FCC 47 CFR § 2.1093
IEEE Std 1528-2013

SAR EVALUATION REPORT

FOR

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

MODEL NUMBER: SM-T835C

FCC ID: A3LSMT835C

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TL-637

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1. Attestation of Test Results

Applicant Name	SAMSUNG ELECTRONICS CO.,LTD.			
FCC ID	A3LSMT835C			
Model Name	SM-T835C			
Applicable Standards	FCC 47 CFR § 2.1093 Published RF exposure KDB procedures IEEE Std 1528-2013			
SAR Limits (W/Kg)				
Exposure Category	Peak spatial-average(1g of tissue)			
General population / Uncontrolled exposure	1.6			
The Highest Reported SAR (W/kg)				
RF Exposure Conditions	**Equipment Class**			
	Licensed	**DTS**	**U-NII**	**DSS(BT)**
Standalone	1.35	1.19	0.94	0.25
Simultaneous TX	1.58	1.58	1.52	1.45
Date Tested	6/4/2018 to 7/5/2018			
Test Results	Pass			

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 Lead Test Engineer UL Korea, Ltd. Suwon Laboratory	Sunghoon Kim Associate Test Engineer UL Korea, Ltd. Suwon Laboratory

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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

In addition to the above, the following information was used:

- TCB workshop October, 2014; Page 37, RF Exposure Procedures Update (Other LTE Considerations)
- TCB workshop October, 2016; Page 7, RF Exposure Procedures (Bluetooth Duty Factor)

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.

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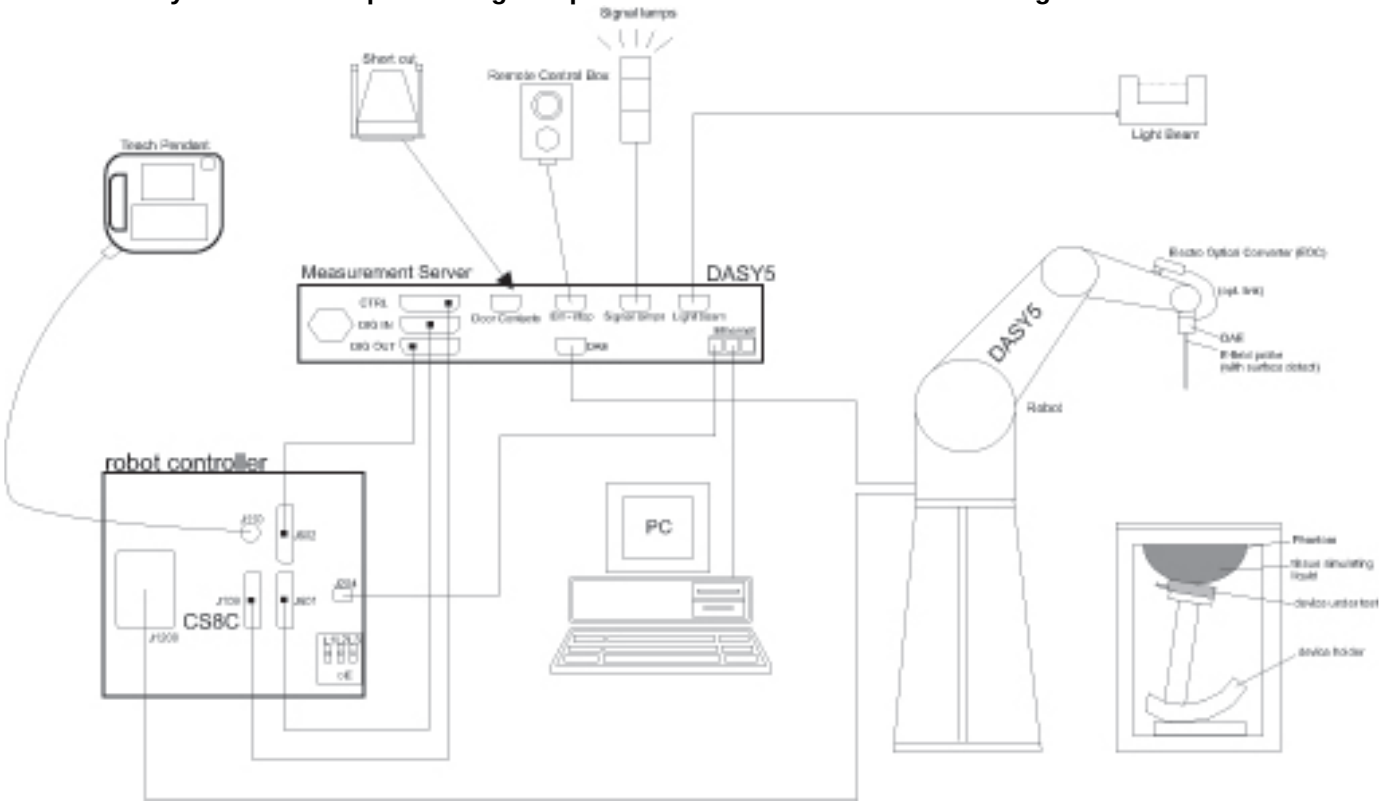
4. SAR Measurement System & Test Equipment

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.

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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

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

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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	$\leq 1.5 \cdot \Delta z_{Zoom}(n-1)$	
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.

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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	8-8-2018
Dielectric Assessment Kit	SPEAG	DAK-3.5	1196	8-2-2018
Dielectric Assessment Kit	SPEAG	DAK-3.5	1046	4-17-2019
Shorting block	SPEAG	DAK-3.5 Short	SM DAK 200 BA	N/A
Thermometer	LKM	DTM3000	3424	8-11-2018
Thermometer	Lutron	MHB-382SD	AH.91478	8-10-2018

System Check

Name of Equipment	Manufacturer	Type/Model	Serial No.	Cal. Due Date
MXG Analog Signal Generator	Agilent	N5181A	MY50145882	8-7-2018
Power Sensor	Agilent	U2000A	MY54260010	8-8-2018
Power Sensor	Agilent	U2000A	MY54260007	8-8-2018
Power Amplifier	EXODUS	1410025-AMP2027-10003	10003	8-8-2018
Directional Coupler	Agilent	772D	MY52180193	8-7-2018
Directional Coupler	Agilent	778D	MY52180432	8-7-2018
Low Pass Filter	MICROLAB	LA-15N	03943	8-7-2018
Low Pass Filter	FILTRON	L14012FL	1410003S	8-7-2018
Low Pass Filter	MICROLAB	LA-60N	03942	8-7-2018
Attenuator	Agilent	8491B/003	MY39269292	8-7-2018
Attenuator	Agilent	8491B/010	MY39269315	8-7-2018
Attenuator	Agilent	8491B/020	MY39269298	8-7-2018
E-Field Probe (SAR1)	SPEAG	EX3DV4	7376	8-22-2018
E-Field Probe (SAR1)	SPEAG	EX3DV4	7330	1-22-2019
E-Field Probe (SAR2)	SPEAG	EX3DV4	7330	1-22-2019
E-Field Probe (SAR2)	SPEAG	EX3DV4	7313	2-20-2019
E-Field Probe (SAR3)	SPEAG	EX3DV4	7314	9-28-2018
Data Acquisition Electronics (SAR1)	SPEAG	DAE4	1468	8-22-2018
Data Acquisition Electronics (SAR2)	SPEAG	DAE4	1447	3-15-2019
Data Acquisition Electronics (SAR3)	SPEAG	DAE4	1494	7-20-2018
System Validation Dipole	SPEAG	D750V3	1122	2-19-2019
System Validation Dipole	SPEAG	D835V2	4d194	7-19-2018
System Validation Dipole	SPEAG	D1900V2	5d190	9-20-2018
System Validation Dipole	SPEAG	D2450V2	939	9-19-2018
System Validation Dipole	SPEAG	D2600V2	1097	1-17-2019
System Validation Dipole	SPEAG	D5GHzV2	1209	2-15-2019
Thermometer (SAR1)	Lutron	MHB-382SD	AH.91463	8-10-2018
Thermometer (SAR2)	Lutron	MHB-382SD	AH.50215	2-9-2019
Thermometer (SAR3)	Lutron	MHB-382SD	AH.50213	8-16-2018

Others

Name of Equipment	Manufacturer	Type/Model	Serial No.	Cal. Due Date
Base Station Simulator	R & S	CMW500	150313	12-08-2018
Base Station Simulator	R & S	CMW500	150314	12-05-2018
Bluetooth Tester	TESCOM	TC-3000C	3000C000546	8-7-2018

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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 and the measured 10-g SAR within a frequency band is < 3.75 W/kg. The expanded SAR measurement uncertainty must be ≤ 30%, for a confidence interval of k = 2. If these conditions are met, 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): 249.3 mm x 164.3 mm Overall Diagonal: 290.0 mm Display Diagonal: 267.0 mm
Back Cover	☒ The Back Cover is not removable.
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, Only 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 – Ch.48, Ch.149 – Ch.165)
Test Sample Information	**No.** / **S/N** / **Notes** 1 / R22K4004VWT / Main Conducted 2 / R22K4004VYE / Main Conducted 3 / R22K4004WOF / Wi-Fi Conducted 4 / R22K4004LMY / SAR 5 / R22K4004MRN / SAR 6 / R22K500LE6E / SAR

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6.2. Wireless Technologies

Wireless technologies	Frequency bands	Operating mode		Duty Cycle used for SAR testing
GSM	850 1900	Voice (GMSK) GPRS (GMSK) EGPRS (8PSK)	GPRS Multi-Slot Class: ☐ Class 8 - 1 Up, 4 Down ☐ Class 10 - 2 Up, 4 Down ☐ Class 12 - 4 Up, 4 Down ☒ Class 33 - 4 Up, 5 Down	GSM Voice: 12.5% (E)GPRS: 1 Slot: 12.5% 2 Slots: 25% 3 Slots: 37.5% 4 Slots: 50%
	Does this device support DTM (Dual Transfer Mode)? ☐ Yes ☒ No			
W-CDMA (UMTS)	Band II Band V	UMTS Rel. 99 (Voice & Data) HSDPA (Release.9) HSUPA (Release.9) DC-HSDPA (Release 9) HSPA+ (Release.9)		100%
LTE	FDD Band 5 FDD Band 12 FDD Band 17 TDD Band 41	QPSK 16QAM Rel. 11 Carrier Aggregation (1 Uplink and 3 Downlinks)		100% (FDD) 63.3% (TDD)[1]
	Does this device support SV-LTE (1xRTT-LTE)? ☐ Yes ☒ No			
Wi-Fi	2.4 GHz	802.11b 802.11g 802.11n (HT20)		99.5% (802.11b) 96.9% (802.11g) 96.6% (802.11n 20MHz BW)
	5 GHz	802.11a 802.11n (HT20) 802.11n (HT40) 802.11ac (VHT20) 802.11ac (VHT40) 802.11ac (VHT80)		97.2% (802.11a) 96.9% (802.11n/ac 20MHz BW) 94.5% (802.11n/ac 40MHz BW) 88.4% (802.11ac 80MHz BW)
	Does this device support bands 5.60 ~ 5.65 GHz? ☒ Yes ☐ No			
	Does this device support Band gap channel(s)? ☒ Yes ☐ No			
Bluetooth	2.4 GHz	Version 5.0 LE		76.9% (DH5)

Notes:

1. This device supports uplink-downlink configuration 0-6. The configuration with the highest duty cycle was used (Subframe Number 0 at 63.3%).
2. The Bluetooth protocol is considered source-based averaging. Bluetooth GFSK (DH5) was verified to have the highest duty cycle of 76.9% and was considered and used for SAR Testing.
3. Duty cycle for Wi-Fi is referenced from the DTS and UNII report.

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6.3. Nominal and Maximum Output Power

KDB 447498 sec.4.1. 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

RF Air interface	Mode	Time Slots	Max. RF Output Power (dBm)		Reduced. RF Output Power (dBm)	
			Tune-up Limit	Frame Pwr	Tune-up Limit	Frame Pwr
GSM850	Voice/GPRS	1	**33.5**	**24.5**	**22.5**	**13.5**
	GPRS	2	**30.5**	**24.5**	**21.5**	**15.5**
	GPRS	3	**29.5**	**25.2**	**19.5**	**15.2**
	GPRS	4	**28.0**	**25.0**	**17.5**	**14.5**
	EGPRS	1	**27.5**	**18.5**	**16.0**	**7.0**
	EGPRS	2	**26.0**	**20.0**	**16.3**	**10.3**
	EGPRS	3	**24.0**	**19.7**	**14.0**	**9.7**
	EGPRS	4	**22.5**	**19.5**	**12.0**	**9.0**
GSM1900	Voice/GPRS	1	**31.0**	**22.0**	**23.0**	**14.0**
	GPRS	2	**28.0**	**22.0**	**21.0**	**15.0**
	GPRS	3	**26.0**	**21.7**	**19.0**	**14.7**
	GPRS	4	**23.5**	**20.5**	**13.5**	**10.5**
	EGPRS	1	**26.0**	**17.0**	**16.5**	**7.5**
	EGPRS	2	**24.5**	**18.5**	**12.0**	**6.0**
	EGPRS	3	**22.5**	**18.2**	**13.5**	**9.2**
	EGPRS	4	**21.5**	**18.5**	**12.0**	**9.0**

RF Air interface	Mode	Max. RF Output Power (dBm)	Reduced. RF Output Power (dBm)
W-CDMA Band II	R99	**24.0**	**14.0**
	HSDPA	**23.0**	**13.5**
	HSUPA	**23.0**	**13.5**
	DC-HSDPA	**23.0**	**13.5**
W-CDMA Band V	R99	**23.8**	**16.0**
	HSDPA	**23.0**	**14.5**
	HSUPA	**23.0**	**14.5**
	DC-HSDPA	**23.0**	**14.5**

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RF Air interface	Mode	Max. RF Output Power (dBm)	Reduced. RF Output Power (dBm)
LTE Band 5	QPSK	**24.0**	**15.0**
LTE Band 12	QPSK	**23.5**	**14.0**
LTE Band 17	QPSK	**23.5**	**17.0**
LTE Band 41	QPSK	**24.5**	**17.0**

Notes:

1. LTE QPSK configuration has the highest maximum average output power per 3GPP standard.

RF Air interface	Mode	Max. RF Output Power (dBm)	
		Ant.1	Ant.2
WiFi 2.4 GHz	802.11b	**13.0**	**13.0**
	802.11g	**13.0**	**13.0**
	802.11n HT20	**13.0**	**13.0**
WiFi 5 GHz	802.11a	**10.0**	**10.0**
	802.11n HT20	**10.0**	**10.0**
	802.11n HT40	**10.0**	**10.0**
	802.11ac VHT20	**10.0**	**10.0**
	802.11ac VHT40	**10.0**	**10.0**
	802.11ac VHT80	**10.0**	**10.0**
Bluetooth		**9.5**	
Bluetooth LE		**3.5**	

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6.4. General LTE SAR Test and Reporting Considerations

Item	Description						
Frequency range, Channel Bandwidth, Numbers and Frequencies	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 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 17	Frequency range: 704 - 716 MHz					
		Channel Bandwidth					
		20 MHz	15 MHz	10 MHz	5 MHz	3 MHz	1.4 MHz
	Low			23780/ 709	23755/ 706.5		
	Mid			23790/ 710	23790/ 710		
	High			23800/ 711	23825/ 713.5		
	Band 41	Frequency range: 2496 - 2690 MHz					
		Channel Bandwidth					
		20 MHz	15 MHz	10 MHz	5 MHz	3 MHz	1.4 MHz
	Low	39750 / 2506.0					
	Low-Mid	40185 / 2549.5					
	Mid	40620 / 2593.0					
	Mid-High	41055 / 2636.5					
	High	41490 / 2680.0					
LTE transmitter and antenna implementation	Refer to Appendix A.						
Maximum power reduction (MPR)	**Table 6.2.3-1: Maximum Power Reduction (MPR) for Power Class 1, 2 and 3**						

Modulation	Channel bandwidth / Transmission bandwidth (N_{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
64 QAM	≤ 5	≤ 4	≤ 8	≤ 12	≤ 16	≤ 18	≤ 2
64 QAM	> 5	> 4	> 8	> 12	> 16	> 18	≤ 3
256 QAM	≥ 1						≤ 5

MPR Built-in by design
The manufacturer MPR values are always within the 3GPP maximum MPR allowance but may not follow the default MPR values.
A-MPR (additional MPR) was disabled during SAR testing

Power reduction	Yes
Spectrum plots for RB configurations	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.

Notes:

1. SAR Testing for LTE was performed with the same number of RB and RB offsets transmitting on all TTI frames (maximum TTI).

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6.5. LTE (TDD) Considerations

According to KDB 941225 D05 SAR for LTE Devices v02r02, for Time-Division Duplex (TDD) systems, SAR must be tested using a fixed periodic duty factor according to the highest transmission duty factor implemented for the device and supported by the defined 3GPP LTE TDD configurations.

LTE TDD Bands support 3GPP TS 36.211 section 4.2 for Type 2 Frame Structure and Table 4.2-2 for uplink-downlink configurations and Table 4.2-1 for Special subframe configurations.

Table 4.2-1: Configuration of special subframe (lengths of DwPTS/GP/UpPTS).

Special subframe configuration	Normal cyclic prefix in downlink			Extended cyclic prefix in downlink		
	DwPTS	UpPTS		DwPTS	UpPTS	
		Normal cyclic prefix in uplink	Extended cyclic prefix in uplink		Normal cyclic prefix in uplink	Extended cyclic prefix in uplink
0	$6592 \cdot T_s$	$2192 \cdot T_s$	$2560 \cdot T_s$	$7680 \cdot T_s$	$2192 \cdot T_s$	$2560 \cdot T_s$
1	$19760 \cdot T_s$			$20480 \cdot T_s$		
2	$21952 \cdot T_s$			$23040 \cdot T_s$		
3	$24144 \cdot T_s$			$25600 \cdot T_s$		
4	$26336 \cdot T_s$			$7680 \cdot T_s$	$4384 \cdot T_s$	$5120 \cdot T_s$
5	$6592 \cdot T_s$	$4384 \cdot T_s$	$5120 \cdot T_s$	$20480 \cdot T_s$		
6	$19760 \cdot T_s$			$23040 \cdot T_s$		
7	$21952 \cdot T_s$			$12800 \cdot T_s$		
8	$24144 \cdot T_s$			-	-	-
9	$13168 \cdot T_s$			-	-	-

Calculated Duty Cycle

Uplink-Downlink Configuration	Downlink-to-Uplink Switch-point Periodicity	Subframe Number										Calculated Duty Cycle (%)
		0	1	2	3	4	5	6	7	8	9	
0	5 ms	D	S	U	U	U	D	S	U	U	U	63.33
1	5 ms	D	S	U	U	D	D	S	U	U	D	43.33
2	5 ms	D	S	U	D	D	D	S	U	D	D	23.33
3	10 ms	D	S	U	U	U	D	D	D	D	D	31.67
4	10 ms	D	S	U	U	D	D	D	D	D	D	21.67
5	10 ms	D	S	U	D	D	D	D	D	D	D	11.67
6	5 ms	D	S	U	U	U	D	S	U	U	D	53.33

Calculated Duty Cycle = Extended cyclic prefix in uplink x (T_s) x # of S + # of U

<u>Example for Calculated Duty Cycle for Uplink-Downlink Configuration 0:</u>
Calculated Duty Cycle = 5120 x [1/(15000 x 2048)] x 2 + 6 ms = 63.33%
where
T_s = 1/(15000 x 2048) seconds

Note(s):
This device supports uplink-downlink configurations 0-6. The configuration with highest duty cycle was used for SAR Testing: configuration 0 at 63.3% duty cycle and Special Subframe 7.

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6.6. LTE Carrier Aggregation Combinations

DL Intra-Band Non-Contiguous

E-UTRA CA configuration (BCS)	E-UTRA Band	Allowed Channel BW Per Carrier (MHz)			Max Aggregated BW
		1st Carrier	2nd Carrier	3rd Carrier	
CA_41A-41A (0)(1)	Band 41	10, 15, 20	10, 15, 20		40 MHz
		5, 10, 15, 20	5, 10, 15, 20		

DL Intra-Band Contiguous

E-UTRA CA configuration (BCS)	E-UTRA Band	Allowed Channel BW Per Carrier (MHz)			Max Aggregated BW
		1st Carrier	2nd Carrier	3rd Carrier	
CA_41C (0)(1)(2)(3)	Band 41	10	20		40 MHz
		15	15, 20		
		20	10, 15, 20		
		5, 10	20		40 MHz
		15	15, 20		
		20	5, 10, 15, 20		
		10	15, 20		40 MHz
		15	10, 15, 20		
		20	10, 15, 20		
		10	20		40 MHz
		20	20		
CA_41D (0)	Band 41	10	20	15	60 MHz
		10	15, 20	20	
		15	20	10, 15	
		15	10, 15, 20	20	
		20	15, 20	10	
		20	10, 15, 20	15, 20	

Note(s):

For supported channels, please refer to §6.4

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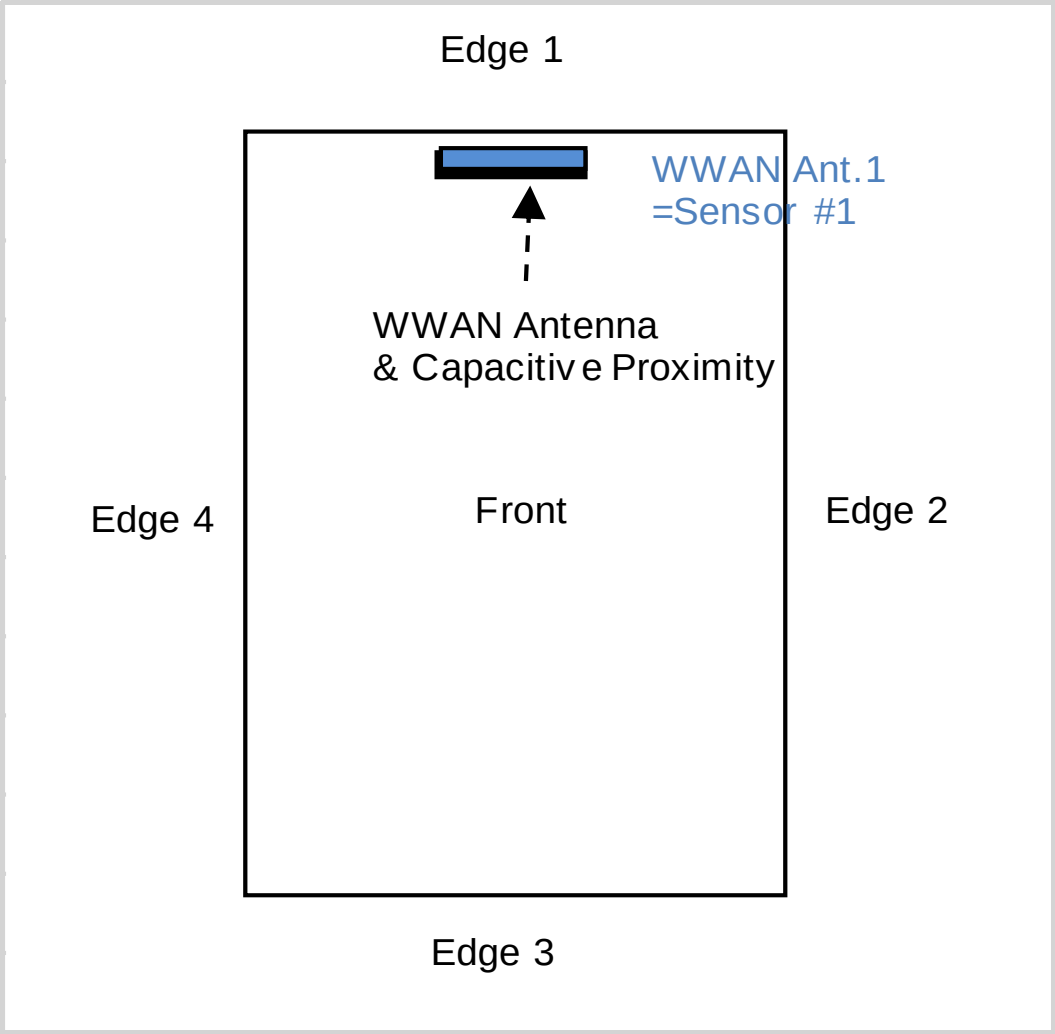
6.7. Proximity sensor feature

The DUT has one proximity sensors to reduce the output power. The position of the sensors and antenna are as shown in the graphic.



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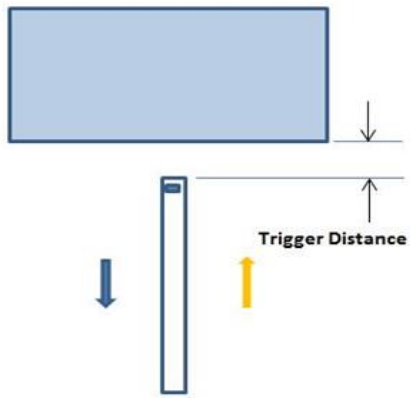
6.7.1 Proximity Sensor Triggering Distance (KDB 616217 §6.2)

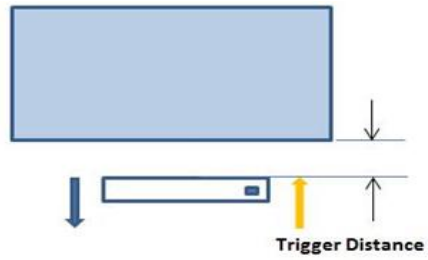
Rear, Edge 1 of the DUT was placed directly below the flat phantom. The DUT was moved toward the phantom in accordance with the steps outlined in KDB 616217 §6.2 to determine the trigger distance for enabling power reduction. The DUT was moved away from the phantom to determine the trigger distance for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

The 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 616217 §6.2, Edge 1



Proximity Sensor Trigger Distance Assessment
KDB 616217 §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 point

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	17 mm	17 mm	15 mm	15 mm
850 muscle	17 mm	17 mm	15 mm	15 mm
1900 muscle	17 mm	17 mm	15 mm	15 mm
2600 muscle	17 mm	17 mm	15 mm	15 mm

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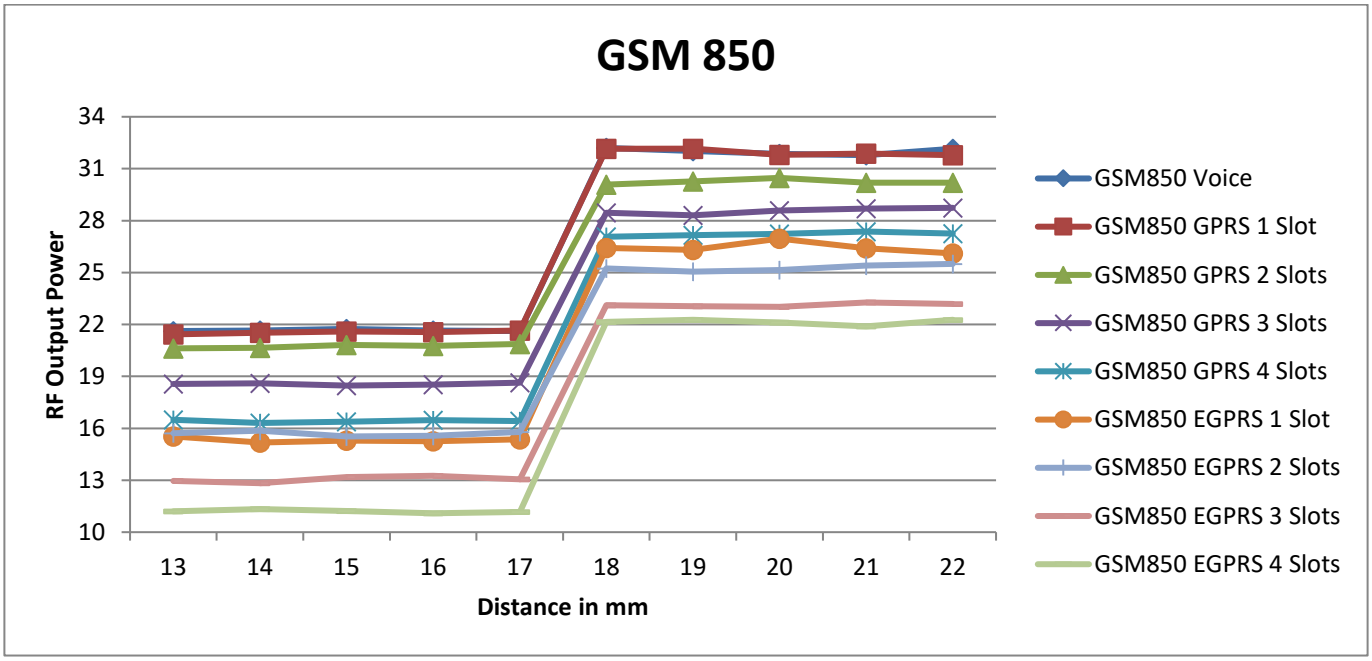
Proximity Sensor Triggering Distance Measurement Results

GSM 850

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

Distance to DUT vs. Output Power in dBm										
Distance (mm)	13	14	15	16	17	18	19	20	21	22
GSM850 Voice	21.6	21.7	21.8	21.7	21.6	32.2	32.0	31.9	31.8	32.2
GSM850 GPRS 1 Slot	21.4	21.5	21.6	21.6	21.7	32.2	32.2	31.8	31.9	31.8
GSM850 GPRS 2 Slots	20.6	20.7	20.8	20.8	20.9	30.1	30.3	30.5	30.2	30.2
GSM850 GPRS 3 Slots	18.6	18.6	18.5	18.5	18.6	28.5	28.3	28.6	28.7	28.7
GSM850 GPRS 4 Slots	16.5	16.3	16.4	16.5	16.4	27.1	27.2	27.2	27.4	27.3
GSM850 EGPRS 1 Slot	15.5	15.2	15.3	15.3	15.4	26.4	26.3	27.0	26.4	26.1
GSM850 EGPRS 2 Slots	15.7	15.9	15.5	15.6	15.8	25.2	25.1	25.1	25.4	25.5
GSM850 EGPRS 3 Slots	13.0	12.8	13.2	13.3	13.1	23.1	23.1	23.0	23.3	23.2
GSM850 EGPRS 4 Slots	11.2	11.3	11.2	11.1	11.2	22.2	22.3	22.1	21.9	22.3



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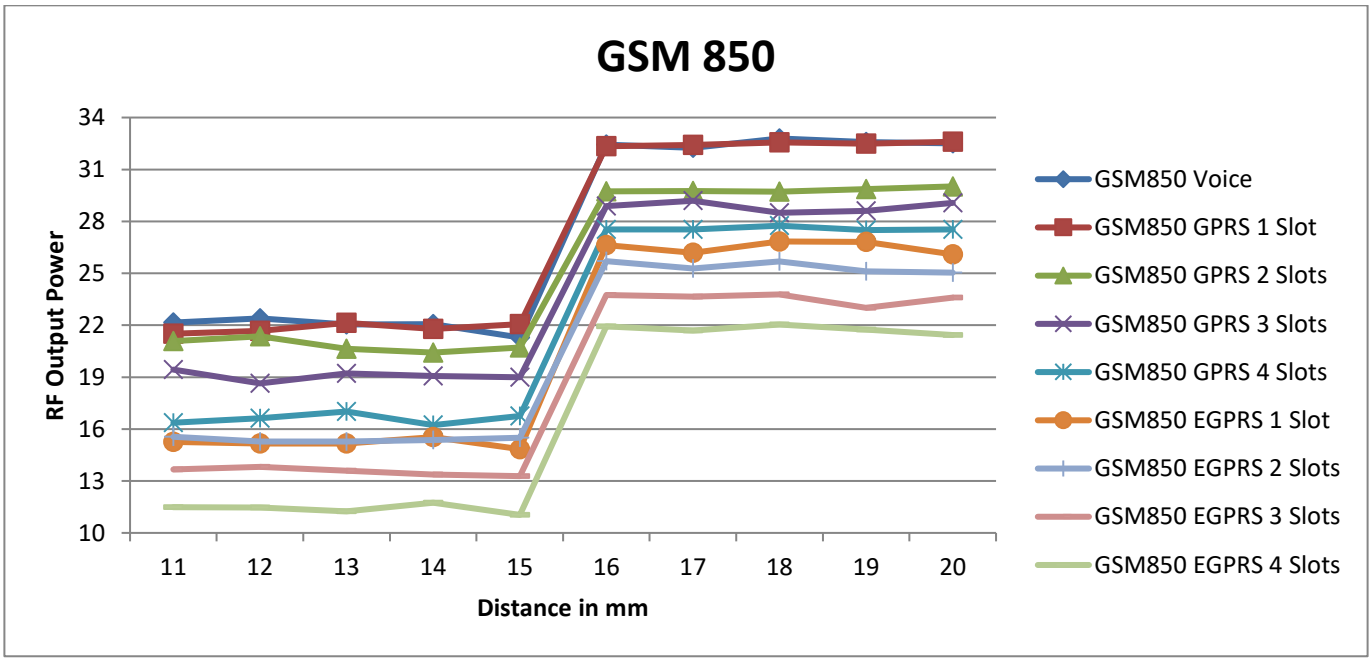
Edge 1, DUT Moving Toward (Trigger) and Away (Release) from the Phantom

