FCC 47 CFR § 2.1093
IEEE Std 1528-2013

SAR EVALUATION REPORT

FOR

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

MODEL NUMBER: SM-A8050

FCC ID: A3LSMA8050

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ACCREDITED
Testing Laboratory

TL-637

Revision History

Rev.	Date	Revisions	Revised By
V1	4/17/2019	Initial Issue	JeongYeon Won
V2	4/22/2019	-Sec.6.3 Added “Note.2” in WLAN target power table.	JeongYeon Won
V3	4/24/2019	-Sec.7 Revised Note 6’s comment.	JeongYeon Won

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1. Attestation of Test Results

Applicant Name	SAMSUNG ELECTRONICS CO.,LTD.			
FCC ID	A3LSMA8050			
Model Number	SM-A8050			
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)		Peak spatial-average(10g of tissue)	
General population / Uncontrolled exposure	1.6		4	
The Highest Reported SAR (W/kg)				
RF Exposure Conditions	**Equipment Class**			
	Licensed	**DTS**	**U-NII**	**DSS(BT)**
Head	0.32	<0.10	<0.10	<0.10
Body-worn	0.62	<0.10	0.17	<0.10
Hotspot	1.36	0.17	<0.10	<0.10
Product Specific 10g	1.86	N/A	1.46	N/A
Simultaneous TX – Head	0.37	0.32	0.37	0.33
Simultaneous TX – Body-worn	0.81	0.79	0.81	0.79
Simultaneous TX – Hotspot	1.51	1.46	1.51	1.45
Simultaneous TX – Product Specific 10g	3.46	N/A	3.46	N/A
Date Tested	3/5/2019 to 4/13/2019			
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	JeongYeon Won Laboratory Technician 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
- 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
- 941225 D07 UMPC Mini Tablet v01r02

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

- TCB workshop October, 2014; Page 36, RF Exposure Procedures Update (Overlapping LTE Bands)
- TCB workshop October, 2014; Page 37, RF Exposure Procedures Update (Other LTE Considerations)
- TCB workshop October, 2016; Page 7, RF Exposure Procedures (Bluetooth Duty Factor)
- TCB workshop October, 2016; Page 18, RF Exposure Procedures (DUT Holder Perturbations)
- TCB workshop May, 2017; Page 6, RF Exposure Procedures (LTE Test Conditions)
- TCB workshop Nov, 2017; Page 3, RF Exposure Procedures (LTE UL/DL Carrier Aggregation SAR)
- TCB workshop April, 2018; Page 3, RF Exposure Procedures (LTE DL CA SAR Test Exclusion Update)

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
SAR 4 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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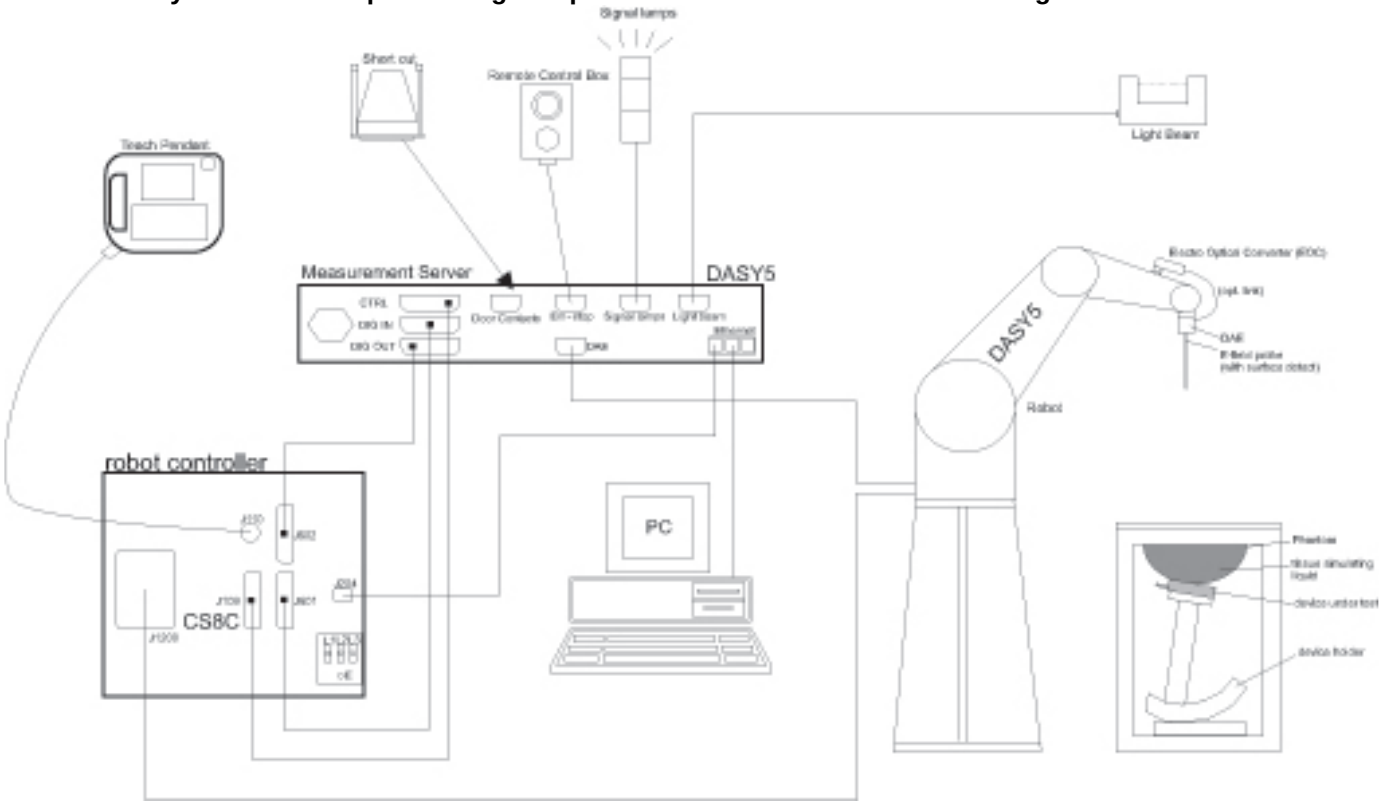
4. SAR Measurement System & Test Equipment

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	8-7-2019
Dielectric Assessment Kit	SPEAG	DAK-3.5	1196	6-26-2019
Shorting block	SPEAG	DAK-3.5 Short	SM DAK 200 BA	N/A
Thermometer	LKM	DTM3000	3424	8-9-2019

System Check

Name of Equipment	Manufacturer	Type/Model	Serial No.	Cal. Due Date
MXG Analog Signal Generator	Agilent	N5181A	MY50145882	8-7-2019
Power Sensor	Agilent	U2000A	MY54260010	8-7-2019
Power Sensor	Agilent	U2000A	MY54260007	8-7-2019
Power Amplifier	EXODUS	1410025-AMP2027-10003	10003	8-8-2019
Directional Coupler	Agilent	772D	MY52180193	8-7-2019
Directional Coupler	Agilent	778D	MY52180432	8-7-2019
Low Pass Filter	MICROLAB	LA-15N	03943	8-7-2019
Low Pass Filter	FILTRON	L14012FL	1410003S	8-7-2019
Attenuator	Agilent	8491B/003	MY39269292	8-7-2019
Attenuator	Agilent	8491B/010	MY39269315	8-7-2019
Attenuator	Agilent	8491B/020	MY39269298	8-7-2019
E-Field Probe (SAR1)	SPEAG	EX3DV4	7376	9-26-2019
E-Field Probe (SAR2)	SPEAG	EX3DV4	7330	1-31-2020
E-Field Probe (SAR3)	SPEAG	EX3DV4	7314	8-30-2019
E-Field Probe (SAR4)	SPEAG	EX3DV4	3991	5-24-2019
Data Acquisition Electronics (SAR1)	SPEAG	DAE4	912	11-16-2019
Data Acquisition Electronics (SAR1)	SPEAG	DAE4	1447	3-21-2020
Data Acquisition Electronics (SAR2)	SPEAG	DAE4	1494	7-23-2019
Data Acquisition Electronics (SAR3)	SPEAG	DAE4	1468	8-22-2019
Data Acquisition Electronics (SAR4)	SPEAG	DAE4	1259	7-26-2019
System Validation Dipole	SPEAG	D750V3	1122	2-19-2020
System Validation Dipole	SPEAG	D835V2	4d174	1-23-2021
System Validation Dipole	SPEAG	D1750V2	1125	2-16-2020
System Validation Dipole	SPEAG	D1900V2	5d199	3-15-2020
System Validation Dipole	SPEAG	D1900V2	5d190	10-23-2020
System Validation Dipole	SPEAG	D2450V2	939	10-16-2020
System Validation Dipole	SPEAG	D2600V2	1097	1-17-2020
System Validation Dipole	SPEAG	D5GHzV2	1184	8-21-2020
Thermometer (SAR1)	Lutron	MHB-382SD	AH.91463	8-8-2019
Thermometer (SAR2)	Lutron	MHB-382SD	AH.50215	8-13-2019
Thermometer (SAR3)	Lutron	MHB-382SD	AH.50213	8-14-2019
Thermometer (SAR4)	Lutron	MHB-382SD	AH.91478	8-8-2019

Others

Name of Equipment	Manufacturer	Type/Model	Serial No.	Cal. Due Date
Base Station Simulator	R & S	CMW500	150313	8-9-2019
Base Station Simulator	R & S	CMW500	150314	8-9-2019
Base Station Simulator	R & S	CMW500	162790	8-9-2019
Wireless Connectivity Tester	R & S	CMW270	100982	8-8-2019
Bluetooth Tester	TESCOM	TC-3000C	3000C000546	8-7-2019

Note(s):

Refer to Appendix F that mentioned about justification for Extended SAR Dipole Calibrations.
(D750V3, SN : 1122, D1750V2, SN : 1125, D1900, SN : 5d199 and D2600, SN : 1097)

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5. Measurement Uncertainty

Per KDB 865664 D01 SAR Measurement 100 MHz to 6 GHz, when the highest measured 1-g SAR within a frequency band is < 1.5 W/kg and the measured 10-g SAR within a frequency band is < 3.75 W/kg. The expanded SAR measurement uncertainty must be ≤ 30%, for a confidence interval of k = 2. If these conditions are met, extensive SAR measurement uncertainty analysis described in IEEE Std 1528-2013 is not required in SAR reports submitted for equipment approval.

6. Device Under Test (DUT) Information

6.1. DUT Description

Device Dimension	Overall (Length x Width): 163.0 mm x 76.0 mm Overall Diagonal: 175.0 mm Display Diagonal: 168.0 mm
Back Cover	☒ The Back Cover is not removable.
Battery Options	☒ The rechargeable battery is not user accessible
Wireless Router (Hotspot)	Wi-Fi Hotspot mode permits the device to share its cellular data connection with other Wi-Fi-enabled devices. ☒ Mobile Hotspot (Wi-Fi 2.4 GHz) ☒ Mobile Hotspot (Wi-Fi 5.8 GHz)
Wi-Fi Direct	Wi-Fi Direct enabled devices transfer data directly between each other ☒ Wi-Fi Direct (Wi-Fi 2.4 GHz) ☒ Wi-Fi Direct (Wi-Fi 5 GHz : Ch.36 – Ch.48, Ch.149 – Ch.165))
Test Sample Information	**No.** / **S/N** / **Notes** 1 / R38M10QK33K / Main conducted 2 / R38M3096LDT / WiFi conducted 3 / R38M10QK32M / SAR 4 / R38M10QK2WA / SAR 5 / R38M10QK2VL / SAR

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6.2. Wireless Technologies

Wireless technologies	Frequency bands	Operating mode		Duty Cycle used for SAR testing
CDMA (CDMA2000)	BC0	1xRTT (Voice & Data) 1xEV-DO Rel. 0 1xEV-DO Rev. A 1xAdvanced		100%
	Does this device support SV-DO (1xRTT-1xEVDO)? ☐ Yes ☒ No			
GSM	850 1900	Voice (GMSK) GPRS (GMSK) EGPRS (8PSK)	GPRS Multi-Slot Class: ☐ Class 8 - 1 Up, 4 Down ☐ Class 10 - 2 Up, 4 Down ☐ Class 12 - 4 Up, 4 Down ☒ Class 33 - 4 Up, 5 Down	GSM Voice: 12.5% (E)GPRS: 1 Slot: 12.5% 2 Slots: 25% 3 Slots: 37.5% 4 Slots: 50%
	Does this device support DTM (Dual Transfer Mode)? ☐ Yes ☒ No			
W-CDMA (UMTS)	Band II Band V	UMTS Rel. 99 (Voice & Data) HSDPA (Category 24) HSUPA (Category 6) HSPA+ (DL only)		100%
LTE	FDD Band 4 FDD Band 5 FDD Band 12 FDD Band 17 TDD Band 41	QPSK 16QAM 64QAM Rel. 11 Carrier Aggregation (2 Uplinks and 3 Downlinks)		100% (FDD) 63.3% (TDD)[1]
	TDD Band 41 2CC			
	Does this device support SV-LTE (1xRTT-LTE)? ☐ Yes ☒ No			
Wi-Fi	2.4 GHz	802.11b 802.11g 802.11n (HT20)		98.8% (802.11b) 98.7% (802.11g) 98.5% (802.11n 20MHz BW)
	5 GHz	802.11a 802.11n (HT20) 802.11n (HT40) 802.11ac (VHT20) 802.11ac (VHT40) 802.11ac (VHT80)		98.6% (802.11a) 98.5% (802.11n,ac 20MHz BW) 98.2% (802.11n,ac 40MHz BW) 99.1% (802.11ac 80MHz BW)
Bluetooth	2.4 GHz	Version 5.0 LE		76.9% (DH5)

Notes:

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

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6.3. Nominal and Maximum Output Power

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

RF Air interface	Antenna	Mode	Max. RF Output Power (dBm)
			Tune-up Limit
CDMA BC0	Main 1	1xRTT	**24.8**
		1xEVDO Rel.0	**24.8**
		1xEVDO Rel.A	**24.8**
		1xAdvabced	**24.8**

RF Air interface	Antenna	Mode	Time Slots	Max. RF Output Power (dBm)	
				Tune-up Limit	Frame Pwr
GSM850	Main 1	Voice/GPRS	1	**34.0**	**25.0**
		GPRS	2	**31.0**	**25.0**
		GPRS	3	**28.5**	**24.2**
		GPRS	4	**27.0**	**24.0**
		EGPRS	1	**27.0**	**18.0**
		EGPRS	2	**24.5**	**18.5**
		EGPRS	3	**23.0**	**18.7**
		EGPRS	4	**21.0**	**18.0**
GSM1900	Main 1	Voice/GPRS	1	**30.8**	**21.8**
		GPRS	2	**27.8**	**21.8**
		GPRS	3	**26.0**	**21.7**
		GPRS	4	**24.8**	**21.8**
		EGPRS	1	**25.5**	**16.5**
		EGPRS	2	**23.5**	**17.5**
		EGPRS	3	**23.0**	**18.7**
		EGPRS	4	**21.5**	**18.5**

RF Air interface	Antenna	Mode	Max. RF Output Power (dBm)	Reduced. RF Output Power (dBm)
W-CDMA Band II	Main 1	R99	**24.0**	**19.0**
		HSDPA	**23.0**	**18.0**
		HSUPA	**23.5**	**18.5**
W-CDMA Band V	Main 1	R99	**25.0**	
		HSDPA	**24.0**	
		HSUPA	**24.0**	

RF Air interface	Antenna	Mode	Max. RF Output Power (dBm)	Reduced. RF Output Power (dBm)
LTE Band 4	Main 1	QPSK	**25.0**	**20.0**
LTE Band 5	Main 1	QPSK	**25.5**	
LTE Band 12	Main 1	QPSK	**25.0**	
LTE Band 17*	Main 1	QPSK	**25.0**	
LTE Band 41	Main 2	QPSK	**24.5**	
LTE-Uplink 2CA Band 41	Main 2	QPSK	**24.5**	

Notes:

1. The device utilizes power reduction under some portable hotspot conditions for SAR compliance. There is power reduction for WWAN bands (WCDMA Band II, LTE Band 4). The reduced powers were confirmed via conducted power measurements the RF port. Detailed description of the hotspot power reduction mechanism is included in the operational description.
2. WWAN bands (WCDMA Band II, LTE Band 4) has support to proximity sensor back-off function. it is operating during extremity (hand-held) use conditions. And This function is apply to phablet 10-g SAR exposure condition. Other Head and Body exposure conditions are performed SAR test at full power. The proximity sensor details explain in SAR report according to Section 6 in KDB 616217.
3. All back-off functions are not operating at the same time.
4. LTE QPSK configuration has the highest maximum average output power per 3GPP standard.
5. LTE Band 17 (Frequency range: 704-716 MHz) is covered by LTE Band 12 (Frequency range: 699-716 MHz) due to overlapping frequency range, same maximum tune-up limit and same channel bandwidth.

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RF Air interface	Mode	Max. RF Output Power (dBm)	Reduced. RF Output Power (dBm)
WiFi 2.4 GHz (Ch.1 - Ch.11)	802.11b	**19.0**	**12.0**
	802.11g	**17.5**	**12.0**
	802.11n HT20	**17.5**	**12.0**
WiFi 2.4 GHz (Ch.12 - Ch.13)	802.11b	**8.0**	**8.0**
	802.11g	**8.0**	**8.0**
	802.11n HT20	**7.0**	**7.0**
WiFi 5 GHz (UNII-1)	802.11a	**16.5**	**12.0**
	802.11n HT20	**16.5**	**12.0**
	802.11n HT40	**16.0**	**12.0**
	802.11ac VHT20	**16.5**	**12.0**
	802.11ac VHT40	**16.0**	**12.0**
	802.11ac VHT80	**14.0**	**12.0**
WiFi 5 GHz (UNII-2A)	802.11a	**16.5**	**12.0**
	802.11n HT20	**16.5**	**12.0**
	802.11n HT40	**15.0**	**12.0**
	802.11ac VHT20	**16.5**	**12.0**
	802.11ac VHT40	**15.0**	**12.0**
	802.11ac VHT80	**14.0**	**12.0**
WiFi 5 GHz (UNII-2C)	802.11a	**14.5**	**12.0**
	802.11n HT20	**14.5**	**12.0**
	802.11n HT40	**16.0**	**12.0**
	802.11ac VHT20	**14.5**	**12.0**
	802.11ac VHT40	**16.0**	**12.0**
	802.11ac VHT80	**14.0**	**12.0**
WiFi 5 GHz (UNII-3)	802.11a	**16.0**	**12.0**
	802.11n HT20	**16.0**	**12.0**
	802.11n HT40	**16.0**	**12.0**
	802.11ac VHT20	**16.0**	**12.0**
	802.11ac VHT40	**16.0**	**12.0**
	802.11ac VHT80	**14.0**	**12.0**
Bluetooth		**15.0**	
Bluetooth LE		**12.0**	

Note(s):

1. This device uses an independent fixed level power reduction mechanism for WLAN operations during voice or VoIP held to ear scenarios. 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 descriptions of the power reduction mechanism are included in the operational description.
2. Each Ant.1 & Ant.2 are operating same target power for SISO mode as well as MIMO mod according above table.

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6.4. General LTE SAR Test and Reporting Considerations

Item	Description						
Frequency range, Channel Bandwidth, Numbers and Frequencies	Band 4	Frequency range: 1710 - 1755 MHz					
		Channel Bandwidth					
		20 MHz	15 MHz	10 MHz	5 MHz	3 MHz	1.4 MHz
	Low	20050/ 1720	20025/ 1717.5	20000/ 1715	19975/ 1712.5	19965/ 1711.5	19957/ 1710.7
	Mid	20175/ 1732.5	20175/ 1732.5	20175/ 1732.5	20175/ 1732.5	20175/ 1732.5	20175/ 1732.5
	High	20300/ 1745	20325/ 1747.5	20350/ 1750	20375/ 1752.5	20385/ 1753.5	20393/ 1754.3
	Band 5	Frequency range: 824 - 849 MHz					
		Channel Bandwidth					
		20 MHz	15 MHz	10 MHz	5 MHz	3 MHz	1.4 MHz
	Low			20450/ 829	20425/ 826.5	20415/ 825.5	20407/ 824.7
	Mid			20525/ 836.5	20525/ 836.5	20525/ 836.5	20525/ 836.5
	High			20600/ 844	20625/ 846.5	20635/ 847.5	20643/ 848.3
	Band 12	Frequency range: 699 – 716 MHz					
		Channel Bandwidth					
		20 MHz	15 MHz	10 MHz	5 MHz	3 MHz	1.4 MHz
	Low			23060/ 704	23035/ 701.5	23025/ 700.5	23017/ 699.7
	Mid			23095/ 707.5	23095/ 707.5	23095/ 707.5	23095/ 707.5
	High			23130/ 711	23155/ 713.5	23165/ 714.5	23173/ 715.3
	Band 17	Frequency range: 704 - 716 MHz					
		Channel Bandwidth					
		20 MHz	15 MHz	10 MHz	5 MHz	3 MHz	1.4 MHz
	Low			23780/ 709	23755/ 706.5		
	Mid			23790/ 710	23790/ 710		
	High			23800/ 711	23825/ 713.5		
	Band 41	Frequency range: 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	41215/ 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 1, 2 and 3**						

Modulation	Channel bandwidth / Transmission bandwidth (N_{RB})						MPR (dB)
	1.4 MHz	3.0 MHz	5 MHz	10 MHz	15 MHz	20 MHz	
QPSK	> 5	> 4	> 8	> 12	> 16	> 18	≤ 1
16 QAM	≤ 5	≤ 4	≤ 8	≤ 12	≤ 16	≤ 18	≤ 1
16 QAM	> 5	> 4	> 8	> 12	> 16	> 18	≤ 2
64 QAM	≤ 5	≤ 4	≤ 8	≤ 12	≤ 16	≤ 18	≤ 2
64 QAM	> 5	> 4	> 8	> 12	> 16	> 18	≤ 3
256 QAM	≥ 1						≤ 5

MPR Built-in by design

The manufacturer MPR values are always within the 3GPP maximum MPR allowance but may not follow the default MPR values.

A-MPR (additional MPR) was disabled during SAR testing

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General LTE SAR Test and Reporting Considerations (Continued)

Power reduction	Yes
Spectrum plots for RB configurations	A properly configured base station simulator was used for the SAR and power measurements; therefore, spectrum plots for each RB allocation and offset configuration are not included in the SAR report.

Notes:

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

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6.5. LTE (TDD) Considerations

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

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

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

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

Calculated Duty Cycle

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

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

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

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

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6.6. LTE Carrier Aggregation

DL Inter-Band (Nom-Contiguous)

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

DL Inter-Band (Contiguous)

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

UL Intra-Band Contiguous

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

Note(s):

1. For supported channels, please refer to §6.4.

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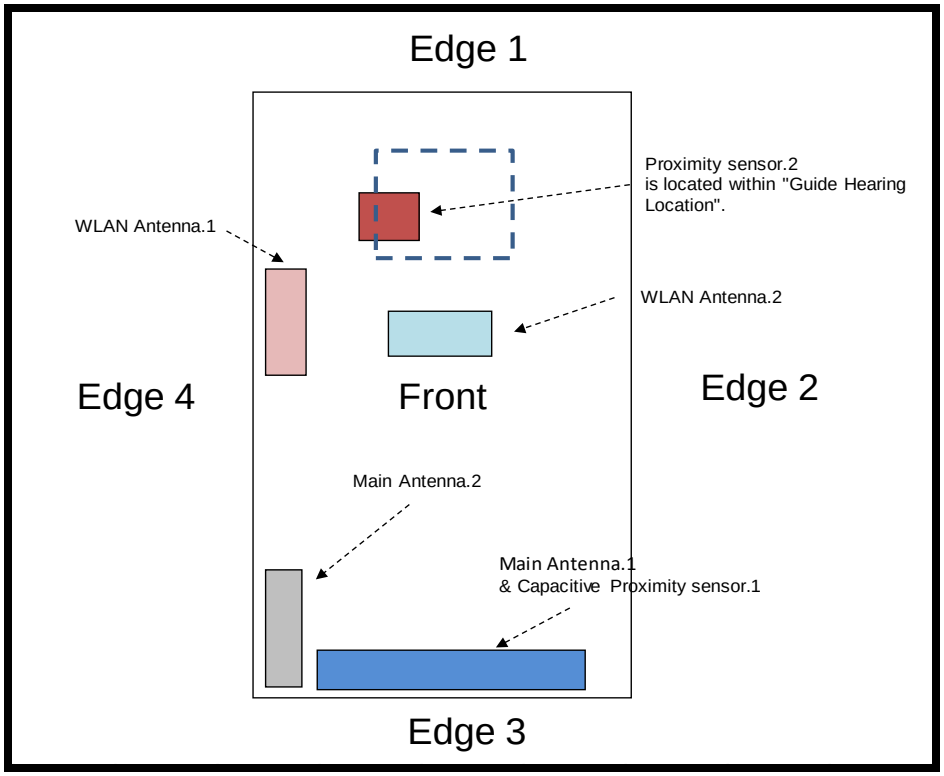
6.7. Proximity Sensor feature

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



Notes:

1. Proximity sensor.1 is related to only Main Antenna.1.
2. Proximity sensor.2 is related to both WLAN Antenna.1 and 2.

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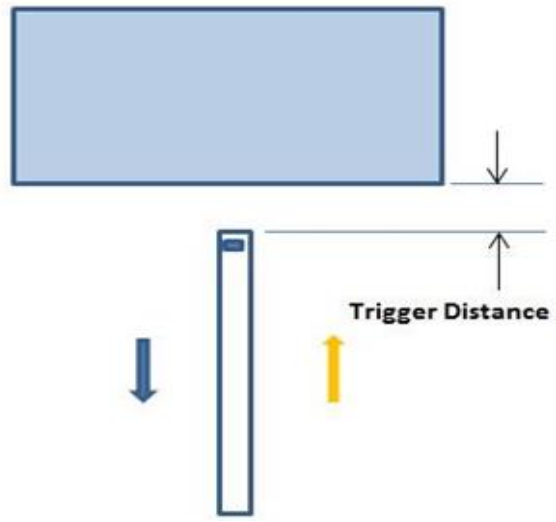
6.7.1. Proximity Sensor Triggering Distance (KDB 616217 §6.2)

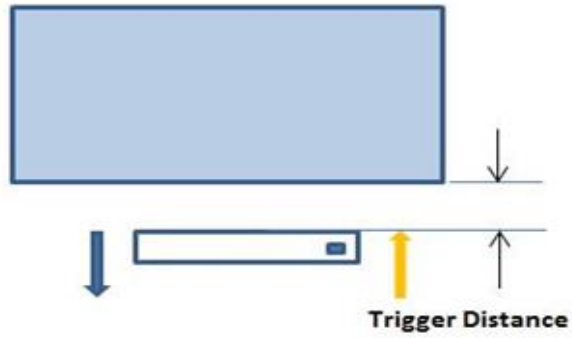
Front, Rear and Edge 3 of the DUT was placed directly below the flat phantom. The DUT was moved toward the phantom in accordance with the steps outlined in KDB 616217 §6.2 to determine the trigger distance for enabling power reduction. The DUT was moved away from the phantom to determine the trigger distance for resuming full power.

