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: PY7-04685Z

Report Number: 12132753-S1V1
Issue Date: 5/7/2018

Prepared for
SONY MOBILE COMMUNICATIONS INC.
4-12-3 HIGASHI-SHINAGAWA
SHINAGAWA-KU,TOKYO, 140-0002, JAPAN

Prepared by
UL VERIFICATION SERVICES INC.
47173 BENICIA STREET
FREMONT, CA 94538, U.S.A.
TEL: (510) 771-1000
FAX: (510) 661-0888

NVLAP LAB CODE 200065-0

Revision History

Rev.	Date	Revisions	Revised By
V1	5/7/2018	Initial Issue	--

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. SAR Measurement System 7

4.2. SAR Scan Procedures 8

4.3. Test Equipment 10

5. Measurement Uncertainty 12

6. Device Under Test (DUT) Information 13

6.1. DUT Description 13

6.2. Wireless Technologies 14

6.3. General LTE SAR Test and Reporting Considerations 15

6.4. LTE (TDD) Considerations 17

6.5. LTE Carrier Aggregation 18

7. RF Exposure Conditions (Test Configurations) 19

8. Dielectric Property Measurements & System Check 20

8.1. Dielectric Property Measurements 20

8.2. System Check 23

9. Conducted Output Power Measurements 25

9.1. GSM 25

9.2. W-CDMA 28

9.3. LTE 33

9.4. LTE Carrier Aggregation 46

9.5. Wi-Fi 2.4GHz (DTS Band) 47

9.6. Wi-Fi 5GHz (U-NII Bands) 48

9.7. Bluetooth 50

10. Measured and Reported (Scaled) SAR Results 51

10.1. GSM850 53

10.2. GSM1900 53

10.3. W-CDMA Band II 54

10.4. W-CDMA Band IV 54

10.5. W-CDMA Band V 55

10.6. LTE Band 4 (20MHz Bandwidth) 55

10.7. LTE Band 5 (10MHz Bandwidth) 56
10.8. LTE Band 7 (20MHz Bandwidth) 57
10.9. LTE Band 13 (10MHz Bandwidth) 58
10.10. LTE Band 17 (10MHz Bandwidth) 59
10.11. LTE Band 41 (20MHz Bandwidth) 60
10.12. Wi-Fi (DTS Band) 61
10.13. Wi-Fi (U-NII Band) 62
10.14. Bluetooth 64

11. SAR Measurement Variability 65

12. Simultaneous Transmission SAR Analysis 66
12.1. Sum of the SAR for WWAN & Wi-Fi & BT 67

Appendixes 68
12132753-S1V1 Appendix A: SAR Setup Photos 68
12132753-S1V1 Appendix B: SAR System Check Plots 68
12132753-S1V1 Appendix C: Highest SAR Test Plots 68
12132753-S1V1 Appendix D: SAR Liquid Tissue Ingredients 68
12132753-S1V1 Appendix E: SAR Probe Calibration Certificates 68
12132753-S1V1 Appendix F: SAR Dipole Calibration Certificates 68

1. Attestation of Test Results

Applicant Name	SONY MOBILE COMMUNICATIONS INC.			
FCC ID	PY7-04685Z			
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	0.248	0.261	0.265	0.311
Body-worn	0.260	0.025	0.054	0.020
Hotspot/Wi-Fi Direct	0.673	0.061	N/A	0.051
Product specific 10g SAR	N/A	N/A	0.199	N/A
Simultaneous TX	0.877	0.736	0.877	0.877
Date Tested	4/23/2018 to 5/2/2018			
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.	Chakrit Thammanavarat 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

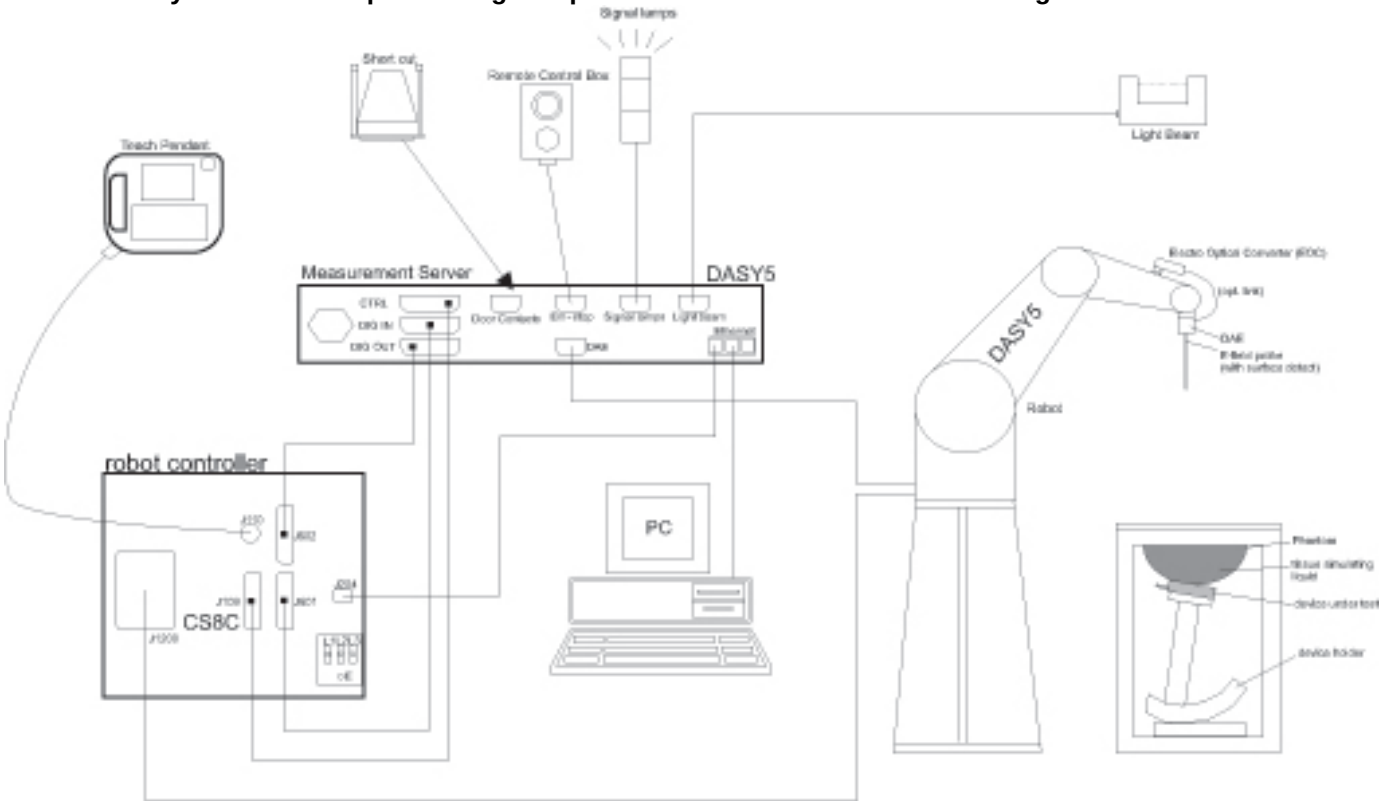
47173 Benicia Street	47266 Benicia Street
SAR Lab A	SAR Lab 1
SAR Lab B	SAR Lab 2
SAR Lab C	SAR Lab 3
SAR Lab D	SAR Lab 4
SAR Lab E	
SAR Lab F	
SAR Lab G	
SAR Lab H	

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	½·δ·ln(2) ± 0.5 mm
Maximum probe angle from probe axis to phantom surface normal at the measurement location	30° ± 1°	20° ± 1°
Maximum area scan spatial resolution: Δx_{Area}, Δy_{Area}	≤ 2 GHz: ≤ 15 mm 2 – 3 GHz: ≤ 12 mm	3 – 4 GHz: ≤ 12 mm 4 – 6 GHz: ≤ 10 mm
	When the x or y dimension of the test device, in the measurement plane orientation, is smaller than the above, the measurement resolution must be ≤ 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: Δx_{Zoom}, Δy_{Zoom}			≤ 2 GHz: ≤ 8 mm 2 – 3 GHz: ≤ 5 mm*	3 – 4 GHz: ≤ 5 mm* 4 – 6 GHz: ≤ 4 mm*
Maximum zoom scan spatial resolution, normal to phantom surface	uniform grid: $\Delta z_{Zoom}(n)$		≤ 5 mm	3 – 4 GHz: ≤ 4 mm 4 – 5 GHz: ≤ 3 mm 5 – 6 GHz: ≤ 2 mm
	graded grid	$\Delta z_{Zoom}(1)$: between 1st two points closest to phantom surface	≤ 4 mm	3 – 4 GHz: ≤ 3 mm 4 – 5 GHz: ≤ 2.5 mm 5 – 6 GHz: ≤ 2 mm
		$\Delta z_{Zoom}(n>1)$: between subsequent points	≤ 1.5·$\Delta z_{Zoom}(n-1)$	
Minimum zoom scan volume	x, y, z		≥ 30 mm	3 – 4 GHz: ≥ 28 mm 4 – 5 GHz: ≥ 25 mm 5 – 6 GHz: ≥ 22 mm

Note: δ is the penetration depth of a plane-wave at normal incidence to the tissue medium; see draft standard IEEE P1528-2011 for details.

* When zoom scan is required and the *reported* SAR from the *area scan based 1-g SAR estimation* 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	MY52200012	10/27/2018
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 D)	SPEAG	EX3DV4	7335	3/16/2019
E-Field Probe (SAR Lab E)	SPEAG	EX3DV4	3989	1/16/2019
E-Field Probe (SAR Lab F)	SPEAG	EX3DV4	3929	3/16/2019
E-Field Probe (SAR Lab G)	SPEAG	EX3DV4	3871	8/23/2018
E-Field Probe (SAR Lab H)	SPEAG	EX3DV4	7483	12/12/2018
Data Acquisition Electronics (SAR Lab A)	SPEAG	DAE4	1540	2/23/2019
Data Acquisition Electronics (SAR Lab B)	SPEAG	DAE4	1380	7/24/2018
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	D1750V2	1077	10/5/2018
System Validation Dipole	SPEAG	D1900V2	5d043	11/22/2018
System Validation Dipole	SPEAG	D2450V2	748	2/14/2019
System Validation Dipole	SPEAG	D2600V2	1036	3/16/2019
System Validation Dipole	SPEAG	D5GHzV2	1138	10/26/2018
System Validation Dipole	SPEAG	D5GHzV2	1003	3/13/2019

Other

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

5. Measurement Uncertainty

Per KDB 865664 D01 SAR Measurement 100 MHz to 6 GHz, when the highest measured 1-g SAR within a frequency band is < 1.5 W/kg and the measured 10-g SAR within a frequency band is < 3.75 W/kg. The expanded SAR measurement uncertainty must be ≤ 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** CB512FP159 / SAR GSM/UMTS / Conducted CB512FP19F / SAR LTE (LB/MB) / Conducted CB512FP16W / SAR LTE HB / Conducted CB512FP153 / WLAN – 2.4GHz / Conducted CB512FP17D / WLAN – 5GHz / Conducted CB512FPOJE / SAR LB GSM/UMTS #1 / Radiated CB512FPOZU / SAR LB GSM/UMTS #2 / Radiated CB512FP11J / SAR MB GSM/UMTS #1 / Radiated CB512FP0ZJ / SAR MB GSM/UMTS #2 / Radiated CB512FPOJ8 / SAR LTE LB #1 / Radiated CB512FP124 / SAR LTE LB #2 / Radiated CB512FPOEP / SAR LTE MB #1 / Radiated CB512FP0ZG / SAR LTE MB #2 / Radiated CB512FP11X / SAR LTE HB #1 / Radiated CB512FP0Z7 / SAR LTE HB #2 / Radiated CB512FP0E0 / SAR WLAN 2.4GHz # 1 / Radiated CB512FP0ZK / SAR WLAN 2.4GHz # 2 / Radiated CB512FP0DH / SAR WLAN 2.4GHz # 3 / Radiated CB512FP0CD / SAR WLAN 5GHz # 1 / Radiated CB512FP120 / SAR WLAN 5GHz # 2 / Radiated
Hardware Version	A
Software Version	0.271

6.2. Wireless Technologies

<table>
<tr><th>Wireless technologies</th><th>Frequency bands</th><th colspan="2">Operating mode</th><th>Duty Cycle used for SAR testing</th></tr>
<tr><td rowspan="2">GSM</td><td>850
1900</td><td>Voice (GMSK)
GPRS (GMSK)
EGPRS (8PSK)</td><td>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</td><td>GSM Voice: 12.5%
(E)GPRS: 1 Slot: 12.5%
2 Slots: 25%
3 Slots: 37.5%
4 Slots: 50%</td></tr>
<tr><td colspan="4">Does this device support DTM (Dual Transfer Mode)? ☒ Yes ☐ No</td></tr>
<tr><td>W-CDMA (UMTS)</td><td>Band II
Band IV
Band V</td><td colspan="2">UMTS Rel. 99 (Voice & Data)
HSDPA (Rel. 5)
HSUPA (Rel. 6)</td><td>100%</td></tr>
<tr><td rowspan="2">LTE</td><td>FDD Band 4
FDD Band 5
FDD Band 7
FDD Band 13
FDD Band 17
TDD Band 41</td><td colspan="2">QPSK
16QAM
64QAM
Rel. 12 Carrier Aggregation (1 Uplink and 2 Downlinks)</td><td>100% (FDD)
63.3% (TDD) [2] Refer to §6.4.</td></tr>
<tr><td colspan="4">Does this device support SV-LTE (1xRTT-LTE)? ☐ Yes ☒ No</td></tr>
<tr><td rowspan="4">Wi-Fi</td><td>2.4 GHz [1]</td><td colspan="2">802.11b
802.11g
802.11n (HT20)</td><td><table><tr><th>Duty Cycle</th><th>Duty Factor</th><th>Mode</th></tr><tr><td>99.35%</td><td>1.007</td><td>802.11b</td></tr><tr><td>98.25%</td><td>1.018</td><td>802.11g</td></tr><tr><td>97.40%</td><td>1.027</td><td>802.11n 20MHz BW</td></tr></table></td></tr>
<tr><td>5 GHz [1]</td><td colspan="2">802.11a
802.11n (HT20)
802.11n (HT40)
802.11ac (VHT20)
802.11ac (VHT40)
802.11ac (VHT80)</td><td><table><tr><th>Duty Cycle</th><th>Duty Factor</th><th>Mode</th></tr><tr><td>98.21%</td><td>1.018</td><td>802.11a</td></tr><tr><td>97.78%</td><td>1.023</td><td>802.11n/ac 20MHz BW</td></tr><tr><td>92.95%</td><td>1.076</td><td>802.11n/ac 40MHz BW</td></tr><tr><td>86.69%</td><td>1.154</td><td>802.11ac 80MHz BW</td></tr></table></td></tr>
<tr><td colspan="4">Does this device support bands 5.60 ~ 5.65 GHz? ☒ Yes ☐ No</td></tr>
<tr><td colspan="4">Does this device support Band gap channel(s)? ☒ Yes ☐ No</td></tr>
<tr><td>Bluetooth</td><td>2.4 GHz</td><td colspan="2">Version 5.0 LE</td><td><table><tr><th>Duty Cycle</th><th>Duty Factor</th><th>Mode</th></tr><tr><td>76.96%</td><td>1.299</td><td>DH5</td></tr></table></td></tr>
</table>

