



**FCC 47 CFR § 2.1093
IEEE Std 1528-2013**

SAR EVALUATION REPORT

FOR

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

MODEL NUMBER: SM-A505GT/DS

FCC ID: A3LSMA505GT

REPORT NUMBER: 4788805359-S1V1

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Prepared for
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TL-637

Revision History

Rev.	Date	Revisions	Revised By
V1	2/8/2019	Initial Issue	Eunji Choi

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1. Attestation of Test Results

Applicant Name	SAMSUNG ELECTRONICS CO.,LTD.
FCC ID	A3LSMA505GT
Model Number	SM-A505GT/DS
Applicable Standards	FCC 47 CFR § 2.1093 Published RF exposure KDB procedures IEEE Std 1528-2013


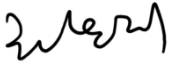
SAR Limits (W/Kg)		
Exposure Category	Peak spatial-average(1g of tissue)	Phablet (10g of tissue)
General population / Uncontrolled exposure	1.6	4.0

The Highest Reported SAR (W/kg)					
RF Exposure Conditions	Equipment Class				
	Licensed	DTS	UNII	DSS(BT)	
Head	0.39	0.16	0.86	0.165	
Body-worn	0.49	< 0.10	0.30	N/A	
Hotspot	1.08	0.11	0.55		
Phablet-10g	N/A	N/A	0.97		
Standalone Tx	Head	1.26	0.55	1.26	0.557
	Body-worn	0.78	0.53	0.78	N/A
	Hotspot	1.59	1.18	1.59	
	Phablet-10g	N/A			

Date Tested	12/17/2018 to 2/8/2019
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	Eunji Choi Associate Test Engineer UL Korea, Ltd. Suwon Laboratory

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 18, RF Exposure Procedures (DUT Holder Perturbations)
- [TCB workshop](#) October, 2016; Page 7, RF Exposure Procedures (Bluetooth Duty Factor)

3. Facilities and Accreditation

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

Suwon
SAR 1 Room
SAR 2 Room
SAR 3 Room
SAR 4 Room

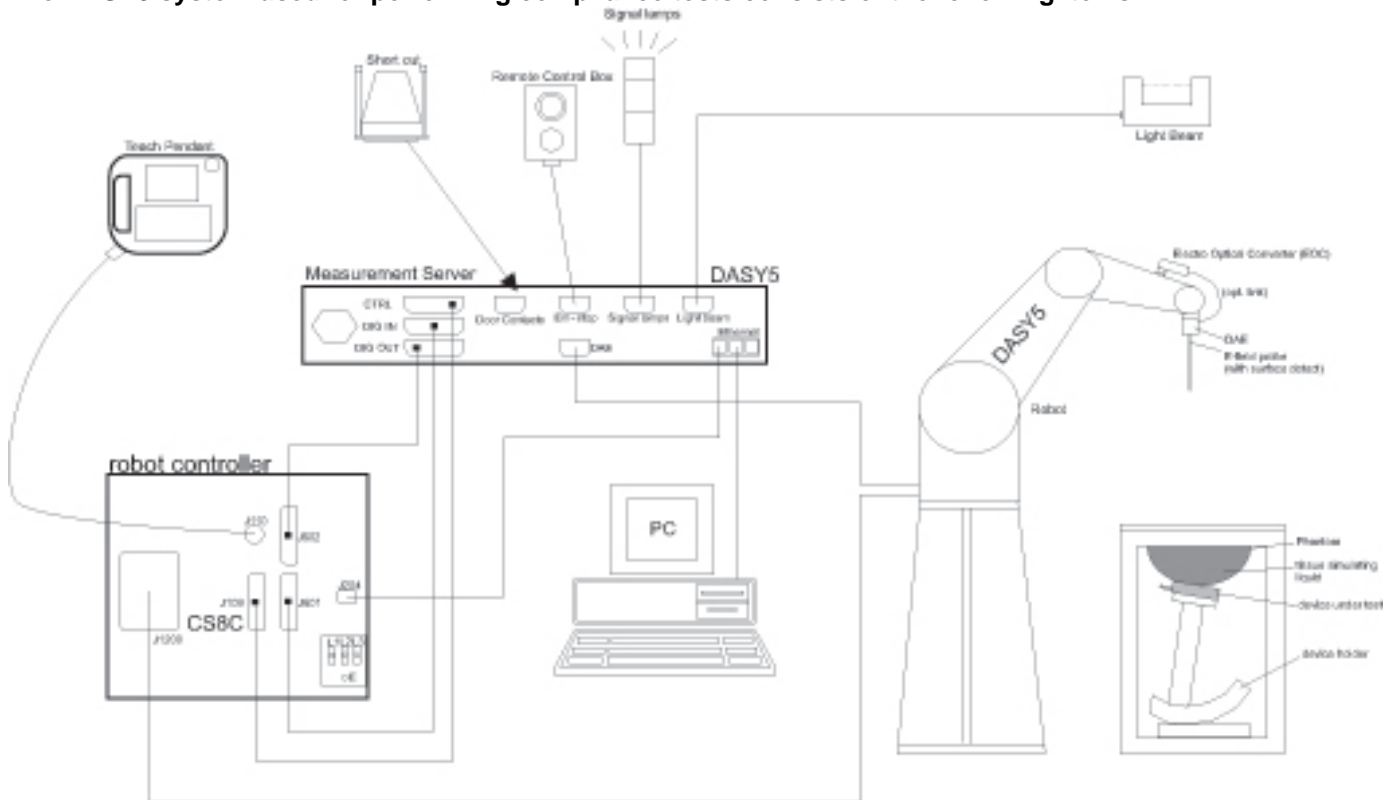
UL Korea, Ltd. is accredited by IAS, Laboratory Code TL-637.

The full scope of accreditation can be viewed at <http://www.iasonline.org/PDF/TL/TL-637.pdf>.

4. SAR Measurement System & Test Equipment

4.1. SAR Measurement System

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



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

4.2. SAR Scan Procedures

Step 1: Power Reference Measurement

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

Step 2: Area Scan

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

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

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

Step 3: Zoom Scan

Zoom Scans are used to assess the peak spatial SAR values within a cubic averaging volume containing 1 g and 10 g of simulated tissue. The Zoom Scan measures points (refer to table below) within a cube whose base faces are centered on the maxima found in a preceding area scan job within the same procedure. When the measurement is done, the Zoom Scan evaluates the averaged SAR for 1 g and 10 g and displays these values next to the job's label.

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

			≤ 3 GHz	> 3 GHz
Maximum zoom scan spatial resolution: $\Delta x_{Zoom}, \Delta y_{Zoom}$			≤ 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 1 st two points closest to phantom surface	≤ 4 mm	3 – 4 GHz: ≤ 3 mm 4 – 5 GHz: ≤ 2.5 mm 5 – 6 GHz: ≤ 2 mm
		$\Delta z_{Zoom}(n>1)$: between subsequent points	≤ 1.5 · $\Delta z_{Zoom}(n-1)$	
Minimum zoom scan volume	x, y, z	≥ 30 mm	3 – 4 GHz: ≥ 28 mm 4 – 5 GHz: ≥ 25 mm 5 – 6 GHz: ≥ 22 mm	
Note: δ is the penetration depth of a plane-wave at normal incidence to the tissue medium; see draft standard IEEE P1528-2011 for details. * When zoom scan is required and the <i>reported</i> SAR from the <i>area scan based 1-g SAR estimation</i> procedures of KDB 447498 is ≤ 1.4 W/kg, ≤ 8 mm, ≤ 7 mm and ≤ 5 mm zoom scan resolution may be applied, respectively, for 2 GHz to 3 GHz, 3 GHz to 4 GHz and 4 GHz to 6 GHz.				

Step 4: Power drift measurement

The Power Drift Measurement measures the field at the same location as the most recent power reference measurement within the same procedure, and with the same settings. The Power Drift Measurement gives the field difference in dB from the reading conducted within the last Power Reference Measurement. This allows a user to monitor the power drift of the device under test within a batch process. The measurement procedure is the same as Step 1.

Step 5: Z-Scan (FCC only)

The Z Scan measures points along a vertical straight line. The line runs along the Z-axis of a one-dimensional grid. In order to get a reasonable extrapolation the extrapolated distance should not be larger than the step size in Z-direction.

4.3. Test Equipment

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

Dielectric Property Measurements

Name of Equipment	Manufacturer	Type/Model	Serial No.	Cal. Due Date
Network Analyzer	Agilent	E5071C	MY46522054	8-7-2019
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
Low Pass Filter	MICROLAB	LA-60N	03942	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	7313	2-20-2019
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	1494	7-23-2019
Data Acquisition Electronics (SAR2)	SPEAG	DAE4	1447	3-15-2019
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	2-19-2019
System Validation Dipole	SPEAG	D835V2	4d194	7-24-2019
System Validation Dipole	SPEAG	D1750V2	1125	2-16-2019
System Validation Dipole	SPEAG	D1900V2	5d199	3-15-2019
System Validation Dipole	SPEAG	D2450V2	960	3-20-2019
System Validation Dipole	SPEAG	D2600V2	1097	1-17-2019
System Validation Dipole	SPEAG	D5GHzV2	1209	2-15-2019
Thermometer (SAR1)	Lutron	MHB-382SD	AH.91463	8-8-2019
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 (D2600, SN : 1097)

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 $\leq 30\%$, 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): 158.5 mm x 74.5 mm Overall Diagonal: 165 mm Display Diagonal: 158 mm																																							
Back Cover	<input checked="" type="checkbox"/> The Back Cover is not removable.																																							
Battery Options	<input checked="" type="checkbox"/> 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. <input checked="" type="checkbox"/> Mobile Hotspot (Wi-Fi 2.4 GHz, Ch 1~13) <input checked="" type="checkbox"/> Mobile Hotspot (Wi-Fi 5 GHz_Ch.149)																																							
Wi-Fi Direct	Wi-Fi Direct enabled devices transfer data directly between each other <input checked="" type="checkbox"/> Wi-Fi Direct (Wi-Fi 2.4 GHz, Ch 1~13) <input checked="" type="checkbox"/> Wi-Fi Direct (Wi-Fi 5 GHz_Ch 36~48, Ch.149~165)																																							
Test Sample Information	<table border="1"> <thead> <tr> <th>No.</th> <th>S/N</th> <th>Notes</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>R38KC05YNFH</td> <td>Main Conducted</td> </tr> <tr> <td>2</td> <td>984357344c313448</td> <td>Main Conducted</td> </tr> <tr> <td>3</td> <td>R38KC05YNSD</td> <td>Wi-Fi Conducted</td> </tr> <tr> <td>4</td> <td>R38KC05YNJB</td> <td>SAR</td> </tr> <tr> <td>5</td> <td>R38KC05YNDK</td> <td>SAR</td> </tr> <tr> <td>6</td> <td>R38KC05YNEV</td> <td>SAR</td> </tr> <tr> <td>7</td> <td>R38KJC05YNRF</td> <td>SAR</td> </tr> <tr> <td>8</td> <td>R38105PMML</td> <td>SAR</td> </tr> <tr> <td>9</td> <td>R38M105PMLR</td> <td>SAR</td> </tr> <tr> <td>10</td> <td>R38KC05Z2HA</td> <td>SAR</td> </tr> <tr> <td>11</td> <td>R38M105PVGJ</td> <td>SAR</td> </tr> <tr> <td>12</td> <td>R38M105PVFX</td> <td>SAR</td> </tr> </tbody> </table>	No.	S/N	Notes	1	R38KC05YNFH	Main Conducted	2	984357344c313448	Main Conducted	3	R38KC05YNSD	Wi-Fi Conducted	4	R38KC05YNJB	SAR	5	R38KC05YNDK	SAR	6	R38KC05YNEV	SAR	7	R38KJC05YNRF	SAR	8	R38105PMML	SAR	9	R38M105PMLR	SAR	10	R38KC05Z2HA	SAR	11	R38M105PVGJ	SAR	12	R38M105PVFX	SAR
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6	R38KC05YNEV	SAR																																						
7	R38KJC05YNRF	SAR																																						
8	R38105PMML	SAR																																						
9	R38M105PMLR	SAR																																						
10	R38KC05Z2HA	SAR																																						
11	R38M105PVGJ	SAR																																						
12	R38M105PVFX	SAR																																						

6.2. Wireless Technologies

Wireless technologies	Frequency bands	Operating mode		Duty Cycle used for SAR testing
GSM	850 1900	Voice (GMSK)	GPRS Multi-Slot Class:	GSM Voice: 12.5% (E)GPRS: 1 Slot: 12.5% 2 Slot: 25% 3 Slot: 37.5% 4 Slot: 50%
		GPRS (GMSK)	<input type="checkbox"/> Class 8 – 1 UP, 4 Down	
		EGPRS (8PSK)	<input type="checkbox"/> Class 10 – 2 UP, 4 Down	
			<input type="checkbox"/> Class 12 – 4 UP, 4 Down	
			<input checked="" type="checkbox"/> Class 33 – 4 UP, 5 Down	
Does this device support DTM (Dual Transfer Mode)? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No				
W-CDMA (UMTS)	Band II Band IV Band V	UMTS Rel. 99 (Voice & Data) HSDPA (Release.9) HSUPA (Release.9) DC-HSDPA (Release 9) HSPA+ (Release 9)		100%
LTE	FDD Band 2 FDD Band 4 FDD Band 5 FDD Band 12 FDD Band 13 FDD Band 17 FDD Band 26 FDD Band 66 TDD Band 41	QPSK 16QAM Rel. 10 Carrier Aggregation support downlink only		100% (FDD) 63.3% (TDD)
		Does this device support SV-LTE (1xRTT-LTE)? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No		
Wi-Fi	2.4 GHz	802.11b		99.8% (802.11b)
		802.11g		97.2% (802.11g)
	802.11n (HT20)		97.0% (802.11n 20MHz BW)	
	5 GHz	802.11a		97.7% (802.11a)
802.11n (HT20)		97.5% (802.11n, 11ac 20MHz BW)		
802.11n (HT40)		93.2% (802.11n, 11ac 40MHz BW)		
802.11ac (VHT20)		85.6% (802.11ac 80MHz BW)		
		802.11ac (VHT40)		
		802.11ac (VHT80)		
Does this device support bands 5.60 ~ 5.65 GHz? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No				
Does this device support Band gap channel(s)? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No				
Bluetooth	2.4 GHz	Version 5.0 LE		76.7% (DH5)

Notes:

1. This device supports uplink-downlink configuration 0-6. The configuration with the highest duty cycle was used (uplink-downlink configuration 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.

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	Time Slots	Max. RF Output Power (dBm)	
				Tune-up Limit	Frame Power
GSM 850	Ant.1	Voice/GPRS	1	34.0	25.0
		GPRS	2	31.5	25.5
		GPRS	3	30.0	25.7
		GPRS	4	29.0	26.0
		EGPRS	1	27.5	18.5
		EGPRS	2	25.0	19.0
		EGPRS	3	24.0	19.7
		EGPRS	4	23.0	20.0
GSM 1900	Ant.1	Voice/GPRS	1	31.0	22.0
		GPRS	2	28.0	22.0
		GPRS	3	26.0	21.7
		GPRS	4	24.5	21.5
		EGPRS	1	26.5	17.5
		EGPRS	2	24.0	18.0
		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	Ant.1	R99	24.5	21.5
		HSDPA	23.5	21.0
		HSUPA	23.0	21.0
		DC-HSDPA	23.5	21.0
W-CDMA Band IV	Ant.1	R99	25.0	22.0
		HSDPA	24.5	21.5
		HSUPA	23.0	21.5
		DC-HSDPA	24.5	21.5
W-CDMA Band V	Ant.1	R99	25.5	
		HSDPA	24.5	
		HSUPA	22.5	
		DC-HSDPA	25.0	

RF Air interface	Antenna	Mode	Max. RF Output Power (dBm)	Reduced. RF Output Power (dBm)
LTE Band 2	Ant.1	QPSK	25.0	23.0
LTE Band 4 ⁶	Ant.1	QPSK	25.0	22.8
LTE Band 5 ⁷	Ant.1	QPSK	25.5	
LTE Band 12	Ant.1	QPSK	25.5	
LTE Band 13	Ant.1	QPSK	25.5	
LTE Band 17 ⁸	Ant.1	QPSK	25.5	
LTE Band 26	Ant.1	QPSK	25.5	
LTE Band 41	Ant.2	QPSK	24.5	
LTE Band 66	Ant.1	QPSK	25.0	22.8

Note(s):

1. This device utilizes power reduction under portable hotspot conditions for SAR compliance in WCDMA Band II/IV and LTE Band 2/4/66. 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. This device supports to proximity sensor back-off function during extremity (hand-held) use conditions in WCDMA Band II/IV and LTE Band 2/4/66. And this function is applied to phablet 10-g SAR exposure condition. Other Head and Body exposure conditions are performed SAR test with full power. The proximity sensor details are explained in SAR report according to Section 6 in KDB 616217.
3. WCDMA Band II has support to power reduction when earphone is connected to phone. But Max power's reported SAR result is not over 1.2 W/kg in body-worn exposure condition. so we don't need to evaluation for phone + earphone configuration in body-worn accessory exposure condition according to Sec.2.3 in KDB 648474 D04. Therefore we don't need to consider about power reduction when earphone is connected to phone.
4. All Power reduction mechanisms do not work at the same time.
5. LTE QPSK configuration has the highest maximum average output power per 3GPP standard.
6. LTE Band 4 (Frequency range: 1710-1755 MHz) is covered by LTE Band 66 (Frequency range: 1710-1780 MHz) due to overlapping frequency range, same maximum tune-up limit and same channel bandwidth.
7. LTE Band 5 (Frequency range: 824-849 MHz) is covered by LTE Band 26 (Frequency range: 814-849 MHz) due to overlapping frequency range, same maximum tune-up limit and same channel bandwidth from 10MHz to 1.4MHz. Therefore, LTE Band 26 at 15MHz bandwidth has been measured.
8. 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.

RF Air interface	Mode	Max. RF Output Power (dBm)	Reduced. RF Output Power (dBm)
WiFi 2.4 GHz (Ch.1 - Ch.10)	802.11b	17.5	14.5
	802.11g	17.0	14.0
	802.11n HT20	17.0	14.0
WiFi 2.4 GHz (Ch.11)	802.11b	17.5	14.5
	802.11g	15.0	12.0
	802.11n HT20	14.5	11.5
WiFi 2.4 GHz (Ch.12)	802.11b	16.0	13.0
	802.11g	11.5	8.5
	802.11n HT20	12.0	9.0
WiFi 2.4 GHz (Ch.13)	802.11b	12.5	9.5
	802.11g	9.5	6.5
	802.11n HT20	10.0	7.0
WiFi 5.2 GHz	802.11a	15.5	13.0
	802.11n HT20	15.5	13.0
	802.11n HT40	12.5	
	802.11ac VHT20	15.5	13.0
	802.11ac VHT40	12.5	
	802.11ac VHT80	11.0	
WiFi 5.3 GHz	802.11a	10.5	
	802.11n HT20	10.5	
	802.11n HT40	8.5	
	802.11ac VHT20	10.5	
	802.11ac VHT40	8.5	
	802.11ac VHT80	8.0	
WiFi 5.5 GHz	802.11a	13.5	
	802.11n HT20	13.0	
	802.11n HT40	10.5	
	802.11ac VHT20	13.0	
	802.11ac VHT40	10.5	
	802.11ac VHT80	9.5	
WiFi 5.8 GHz	802.11a	16.0	13.0
	802.11n HT20	16.0	13.0
	802.11n HT40	15.0	12.0
	802.11ac VHT20	16.0	13.0
	802.11ac VHT40	15.0	12.0
	802.11ac VHT80	14.0	11.0
Bluetooth		10.0	
Bluetooth LE		7.0	

Note(s):

This device uses an independent fixed level power reduction mechanism for WLAN operations during RCV operated. Detailed descriptions of the power reduction mechanism are included in the operational description.

6.4. General LTE SAR Test and Reporting Considerations

Item	Description						
Frequency range, Channel Bandwidth, Numbers and Frequencies	Band 2	Frequency range: 1850 - 1910 MHz					
		Channel Bandwidth					
		20 MHz	15 MHz	10 MHz	5 MHz	3 MHz	1.4 MHz
	Low	18700/ 1860	18675/ 1857.5	18650/ 1855	18625/ 1852.5	18615/ 1851.5	18607/ 1850.7
	Mid	18900/ 1880	18900/ 1880	18900/ 1880	18900/ 1880	18900/ 1880	18900/ 1880
	High	19100/ 1900	19125/ 1902.5	19150/ 1905	19175/ 1907.5	19185/ 1908.5	19193/ 1909.3
	Band 4	Frequency range: 1710 - 1755 MHz					
		Channel Bandwidth					
		20 MHz	15 MHz	10 MHz	5 MHz	3 MHz	1.4 MHz
	Low	20050/ 1720	20025/ 1717.5	20000/ 1715	19975/ 1712.5	19965/ 1711.5	19957/ 1710.7
	Mid	20175/ 1732.5	20175/ 1732.5	20175/ 1732.5	20175/ 1732.5	20175/ 1732.5	20175/ 1732.5
	High	20300/ 1745	20325/ 1747.5	20350/ 1750	20375/ 1752.5	20385/ 1753.5	20393/ 1754.3
	Band 5	Frequency range: 824 - 849 MHz					
		Channel Bandwidth					
		20 MHz	15 MHz	10 MHz	5 MHz	3 MHz	1.4 MHz
	Low			20450/ 829	20425/ 826.5	20415/ 825.5	20407/ 824.7
	Mid			20525/ 836.5	20525/ 836.5	20525/ 836.5	20525/ 836.5
	High			20600/ 844	20625/ 846.5	20635/ 847.5	20643/ 848.3
	Band 12	Frequency range: 699 – 716 MHz					
		Channel Bandwidth					
		20 MHz	15 MHz	10 MHz	5 MHz	3 MHz	1.4 MHz
	Low			23060/ 704	23035/ 701.5	23025/ 700.5	23017/ 699.7
	Mid			23095/ 707.5	23095/ 707.5	23095/ 707.5	23095/ 707.5
	High			23130/ 711	23155/ 713.5	23165/ 714.5	23173/ 715.3
	Band 13	Frequency range: 777 - 787 MHz					
		Channel Bandwidth					
		20 MHz	15 MHz	10 MHz	5 MHz	3 MHz	1.4 MHz
	Low				23205/ 779.5		
Mid			23230/ 782	23230/ 782			
High				23255/ 784.5			
Band 17	Frequency range: 704 - 716 MHz						
	Channel Bandwidth						
	20 MHz	15 MHz	10 MHz	5 MHz	3 MHz	1.4 MHz	
Low			23780/ 709	23755/ 706.5			
Mid			23790/ 710	23790/ 710			
High			23800/ 711	23825/ 713.5			

Item	Description																																																														
Frequency range, Channel Bandwidth, Numbers and Frequencies	<table border="1"> <thead> <tr> <th colspan="7">Frequency range: 814 - 849 MHz</th> </tr> <tr> <th colspan="7">Channel Bandwidth</th> </tr> <tr> <th>20 MHz</th> <th>15 MHz</th> <th>10 MHz</th> <th>5 MHz</th> <th>3 MHz</th> <th>1.4 MHz</th> <th></th> </tr> </thead> <tbody> <tr> <td>Low</td> <td>26765/821.5</td> <td>26740/819</td> <td>26715/816.5</td> <td>26705/815.5</td> <td>26697/814.7</td> <td></td> </tr> <tr> <td>Mid</td> <td>26865/831.5</td> <td>26865/831.5</td> <td>26865/831.5</td> <td>26865/831.5</td> <td>26865/831.5</td> <td></td> </tr> <tr> <td>High</td> <td>26965/841.5</td> <td>26990/844</td> <td>27015/846.5</td> <td>27025/847.5</td> <td>27033/848.3</td> <td></td> </tr> </tbody> </table>	Frequency range: 814 - 849 MHz							Channel Bandwidth							20 MHz	15 MHz	10 MHz	5 MHz	3 MHz	1.4 MHz		Low	26765/821.5	26740/819	26715/816.5	26705/815.5	26697/814.7		Mid	26865/831.5	26865/831.5	26865/831.5	26865/831.5	26865/831.5		High	26965/841.5	26990/844	27015/846.5	27025/847.5	27033/848.3																					
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High	132572/1770	132597/1772.5	132622/1775	132647/1777.5	132657/1778.5	132665/1779.3																																																									
LTE transmitter and antenna implementation	Refer to Appendix A.																																																														
Maximum power reduction (MPR)	<p>Table 6.2.3-1: Maximum Power Reduction (MPR) for Power Class 1, 2 and 3</p> <table border="1"> <thead> <tr> <th rowspan="2">Modulation</th> <th colspan="6">Channel bandwidth / Transmission bandwidth (N_{RB})</th> <th rowspan="2">MPR (dB)</th> </tr> <tr> <th>1.4 MHz</th> <th>3.0 MHz</th> <th>5 MHz</th> <th>10 MHz</th> <th>15 MHz</th> <th>20 MHz</th> </tr> </thead> <tbody> <tr> <td>QPSK</td> <td>> 5</td> <td>> 4</td> <td>> 8</td> <td>> 12</td> <td>> 16</td> <td>> 18</td> <td>≤ 1</td> </tr> <tr> <td>16 QAM</td> <td>≤ 5</td> <td>≤ 4</td> <td>≤ 8</td> <td>≤ 12</td> <td>≤ 16</td> <td>≤ 18</td> <td>≤ 1</td> </tr> <tr> <td>16 QAM</td> <td>> 5</td> <td>> 4</td> <td>> 8</td> <td>> 12</td> <td>> 16</td> <td>> 18</td> <td>≤ 2</td> </tr> <tr> <td>64 QAM</td> <td>≤ 5</td> <td>≤ 4</td> <td>≤ 8</td> <td>≤ 12</td> <td>≤ 16</td> <td>≤ 18</td> <td>≤ 2</td> </tr> <tr> <td>64 QAM</td> <td>> 5</td> <td>> 4</td> <td>> 8</td> <td>> 12</td> <td>> 16</td> <td>> 18</td> <td>≤ 3</td> </tr> <tr> <td>256 QAM</td> <td colspan="6">≥ 1</td> <td>≤ 5</td> </tr> </tbody> </table> <p>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</p>	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
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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.																																																														

Note(s):

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

6.5. LTE Carrier Aggregation

DL Inter-Band

E-UTRA CA configuration (BCS)	E-UTRA Band	Reversible	Bandwidth						Max Aggregated BW
			1.4 MHz	3 MHz	5 MHz	10 MHz	15 MHz	20 MHz	
CA_2A-5A (0)(1)	Band 2	Y			Yes	Yes	Yes	Yes	30 MHz
	Band 5				Yes	Yes			
	Band 2				Yes	Yes			20 MHz
	Band 5				Yes	Yes			
CA_2A-12A (0)(1)(2)	Band 2	Y			Yes	Yes	Yes	Yes	30 MHz
	Band 12				Yes	Yes			
	Band 2				Yes	Yes	Yes	Yes	30 MHz
	Band 12		Yes	Yes	Yes	Yes			
	Band 2				Yes	Yes			20 MHz
	Band 12				Yes	Yes			
CA_2A-13A (0)(1)	Band 2	Y			Yes	Yes	Yes	Yes	30 MHz
	Band 13					Yes			
	Band 2				Yes	Yes			20 MHz
	Band 13					Yes			
CA_2A-17A (0)	Band 2	Y			Yes	Yes			20 MHz
	Band 17				Yes	Yes			
CA_4A-5A (0)(1)	Band 4	Y			Yes	Yes			20 MHz
	Band 5				Yes	Yes			
	Band 4				Yes	Yes	Yes	Yes	30 MHz
	Band 5				Yes	Yes			
CA_4A-12A (0)(1)(2)(3)(4)(5)	Band 4	Y	Yes	Yes	Yes	Yes			20 MHz
	Band 12				Yes	Yes			
	Band 4		Yes	Yes	Yes	Yes	Yes	Yes	30 MHz
	Band 12				Yes	Yes			
	Band 4				Yes	Yes	Yes	Yes	30 MHz
	Band 12		Yes	Yes	Yes	Yes			
	Band 4				Yes	Yes			20 MHz
	Band 12				Yes	Yes			
	Band 4				Yes	Yes	Yes	Yes	30 MHz
	Band 12				Yes	Yes			
	Band 4				Yes	Yes	Yes		20 MHz
	Band 12				Yes				
CA_4A-13A (0)(1)	Band 4	Y			Yes	Yes	Yes	Yes	30 MHz
	Band 13					Yes			
	Band 4				Yes	Yes			20 MHz
	Band 13					Yes			
CA_4A-17A (0)	Band 4	Y			Yes	Yes			20 MHz
	Band 17				Yes	Yes			
CA_5A-41A (0)	Band 5	N			Yes	Yes			30 MHz
	Band 41						Yes		

Note(s):

- For supported channels, please refer to §6.4.

