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: PY7-11821Y

Report Number: 12132671-S1V2
Issue Date: 3/7/2018

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	3/5/2018	Initial Issue	--
V2	3/7/2018	Report revised based on reviewer's feedback Sec. 6.2: Added note. Sec. 7: Updated. Sec. 10.3: Corrected typo. Sec. 10.12 and 10.13: Updated.	Chakrit Thammanavarat

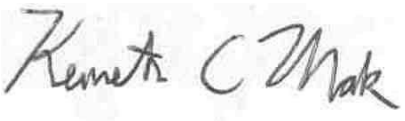
Table of Contents

1. Attestation of Test Results

Applicant Name	SONY MOBILE COMMUNICATIONS INC.			
FCC ID	PY7-11821Y			
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	0.348	0.350	0.532	0.105
Body-worn	0.318	0.027	0.059	0.012
Hotspot/Wi-Fi Direct	0.672	0.108	N/A	0.067
Product specific 10g SAR	N/A	N/A	0.381	N/A
Simultaneous TX	1.101	0.816	1.101	1.101
Date Tested	2/12/2018 to 2/23/2018			
Test Results	Pass			

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

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

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

2. Test Specification, Methods and Procedures

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

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

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

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

3. Facilities and Accreditation

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

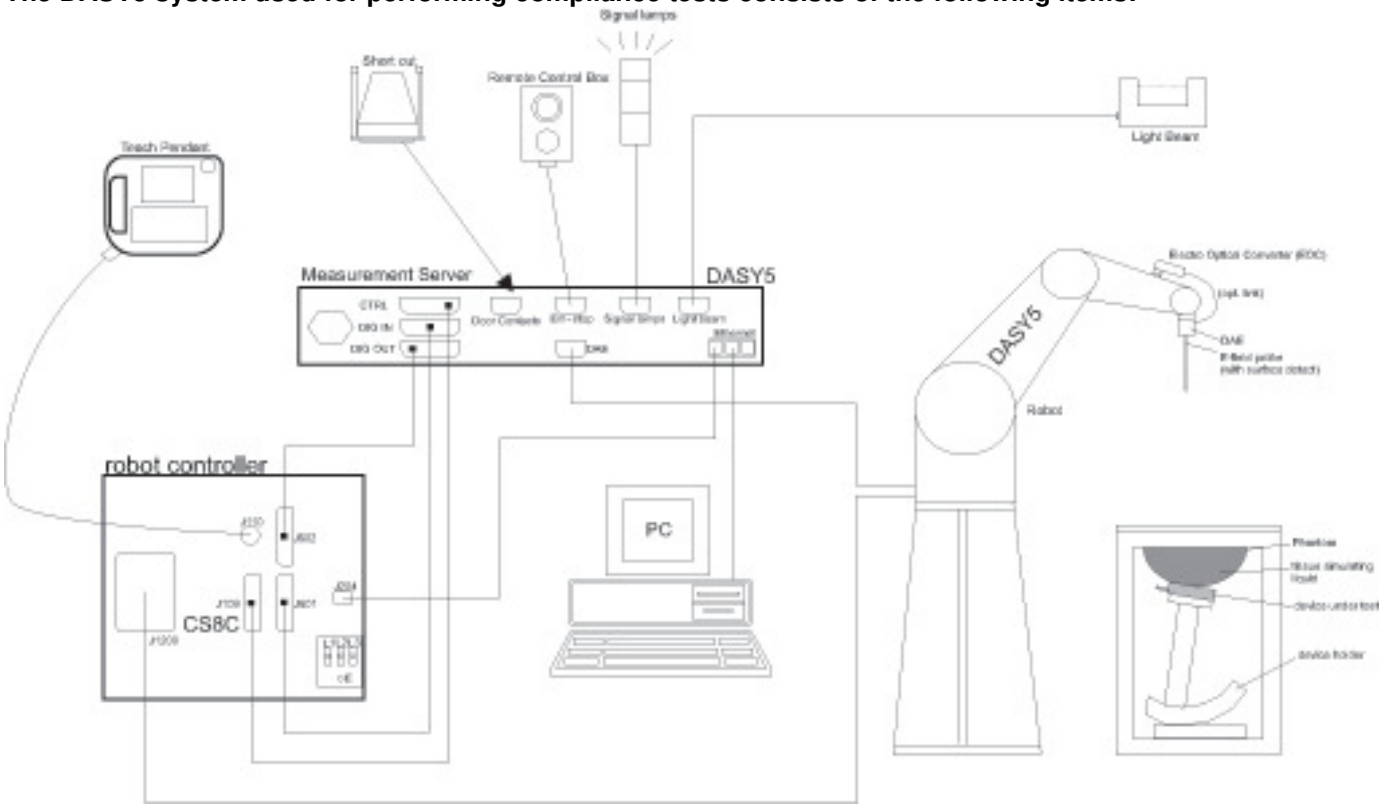
47173 Benicia Street	47266 Benicia Street
SAR Lab A	SAR Lab 1
SAR Lab B	SAR Lab 2
SAR Lab C	SAR Lab 3
SAR Lab D	SAR Lab 4
SAR Lab E	
SAR Lab F	
SAR Lab G	
SAR Lab H	

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

4. SAR Measurement System & Test Equipment

4.1. SAR Measurement System

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



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

4.2. SAR Scan Procedures

Step 1: Power Reference Measurement

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

Step 2: Area Scan

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

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

	≤ 3 GHz	> 3 GHz
Maximum distance from closest measurement point (geometric center of probe sensors) to phantom surface	5 ± 1 mm	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	MY53020038	4/13/2018
DC Power Supply	HP	6296A	2841A-05955	N/A
Amplifier	MITEQ	AMF-4D-00400600-50-30P	1795093	N/A
Directional coupler	Werlatone	C8060-102	2149	N/A
Synthesized Signal Generator	Agilent	N5181A	MY50140630	5/16/2018
Power Meter	HP	437B	3125U12345	8/10/2018
Power Meter	HP	437B	3125U11347	8/15/2018
Power Sensor	HP	8481A	3318A92374	8/15/2018
Power Sensor	HP	8481A	1926A27048	8/10/2018
Amplifier	MITEQ	AMF-4D-00400600-50-30P	1795092	N/A
Directional coupler	Werlatone	C8060-102	2141	N/A
DC Power Supply	BK Precision	1611	215-02292	N/A

