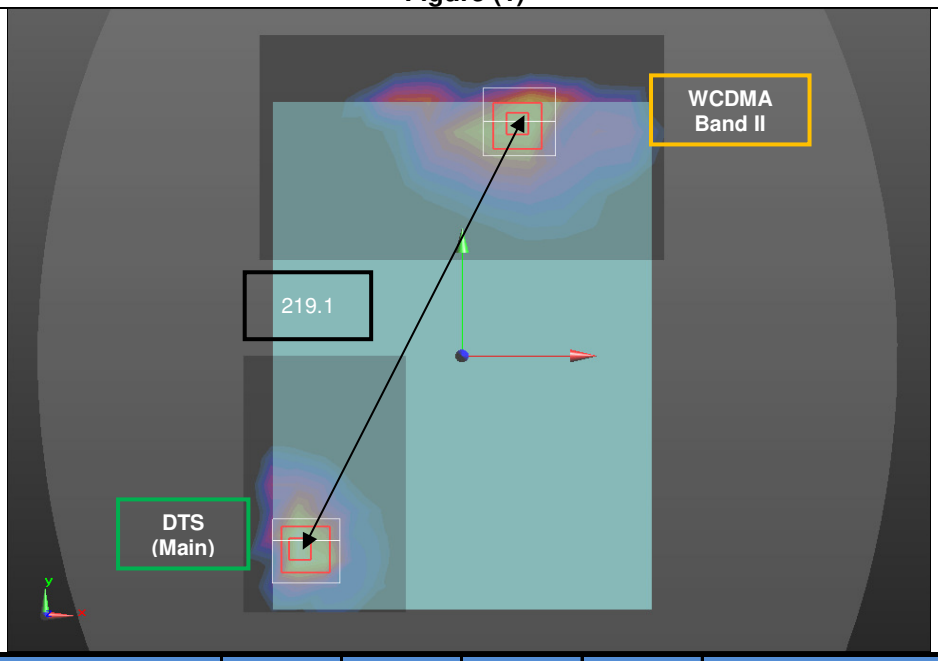
Test Position	Standalone SAR (W/kg)				∑ 1-g SAR (W/kg)		Calculated distance (mm)	SPLSR (≤ 0.04)	Volume Scan (Yes/ No)	Figure
	① WWAN	② DTS Main	③ DTS Sub	④ DTS MIMO						
Rear	0.860	0.979			① + ②	1.839	217.1	0.01	No	33
	0.860		1.001		① + ③	1.861	232.3	0.01	No	34
	0.860			0.856	① + ④	1.716	217.1	0.01	No	35

Test Position	Standalone SAR (W/kg)			∑ 1-g SAR (W/kg)		Calculated distance (mm)	SPLSR (≤ 0.04)	Volume Scan (Yes/ No)	Figure
	① WWAN	② U-NII Main	③ U-NII Sub						
Rear	0.860	0.152	1.087	① + ② + ③	2.099				36
	0.860	0.152		① + ②	1.012	212.6	0.00	No	
	0.860		1.087	① + ③	1.947	231.7	0.01	No	
		0.152	1.087	② + ③	1.239	66.7	0.02	No	

Conclusion:

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

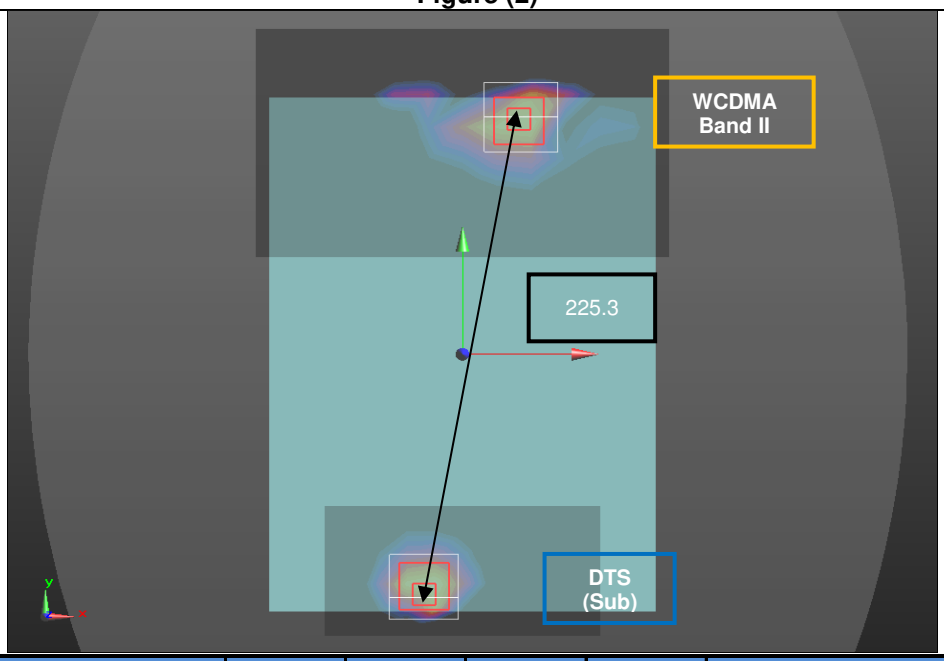
Figure (1)



Mode		SAR	X	Y	Z	d: Calculated distance (mm)	
		W/kg	m	m	m		
WCDMA Band II	①	1.056	0.0223	0.1079	-0.0031	① + ②	219.1
DTS Main	②	0.979	-0.0734	-0.0892	-0.002		

The Peak Location Separation Distance is computed by using the
SQRT((X1-X2)^2+(Y1-Y2)^2+(Z1-Z2)^2)

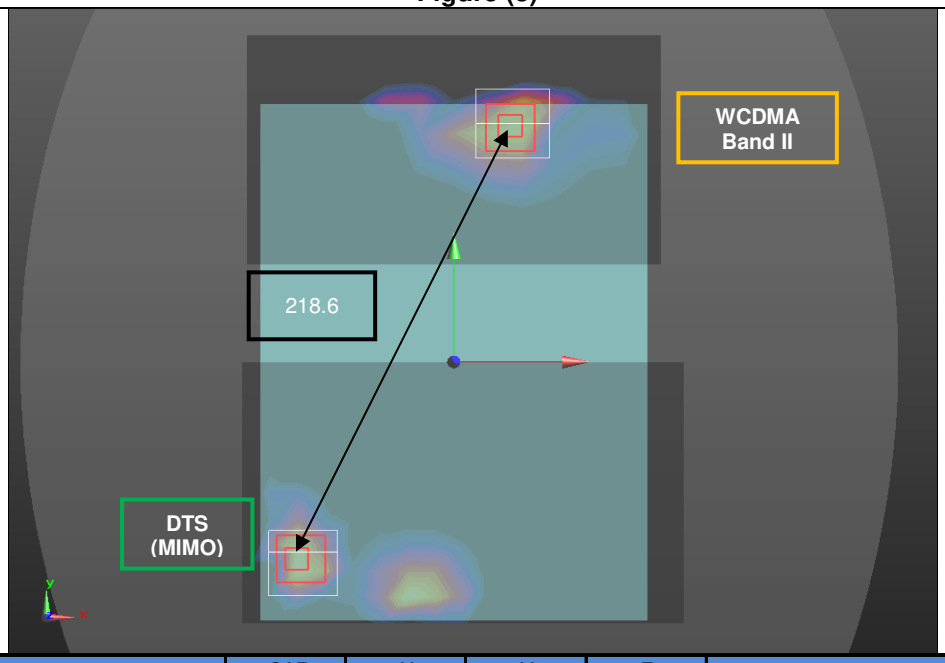
Figure (2)



Mode		SAR	X	Y	Z	d: Calculated distance (mm)	
		W/kg	m	m	m		
WCDMA Band II	①	1.056	0.0223	0.1079	-0.0031	① + ②	225.3
DTS Sub	②	1.001	-0.0158	-0.1142	-0.0021		

The Peak Location Separation Distance is computed by using the
SQRT((X1-X2)^2+(Y1-Y2)^2+(Z1-Z2)^2)

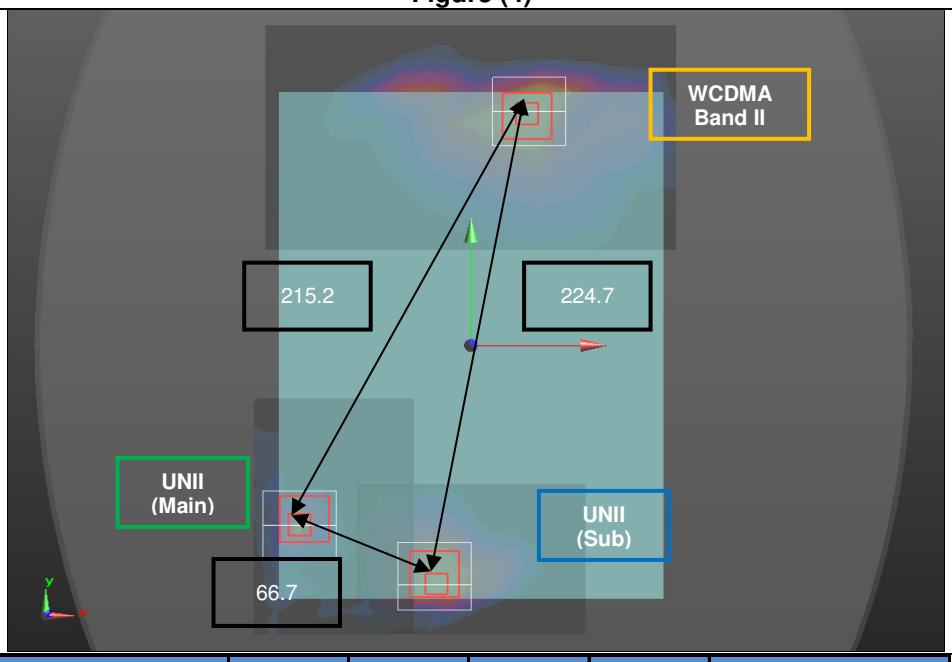
Figure (3)



Mode		SAR	X	Y	Z	d: Calculated distance (mm)	
		W/kg	m	m	m		
WCDMA Band II	①	1.056	0.0223	0.1079	-0.0031	① + ②	218.6
DTS MIMO	②	0.856	-0.0696	-0.0904	-0.002		

The Peak Location Separation Distance is computed by using the
SQRT((X1-X2)^2+(Y1-Y2)^2+(Z1-Z2)^2)

