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, ANT+ and NFC

MODEL NUMBER: SM-T395C

FCC ID: A3LSMT395C

REPORT NUMBER: 4788148881-S1V1

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1. Attestation of Test Results

Applicant Name		SAMSUNG ELECTRONICS CO.,LTD.			
FCC ID		A3LSMT395C			
Model Name		SM-T395C			
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)**
Head		1.00	0.98	0.64	N/A
Body		0.65	1.05	0.90	N/A
Simultaneous TX	Head	1.54	1.43	1.54	N/A
	Body	1.55	1.55	1.37	N/A
Date Tested		9/13/2017 to 9/27/2017			
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
- 648474 D04 Handset SAR v01r03
- 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

Additional Guidance: KDB inquiry

- Additional SAR test of corner side – KDB guidance to identify that SAR test when sensor and antenna is located near corner side.

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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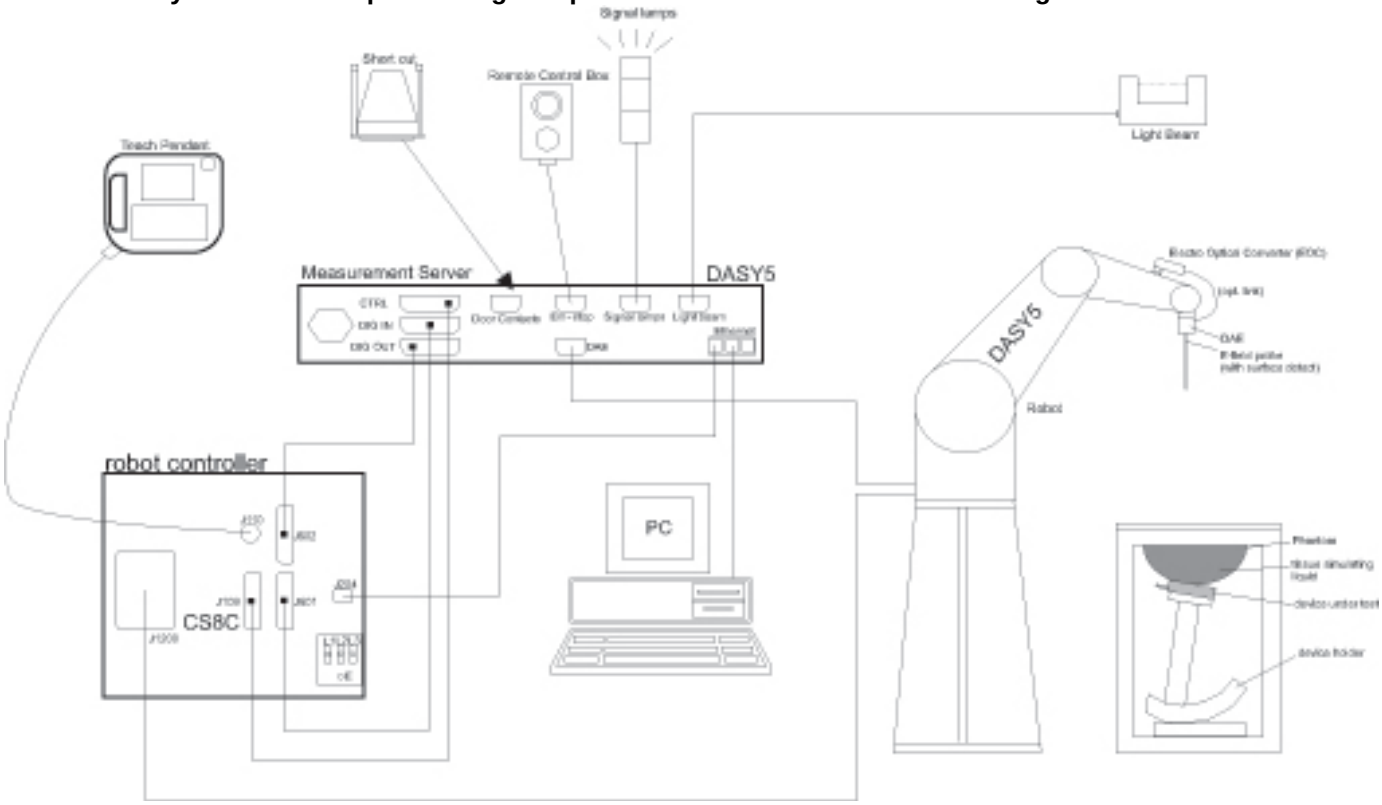
4. SAR Measurement System & Test Equipment

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
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 (SAR2)	SPEAG	EX3DV4	7313	1-30-2018
E-Field Probe (SAR3)	SPEAG	EX3DV4	7330	2-28-2018
Data Acquisition Electronics (SAR1)	SPEAG	DAE4	1468	8-22-2018
Data Acquisition Electronics (SAR2)	SPEAG	DAE4	1494	7-20-2018
Data Acquisition Electronics (SAR3)	SPEAG	DAE4	912	11-18-2017
System Validation Dipole	SPEAG	D835V2	4d194	7-19-2018
System Validation Dipole	SPEAG	D1900V2	5d199	2-21-2018
System Validation Dipole	SPEAG	D2450V2	960	2-21-2018
System Validation Dipole	SPEAG	D2600V2	1097	11-15-2017
System Validation Dipole	SPEAG	D5GHzV2	1184	8-23-2018
Thermometer (SAR1)	Lutron	MHB-382SD	AH.91463	8-10-2018
Thermometer (SAR2)	Lutron	MHB-382SD	AH.50215	8-16-2018
Thermometer (SAR3)	Lutron	MHB-382SD	AH.50213	8-16-2018

Other

Name of Equipment	Manufacturer	Type/Model	Serial No.	Cal. Due Date
Base Station Simulator	R & S	CMW500	150313	8-7-2018
Base Station Simulator	R & S	CMW500	150314	8-7-2018

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.

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6. Device Under Test (DUT) Information

6.1. DUT Description

Device Dimension	Overall (Length x Width): 213.1 mm x 126.2 mm Overall Diagonal: 230.0 mm Display Diagonal: 203.0 mm
Back Cover	☒ Normal Battery Cover
Battery Options	☒ Standard – Lithium-ion battery, Rating 3.8 V, 16.91 Wh
Accessory	Protective cover and S-pen
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, Ch.1 – Ch.11) ☒ Mobile Hotspot (Wi-Fi 5 GHz, Ch.149 – Ch.165)
Wi-Fi Direct	Wi-Fi Direct enabled devices transfer data directly between each other ☒ Wi-Fi Direct (Wi-Fi 2.4 GHz, Ch.1 – Ch.11) ☒ Wi-Fi Direct (Wi-Fi 5 GHz, Ch.36 – Ch.48, Ch.149 – Ch.165)
Test Sample Information	**No. / S/N / Notes / No. / S/N / Notes** 1 / R22J800JT7A / Main Conducted / 5 / R22J800JNSZ / SAR 2 / R22J800JNGV / Main Conducted / 6 / R22J800JR7X / SAR 3 / R22J800JNNB / Wi-Fi Conducted / 7 / R22J800JR0J / SAR 4 / R22J800JPSF / Wi-Fi Conducted

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%
	☒ Class B = GPRS connection interrupted during a GSM call, automatically resumed at end of call. Does this device support DTM (Dual Transfer Mode)? ☒ Yes ☐ No			
W-CDMA (UMTS)	Band II Band V	UMTS Rel. 99 (Voice & Data) HSDPA (Rel.8) HSUPA (Rel.8) HSPA+ (Rel.8)		100%
LTE	FDD Band 5 FDD Band 7 TDD Band 38 TDD Band 41	QPSK 16QAM ☒ Rel. 10 Carrier Aggregation (1 Uplink and 2 Downlinks) (Carrier Aggregation is only supported for downlink and not for uplink.)		100% (FDD) 63.3% (TDD)
	Does this device support SV-LTE (1xRTT-LTE)? ☐ Yes ☒ No			
Wi-Fi	2.4 GHz	802.11b, 802.11g 802.11n (HT20)		100%
	5 GHz	802.11a, 802.11n (HT20, HT40) 802.11ac (VHT20, VHT40, VHT80)		100%
	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 4.2 LE		76.88% (DH5)

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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

Upper limit (dB): -1.5 ~ 0.5		Max. RF Output Pow er (dBm)		Reduction. RF Output Pow er (dBm)	
RF Air interface	Mode	Target	Max. tune-up tolerance limit	Target	Max. tune-up tolerance limit
GSM850	Voice (1 slot)	32.5	**33.0**	31.0	**31.5**
	GPRS 1 slot	32.5	**33.0**	28.5	**29.0**
	GPRS 2 slots	30.0	**30.5**	27.0	**27.5**
	GPRS 3 slots	28.5	**29.0**	25.5	**26.0**
	GPRS 4 slots	27.0	**27.5**	24.0	**24.5**
	EGPRS 1 slot	26.5	**27.0**	26.5	**27.0**
	EGPRS 2 slots	24.5	**25.0**	24.5	**25.0**
	EGPRS 3 slots	23.5	**24.0**	23.5	**24.0**
	EGPRS 4 slots	22.0	**22.5**	22.0	**22.5**
GSM1900	Voice (1 slot)	29.0	**29.5**	22.0	**22.5**
	GPRS 1 slot	28.5	**29.0**	18.0	**18.5**
	GPRS 2 slots	26.0	**26.5**	17.0	**17.5**
	GPRS 3 slots	24.5	**25.0**	16.0	**16.5**
	GPRS 4 slots	23.5	**24.0**	14.0	**14.5**
	EGPRS 1 slot	25.0	**25.5**	19.5	**20.0**
	EGPRS 2 slots	23.0	**23.5**	17.5	**18.0**
	EGPRS 3 slots	22.0	**22.5**	16.0	**16.5**
	EGPRS 4 slots	21.0	**21.5**	14.0	**14.5**
W-CDMA Band II	R99	22.5	**23.0**	13.0	**13.5**
	HSDPA	21.5	**22.0**	13.0	**13.5**
	HSUPA	21.0	**21.5**	13.0	**13.5**
W-CDMA Band V	R99	22.5	**23.0**	17.5	**18.0**
	HSDPA	22.5	**23.0**	17.0	**17.5**
	HSUPA	21.0	**21.5**	17.0	**17.5**
LTE Band 5	QPSK, 16QAM	23.0	**23.5**	18.0	**18.5**
LTE Band 7	QPSK, 16QAM	23.0	**23.5**	10.5	**11.0**
LTE Band 38	QPSK, 16QAM	23.0	**23.5**	12.0	**12.5**
LTE Band 41	QPSK, 16QAM	23.0	**23.5**	12.0	**12.5**

Note(s):

This device support to both “Proximity sensor feature” and “IR sensor reduction feature” at License bands.

Each sensor feature is reduce the transmit power using a single fixed level of reduction. Both sensors are not operating at the same time and Proximity sensor was operated prior to IR sensor. Proximity sensor feature is operating when the device is used in close proximity to the user’s body. SAR test distance is considered according to KDB 616217 D04 Section 6.

IR sensor feature is operating when the User is used at held to ear scenarios during voice or VoIP call. Per FCC Guidance, the held-to-ear exposure conditions were evaluated at reduced power according to the head SAR positions described in IEEE 1528 2013. Detailed description of the power reduction mechanism are included in the operational description.

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Upper limit (dB): ~ 0.5		Max. RF Output Power (dBm)		Reduce RF Output Power (dBm)	
RF Air interface	Mode	Target	Max. Power limit	Target	Max. Power limit
WiFi 2.4 GHz (Ch.1 ~ Ch.11)	802.11b	17.0	**17.5**	13.0	**13.5**
	802.11g	16.0	**16.5**	13.0	**13.5**
	802.11n HT20	16.0	**16.5**	13.0	**13.5**
WiFi 2.4 GHz (Ch.12)	802.11b	8.0	**8.5**	8.0	**8.5**
	802.11g	8.0	**8.5**	8.0	**8.5**
	802.11n HT20	8.0	**8.5**	8.0	**8.5**
WiFi 2.4 GHz (Ch.13)	802.11b	8.0	**8.5**	8.0	**8.5**
	802.11g	3.0	**3.5**	3.0	**3.5**
	802.11n HT20	2.0	**2.5**	2.0	**2.5**
WiFi 5 GHz (Execpt 5700 MHz)	802.11a	12.0	**12.5**	8.0	**8.5**
	802.11n HT20	11.0	**11.5**	8.0	**8.5**
	802.11n HT40	11.0	**11.5**	8.0	**8.5**
	802.11ac VHT20	11.0	**11.5**	8.0	**8.5**
	802.11ac VHT40	11.0	**11.5**	8.0	**8.5**
	802.11ac VHT80	11.0	**11.5**	8.0	**8.5**
WiFi 5700 MHz	802.11a	11.0	**11.5**	8.0	**8.5**
	802.11n HT20	10.0	**10.5**	8.0	**8.5**
	802.11n HT40	11.0	**11.5**	8.0	**8.5**
	802.11ac VHT20	11.0	**11.5**	8.0	**8.5**
	802.11ac VHT40	11.0	**11.5**	8.0	**8.5**
	802.11ac VHT80	11.0	**11.5**	8.0	**8.5**
Bluetooth		8.5	**9.0**	N/A	
Bluetooth LE		1.0	**1.5**	N/A	

Note(s):

This device support to “Proximity sensor feature” at WLAN bands. Proximity sensor feature is operating when the device is used in close proximity to the user’s body. SAR test distance is considered according to KDB 616217 D04 Section 6.

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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 7	Frequency range: 2500 - 2570 MHz					
	Channel Bandwidth					
	20 MHz	15 MHz	10 MHz	5 MHz	3 MHz	1.4 MHz
Low	20850/ 2510	20825/ 2507.5	20800/ 2505	20775/ 2502.5		
Mid	21100/ 2535	21100/ 2535	21100/ 2535	21100/ 2535		
High	21350/ 2560	21375/ 2562.5	21400/ 2565	21425/ 2567.5		

Band 38	Frequency range: 2570 - 2620 MHz					
	Channel Bandwidth					
	20 MHz	15 MHz	10 MHz	5 MHz	3 MHz	1.4 MHz
Low	37850/ 2580	37825/ 2577.5	37800/ 2575	37775/ 2572.5		
Mid	38000/ 2595	38000/ 2595	38000/ 2595	38000/ 2595		
High	38150 2610	38175/ 2612.5	38200/ 2615	38225/ 2617.5		

Band 41	Frequency range: 2555 - 2655 MHz					
	Channel Bandwidth					
	20 MHz	15 MHz	10 MHz	5 MHz	3 MHz	1.4 MHz
Low	40340/ 2565	40315/ 2562.5	40290/ 2560	40265/ 2557.5		
Mid	40740/ 2605	40740/ 2605	40740/ 2605	40740/ 2605		
High	41140/ 2645	41165/ 2647.5	41190/ 2650	41250/ 2652.5		

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 3

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

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.

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6.5. LTE Carrier Aggregation

Combination	CA configuration	Bandwidth (MHz)											
		Carrier 1						Carrier 2					
		20	15	10	5	3	1.4	20	15	10	5	3	1.4
Intra-Band contiguous	38C		√						√				
		√						√					
	41C			√				√					
			√					√	√				
		√						√	√	√			
	41C(1)			√	√			√					
			√					√	√				
		√						√	√	√	√		
	41C(2)			√				√	√				
			√					√	√	√			
		√						√	√	√			
	41C(3)			√				√					
		√						√					
Intra-Band Non-contiguous	41A-41A	√	√	√				√	√	√			
	41A-41A(1)	√	√	√	√			√	√	√	√		

Note(s):

For supported channels, please refer to §6.4

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6.6. LTE (TDD) Considerations

According to KDB 941225 D05 SAR for LTE Devices, 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.

SAR was tested with the highest transmission duty factor (63.33%) using Uplink-downlink configuration 0 and Special subframe configuration 7.

LTE TDD Band 38 supports 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

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6.7. Power Reduction features

6.7.1. Proximity sensor feature

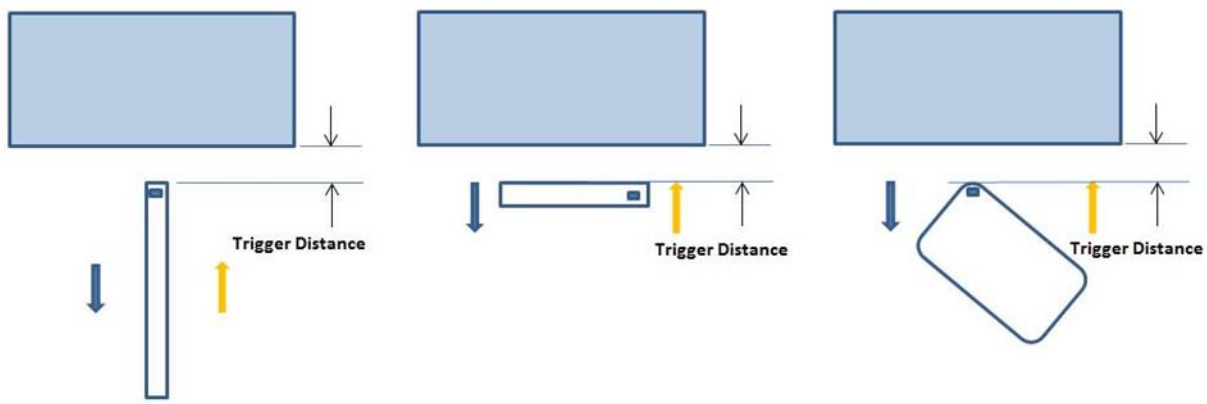
6.7.1.1 Proximity Sensor Triggering Distance (KDB 616217 §6.2)

Rear, Front, Edge 1, Edge 2, Corner of the DUT was placed directly below the flat phantom. The DUT was moved toward the phantom in accordance with the steps outlined in KDB 616217 §6.2 to determine the trigger distance for enabling power reduction. The DUT was moved away from the phantom to determine the trigger distance for resuming full power.

The measurement was then repeated for the surface of Rear, Front, Edge 1, Edge 2, Corner.

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, Edge 2

Proximity Sensor Trigger Distance Assessment

KDB 616217 §6.2, Front, Rear

Proximity Sensor Trigger Distance Assessment

KDB 616217 §6.2, Corner of between Edge 1 and Edge 2

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	Trigger distance – Edge 2	Trigger distance – Corner	Tissue simulating liquid	Trigger distance - Front
	Moving toward / from phantom	Moving toward / from phantom	Moving toward / from phantom	Moving toward / from phantom		Moving toward / from phantom
750 muscle	16 mm	16 mm	4 mm	9 mm	750 Head	12 mm
850 muscle	16 mm	16 mm	4 mm	9 mm	850 Head	12 mm
1750 muscle	16 mm	16 mm	4 mm	9 mm	1750 Head	12 mm
1900 muscle	16 mm	16 mm	4 mm	9 mm	1900 Head	12 mm
2600 muscle	16 mm	16 mm	4 mm	9 mm	2600 Head	12 mm
2450 muscle	6 mm	3 mm	N/A	N/A	2450 Head	N/A
5000 muscle	6 mm	3 mm	N/A	N/A	5000 Head	N/A

Note(s):

Corner side is located between Edge 1 and Edge 2.

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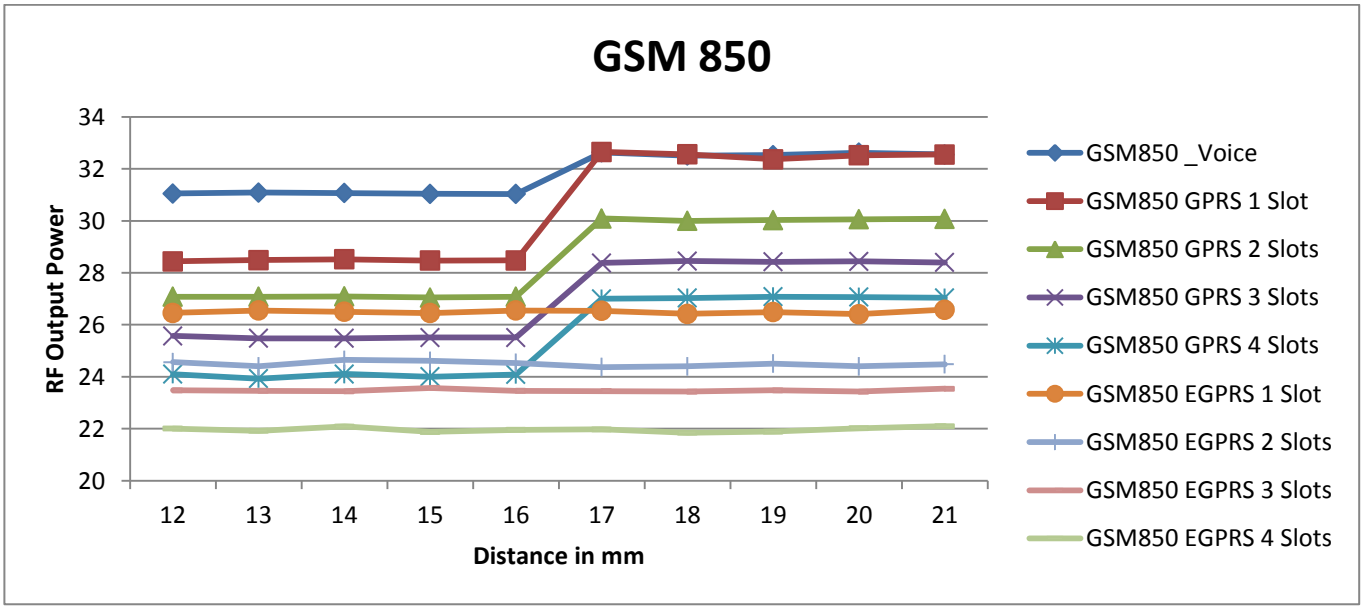
Proximity Sensor Triggering Distance Measurement Results

GSM 850

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

Distance to DUT vs. Output Power in dBm										
Distance (mm)	12	13	14	15	16	17	18	19	20	21
GSM850 _Voice	31.1	31.1	31.1	31.0	31.0	32.6	32.5	32.5	32.6	32.6
GSM850 GPRS 1 Slot	28.4	28.5	28.5	28.5	28.5	32.7	32.6	32.4	32.5	32.6
GSM850 GPRS 2 Slots	27.1	27.1	27.1	27.1	27.1	30.1	30.0	30.0	30.1	30.1
GSM850 GPRS 3 Slots	25.6	25.5	25.5	25.5	25.5	28.4	28.5	28.4	28.4	28.4
GSM850 GPRS 4 Slots	24.1	23.9	24.1	24.0	24.1	27.0	27.0	27.1	27.1	27.0
GSM850 EGPRS 1 Slot	26.5	26.6	26.5	26.5	26.6	26.5	26.4	26.5	26.4	26.6
GSM850 EGPRS 2 Slots	24.6	24.4	24.7	24.6	24.5	24.4	24.4	24.5	24.4	24.5
GSM850 EGPRS 3 Slots	23.5	23.5	23.4	23.6	23.5	23.5	23.4	23.5	23.4	23.5
GSM850 EGPRS 4 Slots	22.0	21.9	22.1	21.9	22.0	22.0	21.9	21.9	22.0	22.1



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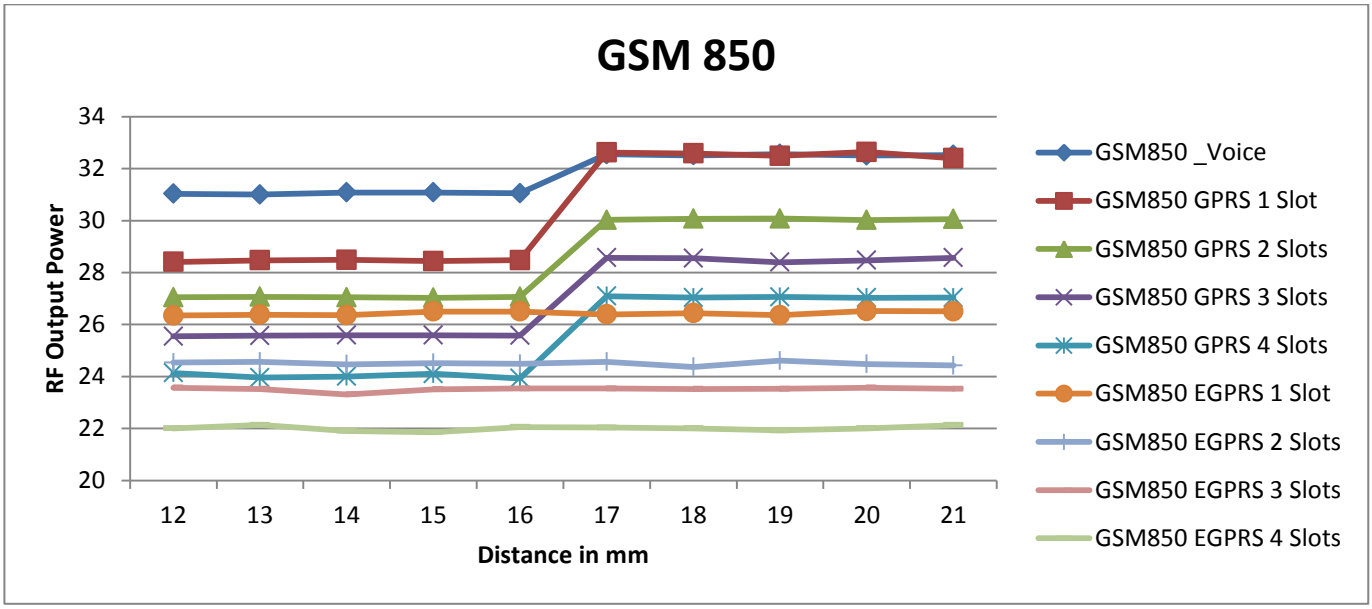
Edge 1, DUT Moving Toward (Trigger) and Away (Release) from the Phantom

Distance to DUT vs. Output Power in dBm										
Distance (mm)	12	13	14	15	16	17	18	19	20	21
GSM850 _Voice	31.0	31.0	31.1	31.1	31.1	32.6	32.5	32.6	32.5	32.5
GSM850 GPRS 1 Slot	28.4	28.5	28.5	28.4	28.5	32.6	32.6	32.5	32.6	32.4
GSM850 GPRS 2 Slots	27.1	27.1	27.1	27.0	27.1	30.0	30.1	30.1	30.0	30.1
GSM850 GPRS 3 Slots	25.6	25.6	25.6	25.6	25.6	28.6	28.6	28.4	28.5	28.6
GSM850 GPRS 4 Slots	24.1	24.0	24.0	24.1	23.9	27.1	27.0	27.1	27.0	27.0
GSM850 EGPRS 1 Slot	26.4	26.4	26.4	26.5	26.5	26.4	26.4	26.4	26.5	26.5
GSM850 EGPRS 2 Slots	24.5	24.6	24.5	24.5	24.5	24.6	24.4	24.6	24.5	24.4
GSM850 EGPRS 3 Slots	23.6	23.5	23.3	23.5	23.5	23.5	23.5	23.5	23.6	23.5
GSM850 EGPRS 4 Slots	22.0	22.1	21.9	21.9	22.1	22.0	22.0	21.9	22.0	22.1



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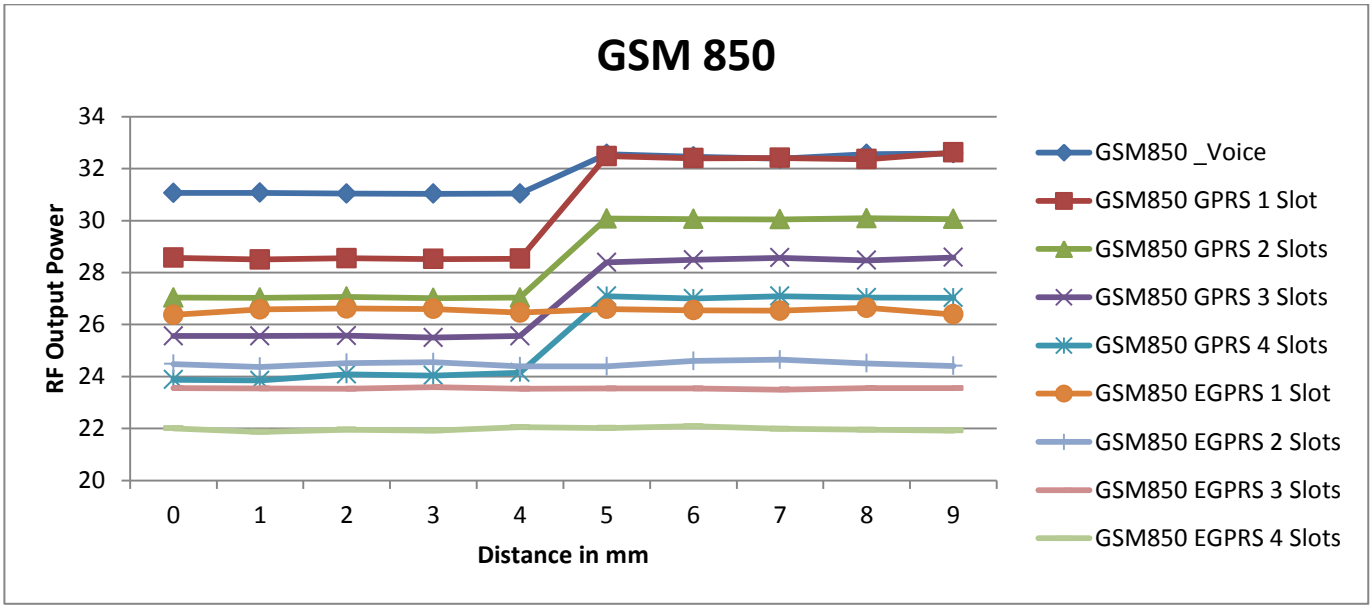
Edge 2, DUT Moving Toward (Trigger) and Away (Release) from the Phantom

Distance to DUT vs. Output Power in dBm										
Distance (mm)	0	1	2	3	4	5	6	7	8	9
GSM850 _Voice	31.1	31.1	31.0	31.0	31.0	32.6	32.5	32.4	32.6	32.6
GSM850 GPRS 1 Slot	28.6	28.5	28.6	28.5	28.5	32.5	32.4	32.4	32.4	32.6
GSM850 GPRS 2 Slots	27.0	27.0	27.1	27.0	27.0	30.1	30.1	30.1	30.1	30.1
GSM850 GPRS 3 Slots	25.6	25.6	25.6	25.5	25.6	28.4	28.5	28.6	28.5	28.6
GSM850 GPRS 4 Slots	23.9	23.9	24.1	24.0	24.2	27.1	27.0	27.1	27.0	27.0
GSM850 EGPRS 1 Slot	26.4	26.6	26.6	26.6	26.5	26.6	26.6	26.5	26.6	26.4
GSM850 EGPRS 2 Slots	24.5	24.4	24.5	24.6	24.4	24.4	24.6	24.7	24.5	24.4
GSM850 EGPRS 3 Slots	23.6	23.5	23.5	23.6	23.5	23.5	23.5	23.5	23.6	23.6
GSM850 EGPRS 4 Slots	22.0	21.9	22.0	21.9	22.1	22.0	22.1	22.0	22.0	21.9



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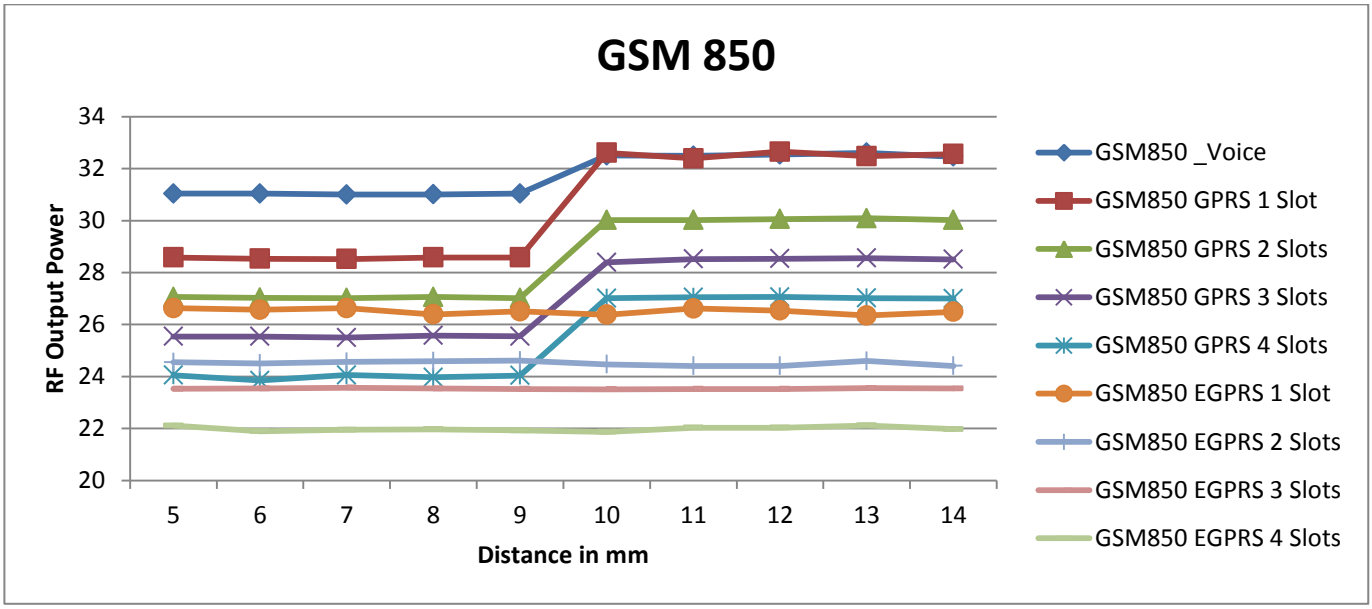
Corner, DUT Moving Toward (Trigger) and Away (Release) from the Phantom

