



SAR EVALUATION REPORT

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

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

FCC ID: PY7-34118S

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Revision History

Rev.	Date	Revisions	Revised By
V1	3/27/2018	Initial Issue	--
V2	3/30/2018	Report revised based on reviewer's feedback : Appendixes A : Corrected typo.	Art Thammanavarat

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	12
6.	Device Under Test (DUT) Information	13
6.1.	<i>DUT Description</i>	<i>13</i>
6.2.	<i>Wireless Technologies</i>	<i>14</i>
6.3.	<i>General LTE SAR Test and Reporting Considerations</i>	<i>15</i>
6.4.	<i>LTE (TDD) Considerations</i>	<i>17</i>
7.	RF Exposure Conditions (Test Configurations)	18
8.	Dielectric Property Measurements & System Check	19
8.1.	<i>Dielectric Property Measurements.....</i>	<i>19</i>
8.2.	<i>System Check.....</i>	<i>23</i>
9.	Conducted Output Power Measurements.....	25
9.1.	<i>GSM</i>	<i>25</i>
9.2.	<i>W-CDMA</i>	<i>28</i>
9.3.	<i>LTE</i>	<i>32</i>
9.4.	<i>LTE Carrier Aggregation.....</i>	<i>45</i>
9.5.	<i>Wi-Fi 2.4GHz (DTS Band)</i>	<i>45</i>
9.6.	<i>Wi-Fi 5GHz (U-NII Bands)</i>	<i>46</i>
9.7.	<i>Bluetooth</i>	<i>48</i>
10.	Measured and Reported (Scaled) SAR Results	49
10.1.	<i>GSM850</i>	<i>51</i>
10.2.	<i>GSM1900</i>	<i>51</i>
10.3.	<i>W-CDMA Band II</i>	<i>52</i>
10.4.	<i>W-CDMA Band IV</i>	<i>52</i>
10.5.	<i>LTE Band 2 (20MHz Bandwidth).....</i>	<i>53</i>
10.6.	<i>LTE Band 4 (20MHz Bandwidth).....</i>	<i>54</i>
10.7.	<i>LTE Band 12 (10MHz Bandwidth).....</i>	<i>55</i>

10.8.	LTE Band 17 (10MHz Bandwidth).....	55
10.9.	LTE Band 41 (20MHz Bandwidth).....	56
10.10.	Wi-Fi (DTS Band).....	57
10.11.	Wi-Fi (U-NII Band).....	58
10.12.	Bluetooth.....	59
11.	SAR Measurement Variability	60
12.	Simultaneous Transmission SAR Analysis	61
12.1.	Sum of the SAR for WWAN & Wi-Fi & BT.....	62
Appendixes.....		63
12132873-S1V1 Appendix A:	SAR Setup Photos	63
12132873-S1V1 Appendix B:	SAR System Check Plots.....	63
12132873-S1V1 Appendix C:	Highest SAR Test Plots	63
12132873-S1V1 Appendix D:	SAR Liquid Tissue Ingredients.....	63
12132873-S1V1 Appendix E:	SAR Probe Calibration Certificates.....	63
12132873-S1V1 Appendix F:	SAR Dipole Calibration Certificates.....	63

1. Attestation of Test Results

Applicant Name	SONY MOBILE COMMUNICATIONS INC.			
FCC ID	PY7-34118S			
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	0.226	0.406	0.512	0.209
Body-worn	0.220	0.047	0.049	0.022
Hotspot/Wi-Fi Direct	0.813	0.096	N/A	0.066
Product specific 10g SAR	N/A	N/A	0.336	N/A
Simultaneous TX	1.027	0.917	1.027	1.027
Date Tested	3/5/2018 to 3/27/2018			
Test Results	Pass			

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

Note: The results documented in this report apply only to the tested sample, under the conditions and modes of operation as described herein. This document may not be altered or revised in any way unless done so by UL Verification Services Inc. and all revisions are duly noted in the revisions section. Any alteration of this document not carried out by UL Verification Services Inc. will constitute fraud and shall nullify the document. This report must not be used by the client to claim product certification, approval, or endorsement by NVLAP, NIST, any agency of the Federal Government, or any agency of any government (NIST Handbook 150, Annex A). This report is written to support regulatory compliance of the applicable standards stated above.

Approved & Released By: 	Prepared By: 
Devin Chang Senior Test Engineer UL Verification Services Inc.	Kenneth C. Mak Test Engineer UL Verification Services Inc.

2. Test Specification, Methods and Procedures

The tests documented in this report were performed in accordance with FCC 47 CFR § 2.1093, IEEE STD 1528-2013, the following FCC Published RF exposure [KDB](#) procedures:

- 248227 D01 802.11 Wi-Fi SAR v02r02
- 447498 D01 General RF Exposure Guidance v06
- 447498 D03 Supplement C Cross-Reference v01
- 648474 D04 Handset SAR v01r03
- 865664 D01 SAR measurement 100 MHz to 6 GHz v01r04
- 865664 D02 RF Exposure Reporting v01r02
- 941225 D01 3G SAR Procedures v03r01
- 941225 D05 SAR for LTE Devices v02r05
- 941225 D05A LTE Rel.10 KDB Inquiry Sheet v01r02
- 941225 D06 Hotspot Mode v02r01

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

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

3. Facilities and Accreditation

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

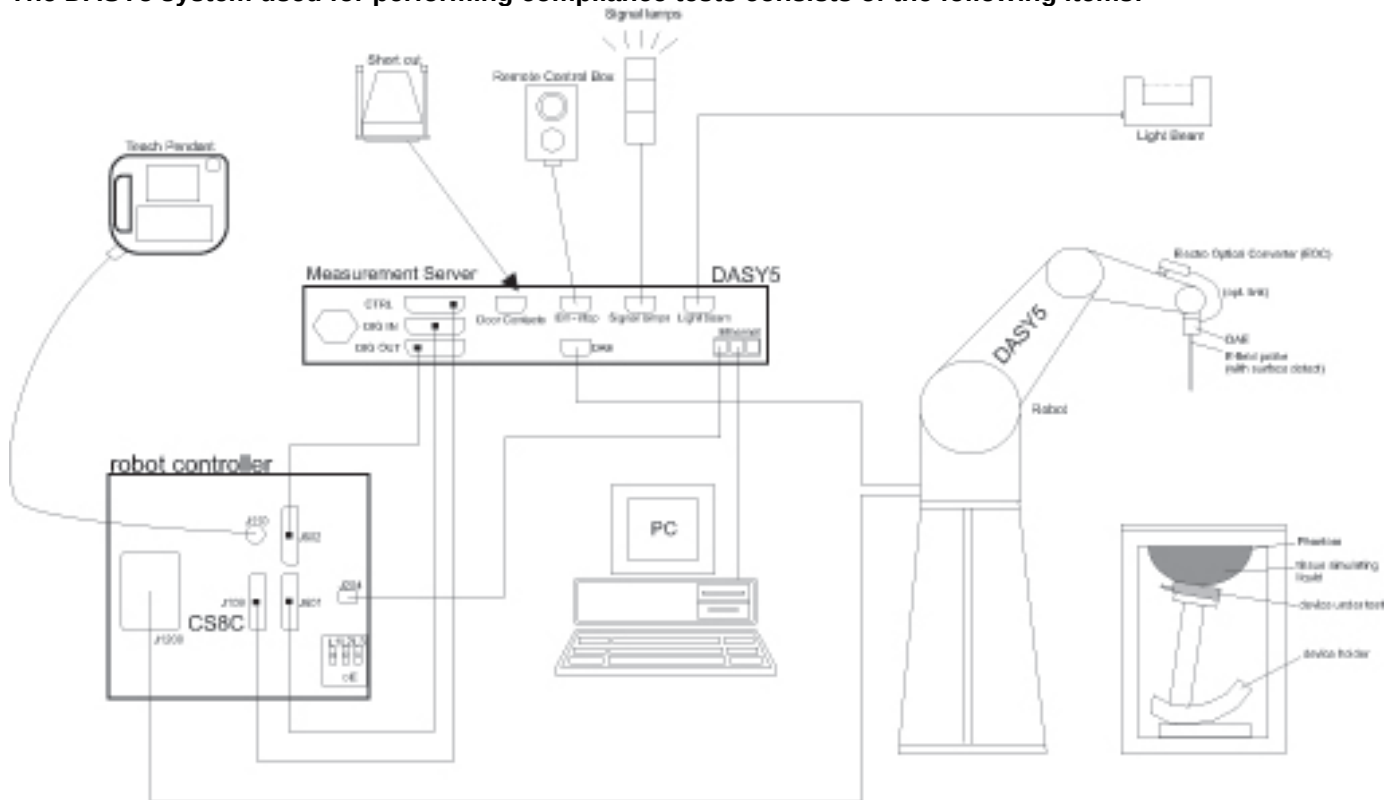
47173 Benicia Street	47266 Benicia Street
SAR Lab A	SAR Lab 1
SAR Lab B	SAR Lab 2
SAR Lab C	SAR Lab 3
SAR Lab D	SAR Lab 4
SAR Lab E	
SAR Lab F	
SAR Lab G	
SAR Lab H	

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

4. SAR Measurement System & Test Equipment

4.1. SAR Measurement System

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



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

4.2. SAR Scan Procedures

Step 1: Power Reference Measurement

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

Step 2: Area Scan

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

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

	≤ 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: $\Delta x_{\text{Area}}, \Delta y_{\text{Area}}$	≤ 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: $\Delta x_{\text{Zoom}}, \Delta y_{\text{Zoom}}$			≤ 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: $\Delta z_{\text{Zoom}}(n)$		≤ 5 mm	3 – 4 GHz: ≤ 4 mm 4 – 5 GHz: ≤ 3 mm 5 – 6 GHz: ≤ 2 mm
	graded grid	$\Delta z_{\text{Zoom}}(1)$: between 1 st two points closest to phantom surface	≤ 4 mm	3 – 4 GHz: ≤ 3 mm 4 – 5 GHz: ≤ 2.5 mm 5 – 6 GHz: ≤ 2 mm
		$\Delta z_{\text{Zoom}}(n>1)$: between subsequent points	$\leq 1.5 \cdot \Delta z_{\text{Zoom}}(n-1)$	
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 <u>reported</u> 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	1087	11/14/2018
Shorting block	SPEAG	DAK-3.5 Short	SM DAK 200 BA	11/14/2018
Thermometer	Traceable Calibration Control Co.	4242	150378159	5/26/2018

System Check

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

Lab Equipment

Name of Equipment	Manufacturer	Type/Model	Serial No.	Cal. Due Date
E-Field Probe (SAR Lab A)	SPEAG	EX3DV4	7463	7/5/2018
E-Field Probe (SAR Lab B)	SPEAG	EX3DV4	3772	2/13/2019
E-Field Probe (SAR Lab C)	SPEAG	EX3DV4	3990	2/14/2019
E-Field Probe (SAR Lab D)	SPEAG	EX3DV4	7356	4/21/2018
E-Field Probe (SAR Lab E)	SPEAG	EX3DV4	3989	1/16/2019
E-Field Probe (SAR Lab F)	SPEAG	EX3DV4	3773	4/21/2018
E-Field Probe (SAR Lab G)	SPEAG	EX3DV4	3871	8/23/2018
E-Field Probe (SAR Lab H)	SPEAG	EX3DV4	7483	12/12/2018
Data Acquisition Electronics (SAR Lab A)	SPEAG	DAE4	1434	4/19/2018
Data Acquisition Electronics (SAR Lab B)	SPEAG	DAE4	1380	7/24/2018
Data Acquisition Electronics (SAR Lab C)	SPEAG	DAE4	1343	8/21/2018
Data Acquisition Electronics (SAR Lab D)	SPEAG	DAE4	1352	11/8/2018
Data Acquisition Electronics (SAR Lab E)	SPEAG	DAE4	1259	1/10/2019
Data Acquisition Electronics (SAR Lab F)	SPEAG	DAE4	1377	10/11/2018
Data Acquisition Electronics (SAR Lab G)	SPEAG	DAE4	1359	2/9/2019
Data Acquisition Electronics (SAR Lab H)	SPEAG	DAE4	1257	10/11/2018
System Validation Dipole	SPEAG	D750V3	1071	11/21/2018
System Validation Dipole	SPEAG	D835V2	4d142	10/12/2018
System Validation Dipole	SPEAG	D835V2	4d002	11/21/2018
System Validation Dipole	SPEAG	D900V2	108	11/22/2018
System Validation Dipole	SPEAG	D1750V2	1050	4/18/2018
System Validation Dipole	SPEAG	D1750V2	1077	10/5/2018
System Validation Dipole	SPEAG	D1900V2	5d140	4/19/2018
System Validation Dipole	SPEAG	D1900V2	5d043	11/22/2018
System Validation Dipole	SPEAG	D2450V2	748	2/14/2019
System Validation Dipole	SPEAG	D2600V2	1006	10/5/2018
System Validation Dipole	SPEAG	D5GHzV2	1138	10/26/2018
System Validation Dipole	SPEAG	D5GHzV2	1168	11/23/2018

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	2/19/2019
Base station Simulator	R&S	CMW500	T960	135384	2/20/2019
Base station Simulator	R&S	CMW500	T948	135393	2/17/2019
Base station Simulator	R&S	CMW500	T958	134855	2/15/2019
Base station Simulator	R&S	CMW500	T259	124594	2/21/2019
Base station Simulator	R&S	CMW500	T1526	147543	2/17/2019
Base station Simulator	R&S	CMW500	T964	134853	2/16/2019
Base station Simulator	R&S	CMW500	T268	124593	2/22/2019
Base station Simulator	R&S	CMW500	T953	135390	2/16/2019
Base station Simulator	R&S	CMW500	T959	137873	2/17/2019
Base station Simulator	R&S	CMW500	T919	125236	2/21/2019
Base station Simulator	Agilent	E5515C	T213	GB47050526	3/22/2019

5. Measurement Uncertainty

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

Therefore, the measurement uncertainty is not required.