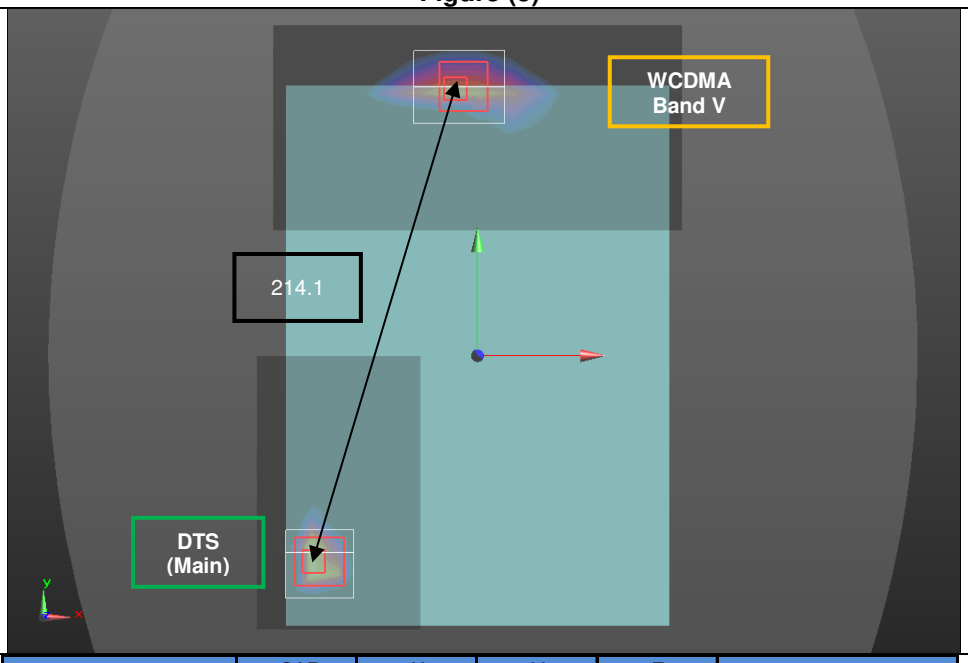
Figure (4)



Mode		SAR	X	Y	Z	d: Calculated distance (mm)	
		W/kg	m	m	m		
WCDMA Band II	①	1.056	0.0223	0.1079	-0.0031	① + ②	215.2
UNII Main	②	0.152	-0.075	-0.084	-0.0029	① + ③	224.7
UNII Sub	③	1.087	-0.0152	-0.1136	-0.0028	② + ③	66.7

The Peak Location Separation Distance is computed by using the
SQRT((X1-X2)^2+(Y1-Y2)^2+(Z1-Z2)^2)

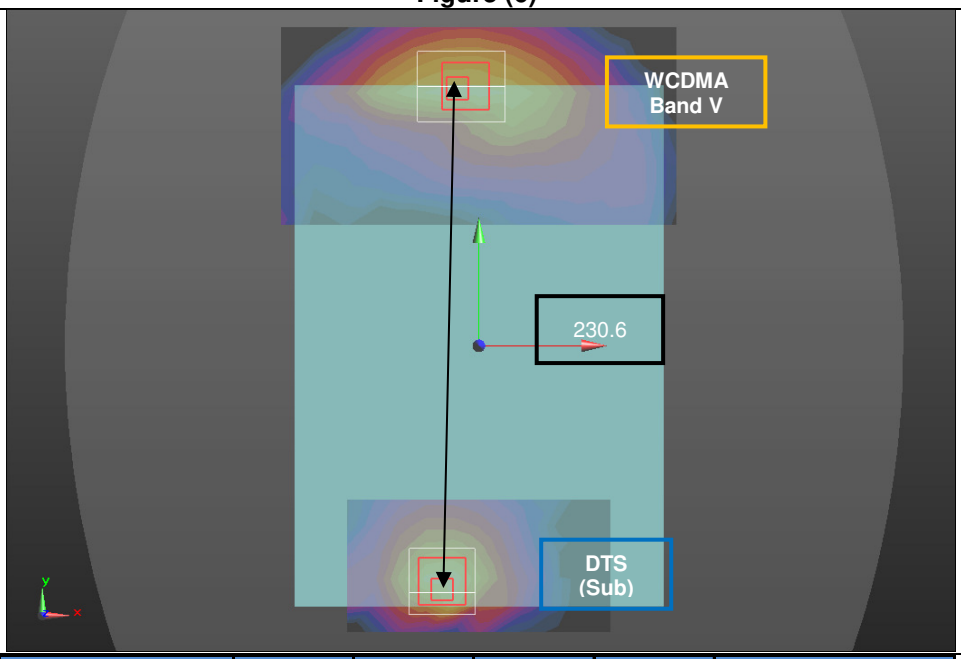
Figure (5)



Mode		SAR	X	Y	Z	d: Calculated distance (mm)	
		W/kg	m	m	m		
WCDMA Band V	①	0.848	-0.0136	0.1164	-0.0039	① + ②	214.1
DTS Main	②	0.979	-0.0734	-0.0892	-0.002		

The Peak Location Separation Distance is computed by using the
SQRT((X1-X2)^2+(Y1-Y2)^2+(Z1-Z2)^2)

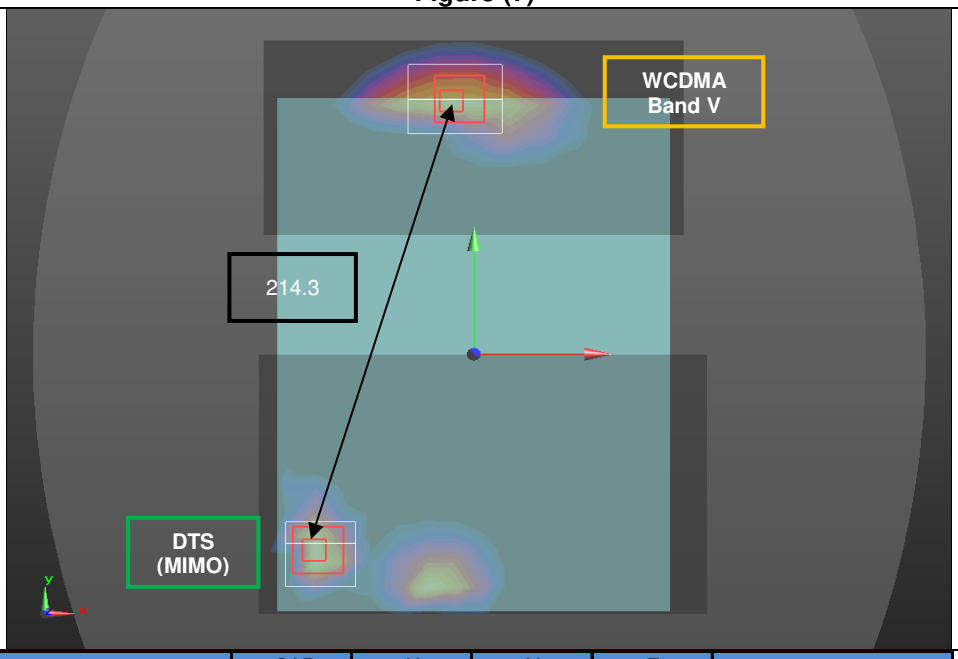
Figure (6)



Mode		SAR	X	Y	Z	d: Calculated distance (mm)	
		W/kg	m	m	m		
WCDMA Band V	①	0.848	-0.0136	0.1164	-0.0039	① + ②	230.6
DTS Sub	②	1.001	-0.0158	-0.1142	-0.0021		

The Peak Location Separation Distance is computed by using the
SQRT((X1-X2)^2+(Y1-Y2)^2+(Z1-Z2)^2)

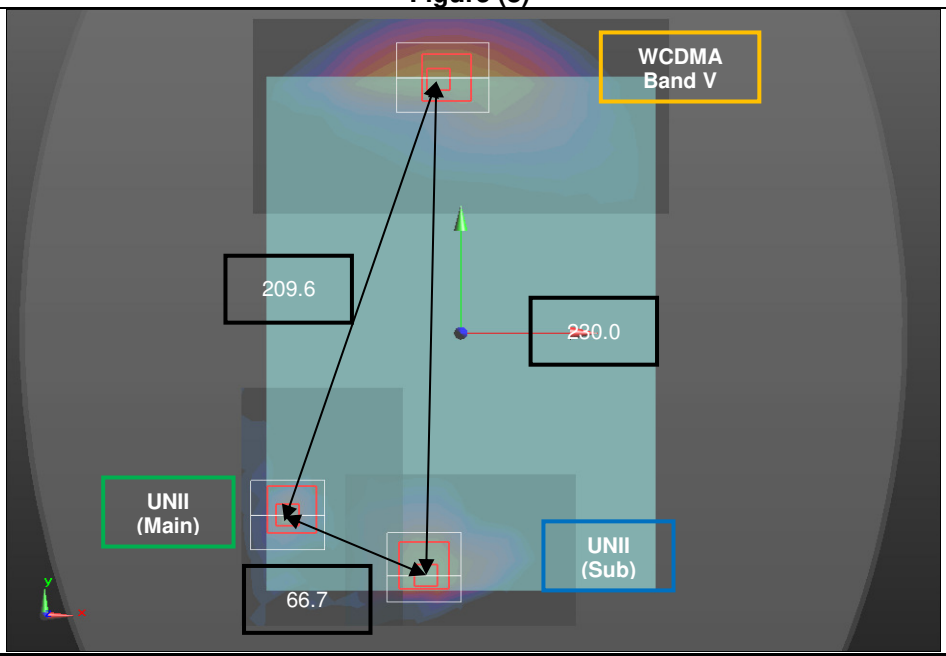
Figure (7)



Mode		SAR	X	Y	Z	d: Calculated distance (mm)	
		W/kg	m	m	m		
WCDMA Band V	①	0.848	-0.0136	0.1164	-0.0039	① + ②	214.3
DTS MIMO	②	0.856	-0.0696	-0.0904	-0.002		

The Peak Location Separation Distance is computed by using the
SQRT((X1-X2)^2+(Y1-Y2)^2+(Z1-Z2)^2)

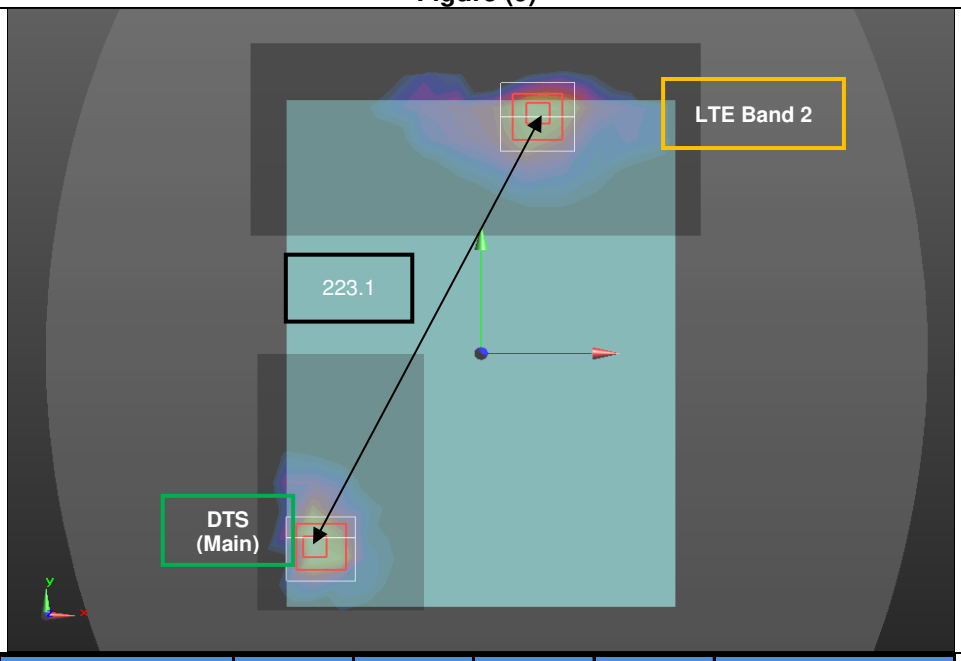
Figure (8)



Mode		SAR	X	Y	Z	d: Calculated distance (mm)	
		W/kg	m	m	m		
WCDMA Band V	①	0.848	-0.0136	0.1164	-0.0039	① + ②	209.6
UNII Main	②	0.152	-0.075	-0.084	-0.0029	① + ③	230.0
UNII Sub	③	1.087	-0.0152	-0.1136	-0.0028	② + ③	66.7