Notes:

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

6.3. General LTE SAR Test and Reporting Considerations

Item	Description						
Frequency range, Channel Bandwidth, Numbers and Frequencies	Band 4	Frequency range: 1710 - 1755 MHz					
		Channel Bandwidth					
		20 MHz	15 MHz	10 MHz	5 MHz	3 MHz	1.4 MHz
	Low	20050/ 1720	20025/ 1717.5	20000/ 1715	19975/ 1712.5	19965/ 1711.5	19957/ 1710.7
	Mid	20175/ 1732.5	20175/ 1732.5	20175/ 1732.5	20175/ 1732.5	20175/ 1732.5	20175/ 1732.5
	High	20300/ 1745	20325/ 1747.5	20350/ 1750	20375/ 1752.5	20385/ 1753.5	20393/ 1754.3
	Band 5	Frequency range: 824 - 849 MHz					
		Channel Bandwidth					
		20 MHz	15 MHz	10 MHz	5 MHz	3 MHz	1.4 MHz
	Low			20450/ 829	20425/ 826.5	20415/ 825.5	20407/ 824.7
	Mid			20525/ 836.5	20525/ 836.5	20525/ 836.5	20525/ 836.5
	High			20600/ 844	20625/ 846.5	20635/ 847.5	20643/ 848.3
	Band 7	Frequency range: 2500 - 2570 MHz					
		Channel Bandwidth					
		20 MHz	15 MHz	10 MHz	5 MHz	3 MHz	1.4 MHz
	Low	20850 2510	20825 2507.5	20800 2505	20775 2502.5		
	Mid	21100 2535	21100 2535	21100 2535	21100 2535		
	High	21350 2560	21375 2562.5	21400 2565	21425 2567.5		
	Band 13	Frequency range: 777 - 787 MHz					
		Channel Bandwidth					
		20 MHz	15 MHz	10 MHz	5 MHz	3 MHz	1.4 MHz
	Low				23205/ 779.5		
	Mid			23230/ 782	23230/ 782		
	High				23255/ 784.5		
	Band 17	Frequency range: 704 - 716 MHz					
		Channel Bandwidth					
		20 MHz	15 MHz	10 MHz	5 MHz	3 MHz	1.4 MHz
	Low			23780/ 709	23755/ 706.5		
	Mid			23790/ 710	23790/ 710		
	High			23800/ 711	23825/ 713.5		
	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** 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
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.

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

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

Example for Calculated Duty Cycle for Uplink-Downlink Configuration 0:
Calculated Duty Cycle = 5120 x [1/(15000 x 2048)] x 2 + 6 ms = 63.33%
where
T_s = 1/(15000 x 2048) seconds

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

6.5. LTE Carrier Aggregation

Combination	CA configuration	Bandwidth (MHz)											
		PCC						SCC1					
		20	15	10	5	3	1.4	20	15	10	5	3	1.4
Intra-Band Contiguous	41C				√			√					
				√				√					
			√					√	√				
		√						√	√	√	√		

Note(s):

For supported channels, please refer to §6.3

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:

1. SAR is not required because the distance from the antenna to the edge is > 25 mm as per KDB 941225 D06 Hot Spot SAR.
2. 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.
3. 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.
4. 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 ± 2°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 (εr) and conductivity (σ) of typical tissue-equivalent media recipes are expected to be within ± 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 εr and σ may be relaxed to ± 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 (εr)			Conductivity (σ)		
					Measured	Target	Delta (%)	Measured	Target	Delta (%)
A	4/23/2018	1900	Head	1900	38.27	40.00	-4.32	1.41	1.40	0.50
				1850	38.55	40.00	-3.63	1.37	1.40	-2.50
				1980	37.98	40.00	-5.05	1.50	1.40	7.07
A	4/23/2018	1900	Body	1900	55.30	53.30	3.75	1.49	1.52	-1.84
				1850	55.33	53.30	3.81	1.46	1.52	-3.95
				1920	55.14	53.30	3.45	1.51	1.52	-0.79
B	4/23/2018	2600	Head	2600	37.55	39.01	-3.74	2.06	1.96	4.99
				2495	38.04	39.14	-2.82	1.93	1.85	4.62
				2690	37.18	38.90	-4.41	2.16	2.06	4.88
B	4/23/2018	2600	Body	2600	52.68	52.51	0.32	2.21	2.16	2.05
				2495	53.02	52.64	0.72	2.08	2.01	3.22
				2690	52.44	52.40	0.08	2.31	2.29	0.95
D	4/25/2018	750	Head	750	41.89	41.96	-0.17	0.94	0.89	5.40
				695	42.52	42.24	0.65	0.87	0.89	-2.00
				790	41.43	41.76	-0.78	0.97	0.90	8.47
D	4/30/2018	750	Body	750	54.14	55.55	-2.53	1.02	0.96	5.70
				695	54.73	55.76	-1.84	0.96	0.96	0.13
				790	53.52	55.39	-3.38	1.05	0.97	9.09
E	4/23/2018	835	Head	835	41.52	41.50	0.05	0.89	0.90	-1.49
				805	42.08	41.68	0.96	0.86	0.90	-3.65
				920	40.53	41.49	-2.32	0.97	0.98	-0.97
E	4/23/2018	835	Body	835	53.58	55.20	-2.93	1.01	0.97	4.23
				805	53.86	55.33	-2.66	0.97	0.97	0.31
				905	52.67	55.00	-4.24	1.07	1.05	1.76
F	4/23/2018	2450	Head	2450	38.42	39.20	-1.99	1.74	1.80	-3.17
				2400	38.50	39.30	-2.03	1.69	1.75	-3.29
				2480	38.31	39.16	-2.18	1.76	1.83	-3.90
F	4/25/2018	2450	Body	2450	51.38	52.70	-2.50	2.04	1.95	4.41
				2400	51.50	52.77	-2.41	1.94	1.90	2.05
				2480	51.34	52.66	-2.51	2.07	1.99	3.76
F	4/27/2018	2450	Head	2450	41.49	39.20	5.84	1.89	1.80	5.11
				2400	41.62	39.30	5.91	1.84	1.75	5.10
				2480	41.36	39.16	5.61	1.92	1.83	4.89

SAR Lab	Date	Band (MHz)	Tissue Type	Frequency (MHz)	Relative Permittivity (εr)			Conductivity (σ)		
					Measured	Target	Delta (%)	Measured	Target	Delta (%)
G	4/23/2018	1750	Head	1750	38.66	40.08	-3.55	1.39	1.37	1.76
				1710	38.80	40.15	-3.35	1.36	1.35	0.86
				1800	38.63	40.00	-3.42	1.42	1.40	1.43
G	4/23/2018	1750	Body	1750	52.01	53.44	-2.68	1.50	1.49	1.00
				1710	52.11	53.54	-2.68	1.46	1.46	-0.38
				1800	52.04	53.30	-2.36	1.54	1.52	1.05
G	4/26/2018	5200	Body	5200	50.29	49.02	2.59	5.30	5.29	0.10
				5150	50.15	49.09	2.16	5.29	5.24	1.04
				5350	49.81	48.82	2.04	5.55	5.47	1.40
G	4/30/2018	5250	Body	5250	47.97	48.95	-2.01	5.37	5.35	0.37
				5150	48.33	49.09	-1.54	5.29	5.24	1.04
				5350	47.89	48.82	-1.90	5.50	5.47	0.50
G	4/30/2018	5600	Body	5600	47.31	48.48	-2.41	5.88	5.76	1.98
				5500	47.57	48.61	-2.15	5.72	5.64	1.39
				5725	47.07	48.31	-2.56	6.09	5.91	3.03
G	4/30/2018	5750	Body	5750	46.99	48.27	-2.66	6.09	5.94	2.66
				5700	47.14	48.34	-2.49	6.10	5.88	3.84
				5850	46.91	48.20	-2.68	6.27	6.00	4.43
G	5/1/2018	5600	Head	5600	36.86	35.53	3.73	4.89	5.06	-3.36
				5500	37.03	35.65	3.88	4.79	4.96	-3.43
				5725	36.71	35.39	3.73	5.05	5.19	-2.59
G	5/1/2018	5800	Head	5800	36.51	35.30	3.43	5.12	5.27	-2.92
				5700	36.66	35.42	3.50	5.02	5.16	-2.74
				5850	36.51	35.30	3.43	5.19	5.27	-1.56
H	4/25/2018	5200	Head	5250	36.32	35.93	1.08	4.56	4.70	-3.11
				5150	36.22	36.05	0.48	4.46	4.60	-3.13
				5350	36.09	35.82	0.76	4.70	4.80	-2.19
H	4/25/2018	5600	Head	5600	35.66	35.53	0.35	4.90	5.06	-3.27
				5500	35.94	35.65	0.82	4.82	4.96	-2.76
				5725	35.55	35.39	0.45	5.03	5.19	-3.11
H	4/25/2018	5800	Head	5800	35.57	35.30	0.76	5.06	5.27	-4.08
				5700	35.51	35.42	0.25	4.98	5.16	-3.54
				5850	35.35	35.30	0.14	5.11	5.27	-2.98

8.2. System Check

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

System Performance Check Measurement Conditions:

- The measurements were performed in the flat section of the TWIN SAM or ELI phantom, shell thickness: 2.0 ±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	4/23/2018	Head	D1900V2 SN:5d043	11/22/2018	4.170	41.70	42.99	-3.00	2.170	21.70	22.17	-2.12	1,2
A	4/23/2018	Body	D1900V2 SN:5d043	11/22/2018	4.160	41.60	41.00	1.46	2.200	22.00	20.90	5.26	
B	4/23/2018	Head	D2600V2 SN:1036	3/16/2019	5.300	53.00	54.54	-2.82	2.280	22.80	24.56	-7.17	
B	4/23/2018	Body	D2600V2 SN:1036	3/16/2019	5.800	58.00	56.13	3.33	2.520	25.20	25.04	0.64	3,4
D	4/25/2018	Head	D750V3 SN:1071	11/21/2018	0.936	9.36	8.59	8.96	0.616	6.16	5.73	7.50	5,6
D	4/30/2018	Body	D750V3 SN:1071	11/21/2018	0.920	9.20	8.52	7.98	0.616	6.16	5.69	8.26	
E	4/23/2018	Head	D835V2 SN:4d142	10/12/2018	0.938	9.38	9.64	-2.70	0.616	6.16	6.22	-0.96	
E	4/23/2018	Body	D835V2 SN:4d142	10/12/2018	0.995	9.95	9.63	3.32	0.655	6.55	6.27	4.47	7,8
F	4/23/2018	Head	D2450V2 SN:748	2/14/2019	5.290	52.90	52.94	-0.08	2.370	23.70	24.60	-3.66	
F	4/25/2018	Body	D2450V2 SN:748	2/14/2019	5.340	53.40	50.95	4.81	2.420	24.20	23.80	1.68	9,10
F	4/27/2018	Head	D2450V2 SN:748	2/14/2019	5.480	54.80	52.94	3.51	2.480	24.80	24.60	0.81	
G	4/23/2018	Head	D1750V2 SN:1077	10/5/2018	3.600	36.00	36.26	-0.72	1.930	19.30	19.34	-0.21	
G	4/23/2018	Body	D1750V2 SN:1077	10/5/2018	3.570	35.70	37.34	-4.39	1.900	19.00	19.98	-4.90	11,12
G	4/26/2018	Body	D5GHzV2 SN:1138 (5.2 GHz)	10/26/2018	7.670	76.70	73.40	4.50	2.180	21.80	20.60	5.83	
G	4/30/2018	Body	D5GHzV2 SN:1003 (5.25 GHz)	3/13/2019	7.060	70.60	73.60	-4.08	1.980	19.80	20.50	-3.41	
G	4/30/2018	Body	D5GHzV2 SN:1003 (5.60 GHz)	3/13/2019	8.100	81.00	77.70	4.25	2.260	22.60	21.70	4.15	13,14
G	4/30/2018	Body	D5GHzV2 SN:1003 (5.75 GHz)	3/13/2019	7.590	75.90	73.90	2.71	2.100	21.00	20.60	1.94	
G	5/1/2018	Head	D5GHzV2 SN:1138 (5.6 GHz)	10/26/2018	8.080	80.80	83.20	-2.88	2.300	23.00	23.70	-2.95	
G	5/1/2018	Head	D5GHzV2 SN:1138 (5.8 GHz)	10/26/2018	7.400	74.00	79.70	-7.15	2.050	20.50	22.70	-9.69	15,16
H	4/25/2018	Head	D5GHzV2 SN:1138 (5.2 GHz)	10/26/2018	7.230	72.30	77.70	-6.95	2.080	20.80	22.20	-6.31	
H	4/25/2018	Head	D5GHzV2 SN:1138 (5.6 GHz)	10/26/2018	7.940	79.40	83.20	-4.57	2.230	22.30	23.70	-5.91	
H	4/25/2018	Head	D5GHzV2 SN:1138 (5.8 GHz)	10/26/2018	7.360	73.60	79.70	-7.65	2.090	20.90	22.70	-7.93	17,18

9. Conducted Output Power Measurements

9.1. GSM

Per KDB 941225 D01 3G SAR Procedures:

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

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

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

Per October 2013 TCB Workshop:
When the maximum frame-averaged powers levels are within 0.25 dB of each other, test the configuration with the most number of time slots.

