



**SAR EVALUATION REPORT**

**IEEE Std 1528-2013**

*For*

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

**FCC ID: A3LSMA715W  
Model Name: SM-A715W**

**Report Number: 13211873-S1V2  
Issue Date: 2/27/2020**

*Prepared for*

**Samsung Electronics Co. Ltd  
129 Samsung-Ro, Yeongtong-Gu,  
Suwon-Si, Gyeonggi-Do, 16677, Korea**

*Prepared by*

**UL VERIFICATION SERVICES INC.  
47173 BENICIA STREET  
FREMONT, CA 94538, U.S.A.  
TEL: (510) 319-4000  
FAX: (510) 661-0888**



NVLAP LAB CODE 200065-0

**Revision History**

Rev.	Date	Revisions	Revised By
V1	2/24/2020	Initial Issue	--
V2	2/24/2020	Updated Sections: 9.1. GSM1900 and 10.2. GSM1900	AJ Newcomer

## Table of Contents

<b>1.</b>	<b>Attestation of Test Results .....</b>	<b>5</b>
<b>2.</b>	<b>Test Specification, Methods and Procedures.....</b>	<b>6</b>
<b>3.</b>	<b>Facilities and Accreditation.....</b>	<b>6</b>
<b>4.</b>	<b>SAR Measurement System &amp; Test Equipment .....</b>	<b>7</b>
4.1.	<i>SAR Measurement System.....</i>	<i>7</i>
4.2.	<i>SAR Scan Procedures.....</i>	<i>8</i>
4.3.	<i>Test Equipment.....</i>	<i>10</i>
<b>5.</b>	<b>Measurement Uncertainty.....</b>	<b>11</b>
<b>6.</b>	<b>Device Under Test (DUT) Information .....</b>	<b>12</b>
6.1.	<i>DUT Description .....</i>	<i>12</i>
6.2.	<i>Wireless Technologies.....</i>	<i>13</i>
6.3.	<i>General LTE SAR Test and Reporting Considerations.....</i>	<i>14</i>
6.4.	<i>LTE (TDD) Considerations.....</i>	<i>16</i>
6.5.	<i>Power Back-off Operation.....</i>	<i>17</i>
<b>7.</b>	<b>RF Exposure Conditions (Test Configurations).....</b>	<b>18</b>
<b>8.</b>	<b>Dielectric Property Measurements &amp; System Check .....</b>	<b>20</b>
8.1.	<i>Dielectric Property Measurements .....</i>	<i>20</i>
8.2.	<i>System Check.....</i>	<i>22</i>
<b>9.</b>	<b>Conducted Output Power Measurements.....</b>	<b>24</b>
9.1.	<i>GSM .....</i>	<i>24</i>
9.2.	<i>W-CDMA .....</i>	<i>26</i>
9.3.	<i>LTE.....</i>	<i>31</i>
9.4.	<i>LTE Down-Link Carrier Aggregation .....</i>	<i>50</i>
9.5.	<i>Wi-Fi 2.4GHz (DTS Band) .....</i>	<i>53</i>
9.6.	<i>Wi-Fi 5GHz (U-NII Bands).....</i>	<i>54</i>
9.7.	<i>Bluetooth .....</i>	<i>57</i>
<b>10.</b>	<b>Measured and Reported (Scaled) SAR Results.....</b>	<b>59</b>
10.1.	<i>GSM850.....</i>	<i>61</i>
10.2.	<i>GSM1900.....</i>	<i>61</i>
10.3.	<i>W-CDMA Band II.....</i>	<i>62</i>
10.4.	<i>W-CDMA Band IV .....</i>	<i>62</i>
10.5.	<i>W-CDMA Band V .....</i>	<i>63</i>
10.6.	<i>LTE Band 2 (20MHz Bandwidth).....</i>	<i>63</i>

10.7. LTE Band 4 (20MHz Bandwidth) ..... 64

10.8. LTE Band 5 (10MHz Bandwidth) ..... 64

10.9. LTE Band 7 (20MHz Bandwidth) ..... 65

10.10. LTE Band 12 (10MHz Bandwidth) ..... 66

10.11. LTE Band 13 (10MHz Bandwidth) ..... 66

10.12. LTE Band 41 (20MHz Bandwidth) ..... 67

10.13. LTE Band 66 (20MHz Bandwidth) ..... 68

10.14. LTE Band 71 (20MHz Bandwidth) ..... 69

10.15. Wi-Fi (DTS Band) ..... 69

10.16. Wi-Fi (U-NII Band) ..... 70

10.17. Bluetooth ..... 71

**11. SAR Measurement Variability ..... 71**

**12. Simultaneous Transmission Conditions ..... 72**

12.1. Simultaneous transmission SAR test exclusion considerations ..... 72

12.1.1. Sum of SAR ..... 72

12.2. Sum of the SAR for WWAN & Wi-Fi & BT ..... 73

12.3. Sum of the SAR for Extremity WWAN & Wi-Fi ..... 73

**Appendixes ..... 74**

Appendix A: SAR Setup Photos ..... 74

Appendix B: SAR System Check Plots ..... 74



Appendix C: SAR Highest Test Plots ..... 74

Appendix D: SAR Tissue Ingredients ..... 74

Appendix E: SAR Probe Certificates ..... 74

Appendix F: SAR Dipole Certificates ..... 74

# 1. Attestation of Test Results

Applicant Name		Samsung Electronics Co. Ltd			
FCC ID		A3LSMA715W			
Model Name		SM-A715W			
Applicable Standards		Published RF exposure KDB procedures IEEE Std 1528-2013			
Exposure Category		SAR Limits (W/Kg)			
		Peak spatial-average (1g of tissue)		Extremities (hands, wrists, ankles, etc.) (10g of tissue)	
General population / Uncontrolled exposure		1.6		4	
RF Exposure Conditions		<a href="#">Equipment Class</a> - Highest Reported SAR (W/kg)			
		PCE	DTS	NII	DSS
Head		0.729	0.146	0.501	0.054
Body-worn		0.687	0.205	0.376	0.017
Hotspot		0.756	0.416	0.445	0.038
Extremity		1.932	N/A	1.656	N/A
Simultaneous TX	Head	1.230	0.875	1.230	0.783
	Body-worn	1.063	0.892	1.063	0.704
	Hotspot	1.201	1.172	1.201	0.794
	Extremity	3.588	N/A	3.588	N/A
Date Tested		2/4/2020 to 2/20/2020			
Test Results		Pass			
<p>UL Verification Services Inc. tested the above equipment in accordance with the requirements set forth in the above standards. The test results show that the equipment tested is capable of demonstrating compliance with the requirements as documented in this report.</p> <p>The results documented in this report apply only to the tested sample, under the conditions and modes of operation as described herein. It is the manufacturer's responsibility to assure that additional production units of this model are manufactured with identical electrical and mechanical components. All samples tested were in good operating condition throughout the entire test program. Measurement Uncertainties are published for informational purposes only and were not taken into account unless noted otherwise.</p> <p>This document may not be altered or revised in any way unless done so by UL Verification Services Inc. and all revisions are duly noted in the revisions section. Any alteration of this document not carried out by UL Verification Services Inc. 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 NVLAP, NIST, any agency of the Federal Government, or any agency of the U.S. government.</p>					
Approved & Released By:			Prepared By:		
					
Devin Chang Senior Test Engineer UL Verification Services Inc.			AJ Newcomer Laboratory Engineer UL Verification Services Inc.		

## 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
- 447498 D03 Supplement C Cross-Reference v01
- 648474 D04 Handset SAR v01r03
- 680106 D01 RF Exposure Wireless Charging Apps v03
- 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; RF Exposure Procedures (Other LTE Considerations)
- [TCB workshop](#) April 2015; RF Exposure Procedures (Overlapping LTE Bands)
- [TCB workshop](#) October 2015; RF Exposure Procedures (KDB 941225 D05A)
- [TCB workshop](#) April 2016; RF Exposure Procedures (LTE Carrier Aggregation for DL)
- [TCB workshop](#) October 2016; RF Exposure Procedures (Bluetooth Duty Factor)
- [TCB workshop](#) October 2016; RF Exposure Procedures (DUT Holder Perturbations)
- [TCB workshop](#) May 2017; RF Exposure Procedures (Broadband Liquid Above 3 GHz)
- [TCB workshop](#) April 2018; RF Exposure Procedures (LTE DL CA SAR Test Exclusion)
- [TCB workshop](#) April 2019; RF Exposure Procedures (Tissue Simulating Liquids (TSL))

## 3. Facilities and Accreditation

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

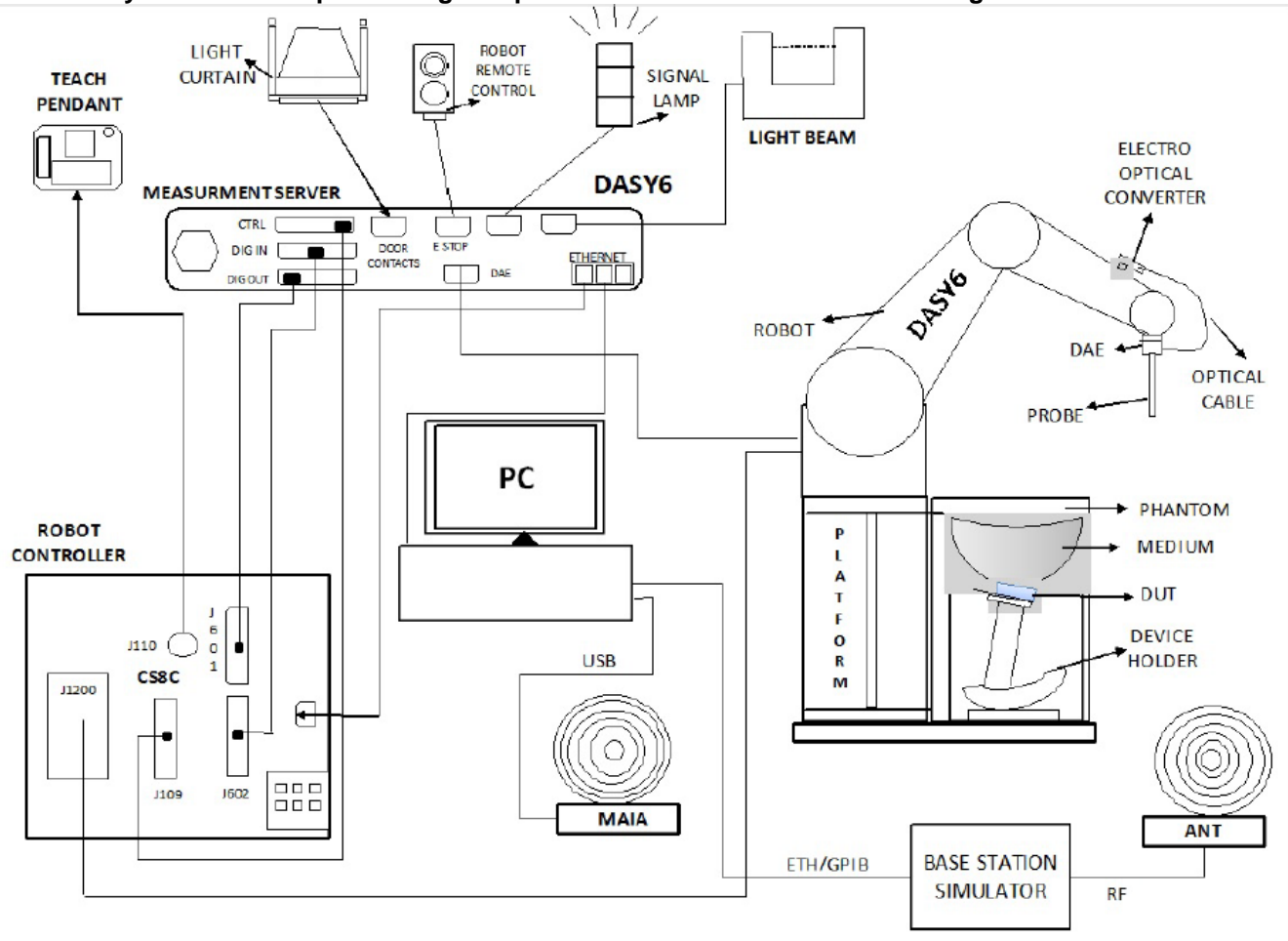
47173 Benicia Street	47266 Benicia Street
SAR Lab A	SAR Lab 1
SAR Lab B	SAR Lab 2
SAR Lab C	SAR Lab 3
SAR Lab D	SAR Lab 4
SAR Lab E	SAR Lab 5
SAR Lab F	SAR Lab 6
SAR Lab G	SAR Lab 7
SAR Lab H	SAR Lab 8

UL Verification Services Inc. is accredited by NVLAP, Laboratory Code 200065-0.

## 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

	$\leq 3$ GHz	$> 3$ GHz
Maximum distance from closest measurement point (geometric center of probe sensors) to phantom surface	$5 \pm 1$ 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: $\Delta x_{Area}$ , $\Delta y_{Area}$	$\leq 2$ GHz: $\leq 15$ mm $2 - 3$ GHz: $\leq 12$ mm	$3 - 4$ GHz: $\leq 12$ mm $4 - 6$ GHz: $\leq 10$ 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: $\Delta x_{Zoom}, \Delta y_{Zoom}$		$\leq 2$ GHz: $\leq 8$ mm $2 - 3$ GHz: $\leq 5$ mm*	$3 - 4$ GHz: $\leq 5$ mm* $4 - 6$ GHz: $\leq 4$ mm*	
Maximum zoom scan spatial resolution, normal to phantom surface	uniform grid: $\Delta z_{Zoom}(n)$	$\leq 5$ mm	$3 - 4$ GHz: $\leq 4$ mm $4 - 5$ GHz: $\leq 3$ mm $5 - 6$ GHz: $\leq 2$ mm	
	graded grid	$\Delta z_{Zoom}(1)$ : between 1 <sup>st</sup> two points closest to phantom surface	$\leq 4$ mm	$3 - 4$ GHz: $\leq 3$ mm $4 - 5$ GHz: $\leq 2.5$ mm $5 - 6$ GHz: $\leq 2$ mm
		$\Delta z_{Zoom}(n>1)$ : between subsequent points	$\leq 1.5 \cdot \Delta z_{Zoom}(n-1)$	
Minimum zoom scan volume	x, y, z	$\geq 30$ mm	$3 - 4$ GHz: $\geq 28$ mm $4 - 5$ GHz: $\geq 25$ mm $5 - 6$ GHz: $\geq 22$ mm	
Note: $\delta$ 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 $\leq 1.4$ W/kg, $\leq 8$ mm, $\leq 7$ mm and $\leq 5$ 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.

### 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
Vector Network Analyzer	R&S	ZNLE6	101273-VA	4/24/2020
Dielectric Probe kit*	SPEAG	DAK-3.5	1103	2/12/2020
Dielectric Probe kit	SPEAG	DAK-3.5	1087	11/19/2020
Shorting Block	SPEAG	DAK-1.2/3.5 Short	SM DAK 200 BA	11/19/2020
Thermometer	Fisher Scientific	Traceable	170064398	5/21/2020

#### System Check

Name of Equipment	Manufacturer	Type/Model	Serial No.	Cal. Due Date
Signal Generator*	R&S	SMB100A	180968-gx	2/14/2020
Power Meter	Agilent (Keysight)	N1912A	MY50001018	1/22/2021
Power Sensor	Agilent (Keysight)	N1921A	MY53020038	7/17/2020
Power Sensor*	R&S	NRP18A	100992-iu	2/15/2020
Bi-directional coupler	Werlatone, Inc.	C8060-102	4064	N/A
Signal Generator*	R&S	SMB100A	180970-zC	2/13/2020
Power Meter	Agilent (Keysight)	N1912A	MY55196007	1/22/2021
Power Sensor	Agilent (Keysight)	E9323A	MY53070005	8/2/2020
Power Sensor*	R&S	NRP18A	100994-RE	2/13/2020
Bi-directional coupler	Werlatone, Inc.	C8060-102	2711	N/A
Signal Generator	Agilent	N5181A	MY50140630	1/21/2021
Power Meter	HP	437B	3125U12345	1/22/2021
Power Sensor	HP	8481A	2702A60780	2/12/2021
DC Power Supply	Sorensen	XT 15-4	1817A02680	N/A
Amplifier	MITEQ	AMF-4D-00400600-50-30P	1795092	N/A
Bi-directional Coupler	Werlatone, Inc.	C8060-102	2148	N/A

#### Lab Equipment

Name of Equipment	Manufacturer	Type/Model	Serial No.	Cal. Due Date
E-Field Probe (SAR Lab 1)	SPEAG	EX3DV4	7501	5/21/2020
E-Field Probe (SAR Lab 2)	SPEAG	EX3DV4	7498	4/18/2020
E-Field Probe (SAR Lab 3)	SPEAG	EX3DV4	3990	8/27/2020
Data Acquisition Electronics (SAR Lab 1)	SPEAG	DAE4	1239	7/10/2020
Data Acquisition Electronics (SAR Lab 2)*	SPEAG	DAE4	1359	2/15/2020
Data Acquisition Electronics (SAR Lab 2)	SPEAG	DAE4	1257	10/10/2020
Data Acquisition Electronics (SAR Lab 3)	SPEAG	DAE4	1544	3/19/2020
System Validation Dipole	SPEAG	D750V3	1019	3/21/2020
System Validation Dipole	SPEAG	D835V2	4d142	8/23/2020
System Validation Dipole	SPEAG	D1750V2	1053	10/10/2020
System Validation Dipole	SPEAG	D1900V2	5d043	11/20/2020
System Validation Dipole	SPEAG	D2450V2	899	3/22/2020
System Validation Dipole	SPEAG	D2600V2	1036	3/22/2020
System Validation Dipole	SPEAG	D5GHzV2	1138	8/26/2020
Thermometer (SAR Labs 1/2/3)	Traceable	15557603	181062309	2/21/2020

**Other**

Name of Equipment	Manufacturer	Type/Model	Serial No.	Cal. Due Date
Power Meter	Agilent (Keysight)	N1911A	MY55196017	1/22/2021
Power Sensor*	Agilent (Keysight)	N1921A	MY55200004	2/6/2020
Power Sensor	Agilent (Keysight)	N1921A	MY55200006	3/1/2020
Base Station Simulator*	R & S	R & S	164541-Ci	2/18/2020
Base Station Simulator	R & S	R & S	125236-eS	4/10/2020
Bluetooth Tester*	R & S	CBT	100900-aC	2/14/2020

**Note(s):**

\*Equipment not used past calibration due date.

**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.

Therefore, the measurement uncertainty is not required.

## 6. Device Under Test (DUT) Information

### 6.1. DUT Description

Device Dimension	Overall (Length x Width): 163.5 mm x 75.9 mm Overall Diagonal: 180.3 mm Display Diagonal: 169.5 mm This is a Phablet Device (display diagonal dimension > 15.0 cm or an overall diagonal dimension > 16.0 cm)																								
Back Cover	The Back Cover is not removable																								
Battery Options	The rechargeable battery is not user accessible.																								
Accessory	Headset																								
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) <input checked="" type="checkbox"/> Mobile Hotspot (Wi-Fi 5.8 GHz)																								
Wi-Fi Direct	Wi-Fi Direct is only available in hand use configuration. <input checked="" type="checkbox"/> Wi-Fi Direct (Wi-Fi 2.4 GHz) <input checked="" type="checkbox"/> Wi-Fi Direct (Wi-Fi 5.2/5.8 GHz)																								
Bluetooth Tethering (Hotspot)	BT Tethering mode permits the device to share its cellular data connection with other devices. <input checked="" type="checkbox"/> BT Tethering (Bluetooth 2.4 GHz)																								
Test sample information	<table border="1"> <thead> <tr> <th>S/N</th> <th>IMEI</th> <th>Notes</th> </tr> </thead> <tbody> <tr> <td>R38N108P98V</td> <td>354712110021831</td> <td>WWAN Conducted</td> </tr> <tr> <td>R38N108PBAR</td> <td>354712110022516</td> <td>WWAN Conducted</td> </tr> <tr> <td>R38N108P8FB</td> <td>354712110021575</td> <td>WLAN Conducted</td> </tr> <tr> <td>R38N108P7LF</td> <td>354712110021294</td> <td>Radiated</td> </tr> <tr> <td>R38N108PG1B</td> <td>35471220024074</td> <td>Radiated</td> </tr> <tr> <td>R38N108PGHK</td> <td>354712110024231</td> <td>Radiated</td> </tr> <tr> <td>R38N108PFGJ</td> <td>354712110023894</td> <td>Radiated</td> </tr> </tbody> </table>	S/N	IMEI	Notes	R38N108P98V	354712110021831	WWAN Conducted	R38N108PBAR	354712110022516	WWAN Conducted	R38N108P8FB	354712110021575	WLAN Conducted	R38N108P7LF	354712110021294	Radiated	R38N108PG1B	35471220024074	Radiated	R38N108PGHK	354712110024231	Radiated	R38N108PFGJ	354712110023894	Radiated
S/N	IMEI	Notes																							
R38N108P98V	354712110021831	WWAN Conducted																							
R38N108PBAR	354712110022516	WWAN Conducted																							
R38N108P8FB	354712110021575	WLAN Conducted																							
R38N108P7LF	354712110021294	Radiated																							
R38N108PG1B	35471220024074	Radiated																							
R38N108PGHK	354712110024231	Radiated																							
R38N108PFGJ	354712110023894	Radiated																							
Hardware Version	REV0.1																								
Software Version	A715W.001																								

## 6.2. Wireless Technologies

Wireless technologies	Frequency bands	Operating mode		Duty Cycle used for SAR testing
GSM	850 1900	Voice (GMSK) GPRS (GMSK) EDGE (8PSK)	GSM Class : B Multi-Slot Class: Class 12 - 4 Up, 4 Down	GSM Voice: 12.5% (E)GPRS: 1 Slot: 12.5% 2 Slots: 25% 3 Slots: 37.5% 4 Slots: 50%
	Does this device support DTM (Dual Transfer Mode)? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No			
W-CDMA (UMTS)	Band II Band IV Band V	UMTS Rel. 99 (Voice & Data) HSDPA (Cat. 24) HSUPA (Cat. 6) DC-HSDPA (Cat. 24) HSPA+ (Rel. 7) DL only		100%
LTE	FDD Band 2 FDD Band 4 FDD Band 5 FDD Band 7 FDD Band 12 FDD Band 13 TDD Band 38 TDD Band 41 FDD Band 66 FDD Band 71	QPSK 16QAM 64QAM Rel. 12 Carrier Aggregation (1 Uplink and 3 Downlinks)		100% (FDD) 63.3% (TDD) Refer to §6.4
	Does this device support SV-LTE (1xRTT-LTE)? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No			
Wi-Fi	2.4 GHz	802.11b 802.11g 802.11n (HT20)		97.58% <small>(802.11b)<sup>1</sup></small>
	5 GHz	802.11a 802.11n (HT20) 802.11n (HT40) 802.11ac (VHT20) 802.11ac (VHT40) 802.11ac (VHT80)		94.67% <small>(802.11n 40MHz BW)<sup>1</sup></small> 84.02% <small>(802.11ac 80MHz BW)<sup>1</sup></small>
	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	BR, EDR, and LE		76.9%

**Notes:**

1. Duty cycle for Wi-Fi is referenced from the DTS and UNII report.

### 6.3. General LTE SAR Test and Reporting Considerations

Item	Description						
Frequency range, Channel Bandwidth, Numbers and Frequencies	Band 2	Frequency range: 1850 - 1910 MHz (BW = 60 MHz)					
		Channel Bandwidth					
		20 MHz	15 MHz	10 MHz	5 MHz	3 MHz	1.4 MHz
	Low	<b>18700</b> <b>/1860</b>	18675/ 1857.5	18650/ 1855	18625/ 1852.5	18615/ 1851.5	18607/ 1850.7
	Mid	<b>18900</b> <b>/1880</b>	18900/ 1880	18900/ 1880	18900/ 1880	18900/ 1880	18900/ 1880
	High	<b>19100</b> <b>/1900</b>	19125/ 1902.5	19150/ 1905	19175/ 1907.5	19185/ 1908.5	19193/ 1909.3
	Band 4	Frequency range: 1710 - 1755 MHz (BW = 45 MHz)					
		Channel Bandwidth					
		20 MHz <sup>1</sup>	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	<b>20175</b> <b>/1732.5</b>	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 (BW = 25 MHz)					
		Channel Bandwidth					
		20 MHz	15 MHz	10 MHz <sup>1</sup>	5 MHz	3 MHz	1.4 MHz
	Low			20450/ 829	20425/ 826.5	20415/ 825.5	20407/ 824.7
	Mid			<b>20525</b> <b>/836.5</b>	20525/ 836.5	20525/ 836.5	20525/ 836.5
	High			20600/ 844	20625/ 846.5	20635/ 847.5	20643/ 848.3
	Band 7	Frequency range: 2500 - 2570 MHz (BW = 70 MHz)					
		Channel Bandwidth					
		20 MHz	15 MHz	10 MHz	5 MHz	3 MHz	1.4 MHz
	Low	<b>20850</b> <b>2510</b>	20825 2507.5	20800 2505	20775 2502.5		
	Mid	<b>21100</b> <b>2535</b>	21100 2535	21100 2535	21100 2535		
	High	<b>21350</b> <b>2560</b>	21375 2562.5	21400 2565	21425 2567.5		
	Band 12	Frequency range: 699 – 716 MHz (BW = 17 MHz)					
		Channel Bandwidth					
		20 MHz	15 MHz	10 MHz <sup>1</sup>	5 MHz	3 MHz	1.4 MHz
	Low			23060/ 704	23035/ 701.5	23025/ 700.5	23017/ 699.7
Mid			<b>23095</b> <b>/707.5</b>	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 (BW = 10 MHz)						
	Channel Bandwidth						
	20 MHz	15 MHz	10 MHz <sup>1</sup>	5 MHz <sup>1</sup>	3 MHz	1.4 MHz	
Low				23205/ 779.5			
Mid			<b>23230</b> <b>/782</b>	23230/ 782			
High				23255/ 784.5			