The Peak Location Separation Distance is computed by using the
SQRT((X1-X2)^2+(Y1-Y2)^2+(Z1-Z2)^2)

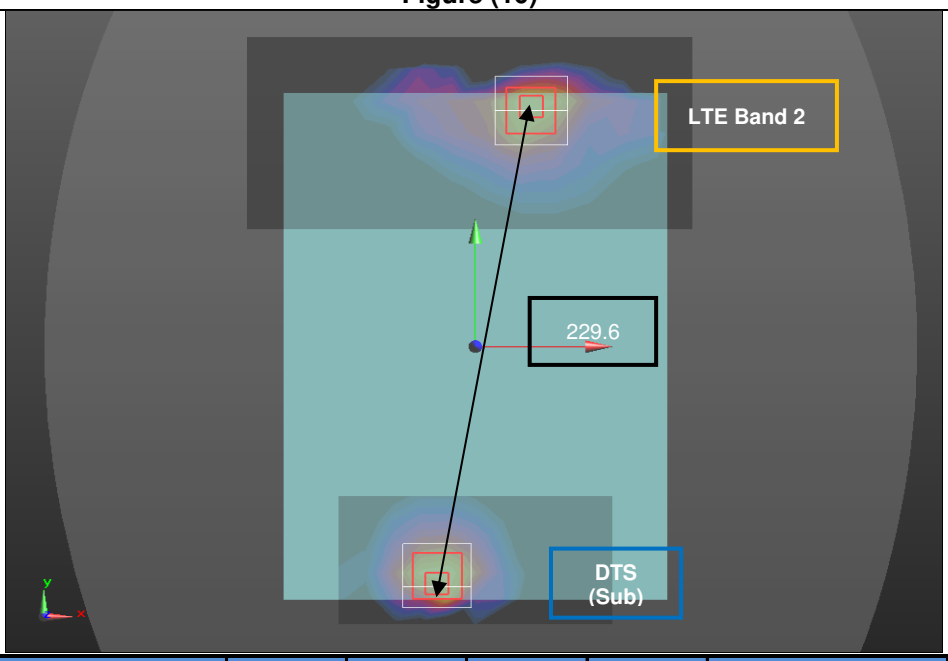
Figure (9)



Mode		SAR	X	Y	Z	d: Calculated distance (mm)	
		W/kg	m	m	m		
LTE Band 2	①	0.908	0.0229	0.1121	-0.0021	① + ②	223.1
DTS Main	②	0.979	-0.0734	-0.0892	-0.002		

The Peak Location Separation Distance is computed by using the
SQRT((X1-X2)^2+(Y1-Y2)^2+(Z1-Z2)^2)

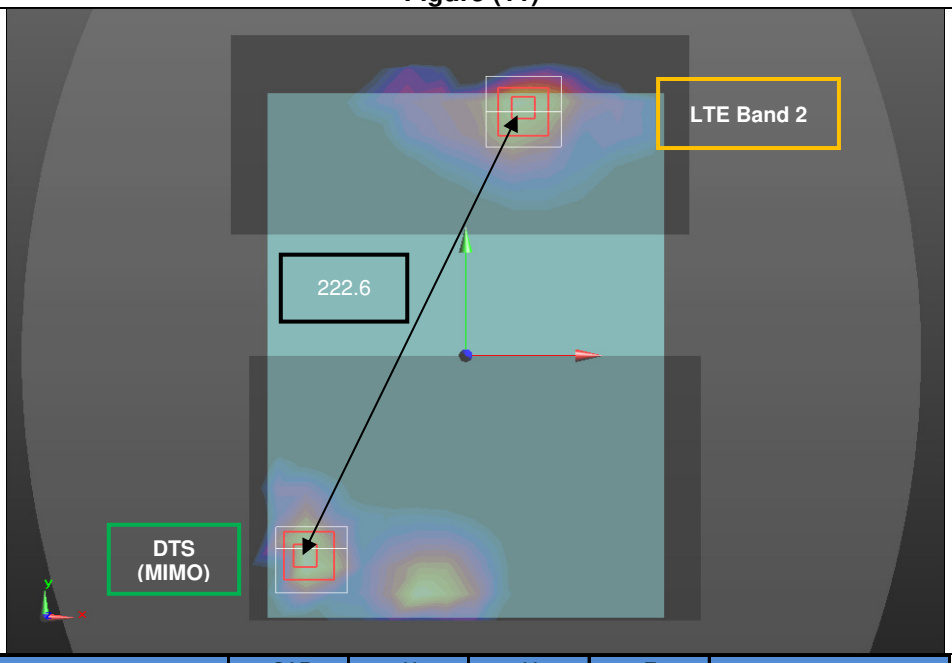
Figure (10)



Mode		SAR	X	Y	Z	d: Calculated distance (mm)	
		W/kg	m	m	m		
LTE Band 2	①	0.908	0.0229	0.1121	-0.0021	① + ②	229.6
DTS Sub	②	1.001	-0.0158	-0.1142	-0.0021		

The Peak Location Separation Distance is computed by using the
SQRT((X1-X2)^2+(Y1-Y2)^2+(Z1-Z2)^2)

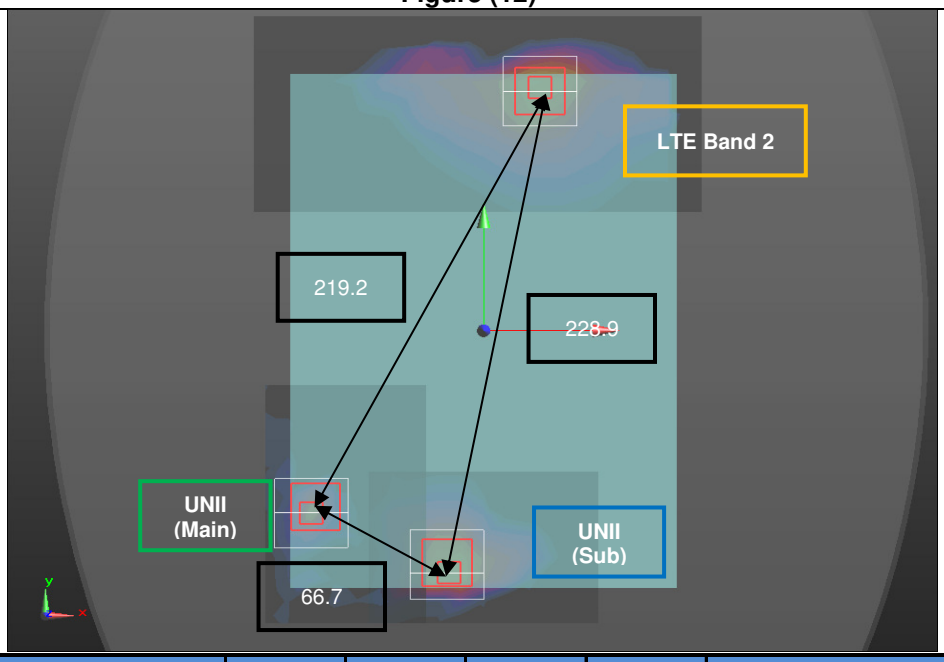
Figure (11)



Mode		SAR	X	Y	Z	d: Calculated distance (mm)	
		W/kg	m	m	m		
LTE Band 2	①	0.908	0.0229	0.1121	-0.0021	① + ②	222.6
DTS MIMO	②	0.856	-0.0696	-0.0904	-0.002		

The Peak Location Separation Distance is computed by using the
SQRT((X1-X2)^2+(Y1-Y2)^2+(Z1-Z2)^2)

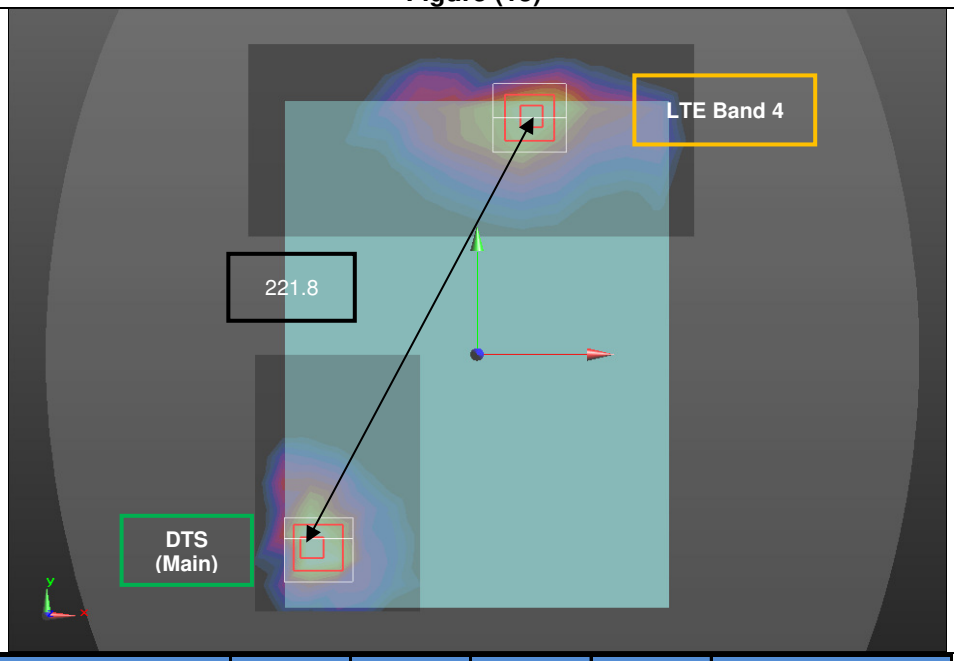
Figure (12)



Mode		SAR	X	Y	Z	d: Calculated distance (mm)	
		W/kg	m	m	m		
LTE Band 2	①	0.908	0.0229	0.1121	-0.0021	① + ②	219.2
UNII Main	②	0.152	-0.075	-0.084	-0.0029	① + ③	228.9
UNII Sub	③	1.087	-0.0152	-0.1136	-0.0028	② + ③	66.7

The Peak Location Separation Distance is computed by using the
SQRT((X1-X2)^2+(Y1-Y2)^2+(Z1-Z2)^2)

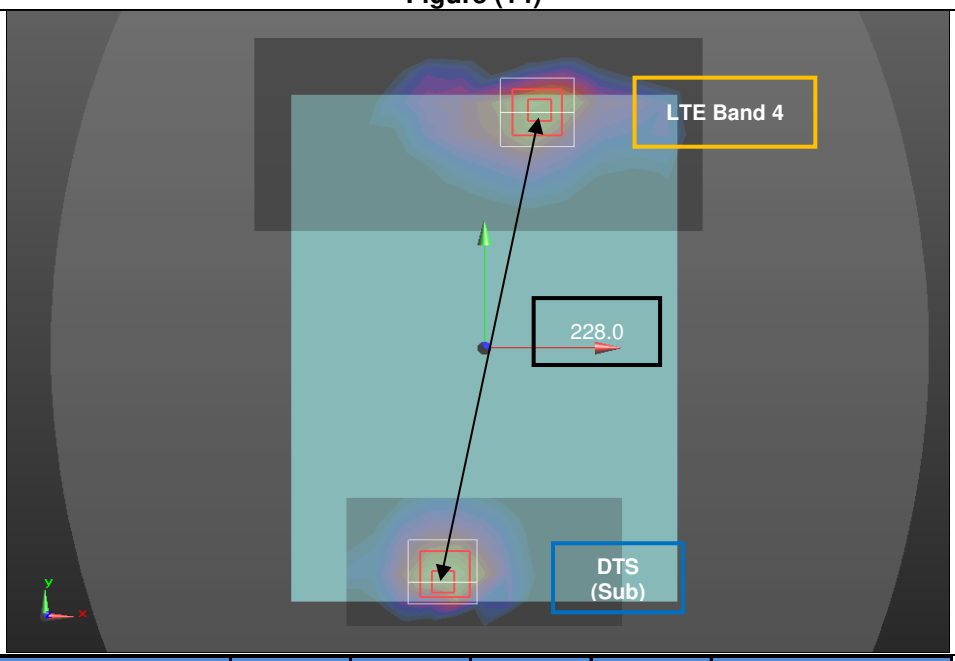
Figure (13)