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

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



Proximity Sensor Trigger Distance Assessment
KDB 616217 §6.2, Edge 3



Proximity Sensor Trigger Distance Assessment
KDB 616217 §6.2, Rear, 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	Antenna	Trigger distance - Front		Trigger distance - Rear		Trigger distance – Edge 3	
		Moving toward phantom	Moving from phantom	Moving toward phantom	Moving from phantom	Moving toward phantom	Moving from phantom
1750 Body	Main Ant.1	9 mm	9 mm	7 mm	7 mm	10 mm	10 mm
1900 Body	Main Ant.1	9 mm	9 mm	7 mm	7 mm	10 mm	10 mm
2450 Head	WLAN Ant.1	6 mm	6 mm	N/A		N/A	
5G Head	WLAN Ant.1	6 mm	6 mm	N/A		N/A	
2450 Head	WLAN Ant.2	5 mm	5 mm	N/A		N/A	
5G Head	WLAN Ant.2	5 mm	5 mm	N/A		N/A	

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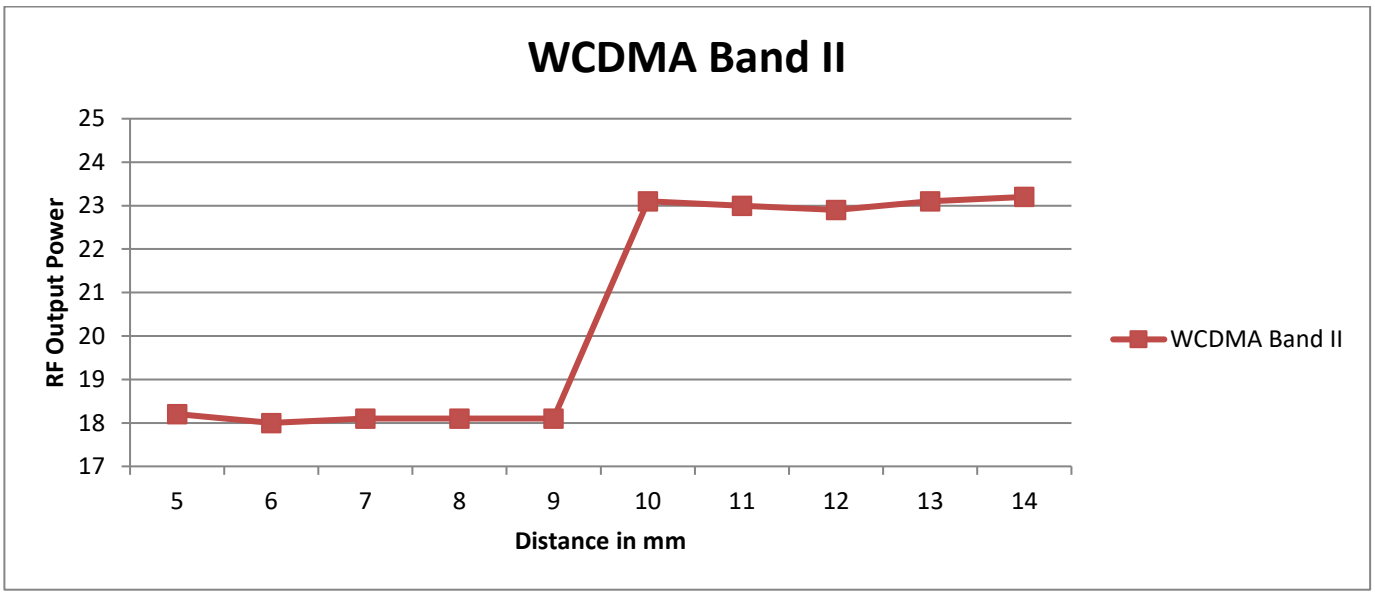
Proximity Sensor Triggering Distance Measurement Results

WCDMA Band II

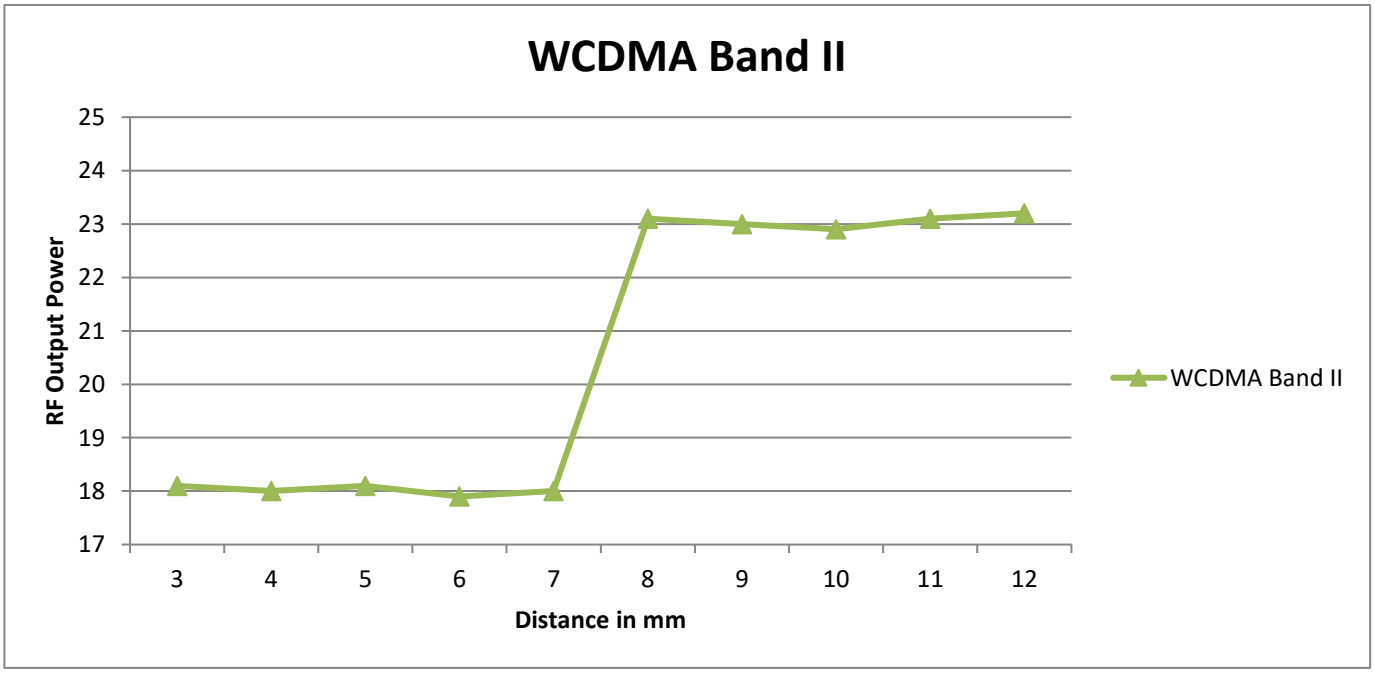
Front, DUT Moving Toward (Trigger) and Away (Release) from the Phantom

Distance to DUT vs. Output Power in dBm										
Distance (mm)	5	6	7	8	9	10	11	12	13	14
WCDMA Band II	18.2	18.0	18.1	18.1	18.1	23.1	23.0	22.9	23.1	23.2



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

Distance to DUT vs. Output Power in dBm										
Distance (mm)	3	4	5	6	7	8	9	10	11	12
WCDMA Band II	18.1	18.0	18.1	17.9	18.0	23.1	23.0	22.9	23.1	23.2



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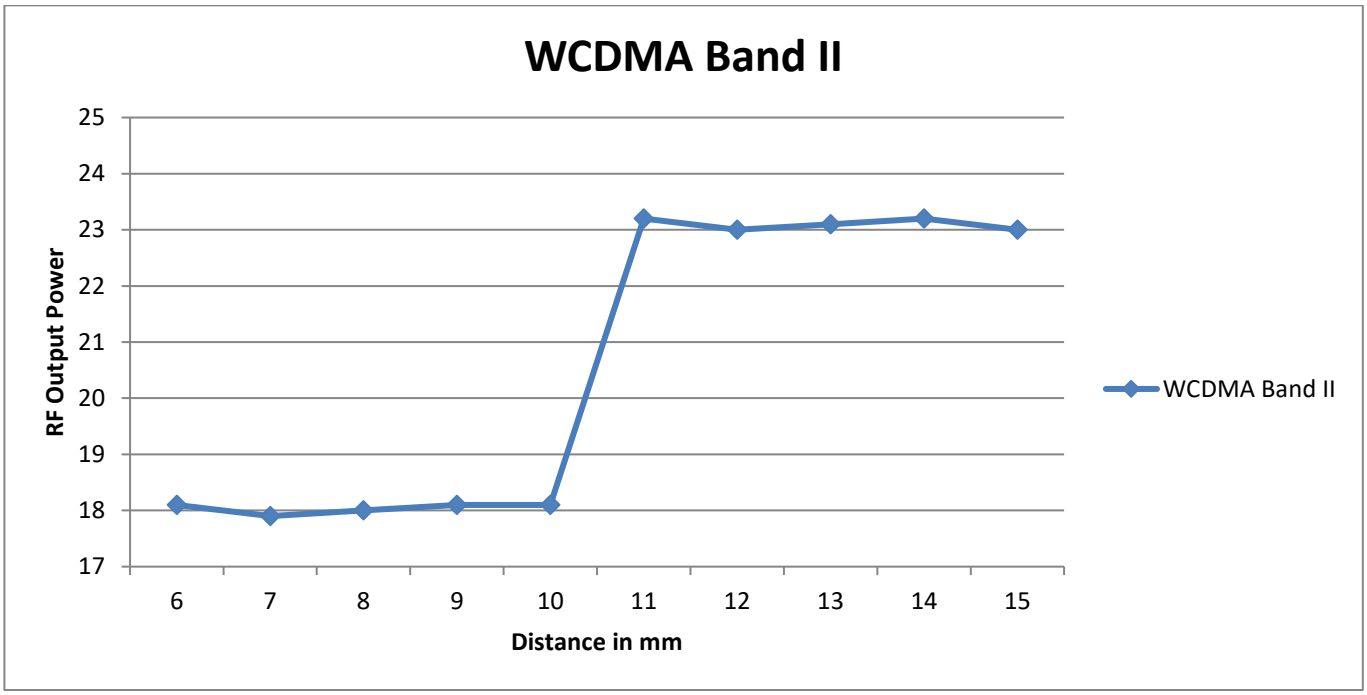
Edge 3, DUT Moving Toward (Trigger) and Away (Release) from the Phantom

Distance to DUT vs. Output Power in dBm										
Distance (mm)	6	7	8	9	10	11	12	13	14	15
WCDMA Band II	18.1	17.9	18.0	18.1	18.1	23.2	23.0	23.1	23.2	23.0



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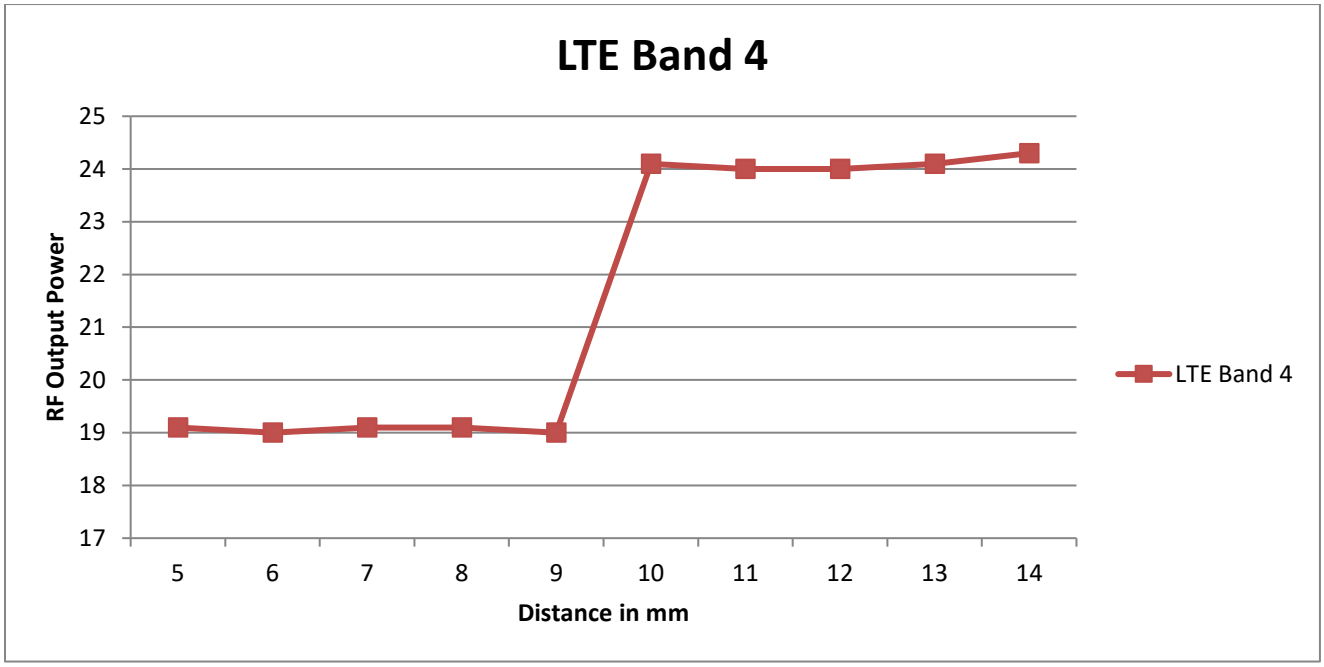
LTE Band 4

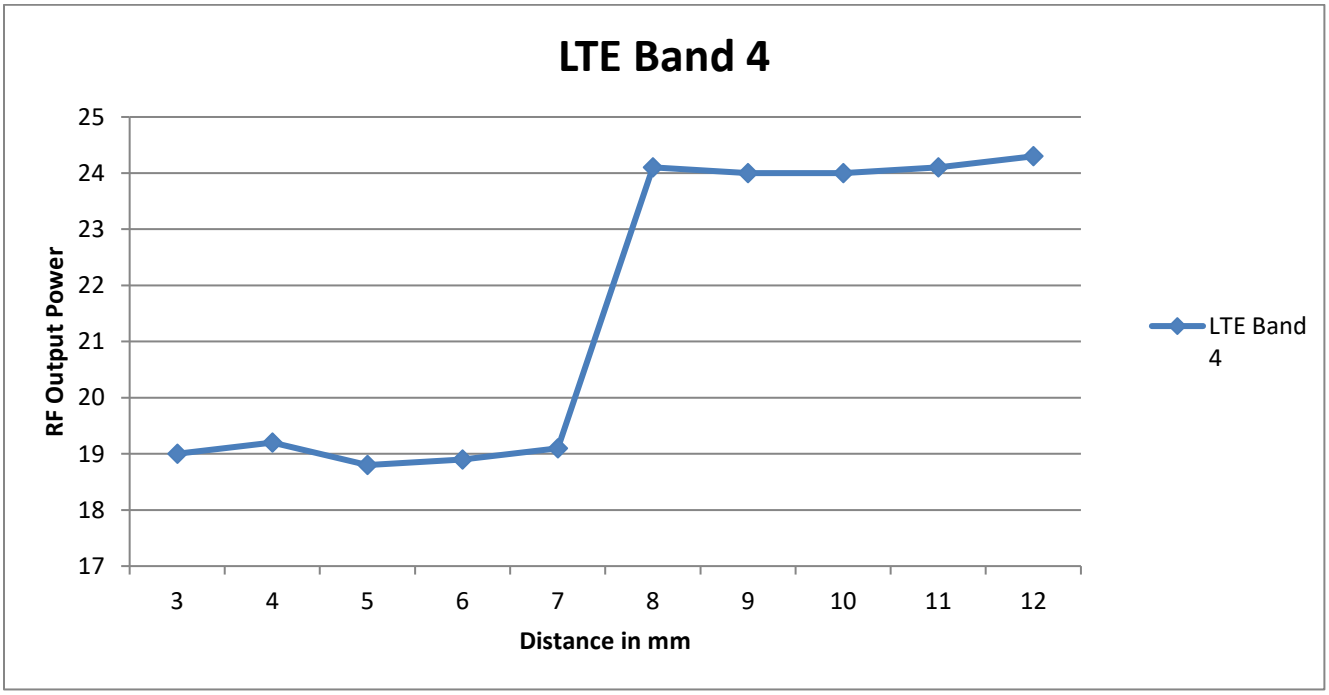
Front, DUT Moving Toward (Trigger) and Away (Release) from the Phantom

Distance to DUT vs. Output Power in dBm										
Distance (mm)	5	6	7	8	9	10	11	12	13	14
LTE Band 4	19.1	19.0	19.1	19.1	19.0	24.1	24.0	24.0	24.1	24.3



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

Distance to DUT vs. Output Power in dBm										
Distance (mm)	3	4	5	6	7	8	9	10	11	12
LTE Band 4	19.0	19.2	18.8	18.9	19.1	24.1	24.0	24.0	24.1	24.3



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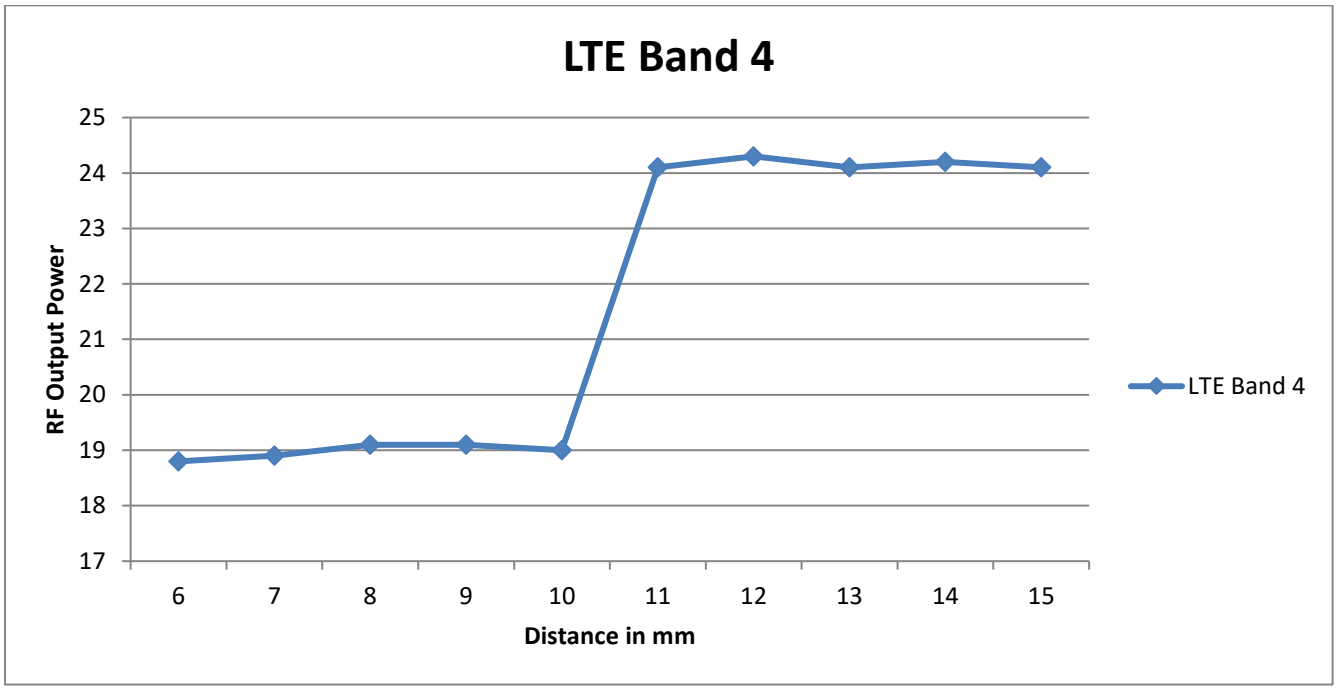
Edge 3, DUT Moving Toward (Trigger) and Away (Release) from the Phantom

Distance to DUT vs. Output Power in dBm										
Distance (mm)	6	7	8	9	10	11	12	13	14	15
LTE Band 4	18.8	18.9	19.1	19.1	19.0	24.1	24.3	24.1	24.2	24.1



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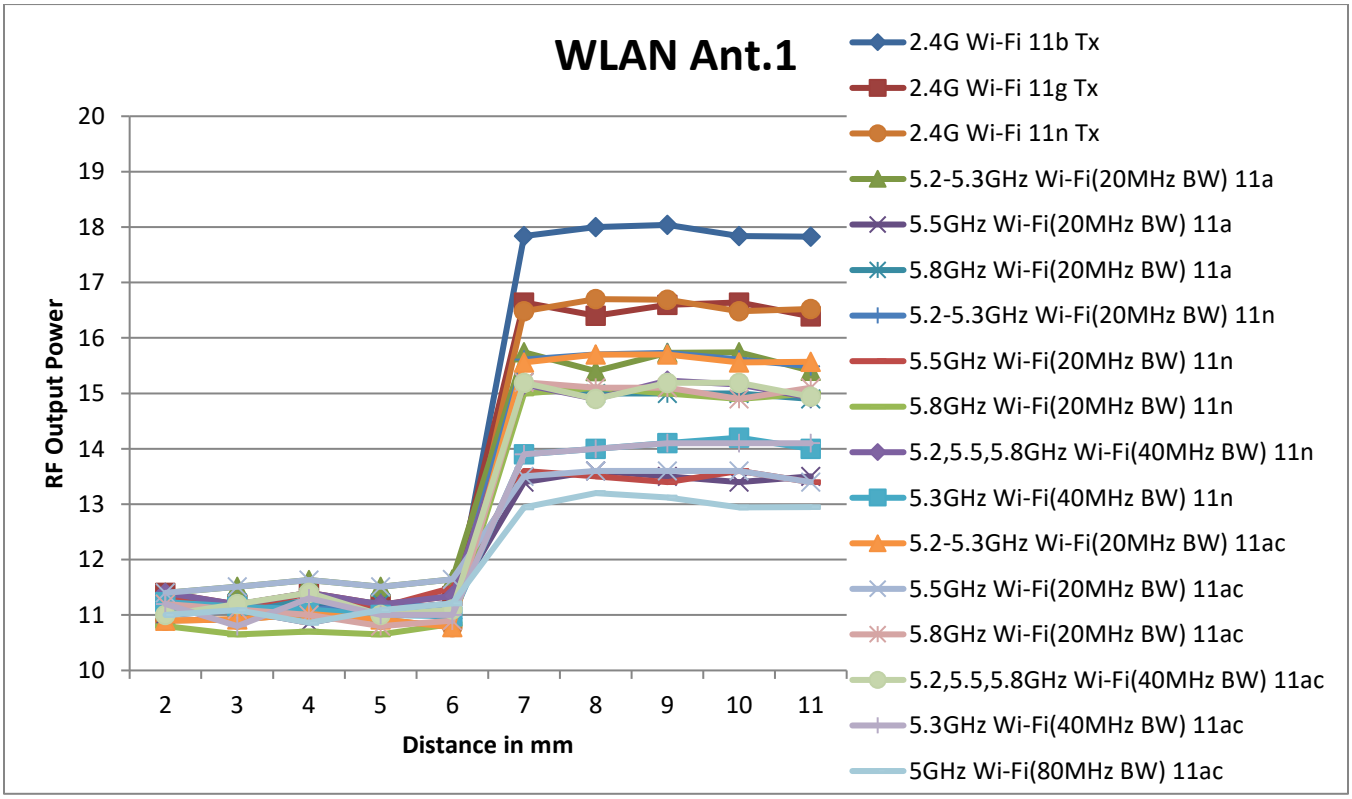
WLAN Ant.1 : 2.4GHz and 5GHz

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

Distance to DUT vs. Output Power in dBm										
Distance (mm)	2	3	4	5	6	7	8	9	10	11
2.4G Wi-Fi 11b Tx	11.0	11.1	11.2	11.1	10.9	17.8	18.0	18.0	17.8	17.8
2.4G Wi-Fi 11g Tx	11.4	11.2	11.4	11.2	11.3	16.6	16.4	16.6	16.6	16.4
2.4G Wi-Fi 11n Tx	10.9	10.9	11.0	10.9	10.8	16.5	16.7	16.7	16.5	16.5
5.2-5.3GHz Wi-Fi(20MHz BW) 11a	11.4	11.5	11.6	11.5	11.6	15.7	15.4	15.7	15.7	15.4
5.5GHz Wi-Fi(20MHz BW) 11a	11.0	11.1	10.9	11.1	11.2	13.4	13.6	13.5	13.4	13.5
5.8GHz Wi-Fi(20MHz BW) 11a	11.1	11.2	11.2	11.2	11.1	15.2	15.0	15.0	15.0	14.9
5.2-5.3GHz Wi-Fi(20MHz BW) 11n	11.1	11.2	11.1	11.2	11.2	15.6	15.7	15.7	15.6	15.5
5.5GHz Wi-Fi(20MHz BW) 11n	11.3	11.1	11.4	11.1	11.5	13.6	13.5	13.4	13.6	13.4
5.8GHz Wi-Fi(20MHz BW) 11n	10.8	10.7	10.7	10.7	10.8	15.0	15.1	15.0	14.9	15.0
5.2,5.5,5.8GHz Wi-Fi(40MHz BW) 11n	11.4	11.2	11.4	11.2	11.3	15.2	14.9	15.2	15.2	14.9
5.3GHz Wi-Fi(40MHz BW) 11n	11.2	11.2	11.1	11.0	11.0	13.9	14.0	14.1	14.2	14.0
5.2-5.3GHz Wi-Fi(20MHz BW) 11ac	10.9	10.9	11.0	10.9	10.8	15.6	15.7	15.7	15.6	15.6
5.5GHz Wi-Fi(20MHz BW) 11ac	11.4	11.5	11.6	11.5	11.6	13.5	13.6	13.6	13.6	13.4
5.8GHz Wi-Fi(20MHz BW) 11ac	11.2	11.1	11.0	10.8	10.9	15.2	15.1	15.1	14.9	15.1
5.2,5.5,5.8GHz Wi-Fi(40MHz BW) 11ac	11.0	11.2	11.4	11.0	11.1	15.2	14.9	15.2	15.2	14.9
5.3GHz Wi-Fi(40MHz BW) 11ac	11.2	10.8	11.3	11.0	11.0	13.9	14.0	14.1	14.1	14.1
5GHz Wi-Fi(80MHz BW) 11ac	11.0	11.1	10.9	11.1	11.2	12.9	13.2	13.1	12.9	13.0



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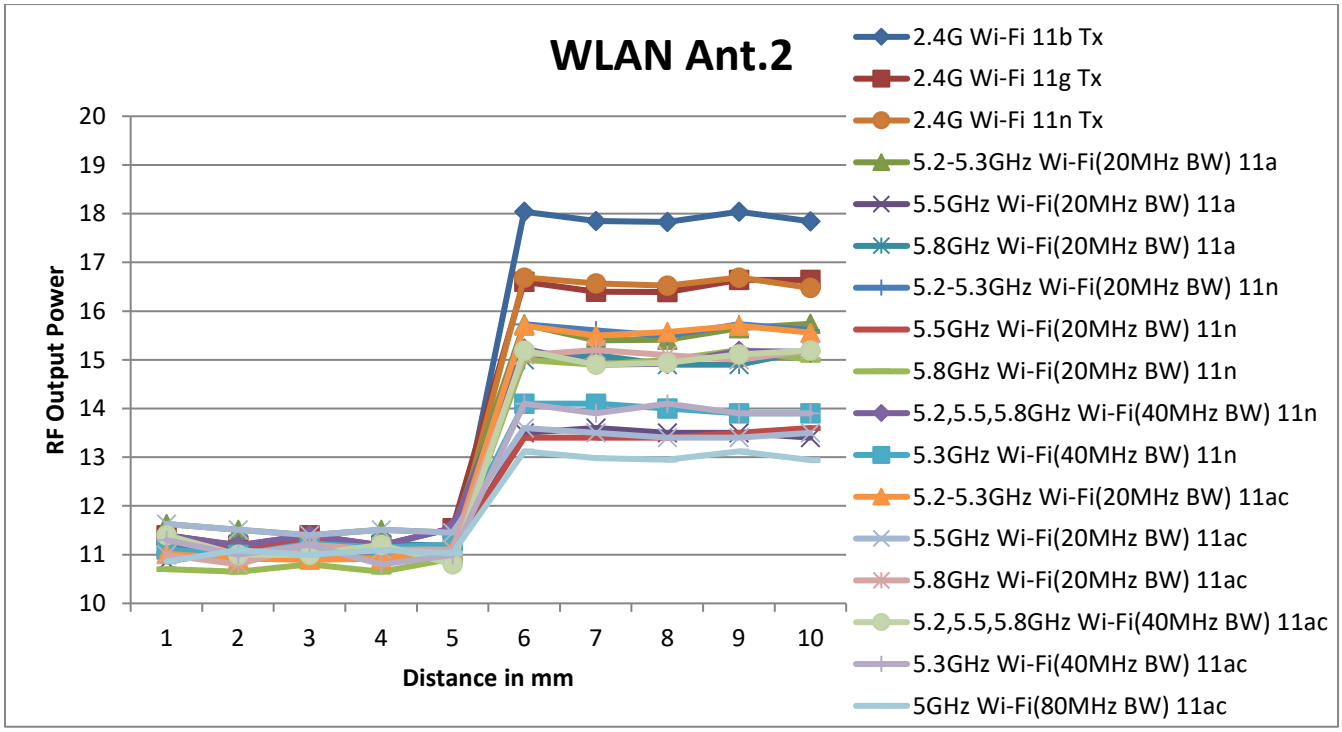
WLAN Ant.2 : 2.4GHz and 5GHz

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

Distance to DUT vs. Output Power in dBm										
Distance (mm)	1	2	3	4	5	6	7	8	9	10
2.4G Wi-Fi 11b Tx	11.2	11.1	11.0	11.1	10.8	18.0	17.9	17.8	18.0	17.8
2.4G Wi-Fi 11g Tx	11.4	11.2	11.4	11.2	11.5	16.6	16.4	16.4	16.6	16.6
2.4G Wi-Fi 11n Tx	11.0	10.9	10.9	10.9	11.1	16.7	16.6	16.5	16.7	16.5
5.2-5.3GHz Wi-Fi(20MHz BW) 11a	11.6	11.5	11.4	11.5	11.5	15.7	15.4	15.4	15.7	15.7
5.5GHz Wi-Fi(20MHz BW) 11a	10.9	11.1	11.0	11.1	11.0	13.5	13.6	13.5	13.5	13.4
5.8GHz Wi-Fi(20MHz BW) 11a	11.2	11.2	11.1	11.2	11.2	15.0	15.1	14.9	14.9	15.2
5.2-5.3GHz Wi-Fi(20MHz BW) 11n	11.1	11.2	11.1	11.2	11.1	15.7	15.6	15.5	15.7	15.6
5.5GHz Wi-Fi(20MHz BW) 11n	11.4	11.1	11.3	11.1	11.1	13.4	13.4	13.4	13.5	13.6
5.8GHz Wi-Fi(20MHz BW) 11n	10.7	10.7	10.8	10.7	10.9	15.0	14.9	15.0	15.2	15.0
5.2,5.5,5.8GHz Wi-Fi(40MHz BW) 11n	11.4	11.2	11.4	11.2	11.5	15.2	14.9	14.9	15.2	15.2
5.3GHz Wi-Fi(40MHz BW) 11n	11.1	11.0	11.2	11.2	11.2	14.1	14.1	14.0	13.9	13.9
5.2-5.3GHz Wi-Fi(20MHz BW) 11ac	11.0	10.9	10.9	10.9	11.1	15.7	15.5	15.6	15.7	15.6
5.5GHz Wi-Fi(20MHz BW) 11ac	11.6	11.5	11.4	11.5	11.5	13.6	13.5	13.4	13.4	13.5
5.8GHz Wi-Fi(20MHz BW) 11ac	11.0	10.8	11.2	11.1	11.1	15.1	15.2	15.1	15.0	15.2
5.2,5.5,5.8GHz Wi-Fi(40MHz BW) 11ac	11.4	11.0	11.0	11.2	10.8	15.2	14.9	14.9	15.1	15.2
5.3GHz Wi-Fi(40MHz BW) 11ac	11.3	11.0	11.2	10.8	11.0	14.1	13.9	14.1	13.9	13.9
5GHz Wi-Fi(80MHz BW) 11ac	10.9	11.1	11.0	11.1	11.0	13.1	13.0	13.0	13.1	12.9



6.7.2. Proximity Sensor Coverage (KDB 616217 §6.3)

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

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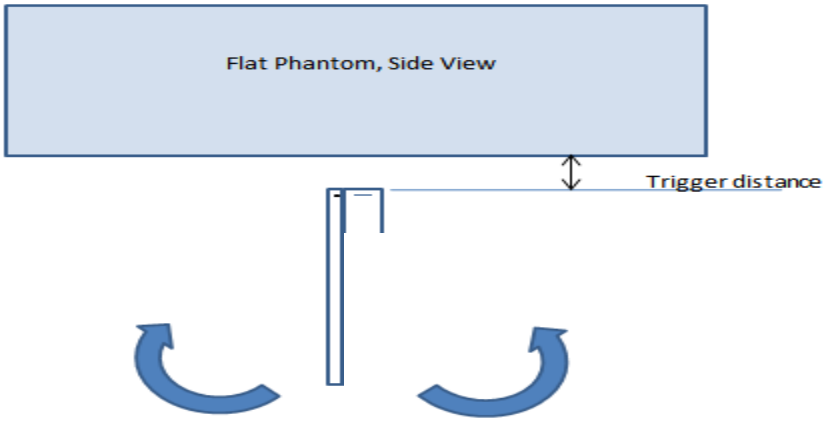
6.7.3. Proximity Sensor Tilt Angle Assessment (KDB 616217 §6.4)

The DUT was positioned directly below the flat phantom at the minimum measured trigger distance with Edge 3 parallel to the base of the flat phantom for each band.

The EUT was rotated about Edge 3 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 asse ıent (Edge 3) KDB 616217 §6.4

Summary of Tablet Tilt Angle Influence to Proximity Sensor Triggering (Edge 3)

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°
1750	10 mm	10 mm	On	On	On	On	On	On	On	On	On	On	On
1900	10 mm	10 mm	On	On	On	On	On	On	On	On	On	On	On

6.7.4. 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 (Main Ant.1)	Front	9 mm	N/A	N/A	8 mm
	Rear	7 mm	N/A	N/A	6 mm
	Edge 3	10 mm	N/A	10 mm	9 mm
WLAN Ant.1	Front	6 mm	N/A	70 mm	5 mm
WLAN Ant.2	Front	5 mm	N/A	70 mm	4 mm

Notes:

1. Worst case distance for WLAN SAR is not considered for body exposure condition. Because Power reduction is applied only voice or VoIP held to ear scenarios.
2. For WLAN, This proximity sensor is only operating in Head exposure condition. So tilt position of Head exposure was additional verified.

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7. RF Exposure Conditions (Test Configurations)

Refer to Appendix A for the specific details of the antenna-to-antenna and antenna-to-edge(s) distances.