Distance to DUT vs. Output Power in dBm										
Distance (mm)	5	6	7	8	9	10	11	12	13	14
GSM850 _Voice	31.0	31.0	31.0	31.0	31.0	32.5	32.5	32.5	32.6	32.5
GSM850 GPRS 1 Slot	28.6	28.5	28.5	28.6	28.6	32.6	32.4	32.7	32.5	32.6
GSM850 GPRS 2 Slots	27.1	27.0	27.0	27.1	27.0	30.0	30.0	30.1	30.1	30.0
GSM850 GPRS 3 Slots	25.5	25.5	25.5	25.6	25.6	28.4	28.5	28.5	28.6	28.5
GSM850 GPRS 4 Slots	24.1	23.9	24.1	24.0	24.0	27.0	27.1	27.1	27.0	27.0
GSM850 EGPRS 1 Slot	26.6	26.6	26.6	26.4	26.5	26.4	26.6	26.5	26.4	26.5
GSM850 EGPRS 2 Slots	24.6	24.5	24.6	24.6	24.6	24.5	24.4	24.4	24.6	24.4
GSM850 EGPRS 3 Slots	23.5	23.5	23.6	23.5	23.5	23.5	23.5	23.5	23.6	23.5
GSM850 EGPRS 4 Slots	22.1	21.9	22.0	22.0	21.9	21.9	22.0	22.0	22.1	22.0



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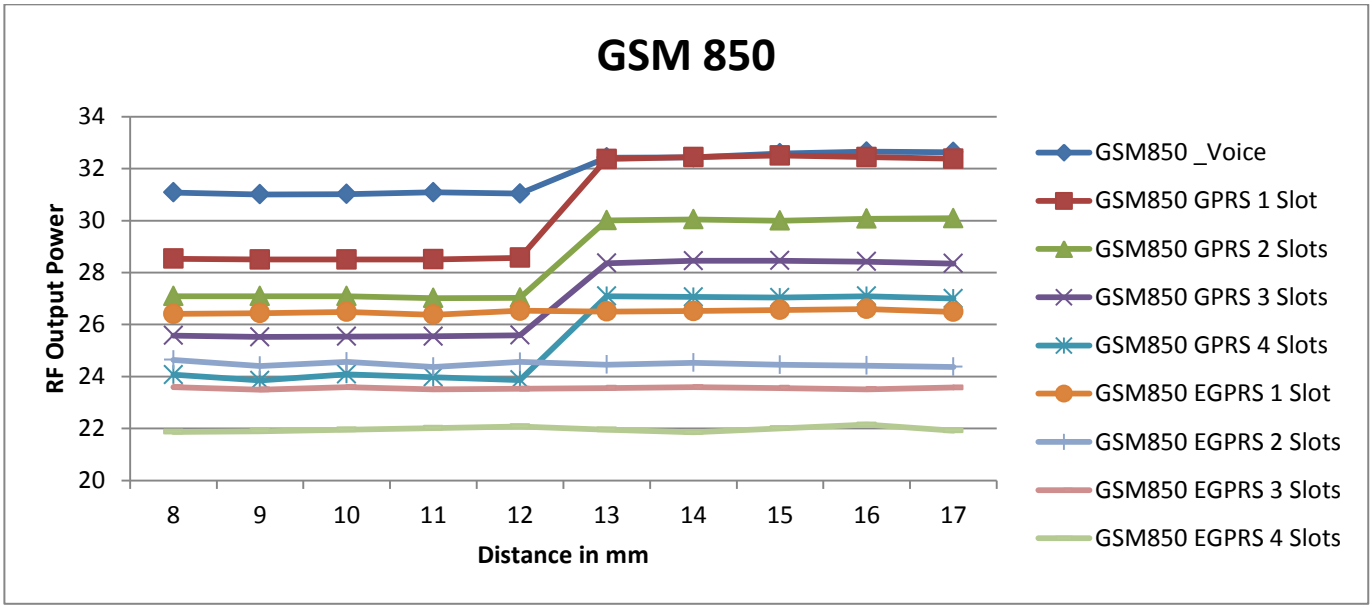
Front, DUT Moving Toward (Trigger) and Away (Release) from the Phantom

Distance to DUT vs. Output Power in dBm										
Distance (mm)	8	9	10	11	12	13	14	15	16	17
GSM850 _Voice	31.1	31.0	31.0	31.1	31.0	32.4	32.4	32.6	32.7	32.6
GSM850 GPRS 1 Slot	28.5	28.5	28.5	28.5	28.6	32.4	32.4	32.5	32.4	32.4
GSM850 GPRS 2 Slots	27.1	27.1	27.1	27.0	27.0	30.0	30.1	30.0	30.1	30.1
GSM850 GPRS 3 Slots	25.6	25.5	25.5	25.6	25.6	28.4	28.5	28.5	28.4	28.4
GSM850 GPRS 4 Slots	24.1	23.9	24.1	24.0	23.9	27.1	27.1	27.0	27.1	27.0
GSM850 EGPRS 1 Slot	26.4	26.4	26.5	26.4	26.5	26.5	26.5	26.6	26.6	26.5
GSM850 EGPRS 2 Slots	24.6	24.4	24.6	24.4	24.6	24.5	24.5	24.5	24.4	24.4
GSM850 EGPRS 3 Slots	23.6	23.5	23.6	23.5	23.5	23.6	23.6	23.6	23.5	23.6
GSM850 EGPRS 4 Slots	21.9	21.9	22.0	22.0	22.1	22.0	21.9	22.0	22.2	21.9



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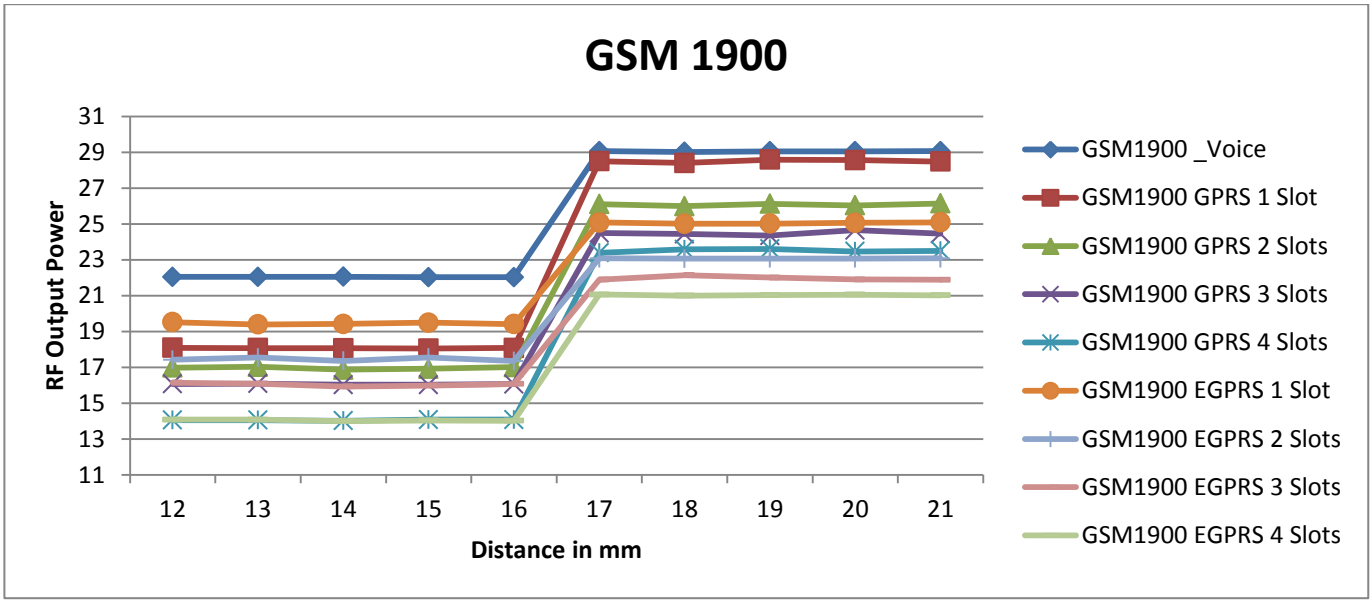
GSM 1900

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

Distance to DUT vs. Output Power in dBm										
Distance (mm)	12	13	14	15	16	17	18	19	20	21
GSM1900 _Voice	22.0	22.0	22.1	22.0	22.0	29.1	29.0	29.1	29.1	29.1
GSM1900 GPRS 1 Slot	18.1	18.1	18.1	18.0	18.1	28.5	28.4	28.6	28.6	28.5
GSM1900 GPRS 2 Slots	17.0	17.0	16.9	16.9	17.0	26.1	26.0	26.1	26.0	26.1
GSM1900 GPRS 3 Slots	16.1	16.1	16.0	16.0	16.1	24.5	24.4	24.4	24.7	24.5
GSM1900 GPRS 4 Slots	14.1	14.1	14.0	14.1	14.1	23.4	23.6	23.6	23.5	23.5
GSM1900 EGPRS 1 Slot	19.5	19.4	19.4	19.5	19.4	25.1	25.0	25.0	25.1	25.1
GSM1900 EGPRS 2 Slots	17.4	17.5	17.4	17.5	17.4	23.1	23.1	23.1	23.1	23.1
GSM1900 EGPRS 3 Slots	16.1	16.1	15.9	16.0	16.1	21.9	22.1	22.0	21.9	21.9
GSM1900 EGPRS 4 Slots	14.1	14.1	14.0	14.0	14.0	21.1	21.0	21.0	21.1	21.0



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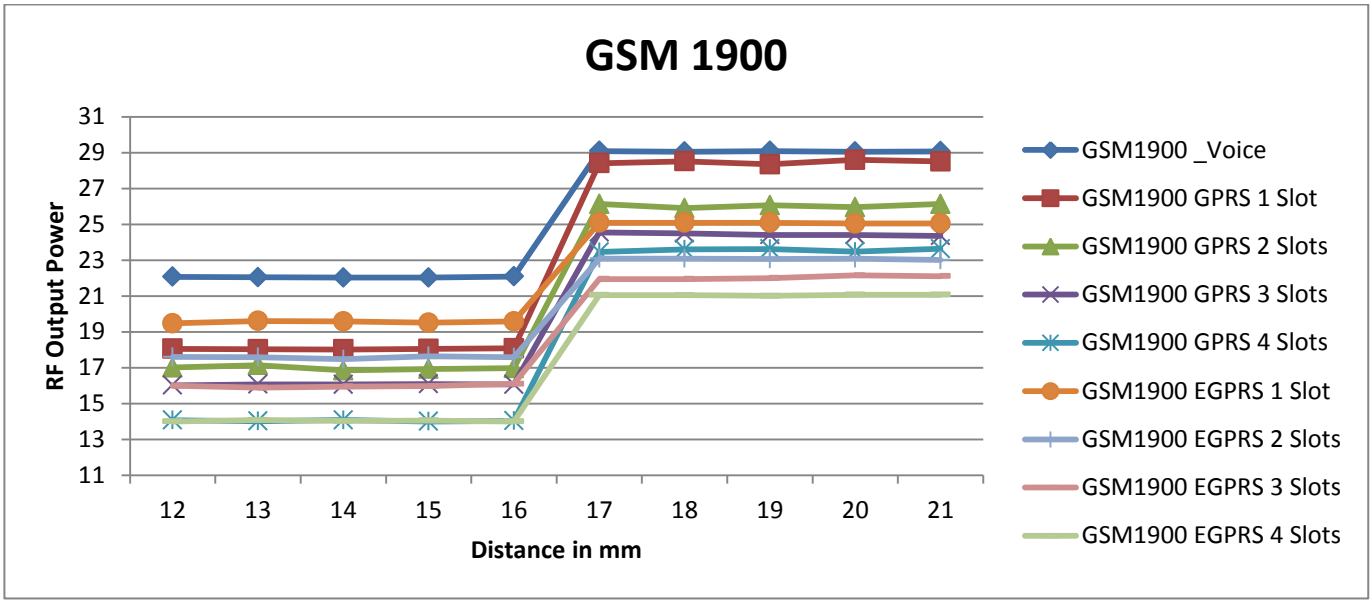
Edge 1, DUT Moving Toward (Trigger) and Away (Release) from the Phantom

Distance to DUT vs. Output Power in dBm										
Distance (mm)	12	13	14	15	16	17	18	19	20	21
GSM1900 _Voice	22.1	22.0	22.0	22.0	22.1	29.1	29.1	29.1	29.1	29.1
GSM1900 GPRS 1 Slot	18.1	18.0	18.0	18.0	18.1	28.4	28.5	28.4	28.6	28.5
GSM1900 GPRS 2 Slots	17.0	17.1	16.9	16.9	17.0	26.1	25.9	26.1	26.0	26.1
GSM1900 GPRS 3 Slots	16.0	16.1	16.1	16.1	16.1	24.6	24.5	24.4	24.4	24.4
GSM1900 GPRS 4 Slots	14.1	14.0	14.1	14.0	14.0	23.5	23.6	23.6	23.5	23.6
GSM1900 EGPRS 1 Slot	19.5	19.6	19.6	19.5	19.6	25.1	25.1	25.1	25.0	25.1
GSM1900 EGPRS 2 Slots	17.6	17.6	17.5	17.6	17.6	23.1	23.1	23.1	23.1	23.0
GSM1900 EGPRS 3 Slots	16.0	15.9	16.0	16.0	16.1	22.0	22.0	22.0	22.2	22.1
GSM1900 EGPRS 4 Slots	14.0	14.1	14.0	14.1	14.0	21.1	21.0	21.0	21.1	21.1



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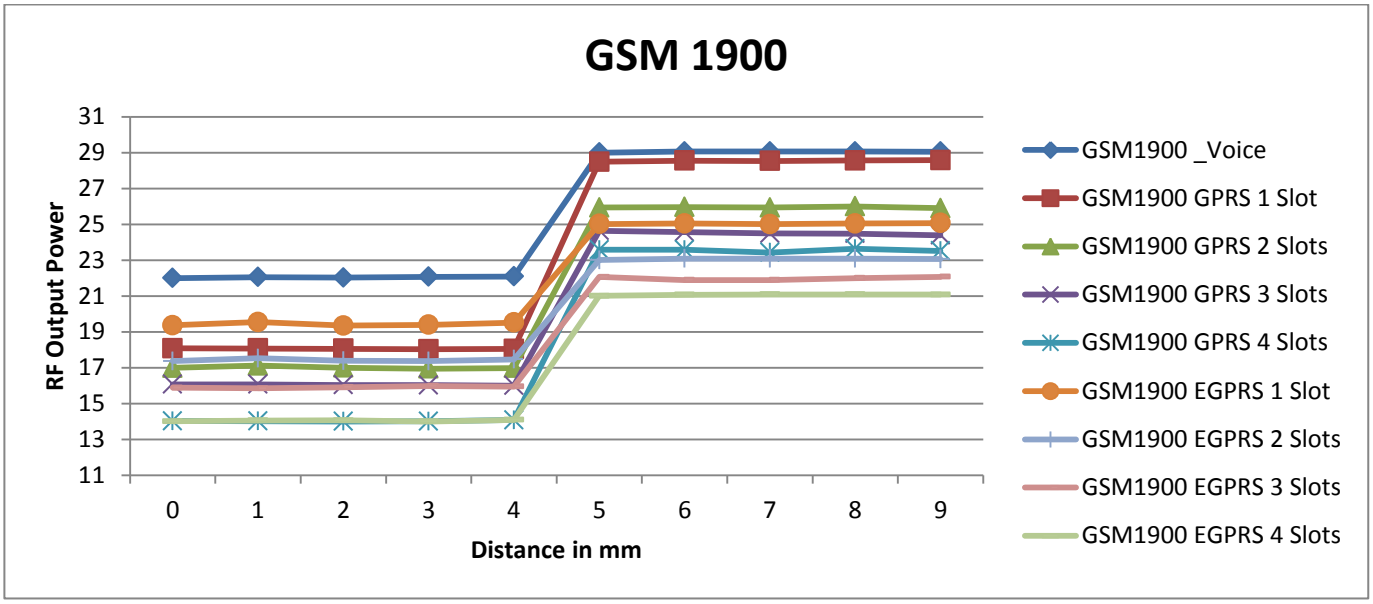
Edge 2, DUT Moving Toward (Trigger) and Away (Release) from the Phantom

Distance to DUT vs. Output Power in dBm										
Distance (mm)	0	1	2	3	4	5	6	7	8	9
GSM1900 _Voice	22.0	22.1	22.0	22.1	22.1	29.0	29.1	29.1	29.1	29.1
GSM1900 GPRS 1 Slot	18.1	18.1	18.1	18.0	18.0	28.5	28.6	28.5	28.6	28.6
GSM1900 GPRS 2 Slots	17.0	17.1	17.0	17.0	17.0	25.9	26.0	25.9	26.0	25.9
GSM1900 GPRS 3 Slots	16.1	16.1	16.0	16.0	16.0	24.6	24.6	24.5	24.5	24.4
GSM1900 GPRS 4 Slots	14.0	14.0	14.0	14.0	14.1	23.6	23.6	23.4	23.6	23.5
GSM1900 EGPRS 1 Slot	19.4	19.5	19.4	19.4	19.5	25.0	25.0	25.0	25.0	25.1
GSM1900 EGPRS 2 Slots	17.4	17.5	17.4	17.4	17.5	23.0	23.1	23.1	23.1	23.1
GSM1900 EGPRS 3 Slots	15.9	15.9	15.9	16.0	16.0	22.1	21.9	21.9	22.0	22.1
GSM1900 EGPRS 4 Slots	14.0	14.1	14.1	14.0	14.1	21.0	21.1	21.1	21.1	21.1



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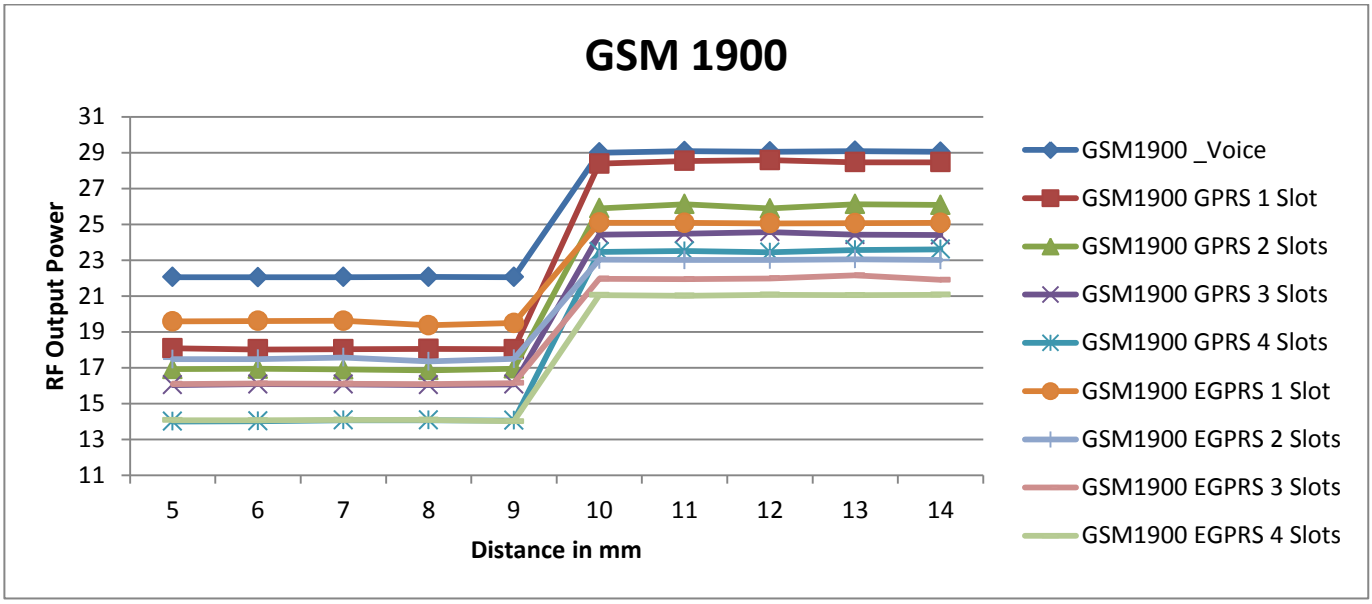
Corner, DUT Moving Toward (Trigger) and Away (Release) from the Phantom

Distance to DUT vs. Output Power in dBm										
Distance (mm)	5	6	7	8	9	10	11	12	13	14
GSM1900 _Voice	22.1	22.0	22.1	22.1	22.1	29.0	29.1	29.1	29.1	29.0
GSM1900 GPRS 1 Slot	18.1	18.0	18.0	18.0	18.0	28.4	28.5	28.6	28.5	28.5
GSM1900 GPRS 2 Slots	16.9	16.9	16.9	16.9	17.0	25.9	26.1	25.9	26.1	26.1
GSM1900 GPRS 3 Slots	16.0	16.1	16.1	16.0	16.1	24.4	24.5	24.6	24.4	24.4
GSM1900 GPRS 4 Slots	14.0	14.0	14.1	14.1	14.1	23.5	23.5	23.4	23.6	23.6
GSM1900 EGPRS 1 Slot	19.6	19.6	19.6	19.4	19.5	25.1	25.1	25.1	25.1	25.1
GSM1900 EGPRS 2 Slots	17.5	17.5	17.6	17.4	17.5	23.0	23.0	23.0	23.1	23.0
GSM1900 EGPRS 3 Slots	16.1	16.1	16.1	16.1	16.1	22.0	21.9	22.0	22.2	21.9
GSM1900 EGPRS 4 Slots	14.1	14.1	14.1	14.1	14.0	21.1	21.0	21.1	21.0	21.1



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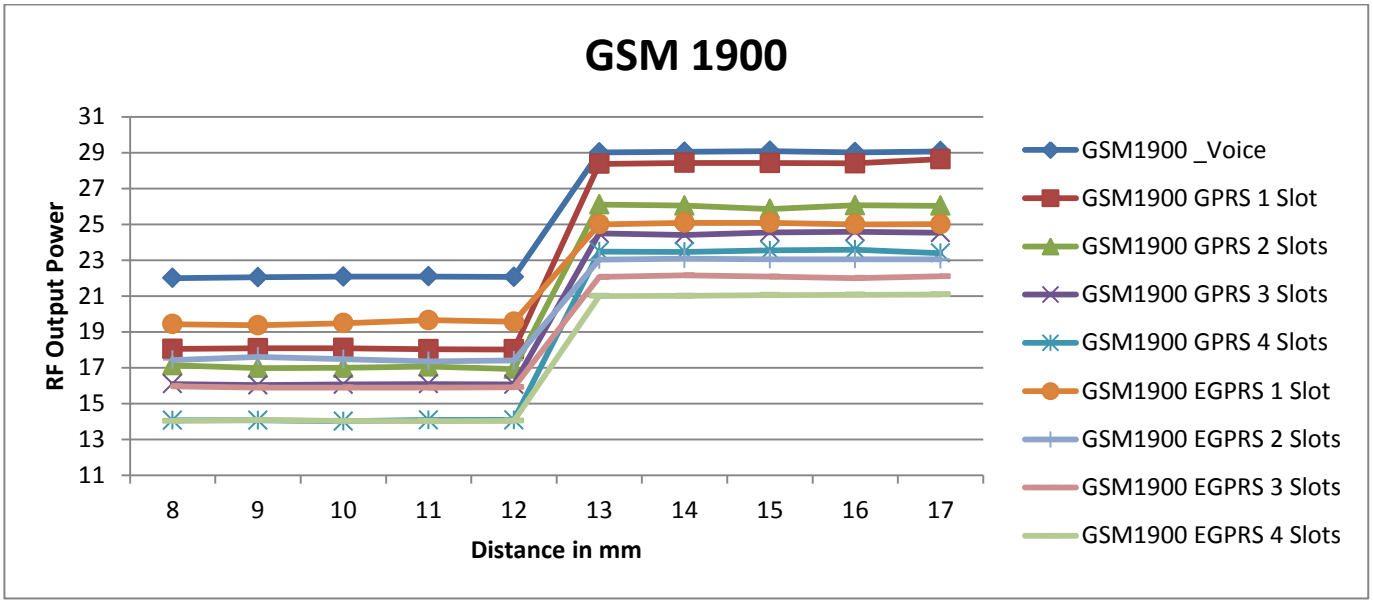
Front, DUT Moving Toward (Trigger) and Away (Release) from the Phantom

Distance to DUT vs. Output Power in dBm										
Distance (mm)	8	9	10	11	12	13	14	15	16	17
GSM1900 _Voice	22.0	22.0	22.1	22.1	22.1	29.0	29.0	29.1	29.0	29.1
GSM1900 GPRS 1 Slot	18.0	18.1	18.1	18.0	18.0	28.4	28.4	28.4	28.4	28.6
GSM1900 GPRS 2 Slots	17.1	17.0	17.0	17.1	16.9	26.1	26.0	25.9	26.1	26.0
GSM1900 GPRS 3 Slots	16.1	16.0	16.1	16.1	16.1	24.5	24.4	24.6	24.6	24.5
GSM1900 GPRS 4 Slots	14.1	14.1	14.0	14.1	14.1	23.5	23.5	23.5	23.6	23.4
GSM1900 EGPRS 1 Slot	19.4	19.4	19.5	19.7	19.6	25.0	25.1	25.1	25.0	25.0
GSM1900 EGPRS 2 Slots	17.4	17.6	17.5	17.4	17.4	23.0	23.1	23.0	23.1	23.0
GSM1900 EGPRS 3 Slots	16.0	15.9	15.9	15.9	15.9	22.1	22.2	22.1	22.0	22.1
GSM1900 EGPRS 4 Slots	14.0	14.1	14.0	14.0	14.0	21.0	21.0	21.1	21.1	21.1



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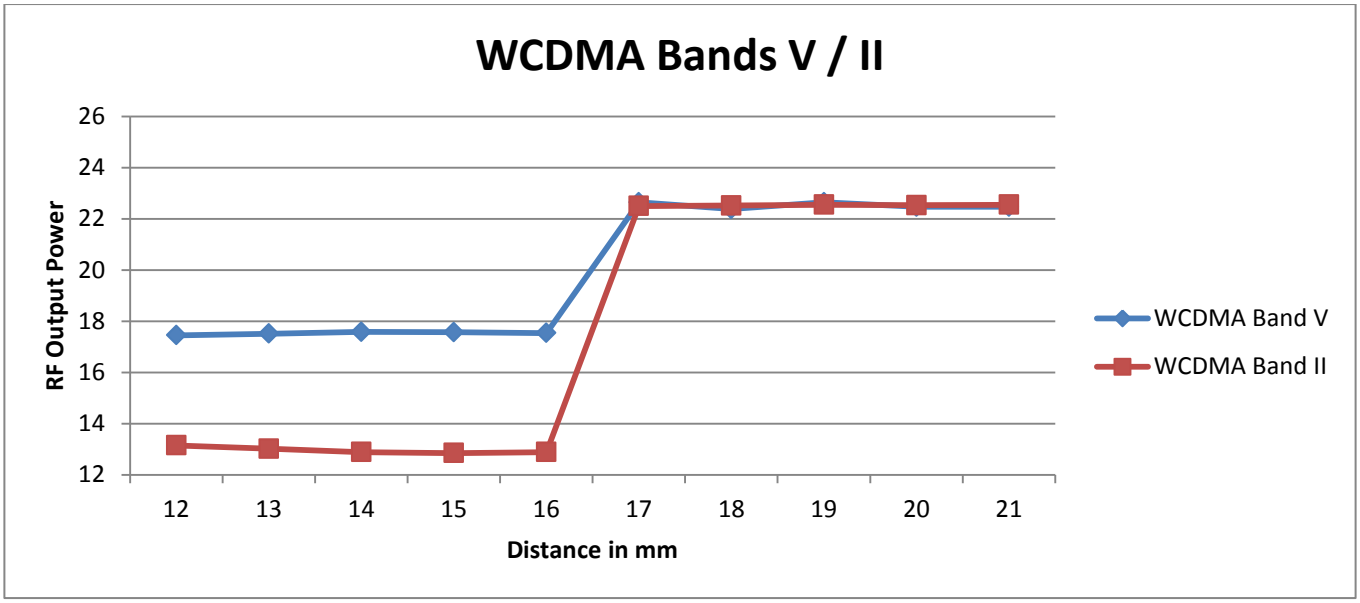
WCDMA Band II/ V

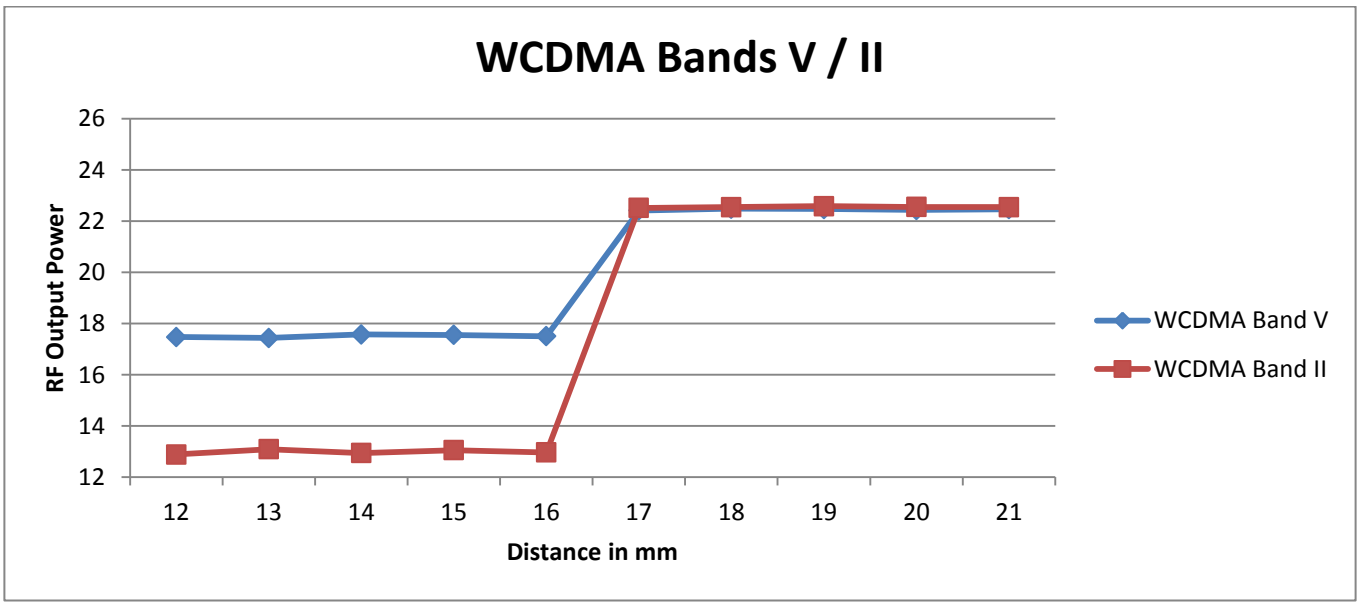
Rear, DUT Moving Toward (Trigger) and Away (Release) from the Phantom

Distance to DUT vs. Output Power in dBm										
Distance (mm)	12	13	14	15	16	17	18	19	20	21
WCDMA Band V	17.5	17.5	17.6	17.6	17.5	22.6	22.4	22.6	22.5	22.5
WCDMA Band II	13.2	13.0	12.9	12.9	12.9	22.5	22.5	22.6	22.5	22.6



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

Distance to DUT vs. Output Power in dBm										
Distance (mm)	12	13	14	15	16	17	18	19	20	21
WCDMA Band V	17.5	17.4	17.6	17.6	17.5	22.4	22.5	22.5	22.4	22.5
WCDMA Band II	12.9	13.1	12.9	13.1	13.0	22.5	22.5	22.6	22.6	22.5