Distance to DUT vs. Output Power in dBm										
Distance (mm)	11	12	13	14	15	16	17	18	19	20
GSM850 Voice	22.2	22.4	22.0	22.1	21.3	32.4	32.2	32.8	32.6	32.5
GSM850 GPRS 1 Slot	21.5	21.7	22.1	21.8	22.1	32.3	32.4	32.6	32.5	32.6
GSM850 GPRS 2 Slots	21.1	21.4	20.6	20.4	20.7	29.7	29.8	29.7	29.9	30.0
GSM850 GPRS 3 Slots	19.4	18.6	19.2	19.1	19.0	28.9	29.2	28.5	28.6	29.1
GSM850 GPRS 4 Slots	16.4	16.6	17.0	16.2	16.8	27.5	27.5	27.8	27.5	27.5
GSM850 EGPRS 1 Slot	15.3	15.2	15.2	15.5	14.8	26.6	26.2	26.8	26.8	26.1
GSM850 EGPRS 2 Slots	15.6	15.3	15.3	15.4	15.5	25.7	25.3	25.7	25.1	25.0
GSM850 EGPRS 3 Slots	13.7	13.8	13.6	13.4	13.3	23.7	23.7	23.8	23.0	23.6
GSM850 EGPRS 4 Slots	11.5	11.5	11.3	11.7	11.0	21.9	21.7	22.0	21.7	21.4



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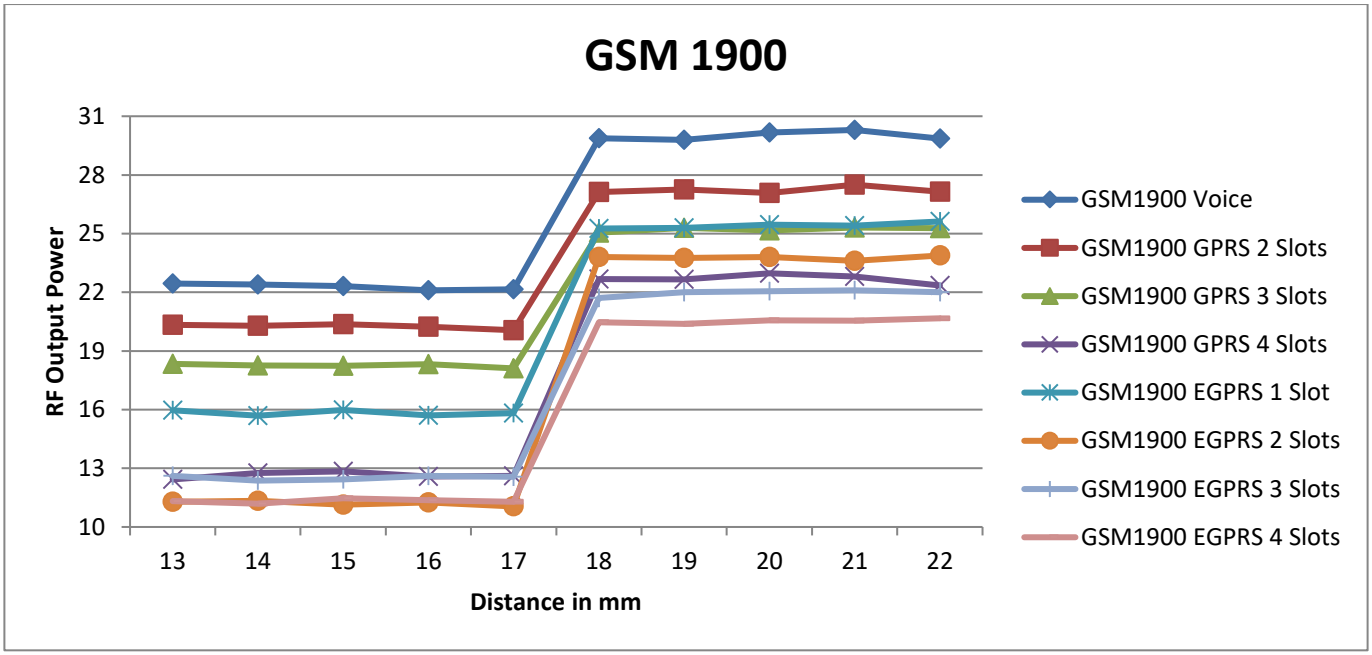
GSM 1900

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

Distance to DUT vs. Output Power in dBm										
Distance (mm)	13	14	15	16	17	18	19	20	21	22
GSM1900 Voice	22.5	22.4	22.3	22.1	22.2	29.9	29.8	30.2	30.3	29.9
GSM1900 GPRS 1 Slot	22.4	22.0	22.5	22.4	22.2	29.8	30.2	29.6	29.8	30.3
GSM1900 GPRS 2 Slots	20.3	20.3	20.4	20.2	20.1	27.1	27.3	27.1	27.5	27.2
GSM1900 GPRS 3 Slots	18.3	18.3	18.2	18.3	18.1	25.1	25.3	25.2	25.3	25.3
GSM1900 GPRS 4 Slots	12.4	12.8	12.8	12.6	12.6	22.7	22.7	23.0	22.8	22.4
GSM1900 EGPRS 1 Slot	16.0	15.7	16.0	15.7	15.8	25.3	25.3	25.5	25.4	25.6
GSM1900 EGPRS 2 Slots	11.3	11.3	11.1	11.3	11.1	23.8	23.8	23.8	23.6	23.9
GSM1900 EGPRS 3 Slots	12.6	12.4	12.4	12.6	12.6	21.7	22.0	22.1	22.1	22.0
GSM1900 EGPRS 4 Slots	11.3	11.2	11.5	11.4	11.3	20.5	20.4	20.6	20.6	20.7



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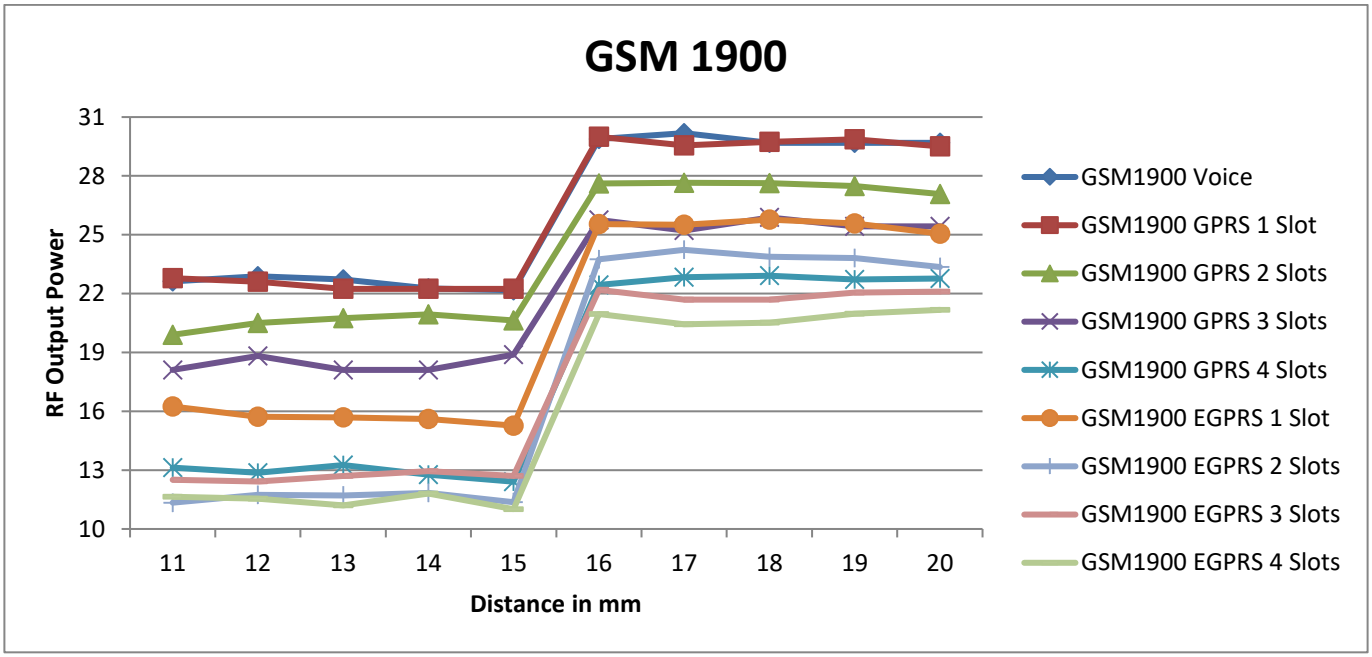
Edge 1, DUT Moving Toward (Trigger) and Away (Release) from the Phantom

Distance to DUT vs. Output Power in dBm										
Distance (mm)	11	12	13	14	15	16	17	18	19	20
GSM1900 Voice	22.6	22.9	22.7	22.3	22.2	29.9	30.2	29.7	29.7	29.7
GSM1900 GPRS 1 Slot	22.8	22.6	22.2	22.2	22.2	30.0	29.6	29.7	29.9	29.5
GSM1900 GPRS 2 Slots	19.9	20.5	20.7	20.9	20.6	27.6	27.7	27.6	27.5	27.1
GSM1900 GPRS 3 Slots	18.1	18.8	18.1	18.1	18.9	25.8	25.2	25.9	25.4	25.4
GSM1900 GPRS 4 Slots	13.1	12.9	13.3	12.8	12.4	22.5	22.8	22.9	22.7	22.8
GSM1900 EGPRS 1 Slot	16.3	15.7	15.7	15.6	15.3	25.5	25.5	25.8	25.6	25.1
GSM1900 EGPRS 2 Slots	11.3	11.7	11.7	11.8	11.4	23.8	24.2	23.9	23.8	23.4
GSM1900 EGPRS 3 Slots	12.5	12.4	12.7	13.0	12.7	22.2	21.7	21.7	22.1	22.1
GSM1900 EGPRS 4 Slots	11.7	11.5	11.2	11.8	11.0	21.0	20.4	20.5	21.0	21.2



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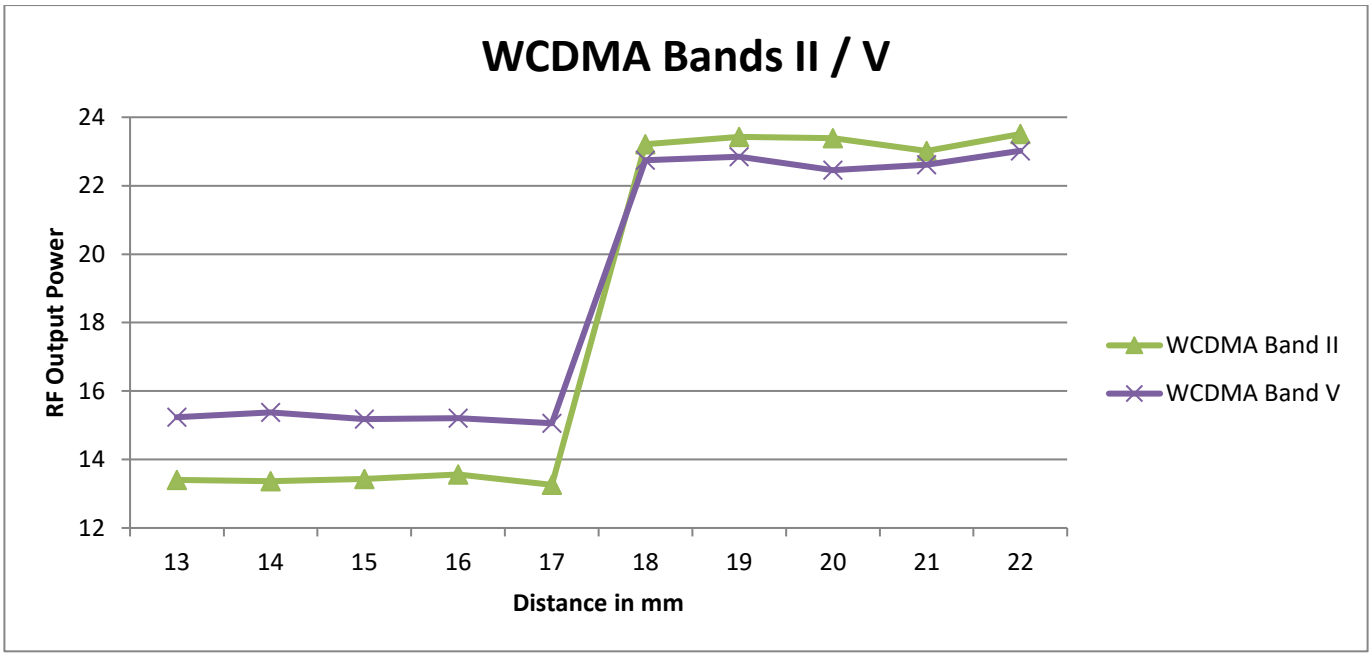
WCDMA Band II/V

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

Distance to DUT vs. Output Power in dBm										
Distance (mm)	13	14	15	16	17	18	19	20	21	22
WCDMA Band II	13.4	13.4	13.4	13.6	13.3	23.2	23.4	23.4	23.0	23.5
WCDMA Band V	15.2	15.4	15.2	15.2	15.1	22.7	22.9	22.5	22.6	23.0



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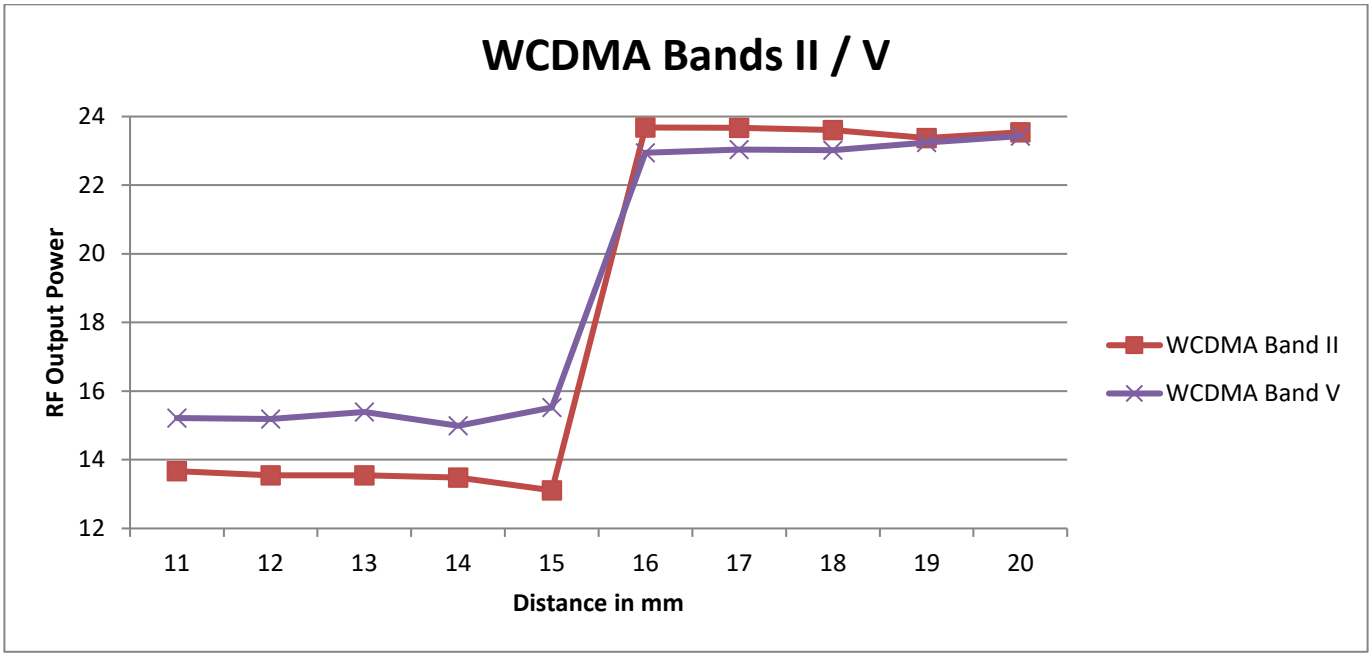
Edge 1, DUT Moving Toward (Trigger) and Away (Release) from the Phantom

Distance to DUT vs. Output Power in dBm										
Distance (mm)	11	12	13	14	15	16	17	18	19	20
WCDMA Band II	13.7	13.6	13.6	13.5	13.1	23.7	23.7	23.6	23.4	23.5
WCDMA Band V	15.2	15.2	15.4	15.0	15.5	22.9	23.0	23.0	23.2	23.4



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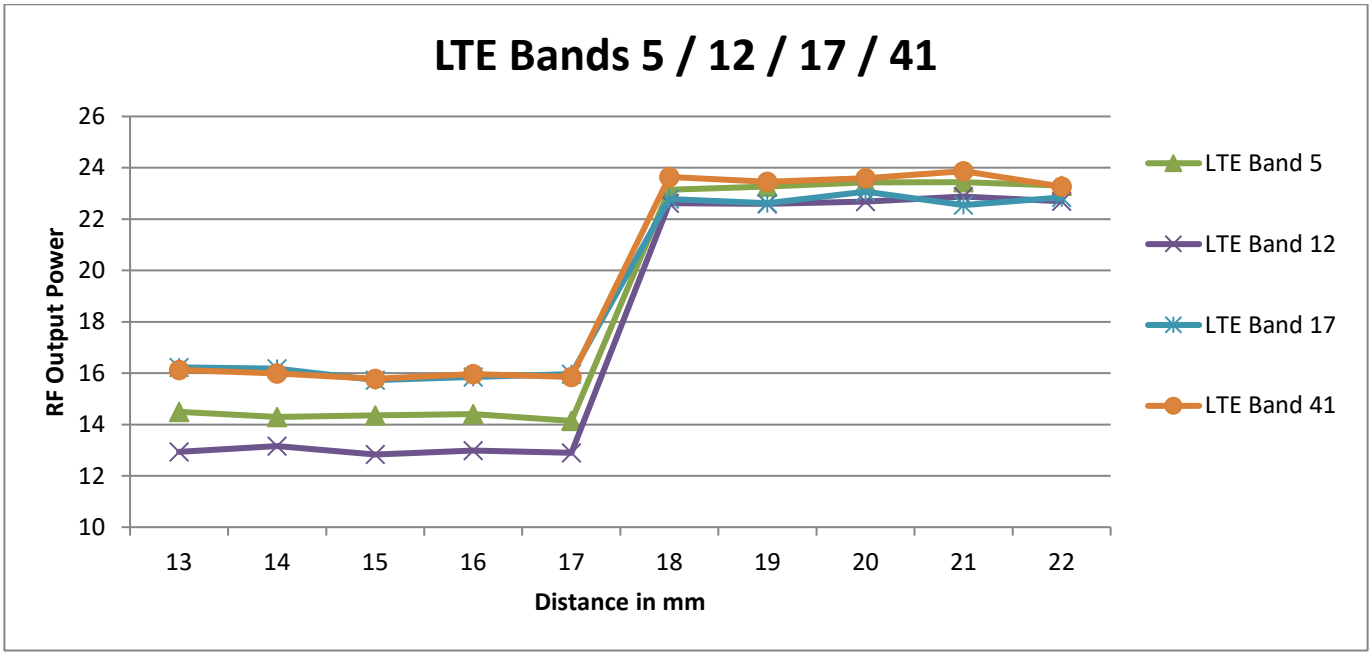
LTE Band 5/12/17/41

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

Distance to DUT vs. Output Power in dBm										
Distance (mm)	13	14	15	16	17	18	19	20	21	22
LTE Band 5	14.5	14.3	14.4	14.4	14.1	23.1	23.3	23.4	23.4	23.3
LTE Band 12	12.9	13.2	12.8	13.0	12.9	22.6	22.6	22.7	22.9	22.7
LTE Band 17	16.2	16.2	15.7	15.9	16.0	22.8	22.6	23.1	22.6	22.8
LTE Band 41	16.1	16.0	15.8	16.0	15.9	23.6	23.5	23.6	23.9	23.3



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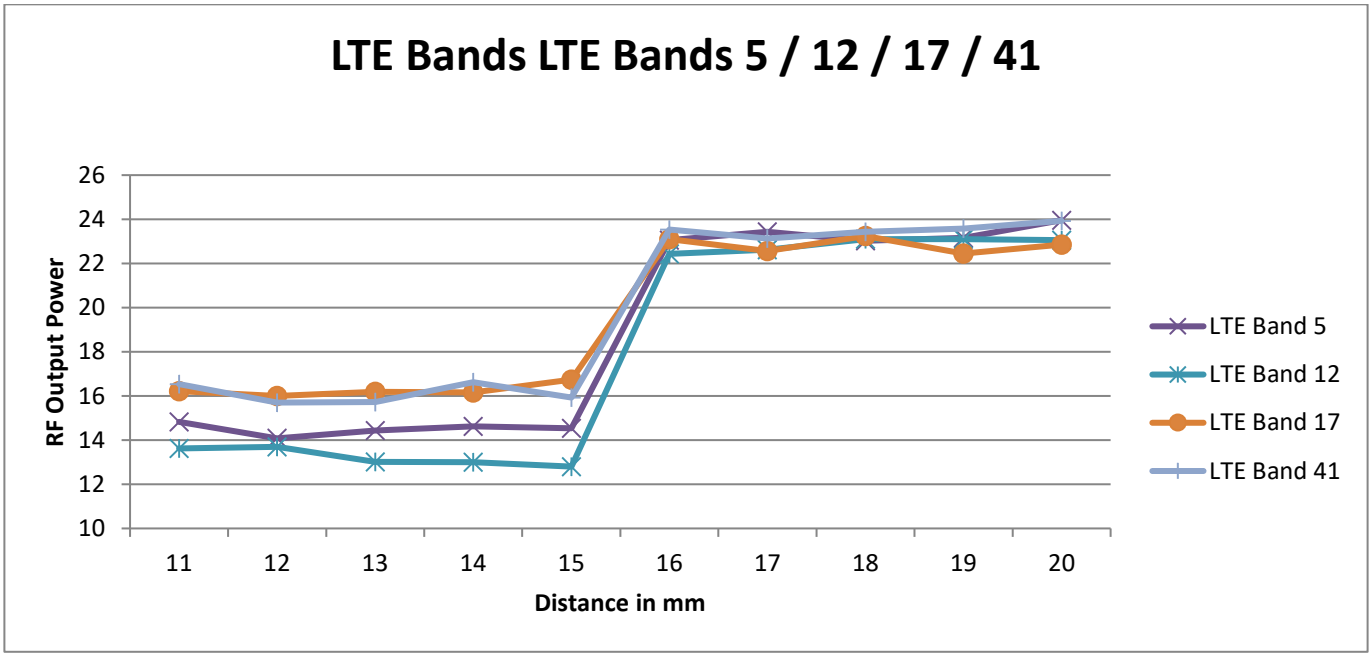
Edge 1, DUT Moving Toward (Trigger) and Away (Release) from the Phantom

Distance to DUT vs. Output Power in dBm										
Distance (mm)	11	12	13	14	15	16	17	18	19	20
LTE Band 5	14.8	14.1	14.4	14.6	14.5	23.1	23.4	23.0	23.2	24.0
LTE Band 12	13.6	13.7	13.0	13.0	12.8	22.4	22.6	23.1	23.1	23.1
LTE Band 17	16.2	16.0	16.2	16.2	16.7	23.1	22.6	23.2	22.5	22.9
LTE Band 41	16.5	15.7	15.7	16.6	15.9	23.5	23.1	23.4	23.6	23.9



6.7.2 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.

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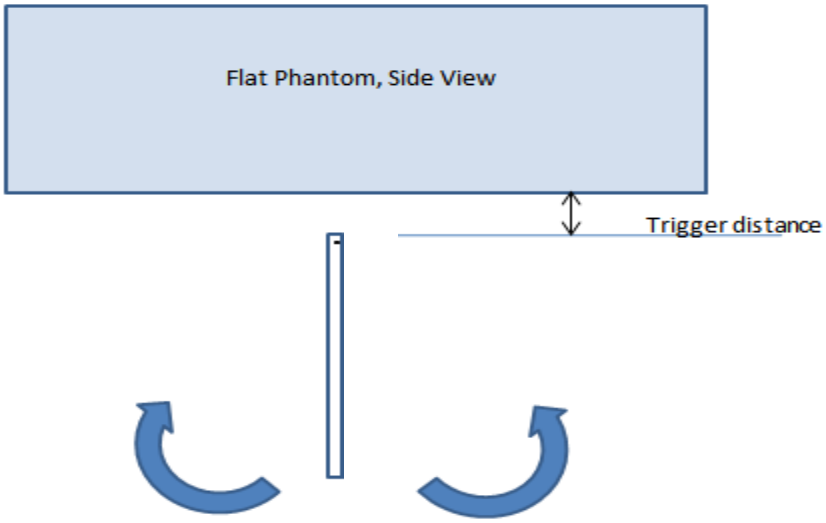
6.7.3 Proximity Sensor Tilt Angle Assessment (KDB 616217 §6.4)

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 (Edge 1)

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	15 mm	15 mm	On	On	On	On	On	On	On	On	On	On	On
850	15 mm	15 mm	On	On	On	On	On	On	On	On	On	On	On
1900	15 mm	15 mm	On	On	On	On	On	On	On	On	On	On	On
2600	15 mm	15 mm	On	On	On	On	On	On	On	On	On	On	On

6.7.4 Resulting test positions for SAR measurements

Wireless technologies	Position	§6.7.1 Triggering Distance	§6.7.2 Coverage	§6.7.3 Tilt Angle	Worst case distance for SAR
WWAN	Rear	17 mm	N/A	N/A	16 mm
	Edge 1	15 mm	N/A	15 mm	14 mm

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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	GPRS 3 Slots	848.8	29.50	334	0	0	42	246	42		61.5 -MEASURE-	61.5 -MEASURE-	7.3 -MEASURE-	> 50 mm	7.3 -MEASURE-	
Cellular	GPRS 2 Slots	1909.8	28.00	158	0	0	42	246	42		43.7 -MEASURE-	43.7 -MEASURE-	5.2 -MEASURE-	> 50 mm	5.2 -MEASURE-	
Cellular	W-CDMA II	1907.6	24.00	251	0	0	42	246	42		69.3 -MEASURE-	69.3 -MEASURE-	8.3 -MEASURE-	> 50 mm	8.3 -MEASURE-	
Cellular	W-CDMA V	846.6	23.80	240	0	0	42	246	42		44.2 -MEASURE-	44.2 -MEASURE-	5.3 -MEASURE-	> 50 mm	5.3 -MEASURE-	
Cellular	LTE Band 5	836.5	24.00	251	0	0	42	246	42		45.9 -MEASURE-	45.9 -MEASURE-	5.5 -MEASURE-	> 50 mm	5.5 -MEASURE-	
Cellular	LTE Band 12	707.5	23.50	224	0	0	42	246	42		37.7 -MEASURE-	37.7 -MEASURE-	4.5 -MEASURE-	> 50 mm	4.5 -MEASURE-	
Cellular	LTE Band 17	710	23.50	224	0	0	42	246	42		37.7 -MEASURE-	37.7 -MEASURE-	4.5 -MEASURE-	> 50 mm	4.5 -MEASURE-	
Cellular	LTE Band 41	2680	24.50	282	0	0	42	246	42		92.3 -MEASURE-	92.3 -MEASURE-	11 -MEASURE-	> 50 mm	11 -MEASURE-	
Power Back-off, Proximity Sensor On																
Cellular	GPRS 2 Slots	848.8	21.50	35	0	0					6.4 -MEASURE-	6.4 -MEASURE-				
Cellular	GPRS 2 Slots	1909.8	21.00	31	0	0					8.6 -MEASURE-	8.6 -MEASURE-				
Cellular	W-CDMA II	1907.6	14.00	25	0	0					6.9 -MEASURE-	6.9 -MEASURE-				
Cellular	W-CDMA V	846.6	16.00	40	0	0					7.4 -MEASURE-	7.4 -MEASURE-				
Cellular	LTE Band 5	836.5	15.00	32	0	0					5.9 -MEASURE-	5.9 -MEASURE-				
Cellular	LTE Band 12	707.5	14.00	25	0	0					4.2 -MEASURE-	4.2 -MEASURE-				
Cellular	LTE Band 17	710	17.00	50	0	0					8.4 -MEASURE-	8.4 -MEASURE-				
Cellular	LTE Band 41	2680	17.00	50	0	0					16.4 -MEASURE-	16.4 -MEASURE-				

Note(s):

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

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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	GPRS 3 Slots	848.8	29.50	334	0	0	42	246	42		< 50 mm	< 50 mm	< 50 mm	1271.9 mW -EXEMPT-	< 50 mm	
Cellular	GPRS 2 Slots	1909.8	28.00	158	0	0	42	246	42		< 50 mm	< 50 mm	< 50 mm	2068.5 mW -EXEMPT-	< 50 mm	
Cellular	W-CDMA II	1907.6	24.00	251	0	0	42	246	42		< 50 mm	< 50 mm	< 50 mm	2068.6 mW -EXEMPT-	< 50 mm	
Cellular	W-CDMA V	846.6	23.80	240	0	0	42	246	42		< 50 mm	< 50 mm	< 50 mm	1269.2 mW -EXEMPT-	< 50 mm	
Cellular	LTE Band 5	836.5	24.00	251	0	0	42	246	42		< 50 mm	< 50 mm	< 50 mm	1257 mW -EXEMPT-	< 50 mm	
Cellular	LTE Band 12	707.5	23.50	224	0	0	42	246	42		< 50 mm	< 50 mm	< 50 mm	1102.8 mW -EXEMPT-	< 50 mm	
Cellular	LTE Band 17	710	23.50	224	0	0	42	246	42		< 50 mm	< 50 mm	< 50 mm	1105.8 mW -EXEMPT-	< 50 mm	
Cellular	LTE Band 41	2680	24.50	282	0	0	42	246	42		< 50 mm	< 50 mm	< 50 mm	2051.6 mW -EXEMPT-	< 50 mm	
Power Back-off, Proximity Sensor On																
Cellular	GPRS 2 Slots	848.8	21.50	35	0	0					< 50 mm	< 50 mm				
Cellular	GPRS 2 Slots	1909.8	21.00	31	0	0					< 50 mm	< 50 mm				
Cellular	W-CDMA II	1907.6	14.00	25	0	0					< 50 mm	< 50 mm				
Cellular	W-CDMA V	846.6	16.00	40	0	0					< 50 mm	< 50 mm				
Cellular	LTE Band 5	836.5	15.00	32	0	0					< 50 mm	< 50 mm				
Cellular	LTE Band 12	707.5	14.00	25	0	0					< 50 mm	< 50 mm				
Cellular	LTE Band 17	710	17.00	50	0	0					< 50 mm	< 50 mm				
Cellular	LTE Band 41	2680	17.00	50	0	0					< 50 mm	< 50 mm				

Note(s):

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

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SAR Test Exclusion Calculations for WLAN

