



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

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Revision History

Rev.	Date	Revisions	Revised By
V1	1/9/2018	Initial Issue	--
V2	1/18/2018	Sec.1: Corrected typo. Sec. 6.1: Updated device dimensions Sec. 6.2: Updated Table Appendix A: Updated Antenna Dimensions exhibit	Kenneth Mak Coltyce Sanders
V3	1/19/2018	Sec.1 and 12: Corrected typo.	Devin Chang

Table of Contents

1.	Attestation of Test Results	5
2.	Test Specification, Methods and Procedures.....	6
3.	Facilities and Accreditation.....	6
4.	SAR Measurement System & Test Equipment	7
4.1.	<i>SAR Measurement System.....</i>	<i>7</i>
4.2.	<i>SAR Scan Procedures.....</i>	<i>8</i>
4.3.	<i>Test Equipment.....</i>	<i>10</i>
5.	Measurement Uncertainty.....	11
6.	Device Under Test (DUT) Information	12
6.1.	<i>DUT Description</i>	<i>12</i>
6.2.	<i>Wireless Technologies.....</i>	<i>13</i>
6.3.	<i>General LTE SAR Test and Reporting Considerations.....</i>	<i>14</i>
6.4.	<i>LTE Carrier Aggregation</i>	<i>16</i>
6.5.	<i>LTE (TDD) Considerations.....</i>	<i>18</i>
7.	RF Exposure Conditions (Test Configurations).....	19
8.	Dielectric Property Measurements & System Check	21
8.1.	<i>Dielectric Property Measurements</i>	<i>21</i>
8.2.	<i>System Check.....</i>	<i>26</i>
9.	Conducted Output Power Measurements.....	28
9.1.	<i>GSM</i>	<i>28</i>
9.2.	<i>W-CDMA</i>	<i>32</i>
9.4.	<i>LTE.....</i>	<i>38</i>
9.5.	<i>LTE Carrier Aggregation</i>	<i>59</i>
9.6.	<i>Wi-Fi 2.4GHz (DTS Band)</i>	<i>61</i>
9.7.	<i>Wi-Fi 5GHz (U-NII Bands).....</i>	<i>62</i>
9.8.	<i>Bluetooth</i>	<i>64</i>
10.	Measured and Reported (Scaled) SAR Results.....	65
10.1.	<i>GSM850.....</i>	<i>67</i>
10.2.	<i>GSM1900.....</i>	<i>67</i>
10.3.	<i>W-CDMA Band II.....</i>	<i>68</i>
10.4.	<i>W-CDMA Band IV</i>	<i>68</i>
10.5.	<i>W-CDMA Band V</i>	<i>68</i>
10.6.	<i>LTE Band 2 (20MHz Bandwidth)</i>	<i>69</i>

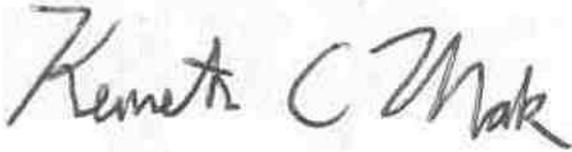
10.7.	<i>LTE Band 4 (20MHz Bandwidth)</i>	69
10.8.	<i>LTE Band 5 (10MHz Bandwidth)</i>	70
10.9.	<i>LTE Band 7 (20MHz Bandwidth)</i>	71
10.10.	<i>LTE Band 12 (10MHz Bandwidth)</i>	72
10.11.	<i>LTE Band 13 (10MHz Bandwidth)</i>	73
10.12.	<i>LTE Band 17 (10MHz Bandwidth)</i>	74
10.13.	<i>LTE Band 26 (15MHz Bandwidth)</i>	74
10.14.	<i>LTE Band 41 (20MHz Bandwidth)</i>	75
10.15.	<i>LTE Band 66 (20MHz Bandwidth)</i>	75
10.16.	<i>Wi-Fi (DTS Band)</i>	76
10.17.	<i>Wi-Fi (U-NII Band)</i>	77
10.18.	<i>Bluetooth</i>	78
10.19.	<i>Standalone SAR Test Exclusion Considerations & Estimated SAR</i>	79
11.	SAR Measurement Variability	80
12.	Simultaneous Transmission SAR Analysis	81
12.1.	<i>Sum of the SAR for WWAN & Wi-Fi & BT</i>	82
Appendixes		83
	<i>12073310-S1V2 Appendix A: SAR Setup Photos</i>	83
	<i>12073310-S1V1 Appendix B: SAR System Check Plots</i>	83
	<i>12073310-S1V1 Appendix C: Highest SAR Test Plots</i>	83
	<i>12073310-S1V1 Appendix D: SAR Liquid Tissue Ingredients</i>	83
	<i>12073310-S1V2 Appendix E: SAR Probe Calibration Certificates</i>	83
	<i>12073310-S1V1 Appendix F: SAR Dipole Calibration Certificates</i>	83

1. Attestation of Test Results

Applicant Name	SONY MOBILE COMMUNICATIONS INC.			
FCC ID	PY7-21831A			
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	0.356	0.328	0.598	0.204
Body-worn	0.307	0.024	0.061	N/A
Hotspot/Wi-Fi Direct	0.622	0.081	N/A	N/A
Product specific 10g SAR	N/A	N/A	0.302	N/A
Simultaneous TX	1.251	0.910	1.251	1.251
Date Tested	12/18/2017 to 12/29/2017			
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

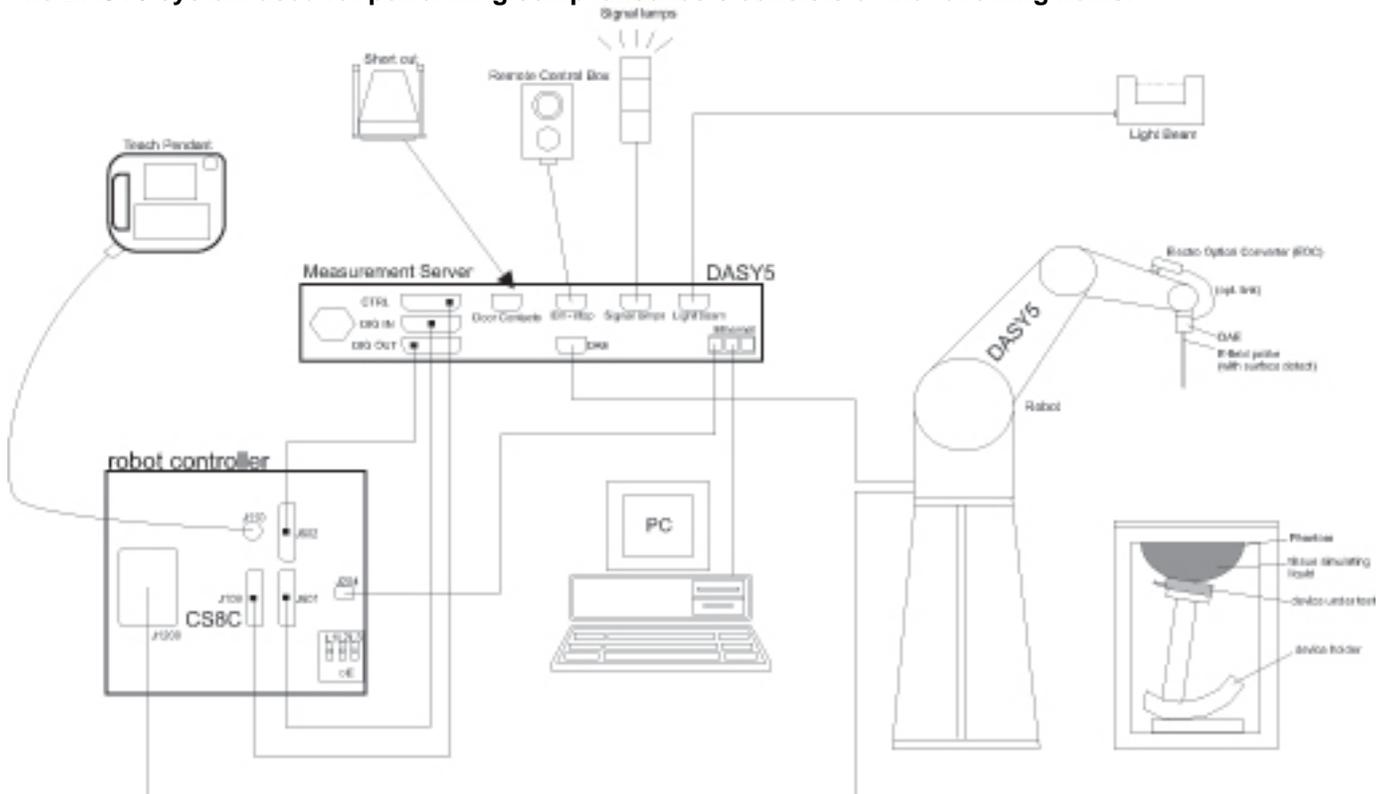
47173 Benicia Street	47266 Benicia Street
SAR Lab A	SAR Lab 1
SAR Lab B	SAR Lab 2
SAR Lab C	SAR Lab 3
SAR Lab D	SAR Lab 4
SAR Lab E	
SAR Lab F	
SAR Lab G	
SAR Lab H	

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

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

Step 3: Zoom Scan

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

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

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

Step 4: Power drift measurement

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

Step 5: Z-Scan (FCC only)

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

4.3. Test Equipment

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

Dielectric Property Measurements

Name of Equipment	Manufacturer	Type/Model	Serial No.	Cal. Due Date
Network Analyzer	Agilent	8753ES	MY40001647	9/15/2018
Dielectric Probe kit	SPEAG	DAK-3.5	1103	2/16/2018
Shorting block	SPEAG	DAK-3.5 Short	SM DAK 200 BA	2/16/2018
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	MY52260009	1/5/2018
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

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	7335	3/15/2018
E-Field Probe (SAR Lab C)	SPEAG	EX3DV4	3929	3/15/2018
E-Field Probe (SAR Lab E)	SPEAG	EX3DV4	3772	2/16/2018
E-Field Probe (SAR Lab F)	SPEAG	EX3DV4	3773	4/21/2018
E-Field Probe (SAR Lab G)	SPEAG	EX3DV4	3989	2/16/2018
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 C)	SPEAG	DAE4	1343	8/21/2018
Data Acquisition Electronics (SAR Lab E)	SPEAG	DAE4	1357	2/13/2018
Data Acquisition Electronics (SAR Lab F)	SPEAG	DAE4	1259	1/20/2018
Data Acquisition Electronics (SAR Lab G)	SPEAG	DAE4	1472	3/10/2018
System Validation Dipole	SPEAG	D750V3	1019	3/13/2018
System Validation Dipole	SPEAG	D835V2	4d142	10/12/2018
System Validation Dipole	SPEAG	D1750V2	1050	4/18/2018
System Validation Dipole	SPEAG	D1900V2	5d043	11/22/2018
System Validation Dipole	SPEAG	D1900V2	5d140	4/19/2018
System Validation Dipole	SPEAG	D1900V2	5d163	10/5/2018
System Validation Dipole	SPEAG	D2450V2	748	2/8/2018
System Validation Dipole	SPEAG	D2450V2	899	3/10/2018
System Validation Dipole	SPEAG	D2600V2	1036	3/10/2018
System Validation Dipole	SPEAG	D5GHzV2	1168	11/23/2018
System Validation Dipole	SPEAG	D5GHzV2	1138	10/26/2018

Other

Name of Equipment	Manufacturer	Type/Model	T Number	Serial No.	Cal. Due Date
Power Meter	Keysight	N1912A	T1273	MY55196007	7/17/2018
Power Meter	Keysight	N1912A	T1263	MY55196004	7/14/2018
Power Meter	Agilent	N1912A	T733	MY50001008	10/17/2018
Power Sensor	Agilent	N1921A	T751	MY53260010	10/17/2018
Power Sensor	Agilent	N1921A	T748	MY53020038	4/13/2018
DC Power Supply	HP	6296A	N/A	2841A-05955	N/A
Base station Simulator	R&S	CMW500	T978	137877	9/1/2018
Base station Simulator	R&S	CMW500	T960	135384	6/30/2018
Base station Simulator	R&S	CMW500	T948	135393	5/15/2018
Base station Simulator	R&S	CMW500	T958	134855	6/12/2018
Base station Simulator	R&S	CMW500	T259	124594	10/24/2018
Base station Simulator	R&S	CMW500	T1526	147543	5/2/2018
Base station Simulator	R&S	CMW500	T964	134853	7/26/2018
Base station Simulator	R&S	CMW500	T268	124593	7/31/2018
Base station Simulator	R&S	CMW500	T953	135390	4/27/2018
Base station Simulator	R&S	CMW500	T376	132909	3/14/2018
Base station Simulator	R&S	CMW500	T959	137873	7/18/2018
Base station Simulator	R&S	CMW500	T232	104245	2/3/2018
Base station Simulator	R&S	CMW500	T919	125236	7/31/2018
Base station Simulator	Agilent	E5515C	T213	GB47050526	2/21/2018

5. Measurement Uncertainty

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

Therefore, the measurement uncertainty is not required.

6. Device Under Test (DUT) Information

6.1. DUT Description

Device Dimension	Overall (Length x Width): 152.79 mm x 72.42 mm Overall Diagonal: 165.695 mm Display Diagonal: 145.0 mm		
Back Cover	<input checked="" type="checkbox"/> The Back Cover is not removable.		
Battery Options	<input checked="" type="checkbox"/> The rechargeable battery is not user accessible.		
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	S/N	Technology	Notes
	QV7000YT15	GSM/UMTS	Conducted
	QV70011G15	GSM/UMTS	Conducted
	QV7000YM15	LTE (LB/MB)	Conducted
	QV7000UW15	LTE Band 26	Conducted
	QV7000T415	LTE (HB)	Conducted
	QV7000SD15	WLAN - 2.4GHz #1	Conducted
	QV7000TQ15	WLAN - 5GHz #1	Conducted
	QV70006W12	GSM/UMTS (MB) #1	Radiated
	QV7000AQ12	GSM/UMTS (MB) #2	Radiated
	QV70008F12	GSM/UMTS (LB) #1	Radiated
	QV7000FN12	GSM/UMTS (LB) #2	Radiated
	QV7000EA12	LTE (LB)	Radiated
	QV70004512	LTE (LB)	Radiated
	QV7000F512	LTE (MB)	Radiated
	QV7000E812	LTE (MB)	Radiated
	QV7000FP12	LTE (HB)	Radiated
	QV7000DN12	LTE (HB)	Radiated
	QV70003P12	WLAN - 2.4GHz #1	Radiated
	QV70006212	WLAN - 2.4GHz #4	Radiated
	QV7000GF12	WLAN - 5GHz	Radiated
	QV7000E012	WLAN - 5GHz	Radiated
	QV7000H412	WLAN - 5GHz	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) DC-HSDPA (Rel. 9)		100%
LTE	FDD Band 2 FDD Band 4 FDD Band 5 FDD Band 7 FDD Band 12 FDD Band 13 FDD Band 17 FDD Band 26 FDD Band 29 (Rx Only) TDD Band 41 FDD Band 66	QPSK 16QAM 64AQM Rel. 12 Carrier Aggregation 4CC (1 Uplink and 4 Downlinks) Refer to §6.5.		100% (FDD) 63.3% (TDD) Refer to §6.6.
Wi-Fi	2.4 GHz	802.11b		98.87% <small>(802.11b)</small>
		802.11g		98.26% <small>(802.11g)</small>
	802.11n (HT20)		97.44% <small>(802.11n)</small>	
	5 GHz	802.11a		98.1% <small>(802.11a)</small>
802.11n (HT20)		97.4% <small>(802.11n HT20)</small>		
802.11n (HT40)		91.5% <small>(802.11n HT40)</small>		
802.11ac (VHT20)		83.7% <small>(802.11ac VHT80)</small>		
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		76.8%(DH5)

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>Table 6.2.3-1: Maximum Power Reduction (MPR) for Power Class 1, 2 and 3</p> <table border="1"> <thead> <tr> <th rowspan="2">Modulation</th> <th colspan="6">Channel bandwidth / Transmission bandwidth (N_{RB})</th> <th rowspan="2">MPR (dB)</th> </tr> <tr> <th>1.4 MHz</th> <th>3.0 MHz</th> <th>5 MHz</th> <th>10 MHz</th> <th>15 MHz</th> <th>20 MHz</th> </tr> </thead> <tbody> <tr> <td>QPSK</td> <td>> 5</td> <td>> 4</td> <td>> 8</td> <td>> 12</td> <td>> 16</td> <td>> 18</td> <td>≤ 1</td> </tr> <tr> <td>16 QAM</td> <td>≤ 5</td> <td>≤ 4</td> <td>≤ 8</td> <td>≤ 12</td> <td>≤ 16</td> <td>≤ 18</td> <td>≤ 1</td> </tr> <tr> <td>16 QAM</td> <td>> 5</td> <td>> 4</td> <td>> 8</td> <td>> 12</td> <td>> 16</td> <td>> 18</td> <td>≤ 2</td> </tr> <tr> <td>64 QAM</td> <td>≤ 5</td> <td>≤ 4</td> <td>≤ 8</td> <td>≤ 12</td> <td>≤ 16</td> <td>≤ 18</td> <td>≤ 2</td> </tr> <tr> <td>64 QAM</td> <td>> 5</td> <td>> 4</td> <td>> 8</td> <td>> 12</td> <td>> 16</td> <td>> 18</td> <td>≤ 3</td> </tr> <tr> <td>256 QAM</td> <td colspan="6">≥ 1</td> <td>≤ 5</td> </tr> </tbody> </table> <p>MPR Built-in by design The manufacturer MPR values are always within the 3GPP maximum MPR allowance but may not follow the default MPR values. A-MPR (additional MPR) was disabled during SAR testing</p>						Modulation	Channel bandwidth / Transmission bandwidth (N _{RB})						MPR (dB)	1.4 MHz	3.0 MHz	5 MHz	10 MHz	15 MHz	20 MHz	QPSK	> 5	> 4	> 8	> 12	> 16	> 18	≤ 1	16 QAM	≤ 5	≤ 4	≤ 8	≤ 12	≤ 16	≤ 18	≤ 1	16 QAM	> 5	> 4	> 8	> 12	> 16	> 18	≤ 2	64 QAM	≤ 5	≤ 4	≤ 8	≤ 12	≤ 16	≤ 18	≤ 2	64 QAM	> 5	> 4	> 8	> 12	> 16	> 18	≤ 3	256 QAM	≥ 1						≤ 5
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																																																													
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 Carrier Aggregation

Combination	CA configuration	Bandwidth (MHz)											
		PCC						SCC1					
		20	15	10	5	3	1.4	20	15	10	5	3	1.4
Intra-Band contiguous	12B				√					√	√		
	7C		√						√	√			
		√							√	√	√		
	41C				√				√				
				√					√	√			
		√							√	√	√	√	
	66B				√						√	√	
				√							√	√	
			√									√	
	66C				√				√				
					√				√	√			
				√					√	√	√		
√								√	√	√	√		
Intra-Band non-contiguous	2A-2A	√	√	√	√			√	√	√	√		
	4A-4A	√	√	√	√			√	√	√	√		
	7A-7A				√					√			
				√					√	√			
		√							√				
66A-66A	√	√	√	√			√	√	√	√			
Inter-Band non-contiguous	2A-4A	√	√	√	√	√	√	√	√	√	√		
	2A-5A	√	√	√	√					√	√		
	2A-7A	√	√	√	√			√	√	√	√		
	2A-12A	√	√	√	√					√	√	√	
	2A-13A	√	√	√	√					√			
	2A-17A			√	√					√	√		
	2A-29A	√	√	√	√					√	√		
	2A-66A	√	√	√	√	√	√	√	√	√	√		
	4A-5A	√	√	√	√					√	√		
	4A-7A	√	√	√	√			√	√	√	√		
	4A-12A	√	√	√	√	√	√			√	√	√	
	4A-13A	√	√	√	√					√			
	4A-17A			√	√					√	√		
	4A-29A	√	√	√	√					√	√		
	5A-7A			√	√	√	√	√	√	√			
5A-12A			√	√					√	√			
5A-29A			√	√					√	√			
12A-66A			√	√					√	√	√	√	