Lab Equipment

Name of Equipment	Manufacturer	Type/Model	Serial No.	Cal. Due Date
E-Field Probe (SAR Lab A)	SPEAG	EX3DV4	7463	7/5/2018
E-Field Probe (SAR Lab B)	SPEAG	EX3DV4	7335	3/15/2018
E-Field Probe (SAR Lab C)	SPEAG	EX3DV4	3929	3/15/2018
E-Field Probe (SAR Lab D)	SPEAG	EX3DV4	7356	4/21/2018
E-Field Probe (SAR Lab E)	SPEAG	EX3DV4	3989	1/16/2019
E-Field Probe (SAR Lab F)	SPEAG	EX3DV4	3773	4/21/2018
E-Field Probe (SAR Lab G)	SPEAG	EX3DV4	3871	8/23/2018
E-Field Probe (SAR Lab H)	SPEAG	EX3DV4	7483	12/12/2018
Data Acquisition Electronics (SAR Lab A)	SPEAG	DAE4	1434	4/19/2018
Data Acquisition Electronics (SAR Lab B)	SPEAG	DAE4	1380	7/24/2018
Data Acquisition Electronics (SAR Lab C)	SPEAG	DAE4	1343	8/21/2018
Data Acquisition Electronics (SAR Lab D)	SPEAG	DAE4	1352	11/8/2018
Data Acquisition Electronics (SAR Lab E)	SPEAG	DAE4	1259	1/10/2019
Data Acquisition Electronics (SAR Lab F)	SPEAG	DAE4	1377	10/11/2018
Data Acquisition Electronics (SAR Lab G)	SPEAG	DAE4	1472	3/10/2018
Data Acquisition Electronics (SAR Lab H)	SPEAG	DAE4	1257	10/11/2018
System Validation Dipole	SPEAG	D750V3	1019	3/13/2018
System Validation Dipole	SPEAG	D835V2	4d117	5/22/2018
System Validation Dipole	SPEAG	D900V2	1d143	10/5/2018
System Validation Dipole	SPEAG	D1750V2	1050	4/18/2018
System Validation Dipole	SPEAG	D1900V2	5d140	4/19/2018
System Validation Dipole	SPEAG	D1900V2	5d043	11/22/2018
System Validation Dipole	SPEAG	D2300V2	1058	8/31/2018
System Validation Dipole	SPEAG	D2450V2	899	3/10/2018
System Validation Dipole	SPEAG	D2600V2	1036	3/10/2018
System Validation Dipole	SPEAG	D2600V2	1006	10/5/2018
System Validation Dipole	SPEAG	D5GHzV2	1168	11/23/2018

Other

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

Note(s):

*Equipment not used past calibration due date.

5. Measurement Uncertainty

Per KDB 865664 D01 SAR Measurement 100 MHz to 6 GHz, when the highest measured 1-g SAR within a frequency band is < 1.5 W/kg and the measured 10-g SAR within a frequency band is < 3.75 W/kg. The expanded SAR measurement uncertainty must be ≤ 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** BH90003VBB / FCC SAR GSM/UMTS / Conducted BH900032BB / FCC SAR LTE LB/MB / Conducted BH90009EBB / WLAN 2.4GHz #1 / Conducted BH900050BB / WLAN 2.4GHz #2 / Conducted BH900039BB / WLAN 5GHz #1 / Conducted BH900036BB / WLAN 5GHz #2 / Conducted BH90005TBB / FCC SAR LTE LB # 1 / Radiated BH9000BJBB / FCC SAR LTE LB # 2 / Radiated BH900021BB / FCC SAR LTE MB # 1 / Radiated BH900094B8 / FCC SAR LTE MB # 2 / Radiated BH90004KB8 / FCC SAR LTE HB/UHB # 1 / Radiated BH90009RB8 / FCC SAR LTE HB/UHB # 2 / Radiated BH9000CBBB / SAR WLAN 2.4GHz # 1 / Radiated BH9000DTBB / SAR WLAN 2.4GHz # 2 / Radiated BH90006LBB / SAR WLAN 2.4GHz # 3 / Radiated BH90005YBB / SAR WLAN 2.4GHz # 4 / Radiated BH90005SBB / SAR WLAN 5GHz # 1 / Radiated BH9000DZBB / SAR WLAN 5GHz # 2 / Radiated BH900025BB / SAR WLAN 5GHz # 3 / Radiated BH90005NBB / SAR WLAN 5GHz # 4 / Radiated BH90007RBB / FCC SAR MB GSM/UMTS #1 / Radiated BH9000CRBB / FCC SAR MB GSM/UMTS #2 / Radiated BH900083BB / FCC SAR LB GSM/UMTS #1 / Radiated BH900067BB / FCC SAR LB GSM/UMTS #2 / Radiated
Hardware Version	A
Software Version	0.202

6.2. Wireless Technologies

Wireless technologies	Frequency bands	Operating mode		Duty Cycle used for SAR testing
GSM	850 1900	Voice (GMSK) GPRS (GMSK) EGPRS (8PSK)	Multi-Slot Class: ☐ Class 8 - 1 Up, 4 Down ☐ Class 10 - 2 Up, 4 Down ☐ Class 12 - 4 Up, 4 Down ☒ Class 33 - 4 Up, 5 Down	GSM Voice: 12.5% (E)GPRS: 1 Slot: 12.5% 2 Slots: 25% 3 Slots: 37.5% 4 Slots: 50%
	Does this device support DTM (Dual Transfer Mode)? ☒ Yes ☐ No			
W-CDMA (UMTS)	Band V	UMTS Rel. 99 (Voice & Data) HSDPA (Rel. 5) HSUPA (Rel. 6) HSPA+ (Rel. 9)		100%
LTE	FDD Band 4 FDD Band 5 FDD Band 7 FDD Band 12 FDD Band 13 FDD Band 17 TDD Band 41	QPSK 16QAM 64AQM Does not support Carrier Aggregation (CA)		100% (FDD) 63.3% (TDD) Refer to §6.4.
	Does this device support SV-LTE (1xRTT-LTE)? ☐ Yes ☒ No			
Wi-Fi	2.4 GHz	802.11b 802.11g 802.11n (HT20)		99.35% (802.11b) [1] 98.11% (802.11g) [1] 97.70% (802.11n) [1]
	5 GHz	802.11a 802.11n (HT20) 802.11n (HT40) 802.11ac (VHT20) 802.11ac (VHT40) 802.11ac (VHT80)		98.16% (802.11a) [1] 97.93% (802.11n HT20) [1] 93.47% (802.11n HT40) [1] 88.44% (802.11ac VHT80) [1]
	Does this device support bands 5.60 ~ 5.65 GHz? ☒ Yes ☐ No			
	Does this device support Band gap channel(s)? ☒ Yes ☐ No			
Bluetooth	2.4 GHz	Version 5.0 LE		76.88%(DH5)