Antenna.1 < 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 2.4 GHz	2462	13.00	20.0	0	243	20	3	122		6.3 -MEASURE-	> 50 mm	1.6 -EXEMPT-	6.3 -MEASURE-	> 50 mm	
Wi-Fi 5.3 GHz	5320	10.00	10.0	0	243	20	3	122		4.6 -MEASURE-	> 50 mm	1.2 -EXEMPT-	4.6 -MEASURE-	> 50 mm	
Wi-Fi 5.5 GHz	5720	10.00	10.0	0	243	20	3	122		4.8 -MEASURE-	> 50 mm	1.2 -EXEMPT-	4.8 -MEASURE-	> 50 mm	
Wi-Fi 5.8 GHz	5825	10.00	10.0	0	243	20	3	122		4.8 -MEASURE-	> 50 mm	1.2 -EXEMPT-	4.8 -MEASURE-	> 50 mm	
Bluetooth	2480	9.50	9.0	0	243	20	3	122		2.8 -EXEMPT-	> 50 mm	0.7 -EXEMPT-	2.8 -EXEMPT-	> 50 mm	

Antenna.2 < 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 2.4 GHz	2462	13.00	20.0	0	243	121	3	20		6.3 -MEASURE-	> 50 mm	> 50 mm	6.3 -MEASURE-	1.6 -EXEMPT-	
Wi-Fi 5.3 GHz	5320	10.00	10.0	0	243	121	3	20		4.6 -MEASURE-	> 50 mm	> 50 mm	4.6 -MEASURE-	1.2 -EXEMPT-	
Wi-Fi 5.5 GHz	5720	10.00	10.0	0	243	121	3	20		4.8 -MEASURE-	> 50 mm	> 50 mm	4.8 -MEASURE-	1.2 -EXEMPT-	
Wi-Fi 5.8 GHz	5825	10.50	10.0	0	243	121	3	20		4.8 -MEASURE-	> 50 mm	> 50 mm	4.8 -MEASURE-	1.2 -EXEMPT-	

Note(s):

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

Antenna.2 > 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 2.4 GHz	2462	13.00	20.0	0	243	20	3	122		< 50 mm	2025.6 mW -EXEMPT-	< 50 mm	< 50 mm	815.6 mW -EXEMPT-	
Wi-Fi 5.3 GHz	5320	10.00	10.0	0	243	20	3	122		< 50 mm	1995 mW -EXEMPT-	< 50 mm	< 50 mm	785 mW -EXEMPT-	
Wi-Fi 5.5 GHz	5720	10.00	10.0	0	243	20	3	122		< 50 mm	1992.7 mW -EXEMPT-	< 50 mm	< 50 mm	782.7 mW -EXEMPT-	
Wi-Fi 5.8 GHz	5825	10.00	10.0	0	243	20	3	122		< 50 mm	1992.2 mW -EXEMPT-	< 50 mm	< 50 mm	782.2 mW -EXEMPT-	
Bluetooth	2480	9.50	9.0	0	243	20	3	122		< 50 mm	2025.3 mW -EXEMPT-	< 50 mm	< 50 mm	815.3 mW -EXEMPT-	

Antenna.2 > 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 2.4 GHz	2462	13.00	20.0	0	243	121	3	20		< 50 mm	2025.6 mW -EXEMPT-	805.6 mW -EXEMPT-	< 50 mm	< 50 mm	
Wi-Fi 5.3 GHz	5320	10.00	10.0	0	243	121	3	20		< 50 mm	1995 mW -EXEMPT-	775 mW -EXEMPT-	< 50 mm	< 50 mm	
Wi-Fi 5.5 GHz	5720	10.00	10.0	0	243	121	3	20		< 50 mm	1992.7 mW -EXEMPT-	772.7 mW -EXEMPT-	< 50 mm	< 50 mm	
Wi-Fi 5.8 GHz	5825	10.00	10.0	0	243	121	3	20		< 50 mm	1992.2 mW -EXEMPT-	772.2 mW -EXEMPT-	< 50 mm	< 50 mm	

Note(s):

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

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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	Pw r Back-off	Rear	Edge 1 (Top Edge)	Edge 2 (Right Edge)	Edge 3 (Bottom Edge)	Edge 4 (Lef t Edge)
GSM850	OFF	Yes	Yes	Yes	No	Yes
	ON	Yes	Yes	No	No	No
GSM1900	OFF	Yes	Yes	Yes	No	Yes
	ON	Yes	Yes	No	No	No
W-CDMA Band II	OFF	Yes	Yes	Yes	No	Yes
	ON	Yes	Yes	No	No	No
W-CDMA Band V	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 12	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
LTE Band 41	OFF	Yes	Yes	Yes	No	Yes
	ON	Yes	Yes	No	No	No
Wi-Fi 2.4 GHz_Ant.1	N/A	Yes	No	No	Yes	No
Wi-Fi 2.4 GHz_Ant.2	N/A	Yes	No	No	Yes	No
Wi-Fi 5.3 GHz_Ant.1	N/A	Yes	No	No	Yes	No
Wi-Fi 5.3 GHz_Ant.2	N/A	Yes	No	No	Yes	No
Wi-Fi 5.5 GHz_Ant.1	N/A	Yes	No	No	Yes	No
Wi-Fi 5.5 GHz_Ant.2	N/A	Yes	No	No	Yes	No
Wi-Fi 5.8 GHz_Ant.1	N/A	Yes	No	No	Yes	No
Wi-Fi 5.8 GHz_Ant.2	N/A	Yes	No	No	Yes	No
Bluetooth	N/A	No	No	No	No	No

Note(s):

1. Yes = Testing is required. No = Testing is not required..

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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)	Body	
	ε_r	σ (S/m)
150	61.9	0.80
300	58.2	0.92
450	56.7	0.94
835	55.2	0.97
900	55.0	1.05
915	55.0	1.06
1450	54.0	1.30
1610	53.8	1.40
1800 – 2000	53.3	1.52
2450	52.7	1.95
3000	52.0	2.73
5000	49.3	5.07
5100	49.1	5.18
5200	49.0	5.30
5300	48.9	5.42
5400	48.7	5.53
5500	48.6	5.65
5600	48.5	5.77
5700	48.3	5.88
5800	48.2	6.00

IEEE Std 1528-2013

Refer to Table 3 within the IEEE Std 1528-2013

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Dielectric Property Measurements Results:

SAR 1 Room

Date	Freq. (MHz)	Liquid Parameters			Measured	Target	Delta (%)	Limit ±(%)
6-11-2018	Body 2600	e'	53.5900	Relative Permittivity (ε_r):	53.59	52.51	2.06	5
		e''	15.2500	Conductivity (σ):	2.20	2.16	2.03	5
	Body 2500	e'	53.8400	Relative Permittivity (ε_r):	53.84	52.64	2.29	5
		e''	14.9900	Conductivity (σ):	2.08	2.02	3.14	5
	Body 2700	e'	53.3600	Relative Permittivity (ε_r):	53.36	52.38	1.86	5
		e''	15.4600	Conductivity (σ):	2.32	2.30	0.85	5
6-30-2018	Body 2450	e'	52.8500	Relative Permittivity (ε_r):	52.85	52.70	0.28	5
		e''	14.6900	Conductivity (σ):	2.00	1.95	2.62	5
	Body 2400	e'	52.9400	Relative Permittivity (ε_r):	52.94	52.77	0.32	5
		e''	14.5600	Conductivity (σ):	1.94	1.90	2.37	5
	Body 2480	e'	52.7800	Relative Permittivity (ε_r):	52.78	52.66	0.22	5
		e''	14.7900	Conductivity (σ):	2.04	1.99	2.38	5
7-3-2018	Body 2450	e'	53.7800	Relative Permittivity (ε_r):	53.78	52.70	2.05	5
		e''	14.6200	Conductivity (σ):	1.99	1.95	2.14	5
	Body 2400	e'	53.9800	Relative Permittivity (ε_r):	53.98	52.77	2.29	5
		e''	14.5000	Conductivity (σ):	1.93	1.90	1.95	5
	Body 2480	e'	53.7200	Relative Permittivity (ε_r):	53.72	52.66	2.01	5
		e''	14.7200	Conductivity (σ):	2.03	1.99	1.89	5

SAR 2 Room

Date	Freq. (MHz)	Liquid Parameters			Measured	Target	Delta (%)	Limit ±(%)
6-4-2018	Body 1900	e'	51.5400	Relative Permittivity (ε_r):	51.54	53.30	-3.30	5
		e''	14.9300	Conductivity (σ):	1.58	1.52	3.77	5
	Body 1850	e'	51.6900	Relative Permittivity (ε_r):	51.69	53.30	-3.02	5
		e''	14.8600	Conductivity (σ):	1.53	1.52	0.56	5
	Body 1910	e'	51.5100	Relative Permittivity (ε_r):	51.51	53.30	-3.36	5
		e''	14.9500	Conductivity (σ):	1.59	1.52	4.46	5
6-11-2018	Body 1900	e'	51.4500	Relative Permittivity (ε_r):	51.45	53.30	-3.47	5
		e''	14.9100	Conductivity (σ):	1.58	1.52	3.63	5
	Body 1850	e'	51.6900	Relative Permittivity (ε_r):	51.69	53.30	-3.02	5
		e''	14.9300	Conductivity (σ):	1.54	1.52	1.04	5
	Body 1910	e'	51.4000	Relative Permittivity (ε_r):	51.40	53.30	-3.56	5
		e''	14.9000	Conductivity (σ):	1.58	1.52	4.11	5
6-14-2018	Body 835	e'	53.7000	Relative Permittivity (ε_r):	53.70	55.20	-2.72	5
		e''	21.1700	Conductivity (σ):	0.98	0.97	1.33	5
	Body 820	e'	53.8400	Relative Permittivity (ε_r):	53.84	55.28	-2.60	5
		e''	21.2100	Conductivity (σ):	0.97	0.97	-0.14	5
	Body 850	e'	53.5400	Relative Permittivity (ε_r):	53.54	55.16	-2.93	5
		e''	21.1100	Conductivity (σ):	1.00	0.99	1.07	5
6-15-2018	Body 750	e'	54.3900	Relative Permittivity (ε_r):	54.39	55.55	-2.08	5
		e''	23.3000	Conductivity (σ):	0.97	0.96	0.89	5
	Body 700	e'	54.9600	Relative Permittivity (ε_r):	54.96	55.74	-1.40	5
		e''	23.7100	Conductivity (σ):	0.92	0.96	-3.79	5
	Body 790	e'	53.9400	Relative Permittivity (ε_r):	53.94	55.39	-2.62	5
		e''	22.9800	Conductivity (σ):	1.01	0.97	4.48	5

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SAR 3 Room

Date	Freq. (MHz)	Liquid Parameters			Measured	Target	Delta (%)	Limit ±(%)
6-11-2018	Body 750	e'	53.6700	Relative Permittivity (ε_r):	53.67	55.55	-3.38	5
		e''	23.1300	Conductivity (σ):	0.96	0.96	0.16	5
	Body 700	e'	54.2600	Relative Permittivity (ε_r):	54.26	55.74	-2.65	5
		e''	23.5200	Conductivity (σ):	0.92	0.96	-4.56	5
	Body 790	e'	53.1900	Relative Permittivity (ε_r):	53.19	55.39	-3.98	5
		e''	22.8200	Conductivity (σ):	1.00	0.97	3.75	5
6-28-2018	Body 5250	e'	47.2700	Relative Permittivity (ε_r):	47.27	48.95	-3.44	5
		e''	17.8300	Conductivity (σ):	5.20	5.35	-2.77	5
	Body 5260	e'	47.2700	Relative Permittivity (ε_r):	47.27	48.94	-3.41	5
		e''	17.8400	Conductivity (σ):	5.22	5.36	-2.74	5
	Body 5600	e'	46.9700	Relative Permittivity (ε_r):	46.97	48.48	-3.11	5
		e''	18.1700	Conductivity (σ):	5.66	5.76	-1.79	5
	Body 5750	e'	46.7100	Relative Permittivity (ε_r):	46.71	48.27	-3.24	5
		e''	18.2200	Conductivity (σ):	5.83	5.94	-1.86	5
	Body 5825	e'	46.5500	Relative Permittivity (ε_r):	46.55	48.20	-3.42	5
		e''	18.2400	Conductivity (σ):	5.91	6.00	-1.54	5

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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 2.5 mm.
  For 5 GHz band - Distance between probe sensors and phantom surface was set to 1.4 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	Body
D750V3	1122	2-19-2018	750	1g	8.63
				10g	5.72
D835V2	4d194	7-19-2017	835	1g	9.30
				10g	6.09
D1900V2	5d190	9-20-2017	1900	1g	40.00
				10g	21.10
D2450V2	939	9-19-2017	2450	1g	50.70
				10g	23.90
D2600V2	1097	1-17-2018	2600	1g	54.40
				10g	24.20
D5GHzV2	1209	2-15-2018	5250	1g	75.70
				10g	21.00
			5600	1g	79.00
				10g	21.90
			5750	1g	75.60
				10g	20.80

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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			
6-11-2018	D2600V2	1097	Body	1g	5.48	54.80	54.40	0.74	1, 2
				10g	2.40	24.00	24.20	-0.83	
6-30-2018	D2450V2	939	Body	1g	5.15	51.50	50.70	1.58	
				10g	2.39	23.90	23.90	0.00	
7-3-2018	D2450V2	939	Body	1g	5.16	51.60	50.70	1.78	3, 4
				10g	2.37	23.70	23.90	-0.84	

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			
6-4-2018	D1900V2	5d190	Body	1g	4.21	42.10	40.00	5.25	5, 6
				10g	2.12	21.20	21.10	0.47	
6-11-2018	D1900V2	5d190	Body	1g	4.28	42.80	40.00	7.00	
				10g	2.19	21.90	21.10	3.79	
6-14-2018	D835V2	4d194	Body	1g	1.01	10.10	9.30	8.60	7, 8
				10g	0.66	6.59	6.09	8.21	
6-15-2018	D750V3	1122	Body	1g	0.90	9.02	8.63	4.52	9, 10
				10g	0.60	5.99	5.72	4.72	

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			
6-11-2018	D750V3	1122	Body	1g	0.87	8.73	8.63	1.16	
				10g	0.58	5.80	5.72	1.40	
6-28-2018	D5GHzV2 (5250)	1209	Body	1g	7.53	75.30	75.70	-0.53	
				10g	2.09	20.90	21.00	-0.48	
6-28-2018	D5GHzV2 (5600)	1209	Body	1g	8.22	82.20	79.00	4.05	
				10g	2.25	22.50	21.90	2.74	
6-28-2018	D5GHzV2 (5750)	1209	Body	1g	7.04	70.40	75.60	-6.88	11, 12
				10g	1.95	19.50	20.80	-6.25	

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9 Conducted Output Power Measurements

9.1 GSM

Per KDB 941225 D01 3G SAR Procedures:

SAR test reduction for GPRS and EDGE modes is determined by the source-based time-averaged output power specified for production units, including tune-up tolerance. The data mode with highest specified time-averaged output power should be tested for SAR compliance in the applicable exposure conditions. For modes with the same specified maximum output power and tolerance, the higher number time-slot configuration should be tested.

GSM850 Measured Results

					Full Power			Reduced Power		
Mode	Coding Scheme	Time Slots	Ch No.	Freq. (MHz)	Burst Pwr (dBm)	Frame Pwr (dBm)	Max. Frame Pwr (dBm)	Burst Pwr (dBm)	Frame Pwr (dBm)	Max. Frame Pwr (dBm)
GSM (Voice)	CS1	1	128	824.4	32.4	23.4	24.5	21.0	12.0	13.5
			190	836.6	32.4	23.4		21.0	12.0	
			251	848.8	32.9	23.9		21.4	12.3	
GPRS (GMSK)	CS1	1	128	824.4	32.4	23.4	24.5	20.9	11.9	13.5
			190	836.6	32.3	23.3		21.0	11.9	
			251	848.8	32.8	23.7		21.3	12.2	
		2	128	824.4	29.3	23.2	24.5	20.1	14.1	**15.5**
			190	836.6	29.2	23.1		20.2	14.2	
			251	848.8	29.5	23.5		20.4	14.4	
		3	128	824.4	28.9	24.6	**25.2**	18.7	14.4	15.2
			190	836.6	28.8	24.6		18.7	14.4	
			251	848.8	29.1	24.8		19.1	14.8	
		4	128	824.4	27.3	24.3	25.0	17.2	14.2	14.5
			190	836.6	27.3	24.3		17.2	14.2	
			251	848.8	27.6	24.6		17.5	14.5	
EGPRS (8PSK)	MCS5	1	128	824.4	25.9	16.8	18.5	13.9	4.9	7.0
			190	836.6	25.8	16.8		14.1	5.0	
			251	848.8	26.2	17.2		14.1	5.1	
		2	128	824.4	24.7	18.7	20.0	14.5	8.5	10.3
			190	836.6	24.6	18.6		14.6	8.6	
			251	848.8	25.0	19.0		15.0	8.9	
		3	128	824.4	22.5	18.3	19.7	13.0	8.8	9.7
			190	836.6	22.5	18.2		13.1	8.8	
			251	848.8	22.9	18.6		13.6	9.3	
		4	128	824.4	21.0	18.0	19.5	11.5	8.5	9.0
			190	836.6	20.9	17.9		11.6	8.5	
			251	848.8	21.3	18.3		12.0	8.9	

Notes:

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

- GMSK (GPRS) mode with 3 time slots for Max power and 2 time slots for reduced power, based on the Tune-up Procedure. Refer to §6.3.
- SAR is not required for EGPRS (8PSK) mode because the maximum output power and tune-up limit is ≤ 1/4dB higher than GMSK GPRS or the adjusted SAR of the highest reported SAR of GMSK GPRS is ≤ 1.2W/kg.

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GSM1900 Measured Results

					Full Power			Reduced Power		
Mode	Coding Scheme	Time Slots	Ch No.	Freq. (MHz)	Burst Pwr (dBm)	Frame Pwr (dBm)	Max. Frame Pwr (dBm)	Burst Pwr (dBm)	Frame Pwr (dBm)	Max. Frame Pwr (dBm)
GSM (Voice)	CS1	1	512	1850.2	30.2	21.1	22.0	21.8	12.8	14.0
			661	1880.0	30.1	21.1		22.1	13.1	
			810	1909.8	30.1	21.1		22.2	13.2	
GPRS (GMSK)	CS1	1	512	1850.2	30.2	21.1	22.0	21.8	12.7	14.0
			661	1880.0	30.0	21.0		21.9	12.9	
			810	1909.8	30.0	21.0		22.0	13.0	
		2	512	1850.2	26.5	20.5	**22.0**	19.7	13.7	**15.0**
			661	1880.0	26.8	20.8		19.9	13.9	
			810	1909.8	26.9	20.9		20.0	13.9	
		3	512	1850.2	25.3	21.0	21.7	17.5	13.3	14.7
			661	1880.0	25.4	21.1		17.8	13.6	
			810	1909.8	25.7	21.4		18.0	13.7	
		4	512	1850.2	22.6	19.6	20.5	13.1	10.1	10.5
			661	1880.0	23.0	20.0		13.3	10.3	
			810	1909.8	23.2	20.2		13.3	10.3	
EGPRS (8PSK)	MCS5	1	512	1850.2	25.1	16.0	17.0	15.2	6.2	7.5
			661	1880.0	25.2	16.1		15.5	6.4	
			810	1909.8	25.3	16.3		15.6	6.6	
		2	512	1850.2	23.5	17.5	18.5	11.3	5.3	6.0
			661	1880.0	23.7	17.6		11.5	5.4	
			810	1909.8	23.8	17.8		11.5	5.5	
		3	512	1850.2	21.0	16.7	18.2	12.9	8.7	9.2
			661	1880.0	21.1	16.9		13.2	8.9	
			810	1909.8	21.3	17.0		13.3	9.0	
		4	512	1850.2	19.2	16.1	18.5	11.2	8.2	9.0
			661	1880.0	19.3	16.3		11.2	8.2	
			810	1909.8	19.4	16.4		11.7	8.7	

Notes:

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

- GMSK (GPRS) mode with 2 time slots for Max power and 2 time slots for reduced power, based on the Tune-up Procedure. Refer to §6.3.
- SAR is not required for EGPRS (8PSK) mode because the maximum output power and tune-up limit is ≤ 1/4dB higher than GMSK GPRS or the adjusted SAR of the highest reported SAR of GMSK GPRS is ≤ 1.2W/kg.

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9.2 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			

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

The following 5 Sub-tests were completed according to Release 6 procedures in table C,11.1.3 of 3GPP TS 34.121-1 v13.
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	-
	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	0
	DHARQ	0	0	0	0	0
	AG Index	20	12	15	17	12
	ETFCI (from 34.121 Table C.11.1.3)	75	67	92	71	67
	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

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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.		

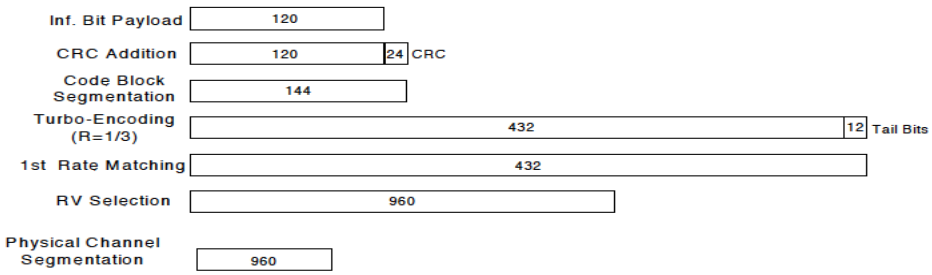

Figure C.8.19: Coding rate for Fixed reference Channel H-Set 12 (QPSK)

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 12			
	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. 8 Therefore, the RF conducted power is not measured.

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WCDMA Band II Measured Results

Band	Mode		UL Ch No.	Freq. (MHz)	MPR (dB)	Max. RF output power (dBm)	Reduced. RF output power (dBm)
						Meas. Avg Pwr	Meas. Avg Pwr
W-CDMA Band II	Rel 99	RMC, 12.2 kbps	9262	1852.4	N/A	22.1	13.2
			9400	1880.0	N/A	22.2	13.5
			9538	1907.6	N/A	22.4	13.6
	HSDPA	Subtest 1	9262	1852.4	0	21.3	12.5
			9400	1880.0		21.5	12.7
			9538	1907.6		21.7	12.9
		Subtest 2	9262	1852.4	0	21.3	12.5
			9400	1880.0		21.5	12.7
			9538	1907.6		21.7	12.9
		Subtest 3	9262	1852.4	0.5	20.8	12.0
			9400	1880.0		21.0	12.2
			9538	1907.6		21.2	12.4
		Subtest 4	9262	1852.4	0.5	20.8	12.0
			9400	1880.0		21.0	12.2
			9538	1907.6		21.2	12.4
	HSUPA	Subtest 1	9262	1852.4	0	21.3	12.5
			9400	1880.0		21.5	12.7
			9538	1907.6		21.7	12.9
		Subtest 2	9262	1852.4	2	19.0	10.2
			9400	1880.0		19.2	10.8
			9538	1907.6		19.4	10.6
		Subtest 3	9262	1852.4	1	20.3	11.5
			9400	1880.0		20.5	11.7
			9538	1907.6		20.7	11.9
		Subtest 4	9262	1852.4	2	19.0	10.2
			9400	1880.0		19.2	10.4
			9538	1907.6		19.4	10.6
		Subtest 5	9262	1852.4	0	20.7	12.5
			9400	1880.0		21.4	12.7
			9538	1907.6		21.7	12.9
	DC-HSDPA	Subtest 1	9262	1852.4	0	21.4	12.5
			9400	1880.0		21.5	12.7
			9538	1907.6		21.7	12.9
		Subtest 2	9262	1852.4	0	21.3	12.5
			9400	1880.0		21.5	12.7
			9538	1907.6		21.7	12.9
		Subtest 3	9262	1852.4	0.5	20.8	12.0
			9400	1880.0		21.0	12.2
			9538	1907.6		21.2	12.4
		Subtest 4	9262	1852.4	0.5	20.8	12.0
			9400	1880.0		21.0	12.2
			9538	1907.6		21.2	12.4

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WCDMA Band V Measured Results

Band	Mode		UL Ch No.	Freq. (MHz)	MPR (dB)	Max. RF output power (dBm)	Reduced. RF output power (dBm)
						Meas. Avg Pwr	Meas. Avg Pwr
W-CDMA Band V	Rel 99	RMC, 12.2 kbps	4132	826.4	N/A	23.2	14.5
			4183	836.6	N/A	23.2	14.7
			4233	846.6	N/A	23.3	14.7
	HSDPA	Subtest 1	4132	826.4	0	22.1	13.5
			4183	836.6		22.2	13.6
			4233	846.6		22.3	13.7
		Subtest 2	4132	826.4	0	22.2	13.5
			4183	836.6		22.2	13.6
			4233	846.6		22.4	13.7
		Subtest 3	4132	826.4	0.5	21.7	13.0
			4183	836.6		21.8	13.1
			4233	846.6		21.8	13.2
		Subtest 4	4132	826.4	0.5	21.6	13.0
			4183	836.6		21.7	13.1
			4233	846.6		21.8	13.2
	HSUPA	Subtest 1	4132	826.4	0	22.1	13.5
			4183	836.6		22.2	13.6
			4233	846.6		22.3	13.7
		Subtest 2	4132	826.4	2	20.2	11.6
			4183	836.6		20.2	11.6
			4233	846.6		20.3	11.7
		Subtest 3	4132	826.4	1	21.1	12.5
			4183	836.6		21.3	12.6
			4233	846.6		21.3	12.7
		Subtest 4	4132	826.4	2	20.1	11.5
			4183	836.6		20.3	11.6
			4233	846.6		20.3	11.7
		Subtest 5	4132	826.4	0	22.2	13.5
			4183	836.6		22.3	13.7
			4233	846.6		22.4	13.7
	DC-HSDPA	Subtest 1	4132	826.4	0	22.2	13.5
			4183	836.6		22.3	13.6
			4233	846.6		22.3	13.7
		Subtest 2	4132	826.4	0	22.2	13.5
			4183	836.6		22.2	13.6
			4233	846.6		22.4	13.7
		Subtest 3	4132	826.4	0.5	21.7	13.0
			4183	836.6		21.7	13.2
			4233	846.6		21.9	13.2
		Subtest 4	4132	826.4	0.5	21.7	13.0
			4183	836.6		21.8	13.1
			4233	846.6		21.9	13.2

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9.3 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 1, 2 and 3

Modulation	Channel bandwidth / Transmission bandwidth (N_{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
64 QAM	≤ 5	≤ 4	≤ 8	≤ 12	≤ 16	≤ 18	≤ 2
64 QAM	> 5	> 4	> 8	> 12	> 16	> 18	≤ 3
256 QAM	≥ 1						≤ 5

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 (subclause)	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	N/A
NS_03	6.6.2.2.1	2, 4,10, 23, 25, 35, 36, 66, 70	3	>5	≤ 1
			5	>6	≤ 1
			10	>6	≤ 1
			15	>8	≤ 1
			20	>10	≤ 1
NS_04	6.6.2.2.2, 6.6.3.3.19	41	5, 10, 15, 20	Table 6.2.4-4, Table 6.2.4-4a	
NS_05	6.6.3.3.1	1	10,15,20	≥ 50 (NOTE1)	≤ 1 (NOTE1)
			15, 20	Table 6.2.4-18 (NOTE2)	
		65 (NOTE 3)	10,15,20	≥ 50	≤ 1 (NOTE 1)
			15,20	Table 6.2.4-18 (NOTE 2)	
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	
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	
NS_11	6.6.2.2.1 6.6.3.3.13	23	1.4, 3, 5, 10, 15, 20	Table 6.2.4-5	
NS_12	6.6.3.3.5	26	1.4, 3, 5, 10, 15	Table 6.2.4-6	
NS_13	6.6.3.3.6	26	5	Table 6.2.4-7	
NS_14	6.6.3.3.7	26	10, 15	Table 6.2.4-8	
NS_15	6.6.3.3.8	26	1.4, 3, 5, 10, 15	Table 6.2.4-9 Table 6.2.4-10	
NS_16	6.6.3.3.9	27	3, 5, 10	Table 6.2.4-11, Table 6.2.4-12, Table 6.2.4-13	
NS_17	6.6.3.3.10	28	5, 10	Table 5.6-1	N/A
NS_18	6.6.3.3.11	28	5	≥ 2	≤ 1
			10, 15, 20	≥ 1	≤ 4
NS_19	6.6.3.3.12	44	10, 15, 20	Table 6.2.4-14	
NS_20	6.2.2 6.6.2.2.1 6.6.3.3.14	23	5, 10, 15, 20	Table 6.2.4-15	
NS_21	6.6.2.2.1 6.6.3.3.15	30	5, 10	Table 6.2.4-16	
NS_22	6.6.3.3.16	42, 43	5, 10, 15, 20	Table 6.2.4-17	
NS_23	6.6.3.3.17	42, 43	5, 10, 15, 20	N/A	
NS_24	6.6.3.3.20	65 (NOTE 4)	5, 10, 15, 20	Table 6.2.4-19	
NS_25	6.6.3.3.21	65 (NOTE 4)	5, 10, 15, 20	Table 6.2.4-20	
NS_26	6.6.3.3.22	68	10, 15	Table 6.2.4-21	
NS_27	6.6.2.2.5, 6.6.3.3.23	48	5, 10, 15, 20	Table 6.2.4-22	
NS_28	6.2.2A, 6.6.3.3.24	46 (NOTE 5)	20	Table 6.2.4-23	
NS_29	6.2.2A, 6.6.2.3.1a, 6.6.3.3.25	46 (NOTE 5)	20	Table 6.2.4-24	
NS_30	6.2.2A, 6.6.3.3.26	46 (NOTE 5)	20	Table 6.2.4-25	
NS_31	6.2.2A, 6.6.3.3.27	46 (NOTE 5)	20	Table 6.2.4-26	
NS_32	-	-	-	-	-
NOTE 1: Applicable when the lower edge of the assigned E-UTRA UL channel bandwidth frequency is larger than or equal to the upper edge of PHS band (1915.7 MHz) + 4 MHz + the channel BW assigned, where channel BW is as defined in subclause 5.6. A-MPR for					

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LTE Band 5 Measured Results

Band	BW (MHz)	Mode	RB Allocation	RB offset	Max. Meas. Avg Pwr (dBm)				Reduced. Meas. Avg Pwr (dBm)			
					MPR	829 MHz	836.5 MHz	844 MHz	MPR	829 MHz	836.5 MHz	844 MHz
LTE Band 5	10	QPSK	1	0	0		23.4		0		14.4	
			1	25	0		23.4		0		14.3	
			1	49	0		23.3		0		14.2	
			25	0	1		22.4		0		14.4	
			25	12	1		22.4		0		14.4	
			25	25	1		22.3		0		14.4	
			50	0	1		22.4		0		14.4	
		16QAM	1	0	1		22.8		0		14.4	
			1	25	1		22.7		0		14.3	
			1	49	1		22.6		0		14.2	
			25	0	2		21.5		0		14.5	
			25	12	2		21.4		0		14.5	
			25	25	2		21.4		0		14.4	
			50	0	2		21.4		0		14.4	
		64QAM	1	0	2		21.6		0		14.6	
			1	25	2		21.5		0		14.5	
			1	49	2		21.4		0		14.4	
			25	0	3		20.6		0		14.5	
			25	12	3		20.5		0		14.5	
			25	25	3		20.5		0		14.5	
			50	0	3		20.5		0		14.5	

Band	BW (MHz)	Mode	RB Allocation	RB offset	Max. Meas. Avg Pwr (dBm)				Reduced. Meas. Avg Pwr (dBm)			
					MPR	826.5 MHz	836.5 MHz	846.5 MHz	MPR	826.5 MHz	836.5 MHz	846.5 MHz
LTE Band 5	5	QPSK	1	0	0	23.5	23.5	23.6	0	14.5	14.5	14.6
			1	12	0	23.4	23.5	23.5	0	14.4	14.4	14.5
			1	24	0	23.4	23.4	23.5	0	14.4	14.4	14.5
			12	0	1	22.5	22.4	22.5	0	14.4	14.4	14.4
			12	7	1	22.5	22.4	22.5	0	14.4	14.4	14.4
			12	13	1	22.4	22.5	22.5	0	14.4	14.4	14.4
			25	0	1	22.5	22.4	22.5	0	14.4	14.4	14.4
		16QAM	1	0	1	23.0	22.6	22.7	0	14.6	14.6	14.5
			1	12	1	22.9	22.5	22.6	0	14.5	14.5	14.5
			1	24	1	22.9	22.5	22.5	0	14.5	14.5	14.4
			12	0	2	21.6	21.5	21.6	0	14.5	14.5	14.5
			12	7	2	21.6	21.6	21.6	0	14.5	14.5	14.5
			12	13	2	21.6	21.6	21.5	0	14.5	14.4	14.5
			25	0	2	21.5	21.5	21.5	0	14.4	14.4	14.4
		64QAM	1	0	2	21.7	21.7	21.7	0	14.6	14.7	14.6
			1	12	2	21.6	21.7	21.5	0	14.6	14.7	14.5
			1	24	2	21.6	21.7	21.5	0	14.5	14.6	14.5
			12	0	3	20.5	20.4	20.6	0	14.4	14.4	14.7
			12	7	3	20.5	20.4	20.7	0	14.4	14.4	14.7
			12	13	3	20.5	20.3	20.6	0	14.4	14.4	14.7
			25	0	3	20.4	20.4	20.6	0	14.4	14.4	14.7