6. Device Under Test (DUT) Information

6.1. DUT Description

Device Dimension	Please refer to Appendix A		
Back Cover	☒ The Back Cover is not removable.		
Battery Options	☒ The rechargeable battery is not user accessible.		
Accessory	Headset		
Wireless Router (Hotspot)	Wi-Fi Hotspot mode permits the device to share its cellular data connection with other Wi-Fi-enabled devices. ☒ Mobile Hotspot (Wi-Fi 2.4 GHz) ☐ Mobile Hotspot (Wi-Fi 5 GHz)		
Wi-Fi Direct	Wi-Fi Direct enabled devices transfer data directly between each other ☒ Wi-Fi Direct (Wi-Fi 2.4 GHz) ☐ Wi-Fi Direct (Wi-Fi 5 GHz)		
Test sample information	S/N	Technology	Notes
	BH90005WBJ	SAR GSM/UMTS	Conducted
	BH900021BJ	SAR LTE (LB/MB)	Conducted
	BH90001SBJ	SAR LTE HB	Conducted
	BH9000CSBJ	WLAN – 2.4GHz	Conducted
	BH9000CMBJ	WLAN – 5GHz	Conducted
	BH900044BX	SAR LB GSM/UMTS #1	Radiated
	BH900083BJ	SAR LB GSM/UMTS #2	Radiated
	BH90001KBJ	SAR MB GSM/UMTS #1	Radiated
	BH90007MBX	SAR MB GSM/UMTS #2	Radiated
	BH90008ABX	SAR LTE LB #1	Radiated
	BH90006VBX	SAR LTE LB #2	Radiated
	BH900076BJ	SAR LTE MB #1	Radiated
	BH90003LBJ	SAR LTE MB #2	Radiated
	BH90006UBX	SAR LTE HB #1	Radiated
	BH90007VBX	SAR LTE HB #2	Radiated
	BH90005QBJ	SAR WLAN 2.4GHz # 1	Radiated
	BH90001WBY	SAR WLAN 2.4GHz # 2	Radiated
	BH90003XBY	SAR WLAN 2.4GHz # 3	Radiated
	BH900039BY	SAR WLAN 2.4GHz # 4	Radiated
	BH90002DBY	SAR WLAN 5GHz # 1	Radiated
	BH900027BY	SAR WLAN 5GHz # 2	Radiated
	BH900026BY	SAR WLAN 5GHz # 3	Radiated
	BH900047BY	SAR WLAN 5GHz # 4	Radiated
Hardware Version	A		
Software Version	0.123		

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: ☐ Class 8 - 1 Up, 4 Down ☐ Class 10 - 2 Up, 4 Down ☐ Class 12 - 4 Up, 4 Down ☒ Class 33 - 4 Up, 5 Down	GSM Voice: 12.5% (E)GPRS: 1 Slot: 12.5% 2 Slots: 25% 3 Slots: 37.5% 4 Slots: 50%
	Does this device support DTM (Dual Transfer Mode)? ☒ Yes ☐ No			
W-CDMA (UMTS)	Band II Band IV	UMTS Rel. 99 (Voice & Data) HSDPA (Rel. 5) HSUPA (Rel. 6) HSPA+ (Rel. 9)		100%
LTE	FDD Band 2 FDD Band 4 FDD Band 12 FDD Band 17 TDD Band 41	QPSK 16QAM 64QAM Rel. 12 Carrier Aggregation (1 Uplink and 2 Downlinks)		100% (FDD) 63.3% (TDD) ² Refer to §6.4.
	Does this device support SV-LTE (1xRTT-LTE)? ☐ Yes ☒ No			
Wi-Fi	2.4 GHz	802.11b 802.11g 802.11n (HT20)		99.35% ^(802.11b) ¹ 98.11% ^(802.11g) ¹ 97.70% ^(802.11n) ¹
	5 GHz	802.11a 802.11n (HT20) 802.11n (HT40) 802.11ac (VHT20) 802.11ac (VHT40) 802.11ac (VHT80)		98.16% ^(802.11a) ¹ 97.93% ^(802.11n HT20) ¹ 93.47% ^(802.11n HT40) ¹ 88.44% ^(802.11ac VHT80) ¹
	Does this device support bands 5.60 ~ 5.65 GHz? ☒ Yes ☐ No			
	Does this device support Band gap channel(s)? ☒ Yes ☐ No			
Bluetooth	2.4 GHz	Version 5.0 LE		76.88%(DH5)

Notes:

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

6.3. General LTE SAR Test and Reporting Considerations

Item	Description						
Frequency range, Channel Bandwidth, Numbers and Frequencies	Band 2	Frequency range: 1850 - 1910 MHz					
		Channel Bandwidth					
		20 MHz	15 MHz	10 MHz	5 MHz	3 MHz	1.4 MHz
	Low	18700/ 1860	18675/ 1857.5	18650/ 1855	18625/ 1852.5	18615/ 1851.5	18607/ 1850.7
	Mid	18900/ 1880	18900/ 1880	18900/ 1880	18900/ 1880	18900/ 1880	18900/ 1880
	High	19100/ 1900	19125/ 1902.5	19150/ 1905	19175/ 1907.5	19185/ 1908.5	19193/ 1909.3
	Band 4	Frequency range: 1710 - 1755 MHz					
		Channel Bandwidth					
		20 MHz	15 MHz	10 MHz	5 MHz	3 MHz	1.4 MHz
	Low	20050/ 1720	20025/ 1717.5	20000/ 1715	19975/ 1712.5	19965/ 1711.5	19957/ 1710.7
	Mid	20175/ 1732.5	20175/ 1732.5	20175/ 1732.5	20175/ 1732.5	20175/ 1732.5	20175/ 1732.5
	High	20300/ 1745	20325/ 1747.5	20350/ 1750	20375/ 1752.5	20385/ 1753.5	20393/ 1754.3
	Band 12	Frequency range: 699 – 716 MHz					
		Channel Bandwidth					
		20 MHz	15 MHz	10 MHz	5 MHz	3 MHz	1.4 MHz
	Low			23060/ 704	23035/ 701.5	23025/ 700.5	23017/ 699.7
	Mid			23095/ 707.5	23095/ 707.5	23095/ 707.5	23095/ 707.5
	High			23130/ 711	23155/ 713.5	23165/ 714.5	23173/ 715.3
	Band 17	Frequency range: 704 - 716 MHz					
		Channel Bandwidth					
		20 MHz	15 MHz	10 MHz	5 MHz	3 MHz	1.4 MHz
	Low			23780/ 709	23755/ 706.5		
	Mid			23790/ 710	23790/ 710		
	High			23800/ 711	23825/ 713.5		
	Band 41	Frequency range: 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					

General LTE SAR Test and Reporting Considerations (Continued)

LTE transmitter and antenna implementation	Refer to Appendix A.																																																														
Maximum power reduction (MPR)	Table 6.2.3-1: Maximum Power Reduction (MPR) for Power Class 1, 2 and 3 <table> <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> <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> </table> 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	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:

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

6.4. LTE (TDD) Considerations

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

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

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

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

Calculated Duty Cycle

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

Calculated Duty Cycle = Extended cyclic prefix in uplink $\times (T_s) \times \# \text{ of S} + \# \text{ of U}$

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

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

where

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

Note(s):

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

7. RF Exposure Conditions (Test Configurations)

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

Wireless technologies	RF Exposure Conditions	DUT-to-User Separation	Test Position	Antenna-to-edge/surface	SAR Required
WWAN Main Ant. 1 & 2	Head	0 mm	Left Touch	N/A	Yes
			Left Tilt (15°)	N/A	Yes
			Right Touch	N/A	Yes
			Right Tilt (15°)	N/A	Yes
	Body	15 mm	Rear	N/A	Yes
			Front	N/A	Yes
	Hotspot	10 mm	Rear	< 25 mm	Yes
			Front	< 25 mm	Yes
			Edge 1 (Top)	> 25 mm	No
			Edge 2 (Right)	< 25 mm	Yes
			Edge 3 (Bottom)	< 25 mm	Yes
			Edge 4 (Left)	< 25 mm	Yes
WLAN/BT (Chain 0)	Head	0 mm	Left Touch	N/A	Yes
			Left Tilt (15°)	N/A	Yes
			Right Touch	N/A	Yes
			Right Tilt (15°)	N/A	Yes
	Body	15 mm	Rear	N/A	Yes
			Front	N/A	Yes
	Hotspot / Wi-Fi Direct (2.4 GHz only)	10 mm	Rear	< 25 mm	Yes
			Front	< 25 mm	Yes
			Edge 1 (Top)	< 25 mm	Yes
			Edge 2 (Right)	> 25 mm	No
			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	< 25 mm	Yes
			Edge 1 (Top)	< 25 mm	Yes
			Edge 2 (Right)	> 25 mm	No
			Edge 3 (Bottom)	> 25 mm	No
			Edge 4 (Left)	< 25 mm	Yes
WLAN (Chain 1)	Head	0 mm	Left Touch	N/A	Yes
			Left Tilt (15°)	N/A	Yes
			Right Touch	N/A	Yes
			Right Tilt (15°)	N/A	Yes
	Body	15 mm	Rear	N/A	Yes
			Front	N/A	Yes
	Hotspot / Wi-Fi Direct (2.4 GHz only)	10 mm	Rear	< 25 mm	Yes
			Front	< 25 mm	Yes
			Edge 1 (Top)	> 25 mm	No
			Edge 2 (Right)	< 25 mm	Yes
			Edge 3 (Bottom)	> 25 mm	No
			Edge 4 (Left)	> 25 mm	No
	Product specific (5 GHz bands only)	0 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
			Edge 4 (Left)	> 25 mm	No

Notes:

- SAR is not required because the distance from the antenna to the edge is > 25 mm as per KDB 941225 D06 Hot Spot SAR.
- When Hotspot Mode is not supported, 10-g Extremity SAR is required for all surfaces and edges with an antenna located at ≤ 25 mm from that surface or edge in direct contact with a flat phantom, to address interactive hand use exposure conditions.
- When hotspot mode applies, 10-g extremity SAR is required only for the surfaces and edges with hotspot mode 1-g reported SAR > 1.2 W/kg.
- The WWAN Sub Antenna does not support FCC bands.

8. Dielectric Property Measurements & System Check

8.1. Dielectric Property Measurements

The temperature of the tissue-equivalent medium used during measurement must also be within 18°C to 25°C and within $\pm 2^\circ\text{C}$ of the temperature when the tissue parameters are characterized.

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

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

The dielectric constant (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	3/13/2018	900	Head	900	40.30	41.50	-2.89	1.04	0.97	7.42
				805	41.19	41.68	-1.17	0.95	0.90	5.91
				915	40.10	41.50	-3.37	1.05	0.98	7.45
A	3/14/2018	900	Head	900	41.31	41.50	-0.46	1.00	0.97	2.93
				805	42.32	41.68	1.54	0.90	0.90	-0.03
				915	41.09	41.50	-0.99	1.01	0.98	2.96
A	3/26/2018	1900	Body	1900	52.70	53.30	-1.13	1.54	1.52	1.58
				1850	52.86	53.30	-0.83	1.50	1.52	-1.58
				1920	52.69	53.30	-1.14	1.56	1.52	2.89
B	3/7/2018	1900	Body	1900	52.46	53.30	-1.58	1.56	1.52	2.70
				1850	52.55	53.30	-1.41	1.52	1.52	-0.07
				1920	52.39	53.30	-1.71	1.57	1.52	3.49
B	3/8/2018	1900	Head	1900	38.75	40.00	-3.13	1.43	1.40	2.00
				1850	38.90	40.00	-2.75	1.39	1.40	-0.86
				1920	38.62	40.00	-3.45	1.44	1.40	3.00
B	3/9/2018	1750	Head	1750	38.34	40.08	-4.35	1.33	1.37	-2.85
				1710	38.53	40.15	-4.03	1.30	1.35	-3.74
				1785	38.22	40.03	-4.52	1.37	1.39	-1.64
B	3/9/2018	1750	Body	1750	51.61	53.44	-3.43	1.48	1.49	-0.21
				1710	51.78	53.54	-3.29	1.45	1.46	-1.06
				1785	51.54	53.35	-3.40	1.52	1.51	0.68
B	3/13/2018	1750	Head	1750	40.34	40.08	0.64	1.33	1.37	-2.85
				1710	40.53	40.15	0.96	1.29	1.35	-4.26
				1785	40.28	40.03	0.62	1.37	1.39	-1.71
B	3/14/2018	1900	Head	1900	36.87	40.00	-7.83	1.42	1.40	1.71
				1850	37.12	40.00	-7.20	1.39	1.40	-0.86
				1980	36.63	40.00	-8.42	1.50	1.40	6.93
B	3/15/2018	1900	Head	1900	37.27	40.00	-6.82	1.41	1.40	0.50
				1850	37.48	40.00	-6.30	1.36	1.40	-2.86
				1980	37.06	40.00	-7.35	1.48	1.40	5.57
C	3/14/2018	1900	Head	1900	40.54	40.00	1.35	1.40	1.40	-0.21
				1850	40.89	40.00	2.23	1.34	1.40	-4.36
				1980	40.43	40.00	1.08	1.46	1.40	4.21

SAR Lab	Date	Band (MHz)	Tissue Type	Frequency (MHz)	Relative Permittivity (ϵ_r)			Conductivity (σ)		
					Measured	Target	Delta (%)	Measured	Target	Delta (%)
D	3/9/2018	750	Head	750	41.86	41.96	-0.24	0.93	0.89	4.55
				695	42.62	42.24	0.89	0.87	0.89	-1.67
				790	41.32	41.76	-1.05	0.97	0.90	8.14
D	3/9/2018	750	Body	750	55.24	55.55	-0.55	0.94	0.96	-2.04
				695	55.84	55.76	0.15	0.89	0.96	-7.00
				790	54.75	55.39	-1.16	0.99	0.97	2.29
D	3/10/2018	750	Head	750	40.28	41.96	-4.01	0.90	0.89	0.70
				695	41.11	42.24	-2.68	0.85	0.89	-4.42
				790	39.79	41.76	-4.71	0.94	0.90	4.35
D	3/13/2018	750	Head	750	38.28	41.96	-8.77	0.93	0.89	4.43
				695	39.04	42.24	-7.58	0.89	0.89	-0.32
				790	37.71	41.76	-9.69	0.97	0.90	7.70
D	3/14/2018	750	Head	750	42.19	41.96	0.54	0.98	0.89	9.63
				695	40.22	42.24	-4.79	0.94	0.89	5.45
				790	39.65	41.76	-5.04	0.97	0.90	8.13
E	3/5/2018	2600	Head	2600	40.14	39.01	2.89	2.02	1.96	2.90
				2495	40.46	39.14	3.36	1.91	1.85	3.05
				2690	39.80	38.90	2.32	2.12	2.06	3.04
E	3/9/2018	2600	Head	2600	39.64	39.01	1.61	2.01	1.96	2.18
				2495	39.98	39.14	2.14	1.89	1.85	2.07
				2690	39.35	38.90	1.16	2.10	2.06	2.07
E	3/9/2018	2600	Body	2600	51.74	52.51	-1.47	2.14	2.16	-1.10
				2495	52.03	52.64	-1.16	2.01	2.01	-0.21
				2690	51.51	52.40	-1.69	2.24	2.29	-2.16
F	3/6/2018	2450	Body	2450	50.66	52.70	-3.87	1.90	1.95	-2.77
				2400	50.86	52.77	-3.62	1.82	1.90	-4.01
				2480	50.54	52.66	-4.03	1.93	1.99	-3.02
F	3/6/2018	2450	Head	2450	39.20	39.20	0.00	1.79	1.80	-0.33
				2400	39.42	39.30	0.31	1.74	1.75	-0.84
				2480	39.08	39.16	-0.21	1.83	1.83	-0.13
F	3/14/2018	835	Body	835	54.66	55.20	-0.98	1.00	0.97	3.40
				805	54.94	55.33	-0.71	0.98	0.97	1.00
				915	53.81	55.00	-2.16	1.08	1.06	2.26