Wireless technologies	RF Exposure Conditions	DUT Configuration	DUT-to-User Separation	Test Position	Antenna-to-edge/surface	SAR Required	Note
WWAN (Main Ant.1)	Head	Configuration 1	0 mm	Left Touch	N/A	Yes	
				Left Tilt (7°)	N/A	Yes	
				Right Touch	N/A	Yes	
				Right Tilt (7°)	N/A	Yes	
	Body	Configuration 1	15 mm	Rear	N/A	Yes	
				Front	N/A	Yes	
	Hotspot	Configuration 1 & Configuration 2	10 mm	Rear	< 25 mm	Yes	
				Front	< 25 mm	Yes	
				Edge 1 (Top)	> 25 mm	No	1
				Edge 2 (Right)	< 25 mm	Yes	
				Edge 3 (Bottom)	< 25 mm	Yes	
				Edge 4 (Left)	< 25 mm	Yes	
	Product Specific 10g	Configuration 1 & Configuration 2	0 mm	Rear	Refer to notes 2 & 3		
				Front			
				Edge 1 (Top)			
				Edge 2 (Right)			
				Edge 3 (Bottom)			
				Edge 4 (Left)			
WWAN (Main Ant.2)	Head	Configuration 1	0 mm	Left Touch	N/A	Yes	
				Left Tilt (7°)	N/A	Yes	
				Right Touch	N/A	Yes	
				Right Tilt (7°)	N/A	Yes	
	Body	Configuration 1	15 mm	Rear	N/A	Yes	
				Front	N/A	Yes	
	Hotspot	Configuration 1 & Configuration 2	10 mm	Rear	< 25 mm	Yes	
				Front	< 25 mm	Yes	
				Edge 1 (Top)	> 25 mm	No	1
				Edge 2 (Right)	> 25 mm	No	1
				Edge 3 (Bottom)	< 25 mm	Yes	
				Edge 4 (Left)	< 25 mm	Yes	
	Product Specific 10g	Configuration 1 & Configuration 2	0 mm	Rear	Refer to notes 2 & 3		
				Front			
				Edge 1 (Top)			
				Edge 2 (Right)			
				Edge 3 (Bottom)			
				Edge 4 (Left)			

Notes:

1. SAR is not required because the distance from the antenna to the edge is > 25 mm as per KDB 941225 D06 Hot Spot SAR.
2. For Phablet devices: When hotspot mode applies, Product specific 10-g SAR is required only for the surfaces and edges with hotspot mode 1-g reported SAR > 1.2 W/kg.
3. For Phablet devices: When hotspot mode applies and power reduction applies to hotspot mode, Product Specific 10-g SAR is required for each test position that has an adjusted SAR to maximum power that is > 1.2 W/kg.
4. This device has not support to traditional earpiece. So we got guidance for the acceptable head SAR test configuration from FCC.
5. Tilt test is evaluated at 7 degree due to any point on the handset is in contact with the phantom.
6. This device has an extendable camera lens on the front side. *Following guidance from FCC via KDB enquiry* head and body-worn exposure conditions were evaluated with the lens in the closed position (configuration 1) consistent with how the lens would be positioned in those conditions. Hot-spot and extremity SAR measurements were made with the lens in the closed position(configuration 1) and in the extended position (configuration 2).

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Wireless technologies	RF Exposure Conditions	DUT Configuration	DUT-to-User Separation	Test Position	Antenna-to-edge/surface	SAR Required	Note
WLAN & BT (Ant.1)	Head	Configuration 1	0 mm	Left Touch	N/A	Yes	
				Left Tilt (7°)	N/A	Yes	
				Right Touch	N/A	Yes	
				Right Tilt (7°)	N/A	Yes	
	Body	Configuration 1	15 mm	Rear	N/A	Yes	
				Front	N/A	Yes	
	Hotspot	Configuration 1 & Configuration 2	10 mm	Rear	< 25 mm	Yes	
				Front	< 25 mm	Yes	
				Edge 1 (Top)	> 25 mm	No	1
				Edge 2 (Right)	> 25 mm	No	1
				Edge 3 (Bottom)	> 25 mm	No	1
				Edge 4 (Left)	< 25 mm	Yes	
	Product Specific 10g	Configuration 1 & Configuration 2	0 mm	Rear	Refer to notes 2 & 3		
				Front			
				Edge 1 (Top)			
				Edge 2 (Right)			
				Edge 3 (Bottom)			
				Edge 4 (Left)			
WLAN (Ant.2)	Head	Configuration 1	0 mm	Left Touch	N/A	Yes	
				Left Tilt (7°)	N/A	Yes	
				Right Touch	N/A	Yes	
				Right Tilt (7°)	N/A	Yes	
	Body	Configuration 1	15 mm	Rear	N/A	Yes	
				Front	N/A	Yes	
	Hotspot	Configuration 1 & Configuration 2	10 mm	Rear	< 25 mm	Yes	
				Front	< 25 mm	Yes	
				Edge 1 (Top)	> 25 mm	No	1
				Edge 2 (Right)	> 25 mm	No	1
				Edge 3 (Bottom)	> 25 mm	No	1
				Edge 4 (Left)	< 25 mm	Yes	
	Product Specific 10g	Configuration 1 & Configuration 2	0 mm	Rear	Refer to notes 2 & 3		
				Front			
				Edge 1 (Top)			
				Edge 2 (Right)			
				Edge 3 (Bottom)			
				Edge 4 (Left)			

Notes:

1. SAR is not required because the distance from the antenna to the edge is > 25 mm as per KDB 941225 D06 Hot Spot SAR.
2. For Phablet devices: When hotspot mode applies, Product specific 10-g SAR is required only for the surfaces and edges with hotspot mode 1-g reported SAR > 1.2 W/kg.
3. For Phablet devices: When hotspot mode is not supported, Product specific 10-g SAR is required for all surfaces and edges with an antenna located at ≤ 25mm from that surface or edge in direct contact with a flat phantom, to address interactive hand use exposure conditions.
4. This device has not support to traditional earpiece. So we got guidance for the acceptable head SAR test configuration from FCC.
5. Tilt test is evaluated at 7 degree due to any point on the handset is in contact with the phantom.
6. This device has an extendable camera lens on the front side. *Following guidance from FCC via KDB enquiry* head and body-worn exposure conditions were evaluated with the lens in the closed position (configuration 1) consistent with how the lens would be positioned in those conditions. Hot-spot and extremity SAR measurements were made with the lens in the closed position(configuration 1) and in the extended position (configuration 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 ±(%)
3-21-2019	Body 2600	e'	53.6800	Relative Permittivity (ε_r):	53.68	52.51	2.23	5
		e''	15.3100	Conductivity (σ):	2.21	2.16	2.43	5
	Body 2500	e'	53.8800	Relative Permittivity (ε_r):	53.88	52.64	2.36	5
		e''	15.0800	Conductivity (σ):	2.10	2.02	3.76	5
	Body 2700	e'	53.4400	Relative Permittivity (ε_r):	53.44	52.38	2.01	5
		e''	15.5000	Conductivity (σ):	2.33	2.30	1.11	5
4-4-2019	Head 2600	e'	38.1200	Relative Permittivity (ε_r):	38.12	39.01	-2.28	5
		e''	14.1100	Conductivity (σ):	2.04	1.96	3.96	5
	Head 2500	e'	38.4800	Relative Permittivity (ε_r):	38.48	39.14	-1.68	5
		e''	13.8800	Conductivity (σ):	1.93	1.85	4.07	5
	Head 2700	e'	37.7400	Relative Permittivity (ε_r):	37.74	38.88	-2.94	5
		e''	14.3700	Conductivity (σ):	2.16	2.07	4.21	5
4-5-2019	Head 5250	e'	36.1300	Relative Permittivity (ε_r):	36.13	35.93	0.55	5
		e''	16.1000	Conductivity (σ):	4.70	4.70	-0.05	5
	Head 5260	e'	36.1100	Relative Permittivity (ε_r):	36.11	35.92	0.52	5
		e''	16.1200	Conductivity (σ):	4.71	4.71	0.05	5
	Head 5600	e'	35.7000	Relative Permittivity (ε_r):	35.70	35.53	0.47	5
		e''	16.2700	Conductivity (σ):	5.07	5.06	0.12	5
	Head 5750	e'	35.4400	Relative Permittivity (ε_r):	35.44	35.36	0.22	5
		e''	16.3400	Conductivity (σ):	5.22	5.21	0.20	5
	Head 5825	e'	35.3300	Relative Permittivity (ε_r):	35.33	35.30	0.08	5
		e''	16.4200	Conductivity (σ):	5.32	5.27	0.92	5
4-8-2019	Body 2250	e'	54.0800	Relative Permittivity (ε_r):	54.08	52.97	2.09	5
		e''	13.9200	Conductivity (σ):	1.74	1.76	-0.84	5
	Body 2300	e'	53.9300	Relative Permittivity (ε_r):	53.93	52.90	1.94	5
		e''	14.1400	Conductivity (σ):	1.81	1.80	0.27	5
	Body 2350	e'	53.9000	Relative Permittivity (ε_r):	53.90	52.84	2.01	5
		e''	14.3300	Conductivity (σ):	1.87	1.85	1.17	5
4-8-2019	Head 5250	e'	36.3500	Relative Permittivity (ε_r):	36.35	35.93	1.16	5
		e''	15.9300	Conductivity (σ):	4.65	4.70	-1.10	5
	Head 5260	e'	36.3400	Relative Permittivity (ε_r):	36.34	35.92	1.16	5
		e''	15.9400	Conductivity (σ):	4.66	4.71	-1.07	5
	Head 5600	e'	35.8800	Relative Permittivity (ε_r):	35.88	35.53	0.97	5
		e''	15.9900	Conductivity (σ):	4.98	5.06	-1.61	5
	Head 5750	e'	35.6200	Relative Permittivity (ε_r):	35.62	35.36	0.73	5
		e''	16.0900	Conductivity (σ):	5.14	5.21	-1.33	5
	Head 5825	e'	35.5400	Relative Permittivity (ε_r):	35.54	35.30	0.68	5
		e''	16.1600	Conductivity (σ):	5.23	5.27	-0.68	5
4-9-2019	Head 2450	e'	39.7500	Relative Permittivity (ε_r):	39.75	39.20	1.40	5
		e''	13.4400	Conductivity (σ):	1.83	1.80	1.72	5
	Head 2400	e'	40.0700	Relative Permittivity (ε_r):	40.07	39.30	1.97	5
		e''	13.2200	Conductivity (σ):	1.76	1.75	0.72	5
	Head 2480	e'	39.6000	Relative Permittivity (ε_r):	39.60	39.16	1.12	5
		e''	13.5400	Conductivity (σ):	1.87	1.83	1.89	5
4-10-2019	Body 2450	e'	51.9600	Relative Permittivity (ε_r):	51.96	52.70	-1.40	5
		e''	14.4000	Conductivity (σ):	1.96	1.95	0.60	5
	Body 2400	e'	52.2700	Relative Permittivity (ε_r):	52.27	52.77	-0.95	5
		e''	14.2000	Conductivity (σ):	1.89	1.90	-0.16	5
	Body 2480	e'	51.8400	Relative Permittivity (ε_r):	51.84	52.66	-1.56	5
		e''	14.5000	Conductivity (σ):	2.00	1.99	0.37	5

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SAR 1 Room _(Continued)

Date	Freq. (MHz)	Liquid Parameters			Measured	Target	Delta (%)	Limit ±(%)
4-10-2019	Body 2600	e'	51.3100	Relative Permittivity (ε_r):	51.31	52.51	-2.29	5
		e''	14.5300	Conductivity (σ):	2.10	2.16	-2.79	5
	Body 2500	e'	51.7400	Relative Permittivity (ε_r):	51.74	52.64	-1.70	5
		e''	14.4800	Conductivity (σ):	2.01	2.02	-0.37	5
	Body 2700	e'	51.0800	Relative Permittivity (ε_r):	51.08	52.38	-2.49	5
		e''	14.6100	Conductivity (σ):	2.19	2.30	-4.69	5

SAR 2 Room

Date	Freq. (MHz)	Liquid Parameters			Measured	Target	Delta (%)	Limit ±(%)
4-8-2019	Body 835	e'	53.0700	Relative Permittivity (ε_r):	53.07	55.20	-3.86	5
		e''	20.8200	Conductivity (σ):	0.97	0.97	-0.35	5
	Body 820	e'	53.2200	Relative Permittivity (ε_r):	53.22	55.28	-3.72	5
		e''	20.8800	Conductivity (σ):	0.95	0.97	-1.70	5
	Body 850	e'	52.9600	Relative Permittivity (ε_r):	52.96	55.16	-3.98	5
		e''	20.7700	Conductivity (σ):	0.98	0.99	-0.56	5

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SAR 3 Room

Date	Freq. (MHz)	Liquid Parameters			Measured	Target	Delta (%)	Limit ±(%)
4-1-2019	Head 835	e'	41.8800	Relative Permittivity (ε_r):	41.88	41.50	0.92	5
		e''	19.8300	Conductivity (σ):	0.92	0.90	2.30	5
	Head 820	e'	42.0500	Relative Permittivity (ε_r):	42.05	41.60	1.08	5
		e''	19.8800	Conductivity (σ):	0.91	0.90	0.89	5
	Head 850	e'	41.7100	Relative Permittivity (ε_r):	41.71	41.50	0.51	5
		e''	19.8100	Conductivity (σ):	0.94	0.92	2.32	5
4-1-2019	Body 835	e'	55.0800	Relative Permittivity (ε_r):	55.08	55.20	-0.22	5
		e''	20.7400	Conductivity (σ):	0.96	0.97	-0.73	5
	Body 820	e'	55.2000	Relative Permittivity (ε_r):	55.20	55.28	-0.14	5
		e''	20.8000	Conductivity (σ):	0.95	0.97	-2.07	5
	Body 850	e'	54.9500	Relative Permittivity (ε_r):	54.95	55.16	-0.38	5
		e''	20.6800	Conductivity (σ):	0.98	0.99	-0.99	5
4-5-2019	Body 5250	e'	47.3900	Relative Permittivity (ε_r):	47.39	48.95	-3.19	5
		e''	18.4800	Conductivity (σ):	5.39	5.35	0.78	5
	Body 5260	e'	47.3600	Relative Permittivity (ε_r):	47.36	48.94	-3.23	5
		e''	18.5000	Conductivity (σ):	5.41	5.36	0.86	5
	Body 5600	e'	46.8300	Relative Permittivity (ε_r):	46.83	48.48	-3.40	5
		e''	18.7600	Conductivity (σ):	5.84	5.76	1.40	5
	Body 5750	e'	46.5900	Relative Permittivity (ε_r):	46.59	48.27	-3.49	5
		e''	18.9000	Conductivity (σ):	6.04	5.94	1.80	5
	Body 5825	e'	46.4700	Relative Permittivity (ε_r):	46.47	48.20	-3.59	5
		e''	18.9700	Conductivity (σ):	6.14	6.00	2.40	5
4-8-2019	Body 5250	e'	47.7900	Relative Permittivity (ε_r):	47.79	48.95	-2.37	5
		e''	18.5400	Conductivity (σ):	5.41	5.35	1.10	5
	Body 5260	e'	47.7700	Relative Permittivity (ε_r):	47.77	48.94	-2.39	5
		e''	18.5400	Conductivity (σ):	5.42	5.36	1.08	5
	Body 5600	e'	47.1800	Relative Permittivity (ε_r):	47.18	48.48	-2.68	5
		e''	18.8600	Conductivity (σ):	5.87	5.76	1.94	5
	Body 5750	e'	46.9700	Relative Permittivity (ε_r):	46.97	48.27	-2.70	5
		e''	19.0100	Conductivity (σ):	6.08	5.94	2.39	5
	Body 5825	e'	46.8500	Relative Permittivity (ε_r):	46.85	48.20	-2.80	5
		e''	19.0700	Conductivity (σ):	6.18	6.00	2.94	5
4-9-2019	Head 835	e'	43.2000	Relative Permittivity (ε_r):	43.20	41.50	4.10	5
		e''	19.4800	Conductivity (σ):	0.90	0.90	0.49	5
	Head 820	e'	43.4000	Relative Permittivity (ε_r):	43.40	41.60	4.32	5
		e''	19.5400	Conductivity (σ):	0.89	0.90	-0.84	5
	Head 850	e'	43.0000	Relative Permittivity (ε_r):	43.00	41.50	3.61	5
		e''	19.4700	Conductivity (σ):	0.92	0.92	0.57	5
4-12-2019	Body 1900	e'	53.1000	Relative Permittivity (ε_r):	53.10	53.30	-0.38	5
		e''	14.9600	Conductivity (σ):	1.58	1.52	3.98	5
	Body 1850	e'	53.2000	Relative Permittivity (ε_r):	53.20	53.30	-0.19	5
		e''	15.0600	Conductivity (σ):	1.55	1.52	1.92	5
	Body 1910	e'	53.0900	Relative Permittivity (ε_r):	53.09	53.30	-0.39	5
		e''	15.0000	Conductivity (σ):	1.59	1.52	4.80	5

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SAR 4 Room

Date	Freq. (MHz)	Liquid Parameters			Measured	Target	Delta (%)	Limit ±(%)
4-1-2019	Body 1900	e'	54.8200	Relative Permittivity (ε_r):	54.82	53.30	2.85	5
		e''	14.5000	Conductivity (σ):	1.53	1.52	0.78	5
	Body 1850	e'	54.8700	Relative Permittivity (ε_r):	54.87	53.30	2.95	5
		e''	14.4900	Conductivity (σ):	1.49	1.52	-1.94	5
	Body 1910	e'	54.8000	Relative Permittivity (ε_r):	54.80	53.30	2.81	5
		e''	14.5100	Conductivity (σ):	1.54	1.52	1.38	5
4-2-2019	Head 1900	e'	38.8700	Relative Permittivity (ε_r):	38.87	40.00	-2.83	5
		e''	13.6100	Conductivity (σ):	1.44	1.40	2.70	5
	Head 1850	e'	38.9600	Relative Permittivity (ε_r):	38.96	40.00	-2.60	5
		e''	13.6600	Conductivity (σ):	1.41	1.40	0.37	5
	Head 1910	e'	38.8500	Relative Permittivity (ε_r):	38.85	40.00	-2.88	5
		e''	13.6100	Conductivity (σ):	1.45	1.40	3.24	5
4-4-2019	Head 750	e'	42.3000	Relative Permittivity (ε_r):	42.30	41.96	0.81	5
		e''	22.0200	Conductivity (σ):	0.92	0.89	2.82	5
	Head 700	e'	42.2500	Relative Permittivity (ε_r):	42.25	42.22	0.08	5
		e''	22.8900	Conductivity (σ):	0.89	0.89	0.19	5
	Head 790	e'	42.1600	Relative Permittivity (ε_r):	42.16	41.76	0.97	5
		e''	21.2200	Conductivity (σ):	0.93	0.90	4.01	5
4-4-2019	Body 750	e'	56.8300	Relative Permittivity (ε_r):	56.83	55.55	2.31	5
		e''	23.9100	Conductivity (σ):	1.00	0.96	3.53	5
	Body 700	e'	56.9200	Relative Permittivity (ε_r):	56.92	55.74	2.12	5
		e''	24.9500	Conductivity (σ):	0.97	0.96	1.24	5
	Body 790	e'	56.6800	Relative Permittivity (ε_r):	56.68	55.39	2.32	5
		e''	22.8600	Conductivity (σ):	1.00	0.97	3.93	5
4-4-2019	Body 1750	e'	52.6300	Relative Permittivity (ε_r):	52.63	53.44	-1.52	5
		e''	15.3300	Conductivity (σ):	1.49	1.49	0.37	5
	Body 1710	e'	52.6500	Relative Permittivity (ε_r):	52.65	53.54	-1.67	5
		e''	15.5100	Conductivity (σ):	1.47	1.46	0.90	5
	Body 1755	e'	52.6300	Relative Permittivity (ε_r):	52.63	53.43	-1.49	5
		e''	15.3200	Conductivity (σ):	1.49	1.49	0.39	5
4-5-2019	Head 1750	e'	39.3400	Relative Permittivity (ε_r):	39.34	40.08	-1.86	5
		e''	14.2100	Conductivity (σ):	1.38	1.37	1.00	5
	Head 1710	e'	39.3600	Relative Permittivity (ε_r):	39.36	40.15	-1.96	5
		e''	14.3000	Conductivity (σ):	1.36	1.35	0.98	5
	Head 1755	e'	39.3400	Relative Permittivity (ε_r):	39.34	40.08	-1.84	5
		e''	14.2000	Conductivity (σ):	1.39	1.37	1.01	5
4-10-2019	Body 1900	e'	53.1600	Relative Permittivity (ε_r):	53.16	53.30	-0.26	5
		e''	14.9900	Conductivity (σ):	1.58	1.52	4.19	5
	Body 1850	e'	53.3300	Relative Permittivity (ε_r):	53.33	53.30	0.06	5
		e''	15.1200	Conductivity (σ):	1.56	1.52	2.32	5
	Body 1910	e'	53.1400	Relative Permittivity (ε_r):	53.14	53.30	-0.30	5
		e''	14.9700	Conductivity (σ):	1.59	1.52	4.59	5
4-10-2019	Head 1900	e'	38.5100	Relative Permittivity (ε_r):	38.51	40.00	-3.73	5
		e''	13.6600	Conductivity (σ):	1.44	1.40	3.08	5
	Head 1850	e'	38.6400	Relative Permittivity (ε_r):	38.64	40.00	-3.40	5
		e''	13.8100	Conductivity (σ):	1.42	1.40	1.47	5
	Head 1910	e'	38.4800	Relative Permittivity (ε_r):	38.48	40.00	-3.80	5
		e''	13.6400	Conductivity (σ):	1.45	1.40	3.47	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
D750V3	1122	2-19-2018	750	1g	8.22	8.63
				10g	5.35	5.72
D835V2	4d174	1-23-2019	835	1g	9.28	9.47
				10g	6.04	6.23
D1750V2	1125	2-16-2018	1750	1g	36.50	36.80
				10g	19.30	19.50
D1900V2	5d199	3-15-2018	1900	1g	40.40	39.60
				10g	21.10	20.80
D1900V2	5d190	10-23-2018	1900	1g	39.10	39.00
				10g	20.40	20.50
D2450V2	939	10-16-2018	2450	1g	53.20	50.10
				10g	24.80	23.50
D2600V2	1097	1-17-2018	2600	1g	56.40	54.40
				10g	25.30	24.20
D5GHzV2	1184	8-21-2018	5250	1g	81.10	75.00
				10g	23.40	20.90
			5600	1g	85.00	78.60
				10g	24.40	22.00
			5750	1g	82.60	76.20
				10g	23.70	21.20

Note(s):

Refer to Appendix F that mentioned about justification for Extended SAR Dipole Calibrations
(D750, SN : 1122, D1750, SN : 1125, D1900, SN : 5d199, D2600, SN : 1097)

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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			
3-21-2019	D2600V2	1097	Body	1g	5.24	52.40	54.40	-3.68	1, 2
				10g	2.33	23.30	24.20	-3.72	
4-4-2019	D2600V2	1097	Head	1g	5.75	57.50	56.40	1.95	
				10g	2.51	25.10	25.30	-0.79	
4-5-2019	D5GHzV2	1184	Head	1g	7.49	74.90	81.10	-7.64	3, 4
				10g	2.14	21.40	23.40	-8.55	
4-5-2019	D5GHzV2	1184	Head	1g	8.36	83.60	85.00	-1.65	
				10g	2.36	23.60	24.40	-3.28	
4-5-2019	D5GHzV2	1184	Head	1g	8.14	81.40	82.60	-1.45	
				10g	2.31	23.10	23.70	-2.53	
4-8-2019	D2450V2	939	Body	1g	5.31	53.10	50.10	5.99	
				10g	2.47	24.70	23.50	5.11	
4-8-2019	D5GHzV2	1184	Head	1g	7.85	78.50	81.10	-3.21	
				10g	2.22	22.20	23.40	-5.13	
4-8-2019	D5GHzV2	1184	Head	1g	8.82	88.20	85.00	3.76	
				10g	2.48	24.80	24.40	1.64	
4-8-2019	D5GHzV2	1184	Head	1g	8.66	86.60	82.60	4.84	
				10g	2.45	24.50	23.70	3.38	
4-9-2019	D2450V2	939	Head	1g	5.39	53.90	53.20	1.32	
				10g	2.45	24.50	24.80	-1.21	
4-10-2019	D2450V2	939	Body	1g	5.44	54.40	50.10	8.58	5, 6
				10g	2.54	25.40	23.50	8.09	
4-10-2019	D2600V2	1097	Body	1g	5.55	55.50	54.40	2.02	
				10g	2.48	24.80	24.20	2.48	

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			
4-8-2019	D835V2	4d174	Body	1g	0.95	9.5	9.47	0.32	7, 8
				10g	0.62	6.2	6.23	0.00	

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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			
4-1-2019	D835V2	4d174	Head	1g	0.91	9.05	9.28	-2.48	
				10g	0.59	5.93	6.04	-1.82	
4-1-2019	D835V2	4d174	Body	1g	0.97	9.72	9.47	2.64	
				10g	0.64	6.36	6.23	2.09	
4-5-2019	D5GHzV2	1184	Body	1g	7.88	78.80	75.00	5.07	
				10g	2.20	22.00	20.90	5.26	
4-5-2019	D5GHzV2	1184	Body	1g	8.45	84.50	78.60	7.51	
				10g	2.33	23.30	22.00	5.91	
4-5-2019	D5GHzV2	1184	Body	1g	7.66	76.60	76.20	0.52	
				10g	2.13	21.30	21.20	0.47	
4-8-2019	D5GHzV2	1184	Body	1g	7.81	78.10	75.00	4.13	
				10g	2.17	21.70	20.90	3.83	
4-8-2019	D5GHzV2	1184	Body	1g	8.26	82.60	78.60	5.09	
				10g	2.27	22.70	22.00	3.18	
4-8-2019	D5GHzV2	1184	Body	1g	7.54	75.43	76.20	-1.01	
				10g	2.10	21.00	21.20	-0.94	
4-9-2019	D835V2	4d174	Head	1g	0.97	9.72	9.28	4.74	9, 10
				10g	0.64	6.37	6.04	5.46	
4-12-2019	D1900V2	5d190	Body	1g	4.01	40.10	39.00	2.82	11, 12
				10g	2.09	20.90	20.50	1.95	

SAR 4 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			
4-1-2019	D1900V2	5d199	Body	1g	4.02	40.20	39.60	1.52	
				10g	2.09	20.90	20.80	0.48	
4-2-2019	D1900V2	5d199	Head	1g	3.96	39.60	40.40	-1.98	
				10g	2.05	20.50	21.10	-2.84	
4-4-2019	D750V3	1122	Head	1g	0.82	8.19	8.22	-0.36	
				10g	0.53	5.31	5.35	-0.75	
4-4-2019	D750V3	1122	Body	1g	0.89	8.90	8.63	3.13	13, 14
				10g	0.59	5.91	5.72	3.32	
4-4-2019	D1750V2	1125	Body	1g	3.68	36.80	36.80	0.00	
				10g	1.96	19.60	19.50	0.51	
4-5-2019	D1750V2	1125	Head	1g	3.55	35.50	36.50	-2.74	15, 16
				10g	1.87	18.70	19.30	-3.11	
4-10-2019	D1900V2	5d190	Body	1g	3.84	38.40	39.00	-1.54	
				10g	2.00	20.00	20.50	-2.44	
4-10-2019	D1900V2	5d199	Body	1g	3.82	38.20	39.10	-2.30	
				10g	1.97	19.70	20.40	-3.43	

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9. Conducted Output Power Measurements

Conducted output power was measured for WWAN in accordance with ANSI C63.26-2015.

9.1 CDMA

1x Advanced Setup Procedures used to establish the test signals

Call box setup procedure

- Protocol Rev > 6 (IS-2000-0)
- System ID: 331; NID: 65535, Reg. Ch. #.:
- Radio Config (RC) > Fwd11,Rvs8
- Service Option (SO) Setup > SO75 (Loopback)
- Traffic Data Rate > Full
- Rvs Power Ctrl > All Up bits (Maximum TxPout)
- Reverse Power Control Mode: 00-200 to 400 bps
- Smart blanking was disabled.

