



**SAR EVALUATION REPORT**

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

*For*  
**GSM/WCDMA/LTE Phone with BT, DTS/UNII a/b/g/n/ac & NFC**

**FCC ID: PY7-24117Q**

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NVLAP LAB CODE 200065-0

**Revision History**

Rev.	Date	Revisions	Revised By
V1	4/30/2018	Initial Issue	--
V2	5/11/2018	Sec 12: Updated Simultaneous transmission condition table	Kenneth Mak

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# 1. Attestation of Test Results

Applicant Name	SONY MOBILE COMMUNICATIONS INC.			
FCC ID	PY7-24117Q			
Applicable Standards	FCC 47 CFR § 2.1093 Published RF exposure KDB procedures IEEE Std 1528-2013			
Exposure Category	SAR Limits (W/Kg)			
	Peak spatial-average (1g of tissue)		Product specific (10g of tissue)	
General population / Uncontrolled exposure	1.6		4	
RF Exposure Conditions	Equipment Class - Highest Reported SAR (W/kg)			
	PCE	DTS	NII	DSS
Head	0.186	0.363	0.114	0.363
Body-worn	0.391	0.031	0.035	0.018
Hotspot/Wi-Fi Direct	0.546	0.061	N/A	0.054
Product specific 10g SAR	N/A	N/A	0.155	N/A
Simultaneous TX	0.688	0.607	0.688	0.688
Date Tested	3/22/2018 to 4/28/2018			
Test Results	Pass			

UL Verification Services Inc. tested the above equipment in accordance with the requirements set forth in the above standards. All indications of Pass/Fail in this report are opinions expressed by UL Verification Services Inc. based on interpretations and/or observations of test results. Measurement Uncertainties were not taken into account and are published for informational purposes only. The test results show that the equipment tested is capable of demonstrating compliance with the requirements as documented in this report.

**Note:** The results documented in this report apply only to the tested sample, under the conditions and modes of operation as described herein. This document may not be altered or revised in any way unless done so by UL 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 any government (NIST Handbook 150, Annex A). This report is written to support regulatory compliance of the applicable standards stated above.

Approved & Released By: 	Prepared By: 
Devin Chang Senior Test Engineer UL Verification Services Inc.	Kenneth C. Mak Test 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
- 865664 D01 SAR measurement 100 MHz to 6 GHz v01r04
- 865664 D02 RF Exposure Reporting v01r02
- 941225 D01 3G SAR Procedures v03r01
- 941225 D05 SAR for LTE Devices v02r05
- 941225 D05A LTE Rel.10 KDB Inquiry Sheet v01r02
- 941225 D06 Hotspot Mode v02r01

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

- [TCB workshop](#) October, 2014; Page 36, RF Exposure Procedures Update (Overlapping LTE Bands)
- [TCB workshop](#) October, 2014; Page 37, RF Exposure Procedures Update (Other LTE Considerations)
- [TCB workshop](#) October, 2015; Page 6, RF Exposure Procedures (KDB 941225 D05A)
- [TCB workshop](#) April, 2016; Page 13, RF Exposure Procedures (LTE Carrier Aggregation for DL)
- [TCB workshop](#) October, 2016; Page 7, RF Exposure Procedures (Bluetooth Duty Factor)

## 3. Facilities and Accreditation

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

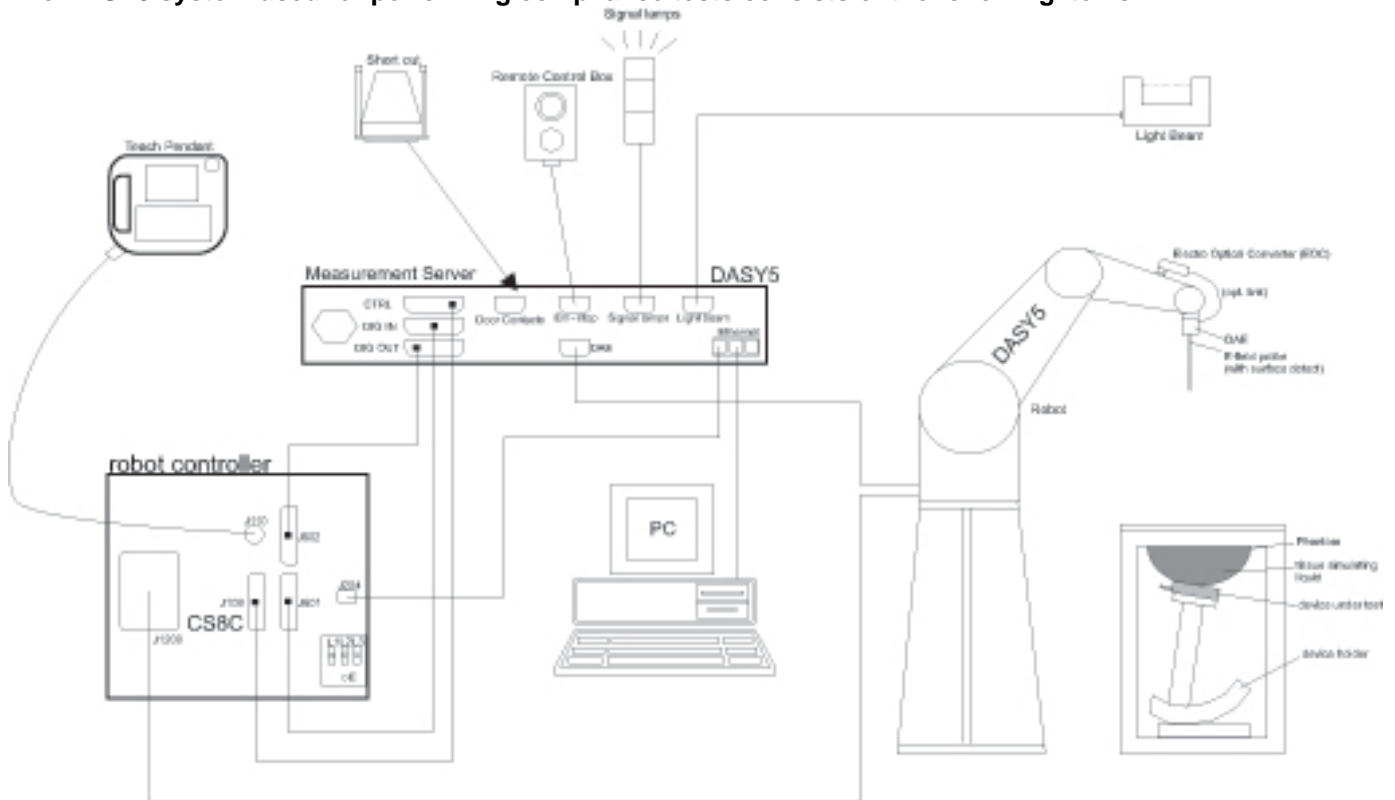
47173 Benicia Street	47266 Benicia Street
SAR Lab A	SAR Lab 1
SAR Lab B	SAR Lab 2
SAR Lab C	SAR Lab 3
SAR Lab D	SAR Lab 4
SAR Lab E	
SAR Lab F	
SAR Lab G	
SAR Lab H	

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

		$\leq 3$ 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.

**Step 5: Z-Scan (FCC only)**

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

### 4.3. Test Equipment

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

#### Dielectric Property Measurements

Name of Equipment	Manufacturer	Type/Model	Serial No.	Cal. Due Date
Network Analyzer	Agilent	8753ES	MY40001647	9/15/2018
Dielectric Probe kit	SPEAG	DAK-3.5	1087	11/14/2018
Shorting block	SPEAG	DAK-3.5 Short	SM DAK 200 BA	11/14/2018
Thermometer	Traceable Calibration Control Co.	4242	150378159	5/26/2018

#### System Check

Name of Equipment	Manufacturer	Type/Model	Serial No.	Cal. Due Date
Synthesized Signal Generator	Agilent	N5181A	MY50140610	5/31/2018
Power Meter	Keysight	N1912A	MY55196008	5/12/2018
Power Sensor	Agilent	N1921A	MY53260001	10/27/2018
Power Sensor	Agilent	N1921A	MY53020038	4/13/2018 *
DC Power Supply	HP	6296A	2841A-05955	N/A
Amplifier	MITEQ	AMF-4D-00400600-50-30P	1795093	N/A
Directional coupler	Werlatone	C8060-102	2149	N/A
Synthesized Signal Generator	Agilent	N5181A	MY50140630	5/16/2018
Power Meter	HP	437B	3125U12345	8/10/2018
Power Meter	HP	437B	3125U11347	8/15/2018
Power Sensor	HP	8481A	3318A92374	8/15/2018
Power Sensor	HP	8481A	1926A27048	8/10/2018
Amplifier	MITEQ	AMF-4D-00400600-50-30P	1795092	N/A
Directional coupler	Werlatone	C8060-102	2141	N/A
DC Power Supply	BK Precision	1611	215-02292	N/A

#### Note(s):

\*Equipment not used past calibration due date.

**Lab Equipment**

Name of Equipment	Manufacturer	Type/Model	Serial No.	Cal. Due Date
E-Field Probe (SAR Lab A)	SPEAG	EX3DV4	7463	7/5/2018
E-Field Probe (SAR Lab B)	SPEAG	EX3DV4	3772	2/13/2019
E-Field Probe (SAR Lab F)	SPEAG	EX3DV4	3929	3/16/2019
E-Field Probe (SAR Lab G)	SPEAG	EX3DV4	3871	8/23/2018
E-Field Probe (SAR Lab H)	SPEAG	EX3DV4	7483	12/12/2018
Data Acquisition Electronics (SAR Lab A)	SPEAG	DAE4	1434	4/19/2018 *
Data Acquisition Electronics (SAR Lab B)	SPEAG	DAE4	1380	7/24/2018
Data Acquisition Electronics (SAR Lab F)	SPEAG	DAE4	1377	10/11/2018
Data Acquisition Electronics (SAR Lab G)	SPEAG	DAE4	1359	2/9/2019
Data Acquisition Electronics (SAR Lab H)	SPEAG	DAE4	1257	10/11/2018
System Validation Dipole	SPEAG	D750V3	1024	5/12/2018
System Validation Dipole	SPEAG	D835V2	4d002	11/21/2018
System Validation Dipole	SPEAG	D1750V2	1077	10/5/2018
System Validation Dipole	SPEAG	D1900V2	5d140	4/19/2018 *
System Validation Dipole	SPEAG	D2450V2	748	2/14/2019
System Validation Dipole	SPEAG	D2600V2	1006	10/5/2018
System Validation Dipole	SPEAG	D5GHzV2	1138	10/26/2018
System Validation Dipole	SPEAG	D5GHzV2	1003	3/13/2019

**Note(s):**

\*Equipment not used past calibration due date.

**Other**

Name of Equipment	Manufacturer	Type/Model	T Number	Serial No.	Cal. Due Date
Power Meter	Agilent	N1912A	T733	MY50001018	10/17/2018
Power Sensor	Agilent	N1921A	T309	MY52270022	12/28/2018
DC Power Supply	HP	6296A	N/A	2841A-05955	N/A
Base station Simulator	R&S	CMW500	T978	137877	2/19/2019
Base station Simulator	R&S	CMW500	T960	135384	2/20/2019
Base station Simulator	R&S	CMW500	T948	135393	2/17/2019
Base station Simulator	R&S	CMW500	T958	134855	2/15/2019
Base station Simulator	R&S	CMW500	T259	124594	2/21/2019
Base station Simulator	R&S	CMW500	T1526	147543	2/17/2019
Base station Simulator	R&S	CMW500	T964	134853	2/16/2019
Base station Simulator	R&S	CMW500	T268	124593	2/22/2019
Base station Simulator	R&S	CMW500	T953	135390	2/16/2019
Base station Simulator	R&S	CMW500	T959	137873	2/17/2019
Base station Simulator	R&S	CMW500	T919	125236	2/21/2019
Base station Simulator	Agilent	E5515C	T213	GB47050526	3/22/2019

## 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	Please refer to Appendix A		
Back Cover	<input checked="" type="checkbox"/> The Back Cover is not removable.		
Battery Options	<input checked="" type="checkbox"/> The rechargeable battery is not user accessible.		
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 type="checkbox"/> Mobile Hotspot (Wi-Fi 5 GHz)		
Wi-Fi Direct	Wi-Fi Direct enabled devices transfer data directly between each other <input checked="" type="checkbox"/> Wi-Fi Direct (Wi-Fi 2.4 GHz) <input type="checkbox"/> Wi-Fi Direct (Wi-Fi 5 GHz)		
Test sample information	<b>S/N</b>	<b>Technology</b>	<b>Notes</b>
	BH90006MB2	SAR GSM/UMTS	Conducted
	BH90004AB2	SAR LTE (LB/MB)	Conducted
	BH90005NB2	SAR LTE HB	Conducted
	BH90006PB2	WLAN – 2.4GHz	Conducted
	BH900043B2	WLAN – 5GHz	Conducted
	BH90004QB2	SAR LB GSM/UMTS #1	Radiated
	BH90004DB2	SAR LB GSM/UMTS #2	Radiated
	BH90006DB2	SAR MB GSM/UMTS #1	Radiated
	BH900025B2	SAR MB GSM/UMTS #2	Radiated
	BH90004LB2	SAR LTE LB #1	Radiated
	BH900044B2	SAR LTE LB #2	Radiated
	BH900024B2	SAR LTE MB #1	Radiated
	BH90004KB2	SAR LTE MB #2	Radiated
	BH90004NB2	SAR LTE HB #1	Radiated
	BH90001DB2	SAR LTE HB #2	Radiated
	BH90001WB2	SAR WLAN 2.4GHz # 1	Radiated
	BH90001XB2	SAR WLAN 2.4GHz # 2	Radiated
	BH900012B2	SAR WLAN 5GHz # 1	Radiated
BH900043B2	SAR WLAN 5GHz # 2	Radiated	
BH90003XB2	SAR WLAN 5GHz # 3	Radiated	
Hardware Version	A		
Software Version	0.202		

## 6.2. Wireless Technologies

Wireless technologies	Frequency bands	Operating mode		Duty Cycle used for SAR testing
GSM	850 1900	Voice (GMSK) GPRS (GMSK) EGPRS (8PSK)	Multi-Slot Class: <input type="checkbox"/> Class 8 - 1 Up, 4 Down <input type="checkbox"/> Class 10 - 2 Up, 4 Down <input type="checkbox"/> Class 12 - 4 Up, 4 Down <input checked="" type="checkbox"/> Class 33 - 4 Up, 5 Down	GSM Voice: 12.5% (E)GPRS: 1 Slot: 12.5% 2 Slots: 25% 3 Slots: 37.5% 4 Slots: 50%
W-CDMA (UMTS)	Band II Band IV Band V	UMTS Rel. 99 (Voice & Data) HSDPA (Rel. 5) HSUPA (Rel. 6) HSPA+ (Rel. 9)		100%
LTE	FDD Band 2 FDD Band 5 FDD Band 7 FDD Band 12 FDD Band 13 FDD Band 17 FDD Band 26 FDD Band 66 TDD Band 41	QPSK 16QAM 64AQM Rel. 12 Carrier Aggregation (1 Uplink and 2 Downlinks)		100% (FDD) 63.3% (TDD) <sup>2</sup> Refer to §6.4.
Wi-Fi	2.4 GHz	802.11b		99.03% <sup>(802.11b)<sup>1</sup></sup>
		802.11g		98.31% <sup>(802.11g)<sup>1</sup></sup>
	802.11n (HT20)		97.10% <sup>(802.11n)<sup>1</sup></sup>	
	5 GHz	802.11a		98.1% <sup>(802.11a)<sup>1</sup></sup>
802.11n (HT20)		96.9% <sup>(802.11n HT20)<sup>1</sup></sup>		
802.11n (HT40)		89.5% <sup>(802.11n HT40)<sup>1</sup></sup>		
802.11ac (VHT20)		84.5% <sup>(802.11ac VHT80)<sup>1</sup></sup>		
802.11ac (VHT40)				
802.11ac (VHT80)				
Does this device support bands 5.60 ~ 5.65 GHz? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No				
Does this device support Band gap channel(s)? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No				
Bluetooth	2.4 GHz	Version 5.0 LE		76.93%(DH5)

**Notes:**

1. Duty cycle for Wi-Fi is referenced from the DTS and UNII report.
2. This device supports uplink-downlink configuration 0-6. The configuration with the highest duty cycle was used (Subframe Number 0 at 63.3%).

### 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					
		Channel Bandwidth					
		20 MHz	15 MHz	10 MHz	5 MHz	3 MHz	1.4 MHz
	Low	18700/ 1860	18675/ 1857.5	18650/ 1855	18625/ 1852.5	18615/ 1851.5	18607/ 1850.7
	Mid	18900/ 1880	18900/ 1880	18900/ 1880	18900/ 1880	18900/ 1880	18900/ 1880
	High	19100/ 1900	19125/ 1902.5	19150/ 1905	19175/ 1907.5	19185/ 1908.5	19193/ 1909.3
	Band 4	Frequency range: 1710 - 1755 MHz					
		Channel Bandwidth					
		20 MHz	15 MHz	10 MHz	5 MHz	3 MHz	1.4 MHz
	Low	20050/ 1720	20025/ 1717.5	20000/ 1715	19975/ 1712.5	19965/ 1711.5	19957/ 1710.7
	Mid	20175/ 1732.5	20175/ 1732.5	20175/ 1732.5	20175/ 1732.5	20175/ 1732.5	20175/ 1732.5
	High	20300/ 1745	20325/ 1747.5	20350/ 1750	20375/ 1752.5	20385/ 1753.5	20393/ 1754.3
	Band 5	Frequency range: 824 - 849 MHz					
		Channel Bandwidth					
		20 MHz	15 MHz	10 MHz	5 MHz	3 MHz	1.4 MHz
	Low			20450/ 829	20425/ 826.5	20415/ 825.5	20407/ 824.7
	Mid			20525/ 836.5	20525/ 836.5	20525/ 836.5	20525/ 836.5
	High			20600/ 844	20625/ 846.5	20635/ 847.5	20643/ 848.3
	Band 7	Frequency range: 2500 - 2570 MHz					
		Channel Bandwidth					
		20 MHz	15 MHz	10 MHz	5 MHz	3 MHz	1.4 MHz
	Low	20850 2510	20825 2507.5	20800 2505	20775 2502.5		
	Mid	21100 2535	21100 2535	21100 2535	21100 2535		
	High	21350 2560	21375 2562.5	21400 2565	21425 2567.5		
	Band 12	Frequency range: 699 – 716 MHz					
		Channel Bandwidth					
		20 MHz	15 MHz	10 MHz	5 MHz	3 MHz	1.4 MHz
	Low			23060/ 704	23035/ 701.5	23025/ 700.5	23017/ 699.7
Mid			23095/ 707.5	23095/ 707.5	23095/ 707.5	23095/ 707.5	
High			23130/ 711	23155/ 713.5	23165/ 714.5	23173/ 715.3	
Band 13	Frequency range: 777 - 787 MHz						
	Channel Bandwidth						
	20 MHz	15 MHz	10 MHz	5 MHz	3 MHz	1.4 MHz	
Low				23205/ 779.5			
Mid			23230/ 782	23230/ 782			
High				23255/ 784.5			