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LTE Band 5 Measured Results (Continued)

Band	BW (MHz)	Mode	RB Allocation	RB offset	Max. Meas. Avg Pwr (dBm)				Reduced. Meas. Avg Pwr (dBm)			
					MPR	825.5 MHz	836.5 MHz	847.5 MHz	MPR	825.5 MHz	836.5 MHz	847.5 MHz
LTE Band 5	3	QPSK	1	0	0	23.5	23.4	23.4	0	14.4	14.3	14.5
			1	8	0	23.6	23.5	23.5	0	14.5	14.4	14.5
			1	14	0	23.5	23.3	23.4	0	14.4	14.3	14.4
			8	0	1	22.5	22.4	22.5	0	14.4	14.4	14.4
			8	4	1	22.5	22.4	22.5	0	14.4	14.4	14.4
			8	7	1	22.5	22.5	22.5	0	14.4	14.4	14.4
			15	0	1	22.5	22.4	22.5	0	14.4	14.4	14.4
		16QAM	1	0	1	22.8	22.4	22.4	0	14.7	14.3	14.3
			1	8	1	22.9	22.3	22.4	0	14.8	14.4	14.4
			1	14	1	22.8	22.2	22.3	0	14.7	14.3	14.3
			8	0	2	21.5	21.6	21.6	0	14.5	14.5	14.5
			8	4	2	21.6	21.6	21.6	0	14.5	14.5	14.6
			8	7	2	21.5	21.6	21.6	0	14.5	14.5	14.5
			15	0	2	21.5	21.5	21.5	0	14.4	14.5	14.5
		64QAM	1	0	2	21.6	21.5	22.0	0	14.6	14.5	14.9
			1	8	2	21.7	21.6	21.9	0	14.6	14.5	14.9
			1	14	2	21.5	21.5	21.8	0	14.5	14.4	14.9
			8	0	3	20.3	20.5	20.6	0	14.3	14.4	14.7
			8	4	3	20.4	20.5	20.7	0	14.4	14.4	14.7
			8	7	3	20.4	20.5	20.7	0	14.3	14.5	14.7
			15	0	3	20.5	20.5	20.6	0	14.4	14.4	14.6

Band	BW (MHz)	Mode	RB Allocation	RB offset	Max. Meas. Avg Pwr (dBm)				Reduced. Meas. Avg Pwr (dBm)			
					MPR	824.7 MHz	836.5 MHz	848.3 MHz	MPR	824.7 MHz	836.5 MHz	848.3 MHz
LTE Band 5	1.4	QPSK	1	0	0	23.4	23.4	23.3	0	14.3	14.3	14.5
			1	3	0	23.4	23.4	23.4	0	14.3	14.3	14.5
			1	5	0	23.4	23.4	23.3	0	14.3	14.3	14.5
			3	0	0	23.4	23.3	23.3	0	14.3	14.3	14.5
			3	1	0	23.4	23.4	23.4	0	14.4	14.3	14.6
			3	3	0	23.5	23.4	23.4	0	14.4	14.3	14.6
			6	0	1	22.4	22.4	22.4	0	14.3	14.3	14.5
		16QAM	1	0	1	22.8	22.4	22.5	0	14.6	14.4	14.6
			1	3	1	22.8	22.5	22.5	0	14.7	14.5	14.6
			1	5	1	22.7	22.5	22.4	0	14.6	14.4	14.5
			3	0	1	22.6	22.4	22.4	0	14.5	14.4	14.7
			3	1	1	22.6	22.4	22.4	0	14.5	14.4	14.8
			3	3	1	22.6	22.4	22.4	0	14.6	14.4	14.8
			6	0	2	21.3	21.5	21.5	0	14.2	14.5	14.7
		64QAM	1	0	2	21.5	21.4	22.0	0	14.6	14.5	14.6
			1	3	2	21.5	21.5	22.0	0	14.7	14.5	14.7
			1	5	2	21.5	21.3	21.8	0	14.6	14.5	14.6
			3	0	3	21.3	21.4	21.8	0	14.6	14.2	14.6
			3	1	3	21.3	21.5	21.8	0	14.6	14.3	14.7
			3	3	3	21.3	21.4	21.8	0	14.6	14.3	14.7
			6	0	3	20.4	20.6	20.4	0	14.3	14.4	14.8

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

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LTE Band 12 Measured Results

Band	BW (MHz)	Mode	RB Allocation	RB offset	Max. Meas. Avg Pwr (dBm)				Reduced. Meas. Avg Pwr (dBm)			
					MPR	704 MHz	707.5 MHz	711 MHz	MPR	704 MHz	707.5 MHz	711 MHz
LTE Band 12	10	QPSK	1	0	0		22.4		0		12.9	
			1	25	0		22.3		0		12.8	
			1	49	0		22.2		0		12.7	
			25	0	1		21.4		0		12.9	
			25	12	1		21.4		0		12.8	
			25	25	1		21.3		0		12.8	
			50	0	1		21.4		0		12.8	
		16QAM	1	0	1		21.4		0		12.8	
			1	25	1		21.3		0		12.7	
			1	49	1		21.2		0		12.6	
			25	0	2		20.4		0		12.9	
			25	12	2		20.4		0		12.9	
			25	25	2		20.3		0		12.8	
			50	0	2		20.4		0		12.9	
		64QAM	1	0	2		20.7		0		13.1	
			1	25	2		20.6		0		13.0	
			1	49	2		20.5		0		12.9	
			25	0	3		19.5		0		12.9	
			25	12	3		19.4		0		12.9	
			25	25	3		19.3		0		12.8	
			50	0	3		19.4		0		12.8	

Band	BW (MHz)	Mode	RB Allocation	RB offset	Max. Meas. Avg Pwr (dBm)				Reduced. Meas. Avg Pwr (dBm)			
					MPR	701.5 MHz	707.5 MHz	713.5 MHz	MPR	701.5 MHz	707.5 MHz	713.5 MHz
LTE Band 12	5	QPSK	1	0	0	22.2	22.5	22.6	0	12.6	12.9	13.0
			1	12	0	22.1	22.4	22.4	0	12.5	12.8	13.0
			1	24	0	22.1	22.4	22.4	0	12.5	12.8	12.9
			12	0	1	21.1	21.4	21.5	0	12.6	12.8	13.0
			12	7	1	21.2	21.4	21.4	0	12.6	12.8	13.0
			12	13	1	21.1	21.3	21.4	0	12.5	12.8	12.9
			25	0	1	21.1	21.3	21.4	0	12.6	12.8	13.0
		16QAM	1	0	1	21.7	21.6	21.6	0	13.1	13.0	13.1
			1	12	1	21.6	21.5	21.5	0	13.1	13.0	13.1
			1	24	1	21.6	21.5	21.5	0	13.0	12.9	13.0
			12	0	2	20.3	20.5	20.5	0	12.8	12.9	13.1
			12	7	2	20.3	20.5	20.5	0	12.8	12.9	13.1
			12	13	2	20.3	20.4	20.4	0	12.7	12.9	13.0
			25	0	2	20.2	20.4	20.4	0	12.6	12.8	12.9
		64QAM	1	0	2	20.4	20.3	20.8	0	12.9	12.8	13.2
			1	12	2	20.4	20.3	20.7	0	12.9	12.7	13.2
			1	24	2	20.3	20.2	20.7	0	12.8	12.7	13.1
			12	0	3	19.1	19.4	19.6	0	12.5	12.9	13.0
			12	7	3	19.1	19.4	19.6	0	12.5	12.8	13.0
			12	13	3	19.1	19.4	19.5	0	12.5	12.8	13.0
			25	0	3	19.1	19.3	19.5	0	12.5	12.8	12.9

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LTE Band 12 Measured Results (Continued)

Band	BW (MHz)	Mode	RB Allocation	RB offset	Max. Meas. Avg Pwr (dBm)				Reduced. Meas. Avg Pwr (dBm)			
					MPR	700.5 MHz	707.5 MHz	714.5 MHz	MPR	700.5 MHz	707.5 MHz	714.5 MHz
LTE Band 12	3	QPSK	1	0	0	22.2	22.3	22.5	0	12.6	12.8	12.8
			1	8	0	22.3	22.4	22.5	0	12.7	12.9	12.9
			1	14	0	22.1	22.3	22.4	0	12.6	12.8	12.8
			8	0	1	21.1	21.3	21.5	0	12.6	12.8	12.8
			8	4	1	21.1	21.4	21.5	0	12.6	12.8	12.8
			8	7	1	21.1	21.4	21.5	0	12.6	12.9	12.8
			15	0	1	21.1	21.4	21.5	0	12.6	12.8	12.8
		16QAM	1	0	1	21.5	21.3	21.5	0	13.0	12.7	12.7
			1	8	1	21.5	21.4	21.6	0	13.0	12.8	12.8
			1	14	1	21.5	21.2	21.4	0	12.9	12.6	12.7
			8	0	2	20.2	20.5	20.5	0	12.7	12.9	12.9
			8	4	2	20.2	20.5	20.6	0	12.7	12.9	12.9
			8	7	2	20.2	20.5	20.6	0	12.6	12.9	12.9
			15	0	2	20.2	20.4	20.5	0	12.6	12.9	12.9
		64QAM	1	0	2	20.2	20.6	20.7	0	12.6	13.1	13.2
			1	8	2	20.3	20.7	20.7	0	12.7	13.1	13.2
			1	14	2	20.2	20.6	20.6	0	12.6	13.0	13.0
			8	0	3	19.1	19.4	19.4	0	12.6	12.8	12.9
			8	4	3	19.2	19.4	19.4	0	12.6	12.9	12.9
			8	7	3	19.1	19.4	19.4	0	12.6	12.9	12.9
			15	0	3	19.1	19.3	19.5	0	12.6	12.8	12.9

Band	BW (MHz)	Mode	RB Allocation	RB offset	Max. Meas. Avg Pwr (dBm)				Reduced. Meas. Avg Pwr (dBm)			
					MPR	699.7 MHz	707.5 MHz	715.3 MHz	MPR	699.7 MHz	707.5 MHz	715.3 MHz
LTE Band 12	1.4	QPSK	1	0	0	21.9	22.3	22.5	0	12.4	12.7	12.9
			1	3	0	22.0	22.4	22.5	0	12.5	12.8	13.0
			1	5	0	21.9	22.3	22.5	0	12.4	12.7	12.9
			3	0	0	21.9	22.4	22.5	0	12.4	12.7	13.0
			3	1	0	22.0	22.4	22.5	0	12.4	12.8	13.0
			3	3	0	22.0	22.4	22.5	0	12.4	12.8	13.0
			6	0	1	21.0	21.3	21.5	0	12.4	12.7	13.0
		16QAM	1	0	1	21.0	21.7	21.5	0	12.6	12.7	13.3
			1	3	1	21.1	21.7	21.6	0	12.6	12.8	13.3
			1	5	1	21.0	21.6	21.6	0	12.5	12.7	13.3
			3	0	1	21.2	21.5	21.5	0	12.5	12.9	13.1
			3	1	1	21.2	21.5	21.6	0	12.5	12.9	13.1
			3	3	1	21.2	21.5	21.6	0	12.5	13.0	13.1
			6	0	2	20.1	20.2	20.6	0	12.6	12.9	12.8
		64QAM	1	0	2	20.1	20.4	20.8	0	12.8	12.9	13.0
			1	3	2	20.1	20.4	20.9	0	12.9	12.9	13.1
			1	5	2	20.1	20.3	20.7	0	12.8	12.9	12.9
			3	0	3	19.9	20.4	20.7	0	12.7	12.7	13.0
			3	1	3	19.9	20.5	20.8	0	12.8	12.7	13.1
			3	3	3	19.9	20.4	20.8	0	12.8	12.7	13.1
			6	0	3	19.0	19.5	19.4	0	12.4	12.8	13.2

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

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LTE Band 17 Measured Results

Band	BW (MHz)	Mode	RB Allocation	RB offset	Max. Meas. Avg Pwr (dBm)				Reduced. Meas. Avg Pwr (dBm)			
					MPR	709 MHz	710 MHz	711 MHz	MPR	709 MHz	710 MHz	711 MHz
LTE Band 17	10	QPSK	1	0	0		22.4		0		15.8	
			1	25	0		22.3		0		15.8	
			1	49	0		22.2		0		15.7	
			25	0	1		21.4		0		15.9	
			25	12	1		21.4		0		15.9	
			25	25	1		21.3		0		15.8	
			50	0	1		21.4		0		15.8	
		16QAM	1	0	1		21.3		0		15.8	
			1	25	1		21.2		0		15.7	
			1	49	1		21.1		0		15.6	
			25	0	2		20.4		0		15.9	
			25	12	2		20.4		0		15.8	
			25	25	2		20.4		0		15.8	
			50	0	2		20.4		0		15.8	
		64QAM	1	0	2		20.7		0		16.2	
			1	25	2		20.6		0		16.0	
			1	49	2		20.5		0		15.9	
			25	0	3		19.4		0		15.9	
			25	12	3		19.4		0		15.9	
			25	25	3		19.3		0		15.8	
			50	0	3		19.4		0		15.8	

Band	BW (MHz)	Mode	RB Allocation	RB offset	Max. Meas. Avg Pwr (dBm)				Reduced. Meas. Avg Pwr (dBm)			
					MPR	706.5 MHz	710 MHz	713.5 MHz	MPR	706.5 MHz	710 MHz	713.5 MHz
LTE Band 17	5	QPSK	1	0	0		22.4		0		15.9	
			1	12	0		22.4		0		15.8	
			1	24	0		22.3		0		15.8	
			12	0	1		21.4		0		15.8	
			12	7	1		21.3		0		15.8	
			12	13	1		21.3		0		15.8	
			25	0	1		21.4		0		15.8	
		16QAM	1	0	1		21.5		0		16.0	
			1	12	1		21.5		0		15.9	
			1	24	1		21.4		0		15.9	
			12	0	2		20.4		0		15.9	
			12	7	2		20.4		0		15.9	
			12	13	2		20.4		0		15.9	
			25	0	2		20.4		0		15.8	
		64QAM	1	0	2		20.6		0		16.1	
			1	12	2		20.5		0		16.1	
			1	24	2		20.5		0		16.1	
			12	0	3		19.4		0		15.8	
			12	7	3		19.4		0		15.8	
			12	13	3		19.4		0		15.8	
			25	0	3		19.3		0		15.8	

Note(s):

10/5MHz 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

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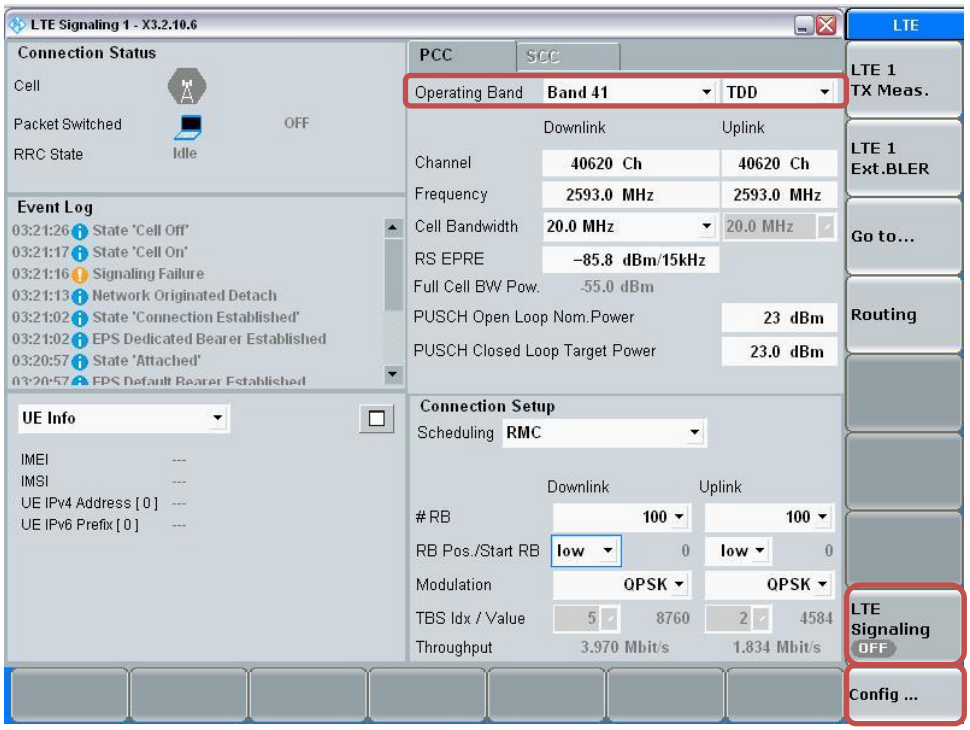
LTE Band TDD Measured Results

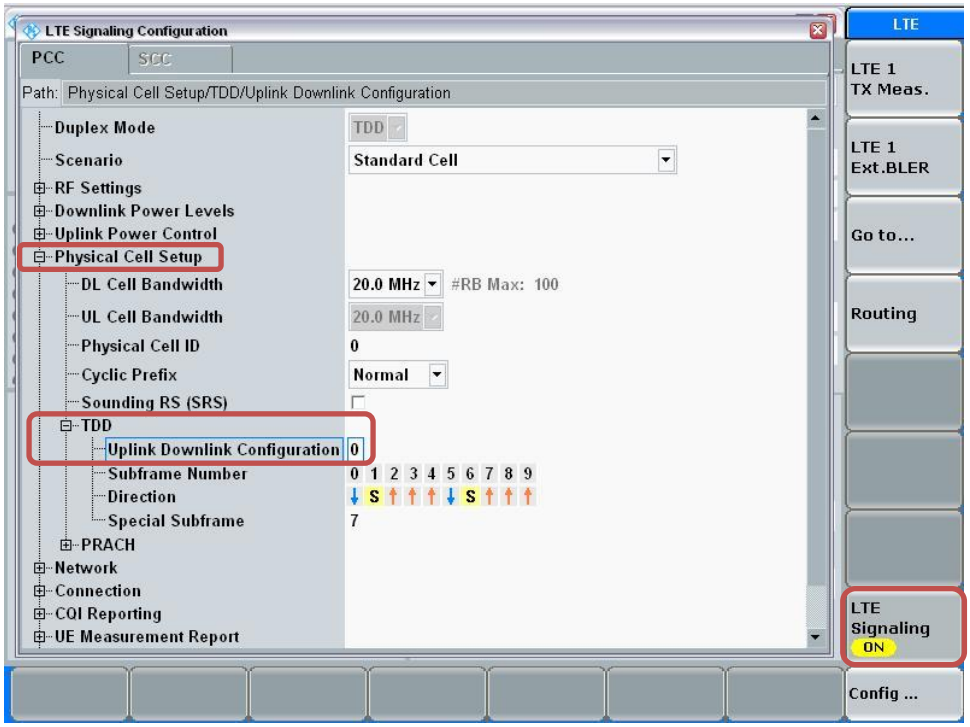
Procedure used to establish SAR test signal for LTE TDD Band

Set to CMW-500 with following parameters:

- Turn the LTE Signaling off using “ON | OFF” key
- Operating Band: Select Band 41 and TDD
- Go to “Config….”



- Go to “Physical Cell Setup”
- Select “TDD” and Set “Uplink Downlink Configuration” to “0”
- Turn the cell on using “ON | OFF” key



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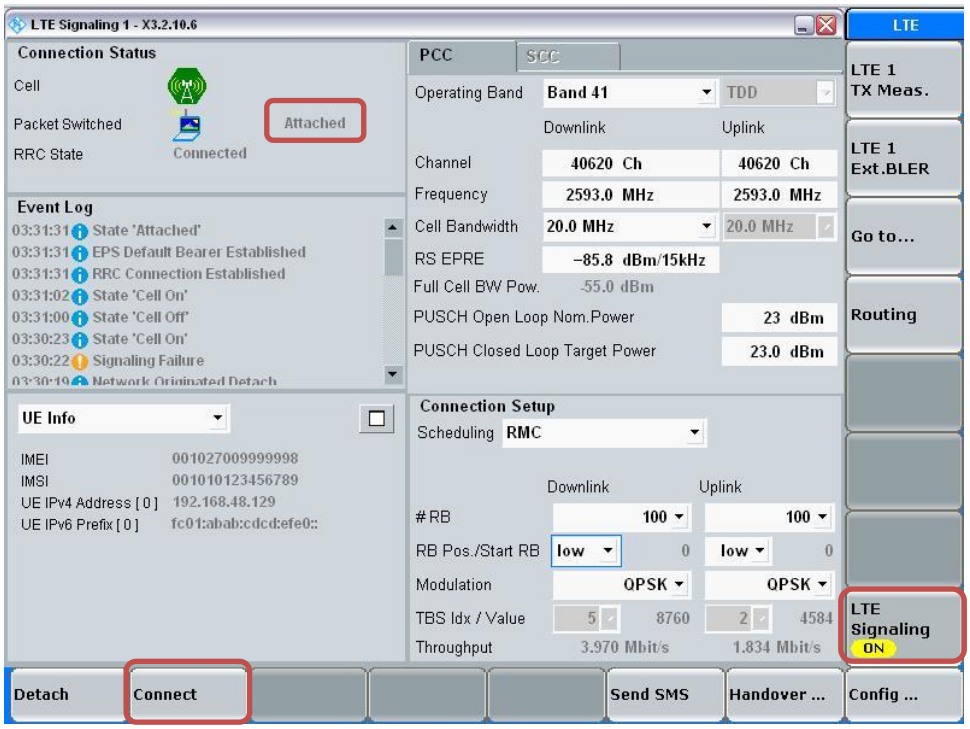
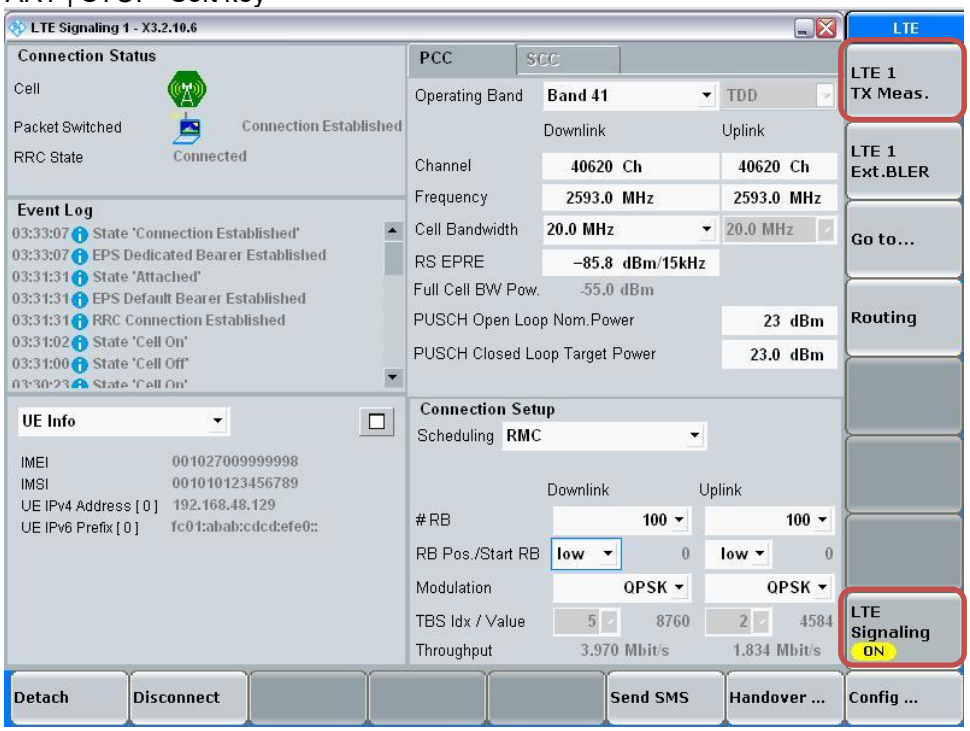
Connect to EUT

- Turn the cell on using “ON | OFF” key
- After EUT is Attached
- Select “Connect”



Max Power Setting

- Select “LTE 1 TX Meas.”
- Press “RESTART | STOP” Soft key



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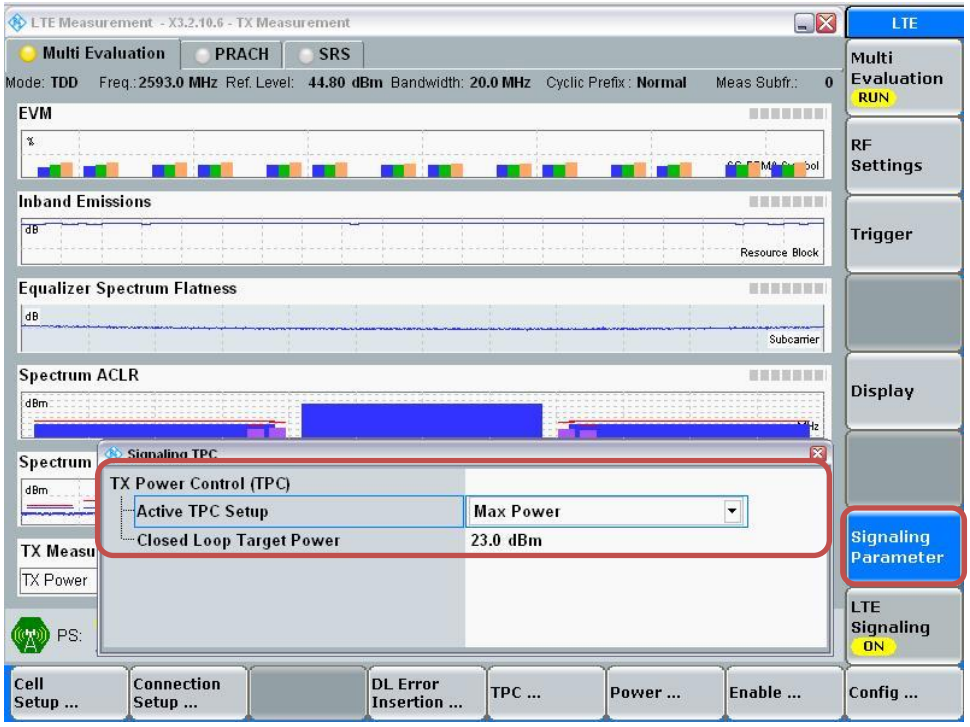
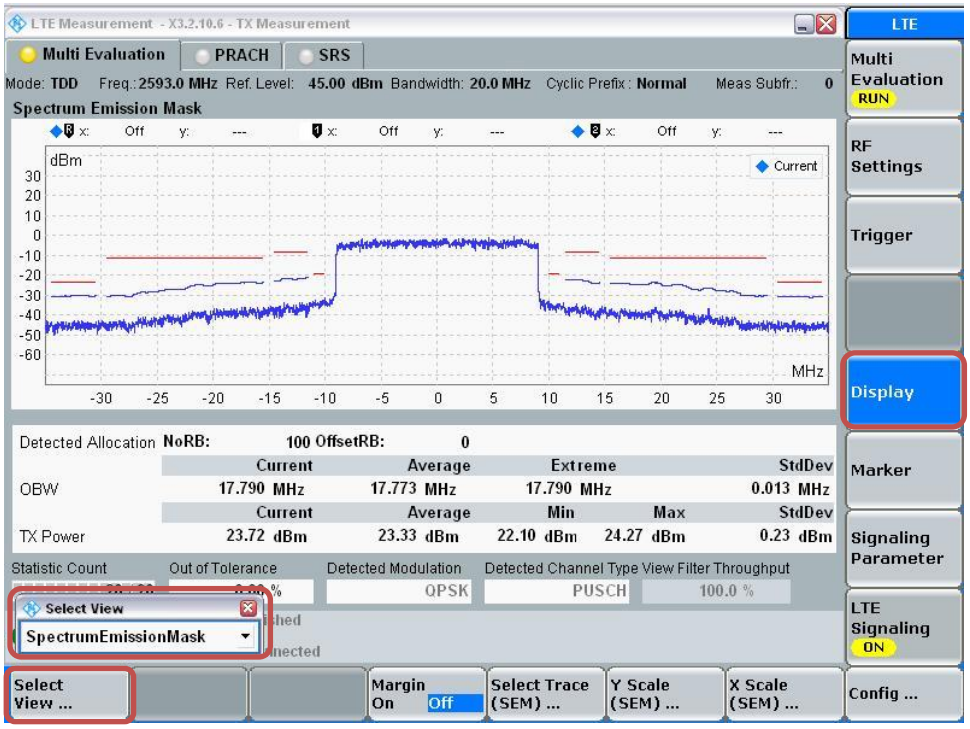
- Select “Signaling Parameter”
- Select “TX Power Control (TPC)” > Select “Active TPC Setup” to “Max Power” > Set “Closed Loop Target Power” to “23 dBm”



View TX Power

- Go to “Display”
- Select “Select View…”
- Select “Spectrum Emission Mask”



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Max power results

LTE Band 41 Measured Results

Band	BW (MHz)	Mode	RB Allocation	RB offset	MPR	Max. Meas. Avg Pwr (dBm)				
						2506 MHz	2549.5 MHz	2593 MHz	2636.5 MHz	2680 MHz
LTE Band 41	20	QPSK	1	0	0	23.7	23.9	24.2	24.1	23.9
			1	49	0	23.5	23.8	24.0	23.9	23.7
			1	99	0	23.4	23.7	23.9	23.8	23.6
			50	0	1	22.5	22.9	23.1	23.0	22.8
			50	24	1	22.5	22.8	23.1	22.9	22.7
			50	50	1	22.4	22.8	23.0	22.8	22.6
			100	0	1	22.5	22.8	23.1	22.9	22.7
		16QAM	1	0	1	22.4	23.0	23.2	22.9	23.0
			1	49	1	22.3	22.8	23.0	22.7	22.7
			1	99	1	22.2	22.8	22.9	22.6	22.6
			50	0	2	21.6	21.9	22.1	22.0	21.8
			50	24	2	21.5	21.8	22.0	21.9	21.8
			50	50	2	21.4	21.8	22.0	21.9	21.7
			100	0	2	21.5	21.8	22.0	21.9	21.7
		64QAM	1	0	2	21.6	21.6	21.9	22.0	22.0
			1	49	2	21.4	21.9	21.7	21.8	21.8
			1	99	2	21.3	21.8	21.6	21.7	21.7
			50	0	3	20.7	20.9	21.3	21.0	20.9
			50	24	3	20.6	20.9	21.2	21.0	20.8
			50	50	3	20.6	20.9	21.1	20.9	20.7
			100	0	3	20.6	21.0	21.1	20.9	20.8
Band	BW (MHz)	Mode	RB Allocation	RB offset	MPR	Max. Meas. Avg Pwr (dBm)				
						2506 MHz	2549.5 MHz	2593 MHz	2636.5 MHz	2680 MHz
LTE Band 41	15	QPSK	1	0	0	23.6	23.9	24.1	24.1	23.8
			1	36	0	23.4	23.7	24.0	23.9	23.6
			1	74	0	23.4	23.7	23.9	23.8	23.6
			36	0	1	22.5	22.8	23.1	22.9	22.7
			36	18	1	22.5	22.8	23.1	22.9	22.7
			36	37	1	22.4	22.7	23.0	22.8	22.6
			75	0	1	22.5	22.8	23.0	22.9	22.6
		16QAM	1	0	1	22.5	22.9	23.1	23.0	22.8
			1	36	1	22.4	22.8	22.9	22.8	22.6
			1	74	1	22.3	22.7	22.8	22.7	22.5
			36	0	2	21.5	21.8	22.1	21.9	21.7
			36	18	2	21.5	21.8	22.1	21.9	21.7
			36	37	2	21.4	21.7	22.0	21.8	21.6
			75	0	2	21.5	21.8	22.1	21.9	21.7
		64QAM	1	0	2	21.9	21.8	21.9	21.9	21.7
			1	36	2	21.8	21.7	21.6	21.6	21.6
			1	74	2	21.7	21.6	21.6	21.6	21.4
			36	0	3	20.7	20.9	21.3	21.1	20.8
			36	18	3	20.6	20.9	21.2	21.1	20.7
			36	37	3	20.6	20.8	21.2	21.0	20.7
			75	0	3	20.6	20.9	21.1	21.0	20.8