Note(s):
 For supported channels, please refer to §6.4

Combination	CA configuration	Bandwidth (MHz)																	
		PCC						SCC1						SCC2					
		20	15	10	5	3	1.4	20	15	10	5	3	1.4	20	15	10	5	3	1.4
Inter-Band non-contiguous	2A-2A-4A	√	√	√	√			√	√	√	√			√	√	√	√		
	2A-2A-12A	√	√	√	√			√	√	√	√			√	√	√	√		
	2A-2A-13A	√	√	√	√			√	√	√	√					√			
	2A-4A-4A	√	√	√	√			√	√	√	√			√	√	√	√		
	2A-4A-5A	√	√	√	√			√	√	√	√					√	√		
	2A-4A-7A	√	√	√	√			√	√	√	√			√	√	√	√		
	2A-4A-12A	√	√	√	√			√	√	√	√					√	√		
	2A-4A-13A	√	√	√	√			√	√	√	√					√			
	2A-4A-29A	√	√	√	√			√	√	√	√							√	√
	2A-5A-29A	√	√	√	√					√	√							√	√
	2A-7A-7A	√	√	√	√			√	√	√	√			√	√	√	√		
	2A-12A-66A	√	√	√	√					√	√			√	√	√	√		
	2A-12B	√	√	√	√						√						√	√	
	2A-66A-66A	√	√	√	√			√	√	√	√			√	√	√	√		
	4A-4A-5A	√	√	√	√			√	√	√	√					√	√		
	4A-4A-12A	√	√	√	√			√	√	√	√					√	√		
	4A-4A-13A	√	√	√	√			√	√	√	√					√			
	4A-4A-29A	√	√	√	√			√	√	√	√						√	√	
	4A-5A-29A	√	√	√	√					√	√					√	√		
	4A-7A-7A	√	√	√	√			√	√	√	√			√	√	√	√		
4A-7C	√	√	√	√					√						√				
	√	√	√	√					√				√	√					
	√	√	√	√			√						√	√	√				
4A-12B	√	√	√	√					√						√	√			
5A-7A-7A			√	√			√	√	√	√			√	√	√	√			
12A-66A-66A			√	√			√	√	√	√			√	√	√	√			

Note(s):
For supported channels, please refer to §6.4

Combination	CA configuration	Bandwidth (MHz)																							
		PCC						SCC1						SCC2						SCC3					
		20	15	10	5	3	1.4	20	15	10	5	3	1.4	20	15	10	5	3	1.4	20	15	10	5	3	1.4
Inter-Band non-contiguous	2A-4A-5A-29A	√	√	√	√			√	√	√	√			√	√	√	√			√	√			√	√
	2A-4A-7A-7A	√	√	√	√			√	√	√	√			√	√	√	√			√	√	√	√		
	2A-4A-7C	√	√	√	√			√	√	√	√					√				√					
		√	√	√	√			√	√	√	√			√						√	√				

Note(s):
For supported channels, please refer to §6.4

6.5. LTE (TDD) Considerations

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

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

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

Special subframe configuration	Normal cyclic prefix in downlink			Extended cyclic prefix in downlink		
	DwPTS	UpPTS		DwPTS	UpPTS	
		Normal cyclic prefix in uplink	Extended cyclic prefix in uplink		Normal cyclic prefix in uplink	Extended cyclic prefix in uplink
0	$6592 \cdot T_s$	$2192 \cdot T_s$	$2560 \cdot T_s$	$7680 \cdot T_s$	$2192 \cdot T_s$	$2560 \cdot T_s$
1	$19760 \cdot T_s$			$20480 \cdot T_s$		
2	$21952 \cdot T_s$			$23040 \cdot T_s$		
3	$24144 \cdot T_s$			$25600 \cdot T_s$		
4	$26336 \cdot T_s$			$7680 \cdot T_s$		
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	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
WWAN Main Ant. 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
			Edge 3 (Bottom)	> 25 mm	No
			Edge 4 (Left)	< 25 mm	Yes
	Product specific (5 GHz bands only)	0 mm	Rear	< 25 mm	Yes
			Front	N/A	No
			Edge 1 (Top)	< 25 mm	Yes
			Edge 2 (Right)	> 25 mm	No
Edge 3 (Bottom)			> 25 mm	No	
Edge 4 (Left)			< 25 mm	Yes	

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 include the FCC band.

RF Exposure Conditions (Test Configurations) continued:

Wireless technologies	RF Exposure Conditions	DUT-to-User Separation	Test Position	Antenna-to-edge/surface	SAR Required
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
			Edge 3 (Bottom)	> 25 mm	No
	Product specific (5 GHz bands only)	0 mm	Edge 4 (Left)	> 25 mm	No
			Rear	< 25 mm	Yes
			Front	N/A	No
			Edge 1 (Top)	> 25 mm	No
			Edge 2 (Right)	< 25 mm	Yes
				Edge 3 (Bottom)	> 25 mm
			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.

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 (ϵ_r) and conductivity (σ) 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 ϵ_r and σ may be relaxed to $\pm 10\%$. This is limited to frequencies ≤ 3 GHz.

Tissue Dielectric Parameters

FCC KDB 865664 D01 SAR Measurement 100 MHz to 6 GHz

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

IEEE Std 1528-2013

Refer to Table 3 within the IEEE Std 1528-2013

Dielectric Property Measurements Results:

SAR Lab	Date	Band (MHz)	Tissue Type	Frequency (MHz)	Relative Permittivity (ϵ_r)			Conductivity (σ)		
					Measured	Target	Delta (%)	Measured	Target	Delta (%)
A	12/18/2017	835	Body	835	54.67	55.20	-0.96	1.00	0.97	2.77
				805	54.96	55.33	-0.68	0.97	0.97	-0.24
				905	54.01	55.00	-1.80	1.06	1.05	1.09
A	12/26/2017	835	Head	835	41.69	41.50	0.46	0.90	0.90	0.16
				805	42.17	41.68	1.18	0.86	0.90	-3.69
				905	40.87	41.50	-1.52	0.96	0.97	-1.28
A	12/26/2017	835	Body	835	54.32	55.20	-1.59	0.98	0.97	1.39
				805	54.73	55.33	-1.09	0.95	0.97	-2.10
				905	53.64	55.00	-2.47	1.05	1.05	-0.14
B	12/18/2017	1900	Head	1900	40.93	40.00	2.33	1.43	1.40	2.36
				1850	41.21	40.00	3.03	1.38	1.40	-1.21
				1920	40.83	40.00	2.08	1.45	1.40	3.79
B	12/18/2017	1900	Body	1900	53.45	53.30	0.28	1.50	1.52	-1.25
				1850	53.68	53.30	0.71	1.45	1.52	-4.54
				1920	53.38	53.30	0.15	1.52	1.52	0.13
B	12/20/2017	1750	Body	1750	51.80	53.44	-3.07	1.48	1.49	-0.14
				1710	51.86	53.54	-3.14	1.44	1.46	-1.34
				1755	51.77	53.43	-3.10	1.49	1.49	-0.02
B	12/21/2017	1900	Head	1950	38.74	40.00	-3.15	1.42	1.40	1.21
				1900	38.93	40.00	-2.67	1.37	1.40	-2.14
				1980	38.62	40.00	-3.45	1.45	1.40	3.64

SAR Lab	Date	Band (MHz)	Tissue Type	Frequency (MHz)	Relative Permittivity (ϵ_r)			Conductivity (σ)		
					Measured	Target	Delta (%)	Measured	Target	Delta (%)
B	12/26/2017	1750	Body	1750	53.58	53.44	0.26	1.49	1.49	0.39
				1710	53.50	53.54	-0.08	1.47	1.46	0.58
				1755	53.61	53.43	0.34	1.49	1.49	0.19
B	12/26/2017	1900	Head	1900	41.35	40.00	3.38	1.39	1.40	-0.64
				1850	41.63	40.00	4.08	1.34	1.40	-4.57
				1920	41.19	40.00	2.97	1.42	1.40	1.50
B	12/27/2017	1750	Head	1750	38.24	40.08	-4.60	1.37	1.37	0.07
				1710	38.63	40.15	-3.78	1.35	1.35	0.27
				1800	38.01	40.00	-4.98	1.43	1.40	2.21
C	12/18/2017	2600	Head	2600	38.10	39.01	-2.33	2.04	1.96	4.07
				2495	38.47	39.14	-1.72	1.91	1.85	3.43
				2690	37.72	38.90	-3.03	2.15	2.06	4.54
C	12/21/2017	2600	Body	2600	51.41	52.51	-2.10	2.19	2.16	1.54
				2495	51.71	52.64	-1.77	2.06	2.01	2.27
				2690	51.05	52.40	-2.57	2.31	2.29	0.77
E	12/19/2017	750	Head	750	40.28	41.96	-4.01	0.91	0.89	1.73
				695	41.05	42.24	-2.83	0.86	0.89	-3.47
				790	39.78	41.76	-4.73	0.94	0.90	5.39
E	12/20/2017	750	Head	750	40.69	41.96	-3.03	0.91	0.89	1.35
				695	41.45	42.24	-1.88	0.86	0.89	-3.74
				790	40.15	41.76	-3.85	0.94	0.90	5.06
E	12/21/2017	750	Head	750	40.99	41.96	-2.32	0.93	0.89	4.27
				695	41.71	42.24	-1.26	0.88	0.89	-0.88
				790	40.42	41.76	-3.20	0.97	0.90	8.16
E	12/21/2017	750	Body	750	56.55	55.55	1.81	0.97	0.96	0.21
				695	57.04	55.76	2.30	0.91	0.96	-4.71
				790	56.18	55.39	1.42	1.00	0.97	3.92
E	12/22/2017	750	Head	750	39.50	41.96	-5.87	0.89	0.89	0.11
				695	40.22	42.24	-4.79	0.84	0.89	-5.14
				790	39.06	41.76	-6.46	0.93	0.90	3.72
E	12/26/2017	750	Head	750	41.22	41.96	-1.77	0.88	0.89	-1.40
				695	41.88	42.24	-0.86	0.83	0.89	-6.47
				790	40.67	41.76	-2.60	0.92	0.90	2.42
E	12/26/2017	750	Body	750	56.17	55.55	1.12	0.92	0.96	-4.71
				695	56.61	55.76	1.53	0.87	0.96	-9.54
				790	55.84	55.39	0.81	0.96	0.97	-0.96

SAR Lab	Date	Band (MHz)	Tissue Type	Frequency (MHz)	Relative Permittivity (ϵ_r)			Conductivity (σ)		
					Measured	Target	Delta (%)	Measured	Target	Delta (%)
E	12/26/2017	835	Body	835	53.65	55.20	-2.81	0.98	0.97	0.72
				805	54.06	55.33	-2.30	0.94	0.97	-2.77
				905	53.01	55.00	-3.62	1.05	1.05	-0.71
E	12/27/2017	750	Head	750	40.90	41.96	-2.53	0.92	0.89	2.51
				695	41.64	42.24	-1.43	0.86	0.89	-3.04
				790	40.58	41.76	-2.82	0.97	0.90	7.78
E	12/27/2017	750	Body	750	56.40	55.55	1.54	0.98	0.96	1.69
				695	57.15	55.76	2.50	0.92	0.96	-3.71
				790	55.95	55.39	1.01	1.03	0.97	6.30
F	12/18/2017	2450	Head	2450	38.35	39.20	-2.17	1.85	1.80	2.94
				2400	38.55	39.30	-1.90	1.80	1.75	2.65
				2480	38.24	39.16	-2.35	1.89	1.83	2.92
F	12/20/2017	2450	Body	2450	53.52	52.70	1.56	2.00	1.95	2.77
				2400	53.67	52.77	1.70	1.94	1.90	2.21
				2480	53.44	52.66	1.48	2.05	1.99	2.75
F	12/21/2017	2300	Head	2300	38.74	39.47	-1.86	1.69	1.66	1.40
				2350	38.52	39.38	-2.20	1.74	1.71	1.95
				2400	38.32	39.30	-2.49	1.80	1.75	2.65
F	12/26/2017	2600	Body	2600	50.91	52.51	-3.05	2.12	2.16	-1.70
				2495	51.36	52.64	-2.44	1.98	2.01	-1.45
				2690	50.62	52.40	-3.39	2.22	2.29	-3.03
F	12/27/2017	2450	Body	2450	51.58	52.70	-2.13	1.90	1.95	-2.51
				2400	51.74	52.77	-1.96	1.84	1.90	-3.16
				2480	51.43	52.66	-2.34	1.94	1.99	-2.47
F	12/27/2017	2450	Head	2450	38.36	39.20	-2.14	1.89	1.80	4.83
				2400	38.54	39.30	-1.93	1.84	1.75	4.93
				2480	38.16	39.16	-2.56	1.92	1.83	5.00
F	12/27/2017	5200	Body	5200	49.47	49.02	0.92	5.16	5.29	-2.56
				5150	49.55	49.09	0.94	5.07	5.24	-3.22
				5350	49.27	48.82	0.93	5.34	5.47	-2.35
F	12/27/2017	5600	Body	5600	48.83	48.48	0.73	5.67	5.76	-1.61
				5500	49.03	48.61	0.86	5.53	5.64	-1.97
				5725	48.71	48.31	0.83	5.85	5.91	-0.99
F	12/27/2017	5800	Body	5800	48.58	48.20	0.79	5.95	6.00	-0.78
				5700	48.72	48.34	0.78	5.81	5.88	-1.08
				5850	48.49	48.20	0.60	6.00	6.00	0.05
F	1/5/2018	2450	Head	2450	39.11	39.20	-0.23	1.84	1.80	2.28
				2400	39.37	39.30	0.19	1.80	1.75	2.65
				2480	39.03	39.16	-0.34	1.89	1.83	2.92

SAR Lab	Date	Band (MHz)	Tissue Type	Frequency (MHz)	Relative Permittivity (ϵ_r)			Conductivity (σ)		
					Measured	Target	Delta (%)	Measured	Target	Delta (%)
G	12/20/2017	5200	Head	5200	37.03	35.99	2.89	4.52	4.65	-2.82
				5150	37.16	36.05	3.09	4.46	4.60	-3.02
				5350	37.08	35.82	3.52	4.76	4.80	-1.01
G	12/20/2017	5600	Head	5600	36.77	35.53	3.48	4.98	5.06	-1.66
				5500	36.67	35.65	2.87	4.85	4.96	-2.16
				5725	36.54	35.39	3.25	5.13	5.19	-1.16
G	12/20/2017	5800	Head	5800	36.34	35.30	2.95	5.03	5.27	-4.63
				5700	36.49	35.42	3.02	5.05	5.16	-2.10
				5850	36.48	35.30	3.34	5.31	5.27	0.70
G	12/26/2017	5200	Head	5200	37.03	35.99	2.89	4.52	4.65	-2.82
				5150	37.16	36.05	3.09	4.46	4.60	-3.02
				5350	37.08	35.82	3.52	4.76	4.80	-1.01
G	12/26/2017	5600	Head	5600	36.77	35.53	3.48	4.98	5.06	-1.66
				5500	36.67	35.65	2.87	4.85	4.96	-2.16
				5725	36.54	35.39	3.25	5.13	5.19	-1.16
G	12/26/2017	5800	Head	5800	36.34	35.30	2.95	5.03	5.27	-4.63
				5700	36.49	35.42	3.02	5.05	5.16	-2.10
				5850	36.48	35.30	3.34	5.31	5.27	0.70
G	12/28/2017	5600	Body	5600	47.01	48.48	-3.03	5.91	5.76	2.62
				5500	47.20	48.61	-2.91	5.77	5.64	2.22
				5725	46.85	48.31	-3.02	6.10	5.91	3.25
G	12/28/2017	5600	Body	5800	46.70	48.20	-3.11	6.19	6.00	3.17
				5700	46.84	48.34	-3.11	6.06	5.88	3.15
				5850	46.62	48.20	-3.28	6.27	6.00	4.57

8.2. System Check

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

System Performance Check Measurement Conditions:

- The measurements were performed in the flat section of the TWIN SAM or ELI phantom, shell thickness: 2.0 ± 0.2 mm (bottom plate) filled with Body or Head simulating liquid of the following parameters.
- The depth of tissue-equivalent liquid in a phantom must be ≥ 15.0 cm for SAR measurements ≤ 3 GHz and ≥ 10.0 cm for measurements > 3 GHz.
- The DASY system with an E-Field Probe was used for the measurements.
- The dipole was mounted on the small tripod so that the dipole feed point was positioned below the center marking of the flat phantom section and the dipole was oriented parallel to the body axis (the long side of the phantom). The standard measuring distance was 10 mm (above 1 GHz) and 15 mm (below 1 GHz) from dipole center to the simulating liquid surface.
- The coarse grid with a grid spacing of 15 mm was aligned with the dipole.
For 5 GHz band - The coarse grid with a grid spacing of 10 mm was aligned with the dipole.
- Special 7x7x7 (below 3 GHz) and/or 8x8x7 (above 3 GHz) fine cube was chosen for the cube.
- Distance between probe sensors and phantom surface was set to 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	12/18/2017	Body	D835V2 SN:4d142	10/12/2018	0.936	9.36	9.63	-2.80	0.618	6.18	6.27	-1.44	
A	12/26/2017	Head	D835V2 SN:4d142	10/12/2018	1.000	10.00	9.64	3.73	0.661	6.61	6.22	6.27	1,2
A	12/26/2017	Body	D835V2 SN:4d142	10/12/2018	0.932	9.32	9.63	-3.22	0.615	6.15	6.27	-1.91	
B	12/18/2017	Head	D1900V2 SN:5d043	11/22/2018	4.250	42.50	42.99	-1.14	2.190	21.90	22.17	-1.22	
B	12/18/2017	Body	D1900V2 SN:5d043	11/22/2018	4.170	41.70	41.00	1.71	2.180	21.80	20.90	4.31	3,4
B	12/20/2017	Body	D1750V2 SN:1050	4/18/2018	3.490	34.90	37.68	-7.38	1.840	18.40	19.92	-7.63	5,6
B	12/21/2017	Head	D1900V2 SN:5d163	10/5/2018	3.650	36.50	38.77	-5.86	1.880	18.80	20.10	-6.47	7,8
B	12/26/2017	Body	D1750V2 SN:1050	4/18/2018	3.560	35.60	37.68	-5.52	1.880	18.80	19.92	-5.62	
B	12/26/2017	Head	D1900V2 SN:5d140	4/19/2018	4.090	40.90	40.80	0.25	2.130	21.30	21.16	0.66	9,10
B	12/27/2017	Head	D1750V2 SN:1050	4/18/2018	3.610	36.10	36.76	-1.80	1.920	19.20	19.60	-2.04	
C	12/18/2017	Head	D2600V2 SN:1036	3/10/2018	6.010	60.10	57.50	4.52	2.580	25.80	25.60	0.78	11,12
C	12/21/2017	Body	D2600V2 SN:1036	3/10/2018	5.700	57.00	54.60	4.40	2.480	24.80	24.50	1.22	
E	12/19/2017	Head	D750V3 SN:1019	3/13/2018	0.828	8.28	8.22	0.73	0.543	5.43	5.39	0.74	
E	12/21/2017	Body	D750V3 SN:1019	3/13/2018	0.885	8.85	8.76	1.03	0.591	5.91	5.80	1.90	
E	12/26/2017	Head	D750V3 SN:1019	3/13/2018	0.892	8.92	8.22	8.52	0.587	5.87	5.39	8.91	13,14
E	12/26/2017	Body	D750V3 SN:1019	3/13/2018	0.841	8.41	8.76	-4.00	0.562	5.62	5.80	-3.10	
E	12/26/2017	Body	D835V2 SN:4d142	10/12/2018	0.933	9.33	9.63	-3.12	0.613	6.13	6.27	-2.23	15,16
F	12/18/2017	Head	D2450V2 SN:748	2/8/2018	5.590	55.90	52.10	7.29	2.500	25.00	24.20	3.31	
F	12/20/2017	Body	D2450V2 SN:748	2/8/2018	5.020	50.20	51.30	-2.14	2.290	22.90	23.90	-4.18	
F	12/26/2017	Body	D2600V2 SN:1036	3/10/2018	5.370	53.70	54.60	-1.65	2.290	22.90	24.50	-6.53	17,18
F	12/27/2017	Body	D2450V2 SN:748	2/8/2018	4.850	48.50	51.30	-5.46	2.190	21.90	23.90	-8.37	
F	12/27/2017	Head	D2450V2 SN:899	3/10/2018	5.770	57.70	52.60	9.70	2.580	25.80	24.60	4.88	19,20
F	12/28/2017	Body	D5GHzV2 SN:1138 (5.2 GHz)	10/26/2018	7.330	73.30	73.40	-0.14	2.090	20.90	20.60	1.46	
F	12/28/2017	Body	D5GHzV2 SN:1138 (5.6 GHz)	10/26/2018	8.310	83.10	79.50	4.53	2.310	23.10	22.30	3.59	21,22
F	12/28/2017	Body	D5GHzV2 SN:1138 (5.8 GHz)	10/26/2018	7.380	73.80	76.80	-3.91	2.069	20.69	21.30	-2.86	
F	1/5/2018	Head	D2450V2 SN:748	2/8/2018	5.710	57.10	52.10	9.60	2.550	25.50	24.20	5.37	23,24
G	12/20/2017	Head	D5GHzV2 SN:1168 (5.2 GHz)	11/23/2018	7.460	74.60	80.90	-7.79	2.150	21.50	22.80	-5.70	
G	12/20/2017	Head	D5GHzV2 SN:1168 (5.6 GHz)	11/23/2018	8.130	81.30	87.20	-6.77	2.290	22.90	24.40	-6.15	
G	12/20/2017	Head	D5GHzV2 SN:1168 (5.8 GHz)	11/23/2018	7.480	74.80	79.10	-5.44	2.120	21.20	22.10	-4.07	
G	12/26/2017	Head	D5GHzV2 SN:1168 (5.2 GHz)	11/23/2018	7.720	77.20	80.90	-4.57	2.220	22.20	22.80	-2.63	
G	12/26/2017	Head	D5GHzV2 SN:1168 (5.6 GHz)	11/23/2018	8.360	83.60	87.20	-4.13	2.350	23.50	24.40	-3.69	
G	12/26/2017	Head	D5GHzV2 SN:1168 (5.8 GHz)	11/23/2018	7.240	72.40	79.10	-8.47	2.050	20.50	22.10	-7.24	25,26
G	12/28/2017	Body	D5GHzV2 SN:1138 (5.6 GHz)	10/26/2018	8.140	81.40	79.50	2.39	2.250	22.50	22.30	0.90	
G	12/28/2017	Body	D5GHzV2 SN:1138 (5.8 GHz)	10/26/2018	8.260	82.60	76.80	7.55	2.310	23.10	21.30	8.45	27,28

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.