Mode		SAR	X	Y	Z	d: Calculated distance (mm)	
		W/kg	m	m	m		
LTE Band 4	①	0.757	0.023	0.1105	-0.0032	① + ②	221.8
DTS Main	②	0.979	-0.0734	-0.0892	-0.002		

The Peak Location Separation Distance is computed by using the
SQRT((X1-X2)^2+(Y1-Y2)^2+(Z1-Z2)^2)

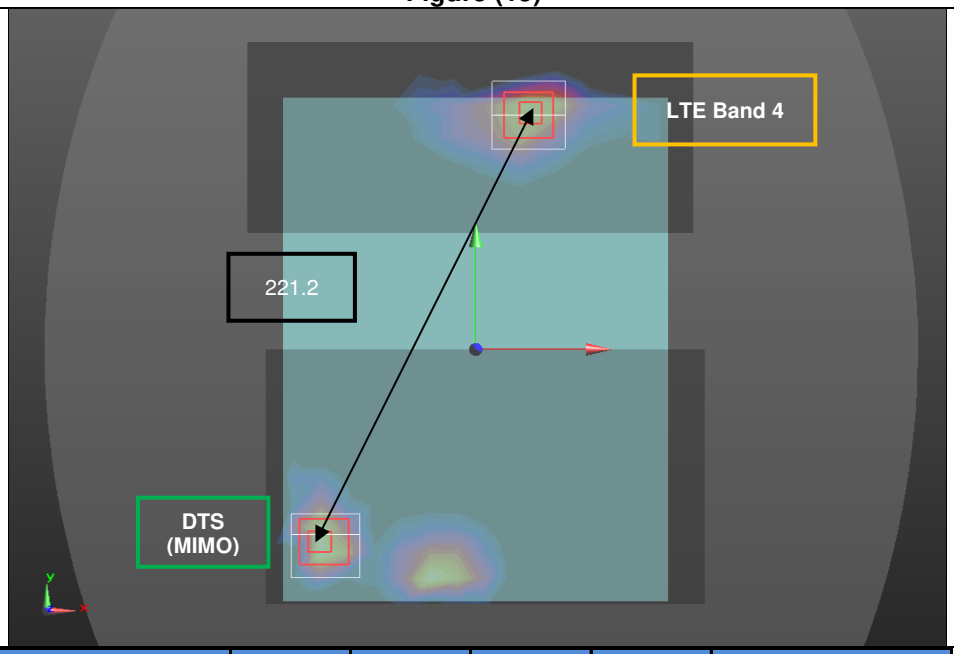
Figure (14)



Mode		SAR	X	Y	Z	d: Calculated distance (mm)	
		W/kg	m	m	m		
LTE Band 4	①	0.757	0.023	0.1105	-0.0032	① + ②	228.0
DTS Sub	②	1.001	-0.0158	-0.1142	-0.0021		

The Peak Location Separation Distance is computed by using the
SQRT((X1-X2)^2+(Y1-Y2)^2+(Z1-Z2)^2)

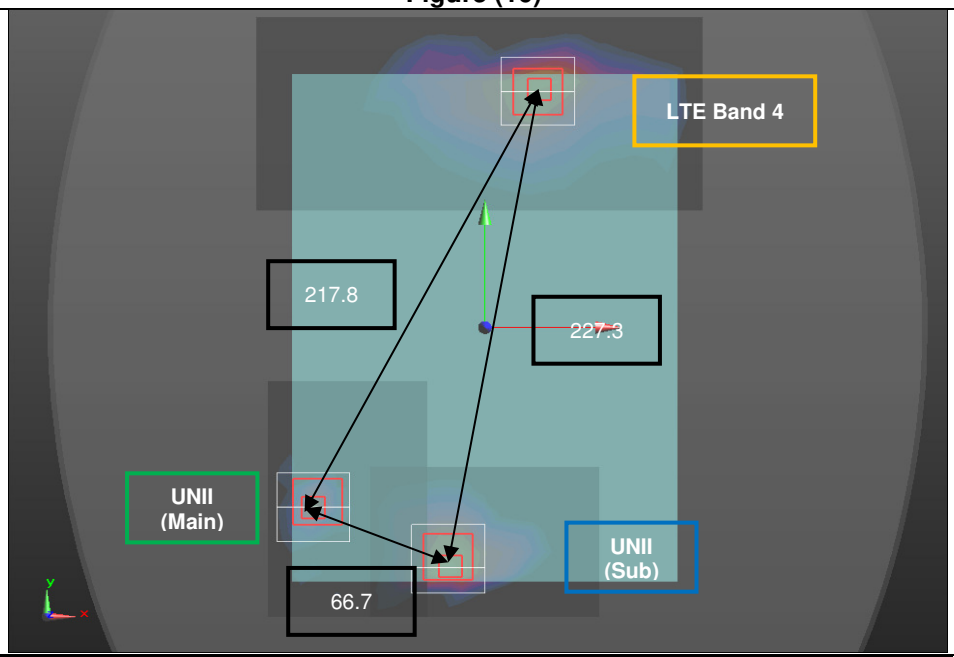
Figure (15)



Mode		SAR	X	Y	Z	d: Calculated distance (mm)	
		W/kg	m	m	m		
LTE Band 4	①	0.757	0.023	0.1105	-0.0032	① + ②	221.2
DTS MIMO	②	0.856	-0.0696	-0.0904	-0.002		

The Peak Location Separation Distance is computed by using the
SQRT((X1-X2)^2+(Y1-Y2)^2+(Z1-Z2)^2)

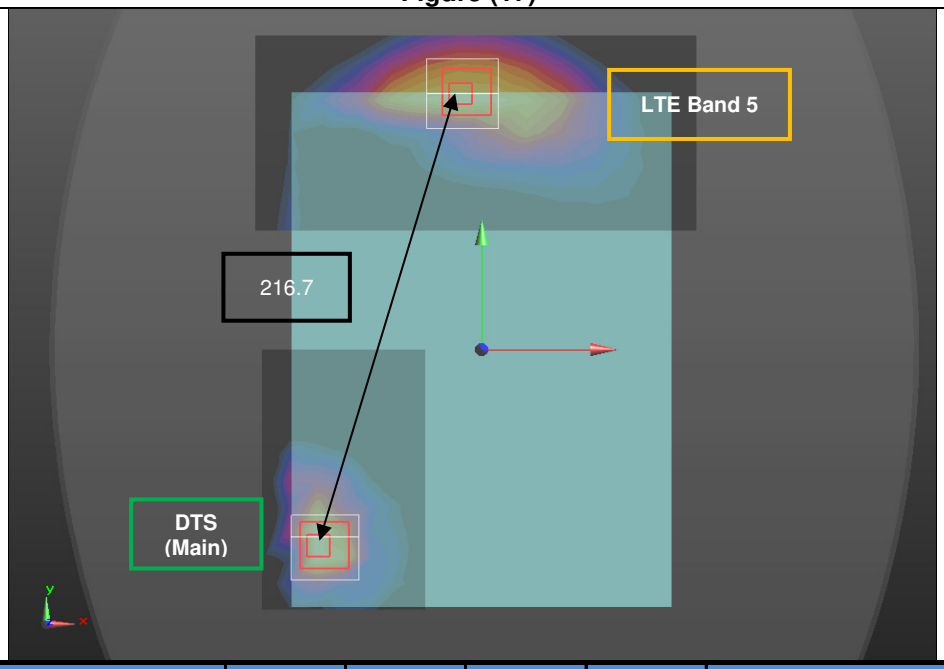
Figure (16)



Mode		SAR	X	Y	Z	d: Calculated distance (mm)	
		W/kg	m	m	m		
LTE Band 4	①	0.757	0.023	0.1105	-0.0032	① + ②	217.8
UNII Main	②	0.152	-0.075	-0.084	-0.0029	① + ③	227.3
UNII Sub	③	1.087	-0.0152	-0.1136	-0.0028	② + ③	66.7

The Peak Location Separation Distance is computed by using the
SQRT((X1-X2)^2+(Y1-Y2)^2+(Z1-Z2)^2)

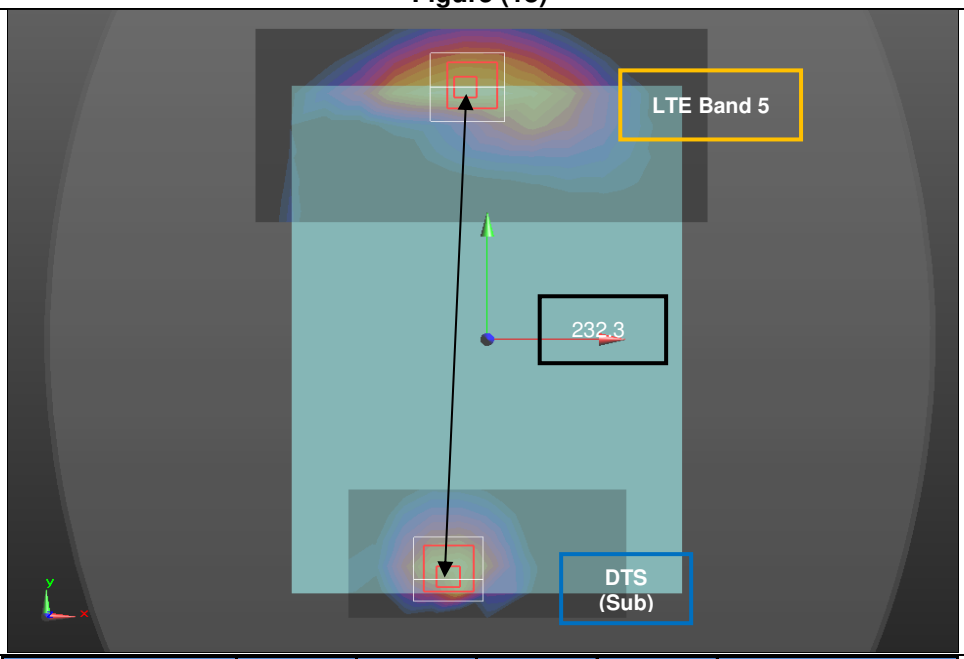
Figure (17)



Mode		SAR	X	Y	Z	d: Calculated distance (mm)	
		W/kg	m	m	m		
LTE Band 5	①	0.915	-0.0101	0.118	-0.0029	① + ②	216.7
DTS Main	②	0.979	-0.0734	-0.0892	-0.002		

The Peak Location Separation Distance is computed by using the
SQRT((X1-X2)^2+(Y1-Y2)^2+(Z1-Z2)^2)