GSM850 Measured Results

Mode	Coding Scheme	Time Slots	Ch No.	Freq. (MHz)	Maximum Average Power (dBm)			
					Measured		Tune-up Limit	
					Burst Pwr	Frame Pwr	Burst Pwr	Frame Pwr
GSM/ GPRS	CS1	1	128	824.2	32.80	23.77	33.20	24.17
			190	836.6	32.80	23.77		
			251	848.8	32.80	23.77		
GPRS/EDGE (GMSK)	CS1	2	128	824.2	30.80	24.78	31.20	25.18
			190	836.6	30.80	24.78		
			251	848.8	30.80	24.78		
		3	128	824.2	28.70	24.44	29.20	24.94
			190	836.6	28.60	24.34		
			251	848.8	28.80	24.54		
		4	128	824.2	27.80	24.79	28.20	**25.19**
			190	836.6	27.80	24.79		
			251	848.8	27.70	24.69		
EDGE (8PSK)	MCS5	1	128	824.2	27.00	17.97	28.00	18.97
			190	836.6	27.00	17.97		
			251	848.8	27.00	17.97		
		2	128	824.2	25.80	19.78	26.50	20.48
			190	836.6	25.80	19.78		
			251	848.8	25.70	19.68		
		3	128	824.2	23.70	19.44	24.50	20.24
			190	836.6	23.70	19.44		
			251	848.8	23.60	19.34		
		4	128	824.2	22.50	19.49	23.50	20.49
			190	836.6	22.40	19.39		
			251	848.8	22.40	19.39		

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 ≤ 1/4dB higher than GMSK GPRS or the adjusted SAR of the highest reported SAR of GMSK GPRS is ≤ 1.2W/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	28.00	18.97	28.70	19.67
			661	1880.0	28.40	19.37		
			810	1909.8	28.20	19.17		
GPRS/EDGE (GMSK)	CS1	2	512	1850.2	26.00	19.98	26.70	20.68
			661	1880.0	26.30	20.28		
			810	1909.8	26.20	20.18		
		3	512	1850.2	23.90	19.64	24.70	20.44
			661	1880.0	24.30	20.04		
			810	1909.8	24.10	19.84		
		4	512	1850.2	22.90	19.89	23.70	**20.69**
			661	1880.0	23.10	20.09		
			810	1909.8	22.90	19.89		
EDGE (8PSK)	MCS5	1	512	1850.2	25.10	16.07	27.00	17.97
			661	1880.0	25.50	16.47		
			810	1909.8	25.40	16.37		
		2	512	1850.2	24.30	18.28	25.50	19.48
			661	1880.0	24.70	18.68		
			810	1909.8	24.60	18.58		
		3	512	1850.2	22.10	17.84	23.50	19.24
			661	1880.0	22.50	18.24		
			810	1909.8	22.50	18.24		
		4	512	1850.2	21.10	18.09	22.50	19.49
			661	1880.0	21.40	18.39		
			810	1909.8	21.30	18.29		

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

GSM850 DTM Measured Results

Mode	Coding Scheme	Time Slots	Ch No.	Freq. (MHz)	Maximum Average Power (dBm)							
					Measured				Tune-up Limit			
					CS Burst Pwr	PS Burst Pwr	CS Frame Pwr	PS Frame Pwr	CS Burst Pwr	PS Burst Pwr	CS Frame Pwr	PS Frame Pwr
GSM (Voice) + GPRS/EDGE (GMSK)	CS1	1	128	824.2	32.80		23.77		33.20		24.17	
			190	836.6	32.80		23.77					
			251	848.8	32.80		23.77					
		2	128	824.2	30.60	30.80	24.58	24.78	31.20	31.20	25.18	25.18
			190	836.6	30.60	30.70	24.58	24.68				
			251	848.8	30.50	30.60	24.48	24.58				
		3	128	824.2	28.30	28.50	24.04	24.24	29.20	29.20	24.94	24.94
			190	836.6	28.20	28.50	23.94	24.24				
			251	848.8	28.40	28.70	24.14	24.44				
GSM (Voice) + EDGE (8PSK)	MCS5	1	128	824.2	32.80		23.77		33.20		24.17	
			190	836.6	32.80		23.77					
			251	848.8	32.80		23.77					
		2	128	824.2	30.60	25.60	24.58	19.58	31.20	26.50	25.18	20.48
			190	836.6	30.50	25.50	24.48	19.48				
			251	848.8	30.50	25.40	24.48	19.38				
		3	128	824.2	28.50	23.60	24.24	19.34	29.20	24.50	24.94	20.24
			190	836.6	28.50	23.70	24.24	19.44				
			251	848.8	28.30	23.70	24.04	19.44				

Notes:

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

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

GSM1900 DTM Measured Results

Mode	Coding Scheme	Time Slots	Ch No.	Freq. (MHz)	Maximum Average Power (dBm)							
					Measured				Tune-up Limit			
					CS Burst Pwr	PS Burst Pwr	CS Frame Pwr	PS Frame Pwr	CS Burst Pwr	PS Burst Pwr	CS Frame Pwr	PS Frame Pwr
GSM (Voice) + GPRS/EDGE (GMSK)	CS1	1	512	1850.2	28.00		18.97		28.70		19.67	
			661	1880.0	28.40		19.37					
			810	1909.8	28.20		19.17					
		2	512	1850.2	25.70	25.80	19.68	19.78	26.70	26.70	20.68	20.68
			661	1880.0	26.10	26.20	20.08	20.18				
			810	1909.8	26.10	26.30	20.08	20.28				
		3	512	1850.2	23.60	23.70	19.34	19.44	24.70	24.70	20.44	20.44
			661	1880.0	24.10	24.30	19.84	20.04				
			810	1909.8	24.10	24.20	19.84	19.94				
GSM (Voice) + EDGE (8PSK)	MCS5	1	512	1850.2	28.00		18.97		28.70		19.67	
			661	1880.0	28.40		19.37					
			810	1909.8	28.20		19.17					
		2	512	1850.2	25.60	24.20	19.58	18.18	26.70	25.50	20.68	19.48
			661	1880.0	26.20	24.90	20.18	18.88				
			810	1909.8	26.10	24.90	20.08	18.88				
		3	512	1850.2	23.50	22.20	19.24	17.94	24.70	23.50	20.44	19.24
			661	1880.0	24.00	22.60	19.74	18.34				
			810	1909.8	24.00	22.70	19.74	18.44				

Notes:

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

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

9.2. W-CDMA

Release 99 Setup Procedures used to establish the test signals

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

Mode	Subtest	Rel99
WCDMA General Settings	Loopback Mode	Test Mode 2
	Rel99 RMC	12.2kbps RMC
	Power Control Algorithm	Algorithm2
	βc/βd	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			
	βc	2/15	11/15	15/15	15/15
	βd	15/15	15/15	8/15	4/15
	Bd (SF)	64			
	βc/βd	2/15	11/15	15/8	15/4
	βhs	4/15	24/15	30/15	30/15
	MPR (dB)	0	0	0.5	0.5
HSDPA Specific Settings	D_{ACK}	8			
	D_{NAK}	8			
	DCQI	8			
	Ack-Nack repetition factor	3			
	CQI Feedback (Table 5.2B.4)	4ms			
	CQI Repetition Factor (Table 5.2B.4)	2			
	Ahs=βhs/βc	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
	βc	11/15	6/15	15/15	2/15	15/15
	βd	15/15	15/15	9/15	15/15	0
	βec	209/225	12/15	30/15	2/15	5/15
	βc/βd	11/15	6/15	15/9	2/15	-
	βhs	22/15	12/15	30/15	4/15	5/15
	βed	1309/225	94/75	47/15	56/75	47/15
	CM (dB)	1	3	2	3	1
	MPR (dB)	0	2	1	2	0
HSDPA Specific Settings	DACK	8				0
	DNAK	8				0
	DCQI	8				0
	Ack-Nack repetition factor	3				
	CQI Feedback (Table 5.2B.4)	4ms				
	CQI Repetition Factor (Table 5.2B.4)	2				
	Ahs = βhs/βc	30/15				
HSUPA Specific Settings	E-DPDCCH	6	8	8	5	0
	DHARQ	0	0	0	0	0
	AG Index	20	12	15	17	12
	ETFCI (from 34.121 Table C.11.1.3)	75	67	92	71	67
	Associated Max UL Data Rate kbps	242.1	174.9	482.8	205.8	308.9
	Reference E-TFCIs	5	5	2	5	1
	Reference E-TFCI	11	11	11	11	67
	Reference E-TFCI PO	4	4	4	4	18
	Reference E-TFCI	67	67	92	67	67
	Reference E-TFCI PO	18	18	18	18	18
	Reference E-TFCI	71	71	71	71	71
	Reference E-TFCI PO	23	23	23	23	23
	Reference E-TFCI	75	75	75	75	75
	Reference E-TFCI PO	26	26	26	26	26
	Reference E-TFCI	81	81	81	81	81
	Reference E-TFCI PO	27	27	27	27	27
	Maximum Channelization Codes	2xSF2				SF4

W-CDMA Band II Measured Results

Mode		UL Ch No.	Freq. (MHz)	Maximum Average Power (dBm)		
				Measured Pwr	MPR	Tune-up Limit
Release 99	Rel 99 (RMC, 12.2 kbps)	9262	1852.4	22.10	N/A	22.70
		9400	1880.0	22.30		
		9538	1907.6	22.40		
HSDPA	Subtest 1	9262	1852.4	21.00	0	22.00
		9400	1880.0	21.30		
		9538	1907.6	21.30		
	Subtest 2	9262	1852.4	21.00	0	22.00
		9400	1880.0	20.70		
		9538	1907.6	20.80		
	Subtest 3	9262	1852.4	19.70	0.5	21.50
		9400	1880.0	19.90		
		9538	1907.6	19.80		
	Subtest 4	9262	1852.4	19.70	0.5	21.50
		9400	1880.0	20.00		
		9538	1907.6	20.30		
HSUPA	Subtest 1	9262	1852.4	21.10	0	22.00
		9400	1880.0	21.40		
		9538	1907.6	21.40		
	Subtest 2	9262	1852.4	19.10	2	20.00
		9400	1880.0	19.40		
		9538	1907.6	19.40		
	Subtest 3	9262	1852.4	20.10	1	21.00
		9400	1880.0	20.40		
		9538	1907.6	20.40		
	Subtest 4	9262	1852.4	19.10	2	20.00
		9400	1880.0	19.40		
		9538	1907.6	19.40		
	Subtest 5	9262	1852.4	21.10	0	22.00
		9400	1880.0	21.40		
		9538	1907.6	21.40		

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	24.20	N/A	24.70
		1413	1732.6	24.30		
		1513	1752.6	24.30		
HSDPA	Subtest 1	1312	1712.4	23.20	0	24.00
		1413	1732.6	23.20		
		1513	1752.6	23.30		
	Subtest 2	1312	1712.4	23.20	0	24.00
		1413	1732.6	23.30		
		1513	1752.6	23.30		
	Subtest 3	1312	1712.4	23.20	0.5	23.50
		1413	1732.6	23.30		
		1513	1752.6	23.30		
	Subtest 4	1312	1712.4	23.20	0.5	23.50
		1413	1732.6	23.30		
		1513	1752.6	23.20		
HSUPA	Subtest 1	1312	1712.4	23.20	0	24.00
		1413	1732.6	23.30		
		1513	1752.6	23.30		
	Subtest 2	1312	1712.4	21.20	2	22.00
		1413	1732.6	21.30		
		1513	1752.6	21.30		
	Subtest 3	1312	1712.4	22.20	1	23.00
		1413	1732.6	22.30		
		1513	1752.6	22.30		
	Subtest 4	1312	1712.4	21.20	2	22.00
		1413	1732.6	21.30		
		1513	1752.6	21.20		
	Subtest 5	1312	1712.4	23.20	0	24.00
		1413	1732.6	23.30		
		1513	1752.6	23.30		

W-CDMA Band V Measured Results

Mode		UL Ch No.	Freq. (MHz)	Maximum Average Power (dBm)		
				Measured Pwr	MPR	Tune-up Limit
Release 99	Rel 99 (RMC, 12.2 kbps)	4132	826.4	24.50	N/A	24.90
		4183	836.6	24.40		
		4233	846.6	24.40		
HSDPA	Subtest 1	4132	826.4	23.00	0	24.20
		4183	836.6	22.90		
		4233	846.6	22.90		
	Subtest 2	4132	826.4	22.60	0	24.20
		4183	836.6	22.50		
		4233	846.6	22.40		
	Subtest 3	4132	826.4	23.00	0.5	23.70
		4183	836.6	23.00		
		4233	846.6	22.90		
	Subtest 4	4132	826.4	23.00	0.5	23.70
		4183	836.6	22.90		
		4233	846.6	22.90		
HSUPA	Subtest 1	4132	826.4	23.50	0	24.20
		4183	836.6	23.40		
		4233	846.6	23.30		
	Subtest 2	4132	826.4	21.50	2	22.20
		4183	836.6	21.40		
		4233	846.6	21.40		
	Subtest 3	4132	826.4	22.50	1	23.20
		4183	836.6	22.40		
		4233	846.6	22.40		
	Subtest 4	4132	826.4	21.50	2	22.20
		4183	836.6	21.40		
		4233	846.6	21.30		
	Subtest 5	4132	826.4	23.50	0	24.20
		4183	836.6	23.50		
		4233	846.6	23.40		

9.3. LTE

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

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

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

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

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

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

Network Signalling value	Requirements (subclause)	E-UTRA Band	Channel bandwidth (MHz)	Resources Blocks (N_{RB})	A-MPR (dB)
NS_01	6.6.2.1.1	Table 5.5-1	1.4, 3, 5, 10, 15, 20	Table 5.6-1	N/A
NS_03	6.6.2.2.1	2, 4,10, 23, 25, 35, 36, 66, 70	3	>5	≤ 1
			5	>6	≤ 1
			10	>6	≤ 1
			15	>8	≤ 1
			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 (NOTE1)	≤ 1 (NOTE1)
			15, 20	Table 6.2.4-18 (NOTE2)	
		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 6.6.3.3.2	13	10	Table 6.2.4-2	
NS_08	6.6.3.3.3	19	10, 15	> 44	≤ 3
NS_09	6.6.3.3.4	21	10, 15	> 40	≤ 1
				> 55	≤ 2
NS_10		20	15, 20	Table 6.2.4-3	
NS_11	6.6.2.2.1 6.6.3.3.13	23	1.4, 3, 5, 10, 15, 20	Table 6.2.4-5	
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 6.6.2.2.1 6.6.3.3.14	23	5, 10, 15, 20	Table 6.2.4-15	
NS_21	6.6.2.2.1 6.6.3.3.15	30	5, 10	Table 6.2.4-16	
NS_22	6.6.3.3.16	42, 43	5, 10, 15, 20	Table 6.2.4-17	
NS_23	6.6.3.3.17	42, 43	5, 10, 15, 20	N/A	
NS_24	6.6.3.3.20	65 (NOTE 4)	5, 10, 15, 20	Table 6.2.4-19	
NS_25	6.6.3.3.21	65 (NOTE 4)	5, 10, 15, 20	Table 6.2.4-20	
NS_26	6.6.3.3.22	68	10, 15	Table 6.2.4-21	
NS_27	6.6.2.2.5, 6.6.3.3.23	48	5, 10, 15, 20	Table 6.2.4-22	
NS_28	6.2.2A, 6.6.3.3.24	46 (NOTE 5)	20	Table 6.2.4-23	
NS_29	6.2.2A, 6.6.2.3.1a, 6.6.3.3.25	46 (NOTE 5)	20	Table 6.2.4-24	
NS_30	6.2.2A, 6.6.3.3.26	46 (NOTE 5)	20	Table 6.2.4-25	
NS_31	6.2.2A, 6.6.3.3.27	46 (NOTE 5)	20	Table 6.2.4-26	
NS_32	-	-	-	-	-