GSM850 Measured Results

Mode	Coding Scheme	Time Slots	Ch No.	Freq. (MHz)	Burst Pwr (dBm)	Frame Pwr (dBm)	Max. Output Pwr (dBm)	Max. Frame Pwr (dBm)	
GSM/ GPRS	CS1	1	128	824.4	32.4	23.4	33.2	24.2	
			190	836.6	32.4	23.4			
			251	848.8	32.5	23.5			
GPRS (GMSK)		2	2	128	824.4	30.3	24.3	31.2	25.2
				190	836.6	30.4	24.4		
				251	848.8	30.4	24.4		
		3	3	128	824.4	28.5	24.2	29.2	24.9
				190	836.6	28.6	24.3		
				251	848.8	28.6	24.3		
		4	4	128	824.4	27.6	24.6	28.2	25.2
				190	836.6	27.6	24.6		
				251	848.8	27.6	24.6		
EGPRS (8PSK)	MCS5	1	128	824.4	27.1	18.1	28.0	19.0	
			190	836.6	27.0	18.0			
			251	848.8	27.0	18.0			
		2	2	128	824.4	25.4	19.4	26.5	20.5
				190	836.6	25.3	19.3		
				251	848.8	25.3	19.3		
		3	3	128	824.4	23.6	19.3	24.5	20.2
				190	836.6	23.5	19.2		
				251	848.8	23.5	19.2		
		4	4	128	824.4	22.4	19.4	23.5	20.5
				190	836.6	22.2	19.2		
				251	848.8	22.3	19.3		

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 ≤ 1.2 W/kg.

GSM1900 Measured Results

Mode	Coding Scheme	Time Slots	Ch No.	Freq. (MHz)	Burst Pwr (dBm)	Frame Pwr (dBm)	Max. Output Pwr (dBm)	Max. Frame Pwr (dBm)			
GSM/GPRS	CS1	1	512	1850.2	28.2	19.2	28.7	19.7			
			661	1880.0	28.2	19.2					
			810	1909.8	28.2	19.2					
GPRS (GMSK)		2	2	512	1850.2	26.1	20.1	26.7	20.7		
				661	1880.0	26.1	20.1				
				810	1909.8	26.1	20.1				
		4	3	3	512	1850.2	24.1	19.8	24.7	20.4	
					661	1880.0	24.1	19.8			
					810	1909.8	24.1	19.8			
			4	4	4	512	1850.2	23.4	20.4	23.7	20.7
						661	1880.0	23.4	20.4		
						810	1909.8	23.5	20.5		
	EGPRS (8PSK)	MCS5	1	512	1850.2	26.0	17.0	27.0	18.0		
				661	1880.0	25.9	16.9				
				810	1909.8	25.9	16.9				
2			2	2	512	1850.2	24.6	18.6	25.5	19.5	
					661	1880.0	24.5	18.5			
					810	1909.8	24.4	18.4			
3			3	3	512	1850.2	22.4	18.1	23.5	19.2	
					661	1880.0	22.3	18.0			
					810	1909.8	22.3	18.0			
4			4	4	512	1850.2	21.3	18.3	22.5	19.5	
					661	1880.0	21.2	18.2			
					810	1909.8	21.3	18.3			

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 ≤ 1.2 W/kg.

GSM850 DTM Measured Results

Mode	Coding Scheme	Time Slots	Ch No.	Freq. (MHz)	Max Meas. Avg Pwr				Max. Output Pwr (dBm)	
					CS		PS		CS	PS
					Burst (dBm)	Frame (dBm)	Burst (dBm)	Frame (dBm)		
GSM(Voice) + GPRS(GMSK)	CS1	1	128	824.2	32.4	23.4			33.2	
			190	836.6	32.4	23.4				
			251	848.8	32.5	23.5				
		2	128	824.2	30.7	24.7	30.8	24.8	31.2	31.2
			190	836.6	30.6	24.6	30.8	24.8		
			251	848.8	30.6	24.6	30.8	24.8		
		3	128	824.2	28.7	24.4	28.9	24.6	29.2	29.2
			190	836.6	28.6	24.3	28.8	24.5		
			251	848.8	28.5	24.2	28.9	24.6		
GSM(Voice) + EGPRS(8PSK)	MCS5	1	128	824.2	32.4	23.4			33.2	
			190	836.6	32.4	23.4				
			251	848.8	32.5	23.5				
		2	128	824.2	30.8	24.8	25.6	19.6	31.2	26.5
			190	836.6	30.7	24.7	26.0	20.0		
			251	848.8	30.7	24.7	26.0	20.0		
		3	128	824.2	28.3	24.0	23.4	19.1	29.2	24.5
			190	836.6	28.2	23.9	23.4	19.1		
			251	848.8	28.2	23.9	23.8	19.5		

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 $\leq 1/4$ dB higher than that of GSM(Voice) + GMSK (GPRS) mode or the adjusted SAR of the highest reported SAR of GSM(Voice) + GMSK (GPRS) is ≤ 1.2 W/kg.

GSM1900 DTM Measured Results

Mode	Coding Scheme	Time Slots	Ch No.	Freq. (MHz)	Max Meas. Avg Pwr				Max. Output Pwr (dBm)	
					CS		PS		CS	PS
					Burst (dBm)	Frame (dBm)	Burst (dBm)	Frame (dBm)		
GSM(Voice) + GPRS(GMSK)	CS1	1	512	1850.2	28.2	19.2			28.7	
			661	1880.0	28.2	19.2				
			810	1909.8	28.2	19.2				
		2	512	1850.2	26.0	20.0	26.2	20.2	26.7	26.7
			661	1880.0	26.2	20.2	26.4	20.4		
			810	1909.8	26.1	20.1	26.2	20.2		
		3	512	1850.2	24.1	19.8	24.2	19.9	24.7	24.7
			661	1880.0	24.1	19.8	24.2	19.9		
			810	1909.8	24.0	19.7	24.2	19.9		
GSM(Voice) + EGPRS(8PSK)	MCS5	1	512	1850.2	28.2	19.2			28.7	
			661	1880.0	28.2	19.2				
			810	1909.8	28.2	19.2				
		2	512	1850.2	26.1	20.1	22.5	16.5	26.7	25.5
			661	1880.0	26.3	20.3	22.5	16.5		
			810	1909.8	26.2	20.2	22.7	16.7		
		3	512	1850.2	24.7	20.4	22.6	18.3	24.7	23.5
			661	1880.0	24.7	20.4	22.6	18.3		
			810	1909.8	24.7	20.4	22.5	18.2		

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
	β_c/β_d	8/15

HSDPA Setup Procedures used to establish the test signals

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

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

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

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

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

DC-HSDPA Setup Procedures used to establish the test signals

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

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

Table E.5.0: Levels for HSDPA connection setup

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

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

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

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

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

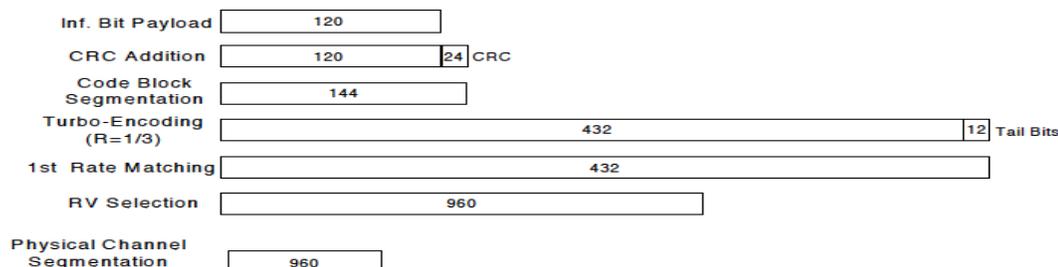


Figure C.8.19: Coding rate for Fixed reference Channel H-Set 12 (QPSK)

The following 4 Sub-tests for HSDPA were completed according to Release 9 procedures in section 5.2 of 3GPP TS34.121. A summary of subtest settings are illustrated below:

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

HSPA+

Since 16QAM is not used for uplink, the uplink Category and release is same as HSUPA, i.e., Rel. 9 Therefore, the RF conducted power is not measured.

W-CDMA Band II Measured Results

Band	Mode		UL Ch No.	Freq. (MHz)	MPR (dB)	Max. Meas. Avg Pwr (dBm)	Max. Output Pwr (dBm)
W-CDMA Band II	Rel 99	RMC, 12.2 kbps	9262	1852.4	N/A	22.7	22.7
			9400	1880.0	N/A	22.6	
			9538	1907.6	N/A	22.5	
	HSDPA	Subtest 1	9262	1852.4	0	22.0	22.0
			9400	1880.0	0	22.0	
			9538	1907.6	0	22.0	
		Subtest 2	9262	1852.4	0	22.0	22.0
			9400	1880.0	0	22.0	
			9538	1907.6	0	22.0	
		Subtest 3	9262	1852.4	0.5	21.0	21.5
			9400	1880.0	0.5	21.0	
			9538	1907.6	0.5	21.0	
		Subtest 4	9262	1852.4	0.5	21.0	21.5
			9400	1880.0	0.5	21.0	
			9538	1907.6	0.5	21.0	
	HSUPA	Subtest 1	9262	1852.4	0	22.0	22.0
			9400	1880.0	0	22.0	
			9538	1907.6	0	22.0	
		Subtest 2	9262	1852.4	2	20.0	20.0
			9400	1880.0	2	20.0	
			9538	1907.6	2	20.0	
		Subtest 3	9262	1852.4	1	21.0	21.0
			9400	1880.0	1	21.0	
			9538	1907.6	1	21.0	
		Subtest 4	9262	1852.4	2	20.0	20.0
			9400	1880.0	2	20.0	
			9538	1907.6	2	20.0	
	Subtest 5	9262	1852.4	0	22.0	22.0	
		9400	1880.0	0	22.0		
		9538	1907.6	0	22.0		
	DC-HSDPA	Subtest 1	9262	1852.4	0	21.7	22.0
			9400	1880.0	0	21.8	
			9538	1907.6	0	21.6	
		Subtest 2	9262	1852.4	0	21.7	22.0
			9400	1880.0	0	21.8	
			9538	1907.6	0	21.7	
Subtest 3		9262	1852.4	0.5	21.2	21.5	
		9400	1880.0	0.5	21.3		
		9538	1907.6	0.5	21.1		
Subtest 4		9262	1852.4	0.5	21.2	21.5	
		9400	1880.0	0.5	21.3		
		9538	1907.6	0.5	21.1		

W-CDMA Band IV Measured Results

Band	Mode		UL Ch No.	Freq. (MHz)	MPR (dB)	Max. Meas. Avg Pwr (dBm)	Max. Output Pwr (dBm)
W-CDMA Band IV	Rel 99	RMC, 12.2 kbps	1312	1712.4	N/A	22.5	22.7
			1413	1732.6	N/A	22.6	
			1513	1752.6	N/A	22.5	
	HSDPA	Subtest 1	1312	1712.4	0	22.0	22.0
			1413	1732.6	0	22.0	
			1513	1752.6	0	22.0	
		Subtest 2	1312	1712.4	0	22.0	22.0
			1413	1732.6	0	22.0	
			1513	1752.6	0	22.0	
		Subtest 3	1312	1712.4	0.5	21.0	21.5
			1413	1732.6	0.5	21.0	
			1513	1752.6	0.5	21.0	
		Subtest 4	1312	1712.4	0.5	21.0	21.5
			1413	1732.6	0.5	21.0	
			1513	1752.6	0.5	21.0	
	HSUPA	Subtest 1	1312	1712.4	0	22.0	22.0
			1413	1732.6	0	22.0	
			1513	1752.6	0	22.0	
		Subtest 2	1312	1712.4	2	19.5	20.0
			1413	1732.6	2	20.0	
			1513	1752.6	2	20.0	
		Subtest 3	1312	1712.4	1	21.0	21.0
			1413	1732.6	1	21.0	
			1513	1752.6	1	21.0	
		Subtest 4	1312	1712.4	2	20.0	20.0
			1413	1732.6	2	20.0	
			1513	1752.6	2	20.0	
		Subtest 5	1312	1712.4	0	21.7	22.0
			1413	1732.6	0	21.7	
			1513	1752.6	0	21.6	
	DC-HSDPA	Subtest 1	1312	1712.4	0	21.7	22.0
			1413	1732.6	0	21.8	
			1513	1752.6	0	21.7	
		Subtest 2	1312	1712.4	0	21.7	22.0
			1413	1732.6	0	21.8	
			1513	1752.6	0	21.7	
		Subtest 3	1312	1712.4	0.5	21.3	21.5
			1413	1732.6	0.5	21.3	
			1513	1752.6	0.5	21.2	
		Subtest 4	1312	1712.4	0.5	21.2	21.5
			1413	1732.6	0.5	21.3	
			1513	1752.6	0.5	21.2	

W-CDMA Band V Measured Results

Band	Mode		UL Ch No.	Freq. (MHz)	MPR (dB)	Max. Meas. Avg Pwr (dBm)	Max. Output Pwr (dBm)			
W-CDMA Band V	Rel 99	RMC, 12.2 kbps	4132	826.4	N/A	24.8	24.9			
			4183	836.6	N/A	24.7				
			4233	846.6	N/A	24.7				
	HSDPA	Subtest 1		4132	826.4	0	23.8	24.2		
				4183	836.6	0	23.7			
				4233	846.6	0	23.7			
		Subtest 2			4132	826.4	0	23.8	24.2	
					4183	836.6	0	23.7		
					4233	846.6	0	23.7		
		Subtest 3			4132	826.4	0.5	23.3	23.7	
					4183	836.6	0.5	23.2		
					4233	846.6	0.5	23.2		
		Subtest 4			4132	826.4	0.5	23.3	23.7	
					4183	836.6	0.5	23.2		
					4233	846.6	0.5	23.3		
	HSUPA	Subtest 1			4132	826.4	0	23.9	24.2	
					4183	836.6	0	23.8		
					4233	846.6	0	23.8		
		Subtest 2				4132	826.4	2	22.0	22.2
						4183	836.6	2	21.9	
						4233	846.6	2	21.9	
		Subtest 3				4132	826.4	1	23.0	23.2
						4183	836.6	1	22.9	
						4233	846.6	1	22.9	
		Subtest 4				4132	826.4	2	21.9	22.2
						4183	836.6	2	21.9	
						4233	846.6	2	22.0	
		Subtest 5				4132	826.4	0	23.9	24.2
						4183	836.6	0	23.9	
						4233	846.6	0	23.9	
	DC-HSDPA	Subtest 1			4132	826.4	0	23.9	24.2	
					4183	836.6	0	23.8		
					4233	846.6	0	23.8		
		Subtest 2				4132	826.4	0	24.0	24.2
						4183	836.6	0	23.9	
						4233	846.6	0	23.9	
Subtest 3					4132	826.4	0.5	23.4	23.7	
					4183	836.6	0.5	23.4		
					4233	846.6	0.5	23.4		
Subtest 4					4132	826.4	0.5	23.5	23.7	
					4183	836.6	0.5	23.4		
					4233	846.6	0.5	23.4		

9.4. LTE

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

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

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

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

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

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

Network Signalling value	Requirements (subclause)	E-UTRA Band	Channel bandwidth (MHz)	Resources Blocks (N_{RB})	A-MPR (dB)
NS_01	6.6.2.1.1	Table 5.5-1	1.4, 3, 5, 10, 15, 20	Table 5.6-1	N/A
NS_03	6.6.2.2.1	2, 4, 10, 23, 25, 35, 36, 66, 70	3	>5	≤ 1
			5	>6	≤ 1
			10	>8	≤ 1
			15	>8	≤ 1
NS_04	6.6.2.2.2, 6.6.3.3.19	41	5, 10, 15, 20	Table 6.2.4-4, Table 6.2.4-4a	
				20	>10
NS_05	6.6.3.3.1	1	10, 15, 20	≥ 50 (NOTE 1)	≤ 1 (NOTE 1)
			15, 20	Table 6.2.4-18 (NOTE 2)	
		65 (NOTE 3)	10, 15, 20	≥ 50	≤ 1 (NOTE 1)
NS_06	6.6.2.2.3	12, 13, 14, 17	1.4, 3, 5, 10	Table 5.6-1	N/A
NS_07	6.6.2.2.3	13	10	Table 6.2.4-2	
NS_08	6.6.3.3.2			10, 15	> 44
NS_09	6.6.3.3.3	19	10, 15	> 40	≤ 1
				> 55	≤ 2
NS_10	6.6.3.3.4	21	10, 15	Table 6.2.4-3	
NS_11	6.6.2.2.1	23	1.4, 3, 5, 10, 15, 20	Table 6.2.4-5	
				6.6.3.3.13	Table 6.2.4-6
NS_12	6.6.3.3.5	26	1.4, 3, 5, 10, 15	Table 6.2.4-7	
NS_13	6.6.3.3.6	26	5	Table 6.2.4-8	
NS_14	6.6.3.3.7	26	10, 15	Table 6.2.4-9	
NS_15	6.6.3.3.8	26	1.4, 3, 5, 10, 15	Table 6.2.4-10	
NS_16	6.6.3.3.9	27	3, 5, 10	Table 6.2.4-11, Table 6.2.4-12, Table 6.2.4-13	
NS_17	6.6.3.3.10	28	5, 10	Table 5.6-1	N/A
NS_18	6.6.3.3.11	28	5	≥ 2	≤ 1
			10, 15, 20	≥ 1	≤ 4
NS_19	6.6.3.3.12	44	10, 15, 20	Table 6.2.4-14	
NS_20	6.2.2	23	5, 10, 15, 20	Table 6.2.4-15	
	6.6.2.2.1			Table 6.2.4-16	
NS_21	6.6.3.3.14	30	5, 10	Table 6.2.4-17	
NS_22	6.6.2.2.1	30	5, 10	Table 6.2.4-18	
NS_23	6.6.3.3.15	42, 43	5, 10, 15, 20	Table 6.2.4-19	
NS_24	6.6.3.3.16	42, 43	5, 10, 15, 20	Table 6.2.4-20	
NS_25	6.6.3.3.17	65 (NOTE 4)	5, 10, 15, 20	Table 6.2.4-21	
NS_26	6.6.3.3.18	65 (NOTE 4)	5, 10, 15, 20	Table 6.2.4-22	
NS_27	6.6.3.3.21	68	10, 15	Table 6.2.4-23	
NS_28	6.6.2.2.5	48	5, 10, 15, 20	Table 6.2.4-24	
	6.6.3.3.23			Table 6.2.4-25	
NS_29	6.2.2A, 6.6.3.3.24	46 (NOTE 5)	20	Table 6.2.4-26	
NS_30	6.2.2A,	46 (NOTE 5)	20	Table 6.2.4-27	
	6.6.2.3.1a,			Table 6.2.4-28	
NS_31	6.6.3.3.25	46 (NOTE 5)	20	Table 6.2.4-29	
NS_32	6.2.2A,	46 (NOTE 5)	20	Table 6.2.4-30	
	6.6.3.3.26			Table 6.2.4-31	
NS_33	6.2.2A,	46 (NOTE 5)	20	Table 6.2.4-32	
NS_34	6.6.3.3.27	46 (NOTE 5)	20	Table 6.2.4-33	
NS_35	-	-	-	-	-