SAR Lab	Date	Band (MHz)	Tissue Type	Frequency (MHz)	Relative Permittivity (ϵ_r)			Conductivity (σ)		
					Measured	Target	Delta (%)	Measured	Target	Delta (%)
G	3/6/2018	5200	Head	5200	35.96	35.99	-0.08	4.63	4.65	-0.47
				5150	36.03	36.05	-0.05	4.57	4.60	-0.71
				5350	35.73	35.82	-0.25	4.76	4.80	-0.99
G	3/6/2018	5600	Head	5600	35.37	35.53	-0.46	5.01	5.06	-1.01
				5500	35.50	35.65	-0.42	4.92	4.96	-0.68
				5725	35.34	35.39	-0.14	5.15	5.19	-0.74
G	3/6/2018	5800	Head	5800	35.18	35.30	-0.34	5.24	5.27	-0.59
				5700	35.27	35.42	-0.42	5.11	5.16	-0.96
				5850	35.14	35.30	-0.45	5.25	5.27	-0.34
G	3/6/2018	5200	Body	5200	49.63	49.02	1.25	5.31	5.29	0.25
				5150	49.61	49.09	1.06	5.27	5.24	0.66
				5350	49.24	48.82	0.87	5.51	5.47	0.67
G	3/6/2018	5600	Body	5600	48.96	48.48	0.99	5.85	5.76	1.46
				5500	49.07	48.61	0.94	5.72	5.64	1.36
				5725	48.87	48.31	1.16	6.04	5.91	2.17
G	3/6/2018	5800	Body	5800	48.81	48.20	1.27	6.13	6.00	2.22
				5700	48.87	48.34	1.09	5.99	5.88	1.86
				5850	48.64	48.20	0.91	6.18	6.00	2.93
G	3/26/2018	835	Body	835	56.33	55.20	2.05	0.97	0.97	0.46
				805	56.36	55.33	1.85	0.96	0.97	-0.82
				905	56.36	55.00	2.47	1.01	1.05	-3.85
H	3/6/2018	5200	Head	5200	35.46	35.99	-1.47	4.59	4.65	-1.38
				5150	35.48	36.05	-1.57	4.53	4.60	-1.56
				5350	35.24	35.82	-1.62	4.71	4.80	-2.01
H	3/6/2018	5600	Head	5600	34.87	35.53	-1.87	4.97	5.06	-1.86
				5500	35.03	35.65	-1.73	4.88	4.96	-1.53
				5725	34.77	35.39	-1.76	5.10	5.19	-1.66
H	3/6/2018	5800	Head	5800	34.65	35.30	-1.84	5.18	5.27	-1.71
				5700	34.80	35.42	-1.75	5.07	5.16	-1.87
				5850	34.66	35.30	-1.81	5.21	5.27	-1.06
H	3/12/2018	835	Head	835	41.08	41.50	-1.01	0.89	0.90	-1.14
				805	41.49	41.68	-0.45	0.86	0.90	-4.06
				905	40.26	41.50	-2.99	0.95	0.97	-2.80

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	3/13/2018	Head	D900V2 SN:108	11/22/2018	1.150	11.50	10.70	7.48	0.741	7.41	6.88	7.70	1,2
A	3/26/2018	Body	D1900V2 SN:5d140	4/19/2018	4.150	41.50	41.20	0.73	2.120	21.20	21.52	-1.49	3,4
B	3/7/2018	Body	D1900V2 SN:5d140	4/19/2018	4.090	40.90	41.20	-0.73	2.090	20.90	21.52	-2.88	
B	3/8/2018	Head	D1900V2 SN:5d140	4/19/2018	4.150	41.50	40.80	1.72	2.110	21.10	21.16	-0.28	
B	3/9/2018	Head	D1750V2 SN:1077	10/5/2018	3.710	37.10	36.26	2.32	1.960	19.60	19.34	1.34	
B	3/9/2018	Body	D1750V2 SN:1077	10/5/2018	3.640	36.40	37.34	-2.52	1.920	19.20	19.98	-3.90	5,6
B	3/13/2018	Head	D1750V2 SN:1050	4/18/2018	3.570	35.70	36.76	-2.88	1.890	18.90	19.60	-3.57	7,8
B	3/14/2018	Head	D1900V2 SN:5d140	4/19/2018	4.210	42.10	40.80	3.19	2.130	21.30	21.16	0.66	9,10
C	3/14/2018	Head	D1900V2 SN:5d043	11/22/2018	3.970	39.70	42.99	-7.65	2.030	20.30	22.17	-8.43	11,12
D	3/9/2018	Head	D750V3 SN:1071	11/21/2018	0.869	8.69	8.59	1.16	0.572	5.72	5.73	-0.17	13,14
D	3/9/2018	Body	D750V3 SN:1071	11/21/2018	0.852	8.52	8.52	0.00	0.570	5.70	5.69	0.18	
D	3/13/2018	Head	D750V3 SN:1071	11/21/2018	0.858	8.58	8.59	-0.12	0.563	5.63	5.73	-1.75	
E	3/5/2018	Head	D2600V2 SN:1006	10/5/2018	5.820	58.20	55.73	4.43	2.510	25.10	25.08	0.08	15,16
E	3/9/2018	Head	D2600V2 SN:1006	10/5/2018	5.800	58.00	55.73	4.07	2.530	25.30	25.08	0.88	
E	3/9/2018	Body	D2600V2 SN:1006	10/5/2018	5.460	54.60	56.13	-2.73	2.370	23.70	25.00	-5.20	
F	3/6/2018	Head	D2450V2 SN:748	2/14/2019	5.370	53.70	52.94	1.44	2.390	23.90	24.60	-2.85	17,18
F	3/6/2018	Body	D2450V2 SN:748	2/14/2019	5.140	51.40	50.95	0.88	2.310	23.10	23.80	-2.94	
F	3/14/2018	Body	D835V2 SN:4d142	10/12/2018	1.020	10.20	9.63	5.92	0.667	6.67	6.27	6.38	19,20
G	3/6/2018	Head	D5GHzV2 SN:1138 (5.2 GHz)	10/26/2018	7.780	77.80	77.70	0.13	2.230	22.30	22.20	0.45	
G	3/6/2018	Head	D5GHzV2 SN:1138 (5.6 GHz)	10/26/2018	7.710	77.10	83.20	-7.33	2.180	21.80	23.70	-8.02	21,22
G	3/6/2018	Head	D5GHzV2 SN:1138 (5.8 GHz)	10/26/2018	7.650	76.50	79.70	-4.02	2.160	21.60	22.70	-4.85	
G	3/6/2018	Body	D5GHzV2 SN:1138 (5.2 GHz)	10/26/2018	7.080	70.80	73.40	-3.54	2.000	20.00	20.60	-2.91	
G	3/6/2018	Body	D5GHzV2 SN:1138 (5.6 GHz)	10/26/2018	7.750	77.50	79.50	-2.52	2.130	21.30	22.30	-4.48	
G	3/6/2018	Body	D5GHzV2 SN:1138 (5.8 GHz)	10/26/2018	7.620	76.20	76.80	-0.78	2.130	21.30	21.30	0.00	
G	3/26/2018	Body	D835V2 SN:4d002	11/21/2018	0.958	9.58	10.23	-6.35	0.641	6.41	6.80	-5.74	23,24
H	3/6/2018	Head	D5GHzV2 SN:1168 (5.2 GHz)	11/23/2018	7.690	76.90	80.90	-4.94	2.200	22.00	22.80	-3.51	
H	3/6/2018	Head	D5GHzV2 SN:1168 (5.6 GHz)	11/23/2018	9.210	92.10	87.20	5.62	2.600	26.00	24.40	6.56	25,26
H	3/6/2018	Head	D5GHzV2 SN:1168 (5.8 GHz)	11/23/2018	8.240	82.40	79.10	4.17	2.310	23.10	22.10	4.52	
H	3/12/2018	Head	D835V2 SN:4d142	10/12/2018	0.934	9.34	9.64	-3.11	0.612	6.12	6.22	-1.61	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.

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

Per October 2013 TCB Workshop:

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

GSM850 Measured Results

Mode	Coding Scheme	Time Slots	Ch No.	Freq. (MHz)	Maximum Average Power (dBm)			
					Measured		Tune-up Limit	
					Burst Pwr	Frame Pwr	Burst Pwr	Frame Pwr
GSM/GPRS	CS1	1	128	824.4	32.70	23.67	33.20	24.17
			190	836.6	32.90	23.87		
			251	848.8	32.90	23.87		
GPRS (GMSK)	CS1	2	128	824.4	30.80	24.78	31.20	25.18
			190	836.6	30.90	24.88		
			251	848.8	31.00	24.98		
		3	128	824.4	28.40	24.14	29.20	24.94
			190	836.6	28.80	24.54		
			251	848.8	28.70	24.44		
		4	128	824.4	27.70	24.69	28.20	25.19
			190	836.6	27.80	24.79		
			251	848.8	28.00	24.99		
EGPRS (8PSK)	MCS5	1	128	824.4	27.10	18.07	28.00	18.97
			190	836.6	27.10	18.07		
			251	848.8	27.20	18.17		
		2	128	824.4	25.60	19.58	26.50	20.48
			190	836.6	25.60	19.58		
			251	848.8	25.70	19.68		
		3	128	824.4	23.50	19.24	24.50	20.24
			190	836.6	23.50	19.24		
			251	848.8	23.60	19.34		
		4	128	824.4	22.60	19.59	23.50	20.49
			190	836.6	22.60	19.59		
			251	848.8	22.80	19.79		

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)	Maximum Average Power (dBm)			
					Measured		Tune-up Limit	
					Burst Pwr	Frame Pwr	Burst Pwr	Frame Pwr
GSM/GPRS	CS1	1	512	1850.2	28.10	19.07	28.70	19.67
			661	1880.0	28.40	19.37		
			810	1909.8	28.30	19.27		
GPRS (GMSK)	CS1	2	512	1850.2	26.10	20.08	26.70	20.68
			661	1880.0	26.30	20.28		
			810	1909.8	26.30	20.28		
		3	512	1850.2	24.10	19.84	24.70	20.44
			661	1880.0	24.30	20.04		
			810	1909.8	24.40	20.14		
		4	512	1850.2	23.30	20.29	23.70	20.69
			661	1880.0	23.40	20.39		
			810	1909.8	23.30	20.29		
EGPRS (8PSK)	MCS5	1	512	1850.2	25.70	16.67	27.00	17.97
			661	1880.0	25.80	16.77		
			810	1909.8	25.80	16.77		
		2	512	1850.2	24.40	18.38	25.50	19.48
			661	1880.0	24.50	18.48		
			810	1909.8	24.50	18.48		
		3	512	1850.2	22.50	18.24	23.50	19.24
			661	1880.0	22.70	18.44		
			810	1909.8	22.60	18.34		
		4	512	1850.2	21.40	18.39	22.50	19.49
			661	1880.0	21.50	18.49		
			810	1909.8	21.50	18.49		

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)	Maximum Average Power (dBm)							
					Measured				Tune-up Limit			
					CS Burst Pwr	PS Burst Pwr	CS Frame Pwr	PS Frame Pwr	CS Burst Pwr	PS Burst Pwr	CS Frame Pwr	PS Frame Pwr
GSM (Voice) + GPRS (GMSK)	CS1	1	128	824.2	32.70		23.67		33.20		24.17	
			190	836.6	32.90		23.87					
			251	848.8	32.90		23.87					
		2	128	824.2	30.60	30.70	24.58	24.68	31.20	31.20	25.18	25.18
			190	836.6	30.70	30.90	24.68	24.88				
			251	848.8	30.70	30.90	24.68	24.88				
		3	128	824.2	28.40	28.50	24.14	24.24	29.20	29.20	24.94	24.94
			190	836.6	28.40	28.60	24.14	24.34				
			251	848.8	28.60	28.80	24.34	24.54				
GSM (Voice) + EGPRS (8PSK)	MCS5	1	128	824.2	32.70		23.67		33.20		24.17	
			190	836.6	32.90		23.87					
			251	848.8	32.90		23.87					
		2	128	824.2	30.50	25.40	24.48	19.38	31.20	26.50	25.18	20.48
			190	836.6	30.60	25.50	24.58	19.48				
			251	848.8	30.80	25.60	24.78	19.58				
		3	128	824.2	28.50	23.30	24.24	19.04	29.20	24.50	24.94	20.24
			190	836.6	28.50	23.40	24.24	19.14				
			251	848.8	28.50	23.50	24.24	19.24				

Notes:

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

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

GSM1900 DTM Measured Results

Mode	Coding Scheme	Time Slots	Ch No.	Freq. (MHz)	Maximum Average Power (dBm)							
					Measured				Tune-up Limit			
					CS Burst Pwr	PS Burst Pwr	CS Frame Pwr	PS Frame Pwr	CS Burst Pwr	PS Burst Pwr	CS Frame Pwr	PS Frame Pwr
GSM (Voice) + GPRS (GMSK)	CS1	1	512	1850.2	28.10		19.07		28.70		19.67	
			661	1880.0	28.40		19.37					
			810	1909.8	28.30		19.27					
		2	512	1850.2	25.90	26.00	19.88	19.98	26.70	26.70	20.68	20.68
			661	1880.0	26.10	26.30	20.08	20.28				
			810	1909.8	26.00	26.20	19.98	20.18				
		3	512	1850.2	24.00	24.10	19.74	19.84	24.70	24.70	20.44	20.44
			661	1880.0	24.20	24.30	19.94	20.04				
			810	1909.8	24.10	24.30	19.84	20.04				
GSM (Voice) + EGPRS (8PSK)	MCS5	1	512	1850.2	28.10		19.07		28.70		19.67	
			661	1880.0	28.40		19.37					
			810	1909.8	28.30		19.27					
		2	512	1850.2	25.80	24.30	19.78	18.28	26.70	25.50	20.68	19.48
			661	1880.0	26.10	24.40	20.08	18.38				
			810	1909.8	26.00	24.40	19.98	18.38				
		3	512	1850.2	23.90	22.50	19.64	18.24	24.70	23.50	20.44	19.24
			661	1880.0	24.30	22.70	20.04	18.44				
			810	1909.8	24.00	22.60	19.74	18.34				

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

9.2. W-CDMA

Release 99 Setup Procedures used to establish the test signals

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

Mode	Subtest	Rel99
WCDMA General Settings	Loopback Mode	Test Mode 2
	Rel99 RMC	12.2kbps RMC
	Power Control Algorithm	Algorithm2
	β_c/β_d	8/15

HSDPA Setup Procedures used to establish the test signals

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

	Mode	HSDPA	HSDPA	HSDPA	HSDPA
	Subtest	1	2	3	4
W-CDMA General Settings	Loopback Mode	Test Mode 1			
	Rel99 RMC	12.2kbps RMC			
	HSDPA FRC	H-Set 1			
	Power Control Algorithm	Algorithm 2			
	β_c	2/15	11/15	15/15	15/15
	β_d	15/15	15/15	8/15	4/15
	Bd (SF)	64			
	β_c/β_d	2/15	11/15	15/8	15/4
	β_{hs}	4/15	24/15	30/15	30/15
HSDPA Specific Settings	MPR (dB)	0	0	0.5	0.5
	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
HSDPA Specific Settings	CM (dB)	1	3	2	3	1
	MPR (dB)	0	2	1	2	0
	DACK	8				0
	DNAK	8				0
	DCQI	8				0
	Ack-Nack repetition factor	3				
	CQI Feedback (Table 5.2B.4)	4ms				
HSUPA Specific Settings	CQI Repetition Factor (Table 5.2B.4)	2				
	$A_{hs} = \beta_{hs}/\beta_c$	30/15				
	E-DPDCCCH	6	8	8	5	0
	DHARQ	0	0	0	0	0
	AG Index	20	12	15	17	12
	ETFCI (from 34.121 Table C.11.1.3)	75	67	92	71	67
	Associated Max UL Data Rate kbps	242.1	174.9	482.8	205.8	308.9
	Reference E-TFCIs	5	5	2	5	1
	Reference E-TFCI	11	11	11	11	67
	Reference E-TFCI PO	4	4	4	4	18
	Reference E-TFCI	67	67	92	67	67
	Reference E-TFCI PO	18	18	18	18	18
	Reference E-TFCI	71	71	71	71	71
	Reference E-TFCI PO	23	23	23	23	23
	Reference E-TFCI	75	75	75	75	75
	Reference E-TFCI PO	26	26	26	26	26
	Reference E-TFCI	81	81	81	81	81
	Reference E-TFCI PO	27	27	27	27	27
	Maximum Channelization Codes	2xSF2				SF4