Notes:

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

6.3. General LTE SAR Test and Reporting Considerations

Item	Description						
Frequency range, Channel Bandwidth, Numbers and Frequencies	Band 4	Frequency range: 1710 - 1755 MHz					
		Channel Bandwidth					
		20 MHz	15 MHz	10 MHz	5 MHz	3 MHz	1.4 MHz
	Low	20050/ 1720	20025/ 1717.5	20000/ 1715	19975/ 1712.5	19965/ 1711.5	19957/ 1710.7
	Mid	20175/ 1732.5	20175/ 1732.5	20175/ 1732.5	20175/ 1732.5	20175/ 1732.5	20175/ 1732.5
	High	20300/ 1745	20325/ 1747.5	20350/ 1750	20375/ 1752.5	20385/ 1753.5	20393/ 1754.3
	Band 5	Frequency range: 824 - 849 MHz					
		Channel Bandwidth					
		20 MHz	15 MHz	10 MHz	5 MHz	3 MHz	1.4 MHz
	Low			20450/ 829	20425/ 826.5	20415/ 825.5	20407/ 824.7
	Mid			20525/ 836.5	20525/ 836.5	20525/ 836.5	20525/ 836.5
	High			20600/ 844	20625/ 846.5	20635/ 847.5	20643/ 848.3
	Band 7	Frequency range: 2500 - 2570 MHz					
		Channel Bandwidth					
		20 MHz	15 MHz	10 MHz	5 MHz	3 MHz	1.4 MHz
	Low	20850 2510	20825 2507.5	20800 2505	20775 2502.5		
	Mid	21100 2535	21100 2535	21100 2535	21100 2535		
	High	21350 2560	21375 2562.5	21400 2565	21425 2567.5		
	Band 12	Frequency range: 699 – 716 MHz					
		Channel Bandwidth					
		20 MHz	15 MHz	10 MHz	5 MHz	3 MHz	1.4 MHz
	Low			23060/ 704	23035/ 701.5	23025/ 700.5	23017/ 699.7
	Mid			23095/ 707.5	23095/ 707.5	23095/ 707.5	23095/ 707.5
	High			23130/ 711	23155/ 713.5	23165/ 714.5	23173/ 715.3
	Band 13	Frequency range: 777 - 787 MHz					
		Channel Bandwidth					
		20 MHz	15 MHz	10 MHz	5 MHz	3 MHz	1.4 MHz
	Low				23205/ 779.5		
	Mid			23230/ 782	23230/ 782		
	High				23255/ 784.5		

General LTE SAR Test and Reporting Considerations (Continued)

Frequency range, Channel Bandwidth, Numbers and Frequencies

Band 17	Frequency range: 704 - 716 MHz					
	Channel Bandwidth					
	20 MHz	15 MHz	10 MHz	5 MHz	3 MHz	1.4 MHz
Low			23780/ 709	23755/ 706.5		
Mid			23790/ 710	23790/ 710		
High			23800/ 711	23825/ 713.5		

Band 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					

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**

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

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.

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.

7. RF Exposure Conditions (Test Configurations)

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

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

Notes:

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.

RF Exposure Conditions (Test Configurations) continued:

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

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	2/13/2018	900	Head	900	42.11	41.50	1.47	1.00	0.97	2.58
				805	43.28	41.68	3.84	0.90	0.90	0.39
				915	41.99	41.50	1.18	1.01	0.98	3.27
A	2/19/2018	900	Head	900	40.90	41.50	-1.45	1.00	0.97	3.51
				805	42.14	41.68	1.10	0.92	0.90	2.48
				915	40.73	41.50	-1.86	1.02	0.98	4.18
A	2/19/2018	835	Body	835	52.86	55.20	-4.24	0.98	0.97	0.90
				805	53.34	55.33	-3.60	0.95	0.97	-1.44
				905	52.32	55.00	-4.87	1.05	1.05	0.14
B	2/13/2018	1900	Head	1900	37.48	40.00	-6.30	1.44	1.40	2.50
				1850	37.66	40.00	-5.85	1.40	1.40	-0.14
				1980	37.17	40.00	-7.07	1.51	1.40	7.64
B	2/14/2018	1900	Head	1900	36.43	40.00	-8.93	1.45	1.40	3.64
				1850	36.57	40.00	-8.58	1.41	1.40	0.57
				1980	36.09	40.00	-9.77	1.53	1.40	9.21
B	2/15/2018	1900	Head	1900	36.74	40.00	-8.15	1.47	1.40	4.86
				1850	36.88	40.00	-7.80	1.43	1.40	1.93
				1980	36.43	40.00	-8.93	1.54	1.40	9.86
B	2/15/2018	1900	Body	1900	51.07	53.30	-4.18	1.63	1.52	7.50
				1850	51.28	53.30	-3.79	1.60	1.52	4.93
				1920	51.05	53.30	-4.22	1.65	1.52	8.68
D	2/12/2018	1750	Head	1750	39.80	40.08	-0.71	1.36	1.37	-0.80
				1710	39.93	40.15	-0.54	1.33	1.35	-1.07
				1755	39.74	40.08	-0.84	1.37	1.37	-0.50
D	2/12/2018	1750	Body	1750	53.34	53.44	-0.19	1.48	1.49	-0.14
				1710	53.56	53.54	0.03	1.43	1.46	-2.09
				1755	53.33	53.43	-0.18	1.49	1.49	-0.22
D	2/15/2018	750	Head	750	40.28	41.96	-4.01	0.90	0.89	0.65
				695	41.18	42.24	-2.52	0.85	0.89	-4.79
				790	39.90	41.76	-4.45	0.93	0.90	4.31
D	2/19/2018	750	Body	750	57.27	55.55	3.10	0.98	0.96	1.81
				695	57.60	55.76	3.30	0.93	0.96	-3.02
				790	56.99	55.39	2.88	1.01	0.97	4.54
D	2/19/2018	750	Head	750	40.34	41.96	-3.86	0.90	0.89	0.57
				695	41.15	42.24	-2.59	0.85	0.89	-4.53
				790	39.85	41.76	-4.57	0.93	0.90	4.01