DL Intra-Band Non-contiguous

E-UTRA CA configuration (BCS)	E-UTRA Band	Reversible	Allowed Channel BW Per Carrier (MHz)		Max Aggregated BW
			1st Carrier	2nd Carrier	
CA_2A-2A (0)	Band 2	-	5, 10, 15, 20	5, 10, 15, 20	40 MHz
CA_4A-4A (0)(1)	Band 4	-	5, 10, 15, 20	5, 10, 15, 20	40 MHz
			5, 10	5, 10	20 MHz
CA_5A-5A (0)(1)	Band 5	-	5, 10	5, 10	20 MHz
			3	5	8 MHz
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
CA_66A-66A (0)	Band 66	-	5, 10, 15, 20	5, 10, 15, 20	40 MHz

DL Intra-Band Contiguous

E-UTRA CA configuration (BCS)	E-UTRA Band	Reversible	Allowed Channel BW Per Carrier (MHz)		Max Aggregated BW
			1st Carrier	2nd Carrier	
CA_2C (0)	Band 2	-	5	20	40 MHz
			10	15, 20	
			15	10, 15, 20	
			20	5, 10, 15, 20	
CA_5B (0)(1)	Band 5	-	5, 10	10	20 MHz
			10	5	8 MHz
			3	5	
			5	3	
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	40 MHz
			10	15, 20	
			15	10, 15, 20	
20	10, 15, 20	40 MHz			
10	20				
20	20				
CA_66C (0)	Band 66	-	5	20	40 MHz
			10	15, 20	
			15	10, 15, 20	
			20	5, 10, 15, 20	

Note(s):

- For supported channels, please refer to §6.4.

6.6. LTE (TDD) Considerations

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

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	$26336 \cdot T_s$			$7680 \cdot T_s$		
5	$6592 \cdot T_s$	$4384 \cdot T_s$	$5120 \cdot T_s$	$20480 \cdot T_s$	$4384 \cdot T_s$	$5120 \cdot T_s$
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 $\times (T_s) \times \#$ of S + $\#$ of U

Example for Calculated Duty Cycle for Uplink-Downlink Configuration 0:

Calculated Duty Cycle = $5120 \times [1/(15000 \times 2048)] \times 2 + 6 \text{ ms} = 63.33\%$

where

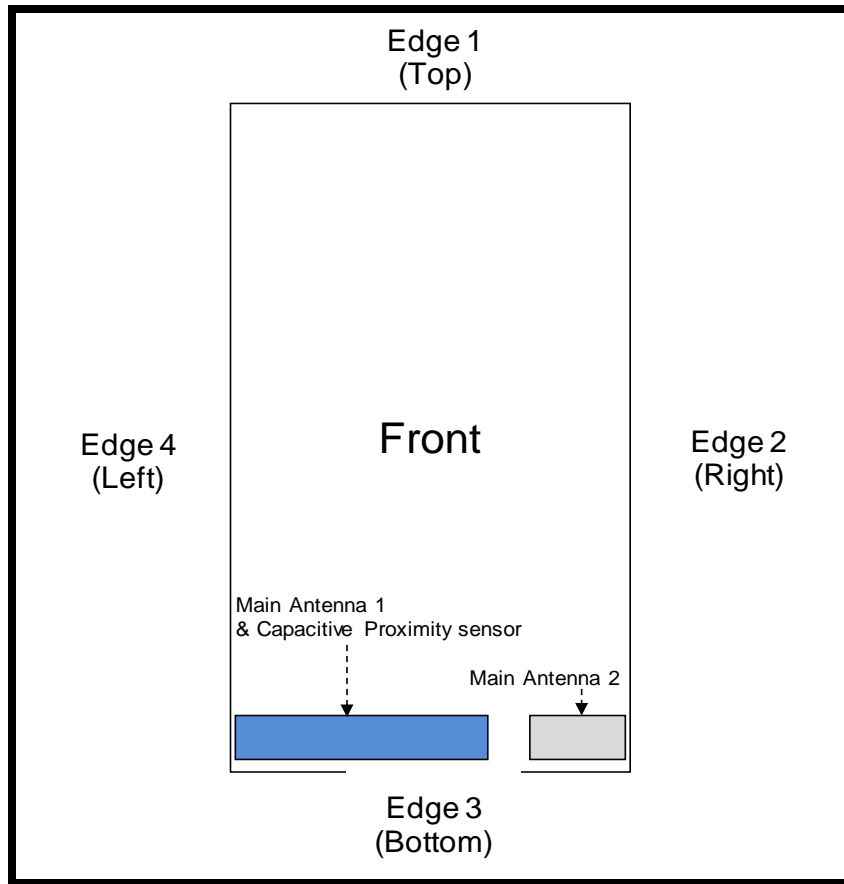
$T_s = 1/(15000 \times 2048)$ seconds

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.

6.7. Proximity sensor feature

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

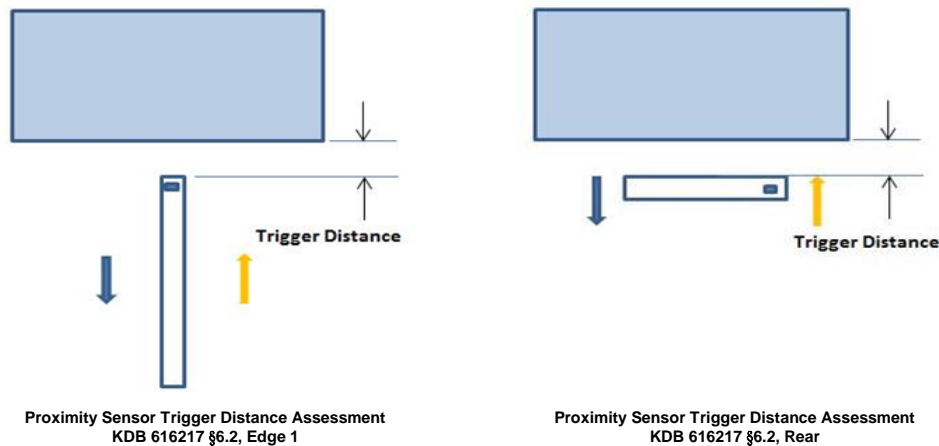


6.7.1. Proximity Sensor Triggering Distance (KDB 616217 §6.2)

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

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

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



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

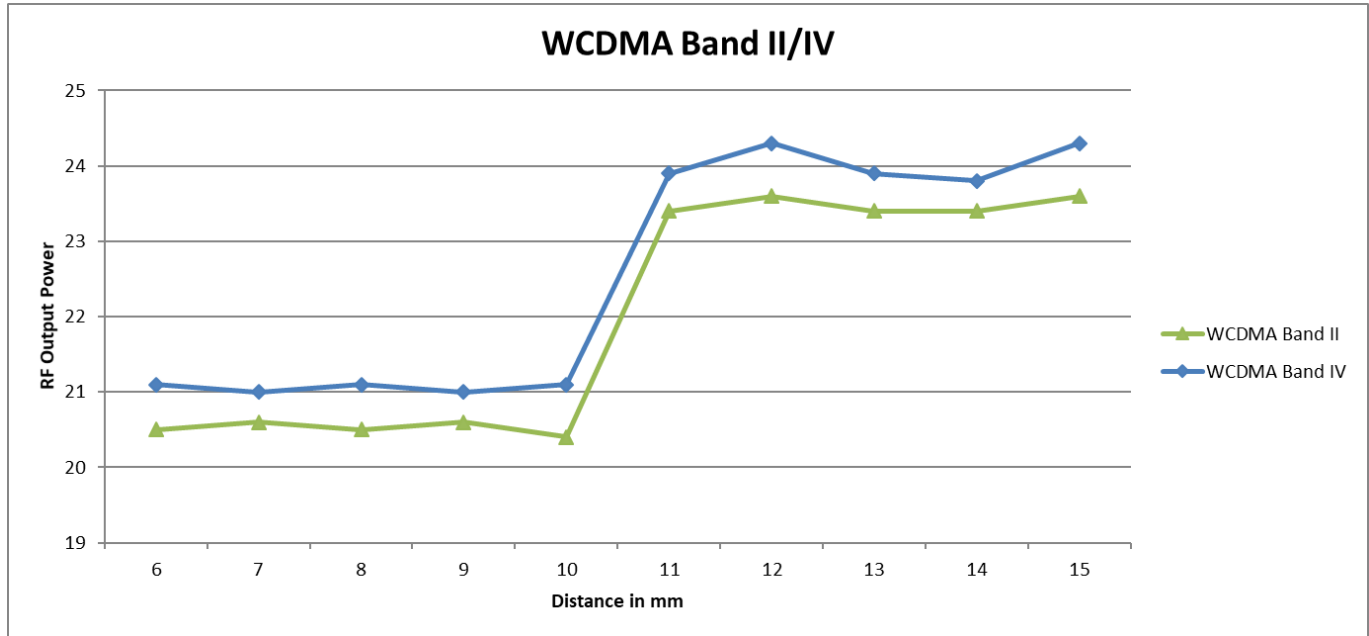
Antenna	Tissue Simulating Liquid	Trigger distance - Rear		Trigger distance - Front		Trigger distance - Edge 3	
		Moving toward phantom	Moving from phantom	Moving toward phantom	Moving from phantom	Moving toward phantom	Moving from phantom
Main Antenna 1	1750 muscle	10 mm	10 mm	2 mm	2 mm	6 mm	6 mm
	1900 muscle	10 mm	10 mm	2 mm	2 mm	6 mm	6 mm

Proximity Sensor Triggering Distance Measurement Results

WCDMA Band II / IV

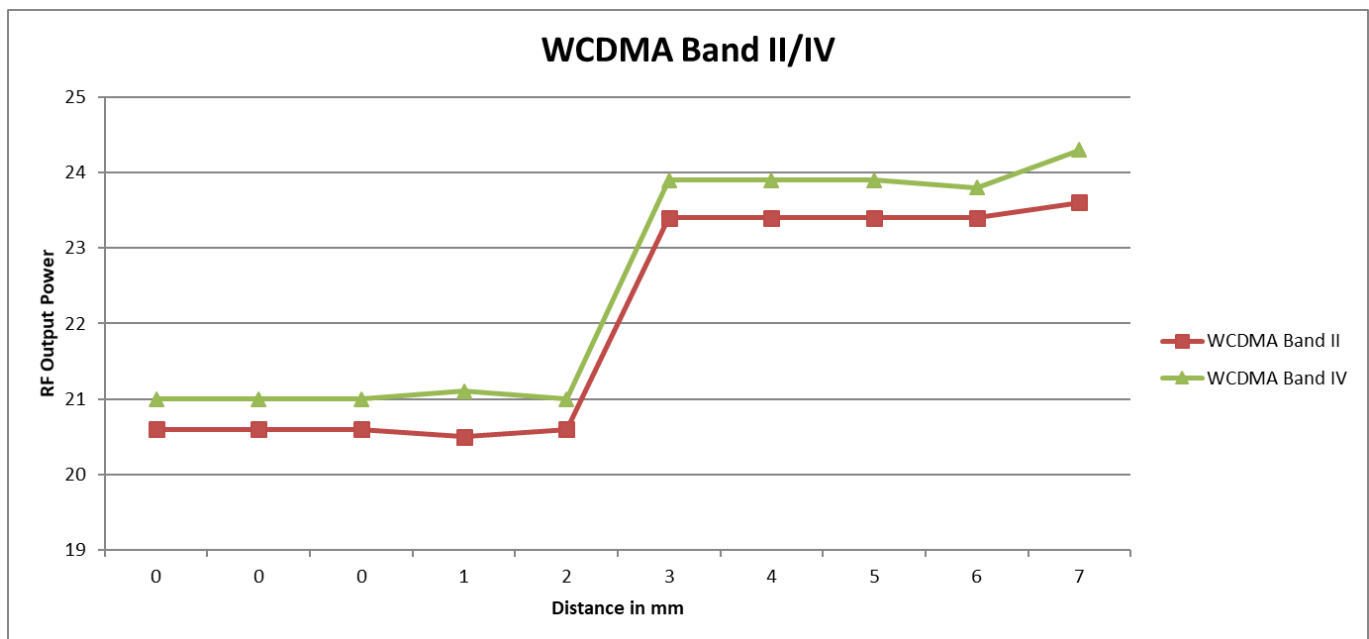
Rear, DUT Moving Toward (Trigger) from the Phantom

Distance to DUT vs. Output Power in dBm										
Distance (mm)	6	7	8	9	10	11	12	13	14	15
WCDMA Band II	20.5	20.6	20.5	20.6	20.4	23.4	23.6	23.4	23.4	23.6
WCDMA Band IV	21.1	21.0	21.1	21.0	21.1	23.9	24.3	23.9	23.8	24.3



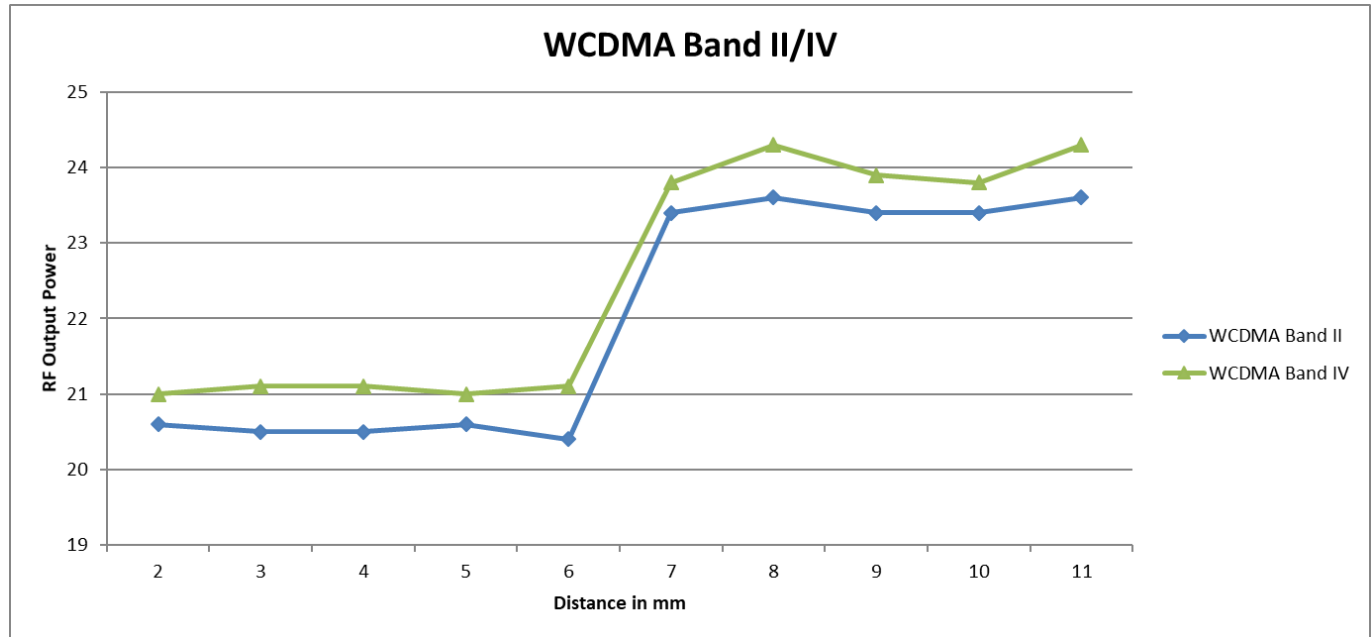
Front, DUT Moving Toward (Trigger) from the Phantom

Distance to DUT vs. Output Power in dBm										
Distance (mm)	0	0	0	1	2	3	4	5	6	7
WCDMA Band II	20.6	20.6	20.6	20.5	20.6	23.4	23.4	23.4	23.4	23.6
WCDMA Band IV	21.0	21.0	21.0	21.1	21.0	23.9	23.9	23.9	23.8	24.3



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

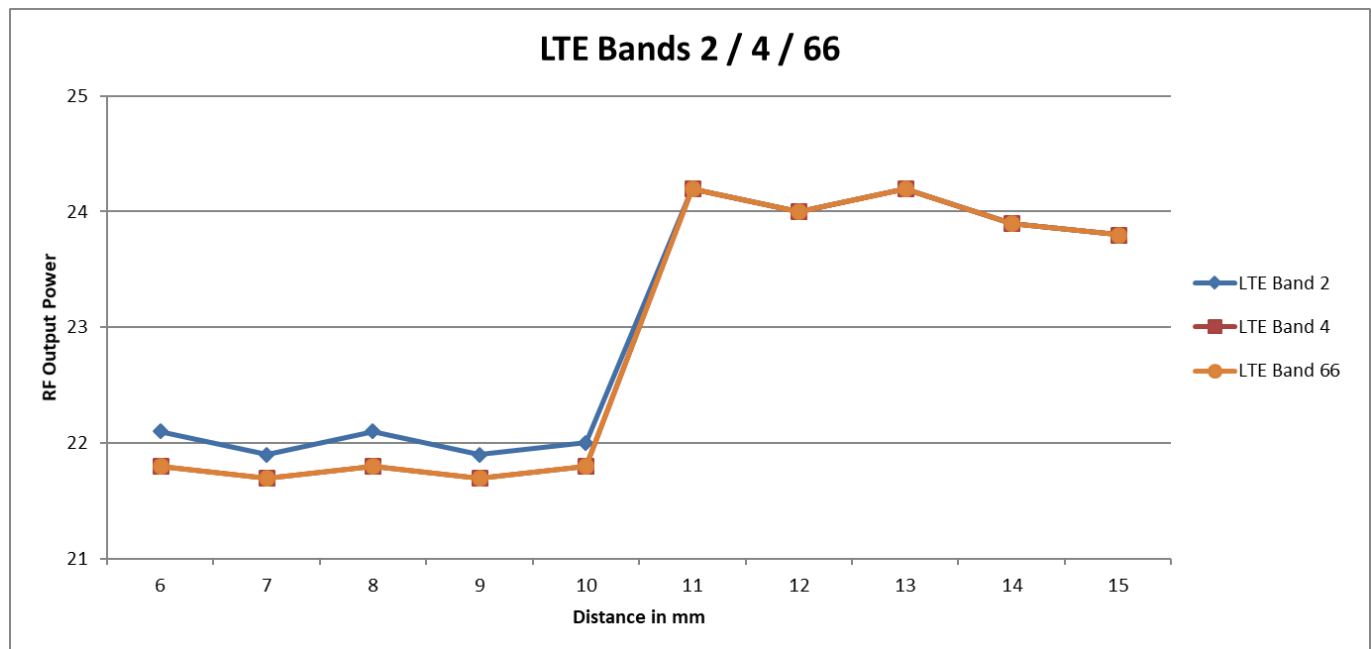
Distance to DUT vs. Output Power in dBm										
Distance (mm)	2	3	4	5	6	7	8	9	10	11
WCDMA Band II	20.6	20.5	20.5	20.6	20.4	23.4	23.6	23.4	23.4	23.6
WCDMA Band IV	21.0	21.1	21.1	21.0	21.1	23.8	24.3	23.9	23.8	24.3



LTE Band 2 / 4 / 66

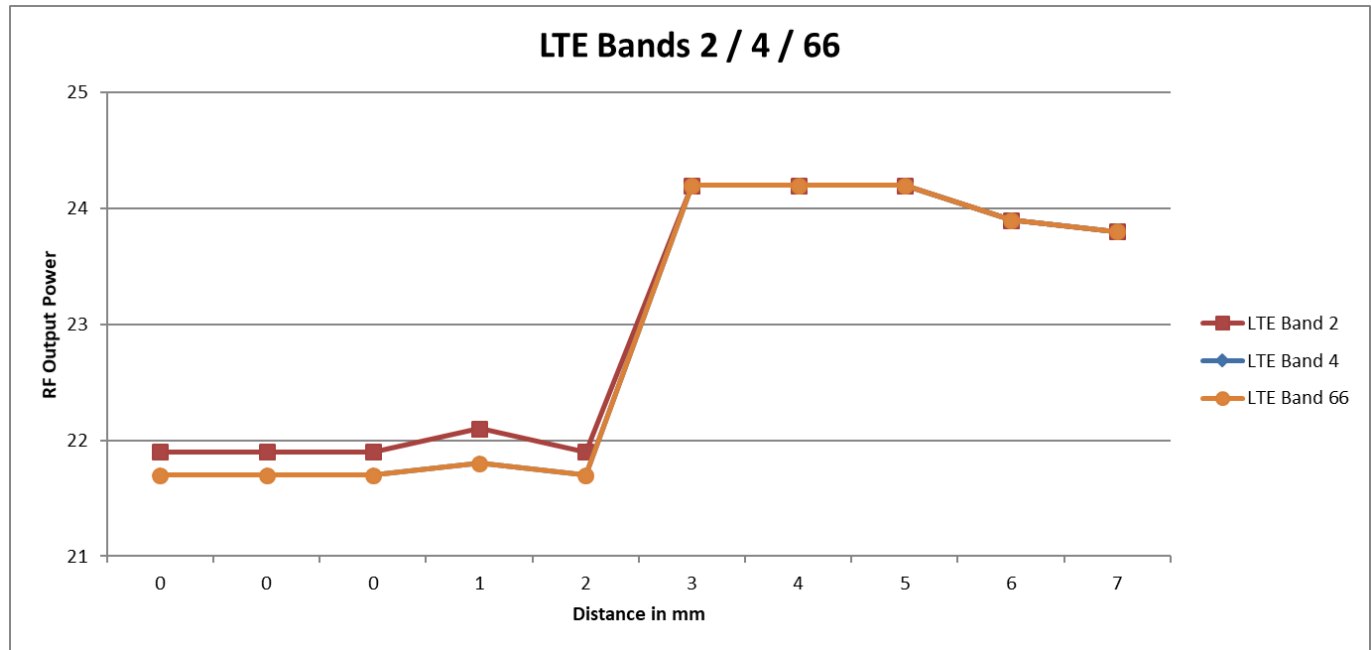
Rear, DUT Moving Toward (Trigger) from the Phantom

Distance to DUT vs. Output Power in dBm										
Distance (mm)	6	7	8	9	10	11	12	13	14	15
LTE Band 2	22.1	21.9	22.1	21.9	22.0	24.2	24.0	24.2	23.9	23.8
LTE Band 4	21.8	21.7	21.8	21.7	21.8	24.2	24.0	24.2	23.9	23.8
LTE Band 66	21.8	21.7	21.8	21.7	21.8	24.2	24.0	24.2	23.9	23.8