Frequency range, Channel Bandwidth, Numbers and Frequencies	Band 38	Frequency range: 2570 - 2620 MHz (BW = 50 MHz)																																																																		
		Channel Bandwidth																																																																		
		20 MHz <sup>1</sup>	15 MHz	20 MHz <sup>1</sup>	5 MHz	20 MHz <sup>1</sup>	1.4 MHz																																																													
	Low	37850/ 2580	37825/ 2577.5	37800/ 2575	37775/ 2572.5																																																															
	Mid	<b>38000/ 2595</b>	38000/ 2595	38000/ 2595	38000/ 2595																																																															
	High	38150 2610	38175/ 2612.5	38200/ 2615	38225/ 2617.5																																																															
	Band 41 <sup>2</sup>	Frequency range: 2496 - 2690 MHz (BW = 194 MHz)																																																																		
		Channel Bandwidth																																																																		
		20 MHz	15 MHz	10 MHz	5 MHz	3 MHz	1.4 MHz																																																													
	Low	<b>39750 / 2506.0</b>																																																																		
	Mid- Low	<b>40185 / 2549.5</b>																																																																		
	Mid	<b>40620 / 2593.0</b>																																																																		
	Mid-High	<b>41055 / 2636.5</b>																																																																		
	High	<b>41490 / 2680.0</b>																																																																		
	Band 66	Frequency range: 1710 - 1780 MHz (BW = 70 MHz)																																																																		
		Channel Bandwidth																																																																		
		20 MHz	15 MHz	10 MHz	5 MHz	3 MHz	1.4 MHz																																																													
	Low	<b>132072/ 1720</b>	132047/ 1717.5	132022/ 1715	131997/ 1712.5	131987/ 1711.5	131979/ 1710.7																																																													
	Mid	<b>132322/ 1745</b>	132322/ 1745	132322/ 1745	132322/ 1745	132322/ 1745	132322/ 1745																																																													
	High	<b>132572/ 1770</b>	132597/ 1772.5	132622/ 1775	132647/ 1777.5	132657/ 1778.5	132665/ 1779.3																																																													
Band 71	Frequency range: 663 - 698 MHz (BW = 35 MHz)																																																																			
	Channel Bandwidth																																																																			
	20 MHz <sup>1</sup>	15 MHz <sup>1</sup>	10 MHz	5 MHz	3 MHz	1.4 MHz																																																														
Low	133222/ 673	133197/ 670.5	133172/ 668	133147/ 665.5																																																																
Mid	<b>133297/ 680.5</b>	133297/ 680.5	133297/ 680.5	133297/ 680.5																																																																
High	133372/ 688	133397/ 690.5	133422/ 693	133447/ 695.5																																																																
LTE transmitter and antenna implementation	Refer to Appendix A.																																																																			
Maximum power reduction (MPR)	<p><b>Table 6.2.3-1: Maximum Power Reduction (MPR) for Power Class 1, 2 and 3</b></p> <table border="1"> <thead> <tr> <th rowspan="2">Modulation</th> <th colspan="6">Channel bandwidth / Transmission bandwidth (N<sub>RB</sub>)</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>&gt; 5</td> <td>&gt; 4</td> <td>&gt; 8</td> <td>&gt; 12</td> <td>&gt; 16</td> <td>&gt; 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>&gt; 5</td> <td>&gt; 4</td> <td>&gt; 8</td> <td>&gt; 12</td> <td>&gt; 16</td> <td>&gt; 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>&gt; 5</td> <td>&gt; 4</td> <td>&gt; 8</td> <td>&gt; 12</td> <td>&gt; 16</td> <td>&gt; 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 <sub>RB</sub> )						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
Modulation	Channel bandwidth / Transmission bandwidth (N <sub>RB</sub> )							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																																																													
Power reduction	Yes																																																																			
Spectrum plots for RB configurations	A properly configured base station simulator was used for the SAR and power measurements; therefore, spectrum plots for each RB allocation and offset configuration are not included in the SAR report.																																																																			

**Notes:**

- Maximum bandwidth 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 41 test channels in accordance with October 2014 TCB workshop for all channels bandwidths.
- SAR Testing for LTE was performed with the same number of RB and RB offsets transmitting on all TTI frames (maximum TTI).

### 6.4. 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	$6592 \cdot T_s$	$(1+X) \cdot 2192 \cdot T_s$	$(1+X) \cdot 2560 \cdot T_s$	$7680 \cdot T_s$	$(1+X) \cdot 2192 \cdot T_s$	$(1+X) \cdot 2560 \cdot T_s$
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	$6592 \cdot T_s$	$(2+X) \cdot 2192 \cdot T_s$	$(2+X) \cdot 2560 \cdot T_s$	$20480 \cdot T_s$	$(2+X) \cdot 2192 \cdot T_s$	$(2+X) \cdot 2560 \cdot T_s$
6	$19760 \cdot T_s$			$23040 \cdot T_s$		
7	$21952 \cdot T_s$			$12800 \cdot T_s$		
8	$24144 \cdot T_s$			-		
9	$13168 \cdot T_s$			-		
10	$13168 \cdot T_s$	$13152 \cdot T_s$	$12800 \cdot T_s$	-	-	-

Table 4.2-2: Uplink-downlink configurations & 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	63.3%
1	5 ms	D	S	U	U	D	D	S	U	U	D	43.3%
2	5 ms	D	S	U	D	D	D	S	U	D	D	23.3%
3	10 ms	D	S	U	U	U	D	D	D	D	D	31.7%
4	10 ms	D	S	U	U	D	D	D	D	D	D	21.7%
5	10 ms	D	S	U	D	D	D	D	D	D	D	11.7%
6	5 ms	D	S	U	U	U	D	S	U	U	D	53.3%

Calculated Duty Cycle = Extended cyclic prefix in uplink \* (T<sub>s</sub>) \* # of S + # of U / period

**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.



## 6.5. Power Back-off Operation

This device supports multiple power back-off modes: WWAN (Ear-jack), WWAN (Hotspot), WWAN (Grip Sensor), WWAN (RCV) and WLAN. Each of the power back-off operates within specific exposure conditions for certain technologies. For full details on how each power back-off mode operates, refer to the Operational Description.

Power Back-off mode	Technologies Supported	Exposure Conditions Active			
		Head	Body-worn	Hotspot	Extremity
WWAN (Earjack) <sup>1,2</sup>	W-CDMA B2/4 LTE B2/4/7/38/41/66	N/A	✓	N/A	✓
WWAN (Hotspot) <sup>1</sup>	W-CDMA B2/4 LTE B2/4/7/38/41/66	N/A	N/A	✓	N/A
WWAN (Grip Sensor) <sup>1</sup>	W-CDMA B2/4 LTE B2/4/7/38/41/66	N/A	N/A	N/A	✓
WWAN (RCV) <sup>1</sup>	LTE B7/38/41	✓	N/A	N/A	N/A
WLAN	Wi-Fi 2.4GHz Wi-Fi 5GHz	✓	N/A	N/A	N/A

### Note(s):

- Tune-Up Limits for WWAN (Earjack), WWAN (Hotspot), WWAN (Grip Sensor), and WWAN (RCV) are all Reduced Average Powers. Please refer to §9 for all power measurements.
- Body-worn SAR tested at full power without ear-jack connected because no SAR values were over 1.2 W/kg.

### Extremity 10g Adjusted SAR Calculation

Wireless technologies	Max Tune-up Limit (dBm)	Reduced Tune-Up Limit (dBm)	Power Factor	Reported SAR Limit (W/kg)
W-CDMA B2	24.0	21.0	2.00	0.601
W-CDMA B4	24.0	22.0	1.58	0.757
LTE B2	24.5	21.5	2.00	0.601
LTE B4	25.0	23.0	1.58	0.757
LTE B7	23.0	19.5	2.24	0.536
LTE B41	24.0	21.0	2.00	0.601
LTE B66	25.0	22.5	1.78	0.675

### Note(s):

- Hotspot mode supports power reduction. When the measured SAR is scaled to the maximum tune-up limit, the adjusted SAR is < 1.2 W/kg. Therefore, Extremity SAR testing is not required for this band in accordance with KDB 648474 §2.5 b. Refer to §10 for Reported SAR results. If the Reported SAR 1g value in §10 is less than the Reported SAR Limit listed above, then Extremity SAR is not required.
- LTE 50% RB is scaled up to the Max Tune-Up Limit with MPR included.

## 7. RF Exposure Conditions (Test Configurations)

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

Wireless technologies	RF Exposure Conditions	DUT-to-User Separation	Test Position	Antenna-to-edge/surface	SAR Required	Note
WWAN Main 1 ANT (GSM850/1900 W-CDMA B2/4/5 LTE B2/4/5/12/13/ 66/71)	Head	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	No	1
			Edge 2 (Right)	≤ 25 mm	Yes	
			Edge 3 (Bottom)	≤ 25 mm	Yes	
	Extremity	0 mm	Edge 4 (Left)	≤ 25 mm	Yes	
			Rear	Refer to notes 2 & 3		
			Front			
			Edge 1 (Top)			
			Edge 2 (Right)			
Edge 3 (Bottom)						
Edge 4 (Left)						
WWAN Main 2 ANT (LTE B7/38/41)	Head	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	No	1
			Edge 3 (Bottom)	> 25 mm	No	1
	Extremity	0 mm	Edge 4 (Left)	≤ 25 mm	Yes	
			Rear	Refer to notes 2 & 3		
			Front			
			Edge 1 (Top)			
			Edge 2 (Right)			
Edge 3 (Bottom)						
Edge 4 (Left)						

**Notes:**

- SAR is not required because the distance from the antenna to the edge is > 25 mm as per KDB 941225 D06 Hot Spot SAR.
- For Phablet devices: when hotspot mode applies, Extremity SAR is required only for the surfaces and edges with hotspot mode 1-g reported SAR > 1.2 W/kg.
- For Phablet devices: when hotspot mode applies and power reduction applies to hotspot mode, Extremity SAR is required for each test position that has an adjusted SAR to maximum power that is > 1.2 W/kg.

Wireless technologies	RF Exposure Conditions	DUT-to-User Separation	Test Position	Antenna-to-edge/surface	SAR Required	Note	
WLAN	Head	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		
			Edge 3 (Bottom)	> 25 mm	No	1	
	Extremity	0 mm	Edge 4 (Left)	> 25 mm	No	1	
			Rear	Refer to notes 2 & 3			
			Front				
			Edge 1 (Top)				
			Edge 2 (Right)				
Edge 3 (Bottom)							
Edge 4 (Left)							

**Notes:**

- SAR is not required because the distance from the antenna to the edge is > 25 mm as per KDB 941225 D06 Hot Spot SAR.
- For Phablet devices: when Hotspot Mode is not supported, 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.
- For Phablet devices: when hotspot mode applies, Extremity SAR is required only for the surfaces and edges with hotspot mode 1-g reported SAR > 1.2 W/kg.
- Wi-Fi Direct is only available in Hand use configuration.

## 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.

The dielectric constant ( $\epsilon_r$ ) and conductivity ( $\sigma$ ) of typical tissue-equivalent media recipes are expected to be within  $\pm 5\%$  of the required target values; but for SAR measurement systems that have implemented the SAR error compensation algorithms documented in IEEE Std 1528-2013, to automatically compensate the measured SAR results for deviations between the measured and required tissue dielectric parameters, the tolerance for  $\epsilon_r$  and  $\sigma$  may be relaxed to  $\pm 10\%$ . This is limited to frequencies  $\leq 3$  GHz.

#### Tissue Dielectric Parameters

FCC KDB 865664 D01 SAR Measurement 100 MHz to 6 GHz

Target Frequency (MHz)	Head	
	$\epsilon_r$	$\sigma$ (S/m)
150	52.3	0.76
300	45.3	0.87
450	43.5	0.87
835	41.5	0.90
900	41.5	0.97
915	41.5	0.98
1450	40.5	1.20
1610	40.3	1.29
1800 – 2000	40.0	1.40
2450	39.2	1.80
3000	38.5	2.40
5000	36.2	4.45
5100	36.1	4.55
5200	36.0	4.66
5300	35.9	4.76
5400	35.8	4.86
5500	35.6	4.96
5600	35.5	5.07
5700	35.4	5.17
5800	35.3	5.27

#### IEEE Std 1528-2013

Refer to Table 3 within the IEEE Std 1528-2013

#### IEC 62209-1

Refer to Table A.3 within the IEC 62209-1

**Dielectric Property Measurements Results:**

SAR Lab	Date	Band (MHz)	Tissue Type	Frequency (MHz)	Relative Permittivity ( $\epsilon_r$ )			Conductivity ( $\sigma$ )		
					Measured	Target	Delta (%)	Measured	Target	Delta (%)
1	2/4/2020	835	Head	835	42.19	41.50	1.66	0.89	0.90	-0.80
				805	42.58	41.68	2.16	0.90	0.90	-0.01
				850	42.05	41.50	1.33	0.90	0.92	-2.15
1	2/6/2020	750	Head	750	39.96	41.96	-4.77	0.88	0.89	-0.93
				660	43.51	42.42	2.56	0.84	0.89	-4.94
				800	41.87	41.71	0.40	0.89	0.90	-0.70
1	2/10/2020	750	Head	750	40.89	41.96	-2.55	0.91	0.89	1.63
				660	40.33	42.42	-4.93	0.87	0.89	-1.45
				800	40.08	41.71	-3.90	0.93	0.90	3.51
1	2/11/2020	2600	Head	2600	40.05	39.01	2.66	1.96	1.96	-0.21
				2495	40.19	39.14	2.67	1.87	1.85	1.32
				2690	39.85	38.90	2.45	2.03	2.06	-1.48
1	2/12/2020	2450	Head	2450	37.30	39.20	-4.85	1.83	1.80	1.78
				2400	37.36	39.30	-4.93	1.79	1.75	2.30
				2480	37.23	39.16	-4.93	1.84	1.83	0.52
1	2/13/2020	1750	Head	1750	38.69	40.08	-3.48	1.33	1.37	-3.07
				1710	38.74	40.15	-3.50	1.31	1.35	-3.00
				1755	38.68	40.08	-3.49	1.33	1.37	-2.97
1	2/17/2020	2450	Head	2450	40.07	39.20	2.22	1.82	1.80	1.33
				2400	40.10	39.30	2.04	1.78	1.75	1.79
				2480	39.97	39.16	2.06	1.84	1.83	0.14
2	2/5/2020	1750	Head	1750	39.11	40.08	-2.43	1.33	1.37	-2.55
				1710	39.29	40.15	-2.13	1.32	1.35	-2.33
				1755	39.10	40.08	-2.44	1.34	1.37	-2.39
2	2/5/2020	1900	Head	1900	38.85	40.00	-2.88	1.42	1.40	1.07
				1850	39.06	40.00	-2.35	1.39	1.40	-0.64
				1920	38.87	40.00	-2.83	1.43	1.40	2.00
2	2/11/2020	1750	Head	1750	39.44	40.08	-1.61	1.32	1.37	-3.94
				1710	39.48	40.15	-1.66	1.30	1.35	-3.82
				1755	39.44	40.08	-1.59	1.32	1.37	-3.85
3	2/11/2020	2600	Head	2600	37.52	39.01	-3.82	1.90	1.96	-3.37
				2495	37.62	39.14	-3.89	1.82	1.85	-1.82
				2690	37.38	38.90	-3.90	1.97	2.06	-4.15
3	2/13/2020	5750	Head	5800	34.73	35.30	-1.61	5.11	5.27	-3.11
				5700	34.90	35.42	-1.47	4.97	5.16	-3.67
				5850	34.69	35.30	-1.73	5.15	5.27	-2.20
3	2/14/2020	5200	Head	5200	36.40	35.99	1.14	4.49	4.65	-3.53
				5150	36.48	36.05	1.20	4.43	4.60	-3.67
				5350	36.11	35.82	0.81	4.64	4.80	-3.51
3	2/14/2020	5600	Head	5600	35.75	35.53	0.61	4.87	5.06	-3.78
				5500	35.91	35.65	0.74	4.76	4.96	-3.95
				5725	35.51	35.39	0.34	5.01	5.19	-3.40

## 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:  $2.0 \pm 0.2$  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  $\geq 15.0$  cm for SAR measurements  $\leq 3$  GHz and  $\geq 10.0$  cm for measurements  $> 3$  GHz.
- The DASY system with an E-Field Probe was used for the measurements.
- The dipole was mounted on the small tripod so that the dipole feed point was positioned below the center marking of the flat phantom section and the dipole was oriented parallel to the body axis (the long side of the phantom). The standard measuring distance was 10 mm (above 1 GHz) and 15 mm (below 1 GHz) from dipole center to the simulating liquid surface.
- The coarse grid with a grid spacing of 15 mm was aligned with the dipole.  
For 5 GHz band - The coarse grid with a grid spacing of 10 mm was aligned with the dipole.
- Special 7x7x7 (below 3 GHz) and/or 8x8x7 (above 3 GHz) fine cube was chosen for the cube.
- Distance between probe sensors and phantom surface was set to 3 mm.  
For 5 GHz band - Distance between probe sensors and phantom surface was set to 2.5 mm
- The dipole input power (forward power) was 100 mW.
- The results are normalized to 1 W input power.

**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  $\pm 10\%$  of the manufacturer calibrated dipole SAR target. Refer to Appendix B for the SAR System Check Plots.

SAR Lab	Date	Tissue Type	Dipole Type Serial #	Dipole Cal. Due Data	Measured Results for 1g SAR				Measured Results for 10g SAR				Plot No.
					Zoom Scan to 100 mW	Normalize to 1 W	Target (Ref. Value)	Delta $\pm 10\%$	Zoom Scan to 100 mW	Normalize to 1 W	Target (Ref. Value)	Delta $\pm 10\%$	
1	2/4/2020	Head	D835V2 SN:4d142	8/23/2020	0.952	9.52	9.61	<b>-0.94</b>	0.621	6.21	6.22	-0.16	1,2
1	2/6/2020	Head	D750V3 SN:1019	3/21/2020	0.839	8.39	8.29	1.21	0.551	5.51	5.44	1.29	
1	2/10/2020	Head	D750V3 SN:1019	3/21/2020	0.853	8.53	8.29	<b>2.90</b>	0.561	5.61	5.44	3.13	3,4
1	2/11/2020	Head	D2600V2 SN:1036	3/22/2020	5.770	57.70	55.90	<b>3.22</b>	2.590	25.90	24.80	4.44	5,6
1	2/12/2020	Head	D2450V2 SN:899	3/22/2020	4.990	49.90	51.60	-3.29	2.320	23.20	24.10	-3.73	
1	2/13/2020	Head	D1750V2 SN:1053	10/10/2020	3.610	36.10	37.20	<b>-2.96</b>	1.930	19.30	19.60	-1.53	7,8
1	2/17/2020	Head	D2450V2 SN:899	3/22/2020	5.560	55.60	51.60	<b>7.75</b>	2.590	25.90	24.10	7.47	9,10
2	2/5/2020	Head	D1750V2 SN:1053	10/10/2020	3.570	35.70	37.20	-4.03	1.890	18.90	19.60	-3.57	
2	2/5/2020	Head	D1900V2 SN:5d043	11/20/2020	4.180	41.80	40.40	<b>3.47</b>	2.140	21.40	21.10	1.42	11,12
2	2/11/2020	Head	D1750V2 SN:1053	10/10/2020	3.550	35.50	37.20	<b>-4.57</b>	1.880	18.80	19.60	-4.08	13,14
3	2/11/2020	Head	D2600V2 SN:1036	3/22/2020	5.840	58.40	55.90	<b>4.47</b>	2.610	26.10	24.80	5.24	15,16
3	2/13/2020	Head	D5GHzV2 SN:1138 (5.8 GHz)	8/26/2020	8.210	82.10	81.50	<b>0.74</b>	2.300	23.00	23.10	-0.43	17,18
3	2/14/2020	Head	D5GHzV2 SN:1138 (5.2 GHz)	8/26/2020	7.380	73.80	80.30	<b>-8.09</b>	2.110	21.10	23.00	-8.26	19,20
3	2/14/2020	Head	D5GHzV2 SN:1138 (5.6 GHz)	8/26/2020	8.040	80.40	85.50	<b>-5.96</b>	2.270	22.70	24.50	-7.35	21,22

## 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.

When different maximum output power applies to GSM voice or GPRS/EDGE time slots, GSM voice and GPRS/EDGE time slots should be tested separately to determine compliance by summing the corresponding reported SAR.

The GMSK EDGE configurations are grouped with GPRS and considered with respect to time-averaged maximum output power to determine compliance

#### Per October 2013 TCB Workshop:

When the maximum frame-averaged powers levels are within 0.25 dB of each other, test the configuration with the most number of time slots.



**Maximum Output Power (Tune-up Limit) for GSM**

SAR is not required for EDGE (8PSK) mode because the maximum output power and tune-up limit is  $\leq 1/4$ dB higher than GPRS/EDGE (GMSK) or the adjusted SAR of the highest reported SAR of GPRS/EDGE (GMSK) is  $\leq 1.2$ W/kg.

**GSM850 Measured Results**

Mode	Coding Scheme	Time Slots	Ch No.	Freq. (MHz)	Maximum Average Power (dBm)			
					Measured		Tune-up Limit	
					Burst Pwr	Frame Pwr	Burst Pwr	Frame Pwr
GPRS/EDGE (GMSK)	CS1	1	128	824.2	33.6	24.6	34.5	25.5
			190	836.6	33.7	24.7		
			251	848.8	33.3	24.3		
		2	128	824.2	29.7	23.7	30.5	24.5
			190	836.6	29.5	23.5		
			251	848.8	29.0	23.0		
		3	128	824.2	27.6	23.3	29.0	24.7
			190	836.6	27.8	23.5		
			251	848.8	27.7	23.4		
		4	128	824.2	26.7	23.7	28.0	25.0
			190	836.6	26.4	23.4		
			251	848.8	26.4	23.4		
EDGE (8PSK)	MCS5	1	128	824.2	25.7	16.7	27.0	18.0
			190	836.6	25.6	16.6		
			251	848.8	25.3	16.3		
		2	128	824.2	22.6	16.6	24.0	18.0
			190	836.6	22.7	16.7		
			251	848.8	22.3	16.3		
		3	128	824.2	21.3	17.0	22.5	18.2
			190	836.6	21.2	16.9		
			251	848.8	20.7	16.4		
		4	128	824.2	19.5	16.5	21.0	18.0
			190	836.6	19.4	16.4		
			251	848.8	19.2	16.2		

**Notes:**

Based on the Tune-up Procedure, GPRS/EDGE (GMSK) mode with 1 time slot have maximum frame-averaged power.

**GSM1900 Measured Results**

Mode	Coding Scheme	Time Slots	Ch No.	Freq. (MHz)	Maximum Average Power (dBm)			
					Measured		Tune-up Limit	
					Burst Pwr	Frame Pwr	Burst Pwr	Frame Pwr
GPRS/EDGE (GMSK)	CS1	1	512	1850.2	30.7	21.7	31.5	22.5
			661	1880.0	30.8	21.8		
			810	1909.8	30.3	21.3		
		2	512	1850.2	26.4	20.4	27.5	21.5
			661	1880.0	27.2	21.2		
			810	1909.8	26.9	20.9		
		3	512	1850.2	24.4	20.1	25.5	21.2
			661	1880.0	25.0	20.7		
			810	1909.8	24.6	20.3		
		4	512	1850.2	24.1	21.1	24.5	21.5
			661	1880.0	24.5	21.5		
			810	1909.8	24.3	21.3		
EDGE (8PSK)	MCS5	1	512	1850.2	23.9	14.9	25.0	16.0
			661	1880.0	24.2	15.2		
			810	1909.8	23.9	14.9		
		2	512	1850.2	21.6	15.6	22.0	16.0
			661	1880.0	21.9	15.9		
			810	1909.8	21.5	15.5		
		3	512	1850.2	19.5	15.2	21.0	16.7
			661	1880.0	19.8	15.5		
			810	1909.8	19.0	14.7		
		4	512	1850.2	18.3	15.3	19.5	16.5
			661	1880.0	18.5	15.5		
			810	1909.8	18.5	15.5		

**Notes:**

Based on the Tune-up Procedure, GPRS/EDGE (GMSK) mode with 1 time slot for maximum frame-averaged power.