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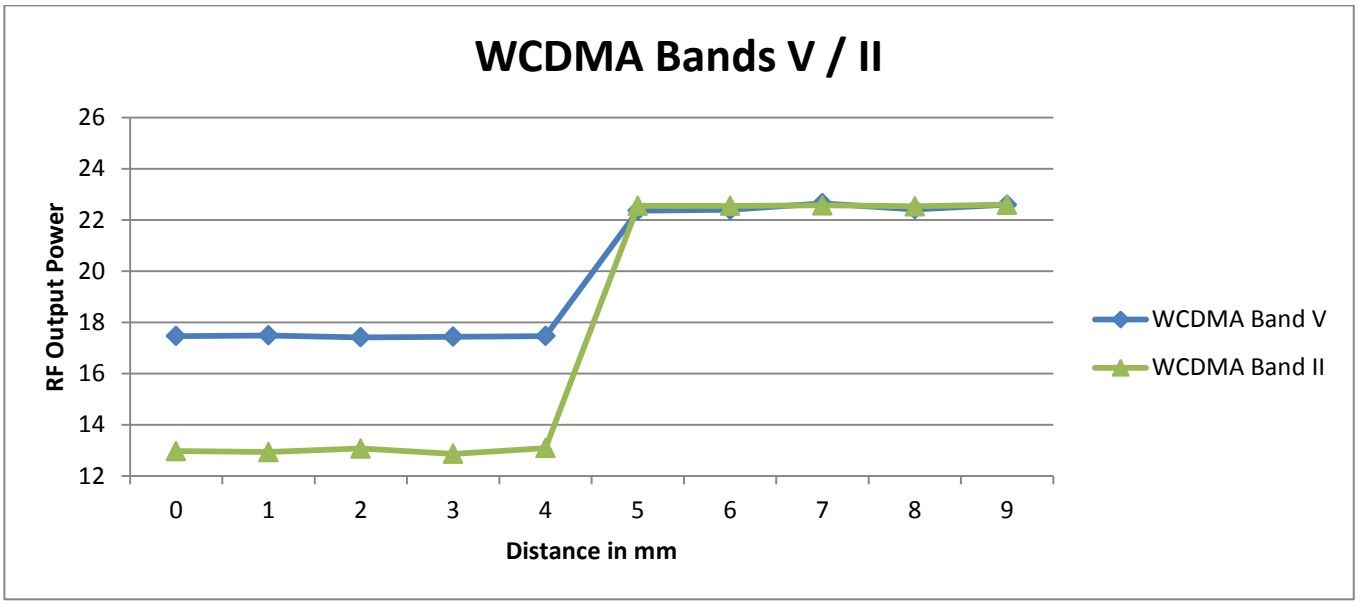
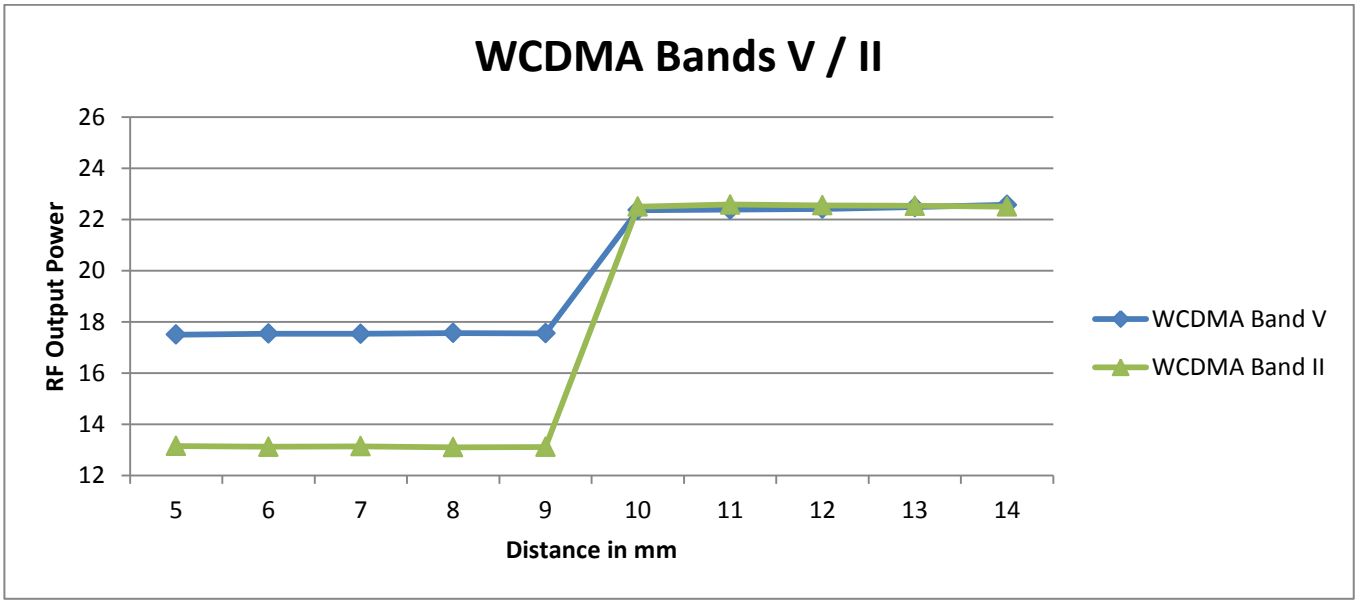
Edge 2, DUT Moving Toward (Trigger) and Away (Release) from the Phantom

Distance to DUT vs. Output Power in dBm										
Distance (mm)	0	1	2	3	4	5	6	7	8	9
WCDMA Band V	17.5	17.5	17.4	17.4	17.5	22.4	22.4	22.7	22.4	22.6
WCDMA Band II	13.0	12.9	13.1	12.9	13.1	22.6	22.6	22.6	22.5	22.6



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

Distance to DUT vs. Output Power in dBm										
Distance (mm)	5	6	7	8	9	10	11	12	13	14
WCDMA Band V	17.5	17.5	17.5	17.6	17.6	22.4	22.4	22.4	22.5	22.6
WCDMA Band II	13.2	13.1	13.1	13.1	13.1	22.5	22.6	22.6	22.5	22.5



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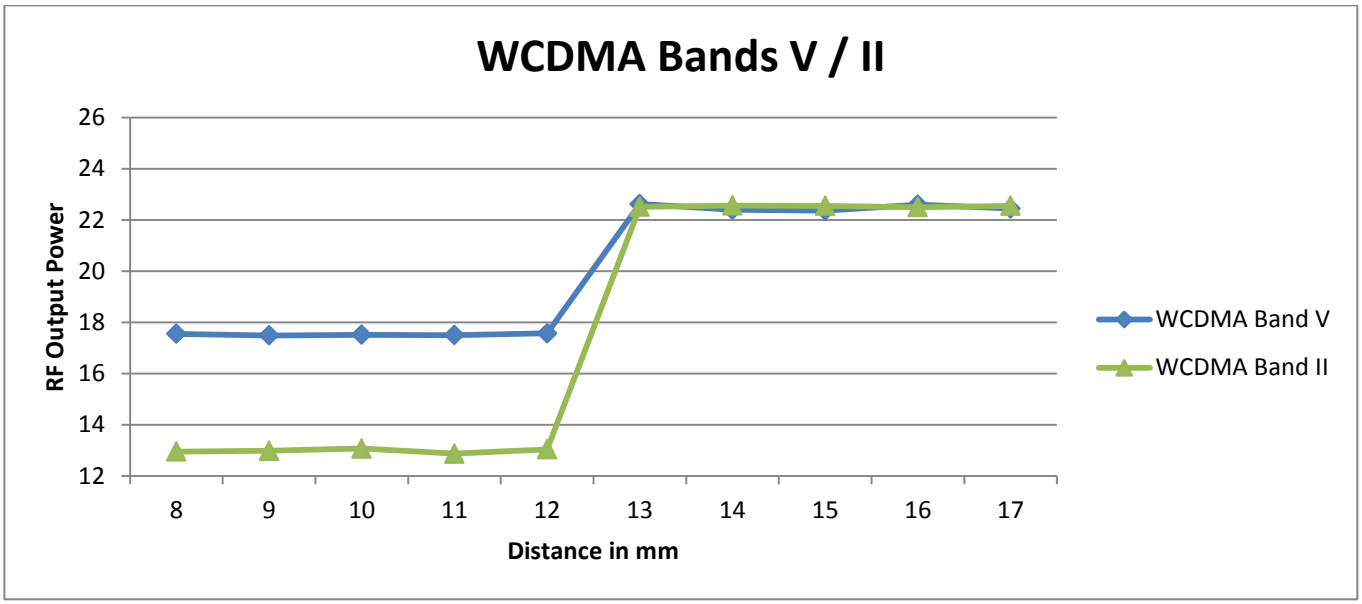
Front, DUT Moving Toward (Trigger) and Away (Release) from the Phantom

Distance to DUT vs. Output Power in dBm										
Distance (mm)	8	9	10	11	12	13	14	15	16	17
WCDMA Band V	17.6	17.5	17.5	17.5	17.6	22.6	22.4	22.4	22.6	22.4
WCDMA Band II	13.0	13.0	13.1	12.9	13.0	22.5	22.6	22.6	22.5	22.6



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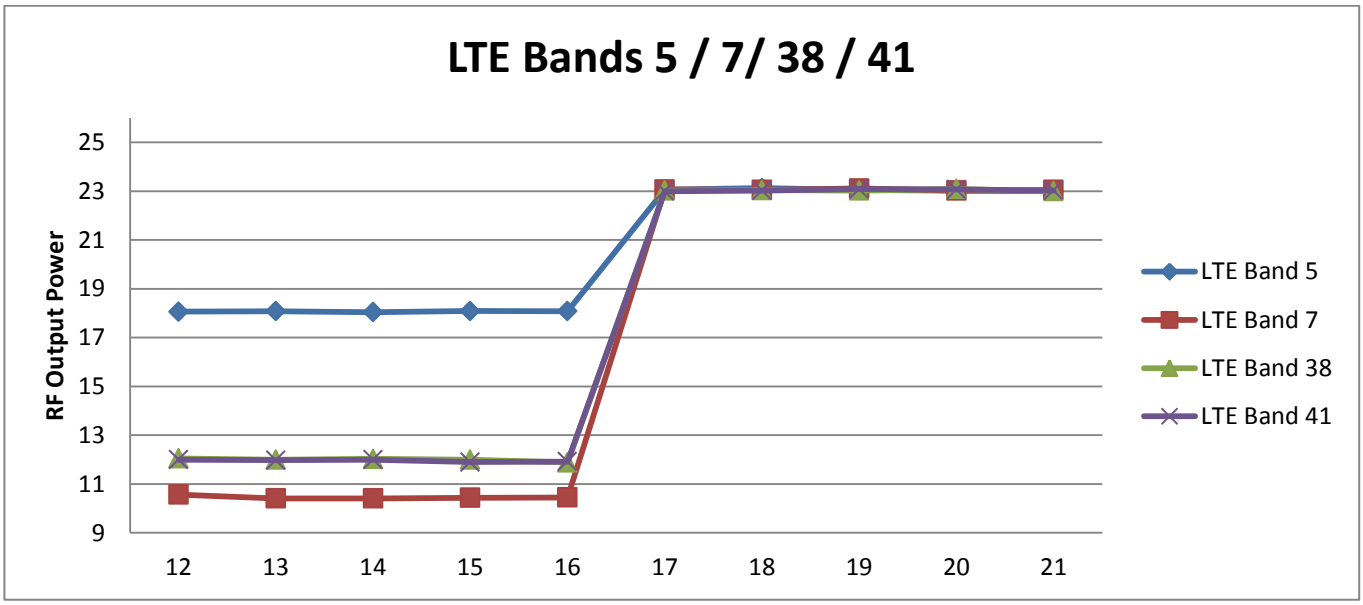
LTE Band 5/ 7/ 38/ 41

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

Distance to DUT vs. Output Power in dBm										
Distance (mm)	12	13	14	15	16	17	18	19	20	21
LTE Band 5	18.1	18.1	18.0	18.1	18.1	23.1	23.1	23.0	23.0	23.0
LTE Band 7	10.6	10.4	10.4	10.4	10.5	23.1	23.1	23.1	23.0	23.1
LTE Band 38	12.1	12.0	12.0	12.0	11.9	23.0	23.0	23.0	23.1	23.0
LTE Band 41	12.0	12.0	12.0	11.9	11.9	23.0	23.0	23.1	23.1	23.0



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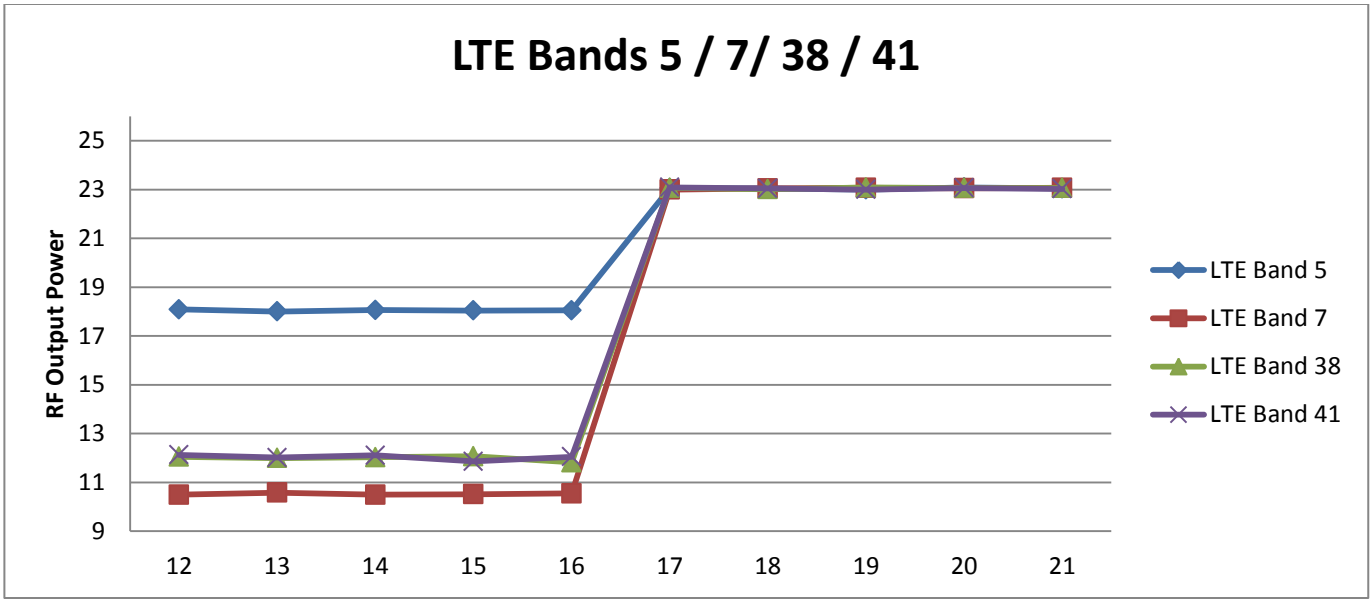
Edge 1, DUT Moving Toward (Trigger) and Away (Release) from the Phantom

Distance to DUT vs. Output Power in dBm										
Distance (mm)	12	13	14	15	16	17	18	19	20	21
LTE Band 5	18.1	18.0	18.1	18.0	18.1	23.1	23.0	23.0	23.1	23.0
LTE Band 7	10.5	10.6	10.5	10.5	10.6	23.0	23.0	23.1	23.1	23.1
LTE Band 38	12.1	12.0	12.0	12.1	11.8	23.1	23.0	23.1	23.1	23.1
LTE Band 41	12.1	12.0	12.1	11.9	12.1	23.1	23.0	23.0	23.1	23.0



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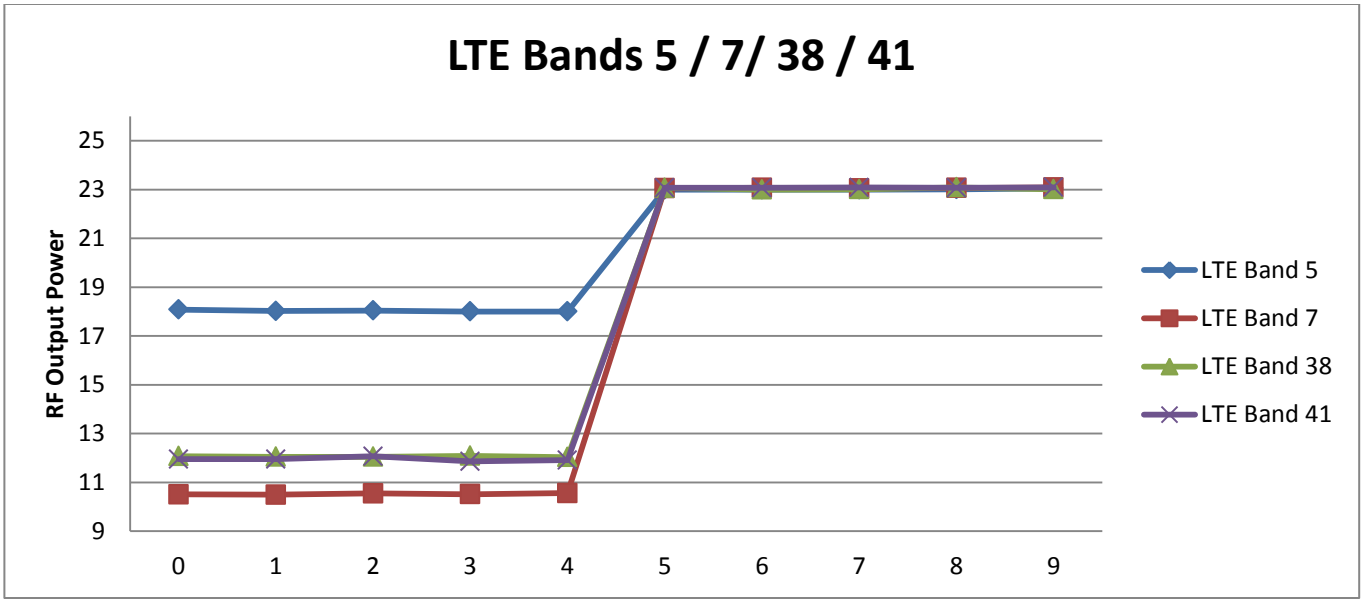
Edge 2, DUT Moving Toward (Trigger) and Away (Release) from the Phantom

Distance to DUT vs. Output Power in dBm										
Distance (mm)	0	1	2	3	4	5	6	7	8	9
LTE Band 5	18.1	18.0	18.0	18.0	18.0	23.0	23.0	23.0	23.0	23.1
LTE Band 7	10.5	10.5	10.6	10.5	10.6	23.1	23.1	23.0	23.1	23.1
LTE Band 38	12.1	12.1	12.1	12.1	12.0	23.1	23.0	23.0	23.1	23.0
LTE Band 41	12.0	12.0	12.1	11.9	11.9	23.1	23.1	23.1	23.1	23.1



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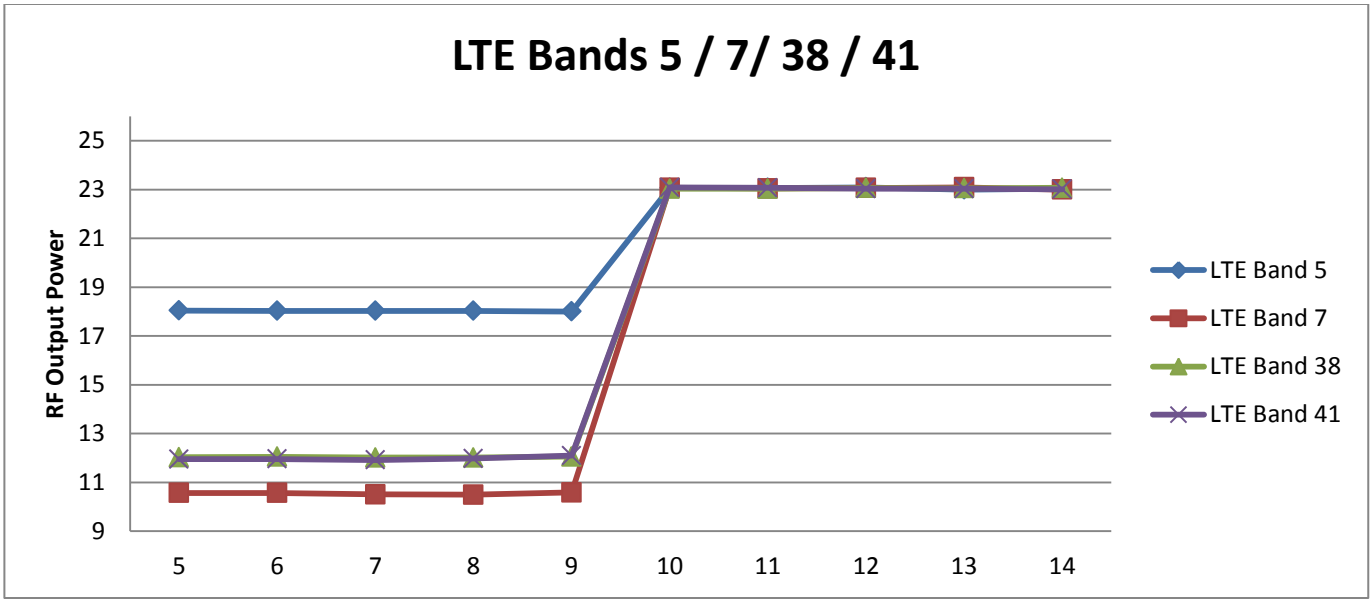
Corner, DUT Moving Toward (Trigger) and Away (Release) from the Phantom

Distance to DUT vs. Output Power in dBm										
Distance (mm)	5	6	7	8	9	10	11	12	13	14
LTE Band 5	18.0	18.0	18.0	18.0	18.0	23.1	23.1	23.1	23.0	23.0
LTE Band 7	10.6	10.6	10.5	10.5	10.6	23.1	23.0	23.1	23.1	23.0
LTE Band 38	12.0	12.1	12.0	12.0	12.1	23.0	23.0	23.1	23.1	23.1
LTE Band 41	12.0	12.0	11.9	12.0	12.1	23.1	23.1	23.0	23.0	23.0



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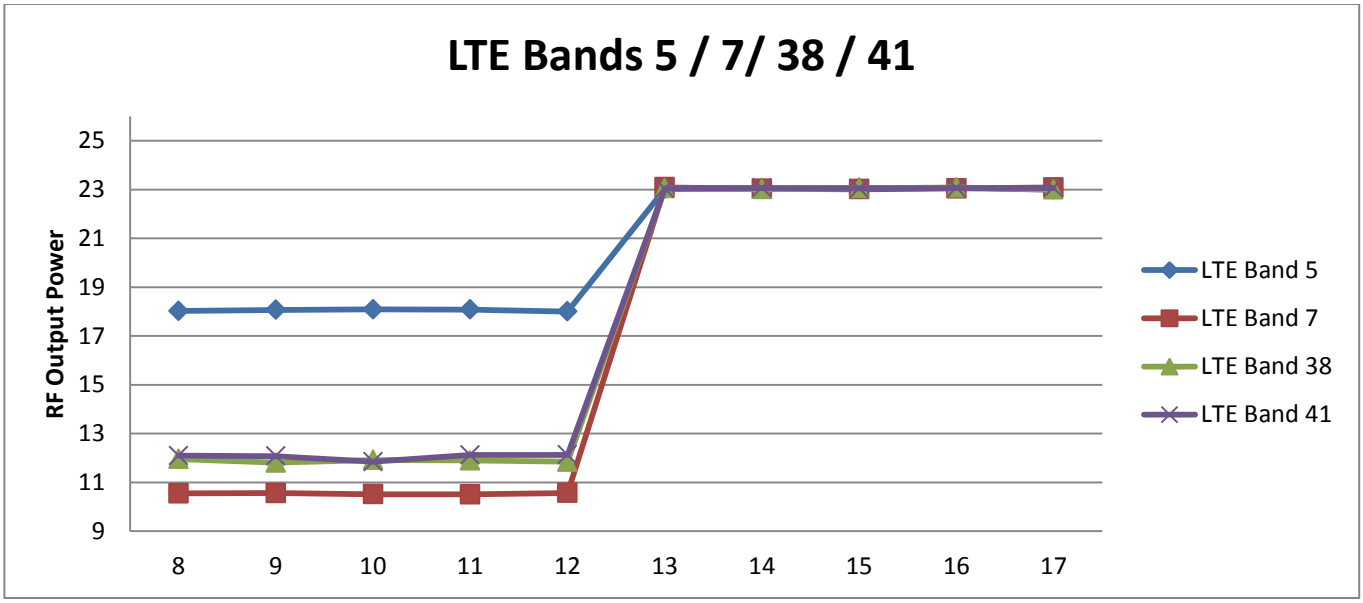
Front, DUT Moving Toward (Trigger) and Away (Release) from the Phantom

Distance to DUT vs. Output Power in dBm										
Distance (mm)	8	9	10	11	12	13	14	15	16	17
LTE Band 5	18.0	18.1	18.1	18.1	18.0	23.0	23.0	23.1	23.1	23.0
LTE Band 7	10.6	10.6	10.5	10.5	10.6	23.1	23.0	23.0	23.0	23.1
LTE Band 38	12.0	11.8	11.9	11.9	11.9	23.1	23.0	23.1	23.1	23.0
LTE Band 41	12.1	12.1	11.9	12.1	12.1	23.0	23.1	23.0	23.1	23.1



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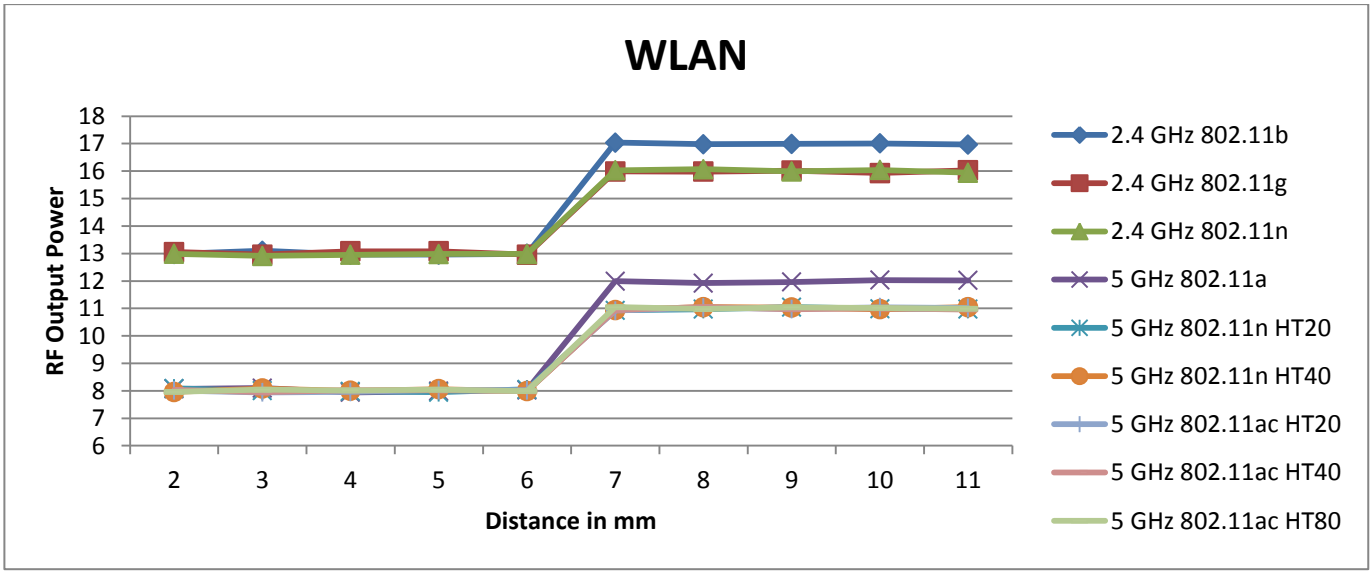
WLAN 2.4GHz and 5GHz

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

Distance to DUT vs. Output Power in dBm											
Antenna	Distance	2	3	4	5	6	7	8	9	10	11
WLAN	2.4 GHz 802.11b	13.0	13.1	13.0	13.0	13.0	17.0	17.0	17.0	17.0	17.0
	2.4 GHz 802.11g	13.1	13.0	13.1	13.1	13.0	16.0	16.0	16.0	15.9	16.0
	2.4 GHz 802.11n	13.0	12.9	13.0	13.0	13.0	16.0	16.1	16.0	16.0	15.9
	5 GHz 802.11a	8.1	8.1	7.9	8.0	8.0	12.0	11.9	12.0	12.0	12.0
	5 GHz 802.11n HT20	8.1	8.0	8.0	8.0	8.1	10.9	11.0	11.1	11.0	11.0
	5 GHz 802.11n HT40	8.0	8.1	8.0	8.1	8.0	10.9	11.1	11.0	11.0	11.1
	5 GHz 802.11ac HT20	8.0	7.9	8.0	8.0	8.0	10.9	11.0	11.0	11.0	11.0
	5 GHz 802.11ac HT40	8.0	8.0	8.0	8.0	8.0	10.9	11.1	11.0	11.0	11.0
	5 GHz 802.11ac HT80	8.0	8.0	8.0	8.0	8.0	11.1	11.0	11.0	11.0	11.0



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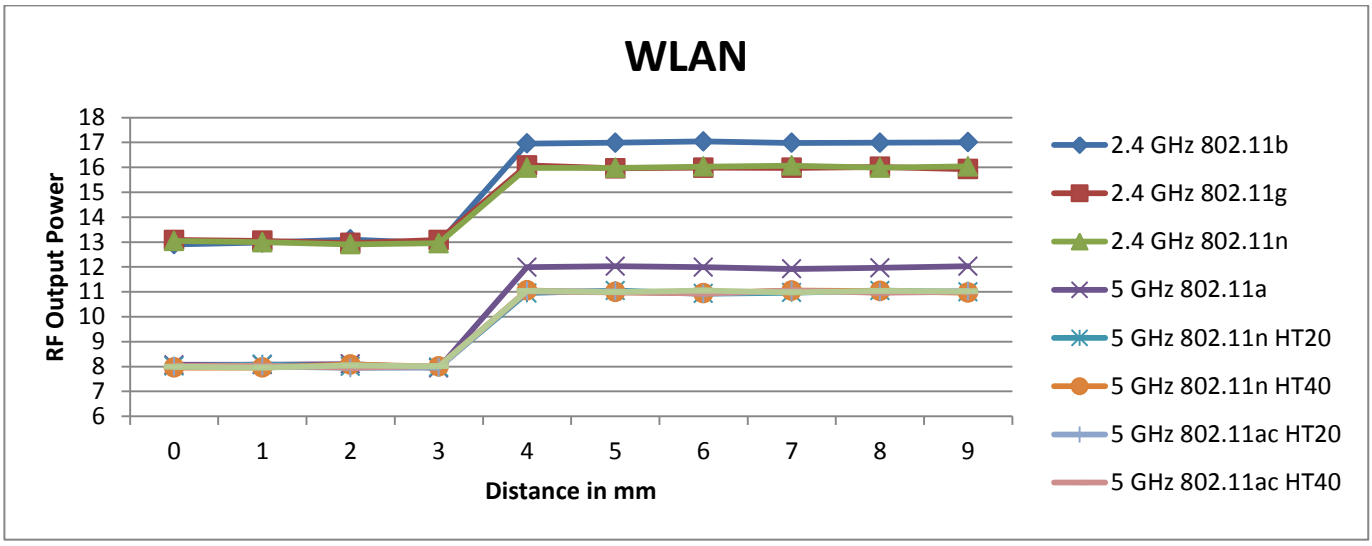
Edge 1, DUT Moving Toward (Trigger) and Away (Release) from the Phantom

Distance to DUT vs. Output Power in dBm											
Antenna	Distance (mm)	0	1	2	3	4	5	6	7	8	9
WLAN	2.4 GHz 802.11b	12.9	13.0	13.1	13.0	17.0	17.0	17.0	17.0	17.0	17.0
	2.4 GHz 802.11g	13.1	13.1	13.0	13.1	16.1	16.0	16.0	16.0	16.0	15.9
	2.4 GHz 802.11n	13.0	13.0	12.9	13.0	16.0	16.0	16.0	16.1	16.0	16.0
	5 GHz 802.11a	8.1	8.1	8.1	7.9	12.0	12.0	12.0	11.9	12.0	12.0
	5 GHz 802.11n HT20	8.0	8.1	8.0	8.0	11.0	11.1	10.9	11.0	11.1	11.0
	5 GHz 802.11n HT40	8.0	8.0	8.1	8.0	11.1	11.0	10.9	11.1	11.0	11.0
	5 GHz 802.11ac HT20	8.0	8.0	7.9	8.0	11.0	11.0	10.9	11.0	11.0	11.0
	5 GHz 802.11ac HT40	8.0	8.0	8.0	8.0	11.0	11.0	10.9	11.1	11.0	11.0
	5 GHz 802.11ac HT80	8.0	8.0	8.0	8.0	11.0	11.0	11.1	11.0	11.0	11.0



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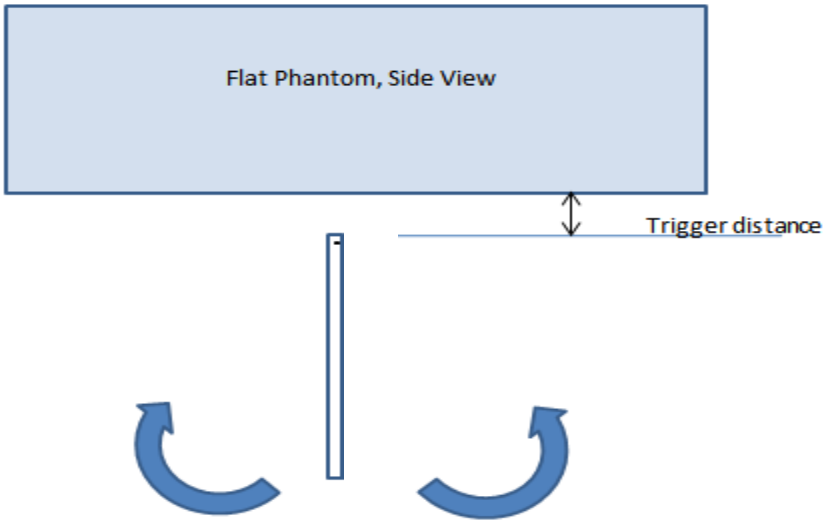
6.7.1.2 Proximity Sensor Coverage (KDB 616217 §6.3)

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

6.7.1.3 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, Edge 2 parallel to the base of the flat phantom for each band.