SAR Lab	Date	Band (MHz)	Tissue Type	Frequency (MHz)	Relative Permittivity (εr)			Conductivity (σ)		
					Measured	Target	Delta (%)	Measured	Target	Delta (%)
E	2/14/2018	2600	Head	2600	39.23	39.01	0.56	1.97	1.96	0.35
				2495	39.57	39.14	1.09	1.86	1.85	0.51
				2690	38.93	38.90	0.08	2.07	2.06	0.46
E	2/19/2018	2600	Head	2600	39.56	39.01	1.41	1.91	1.96	-2.51
				2495	39.89	39.14	1.91	1.81	1.85	-2.31
				2690	39.28	38.90	0.98	2.00	2.06	-2.94
E	2/20/2018	2600	Body	2600	50.18	52.51	-4.44	2.13	2.16	-1.43
				2495	50.38	52.64	-4.30	2.02	2.01	0.14
				2690	50.02	52.40	-4.54	2.24	2.29	-2.11
F	2/15/2018	2450	Body	2450	52.29	52.70	-0.78	2.03	1.95	4.10
				2400	52.55	52.77	-0.42	1.96	1.90	3.42
				2480	52.18	52.66	-0.92	2.08	1.99	4.16
F	2/15/2018	2450	Head	2450	39.84	39.20	1.63	1.76	1.80	-2.50
				2400	40.05	39.30	1.92	1.71	1.75	-2.43
				2480	39.73	39.16	1.45	1.80	1.83	-1.82
F	2/19/2018	2450	Head	2450	39.04	39.20	-0.41	1.80	1.80	-0.06
				2400	39.23	39.30	-0.17	1.75	1.75	-0.27
				2480	38.93	39.16	-0.59	1.84	1.83	0.14
F	2/21/2018	2450	Body	2450	50.64	52.70	-3.91	1.98	1.95	1.44
				2400	50.81	52.77	-3.72	1.91	1.90	0.63
				2480	50.54	52.66	-4.03	2.02	1.99	1.20
G	2/14/2018	5800	Head	5800	36.39	35.30	3.09	5.19	5.27	-1.56
				5700	36.36	35.42	2.65	5.09	5.16	-1.41
				5850	36.23	35.30	2.63	5.26	5.27	-0.21
G	2/16/2018	5200	Head	5200	35.93	35.99	-0.17	4.63	4.65	-0.45
				5150	36.03	36.05	-0.05	4.56	4.60	-0.91
				5350	35.60	35.82	-0.61	4.77	4.80	-0.72
G	2/16/2018	5600	Head	5600	35.20	35.53	-0.94	5.03	5.06	-0.62
				5500	35.43	35.65	-0.61	4.91	4.96	-0.93
				5725	35.13	35.39	-0.74	5.17	5.19	-0.35
G	2/16/2018	5800	Head	5800	34.99	35.30	-0.88	5.25	5.27	-0.40
				5700	35.05	35.42	-1.04	5.15	5.16	-0.17
				5850	34.98	35.30	-0.91	5.31	5.27	0.70
G	2/16/2018	5200	Body	5200	47.88	49.02	-2.32	5.31	5.29	0.31
				5150	48.03	49.09	-2.15	5.25	5.24	0.28
				5350	47.57	48.82	-2.55	5.51	5.47	0.79
G	2/16/2018	5600	Body	5600	47.16	48.48	-2.72	5.84	5.76	1.34
				5500	47.34	48.61	-2.62	5.66	5.64	0.35
				5725	47.03	48.31	-2.65	6.01	5.91	1.73
G	2/16/2018	5800	Body	5800	46.86	48.20	-2.78	6.11	6.00	1.77
				5700	46.94	48.34	-2.90	5.97	5.88	1.62
				5850	46.92	48.20	-2.66	6.19	6.00	3.12

SAR Lab	Date	Band (MHz)	Tissue Type	Frequency (MHz)	Relative Permittivity (εr)			Conductivity (σ)		
					Measured	Target	Delta (%)	Measured	Target	Delta (%)
G	2/20/2018	5200	Head	5200	35.36	35.99	-1.75	4.61	4.65	-0.84
				5150	35.48	36.05	-1.57	4.58	4.60	-0.41
				5350	35.24	35.82	-1.62	4.79	4.80	-0.30
G	2/20/2018	5600	Head	5600	34.73	35.53	-2.26	5.02	5.06	-0.78
				5500	34.97	35.65	-1.90	4.92	4.96	-0.87
				5725	34.56	35.39	-2.35	5.15	5.19	-0.70
G	2/20/2018	5800	Head	5800	34.54	35.30	-2.15	5.21	5.27	-1.06
				5700	34.67	35.42	-2.12	5.13	5.16	-0.73
				5850	34.53	35.30	-2.18	5.27	5.27	0.06
G	2/20/2018	5200	Body	5200	48.06	49.02	-1.96	5.17	5.29	-2.28
				5150	48.20	49.09	-1.81	5.13	5.24	-2.11
				5350	47.98	48.82	-1.71	5.37	5.47	-1.77
G	2/20/2018	5600	Body	5600	47.48	48.48	-2.06	5.67	5.76	-1.58
				5500	47.74	48.61	-1.80	5.53	5.64	-2.12
				5725	47.23	48.31	-2.23	5.82	5.91	-1.55
G	2/20/2018	5800	Body	5800	47.35	48.20	-1.76	5.90	6.00	-1.62
				5700	47.46	48.34	-1.82	5.79	5.88	-1.56
				5850	47.28	48.20	-1.91	5.97	6.00	-0.45
H	2/16/2018	5600	Head	5600	36.05	35.53	1.45	4.96	5.06	-2.00
				5500	36.34	35.65	1.94	4.83	4.96	-2.54
				5725	36.04	35.39	1.83	5.08	5.19	-2.07
H	2/19/2018	5600	Head	5600	35.36	35.53	-0.49	5.04	5.06	-0.40
				5500	35.59	35.65	-0.16	4.96	4.96	0.04
				5725	35.32	35.39	-0.20	5.19	5.19	0.04