W-CDMA Band II Measured Results

Mode		UL Ch No.	Freq. (MHz)	Maximum Average Power (dBm)		
				Measured Pwr	MPR	Tune-up Limit
Release 99	Rel 99 (RMC, 12.2 kbps)	9262	1852.4	22.00	N/A	22.70
		9400	1880.0	22.10		
		9538	1907.6	22.00		
HSDPA	Subtest 1	9262	1852.4	21.00	0	22.00
		9400	1880.0	21.00		
		9538	1907.6	21.00		
	Subtest 2	9262	1852.4	20.80	0	22.00
		9400	1880.0	20.80		
		9538	1907.6	20.80		
	Subtest 3	9262	1852.4	20.20	0.5	21.50
		9400	1880.0	20.30		
		9538	1907.6	20.20		
	Subtest 4	9262	1852.4	20.10	0.5	21.50
		9400	1880.0	20.30		
		9538	1907.6	20.20		
HSUPA	Subtest 1	9262	1852.4	20.90	0	22.00
		9400	1880.0	21.00		
		9538	1907.6	21.00		
	Subtest 2	9262	1852.4	18.90	2	20.00
		9400	1880.0	18.90		
		9538	1907.6	19.00		
	Subtest 3	9262	1852.4	20.00	1	21.00
		9400	1880.0	20.00		
		9538	1907.6	20.00		
	Subtest 4	9262	1852.4	18.90	2	20.00
		9400	1880.0	19.00		
		9538	1907.6	19.00		
	Subtest 5	9262	1852.4	20.90	0	22.00
		9400	1880.0	21.00		
		9538	1907.6	21.00		

W-CDMA Band IV Measured Results

Mode		UL Ch No.	Freq. (MHz)	Maximum Average Power (dBm)		
				Measured Pwr	MPR	Tune-up Limit
Release 99	Rel 99 (RMC, 12.2 kbps)	1312	1712.4	22.20	N/A	22.70
		1413	1732.6	22.20		
		1513	1752.6	22.10		
HSDPA	Subtest 1	1312	1712.4	21.20	0	22.00
		1413	1732.6	21.10		
		1513	1752.6	21.10		
	Subtest 2	1312	1712.4	21.00	0	22.00
		1413	1732.6	21.00		
		1513	1752.6	20.90		
	Subtest 3	1312	1712.4	20.40	0.5	21.50
		1413	1732.6	20.40		
		1513	1752.6	20.30		
	Subtest 4	1312	1712.4	20.40	0.5	21.50
		1413	1732.6	20.30		
		1513	1752.6	20.20		
HSUPA	Subtest 1	1312	1712.4	21.10	0	22.00
		1413	1732.6	21.10		
		1513	1752.6	21.10		
	Subtest 2	1312	1712.4	19.10	2	20.00
		1413	1732.6	19.20		
		1513	1752.6	19.00		
	Subtest 3	1312	1712.4	20.20	1	21.00
		1413	1732.6	20.20		
		1513	1752.6	20.10		
	Subtest 4	1312	1712.4	19.20	2	20.00
		1413	1732.6	19.20		
		1513	1752.6	19.10		
	Subtest 5	1312	1712.4	21.20	0	22.00
		1413	1732.6	21.20		
		1513	1752.6	21.10		

9.3. LTE

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

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

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

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

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

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

Network Signalling value	Requirements (subclause)	E-UTRA Band	Channel bandwidth (MHz)	Resources Blocks (N_{RB})	A-MPR (dB)
NS_01	6.6.2.1.1	Table 5.5-1	1.4, 3, 5, 10, 15, 20	Table 5.6-1	N/A
NS_03	6.6.2.2.1	2, 4, 10, 23, 25, 35, 38, 66, 70	3	>5	≤ 1
			5	>6	≤ 1
			10	>8	≤ 1
			15	>8	≤ 1
			20	>10	≤ 1
NS_04	6.6.2.2.2, 6.6.3.3.19	41	5, 10, 15, 20	Table 6.2.4-4, Table 6.2.4-4a	
NS_05	6.6.3.3.1	1	10, 15, 20	≥ 50 (NOTE 1)	≤ 1 (NOTE 1)
			15, 20	Table 6.2.4-18 (NOTE 2)	
		65 (NOTE 3)	10, 15, 20	≥ 50	≤ 1 (NOTE 1)
			15, 20	Table 6.2.4-18 (NOTE 2)	
NS_06	6.6.2.2.3	12, 13, 14, 17	1.4, 3, 5, 10	Table 5.6-1	N/A
NS_07	6.6.2.2.3	13	10	Table 6.2.4-2	
NS_08	6.6.3.3.2				
NS_08	6.6.3.3.3	19	10, 15	> 44	≤ 3
NS_09	6.6.3.3.4	21	10, 15	> 40	≤ 1
				> 55	≤ 2
NS_10		20	15, 20	Table 6.2.4-3	
NS_11	6.6.2.2.1	23	1.4, 3, 5, 10, 15, 20	Table 6.2.4-5	
NS_12	6.6.3.3.13				
NS_12	6.6.3.3.5	26	1.4, 3, 5, 10, 15	Table 6.2.4-6	
NS_13	6.6.3.3.6	26	5	Table 6.2.4-7	
NS_14	6.6.3.3.7	26	10, 15	Table 6.2.4-8	
NS_15	6.6.3.3.8	26	1.4, 3, 5, 10, 15	Table 6.2.4-9 Table 6.2.4-10	
NS_16	6.6.3.3.9	27	3, 5, 10	Table 6.2.4-11, Table 6.2.4-12, Table 6.2.4-13	
NS_17	6.6.3.3.10	28	5, 10	Table 5.6-1	N/A
NS_18	6.6.3.3.11	28	5	≥ 2	≤ 1
			10, 15, 20	≥ 1	≤ 4
NS_19	6.6.3.3.12	44	10, 15, 20	Table 6.2.4-14	
NS_20	6.2.2	23	5, 10, 15, 20	Table 6.2.4-15	
	6.6.2.2.1				
NS_21	6.6.3.3.14	30	5, 10	Table 6.2.4-16	
NS_22	6.6.2.2.1				
NS_22	6.6.3.3.15	42, 43	5, 10, 15, 20	Table 6.2.4-17	
NS_23	6.6.3.3.16	42, 43	5, 10, 15, 20	N/A	
NS_24	6.6.3.3.17	65 (NOTE 4)	5, 10, 15, 20	Table 6.2.4-18	
NS_25	6.6.3.3.20	65 (NOTE 4)	5, 10, 15, 20	Table 6.2.4-20	
NS_26	6.6.3.3.21	68	10, 15	Table 6.2.4-21	
NS_27	6.6.3.3.22	48	5, 10, 15, 20	Table 6.2.4-22	
	6.6.2.2.5,				
NS_28	6.6.3.3.23	46 (NOTE 5)	20	Table 6.2.4-23	
NS_29	6.2.2A,				
NS_29	6.6.2.3.1a,	46 (NOTE 5)	20	Table 6.2.4-24	
NS_30	6.6.3.3.25				
NS_30	6.2.2A,	46 (NOTE 5)	20	Table 6.2.4-25	
NS_31	6.6.3.3.26				
NS_31	6.2.2A,	46 (NOTE 5)	20	Table 6.2.4-26	
NS_32	6.6.3.3.27				
NS_32	-	-	-	-	-

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

LTE Band 2 Measured Results

BW (MHz)	Mode	RB Allocation	RB offset	Maximum Average Power (dBm)				
				Measured Pwr (dBm)			MPR	Tune-up Limit
				18700	18900	19100		
				1860 MHz	1880 MHz	1900 MHz		
20 MHz	QPSK	1	0	22.47	22.47	22.75	0.0	23
		1	49	22.14	22.28	22.41	0.0	23
		1	99	22.12	22.55	22.24	0.0	23
		50	0	22.34	22.39	22.61	0.0	23
		50	24	22.26	22.52	22.56	0.0	23
		50	50	22.18	22.45	22.49	0.0	23
		100	0	22.27	22.50	22.53	0.0	23
	16QAM	1	0	22.52	22.61	22.73	0.0	23
		1	49	22.23	22.40	22.39	0.0	23
		1	99	22.24	22.68	22.26	0.0	23
		50	0	21.95	22.01	22.18	0.0	23
		50	24	21.91	22.13	22.14	0.0	23
		50	50	21.87	22.06	22.06	0.0	23
		100	0	21.85	22.11	22.10	0.0	23
	64QAM	1	0	22.37	22.84	22.80	0.0	23
		1	49	22.16	22.72	22.58	0.0	23
		1	99	22.20	23.00	22.38	0.0	23
		50	0	21.58	21.66	21.92	1.0	22
		50	24	21.57	21.81	21.84	1.0	22
		50	50	21.49	21.72	21.84	1.0	22
		100	0	21.55	21.73	21.81	1.0	22
BW (MHz)	Mode	RB Allocation	RB offset	Measured Pwr (dBm)			MPR	Tune-up Limit
				18675	18900	19125		
				1857.5 MHz	1880 MHz	1902.5 MHz		
15 MHz	QPSK	1	0	22.32	22.43	22.61	0.0	23
		1	37	22.11	22.31	22.40	0.0	23
		1	74	22.10	22.37	22.38	0.0	23
		36	0	22.19	22.40	22.66	0.0	23
		36	20	22.24	22.46	22.60	0.0	23
		36	39	22.20	22.40	22.43	0.0	23
		75	0	22.26	22.47	22.59	0.0	23
	16QAM	1	0	22.30	22.38	22.23	0.0	23
		1	37	22.10	22.24	21.92	0.0	23
		1	74	22.07	22.30	21.91	0.0	23
		36	0	21.77	22.08	22.25	0.0	23
		36	20	21.85	22.13	22.20	0.0	23
		36	39	21.79	22.05	22.04	0.0	23
		75	0	21.89	22.10	22.18	0.0	23
	64QAM	1	0	22.53	22.21	22.76	0.0	23
		1	37	22.41	22.18	22.53	0.0	23
		1	74	22.47	22.31	22.47	0.0	23
		36	0	21.44	21.69	21.93	1.0	22
		36	20	21.51	21.81	21.90	1.0	22
		36	39	21.46	21.77	21.73	1.0	22
		75	0	21.55	21.77	21.89	1.0	22

LTE Band 2 Measured Results (continues)

BW (MHz)	Mode	RB Allocation	RB offset	Measured Pwr (dBm)			MPR	Tune-up Limit
				18650	18900	19150		
				1855 MHz	1880 MHz	1905 MHz		
10 MHz	QPSK	1	0	22.38	22.54	22.51	0.0	23
		1	25	22.08	22.33	22.28	0.0	23
		1	49	22.35	22.59	22.29	0.0	23
		25	0	22.18	22.36	22.51	0.0	23
		25	12	22.15	22.47	22.39	0.0	23
		25	25	22.22	22.44	22.37	0.0	23
		50	0	22.25	22.46	22.49	0.0	23
	16QAM	1	0	22.07	22.47	22.01	0.0	23
		1	25	21.74	22.26	21.80	0.0	23
		1	49	21.99	22.48	21.75	0.0	23
		25	0	21.87	21.98	22.13	0.0	23
		25	12	21.85	22.09	21.98	0.0	23
		25	25	21.91	22.05	21.91	0.0	23
		50	0	21.87	22.06	22.06	0.0	23
	64QAM	1	0	22.32	22.32	22.43	0.0	23
		1	25	22.03	22.21	22.36	0.0	23
		1	49	22.28	22.50	22.33	0.0	23
		25	0	21.49	21.66	21.79	1.0	22
		25	12	21.49	21.79	21.70	1.0	22
		25	25	21.56	21.77	21.64	1.0	22
		50	0	21.46	21.70	21.71	1.0	22
BW (MHz)	Mode	RB Allocation	RB offset	Maximum Average Power (dBm)			MPR	Tune-up Limit
				Measured Pwr (dBm)				
				18625	18900	19175		
				1852.5 MHz	1880 MHz	1907.5 MHz		
5 MHz	QPSK	1	0	22.23	22.27	22.43	0.0	23
		1	12	22.16	22.30	22.39	0.0	23
		1	24	22.16	22.40	22.40	0.0	23
		12	0	22.17	22.37	22.37	0.0	23
		12	7	22.13	22.33	22.36	0.0	23
		12	13	22.12	22.45	22.31	0.0	23
		25	0	22.17	22.45	22.37	0.0	23
	16QAM	1	0	21.89	22.37	22.11	0.0	23
		1	12	21.80	22.37	22.03	0.0	23
		1	24	21.82	22.48	22.04	0.0	23
		12	0	21.81	22.06	22.03	0.0	23
		12	7	21.77	22.04	22.02	0.0	23
		12	13	21.76	22.10	21.97	0.0	23
		25	0	21.72	22.04	21.96	0.0	23
	64QAM	1	0	22.15	22.26	21.90	0.0	23
		1	12	22.08	22.39	21.87	0.0	23
		1	24	22.09	22.44	21.96	0.0	23
		12	0	21.47	21.52	21.66	1.0	22
		12	7	21.45	21.53	21.65	1.0	22
		12	13	21.44	21.65	21.60	1.0	22
		25	0	21.43	21.61	21.57	1.0	22

LTE Band 2 Measured Results (continues)