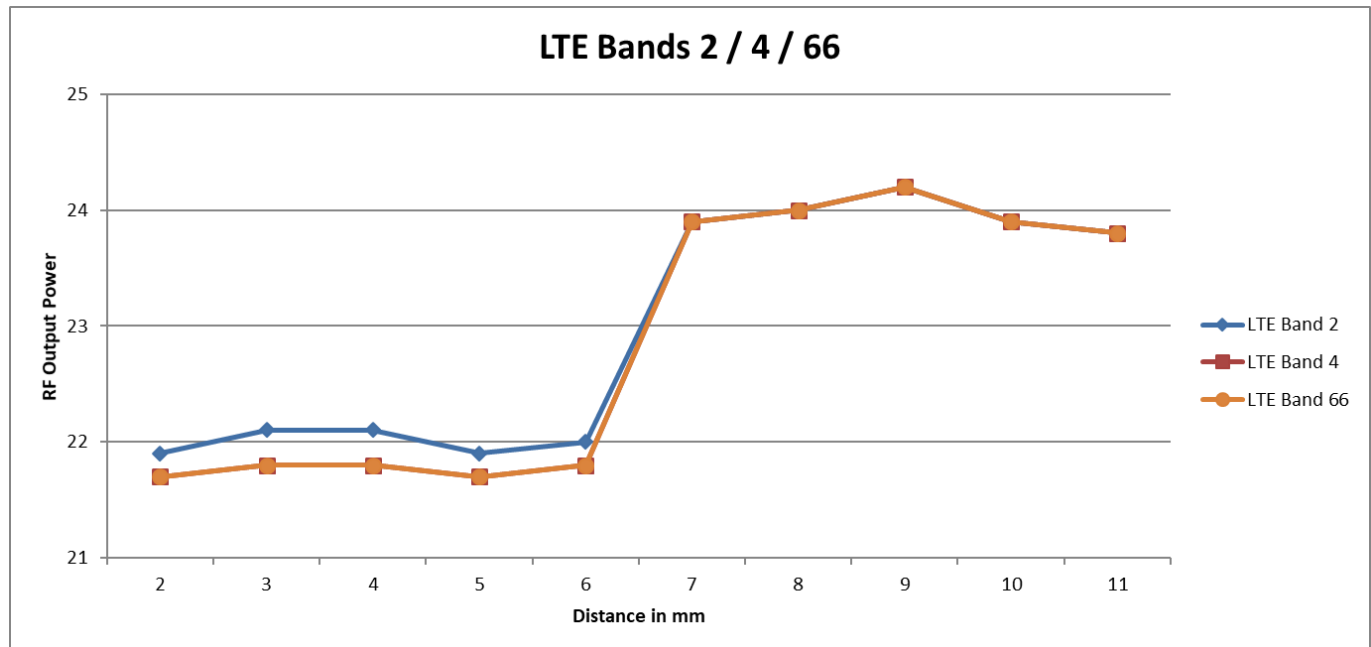
Front, DUT Moving Toward (Trigger) from the Phantom

Distance to DUT vs. Output Power in dBm										
Distance (mm)	0	0	0	1	2	3	4	5	6	7
LTE Band 2	21.9	21.9	21.9	22.1	21.9	24.2	24.2	24.2	23.9	23.8
LTE Band 4	21.7	21.7	21.7	21.8	21.7	24.2	24.2	24.2	23.9	23.8
LTE Band 66	21.7	21.7	21.7	21.8	21.7	24.2	24.2	24.2	23.9	23.8



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

Distance to DUT vs. Output Power in dBm										
Distance (mm)	2	3	4	5	6	7	8	9	10	11
LTE Band 2	21.9	22.1	22.1	21.9	22.0	23.9	24.0	24.2	23.9	23.8
LTE Band 4	21.7	21.8	21.8	21.7	21.8	23.9	24.0	24.2	23.9	23.8
LTE Band 66	21.7	21.8	21.8	21.7	21.8	23.9	24.0	24.2	23.9	23.8



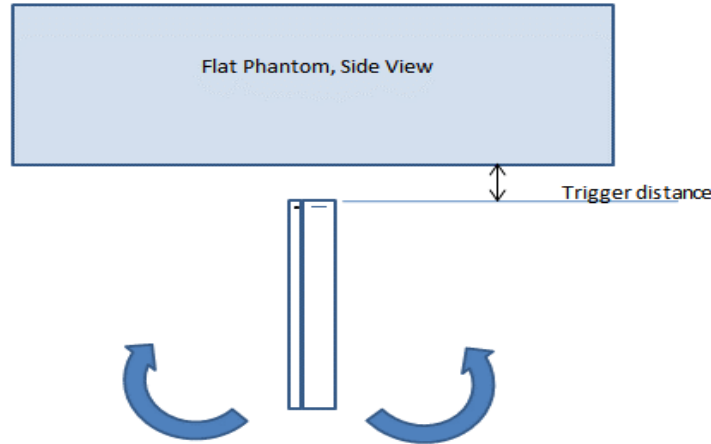
6.7.2. Proximity Sensor Coverage (KDB 616217 §6.3)

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

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 assessment (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	16 mm	16 mm	On	On	On	On	On	On	On	On	On	On	On	On
1900	16 mm	16 mm	On	On	On	On	On	On	On	On	On	On	On	On

6.7.4. Resulting test positions for SAR measurements

Wireless technologies	Position	§6.7.1 Triggering Distance	§6.7.2 Coverage	§6.7.3 Tilt Angle	Worst case distance for SAR
WWAN (Main Ant.1)	Rear	10 mm	N/A	N/A	9 mm
	Front	2 mm	N/A	N/A	1 mm
	Edge 3	6 mm	N/A	6 mm	5 mm

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	Antennaa	DUT-to-User Separation	Test Position	Antenna-to-edge/surface	SAR Required	Note
WWAN	Head	Main Ant. 1 & 2	0 mm	Left Touch	N/A	Yes	
				Left Tilt (15°)	N/A	Yes	
				Right Touch	N/A	Yes	
				Right Tilt (15°)	N/A	Yes	
	Body	Main Ant. 1 & 2	15 mm	Rear	N/A	Yes	
				Front	N/A	Yes	
	Hotspot	Main Ant. 1	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	
	Hotspot	Main Ant. 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	
	Phablet-10g	Main Ant. 1	0 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	
	Phablet-10g	Main Ant. 2	0 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		
WLAN	Head	Wi-Fi Ant.	0 mm	Left Touch	N/A	Yes	
				Left Tilt (15°)	N/A	Yes	
				Right Touch	N/A	Yes	
				Right Tilt (15°)	N/A	Yes	
	Body	15 mm	Rear	N/A	Yes		
			Front	N/A	Yes		
	Hotspot	10 mm	Rear	< 25 mm	Yes		
			Front	< 25 mm	Yes		
			Edge 1 (Top)	< 25 mm	Yes		
			Edge 2 (Right)	< 25 mm	Yes		
	Phablet-10g	0 mm	Rear	< 25 mm	Yes		
			Front	< 25 mm	Yes		
			Edge 1 (Top)	< 25 mm	Yes		
			Edge 2 (Right)	< 25 mm	Yes		
	Phablet-10g	0 mm	Edge 3 (Bottom)	> 25 mm	No	1	
			Edge 4 (Left)	> 25 mm	No	1	
			Edge 3 (Bottom)	> 25 mm	No	1	
			Edge 4 (Left)	> 25 mm	No	1	

Notes:

- SAR is not required because the distance from the antenna to the edge is > 25 mm as per KDB 941225 D06 Hotspot SAR.
- When Hotspot Mode is not supported, 10-g Phablet 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 Phablet SAR is required only for the surfaces and edges with hotspot mode 1-g reported SAR > 1.2 W/kg. When hotspot mode does not apply, 10-g Phablet SAR is required for all surfaces and Edges within 25mm of the antenna.

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 $\pm 2^\circ\text{C}$ of the temperature when the tissue parameters are characterized.

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

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

Tissue Dielectric Parameters

FCC KDB 865664 D01 SAR Measurement 100 MHz to 6 GHz

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

IEEE Std 1528-2013

Refer to Table 3 within the IEEE Std 1528-2013

Dielectric Property Measurements Results:

SAR 1 Room

Date	Freq. (MHz)	Liquid Parameters		Measured	Target	Delta (%)	Limit ±(%)	
1-24-2019	Head 2600	e'	38.9300	Relative Permittivity (ϵ_r):	38.93	39.01	-0.21	5
		e"	13.6000	Conductivity (σ):	1.97	1.96	0.20	5
	Head 2500	e'	39.2700	Relative Permittivity (ϵ_r):	39.27	39.14	0.34	5
		e"	13.4200	Conductivity (σ):	1.87	1.85	0.62	5
	Head 2700	e'	38.5900	Relative Permittivity (ϵ_r):	38.59	38.88	-0.76	5
		e"	13.7800	Conductivity (σ):	2.07	2.07	-0.07	5
1-31-2019	Head 5180	e'	35.3800	Relative Permittivity (ϵ_r):	35.38	36.01	-1.76	5
		e"	16.4100	Conductivity (σ):	4.73	4.63	2.07	5
	Head 5260	e'	35.2300	Relative Permittivity (ϵ_r):	35.23	35.92	-1.93	5
		e"	16.4800	Conductivity (σ):	4.82	4.71	2.28	5
	Head 5600	e'	34.5700	Relative Permittivity (ϵ_r):	34.57	35.53	-2.71	5
		e"	16.6400	Conductivity (σ):	5.18	5.06	2.39	5
	Head 5750	e'	34.3300	Relative Permittivity (ϵ_r):	34.33	35.36	-2.92	5
		e"	16.8000	Conductivity (σ):	5.37	5.21	3.02	5
	Head 5825	e'	34.1700	Relative Permittivity (ϵ_r):	34.17	35.30	-3.20	5
		e"	16.8800	Conductivity (σ):	5.47	5.27	3.74	5
1-31-2019	Head 2450	e'	39.6500	Relative Permittivity (ϵ_r):	39.65	39.20	1.15	5
		e"	13.3900	Conductivity (σ):	1.82	1.80	1.34	5
	Head 2400	e'	39.8200	Relative Permittivity (ϵ_r):	39.82	39.30	1.33	5
		e"	13.2300	Conductivity (σ):	1.77	1.75	0.79	5
	Head 2480	e'	39.5400	Relative Permittivity (ϵ_r):	39.54	39.16	0.96	5
		e"	13.4700	Conductivity (σ):	1.86	1.83	1.37	5
2-8-2019	Body 2450	e'	52.6200	Relative Permittivity (ϵ_r):	52.62	52.70	-0.15	5
		e"	14.4100	Conductivity (σ):	1.96	1.95	0.67	5
	Body 2400	e'	52.7000	Relative Permittivity (ϵ_r):	52.70	52.77	-0.14	5
		e"	14.3500	Conductivity (σ):	1.91	1.90	0.89	5
	Body 2480	e'	52.5300	Relative Permittivity (ϵ_r):	52.53	52.66	-0.25	5
		e"	14.4600	Conductivity (σ):	1.99	1.99	0.09	5

SAR 2 Room

Date	Freq. (MHz)	Liquid Parameters		Measured	Target	Delta (%)	Limit ±(%)	
1-10-2019	Body 835	e'	55.7700	Relative Permittivity (ϵ_r):	55.77	55.20	1.03	5
		e"	21.6800	Conductivity (σ):	1.01	0.97	3.77	5
	Body 820	e'	55.9100	Relative Permittivity (ϵ_r):	55.91	55.28	1.15	5
		e"	21.7600	Conductivity (σ):	0.99	0.97	2.44	5
	Body 850	e'	55.6400	Relative Permittivity (ϵ_r):	55.64	55.16	0.88	5
		e"	21.5900	Conductivity (σ):	1.02	0.99	3.37	5
1-14-2019	Body 835	e'	54.0300	Relative Permittivity (ϵ_r):	54.03	55.20	-2.12	5
		e"	20.8800	Conductivity (σ):	0.97	0.97	-0.06	5
	Body 820	e'	54.1900	Relative Permittivity (ϵ_r):	54.19	55.28	-1.97	5
		e"	20.8800	Conductivity (σ):	0.95	0.97	-1.70	5
	Body 850	e'	53.8700	Relative Permittivity (ϵ_r):	53.87	55.16	-2.33	5
		e"	20.8700	Conductivity (σ):	0.99	0.99	-0.08	5
1-16-2019	Body 750	e'	57.4400	Relative Permittivity (ϵ_r):	57.44	55.55	3.41	5
		e"	23.1900	Conductivity (σ):	0.97	0.96	0.42	5
	Body 700	e'	57.9100	Relative Permittivity (ϵ_r):	57.91	55.74	3.90	5
		e"	23.7300	Conductivity (σ):	0.92	0.96	-3.71	5
	Body 790	e'	57.3700	Relative Permittivity (ϵ_r):	57.37	55.39	3.57	5
		e"	22.9300	Conductivity (σ):	1.01	0.97	4.25	5
1-21-2019	Body 750	e'	56.8700	Relative Permittivity (ϵ_r):	56.87	55.55	2.38	5
		e"	23.1300	Conductivity (σ):	0.96	0.96	0.16	5
	Body 700	e'	57.2900	Relative Permittivity (ϵ_r):	57.29	55.74	2.78	5
		e"	23.4300	Conductivity (σ):	0.91	0.96	-4.93	5
	Body 790	e'	56.3700	Relative Permittivity (ϵ_r):	56.37	55.39	1.77	5
		e"	22.8200	Conductivity (σ):	1.00	0.97	3.75	5

SAR 3 Room

Date	Freq. (MHz)	Liquid Parameters		Measured	Target	Delta (%)	Limit ±(%)	
1-10-2019	Head 835	e'	41.2900	Relative Permittivity (ϵ_r):	41.29	41.50	-0.51	5
		e''	19.5400	Conductivity (σ):	0.91	0.90	0.80	5
	Head 820	e'	41.4500	Relative Permittivity (ϵ_r):	41.45	41.60	-0.37	5
		e''	19.5800	Conductivity (σ):	0.89	0.90	-0.64	5
	Head 850	e'	41.1300	Relative Permittivity (ϵ_r):	41.13	41.50	-0.89	5
		e''	19.5200	Conductivity (σ):	0.92	0.92	0.83	5
1-11-2019	Head 750	e'	41.4800	Relative Permittivity (ϵ_r):	41.48	41.96	-1.15	5
		e''	21.6000	Conductivity (σ):	0.90	0.89	0.86	5
	Head 700	e'	42.4500	Relative Permittivity (ϵ_r):	42.45	42.22	0.55	5
		e''	22.3900	Conductivity (σ):	0.87	0.89	-2.00	5
	Head 790	e'	40.5000	Relative Permittivity (ϵ_r):	40.50	41.76	-3.01	5
		e''	21.2200	Conductivity (σ):	0.93	0.90	4.01	5
1-14-2019	Head 1750	e'	38.7300	Relative Permittivity (ϵ_r):	38.73	40.08	-3.38	5
		e''	14.5500	Conductivity (σ):	1.42	1.37	3.42	5
	Head 1710	e'	38.9300	Relative Permittivity (ϵ_r):	38.93	40.15	-3.03	5
		e''	14.4900	Conductivity (σ):	1.38	1.35	2.33	5
	Head 1755	e'	38.7100	Relative Permittivity (ϵ_r):	38.71	40.08	-3.41	5
		e''	14.5500	Conductivity (σ):	1.42	1.37	3.50	5
1-14-2019	Body 1750	e'	54.6600	Relative Permittivity (ϵ_r):	54.66	53.44	2.28	5
		e''	14.9300	Conductivity (σ):	1.45	1.49	-2.25	5
	Body 1710	e'	54.7700	Relative Permittivity (ϵ_r):	54.77	53.54	2.29	5
		e''	15.0400	Conductivity (σ):	1.43	1.46	-2.16	5
	Body 1755	e'	54.6400	Relative Permittivity (ϵ_r):	54.64	53.43	2.27	5
		e''	14.9200	Conductivity (σ):	1.46	1.49	-2.24	5
1-14-2019	Body 1900	e'	54.3600	Relative Permittivity (ϵ_r):	54.36	53.30	1.99	5
		e''	14.9600	Conductivity (σ):	1.58	1.52	3.98	5
	Body 1850	e'	54.4900	Relative Permittivity (ϵ_r):	54.49	53.30	2.23	5
		e''	15.0000	Conductivity (σ):	1.54	1.52	1.51	5
	Body 1910	e'	54.3400	Relative Permittivity (ϵ_r):	54.34	53.30	1.95	5
		e''	14.9600	Conductivity (σ):	1.59	1.52	4.53	5
1-21-2019	Body 1750	e'	55.1400	Relative Permittivity (ϵ_r):	55.14	53.44	3.18	5
		e''	14.8100	Conductivity (σ):	1.44	1.49	-3.03	5
	Body 1710	e'	55.2700	Relative Permittivity (ϵ_r):	55.27	53.54	3.22	5
		e''	14.8800	Conductivity (σ):	1.41	1.46	-3.20	5
	Body 1755	e'	55.1300	Relative Permittivity (ϵ_r):	55.13	53.43	3.19	5
		e''	14.8300	Conductivity (σ):	1.45	1.49	-2.82	5
1-21-2019	Body 1900	e'	54.8400	Relative Permittivity (ϵ_r):	54.84	53.30	2.89	5
		e''	14.8600	Conductivity (σ):	1.57	1.52	3.28	5
	Body 1850	e'	54.9800	Relative Permittivity (ϵ_r):	54.98	53.30	3.15	5
		e''	14.8300	Conductivity (σ):	1.53	1.52	0.36	5
	Body 1910	e'	54.8000	Relative Permittivity (ϵ_r):	54.80	53.30	2.81	5
		e''	14.9100	Conductivity (σ):	1.58	1.52	4.18	5

SAR 3 Room (Continued)

Date	Freq. (MHz)	Liquid Parameters		Measured	Target	Delta (%)	Limit ±(%)	
1-24-2019	Body 1900	e'	54.4000	Relative Permittivity (ε _r):	54.40	53.30	2.06	5
		e''	14.8000	Conductivity (σ):	1.56	1.52	2.87	5
	Body 1850	e'	54.4300	Relative Permittivity (ε _r):	54.43	53.30	2.12	5
		e''	14.7400	Conductivity (σ):	1.52	1.52	-0.25	5
	Body 1910	e'	54.4100	Relative Permittivity (ε _r):	54.41	53.30	2.08	5
		e''	14.8200	Conductivity (σ):	1.57	1.52	3.55	5
2-7-2019	Body 5180	e'	47.6300	Relative Permittivity (ε _r):	47.63	49.05	-2.89	10
		e''	17.7200	Conductivity (σ):	5.10	5.27	-3.18	5
	Body 5260	e'	47.5100	Relative Permittivity (ε _r):	47.51	48.94	-2.92	10
		e''	17.7700	Conductivity (σ):	5.20	5.36	-3.12	5
	Body 5600	e'	47.0200	Relative Permittivity (ε _r):	47.02	48.48	-3.01	10
		e''	18.0200	Conductivity (σ):	5.61	5.76	-2.60	5
	Body 5750	e'	46.8200	Relative Permittivity (ε _r):	46.82	48.27	-3.01	10
		e''	18.1600	Conductivity (σ):	5.81	5.94	-2.19	5
	Body 5825	e'	46.7200	Relative Permittivity (ε _r):	46.72	48.20	-3.07	10
		e''	18.2200	Conductivity (σ):	5.90	6.00	-1.65	5

SAR 4 Room

Date	Freq. (MHz)	Liquid Parameters		Measured	Target	Delta (%)	Limit ±(%)	
1-9-2018	Head 1900	e'	41.2100	Relative Permittivity (ε _r):	41.21	40.00	3.03	5
		e''	13.5900	Conductivity (σ):	1.44	1.40	2.55	5
	Head 1850	e'	41.4100	Relative Permittivity (ε _r):	41.41	40.00	3.52	5
		e''	13.2800	Conductivity (σ):	1.37	1.40	-2.42	5
	Head 1910	e'	41.1700	Relative Permittivity (ε _r):	41.17	40.00	2.93	5
		e''	13.6000	Conductivity (σ):	1.44	1.40	3.17	5
1-18-2019	Head 1900	e'	41.2600	Relative Permittivity (ε _r):	41.26	40.00	3.15	5
		e''	13.0600	Conductivity (σ):	1.38	1.40	-1.45	5
	Head 1850	e'	41.4700	Relative Permittivity (ε _r):	41.47	40.00	3.68	5
		e''	12.9400	Conductivity (σ):	1.33	1.40	-4.92	5
	Head 1910	e'	41.2200	Relative Permittivity (ε _r):	41.22	40.00	3.05	5
		e''	13.1000	Conductivity (σ):	1.39	1.40	-0.63	5
1-21-2019	Body 2600	e'	52.1000	Relative Permittivity (ε _r):	52.10	52.51	-0.78	5
		e''	15.3700	Conductivity (σ):	2.22	2.16	2.83	5
	Body 2500	e'	52.3900	Relative Permittivity (ε _r):	52.39	52.64	-0.47	5
		e''	15.1400	Conductivity (σ):	2.10	2.02	4.17	5
	Body 2700	e'	51.6800	Relative Permittivity (ε _r):	51.68	52.38	-1.35	5
		e''	15.5700	Conductivity (σ):	2.34	2.30	1.57	5
1-23-2019	Body 2600	e'	51.2500	Relative Permittivity (ε _r):	51.25	52.51	-2.40	5
		e''	15.4900	Conductivity (σ):	2.24	2.16	3.64	5
	Body 2500	e'	51.5300	Relative Permittivity (ε _r):	51.53	52.64	-2.10	5
		e''	15.2100	Conductivity (σ):	2.11	2.02	4.65	5
	Body 2700	e'	50.9400	Relative Permittivity (ε _r):	50.94	52.38	-2.76	5
		e''	15.7100	Conductivity (σ):	2.36	2.30	2.48	5
1-25-2019	Head 1900	e'	40.2000	Relative Permittivity (ε _r):	40.20	40.00	0.50	5
		e''	13.6900	Conductivity (σ):	1.45	1.40	3.31	5
	Head 1850	e'	40.3600	Relative Permittivity (ε _r):	40.36	40.00	0.90	5
		e''	13.6300	Conductivity (σ):	1.40	1.40	0.15	5
	Head 1910	e'	40.1500	Relative Permittivity (ε _r):	40.15	40.00	0.37	5
		e''	13.6900	Conductivity (σ):	1.45	1.40	3.85	5
2-7-2019	Body 1900	e'	55.2700	Relative Permittivity (ε _r):	55.27	53.30	3.70	5
		e''	14.8300	Conductivity (σ):	1.57	1.52	3.07	5
	Body 1850	e'	55.4100	Relative Permittivity (ε _r):	55.41	53.30	3.96	5
		e''	14.8500	Conductivity (σ):	1.53	1.52	0.50	5
	Body 1910	e'	55.2400	Relative Permittivity (ε _r):	55.24	53.30	3.64	5
		e''	14.8100	Conductivity (σ):	1.57	1.52	3.48	5

8.2. System Check

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

System Performance Check Measurement Conditions:

- The measurements were performed in the flat section of the TWIN SAM or ELI phantom, shell thickness: 2.0 ±0.2 mm (bottom plate) filled with Body or Head simulating liquid of the following parameters.
- The depth of tissue-equivalent liquid in a phantom must be ≥ 15.0 cm for SAR measurements ≤ 3 GHz and ≥ 10.0 cm for measurements > 3 GHz.
- The DASY system with an E-Field Probe was used for the measurements.
- The dipole was mounted on the small tripod so that the dipole feed point was positioned below the center marking of the flat phantom section and the dipole was oriented parallel to the body axis (the long side of the phantom). The standard measuring distance was 10 mm (above 1 GHz) and 15 mm (below 1 GHz) from dipole center to the simulating liquid surface.
- The coarse grid with a grid spacing of 15 mm was aligned with the dipole.
For 5 GHz band - The coarse grid with a grid spacing of 10 mm was aligned with the dipole.
- Special 7x7x7 (below 3 GHz) and/or 8x8x7 (above 3 GHz) fine cube was chosen for the cube.
- Distance between probe sensors and phantom surface was set to 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	4d194	7-24-2018	835	1g	9.36	9.61
				10g	6.02	6.32
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
D2450V2	960	3-20-2018	2450	1g	53.60	49.80
				10g	25.10	23.50
D2600V2	1097	1-17-2018	2600	1g	56.40	54.40
				10g	25.30	24.20
D5GHzV2	1209	2-15-2018	5250	1g	80.80	75.70
				10g	23.10	21.00
			5600	1g	83.40	79.00
				10g	23.80	21.90
			5750	1g	80.70	75.60
				10g	22.90	20.80

Note(s):

Refer to Appendix F that mentioned about justification for Extended SAR Dipole Calibrations (D2600, SN : 1097)

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 $\pm 10\%$	Plot No.	
	Type	Serial #		Zoom Scan to 100 mW	Normalize to 1 W				
1-24-2019	D2600V2	1097	Head	1g	5.92	59.20	56.40	4.96	1,2
				10g	2.58	25.80	25.30	1.98	
1-31-2019	D5GHzV2 (5250)	1209	Head	1g	8.22	82.20	80.80	1.73	
				10g	2.34	23.40	23.10	1.30	
1-31-2019	D5GHzV2 (5600)	1209	Head	1g	8.68	86.80	83.40	4.08	
				10g	2.44	24.40	23.80	2.52	
1-31-2019	D5GHzV2 (5750)	1209	Head	1g	8.43	84.30	80.70	4.46	
				10g	2.39	23.90	22.90	4.37	
1-31-2019	D2450V2	960	Head	1g	5.11	51.10	53.60	-4.66	
				10g	2.31	23.10	25.10	-7.97	
2-8-2019	D2450V2	960	Body	1g	5.30	53.00	49.80	6.43	3,4
				10g	2.44	24.40	23.50	3.83	

SAR 2 Room

Date Tested	System Dipole		T.S. Liquid	Measured Results		Target (Ref. Value)	Delta $\pm 10\%$	Plot No.	
	Type	Serial #		Zoom Scan to 100 mW	Normalize to 1 W				
1-10-2019	D835V2	4d194	Body	1g	1.04	10.40	9.61	8.22	5,6
				10g	0.68	6.79	6.32	7.44	
1-14-2019	D835V2	4d194	Body	1g	1.04	10.40	9.61	8.22	7,8
				10g	0.68	6.81	6.32	7.75	
1-16-2019	D750V3	1122	Body	1g	0.90	9.04	8.63	4.75	
				10g	0.60	6.02	5.72	5.24	
1-21-2019	D750V3	1122	Body	1g	0.89	8.89	8.63	3.01	
				10g	0.59	5.92	5.72	3.50	