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

LTE Band 2 Measured Results

Band	BW (MHz)	Mode	RB Allocation	RB offset	MPR	Max. Meas. Avg Pwr (dBm)			Max. Output Pwr (dBm)
						1860 MHz	1880 MHz	1900 MHz	
LTE Band 2	20	QPSK	1	0	0	22.9	23.0	23.0	23.0
			1	49	0	22.7	22.7	22.9	
			1	99	0	22.7	22.9	22.8	
			50	0	0	22.8	22.9	22.9	
			50	24	0	22.8	22.9	22.9	
			50	50	0	22.6	22.8	22.9	
			100	0	0	22.7	22.8	22.9	
		16QAM	1	0	0	22.9	23.0	23.0	23.0
			1	49	0	22.7	22.8	22.9	
			1	99	0	22.7	23.0	22.8	
			50	0	0	22.5	22.5	22.5	
			50	24	0	22.4	22.4	22.5	
			50	50	0	22.2	22.4	22.5	
			100	0	0	22.3	22.5	22.5	
		64QAM	1	0	0	22.9	22.7	22.6	23.0
			1	49	0	22.8	22.5	22.5	
			1	99	0	22.8	22.6	22.4	
			50	0	1	21.8	21.9	21.9	22.0
			50	24	1	21.8	21.8	21.9	
			50	50	1	21.6	21.8	21.9	
			100	0	1	21.7	21.8	21.9	

Band	BW (MHz)	Mode	RB Allocation	RB offset	MPR	Max. Meas. Avg Pwr (dBm)			Max. Output Pwr (dBm)
						1857.5 MHz	1880 MHz	1902.5 MHz	
LTE Band 2	15	QPSK	1	0	0	22.8	22.8	22.6	23.0
			1	37	0	22.6	22.6	22.5	
			1	74	0	22.6	22.6	22.6	
			36	0	0	22.7	22.6	22.5	
			36	20	0	22.8	22.7	22.6	
			36	39	0	22.8	22.7	22.6	
			75	0	0	22.8	22.7	22.6	
		16QAM	1	0	0	22.8	22.9	22.9	23.0
			1	37	0	22.6	22.7	22.7	
			1	74	0	22.5	22.7	22.7	
			36	0	0	22.4	22.2	22.3	
			36	20	0	22.5	22.3	22.3	
			36	39	0	22.4	22.3	22.3	
			75	0	0	22.5	22.3	22.3	
		64QAM	1	0	0	22.8	22.4	22.7	23.0
			1	37	0	22.7	22.3	22.6	
			1	74	0	22.6	22.3	22.6	
			36	0	1	21.7	21.8	21.9	22.0
			36	20	1	21.8	21.8	21.9	
			36	39	1	21.8	21.8	21.9	
			75	0	1	21.8	21.7	21.9	

LTE Band 2 Measured Results (continued)

Band	BW (MHz)	Mode	RB Allocation	RB offset	MPR	Max. Meas. Avg Pwr (dBm)			Max. Output Pwr (dBm)
						1855 MHz	1880 MHz	1905 MHz	
LTE Band 2	10	QPSK	1	0	0	22.7	22.7	22.8	23.0
			1	25	0	22.4	22.5	22.6	
			1	49	0	22.7	22.7	22.6	
			25	0	0	22.5	22.6	22.7	
			25	12	0	22.5	22.6	22.7	
			25	25	0	22.5	22.5	22.7	
			50	0	0	22.6	22.6	22.7	
		16QAM	1	0	0	22.4	22.6	22.3	23.0
			1	25	0	22.1	22.5	22.1	
			1	49	0	22.3	22.7	22.1	
			25	0	0	22.2	22.2	22.3	
			25	12	0	22.2	22.2	22.3	
			25	25	0	22.2	22.2	22.3	
		64QAM	1	0	0	22.5	22.6	22.6	23.0
			1	25	0	22.3	22.4	22.4	
			1	49	0	22.5	22.6	22.4	
			25	0	1	21.8	21.8	21.9	22.0
			25	12	1	21.8	21.8	21.9	
			25	25	1	21.8	21.7	21.9	
			50	0	1	21.8	21.7	21.8	

Band	BW (MHz)	Mode	RB Allocation	RB offset	MPR	Max. Meas. Avg Pwr (dBm)			Max. Output Pwr (dBm)
						1852.5 MHz	1880 MHz	1907.5 MHz	
LTE Band 2	5	QPSK	1	0	0	22.6	22.5	22.5	23.0
			1	12	0	22.5	22.6	22.5	
			1	24	0	22.5	22.6	22.5	
			12	0	0	22.4	22.5	22.5	
			12	7	0	22.5	22.5	22.6	
			12	13	0	22.4	22.5	22.6	
			25	0	0	22.5	22.5	22.6	
		16QAM	1	0	0	22.2	22.1	22.6	23.0
			1	12	0	22.2	22.2	22.6	
			1	24	0	22.2	22.2	22.6	
			12	0	0	22.1	22.2	22.4	
			12	7	0	22.1	22.2	22.4	
			12	13	0	22.1	22.2	22.4	
		64QAM	25	0	0	22.1	22.1	22.3	
			1	0	0	22.5	22.0	22.5	23.0
			1	12	0	22.4	22.1	22.4	
			1	24	0	22.4	22.1	22.4	
			12	0	1	21.6	21.7	21.8	22.0
			12	7	1	21.6	21.7	21.8	
			12	13	1	21.6	21.7	21.8	
		25	0	1	21.6	21.7	21.8		

LTE Band 2 Measured Results (continued)

Band	BW (MHz)	Mode	RB Allocation	RB offset	MPR	Max. Meas. Avg Pwr (dBm)			Max. Output Pwr (dBm)
						1851.5 MHz	1880 MHz	1908.5 MHz	
LTE Band 2	3	QPSK	1	0	0	22.4	22.6	22.7	23.0
			1	8	0	22.5	22.6	22.7	
			1	14	0	22.4	22.5	22.6	
			8	0	0	22.5	22.5	22.6	
			8	4	0	22.5	22.6	22.7	
			8	7	0	22.5	22.5	22.7	
			15	0	0	22.5	22.5	22.7	
		16QAM	1	0	0	22.1	22.5	22.1	23.0
			1	8	0	22.2	22.6	22.2	
			1	14	0	22.0	22.5	22.1	
			8	0	0	22.1	22.2	22.3	
			8	4	0	22.1	22.2	22.3	
			8	7	0	22.1	22.2	22.3	
		64QAM	1	0	0	22.2	22.4	22.3	23.0
			1	8	0	22.3	22.4	22.3	
			1	14	0	22.2	22.3	22.2	
			8	0	1	21.6	21.7	21.5	22.0
			8	4	1	21.6	21.7	21.6	
8	7		1	21.6	21.7	21.7			
15	0		1	21.6	21.6	21.7			

Band	BW (MHz)	Mode	RB Allocation	RB offset	MPR	Max. Meas. Avg Pwr (dBm)			Max. Output Pwr (dBm)
						1850.7 MHz	1880 MHz	1909.3 MHz	
LTE Band 2	1.4	QPSK	1	0	0	22.4	22.4	22.5	23.0
			1	3	0	22.5	22.4	22.5	
			1	5	0	22.4	22.4	22.5	
			3	0	0	22.4	22.4	22.5	
			3	1	0	22.4	22.5	22.6	
			3	3	0	22.4	22.4	22.6	
			6	0	0	22.4	22.4	22.5	
		16QAM	1	0	0	22.1	22.0	22.4	23.0
			1	3	0	22.1	22.1	22.5	
			1	5	0	22.1	22.1	22.4	
			3	0	0	22.1	22.2	22.3	
			3	1	0	22.1	22.3	22.3	
			3	3	0	22.1	22.3	22.4	
		64QAM	1	0	0	22.4	22.1	22.0	23.0
			1	3	0	22.5	22.2	22.2	
			1	5	0	22.4	22.2	22.1	
			3	0	0	22.4	22.0	22.1	
			3	1	0	22.4	22.0	22.3	
			3	3	0	22.4	22.0	22.3	
			6	0	1	21.5	21.6	21.9	

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

Band	BW (MHz)	Mode	RB Allocation	RB offset	MPR	Max. Meas. Avg Pwr (dBm)			Max. Output Pwr (dBm)
						829 MHz	836.5 MHz	844 MHz	
LTE Band 5	10	QPSK	1	0	0		24.3		25.0
			1	25	0		24.5		
			1	49	0		24.4		
			25	0	1		23.6		24.0
			25	12	1		23.5		
			25	25	1		23.5		
		16QAM	1	0	1		23.8		24.0
			1	25	1		23.9		
			1	49	1		23.8		
			25	0	2		22.7		23.0
			25	12	2		22.7		
			25	25	2		22.6		
		64QAM	50	0	2		22.6		23.0
			1	0	2		21.9		
			1	25	2		22.1		
			1	49	2		22.0		22.0
			25	0	3		21.7		
			25	12	3		21.7		
25	25	3		21.6					
50	0	3		21.6					
Band	BW (MHz)	Mode	RB Allocation	RB offset	MPR	Max. Meas. Avg Pwr (dBm)			Max. Output Pwr (dBm)
						826.5 MHz	836.5 MHz	846.5 MHz	
LTE Band 5	5	QPSK	1	0	0	24.7	24.4	24.6	25.0
			1	12	0	24.7	24.4	24.5	
			1	24	0	24.7	24.4	24.5	
			12	0	1	23.6	23.5	23.6	24.0
			12	7	1	23.6	23.5	23.6	
			12	13	1	23.6	23.5	23.6	
		25	0	1	23.7	23.5	23.6	24.0	
		1	0	1	23.4	23.5	23.7		
		1	12	1	23.4	23.5	23.6		
		16QAM	1	24	1	23.4	23.5	23.6	23.0
			12	0	2	22.8	22.7	22.9	
			12	7	2	22.8	22.7	22.8	
			12	13	2	22.8	22.7	22.8	23.0
			25	0	2	22.7	22.7	22.8	
			1	0	2	21.5	21.7	22.2	
		1	12	2	21.9	21.7	22.2		
		1	24	2	21.8	21.7	22.1	22.0	
		12	0	3	21.8	21.7	21.7		
12	7	3	21.8	21.7	21.7				
12	13	3	21.8	21.7	21.7	22.0			
25	0	3	21.7	21.6	21.7				

Note(s):

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

LTE Band 5 Measured Results (continued)

Band	BW (MHz)	Mode	RB Allocation	RB offset	MPR	Max. Meas. Avg Pwr (dBm)			Max. Output Pwr (dBm)
						825.5 MHz	836.5 MHz	847.5 MHz	
LTE Band 5	3	QPSK	1	0	0	24.6	24.5	24.6	25.0
			1	8	0	24.7	24.5	24.7	
			1	14	0	24.6	24.4	24.6	
			8	0	1	23.6	23.5	23.6	24.0
			8	4	1	23.7	23.5	23.6	
			8	7	1	23.7	23.5	23.6	
		15	0	1	23.7	23.5	23.6		
		16QAM	1	0	1	23.1	23.4	23.5	24.0
			1	8	1	23.2	23.5	23.6	
			1	14	1	23.1	23.4	23.5	
			8	0	2	22.8	22.6	22.7	23.0
			8	4	2	22.9	22.6	22.8	
			8	7	2	22.9	22.6	22.8	
		15	0	2	22.8	22.6	22.7		
		64QAM	1	0	2	22.2	21.5	21.7	23.0
			1	8	2	22.3	22.2	22.3	
			1	14	2	22.2	22.0	22.2	
			8	0	3	21.7	21.6	21.8	22.0
8	4		3	21.9	21.7	21.8			
8	7		3	21.9	21.7	21.8			
15	0	3	21.7	21.6	21.7				
Band	BW (MHz)	Mode	RB Allocation	RB offset	MPR	Max. Meas. Avg Pwr (dBm)			Max. Output Pwr (dBm)
						824.7 MHz	836.5 MHz	848.3 MHz	
LTE Band 5	1.4	QPSK	1	0	0	24.6	24.3	24.4	25.0
			1	3	0	24.6	24.4	24.5	
			1	5	0	24.6	24.3	24.4	
			3	0	0	24.5	24.3	24.5	24.0
			3	1	0	24.6	24.4	24.6	
			3	3	0	24.6	24.4	24.5	
		6	0	1	23.6	23.4	23.5		
		16QAM	1	0	1	23.7	23.4	23.6	24.0
			1	3	1	23.7	23.5	23.7	
			1	5	1	23.6	23.5	23.6	
			3	0	1	23.7	23.6	23.8	23.0
			3	1	1	23.7	23.7	23.8	
			3	3	1	23.7	23.7	23.8	
		6	0	2	22.8	22.6	22.8		
		64QAM	1	0	2	23.0	22.3	22.5	23.0
			1	3	2	22.8	22.7	23.0	
			1	5	2	22.7	22.5	22.9	
			3	0	2	22.8	22.6	22.9	22.0
3	1		2	22.9	22.7	23.0			
3	3		2	22.9	22.7	23.0			
6	0	3	22.0	21.8	21.6				

LTE Band 7 Measured Results

Band	BW (MHz)	Mode	RB Allocation	RB offset	MPR	Max. Meas. Avg Pwr (dBm)			Max. Output Pwr (dBm)
						2510 MHz	2535 MHz	2560 MHz	
LTE Band 7	20	QPSK	1	0	0	22.6	22.7	22.6	23.0
			1	49	0	22.3	22.7	22.3	
			1	99	0	22.3	22.6	22.2	
			50	0	0	22.5	22.8	22.5	
			50	24	0	22.5	22.8	22.4	
			50	50	0	22.4	22.7	22.3	
		16QAM	100	0	0	22.5	22.8	22.4	23.0
			1	0	0	22.7	22.7	22.6	
			1	49	0	22.3	22.7	22.4	
			1	99	0	22.3	22.6	22.3	
			50	0	0	22.1	22.4	22.1	
			50	24	0	22.0	22.4	22.0	
		64QAM	50	50	0	21.9	22.3	21.9	23.0
			100	0	0	22.0	22.4	22.0	
			1	0	0	22.5	23.0	22.4	
			1	49	0	22.2	23.0	22.2	
			1	99	0	22.3	23.0	22.2	
			50	0	1	21.8	22.0	21.6	
64QAM	50	24	1	21.7	22.0	21.5	22.0		
	50	50	1	21.7	22.0	21.5			
	100	0	1	21.7	22.0	21.5			

Band	BW (MHz)	Mode	RB Allocation	RB offset	MPR	Max. Meas. Avg Pwr (dBm)			Max. Output Pwr (dBm)	
						2507.5 MHz	2535 MHz	2562.5 MHz		
LTE Band 7	15	QPSK	1	0	0	22.5	22.7	22.7	23.0	
			1	37	0	22.3	22.7	22.5		
			1	74	0	22.2	22.6	22.4		
			36	0	0	22.4	22.7	22.6		
			36	20	0	22.4	22.8	22.6		
			36	39	0	22.2	22.7	22.5		
			75	0	0	22.4	22.8	22.5		
		16QAM	1	0	0	22.5	22.6	22.2	23.0	
			1	37	0	22.2	22.7	22.0		
			1	74	0	22.0	22.5	21.8		
			36	0	0	22.0	22.4	22.2		
			36	20	0	22.0	22.4	22.2		
			36	39	0	21.8	22.3	22.1		
			75	0	0	22.0	22.3	22.2		
		64QAM	1	0	0	22.7	22.5	22.5	23.0	
			1	37	0	22.5	22.5	22.4		
			1	74	0	22.5	22.5	22.3		
			64QAM	36	0	1	21.6	22.0	21.7	22.0
				36	20	1	21.6	22.0	21.7	
				36	39	1	21.5	22.0	21.6	
				75	0	1	21.6	22.0	21.7	

LTE Band 7 Measured Results (continued)

Band	BW (MHz)	Mode	RB Allocation	RB offset	MPR	Max. Meas. Avg Pwr (dBm)			Max. Output Pwr (dBm)	
						2505 MHz	2535 MHz	2565 MHz		
LTE Band 7	10	QPSK	1	0	0	22.4	22.6	22.5	23.0	
			1	25	0	22.3	22.7	22.5		
			1	49	0	22.1	22.6	22.4		
			25	0	0	22.4	22.6	22.6		
			25	12	0	22.4	22.8	22.6		
			25	25	0	22.3	22.7	22.5		
		16QAM	50	0	0	22.4	22.7	22.6	23.0	
			1	0	0	22.0	22.5	22.1		
			1	25	0	21.9	22.6	21.9		
			1	49	0	21.8	22.6	21.8		
			25	0	0	22.1	22.3	22.2		
			25	12	0	22.1	22.4	22.1		
		64QAM	25	25	0	22.0	22.3	22.1	23.0	
			50	0	0	22.0	22.4	22.1		
			1	0	0	22.3	22.4	22.5		23.0
			1	25	0	22.2	22.5	22.4		
			1	49	0	22.1	22.5	22.3		22.0
			25	0	1	21.7	21.9	21.7		
25	12	1	21.7	22.0	21.7					
25	25	1	21.6	22.0	21.7					
50	0	1	21.6	22.0	21.6					

Band	BW (MHz)	Mode	RB Allocation	RB offset	MPR	Max. Meas. Avg Pwr (dBm)			Max. Output Pwr (dBm)	
						2502.5 MHz	2535 MHz	2567.5 MHz		
LTE Band 7	5	QPSK	1	0	0	22.5	22.6	22.6	23.0	
			1	12	0	22.5	22.7	22.6		
			1	24	0	22.4	22.7	22.5		
			12	0	0	22.5	22.7	22.5		
			12	7	0	22.5	22.7	22.5		
			12	13	0	22.5	22.7	22.5		
		16QAM	25	0	0	22.5	22.7	22.5	23.0	
			1	0	0	22.2	22.7	22.2		
			1	12	0	22.1	22.8	22.2		
			1	24	0	22.1	22.7	22.1		
			12	0	0	22.1	22.4	22.2		
			12	7	0	22.1	22.4	22.2		
		64QAM	12	13	0	22.1	22.4	22.2	23.0	
			25	0	0	22.0	22.3	22.1		
			1	0	0	22.4	22.6	22.0		23.0
			1	12	0	22.4	22.7	22.0		
			1	24	0	22.4	22.6	22.0		22.0
			12	0	1	21.8	21.9	21.6		
12	7	1	21.8	21.9	21.6					
12	13	1	21.7	21.9	21.6					
25	0	1	21.7	21.9	21.6					