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

LTE Band 4 Measured Results

BW (MHz)	Mode	RB Allocation	RB offset	Maximum Average Power (dBm)			MPR	Tune-up Limit
				20050	20175	20300		
				1720 MHz	1732.5 MHz	1745 MHz		
20 MHz	QPSK	1	0	23.40	23.27	23.28	0.0	24
		1	49	23.37	23.14	23.17	0.0	24
		1	99	23.44	23.15	23.26	0.0	24
		50	0	23.48	23.33	23.30	0.0	24
		50	24	23.52	23.25	23.21	0.0	24
		50	50	23.52	23.26	23.27	0.0	24
		100	0	23.50	23.26	23.20	0.0	24
	16QAM	1	0	23.45	23.40	23.29	0.0	24
		1	49	23.39	23.27	23.14	0.0	24
		1	99	23.50	23.26	23.24	0.0	24
		50	0	22.10	21.99	21.86	1.0	23
		50	24	22.13	21.87	21.80	1.0	23
		50	50	22.19	21.83	21.84	1.0	23
		100	0	22.11	21.89	21.81	1.0	23
	64QAM	1	0	22.59	22.11	22.03	1.0	23
		1	49	22.60	21.99	21.92	1.0	23
		1	99	22.68	21.98	22.00	1.0	23
		50	0	21.08	20.93	20.81	2.0	22
		50	24	21.12	20.87	20.75	2.0	22
		50	50	21.19	20.82	20.80	2.0	22
		100	0	21.06	20.83	20.75	2.0	22

BW (MHz)	Mode	RB Allocation	RB offset	Maximum Average Power (dBm)			MPR	Tune-up Limit
				20025	20175	20325		
				1717.5 MHz	1732.5 MHz	1747.5 MHz		
15 MHz	QPSK	1	0	23.55	23.23	23.31	0.0	24
		1	37	23.44	23.15	23.23	0.0	24
		1	74	23.53	23.16	23.30	0.0	24
		36	0	23.55	23.28	23.21	0.0	24
		36	20	23.57	23.20	23.25	0.0	24
		36	39	23.52	23.20	23.21	0.0	24
		75	0	23.59	23.22	23.25	0.0	24
	16QAM	1	0	23.47	22.75	23.29	0.0	24
		1	37	23.37	22.66	23.17	0.0	24
		1	74	23.45	22.69	23.28	0.0	24
		36	0	22.21	21.89	21.78	1.0	23
		36	20	22.26	21.81	21.84	1.0	23
		36	39	22.19	21.80	21.80	1.0	23
		75	0	22.24	21.84	21.86	1.0	23
	64QAM	1	0	22.20	22.08	22.35	1.0	23
		1	37	22.11	22.00	22.29	1.0	23
		1	74	22.21	21.98	22.38	1.0	23
		36	0	21.19	20.83	20.71	2.0	22
		36	20	21.25	20.81	20.79	2.0	22
		36	39	21.21	20.76	20.73	2.0	22
		75	0	21.22	20.78	20.81	2.0	22

LTE Band 4 Measured Results (continued)

BW (MHz)	Mode	RB Allocation	RB offset	Maximum Average Power (dBm)			MPR	Tune-up Limit
				20000	20175	20350		
				1715 MHz	1732.5 MHz	1750 MHz		
10 MHz	QPSK	1	0	23.44	23.24	23.22	0.0	24
		1	25	23.39	23.12	23.09	0.0	24
		1	49	23.49	23.14	23.18	0.0	24
		25	0	23.50	23.25	23.24	0.0	24
		25	12	23.47	23.22	23.25	0.0	24
		25	25	23.52	23.21	23.21	0.0	24
		50	0	23.47	23.23	23.22	0.0	24
	16QAM	1	0	23.36	22.78	22.89	0.0	24
		1	25	23.31	22.66	22.76	0.0	24
		1	49	23.43	22.65	22.82	0.0	24
		25	0	22.13	21.89	21.95	1.0	23
		25	12	22.11	21.88	21.95	1.0	23
		25	25	22.19	21.79	21.91	1.0	23
		50	0	22.10	21.83	21.88	1.0	23
	64QAM	1	0	22.10	22.07	21.93	1.0	23
		1	25	22.11	21.97	21.82	1.0	23
		1	49	22.23	21.96	21.87	1.0	23
		25	0	21.18	20.84	20.88	2.0	22
		25	12	21.17	20.84	20.85	2.0	22
		25	25	21.23	20.78	20.78	2.0	22
		50	0	21.14	20.78	20.73	2.0	22
BW (MHz)	Mode	RB Allocation	RB offset	Maximum Average Power (dBm)			MPR	Tune-up Limit
				19975	20175	20375		
				1712.5 MHz	1732.5 MHz	1752.5 MHz		
5 MHz	QPSK	1	0	23.51	23.20	23.45	0.0	24
		1	12	23.44	23.14	23.35	0.0	24
		1	24	23.55	23.17	23.36	0.0	24
		12	0	23.46	23.22	23.35	0.0	24
		12	7	23.58	23.22	23.32	0.0	24
		12	13	23.56	23.22	23.30	0.0	24
		25	0	23.56	23.25	23.34	0.0	24
	16QAM	1	0	23.18	23.32	23.10	0.0	24
		1	12	23.08	23.25	23.01	0.0	24
		1	24	23.20	23.27	23.04	0.0	24
		12	0	22.12	21.93	22.02	1.0	23
		12	7	22.22	21.94	22.03	1.0	23
		12	13	22.20	21.92	22.00	1.0	23
		25	0	22.11	21.87	21.96	1.0	23
	64QAM	1	0	22.37	21.65	22.04	1.0	23
		1	12	22.33	21.61	21.98	1.0	23
		1	24	22.41	21.61	21.99	1.0	23
		12	0	21.04	20.77	20.89	2.0	22
		12	7	21.15	20.77	20.89	2.0	22
		12	13	21.13	20.75	20.86	2.0	22
		25	0	21.17	20.73	20.84	2.0	22

LTE Band 4 Measured Results (continued)

BW (MHz)	Mode	RB Allocation	RB offset	Maximum Average Power (dBm)			MPR	Tune-up Limit
				19965	20175	20385		
				1711.5 MHz	1732.5 MHz	1753.5 MHz		
3 MHz	QPSK	1	0	23.43	23.15	23.27	0.0	24
		1	8	23.52	23.21	23.30	0.0	24
		1	14	23.41	23.14	23.22	0.0	24
		8	0	23.42	23.16	23.27	0.0	24
		8	4	23.45	23.20	23.31	0.0	24
		8	7	23.44	23.19	23.29	0.0	24
		15	0	23.41	23.18	23.29	0.0	24
	16QAM	1	0	23.38	22.66	22.91	0.0	24
		1	8	23.43	22.73	22.95	0.0	24
		1	14	23.34	22.62	22.84	0.0	24
		8	0	22.09	21.86	21.90	1.0	23
		8	4	22.14	21.88	21.95	1.0	23
		8	7	22.12	21.87	21.95	1.0	23
		15	0	22.07	21.81	21.86	1.0	23
	64QAM	1	0	22.23	21.75	22.03	1.0	23
		1	8	22.26	21.86	22.11	1.0	23
		1	14	22.17	21.76	21.99	1.0	23
		8	0	21.00	20.71	20.78	2.0	22
		8	4	21.04	20.76	20.85	2.0	22
		8	7	21.02	20.74	20.83	2.0	22
		15	0	21.08	20.74	20.77	2.0	22

BW (MHz)	Mode	RB Allocation	RB offset	Maximum Average Power (dBm)			MPR	Tune-up Limit
				19957	20175	20393		
				1710.7 MHz	1732.5 MHz	1754.3 MHz		
1.4 MHz	QPSK	1	0	23.26	22.96	23.23	0.0	24
		1	3	23.34	23.06	23.27	0.0	24
		1	5	23.26	22.95	23.18	0.0	24
		3	0	23.30	23.01	23.18	0.0	24
		3	1	23.37	23.06	23.25	0.0	24
		3	3	23.38	23.07	23.26	0.0	24
		6	0	23.00	23.00	23.00	0.0	24
	16QAM	1	0	22.94	23.00	22.87	0.0	24
		1	3	22.96	23.00	22.94	0.0	24
		1	5	22.91	23.00	22.88	0.0	24
		3	0	23.00	22.88	22.86	0.0	24
		3	1	23.00	22.93	22.93	0.0	24
		3	3	23.00	22.94	22.93	0.0	24
		6	0	22.00	21.58	21.93	1.0	23
	64QAM	1	0	22.05	21.56	21.98	1.0	23
		1	3	22.12	21.68	22.10	1.0	23
		1	5	22.08	21.53	21.97	1.0	23
		3	0	21.88	21.59	21.94	1.0	23
		3	1	21.96	21.69	22.03	1.0	23
		3	3	21.96	21.69	22.03	1.0	23
		6	0	21.00	20.80	20.62	2.0	22

LTE Band 5 Measured Results

BW (MHz)	Mode	RB Allocation	RB offset	Maximum Average Power (dBm)			MPR	Tune-up Limit
				20450	20525	20600		
				829 MHz	836.5 MHz	844 MHz		
10 MHz	QPSK	1	0	24.50	24.50	24.44	0.0	25
		1	25	24.37	24.45	24.40	0.0	25
		1	49	24.37	24.48	24.23	0.0	25
		25	0	23.55	23.60	23.49	1.0	24
		25	12	23.48	23.58	23.43	1.0	24
		25	25	23.50	23.50	23.34	1.0	24
		50	0	23.44	23.57	23.42	1.0	24
	16QAM	1	0	23.14	23.48	22.97	1.0	24
		1	25	23.01	23.40	22.97	1.0	24
		1	49	23.01	23.41	22.70	1.0	24
		25	0	22.15	22.22	22.04	2.0	23
		25	12	22.13	22.18	22.02	2.0	23
		25	25	22.17	22.09	21.96	2.0	23
		50	0	22.06	22.11	21.97	2.0	23
	64QAM	1	0	22.06	22.21	22.08	2.0	23
		1	25	22.01	22.22	22.09	2.0	23
		1	49	22.05	22.26	21.86	2.0	23
		25	0	21.02	21.07	21.00	3.0	22
		25	12	21.02	21.06	20.96	3.0	22
		25	25	21.05	20.97	20.91	3.0	22
		50	0	20.98	20.99	20.90	3.0	22

BW (MHz)	Mode	RB Allocation	RB offset	Maximum Average Power (dBm)			MPR	Tune-up Limit
				20425	20525	20625		
				826.5 MHz	836.5 MHz	846.5 MHz		
5 MHz	QPSK	1	0	24.60	24.56	24.48	0.0	25
		1	12	24.41	24.50	24.28	0.0	25
		1	24	24.40	24.50	24.17	0.0	25
		12	0	23.53	23.57	23.49	1.0	24
		12	7	23.51	23.57	23.40	1.0	24
		12	13	23.35	23.53	23.39	1.0	24
		25	0	23.52	23.57	23.39	1.0	24
	16QAM	1	0	23.28	23.27	23.59	1.0	24
		1	12	23.06	23.17	23.38	1.0	24
		1	24	23.07	23.13	23.35	1.0	24
		12	0	22.18	22.16	22.18	2.0	23
		12	7	22.17	22.18	22.07	2.0	23
		12	13	22.05	22.15	22.07	2.0	23
		25	0	22.12	22.07	22.01	2.0	23
	64QAM	1	0	22.29	21.91	22.20	2.0	23
		1	12	22.10	21.83	22.01	2.0	23
		1	24	22.07	21.81	21.96	2.0	23
		12	0	20.95	21.02	21.03	3.0	22
		12	7	20.95	21.03	20.91	3.0	22
		12	13	20.81	21.00	20.89	3.0	22
		25	0	20.94	20.96	20.84	3.0	22

Note(s):

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

LTE Band 5 Measured Results (continued)

BW (MHz)	Mode	RB Allocation	RB offset	Maximum Average Power (dBm)			MPR	Tune-up Limit
				20415	20525	20635		
				825.5 MHz	836.5 MHz	847.5 MHz		
3 MHz	QPSK	1	0	24.51	24.48	24.42	0.0	25
		1	8	24.57	24.50	24.33	0.0	25
		1	14	24.34	24.43	24.00	0.0	25
		8	0	23.49	23.51	23.31	1.0	24
		8	4	23.52	23.56	23.37	1.0	24
		8	7	23.51	23.50	23.38	1.0	24
		15	0	23.49	23.52	23.37	1.0	24
	16QAM	1	0	23.46	23.00	23.09	1.0	24
		1	8	23.50	23.04	22.95	1.0	24
		1	14	23.30	22.88	22.83	1.0	24
		8	0	22.14	22.18	21.93	2.0	23
		8	4	22.16	22.18	21.98	2.0	23
		8	7	22.15	22.18	21.98	2.0	23
		15	0	22.14	22.12	21.88	2.0	23
	64QAM	1	0	22.03	22.26	22.09	2.0	23
		1	8	22.12	22.28	22.02	2.0	23
		1	14	21.90	22.16	21.88	2.0	23
		8	0	20.98	20.99	20.75	3.0	22
		8	4	21.02	21.03	20.77	3.0	22
		8	7	21.00	21.01	20.77	3.0	22
		15	0	21.00	20.94	20.83	3.0	22

BW (MHz)	Mode	RB Allocation	RB offset	Maximum Average Power (dBm)			MPR	Tune-up Limit
				20407	20525	20643		
				824.7 MHz	836.5 MHz	848.3 MHz		
1.4 MHz	QPSK	1	0	24.40	24.46	24.27	0.0	25
		1	3	24.44	24.47	24.23	0.0	25
		1	5	24.39	24.40	24.09	0.0	25
		3	0	24.44	24.36	24.18	0.0	25
		3	1	24.49	24.44	24.24	0.0	25
		3	3	24.49	24.43	24.26	0.0	25
		6	0	23.38	23.45	23.27	1.0	24
	16QAM	1	0	23.33	23.07	22.78	1.0	24
		1	3	23.39	23.14	22.83	1.0	24
		1	5	23.32	23.08	22.76	1.0	24
		3	0	23.18	23.06	22.96	1.0	24
		3	1	23.26	23.11	23.04	1.0	24
		3	3	23.24	23.11	23.04	1.0	24
		6	0	21.95	22.13	22.01	2.0	23
	64QAM	1	0	22.02	21.94	22.02	2.0	23
		1	3	22.07	22.04	22.12	2.0	23
		1	5	22.03	21.89	21.97	2.0	23
		3	0	21.82	21.96	21.96	2.0	23
		3	1	21.88	22.05	22.03	2.0	23
		3	3	21.88	22.04	22.02	2.0	23
		6	0	20.95	21.15	20.69	3.0	22