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				
1-10-2019	D835V2	4d194	Head	1g	0.98	9.84	9.36	5.13	
				10g	0.65	6.46	6.02	7.31	
1-11-2019	D750V3	1122	Head	1g	0.83	8.31	8.22	1.09	
				10g	0.55	5.51	5.35	2.99	
1-14-2019	D1750V2	1125	Head	1g	3.56	35.60	36.50	-2.47	
				10g	1.85	18.50	19.30	-4.15	
1-14-2019	D1750V2	1125	Body	1g	3.51	35.10	36.80	-4.62	
				10g	1.83	18.30	19.50	-6.15	
1-14-2019	D1900V2	5d199	Body	1g	4.11	41.10	39.60	3.79	
				10g	2.06	20.60	20.80	-0.96	
1-21-2019	D1750V2	1125	Body	1g	3.94	39.40	36.80	7.07	9,10
				10g	2.11	21.10	19.50	8.21	
1-21-2019	D1900V2	5d199	Body	1g	4.17	41.70	39.60	5.30	
				10g	2.17	21.70	20.80	4.33	
1-24-2019	D1900V2	5d199	Body	1g	4.21	42.10	39.60	6.31	11,12
				10g	2.20	22.00	20.80	5.77	
2-7-2019	D5GHzV2 (5250)	1209	Body	1g	7.24	72.40	75.70	-4.36	
				10g	2.00	20.00	21.00	-4.76	
2-7-2019	D5GHzV2 (5600)	1209	Body	1g	8.15	81.50	79.00	3.16	
				10g	2.23	22.30	21.90	1.83	
2-7-2019	D5GHzV2 (5750)	1209	Body	1g	7.22	72.20	75.60	-4.50	13,14
				10g	1.98	19.80	20.80	-4.81	

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				
1-9-2019	D1900V2	5d199	Head	1g	4.10	41.00	40.40	1.49	
				10g	2.10	21.00	21.10	-0.47	
1-18-2019	D1900V2	5d199	Head	1g	3.94	39.40	40.40	-2.48	
				10g	2.03	20.30	21.10	-3.79	
1-21-2019	D2600V2	1097	Body	1g	5.51	55.10	54.40	1.29	
				10g	2.43	24.30	24.20	0.41	
1-23-2019	D2600V2	1097	Body	1g	5.30	53.00	54.40	-2.57	
				10g	2.31	23.10	24.20	-4.55	
1-25-2019	D1900V2	5d199	Head	1g	4.18	41.80	40.40	3.47	
				10g	2.14	21.40	21.10	1.42	
2-7-2019	D1900V2	5d199	Body	1g	4.16	41.60	39.60	5.05	15,16
				10g	2.08	20.80	20.80	0.00	

9. Conducted Output Power Measurements

9.1. GSM

Per KDB 941225 D01 3G SAR Procedures:

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

GSM850 Measured Results

Full Power

Mode	Coding Scheme	Time Slots	Ch No.	Freq. (MHz)	Burst Pwr (dBm)	Frame Pwr (dBm)	Max. Frame Pwr (dBm)
GSM (Voice)	CS1	1	128	824.2	32.8	23.8	25.0
			190	836.6	32.9	23.8	
			251	848.8	33.0	24.0	
GPRS (GMSK)	CS1	1	128	824.2	32.8	23.8	25.0
			190	836.6	32.9	23.8	
			251	848.8	33.0	24.0	
		2	128	824.2	30.9	24.9	25.5
			190	836.6	30.9	24.8	
			251	848.8	30.8	24.8	
		3	128	824.2	29.2	25.0	25.7
			190	836.6	28.9	24.7	
			251	848.8	29.2	24.9	
		4	128	824.2	28.3	25.3	26.0
			190	836.6	28.2	25.2	
			251	848.8	28.4	25.4	
EGPRS (8PSK)	MCS5	1	128	824.2	26.5	17.5	18.5
			190	836.6	26.3	17.3	
			251	848.8	26.5	17.5	
		2	128	824.2	24.3	18.3	19.0
			190	836.6	24.3	18.2	
			251	848.8	24.3	18.2	
		3	128	824.2	23.3	19.1	19.7
			190	836.6	23.0	18.8	
			251	848.8	23.2	19.0	
		4	128	824.2	22.0	19.0	20.0
			190	836.6	22.0	19.0	
			251	848.8	22.0	19.0	

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 $\leq 1/4$ dB higher than GMSK GPRS or the adjusted SAR of the highest reported SAR of GMSK GPRS is ≤ 1.2 W/kg.

GSM1900 Measured Results**Full Power**

Mode	Coding Scheme	Time Slots	Ch No.	Freq. (MHz)	Burst Pwr (dBm)	Frame Pwr (dBm)	Max. Frame Pwr (dBm)
GSM (Voice)	CS1	1	512	1850.2	29.6	20.6	22.0
			661	1880.0	29.4	20.4	
			810	1909.8	29.8	20.7	
GPRS (GMSK)	CS1	1	512	1850.2	29.6	20.6	22.0
			661	1880.0	29.4	20.4	
			810	1909.8	29.8	20.8	
		2	512	1850.2	27.2	21.1	22.0
			661	1880.0	27.1	21.0	
			810	1909.8	27.6	21.5	
		3	512	1850.2	25.3	21.1	21.7
			661	1880.0	25.0	20.7	
			810	1909.8	25.6	21.3	
		4	512	1850.2	24.2	21.2	21.5
			661	1880.0	24.1	21.1	
			810	1909.8	24.5	21.5	
EGPRS (8PSK)	MCS5	1	512	1850.2	25.6	16.6	17.5
			661	1880.0	25.4	16.4	
			810	1909.8	25.7	16.7	
		2	512	1850.2	23.5	17.4	18.0
			661	1880.0	23.3	17.3	
			810	1909.8	23.7	17.7	
		3	512	1850.2	22.5	18.2	18.7
			661	1880.0	22.3	18.0	
			810	1909.8	22.4	18.2	
		4	512	1850.2	21.0	17.9	18.5
			661	1880.0	20.7	17.7	
			810	1909.8	21.2	18.1	

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 $\leq 1/4$ dB higher than GMSK GPRS or the adjusted SAR of the highest reported SAR of GMSK GPRS is ≤ 1.2 W/kg.

9.2. W-CDMA

Release 99 Setup Procedures used to establish the test signals

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

Mode	Subtest	Rel99
WCDMA General Settings	Loopback Mode	Test Mode 2
	Rel99 RMC	12.2kbps RMC
	Power Control Algorithm	Algorithm2
	β_c/β_d	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			
	β_c	2/15	11/15	15/15	15/15
	β_d	15/15	15/15	8/15	4/15
	Bd (SF)	64			
	β_c/β_d	2/15	11/15	15/8	15/4
	β_{hs}	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			
$A_{hs}=\beta_{hs}/\beta_c$	30/15				

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

The following 5 Sub-tests were completed according to Release 6 procedures in 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
	β_c	11/15	6/15	15/15	2/15	15/15
	β_d	15/15	15/15	9/15	15/15	0
	β_{ec}	209/225	12/15	30/15	2/15	5/15
	β_c/β_d	11/15	6/15	15/9	2/15	-
	β_{hs}	22/15	12/15	30/15	4/15	5/15
	β_{ed}	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				
	A _{hs} = β_{hs}/β_c	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	

DC-HSDPA Setup Procedures used to establish the test signals

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

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

Table E.5.0: Levels for HSDPA connection setup

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

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

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

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

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

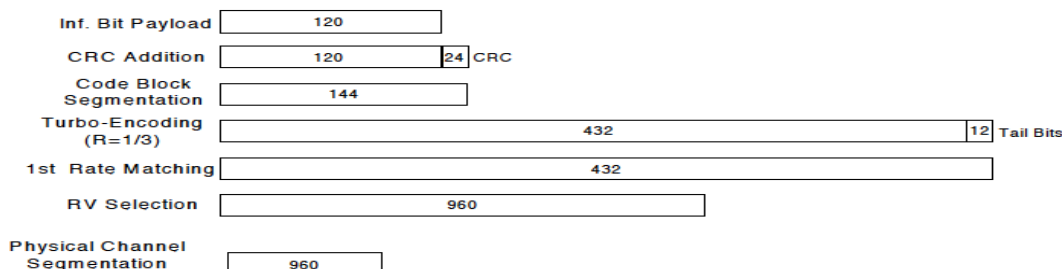


Figure C.8.19: Coding rate for Fixed reference Channel H-Set 12 (QPSK)

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

	Mode	HSDPA	HSDPA	HSDPA	HSDPA
	Subtest	1	2	3	4
WCDMA General Settings	Loopback Mode	Test Mode 1			
	Rel99 RMC	12.2kbps RMC			
	HSDPA FRC	H-Set 12			
	Power Control Algorithm	Algorithm2			
	β_c	2/15	11/15	15/15	15/15
	β_d	15/15	15/15	8/15	4/15
	β_d (SF)	64			
	β_c/β_d	2/15	11/15	15/8	15/4
	β_{hs}	4/15	24/15	30/15	30/15
MPR (dB)	0	0	0.5	0.5	
HSDPA Specific Settings	DACK	8			
	DNAK	8			
	DCQI	8			
	Ack-Nack Repetition factor	3			
	CQI Feedback	4ms			
	CQI Repetition Factor	2			
	A _{hs} = β_{hs}/β_c	30/15			

HSPA+

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

W-CDMA Band II Measured Results

Band	Mode		UL Ch No.	Freq. (MHz)	Max. RF output power (dBm)		Reduced RF output power (dBm)		
					MPR (dB)	Meas. Avg Pwr	MPR (dB)	Hotspot back-off	Proximity Sensor back-off
								Meas. Avg Pwr	Meas. Avg Pwr
W-CDMA Band II	Rel 99	RMC, 12.2 kbps	9262	1852.4	N/A	23.6	N/A	20.6	20.6
			9400	1880.0	N/A	23.0	N/A	20.1	20.1
			9538	1907.6	N/A	23.4	N/A	20.3	20.3
	HSDPA	Subtest 1	9262	1852.4	0	23.3	0	20.6	20.6
			9400	1880.0	0	22.7	0	20.1	20.1
			9538	1907.6	0	23.0	0	20.2	20.2
		Subtest 2	9262	1852.4	0	22.5	0	20.7	20.7
			9400	1880.0	0	21.9	0	20.2	20.2
			9538	1907.6	0	22.2	0	20.3	20.3
		Subtest 3	9262	1852.4	0.5	22.2	0	20.7	20.7
			9400	1880.0	0.5	21.5	0	20.2	20.2
			9538	1907.6	0.5	21.9	0	20.3	20.3
		Subtest 4	9262	1852.4	0.5	21.8	0	20.7	20.7
			9400	1880.0	0.5	21.2	0	20.2	20.2
			9538	1907.6	0.5	21.6	0	20.3	20.3
	HSUPA	Subtest 1	9262	1852.4	0	21.5	0	19.8	19.8
			9400	1880.0	0	21.0	0	19.2	19.2
			9538	1907.6	0	21.3	0	19.4	19.4
		Subtest 2	9262	1852.4	2	19.8	0	19.9	19.9
			9400	1880.0	2	19.2	0	19.2	19.3
			9538	1907.6	2	19.5	0	19.5	19.6
		Subtest 3	9262	1852.4	1	20.6	0	19.8	19.9
			9400	1880.0	1	20.2	0	19.2	19.3
			9538	1907.6	1	20.4	0	19.5	19.5
		Subtest 4	9262	1852.4	2	19.8	0	19.9	19.9
			9400	1880.0	2	19.2	0	19.2	19.3
			9538	1907.6	2	19.5	0	19.5	19.5
		Subtest 5	9262	1852.4	0	22.5	0	20.7	20.7
			9400	1880.0	0	22.0	0	20.1	20.1
			9538	1907.6	0	22.3	0	20.3	20.3
	DC-HSDPA	Subtest 1	9262	1852.4	0	23.1	0	20.5	20.2
			9400	1880.0	0	22.7	0	20.2	20.2
			9538	1907.6	0	22.9	0	20.2	20.2
		Subtest 2	9262	1852.4	0	22.3	0	20.6	20.6
			9400	1880.0	0	22.0	0	20.2	20.2
			9538	1907.6	0	22.1	0	20.2	20.2
Subtest 3		9262	1852.4	0.5	20.8	0	20.6	20.6	
		9400	1880.0	0.5	20.6	0	20.2	20.2	
		9538	1907.6	0.5	20.6	0	20.2	20.2	
Subtest 4		9262	1852.4	0.5	21.6	0	20.6	20.6	
		9400	1880.0	0.5	21.2	0	20.2	20.2	
		9538	1907.6	0.5	21.4	0	20.2	20.2	

W-CDMA Band IV Measured Results

Band	Mode		UL Ch No.	Freq. (MHz)	Max. RF output power (dBm)		Reduced RF output power (dBm)		
					MPR (dB)	Meas. Avg Pwr	MPR (dB)	Hotspot back-off	Proximity Sensor back-off
								Meas. Avg Pwr	Meas. Avg Pwr
W-CDMA Band IV	Rel 99	RMC, 12.2 kbps	1312	1712.4	N/A	24.4	N/A	21.2	21.1
			1413	1732.6	N/A	23.5	N/A	20.4	20.4
			1513	1752.6	N/A	23.9	N/A	20.7	20.6
	HSDPA	Subtest 1	1312	1712.4	0	24.4	0	21.1	21.1
			1413	1732.6	0	23.5	0	20.4	20.4
			1513	1752.6	0	23.9	0	20.6	20.7
		Subtest 2	1312	1712.4	0	23.4	0	21.2	21.1
			1413	1732.6	0	22.6	0	20.5	20.5
			1513	1752.6	0	22.9	0	20.7	20.7
		Subtest 3	1312	1712.4	1	22.4	0	21.2	21.2
			1413	1732.6	1	21.5	0	20.5	20.5
			1513	1752.6	1	21.8	0	20.8	20.7
		Subtest 4	1312	1712.4	1	22.4	0	21.2	21.3
			1413	1732.6	1	21.5	0	20.5	20.5
			1513	1752.6	1	21.9	0	20.8	20.8
	HSUPA	Subtest 1	1312	1712.4	1	21.4	0	20.3	20.4
			1413	1732.6	1	20.7	0	19.6	19.6
			1513	1752.6	1	20.9	0	19.8	19.8
		Subtest 2	1312	1712.4	3	19.5	1	19.2	19.2
			1413	1732.6	3	18.6	1	18.5	18.4
			1513	1752.6	3	18.9	1	18.7	18.7
		Subtest 3	1312	1712.4	1	21.0	0	20.4	20.4
			1413	1732.6	1	20.2	0	19.6	19.5
			1513	1752.6	1	20.5	0	19.9	19.9
		Subtest 4	1312	1712.4	2	20.0	1	19.8	19.7
			1413	1732.6	2	19.1	1	19.0	19.0
			1513	1752.6	2	19.4	1	19.3	19.3
		Subtest 5	1312	1712.4	0	22.8	0	21.2	21.3
			1413	1732.6	0	22.0	0	20.5	20.5
			1513	1752.6	0	22.3	0	20.7	20.7
	DC-HSDPA	Subtest 1	1312	1712.4	0	24.5	0	21.3	21.3
			1413	1732.6	0	23.8	0	20.8	20.8
			1513	1752.6	0	23.9	0	20.9	20.8
		Subtest 2	1312	1712.4	0	23.4	0	21.3	21.3
			1413	1732.6	0	22.8	0	20.8	20.8
			1513	1752.6	0	22.8	0	20.8	20.8
		Subtest 3	1312	1712.4	1	22.4	0	21.3	21.3
			1413	1732.6	1	21.7	0	20.8	20.8
			1513	1752.6	1	21.8	0	20.8	20.8
		Subtest 4	1312	1712.4	1	22.4	0	21.3	21.3
			1413	1732.6	1	21.7	0	20.8	20.8
			1513	1752.6	1	21.8	0	20.8	20.9

W-CDMA Band V Measured Results

Band	Mode		UL Ch No.	Freq. (MHz)	Max. RF output power (dBm)		
					MPR (dB)	Meas. Avg Pwr	
W-CDMA Band V	Rel 99	RMC, 12.2 kbps	4132	826.4	N/A	24.6	
			4183	836.6	N/A	24.6	
			4233	846.6	N/A	24.5	
	HSDPA	Subtest 1	4132	826.4	0	24.4	
			4183	836.6	0	24.3	
			4233	846.6	0	24.3	
		Subtest 2	4132	826.4	0	23.1	
			4183	836.6	0	23.1	
			4233	846.6	0	23.0	
		Subtest 3	4132	826.4	0.5	22.2	
			4183	836.6	0.5	22.2	
			4233	846.6	0.5	22.1	
		Subtest 4	4132	826.4	0.5	22.3	
			4183	836.6	0.5	22.2	
			4233	846.6	0.5	22.1	
		HSUPA	Subtest 1	4132	826.4	0	20.5
				4183	836.6	0	20.5
				4233	846.6	0	20.4
	Subtest 2		4132	826.4	2	19.0	
			4183	836.6	2	19.0	
			4233	846.6	2	19.0	
	Subtest 3		4132	826.4	1	20.0	
			4183	836.6	1	20.1	
			4233	846.6	1	19.9	
	Subtest 4		4132	826.4	2	19.0	
			4183	836.6	2	19.0	
			4233	846.6	2	18.9	
	Subtest 5		4132	826.4	0	22.2	
			4183	836.6	0	22.2	
			4233	846.6	0	22.1	
	DC-HSDPA	Subtest 1	4132	826.4	0	24.6	
			4183	836.6	0	24.6	
			4233	846.6	0	24.5	
		Subtest 2	4132	826.4	0	23.1	
			4183	836.6	0	23.0	
			4233	846.6	0	23.0	
Subtest 3		4132	826.4	1	22.2		
		4183	836.6	1	22.1		
		4233	846.6	1	22.1		
Subtest 4		4132	826.4	1	22.1		
		4183	836.6	1	22.1		
		4233	846.6	1	22.1		

9.3. LTE

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

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

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

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

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

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

Network Signalling value	Requirements (subclause)	E-UTRA Band	Channel bandwidth (MHz)	Resources Blocks (N _{RB})	A-MPR (dB)
NS_01	6.6.2.1.1	Table 5.5-1	1.4, 3, 5, 10, 15, 20	Table 5.6-1	N/A
NS_03	6.6.2.2.1	2, 4, 10, 23, 25, 35, 36, 66, 70	3	>5	≤ 1
			5	>6	≤ 1
			10	>6	≤ 1
			15	>8	≤ 1
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	
			10, 15, 20	≥ 50 (NOTE 1)	≤ 1 (NOTE 1)
NS_05	6.6.3.3.1	1	15, 20	Table 6.2.4-18 (NOTE 2)	
			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	
			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	
			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	
			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

LTE Band 2 Measured Results

Band	BW (MHz)	Mode	RB Allocation	RB offset	Maximum Avg Pwr (dBm)				Reduced Avg Pwr (dBm) Hotspot back-off				Reduced Avg Pwr (dBm) Proximity Sensor back-off			
					MPR	1860 MHz	1880 MHz	1900 MHz	MPR	1860 MHz	1880 MHz	1900 MHz	MPR	1860 MHz	1880 MHz	1900 MHz
					LTE Band 2	20	QPSK	1	0	0	23.9	23.7	24.0	0	21.9	21.7
		1	49	0	23.9	23.7		23.9	0	21.9	21.7	21.9	0	22.0	21.7	21.9
		1	99	0	24.0	23.6		23.2	0	22.0	21.6	21.7	0	22.0	21.7	21.7
		50	0	1	22.9	22.7		23.1	0	21.9	21.7	22.1	0	21.8	21.7	22.1
		50	24	1	22.9	22.7		23.0	0	21.9	21.7	22.0	0	21.9	21.7	22.0
		50	50	1	22.9	22.7		22.9	0	21.9	21.7	21.9	0	21.9	21.7	21.9
		16QAM	100	0	1	22.9	22.7	23.0	0	21.9	21.7	22.0	0	21.8	21.7	22.0
			1	0	1	22.7	22.7	23.1	0	21.9	21.7	22.4	0	21.7	21.7	22.2
			1	49	1	22.8	22.7	23.0	0	21.9	21.7	22.2	0	21.8	21.7	22.0
			1	99	1	22.8	22.7	22.6	0	21.9	21.6	22.0	0	21.8	21.6	22.0
			50	0	2	21.9	21.8	22.1	0	21.9	21.7	22.0	0	21.8	21.7	22.0
			50	24	2	21.9	21.8	22.0	0	21.9	21.7	22.0	0	21.9	21.7	22.0
			50	50	2	21.9	21.7	21.9	0	21.9	21.7	21.9	0	21.8	21.7	21.9
			100	0	2	21.9	21.8	22.1	0	21.9	21.8	22.0	0	21.9	21.8	22.0
Band	BW (MHz)	Mode	RB Allocation	RB offset	Maximum Avg Pwr (dBm)				Reduced Avg Pwr (dBm) Hotspot back-off				Reduced Avg Pwr (dBm) Proximity Sensor back-off			
					MPR	1857.5 MHz	1880 MHz	1902.5 MHz	MPR	1857.5 MHz	1880 MHz	1902.5 MHz	MPR	1857.5 MHz	1880 MHz	1902.5 MHz
					LTE Band 2	15	QPSK	1	0	0	23.8	23.8	24.0	0	21.8	21.9
		1	36	0	23.8	23.8		23.9	0	21.8	21.8	22.0	0	21.8	21.8	22.0
		1	74	0	23.8	23.8		23.7	0	21.8	21.8	21.9	0	21.8	21.8	21.9
		36	0	1	22.9	22.8		23.1	0	21.9	21.8	22.1	0	21.9	21.7	22.1
		36	18	1	22.9	22.8		23.0	0	21.9	21.7	22.0	0	21.9	21.7	22.0
		36	37	1	22.9	22.7		23.0	0	21.8	21.7	22.0	0	21.9	21.7	22.0
		16QAM	75	0	1	22.9	22.7	23.0	0	21.9	21.7	22.1	0	21.8	21.7	22.0
			1	0	1	23.0	22.7	23.3	0	21.7	21.5	22.2	0	21.8	21.4	22.1
			1	36	1	23.0	22.7	23.1	0	21.8	21.5	22.1	0	21.8	21.4	22.1
			1	74	1	23.0	22.6	23.0	0	21.8	21.4	22.1	0	21.8	21.4	22.1
			36	0	2	21.9	21.7	22.0	0	21.9	21.7	22.1	0	21.9	21.7	22.0
			36	18	2	21.9	21.7	22.0	0	21.9	21.7	22.0	0	21.9	21.7	22.0
			36	37	2	21.9	21.7	22.0	0	21.9	21.7	22.0	0	21.9	21.7	22.0
			75	0	2	21.9	21.7	22.1	0	21.9	21.7	22.1	0	21.9	21.7	22.0

LTE Band 2 Measured Results (Continued)

Band	BW (MHz)	Mode	RB Allocation	RB offset	Maximum Avg Pwr (dBm)				Reduced Avg Pwr (dBm) Hotspot back-off				Reduced Avg Pwr (dBm) Proximity Sensor back-off			
					MPR	1855 MHz	1880 MHz	1905 MHz	MPR	1855 MHz	1880 MHz	1905 MHz	MPR	1855 MHz	1880 MHz	1905 MHz
LTE Band 2	10	QPSK	1	0	0	23.9	23.8	24.0	0	21.9	21.8	22.2	0	21.9	21.8	22.2
			1	25	0	23.9	23.7	24.0	0	21.9	21.8	22.2	0	21.9	21.8	22.1
			1	49	0	23.9	23.7	23.9	0	22.0	21.8	22.2	0	21.9	21.8	22.1
			25	0	1	22.9	22.7	23.1	0	21.9	21.7	22.1	0	21.9	21.7	22.1
			25	12	1	22.9	22.7	23.0	0	21.9	21.7	22.1	0	21.9	21.7	22.0
			25	25	1	22.9	22.7	23.0	0	21.9	21.7	22.1	0	21.9	21.7	22.0
		16QAM	50	0	1	22.9	22.7	23.1	0	21.9	21.7	22.1	0	21.9	21.7	22.1
			1	0	1	22.9	22.7	23.1	0	22.1	21.7	22.0	0	22.0	21.6	22.1
			1	25	1	22.9	22.7	23.1	0	22.1	21.7	21.9	0	22.0	21.6	22.0
			1	49	1	23.0	22.8	23.1	0	22.1	21.6	22.0	0	22.0	21.7	22.1
			25	0	2	22.0	21.8	22.2	0	22.0	21.7	22.2	0	22.0	21.7	22.2
			25	12	2	22.0	21.8	22.1	0	22.0	21.7	22.2	0	22.0	21.7	22.1
			25	25	2	22.0	21.7	22.1	0	22.0	21.7	22.1	0	22.0	21.7	22.1
			50	0	2	22.0	21.7	22.1	0	21.9	21.8	22.1	0	21.9	21.7	22.1
Band	BW (MHz)	Mode	RB Allocation	RB offset	Maximum Avg Pwr (dBm)				Reduced Avg Pwr (dBm) Hotspot back-off				Reduced Avg Pwr (dBm) Proximity Sensor back-off			
					MPR	1852.5 MHz	1880 MHz	1907.5 MHz	MPR	1852.5 MHz	1880 MHz	1907.5 MHz	MPR	1852.5 MHz	1880 MHz	1907.5 MHz
LTE Band 2	5	QPSK	1	0	0	23.8	23.5	24.0	0	21.8	21.6	22.1	0	21.9	21.6	22.1
			1	12	0	23.8	23.5	24.0	0	21.8	21.6	22.1	0	21.9	21.6	22.0
			1	24	0	23.8	23.5	24.0	0	21.8	21.7	22.1	0	21.9	21.6	22.1
			12	0	1	22.9	22.7	23.1	0	21.9	21.7	22.2	0	21.9	21.7	22.2
			12	7	1	22.9	22.7	23.1	0	21.9	21.7	22.2	0	21.9	21.7	22.2
			12	13	1	22.9	22.7	23.1	0	21.9	21.7	22.2	0	21.9	21.7	22.2
		16QAM	25	0	1	22.9	22.7	23.1	0	21.9	21.7	22.2	0	21.9	21.7	22.2
			1	0	1	22.7	22.6	23.0	0	21.7	21.5	22.2	0	21.8	21.6	22.2
			1	12	1	22.6	22.6	23.0	0	21.7	21.5	22.1	0	21.8	21.6	22.1
			1	24	1	22.7	22.6	23.1	0	21.8	21.5	22.2	0	21.8	21.6	22.2
			12	0	2	21.9	21.7	22.2	0	22.0	21.7	22.1	0	21.9	21.6	22.2
			12	7	2	21.9	21.7	22.2	0	21.9	21.7	22.1	0	21.8	21.6	22.1
			12	13	2	21.9	21.7	22.2	0	21.9	21.7	22.1	0	22.0	21.7	22.1
			25	0	2	22.0	21.7	22.2	0	21.9	21.8	22.2	0	21.9	21.7	22.2