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	2/13/2018	Head	D900V2 SN:1d143	10/5/2018	1.100	11.00	10.27	7.11	0.710	7.10	6.60	7.58	1,2
A	2/19/2018	Head	D900V2 SN:1d143	10/5/2018	1.090	10.90	10.27	6.13	0.708	7.08	6.60	7.27	
A	2/19/2018	Body	D835V2 SN:4d117	5/22/2018	0.985	9.85	10.39	-5.20	0.650	6.50	6.76	-3.85	3,4
B	2/13/2018	Head	D1900V2 SN:5d140	4/19/2018	4.090	40.90	40.80	0.25	2.090	20.90	21.16	-1.23	5,6
B	2/15/2018	Body	D1900V2 SN:5d043	11/22/2018	4.380	43.80	41.00	6.83	2.250	22.50	20.90	7.66	7,8
D	2/12/2018	Head	D1750V2 SN:1050	4/18/2018	3.660	36.60	36.76	-0.44	1.930	19.30	19.60	-1.53	9,10
D	2/12/2018	Body	D1750V2 SN:1050	4/18/2018	3.770	37.70	37.68	0.05	1.990	19.90	19.92	-0.10	
D	2/15/2018	Head	D750V3 SN:1019	3/13/2018	0.843	8.43	8.22	2.55	0.552	5.52	5.39	2.41	
D	2/19/2018	Body	D750V3 SN:1019	3/13/2018	0.905	9.05	8.76	3.31	0.606	6.06	5.80	4.48	11,12
D	2/19/2018	Head	D750V3 SN:1019	3/13/2018	0.818	8.18	8.22	-0.49	0.536	5.36	5.39	-0.56	
E	2/14/2018	Head	D2600V2 SN:1036	3/10/2018	5.790	57.90	57.50	0.70	2.500	25.00	25.60	-2.34	
E	2/19/2018	Head	D2600V2 SN:1036	3/10/2018	5.420	54.20	57.50	-5.74	2.340	23.40	25.60	-8.59	13,14
E	2/21/2018	Body	D2600V2 SN:1006	10/5/2018	5.590	55.90	56.13	-0.41	2.420	24.20	25.00	-3.20	15,16
F	2/15/2018	Body	D2450V2 SN:899	3/10/2018	5.140	51.40	50.30	2.19	2.340	23.40	23.70	-1.27	
F	2/15/2018	Head	D2450V2 SN:899	3/10/2018	4.980	49.80	52.60	-5.32	2.230	22.30	24.60	-9.35	
F	2/19/2018	Head	D2450V2 SN:899	3/10/2018	5.180	51.80	52.60	-1.52	2.320	23.20	24.60	-5.69	
F	2/21/2018	Body	D2450V2 SN:899	3/10/2018	5.410	54.10	50.30	7.55	2.460	24.60	23.70	3.80	17,18
G	2/14/2018	Head	D5GHzV2 SN:1168 (5.8 GHz)	11/23/2018	7.380	73.80	79.10	-6.70	2.120	21.20	22.10	-4.07	
G	2/16/2018	Head	D5GHzV2 SN:1168 (5.2 GHz)	11/23/2018	7.670	76.70	80.90	-5.19	2.200	22.00	22.80	-3.51	
G	2/16/2018	Head	D5GHzV2 SN:1168 (5.6 GHz)	11/23/2018	7.920	79.20	87.20	-9.17	2.240	22.40	24.40	-8.20	
G	2/16/2018	Head	D5GHzV2 SN:1168 (5.8 GHz)	11/23/2018	7.550	75.50	79.10	-4.55	2.150	21.50	22.10	-2.71	
G	2/16/2018	Body	D5GHzV2 SN:1168 (5.2 GHz)	11/23/2018	7.090	70.90	70.70	0.28	1.990	19.90	19.70	1.02	
G	2/16/2018	Body	D5GHzV2 SN:1168 (5.6 GHz)	11/23/2018	7.580	75.80	75.60	0.26	2.090	20.90	20.80	0.48	
G	2/16/2018	Body	D5GHzV2 SN:1168 (5.8 GHz)	11/23/2018	7.150	71.50	65.30	9.49	1.960	19.60	18.20	7.69	19,20
G	2/20/2018	Head	D5GHzV2 SN:1168 (5.2 GHz)	11/23/2018	7.660	76.60	80.90	-5.32	2.210	22.10	22.80	-3.07	
G	2/20/2018	Head	D5GHzV2 SN:1168 (5.6 GHz)	11/23/2018	8.520	85.20	87.20	-2.29	2.400	24.00	24.40	-1.64	
G	2/20/2018	Head	D5GHzV2 SN:1168 (5.8 GHz)	11/23/2018	7.620	76.20	79.10	-3.67	2.170	21.70	22.10	-1.81	
G	2/20/2018	Body	D5GHzV2 SN:1168 (5.2 GHz)	11/23/2018	6.770	67.70	70.70	-4.24	1.910	19.10	19.70	-3.05	
G	2/20/2018	Body	D5GHzV2 SN:1168 (5.6 GHz)	11/23/2018	7.960	79.60	75.60	5.29	2.200	22.00	20.80	5.77	
G	2/20/2018	Body	D5GHzV2 SN:1168 (5.8 GHz)	11/23/2018	6.880	68.80	65.30	5.36	1.900	19.00	18.20	4.40	
H	2/16/2018	Head	D5GHzV2 SN:1168 (5.6 GHz)	11/23/2018	8.250	82.50	87.20	-5.39	2.340	23.40	24.40	-4.10	21,22
H	2/19/2018	Head	D5GHzV2 SN:1168 (5.6 GHz)	11/23/2018	8.480	84.80	87.20	-2.75	2.390	23.90	24.40	-2.05	