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LTE Band 41 Measured Results (Continued)

Band	BW (MHz)	Mode	RB Allocation	RB offset	MPR	Max. Meas. Avg Pwr (dBm)				
						2506 MHz	2549.5 MHz	2593 MHz	2636.5 MHz	2680 MHz
LTE Band 41	10	QPSK	1	0	0	23.5	23.8	24.1	24.0	23.7
			1	25	0	23.5	23.7	24.0	23.9	23.6
			1	49	0	23.4	23.7	23.9	23.8	23.5
			25	0	1	22.5	22.8	23.0	22.9	22.7
			25	12	1	22.5	22.8	23.1	22.9	22.7
			25	25	1	22.4	22.8	23.0	22.8	22.6
			50	0	1	22.5	22.8	23.0	22.9	22.6
		16QAM	1	0	1	22.5	22.9	23.0	22.9	22.9
			1	25	1	22.4	22.8	22.9	22.8	22.8
			1	49	1	22.3	22.8	22.8	22.7	22.7
			25	0	2	21.5	21.8	22.1	21.9	21.7
			25	12	2	21.5	21.8	22.0	21.9	21.7
			25	25	2	21.4	21.8	22.0	21.8	21.6
			50	0	2	21.5	21.8	22.0	21.9	21.7
		64QAM	1	0	2	21.9	22.0	21.8	21.8	21.9
			1	25	2	21.8	21.9	21.7	21.7	21.8
			1	49	2	21.7	21.8	21.7	21.6	21.7
			25	0	3	20.6	20.8	21.2	21.0	20.7
			25	12	3	20.5	20.8	21.2	21.0	20.7
			25	25	3	20.5	20.8	21.2	20.9	20.7
			50	0	3	20.5	20.9	21.1	21.0	20.8

Band	BW (MHz)	Mode	RB Allocation	RB offset	MPR	Max. Meas. Avg Pwr (dBm)				
						2506 MHz	2549.5 MHz	2593 MHz	2636.5 MHz	2680 MHz
LTE Band 41	5	QPSK	1	0	0	24.2	23.9	24.2	24.1	23.9
			1	12	0	24.2	23.9	24.2	24.1	23.8
			1	24	0	24.2	23.9	24.2	24.0	23.8
			12	0	1	22.6	22.9	23.1	22.9	22.8
			12	7	1	22.6	22.9	23.1	22.9	22.8
			12	13	1	22.5	22.9	23.0	22.9	22.7
			25	0	1	23.2	22.9	23.1	23.0	22.8
		16QAM	1	0	1	23.2	22.7	23.3	23.1	22.7
			1	12	1	23.2	22.7	23.3	23.1	22.7
			1	24	1	23.1	22.6	23.2	23.0	22.6
			12	0	2	21.6	21.9	22.2	22.0	21.8
			12	7	2	21.6	22.0	22.2	22.0	21.8
			12	13	2	21.5	21.9	22.1	22.0	21.7
			25	0	2	22.2	21.9	22.2	22.1	21.8
		64QAM	1	0	2	21.9	22.0	21.8	21.7	21.9
			1	12	2	21.9	21.9	21.8	21.7	21.9
			1	24	2	21.8	21.9	21.8	21.6	21.8
			12	0	3	20.6	20.8	21.2	21.0	20.7
			12	7	3	20.6	20.8	21.2	21.0	20.7
			12	13	3	20.6	20.8	21.1	21.0	20.7
			25	0	3	20.5	20.8	21.2	20.9	20.7

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Reduced power results

LTE Band 41 Measured Results

Band	BW (MHz)	Mode	RB Allocation	RB offset	MPR	Reduced. Meas. Avg Pwr (dBm)				
						2506 MHz	2549.5 MHz	2593 MHz	2636.5 MHz	2680 MHz
LTE Band 41	20	QPSK	1	0	0	16.0	16.4	16.6	16.5	16.3
			1	49	0	15.8	16.2	16.4	16.3	16.0
			1	99	0	15.8	16.1	16.3	16.2	15.9
			50	0	0	15.9	16.2	16.5	16.4	16.2
			50	24	0	15.9	16.2	16.4	16.3	16.1
			50	50	0	15.8	16.1	16.4	16.2	16.0
			100	0	0	15.9	16.2	16.5	16.3	16.1
		16QAM	1	0	0	15.8	16.4	16.6	16.4	16.3
			1	49	0	15.7	16.3	16.4	16.1	16.1
			1	99	0	15.5	16.2	16.3	16.0	16.0
			50	0	0	15.9	16.3	16.5	16.4	16.2
			50	24	0	15.9	16.2	16.4	16.4	16.1
			50	50	0	15.8	16.1	16.4	16.3	16.0
			100	0	0	15.9	16.2	16.5	16.3	16.1
		64QAM	1	0	0	16.0	16.3	16.5	16.5	16.3
			1	49	0	15.7	16.2	16.5	16.2	16.1
			1	99	0	15.7	16.1	16.5	16.1	16.0
			50	0	0	16.0	16.3	16.5	16.5	16.2
			50	24	0	15.9	16.2	16.5	16.4	16.1
			50	50	0	15.9	16.2	16.4	16.3	16.0
			100	0	0	15.9	16.3	16.5	16.3	16.1
Band	BW (MHz)	Mode	RB Allocation	RB offset	MPR	Reduced. Meas. Avg Pwr (dBm)				
						2506 MHz	2549.5 MHz	2593 MHz	2636.5 MHz	2680 MHz
LTE Band 41	15	QPSK	1	0	0	15.9	16.2	16.6	16.4	16.2
			1	36	0	15.8	16.1	16.4	16.2	16.0
			1	74	0	15.8	16.0	16.3	16.2	15.9
			36	0	0	15.8	16.2	16.5	16.3	16.1
			36	18	0	15.9	16.1	16.4	16.3	16.0
			36	37	0	15.8	16.1	16.4	16.2	16.0
			75	0	0	15.8	16.1	16.4	16.3	16.0
		16QAM	1	0	0	16.0	16.2	16.5	16.5	16.1
			1	36	0	15.8	16.0	16.3	16.3	15.9
			1	74	0	15.8	16.0	16.3	16.2	15.9
			36	0	0	15.9	16.2	16.5	16.4	16.1
			36	18	0	15.9	16.2	16.4	16.4	16.1
			36	37	0	15.8	16.1	16.4	16.2	16.0
			75	0	0	15.8	16.2	16.4	16.3	16.1
		64QAM	1	0	0	16.2	16.1	16.2	16.7	16.0
			1	36	0	16.1	15.9	16.0	16.5	15.8
			1	74	0	16.0	15.9	15.9	16.5	15.7
			36	0	0	16.0	16.2	16.6	16.4	16.1
			36	18	0	15.9	16.1	16.5	16.4	16.1
			36	37	0	15.9	16.1	16.4	16.3	16.0
			75	0	0	15.9	16.2	16.4	16.4	16.1

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LTE Band 41 Measured Results (Continued)

Band	BW (MHz)	Mode	RB Allocation	RB offset	MPR	Reduced. Meas. Avg Pwr (dBm)				
						2506 MHz	2549.5 MHz	2593 MHz	2636.5 MHz	2680 MHz
LTE Band 41	10	QPSK	1	0	0	15.9	16.1	16.4	16.4	16.1
			1	25	0	15.8	16.1	16.4	16.3	16.0
			1	49	0	15.8	16.1	16.3	16.2	15.9
			25	0	0	15.9	16.2	16.4	16.3	16.1
			25	12	0	15.9	16.2	16.5	16.3	16.1
			25	25	0	15.8	16.1	16.4	16.2	16.0
			50	0	0	15.9	16.2	16.4	16.3	16.0
		16QAM	1	0	0	15.9	16.3	16.4	16.3	16.2
			1	25	0	15.8	16.3	16.3	16.3	16.1
			1	49	0	15.7	16.2	16.3	16.2	16.1
			25	0	0	15.9	16.2	16.5	16.3	16.1
			25	12	0	15.9	16.2	16.5	16.3	16.1
			25	25	0	15.8	16.2	16.4	16.3	16.0
			50	0	0	15.9	16.2	16.4	16.3	16.1
		64QAM	1	0	0	16.2	16.2	16.1	16.6	16.1
			1	25	0	16.0	16.2	16.0	16.5	16.1
			1	49	0	16.0	16.1	15.9	16.5	16.0
			25	0	0	15.9	16.1	16.5	16.3	16.0
			25	12	0	15.9	16.1	16.5	16.3	16.0
			25	25	0	15.8	16.1	16.5	16.2	16.0
			50	0	0	15.8	16.2	16.4	16.3	16.1

Band	BW (MHz)	Mode	RB Allocation	RB offset	MPR	Reduced. Meas. Avg Pwr (dBm)				
						2506 MHz	2549.5 MHz	2593 MHz	2636.5 MHz	2680 MHz
LTE Band 41	5	QPSK	1	0	0	15.8	16.0	16.4	16.2	16.0
			1	12	0	15.8	16.0	16.4	16.2	16.0
			1	24	0	15.7	16.0	16.3	16.2	15.9
			12	0	0	15.8	16.1	16.4	16.3	16.1
			12	7	0	15.8	16.2	16.4	16.3	16.1
			12	13	0	15.8	16.1	16.4	16.3	16.0
			25	0	0	15.8	16.1	16.4	16.3	16.0
		16QAM	1	0	0	15.9	16.1	16.4	16.4	16.0
			1	12	0	15.9	16.1	16.4	16.4	15.9
			1	24	0	15.8	16.0	16.3	16.3	15.9
			12	0	0	15.9	16.2	16.4	16.3	16.1
			12	7	0	15.9	16.2	16.4	16.4	16.1
			12	13	0	15.9	16.2	16.4	16.3	16.0
			25	0	0	15.8	16.2	16.5	16.3	16.1
		64QAM	1	0	0	16.3	16.3	16.1	16.7	16.2
			1	12	0	16.2	16.2	16.1	16.7	16.2
			1	24	0	16.2	16.2	16.1	16.6	16.1
			12	0	0	16.0	16.1	16.5	16.4	16.0
			12	7	0	16.0	16.1	16.4	16.4	16.0
			12	13	0	16.0	16.1	16.4	16.4	16.0
			25	0	0	15.8	16.1	16.5	16.3	16.0

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9.3.1 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 up to four (3) downlinks.

1. Max power condition

2CC	E-UTRA CA configuration (BCS)	Bands			UL					DL							LTE Rel 8 Tx. Power [dBm]	LTE Rel 10 Tx. Power [dBm]	Delta
		PCC	SCC		PCC					PCC			SCC						
		1st	2nd		Mode	BW (MHz)	Channel	Freq. (MHz)	RB/Offset	BW (MHz)	Channel	Freq. (MHz)	BW (MHz)	Channel	Freq. (MHz)				
	41A-41A	41A	41A		QPSK	20	40620	2593.0	1/0	20	40620	2593.0	20	41490	2680.0		24.21	24.25	0.04
	41C	41C	41C		QPSK	20	40620	2593.0	1/0	20	40620	2593.0	20	40818	2612.8		24.21	24.18	-0.03

3CC	E-UTRA CA configuration (BCS)	Bands				UL					DL									LTE Rel 8 Tx. Power [dBm]	LTE Rel 10 Tx. Power [dBm]	Delta
		PCC	SCC	TCC		PCC					PCC			SCC			TCC					
		1st	2nd	3rd		Mode	BW (MHz)	Channel	Freq. (MHz)	RB/Offset	BW (MHz)	Channel	Freq. (MHz)	BW (MHz)	Channel	Freq. (MHz)	BW (MHz)	Channel	Freq. (MHz)			
	41D	41D	41D	41D		QPSK	20	40620	2593.0	1/0	20	40620	2593.0	20	40818	2612.8	20	41016	2632.6		24.21	24.20	-0.01

2. Reduced power condition

2CC	E-UTRA CA configuration (BCS)	Bands			UL					DL							LTE Rel 8 Tx. Power [dBm]	LTE Rel 10 Tx. Power [dBm]	Delta
		PCC	SCC		PCC					PCC			SCC						
		1st	2nd		Mode	BW (MHz)	Channel	Freq. (MHz)	RB/Offset	BW (MHz)	Channel	Freq. (MHz)	BW (MHz)	Channel	Freq. (MHz)				
	41A-41A	41A	41A		16QAM	20	40620	2593.0	1/0	20	40620	2593.0	20	41490	2680.0		16.60	16.58	-0.02
	41C	41C	41C		16QAM	20	40620	2593.0	1/0	20	40620	2593.0	20	40818	2612.8		16.60	16.56	-0.04

3CC	E-UTRA CA configuration (BCS)	Bands				UL					DL									LTE Rel 8 Tx. Power [dBm]	LTE Rel 10 Tx. Power [dBm]	Delta
		PCC	SCC	TCC		PCC					PCC			SCC			TCC					
		1st	2nd	3rd		Mode	BW (MHz)	Channel	Freq. (MHz)	RB/Offset	BW (MHz)	Channel	Freq. (MHz)	BW (MHz)	Channel	Freq. (MHz)	BW (MHz)	Channel	Freq. (MHz)			
	41D	41D	41D	41D		16QAM	20	40620	2593.0	1/0	20	40620	2593.0	20	40818	2612.8	20	41016	2632.6		16.60	16.61	0.01

Note:

1. Per KDB 941225 D05A LTE Rel. 10 KDB Inquiry Sheet: SAR is excluded for Carrier Aggregation when measured power does not exceed LTE Release 8 by more than a 1/4 dBm.
2. When the same frequency band is used for both contiguous and non-contiguous in DL CA Intra band, power was measured using the configuration with the largest aggregated bandwidth and maximum output power among the contiguous and non-contiguous in DL CA Intra band configurations.

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9.4 Wi-Fi 2.4GHz (DTS Band)

Measured Results

Antenna	Band (GHz)	Mode	Data Rate	Ch #	Freq. (MHz)	Max Pwr.		
						Avg Pwr (dBm)	Max Output Power (dBm)	SAR Test (Yes/No)
Ant.1	2.4	802.11b	1 Mbps	1	2412	12.3	13.0	Yes
				6	2437	12.2		
				11	2462	12.7		
		802.11g	6 Mbps	1	2412	12.1	13.0	No
				6	2437	12.0		
				11	2462	12.3		
		802.11n (HT20)	6.5 Mbps	1	2412	11.9	13.0	No
				6	2437	11.8		
				11	2462	12.2		

Antenna	Band (GHz)	Mode	Data Rate	Ch #	Freq. (MHz)	Max Pwr.		
						Avg Pwr (dBm)	Max Output Power (dBm)	SAR Test (Yes/No)
Ant.2	2.4	802.11b	1 Mbps	1	2412	12.5	13.0	Yes
				6	2437	12.8		
				11	2462	13.0		
		802.11g	6 Mbps	1	2412	12.4	13.0	No
				6	2437	12.6		
				11	2462	12.8		
		802.11n (HT20)	6.5 Mbps	1	2412	12.2	13.0	No
				6	2437	12.4		
				11	2462	12.7		

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.

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9.5 Bluetooth

Average Power Measured Results

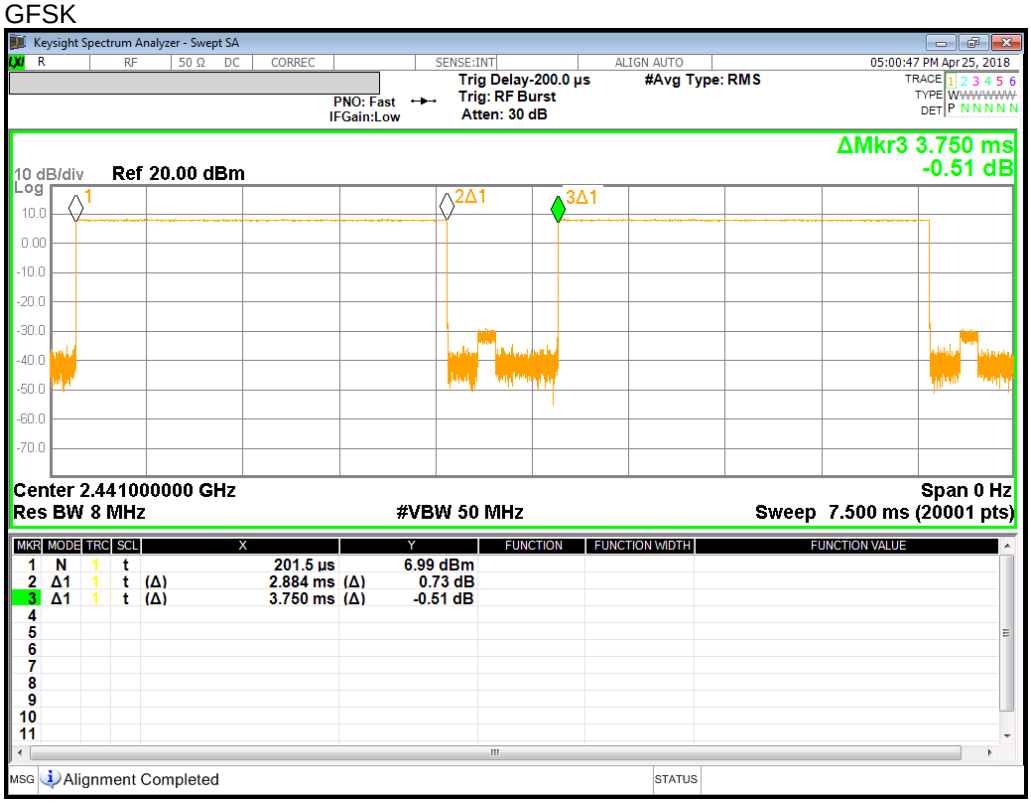
Band (GHz)	Mode	Ch #	Freq. (MHz)	Meas. Avg Pwr (dBm)
2.4	GFSK	0	2402	9.0
		39	2441	8.9
		78	2480	9.3
	EDR, π/4 DQPSK	0	2402	8.5
		39	2441	8.5
		78	2480	8.8
	EDR, 8-DPSK	0	2402	8.5
		39	2441	8.5
		78	2480	8.9
	LE, GFSK, 1M	0	2402	2.1
		19	2440	2.1
		39	2480	3.1
	LE, GFSK, 2M	0	2402	1.8
		19	2440	1.9
		39	2480	2.9

Duty Factor Measured Results

Mode	Type	T on (ms)	Period (ms)	Duty Cycle	Crest Factor (1/duty cycle)
GFSK	DH5	2.884	3.750	76.9%	1.30

Duty Cycle plots

GFSK



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9.6 Wi-Fi 5GHz (U-NII Bands)

Measured Results

Band (GHz)	Mode	Data Rate	Ch #	Freq. (MHz)	**Ant.1** Max Pwr.			**Ant.2** Max Pwr.		
					Avg Pwr (dBm)	Max Output Power (dBm)	SAR Test (Yes/No)	Avg Pwr (dBm)	Max Output Power (dBm)	SAR Test (Yes/No)
5.3 (U-NII 2A)	802.11a	6 Mbps	52	5260	Not Required	10.0	No	Not Required	10.0	No
			56	5280						
			60	5300						
			64	5320						
	802.11n (HT20)	6.5 Mbps	52	5260		10.0	No		10.0	No
			56	5280						
			60	5300						
			64	5320						
	802.11n (HT40)	13.5 Mbps	54	5270		10.0	No		10.0	No
			62	5310						
	802.11ac (VHT20)	6.5 Mbps	52	5260		10.0	No		10.0	No
			56	5280						
			60	5300						
			64	5320						
	802.11ac (VHT40)	13.5 Mbps	54	5270		10.0	No		10.0	No
			62	5310						
	802.11ac (VHT80)	29.3 Mbps	58	5290	9.3	10.0	Yes	9.2	10.0	Yes
5.5 (U-NII 2C)	802.11a	6 Mbps	100	5500	Not Required	10.0	No	Not Required	10.0	No
			120	5600						
			124	5620						
			144	5720						
	802.11n (HT20)	6.5 Mbps	100	5500		10.0	No		10.0	No
			120	5600						
			124	5620						
			144	5720						
	802.11n (HT40)	13.5 Mbps	102	5510		10.0	No		10.0	No
			118	5590						
			126	5630						
			142	5710						
	802.11ac (VHT20)	6.5 Mbps	100	5500		10.0	No		10.0	No
			120	5600						
			124	5620						
			144	5720						
	802.11ac (VHT40)	13.5 Mbps	102	5510		10.0	No		10.0	No
			118	5590						
			126	5630						
			142	5710						
	802.11ac (VHT80)	29.3 Mbps	106	5530	9.6	10.0	Yes	9.2	10.0	Yes
			122	5610	9.5			9.1		
			138	5690	9.9			9.0		
5.8 (U-NII 3)	802.11a	6 Mbps	149	5745	Not Required	10.0	Yes	Not Required	10.0	No
			157	5785						
			165	5825						
	802.11n (HT20)	6.5 Mbps	149	5745		10.0	No		10.0	No
			157	5785						
			165	5825						
	802.11n (HT40)	13.5 Mbps	151	5755		10.0	No		10.0	No
			159	5795						
	802.11ac (VHT20)	6.5 Mbps	149	5745		10.0	No		10.0	No
			157	5785						
			165	5825						
	802.11ac (VHT40)	13.5 Mbps	151	5755		10.0	No		10.0	No
			159	5795						
	802.11ac (VHT80)	29.3 Mbps	155	5775	9.6	10.0	Yes	9.1	10.0	Yes

Note(s):

1. For "Not required", SAR Test reduction was applied from KDB 248227 guidance, Sec. 2.1, b), 1) when the same maximum power is specified for multiple transmission modes in a frequency band, the largest channel bandwidth, lowest order modulation, lowest data rate and lowest order 802.11a/g/n/ac mode is used for SAR measurement, on the highest measured output power channel in the initial test configuration, for each frequency band. Additional output power
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.

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10 Measured and Reported (Scaled) SAR Results

SAR Test Reduction criteria are as follows:

Reported SAR(W/kg) for WWAN= Measured SAR *Tune-up Scaling Factor

Reported SAR(W/kg) for Wi-Fi and Bluetooth= Measured SAR * Tune-up scaling factor * Duty Cycle scaling factor

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 must be measured with the maximum TTI(transmit time interval) supported by the device in each LTE configuration.
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.
- For LTE bands that do not support at least three non-overlapping channels in certain channel bandwidths, test the available non-overlapping channels instead. 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; therefore, the requirement for H, M and L channels may not fully apply.

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KDB 248227 D01 SAR meas for 802.11:

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*.

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10.1 GSM 850

RF Exposure Conditions	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	GPRS 3 Slots	OFF	16	Rear	190	836.6	29.5	28.8	0.493	0.575	
			14	Edge 1	128	824.2	29.5	28.9	1.110	1.282	1
					190	836.6	29.5	28.8	1.040	1.213	
					251	848.8	29.5	29.1	1.090	1.193	
			0	Edge 2	190	836.6	29.5	28.8	0.140	0.163	
			0	Rear 4	190	836.6	29.5	28.8	0.116	0.135	
	GPRS 2 Slots	On	0	Rear	190	836.6	21.5	20.2	0.418	0.563	
				Edge 1	190	836.6	21.5	20.2	0.455	0.613	

10.2 GSM 1900

RF Exposure Conditions	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	GPRS 2 Slots	OFF	16	Rear	661	1880.0	28.0	26.8	0.224	0.294	
			14	Edge 1	661	1880.0	28.0	26.8	0.271	0.356	
			0	Edge 2	661	1880.0	28.0	26.8	0.231	0.303	
			0	Rear 4	661	1880.0	28.0	26.8	0.122	0.160	
	GPRS 2 Slots	On	0	Rear	512	1850.2	21.0	19.7	0.862	1.162	
					661	1880.0	21.0	19.9	0.941	1.201	2
					810	1909.8	21.0	20.0	0.834	1.062	
				Edge 1	512	1850.2	21.0	19.7	0.660	0.890	
					661	1880.0	21.0	19.9	0.763	0.974	
					810	1909.8	21.0	20.0	0.696	0.886	

10.3 W-CDMA Band II

RF Exposure Conditions	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	Off	16	Rear	9400	1880.0	24.0	22.2	0.427	0.643	
			14	Edge 1	9400	1880.0	24.0	22.2	0.480	0.723	
			0	Edge 2	9400	1880.0	24.0	22.2	0.452	0.681	
			0	Edge 4	9400	1880.0	24.0	22.2	0.276	0.416	
	Rel 99 RMC	On	0	Rear	9262	1852.4	14.0	13.2	0.924	1.101	
					9400	1880.0	14.0	13.5	0.987	1.120	
					9538	1907.6	14.0	13.6	1.070	1.176	3
				Edge 1	9262	1852.4	14.0	13.2	0.757	0.902	
					9400	1880.0	14.0	13.5	0.815	0.925	
					9538	1907.6	14.0	13.6	0.898	0.987	

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10.4 W-CDMA Band V

RF Exposure Conditions	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	Off	16	Rear	4183	836.6	23.8	23.2	0.651	0.742	
			14	Edge 1	4132	826.4	23.8	23.2	1.170	1.339	4
					4183	836.6	23.8	23.2	1.150	1.311	
					4233	846.6	23.8	23.3	1.160	1.296	
			0	Edge 2	4183	836.6	23.8	23.2	0.135	0.154	
			0	Edge 4	4183	836.6	23.8	23.2	0.127	0.145	
	Rel 99 RMC	On	0	Rear	4132	826.4	16.0	14.5	0.608	0.857	
					4183	836.6	16.0	14.7	0.611	0.832	
					4233	846.6	16.0	14.7	0.614	0.828	
				Edge 1	4183	836.6	16.0	14.7	0.585	0.796	

10.5 LTE Band 5 (10MHz Bandwidth)

RF Exposure Conditions	Mode	PWR Back-off	Dist. (mm)	Test Position	Ch #.	Freq. (MHz)	RB Allocation	RB offest	Power (dBm)		1-g SAR (W/kg)		Plot No.
									Tune-up limit	Meas.	Meas.	Scaled	
Standalone	QPSK	Off	16	Rear	20525	836.5	1	0	24.0	23.4	0.660	0.751	
							25	0	23.0	22.4	0.530	0.603	
			14	Edge 1	20525	836.5	1	0	24.0	23.4	1.090	1.241	5
							25	0	23.0	22.4	0.867	0.987	
							50	0	23.0	22.4	0.856	0.984	
			0	Edge 2	20525	836.5	1	0	24.0	23.4	0.179	0.204	
							25	0	23.0	22.4	0.136	0.155	
			0	Edge 4	20525	836.5	1	0	24.0	23.4	0.165	0.188	
							25	0	23.0	22.4	0.122	0.139	
	QPSK	On	0	Rear	20525	836.5	1	0	15.0	14.4	0.596	0.685	
							25	0	15.0	14.4	0.592	0.674	
				Edge 1	20525	836.5	1	0	15.0	14.4	0.563	0.647	
							25	0	15.0	14.4	0.559	0.637	

10.6 LTE Band 12 (10MHz Bandwidth)

RF Exposure Conditions	Mode	PWR Back-off	Dist. (mm)	Test Position	Ch #.	Freq. (MHz)	RB Allocation	RB offest	Power (dBm)		1-g SAR (W/kg)		Plot No.
									Tune-up limit	Meas.	Meas.	Scaled	
Standalone	QPSK	Off	16	Rear	23095	707.5	1	0	23.5	22.4	0.344	0.442	
							25	12	22.5	21.4	0.272	0.350	
			14	Edge 1	23095	707.5	1	0	23.5	22.4	0.418	0.537	6
							25	12	22.5	21.4	0.318	0.409	
			0	Edge 2	23095	707.5	1	0	23.5	22.4	0.092	0.118	
							25	12	22.5	21.4	0.082	0.105	
			0	Edge 4	23095	707.5	1	0	23.5	22.4	0.104	0.134	
							25	12	22.5	21.4	0.089	0.115	
	QPSK	On	0	Rear	23095	707.5	1	0	14.0	12.9	0.317	0.412	
							25	0	14.0	12.9	0.320	0.416	
				Edge 1	23095	707.5	1	0	14.0	12.9	0.334	0.434	
							25	0	14.0	12.9	0.336	0.436	

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10.7 LTE Band 17 (10MHz Bandwidth)

RF Exposure Conditions	Mode	PWR Back-off	Dist. (mm)	Test Position	Ch #.	Freq. (MHz)	RB Allocation	RB offest	Power (dBm)		1-g SAR (W/kg)		Plot No.
									Tune-up limit	Meas.	Meas.	Scaled	
Standalone	QPSK	Off	16	Rear	23790	710.0	1	0	23.5	22.4	0.385	0.501	
							25	0	22.5	21.4	0.305	0.391	
			14	Edge 1	23790	710.0	1	0	23.5	22.4	0.417	0.542	
							25	0	22.5	21.4	0.335	0.430	
			0	Edge 2	23790	710.0	1	0	23.5	22.4	0.104	0.135	
							25	0	22.5	21.4	0.086	0.110	
			0	Edge 4	23790	710.0	1	0	23.5	22.4	0.095	0.124	
							25	0	22.5	21.4	0.083	0.107	
	QPSK	On	0	Rear	23790	710.0	1	0	17.0	15.8	0.633	0.825	
							25	0	17.0	15.9	0.640	0.827	
							50	0	17.0	15.8	0.627	0.819	
				Edge 1	23790	710.0	1	0	17.0	15.8	0.671	0.875	
							25	0	17.0	15.9	0.675	0.872	
							50	0	17.0	15.8	0.675	0.882	7

10.8 LTE Band 41 (20MHz Bandwidth)

RF Exposure Conditions	Mode	PWR Back-off	Dist. (mm)	Test Position	Ch #.	Freq. (MHz)	RB Allocation	RB offest	Power (dBm)		1-g SAR (W/kg)		Plot No.
									Tune-up limit	Meas.	Meas.	Scaled	
Standalone	QPSK	Off	16	Rear	40620	2593.0	1	0	24.5	24.2	0.403	0.430	
							50	0	23.5	23.1	0.327	0.356	
			14	Edge 1	40620	2593.0	1	0	24.5	24.2	0.452	0.483	
							50	0	23.5	23.1	0.372	0.405	
			0	Edge 2	40620	2593.0	1	0	24.5	24.2	0.525	0.561	
							50	0	23.5	23.1	0.445	0.484	
			0	Edge 4	40620	2593.0	1	0	24.5	24.2	0.110	0.117	
							50	0	23.5	23.1	0.090	0.098	
	QPSK	On	0	Rear	39750	2506.0	1	0	17.0	16.0	0.927	1.158	
							50	0	17.0	15.9	0.932	1.189	
					40185	2549.5	1	0	17.0	16.4	1.110	1.286	
							50	0	17.0	16.2	1.100	1.312	
					40620	2593.0	1	0	17.0	16.6	1.220	1.349	
							50	0	17.0	16.5	1.200	1.351	8
							100	0	17.0	16.5	1.190	1.346	
					41055	2636.5	1	0	17.0	16.5	1.170	1.315	
							50	0	17.0	16.4	1.140	1.306	
					41490	2680.0	1	0	17.0	16.3	1.020	1.197	
							50	0	17.0	16.2	0.993	1.200	
				Edge 1	39750	2506.0	1	0	17.0	16.0	0.619	0.773	
							50	0	17.0	15.9	0.625	0.798	
					40185	2549.5	1	0	17.0	16.4	0.830	0.962	
							50	0	17.0	16.2	0.824	0.983	
					40620	2593.0	1	0	17.0	16.6	0.935	1.034	
							50	0	17.0	16.5	0.965	1.086	
							100	0	17.0	16.5	0.955	1.080	
					41055	2636.5	1	0	17.0	16.5	0.962	1.081	
							50	0	17.0	16.4	0.939	1.075	
					41490	2680.0	1	0	17.0	16.3	0.821	0.964	
							50	0	17.0	16.2	0.793	0.958	

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10.9 Wi-Fi (DTS Band)

Frequency Band	Mode	RF Exposure Conditions	Antenna	Dist. (mm)	Test Position	Ch #.	Freq. (MHz)	Area Scan Max. SAR (W/kg)	Duty Cycle (%)	Power (dBm)		1-g SAR (W/kg)		Note	Plot No.
										Tune-up limit	Meas.	Meas.	Scaled		
2.4GHz	802.11b 1 Mbps	Standalone	Ant.1	0	Rear	1	2412.0	1.373	99.5	13.0	12.3	0.958	1.142	3	
						11	2462.0	1.837	99.5	13.0	12.7	1.100	1.190		9
					Edge 1	11	2462.0	0.013	99.5	13.0	12.7	0.009	0.010	4	
					Edge 3	11	2462.0	0.266	99.5	13.0	12.7	0.315	0.341	2	
			Ant.2	0	Rear	6	2437.0	0.876	99.5	13.0	12.8	1.010	1.068	3	
						11	2462.0	0.990	99.5	13.0	13.0	1.120	1.136		
					Edge 1	11	2462.0	0.005	99.5	13.0	13.0	0.003	0.003	4	
					Edge 3	11	2462.0	0.109	99.5	13.0	13.0	0.092	0.093	2	

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 testing is not required for OFDM mode(s) 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.