LTE Band 7 Measured Results

BW (MHz)	Mode	RB Allocation	RB offset	Maximum Average Power (dBm)			MPR	Tune-up Limit
				20850	21100	21350		
				2510 MHz	2535 MHz	2560 MHz		
20 MHz	QPSK	1	0	22.70	22.73	22.72	0.0	23
		1	49	22.47	22.55	22.48	0.0	23
		1	99	22.36	22.46	22.49	0.0	23
		50	0	22.67	22.75	22.57	0.0	23
		50	24	22.61	22.69	22.54	0.0	23
		50	50	22.55	22.60	22.55	0.0	23
		100	0	22.56	22.64	22.49	0.0	23
	16QAM	1	0	22.82	22.83	22.73	0.0	23
		1	49	22.60	22.68	22.46	0.0	23
		1	99	22.49	22.64	22.46	0.0	23
		50	0	22.31	22.35	22.15	0.0	23
		50	24	22.29	22.29	22.10	0.0	23
		50	50	22.18	22.19	22.11	0.0	23
		100	0	22.19	22.31	22.07	0.0	23
	64QAM	1	0	22.00	22.48	22.39	0.0	23
		1	49	21.85	22.53	22.23	0.0	23
		1	99	21.82	22.51	22.32	0.0	23
		50	0	20.78	21.03	21.01	0.0	22
		50	24	20.71	21.03	20.96	0.0	22
		50	50	20.63	21.01	21.08	0.0	22
		100	0	20.70	20.97	20.94	0.0	22

BW (MHz)	Mode	RB Allocation	RB offset	Maximum Average Power (dBm)			MPR	Tune-up Limit
				20825	21100	21375		
				2507.5 MHz	2535 MHz	2562.5 MHz		
15 MHz	QPSK	1	0	22.87	22.69	22.56	0.0	23
		1	37	22.66	22.60	22.48	0.0	23
		1	74	22.63	22.52	22.46	0.0	23
		36	0	22.76	22.73	22.49	0.0	23
		36	20	22.70	22.65	22.56	0.0	23
		36	39	22.63	22.57	22.51	0.0	23
		75	0	22.66	22.66	22.56	0.0	23
	16QAM	1	0	22.81	22.61	22.10	0.0	23
		1	37	22.68	22.55	22.02	0.0	23
		1	74	22.44	22.46	22.03	0.0	23
		36	0	22.35	22.40	22.14	0.0	23
		36	20	22.27	22.31	22.18	0.0	23
		36	39	22.23	22.22	22.10	0.0	23
		75	0	22.28	22.29	22.19	0.0	23
	64QAM	1	0	22.10	22.18	22.51	0.0	23
		1	37	21.98	22.20	22.53	0.0	23
		1	74	21.91	22.18	22.62	0.0	23
		36	0	21.00	21.00	20.94	0.0	22
		36	20	21.01	21.00	21.05	0.0	22
		36	39	20.93	20.94	20.98	0.0	22
		75	0	20.94	20.98	21.06	0.0	22

LTE Band 7 Measured Results (continued)

BW (MHz)	Mode	RB Allocation	RB offset	Maximum Average Power (dBm)			MPR	Tune-up Limit
				20800	21100	21400		
				2505 MHz	2535 MHz	2565 MHz		
10 MHz	QPSK	1	0	22.76	22.66	22.54	0.0	23
		1	25	22.64	22.62	22.58	0.0	23
		1	49	22.59	22.59	22.55	0.0	23
		25	0	22.75	22.71	22.61	0.0	23
		25	12	22.74	22.66	22.58	0.0	23
		25	25	22.67	22.60	22.62	0.0	23
		50	0	22.72	22.63	22.54	0.0	23
	16QAM	1	0	22.41	22.58	22.12	0.0	23
		1	25	22.28	22.55	22.09	0.0	23
		1	49	22.16	22.49	22.06	0.0	23
		25	0	22.43	22.31	22.20	0.0	23
		25	12	22.42	22.28	22.16	0.0	23
		25	25	22.37	22.22	22.22	0.0	23
		50	0	22.35	22.21	22.13	0.0	23
	64QAM	1	0	22.11	21.92	22.27	0.0	23
		1	25	22.03	22.02	22.35	0.0	23
		1	49	22.01	22.03	22.31	0.0	23
		25	0	21.01	21.05	21.08	0.0	22
		25	12	20.99	21.03	21.07	0.0	22
		25	25	20.97	21.01	21.16	0.0	22
		50	0	20.91	21.00	21.03	0.0	22

BW (MHz)	Mode	RB Allocation	RB offset	Maximum Average Power (dBm)			MPR	Tune-up Limit
				20775	21100	21425		
				2502.5 MHz	2535 MHz	2567.5 MHz		
5 MHz	QPSK	1	0	22.77	22.54	22.70	0.0	23
		1	12	22.73	22.58	22.66	0.0	23
		1	24	22.71	22.52	22.61	0.0	23
		12	0	22.74	22.63	22.62	0.0	23
		12	7	22.74	22.64	22.65	0.0	23
		12	13	22.72	22.64	22.62	0.0	23
		25	0	22.73	22.65	22.61	0.0	23
	16QAM	1	0	22.45	22.64	22.37	0.0	23
		1	12	22.39	22.70	22.33	0.0	23
		1	24	22.38	22.65	22.32	0.0	23
		12	0	22.38	22.38	22.29	0.0	23
		12	7	22.38	22.37	22.28	0.0	23
		12	13	22.37	22.35	22.25	0.0	23
		25	0	22.29	22.28	22.21	0.0	23
	64QAM	1	0	22.13	22.11	22.03	0.0	23
		1	12	22.10	22.22	21.99	0.0	23
		1	24	22.12	22.17	22.02	0.0	23
		12	0	20.97	20.89	21.14	0.0	22
		12	7	20.98	20.91	21.15	0.0	22
		12	13	20.97	20.87	21.14	0.0	22
		25	0	20.93	20.90	21.07	0.0	22

LTE Band 13 Measured Results

BW (MHz)	Mode	RB Allocation	RB offset	Maximum Average Power (dBm)		MPR	Tune-up Limit
				[redacted]	23230 / 782 MHz		
10 MHz	QPSK	1	0		24.51	0.0	25
		1	25		24.67	0.0	25
		1	49		24.83	0.0	25
		25	0		23.31	1.0	24
		25	12		23.51	1.0	24
		25	25		23.42	1.0	24
		50	0		23.36	1.0	24
	16QAM	1	0		23.08	1.0	24
		1	25		23.30	1.0	24
		1	49		23.41	1.0	24
		25	0		22.39	2.0	23
		25	12		22.59	2.0	23
		25	25		22.53	2.0	23
		50	0		22.39	2.0	23
	64QAM	1	0		22.11	2.0	23
		1	25		22.35	2.0	23
		1	49		22.46	2.0	23
		25	0		21.24	3.0	22
		25	12		21.43	3.0	22
		25	25		21.39	3.0	22
		50	0		21.25	3.0	22

BW (MHz)	Mode	RB Allocation	RB offset	Maximum Average Power (dBm)		MPR	Tune-up Limit
				[redacted]	23230 / 782 MHz		
5 MHz	QPSK	1	0		24.72	0.0	25
		1	12		24.75	0.0	25
		1	24		24.85	0.0	25
		12	0		23.73	1.0	24
		12	7		23.83	1.0	24
		12	13		23.81	1.0	24
		25	0		23.85	1.0	24
	16QAM	1	0		23.41	1.0	24
		1	12		23.41	1.0	24
		1	24		23.51	1.0	24
		12	0		22.41	2.0	23
		12	7		22.52	2.0	23
		12	13		22.49	2.0	23
		25	0		22.46	2.0	23
	64QAM	1	0		22.07	2.0	23
		1	12		22.09	2.0	23
		1	24		22.17	2.0	23
		12	0		21.30	3.0	22
		12	7		21.36	3.0	22
		12	13		21.35	3.0	22
		25	0		21.30	3.0	22

Note(s):

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

LTE Band 17 Measured Results

BW (MHz)	Mode	RB Allocation	RB offset	Maximum Average Power (dBm)			MPR	Tune-up Limit
				[redacted]	23790	[redacted]		
					710 MHz			
10 MHz	QPSK	1	0		24.38		0.0	25
		1	25		24.42		0.0	25
		1	49		24.57		0.0	25
		25	0		23.51		1.0	24
		25	12		23.48		1.0	24
		25	25		23.44		1.0	24
		50	0		23.47		1.0	24
	16QAM	1	0		23.28		1.0	24
		1	25		23.35		1.0	24
		1	49		23.45		1.0	24
		25	0		22.13		2.0	23
		25	12		22.11		2.0	23
		25	25		22.02		2.0	23
		50	0		22.09		2.0	23
	64QAM	1	0		21.92		2.0	23
		1	25		22.04		2.0	23
		1	49		22.17		2.0	23
		25	0		21.05		3.0	22
		25	12		21.03		3.0	22
		25	25		21.00		3.0	22
		50	0		20.96		3.0	22

BW (MHz)	Mode	RB Allocation	RB offset	Maximum Average Power (dBm)			MPR	Tune-up Limit
				[redacted]	23790	[redacted]		
					710 MHz			
5 MHz	QPSK	1	0		24.49		0.0	25
		1	12		24.49		0.0	25
		1	24		24.58		0.0	25
		12	0		23.52		1.0	24
		12	7		23.50		1.0	24
		12	13		23.44		1.0	24
		25	0		23.48		1.0	24
	16QAM	1	0		23.12		1.0	24
		1	12		23.14		1.0	24
		1	24		23.25		1.0	24
		12	0		22.16		2.0	23
		12	7		22.16		2.0	23
		12	13		22.12		2.0	23
		25	0		22.09		2.0	23
	64QAM	1	0		22.08		2.0	23
		1	12		22.14		2.0	23
		1	24		22.25		2.0	23
		12	0		21.06		3.0	22
		12	7		21.03		3.0	22
		12	13		20.99		3.0	22
		25	0		20.96		3.0	22

LTE Band 41 Measured Results

BW (MHz)	Mode	RB Allocation	RB offset	Maximum Average Power (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	22.66	22.64	22.79	22.88	22.82	0.0	23
		1	49	22.56	22.48	22.53	22.63	22.64	0.0	23
		1	99	22.49	22.46	22.57	22.65	22.48	0.0	23
		50	0	22.68	22.62	22.71	22.78	22.68	0.0	23
		50	24	22.61	22.56	22.62	22.69	22.58	0.0	23
		50	50	22.50	22.54	22.53	22.60	22.58	0.0	23
		100	0	22.57	22.45	22.63	22.66	22.59	0.0	23
	16QAM	1	0	22.09	22.25	22.33	22.28	22.46	0.0	23
		1	49	21.95	22.11	22.08	22.01	22.29	0.0	23
		1	99	21.86	22.15	22.10	22.05	22.13	0.0	23
		50	0	22.26	22.25	22.27	22.35	22.29	0.0	23
		50	24	22.19	22.15	22.20	22.26	22.19	0.0	23
		50	50	22.13	22.19	22.10	22.19	22.19	0.0	23
		100	0	22.17	21.94	22.19	22.23	22.16	0.0	23
	64QAM	1	0	21.68	21.85	22.24	22.57	22.40	0.0	23
		1	49	21.63	21.80	22.08	22.40	22.31	0.0	23
		1	99	21.62	21.85	22.12	22.42	22.19	0.0	23
		50	0	20.86	21.02	21.23	21.21	21.01	0.0	22
		50	24	20.82	20.99	21.18	21.13	20.91	0.0	22
		50	50	20.75	21.05	21.14	21.08	20.95	0.0	22
		100	0	20.78	20.76	21.17	21.11	20.92	0.0	22

BW (MHz)	Mode	RB Allocation	RB offset	Maximum Average Power (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	22.56	22.68	22.64	22.80	22.73	0.0	23
		1	37	22.51	22.49	22.50	22.61	22.62	0.0	23
		1	74	22.42	22.45	22.51	22.63	22.49	0.0	23
		36	0	22.60	22.55	22.63	22.73	22.63	0.0	23
		36	20	22.55	22.50	22.58	22.64	22.68	0.0	23
		36	39	22.48	22.52	22.51	22.56	22.60	0.0	23
		75	0	22.53	22.61	22.56	22.62	22.55	0.0	23
	16QAM	1	0	22.13	22.27	22.25	22.33	22.33	0.0	23
		1	37	22.04	22.06	22.08	22.15	22.21	0.0	23
		1	74	21.98	22.10	22.11	22.18	22.07	0.0	23
		36	0	22.17	22.17	22.23	22.28	22.24	0.0	23
		36	20	22.13	22.14	22.18	22.26	22.26	0.0	23
		36	39	22.05	22.16	22.10	22.17	22.19	0.0	23
		75	0	22.14	22.07	22.19	22.24	22.17	0.0	23
	64QAM	1	0	21.96	22.26	22.04	21.75	21.58	0.0	23
		1	37	21.93	22.14	21.90	21.62	21.48	0.0	23
		1	74	21.90	22.17	21.93	21.67	21.42	0.0	23
		36	0	20.84	21.05	21.13	21.18	21.01	0.0	22
		36	20	20.82	21.01	21.09	21.16	21.06	0.0	22
		36	39	20.77	21.09	21.03	21.10	20.98	0.0	22
		75	0	20.75	20.90	21.12	21.09	20.92	0.0	22

LTE Band 41 Measured Results (continued)