9. Conducted Output Power Measurements

9.1. GSM

Per KDB 941225 D01 3G SAR Procedures:

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

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

GSM850 Measured Results

Mode	Coding Scheme	Time Slots	Ch No.	Freq. (MHz)	Maximum Average Power (dBm)			
					Measured		Tune-up Limit	
					Burst Pwr	Frame Pwr	Burst Pwr	Frame Pwr
GSM/GPRS	CS1	1	128	824.4	32.70	23.67	33.20	24.17
			190	836.6	32.80	23.77		
			251	848.8	32.80	23.77		
GPRS (GMSK)	CS1	2	128	824.4	30.70	24.68	31.20	25.18
			190	836.6	30.80	24.78		
			251	848.8	30.90	24.88		
		3	128	824.4	28.60	24.34	29.20	24.94
			190	836.6	28.70	24.44		
			251	848.8	28.60	24.34		
		4	128	824.4	27.90	24.89	28.20	25.19
			190	836.6	27.90	24.89		
			251	848.8	27.90	24.89		
EGPRS (8PSK)	MCS5	1	128	824.4	26.90	17.87	28.00	18.97
			190	836.6	26.90	17.87		
			251	848.8	26.90	17.87		
		2	128	824.4	25.60	19.58	26.50	20.48
			190	836.6	25.70	19.68		
			251	848.8	25.60	19.58		
		3	128	824.4	23.50	19.24	24.50	20.24
			190	836.6	23.60	19.34		
			251	848.8	23.60	19.34		
		4	128	824.4	22.30	19.29	23.50	20.49
			190	836.6	22.40	19.39		
			251	848.8	22.50	19.49		

Notes:

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

- GMSK (GPRS) mode with 4 time slots for Max power based on the Tune-up Procedure.
- SAR is not required for EGPRS (8PSK) mode because the maximum output power and tune-up limit is ≤ 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	28.30	19.27	28.70	19.67
			661	1880.0	28.10	19.07		
			810	1909.8	28.10	19.07		
GPRS (GMSK)	CS1	2	512	1850.2	26.30	20.28	26.70	20.68
			661	1880.0	26.10	20.08		
			810	1909.8	26.10	20.08		
		3	512	1850.2	24.30	20.04	24.70	20.44
			661	1880.0	24.10	19.84		
			810	1909.8	24.10	19.84		
		4	512	1850.2	23.30	20.29	23.70	20.69
			661	1880.0	23.10	20.09		
			810	1909.8	23.00	19.99		
EGPRS (8PSK)	MCS5	1	512	1850.2	25.40	16.37	27.00	17.97
			661	1880.0	25.20	16.17		
			810	1909.8	25.20	16.17		
		2	512	1850.2	24.60	18.58	25.50	19.48
			661	1880.0	24.50	18.48		
			810	1909.8	24.50	18.48		
		3	512	1850.2	22.60	18.34	23.50	19.24
			661	1880.0	22.30	18.04		
			810	1909.8	22.30	18.04		
		4	512	1850.2	21.40	18.39	22.50	19.49
			661	1880.0	21.10	18.09		
			810	1909.8	21.10	18.09		

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 (GMSK)	CS1	1	128	824.2	32.70		23.67		33.20		24.17	
			190	836.6	32.80		23.77					
			251	848.8	32.80		23.77					
		2	128	824.2	30.50	30.60	24.48	24.58	31.20	31.20	25.18	25.18
			190	836.6	30.70	30.90	24.68	24.88				
			251	848.8	30.70	30.90	24.68	24.88				
		3	128	824.2	28.40	28.60	24.14	24.34	29.20	29.20	24.94	24.94
			190	836.6	28.40	28.70	24.14	24.44				
			251	848.8	28.40	28.70	24.14	24.44				
GSM (Voice) + EGPRS (8PSK)	MCS5	1	128	824.2	32.70		23.67		33.20		24.17	
			190	836.6	32.80		23.77					
			251	848.8	32.80		23.77					
		2	128	824.2	30.80	25.60	24.78	19.58	31.20	26.50	25.18	20.48
			190	836.6	30.90	25.60	24.88	19.58				
			251	848.8	30.80	25.70	24.78	19.68				
		3	128	824.2	28.60	23.60	24.34	19.34	29.20	24.50	24.94	20.24
			190	836.6	28.70	23.60	24.44	19.34				
			251	848.8	28.60	23.60	24.34	19.34				

Notes:

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

- GSM(Voice) + GMSK(GPRS) mode with 2 time slots for Max power based on the Tune-up Procedure.
- SAR is not required for GSM(Voice) + EGPRS (8PSK) mode because the maximum output power and tune-up limit is ≤ 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 (GMSK)	CS1	1	512	1850.2	28.30		19.27		28.70		19.67	
			661	1880.0	28.10		19.07					
			810	1909.8	28.10		19.07					
		2	512	1850.2	26.10	26.20	20.08	20.18	26.70	26.70	20.68	20.68
			661	1880.0	26.00	26.20	19.98	20.18				
			810	1909.8	26.00	26.20	19.98	20.18				
		3	512	1850.2	24.20	24.20	19.94	19.94	24.70	24.70	20.44	20.44
			661	1880.0	24.10	24.20	19.84	19.94				
			810	1909.8	24.10	24.30	19.84	20.04				
GSM (Voice) + EGPRS (8PSK)	MCS5	1	512	1850.2	28.30		19.27		28.70		19.67	
			661	1880.0	28.10		19.07					
			810	1909.8	28.10		19.07					
		2	512	1850.2	26.20	24.70	20.18	18.68	26.70	25.50	20.68	19.48
			661	1880.0	26.10	24.20	20.08	18.18				
			810	1909.8	26.10	24.50	20.08	18.48				
		3	512	1850.2	24.10	22.60	19.84	18.34	24.70	23.50	20.44	19.24
			661	1880.0	23.90	22.40	19.64	18.14				
			810	1909.8	24.00	22.40	19.74	18.14				