## 9.2. W-CDMA

### Per KDB 941225 D01 3G SAR Procedures for W-CDMA:

Maximum output power is verified on the high, middle and low channels and using the appropriate 12.2 kbps RMC with TPC (transmit power control) set to all "1's"

### 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. A summary of these settings is illustrated below:

Mode	Subtest	Rel99
WCDMA General Settings	Loopback Mode	Test Mode 2
	Rel99 RMC	12.2kbps RMC
	Power Control Algorithm	Algorithm2
	$\beta_c/\beta_d$	8/15

### HSDPA Setup Procedures used to establish the test signals

The following 4 Sub-tests were completed according to procedures in table C.10.1.4 of 3GPP TS 34.121-1. A summary of these settings is illustrated below:

Table C.10.1.4:  $\beta$  values for transmitter characteristics tests with HS-DPCCH

Sub-test	$\beta_c$	$\beta_d$	$\beta_d$ (SF)	$\beta_c/\beta_d$	$\beta_{HS}$ (Note 1, Note 2)	CM (dB) (Note 3)	MPR (dB) (Note 3)
1	2/15	15/15	64	2/15	4/15	0.0	0.0
2	12/15 (Note 4)	15/15 (Note 4)	64	12/15 (Note 4)	24/15	1.0	0.0
3	15/15	8/15	64	15/8	30/15	1.5	0.5
4	15/15	4/15	64	15/4	30/15	1.5	0.5

Note 1:  $\Delta_{ACK}$ ,  $\Delta_{NACK}$  and  $\Delta_{CQI} = 30/15$  with  $\beta_{HS} = 30/15 * \beta_c$ .

Note 2: For the HS-DPCCH power mask requirement test in clause 5.2C, 5.7A, and the Error Vector Magnitude (EVM) with HS-DPCCH test in clause 5.13.1A, and HSDPA EVM with phase discontinuity in clause 5.13.1AA,  $\Delta_{ACK}$  and  $\Delta_{NACK} = 30/15$  with  $\beta_{HS} = 30/15 * \beta_c$ , and  $\Delta_{CQI} = 24/15$  with  $\beta_{HS} = 24/15 * \beta_c$ .

Note 3: CM = 1 for  $\beta_c/\beta_d = 12/15$ ,  $\beta_{HS}/\beta_c = 24/15$ . For all other combinations of DPDCH, DPCCH and HS-DPCCH the MPR is based on the relative CM difference. This is applicable for only UEs that support HSDPA in release 6 and later releases.

Note 4: For subtest 2 the  $\beta_c/\beta_d$  ratio of 12/15 for the TFC during the measurement period (TF1, TF0) is achieved by setting the signalled gain factors for the reference TFC (TF1, TF1) to  $\beta_c = 11/15$  and  $\beta_d = 15/15$ .

### HSUPA Setup Procedures used to establish the test signals

The following 5 Sub-tests were completed according to procedures in table C.11.1.3 of 3GPP TS 34.121-1. A summary of these settings is illustrated below:

Table C.11.1.3:  $\beta$  values for transmitter characteristics tests with HS-DPCCH and E-DCH

Sub-test	$\beta_c$	$\beta_d$	$\beta_d$ (SF)	$\beta_c/\beta_d$	$\beta_{HS}$ (Note 1)	$\beta_{ec}$	$\beta_{ed}$ (Note 4) (Note 5)	$\beta_{ed}$ (SF)	$\beta_{ed}$ (Codes)	CM (dB) (Note 2)	MPR (dB) (Note 2) (Note 6)	AG Index (Note 5)	E-TFCI
1	11/15 (Note 3)	15/15 (Note 3)	64	11/15 (Note 3)	22/15	209/25	1309/225	4	1	1.0	0.0	20	75
2	6/15	15/15	64	6/15	12/15	12/15	94/75	4	1	3.0	2.0	12	67
3	15/15	9/15	64	15/9	30/15	30/15	$\beta_{ed1}: 47/15$ $\beta_{ed2}: 47/15$	4	2	2.0	1.0	15	92
4	2/15	15/15	64	2/15	4/15	2/15	56/75	4	1	3.0	2.0	17	71
5	15/15	0	-	-	5/15	5/15	47/15	4	1	1.0	0.0	12	67

Note 1: For sub-test 1 to 4,  $\Delta_{ACK}$ ,  $\Delta_{NACK}$  and  $\Delta_{CQI} = 30/15$  with  $\beta_{HS} = 30/15 * \beta_c$ . For sub-test 5,  $\Delta_{ACK}$ ,  $\Delta_{NACK}$  and  $\Delta_{CQI} = 5/15$  with  $\beta_{HS} = 5/15 * \beta_c$ .

Note 2: CM = 1 for  $\beta_c/\beta_d = 12/15$ ,  $\beta_{HS}/\beta_c = 24/15$ . For all other combinations of DPDCH, DPCCH, HS-DPCCH, E-DPCCH and E-DPCCH the MPR is based on the relative CM difference.

Note 3: For subtest 1 the  $\beta_c/\beta_d$  ratio of 11/15 for the TFC during the measurement period (TF1, TF0) is achieved by setting the signalled gain factors for the reference TFC (TF1, TF1) to  $\beta_c = 10/15$  and  $\beta_d = 15/15$ .

Note 4: In case of testing by UE using E-DPCCH Physical Layer category 1, Sub-test 3 is omitted according to TS25.306 Table 5.1g.

Note 5:  $\beta_{ed}$  can not be set directly; it is set by Absolute Grant Value.

Note 6: For subtests 2, 3 and 4, UE may perform E-DPCCH power scaling at max power which could results in slightly smaller MPR values.

**DC-HSDPA Setup Procedures used to establish the test signals**

The following 4 Sub-tests for DC-HSDPA were completed according to procedures in table C08.1.12 of 3GPP TS 34.121-1. A summary of subtest settings is illustrated below:

**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.	

**HSPA+ Setup Procedures used to establish the test signals**

DUT supports HSPA+ DL only. Therefore, conducted power measurements is not required.

**Maximum Output Power (Tune-up Limit) for W-CDMA**

SAR measurement is not required for the HSDPA, HSUPA, and DC-HSDPA. When primary mode and the adjusted SAR is  $\leq 1.2$  W/kg and secondary mode is  $\leq \frac{1}{4}$  dB higher than the primary mode

**W-CDMA Band II Measured Results**

Mode	UL Ch No.	Freq. (MHz)	Maximum Average Power (dBm)			Grip/Hotspot Average Power (dBm)			Ear-Jack Average Power (dBm)			
			Measured Pwr	MPR	Tune-up Limit	Measured Pwr	MPR	Tune-up Limit	Measured Pwr	MPR	Tune-up Limit	
Release 99	Rel 99 (RMC, 12.2 kbps)	9262	1852.4	23.8	N/A	24.0	20.8	N/A	21.0	21.8	N/A	22.0
		9400	1880.0	23.8			20.8			21.7		
		9538	1907.6	23.3			20.3			21.2		
HSDPA	Subtest 1	9262	1852.4	22.8	0	23.0	19.8	0	20.0	20.8	0	21.0
		9400	1880.0	22.8			19.8			20.7		
		9538	1907.6	22.3			19.3			20.2		
	Subtest 2	9262	1852.4	22.8	0	23.0	19.8	0	20.0	20.8	0	21.0
		9400	1880.0	22.8			19.8			20.7		
		9538	1907.6	22.3			19.3			20.2		
	Subtest 3	9262	1852.4	22.3	0.5	22.5	19.2	0.5	19.5	20.3	0.5	20.5
		9400	1880.0	22.3			19.3			20.2		
		9538	1907.6	21.8			18.8			19.7		
	Subtest 4	9262	1852.4	22.3	0.5	22.5	19.2	0.5	19.5	20.3	0.5	20.5
		9400	1880.0	22.3			19.3			20.2		
		9538	1907.6	21.8			18.8			19.7		
HSUPA	Subtest 1	9262	1852.4	22.8	0	23.0	19.8	0	20.0	20.8	0	21.0
		9400	1880.0	22.8			19.8			20.7		
		9538	1907.6	22.3			19.3			20.1		
	Subtest 2	9262	1852.4	20.8	2	21.0	17.8	2	18.0	18.8	2	19.0
		9400	1880.0	20.6			17.8			18.8		
		9538	1907.6	20.3			17.3			18.2		
	Subtest 3	9262	1852.4	20.8	1	22.0	17.8	1	19.0	18.8	1	20.0
		9400	1880.0	20.8			17.8			18.7		
		9538	1907.6	20.3			17.3			18.2		
	Subtest 4	9262	1852.4	20.8	2	21.0	17.8	2	18.0	18.8	2	19.0
		9400	1880.0	20.6			17.8			18.7		
		9538	1907.6	20.3			17.3			18.2		
	Subtest 5	9262	1852.4	22.8	0	23.0	19.8	0	20.0	20.7	0	21.0
		9400	1880.0	22.8			19.8			20.7		
		9538	1907.6	22.3			19.3			20.2		
DC-HSDPA	Subtest 1	9262	1852.4	22.8	0	23.0	19.8	0	20.0	20.8	0	21.0
		9400	1880.0	22.8			19.8			20.7		
		9538	1907.6	22.3			19.3			20.1		
	Subtest 2	9262	1852.4	22.8	0	23.0	19.8	0	20.0	20.8	0	21.0
		9400	1880.0	22.8			19.8			20.7		
		9538	1907.6	22.3			19.3			20.2		
	Subtest 3	9262	1852.4	22.3	0.5	22.5	19.2	0.5	19.5	20.3	0.5	20.5
		9400	1880.0	22.3			19.3			20.2		
		9538	1907.6	21.8			18.8			19.7		
	Subtest 4	9262	1852.4	22.3	0.5	22.5	19.2	0.5	19.5	20.3	0.5	20.5
		9400	1880.0	22.3			19.3			20.2		
		9538	1907.6	21.8			18.8			19.7		

**W-CDMA Band IV Measured Results**

Mode		UL Ch No.	Freq. (MHz)	Maximum Average Power (dBm)			Grip/Hotspot Average Power (dBm)			Ear-Jack Average Power (dBm)		
				Measured Pwr	MPR	Tune-up Limit	Measured Pwr	MPR	Tune-up Limit	Measured Pwr	MPR	Tune-up Limit
Release 99	Rel 99 (RMC, 12.2 kbps)	1312	1712.4	23.4	N/A	24.0	21.4	N/A	22.0	22.8	N/A	23.0
		1413	1732.6	23.3			21.3			22.5		
		1513	1752.6	23.2			21.2			22.7		
HSDPA	Subtest 1	1312	1712.4	22.3	0	23.0	20.4	0	21.0	21.7	0	22.0
		1413	1732.6	22.2			20.3			21.5		
		1513	1752.6	22.0			20.3			21.8		
	Subtest 2	1312	1712.4	22.3	0	23.0	20.4	0	21.0	21.7	0	22.0
		1413	1732.6	22.2			20.3			21.4		
		1513	1752.6	22.0			20.3			21.6		
	Subtest 3	1312	1712.4	21.9	0.5	22.5	19.9	0.5	20.5	21.2	0.5	21.5
		1413	1732.6	21.8			19.8			20.9		
		1513	1752.6	21.7			19.7			21.1		
	Subtest 4	1312	1712.4	21.9	0.5	22.5	19.9	0.5	20.5	21.2	0.5	21.5
		1413	1732.6	21.8			19.8			20.9		
		1513	1752.6	21.7			19.7			21.1		
HSUPA	Subtest 1	1312	1712.4	22.5	0	23.0	20.4	0	21.0	21.7	0	22.0
		1413	1732.6	22.4			20.4			21.3		
		1513	1752.6	22.4			20.3			21.6		
	Subtest 2	1312	1712.4	20.4	2	21.0	18.4	2	19.0	19.8	2	20.0
		1413	1732.6	20.4			18.4			19.5		
		1513	1752.6	20.4			18.4			19.6		
	Subtest 3	1312	1712.4	21.4	1	22.0	19.4	1	20.0	20.7	1	21.0
		1413	1732.6	21.4			19.4			20.5		
		1513	1752.6	21.3			19.4			20.7		
	Subtest 4	1312	1712.4	20.4	2	21.0	18.4	2	19.0	19.7	2	20.0
		1413	1732.6	20.4			18.4			19.4		
		1513	1752.6	20.4			18.4			19.6		
	Subtest 5	1312	1712.4	22.4	0	23.0	20.4	0	21.0	21.4	0	22.0
		1413	1732.6	22.4			20.4			21.4		
		1513	1752.6	22.3			20.3			21.2		
DC-HSDPA	Subtest 1	1312	1712.4	22.3	0	23.0	20.4	0	21.0	21.7	0	22.0
		1413	1732.6	22.2			20.3			21.4		
		1513	1752.6	22.0			20.3			21.5		
	Subtest 2	1312	1712.4	22.3	0	23.0	20.4	0	21.0	21.7	0	22.0
		1413	1732.6	22.2			20.3			21.4		
		1513	1752.6	22.0			20.3			21.6		
	Subtest 3	1312	1712.4	21.9	0.5	22.5	19.9	0.5	20.5	21.2	0.5	21.5
		1413	1732.6	21.8			19.8			20.9		
		1513	1752.6	21.7			19.7			21.1		
	Subtest 4	1312	1712.4	21.9	0.5	22.5	19.9	0.5	20.5	21.2	0.5	21.5
		1413	1732.6	21.8			19.8			20.9		
		1513	1752.6	21.7			19.7			21.1		

**W-CDMA Band V Measured Results**

Mode		UL Ch No.	Freq. (MHz)	Maximum Average Power (dBm)		
				Measured Pwr	MPR	Tune-up Limit
Release 99	Rel 99 (RMC, 12.2 kbps)	4132	826.4	24.1	N/A	24.5
		4183	836.6	23.9		
		4233	846.6	23.7		
HSDPA	Subtest 1	4132	826.4	23.0	0	23.5
		4183	836.6	23.0		
		4233	846.6	22.6		
	Subtest 2	4132	826.4	23.0	0	23.5
		4183	836.6	23.0		
		4233	846.6	22.6		
	Subtest 3	4132	826.4	22.6	0.5	23.0
		4183	836.6	22.5		
		4233	846.6	22.1		
	Subtest 4	4132	826.4	22.6	0.5	23.0
		4183	836.6	22.5		
		4233	846.6	22.1		
HSUPA	Subtest 1	4132	826.4	23.1	0	23.5
		4183	836.6	23.0		
		4233	846.6	22.6		
	Subtest 2	4132	826.4	21.1	2	21.5
		4183	836.6	21.0		
		4233	846.6	20.6		
	Subtest 3	4132	826.4	22.1	1	22.5
		4183	836.6	21.9		
		4233	846.6	21.6		
	Subtest 4	4132	826.4	21.1	2	21.5
		4183	836.6	21.0		
		4233	846.6	20.6		
	Subtest 5	4132	826.4	23.1	0	23.5
		4183	836.6	23.0		
		4233	846.6	22.6		
DC-HSDPA	Subtest 1	4132	826.4	23.0	0	23.5
		4183	836.6	23.0		
		4233	846.6	22.6		
	Subtest 2	4132	826.4	23.0	0	23.5
		4183	836.6	23.0		
		4233	846.6	22.6		
	Subtest 3	4132	826.4	22.6	0.5	23.0
		4183	836.6	22.5		
		4233	846.6	22.1		
	Subtest 4	4132	826.4	22.6	0.5	23.0
		4183	836.6	22.5		
		4233	846.6	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

**Maximum Output Power (Tune-up Limit) for LTE**

According to April 2015 TCB workshop, SAR test exclusion can be applied for testing overlapping LTE bands as follows:

- a) The maximum output power, including tolerance, for the smaller band must be ≤ the larger band to qualify for the SAR test exclusion.
- b) The channel bandwidth and other operating parameters for the smaller band must be fully supported by the larger band.
  - LTE Band 4 (1710-1755 MHz) Max Power and Ear-Jack Power are covered by LTE Band 66 (1710-1780 MHz)
  - LTE Band 38 (2570-2620 MHz) is covered by LTE Band 41 (2496-2690 MHz)

Maximum bandwidth 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 QPSK configuration has the highest maximum average output power per 3GPP standard.

SAR measurement is not required for the 16QAM, and 64QAM. When the highest maximum output power for 16QAM, and 64QAM is ≤ ½ dB higher than the QPSK or when the reported SAR for the QPSK configuration is ≤ 1.45 W/kg.

Please refer to section 6.3. for LTE detail test channels and section 6.5 Power Back-off Operation.

RF Air interface	Mode	Tune-up Power Limit (dBm)			
		Maximum	Grip/Hotspot	RCV	Ear-Jack
LTE Band 2	QPSK	24.5	21.5		22.5
LTE Band 4	QPSK	25.0	23.0		24.0
LTE Band 5	QPSK	25.5			
LTE Band 7	QPSK	23.0	19.5	20.0	19.5
LTE Band 12	QPSK	25.0			
LTE Band 13	QPSK	25.0			
LTE Band 38	QPSK	24.0	20.5	21.5	20.5
LTE Band 41	QPSK	24.0	21.0	21.5	21.0
LTE Band 66	QPSK	25.0	22.5		24.0
LTE Band 71	QPSK	25.5			



**LTE Band 2 Measured Results**

BW (MHz)	Mode	RB Allocation	RB offset	Maximum Average Power (dBm)					Grip and Hotspot Average Power (dBm)					Ear-Jack Average Power (dBm)					
				18700	18900	19100	MFR	Tune-up Limit	18700	18900	19100	MFR	Tune-up Limit	18700	18900	19100	MFR	Tune-up Limit	
				1860 MHz	1880 MHz	1900 MHz			1860 MHz	1880 MHz	1900 MHz			1860 MHz	1880 MHz	1900 MHz			
20 MHz	QPSK	1	0	23.8	24.0	24.2	0	24.5	20.9	21.1	20.7	0	21.5	22.0	22.0	21.8	0	22.5	
		1	49	23.9	24.1	24.1	0	24.5	20.9	21.2	20.7	0	21.5	22.0	22.1	21.6	0	22.5	
		1	99	23.9	24.0	24.1	0	24.5	21.0	21.0	20.5	0	21.5	22.0	21.9	21.4	0	22.5	
		50	0	23.0	23.2	23.4	1	23.5	20.9	21.2	20.9	0	21.5	22.1	22.1	21.9	0	22.5	
		50	24	23.0	23.3	23.2	1	23.5	21.0	21.3	20.8	0	21.5	22.1	22.2	21.7	0	22.5	
		50	50	23.0	23.1	23.1	1	23.5	21.0	21.2	20.7	0	21.5	22.0	22.0	21.6	0	22.5	
	16QAM	100	0	22.9	23.2	23.2	1	23.5	21.0	21.2	20.8	0	21.5	22.0	22.1	21.7	0	22.5	
		1	0	23.5	23.5	23.5	1	23.5	21.5	21.5	21.2	0	21.5	22.5	22.5	22.3	0	22.5	
		1	49	23.5	23.5	23.5	1	23.5	21.5	21.4	21.2	0	21.5	22.5	22.5	22.2	0	22.5	
		1	99	23.5	23.5	23.3	1	23.5	21.5	21.5	21.0	0	21.5	22.5	22.5	21.9	0	22.5	
		50	0	22.1	22.3	22.5	2	22.5	21.1	21.4	20.9	0	21.5	22.2	22.3	22.0	0	22.5	
		50	24	22.2	22.4	22.3	2	22.5	21.2	21.4	20.8	0	21.5	22.3	22.3	21.9	0	22.5	
	64QAM	50	50	22.2	22.3	22.2	2	22.5	21.2	21.3	20.8	0	21.5	22.2	22.2	21.7	0	22.5	
		100	0	22.2	22.3	22.3	2	22.5	21.1	21.4	20.8	0	21.5	22.1	22.3	21.8	0	22.5	
		1	0	22.3	22.5	22.5	2	22.5	21.3	21.5	21.2	0	21.5	22.0	22.5	22.1	0	22.5	
		1	49	22.4	22.5	22.5	2	22.5	21.4	21.5	21.0	0	21.5	22.4	22.5	21.9	0	22.5	
		1	99	22.5	22.5	22.2	2	22.5	21.4	21.5	20.9	0	21.5	22.4	22.5	21.7	0	22.5	
		50	0	21.2	21.3	21.5	3	21.5	21.1	21.3	21.1	0	21.5	21.1	21.3	21.5	0	22.5	
	15 MHz	QPSK	1	0	23.9	24.0	24.1	0	24.5	20.9	21.1	20.7	0	21.5	22.1	22.0	21.8	0	22.5
			1	37	23.9	24.1	24.1	0	24.5	20.9	21.1	20.6	0	21.5	22.1	22.1	21.6	0	22.5
			1	74	24.0	23.9	24.1	0	24.5	21.0	20.9	20.5	0	21.5	22.1	21.9	21.5	0	22.5
			36	0	22.9	23.1	23.2	1	23.5	20.9	21.1	20.7	0	21.5	22.0	22.0	21.7	0	22.5
			36	20	23.0	23.2	23.2	1	23.5	20.9	21.2	20.7	0	21.5	22.1	22.1	21.7	0	22.5
			36	39	23.0	23.2	23.2	1	23.5	20.9	21.2	20.6	0	21.5	22.1	22.1	21.6	0	22.5
16QAM		75	0	22.9	23.2	23.2	1	23.5	20.9	21.1	20.7	0	21.5	22.1	22.1	21.7	0	22.5	
		1	0	23.3	23.1	23.5	1	23.5	21.4	21.2	21.2	0	21.5	22.5	22.0	22.2	0	22.5	
		1	37	23.4	23.1	23.4	1	23.5	21.5	21.2	21.0	0	21.5	22.5	22.1	22.0	0	22.5	
		1	74	23.4	23.0	23.3	1	23.5	21.5	21.0	20.9	0	21.5	22.5	21.9	21.8	0	22.5	
		36	0	22.0	22.3	22.4	2	22.5	21.0	21.3	20.9	0	21.5	22.1	22.2	21.9	0	22.5	
		36	20	22.1	22.3	22.3	2	22.5	21.1	21.3	20.9	0	21.5	22.2	22.2	21.9	0	22.5	
64QAM		36	39	22.0	22.3	22.3	2	22.5	21.0	21.4	20.8	0	21.5	22.2	22.2	21.7	0	22.5	
		75	0	22.1	22.3	22.3	2	22.5	21.1	21.3	20.8	0	21.5	22.2	22.2	21.9	0	22.5	
		1	0	22.5	22.5	22.4	2	22.5	21.5	21.5	21.0	0	21.5	22.5	22.5	21.9	0	22.5	
		1	37	22.5	22.5	22.3	2	22.5	21.5	21.5	20.8	0	21.5	22.5	22.5	21.7	0	22.5	
		1	74	22.5	22.4	22.1	2	22.5	21.5	21.4	20.7	0	21.5	22.5	22.3	21.5	0	22.5	
		36	0	21.1	21.3	21.4	3	21.5	21.0	21.3	21.0	0	21.5	21.0	21.2	21.3	0	22.5	
10 MHz		QPSK	36	20	21.1	21.4	21.4	3	21.5	21.1	21.3	20.9	0	21.5	21.1	21.3	21.3	0	22.5
			36	39	21.1	21.4	21.3	3	21.5	21.1	21.3	20.8	0	21.5	21.0	21.3	21.2	0	22.5
			75	0	21.1	21.3	21.3	3	21.5	21.1	21.3	20.9	0	21.5	21.1	21.2	21.3	0	22.5
			1	0	24.0	24.2	24.2	0	24.5	21.0	21.2	20.7	0	21.5	22.2	22.2	21.8	0	22.5
			1	25	23.9	24.1	24.1	0	24.5	21.0	21.2	20.6	0	21.5	22.2	22.1	21.6	0	22.5
			1	49	23.9	24.1	24.1	0	24.5	21.0	21.2	20.6	0	21.5	22.3	22.1	21.6	0	22.5
	16QAM	25	0	22.4	22.7	22.7	1	23.5	21.0	21.2	20.7	0	21.5	22.2	22.1	21.8	0	22.5	
		25	12	22.5	22.7	22.7	1	23.5	21.0	21.3	20.6	0	21.5	22.3	22.2	21.8	0	22.5	
		25	25	22.5	22.7	22.6	1	23.5	21.0	21.2	20.7	0	21.5	22.2	22.1	21.7	0	22.5	
		50	0	22.5	22.7	22.6	1	23.5	21.0	21.3	20.6	0	21.5	22.2	22.1	21.7	0	22.5	
		1	0	23.1	23.2	23.5	1	23.5	21.2	21.3	21.1	0	21.5	22.2	22.2	22.1	0	22.5	
		1	25	23.1	23.1	23.4	1	23.5	21.1	21.3	21.0	0	21.5	22.2	22.1	22.0	0	22.5	
	64QAM	1	49	23.1	23.1	23.3	1	23.5	21.1	21.2	20.9	0	21.5	22.3	22.1	21.9	0	22.5	
		25	0	22.5	22.5	22.5	2	22.5	21.2	21.3	20.8	0	21.5	22.3	22.2	21.8	0	22.5	
		25	12	22.5	22.5	22.5	2	22.5	21.2	21.4	20.8	0	21.5	22.3	22.2	21.8	0	22.5	
		25	25	22.5	22.5	22.5	2	22.5	21.2	21.4	20.8	0	21.5	22.3	22.2	21.7	0	22.5	
		50	0	22.5	22.5	22.5	2	22.5	21.1	21.3	20.7	0	21.5	22.2	22.2	21.7	0	22.5	
		1	0	22.3	22.5	22.4	2	22.5	21.3	21.5	20.9	0	21.5	22.2	22.5	21.8	0	22.5	
	64QAM	1	25	22.3	22.5	22.3	2	22.5	21.3	21.5	20.8	0	21.5	22.2	22.5	21.7	0	22.5	
		1	49	22.3	22.5	22.2	2	22.5	21.3	21.5	20.8	0	21.5	22.3	22.5	21.6	0	22.5	
		25	0	21.2	21.4	21.4	3	21.5	21.2	21.3	20.9	0	21.5	21.1	21.3	21.4	0	22.5	
		25	12	21.2	21.4	21.3	3	21.5	21.2	21.4	20.8	0	21.5	21.2	21.3	21.2	0	22.5	
		25	25	21.2	21.4	21.3	3	21.5	21.2	21.4	20.9	0	21.5	21.1	21.3	21.3	0	22.5	
		50	0	21.1	21.3	21.3	3	21.5	21.1	21.3	20.8	0	21.5	21.1	21.3	21.2	0	22.5	