BW (MHz)	Mode	RB Allocation	RB offset	Measured Pwr (dBm)			MPR	Tune-up Limit
				18615	18900	19185		
				1851.5 MHz	1880 MHz	1908.5 MHz		
3 MHz	QPSK	1	0	22.10	22.31	22.18	0.0	23
		1	8	22.16	22.40	22.25	0.0	23
		1	14	22.03	22.38	22.18	0.0	23
		8	0	22.11	22.29	22.18	0.0	23
		8	4	22.12	22.29	22.26	0.0	23
		8	7	22.11	22.28	22.31	0.0	23
		15	0	22.11	22.37	22.33	0.0	23
	16QAM	1	0	21.77	22.24	21.81	0.0	23
		1	8	21.82	22.30	21.88	0.0	23
		1	14	21.69	22.28	21.75	0.0	23
		8	0	21.75	21.95	21.98	0.0	23
		8	4	21.76	21.94	21.97	0.0	23
		8	7	21.75	21.94	22.00	0.0	23
		15	0	21.66	22.01	21.90	0.0	23
	64QAM	1	0	22.06	22.14	22.20	0.0	23
		1	8	22.10	22.27	22.28	0.0	23
		1	14	21.99	22.23	22.16	0.0	23
		8	0	21.33	21.57	21.58	1.0	22
		8	4	21.35	21.59	21.63	1.0	22
		8	7	21.35	21.57	21.60	1.0	22
		15	0	21.40	21.68	21.55	1.0	22
BW (MHz)	Mode	RB Allocation	RB offset	Measured Pwr (dBm)			MPR	Tune-up Limit
				18607	18900	19193		
				1850.7 MHz	1880 MHz	1909.3 MHz		
1.4 MHz	QPSK	1	0	22.00	22.20	22.10	0.0	23
		1	3	22.06	22.28	22.16	0.0	23
		1	5	21.95	22.17	22.08	0.0	23
		3	0	22.00	22.25	22.11	0.0	23
		3	1	22.06	22.30	22.13	0.0	23
		3	3	22.06	22.28	22.13	0.0	23
		6	0	22.04	22.15	22.10	0.0	23
	16QAM	1	0	21.62	22.15	21.77	0.0	23
		1	3	21.70	22.23	21.87	0.0	23
		1	5	21.69	22.12	21.75	0.0	23
		3	0	21.79	22.03	21.78	0.0	23
		3	1	21.88	22.06	21.81	0.0	23
		3	3	21.85	22.05	21.79	0.0	23
		6	0	21.80	21.68	21.84	0.0	23
	64QAM	1	0	21.88	22.40	21.97	0.0	23
		1	3	21.96	22.48	22.04	0.0	23
		1	5	21.87	22.37	21.99	0.0	23
		3	0	21.93	22.32	21.81	0.0	23
		3	1	21.99	22.42	21.88	0.0	23
		3	3	21.99	22.41	21.87	0.0	23
		6	0	21.58	21.44	21.42	1.0	22

LTE Band 4 Measured Results

BW (MHz)	Mode	RB Allocation	RB offset	Maximum Average Power (dBm)				
				Measured Pwr (dBm)			MPR	Tune-up Limit
					20175			
					1732.5 MHz			
20 MHz	QPSK	1	0		22.51		0.0	23
		1	49		22.28		0.0	23
		1	99		22.30		0.0	23
		50	0		22.51		0.0	23
		50	24		22.51		0.0	23
		50	50		22.43		0.0	23
		100	0		22.47		0.0	23
	16QAM	1	0		22.58		0.0	23
		1	49		22.30		0.0	23
		1	99		22.36		0.0	23
		50	0		22.09		0.0	23
		50	24		22.13		0.0	23
		50	50		22.06		0.0	23
		100	0		22.10		0.0	23
	64QAM	1	0		22.89		0.0	23
		1	49		22.67		0.0	23
		1	99		22.80		0.0	23
		50	0		21.74		1.0	22
		50	24		21.81		1.0	22
		50	50		21.75		1.0	22
		100	0		21.75		1.0	22
BW (MHz)	Mode	RB Allocation	RB offset	Measured Pwr (dBm)			MPR	Tune-up Limit
				20025	20175	20325		
				1717.5 MHz	1732.5 MHz	1747.5 MHz		
15 MHz	QPSK	1	0	22.52	22.53	22.43	0.0	23
		1	37	22.44	22.34	22.24	0.0	23
		1	74	22.46	22.36	22.19	0.0	23
		36	0	22.41	22.41	22.40	0.0	23
		36	20	22.44	22.50	22.34	0.0	23
		36	39	22.38	22.39	22.27	0.0	23
		75	0	22.43	22.48	22.31	0.0	23
	16QAM	1	0	22.46	22.46	21.97	0.0	23
		1	37	22.35	22.25	21.76	0.0	23
		1	74	22.41	22.32	21.73	0.0	23
		36	0	21.96	22.08	21.98	0.0	23
		36	20	22.02	22.10	21.93	0.0	23
		36	39	21.97	22.05	21.87	0.0	23
		75	0	22.03	22.10	21.92	0.0	23
	64QAM	1	0	22.75	22.36	22.45	0.0	23
		1	37	22.72	22.18	22.29	0.0	23
		1	74	22.85	22.29	22.31	0.0	23
		36	0	21.66	21.75	21.62	1.0	22
		36	20	21.71	21.81	21.60	1.0	22
		36	39	21.69	21.77	21.55	1.0	22
		75	0	21.75	21.76	21.56	1.0	22

LTE Band 4 Measured Results (continued)

BW (MHz)	Mode	RB Allocation	RB offset	Measured Pwr (dBm)			MPR	Tune-up Limit
				20000	20175	20350		
				1715 MHz	1732.5 MHz	1750 MHz		
10 MHz	QPSK	1	0	22.38	22.43	22.31	0.0	23
		1	25	22.27	22.32	22.20	0.0	23
		1	49	22.31	22.38	22.19	0.0	23
		25	0	22.40	22.44	22.32	0.0	23
		25	12	22.37	22.48	22.33	0.0	23
		25	25	22.46	22.42	22.27	0.0	23
		50	0	22.46	22.45	22.31	0.0	23
	16QAM	1	0	22.04	22.37	21.86	0.0	23
		1	25	21.90	22.24	21.74	0.0	23
		1	49	21.98	22.29	21.69	0.0	23
		25	0	22.08	22.02	21.94	0.0	23
		25	12	22.06	22.08	21.90	0.0	23
		25	25	22.10	22.06	21.84	0.0	23
		50	0	22.10	22.07	21.88	0.0	23
	64QAM	1	0	22.31	22.24	22.32	0.0	23
		1	25	22.21	22.16	22.25	0.0	23
		1	49	22.30	22.29	22.27	0.0	23
		25	0	21.73	21.72	21.58	1.0	22
		25	12	21.72	21.81	21.58	1.0	22
		25	25	21.77	21.77	21.54	1.0	22
		50	0	21.73	21.77	21.54	1.0	22
BW (MHz)	Mode	RB Allocation	RB offset	Maximum Average Power (dBm)			MPR	Tune-up Limit
				Measured Pwr (dBm)				
				19975	20175	20375		
				1712.5 MHz	1732.5 MHz	1752.5 MHz		
5 MHz	QPSK	1	0	22.45	22.39	22.47	0.0	23
		1	12	22.38	22.31	22.39	0.0	23
		1	24	22.37	22.42	22.37	0.0	23
		12	0	22.43	22.42	22.34	0.0	23
		12	7	22.43	22.49	22.35	0.0	23
		12	13	22.38	22.47	22.33	0.0	23
		25	0	22.39	22.46	22.35	0.0	23
	16QAM	1	0	22.10	22.49	22.13	0.0	23
		1	12	22.01	22.41	22.05	0.0	23
		1	24	22.02	22.53	22.06	0.0	23
		12	0	22.02	22.11	22.04	0.0	23
		12	7	22.01	22.21	22.04	0.0	23
		12	13	21.98	22.16	22.01	0.0	23
		25	0	21.91	22.11	22.00	0.0	23
	64QAM	1	0	22.34	22.39	22.03	0.0	23
		1	12	22.29	22.37	22.00	0.0	23
		1	24	22.31	22.46	22.00	0.0	23
		12	0	21.68	21.55	21.66	1.0	22
		12	7	21.69	21.65	21.65	1.0	22
		12	13	21.67	21.63	21.62	1.0	22
		25	0	21.64	21.67	21.58	1.0	22

LTE Band 4 Measured Results (continued)

BW (MHz)	Mode	RB Allocation	RB offset	Measured Pwr (dBm)			MPR	Tune-up Limit
				19965	20175	20385		
				1711.5 MHz	1732.5 MHz	1753.5 MHz		
3 MHz	QPSK	1	0	22.34	22.36	22.31	0.0	23
		1	8	22.39	22.42	22.35	0.0	23
		1	14	22.29	22.41	22.29	0.0	23
		8	0	22.37	22.31	22.28	0.0	23
		8	4	22.39	22.35	22.33	0.0	23
		8	7	22.37	22.42	22.30	0.0	23
		15	0	22.35	22.41	22.33	0.0	23
	16QAM	1	0	22.00	22.26	21.83	0.0	23
		1	8	22.01	22.35	21.89	0.0	23
		1	14	21.90	22.35	21.75	0.0	23
		8	0	21.97	21.98	22.02	0.0	23
		8	4	21.99	22.00	22.04	0.0	23
		8	7	21.97	22.09	22.05	0.0	23
		15	0	21.89	22.05	21.96	0.0	23
	64QAM	1	0	22.29	22.15	22.35	0.0	23
		1	8	22.33	22.26	22.44	0.0	23
		1	14	22.23	22.23	22.35	0.0	23
		8	0	21.55	21.60	21.60	1.0	22
		8	4	21.59	21.63	21.66	1.0	22
		8	7	21.56	21.72	21.64	1.0	22
		15	0	21.64	21.71	21.55	1.0	22
BW (MHz)	Mode	RB Allocation	RB offset	Measured Pwr (dBm)			MPR	Tune-up Limit
				19957	20175	20393		
				1710.7 MHz	1732.5 MHz	1754.3 MHz		
1.4 MHz	QPSK	1	0	22.28	22.21	22.22	0.0	23
		1	3	22.32	22.24	22.28	0.0	23
		1	5	22.25	22.18	22.21	0.0	23
		3	0	22.25	22.22	22.26	0.0	23
		3	1	22.31	22.29	22.29	0.0	23
		3	3	22.32	22.27	22.30	0.0	23
		6	0	22.24	22.22	22.18	0.0	23
	16QAM	1	0	21.92	21.84	22.16	0.0	23
		1	3	21.96	21.88	22.24	0.0	23
		1	5	21.91	21.85	22.16	0.0	23
		3	0	21.92	22.01	22.03	0.0	23
		3	1	21.97	22.05	22.07	0.0	23
		3	3	21.96	22.05	22.06	0.0	23
		6	0	21.95	21.97	21.73	0.0	23
	64QAM	1	0	22.13	22.05	22.34	0.0	23
		1	3	22.19	22.15	22.34	0.0	23
		1	5	22.14	22.03	22.34	0.0	23
		3	0	21.96	22.12	22.34	0.0	23
		3	1	22.02	22.19	22.34	0.0	23
		3	3	22.06	22.20	22.34	0.0	23
		6	0	21.56	21.77	22.00	1.0	22

LTE Band 12 Measured Results

BW (MHz)	Mode	RB Allocation	RB offset	Maximum Average Power (dBm)				
				Measured Pwr (dBm)			MPR	Tune-up Limit
					23095			
					707.5 MHz			
10 MHz	QPSK	1	0		24.47		0.0	25
		1	25		24.38		0.0	25
		1	49		24.37		0.0	25
		25	0		23.45		1.0	24
		25	12		23.44		1.0	24
		25	25		23.34		1.0	24
		50	0		23.37		1.0	24
	16QAM	1	0		23.84		1.0	24
		1	25		23.74		1.0	24
		1	49		23.72		1.0	24
		25	0		22.57		2.0	23
		25	12		22.50		2.0	23
		25	25		22.46		2.0	23
		50	0		22.49		2.0	23
	64QAM	1	0		22.25		2.0	23
		1	25		22.20		2.0	23
		1	49		22.24		2.0	23
		25	0		21.76		3.0	22
		25	12		21.73		3.0	22
		25	25		21.70		3.0	22
		50	0		21.67		3.0	22
BW (MHz)	Mode	RB Allocation	RB offset	Measured Pwr (dBm)			MPR	Tune-up Limit
				23035	23095	23155		
				701.5 MHz	707.5 MHz	713.5 MHz		
5 MHz	QPSK	1	0	24.15	24.31	24.66	0.0	25
		1	12	24.61	24.35	24.55	0.0	25
		1	24	24.56	24.31	24.40	0.0	25
		12	0	23.32	23.44	23.49	1.0	24
		12	7	23.51	23.41	23.48	1.0	24
		12	13	23.58	23.39	23.48	1.0	24
		25	0	23.35	23.42	23.50	1.0	24
	16QAM	1	0	23.25	23.86	23.74	1.0	24
		1	12	23.74	23.91	23.66	1.0	24
		1	24	23.68	23.90	23.53	1.0	24
		12	0	22.45	22.63	22.65	2.0	23
		12	7	22.65	22.65	22.67	2.0	23
		12	13	22.75	22.62	22.65	2.0	23
		25	0	22.47	22.52	22.61	2.0	23
	64QAM	1	0	22.61	22.33	22.23	2.0	23
		1	12	22.61	22.40	22.13	2.0	23
		1	24	22.63	22.35	22.11	2.0	23
		12	0	21.70	21.62	21.78	3.0	22
		12	7	21.90	21.61	21.79	3.0	22
		12	13	21.94	21.60	21.76	3.0	22
		25	0	21.76	21.65	21.74	3.0	22

Note(s):

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

LTE Band 12 Measured Results (continues)

BW (MHz)	Mode	RB Allocation	RB offset	Measured Pwr (dBm)			MPR	Tune-up Limit
				23025	23095	23165		
				700.5 MHz	707.5 MHz	714.5 MHz		
3 MHz	QPSK	1	0	24.04	24.28	24.45	0.0	25
		1	8	24.18	24.46	24.50	0.0	25
		1	14	24.39	24.31	24.23	0.0	25
		8	0	23.15	23.35	23.44	1.0	24
		8	4	23.30	23.38	23.48	1.0	24
		8	7	23.38	23.36	23.44	1.0	24
		15	0	23.29	23.36	23.46	1.0	24
	16QAM	1	0	23.16	23.67	23.38	1.0	24
		1	8	23.36	23.81	23.44	1.0	24
		1	14	23.54	23.72	23.18	1.0	24
		8	0	22.34	22.52	22.64	2.0	23
		8	4	22.45	22.54	22.65	2.0	23
		8	7	22.56	22.52	22.65	2.0	23
		15	0	22.39	22.49	22.54	2.0	23
	64QAM	1	0	22.63	22.08	22.50	2.0	23
		1	8	22.64	22.30	22.56	2.0	23
		1	14	22.57	22.22	22.45	2.0	23
		8	0	21.53	21.66	21.75	3.0	22
		8	4	21.67	21.70	21.82	3.0	22
		8	7	21.76	21.68	21.77	3.0	22
		15	0	21.77	21.68	21.71	3.0	22
BW (MHz)	Mode	RB Allocation	RB offset	Maximum Average Power (dBm)			MPR	Tune-up Limit
				Measured Pwr (dBm)				
				23017	23095	23173		
				699.7 MHz	707.5 MHz	715.3 MHz		
1.4 MHz	QPSK	1	0	23.97	24.30	24.46	0.0	25
		1	3	24.16	24.37	24.49	0.0	25
		1	5	24.13	24.31	24.31	0.0	25
		3	0	24.04	24.34	24.35	0.0	25
		3	1	24.09	24.39	24.39	0.0	25
		3	3	24.15	24.39	24.36	0.0	25
		6	0	23.11	23.27	23.39	1.0	24
	16QAM	1	0	23.06	23.69	23.49	1.0	24
		1	3	23.34	23.75	23.52	1.0	24
		1	5	23.28	23.70	23.42	1.0	24
		3	0	23.29	23.53	23.46	1.0	24
		3	1	23.36	23.59	23.51	1.0	24
		3	3	23.41	23.58	23.48	1.0	24
		6	0	22.41	22.30	22.57	2.0	23
	64QAM	1	0	22.72	22.21	22.23	2.0	23
		1	3	22.81	22.26	22.31	2.0	23
		1	5	22.69	22.20	22.18	2.0	23
		3	0	22.67	22.00	22.26	2.0	23
		3	1	22.71	22.07	22.33	2.0	23
		3	3	22.69	22.08	22.33	2.0	23
		6	0	21.45	21.63	21.91	3.0	22