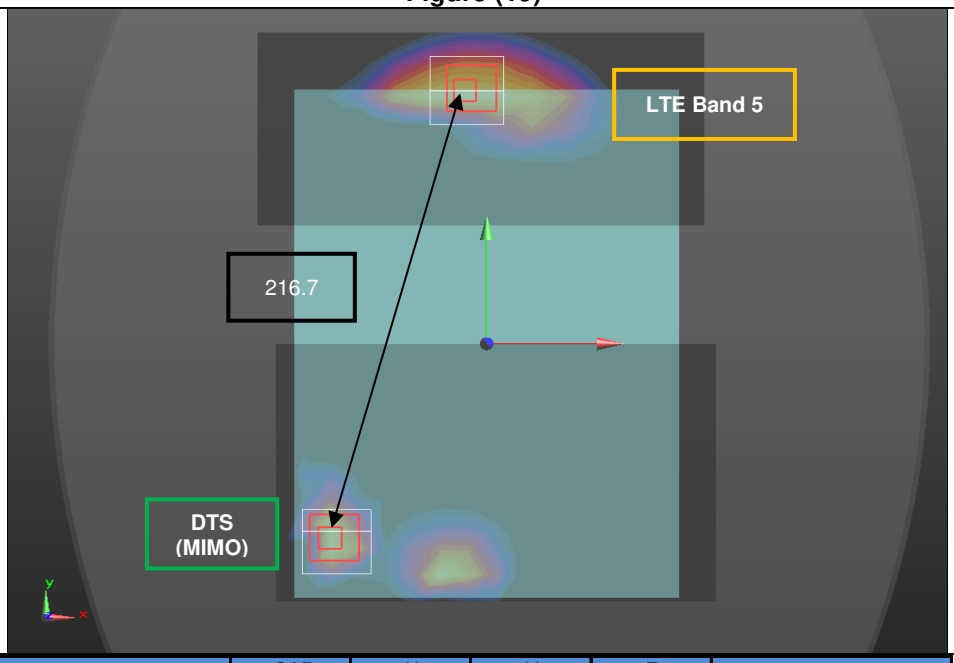
Figure (18)



Mode		SAR	X	Y	Z	d: Calculated distance (mm)	
		W/kg	m	m	m		
LTE Band 5	①	0.915	-0.0101	0.118	-0.0029	① + ②	232.3
DTS Sub	②	1.001	-0.0158	-0.1142	-0.0021		

The Peak Location Separation Distance is computed by using the
SQRT((X1-X2)^2+(Y1-Y2)^2+(Z1-Z2)^2)

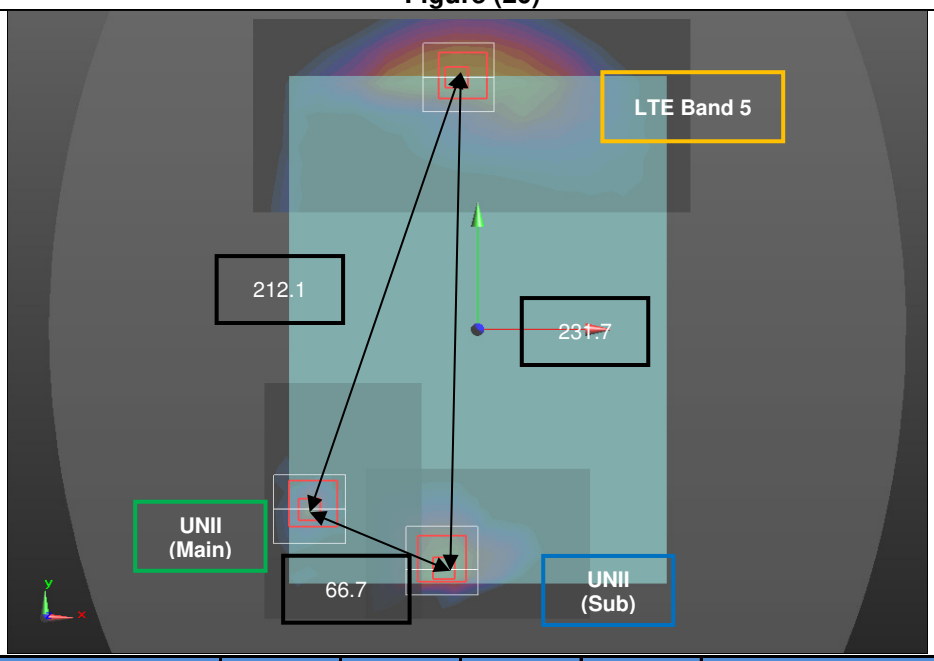
Figure (19)



Mode		SAR	X	Y	Z	d: Calculated distance (mm)	
		W/kg	m	m	m		
LTE Band 5	①	0.915	-0.0101	0.118	-0.0029	① + ②	216.7
DTS MIMO	②	0.856	-0.0696	-0.0904	-0.002		

The Peak Location Separation Distance is computed by using the
SQRT((X1-X2)^2+(Y1-Y2)^2+(Z1-Z2)^2)

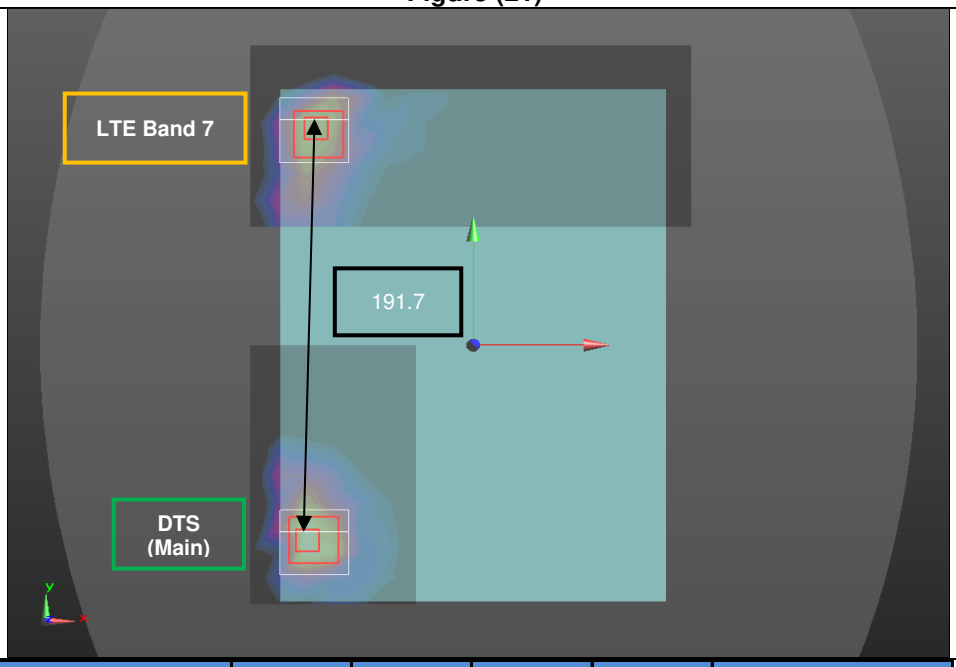
Figure (20)



Mode		SAR	X	Y	Z	d: Calculated distance (mm)	
		W/kg	m	m	m		
LTE Band 5	①	0.915	-0.0101	0.118	-0.0029	① + ②	212.2
UNII Main	②	0.152	-0.075	-0.084	-0.0029	① + ③	231.7
UNII Sub	③	1.087	-0.0152	-0.1136	-0.0028	② + ③	66.7

The Peak Location Separation Distance is computed by using the
SQRT((X1-X2)^2+(Y1-Y2)^2+(Z1-Z2)^2)

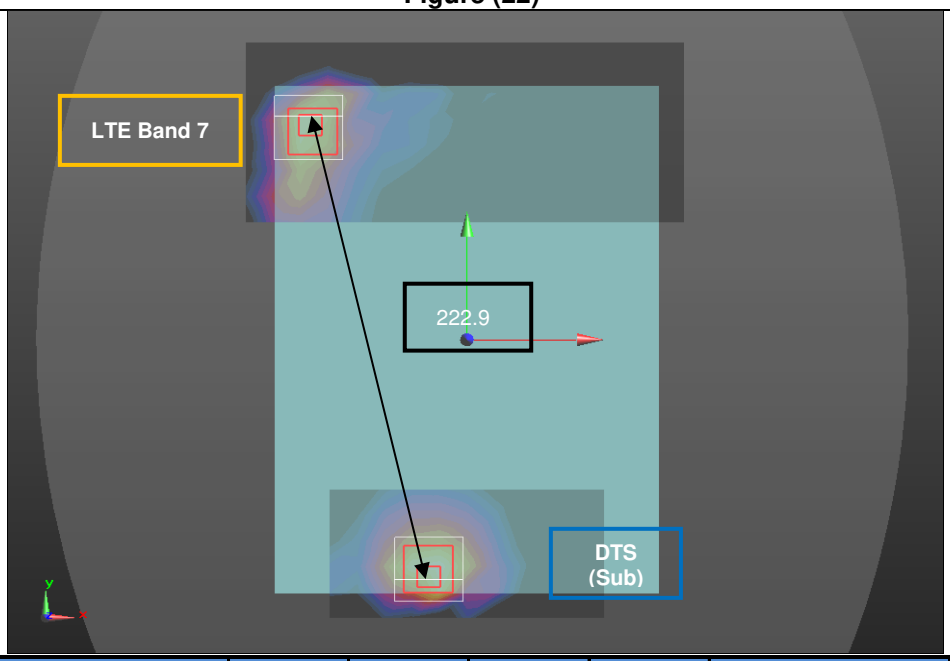
Figure (21)



Mode		SAR	X	Y	Z	d: Calculated distance (mm)	
		W/kg	m	m	m		
LTE Band 7	①	0.735	-0.0684	0.1024	-0.0021	① + ②	191.7
DTS Main	②	0.979	-0.0734	-0.0892	-0.002		

The Peak Location Separation Distance is computed by using the
SQRT((X1-X2)^2+(Y1-Y2)^2+(Z1-Z2)^2)

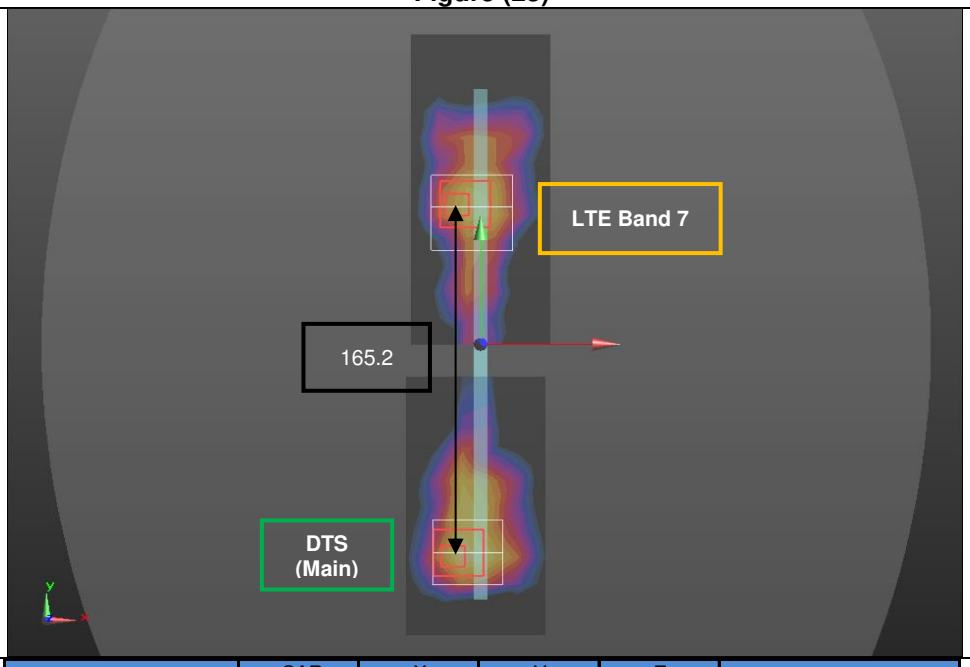
Figure (22)