BW (MHz)	Mode	RB Allocation	RB offset	Maximum Average Power (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	22.49	22.56	22.62	22.70	22.68	0.0	23
		1	25	22.51	22.44	22.51	22.61	22.59	0.0	23
		1	49	22.47	22.38	22.45	22.67	22.56	0.0	23
		25	0	22.61	22.55	22.60	22.71	22.62	0.0	23
		25	12	22.60	22.54	22.62	22.69	22.68	0.0	23
		25	25	22.51	22.48	22.55	22.64	22.61	0.0	23
		50	0	22.59	22.50	22.57	22.64	22.54	0.0	23
	16QAM	1	0	22.06	22.23	22.17	22.27	22.33	0.0	23
		1	25	22.06	22.12	22.07	22.15	22.26	0.0	23
		1	49	21.98	22.09	22.03	22.21	22.24	0.0	23
		25	0	22.18	22.12	22.20	22.27	22.18	0.0	23
		25	12	22.16	22.09	22.20	22.25	22.24	0.0	23
		25	25	22.10	22.04	22.12	22.18	22.21	0.0	23
		50	0	22.19	22.12	22.17	22.25	22.17	0.0	23
	64QAM	1	0	21.94	22.18	22.18	21.68	21.51	0.0	23
		1	25	21.95	22.13	22.12	21.64	21.50	0.0	23
		1	49	21.94	22.12	22.10	21.71	21.47	0.0	23
		25	0	20.76	20.93	21.05	21.17	20.93	0.0	22
		25	12	20.76	20.92	21.08	21.16	21.01	0.0	22
		25	25	20.70	20.88	21.04	21.09	20.97	0.0	22
		50	0	20.74	20.89	21.10	21.07	20.89	0.0	22
BW (MHz)	Mode	RB Allocation	RB offset	Maximum Average Power (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	22.51	22.45	22.59	22.64	22.56	0.0	23
		1	12	22.48	22.40	22.53	22.59	22.52	0.0	23
		1	24	22.46	22.36	22.52	22.69	22.46	0.0	23
		12	0	22.57	22.49	22.59	22.68	22.61	0.0	23
		12	7	22.56	22.51	22.60	22.67	22.62	0.0	23
		12	13	22.54	22.48	22.59	22.63	22.62	0.0	23
		25	0	22.53	22.50	22.58	22.64	22.62	0.0	23
	16QAM	1	0	22.18	21.98	22.12	22.29	22.11	0.0	23
		1	12	22.16	21.92	22.08	22.26	22.05	0.0	23
		1	24	22.16	21.88	22.04	22.35	21.99	0.0	23
		12	0	22.19	22.10	22.15	22.29	22.22	0.0	23
		12	7	22.20	22.11	22.14	22.30	22.22	0.0	23
		12	13	22.16	22.09	22.13	22.27	22.22	0.0	23
		25	0	22.14	22.07	22.21	22.24	22.17	0.0	23
	64QAM	1	0	21.44	22.28	22.45	21.76	22.08	0.0	23
		1	12	21.42	22.27	22.45	21.76	22.05	0.0	23
		1	24	21.42	22.28	22.45	21.81	22.00	0.0	23
		12	0	20.74	21.02	21.21	21.10	20.87	0.0	22
		12	7	20.74	21.03	21.21	21.11	20.90	0.0	22
		12	13	20.74	21.01	21.19	21.09	20.89	0.0	22
		25	0	20.77	20.91	21.08	21.11	20.87	0.0	22

9.4. LTE Carrier Aggregation

The following power measurements were performed with a single carrier uplink; CA for this particular project is only supported in the downlinks. The CA combination is one (1) Uplink and two (2) Downlinks.

Type	LTE CA combinations		PCC (UL)					SCC (DL)			LTE Rel 8 Tx. Power [dBm]	LTE Rel 11 Tx. Power [dBm]	Delta
	PCC + SCC		Mode	BW (MHz)	Channel	Freq. (MHz)	RB/Offset	BW (MHz)	Channel	Freq. (MHz)			
Intra-Band Contiguous	41C		QPSK	20	39750	2506.0	50,0	20	39948	2525.8	22.66	22.75	0.4%

Note:

Per KDB 941225 D05A LTE Rel. 10 KDB Inquiry Sheet: SAR is excluded for Carrier Aggregation when measured power does not exceed LTE Release 8 by more than a $^1/_4$ dBm.

9.5. 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	10.50	12.01	Yes	9.20	9.68	Yes
			6	2437	11.10	12.01		9.20	9.68	
			11	2462	10.90	12.01		8.90	9.68	
			12	2467	11.00	12.01		8.90	9.68	
			13	2472	10.00	10.79		8.90	9.68	
OFDM 2.4 GHz	802.11g	6 Mbps	1	2412	Not Required	12.17	No	Not Required	9.63	No
			6	2437		12.17			9.63	
			11	2462		12.17			9.63	
			12	2467		10.85			5.65	
			13	2472		2.85			-2.35	
	802.11n (HT20)	6.5 Mbps	1	2412		12.18	No		9.52	No
			6	2437		12.18			9.52	
			11	2462		12.18			9.52	
			12	2467		10.87			5.65	
			13	2472		1.87			-3.35	

Note(s):

1. SAR is not required for 802.11g/n modes when the adjusted SAR for 802.11b is < 1.2 W/kg.
2. 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	Not Required	12.14	No	Not Required	9.76	No
			40	5200		12.14			9.76	
			44	5220		12.14			9.76	
			48	5240		12.14			9.76	
	802.11n (HT20)	6.5 Mbps	36	5180		12.97	No	9.10	11.06	Yes
			40	5200		12.97		9.10	11.06	
			44	5220		12.97		9.50	11.06	
			48	5240		12.97		9.40	11.06	
	802.11ac (VHT20)	6.5 Mbps	36	5180		12.17	No	Not Required	9.85	No
			40	5200		12.17			9.85	
			44	5220		12.17			9.85	
			48	5240		12.17			9.85	
	802.11n (HT40)	13.5 Mbps	38	5190		12.97	No		10.56	No
			46	5230		12.97			10.56	
	802.11ac (VHT40)	13.5 Mbps	38	5190		12.17	No		8.15	No
			46	5230		12.17			9.85	
	802.11ac (VHT80)	29.3 Mbps	42	5210		12.17	No		9.85	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	12.19	No	Not Required	9.93	No
			56	5280		12.19			9.93	
			60	5300		12.19			9.93	
			64	5320		12.19			9.93	
	802.11n (HT20)	6.5 Mbps	52	5260		13.36	No		10.74	No
			56	5280		13.36			10.74	
			60	5300		13.36			10.74	
			64	5320		13.36			10.74	
	802.11ac (VHT20)	6.5 Mbps	52	5260		11.75	No		9.83	No
			56	5280		11.75			9.83	
			60	5300		11.75			9.83	
			64	5320		11.75			9.83	
	802.11n (HT40)	13.5 Mbps	54	5270	11.80	13.36	Yes		10.74	No
			62	5310	11.70	13.36			10.74	
	802.11ac (VHT40)	13.5 Mbps	54	5270	Not Required	11.75	No		9.83	No
			62	5310		11.75			8.59	
	802.11ac (VHT80)	29.3 Mbps	58	5290		11.75	No		9.83	No

Note(s):

1. 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.
2. 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.
3. 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	11.10	11.31	Yes	8.30	9.64	Yes
			116	5580	11.00	11.31		8.00	9.64	
			124	5620	11.00	11.31		8.20	9.64	
			144	5720	9.80	11.31		8.20	9.64	
	802.11n (HT20)	6.5 Mbps	100	5500	Not Required	11.29	No	Not Required	9.42	No
			116	5580		11.29			9.42	
			124	5620		11.29			9.42	
			144	5720		11.29			9.42	
	802.11ac (VHT20)	6.5 Mbps	100	5500		11.03	No		9.52	No
			116	5580		11.03			9.52	
			124	5620		11.03			9.52	
			144	5720		11.03			9.52	
	802.11n (HT40)	13.5 Mbps	102	5510		11.29	No		9.42	No
			118	5590		11.29			9.42	
			126	5630		11.29			9.42	
			142	5710		11.29			9.42	
	802.11ac (VHT40)	13.5 Mbps	102	5510		11.03	No		9.52	No
			118	5590		11.03			9.52	
			126	5630		11.03			9.52	
			142	5710		11.03			9.52	
	802.11ac (VHT80)	29.3 Mbps	106	5530		11.03	No		9.52	No
			122	5610		11.03			9.52	
			138	5690		11.03			9.52	

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	12.48	No	Not Required	10.18	No
			157	5785		12.48			10.18	
			165	5825		12.48			10.18	
	802.11n (HT20)	6.5 Mbps	149	5745		12.65	No		10.23	No
			157	5785		12.65			10.23	
			165	5825		12.65			10.23	
	802.11ac (VHT20)	6.5 Mbps	149	5745		13.25	No		9.91	No
			157	5785		13.25			9.91	
			165	5825		13.25			9.91	
	802.11n (HT40)	13.5 Mbps	151	5755		12.65	No	9.80	10.23	Yes
			159	5795		12.65		9.90	10.23	
	802.11ac (VHT40)	13.5 Mbps	151	5755		13.25	No	Not Required	9.91	No
			159	5795		13.25			9.91	
	802.11ac (VHT80)	29.3 Mbps	155	5775	11.50	13.25	Yes		9.91	No

Note(s):

1. 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.
2. 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

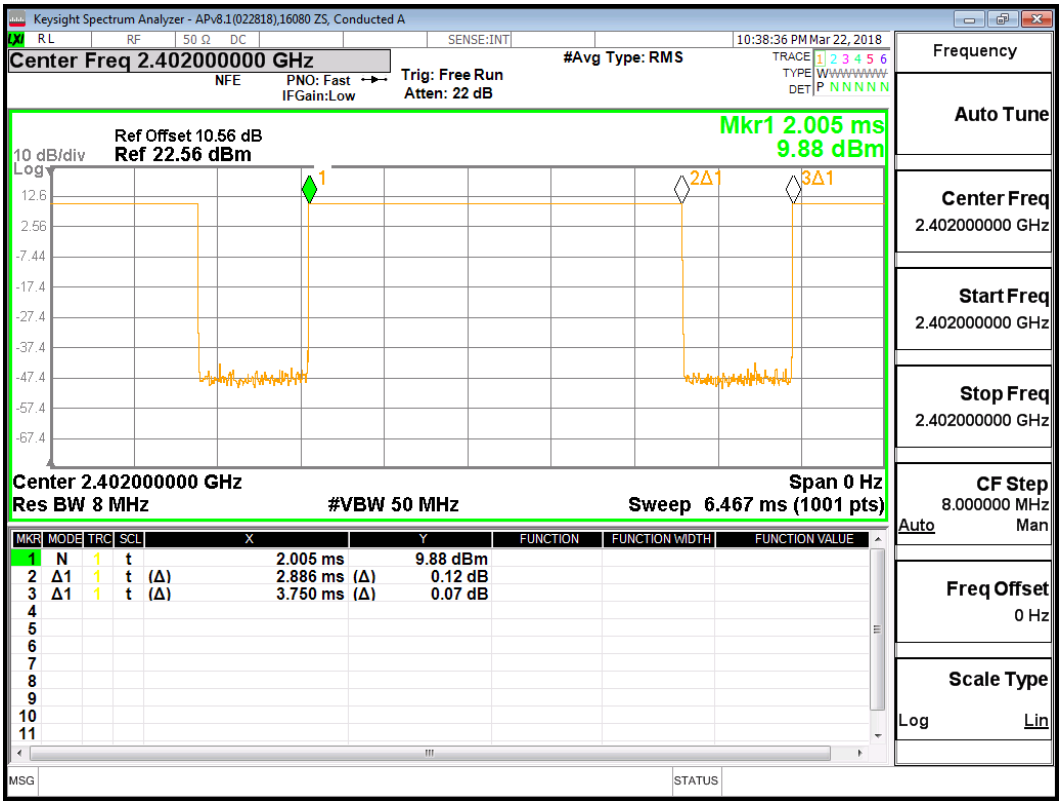
Band	Mode	Ch #	Freq. (MHz)	Chain 0 Average Power (dBm)		
				Meas Pwr	Tune-up	SAR Test (Yes/No)
2.4	GFSK	0	2402	10.38	10.74	Yes
		39	2441	10.74	11.73	
		78	2480	10.09	10.51	
	EDR, π/4 DQPSK	0	2402	6.23	8.22	No
		39	2441	7.11	9.05	
		78	2480	6.96	8.14	
	EDR, 8-DPSK	0	2402	6.33	8.22	No
		39	2441	8.03	9.05	
		78	2480	6.96	8.14	
	LE, GFSK	0	2402	5.10	5.16	No
		19	2440	4.38	5.82	
		39	2480	3.66	4.99	

Duty Factor Measured Results

Mode	Type	T on (ms)	Period (ms)	Duty Cycle	Crest Factor (1/duty cycle)
GFSK	DH5	2.886	3.75	76.96%	1.299

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 ≤ ¼ 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)		Plots No.
						Tune-up Limit	Meas.	Meas.	Scaled	
Head	GPRS 4 Slots	0	Left Touch	190	836.6	28.20	27.80	0.116	0.127	1
			Left Tilt	190	836.6	28.20	27.80	0.063	0.069	
			Right Touch	190	836.6	28.20	27.80	0.096	0.105	
			Right Tilt	190	836.6	28.20	27.80	0.063	0.069	
Body-worn	GPRS 4 Slots	15	Rear	190	836.6	28.20	27.80	0.227	0.249	
			Front	190	836.6	28.20	27.80	0.232	0.254	2
Hotspot	GPRS 4 Slots	10	Rear	190	836.6	28.20	27.80	0.329	0.361	3
			Front	190	836.6	28.20	27.80	0.326	0.357	
			Edge 2	190	836.6	28.20	27.80	0.141	0.155	
			Edge 3	190	836.6	28.20	27.80	0.180	0.197	
			Edge 4	190	836.6	28.20	27.80	0.280	0.307	
Hotspot	DTM 2 Slots	10	Rear	190	836.6	31.20	30.70	0.311	0.349	

10.2. GSM1900

RF Exposure Conditions	Mode	Dist. (mm)	Test Position	Ch #.	Freq. (MHz)	Power (dBm)		1-g SAR (W/kg)		Plots No.
						Tune-up Limit	Meas.	Meas.	Scaled	
Head	GPRS 4 Slots	0	Left Touch	661	1880.0	23.70	23.10	0.082	0.094	4
			Left Tilt	661	1880.0	23.70	23.10	0.034	0.039	
			Right Touch	661	1880.0	23.70	23.10	0.063	0.072	
			Right Tilt	661	1880.0	23.70	23.10	0.043	0.049	
Body-worn	GPRS 4 Slots	15	Rear	661	1880.0	23.70	23.10	0.078	0.090	
			Front	661	1880.0	23.70	23.10	0.118	0.135	5
Hotspot	GPRS 4 Slots	10	Rear	661	1880.0	23.70	23.10	0.126	0.145	
			Front	661	1880.0	23.70	23.10	0.198	0.227	
			Edge 2	661	1880.0	23.70	23.10	0.077	0.088	
			Edge 3	661	1880.0	23.70	23.10	0.430	0.494	6
			Edge 4	661	1880.0	23.70	23.10	0.129	0.148	
Hotspot	DTM (CS+PS)	10	Edge 3	661	1880.0	26.70	26.20	0.430	0.482	