LTE Band 12 Measured Results

Band	BW (MHz)	Mode	RB Allocation	RB offset	MPR	Max. Meas. Avg Pwr (dBm)			Max. Output Pwr (dBm)
						704 MHz	707.5 MHz	711 MHz	
LTE Band 12	10	QPSK	1	0	0		24.3		25.0
			1	25	0		24.4		
			1	49	0		24.5		
			25	0	1		23.5		24.0
			25	12	1		23.4		
			25	25	1		23.4		
		16QAM	50	0	1		23.4		
			1	0	1		23.7		24.0
			1	25	1		23.8		
			1	49	1		23.9		
			25	0	2		22.6		23.0
			25	12	2		22.6		
		25	25	2		22.5			
		64QAM	50	0	2		22.5		
			1	0	2		21.8		23.0
			1	25	2		22.0		
			1	49	2		22.1		
			25	0	3		21.6		22.0
25	12		3		21.6				
25	25	3		21.6					
50	0	3		21.6					
Band	BW (MHz)	Mode	RB Allocation	RB offset	MPR	Max. Meas. Avg Pwr (dBm)			Max. Output Pwr (dBm)
						701.5 MHz	707.5 MHz	713.5 MHz	
LTE Band 12	5	QPSK	1	0	0	24.4	24.3	24.6	25.0
			1	12	0	24.5	24.3	24.6	
			1	24	0	24.5	24.4	24.6	
			12	0	1	23.6	23.4	23.5	24.0
			12	7	1	23.5	23.4	23.5	
			12	13	1	23.5	23.4	23.5	
		25	0	1	23.6	23.4	23.6		
		16QAM	1	0	1	23.5	23.4	23.3	24.0
			1	12	1	23.6	23.4	23.2	
			1	24	1	23.5	23.5	23.3	
			12	0	2	22.7	22.6	22.7	23.0
			12	7	2	22.7	22.6	22.7	
			12	13	2	22.7	22.6	22.7	
		25	0	2	22.7	22.5	22.7		
		64QAM	1	0	2	21.7	21.5	21.7	23.0
			1	12	2	21.7	21.6	21.7	
			1	24	2	21.7	21.7	21.8	
			12	0	3	21.7	21.6	21.7	22.0
12	7		3	21.7	21.6	21.7			
12	13		3	21.6	21.6	21.7			
25	0	3	21.6	21.5	21.6				

Note(s):

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

LTE Band 12 Measured Results (continued)

Band	BW (MHz)	Mode	RB Allocation	RB offset	MPR	Max. Meas. Avg Pwr (dBm)			Max. Output Pwr (dBm)
						700.5 MHz	707.5 MHz	714.5 MHz	
LTE Band 12	3	QPSK	1	0	0	24.5	24.3	24.5	25.0
			1	8	0	24.5	24.5	24.6	
			1	14	0	24.5	24.5	24.6	
			8	0	1	23.4	23.4	23.5	24.0
			8	4	1	23.4	23.4	23.6	
			8	7	1	23.5	23.4	23.6	
		15	0	1	23.5	23.4	23.5		
		16QAM	1	0	1	23.4	22.8	23.0	24.0
			1	8	1	23.4	22.9	23.2	
			1	14	1	23.4	22.9	23.0	
			8	0	2	22.6	22.6	22.7	23.0
			8	4	2	22.6	22.6	22.8	
			8	7	2	22.7	22.6	22.8	
		15	0	2	22.6	22.5	22.6		
		64QAM	1	0	2	21.5	21.9	22.1	23.0
			1	8	2	22.1	22.1	22.1	
			1	14	2	22.0	22.0	22.0	
			8	0	3	21.6	21.6	21.6	22.0
8	4		3	21.6	21.6	21.7			
8	7		3	21.7	21.6	21.7			
15	0	3	21.6	21.5	21.7				
Band	BW (MHz)	Mode	RB Allocation	RB offset	MPR	Max. Meas. Avg Pwr (dBm)			Max. Output Pwr (dBm)
						699.7 MHz	707.5 MHz	715.3 MHz	
LTE Band 12	1.4	QPSK	1	0	0	24.3	24.3	24.5	25.0
			1	3	0	24.4	24.3	24.6	
			1	5	0	24.3	24.3	24.5	
			3	0	0	24.3	24.3	24.5	24.0
			3	1	0	24.4	24.4	24.6	
			3	3	0	24.3	24.3	24.6	
		6	0	1	23.3	23.3	23.5		
		16QAM	1	0	1	23.4	23.4	23.9	24.0
			1	3	1	23.5	23.5	23.9	
			1	5	1	23.4	23.4	23.9	
			3	0	1	23.6	23.6	23.7	23.0
			3	1	1	23.6	23.6	23.8	
			3	3	1	23.6	23.6	23.8	
		6	0	2	22.6	22.6	22.5		
		64QAM	1	0	2	21.5	21.5	21.9	23.0
			1	3	2	22.1	21.8	22.0	
			1	5	2	22.0	21.7	21.8	
			3	0	2	22.7	22.5	22.7	22.0
3	1		2	22.8	22.7	22.8			
3	3		2	22.8	22.6	22.8			
6	0	3	21.4	21.7	21.9				

LTE Band 13 Measured Results

Band	BW (MHz)	Mode	RB Allocation	RB offset	MPR	Max. Meas. Avg Pwr (dBm)	Max. Output Pwr (dBm)
						782 MHz	
LTE Band 13	10	QPSK	1	0	0	24.2	25.0
			1	25	0	24.9	
			1	49	0	24.2	
			25	0	1	23.9	24.0
			25	12	1	24.0	
			25	25	1	23.8	
		50	0	1	24.0		
		16QAM	1	0	1	23.2	24.0
			1	25	1	23.9	
			1	49	1	23.1	
			25	0	2	23.0	23.0
			25	12	2	23.0	
			25	25	2	23.0	
		50	0	2	23.0		
		64QAM	1	0	2	22.6	23.0
			1	25	2	23.0	
			1	49	2	22.6	
			25	0	3	22.0	22.0
			25	12	3	22.0	
			25	25	3	22.0	
		50	0	3	22.0		
Band	BW (MHz)	Mode	RB Allocation	RB offset	MPR	Max. Meas. Avg Pwr (dBm)	Max. Output Pwr (dBm)
						782 MHz	
LTE Band 13	5	QPSK	1	0	0	24.8	25.0
			1	12	0	24.9	
			1	24	0	24.9	
			12	0	1	23.9	24.0
			12	7	1	23.9	
			12	13	1	24.0	
		25	0	1	23.9		
		16QAM	1	0	1	24.0	24.0
			1	12	1	24.0	
			1	24	1	24.0	
			12	0	2	23.0	23.0
			12	7	2	23.0	
			12	13	2	23.0	
		25	0	2	23.0		
		64QAM	1	0	2	22.9	23.0
			1	12	2	22.9	
			1	24	2	23.0	
			12	0	3	22.0	22.0
			12	7	3	22.0	
			12	13	3	22.0	
		25	0	3	22.0		

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

Band	BW (MHz)	Mode	RB Allocation	RB offset	MPR	Max. Meas. Avg Pwr (dBm)			Max. Output Pwr (dBm)
						821.5 MHz	831.5 MHz	841.5 MHz	
LTE Band 26	15	QPSK	1	0	0		24.0		24.0
			1	37	0		24.0		
			1	74	0		23.9		
			36	0	0		23.1		
			36	20	0		23.1		
			36	39	0		23.0		
		16QAM	75	0	0		23.0		
			1	0	0		23.5		24.0
			1	37	0		23.4		
			1	74	0		23.3		
			36	0	1		22.2		23.0
			36	20	1		22.2		
		36	39	1		22.1			
		64QAM	75	0	1		22.1		
			1	0	1		22.3		23.0
			1	37	1		22.2		
			1	74	1		22.1		
			36	0	2		21.3		22.0
36	20		2		21.2				
36	39	2		21.1					
			75	0	2		21.1		

Band	BW (MHz)	Mode	RB Allocation	RB offset	MPR	Max. Meas. Avg Pwr (dBm)			Max. Output Pwr (dBm)	
						819 MHz	831.5 MHz	844 MHz		
LTE Band 26	10	QPSK	1	0	0	24.0	24.0	24.0	24.0	
			1	25	0	24.0	24.0	23.8		
			1	49	0	24.0	23.9	24.0		
			25	0	0	23.3	23.0	23.0		
			25	12	0	23.3	23.0	22.9		
			25	25	0	23.2	23.0	22.9		
		16QAM	50	0	0	23.2	23.0	22.9		
			1	0	0	23.3	23.5	23.0	24.0	
			1	25	0	23.2	23.3	22.8		
			1	49	0	23.2	23.4	22.9		
			25	0	1	22.4	22.1	22.0	23.0	
			25	12	1	22.3	22.1	22.0		
		25	25	1	22.3	22.1	22.0			
		64QAM	50	0	1	22.2	22.0	21.9		
			1	0	1	22.4	22.2	22.3	23.0	
			1	25	1	22.4	22.1	22.2		
			1	49	1	22.3	22.1	22.3		
			25	0	2	21.3	21.1	21.0	22.0	
			25	12	2	21.3	21.1	21.0		
		25	25	2	21.3	21.1	21.0			
					50	0	2	21.2	21.0	21.0

Note(s):

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

LTE Band 26 Measured Results (continued)

Band	BW (MHz)	Mode	RB Allocation	RB offset	MPR	Max. Meas. Avg Pwr (dBm)			Max. Output Pwr (dBm)		
						816.5 MHz	831.5 MHz	846.5 MHz			
LTE Band 26	5	QPSK	1	0	0	24.0	24.0	24.0	24.0		
			1	12	0	24.0	24.0	24.0			
			1	24	0	24.0	23.9	24.0			
			12	0	0	23.2	23.0	22.8			
			12	7	0	23.2	23.0	22.8			
			12	13	0	23.2	23.0	22.9			
		16QAM	25	0	0	23.2	23.0	23.0	24.0		
			1	0	0	23.4	23.5	23.1			
			1	12	0	23.3	23.6	23.1			
			1	24	0	23.3	23.5	23.2			
			12	0	1	22.3	22.2	22.0			
			12	7	1	22.3	22.2	22.0			
		64QAM	12	13	1	22.3	22.2	22.1	23.0		
			25	0	1	22.2	22.1	22.0			
			1	0	1	22.5	22.3	21.9			
			1	12	1	22.5	22.3	21.9			
			1	24	1	22.5	22.3	22.0			
			12	0	2	21.4	21.1	21.0			
LTE Band 26	3	QPSK	12	7	2	21.4	21.0	20.9	22.0		
			12	13	2	21.3	21.0	21.1			
			25	0	2	21.3	21.1	21.0			
			1	0	0	24.0	23.9	23.9			
			1	8	0	24.0	24.0	24.0			
			1	14	0	24.0	24.0	24.0			
LTE Band 26	3	16QAM	8	0	0	23.2	23.0	22.9	24.0		
			8	4	0	23.2	23.0	23.0			
			8	7	0	23.2	23.0	23.0			
			15	0	0	23.1	22.9	22.9			
			1	0	0	23.3	23.4	22.9			
			1	8	0	23.3	23.5	23.0			
		64QAM	1	14	0	23.2	23.4	22.9	24.0		
			8	0	1	22.3	22.1	22.1			
			8	4	1	22.3	22.2	22.1			
			8	7	1	22.3	22.2	22.2			
			15	0	1	22.2	22.1	22.1			
			1	0	1	22.5	22.1	22.3			
		LTE Band 26	3	QPSK	1	8	1	22.5	22.3	22.4	23.0
					1	14	1	22.4	22.2	22.3	
					8	0	2	21.2	21.1	21.1	
					8	4	2	21.2	21.1	21.1	
					8	7	2	21.3	21.1	21.1	
					15	0	2	21.3	21.1	21.0	

LTE Band 26 Measured Results (continued)

Band	BW (MHz)	Mode	RB Allocation	RB offset	MPR	Max. Meas. Avg Pwr (dBm)			Max. Output Pwr (dBm)
						814.7 MHz	831.5 MHz	848.3 MHz	
LTE Band 26	1.4	QPSK	1	0	0	24.0	23.9	23.9	24.0
			1	3	0	24.0	24.0	23.9	
			1	5	0	24.0	23.9	23.9	
			3	0	0	23.8	23.9	23.9	
			3	1	0	23.9	23.9	24.0	
			3	3	0	23.8	24.0	24.0	
			6	0	0	23.1	22.9	23.0	
		16QAM	1	0	0	23.5	23.1	23.0	24.0
			1	3	0	23.6	23.1	23.0	
			1	5	0	23.5	23.1	23.0	
			3	0	0	23.4	23.0	23.1	
			3	1	0	23.4	23.1	23.2	
			3	3	0	23.4	23.1	23.2	
			6	0	1	22.1	22.1	22.2	
		64QAM	1	0	1	22.3	22.1	22.4	23.0
			1	3	1	22.4	22.2	22.5	
			1	5	1	22.4	22.1	22.3	
			3	0	1	22.1	22.1	22.3	
			3	1	1	22.2	22.2	22.4	
			3	3	1	22.2	22.2	22.3	
			6	0	2	21.3	21.3	21.0	

LTE Band 41 Measured Results

Band	BW (MHz)	Mode	RB Allocation	RB offset	MPR	Max. Meas. Avg Pwr (dBm)					Max. Output Pwr (dBm)
						2506 MHz	2549.5 MHz	2593 MHz	2636.5 MHz	2680 MHz	
LTE Band 41	20	QPSK	1	0	0	22.4	22.6	22.6	22.6	22.4	23.0
			1	49	0	22.1	22.3	22.4	22.3	22.2	
			1	99	0	22.1	22.1	22.3	22.0	22.2	
			50	0	0	22.2	22.5	22.6	22.4	22.3	
			50	24	0	22.2	22.4	22.5	22.3	22.1	
			50	50	0	22.1	22.3	22.4	22.1	22.1	
		100	0	0	22.1	22.3	22.5	22.2	22.1		
		16QAM	1	0	0	21.7	22.2	22.1	22.0	22.1	23.0
			1	49	0	21.5	22.0	22.0	21.7	21.9	
			1	99	0	21.4	21.8	21.9	21.4	21.8	
			50	0	0	21.8	22.1	22.2	22.0	21.9	
			50	24	0	21.8	22.0	22.1	21.9	21.8	
			50	50	0	21.7	21.9	21.9	21.7	21.8	
		100	0	0	21.7	21.9	22.1	21.8	21.7		
		64QAM	1	0	0	22.1	22.5	22.8	22.3	22.4	23.0
			1	49	0	22.0	22.2	22.7	22.3	22.3	
			1	99	0	22.1	22.3	22.8	22.3	22.3	
			50	0	1	21.7	21.9	22.0	22.0	21.8	22.0
50	24		1	21.8	21.8	22.0	21.9	21.8			
50	50		1	21.7	21.8	21.9	22.0	21.8			
100	0	1	21.8	21.9	21.9	21.9	21.8				
Band	BW (MHz)	Mode	RB Allocation	RB offset	MPR	Max. Meas. Avg Pwr (dBm)					Max. Output Pwr (dBm)
LTE Band 41	15	QPSK	1	0	0	22.2	22.4	22.4	22.5	22.3	23.0
			1	37	0	22.1	22.3	22.4	22.2	22.1	
			1	74	0	22.0	22.1	22.3	22.1	22.1	
			36	0	0	22.2	22.4	22.5	22.4	22.2	
			36	20	0	22.1	22.3	22.5	22.3	22.1	
			36	39	0	22.1	22.2	22.4	22.2	22.1	
		75	0	0	22.1	22.3	22.4	22.3	22.1		
		16QAM	1	0	0	21.7	22.1	22.0	22.0	21.9	23.0
			1	37	0	21.6	21.9	21.9	21.8	21.8	
			1	74	0	21.5	21.7	21.8	21.7	21.7	
			36	0	0	21.7	22.0	22.1	21.9	21.8	
			36	20	0	21.7	22.0	22.0	21.9	21.7	
			36	39	0	21.6	21.9	22.0	21.8	21.7	
		75	0	0	21.7	21.9	22.0	21.9	21.7		
		64QAM	1	0	0	22.4	22.2	22.0	22.7	22.2	23.0
			1	37	0	22.3	22.2	21.9	22.6	22.1	
			1	74	0	22.4	22.1	22.0	22.6	22.1	
			36	0	1	21.7	21.7	22.0	22.0	21.7	22.0
36	20		1	21.8	21.7	22.0	21.9	21.7			
36	39		1	21.7	21.8	22.0	21.9	21.7			
75	0	1	21.8	21.9	21.9	21.9	21.7				

LTE Band 41 Measured Results (continued)

Band	BW (MHz)	Mode	RB Allocation	RB offset	MPR	Max. Meas. Avg Pwr (dBm)					Max. Output Pwr (dBm)
						2506 MHz	2549.5 MHz	2593 MHz	2636.5 MHz	2680 MHz	
LTE Band 41	10	QPSK	1	0	0	22.2	22.4	22.4	22.4	22.2	23.0
			1	25	0	22.1	22.3	22.4	22.2	22.1	
			1	49	0	22.0	22.2	22.3	22.2	22.1	
			25	0	0	22.2	22.4	22.5	22.3	22.1	
			25	12	0	22.2	22.3	22.5	22.3	22.1	
			25	25	0	22.1	22.3	22.4	22.3	22.2	
		50	0	0	22.1	22.3	22.5	22.3	22.1		
		16QAM	1	0	0	21.7	22.1	21.9	21.9	21.9	23.0
			1	25	0	21.6	22.0	21.9	21.8	21.8	
			1	49	0	21.5	21.9	21.9	21.7	21.8	
			25	0	0	21.7	21.9	22.0	21.9	21.7	
			25	12	0	21.7	22.0	22.0	21.9	21.7	
			25	25	0	21.7	21.9	22.0	21.8	21.7	
		50	0	0	21.7	22.0	22.0	21.9	21.7		
		64QAM	1	0	0	22.4	22.4	21.9	22.7	22.4	23.0
			1	25	0	22.4	22.4	22.0	22.7	22.3	
			1	49	0	22.4	22.3	21.9	22.6	22.3	
			25	0	1	21.6	21.8	22.0	21.8	21.7	22.0
25	12		1	21.7	21.8	22.0	21.8	21.6			
25	25		1	21.7	21.8	21.9	21.9	21.7			
50	0	1	21.7	21.8	21.9	21.9	21.7				
Band	BW (MHz)	Mode	RB Allocation	RB offset	MPR	Max. Meas. Avg Pwr (dBm)					Max. Output Pwr (dBm)
LTE Band 41	5	QPSK	1	0	0	22.1	22.3	22.5	22.3	22.0	23.0
			1	12	0	22.1	22.3	22.5	22.3	22.1	
			1	24	0	22.1	22.2	22.4	22.2	22.0	
			12	0	0	22.2	22.4	22.5	22.3	22.1	
			12	7	0	22.2	22.4	22.5	22.3	22.1	
			12	13	0	22.2	22.4	22.5	22.3	22.2	
		25	0	0	22.2	22.4	22.5	22.3	22.1		
		16QAM	1	0	0	21.8	21.9	22.0	21.9	21.6	23.0
			1	12	0	21.8	21.8	22.0	21.9	21.6	
			1	24	0	21.7	21.8	21.9	21.9	21.6	
			12	0	0	21.8	22.0	22.1	21.9	21.7	
			12	7	0	21.8	22.0	22.0	21.9	21.7	
			12	13	0	21.8	21.9	22.0	21.9	21.7	
		25	0	0	21.8	22.0	22.1	21.9	21.7		
		64QAM	1	0	0	21.8	22.7	22.6	22.1	22.6	23.0
			1	12	0	21.8	22.7	22.5	22.2	22.7	
			1	24	0	21.8	22.7	22.5	22.1	22.7	
			12	0	1	21.6	21.9	21.9	21.9	21.8	22.0
12	7		1	21.7	21.9	21.9	22.0	21.8			
12	13		1	21.7	21.9	21.9	22.0	21.9			
25	0	1	21.7	21.8	21.8	21.9	21.7				