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 41 Measured Results

BW (MHz)	Mode	RB Allocation	RB offset	Maximum Average Power (dBm)						
				Measured Pwr (dBm)					MPR	Tune-up Limit
				39750	40185	40620	41055	41490		
				2506 MHz	2549.5 MHz	2593 MHz	2636.5 MHz	2680 MHz		
20 MHz	QPSK	1	0	22.54	22.60	22.63	22.64	22.76	0.0	23
		1	49	22.52	22.55	22.46	22.70	22.56	0.0	23
		1	99	22.60	22.49	22.42	22.73	22.45	0.0	23
		50	0	22.59	22.66	22.59	22.65	22.65	0.0	23
		50	24	22.66	22.63	22.55	22.61	22.60	0.0	23
		50	50	22.61	22.57	22.50	22.67	22.52	0.0	23
		100	0	22.62	22.61	22.52	22.59	22.59	0.0	23
	16QAM	1	0	21.99	22.23	22.16	22.03	22.38	0.0	23
		1	49	21.92	22.22	22.02	22.09	22.19	0.0	23
		1	99	21.98	22.20	21.97	22.11	22.08	0.0	23
		50	0	22.21	22.26	22.19	22.23	22.25	0.0	23
		50	24	22.26	22.24	22.12	22.22	22.19	0.0	23
		50	50	22.20	22.21	22.06	22.27	22.11	0.0	23
		100	0	22.23	22.19	22.11	22.20	22.11	0.0	23
	64QAM	1	0	22.07	22.23	22.60	22.14	22.34	0.0	23
		1	49	22.04	22.20	22.44	22.18	22.14	0.0	23
		1	99	22.09	22.16	22.39	22.18	22.05	0.0	23
		50	0	21.77	21.81	21.74	21.79	21.78	1.0	22
		50	24	21.86	21.79	21.68	21.73	21.70	1.0	22
		50	50	21.77	21.72	21.61	21.77	21.62	1.0	22
		100	0	21.79	21.78	21.62	21.68	21.73	1.0	22
BW (MHz)	Mode	RB Allocation	RB offset	Measured Pwr (dBm)					MPR	Tune-up Limit
				39750	40185	40620	41055	41490		
				2506 MHz	2549.5 MHz	2593 MHz	2636.5 MHz	2680 MHz		
15 MHz	QPSK	1	0	22.48	22.57	22.53	22.65	22.67	0.0	23
		1	37	22.49	22.56	22.47	22.71	22.54	0.0	23
		1	74	22.54	22.48	22.36	22.70	22.42	0.0	23
		36	0	22.54	22.62	22.55	22.64	22.60	0.0	23
		36	20	22.63	22.58	22.54	22.59	22.56	0.0	23
		36	39	22.60	22.50	22.47	22.65	22.52	0.0	23
		75	0	22.60	22.58	22.50	22.59	22.56	0.0	23
	16QAM	1	0	22.05	22.15	22.14	22.22	22.28	0.0	23
		1	37	22.03	22.18	22.03	22.23	22.14	0.0	23
		1	74	22.12	22.13	21.96	22.24	22.04	0.0	23
		36	0	22.12	22.24	22.14	22.19	22.20	0.0	23
		36	20	22.19	22.21	22.14	22.17	22.16	0.0	23
		36	39	22.19	22.18	22.06	22.21	22.13	0.0	23
		75	0	22.22	22.19	22.13	22.19	22.15	0.0	23
	64QAM	1	0	22.36	22.01	21.78	22.53	22.11	0.0	23
		1	37	22.38	22.01	21.68	22.51	21.94	0.0	23
		1	74	22.40	21.97	21.60	22.55	21.85	0.0	23
		36	0	21.76	21.72	21.74	21.82	21.69	1.0	22
		36	20	21.82	21.70	21.70	21.79	21.63	1.0	22
		36	39	21.77	21.65	21.68	21.85	21.61	1.0	22
		75	0	21.78	21.76	21.64	21.70	21.70	1.0	22

LTE Band 41 Measured Results (continued)

BW (MHz)	Mode	RB Allocation	RB offset	Measured Pw r (dBm)					MPR	Tune-up Limit
				39750	40185	40620	41055	41490		
				2506 MHz	2549.5 MHz	2593 MHz	2636.5 MHz	2680 MHz		
10 MHz	QPSK	1	0	22.52	22.63	22.52	22.62	22.63	0.0	23
		1	25	22.48	22.54	22.46	22.69	22.52	0.0	23
		1	49	22.60	22.49	22.41	22.64	22.50	0.0	23
		25	0	22.55	22.60	22.55	22.61	22.62	0.0	23
		25	12	22.63	22.62	22.56	22.62	22.58	0.0	23
		25	25	22.63	22.60	22.52	22.68	22.55	0.0	23
		50	0	22.64	22.58	22.52	22.57	22.54	0.0	23
	16QAM	1	0	22.12	22.33	22.10	22.16	22.31	0.0	23
		1	25	22.04	22.24	22.02	22.22	22.18	0.0	23
		1	49	22.13	22.22	21.98	22.19	22.17	0.0	23
		25	0	22.16	22.19	22.15	22.16	22.17	0.0	23
		25	12	22.24	22.21	22.12	22.16	22.13	0.0	23
		25	25	22.19	22.20	22.08	22.23	22.12	0.0	23
		50	0	22.22	22.24	22.12	22.17	22.15	0.0	23
	64QAM	1	0	22.42	22.25	21.74	22.50	22.28	0.0	23
		1	25	22.37	22.21	21.67	22.54	22.15	0.0	23
		1	49	22.43	22.21	21.63	22.50	22.13	0.0	23
		25	0	21.65	21.63	21.69	21.71	21.64	1.0	22
		25	12	21.72	21.68	21.70	21.68	21.59	1.0	22
		25	25	21.71	21.61	21.66	21.77	21.59	1.0	22
		50	0	21.74	21.70	21.64	21.68	21.64	1.0	22
BW (MHz)	Mode	RB Allocation	RB offset	Maximum Average Power (dBm)						
				Measured Pw r (dBm)					MPR	Tune-up Limit
				39750	40185	40620	41055	41490		
				2506 MHz	2549.5 MHz	2593 MHz	2636.5 MHz	2680 MHz		
				5 MHz	QPSK	1	0	22.39	22.61	22.51
1	12	22.39	22.56			22.48	22.62	22.54	0.0	23
1	24	22.47	22.53			22.45	22.62	22.51	0.0	23
12	0	22.46	22.61			22.54	22.59	22.58	0.0	23
12	7	22.63	22.63			22.54	22.71	22.60	0.0	23
12	13	22.61	22.60			22.50	22.70	22.57	0.0	23
25	0	22.63	22.57			22.49	22.59	22.55	0.0	23
16QAM	1	0	21.99		22.10	22.17	22.06	22.06	0.0	23
	1	12	21.96		22.10	22.16	22.15	22.04	0.0	23
	1	24	22.02		22.06	22.17	22.09	21.99	0.0	23
	12	0	22.07		22.14	22.14	22.20	22.09	0.0	23
	12	7	22.20		22.17	22.20	22.32	22.12	0.0	23
	12	13	22.20		22.16	22.18	22.31	22.06	0.0	23
	25	0	22.17		22.22	22.10	22.16	22.13	0.0	23
64QAM	1	0	21.80		22.55	22.25	21.88	22.48	0.0	23
	1	12	21.80		22.55	22.22	21.99	22.47	0.0	23
	1	24	21.85		22.54	22.19	21.96	22.45	0.0	23
	12	0	21.62		21.79	21.54	21.71	21.73	1.0	22
	12	7	21.73		21.80	21.56	21.81	21.77	1.0	22
	12	13	21.70		21.77	21.53	21.79	21.71	1.0	22
	25	0	21.78		21.66	21.55	21.74	21.61	1.0	22

9.4. LTE Carrier Aggregation

The following power measurements were performed with a single carrier uplink; CA for this device is only supported in the downlinks.

This device supports CA combinations of one (1) Uplink and up to two (2) Downlinks.

Type	LTE CA combinations		PCC (UL)					SCC (DL)			LTE Rel 8	LTE Rel 11	Delta
			Mode	BW (MHz)	Channel	Freq. (MHz)	RB/Offset	BW (MHz)	Channel	Freq. (MHz)	Tx. Power [dBm]	Tx. Power [dBm]	
Intra-Band Contiguous	41C		QPSK	20	39750	2506.0	50,24	20	39948	2525.8	22.45	22.45	0.0%

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 $\frac{1}{4}$ dBm

9.5. Wi-Fi 2.4GHz (DTS Band)

Measured Results

Band	Mode	Data Rate	Ch #	Freq. (MHz)	Chain 0 Average Power (dBm)			Chain 1 Average Power (dBm)		
					Meas Pwr	Tune-up	SAR Test (Yes/No)	Meas Pwr	Tune-up	SAR Test (Yes/No)
DSSS 2.4 GHz	802.11b	1 Mbps	1	2412	12.4	13.5	Yes	11.9	13.2	Yes
			6	2437	12.4	13.5		12.1	13.2	
			11	2462	12.1	13.5		11.9	13.2	
			12	2467	12.2	13.5		12.1	13.2	
			13	2472	10.7	12.0		11.8	13.2	
OFDM 2.4 GHz	802.11g	6 Mbps	1	2412	Not Required	13.8	No	Not Required	13.2	No
			6	2437		13.8			13.2	
			11	2462		13.8			13.2	
			12	2467		11.0			10.3	
			13	2472		3.0			2.3	
	802.11n (HT20)	6.5 Mbps	1	2412		13.9	No		13.2	No
			6	2437		13.9			13.2	
			11	2462		13.9			13.2	
			12	2467		11.1			10.3	
			13	2472		1.6			0.8	

Note(s):

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

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

Measured Results

Band	Mode	Data Rate	Ch #	Freq. (MHz)	Chain 0 Average Power (dBm)			Chain 1 Average Power (dBm)			
					Meas Pwr	Tune-up	SAR Test (Yes/No)	Meas Pwr	Tune-up	SAR Test (Yes/No)	
UNII-1 5.2 GHz	802.11a	6 Mbps	36	5180	10.70	12.50	Yes	Not Required	11.80	No	
			40	5200	10.85	12.50			11.80		
			44	5220	11.00	12.50			11.80		
			48	5240	11.00	12.50			11.80		
	802.11n (HT20)	6.5 Mbps	36	5180	Not Required	12.40	No		11.90	No	
			40	5200		12.40			11.90		
			44	5220		12.40			11.90		
			48	5240		12.40			11.90		
	802.11ac (VHT20)	6.5 Mbps	36	5180	Not Required	12.40	No		11.90	No	
			40	5200		12.40			11.90		
			44	5220		12.40			11.90		
			48	5240		12.40			11.90		
	802.11n (HT40)	13.5 Mbps	38	5190	Not Required	12.40	No		10.90	No	
			46	5230		12.40			11.90		
	802.11ac (VHT40)	13.5 Mbps	38	5190	Not Required	12.40	No		10.90	No	
			46	5230		12.40			11.90		
802.11ac (VHT80)	29.3 Mbps	42	5210	Not Required	12.40	No	11.90	No			
Band	Mode	Data Rate	Ch #	Freq. (MHz)	Chain 0 Average Power (dBm)			Chain 1 Average Power (dBm)			
					Meas Pwr	Tune-up	SAR Test (Yes/No)	Meas Pwr	Tune-up	SAR Test (Yes/No)	
UNII-2A 5.3 GHz	802.11a	6 Mbps	52	5260	Not Required	12.30	No	10.85	12.00	Yes	
			56	5280		12.30		10.70	12.00		
			60	5300		12.30		10.50	12.00		
			64	5320		12.30		10.53	12.00		
	802.11n (HT20)	6.5 Mbps	52	5260		Not Required	12.20	No	Not Required	11.90	No
			56	5280			12.20			11.90	
			60	5300			12.20			11.90	
			64	5320			12.20			11.90	
	802.11ac (VHT20)	6.5 Mbps	52	5260		Not Required	12.30	No		11.90	No
			56	5280			12.30			11.90	
			60	5300			12.30			11.90	
			64	5320			12.30			11.90	
	802.11n (HT40)	13.5 Mbps	54	5270		Not Required	12.20	No		11.90	No
			62	5310			12.20			11.90	
	802.11ac (VHT40)	13.5 Mbps	54	5270		Not Required	12.30	No		11.90	No
			62	5310			12.30			11.60	
802.11ac (VHT80)	29.3 Mbps	58	5290	Not Required	12.30	No	11.90	No			

Note(s):

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

Band	Mode	Data Rate	Ch #	Freq. (MHz)	Chain 0 Average Power (dBm)			Chain 1 Average Power (dBm)		
					Meas Pwr	Tune-up	SAR Test (Yes/No)	Meas Pwr	Tune-up	SAR Test (Yes/No)
UNII-2C 5.5 GHz	802.11a	6 Mbps	100	5500	Not Required	12.00	No	9.70	11.70	Yes
			116	5580		12.00		10.00	11.70	
			124	5620		12.00		10.40	11.70	
			144	5720		12.00		10.40	11.70	
	802.11n (HT20)	6.5 Mbps	100	5500		12.00	No	Not Required	11.60	No
			116	5580		12.00			11.60	
			124	5620		12.00			11.60	
			144	5720		12.00			11.60	
	802.11ac (VHT20)	6.5 Mbps	100	5500		12.00	No		11.60	No
			116	5580		12.00			11.60	
			124	5620		12.00			11.60	
			144	5720		12.00			11.60	
	802.11n (HT40)	13.5 Mbps	102	5510		12.00	No		11.60	No
			118	5590		12.00			11.60	
			126	5630		12.00			11.60	
			142	5710		12.00			11.60	
	802.11ac (VHT40)	13.5 Mbps	102	5510		12.00	No	11.60	No	
			118	5590		12.00		11.60		
			126	5630		12.00		11.60		
			142	5710		12.00		11.60		
	802.11ac (VHT80)	29.3 Mbps	106	5530	10.60	12.00	Yes	11.60	No	
			122	5610	10.87	12.00		11.60		
			138	5690	10.78	12.00		11.60		
Band	Mode	Data Rate	Ch #	Freq. (MHz)	Chain 0 Average Power (dBm)			Chain 1 Average Power (dBm)		
					Meas Pwr	Tune-up	SAR Test (Yes/No)	Meas Pwr	Tune-up	SAR Test (Yes/No)
UNII-3 5.8 GHz	802.11a	6 Mbps	149	5745	Not Required	10.10	No	Not Required	9.80	No
			157	5785		10.10			9.80	
			165	5825		10.10			9.80	
	802.11n (HT20)	6.5 Mbps	149	5745		10.10	No		9.80	No
			157	5785		10.10			9.80	
			165	5825		10.10			9.80	
	802.11ac (VHT20)	6.5 Mbps	149	5745		10.10	No		9.80	No
			157	5785		10.10			9.80	
			165	5825		10.10			9.80	
	802.11n (HT40)	13.5 Mbps	151	5755		10.10	No		9.80	No
			159	5795		10.10			9.80	
	802.11ac (VHT40)	13.5 Mbps	151	5755		10.10	No		9.80	No
			159	5795		10.10			9.80	
	802.11ac (VHT80)	29.3 Mbps	155	5775	8.45	10.10	Yes	7.80	9.80	Yes