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 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	24.30	N/A	24.90
		4183	836.6	24.30		
		4233	846.6	24.40		
HSDPA	Subtest 1	4132	826.4	23.30	0	24.20
		4183	836.6	23.30		
		4233	846.6	23.40		
	Subtest 2	4132	826.4	23.30	0	24.20
		4183	836.6	23.30		
		4233	846.6	23.40		
	Subtest 3	4132	826.4	22.80	0.5	23.70
		4183	836.6	22.80		
		4233	846.6	22.90		
	Subtest 4	4132	826.4	22.80	0.5	23.70
		4183	836.6	22.80		
		4233	846.6	22.90		
HSUPA	Subtest 1	4132	826.4	23.20	0	24.20
		4183	836.6	23.30		
		4233	846.6	23.40		
	Subtest 2	4132	826.4	21.30	2	22.20
		4183	836.6	21.30		
		4233	846.6	21.50		
	Subtest 3	4132	826.4	22.30	1	23.20
		4183	836.6	22.40		
		4233	846.6	22.40		
	Subtest 4	4132	826.4	21.30	2	22.20
		4183	836.6	21.30		
		4233	846.6	21.40		
	Subtest 5	4132	826.4	23.30	0	24.20
		4183	836.6	23.30		
		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	Measured Pwr (dBm)			MPR	Tune-up Limit
					20175			
					1732.5 MHz			
20 MHz	QPSK	1	0		22.62		0.0	23
		1	49		22.45		0.0	23
		1	99		22.27		0.0	23
		50	0		22.55		0.0	23
		50	24		22.48		0.0	23
		50	50		22.27		0.0	23
		100	0		22.46		0.0	23
	16QAM	1	0		22.70		0.0	23
		1	49		22.55		0.0	23
		1	99		22.36		0.0	23
		50	0		22.15		0.0	23
		50	24		22.10		0.0	23
		50	50		21.99		0.0	23
		100	0		22.05		0.0	23
	64QAM	1	0		22.92		0.0	23
		1	49		22.82		0.0	23
		1	99		22.71		0.0	23
		50	0		21.81		1.0	22
		50	24		21.75		1.0	22
		50	50		21.71		1.0	22
		100	0		21.70		1.0	22

BW (MHz)	Mode	RB Allocation	RB offset	Measured Pwr (dBm)			MPR	Tune-up Limit
				20025	20175	20325		
				1717.5 MHz	1732.5 MHz	1747.5 MHz		
15 MHz	QPSK	1	0	22.78	22.65	22.59	0.0	23
		1	37	22.55	22.52	22.39	0.0	23
		1	74	22.56	22.32	22.48	0.0	23
		36	0	22.68	22.47	22.50	0.0	23
		36	20	22.60	22.42	22.43	0.0	23
		36	39	22.60	22.35	22.34	0.0	23
		75	0	22.64	22.41	22.46	0.0	23
	16QAM	1	0	22.63	22.57	22.10	0.0	23
		1	37	22.42	22.43	21.89	0.0	23
		1	74	22.44	22.28	22.01	0.0	23
		36	0	22.33	22.03	22.10	0.0	23
		36	20	22.28	21.97	22.04	0.0	23
		36	39	22.18	21.91	21.96	0.0	23
		75	0	22.26	21.99	22.04	0.0	23
	64QAM	1	0	22.89	22.38	22.61	0.0	23
		1	37	22.78	22.34	22.47	0.0	23
		1	74	22.90	22.22	22.65	0.0	23
		36	0	21.91	21.79	21.82	1.0	22
		36	20	21.87	21.76	21.76	1.0	22
		36	39	21.83	21.73	21.75	1.0	22
		75	0	21.91	21.72	21.77	1.0	22

LTE Band 4 Measured Results (continues)

BW (MHz)	Mode	RB Allocation	RB offset	Measured Pwr (dBm)			MPR	Tune-up Limit
				20000	20175	20350		
				1715 MHz	1732.5 MHz	1750 MHz		
10 MHz	QPSK	1	0	22.27	22.49	22.48	0.0	23
		1	25	22.24	22.48	22.39	0.0	23
		1	49	22.22	22.37	22.53	0.0	23
		25	0	22.53	22.51	22.47	0.0	23
		25	12	22.52	22.44	22.45	0.0	23
		25	25	22.26	22.41	22.46	0.0	23
		50	0	22.49	22.50	22.41	0.0	23
	16QAM	1	0	22.00	22.00	22.02	0.0	23
		1	25	21.87	21.96	22.27	0.0	23
		1	49	21.86	21.83	22.45	0.0	23
		25	0	22.16	22.07	22.06	0.0	23
		25	12	22.10	22.03	22.04	0.0	23
		25	25	21.96	21.98	22.10	0.0	23
		50	0	22.05	22.01	22.02	0.0	23
	64QAM	1	0	22.21	22.29	22.47	0.0	23
		1	25	22.13	22.32	22.41	0.0	23
		1	49	22.11	22.25	22.59	0.0	23
		25	0	21.76	21.76	21.75	1.0	22
		25	12	21.76	21.78	21.75	1.0	22
		25	25	21.59	21.74	21.80	1.0	22
		50	0	21.66	21.71	21.68	1.0	22
BW (MHz)	Mode	RB Allocation	RB offset	Measured Pwr (dBm)			MPR	Tune-up Limit
				19975	20175	20375		
				1712.5 MHz	1732.5 MHz	1752.5 MHz		
5 MHz	QPSK	1	0	22.52	22.53	22.44	0.0	23
		1	12	22.50	22.47	22.44	0.0	23
		1	24	22.40	22.32	22.54	0.0	23
		12	0	22.57	22.52	22.46	0.0	23
		12	7	22.55	22.43	22.51	0.0	23
		12	13	22.54	22.43	22.47	0.0	23
		25	0	22.56	22.44	22.50	0.0	23
	16QAM	1	0	22.55	22.28	22.11	0.0	23
		1	12	22.57	22.20	22.13	0.0	23
		1	24	22.45	22.10	22.24	0.0	23
		12	0	22.26	22.21	22.04	0.0	23
		12	7	22.25	22.07	22.11	0.0	23
		12	13	22.21	22.03	22.08	0.0	23
		25	0	22.16	22.04	22.03	0.0	23
	64QAM	1	0	22.42	22.56	22.11	0.0	23
		1	12	22.44	22.52	22.15	0.0	23
		1	24	22.37	22.40	22.25	0.0	23
		12	0	21.82	21.70	21.72	1.0	22
		12	7	21.82	21.61	21.81	1.0	22
		12	13	21.80	21.60	21.78	1.0	22
		25	0	21.80	21.64	21.73	1.0	22