10.10 Bluetooth

Frequency Band	Mode	RF Exposure Conditions	Antenna	Dist. (mm)	Test Position	Ch #.	Freq. (MHz)	Duty Cycle (%)	Power (dBm)		1-g SAR (W/kg)		Plot No.
									Tune-up limit	Meas.	Meas.	Scaled	
2.4GHz	GFSK	Standalone	Ant.1	0	Rear	78	2480.0	76.9	9.5	9.3	0.183	0.252	10
					Edge 1	78	2480.0	76.9	9.5	9.3	< 0.001	< 0.001	
					Edge 3	78	2480.0	76.9	9.5	9.3	0.063	0.087	

Note(s):

Additional Bluetooth SAR testing required in order satisfying FCC simultaneous transmission limit criteria.

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10.11 Wi-Fi (U-NII Band)

Frequency Band	Mode	RF Exposure Conditions	Antenna	Dist. (mm)	Test Position	Ch #.	Freq. (MHz)	Area Scan Max. SAR (W/kg)	Duty Cycle (%)	Power (dBm)		1-g SAR (W/kg)		Note	Plot No.
										Tune-up limit	Meas.	Meas.	Scaled		
5.3 GHz U-NII 2A	802.11ac 29.3 Mbps (VHT80)	Standalone	Ant.1	0	Rear	58	5290.0	1.862	88.4	10.0	9.3	0.706	0.929		11
					Edge 1	58	5290.0	0.011	88.4	10.0	9.3	0.001	0.002	4	
					Edge 3	58	5290.0	0.572	88.4	10.0	9.3	0.167	0.220	2	
			Ant.2	0	Rear	58	5290.0	0.443	88.4	10.0	9.2	0.305	0.411		
					Edge 1	58	5290.0	0.009	88.4	10.0	9.2	<0.001	<0.001	4	
					Edge 3	58	5290.0	0.135	88.4	10.0	9.2	0.046	0.062	2	
Frequency Band	Mode	RF Exposure Conditions	Antenna	Dist. (mm)	Test Position	Ch #.	Freq. (MHz)	Area Scan Max. SAR (W/kg)	Duty Cycle (%)	Power (dBm)		1-g SAR (W/kg)		Note	Plot No.
										Tune-up limit	Meas.	Meas.	Scaled		
5.5 GHz U-NII 2C	802.11ac 29.3 Mbps (VHT80)	Standalone	Ant.1	0	Rear	138	5690.0	0.805	88.4	10.0	9.9	0.679	0.786		12
					Edge 1	138	5690.0	0.028	88.4	10.0	9.9	0.001	0.002	4	
					Edge 3	138	5690.0	0.552	88.4	10.0	9.9	0.150	0.174	2	
			Ant.2	0	Rear	106	5530.0	0.627	88.4	10.0	9.2	0.348	0.470		
					Edge 1	106	5530.0	0.013	88.4	10.0	9.2	<0.001	<0.001	4	
					Edge 3	106	5530.0	0.283	88.4	10.0	9.2	0.140	0.189	2	
Frequency Band	Mode	RF Exposure Conditions	Antenna	Dist. (mm)	Test Position	Ch #.	Freq. (MHz)	Area Scan Max. SAR (W/kg)	Duty Cycle (%)	Power (dBm)		1-g SAR (W/kg)		Note	Plot No.
										Tune-up limit	Meas.	Meas.	Scaled		
5.8 GHz U-NII 3	802.11ac 29.3 Mbps (VHT80)	Standalone	Ant.1	0	Rear	155	5775.0	2.472	88.4	10.0	9.6	0.759	0.941		13
					Edge 1	155	5775.0	0.010	88.4	10.0	9.6	<0.001	<0.001	4	
					Edge 3	155	5775.0	0.309	88.4	10.0	9.6	0.101	0.125	2	
			Ant.2	0	Rear	155	5775.0	0.951	88.4	10.0	9.1	0.361	0.503		
					Edge 1	155	5775.0	0.009	88.4	10.0	9.1	<0.001	<0.001	4	
					Edge 3	155	5775.0	0.191	88.4	10.0	9.1	0.078	0.109	2	

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.

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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	0.418	N/A	N/A
	LTE Band 17	Standalone	Edge 1	No	0.675	N/A	N/A
850	GSM 850	Standalone	Edge 1	No	1.110	N/A	N/A
	WCDMA Band V	Standalone	Edge 1	Yes	1.170	1.170	1.00
	LTE Band 5	Standalone	Edge 1	No	1.090	N/A	N/A
1900	GSM 1900	Standalone	Rear	No	0.941	N/A	N/A
	WCDMA Band II	Standalone	Rear	Yes	1.070	1.080	1.01
2400	Wi-Fi 802.11b/g/n	Standalone	Rear	Yes	1.120	1.060	1.06
	Bluetooth	Standalone	Rear	No	0.183	N/A	N/A
2600	LTE Band 41	Standalone	Rear	Yes	1.220	1.220	1.00
5300	Wi-Fi 802.11a/n/ac	Standalone	Rear	No	0.706	N/A	N/A
5500	Wi-Fi 802.11a/n/ac	Standalone	Rear	No	0.679	N/A	N/A
5800	Wi-Fi 802.11a/n/ac	Standalone	Rear	No	0.759	N/A	N/A

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.

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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:

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

Simultaneous Transmission Condition

RF Exposure Condition	Item	Capable Transmit Configurations				
Standalone	1	GSM(GPRS/EDGE)	+	DTS_Ant.1	+	DTS_Ant.2
	2	GSM(GPRS/EDGE)	+	U-NII_Ant.1	+	U-NII_Ant.2
	3	GSM(GPRS/EDGE)	+	DTS_Ant.1	+	U-NII_Ant.2
	4	GSM(GPRS/EDGE)	+	BT		
	5	W-CDMA	+	DTS_Ant.1	+	DTS_Ant.2
	6	W-CDMA	+	U-NII_Ant.1	+	U-NII_Ant.2
	7	W-CDMA	+	DTS_Ant.1	+	U-NII_Ant.2
	8	W-CDMA	+	BT		
	9	LTE	+	DTS_Ant.1	+	DTS_Ant.2
	10	LTE	+	U-NII_Ant.1	+	U-NII_Ant.2
	11	LTE	+	DTS_Ant.1	+	U-NII_Ant.2
	12	LTE	+	BT		

Notes:

1. DTS and UNII supports Hotspot.
2. DTS and UNII supports Wi-Fi Direct.
3. GPRS/EDGE. W-CDMA and LTE supports Hotspot.
4. DTS Radio cannot transmit simultaneously w ith Bluetooth Radio.
5. U-NII Radio cannot transmit simultaneously w ith Bluetooth Radio.
6. Only U-NII (Ant.2) Radio can transmit simultaneously w ith Only DTS (Ant.1) Radio.

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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	GPRS 3 Slots	848.8	29.50	334	0	0	42	246	42		-MEASURE-	-MEASURE-	-MEASURE-	0.400	-MEASURE-	
Cellular	GPRS 2 Slots	848.8	28.00	158	0	0	42	246	42		-MEASURE-	-MEASURE-	-MEASURE-	0.400	-MEASURE-	
Cellular	W-CDMA II	1907.6	24.00	251	0	0	42	246	42		-MEASURE-	-MEASURE-	-MEASURE-	0.400	-MEASURE-	
Cellular	W-CDMA V	846.6	23.80	240	0	0	42	246	42		-MEASURE-	-MEASURE-	-MEASURE-	0.400	-MEASURE-	
Cellular	LTE Band 5	836.5	24.00	251	0	0	42	246	42		-MEASURE-	-MEASURE-	-MEASURE-	0.400	-MEASURE-	
Cellular	LTE Band 12	707.5	23.50	224	0	0	42	246	42		-MEASURE-	-MEASURE-	-MEASURE-	0.400	-MEASURE-	
Cellular	LTE Band 17	710	23.50	224	0	0	42	246	42		-MEASURE-	-MEASURE-	-MEASURE-	0.400	-MEASURE-	
Cellular	LTE Band 41	2680	24.50	282	0	0	42	246	42		-MEASURE-	-MEASURE-	-MEASURE-	0.400	-MEASURE-	
Power Back-off, Proximity Sensor On																
Cellular	GPRS 2 Slots	848.8	21.50	35	0	0					-MEASURE-	-MEASURE-				
Cellular	GPRS 2 Slots	848.8	21.00	31	0	0					-MEASURE-	-MEASURE-				
Cellular	W-CDMA II	1907.6	14.00	25	0	0					-MEASURE-	-MEASURE-				
Cellular	W-CDMA V	846.6	16.00	40	0	0					-MEASURE-	-MEASURE-				
Cellular	LTE Band 5	836.5	15.00	32	0	0					-MEASURE-	-MEASURE-				
Cellular	LTE Band 12	707.5	14.00	25	0	0					-MEASURE-	-MEASURE-				
Cellular	LTE Band 17	710	17.00	50	0	0					-MEASURE-	-MEASURE-				
Cellular	LTE Band 41	2680	17.00	50	0	0					-MEASURE-	-MEASURE-				

Estimated SAR for WLAN

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
Ant.1															
Wi-Fi 2.4 GHz	2462	13.00	20	0	243	20	3	122		-MEASURE-	0.400	0.209	-MEASURE-	0.400	
Wi-Fi 5.3 GHz	5320	10.00	10	0	243	20	3	122		-MEASURE-	0.400	0.154	-MEASURE-	0.400	
Wi-Fi 5.5 GHz	5720	10.00	10	0	243	20	3	122		-MEASURE-	0.400	0.159	-MEASURE-	0.400	
Wi-Fi 5.8 GHz	5825	10.00	10	0	243	20	3	122		-MEASURE-	0.400	0.161	-MEASURE-	0.400	
Bluetooth	2480	9.50	9	0	243	20	3	122		0.378	0.400	0.094	0.378	0.400	
Ant.2															
Wi-Fi 2.4 GHz	2462	13	20	0	243	121	3	20		-MEASURE-	0.400	0.400	-MEASURE-	0.209	
Wi-Fi 5.3 GHz	5320	10	10	0	243	121	3	20		-MEASURE-	0.400	0.400	-MEASURE-	0.154	
Wi-Fi 5.5 GHz	5720	10	10	0	243	121	3	20		-MEASURE-	0.400	0.400	-MEASURE-	0.159	
Wi-Fi 5.8 GHz	5825	10	10	0	243	121	3	20		-MEASURE-	0.400	0.400	-MEASURE-	0.161	

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12.1 Sum of the SAR for GSM 850 & Wi-Fi & BT

Test Position	Standalone SAR (W/kg)					
	WWAN ①	DTS_Ant.1 ②	DTS_Ant.2 ③	UNII_Ant.1 ④	UNII_Ant.2 ⑤	BT ⑥
Rear	0.575	1.190	1.136	0.941	0.503	0.252
Edge 1	1.282	0.010	0.003	0.002	0.001	0.001
Edge 2	0.163	0.209	0.400	0.161	0.400	0.094
Edge 3	0.400	0.341	0.093	0.220	0.189	0.087
Edge 4	0.135	0.400	0.209	0.400	0.161	0.400

Test Position	∑ 1-g SAR (W/kg)							
	WWAN + DTS_Ant.1 ① + ②	WWAN + DTS_Ant.2 ① + ③	WWAN + UNII_Ant.1 ① + ④	WWAN + UNII_Ant.2 ① + ⑤	WWAN + BT ① + ⑥	WWAN + DTS_Ant.1 + DTS_Ant.2 ① + ② + ③	WWAN + UNII_Ant.1 + UNII_Ant.2 ① + ④ + ⑤	WWAN + DTS_Ant.1 + UNII_Ant.2 ① + ② + ⑤
Rear	1.765	1.711	1.516	1.078	0.827	2.901	2.019	2.268
Edge 1	1.292	1.285	1.284	1.283	1.283	1.295	1.285	1.293
Edge 2	0.372	0.563	0.324	0.563	0.257	0.772	0.724	0.772
Edge 3	0.741	0.493	0.620	0.589	0.487	0.834	0.809	0.930
Edge 4	0.535	0.344	0.535	0.296	0.535	0.744	0.696	0.696

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_Ant.1	③ DTS_Ant.2	④ UNII_Ant.1	⑤ UNII_Ant.2	⑥ BT						
Rear	0.575	1.190					① + ②	1.765	242.8	0.01	No	1
Rear	0.575		1.136				① + ③	1.711	247.8	0.01	No	2
Rear	0.575	1.190	1.136				① + ② + ③	2.901				3
	0.575	1.190					① + ②	1.765	242.8	0.01	No	
	0.575		1.136				① + ③	1.711	247.8	0.01	No	
		1.190	1.136				② + ③	2.326	99.1	0.04	No	
Rear	0.575			0.941	0.503		① + ④ + ⑤	2.019				4
	0.575			0.941			① + ④	1.516	247.2	0.01	No	
	0.575				0.503		① + ⑤	1.078	244.0	0.00	No	
				0.941	0.503		④ + ⑤	1.444	89.5	0.02	No	
Rear	0.575	1.190			0.503		① + ② + ③	2.268				5
	0.575	1.190					① + ②	1.765	242.8	0.01	No	
	0.575				0.503		① + ⑤	1.078	244.0	0.00	No	
		1.190			0.503		② + ⑤	1.693	94.0	0.02	No	

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12.2 Sum of the SAR for GSM 1900 & Wi-Fi & BT

Test Position	Standalone SAR (W/kg)					
	WWAN ①	DTS_Ant.1 ②	DTS_Ant.2 ③	UNII_Ant.1 ④	UNII_Ant.2 ⑤	BT ⑥
Rear	1.201	1.190	1.136	0.941	0.503	0.252
Edge 1	0.974	0.010	0.003	0.002	0.001	0.001
Edge 2	0.303	0.209	0.400	0.161	0.400	0.094
Edge 3	0.400	0.341	0.093	0.220	0.189	0.087
Edge 4	0.160	0.400	0.209	0.400	0.161	0.400

Test Position	∑ 1-g SAR (W/kg)							
	WWAN + DTS_Ant.1 ① + ②	WWAN + DTS_Ant.2 ① + ③	WWAN + UNII_Ant.1 ① + ④	WWAN + UNII_Ant.2 ① + ⑤	WWAN + BT ① + ⑥	WWAN + DTS_Ant.1 + DTS_Ant.2 ① + ② + ③	WWAN + UNII_Ant.1 + UNII_Ant.2 ① + ④ + ⑤	WWAN + DTS_Ant.1 + UNII_Ant.2 ① + ② + ⑤
Rear	2.391	2.337	2.142	1.704	1.453	3.527	2.645	2.894
Edge 1	0.984	0.977	0.976	0.975	0.975	0.987	0.977	0.985
Edge 2	0.512	0.703	0.464	0.703	0.397	0.912	0.864	0.912
Edge 3	0.741	0.493	0.620	0.589	0.487	0.834	0.809	0.930
Edge 4	0.560	0.369	0.560	0.321	0.560	0.769	0.721	0.721

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_Ant.1	③ DTS_Ant.2	④ UNII_Ant.1	⑤ UNII_Ant.2	⑥ BT						
Rear	1.201	1.190					① + ②	2.391	227.7	0.02	No	6
Rear	1.201		1.136				① + ③	2.337	245.8	0.01	No	7
Rear	1.201	1.190	1.136				① + ② + ③	3.527				8
	1.201	1.190					① + ②	2.391	227.7	0.02	No	
	1.201		1.136				① + ③	2.337	245.8	0.01	No	
		1.190	1.136				② + ③	2.326	99.1	0.04	No	
Rear	1.201			0.941			① + ④	2.142	232.8	0.01	No	9
Rear	1.201				0.503		① + ⑤	1.704	241.5	0.01	No	10
Rear	1.201			0.941	0.503		① + ④ + ⑤	2.645				11
	1.201			0.941			① + ④	2.142	232.8	0.01	No	
	1.201				0.503		① + ⑤	1.704	241.5	0.01	No	
				0.941	0.503		④ + ⑤	1.444	89.5	0.02	No	
Rear	1.201	1.190			0.503		① + ② + ③	2.894				12
	1.201	1.190					① + ②	2.391	227.7	0.02	No	
	1.201				0.503		① + ⑤	1.704	241.5	0.01	No	
		1.190			0.503		② + ⑤	1.693	94.0	0.02	No	

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

Test Position	Standalone SAR (W/kg)					
	WWAN ①	DTS_Ant.1 ②	DTS_Ant.2 ③	UNII_Ant.1 ④	UNII_Ant.2 ⑤	BT ⑥
Rear	1.176	1.190	1.136	0.941	0.503	0.252
Edge 1	0.987	0.010	0.003	0.002	0.001	0.001
Edge 2	0.681	0.209	0.400	0.161	0.400	0.094
Edge 3	0.400	0.341	0.093	0.220	0.189	0.087
Edge 4	0.416	0.400	0.209	0.400	0.161	0.400

Test Position	∑ 1-g SAR (W/kg)							
	WWAN + DTS_Ant.1 ① + ②	WWAN + DTS_Ant.2 ① + ③	WWAN + UNII_Ant.1 ① + ④	WWAN + UNII_Ant.2 ① + ⑤	WWAN + BT ① + ⑥	WWAN + DTS_Ant.1 + DTS_Ant.2 ① + ② + ③	WWAN + UNII_Ant.1 + UNII_Ant.2 ① + ④ + ⑤	WWAN + DTS_Ant.1 + UNII_Ant.2 ① + ② + ⑤
Rear	2.366	2.312	2.117	1.679	1.428	3.502	2.620	2.869
Edge 1	0.997	0.990	0.989	0.988	0.988	1.000	0.990	0.998
Edge 2	0.890	1.081	0.842	1.081	0.775	1.290	1.242	1.290
Edge 3	0.741	0.493	0.620	0.589	0.487	0.834	0.809	0.930
Edge 4	0.816	0.625	0.816	0.577	0.816	1.025	0.977	0.977

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_Ant.1	③ DTS_Ant.2	④ UNII_Ant.1	⑤ UNII_Ant.2	⑥ BT						
Rear	1.176	1.190					① + ②	2.366	232.9	0.02	No	13
Rear	1.176		1.136				① + ③	2.312	248.4	0.01	No	14
Rear	1.176	1.190	1.136				① + ② + ③	3.502				15
	1.176	1.190					① + ②	2.366	232.9	0.02	No	
	1.176		1.136				① + ③	2.312	248.4	0.01	No	
		1.190	1.136				② + ③	2.326	99.1	0.04	No	
Rear	1.176			0.941			① + ④	2.117	237.9	0.01	No	16
Rear	1.176				0.503		① + ⑤	1.679	244.2	0.01	No	17
Rear	1.176			0.941	0.503		① + ④ + ⑤	2.620				18
	1.176			0.941			① + ④	2.117	237.9	0.01	No	
	1.176				0.503		① + ⑤	1.679	244.2	0.01	No	
				0.941	0.503		④ + ⑤	1.444	89.5	0.02	No	
Rear	1.176	1.190			0.503		① + ② + ③	2.869				19
	1.176	1.190					① + ②	2.366	232.9	0.02	No	
	1.176				0.503		① + ⑤	1.679	244.2	0.01	No	
		1.190			0.503		② + ⑤	1.693	94.0	0.02	No	

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

Test Position	Standalone SAR (W/kg)					
	WWAN ①	DTS_Ant.1 ②	DTS_Ant.2 ③	UNII_Ant.1 ④	UNII_Ant.2 ⑤	BT ⑥
Rear	0.857	1.190	1.136	0.941	0.503	0.252
Edge 1	1.339	0.010	0.003	0.002	0.001	0.001
Edge 2	0.154	0.209	0.400	0.161	0.400	0.094
Edge 3	0.400	0.341	0.093	0.220	0.189	0.087
Edge 4	0.145	0.400	0.209	0.400	0.161	0.400

Test Position	∑ 1-g SAR (W/kg)							
	WWAN + DTS_Ant.1 ① + ②	WWAN + DTS_Ant.2 ① + ③	WWAN + UNII_Ant.1 ① + ④	WWAN + UNII_Ant.2 ① + ⑤	WWAN + BT ① + ⑥	WWAN + DTS_Ant.1 + DTS_Ant.2 ① + ② + ③	WWAN + UNII_Ant.1 + UNII_Ant.2 ① + ④ + ⑤	WWAN + DTS_Ant.1 + UNII_Ant.2 ① + ② + ⑤
Rear	2.047	1.993	1.798	1.360	1.109	3.183	2.301	2.550
Edge 1	1.349	1.342	1.341	1.340	1.340	1.352	1.342	1.350
Edge 2	0.363	0.554	0.315	0.554	0.248	0.763	0.715	0.763
Edge 3	0.741	0.493	0.620	0.589	0.487	0.834	0.809	0.930
Edge 4	0.545	0.354	0.545	0.306	0.545	0.754	0.706	0.706

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_Ant.1	③ DTS_Ant.2	④ UNII_Ant.1	⑤ UNII_Ant.2	⑥ BT						
Rear	0.857	1.190					① + ②	2.047	243.1	0.01	No	20
Rear	0.857		1.136				① + ③	1.993	247.5	0.01	No	21
Rear	0.857	1.190	1.136				① + ② + ③	3.183				22
	0.857	1.190					① + ②	2.047	243.1	0.01	No	
	0.857		1.136				① + ③	1.993	247.5	0.01	No	
		1.190	1.136				② + ③	2.326	99.1	0.04	No	
Rear	0.857			0.941			① + ④	1.798	247.5	0.01	No	23
Rear	0.857			0.941	0.503		① + ④ + ⑤	2.301				24
	0.857			0.941			① + ④	1.798	247.5	0.01	No	
	0.857				0.503		① + ⑤	1.360	243.7	0.01	No	
				0.941	0.503		④ + ⑤	1.444	89.5	0.02	No	
Rear	0.857	1.190			0.503		① + ② + ③	2.550				25
	0.857	1.190					① + ②	2.047	243.1	0.01	No	
	0.857				0.503		① + ⑤	1.360	243.7	0.01	No	
		1.190			0.503		② + ⑤	1.693	94.0	0.02	No	

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

Test Position	Standalone SAR (W/kg)					
	WWAN ①	DTS_Ant.1 ②	DTS_Ant.2 ③	UNII_Ant.1 ④	UNII_Ant.2 ⑤	BT ⑥
Rear	0.751	1.190	1.136	0.941	0.503	0.252
Edge 1	1.241	0.010	0.003	0.002	0.001	0.001
Edge 2	0.204	0.209	0.400	0.161	0.400	0.094
Edge 3	0.400	0.341	0.093	0.220	0.189	0.087
Edge 4	0.188	0.400	0.209	0.400	0.161	0.400

Test Position	∑ 1-g SAR (W/kg)							
	WWAN + DTS_Ant.1 ① + ②	WWAN + DTS_Ant.2 ① + ③	WWAN + UNII_Ant.1 ① + ④	WWAN + UNII_Ant.2 ① + ⑤	WWAN + BT ① + ⑥	WWAN + DTS_Ant.1 + DTS_Ant.2 ① + ② + ③	WWAN + UNII_Ant.1 + UNII_Ant.2 ① + ④ + ⑤	WWAN + DTS_Ant.1 + UNII_Ant.2 ① + ② + ⑤
Rear	1.941	1.887	1.692	1.254	1.003	3.077	2.195	2.444
Edge 1	1.251	1.244	1.243	1.242	1.242	1.254	1.244	1.252
Edge 2	0.413	0.604	0.365	0.604	0.298	0.813	0.765	0.813
Edge 3	0.741	0.493	0.620	0.589	0.487	0.834	0.809	0.930
Edge 4	0.588	0.397	0.588	0.349	0.588	0.797	0.749	0.749

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_Ant.1	③ DTS_Ant.2	④ UNII_Ant.1	⑤ UNII_Ant.2	⑥ BT						
Rear	0.751	1.190					① + ②	1.941	243.7	0.01	No	26
Rear	0.751		1.136				① + ③	1.887	248.6	0.01	No	27
Rear	0.751	1.190	1.136				① + ② + ③	3.077				28
	0.751	1.190					① + ②	1.941	243.7	0.01	No	
	0.751		1.136				① + ③	1.887	248.6	0.01	No	
		1.190	1.136				② + ③	2.326	99.1	0.04	No	
Rear	0.751			0.941			① + ④	1.692	248.1	0.01	No	29
Rear	0.751			0.941	0.503		① + ④ + ⑤	2.195				30
	0.751			0.941			① + ④	1.692	248.1	0.01	No	
	0.751				0.503		① + ⑤	1.254	244.9	0.01	No	
				0.941	0.503		④ + ⑤	1.444	89.5	0.02	No	
Rear	0.751	1.190			0.503		① + ② + ③	2.444				31
	0.751	1.190					① + ②	1.941	243.7	0.01	No	
	0.751				0.503		① + ⑤	1.254	244.9	0.01	No	
		1.190			0.503		② + ⑤	1.693	94.0	0.02	No	

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

Test Position	Standalone SAR (W/kg)					
	WWAN ①	DTS_Ant.1 ②	DTS_Ant.2 ③	UNII_Ant.1 ④	UNII_Ant.2 ⑤	BT ⑥
Rear	0.442	1.190	1.136	0.941	0.503	0.252
Edge 1	0.537	0.010	0.003	0.002	0.001	0.001
Edge 2	0.118	0.209	0.400	0.161	0.400	0.094
Edge 3	0.400	0.341	0.093	0.220	0.189	0.087
Edge 4	0.134	0.400	0.209	0.400	0.161	0.400

Test Position	∑ 1-g SAR (W/kg)							
	WWAN + DTS_Ant.1 ① + ②	WWAN + DTS_Ant.2 ① + ③	WWAN + UNII_Ant.1 ① + ④	WWAN + UNII_Ant.2 ① + ⑤	WWAN + BT ① + ⑥	WWAN + DTS_Ant.1 + DTS_Ant.2 ① + ② + ③	WWAN + UNII_Ant.1 + UNII_Ant.2 ① + ④ + ⑤	WWAN + DTS_Ant.1 + UNII_Ant.2 ① + ② + ⑤
Rear	1.632	1.578	1.383	0.945	0.694	2.768	1.886	2.135
Edge 1	0.547	0.540	0.539	0.538	0.538	0.550	0.540	0.548
Edge 2	0.327	0.518	0.279	0.518	0.212	0.727	0.679	0.727
Edge 3	0.741	0.493	0.620	0.589	0.487	0.834	0.809	0.930
Edge 4	0.534	0.343	0.534	0.295	0.534	0.743	0.695	0.695

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_Ant.1	③ DTS_Ant.2	④ UNII_Ant.1	⑤ UNII_Ant.2	⑥ BT						
Rear	0.442	1.190					① + ②	1.632	234.7	0.01	No	32
Rear	0.442	1.190	1.136				① + ② + ③	2.768				33
	0.442	1.190					① + ②	1.632	234.7	0.01	No	
	0.442		1.136				① + ③	1.578	247.5	0.01	No	
		1.190	1.136				② + ③	2.326	99.1	0.04	No	
Rear	0.442			0.941	0.503		① + ④ + ⑤	1.886				34
	0.442			0.941			① + ④	1.383	239.5	0.01	No	
	0.442				0.503		① + ⑤	0.945	243.5	0.00	No	
				0.941	0.503		④ + ⑤	1.444	89.5	0.02	No	
Rear	0.442	1.190			0.503		① + ② + ③	2.135				35
	0.442	1.190					① + ②	1.632	234.7	0.01	No	
	0.442				0.503		① + ⑤	0.945	243.5	0.00	No	
		1.190			0.503		② + ⑤	1.693	94.0	0.02	No	

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

Test Position	Standalone SAR (W/kg)					
	WWAN ①	DTS_Ant.1 ②	DTS_Ant.2 ③	UNII_Ant.1 ④	UNII_Ant.2 ⑤	BT ⑥
Rear	0.827	1.190	1.136	0.941	0.503	0.252
Edge 1	0.882	0.010	0.003	0.002	0.001	0.001
Edge 2	0.135	0.209	0.400	0.161	0.400	0.094
Edge 3	0.400	0.341	0.093	0.220	0.189	0.087
Edge 4	0.124	0.400	0.209	0.400	0.161	0.400

Test Position	∑ 1-g SAR (W/kg)							
	WWAN + DTS_Ant.1 ① + ②	WWAN + DTS_Ant.2 ① + ③	WWAN + UNII_Ant.1 ① + ④	WWAN + UNII_Ant.2 ① + ⑤	WWAN + BT ① + ⑥	WWAN + DTS_Ant.1 + DTS_Ant.2 ① + ② + ③	WWAN + UNII_Ant.1 + UNII_Ant.2 ① + ④ + ⑤	WWAN + DTS_Ant.1 + UNII_Ant.2 ① + ② + ⑤
Rear	2.017	1.963	1.768	1.330	1.079	3.153	2.271	2.520
Edge 1	0.892	0.885	0.884	0.883	0.883	0.895	0.885	0.893
Edge 2	0.344	0.535	0.296	0.535	0.229	0.744	0.696	0.744
Edge 3	0.741	0.493	0.620	0.589	0.487	0.834	0.809	0.930
Edge 4	0.524	0.333	0.524	0.285	0.524	0.733	0.685	0.685

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_Ant.1	③ DTS_Ant.2	④ UNII_Ant.1	⑤ UNII_Ant.2	⑥ BT						
Rear	0.827	1.190					① + ②	2.017	240.8	0.01	No	36
Rear	0.827		1.136				① + ③	1.963	247.0	0.01	No	37
Rear	0.827	1.190	1.136				① + ② + ③	3.153				38
	0.827	1.190					① + ②	2.017	240.8	0.01	No	
	0.827		1.136				① + ③	1.963	247.0	0.01	No	
		1.190	1.136				② + ③	2.326	99.1	0.04	No	
Rear	0.827			0.941			① + ④	1.768	245.4	0.01	No	39
Rear	0.827			0.941	0.503		① + ④ + ⑤	2.271				40
	0.827			0.941			① + ④	1.768	245.4	0.01	No	
	0.827				0.503		① + ⑤	1.330	243.2	0.01	No	
				0.941	0.503		④ + ⑤	1.444	89.5	0.02	No	
Rear	0.827	1.190			0.503		① + ② + ③	2.520				41
	0.827	1.190					① + ②	2.017	240.8	0.01	No	
	0.827				0.503		① + ⑤	1.330	243.2	0.01	No	
		1.190			0.503		② + ⑤	1.693	94.0	0.02	No	

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12.8 Sum of the SAR for LTE Band 41 & Wi-Fi & BT

Test Position	Standalone SAR (W/kg)					
	WWAN ①	DTS_Ant.1 ②	DTS_Ant.2 ③	UNII_Ant.1 ④	UNII_Ant.2 ⑤	BT ⑥
Rear	1.351	1.190	1.136	0.941	0.503	0.252
Edge 1	1.086	0.010	0.003	0.002	0.001	0.001
Edge 2	0.561	0.209	0.400	0.161	0.400	0.094
Edge 3	0.400	0.341	0.093	0.220	0.189	0.087
Edge 4	0.117	0.400	0.209	0.400	0.161	0.400