Note(s):

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

9.7. Bluetooth

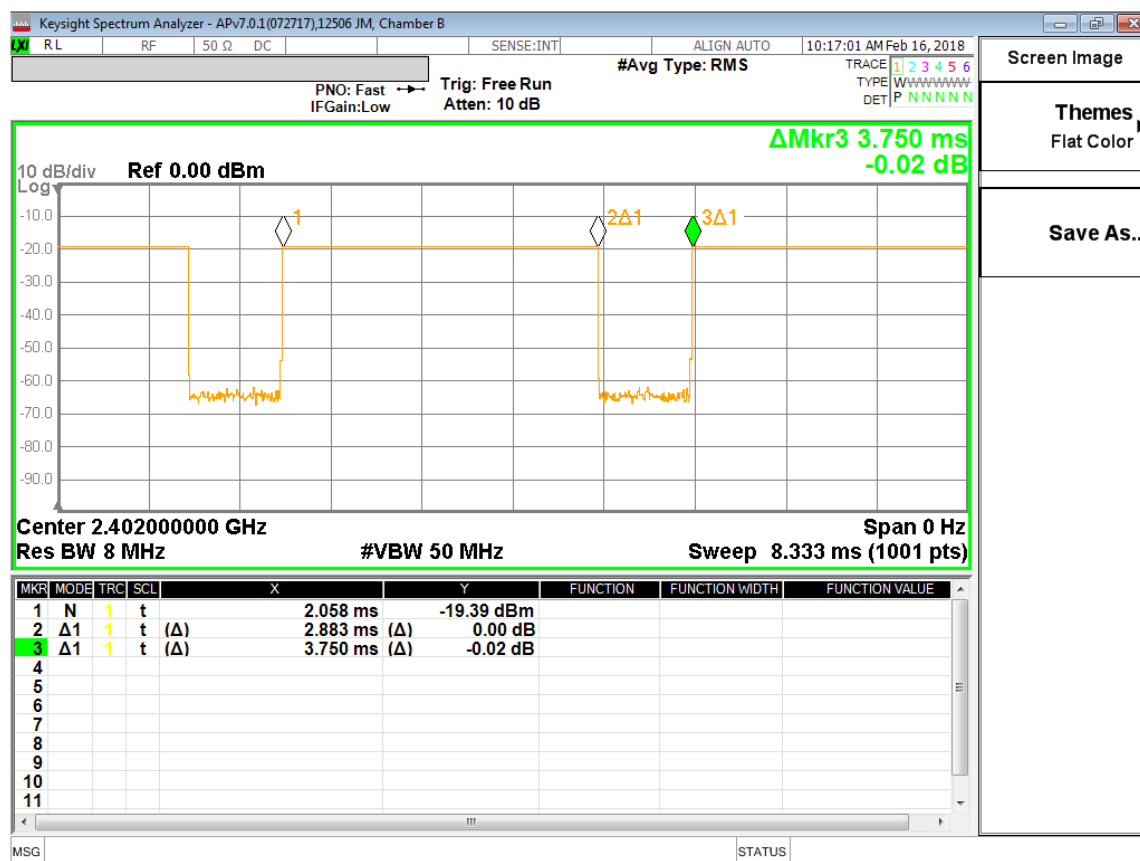
Band	Mode	Ch #	Freq. (MHz)	Chain 0 Average Power (dBm)		
				Meas Pwr	Tune-up	SAR Test (Yes/No)
2.4	GFSK	0	2402	9.60	10.30	Yes
		39	2441	9.73	10.90	
		78	2480	9.70	10.00	
	EDR, $\pi/4$ DQPSK	0	2402	6.81	7.40	No
		39	2441	7.83	8.20	
		78	2480	6.78	7.30	
	EDR, 8-DPSK	0	2402	6.83	7.40	No
		39	2441	7.84	8.20	
		78	2480	6.77	7.30	
	LE, GFSK	0	2402	3.50	4.00	No
		19	2440	4.90	5.40	
		39	2480	4.30	4.90	

Duty Factor Measured Results

Mode	Type	T on (ms)	Period (ms)	Duty Cycle	Crest Factor (1/duty cycle)
GFSK	DH5	2.883	3.75	76.88%	1.14

Duty Cycle plot

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

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

10.1. GSM850

RF Exposure Conditions	Mode	Dist. (mm)	Test Position	Ch #.	Freq. (MHz)	Power (dBm)		1-g SAR (W/kg)		Plot No.
						Tune-up Limit	Meas.	Meas.	Scaled	
Head	GPRS 4 Slots	0	Left Touch	190	836.6	28.20	27.80	0.033	0.036	1
			Left Tilt	190	836.6	28.20	27.80	0.008	0.009	
			Right Touch	190	836.6	28.20	27.80	0.019	0.021	
			Right Tilt	190	836.6	28.20	27.80	0.009	0.010	
Body-worn	GPRS 4 Slots	15	Rear	190	836.6	28.20	27.80	0.090	0.099	
			Front	190	836.6	28.20	27.80	0.128	0.140	2
Hotspot	GPRS 4 Slots	10	Rear	190	836.6	28.20	27.80	0.142	0.156	
			Front	190	836.6	28.20	27.80	0.203	0.223	
			Edge 2	190	836.6	28.20	27.80	0.079	0.087	
			Edge 3	190	836.6	28.20	27.80	0.130	0.143	
			Edge 4	190	836.6	28.20	27.80	0.180	0.197	
Hotspot	DTM 2 slots	10	Rear	190	836.6	31.20	30.90	0.215	0.230	
			Front	190	836.6	31.20	30.90	0.276	0.296	
			Edge 2	190	836.6	31.20	30.90	0.108	0.116	
			Edge 3	190	836.6	31.20	30.90	0.186	0.199	
			Edge 4	190	836.6	31.20	30.90	0.279	0.299	3

10.2. GSM1900

RF Exposure Conditions	Mode	Dist. (mm)	Test Position	Ch #.	Freq. (MHz)	Power (dBm)		1-g SAR (W/kg)		Plot No.
						Tune-up Limit	Meas.	Meas.	Scaled	
Head	GPRS 4 Slots	0	Left Touch	661	1880.0	23.70	23.40	0.085	0.091	4
			Left Tilt	661	1880.0	23.70	23.40	0.013	0.014	
			Right Touch	661	1880.0	23.70	23.40	0.051	0.055	
			Right Tilt	661	1880.0	23.70	23.40	0.012	0.013	
Body-worn	GPRS 4 Slots	15	Rear	661	1880.0	23.70	23.40	0.059	0.063	
			Front	661	1880.0	23.70	23.40	0.103	0.110	5
Hotspot	GPRS 4 Slots	10	Rear	661	1880.0	23.70	23.40	0.118	0.126	
			Front	661	1880.0	23.70	23.40	0.190	0.204	
			Edge 2	661	1880.0	23.70	23.40	0.013	0.014	
			Edge 3	661	1880.0	23.70	23.40	0.224	0.240	
			Edge 4	661	1880.0	23.70	23.40	0.073	0.078	
Hotspot	DTM 2 Slots	10	Edge 3	661	1880.0	26.70	26.30	0.222	0.243	6

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)		Plots No.
							Tune-up Limit	Meas.	Meas.	Scaled	
Head	Rel 99 RMC 12.2 kbps	OFF	0	Left Touch	9400	1880.0	22.70	22.10	0.155	0.178	7
				Left Tilt	9400	1880.0	22.70	22.10	0.062	0.071	
				Right Touch	9400	1880.0	22.70	22.10	0.103	0.118	
				Right Tilt	9400	1880.0	22.70	22.10	0.059	0.068	
Body-worn	Rel 99 RMC 12.2 kbps	OFF	15	Rear	9400	1880.0	22.70	22.10	0.160	0.184	
				Front	9400	1880.0	22.70	22.10	0.190	0.218	8
Hotspot	Rel 99 RMC 12.2 kbps	OFF	10	Rear	9400	1880.0	22.70	22.10	0.295	0.339	
				Front	9400	1880.0	22.70	22.10	0.395	0.454	
				Edge 2	9400	1880.0	22.70	22.10	0.031	0.036	
				Edge 3	9262	1852.4	22.70	22.00	0.544	0.639	
					9400	1880.0	22.70	22.10	0.708	0.813	9
					9538	1907.6	22.70	22.00	0.602	0.707	
				Edge 4	9400	1880.0	22.70	22.10	0.320	0.367	

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)		Plots No.
							Tune-up Limit	Meas.	Meas.	Scaled	
Head	Rel 99 RMC 12.2 kbps	OFF	0	Left Touch	1413	1732.6	22.70	22.20	0.154	0.173	10
				Left Tilt	1413	1732.6	22.70	22.20	0.036	0.040	
				Right Touch	1413	1732.6	22.70	22.20	0.094	0.105	
				Right Tilt	1413	1732.6	22.70	22.20	0.038	0.043	
Body-worn	Rel 99 RMC 12.2 kbps	OFF	15	Rear	1413	1732.6	22.70	22.20	0.099	0.111	
				Front	1413	1732.6	22.70	22.20	0.111	0.125	11
Hotspot	Rel 99 RMC 12.2 kbps	OFF	10	Rear	1413	1732.6	22.70	22.20	0.194	0.218	
				Front	1413	1732.6	22.70	22.20	0.280	0.314	12
				Edge 2	1413	1732.6	22.70	22.20	0.009	0.010	
				Edge 3	1413	1732.6	22.70	22.20	0.254	0.285	
				Edge 4	1413	1732.6	22.70	22.20	0.270	0.303	

10.5. 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)		Plots No.
									Tune-up Limit	Meas.	Meas.	Scaled	
Head	QPSK	OFF	0	Left Touch	18900	1880.0	1	99	23.00	22.55	0.204	0.226	13
							50	24	23.00	22.52	0.197	0.220	
				Left Tilt	18900	1880.0	1	99	23.00	22.55	0.080	0.089	
							50	24	23.00	22.52	0.070	0.078	
				Right Touch	18900	1880.0	1	99	23.00	22.55	0.145	0.161	
							50	24	23.00	22.52	0.146	0.163	
				Right Tilt	18900	1880.0	1	99	23.00	22.55	0.065	0.072	
							50	24	23.00	22.52	0.049	0.055	
Body-worn	QPSK	OFF	15	Rear	18900	1880.0	1	99	23.00	22.55	0.132	0.146	
							50	24	23.00	22.52	0.131	0.146	
				Front	18900	1880.0	1	99	23.00	22.55	0.153	0.170	
							50	24	23.00	22.52	0.153	0.171	14
Hotspot	QPSK	OFF	10	Rear	18900	1880.0	1	99	23.00	22.55	0.299	0.332	
							50	24	23.00	22.52	0.297	0.332	
				Front	18900	1880.0	1	99	23.00	22.55	0.343	0.380	
							50	24	23.00	22.52	0.349	0.390	
				Edge 2	18900	1880.0	1	99	23.00	22.55	0.019	0.021	
							50	24	23.00	22.52	0.018	0.020	
				Edge 3	18900	1880.0	1	99	23.00	22.55	0.482	0.535	15
							50	24	23.00	22.52	0.474	0.529	
				Edge 4	18900	1880.0	1	99	23.00	22.55	0.296	0.328	
							50	24	23.00	22.52	0.300	0.335	

10.6. LTE Band 4 (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)		Plots No.
									Tune-up Limit	Meas.	Meas.	Scaled	
Head	QPSK	OFF	0	Left Touch	20175	1732.5	1	0	23.00	22.51	0.120	0.134	16
							50	0	23.00	22.51	0.125	0.140	
				Left Tilt (15°)	20175	1732.5	1	0	23.00	22.51	0.022	0.025	
							50	0	23.00	22.51	0.025	0.028	
				Right Touch	20175	1732.5	1	0	23.00	22.51	0.074	0.083	
							50	0	23.00	22.51	0.080	0.090	
				Right Tilt (15°)	20175	1732.5	1	0	23.00	22.51	0.024	0.027	
							50	0	23.00	22.51	0.025	0.028	
Body	QPSK	OFF	15	Rear	20175	1732.5	1	0	23.00	22.51	0.094	0.105	
							50	0	23.00	22.51	0.098	0.110	
				Front	20175	1732.5	1	0	23.00	22.51	0.133	0.149	17
							50	0	23.00	22.51	0.139	0.156	
Hotspot	QPSK	OFF	10	Rear	20175	1732.5	1	0	23.00	22.51	0.168	0.188	
							50	0	23.00	22.51	0.175	0.196	
				Front	20175	1732.5	1	0	23.00	22.51	0.316	0.354	18
							50	0	23.00	22.51	0.328	0.367	
				Edge 2	20175	1732.5	1	0	23.00	22.51	0.006	0.007	
							50	0	23.00	22.51	0.005	0.006	
				Edge 3	20175	1732.5	1	0	23.00	22.51	0.201	0.225	
							50	0	23.00	22.51	0.206	0.231	
				Edge 4	20175	1732.5	1	0	23.00	22.51	0.244	0.273	
							50	0	23.00	22.51	0.254	0.284	

10.7. 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)		Plots No.
									Tune-up Limit	Meas.	Meas.	Scaled	
Head	QPSK	OFF	0	Left Touch	23095	707.5	1	0	25.00	24.47	0.199	0.225	19
							25	0	24.00	23.45	0.160	0.182	
				Left Tilt (15°)	23095	707.5	1	0	25.00	24.47	0.044	0.049	
							25	0	24.00	23.45	0.036	0.041	
				Right Touch	23095	707.5	1	0	25.00	24.47	0.114	0.129	
							25	0	24.00	23.45	0.094	0.106	
				Right Tilt (15°)	23095	707.5	1	0	25.00	24.47	0.035	0.040	
							25	0	24.00	23.45	0.029	0.033	
Body & Hotspot	QPSK	OFF	15	Rear	23095	707.5	1	0	25.00	24.47	0.106	0.120	
							25	0	24.00	23.45	0.088	0.100	
				Front	23095	707.5	1	0	25.00	24.47	0.117	0.132	20
							25	0	24.00	23.45	0.091	0.104	
Hotspot	QPSK	OFF	10	Rear	23095	707.5	1	0	25.00	24.47	0.160	0.181	
							25	0	24.00	23.45	0.133	0.151	
				Front	23095	707.5	1	0	25.00	24.47	0.187	0.211	
							25	0	24.00	23.45	0.147	0.167	
				Edge 2	23095	707.5	1	0	25.00	24.47	0.034	0.038	
							25	0	24.00	23.45	0.028	0.032	
				Edge 3	23095	707.5	1	0	25.00	24.47	0.063	0.071	
							25	0	24.00	23.45	0.049	0.056	
				Edge 4	23095	707.5	1	0	25.00	24.47	0.238	0.269	21
							25	0	24.00	23.45	0.196	0.222	

10.8. 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.