The EUT was rotated about Edge 1, Edge 2 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, Edge 2) 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	16 mm	16 mm	On	On	On	On	On	On	On	On	On	On	On
850	16 mm	16 mm	On	On	On	On	On	On	On	On	On	On	On
1750	16 mm	16 mm	On	On	On	On	On	On	On	On	On	On	On
1900	16 mm	16 mm	On	On	On	On	On	On	On	On	On	On	On
2600	16 mm	16 mm	On	On	On	On	On	On	On	On	On	On	On
2450	3 mm	3 mm	On	On	On	On	On	On	On	On	On	On	On
5000	3 mm	3 mm	On	On	On	On	On	On	On	On	On	On	On

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Summary of Tablet Tilt Angle Influence to Proximity Sensor Triggering (Edge 2)

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	4 mm	4 mm	On	On	On	On	On	On	On	On	On	On	On
850	4 mm	4 mm	On	On	On	On	On	On	On	On	On	On	On
1750	4 mm	4 mm	On	On	On	On	On	On	On	On	On	On	On
1900	4 mm	4 mm	On	On	On	On	On	On	On	On	On	On	On
2600	4 mm	4 mm	On	On	On	On	On	On	On	On	On	On	On

6.7.1.4 Resulting test positions for SAR measurements

Wireless technologies	Position	§6.2 Triggering Distance	§6.3 Coverage	§6.4 Tilt Angle	Worst case distance for SAR
WWAN	Rear	16 mm	N/A	N/A	15 mm
	Edge 1	16 mm	N/A	16 mm	15 mm
	Edge 2	4 mm	N/A	4 mm	3 mm
	Corner	9mm	N/A	N/A	8 mm
	Front	12 mm	N/A	N/A	11 mm
WLAN	Rear	6 mm	N/A	N/A	5 mm
	Edge 1	3 mm	N/A	3 mm	2 mm

Note(s):

Corner side is located between Edge 1 and Edge 2.

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6.7.2. IR sensor feature

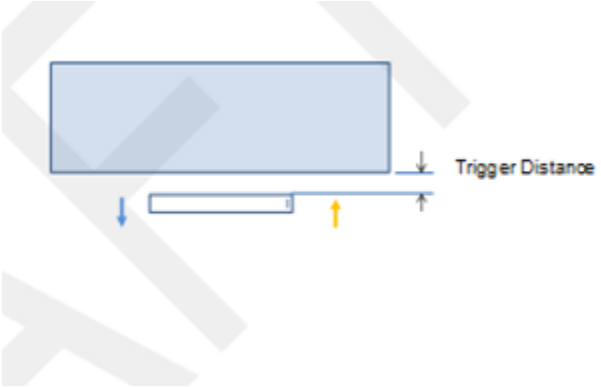
6.7.2.1 IR Sensor Triggering Distance (KDB 616217 §6.2)

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

The measurement was then repeated for the surface of Front

The DUT featured a visual indicator on its display that showed the status of the IR sensor (Triggered or not triggered). This was used to determine the status of the sensor during the IR 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 IR sensor status indication. This was achieved by observing the IR sensor status at the same time as monitoring the conducted power. Section 9 contains both the full and reduced conducted power measurements.



IR Sensor Trigger Distance Assessment
KDB 616217 §6.2, Front

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 - Front	
	Moving toward phantom	Moving from phantom
750 Head	60 mm	60 mm
850 Head	60 mm	60 mm
1750 Head	60 mm	60 mm
1900 Head	60 mm	60 mm
2600 Head	60 mm	60 mm

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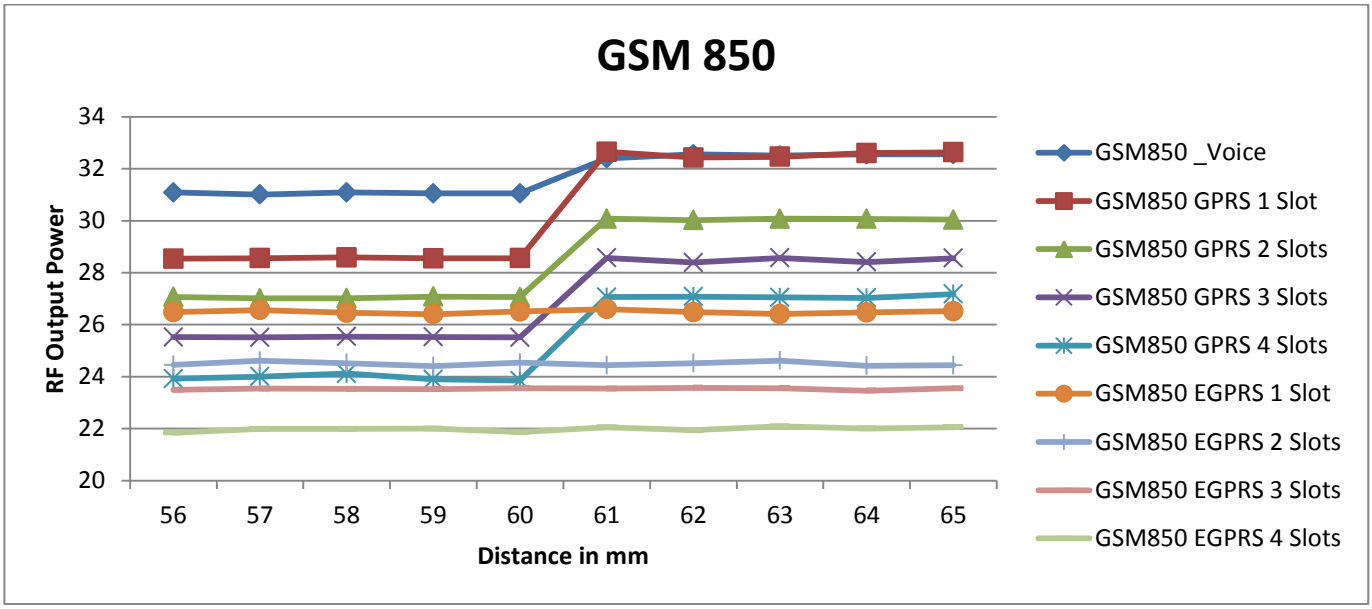
IR Sensor Triggering Distance Measurement Results
GSM 850

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

Distance to DUT vs. Output Power in dBm										
Distance (mm)	56	57	58	59	60	61	62	63	64	65
GSM850 _Voice	31.1	31.0	31.1	31.1	31.1	32.4	32.6	32.5	32.6	32.6
GSM850 GPRS 1 Slot	28.5	28.6	28.6	28.6	28.6	32.7	32.4	32.5	32.6	32.6
GSM850 GPRS 2 Slots	27.1	27.0	27.0	27.1	27.1	30.1	30.0	30.1	30.1	30.0
GSM850 GPRS 3 Slots	25.5	25.5	25.5	25.5	25.5	28.6	28.4	28.6	28.4	28.6
GSM850 GPRS 4 Slots	23.9	24.0	24.1	23.9	23.9	27.1	27.1	27.1	27.0	27.2
GSM850 EGPRS 1 Slot	26.5	26.6	26.5	26.4	26.5	26.6	26.5	26.4	26.5	26.5
GSM850 EGPRS 2 Slots	24.5	24.6	24.5	24.4	24.5	24.4	24.5	24.6	24.4	24.4
GSM850 EGPRS 3 Slots	23.5	23.5	23.5	23.5	23.6	23.5	23.6	23.6	23.5	23.6
GSM850 EGPRS 4 Slots	21.9	22.0	22.0	22.0	21.9	22.1	21.9	22.1	22.0	22.1



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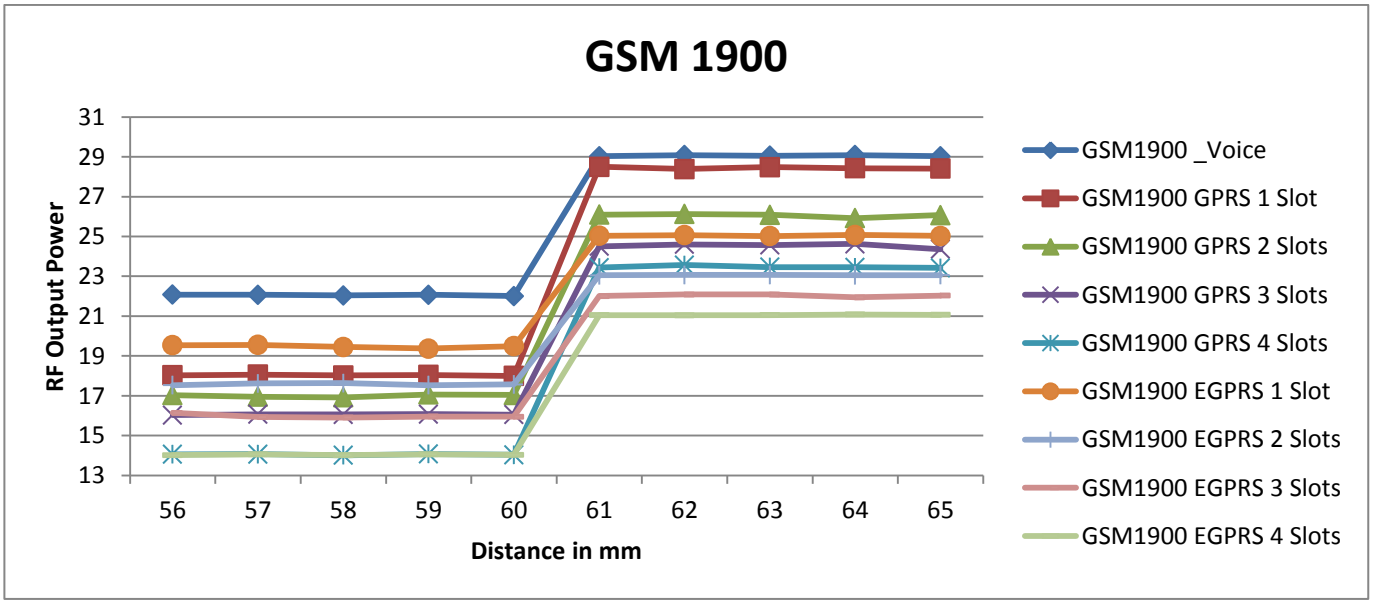
GSM 1900

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

Distance to DUT vs. Output Power in dBm										
Distance (mm)	56	57	58	59	60	61	62	63	64	65
GSM1900 _Voice	22.1	22.1	22.0	22.1	22.0	29.0	29.1	29.1	29.1	29.0
GSM1900 GPRS 1 Slot	18.0	18.1	18.0	18.1	18.0	28.5	28.4	28.5	28.4	28.4
GSM1900 GPRS 2 Slots	17.0	17.0	16.9	17.1	17.0	26.1	26.1	26.1	25.9	26.1
GSM1900 GPRS 3 Slots	16.0	16.1	16.1	16.1	16.1	24.5	24.6	24.6	24.6	24.4
GSM1900 GPRS 4 Slots	14.1	14.1	14.0	14.1	14.0	23.4	23.6	23.5	23.5	23.4
GSM1900 EGPRS 1 Slot	19.5	19.6	19.5	19.4	19.5	25.0	25.1	25.0	25.1	25.0
GSM1900 EGPRS 2 Slots	17.5	17.6	17.6	17.5	17.6	23.1	23.1	23.1	23.1	23.1
GSM1900 EGPRS 3 Slots	16.1	15.9	15.9	16.0	16.0	22.0	22.1	22.1	21.9	22.0
GSM1900 EGPRS 4 Slots	14.0	14.1	14.0	14.1	14.0	21.1	21.0	21.1	21.1	21.1



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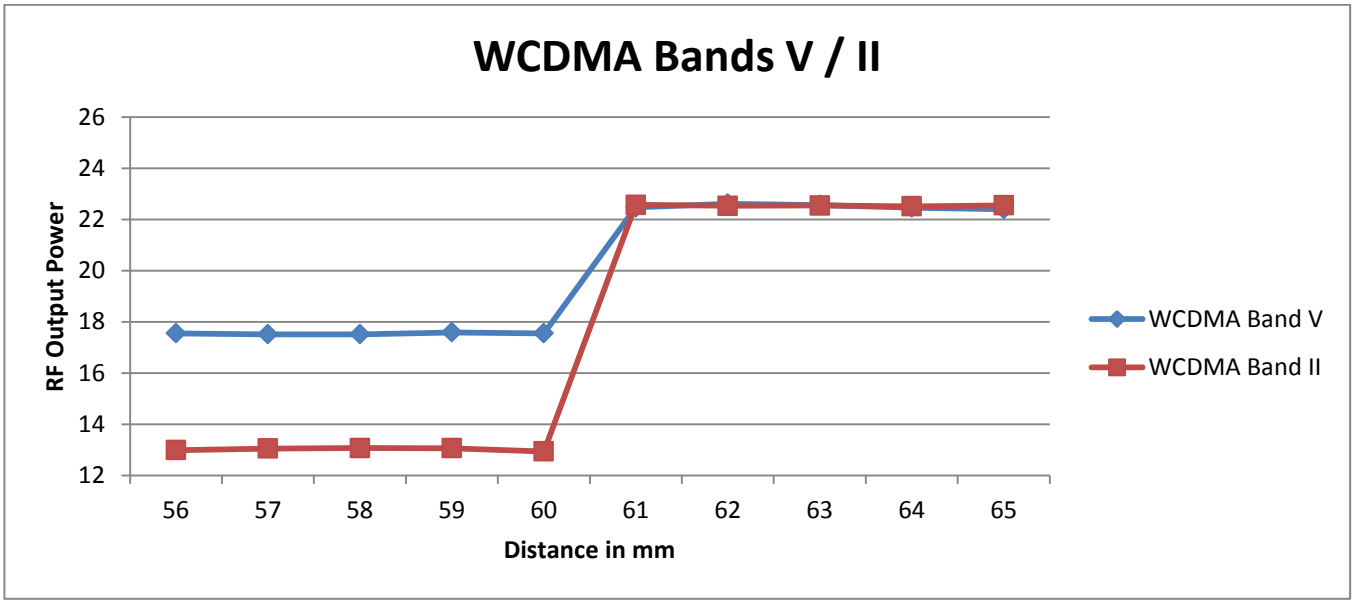
WCDMA Band II/ V

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

Distance to DUT vs. Output Power in dBm										
Distance (mm)	56	57	58	59	60	61	62	63	64	65
WCDMA Band V	17.6	17.5	17.5	17.6	17.6	22.5	22.6	22.6	22.5	22.4
WCDMA Band II	13.0	13.1	13.1	13.1	12.9	22.6	22.5	22.5	22.5	22.6



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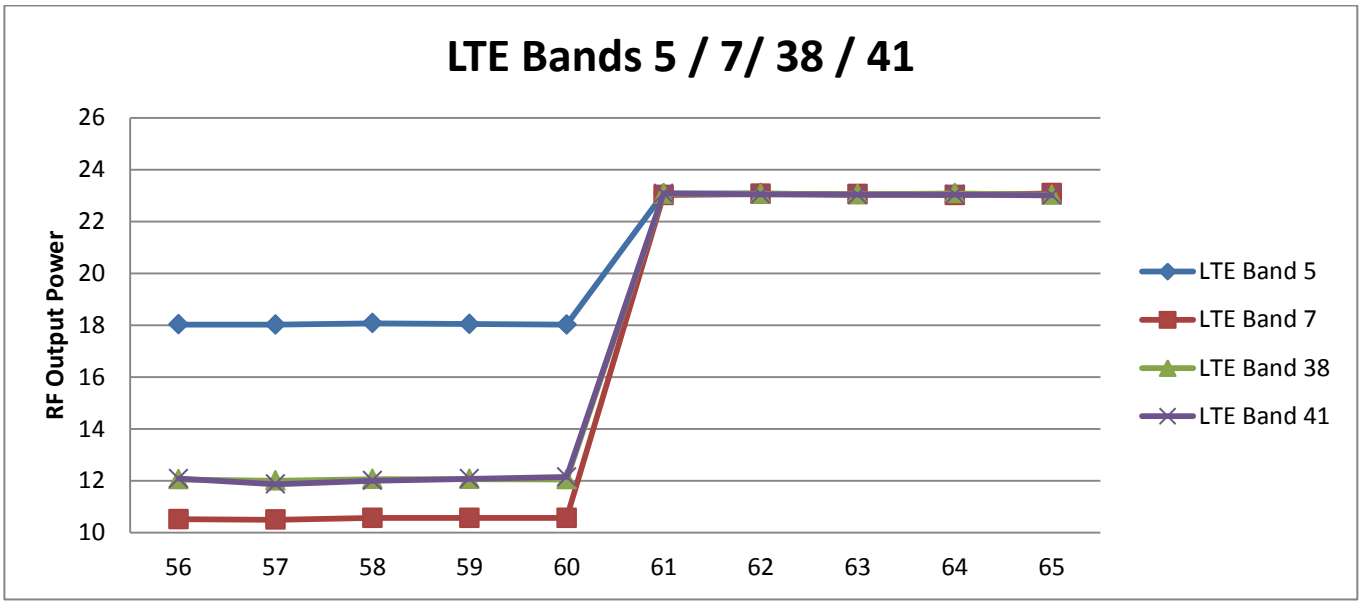
LTE Band 5/ 7/ 38/ 41

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

Distance to DUT vs. Output Power in dBm										
Distance (mm)	56	57	58	59	60	61	62	63	64	65
LTE Band 5	18.0	18.0	18.1	18.1	18.0	23.1	23.1	23.0	23.1	23.0
LTE Band 7	10.5	10.5	10.6	10.6	10.6	23.0	23.1	23.1	23.0	23.1
LTE Band 38	12.1	12.0	12.1	12.1	12.1	23.1	23.1	23.1	23.1	23.0
LTE Band 41	12.1	11.9	12.0	12.1	12.2	23.1	23.1	23.0	23.0	23.0



6.7.2.2 Resulting test positions for SAR measurements

Wireless technologies	DUT Position	§6.2 Triggering Distance	§6.3 Coverage	§6.4 Tilt Angle	Worst case distance for SAR
WWAN	Front	60 mm	N/A	N/A	59 mm

Notes:

Worst case distance for SAR is not consider for body exposure condition. Because Power reduction is only apply voice or VoIP held to ear scenarios.

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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	Corner	Rear	Edge 1	Edge 2	Edge 3	Edge 4	Corner
Full Power, Proximity Sensor Off																
Cellular	GPRS 3 Slots	848.8	29.00	298	2	4	8	195	83	8	54.9 -MEASURE-	54.9 -MEASURE-	34.3 -MEASURE-	> 50 mm	> 50 mm	34.3 -MEASURE-
Cellular	GPRS 4 Slots	1909.8	24.00	126	2	4	8	195	83	8	34.8 -MEASURE-	34.8 -MEASURE-	21.8 -MEASURE-	> 50 mm	> 50 mm	21.8 -MEASURE-
Cellular	W-CDMA V	846.6	23.00	200	2	4	8	195	83	8	36.8 -MEASURE-	36.8 -MEASURE-	23 -MEASURE-	> 50 mm	> 50 mm	23 -MEASURE-
Cellular	W-CDMA II	1907.6	23.00	200	2	4	8	195	83	8	55.2 -MEASURE-	55.2 -MEASURE-	34.5 -MEASURE-	> 50 mm	> 50 mm	34.5 -MEASURE-
Cellular	LTE Band 5	844	23.50	224	2	4	8	195	83	8	41.2 -MEASURE-	41.2 -MEASURE-	25.7 -MEASURE-	> 50 mm	> 50 mm	25.7 -MEASURE-
Cellular	LTE Band 7	2560	23.50	224	2	4	8	195	83	8	71.7 -MEASURE-	71.7 -MEASURE-	44.8 -MEASURE-	> 50 mm	> 50 mm	44.8 -MEASURE-
Cellular	LTE Band 38	2595	23.50	224	2	4	8	195	83	8	72.2 -MEASURE-	72.2 -MEASURE-	45.1 -MEASURE-	> 50 mm	> 50 mm	45.1 -MEASURE-
Cellular	LTE Band 41	2645	23.50	224	2	4	8	195	83	8	72.9 -MEASURE-	72.9 -MEASURE-	45.5 -MEASURE-	> 50 mm	> 50 mm	45.5 -MEASURE-
Power Back-off, Proximity Sensor On																
Cellular	GPRS 3 Slots	848.8	26.00	149	2	4	8			8	27.5 -MEASURE-	27.5 -MEASURE-	17.2 -MEASURE-			17.2 -MEASURE-
Cellular	GPRS 3 Slots	1909.8	16.50	17	2	4	8			8	4.7 -MEASURE-	4.7 -MEASURE-	3 -EXEMPT-			3 -EXEMPT-
Cellular	W-CDMA V	846.6	18.00	63	2	4	8			8	11.6 -MEASURE-	11.6 -MEASURE-	7.2 -MEASURE-			7.2 -MEASURE-
Cellular	W-CDMA II	1907.6	13.50	22	2	4	8			8	6.1 -MEASURE-	6.1 -MEASURE-	3.8 -MEASURE-			3.8 -MEASURE-
Cellular	LTE Band 5	844	18.50	71	2	4	8			8	13 -MEASURE-	13 -MEASURE-	8.2 -MEASURE-			8.2 -MEASURE-
Cellular	LTE Band 7	2560	11.00	13	2	4	8			8	4.2 -MEASURE-	4.2 -MEASURE-	2.6 -EXEMPT-			2.6 -EXEMPT-
Cellular	LTE Band 38	2595	12.50	18	2	4	8			8	5.8 -MEASURE-	5.8 -MEASURE-	3.6 -MEASURE-			3.6 -MEASURE-
Cellular	LTE Band 41	2645	12.50	18	2	4	8			8	5.9 -MEASURE-	5.9 -MEASURE-	3.7 -MEASURE-			3.7 -MEASURE-

Note(s):

1. According to KDB 447498, if the calculated threshold value is >3 then SAR testing is required.
2. Corner side is located between Edge 1 and Edge 2.

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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	corner	Rear	Edge 1	Edge 2	Edge 3	Edge 4	corner
Full Power, Proximity Sensor Off																
Cellular	GPRS 3 Slots	848.8	29.00	298	2	4	8	195	83	8	< 50 mm	< 50 mm	< 50 mm	983.3 mW -EXEMPT-	349.5 mW -EXEMPT-	< 50 mm
Cellular	GPRS 4 Slots	1909.8	24.00	126	2	4	8	195	83	8	< 50 mm	< 50 mm	< 50 mm	1558.5 mW -EXEMPT-	438.5 mW -EXEMPT-	< 50 mm
Cellular	W-CDMA V	846.6	23.00	200	2	4	8	195	83	8	< 50 mm	< 50 mm	< 50 mm	981.4 mW -EXEMPT-	349.3 mW -EXEMPT-	< 50 mm
Cellular	W-CDMA II	1907.6	23.00	200	2	4	8	195	83	8	< 50 mm	< 50 mm	< 50 mm	1558.6 mW -EXEMPT-	438.6 mW -EXEMPT-	< 50 mm
Cellular	LTE Band 5	844	23.50	224	2	4	8	195	83	8	< 50 mm	< 50 mm	< 50 mm	979.1 mW -EXEMPT-	349 mW -EXEMPT-	< 50 mm
Cellular	LTE Band 7	2560	23.50	224	2	4	8	195	83	8	< 50 mm	< 50 mm	< 50 mm	1543.8 mW -EXEMPT-	423.8 mW -EXEMPT-	< 50 mm
Cellular	LTE Band 38	2595	23.50	224	2	4	8	195	83	8	< 50 mm	< 50 mm	< 50 mm	1543.1 mW -EXEMPT-	423.1 mW -EXEMPT-	< 50 mm
Cellular	LTE Band 41	2645	23.50	224	2	4	8	195	83	8	< 50 mm	< 50 mm	< 50 mm	1542.2 mW -EXEMPT-	422.2 mW -EXEMPT-	< 50 mm
Power Back-off, Proximity Sensor On																
Cellular	GPRS 3 Slots	848.8	26.00	149	2	4	8			8	< 50 mm	< 50 mm	< 50 mm			< 50 mm
Cellular	GPRS 3 Slots	1909.8	16.50	17	2	4	8			8	< 50 mm	< 50 mm	< 50 mm			< 50 mm
Cellular	W-CDMA V	846.6	18.00	63	2	4	8			8	< 50 mm	< 50 mm	< 50 mm			< 50 mm
Cellular	W-CDMA II	1907.6	13.50	22	2	4	8			8	< 50 mm	< 50 mm	< 50 mm			< 50 mm
Cellular	LTE Band 5	844	18.50	71	2	4	8			8	< 50 mm	< 50 mm	< 50 mm			< 50 mm
Cellular	LTE Band 7	2560	11.00	13	2	4	8			8	< 50 mm	< 50 mm	< 50 mm			< 50 mm
Cellular	LTE Band 38	2595	12.50	18	2	4	8			8	< 50 mm	< 50 mm	< 50 mm			< 50 mm
Cellular	LTE Band 41	2645	12.50	18	2	4	8			8	< 50 mm	< 50 mm	< 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.
2. Corner side is located between Edge 1 and Edge 2.

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SAR Test Exclusion Calculations for WLAN

Antennas < 50mm to adjacent edges

Tx Interface	Frequency (MHz)	Output Power		Separation Distances (mm)					Calculated Threshold Value				
		dBm	mW	Rear	Edge 1	Edge 2	Edge 3	Edge 4	Rear	Edge 1	Edge 2	Edge 3	Edge 4
Full Power, Proximity Sensor Off													
Wi-Fi 2.4 GHz	2462	17.50	56	2	4	89	201	28	17.6 -MEASURE-	17.6 -MEASURE-	> 50 mm	> 50 mm	3.1 -MEASURE-
Wi-Fi 5.3 GHz	5320	12.50	18	2	4	89	201	28	8.3 -MEASURE-	8.3 -MEASURE-	> 50 mm	> 50 mm	1.5 -EXEMPT-
Wi-Fi 5.5 GHz	5720	12.50	18	2	4	89	201	28	8.6 -MEASURE-	8.6 -MEASURE-	> 50 mm	> 50 mm	1.5 -EXEMPT-
Wi-Fi 5.8 GHz	5825	12.50	18	2	4	89	201	28	8.7 -MEASURE-	8.7 -MEASURE-	> 50 mm	> 50 mm	1.6 -EXEMPT-
Bluetooth	2480	9.00	8	2	4	89	201	28	2.5 -EXEMPT-	2.5 -EXEMPT-	> 50 mm	> 50 mm	0.4 -EXEMPT-
Power Back-off, Proximity Sensor On													
Wi-Fi 2.4 GHz	2462	13.50	22	2	4				6.9 -MEASURE-	6.9 -MEASURE-			
Wi-Fi 5.3 GHz	5320	8.50	7	2	4				3.2 -MEASURE-	3.2 -MEASURE-			
Wi-Fi 5.5 GHz	5720	8.50	7	2	4				3.3 -MEASURE-	3.3 -MEASURE-			
Wi-Fi 5.8 GHz	5825	8.50	7	2	4				3.4 -MEASURE-	3.4 -MEASURE-			

Note(s):

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

Antennas > 50mm to adjacent edges

Tx Interface	Frequency (MHz)	Output Power		Separation Distances (mm)					Calculated Threshold Value				
		dBm	mW	Rear	Edge 1	Edge 2	Edge 3	Edge 4	Rear	Edge 1	Edge 2	Edge 3	Edge 4
Full Power, Proximity Sensor Off													
Wi-Fi 2.4 GHz	2462	17.50	56	2	4	89	201	28	< 50 mm	< 50 mm	485.6 mW -EXEMPT-	1605.6 mW -EXEMPT-	< 50 mm
Wi-Fi 5.3 GHz	5320	12.50	18	2	4	89	201	28	< 50 mm	< 50 mm	455 mW -EXEMPT-	1575 mW -EXEMPT-	< 50 mm
Wi-Fi 5.5 GHz	5720	12.50	18	2	4	89	201	28	< 50 mm	< 50 mm	452.7 mW -EXEMPT-	1572.7 mW -EXEMPT-	< 50 mm
Wi-Fi 5.8 GHz	5825	12.50	18	2	4	89	201	28	< 50 mm	< 50 mm	452.2 mW -EXEMPT-	1572.2 mW -EXEMPT-	< 50 mm
Bluetooth	2480	9.00	8	2	4	89	201	28	< 50 mm	< 50 mm	485.3 mW -EXEMPT-	1605.3 mW -EXEMPT-	< 50 mm
Power Back-off, Proximity Sensor On													
Wi-Fi 2.4 GHz	2462	13.50	22	2	4				< 50 mm	< 50 mm			
Wi-Fi 5.3 GHz	5320	8.50	7	2	4				< 50 mm	< 50 mm			
Wi-Fi 5.5 GHz	5720	8.50	7	2	4				< 50 mm	< 50 mm			
Wi-Fi 5.8 GHz	5825	8.50	7	2	4				< 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	Pwr Back-off	Rear	Edge 1 (Top Edge)	Edge 2 (Right Edge)	Edge 3 (Bottom Edge)	Edge 4 (Left Edge)	Corner Note 5
GSM850	OFF	Yes	Yes	Yes	No	No	Yes
	ON	Yes	Yes	Yes	No	No	Yes
GSM1900	OFF	Yes	Yes	Yes	No	No	Yes
	ON	Yes	Yes	No	No	No	No
W-CDMA Band II	OFF	Yes	Yes	Yes	No	No	Yes
	ON	Yes	Yes	Yes	No	No	Yes
W-CDMA Band V	OFF	Yes	Yes	Yes	No	No	Yes
	ON	Yes	Yes	Yes	No	No	Yes
LTE Band 5	OFF	Yes	Yes	Yes	No	No	Yes
	ON	Yes	Yes	Yes	No	No	Yes
LTE Band 7	OFF	Yes	Yes	Yes	No	No	Yes
	ON	Yes	Yes	No	No	No	No
LTE Band 38	OFF	Yes	Yes	Yes	No	No	Yes
	ON	Yes	Yes	Yes	No	No	Yes
LTE Band 41	OFF	Yes	Yes	Yes	No	No	Yes
	ON	Yes	Yes	Yes	No	No	Yes
Wi-Fi 2.4 GHz	OFF	Yes	Yes	No	No	Yes	No
	ON	Yes	Yes	No	No	No	No
Wi-Fi 5.3 GHz	OFF	Yes	Yes	No	No	No	No
	ON	Yes	Yes	No	No	No	No
Wi-Fi 5.5 GHz	OFF	Yes	Yes	No	No	No	No
	ON	Yes	Yes	No	No	No	No
Wi-Fi 5.8 GHz	OFF	Yes	Yes	No	No	No	No
	ON	Yes	Yes	No	No	No	No
Bluetooth	OFF	No	No	No	No	No	No

Note(s):

1. Yes = Testing is required. No = Testing is not required.
2. This device is support to Next to ear voice calls, so Head exposure also consider about SAR test.
3. For Pwr Back-off, All Head exposure conditions were tested using Proximity-sensor reduction mode and IR-sensor reduction was additional tested at worst configuration.
4. Protective cover (with S-pen) is in-box item. So additional SAR test were performed worst configuration in each exposure conditions.
5. Corner side is located between Edge 1 and Edge 2.