Mode		SAR	X	Y	Z	d: Calculated distance (mm)	
		W/kg	m	m	m		
LTE Band 7	①	0.735	-0.0684	0.1024	-0.0021	① + ②	222.9
DTS Sub	②	1.001	-0.0158	-0.1142	-0.0021		

The Peak Location Separation Distance is computed by using the
SQRT((X1-X2)^2+(Y1-Y2)^2+(Z1-Z2)^2)

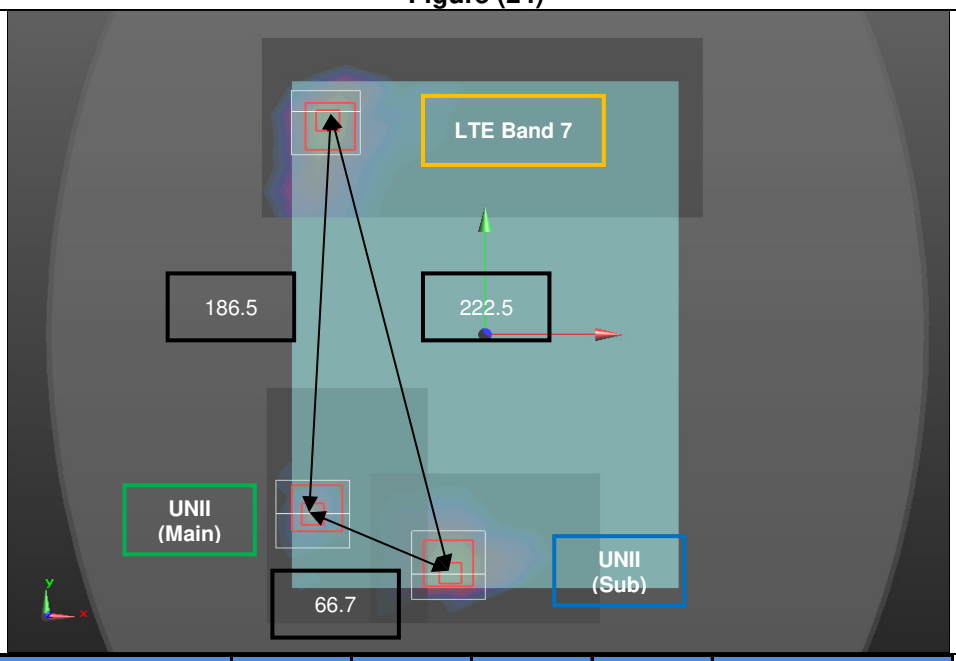
Figure (23)



Mode		SAR	X	Y	Z	d: Calculated distance (mm)	
		W/kg	m	m	m		
LTE Band 7	①	0.791	-0.0012	0.0646	-0.0024	① + ②	165.2
DTS Main	②	0.885	-0.0006	-0.1006	-0.0024		

The Peak Location Separation Distance is computed by using the
SQRT((X1-X2)^2+(Y1-Y2)^2+(Z1-Z2)^2)

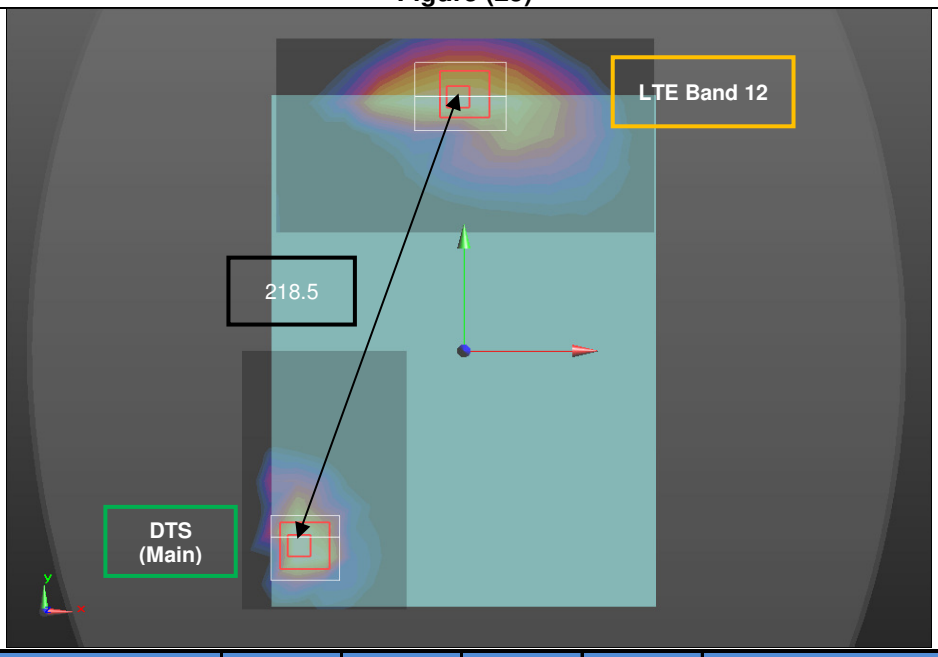
Figure (24)



Mode		SAR	X	Y	Z	d: Calculated distance (mm)	
		W/kg	m	m	m		
LTE Band 7	①	0.735	-0.0684	0.1024	-0.0021	① + ②	186.5
UNII Main	②	0.152	-0.075	-0.084	-0.0029	① + ③	222.5
UNII Sub	③	1.087	-0.0152	-0.1136	-0.0028	② + ③	66.7

The Peak Location Separation Distance is computed by using the
SQRT((X1-X2)^2+(Y1-Y2)^2+(Z1-Z2)^2)

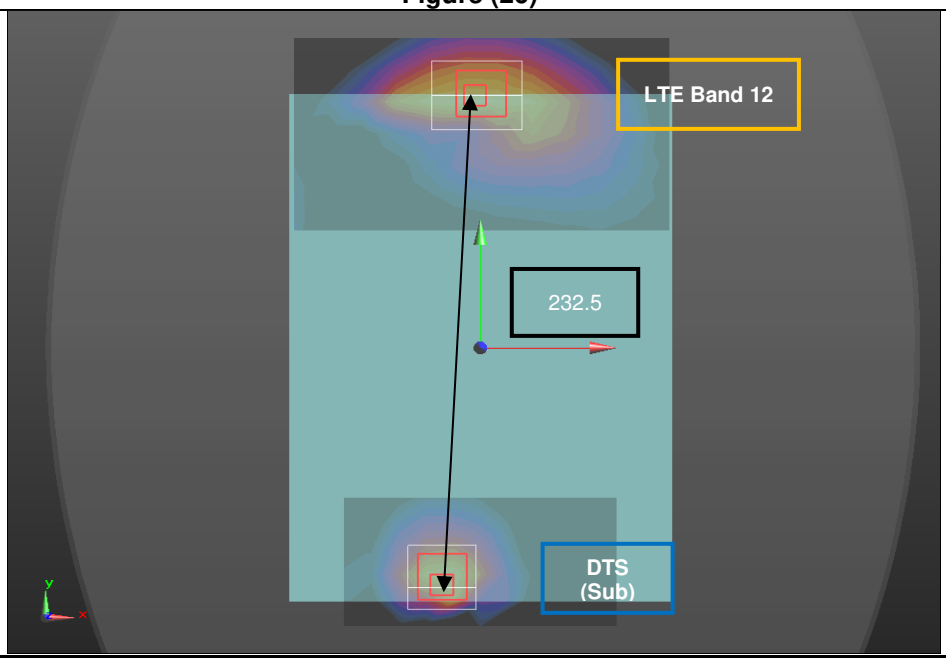
Figure (25)



Mode		SAR	X	Y	Z	d: Calculated distance (mm)	
		W/kg	m	m	m		
LTE Band 12	①	0.834	-0.0039	0.118	-0.0027	① + ②	218.5
DTS Main	②	0.979	-0.0734	-0.0892	-0.002		

The Peak Location Separation Distance is computed by using the
SQRT((X1-X2)^2+(Y1-Y2)^2+(Z1-Z2)^2)

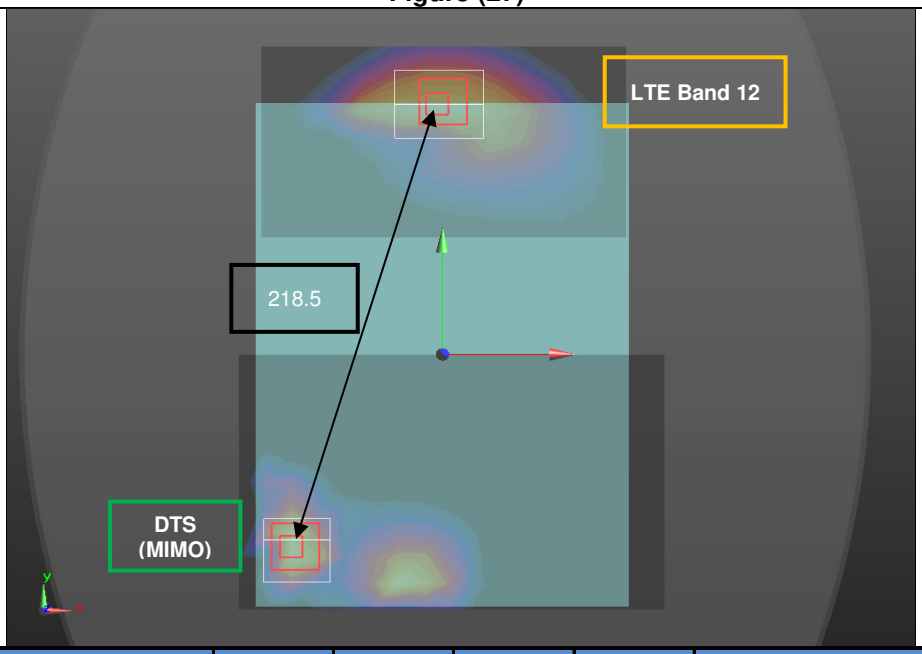
Figure (26)



Mode		SAR	X	Y	Z	d: Calculated distance (mm)	
		W/kg	m	m	m		
LTE Band 12	①	0.834	-0.0039	0.118	-0.0027	① + ②	232.5
DTS Sub	②	1.001	-0.0158	-0.1142	-0.0021		

The Peak Location Separation Distance is computed by using the
SQRT((X1-X2)^2+(Y1-Y2)^2+(Z1-Z2)^2)