10.9. 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)		Plots No.
									Tune-up Limit	Meas.	Meas.	Scaled	
Head	QPSK	OFF	0	Left Touch	40620	2593.0	1	0	23.00	22.63	0.034	0.037	
							50	0	23.00	22.59	0.032	0.035	
				Left Tilt (15°)	40620	2593.0	1	0	23.00	22.63	0.020	0.022	
							50	0	23.00	22.59	0.016	0.018	
				Right Touch	40620	2593.0	1	0	23.00	22.63	0.040	0.044	22
							50	0	23.00	22.59	0.036	0.040	
				Right Tilt (15°)	40620	2593.0	1	0	23.00	22.63	0.005	0.005	
							50	0	23.00	22.59	0.003	0.004	
Body-worn	QPSK	OFF	15	Rear	40620	2593.0	1	0	23.00	22.63	0.143	0.156	
							50	0	23.00	22.59	0.135	0.148	
				Front	40620	2593.0	1	0	23.00	22.63	0.202	0.220	23
							50	0	23.00	22.59	0.195	0.214	
Hotspot	QPSK	OFF	10	Rear	40620	2593.0	1	0	23.00	22.63	0.244	0.266	
							50	0	23.00	22.59	0.232	0.255	
				Front	40620	2593.0	1	0	23.00	22.63	0.329	0.359	
							50	0	23.00	22.59	0.317	0.349	
				Edge 2	40620	2593.0	1	0	23.00	22.63	0.118	0.129	
							50	0	23.00	22.59	0.119	0.131	
				Edge 3	40620	2593.0	1	0	23.00	22.63	0.726	0.791	24
							50	0	23.00	22.59	0.687	0.756	
				Edge 4	40620	2593.0	1	0	23.00	22.63	0.067	0.073	
							50	0	23.00	22.59	0.060	0.066	

10.10. Wi-Fi (DTS Band)

RF Exposure Conditions	Mode	Antenna	Dist. (mm)	Test Position	Ch #.	Freq. (MHz)	Area Scan Max. SAR (W/kg)	Duty Cycle	Power (dBm)		1-g SAR (W/kg)		Plot No.
									Tune-up Limit	Meas.	Meas.	Scaled	
Head	802.11b 1 Mbps	Chain 0	0	Left Touch	6	2437	0.151	99.35%	13.50	12.40			
				Left Tilt	6	2437	0.239	99.35%	13.50	12.40			
				Right Touch	6	2437	0.503	99.35%	13.50	12.40	0.313	0.406	25
				Right Tilt	6	2437	0.405	99.35%	13.50	12.40	0.260	0.337	
Body-worn	802.11b 1 Mbps	Chain 0	15	Rear	6	2437	0.025	99.35%	13.50	12.40			
				Front	6	2437	0.039	99.35%	13.50	12.40	0.036	0.047	26
Hotspot	802.11b 1 Mbps	Chain 0	10	Rear	6	2437	0.052	99.35%	13.50	12.40			
				Front	6	2437	0.039	99.35%	13.50	12.40			
				Edge 1	6	2437	0.041	99.35%	13.50	12.40			
				Edge 4	6	2437	0.120	99.35%	13.50	12.40	0.074	0.096	27
Head	802.11b 1 Mbps	Chain 1	0	Left Touch	6	2437	0.127	99.35%	13.20	12.10	0.078	0.101	28
				Left Tilt	6	2437	0.027	99.35%	13.20	12.10			
				Right Touch	6	2437	0.110	99.35%	13.20	12.10			
				Right Tilt	6	2437	0.007	99.35%	13.20	12.10			
Body-worn	802.11b 1 Mbps	Chain 1	15	Rear	6	2437	0.003	99.35%	13.20	12.10			
				Front	6	2437	0.005	99.35%	13.20	12.10	0.002	0.002	29
Hotspot	802.11b 1 Mbps	Chain 1	10	Rear	6	2437	0.011	99.35%	13.20	12.10	0.006	0.008	30
				Front	6	2437	0.010	99.35%	13.20	12.10			
				Edge 2	6	2437	0.004	99.35%	13.20	12.10			

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.

10.11. 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)		Plots No.
									Tune-up Limit	Meas.	Meas.	Scaled	
Head	802.11a	Chain 0	0	Left Touch	48	5240	0.264	97.6%	12.50	11.00			
				Left Tilt	48	5240	0.260	97.6%	12.50	11.00			
				Right Touch	48	5240	0.834	97.6%	12.50	11.00	0.354	0.512	31
				Right Tilt	48	5240	0.562	97.6%	12.50	11.00	0.312	0.452	
Body-worn	802.11a	Chain 0	15	Rear	48	5240	0.049	97.6%	12.50	11.00	0.015	0.022	32
				Front	48	5240	0.047	97.6%	12.50	11.00			
Head	802.11a	Chain 1	0	Left Touch	52	5260	0.247	97.6%	12.00	10.85	0.107	0.143	33
				Left Tilt	52	5260	0.131	97.6%	12.00	10.85			
				Right Touch	52	5260	0.245	97.6%	12.00	10.85			
				Right Tilt	52	5260	0.053	97.6%	12.00	10.85			
Body	802.11a	Chain 1	15	Rear	52	5260	0.009	97.6%	12.00	10.85			
				Front	52	5260	0.016	97.6%	12.00	10.85	0.007	0.009	34
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)		Plots No.
									Tune-up Limit	Meas.	Meas.	Scaled	
Product Specific	802.11a	Chain 0	0	Rear	48	5240	0.549	97.6%	12.50	11.00			
				Front	48	5240	1.560	97.6%	12.50	11.00	0.207	0.300	35
				Edge 1	48	5240	0.912	97.6%	12.50	11.00			
				Edge 4	48	5240	0.783	97.6%	12.50	11.00			
Extremity	802.11a	Chain 1	0	Rear	52	5260	0.292	97.6%	12.00	10.85			
				Front	52	5260	0.667	97.6%	12.00	10.85	0.084	0.113	36
				Edge 2	52	5260	0.236	97.6%	12.00	10.85			

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)		Plots No.
									Tune-up Limit	Meas.	Meas.	Scaled	
Head	802.11ac VHT80	Chain 1	0	Left Touch	122	5610	0.341	97.6%	12.00	10.87			
				Left Tilt	122	5610	0.221	97.6%	12.00	10.87			
				Right Touch	122	5610	0.571	97.6%	12.00	10.87			
				Right Tilt	122	5610	0.632	97.6%	12.00	10.87	0.272	0.362	37
Body	802.11ac VHT80	Chain 1	15	Rear	122	5610	0.099	97.6%	12.00	10.87	0.028	0.037	38
				Front	122	5610	0.033	97.6%	12.00	10.87			
Head	802.11a	Chain 1	0	Left Touch	144	5720	0.389	97.6%	11.70	10.40	0.087	0.120	39
				Left Tilt	144	5720	0.069	97.6%	11.70	10.40			
				Right Touch	144	5720	0.099	97.6%	11.70	10.40			
				Right Tilt	144	5720	0.017	97.6%	11.70	10.40			
Body	802.11a	Chain 1	15	Rear	144	5720	0.018	97.6%	11.70	10.40	-	-	40
				Front	144	5720	0.007	97.6%	11.70	10.40			
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)		Plots No.
									Tune-up Limit	Meas.	Meas.	Scaled	
Product Specific	802.11ac VHT80	Chain 1	0	Rear	122	5610	0.800	97.6%	12.00	10.87			
				Front	122	5610	2.130	97.6%	12.00	10.87	0.253	0.336	41
				Edge 1	122	5610	0.407	97.6%	12.00	10.87			
				Edge 4	122	5610	1.470	97.6%	12.00	10.87			
Product Specific	802.11a	Chain 1	0	Rear	144	5720	0.535	97.6%	11.70	10.40			
				Front	144	5720	0.855	97.6%	11.70	10.40	0.085	0.117	42
				Edge 2	144	5720	0.336	97.6%	11.70	10.40			

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)		Plots No.
									Tune-up Limit	Meas.	Meas.	Scaled	
Head	802.11ac (VHT80)	Chain 0	0	Left Touch	155	5775	0.261	97.6%	10.10	8.45			
				Left Tilt	155	5775	0.253	97.6%	10.10	8.45			
				Right Touch	155	5775	0.642	97.6%	10.10	8.45	0.260	0.390	43
				Right Tilt	155	5775	0.574	97.6%	10.10	8.45			
Body	802.11ac (VHT80)	Chain 0	15	Rear	155	5775	0.094	97.6%	10.10	8.45	0.033	0.049	44
				Front	155	5775	0.034	97.6%	10.10	8.45			
Head	802.11ac (VHT80)	Chain 1	0	Left Touch	155	5775	0.179	97.6%	9.80	7.80	0.050	0.081	45
				Left Tilt	155	5775	0.033	97.6%	9.80	7.80			
				Right Touch	155	5775	0.118	97.6%	9.80	7.80			
				Right Tilt	155	5775	0.010	97.6%	9.80	7.80			
Body	802.11ac (VHT80)	Chain 1	15	Rear	155	5775	0.013	97.6%	9.80	7.80	-	-	46
				Front	155	5775	0.004	97.6%	9.80	7.80			
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)		Plots No.
									Tune-up Limit	Meas.	Meas.	Scaled	
Product Specific	802.11ac (VHT80)	Chain 0	0	Rear	155	5775	0.829	97.6%	10.10	8.45			
				Front	155	5775	1.160	97.6%	10.10	8.45	0.139	0.208	47
				Edge 1	155	5775	0.522	97.6%	10.10	8.45			
				Edge 4	155	5775	0.503	97.6%	10.10	8.45			
Product Specific	802.11ac (VHT80)	Chain 1	0	Rear	155	5775	0.223	97.6%	9.80	7.80			
				Front	155	5775	0.497	97.6%	9.80	7.80	0.032	0.052	48
				Edge 2	155	5775	0.217	97.6%	9.80	7.80			

10.12. Bluetooth

RF Exposure Conditions	Mode	Antenna	Dist. (mm)	Test Position	Ch #.	Freq. (MHz)	Duty Cycle	Power (dBm)		1-g SAR (W/kg)		Plots No.
								Tune-up Limit	Meas.	Meas.	Scaled	
Head	GFSK	Chain 0	0	Left Touch	39	2441	76.88%	10.90	9.73	0.041	0.070	
				Left Tilt	39	2441	76.88%	10.90	9.73	0.058	0.099	
				Right Touch	39	2441	76.88%	10.90	9.73	0.123	0.209	49
				Right Tilt	39	2441	76.88%	10.90	9.73	0.104	0.177	
Body-worn	GFSK	Chain 0	15	Rear	39	2441	76.88%	10.90	9.73	0.006	0.010	
				Front	39	2441	76.88%	10.90	9.73	0.013	0.022	50
Hotspot	GFSK	Chain 0	10	Rear	39	2441	76.88%	10.90	9.73	0.013	0.022	
				Front	39	2441	76.88%	10.90	9.73	0.023	0.039	
				Edge 1	39	2441	76.88%	10.90	9.73	0.012	0.020	
				Edge 4	39	2441	76.88%	10.90	9.73	0.039	0.066	51

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)	First Repeated	
						Measured SAR (W/kg)	Largest to Smallest SAR Ratio
700	LTE Band 12	Hotspot	Edge 4	No	0.238	N/A	N/A
850	GSM 850	Hotspot	Edge 4	No	0.279	N/A	N/A
1700	WCDMA Band IV	Hotspot	Front	No	0.280	N/A	N/A
	LTE Band 4	Hotspot	Front	No	0.328	N/A	N/A
1900	GSM 1900	Hotspot	Edge 3	No	0.224	N/A	N/A
	WCDMA Band II	Hotspot	Edge 3	No	0.708	N/A	N/A
	LTE Band 2	Hotspot	Edge 3	No	0.482	N/A	N/A
2400	Wi-Fi 802.11b/g/n	Head	Right Touch	No	0.313	N/A	N/A
2400	BT	Head	Right Touch	No	0.123	N/A	N/A
2600	LTE Band 41	Hotspot	Edge 3	No	0.726	N/A	N/A
5200	Wi-Fi 802.11a/n/ac	Head	Right Touch	No	0.354	N/A	N/A
5300	Wi-Fi 802.11a/n/ac	Head	Left Touch	No	0.107	N/A	N/A
5500	Wi-Fi 802.11a/n/ac	Head	Right Tilt	No	0.272	N/A	N/A
5800	Wi-Fi 802.11a/n/ac	Head	Right Touch	No	0.260	N/A	N/A

Note(s):

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

Frequency Band (MHz)	Air Interface	RF Exposure Conditions	Test Position	Repeated SAR (Yes/No)	Highest Measured SAR (W/kg)	First Repeated	
						Measured SAR (W/kg)	Largest to Smallest SAR Ratio
5200	Wi-Fi 802.11a/n/ac	Product specific	Front	No	0.207	N/A	N/A
5300	Wi-Fi 802.11a/n/ac	Product specific	Front	No	0.084	N/A	N/A
5500	Wi-Fi 802.11a/n/ac	Product specific	Front	No	0.253	N/A	N/A
5800	Wi-Fi 802.11a/n/ac	Product specific	Front	No	0.139	N/A	N/A

Note(s):

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

12. Simultaneous Transmission SAR Analysis

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

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

Where:

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	0.226	0.406	0.101	0.512	0.143	0.070	0.296	0.632	0.733	0.775	0.881	0.951	0.725	
	Left Tilt	0.089	0.406	0.101	0.512	0.143	0.099	0.188	0.495	0.596	0.638	0.744	0.843	0.754	
	Right Touch	0.163	0.406	0.101	0.512	0.143	0.209	0.372	0.569	0.670	0.712	0.818	1.027	0.864	
	Right Tilt	0.072	0.337	0.101	0.452	0.143	0.177	0.249	0.409	0.510	0.552	0.667	0.844	0.772	
Body-worn	Rear	0.184	0.047	0.002	0.049	0.009	0.010	0.194	0.231	0.233	0.240	0.242	0.252	0.068	
	Front	0.220	0.047	0.002	0.049	0.009	0.022	0.242	0.267	0.269	0.276	0.278	0.300	0.080	
Hotspot	Rear	0.339	0.096	0.008			0.022	0.361	0.435	0.443		0.339	0.361		
	Front	0.454	0.096	0.008			0.039	0.493	0.550	0.558		0.454	0.493		
	Edge 2	0.131	0.096	0.008			0.066	0.197	0.227	0.235					
	Edge 3	0.813	0.096	0.008			0.066	0.879	0.909	0.917					
	Edge 4	0.367	0.096	0.008			0.066	0.433	0.463	0.471					

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.

12132873-S1V2 Appendix A: SAR Setup Photos

12132873-S1V1 Appendix B: SAR System Check Plots

12132873-S1V1 Appendix C: Highest SAR Test Plots

12132873-S1V1 Appendix D: SAR Liquid Tissue Ingredients

12132873-S1V1 Appendix E: SAR Probe Calibration Certificates

12132873-S1V1 Appendix F: SAR Dipole Calibration Certificates

END OF REPORT