Test Position	∑ 1-g SAR (W/kg)							
	WWAN + DTS_Ant.1 ① + ②	WWAN + DTS_Ant.2 ① + ③	WWAN + UNII_Ant.1 ① + ④	WWAN + UNII_Ant.2 ① + ⑤	WWAN + BT ① + ⑥	WWAN + DTS_Ant.1 + DTS_Ant.2 ① + ② + ③	WWAN + UNII_Ant.1 + UNII_Ant.2 ① + ④ + ⑤	WWAN + DTS_Ant.1 + UNII_Ant.2 ① + ② + ⑤
Rear	2.541	2.487	2.292	1.854	1.603	3.677	2.795	3.044
Edge 1	1.096	1.089	1.088	1.087	1.087	1.099	1.089	1.097
Edge 2	0.770	0.961	0.722	0.961	0.655	1.170	1.122	1.170
Edge 3	0.741	0.493	0.620	0.589	0.487	0.834	0.809	0.930
Edge 4	0.517	0.326	0.517	0.278	0.517	0.726	0.678	0.678

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_Ant.1	③ DTS_Ant.2	④ UNII_Ant.1	⑤ UNII_Ant.2	⑥ BT						
Rear	1.351	1.190					① + ②	2.541	231.7	0.02	No	42
Rear	1.351		1.136				① + ③	2.487	247.0	0.02	No	43
Rear	1.351					0.252	① + ⑥	1.603	233.4	0.01	No	44
Rear	1.351	1.190	1.136				① + ② + ③	3.677				45
	1.351	1.190					① + ②	2.541	231.7	0.02	No	
	1.351		1.136				① + ③	2.487	247.0	0.02	No	
		1.190	1.136				② + ③	2.326	99.1	0.04	No	
Rear	1.351			0.941			① + ④	2.292	236.7	0.01	No	46
Rear	1.351				0.503		① + ⑤	1.854	242.8	0.01	No	47
Rear	1.351			0.941	0.503		① + ④ + ⑤	2.795				48
	1.351			0.941			① + ④	2.292	236.7	0.01	No	
	1.351				0.503		① + ⑤	1.854	242.8	0.01	No	
				0.941	0.503		④ + ⑤	1.444	89.5	0.02	No	
Rear	1.351	1.190			0.503		① + ② + ③	3.044				49
	1.351	1.190					① + ②	2.541	231.7	0.02	No	
	1.351				0.503		① + ⑤	1.854	242.8	0.01	No	
		1.190			0.503		② + ⑤	1.693	94.0	0.02	No	

Conclusion:

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

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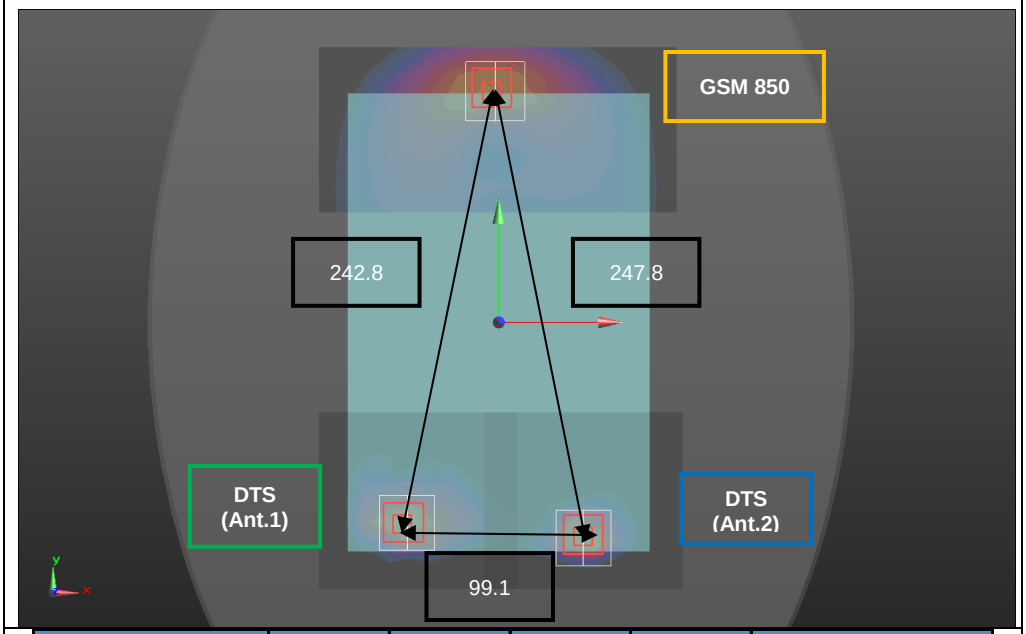
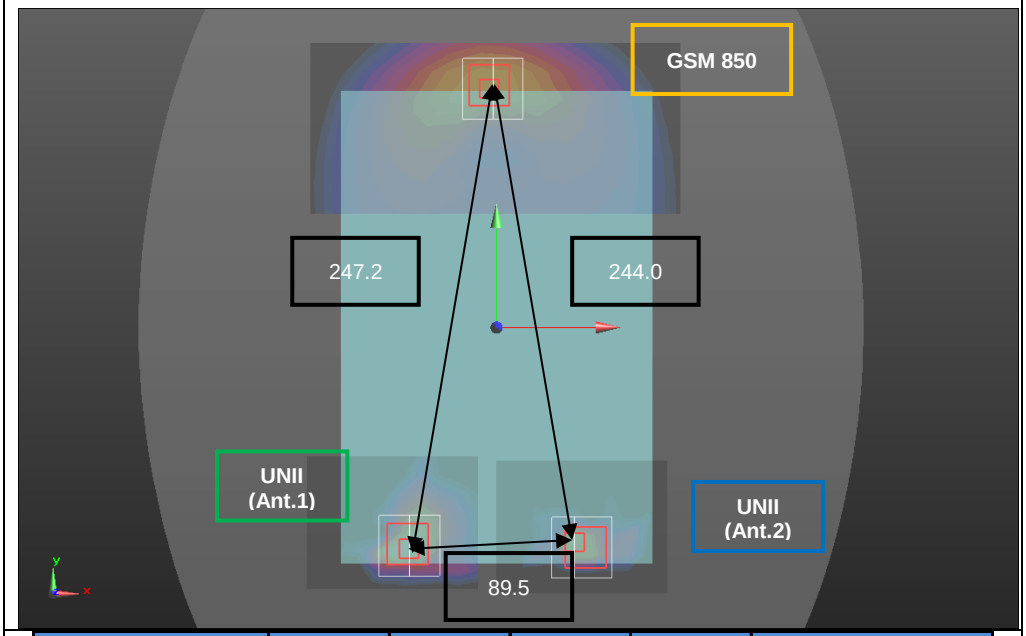
Figure (1, 2, 3)



Mode		SAR	X	Y	Z	d: Calculated distance (mm)	
		W/kg	m	m	m		
GSM 850	①	0.575	-0.0052	0.126	-0.0031	① + ②	242.8
DTS_Ant.1	②	1.190	-0.053	-0.112	-0.0008	① + ③	247.8
DTS_Ant.2	③	1.136	0.046	-0.1164	-0.001	② + ③	99.1

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		
GSM 850	①	0.575	-0.0052	0.126	-0.0031	① + ②	247.2
UNII_Ant.1	②	0.941	-0.0484	-0.1174	-0.0017	① + ③	244.0
UNII_Ant.2	③	0.503	0.041	-0.1136	-0.0015	② + ③	89.5

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

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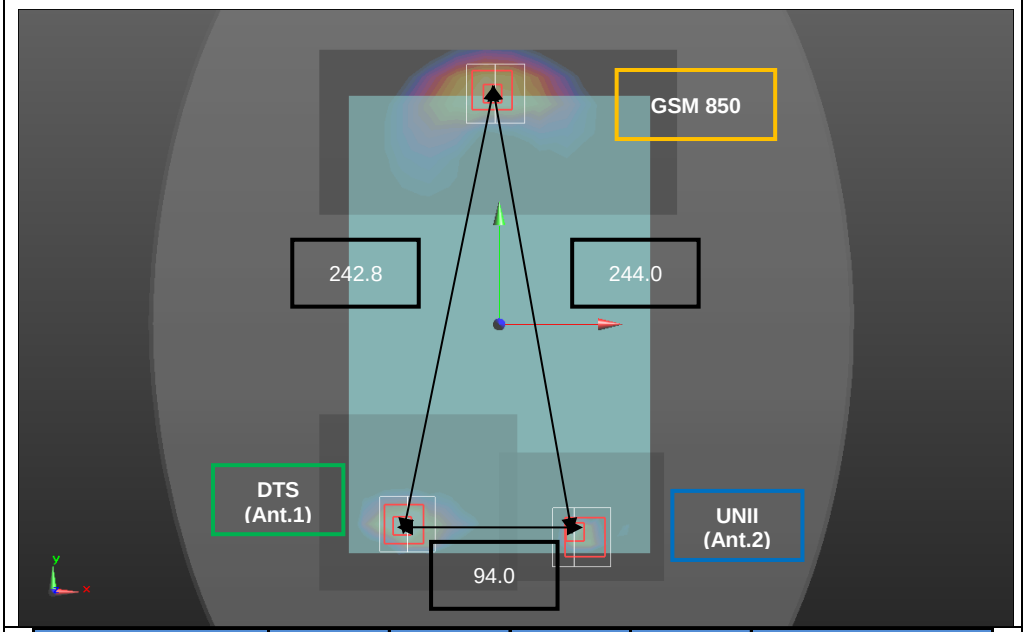
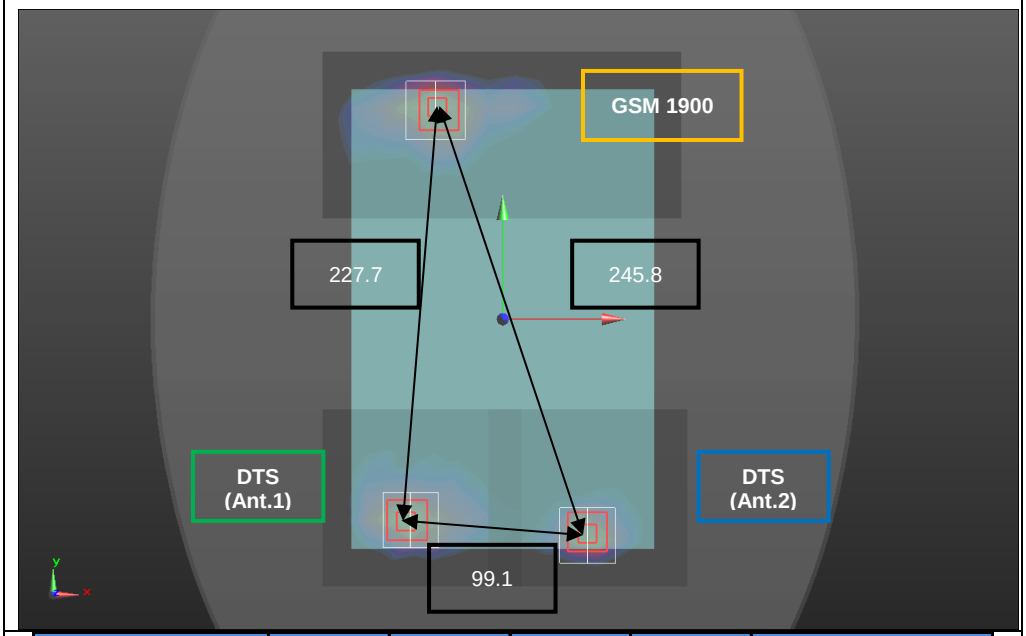
Figure (5)



Mode		SAR	X	Y	Z	d: Calculated distance (mm)	
		W/kg	m	m	m		
GSM 850	①	0.575	-0.0052	0.126	-0.0031	① + ②	242.8
DTS_Ant.1	②	1.190	-0.053	-0.112	-0.0008	① + ③	244.0
UNII_Ant.2	③	0.503	0.041	-0.1136	-0.0015	② + ③	94.0

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

Figure (6, 7, 8)



Mode		SAR	X	Y	Z	d: Calculated distance (mm)	
		W/kg	m	m	m		
GSM 1900	①	1.201	-0.0365	0.1151	-0.0024	① + ②	227.7
DTS_Ant.1	②	1.190	-0.053	-0.112	-0.0008	① + ③	245.8
DTS_Ant.2	③	1.136	0.046	-0.1164	-0.001	② + ③	99.1

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

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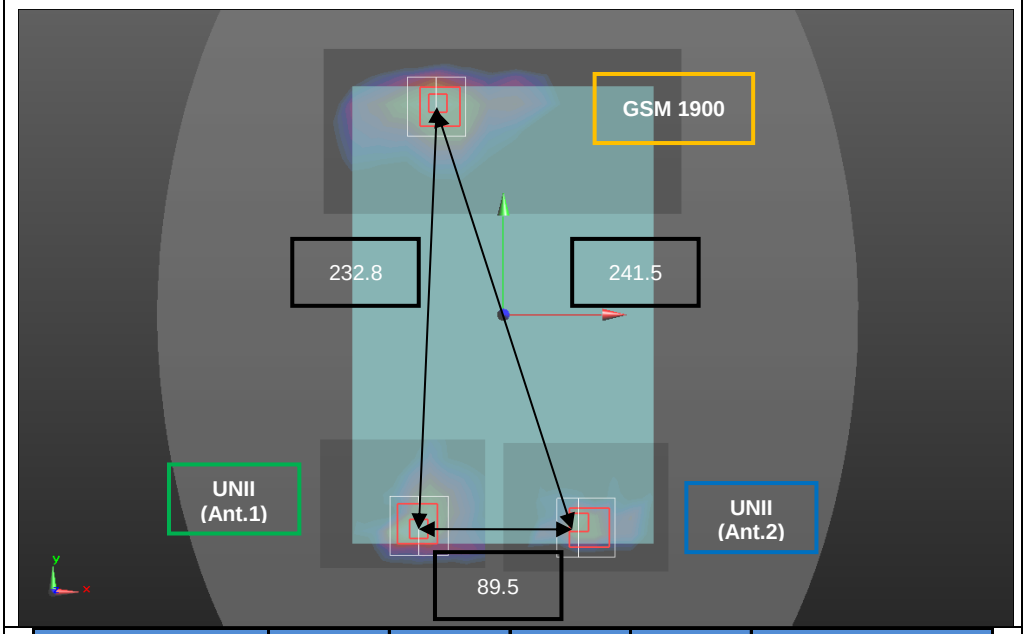
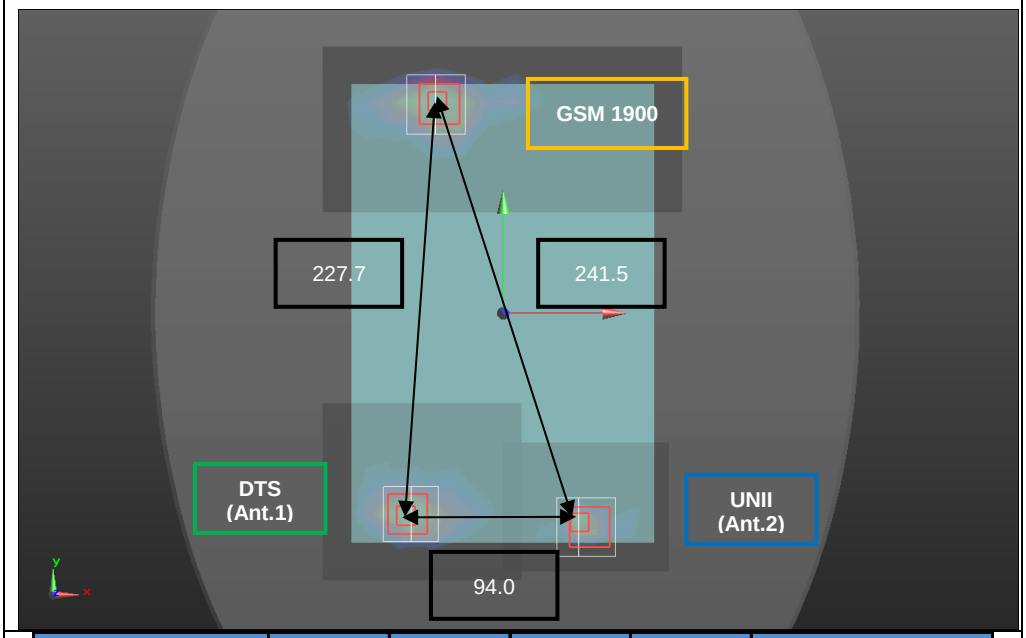
Figure (9, 10, 11)



Mode		SAR	X	Y	Z	d: Calculated distance (mm)	
		W/kg	m	m	m		
GSM 1900	①	1.201	-0.0365	0.1151	-0.0024	① + ②	232.8
UNII_Ant.1	②	0.941	-0.0484	-0.1174	-0.0017	① + ③	241.5
UNII_Ant.2	③	0.503	0.041	-0.1136	-0.0015	② + ③	89.5

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		
GSM 1900	①	1.201	-0.0365	0.1151	-0.0024	① + ②	227.7
DTS_Ant.1	②	1.190	-0.053	-0.112	-0.0008	① + ③	241.5
UNII_Ant.2	③	0.503	0.041	-0.1136	-0.0015	② + ③	94.0

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

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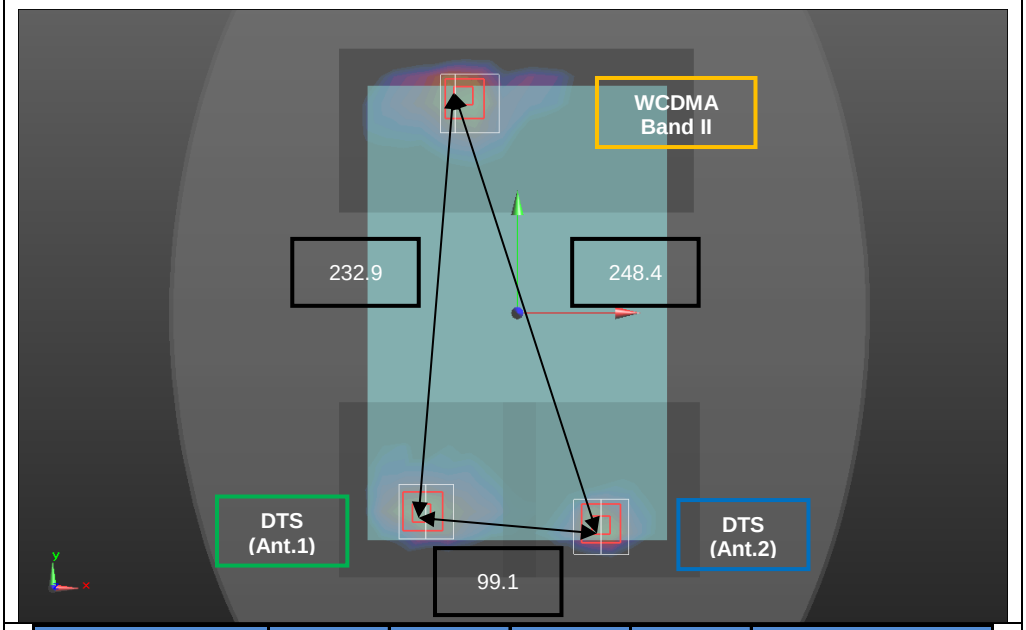
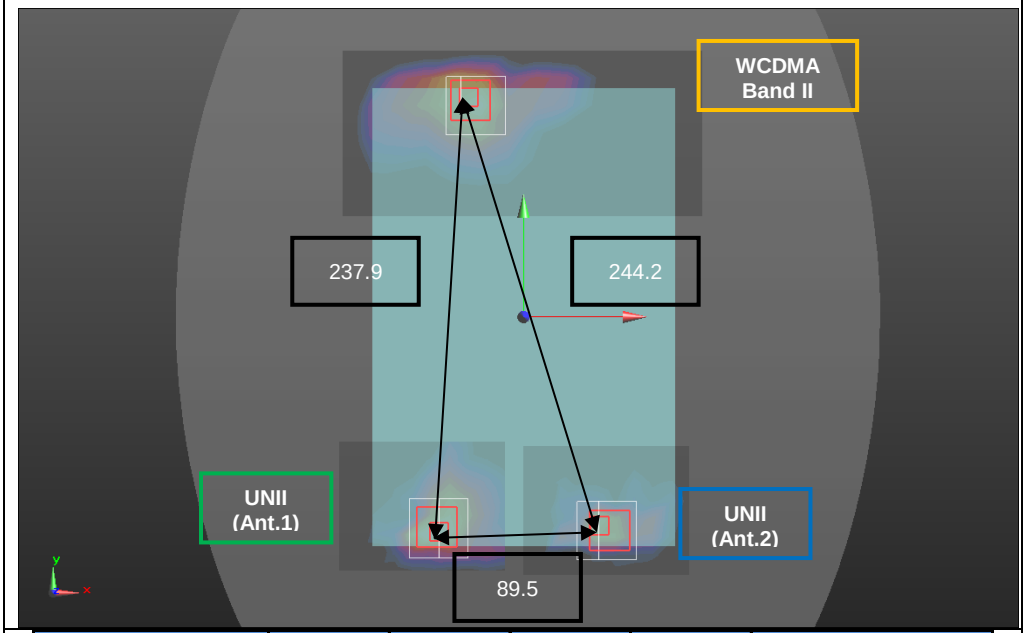
Figure (13, 14, 15)



Mode		SAR	X	Y	Z	d: Calculated distance (mm)	
		W/kg	m	m	m		
WCDMA Band II	①	1.176	-0.0308	0.1198	-0.0059	① + ②	232.9
DTS_Ant.1	②	1.190	-0.053	-0.112	-0.0008	① + ③	248.4
DTS_Ant.2	③	1.136	0.046	-0.1164	-0.001	② + ③	99.1

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

Figure (16, 17, 18)



Mode		SAR	X	Y	Z	d: Calculated distance (mm)	
		W/kg	m	m	m		
WCDMA Band II	①	1.176	-0.0308	0.1198	-0.0059	① + ②	237.9
UNII_Ant.1	②	0.941	-0.0484	-0.1174	-0.0017	① + ③	244.2
UNII_Ant.2	③	0.503	0.041	-0.1136	-0.0015	② + ③	89.5

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

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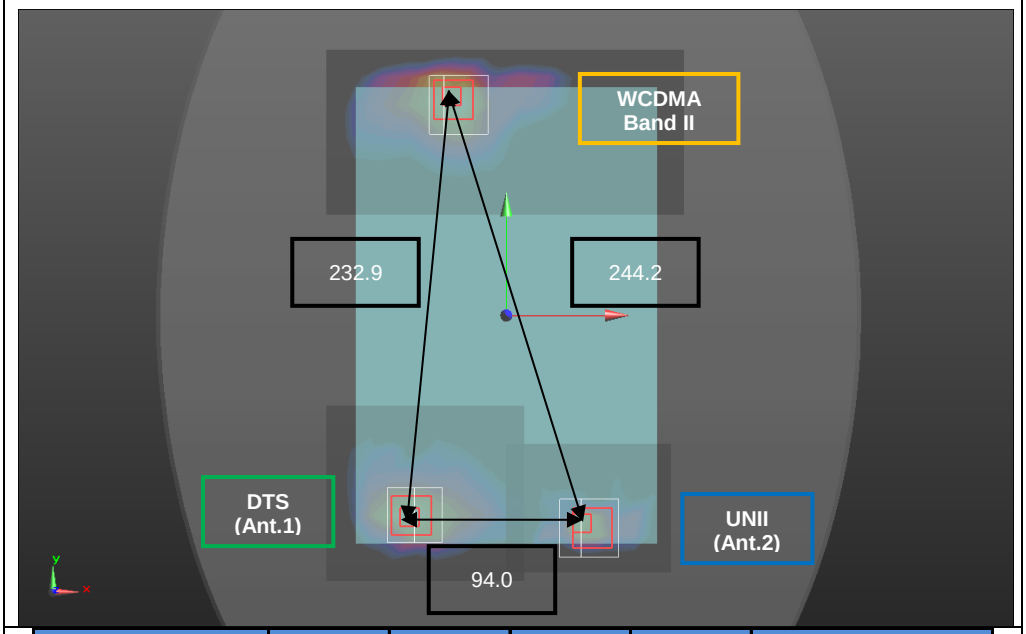
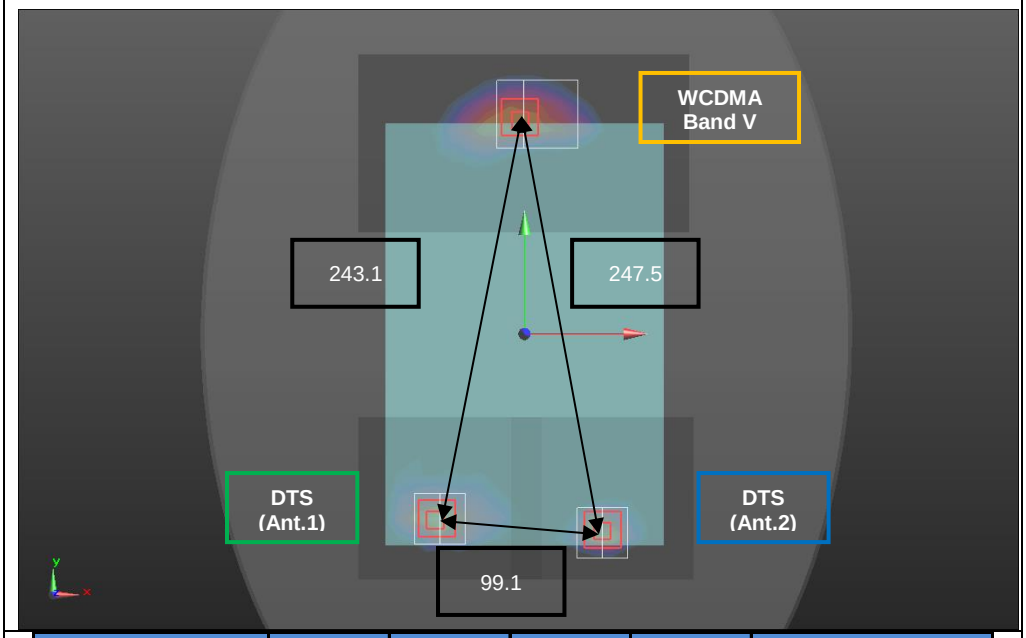
Figure (19)



Mode		SAR	X	Y	Z	d: Calculated distance (mm)	
		W/kg	m	m	m		
WCDMA Band II	①	1.176	-0.0308	0.1198	-0.0059	① + ②	232.9
DTS_Ant.1	②	1.190	-0.053	-0.112	-0.0008	① + ③	244.2
UNII_Ant.2	③	0.503	0.041	-0.1136	-0.0015	② + ③	94.0

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

Figure (20, 21, 22)



Mode		SAR	X	Y	Z	d: Calculated distance (mm)	
		W/kg	m	m	m		
WCDMA Band V	①	0.857	-0.0037	0.126	-0.003	① + ②	243.1
DTS_Ant.1	②	1.190	-0.053	-0.112	-0.0008	① + ③	247.5
DTS_Ant.2	③	1.136	0.046	-0.1164	-0.001	② + ③	99.1

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

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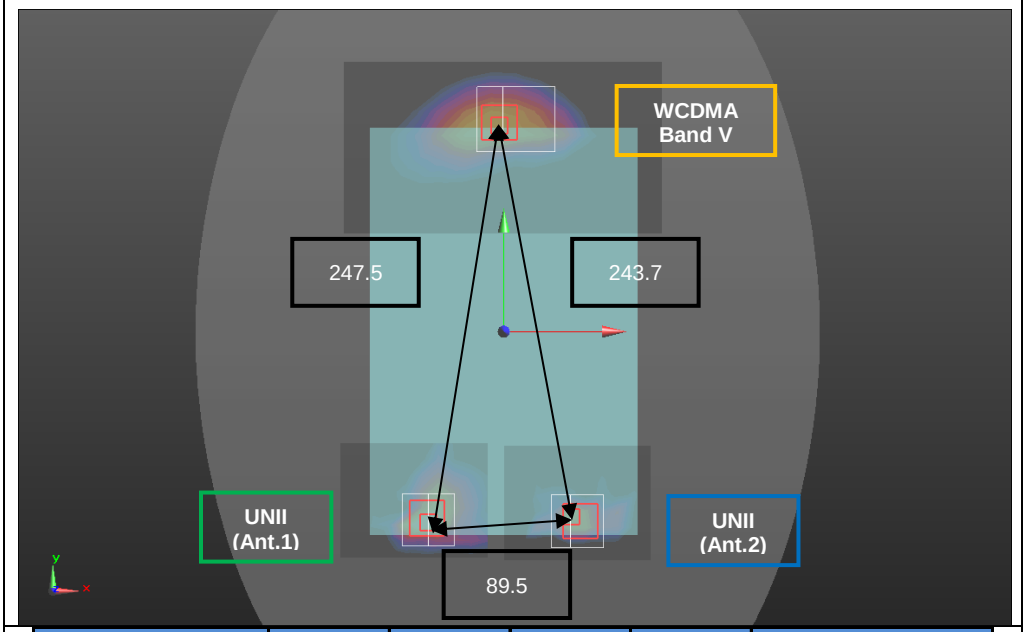
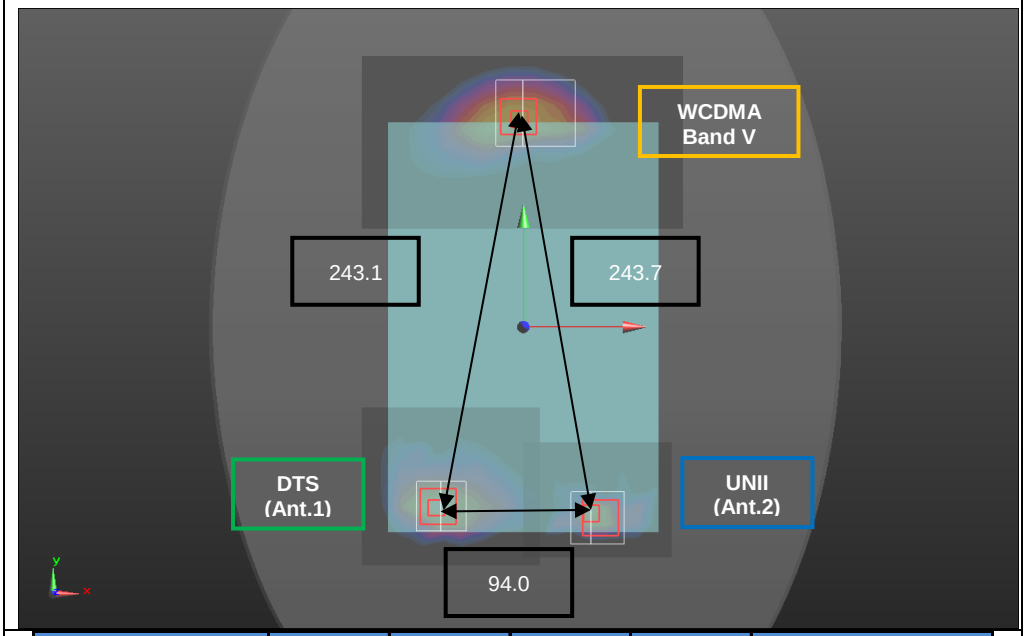
Figure (23, 24)



Mode		SAR	X	Y	Z	d: Calculated distance (mm)	
		W/kg	m	m	m		
WCDMA Band V	①	0.857	-0.0037	0.126	-0.003	① + ②	247.5
UNII_Ant.1	②	0.941	-0.0484	-0.1174	-0.0017	① + ③	243.7
UNII_Ant.2	③	0.503	0.041	-0.1136	-0.0015	② + ③	89.5

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		
WCDMA Band V	①	0.857	-0.0037	0.126	-0.003	① + ②	243.1
DTS_Ant.1	②	1.190	-0.053	-0.112	-0.0008	① + ③	243.7
UNII_Ant.2	③	0.503	0.041	-0.1136	-0.0015	② + ③	94.0