LTE Band 66 Measured Results

Band	BW (MHz)	Mode	RB Allocation	RB offset	MPR	Max. Meas. Avg Pwr (dBm)			Max. Output Pwr (dBm)	
						1720 MHz	1745 MHz	1770 MHz		
LTE Band 66	20	QPSK	1	0	0	22.6	22.5	22.7	23.0	
			1	49	0	22.4	22.4	22.5		
			1	99	0	22.4	22.5	22.6		
			50	0	0	22.6	22.6	22.6		
			50	24	0	22.6	22.6	22.6		
			50	50	0	22.5	22.6	22.6		
		16QAM	1	0	0	22.6	22.5	22.8	23.0	
			1	49	0	22.5	22.4	22.5		
			1	99	0	22.5	22.6	22.6		
			50	0	0	22.2	22.2	22.2		
			50	24	0	22.2	22.3	22.2		
			50	50	0	22.1	22.2	22.1		
		64QAM	1	0	0	22.6	22.4	22.7	23.0	
			1	49	0	22.4	22.4	22.4		
			1	99	0	22.4	22.5	22.6		
			50	0	1	21.8	21.8	21.9	22.0	
			50	24	1	21.8	21.9	21.8		
			50	50	1	21.7	21.8	21.7		
			100	0	1	21.7	21.8	21.7		
Band	BW (MHz)	Mode	RB Allocation	RB offset	MPR	Max. Meas. Avg Pwr (dBm)			Max. Output Pwr (dBm)	
						1717.5 MHz	1745 MHz	1772.5 MHz		
LTE Band 66	15	QPSK	1	0	0	22.7	22.6	22.6	23.0	
			1	37	0	22.6	22.4	22.5		
			1	74	0	22.6	22.5	22.5		
			36	0	0	22.7	22.5	22.6		
			36	20	0	22.6	22.6	22.6		
			36	39	0	22.6	22.5	22.4		
		16QAM	75	0	0	22.6	22.6	22.5	23.0	
			1	0	0	22.7	22.1	22.1		
			1	37	0	22.5	21.9	21.9		
			1	74	0	22.5	22.1	22.0		
			36	0	0	22.3	22.1	22.1		
			36	20	0	22.2	22.2	22.1		
		64QAM	36	39	0	22.2	22.2	22.0	23.0	
			75	0	0	22.2	22.2	22.1		
			1	0	0	22.6	22.5	22.6		23.0
			1	37	0	22.5	22.4	22.4		
			1	74	0	22.5	22.5	22.5		
			36	0	1	21.8	21.6	21.7		22.0
36	20	1	21.8	21.7	21.7					
36	39	1	21.8	21.7	21.7					
			75	0	1	21.7	21.7	21.7		

LTE Band 66 Measured Results (continued)

Band	BW (MHz)	Mode	RB Allocation	RB offset	MPR	Max. Meas. Avg Pwr (dBm)			Max. Output Pwr (dBm)	
						1715 MHz	1745 MHz	1775 MHz		
LTE Band 66	10	QPSK	1	0	0	22.5	22.4	22.4	23.0	
			1	25	0	22.4	22.4	22.4		
			1	49	0	22.4	22.5	22.4		
			25	0	0	22.5	22.5	22.4		
			25	12	0	22.4	22.6	22.4		
			25	25	0	22.4	22.5	22.5		
		16QAM	1	0	0	22.4	22.4	21.9	23.0	
			1	25	0	22.3	22.3	21.9		
			1	49	0	22.3	22.4	21.9		
			25	0	0	22.1	22.0	22.0		
			25	12	0	22.1	22.1	22.0		
			25	25	0	22.1	22.1	22.1		
		64QAM	1	0	0	22.3	22.3	22.4	23.0	
			1	25	0	22.3	22.2	22.4		
			1	49	0	22.3	22.4	22.4		
			25	0	1	21.7	21.6	21.6	22.0	
			25	12	1	21.7	21.7	21.6		
			25	25	1	21.6	21.7	21.6		
			50	0	1	21.6	21.7	21.6		
Band	BW (MHz)	Mode	RB Allocation	RB offset	MPR	Max. Meas. Avg Pwr (dBm)			Max. Output Pwr (dBm)	
						1712.5 MHz	1745 MHz	1777.5 MHz		
LTE Band 66	5	QPSK	1	0	0	22.2	22.4	22.6	23.0	
			1	12	0	22.2	22.3	22.5		
			1	24	0	22.2	22.5	22.5		
			12	0	0	22.3	22.4	22.5		
			12	7	0	22.3	22.4	22.5		
			12	13	0	22.2	22.5	22.4		
		16QAM	25	0	0	22.3	22.5	22.5	23.0	
			1	0	0	22.3	22.5	22.2		
			1	12	0	22.3	22.5	22.2		
			1	24	0	22.3	22.6	22.2		
			12	0	0	22.0	22.1	22.1		
			12	7	0	22.0	22.1	22.1		
		64QAM	12	13	0	21.9	22.2	22.1	23.0	
			25	0	0	21.9	22.2	22.1		
			1	0	0	21.8	22.0	22.1		23.0
			1	12	0	21.8	21.9	22.0		
			1	24	0	21.8	22.0	22.0		
			12	0	1	21.4	21.6	21.6		22.0
12	7	1	21.4	21.6	21.6					
12	13	1	21.4	21.7	21.6					
			25	0	1	21.3	21.6	21.6		

LTE Band 66 Measured Results (continued)

Band	BW (MHz)	Mode	RB Allocation	RB offset	MPR	Max. Meas. Avg Pwr (dBm)			Max. Output Pwr (dBm)	
						1711.5 MHz	1745 MHz	1778.5 MHz		
LTE Band 66	3	QPSK	1	0	0	22.3	22.4	22.4	23.0	
			1	8	0	22.3	22.5	22.5		
			1	14	0	22.2	22.4	22.4		
			8	0	0	22.2	22.4	22.4		
			8	4	0	22.2	22.4	22.4		
			8	7	0	22.2	22.4	22.4		
		16QAM	15	0	0	22.3	22.4	22.4	23.0	
			1	0	0	22.2	22.3	21.9		
			1	8	0	22.3	22.4	22.0		
			1	14	0	22.1	22.3	21.8		
			8	0	0	21.9	22.0	22.1		
			8	4	0	21.9	22.1	22.1		
		64QAM	8	7	0	21.9	22.1	22.1	23.0	
			15	0	0	21.9	22.0	22.0		
			1	0	0	21.7	21.9	22.3		23.0
			1	8	0	22.2	22.4	22.4		
			1	14	0	22.1	22.3	22.3		22.0
			8	0	1	21.4	21.6	21.6		
8	4	1	21.4	21.6	21.7					
8	7	1	21.4	21.6	21.6					
LTE Band 66	1.4	QPSK	15	0	1	21.3	21.5	21.6	22.0	
			1	0	0	22.1	22.3	22.4		23.0
			1	3	0	22.2	22.3	22.4		
			1	5	0	22.1	22.3	22.3		
			3	0	0	22.2	22.3	22.3		
			3	1	0	22.2	22.4	22.4		
		16QAM	3	3	0	22.2	22.4	22.4	23.0	
			6	0	0	22.1	22.3	22.4		
			1	0	0	22.1	22.2	22.0		23.0
			1	3	0	22.1	22.3	22.0		
			1	5	0	22.1	22.2	22.0		
			3	0	0	21.9	22.1	22.1		
		3	1	0	22.0	22.1	22.2			
		3	3	0	22.0	22.1	22.2			
		64QAM	6	0	0	21.6	21.8	22.1	23.0	
			1	0	0	21.7	21.8	21.5		23.0
			1	3	0	22.0	22.4	22.4		
			1	5	0	21.9	22.2	22.3		
3	0		0	21.7	22.2	22.3				
3	1		0	21.8	22.3	22.4				
64QAM	3	3	0	21.8	22.3	22.3	23.0			
	6	0	1	21.3	21.4	21.5				

9.5. LTE Carrier Aggregation

The following power measurements were performed with a single carrier uplink; CA for this particular project is only supported in the downlinks. The CA combination is one (1) Uplink and to four (4) Downlinks.

Type	LTE CA combinations		PCC (UL)					SCC (DL)			LTE Rel 8 Tx. Power [dBm]	LTE Rel 12 Tx. Power [dBm]	Delta	
	PCC	+	SCC	Mode	BW (MHz)	Channel	Freq. (MHz)	RB/Offset	BW (MHz)	Channel				Freq. (MHz)
Intra-Band Contiguous	12B			QPSK	5	23035	701.5	1,0	10	5107	738.7	24.86	24.03	-3.3%
	7C			QPSK	20	21001	2525.1	1,0	20	3199	2664.9	22.73	22.73	0.0%
	41C			QPSK	20	39750	2506.0	1,0	20	39948	2525.8	22.36	22.56	0.9%
	66B			QPSK	15	132597	1772.5	75,0	5	67154	2181.8	22.95	22.96	0.0%
	66C			QPSK	20	132072	1720.0	100,0	20	66734	2139.8	23.00	22.99	0.0%
Intra-Band Non-Contiguous	2A	+	2A	QPSK	20	18700	1860.0	1,0	20	1100	1980.0	22.90	22.77	-0.6%
	4A	+	4A	QPSK	20	20050	1720.0	1,0	20	2300	2145.0	22.70	22.71	0.0%
	7A	+	7A	QPSK	20	20850	2510.0	1,0	20	3350	2680.0	22.73	22.90	0.7%
	66A	+	66A	QPSK	20	132572	1770.0	1,0	20	66536	2120.0	22.92	22.90	-0.1%
Inter-Band Non-Contiguous	2A	+	4A	QPSK	20	18900	1880.0	1,0	20	2300	2145.0	22.97	23.00	0.1%
	2A	+	5A	QPSK	20	18900	1880.0	1,0	10	2450	874.0	22.97	23.00	0.1%
	2A	+	7A	QPSK	20	18900	1880.0	1,0	20	3350	2680.0	22.97	22.86	-0.5%
	2A	+	12A	QPSK	20	18900	1880.0	1,0	10	5095	737.5	22.97	23.00	0.1%
	2A	+	13A	QPSK	20	18900	1880.0	1,0	10	5230	751.0	22.97	23.00	0.1%
	2A	+	17A	QPSK	10	19150	1905.0	1,0	10	5790	740.0	22.97	23.00	0.1%
	2A	+	29A	QPSK	20	18900	1880.0	1,0	10	9715	722.5	22.97	22.96	0.0%
	2A	+	66A	QPSK	20	18900	1880.0	1,0	20	66886	2155.0	22.97	23.00	0.1%
	4A	+	5A	QPSK	20	20175	1732.5	1,0	10	2525	881.5	22.74	22.93	0.8%
	4A	+	7A	QPSK	20	20175	1732.5	1,0	20	3100	2655.0	22.74	22.92	0.8%
	4A	+	12A	QPSK	20	20175	1732.5	1,0	10	5095	737.5	22.74	22.96	1.0%
	4A	+	13A	QPSK	20	20175	1732.5	1,0	10	5230	751.0	22.74	22.96	1.0%
	4A	+	17A	QPSK	10	20000	1715.0	1,0	10	5790	740.0	22.71	22.80	0.4%
	4A	+	29A	QPSK	20	20175	1732.5	1,0	10	9715	722.5	22.74	22.98	1.1%
	5A	+	7A	QPSK	10	20525	836.5	1,0	20	3350	2680.0	24.85	25.00	0.6%
	5A	+	12A	QPSK	10	20525	836.5	1,0	10	5095	737.5	24.85	24.97	0.5%
5A	+	29A	QPSK	10	20600	844.0	1,0	10	9720	723.0	24.85	25.00	0.6%	
12A	+	66A	QPSK	10	23095	707.5	1,0	20	66886	2155.0	24.77	24.80	0.1%	

Note:

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

Type	LTE CA combinations			PCC (UL)				SCC1 (DL)			SCC2 (DL)			LTE Rel 8 Tx. Power [dBm]	LTE Rel 12 Tx. Power [dBm]	Delta			
	PCC	+	SCC1	+	SCC2	Mode	BW (MHz)	Channel	Freq. (MHz)	RB/Offset	BW (MHz)	Channel	Freq. (MHz)				BW (MHz)	Channel	Freq. (MHz)
Inter-Band Non-Contiguous	2A	+	2A	+	4A	QPSK	20	18900	1880.0	1,0	20	1100	1980.0	20	2175	2132.5	22.97	23.09	0.5%
	2A	+	2A	+	12A	QPSK	20	18900	1880.0	1,0	20	1100	1980.0	10	5095	737.5	22.97	22.97	0.0%
	2A	+	2A	+	13A	QPSK	20	18900	1880.0	1,0	20	1100	1980.0	10	5230	751.0	22.97	23.00	0.1%
	2A	+	4A	+	4A	QPSK	20	18900	1880.0	1,0	20	2300	2145.0	20	2050	2120.0	22.97	23.20	1.0%
	2A	+	4A	+	5A	QPSK	20	18900	1880.0	1,0	20	2300	2145.0	10	2525	881.5	22.97	23.02	0.2%
	2A	+	4A	+	7A	QPSK	20	18900	1880.0	1,0	20	2300	2145.0	20	3100	2655.0	22.97	23.07	0.4%
	2A	+	4A	+	12A	QPSK	20	18900	1880.0	1,0	20	2300	2145.0	10	5095	737.5	22.97	23.06	0.4%
	2A	+	4A	+	13A	QPSK	20	18900	1880.0	1,0	20	2300	2145.0	10	5230	751.0	22.97	23.05	0.3%
	2A	+	4A	+	29A	QPSK	20	18900	1880.0	1,0	20	2300	2145.0	10	9715	722.5	22.97	23.04	0.3%
	2A	+	5A	+	29A	QPSK	20	18900	1880.0	1,0	10	2525	881.5	10	9715	722.5	22.97	23.01	0.2%
	2A	+	7A	+	7A	QPSK	20	18900	1880.0	1,0	20	2850	2630.0	20	3350	2680.0	22.97	22.83	-0.6%
	2A	+	12A	+	66A	QPSK	20	18900	1880.0	1,0	10	5095	737.5	20	66886	2155.0	22.97	23.03	0.3%
	2A	+	12B			QPSK	20	18900	1880.0	1,0	5	5035	731.5	10	5107	738.7	22.97	23.10	0.6%
	2A	+	66A	+	66A	QPSK	20	18900	1880.0	1,0	20	66536	2120.0	20	66886	2155.0	22.97	23.20	1.0%
	4A	+	4A	+	5A	QPSK	20	20050	1720.0	1,0	20	2300	2145.0	10	2525	881.5	22.74	22.76	0.1%
	4A	+	4A	+	12A	QPSK	20	20050	1720.0	1,0	20	2300	2145.0	10	5095	737.5	22.74	22.84	0.4%
	4A	+	4A	+	13A	QPSK	20	20050	1720.0	1,0	20	2300	2145.0	10	5230	751.0	22.74	22.79	0.2%
	4A	+	4A	+	29A	QPSK	20	20050	1720.0	1,0	20	2300	2145.0	10	9715	722.5	22.74	22.79	0.2%
	4A	+	5A	+	29A	QPSK	20	20175	1732.5	1,0	10	2525	881.5	10	9715	722.5	22.74	22.87	0.6%
	4A	+	7A	+	7A	QPSK	20	20175	1732.5	1,0	20	2850	2630.0	20	3350	2680.0	22.74	22.97	1.0%
4A	+	7C			QPSK	20	20175	1732.5	1,0	20	3001	2645.1	20	3199	2664.9	22.74	22.97	1.0%	
4A	+	12B			QPSK	20	20175	1732.5	1,0	5	5035	731.5	10	5107	738.7	22.74	22.77	0.1%	
5A	+	7A	+	7A	QPSK	10	20525	836.5	25,0	20	2850	2630.0	20	3350	2680.0	24.10	24.07	-0.1%	
12A	+	66A	+	66A	QPSK	10	23095	707.5	25,0	20	66536	2120.0	20	67236	2190.0	23.96	23.97	0.0%	

Type	LTE CA combinations				PCC (UL)				SCC1 (DL)			SCC2 (DL)			SCC3 (DL)			LTE Rel 8 Tx. Power [dBm]	LTE Rel 12 Tx. Power [dBm]	Delta				
	PCC	+	SCC1	+	SCC2	+	SCC3	Mode	BW (MHz)	Channel	Freq. (MHz)	RB/Offset	BW (MHz)	Channel	Freq. (MHz)	BW (MHz)	Channel				Freq. (MHz)	BW (MHz)	Channel	Freq. (MHz)
Inter-Band Non-Contiguous	2A	+	4A	+	5A	+	29A	QPSK	20	18900	1880.0	1,0	20	2175	2132.5	10	2525	881.5	10	9715	722.5	22.97	23.10	0.6%
	2A	+	4A	+	7A	+	7A	QPSK	20	18900	1880.0	1,0	20	2175	2132.5	20	3100	2655.0	20	3350	2680.0	22.97	23.08	0.5%
	2A	+	4A	+	7C			QPSK	20	18900	1880.0	1,0	20	2175	2132.5	20	3001	2645.1	20	3199	2664.9	22.97	23.01	0.2%

Note:

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

9.6. Wi-Fi 2.4GHz (DTS Band)

Measured Results

Band (GHz)	Mode	Data Rate	Ch #	Freq. (MHz)	Meas. Avg Pwr (dBm)		Max Output Power (dBm)		SAR Test (Yes/No)
					Chain 0	Chain 1	Chain 0	Chain 1	
2.4 (DSSS)	802.11b	1 Mbps	1	2412	13.2	12.7	13.5	13.3	Yes
			6	2437	13.1	13.0			
			11	2462	12.7	12.8			
2.4 (OFDM)	802.11g	6 Mbps	1	2412	Not Required	Not Required	13.8	13.3	No
			6	2437					
			11	2462					
	802.11n (HT20)	6.5 Mbps	1	2412			13.9	13.3	No
			6	2437					
			11	2462					

Note(s):

- SAR is not required for 802.11g/n modes when the adjusted SAR for 802.11b is < 1.2 W/kg.
- For "Not required", SAR Test reduction was applied from KDB 248227 guidance, Sec. 2.1, b), 1) when the same maximum power is specified for multiple transmission modes in a frequency band, the largest channel bandwidth, lowest order modulation, lowest data rate and lowest order 802.11a/g/n/ac mode is used for SAR measurement, on the highest measured output power channel in the initial test configuration, for each frequency band. Additional output power measurements were not deemed necessary.
- Additionally, SAR is not required for Channels 12 and 13 because the tune-up limit and the measured output power for these two channels are no greater than those for the default test channels.

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

Measured Results

Band (GHz)	Mode	Data Rate	Ch #	Freq. (MHz)	Meas. Avg Pwr (dBm)		Max Output Power (dBm)		SAR Test (Yes/No)
					Chain 0	Chain 1	Chain 0	Chain 1	
5.2 U-NII 1	802.11a	6 Mbps	36	5180	11.0	Not Required	12.5	12.5	Yes
			40	5200	10.9				
			44	5220	11.4				
			48	5240	11.6				
	802.11n (HT20)	6.5 Mbps	36	5180			12.4	12.4	No
			40	5200					
			44	5220					
			48	5240					
	802.11n (HT40)	13.5 Mbps	38	5190			12.4	12.4	No
			46	5230					
	802.11ac (VHT20)	6.5 Mbps	36	5180			12.4	12.5	No
			40	5200					
			44	5220					
			48	5240					
802.11ac (VHT40)	13.5 Mbps	38	5190		12.4	11.6	No		
		46	5230			12.4			
802.11ac (VHT80)	29.3 Mbps	42	5210		12.4	12.5	No		
5.3 U-NII-2A	802.11a	6 Mbps	52	5260	11.0	Not Required	12.3	12.7	Yes
			56	5280	11.2				
			60	5300	11.6				
			64	5320	11.4				
			52	5260					
	802.11n (HT20)	6.5 Mbps	56	5280			12.2	12.6	No
			60	5300					
			64	5320					
			54	5270					
	802.11n (HT40)	13.5 Mbps	62	5310			12.2	12.6	No
			52	5260					
	802.11ac (VHT20)	6.5 Mbps	56	5280			12.3	12.6	No
			60	5300					
			64	5320					
54			5270						
802.11ac (VHT40)	13.5 Mbps	62	5310		12.3	12.6	No		
		58	5290			12.1			
802.11ac (VHT80)	29.3 Mbps	58	5290		12.3	12.6	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 (GHz)	Mode	Data Rate	Ch #	Freq. (MHz)	Meas. Avg Pwr (dBm)		Max Output Power (dBm)		SAR Test (Yes/No)
					Chain 0	Chain 1	Chain 0	Chain 1	
5.5 U-NII-2C	802.11a	6 Mbps	100	5500	Not Required	Not Required	12.0	11.6	No
			120	5600					
			124	5620					
			144	5720					
	802.11n (HT20)	6.5 Mbps	100	5500			12.0	11.6	No
			120	5600					
			124	5620					
			144	5720					
	802.11n (HT40)	13.5 Mbps	102	5510			12.0	11.6	No
			118	5590					
			126	5630					
			142	5710					
	802.11ac (VHT20)	6.5 Mbps	100	5500			12.0	11.8	No
			120	5600					
			124	5620					
			144	5720					
	802.11ac (VHT40)	13.5 Mbps	102	5510			12.0	11.8	No
			118	5590					
126			5630						
142			5710						
802.11ac (VHT80)	29.3 Mbps	106	5530	10.6	10.9	12.0	11.8	Yes	
		122	5610	10.8	10.6				
		138	5690	10.7	10.6				
5.8 U-NII-3	802.11a	6 Mbps	149	5745	Not Required	Not Required	10.1	9.7	Yes
			157	5785					
			165	5825					
	802.11n (HT20)	6.5 Mbps	149	5745			10.1	9.5	No
			157	5785					
			165	5825					
	802.11n (HT40)	13.5 Mbps	151	5755			10.1	9.5	No
			159	5795					
			149	5745					
	802.11ac (VHT20)	6.5 Mbps	157	5785			10.1	9.5	No
			165	5825					
			151	5755					
802.11ac (VHT40)	13.5 Mbps	159	5795	10.1	9.5	No			
		155	5775				8.9	8.9	10.1

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.