**General LTE SAR Test and Reporting Considerations (Continued)**

Frequency range, Channel Bandwidth, Numbers and Frequencies	Band 17	Frequency range: 704 - 716 MHz																																																																		
		Channel Bandwidth																																																																		
		20 MHz	15 MHz	10 MHz	5 MHz	3 MHz	1.4 MHz																																																													
	Low			23780/ 709	23755/ 706.5																																																															
	Mid			23790/ 710	23790/ 710																																																															
	High			23800/ 711	23825/ 713.5																																																															
	Band 26	Frequency range: 814 - 849 MHz																																																																		
		Channel Bandwidth																																																																		
		20 MHz	15 MHz	10 MHz	5 MHz	3 MHz	1.4 MHz																																																													
	Low		26765/ 821.5	26740/ 819	26715/ 816.5	26705/ 815.5	26697/ 814.7																																																													
	Mid		26865/ 831.5	26865/ 831.5	26865/ 831.5	26865/ 831.5	26865/ 831.5																																																													
	High		26965/ 841.5	26990/ 844	27015/ 846.5	27025/ 847.5	27033/ 848.3																																																													
	Band 41	Frequency range: 2496 - 2690 MHz																																																																		
		Channel Bandwidth																																																																		
		20 MHz	15 MHz	10 MHz	5 MHz	3 MHz	1.4 MHz																																																													
	Low	39750 / 2506.0																																																																		
	Low-Mid	40185 / 2549.5																																																																		
	Mid	40620 / 2593.0																																																																		
	Mid-High	41055 / 2636.5																																																																		
	High	41490 / 2680.0																																																																		
Band 66	Frequency range: 1710 - 1780 MHz																																																																			
	Channel Bandwidth																																																																			
	20 MHz	15 MHz	10 MHz	5 MHz	3 MHz	1.4 MHz																																																														
Low	132072/ 1720	132047/ 1717.5	132022/ 1715	131997/ 1712.5	131987/ 1711.5	131979/ 1710.7																																																														
Mid	132322/ 1745	132322/ 1745	132322/ 1745	132322/ 1745	132322/ 1745	132322/ 1745																																																														
High	132572/ 1770	132597/ 1772.5	132622/ 1775	132647/ 1777.5	132657/ 1778.5	132665/ 1779.3																																																														
LTE transmitter and antenna implementation	Refer to Appendix A.																																																																			
Maximum power reduction (MPR)	<p><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	No																																																																			
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:**

- 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	$6592 \cdot T_s$	$2192 \cdot T_s$	$2560 \cdot T_s$	$7680 \cdot T_s$	$2192 \cdot T_s$	$2560 \cdot T_s$
1	$19760 \cdot T_s$			$20480 \cdot T_s$		
2	$21952 \cdot T_s$			$23040 \cdot T_s$		
3	$24144 \cdot T_s$			$25600 \cdot T_s$		
4	$26336 \cdot T_s$			$7680 \cdot T_s$		
5	$6592 \cdot T_s$	$4384 \cdot T_s$	$5120 \cdot T_s$	$20480 \cdot T_s$	$4384 \cdot T_s$	$5120 \cdot T_s$
6	$19760 \cdot T_s$			$23040 \cdot T_s$		
7	$21952 \cdot T_s$			$12800 \cdot T_s$		
8	$24144 \cdot T_s$			-		
9	$13168 \cdot T_s$			-		

### Calculated Duty Cycle

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

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

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

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

where

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

### Note(s):

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

## 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
WWAN Main Ant. 1 & 2	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
			Edge 2 (Right)	< 25 mm	Yes
			Edge 3 (Bottom)	< 25 mm	Yes
			Edge 4 (Left)	< 25 mm	Yes
WLAN/BT (Chain 0)	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 / Wi-Fi Direct (2.4 GHz only)	10 mm	Rear	< 25 mm	Yes
			Front	< 25 mm	Yes
			Edge 1 (Top)	< 25 mm	Yes
			Edge 2 (Right)	> 25 mm	No
	Product specific (5 GHz bands only)	0 mm	Edge 3 (Bottom)	> 25 mm	No
			Edge 4 (Left)	< 25 mm	Yes
			Rear	< 25 mm	Yes
			Front	< 25 mm	Yes
			Edge 1 (Top)	< 25 mm	Yes
			Edge 2 (Right)	> 25 mm	No
Edge 3 (Bottom)			> 25 mm	No	
Edge 4 (Left)			< 25 mm	Yes	
WLAN (Chain 1)	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 / Wi-Fi Direct (2.4 GHz only)	10 mm	Rear	< 25 mm	Yes
			Front	< 25 mm	Yes
			Edge 1 (Top)	> 25 mm	No
			Edge 2 (Right)	< 25 mm	Yes
	Product specific (5 GHz bands only)	0 mm	Edge 3 (Bottom)	> 25 mm	No
			Edge 4 (Left)	> 25 mm	No
			Rear	< 25 mm	Yes
			Front	< 25 mm	Yes
			Edge 1 (Top)	> 25 mm	No
			Edge 2 (Right)	< 25 mm	Yes
Edge 3 (Bottom)			> 25 mm	No	
Edge 4 (Left)			> 25 mm	No	

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

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

#### IEEE Std 1528-2013

Refer to Table 3 within the IEEE Std 1528-2013

**Dielectric Property Measurements Results:**

SAR Lab	Date	Band (MHz)	Tissue Type	Frequency (MHz)	Relative Permittivity ( $\epsilon_r$ )			Conductivity ( $\sigma$ )		
					Measured	Target	Delta (%)	Measured	Target	Delta (%)
A	3/22/2018	1900	Head	1900	39.86	40.00	-0.35	1.40	1.40	0.07
				1850	40.05	40.00	0.12	1.35	1.40	-3.57
				1920	39.79	40.00	-0.53	1.42	1.40	1.57
A	3/22/2018	1900	Body	1900	52.25	53.30	-1.97	1.54	1.52	1.51
				1850	52.45	53.30	-1.59	1.49	1.52	-2.17
				1920	52.12	53.30	-2.21	1.58	1.52	3.62
A	3/26/2018	1900	Head	1900	40.61	40.00	1.53	1.44	1.40	2.79
				1850	40.81	40.00	2.03	1.40	1.40	-0.21
				1920	40.49	40.00	1.23	1.46	1.40	4.14
A	3/26/2018	1900	Body	1900	52.70	53.30	-1.13	1.54	1.52	1.58
				1850	52.86	53.30	-0.83	1.50	1.52	-1.58
				1920	52.69	53.30	-1.14	1.56	1.52	2.89
B	3/22/2018	2600	Head	2600	38.90	39.01	-0.28	2.14	1.96	9.06
				2495	39.38	39.14	0.60	2.03	1.85	9.81
				2690	38.46	38.90	-1.12	2.24	2.06	8.81
B	3/22/2018	2600	Body	2600	50.22	52.51	-4.36	2.32	2.16	7.37
				2495	50.56	52.64	-3.96	2.20	2.01	9.43
				2690	49.93	52.40	-4.71	2.42	2.29	5.71
B	3/23/2018	2600	Head	2600	40.21	39.01	3.07	2.13	1.96	8.76
				2495	40.75	39.14	4.10	2.01	1.85	8.73
				2690	39.68	38.90	2.01	2.22	2.06	7.80
B	3/23/2018	2600	Body	2600	50.59	52.51	-3.66	2.29	2.16	6.12
				2495	51.04	52.64	-3.05	2.19	2.01	8.53
				2690	50.28	52.40	-4.04	2.39	2.29	4.40
B	3/26/2018	2600	Body	2600	51.40	52.51	-2.12	2.15	2.16	-0.59
				2495	51.67	52.64	-1.85	2.01	2.01	-0.31
				2690	50.84	52.40	-2.97	2.25	2.29	-1.54
F	4/12/2018	2450	Body	2450	50.41	52.70	-4.35	2.03	1.95	3.90
				2400	50.63	52.77	-4.06	1.95	1.90	2.74
				2480	50.35	52.66	-4.39	2.06	1.99	3.41
F	4/16/2018	2450	Body	2450	39.08	39.20	-0.31	1.82	1.80	0.83
				2400	39.22	39.30	-0.20	1.76	1.75	0.59
				2480	38.99	39.16	-0.44	1.85	1.83	1.18

SAR Lab	Date	Band (MHz)	Tissue Type	Frequency (MHz)	Relative Permittivity ( $\epsilon_r$ )			Conductivity ( $\sigma$ )		
					Measured	Target	Delta (%)	Measured	Target	Delta (%)
G	3/22/2018	835	Head	835	43.13	41.50	3.93	0.93	0.90	3.43
				805	43.13	41.68	3.48	0.92	0.90	2.11
				905	42.96	41.50	3.52	0.95	0.97	-1.92
G	3/22/2018	835	Body	835	55.23	55.20	0.05	1.01	0.97	3.71
				805	55.25	55.33	-0.15	0.98	0.97	1.78
				905	55.00	55.00	0.00	1.02	1.05	-2.90
G	3/26/2018	835	Head	835	41.88	41.50	0.92	0.90	0.90	-0.23
				805	41.96	41.68	0.67	0.89	0.90	-1.08
				905	41.79	41.50	0.70	0.93	0.97	-4.21
G	3/26/2018	835	Body	835	56.33	55.20	2.05	0.97	0.97	0.46
				805	56.36	55.33	1.85	0.96	0.97	-0.82
				905	56.36	55.00	2.47	1.01	1.05	-3.85
G	3/27/2018	750	Head	750	44.77	41.96	6.69	0.85	0.89	-4.89
				695	44.74	42.24	5.91	0.82	0.89	-7.99
				790	44.77	41.76	7.22	0.86	0.90	-3.50
G	3/27/2018	750	Body	750	55.49	55.55	-0.10	0.95	0.96	-1.76
				695	55.55	55.76	-0.37	0.91	0.96	-4.89
				790	55.57	55.39	0.32	0.96	0.97	-0.97
G	3/28/2018	1750	Head	1750	41.84	40.08	4.38	1.43	1.37	4.31
				1710	41.79	40.15	4.09	1.41	1.35	4.80
				1800	41.68	40.00	4.20	1.45	1.40	3.64
G	3/28/2018	1750	Body	1750	53.51	53.44	0.13	1.56	1.49	4.70
				1710	53.35	53.54	-0.36	1.53	1.46	4.48
				1755	53.50	53.43	0.13	1.55	1.49	4.28
G	4/26/2018	5200	Body	5200	50.29	49.02	2.59	5.30	5.29	0.10
				5150	50.15	49.09	2.16	5.29	5.24	1.04
				5350	49.81	48.82	2.04	5.55	5.47	1.40
G	4/26/2018	5600	Body	5600	49.36	48.48	1.82	5.89	5.76	2.20
				5500	49.60	48.61	2.03	5.78	5.64	2.42
				5725	49.24	48.31	1.93	6.09	5.91	3.12
G	4/26/2018	5800	Body	5800	48.98	48.20	1.62	6.23	6.00	3.90
				5700	49.30	48.34	1.98	6.09	5.88	3.66
				5850	48.97	48.20	1.60	6.30	6.00	4.92

SAR Lab	Date	Band (MHz)	Tissue Type	Frequency (MHz)	Relative Permittivity ( $\epsilon_r$ )			Conductivity ( $\sigma$ )		
					Measured	Target	Delta (%)	Measured	Target	Delta (%)
H	4/16/2018	5250	Body	5250	47.75	48.95	-2.46	5.40	5.35	0.90
				5200	47.87	49.02	-2.35	5.38	5.29	1.57
				5350	47.58	48.82	-2.53	5.53	5.47	1.01
H	4/16/2018	5600	Body	5600	47.11	48.48	-2.82	5.90	5.76	2.34
				5500	47.32	48.61	-2.66	5.70	5.64	0.91
				5725	46.77	48.31	-3.18	6.06	5.91	2.59
H	4/16/2018	5750	Body	5750	46.72	48.27	-3.22	6.08	5.94	2.44
				5700	46.86	48.34	-3.07	6.03	5.88	2.56
				5850	46.61	48.20	-3.30	6.27	6.00	4.43
H	4/17/2018	5200	Head	5200	34.48	35.99	-4.20	4.79	4.65	2.92
				5150	34.77	36.05	-3.54	4.59	4.60	-0.26
				5350	34.48	35.82	-3.74	4.79	4.80	-0.36
H	4/17/2018	5600	Head	5600	34.10	35.53	-4.04	5.05	5.06	-0.26
				5500	34.29	35.65	-3.81	4.94	4.96	-0.46
				5725	34.06	35.39	-3.76	5.17	5.19	-0.27
H	4/17/2018	5800	Head	5800	33.83	35.30	-4.16	5.25	5.27	-0.46
				5700	33.99	35.42	-4.04	5.13	5.16	-0.71
				5850	33.78	35.30	-4.31	5.29	5.27	0.44
H	4/25/2018	5200	Head	5250	36.32	35.93	1.08	4.56	4.70	-3.11
				5150	36.22	36.05	0.48	4.46	4.60	-3.13
				5350	36.09	35.82	0.76	4.70	4.80	-2.19
H	4/25/2018	5600	Head	5600	35.66	35.53	0.35	4.90	5.06	-3.27
				5500	35.94	35.65	0.82	4.82	4.96	-2.76
				5725	35.55	35.39	0.45	5.03	5.19	-3.11
H	4/25/2018	5800	Head	5800	35.57	35.30	0.76	5.06	5.27	-4.08
				5700	35.51	35.42	0.25	4.98	5.16	-3.54
				5850	35.35	35.30	0.14	5.11	5.27	-2.98

## 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 10% of the manufacturer calibrated dipole SAR target.

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 ±10 %	Zoom Scan to 100 mW	Normalize to 1 W	Target (Ref. Value)	Delta ±10 %	
A	3/22/2018	Head	D1900V2 SN:5d140	4/19/2018	4.090	40.90	40.80	0.25	2.090	20.90	21.16	-1.23	
A	3/22/2018	Body	D1900V2 SN:5d140	4/19/2018	4.170	41.70	41.20	1.21	2.140	21.40	21.52	-0.56	1,2
A	3/26/2018	Head	D1900V2 SN:5d140	4/19/2018	4.110	41.10	40.80	0.74	2.110	21.10	21.16	-0.28	
A	3/26/2018	Body	D1900V2 SN:5d140	4/19/2018	4.150	41.50	41.20	0.73	2.120	21.20	21.52	-1.49	
B	3/22/2018	Head	D2600V2 SN:1006	10/5/2018	6.080	60.80	55.73	9.10	2.640	26.40	25.08	5.26	3,4
B	3/22/2018	Body	D2600V2 SN:1006	10/5/2018	5.880	58.80	56.13	4.76	2.560	25.60	25.00	2.40	
B	3/26/2018	Body	D2600V2 SN:1006	10/5/2018	5.610	56.10	56.13	-0.05	2.440	24.40	25.00	-2.40	
F	4/12/2018	Body	D2450V2 SN:748	2/14/2019	5.300	53.00	50.95	4.02	2.390	23.90	23.80	0.42	5,6
F	4/16/2018	Head	D2450V2 SN:748	2/14/2019	5.300	53.00	52.94	0.11	2.380	23.80	24.60	-3.25	
G	3/22/2018	Head	D835V2 SN:4d002	11/21/2018	0.973	9.73	10.27	-5.26	0.643	6.43	6.76	-4.88	
G	3/22/2018	Body	D835V2 SN:4d002	11/21/2018	0.979	9.79	10.23	-4.30	0.655	6.55	6.80	-3.68	
G	3/26/2018	Head	D835V2 SN:4d002	11/21/2018	0.934	9.34	10.27	-9.06	0.621	6.21	6.76	-8.14	7,8
G	3/26/2018	Body	D835V2 SN:4d002	11/21/2018	0.958	9.58	10.23	-6.35	0.641	6.41	6.80	-5.74	
G	3/27/2018	Head	D750V3 SN:1024	5/12/2018	0.802	8.02	8.47	-5.31	0.536	5.36	5.53	-3.07	9,10
G	3/27/2018	Body	D750V3 SN:1024	5/12/2018	0.852	8.52	8.59	-0.81	0.573	5.73	5.65	1.42	
G	3/28/2018	Body	D1750V2 SN:1077	10/5/2018	3.740	37.40	37.34	0.16	2.000	20.00	19.98	0.10	
G	3/28/2018	Head	D1750V2 SN:1077	10/5/2018	3.670	36.70	36.26	1.21	1.960	19.60	19.34	1.34	11,12
G	4/26/2018	Body	D5GHzV2 SN:1138 (5.2 GHz)	10/26/2018	7.670	76.70	73.40	4.50	2.180	21.80	20.60	5.83	
G	4/26/2018	Body	D5GHzV2 SN:1138 (5.6 GHz)	10/26/2018	7.420	74.20	79.50	-6.67	2.060	20.60	22.30	-7.62	13,14
G	4/26/2018	Body	D5GHzV2 SN:1138 (5.8 GHz)	10/26/2018	8.040	80.40	76.80	4.69	2.250	22.50	21.30	5.63	
H	4/16/2018	Body	D5GHzV2 SN:1003 (5.25 GHz)	3/13/2019	7.280	72.80	73.60	-1.09	2.060	20.60	20.50	0.49	
H	4/16/2018	Body	D5GHzV2 SN:1003 (5.60 GHz)	3/13/2019	8.210	82.10	77.70	5.66	2.300	23.00	21.70	5.99	15,16
H	4/16/2018	Body	D5GHzV2 SN:1003 (5.75 GHz)	3/13/2019	7.140	71.40	73.90	-3.38	2.000	20.00	20.60	-2.91	
H	4/17/2018	Head	D5GHzV2 SN:1138 (5.2 GHz)	10/26/2018	7.310	73.10	77.70	-5.92	2.090	20.90	22.20	-5.86	
H	4/17/2018	Head	D5GHzV2 SN:1138 (5.6 GHz)	10/26/2018	7.850	78.50	83.20	-5.65	2.200	22.00	23.70	-7.17	
H	4/17/2018	Head	D5GHzV2 SN:1138 (5.8 GHz)	10/26/2018	7.390	73.90	79.70	-7.28	2.100	21.00	22.70	-7.49	
H	4/25/2018	Head	D5GHzV2 SN:1138 (5.2 GHz)	10/26/2018	7.230	72.30	77.70	-6.95	2.080	20.80	22.20	-6.31	
H	4/25/2018	Head	D5GHzV2 SN:1138 (5.6 GHz)	10/26/2018	7.940	79.40	83.20	-4.57	2.230	22.30	23.70	-5.91	
H	4/25/2018	Head	D5GHzV2 SN:1138 (5.8 GHz)	10/26/2018	7.360	73.60	79.70	-7.65	2.090	20.90	22.70	-7.93	17,18



## 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.

#### GSM850 Measured Results

Mode	Coding Scheme	Time Slots	Ch No.	Freq. (MHz)	Maximum Average Power (dBm)			
					Measured		Tune-up Limit	
					Burst Pwr	Frame Pwr	Burst Pwr	Frame Pwr
GSM/GPRS	CS1	1	128	824.2	32.99	23.96	33.20	24.17
			190	836.6	32.96	23.93		
			251	848.8	32.88	23.85		
GPRS/EDGE (GMSK)	CS1	2	128	824.2	31.07	25.05	31.20	25.18
			190	836.6	31.02	25.00		
			251	848.8	30.89	24.87		
		3	128	824.2	28.84	24.58	29.20	24.94
			190	836.6	28.85	24.59		
			251	848.8	28.91	24.65		
		4	128	824.2	27.82	24.81	28.20	25.19
			190	836.6	27.90	24.89		
			251	848.8	27.77	24.76		
EDGE (8PSK)	MCS5	1	128	824.2	27.40	18.37	28.00	18.97
			190	836.6	27.24	18.21		
			251	848.8	27.01	17.98		
		2	128	824.2	25.68	19.66	26.50	20.48
			190	836.6	25.55	19.53		
			251	848.8	25.43	19.41		
		3	128	824.2	23.77	19.51	24.50	20.24
			190	836.6	23.70	19.44		
			251	848.8	23.54	19.28		
		4	128	824.2	23.04	20.03	23.50	20.49
			190	836.6	22.78	19.77		
			251	848.8	22.70	19.69		