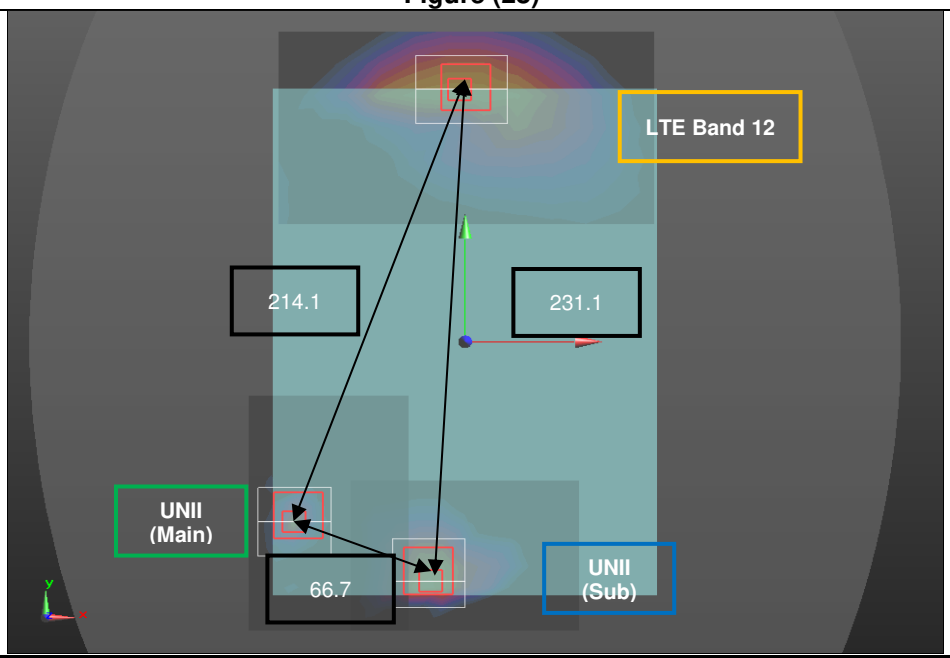
Figure (27)



Mode		SAR	X	Y	Z	d: Calculated distance (mm)	
		W/kg	m	m	m		
LTE Band 12	①	0.834	-0.0039	0.118	-0.0027	① + ②	218.5
DTS MIMO	②	0.856	-0.0696	-0.0904	-0.002		

The Peak Location Separation Distance is computed by using the
SQRT((X1-X2)^2+(Y1-Y2)^2+(Z1-Z2)^2)

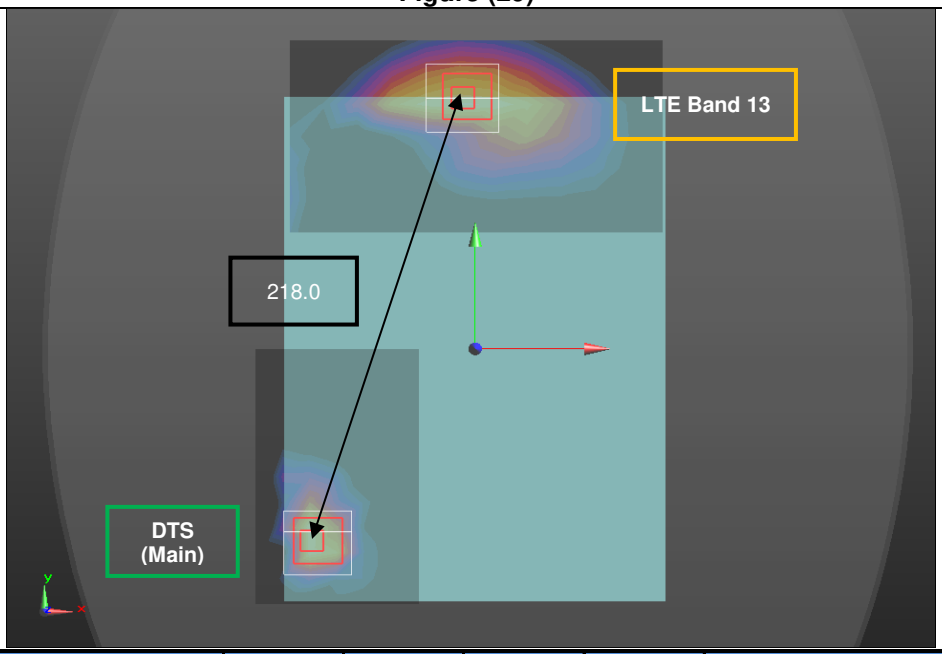
Figure (28)



Mode		SAR	X	Y	Z	d: Calculated distance (mm)	
		W/kg	m	m	m		
LTE Band 12	①	0.834	-0.0039	0.118	-0.0027	① + ②	214.1
UNII Main	②	0.152	-0.075	-0.084	-0.0029	① + ③	231.9
UNII Sub	③	1.087	-0.0152	-0.1136	-0.0028	② + ③	66.7

The Peak Location Separation Distance is computed by using the
SQRT((X1-X2)^2+(Y1-Y2)^2+(Z1-Z2)^2)

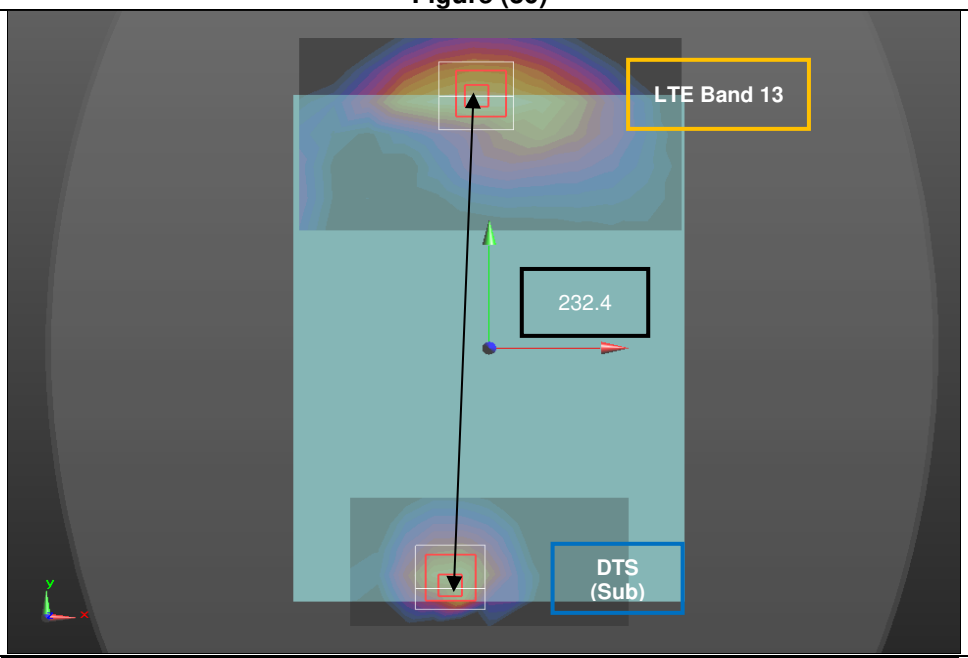
Figure (29)



Mode		SAR	X	Y	Z	d: Calculated distance (mm)	
		W/kg	m	m	m		
LTE Band 13	①	1.014	-0.0055	0.118	-0.0025	① + ②	218.0
DTS Main	②	0.979	-0.0734	-0.0892	-0.002		

The Peak Location Separation Distance is computed by using the
SQRT((X1-X2)^2+(Y1-Y2)^2+(Z1-Z2)^2)

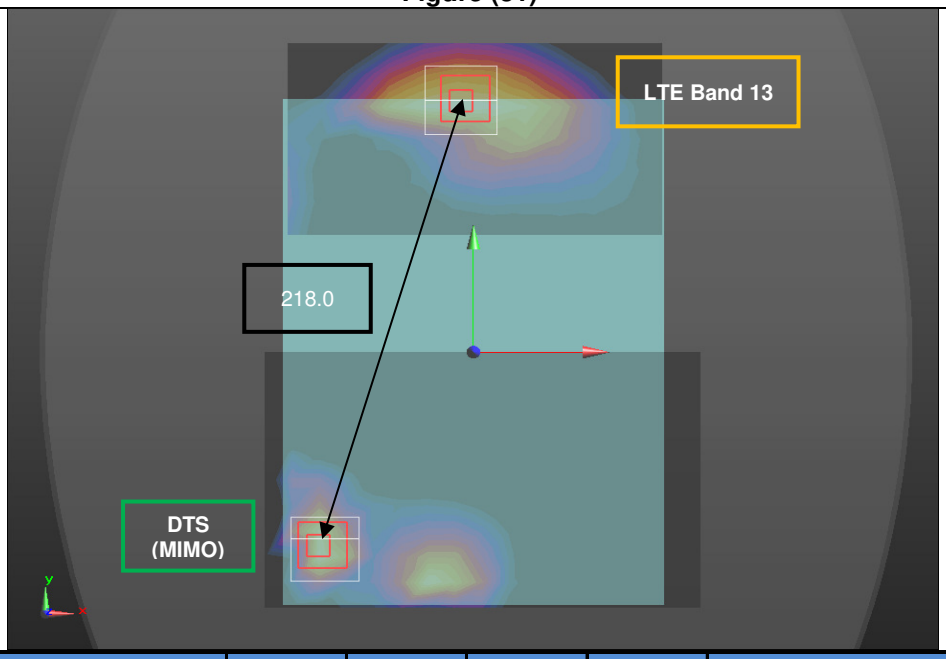
Figure (30)



Mode		SAR	X	Y	Z	d: Calculated distance (mm)	
		W/kg	m	m	m		
LTE Band 13	①	1.014	-0.0055	0.118	-0.0025	① + ②	232.4
DTS Sub	②	1.001	-0.0158	-0.1142	-0.0021		

The Peak Location Separation Distance is computed by using the
SQRT((X1-X2)^2+(Y1-Y2)^2+(Z1-Z2)^2)

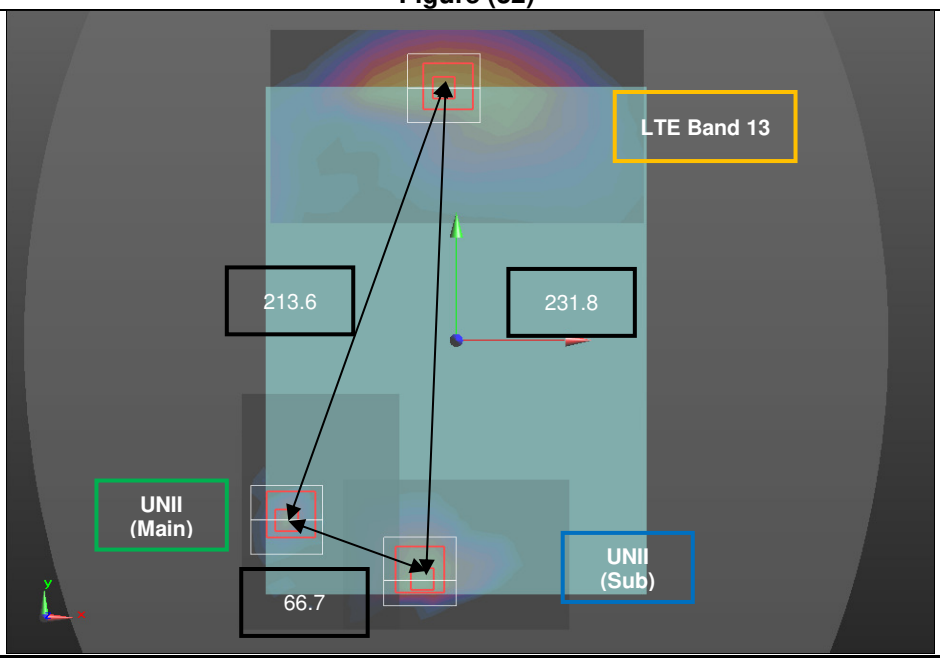
Figure (31)