**LTE Band 2 Measured Results (continued)**

BW (MHz)	Mode	RB Allocation	RB offset	Maximum Average Power (dBm)					Grip and Hotspot Average Power (dBm)					Ear-Jack Average Power (dBm)										
				18625			18900		19175		18625			18900		19175		18625			18900		19175	
				1852.5 MHz	1880 MHz	1907.5 MHz	MFR	Tune-up Limit	1852.5 MHz	1880 MHz	1907.5 MHz	MFR	Tune-up Limit	1852.5 MHz	1880 MHz	1907.5 MHz	MFR	Tune-up Limit	1852.5 MHz	1880 MHz	1907.5 MHz	MFR	Tune-up Limit	
5 MHz	QPSK	1	0	24.0	24.2	24.1	0	24.5	21.0	21.3	20.6	0	21.5	22.2	22.0	21.7	0	22.5						
		1	12	24.0	24.3	24.1	0	24.5	21.1	21.3	20.5	0	21.5	22.3	22.1	21.7	0	22.5						
		1	24	23.9	24.1	24.1	0	24.5	21.0	21.1	20.5	0	21.5	22.2	22.0	21.6	0	22.5						
		12	0	23.0	23.2	23.1	1	23.5	21.0	21.2	20.7	0	21.5	22.2	22.1	21.8	0	22.5						
		12	7	23.0	23.2	23.1	1	23.5	21.0	21.3	20.6	0	21.5	22.2	22.1	21.7	0	22.5						
	16QAM	12	13	23.0	23.2	23.1	1	23.5	21.0	21.2	20.6	0	21.5	22.2	22.1	21.7	0	22.5						
		25	0	22.5	22.7	22.7	1	23.5	21.0	21.2	20.7	0	21.5	22.2	22.1	21.7	0	22.5						
		1	0	23.1	23.3	23.5	1	23.5	21.2	21.5	21.1	0	21.5	22.3	22.3	22.2	0	22.5						
		1	12	23.1	23.4	23.5	1	23.5	21.2	21.5	21.1	0	21.5	22.3	22.4	22.1	0	22.5						
		1	24	23.1	23.3	23.5	1	23.5	21.2	21.4	21.1	0	21.5	22.3	22.3	22.1	0	22.5						
	64QAM	12	0	22.1	22.4	22.3	2	22.5	21.2	21.4	20.9	0	21.5	22.2	22.3	21.9	0	22.5						
		12	7	22.1	22.4	22.3	2	22.5	21.2	21.5	20.8	0	21.5	22.3	22.3	21.8	0	22.5						
		12	13	22.1	22.4	22.3	2	22.5	21.2	21.4	20.8	0	21.5	22.3	22.3	21.7	0	22.5						
		25	0	22.0	22.3	22.3	2	22.5	21.0	21.4	20.8	0	21.5	22.1	22.2	21.8	0	22.5						
		1	0	22.3	22.2	22.4	2	22.5	21.3	21.2	21.0	0	21.5	22.2	22.2	21.8	0	22.5						
	3 MHz	QPSK	1	8	24.0	24.3	24.2	0	24.5	21.0	21.3	20.6	0	21.5	22.2	22.2	21.6	0	22.5					
			1	14	23.9	24.1	24.1	0	24.5	20.9	21.2	20.5	0	21.5	22.1	22.1	21.5	0	22.5					
			8	0	23.0	23.2	23.0	1	23.5	20.9	21.2	20.5	0	21.5	22.2	22.1	21.5	0	22.5					
			8	4	23.0	23.2	23.1	1	23.5	20.9	21.2	20.6	0	21.5	22.1	22.1	21.5	0	22.5					
			8	7	23.0	23.2	23.1	1	23.5	21.0	21.2	20.6	0	21.5	22.1	22.1	21.5	0	22.5					
		16QAM	15	0	22.9	23.2	23.0	1	23.5	20.9	21.2	20.6	0	21.5	22.1	22.1	21.5	0	22.5					
			1	0	23.0	23.1	23.3	1	23.5	20.9	21.5	20.6	0	21.5	22.2	22.1	21.9	0	22.5					
			1	8	23.1	23.2	23.4	1	23.5	21.1	21.4	20.7	0	21.5	22.3	22.2	22.0	0	22.5					
			1	14	23.0	23.1	23.3	1	23.5	20.9	21.5	20.6	0	21.5	22.2	22.0	21.9	0	22.5					
			8	0	22.1	22.4	22.1	2	22.5	21.1	21.4	20.6	0	21.5	22.2	22.3	21.6	0	22.5					
64QAM	8	4	22.1	22.4	22.2	2	22.5	21.2	21.4	20.7	0	21.5	22.2	22.3	21.7	0	22.5							
	8	7	22.1	22.4	22.2	2	22.5	21.2	21.4	20.7	0	21.5	22.2	22.3	21.7	0	22.5							
	15	0	22.0	22.3	22.1	2	22.5	21.1	21.4	20.6	0	21.5	22.1	22.2	21.6	0	22.5							
	1	0	22.2	22.5	22.1	2	22.5	21.2	21.5	20.7	0	21.5	22.1	22.5	21.6	0	22.5							
	1	8	22.3	22.5	22.2	2	22.5	21.3	21.5	20.9	0	21.5	22.3	22.5	21.7	0	22.5							
1.4 MHz	QPSK	1	14	24.0	24.2	24.0	0	24.5	21.0	21.3	20.6	0	21.5	22.1	22.1	21.5	0	22.5						
		1	0	23.8	24.1	24.0	0	24.5	20.9	21.1	20.4	0	21.5	22.0	22.0	21.5	0	22.5						
		1	3	23.9	24.2	24.0	0	24.5	20.9	21.2	20.5	0	21.5	22.0	22.1	21.5	0	22.5						
		1	5	23.8	24.1	24.0	0	24.5	20.9	21.2	20.4	0	21.5	22.0	22.0	21.5	0	22.5						
		3	0	23.9	24.1	23.9	0	24.5	20.9	21.2	20.5	0	21.5	22.0	22.1	21.4	0	22.5						
	16QAM	3	1	24.0	24.2	24.0	0	24.5	21.0	21.3	20.6	0	21.5	22.2	22.1	21.5	0	22.5						
		3	3	24.0	24.2	24.0	0	24.5	21.0	21.3	20.6	0	21.5	22.1	22.1	21.5	0	22.5						
		6	0	22.9	23.1	23.0	1	23.5	20.9	21.2	20.5	0	21.5	22.0	22.0	21.5	0	22.5						
		1	0	23.0	23.3	23.2	1	23.5	21.1	21.5	20.5	0	21.5	22.2	22.5	21.5	0	22.5						
		1	3	23.0	23.3	23.3	1	23.5	21.2	21.5	20.6	0	21.5	22.2	22.5	21.6	0	22.5						
64QAM	1	5	23.0	23.3	23.3	1	23.5	21.1	21.5	20.6	0	21.5	22.2	22.5	21.5	0	22.5							
	3	0	23.2	23.3	23.1	1	23.5	21.1	21.5	20.7	0	21.5	22.2	22.4	21.7	0	22.5							
	3	1	23.3	23.4	23.2	1	23.5	21.2	21.5	20.8	0	21.5	22.3	22.5	21.8	0	22.5							
	3	3	23.3	23.4	23.2	1	23.5	21.1	21.5	20.8	0	21.5	22.3	22.5	21.8	0	22.5							
	6	0	22.1	22.4	21.9	2	22.5	21.1	21.2	20.7	0	21.5	22.2	22.1	21.7	0	22.5							
64QAM	1	0	22.1	22.4	22.3	2	22.5	21.2	21.5	20.7	0	21.5	22.0	22.3	21.8	0	22.5							
	1	3	22.2	22.5	22.4	2	22.5	21.3	21.4	20.8	0	21.5	22.1	22.4	21.9	0	22.5							
	1	5	22.1	22.4	22.3	2	22.5	21.2	21.5	20.7	0	21.5	22.0	22.4	21.8	0	22.5							
	3	0	22.2	22.3	22.3	2	22.5	21.0	21.5	20.8	0	21.5	22.1	22.2	21.8	0	22.5							
	3	1	22.3	22.3	22.4	2	22.5	21.1	21.5	20.9	0	21.5	22.2	22.2	21.9	0	22.5							
3	3	22.3	22.4	22.4	2	22.5	21.1	21.5	20.9	0	21.5	22.2	22.3	21.8	0	22.5								
6	0	21.3	21.3	21.1	3	21.5	21.1	21.3	20.9	0	21.5	21.2	21.2	20.9	0	22.5								

**LTE Band 4 Measured Results**

BW (MHz)	Mode	RB Allocation	RB offset	Grip and Hotspot Average Power (dBm)				
				20175			MFR	Tune-up Limit
				1732.5 MHz				
20 MHz	QPSK	1	0	21.9			0	23
		1	49	21.6			0	23
		1	99	21.6			0	23
		50	0	21.8			0	23
		50	24	21.7			0	23
		50	50	21.7			0	23
	16QAM	100	0	21.7			0	23
		1	0	22.3			0	23
		1	49	22.0			0	23
		1	99	22.1			0	23
		50	0	21.8			0	23
		50	24	21.8			0	23
	64QAM	50	50	21.7			0	23
		100	0	21.8			0	23
		1	0	22.2			0	23
		1	49	22.1			0	23
		1	99	22.1			0	23
		50	0	21.4			0	23
				Grip and Hotspot Average Power (dBm)				
BW (MHz)	Mode	RB Allocation	RB offset	20025	20175	20325	MFR	Tune-up Limit
				1717.5 MHz	1732.5 MHz	1747.5 MHz		
15 MHz	QPSK	1	0	22.0	21.8	21.8	0	23
		1	37	21.9	21.6	21.8	0	23
		1	74	21.8	21.6	21.9	0	23
		36	0	21.9	21.7	21.8	0	23
		36	20	21.9	21.7	21.8	0	23
		36	39	21.8	21.6	21.8	0	23
	16QAM	75	0	21.7	21.7	21.7	0	23
		1	0	22.4	21.8	22.3	0	23
		1	37	22.2	21.6	22.2	0	23
		1	74	22.1	21.7	22.3	0	23
		36	0	22.0	21.8	21.9	0	23
		36	20	21.9	21.8	22.0	0	23
	64QAM	36	39	21.8	21.7	22.0	0	23
		75	0	21.9	21.8	21.9	0	23
		1	0	22.2	22.2	22.5	0	23
		1	37	22.0	22.0	22.5	0	23
		1	74	21.9	22.1	22.5	0	23
		36	0	21.6	21.3	20.9	0	23
				Grip and Hotspot Average Power (dBm)				
BW (MHz)	Mode	RB Allocation	RB offset	20000	20175	20350	MFR	Tune-up Limit
				1715 MHz	1732.5 MHz	1750 MHz		
10 MHz	QPSK	1	0	22.0	21.7	21.8	0	23
		1	25	21.8	21.7	21.7	0	23
		1	49	21.8	21.7	21.8	0	23
		25	0	21.9	21.7	21.8	0	23
		25	12	21.9	21.7	21.8	0	23
		25	25	21.9	21.7	21.8	0	23
	16QAM	50	0	21.8	21.7	21.9	0	23
		1	0	21.9	22.1	22.0	0	23
		1	25	21.7	22.1	21.9	0	23
		1	49	21.7	22.1	21.9	0	23
		25	0	21.9	21.8	22.1	0	23
		25	12	21.9	21.8	22.0	0	23
	64QAM	25	25	21.9	21.8	22.0	0	23
		50	0	21.9	21.8	22.0	0	23
		1	0	22.1	22.1	22.1	0	23
		1	25	21.9	22.0	22.1	0	23
		1	49	22.0	22.1	22.1	0	23
		25	0	21.9	21.9	22.1	0	23
				Grip and Hotspot Average Power (dBm)				
				20000				
				1715 MHz				
				20175				
				1732.5 MHz				
				20350				
				1750 MHz				

**Notes:**

LTE Band 4 Max Power and Ear-jack Reduced Power are covered by LTE Band 66. LTE Band 4 Hotspot Reduced Power is not covered by LTE Band 66.

**LTE Band 4 Measured Results (continued)**

BW (MHz)	Mode	RB Allocation	RB offset	Grip and Hotspot Average Power (dBm)					
				19975	20175	20375	MPR	Tune-up Limit	
				1712.5 MHz	1732.5 MHz	1752.5 MHz			
5 MHz	QPSK	1	0	22.0	21.8	21.8	0	23	
		1	12	21.9	21.7	21.8	0	23	
		1	24	21.9	21.7	21.8	0	23	
		12	0	21.9	21.7	21.9	0	23	
		12	7	21.9	21.7	21.9	0	23	
		12	13	21.8	21.7	21.9	0	23	
	16QAM	25	0	21.8	21.7	21.9	0	23	
		1	0	22.0	21.9	22.4	0	23	
		1	12	22.0	21.8	22.4	0	23	
		1	24	21.9	21.9	22.4	0	23	
		12	0	22.0	21.8	22.1	0	23	
		12	7	22.0	21.8	22.1	0	23	
	64QAM	12	13	21.9	21.8	22.0	0	23	
		25	0	21.8	21.8	22.0	0	23	
		1	0	22.3	21.7	22.2	0	23	
		1	12	22.2	21.7	22.2	0	23	
		1	24	22.1	21.7	22.2	0	23	
		12	0	21.5	21.3	21.1	0	23	
	3 MHz	QPSK	12	7	21.5	21.3	21.1	0	23
			12	13	21.3	21.3	21.1	0	23
			25	0	21.4	21.3	21.0	0	23
1			0	21.9	21.6	21.8	0	23	
1			8	21.9	21.7	21.9	0	23	
1			14	21.8	21.6	21.8	0	23	
16QAM		8	0	21.9	21.6	21.8	0	23	
		8	4	21.9	21.7	21.8	0	23	
		8	7	21.9	21.7	21.8	0	23	
		15	0	21.9	21.6	21.8	0	23	
		1	0	22.0	21.6	22.2	0	23	
		1	8	22.0	21.7	22.3	0	23	
64QAM		1	14	21.9	21.6	22.2	0	23	
		8	0	21.9	21.8	22.0	0	23	
		8	4	22.0	21.8	22.0	0	23	
		8	7	22.0	21.8	22.0	0	23	
		15	0	21.9	21.7	21.9	0	23	
		1	0	22.0	22.1	22.1	0	23	
1.4 MHz		QPSK	1	8	22.1	22.1	22.2	0	23
			1	14	22.0	22.1	22.1	0	23
			8	0	21.5	21.3	20.9	0	23
	8		4	21.6	21.3	21.0	0	23	
	8		7	21.6	21.3	21.0	0	23	
	15		0	21.5	21.2	21.0	0	23	
	16QAM	1	0	21.8	21.5	21.8	0	23	
		1	3	21.9	21.6	21.8	0	23	
		1	5	21.8	21.5	21.8	0	23	
		3	0	21.8	21.6	21.7	0	23	
		3	1	21.9	21.6	21.8	0	23	
		3	3	21.9	21.7	21.8	0	23	
	64QAM	6	0	21.8	21.5	21.8	0	23	
		1	0	22.2	21.6	21.9	0	23	
		1	3	22.2	21.7	22.0	0	23	
		1	5	22.1	21.7	21.9	0	23	
		3	0	22.0	21.8	21.9	0	23	
		3	1	22.1	21.9	22.0	0	23	
	64QAM	3	3	22.1	21.9	22.0	0	23	
		6	0	21.8	21.8	21.9	0	23	
		1	0	22.2	21.8	22.0	0	23	
1		3	22.3	21.9	22.1	0	23		
1		5	22.2	21.8	21.9	0	23		
3		0	22.1	21.7	22.0	0	23		
64QAM	3	1	22.2	21.7	22.1	0	23		
	3	3	22.2	21.7	22.1	0	23		
	6	0	21.4	21.2	21.2	0	23		

**Notes:**

LTE Band 4 Max Power and Ear-jack Reduced Power are covered by LTE Band 66. LTE Band 4 Hotspot Reduced Power is not covered by LTE Band 66.

**LTE Band 5 Measured Results**

BW (MHz)	Mode	RB Allocation	RB offset	Maximum Average Power (dBm)				
				20525			MFR	Tune-up Limit
				836.5 MHz				
10 MHz	QPSK	1	0	24.6			0	25.5
		1	25	24.5			0	25.5
		1	49	24.5			0	25.5
		25	0	23.5			1	24.5
		25	12	23.6			1	24.5
		25	25	23.5			1	24.5
	16QAM	50	0	23.5			1	24.5
		1	0	23.5			1	24.5
		1	25	23.4			1	24.5
		1	49	23.3			1	24.5
		25	0	22.1			2	23.5
		25	12	22.2			2	23.5
	64QAM	25	25	22.1			2	23.5
		50	0	22.1			2	23.5
		1	0	22.9			2	23.5
		1	25	22.8			2	23.5
		1	49	22.8			2	23.5
		25	0	22.2			3	22.5
5 MHz	QPSK	25	12	22.2			3	22.5
		25	25	22.2			3	22.5
		50	0	22.2			3	22.5
		1	0	22.1			3	22.5
		1	12	24.5	24.7	24.4	0	25.5
		1	12	24.5	24.6	24.3	0	25.5
	16QAM	1	24	24.5	24.6	24.4	0	25.5
		12	0	23.5	23.6	23.4	1	24.5
		12	7	23.5	23.6	23.4	1	24.5
		12	13	23.5	23.5	23.3	1	24.5
		25	0	23.5	23.5	23.3	1	24.5
		1	0	24.0	23.7	23.5	1	24.5
	64QAM	1	12	24.0	23.7	23.4	1	24.5
		1	24	23.9	23.7	23.4	1	24.5
		12	0	22.7	22.7	22.4	2	23.5
		12	7	22.7	22.7	22.4	2	23.5
		12	13	22.6	22.6	22.4	2	23.5
		25	0	22.5	22.6	22.3	2	23.5
3 MHz	QPSK	1	0	22.8	22.5	22.6	2	23.5
		1	12	22.8	22.5	22.5	2	23.5
		1	24	22.7	22.5	22.5	2	23.5
		12	0	21.6	21.6	21.3	3	22.5
		12	7	21.6	21.6	21.3	3	22.5
		12	13	21.6	21.6	21.2	3	22.5
	16QAM	25	0	21.7	21.6	21.3	3	22.5
		1	0	24.5	24.5	24.2	0	25.5
		1	8	24.6	24.6	24.2	0	25.5
3 MHz	QPSK	1	14	24.5	24.5	24.2	0	25.5
		8	0	23.5	23.5	23.2	1	24.5
		8	4	23.5	23.5	23.3	1	24.5
		8	7	23.5	23.5	23.3	1	24.5
		15	0	23.5	23.5	23.2	1	24.5
		1	0	23.8	23.4	23.3	1	24.5
	16QAM	1	8	23.9	23.5	23.3	1	24.5
		1	14	23.8	23.4	23.2	1	24.5
		8	0	22.6	22.7	22.3	2	23.5
		8	4	22.6	22.7	22.3	2	23.5
		8	7	22.6	22.7	22.3	2	23.5
		15	0	22.5	22.6	22.2	2	23.5
	64QAM	1	0	22.8	22.8	22.3	2	23.5
		1	8	22.8	22.9	22.4	2	23.5
		1	14	22.7	22.8	22.3	2	23.5
8		0	21.6	21.6	21.4	3	22.5	
8		4	21.6	21.7	21.4	3	22.5	
8		7	21.6	21.7	21.4	3	22.5	

**LTE Band 5 Measured Results (continued)**

BW (MHz)	Mode	RB Allocation	RB offset	Maximum Average Power (dBm)				
				20407	20525	20643	MPR	Tune-up Limit
				824.7 MHz	836.5 MHz	848.3 MHz		
1.4 MHz	QPSK	1	0	24.3	24.5	24.2	0	25.5
		1	3	24.4	24.5	24.3	0	25.5
		1	5	24.3	24.4	24.2	0	25.5
		3	0	24.3	24.4	24.0	0	25.5
		3	1	24.3	24.4	24.1	0	25.5
		3	3	24.3	24.4	24.1	0	25.5
		6	0	23.4	23.5	23.2	1	24.5
	16QAM	1	0	23.4	23.8	23.2	1	24.5
		1	3	23.4	23.8	23.3	1	24.5
		1	5	23.4	23.8	23.2	1	24.5
		3	0	23.5	23.6	23.1	1	24.5
		3	1	23.6	23.6	23.2	1	24.5
		3	3	23.5	23.6	23.2	1	24.5
	64QAM	6	0	22.6	22.4	22.3	2	23.5
		1	0	22.7	22.9	22.2	2	23.5
		1	3	22.7	22.9	22.3	2	23.5
		1	5	22.7	22.8	22.2	2	23.5
		3	0	22.4	22.7	22.2	2	23.5
		3	1	22.5	22.8	22.3	2	23.5
		3	3	22.5	22.8	22.3	2	23.5
		6	0	21.6	21.5	21.5	3	22.5