#### Notes:

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

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

**GSM1900 Measured Results**

Mode	Coding Scheme	Time Slots	Ch No.	Freq. (MHz)	Maximum Average Power (dBm)			
					Measured		Tune-up Limit	
					Burst Pwr	Frame Pwr	Burst Pwr	Frame Pwr
GSM/GPRS	CS1	1	512	1850.2	29.04	20.01	29.70	20.67
			661	1880.0	29.24	20.21		
			810	1909.8	29.34	20.31		
GPRS/EDGE (GMSK)	CS1	2	512	1850.2	26.90	20.88	27.70	21.68
			661	1880.0	27.19	21.17		
			810	1909.8	27.38	21.36		
		3	512	1850.2	24.80	20.54	25.70	21.44
			661	1880.0	25.07	20.81		
			810	1909.8	25.23	20.97		
		4	512	1850.2	23.93	20.92	24.70	21.69
			661	1880.0	24.19	21.18		
			810	1909.8	24.33	21.32		
EDGE (8PSK)	MCS5	1	512	1850.2	25.64	16.61	27.00	17.97
			661	1880.0	25.77	16.74		
			810	1909.8	25.90	16.87		
		2	512	1850.2	24.39	18.37	25.50	19.48
			661	1880.0	24.59	18.57		
			810	1909.8	24.64	18.62		
		3	512	1850.2	22.24	17.98	23.50	19.24
			661	1880.0	22.40	18.14		
			810	1909.8	22.47	18.21		
		4	512	1850.2	21.41	18.40	22.50	19.49
			661	1880.0	21.48	18.47		
			810	1909.8	21.72	18.71		

**Notes:**

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

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

**GSM850 DTM Measured Results**

Mode	Coding Scheme	Time Slots	Ch No.	Freq. (MHz)	Maximum Average Power (dBm)								
					Measured				Tune-up Limit				
					CS Burst Pwr	PS Burst Pwr	CS Frame Pwr	PS Frame Pwr	CS Burst Pwr	PS Burst Pwr	CS Frame Pwr	PS Frame Pwr	
GSM (Voice) + GPRS/EDGE (GMSK)	CS1	1	128	824.2	32.90		23.87			33.20		24.17	
			190	836.6	32.90		23.87						
			251	848.8	32.90		23.87						
		2	128	824.2	30.80	30.90	24.78	24.88	31.20	31.20	25.18	25.18	
			190	836.6	30.70	30.90	24.68	24.88					
			251	848.8	30.60	30.70	24.58	24.68					
		3	128	824.2	28.70	29.00	24.44	24.74	29.20	29.20	24.94	24.94	
			190	836.6	28.70	29.00	24.44	24.74					
			251	848.8	28.50	28.80	24.24	24.54					
GSM (Voice) + EDGE (8PSK)	MCS5	1	128	824.2	32.90		23.87		33.20		24.17		
			190	836.6	32.80		23.77						
			251	848.8	32.80		23.77						
		2	128	824.2	30.90	26.00	24.88	19.98	31.20	26.50	25.18	20.48	
			190	836.6	30.80	25.90	24.78	19.88					
			251	848.8	30.70	25.80	24.68	19.78					
		3	128	824.2	28.50	23.60	24.24	19.34	29.20	24.50	24.94	20.24	
			190	836.6	28.40	23.60	24.14	19.34					
			251	848.8	28.20	23.50	23.94	19.24					

**Notes:**

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

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

**GSM1900 DTM Measured Results**

Mode	Coding Scheme	Time Slots	Ch No.	Freq. (MHz)	Maximum Average Power (dBm)								
					Measured				Tune-up Limit				
					CS Burst Pwr	PS Burst Pwr	CS Frame Pwr	PS Frame Pwr	CS Burst Pwr	PS Burst Pwr	CS Frame Pwr	PS Frame Pwr	
GSM (Voice) + GPRS/EDGE (GMSK)	CS1	1	512	1850.2	29.10		20.07		29.70		20.67		
			661	1880.0	29.10		20.07						
			810	1909.8	29.40		20.37						
		2	512	1850.2	26.90	27.10	20.88	21.08	27.70	27.70	21.68	21.68	
			661	1880.0	27.10	27.30	21.08	21.28					
			810	1909.8	27.20	27.40	21.18	21.38					
		3	512	1850.2	24.80	25.00	20.54	20.74	25.70	25.70	21.44	21.44	
			661	1880.0	25.20	25.30	20.94	21.04					
			810	1909.8	25.20	25.40	20.94	21.14					
GSM (Voice) + EDGE (8PSK)	MCS5	1	512	1850.2	29.10		20.07		29.70		20.67		
			661	1880.0	29.20		20.17						
			810	1909.8	29.30		20.27						
		2	512	1850.2	26.90	23.60	20.88	17.58	27.70	25.50	21.68	19.48	
			661	1880.0	27.20	23.80	21.18	17.78					
			810	1909.8	27.30	23.90	21.28	17.88					
		3	512	1850.2	25.20	22.10	20.94	17.84	25.70	23.50	21.44	19.24	
			661	1880.0	25.50	22.30	21.24	18.04					
			810	1909.8	25.60	22.50	21.34	18.24					

**Notes:**

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

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

## 9.2. W-CDMA

### Release 99 Setup Procedures used to establish the test signals

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

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

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

The following 4 Sub-tests were completed according to Release 5 procedures in section 5.2 of 3GPP TS34.121. A summary of these settings are illustrated below:

	Mode	HSDPA	HSDPA	HSDPA	HSDPA
	Subtest	1	2	3	4
W-CDMA General Settings	Loopback Mode	Test Mode 1			
	Rel99 RMC	12.2kbps RMC			
	HSDPA FRC	H-Set 1			
	Power Control Algorithm	Algorithm 2			
	$\beta_c$	2/15	11/15	15/15	15/15
	$\beta_d$	15/15	15/15	8/15	4/15
	Bd (SF)	64			
	$\beta_c/\beta_d$	2/15	11/15	15/8	15/4
	$\beta_{hs}$	4/15	24/15	30/15	30/15
MPR (dB)	0	0	0.5	0.5	
HSDPA Specific Settings	$D_{ACK}$	8			
	$D_{NAK}$	8			
	DCQI	8			
	Ack-Nack repetition factor	3			
	CQI Feedback (Table 5.2B.4)	4ms			
	CQI Repetition Factor (Table 5.2B.4)	2			
$A_{hs}=\beta_{hs}/\beta_c$	30/15				

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

The following 5 Sub-tests were completed according to Release 6 procedures in table C,11.1.3 of 3GPP TS 34.121-1 v13. A summary of these settings are illustrated below:

	Mode	HSPA				
	Subtest	1	2	3	4	5
WCDMA General Settings	Loopback Mode	Test Mode 1				
	Rel99 RMC	12.2 kbps RMC				
	HSDPA FRC	H-Set 1				
	HSUPA Test	HSPA				
	Power Control Algorithm	Algorithm 2				Algorithm 1
	$\beta_c$	11/15	6/15	15/15	2/15	15/15
	$\beta_d$	15/15	15/15	9/15	15/15	0
	$\beta_{ec}$	209/225	12/15	30/15	2/15	5/15
	$\beta_c/\beta_d$	11/15	6/15	15/9	2/15	-
	$\beta_{hs}$	22/15	12/15	30/15	4/15	5/15
	$\beta_{ed}$	1309/225	94/75	47/15	56/75	47/15
CM (dB)	1	3	2	3	1	
MPR (dB)	0	2	1	2	0	
HSDPA Specific Settings	DACK	8				0
	DNAK	8				0
	DCQI	8				0
	Ack-Nack repetition factor	3				
	CQI Feedback (Table 5.2B.4)	4ms				
	CQI Repetition Factor (Table 5.2B.4)	2				
A <sub>hs</sub> = $\beta_{hs}/\beta_c$	30/15					
HSUPA Specific Settings	E-DPDCCH	6	8	8	5	0
	DHARQ	0	0	0	0	0
	AG Index	20	12	15	17	12
	ETFCI (from 34.121 Table C.11.1.3)	75	67	92	71	67
	Associated Max UL Data Rate kbps	242.1	174.9	482.8	205.8	308.9
	Reference E-TFCIs	5	5	2	5	1
	Reference E-TFCI	11	11	11	11	67
	Reference E-TFCI PO	4	4	4	4	18
	Reference E-TFCI	67	67	92	67	67
	Reference E-TFCI PO	18	18	18	18	18
	Reference E-TFCI	71	71	71	71	71
	Reference E-TFCI PO	23	23	23	23	23
	Reference E-TFCI	75	75	75	75	75
	Reference E-TFCI PO	26	26	26	26	26
	Reference E-TFCI	81	81	81	81	81
Reference E-TFCI PO	27	27	27	27	27	
Maximum Channelization Codes	2xSF2				SF4	

**W-CDMA Band II 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)	9262	1852.4	22.20	N/A	22.70
		9400	1880.0	22.30		
		9538	1907.6	22.30		
HSDPA	Subtest 1	9262	1852.4	21.20	0	22.00
		9400	1880.0	21.30		
		9538	1907.6	21.30		
	Subtest 2	9262	1852.4	21.20	0	22.00
		9400	1880.0	21.30		
		9538	1907.6	21.30		
	Subtest 3	9262	1852.4	20.70	0.5	21.50
		9400	1880.0	20.80		
		9538	1907.6	20.80		
	Subtest 4	9262	1852.4	20.70	0.5	21.50
		9400	1880.0	20.80		
		9538	1907.6	20.80		
HSUPA	Subtest 1	9262	1852.4	21.10	0	22.00
		9400	1880.0	21.30		
		9538	1907.6	21.30		
	Subtest 2	9262	1852.4	19.00	2	20.00
		9400	1880.0	19.30		
		9538	1907.6	19.30		
	Subtest 3	9262	1852.4	20.10	1	21.00
		9400	1880.0	20.30		
		9538	1907.6	20.40		
	Subtest 4	9262	1852.4	19.00	2	20.00
		9400	1880.0	19.30		
		9538	1907.6	19.30		
	Subtest 5	9262	1852.4	21.10	0	22.00
		9400	1880.0	21.30		
		9538	1907.6	21.30		
DC-HSDPA	Subtest 1	9262	1852.4	21.20	0	22.00
		9400	1880.0	21.30		
		9538	1907.6	21.30		
	Subtest 2	9262	1852.4	21.20	0	22.00
		9400	1880.0	21.30		
		9538	1907.6	21.30		
	Subtest 3	9262	1852.4	20.70	0.5	21.50
		9400	1880.0	20.80		
		9538	1907.6	20.80		
	Subtest 4	9262	1852.4	20.70	0.5	21.50
		9400	1880.0	20.80		
		9538	1907.6	20.80		

**W-CDMA Band IV 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)	1312	1712.4	21.20	N/A	21.70
		1413	1732.6	21.20		
		1513	1752.6	21.20		
HSDPA	Subtest 1	1312	1712.4	20.20	0	21.00
		1413	1732.6	20.20		
		1513	1752.6	20.20		
	Subtest 2	1312	1712.4	20.20	0	21.00
		1413	1732.6	20.20		
		1513	1752.6	20.20		
	Subtest 3	1312	1712.4	19.70	0.5	20.50
		1413	1732.6	19.70		
		1513	1752.6	19.70		
	Subtest 4	1312	1712.4	19.70	0.5	20.50
		1413	1732.6	19.70		
		1513	1752.6	19.70		
HSUPA	Subtest 1	1312	1712.4	20.20	0	21.00
		1413	1732.6	20.20		
		1513	1752.6	20.20		
	Subtest 2	1312	1712.4	18.20	2	19.00
		1413	1732.6	18.20		
		1513	1752.6	18.10		
	Subtest 3	1312	1712.4	19.20	1	20.00
		1413	1732.6	19.30		
		1513	1752.6	19.20		
	Subtest 4	1312	1712.4	18.20	2	19.00
		1413	1732.6	18.20		
		1513	1752.6	18.10		
	Subtest 5	1312	1712.4	20.20	0	21.00
		1413	1732.6	20.20		
		1513	1752.6	20.20		
DC-HSDPA	Subtest 1	1312	1712.4	20.20	0	21.00
		1413	1732.6	20.20		
		1513	1752.6	20.20		
	Subtest 2	1312	1712.4	20.20	0	21.00
		1413	1732.6	20.20		
		1513	1752.6	20.20		
	Subtest 3	1312	1712.4	19.70	0.5	20.50
		1413	1732.6	19.70		
		1513	1752.6	19.70		
	Subtest 4	1312	1712.4	19.70	0.5	20.50
		1413	1732.6	19.70		
		1513	1752.6	19.70		

**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	24.90	N/A	24.90
		4183	836.6	24.90		
		4233	846.6	24.80		
HSDPA	Subtest 1	4132	826.4	24.00	0	24.20
		4183	836.6	23.90		
		4233	846.6	23.80		
	Subtest 2	4132	826.4	24.00	0	24.20
		4183	836.6	23.90		
		4233	846.6	23.80		
	Subtest 3	4132	826.4	23.50	0.5	23.70
		4183	836.6	23.50		
		4233	846.6	23.30		
	Subtest 4	4132	826.4	23.50	0.5	23.70
		4183	836.6	23.50		
		4233	846.6	23.30		
HSUPA	Subtest 1	4132	826.4	24.00	0	24.20
		4183	836.6	24.00		
		4233	846.6	23.80		
	Subtest 2	4132	826.4	22.00	2	22.20
		4183	836.6	22.00		
		4233	846.6	21.70		
	Subtest 3	4132	826.4	23.10	1	23.20
		4183	836.6	23.00		
		4233	846.6	22.90		
	Subtest 4	4132	826.4	22.00	2	22.20
		4183	836.6	22.00		
		4233	846.6	21.70		
	Subtest 5	4132	826.4	24.00	0	24.20
		4183	836.6	24.00		
		4233	846.6	23.80		
DC-HSDPA	Subtest 1	4132	826.4	24.00	0	24.20
		4183	836.6	23.90		
		4233	846.6	23.80		
	Subtest 2	4132	826.4	24.00	0	24.20
		4183	836.6	23.90		
		4233	846.6	23.80		
	Subtest 3	4132	826.4	23.50	0.5	23.70
		4183	836.6	23.50		
		4233	846.6	23.30		
	Subtest 4	4132	826.4	23.50	0.5	23.70
		4183	836.6	23.50		
		4233	846.6	23.30		



### 9.3. LTE

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

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

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

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

The allowed A-MPR values specified below in Table 6.2.4.-1 of 3GPP TS36.101 are in addition to the allowed MPR requirements. All the measurements below were performed with A-MPR disabled, by using Network Signaling Value of "NS\_01".

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

Network Signalling value	Requirements (subclause)	E-UTRA Band	Channel bandwidth (MHz)	Resources Blocks ( $N_{RB}$ )	A-MPR (dB)
NS_01	6.6.2.1.1	Table 5.5-1	1.4, 3, 5, 10, 15, 20	Table 5.6-1	N/A
NS_03	6.6.2.2.1	2, 4, 10, 23, 25, 35, 36, 66, 70	3	>5	$\leq 1$
			5	>6	$\leq 1$
			10	>8	$\leq 1$
			15	>8	$\leq 1$
NS_04	6.6.2.2.2, 6.6.3.3.19	41	5, 10, 15, 20	Table 6.2.4-4, Table 6.2.4-4a	
				NS_05	6.6.3.3.1
15, 20	Table 6.2.4-18 (NOTE2)				
NS_06	6.6.2.2.3	12, 13, 14, 17	1.4, 3, 5, 10	Table 5.6-1	N/A
NS_08	6.6.3.3.3	19	10, 15	> 44	$\leq 3$
				NS_09	6.6.3.3.4
> 55	$\leq 2$				
NS_10		20	15, 20	Table 6.2.4-3	
NS_11	6.6.2.2.1, 6.6.3.3.13	23	1.4, 3, 5, 10, 15, 20	Table 6.2.4-5	
				NS_12	6.6.3.3.5
NS_13	6.6.3.3.6	28	5		
NS_14	6.6.3.3.7	28	10, 15	Table 6.2.4-8	
NS_15	6.6.3.3.8	28	1.4, 3, 5, 10, 15	Table 6.2.4-9	
				Table 6.2.4-10	
NS_16	6.6.3.3.9	27	3, 5, 10	Table 6.2.4-11, Table 6.2.4-12, Table 6.2.4-13	
NS_17	6.6.3.3.10	28	5, 10	Table 5.6-1	N/A
NS_18	6.6.3.3.11	28	5	$\geq 2$	$\leq 1$
			10, 15, 20	$\geq 1$	$\leq 4$
NS_19	6.6.3.3.12	44	10, 15, 20	Table 6.2.4-14	
NS_20	6.2.2, 6.6.2.2.1, 6.6.3.3.14	23	5, 10, 15, 20	Table 6.2.4-15	
				NS_21	6.6.2.2.1, 6.6.3.3.15
NS_22	6.6.3.3.16	42, 43	5, 10, 15, 20		
NS_23	6.6.3.3.17	42, 43	5, 10, 15, 20	N/A	
NS_24	6.6.3.3.20	65 (NOTE 4)	5, 10, 15, 20	Table 6.2.4-19	
NS_25	6.6.3.3.21	65 (NOTE 4)	5, 10, 15, 20	Table 6.2.4-20	
NS_26	6.6.3.3.22	68	10, 15	Table 6.2.4-21	
NS_27	6.6.2.2.5, 6.6.3.3.23	48	5, 10, 15, 20	Table 6.2.4-22	
				NS_28	6.2.2A, 6.6.3.3.24
NS_29	6.2.2A, 6.6.2.3.1a, 6.6.3.3.25	46 (NOTE 5)	20		
				NS_30	6.2.2A, 6.6.3.3.26
NS_31	6.2.2A, 6.6.3.3.27	46 (NOTE 5)	20		
				NS_32	-

NOTE 1: Applicable when the lower edge of the assigned E-UTRA UL channel bandwidth frequency is larger than or equal to the upper edge of PHS band (1915.7 MHz) + 4 MHz + the channel BW assigned, where channel BW is as defined in subclause 5.6. A-MPR for

**LTE Band 2 Measured Results**

BW (MHz)	Mode	RB Allocation	RB offset	Maximum Average Power (dBm)				
				18700	18900	19100	MPR	Tune-up Limit
				1860 MHz	1880 MHz	1900 MHz		
20 MHz	QPSK	1	0	22.41	22.48	22.38	0.0	23
		1	49	22.08	22.17	22.11	0.0	23
		1	99	22.36	22.35	22.26	0.0	23
		50	0	22.52	22.59	22.73	0.0	23
		50	24	22.47	22.59	22.65	0.0	23
		50	50	22.52	22.53	22.64	0.0	23
		100	0	22.57	22.57	22.65	0.0	23
	16QAM	1	0	22.70	22.89	22.68	0.0	23
		1	49	22.40	22.58	22.43	0.0	23
		1	99	22.68	22.76	22.48	0.0	23
		50	0	22.17	22.26	22.29	0.0	23
		50	24	22.07	22.20	22.24	0.0	23
		50	50	22.20	22.14	22.22	0.0	23
		100	0	22.20	22.20	22.25	0.0	23
	64QAM	1	0	22.96	22.77	22.58	0.0	23
		1	49	22.68	22.44	22.31	0.0	23
		1	99	22.95	22.59	22.39	0.0	23
		50	0	21.28	21.38	21.46	1.0	22
		50	24	21.21	21.38	21.40	1.0	22
		50	50	21.27	21.32	21.35	1.0	22
		100	0	21.27	21.34	21.43	1.0	22
BW (MHz)	Mode	RB Allocation	RB offset	Maximum Average Power (dBm)				
				18675	18900	19125	MPR	Tune-up Limit
				1857.5 MHz	1880 MHz	1902.5 MHz		
15 MHz	QPSK	1	0	22.62	22.67	22.81	0.0	23
		1	37	22.47	22.54	22.72	0.0	23
		1	74	22.51	22.55	22.69	0.0	23
		36	0	22.51	22.62	22.82	0.0	23
		36	20	22.49	22.56	22.76	0.0	23
		36	39	22.47	22.52	22.76	0.0	23
		75	0	22.51	22.57	22.79	0.0	23
	16QAM	1	0	22.53	22.61	22.25	0.0	23
		1	37	22.40	22.45	22.23	0.0	23
		1	74	22.43	22.46	22.22	0.0	23
		36	0	22.10	22.22	22.43	0.0	23
		36	20	22.04	22.21	22.35	0.0	23
		36	39	22.05	22.19	22.31	0.0	23
		75	0	22.07	22.19	22.37	0.0	23
	64QAM	1	0	22.71	22.40	22.59	0.0	23
		1	37	22.60	22.22	22.60	0.0	23
		1	74	22.66	22.20	22.59	0.0	23
		36	0	21.22	21.34	21.50	1.0	22
		36	20	21.19	21.33	21.47	1.0	22
		36	39	21.17	21.30	21.45	1.0	22
		75	0	21.22	21.32	21.47	1.0	22