LTE Band 2 Measured Results (Continued)

Band	BW (MHz)	Mode	RB Allocation	RB offset	Maximum Avg Pwr (dBm)				Reduced Avg Pwr (dBm) Hotspot back-off				Reduced Avg Pwr (dBm) Proximity Sensor back-off			
					MPR	1851.5 MHz	1880 MHz	1908.5 MHz	MPR	1851.5 MHz	1880 MHz	1908.5 MHz	MPR	1851.5 MHz	1880 MHz	1908.5 MHz
LTE Band 2	3	QPSK	1	0	0	23.8	23.8	24.0	0	21.8	21.7	22.2	0	21.9	21.7	22.1
			1	8	0	23.8	23.7	24.0	0	21.8	21.7	22.3	0	21.9	21.7	22.1
			1	14	0	23.9	23.7	24.0	0	21.9	21.7	22.3	0	21.9	21.7	22.1
			8	0	1	22.8	22.7	23.1	0	21.9	21.7	22.1	0	21.9	21.7	22.2
			8	4	1	22.9	22.7	23.1	0	21.8	21.7	22.2	0	21.9	21.7	22.2
			8	7	1	22.9	22.7	23.1	0	21.9	21.7	22.2	0	21.9	21.7	22.2
		16QAM	15	0	1	22.9	22.7	23.1	0	21.9	21.7	22.2	0	21.9	21.7	22.2
			1	0	1	22.9	22.6	23.3	0	21.9	21.6	22.2	0	21.8	21.6	22.2
			1	8	1	22.9	22.6	23.2	0	21.9	21.7	22.2	0	22.0	21.6	22.0
			1	14	1	22.9	22.3	23.0	0	21.9	21.6	22.1	0	21.8	21.5	22.1
			8	0	2	22.0	21.8	22.1	0	22.0	21.7	22.1	0	22.0	21.7	22.1
			8	4	2	22.0	21.7	22.1	0	22.0	21.7	22.1	0	22.0	21.7	22.1
			8	7	2	22.0	21.7	22.1	0	22.0	21.7	22.1	0	22.0	21.7	22.1
			15	0	2	21.9	21.7	22.1	0	21.9	21.7	22.1	0	21.9	21.7	22.1
Band	BW (MHz)	Mode	RB Allocation	RB offset	Maximum Avg Pwr (dBm)				Reduced Avg Pwr (dBm) Hotspot back-off				Reduced Avg Pwr (dBm) Proximity Sensor back-off			
					MPR	1850.7 MHz	1880 MHz	1909.3 MHz	MPR	1850.7 MHz	1880 MHz	1909.3 MHz	MPR	1850.7 MHz	1880 MHz	1909.3 MHz
LTE Band 2	1.4	QPSK	1	0	0	23.9	23.8	24.0	0	21.9	21.8	22.3	0	21.9	21.8	22.1
			1	3	0	23.9	23.8	24.0	0	21.8	21.7	22.3	0	21.9	21.7	22.2
			1	5	0	23.9	23.8	24.0	0	21.9	21.8	22.4	0	21.8	21.9	22.1
			3	0	0	23.8	23.6	24.0	0	21.9	21.7	22.2	0	21.9	21.7	22.2
			3	1	0	23.8	23.6	24.0	0	21.9	21.7	22.2	0	21.9	21.7	22.2
			3	3	0	23.8	23.6	24.0	0	21.9	21.7	22.2	0	21.9	21.7	22.2
		16QAM	6	0	1	22.9	22.7	23.1	0	21.9	21.7	22.2	0	21.9	21.7	22.1
			1	0	1	22.9	22.5	23.2	0	21.8	21.6	22.0	0	21.8	21.5	22.1
			1	3	1	23.1	22.6	23.2	0	22.0	21.5	21.9	0	21.8	21.6	21.9
			1	5	1	22.8	22.6	23.1	0	21.9	21.6	22.1	0	21.9	21.5	22.1
			3	0	1	22.9	22.8	23.2	0	21.9	21.7	22.1	0	21.9	21.7	22.1
			3	1	1	22.9	22.7	23.2	0	21.9	21.7	22.1	0	21.8	21.7	22.1
			3	3	1	22.9	22.7	23.2	0	21.9	21.7	22.1	0	21.8	21.7	22.2
			6	0	2	21.9	21.8	22.1	0	21.7	21.8	22.2	0	21.8	21.7	22.1

LTE Band 4 Measured Results

SAR for LTE Band 4 (Frequency range: 1710-1755 MHz) is covered by LTE Band 66 (Frequency range: 1710-1780 MHz) due to similar frequency range, same maximum tune-up limit and same channel bandwidth.

LTE Band 5 Measured Results

SAR for LTE Band 5 (Frequency range: 824-849 MHz) is covered by LTE Band 26 (Frequency range: 814-849 MHz) due to similar frequency range, same maximum tune-up limit and same channel bandwidth.

LTE Band 12 Measured Results

Band	BW (MHz)	Mode	RB Allocation	RB offset	Maximum Avg Pwr (dBm)			
					MPR	704 MHz	707.5 MHz	711 MHz
LTE Band 12	10	QPSK	1	0	0		24.8	
			1	25	0		24.8	
			1	49	0		24.8	
			25	0	1		23.7	
			25	12	1		23.7	
			25	25	1		23.7	
			50	0	1		23.7	
		16QAM	1	0	1		23.7	
			1	25	1		23.6	
			1	49	1		23.6	
			25	0	2		22.7	
			25	12	2		22.7	
			25	25	2		22.7	
			50	0	2		22.7	
Band	BW (MHz)	Mode	RB Allocation	RB offset	Maximum Avg Pwr (dBm)			
					MPR	701.5 MHz	707.5 MHz	713.5 MHz
LTE Band 12	5	QPSK	1	0	0	24.7	24.7	24.7
			1	12	0	24.6	24.7	24.8
			1	24	0	24.5	24.6	24.8
			12	0	1	23.6	23.6	23.7
			12	7	1	23.6	23.6	23.8
			12	13	1	23.6	23.6	23.8
			25	0	1	23.6	23.6	23.7
		16QAM	1	0	1	23.4	23.4	23.6
			1	12	1	23.3	23.4	23.7
			1	24	1	23.2	23.4	23.8
			12	0	2	22.6	22.6	22.7
			12	7	2	22.6	22.6	22.7
			12	13	2	22.6	22.6	22.7
			25	0	2	22.7	22.6	22.7

Note(s):

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

LTE Band 12 Measured Results (continued)

Band	BW (MHz)	Mode	RB Allocation	RB offset	Maximum Avg Pwr (dBm)			
					MPR	700.5 MHz	707.5 MHz	714.5 MHz
LTE Band 12	3	QPSK	1	0	0	24.8	24.8	24.8
			1	8	0	24.7	24.7	24.8
			1	14	0	24.6	24.7	24.8
			8	0	1	23.7	23.7	23.8
			8	4	1	23.6	23.7	23.8
			8	7	1	23.7	23.7	23.8
			15	0	1	23.6	23.6	23.7
		16QAM	1	0	1	23.6	23.2	23.6
			1	8	1	23.6	23.4	23.5
			1	14	1	23.3	23.3	23.6
			8	0	2	22.7	22.7	22.6
			8	4	2	22.6	22.6	22.6
			8	7	2	22.7	22.6	22.7
			15	0	2	22.6	22.6	22.7
Band	BW (MHz)	Mode	RB Allocation	RB offset	Maximum Avg Pwr (dBm)			
					MPR	699.7 MHz	707.5 MHz	715.3 MHz
LTE Band 12	1.4	QPSK	1	0	0	24.7	24.7	24.8
			1	3	0	24.7	24.6	24.8
			1	5	0	24.6	24.7	24.8
			3	0	0	24.7	24.6	24.7
			3	1	0	24.7	24.6	24.8
			3	3	0	24.7	24.6	24.8
			6	0	1	23.7	23.6	23.8
		16QAM	1	0	1	23.6	23.5	23.6
			1	3	1	23.7	23.5	23.6
			1	5	1	23.6	23.5	23.7
			3	0	1	23.7	23.7	23.7
			3	1	1	23.8	23.7	23.7
			3	3	1	23.7	23.7	23.7
			6	0	2	22.6	22.7	22.8

LTE Band 13 Measured Results

Band	BW (MHz)	Mode	RB Allocation	RB offset	Maximum Avg Pwr (dBm)			
					MPR		782 MHz	
LTE Band 13	10	QPSK	1	0	0		24.7	
			1	25	0		24.7	
			1	49	0		24.7	
			25	0	1		23.6	
			25	12	1		23.6	
			25	25	1		23.6	
			50	0	1		23.6	
		16QAM	1	0	1		23.5	
			1	25	1		23.5	
			1	49	1		23.5	
			25	0	2		22.7	
			25	12	2		22.6	
			25	25	2		22.7	
			50	0	2		22.6	
Band	BW (MHz)	Mode	RB Allocation	RB offset	Maximum Avg Pwr (dBm)			
					MPR		782 MHz	
LTE Band 13	5	QPSK	1	0	0		24.6	
			1	12	0		24.5	
			1	24	0		24.5	
			12	0	1		23.6	
			12	7	1		23.6	
			12	13	1		23.6	
			25	0	1		23.6	
		16QAM	1	0	1		23.2	
			1	12	1		23.1	
			1	24	1		23.2	
			12	0	2		22.6	
			12	7	2		22.7	
			12	13	2		22.6	
			25	0	2		22.7	

Note(s):

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

LTE Band 17 Measured Results

SAR for 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.

LTE Band 26 Measured Results

Band	BW (MHz)	Mode	RB Allocation	RB offset	Maximum Avg Pwr (dBm)			
					MPR	821.5 MHz	831.5 MHz	841.5 MHz
LTE Band 26	15	QPSK	1	0	0		24.6	
			1	36	0		24.4	
			1	74	0		24.4	
			36	0	1		23.4	
			36	18	1		23.4	
			36	37	1		23.4	
			75	0	1		23.4	
		16QAM	1	0	1		23.4	
			1	36	1		23.3	
			1	74	1		23.3	
			36	0	2		22.4	
			36	18	2		22.4	
			36	37	2		22.4	
			75	0	2		22.4	
Band	BW (MHz)	Mode	RB Allocation	RB offset	Maximum Avg Pwr (dBm)			
					MPR	819 MHz	831.5 MHz	844 MHz
LTE Band 26	10	QPSK	1	0	0	24.4	24.5	24.4
			1	25	0	24.3	24.4	24.4
			1	49	0	24.2	24.4	24.3
			25	0	1	23.3	23.5	23.4
			25	12	1	23.3	23.4	23.4
			25	25	1	23.3	23.5	23.4
			50	0	1	23.3	23.4	23.4
		16QAM	1	0	1	23.5	23.6	23.3
			1	25	1	23.4	23.5	23.3
			1	49	1	23.3	23.5	23.2
			25	0	2	22.4	22.5	22.5
			25	12	2	22.3	22.5	22.4
			25	25	2	22.3	22.4	22.5
			50	0	2	22.3	22.5	22.4

Note(s):

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

LTE Band 26 Measured Results (continued)

Band	BW (MHz)	Mode	RB Allocation	RB offset	Maximum Avg Pwr (dBm)			
					MPR	816.5 MHz	831.5 MHz	846.5 MHz
LTE Band 26	5	QPSK	1	0	0	24.3	24.4	24.4
			1	12	0	24.3	24.5	24.4
			1	24	0	24.3	24.5	24.3
			12	0	1	23.4	23.5	23.4
			12	7	1	23.3	23.4	23.4
			12	13	1	23.3	23.4	23.4
			25	0	1	23.3	23.4	23.4
		16QAM	1	0	1	23.3	23.5	23.1
			1	12	1	23.3	23.5	23.2
			1	24	1	23.2	23.5	23.1
			12	0	2	22.3	22.4	22.4
			12	7	2	22.4	22.4	22.4
			12	13	2	22.3	22.4	22.3
			25	0	2	22.4	22.5	22.4
Band	BW (MHz)	Mode	RB Allocation	RB offset	Maximum Avg Pwr (dBm)			
					MPR	815.5 MHz	831.5 MHz	847.5 MHz
LTE Band 26	3	QPSK	1	0	0	24.4	24.5	24.6
			1	8	0	24.4	24.4	24.5
			1	14	0	24.4	24.4	24.5
			8	0	1	23.4	23.4	23.4
			8	4	1	23.4	23.4	23.4
			8	7	1	23.4	23.4	23.4
			15	0	1	23.4	23.4	23.4
		16QAM	1	0	1	23.5	23.5	23.1
			1	8	1	23.5	23.4	23.3
			1	14	1	23.3	23.4	23.2
			8	0	2	22.4	22.5	22.4
			8	4	2	22.4	22.5	22.4
			8	7	2	22.4	22.5	22.4
			15	0	2	22.5	22.4	22.4

LTE Band 26 Measured Results (continued)

Band	BW (MHz)	Mode	RB Allocation	RB offset	Maximum Avg Pwr (dBm)			
					MPR	814.7 MHz	831.5 MHz	848.3 MHz
LTE Band 26	1.4	QPSK	1	0	0	24.5	24.5	24.5
			1	3	0	24.5	24.5	24.4
			1	5	0	24.5	24.4	24.3
			3	0	0	24.4	24.4	24.3
			3	1	0	24.5	24.4	24.4
			3	3	0	24.5	24.5	24.4
			6	0	1	23.4	23.4	23.4
		16QAM	1	0	1	23.2	23.3	23.3
			1	3	1	23.0	23.2	23.3
			1	5	1	23.4	23.2	23.3
			3	0	1	23.4	23.3	23.4
			3	1	1	23.4	23.3	23.4
			3	3	1	23.4	23.3	23.4
			6	0	2	22.5	22.4	22.2

LTE Band 66 Measured Results

Band	BW (MHz)	Mode	RB Allocation	RB offset	Maximum Avg Pwr (dBm)			Reduced Avg Pwr (dBm) Hotspot back-off			Reduced Avg Pwr (dBm) Proximity Sensor back-off					
					MPR	1720 MHz	1745 MHz	1770 MHz	MPR	1720 MHz	1745 MHz	1770 MHz	MPR	1720 MHz	1745 MHz	1770 MHz
LTE Band 66	20	QPSK	1	0	0	24.3	24.3	24.4	0	21.4	21.2	21.4	0	21.3	21.3	21.4
			1	49	0	24.2	24.3	24.4	0	21.3	21.2	21.4	0	21.2	21.3	21.4
			1	99	0	24.2	24.3	24.4	0	21.2	21.2	21.4	0	21.2	21.3	21.4
			50	0	1	23.2	23.3	23.4	0	21.2	21.3	21.3	0	21.3	21.3	21.4
			50	24	1	23.2	23.3	23.3	0	21.2	21.3	21.3	0	21.2	21.3	21.3
			50	50	1	23.1	23.3	23.3	0	21.2	21.3	21.3	0	21.2	21.3	21.4
		16QAM	100	0	1	23.2	23.3	23.3	0	21.2	21.3	21.3	0	21.2	21.3	21.3
			1	0	1	23.2	23.3	23.4	0	21.3	21.2	21.5	0	21.3	21.2	21.5
			1	49	1	23.1	23.2	23.4	0	21.3	21.1	21.5	0	21.2	21.1	21.5
			1	99	1	23.0	23.2	23.4	0	21.1	21.1	21.5	0	21.1	21.1	21.5
			50	0	2	22.3	22.3	22.4	0	21.3	21.3	21.3	0	21.3	21.3	21.4
			50	24	2	22.2	22.3	22.4	0	21.2	21.3	21.3	0	21.2	21.3	21.3
			50	50	2	22.2	22.3	22.3	0	21.2	21.3	21.3	0	21.2	21.2	21.3
100	0	2	22.2	22.3	22.4	0	21.2	21.3	21.4	0	21.2	21.3	21.4			
Band	BW (MHz)	Mode	RB Allocation	RB offset	Maximum Avg Pwr (dBm)			Reduced Avg Pwr (dBm) Hotspot back-off			Reduced Avg Pwr (dBm) Proximity Sensor back-off					
					MPR	1717.5 MHz	1745 MHz	1772.5 MHz	MPR	1717.5 MHz	1745 MHz	1772.5 MHz	MPR	1717.5 MHz	1745 MHz	1772.5 MHz
LTE Band 66	15	QPSK	1	0	0	24.1	24.4	24.4	0	21.2	21.3	21.4	0	21.2	21.4	21.4
			1	36	0	24.1	24.4	24.4	0	21.2	21.3	21.4	0	21.2	21.3	21.4
			1	74	0	24.1	24.3	24.4	0	21.2	21.3	21.4	0	21.1	21.3	21.4
			36	0	1	23.2	23.3	23.4	0	21.2	21.3	21.4	0	21.2	21.3	21.4
			36	18	1	23.2	23.3	23.4	0	21.2	21.3	21.4	0	21.2	21.3	21.4
			36	37	1	23.2	23.3	23.4	0	21.2	21.3	21.4	0	21.2	21.3	21.4
		16QAM	75	0	1	23.2	23.3	23.4	0	21.2	21.3	21.4	0	21.2	21.3	21.4
			1	0	1	23.2	23.3	23.6	0	21.3	21.2	21.5	0	21.3	21.3	21.4
			1	36	1	23.2	23.3	23.6	0	21.2	21.2	21.5	0	21.2	21.3	21.4
			1	74	1	23.1	23.3	23.5	0	21.1	21.2	21.5	0	21.2	21.2	21.5
			36	0	2	22.3	22.3	22.5	0	21.3	21.3	21.4	0	21.3	21.3	21.4
			36	18	2	22.3	22.3	22.4	0	21.2	21.3	21.4	0	21.3	21.3	21.4
			36	37	2	22.2	22.3	22.4	0	21.2	21.3	21.4	0	21.2	21.3	21.4
			75	0	2	22.2	22.3	22.4	0	21.2	21.3	21.4	0	21.2	21.3	21.4

LTE Band 66 Measured Results (continued)

Band	BW (MHz)	Mode	RB Allocation	RB offset	Maximum Avg Pwr (dBm)				Reduced Avg Pwr (dBm) Hotspot back-off				Reduced Avg Pwr (dBm) Proximity Sensor back-off			
					MPR	1715 MHz	1745 MHz	1775 MHz	MPR	1715 MHz	1745 MHz	1775 MHz	MPR	1715 MHz	1745 MHz	1775 MHz
LTE Band 66	10	QPSK	1	0	0	24.2	24.4	24.4	0	21.2	21.3	21.5	0	21.3	21.3	21.5
			1	25	0	24.2	24.3	24.4	0	21.3	21.3	21.4	0	21.3	21.3	21.4
			1	49	0	24.1	24.3	24.4	0	21.2	21.3	21.4	0	21.2	21.3	21.4
			25	0	1	23.2	23.2	23.4	0	21.3	21.3	21.5	0	21.3	21.3	21.4
			25	12	1	23.2	23.3	23.4	0	21.3	21.3	21.4	0	21.2	21.3	21.4
			25	25	1	23.2	23.3	23.4	0	21.2	21.3	21.4	0	21.2	21.3	21.4
		16QAM	50	0	1	23.2	23.3	23.4	0	21.3	21.3	21.4	0	21.2	21.3	21.4
			1	0	1	23.3	23.2	23.4	0	21.3	21.3	21.4	0	21.4	21.4	21.4
			1	25	1	23.2	23.3	23.3	0	21.3	21.2	21.4	0	21.3	21.4	21.4
			1	49	1	23.3	23.2	23.3	0	21.2	21.2	21.4	0	21.3	21.4	21.3
			25	0	2	22.3	22.3	22.5	0	21.3	21.3	21.5	0	21.3	21.3	21.4
			25	12	2	22.3	22.3	22.5	0	21.3	21.3	21.5	0	21.3	21.3	21.4
			25	25	2	22.3	22.3	22.5	0	21.3	21.3	21.5	0	21.3	21.3	21.4
			50	0	2	22.2	22.3	22.5	0	21.2	21.3	21.4	0	21.3	21.3	21.5
Band	BW (MHz)	Mode	RB Allocation	RB offset	Maximum Avg Pwr (dBm)				Reduced Avg Pwr (dBm) Hotspot back-off				Reduced Avg Pwr (dBm) Proximity Sensor back-off			
					MPR	1712.5 MHz	1745 MHz	1777.5 MHz	MPR	1712.5 MHz	1745 MHz	1777.5 MHz	MPR	1712.5 MHz	1745 MHz	1777.5 MHz
LTE Band 66	5	QPSK	1	0	0	24.1	24.2	24.4	0	21.2	21.2	21.5	0	21.3	21.2	21.4
			1	12	0	24.2	24.3	24.4	0	21.2	21.2	21.5	0	21.3	21.3	21.4
			1	24	0	24.2	24.3	24.4	0	21.2	21.3	21.5	0	21.3	21.3	21.5
			12	0	1	23.2	23.3	23.5	0	21.2	21.3	21.5	0	21.2	21.3	21.4
			12	7	1	23.2	23.2	23.5	0	21.2	21.3	21.5	0	21.2	21.3	21.4
			12	13	1	23.1	23.3	23.5	0	21.2	21.3	21.5	0	21.2	21.3	21.4
		16QAM	25	0	1	23.2	23.3	23.5	0	21.2	21.3	21.5	0	21.2	21.3	21.4
			1	0	1	23.1	23.1	23.4	0	21.2	21.4	21.4	0	21.3	21.3	21.4
			1	12	1	23.1	23.2	23.4	0	21.2	21.4	21.4	0	21.3	21.3	21.4
			1	24	1	23.0	23.1	23.4	0	21.2	21.4	21.3	0	21.2	21.3	21.4
			12	0	2	22.2	22.3	22.5	0	21.3	21.2	21.5	0	21.2	21.3	21.5
			12	7	2	22.2	22.3	22.5	0	21.2	21.2	21.5	0	21.2	21.2	21.4
			12	13	2	22.2	22.3	22.5	0	21.2	21.3	21.5	0	21.2	21.2	21.5
			25	0	2	22.2	22.3	22.6	0	21.3	21.3	21.5	0	21.3	21.3	21.5

LTE Band 66 Measured Results (continued)

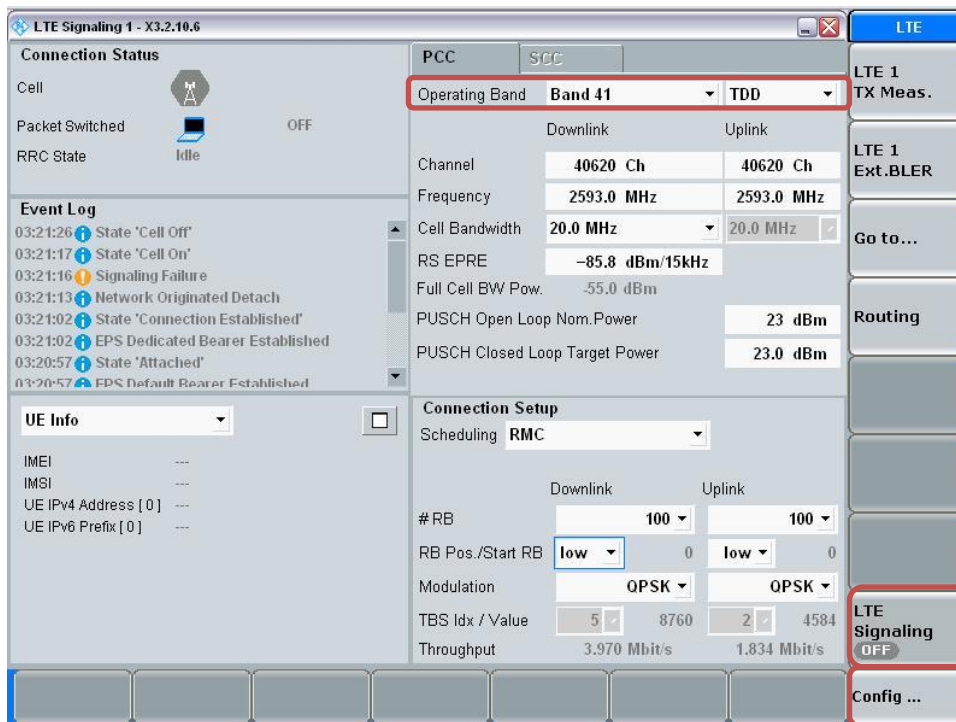
Band	BW (MHz)	Mode	RB Allocation	RB offset	Maximum Avg Pwr (dBm)				Reduced Avg Pwr (dBm) Hotspot back-off				Reduced Avg Pwr (dBm) Proximity Sensor back-off			
					MPR	1711.5 MHz	1745 MHz	1778.5 MHz	MPR	1711.5 MHz	1745 MHz	1778.5 MHz	MPR	1711.5 MHz	1745 MHz	1778.5 MHz
LTE Band 66	3	QPSK	1	0	0	24.3	24.3	24.4	0	21.3	21.3	21.5	0	21.3	21.3	21.4
			1	8	0	24.2	24.3	24.4	0	21.3	21.3	21.5	0	21.3	21.3	21.5
			1	14	0	24.2	24.3	24.4	0	21.3	21.3	21.5	0	21.3	21.3	21.4
			8	0	1	23.2	23.3	23.5	0	21.2	21.3	21.5	0	21.2	21.2	21.4
			8	4	1	23.2	23.3	23.5	0	21.2	21.3	21.5	0	21.2	21.3	21.5
			8	7	1	23.2	23.3	23.5	0	21.2	21.3	21.5	0	21.2	21.3	21.5
		16QAM	15	0	1	23.2	23.3	23.4	0	21.2	21.3	21.5	0	21.2	21.3	21.5
			1	0	1	23.0	23.0	23.5	0	21.3	21.2	21.5	0	21.4	21.2	21.5
			1	8	1	23.1	23.1	23.5	0	21.4	21.3	21.5	0	21.3	21.2	21.4
			1	14	1	23.2	23.1	23.4	0	21.4	21.3	21.5	0	21.1	21.2	21.4
			8	0	2	22.3	22.3	22.4	0	21.3	21.3	21.4	0	21.4	21.4	21.4
			8	4	2	22.3	22.3	22.4	0	21.2	21.3	21.4	0	21.3	21.4	21.4
			8	7	2	22.3	22.3	22.4	0	21.3	21.3	21.4	0	21.3	21.4	21.4
			15	0	2	22.2	22.3	22.5	0	21.2	21.3	21.5	0	21.3	21.3	21.5
Band	BW (MHz)	Mode	RB Allocation	RB offset	Maximum Avg Pwr (dBm)				Reduced Avg Pwr (dBm) Hotspot back-off				Reduced Avg Pwr (dBm) Proximity Sensor back-off			
					MPR	1710.7 MHz	1745 MHz	1779.3 MHz	MPR	1710.7 MHz	1745 MHz	1779.3 MHz	MPR	1710.7 MHz	1745 MHz	1779.3 MHz
LTE Band 66	1.4	QPSK	1	0	0	24.2	24.2	23.4	0	21.3	21.3	21.5	0	21.3	21.3	21.4
			1	3	0	24.3	24.3	24.4	0	21.2	21.2	21.4	0	21.2	21.3	21.4
			1	5	0	24.3	24.3	24.4	0	21.2	21.2	21.4	0	21.2	21.3	21.5
			3	0	0	24.3	24.3	24.4	0	21.3	21.3	21.5	0	21.3	21.3	21.5
			3	1	0	24.3	24.3	24.4	0	21.3	21.3	21.5	0	21.3	21.4	21.4
			3	3	0	24.3	24.3	24.4	0	21.3	21.3	21.5	0	21.3	21.3	21.4
		16QAM	6	0	1	23.3	23.3	23.5	0	21.3	21.3	21.4	0	21.3	21.3	21.5
			1	0	1	23.2	23.2	23.3	0	21.3	21.1	21.4	0	21.3	21.1	21.3
			1	3	1	23.2	23.1	23.2	0	21.1	21.1	21.4	0	21.2	21.2	21.3
			1	5	1	23.3	23.1	23.2	0	21.1	21.1	21.4	0	21.2	21.1	21.4
			3	0	1	23.3	23.2	23.4	0	21.2	21.2	21.4	0	21.3	21.2	21.4
			3	1	1	23.3	23.3	23.4	0	21.2	21.2	21.4	0	21.3	21.2	21.4
			3	3	1	23.3	23.2	23.4	0	21.2	21.2	21.4	0	21.3	21.2	21.5
			6	0	2	22.3	22.4	22.5	0	21.1	21.4	21.5	0	21.1	21.3	21.5