**LTE Band 7 Measured Results**

BW (MHz)	Mode	RB Allocation	RB offset	Maximum Average Power (dBm)					Grip, Hotspot and Ear-Jack Average Power (dBm)					RCV Average Power (dBm)						
				20850	21100	21350	MFR	Tune-up Limit	20850	21100	21350	MFR	Tune-up Limit	20850	21100	21350	MFR	Tune-up Limit		
				2510 MHz	2535 MHz	2560 MHz			2510 MHz	2535 MHz	2560 MHz			2510 MHz	2535 MHz	2560 MHz				
20 MHz	QPSK	1	0	22.4	22.3	22.3	0	23	19.3	19.3	19.3	0	19.5	18.7	18.6	18.7	0	20		
		1	49	22.5	22.4	22.3	0	23	19.5	19.3	19.3	0	19.5	18.8	18.8	18.9	0	20		
		1	99	22.4	22.3	22.4	0	23	19.3	19.3	19.3	0	19.5	18.7	18.7	18.8	0	20		
		50	0	21.5	21.4	21.4	1	22	19.5	19.3	19.4	0	19.5	18.8	18.8	18.7	0	20		
		50	24	21.6	21.4	21.4	1	22	19.5	19.4	19.4	0	19.5	18.8	18.8	18.9	0	20		
		50	50	21.5	21.4	21.3	1	22	19.5	19.3	19.3	0	19.5	18.9	18.7	18.8	0	20		
	16QAM	100	0	21.5	21.4	21.4	1	22	19.5	19.3	19.3	0	19.5	18.8	18.8	18.8	0	20		
		1	0	21.9	21.7	21.8	1	22	18.4	19.5	18.5	0	19.5	19.2	19.2	19.1	0	20		
		1	49	22.0	21.8	21.9	1	22	18.6	18.7	18.6	0	19.5	19.4	19.2	19.3	0	20		
		1	99	21.8	21.7	21.8	1	22	18.5	19.5	18.5	0	19.5	19.3	19.2	19.2	0	20		
		50	0	20.6	20.5	20.5	2	21	19.5	19.4	19.4	0	19.5	18.9	18.8	18.8	0	20		
		50	24	20.7	20.5	20.5	2	21	19.5	19.4	19.4	0	19.5	18.9	18.9	18.9	0	20		
	64QAM	50	50	20.6	20.4	20.4	2	21	19.5	19.4	19.4	0	19.5	18.9	18.8	18.9	0	20		
		100	0	20.6	20.4	20.5	2	21	19.5	19.4	19.4	0	19.5	18.9	18.8	18.9	0	20		
		1	0	20.9	20.5	20.7	2	21	19.5	19.5	19.5	0	19.5	19.4	18.9	19.1	0	20		
		1	49	21.0	20.6	20.7	2	21	18.7	19.5	19.5	0	19.5	19.5	19.0	19.2	0	20		
		1	99	21.0	20.5	20.6	2	21	18.6	19.5	19.5	0	19.5	19.4	19.0	19.2	0	20		
		50	0	19.6	19.4	19.5	3	20	19.5	19.5	19.5	0	19.5	18.9	18.9	18.9	0	20		
		50	24	19.6	19.5	19.5	3	20	19.5	19.5	19.5	0	19.5	18.9	18.9	19.0	0	20		
		50	50	19.5	19.4	19.4	3	20	19.5	19.4	19.4	0	19.5	19.0	18.8	18.9	0	20		
		100	0	19.5	19.4	19.4	3	20	19.5	19.4	19.4	0	19.5	18.8	18.8	18.9	0	20		
		15 MHz	QPSK	1	0	22.4	22.4	22.4	0	23	19.5	19.3	19.3	0	19.5	18.8	18.7	18.8	0	20
				1	37	22.5	22.4	22.5	0	23	19.5	19.3	19.4	0	19.5	18.9	18.8	18.9	0	20
				1	74	22.5	22.4	22.5	0	23	19.5	19.3	19.3	0	19.5	18.7	18.7	18.9	0	20
36	0			21.5	21.4	21.4	1	22	19.5	19.3	19.3	0	19.5	18.9	18.8	18.8	0	20		
36	20			21.6	21.4	21.5	1	22	19.5	19.3	19.3	0	19.5	18.9	18.8	18.9	0	20		
36	39			21.6	21.4	21.5	1	22	19.5	19.3	19.4	0	19.5	18.8	18.7	18.8	0	20		
16QAM	75		0	21.6	21.4	21.4	1	22	19.5	19.3	19.3	0	19.5	18.8	18.7	18.8	0	20		
	1		0	21.4	21.8	21.8	1	22	18.6	19.3	19.5	0	19.5	19.2	18.6	19.2	0	20		
	1		37	21.4	21.7	21.8	1	22	18.8	19.3	19.1	0	19.5	19.3	18.7	19.3	0	20		
	1		74	21.5	21.8	21.7	1	22	18.6	19.3	19.5	0	19.5	19.2	18.7	19.3	0	20		
	36		0	20.5	20.5	20.4	2	21	19.5	19.5	19.4	0	19.5	18.9	18.9	19.0	0	20		
	36		20	20.6	20.6	20.5	2	21	19.5	19.5	19.4	0	19.5	18.9	18.9	19.0	0	20		
64QAM	36		39	20.6	20.5	20.5	2	21	19.5	19.4	19.5	0	19.5	18.9	18.8	19.0	0	20		
	75		0	20.6	20.5	20.5	2	21	19.5	19.4	19.4	0	19.5	18.9	18.8	18.9	0	20		
	1		0	20.9	20.5	20.9	2	21	18.3	19.5	19.5	0	19.5	18.9	19.3	19.2	0	20		
	1		37	20.8	20.5	21.0	2	21	18.8	19.5	19.5	0	19.5	19.0	19.4	19.3	0	20		
	1		74	20.8	20.5	20.8	2	21	18.5	19.5	19.5	0	19.5	18.9	19.4	19.2	0	20		
	36		0	19.5	19.5	19.4	3	20	19.5	19.5	19.5	0	19.5	19.1	18.8	18.9	0	20		
	36		20	19.6	19.5	19.5	3	20	19.5	19.5	19.5	0	19.5	19.0	18.9	19.0	0	20		
	36		39	19.6	19.5	19.5	3	20	19.5	19.5	19.5	0	19.5	19.0	18.8	18.9	0	20		
	75		0	19.5	19.5	19.4	3	20	19.5	19.5	19.4	0	19.5	19.0	18.9	18.9	0	20		
	10 MHz		QPSK	1	0	22.5	22.4	22.3	0	23	19.5	19.3	19.3	0	19.5	18.7	18.8	18.8	0	20
				1	25	22.5	22.4	22.4	0	23	19.4	19.3	19.4	0	19.5	18.7	18.7	18.9	0	20
				1	49	22.6	22.3	22.4	0	23	19.5	19.2	19.4	0	19.5	18.8	18.7	18.9	0	20
25		0		21.0	20.9	20.8	1	22	19.5	19.4	19.3	0	19.5	18.7	18.8	18.8	0	20		
25		12		21.0	20.9	20.9	1	22	19.5	19.4	19.4	0	19.5	18.9	18.8	19.0	0	20		
25		25		21.1	20.9	20.9	1	22	19.5	19.4	19.4	0	19.5	18.8	18.8	18.9	0	20		
16QAM		50	0	21.1	20.9	20.8	1	22	19.5	19.4	19.3	0	19.5	18.9	18.8	18.8	0	20		
		1	0	21.4	21.8	21.4	1	22	18.7	19.4	19.3	0	19.5	19.1	18.8	18.8	0	20		
		1	25	21.5	21.8	21.5	1	22	18.7	19.4	19.4	0	19.5	19.2	18.8	18.9	0	20		
		1	49	21.5	21.7	21.4	1	22	18.7	19.4	19.3	0	19.5	19.2	18.8	18.8	0	20		
		25	0	21.0	21.0	20.9	2	21	19.5	19.5	19.4	0	19.5	18.8	18.9	18.9	0	20		
		25	12	21.0	21.0	21.0	2	21	19.5	19.5	19.5	0	19.5	19.0	18.9	19.0	0	20		
64QAM		25	25	21.0	21.0	21.0	2	21	19.5	19.5	19.5	0	19.5	19.0	18.9	19.0	0	20		
		50	0	21.0	21.0	20.9	2	21	19.5	19.4	19.3	0	19.5	18.9	18.9	18.9	0	20		
		1	0	20.6	20.7	20.4	2	21	19.5	19.5	19.5	0	19.5	18.9	19.0	19.1	0	20		
		1	25	20.6	20.7	20.6	2	21	19.5	19.5	19.5	0	19.5	18.9	19.0	19.2	0	20		
		1	49	20.7	20.6	20.5	2	21	19.5	19.5	19.5	0	19.5	19.0	19.0	19.2	0	20		
		25	0	20.9	20.9	21.0	2	21	19.5	19.5	19.4	0	19.5	19.0	18.9	18.9	0	20		
		25	12	20.9	20.9	21.0	2	21	19.5	19.5	19.5	0	19.5	19.0	18.9	19.1	0	20		
		25	25	20.9	20.9	21.0	2	21	19.5	19.5	19.5	0	19.5	19.0	18.9	19.0	0	20		
		50	0	20.9	20.9	21.0	2	21	19.5	19.4	19.4	0	19.5	19.0	18.8	18.9	0	20		

**LTE Band 7 Measured Results (continued)**

BW (MHz)	Mode	RB Allocation	RB offset	Maximum Average Power (dBm)					Grip, Hotspot and Ear-Jack Average Power (dBm)					RCV Average Power (dBm)				
				20775	21100	21425	MFR	Tune-up Limit	20775	21100	21425	MFR	Tune-up Limit	20775	21100	21425	MFR	Tune-up Limit
				2502.5 MHz	2535 MHz	2567.5 MHz			2502.5 MHz	2535 MHz	2567.5 MHz			2502.5 MHz	2535 MHz	2567.5 MHz		
5 MHz	QPSK	1	0	22.5	22.5	22.4	0	23	19.5	19.4	19.4	0	19.5	18.8	18.7	18.9	0	20
		1	12	22.5	22.5	22.4	0	23	19.5	19.4	19.4	0	19.5	18.9	18.7	18.9	0	20
		1	24	22.5	22.5	22.4	0	23	19.5	19.4	19.3	0	19.5	18.8	18.7	18.9	0	20
		12	0	21.5	21.4	21.5	1	22	19.5	19.3	19.4	0	19.5	18.8	18.8	18.9	0	20
		12	7	21.5	21.5	21.5	1	22	19.5	19.4	19.4	0	19.5	18.8	18.8	19.0	0	20
		12	13	21.5	21.5	21.5	1	22	19.5	19.4	19.4	0	19.5	18.8	18.8	18.9	0	20
		25	0	21.5	21.5	21.5	1	22	19.5	19.4	19.4	0	19.5	18.8	18.8	18.9	0	20
	1	0	21.6	21.6	21.9	1	22	19.5	19.5	18.7	0	19.5	19.0	19.3	19.0	0	20	
	1	12	21.7	21.6	21.9	1	22	19.5	19.5	18.8	0	19.5	19.0	19.3	19.0	0	20	
	1	24	21.6	21.6	21.9	1	22	19.5	19.5	18.8	0	19.5	18.9	19.2	19.0	0	20	
	12	0	20.6	20.5	20.6	2	21	19.5	19.5	19.5	0	19.5	18.9	19.0	19.0	0	20	
	12	7	20.6	20.5	20.6	2	21	19.5	19.5	19.5	0	19.5	18.9	19.0	19.0	0	20	
	12	13	20.6	20.5	20.6	2	21	19.5	19.5	19.5	0	19.5	18.9	18.9	19.0	0	20	
	25	0	20.5	20.4	20.6	2	21	19.5	19.4	19.5	0	19.5	18.8	18.9	18.9	0	20	
	1	0	20.7	20.3	20.6	2	21	19.5	19.3	19.5	0	19.5	19.1	18.7	19.2	0	20	
	1	12	20.8	20.3	20.6	2	21	19.5	19.3	19.5	0	19.5	19.1	18.7	19.3	0	20	
	1	24	20.7	20.3	20.6	2	21	19.5	19.3	19.5	0	19.5	19.1	18.7	19.2	0	20	
	12	0	19.6	19.5	19.4	3	20	19.5	19.5	19.4	0	19.5	18.9	18.9	18.9	0	20	
	12	7	19.6	19.5	19.4	3	20	19.5	19.5	19.4	0	19.5	19.0	18.9	18.9	0	20	
	12	13	19.6	19.5	19.4	3	20	19.5	19.5	19.4	0	19.5	18.9	18.8	18.9	0	20	
	25	0	19.5	19.4	19.4	3	20	19.5	19.4	19.4	0	19.5	18.9	18.8	19.0	0	20	



**LTE Band 12 Measured Results**

BW (MHz)	Mode	RB Allocation	RB offset	Maximum Average Power (dBm)				
				23095			MFR	Tune-up Limit
				707.5 MHz				
10 MHz	QPSK	1	0	23.7			0	25
		1	25	23.6			0	25
		1	49	23.7			0	25
		25	0	22.7			1	24
		25	12	22.7			1	24
		25	25	22.6			1	24
	16QAM	50	0	22.7			1	24
		1	0	22.6			1	24
		1	25	22.6			1	24
		1	49	22.6			1	24
		25	0	21.8			2	23
		25	12	21.8			2	23
	64QAM	25	25	21.7			2	23
		50	0	21.8			2	23
		1	0	21.8			2	23
		1	25	21.8			2	23
		1	49	21.9			2	23
		25	0	20.9			3	22
		25	12	20.8			3	22
		25	25	20.8			3	22
		50	0	20.8			3	22
BW (MHz)	Mode	RB Allocation	RB offset	Maximum Average Power (dBm)				
				23035	23095	23155	MFR	Tune-up Limit
				701.5 MHz				
5 MHz	QPSK	1	0	23.7	23.7	23.7	0	25
		1	12	23.7	23.8	23.6	0	25
		1	24	23.7	23.7	23.7	0	25
		12	0	22.7	22.7	22.7	1	24
		12	7	22.7	22.7	22.7	1	24
		12	13	22.7	22.6	22.6	1	24
	16QAM	25	0	22.7	22.7	22.6	1	24
		1	0	22.8	22.8	23.2	1	24
		1	12	22.8	22.8	23.1	1	24
		1	24	22.8	22.8	23.2	1	24
		12	0	21.8	21.8	21.9	2	23
		12	7	21.8	21.8	21.9	2	23
	64QAM	12	13	21.8	21.8	21.8	2	23
		25	0	21.7	21.8	21.8	2	23
		1	0	21.9	21.5	22.0	2	23
		1	12	21.9	21.6	21.9	2	23
		1	24	21.9	21.6	22.0	2	23
		12	0	20.8	20.8	20.7	3	22
		12	7	20.8	20.8	20.7	3	22
		12	13	20.8	20.8	20.6	3	22
		25	0	20.7	20.7	20.6	3	22
BW (MHz)	Mode	RB Allocation	RB offset	Maximum Average Power (dBm)				
				23025	23095	23165	MFR	Tune-up Limit
				700.5 MHz				
3 MHz	QPSK	1	0	23.4	23.6	23.6	0	25
		1	8	23.6	23.7	23.8	0	25
		1	14	23.6	23.6	23.7	0	25
		8	0	22.5	22.6	22.6	1	24
		8	4	22.5	22.6	22.6	1	24
		8	7	22.6	22.6	22.7	1	24
	16QAM	15	0	22.6	22.6	22.6	1	24
		1	0	22.6	22.5	23.0	1	24
		1	8	22.6	22.6	23.1	1	24
		1	14	22.6	22.5	23.0	1	24
		8	0	21.6	21.8	21.7	2	23
		8	4	21.7	21.8	21.7	2	23
	64QAM	8	7	21.8	21.8	21.8	2	23
		15	0	21.7	21.7	21.7	2	23
		1	0	21.8	22.0	21.8	2	23
		1	8	21.8	22.1	21.9	2	23
		1	14	21.8	22.0	21.8	2	23
		8	0	20.6	20.8	20.8	3	22
		8	4	20.6	20.9	20.8	3	22
		8	7	20.7	20.8	20.9	3	22
		15	0	20.8	20.7	20.7	3	22

**LTE Band 12 Measured Results (continued)**

BW (MHz)	Mode	RB Allocation	RB offset	Maximum Average Power (dBm)				
				23017	23095	23173	MPR	Tune-up Limit
				699.7 MHz	707.5 MHz	715.3 MHz		
1.4 MHz	QPSK	1	0	23.5	23.5	23.6	0	25
		1	3	23.5	23.5	23.7	0	25
		1	5	23.4	23.5	23.6	0	25
		3	0	23.4	23.4	23.5	0	25
		3	1	23.4	23.5	23.5	0	25
		3	3	23.4	23.5	23.6	0	25
		6	0	22.4	22.6	22.6	1	24
	16QAM	1	0	22.8	22.6	22.7	1	24
		1	3	22.9	22.6	22.8	1	24
		1	5	22.8	22.6	22.6	1	24
		3	0	22.6	22.7	22.6	1	24
		3	1	22.6	22.8	22.6	1	24
		3	3	22.6	22.8	22.6	1	24
	64QAM	6	0	21.4	21.8	21.8	2	23
		1	0	21.8	22.0	21.8	2	23
		1	3	21.8	22.1	21.9	2	23
		1	5	21.8	22.0	21.8	2	23
		3	0	21.5	21.9	21.8	2	23
		3	1	21.6	22.0	21.9	2	23
		3	3	21.6	22.0	21.8	2	23
		6	0	20.7	20.6	21.0	3	22

**LTE Band 13 Measured Results**

BW (MHz)	Mode	RB Allocation	RB offset	Maximum Average Power (dBm)			
				23230		MFR	Tune-up Limit
				782 MHz			
10 MHz	QPSK	1	0	23.9	0	25	
		1	25	23.8	0	25	
		1	49	23.7	0	25	
		25	0	22.9	1	24	
		25	12	22.9	1	24	
		25	25	22.8	1	24	
		50	0	22.8	1	24	
	16QAM	1	0	22.8	1	24	
		1	25	22.8	1	24	
		1	49	22.6	1	24	
		25	0	22.0	2	23	
		25	12	22.0	2	23	
		25	25	22.0	2	23	
		50	0	21.9	2	23	
	64QAM	1	0	22.2	2	23	
		1	25	22.1	2	23	
		1	49	22.0	2	23	
		25	0	20.9	3	22	
		25	12	21.0	3	22	
		25	25	20.9	3	22	
		50	0	20.9	3	22	
BW (MHz)	Mode	RB Allocation	RB offset	Maximum Average Power (dBm)			
				23230		MFR	Tune-up Limit
				782 MHz			
5 MHz	QPSK	1	0	24.0	0	25	
		1	12	23.9	0	25	
		1	24	23.9	0	25	
		12	0	22.9	1	24	
		12	7	22.9	1	24	
		12	13	22.9	1	24	
		25	0	22.8	1	24	
	16QAM	1	0	22.9	1	24	
		1	12	22.9	1	24	
		1	24	22.9	1	24	
		12	0	21.9	2	23	
		12	7	21.9	2	23	
		12	13	21.9	2	23	
		25	0	21.9	2	23	
	64QAM	1	0	21.7	2	23	
		1	12	21.7	2	23	
		1	24	21.7	2	23	
		12	0	20.9	3	22	
		12	7	20.9	3	22	
		12	13	20.9	3	22	
		25	0	20.8	3	22	



**LTE Band 41 Measured Results (continued)**

BW (MHz)	Mode	RB Allocation	RB offset	Maximum Average Power (dBm)						Otp. Hotspot and Ear-Jack Average Power (dBm)						RCV Average Power (dBm)									
				39750		40185		40620		41055		41490		Tune-up Limit	39750		40185		40620		41055		41490		Tune-up Limit
				2506 MHz	2549.5 MHz	2593 MHz	2636.5 MHz	2680 MHz	MFR	2506 MHz	2549.5 MHz	2593 MHz	2636.5 MHz		2680 MHz	MFR	2506 MHz	2549.5 MHz	2593 MHz	2636.5 MHz	2680 MHz	MFR			
5 MHz	QPSK	1	0	23.5	23.6	23.7	23.5	23.6	0	24	20.5	20.6	20.7	20.5	20.5	0	21	20.5	20.4	20.7	20.5	20.4	0	21.5	
		1	12	23.5	23.6	23.6	23.5	23.6	0	24	20.5	20.6	20.6	20.4	20.5	0	21	20.5	20.4	20.7	20.5	20.3	0	21.5	
		1	24	23.6	23.6	23.7	23.5	23.6	0	24	20.5	20.6	20.7	20.4	20.4	0	21	20.5	20.4	20.7	20.4	20.3	0	21.5	
		12	0	22.7	22.7	22.7	22.6	22.6	1	23	20.6	20.6	20.7	20.6	20.5	0	21	20.6	20.5	20.7	20.6	20.5	0	21.5	
		12	7	22.7	22.7	22.8	22.7	22.7	1	23	20.7	20.7	20.8	20.6	20.6	0	21	20.6	20.6	20.8	20.5	20.5	0	21.5	
		12	13	22.7	22.7	22.8	22.6	22.6	1	23	20.7	20.7	20.8	20.6	20.5	0	21	20.6	20.6	20.8	20.5	20.5	0	21.5	
		25	0	22.8	22.7	22.8	22.6	22.6	1	23	20.7	20.7	20.8	20.6	20.6	0	21	20.5	20.6	20.8	20.5	20.5	0	21.5	
		1	0	22.6	22.6	22.8	22.5	22.5	1	23	20.6	20.6	20.9	20.6	20.6	0	21	20.6	20.5	20.7	20.7	20.5	0	21.5	
	1	12	22.6	22.6	22.8	22.5	22.5	1	23	20.5	20.6	20.9	20.6	20.6	0	21	20.7	20.5	20.7	20.7	20.5	0	21.5		
	1	24	22.6	22.6	22.8	22.5	22.5	1	23	20.6	20.6	20.9	20.5	20.5	0	21	20.7	20.5	20.7	20.7	20.4	0	21.5		
	12	0	21.7	21.7	21.9	21.8	21.7	2	22	20.7	20.7	20.9	20.8	20.7	0	21	20.7	20.6	20.8	20.8	20.7	0	21.5		
	12	7	21.9	21.8	22.0	21.8	21.8	2	22	20.8	20.7	21.0	20.8	20.7	0	21	20.7	20.7	20.8	20.7	20.7	0	21.5		
	12	13	21.8	21.7	22.0	21.8	21.6	2	22	20.7	20.7	21.0	20.7	20.7	0	21	20.7	20.7	20.9	20.7	20.7	0	21.5		
	25	0	21.8	21.8	21.9	21.7	21.7	2	22	20.7	20.7	21.0	20.7	20.7	0	21	20.6	20.6	20.9	20.7	20.6	0	21.5		
	1	0	21.5	21.9	22.0	21.4	21.8	2	22	20.5	21.0	21.0	20.4	21.0	0	21	20.7	20.3	21.1	20.8	20.2	0	21.5		
	1	12	21.4	21.8	22.0	21.4	21.7	2	22	20.5	21.0	21.0	20.4	21.0	0	21	20.7	20.3	21.2	20.8	20.3	0	21.5		
	1	24	21.5	21.9	22.0	21.3	21.6	2	22	20.5	21.0	21.0	20.3	20.9	0	21	20.7	20.3	21.2	20.7	20.2	0	21.5		
	12	0	20.8	20.7	21.0	20.7	20.6	3	21	20.7	20.8	20.8	20.7	20.7	0	21	20.6	20.6	20.9	20.6	20.6	0	21.5		
	12	7	20.9	20.8	21.0	20.7	20.6	3	21	20.8	20.9	20.9	20.7	20.8	0	21	20.6	20.6	20.9	20.6	20.7	0	21.5		
	12	13	20.8	20.8	21.0	20.7	20.6	3	21	20.8	20.9	20.9	20.7	20.8	0	21	20.5	20.6	21.0	20.6	20.6	0	21.5		
	25	0	20.9	20.8	21.0	20.8	20.6	3	21	20.9	20.8	20.9	20.7	20.6	0	21	20.5	20.7	20.9	20.6	20.6	0	21.5		

**LTE Band 66 Measured Results**

BW (MHz)	Mode	RB Allocation	RB offset	Maximum Average Power (dBm)					Grip and Hotspot Average Power (dBm)					Ear-Jack Average Power (dBm)					
				132072	132322	132572	MFR	Tune-up Limit	132072	132322	132572	MFR	Tune-up Limit	132072	132322	132572	MFR	Tune-up Limit	
				1720 MHz	1745 MHz	1770 MHz			1720 MHz	1745 MHz	1770 MHz			1720 MHz	1745 MHz	1770 MHz			
20 MHz	QPSK	1	0	24.5	24.4	24.3	0	25	21.5	21.5	21.4	0	22.5	23.6	23.6	23.5	0	24	
		1	49	24.2	24.2	24.1	0	25	21.3	21.3	21.2	0	22.5	23.4	23.3	23.3	0	24	
		1	99	24.3	24.2	24.1	0	25	21.3	21.2	21.1	0	22.5	23.3	23.3	23.2	0	24	
		50	0	23.4	23.4	23.3	1	24	21.4	21.4	21.5	0	22.5	23.4	23.5	23.4	0	24	
		50	24	23.3	23.3	23.2	1	24	21.4	21.4	21.3	0	22.5	23.4	23.5	23.4	0	24	
		50	50	23.3	23.3	23.2	1	24	21.4	21.4	21.3	0	22.5	23.4	23.4	23.4	0	24	
	16QAM	100	0	23.3	23.3	23.2	1	24	21.4	21.4	21.3	0	22.5	23.4	23.5	23.4	0	24	
		1	0	23.8	23.8	23.8	1	24	22.0	22.0	21.9	0	22.5	23.9	23.9	24.0	0	24	
		1	49	23.5	23.6	23.6	1	24	21.9	21.8	21.7	0	22.5	23.7	23.7	23.7	0	24	
		1	99	23.7	23.5	23.6	1	24	21.9	21.8	21.6	0	22.5	23.7	23.6	23.7	0	24	
		50	0	22.4	22.4	22.4	2	23	21.5	21.6	21.5	0	22.5	22.5	22.5	22.5	0	24	
		50	24	22.4	22.4	22.3	2	23	21.5	21.5	21.4	0	22.5	22.5	22.5	22.5	0	24	
	64QAM	50	50	22.4	22.3	22.3	2	23	21.5	21.5	21.4	0	22.5	22.5	22.5	22.5	0	24	
		100	0	22.4	22.4	22.3	2	23	21.5	21.5	21.4	0	22.5	22.5	22.5	22.5	0	24	
		1	0	22.8	23.0	22.5	2	23	22.1	22.5	22.0	0	22.5	22.5	23.3	22.7	0	24	
		1	49	22.6	22.9	22.4	2	23	21.9	22.3	21.8	0	22.5	22.7	23.1	22.4	0	24	
		1	99	22.7	22.8	22.4	2	23	22.0	22.2	21.7	0	22.5	22.7	22.9	22.5	0	24	
		50	0	21.5	21.5	21.4	3	22	21.3	21.4	21.3	0	22.5	21.6	21.6	21.6	0	24	
	15 MHz	QPSK	1	0	24.6	24.3	24.3	0	25	21.5	21.4	21.3	0	22.5	23.5	23.5	23.4	0	24
			1	37	24.4	24.2	24.2	0	25	21.4	21.3	21.2	0	22.5	23.5	23.4	23.3	0	24
			1	74	24.3	24.2	24.1	0	25	21.4	21.2	21.2	0	22.5	23.4	23.3	23.2	0	24
			36	0	23.4	23.2	23.3	1	24	21.4	21.4	21.3	0	22.5	23.6	23.5	23.4	0	24
			36	20	23.3	23.3	23.2	1	24	21.3	21.3	21.3	0	22.5	23.5	23.4	23.4	0	24
			36	39	23.3	23.2	23.2	1	24	21.3	21.3	21.3	0	22.5	23.5	23.4	23.4	0	24
16QAM		75	0	23.3	23.2	23.2	1	24	21.3	21.4	21.3	0	22.5	23.4	23.4	23.4	0	24	
		1	0	23.7	23.2	23.6	1	24	21.9	21.4	21.8	0	22.5	23.8	23.8	23.3	0	24	
		1	37	23.6	23.1	23.5	1	24	21.8	21.3	21.7	0	22.5	23.8	23.7	23.2	0	24	
		1	74	23.6	23.1	23.5	1	24	21.8	21.3	21.6	0	22.5	23.7	23.6	23.1	0	24	
		36	0	22.5	22.4	22.4	2	23	21.5	21.5	21.4	0	22.5	22.7	22.5	22.5	0	24	
		36	20	22.3	22.4	22.3	2	23	21.4	21.4	21.4	0	22.5	22.6	22.5	22.5	0	24	
64QAM		36	39	22.4	22.3	22.3	2	23	21.4	21.4	21.4	0	22.5	22.5	22.5	22.5	0	24	
		75	0	22.4	22.4	22.4	2	23	21.5	21.4	21.5	0	22.5	22.6	22.5	22.5	0	24	
		1	0	23.0	22.7	22.4	2	23	22.1	21.8	22.2	0	22.5	23.1	22.8	22.5	0	24	
		1	37	22.9	22.6	22.3	2	23	22.0	21.8	22.2	0	22.5	23.0	22.7	22.4	0	24	
		1	74	22.9	22.5	22.3	2	23	22.0	21.8	22.2	0	22.5	23.0	22.7	22.4	0	24	
		36	0	21.5	21.4	21.4	3	22	21.3	21.3	21.2	0	22.5	21.6	21.6	21.5	0	24	
10 MHz		QPSK	36	20	21.4	21.4	21.4	3	22	21.2	21.3	21.2	0	22.5	21.5	21.6	21.5	0	24
			36	39	21.4	21.4	21.4	3	22	21.2	21.3	21.2	0	22.5	21.5	21.5	21.5	0	24
			75	0	21.4	21.4	21.4	3	22	21.2	21.2	21.2	0	22.5	21.6	21.5	21.5	0	24
			1	0	24.4	24.2	24.2	0	25	21.4	21.3	21.3	0	22.5	23.5	23.4	23.4	0	24
			1	25	24.3	24.1	24.1	0	25	21.3	21.3	21.1	0	22.5	23.4	23.4	23.2	0	24
			1	49	24.2	24.2	24.1	0	25	21.3	21.3	21.2	0	22.5	23.4	23.4	23.2	0	24
	16QAM	25	0	23.3	23.3	23.3	1	24	21.5	21.4	21.3	0	22.5	23.5	23.5	23.4	0	24	
		25	12	23.3	23.3	23.3	1	24	21.4	21.4	21.3	0	22.5	23.5	23.5	23.4	0	24	
		25	25	23.2	23.3	23.1	1	24	21.3	21.3	21.2	0	22.5	23.4	23.4	23.3	0	24	
		50	0	23.3	23.2	23.2	1	24	21.4	21.4	21.3	0	22.5	23.4	23.4	23.4	0	24	
		1	0	23.3	23.2	23.5	1	24	21.5	21.4	21.7	0	22.5	23.4	23.8	23.3	0	24	
		1	25	23.2	23.1	23.4	1	24	21.5	21.3	21.6	0	22.5	23.3	23.7	23.2	0	24	
	64QAM	1	49	23.2	23.1	23.4	1	24	21.4	21.3	21.6	0	22.5	23.2	23.8	23.3	0	24	
		25	0	22.5	22.4	22.3	2	23	21.6	21.5	21.4	0	22.5	22.5	22.5	22.5	0	24	
		25	12	22.4	22.4	22.3	2	23	21.6	21.5	21.4	0	22.5	22.6	22.5	22.5	0	24	
		25	25	22.4	22.4	22.2	2	23	21.5	21.5	21.4	0	22.5	22.5	22.6	22.4	0	24	
		50	0	22.3	22.3	22.4	2	23	21.5	21.5	21.4	0	22.5	22.4	22.6	22.5	0	24	
		1	0	22.5	22.6	22.4	2	23	21.9	21.7	21.4	0	22.5	22.6	22.8	22.5	0	24	
	64QAM	1	25	22.5	22.6	22.3	2	23	21.8	21.7	21.3	0	22.5	22.5	22.7	22.4	0	24	
		1	49	22.4	22.6	22.3	2	23	21.7	21.7	21.4	0	22.5	22.5	22.7	22.4	0	24	
		25	0	21.5	21.5	21.4	3	22	21.3	21.0	20.9	0	22.5	21.6	21.6	21.6	0	24	
		25	12	21.5	21.5	21.4	3	22	21.0	20.9	21.0	0	22.5	21.6	21.6	21.5	0	24	
		25	25	21.4	21.4	21.3	3	22	20.9	21.0	20.8	0	22.5	21.5	21.6	21.5	0	24	
		50	0	21.3	21.4	21.4	3	22	20.9	21.0	20.9	0	22.5	21.5	21.6	21.5	0	24	