CDMA BC0 Measured Results

Mode		Channel	Freq. (MHz)	Maximum Average Power (dBm)	
				Measured Pwr	Tune-up Limit
1xRTT	RC1, SO55 (Loopback)	1013	824.70	24.0	24.8
		384	836.52	24.0	
		777	848.31	23.9	
	RC3, SO55 (Loopback)	1013	824.70	24.0	
		384	836.52	23.9	
		777	848.31	24.0	
	RC3, SO32 (+F-SCH)	1013	824.70	24.0	
		384	836.52	24.0	
		777	848.31	24.0	
1xAdvanced	Fwd11/Rvs8 SO75 (Loopback)	1013	824.70	24.0	24.8
		384	836.52	23.8	
		777	848.31	23.9	
1xEv-Do Rel. 0	307.2 kbps (2 slot, QPSK)	1013	824.70	23.8	24.8
		384	836.52	23.7	
		777	848.31	23.7	
1xEv-Do Rev. A	307.2k, QPSK/ ACK channel is transmitted at all the slots	1013	824.70	23.8	24.8
		384	836.52	23.7	
		777	848.31	23.7	

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9.2 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

Mode	Coding Scheme	Time Slots	Ch No.	Freq. (MHz)	Maximum Average Power (dBm)			
					Measured		Tune-up Limit	
					Burst Pwr	Frame Pwr	Burst Pwr	Frame Pwr
GSM (Voice)	CS1	1	128	824.2	33.2	24.2	34.0	25.0
			190	836.6	33.4	24.4		
			251	848.8	33.2	24.2		
GPRS (GMSK)	CS1	1	128	824.2	33.2	24.2	34.0	25.0
			190	836.6	33.5	24.5		
			251	848.8	33.3	24.3		
		2	128	824.2	29.4	23.4	31.0	**25.0**
			190	836.6	29.6	23.5		
			251	848.8	29.3	23.3		
		3	128	824.2	27.7	23.4	28.5	24.2
			190	836.6	27.4	23.1		
			251	848.8	27.6	23.3		
		4	128	824.2	26.3	23.3	27.0	24.0
			190	836.6	26.5	23.5		
			251	848.8	26.1	23.1		
EGPRS (8PSK)	MCS5	1	128	824.2	26.3	17.3	27.0	18.0
			190	836.6	26.1	17.1		
			251	848.8	26.1	17.1		
		2	128	824.2	23.2	17.2	24.5	18.5
			190	836.6	23.1	17.1		
			251	848.8	23.1	17.1		
		3	128	824.2	21.8	17.6	23.0	18.7
			190	836.6	21.8	17.6		
			251	848.8	21.7	17.5		
		4	128	824.2	20.3	17.3	21.0	18.0
			190	836.6	20.4	17.4		
			251	848.8	20.2	17.2		

Notes:

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

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

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GSM1900 Measured Results

Mode	Coding Scheme	Time Slots	Ch No.	Freq. (MHz)	Maximum Average Power (dBm)			
					Measured		Tune-up Limit	
					Burst Pwr	Frame Pwr	Burst Pwr	Frame Pwr
GSM (Voice)	CS1	1	512	1850.2	30.3	21.2	30.8	21.8
			661	1880.0	30.2	21.2		
			810	1909.8	30.2	21.1		
GPRS (GMSK)	CS1	1	512	1850.2	30.3	21.2	30.8	21.8
			661	1880.0	30.2	21.1		
			810	1909.8	30.1	21.1		
		2	512	1850.2	27.0	21.0	27.8	21.8
			661	1880.0	27.0	21.0		
			810	1909.8	27.2	21.2		
		3	512	1850.2	24.9	20.6	26.0	21.7
			661	1880.0	25.0	20.7		
			810	1909.8	25.2	20.9		
		4	512	1850.2	23.5	20.5	24.8	**21.8**
			661	1880.0	23.5	20.5		
			810	1909.8	23.7	20.7		
EGPRS (8PSK)	MCS5	1	512	1850.2	25.1	16.1	25.5	16.5
			661	1880.0	25.0	16.0		
			810	1909.8	25.2	16.2		
		2	512	1850.2	22.7	16.6	23.5	17.5
			661	1880.0	22.6	16.6		
			810	1909.8	22.9	16.9		
		3	512	1850.2	21.9	17.7	23.0	18.7
			661	1880.0	21.9	17.7		
			810	1909.8	22.3	18.0		
		4	512	1850.2	20.5	17.4	21.5	18.5
			661	1880.0	20.5	17.5		
			810	1909.8	20.9	17.8		

Notes:

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

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

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9.3 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+

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W-CDMA Band II Measured Results

Mode		UL Ch No.	Freq. (MHz)	Maximum Average Power (dBm)			Reduced Average Power (dBm) - hotspot			Reduced Average Power (dBm) - Proximity sensor		
				Measured Pwr	MPR	Tune-up Limit	Measured Pwr	MPR	Tune-up Limit	Measured Pwr	MPR	Tune-up Limit
Release 99	Rel 99 (RMC, 12.2 kbps)	9262	1852.4	23.3	N/A	24.0	18.9	N/A	19.0	19.0	N/A	19.0
		9400	1880.0	23.3			18.9			18.9		
		9538	1907.6	23.4			18.9			19.0		
HSDPA	Subtest 1	9262	1852.4	22.3	0	23.0	18.0	0	18.0	18.0	0	18.0
		9400	1880.0	22.3			17.9			17.9		
		9538	1907.6	22.4			17.9			18.0		
	Subtest 2	9262	1852.4	22.3	0	23.0	18.0	0	18.0	18.0	0	18.0
		9400	1880.0	22.3			17.9			17.9		
		9538	1907.6	22.4			17.9			18.0		
	Subtest 3	9262	1852.4	21.8	0.5	22.5	17.5	0.5	17.5	17.5	0.5	17.5
		9400	1880.0	21.8			17.4			17.4		
		9538	1907.6	21.9			17.4			17.4		
	Subtest 4	9262	1852.4	21.8	0.5	22.5	17.5	0.5	17.5	17.5	0.5	17.5
		9400	1880.0	21.8			17.4			17.4		
		9538	1907.6	21.8			17.4			17.5		
HSUPA	Subtest 1	9262	1852.4	22.3	0	23.5	18.0	0	18.5	18.0	0	18.5
		9400	1880.0	22.3			17.9			17.9		
		9538	1907.6	22.3			17.9			17.9		
	Subtest 2	9262	1852.4	20.3	2	21.5	16.0	2	16.5	16.0	2	16.5
		9400	1880.0	20.3			15.9			15.9		
		9538	1907.6	20.4			16.0			16.0		
	Subtest 3	9262	1852.4	21.3	1	22.5	17.0	1	17.5	17.0	1	17.5
		9400	1880.0	21.3			16.9			16.9		
		9538	1907.6	21.4			17.0			17.0		
	Subtest 4	9262	1852.4	20.3	2	21.5	16.0	2	16.5	16.0	2	16.5
		9400	1880.0	20.3			15.9			15.9		
		9538	1907.6	20.3			15.9			15.9		
	Subtest 5	9262	1852.4	21.9	0	23.5	17.7	0	18.5	17.7	0	18.5
		9400	1880.0	22.0			17.5			17.5		
		9538	1907.6	22.0			17.6			17.6		

W-CDMA Band V Measured Results

Mode		UL Ch No.	Freq. (MHz)	Maximum Average Power (dBm)		
				Measured Pwr	MPR	Tune-up Limit
Release 99	Rel 99 (RMC, 12.2 kbps)	4132	826.4	23.4	N/A	25.0
		4183	836.6	23.3		
		4233	846.6	23.2		
HSDPA	Subtest 1	4132	826.4	22.4	0	24.0
		4183	836.6	22.3		
		4233	846.6	22.2		
	Subtest 2	4132	826.4	22.4	0	24.0
		4183	836.6	22.3		
		4233	846.6	22.2		
	Subtest 3	4132	826.4	21.9	0.5	23.5
		4183	836.6	21.7		
		4233	846.6	21.7		
	Subtest 4	4132	826.4	21.9	0.5	23.5
		4183	836.6	21.8		
		4233	846.6	21.7		
HSUPA	Subtest 1	4132	826.4	22.4	0	24.0
		4183	836.6	22.3		
		4233	846.6	22.2		
	Subtest 2	4132	826.4	20.4	2	22.0
		4183	836.6	20.2		
		4233	846.6	20.2		
	Subtest 3	4132	826.4	21.4	1	23.0
		4183	836.6	21.3		
		4233	846.6	21.2		
	Subtest 4	4132	826.4	20.4	2	22.0
		4183	836.6	20.2		
		4233	846.6	20.2		
	Subtest 5	4132	826.4	22.1	0	24.0
		4183	836.6	22.0		
		4233	846.6	21.8		

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9.4 LTE

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

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

Table 6.2.3-1: Maximum Power Reduction (MPR) for Power Class 1, 2 and 3

Modulation	Channel bandwidth / Transmission bandwidth (N_{RB})						MPR (dB)
	1.4 MHz	3.0 MHz	5 MHz	10 MHz	15 MHz	20 MHz	
QPSK	> 5	> 4	> 8	> 12	> 16	> 18	≤ 1
16 QAM	≤ 5	≤ 4	≤ 8	≤ 12	≤ 16	≤ 18	≤ 1
16 QAM	> 5	> 4	> 8	> 12	> 16	> 18	≤ 2
64 QAM	≤ 5	≤ 4	≤ 8	≤ 12	≤ 16	≤ 18	≤ 2
64 QAM	> 5	> 4	> 8	> 12	> 16	> 18	≤ 3
256 QAM	≥ 1						≤ 5

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

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

Network Signalling value	Requirements (subclause)	E-UTRA Band	Channel bandwidth (MHz)	Resources Blocks (N_{RB})	A-MPR (dB)
NS_01	6.6.2.1.1	Table 5.5-1	1.4, 3, 5, 10, 15, 20	Table 5.6-1	N/A
NS_03	6.6.2.2.1	2, 4,10, 23, 25, 35, 36, 66, 70	3	>5	≤ 1
			5	>6	≤ 1
			10	>6	≤ 1
			15	>8	≤ 1
			20	>10	≤ 1
NS_04	6.6.2.2.2, 6.6.3.3.19	41	5, 10, 15, 20	Table 6.2.4-4, Table 6.2.4-4a	
NS_05	6.6.3.3.1	1	10,15,20	≥ 50 (NOTE1)	≤ 1 (NOTE1)
			15, 20	Table 6.2.4-18 (NOTE2)	
		65 (NOTE 3)	10,15,20	≥ 50	≤ 1 (NOTE 1)
			15,20	Table 6.2.4-18 (NOTE 2)	
NS_06	6.6.2.2.3	12, 13, 14, 17	1.4, 3, 5, 10	Table 5.6-1	N/A
NS_07	6.6.2.2.3 6.6.3.3.2	13	10	Table 6.2.4-2	
NS_08	6.6.3.3.3	19	10, 15	> 44	≤ 3
NS_09	6.6.3.3.4	21	10, 15	> 40	≤ 1
				> 55	≤ 2
NS_10		20	15, 20	Table 6.2.4-3	
NS_11	6.6.2.2.1 6.6.3.3.13	23	1.4, 3, 5, 10, 15, 20	Table 6.2.4-5	
NS_12	6.6.3.3.5	26	1.4, 3, 5, 10, 15	Table 6.2.4-6	
NS_13	6.6.3.3.6	26	5	Table 6.2.4-7	
NS_14	6.6.3.3.7	26	10, 15	Table 6.2.4-8	
NS_15	6.6.3.3.8	26	1.4, 3, 5, 10, 15	Table 6.2.4-9 Table 6.2.4-10	
NS_16	6.6.3.3.9	27	3, 5, 10	Table 6.2.4-11, Table 6.2.4-12, Table 6.2.4-13	
NS_17	6.6.3.3.10	28	5, 10	Table 5.6-1	N/A
NS_18	6.6.3.3.11	28	5	≥ 2	≤ 1
			10, 15, 20	≥ 1	≤ 4
NS_19	6.6.3.3.12	44	10, 15, 20	Table 6.2.4-14	
NS_20	6.2.2 6.6.2.2.1 6.6.3.3.14	23	5, 10, 15, 20	Table 6.2.4-15	
NS_21	6.6.2.2.1 6.6.3.3.15	30	5, 10	Table 6.2.4-16	
NS_22	6.6.3.3.16	42, 43	5, 10, 15, 20	Table 6.2.4-17	
NS_23	6.6.3.3.17	42, 43	5, 10, 15, 20	N/A	
NS_24	6.6.3.3.20	65 (NOTE 4)	5, 10, 15, 20	Table 6.2.4-19	
NS_25	6.6.3.3.21	65 (NOTE 4)	5, 10, 15, 20	Table 6.2.4-20	
NS_26	6.6.3.3.22	68	10, 15	Table 6.2.4-21	
NS_27	6.6.2.2.5, 6.6.3.3.23	48	5, 10, 15, 20	Table 6.2.4-22	
NS_28	6.2.2A, 6.6.3.3.24	46 (NOTE 5)	20	Table 6.2.4-23	
NS_29	6.2.2A, 6.6.2.3.1a, 6.6.3.3.25	46 (NOTE 5)	20	Table 6.2.4-24	
NS_30	6.2.2A, 6.6.3.3.26	46 (NOTE 5)	20	Table 6.2.4-25	
NS_31	6.2.2A, 6.6.3.3.27	46 (NOTE 5)	20	Table 6.2.4-26	
NS_32	-	-	-	-	-
NOTE 1: Applicable when the lower edge of the assigned E-UTRA UL channel bandwidth frequency is larger than or equal to the upper edge of PHS band (1915.7 MHz) + 4 MHz + the channel BW assigned, where channel BW is as defined in subclause 5.6. A-MPR for					

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1 Max power Results

LTE Band 4 Measured Results

BW (MHz)	Mode	RB Allocation	RB offset	Maximum Average Power (dBm)			MPR	Tune-up Limit
				Measured Pwr (dBm)				
				[redacted]	20175	[redacted]		
					1732.5 MHz			
20 MHz	QPSK	1	0	[redacted]	24.0	[redacted]	0.0	25
		1	49	[redacted]	23.9	[redacted]	0.0	25
		1	99	[redacted]	23.9	[redacted]	0.0	25
		50	0	[redacted]	23.0	[redacted]	1.0	24
		50	24	[redacted]	23.0	[redacted]	1.0	24
		50	50	[redacted]	22.9	[redacted]	1.0	24
		100	0	[redacted]	23.0	[redacted]	1.0	24
	16QAM	1	0	[redacted]	23.3	[redacted]	1.0	24
		1	49	[redacted]	23.2	[redacted]	1.0	24
		1	99	[redacted]	23.2	[redacted]	1.0	24
		50	0	[redacted]	22.1	[redacted]	2.0	23
		50	24	[redacted]	22.1	[redacted]	2.0	23
		50	50	[redacted]	22.0	[redacted]	2.0	23
		100	0	[redacted]	22.1	[redacted]	2.0	23
	64QAM	1	0	[redacted]	22.3	[redacted]	2.0	23
		1	49	[redacted]	22.3	[redacted]	2.0	23
		1	99	[redacted]	22.3	[redacted]	2.0	23
		50	0	[redacted]	21.3	[redacted]	3.0	22
		50	24	[redacted]	21.2	[redacted]	3.0	22
		50	50	[redacted]	21.2	[redacted]	3.0	22
		100	0	[redacted]	21.2	[redacted]	3.0	22

BW (MHz)	Mode	RB Allocation	RB offset	Measured Pwr (dBm)			MPR	Tune-up Limit
				20025	20175	20325		
				1717.5 MHz	1732.5 MHz	1747.5 MHz		
15 MHz	QPSK	1	0	23.9	24.0	24.0	0.0	25
		1	37	23.9	23.9	23.9	0.0	25
		1	74	23.9	23.9	23.8	0.0	25
		36	0	22.9	23.0	23.0	1.0	24
		36	20	22.8	22.9	23.0	1.0	24
		36	39	22.9	22.9	22.9	1.0	24
		75	0	22.9	23.0	22.9	1.0	24
	16QAM	1	0	23.2	23.2	22.9	1.0	24
		1	37	23.0	23.2	22.7	1.0	24
		1	74	23.1	23.2	22.8	1.0	24
		36	0	21.9	22.1	22.1	2.0	23
		36	20	21.8	22.0	22.0	2.0	23
		36	39	21.9	22.0	22.0	2.0	23
		75	0	22.0	22.1	22.0	2.0	23
	64QAM	1	0	22.1	22.4	22.7	2.0	23
		1	37	22.0	22.3	22.5	2.0	23
		1	74	22.1	22.3	22.6	2.0	23
		36	0	21.1	21.2	21.2	3.0	22
		36	20	21.1	21.2	21.1	3.0	22
		36	39	21.1	21.1	21.1	3.0	22
		75	0	21.1	21.2	21.2	3.0	22

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LTE Band 4 Measured Results (continued)

BW (MHz)	Mode	RB Allocation	RB offset	Measured Pwr (dBm)			MPR	Tune-up Limit
				20000	20175	20350		
				1715 MHz	1732.5 MHz	1750 MHz		
10 MHz	QPSK	1	0	23.7	23.9	23.9	0.0	25
		1	25	23.7	23.8	23.8	0.0	25
		1	49	23.7	23.8	23.8	0.0	25
		25	0	22.8	23.0	22.9	1.0	24
		25	12	22.7	23.0	22.9	1.0	24
		25	25	22.7	22.9	22.9	1.0	24
		50	0	22.7	22.9	22.9	1.0	24
	16QAM	1	0	22.7	23.0	22.9	1.0	24
		1	25	22.6	22.9	22.8	1.0	24
		1	49	22.6	22.9	22.8	1.0	24
		25	0	22.8	22.9	23.0	2.0	23
		25	12	22.8	23.0	23.0	2.0	23
		25	25	22.8	23.0	22.9	2.0	23
		50	0	22.8	23.0	22.9	2.0	23
	64QAM	1	0	21.9	23.0	22.2	2.0	23
		1	25	21.8	22.9	22.1	2.0	23
		1	49	21.9	22.9	22.1	2.0	23
		25	0	21.1	21.2	21.2	3.0	22
		25	12	21.1	21.2	21.1	3.0	22
		25	25	21.0	21.2	21.1	3.0	22
		50	0	21.0	21.1	21.0	3.0	22

BW (MHz)	Mode	RB Allocation	RB offset	Maximum Average Power (dBm)			MPR	Tune-up Limit
				Measured Pwr (dBm)				
				19975	20175	20375		
				1712.5 MHz	1732.5 MHz	1752.5 MHz		
5 MHz	QPSK	1	0	23.7	24.0	23.9	0.0	25
		1	12	23.6	23.9	23.9	0.0	25
		1	24	23.8	23.9	23.9	0.0	25
		12	0	22.6	22.9	22.9	1.0	24
		12	7	22.6	23.0	22.9	1.0	24
		12	13	22.7	22.9	22.9	1.0	24
		25	0	22.7	22.9	22.9	1.0	24
	16QAM	1	0	22.8	23.0	23.0	1.0	24
		1	12	22.7	23.0	22.9	1.0	24
		1	24	22.8	23.0	22.9	1.0	24
		12	0	21.8	22.1	22.0	2.0	23
		12	7	21.8	22.1	22.0	2.0	23
		12	13	21.8	22.0	22.0	2.0	23
		25	0	21.8	21.9	21.9	2.0	23
	64QAM	1	0	22.1	22.0	22.3	2.0	23
		1	12	22.0	21.9	22.2	2.0	23
		1	24	22.1	21.9	22.2	2.0	23
		12	0	20.8	21.2	21.2	3.0	22
		12	7	20.7	21.1	21.1	3.0	22
		12	13	20.8	21.1	21.1	3.0	22
		25	0	20.8	21.1	21.1	3.0	22

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LTE Band 4 Measured Results (continued)

BW (MHz)	Mode	RB Allocation	RB offset	Measured Pwr (dBm)			MPR	Tune-up Limit
				19965	20175	20385		
				1711.5 MHz	1732.5 MHz	1753.5 MHz		
3 MHz	QPSK	1	0	23.6	23.9	23.8	0.0	25
		1	8	23.6	23.9	23.9	0.0	25
		1	14	23.6	23.8	23.8	0.0	25
		8	0	22.6	22.9	22.9	1.0	24
		8	4	22.6	23.0	22.9	1.0	24
		8	7	22.6	22.9	22.9	1.0	24
		15	0	22.6	22.9	22.9	1.0	24
	16QAM	1	0	22.7	22.9	22.8	1.0	24
		1	8	22.7	23.0	22.9	1.0	24
		1	14	22.6	22.9	22.8	1.0	24
		8	0	21.7	22.0	22.0	2.0	23
		8	4	21.7	22.0	22.0	2.0	23
		8	7	21.7	22.1	22.0	2.0	23
		15	0	21.6	21.9	21.9	2.0	23
	64QAM	1	0	22.1	22.2	22.0	2.0	23
		1	8	22.1	22.2	22.1	2.0	23
		1	14	22.0	22.1	22.0	2.0	23
		8	0	20.8	21.0	21.0	3.0	22
		8	4	20.9	21.0	21.0	3.0	22
		8	7	20.8	21.0	21.0	3.0	22
		15	0	20.7	21.1	21.0	3.0	22

BW (MHz)	Mode	RB Allocation	RB offset	Measured Pwr (dBm)			MPR	Tune-up Limit
				19957	20175	20393		
				1710.7 MHz	1732.5 MHz	1754.3 MHz		
1.4 MHz	QPSK	1	0	23.6	23.8	23.7	0.0	25
		1	3	23.6	23.8	23.7	0.0	25
		1	5	23.5	23.7	23.7	0.0	25
		3	0	23.5	23.7	23.6	0.0	25
		3	1	23.6	23.8	23.7	0.0	25
		3	3	23.6	23.8	23.7	0.0	25
		6	0	22.5	22.8	22.7	1.0	24
	16QAM	1	0	22.9	22.8	22.7	1.0	24
		1	3	23.0	22.9	22.7	1.0	24
		1	5	22.9	22.9	22.7	1.0	24
		3	0	22.7	23.0	22.8	1.0	24
		3	1	22.8	23.1	22.9	1.0	24
		3	3	22.8	23.0	22.9	1.0	24
		6	0	21.5	22.1	22.0	2.0	23
	64QAM	1	0	21.8	22.0	22.2	2.0	23
		1	3	21.9	22.1	22.3	2.0	23
		1	5	21.8	22.0	22.2	2.0	23
		3	0	21.6	22.0	22.2	2.0	23
		3	1	21.7	22.1	22.2	2.0	23
		3	3	21.7	22.1	22.2	2.0	23
		6	0	20.7	21.2	20.9	3.0	22

Note(s):

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

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LTE Band 5 Measured Results

BW (MHz)	Mode	RB Allocation	RB offset	Maximum Average Power (dBm)			MPR	Tune-up Limit
				Measured Pwr (dBm)				
				[redacted]	20525	[redacted]		
				[redacted]	836.5 MHz	[redacted]		
10 MHz	QPSK	1	0	[redacted]	24.0	[redacted]	0.0	25.5
		1	25	[redacted]	23.9	[redacted]	0.0	25.5
		1	49	[redacted]	23.8	[redacted]	0.0	25.5
		25	0	[redacted]	23.0	[redacted]	1.0	24.5
		25	12	[redacted]	22.9	[redacted]	1.0	24.5
		25	25	[redacted]	22.9	[redacted]	1.0	24.5
		50	0	[redacted]	23.0	[redacted]	1.0	24.5
	16QAM	1	0	[redacted]	22.9	[redacted]	1.0	24.5
		1	25	[redacted]	22.8	[redacted]	1.0	24.5
		1	49	[redacted]	22.7	[redacted]	1.0	24.5
		25	0	[redacted]	21.6	[redacted]	2.0	23.5
		25	12	[redacted]	21.6	[redacted]	2.0	23.5
		25	25	[redacted]	21.5	[redacted]	2.0	23.5
		50	0	[redacted]	21.5	[redacted]	2.0	23.5
	64QAM	1	0	[redacted]	22.3	[redacted]	2.0	23.5
		1	25	[redacted]	22.2	[redacted]	2.0	23.5
		1	49	[redacted]	22.2	[redacted]	2.0	23.5
		25	0	[redacted]	21.6	[redacted]	3.0	22.5
		25	12	[redacted]	21.6	[redacted]	3.0	22.5
		25	25	[redacted]	21.5	[redacted]	3.0	22.5
		50	0	[redacted]	21.5	[redacted]	3.0	22.5

BW (MHz)	Mode	RB Allocation	RB offset	Measured Pwr (dBm)			MPR	Tune-up Limit
				20425	20525	20625		
				826.5 MHz	836.5 MHz	846.5 MHz		
5 MHz	QPSK	1	0	24.1	24.0	23.8	0.0	25.5
		1	12	24.0	23.9	23.8	0.0	25.5
		1	24	24.0	23.9	23.8	0.0	25.5
		12	0	23.1	22.9	22.7	1.0	24.5
		12	7	23.1	22.9	22.7	1.0	24.5
		12	13	23.1	22.9	22.7	1.0	24.5
		25	0	23.1	22.9	22.8	1.0	24.5
	16QAM	1	0	23.6	23.1	22.9	1.0	24.5
		1	12	23.5	23.0	22.8	1.0	24.5
		1	24	23.5	23.0	22.8	1.0	24.5
		12	0	22.3	22.0	21.9	2.0	23.5
		12	7	22.3	22.0	21.9	2.0	23.5
		12	13	22.2	22.0	21.8	2.0	23.5
		25	0	22.2	21.9	21.8	2.0	23.5
	64QAM	1	0	22.4	21.9	22.0	2.0	23.5
		1	12	22.3	21.8	22.0	2.0	23.5
		1	24	22.3	21.9	21.9	2.0	23.5
		12	0	21.1	21.1	20.9	3.0	22.5
		12	7	21.1	21.0	20.8	3.0	22.5
		12	13	21.1	21.0	20.7	3.0	22.5
		25	0	21.1	21.0	20.8	3.0	22.5

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LTE Band 5 Measured Results (continued)

BW (MHz)	Mode	RB Allocation	RB offset	Measured Pwr (dBm)			MPR	Tune-up Limit
				20415	20525	20635		
				825.5 MHz	836.5 MHz	847.5 MHz		
3 MHz	QPSK	1	0	24.0	23.9	23.7	0.0	25.5
		1	8	24.0	23.9	23.8	0.0	25.5
		1	14	24.0	23.9	23.8	0.0	25.5
		8	0	23.0	22.9	22.7	1.0	24.5
		8	4	23.0	22.9	22.7	1.0	24.5
		8	7	23.0	22.9	22.7	1.0	24.5
		15	0	23.0	22.9	22.7	1.0	24.5
	16QAM	1	0	23.1	22.9	23.1	1.0	24.5
		1	8	23.1	22.9	23.1	1.0	24.5
		1	14	23.0	22.8	23.0	1.0	24.5
		8	0	22.1	22.1	21.8	2.0	23.5
		8	4	22.2	22.1	21.8	2.0	23.5
		8	7	22.1	22.1	21.8	2.0	23.5
		15	0	22.0	22.0	21.8	2.0	23.5
	64QAM	1	0	22.2	22.2	22.1	2.0	23.5
		1	8	22.2	22.1	22.0	2.0	23.5
		1	14	22.1	22.1	22.0	2.0	23.5
		8	0	21.1	20.9	20.7	3.0	22.5
		8	4	21.2	20.9	20.8	3.0	22.5
		8	7	21.2	20.9	20.7	3.0	22.5
		15	0	21.1	21.0	20.8	3.0	22.5

BW (MHz)	Mode	RB Allocation	RB offset	Maximum Average Power (dBm)			MPR	Tune-up Limit
				Measured Pwr (dBm)				
				20407	20525	20643		
				824.7 MHz	836.5 MHz	848.3 MHz		
1.4 MHz	QPSK	1	0	23.9	23.9	23.6	0.0	25.5
		1	3	23.9	23.9	23.7	0.0	25.5
		1	5	23.9	23.8	23.6	0.0	25.5
		3	0	23.9	23.8	23.5	0.0	25.5
		3	1	23.9	23.8	23.6	0.0	25.5
		3	3	24.0	23.8	23.6	0.0	25.5
		6	0	22.9	22.8	22.6	1.0	24.5
	16QAM	1	0	23.0	22.9	22.9	1.0	24.5
		1	3	23.0	23.0	23.0	1.0	24.5
		1	5	23.0	22.9	22.9	1.0	24.5
		3	0	23.1	22.9	22.8	1.0	24.5
		3	1	23.2	23.0	22.8	1.0	24.5
		3	3	23.2	23.0	22.8	1.0	24.5
		6	0	22.1	22.0	21.5	2.0	23.5
	64QAM	1	0	22.1	22.0	22.0	2.0	23.5
		1	3	22.1	22.1	22.1	2.0	23.5
		1	5	22.0	22.0	21.9	2.0	23.5
		3	0	22.2	21.9	21.9	2.0	23.5
		3	1	22.0	21.9	22.0	2.0	23.5
		3	3	22.1	22.9	21.9	2.0	23.5
		6	0	21.1	21.2	20.6	3.0	22.5

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 12 Measured Results

BW (MHz)	Mode	RB Allocation	RB offset	Maximum Average Power (dBm)			MPR	Tune-up Limit
				Measured Pwr (dBm)				
				[redacted]	23095	[redacted]		
				[redacted]	707.5 MHz	[redacted]		
10 MHz	QPSK	1	0	[redacted]	23.7	[redacted]	0.0	25
		1	25	[redacted]	23.5	[redacted]	0.0	25
		1	49	[redacted]	23.5	[redacted]	0.0	25
		25	0	[redacted]	22.6	[redacted]	1.0	24
		25	12	[redacted]	22.6	[redacted]	1.0	24
		25	25	[redacted]	22.5	[redacted]	1.0	24
		50	0	[redacted]	22.5	[redacted]	1.0	24
	16QAM	1	0	[redacted]	22.6	[redacted]	1.0	24
		1	25	[redacted]	22.4	[redacted]	1.0	24
		1	49	[redacted]	22.3	[redacted]	1.0	24
		25	0	[redacted]	21.7	[redacted]	2.0	23
		25	12	[redacted]	21.6	[redacted]	2.0	23
		25	25	[redacted]	21.6	[redacted]	2.0	23
		50	0	[redacted]	21.6	[redacted]	2.0	23
	64QAM	1	0	[redacted]	21.9	[redacted]	2.0	23
		1	25	[redacted]	21.7	[redacted]	2.0	23
		1	49	[redacted]	21.6	[redacted]	2.0	23
		25	0	[redacted]	20.8	[redacted]	3.0	22
		25	12	[redacted]	20.8	[redacted]	3.0	22
		25	25	[redacted]	20.7	[redacted]	3.0	22
		50	0	[redacted]	20.7	[redacted]	3.0	22

BW (MHz)	Mode	RB Allocation	RB offset	Measured Pwr (dBm)			MPR	Tune-up Limit
				23035	23095	23155		
				701.5 MHz	707.5 MHz	713.5 MHz		
5 MHz	QPSK	1	0	23.9	23.6	23.5	0.0	25
		1	12	23.8	23.6	23.5	0.0	25
		1	24	23.6	23.6	23.5	0.0	25
		12	0	22.7	22.6	22.4	1.0	24
		12	7	22.7	22.6	22.5	1.0	24
		12	13	22.7	22.5	22.5	1.0	24
		25	0	22.6	22.6	22.4	1.0	24
	16QAM	1	0	22.7	22.6	22.5	1.0	24
		1	12	22.7	22.5	22.5	1.0	24
		1	24	22.6	22.6	22.5	1.0	24
		12	0	21.8	21.7	21.6	2.0	23
		12	7	21.8	21.7	21.6	2.0	23
		12	13	21.8	21.7	21.6	2.0	23
		25	0	21.6	21.6	21.4	2.0	23
	64QAM	1	0	22.0	21.5	21.5	2.0	23
		1	12	21.9	21.5	21.5	2.0	23
		1	24	21.9	21.5	21.5	2.0	23
		12	0	20.7	20.7	20.5	3.0	22
		12	7	20.7	20.7	20.5	3.0	22
		12	13	20.7	20.7	20.5	3.0	22
		25	0	20.7	20.6	20.5	3.0	22

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LTE Band 12 Measured Results (continued)

BW (MHz)	Mode	RB Allocation	RB offset	Measured Pwr (dBm)			MPR	Tune-up Limit
				23025	23095	23165		
				700.5 MHz	707.5 MHz	714.5 MHz		
3 MHz	QPSK	1	0	23.9	23.6	23.5	0.0	25
		1	8	23.9	23.6	23.5	0.0	25
		1	14	23.8	23.5	23.5	0.0	25
		8	0	22.8	22.6	22.5	1.0	24
		8	4	22.8	22.6	22.5	1.0	24
		8	7	22.8	22.6	22.5	1.0	24
		15	0	22.7	22.5	22.5	1.0	24
	16QAM	1	0	22.6	22.5	22.5	1.0	24
		1	8	22.6	22.6	22.5	1.0	24
		1	14	22.6	22.5	22.4	1.0	24
		8	0	21.9	21.6	21.6	2.0	23
		8	4	21.9	21.7	21.6	2.0	23
		8	7	21.9	21.6	21.6	2.0	23
		15	0	21.8	21.5	21.5	2.0	23
	64QAM	1	0	21.7	21.6	21.6	2.0	23
		1	8	21.7	21.6	21.6	2.0	23
		1	14	21.7	21.5	21.5	2.0	23
		8	0	20.9	20.6	20.6	3.0	22
		8	4	20.8	20.7	20.6	3.0	22
		8	7	20.8	20.7	20.6	3.0	22
		15	0	20.7	20.5	20.6	3.0	22