9.8. Bluetooth

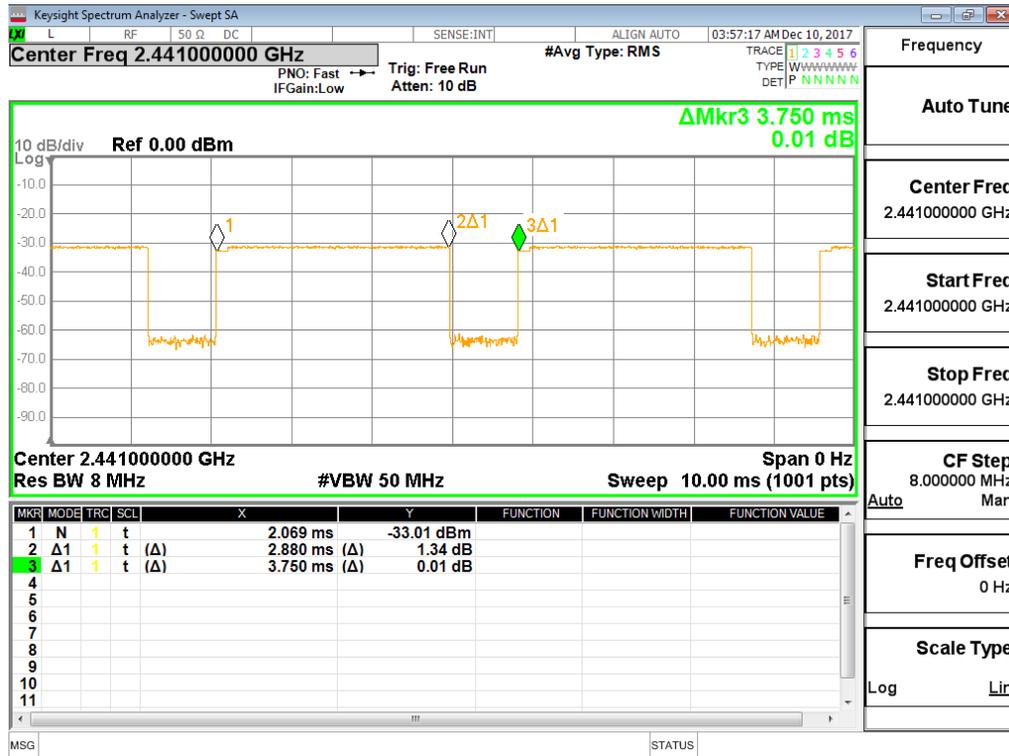
Band (MHz)	Mode	Ch #	Freq. (MHz)	Conducted Avg Power		Max Output Power (dBm)	SAR Test (Yes/No)
				(dBm)	(mW)		
2.4	GFSK	0	2402	9.84	9.64	10.3	Yes
		39	2441	10.88	12.25		
		78	2480	9.24	8.39		
	EDR, $\pi/4$ DQPSK	0	2402	7.04	5.06	7.4	No
		39	2441	8.15	6.53		
		78	2480	7.24	5.30		
	EDR, 8-DPSK	0	2402	7.31	5.38	7.4	No
		39	2441	8.15	6.53		
		78	2480	7.27	5.33		
	LE, GFSK	0	2402	3.58	2.28	4.0	No
		19	2440	5.36	3.44		
		39	2480	4.22	2.64		

Duty Factor Measured Results

Mode	Type	T on (ms)	Period (ms)	Duty Cycle	Crest Factor (1/duty cycle)
GFSK	DH5	2.88	3.75	76.80%	1.30

Duty Cycle plots

GFSK



10. Measured and Reported (Scaled) SAR Results

SAR Test Reduction criteria are as follows:

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

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

KDB 447498 D01 General RF Exposure Guidance:

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

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

KDB 648474 D04 Handset SAR:

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

KDB 648474 D04 Handset SAR (Phablet Only):

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

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

KDB 941225 D01 SAR test for 3G devices:

When the maximum output power and tune-up tolerance specified for production units in a secondary mode is $\leq 1/4$ dB higher than the primary mode or when the highest reported SAR of the primary mode is scaled by the ratio of specified maximum output power and tune-up tolerance of secondary to primary mode and the adjusted SAR is ≤ 1.2 W/kg, SAR measurement is not required for the secondary mode.

KDB 941225 D05 SAR for LTE Devices:

SAR test reduction is applied using the following criteria:

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

KDB 248227 D01 SAR meas for 802.11:

SAR test reduction for 802.11 Wi-Fi transmission mode configurations are considered separately for DSSS and OFDM. An initial test position is determined to reduce the number of tests required for certain exposure configurations with multiple test positions. An initial test configuration is determined for each frequency band and aggregated band according to maximum output power, channel bandwidth, wireless mode configurations and other operating parameters to streamline the measurement requirements. For 2.4 GHz DSSS, either the initial test position or DSSS procedure is applied to reduce the number of SAR tests; these are

mutually exclusive. For OFDM, an initial test position is only applicable to next to the ear, UMPC mini-tablet and hotspot mode configurations, which is tested using the initial test configuration to facilitate test reduction. For other exposure conditions with a fixed test position, SAR test reduction is determined using only the initial test configuration.

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

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

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

10.1. GSM850

RF Exposure Conditions	Mode	Pwr Back-off	Dist. (mm)	Test Position	Ch #.	Freq. (MHz)	Power (dBm)		1-g SAR (W/kg)		Plot No.
							Tune-up Limit	Meas.	Meas.	Scaled	
Head	GPRS 4 Slots	OFF	0	Left Touch	190	836.6	28.2	27.6	0.161	0.185	1
				Left Tilt	190	836.6	28.2	27.6	0.057	0.065	
				Right Touch	190	836.6	28.2	27.6	0.018	0.021	
				Right Tilt	190	836.6	28.2	27.6	0.002	0.002	
Body-worn	GPRS 4 Slots	OFF	15	Rear	190	836.6	28.2	27.6	0.147	0.169	
				Front	190	836.6	28.2	27.6	0.160	0.184	2
Hotspot	GPRS 4 Slots	OFF	10	Rear	190	836.6	28.2	27.6	0.257	0.295	
				Front	190	836.6	28.2	27.6	0.303	0.348	3
				Edge 2	190	836.6	28.2	27.6	0.205	0.235	
				Edge 3	190	836.6	28.2	27.6	0.141	0.162	
				Edge 4	190	836.6	28.2	27.6	0.171	0.196	
Hotspot	DTM 2 slots	OFF	10	Front	190	836.6	31.2	30.8	0.305	0.334	

10.2. GSM1900

RF Exposure Conditions	Mode	Pwr Back-off	Dist. (mm)	Test Position	Ch #.	Freq. (MHz)	Power (dBm)		1-g SAR (W/kg)		Plot No.
							Tune-up Limit	Meas.	Meas.	Scaled	
Head	GPRS 4 Slots	OFF	0	Left Touch	661	1880.0	23.7	23.4	0.088	0.094	
				Left Tilt	661	1880.0	23.7	23.4	0.046	0.049	
				Right Touch	661	1880.0	23.7	23.4	0.093	0.100	4
				Right Tilt	661	1880.0	23.7	23.4	0.050	0.053	
Body-worn	GPRS 4 Slots	OFF	15	Rear	661	1880.0	23.7	23.4	0.083	0.089	
				Front	661	1880.0	23.7	23.4	0.125	0.134	5
Hotspot	GPRS 4 Slots	OFF	10	Rear	661	1880.0	23.7	23.4	0.133	0.143	
				Front	661	1880.0	23.7	23.4	0.202	0.216	
				Edge 2	661	1880.0	23.7	23.4	0.061	0.065	
				Edge 3	661	1880.0	23.7	23.4	0.298	0.319	6
				Edge 4	661	1880.0	23.7	23.4	0.242	0.259	
Hotspot	DTM 2 slots	OFF	10	Edge 3	661	1880.0	26.7	26.4	0.276	0.296	

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	1880.0	22.7	22.6	0.216	0.221	7
				Left Tilt	9400	1880.0	22.7	22.6	0.100	0.102	
				Right Touch	9400	1880.0	22.7	22.6	0.192	0.196	
				Right Tilt	9400	1880.0	22.7	22.6	0.090	0.092	
Body-w orn	Rel 99 RMC 12.2 kbps	OFF	15	Rear	9400	1880.0	22.7	22.6	0.200	0.205	
				Front	9400	1880.0	22.7	22.6	0.246	0.252	8
Hotspot	Rel 99 RMC 12.2 kbps	OFF	10	Rear	9400	1880.0	22.7	22.6	0.292	0.299	
				Front	9400	1880.0	22.7	22.6	0.493	0.504	9
				Edge 2	9400	1880.0	22.7	22.6	0.127	0.130	
				Edge 3	9400	1880.0	22.7	22.6	0.433	0.443	
				Edge 4	9400	1880.0	22.7	22.6	0.335	0.343	

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	22.7	22.6	0.269	0.275	10
				Left Tilt	1413	1732.6	22.7	22.6	0.113	0.116	
				Right Touch	1413	1732.6	22.7	22.6	0.181	0.185	
				Right Tilt	1413	1732.6	22.7	22.6	0.121	0.124	
Body-w orn	Rel 99 RMC 12.2 kbps	OFF	15	Rear	1413	1732.6	22.7	22.6	0.196	0.201	
				Front	1413	1732.6	22.7	22.6	0.262	0.268	11
Hotspot	Rel 99 RMC 12.2 kbps	OFF	10	Rear	1413	1732.6	22.7	22.6	0.303	0.310	
				Front	1413	1732.6	22.7	22.6	0.455	0.466	
				Edge 2	1413	1732.6	22.7	22.6	0.051	0.052	
				Edge 3	1413	1732.6	22.7	22.6	0.490	0.501	
				Edge 4	1413	1732.6	22.7	22.6	0.522	0.534	12

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	836.6	24.9	24.7	0.224	0.235	13
				Left Tilt	4183	836.6	24.9	24.7	0.071	0.074	
				Right Touch	4183	836.6	24.9	24.7	0.132	0.138	
				Right Tilt	4183	836.6	24.9	24.7	0.051	0.053	
Body-w orn	Rel 99 RMC 12.2 kbps	OFF	15	Rear	4183	836.6	24.9	24.7	0.187	0.196	
				Front	4183	836.6	24.9	24.7	0.199	0.208	14
Hotspot	Rel 99 RMC 12.2 kbps	OFF	10	Rear	4183	836.6	24.9	24.7	0.364	0.381	
				Front	4183	836.6	24.9	24.7	0.364	0.381	15
				Edge 2	4183	836.6	24.9	24.7	0.248	0.260	
				Edge 3	4183	836.6	24.9	24.7	0.188	0.197	
				Edge 4	4183	836.6	24.9	24.7	0.217	0.227	

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	23.0	23.0	0.184	0.185	16
							50	0	23.0	22.9	0.174	0.178	
				Left Tilt	18900	1880.0	1	0	23.0	23.0	0.122	0.123	
							50	0	23.0	22.9	0.110	0.112	
				Right Touch	18900	1880.0	1	0	23.0	23.0	0.134	0.135	
							50	0	23.0	22.9	0.108	0.110	
				Right Tilt	18900	1880.0	1	0	23.0	23.0	0.076	0.077	
							50	0	23.0	22.9	0.066	0.067	
Body-worn	QPSK	OFF	15	Rear	18900	1880.0	1	0	23.0	23.0	0.207	0.208	
							50	0	23.0	22.9	0.199	0.203	
				Front	18900	1880.0	1	0	23.0	23.0	0.304	0.306	17
							50	0	23.0	22.9	0.294	0.300	
Hotspot	QPSK	OFF	10	Rear	18900	1880.0	1	0	23.0	23.0	0.339	0.341	
							50	0	23.0	22.9	0.324	0.331	
				Front	18900	1880.0	1	0	23.0	23.0	0.458	0.461	
							50	0	23.0	22.9	0.439	0.448	
				Edge 2	18900	1880.0	1	0	23.0	23.0	0.123	0.124	
							50	0	23.0	22.9	0.122	0.125	
				Edge 3	18900	1880.0	1	0	23.0	23.0	0.416	0.419	
							50	0	23.0	22.9	0.406	0.415	
Edge 4	18900	1880.0	1	0	23.0	23.0	0.496	0.499	18				
			50	0	23.0	22.9	0.477	0.487					

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	25.0	24.5	0.157	0.178	19
							25	0	24.0	23.6	0.135	0.149	
				Left Tilt	20525	836.5	1	25	25.0	24.5	0.080	0.091	
							25	0	24.0	23.6	0.067	0.074	
				Right Touch	20525	836.5	1	25	25.0	24.5	0.157	0.178	
							25	0	24.0	23.6	0.126	0.139	
Right Tilt	20525	836.5	1	25	25.0	24.5	0.060	0.068					
			25	0	24.0	23.6	0.050	0.055					
Body-worn	QPSK	OFF	15	Rear	20525	836.5	1	25	25.0	24.5	0.131	0.149	20
							25	0	24.0	23.6	0.102	0.113	
				Front	20525	836.5	1	25	25.0	24.5	0.110	0.125	
							25	0	24.0	23.6	0.083	0.092	
Hotspot	QPSK	OFF	10	Rear	20525	836.5	1	25	25.0	24.5	0.260	0.295	21
							25	0	24.0	23.6	0.202	0.223	
				Front	20525	836.5	1	25	25.0	24.5	0.247	0.280	
							25	0	24.0	23.6	0.192	0.212	
				Edge 2	20525	836.5	1	25	25.0	24.5	0.241	0.274	
							25	0	24.0	23.6	0.186	0.205	
				Edge 3	20525	836.5	1	25	25.0	24.5	0.164	0.186	
							25	0	24.0	23.6	0.130	0.144	
Edge 4	20525	836.5	1	25	25.0	24.5	0.126	0.143					
			25	0	24.0	23.6	0.119	0.131					

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	0	23.0	22.7	0.084	0.089	
							50	24	23.0	22.8	0.081	0.085	
				Left Tilt (15°)	21100	2535.0	1	0	23.0	22.7	0.085	0.090	22
							50	24	23.0	22.8	0.064	0.067	
				Right Touch	21100	2535.0	1	0	23.0	22.7	0.075	0.080	
							50	24	23.0	22.8	0.066	0.069	
				Right Tilt (15°)	21100	2535.0	1	0	23.0	22.7	0.043	0.046	
							50	24	23.0	22.8	0.043	0.045	
Body-worn	QPSK	OFF	15	Rear	21100	2535.0	1	0	23.0	22.7	0.115	0.122	
							50	24	23.0	22.8	0.124	0.130	
				Front	21100	2535.0	1	0	23.0	22.7	0.143	0.152	
							50	24	23.0	22.8	0.150	0.157	23
Hotspot	QPSK	OFF	10	Rear	21100	2535.0	1	0	23.0	22.7	0.252	0.268	
							50	24	23.0	22.8	0.279	0.292	
				Front	21100	2535.0	1	0	23.0	22.7	0.246	0.262	
							50	24	23.0	22.8	0.261	0.274	
				Edge 2	21100	2535.0	1	0	23.0	22.7	0.152	0.162	
							50	24	23.0	22.8	0.152	0.159	
				Edge 3	21100	2535.0	1	0	23.0	22.7	0.504	0.536	24
							50	24	23.0	22.8	0.481	0.504	
				Edge 4	21100	2535.0	1	0	23.0	22.7	0.048	0.051	
							50	24	23.0	22.8	0.047	0.049	

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	25.0	24.5	0.073	0.081	25
							25	0	24.0	23.5	0.069	0.078	
				Left Tilt (15°)	23095	707.5	1	49	25.0	24.5	0.024	0.027	
							25	0	24.0	23.5	0.023	0.026	
				Right Touch	23095	707.5	1	49	25.0	24.5	0.068	0.075	
							25	0	24.0	23.5	0.063	0.071	
				Right Tilt (15°)	23095	707.5	1	49	25.0	24.5	0.023	0.025	
							25	0	24.0	23.5	0.025	0.029	
Body-worn	QPSK	OFF	15	Rear	23095	707.5	1	49	25.0	24.5	0.067	0.075	26
							25	0	24.0	23.5	0.060	0.068	
				Front	23095	707.5	1	49	25.0	24.5	0.067	0.074	
							25	0	24.0	23.5	0.062	0.070	
Hotspot	QPSK	OFF	10	Rear	23095	707.5	1	49	25.0	24.5	0.083	0.093	
							25	0	24.0	23.5	0.078	0.088	
				Front	23095	707.5	1	49	25.0	24.5	0.087	0.097	27
							25	0	24.0	23.5	0.082	0.092	
				Edge 2	23095	707.5	1	49	25.0	24.5	0.063	0.070	
							25	0	24.0	23.5	0.053	0.060	
				Edge 3	23095	707.5	1	49	25.0	24.5	0.015	0.016	
							25	0	24.0	23.5	0.013	0.015	
				Edge 4	23095	707.5	1	49	25.0	24.5	0.086	0.096	
							25	0	24.0	23.5	0.082	0.093	

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	25.0	24.9	0.349	0.356	28
							25	12	24.0	24.0	0.351	0.352	
				Left Tilt (15°)	23230	782.0	1	25	25.0	24.9	0.058	0.059	
							25	12	24.0	24.0	0.047	0.047	
				Right Touch	23230	782.0	1	25	25.0	24.9	0.200	0.204	
							25	12	24.0	24.0	0.139	0.139	
				Right Tilt (15°)	23230	782.0	1	25	25.0	24.9	0.063	0.064	
							25	12	24.0	24.0	0.052	0.052	
Body-worn	QPSK	OFF	15	Rear	23230	782.0	1	25	25.0	24.9	0.236	0.241	
							25	12	24.0	24.0	0.191	0.191	
				Front	23230	782.0	1	25	25.0	24.9	0.273	0.279	29
							25	12	24.0	24.0	0.199	0.199	
Hotspot	QPSK	OFF	10	Rear	23230	782.0	1	25	25.0	24.9	0.292	0.298	
							25	12	24.0	24.0	0.236	0.237	
				Front	23230	782.0	1	25	25.0	24.9	0.318	0.325	30
							25	12	24.0	24.0	0.257	0.258	
				Edge 2	23230	782.0	1	25	25.0	24.9	0.262	0.267	
							25	12	24.0	24.0	0.213	0.213	
				Edge 3	23230	782.0	1	25	25.0	24.9	0.112	0.114	
							25	12	24.0	24.0	0.089	0.090	
				Edge 4	23230	782.0	1	25	25.0	24.9	0.209	0.213	
							25	12	24.0	24.0	0.167	0.167	