LTE Band TDD Measured Results

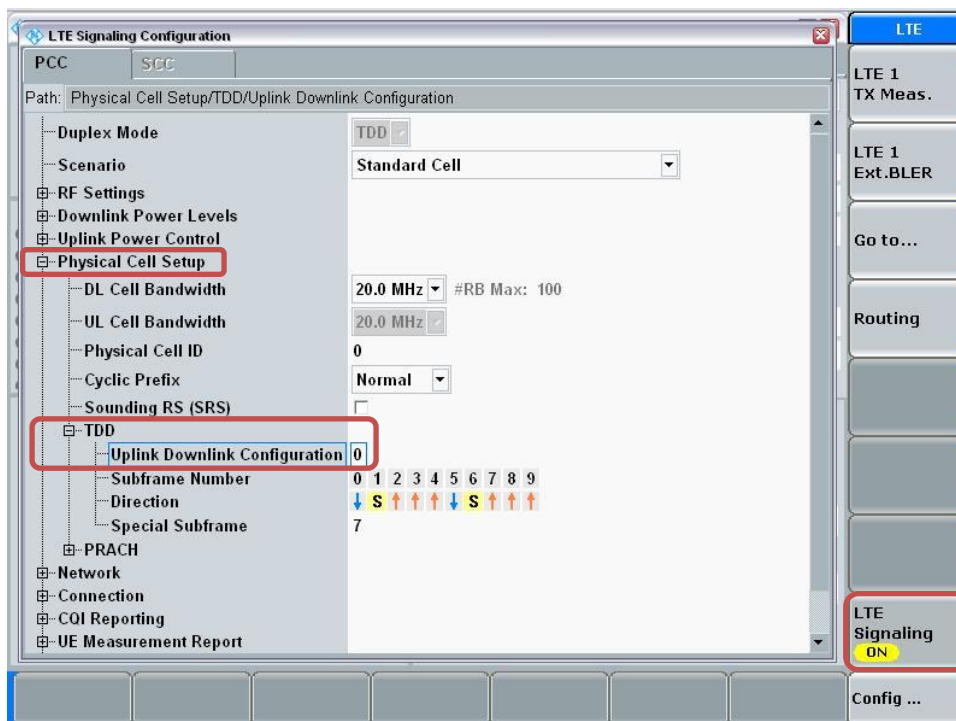
Procedure used to establish SAR test signal for LTE TDD Band

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...”

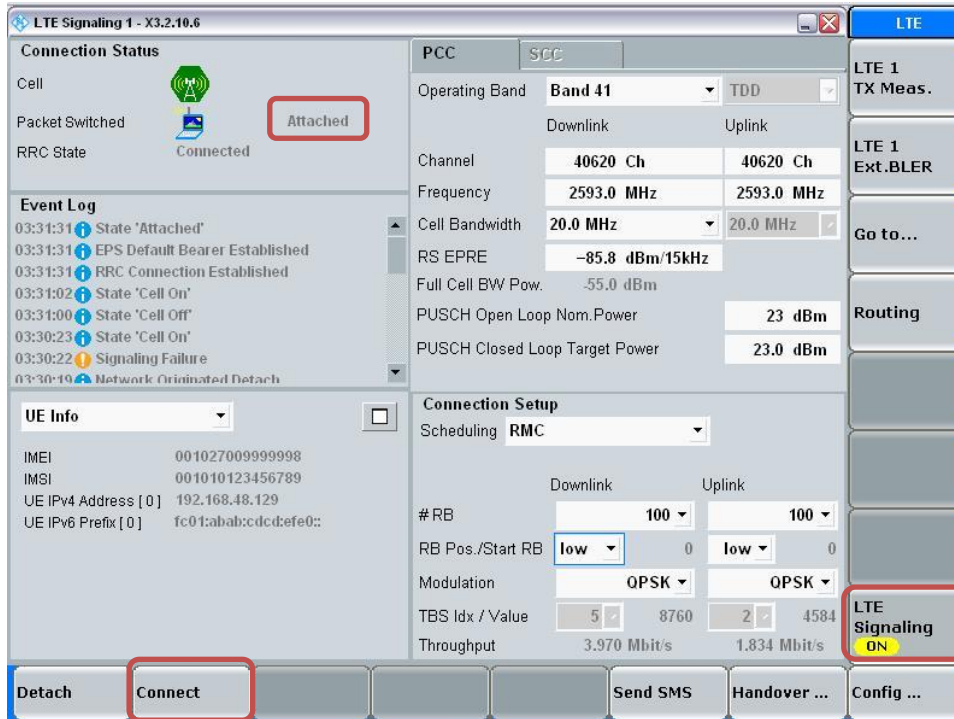


- Go to “Physical Cell Setup”
- Select “TDD” and Set “Uplink Downlink Configuration” to “0” (Uplink Downlink Configuration “0” for Power class 3, Uplink Downlink Configuration “1” for Power class 2.)
- Turn the cell on using “ON | OFF” key



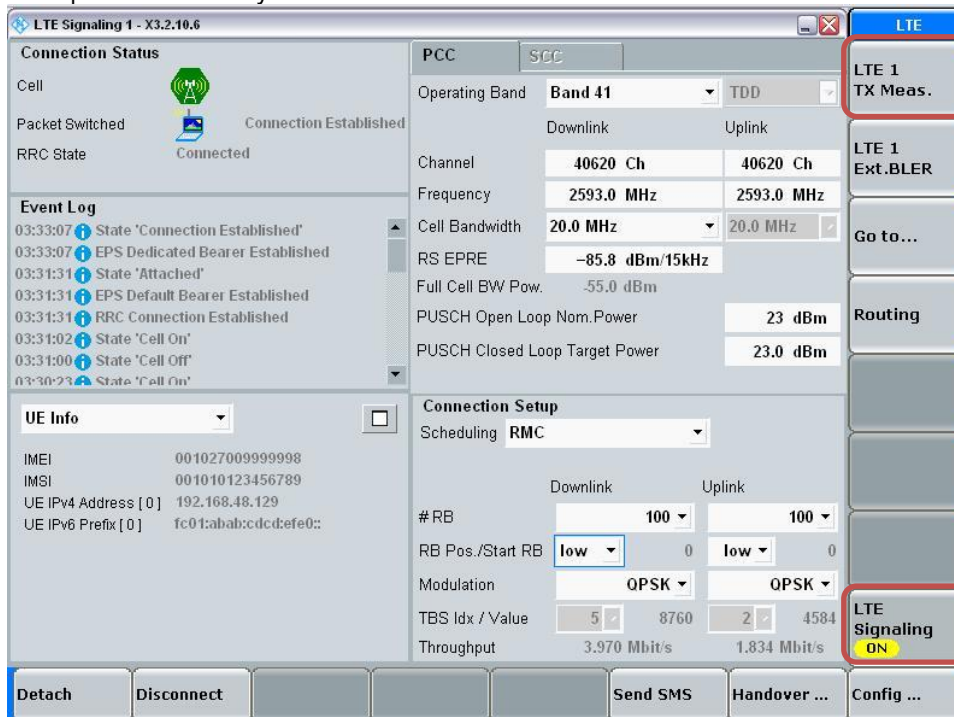
Connect to EUT

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

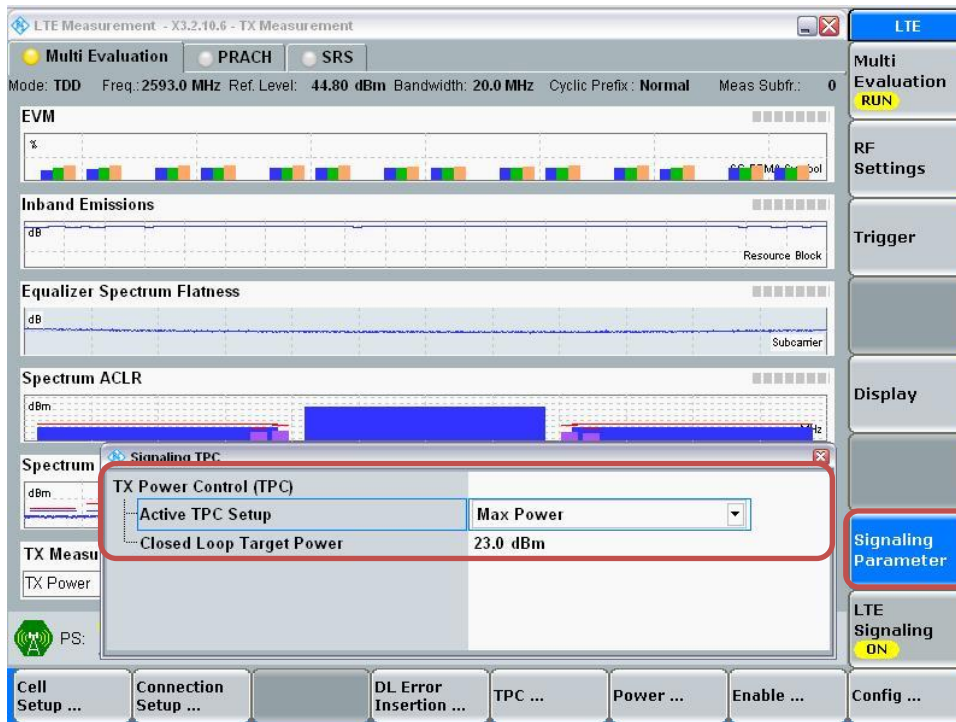


Max Power Setting

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



- 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”



LTE Band 41 Measured Results

Band	BW (MHz)	Mode	RB Allocation	RB offset	Maximum Avg Pwr (dBm)					
					MPR	2506 MHz	2549.5 MHz	2593 MHz	2636.5 MHz	2680 MHz
LTE Band 41	20	QPSK	1	0	0	23.4	23.2	22.8	22.6	22.9
			1	49	0	23.3	23.2	22.8	22.6	22.9
			1	99	0	23.3	23.3	22.8	22.7	23.0
			50	0	1	22.3	22.2	21.7	21.6	21.8
			50	24	1	22.3	22.2	21.8	21.6	21.8
			50	50	1	22.2	22.2	21.8	21.6	21.8
			100	0	1	22.3	22.2	21.8	21.6	21.8
		16QAM	1	0	1	22.3	22.1	21.4	21.7	21.7
			1	49	1	22.0	22.1	21.5	21.8	22.1
			1	99	1	22.2	22.0	21.5	21.7	21.9
			50	0	2	21.3	21.2	20.8	20.6	20.8
			50	24	2	21.3	21.1	20.8	20.6	20.8
			50	50	2	21.2	21.2	20.8	20.6	20.9
			100	0	2	21.3	21.2	20.8	20.6	20.8
Band	BW (MHz)	Mode	RB Allocation	RB offset	Maximum Avg Pwr (dBm)					
					MPR	2506 MHz	2549.5 MHz	2593 MHz	2636.5 MHz	2680 MHz
LTE Band 41	15	QPSK	1	0	0	23.4	23.3	22.8	22.6	22.8
			1	36	0	23.3	23.2	22.8	22.6	22.9
			1	74	0	23.3	23.2	22.8	22.6	22.9
			36	0	1	22.3	22.2	21.8	21.6	21.8
			36	18	1	22.3	22.2	21.8	21.6	21.8
			36	37	1	22.3	22.2	21.8	21.6	21.9
			75	0	1	22.3	22.2	21.8	21.6	21.8
		16QAM	1	0	1	22.5	21.9	21.3	21.7	21.5
			1	36	1	22.2	21.8	21.6	21.6	21.6
			1	74	1	22.5	21.9	21.5	21.7	21.7
			36	0	2	21.4	21.2	20.8	20.7	20.8
			36	18	2	21.3	21.2	20.8	20.7	20.8
			36	37	2	21.3	21.2	20.8	20.7	20.9
			75	0	2	21.3	21.2	20.8	20.7	20.9

LTE Band 41 Measured Results (Continued)

Band	BW (MHz)	Mode	RB Allocation	RB offset	Maximum Avg Pwr (dBm)					
					MPR	2506 MHz	2549.5 MHz	2593 MHz	2636.5 MHz	2680 MHz
LTE Band 41	10	QPSK	1	0	0	23.3	23.2	22.8	22.6	22.8
			1	25	0	23.3	23.2	22.8	22.6	22.9
			1	49	0	23.3	23.2	22.8	22.6	22.9
			25	0	1	22.3	22.2	21.7	21.6	21.8
			25	12	1	22.3	22.2	21.7	21.6	21.8
			25	25	1	22.3	22.2	21.8	21.6	21.8
			50	0	1	22.3	22.2	21.7	21.6	21.8
		16QAM	1	0	1	22.5	22.0	21.7	21.6	21.5
			1	25	1	22.5	22.0	21.7	21.7	21.6
			1	49	1	22.4	22.0	21.7	21.7	21.7
			25	0	2	21.4	21.2	20.7	20.7	20.8
			25	12	2	21.4	21.2	20.7	20.7	20.9
			25	25	2	21.3	21.2	20.7	20.7	20.9
			50	0	2	21.3	21.2	20.7	20.6	20.9
Band	BW (MHz)	Mode	RB Allocation	RB offset	Maximum Avg Pwr (dBm)					
					MPR	2506 MHz	2549.5 MHz	2593 MHz	2636.5 MHz	2680 MHz
LTE Band 41	5	QPSK	1	0	0	23.3	23.2	22.8	22.6	22.8
			1	12	0	23.3	23.2	22.8	22.6	22.8
			1	24	0	23.3	23.2	22.8	22.6	22.9
			12	0	1	22.3	22.2	21.8	21.5	21.8
			12	7	1	22.3	22.2	21.7	21.5	21.8
			12	13	1	22.3	22.2	21.7	21.6	21.8
			25	0	1	22.3	22.2	21.7	21.5	21.8
		16QAM	1	0	1	21.8	22.1	21.6	21.0	21.7
			1	12	1	21.8	22.1	21.7	21.1	21.8
			1	24	1	21.8	22.1	21.7	21.0	21.8
			12	0	2	21.1	21.1	20.8	20.5	20.7
			12	7	2	21.1	21.1	20.8	20.5	20.8
			12	13	2	21.1	21.1	20.8	20.5	20.8
			25	0	2	21.3	21.2	20.7	20.6	20.9

9.3.1. LTE Rel. 10 Carrier Aggregation

LTE Release 10 Carrier Aggregation

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

1. Max power condition

Inter-band

E-UTRA CA configuration (BCS)	Bands		UL					DL						LTE Rel 8 Tx. Power [dBm]	LTE Rel 10 Tx. Power [dBm]	Delta
	PCC	SCC	PCC					PCC			SCC					
	1st	2nd	Mode	BW (MHz)	Channel	Freq. (MHz)	RB/Offset	BW (MHz)	Channel	Freq. (MHz)	BW (MHz)	Channel	Freq. (MHz)			
2A-5A	2A	5A	QPSK	20	19100	1900	1/0	20	1100	1980	10	2525	881.5	24.0	23.9	-0.19
	5A	2A	QPSK	10	20450	829	1/0	10	2450	874	20	900	1960	24.1	24.0	-0.08
2A-12A	2A	12A	QPSK	20	19100	1900	1/0	20	1100	1980	10	5095	737.5	24.0	23.8	-0.21
	12A	2A	QPSK	10	23095	707.5	1/0	10	5095	737.5	20	900	1960	24.8	24.8	-0.04
2A-13A	2A	13A	QPSK	20	19100	1900	1/0	20	1100	1980	10	5230	751	24.0	23.9	-0.16
	13A	2A	QPSK	10	23230	782	1/0	10	5230	751	20	900	1960	24.7	24.6	-0.18
2A-17A	2A	17A	QPSK	20	19100	1900	1/0	20	1100	1980	10	5790	740	24.0	23.8	-0.20
	17A	2A	QPSK	10	23790	710	1/49	10	5790	740	20	900	1960	24.8	24.8	0.01
4A-5A	4A	5A	QPSK	20	20300	1745	1/0	20	2300	2145	10	2525	881.5	24.0	23.8	-0.19
	5A	4A	QPSK	10	20450	829	1/0	10	2450	874	20	2175	2132.5	24.1	24.0	-0.02
4A-12A	4A	12A	QPSK	20	20300	1745	1/0	20	2300	2145	10	5095	737.5	24.0	23.8	-0.20
	12A	4A	QPSK	10	23095	707.5	1/0	10	5095	737.5	20	2175	2132.5	24.8	24.7	-0.11
4A-13A	4A	13A	QPSK	20	20300	1745	1/0	20	2300	2145	10	5230	751	24.0	23.9	-0.13
	13A	4A	QPSK	10	23230	782	1/0	10	5230	751	20	2175	2132.5	24.7	24.6	-0.19
4A-17A	4A	17A	QPSK	10	20300	1745	1/0	20	2300	2145	10	5790	740	24.0	23.8	-0.20
	17A	4A	QPSK	10	23790	710	1/49	10	5790	740	20	2175	2132.5	24.8	24.8	-0.01
5A-41A	5A	41A	QPSK	10	20450	829	1/0	10	2450	874	20	40620	2593	24.1	24.1	-0.01

Intra-band Non-contiguous

E-UTRA CA configuration (BCS)	Bands		UL					DL						LTE Rel 8 Tx. Power [dBm]	LTE Rel 10 Tx. Power [dBm]	Delta
	PCC	SCC	PCC					PCC			SCC					
	1st	2nd	Mode	BW (MHz)	Channel	Freq. (MHz)	RB/Offset	BW (MHz)	Channel	Freq. (MHz)	BW (MHz)	Channel	Freq. (MHz)			
2A-2A	2A	2A	QPSK	20	19100	1900	1/0	20	1100	1980	20	700	1940	24.0	23.9	-0.16
4A-4A	4A	4A	QPSK	20	20300	1745	1/0	20	2300	2145	20	2050	2120	24.0	23.8	-0.17
5A-5A	5A	5A	QPSK	10	20450	829	1/0	10	2450	874	10	2600	889	24.1	24.1	0.00
41A-41A	41A	41A	QPSK	20	39750	2506	1/0	20	39750	2506	20	41490	2680	23.4	23.3	-0.05
66A-66A	66A	66A	QPSK	20	132572	1770	1/49	20	67036	2170	20	66536	2120	24.4	24.2	-0.20

Intra-band Contiguous

E-UTRA CA configuration (BCS)	Bands		UL					DL						LTE Rel 8 Tx. Power [dBm]	LTE Rel 10 Tx. Power [dBm]	Delta
	PCC	SCC	PCC					PCC			SCC					
	1st	2nd	Mode	BW (MHz)	Channel	Freq. (MHz)	RB/Offset	BW (MHz)	Channel	Freq. (MHz)	BW (MHz)	Channel	Freq. (MHz)			
2C	2C	2C	QPSK	20	19100	1900	1/0	20	1100	1980	20	902	1960.2	24.0	23.8	-0.20
5B	5B	5B	QPSK	10	20450	829	1/0	10	2450	874	10	2549	883.9	24.1	23.9	-0.12
41C	41C	41C	QPSK	20	39750	2506	1/0	20	39750	2506	20	39948	2525.8	23.4	23.3	-0.05
66C	66C	66C	QPSK	20	132572	1770	1/49	20	67036	2170	20	66838	2150.2	24.4	24.3	-0.16

2. Reduced power condition (Hotspot back-off)

Inter-band

E-UTRA CA configuration (BCS)	Bands		UL					DL					LTE Rel 8 Tx. Power [dBm]	LTE Rel 10 Tx. Power [dBm]	Delta	
	PCC	SCC	PCC					PCC		SCC						
	1st	2nd	Mode	BW (MHz)	Channel	Freq. (MHz)	RB/Offset	BW (MHz)	Channel	Freq. (MHz)	BW (MHz)	Channel				Freq. (MHz)
2A-5A	2A	5A	16QAM	20	19100	1900	1/0	20	1100	1980	10	2525	881.5	22.4	22.2	-0.14
2A-12A	2A	12A	16QAM	20	19100	1900	1/0	20	1100	1980	10	5095	737.5	22.4	22.2	-0.13
2A-13A	2A	13A	16QAM	20	19100	1900	1/0	20	1100	1980	10	5230	751	22.4	22.3	-0.07
2A-17A	2A	17A	16QAM	20	19100	1900	1/0	20	1100	1980	10	5790	740	22.4	22.3	-0.10
4A-5A	4A	5A	QPSK	20	20300	1745	1/0	20	2300	2145	10	2525	881.5	21.0	20.9	-0.11
4A-12A	4A	12A	QPSK	20	20300	1745	1/0	20	2300	2145	10	5095	737.5	21.0	21.0	-0.06
4A-13A	4A	13A	QPSK	20	20300	1745	1/0	20	2300	2145	10	5230	751	21.0	20.9	-0.11
4A-17A	4A	17A	QPSK	20	20300	1745	1/0	20	2300	2145	10	5790	740	21.0	21.0	-0.09

Intra-band Non-contiguous

E-UTRA CA configuration (BCS)	Bands		UL					DL					LTE Rel 8 Tx. Power [dBm]	LTE Rel 10 Tx. Power [dBm]	Delta	
	PCC	SCC	PCC					PCC		SCC						
	1st	2nd	Mode	BW (MHz)	Channel	Freq. (MHz)	RB/Offset	BW (MHz)	Channel	Freq. (MHz)	BW (MHz)	Channel				Freq. (MHz)
2A-2A	2A	2A	16QAM	20	19100	1900	1/0	20	1100	1980	20	700	1940	22.4	22.2	-0.13
4A-4A	4A	4A	QPSK	20	20300	1745	1/0	20	2300	2145	20	2050	2120	21.0	21.0	-0.10
66A-66A	66A	66A	16QAM	20	132572	1770	1/0	20	67036	2170	20	66536	2120	21.5	21.4	-0.11

Intra-band Contiguous

E-UTRA CA configuration (BCS)	Bands		UL					DL					LTE Rel 8 Tx. Power [dBm]	LTE Rel 10 Tx. Power [dBm]	Delta	
	PCC	SCC	PCC					PCC		SCC						
	1st	2nd	Mode	BW (MHz)	Channel	Freq. (MHz)	RB/Offset	BW (MHz)	Channel	Freq. (MHz)	BW (MHz)	Channel				Freq. (MHz)
2C	2C	2C	16QAM	20	19100	1900	1/0	20	1100	1980	20	902	1960.2	22.4	22.2	-0.13
66C	66C	66C	16QAM	20	132572	1770	1/0	20	67036	2170	20	66838	2150.2	21.5	21.5	-0.08

3. Reduced power condition (Proximity sensor back-off)

Inter-band

E-UTRA CA configuration (BCS)	Bands		UL					DL						LTE Rel 8 Tx. Power [dBm]	LTE Rel 10 Tx. Power [dBm]	Delta
	PCC	SCC	PCC					PCC			SCC					
	1st	2nd	Mode	BW (MHz)	Channel	Freq. (MHz)	RB/Offset	BW (MHz)	Channel	Freq. (MHz)	BW (MHz)	Channel	Freq. (MHz)			
2A-5A	2A	5A	16QAM	20	19100	1900	1/0	20	1100	1980	10	2525	881.5	22.2	22.1	-0.07
2A-12A	2A	12A	16QAM	20	19100	1900	1/0	20	1100	1980	10	5095	737.5	22.2	22.2	-0.03
2A-13A	2A	13A	16QAM	20	19100	1900	1/0	20	1100	1980	10	5230	751	22.2	22.1	-0.08
2A-17A	2A	17A	16QAM	20	19100	1900	1/0	20	1100	1980	10	5790	740	22.2	22.2	-0.06
4A-5A	4A	5A	QPSK	20	20050	1720	1/0	20	2050	2120	10	2525	881.5	21.0	21.0	-0.05
4A-12A	4A	12A	QPSK	20	20050	1720	1/0	20	2050	2120	10	5095	737.5	21.0	20.9	-0.10
4A-13A	4A	13A	QPSK	20	20050	1720	1/0	20	2050	2120	10	5230	751	21.0	21.0	-0.06
4A-17A	4A	17A	QPSK	20	20050	1720	1/0	20	2050	2120	10	5790	740	21.0	21.0	-0.06

Intra-band Non-contiguous

E-UTRA CA configuration (BCS)	Bands		UL					DL						LTE Rel 8 Tx. Power [dBm]	LTE Rel 10 Tx. Power [dBm]	Delta
	PCC	SCC	PCC					PCC			SCC					
	1st	2nd	Mode	BW (MHz)	Channel	Freq. (MHz)	RB/Offset	BW (MHz)	Channel	Freq. (MHz)	BW (MHz)	Channel	Freq. (MHz)			
2A-2A	2A	2A	16QAM	20	19100	1900	1/0	20	1100	1980	20	700	1940	22.2	22.1	-0.09
4A-4A	4A	4A	QPSK	20	20050	1720	1/0	20	2050	2120	20	2300	2145	21.0	20.9	-0.08
66A-66A	66A	66A	16QAM	20	132572	1770	1/0	20	67036	2170	20	66536	2120	21.5	21.4	-0.06

Intra-band Contiguous

E-UTRA CA configuration (BCS)	Bands		UL					DL						LTE Rel 8 Tx. Power [dBm]	LTE Rel 10 Tx. Power [dBm]	Delta
	PCC	SCC	PCC					PCC			SCC					
	1st	2nd	Mode	BW (MHz)	Channel	Freq. (MHz)	RB/Offset	BW (MHz)	Channel	Freq. (MHz)	BW (MHz)	Channel	Freq. (MHz)			
2C	2C	2C	16QAM	20	19100	1900	1/0	20	1100	1980	20	902	1960.2	22.2	22.1	-0.11
66C	66C	66C	16QAM	20	132572	1770	1/0	20	67036	2170	20	66838	2150.2	21.5	21.4	-0.11

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.