**LTE Band 66 Measured Results (continued)**

BW (MHz)	Mode	RB Allocation	RB offset	Maximum Average Power (dBm)					Reduced Average Power (dBm)					Reduced Average Power (dBm)										
				13197		132322		132647	MFR	Tune-up Limit	13197		132322		132647	MFR	Tune-up Limit	13197		132322		132647	MFR	Tune-up Limit
				1712.5 MHz	1745 MHz	1777.5 MHz	1712.5 MHz	1745 MHz			1777.5 MHz	1712.5 MHz	1745 MHz	1777.5 MHz	1712.5 MHz			1745 MHz	1777.5 MHz					
5 MHz	QPSK	1	0	24.4	24.3	24.1	0	25	21.4	21.4	21.2	0	22.5	23.5	23.5	23.3	0	24						
		1	12	24.4	24.3	24.1	0	25	21.4	21.4	21.2	0	22.5	23.5	23.4	23.2	0	24						
		1	24	24.4	24.3	24.1	0	25	21.4	21.4	21.2	0	22.5	23.5	23.5	23.3	0	24						
		12	0	23.3	23.2	23.1	1	24	21.4	21.3	21.2	0	22.5	23.5	23.4	23.3	0	24						
		12	7	23.4	23.2	23.1	1	24	21.5	21.4	21.2	0	22.5	23.5	23.4	23.3	0	24						
	16QAM	12	13	23.4	23.2	23.1	1	24	21.4	21.3	21.2	0	22.5	23.4	23.4	23.3	0	24						
		25	0	23.3	23.2	23.1	1	24	21.4	21.4	21.2	0	22.5	23.4	23.4	23.3	0	24						
		1	0	23.4	23.4	23.6	1	24	21.6	21.6	21.8	0	22.5	23.5	23.5	23.8	0	24						
		1	12	23.3	23.3	23.6	1	24	21.5	21.6	21.7	0	22.5	23.5	23.5	23.7	0	24						
		1	24	23.4	23.4	23.6	1	24	21.6	21.6	21.8	0	22.5	23.5	23.5	23.8	0	24						
		12	0	22.4	22.4	22.3	2	23	21.6	21.6	21.5	0	22.5	22.5	22.6	22.5	0	24						
		12	7	22.4	22.4	22.3	2	23	21.5	21.5	21.5	0	22.5	22.5	22.6	22.5	0	24						
		12	13	22.4	22.4	22.3	2	23	21.6	21.5	21.5	0	22.5	22.5	22.5	22.5	0	24						
		25	0	22.3	22.3	22.2	2	23	21.5	21.5	21.4	0	22.5	22.4	22.5	22.4	0	24						
		64QAM	1	0	22.6	22.3	22.5	2	23	21.7	21.3	21.5	0	22.5	22.7	22.4	22.6	0	24					
	1		12	22.6	22.2	22.5	2	23	21.6	21.3	21.5	0	22.5	22.6	22.4	22.6	0	24						
	1		24	22.6	22.2	22.5	2	23	21.6	21.3	21.5	0	22.5	22.7	22.4	22.6	0	24						
	12		0	21.5	21.4	21.2	3	22	21.0	21.0	20.7	0	22.5	21.6	21.6	21.5	0	24						
	12		7	21.4	21.4	21.2	3	22	21.0	20.9	20.8	0	22.5	21.6	21.6	21.5	0	24						
	12		13	21.4	21.4	21.2	3	22	21.0	20.9	20.7	0	22.5	21.6	21.5	21.5	0	24						
	25		0	21.4	21.3	21.2	3	22	21.0	20.8	20.7	0	22.5	21.5	21.5	21.5	0	24						
	25		0	21.4	21.3	21.2	3	22	21.0	20.8	20.7	0	22.5	21.5	21.5	21.5	0	24						
	3 MHz	QPSK	1	0	24.0	24.0	23.6	0	25	21.3	21.3	21.1	0	22.5	23.4	23.3	23.3	0	24					
			1	8	24.3	24.0	23.7	0	25	21.4	21.3	21.3	0	22.5	23.5	23.4	23.3	0	24					
			1	14	24.1	23.9	23.6	0	25	21.4	21.3	21.2	0	22.5	23.4	23.4	23.3	0	24					
8			0	23.2	22.7	22.6	1	24	21.4	21.3	21.2	0	22.5	23.5	23.4	23.3	0	24						
8			4	23.2	22.8	22.7	1	24	21.4	21.3	21.2	0	22.5	23.5	23.4	23.3	0	24						
16QAM		8	7	23.1	22.8	22.7	1	24	21.4	21.3	21.2	0	22.5	23.5	23.4	23.3	0	24						
		15	0	23.1	22.7	22.7	1	24	21.4	21.3	21.2	0	22.5	23.5	23.4	23.3	0	24						
		1	0	23.4	22.8	22.5	1	24	21.5	21.3	21.6	0	22.5	23.4	23.3	23.6	0	24						
		1	8	23.5	22.9	22.6	1	24	21.6	21.4	21.7	0	22.5	23.4	23.3	23.7	0	24						
		1	14	23.4	22.8	22.5	1	24	21.5	21.3	21.6	0	22.5	23.4	23.2	23.6	0	24						
		8	0	22.2	21.9	21.8	2	23	21.5	21.5	21.3	0	22.5	22.5	22.6	22.4	0	24						
		8	4	22.2	21.9	21.8	2	23	21.5	21.5	21.4	0	22.5	22.5	22.6	22.4	0	24						
		8	7	22.2	21.9	21.8	2	23	21.5	21.5	21.4	0	22.5	22.5	22.6	22.4	0	24						
		15	0	22.2	21.8	21.7	2	23	21.4	21.4	21.3	0	22.5	22.5	22.5	22.4	0	24						
		64QAM	1	0	22.4	22.2	22.2	2	23	21.6	21.6	21.3	0	22.5	22.7	22.7	22.3	0	24					
1			8	22.5	22.3	22.3	2	23	21.6	21.7	21.4	0	22.5	22.7	22.8	22.4	0	24						
1			14	22.4	22.2	22.2	2	23	21.5	21.6	21.3	0	22.5	22.6	22.7	22.4	0	24						
8			0	21.2	21.2	21.0	3	22	20.9	20.9	20.8	0	22.5	21.5	21.5	21.5	0	24						
8			4	21.3	21.2	21.1	3	22	20.9	21.0	20.8	0	22.5	21.5	21.6	21.5	0	24						
8			7	21.3	21.2	21.1	3	22	20.8	20.9	20.8	0	22.5	21.5	21.6	21.5	0	24						
15			0	21.1	21.2	21.1	3	22	20.9	20.8	20.8	0	22.5	21.6	21.5	21.5	0	24						
1.4 MHz			QPSK	1	0	23.8	23.6	23.5	0	25	21.3	21.2	21.1	0	22.5	23.3	23.3	23.2	0	24				
				1	3	23.9	23.7	23.5	0	25	21.3	21.2	21.2	0	22.5	23.4	23.4	23.2	0	24				
				1	5	23.8	23.6	23.5	0	25	21.3	21.2	21.1	0	22.5	23.3	23.3	23.2	0	24				
		3		0	23.7	23.7	23.5	0	25	21.3	21.2	21.1	0	22.5	23.3	23.3	23.2	0	24					
	3	1		23.7	23.8	23.6	0	25	21.4	21.3	21.2	0	22.5	23.3	23.4	23.3	0	24						
	16QAM	3	3	23.7	23.8	23.6	0	25	21.4	21.3	21.2	0	22.5	23.3	23.4	23.3	0	24						
		6	0	22.8	22.6	22.6	1	24	21.3	21.2	21.1	0	22.5	23.5	23.3	23.2	0	24						
		1	0	22.8	23.0	22.6	1	24	21.7	21.3	21.3	0	22.5	23.3	23.4	23.5	0	24						
		1	3	22.8	23.1	22.6	1	24	21.7	21.4	21.3	0	22.5	23.3	23.4	23.6	0	24						
		1	5	22.8	23.0	22.6	1	24	21.7	21.4	21.3	0	22.5	23.3	23.4	23.5	0	24						
		3	0	22.8	23.0	22.8	1	24	21.6	21.5	21.3	0	22.5	23.5	23.4	23.4	0	24						
		3	1	22.9	23.1	22.9	1	24	21.6	21.6	21.4	0	22.5	23.5	23.5	23.5	0	24						
		3	3	22.8	23.0	22.9	1	24	21.6	21.6	21.3	0	22.5	23.5	23.5	23.5	0	24						
		6	0	21.9	21.6	21.8	2	23	21.3	21.5	21.3	0	22.5	22.6	22.5	22.2	0	24						
		64QAM	1	0	22.2	22.2	22.3	2	23	21.4	21.6	21.2	0	22.5	22.7	22.5	22.3	0	24					
	1		3	22.2	22.3	22.4	2	23	21.5	21.7	21.3	0	22.5	22.8	22.5	22.4	0	24						
	1		5	22.1	22.2	22.3	2	23	21.4	21.6	21.2	0	22.5	22.7	22.4	22.4	0	24						
	3		0	22.2	22.1	22.3	2	23	21.2	21.7	21.3	0	22.5	22.6	22.5	22.2	0	24						
	3		1	22.3	22.2	22.4	2	23	21.3	21.8	21.4	0	22.5	22.7	22.6	22.3	0	24						
	3		3	22.3	22.2	22.4	2	23	21.4	21.7	21.4	0	22.5	22.7	22.7	22.3	0	24						
	6		0	21.4	21.2	21.0	3	22	20.9	20.7	21.0	0	22.5	21.5	21.7	21.5	0	24						
	6		0	21.4	21.2	21.0	3	22	20.9	20.7	21.0	0	22.5	21.5	21.7	21.5	0	24						

**LTE Band 71 Measured Results**

BW (MHz)	Mode	RB Allocation	RB offset	Maximum Average Power (dBm)				
				133297			MFR	Tune-up Limit
				680.5 MHz				
20 MHz	QPSK	1	0	24.5		0	25.5	
		1	49	24.4		0	25.5	
		1	99	24.1		0	25.5	
		50	0	23.5		1	24.5	
		50	24	23.5		1	24.5	
		50	50	23.4		1	24.5	
	16QAM	100	0	23.4		1	24.5	
		1	0	23.9		1	24.5	
		1	49	23.7		1	24.5	
		1	99	23.5		1	24.5	
		50	0	22.5		2	23.5	
		50	24	22.5		2	23.5	
	64QAM	50	50	22.3		2	23.5	
		100	0	22.4		2	23.5	
		1	0	23.1		2	23.5	
		1	49	23.0		2	23.5	
		1	99	22.7		2	23.5	
		50	0	21.5		3	22.5	
15 MHz	QPSK	50	24	21.5		3	22.5	
		50	50	21.4		3	22.5	
		100	0	21.5		3	22.5	
		1	0	24.6		0	25.5	
		1	37	24.2		0	25.5	
		1	74	24.0		0	25.5	
	16QAM	36	0	23.3		1	24.5	
		36	20	23.5		1	24.5	
		36	39	23.4		1	24.5	
		75	0	23.4		1	24.5	
		1	0	23.9		1	24.5	
		1	37	23.5		1	24.5	
	64QAM	1	74	23.3		1	24.5	
		36	0	22.3		2	23.5	
		36	20	22.2		2	23.5	
		36	39	22.1		2	23.5	
		75	0	22.2		2	23.5	
		1	0	22.8		2	23.5	
10 MHz	QPSK	1	37	22.7		2	23.5	
		1	74	22.4		2	23.5	
		36	0	21.5		3	22.5	
		36	20	21.5		3	22.5	
		36	39	21.5		3	22.5	
		75	0	21.5		3	22.5	
	16QAM	1	0	24.4	24.2	23.9	0	25.5
		1	25	24.4	24.1	23.9	0	25.5
		1	49	24.4	23.9	23.7	0	25.5
		25	0	23.2	23.1	22.9	1	24.5
		25	12	23.2	23.1	22.9	1	24.5
		25	25	23.2	23.0	22.8	1	24.5
	64QAM	50	0	23.3	23.1	22.9	1	24.5
		1	0	23.1	23.5	23.0	1	24.5
		1	25	23.1	23.4	22.8	1	24.5
		1	49	23.1	23.2	22.7	1	24.5
		25	0	22.2	22.3	22.0	2	23.5
		25	12	22.2	22.2	22.1	2	23.5
10 MHz	16QAM	25	25	22.2	22.2	22.0	2	23.5
		50	0	22.2	22.1	21.9	2	23.5
		1	0	22.8	22.6	22.5	2	23.5
		1	25	22.7	22.5	22.4	2	23.5
		1	49	22.7	22.4	22.2	2	23.5
		25	0	21.5	21.6	21.4	3	22.5
10 MHz	64QAM	25	12	21.5	21.6	21.4	3	22.5
		25	25	21.6	21.5	21.3	3	22.5
		50	0	21.6	21.5	21.3	3	22.5



**LTE Band 71 Measured Results (continued)**

BW (MHz)	Mode	RB Allocation	RB offset	Maximum Average Power (dBm)				
				133147	133297	133447	MPR	Tune-up Limit
				665.5 MHz	680.5 MHz	695.5 MHz		
5 MHz	QPSK	1	0	24.2	24.5	24.1	0	25.5
		1	12	24.1	24.4	23.9	0	25.5
		1	24	24.1	24.4	23.9	0	25.5
		12	0	23.1	23.4	23.1	1	24.5
		12	7	23.1	23.3	22.7	1	24.5
		12	13	23.1	23.3	22.6	1	24.5
		25	0	23.1	23.0	22.7	1	24.5
	16QAM	1	0	23.2	23.3	23.2	1	24.5
		1	12	23.2	23.2	23.1	1	24.5
		1	24	23.2	23.4	23.1	1	24.5
		12	0	22.2	22.4	21.9	2	23.5
		12	7	22.2	22.5	21.8	2	23.5
		12	13	22.1	22.4	21.8	2	23.5
	64QAM	25	0	22.1	22.3	21.9	2	23.5
		1	0	22.7	22.4	22.4	2	23.5
		1	12	22.6	22.3	22.3	2	23.5
		1	24	22.7	22.3	22.2	2	23.5
		12	0	21.6	21.5	21.1	3	22.5
		12	7	21.6	21.6	21.0	3	22.5
		12	13	21.5	21.5	21.0	3	22.5
	25	0	21.5	21.4	21.1	3	22.5	

### 9.4. LTE Down-Link Carrier Aggregation

The tables below show the supported frequency bands of the device for DL Inter-band and DL Intra-band combinations.

When carrier aggregation is limited to downlink only, uplink maximum output power (single carrier) is measured for the supported combinations of downlink carrier aggregation listed in the table below. In applying the power measurement procedures of KDB 941225 D05A and April 2018 TCB workshop for DL CA to qualify for UL SAR test exclusion, power measurement is required only for the subset in each row with the largest combination of frequency bands and CCs (far right most configuration highlighted in the table below).

Index	2CC	Restriction	Completely Covered by Measurement Superset	Index	3CC	Restriction	Completely Covered by Measurement Superset
2CC # 1	CA_2A-2A	N/A	No	3CC # 1	CA_2A-2A-4A	N/A	No
2CC # 2	CA_2A-4A	N/A	No	3CC # 2	CA_2A-2A-5A	N/A	No
2CC # 3	CA_2A-5A	N/A	No	3CC # 3	CA_2A-2A-12A	N/A	No
2CC # 4	CA_2A-7A	N/A	No	3CC # 4	CA_2A-4A-4A	N/A	No
2CC # 5	CA_2A-12A	N/A	No	3CC # 5	CA_2A-4A-5A	N/A	No
2CC # 6	CA_2A-13A	N/A	No	3CC # 6	CA_2A-4A-7A	N/A	No
2CC # 7	CA_2A-66A	N/A	No	3CC # 7	CA_2A-4A-12A	N/A	No
2CC # 8	CA_4A-4A	N/A	No	3CC # 8	CA_2A-5A-66A	N/A	No
2CC # 9	CA_4A-5A	N/A	No	3CC # 9	CA_2A-7C	N/A	No
2CC # 10	CA_4A-7A	N/A	No	3CC # 10	CA_2A-7A-7A	N/A	No
2CC # 11	CA_4A-12A	N/A	No	3CC # 11	CA_2A-7A-12A	N/A	No
2CC # 12	CA_4A-13A	N/A	No	3CC # 12	CA_2A-12A-66A	N/A	No
2CC # 13	CA_4A-71A	N/A	No	3CC # 13	CA_2A-12B	N/A	No
2CC # 14	CA_5A-7A	N/A	No	3CC # 14	CA_2A-13A-66A	N/A	No
2CC # 15	CA_5A-66A	N/A	No	3CC # 15	CA_4A-4A-7A	N/A	No
2CC # 16	CA_7C	N/A	No	3CC # 16	CA_4A-4A-12A	N/A	No
2CC # 17	CA_7A-7A	N/A	No	3CC # 17	CA_4A-7A-7A	N/A	No
2CC # 18	CA_7A-12A	N/A	No	3CC # 18	CA_4A-7C	N/A	No
2CC # 19	CA_7A-66A	N/A	No	3CC # 19	CA_4A-7A-12A	N/A	No
2CC # 20	CA_12B	N/A	No	3CC # 20	CA_4A-12B	N/A	No
2CC # 21	CA_12A-66A	N/A	No	3CC # 21	CA_7A-12B	N/A	No
2CC # 22	CA_13A-66A	N/A	No	3CC # 22	CA_7A-66A-66A	N/A	No
2CC # 23	CA_66B	N/A	No	3CC # 23	CA_12A-66C	N/A	No
2CC # 24	CA_66C	N/A	No	3CC # 24	CA_13A-66C	N/A	No
2CC # 25	CA_66A-66A	N/A	No	3CC # 25	CA_66A-66C	N/A	No
				3CC # 26	CA_66C-71A	N/A	No
				3CC # 27	CA_13A-66A-66A	N/A	No
				3CC # 28	CA_66A-66A-71A	N/A	No

In applying the power measurement procedures of KDB 941225 D05A for DL CA to qualify for UL SAR test exclusion, power measurement is required only for the CA configuration with the largest aggregated DL CA BW in each frequency band, independently for contiguous and non-contiguous CA; however, if the same frequency band is used for both contiguous and non-contiguous CA, power measurement was performed using the configuration with the largest aggregated BW and maximum output power among contiguous and non-contiguous CA.