BW (MHz)	Mode	RB Allocation	RB offset	Maximum Average Power (dBm)			MPR	Tune-up Limit
				Measured Pwr (dBm)				
				23017	23095	23173		
				699.7 MHz	707.5 MHz	715.3 MHz		
1.4 MHz	QPSK	1	0	23.7	23.5	23.4	0.0	25
		1	3	23.7	23.5	23.5	0.0	25
		1	5	23.7	23.5	23.4	0.0	25
		3	0	23.5	23.4	23.4	0.0	25
		3	1	23.6	23.5	23.4	0.0	25
		3	3	23.5	23.5	23.5	0.0	25
		6	0	22.7	22.5	22.4	1.0	24
	16QAM	1	0	22.5	22.8	22.8	1.0	24
		1	3	22.6	22.8	22.8	1.0	24
		1	5	22.6	22.8	22.7	1.0	24
		3	0	22.7	22.6	22.6	1.0	24
		3	1	22.7	22.7	22.7	1.0	24
		3	3	22.7	22.7	22.7	1.0	24
		6	0	21.8	21.4	21.4	2.0	23
	64QAM	1	0	21.7	22.4	22.4	2.0	23
		1	3	21.8	22.5	22.5	2.0	23
		1	5	21.7	22.4	22.4	2.0	23
		3	0	21.8	22.6	22.5	2.0	23
		3	1	21.8	22.7	22.6	2.0	23
		3	3	21.8	22.7	22.5	2.0	23
		6	0	21.0	21.5	21.4	3.0	22

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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2. Reduced power Results

LTE Band 4 Measured Results

BW (MHz)	Mode	RB Allocation	RB offset	Hotspot-Reduced Average Power (dBm)					Proximity sensor-Reduced Average Power (dBm)				
				Measured Pwr (dBm)			MPR	Tune-up Limit	Measured Pwr (dBm)			MPR	Tune-up Limit
				[redacted]	20175	[redacted]			[redacted]	20175	[redacted]		
				[redacted]	1732.5 MHz	[redacted]			[redacted]	1732.5 MHz	[redacted]		
20 MHz	QPSK	1	0	[redacted]	18.7	[redacted]	0.0	20	[redacted]	18.7	[redacted]	0.0	20
		1	49	[redacted]	18.6	[redacted]	0.0	20	[redacted]	18.6	[redacted]	0.0	20
		1	99	[redacted]	18.5	[redacted]	0.0	20	[redacted]	18.6	[redacted]	0.0	20
		50	0	[redacted]	18.8	[redacted]	0.0	20	[redacted]	18.8	[redacted]	0.0	20
		50	24	[redacted]	18.7	[redacted]	0.0	20	[redacted]	18.7	[redacted]	0.0	20
		50	50	[redacted]	18.7	[redacted]	0.0	20	[redacted]	18.6	[redacted]	0.0	20
		100	0	[redacted]	18.7	[redacted]	0.0	20	[redacted]	18.7	[redacted]	0.0	20
	16QAM	1	0	[redacted]	19.2	[redacted]	0.0	20	[redacted]	19.2	[redacted]	0.0	20
		1	49	[redacted]	19.1	[redacted]	0.0	20	[redacted]	19.1	[redacted]	0.0	20
		1	99	[redacted]	19.1	[redacted]	0.0	20	[redacted]	19.1	[redacted]	0.0	20
		50	0	[redacted]	18.8	[redacted]	0.0	20	[redacted]	18.8	[redacted]	0.0	20
		50	24	[redacted]	18.8	[redacted]	0.0	20	[redacted]	18.8	[redacted]	0.0	20
		50	50	[redacted]	18.7	[redacted]	0.0	20	[redacted]	18.7	[redacted]	0.0	20
		100	0	[redacted]	18.8	[redacted]	0.0	20	[redacted]	18.8	[redacted]	0.0	20
	64QAM	1	0	[redacted]	19.1	[redacted]	0.0	20	[redacted]	19.2	[redacted]	0.0	20
		1	49	[redacted]	19.0	[redacted]	0.0	20	[redacted]	19.2	[redacted]	0.0	20
		1	99	[redacted]	19.0	[redacted]	0.0	20	[redacted]	19.2	[redacted]	0.0	20
		50	0	[redacted]	18.9	[redacted]	0.0	20	[redacted]	18.9	[redacted]	0.0	20
		50	24	[redacted]	18.8	[redacted]	0.0	20	[redacted]	18.8	[redacted]	0.0	20
		50	50	[redacted]	18.8	[redacted]	0.0	20	[redacted]	18.7	[redacted]	0.0	20
		100	0	[redacted]	18.8	[redacted]	0.0	20	[redacted]	18.8	[redacted]	0.0	20

BW (MHz)	Mode	RB Allocation	RB offset	Measured Pwr (dBm)			MPR	Tune-up Limit	Measured Pwr (dBm)			MPR	Tune-up Limit
				20025	20175	20325			20025	20175	20325		
				1717.5 MHz	1732.5 MHz	1747.5 MHz			1717.5 MHz	1732.5 MHz	1747.5 MHz		
15 MHz	QPSK	1	0	18.6	18.7	18.8	0.0	20	18.5	18.8	18.7	0.0	20
		1	37	18.5	18.6	18.7	0.0	20	18.5	18.6	18.6	0.0	20
		1	74	18.6	18.6	18.6	0.0	20	18.5	18.7	18.6	0.0	20
		36	0	18.6	18.7	18.7	0.0	20	18.6	18.7	18.7	0.0	20
		36	20	18.5	18.7	18.6	0.0	20	18.5	18.7	18.6	0.0	20
		36	39	18.6	18.6	18.7	0.0	20	18.6	18.6	18.6	0.0	20
		75	0	18.6	18.7	18.6	0.0	20	18.6	18.6	18.6	0.0	20
	16QAM	1	0	19.1	18.7	18.9	0.0	20	18.6	19.2	19.2	0.0	20
		1	37	19.0	18.6	19.1	0.0	20	18.5	19.1	19.0	0.0	20
		1	74	19.1	18.6	19.1	0.0	20	18.6	19.1	19.0	0.0	20
		36	0	18.8	18.8	18.8	0.0	20	18.7	18.8	18.8	0.0	20
		36	20	18.7	18.8	18.7	0.0	20	18.6	18.8	18.8	0.0	20
		36	39	18.7	18.7	18.7	0.0	20	18.7	18.7	18.7	0.0	20
		75	0	18.8	18.8	18.7	0.0	20	18.7	18.8	18.7	0.0	20
	64QAM	1	0	18.8	18.9	19.2	0.0	20	19.2	19.2	18.9	0.0	20
		1	37	18.8	19.2	19.1	0.0	20	19.1	19.1	18.8	0.0	20
		1	74	18.8	19.3	19.1	0.0	20	19.2	19.1	18.8	0.0	20
		36	0	18.7	18.8	18.8	0.0	20	18.7	18.8	18.8	0.0	20
		36	20	18.7	18.8	18.7	0.0	20	18.6	18.8	18.7	0.0	20
		36	39	18.8	18.7	18.6	0.0	20	18.7	18.7	18.7	0.0	20
		75	0	18.7	18.8	18.7	0.0	20	18.7	18.8	18.7	0.0	20

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LTE Band 4 Measured Results (continued)

BW (MHz)	Mode	RB Allocation	RB offset	Measured Pwr (dBm)			MPR	Tune-up Limit	Measured Pwr (dBm)			MPR	Tune-up Limit
				20000	20175	20350			20000	20175	20350		
				1715 MHz	1732.5 MHz	1750 MHz			1715 MHz	1732.5 MHz	1750 MHz		
10 MHz	QPSK	1	0	18.4	18.7	18.7	0.0	20	18.4	18.7	18.7	0.0	20
		1	25	18.3	18.6	18.6	0.0	20	18.4	18.6	18.5	0.0	20
		1	49	18.3	18.6	18.6	0.0	20	18.4	18.5	18.5	0.0	20
		25	0	18.5	18.7	18.7	0.0	20	18.5	18.7	18.7	0.0	20
		25	12	18.5	18.7	18.7	0.0	20	18.5	18.7	18.6	0.0	20
		25	25	18.4	18.6	18.7	0.0	20	18.4	18.7	18.6	0.0	20
		50	0	18.5	18.6	18.7	0.0	20	18.5	18.7	18.6	0.0	20
	16QAM	1	0	18.6	19.2	18.7	0.0	20	18.4	18.8	19.1	0.0	20
		1	25	18.5	19.0	18.6	0.0	20	18.4	18.7	19.0	0.0	20
		1	49	18.5	19.0	18.6	0.0	20	18.4	18.7	19.0	0.0	20
		25	0	18.7	18.9	18.8	0.0	20	18.6	18.9	18.8	0.0	20
		25	12	18.7	18.8	18.8	0.0	20	18.6	18.8	18.7	0.0	20
		25	25	18.6	18.8	18.7	0.0	20	18.5	18.8	18.7	0.0	20
		50	0	18.6	18.8	18.8	0.0	20	18.5	18.8	18.7	0.0	20
	64QAM	1	0	19.1	18.8	18.8	0.0	20	19.1	18.8	18.8	0.0	20
		1	25	19.0	18.7	18.8	0.0	20	19.0	18.7	18.7	0.0	20
		1	49	19.0	18.7	18.7	0.0	20	19.0	18.7	18.7	0.0	20
		25	0	18.6	18.9	18.8	0.0	20	18.6	18.9	18.8	0.0	20
		25	12	18.6	18.8	18.7	0.0	20	18.6	18.8	18.7	0.0	20
		25	25	18.6	18.8	18.7	0.0	20	18.6	18.8	18.7	0.0	20
		50	0	18.6	18.8	18.7	0.0	20	18.6	18.8	18.7	0.0	20

BW (MHz)	Mode	RB Allocation	RB offset	Measured Pwr (dBm)			MPR	Tune-up Limit	Measured Pwr (dBm)			MPR	Tune-up Limit
				19975	20175	20375			19975	20175	20375		
				1712.5 MHz	1732.5 MHz	1752.5 MHz			1712.5 MHz	1732.5 MHz	1752.5 MHz		
5 MHz	QPSK	1	0	18.4	18.8	18.7	0.0	20	18.5	18.7	18.6	0.0	20
		1	12	18.3	18.7	18.6	0.0	20	18.4	18.6	18.5	0.0	20
		1	24	18.4	18.7	18.6	0.0	20	18.5	18.7	18.6	0.0	20
		12	0	18.4	18.7	18.6	0.0	20	18.4	18.7	18.6	0.0	20
		12	7	18.4	18.7	18.6	0.0	20	18.4	18.7	18.6	0.0	20
		12	13	18.5	18.6	18.6	0.0	20	18.4	18.6	18.6	0.0	20
		25	0	18.5	18.7	18.6	0.0	20	18.4	18.6	18.6	0.0	20
	16QAM	1	0	19.0	18.9	18.9	0.0	20	18.7	18.9	19.2	0.0	20
		1	12	18.9	18.8	18.8	0.0	20	18.6	18.8	19.1	0.0	20
		1	24	19.0	18.9	18.8	0.0	20	18.7	18.8	19.2	0.0	20
		12	0	18.6	18.8	18.8	0.0	20	18.5	18.8	18.8	0.0	20
		12	7	18.6	18.8	18.7	0.0	20	18.5	18.8	18.8	0.0	20
		12	13	18.7	18.8	18.7	0.0	20	18.6	18.8	18.8	0.0	20
		25	0	18.6	18.8	18.6	0.0	20	18.6	18.7	18.7	0.0	20
	64QAM	1	0	18.4	18.8	19.0	0.0	20	18.4	18.8	19.0	0.0	20
		1	12	18.3	18.8	18.9	0.0	20	18.3	18.7	18.9	0.0	20
		1	24	18.4	18.8	19.0	0.0	20	18.4	18.8	18.9	0.0	20
		12	0	18.5	18.7	18.7	0.0	20	18.4	18.7	18.7	0.0	20
		12	7	18.4	18.7	18.7	0.0	20	18.4	18.7	18.7	0.0	20
		12	13	18.5	18.7	18.7	0.0	20	18.5	18.7	18.7	0.0	20
		25	0	18.6	18.8	18.6	0.0	20	18.6	18.8	18.7	0.0	20

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LTE Band 4 Measured Results (continued)

BW (MHz)	Mode	RB Allocation	RB offset	Measured Pwr (dBm)			MPR	Tune-up Limit	Measured Pwr (dBm)			MPR	Tune-up Limit
				19965	20175	20385			19965	20175	20385		
				1711.5 MHz	1732.5 MHz	1753.5 MHz			1711.5 MHz	1732.5 MHz	1753.5 MHz		
3 MHz	QPSK	1	0	18.4	18.6	18.7	0.0	20	18.4	18.6	18.6	0.0	20
		1	8	18.4	18.7	18.7	0.0	20	18.4	18.6	18.7	0.0	20
		1	14	18.3	18.6	18.6	0.0	20	18.3	18.5	18.5	0.0	20
		8	0	18.4	18.6	18.6	0.0	20	18.3	18.6	18.6	0.0	20
		8	4	18.4	18.7	18.6	0.0	20	18.4	18.6	18.6	0.0	20
		8	7	18.4	18.7	18.6	0.0	20	18.4	18.6	18.5	0.0	20
		15	0	18.4	18.7	18.6	0.0	20	18.4	18.6	18.5	0.0	20
	16QAM	1	0	18.4	18.8	19.1	0.0	20	18.4	18.8	19.0	0.0	20
		1	8	18.4	18.8	19.1	0.0	20	18.4	18.8	19.1	0.0	20
		1	14	18.3	18.7	19.0	0.0	20	18.3	18.7	19.0	0.0	20
		8	0	18.6	18.7	18.7	0.0	20	18.6	18.7	18.7	0.0	20
		8	4	18.6	18.8	18.8	0.0	20	18.5	18.7	18.7	0.0	20
		8	7	18.6	18.8	18.8	0.0	20	18.5	18.8	18.7	0.0	20
		15	0	18.5	18.7	18.7	0.0	20	18.5	18.7	18.7	0.0	20
	64QAM	1	0	19.0	18.7	18.8	0.0	20	18.6	19.2	18.7	0.0	20
		1	8	19.0	18.8	18.8	0.0	20	18.6	18.9	18.7	0.0	20
		1	14	18.9	18.7	18.7	0.0	20	18.5	19.2	18.6	0.0	20
		8	0	18.6	18.8	18.6	0.0	20	18.4	18.9	18.7	0.0	20
		8	4	18.6	18.8	18.7	0.0	20	18.5	18.9	18.7	0.0	20
		8	7	18.6	18.7	18.7	0.0	20	18.4	18.9	18.7	0.0	20
		15	0	18.4	18.7	18.7	0.0	20	18.5	18.7	18.7	0.0	20

BW (MHz)	Mode	RB Allocation	RB offset	Measured Pwr (dBm)			MPR	Tune-up Limit	Measured Pwr (dBm)			MPR	Tune-up Limit
				19957	20175	20393			19957	20175	20393		
				1710.7 MHz	1732.5 MHz	1754.3 MHz			1710.7 MHz	1732.5 MHz	1754.3 MHz		
1.4 MHz	QPSK	1	0	18.3	18.6	18.5	0.0	20	18.3	18.6	18.4	0.0	20
		1	3	18.4	18.7	18.6	0.0	20	18.3	18.6	18.5	0.0	20
		1	5	18.3	18.6	18.5	0.0	20	18.3	18.6	18.4	0.0	20
		3	0	18.4	18.6	18.5	0.0	20	18.3	18.5	18.4	0.0	20
		3	1	18.4	18.7	18.6	0.0	20	18.4	18.6	18.5	0.0	20
		3	3	18.4	18.6	18.6	0.0	20	18.3	18.5	18.5	0.0	20
		6	0	18.3	18.6	18.6	0.0	20	18.2	18.5	18.5	0.0	20
	16QAM	1	0	18.8	18.8	18.7	0.0	20	18.8	18.8	18.6	0.0	20
		1	3	18.8	18.8	18.7	0.0	20	18.8	18.8	18.6	0.0	20
		1	5	18.8	18.9	18.7	0.0	20	18.7	18.8	18.6	0.0	20
		3	0	18.6	18.8	18.8	0.0	20	18.6	18.7	18.7	0.0	20
		3	1	18.7	18.8	18.8	0.0	20	18.6	18.7	18.8	0.0	20
		3	3	18.6	18.8	18.8	0.0	20	18.6	18.7	18.7	0.0	20
		6	0	18.3	18.8	18.8	0.0	20	18.3	18.7	18.7	0.0	20
	64QAM	1	0	18.4	18.7	18.7	0.0	20	18.5	18.6	18.6	0.0	20
		1	3	18.4	18.7	18.7	0.0	20	18.6	18.6	18.6	0.0	20
		1	5	18.3	18.7	18.7	0.0	20	18.5	18.7	18.6	0.0	20
		3	0	18.6	18.7	18.6	0.0	20	18.4	18.8	18.6	0.0	20
		3	1	18.6	18.8	18.6	0.0	20	18.4	18.9	18.7	0.0	20
		3	3	18.6	18.8	18.6	0.0	20	18.4	18.8	18.7	0.0	20
		6	0	18.4	18.6	18.6	0.0	20	18.4	18.6	18.5	0.0	20

Note(s):

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

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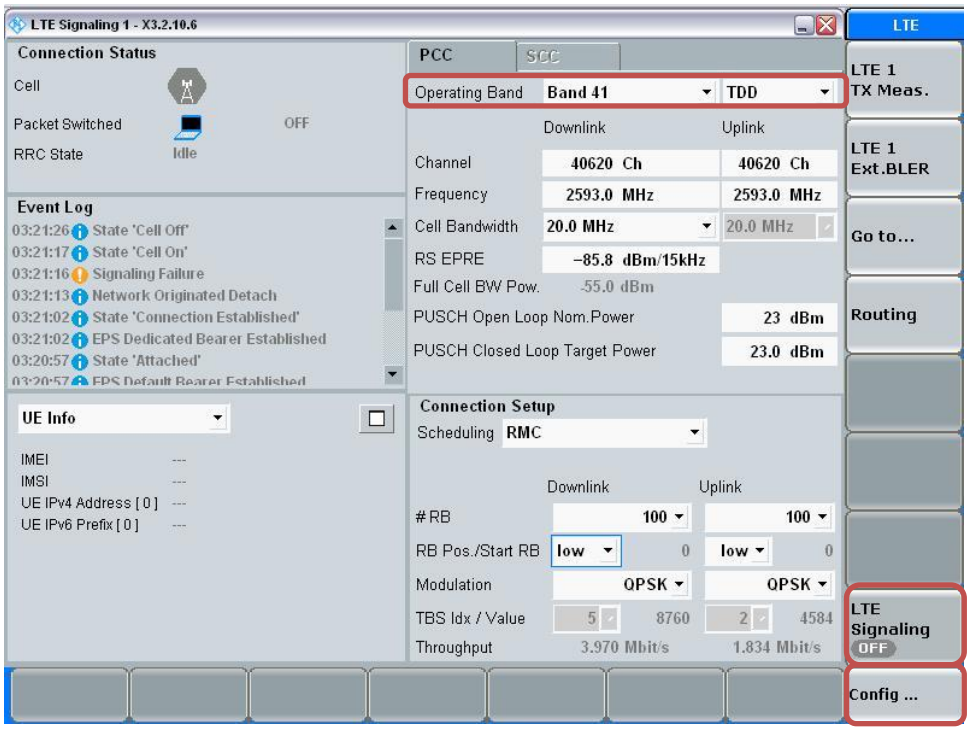
LTE Band TDD Measured Results

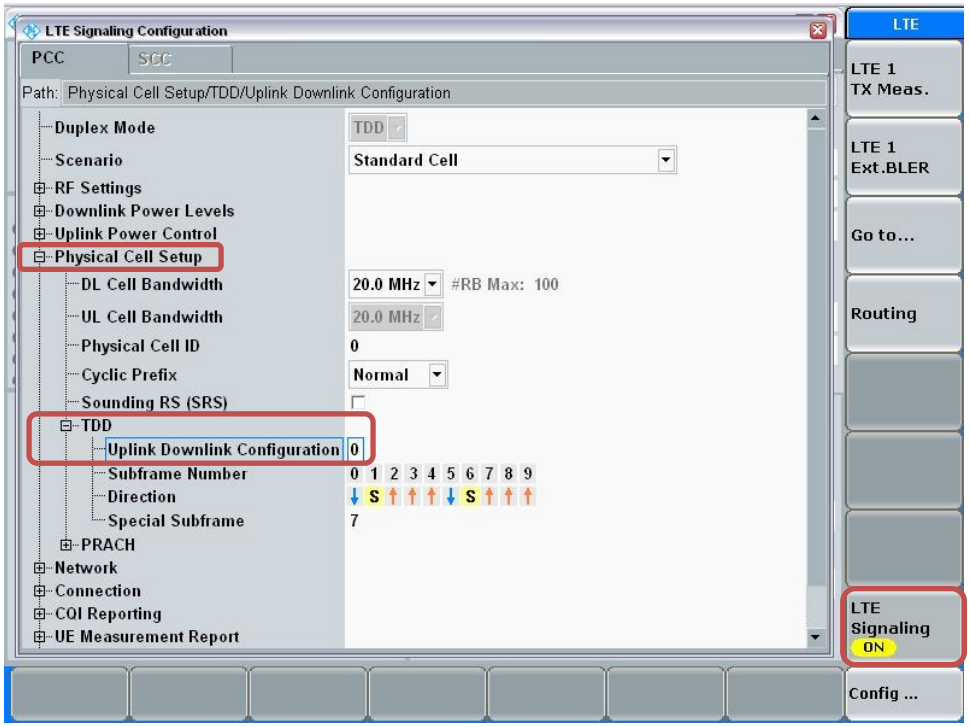
Procedure used to establish SAR test signal for LTE TDD Band

Set to CMW-500 with following parameters:

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



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



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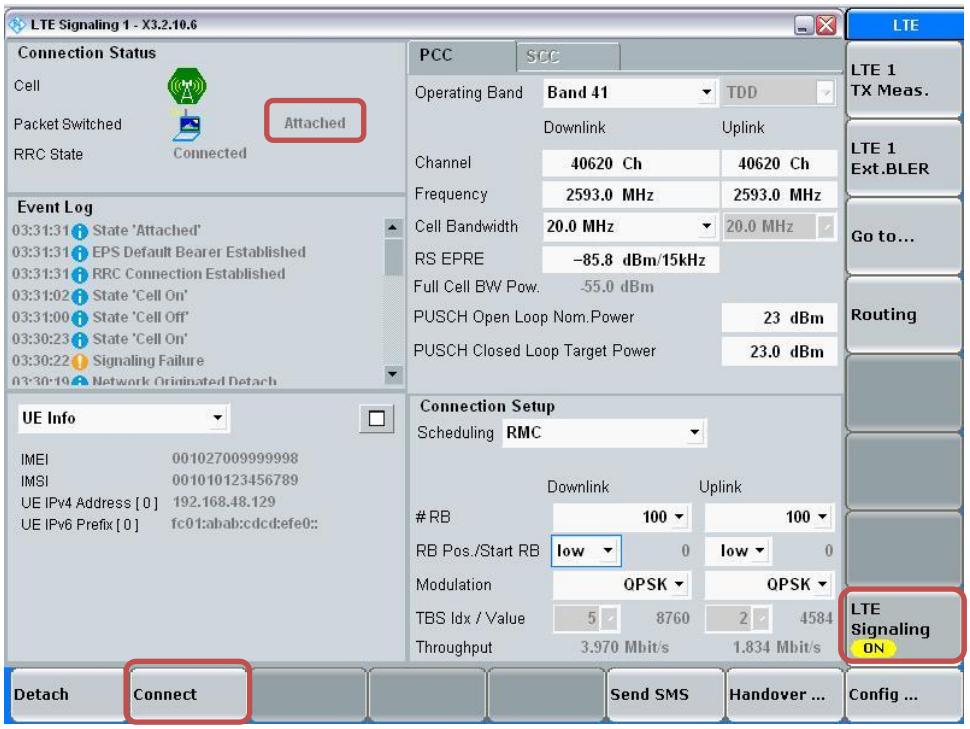
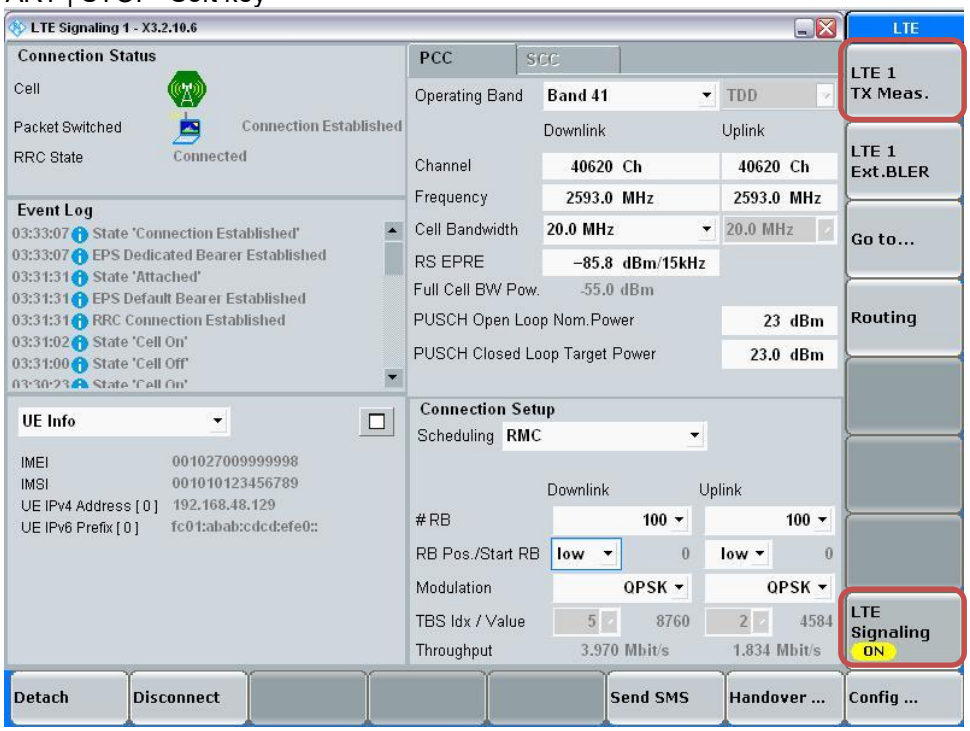
Connect to EUT

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



Max Power Setting

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



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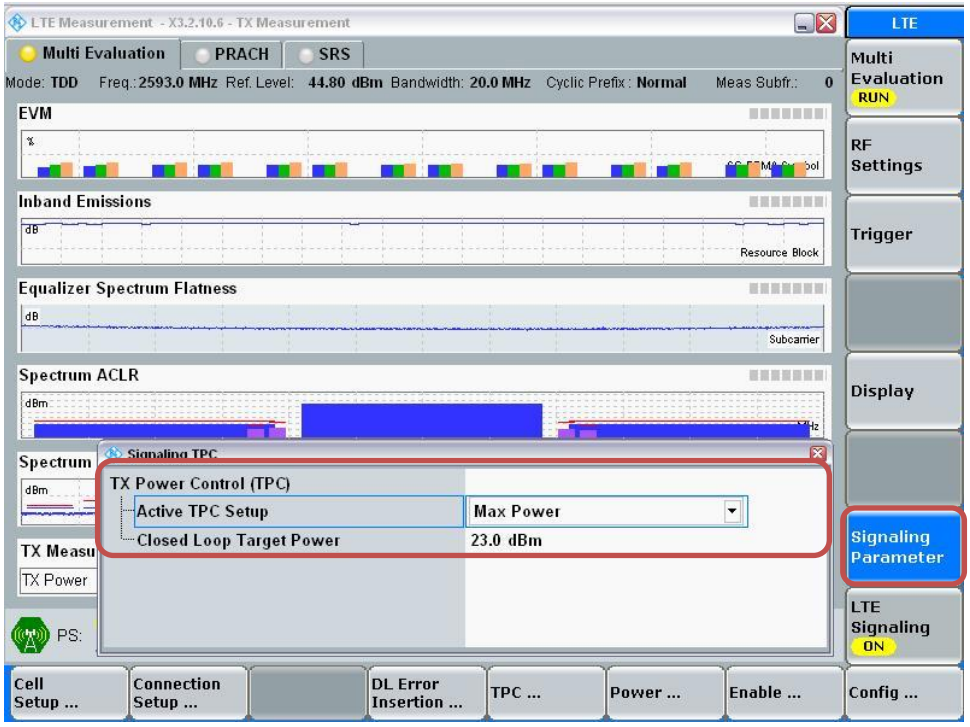
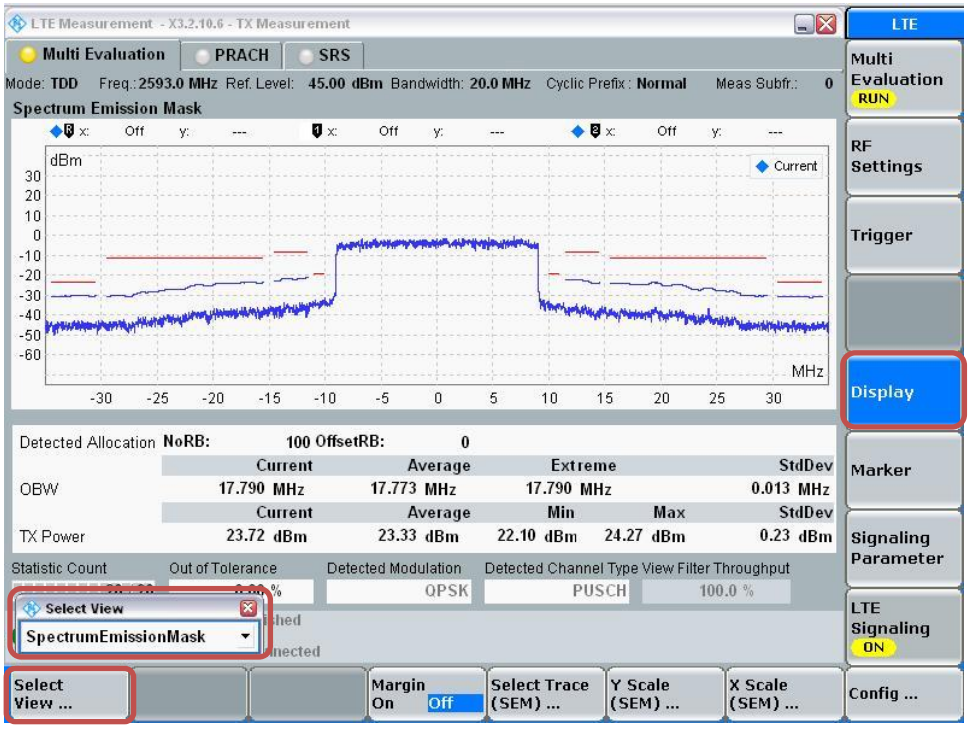
- Select “Signaling Parameter”
- Select “TX Power Control (TPC)” > Select “Active TPC Setup” to “Max Power” > Set “Closed Loop Target Power” to “23 dBm”



View TX Power

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



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LTE Band 41 Measured Results