9.4. Wi-Fi 2.4 GHz (DTS Band)

Measured Results

Mode	Data Rate	Ch #	Freq. (MHz)	Max Pw r.			Reduction Pw r.		
				Avg Pw r (dBm)	Max Output Power (dBm)	SAR Test (Yes/No)	Avg Pw r (dBm)	Max Output Power (dBm)	SAR Test (Yes/No)
802.11b	1 Mbps	1	2412	16.9	17.5	Yes	14.2	14.5	Yes
		6	2437	16.2			13.6		
		11	2462	16.7			14.0		
		12	2467	15.5	16.0	No	12.4	13.0	No
		13	2472	11.9	12.5		8.7	9.5	
802.11g	6 Mbps	1	2412	Not Require	17.0	No	Not Require	14.0	No
		6	2437		15.0			12.0	
		11	2462		11.5			8.5	
		12	2467		9.5			6.5	
		13	2472		9.5			6.5	
802.11n (HT20)	6.5 Mbps	1	2412	Not Require	17.0	No	Not Require	14.0	No
		6	2437		14.5			11.5	
		11	2462		12.0			9.0	
		12	2467		10.0			7.0	
		13	2472		10.0			7.0	

Note(s):

- SAR is not required for 802.11g/n modes when the adjusted SAR for 802.11b is < 1.2 W/kg.
- 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.
- 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.

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

Measured Results

Antenna	Band (GHz)	Mode	Data Rate	Ch #	Freq. (MHz)	Max Pwr.			Reduction Pwr.		
						Avg Pwr (dBm)	Max Output Power (dBm)	SAR Test (Yes/No)	Avg Pwr (dBm)	Max Output Power (dBm)	SAR Test (Yes/No)
SISO Ant 1	5.2 (U-NII 1)	802.11a	6 Mbps	36	5180	14.7	15.5	Yes	12.7	13.0	No
				40	5200	14.8			12.5		
				44	5220	14.9			12.6		
				48	5240	14.7			12.6		
		802.11n (HT20)	6.5 Mbps	36	5180	14.6	15.5	No	12.3	13.0	No
				40	5200	14.5			12.2		
				44	5220	14.5			12.3		
		802.11n (HT40)	13.5 Mbps	38	5190	Not Required	12.5	No	Not Required	12.5	No
				46	5230	Not Required			Not Required		
		802.11ac (VHT20)	6.5 Mbps	36	5180	14.6	15.5	No	12.2	13.0	No
				40	5200	14.4			12.1		
				44	5220	14.4			12.2		
				48	5240	14.3			12.1		
		802.11ac (VHT40)	13.5 Mbps	38	5190	Not Required	12.5	No	Not Required	12.5	No
	46			5230	Not Required	Not Required					
	802.11ac (VHT80)	29.3 Mbps	42	5210	Not Required	11.0	No	Not Required	11.0	Yes	
	5.5 (U-NII 2C)	802.11a	6 Mbps	100	5500	12.8	13.5	Yes			
				120	5600	12.2					
				124	5620	12.0					
				144	5720	12.2					
		802.11n (HT20)	6.5 Mbps	100	5500	Not Required	13.0	No			
				120	5600	Not Required					
				124	5620	Not Required					
				144	5720	Not Required					
		802.11n (HT40)	13.5 Mbps	102	5510	Not Required	10.5	No			
				118	5590	Not Required					
				126	5630	Not Required					
				142	5710	Not Required					
802.11ac (VHT20)		6.5 Mbps	100	5500	Not Required	13.0	No				
			120	5600	Not Required						
			124	5620	Not Required						
			144	5720	Not Required						
802.11ac (VHT40)		13.5 Mbps	102	5510	Not Required	10.5	No				
			118	5590	Not Required						
	126		5630	Not Required							
	142		5710	Not Required							
802.11ac (VHT80)	29.3 Mbps	106	5530	Not Required	9.5	No					
		122	5610	Not Required							
		138	5690	Not Required							
		154	5770	Not Required							
5.8 (U-NII 3)	802.11a	6 Mbps	149	5745	14.7	16.0	Yes	12.7	13.0	No	
			157	5785	14.3			12.7			
			165	5825	14.4			12.8			
	802.11n (HT20)	6.5 Mbps	149	5745	14.6	16.0	No	12.4	13.0	No	
			157	5785	14.1			12.4			
			165	5825	14.3			12.6			
	802.11n (HT40)	13.5 Mbps	151	5755	Not Required	15.0	No	Not Required	12.0	Yes	
			159	5795	Not Required			Not Required			
	802.11ac (VHT20)	6.5 Mbps	149	5745	14.6	16.0	No	12.3	13.0	No	
			157	5785	14.1			12.4			
			165	5825	14.2			12.5			
	802.11ac (VHT40)	13.5 Mbps	151	5755	Not Required	15.0	No	Not Required	12.0	Yes	
			159	5795	Not Required			Not Required			
	802.11ac (VHT80)	29.3 Mbps	155	5775	Not Required	14.0	No	Not Required	11.0	Yes	

Note(s):

- 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.
- When the same transmission mode configurations have the same maximum output power on the same channel for the 802.11 a/g/n/ac modes, the channel in the lower order/sequence 802.11 mode (i.e. a, g, n then ac) is selected.
- When different maximum output power is specified for both UNII band I and UNII band 2A, begin SAR measurement in the band with higher specified maximum output power. The highest reported SAR for the tested configuration is adjusted by the ratio of lower to higher specified maximum output power for the two bands. When the adjusted SAR is ≤ 1.2 W/kg, SAR is not required for the band with lower maximum output power in that test configuration; otherwise, each band is tested independently for SAR.

9.6. Bluetooth

Average Power Measured Results

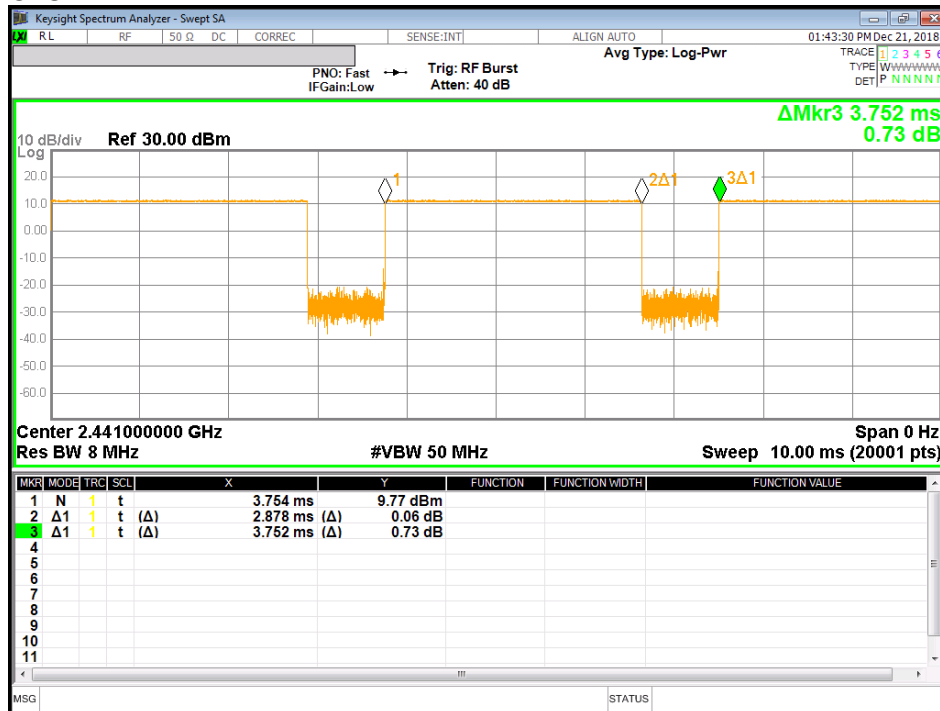
Band (GHz)	Mode	Ch #	Freq. (MHz)	Meas. Avg Pwr (dBm)
2.4	GFSK	0	2402	9.5
		39	2441	9.9
		78	2480	8.8
	EDR, 8-DPSK	0	2402	7.5
		39	2441	7.7
		78	2480	6.6
	LE, GFSK, 1Mbps	0	2402	6.8
		19	2440	6.9
		39	2480	6.0
	LE, GFSK, 2Mbps	0	2402	6.5
		19	2440	6.8
		39	2480	5.9

Duty Factor Measured Results

Mode	Type	T on (ms)	Period (ms)	Duty Cycle	Crest Factor (1/duty cycle)
GFSK	DH5	2.878	3.752	76.7%	1.30

Duty Cycle plots

GFSK



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 $\leq \frac{1}{4}$ 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.

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.

10.1. GSM 850

Antenna	RF Exposure Conditions	Mode	PWR Back-off	Dist. (mm)	Test Position	Ch #.	Freq. (MHz)	Power (dBm)		1-g SAR (W/kg)		Plot No.
								Tune-up limit	Meas.	Meas.	Scaled	
Main Ant.1	Head	GPRS 4 Slots	N/A	0	Left Touch	190	836.6	29.0	28.2	0.190	0.226	
					Left Tilt	190	836.6	29.0	28.2	0.109	0.130	
					Right Touch	190	836.6	29.0	28.2	0.246	0.293	1
					Right Tilt	190	836.6	29.0	28.2	0.118	0.141	
	Body-worn	GPRS 4 Slots	N/A	15	Rear	190	836.6	29.0	28.2	0.407	0.485	2
					Front	190	836.6	29.0	28.2	0.239	0.285	
	Hotspot	GPRS 4 Slots	N/A	10	Rear	128	824.4	29.0	28.3	0.736	0.867	
						190	836.6	29.0	28.2	0.904	1.077	3
						251	848.8	29.0	28.4	0.825	0.949	
					Front	190	836.6	29.0	28.2	0.246	0.293	
					Edge 2	190	836.6	29.0	28.2	0.347	0.413	
					Edge 3	190	836.6	29.0	28.2	0.353	0.421	
Edge 4	190	836.6	29.0	28.2	0.101	0.120						

10.2. GSM 1900

Antenna	RF Exposure Conditions	Mode	PWR Back-off	Dist. (mm)	Test Position	Ch #.	Freq. (MHz)	Power (dBm)		1-g SAR (W/kg)		Plot No.
								Tune-up limit	Meas.	Meas.	Scaled	
Main Ant.1	Head	GPRS 2 Slots	N/A	0	Left Touch	810	1909.8	28.0	27.6	0.019	0.021	4
					Left Tilt	810	1909.8	28.0	27.6	0.007	0.008	
					Right Touch	810	1909.8	28.0	27.6	0.013	0.014	
					Right Tilt	810	1909.8	28.0	27.6	0.009	0.010	
	Body-worn	GPRS 2 Slots	N/A	15	Rear	810	1909.8	28.0	27.6	0.019	0.021	5
					Front	810	1909.8	28.0	27.6	0.007	0.008	
	Hotspot	GPRS 2 Slots	N/A	10	Rear	810	1909.8	28.0	27.6	0.043	0.047	6
					Front	810	1909.8	28.0	27.6	0.009	0.010	
					Edge 2	810	1909.8	28.0	27.6	0.002	0.002	
					Edge 3	810	1909.8	28.0	27.6	0.019	0.021	
					Edge 4	810	1909.8	28.0	27.6	0.016	0.017	

10.3. 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)		Plot No.
								Tune-up limit	Meas.	Meas.	Scaled	
Main Ant.1	Head	Rel.99 RMC	Off	0	Left Touch	9262	1852.4	24.5	23.6	0.260	0.321	7
					Left Tilt	9262	1852.4	24.5	23.6	0.173	0.214	
					Right Touch	9262	1852.4	24.5	23.6	0.164	0.203	
					Right Tilt	9262	1852.4	24.5	23.6	0.139	0.172	
	Body-w orn	Rel.99 RMC	Off	15	Rear	9262	1852.4	24.5	23.6	0.282	0.349	8
					Front	9262	1852.4	24.5	23.6	0.239	0.295	
	Hotspot	Rel.99 RMC	On	10	Rear	9400	1880.0	21.5	20.1	0.318	0.435	9
					Front	9400	1880.0	21.5	20.1	0.192	0.263	
					Edge 2	9400	1880.0	21.5	20.1	0.064	0.087	
					Edge 3	9400	1880.0	21.5	20.1	0.146	0.200	
					Edge 4	9400	1880.0	21.5	20.1	0.165	0.226	

10.4. W-CDMA Band IV

Antenna	RF Exposure Conditions	Mode	PWR Back-off	Dist. (mm)	Test Position	Ch #.	Freq. (MHz)	Power (dBm)		1-g SAR (W/kg)		Plot No.
								Tune-up limit	Meas.	Meas.	Scaled	
Main Ant.1	Head	Rel.99 RMC	Off	0	Left Touch	1312	1712.4	25.0	24.4	0.116	0.133	10
					Left Tilt	1312	1712.4	25.0	24.4	0.072	0.082	
					Right Touch	1312	1712.4	25.0	24.4	0.066	0.076	
					Right Tilt	1312	1712.4	25.0	24.4	0.063	0.072	
	Body-w orn	Rel.99 RMC	Off	15	Rear	1312	1712.4	25.0	24.4	0.281	0.321	11
					Front	1312	1712.4	25.0	24.4	0.178	0.203	
	Hotspot	Rel.99 RMC	On	10	Rear	1312	1712.4	22.0	21.2	0.358	0.434	12
					Front	1312	1712.4	22.0	21.2	0.192	0.233	
					Edge 2	1312	1712.4	22.0	21.2	0.039	0.048	
					Edge 3	1312	1712.4	22.0	21.2	0.239	0.290	
					Edge 4	1312	1712.4	22.0	21.2	0.162	0.196	

10.5. W-CDMA Band V

Antenna	RF Exposure Conditions	Mode	PWR Back-off	Dist. (mm)	Test Position	Ch #.	Freq. (MHz)	Power (dBm)		1-g SAR (W/kg)		Plot No.
								Tune-up limit	Meas.	Meas.	Scaled	
Main Ant.1	Head	Rel.99 RMC	N/A	0	Left Touch	4183	836.6	25.5	24.6	0.034	0.042	
					Left Tilt	4183	836.6	25.5	24.6	0.018	0.021	
					Right Touch	4183	836.6	25.5	24.6	0.044	0.054	13
					Right Tilt	4183	836.6	25.5	24.6	0.019	0.024	
	Body-w orn	Rel.99 RMC	N/A	15	Rear	4183	836.6	25.0	24.6	0.152	0.165	14
					Front	4183	836.6	25.0	24.6	0.045	0.049	
	Hotspot	Rel.99 RMC	N/A	10	Rear	4183	836.6	25.5	24.6	0.323	0.394	15
					Front	4183	836.6	25.5	24.6	0.059	0.072	
					Edge 2	4183	836.6	25.5	24.6	0.075	0.092	
					Edge 3	4183	836.6	25.5	24.6	0.107	0.130	
					Edge 4	4183	836.6	25.5	24.6	0.014	0.017	

10.6. LTE Band 2 (20MHz Bandwidth)

Antenna	RF Exposure Conditions	Mode	PWR Back-off	Dist. (mm)	Test Position	Ch #.	Freq. (MHz)	RB Allocation	RB offset	Power (dBm)		1-g SAR (W/kg)		Plot No.
										Tune-up limit	Meas.	Meas.	Scaled	
Main Ant.1	Head	QPSK	Off	0	Left Touch	19100	1900.0	1	0	25.0	24.0	0.314	0.392	16
								50	0	24.0	23.1	0.243	0.301	
					Left Tilt	19100	1900.0	1	0	25.0	24.0	0.216	0.269	
								50	0	24.0	23.1	0.170	0.210	
					Right Touch	19100	1900.0	1	0	25.0	24.0	0.220	0.274	
								50	0	24.0	23.1	0.167	0.207	
					Right Tilt	19100	1900.0	1	0	25.0	24.0	0.167	0.208	
								50	0	24.0	23.1	0.134	0.166	
	Body-w orn	QPSK	Off	15	Rear	19100	1900.0	1	0	25.0	24.0	0.392	0.489	17
								50	0	24.0	23.1	0.328	0.406	
					Front	19100	1900.0	1	0	25.0	24.0	0.286	0.357	
								50	0	24.0	23.1	0.227	0.281	
	Hotspot	QPSK	On	10	Rear	19100	1900.0	1	0	23.0	22.0	0.567	0.713	18
								50	0	23.0	22.1	0.552	0.686	
					Front	19100	1900.0	1	0	23.0	22.0	0.272	0.342	
								50	0	23.0	22.1	0.267	0.332	
					Edge 2	19100	1900.0	1	0	23.0	22.0	0.116	0.146	
								50	0	23.0	22.1	0.114	0.142	
					Edge 3	19100	1900.0	1	0	23.0	22.0	0.233	0.293	
								50	0	23.0	22.1	0.217	0.270	
					Edge 4	19100	1900.0	1	0	23.0	22.0	0.339	0.426	
								50	0	23.0	22.1	0.329	0.409	

10.7. LTE Band 4 (20MHz Bandwidth)

SAR for LTE Band 4 (Frequency range: 1710-1755 MHz) is covered by LTE Band 66 (Frequency range: 1710-1780 MHz) due to overlapping frequency range, higher maximum tune-up limit and same channel bandwidth.

10.8. LTE Band 5 (10MHz Bandwidth)

SAR for LTE Band 5 (Frequency Range: 824-849 MHz) is covered by LTE Band 26 (Frequency Range: 814-849 MHz) due to overlapping frequency range, same maximum tune-up limit and same channel bandwidth from 10MHz to 1.4MHz. Therefore, LTE Band 26 at 15MHz bandwidth has been measured.

10.9. LTE Band 12 (10MHz Bandwidth)

Antenna	RF Exposure Conditions	Mode	PWR Back-off	Dist. (mm)	Test Position	Ch #.	Freq. (MHz)	RB Allocation	RB offset	Power (dBm)		1-g SAR (W/kg)		Plot No.
										Tune-up limit	Meas.	Meas.	Scaled	
Main Ant.1	Head	QPSK	N/A	0	Left Touch	23095	707.5	1	0	25.5	24.8	0.053	0.062	
								25	25	24.5	23.7	0.054	0.065	
					Left Tilt	23095	707.5	1	0	25.5	24.8	0.029	0.033	
								25	25	24.5	23.7	0.029	0.035	
					Right Touch	23095	707.5	1	0	25.5	24.8	0.064	0.074	19
								25	25	24.5	23.7	0.054	0.065	
					Right Tilt	23095	707.5	1	0	25.5	24.8	0.028	0.032	
								25	25	24.5	23.7	0.027	0.033	
	Body-w orn	QPSK	N/A	15	Rear	23095	707.5	1	0	25.5	24.8	0.136	0.158	
								25	25	24.5	23.7	0.144	0.173	
					Front	23095	707.5	1	0	25.5	24.8	0.064	0.074	20
								25	25	24.5	23.7	0.069	0.083	
	Hotspot	QPSK	N/A	10	Rear	23095	707.5	1	0	25.5	24.8	0.145	0.168	21
								25	25	24.5	23.7	0.141	0.170	
					Front	23095	707.5	1	0	25.5	24.8	0.068	0.079	
								25	25	24.5	23.7	0.069	0.083	
					Edge 2	23095	707.5	1	0	25.5	24.8	0.076	0.088	
								25	25	24.5	23.7	0.079	0.095	
					Edge 3	23095	707.5	1	0	25.5	24.8	0.053	0.061	
								25	25	24.5	23.7	0.054	0.066	
					Edge 4	23095	707.5	1	0	25.5	24.8	0.048	0.056	
								25	25	24.5	23.7	0.055	0.066	

10.10. LTE Band 13 (10MHz Bandwidth)

Antenna	RF Exposure Conditions	Mode	PWR Back-off	Dist. (mm)	Test Position	Ch #.	Freq. (MHz)	RB Allocation	RB offset	Power (dBm)		1-g SAR (W/kg)		Plot No.
										Tune-up limit	Meas.	Meas.	Scaled	
Main Ant.1	Head	QPSK	N/A	0	Left Touch	23230	782.0	1	0	25.5	24.7	0.107	0.127	
								25	25	24.5	23.6	0.075	0.091	
					Left Tilt	23230	782.0	1	0	25.5	24.7	0.069	0.082	
								25	25	24.5	23.6	0.048	0.058	
					Right Touch	23230	782.0	1	0	25.5	24.7	0.144	0.171	22
								25	25	24.5	23.6	0.103	0.126	
					Right Tilt	23230	782.0	1	0	25.5	24.7	0.067	0.080	
								25	25	24.5	23.6	0.049	0.060	
	Body-w orn	QPSK	N/A	15	Rear	23230	782.0	1	0	25.5	24.7	0.305	0.363	23
								25	25	24.5	23.6	0.228	0.278	
					Front	23230	782.0	1	0	25.5	24.7	0.169	0.201	
								25	25	24.5	23.6	0.120	0.146	
	Hotspot	QPSK	N/A	10	Rear	23230	782.0	1	0	25.5	24.7	0.617	0.734	24
								25	25	24.5	23.6	0.451	0.550	
					Front	23230	782.0	1	0	25.5	24.7	0.173	0.206	
								25	25	24.5	23.6	0.123	0.150	
					Edge 2	23230	782.0	1	0	25.5	24.7	0.295	0.351	
								25	25	24.5	23.6	0.219	0.267	
					Edge 3	23230	782.0	1	0	25.5	24.7	0.218	0.259	
								25	25	24.5	23.6	0.161	0.196	
					Edge 4	23230	782.0	1	0	25.5	24.7	0.120	0.143	
								25	25	24.5	23.6	0.081	0.099	

10.11. LTE Band 17 (10MHz Bandwidth)

SAR for 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.