10.3. W-CDMA Band II

RF Exposure Conditions	Mode	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	0	Left Touch	9400	1880.0	22.70	22.30	0.116	0.127	7
			Left Tilt	9400	1880.0	22.70	22.30	0.057	0.062	
			Right Touch	9400	1880.0	22.70	22.30	0.088	0.096	
			Right Tilt	9400	1880.0	22.70	22.30	0.068	0.075	
Body-worn	Rel. 99 RMC	15	Rear	9400	1880.0	22.70	22.30	0.095	0.104	
			Front	9400	1880.0	22.70	22.30	0.167	0.183	8
Hotspot	Rel. 99 RMC	10	Rear	9400	1880.0	22.70	22.30	0.242	0.265	
			Front	9400	1880.0	22.70	22.30	0.300	0.329	
			Edge 2	9400	1880.0	22.70	22.30	0.104	0.114	
			Edge 3	9400	1880.0	22.70	22.30	0.614	0.673	9
			Edge 4	9400	1880.0	22.70	22.30	0.219	0.240	

10.4. W-CDMA Band IV

RF Exposure Conditions	Mode	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	0	Left Touch	1413	1732.6	24.70	24.30	0.062	0.068	
			Left Tilt	1413	1732.6	24.70	24.30	0.035	0.038	
			Right Touch	1413	1732.6	24.70	24.30	0.064	0.070	10
			Right Tilt	1413	1732.6	24.70	24.30	0.038	0.042	
Body-worn	Rel. 99 RMC	15	Rear	1413	1732.6	24.70	24.30	0.107	0.117	
			Front	1413	1732.6	24.70	24.30	0.140	0.154	11
Hotspot	Rel. 99 RMC	10	Rear	1413	1732.6	24.70	24.30	0.208	0.228	
			Front	1413	1732.6	24.70	24.30	0.261	0.286	
			Edge 2	1413	1732.6	24.70	24.30	0.033	0.036	
			Edge 3	1413	1732.6	24.70	24.30	0.391	0.429	12
			Edge 4	1413	1732.6	24.70	24.30	0.262	0.287	

10.5. W-CDMA Band V

RF Exposure Conditions	Mode	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	0	Left Touch	4183	836.6	24.90	24.40	0.097	0.109	13
			Left Tilt	4183	836.6	24.90	24.40	0.052	0.059	
			Right Touch	4183	836.6	24.90	24.40	0.095	0.107	
			Right Tilt	4183	836.6	24.90	24.40	0.054	0.061	
Body-worn	Rel. 99 RMC	15	Rear	4183	836.6	24.90	24.40	0.194	0.218	
			Front	4183	836.6	24.90	24.40	0.209	0.235	14
Hotspot	Rel. 99 RMC	10	Rear	4183	836.6	24.90	24.40	0.271	0.304	
			Front	4183	836.6	24.90	24.40	0.292	0.328	15
			Edge 2	4183	836.6	24.90	24.40	0.104	0.117	
			Edge 3	4183	836.6	24.90	24.40	0.180	0.202	
			Edge 4	4183	836.6	24.90	24.40	0.268	0.301	

10.6. LTE Band 4 (20MHz Bandwidth)

RF Exposure Conditions	Mode	Dist. (mm)	Test Position	Ch #.	Freq. (MHz)	RB Allocation	RB offest	Power (dBm)		1-g SAR (W/kg)		Plots No.
								Tune-up Limit	Meas.	Meas.	Scaled	
Head	QPSK	0	Left Touch	20175	1732.5	1	0	24.00	23.27	0.071	0.084	
						50	0	24.00	23.33	0.073	0.085	
			Left Tilt (15°)	20175	1732.5	1	0	24.00	23.27	0.047	0.056	
						50	0	24.00	23.33	0.048	0.056	
			Right Touch	20175	1732.5	1	0	24.00	23.27	0.082	0.097	
						50	0	24.00	23.33	0.088	0.103	16
			Right Tilt (15°)	20175	1732.5	1	0	24.00	23.27	0.040	0.047	
						50	0	24.00	23.33	0.041	0.048	
Body-worn	QPSK	15	Rear	20175	1732.5	1	0	24.00	23.27	0.103	0.122	
						50	0	24.00	23.33	0.102	0.119	
			Front	20175	1732.5	1	0	24.00	23.27	0.156	0.185	
						50	0	24.00	23.33	0.161	0.188	17
Hotspot	QPSK	10	Rear	20175	1732.5	1	0	24.00	23.27	0.167	0.198	
						50	0	24.00	23.33	0.168	0.196	
			Front	20175	1732.5	1	0	24.00	23.27	0.295	0.349	
						50	0	24.00	23.33	0.301	0.351	18
			Edge 2	20175	1732.5	1	0	24.00	23.27	0.030	0.035	
						50	0	24.00	23.33	0.031	0.036	
			Edge 3	20175	1732.5	1	0	24.00	23.27	0.264	0.312	
						50	0	24.00	23.33	0.265	0.309	
			Edge 4	20175	1732.5	1	0	24.00	23.27	0.244	0.289	
						50	0	24.00	23.33	0.252	0.294	

10.7. LTE Band 5 (10MHz Bandwidth)

RF Exposure Conditions	Mode	Dist. (mm)	Test Position	Ch #.	Freq. (MHz)	RB Allocation	RB offest	Power (dBm)		1-g SAR (W/kg)		Plots No.
								Tune-up Limit	Meas.	Meas.	Scaled	
Head	QPSK	0	Left Touch	20525	836.5	1	0	25.00	24.50	0.095	0.107	19
						25	0	24.00	23.60	0.075	0.082	
			Left Tilt (15°)	20525	836.5	1	0	25.00	24.50	0.042	0.047	
						25	0	24.00	23.60	0.031	0.034	
			Right Touch	20525	836.5	1	0	25.00	24.50	0.085	0.095	
						25	0	24.00	23.60	0.066	0.072	
			Right Tilt (15°)	20525	836.5	1	0	25.00	24.50	0.045	0.050	
						25	0	24.00	23.60	0.035	0.038	
Body-worn	QPSK	15	Rear	20525	836.5	1	0	25.00	24.50	0.228	0.256	20
						25	0	24.00	23.60	0.180	0.197	
			Front	20525	836.5	1	0	25.00	24.50	0.200	0.224	
						25	0	24.00	23.60	0.159	0.174	
Hotspot	QPSK	10	Rear	20525	836.5	1	0	25.00	24.50	0.288	0.323	21
						25	0	24.00	23.60	0.225	0.247	
			Front	20525	836.5	1	0	25.00	24.50	0.273	0.306	
						25	0	24.00	23.60	0.221	0.242	
			Edge 2	20525	836.5	1	0	25.00	24.50	0.162	0.182	
						25	0	24.00	23.60	0.133	0.146	
			Edge 3	20525	836.5	1	0	25.00	24.50	0.174	0.195	
						25	0	24.00	23.60	0.139	0.152	
			Edge 4	20525	836.5	1	0	25.00	24.50	0.247	0.277	
						25	0	24.00	23.60	0.197	0.216	

10.8. LTE Band 7 (20MHz Bandwidth)

RF Exposure Conditions	Mode	Dist. (mm)	Test Position	Ch #.	Freq. (MHz)	RB Allocation	RB offest	Power (dBm)		1-g SAR (W/kg)		Plots No.
								Tune-up Limit	Meas.	Meas.	Scaled	
Head	QPSK	0	Left Touch	21100	2535.0	1	0	23.00	22.73	0.096	0.102	
						50	0	23.00	22.75	0.097	0.103	
			Left Tilt (15°)	21100	2535.0	1	0	23.00	22.73	0.067	0.071	
						50	0	23.00	22.75	0.073	0.077	
			Right Touch	21100	2535.0	1	0	23.00	22.73	0.156	0.166	22
						50	0	23.00	22.75	0.151	0.160	
			Right Tilt (15°)	21100	2535.0	1	0	23.00	22.73	0.041	0.044	
						50	0	23.00	22.75	0.042	0.045	
Body	QPSK	15	Rear	21100	2535.0	1	0	23.00	22.73	0.076	0.081	
						50	0	23.00	22.75	0.075	0.079	
			Front	21100	2535.0	1	0	23.00	22.73	0.127	0.135	23
						50	0	23.00	22.75	0.100	0.106	
Hotspot	QPSK	10	Rear	21100	2535.0	1	0	23.00	22.73	0.164	0.175	
						50	0	23.00	22.75	0.160	0.170	
			Front	21100	2535.0	1	0	23.00	22.73	0.192	0.204	
						50	0	23.00	22.75	0.191	0.202	
			Edge 2	21100	2535.0	1	0	23.00	22.73	0.131	0.139	
						50	0	23.00	22.75	0.124	0.131	
			Edge 3	21100	2535.0	1	0	23.00	22.73	0.523	0.557	24
						50	0	23.00	22.75	0.513	0.544	
			Edge 4	21100	2535.0	1	0	23.00	22.73	0.048	0.051	
						50	0	23.00	22.75	0.052	0.055	

10.9. LTE Band 13 (10MHz Bandwidth)

RF Exposure Conditions	Mode	Dist. (mm)	Test Position	Ch #.	Freq. (MHz)	RB Allocation	RB offest	Power (dBm)		1-g SAR (W/kg)		Plots No.
								Tune-up Limit	Meas.	Meas.	Scaled	
Head	QPSK	0	Left Touch	23230	782.0	1	49	25.0	24.83	0.192	0.200	
						25	12	24.0	23.51	0.161	0.180	
			Left Tilt (15°)	23230	782.0	1	49	25.0	24.83	0.083	0.086	
						25	12	24.0	23.51	0.073	0.081	
			Right Touch	23230	782.0	1	49	25.0	24.83	0.238	0.248	25
						25	12	24.0	23.51	0.195	0.218	
			Right Tilt (15°)	23230	782.0	1	49	25.0	24.83	0.091	0.095	
						25	12	24.0	23.51	0.076	0.085	
Body-worn	QPSK	15	Rear	23230	782.0	1	49	25.0	24.83	0.245	0.255	
						25	12	24.0	23.51	0.201	0.225	
			Front	23230	782.0	1	49	25.0	24.83	0.250	0.260	26
						25	12	24.0	23.51	0.204	0.228	
Hotspot	QPSK	10	Rear	23230	782.0	1	49	25.0	24.83	0.359	0.374	
						25	12	24.0	23.51	0.298	0.333	
			Front	23230	782.0	1	49	25.0	24.83	0.364	0.379	
						25	12	24.0	23.51	0.298	0.333	
			Edge 2	23230	782.0	1	49	25.0	24.83	0.170	0.177	
						25	12	24.0	23.51	0.140	0.157	
			Edge 3	23230	782.0	1	49	25.0	24.83	0.166	0.173	
						25	12	24.0	23.51	0.140	0.157	
			Edge 4	23230	782.0	1	49	25.0	24.83	0.371	0.386	27
						25	12	24.0	23.51	0.295	0.330	

10.10. LTE Band 17 (10MHz Bandwidth)

RF Exposure Conditions	Mode	Dist. (mm)	Test Position	Ch #.	Freq. (MHz)	RB Allocation	RB offest	Power (dBm)		1-g SAR (W/kg)		Plots No.
								Tune-up Limit	Meas.	Meas.	Scaled	
Head	QPSK	0	Left Touch	23790	710.0	1	49	25.0	24.57	0.130	0.144	28
						25	0	24.0	23.51	0.108	0.121	
			Left Tilt (15°)	23790	710.0	1	49	25.0	24.57	0.068	0.075	
						25	0	24.0	23.51	0.060	0.067	
			Right Touch	23790	710.0	1	49	25.0	24.57	0.119	0.132	
						25	0	24.0	23.51	0.097	0.108	
			Right Tilt (15°)	23790	710.0	1	49	25.0	24.57	0.064	0.071	
						25	0	24.0	23.51	0.053	0.060	
Body-worn	QPSK	15	Rear	23790	710.0	1	49	25.0	24.57	0.170	0.188	
						25	0	24.0	23.51	0.151	0.169	
			Front	23790	710.0	1	49	25.0	24.57	0.196	0.217	29
						25	0	24.0	23.51	0.171	0.192	
Hotspot	QPSK	10	Rear	23790	710.0	1	49	25.0	24.57	0.263	0.291	
						25	0	24.0	23.51	0.231	0.259	
			Front	23790	710.0	1	49	25.0	24.57	0.300	0.332	30
						25	0	24.0	23.51	0.241	0.270	
			Edge 2	23790	710.0	1	49	25.0	24.57	0.112	0.124	
						25	0	24.0	23.51	0.087	0.098	
			Edge 3	23790	710.0	1	49	25.0	24.57	0.099	0.110	
						25	0	24.0	23.51	0.085	0.095	
			Edge 4	23790	710.0	1	49	25.0	24.57	0.261	0.288	
						25	0	24.0	23.51	0.230	0.258	

10.11. LTE Band 41 (20MHz Bandwidth)

RF Exposure Conditions	Mode	Dist. (mm)	Test Position	Ch #.	Freq. (MHz)	RB Allocation	RB offest	Power (dBm)		1-g SAR (W/kg)		Plots No.
								Tune-up Limit	Meas.	Meas.	Scaled	
Head	QPSK	0	Left Touch	40620	2593.0	1	0	23.00	22.79	0.039	0.041	
						50	0	23.00	22.71	0.037	0.040	
			Left Tilt	40620	2593.0	1	0	23.00	22.79	0.036	0.038	
						50	0	23.00	22.71	0.035	0.037	
			Right Touch	40620	2593.0	1	0	23.00	22.79	0.071	0.075	31
						50	0	23.00	22.71	0.069	0.074	
			Right Tilt	40620	2593.0	1	0	23.00	22.79	0.015	0.016	
						50	0	23.00	22.71	0.018	0.019	
Body-worn	QPSK	15	Rear	40620	2593.0	1	0	23.00	22.79	0.066	0.069	
						50	0	23.00	22.71	0.065	0.069	
			Front	40620	2593.0	1	0	23.00	22.79	0.071	0.075	
						50	0	23.00	22.71	0.073	0.078	32
Hotspot	QPSK	10	Rear	40620	2593.0	1	0	23.00	22.79	0.127	0.133	
						50	0	23.00	22.71	0.088	0.094	
			Front	40620	2593.0	1	0	23.00	22.79	0.137	0.144	
						50	0	23.00	22.71	0.135	0.144	
			Edge 2	40620	2593.0	1	0	23.00	22.79	0.104	0.109	
						50	0	23.00	22.71	0.100	0.107	
			Edge 3	40620	2593.0	1	0	23.00	22.79	0.269	0.282	
						50	0	23.00	22.71	0.268	0.286	33
			Edge 4	40620	2593.0	1	0	23.00	22.79	0.028	0.029	
						50	0	23.00	22.71	0.029	0.031	

10.12. Wi-Fi (DTS Band)

RF Exposure Conditions	Mode	Antenna	Dist. (mm)	Test Position	Ch #.	Freq. (MHz)	Area Scan Max. SAR (W/kg)	Duty Cycle Factor	Power (dBm)		1-g SAR (W/kg)		Plots No.
									Tune-up Limit	Meas.	Meas.	Scaled	
Head	802.11b 1 Mbps	Chain 0	0	Left Touch	6	2437	0.103	1.007	12.01	11.10			
				Left Tilt	6	2437	0.118	1.007	12.01	11.10			
				Right Touch	6	2437	0.372	1.007	12.01	11.10	0.210	0.261	34
				Right Tilt	6	2437	0.302	1.007	12.01	11.10			
Body-worn	802.11b 1 Mbps	Chain 0	15	Rear	6	2437	0.013	1.007	12.01	11.10			
				Front	6	2437	0.025	1.007	12.01	11.10	0.020	0.025	35
Hotspot	802.11b 1 Mbps	Chain 0	10	Rear	6	2437	0.033	1.007	12.01	11.10			
				Front	6	2437	0.051	1.007	12.01	11.10			
				Edge 1	6	2437	0.034	1.007	12.01	11.10			
				Edge 4	6	2437	0.060	1.007	12.01	11.10	0.049	0.061	36
Head	802.11b 1 Mbps	Chain 1	0	Left Touch	6	2437	0.054	1.007	9.68	9.20	0.021	0.024	37
				Left Tilt	6	2437	0.047	1.007	9.68	9.20			
				Right Touch	6	2437	0.042	1.007	9.68	9.20			
				Right Tilt	6	2437	0.025	1.007	9.68	9.20			
Body-worn	802.11b 1 Mbps	Chain 1	15	Rear	6	2437	<0.001	1.007	9.68	9.20			
				Front	6	2437	0.001	1.007	9.68	9.20	-	-	38
Hotspot	802.11b 1 Mbps	Chain 1	10	Rear	6	2437	<0.001	1.007	9.68	9.20			
				Front	6	2437	0.005	1.007	9.68	9.20			
				Edge 2	6	2437	0.007	1.007	9.68	9.20	0.002	0.002	39

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.