BW (MHz)	Mode	RB Allocation	RB offset	Maximum Average Power (dBm)			MPR	Tune-up Limit
				Measured Pwr (dBm)				
				40340	40740	41140		
				2565 MHz	2605 MHz	2645 MHz		
20 MHz	QPSK	1	0	23.9	23.5	23.3	0.0	24.5
		1	49	23.7	23.3	23.1	0.0	24.5
		1	99	24.0	23.3	23.0	0.0	24.5
		50	0	22.6	22.4	22.4	1.0	23.5
		50	24	22.6	22.5	22.3	1.0	23.5
		50	50	22.7	22.4	22.3	1.0	23.5
		100	0	22.6	22.4	22.3	1.0	23.5
	16QAM	1	0	22.9	22.5	22.3	1.0	23.5
		1	49	22.6	22.3	22.1	1.0	23.5
		1	99	22.5	22.3	22.0	1.0	23.5
		50	0	21.7	21.5	21.6	2.0	22.5
		50	24	21.6	21.5	21.5	2.0	22.5
		50	50	21.5	21.4	21.5	2.0	22.5
		100	0	21.6	21.5	21.4	2.0	22.5
	64QAM	1	0	21.9	21.9	21.4	2.0	22.5
		1	49	21.6	21.7	21.2	2.0	22.5
		1	99	21.5	21.7	21.1	2.0	22.5
		50	0	20.7	20.5	20.6	3.0	21.5
		50	24	20.7	20.5	20.5	3.0	21.5
		50	50	20.6	20.4	20.4	3.0	21.5
		100	0	20.7	20.5	20.4	3.0	21.5
BW (MHz)	Mode	RB Allocation	RB offset	Measured Pwr (dBm)			MPR	Tune-up Limit
				40315	40740	41165		
				2562.5 MHz	2605 MHz	2647.5 MHz		
15 MHz	QPSK	1	0	23.9	23.3	23.2	0.0	24.5
		1	37	23.7	23.2	23.0	0.0	24.5
		1	74	23.5	23.2	22.9	0.0	24.5
		36	0	22.7	22.4	22.2	1.0	23.5
		36	20	22.7	22.5	22.2	1.0	23.5
		36	39	22.6	22.3	22.1	1.0	23.5
		75	0	22.6	22.4	22.2	1.0	23.5
	16QAM	1	0	22.8	22.3	22.3	1.0	23.5
		1	37	22.5	22.3	22.2	1.0	23.5
		1	74	22.5	22.2	22.2	1.0	23.5
		36	0	21.7	21.4	21.3	2.0	22.5
		36	20	21.7	21.5	21.3	2.0	22.5
		36	39	21.6	21.4	21.2	2.0	22.5
		75	0	21.7	21.5	21.3	2.0	22.5
	64QAM	1	0	22.1	21.3	20.9	2.0	22.5
		1	37	21.8	21.2	20.8	2.0	22.5
		1	74	21.7	21.1	20.7	2.0	22.5
		36	0	20.9	20.4	20.4	3.0	21.5
		36	20	20.8	20.5	20.4	3.0	21.5
		36	39	20.7	20.4	20.3	3.0	21.5
		75	0	20.7	20.5	20.3	3.0	21.5

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LTE Band 41 Measured Results (continued)

BW (MHz)	Mode	RB Allocation	RB offset	Measured Pwr (dBm)			MPR	Tune-up Limit
				40290	40740	41190		
				2560 MHz	2605 MHz	2650 MHz		
10 MHz	QPSK	1	0	23.9	23.3	23.1	0.0	24.5
		1	25	23.7	23.3	23.0	0.0	24.5
		1	49	23.7	23.3	22.9	0.0	24.5
		25	0	22.2	21.9	21.8	1.0	23.5
		25	12	22.2	21.9	21.7	1.0	23.5
		25	25	22.1	21.8	21.6	1.0	23.5
		50	0	22.1	21.9	21.6	1.0	23.5
	16QAM	1	0	22.9	22.4	22.4	1.0	23.5
		1	25	22.7	22.3	22.2	1.0	23.5
		1	49	22.6	22.3	22.1	1.0	23.5
		25	0	21.7	21.5	21.4	2.0	22.5
		25	12	21.7	21.5	21.4	2.0	22.5
		25	25	21.6	21.4	21.3	2.0	22.5
		50	0	21.7	21.5	21.4	2.0	22.5
	64QAM	1	0	22.1	21.4	20.9	2.0	22.5
		1	25	21.8	21.3	20.8	2.0	22.5
		1	49	21.7	21.4	20.7	2.0	22.5
		25	0	20.7	20.4	20.4	3.0	21.5
		25	12	20.7	20.4	20.4	3.0	21.5
		25	25	20.6	20.3	20.3	3.0	21.5
		50	0	20.6	20.4	20.3	3.0	21.5

BW (MHz)	Mode	RB Allocation	RB offset	Maximum Average Power (dBm)			MPR	Tune-up Limit
				Measured Pwr (dBm)				
				40265	40740	41215		
				2557.5 MHz	2605 MHz	2652.5 MHz		
5 MHz	QPSK	1	0	23.8	23.4	23.0	0.0	24.5
		1	12	23.7	23.3	23.1	0.0	24.5
		1	24	23.6	23.4	23.0	0.0	24.5
		12	0	22.8	22.4	22.2	1.0	23.5
		12	7	22.8	22.4	22.2	1.0	23.5
		12	13	22.7	22.4	22.2	1.0	23.5
		25	0	22.6	22.4	22.2	1.0	23.5
	16QAM	1	0	22.7	22.4	22.3	1.0	23.5
		1	12	22.6	22.3	22.4	1.0	23.5
		1	24	22.5	22.3	22.3	1.0	23.5
		12	0	21.8	21.4	21.4	2.0	22.5
		12	7	21.8	21.3	21.4	2.0	22.5
		12	13	21.7	21.4	21.4	2.0	22.5
		25	0	21.6	21.5	21.4	2.0	22.5
	64QAM	1	0	21.9	21.1	21.7	2.0	22.5
		1	12	21.8	21.0	21.7	2.0	22.5
		1	24	21.7	21.0	21.6	2.0	22.5
		12	0	20.7	20.4	20.4	3.0	21.5
		12	7	20.7	20.4	20.4	3.0	21.5
		12	13	20.6	20.4	20.4	3.0	21.5
		25	0	20.6	20.5	20.3	3.0	21.5

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9.4.1 LTE Rel.11 Carrier Aggregation

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

For inter-band carrier aggregation with uplink assigned to one E-UTRA band (Table 5.6A-1), the requirement in subclause 6.2.3 apply.

For inter-band carrier aggregation with one component carrier per operating band and the uplink active in two E-UTRA bands, the requirements in subclause 6.2.3 apply for each uplink component carrier.

For inter-band contiguous carrier aggregation the allowed Maximum Power Reduction (MPR) for the maximum output power applicable to the DUT in the table below. In case the modulation format is different on different component carriers the MPR is determined by the rules applied to higher order of those modulations.

Modulation	CA bandwidth Class B and C / Smallest Component Carrier Transmission Bandwidth Configuration				MPR (dB)
	25 RB	50 RB	75 RB	100 RB	
QPSK	> 8 and ≤ 25	> 12 and ≤ 50	> 16 and ≤ 75	> 18 and ≤ 100	≤ 1
QPSK	> 25	> 50	> 75	> 100	≤ 2
16 QAM	≤ 8	≤ 12	≤ 16	≤ 18	≤ 1
16 QAM	> 8 and ≤ 25	> 12 and ≤ 50	> 16 and ≤ 75	> 18 and ≤ 100	≤ 2
16 QAM	> 25	> 50	> 75	> 100	≤ 3
64 QAM	≤ 8 and allocation wholly contained within a single CC	≤ 12 and allocation wholly contained within a single CC	≤ 16 and allocation wholly contained within a single CC	≤ 18 and allocation wholly contained within a single CC	≤ 2
64 QAM	> 8 or allocation extends across two CC's	> 12 or allocation extends across two CC's	> 16 or allocation extends across two CC's	> 18 or allocation extends across two CC's	≤ 3

For PUCCH and SRS transmissions, the allowed MPR is according to that specified for PUSCH QPSK modulation for the corresponding transmission bandwidth.

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For intra-band contiguous carrier aggregation bandwidth class C with non-contiguous resource allocation, the allowed Maximum Power Reduction (MPR) for the maximum output power in Table 6.2.2A-1 is specified as follows

$$MPR = CEIL\ \{\min(M_A, M_{IM5}), 0.5\}$$

Where M_A is defined as follows

$M_A =$	8.2	;$0 \le A < 0.025$
	9.2 – 40A	;$0.025 \le A < 0.05$
	8 – 16A	;$0.05 \le A < 0.25$
	4.83 – 3.33A	;$0.25 \le A \le 0.4$
	3.83 – 0.83A	;$0.4 \le A \le 1$

and M_{IM5} is defined as follows

$M_{IM5} =$	4.5	; $\Delta_{IM5} < 1.5 * BW_{Channel_CA}$
	6.0	; $1.5 * BW_{Channel_CA} \le \Delta_{IM5} < BW_{Channel_CA}/2 + \Delta f_{ooB}$
	M_A	; $\Delta_{IM5} \ge BW_{Channel_CA}/2 + \Delta f_{ooB}$

Where

$A = N_{RB_alloc} / N_{RB_agg}$

$\Delta_{IM5} = \max(\left| F_{C_agg} - (3*F_{agg_alloc_low} - 2*F_{agg_alloc_high}) \right|, \left| F_{C_agg} - (3*F_{agg_alloc_high} - 2*F_{agg_alloc_low}) \right|)$

CEIL{M_A, 0.5} means rounding upwards to closest 0.5dB, i.e. MPR ∈ [3.0, 3.5, 4.0, 4.5, 5.0, 5.5, 6.0, 6.5, 7.0, 7.5, 8.0, 8.5]

For intra-band carrier aggregation, the MPR is evaluated per slot and given by the maximum value taken over the transmission(s) on all component carriers within the slot; the maximum MPR over the two slots is then applied for the entire subframe.

For intra-band non-contiguous carrier aggregation with one uplink carrier on the PCC, the requirements in the subclause 6.2.3 apply. For intra-band non-contiguous aggregation with two uplink carriers the MPR is defined tfor those E-UTRA bands where maximum possible $W_{GAP} \le 42.2$ MHz as follows

$$MPR = CEIL\{M_A, 0.5\}$$

Where M_N is defined as follows

$M_N =$	-0.125N + 18.25	; $2 \le N \le 50$
	-0.0333 N + 13.67	; $50 < N \le 200$

Where $N = N_{RB_alloc}$ is the number of allocated resource blocks.

For the UE maximum output power modified by MPR, the power limits specified in subclause 6.2.5A apply.

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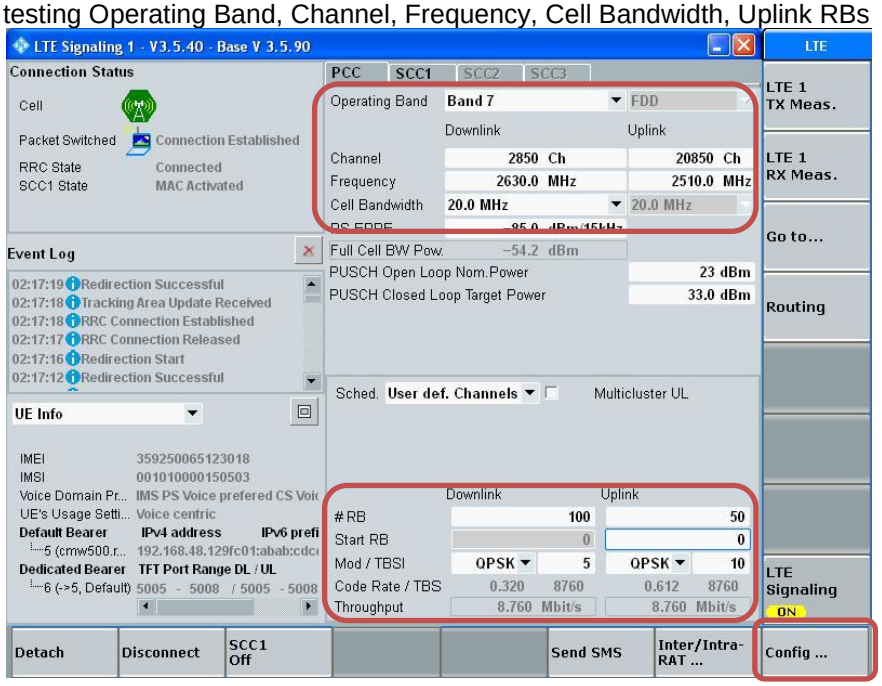
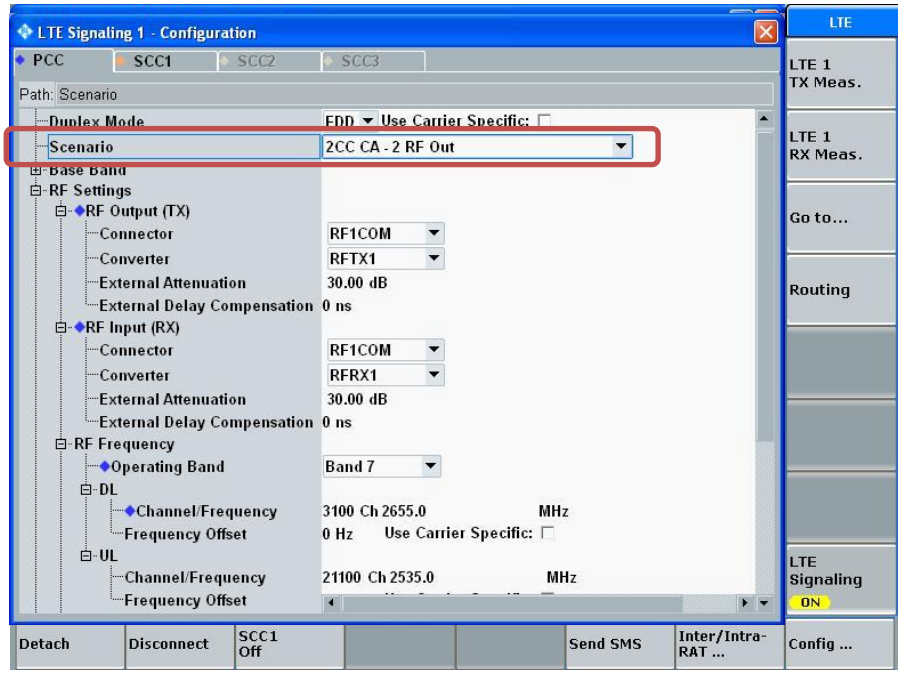
LTE Carrier Aggregation Test Signal Set-up Procedure

(Use normal LTE set-up procedure in addition with the following steps)

Set to CMW-500 with following parameters:

- PCC tab:
  - Select the testing Operating Band, Channel, Frequency, Cell Bandwidth, Uplink RBs
- 

- Go to “Config….”
- Go to “Scenario”
- Set to “2CC CA – 2 RF Out”



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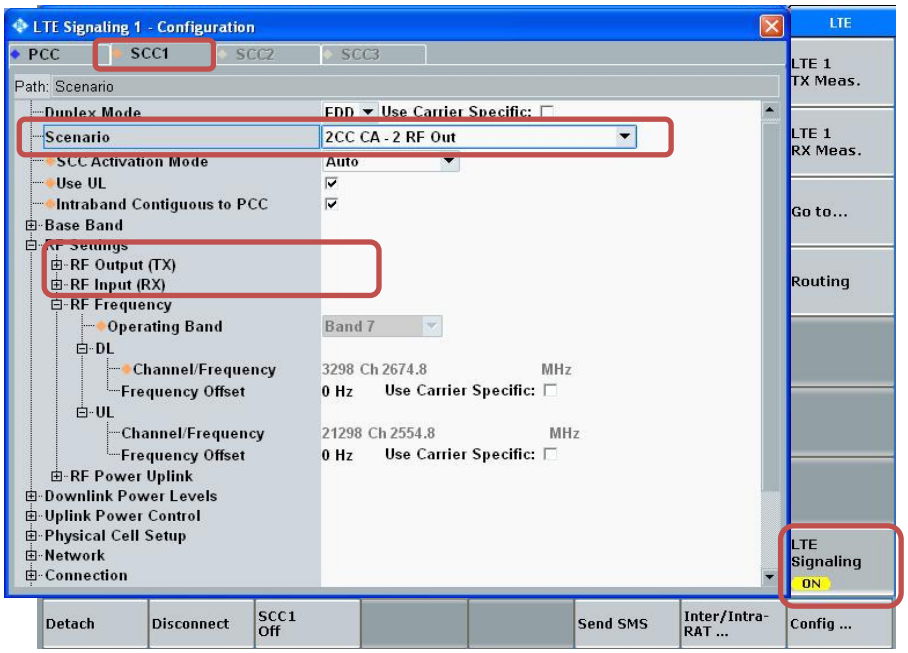
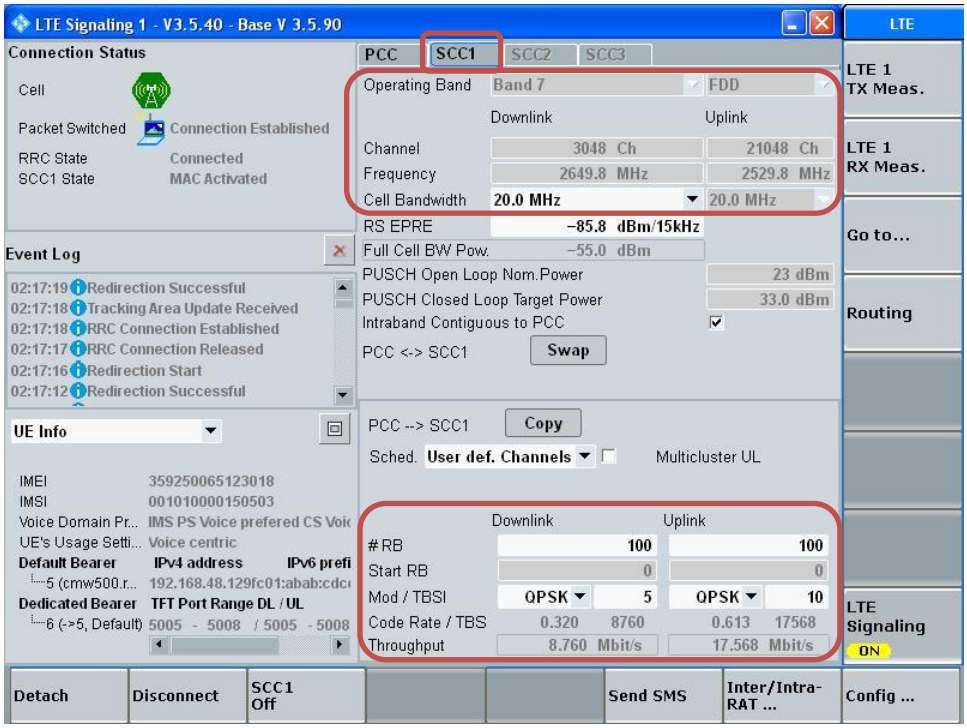
- Select “SCC1” tab
- Go to “Scenario”
- Set to “2CC CA – 2 RF Out”
- Enable “Use UL”
- Enable “Intraband Contiguous to PCC”
- Select “LTE Signaling” button



- Select “SCC1” tab
  - Select the testing Cell Bandwidth, Uplink RBs



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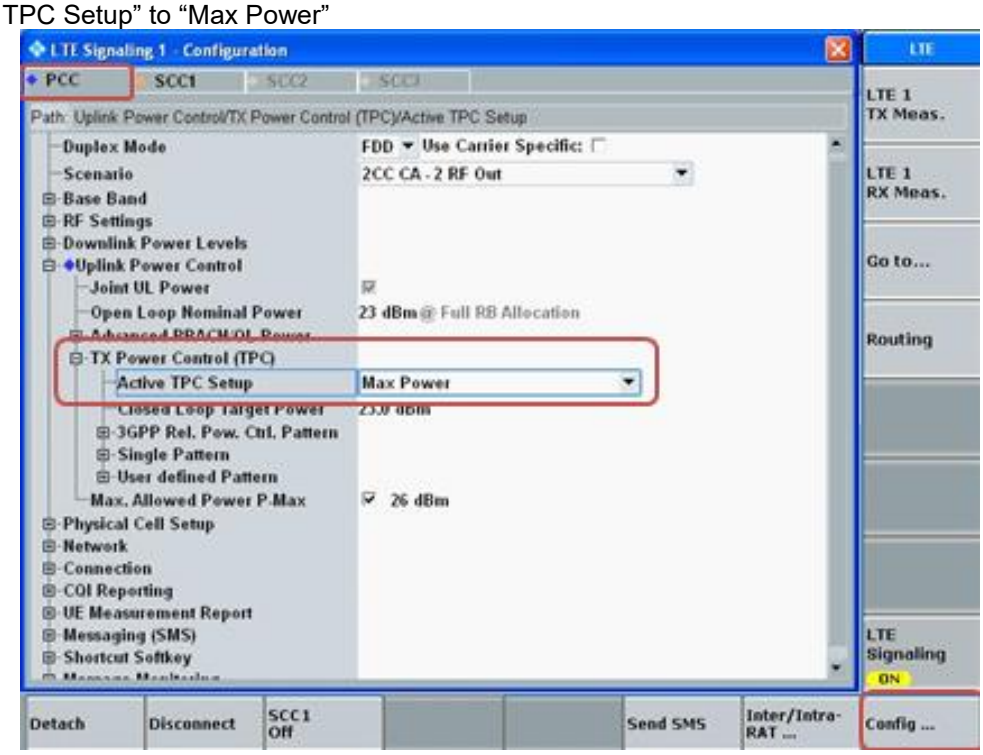
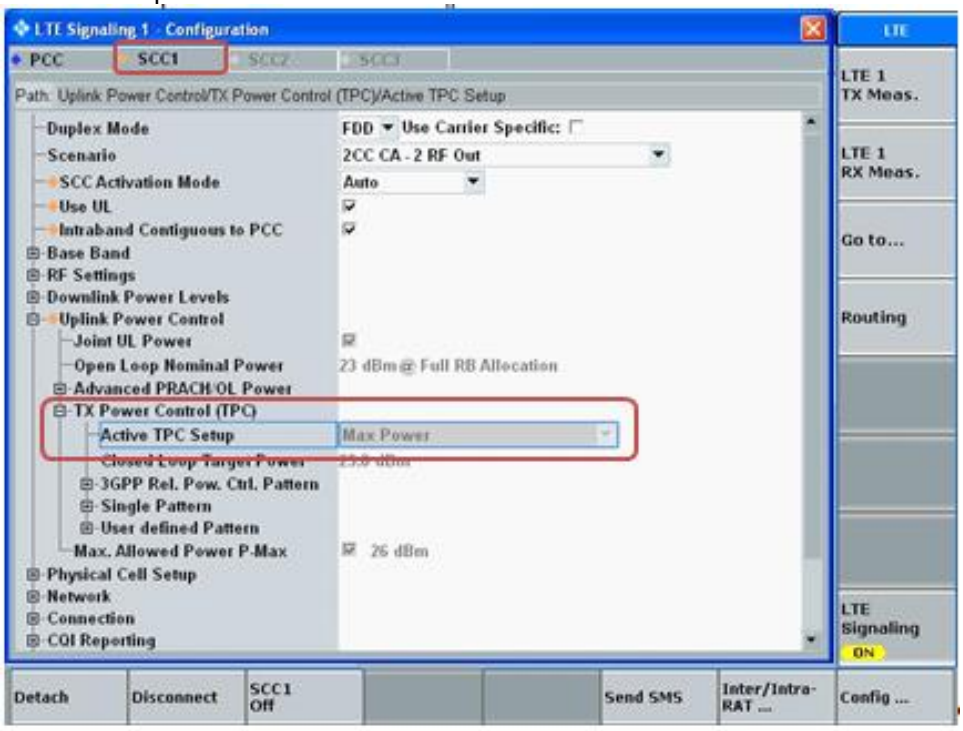
Max Power Setting

- Select “Config …” button
- Select PCC tab
- Set “Active TPC Setup” to “Max Power”



- Select SCC1 tab
- Verify that “Active TPC Setup” is set to “Max Power”



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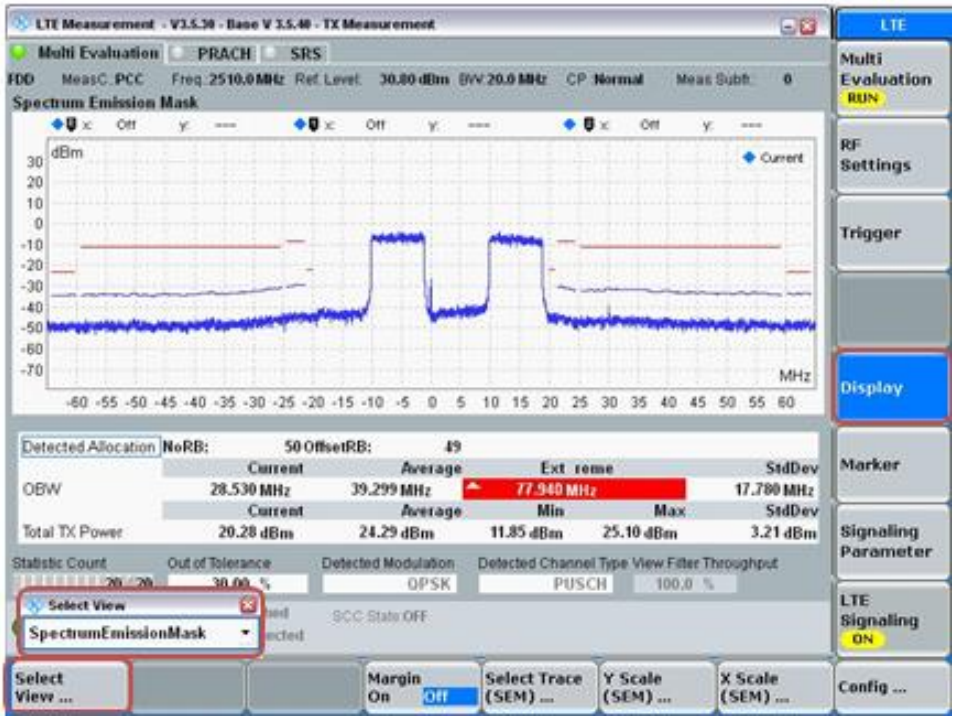
View TX Power

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



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LTE Carrier Aggregation Up Link Combinations;

According to the TCB workshop (Nov. 2017), Maximum output power measurement is required for each UL CA configuration for the required test channels described in KDB 941225 D05. The required test channel should be associated with the UL PCC. And the SCC and subsequent CC must use configurations similar to the PCC to establish conservative or worst case equivalent SAR test conditions.

The detail of the UL CA configurations corresponding to the maximum output power conditions specified are mentioned in the power table for the CC combinations, including aggregated BW, RB allocation and offset per CC, modulation, MPR conditions with respect to RB allocation and offsets across the CCs

LTE-uplink 2CA Band 41 for SAR testing

E-UTRA CA configurations	PWR Back-off	Bands		DL						UL																	LTE Rel.8 Power (dBm)	Delta
		PCC	SCC	PCC			SCC			PCC						SCC						MPR	PCC+SCC					
		1st	2nd	BW	Freq	Ch	BW	Freq	Ch	Mod	RB	Offset	BW	Freq	Ch	Mod	RB	Offset	BW	Freq	Ch		Aggregated BW	Tune-Up Limit	CA power (total PCC+SCC)	3GPP Rel.#		
CA_41C (0)	Off	41C	41C	20	2565.0	40340	20	2584.8	40538	QPSK	1	99	20	2565.0	40340	QPSK	1	0	20	2584.8	40538	0	40	24.5	23.5	12	24.0	-0.5
		41C	41C	20	2605.0	40740	20	2585.2	40542	QPSK	1	0	20	2605.0	40740	QPSK	1	99	20	2585.2	40542	0	40	24.5	23.2	12	23.5	-0.3
		41C	41C	20	2645.0	41140	20	2625.2	40942	QPSK	1	0	20	2645.0	41140	QPSK	1	99	20	2625.2	40942	0	40	24.5	23.0	12	23.3	-0.3

Note(s):

Both UL CA SAR is measured at yellow highlight configurations according to standalone SAR configurations.
Standalone SAR configurations and output power results are reference to section. 10.9.

LTE Carrier Aggregation Down Link Combinations;

The DL CA power measurement conditions for various CC's combinations were determined according LTE DL CA SAR Test Exclusion guidance in TCB workshop note (April 2018). Only yellow highlighted cells need power measurement. The following power measurements were performed with a single carrier uplink; CA for this particular project only supports one (1) uplink and up to three (3) downlinks.

LTE Release 10 Carrier Aggregation

Index	2CC	Restriction	Completely Covered by Measurement Supersrt	Reverse
2CC #1	41A-41A			-
2CC #2	41C			-

Index	3CC	Restriction	Completely Covered by Measurement Supersrt	Reverse
3CC #1	41D			-

DL CA Measured Results

E-UTRA CA configutation (BCS)		Bands			UL					DL									LTE Rel 8 Tx. Power [dBm]	LTE Rel 10 Tx. Power [dBm]	Delta
		PCC	SCC1	SCC2	PCC					PCC			SCC1			SCC2					
		1st	2nd	3rd	Mode	BW (MHz)	Channel	Freq. (MHz)	RB/Offset	BW (MHz)	Channel	Freq. (MHz)	BW (MHz)	Channel	Freq. (MHz)	BW (MHz)	Channel	Freq. (MHz)			
Intra Non-contiguous	41A-41A	41A	41A		QPSK	20	40340	2565	1/99	20	40340	2565	20	41140	2645.0				24.0	23.8	-0.2
Intra Contiguous	41C	41C	41C		QPSK	20	40340	2565	1/99	20	40340	2565	20	40538	2584.8				24.0	23.8	-0.2
	41D	41D	41D	41D	QPSK	20	40340	2565	1/99	20	40340	2565	20	40538	2584.8	20	40736	2604.6	24.0	23.8	-0.2

Note:

1_Per KDB 941225 D05A LTE Rel. 10 KDB Inquiry Sheet: SAR is excluded for Carrier Aggregation when measured power does not exceed LTE Release 8 by more than a 1/4 dB.

2_When the same frequency band is used for both contiguous and non-contiguous in DL CA Intra band, power was measured using the configuration with the largest aggregated bandwidth and maximum output power among the contiguous and non-contiguous in DL CA Intra band configurations

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9.5 Wi-Fi 2.4 GHz (DTS Band)

Measured Results

Antenna	Band (GHz)	Mode	Data Rate	Ch #	Freq. (MHz)	Maximum Average Power (dBm)			Reduced Average Power (dBm)		
						Meas Pwr	Tune-up Limit	SAR Test (Yes/No)	Meas Pwr	Tune-up Limit	SAR Test (Yes/No)
WLAN Ant.1	2.4	802.11b	1 Mbps	1	2412.0	18.1	19.0	Yes	11.9	12.0	Yes
				6	2437.0	17.7			11.5		
				11	2462.0	17.8			11.4		
				12	2467.0	7.0	8.0	No	7.0	8.0	No
				13	2472.0	7.0			7.0		
		802.11g	6 Mbps	1	2412.0	Not Required	17.5	No	Not Required	12.0	No
				6	2437.0						
				11	2462.0						
				12	2467.0		8.0			8.0	
				13	2472.0						
		802.11n (HT20)	6.5 Mbps	1	2412.0	Not Required	17.5	No	Not Required	12.0	No
				6	2437.0						
				11	2462.0						
				12	2467.0		7.0			7.0	
				13	2472.0						

Antenna	Band (GHz)	Mode	Data Rate	Ch #	Freq. (MHz)	Maximum Average Power (dBm)			Reduced Average Power (dBm)		
						Meas Pwr	Tune-up Limit	SAR Test (Yes/No)	Meas Pwr	Tune-up Limit	SAR Test (Yes/No)
WLAN Ant.2	2.4	802.11b	1 Mbps	1	2412.0	18.9	19.0	Yes	11.8	12.0	Yes
				6	2437.0	17.9			10.9		
				11	2462.0	17.9			10.9		
				12	2467.0	6.9	8.0	No	6.9	8.0	No
				13	2472.0	6.9			6.9		
		802.11g	6 Mbps	1	2412.0	Not Required	17.5	No	Not Required	12.0	No
				6	2437.0						
				11	2462.0						
				12	2467.0		8.0			8.0	
				13	2472.0						
		802.11n (HT20)	6.5 Mbps	1	2412.0	Not Required	17.5	No	Not Required	12.0	No
				6	2437.0						
				11	2462.0						
				12	2467.0		7.0			7.0	
				13	2472.0						

Note(s):

1. SAR is not required for 802.11g/n modes when the adjusted SAR for 802.11b is < 1.2 W/kg.
2. 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 measurements were not deemed necessary.
3. 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. Refer to §6.3.