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

BW (MHz)	Mode	RB Allocation	RB offset	Maximum Average Power (dBm)				
				18650	18900	19150	MPR	Tune-up Limit
				1855 MHz	1880 MHz	1905 MHz		
10 MHz	QPSK	1	0	22.77	22.77	22.66	0.0	23
		1	25	22.48	22.51	22.66	0.0	23
		1	49	22.69	22.73	22.66	0.0	23
		25	0	22.51	22.57	22.79	0.0	23
		25	12	22.51	22.58	22.76	0.0	23
		25	25	22.47	22.55	22.75	0.0	23
	16QAM	50	0	22.50	22.57	22.77	0.0	23
		1	0	22.67	22.31	22.31	0.0	23
		1	25	22.41	22.04	22.31	0.0	23
		1	49	22.59	22.22	22.27	0.0	23
		25	0	22.14	22.19	22.47	0.0	23
		25	12	22.14	22.21	22.47	0.0	23
	64QAM	25	25	22.10	22.18	22.43	0.0	23
		50	0	22.12	22.17	22.39	0.0	23
		1	0	22.41	22.69	22.43	0.0	23
		1	25	22.16	22.42	22.45	0.0	23
		1	49	22.35	22.59	22.43	0.0	23
		25	0	21.24	21.28	21.54	1.0	22
5 MHz	QPSK	25	12	21.24	21.31	21.52	1.0	22
		25	25	21.23	21.26	21.49	1.0	22
		50	0	21.21	21.26	21.44	1.0	22
		1	0	22.47	22.66	22.79	0.0	23
		1	12	22.44	22.59	22.72	0.0	23
		1	24	22.44	22.60	22.70	0.0	23
	16QAM	12	0	22.50	22.54	22.72	0.0	23
		12	7	22.49	22.52	22.72	0.0	23
		12	13	22.48	22.52	22.72	0.0	23
		25	0	22.53	22.54	22.71	0.0	23
		1	0	22.59	22.29	22.42	0.0	23
		1	12	22.55	22.24	22.37	0.0	23
	64QAM	1	24	22.56	22.25	22.39	0.0	23
		12	0	22.22	22.21	22.36	0.0	23
		12	7	22.19	22.19	22.35	0.0	23
		12	13	22.19	22.19	22.34	0.0	23
		25	0	22.14	22.15	22.27	0.0	23
		1	0	22.30	22.44	22.25	0.0	23
64QAM	1	12	22.25	22.41	22.20	0.0	23	
	1	24	22.29	22.39	22.21	0.0	23	
	12	0	21.60	21.56	21.82	1.0	22	
	12	7	21.60	21.54	21.82	1.0	22	
	12	13	21.59	21.54	21.80	1.0	22	
	25	0	21.57	21.57	21.76	1.0	22	

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

BW (MHz)	Mode	RB Allocation	RB offset	Maximum Average Power (dBm)				
				18615	18900	19185	MPR	Tune-up Limit
				1851.5 MHz	1880 MHz	1908.5 MHz		
3 MHz	QPSK	1	0	22.46	22.46	22.64	0.0	23
		1	8	22.55	22.56	22.69	0.0	23
		1	14	22.44	22.46	22.58	0.0	23
		8	0	22.46	22.48	22.64	0.0	23
		8	4	22.45	22.50	22.69	0.0	23
		8	7	22.44	22.52	22.68	0.0	23
	16QAM	15	0	22.45	22.49	22.67	0.0	23
		1	0	22.37	21.99	22.28	0.0	23
		1	8	22.47	22.07	22.35	0.0	23
		1	14	22.34	21.94	22.23	0.0	23
		8	0	22.11	22.19	22.27	0.0	23
		8	4	22.11	22.18	22.30	0.0	23
	64QAM	8	7	22.10	22.18	22.31	0.0	23
		15	0	22.06	22.13	22.22	0.0	23
		1	0	22.08	22.36	22.34	0.0	23
		1	8	22.21	22.45	22.37	0.0	23
		1	14	22.08	22.32	22.38	0.0	23
		8	0	21.54	21.61	21.66	1.0	22
1.4 MHz	QPSK	8	4	21.55	21.62	21.71	1.0	22
		8	7	21.56	21.62	21.72	1.0	22
		15	0	21.53	21.54	21.79	1.0	22
		1	0	22.43	22.37	22.32	0.0	23
		1	3	22.48	22.43	22.43	0.0	23
		1	5	22.40	22.38	22.36	0.0	23
	16QAM	3	0	22.47	22.32	22.38	0.0	23
		3	1	22.50	22.41	22.43	0.0	23
		3	3	22.50	22.40	22.44	0.0	23
		6	0	22.41	22.34	22.41	0.0	23
		1	0	22.37	22.06	21.96	0.0	23
		1	3	22.43	22.12	22.07	0.0	23
	64QAM	1	5	22.37	22.07	22.02	0.0	23
		3	0	22.25	22.00	22.16	0.0	23
		3	1	22.30	22.08	22.23	0.0	23
		3	3	22.28	22.07	22.23	0.0	23
		6	0	21.95	22.09	22.16	0.0	23
		1	0	22.41	22.16	22.16	0.0	23
64QAM	1	3	22.52	22.23	22.22	0.0	23	
	1	5	22.42	22.19	22.19	0.0	23	
	3	0	22.40	21.96	21.97	0.0	23	
	3	1	22.44	22.02	22.02	0.0	23	
	3	3	22.45	22.04	22.03	0.0	23	
	6	0	21.52	21.54	21.54	1.0	22	

**LTE Band 4 Measured Results**

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

**LTE Band 5 Measured Results**

BW (MHz)	Mode	RB Allocation	RB offset	Maximum Average Power (dBm)				
							MPR	Tune-up Limit
				20525	836.5 MHz			
10 MHz	QPSK	1	0				0.0	25
		1	25				0.0	25
		1	49				0.0	25
		25	0				1.0	24
		25	12				1.0	24
		25	25				1.0	24
	16QAM	50	0				1.0	24
		1	0				1.0	24
		1	25				1.0	24
		1	49				1.0	24
		25	0				2.0	23
		25	12				2.0	23
	64QAM	25	25				2.0	23
		50	0				2.0	23
		1	0				2.0	23
		1	25				2.0	23
		1	49				2.0	23
		25	0				3.0	22
5 MHz	QPSK	25	12				3.0	22
		25	25				3.0	22
		50	0				3.0	22
		1	0				2.0	23
		1	12				2.0	23
		1	24				2.0	23
	16QAM	12	0				1.0	24
		12	7				1.0	24
		12	13				1.0	24
		25	0				1.0	24
		1	0				1.0	24
		1	12				1.0	24
	64QAM	1	24				1.0	24
		12	0				2.0	23
		12	7				2.0	23
		12	13				2.0	23
		25	0				2.0	23
		1	0				2.0	23
5 MHz	16QAM	1	12				2.0	23
		1	24				2.0	23
		12	0				2.0	23
		12	7				2.0	23
		12	13				2.0	23
		25	0				2.0	23
	64QAM	1	0				2.0	23
		1	12				2.0	23
		1	24				2.0	23
		12	0				3.0	22
		12	7				3.0	22
		12	13				3.0	22
5 MHz	64QAM	25	0				3.0	22
		1	0				2.0	23
		1	12				2.0	23
		1	24				2.0	23
		12	0				3.0	22
		12	7				3.0	22

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

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

BW (MHz)	Mode	RB Allocation	RB offset	Maximum Average Power (dBm)				
				20415	20525	20635	MPR	Tune-up Limit
				825.5 MHz	836.5 MHz	847.5 MHz		
3 MHz	QPSK	1	0	24.44	24.58	24.56	0.0	25
		1	8	24.50	24.65	24.51	0.0	25
		1	14	24.39	24.53	24.35	0.0	25
		8	0	23.45	23.57	23.47	1.0	24
		8	4	23.50	23.60	23.52	1.0	24
		8	7	23.47	23.58	23.54	1.0	24
	16QAM	15	0	23.46	23.59	23.52	1.0	24
		1	0	23.63	24.00	23.57	1.0	24
		1	8	23.66	24.00	23.49	1.0	24
		1	14	23.57	23.96	23.29	1.0	24
		8	0	22.60	22.73	22.68	2.0	23
		8	4	22.62	22.74	22.69	2.0	23
	64QAM	8	7	22.62	22.73	22.72	2.0	23
		15	0	22.52	22.71	22.63	2.0	23
		1	0	22.37	22.40	22.27	2.0	23
		1	8	22.41	22.39	22.22	2.0	23
		1	14	22.30	22.30	22.11	2.0	23
		8	0	21.60	21.61	21.62	3.0	22
1.4 MHz	QPSK	8	4	21.66	21.65	21.68	3.0	22
		8	7	21.63	21.64	21.65	3.0	22
		15	0	21.56	21.71	21.65	3.0	22
		1	0	24.45	24.45	24.38	0.0	25
		1	3	24.48	24.50	24.44	0.0	25
		1	5	24.40	24.44	24.33	0.0	25
	16QAM	3	0	24.39	24.46	24.38	0.0	25
		3	1	24.46	24.54	24.44	0.0	25
		3	3	24.45	24.52	24.44	0.0	25
		6	0	23.40	23.51	23.41	1.0	24
		1	0	23.58	23.54	23.78	1.0	24
		1	3	23.64	23.61	23.79	1.0	24
	64QAM	1	5	23.58	23.56	23.70	1.0	24
		3	0	23.57	23.73	23.60	1.0	24
		3	1	23.63	23.83	23.68	1.0	24
		3	3	23.60	23.80	23.64	1.0	24
		6	0	22.64	22.76	22.39	2.0	23
		1	0	21.84	21.86	22.03	2.0	23
QPSK	1	3	21.90	21.94	22.12	2.0	23	
	1	5	21.85	21.81	21.99	2.0	23	
	3	0	22.47	22.68	22.77	2.0	23	
	3	1	22.55	22.77	22.84	2.0	23	
	3	3	22.53	22.76	22.82	2.0	23	
	6	0	21.57	21.86	21.51	3.0	22	

**LTE Band 7 Measured Results**

BW (MHz)	Mode	RB Allocation	RB offset	Maximum Average Power (dBm)				
				20850	21100	21350	MPR	Tune-up Limit
				2510 MHz	2535 MHz	2560 MHz		
20 MHz	QPSK	1	0	19.23	19.26	19.45	0.0	20
		1	49	18.99	19.24	19.24	0.0	20
		1	99	19.06	19.33	19.14	0.0	20
		50	0	19.18	19.31	19.40	0.0	20
		50	24	19.11	19.38	19.37	0.0	20
		50	50	19.10	19.28	19.29	0.0	20
		100	0	19.21	19.31	19.33	0.0	20
	16QAM	1	0	19.26	19.26	19.65	0.0	20
		1	49	19.03	19.27	19.34	0.0	20
		1	99	18.97	19.41	19.26	0.0	20
		50	0	18.78	18.86	19.00	0.0	20
		50	24	18.67	18.91	18.94	0.0	20
		50	50	18.67	18.86	18.80	0.0	20
		100	0	18.77	18.89	18.81	0.0	20
	64QAM	1	0	19.12	19.49	19.47	0.0	20
		1	49	18.86	19.47	19.17	0.0	20
		1	99	18.86	19.63	19.12	0.0	20
		50	0	18.85	18.91	19.06	0.0	20
		50	24	18.77	19.03	19.02	0.0	20
		50	50	18.78	18.91	18.89	0.0	20
		100	0	18.86	18.92	18.94	0.0	20
BW (MHz)	Mode	RB Allocation	RB offset	Maximum Average Power (dBm)				
				20825	21100	21375	MPR	Tune-up Limit
				2507.5 MHz	2535 MHz	2562.5 MHz		
15 MHz	QPSK	1	0	19.26	19.24	19.25	0.0	20
		1	37	19.10	19.26	19.14	0.0	20
		1	74	19.02	19.29	19.08	0.0	20
		36	0	19.22	19.40	19.21	0.0	20
		36	20	19.25	19.31	19.21	0.0	20
		36	39	19.17	19.29	19.16	0.0	20
		75	0	19.23	19.28	19.20	0.0	20
	16QAM	1	0	19.29	18.62	19.20	0.0	20
		1	37	19.16	18.75	19.04	0.0	20
		1	74	19.04	18.77	19.02	0.0	20
		36	0	18.98	18.96	18.86	0.0	20
		36	20	18.90	18.90	18.84	0.0	20
		36	39	18.83	18.86	18.75	0.0	20
		75	0	18.87	18.91	18.79	0.0	20
	64QAM	1	0	19.58	18.99	19.22	0.0	20
		1	37	19.40	19.00	19.04	0.0	20
		1	74	19.29	19.05	18.98	0.0	20
		36	0	18.95	19.05	18.90	0.0	20
		36	20	18.90	19.05	18.83	0.0	20
		36	39	18.83	18.95	18.82	0.0	20
		75	0	18.91	18.95	18.83	0.0	20



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

BW (MHz)	Mode	RB Allocation	RB offset	Maximum Average Power (dBm)				
				20800	21100	21400	MPR	Tune-up Limit
				2505 MHz	2535 MHz	2565 MHz		
10 MHz	QPSK	1	0	19.19	19.27	19.18	0.0	20
		1	25	19.09	19.30	19.14	0.0	20
		1	49	19.05	19.35	19.14	0.0	20
		25	0	19.20	19.34	19.23	0.0	20
		25	12	19.17	19.31	19.22	0.0	20
		25	25	19.15	19.27	19.16	0.0	20
	16QAM	50	0	19.15	19.30	19.18	0.0	20
		1	0	18.82	19.16	18.68	0.0	20
		1	25	18.75	19.19	18.60	0.0	20
		1	49	18.58	19.26	18.53	0.0	20
		25	0	18.88	18.98	18.82	0.0	20
		25	12	18.86	18.95	18.77	0.0	20
	64QAM	25	25	18.82	18.91	18.72	0.0	20
		50	0	18.77	18.90	18.76	0.0	20
		1	0	19.02	18.97	19.08	0.0	20
		1	25	18.87	19.00	19.03	0.0	20
		1	49	18.81	19.07	18.98	0.0	20
		25	0	18.86	19.03	18.83	0.0	20
5 MHz	QPSK	25	12	18.85	19.02	18.83	0.0	20
		25	25	18.80	18.96	18.78	0.0	20
		50	0	18.77	18.96	18.77	0.0	20
		1	0	19.25	19.22	19.27	0.0	20
		1	12	19.23	19.31	19.26	0.0	20
		1	24	19.21	19.28	19.23	0.0	20
	16QAM	12	0	19.21	19.37	19.20	0.0	20
		12	7	19.21	19.36	19.21	0.0	20
		12	13	19.21	19.35	19.18	0.0	20
		25	0	19.21	19.36	19.24	0.0	20
		1	0	18.87	19.29	18.90	0.0	20
		1	12	18.87	19.39	18.85	0.0	20
	64QAM	1	24	18.88	19.37	18.84	0.0	20
		12	0	18.84	19.06	18.85	0.0	20
		12	7	18.86	19.06	18.85	0.0	20
		12	13	18.83	19.04	18.84	0.0	20
		25	0	18.76	18.98	18.79	0.0	20
		1	0	18.73	19.05	19.04	0.0	20
QPSK	1	12	18.67	19.09	19.02	0.0	20	
	1	24	18.67	19.04	18.96	0.0	20	
	12	0	18.82	18.96	18.72	0.0	20	
	12	7	18.83	19.00	18.72	0.0	20	
	12	13	18.82	18.97	18.69	0.0	20	
	25	0	18.73	18.91	18.72	0.0	20	

**LTE Band 12 Measured Results**

BW (MHz)	Mode	RB Allocation	RB offset	Maximum Average Power (dBm)					
							MPR	Tune-up Limit	
				23095	707.5 MHz				
10 MHz	QPSK	1	0		24.51		0.0	25	
		1	25		24.57		0.0	25	
		1	49		24.62		0.0	25	
		25	0		23.52		1.0	24	
		25	12		23.63		1.0	24	
		25	25		23.55		1.0	24	
	16QAM	50	0		23.59		1.0	24	
		1	0		23.89		1.0	24	
		1	25		23.93		1.0	24	
		1	49		23.97		1.0	24	
		25	0		22.33		2.0	23	
		25	12		22.32		2.0	23	
	64QAM	25	25		22.25		2.0	23	
		50	0		22.68		2.0	23	
		1	0		22.20		2.0	23	
		1	25		22.25		2.0	23	
		1	49		22.31		2.0	23	
		25	0		21.75		3.0	22	
5 MHz	QPSK	25	12		21.77		3.0	22	
		25	25		21.71		3.0	22	
		50	0		21.33		3.0	22	
		1	0		24.31	24.41	24.64	0.0	25
		1	12		24.50	24.49	24.57	0.0	25
		1	24		24.44	24.55	24.43	0.0	25
	16QAM	12	0		23.43	23.54	23.51	1.0	24
		12	7		23.52	23.60	23.52	1.0	24
		12	13		23.50	23.57	23.48	1.0	24
		25	0		23.44	23.57	23.51	1.0	24
		1	0		23.42	23.96	23.73	1.0	24
		1	12		23.57	24.00	23.67	1.0	24
64QAM	1	24		23.57	24.00	23.54	1.0	24	
	12	0		22.56	22.76	22.68	2.0	23	
	12	7		22.62	22.80	22.66	2.0	23	
	12	13		22.60	22.77	22.64	2.0	23	
	25	0		22.51	22.71	22.60	2.0	23	
	1	0		22.33	22.47	22.02	2.0	23	
64QAM	1	12		22.27	22.43	21.95	2.0	23	
	1	24		22.26	22.39	21.96	2.0	23	
	12	0		21.65	21.64	21.64	3.0	22	
	12	7		21.66	21.64	21.62	3.0	22	
	12	13		21.64	21.60	21.60	3.0	22	
	25	0		21.61	21.62	21.59	3.0	22	