## 2CC DL CA Measured Results

E-UTRA CA configuration	CC1 (UL)					CC2 (DL)			Aggregated BW	CA Inactive (dBm)	CA Active (dBm)	Delta	2CC #
	Mode	BW (MHz)	Channel	Freq (MHz)	RB,Offset	BW (MHz)	Channel	Freq (MHz)					
CA_2A-2A	QPSK	20	18700	1860	1,0	20	1100	1980	40	23.86	23.97	0.11	1
CA_2A-4A	QPSK	20	18900	1880	1,0	20	2300	2145	40	23.92	23.99	0.07	2
CA_2A-5A	QPSK	20	18900	1880	1,0	10	2600	889	30	23.92	23.96	0.04	3
CA_2A-7A	QPSK	20	18900	1880	1,0	20	3100	2655	40	23.92	23.95	0.03	4
CA_2A-12A	QPSK	20	18900	1880	1,0	10	5095	737.5	30	23.92	23.96	0.04	5
CA_2A-13A	QPSK	20	18900	1880	1,0	10	5230	751	30	23.92	23.96	0.04	6
CA_2A-66A	QPSK	20	18900	1880	1,0	20	66886	2155	40	23.92	24.03	0.11	7
CA_4A-4A	QPSK	20	20050	1720	1,0	20	2300	2145	40	24.58	24.61	0.03	8
CA_4A-5A	QPSK	20	20175	1732.5	1,0	10	2525	881.5	30	24.28	24.41	0.13	9
CA_4A-7A	QPSK	20	20175	1732.5	1,0	20	3100	2655	40	24.28	24.42	0.14	10
CA_4A-12A	QPSK	20	20175	1732.5	1,0	10	5095	737.5	30	24.28	24.39	0.11	11
CA_4A-13A	QPSK	20	20175	1732.5	1,0	10	5230	751	30	24.28	24.40	0.12	12
CA_4A-71A	QPSK	20	20175	1732.5	1,0	20	68786	637	40	24.28	24.43	0.15	13
CA_5A-7A	QPSK	10	20525	836.5	1,0	20	3100	2655	30	24.60	24.67	0.07	14
CA_5A-66A	QPSK	10	20525	836.5	1,0	20	66886	2155	30	24.60	24.65	0.05	15
CA_7C	QPSK	20	21001	2525.1	1,0	20	3199	2664.9	40	22.14	22.25	0.11	16
CA_7A-7A	QPSK	20	20850	2510	1,0	20	3350	2680	40	22.18	22.19	0.01	17
CA_7A-12A	QPSK	20	21100	2535	1,0	10	5095	737.5	30	22.16	22.20	0.04	18
CA_7A-66A	QPSK	20	21100	2535	1,0	20	66886	2155	40	22.16	22.21	0.05	19
CA_12B	QPSK	5	23048	702.8	1,0	10	5120	740	15	23.65	23.72	0.07	20
CA_12A-66A	QPSK	10	23095	707.5	1,0	20	66886	2155	30	23.60	23.72	0.12	21
CA_13A-66A	QPSK	10	23230	782	1,0	20	66886	2155	30	24.14	24.17	0.03	22
CA_66B	QPSK	10	132022	1715	1,0	10	66585	2124.9	20	24.64	24.70	0.06	23
CA_66C	QPSK	20	132072	1720	1,0	20	66734	2139.8	40	24.53	24.53	0.00	24
CA_66A-66A	QPSK	20	132072	1720	1,0	20	67236	2190	40	24.53	24.55	0.02	25

**3CC DL CA Measured Results**

E-UTRA CA configuration	CC1 (UL)					CC2 (DL)			CC3 (DL)			Aggregated BW	CA Inactive (dBm)	CA Active (dBm)	Delta	3CC #
	Mode	BW (MHz)	Channel	Freq (MHz)	RB,Offset	BW (MHz)	Channel	Freq (MHz)	BW (MHz)	Channel	Freq (MHz)					
CA_2A-2A-4A	QPSK	20	18700	1860	1,0	20	1100	1980	20	2300	2145	60	23.94	23.87	-0.07	1
CA_2A-2A-5A	QPSK	20	18700	1860	1,0	20	1100	1980	10	2600	889	50	23.94	23.90	-0.04	2
CA_2A-2A-12A	QPSK	20	18700	1860	1,0	20	1100	1980	10	5095	737.5	50	23.94	23.90	-0.04	3
CA_2A-4A-4A	QPSK	20	18900	1880	1,0	20	2050	2120	20	2300	2145	60	23.10	23.02	-0.08	4
CA_2A-4A-5A	QPSK	20	18900	1880	1,0	20	2300	2145	10	2600	889	50	23.89	23.94	0.05	5
CA_2A-4A-7A	QPSK	20	18900	1880	1,0	20	2300	2145	20	3100	2655	60	23.89	23.92	0.03	6
CA_2A-4A-12A	QPSK	20	18900	1880	1,0	20	2300	2145	10	5095	737.5	50	23.89	23.96	0.07	7
CA_2A-5A-66A	QPSK	20	18900	1880	1,0	10	2600	889	20	66886	2155	50	23.89	24.04	0.15	8
CA_2A-7C	QPSK	20	18900	1880	1,0	20	3001	2645.1	20	3199	2664.9	60	23.89	23.96	0.07	9
CA_2A-7A-7A	QPSK	20	18900	1880	1,0	20	2850	2630	20	3350	2680	60	23.89	23.94	0.05	10
CA_2A-7A-12A	QPSK	20	18900	1880	1,0	20	3100	2655	10	5095	737.5	50	23.89	24.01	0.12	11
CA_2A-12A-66A	QPSK	20	18900	1880	1,0	10	5095	737.5	20	66886	2155	50	23.89	24.04	0.15	12
CA_2A-12B	QPSK	20	18900	1880	1,0	5	5048	732.8	10	5120	740	35	23.89	24.03	0.14	13
CA_2A-13A-66A	QPSK	20	18900	1880	1,0	10	5230	751	20	66886	2155	50	23.89	24.04	0.15	14
CA_4A-4A-7A	QPSK	20	20050	1720	1,0	20	2300	2145	20	3100	2655	60	24.50	24.54	0.04	15
CA_4A-4A-12A	QPSK	20	20050	1720	1,0	20	2300	2145	10	5095	737.5	50	24.50	24.64	0.14	16
CA_4A-7A-7A	QPSK	20	20175	1732.5	1,0	20	2850	2630	20	3350	2680	60	24.40	24.30	-0.10	17
CA_4A-7C	QPSK	20	20175	1732.5	1,0	20	3001	2645.1	20	3199	2664.9	60	24.40	24.31	-0.09	18
CA_4A-7A-12A	QPSK	20	20175	1732.5	1,0	20	3100	2655	10	5095	737.5	50	24.40	24.39	-0.01	19
CA_4A-12B	QPSK	20	20175	1732.5	1,0	5	5048	732.8	10	5120	740	35	24.40	24.28	-0.12	20
CA_7A-12B	QPSK	20	21100	2535	1,0	5	5048	732.8	10	5120	740	35	22.20	22.15	-0.05	21
CA_7A-66A-66A	QPSK	20	21100	2535	1,0	20	66536	2120	20	67236	2190	60	22.20	22.17	-0.03	22
CA_12A-66C	QPSK	10	23095	707.5	1,0	20	67036	2170	20	67234	2189.8	50	23.65	23.61	-0.04	23
CA_13A-66C	QPSK	10	23230	782	1,0	20	67036	2170	20	67234	2189.8	50	24.07	24.05	-0.02	24
CA_66A-66C	QPSK	20	132322	1745	1,0	20	67036	2170	20	67234	2189.8	60	24.47	24.49	0.02	25
CA_66C-71A	QPSK	20	132572	1770	1,0	20	67234	2189.8	20	68786	637	60	24.37	24.40	0.03	26
CA_13A-66A-66A	QPSK	10	23230	782	1,0	20	66536	2120	20	67236	2190	50	24.07	24.04	-0.03	27
CA_66A-66A-71A	QPSK	20	132072	1720	1,0	20	67236	2190	20	68786	637	60	24.61	24.66	0.05	28

### 9.5. Wi-Fi 2.4GHz (DTS Band)

#### Maximum Output Power (Tune-up Limit) for Wi-Fi 2.4 GHz

The maximum output power specified for production units are determined for all applicable 802.11 transmission modes in each standalone and aggregated frequency band. Maximum output power is measured for the highest maximum output power configuration(s) in each frequency band according to the default power measurement procedures.

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 802.11b/g/n 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.

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  $\leq 1.2$  W/kg.

#### Wi-Fi 2.4GHz Measured Results

Band	Mode	Ch #	Freq. (MHz)	Maximum Average Power (dBm)			Reduced Average Power (dBm)		
				Meas Pwr	Tune-up	SAR Test (Yes/No)	Meas Pwr	Tune-up	SAR Test (Yes/No)
DSSS 2.4 GHz	802.11b	1	2412	18.6	19.0	Yes	11.5	12.0	Yes
		6	2437	18.4	19.0		11.9	12.0	
		11	2462	18.4	19.0		11.5	12.0	
OFDM 2.4 GHz	802.11g	1	2412		18.0	No		12.0	No
		2	2417		18.0			12.0	
		6	2437		18.0			12.0	
		10	2457		18.0			12.0	
		11	2462		15.5			12.0	
	802.11n (HT20)	1	2412		17.0	No		12.0	No
		2	2417		18.0			12.0	
		6	2437		18.0			12.0	
		10	2457		18.0			12.0	
		11	2462		15.5			12.0	

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

### Maximum Output Power (Tune-up Limit) for Wi-Fi 5 GHz

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 transmission mode is selected.

The maximum output power specified for production units are determined for all applicable 802.11 transmission modes in each standalone and aggregated frequency band. Maximum output power is measured for the highest maximum output power configuration(s) in each frequency band according to the default power measurement procedures.

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.

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  $\leq 1.2$  W/kg, SAR is not required for UNII 1; otherwise treat the remaining bands separately and test them independently for SAR.

**Wi-Fi 5 GHz Measured Results**

Band	Mode	Ch #	Freq. (MHz)	Maximum Average Power (dBm)			Reduced Average Power (dBm)		
				Meas Pwr	Tune-up	SAR Test (Yes/No)	Meas Pwr	Tune-up	SAR Test (Yes/No)
UNII-1 5.2 GHz	802.11a	36	5180	15.6	16.0	No		12.0	No
		40	5200	15.6	16.0		12.0		
		44	5220	15.7	16.0		12.0		
		48	5240	15.7	16.0		12.0		
	802.11n (HT20)	36	5180		16.0	No		12.0	No
		40	5200		16.0		12.0		
		44	5220		16.0		12.0		
		48	5240		16.0		12.0		
	802.11ac (VHT20)	36	5180		15.0	No		12.0	No
		40	5200		15.0		12.0		
		44	5220		15.0		12.0		
		48	5240		15.0		12.0		
	802.11n (HT40)	38	5190		15.0	No		12.0	No
		46	5230		15.0		12.0		
	802.11ac (VHT40)	38	5190		15.0	No		12.0	No
		46	5230		15.0		12.0		
802.11ac (VHT80)	42	5210		13.0	No	12.0	12.0	No	
Band	Mode	Ch #	Freq. (MHz)	Maximum Average Power (dBm)			Reduced Average Power (dBm)		
				Meas Pwr	Tune-up	SAR Test (Yes/No)	Meas Pwr	Tune-up	SAR Test (Yes/No)
UNII-2A 5.3 GHz	802.11a	52	5260		16.0	No		12.0	No
		56	5280		16.0		12.0		
		60	5300		16.0		12.0		
		64	5320		16.0		12.0		
	802.11n (HT20)	52	5260		16.0	No		12.0	No
		56	5280		16.0		12.0		
		60	5300		16.0		12.0		
		64	5320		16.0		12.0		
	802.11ac (VHT20)	52	5260		15.0	No		12.0	No
		56	5280		15.0		12.0		
		60	5300		15.0		12.0		
		64	5320		15.0		12.0		
	802.11n (HT40)	54	5270	15.6	16.0	Yes		12.0	No
		62	5310	15.4	16.0		12.0		
	802.11ac (VHT40)	54	5270		15.0	No		12.0	No
		62	5310		15.0		12.0		
802.11ac (VHT80)	58	5290		14.0	No	11.5	12.0	Yes	

Band	Mode	Ch #	Freq. (MHz)	Maximum Average Power (dBm)			Reduced Average Power (dBm)		
				Meas Pwr	Tune-up	SAR Test (Yes/No)	Meas Pwr	Tune-up	SAR Test (Yes/No)
UNII-2C 5.5 GHz	802.11a	100	5500		16.0	No		12.0	No
		116	5580		16.0		12.0		
		124	5620		16.0		12.0		
		144	5720		16.0		12.0		
	802.11n (HT20)	100	5500		16.0	No		12.0	No
		116	5580		16.0		12.0		
		124	5620		16.0		12.0		
		144	5720		16.0		12.0		
	802.11ac (VHT20)	100	5500		15.0	No		12.0	No
		116	5580		15.0		12.0		
		124	5620		15.0		12.0		
		144	5720		15.0		12.0		
	802.11n (HT40)	102	5510	15.4	16.0	Yes		12.0	No
		118	5590	15.8	16.0		12.0		
		126	5630	15.4	16.0		12.0		
		142	5710	15.4	16.0		12.0		
	802.11ac (VHT40)	102	5510		15.0	No		12.0	No
		118	5590		15.0		12.0		
		126	5630		15.0		12.0		
		142	5710		15.0		12.0		
802.11ac (VHT80)	106	5530		14.0	No	11.8	12.0	Yes	
	122	5610		14.0		11.8	12.0		
	138	5690		14.0		11.9	12.0		
Band	Mode	Ch #	Freq. (MHz)	Maximum Average Power (dBm)			Reduced Average Power (dBm)		
				Meas Pwr	Tune-up	SAR Test (Yes/No)	Meas Pwr	Tune-up	SAR Test (Yes/No)
UNII-3 5.8 GHz	802.11a	149	5745		16.0	No		12.0	No
		157	5785		16.0		12.0		
		165	5825		16.0		12.0		
	802.11n (HT20)	149	5745		16.0	No		12.0	No
		157	5785		16.0		12.0		
		165	5825		16.0		12.0		
	802.11ac (VHT20)	149	5745		15.0	No		12.0	No
		157	5785		15.0		12.0		
		165	5825		15.0		12.0		
	802.11n (HT40)	151	5755	15.8	16.0	Yes		12.0	No
		159	5795	15.6	16.0		12.0		
	802.11ac (VHT40)	151	5755		15.0	No		12.0	No
		159	5795		15.0		12.0		
802.11ac (VHT80)	155	5775		14.0	No	11.5	12.0	Yes	



## 9.7. Bluetooth

### Maximum Output Power (Tune-up Limit) for Bluetooth

SAR measurement is not required for the EDR and LE. When the secondary mode is  $\leq \frac{1}{4}$  dB higher than the primary mode.

### Bluetooth Measured Results

Band	Mode	Ch #	Freq. (MHz)	Maximum Average Power (dBm)		
				Meas Pwr	Tune-up	SAR Test (Yes/No)
2.4	BR GFSK	0	2402	10.4	11.0	Yes
		39	2441	10.8	11.0	
		78	2480	10.4	11.0	
	EDR, $\pi/4$ DQPSK	0	2402		11.0	No
		39	2441		11.0	
		78	2480		11.0	
	EDR, 8-DPSK	0	2402		11.0	No
		39	2441		11.0	
		78	2480		11.0	
	LE, GFSK	0	2402		8.0	No
		19	2440		8.0	
		39	2480		8.0	

### Duty Factor Measured Results

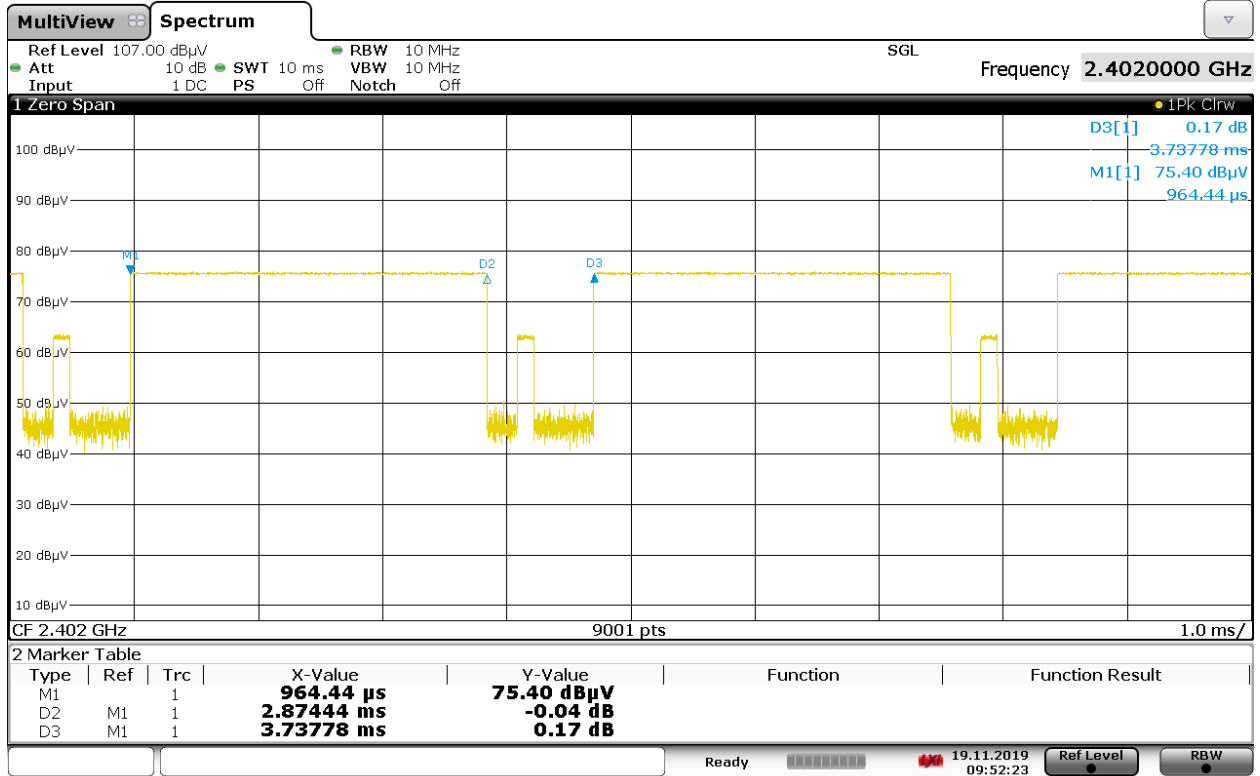
Mode	Type	T on (ms)	Period (ms)	Duty Cycle	Crest Factor (1/duty cycle)
GFSK	DH5	2.87444	3.73778	76.90%	1.30

**Note(s):**

Duty Cycle = (T on / period) \* 100%

### Duty Cycle plots

GFSK



09:52:23 19.11.2019

## 10. Measured and Reported (Scaled) SAR Results

### SAR Test Reduction criteria are as follows:

- Reported SAR(W/kg) for WWAN and Bluetooth = Measured SAR \*Tune-up Scaling Factor
- Reported SAR(W/kg) for Wi-Fi = Measured SAR \* Tune-up scaling factor \* Duty Cycle scaling factor
- Duty Cycle scaling factor = 1 / Duty cycle (%)

### 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:

- $\leq 0.8$  W/kg or 2.0 W/kg, for 1-g or 10-g respectively, when the transmission band is  $\leq 100$  MHz
- $\leq 0.6$  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
- $\leq 0.4$  W/kg or 1.0 W/kg, for 1-g or 10-g respectively, when the transmission band is  $\geq 200$  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):

For smart phones, with a display diagonal dimension  $> 15.0$  cm or an overall diagonal dimension  $> 16.0$  cm.

When hotspot mode does not apply, 10-g Extremity SAR is required for all surfaces and edges with an antenna located at  $\leq 25$  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; however, when power reduction applies to hotspot mode the measured SAR must be scaled to the maximum output power, including tolerance, allowed for phablet modes to compare with the 1.2 W/kg SAR test reduction threshold.

### 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  $\leq 1.2$  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:

- $\leq 0.4$  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  $\leq 0.8$  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  $\leq 1.2$  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  $\leq 1.2$  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  $\leq 1.2$  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. GSM850**

RF Exposure Conditions	Mode	Power Back-off	Dist. (mm)	Test Position	Ch #.	Freq. (MHz)	Power (dBm)		1-g SAR (W/kg)		Plot No.
							Tune-up Limit	Meas.	Meas.	Scaled	
Head	GPRS 1 Slot	N/A	0	Left Touch	190	836.6	34.5	33.7	0.174	0.209	
				Left Tilt	190	836.6	34.5	33.7	0.100	0.120	
				Right Touch	190	836.6	34.5	33.7	0.194	<b>0.233</b>	1
				Right Tilt	190	836.6	34.5	33.7	0.098	0.118	
Body-worn	GPRS 1 Slot	N/A	15	Rear	190	836.6	34.5	33.7	0.080	0.096	
				Front	190	836.6	34.5	33.7	0.140	<b>0.168</b>	2
Hotspot	GPRS 1 Slot	N/A	10	Rear	190	836.6	34.5	33.7	0.102	0.123	
				Front	190	836.6	34.5	33.7	0.145	0.174	
				Edge 2	190	836.6	34.5	33.7	0.251	<b>0.302</b>	3
				Edge 3	190	836.6	34.5	33.7	0.040	0.048	
				Edge 4	190	836.6	34.5	33.7	0.073	0.088	

**10.2. GSM1900**

RF Exposure Conditions	Mode	Power Back-off	Dist. (mm)	Test Position	Ch #.	Freq. (MHz)	Power (dBm)		1-g SAR (W/kg)		Plot No.
							Tune-up Limit	Meas.	Meas.	Scaled	
Head	GPRS 1 slot	N/A	0	Left Touch	661	1880.0	31.5	30.8	0.110	<b>0.129</b>	4
				Left Tilt	661	1880.0	31.5	30.8	0.056	0.066	
				Right Touch	661	1880.0	31.5	30.8	0.057	0.067	
				Right Tilt	661	1880.0	31.5	30.8	0.043	0.051	
Body-worn	GPRS 1 slot	N/A	15	Rear	661	1880.0	31.5	30.8	0.143	<b>0.168</b>	5
				Front	661	1880.0	31.5	30.8	0.094	0.110	
Hotspot	GPRS 1 slot	N/A	10	Rear	661	1880.0	31.5	30.8	0.341	<b>0.401</b>	6
				Front	661	1880.0	31.5	30.8	0.190	0.223	
				Edge 2	661	1880.0	31.5	30.8	0.043	0.051	
				Edge 3	661	1880.0	31.5	30.8	0.248	0.291	
				Edge 4	661	1880.0	31.5	30.8	0.151	0.177	

### 10.3. W-CDMA Band II

RF Exposure Conditions	Mode	Power Back-off	Dist. (mm)	Test Position	Ch #.	Freq. (MHz)	Power (dBm)		1-g SAR (W/kg)		Plot No.
							Tune-up Limit	Meas.	Meas.	Scaled	
Head	Rel 99 RMC 12.2 kbps	N/A	0	Left Touch	9400	1880.0	24.0	23.8	0.218	<b>0.228</b>	7
				Left Tilt	9400	1880.0	24.0	23.8	0.106	0.111	
				Right Touch	9400	1880.0	24.0	23.8	0.136	0.142	
				Right Tilt	9400	1880.0	24.0	23.8	0.109	0.114	
Body-w orn	Rel 99 RMC 12.2 kbps	N/A	15	Rear	9400	1880.0	24.0	23.8	0.350	<b>0.366</b>	8
				Front	9400	1880.0	24.0	23.8	0.210	0.220	
Hotspot	Rel 99 RMC 12.2 kbps	ON	10	Rear	9400	1880.0	21.0	20.8	0.330	0.346	
				Front	9400	1880.0	21.0	20.8	0.361	<b>0.378</b>	9
				Edge 2	9400	1880.0	21.0	20.8	0.075	0.078	
				Edge 3	9400	1880.0	21.0	20.8	0.207	0.217	
				Edge 4	9400	1880.0	21.0	20.8	0.259	0.271	

### 10.4. W-CDMA Band IV

RF Exposure Conditions	Mode	Power Back-off	Dist. (mm)	Test Position	Ch #.	Freq. (MHz)	Power (dBm)		1-g SAR (W/kg)		Plot No.
							Tune-up Limit	Meas.	Meas.	Scaled	
Head	Rel 99 RMC 12.2 kbps	N/A	0	Left Touch	1413	1732.6	24.0	23.3	0.191	<b>0.224</b>	10
				Left Tilt	1413	1732.6	24.0	23.3	0.106	0.125	
				Right Touch	1413	1732.6	24.0	23.3	0.118	0.139	
				Right Tilt	1413	1732.6	24.0	23.3	0.090	0.106	
Body-w orn	Rel 99 RMC 12.2 kbps	N/A	15	Rear	1413	1732.6	24.0	23.3	0.285	<b>0.335</b>	11
				Front	1413	1732.6	24.0	23.3	0.206	0.242	
Hotspot	Rel 99 RMC 12.2 kbps	ON	10	Rear	1413	1732.6	22.0	21.3	0.254	0.298	
				Front	1413	1732.6	22.0	21.3	0.335	<b>0.394</b>	12
				Edge 2	1413	1732.6	22.0	21.3	0.094	0.110	
				Edge 3	1413	1732.6	22.0	21.3	0.159	0.187	
				Edge 4	1413	1732.6	22.0	21.3	0.242	0.284	

### 10.5. W-CDMA Band V

RF Exposure Conditions	Mode	Power Back-off	Dist. (mm)	Test Position	Ch #.	Freq. (MHz)	Power (dBm)		1-g SAR (W/kg)		Plot No.
							Tune-up Limit	Meas.	Meas.	Scaled	
Head	Rel. 99 RMC	N/A	0	Left Touch	4183	836.6	24.5	23.9	0.185	0.212	
				Left Tilt	4183	836.6	24.5	23.9	0.117	0.134	
				Right Touch	4183	836.6	24.5	23.9	0.225	<b>0.258</b>	13
				Right Tilt	4183	836.6	24.5	23.9	0.098	0.113	
Body-worn	Rel. 99 RMC	N/A	15	Rear	4183	836.6	24.5	23.9	0.292	<b>0.335</b>	14
				Front	4183	836.6	24.5	23.9	0.144	0.165	
Hotspot	Rel. 99 RMC	N/A	10	Rear	4183	836.6	24.5	23.9	0.153	0.176	
				Front	4183	836.6	24.5	23.9	0.172	0.197	
				Edge 2	4183	836.6	24.5	23.9	0.238	<b>0.273</b>	15
				Edge 3	4183	836.6	24.5	23.9	0.053	0.061	
				Edge 4	4183	836.6	24.5	23.9	0.083	0.095	

### 10.6. LTE Band 2 (20MHz Bandwidth)

RF Exposure Conditions	Mode	Power 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	
Head	QPSK	N/A	0	Left Touch	18900	1880.0	1	49	24.5	24.1	0.243	<b>0.266</b>	16
							50	24	23.5	23.3	0.198	0.207	
				Left Tilt	18900	1880.0	1	49	24.5	24.1	0.131	0.144	
							50	24	23.5	23.3	0.103	0.108	
				Right Touch	18900	1880.0	1	49	24.5	24.1	0.157	0.172	
							50	24	23.5	23.3	0.124	0.130	
Right Tilt	18900	1880.0	1	49	24.5	24.1	0.107	0.117					
			50	24	23.5	23.3	0.083	0.087					
Body-worn	QPSK	N/A	15	Rear	18900	1880.0	1	49	24.5	24.1	0.383	<b>0.420</b>	17
							50	24	23.5	23.3	0.315	0.330	
				Front	18900	1880.0	1	49	24.5	24.1	0.226	0.248	
							50	24	23.5	23.3	0.182	0.191	
Hotspot	QPSK	ON	10	Rear	18900	1880.0	1	49	21.5	21.2	0.324	<b>0.347</b>	18
							50	24	21.5	21.3	0.327	0.342	
				Front	18900	1880.0	1	49	21.5	21.2	0.135	0.145	
							50	24	21.5	21.3	0.138	0.145	
				Edge 2	18900	1880.0	1	49	21.5	21.2	0.076	0.081	
							50	24	21.5	21.3	0.059	0.062	
				Edge 3	18900	1880.0	1	49	21.5	21.2	0.244	0.261	
							50	24	21.5	21.3	0.245	0.257	
				Edge 4	18900	1880.0	1	49	21.5	21.2	0.198	0.212	
							50	24	21.5	21.3	0.195	0.204	

### 10.7. LTE Band 4 (20MHz Bandwidth)

RF Exposure Conditions	Mode	Power 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	
Hotspot	QPSK	ON	10	Rear	20175	1732.5	1	0	23.0	21.9	0.263	0.339	
							50	0	23.0	21.8	0.281	0.370	
				Front	20175	1732.5	1	0	23.0	21.9	0.194	0.250	
							50	0	23.0	21.8	0.211	0.278	
				Edge 2	20175	1732.5	1	0	23.0	21.9	0.046	0.059	
							50	0	23.0	21.8	0.050	0.066	
				Edge 3	20175	1732.5	1	0	23.0	21.9	0.145	0.187	
							50	0	23.0	21.8	0.152	0.200	
				Edge 4	20175	1732.5	1	0	23.0	21.9	0.285	0.367	
							50	0	23.0	21.8	0.291	<b>0.384</b>	

**Notes:**

LTE Band 4 Max Power and Ear-jack Reduced Power are covered by LTE Band 66. LTE Band 4 Hotspot Reduced Power is not covered by LTE Band 66.