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

Measured Results

Antenna	Band (GHz)	Mode	Data Rate	Ch #	Freq. (MHz)	Maximum Average Power (dBm)			Reduced Average Power (dBm)		
						Meas Pwr	Tune-up Limit	SAR Test (Yes/No)	Meas Pwr	Tune-up Limit	SAR Test (Yes/No)
WLAN Ant.1	5.3 (U-NII 2A)	802.11a	6 Mbps	52	5260.0	16.2	16.5	Yes	Not Required	12.0	No
				56	5280.0	16.1					
				60	5300.0	15.9					
				64	5320.0	15.9					
		802.11n (HT20)	6.5 Mbps	52	5260.0	16.0	16.5	No	Not Required	12.0	No
				56	5280.0	15.8					
				60	5300.0	15.7					
				64	5320.0	15.7					
		802.11n (HT40)	13.5 Mbps	54	5270.0	Not Required	15.0	No	Not Required	12.0	No
				62	5310.0						
		802.11ac (VHT20)	6.5 Mbps	52	5260.0	15.8	16.5	No	Not Required	12.0	No
				56	5280.0	15.6					
				60	5300.0	15.6					
				64	5320.0	15.5					
		802.11ac (VHT40)	13.5 Mbps	54	5270.0	Not Required	15.0	No	Not Required	12.0	No
				62	5310.0						
		802.11ac (VHT80)	29.3 Mbps	58	5290.0	Not Required	14.0	No	11.7	12.0	Yes
	5.5 (U-NII 2C)	802.11a	6 Mbps	100	5500.0	Not Required	14.5	No	Not Required	12.0	No
				120	5600.0						
				124	5620.0						
				144	5720.0						
		802.11n (HT20)	6.5 Mbps	100	5500.0	Not Required	14.5	No	Not Required	12.0	No
				120	5600.0						
				124	5620.0						
				144	5720.0						
		802.11n (HT40)	13.5 Mbps	102	5510.0	15.6	16.0	Yes	Not Required	12.0	No
				118	5590.0	15.4					
				126	5630.0	15.3					
				142	5710.0	15.5					
		802.11ac (VHT20)	6.5 Mbps	100	5500.0	Not Required	14.5	No	Not Required	12.0	No
				120	5600.0						
				124	5620.0						
				144	5720.0						
		802.11ac (VHT40)	13.5 Mbps	102	5510.0	15.5	16.0	No	Not Required	12.0	No
				118	5590.0	15.2					
				126	5630.0	15.2					
				142	5710.0	15.3					
		802.11ac (VHT80)	29.3 Mbps	106	5530.0	Not Required	14.0	No	11.6	12.0	Yes
				122	5610.0				11.1		
				138	5690.0				11.5		
	5.8 (U-NII 3)	802.11a	6 Mbps	149	5745.0	Not Required	16.0	No	Not Required	12.0	No
				157	5785.0						
				165	5825.0						
		802.11n (HT20)	6.5 Mbps	149	5745.0	Not Required	16.0	No	Not Required	12.0	No
				157	5785.0						
				165	5825.0						
		802.11n (HT40)	13.5 Mbps	151	5755.0	15.5	16.0	Yes	Not Required	12.0	No
				159	5795.0	15.7					
		802.11ac (VHT20)	6.5 Mbps	149	5745.0	Not Required	16.0	No	Not Required	12.0	No
				157	5785.0						
				165	5825.0						
		802.11ac (VHT40)	13.5 Mbps	151	5755.0	15.3	16.0	No	Not Required	12.0	No
				159	5795.0	15.6					
		802.11ac (VHT80)	29.3 Mbps	155	5775.0	Not Required	14.0	No	11.9	12.0	Yes

Note(s):

1. For "Not required", SAR Test reduction was applied from KDB 248227 guidance, Sec. 2.1, b), 1) when the same maximum power is specified for multiple transmission modes in a frequency band, the largest channel bandwidth, lowest order modulation, lowest data rate and lowest order 802.11a/g/n/ac mode is used for SAR measurement, on the highest measured output power channel in the initial test configuration, for each frequency band.
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/ax modes, the channel in the lower order/sequence 802.11 mode (i.e. a, g, n ac) is selected.
3. When UNII band 2A's specified maximum output power is higher or same than UNII band 1, 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 1
   - > 1.2 W/kg, both bands should be tested independently for SAR.

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Measured Results

Antenna	Band (GHz)	Mode	Data Rate	Ch #	Freq. (MHz)	Maximum Average Power (dBm)			Reduced Average Power (dBm)		
						Meas Pwr	Tune-up Limit	SAR Test (Yes/No)	Meas Pwr	Tune-up Limit	SAR Test (Yes/No)
WLAN Ant.2	5.3 (U-NII 2A)	802.11a	6 Mbps	52	5260.0	15.8	16.5	Yes	Not Required	12.0	No
				56	5280.0	15.7					
				60	5300.0	15.5					
				64	5320.0	15.6					
		802.11n (HT20)	6.5 Mbps	52	5260.0	15.5	16.5	No	Not Required	12.0	No
				56	5280.0	15.5					
				60	5300.0	15.3					
				64	5320.0	15.3					
		802.11n (HT40)	13.5 Mbps	54	5270.0	Not Required	15.0	No	Not Required	12.0	No
				62	5310.0						
		802.11ac (VHT20)	6.5 Mbps	52	5260.0	15.3	16.5	No	Not Required	12.0	No
				56	5280.0	15.3					
				60	5300.0	15.1					
				64	5320.0	15.2					
		802.11ac (VHT40)	13.5 Mbps	54	5270.0	Not Required	15.0	No	Not Required	12.0	No
				62	5310.0						
		802.11ac (VHT80)	29.3 Mbps	58	5290.0	Not Required	14.0	No	11.4	12.0	Yes
	5.5 (U-NII 2C)	802.11a	6 Mbps	100	5500.0	Not Required	14.5	No	Not Required	12.0	No
				120	5600.0						
				124	5620.0						
				144	5720.0						
		802.11n (HT20)	6.5 Mbps	100	5500.0	Not Required	14.5	No	Not Required	12.0	No
				120	5600.0						
				124	5620.0						
				144	5720.0						
		802.11n (HT40)	13.5 Mbps	102	5510.0	15.5	16.0	Yes	Not Required	12.0	No
				118	5590.0	15.5					
				126	5630.0	15.2					
				142	5710.0	15.3					
		802.11ac (VHT20)	6.5 Mbps	100	5500.0	Not Required	14.5	No	Not Required	12.0	No
				120	5600.0						
				124	5620.0						
				144	5720.0						
		802.11ac (VHT40)	13.5 Mbps	102	5510.0	15.4	16.0	No	Not Required	12.0	No
				118	5590.0	15.3					
				126	5630.0	15.0					
				142	5710.0	15.1					
		802.11ac (VHT80)	29.3 Mbps	106	5530.0	Not Required	14.0	No	12.0	12.0	Yes
				122	5610.0				11.7		
				138	5690.0				11.3		
	5.8 (U-NII 3)	802.11a	6 Mbps	149	5745.0	Not Required	16.0	No	Not Required	12.0	No
				157	5785.0						
				165	5825.0						
		802.11n (HT20)	6.5 Mbps	149	5745.0	Not Required	16.0	No	Not Required	12.0	No
				157	5785.0						
				165	5825.0						
		802.11n (HT40)	13.5 Mbps	151	5755.0	15.1	16.0	Yes	Not Required	12.0	No
				159	5795.0	14.8					
		802.11ac (VHT20)	6.5 Mbps	149	5745.0	Not Required	16.0	No	Not Required	12.0	No
				157	5785.0						
				165	5825.0						
		802.11ac (VHT40)	13.5 Mbps	151	5755.0	15.0	16.0	No	Not Required	12.0	No
				159	5795.0	14.6					
		802.11ac (VHT80)	29.3 Mbps	155	5775.0	Not Required	14.0	No	11.3	12.0	Yes

Note(s):

1. For "Not required", SAR Test reduction was applied from KDB 248227 guidance, Sec. 2.1, b), 1) when the same maximum power is specified for multiple transmission modes in a frequency band, the largest channel bandwidth, lowest order modulation, lowest data rate and lowest order 802.11a/g/n/ac mode is used for SAR measurement, on the highest measured output power channel in the initial test configuration, for each frequency band.
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/ax modes, the channel in the lower order/sequence 802.11 mode (i.e. a, g, n ac) is selected.
3. When UNII band 2A's specified maximum output power is higher or same than UNII band 1, 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 1
   - > 1.2 W/kg, both bands should be tested independently for SAR.

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9.7 Bluetooth

Measured Results

Band (GHz)	Mode	Ch #	Freq. (MHz)	Maximum Average Power (dBm)	
				Meas Pwr	Tune-up Limit
2.4	GFSK	0	2402	14.2	15.0
		39	2441	13.5	
		78	2480	14.0	
	EDR, 8-DPSK	0	2402	11.9	
		39	2441	11.6	
		78	2480	12.6	
	LE, GFSK-1M	0	2402	11.1	12.0
		19	2440	10.8	
		39	2480	11.7	
	LE, GFSK-2M	0	2402	11.0	
		19	2440	10.6	
		39	2480	11.5	

Note(s):

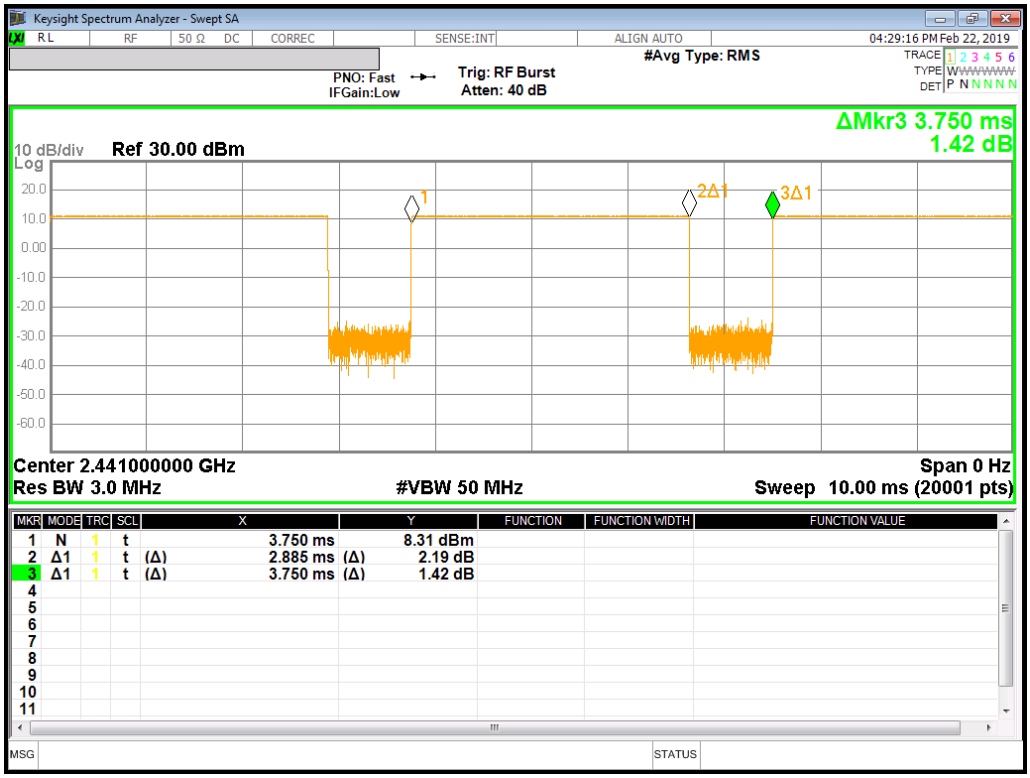
SAR test is evaluated at GFSK mode in Bluetooth

Duty Factor Measured Results

Mode	Type	T on (ms)	Period (ms)	Duty Cycle	Crest Factor (1/duty cycle)
GFSK	DH5	2.885	3.750	76.9%	1.30

Duty Cycle plots

GFSK



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10. Measured and Reported (Scaled) SAR Results

SAR Test Reduction criteria are as follows:

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

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

KDB 447498 D01 General RF Exposure Guidance:

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

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

KDB 648474 D04 Handset SAR:

With headset attached, when the reported SAR for body-worn accessory, measured without a headset connected to the handset, is > 1.2 W/kg, the highest reported SAR configuration for that wireless mode and frequency band should be repeated for that body-worn accessory with a headset attached to the handset.

KDB 648474 D04 Handset SAR (Phablet Only):

When hotspot mode does not apply, 10-g Extremity SAR is required for all surfaces and edges with an antenna located at ≤ 25 mm from that surface or edge in direct contact with a flat phantom, to address interactive hand use exposure conditions. When hotspot mode applies, 10-g extremity SAR is required only for the surfaces and edges with hotspot mode 1-g reported SAR > 1.2 W/kg .

Additional 1-g SAR testing at 5 mm is not required when hotspot mode 10-g extremity SAR is not required for the surfaces and edges; since all 1-g reported SAR < 1.2 W/kg.

KDB 941225 D01 SAR test for 3G devices:

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

KDB 941225 D05 SAR for LTE Devices:

SAR test reduction is applied using the following criteria:

- Start with the largest channel bandwidth and measure SAR for QPSK with 1 RB, and 50% RB allocation, using the RB offset and required test channel combination with the highest maximum output power among RB offsets at the upper edge, middle and lower edge of each required test channel.
- When the reported SAR is > 0.8 W/kg, testing for other Channels is performed at the highest output power level for 1RB, and 50% RB configuration for that channel.
- Testing for 100% RB configuration is performed at the highest output power level for 100% RB configuration across the Low, Mid and High Channel when the highest reported SAR for 1 RB and 50% RB are > 0.8 W/kg. Testing for the remaining required channels is not needed because the reported SAR for 100% RB Allocation < 1.45 W/kg.
- Testing for 16-QAM modulation is not required because the reported SAR for QPSK is < 1.45 W/Kg and its output power is not more than 0.5 dB higher than that of QPSK.
- Testing for the other channel bandwidths is not required because the reported SAR for the highest channel bandwidth is < 1.45 W/Kg and its output power is not more than 0.5 dB higher than that of the highest channel bandwidth.
- For LTE bands that do not support at least three non-overlapping channels in certain channel bandwidths, test the available non-overlapping channels instead. When a device supports overlapping channel assignment in a channel bandwidth configuration, the middle channel of the group of overlapping channels should be selected for testing; therefore, the requirement for H, M and L channels may not fully apply.

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KDB 248227 D01 SAR meas for 802.11:

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

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

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

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

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10.1 CDMA BC0

Antenna	RF Exposure Conditions	Mode	PWR Back-off	Dist. (mm)	Test Position	Ch #.	Freq. (MHz)	Power (dBm)		1-g SAR (W/kg)		Note	Plot No.
								Tune-up limit	Meas.	Meas.	Scaled		
Main 1	Head	1xRTT (RC3 SO55)	N/A	0	Left Touch	384	836.5	24.8	24.0	0.103	0.124	1	
					Left Tilt	384	836.5	24.8	24.0	0.104	0.126		
					Right Touch	384	836.5	24.8	24.0	0.130	0.157		1
					Right Tilt	384	836.5	24.8	24.0	0.094	0.113		
	Body-worn	1xRTT (RC3 SO32)	N/A	15	Rear	384	836.5	24.8	24.0	0.171	0.207		2
					Front	384	836.5	24.8	24.0	0.136	0.164		
	Hotspot	1xEVDO (Rev. 0)	N/A	10	Rear	384	836.5	24.8	23.7	0.356	0.458		3
					Front	384	836.5	24.8	23.7	0.293	0.377		
					Edge 2	384	836.5	24.8	23.7	0.196	0.252		
					Edge 3	384	836.5	24.8	23.7	0.216	0.278		
					Edge 4	384	836.5	24.8	23.7	0.033	0.043		
Main.1	Hotspot	1xEVDO (Rev. 0)	N/A	10	Rear	384	836.5	24.8	23.7	0.337	0.433	2	

10.2 GSM 850

Antenna	RF Exposure Conditions	Mode	PWR Back-off	Dist. (mm)	Test Position	Ch #.	Freq. (MHz)	Power (dBm)		1-g SAR (W/kg)		Note	Plot No.
								Tune-up limit	Meas.	Meas.	Scaled		
Main 1	Head	GPRS 2 Slot	N/A	0	Left Touch	190	836.6	31.0	29.6	0.110	0.153	1	
					Left Tilt	190	836.6	31.0	29.6	0.101	0.140		
					Right Touch	190	836.6	31.0	29.6	0.125	0.174		4
					Right Tilt	190	836.6	31.0	29.6	0.093	0.129		
	Body-worn	GPRS 2 Slot	N/A	15	Rear	190	836.6	31.0	29.6	0.190	0.264		5
					Front	190	836.6	31.0	29.6	0.153	0.213		
	Hotspot	GPRS 2 Slot	N/A	10	Rear	190	836.6	31.0	29.6	0.363	0.505		6
					Front	190	836.6	31.0	29.6	0.264	0.367		
					Edge 2	190	836.6	31.0	29.6	0.074	0.103		
					Edge 3	190	836.6	31.0	29.6	0.196	0.272		
					Edge 4	190	836.6	31.0	29.6	0.037	0.051		
Main.1	Hotspot	GPRS 2 Slot	N/A	10	Rear	190	836.6	31.0	29.6	0.339	0.471	2	

Note(s) for Sec.10:

1. DUT was tested for Configuration.1. Please refer to Test Configuration in Sec.7.
2. DUT was tested for Configuration.2. Please refer to Test Configuration in Sec.7.

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10.3 GSM1900

Antenna	RF Exposure Conditions	Mode	PWR Back-off	Dist. (mm)	Test Position	Ch #.	Freq. (MHz)	Power (dBm)		1-g SAR (W/kg)		Note	Plot No.
								Tune-up limit	Meas.	Meas.	Scaled		
Main 1	Head	GPRS 4 Slot	N/A	0	Left Touch	661	1880.0	24.8	23.5	0.047	0.064	1	
					Left Tilt	661	1880.0	24.8	23.5	0.024	0.032		
					Right Touch	661	1880.0	24.8	23.5	0.071	0.096		7
					Right Tilt	661	1880.0	24.8	23.5	0.029	0.039		
	Body-worn	GPRS 4 Slot	N/A	15	Rear	661	1880.0	24.8	23.5	0.202	0.274		8
					Front	661	1880.0	24.8	23.5	0.187	0.254		
	Hotspot	GPRS 4 Slot	N/A	10	Rear	661	1880.0	24.8	23.5	0.435	0.590		
					Front	661	1880.0	24.8	23.5	0.410	0.556		
					Edge 2	661	1880.0	24.8	23.5	0.091	0.123		
					Edge 3	512	1850.2	24.8	23.5	1.010	1.362		9
						661	1880.0	24.8	23.5	0.859	1.166		
						810	1909.8	24.8	23.7	0.710	0.908		
					Edge 4	661	1880.0	24.8	23.5	0.033	0.044		
Main.1	Hotspot	GPRS 4 Slot	N/A	10	Edge 3	512	1850.2	24.8	23.5	0.985	1.329	2	

Antenna	RF Exposure Conditions	Mode	PWR Back-off	Dist. (mm)	Test Position	Ch #.	Freq. (MHz)	Power (dBm)		10-g SAR (W/kg)		Note	Plot No.
								Tune-up limit	Meas.	Meas.	Scaled		
Main 1	Product Specific-10g	GPRS 4 Slot	N/A	0	Edge 3	512	1850.2	24.8	23.5	1.380	1.862	1	10
Main 1	Product Specific-10g	GPRS 4 Slot	N/A	0	Edge 3	512	1850.2	24.8	23.5	1.330	1.794	2	

10.4 W-CDMA Band II

Antenna	RF Exposure Conditions	Mode	PWR Back-off	Dist. (mm)	Test Position	Ch #.	Freq. (MHz)	Power (dBm)		1-g SAR (W/kg)		Note	Plot No.
								Tune-up limit	Meas.	Meas.	Scaled		
Main.1	Head	Rel.99 RMC	Off	0	Left Touch	9400	1880.0	24.0	23.3	0.060	0.070	1	
					Left Tilt	9400	1880.0	24.0	23.3	0.010	0.012		
					Right Touch	9400	1880.0	24.0	23.3	0.074	0.087		11
					Right Tilt	9400	1880.0	24.0	23.3	0.032	0.038		
	Body-worn	Rel.99 RMC	Off	15	Rear	9400	1880.0	24.0	23.3	0.320	0.376		
					Front	9400	1880.0	24.0	23.3	0.325	0.382		12
	Hotspot	Rel.99 RMC	On	10	Rear	9400	1880.0	19.0	18.9	0.276	0.283		
					Front	9400	1880.0	19.0	18.9	0.273	0.280		
					Edge 2	9400	1880.0	19.0	18.9	0.054	0.056		
					Edge 3	9400	1880.0	19.0	18.9	0.551	0.566		13
					Edge 4	9400	1880.0	19.0	18.9	0.017	0.017		
Main.1	Hotspot	Rel.99 RMC	On	10	Edge 3	9400	1880.0	19.0	18.9	0.509	0.522	2	

Antenna	RF Exposure Conditions	Mode	PWR Back-off	Dist. (mm)	Test Position	Ch #.	Freq. (MHz)	Power (dBm)		10-g SAR (W/kg)		Note	Plot No.
								Tune-up limit	Meas.	Meas.	Scaled		
Main.1	Product Specific-10g	Rel.99 RMC	Off	9	Edge 3	9400	1880.0	24.0	23.3	1.220	1.434	1	14
			On	0		9400	1880.0	19.0	18.9	0.877	0.894		
Main.1	Product Specific-10g	Rel.99 RMC	Off	9	Edge 3	9400	1880.0	24.0	23.3	1.020	1.199	2	

Note(s) for Sec.10:

1. DUT was tested for Configuration.1. Please refer to Test Configuration in Sec.7.
2. DUT was tested for Configuration.2. Please refer to Test Configuration in Sec.7.

10.5 W-CDMA Band V

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Antenna	RF Exposure Conditions	Mode	PWR Back-off	Dist. (mm)	Test Position	Ch #.	Freq. (MHz)	Power (dBm)		1-g SAR (W/kg)		Note	Plot No.
								Tune-up limit	Meas.	Meas.	Scaled		
Main 1	Head	Rel.99 RMC	N/A	0	Left Touch	4183	836.6	25.0	23.3	0.143	0.211	1	
					Left Tilt	4183	836.6	25.0	23.3	0.123	0.182		
					Right Touch	4183	836.6	25.0	23.3	0.167	0.247		15
					Right Tilt	4183	836.6	25.0	23.3	0.113	0.167		
	Body-worn	Rel.99 RMC	N/A	15	Rear	4183	836.6	25.0	23.3	0.262	0.387		16
					Front	4183	836.6	25.0	23.3	0.208	0.307		
	Hotspot	Rel.99 RMC	N/A	10	Rear	4183	836.6	25.0	23.3	0.521	0.770		17
					Front	4183	836.6	25.0	23.3	0.402	0.594		
					Edge 2	4183	836.6	25.0	23.3	0.089	0.132		
					Edge 3	4183	836.6	25.0	23.3	0.283	0.418		
					Edge 4	4183	836.6	25.0	23.3	0.045	0.066		
Main.1	Hotspot	Rel.99 RMC	N/A	10	Rear	4183	836.6	25.0	23.3	0.515	0.761	2	

10.6 LTE Band 4 (20MHz Bandwidth)

Antenna	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	Plot No.
										Tune-up limit	Meas.	Meas.	Scaled		
Main 1	Head	QPSK	Off	0	Left Touch	20175	1732.5	1	0	25.0	24.0	0.252	0.315	1	18
								50	0	24.0	23.0	0.198	0.248		
					Left Tilt	20175	1732.5	1	0	25.0	24.0	0.084	0.105		
								50	0	24.0	23.0	0.066	0.083		
					Right Touch	20175	1732.5	1	0	25.0	24.0	0.197	0.247		
								50	0	24.0	23.0	0.154	0.193		
					Right Tilt	20175	1732.5	1	0	25.0	24.0	0.078	0.098		
								50	0	24.0	23.0	0.063	0.079		
	Body-worn	QPSK	Off	15	Rear	20175	1732.5	1	0	25.0	24.0	0.478	0.598		
								50	0	24.0	23.0	0.391	0.489		
					Front	20175	1732.5	1	0	25.0	24.0	0.498	0.623		19
								50	0	24.0	23.0	0.408	0.510		
	Hotspot	QPSK	On	10	Rear	20175	1732.5	1	99	20.0	18.7	0.262	0.355		
								50	50	20.0	18.8	0.262	0.346		
					Front	20175	1732.5	1	99	20.0	18.7	0.289	0.391		
								50	50	20.0	18.8	0.294	0.388		
					Edge 2	20175	1732.5	1	99	20.0	18.7	0.042	0.056		
								50	50	20.0	18.8	0.039	0.052		
					Edge 3	20175	1732.5	1	99	20.0	18.7	0.465	0.630		20
								50	50	20.0	18.8	0.464	0.612		
					Edge 4	20175	1732.5	1	99	20.0	18.7	0.044	0.060		
								50	50	20.0	18.8	0.046	0.060		
Main.1	Hotspot	QPSK	On	10	Edge 3	20175	1732.5	1	99	20.0	18.7	0.459	0.622	2	

Antenna	RF Exposure Conditions	Mode	PWR Back-off	Dist. (mm)	Test Position	Ch #.	Freq. (MHz)	RB Allocation	RB offest	Power (dBm)		10-g SAR (W/kg)		Note	Plot No.
										Tune-up limit	Meas.	Meas.	Scaled		
Main.1	Product Specific-10g	QPSK	Off	8	Front	20175	1732.5	1	0	25.0	24.0	0.787	0.985	1	
			On	0				1	99	20.0	18.7	0.895	1.209		
Main.1	Product Specific-10g	QPSK	Off	9	Edge 3	20175	1732.5	1	0	25.0	24.0	1.080	1.352		
			On	0				1	99	20.0	18.7	1.340	1.809		21
Main.1	Product Specific-10g	QPSK	On	0	Edge 3	20175	1732.5	1	99	20.0	18.7	1.170	1.580	2	

Note(s) for Sec.10:

1. DUT was tested for Configuration.1. Please refer to Test Configuration in Sec.7.
2. DUT was tested for Configuration.2. Please refer to Test Configuration in Sec.7.

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10.7 LTE Band 5 (10MHz Bandwidth)

Antenna	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	Plot No.
										Tune-up limit	Meas.	Meas.	Scaled		
Main 1	Head	QPSK	N/A	0	Left Touch	20525	836.5	1	0	25.5	24.0	0.118	0.168	1	
								25	0	24.5	23.0	0.096	0.136		
					Left Tilt	20525	836.5	1	0	25.5	24.0	0.089	0.127		
								25	0	24.5	23.0	0.071	0.101		
					Right Touch	20525	836.5	1	0	25.5	24.0	0.134	0.191		22
								25	0	24.5	23.0	0.113	0.161		
					Right Tilt	20525	836.5	1	0	25.5	24.0	0.089	0.126		
								25	0	24.5	23.0	0.072	0.103		
	Body-worn	QPSK	N/A	15	Rear	20525	836.5	1	0	25.5	24.0	0.196	0.279		23
								25	0	24.5	23.0	0.163	0.233		
					Front	20525	836.5	1	0	25.5	24.0	0.170	0.242		
								25	0	24.5	23.0	0.140	0.200		
	Hotspot	QPSK	N/A	10	Rear	20525	836.5	1	0	25.5	24.0	0.383	0.546		24
								25	0	24.5	23.0	0.317	0.453		
					Front	20525	836.5	1	0	25.5	24.0	0.316	0.450		
								25	0	24.5	23.0	0.259	0.370		
					Edge 2	20525	836.5	1	0	25.5	24.0	0.203	0.289		
								25	0	24.5	23.0	0.175	0.250		
					Edge 3	20525	836.5	1	0	25.5	24.0	0.238	0.339		
								25	0	24.5	23.0	0.193	0.276		
					Edge 4	20525	836.5	1	0	25.5	24.0	0.047	0.067		
								25	0	24.5	23.0	0.032	0.046		
Main.1	Hotspot	QPSK	N/A	10	Rear	20525	836.5	1	0	25.5	24.0	0.380	0.542	2	

10.8 LTE Band 12 (10MHz Bandwidth)

Antenna	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	Plot No.
										Tune-up limit	Meas.	Meas.	Scaled		
Main 1	Head	QPSK	N/A	0	Left Touch	23095	707.5	1	0	25.0	23.7	0.112	0.151	1	
								25	0	24.0	22.6	0.089	0.123		
					Left Tilt	23095	707.5	1	0	25.0	23.7	0.120	0.161		
								25	0	24.0	22.6	0.094	0.129		
					Right Touch	23095	707.5	1	0	25.0	23.7	0.128	0.172		25
								25	0	24.0	22.6	0.101	0.139		
					Right Tilt	23095	707.5	1	0	25.0	23.7	0.108	0.145		
								25	0	24.0	22.6	0.087	0.119		
	Body-worn	QPSK	N/A	15	Rear	23095	707.5	1	0	25.0	23.7	0.199	0.268		26
								25	0	24.0	22.6	0.155	0.214		
					Front	23095	707.5	1	0	25.0	23.7	0.172	0.231		
								25	0	24.0	22.6	0.135	0.186		
	Hotspot	QPSK	N/A	10	Rear	23095	707.5	1	0	25.0	23.7	0.328	0.441		27
								25	0	24.0	22.6	0.258	0.356		
					Front	23095	707.5	1	0	25.0	23.7	0.221	0.297		
								25	0	24.0	22.6	0.175	0.242		
					Edge 2	23095	707.5	1	0	25.0	23.7	0.156	0.210		
								25	0	24.0	22.6	0.122	0.168		
					Edge 3	23095	707.5	1	0	25.0	23.7	0.130	0.175		
								25	0	24.0	22.6	0.103	0.142		
					Edge 4	23095	707.5	1	0	25.0	23.7	0.123	0.165		
								25	0	24.0	22.6	0.094	0.129		
Main.1	Hotspot	QPSK	N/A	10	Rear	23095	707.5	1	0	25.0	23.7	0.310	0.417	2	

Note(s) for Sec.10:

1. DUT was tested for Configuration.1. Please refer to Test Configuration in Sec.7.
2. DUT was tested for Configuration.2. Please refer to Test Configuration in Sec.7.