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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)	Head		Body	
	ε_r	σ (S/m)	ε_r	σ (S/m)
150	52.3	0.76	61.9	0.80
300	45.3	0.87	58.2	0.92
450	43.5	0.87	56.7	0.94
835	41.5	0.90	55.2	0.97
900	41.5	0.97	55.0	1.05
915	41.5	0.98	55.0	1.06
1450	40.5	1.20	54.0	1.30
1610	40.3	1.29	53.8	1.40
1800 – 2000	40.0	1.40	53.3	1.52
2450	39.2	1.80	52.7	1.95
3000	38.5	2.40	52.0	2.73
5000	36.2	4.45	49.3	5.07
5100	36.1	4.55	49.1	5.18
5200	36.0	4.66	49.0	5.30
5300	35.9	4.76	48.9	5.42
5400	35.8	4.86	48.7	5.53
5500	35.6	4.96	48.6	5.65
5600	35.5	5.07	48.5	5.77
5700	35.4	5.17	48.3	5.88
5800	35.3	5.27	48.2	6.00

IEEE Std 1528-2013

Refer to Table 3 within the IEEE Std 1528-2013

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Dielectric Property Measurements Results:

SAR 1 Room

Date	Freq. (MHz)	Liquid Parameters			Measured	Target	Delta (%)	Limit ±(%)
9-13-2017	Head 1900	e'	38.9600	Relative Permittivity (ε_r):	38.96	40.00	-2.60	5
		e''	13.4200	Conductivity (σ):	1.42	1.40	1.27	5
	Head 1850	e'	39.1400	Relative Permittivity (ε_r):	39.14	40.00	-2.15	5
		e''	13.3800	Conductivity (σ):	1.38	1.40	-1.69	5
	Head 1910	e'	38.9300	Relative Permittivity (ε_r):	38.93	40.00	-2.68	5
		e''	13.4300	Conductivity (σ):	1.43	1.40	1.88	5
9-18-2017	Body 5180	e'	47.6400	Relative Permittivity (ε_r):	47.64	49.05	-2.87	5
		e''	17.9100	Conductivity (σ):	5.16	5.27	-2.14	5
	Body 5300	e'	47.4200	Relative Permittivity (ε_r):	47.42	48.88	-3.00	5
		e''	18.0200	Conductivity (σ):	5.31	5.41	-1.86	5
	Body 5500	e'	47.0900	Relative Permittivity (ε_r):	47.09	48.61	-3.13	5
		e''	18.1700	Conductivity (σ):	5.56	5.64	-1.55	5
	Body 5600	e'	46.9200	Relative Permittivity (ε_r):	46.92	48.48	-3.21	5
		e''	18.2800	Conductivity (σ):	5.69	5.76	-1.20	5
	Body 5800	e'	46.6000	Relative Permittivity (ε_r):	46.60	48.20	-3.32	5
		e''	18.4700	Conductivity (σ):	5.96	6.00	-0.72	5
	Body 5825	e'	46.5600	Relative Permittivity (ε_r):	46.56	48.20	-3.40	5
		e''	18.4900	Conductivity (σ):	5.99	6.00	-0.19	5
9-20-2017	Head 5180	e'	35.6800	Relative Permittivity (ε_r):	35.68	36.01	-0.92	5
		e''	15.5000	Conductivity (σ):	4.46	4.63	-3.59	5
	Head 5300	e'	35.5000	Relative Permittivity (ε_r):	35.50	35.88	-1.05	5
		e''	15.5400	Conductivity (σ):	4.58	4.75	-3.65	5
	Head 5500	e'	35.2200	Relative Permittivity (ε_r):	35.22	35.65	-1.20	5
		e''	15.6000	Conductivity (σ):	4.77	4.96	-3.78	5
	Head 5600	e'	35.0700	Relative Permittivity (ε_r):	35.07	35.53	-1.31	5
		e''	15.6500	Conductivity (σ):	4.87	5.06	-3.70	5
	Head 5800	e'	34.8000	Relative Permittivity (ε_r):	34.80	35.30	-1.42	5
		e''	15.7500	Conductivity (σ):	5.08	5.27	-3.62	5
	Head 5825	e'	34.7500	Relative Permittivity (ε_r):	34.75	35.30	-1.56	5
		e''	15.7600	Conductivity (σ):	5.10	5.27	-3.14	5
9-22-2017	Body 5180	e'	48.1700	Relative Permittivity (ε_r):	48.17	49.05	-1.79	5
		e''	17.6100	Conductivity (σ):	5.07	5.27	-3.78	5
	Body 5300	e'	48.0000	Relative Permittivity (ε_r):	48.00	48.88	-1.81	5
		e''	17.7000	Conductivity (σ):	5.22	5.41	-3.61	5
	Body 5500	e'	47.7300	Relative Permittivity (ε_r):	47.73	48.61	-1.82	5
		e''	17.8300	Conductivity (σ):	5.45	5.64	-3.40	5
	Body 5600	e'	47.5900	Relative Permittivity (ε_r):	47.59	48.48	-1.83	5
		e''	17.9300	Conductivity (σ):	5.58	5.76	-3.09	5
	Body 5800	e'	47.3500	Relative Permittivity (ε_r):	47.35	48.20	-1.76	5
		e''	18.1100	Conductivity (σ):	5.84	6.00	-2.66	5
	Body 5825	e'	47.3000	Relative Permittivity (ε_r):	47.30	48.20	-1.87	5
		e''	18.1300	Conductivity (σ):	5.87	6.00	-2.13	5
9-25-2017	Body 5180	e'	50.5800	Relative Permittivity (ε_r):	50.58	49.05	3.13	5
		e''	17.8700	Conductivity (σ):	5.15	5.27	-2.36	5
	Body 5300	e'	50.4000	Relative Permittivity (ε_r):	50.40	48.88	3.10	5
		e''	17.9800	Conductivity (σ):	5.30	5.41	-2.08	5
	Body 5500	e'	50.1100	Relative Permittivity (ε_r):	50.11	48.61	3.08	5
		e''	18.1500	Conductivity (σ):	5.55	5.64	-1.66	5
	Body 5600	e'	49.9600	Relative Permittivity (ε_r):	49.96	48.48	3.06	5
		e''	18.2600	Conductivity (σ):	5.69	5.76	-1.31	5
	Body 5800	e'	49.6800	Relative Permittivity (ε_r):	49.68	48.20	3.07	5
		e''	18.4600	Conductivity (σ):	5.95	6.00	-0.78	5
	Body 5825	e'	49.6400	Relative Permittivity (ε_r):	49.64	48.20	2.99	5
		e''	18.4900	Conductivity (σ):	5.99	6.00	-0.19	5

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SAR 2 Room

Date	Freq. (MHz)	Liquid Parameters			Measured	Target	Delta (%)	Limit ±(%)
9-13-2017	Body 2600	e'	51.0000	Relative Permittivity (ε_r):	51.00	52.51	-2.88	5
		e''	14.5700	Conductivity (σ):	2.11	2.16	-2.52	5
	Body 2500	e'	51.2500	Relative Permittivity (ε_r):	51.25	52.64	-2.63	5
		e''	14.3600	Conductivity (σ):	2.00	2.02	-1.19	5
	Body 2700	e'	50.7300	Relative Permittivity (ε_r):	50.73	52.38	-3.16	5
		e''	14.7700	Conductivity (σ):	2.22	2.30	-3.65	5
9-18-2017	Body 2600	e'	50.8400	Relative Permittivity (ε_r):	50.84	52.51	-3.18	5
		e''	14.6900	Conductivity (σ):	2.12	2.16	-1.72	5
	Body 2500	e'	51.1500	Relative Permittivity (ε_r):	51.15	52.64	-2.82	5
		e''	14.4400	Conductivity (σ):	2.01	2.02	-0.64	5
	Body 2700	e'	50.5300	Relative Permittivity (ε_r):	50.53	52.38	-3.54	5
		e''	14.9000	Conductivity (σ):	2.24	2.30	-2.80	5
9-19-2017	Head 835	e'	41.3200	Relative Permittivity (ε_r):	41.32	41.50	-0.43	5
		e''	19.6200	Conductivity (σ):	0.91	0.90	1.21	5
	Head 820	e'	41.5100	Relative Permittivity (ε_r):	41.51	41.60	-0.22	5
		e''	19.6600	Conductivity (σ):	0.90	0.90	-0.23	5
	Head 850	e'	41.1400	Relative Permittivity (ε_r):	41.14	41.50	-0.87	5
		e''	19.5600	Conductivity (σ):	0.92	0.92	1.03	5
9-21-2017	Body 2450	e'	52.3100	Relative Permittivity (ε_r):	52.31	52.70	-0.74	5
		e''	14.5900	Conductivity (σ):	1.99	1.95	1.93	5
	Body 2400	e'	52.4300	Relative Permittivity (ε_r):	52.43	52.77	-0.65	5
		e''	14.4600	Conductivity (σ):	1.93	1.90	1.67	5
	Body 2480	e'	52.2200	Relative Permittivity (ε_r):	52.22	52.66	-0.84	5
		e''	14.6700	Conductivity (σ):	2.02	1.99	1.54	5
9-25-2017	Body 2600	e'	51.2900	Relative Permittivity (ε_r):	51.29	52.51	-2.32	5
		e''	14.8600	Conductivity (σ):	2.15	2.16	-0.58	5
	Body 2500	e'	51.5700	Relative Permittivity (ε_r):	51.57	52.64	-2.03	5
		e''	14.6600	Conductivity (σ):	2.04	2.02	0.87	5
	Body 2700	e'	51.0500	Relative Permittivity (ε_r):	51.05	52.38	-2.55	5
		e''	15.0500	Conductivity (σ):	2.26	2.30	-1.82	5
9-25-2017	Head 835	e'	42.1700	Relative Permittivity (ε_r):	42.17	41.50	1.61	5
		e''	19.8000	Conductivity (σ):	0.92	0.90	2.14	5
	Head 820	e'	42.3300	Relative Permittivity (ε_r):	42.33	41.60	1.75	5
		e''	19.8200	Conductivity (σ):	0.90	0.90	0.58	5
	Head 850	e'	42.0000	Relative Permittivity (ε_r):	42.00	41.50	1.20	5
		e''	19.7700	Conductivity (σ):	0.93	0.92	2.12	5

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SAR 3 Room

Date	Freq. (MHz)	Liquid Parameters			Measured	Target	Delta (%)	Limit ±(%)
9-13-2017	Body 1900	e'	53.9600	Relative Permittivity (ε_r):	53.96	53.30	1.24	5
		e''	14.8700	Conductivity (σ):	1.57	1.52	3.35	5
	Body 1850	e'	54.1200	Relative Permittivity (ε_r):	54.12	53.30	1.54	5
		e''	14.8500	Conductivity (σ):	1.53	1.52	0.50	5
	Body 1910	e'	53.9300	Relative Permittivity (ε_r):	53.93	53.30	1.18	5
		e''	14.8900	Conductivity (σ):	1.58	1.52	4.04	5
9-18-2017	Body 835	e'	53.4100	Relative Permittivity (ε_r):	53.41	55.20	-3.24	5
		e''	21.5200	Conductivity (σ):	1.00	0.97	3.00	5
	Body 820	e'	53.5500	Relative Permittivity (ε_r):	53.55	55.28	-3.12	5
		e''	21.5800	Conductivity (σ):	0.98	0.97	1.60	5
	Body 850	e'	53.2600	Relative Permittivity (ε_r):	53.26	55.16	-3.44	5
		e''	21.4500	Conductivity (σ):	1.01	0.99	2.70	5
9-21-2017	Head 2450	e'	38.5800	Relative Permittivity (ε_r):	38.58	39.20	-1.58	5
		e''	13.3800	Conductivity (σ):	1.82	1.80	1.26	5
	Head 2400	e'	38.7400	Relative Permittivity (ε_r):	38.74	39.30	-1.42	5
		e''	13.2700	Conductivity (σ):	1.77	1.75	1.10	5
	Head 2480	e'	38.4800	Relative Permittivity (ε_r):	38.48	39.16	-1.74	5
		e''	13.4600	Conductivity (σ):	1.86	1.83	1.29	5
9-21-2017	Head 2600	e'	38.0000	Relative Permittivity (ε_r):	38.00	39.01	-2.59	5
		e''	13.6900	Conductivity (σ):	1.98	1.96	0.87	5
	Head 2500	e'	38.4000	Relative Permittivity (ε_r):	38.40	39.14	-1.88	5
		e''	13.5000	Conductivity (σ):	1.88	1.85	1.22	5
	Head 2700	e'	37.6800	Relative Permittivity (ε_r):	37.68	38.88	-3.10	5
		e''	13.8900	Conductivity (σ):	2.09	2.07	0.73	5
9-25-2017	Body 835	e'	53.1900	Relative Permittivity (ε_r):	53.19	55.20	-3.64	5
		e''	21.5300	Conductivity (σ):	1.00	0.97	3.05	5
	Body 820	e'	53.3300	Relative Permittivity (ε_r):	53.33	55.28	-3.52	5
		e''	21.5700	Conductivity (σ):	0.98	0.97	1.55	5
	Body 850	e'	53.0400	Relative Permittivity (ε_r):	53.04	55.16	-3.84	5
		e''	21.4900	Conductivity (σ):	1.02	0.99	2.89	5
9-25-2017	Head 2600	e'	38.0500	Relative Permittivity (ε_r):	38.05	39.01	-2.46	5
		e''	13.5200	Conductivity (σ):	1.95	1.96	-0.39	5
	Head 2500	e'	38.3900	Relative Permittivity (ε_r):	38.39	39.14	-1.91	5
		e''	13.3200	Conductivity (σ):	1.85	1.85	-0.13	5
	Head 2700	e'	37.7300	Relative Permittivity (ε_r):	37.73	38.88	-2.97	5
		e''	13.7100	Conductivity (σ):	2.06	2.07	-0.58	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	Head	Body
D835V2	4d194	7-19-2017	835	1g	9.33	9.30
				10g	6.03	6.09
D1900V2	5d199	2-21-2017	1900	1g	41.30	40.40
				10g	21.40	21.30
D2450V2	960	2-21-2017	2450	1g	52.90	50.90
				10g	24.70	23.80
D2600V2	1097	11-15-2016	2600	1g	55.80	54.90
				10g	25.00	24.60
D5GHzV2	1184	8-23-2017	5300	1g	81.30	76.40
				10g	23.20	21.30
D5GHzV2	1184	8-23-2017	5500	1g	80.60	77.10
				10g	22.90	21.30
D5GHzV2	1184	8-23-2017	5600	1g	82.30	79.20
				10g	23.40	22.20
D5GHzV2	1184	8-23-2017	5800	1g	78.10	76.40
				10g	22.20	21.20

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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			
9-13-2017	D1900V2	5d199	Head	1g	3.83	38.30	41.30	-7.26	1, 2
				10g	1.96	19.60	21.40	-8.41	
9-18-2017	D5GHzV2 (5300)	1184	Body	1g	7.66	76.60	76.40	0.26	
				10g	2.15	21.50	21.30	0.94	
9-18-2017	D5GHzV2 (5500)	1184	Body	1g	8.03	80.30	77.10	4.15	
				10g	2.26	22.60	21.30	6.10	
9-18-2017	D5GHzV2 (5600)	1184	Body	1g	8.47	84.70	79.20	6.94	3, 4
				10g	2.36	23.60	22.20	6.31	
9-18-2017	D5GHzV2 (5800)	1184	Body	1g	7.82	78.20	76.40	2.36	
				10g	2.18	21.80	21.20	2.83	
9-20-2017	D5GHzV2 (5300)	1184	Head	1g	7.66	76.60	81.30	-5.78	
				10g	2.19	21.90	23.20	-5.60	
9-20-2017	D5GHzV2 (5500)	1184	Head	1g	7.75	77.50	80.60	-3.85	
				10g	2.22	22.20	22.90	-3.06	
9-20-2017	D5GHzV2 (5600)	1184	Head	1g	8.23	82.30	82.30	0.00	
				10g	2.35	23.50	23.40	0.43	
9-20-2017	D5GHzV2 (5800)	1184	Head	1g	7.69	76.90	78.10	-1.54	
				10g	2.20	22.00	22.20	-0.90	
9-22-2017	D5GHzV2 (5300)	1184	Body	1g	7.55	75.50	76.40	-1.18	
				10g	2.12	21.20	21.30	-0.47	
9-22-2017	D5GHzV2 (5500)	1184	Body	1g	7.83	78.30	77.10	1.56	
				10g	2.20	22.00	21.30	3.29	
9-22-2017	D5GHzV2 (5600)	1184	Body	1g	8.39	83.90	79.20	5.93	
				10g	2.35	23.50	22.20	5.86	
9-22-2017	D5GHzV2 (5800)	1184	Body	1g	8.11	81.10	76.40	6.15	
				10g	2.26	22.60	21.20	6.60	
9-25-2017	D5GHzV2 (5300)	1184	Body	1g	7.75	77.50	76.40	1.44	
				10g	2.17	21.70	21.30	1.88	
9-25-2017	D5GHzV2 (5500)	1184	Body	1g	7.92	79.20	77.10	2.72	
				10g	2.23	22.30	21.30	4.69	
9-25-2017	D5GHzV2 (5600)	1184	Body	1g	8.35	83.50	79.20	5.43	
				10g	2.33	23.30	22.20	4.95	
9-25-2017	D5GHzV2 (5800)	1184	Body	1g	7.99	79.90	76.40	4.58	
				10g	2.23	22.30	21.20	5.19	

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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			
9-13-2017	D2600V2	1097	Body	1g	5.58	55.80	54.90	1.64	
				10g	2.42	24.20	24.60	-1.63	
9-18-2017	D2600V2	1097	Body	1g	5.43	54.30	54.90	-1.09	
				10g	2.36	23.60	24.60	-4.07	
9-19-2017	D835V2	4d194	Head	1g	0.98	9.76	9.33	4.61	
				10g	0.64	6.41	6.03	6.30	
9-21-2017	D2450V2	960	Body	1g	5.13	51.30	50.90	0.79	5, 6
				10g	2.35	23.50	23.80	-1.26	
9-25-2017	D2600V2	1097	Body	1g	5.72	57.20	54.90	4.19	
				10g	2.48	24.80	24.60	0.81	
9-25-2017	D835V2	4d194	Head	1g	1.00	9.98	9.33	6.97	
				10g	0.66	6.55	6.03	8.62	

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			
9-13-2017	D1900V2	5d199	Body	1g	3.91	39.10	40.40	-3.22	
				10g	2.00	20.00	21.30	-6.10	
9-18-2017	D835V2	4d194	Body	1g	1.01	10.10	9.30	8.60	7, 8
				10g	0.66	6.60	6.09	8.37	
9-21-2017	D2450V2	960	Head	1g	5.30	53.00	52.90	0.19	
				10g	2.39	23.90	24.70	-3.24	
9-21-2017	D2600V2	1097	Head	1g	5.82	58.20	55.80	4.30	9, 10
				10g	2.52	25.20	25.00	0.80	
9-25-2017	D835V2	4d194	Body	1g	0.99	9.94	9.30	6.88	
				10g	0.65	6.52	6.09	7.06	
9-25-2017	D2600V2	1097	Head	1g	5.56	55.60	55.80	-0.36	
				10g	2.42	24.20	25.00	-3.20	

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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

Band	Mode	Coding Scheme	Time Slots	Ch No.	Freq. (MHz)	Max. Pwr			Reduced Pwr				
									Proximity sensor mode		IR sensor mode		Frame Pwr Maximum
						Burst (dBm)	Frame (dBm)	Frame Pwr Maximum	Burst (dBm)	Frame (dBm)	Burst (dBm)	Frame (dBm)	
850	GSM (Voice)	CS1	1	128	824.2	32.7	23.7	23.97	31.1	22.1	31.2	22.2	22.47
				190	836.6	32.4	23.4		30.7	21.7	30.8	21.8	
				251	848.8	32.2	23.1		30.6	21.5	30.6	21.6	
	GPRS (GMSK)	CS1	1	128	824.2	32.7	23.7	23.97	28.7	19.7	28.8	19.8	19.97
				190	836.6	32.5	23.5		28.6	19.6	28.7	19.6	
				251	848.8	32.1	23.1		28.6	19.5	28.6	19.6	
			2	128	824.2	30.1	24.1	24.48	27.2	21.1	27.2	21.2	21.48
				190	836.6	29.8	23.8		27.0	21.0	27.1	21.0	
				251	848.8	30.0	23.9		27.2	21.2	27.3	21.2	
			3	128	824.2	28.5	24.2	24.74	25.7	21.4	25.7	21.5	21.74
				190	836.6	28.6	24.3		25.7	21.5	25.8	21.6	
				251	848.8	28.6	24.3		25.7	21.4	25.8	21.5	
			4	128	824.2	27.3	24.3	24.49	24.4	21.4	24.5	21.5	21.49
				190	836.6	27.2	24.2		24.2	21.2	24.3	21.3	
				251	848.8	27.2	24.2		24.2	21.2	24.3	21.2	
	EGPRS (8PSK)	MCS5	1	128	824.2	26.7	17.6	17.97	26.5	17.5	26.6	17.6	17.97
				190	836.6	26.7	17.7		26.7	17.6	26.6	17.6	
				251	848.8	26.8	17.8		26.8	17.7	26.8	17.8	
			2	128	824.2	24.8	18.8	18.98	24.7	18.7	24.8	18.8	18.98
				190	836.6	24.6	18.6		24.7	18.7	24.7	18.6	
				251	848.8	25.0	19.0		24.8	18.7	25.0	18.9	
			3	128	824.2	23.1	18.9	19.74	23.2	19.0	23.3	19.1	19.74
				190	836.6	23.4	19.2		23.4	19.1	23.6	19.3	
				251	848.8	23.9	19.7		23.7	19.4	23.7	19.5	
			4	128	824.2	21.9	18.9	19.49	21.9	18.8	22.1	19.1	19.49
				190	836.6	22.3	19.3		21.9	18.9	22.1	19.1	
				251	848.8	22.5	19.5		22.2	19.1	22.1	19.1	

Notes:

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

- Standalone: GMSK (GPRS) mode with 3 time slots for Max power and 3 time slots for Reduced power, based on the output power measurements above
- SAR is not required for EGPRS (8PSK) mode because its output power is less than that of GPRS Mode

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GSM1900 Measured Results

Band	Mode	Coding Scheme	Time Slots	Ch No.	Freq. (MHz)	Max. Pwr			Reduced Pwr				Frame Pwr Maximum
									Proximity sensor mode		IR sensor mode		
						Burst (dBm)	Frame (dBm)	Frame Pwr Maximum	Burst (dBm)	Frame (dBm)	Burst (dBm)	Frame (dBm)	
1900	GSM (Voice)	CS1	1	512	1850.2	28.6	19.5	20.47	22.1	13.0	22.1	13.1	13.47
				661	1880.0	28.7	19.7		22.2	13.2	22.2	13.2	
				810	1909.8	28.3	19.3		21.9	12.9	21.9	12.9	
	GPRS (GMSK)	CS1	1	512	1850.2	28.5	19.5	19.97	17.4	8.4	17.4	8.4	9.47
				661	1880.0	28.7	19.7		17.8	8.8	17.7	8.6	
				810	1909.8	28.2	19.2		17.8	8.7	17.8	8.7	
			2	512	1850.2	25.6	19.6	20.48	16.3	10.3	16.3	10.3	11.48
				661	1880.0	25.7	19.7		16.8	10.7	16.8	10.8	
				810	1909.8	25.7	19.7		16.6	10.5	16.6	10.6	
			3	512	1850.2	24.2	19.9	20.74	14.8	10.5	14.8	10.5	12.24
				661	1880.0	24.3	20.0		15.3	11.1	15.4	11.1	
				810	1909.8	24.0	19.7		15.4	11.1	15.1	10.9	
			4	512	1850.2	23.2	20.2	20.99	13.5	10.5	13.5	10.5	11.49
				661	1880.0	23.0	20.0		13.6	10.6	13.6	10.6	
				810	1909.8	22.9	19.9		14.0	11.0	14.0	11.0	
	EGPRS (8PSK)	MCS5	1	512	1850.2	24.8	15.7	16.47	19.0	10.0	19.0	10.0	10.97
				661	1880.0	24.9	15.9		19.1	10.0	19.1	10.0	
				810	1909.8	24.4	15.4		18.5	9.4	18.5	9.4	
			2	512	1850.2	23.2	17.2	17.48	16.8	10.8	16.8	10.8	11.98
				661	1880.0	23.2	17.2		17.1	11.1	17.1	11.1	
				810	1909.8	22.7	16.6		16.5	10.5	16.5	10.5	
			3	512	1850.2	21.8	17.5	18.24	15.7	11.4	15.7	11.4	12.24
				661	1880.0	21.9	17.6		15.4	11.2	15.4	11.2	
				810	1909.8	21.3	17.0		14.7	10.5	14.8	10.5	
			4	512	1850.2	20.6	17.6	18.49	14.5	11.5	14.5	11.5	11.49
				661	1880.0	20.4	17.4		14.3	11.2	14.3	11.3	
				810	1909.8	19.8	16.7		13.6	10.6	13.6	10.6	

Notes:

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

- Standalone: GMSK (GPRS) mode with 4 time slots for Max power and 3 time slots for Reduced power, based on the output power measurements above
- SAR is not required for EGPRS (8PSK) mode because its output power is less than that of GPRS Mode

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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

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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W-CDMA Band II Measured Results

Band	Mode		UL Ch No.	Freq. (MHz)	Max. Pwr		Reduced Pwr		
					MPR (dB)	Meas. Pwr (dBm)	MPR (dB)	Proximity sensor Meas. Pwr (dBm)	IR sensor Meas. Pwr (dBm)
W-CDMA Band II	Rel 99	RMC, 12.2 kbps	9262	1852.4	N/A	22.6	0	13.1	13.2
			9400	1880.0	N/A	22.4	0	13.0	13.0
			9538	1907.6	N/A	22.3	0	12.9	12.9
	HSDPA	Subtest 1	9262	1852.4	0	21.5	0	13.1	13.1
			9400	1880.0	0	21.7	0	13.0	13.0
			9538	1907.6	0	21.5	0	12.9	12.9
		Subtest 2	9262	1852.4	0	21.8	0	13.2	13.2
			9400	1880.0	0	21.7	0	13.1	13.1
			9538	1907.6	0	21.6	0	12.9	12.9
		Subtest 3	9262	1852.4	0.5	20.7	0	13.2	13.2
			9400	1880.0	0.5	20.7	0	13.1	13.0
			9538	1907.6	0.5	20.5	0	12.9	12.9
		Subtest 4	9262	1852.4	0.5	20.5	0	13.2	13.2
			9400	1880.0	0.5	20.7	0	13.1	13.1
			9538	1907.6	0.5	20.5	0	12.9	13.0
	HSUPA	Subtest 1	9262	1852.4	0	20.8	0	12.1	12.2
			9400	1880.0	0	20.7	0	12.0	12.1
			9538	1907.6	0	20.6	0	11.9	11.9
		Subtest 2	9262	1852.4	2	19.0	0	13.1	13.2
			9400	1880.0	2	18.8	0	13.0	13.1
			9538	1907.6	2	18.6	0	12.9	12.9
		Subtest 3	9262	1852.4	1	18.9	0	13.1	13.2
			9400	1880.0	1	18.8	0	13.0	13.0
			9538	1907.6	1	18.6	0	12.8	12.9
		Subtest 4	9262	1852.4	2	18.9	0	13.1	13.2
			9400	1880.0	2	18.8	0	13.0	13.1
			9538	1907.6	2	18.6	0	12.9	12.9
		Subtest 5	9262	1852.4	0	20.8	0	13.1	13.1
			9400	1880.0	0	20.7	0	13.0	13.0
			9538	1907.6	0	20.6	0	12.8	12.9

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W-CDMA Band V Measured Results

Band	Mode		UL Ch No.	Freq. (MHz)	Max. Pwr		Reduced Pwr		
					MPR (dB)	Meas. Pwr (dBm)	MPR (dB)	Proximity sensor Meas. Pwr (dBm)	IR sensor Meas. Pwr (dBm)
W-CDMA Band V	Rel 99	RMC, 12.2 kbps	4132	826.4	N/A	22.9	0	17.4	17.4
			4183	836.6	N/A	22.9	0	17.4	17.4
			4233	846.6	N/A	22.9	0	17.3	17.4
	HSDPA	Subtest 1	4132	826.4	0	22.6	0	17.3	17.3
			4183	836.6	0	22.5	0	17.3	17.4
			4233	846.6	0	22.5	0	17.4	17.4
		Subtest 2	4132	826.4	0	22.3	0	17.4	17.4
			4183	836.6	0	22.3	0	17.5	17.4
			4233	846.6	0	22.3	0	17.5	17.5
		Subtest 3	4132	826.4	0.5	21.4	0	17.4	17.4
			4183	836.6	0.5	21.5	0	17.4	17.5
			4233	846.6	0.5	21.5	0	17.4	17.4
		Subtest 4	4132	826.4	0.5	22.2	0	17.4	17.4
			4183	836.6	0.5	22.2	0	17.4	17.4
			4233	846.6	0.5	22.2	0	17.4	17.5
	HSUPA	Subtest 1	4132	826.4	0	20.9	0	16.5	16.5
			4183	836.6	0	20.8	0	16.5	16.4
			4233	846.6	0	20.8	0	16.5	16.5
		Subtest 2	4132	826.4	2	18.5	0	16.5	16.5
			4183	836.6	2	18.4	0	16.2	16.5
			4233	846.6	2	18.4	0	16.2	16.2
		Subtest 3	4132	826.4	1	19.3	0	16.5	16.5
			4183	836.6	1	19.3	0	16.5	16.5
			4233	846.6	1	19.3	0	16.5	16.5
		Subtest 4	4132	826.4	2	18.4	0	16.5	16.5
			4183	836.6	2	18.4	0	16.5	16.5
			4233	846.6	2	18.4	0	16.5	16.5
		Subtest 5	4132	826.4	0	21.3	0	17.5	17.5
			4183	836.6	0	21.3	0	17.4	17.4
			4233	846.6	0	21.2	0	17.5	17.5

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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 3

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

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

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

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

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Max power results

LTE Band 5 Measured Results

Band	BW (MHz)	Mode	RB Allocation	RB offset	Target MPR	Max. Avg Pwr (dBm)		
						829 MHz	836.5 MHz	844 MHz
LTE Band 5	10	QPSK	1	0	0		23.2	
			1	25	0		23.2	
			1	49	0		23.2	
			25	0	1		22.1	
			25	12	1		22.1	
			25	25	1		22.1	
			50	0	1		22.1	
		16QAM	1	0	1		21.8	
			1	25	1		21.8	
			1	49	1		21.8	
			25	0	2		21.0	
			25	12	2		21.0	
			25	25	2		21.0	
			50	0	2		21.0	

Band	BW (MHz)	Mode	RB Allocation	RB offset	Target MPR	Max. Avg Pwr (dBm)		
						826.5 MHz	836.5 MHz	846.5 MHz
LTE Band 5	5	QPSK	1	0	0	22.6	22.5	22.7
			1	12	0	22.6	22.5	22.6
			1	24	0	22.6	22.5	22.6
			12	0	1	21.7	21.6	21.7
			12	6	1	21.7	21.6	21.7
			12	11	1	21.7	21.6	21.6
			25	0	1	21.7	21.7	21.7
		16QAM	1	0	1	21.6	21.6	21.6
			1	12	1	21.6	21.5	21.6
			1	24	1	21.6	21.5	21.5
			12	0	2	20.7	20.6	20.6
			12	6	2	20.7	20.6	20.6
			12	11	2	20.7	20.6	20.6
			25	0	2	20.6	20.6	20.7

Band	BW (MHz)	Mode	RB Allocation	RB offset	Target MPR	Max. Avg Pwr (dBm)		
						825.5 MHz	836.5 MHz	847.5 MHz
LTE Band 5	3	QPSK	1	0	0	22.7	22.8	22.7
			1	7	0	22.7	22.7	22.6
			1	14	0	22.7	22.7	22.6
			8	0	1	21.7	21.7	21.6
			8	4	1	21.7	21.7	21.6
			8	7	1	21.7	21.7	21.6
			15	0	1	21.7	21.7	21.6
		16QAM	1	0	1	21.8	21.7	21.5
			1	7	1	21.8	21.7	21.4
			1	14	1	21.8	21.6	21.4
			8	0	2	20.5	20.6	20.6
			8	4	2	20.5	20.6	20.6
			8	7	2	20.5	20.6	20.6
			15	0	2	20.6	20.6	20.6