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

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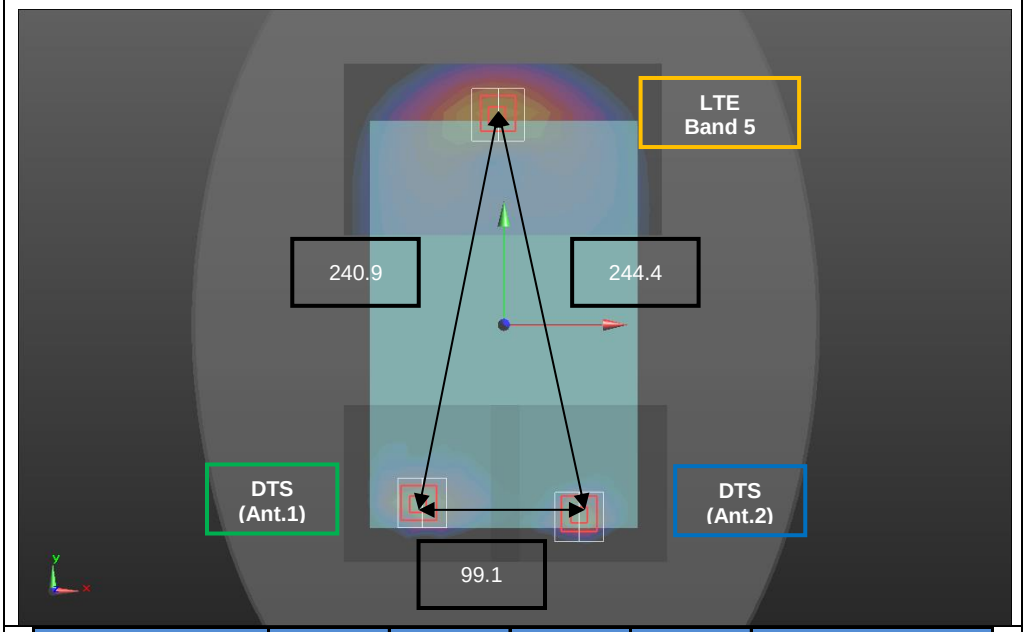
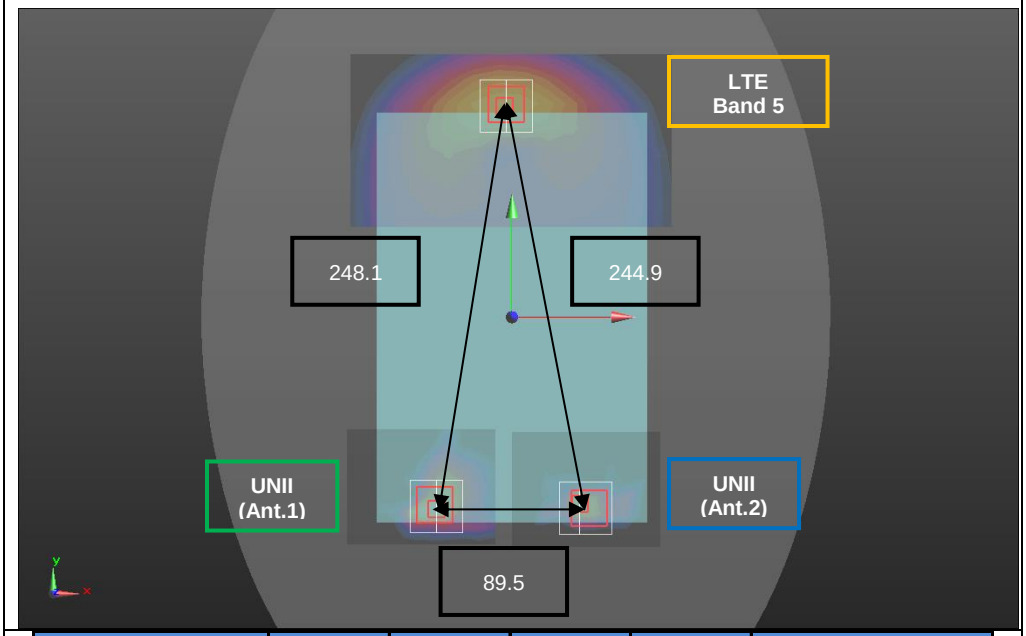
Figure (26, 27, 28)



Mode		SAR	X	Y	Z	d: Calculated distance (mm)	
		W/kg	m	m	m		
LTE Band 5	①	0.751	-0.0051	0.1269	-0.0031	① + ②	243.7
DTS_Ant.1	②	1.190	-0.053	-0.112	-0.0008	① + ③	248.6
DTS_Ant.2	③	1.136	0.046	-0.1164	-0.001	② + ③	99.1

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

Figure (29, 30)



Mode		SAR	X	Y	Z	d: Calculated distance (mm)	
		W/kg	m	m	m		
LTE Band 5	①	0.751	-0.0051	0.1269	-0.0031	① + ②	248.1
UNII_Ant.1	②	0.941	-0.0484	-0.1174	-0.0017	① + ③	244.9
UNII_Ant.2	③	0.503	0.041	-0.1136	-0.0015	② + ③	89.5

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

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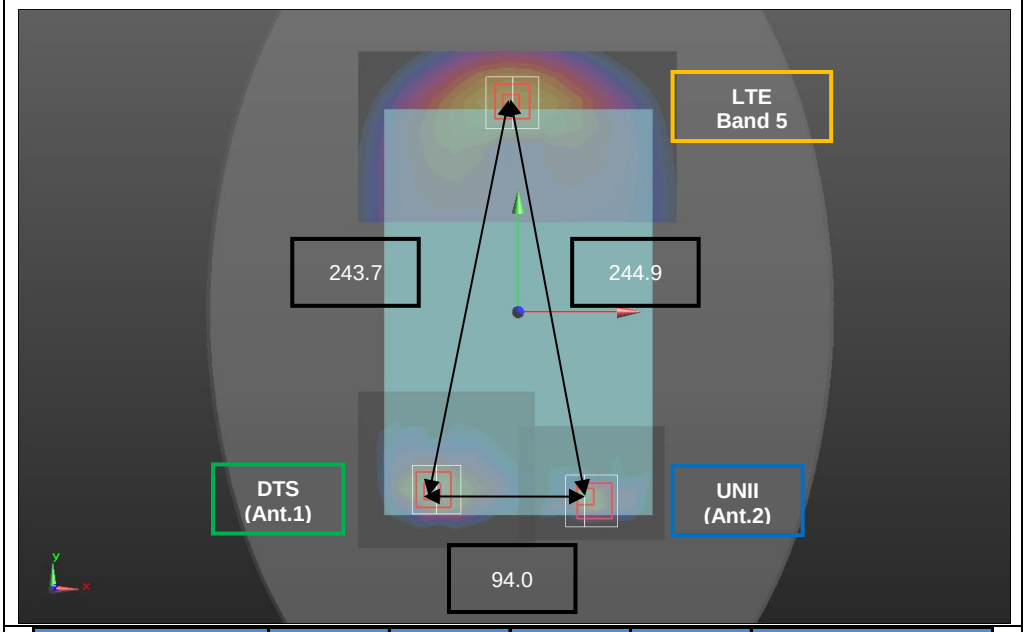
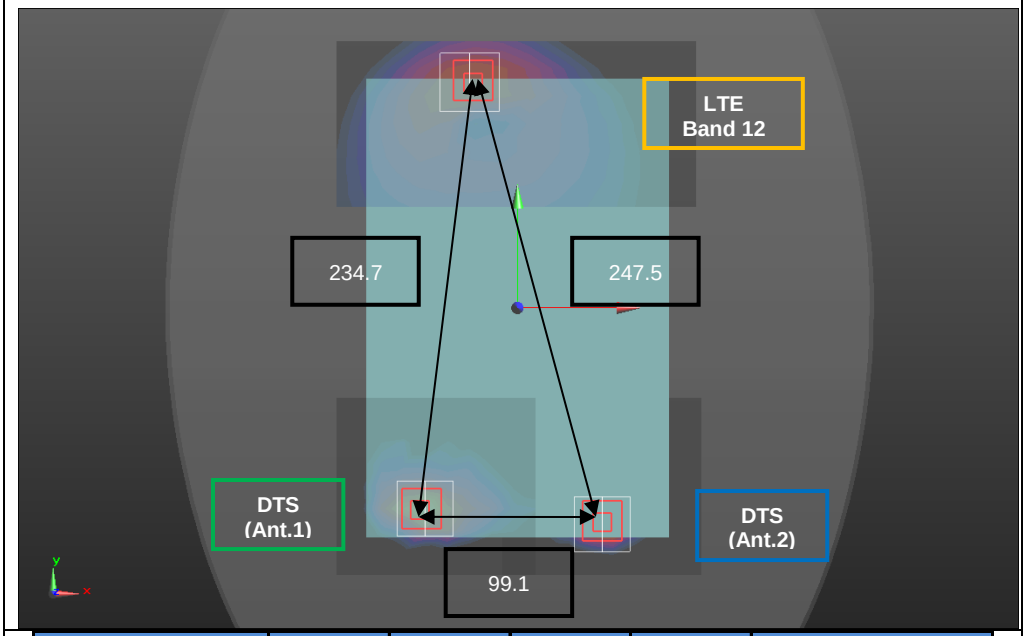
Figure (31)



Mode		SAR	X	Y	Z	d: Calculated distance (mm)	
		W/kg	m	m	m		
LTE Band 5	①	0.751	-0.0051	0.1269	-0.0031	① + ②	243.7
DTS_Ant.1	②	1.190	-0.053	-0.112	-0.0008	① + ③	244.9
UNII_Ant.2	③	0.503	0.041	-0.1136	-0.0015	② + ③	94.0

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

Figure (32, 33)



Mode		SAR	X	Y	Z	d: Calculated distance (mm)	
		W/kg	m	m	m		
LTE Band 12	①	0.442	-0.0244	0.1209	-0.003	① + ②	234.7
DTS_Ant.1	②	1.190	-0.053	-0.112	-0.0008	① + ③	247.5
DTS_Ant.2	③	1.136	0.046	-0.1164	-0.001	② + ③	99.1

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

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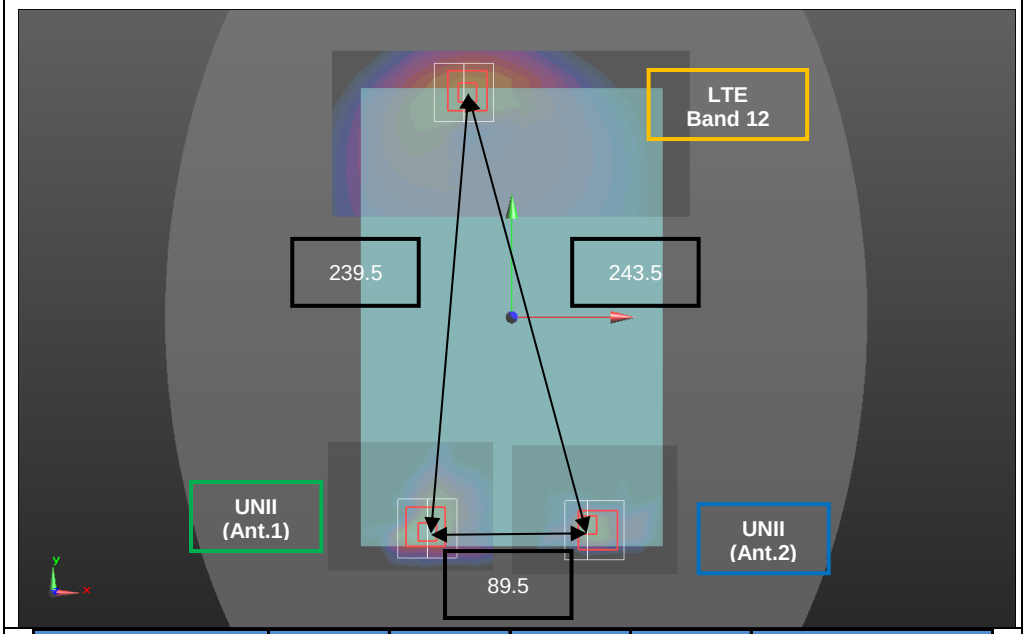
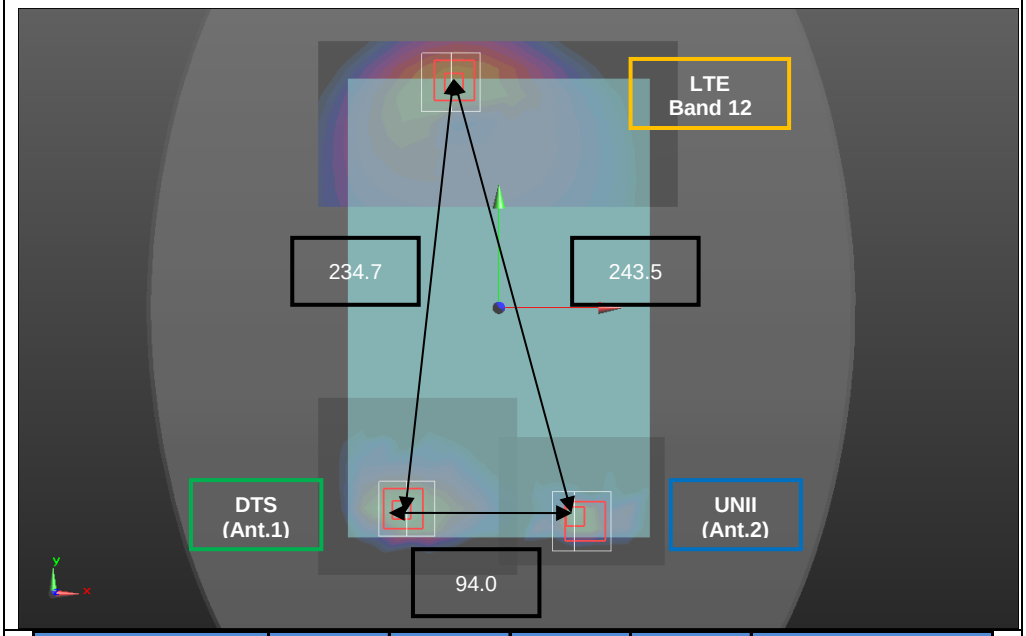
Figure (34)



Mode		SAR	X	Y	Z	d: Calculated distance (mm)	
		W/kg	m	m	m		
LTE Band 12	①	0.442	-0.0244	0.1209	-0.003	① + ②	239.5
UNII_Ant.1	②	0.941	-0.0484	-0.1174	-0.0017	① + ③	243.5
UNII_Ant.2	③	0.503	0.041	-0.1136	-0.0015	② + ③	89.5

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 12	①	0.442	-0.0244	0.1209	-0.003	① + ②	234.7
DTS_Ant.1	②	1.190	-0.053	-0.112	-0.0008	① + ③	243.5
UNII_Ant.2	③	0.503	0.041	-0.1136	-0.0015	② + ③	94.0

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

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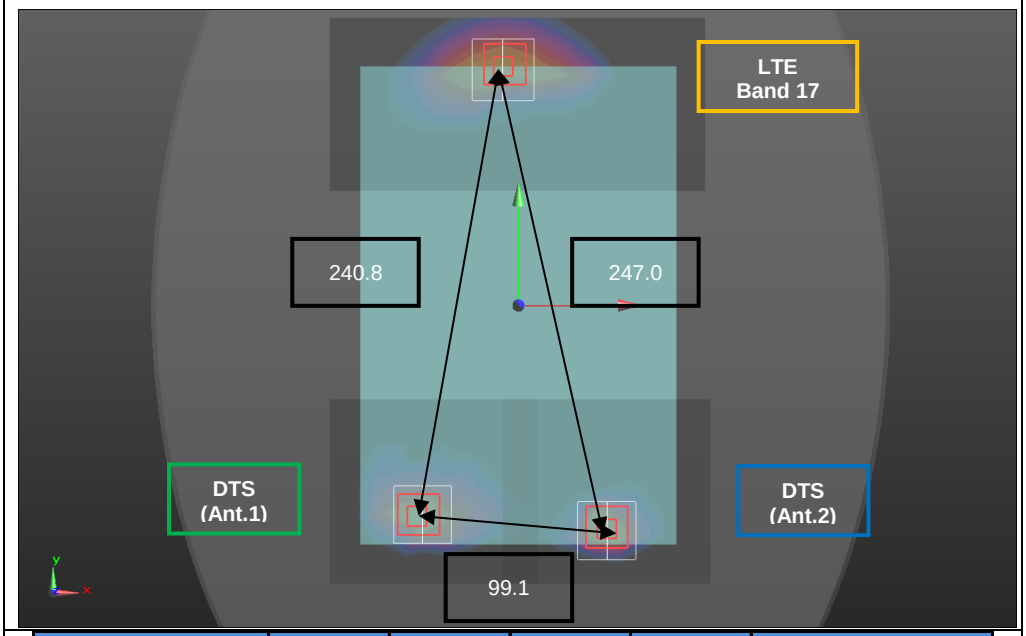
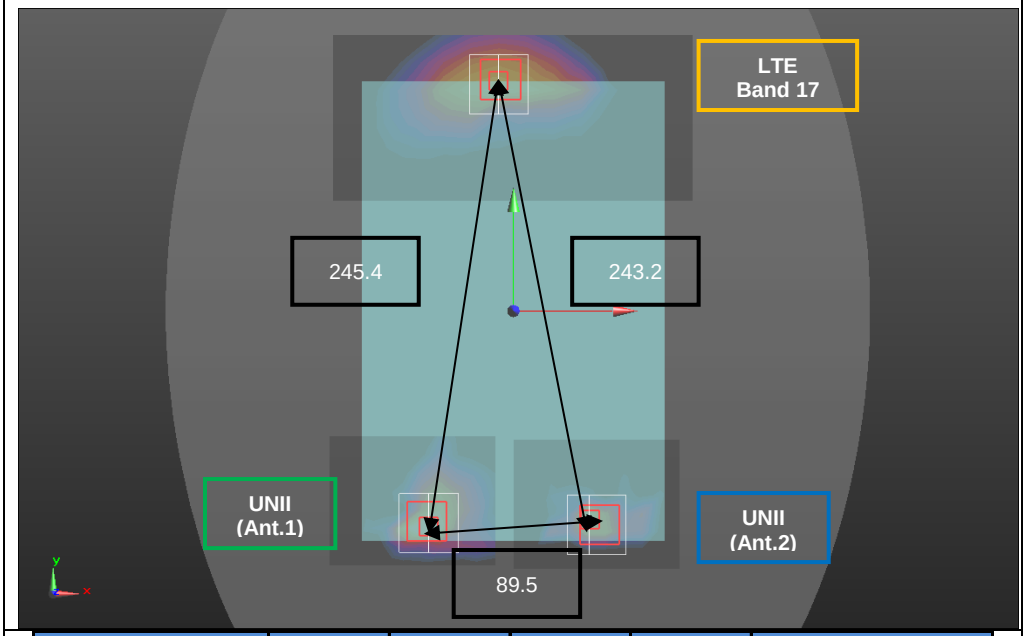
Figure (36, 37, 38)



Mode		SAR	X	Y	Z	d: Calculated distance (mm)	
		W/kg	m	m	m		
LTE Band 17	①	0.827	-0.008	0.1246	-0.0027	① + ②	240.8
DTS_Ant.1	②	1.190	-0.053	-0.112	-0.0008	① + ③	247.0
DTS_Ant.2	③	1.136	0.046	-0.1164	-0.001	② + ③	99.1

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

Figure (39. 40)



Mode		SAR	X	Y	Z	d: Calculated distance (mm)	
		W/kg	m	m	m		
LTE Band 17	①	0.827	-0.008	0.1246	-0.0027	① + ②	245.4
UNII_Ant.1	②	0.941	-0.0484	-0.1174	-0.0017	① + ③	243.2
UNII_Ant.2	③	0.503	0.041	-0.1136	-0.0015	② + ③	89.5

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

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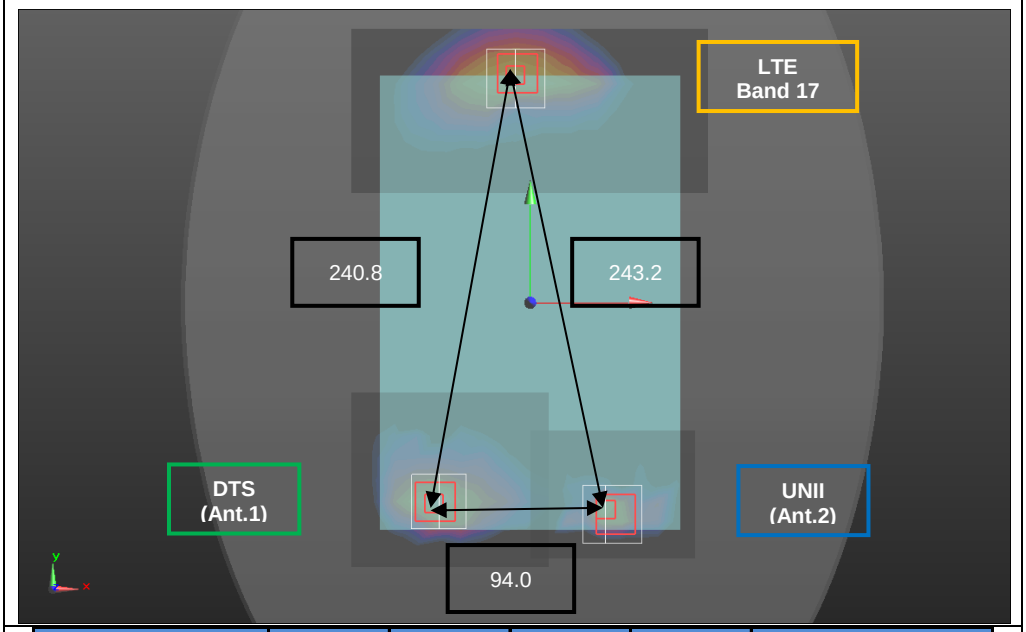
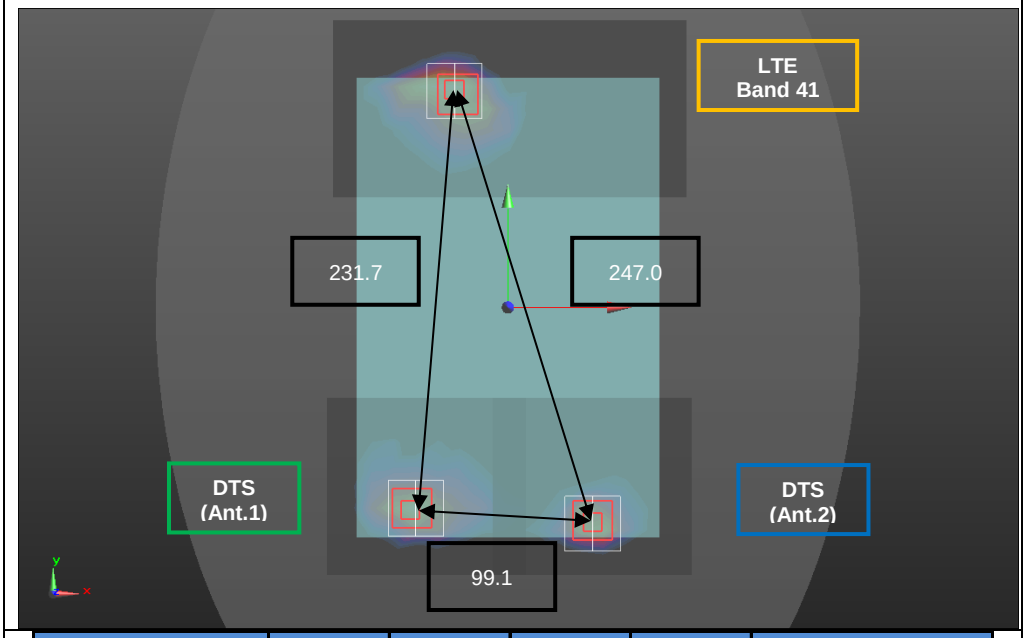
Figure (41)



Mode		SAR	X	Y	Z	d: Calculated distance (mm)	
		W/kg	m	m	m		
LTE Band 17	①	0.827	-0.008	0.1246	-0.0027	① + ②	240.8
DTS_Ant.1	②	1.190	-0.053	-0.112	-0.0008	① + ③	243.2
UNII_Ant.2	③	0.503	0.041	-0.1136	-0.0015	② + ③	94.0

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

Figure (42, 43, 45)



Mode		SAR	X	Y	Z	d: Calculated distance (mm)	
		W/kg	m	m	m		
LTE Band 41	①	1.351	-0.03	0.1186	-0.0009	① + ②	231.7
DTS_Ant.1	②	1.190	-0.053	-0.112	-0.0008	① + ③	247.0
DTS_Ant.2	③	1.136	0.046	-0.1164	-0.001	② + ③	99.1

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

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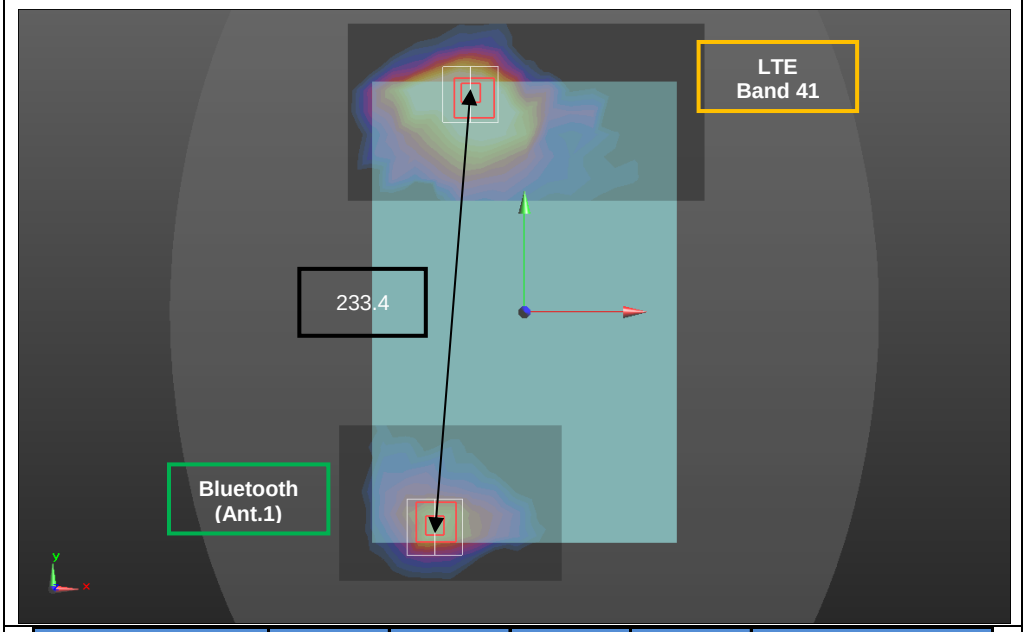
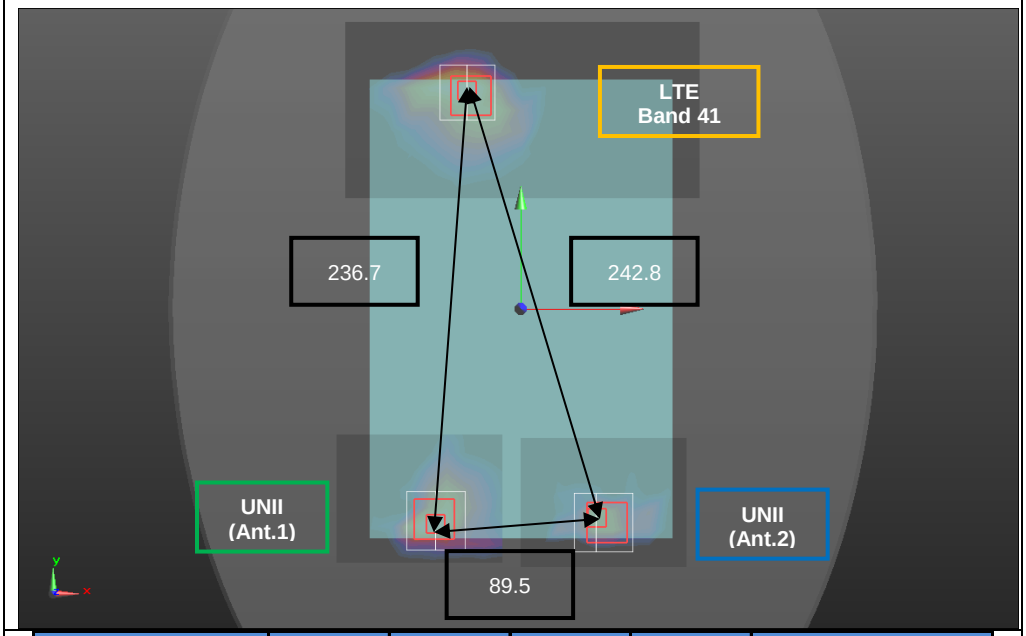
Figure (44)



Mode		SAR	X	Y	Z	d: Calculated distance (mm)	
		W/kg	m	m	m		
LTE Band 41	①	1.351	-0.03	0.1186	-0.0009	① + ②	233.4
Bluetooth	②	0.252	-0.0464	-0.1142	-0.001		

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

Figure (46. 47, 48)



Mode		SAR	X	Y	Z	d: Calculated distance (mm)	
		W/kg	m	m	m		
LTE Band 41	①	1.351	-0.03	0.1186	-0.0009	① + ②	236.7
UNII_Ant.1	②	0.941	-0.0484	-0.1174	-0.0017	① + ③	242.8
UNII_Ant.2	③	0.503	0.041	-0.1136	-0.0015	② + ③	89.5

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

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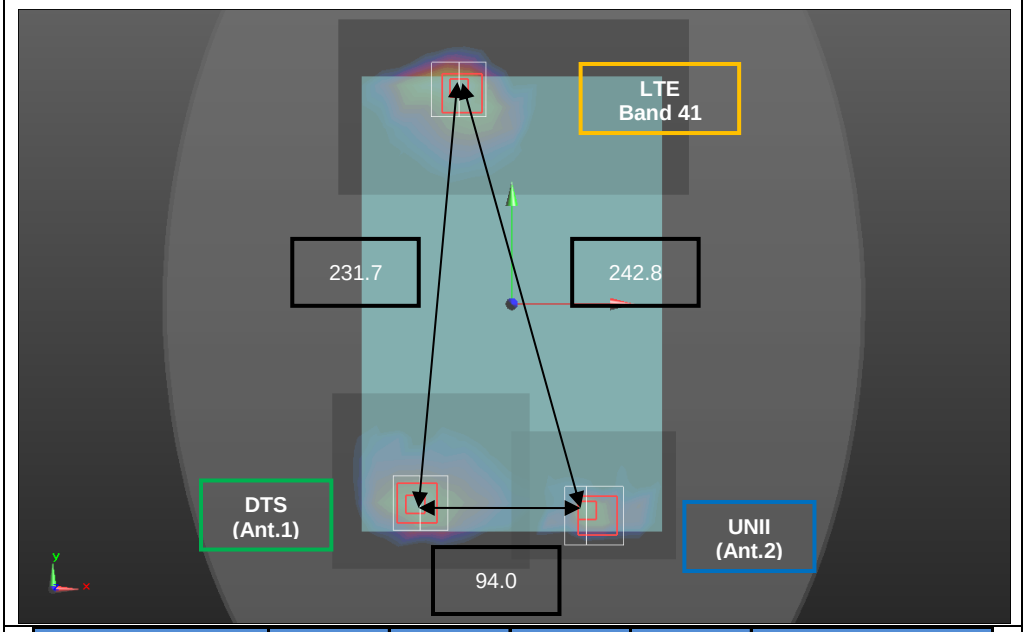
Figure (49)



Mode		SAR	X	Y	Z	d: Calculated distance (mm)	
		W/kg	m	m	m		
LTE Band 41	①	1.351	-0.03	0.1186	-0.0009	① + ②	231.7
DTS_Ant.1	②	1.190	-0.053	-0.112	-0.0008	① + ③	242.8
UNII_Ant.2	③	0.503	0.041	-0.1136	-0.0015	② + ③	94.0

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

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Appendixes

Refer to separated files for the following appendixes.

4788506351-S1V1 FCC Report SAR_App A_Photos & Ant. Locations

4788506351-S1V1 FCC Report SAR_App B_Highest SAR Test Plots

4788506351-S1V1 FCC Report SAR_App C_System Check Plots

4788506351-S1V1 FCC Report SAR_App D_SAR Tissue Ingredients

4788506351-S1V1 FCC Report SAR_App E_Probe Cal. Certificates

4788506351-S1V1 FCC Report SAR_App F_Dipole Cal. Certificates

END OF REPORT

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