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

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

BW (MHz)	Mode	RB Allocation	RB offset	Maximum Average Power (dBm)				
				23025	23095	23165	MPR	Tune-up Limit
				700.5 MHz	707.5 MHz	714.5 MHz		
3 MHz	QPSK	1	0	24.26	24.57	24.44	0.0	25
		1	8	24.38	24.66	24.53	0.0	25
		1	14	24.41	24.53	24.29	0.0	25
		8	0	23.32	23.54	23.46	1.0	24
		8	4	23.47	23.53	23.49	1.0	24
		8	7	23.49	23.59	23.49	1.0	24
	16QAM	15	0	23.44	23.56	23.48	1.0	24
		1	0	23.38	23.96	23.42	1.0	24
		1	8	23.56	24.00	23.47	1.0	24
		1	14	23.50	23.94	23.24	1.0	24
		8	0	22.51	22.73	22.64	2.0	23
		8	4	22.62	22.73	22.67	2.0	23
	64QAM	8	7	22.65	22.72	22.66	2.0	23
		15	0	22.53	22.71	22.58	2.0	23
		1	0	22.29	22.22	22.33	2.0	23
		1	8	22.30	22.32	22.38	2.0	23
		1	14	22.21	22.22	22.29	2.0	23
		8	0	21.52	21.68	21.60	3.0	22
1.4 MHz	QPSK	8	4	21.58	21.72	21.65	3.0	22
		8	7	21.57	21.70	21.63	3.0	22
		15	0	21.63	21.69	21.55	3.0	22
		1	0	24.20	24.49	24.43	0.0	25
		1	3	24.37	24.55	24.48	0.0	25
		1	5	24.27	24.47	24.42	0.0	25
	16QAM	3	0	24.26	24.51	24.34	0.0	25
		3	1	24.33	24.53	24.41	0.0	25
		3	3	24.36	24.55	24.40	0.0	25
		6	0	23.34	23.46	23.39	1.0	24
		1	0	23.28	23.86	23.50	1.0	24
		1	3	23.55	23.90	23.53	1.0	24
	64QAM	1	5	23.40	23.85	23.46	1.0	24
		3	0	23.53	23.70	23.45	1.0	24
		3	1	23.58	23.75	23.50	1.0	24
		3	3	23.61	23.75	23.51	1.0	24
		6	0	22.63	22.46	22.57	2.0	23
		1	0	22.49	22.24	22.07	2.0	23
64QAM	1	3	22.59	22.29	22.14	2.0	23	
	1	5	22.48	22.26	22.02	2.0	23	
	3	0	22.82	22.53	22.57	2.0	23	
	3	1	22.86	22.61	22.68	2.0	23	
	3	3	22.93	22.60	22.65	2.0	23	
	6	0	21.09	21.17	21.28	3.0	22	

**LTE Band 13 Measured Results**

BW (MHz)	Mode	RB Allocation	RB offset	Maximum Average Power (dBm)			
				23230	782 MHz	MPR	Tune-up Limit
10 MHz	QPSK	1	0	24.27		0.0	25
		1	25	24.53		0.0	25
		1	49	24.13		0.0	25
		25	0	23.63		1.0	24
		25	12	23.61		1.0	24
		25	25	23.57		1.0	24
	16QAM	50	0	23.59		1.0	24
		1	0	23.22		1.0	24
		1	25	23.49		1.0	24
		1	49	23.10		1.0	24
		25	0	22.73		2.0	23
		25	12	22.72		2.0	23
	64QAM	25	25	22.68		2.0	23
		50	0	22.64		2.0	23
		1	0	22.36		2.0	23
		1	25	22.40		2.0	23
		1	49	22.32		2.0	23
		25	0	21.76		3.0	22
5 MHz	QPSK	25	12	21.75		3.0	22
		25	25	21.72		3.0	22
		50	0	21.22		3.0	22
		1	0	24.52		0.0	25
		1	12	24.53		0.0	25
		1	24	24.53		0.0	25
	16QAM	12	0	23.59		1.0	24
		12	7	23.62		1.0	24
		12	13	23.56		1.0	24
		25	0	23.58		1.0	24
		1	0	24.00		1.0	24
		1	12	24.00		1.0	24
	64QAM	1	24	24.00		1.0	24
		12	0	22.81		2.0	23
		12	7	22.77		2.0	23
		12	13	22.81		2.0	23
		25	0	22.72		2.0	23
		1	0	22.03		2.0	23
64QAM	1	12	22.06		2.0	23	
	1	24	22.08		2.0	23	
	12	0	21.75		3.0	22	
	12	7	21.75		3.0	22	
	12	13	21.73		3.0	22	
	25	0	21.68		3.0	22	

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

**LTE Band 17 Measured Results**

SAR for LTE Band 17 (Frequency range: 704-716 MHz) is covered by LTE Band 12 (Frequency range: 699-716 MHz) due to overlapping frequency range, same maximum tune-up limit and same channel bandwidth.

**LTE Band 26 Measured Results**

BW (MHz)	Mode	RB Allocation	RB offset	Maximum Average Power (dBm)				
				26865			MPR	Tune-up Limit
				831.5 MHz				
15 MHz	QPSK	1	0		24.35		0.0	25
		1	37		24.47		0.0	25
		1	74		24.34		0.0	25
		36	0		23.42		1.0	24
		36	20		23.50		1.0	24
		36	39		23.41		1.0	24
		75	0		23.46		1.0	24
	16QAM	1	0		23.35		1.0	24
		1	37		23.40		1.0	24
		1	74		23.34		1.0	24
		36	0		22.51		2.0	23
		36	20		22.56		2.0	23
		36	39		22.48		2.0	23
		75	0		22.10		2.0	23
	64QAM	1	0		22.17		2.0	23
		1	37		22.20		2.0	23
		1	74		22.15		2.0	23
		36	0		21.24		3.0	22
		36	20		21.26		3.0	22
		36	39		21.18		3.0	22
		75	0		21.17		3.0	22
BW (MHz)	Mode	RB Allocation	RB offset	Maximum Average Power (dBm)			MPR	Tune-up Limit
				26740	26865	26990		
				819 MHz	831.5 MHz	844 MHz		
10 MHz	QPSK	1	0	24.45	24.48	24.47	0.0	25
		1	25	24.57	24.51	24.32	0.0	25
		1	49	24.58	24.55	24.30	0.0	25
		25	0	23.60	23.59	23.46	1.0	24
		25	12	23.61	23.59	23.45	1.0	24
		25	25	23.64	23.49	23.38	1.0	24
		50	0	23.25	23.23	23.15	1.0	24
	16QAM	1	0	23.77	23.47	23.54	1.0	24
		1	25	23.88	23.46	23.47	1.0	24
		1	49	23.94	23.47	23.32	1.0	24
		25	0	22.68	22.67	22.60	2.0	23
		25	12	22.64	22.62	22.60	2.0	23
		25	25	22.70	22.54	22.53	2.0	23
		50	0	22.18	22.13	22.11	2.0	23
	64QAM	1	0	22.15	22.16	22.32	2.0	23
		1	25	22.23	22.16	22.27	2.0	23
		1	49	22.26	22.21	22.12	2.0	23
		25	0	21.69	21.67	21.58	3.0	22
		25	12	21.67	21.66	21.57	3.0	22
		25	25	21.72	21.64	21.52	3.0	22
		50	0	21.07	21.11	21.02	3.0	22

**Note(s):**

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

**LTE Band 26 Measured Results (continued)**

BW (MHz)	Mode	RB Allocation	RB offset	Maximum Average Power (dBm)				
				26715	26865	27015	MPR	Tune-up Limit
				816.5 MHz	831.5 MHz	846.5 MHz		
5 MHz	QPSK	1	0	24.42	24.55	24.59	0.0	25
		1	12	24.49	24.57	24.53	0.0	25
		1	24	24.57	24.65	24.46	0.0	25
		12	0	23.25	23.24	23.18	1.0	24
		12	7	23.35	23.24	23.21	1.0	24
		12	13	23.33	23.20	23.20	1.0	24
	16QAM	25	0	23.65	23.55	23.49	1.0	24
		1	0	24.00	23.69	23.71	1.0	24
		1	12	24.00	23.72	23.62	1.0	24
		1	24	24.00	23.79	23.55	1.0	24
		12	0	22.74	22.69	22.60	2.0	23
		12	7	22.85	22.71	22.58	2.0	23
	64QAM	12	13	22.81	22.67	22.60	2.0	23
		25	0	22.75	22.63	22.52	2.0	23
		1	0	22.28	22.35	22.07	2.0	23
		1	12	22.30	22.39	21.92	2.0	23
		1	24	22.43	22.42	21.91	2.0	23
		12	0	21.18	21.08	21.11	3.0	22
3 MHz	QPSK	12	7	21.30	21.08	21.12	3.0	22
		12	13	21.25	21.06	21.10	3.0	22
		25	0	21.72	21.59	21.54	3.0	22
		1	0	24.37	24.40	24.46	0.0	25
		1	8	24.43	24.60	24.51	0.0	25
		1	14	24.46	24.48	24.41	0.0	25
	16QAM	8	0	23.40	23.52	23.43	1.0	24
		8	4	23.52	23.53	23.47	1.0	24
		8	7	23.49	23.52	23.49	1.0	24
		15	0	23.49	23.49	23.45	1.0	24
		1	0	23.50	23.86	23.45	1.0	24
		1	8	23.54	23.99	23.45	1.0	24
	64QAM	1	14	23.58	23.91	23.27	1.0	24
		8	0	22.50	22.66	22.60	2.0	23
		8	4	22.64	22.70	22.62	2.0	23
		8	7	22.62	22.69	22.64	2.0	23
		15	0	22.54	22.63	22.55	2.0	23
		1	0	22.21	22.10	22.31	2.0	23
64QAM	1	8	22.22	22.28	22.34	2.0	23	
	1	14	22.20	22.16	22.24	2.0	23	
	8	0	21.47	21.64	21.56	3.0	22	
	8	4	21.60	21.67	21.62	3.0	22	
	8	7	21.58	21.68	21.60	3.0	22	
	15	0	21.61	21.64	21.50	3.0	22	

**LTE Band 26 Measured Results (continued)**

BW (MHz)	Mode	RB Allocation	RB offset	Maximum Average Power (dBm)				
				26697	26865	27033	MPR	Tune-up Limit
				814.7 MHz	831.5 MHz	848.3 MHz		
1.4 MHz	QPSK	1	0	24.31	24.43	24.43	0.0	25
		1	3	24.35	24.51	24.47	0.0	25
		1	5	24.26	24.47	24.39	0.0	25
		3	0	24.26	24.44	24.32	0.0	25
		3	1	24.33	24.48	24.39	0.0	25
		3	3	24.33	24.48	24.38	0.0	25
	16QAM	6	0	23.34	23.43	23.38	1.0	24
		1	0	23.40	23.86	23.49	1.0	24
		1	3	23.46	23.90	23.52	1.0	24
		1	5	23.42	23.86	23.43	1.0	24
		3	0	23.52	23.67	23.42	1.0	24
		3	1	23.60	23.73	23.49	1.0	24
	64QAM	3	3	23.59	23.71	23.46	1.0	24
		6	0	22.57	22.42	22.56	2.0	23
		1	0	22.10	22.12	22.30	2.0	23
		1	3	22.16	22.21	22.38	2.0	23
		1	5	22.11	22.09	22.26	2.0	23
		3	0	22.35	22.61	22.75	2.0	23
	64QAM	3	1	22.43	22.70	22.80	2.0	23
		3	3	22.42	22.69	22.78	2.0	23
		6	0	21.50	21.83	21.45	3.0	22



**LTE Band 41 Measured Results**

BW (MHz)	Mode	RB Allocation	RB offset	Maximum Average Power (dBm)						
				39750	40185	40620	41055	41490	MPR	Tune-up Limit
				2506 MHz	2549.5 MHz	2593 MHz	2636.5 MHz	2680 MHz		
20 MHz	QPSK	1	0	21.33	21.36	21.44	21.37	21.31	0.0	22
		1	49	21.17	21.28	21.22	21.14	20.98	0.0	22
		1	99	21.10	21.24	21.28	21.19	20.89	0.0	22
		50	0	21.33	21.40	21.39	21.31	21.09	0.0	22
		50	24	21.25	21.32	21.34	21.22	20.98	0.0	22
		50	50	21.18	21.26	21.23	21.11	20.92	0.0	22
		100	0	21.23	21.31	21.32	21.20	21.02	0.0	22
	16QAM	1	0	20.98	20.79	20.97	21.02	20.71	0.0	22
		1	49	20.84	20.69	20.75	20.81	20.32	0.0	22
		1	99	20.75	20.63	20.81	20.83	20.24	0.0	22
		50	0	20.94	20.98	20.94	20.89	20.65	0.0	22
		50	24	20.90	20.94	20.89	20.85	20.59	0.0	22
		50	50	20.77	20.86	20.79	20.78	20.48	0.0	22
		100	0	20.83	20.94	20.89	20.78	20.56	0.0	22
	64QAM	1	0	20.82	21.00	21.43	20.90	20.92	0.0	22
		1	49	20.65	20.91	21.23	20.68	20.60	0.0	22
		1	99	20.62	20.86	21.27	20.69	20.49	0.0	22
		50	0	20.94	21.06	21.01	20.93	20.74	0.0	22
		50	24	20.88	20.99	20.96	20.84	20.67	0.0	22
		50	50	20.78	20.93	20.88	20.78	20.58	0.0	22
		100	0	20.85	21.00	20.94	20.83	20.69	0.0	22
BW (MHz)	Mode	RB Allocation	RB offset	Maximum Average Power (dBm)						
				39750	40185	40620	41055	41490	MPR	Tune-up Limit
				2506 MHz	2549.5 MHz	2593 MHz	2636.5 MHz	2680 MHz		
15 MHz	QPSK	1	0	21.25	21.25	21.34	21.32	21.14	0.0	22
		1	37	21.19	21.27	21.21	21.15	20.95	0.0	22
		1	74	21.08	21.23	21.24	21.18	20.86	0.0	22
		36	0	21.26	21.32	21.33	21.24	21.06	0.0	22
		36	20	21.22	21.30	21.30	21.19	20.99	0.0	22
		36	39	21.15	21.29	21.26	21.13	20.95	0.0	22
		75	0	21.21	21.28	21.27	21.19	21.00	0.0	22
	16QAM	1	0	20.83	20.84	20.93	20.91	20.64	0.0	22
		1	37	20.79	20.83	20.72	20.77	20.45	0.0	22
		1	74	20.68	20.78	20.79	20.75	20.40	0.0	22
		36	0	20.90	20.92	20.92	20.88	20.60	0.0	22
		36	20	20.84	20.89	20.89	20.82	20.56	0.0	22
		36	39	20.74	20.85	20.85	20.78	20.52	0.0	22
		75	0	20.80	20.88	20.87	20.76	20.57	0.0	22
	64QAM	1	0	21.08	20.77	20.58	21.14	20.58	0.0	22
		1	37	20.98	20.74	20.45	20.99	20.38	0.0	22
		1	74	20.94	20.66	20.45	21.01	20.28	0.0	22
		36	0	20.94	20.92	21.02	20.93	20.61	0.0	22
		36	20	20.89	20.91	20.98	20.89	20.57	0.0	22
		36	39	20.82	20.85	20.92	20.80	20.52	0.0	22
		75	0	20.83	20.95	20.91	20.81	20.59	0.0	22

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

BW (MHz)	Mode	RB Allocation	RB offset	Maximum Average Power (dBm)						
				39750	40185	40620	41055	41490	MPR	Tune-up Limit
				2506 MHz	2549.5 MHz	2593 MHz	2636.5 MHz	2680 MHz		
10 MHz	QPSK	1	0	21.19	21.32	21.33	21.24	21.07	0.0	22
		1	25	21.18	21.29	21.22	21.16	20.94	0.0	22
		1	49	21.12	21.27	21.20	21.10	20.90	0.0	22
		25	0	21.29	21.32	21.35	21.27	21.04	0.0	22
		25	12	21.27	21.34	21.30	21.21	20.99	0.0	22
		25	25	21.21	21.30	21.29	21.15	20.99	0.0	22
	16QAM	1	0	20.82	20.92	20.86	20.88	20.57	0.0	22
		1	25	20.85	20.84	20.74	20.82	20.43	0.0	22
		1	49	20.81	20.85	20.69	20.73	20.43	0.0	22
		25	0	20.86	20.90	20.92	20.83	20.61	0.0	22
		25	12	20.85	20.92	20.92	20.80	20.56	0.0	22
		25	25	20.78	20.90	20.82	20.76	20.51	0.0	22
	64QAM	1	0	21.02	21.02	20.49	21.10	20.73	0.0	22
		1	25	20.99	20.93	20.45	21.04	20.59	0.0	22
		1	49	20.99	20.92	20.44	20.94	20.57	0.0	22
		25	0	20.80	20.87	20.99	20.83	20.55	0.0	22
		25	12	20.80	20.85	20.98	20.79	20.54	0.0	22
		25	25	20.74	20.81	20.95	20.71	20.49	0.0	22
50	0	20.79	20.88	20.88	20.80	20.57	0.0	22		
BW (MHz)	Mode	RB Allocation	RB offset	Maximum Average Power (dBm)						
				39750	40185	40620	41055	41490	MPR	Tune-up Limit
				2506 MHz	2549.5 MHz	2593 MHz	2636.5 MHz	2680 MHz		
5 MHz	QPSK	1	0	21.12	21.25	21.31	21.10	20.96	0.0	22
		1	12	21.08	21.26	21.26	21.06	20.91	0.0	22
		1	24	21.06	21.27	21.24	21.00	20.85	0.0	22
		12	0	21.21	21.30	21.29	21.19	20.96	0.0	22
		12	7	21.21	21.32	21.32	21.19	20.96	0.0	22
		12	13	21.18	21.29	21.28	21.16	20.93	0.0	22
	16QAM	25	0	21.23	21.30	21.28	21.16	20.96	0.0	22
		1	0	20.67	20.92	20.78	20.66	20.61	0.0	22
		1	12	20.64	20.94	20.76	20.61	20.57	0.0	22
		1	24	20.63	20.90	20.72	20.56	20.55	0.0	22
		12	0	20.83	20.97	20.84	20.77	20.60	0.0	22
		12	7	20.81	20.97	20.86	20.81	20.60	0.0	22
	64QAM	12	13	20.77	20.93	20.79	20.77	20.56	0.0	22
		25	0	20.78	20.90	20.87	20.77	20.52	0.0	22
		1	0	20.49	21.26	21.05	20.50	20.95	0.0	22
		1	12	20.44	21.25	21.00	20.49	20.91	0.0	22
		1	24	20.40	21.24	20.97	20.46	20.86	0.0	22
		12	0	20.80	20.98	20.82	20.83	20.65	0.0	22
12	7	20.81	21.00	20.87	20.82	20.68	0.0	22		
12	13	20.78	20.96	20.83	20.78	20.62	0.0	22		
25	0	20.84	20.87	20.81	20.84	20.54	0.0	22		