### 10.8. LTE Band 5 (10MHz Bandwidth)

RF Exposure Conditions	Mode	Power 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	
Head	QPSK	N/A	0	Left Touch	20525	836.5	1	0	25.5	24.6	0.163	0.201	
							25	12	24.5	23.6	0.147	0.181	
				Left Tilt	20525	836.5	1	0	25.5	24.6	0.115	0.141	
							25	12	24.5	23.6	0.105	0.129	
				Right Touch	20525	836.5	1	0	25.5	24.6	0.198	<b>0.244</b>	20
							25	12	24.5	23.6	0.176	0.217	
				Right Tilt	20525	836.5	1	0	25.5	24.6	0.120	0.148	
							25	12	24.5	23.6	0.105	0.129	
Body-worn	QPSK	N/A	15	Rear	20525	836.5	1	0	25.5	24.6	0.116	0.143	
							25	12	24.5	23.6	0.120	0.148	
				Front	20525	836.5	1	0	25.5	24.6	0.159	<b>0.196</b>	21
							25	12	24.5	23.6	0.144	0.177	
Hotspot	QPSK	N/A	10	Rear	20525	836.5	1	0	25.5	24.6	0.147	0.181	
							25	12	24.5	23.6	0.131	0.161	
				Front	20525	836.5	1	0	25.5	24.6	0.169	<b>0.208</b>	22
							25	12	24.5	23.6	0.147	0.181	
				Edge 2	20525	836.5	1	0	25.5	24.6	0.088	0.108	
							25	12	24.5	23.6	0.077	0.095	
				Edge 3	20525	836.5	1	0	25.5	24.6	0.060	0.074	
							25	12	24.5	23.6	0.043	0.053	
				Edge 4	20525	836.5	1	0	25.5	24.6	0.085	0.105	
							25	12	24.5	23.6	0.072	0.089	



### 10.9. LTE Band 7 (20MHz Bandwidth)

RF Exposure Conditions	Mode	Power 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	
Head	QPSK	ON	0	Left Touch	21100	2535.0	1	49	20.0	18.8	0.127	0.167	
							50	0	20.0	18.8	0.132	0.174	
				Left Tilt	21100	2535.0	1	49	20.0	18.8	0.114	0.150	
							50	0	20.0	18.8	0.118	0.156	
				Right Touch	21100	2535.0	1	49	20.0	18.8	0.553	<b>0.729</b>	23
							50	0	20.0	18.8	0.553	0.729	
Right Tilt	21100	2535.0	1	49	20.0	18.8	0.278	0.366					
			50	0	20.0	18.8	0.282	0.372					
Body-worn	QPSK	OFF	15	Rear	21100	2535.0	1	49	23.0	22.4	0.598	<b>0.687</b>	24
							50	24	22.0	21.4	0.478	0.549	
				Front	21100	2535.0	1	49	23.0	22.4	0.177	0.203	
							50	24	22.0	21.4	0.123	0.141	
Hotspot	QPSK	ON	10	Rear	21100	2535.0	1	49	19.5	19.3	0.576	<b>0.603</b>	25
							50	24	19.5	19.4	0.585	0.599	
				Front	21100	2535.0	1	49	19.5	19.3	0.111	0.116	
							50	24	19.5	19.4	0.112	0.115	
				Edge 1	21100	2535.0	1	49	19.5	19.3	0.053	0.055	
							50	24	19.5	19.4	0.053	0.054	
				Edge 4	21100	2535.0	1	49	19.5	19.3	0.291	0.305	
							50	24	19.5	19.4	0.294	0.301	
RF Exposure Conditions	Mode	Power Back-off	Dist. (mm)	Test Position	Ch #.	Freq. (MHz)	RB Allocation	RB offset	Power (dBm)		10-g SAR (W/kg)		Plot No.
Extremity	QPSK	OFF	8	Rear	21100	2535.0	1	49	23.0	22.4	0.867	<b>0.995</b>	26
							50	24	22.0	21.4	0.703	0.807	
		ON	0	Rear	21100	2535.0	1	49	19.5	19.3	0.911	0.954	
							50	24	19.5	19.4	0.936	0.958	

### 10.10. LTE Band 12 (10MHz Bandwidth)

RF Exposure Conditions	Mode	Power 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	
Head	QPSK	N/A	0	Left Touch	23095	707.5	1	49	25.0	23.7	0.147	0.198	
							25	12	24.0	22.7	0.113	0.152	
				Left Tilt	23095	707.5	1	49	25.0	23.7	0.087	0.117	
							25	12	24.0	22.7	0.066	0.089	
				Right Touch	23095	707.5	1	49	25.0	23.7	0.167	<b>0.225</b>	27
							25	12	24.0	22.7	0.132	0.178	
Right Tilt	23095	707.5	1	49	25.0	23.7	0.087	0.117					
			25	12	24.0	22.7	0.067	0.090					
Body-worn	QPSK	N/A	15	Rear	23095	707.5	1	49	25.0	23.7	0.348	<b>0.469</b>	28
							25	12	24.0	22.7	0.282	0.380	
				Front	23095	707.5	1	49	25.0	23.7	0.231	0.312	
							25	12	24.0	22.7	0.186	0.251	
Hotspot	QPSK	N/A	10	Rear	23095	707.5	1	49	25.0	23.7	0.385	0.519	
							25	12	24.0	22.7	0.310	0.418	
				Front	23095	707.5	1	49	25.0	23.7	0.190	0.256	
							25	12	24.0	22.7	0.154	0.208	
				Edge 2	23095	707.5	1	49	25.0	23.7	0.416	<b>0.561</b>	29
							25	12	24.0	22.7	0.336	0.453	
				Edge 3	23095	707.5	1	49	25.0	23.7	0.025	0.034	
							25	12	24.0	22.7	0.013	0.018	
				Edge 4	23095	707.5	1	49	25.0	23.7	0.261	0.352	
							25	12	24.0	22.7	0.214	0.289	

### 10.11. LTE Band 13 (10MHz Bandwidth)

RF Exposure Conditions	Mode	Power 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	
Head	QPSK	N/A	0	Left Touch	23230	782.0	1	0	25.0	23.9	0.158	0.204	
							25	0	24.0	22.9	0.125	0.161	
				Left Tilt	23230	782.0	1	0	25.0	23.9	0.093	0.120	
							25	0	24.0	22.9	0.073	0.094	
				Right Touch	23230	782.0	1	0	25.0	23.9	0.200	<b>0.258</b>	30
							25	0	24.0	22.9	0.156	0.201	
Right Tilt	23230	782.0	1	0	25.0	23.9	0.102	0.131					
			25	0	24.0	22.9	0.080	0.103					
Body-worn	QPSK	N/A	15	Rear	23230	782.0	1	0	25.0	23.9	0.190	0.245	
							25	0	24.0	22.9	0.185	0.238	
				Front	23230	782.0	1	0	25.0	23.9	0.190	<b>0.245</b>	31
							25	0	24.0	22.9	0.146	0.188	
Hotspot	QPSK	N/A	10	Rear	23230	782.0	1	0	25.0	23.9	0.358	<b>0.461</b>	32
							25	0	24.0	22.9	0.288	0.371	
				Front	23230	782.0	1	0	25.0	23.9	0.176	0.227	
							25	0	24.0	22.9	0.137	0.176	
				Edge 2	23230	782.0	1	0	25.0	23.9	0.354	0.456	
							25	0	24.0	22.9	0.277	0.357	
				Edge 3	23230	782.0	1	0	25.0	23.9	0.147	0.189	
							25	0	24.0	22.9	0.119	0.153	
				Edge 4	23230	782.0	1	0	25.0	23.9	0.182	0.234	
							25	0	24.0	22.9	0.138	0.178	

### 10.12. LTE Band 41 (20MHz Bandwidth)

RF Exposure Conditions	Mode	Power 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	
Head	QPSK	ON	0	Left Touch	40620	2593.0	1	0	21.5	20.7	0.123	0.148	
							50	24	21.5	20.8	0.119	0.140	
				Left Tilt	40620	2593.0	1	0	21.5	20.7	0.137	0.165	
							50	24	21.5	20.8	0.130	0.153	
				Right Touch	40620	2593.0	1	0	21.5	20.7	0.473	<b>0.569</b>	33
							50	24	21.5	20.8	0.460	0.541	
Right Tilt	40620	2593.0	1	0	21.5	20.7	0.210	0.252					
			50	24	21.5	20.8	0.203	0.239					
Body-worn	QPSK	N/A	15	Rear	40620	2593.0	1	0	24.0	23.9	0.394	<b>0.403</b>	34
							50	24	23.0	22.9	0.306	0.313	
				Front	40620	2593.0	1	0	24.0	23.9	0.077	0.079	
							50	24	23.0	22.9	0.055	0.056	
Hotspot	QPSK	ON	10	Rear	40620	2593.0	1	0	21.0	20.9	0.459	0.470	
							50	24	21.0	20.8	0.476	<b>0.498</b>	35
				Front	40620	2593.0	1	0	21.0	20.9	0.136	0.139	
							50	24	21.0	20.8	0.137	0.143	
				Edge 1	40620	2593.0	1	0	21.0	20.9	0.090	0.092	
							50	24	21.0	20.8	0.094	0.098	
Edge 4	40620	2593.0	1	0	21.0	20.9	0.294	0.301					
			50	24	21.0	20.8	0.285	0.298					

### 10.13. LTE Band 66 (20MHz Bandwidth)

RF Exposure Conditions	Mode	Power 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	
Head	QPSK	N/A	0	Left Touch	132322	1745.0	1	0	25.0	24.4	0.258	<b>0.296</b>	36
							50	0	24.0	23.4	0.211	0.242	
				Left Tilt	132322	1745.0	1	0	25.0	24.4	0.136	0.156	
							50	0	24.0	23.4	0.111	0.127	
				Right Touch	132322	1745.0	1	0	25.0	24.4	0.177	0.203	
							50	0	24.0	23.4	0.144	0.165	
Right Tilt	132322	1745.0	1	0	25.0	24.4	0.114	0.131					
			50	0	24.0	23.4	0.093	0.107					
Body-worn	QPSK	N/A	15	Rear	132322	1745.0	1	0	25.0	24.4	0.395	<b>0.454</b>	37
							50	0	24.0	23.4	0.322	0.370	
				Front	132322	1745.0	1	0	25.0	24.4	0.260	0.299	
							50	0	24.0	23.4	0.209	0.240	
Hotspot	QPSK	ON	10	Rear	132322	1745.0	1	0	22.5	21.5	0.569	0.716	
							50	24	22.5	21.4	0.587	<b>0.756</b>	38
				Front	132322	1745.0	1	0	22.5	21.5	0.242	0.305	
							50	24	22.5	21.4	0.250	0.322	
				Edge 2	132322	1745.0	1	0	22.5	21.5	0.060	0.076	
							50	24	22.5	21.4	0.060	0.077	
				Edge 3	132322	1745.0	1	0	22.5	21.5	0.208	0.262	
							50	24	22.5	21.4	0.234	0.301	
Edge 4	132322	1745.0	1	0	22.5	21.5	0.184	0.232					
			50	24	22.5	21.4	0.194	0.250					
RF Exposure Conditions	Mode	Power Back-off	Dist. (mm)	Test Position	Ch #.	Freq. (MHz)	RB Allocation	RB offset	Power (dBm)		10-g SAR (W/kg)		Plot No.
Extremity	QPSK	OFF	10	Rear	132322	1745.0	1	0	25.0	24.4	0.346	0.397	
							50	0	24.0	23.4	0.289	0.332	
		ON	0	Rear	132322	1745.0	1	0	22.5	21.5	1.500	1.888	
							50	24	22.5	21.4	1.500	<b>1.932</b>	39

### 10.14. LTE Band 71 (20MHz Bandwidth)

RF Exposure Conditions	Mode	Power 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	
Head	QPSK	N/A	0	Left Touch	133297	680.5	1	0	25.5	24.5	0.132	<b>0.166</b>	40
							50	0	24.5	23.5	0.101	0.127	
				Left Tilt	133297	680.5	1	0	25.5	24.5	0.075	0.094	
							50	0	24.5	23.5	0.055	0.069	
				Right Touch	133297	680.5	1	0	25.5	24.5	0.126	0.159	
							50	0	24.5	23.5	0.105	0.132	
Right Tilt	133297	680.5	1	0	25.5	24.5	0.068	0.086					
			50	0	24.5	23.5	0.058	0.073					
Body-worn	QPSK	N/A	15	Rear	133297	680.5	1	0	25.5	24.5	0.296	<b>0.373</b>	41
							50	0	24.5	23.5	0.247	0.311	
				Front	133297	680.5	1	0	25.5	24.5	0.170	0.214	
							50	0	24.5	23.5	0.142	0.179	
Hotspot	QPSK	N/A	10	Rear	133297	680.5	1	0	25.5	24.5	0.339	<b>0.427</b>	42
							50	0	24.5	23.5	0.277	0.349	
				Front	133297	680.5	1	0	25.5	24.5	0.157	0.198	
							50	0	24.5	23.5	0.131	0.165	
				Edge 2	133297	680.5	1	0	25.5	24.5	0.286	0.360	
							50	0	24.5	23.5	0.238	0.300	
				Edge 3	133297	680.5	1	0	25.5	24.5	0.089	0.112	
							50	0	24.5	23.5	0.075	0.094	
				Edge 4	133297	680.5	1	0	25.5	24.5	0.177	0.223	
							50	0	24.5	23.5	0.150	0.189	

### 10.15. Wi-Fi (DTS Band)

When the 802.11b reported SAR of the highest measured maximum output power channel is  $\leq 0.8$  W/kg, no further SAR testing is required. If SAR is  $> 0.8$  W/kg and  $\leq 1.2$  W/kg, SAR is required for the next highest measured output power channel. Finally, if SAR is  $> 1.2$  W/kg, SAR is required for the third channel.

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  $\leq 1.2$  W/kg.

RF Exposure Conditions	Mode	Power Back-off	Dist. (mm)	Test Position	Ch #.	Freq. (MHz)	Duty Cycle	Area Scan Max. SAR (W/kg)	Power (dBm)		1-g SAR (W/kg)		Plot No.
									Tune-up Limit	Meas.	Meas.	Scaled	
Head	802.11b 1 Mbps	N/A	0	Left Touch	6	2437	97.58%	0.217	12.0	11.9			
				Left Tilt	6	2437	97.58%	<b>0.228</b>	12.0	11.9	0.139	<b>0.146</b>	43
				Right Touch	6	2437	97.58%	0.090	12.0	11.9			
				Right Tilt	6	2437	97.58%	0.118	12.0	11.9			
Body-worn	802.11b 1 Mbps	N/A	15	Rear	1	2412	97.58%	<b>0.273</b>	19.0	18.6	0.182	<b>0.205</b>	44
				Front	1	2412	97.58%	0.069	19.0	18.6			
Hotspot	802.11b 1 Mbps	N/A	10	Rear	1	2412	97.58%	<b>0.575</b>	19.0	18.6	0.370	<b>0.416</b>	45
				Front	1	2412	97.58%	0.123	19.0	18.6			
				Edge 1	1	2412	97.58%	0.260	19.0	18.6	0.162	0.182	
				Edge 2	1	2412	97.58%	0.061	19.0	18.6			

### 10.16. Wi-Fi (U-NII Band)

#### UNII-1 &2A

When the specified maximum output power is the same for both UNII band 1 and UNII band 2A, begin SAR measurement in UNII band 2A; and if the highest reported SAR for UNII band 2A is

- o  $\leq 1.2$  W/kg, SAR is not required for UNII band 1
- o  $> 1.2$  W/kg, both bands should be tested independently for SAR.

RF Exposure Conditions	Mode	Power Back-off	Dist. (mm)	Test Position	Ch #.	Freq. (MHz)	Duty Cycle	Area Scan Max. SAR (W/kg)	Power (dBm)		1-g SAR (W/kg)		Plot No.
									Tune-up Limit	Meas.	Meas.	Scaled	
Head	802.11ac VHT80	ON	0	Left Touch	58	5290	84.02%	0.245	12.0	11.5			46
				Left Tilt	58	5290	84.02%	<b>0.359</b>	12.0	11.5	0.170	<b>0.227</b>	
				Right Touch	58	5290	84.02%	0.195	12.0	11.5			
				Right Tilt	58	5290	84.02%	0.301	12.0	11.5			
Body-worn	802.11n HT40	N/A	15	Rear	54	5270	94.67%	<b>0.696</b>	16.0	15.6	0.325	<b>0.376</b>	47
				Front	54	5270	94.67%	0.072	16.0	15.6			
RF Exposure Conditions	Mode	Power Back-off	Dist. (mm)	Test Position	Ch #.	Freq. (MHz)	Duty Cycle	Area Scan Max. SAR (W/kg)	Power (dBm)		10-g SAR (W/kg)		Plot No.
Extremity	802.11n HT40	N/A	0	Rear	54	5270	94.67%	<b>18.700</b>	16.0	15.6	1.330	<b>1.540</b>	48
				Front	54	5270	94.67%	1.490	16.0	15.6			
				Edge 1	54	5270	94.67%	8.650	16.0	15.6	0.779	0.902	
				Edge 2	54	5270	94.67%	0.258	16.0	15.6			

#### UNII-2C

RF Exposure Conditions	Mode	Power Back-off	Dist. (mm)	Test Position	Ch #.	Freq. (MHz)	Duty Cycle	Area Scan Max. SAR (W/kg)	Power (dBm)		1-g SAR (W/kg)		Plot No.
									Tune-up Limit	Meas.	Meas.	Scaled	
Head	802.11ac VHT80	ON	0	Left Touch	138	5690	84.02%	0.616	12.0	11.9			49
				Left Tilt	138	5690	84.02%	<b>1.110</b>	12.0	11.9	0.411	<b>0.501</b>	
				Right Touch	138	5690	84.02%	0.619	12.0	11.9			
				Right Tilt	138	5690	84.02%	0.845	12.0	11.9	0.352	0.429	
Body-worn	802.11n HT40	N/A	15	Rear	118	5590	94.67%	<b>0.591</b>	16.0	15.8	0.250	<b>0.278</b>	50
				Front	118	5590	94.67%	0.197	16.0	15.8			
RF Exposure Conditions	Mode	Power Back-off	Dist. (mm)	Test Position	Ch #.	Freq. (MHz)	Duty Cycle	Area Scan Max. SAR (W/kg)	Power (dBm)		10-g SAR (W/kg)		Plot No.
Extremity	802.11n HT40	N/A	0	Rear	118	5590	94.67%	<b>15.700</b>	16.0	15.8	1.490	<b>1.656</b>	51
				Front	118	5590	94.67%	1.320	16.0	15.8			
				Edge 1	118	5590	94.67%	8.140	16.0	15.8	0.955	1.061	
				Edge 2	118	5590	94.67%	0.338	16.0	15.8			

#### UNII-3

RF Exposure Conditions	Mode	Power Back-off	Dist. (mm)	Test Position	Ch #.	Freq. (MHz)	Duty Cycle	Area Scan Max. SAR (W/kg)	Power (dBm)		1-g SAR (W/kg)		Plot No.
									Tune-up Limit	Meas.	Meas.	Scaled	
Head	802.11ac VHT80	ON	0	Left Touch	155	5775	84.02%	0.331	12.0	11.5			52
				Left Tilt	155	5775	84.02%	0.499	12.0	11.5			
				Right Touch	155	5775	84.02%	0.424	12.0	11.5			
				Right Tilt	155	5775	84.02%	<b>0.705</b>	12.0	11.5	0.252	<b>0.337</b>	
Body-worn	802.11n HT40	N/A	15	Rear	151	5755	94.67%	<b>0.420</b>	16.0	15.8	0.182	<b>0.201</b>	53
				Front	151	5755	94.67%	0.123	16.0	15.8			
Hotspot	802.11n HT40	N/A	10	Rear	151	5755	94.67%	0.680	16.0	15.8	0.287	0.317	54
				Front	151	5755	94.67%	0.213	16.0	15.8			
				Edge 1	151	5755	94.67%	<b>0.974</b>	16.0	15.8	0.402	<b>0.445</b>	
				Edge 2	151	5755	94.67%	0.025	16.0	15.8			

## 10.17. Bluetooth

RF Exposure Conditions	Mode	Power Back-off	Dist. (mm)	Test Position	Ch #.	Freq. (MHz)	Power (dBm)		1-g SAR (W/kg)		Plot No.
							Tune-up Limit	Meas.	Meas.	Scaled	
Head	GFSK	N/A	0	Left Touch	39	2441	11.0	10.8	0.037	0.038	
				Left Tilt	39	2441	11.0	10.8	0.052	<b>0.054</b>	55
				Right Touch	39	2441	11.0	10.8	0.022	0.023	
				Right Tilt	39	2441	11.0	10.8	0.024	0.025	
Body-w orn	GFSK	N/A	15	Rear	39	2441	11.0	10.8	0.016	<b>0.017</b>	56
				Front	39	2441	11.0	10.8	0.004	0.004	
Hotspot	GFSK	N/A	10	Rear	39	2441	11.0	10.8	0.037	<b>0.038</b>	57
				Front	39	2441	11.0	10.8	0.008	0.008	
				Edge 1	39	2441	11.0	10.8	0.022	0.023	
				Edge 2	39	2441	11.0	10.8	0.004	0.004	

## 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  $\geq 0.8$  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  $\geq 1.45$  or 3.6 W/kg (~ 10% from the 1-g or 10-g respective SAR limit).
- 4) Perform a third repeated measurement only if the original, first, or second repeated measurement is  $\geq 1.5$  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.

### Note(s):

Repeated measurement is not required since the original highest measured SAR is <0.8 W/kg (1-g) or 2 W/kg (10-g) .

## 12. Simultaneous Transmission Conditions

RF Exposure Condition	Item	Capable Transmit Configurations	
Head Body-w orn Hotspot	1	GSM(Voice)	+ DTS
	2	GSM(Voice)	+ U-NII
	3	GSM(Voice)	+ BT
	4	GSM(GPRS/EDGE)	+ DTS
	5	GSM(GPRS/EDGE)	+ U-NII
	6	GSM(GPRS/EDGE)	+ BT
	7	W-CDMA	+ DTS
	8	W-CDMA	+ U-NII
	9	W-CDMA	+ BT
	10	LTE	+ DTS
	11	LTE	+ U-NII
	12	LTE	+ BT

Notes:

1. DTS & UNII (Ch. 149) supports Hotspot.
2. GPRS/EDGE, W-CDMA, and LTE support Hotspot.
3. DTS Radio cannot transmit simultaneously w ith Bluetooth Radio.
4. U-NII Radio cannot transmit simultaneously w ith Bluetooth Radio.

### 12.1. 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)

#### 12.1.1. 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.

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.



### 12.2. Sum of the SAR for WWAN & Wi-Fi & BT

RF Exposure conditions	Standalone SAR (W/kg)				$\Sigma$ 1-g SAR (W/kg)		
	1	2	3	4	1+2	1+3	1+4
	WWAN	Wi-Fi 2.4G	Wi-Fi 5G	BT			
Head	0.729	0.146	0.501	0.054	0.875	1.230	0.783
Body-worn	0.687	0.205	0.376	0.017	0.892	1.063	0.704
Hotspot	0.756	0.416	0.445	0.038	1.172	1.201	0.794

**Conclusion:**

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

### 12.3. Sum of the SAR for Extremity WWAN & Wi-Fi

RF Exposure conditions	Standalone SAR (W/kg)				$\Sigma$ 10-g SAR (W/kg)		
	1	2	3	4	1+2	1+3	1+4
	WWAN	Wi-Fi 2.4G	Wi-Fi 5G	BT			
Extremity	1.932		1.656			3.588	

**Conclusion:**

Simultaneous transmission SAR measurement (Volume Scan) is not required because either the sum of the 10-g SAR is < 4.0 W/kg or the SPLSR is  $\leq 0.10$  for all circumstances that require SPLSR calculation.

## **Appendixes**

**Refer to separated files for the following appendixes.**

**Appendix A: SAR Setup Photos**

**Appendix B: SAR System Check Plots**

**Appendix C: SAR Highest Test Plots**

**Appendix D: SAR Tissue Ingredients**

**Appendix E: SAR Probe Certificates**

**Appendix F: SAR Dipole Certificates**

**END OF REPORT**