10.13. 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 Factor	Power (dBm)		1-g SAR (W/kg)		Plot No.
									Tune-up Limit	Meas.	Meas.	Scaled	
Head	802.11n HT 40	Chain 0	0	Left Touch	54	5270	0.243	1.076	13.36	11.80			
				Left Tilt	54	5270	0.209	1.076	13.36	11.80			
				Right Touch	54	5270	0.323	1.076	13.36	11.80	0.172	0.265	40
				Right Tilt	54	5270	0.313	1.076	13.36	11.80			
Body-worn	802.11n HT 40	Chain 0	15	Rear	54	5270	0.110	1.076	13.36	11.80	0.035	0.054	41
				Front	54	5270	0.047	1.076	13.36	11.80			
Head	802.11n HT 20	Chain 1	0	Left Touch	44	5220	0.034	1.023	11.06	9.50	0.010	0.014	42
				Left Tilt	44	5220	0.006	1.023	11.06	9.50			
				Right Touch	44	5220	0.023	1.023	11.06	9.50			
				Right Tilt	44	5220	0.006	1.023	11.06	9.50			
Body-worn	802.11n HT 20	Chain 1	15	Rear	44	5220	0.010	1.023	11.06	9.50	-	-	43
				Front	44	5220	0.010	1.023	11.06	9.50			
RF Exposure Conditions	Mode	Antenna	Dist. (mm)	Test Position	Ch #.	Freq. (MHz)	Area Scan Max. SAR (W/kg)	Duty Cycle Factor	Power (dBm)		10-g SAR (W/kg)		Plot No.
									Tune-up Limit	Meas.	Meas.	Scaled	
Product Specific	802.11n HT 40	Chain 0	0	Rear	54	5270	0.544	1.076	13.36	11.80			
				Front	54	5270	1.500	1.076	13.36	11.80	0.129	0.199	44
				Edge 1	54	5270	0.319	1.076	13.36	11.80			
				Edge 4	54	5270	0.757	1.076	13.36	11.80			
Product Specific	802.11n HT 20	Chain 1	0	Rear	44	5220	0.150	1.023	11.06	9.50			
				Front	44	5220	0.277	1.023	11.06	9.50	0.016	0.023	45
				Edge 1	44	5220	0.012	1.023	11.06	9.50			
				Edge 2	44	5220	0.096	1.023	11.06	9.50			

Notes:

1. For results listed with "-", the SAR result is less than 0.001 W/kg.
2. 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.

U-NII-2C

RF Exposure Conditions	Mode	Antenna	Dist. (mm)	Test Position	Ch #.	Freq. (MHz)	Area Scan Max. SAR (W/kg)	Duty Cycle Factor	Power (dBm)		1-g SAR (W/kg)		Plot No.
									Tune-up Limit	Meas.	Meas.	Scaled	
Head	802.11a	Chain 0	0	Left Touch	100	5500	0.122	1.018	11.31	11.10			
				Left Tilt	100	5500	0.083	1.018	11.31	11.10			
				Right Touch	100	5500	0.142	1.018	11.31	11.10	0.042	0.045	46
				Right Tilt	100	5500	0.104	1.018	11.31	11.10			
Body-worn	802.11a	Chain 0	15	Rear	100	5500	0.090	1.018	11.31	11.10	0.028	0.030	47
				Front	100	5500	0.022	1.018	11.31	11.10			
Head	802.11a	Chain 1	0	Left Touch	100	5500	0.0887	1.018	9.64	8.30	0.030	0.042	48
				Left Tilt	100	5500	0.037	1.018	9.64	8.30			
				Right Touch	100	5500	0.047	1.018	9.64	8.30			
				Right Tilt	100	5500	0.011	1.018	9.64	8.30			
Body-worn	802.11a	Chain 1	15	Rear	100	5500	0.0124	1.018	9.64	8.30			
				Front	100	5500	0.0150	1.018	9.64	8.30	0.006	0.008	49
RF Exposure Conditions	Mode	Antenna	Dist. (mm)	Test Position	Ch #.	Freq. (MHz)	Area Scan Max. SAR (W/kg)	Duty Cycle Factor	Power (dBm)		10-g SAR (W/kg)		Plot No.
									Tune-up Limit	Meas.	Meas.	Scaled	
Product Specific	802.11a	Chain 0	0	Rear	100	5500	0.515	1.018	11.31	11.10	0.070	0.075	50
				Front	100	5500	0.364	1.018	11.31	11.10			
				Edge 1	100	5500	0.112	1.018	11.31	11.10			
				Edge 4	100	5500	0.388	1.018	11.31	11.10			
Product Specific	802.11a	Chain 1	0	Rear	100	5500	0.3330	1.018	9.64	8.30	0.026	0.036	51
				Front	100	5500	0.2250	1.018	9.64	8.30			
				Edge 1	100	5500	0.0143	1.018	9.64	8.30			
				Edge 2	100	5500	0.1360	1.018	9.64	8.30			

U-NII-3

RF Exposure Conditions	Mode	Antenna	Dist. (mm)	Test Position	Ch #.	Freq. (MHz)	Area Scan Max. SAR (W/kg)	Duty Cycle Factor	Power (dBm)		1-g SAR (W/kg)		Plot No.
									Tune-up Limit	Meas.	Meas.	Scaled	
Head	802.11ac VHT 80	Chain 0	0	Left Touch	155	5775	0.132	1.154	13.25	11.50	0.041	0.071	52
				Left Tilt	155	5775	0.124	1.154	13.25	11.50			
				Right Touch	155	5775	0.121	1.154	13.25	11.50			
				Right Tilt	155	5775	0.112	1.154	13.25	11.50			
Body-worn	802.11ac VHT 80	Chain 0	15	Rear	155	5775	0.0422	1.154	13.25	11.50	0.013	0.022	53
				Front	155	5775	0.0132	1.154	13.25	11.50			
Head	802.11n HT 40	Chain 1	0	Left Touch	159	5795	0.098	1.076	10.23	9.90	0.046	0.053	54
				Left Tilt	159	5795	0.025	1.076	10.23	9.90			
				Right Touch	159	5795	0.048	1.076	10.23	9.90			
				Right Tilt	159	5795	0.017	1.076	10.23	9.90			
Body-worn	802.11n HT 40	Chain 1	15	Rear	159	5795	0.013	1.076	10.23	9.90			
				Front	159	5795	0.017	1.076	10.23	9.90	-	-	55

RF Exposure Conditions	Mode	Antenna	Dist. (mm)	Test Position	Ch #.	Freq. (MHz)	Area Scan Max. SAR (W/kg)	Duty Cycle Factor	Power (dBm)		10-g SAR (W/kg)		Plot No.
									Tune-up Limit	Meas.	Meas.	Scaled	
Product Specific	802.11ac VHT 80	Chain 0	0	Rear	155	5775	0.432	1.154	13.25	11.50	0.058	0.100	56
				Front	155	5775	0.290	1.154	13.25	11.50			
				Edge 1	155	5775	0.206	1.154	13.25	11.50			
				Edge 4	155	5775	0.413	1.154	13.25	11.50			
Product Specific	802.11n HT 40	Chain 1	0	Rear	159	5795	0.458	1.076	10.23	9.90	0.052	0.060	57
				Front	159	5795	0.252	1.076	10.23	9.90			
				Edge 1	159	5795	0.010	1.076	10.23	9.90			
				Edge 2	159	5795	0.173	1.076	10.23	9.90			

Notes:

1. For results listed with "-", the SAR result is less than 0.001 W/kg.

10.14. Bluetooth

RF Exposure Conditions	Mode	Antenna	Dist. (mm)	Test Position	Ch #.	Freq. (MHz)	Duty Cycle	Power (dBm)		1-g SAR (W/kg)		Plot No.
								Tune-up Limit	Meas.	Meas.	Scaled	
Head	GFSK	Chain 0	0	Left Touch	39	2441	1.299	11.73	10.74	0.050	0.082	
				Left Tilt	39	2441	1.299	11.73	10.74	0.042	0.069	
				Right Touch	39	2441	1.299	11.73	10.74	0.190	0.311	58
				Right Tilt	39	2441	1.299	11.73	10.74	0.128	0.209	
Body-worn	GFSK	Chain 0	15	Rear	39	2441	1.299	11.73	10.74	0.005	0.008	
				Front	39	2441	1.299	11.73	10.74	0.012	0.020	59
Hotspot	GFSK	Chain 0	10	Rear	39	2441	1.299	11.73	10.74	0.012	0.020	
				Front	39	2441	1.299	11.73	10.74	0.031	0.051	60
				Edge 1	39	2441	1.299	11.73	10.74	0.013	0.021	
				Edge 4	39	2441	1.299	11.73	10.74	0.031	0.051	

11. SAR Measurement Variability

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

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

Frequency Band (MHz)	Air Interface	RF Exposure Conditions	Test Position	Repeated SAR (Yes/No)	Highest Measured SAR (W/kg)
700	LTE Band 13	Hotspot	Edge 4	No	0.371
	LTE Band 17	Hotspot	Front	No	0.300
850	GSM 850	Hotspot	Rear	No	0.329
	WCDMA Band V	Hotspot	Front	No	0.292
	LTE Band 5	Hotspot	Rear	No	0.288
1700	WCDMA Band IV	Hotspot	Edge 3	No	0.391
	LTE Band 4	Hotspot	Front	No	0.301
1900	GSM 1900	Hotspot	Edge 3	No	0.430
	WCDMA Band II	Hotspot	Edge 3	No	0.614
2400	Wi-Fi 802.11b/g/n	Head	Right Touch	No	0.210
2400	BT	Head	Right Touch	No	0.190
2500	LTE Band 7	Hotspot	Edge 3	No	0.523
2600	LTE Band 41	Hotspot	Edge 3	No	0.268
5200	Wi-Fi 802.11a/n/ac	Head	Left Touch	No	0.010
5300	Wi-Fi 802.11a/n/ac	Head	Right Touch	No	0.172
5500	Wi-Fi 802.11a/n/ac	Head	Right Touch	No	0.042
5800	Wi-Fi 802.11a/n/ac	Head	Left Touch	No	0.046

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)
5200	Wi-Fi 802.11a/n/ac	Product specific	Rear	No	0.016
5300	Wi-Fi 802.11a/n/ac	Product specific	Rear	No	0.129
5500	Wi-Fi 802.11a/n/ac	Product specific	Rear	No	0.070
5800	Wi-Fi 802.11a/n/ac	Product specific	Rear	No	0.058

Note(s):

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

12. Simultaneous Transmission SAR Analysis

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

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

Where:

SAR_1 is the highest reported or estimated SAR for the first of a pair of simultaneous transmitting antennas, in a specific test operating mode and exposure condition

SAR_2 is the highest reported or estimated SAR for the second of a pair of simultaneous transmitting antennas, in the same test operating mode and exposure condition as the first

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

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

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

Simultaneous Transmission Condition

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

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

RF Exposure conditions	Test Position	Standalone SAR (W/kg)						∑ 1-g SAR (W/kg)					
		WWAN	DTS		U-NII		BT	WWAN + BT	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 + ③	① + ②+ ⑤	① + ④ + ⑤	① + ④ + ⑤ + ⑥	④ + ⑤ + ⑥
Head	Left Touch	0.200	0.261	0.024	0.071	0.053	0.082	0.282	0.485	0.514	0.324	0.406	0.206
	Left Tilt	0.086	0.261	0.024	0.265	0.053	0.069	0.155	0.371	0.400	0.404	0.473	0.387
	Right Touch	0.248	0.261	0.024	0.265	0.053	0.311	0.559	0.533	0.562	0.566	0.877	0.629
	Right Tilt	0.095	0.261	0.024	0.265	0.053	0.209	0.304	0.380	0.409	0.413	0.622	0.527
Body-worn	Rear	0.256	0.025	0.001	0.054	0.008	0.008	0.264	0.282	0.289	0.318	0.326	0.070
	Front	0.260	0.025	0.001	0.054	0.008	0.020	0.280	0.286	0.293	0.322	0.342	0.082
Hotspot	Rear	0.374	0.061	0.002			0.020	0.394	0.437				
	Front	0.379	0.061	0.002			0.051	0.430	0.442				
	Edge 2	0.182	0.061	0.002			0.051	0.233	0.245				
	Edge 3	0.673	0.061	0.002			0.051	0.724	0.736				
	Edge 4	0.386	0.061	0.002			0.051	0.437	0.449				

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.

12132753-S1V1 Appendix A: SAR Setup Photos

12132753-S1V1 Appendix B: SAR System Check Plots

12132753-S1V1 Appendix C: Highest SAR Test Plots

12132753-S1V1 Appendix D: SAR Liquid Tissue Ingredients

12132753-S1V1 Appendix E: SAR Probe Calibration Certificates

12132753-S1V1 Appendix F: SAR Dipole Calibration Certificates

END OF REPORT