**LTE Band 66 Measured Results**

BW (MHz)	Mode	RB Allocation	RB offset	Maximum Average Power (dBm)				
				132072	132322	132572	MPR	Tune-up Limit
				1720 MHz	1745 MHz	1770 MHz		
20 MHz	QPSK	1	0	21.29	21.33	21.26	0.0	22
		1	49	21.14	21.15	21.06	0.0	22
		1	99	21.22	21.13	21.03	0.0	22
		50	0	21.31	21.32	21.23	0.0	22
		50	24	21.23	21.27	21.17	0.0	22
		50	50	21.30	21.20	21.12	0.0	22
		100	0	21.34	21.24	21.17	0.0	22
	16QAM	1	0	21.61	21.69	21.69	0.0	22
		1	49	21.42	21.40	21.50	0.0	22
		1	99	21.55	21.52	21.49	0.0	22
		50	0	21.17	21.25	21.15	0.0	22
		50	24	21.17	21.19	21.09	0.0	22
		50	50	21.20	21.13	21.05	0.0	22
		100	0	21.26	21.18	21.11	0.0	22
	64QAM	1	0	21.13	21.56	21.12	0.0	22
		1	49	20.95	21.37	20.94	0.0	22
		1	99	21.04	21.37	20.91	0.0	22
		50	0	21.21	21.23	21.14	0.0	22
		50	24	21.18	21.20	21.08	0.0	22
		50	50	21.23	21.15	21.05	0.0	22
		100	0	21.25	21.13	21.05	0.0	22
BW (MHz)	Mode	RB Allocation	RB offset	Maximum Average Power (dBm)				
				132047	132322	132597	MPR	Tune-up Limit
				1717.5 MHz	1745 MHz	1772.5 MHz		
15 MHz	QPSK	1	0	21.26	21.31	21.17	0.0	22
		1	37	21.13	21.22	21.00	0.0	22
		1	74	21.12	21.24	20.99	0.0	22
		36	0	21.19	21.30	21.13	0.0	22
		36	20	21.14	21.23	21.06	0.0	22
		36	39	21.12	21.21	21.04	0.0	22
		75	0	21.17	21.25	21.05	0.0	22
	16QAM	1	0	21.57	21.55	21.01	0.0	22
		1	37	21.40	21.47	20.84	0.0	22
		1	74	21.43	21.48	20.76	0.0	22
		36	0	21.09	21.26	21.02	0.0	22
		36	20	21.05	21.20	21.00	0.0	22
		36	39	21.02	21.17	20.95	0.0	22
		75	0	21.08	21.23	20.98	0.0	22
	64QAM	1	0	21.50	20.95	21.05	0.0	22
		1	37	21.37	20.88	20.92	0.0	22
		1	74	21.39	20.88	20.90	0.0	22
		36	0	21.17	21.24	21.06	0.0	22
		36	20	21.13	21.20	21.01	0.0	22
		36	39	21.10	21.18	20.97	0.0	22
		75	0	21.17	21.15	20.99	0.0	22

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

BW (MHz)	Mode	RB Allocation	RB offset	Maximum Average Power (dBm)				
				132022	132322	132622	MPR	Tune-up Limit
				1715 MHz	1745 MHz	1775 MHz		
10 MHz	QPSK	1	0	21.60	21.45	21.40	0.0	22
		1	25	21.49	21.47	21.32	0.0	22
		1	49	21.53	21.51	21.31	0.0	22
		25	0	21.31	21.31	21.15	0.0	22
		25	12	21.30	21.26	21.16	0.0	22
		25	25	21.26	21.25	21.09	0.0	22
	16QAM	50	0	21.57	21.55	21.46	0.0	22
		1	0	21.55	21.00	21.11	0.0	22
		1	25	21.47	21.03	21.01	0.0	22
		1	49	21.47	21.02	20.98	0.0	22
		25	0	21.25	21.18	21.15	0.0	22
		25	12	21.24	21.19	21.15	0.0	22
	64QAM	25	25	21.19	21.17	21.12	0.0	22
		50	0	21.23	21.15	21.09	0.0	22
		1	0	21.35	21.15	21.24	0.0	22
		1	25	21.22	21.18	21.19	0.0	22
		1	49	21.24	21.19	21.16	0.0	22
		25	0	21.21	21.20	21.03	0.0	22
5 MHz	QPSK	25	12	21.20	21.21	21.01	0.0	22
		25	25	21.21	21.16	20.97	0.0	22
		50	0	21.14	21.17	20.96	0.0	22
		1	0	21.51	21.53	21.52	0.0	22
		1	12	21.45	21.47	21.44	0.0	22
		1	24	21.48	21.49	21.46	0.0	22
	16QAM	12	0	21.18	21.24	21.08	0.0	22
		12	7	21.15	21.23	21.09	0.0	22
		12	13	21.12	21.22	21.06	0.0	22
		25	0	21.46	21.56	21.42	0.0	22
		1	0	21.17	21.63	21.19	0.0	22
		1	12	21.13	21.63	21.13	0.0	22
	64QAM	1	24	21.15	21.60	21.16	0.0	22
		12	0	21.14	21.28	21.10	0.0	22
		12	7	21.11	21.27	21.08	0.0	22
		12	13	21.11	21.27	21.06	0.0	22
		25	0	21.02	21.22	21.03	0.0	22
		1	0	21.23	21.39	20.84	0.0	22
64QAM	1	12	21.20	21.35	20.78	0.0	22	
	1	24	21.21	21.31	20.78	0.0	22	
	12	0	21.06	21.03	20.96	0.0	22	
	12	7	21.08	21.03	20.96	0.0	22	
	12	13	21.06	21.03	20.92	0.0	22	
	25	0	21.02	21.06	20.88	0.0	22	

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

BW (MHz)	Mode	RB Allocation	RB offset	Maximum Average Power (dBm)				
				131987	132322	132657	MPR	Tune-up Limit
				1711.5 MHz	1745 MHz	1778.5 MHz		
3 MHz	QPSK	1	0	21.39	21.50	21.28	0.0	22
		1	8	21.46	21.59	21.41	0.0	22
		1	14	21.37	21.45	21.32	0.0	22
		8	0	21.38	21.47	21.35	0.0	22
		8	4	21.43	21.49	21.33	0.0	22
		8	7	21.41	21.48	21.37	0.0	22
	16QAM	15	0	21.43	21.47	21.34	0.0	22
		1	0	21.06	21.44	20.87	0.0	22
		1	8	21.13	21.54	20.93	0.0	22
		1	14	21.01	21.44	20.84	0.0	22
		8	0	21.04	21.17	21.07	0.0	22
		8	4	21.09	21.19	21.07	0.0	22
	64QAM	8	7	21.07	21.19	21.09	0.0	22
		15	0	21.00	21.13	21.00	0.0	22
		1	0	21.18	21.11	21.17	0.0	22
		1	8	21.22	21.24	21.23	0.0	22
		1	14	21.09	21.15	21.10	0.0	22
		8	0	20.92	21.06	20.92	0.0	22
1.4 MHz	QPSK	8	4	20.98	21.12	20.95	0.0	22
		8	7	20.97	21.11	20.94	0.0	22
		15	0	21.01	21.08	20.86	0.0	22
		1	0	21.24	21.43	21.29	0.0	22
		1	3	21.33	21.47	21.35	0.0	22
		1	5	21.29	21.40	21.27	0.0	22
	16QAM	3	0	21.29	21.42	21.20	0.0	22
		3	1	21.35	21.46	21.26	0.0	22
		3	3	21.37	21.47	21.27	0.0	22
		6	0	21.31	21.38	21.23	0.0	22
		1	0	20.91	21.37	20.96	0.0	22
		1	3	20.99	21.42	21.02	0.0	22
	64QAM	1	5	20.94	21.33	20.94	0.0	22
		3	0	21.12	21.22	20.92	0.0	22
		3	1	21.15	21.26	20.96	0.0	22
		3	3	21.18	21.27	20.96	0.0	22
		6	0	21.09	20.94	21.00	0.0	22
		1	0	21.21	21.06	20.95	0.0	22
64QAM	1	3	21.31	21.15	21.07	0.0	22	
	1	5	21.19	21.11	20.91	0.0	22	
	3	0	21.17	20.89	20.98	0.0	22	
	3	1	21.23	20.93	21.05	0.0	22	
	3	3	21.22	20.96	21.07	0.0	22	
	6	0	20.82	21.02	21.16	0.0	22	

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

#### Measured Results

Band	Mode	Data Rate	Ch #	Freq. (MHz)	Chain 0 Average Power (dBm)			Chain 1 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 Mbps	1	2412	11.60	13.00	Yes	12.90	13.80	Yes
			6	2437	11.70	13.00		13.10	13.80	
			11	2462	11.70	13.00		12.80	13.80	
			12	2467	11.80	13.00		12.90	13.80	
			13	2472	9.40	10.70		12.90	13.80	
OFDM 2.4 GHz	802.11g	6 Mbps	1	2412	11.20	11.70	No	9.80	10.20	No
			6	2437	11.30	12.70		12.70	13.80	
			11	2462	11.30	12.70		12.80	13.80	
			12	2467	9.50	10.70		8.00	9.20	
			13	2472	1.20	2.70		0.10	1.20	
	802.11n (HT20)	6.5 Mbps	1	2412	11.60	11.70	No	9.80	10.30	No
			6	2437	11.60	12.70		13.10	14.00	
			11	2462	11.30	12.70		13.10	14.00	
			12	2467	9.40	10.70		8.40	9.30	
			13	2472	0.00	0.70		-1.90	-0.70	

#### Note(s):

- SAR is not required for 802.11g/n modes when the adjusted SAR for 802.11b is < 1.2 W/kg.
- For "Not required", SAR Test reduction was applied from KDB 248227 guidance, Sec. 2.1, b), 1) when the same maximum power is specified for multiple transmission modes in a frequency band, the largest channel bandwidth, lowest order modulation, lowest data rate and lowest order 802.11a/g/n/ac mode is used for SAR measurement, on the highest measured output power channel in the initial test configuration, for each frequency band. Additional output power measurements were not deemed necessary.

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

#### Measured Results

Band	Mode	Data Rate	Ch #	Freq. (MHz)	Chain 0 Average Power (dBm)			Chain 1 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	6 Mbps	36	5180	Not Required	12.20	No	Not Required	11.60	No	
			40	5200		11.60					
			44	5220		11.60					
	802.11n (HT20)	6.5 Mbps	36	5180		12.20	No		11.60		
			40	5200		11.60					
			44	5220		11.60					
	802.11ac (VHT20)	6.5 Mbps	36	5180		12.20	No		11.60		
			40	5200		11.60					
			44	5220		11.60					
	802.11n (HT40)	13.5 Mbps	38	5190		12.20	No		11.60		
			46	5230		11.60					
	802.11ac (VHT40)	13.5 Mbps	38	5190		12.20	No		11.60		
			46	5230		11.60					
	802.11ac (VHT80)	29.3 Mbps	42	5210		11.20	No		7.91	No	
Band	Mode	Data Rate	Ch #	Freq. (MHz)	Chain 0 Average Power (dBm)			Chain 1 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	6 Mbps	52	5260	11.10	12.50	Yes	Not Required	11.90	No	
			56	5280	11.10	12.50			11.90		
			60	5300	11.40	12.50			11.90		
			64	5320	11.30	12.50			11.90		
	802.11n (HT20)	6.5 Mbps	52	5260	Not Required	12.40	No		11.90		
			56	5280		12.40			11.90		
			60	5300		12.40			11.90		
			64	5320		12.40			11.90		
	802.11ac (VHT20)	6.5 Mbps	52	5260		12.20	No		11.90		
			56	5280		12.20			11.90		
			60	5300		12.20			11.90		
			64	5320		12.20			11.90		
	802.11n (HT40)	13.5 Mbps	54	5270		12.40	No		10.40	11.90	Yes
			62	5310		12.40			10.30	11.90	
802.11ac (VHT40)	13.5 Mbps	54	5270	12.20		No	Not Required	11.90	No		
		62	5310	12.20				11.70			
802.11ac (VHT80)	29.3 Mbps	58	5290	11.10		No	7.57	No			

#### Note(s):

- For "Not required", SAR Test reduction was applied from KDB 248227 guidance, Sec. 2.1, b), 1) when the same maximum power is specified for multiple transmission modes in a frequency band, the largest channel bandwidth, lowest order modulation, lowest data rate and lowest order 802.11a/g/n/ac mode is used for SAR measurement, on the highest measured output power channel in the initial test configuration, for each frequency band. Additional output power measurements were not deemed necessary.
- When the same transmission mode configurations have the same maximum output power on the same channel for the 802.11 a/g/n/ac modes, the channel in the lower order/sequence 802.11 mode (i.e. a, g, n then ac) is selected.
- When the specified maximum output power is the same for both UNII band I and UNII band 2A, begin SAR measurement in UNII band 2A; and if the highest reported SAR for UNII band 2A is
  - ≤ 1.2 W/kg, SAR is not required for UNII band I
  - > 1.2 W/kg, both bands should be tested independently for SAR.

Band	Mode	Data Rate	Ch #	Freq. (MHz)	Chain 0 Average Power (dBm)			Chain 1 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	6 Mbps	100	5500	Not Required	10.40	No	Not Required	10.50	No	
			116	5580		10.40			10.50		
			124	5620		10.40			10.50		
			144	5720		10.40			10.50		
	802.11n (HT20)	6.5 Mbps	100	5500		10.40	No		10.70	No	
			116	5580		10.40			10.70		
			124	5620		10.40			10.70		
			144	5720		10.40			10.70		
	802.11ac (VHT20)	6.5 Mbps	100	5500		10.10	No		10.40	No	
			116	5580		10.10			10.40		
			124	5620		10.10			10.40		
			144	5720		10.10			10.40		
	802.11n (HT40)	13.5 Mbps	102	5510		9.70	Yes		10.40	10.70	Yes
			118	5590		8.70			10.40	10.70	
			126	5630		8.70			10.40	10.70	
			142	5710		10.10			10.40	10.70	
	802.11ac (VHT40)	13.5 Mbps	102	5510		10.10	Not Required		10.10	7.10	No
			118	5590		10.10			10.10	7.10	
			126	5630		10.10			10.10	7.10	
			142	5710		10.10			10.10	7.10	
802.11ac (VHT80)	29.3 Mbps	106	5530	10.10	No	10.10	10.40	No			
		122	5610	10.10		10.40	10.40				
		138	5690	10.10		10.40	10.40				
Band	Mode	Data Rate	Ch #	Freq. (MHz)	Chain 0 Average Power (dBm)			Chain 1 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	6 Mbps	149	5745	11.10	11.50	Yes	11.60	11.60	Yes	
			157	5785	11.20	11.50		11.40	11.60		
			165	5825	11.20	11.50		11.60	11.60		
	802.11n (HT20)	6.5 Mbps	149	5745	Not Required	10.40	No	Not Required	7.50	No	
			157	5785		10.40			7.50		
			165	5825		10.40			7.50		
	802.11ac (VHT20)	6.5 Mbps	149	5745		10.40	No		7.10	No	
			157	5785		10.40			7.10		
			165	5825		10.40			7.10		
	802.11n (HT40)	13.5 Mbps	151	5755		10.40	No		7.50	No	
			159	5795		10.40			7.50		
	802.11ac (VHT40)	13.5 Mbps	151	5755		10.40	No		7.10	No	
			159	5795		10.40			7.10		
	802.11ac (VHT80)	29.3 Mbps	155	5775		10.30	No		7.00	No	

**Note(s):**

- For "Not required", SAR Test reduction was applied from KDB 248227 guidance, Sec. 2.1, b), 1) when the same maximum power is specified for multiple transmission modes in a frequency band, the largest channel bandwidth, lowest order modulation, lowest data rate and lowest order 802.11a/g/n/ac mode is used for SAR measurement, on the highest measured output power channel in the initial test configuration, for each frequency band. Additional output power measurements were not deemed necessary.
- When the same transmission mode configurations have the same maximum output power on the same channel for the 802.11 a/g/n/ac modes, the channel in the lower order/sequence 802.11 mode (i.e. a, g, n then ac) is selected.



### 9.6. Bluetooth

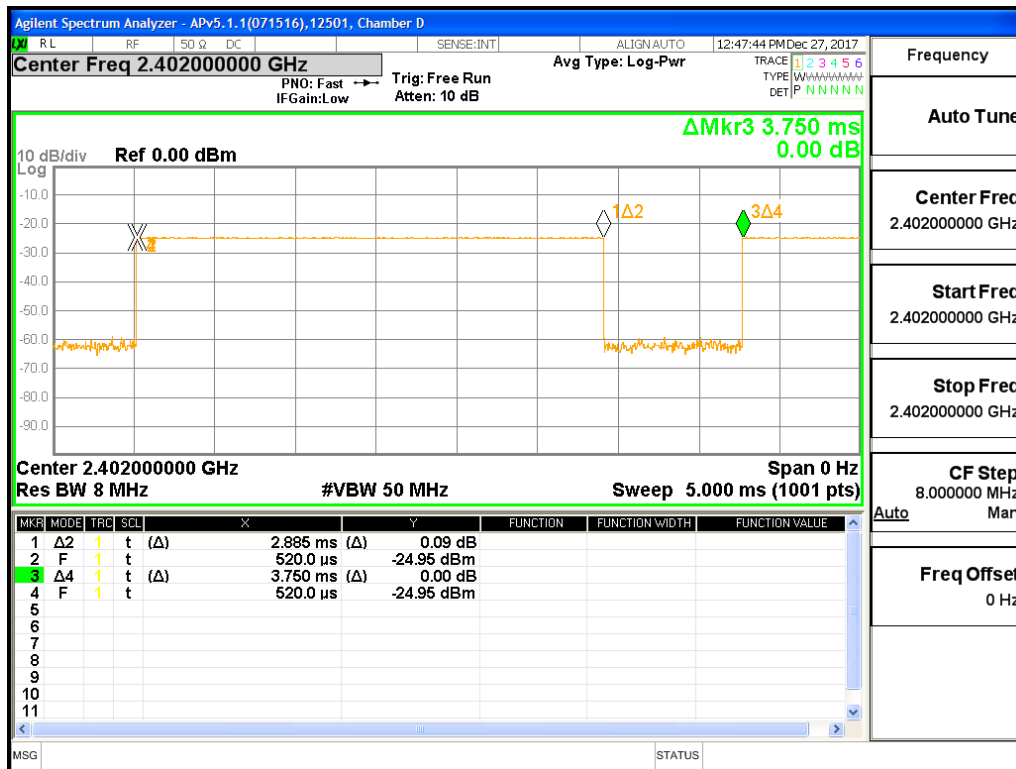
Band	Mode	Ch #	Freq. (MHz)	Chain 0 Average Power (dBm)		
				Meas Pwr	Tune-up	SAR Test (Yes/No)
2.4	GFSK	0	2402	9.16	10.75	Yes
		39	2441	9.76	11.76	
		78	2480	9.74	10.62	
	EDR, $\pi/4$ DQPSK	0	2402	6.39	7.98	No
		39	2441	7.21	9.21	
		78	2480	7.53	8.02	
	EDR, 8-DPSK	0	2402	6.39	7.98	No
		39	2441	7.21	9.21	
		78	2480	7.53	8.02	
	LE, GFSK	0	2402	3.07	5.07	No
		19	2440	4.17	6.17	
		39	2480	5.15	5.15	

#### Duty Factor Measured Results

Mode	Type	T on (ms)	Period (ms)	Duty Cycle	Crest Factor (1/duty cycle)
GFSK	DH5	2.885	3.75	76.93%	1.30

### Duty Cycle plots

GFSK



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

### SAR Test Reduction criteria are as follows:

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

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

### KDB 447498 D01 General RF Exposure Guidance:

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

- $\leq 0.8$  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):

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 .