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LTE Band 5 Measured Results (continued)

Band	BW (MHz)	Mode	RB Allocation	RB offset	Target MPR	Max. Avg Pwr (dBm)		
						824.7 MHz	836.5 MHz	848.3 MHz
LTE Band 5	1.4	QPSK	1	0	0	22.8	22.6	22.6
			1	2	0	22.7	22.6	22.6
			1	5	0	22.8	22.6	22.6
			3	0	0	22.7	22.7	22.7
			3	1	0	22.7	22.7	22.7
			3	2	0	22.7	22.7	22.7
			6	0	1	21.7	21.7	21.7
		16QAM	1	0	1	21.5	21.3	21.5
			1	2	1	21.5	21.2	21.5
			1	5	1	21.5	21.3	21.5
			3	0	1	21.6	21.6	21.4
			3	1	1	21.5	21.4	21.5
			3	2	1	21.5	21.5	21.5
			6	0	2	20.6	20.6	20.5

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 7 Measured Results

Band	BW (MHz)	Mode	RB Allocation	RB offset	Max. Avg Pwr (dBm)			
					MPR	2510 MHz	2535 MHz	2560 MHz
LTE Band 7	20	QPSK	1	0	0	22.8	23.0	23.0
			1	49	0	22.8	23.0	22.9
			1	99	0	23.0	23.0	22.9
			50	0	1	21.9	21.9	21.8
			50	24	1	21.9	22.0	21.8
			50	50	1	21.9	21.9	21.8
			100	0	1	21.9	21.9	21.8
		16QAM	1	0	1	21.9	21.7	21.9
			1	49	1	21.8	21.7	21.8
			1	99	1	21.9	21.7	21.8
			50	0	2	21.0	20.9	20.9
			50	24	2	20.9	20.9	20.9
			50	50	2	20.9	20.9	20.8
			100	0	2	21.0	21.0	20.9

Band	BW (MHz)	Mode	RB Allocation	RB offset	Max. Avg Pwr (dBm)			
					MPR	2507.5 MHz	2535 MHz	2562.5 MHz
LTE Band 7	15	QPSK	1	0	0	23.0	23.0	22.9
			1	37	0	22.9	23.1	22.8
			1	74	0	22.9	23.0	22.8
			36	0	1	21.9	22.0	22.0
			36	20	1	21.9	22.0	21.9
			36	39	1	21.9	22.0	21.9
			75	0	1	21.9	22.0	21.9
		16QAM	1	0	1	21.8	22.0	21.9
			1	37	1	21.8	21.8	21.8
			1	74	1	21.7	21.9	21.8
			36	0	2	20.9	21.0	20.9
			36	20	2	20.8	21.0	21.0
			36	39	2	20.8	21.0	21.0
			75	0	2	20.9	21.0	21.0

Band	BW (MHz)	Mode	RB Allocation	RB offset	Max. Avg Pwr (dBm)			
					MPR	2505 MHz	2535 MHz	2565 MHz
LTE Band 7	10	QPSK	1	0	0	22.9	23.0	22.9
			1	25	0	22.9	23.0	22.9
			1	49	0	22.9	23.0	22.9
			25	0	1	21.9	21.9	21.9
			25	12	1	21.9	22.0	21.8
			25	25	1	21.9	21.9	21.8
			50	0	1	21.9	21.9	21.9
		16QAM	1	0	1	21.7	22.0	22.2
			1	25	1	21.7	21.9	22.1
			1	49	1	21.7	22.0	22.1
			25	0	2	20.9	21.1	21.0
			25	12	2	20.9	21.1	21.0
			25	25	2	20.9	21.1	21.0
			50	0	2	20.9	21.0	20.9

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LTE Band 7 Measured Results (continued)

Band	BW (MHz)	Mode	RB Allocation	RB offset	Max. Avg Pwr (dBm)			
					MPR	2502.5 MHz	2535 MHz	2567.5 MHz
LTE Band 7	5	QPSK	1	0	0	22.4	22.6	22.6
			1	12	0	22.4	22.5	22.6
			1	24	0	22.4	22.6	22.6
			12	0	1	21.4	21.5	21.5
			12	7	1	21.4	21.5	21.5
			12	13	1	21.3	21.5	21.5
			25	0	1	21.4	21.6	21.5
		16QAM	1	0	1	21.2	21.8	21.4
			1	12	1	21.2	21.7	21.4
			1	24	1	21.2	21.7	21.4
			12	0	2	20.3	20.6	20.4
			12	7	2	20.2	20.6	20.4
			12	13	2	20.2	20.5	20.4
			25	0	2	20.3	20.5	20.5

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Reduction power results

LTE Band 5 Measured Results

Band	BW (MHz)	Mode	RB Allocation	RB offset	Target MPR	Proximi sensor reduction. Avg Pwr (dBm)			IR sensor reduction. Avg Pwr (dBm)		
						829 MHz	836.5 MHz	844 MHz	829 MHz	836.5 MHz	844 MHz
LTE Band 5	10	QPSK	1	0	0		18.0			18.0	
			1	25	0		18.0			18.0	
			1	49	0		18.0			18.0	
			25	0	1		17.0			17.0	
			25	12	1		17.0			17.0	
			25	25	1		17.0			17.0	
			50	0	1		17.0			17.0	
		16QAM	1	0	1		16.8			16.9	
			1	25	1		16.8			16.9	
			1	49	1		16.8			16.8	
			25	0	2		16.0			16.0	
			25	12	2		16.0			16.0	
			25	25	2		16.0			16.0	
			50	0	2		15.9			16.0	

Band	BW (MHz)	Mode	RB Allocation	RB offset	Target MPR	Proximi sensor reduction. Avg Pwr (dBm)			IR sensor reduction. Avg Pwr (dBm)		
						826.5 MHz	836.5 MHz	846.5 MHz	826.5 MHz	836.5 MHz	846.5 MHz
LTE Band 5	5	QPSK	1	0	0	17.8	17.6	17.6	17.8	17.6	17.6
			1	12	0	17.8	17.5	17.5	17.7	17.6	17.6
			1	24	0	17.8	17.6	17.5	17.7	17.6	17.5
			12	0	1	16.8	16.7	16.7	16.7	16.6	16.7
			12	6	1	16.7	16.7	16.7	16.7	16.6	16.7
			12	11	1	16.7	16.7	16.6	16.7	16.6	16.6
			25	0	1	16.7	16.7	16.7	16.7	16.7	16.7
		16QAM	1	0	1	16.6	16.8	16.5	16.6	16.8	16.6
			1	12	1	16.6	16.7	16.4	16.6	16.8	16.5
			1	24	1	16.7	16.8	16.4	16.6	16.8	16.5
			12	0	2	15.7	15.6	15.7	15.7	15.6	15.7
			12	6	2	15.7	15.6	15.7	15.7	15.6	15.6
			12	11	2	15.7	15.6	15.7	15.7	15.6	15.6
			25	0	2	15.7	15.7	15.7	15.8	15.7	15.6

Band	BW (MHz)	Mode	RB Allocation	RB offset	Target MPR	Proximi sensor reduction. Avg Pwr (dBm)			IR sensor reduction. Avg Pwr (dBm)		
						825.5 MHz	836.5 MHz	847.5 MHz	825.5 MHz	836.5 MHz	847.5 MHz
LTE Band 5	3	QPSK	1	0	0	17.7	17.7	17.7	17.7	17.7	17.7
			1	7	0	17.7	17.6	17.6	17.7	17.7	17.7
			1	14	0	17.7	17.7	17.6	17.7	17.7	17.6
			8	0	1	16.7	16.7	16.7	16.7	16.7	16.7
			8	4	1	16.7	16.7	16.6	16.7	16.7	16.6
			8	7	1	16.7	16.7	16.6	16.7	16.7	16.6
			15	0	1	16.7	16.7	16.6	16.7	16.7	16.6
		16QAM	1	0	1	16.6	16.8	16.8	16.5	16.8	16.9
			1	7	1	16.5	16.7	16.7	16.5	16.8	16.9
			1	14	1	16.6	16.8	16.7	16.5	16.8	16.8
			8	0	2	15.7	15.6	15.5	15.7	15.7	15.6
			8	4	2	15.7	15.6	15.5	15.7	15.7	15.6
			8	7	2	15.7	15.6	15.5	15.7	15.7	15.5
			15	0	2	15.6	15.6	15.7	15.6	15.7	15.7

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LTE Band 5 Measured Results (continued)

Band	BW (MHz)	Mode	RB Allocation	RB offset	Target MPR	Proximi sensor reduction. Avg Pwr (dBm)			IR sensor reduction. Avg Pwr (dBm)		
						824.7 MHz	836.5 MHz	848.3 MHz	824.7 MHz	836.5 MHz	848.3 MHz
LTE Band 5	1.4	QPSK	1	0	0	17.6	17.7	17.7	17.7	17.7	17.7
			1	2	0	17.6	17.6	17.7	17.6	17.7	17.6
			1	5	0	17.6	17.7	17.7	17.7	17.7	17.7
			3	0	0	17.7	17.6	17.6	17.7	17.7	17.7
			3	1	0	17.7	17.6	17.6	17.7	17.6	17.7
			3	2	0	17.7	17.6	17.7	17.7	17.6	17.7
			6	0	1	16.7	16.7	16.7	16.7	16.7	16.6
		16QAM	1	0	1	16.5	16.6	16.5	16.5	16.4	16.7
			1	2	1	16.5	16.5	16.5	16.4	16.3	16.6
			1	5	1	16.5	16.6	16.5	16.4	16.4	16.6
			3	0	1	16.6	16.5	16.6	16.5	16.5	16.6
			3	1	1	16.6	16.5	16.5	16.5	16.6	16.6
			3	2	1	16.6	16.4	16.6	16.5	16.6	16.5
			6	0	2	15.6	15.6	15.6	15.6	15.6	15.5

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 7 Measured Results

Band	BW (MHz)	Mode	RB Allocation	RB offset	MPR	Proximity sensor reduction. Avg Pwr (dBm)			IR sensor reduction. Avg Pwr (dBm)		
						2510 MHz	2535 MHz	2560 MHz	2510 MHz	2535 MHz	2560 MHz
LTE Band 7	20	QPSK	1	0	0	10.8	10.9	10.8	10.8	10.9	10.8
			1	49	0	10.7	10.9	10.8	10.7	10.9	10.7
			1	99	0	10.7	10.9	10.8	10.7	10.9	10.7
			50	0	1	9.7	9.8	9.6	9.6	9.8	9.6
			50	24	1	9.6	9.8	9.6	9.6	9.8	9.6
			50	50	1	9.6	9.8	9.6	9.6	9.8	9.6
			100	0	1	9.6	9.8	9.6	9.6	9.8	9.6
		16QAM	1	0	1	9.6	9.6	9.7	9.6	9.8	9.8
			1	49	1	9.5	9.6	9.6	9.5	9.9	9.7
			1	99	1	9.5	10.0	9.7	9.5	9.8	9.6
			50	0	2	8.7	8.8	8.6	8.7	8.8	8.6
			50	24	2	8.6	8.8	8.6	8.6	8.8	8.6
			50	50	2	8.6	8.8	8.6	8.6	8.7	8.6
			100	0	2	8.7	8.8	8.6	8.7	8.8	8.6

Band	BW (MHz)	Mode	RB Allocation	RB offset	MPR	Proximity sensor reduction. Avg Pwr (dBm)			IR sensor reduction. Avg Pwr (dBm)		
						2507.5 MHz	2535 MHz	2562.5 MHz	2507.5 MHz	2535 MHz	2562.5 MHz
LTE Band 7	15	QPSK	1	0	0	10.8	11.0	10.9	10.8	10.8	10.9
			1	37	0	10.7	10.9	10.8	10.7	11.0	10.8
			1	74	0	10.7	10.9	10.8	10.7	11.0	10.8
			36	0	1	9.6	9.8	9.7	9.7	9.8	9.7
			36	20	1	9.6	9.8	9.7	9.6	9.8	9.8
			36	39	1	9.6	9.8	9.7	9.6	9.8	9.7
			75	0	1	9.6	9.8	9.7	9.6	9.8	9.7
		16QAM	1	0	1	9.6	10.0	9.9	9.6	9.7	9.8
			1	37	1	9.5	9.9	9.9	9.5	9.7	9.8
			1	74	1	9.5	10.0	9.9	9.5	9.7	9.8
			36	0	2	8.6	8.8	8.8	8.6	8.8	8.8
			36	20	2	8.6	8.8	8.8	8.6	8.8	8.8
			36	39	2	8.6	8.8	8.7	8.6	8.8	8.7
			75	0	2	8.6	8.8	8.7	8.6	8.8	8.7

Band	BW (MHz)	Mode	RB Allocation	RB offset	MPR	Proximity sensor reduction. Avg Pwr (dBm)			IR sensor reduction. Avg Pwr (dBm)		
						2505 MHz	2535 MHz	2565 MHz	2505 MHz	2535 MHz	2565 MHz
LTE Band 7	10	QPSK	1	0	0	10.7	10.9	10.9	10.7	11.0	10.9
			1	25	0	10.7	10.9	10.9	10.7	10.9	10.9
			1	49	0	10.7	10.9	10.9	10.7	11.0	10.9
			25	0	1	9.6	9.8	9.7	9.6	9.8	9.8
			25	12	1	9.5	9.8	9.7	9.6	9.8	9.7
			25	25	1	9.5	9.8	9.8	9.6	9.8	9.8
			50	0	1	9.6	9.8	9.7	9.6	9.8	9.7
		16QAM	1	0	1	9.4	9.9	9.9	9.5	9.7	9.8
			1	25	1	9.4	9.8	9.9	9.5	9.7	9.8
			1	49	1	9.4	9.8	9.8	9.4	9.7	9.8
			25	0	2	8.5	8.8	8.8	8.6	8.8	8.8
			25	12	2	8.5	8.8	8.8	8.6	8.8	8.8
			25	25	2	8.5	8.8	8.8	8.6	8.8	8.8
			50	0	2	8.6	8.8	8.7	8.6	8.8	8.8

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LTE Band 7 Measured Results (continued)

Band	BW (MHz)	Mode	RB Allocation	RB offset	MPR	Proximity sensor reduction. Avg Pwr (dBm)			IR sensor reduction. Avg Pwr (dBm)		
						2502.5 MHz	2535 MHz	2567.5 MHz	2502.5 MHz	2535 MHz	2567.5 MHz
LTE Band 7	5	QPSK	1	0	0	10.1	10.3	10.4	10.1	10.3	10.4
			1	12	0	10.1	10.3	10.3	10.1	10.3	10.4
			1	24	0	10.1	10.3	10.3	10.1	10.3	10.4
			12	0	1	9.1	9.4	9.4	9.1	9.4	9.4
			12	7	1	9.1	9.3	9.4	9.1	9.4	9.3
			12	13	1	9.1	9.4	9.4	9.1	9.4	9.3
			25	0	1	9.1	9.4	9.4	9.1	9.4	9.3
		16QAM	1	0	1	8.9	9.3	9.3	9.0	9.3	9.3
			1	12	1	8.9	9.3	9.3	9.0	9.3	9.3
			1	24	1	8.9	9.3	9.3	9.0	9.4	9.3
			12	0	2	8.1	8.3	8.4	8.1	8.4	8.4
			12	7	2	8.1	8.3	8.4	8.1	8.4	8.4
			12	13	2	8.1	8.3	8.4	8.1	8.4	8.4
			25	0	2	8.1	8.4	8.3	8.1	8.4	8.4

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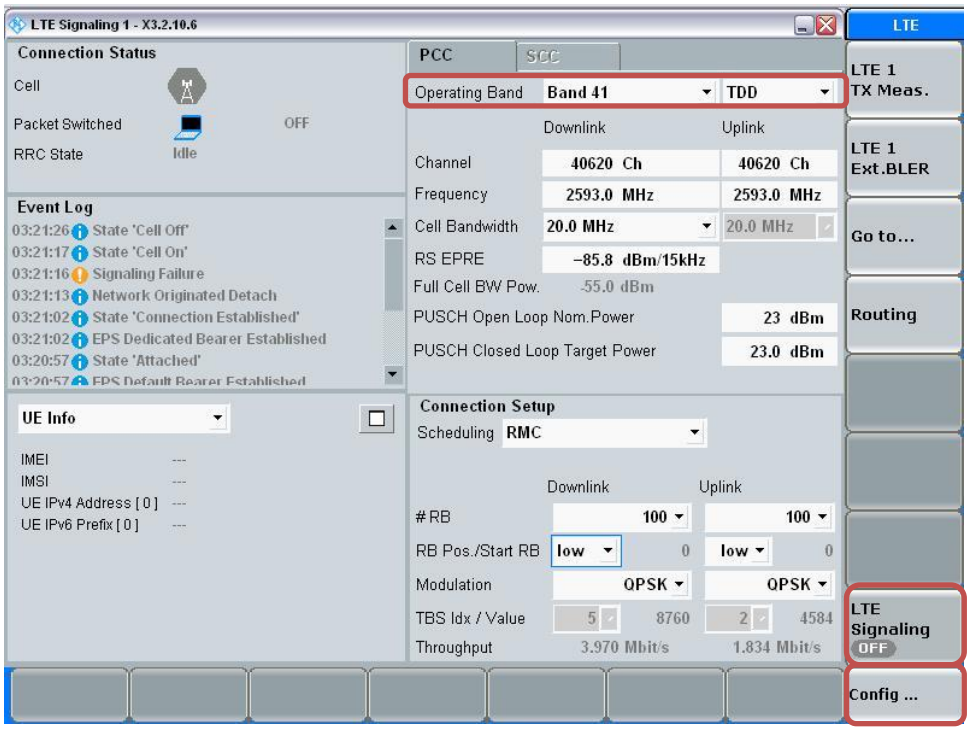
LTE Band 41 Measured Results

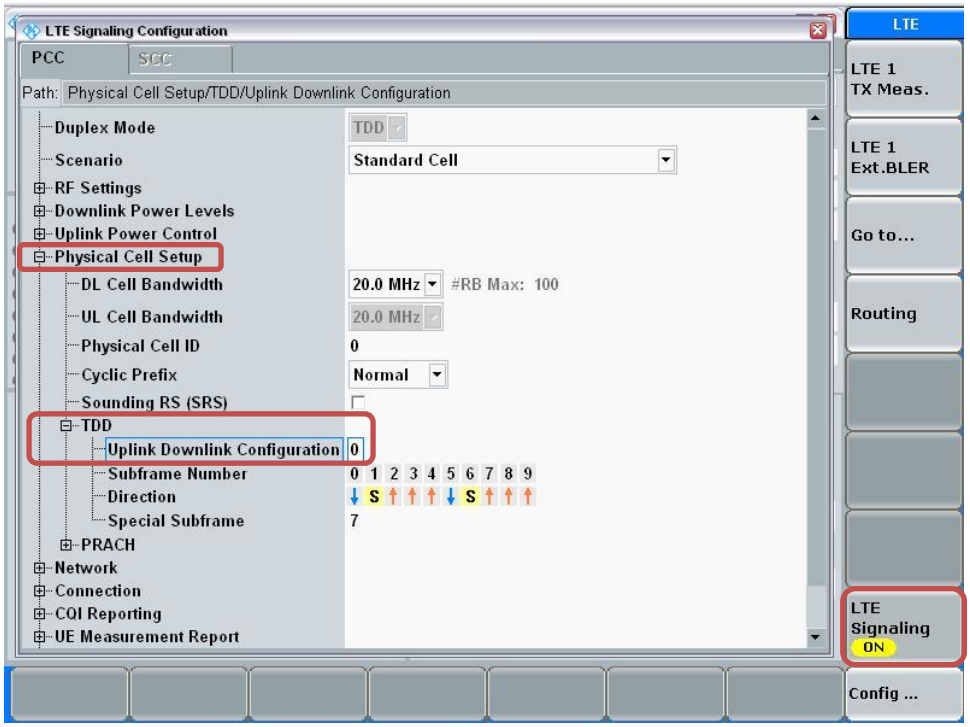
Procedure used to establish SAR test signal for LTE TDD Band

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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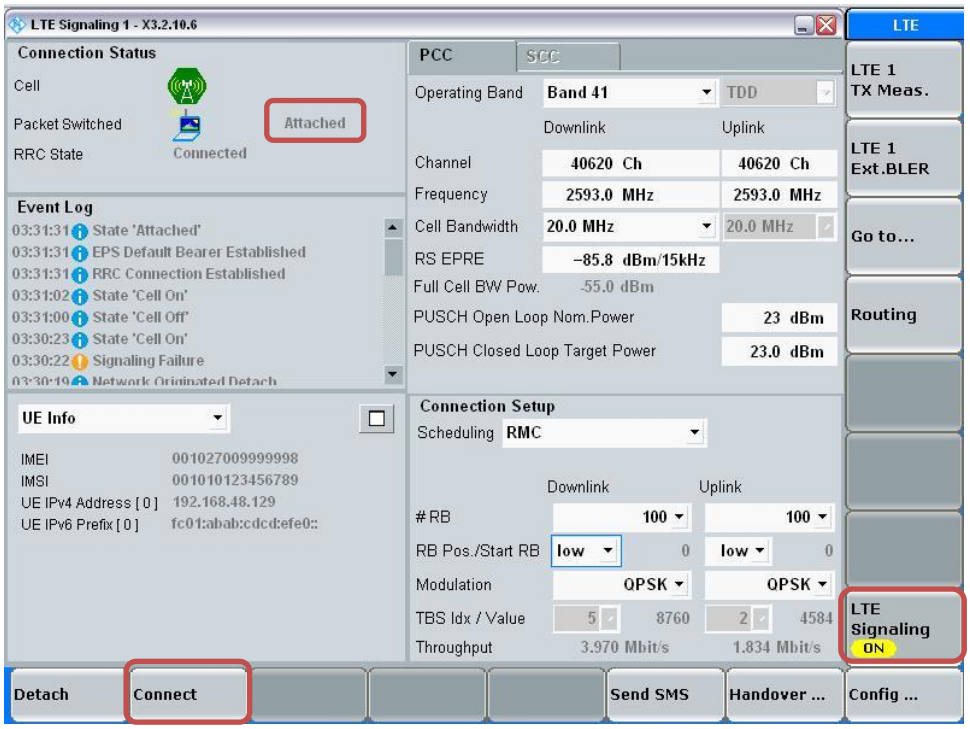
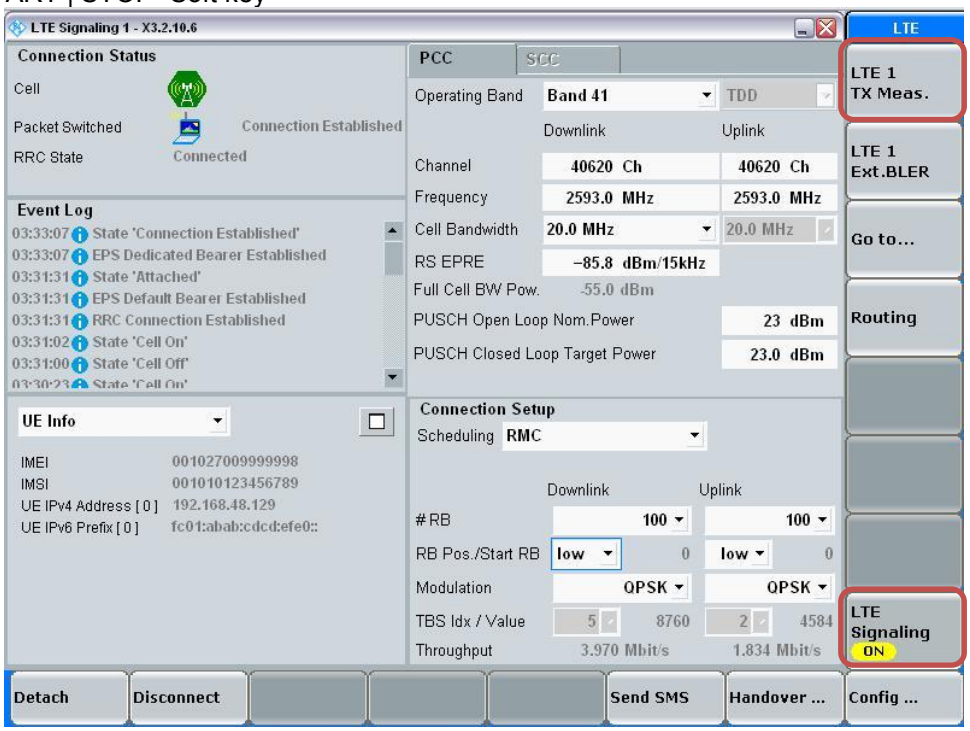
Connect to EUT

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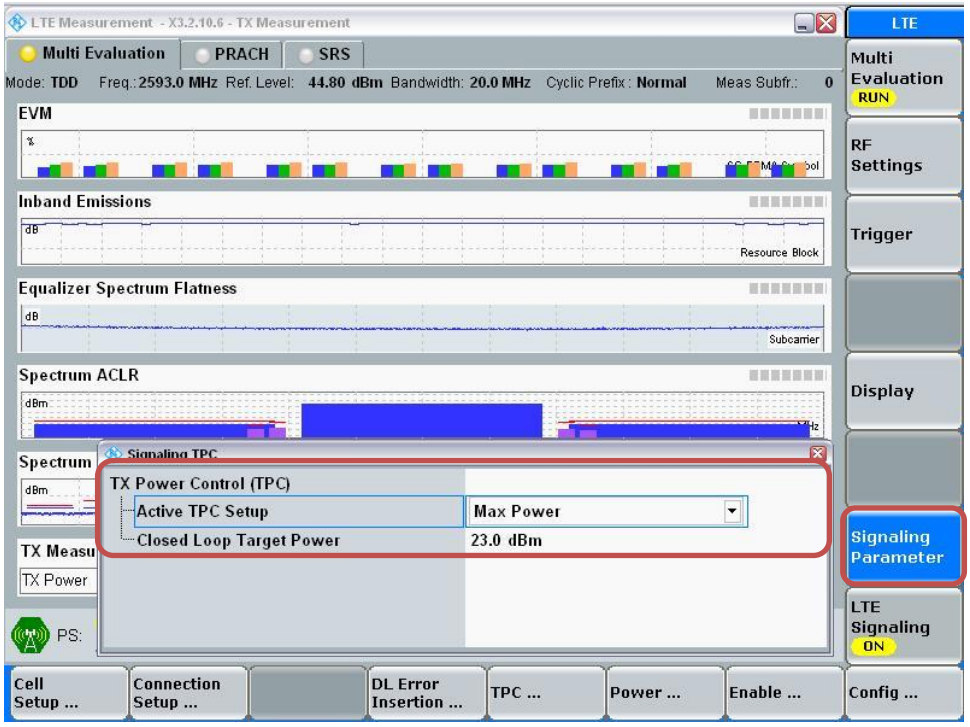
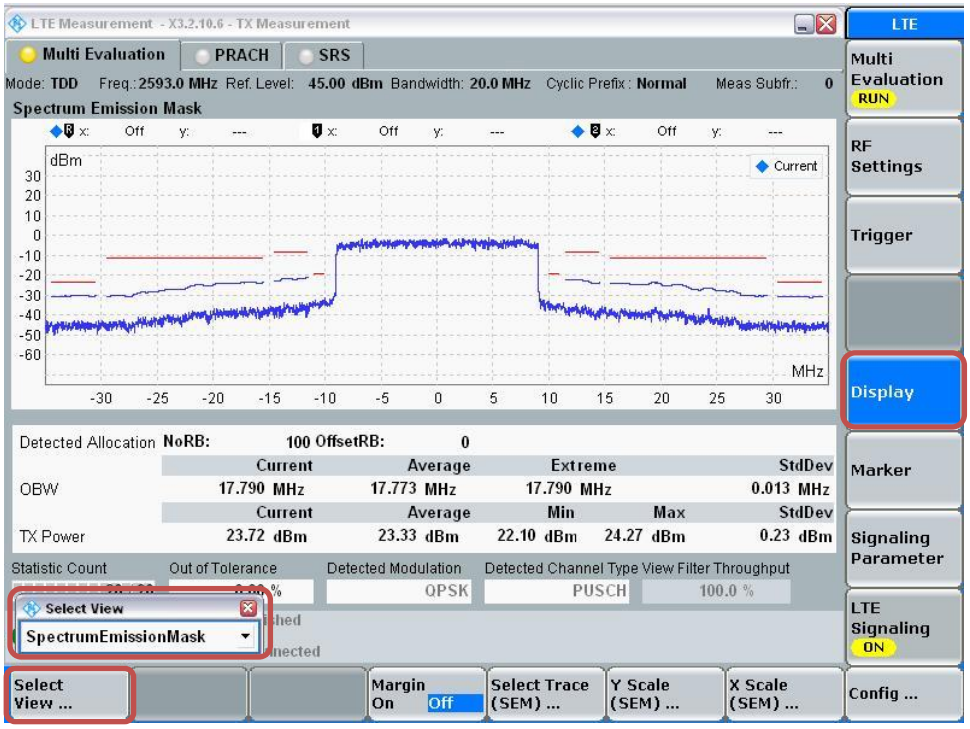
- Select “Signaling Parameter”
- Select “TX Power Control (TPC)” > Select “Active TPC Setup” to “Max Power” > Set “Closed Loop Target Power” to “23 dBm”



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	Max. Avg Pwr (dBm)			
					MPR	2565 MHz	2605 MHz	2645 MHz
LTE Band 41	20	QPSK	1	0	0	23.0	23.1	23.2
			1	49	0	23.0	22.9	23.1
			1	99	0	22.8	22.9	23.0
			50	0	1	21.9	22.0	22.0
			50	24	1	21.9	22.0	22.0
			50	50	1	21.9	21.9	21.9
			100	0	1	21.9	22.0	22.0
		16QAM	1	0	1	21.8	22.1	21.3
			1	49	1	21.6	22.0	21.7
			1	99	1	21.4	21.8	21.4
			50	0	2	20.9	21.1	21.1
			50	24	2	20.8	21.1	21.0
			50	50	2	20.9	21.0	21.0
			100	0	2	20.9	21.0	21.0

Band	BW (MHz)	Mode	RB Allocation	RB offset	Max. Avg Pwr (dBm)			
					MPR	2562.5 MHz	2605 MHz	2647.5 MHz
LTE Band 41	15	QPSK	1	0	0	22.9	23.1	23.2
			1	37	0	22.8	23.1	23.0
			1	74	0	22.8	22.9	23.0
			36	0	1	21.8	22.0	22.1
			36	20	1	21.8	22.0	22.1
			36	39	1	21.8	22.0	22.0
			75	0	1	21.9	22.0	22.1
		16QAM	1	0	1	21.4	22.0	22.1
			1	37	1	21.4	22.1	21.8
			1	74	1	21.7	21.7	21.9
			36	0	2	20.9	21.1	21.1
			36	20	2	20.9	21.1	21.1
			36	39	2	20.8	21.0	21.1
			75	0	2	20.8	21.0	21.1

Band	BW (MHz)	Mode	RB Allocation	RB offset	Max. Avg Pwr (dBm)			
					MPR	2560 MHz	2605 MHz	2650 MHz
LTE Band 41	10	QPSK	1	0	0	22.8	23.0	23.1
			1	25	0	22.8	22.9	23.1
			1	49	0	22.8	22.9	23.0
			25	0	1	21.8	22.0	22.1
			25	12	1	21.8	22.0	22.1
			25	25	1	21.8	22.0	22.1
			50	0	1	21.8	22.0	22.1
		16QAM	1	0	1	21.3	21.7	21.9
			1	25	1	21.3	21.6	21.8
			1	49	1	21.3	21.7	21.8
			25	0	2	20.8	21.1	21.1
			25	12	2	20.8	21.1	21.0
			25	25	2	20.8	21.0	21.0
			50	0	2	20.8	21.1	21.0

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LTE Band 41 Measured Results (continued)

Band	BW (MHz)	Mode	RB Allocation	RB offset	Max. Avg Pwr (dBm)			
					MPR	2557.5 MHz	2605 MHz	2652.5 MHz
LTE Band 41	5	QPSK	1	0	0	22.9	23.0	22.0
			1	12	0	22.8	23.0	23.0
			1	24	0	22.8	22.9	23.1
			12	0	1	21.8	22.0	22.1
			12	7	1	21.8	22.0	22.0
			12	13	1	21.8	22.0	22.0
			25	0	1	21.8	22.0	22.0
		16QAM	1	0	1	21.6	21.9	21.9
			1	12	1	21.6	21.6	21.7
			1	24	1	21.6	21.4	21.4
			12	0	2	20.7	20.9	20.9
			12	7	2	20.7	20.9	20.9
			12	13	2	20.7	20.9	20.9
			25	0	2	20.8	21.0	21.0

LTE Band 38 Measured Results

SAR for LTE Band 38 (Frequency range: 2570-2620 MHz) is covered by LTE Band 41 (Frequency range: 2555-2655 MHz) due to overlapping frequency range, same maximum tune-up limit and same channel bandwidth.