Mode		SAR	X	Y	Z	d: Calculated distance (mm)	
		W/kg	m	m	m		
LTE Band 13	①	1.014	-0.0055	0.118	-0.0025	① + ②	218.0
DTS MIMO	②	0.856	-0.0696	-0.0904	-0.002		

The Peak Location Separation Distance is computed by using the
SQRT((X1-X2)^2+(Y1-Y2)^2+(Z1-Z2)^2)

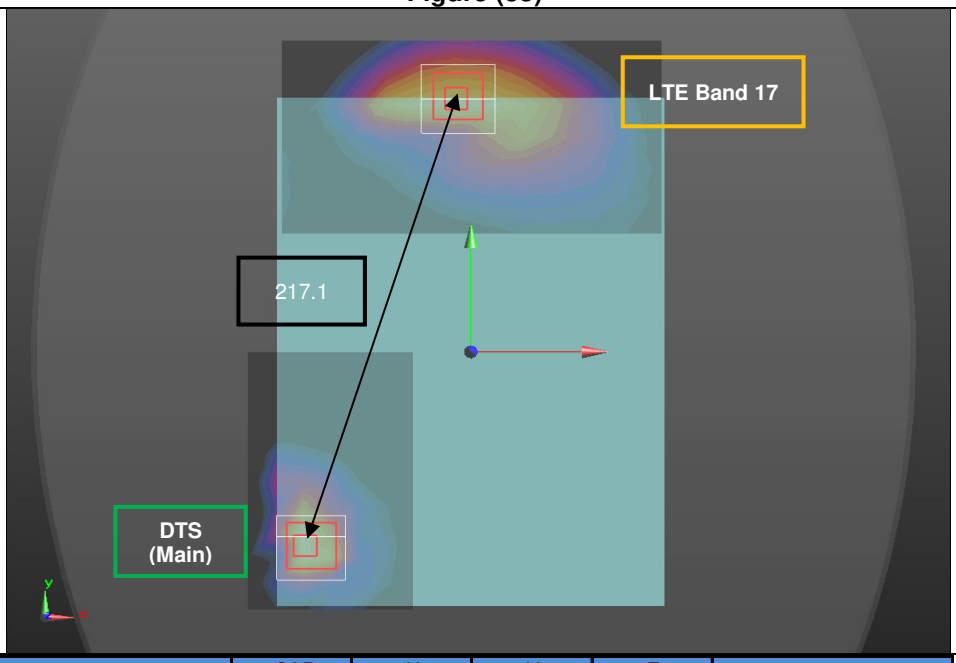
Figure (32)



Mode		SAR	X	Y	Z	d: Calculated distance (mm)	
		W/kg	m	m	m		
LTE Band 13	①	1.014	-0.0055	0.118	-0.0025	① + ②	213.6
UNII Main	②	0.152	-0.075	-0.084	-0.0029	① + ③	231.8
UNII Sub	③	1.087	-0.0152	-0.1136	-0.0028	② + ③	66.7

The Peak Location Separation Distance is computed by using the
SQRT((X1-X2)^2+(Y1-Y2)^2+(Z1-Z2)^2)

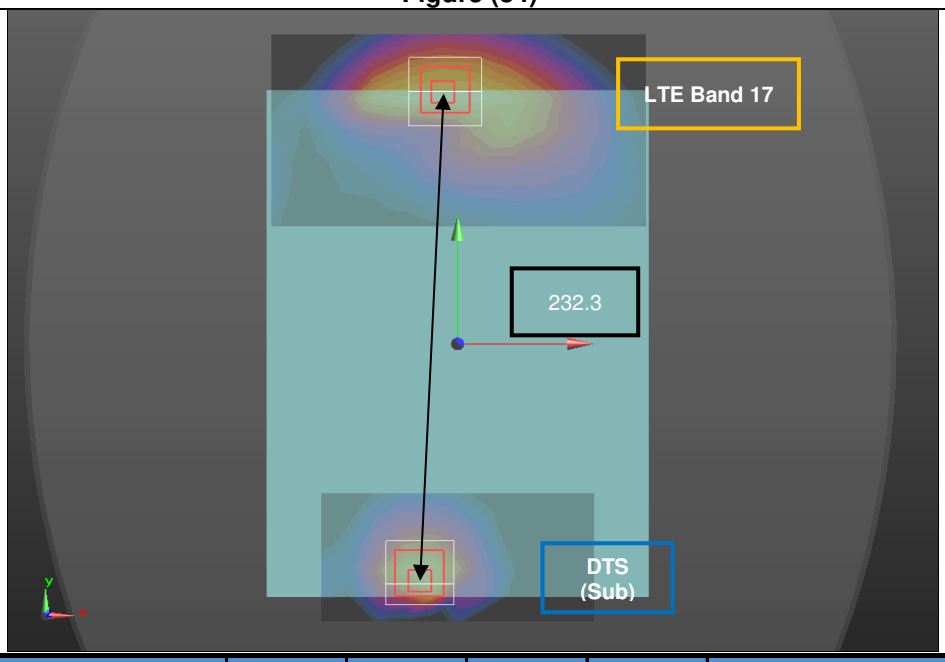
Figure (33)



Mode		SAR	X	Y	Z	d: Calculated distance (mm)	
		W/kg	m	m	m		
LTE Band 17	①	0.86	-0.0087	0.118	-0.0025	① + ②	217.1
DTS Main	②	0.979	-0.0734	-0.0892	-0.002		

The Peak Location Separation Distance is computed by using the
SQRT((X1-X2)^2+(Y1-Y2)^2+(Z1-Z2)^2)

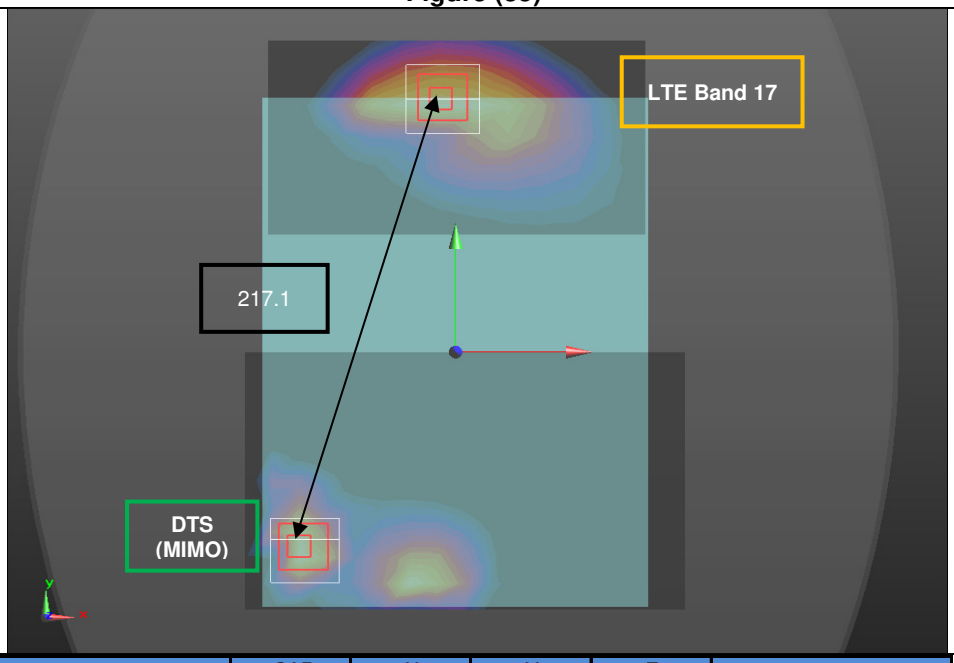
Figure (34)



Mode		SAR	X	Y	Z	d: Calculated distance (mm)	
		W/kg	m	m	m		
LTE Band 17	①	0.86	-0.0087	0.118	-0.0025	① + ②	232.3
DTS Sub	②	1.001	-0.0158	-0.1142	-0.0021		

The Peak Location Separation Distance is computed by using the
SQRT((X1-X2)^2+(Y1-Y2)^2+(Z1-Z2)^2)

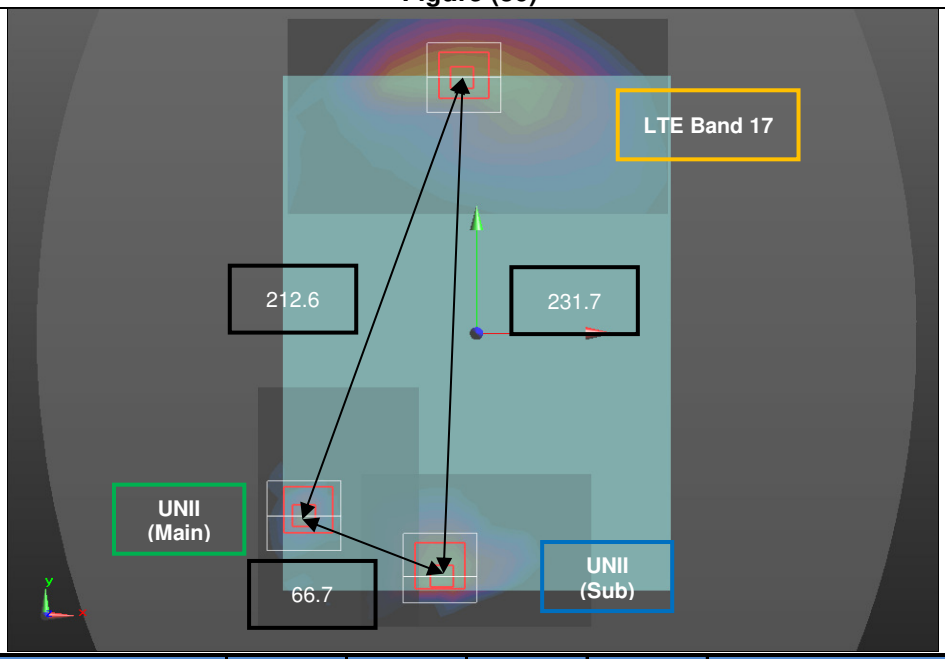
Figure (35)



Mode		SAR	X	Y	Z	d: Calculated distance (mm)	
		W/kg	m	m	m		
LTE Band 17	①	0.86	-0.0087	0.118	-0.0025	① + ②	217.1
DTS MIMO	②	0.856	-0.0696	-0.0904	-0.002		

The Peak Location Separation Distance is computed by using the
SQRT((X1-X2)^2+(Y1-Y2)^2+(Z1-Z2)^2)

Figure (36)



Mode		SAR	X	Y	Z	d: Calculated distance (mm)	
		W/kg	m	m	m		
LTE Band 17	①	0.86	-0.0087	0.118	-0.0025	① + ②	212.6
UNII Main	②	0.152	-0.075	-0.084	-0.0029	① + ③	231.7
UNII Sub	③	1.087	-0.0152	-0.1136	-0.0028	② + ③	66.7

The Peak Location Separation Distance is computed by using the
SQRT((X1-X2)^2+(Y1-Y2)^2+(Z1-Z2)^2)

Appendixes

Refer to separated files for the following appendixes.

16K23786-S1V1 FCC Report SAR_App A_Photos & Ant. Locations

16K23786-S1V1 FCC Report SAR_App B_Highest SAR Test Plots

16K23786-S1V1 FCC Report SAR_App C_System Check Plots

16K23786-S1V1 FCC Report SAR_App D_SAR Tissue Ingredients

16K23786-S1V1 FCC Report SAR_App E_Probe Cal. Certificates

16K23786-S1V1 FCC Report SAR_App F_Dipole Cal. Certificates

END OF REPORT