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

### KDB 941225 D01 SAR test for 3G devices:

When the maximum output power and tune-up tolerance specified for production units in a secondary mode is  $\leq 1/4$  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 closest/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	Dist. (mm)	Test Position	Ch #.	Freq. (MHz)	Power (dBm)		1-g SAR (W/kg)		Plot No.
						Tune-up Limit	Meas.	Meas.	Scaled	
Head	GPRS 4 Slots	0	Left Touch	190	836.6	28.20	27.90	0.110	0.118	1
			Left Tilt	190	836.6	28.20	27.90	0.035	0.038	
			Right Touch	190	836.6	28.20	27.90	0.087	0.093	
			Right Tilt	190	836.6	28.20	27.90	0.054	0.058	
Body-worn	GPRS 4 Slots	15	Rear	190	836.6	28.20	27.90	0.184	0.197	
			Front	190	836.6	28.20	27.90	0.213	0.228	2
Hotspot	GPRS 4 Slots	10	Rear	190	836.6	28.20	27.90	0.311	0.333	3
			Front	190	836.6	28.20	27.90	0.307	0.329	
			Edge 2	190	836.6	28.20	27.90	0.085	0.091	
			Edge 3	190	836.6	28.20	27.90	0.146	0.156	
			Edge 4	190	836.6	28.20	27.90	0.192	0.206	
Hotspot	DTM 2 Slots	10	Rear	190	836.6	31.20	30.90	0.272	0.291	

**10.2. GSM1900**

RF Exposure Conditions	Mode	Dist. (mm)	Test Position	Ch #.	Freq. (MHz)	Power (dBm)		1-g SAR (W/kg)		Plot No.
						Tune-up Limit	Meas.	Meas.	Scaled	
Head	GPRS 4 Slots	0	Left Touch	661	1880.0	24.70	24.19	0.091	0.102	4
			Left Tilt	661	1880.0	24.70	24.19	0.043	0.048	
			Right Touch	661	1880.0	24.70	24.19	0.079	0.089	
			Right Tilt	661	1880.0	24.70	24.19	0.038	0.043	
Body-worn	GPRS 4 Slots	15	Rear	661	1880.0	24.70	24.19	0.066	0.074	
			Front	661	1880.0	24.70	24.19	0.089	0.100	5
Hotspot	GPRS 4 Slots	10	Rear	661	1880.0	24.70	24.19	0.116	0.130	
			Front	661	1880.0	24.70	24.19	0.151	0.170	
			Edge 2	661	1880.0	24.70	24.19	0.048	0.054	
			Edge 3	661	1880.0	24.70	24.19	0.297	0.334	6
			Edge 4	661	1880.0	24.70	24.19	0.073	0.082	
Hotspot	DTM 2 Slots	10	Edge 3	661	1880.0	27.70	27.30	0.245	0.269	

**10.3. W-CDMA Band II**

RF Exposure Conditions	Mode	Pwr Back-off	Dist. (mm)	Test Position	Ch #.	Freq. (MHz)	Power (dBm)		1-g SAR (W/kg)		Plot No.
							Tune-up Limit	Meas.	Meas.	Scaled	
Head	Rel. 99 RMC 12.2 kbps	OFF	0	Left Touch	9400	1880	22.70	22.30	0.114	0.125	7
				Left Tilt	9400	1880	22.70	22.30	0.064	0.070	
				Right Touch	9400	1880	22.70	22.30	0.104	0.114	
				Right Tilt	9400	1880	22.70	22.30	0.053	0.058	
Body-worn	Rel. 99 RMC 12.2 kbps	OFF	15	Rear	9400	1880	22.70	22.30	0.097	0.106	
				Front	9400	1880	22.70	22.30	0.154	0.169	8
Hotspot	Rel. 99 RMC 12.2 kbps	OFF	10	Rear	9400	1880	22.70	22.30	0.170	0.186	
				Front	9400	1880	22.70	22.30	0.252	0.276	
				Edge 2	9400	1880	22.70	22.30	0.062	0.068	
				Edge 3	9400	1880	22.70	22.30	0.421	0.462	9
				Edge 4	9400	1880	22.70	22.30	0.152	0.167	

**10.4. W-CDMA Band IV**

RF Exposure Conditions	Mode	Pwr Back-off	Dist. (mm)	Test Position	Ch #.	Freq. (MHz)	Power (dBm)		1-g SAR (W/kg)		Plot No.
							Tune-up Limit	Meas.	Meas.	Scaled	
Head	Rel. 99 RMC 12.2 kbps	OFF	0	Left Touch	1413	1732.6	21.70	21.20	0.116	0.130	
				Left Tilt	1413	1732.6	21.70	21.20	0.046	0.052	
				Right Touch	1413	1732.6	21.70	21.20	0.136	0.153	10
				Right Tilt	1413	1732.6	21.70	21.20	0.056	0.063	
Body-worn	Rel. 99 RMC 12.2 kbps	OFF	15	Rear	1413	1732.6	21.70	21.20	0.153	0.172	
				Front	1413	1732.6	21.70	21.20	0.268	0.301	11
Hotspot	Rel. 99 RMC 12.2 kbps	OFF	10	Rear	1413	1732.6	21.70	21.20	0.229	0.257	
				Front	1413	1732.6	21.70	21.20	0.412	0.462	12
				Edge 2	1413	1732.6	21.70	21.20	0.035	0.039	
				Edge 3	1413	1732.6	21.70	21.20	0.317	0.356	
				Edge 4	1413	1732.6	21.70	21.20	0.156	0.175	

**10.5. W-CDMA Band V**

RF Exposure Conditions	Mode	Pwr Back-off	Dist. (mm)	Test Position	Ch #.	Freq. (MHz)	Power (dBm)		1-g SAR (W/kg)		Plot No.
							Tune-up Limit	Meas.	Meas.	Scaled	
Head	Rel. 99 RMC 12.2 kbps	OFF	0	Left Touch	4183	837	24.90	24.90	0.086	0.086	
				Left Tilt	4183	837	24.90	24.90	0.039	0.039	
				Right Touch	4183	837	24.90	24.90	0.112	0.112	13
				Right Tilt	4183	837	24.90	24.90	0.040	0.040	
Body-worn	Rel. 99 RMC 12.2 kbps	OFF	15	Rear	4183	837	24.90	24.90	0.161	0.161	
				Front	4183	837	24.90	24.90	0.171	0.171	14
Hotspot	Rel. 99 RMC 12.2 kbps	OFF	10	Rear	4183	837	24.90	24.90	0.263	0.263	15
				Front	4183	837	24.90	24.90	0.255	0.255	
				Edge 2	4183	837	24.90	24.90	0.141	0.141	
				Edge 3	4183	837	24.90	24.90	0.203	0.203	
				Edge 4	4183	837	24.90	24.90	0.243	0.243	

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

RF Exposure Conditions	Mode	Pwr Back-off	Dist. (mm)	Test Position	Ch #.	Freq. (MHz)	RB Allocation	RB offset	Power (dBm)		1-g SAR (W/kg)		Plot No.
									Tune-up Limit	Meas.	Meas.	Scaled	
Head	QPSK	OFF	0	Left Touch	18900	1880.0	1	0	23.00	22.48	0.116	0.131	
							50	0	23.00	22.59	0.109	0.120	
				Left Tilt (15°)	18900	1880.0	1	0	23.00	22.48	0.063	0.071	
							50	0	23.00	22.59	0.057	0.063	
				Right Touch	18900	1880.0	1	0	23.00	22.48	0.140	0.158	16
							50	0	23.00	22.59	0.130	0.143	
				Right Tilt (15°)	18900	1880.0	1	0	23.00	22.48	0.057	0.064	
							50	0	23.00	22.59	0.054	0.059	
Body-worn	QPSK	OFF	15	Rear	18900	1880.0	1	0	23.00	22.48	0.079	0.089	
							50	0	23.00	22.59	0.078	0.085	
				Front	18900	1880.0	1	0	23.00	22.48	0.137	0.154	17
							50	0	23.00	22.59	0.136	0.149	
Hotspot	QPSK	OFF	10	Rear	18900	1880.0	1	0	23.00	22.48	0.141	0.159	
							50	0	23.00	22.59	0.137	0.151	
				Front	18900	1880.0	1	0	23.00	22.48	0.215	0.242	
							50	0	23.00	22.59	0.212	0.233	
				Edge 2	18900	1880.0	1	0	23.00	22.48	0.061	0.069	
							50	0	23.00	22.59	0.059	0.065	
				Edge 3	18900	1880.0	1	0	23.00	22.48	0.394	0.444	18
							50	0	23.00	22.59	0.390	0.429	
				Edge 4	18900	1880.0	1	0	23.00	22.48	0.148	0.167	
							50	0	23.00	22.59	0.141	0.155	

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

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

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

RF Exposure Conditions	Mode	Pwr Back-off	Dist. (mm)	Test Position	Ch #.	Freq. (MHz)	RB Allocation	RB offset	Power (dBm)		1-g SAR (W/kg)		Plot No.
									Tune-up Limit	Meas.	Meas.	Scaled	
Head	QPSK	OFF	0	Left Touch	20525	836.5	1	25	25.00	24.60	0.087	0.096	19
							25	12	24.00	23.65	0.071	0.077	
				Left Tilt	20525	836.5	1	25	25.00	24.60	0.037	0.041	
							25	12	24.00	23.65	0.030	0.033	
				Right Touch	20525	836.5	1	25	25.00	24.60	0.074	0.081	
							25	12	24.00	23.65	0.059	0.064	
Right Tilt	20525	836.5	1	25	25.00	24.60	0.035	0.038					
			25	12	24.00	23.65	0.028	0.030					
Body-worn	QPSK	OFF	15	Rear	20525	836.5	1	25	25.00	24.60	0.174	0.191	
							25	12	24.00	23.65	0.141	0.153	
				Front	20525	836.5	1	25	25.00	24.60	0.175	0.192	20
							25	12	24.00	23.65	0.144	0.156	
Hotspot	QPSK	OFF	10	Rear	20525	836.5	1	25	25.00	24.60	0.248	0.272	
							25	12	24.00	23.65	0.204	0.221	
				Front	20525	836.5	1	25	25.00	24.60	0.262	0.287	21
							25	12	24.00	23.65	0.213	0.231	
				Edge 2	20525	836.5	1	25	25.00	24.60	0.088	0.096	
							25	12	24.00	23.65	0.071	0.077	
				Edge 3	20525	836.5	1	25	25.00	24.60	0.171	0.187	
							25	12	24.00	23.65	0.128	0.139	
Edge 4	20525	836.5	1	25	25.00	24.60	0.186	0.204					
			25	12	24.00	23.65	0.148	0.160					

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

RF Exposure Conditions	Mode	Pwr Back-off	Dist. (mm)	Test Position	Ch #.	Freq. (MHz)	RB Allocation	RB offset	Power (dBm)		1-g SAR (W/kg)		Plot No.
									Tune-up Limit	Meas.	Meas.	Scaled	
Head	QPSK	OFF	0	Left Touch	21100	2535.0	1	99	20.00	19.33	0.053	0.062	
							50	24	20.00	19.38	0.054	0.062	
				Left Tilt (15°)	21100	2535.0	1	99	20.00	19.33	0.040	0.047	
							50	24	20.00	19.38	0.043	0.050	
				Right Touch	21100	2535.0	1	99	20.00	19.33	0.085	0.099	
							50	24	20.00	19.38	0.088	0.102	22
				Right Tilt (15°)	21100	2535.0	1	99	20.00	19.33	0.019	0.022	
							50	24	20.00	19.38	0.020	0.023	
Body-worn	QPSK	OFF	15	Rear	21100	2535.0	1	99	20.00	19.33	0.081	0.095	
							50	24	20.00	19.38	0.084	0.097	
				Front	21100	2535.0	1	99	20.00	19.33	0.099	0.116	
							50	24	20.00	19.38	0.102	0.118	23
Hotspot	QPSK	OFF	10	Rear	21100	2535.0	1	99	20.00	19.33	0.130	0.152	
							50	24	20.00	19.38	0.133	0.153	
				Front	21100	2535.0	1	99	20.00	19.33	0.211	0.246	
							50	24	20.00	19.38	0.246	0.284	
				Edge 2	21100	2535.0	1	99	20.00	19.33	0.149	0.174	
							50	24	20.00	19.38	0.155	0.179	
				Edge 3	21100	2535.0	1	99	20.00	19.33	0.361	0.421	
							50	24	20.00	19.38	0.373	0.430	24
				Edge 4	21100	2535.0	1	99	20.00	19.33	0.039	0.046	
							50	24	20.00	19.38	0.039	0.045	



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

RF Exposure Conditions	Mode	Pwr Back-off	Dist. (mm)	Test Position	Ch #.	Freq. (MHz)	RB Allocation	RB offset	Power (dBm)		1-g SAR (W/kg)		Plot No.
									Tune-up Limit	Meas.	Meas.	Scaled	
Head	QPSK	OFF	0	Left Touch	23095	707.5	1	49	25.00	24.62	0.057	0.062	25
							25	12	24.00	23.63	0.038	0.041	
				Left Tilt	23095	707.5	1	49	25.00	24.62	0.026	0.028	
							25	12	24.00	23.63	0.017	0.019	
				Right Touch	23095	707.5	1	49	25.00	24.62	0.034	0.037	
							25	12	24.00	23.63	0.022	0.024	
Right Tilt	23095	707.5	1	49	25.00	24.62	0.019	0.021					
			25	12	24.00	23.63	0.012	0.013					
Body-w orn	QPSK	OFF	15	Rear	23095	707.5	1	49	25.00	24.62	0.161	0.176	26
							25	12	24.00	23.63	0.124	0.135	
				Front	23095	707.5	1	49	25.00	24.62	0.155	0.169	
							25	12	24.00	23.63	0.119	0.130	
Hotspot	QPSK	OFF	10	Rear	23095	707.5	1	49	25.00	24.62	0.207	0.226	
							25	12	24.00	23.63	0.161	0.175	
				Front	23095	707.5	1	49	25.00	24.62	0.252	0.275	27
							25	12	24.00	23.63	0.198	0.216	
				Edge 2	23095	707.5	1	49	25.00	24.62	0.074	0.081	
							25	12	24.00	23.63	0.055	0.060	
				Edge 3	23095	707.5	1	49	25.00	24.62	0.102	0.111	
							25	12	24.00	23.63	0.079	0.086	
Edge 4	23095	707.5	1	49	25.00	24.62	0.219	0.239					
			25	12	24.00	23.63	0.170	0.185					

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

RF Exposure Conditions	Mode	Pwr Back-off	Dist. (mm)	Test Position	Ch #.	Freq. (MHz)	RB Allocation	RB offset	Power (dBm)		1-g SAR (W/kg)		Plot No.
									Tune-up Limit	Meas.	Meas.	Scaled	
Head	QPSK	OFF	0	Left Touch	23230	782.0	1	25	25.00	24.53	0.167	0.186	28
							25	0	24.00	23.63	0.139	0.151	
				Left Tilt	23230	782.0	1	25	25.00	24.53	0.077	0.086	
							25	0	24.00	23.63	0.062	0.068	
				Right Touch	23230	782.0	1	25	25.00	24.53	0.117	0.130	
							25	0	24.00	23.63	0.090	0.098	
Right Tilt	23230	782.0	1	25	25.00	24.53	0.061	0.068					
			25	0	24.00	23.63	0.048	0.053					
Body-worn	QPSK	OFF	15	Rear	23230	782.0	1	25	25.00	24.53	0.328	0.365	
							25	0	24.00	23.63	0.259	0.282	
				Front	23230	782.0	1	25	25.00	24.53	0.351	0.391	29
							25	0	24.00	23.63	0.279	0.304	
Hotspot	QPSK	OFF	10	Rear	23230	782.0	1	25	25.00	24.53	0.458	0.510	
							25	0	24.00	23.63	0.363	0.395	
				Front	23230	782.0	1	25	25.00	24.53	0.490	0.546	30
							25	0	24.00	23.63	0.351	0.382	
				Edge 2	23230	782.0	1	25	25.00	24.53	0.121	0.135	
							25	0	24.00	23.63	0.094	0.102	
				Edge 3	23230	782.0	1	25	25.00	24.53	0.252	0.281	
							25	0	24.00	23.63	0.201	0.219	
Edge 4	23230	782.0	1	25	25.00	24.53	0.458	0.510					
			25	0	24.00	23.63	0.361	0.393					

**10.12. LTE Band 17 (10MHz Bandwidth)**

SAR for LTE Band 17 (Frequency Range: 704-716 MHz) is covered by LTE Band 12 (Frequency Range: 699-716 MHz) due to overlapping frequency range, same maximum tune-up limit and same channel bandwidth.

**10.13. LTE Band 26 (15MHz Bandwidth)**

RF Exposure Conditions	Mode	Pwr Back-off	Dist. (mm)	Test Position	Ch #.	Freq. (MHz)	RB Allocation	RB offset	Power (dBm)		1-g SAR (W/kg)		Plot No.
									Tune-up Limit	Meas.	Meas.	Scaled	
Head	QPSK	OFF	0	Left Touch	26865	831.5	1	37	25.00	24.47	0.064	0.072	31
							36	20	24.00	23.50	0.051	0.057	
				Left Tilt	26865	831.5	1	37	25.00	24.47	0.028	0.032	
							36	20	24.00	23.50	0.022	0.025	
				Right Touch	26865	831.5	1	37	25.00	24.47	0.061	0.069	
							36	20	24.00	23.50	0.049	0.055	
				Right Tilt	26865	831.5	1	37	25.00	24.47	0.030	0.034	
							36	20	24.00	23.50	0.023	0.026	
Body-worn	QPSK	OFF	15	Rear	26865	831.5	1	37	25.00	24.47	0.172	0.194	
							36	20	24.00	23.50	0.136	0.153	
				Front	26865	831.5	1	37	25.00	24.47	0.188	0.212	32
							36	20	24.00	23.50	0.150	0.168	
Hotspot	QPSK	OFF	10	Rear	26865	831.5	1	37	25.00	24.47	0.254	0.287	
							36	20	24.00	23.50	0.204	0.229	
				Front	26865	831.5	1	37	25.00	24.47	0.259	0.293	33
							36	20	24.00	23.50	0.206	0.231	
				Edge 2	26865	831.5	1	37	25.00	24.47	0.073	0.082	
							36	20	24.00	23.50	0.058	0.065	
				Edge 3	26865	831.5	1	37	25.00	24.47	0.158	0.179	
							36	20	24.00	23.50	0.125	0.140	
				Edge 4	26865	831.5	1	37	25.00	24.47	0.173	0.195	
							36	20	24.00	23.50	0.139	0.156	

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

RF Exposure Conditions	Mode	Pwr Back-off	Dist. (mm)	Test Position	Ch #.	Freq. (MHz)	RB Allocation	RB offset	Power (dBm)		1-g SAR (W/kg)		Plott No.
									Tune-up Limit	Meas.	Meas.	Scaled	
Head	QPSK	OFF	0	Left Touch	40620	2593.0	1	0	22.00	21.44	0.053	0.060	34
							50	0	22.00	21.39	0.052	0.059	
				Left Tilt	40620	2593.0	1	0	22.00	21.44	0.036	0.041	
							50	0	22.00	21.39	0.035	0.040	
				Right Touch	40620	2593.0	1	0	22.00	21.44	0.078	0.089	
							50	0	22.00	21.39	0.076	0.087	
Right Tilt	40620	2593.0	1	0	22.00	21.44	0.018	0.020					
			50	0	22.00	21.39	0.019	0.022					
Body-worn	QPSK	OFF	15	Rear	40620	2593.0	1	0	22.00	21.44	0.086	0.098	35
							50	0	22.00	21.39	0.087	0.100	
				Front	40620	2593.0	1	0	22.00	21.44	0.094	0.107	
							50	0	22.00	21.39	0.095	0.109	
Hotspot	QPSK	OFF	10	Rear	40620	2593.0	1	0	22.00	21.44	0.139	0.158	36
							50	0	22.00	21.39	0.137	0.158	
				Front	40620	2593.0	1	0	22.00	21.44	0.178	0.202	
							50	0	22.00	21.39	0.178	0.205	
				Edge 2	40620	2593.0	1	0	22.00	21.44	0.166	0.189	
							50	0	22.00	21.39	0.167	0.192	
				Edge 3	40620	2593.0	1	0	22.00	21.44	0.376	0.428	
							50	0	22.00	21.39	0.388	0.447	
				Edge 4	40620	2593.0	1	0	22.00	21.44	0.038	0.043	
							50	0	22.00	21.39	0.037	0.043	