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Reduction power results

LTE Band 41 Measured Results

Band	BW (MHz)	Mode	RB Allocation	RB offset	MPR	Proximity sensor reduction. Avg Pwr (dBm)			IR sensor reduction. Avg Pwr (dBm)		
						2565 MHz	2605 MHz	2645 MHz	2565 MHz	2605 MHz	2645 MHz
LTE Band 41	20	QPSK	1	0	0	12.0	12.1	12.1	12.0	12.2	12.3
			1	49	0	12.0	12.0	12.1	11.9	11.8	12.2
			1	99	0	12.0	12.0	11.9	12.0	11.8	12.1
			50	0	1	10.8	10.9	11.1	10.8	10.9	11.1
			50	24	1	10.8	10.9	11.0	10.8	10.8	11.0
			50	50	1	10.8	10.8	11.0	10.8	10.8	11.0
			100	0	1	10.8	10.9	11.0	10.8	10.9	11.0
		16QAM	1	0	1	11.2	11.0	11.2	10.8	11.3	11.3
			1	49	1	10.9	10.5	11.2	10.6	11.4	10.9
			1	99	1	11.1	10.9	11.2	10.9	11.1	11.0
			50	0	2	9.8	10.0	10.1	9.8	9.9	10.1
			50	24	2	9.8	9.9	10.0	9.8	9.9	10.1
			50	50	2	9.8	9.9	10.0	9.8	9.8	10.0
			100	0	2	9.8	9.9	10.0	9.8	9.9	10.0
Band	BW (MHz)	Mode	RB Allocation	RB offset	MPR	Proximity sensor reduction. Avg Pwr (dBm)			IR sensor reduction. Avg Pwr (dBm)		
						2562.5 MHz	2605 MHz	2647.5 MHz	2562.5 MHz	2605 MHz	2647.5 MHz
LTE Band 41	15	QPSK	1	0	0	11.8	11.9	12.1	11.7	12.0	12.2
			1	37	0	11.8	11.9	12.1	11.8	11.9	12.1
			1	74	0	11.8	11.8	12.1	11.9	11.9	12.0
			36	0	1	10.8	10.9	11.1	10.8	10.9	11.1
			36	20	1	10.8	10.9	11.1	10.8	10.9	11.1
			36	39	1	10.8	10.8	11.1	10.8	10.9	11.1
			75	0	1	10.8	10.9	11.1	10.8	10.9	11.1
		16QAM	1	0	1	10.8	10.7	10.8	11.0	11.1	11.0
			1	37	1	10.4	10.9	10.9	10.9	10.9	11.1
			1	74	1	10.7	10.5	10.8	11.1	10.9	10.9
			36	0	2	9.8	9.9	10.1	9.8	10.0	10.2
			36	20	2	9.8	9.9	10.1	9.8	9.9	10.1
			36	39	2	9.8	9.8	10.0	9.8	9.9	10.1
			75	0	2	9.7	9.9	10.1	9.8	9.9	10.1
Band	BW (MHz)	Mode	RB Allocation	RB offset	MPR	Proximity sensor reduction. Avg Pwr (dBm)			IR sensor reduction. Avg Pwr (dBm)		
						2560 MHz	2605 MHz	2650 MHz	2560 MHz	2605 MHz	2650 MHz
LTE Band 41	10	QPSK	1	0	0	11.7	11.9	12.1	11.8	12.0	12.2
			1	25	0	11.7	11.9	12.1	11.8	11.9	12.1
			1	49	0	11.7	11.9	12.1	11.8	11.9	12.1
			25	0	1	10.7	10.9	11.1	10.7	10.9	11.1
			25	12	1	10.7	10.9	11.0	10.7	10.9	11.1
			25	25	1	10.7	10.8	11.0	10.7	10.8	11.1
			50	0	1	10.7	10.8	11.1	10.7	10.9	11.1
		16QAM	1	0	1	10.5	10.9	11.0	10.6	10.8	11.2
			1	25	1	10.5	10.8	11.0	10.5	10.8	11.1
			1	49	1	10.6	10.8	10.9	10.6	10.8	11.1
			25	0	2	9.7	9.9	10.1	9.7	9.9	10.1
			25	12	2	9.7	9.8	10.1	9.7	9.9	10.1
			25	25	2	9.7	9.8	10.1	9.7	9.9	10.1
			50	0	2	9.7	9.8	10.1	9.7	9.9	10.1

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LTE Band 41 Measured Results (continued)

Band	BW (MHz)	Mode	RB Allocation	RB offset	MPR	Proximity sensor reduction. Avg Pwr (dBm)			IR sensor reduction. Avg Pwr (dBm)		
						2557.5 MHz	2605 MHz	2652.5 MHz	2557.5 MHz	2605 MHz	2652.5 MHz
LTE Band 41	5	QPSK	1	0	0	11.7	12.0	12.0	11.8	12.0	12.1
			1	12	0	11.7	11.9	12.1	11.8	11.9	12.1
			1	24	0	11.7	11.9	12.0	11.8	11.9	12.1
			12	0	1	10.7	10.9	11.0	10.7	10.9	11.1
			12	7	1	10.7	10.9	11.0	10.7	10.9	11.0
			12	13	1	10.7	10.9	11.0	10.7	10.8	11.0
			25	0	1	10.7	10.8	11.0	10.7	10.8	11.0
		16QAM	1	0	1	10.5	11.0	11.0	10.2	10.9	10.9
			1	12	1	10.4	10.8	10.9	10.7	10.7	10.8
			1	24	1	10.7	11.1	10.9	10.5	11.0	10.7
			12	0	2	9.6	9.8	10.0	9.8	9.8	10.0
			12	7	2	9.6	9.8	9.9	9.8	9.8	9.9
			12	13	2	9.6	9.8	9.9	9.8	9.8	9.9
			25	0	2	9.7	9.9	10.1	9.7	9.9	10.0

LTE Band 38 Measured Results

SAR for LTE Band 38 (Frequency range: 2570-2620 MHz) is covered by LTE Band 41 (Frequency range: 2555-2655 MHz) due to overlapping frequency range, same maximum tune-up limit and same channel bandwidth.

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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 two (2) downlinks.

1) Max power results

Type	LTE CA combinations			PCC (UL)					SCC (DL)			LTE Rel 8 Tx. Power [dBm]	LTE Rel 10 Tx. Power [dBm]	Delta
	PCC	+	SCC	Mode	BW (MHz)	Channel	Freq. (MHz)	RB/Offset	BW (MHz)	Channel	Freq. (MHz)			
Intra-band cotiguous	38C (0)			QPSK	20	37850	2580	1/0	20	38048	2599.8	23.1	23.1	0.0
	41C (0) (1) (2) (3)			QPSK	20	41140	2645	1/0	20	40942	2625.2	23.2	23.2	0.0
Intra-band Non-cotiguous	41A	+	41A (0) (1)	QPSK	20	41140	2645	1/0	20	40340	2565	23.2	23.3	0.1

2) Proximity sensor Reduction power results

Type	LTE CA combinations			PCC (UL)					SCC (DL)			LTE Rel 8 Tx. Power [dBm]	LTE Rel 10 Tx. Power [dBm]	Delta
	PCC	+	SCC	Mode	BW (MHz)	Channel	Freq. (MHz)	RB/Offset	BW (MHz)	Channel	Freq. (MHz)			
Intra-band cotiguous	38C (0)			QPSK	20	37850	2580	1/0	20	38048	2599.8	12.0	12.0	0.0
	41C (0) (1) (2) (3)			QPSK	10	41190	2650	1/0	20	41046	2635.6	12.2	12.1	-0.1
Intra-band Non-cotiguous	41A	+	41A (0) (1)	QPSK	10	41190	2650	1/0	20	40340	2565	12.2	12.0	-0.2

3) IR sensor Reduction power results

Type	LTE CA combinations			PCC (UL)					SCC (DL)			LTE Rel 8 Tx. Power [dBm]	LTE Rel 10 Tx. Power [dBm]	Delta
	PCC	+	SCC	Mode	BW (MHz)	Channel	Freq. (MHz)	RB/Offset	BW (MHz)	Channel	Freq. (MHz)			
Intra-band cotiguous	38C (0)			QPSK	15	37825	2577.5	1/0	15	37975	2592.5	12.2	12.2	0.0
	41C (0) (1) (2) (3)			QPSK	20	41140	2645	1/0	20	40942	2625.2	12.3	12.2	-0.1
Intra-band Non-cotiguous	41A	+	41A (0) (1)	QPSK	20	41140	2645	1/0	20	40340	2565	12.3	12.3	0.0

Note(s):

1. Per KDB 941225 D05A LTE Rel. 10 KDB inquiry Sheet: SAR is excluded for Carrier Aggregation when measured power doesn't exceed LTE Release 8 by more than a 1/4 dBm.
2. Maximum output power for the uplink with downlink carrier aggregation active may be measured using the highest maximum output power configuration for uplink with downlink carrier aggregation inactive measured among the channel bandwidth, modulation and RB combinations in each frequency band.

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9.4 Wi-Fi 2.4GHz (DTS Band)

Measured Results (Max Power)

Mode	Data Rate	Ch #	Freq. (MHz)	Avg Pwr (dBm)	Max Output Power (dBm)	SAR Test (Yes/No)
802.11b	1 Mbps	1	2412	17.2	17.5	Yes
		6	2437	17.2		
		11	2462	17.0		
		12	2467	7.8	8.5	No
		13	2472	8.3		
802.11g	6 Mbps	1	2412	Not Require	16.5	No
		6	2437			
		11	2462			
		12	2467		8.5	
		13	2472		3.5	
802.11n (HT20)	6.5 Mbps	1	2412	Not Require	16.5	No
		6	2437			
		11	2462			
		12	2467		8.5	
		13	2472		2.5	

Measured Results (Proximity sensor Reduction Power)

Mode	Data Rate	Ch #	Freq. (MHz)	Avg Pwr (dBm)	Max Output Power (dBm)	SAR Test (Yes/No)
802.11b	1 Mbps	1	2412	13.2	13.5	Yes
		6	2437	13.5		
		11	2462	13.3		
		12	2467	7.8	8.5	No
		13	2472	8.3		
802.11g	6 Mbps	1	2412	13.1	13.5	No
		6	2437	12.6		
		11	2462	13.4		
		12	2467	8.4	8.5	
		13	2472	3.2	3.5	
802.11n (HT20)	6.5 Mbps	1	2412	12.9	13.5	No
		6	2437	13.3		
		11	2462	13.1		
		12	2467	8.2	8.5	
		13	2472	2.0	2.5	

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.
2. Additionally, SAR is not required for Channels 12 and 13 because the tune-up limit and the measured output power for these two channels are no greater than those for the default test channels.

9.5 Bluetooth

Maximum tune-up tolerance limit is 9.0 dBm from the rated nominal maximum output power. This power level qualifies for exclusion of SAR testing.

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

Measured Results

Antenna	Band (GHz)	Mode	Data Rate	Ch #	Freq. (MHz)	Max Pwr.			Proximity sensor Reduce Pwr		
						Avg Pwr (dBm)	Max Output Power (dBm)	SAR Test (Yes/No)	Avg Pwr (dBm)	Max Output Power (dBm)	SAR Test (Yes/No)
SISO Main	5.3 (U-NII 2A)	802.11a	6 Mbps	52	5260	11.8	12.5	Yes	Not Required	8.5	No
				56	5280	11.9					
				60	5300	12.1					
				64	5320	11.8					
		802.11n (HT20)	6.5 Mbps	52	5260	Not Required	11.5	No		8.5	No
				56	5280						
				60	5300						
				64	5320						
		802.11n (HT40)	13.5 Mbps	54	5270		11.5	No		8.5	No
				62	5310						
		802.11ac (VHT20)	6.5 Mbps	52	5260		11.5	No		8.5	No
				56	5280						
				60	5300						
				64	5320						
		802.11ac (VHT40)	13.5 Mbps	54	5270		11.5	No		8.5	No
				62	5310						
		802.11ac (VHT80)	29.3 Mbps	58	5290		11.5	No	8.2	8.5	Yes
	5.5 (U-NII 2C)	802.11a	6 Mbps	100	5500	11.8	12.5	Yes	Not Required	8.5	No
				120	5600	11.9					
				124	5620	11.7					
				144	5720	11.8					
		802.11n (HT20)	6.5 Mbps	100	5500	Not Required	11.5	No		8.5	No
				120	5600						
				124	5620						
				144	5720						
		802.11n (HT40)	13.5 Mbps	102	5510		11.5	No		8.5	No
				118	5590						
				126	5630						
				142	5710						
		802.11ac (VHT20)	6.5 Mbps	100	5500		11.5	No		8.5	No
				120	5600						
				124	5620						
				144	5720						
		802.11ac (VHT40)	13.5 Mbps	102	5510		11.5	No		8.5	No
				118	5590						
				126	5630						
				142	5710						
		802.11ac (VHT80)	29.3 Mbps	106	5530		11.5	No	8.5	8.5	Yes
				122	5610				8.4		
				138	5690				8.1		
	5.8 (U-NII 3)	802.11a	6 Mbps	149	5745	11.9	12.5	Yes	Not Required	8.5	No
				157	5785	12.1					
				165	5825	11.7					
		802.11n (HT20)	6.5 Mbps	149	5745	Not Required	11.5	No		8.5	No
				157	5785						
				165	5825						
		802.11n (HT40)	13.5 Mbps	151	5755		11.5	No		8.5	No
				159	5795						
		802.11ac (VHT20)	6.5 Mbps	149	5745		11.5	No		8.5	No
				157	5785						
				165	5825						
		802.11ac (VHT40)	13.5 Mbps	151	5755		11.5	No		8.5	No
				159	5795						
		802.11ac (VHT80)	29.3 Mbps	155	5775		11.5	No	8.2	8.5	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:

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.

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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. GSM850

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	
Head	Voice	On	0	Left Touch	128	824.2	31.5	31.1	0.837	0.908	
					190	836.6	31.5	30.7	0.844	1.004	1
					251	848.8	31.5	30.6	0.745	0.926	
				Left Tilt	128	824.2	31.5	31.1	0.672	0.729	
				Right Touch	128	824.2	31.5	31.1	0.410	0.445	
				Right Tilt	128	824.2	31.5	31.1	0.380	0.412	
Head VoIP	GPRS 3 Slots	On	0	Left Touch	190	836.6	26.0	25.7	0.609	0.648	
				Left Tilt	190	836.6	26.0	25.7	0.482	0.513	
				Right Touch	190	836.6	26.0	25.7	0.388	0.413	
				Right Tilt	190	836.6	26.0	25.7	0.323	0.344	
Body	GPRS 3 Slots	Off	15	Rear	190	836.6	29.0	28.6	0.415	0.458	
			15	Edge 1	190	836.6	29.0	28.6	0.163	0.180	
			8	Corner	190	836.6	29.0	28.6	0.047	0.052	
			3	Edge 2	190	836.6	29.0	28.6	0.289	0.319	
	GPRS 3 Slots	On	0	Rear	190	836.6	26.0	25.7	0.579	0.616	2
			0	Edge 1	190	836.6	26.0	25.7	0.174	0.185	
			0	Corner	190	836.6	26.0	25.7	0.156	0.166	
			0	Edge 2	190	836.6	26.0	25.7	0.209	0.222	

Additional test

RF Exposure Conditions	Mode	Pwr Back Off	Dist. (mm)	Test Position	Ch #.	Freq. (MHz)	Power (dBm)		1-g SAR (W/kg)		Note
							Tune-up limit	Meas.	Meas.	Scaled	
Head	Voice	On	0	Left Touch	190	836.6	31.5	30.7	0.456	0.542	1
					190	836.6	31.5	30.8	0.854	0.999	2
Body	GPRS 3 Slots	On	0	Rear	190	836.6	26.0	25.7	0.308	0.328	1

Note(s):

1. Protective cover (with S-pen) is in-box. So additional SAR test were performed highest reported SAR position in each exposure conditions.
2. For Pwr Back-off, All Head exposure conditions were tested using Proximity-sensor reduction mode and IR-sensor reduction was additional tested at highest SAR position in Head exposure condition.

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10.2. GSM1900

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	
Head	Voice	On	0	Left Touch	661	1880.0	22.5	22.2	0.230	0.245	3
				Left Tilt	661	1880.0	22.5	22.2	0.207	0.221	
				Right Touch	661	1880.0	22.5	22.2	0.079	0.085	
				Right Tilt	661	1880.0	22.5	22.2	0.059	0.063	
Head VoIP	GPRS 3 Slots	On	0	Left Touch	810	1909.8	16.5	15.4	0.139	0.179	
				Left Tilt	810	1909.8	16.5	15.4	0.121	0.156	
				Right Touch	810	1909.8	16.5	15.4	0.042	0.054	
				Right Tilt	810	1909.8	16.5	15.4	0.030	0.039	
Body	GPRS 4 Slots	Off	15	Rear	661	1880.0	24.0	23.0	0.174	0.217	
			15	Edge 1	661	1880.0	24.0	23.0	0.131	0.163	
			8	Corner	661	1880.0	24.0	23.0	0.136	0.170	
			3	Edge 2	661	1880.0	24.0	23.0	0.229	0.286	4
	GPRS 3 Slots	On	0	Rear	810	1909.8	16.5	15.4	0.191	0.246	
			0	Edge 1	810	1909.8	16.5	15.4	0.141	0.182	

Additional test

RF Exposure Conditions	Mode	Pwr Back Off	Dist. (mm)	Test Position	Ch #.	Freq. (MHz)	Power (dBm)		1-g SAR (W/kg)		Note
							Tune-up limit	Meas.	Meas.	Scaled	
Head	Voice	On	0	Left Touch	661	1880.0	22.5	22.2	0.178	0.190	1
					661	1880.0	22.5	22.2	0.214	0.228	2
Body	GPRS 4 Slots	Off	3	Edge 2	661	1880.0	24.0	23.0	0.161	0.201	1

Note(s):

1. Protective cover (with S-pen) is in-box. So additional SAR test were performed highest reported SAR position in each exposure conditions.
2. For Pwr Back-off, All Head exposure conditions were tested using Proximity -sensor reduction mode and IR-sensor reduction was additional tested at highest SAR position in Head exposure condition.

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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	
Head	Rel 99 RMC	On	0	Left Touch	9400	1880.0	13.5	13.0	0.263	0.292	5
				Left Tilt	9400	1880.0	13.5	13.0	0.243	0.270	
				Right Touch	9400	1880.0	13.5	13.0	0.090	0.100	
				Right Tilt	9400	1880.0	13.5	13.0	0.067	0.074	
Body	Rel 99 RMC	Off	15	Rear	9400	1880.0	23.5	22.4	0.391	0.499	
			15	Edge 1	9400	1880.0	23.5	22.4	0.311	0.397	
			8	Corner	9400	1880.0	23.5	22.4	0.278	0.355	
			3	Edge 2	9400	1880.0	23.5	22.4	0.425	0.542	6
		On	0	Rear	9400	1880.0	13.5	13.0	0.364	0.404	
			0	Edge 1	9400	1880.0	13.5	13.0	0.344	0.382	
			0	Corner	9400	1880.0	13.5	13.0	0.083	0.092	
			0	Edge 2	9400	1880.0	13.5	13.0	0.072	0.080	

Additional test

RF Exposure Conditions	Mode	Pwr back Off	Dist. (mm)	Test Position	Ch #.	Freq. (MHz)	Power (dBm)		1-g SAR (W/kg)		Note
							Tune-up limit	Meas.	Meas.	Scaled	
Head	Rel 99 RMC	On	0	Left Touch	9400	1880.0	13.5	13.0	0.230	0.256	1
					9400	1880.0	13.5	13.0	0.260	0.289	2
Body	Rel 99 RMC	Off	3	Edge 2	9400	1880.0	23.5	22.4	0.399	0.509	1

Note(s):

1. Protective cover (with S-pen) is in-box. So additional SAR test were performed highest reported SAR position in each exposure conditions.
2. For Pwr Back-off, All Head exposure conditions were tested using Proximity -sensor reduction mode and IR-sensor reduction was additional tested at highest SAR position in Head exposure condition.

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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	
Head	Rel 99 RMC	On	0	Left Touch	4183	836.6	18.0	17.4	0.376	0.431	7
				Left Tilt	4183	836.6	18.0	17.4	0.296	0.339	
				Right Touch	4183	836.6	18.0	17.4	0.209	0.239	
				Right Tilt	4183	836.6	18.0	17.4	0.168	0.192	
Body	Rel 99 RMC	Off	15	Rear	4183	836.6	23.0	22.9	0.507	0.522	
			15	Edge 1	4183	836.6	23.0	22.9	0.202	0.208	
			8	Corner	4183	836.6	23.0	22.9	0.059	0.061	
			3	Edge 2	4183	836.6	23.0	22.9	0.361	0.371	
		On	0	Rear	4183	836.6	18.0	17.4	0.550	0.630	8
			0	Edge 1	4183	836.6	18.0	17.4	0.168	0.192	
			0	Corner	4183	836.6	18.0	17.4	0.111	0.127	
			0	Edge 2	4183	836.6	18.0	17.4	0.144	0.165	

Additional test

RF Exposure Conditions	Mode	Pwr back Off	Dist. (mm)	Test Position	Ch #.	Freq. (MHz)	Power (dBm)		1-g SAR (W/kg)		Note
							Tune-up limit	Meas.	Meas.	Scaled	
Head	Rel 99 RMC	On	0	Left Touch	4183	836.6	18.0	17.4	0.238	0.273	1
					4183	836.6	18.0	17.4	0.372	0.428	2
Body	Rel 99 RMC	On	0	Rear	4183	836.0	18.0	17.4	0.310	0.355	1

Note(s):

1. Protective cover (with S-pen) is in-box. So additional SAR test were performed highest reported SAR position in each exposure conditions.
2. For Pwr Back-off, All Head exposure conditions were tested using Proximity -sensor reduction mode and IR-sensor reduction was additional tested at highest SAR position in Head exposure condition.

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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	
Head	QPSK	On	0	Left Touch	20525	836.5	1	0	18.5	18.0	0.460	0.518	9
							25	0	17.5	17.0	0.367	0.413	
				Left Tilt	20525	836.5	1	0	18.5	18.0	0.330	0.372	
							25	0	17.5	17.0	0.257	0.289	
				Right Touch	20525	836.5	1	0	18.5	18.0	0.224	0.252	
							25	0	17.5	17.0	0.176	0.198	
				Right Tilt	20525	836.5	1	0	18.5	18.0	0.173	0.195	
							25	0	17.5	17.0	0.135	0.152	
Body	QPSK	Off	15	Rear	20525	836.5	1	49	23.5	23.2	0.467	0.498	
							25	12	22.5	22.1	0.388	0.425	
			15	Edge 1	20525	836.5	1	49	23.5	23.2	0.182	0.194	
							25	12	22.5	22.1	0.147	0.161	
			8	Corner	20525	836.5	1	49	23.5	23.2	0.056	0.059	
							25	12	22.5	22.1	0.046	0.050	
			3	Edge 2	20525	836.5	1	49	23.5	23.2	0.343	0.366	
							25	12	22.5	22.1	0.283	0.310	
	QPSK	On	0	Rear	20525	836.5	1	0	18.5	18.0	0.573	0.646	10
							25	0	17.5	17.0	0.467	0.526	
			0	Edge 1	20525	836.5	1	0	18.5	18.0	0.175	0.197	
							25	0	17.5	17.0	0.136	0.153	
			0	Corner	20525	836.5	1	0	18.5	18.0	0.107	0.121	
							25	0	17.5	17.0	0.086	0.097	
			0	Edge 2	20525	836.5	1	0	18.5	18.0	0.139	0.157	
							25	0	17.5	17.0	0.110	0.124	

Additional test

Mode	PWR Back-off	Dist. (mm)	Test Position	Ch #.	Freq. (MHz)	RB Allocation	RB offest	Power (dBm)		1-g SAR (W/kg)		Note
								Tune-up limit	Meas.	Meas.	Scaled	
QPSK	On	0	Left Touch	20525	836.5	1	0	18.5	18.0	0.288	0.324	1
						1	0	18.5	18.0	0.457	0.514	2
QPSK	On	0	Rear	20525	836.5	1	0	18.5	18.0	0.318	0.358	1

Note(s):

1. Protective cover (with S-pen) is in-box. So additional SAR test were performed highest reported SAR position in each exposure conditions.
2. For Pwr Back-off, All Head exposure conditions were tested using Proximity -sensor reduction mode and IR-sensor reduction was additional tested at highest SAR position in Head exposure condition.

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10.6. LTE Band 7 (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	
Head	QPSK	On	0	Left Touch	21100	2535.0	1	0	11.0	10.9	0.147	0.151	11
							50	0	10.0	9.8	0.108	0.113	
				Left Tilt	21100	2535.0	1	0	11.0	10.9	0.138	0.142	
							50	0	10.0	9.8	0.112	0.117	
				Right Touch	21100	2535.0	1	0	11.0	10.9	0.031	0.032	
							50	0	10.0	9.8	0.021	0.022	
				Right Tilt	21100	2535.0	1	0	11.0	10.9	0.035	0.036	
							50	0	10.0	9.8	0.023	0.024	
Body	QPSK	Off	15	Rear	21100	2535.0	1	0	23.5	23.0	0.553	0.620	12
							50	24	22.5	22.0	0.441	0.495	
			15	Edge 1	21100	2535.0	1	0	23.5	23.0	0.383	0.430	
							50	24	22.5	22.0	0.299	0.336	
			8	Corner	21100	2535.0	1	0	23.5	23.0	0.392	0.440	
							50	24	22.5	22.0	0.314	0.353	
			3	Edge 2	21100	2535.0	1	0	23.5	23.0	0.443	0.497	
							50	24	22.5	22.0	0.354	0.397	
	QPSK	On	0	Rear	21100	2535.0	1	0	11.0	10.9	0.532	0.547	
							50	0	10.0	9.8	0.426	0.445	
			0	Edge 1	21100	2535.0	1	0	11.0	10.9	0.335	0.344	
							50	0	10.0	9.8	0.266	0.278	

Additional test

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)		Note
									Tune-up limit	Meas.	Meas.	Scaled	
Head	QPSK	On	0	Left Touch	21100	2535.0	1	0	11.0	10.9	0.107	0.110	1
							1	0	11.0	10.9	0.134	0.136	2
Body	QPSK	Off	15	Rear	21100	2535.0	1	0	23.5	23.0	0.533	0.598	1

Note(s):

1. Protective cover (with S-pen) is in-box. So additional SAR test were performed highest reported SAR position in each exposure conditions.
2. For Pwr Back-off, All Head exposure conditions were tested using Proximity -sensor reduction mode and IR-sensor reduction was additional tested at highest SAR position in Head exposure condition.

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10.7. LTE Band 38 (20MHz Bandwidth)

SAR for LTE Band 38 (Frequency range: 2570-2620 MHz) is covered by LTE Band 41 (Frequency range: 2555-2655 MHz) due to overlapping frequency range, same maximum tune-up limit and same channel bandwidth.

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	
Head	QPSK	On	0	Left Touch	40740	2605.0	1	0	12.5	12.1	0.085	0.092	13
					41140	2645.0	1	0	11.5	11.1	0.068	0.075	
				Left Tilt	40740	2605.0	1	0	12.5	12.1	0.082	0.089	
					41140	2645.0	1	0	11.5	11.1	0.066	0.073	
				Right Touch	40740	2605.0	1	0	12.5	12.1	0.017	0.019	
					41140	2645.0	1	0	11.5	11.1	0.014	0.015	
				Right Tilt	40740	2605.0	1	0	12.5	12.1	0.001	0.002	
					41140	2645.0	1	0	11.5	11.1	0.001	0.001	
Body	QPSK	Off	15	Rear	41140	2645.0	1	0	23.5	23.2	0.340	0.360	
					40740	2605.0	1	0	22.5	22.0	0.266	0.296	
			15	Edge 1	41140	2645.0	1	0	23.5	23.2	0.205	0.217	
					40740	2605.0	1	0	22.5	22.0	0.170	0.189	
			8	Corner	41140	2645.0	1	0	23.5	23.2	0.223	0.236	
					40740	2605.0	1	0	22.5	22.0	0.165	0.184	
			3	Edge 2	41140	2645.0	1	0	23.5	23.2	0.372	0.394	
					40740	2605.0	1	0	22.5	22.0	0.274	0.305	
	QPSK	On	0	Rear	40740	2605.0	1	0	12.5	12.1	0.377	0.412	14
					41140	2645.0	1	0	11.5	11.1	0.284	0.313	
			0	Edge 1	40740	2605.0	1	0	12.5	12.1	0.220	0.240	
					41140	2645.0	1	0	11.5	11.1	0.175	0.193	
			0	Corner	40740	2605.0	1	0	12.5	12.1	0.039	0.042	
					41140	2645.0	1	0	11.5	11.1	0.032	0.036	
			0	Edge 2	40740	2605.0	1	0	12.5	12.1	0.051	0.055	
					41140	2645.0	1	0	11.5	11.1	0.043	0.047	

Additional test

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)		Note
									Tune-up limit	Meas.	Meas.	Scaled	
Head	QPSK	On	0	Left Touch	40740	2605.0	1	0	12.5	12.1	0.071	0.077	1
							1	0	12.5	12.2	0.086	0.092	2
Body	QPSK	On	0	Rear	40740	2605.0	1	0	12.5	12.1	0.222	0.242	1

Note(s):

1. Protective cover (with S-pen) is in-box. So additional SAR test were performed highest reported SAR position in each exposure conditions.
2. For Pwr Back-off, All Head exposure conditions were tested using Proximity -sensor reduction mode and IR-sensor reduction was additional tested at highest SAR position in Head exposure condition.

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10.9. Wi-Fi (DTS Band)

Frequency Band	Mode	RF Exposure Conditions	PWR Back-off	Dist. (mm)	Test Position	Ch #.	Freq. (MHz)	Area Scan Max. SAR (W/kg)	Power (dBm)		1-g SAR (W/kg)		Note	Plot No.
									Tune-up limit	Meas.	Meas.	Scaled		
2.4GHz	802.11b 1 Mbps	Head	Off	0	Left Touch	6	2437.0	0.403	17.5	17.2	0.318	0.339	4	
					Left Tilt	6	2437.0	0.360	17.5	17.2	0.284	0.303	4	
					Right Touch	1	2412.0	0.972	17.5	17.2	0.893	0.968	3	
						6	2437.0	0.975	17.5	17.2	0.922	0.983		15
					Rightt Tilt	6	2437.0	0.787	17.5	17.2	0.727	0.775	2	
		Body	Off	5	Rear	1	2412.0	1.220	17.5	17.2	0.969	1.050	3	16
						6	2437.0	1.390	17.5	17.2	0.964	1.028		
				2	Edge 1	6	2437.0	0.542	17.5	17.2	0.440	0.469	2	
				0	Edge 4	6	2437.0	0.231	17.5	17.2				
			On	0	Rear	6	2437.0	1.129	13.5	13.5	0.937	0.939		
						11	2462.0	1.091	13.5	13.3	0.909	0.958	3	
				0	Edge 1	6	2437.0	0.324	13.5	13.5	0.255	0.256	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 Head 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.

Additional test

Frequency Band	Mode	RF Exposure Conditions	PWR Back-off	Dist. (mm)	Test Position	Ch #.	Freq. (MHz)	Power (dBm)		1-g SAR (W/kg)		Note
								Tune-up limit	Meas.	Meas.	Scaled	
2.4GHz	802.11b 1 Mbps	Head	Off	0	Right Touch	6	2437.0	17.5	17.2	0.808	0.862	1
		Body	Off	5	Rear	1	2412.0	17.5	17.2	0.539	0.575	1

Note(s):

1. Protective cover (with S-pen) is in-box. So additional SAR test were performed highest reported SAR position in each exposure conditions.