10.12. LTE Band 26 (15MHz Bandwidth)

Antenna	RF Exposure Conditions	Mode	PWR Back-off	Dist. (mm)	Test Position	Ch #.	Freq. (MHz)	RB Allocation	RB offset	Power (dBm)		1-g SAR (W/kg)		Plot No.
										Tune-up limit	Meas.	Meas.	Scaled	
Main Ant.1	Head	QPSK	N/A	0	Left Touch	26865	831.5	1	0	25.5	24.6	0.156	0.193	25
								36	0	24.5	23.4	0.115	0.147	
					Left Tilt	26865	831.5	1	0	25.5	24.6	0.103	0.127	
								36	0	24.5	23.4	0.077	0.098	
					Right Touch	26865	831.5	1	0	25.5	24.6	0.156	0.193	26
								36	0	24.5	23.4	0.120	0.153	
					Right Tilt	26865	831.5	1	0	25.5	24.6	0.078	0.096	
								36	0	24.5	23.4	0.059	0.076	
	Body-w orn	QPSK	N/A	15	Rear	26865	831.5	1	0	25.0	24.6	0.315	0.347	27
								36	0	24.0	23.4	0.237	0.270	
					Front	26865	831.5	1	0	25.0	24.6	0.177	0.195	
								36	0	24.0	23.4	0.139	0.158	
	Hotspot	QPSK	N/A	10	Rear	26865	831.5	1	0	25.0	24.6	0.700	0.771	28
								36	0	24.0	23.4	0.562	0.639	
					Front	26865	831.5	1	0	25.0	24.6	0.162	0.178	
								36	0	24.0	23.4	0.129	0.147	
					Edge 2	26865	831.5	1	0	25.0	24.6	0.277	0.305	
								36	0	24.0	23.4	0.216	0.246	
					Edge 3	26865	831.5	1	0	25.0	24.6	0.233	0.257	
								36	0	24.0	23.4	0.187	0.213	
					Edge 4	26865	831.5	1	0	25.0	24.6	0.096	0.106	
								36	0	24.0	23.4	0.075	0.085	

10.13. LTE Band 41 (20MHz Bandwidth)

Antenna	RF Exposure Conditions	Mode	PWR Back-off	Dist. (mm)	Test Position	Ch #.	Freq. (MHz)	RB Allocation	RB offset	Power (dBm)		1-g SAR (W/kg)		Plot No.
										Tune-up limit	Meas.	Meas.	Scaled	
Main Ant.2	Head	QPSK	N/A	0	Left Touch	39750	2506.0	1	0	24.5	23.4	0.123	0.160	
								50	0	23.5	22.3	0.097	0.128	
					Left Tilt	39750	2506.0	1	0	24.5	23.4	0.124	0.161	
								50	0	23.5	22.3	0.091	0.120	
					Right Touch	39750	2506.0	1	0	24.5	23.4	0.184	0.239	29
								50	0	23.5	22.3	0.140	0.185	
					Right Tilt	39750	2506.0	1	0	24.5	23.4	0.079	0.103	
								50	0	23.5	22.3	0.056	0.074	
	Body-w orn	QPSK	N/A	15	Rear	39750	2506.0	1	0	24.5	23.4	0.237	0.308	
								50	0	23.5	22.3	0.185	0.245	
					Front	39750	2506.0	1	0	24.5	23.4	0.248	0.322	30
								50	0	23.5	22.3	0.195	0.258	
	Hotspot	QPSK	N/A	10	Rear	39750	2506.0	1	0	24.5	23.4	0.397	0.515	31
								50	0	23.5	22.3	0.364	0.481	
					Front	39750	2506.0	1	0	24.5	23.4	0.388	0.504	
								50	0	23.5	22.3	0.301	0.398	
Edge 2					39750	2506.0	1	0	24.5	23.4	0.335	0.435		
							50	0	23.5	22.3	0.236	0.312		
Edge 3					39750	2506.0	1	0	24.5	23.4	0.255	0.331		
							50	0	23.5	22.3	0.200	0.264		

10.14. LTE Band 66 (20MHz Bandwidth)

Antenna	RF Exposure Conditions	Mode	PWR Back-off	Dist. (mm)	Test Position	Ch #.	Freq. (MHz)	RB Allocation	RB offset	Power (dBm)		1-g SAR (W/kg)		Plot No.
										Tune-up limit	Meas.	Meas.	Scaled	
Main Ant.1	Head	QPSK	Off	0	Left Touch	132572	1770.0	1	49	25.0	24.4	0.077	0.088	
								50	0	24.0	23.4	0.056	0.065	
					Left Tilt	132572	1770.0	1	49	25.0	24.4	0.079	0.090	32
								50	0	24.0	23.4	0.056	0.065	
					Right Touch	132572	1770.0	1	49	25.0	24.4	0.073	0.084	
								50	0	24.0	23.4	0.054	0.063	
					Right Tilt	132572	1770.0	1	49	25.0	24.4	0.056	0.064	
								50	0	24.0	23.4	0.041	0.048	
	Body-w orn	QPSK	Off	15	Rear	132572	1770.0	1	49	25.0	24.4	0.306	0.350	33
								50	0	24.0	23.4	0.245	0.284	
					Front	132572	1770.0	1	49	25.0	24.4	0.102	0.117	
								50	0	24.0	23.4	0.076	0.088	
	Hotspot	QPSK	On	10	Rear	132572	1770.0	1	49	22.8	21.4	0.361	0.499	
								50	0	22.8	21.3	0.366	0.512	34
					Front	132572	1770.0	1	49	22.8	21.4	0.093	0.128	
								50	0	22.8	21.3	0.088	0.124	
					Edge 2	132572	1770.0	1	49	22.8	21.4	0.030	0.041	
								50	0	22.8	21.3	0.030	0.041	
Edge 3					132572	1770.0	1	49	22.8	21.4	0.241	0.333		
							50	0	22.8	21.3	0.245	0.342		
Edge 4	132572	1770.0	1	49	22.8	21.4	0.059	0.081						
			50	0	22.8	21.3	0.055	0.077						

10.15. Wi-Fi (DTS Band)

Frequency Band	Mode	RF Exposure Conditions	PWR Back-Off	Dist. (mm)	Test Position	Ch #.	Freq. (MHz)	Area Scan Max. SAR (W/kg)	Duty Cycle (%)	Power (dBm)		1-g SAR (W/kg)		Note	Plot No.
										Tune-up limit	Meas.	Meas.	Scaled		
2.4GHz	802.11b 1 Mbps	Head	On	0	Left Touch	1	2412.0	0.233	99.8%	14.5	14.2				
					Left Tilt	1	2412.0	0.237	99.8%	14.5	14.2	0.151	0.161	1	35
					Right Touch	1	2412.0	0.078	99.8%	14.5	14.2				
					Right Tilt	1	2412.0	0.089	99.8%	14.5	14.2				
		Body-w orn	Off	15	Rear	1	2412.0	0.045	99.8%	17.5	16.9	0.035	0.041	1	36
					Front	1	2412.0	0.030	99.8%	17.5	16.9				
		Hotspot	Off	10	Rear	1	2412.0	0.109	99.8%	17.5	16.9	0.092	0.106	1	37
					Front	1	2412.0	0.075	99.8%	17.5	16.9				
					Edge 1	1	2412.0	0.073	99.8%	17.5	16.9				
					Edge 2	1	2412.0	0.033	99.8%	17.5	16.9				

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.

10.16. Wi-Fi (U-NII Bands)

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)		Note	Plot No.			
										Tune-up limit	Meas.	Meas.	Scaled	Meas.	Scaled					
5.2 GHz U-NII 1	802.11a 6 Mbps	Head	On	0	Left Touch	36	5180.0	0.313	97.7%	13.0	12.7									
					Left Tilt	36	5180.0	0.469	97.7%	13.0	12.7	0.194	0.214			1	38			
					Right Touch	36	5180.0	0.259	97.7%	13.0	12.7									
					Right Tilt	36	5180.0	0.304	97.7%	13.0	12.7									
		Body-worn	Off	15	Rear	44	5220.0	0.150	97.7%	15.5	14.9	0.068	0.080					1	39	
					Front	44	5220.0	0.065	97.7%	15.5	14.9									
		Phablet 10-g	Off	0	Rear	44	5220.0	3.080	97.7%	15.5	14.9				0.248	0.292			1	40
					Front	44	5220.0	0.835	97.7%	15.5	14.9									
					Edge 1	44	5220.0	2.460	97.7%	15.5	14.9									
Edge 2	44	5220.0	0.150	97.7%	15.5	14.9														

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)		Note	Plot No.		
										Tune-up limit	Meas.	Meas.	Scaled	Meas.	Scaled				
5.5 GHz U-NII 2C	802.11a 6 Mbps	Head	N/A	0	Left Touch	100	5500.0	1.105	97.7%	13.5	12.8	0.416	0.500				2		
					Left Tilt	100	5500.0	1.768	97.7%	13.5	12.8	0.718	0.863				41		
					Right Touch	120	5600.0	1.260	97.7%	13.5	12.2	0.497	0.680				3		
					Right Tilt	100	5500.0	0.762	97.7%	13.5	12.8								
		Body-worn	N/A	15	Rear	100	5500.0	0.371	97.7%	13.5	12.8	0.155	0.186					1	42
					Front	100	5500.0	0.131	97.7%	13.5	12.8								
		Phablet 10-g	N/A	0	Rear	100	5500.0	6.500	97.7%	13.5	12.8								
					Front	100	5500.0	1.692	97.7%	13.5	12.8								
					Edge 1	100	5500.0	12.853	97.7%	13.5	12.8					0.810	0.974		1
Edge 2	100	5500.0	0.852	97.7%	13.5	12.8													

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)		Note	Plot No.		
										Tune-up limit	Meas.	Meas.	Scaled				
5.8 GHz UNII 3	802.11a 6 Mbps	Head	On	0	Left Touch	165	5825.0	0.490	97.7%	13.0	12.8						
					Left Tilt	165	5825.0	0.986	97.7%	13.0	12.8	0.350	0.377			1	44
					Right Touch	165	5825.0	0.572	97.7%	13.0	12.8						
					Right Tilt	165	5825.0	0.680	97.7%	13.0	12.8						
		Body-worn	Off	15	Rear	149	5745.0	0.467	97.7%	16.0	14.7	0.214	0.295			1	45
					Front	149	5745.0	0.138	97.7%	16.0	14.7						
		Hotspot	Off	10	Rear	149	5745.0	0.800	97.7%	16.0	14.7	0.368	0.508				2
					Front	149	5745.0	0.231	97.7%	16.0	14.7						
					Edge 1	149	5745.0	0.957	97.7%	16.0	14.7	0.401	0.554				46
Edge 2	149	5745.0	0.152	97.7%	16.0	14.7											

- Note(s):**
- 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.
 - 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.
 - 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).
 - Additional testing required in order satisfying FCC simultaneous transmission limit criteria.

10.17. Bluetooth

Frequency Band	Mode	RF Exposure Conditions	Dist. (mm)	Test Position	Ch #.	Freq. (MHz)	Duty Cycle (%)	Power (dBm)		1-g SAR (W/kg)		Plot No.
								Tune-up limit	Meas.	Meas.	Scaled	
2.4GHz	GFSK	Head	0	Left Touch	39	2441.0	76.7%	10.0	9.9	0.071	0.095	
				Left Tilt	39	2441.0	76.7%	10.0	9.9	0.123	0.165	47
				Right Touch	39	2441.0	76.7%	10.0	9.9	0.028	0.038	
				Right Tilt	39	2441.0	76.7%	10.0	9.9	0.038	0.051	

Standalone SAR Test Exclusion Considerations & Estimated SAR

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

$[(max. \text{ power of channel, including tune-up tolerance, mW}) / (min. \text{ test separation distance, mm})] \cdot [\sqrt{f(\text{GHz})}] \leq 3.0$, for 1-g SAR and ≤ 7.5 for 10-g extremity SAR, where

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

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

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

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

RF Air interface	RF Exposure Conditions	Frequency (GHz)	Max. tune-up tolerance Power		Min. test separation distance (mm)	SAR test exclusion Result*	Estimated 1-g SAR (W/kg)
			(dBm)	(mW)			
Bluetooth	Body-worn	2.480	10.0	10	15	1.0	0.140
	Hotspot	2.480	10.0	10	10	1.6	0.210

Conclusion:

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

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 ($\sim 10\%$ 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
750	LTE Band 12	Hotspot	Rear	No	0.145	N/A	N/A
	LTE Band 13	Hotspot	Rear	No	0.617	N/A	N/A
835	GSM 850	Hotspot	Rear	Yes	0.904	0.922	1.02
	W-CDMA Band V	Hotspot	Rear	No	0.323	N/A	N/A
	LTE Band 26	Hotspot	Rear	No	0.700	N/A	N/A
1750	W-CDMA Band IV	Hotspot	Rear	No	0.358	N/A	N/A
	LTE Band 66	Hotspot	Rear	No	0.366	N/A	N/A
1900	GSM 1900	Hotspot	Rear	No	0.043	N/A	N/A
	W-CDMA Band II	Hotspot	Rear	No	0.318	N/A	N/A
	LTE Band 2	Hotspot	Rear	No	0.567	N/A	N/A
2450	Wi-Fi 802.11b/g/n	Head	Left Tilt	No	0.151	N/A	N/A
	Bluetooth	Head	Left Tilt	No	0.123	N/A	N/A
2600	LTE Band 41	Hotspot	Front	No	0.397	N/A	N/A
5200	Wi-Fi 802.11a/n	Head	Left Tilt	No	0.194	N/A	N/A
5500	Wi-Fi 802.11a/n	Head	Right Tilt	No	0.718	N/A	N/A
5800	Wi-Fi 802.11a/n	Hotspot	Edge 1	No	0.401	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
5200	Wi-Fi 802.11a/n	Extremity (Hand/Wrist/Ankle)	Rear	No	0.248	N/A	N/A
5500	Wi-Fi 802.11a/n	Extremity (Hand/Wrist/Ankle)	Edge 1	No	0.810	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 .

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).

All highest SAR level is not over 1.2 or 3.0 W/kg (1-g or 10-g respectively) in All bands.

Please refer to Section 10. **So DUT Holder perturbations verification are not required.**

13. Simultaneous Transmission SAR Analysis

Simultaneous Transmission Condition

RF Exposure Condition	Item	Capable Transmit Configurations		
Head & Body-w orn & Phablet 10-g	1	GSM (Voice/GPRS)	+	DTS
	2	GSM (Voice/GPRS)	+	BT
	3	GSM (Voice/GPRS)	+	U-NII
	4	W-CDMA	+	DTS
	5	W-CDMA	+	BT
	6	W-CDMA	+	U-NII
	7	LTE	+	DTS
	8	LTE	+	BT
	9	LTE	+	U-NII
Hotspot	19	GSM (GPRS)	+	DTS
	20	GSM (GPRS)	+	BT
	21	GSM (GPRS)	+	U-NII
	22	W-CDMA	+	DTS
	23	W-CDMA	+	BT
	24	W-CDMA	+	U-NII
	25	LTE	+	DTS
	26	LTE	+	BT
	27	LTE	+	U-NII

Notes:

1. DTS supports Wi-Fi Direct, Hotspot and VoIP.
2. U-NII supports Wi-Fi Direct, Hotspot and VoIP.
3. GPRS, W-CDMA and LTE support Hotspot and VoIP.
4. DTS Radio cannot transmit simultaneously w ith U-NII Radio. .
5. DTS or U-NII Radio cannot transmit simultaneously w ith Bluetooth Radio.
6. BT tethering is consider about each RF exposure conditions.

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:

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

Where:

SAR₁ 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

SAR₂ 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

R_i 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:

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

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 **SAR₁** or **SAR₂**. 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 SPLSR 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 SPLSR calculation.

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 GSM 850 & Wi-Fi & BT

RF Exposure	Test Position	Standalone SAR (W/kg)				① + ② WWAN + DTS		① + ③ WWAN + U-NII		① + ④ WWAN + BT	
		① WWAN	② DTS	③ U-NII	④ BT	∑ 1-g SAR (mW/g)	SPLSR (Yes/No)	∑ 1-g SAR (mW/g)	SPLSR (Yes/No)	∑ 1-g SAR (mW/g)	SPLSR (Yes/No)
Head	All position	0.293	0.161	0.863	0.165	0.454	No	1.156	No	0.458	No
Body-Worn	All position	0.485	0.041	0.295	0.140	0.526	No	0.780	No	0.625	No
Hotspot	Rear	1.077	0.106	0.508	0.210	1.183	No	1.585	No	1.287	No
	Front	0.293	0.106	0.554	0.210	0.399	No	0.847	No	0.503	No
	Edge 1		0.106	0.554	0.210						
	Edge 2	0.413	0.106	0.554	0.210	0.519	No	0.967	No	0.623	No
	Edge 3	0.421									
	Edge 4	0.120									

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

RF Exposure	Test Position	Standalone SAR (W/kg)				① + ② WWAN + DTS		① + ③ WWAN + U-NII		① + ④ WWAN + BT	
		① WWAN	② DTS	③ U-NII	④ BT	∑ 1-g SAR (mW/g)	SPLSR (Yes/No)	∑ 1-g SAR (mW/g)	SPLSR (Yes/No)	∑ 1-g SAR (mW/g)	SPLSR (Yes/No)
Head	All position	0.021	0.161	0.863	0.165	0.182	No	0.884	No	0.186	No
Body-Worn	All position	0.021	0.041	0.295	0.140	0.062	No	0.316	No	0.161	No
Hotspot	Rear	0.047	0.106	0.508	0.210	0.153	No	0.555	No	0.257	No
	Front	0.010	0.106	0.554	0.210	0.116	No	0.564	No	0.220	No
	Edge 1		0.106	0.554	0.210						
	Edge 2	0.002	0.106	0.554	0.210	0.108	No	0.556	No	0.212	No
	Edge 3	0.021									
	Edge 4	0.017									

13.3. Sum of the SAR for W-CDMA Band II & Wi-Fi & BT

RF Exposure	Test Position	Standalone SAR (W/kg)				① + ② WWAN + DTS		① + ③ WWAN + U-NII		① + ④ WWAN + BT	
		① WWAN	② DTS	③ U-NII	④ BT	∑ 1-g SAR (mW/g)	SPLSR (Yes/No)	∑ 1-g SAR (mW/g)	SPLSR (Yes/No)	∑ 1-g SAR (mW/g)	SPLSR (Yes/No)
Head	All position	0.321	0.161	0.863	0.165	0.482	No	1.184	No	0.486	No
Body-Worn	All position	0.349	0.041	0.295	0.140	0.390	No	0.644	No	0.489	No
Hotspot	Rear	0.435	0.106	0.508	0.210	0.541	No	0.943	No	0.645	No
	Front	0.263	0.106	0.554	0.210	0.369	No	0.817	No	0.473	No
	Edge 1		0.106	0.554	0.210						
	Edge 2	0.087	0.106	0.554	0.210	0.193	No	0.641	No	0.297	No
	Edge 3	0.200									
	Edge 4	0.226									

13.4. Sum of the SAR for W-CDMA Band IV & Wi-Fi & BT

RF Exposure	Test Position	Standalone SAR (W/kg)				① + ② WWAN + DTS		① + ③ WWAN + U-NII		① + ④ WWAN + BT	
		① WWAN	② DTS	③ U-NII	④ BT	∑ 1-g SAR (mW/g)	SPLSR (Yes/No)	∑ 1-g SAR (mW/g)	SPLSR (Yes/No)	∑ 1-g SAR (mW/g)	SPLSR (Yes/No)
Head	All position	0.133	0.161	0.863	0.165	0.294	No	0.996	No	0.298	No
Body-Worn	All position	0.321	0.041	0.295	0.140	0.362	No	0.616	No	0.461	No
Hotspot	Rear	0.434	0.106	0.508	0.210	0.540	No	0.942	No	0.644	No
	Front	0.233	0.106	0.554	0.210	0.339	No	0.787	No	0.443	No
	Edge 1		0.106	0.554	0.210						
	Edge 2	0.048	0.106	0.554	0.210	0.154	No	0.602	No	0.258	No
	Edge 3	0.290									
	Edge 4	0.196									

13.5. Sum of the SAR for W-CDMA Band V & Wi-Fi & BT

RF Exposure	Test Position	Standalone SAR (W/kg)				① + ② WWAN + DTS		① + ③ WWAN + U-NII		① + ④ WWAN + BT	
		① WWAN	② DTS	③ U-NII	④ BT	∑ 1-g SAR (mW/g)	SPLSR (Yes/No)	∑ 1-g SAR (mW/g)	SPLSR (Yes/No)	∑ 1-g SAR (mW/g)	SPLSR (Yes/No)
Head	All position	0.054	0.161	0.863	0.165	0.215	No	0.917	No	0.219	No
Body-Worn	All position	0.165	0.041	0.295	0.140	0.206	No	0.460	No	0.305	No
Hotspot	Rear	0.394	0.106	0.508	0.210	0.500	No	0.902	No	0.604	No
	Front	0.072	0.106	0.554	0.210	0.178	No	0.626	No	0.282	No
	Edge 1		0.106	0.554	0.210						
	Edge 2	0.092	0.106	0.554	0.210	0.198	No	0.646	No	0.302	No
	Edge 3	0.130									
	Edge 4	0.017									

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

RF Exposure	Test Position	Standalone SAR (W/kg)				① + ② WWAN + DTS		① + ③ WWAN + U-NII		① + ④ WWAN + BT	
		① WWAN	② DTS	③ U-NII	④ BT	∑ 1-g SAR (mW/g)	SPLSR (Yes/No)	∑ 1-g SAR (mW/g)	SPLSR (Yes/No)	∑ 1-g SAR (mW/g)	SPLSR (Yes/No)
Head	All position	0.392	0.161	0.863	0.165	0.553	No	1.255	No	0.557	No
Body-Worn	All position	0.489	0.041	0.295	0.140	0.530	No	0.784	No	0.629	No
Hotspot	Rear	0.713	0.106	0.508	0.210	0.819	No	1.221	No	0.923	No
	Front	0.342	0.106	0.554	0.210	0.448	No	0.896	No	0.552	No
	Edge 1		0.106	0.554	0.210						
	Edge 2	0.146	0.106	0.554	0.210	0.252	No	0.700	No	0.356	No
	Edge 3	0.293									
	Edge 4	0.426									

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

RF Exposure	Test Position	Standalone SAR (W/kg)				① + ② WWAN + DTS		① + ③ WWAN + U-NII		① + ④ WWAN + BT	
		① WWAN	② DTS	③ U-NII	④ BT	∑ 1-g SAR (mW/g)	SPLSR (Yes/No)	∑ 1-g SAR (mW/g)	SPLSR (Yes/No)	∑ 1-g SAR (mW/g)	SPLSR (Yes/No)
Head	All position	0.074	0.161	0.863	0.165	0.235	No	0.937	No	0.239	No
Body-Worn	All position	0.173	0.041	0.295	0.140	0.214	No	0.468	No	0.313	No
Hotspot	Rear	0.170	0.106	0.508	0.210	0.276	No	0.678	No	0.380	No
	Front	0.083	0.106	0.554	0.210	0.189	No	0.637	No	0.293	No
	Edge 1		0.106	0.554	0.210						
	Edge 2	0.095	0.106	0.554	0.210	0.201	No	0.649	No	0.305	No
	Edge 3	0.066									
	Edge 4	0.066									

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

RF Exposure	Test Position	Standalone SAR (W/kg)				① + ② WWAN + DTS		① + ③ WWAN + U-NII		① + ④ WWAN + BT	
		① WWAN	② DTS	③ U-NII	④ BT	∑ 1-g SAR (mW/g)	SPLSR (Yes/No)	∑ 1-g SAR (mW/g)	SPLSR (Yes/No)	∑ 1-g SAR (mW/g)	SPLSR (Yes/No)
Head	All position	0.171	0.161	0.863	0.165	0.332	No	1.034	No	0.336	No
Body-Worn	All position	0.363	0.041	0.295	0.140	0.404	No	0.658	No	0.503	No
Hotspot	Rear	0.734	0.106	0.508	0.210	0.840	No	1.242	No	0.944	No
	Front	0.206	0.106	0.554	0.210	0.312	No	0.760	No	0.416	No
	Edge 1		0.106	0.554	0.210						
	Edge 2	0.351	0.106	0.554	0.210	0.457	No	0.905	No	0.561	No
	Edge 3	0.259									
	Edge 4	0.143									

13.9. Sum of the SAR for LTE Band 26 & Wi-Fi & BT

RF Exposure	Test Position	Standalone SAR (W/kg)				① + ② WWAN + DTS		① + ③ WWAN + U-NII		① + ④ WWAN + BT	
		① WWAN	② DTS	③ U-NII	④ BT	∑ 1-g SAR (mW/g)	SPLSR (Yes/No)	∑ 1-g SAR (mW/g)	SPLSR (Yes/No)	∑ 1-g SAR (mW/g)	SPLSR (Yes/No)
Head	All position	0.193	0.161	0.863	0.165	0.354	No	1.056	No	0.358	No
Body-Worn	All position	0.347	0.041	0.295	0.140	0.388	No	0.642	No	0.487	No
Hotspot	Rear	0.771	0.106	0.508	0.210	0.877	No	1.279	No	0.981	No
	Front	0.178	0.106	0.554	0.210	0.284	No	0.732	No	0.388	No
	Edge 1		0.106	0.554	0.210						
	Edge 2	0.305	0.106	0.554	0.210	0.411	No	0.859	No	0.515	No
	Edge 3	0.257									
	Edge 4	0.106									

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

RF Exposure	Test Position	Standalone SAR (W/kg)				① + ② WWAN + DTS		① + ③ WWAN + U-NII		① + ④ WWAN + BT	
		① WWAN	② DTS	③ U-NII	④ BT	∑ 1-g SAR (mW/g)	SPLSR (Yes/No)	∑ 1-g SAR (mW/g)	SPLSR (Yes/No)	∑ 1-g SAR (mW/g)	SPLSR (Yes/No)
Head	All position	0.239	0.161	0.863	0.165	0.400	No	1.102	No	0.404	No
Body-Worn	All position	0.322	0.041	0.295	0.140	0.363	No	0.617	No	0.462	No
Hotspot	Rear	0.515	0.106	0.508	0.210	0.621	No	1.023	No	0.725	No
	Front	0.504	0.106	0.554	0.210	0.610	No	1.058	No	0.714	No
	Edge 1		0.106	0.554	0.210						
	Edge 2	0.435	0.106	0.554	0.210	0.541	No	0.989	No	0.645	No
	Edge 3	0.331									
	Edge 4										

13.11. Sum of the SAR for LTE Band 66 & Wi-Fi & BT

RF Exposure	Test Position	Standalone SAR (W/kg)				① + ② WWAN + DTS		① + ③ WWAN + U-NII		① + ④ WWAN + BT	
		① WWAN	② DTS	③ U-NII	④ BT	∑ 1-g SAR (mW/g)	SPLSR (Yes/No)	∑ 1-g SAR (mW/g)	SPLSR (Yes/No)	∑ 1-g SAR (mW/g)	SPLSR (Yes/No)
Head	All position	0.090	0.161	0.863	0.165	0.251	No	0.953	No	0.255	No
Body-Worn	All position	0.350	0.041	0.295	0.140	0.391	No	0.645	No	0.490	No
Hotspot	Rear	0.512	0.106	0.508	0.210	0.618	No	1.020	No	0.722	No
	Front	0.128	0.106	0.554	0.210	0.234	No	0.682	No	0.338	No
	Edge 1		0.106	0.554	0.210						
	Edge 2	0.041	0.106	0.554	0.210	0.147	No	0.595	No	0.251	No
	Edge 3	0.342									
	Edge 4	0.081									

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.

Appendixes

Refer to separated files for the following appendixes.

4788805359-S1V1 FCC Report SAR_App A_Photos & Ant. Locations

4788805359-S1V1 FCC Report SAR_App B_Highest SAR Test Plots

4788805359-S1V1 FCC Report SAR_App C_System Check Plots

4788805359-S1V1 FCC Report SAR_App D_SAR Tissue Ingredients

4788805359-S1V1 FCC Report SAR_App E_Probe Cal. Certificates

4788805359-S1V1 FCC Report SAR_App F_Dipole Cal. Certificates

END OF REPORT