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	0	24.0	24.0	0.204	0.204	31
							36	20	24.0	23.1	0.146	0.180	
				Left Tilt (15°)	26865	831.5	1	0	24.0	24.0	0.032	0.032	
							36	20	24.0	23.1	0.035	0.043	
				Right Touch	26865	831.5	1	0	24.0	24.0	0.116	0.116	
							36	20	24.0	23.1	0.088	0.108	
				Right Tilt (15°)	26865	831.5	1	0	24.0	24.0	0.030	0.030	
							36	20	24.0	23.1	0.050	0.062	
Body-w orn	QPSK	OFF	15	Rear	26865	831.5	1	0	24.0	24.0	0.145	0.145	
							36	20	24.0	23.1	0.151	0.186	
				Front	26865	831.5	1	0	24.0	24.0	0.162	0.162	
							36	20	24.0	23.1	0.169	0.208	32
Hotspot	QPSK	OFF	10	Rear	26865	831.5	1	0	24.0	24.0	0.253	0.253	
							36	20	24.0	23.1	0.262	0.322	
				Front	26865	831.5	1	0	24.0	24.0	0.291	0.291	
							36	20	24.0	23.1	0.299	0.368	33
				Edge 2	26865	831.5	1	0	24.0	24.0	0.187	0.187	
							36	20	24.0	23.1	0.213	0.262	
				Edge 3	26865	831.5	1	0	24.0	24.0	0.155	0.155	
							36	20	24.0	23.1	0.152	0.187	
Edge 4	26865	831.5	1	0	24.0	24.0	0.235	0.235					
			36	20	24.0	23.1	0.192	0.236					

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)		Plot No.
									Tune-up Limit	Meas.	Meas.	Scaled	
Head	QPSK	OFF	0	Left Touch	40620	2593.0	1	0	23.0	22.6	0.049	0.054	34
							50	0	23.0	22.6	0.046	0.051	
				Left Tilt (15°)	40620	2593.0	1	0	23.0	22.6	0.025	0.028	
							50	0	23.0	22.6	0.021	0.023	
				Right Touch	40620	2593.0	1	0	23.0	22.6	0.044	0.049	
							50	0	23.0	22.6	0.042	0.046	
				Right Tilt (15°)	40620	2593.0	1	0	23.0	22.6	0.014	0.016	
							50	0	23.0	22.6	0.017	0.019	
Body-worn	QPSK	OFF	15	Rear	40620	2593.0	1	0	23.0	22.6	0.083	0.092	
							50	0	23.0	22.6	0.084	0.093	
				Front	40620	2593.0	1	0	23.0	22.6	0.178	0.197	
							50	0	23.0	22.6	0.183	0.202	35
Hotspot	QPSK	OFF	10	Rear	40620	2593.0	1	0	23.0	22.6	0.182	0.202	
							50	0	23.0	22.6	0.182	0.201	
				Front	40620	2593.0	1	0	23.0	22.6	0.244	0.271	
							50	0	23.0	22.6	0.237	0.262	
				Edge 2	40620	2593.0	1	0	23.0	22.6	0.109	0.121	
							50	0	23.0	22.6	0.115	0.127	
				Edge 3	40620	2593.0	1	0	23.0	22.6	0.274	0.304	36
							50	0	23.0	22.6	0.268	0.296	
Edge 4	40620	2593.0	1	0	23.0	22.6	0.026	0.029					
			50	0	23.0	22.6	0.024	0.026					

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	99	23.0	22.5	0.183	0.204	
							50	24	23.0	22.7	0.190	0.206	37
				Left Tilt (15°)	132322	1745.0	1	99	23.0	22.5	0.077	0.086	
							50	24	23.0	22.7	0.074	0.080	
				Right Touch	132322	1745.0	1	99	23.0	22.5	0.100	0.112	
							50	24	23.0	22.7	0.105	0.114	
				Right Tilt (15°)	132322	1745.0	1	99	23.0	22.5	0.080	0.089	
							50	24	23.0	22.7	0.083	0.089	
Body-worn	QPSK	OFF	15	Rear	132322	1745.0	1	99	23.0	22.5	0.130	0.145	
							50	24	23.0	22.7	0.133	0.144	
				Front	132322	1745.0	1	99	23.0	22.5	0.269	0.300	
							50	24	23.0	22.7	0.283	0.307	38
Hotspot	QPSK	OFF	10	Rear	132322	1745.0	1	99	23.0	22.5	0.220	0.246	
							50	24	23.0	22.7	0.236	0.256	
				Front	132322	1745.0	1	99	23.0	22.5	0.557	0.622	
							50	24	23.0	22.7	0.574	0.622	39
				Edge 2	132322	1745.0	1	99	23.0	22.5	0.050	0.056	
							50	24	23.0	22.7	0.054	0.059	
				Edge 3	132322	1745.0	1	99	23.0	22.5	0.482	0.538	
							50	24	23.0	22.7	0.525	0.569	
Edge 4	132322	1745.0	1	99	23.0	22.5	0.528	0.590					
			50	24	23.0	22.7	0.539	0.584					

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	1	2412	0.181	98.87%	13.5	13.2			
				Left Tilt	1	2412	0.242	98.87%	13.5	13.2			
				Right Touch	1	2412	0.556	98.87%	13.5	13.2			
				Right Tilt	1	2412	0.598	98.87%	13.5	13.2	0.303	0.328	40
Body-worn	802.11b 1 Mbps	Chain 0	15	Rear	1	2412	0.025	98.87%	13.5	13.2			
				Front	1	2412	0.027	98.87%	13.5	13.2	0.022	0.024	41
Hotspot	802.11b 1 Mbps	Chain 0	10	Rear	1	2412	0.060	98.87%	13.5	13.2			
				Front	1	2412	0.064	98.87%	13.5	13.2			
				Edge 1	1	2412	0.027	98.87%	13.5	13.2			
				Edge 2	1	2412	0.007	98.87%	13.5	13.2			
				Edge 4	1	2412	0.125	98.87%	13.5	13.2	0.074	0.081	42
Head	802.11b 1 Mbps	Chain 1	0	Left Touch	6	2437	0.224	98.87%	13.3	13.0			
				Left Tilt	6	2437	0.059	98.87%	13.3	13.0			
				Right Touch	6	2437	0.245	98.87%	13.3	13.0	0.154	0.167	43
				Right Tilt	6	2437	0.030	98.87%	13.3	13.0			
Body-worn	802.11b 1 Mbps	Chain 1	15	Rear	6	2437	0.003	98.87%	13.3	13.0			
				Front	6	2437	0.005	98.87%	13.3	13.0	0.005	0.005	44
Hotspot	802.11b 1 Mbps	Chain 1	10	Rear	6	2437	0.012	98.87%	13.3	13.0	0.007	0.008	45
				Front	6	2437	0.007	98.87%	13.3	13.0			
				Edge 1	6	2437	0.002	98.87%	13.3	13.0			
				Edge 2	6	2437	0.007	98.87%	13.3	13.0			
				Edge 4	6	2437	0.003	98.87%	13.3	13.0			

Notes:

1. For results listed with “-”, the SAR result is less than 0.001 W/kg.
2. 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.
3. 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-1 & 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	48	5240	0.138	98.1%	12.5	11.6			
				Left Tilt	48	5240	0.110	98.1%	12.5	11.6			
				Right Touch	48	5240	1.040	98.1%	12.5	11.6	0.430	0.539	46
				Right Tilt	48	5240	0.432	98.1%	12.5	11.6	0.205	0.257	
Body-w orn	802.11a 6 Mbps	Chain 0	15mm	Rear	48	5240	0.039	98.1%	12.5	11.6	0.014	0.018	47
				Front	48	5240	0.023	98.1%	12.5	11.6			
Head	802.11a 6 Mbps	Chain 1	0	Left Touch	60	5300	0.407	98.1%	12.7	11.6	0.086	0.113	48
				Left Tilt	60	5300	0.191	98.1%	12.7	11.6			
				Right Touch	60	5300	0.169	98.1%	12.7	11.6			
				Right Tilt	60	5300	0.136	98.1%	12.7	11.6			
Body-w orn	802.11a 6 Mbps	Chain 1	15mm	Rear	60	5300	0.011	98.1%	12.7	11.6			
				Front	60	5300	0.012	98.1%	12.7	11.6	0.001	0.001	49
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	0mm	Rear	48	5240	0.828	98.1%	12.5	11.6			
				Front	48	5240	1.040	98.1%	12.5	11.6	0.114	0.143	50
				Edge 1	48	5240	0.617	98.1%	12.5	11.6			
				Edge 2	48	5240	0.010	98.1%	12.5	11.6			
Product specific	802.11a 6 Mbps	Chain 1	0mm	Rear	60	5300	0.371	98.1%	12.7	11.6			
				Front	60	5300	0.800	98.1%	12.7	11.6	0.064	0.084	51
				Edge 4	60	5300	0.002	98.1%	12.7	11.6			

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	802.11ac (VHT80) 29.3 Mbps	Chain 0	0	Left Touch	122	5610	0.273	83.7%	12.0	10.8			
				Left Tilt	122	5610	0.336	83.7%	12.0	10.8			
				Right Touch	122	5610	1.030	83.7%	12.0	10.8	0.380	0.598	52
				Right Tilt	122	5610	0.443	83.7%	12.0	10.8	0.218	0.343	
Body-w orn	802.11ac (VHT80) 29.3 Mbps	Chain 0	15mm	Rear	122	5610	0.074	83.7%	12.0	10.8	0.029	0.046	53
				Front	122	5610	0.064	83.7%	12.0	10.8			
Head	802.11ac (VHT80) 29.3 Mbps	Chain 1	0	Left Touch	106	5530	0.498	83.7%	11.8	10.9	0.154	0.226	54
				Left Tilt	106	5530	0.134	83.7%	11.8	10.9			
				Right Touch	106	5530	0.160	83.7%	11.8	10.9			
				Right Tilt	106	5530	0.062	83.7%	11.8	10.9			
Body-w orn	802.11ac (VHT80) 29.3 Mbps	Chain 1	15mm	Rear	106	5530	0.020	83.7%	11.8	10.9			
				Front	106	5530	0.027	83.7%	11.8	10.9	0.006	0.009	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	802.11ac (VHT80) 29.3 Mbps	Chain 0	0mm	Rear	122	5610	0.741	83.7%	12.0	10.8			
				Front	122	5610	1.760	83.7%	12.0	10.8	0.192	0.302	56
				Edge 1	122	5610	0.329	83.7%	12.0	10.8			
				Edge 2	122	5610	0.022	83.7%	12.0	10.8			
Product specific	802.11ac (VHT80) 29.3 Mbps	Chain 1	0mm	Rear	106	5530	0.492	83.7%	11.8	10.9			
				Front	106	5530	0.889	83.7%	11.8	10.9	0.086	0.126	57
				Edge 4	106	5530	0.021	83.7%	11.8	10.9			

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	802.11ac (VHT80) 29.3 Mbps	Chain 0	0	Left Touch	155	5775	0.208	83.7%	10.1	8.9			
				Left Tilt	155	5775	0.299	83.7%	10.1	8.9			
				Right Touch	155	5775	0.520	83.7%	10.1	8.9	0.183	0.288	58
				Right Tilt	155	5775	0.308	83.7%	10.1	8.9			
Body-worn	802.11ac (VHT80) 29.3 Mbps	Chain 0	15mm	Rear	155	5775	0.096	83.7%	10.1	8.9	0.039	0.061	59
				Front	155	5775	0.028	83.7%	10.1	8.9			
Head	802.11a 6 Mbps	Chain 1	0	Left Touch	165	5825	0.117	98.1%	9.7	8.4	0.039	0.054	60
				Left Tilt	165	5825	0.077	98.1%	9.7	8.4			
				Right Touch	165	5825	0.094	98.1%	9.7	8.4			
				Right Tilt	165	5825	0.011	98.1%	9.7	8.4			
Body-worn	802.11a 6 Mbps	Chain 1	15mm	Rear	165	5825	0.010	98.1%	9.7	8.4			
				Front	165	5825	0.019	98.1%	9.7	8.4	0.001	0.001	61
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	802.11ac (VHT80) 29.3 Mbps	Chain 0	0mm	Rear	155	5775	0.443	83.7%	10.1	8.9	0.046	0.073	
				Front	155	5775	1.300	83.7%	10.1	8.9	0.137	0.216	62
				Edge 1	155	5775	0.241	83.7%	10.1	8.9			
				Edge 2	155	5775	0.014	83.7%	10.1	8.9			
Product specific	802.11a 6 Mbps	Chain 1	0mm	Rear	165	5825	0.130	98.1%	9.7	8.4			
				Front	165	5825	0.689	98.1%	9.7	8.4	0.058	0.079	63
				Edge 4	165	5825	0.013	98.1%	9.7	8.4			

10.18. Bluetooth

RF Exposure Conditions	Mode	Dist. (mm)	Test Position	Ch #.	Freq. (MHz)	Duty Cycle	Power (dBm)		1-g SAR (W/kg)		Plot No.
							Tune-up Limit	Meas.	Meas.	Scaled	
Head	GFSK	0	Left Touch	39	2441	76.8%	10.90	10.88	0.054	0.071	
			Left Tilt	39	2441	76.8%	10.90	10.88	0.068	0.089	
			Right Touch	39	2441	76.8%	10.90	10.88	0.156	0.204	64
			Right Tilt	39	2441	76.8%	10.90	10.88	0.126	0.165	

10.19. Standalone SAR Test Exclusion Considerations & Estimated SAR

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

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

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

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

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

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

Body-worn and Hotspot:

RF Air interface	RF Exposure Conditions	Frequency (GHz)	Max. tune-up tolerance Power		Min. test separation distance (mm)	SAR test exclusion Result*	Estimated 1-g SAR (W/kg)
			(dBm)	(mW)			
Bluetooth	Body-worn	2.480	11.7	15	15	1.6	0.210
Bluetooth	Hotspot	2.480	11.7	15	10	2.4	0.315

Conclusion:

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

11. SAR Measurement Variability

In accordance with published RF Exposure KDB 865664 D01 SAR measurement 100 MHz to 6 GHz. These additional measurements are repeated after the completion of all measurements requiring the same head or body tissue-equivalent medium in a frequency band. The test device should be returned to ambient conditions (normal room temperature) with the battery fully charged before it is re-mounted on the device holder for the repeated measurement(s) to minimize any unexpected variations in the repeated results.

- 1) Repeated measurement is not required when the original highest measured SAR is <0.8 or 2 W/kg (1-g or 10-g respectively); steps 2) through 4) do not apply.
- 2) When the original highest measured SAR is ≥ 0.8 or 2 W/kg (1-g or 10-g respectively), repeat that measurement once.
- 3) Perform a second repeated measurement only if the **ratio of largest to smallest SAR** for the original and first repeated measurements is > 1.20 or when the original or repeated measurement is ≥ 1.45 or 3.6 W/kg (~ 10% from the 1-g or 10-g respective SAR limit).
- 4) Perform a third repeated measurement only if the original, first, or second repeated measurement is ≥ 1.5 or 3.75 W/kg (1-g or 10-g respectively) and the ratio of largest to smallest SAR for the original, first and second repeated measurements is > 1.20.

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	0.087
	LTE Band 13	Head	Left Touch	No	0.351
850	GSM 850	Hotspot	Front	No	0.305
	WCDMA Band V	Hotspot	Front	No	0.364
	LTE Band 5	Hotspot	Rear	No	0.260
	LTE Band 26	Hotspot	Front	No	0.299
1700	WCDMA Band IV	Hotspot	Edge 4	No	0.522
	LTE Band 66	Hotspot	Front	No	0.574
1900	GSM 1900	Hotspot	Edge 3	No	0.298
	WCDMA Band II	Hotspot	Front	No	0.493
	LTE Band 2	Hotspot	Edge 4	No	0.496
2400	Wi-Fi 802.11b/g/n	Head	Right Tilt	No	0.303
2400	BT	Head	Right Touch	No	0.156
2500	LTE Band 7	Hotspot	Edge 3	No	0.504
2600	LTE Band 41	Hotspot	Edge 3	No	0.274
5200	Wi-Fi 802.11a/n/ac	Head	Right Touch	No	0.430
5300	Wi-Fi 802.11a/n/ac	Head	Left Touch	No	0.086
5500	Wi-Fi 802.11a/n/ac	Head	Right Touch	No	0.380
5800	Wi-Fi 802.11a/n/ac	Head	Right Touch	No	0.183

Note(s):

Second Repeated Measurement is not required since the ratio of the largest to smallest SAR for the original and first repeated measurement is < 1.20.

Frequency Band (MHz)	Air Interface	RF Exposure Conditions	Test Position	Repeated SAR (Yes/No)	Highest Measured SAR (W/kg)
5200	Wi-Fi 802.11a/n/ac	Product specific	Front	No	0.014
5300	Wi-Fi 802.11a/n/ac	Product specific	Front	No	0.064
5500	Wi-Fi 802.11a/n/ac	Product specific	Front	No	0.192
5800	Wi-Fi 802.11a/n/ac	Product specific	Front	No	0.137

Note(s):

Repeated Measurement is not required since 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:

SAR₁ is the highest reported or estimated SAR for the first of a pair of simultaneous transmitting antennas, in a specific test operating mode and exposure condition

SAR₂ is the highest reported or estimated SAR for the second of a pair of simultaneous transmitting antennas, in the same test operating mode and exposure condition as the first

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 Chain 0 / BT	WLAN Chain 1
1	GSM/GPRS/Edge	BT/BLE	(None)
2	GSM/GPRS/Edge	WLAN 2.4G	(None)
3	GSM/GPRS/Edge	WLAN 2.4G	WLAN 2.4G
4	GSM/GPRS/Edge	WLAN 2.4G	WLAN 5G
5	GSM/GPRS/Edge	WLAN 5G	WLAN 5G
6	GSM/GPRS/Edge	BT WLAN 5G	WLAN 5G
7	UMTS/HSPA	BT/BLE	(None)
8	UMTS/HSPA	WLAN 2.4G	(None)
9	UMTS/HSPA	WLAN 2.4G	WLAN 2.4G
10	UMTS/HSPA	WLAN 2.4G	WLAN 5G
11	UMTS/HSPA	WLAN 5G	WLAN 5G
12	UMTS/HSPA	BT WLAN 5G	WLAN 5G
13	LTE	BT/BLE	(None)
14	LTE	WLAN 2.4G	(None)
15	LTE	WLAN 2.4G	WLAN 2.4G
16	LTE	WLAN 2.4G	WLAN 5G
17	LTE	WLAN 5G	WLAN 5G
18	LTE	BT WLAN 5G	WLAN 5G
19	(None)	BT WLAN 5G	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	0.356	0.328	0.167	0.598	0.226	0.071	0.427	0.684	0.851	0.910	1.180	1.251	0.895
	Left Tilt	0.123	0.328	0.167	0.598	0.226	0.089	0.212	0.451	0.618	0.677	0.947	1.036	0.913
	Right Touch	0.204	0.328	0.167	0.598	0.226	0.204	0.408	0.532	0.699	0.758	1.028	1.232	1.028
	Right Tilt	0.124	0.328	0.167	0.343	0.226	0.165	0.289	0.452	0.619	0.678	0.693	0.858	0.734
Body-worn	Rear	0.241	0.024	0.005	0.061	0.009	0.210	0.451	0.265	0.270	0.274	0.311	0.521	0.280
	Front	0.307	0.024	0.005	0.061	0.009	0.210	0.517	0.331	0.336	0.340	0.377	0.587	0.280
Hotspot	Rear	0.341	0.081	0.008			0.315	0.656	0.422	0.430				
	Front	0.622	0.081	0.008			0.315	0.937	0.703	0.711				
	Edge 2	0.274	0.081	0.008			0.315	0.589	0.355	0.363				
	Edge 3	0.569	0.081	0.008			0.315	0.884	0.650	0.658				
	Edge 4	0.590	0.081	0.008			0.315	0.905	0.671	0.679				

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.

12073310-S1V2 Appendix A: SAR Setup Photos

12073310-S1V1 Appendix B: SAR System Check Plots

12073310-S1V1 Appendix C: Highest SAR Test Plots

12073310-S1V1 Appendix D: SAR Liquid Tissue Ingredients

12073310-S1V2 Appendix E: SAR Probe Calibration Certificates

12073310-S1V1 Appendix F: SAR Dipole Calibration Certificates

END OF REPORT