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10.10. Wi-Fi (U-NII Band)

Frequency Band	Mode	RF Exposure Conditions	PWR Back-off	Dist. (mm)	Test Position	Ch #.	Freq. (MHz)	Area Scan Max. SAR (W/kg)	Power (dBm)		1-g SAR (W/kg)		Note	Plot No.
									Tune-up limit	Meas.	Meas.	Scaled		
5.3 GHz U-NII 2A	802.11a 6 Mbps	Head	Off	0	Left Touch	60	5300.0	0.615	12.5	12.1	0.285	0.313	4	
					Left Tilt	60	5300.0	0.594	12.5	12.1				
					Right Touch	60	5300.0	0.948	12.5	12.1	0.449	0.493		17
					Rightt Tilt	60	5300.0	0.833	12.5	12.1	0.423	0.465	2	
	802.11a 6 Mbps	Body	Off	5	Rear	60	5300.0	0.952	12.5	12.1	0.497	0.546	2	
				2	Edge 1	56	5280.0	1.852	12.5	11.9	0.772	0.897	3	18
						60	5300.0	1.932	12.5	12.1	0.807	0.887		
	802.11ac 29.3 Mbps (VHT80)	Body	On	0	Rear	58	5290.0	1.193	8.5	8.2	0.666	0.710		
				0	Edge 1	58	5290.0	1.168	8.5	8.2	0.486	0.518	2	
Frequency Band	Mode	RF Exposure Conditions	PWR Back-off	Dist. (mm)	Test Position	Ch #.	Freq. (MHz)	Area Scan Max. SAR (W/kg)	Power (dBm)		1-g SAR (W/kg)		Note	Plot No.
									Tune-up limit	Meas.	Meas.	Scaled		
5.5 GHz U-NII 2C	802.11a 6 Mbps	Head	Off	0	Left Touch	120	5600.0	0.659	12.5	11.9	0.321	0.368	4	
					Left Tilt	120	5600.0	0.613	12.5	11.9				
					Right Touch	120	5600.0	1.056	12.5	11.9	0.497	0.569		19
					Rightt Tilt	120	5600.0	0.952	12.5	11.9	0.432	0.495	2	
	802.11a 6 Mbps	Body	Off	5	Rear	120	5600.0	0.823	12.5	11.9	0.427	0.489	2	
				2	Edge 1	120	5600.0	1.428	12.5	11.9	0.575	0.659		
	802.11ac 29.3 Mbps (VHT80)	Body	On	0	Rear	106	5530.0	1.267	8.5	8.5	0.725	0.728		20
				0	Edge 1	106	5530.0	1.247	8.5	8.5	0.437	0.439	2	
Frequency Band	Mode	RF Exposure Conditions	PWR Back-off	Dist. (mm)	Test Position	Ch #.	Freq. (MHz)	Area Scan Max. SAR (W/kg)	Power (dBm)		1-g SAR (W/kg)		Note	Plot No.
									Tune-up limit	Meas.	Meas.	Scaled		
5.8 GHz U-NII 3	802.11a 6 Mbps	Head	Off	0	Left Touch	157	5785.0	0.971	12.5	12.1	0.483	0.532	4	
					Left Tilt	157	5785.0	0.922	12.5	12.1				
					Right Touch	157	5785.0	1.266	12.5	12.1	0.580	0.639		21
					Rightt Tilt	157	5785.0	1.202	12.5	12.1	0.539	0.594	2	
	802.11a 6 Mbps	Body	Off	5	Rear	157	5785.0	0.923	12.5	12.1	0.485	0.534	2	
				2	Edge 1	157	5785.0	1.477	12.5	12.1	0.608	0.670		22
	802.11ac 29.3 Mbps (VHT80)	Body	On	0	Rear	155	5775.0	1.042	8.5	8.2	0.572	0.607		
				0	Edge 1	155	5775.0	0.949	8.5	8.2	0.344	0.365	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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Additional test

Frequency Band	Mode	RF Exposure Conditions	PWR Back-off	Dist. (mm)	Test Position	Ch #.	Freq. (MHz)	Power (dBm)		1-g SAR (W/kg)		Note
								Tune-up limit	Meas.	Meas.	Scaled	
5.3 GHz U-NII 2A	802.11a 6 Mbps	Head	Off	0	Right Touch	60	5300.0	12.5	12.1	0.252	0.277	1
		Body	Off	2	Edge 1	56	5280.0	12.5	11.9	0.094	0.110	1
5.5 GHz U-NII 2C	802.11a 6 Mbps	Head	Off	0	Right Touch	120	5600.0	12.5	11.9	0.303	0.347	1
	802.11ac 29.3 Mbps (VHT80)	Body	On	0	Rear	106	5530.0	8.5	8.5	0.432	0.434	1
5.8 GHz U-NII 3	802.11a 6 Mbps	Head	Off	0	Right Touch	157	5785.0	12.5	12.1	0.332	0.366	1
		Body	Off	2	Edge 1	157	5785.0	12.5	12.1	0.147	0.162	1

Note(s):

1. Protective cover (with S-pen) is in-box. So additional SAR test were performed highest reported SAR position in each exposure conditions.

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10.11. Bluetooth

Standalone SAR Test Exclusion Considerations & Estimated SAR

The 1-g and 10-g SAR test exclusion thresholds for 100 MHz to 6 GHz at test separation distances ≤ 50 mm are determined by:

[(max. power of channel, including tune-up tolerance, mW) / (min. test separation distance, mm)]·[√f(GHz)] ≤ 3.0, for 1-g SAR and ≤ 7.5 for 10-g extremity SAR, where

- $f_{(GHz)}$ is the RF channel transmit frequency in GHz
- Power and distance are rounded to the nearest mW and mm before calculation
- The result is rounded to one decimal place for comparison

The test exclusions are applicable only when the minimum test separation distance is ≤ 50 mm and for transmission frequencies between 100 MHz and 6 GHz. When the minimum test separation distance is < 5 mm, a distance of 5 mm is applied to determine SAR test exclusion.

When the standalone SAR test exclusion is applied to an antenna that transmits simultaneously with other antennas, the standalone SAR must be estimated according to following to determine simultaneous transmission SAR test exclusion:

- *(max. power of channel, including tune-up tolerance, mW) / (min. test separation distance, mm)]·[√$f_{(GHz)}$/x]* W/kg for test separation distances ≤ 50 mm;
  where x = 7.5 for 1-g SAR, and x = 18.75 for 10-g SAR.
- 0.4 W/kg for 1-g SAR and 1.0 W/kg for 10-g SAR, when the test separation distances is > 50 mm.

Head Exposure Conditions

Max. tune-up tolerance limit		Min. test separation distance (mm)	Frequency (GHz)	SAR test exclusion Result*	Test Configuration	Estimated 1-g SAR (W/kg)
(dBm)	(mW)					
9.0	8	5	2.480	2.5	Head	0.336

Conclusion:

*: The computed value is < 3; therefore, Bluetooth qualifies for Standalone SAR test exclusion.

Body Exposure Conditions

Antennas < 50mm to adjacent edges

Tx Interface	Frequency (MHz)	Output Power		Separation Distances (mm)						Calculated Threshold Value					
		dBm	mW	Rear	Edge 1	Edge 2	Edge 3	Edge 4	Front	Rear	Edge 1	Edge 2	Edge 3	Edge 4	Front
Bluetooth	2480	9.00	8	2	4	89	201	28		2.5 -EXEMPT-	2.5 -EXEMPT-	> 50 mm	> 50 mm	0.4 -EXEMPT-	

Note(s):

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

Antennas > 50mm to adjacent edges

Tx Interface	Frequency (MHz)	Output Power		Separation Distances (mm)						Calculated Threshold Value					
		dBm	mW	Rear	Edge 1	Edge 2	Edge 3	Edge 4	Front	Rear	Edge 1	Edge 2	Edge 3	Edge 4	Front
Bluetooth	2480	9.00	8	2	4	89	201	28		< 50 mm	< 50 mm	485.3 mW -EXEMPT-	1605.3 mW -EXEMPT-	< 50 mm	

Note(s):

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

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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
850	GSM 850	Head	Left Touch	Yes	0.844	0.833	1.01
	WCDMA Band V	Body	Rear	No	0.550	N/A	N/A
	LTE Band 5	Body	Rear	No	0.573	N/A	N/A
1900	GSM 1900	Head	Left Touch	No	0.230	N/A	N/A
	WCDMA Band II	Body	Edge 2	No	0.425	N/A	N/A
2400	Wi-Fi 802.11b/g/n	Body	Rear	Yes	0.969	0.956	1.01
2600	LTE Band 7	Body	Rear	No	0.553	N/A	N/A
	LTE Band 41	Body	Rear	No	0.377	N/A	N/A
5300	Wi-Fi 802.11a/n/ac	Body	Edge 1	No	0.807	0.803	1.00
5500	Wi-Fi 802.11a/n/ac	Body	Rear	No	0.725	N/A	N/A
5800	Wi-Fi 802.11a/n/ac	Body	Edge 1	No	0.608	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		
Head	1	GSM(Voice/GPRS/EDGE)	+	DTS
	2	GSM(Voice/GPRS/EDGE)	+	U-NII
	3	GSM(Voice/GPRS/EDGE)	+	BT
	4	W-CDMA	+	DTS
	5	W-CDMA	+	U-NII
	6	W-CDMA	+	BT
	7	LTE	+	DTS
	8	LTE	+	U-NII
	9	LTE	+	BT
Body	10	GSM(GPRS/EDGE)	+	DTS
	11	GSM(GPRS/EDGE)	+	U-NII
	12	GSM(GPRS/EDGE)	+	BT
	13	W-CDMA	+	DTS
	14	W-CDMA	+	U-NII
	15	W-CDMA	+	BT
	16	LTE	+	DTS
	17	LTE	+	U-NII
	18	LTE	+	BT

Notes:

1. DTS (Ch.1 - Ch.11) and UNII (Ch.149 - Ch.165) supports Hotspot.
2. DTS (Ch.1 - Ch.11) and UNII (Ch.36 - Ch.48, Ch.149 - Ch.165) supports Wi-Fi Direct.
3. GPRS/EDGE, CDMA, W-CDMA and LTE support Hotspot.
4. VoIP is supported in GPRS/EDGE, CDMA, W-CDMA and LTE.
5. DTS Radio cannot transmit simultaneously with Bluetooth Radio.
6. U-NII Radio cannot transmit simultaneously with Bluetooth Radio.
7. U-NII Radio cannot transmit simultaneously with DTS Radio.
8. BT tethering mode are considered in RF exposure conditions

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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	Corner	Rear	Edge 1	Edge 2	Edge 3	Edge 4	Corner
Full Power, Proximity Sensor Off																
Cellular	GPRS 3 Slots	848.8	29.00	298	2	4	8	195	83		-MEASURE-	-MEASURE-	-MEASURE-	0.400	0.400	
Cellular	GPRS 4 Slots	1909.8	24.00	126	2	4	8	195	83		-MEASURE-	-MEASURE-	-MEASURE-	0.400	0.400	
Cellular	W-CDMA V	846.6	23.00	200	2	4	8	195	83		-MEASURE-	-MEASURE-	-MEASURE-	0.400	0.400	
Cellular	W-CDMA II	1907.6	23.00	200	2	4	8	195	83		-MEASURE-	-MEASURE-	-MEASURE-	0.400	0.400	
Cellular	LTE Band 5	844	23.50	224	2	4	8	195	83		-MEASURE-	-MEASURE-	-MEASURE-	0.400	0.400	
Cellular	LTE Band 7	2560	23.50	224	2	4	8	195	83		-MEASURE-	-MEASURE-	-MEASURE-	0.400	0.400	
Cellular	LTE Band 38	2595	23.50	224	2	4	8	195	83		-MEASURE-	-MEASURE-	-MEASURE-	0.400	0.400	
Cellular	LTE Band 41	2645	23.50	224	2	4	8	195	83		-MEASURE-	-MEASURE-	-MEASURE-	0.400	0.400	
Power Back-off, Proximity Sensor On																
Cellular	GPRS 3 Slots	848.8	26.00	149	2	4	8				-MEASURE-	-MEASURE-	-MEASURE-			
Cellular	GPRS 3 Slots	1909.8	16.50	17	2	4	8				-MEASURE-	-MEASURE-	0.392			
Cellular	W-CDMA V	846.6	18.00	63	2	4	8				-MEASURE-	-MEASURE-	-MEASURE-			
Cellular	W-CDMA II	1907.6	13.50	22	2	4	8				-MEASURE-	-MEASURE-	-MEASURE-			
Cellular	LTE Band 5	844	18.50	71	2	4	8				-MEASURE-	-MEASURE-	-MEASURE-			
Cellular	LTE Band 7	2560	11.00	13	2	4	8				-MEASURE-	-MEASURE-	0.347			
Cellular	LTE Band 38	2595	12.50	18	2	4	8				-MEASURE-	-MEASURE-	-MEASURE-			
Cellular	LTE Band 41	2645	12.50	18	2	4	8				-MEASURE-	-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	Rear	Edge 1	Edge 2	Edge 3	Edge 4
Full Power, Proximity Sensor Off													
Wi-Fi 2.4 GHz	2462	17.50	56	2	4	89	201	28	-MEASURE-	-MEASURE-	0.400	0.400	-MEASURE-
Wi-Fi 5.3 GHz	5320	12.50	18	2	4	89	201	28	-MEASURE-	-MEASURE-	0.400	0.400	0.198
Wi-Fi 5.5 GHz	5720	12.50	18	2	4	89	201	28	-MEASURE-	-MEASURE-	0.400	0.400	0.205
Wi-Fi 5.8 GHz	5825	12.50	18	2	4	89	201	28	-MEASURE-	-MEASURE-	0.400	0.400	0.207
Bluetooth	2480	9.00	8	2	4	89	201	28	0.336	0.336	0.400	0.400	0.060
Power Back-off, Proximity Sensor On													
Wi-Fi 2.4 GHz	2462	13.5	22	2	4				-MEASURE-	-MEASURE-			
Wi-Fi 5.3 GHz	5320	8.5	7	2	4				-MEASURE-	-MEASURE-			
Wi-Fi 5.5 GHz	5720	8.5	7	2	4				-MEASURE-	-MEASURE-			
Wi-Fi 5.8 GHz	5825	8.5	7	2	4				-MEASURE-	-MEASURE-			

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

RF Exposure conditions	Test position	① WWAN	② DTS	③ U-NII	④ BT	① + ② WWAN + DTS		① + ③ WWAN + U-NII		① + ④ WWAN + BT	
						∑ 1-g SAR (mW/g)	SPLSR (Yes/ No)	∑ 1-g SAR (mW/g)	SPLSR (Yes/ No)	∑ 1-g SAR (mW/g)	SPLSR (Yes/ No)
Head	Left Touch	1.004	0.339	0.532	0.336	1.343	No	1.536	No	1.340	No
	Left Tilt	0.729	0.303	0.639	0.336	1.032	No	1.368	No	1.065	No
	Right Touch	0.445	0.983	0.639	0.336	1.428	No	1.084	No	0.781	No
	Right Tilt	0.412	0.775	0.594	0.336	1.187	No	1.006	No	0.748	No
Body	Rear	0.616	1.050	0.728	0.336	1.666	Yes	1.344	No	0.952	No
	Edge 1	0.185	0.469	0.897	0.336	0.654	No	1.082	No	0.521	No
	Corner	0.166	0.400	0.400	0.400	0.566	No	0.566	No	0.566	No
	Edge 2	0.319	0.400	0.400	0.400	0.719	No	0.719	No	0.719	No
	Edge 3	0.400	0.400	0.400	0.400	0.800	No	0.800	No	0.800	No
	Edge 4	0.400	1.050	0.400	0.060	1.450	No	0.800	No	0.460	No

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						
Rear	0.616	1.050	① + ②	1.666	55.4	0.04	No	1

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

RF Exposure conditions	Test position	① WWAN	② DTS	③ U-NII	④ BT	① + ② WWAN + DTS		① + ③ WWAN + U-NII		① + ④ WWAN + BT	
						∑ 1-g SAR (mW/g)	SPLSR (Yes/ No)	∑ 1-g SAR (mW/g)	SPLSR (Yes/ No)	∑ 1-g SAR (mW/g)	SPLSR (Yes/ No)
Head	Left Touch	0.245	0.339	0.532	0.336	0.584	No	0.777	No	0.581	No
	Left Tilt	0.221	0.303	0.639	0.336	0.524	No	0.860	No	0.557	No
	Right Touch	0.085	0.983	0.639	0.336	1.068	No	0.724	No	0.421	No
	Right Tilt	0.063	0.775	0.594	0.336	0.838	No	0.657	No	0.399	No
Body	Rear	0.246	1.050	0.728	0.336	1.296	No	0.974	No	0.582	No
	Edge 1	0.182	0.469	0.897	0.336	0.651	No	1.079	No	0.518	No
	Corner	0.170	0.400	0.400	0.400	0.570	No	0.570	No	0.570	No
	Edge 2	0.286	0.400	0.400	0.400	0.686	No	0.686	No	0.686	No
	Edge 3	0.400	0.400	0.400	0.400	0.800	No	0.800	No	0.800	No
	Edge 4	0.400	1.050	0.400	0.060	1.450	No	0.800	No	0.460	No

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

RF Exposure conditions	Test position	① WWAN	② DTS	③ U-NII	④ BT	① + ② WWAN + DTS		① + ③ WWAN + U-NII		① + ④ WWAN + BT	
						∑ 1-g SAR (mW/g)	SPLSR (Yes/ No)	∑ 1-g SAR (mW/g)	SPLSR (Yes/ No)	∑ 1-g SAR (mW/g)	SPLSR (Yes/ No)
Head	Left Touch	0.292	0.339	0.532	0.336	0.631	No	0.824	No	0.628	No
	Left Tilt	0.270	0.303	0.639	0.336	0.573	No	0.909	No	0.606	No
	Right Touch	0.100	0.983	0.639	0.336	1.083	No	0.739	No	0.436	No
	Right Tilt	0.074	0.775	0.594	0.336	0.849	No	0.668	No	0.410	No
Body	Rear	0.499	1.050	0.728	0.336	1.549	No	1.227	No	0.835	No
	Edge 1	0.397	0.469	0.897	0.336	0.866	No	1.294	No	0.733	No
	Corner	0.355	0.400	0.400	0.400	0.755	No	0.755	No	0.755	No
	Edge 2	0.542	0.400	0.400	0.400	0.942	No	0.942	No	0.942	No
	Edge 3	0.400	0.400	0.400	0.400	0.800	No	0.800	No	0.800	No
	Edge 4	0.400	1.050	0.400	0.060	1.450	No	0.800	No	0.460	No

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

RF Exposure conditions	Test position	① WWAN	② DTS	③ U-NII	④ BT	① + ② WWAN + DTS		① + ③ WWAN + U-NII		① + ④ WWAN + BT	
						∑ 1-g SAR (mW/g)	SPLSR (Yes/ No)	∑ 1-g SAR (mW/g)	SPLSR (Yes/ No)	∑ 1-g SAR (mW/g)	SPLSR (Yes/ No)
Head	Left Touch	0.431	0.339	0.532	0.336	0.770	No	0.963	No	0.767	No
	Left Tilt	0.339	0.303	0.639	0.336	0.642	No	0.978	No	0.675	No
	Right Touch	0.239	0.983	0.639	0.336	1.222	No	0.878	No	0.575	No
	Right Tilt	0.192	0.775	0.594	0.336	0.967	No	0.786	No	0.528	No
Body	Rear	0.630	1.050	0.728	0.336	1.680	Yes	1.358	No	0.966	No
	Edge 1	0.208	0.469	0.897	0.336	0.677	No	1.105	No	0.544	No
	Corner	0.165	0.400	0.400	0.400	0.565	No	0.565	No	0.565	No
	Edge 2	0.371	0.400	0.400	0.400	0.771	No	0.771	No	0.771	No
	Edge 3	0.400	0.400	0.400	0.400	0.800	No	0.800	No	0.800	No
	Edge 4	0.400	1.050	0.400	0.060	1.450	No	0.800	No	0.460	No

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						
Rear	0.630	1.050	① + ②	1.680	55.4	0.04	No	2

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

RF Exposure conditions	Test position	① WWAN	② DTS	③ U-NII	④ BT	① + ② WWAN + DTS		① + ③ WWAN + U-NII		① + ④ WWAN + BT	
						∑ 1-g SAR (mW/g)	SPLSR (Yes/ No)	∑ 1-g SAR (mW/g)	SPLSR (Yes/ No)	∑ 1-g SAR (mW/g)	SPLSR (Yes/ No)
Head	Left Touch	0.518	0.339	0.532	0.336	0.857	No	1.050	No	0.854	No
	Left Tilt	0.372	0.303	0.639	0.336	0.675	No	1.011	No	0.708	No
	Right Touch	0.252	0.983	0.639	0.336	1.235	No	0.891	No	0.588	No
	Right Tilt	0.195	0.775	0.594	0.336	0.970	No	0.789	No	0.531	No
Body	Rear	0.646	1.050	0.728	0.336	1.696	Yes	1.374	No	0.982	No
	Edge 1	0.197	0.469	0.897	0.336	0.666	No	1.094	No	0.533	No
	Corner	0.121	0.400	0.400	0.400	0.521	No	0.521	No	0.521	No
	Edge 2	0.366	0.400	0.400	0.400	0.766	No	0.766	No	0.766	No
	Edge 3	0.400	0.400	0.400	0.400	0.800	No	0.800	No	0.800	No
	Edge 4	0.400	1.050	0.400	0.060	1.450	No	0.800	No	0.460	No

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						
Rear	0.646	1.050	① + ②	1.696	55.4	0.04	No	3

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

RF Exposure conditions	Test position	① WWAN	② DTS	③ U-NII	④ BT	① + ② WWAN + DTS		① + ③ WWAN + U-NII		① + ④ WWAN + BT	
						∑ 1-g SAR (mW/g)	SPLSR (Yes/ No)	∑ 1-g SAR (mW/g)	SPLSR (Yes/ No)	∑ 1-g SAR (mW/g)	SPLSR (Yes/ No)
Head	Left Touch	0.151	0.339	0.532	0.336	0.490	No	0.683	No	0.487	No
	Left Tilt	0.142	0.303	0.639	0.336	0.445	No	0.781	No	0.478	No
	Right Touch	0.032	0.983	0.639	0.336	1.015	No	0.671	No	0.368	No
	Right Tilt	0.036	0.775	0.594	0.336	0.811	No	0.630	No	0.372	No
Body	Rear	0.620	1.050	0.728	0.336	1.670	Yes	1.348	No	0.956	No
	Edge 1	0.430	0.469	0.897	0.336	0.899	No	1.327	No	0.766	No
	Corner	0.440	0.400	0.400	0.400	0.840	No	0.840	No	0.840	No
	Edge 2	0.497	0.400	0.400	0.400	0.897	No	0.897	No	0.897	No
	Edge 3	0.400	0.400	0.400	0.400	0.800	No	0.800	No	0.800	No
	Edge 4	0.400	1.050	0.400	0.060	1.450	No	0.800	No	0.460	No

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						
Rear	0.620	1.050	① + ②	1.670	59.2	0.04	No	4

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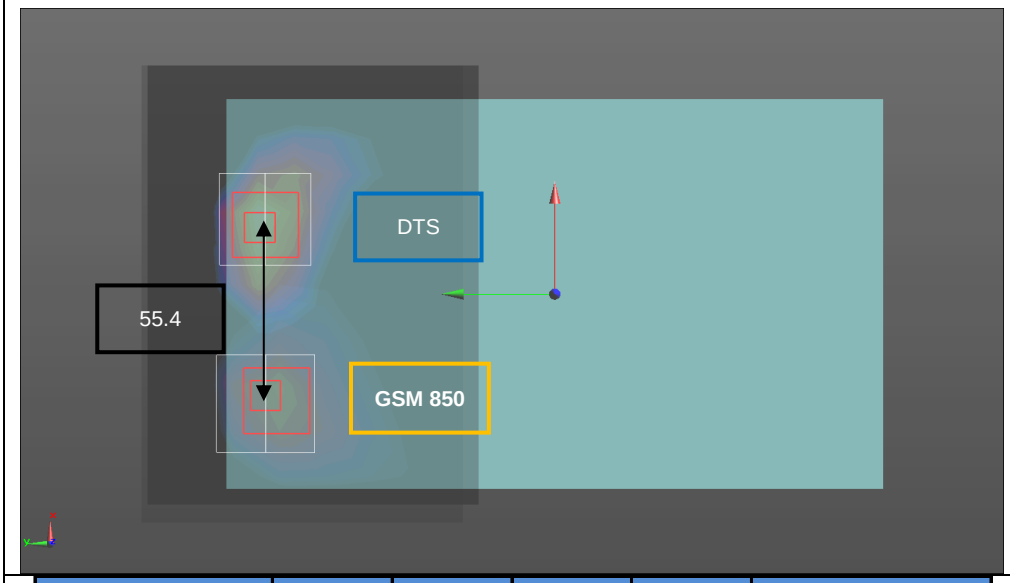
12.7. Sum of the SAR for LTE Band 41 & Wi-Fi & BT

RF Exposure conditions	Test position	① WWAN	② DTS	③ U-NII	④ BT	① + ② WWAN + DTS		① + ③ WWAN + U-NII		① + ④ WWAN + BT	
						∑ 1-g SAR (mW/g)	SPLSR (Yes/ No)	∑ 1-g SAR (mW/g)	SPLSR (Yes/ No)	∑ 1-g SAR (mW/g)	SPLSR (Yes/ No)
Head	Left Touch	0.092	0.339	0.532	0.336	0.431	No	0.624	No	0.428	No
	Left Tilt	0.089	0.303	0.639	0.336	0.392	No	0.728	No	0.425	No
	Right Touch	0.019	0.983	0.639	0.336	1.002	No	0.658	No	0.355	No
	Right Tilt	0.002	0.775	0.594	0.336	0.777	No	0.596	No	0.338	No
Body	Rear	0.412	1.050	0.728	0.336	1.462	No	1.140	No	0.748	No
	Edge 1	0.240	0.469	0.897	0.336	0.709	No	1.137	No	0.576	No
	Corner	0.236	0.400	0.400	0.400	0.636	No	0.636	No	0.636	No
	Edge 2	0.394	0.400	0.400	0.400	0.794	No	0.794	No	0.794	No
	Edge 3	0.400	0.400	0.400	0.400	0.800	No	0.800	No	0.800	No
	Edge 4	0.400	1.050	0.400	0.060	1.450	No	0.800	No	0.460	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.

Figure (1)



Mode		SAR	X	Y	Z	d: Calculated distance (mm)	
		W/kg	m	m	m		
GSM 850	①	0.616	-0.0328	0.0977	-0.0033	① + ②	55.4
DTS	②	1.050	0.0226	0.0976	-0.0027		

The Peak Location Separation Distance is computed by using the

SQRT((X1-X2)^2+(Y1-Y2)^2+(Z1-Z2)^2)

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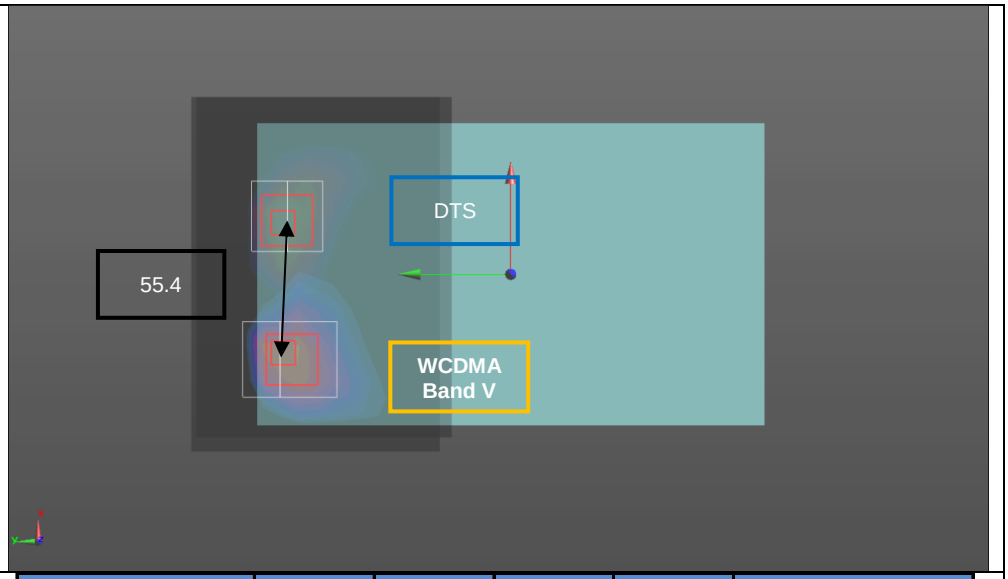
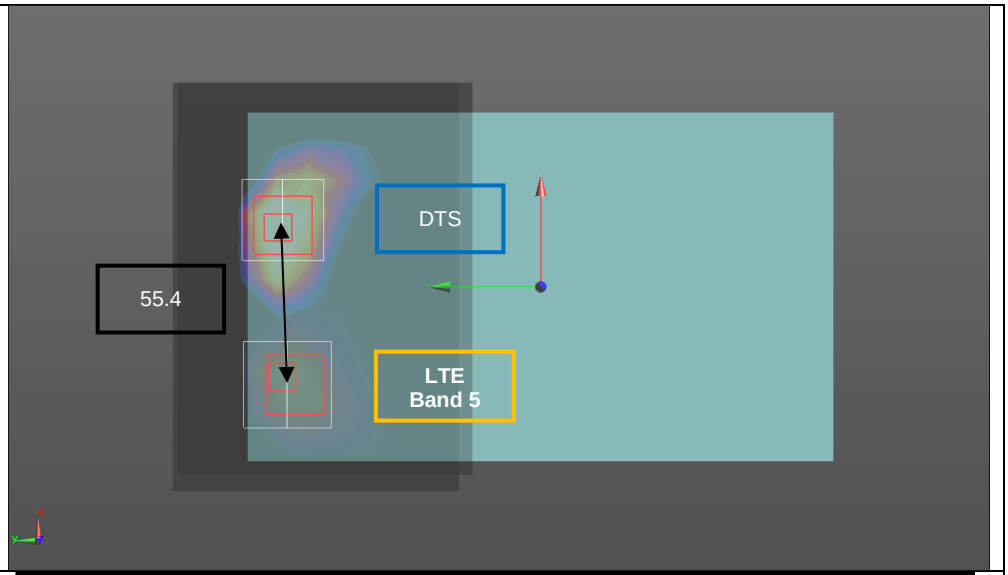
Figure (2)



Mode		SAR	X	Y	Z	d: Calculated distance (mm)	
		W/kg	m	m	m		
WCDMA Band V	①	0.630	-0.0328	0.0991	-0.0032	① + ②	55.4
DTS	②	1.050	0.0226	0.0976	-0.0027		

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

Figure (3)



Mode		SAR	X	Y	Z	d: Calculated distance (mm)	
		W/kg	m	m	m		
LTE Band 5	①	0.646	-0.0328	0.0962	-0.0033	① + ②	55.4
DTS	②	1.050	0.0226	0.0976	-0.0027		

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

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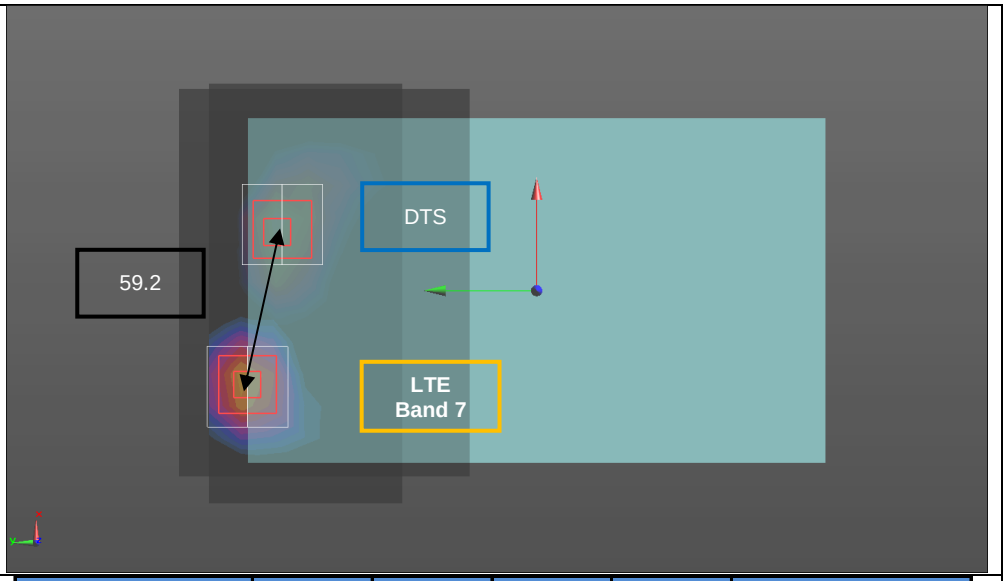
Figure (4)



Mode		SAR	X	Y	Z	d: Calculated distance (mm)	
		W/kg	m	m	m		
LTE Band 7	①	0.620	-0.0358	0.1076	-0.0027	① + ②	59.2
DTS	②	1.050	0.0226	0.0976	-0.0027		

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.

4788148881-S1V1 FCC Report SAR_App A_Photos & Ant. Locations

4788148881-S1V1 FCC Report SAR_App B_Highest SAR Test Plots

4788148881-S1V1 FCC Report SAR_App C_System Check Plots

4788148881-S1V1 FCC Report SAR_App D_SAR Tissue Ingredients

4788148881-S1V1 FCC Report SAR_App E_Probe Cal. Certificates

4788148881-S1V1 FCC Report SAR_App F_Dipole Cal. Certificates

END OF REPORT

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