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10.9 LTE Band 41 (20MHz Bandwidth)

Antenna	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	Plot No.
										Tune-up limit	Meas.	Meas.	Scaled		
Main 2	Head	QPSK	N/A	0	Left Touch	40340	2565.0	1	99	24.5	24.0	0.095	0.108	1	28
								50	50	23.5	22.7	0.073	0.089		
					Left Tilt	40340	2565.0	1	99	24.5	24.0	0.047	0.053		
								50	50	23.5	22.7	0.031	0.038		
					Right Touch	40340	2565.0	1	99	24.5	24.0	0.050	0.056		
								50	50	23.5	22.7	0.035	0.042		
					Right Tilt	40340	2565.0	1	99	24.5	24.0	0.024	0.027		
								50	50	23.5	22.7	0.010	0.013		
	Body-worn	QPSK	N/A	15	Rear	40340	2565.0	1	99	24.5	24.0	0.136	0.154		29
								50	50	23.5	22.7	0.102	0.124		
					Front	40340	2565.0	1	99	24.5	24.0	0.118	0.134		
								50	50	23.5	22.7	0.085	0.104		
	Hotspot	QPSK	N/A	10	Rear	40340	2565.0	1	99	24.5	24.0	0.276	0.313		
								50	50	23.5	22.7	0.203	0.246		
					Front	40340	2565.0	1	99	24.5	24.0	0.226	0.257		
								50	50	23.5	22.7	0.163	0.198		
					Edge 2	40340	2565.0	1	99	24.5	24.0	0.043	0.049		
								50	50	23.5	22.7	0.033	0.040		
					Edge 3	40340	2565.0	1	99	24.5	24.0	0.326	0.370		30
								50	50	23.5	22.7	0.265	0.322		
					Edge 4	40340	2565.0	1	99	24.5	24.0	0.222	0.252		
								50	50	23.5	22.7	0.173	0.210		
Main. 2	Hotspot	QPSK	N/A	10	Edge 3	40340	2565	1	99	24.5	24.0	0.279	0.317	2	

Note(s) for Sec.10:

1. DUT was tested for Configuration.1. Please refer to Test Configuration in Sec.7.
2. DUT was tested for Configuration.2. Please refer to Test Configuration in Sec.7.

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10.10 Wi-Fi (DTS Band)

Antenna	Frequency Band	Mode	RF Exposure Conditions	PWR Back-off	Dist. (mm)	Test Position	Ch #.	Freq. (MHz)	Area Scan Max. SAR (W/kg)	Duty Cycle (%)	Power (dBm)		1-g SAR (W/kg)		A Note	B Note	Plot No.
											Tune-up limit	Meas.	Meas.	Scaled			
SISO (WiFi Ant.1)	2.4GHz	802.11b 1 Mbps	Head	On	0	Left Touch	1	2412.0	0.001	98.8	12.0	11.9			1		
						Left Tilt	1	2412.0	0.001	98.8	12.0	11.9					
						Right Touch	1	2412.0	0.013	98.8	12.0	11.9	0.004	0.004		1	31
						Rightt Tilt	1	2412.0	0.001	98.8	12.0	11.9					
			Body-worn	Off	15	Rear	1	2412.0	0.001	98.8	19.0	18.1	<0.001	<0.001		1	
						Front	1	2412.0	0.002	98.8	19.0	18.1					
			Hotspot	Off	10	Rear	1	2412.0	0.003	98.8	19.0	18.1					
						Front	1	2412.0	0.004	98.8	19.0	18.1					
						Edge 4	1	2412.0	0.009	98.8	19.0	18.1	0.004	0.005		1	
Ant.1	2.4GHz	802.11b 1 Mbps	Hotspot	Off	10	Edge 4	1	2412.0	0.006	98.8	19.0	18.1	<0.001	<0.001	2		
SISO (WiFi Ant.2)	2.4GHz	802.11b 1 Mbps	Head	On	0	Left Touch	1	2412.0	0.001	98.8	12.0	11.8			1		
						Left Tilt	1	2412.0	0.006	98.8	12.0	11.8	<0.001	<0.001			
						Right Touch	1	2412.0	0.002	98.8	12.0	11.8				1	
						Rightt Tilt	1	2412.0	0.002	98.8	12.0	11.8					
			Body-worn	Off	15	Rear	1	2412.0	0.076	98.8	19.0	18.9	0.060	0.062		1	32
						Front	1	2412.0	0.002	98.8	19.0	18.9					
			Hotspot	Off	10	Rear	1	2412.0	0.191	98.8	19.0	18.9	0.165	0.172		1	33
						Front	1	2412.0	0.003	98.8	19.0	18.9					
						Edge 4	1	2412.0	0.021	98.8	19.0	18.9					
Ant.2	2.4GHz	802.11b 1 Mbps	Hotspot	Off	10	Rear	1	2412.0	0.151	98.8	19.0	18.9	0.131	0.136	2		

A-Note(s) for Sec.10:

1. DUT was tested for Configuration.1. Please refer to Test Configuration in Sec.7.
2. DUT was tested for Configuration.2. Please refer to Test Configuration in Sec.7.

B-Note(s):

1. When the Highest reported SAR is ≤ 0.4 or 1.0 W/kg (1-g or 10-g respectively). Therefore, further SAR measurements within this exposure condition are not required.
2. Highest reported SAR is > 0.4 or 1.0 W/kg (1-g or 10-g respectively). Due to the highest reported SAR for this test position, other test positions in this exposure condition were evaluated until a SAR ≤ 0.8 or 2.0 W/kg (1-g or 10-g respectively) was reported.
3. Testing for a second channel was required because the reported SAR for this test position was > 0.8 or 2.0 W/kg (1-g or 10-g respectively).
4. Additional testing required in order satisfying FCC simultaneous transmission limit criteria.
5. SAR testing is not required for OFDM mode(s) when the highest reported SAR for DSSS is adjusted by the ratio of OFDM to DSSS specified maximum output power and the adjusted SAR is ≤ 1.2 W/kg.

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10.11 Wi-Fi (U-NII Bands)

Antenna	Frequency Band	Mode	RF Exposure Conditions	PWR Back-off	Dist. (mm)	Test Position	Ch #.	Freq. (MHz)	Area Scan Max. SAR (W/kg)	Duty Cycle (%)	Power (dBm)		1-g SAR (W/kg)		10-g SAR (W/kg)		A Note	B Note	Plot No.
											Tune-up limit	Meas.	Meas.	Scaled	Meas.	Scaled			
SISO (WiFi Ant.1)	5.3 GHz U-NII 2A	802.11ac VHT80 29.3 Mbps	Head	On	0	Left Touch	58	5290.0	0.026	99.1	12.0	11.7					1		
						Left Tilt	58	5290.0	0.016	99.1	12.0	11.7							
						Right Touch	58	5290.0	0.080	99.1	12.0	11.7	0.026	0.028				1	34
						Rightt Tilt	58	5290.0	0.065	99.1	12.0	11.7							
		802.11a 6 Mbps	Body-worn	Off	15	Rear	52	5260.0	0.014	98.6	16.5	16.2							
						Front	52	5260.0	0.016	98.6	16.5	16.2	0.005	0.006				1	
			Product Specific 10-g	Off	0	Rear	52	5260.0	0.170	98.6	16.5	16.2							
						Front	52	5260.0	1.189	98.6	16.5	16.2			0.074	0.080		1	
						Edge 4	52	5260.0	0.303	98.6	16.5	16.2							
Ant.1	5.3 GHz U-NII 2A	802.11a 6 Mbps	Product Specific 10-g	Off	0	Front	52	5260.0	0.969	98.6	16.5	16.2			0.074	0.080	2		
SISO (WiFi Ant.2)	5.3 GHz U-NII 2A	802.11ac VHT80 29.3 Mbps	Head	On	0	Left Touch	58	5290.0	0.014	99.1	12.0	11.4					1		
						Left Tilt	58	5290.0	0.012	99.1	12.0	11.4							
						Right Touch	58	5290.0	0.022	99.1	12.0	11.4	<0.001	<0.001				1	
						Rightt Tilt	58	5290.0	0.014	99.1	12.0	11.4							
		802.11a 6 Mbps	Body-worn	Off	15	Rear	52	5260.0	0.318	98.6	16.5	15.8	0.140	0.169				1	35
						Front	52	5260.0	0.007	98.6	16.5	15.8							
			Product Specific 10-g	Off	0	Rear	52	5260.0	13.648	98.6	16.5	15.8			1.180	1.422			
						Front	52	5260.0	0.024	98.6	16.5	15.8							
						Edge 4	52	5260.0	0.175	98.6	16.5	15.8			0.025	0.031		2	
Ant.2	5.3 GHz U-NII 2A	802.11a 6 Mbps	Product Specific 10-g	Off	0	Rear	52	5260.0	23.132	98.6	16.5	15.8			1.210	1.458	2		36
						Front	52	5260.0	0.019	98.6	16.5	15.8							
						Edge 4	52	5260.0	0.197	98.6	16.5	15.8			0.029	0.034		2	

A-Note(s) for Sec.10:

1. DUT was tested for Configuration.1. Please refer to Test Configuration in Sec.7.
2. DUT was tested for Configuration.2. Please refer to Test Configuration in Sec.7.

B-Note(s):

1. When the Highest reported SAR is ≤ 0.4 or 1.0 W/kg (1-g or 10-g respectively). Therefore, further SAR measurements within this exposure condition are not required.
2. Highest reported SAR is > 0.4 or 1.0 W/kg (1-g or 10-g respectively). Due to the highest reported SAR for this test position, other test positions in this exposure condition were evaluated until a SAR ≤ 0.8 or 2.0 W/kg (1-g or 10-g respectively) was reported.
3. Testing for a second channel was required because the reported SAR for this test position was > 0.8 or 2.0 W/kg (1-g or 10-g respectively).
4. Additional testing required in order satisfying FCC simultaneous transmission limit criteria.

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Antenna	Frequency Band	Mode	RF Exposure Conditions	PWR Back-off	Dist. (mm)	Test Position	Ch #.	Freq. (MHz)	Area Scan Max. SAR (W/kg)	Duty Cycle (%)	Power (dBm)		1-g SAR (W/kg)		10-g SAR (W/kg)		A Note	B Note	Plot No.
											Tune-up limit	Meas.	Meas.	Scaled	Meas.	Scaled			
SISO (WiFi Ant.1)	5.5 GHz U-NII 2C	802.11ac VHT80 29.3 Mbps	Head	On	0	Left Touch	106	5530.0	0.016	99.1	12.0	11.6					1		
						Left Tilt	106	5530.0	0.024	99.1	12.0	11.6							
						Right Touch	106	5530.0	0.102	99.1	12.0	11.6	0.046	0.050				1	37
						Rightt Tilt	106	5530.0	0.046	99.1	12.0	11.6							
		802.11n HT40 13.5 Mbps	Body-worn	Off	15	Rear	102	5510.0	0.024	98.2	16.0	15.6							
						Front	102	5510.0	0.026	98.2	16.0	15.6	0.008	0.009				1	
			Product Specific 10-g	Off	0	Rear	102	5510.0	0.220	98.2	16.0	15.6							
						Front	102	5510.0	1.956	98.2	16.0	15.6			0.121	0.135		1	
						Edge 4	102	5510.0	1.077	98.2	16.0	15.6							
Ant.1	5.5 GHz U-NII 2C	802.11n HT40	Product Specific 10-g	Off	0	Front	102	5510.0	1.853	98.2	16.0	15.6			0.115	0.129	2		
SISO (WiFi Ant.2)	5.5 GHz U-NII 2C	802.11ac VHT80 29.3 Mbps	Head	On	0	Left Touch	138	5690.0	0.009	99.1	12.0	12.0					1		
						Left Tilt	138	5690.0	0.007	99.1	12.0	12.0							
						Right Touch	138	5690.0	0.006	99.1	12.0	12.0							
						Rightt Tilt	138	5690.0	0.011	99.1	12.0	12.0	<0.001	<0.001				1	
		802.11n HT40 13.5 Mbps	Body-worn	Off	15	Rear	102	5510.0	0.114	98.2	16.0	15.5	0.045	0.052				1	38
						Front	102	5510.0	0.008	98.2	16.0	15.5							
			Product Specific 10-g	Off	0	Rear	102	5510.0	4.206	98.2	16.0	15.5			0.396	0.450		1	
						Front	102	5510.0	0.015	98.2	16.0	15.5							
						Edge 4	102	5510.0	0.064	98.2	16.0	15.5							
Ant.2	5.5 GHz U-NII 2C	802.11n HT40	Product Specific 10-g	Off	0	Rear	102	5510.0	4.710	98.2	16.0	15.5			0.440	0.500	2	1	39
						Front	102	5510.0	0.010	98.2	16.0	15.5							
						Edge 4	102	5510.0	0.028	98.2	16.0	15.5							

A-Note(s) for Sec.10:

1. DUT was tested for Configuration.1. Please refer to Test Configuration in Sec.7.
2. DUT was tested for Configuration.2. Please refer to Test Configuration in Sec.7.

B-Note(s):

1. When the Highest reported SAR is ≤ 0.4 or 1.0 W/kg (1-g or 10-g respectively). Therefore, further SAR measurements within this exposure condition are not required.
2. Highest reported SAR is > 0.4 or 1.0 W/kg (1-g or 10-g respectively). Due to the highest reported SAR for this test position, other test positions in this exposure condition were evaluated until a SAR ≤ 0.8 or 2.0 W/kg (1-g or 10-g respectively) was reported.
3. Testing for a second channel was required because the reported SAR for this test position was > 0.8 or 2.0 W/kg (1-g or 10-g respectively).
4. Additional testing required in order satisfying FCC simultaneous transmission limit criteria.

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Antenna	Frequency Band	Mode	RF Exposure Conditions	PWR Back-off	Dist. (mm)	Test Position	Ch #.	Freq. (MHz)	Area Scan Max. SAR (W/kg)	Duty Cycle (%)	Power (dBm)		1-g SAR (W/kg)		A Note	B Note	Plot No.
											Tune-up limit	Meas.	Meas.	Scaled			
SISO (WiFi Ant.1)	5.8 GHz U-NII 3	802.11ac VHT80 29.3 Mbps	Head	On	0	Left Touch	155	5775.0	0.024	99.1	12.0	11.9			1		
						Left Tilt	155	5775.0	0.010	99.1	12.0	11.9					
						Right Touch	155	5775.0	0.155	99.1	12.0	11.9	0.059	0.060		1	40
						Rightt Tilt	155	5775.0	0.062	99.1	12.0	11.9					
		802.11n HT40 13.5 Mbps	Body-worn	Off	15	Rear	159	5795.0	0.046	98.2	16.0	15.7					
						Front	159	5795.0	0.046	98.2	16.0	15.7	0.019	0.021		1	
			Hotspot	Off	10	Rear	151	5755.0	0.063	98.2	16.0	15.5					
						Front	151	5755.0	0.095	98.2	16.0	15.5					
						Edge 4	151	5755.0	0.105	98.2	16.0	15.5	0.053	0.060		1	
Ant.1	5.8 GHz U-NII 3	802.11n HT40	Hotspot	Off	10	Edge 4	151	5755.0	0.098	98.2	16.0	15.5	0.041	0.047	2		
SISO (WiFi Ant.2)	5.8 GHz U-NII 3	802.11ac VHT80 29.3 Mbps	Head	On	0	Left Touch	155	5775.0	0.006	99.1	12.0	11.3			1		
						Left Tilt	155	5775.0	0.011	99.1	12.0	11.3					
						Right Touch	155	5775.0	0.011	99.1	12.0	11.3	<0.001	<0.001		1	
						Rightt Tilt	155	5775.0	0.008	99.1	12.0	11.3					
		802.11n HT40 13.5 Mbps	Body-worn	Off	15	Rear	151	5755.0	0.117	98.2	16.0	15.1	0.046	0.057		1	41
						Front	151	5755.0	0.005	98.2	16.0	15.1					
			Hotspot	Off	10	Rear	151	5755.0	0.179	98.2	16.0	15.1	0.073	0.091		1	42
						Front	151	5755.0	0.005	98.2	16.0	15.1					
						Edge 4	151	5755.0	0.038	98.2	16.0	15.1					
Ant.2	5.8 GHz U-NII 3	802.11n HT40	Hotspot	Off	10	Rear	151	5755.0	0.144	98.2	16.0	15.1	0.060	0.075	2		

A-Note(s) for Sec.10:

1. DUT was tested for Configuration.1. Please refer to Test Configuration in Sec.7.
2. DUT was tested for Configuration.2. Please refer to Test Configuration in Sec.7.

B-Note(s):

1. When the Highest reported SAR is ≤ 0.4 or 1.0 W/kg (1-g or 10-g respectively). Therefore, further SAR measurements within this exposure condition are not required.
2. Highest reported SAR is > 0.4 or 1.0 W/kg (1-g or 10-g respectively). Due to the highest reported SAR for this test position, other test positions in this exposure condition were evaluated until a SAR ≤ 0.8 or 2.0 W/kg (1-g or 10-g respectively) was reported.
3. Testing for a second channel was required because the reported SAR for this test position was > 0.8 or 2.0 W/kg (1-g or 10-g respectively).
4. Additional testing required in order satisfying FCC simultaneous transmission limit criteria.

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10.12 Bluetooth

Antenna	Frequency Band	Mode	RF Exposure Conditions	Dist. (mm)	Test Position	Ch #.	Freq. (MHz)	Duty Cycle (%)	Power (dBm)		1-g SAR (W/kg)		Note	Plot No.
									Tune-up limit	Meas.	Meas.	Scaled		
WiFi Ant.1	2.4GHz	GFSK	Head	0	Left Touch	0	2402.0	76.9	15.0	14.2	<0.001	<0.001	1	
					Left Tilt	0	2402.0	76.9	15.0	14.2	<0.001	<0.001		
					Right Touch	0	2402.0	76.9	15.0	14.2	0.007	0.011		43
					Right Tilt	0	2402.0	76.9	15.0	14.2	0.002	0.003		
		GFSK	Body-worn	15	Rear	0	2402.0	76.9	15.0	14.2	<0.001	<0.001		
					Front	0	2402.0	76.9	15.0	14.2	<0.001	<0.001		
		GFSK	Hotspot	10	Rear	0	2402.0	76.9	15.0	14.2	<0.001	<0.001		
					Front	0	2402.0	76.9	15.0	14.2	<0.001	<0.001		
					Edge 4	0	2402.0	76.9	15.0	14.2	<0.001	<0.001		

Note(s) for Sec.10:

1. DUT was tested for Configuration.1. Please refer to Test Configuration in Sec.7.
2. Configuration.2 was considered at DTS Ant.1.

10.13 LTE-uplink 2CA Band 41 (20MHz + 20MHz BW)

Antenna	RF Exposure Conditions	Mode	PWR Back-off	Dist. (mm)	Test Position	PCC UL				SCC UL				Power (dBm)		1-g SAR (W/kg)		Plot No.
						Ch #.	Freq. (MHz)	RB Allocation	RB offest	Ch #.	Freq. (MHz)	RB Allocation	RB offest	Tune-up limit	Meas.	Meas.	Scaled	
Main 2	Head	QPSK	Off	0	Left touch	40340	2565.0	1	99	40538	2584.8	1	0	24.5	23.5	0.075	0.093	44
	Body-worn	QPSK	Off	15	Rear	40340	2565.0	1	99	40538	2584.8	1	0	24.5	23.5	0.102	0.128	45
	Hotspot	QPSK	Off	10	Edge 3	40340	2565.0	1	99	40538	2584.8	1	0	24.5	23.5	0.288	0.360	46

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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 <0.8 or 2 W/kg (1-g or 10-g respectively); steps 2) through 4) do not apply.
2) When the original highest measured SAR is ≥ 0.8 or 2 W/kg (1-g or 10-g respectively), 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 or 3.6 W/kg (~ 10% from the 1-g or 10-g respective SAR limit).
4) Perform a third repeated measurement only if the original, first, or second repeated measurement is ≥ 1.5 or 3.75 W/kg (1-g or 10-g respectively) and the ratio of largest to smallest SAR for the original, first and second repeated measurements is > 1.20.

Peak spatial-average (1g of tissue)

Frequency Band (MHz)	Air Interface	RF Exposure Conditions	Test Position	Repeated SAR (Yes/No)	Highest Measured SAR (W/kg)	Repeated Measured SAR (W/kg)	Largest to Smallest SAR Ratio
700	LTE Band 12	Hotspot	Rear	No	0.328	N/A	N/A
835	GSM 850	Hotspot	Rear	No	0.363	N/A	N/A
	CDMA BC 0	Hotspot	Rear	No	0.356	N/A	N/A
	WCDMA Band V	Hotspot	Rear	No	0.521	N/A	N/A
	LTE Band 5	Hotspot	Rear	No	0.383	N/A	N/A
1750	LTE Band 4	Hotspot	Edge 3	No	0.465	N/A	N/A
1900	GSM 1900	Hotspot	Edge 3	Yes	1.010	1	1.01
	WCDMA Band II	Hotspot	Edge 3	No	0.551	N/A	N/A
2400	Wi-Fi 802.11b/g/n	Hotspot	Rear	No	0.165	N/A	N/A
	Bluetooth	Head	Right Touch	No	0.007	N/A	N/A
2600	LTE Band 41	Hotspot	Edge 3	No	0.510	N/A	N/A
5300	Wi-Fi 802.11a/n	Body	Rear	No	0.140	N/A	N/A
5500	Wi-Fi 802.11a/n	Head	Right Touch	No	0.046	N/A	N/A
5800	Wi-Fi 802.11a/n	Hotspot	Rear	No	0.073	N/A	N/A

Peak spatial-average (10g of tissue)

Frequency Band (MHz)	Air Interface	RF Exposure Conditions	Test Position	Repeated SAR (Yes/No)	Highest Measured SAR (W/kg)	Repeated Measured SAR (W/kg)	Largest to Smallest SAR Ratio
1750	LTE Band 4	Product specific 10g	Edge 3	No	1.340	N/A	N/A
1900	GSM 1900	Product specific 10g	Edge 3	No	1.380	N/A	N/A
	WCDMA Band II	Product specific 10g	Edge 3	No	1.220	N/A	N/A
5300	Wi-Fi 802.11a/n	Product specific 10g	Rear	No	1.210	N/A	N/A
5500	Wi-Fi 802.11a/n	Product specific 10g	Rear	No	0.440	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 DUT Holder Perturbations

In accordance with published DUT Holder Perturbations in Oct.2016 TCB workshop,

When Highest reported SAR is over 1.2 or 3.0 W/kg (1-g or 10-g respectively), Holder perturbation verification is required for each antenna, using the highest configuration among all applicable frequency bands. Both Head test and Body test (Edge 1-4 sides) are evaluated with DUT holder. Both Front and Rear sides are evaluated without DUT holder. (Details of test setup are refer to Appendix A.)

So we are only consider about Head test and Body test (Edge 1-4 sides).

Main Antenna

Frequency Band (MHz)	Air Interface	RF Exposure Conditions	Test Position	DUT Holder Perturbation (Yes/No)	Highest Reported SAR (W/kg)	SAR test without holder Scaled SAR (W/kg)	Deviation (%)
1900	GSM 1900	Hotspot	Edge 3	Yes	1.362	1.362	1.00

Note(s):

Both deviation should be within measurement uncertainty (22%).

13 Simultaneous Transmission SAR Analysis

Simultaneous Transmission Condition

RF Exposure Condition	Item	Capable Transmit Configurations				
Head & Body-worn & Hotspot & Product Specific 10-g	1	GSM (Voice/GPRS)	+	DTS Ant.1 (and/or) DTS Ant.2		
	2	GSM (Voice/GPRS)	+	UNII Ant.1 (and/or) UNII Ant.2		
	3	GSM (Voice/GPRS)	+	BT		
	4	GSM (Voice/GPRS)	+	BT	+	UNII Ant.2
	5	GSM (Voice/GPRS)	+	***RSDB scenario***		
	6	W-CDMA	+	DTS Ant.1 (and/or) DTS Ant.2		
	7	W-CDMA	+	UNII Ant.1 (and/or) UNII Ant.2		
	8	W-CDMA	+	BT		
	9	W-CDMA	+	BT	+	UNII Ant.2
	10	W-CDMA	+	***RSDB scenario***		
	11	LTE	+	DTS Ant.1 (and/or) DTS Ant.2		
	12	LTE	+	UNII Ant.1 (and/or) UNII Ant.2		
	13	LTE	+	BT		
	14	LTE	+	BT	+	UNII Ant.2
	15	LTE	+	***RSDB scenario***		

Notes:
1. DTS supports Wi-Fi Direct, Hotspot and VoIP.
2. U-NII supports Wi-Fi Direct, Hotspot and VoIP.
3. GPRS, W-CDMA, LTE supports Hotspot and VoIP.
4. Only U-NII Ant.2 Radio can transmit simultaneously with Bluetooth Radio.
5. DTS Radio cannot transmit simultaneously with Bluetooth Radio.
6. DTS Radio can transmit simultaneously with UNII Radio in RSDB scenarios.
7. BT tethering is consider about each RF exposure conditions
8. GSM (Voice) is only consider in both Head & Body-worn exposure conditions.

RSDB scenarios

Mode	Scenario	# of TX	5GHz (UNII)		2.4GHz (DTS)	
			Ant1	Ant2	Ant1	Ant2
2.4GHz+5GHz RSDB Only	1	2	-	On	On	-

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Simultaneous transmission SAR test exclusion considerations

KDB 447498 D01 General RF Exposure Guidance provides two procedures for determining simultaneous transmission SAR test exclusion: Sum of SAR and SAR to Peak Location Ratio (SPLSR)

Sum of SAR

To qualify for simultaneous transmission SAR test exclusion based upon Sum of SAR the sum of the reported standalone SARs for all simultaneously transmitting antennas shall be below the applicable standalone SAR limit. If the sum of the SARs is above the applicable limit then simultaneous transmission SAR test exclusion may still apply if the requirements of the SAR to Peak Location Ratio (SPLSR) evaluation are met.

SAR to Peak Location Ratio (SPLSR)

KDB 447498 D01 General RF Exposure Guidance explains how to calculate 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 reported 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 reported or estimated SAR for the second of a pair of simultaneous transmitting antennas, in the same test operating mode and exposure condition as the first

Ri is the separation distance between the pair of simultaneous transmitting antennas. When the SAR is measured, for both antennas in the pair, it is determined by the actual x, y and z coordinates in the 1-g SAR for each SAR peak location, based on the extrapolated and interpolated result in the zoom scan measurement, using the formula of

$$[(x_1-x_2)^2 + (y_1-y_2)^2 + (z_1-z_2)^2]$$

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

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

When an individual antenna transmits at on two bands simultaneously, the sum of the highest *reported* SAR for the frequency bands should be used to determine SAR_1.or SAR_2. When SPLSR is necessary, the smallest distance between the peak SAR locations for the antenna pair with respect to the peaks from each antenna should be used.

The antennas in all antenna pairs that do not qualify for simultaneous transmission SAR test exclusion must be tested for SAR compliance, according to the enlarged zoom scan and volume scan post-processing procedures in KDB Publication 865664 D01

The antennas for the unlicensed transmitters are closely situated. As a result, the associated SAR hotspots are also closely situated. Some of the sum of SAR calculations yielded results over 1.6 W/kg. The SPSLR calculations for these situations were performed by treating the unlicensed SAR values as a single transmitter. The most conservative distance between all the unlicensed hotspots to the licensed hotspot was used for the value of *d* in the SPSLR calculation.

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Simultaneous transmission SAR measurement

When simultaneous transmission SAR measurements are required in different frequency bands not covered by a single probe calibration point then separate tests for each frequency band are performed. The tests are performed using enlarged zoom scans which are processed, by means of superposition, using the DASY5 volume scan postprocessing procedures to determine the 1-g SAR for the aggregate SAR distribution.

The spatial resolution used for all enlarged zoom scans is the same as used for the most stringent zoom scans. I.E. the scan parameters required for the highest frequency assessed are used for all enlarged zoom scans. The scans cover the complete area of the device to ensure all transmitting antennas and radiating structures are assessed.

DASY5 provides the ability to perform Multiband Evaluations according to the latest standards using the Volume Scan job as well as appropriate routines for the Post-processing.

In order to extract and process measurements within different frequency bands, the SEMCAD X Post-processor performs the combination and subsequent superposition of these measurement data via DASY5= Combined MultiBand Averaged SAR.

Combined Multi Band Averaged SAR allows - in addition to the data extraction - an evaluation of the 1 g, 10 g and/or arbitrary averaged mass SAR.
Power Scaling Factor is used to allow the volume scans to be scaled by a value other than "1", this is important when the results need to be scaled to different maximum power levels. The Power Scaling Factor is applied to each individual point of the scan. When power scaling is used in multi-band combinations the scaling factor is applied to each individual point of the first scan, the second factor is then applied to each individual point of the second scan and so on. The scans are then combined.

13.1 Sum of the SAR for WWAN & Wi-Fi & BT

RF Exposure	Test Position	Standalone SAR (W/kg)						∑ SAR (W/kg)								
		WWAN	DTS Ant.1	DTS Ant.2	UNII Ant.1	UNII Ant.2	BT	WWAN + DTS Ant.1	WWAN + DTS Ant.2	WWAN + DTS Ant.1 + DTS Ant.2	WWAN + UNII Ant.1	WWAN + UNII Ant.2	WWAN + UNII Ant.1+ UNII Ant.2	WWAN + BT	WWAN + DTS Ant.1 + UNII Ant.2	WWAN + BT + UNII Ant.2
		1	2	3	4	5	6	1+2	1+3	1+2+3	1+4	1+5	1+4+5	1+6	1+2+5	1+5+6
Head (1g-SAR)	All positions	0.315	0.004	0.001	0.050	0.001	0.011	0.319	0.316	0.320	0.365	0.316	0.366	0.326	0.320	0.327
Body-Worn (1g-SAR)	All positions	0.623	0.001	0.062	0.021	0.169	0.001	0.624	0.685	0.686	0.644	0.792	0.813	0.624	0.793	0.793
Hotspot (1-g SAR)	All positions	1.362	0.005	0.172	0.060	0.091	0.001	1.367	1.534	1.539	1.422	1.453	1.513	1.363	1.458	1.454
Product Specific (10-g SAR)	All positions	1.862			0.135	1.458					1.997	3.320	3.455			

Conclusion:

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

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Appendixes

Refer to separated files for the following appendixes.

4788886237-S1V3 FCC Report SAR_App A_Photos & Ant. Locations

4788886237-S1V3 FCC Report SAR_App B_Highest SAR Test Plots

4788886237-S1V3 FCC Report SAR_App C_System Check Plots

4788886237-S1V3 FCC Report SAR_App D_SAR Tissue Ingredients

4788886237-S1V3 FCC Report SAR_App E_Probe Cal. Certificates

4788886237-S1V3 FCC Report SAR_App F_Dipole Cal. Certificates

END OF REPORT

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