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

RF Exposure Conditions	Mode	Pwr Back-off	Dist. (mm)	Test Position	Ch #.	Freq. (MHz)	RB Allocation	RB offset	Power (dBm)		1-g SAR (W/kg)		Plot No.
									Tune-up Limit	Meas.	Meas.	Scaled	
Head	QPSK	OFF	0	Left Touch	132322	1745.0	1	0	22.00	21.33	0.129	0.151	37
							50	0	22.00	21.32	0.119	0.139	
				Left Tilt (15°)	132322	1745.0	1	0	22.00	21.33	0.042	0.049	
							50	0	22.00	21.32	0.044	0.051	
				Right Touch	132322	1745.0	1	0	22.00	21.33	0.137	0.160	
							50	0	22.00	21.32	0.141	0.165	
Right Tilt (15°)	132322	1745.0	1	0	22.00	21.33	0.049	0.057					
			50	0	22.00	21.32	0.049	0.057					
Body	QPSK	OFF	15	Rear	132322	1745.0	1	0	22.00	21.33	0.142	0.166	38
							50	0	22.00	21.32	0.138	0.161	
				Front	132322	1745.0	1	0	22.00	21.33	0.199	0.232	
							50	0	22.00	21.32	0.192	0.225	
Hotspot	QPSK	OFF	10	Rear	132322	1745.0	1	0	22.00	21.33	0.206	0.240	39
							50	0	22.00	21.32	0.196	0.229	
				Front	132322	1745.0	1	0	22.00	21.33	0.315	0.368	
							50	0	22.00	21.32	0.307	0.359	
				Edge 2	132322	1745.0	1	0	22.00	21.33	0.030	0.035	
							50	0	22.00	21.32	0.031	0.036	
				Edge 3	132322	1745.0	1	0	22.00	21.33	0.384	0.448	
							50	0	22.00	21.32	0.373	0.436	
				Edge 4	132322	1745.0	1	0	22.00	21.33	0.145	0.169	
							50	0	22.00	21.32	0.138	0.161	

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

RF Exposure Conditions	Mode	Antenna	Dist. (mm)	Test Position	Ch #.	Freq. (MHz)	Area Scan Max. SAR (W/kg)	Duty Cycle	Power (dBm)		1-g SAR (W/kg)		Plot No.
									Tune-up Limit	Meas.	Meas.	Scaled	
Head	802.11b 1 Mbps	Chain 0	0	Left Touch	6	2437	0.143	99.03%	13.00	11.70			
				Left Tilt	6	2437	0.159	99.03%	13.00	11.70			
				Right Touch	6	2437	0.419	99.03%	13.00	11.70	0.267	0.364	40
				Right Tilt	6	2437	0.338	99.03%	13.00	11.70			
Body-worn	802.11b 1 Mbps	Chain 0	15	Rear	6	2437	0.015	99.03%	13.00	11.70			
				Front	6	2437	0.029	99.03%	13.00	11.70	0.023	0.031	41
Hotspot	802.11b 1 Mbps	Chain 0	10	Rear	6	2437	0.038	99.03%	13.00	11.70			
				Front	6	2437	0.058	99.03%	13.00	11.70	0.045	0.061	42
				Edge 1	6	2437	0.044	99.03%	13.00	11.70			
				Edge 4	6	2437	0.040	99.03%	13.00	11.70			
Head	802.11b 1 Mbps	Chain 1	0	Left Touch	6	2437	0.022	99.03%	13.80	13.10			
				Left Tilt	6	2437	0.012	99.03%	13.80	13.10			
				Right Touch	6	2437	0.027	99.03%	13.80	13.10	0.014	0.017	43
				Right Tilt	6	2437	0.008	99.03%	13.80	13.10			
Body-worn	802.11b 1 Mbps	Chain 1	15	Rear	6	2437	0.001	99.03%	13.80	13.10	-	-	44
				Front	6	2437	0.001	99.03%	13.80	13.10			
Hotspot	802.11b 1 Mbps	Chain 1	10	Rear	6	2437	0.002	99.03%	13.80	13.10			
				Front	6	2437	0.001	99.03%	13.80	13.10			
				Edge 2	6	2437	0.003	99.03%	13.80	13.10	-	-	45

**Notes:**

- For results listed with “-”, the SAR result is less than 0.001 W/kg.
- When the 802.11b reported SAR of the highest measured maximum output power channel is ≤ 0.8 W/kg, no further SAR testing is required. If SAR is > 0.8 W/kg and ≤ 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 ≤ 1.2 W/kg.

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

#### U-NII-2A

RF Exposure Conditions	Mode	Antenna	Dist. (mm)	Test Position	Ch #.	Freq. (MHz)	Area Scan Max. SAR (W/kg)	Duty Cycle	Power (dBm)		1-g SAR (W/kg)		Plot No.
									Tune-up Limit	Meas.	Meas.	Scaled	
Head	802.11a 6 Mbps	Chain 0	0	Left Touch	60	5300	0.124	98.10%	12.5	11.4			
				Left Tilt	60	5300	0.102	98.10%	12.5	11.4			
				Right Touch	60	5300	0.154	98.10%	12.5	11.4	0.087	0.114	46
				Right Tilt	60	5300	0.146	98.10%	12.5	11.4			
Body-worn	802.11a 6 Mbps	Chain 0	15	Rear	60	5300	0.056	98.10%	12.5	11.4	0.020	0.026	47
				Front	60	5300	0.033	98.10%	12.5	11.4			
Head	802.11n HT40	Chain 1	0	Left Touch	54	5270	0.058	89.50%	11.9	10.4	0.029	0.046	48
				Left Tilt	54	5270	0.019	89.50%	11.9	10.4			
				Right Touch	54	5270	0.041	89.50%	11.9	10.4			
				Right Tilt	54	5270	0.024	89.50%	11.9	10.4			
Body-worn	802.11n HT40	Chain 1	15	Rear	54	5270	0.010	89.50%	11.9	10.4	-	-	49
				Front	54	5270	0.004	89.50%	11.9	10.4			
RF Exposure Conditions	Mode	Antenna	Dist. (mm)	Test Position	Ch #.	Freq. (MHz)	Area Scan Max. SAR (W/kg)	Duty Cycle	Power (dBm)		10-g SAR (W/kg)		Plot No.
Product Specific	802.11a 6 Mbps	Chain 0	0	Rear	60	5300	0.389	98.10%	12.5	11.4			
				Front	60	5300	0.458	98.10%	12.5	11.4	0.053	0.070	50
				Edge 1	60	5300	0.122	98.10%	12.5	11.4			
				Edge 4	60	5300	0.272	98.10%	12.5	11.4			
Product Specific	802.11n HT40	Chain 1	0	Rear	54	5270	0.132	89.50%	11.9	10.4			
				Front	54	5270	0.299	89.50%	11.9	10.4	0.019	0.030	51
				Edge 2	54	5270	0.125	89.50%	11.9	10.4			

#### U-NII-2C

RF Exposure Conditions	Mode	Antenna	Dist. (mm)	Test Position	Ch #.	Freq. (MHz)	Area Scan Max. SAR (W/kg)	Duty Cycle	Power (dBm)		1-g SAR (W/kg)		Plot No.
									Tune-up Limit	Meas.	Meas.	Scaled	
Head	802.11n HT40	Chain 0	0	Left Touch	142	5710	0.107	89.50%	10.4	10.1			
				Left Tilt	142	5710	0.123	89.50%	10.4	10.1			
				Right Touch	142	5710	0.153	89.50%	10.4	10.1			
				Right Tilt	142	5710	0.189	89.50%	10.4	10.1	0.068	0.081	52
Body-worn	802.11n HT40	Chain 0	15	Rear	142	5710	0.038	89.50%	10.4	10.1	0.013	0.016	53
				Front	142	5710	0.027	89.50%	10.4	10.1			
Head	802.11n HT40	Chain 1	0	Left Touch	142	5710	0.076	89.50%	10.7	10.7	0.023	0.026	54
				Left Tilt	142	5710	0.021	89.50%	10.7	10.7			
				Right Touch	142	5710	0.031	89.50%	10.7	10.7			
				Right Tilt	142	5710	0.018	89.50%	10.7	10.7			
Body-worn	802.11n HT40	Chain 1	15	Rear	142	5710	0.013	89.50%	10.7	10.7			
				Front	142	5710	0.030	89.50%	10.7	10.7	0.012	0.013	55
RF Exposure Conditions	Mode	Antenna	Dist. (mm)	Test Position	Ch #.	Freq. (MHz)	Area Scan Max. SAR (W/kg)	Duty Cycle	Power (dBm)		10-g SAR (W/kg)		Plot No.
Product Specific	802.11n HT40	Chain 0	0	Rear	142	5710	0.470	89.50%	10.4	10.1	0.076	0.091	56
				Front	142	5710	0.196	89.50%	10.4	10.1			
				Edge 1	142	5710	0.283	89.50%	10.4	10.1			
				Edge 4	142	5710	0.266	89.50%	10.4	10.1			
Product Specific	802.11n HT40	Chain 1	0	Rear	142	5710	0.403	89.50%	10.7	10.7	0.047	0.053	57
				Front	142	5710	0.305	89.50%	10.7	10.7			
				Edge 2	142	5710	0.199	89.50%	10.7	10.7			

U-NII-3

RF Exposure Conditions	Mode	Antenna	Dist. (mm)	Test Position	Ch #.	Freq. (MHz)	Area Scan Max. SAR (W/kg)	Duty Cycle	Power (dBm)		1-g SAR (W/kg)		Plot No.
									Tune-up Limit	Meas.	Meas.	Scaled	
Head	802.11a 6 Mbps	Chain 0	0	Left Touch	165	5825	0.099	98.10%	11.5	11.2			
				Left Tilt	165	5825	0.134	98.10%	11.5	11.2			
				Right Touch	165	5825	0.254	98.10%	11.5	11.2	0.104	0.114	58
				Right Tilt	165	5825	0.149	98.10%	11.5	11.2			
Body-worn	802.11a 6 Mbps	Chain 0	15	Rear	165	5825	0.086	98.10%	11.5	11.2	0.032	0.035	59
				Front	165	5825	0.021	98.10%	11.5	11.2			
Head	802.11a 6 Mbps	Chain 1	0	Left Touch	165	5825	0.093	98.10%	11.6	11.6	0.037	0.037	60
				Left Tilt	165	5825	0.083	98.10%	11.6	11.6			
				Right Touch	165	5825	0.069	98.10%	11.6	11.6			
				Right Tilt	165	5825	0.040	98.10%	11.6	11.6			
Body-worn	802.11a 6 Mbps	Chain 1	15	Rear	165	5825	0.047	98.10%	11.6	11.6	0.017	0.018	61
				Front	165	5825	0.035	98.10%	11.6	11.6			
RF Exposure Conditions	Mode	Antenna	Dist. (mm)	Test Position	Ch #.	Freq. (MHz)	Area Scan Max. SAR (W/kg)	Duty Cycle	Power (dBm)		10-g SAR (W/kg)		Plot No.
Product Specific	802.11a 6 Mbps	Chain 0	0	Rear	165	5825	1.190	98.10%	11.5	11.2	0.142	0.155	
				Front	165	5825	0.534	98.10%	11.5	11.2			
				Edge 1	165	5825	0.236	98.10%	11.5	11.2			
				Edge 4	165	5825	0.643	98.10%	11.5	11.2			
Product Specific	802.11a 6 Mbps	Chain 1	0	Rear	165	5825	0.864	98.10%	11.6	11.6	0.092	0.093	63
				Front	165	5825	0.487	98.10%	11.6	11.6			
				Edge 2	165	5825	0.372	98.10%	11.6	11.6			

10.18. Bluetooth

RF Exposure Conditions	Mode	Antenna	Dist. (mm)	Test Position	Ch #.	Freq. (MHz)	Duty Cycle	Power (dBm)		1-g SAR (W/kg)		Plots No.
								Tune-up Limit	Meas.	Meas.	Scaled	
Head	GFSK	Chain 0	0	Left Touch	39	2441	76.93%	11.76	9.76	0.049	0.101	
				Left Tilt	39	2441	76.93%	11.76	9.76	0.055	0.113	
				Right Touch	39	2441	76.93%	11.76	9.76	0.176	0.363	64
				Right Tilt	39	2441	76.93%	11.76	9.76	0.123	0.253	
Body-worn	GFSK	Chain 0	15	Rear	39	2441	76.93%	11.76	9.76	0.007	0.014	
				Front	39	2441	76.93%	11.76	9.76	0.009	0.018	65
Hotspot	GFSK	Chain 0	10	Rear	39	2441	76.93%	11.76	9.76	0.010	0.021	
				Front	39	2441	76.93%	11.76	9.76	0.026	0.054	66
				Edge 1	39	2441	76.93%	11.76	9.76	0.020	0.040	
				Edge 4	39	2441	76.93%	11.76	9.76	0.023	0.047	

## 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 ( $\sim 10\%$  from the 1-g or 10-g respective SAR limit).
- 4) Perform a third repeated measurement only if the original, first, or second repeated measurement is  $\geq 1.5$  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  $> 1.20$ .

Frequency Band (MHz)	Air Interface	RF Exposure Conditions	Test Position	Repeated SAR (Yes/No)	Highest Measured SAR (W/kg)
700	LTE Band 12	Hotspot	Front	No	0.252
	LTE Band 13	Hotspot	Front	No	0.490
850	GSM 850	Hotspot	Rear	No	0.311
	WCDMA Band V	Hotspot	Rear	No	0.263
	LTE Band 5	Hotspot	Front	No	0.262
	LTE Band 26	Hotspot	Front	No	0.259
1700	WCDMA Band IV	Hotspot	Front	No	0.412
	LTE Band 66	Hotspot	Edge 3	No	0.384
1900	GSM 1900	Hotspot	Edge 3	No	0.297
	WCDMA Band II	Hotspot	Edge 3	No	0.421
	LTE Band 2	Hotspot	Edge 3	No	0.394
2400	Wi-Fi 802.11b/g/n	Head	Right Touch	No	0.267
2400	BT	Head	Right Touch	No	0.176
2500	LTE Band 7	Hotspot	Edge 3	No	0.373
2600	LTE Band 41	Hotspot	Edge 3	No	0.388
5300	Wi-Fi 802.11a/n/ac	Head	Right Touch	No	0.087
5500	Wi-Fi 802.11a/n/ac	Head	Right Tilt	No	0.068
5800	Wi-Fi 802.11a/n/ac	Head	Right Touch	No	0.104

### Note(s):

Repeated measurement is not required when the original highest measured SAR is  $< 0.8$  W/kg

Frequency Band (MHz)	Air Interface	RF Exposure Conditions	Test Position	Repeated SAR (Yes/No)	Highest Measured SAR (W/kg)
5300	Wi-Fi 802.11a/n/ac	Product specific	Front	No	0.053
5500	Wi-Fi 802.11a/n/ac	Product specific	Rear	No	0.076
5800	Wi-Fi 802.11a/n/ac	Product specific	Rear	No	0.142

### Note(s):

Repeated measurement is not required when the original highest measured SAR is  $< 2$  W/kg



## 12. Simultaneous Transmission SAR Analysis

KDB 447498 D01 General RF Exposure Guidance explains how to calculate the SAR to Peak Location Ratio (SPLSR) between pairs of simultaneously transmitting antennas:

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

Where:

**SAR<sub>1</sub>** is the highest reported or estimated SAR for the first of a pair of simultaneous transmitting antennas, in a specific test operating mode and exposure condition

**SAR<sub>2</sub>** is the highest reported or estimated SAR for the second of a pair of simultaneous transmitting antennas, in the same test operating mode and exposure condition as the first

**Ri** is the separation distance between the pair of simultaneous transmitting antennas. When the SAR is measured, for both antennas in the pair, it is determined by the actual x, y and z coordinates in the 1-g SAR for each SAR peak location, based on the extrapolated and interpolated result in the zoom scan measurement, using the formula of  $[(x_1-x_2)^2 + (y_1-y_2)^2 + (z_1-z_2)^2]$

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

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

### Simultaneous Transmission Condition

Case	Cellular	WLAN Chain0 / BT	WLAN Chain1
1	GSM/GPRS/EDGE	BT/BLE	(None)
2	GSM/GPRS/EDGE	WLAN 2.4G	WLAN 2.4G
3	GSM/GPRS/EDGE	WLAN 5G	WLAN 5G
4	UMTS/HSPA	BT/BLE	(None)
5	UMTS/HSPA	WLAN 2.4G	WLAN 2.4G
6	UMTS/HSPA	WLAN 5G	WLAN 5G
7	LTE	BT/BLE	(None)
8	LTE	WLAN 2.4G	WLAN 2.4G
9	LTE	WLAN 5G	WLAN 5G
10	(None)	BT/BLE WLAN 5G	WLAN 5G
11	GSM/GPRS/EDGE	BT/BLE WLAN 5G	WLAN 5G
12	UMTS/HSPA	BT/BLE WLAN 5G	WLAN 5G
13	LTE	BT/BLE WLAN 5G	WLAN 5G
14	GSM/GPRS/EDGE	WLAN 2.4G	WLAN 5G
15	UMTS/HSPA	WLAN 2.4G	WLAN 5G
16	LTE	WLAN 2.4G	WLAN 5G

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

RF Exposure conditions	Test Position	Standalone SAR (W/kg)						Σ 1-g SAR (W/kg)							
		WWAN		DTS		U-NII		BT	WWAN + BT	WWAN + DTS	WWAN + DTS	WWAN+DTS+U-NII	WWAN + U-NII	WWAN+U-NII+BT	U-NII+BT
		①	Chain 0 ②	Chain 1 ③	Chain 0 ④	Chain 1 ⑤	Chain 0 ⑥	① + ⑥	① + ②	① + ② + ③	① + ② + ⑤	① + ④ + ⑤	① + ④ + ⑤ + ⑥	④ + ⑤ + ⑥	
Head	Left Touch	0.186	0.363	0.017	0.114	0.046	0.101	0.287	0.549	0.566	0.595	0.346	0.447	0.261	
	Left Tilt	0.086	0.363	0.017	0.114	0.046	0.114	0.200	0.449	0.466	0.495	0.246	0.360	0.274	
	Right Touch	0.165	0.363	0.017	0.114	0.046	0.363	0.528	0.528	0.545	0.574	0.325	0.688	0.523	
	Right Tilt	0.098	0.363	0.017	0.114	0.046	0.254	0.352	0.461	0.478	0.507	0.258	0.512	0.414	
Body-worn	Rear	0.365	0.031	0.000	0.035	0.018	0.014	0.379	0.396	0.396	0.414	0.418	0.432	0.067	
	Front	0.391	0.031	0.000	0.035	0.018	0.018	0.409	0.422	0.422	0.440	0.444	0.462	0.071	
Hotspot	Rear	0.510	0.061	0.000			0.021	0.531	0.571	0.571					
	Front	0.546	0.061	0.000			0.054	0.600	0.607	0.607					
	Edge 2	0.141	0.061	0.000			0.054	0.195	0.202	0.202					
	Edge 3	0.462	0.061	0.000			0.054	0.516	0.523	0.523					
	Edge 4	0.510	0.061	0.000			0.047	0.557	0.571	0.571					

**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 ≤ 0.04 for all circumstances that require SPLSR calculation.

## **Appendixes**

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

**12118543-S1V1 Appendix A: SAR Setup Photos**

**12118543-S1V1 Appendix B: SAR System Check Plots**

**12118543-S1V1 Appendix C: Highest SAR Test Plots**

**12118543-S1V1 Appendix D: SAR Liquid Tissue Ingredients**

**12118543-S1V1 Appendix E: SAR Probe Calibration Certificates**

**12118543-S1V1 Appendix F: SAR Dipole Calibration Certificates**

**END OF REPORT**