LTE Band 4 Measured Results (continues)

BW (MHz)	Mode	RB Allocation	RB offset	Measured Pwr (dBm)			MPR	Tune-up Limit
				19965	20175	20385		
				1711.5 MHz	1732.5 MHz	1753.5 MHz		
3 MHz	QPSK	1	0	22.49	22.54	22.56	0.0	23
		1	8	22.51	22.47	22.54	0.0	23
		1	14	22.48	22.40	22.54	0.0	23
		8	0	22.50	22.51	22.44	0.0	23
		8	4	22.57	22.51	22.48	0.0	23
		8	7	22.47	22.26	22.51	0.0	23
		15	0	22.52	22.44	22.43	0.0	23
	16QAM	1	0	22.05	22.46	21.94	0.0	23
		1	8	22.07	22.40	22.00	0.0	23
		1	14	22.07	22.30	21.98	0.0	23
		8	0	22.09	22.00	22.12	0.0	23
		8	4	22.14	22.17	22.14	0.0	23
		8	7	22.07	22.02	22.18	0.0	23
		15	0	22.05	22.04	22.07	0.0	23
	64QAM	1	0	22.32	22.27	22.51	0.0	23
		1	8	22.45	22.40	22.69	0.0	23
		1	14	22.35	22.19	22.60	0.0	23
		8	0	21.67	21.74	21.75	1.0	22
		8	4	21.71	21.78	21.82	1.0	22
		8	7	21.70	21.69	21.81	1.0	22
		15	0	21.77	21.66	21.71	1.0	22
BW (MHz)	Mode	RB Allocation	RB offset	Measured Pwr (dBm)			MPR	Tune-up Limit
				19957	20175	20393		
				1710.7 MHz	1732.5 MHz	1754.3 MHz		
1.4 MHz	QPSK	1	0	22.41	22.49	22.59	0.0	23
		1	3	22.38	22.47	22.56	0.0	23
		1	5	22.35	22.42	22.54	0.0	23
		3	0	22.40	22.44	22.48	0.0	23
		3	1	22.44	22.51	22.55	0.0	23
		3	3	22.36	22.43	22.53	0.0	23
		6	0	22.34	22.40	22.50	0.0	23
	16QAM	1	0	22.27	21.99	22.14	0.0	23
		1	3	22.31	22.06	22.22	0.0	23
		1	5	22.26	22.00	22.13	0.0	23
		3	0	22.14	22.17	22.11	0.0	23
		3	1	22.21	22.25	22.19	0.0	23
		3	3	22.11	22.17	22.13	0.0	23
		6	0	21.82	22.15	22.19	0.0	23
	64QAM	1	0	22.39	22.26	22.31	0.0	23
		1	3	22.48	22.32	22.42	0.0	23
		1	5	22.35	22.30	22.31	0.0	23
		3	0	22.37	22.07	22.36	0.0	23
		3	1	22.44	22.17	22.45	0.0	23
		3	3	22.43	22.15	22.44	0.0	23
		6	0	21.49	21.69	21.99	1.0	22

LTE Band 5 Measured Results

BW (MHz)	Mode	RB Allocation	RB offset	Measured Pwr (dBm)			MPR	Tune-up Limit
				[redacted]	20525	[redacted]		
					836.5 MHz			
10 MHz	QPSK	1	0		24.71		0.0	25
		1	25		24.67		0.0	25
		1	49		24.73		0.0	25
		25	0		23.79		1.0	24
		25	12		23.79		1.0	24
		25	25		23.72		1.0	24
		50	0		23.75		1.0	24
	16QAM	1	0		24.00		1.0	24
		1	25		24.00		1.0	24
		1	49		24.00		1.0	24
		25	0		22.94		2.0	23
		25	12		22.89		2.0	23
		25	25		22.83		2.0	23
		50	0		22.85		2.0	23
	64QAM	1	0		22.44		2.0	23
		1	25		22.44		2.0	23
		1	49		22.48		2.0	23
		25	0		22.00		3.0	22
		25	12		22.00		3.0	22
		25	25		21.94		3.0	22
		50	0		21.89		3.0	22

BW (MHz)	Mode	RB Allocation	RB offset	Measured Pwr (dBm)			MPR	Tune-up Limit
				20425	20525	20625		
				826.5 MHz	836.5 MHz	846.5 MHz		
5 MHz	QPSK	1	0	24.80	24.68	23.59	0.0	25
		1	12	24.73	24.66	24.59	0.0	25
		1	24	24.74	24.76	24.66	0.0	25
		12	0	23.79	23.79	23.46	1.0	24
		12	7	23.78	23.77	23.47	1.0	24
		12	13	23.73	23.74	23.54	1.0	24
		25	0	23.76	23.78	23.57	1.0	24
	16QAM	1	0	23.97	24.00	23.74	1.0	24
		1	12	23.89	24.00	23.73	1.0	24
		1	24	23.89	24.00	23.76	1.0	24
		12	0	22.91	22.98	22.64	2.0	23
		12	7	22.90	22.97	22.63	2.0	23
		12	13	22.88	22.97	22.72	2.0	23
		25	0	22.79	22.91	22.67	2.0	23
	64QAM	1	0	22.65	22.61	22.09	2.0	23
		1	12	22.56	22.65	22.11	2.0	23
		1	24	22.60	22.67	22.14	2.0	23
		12	0	21.99	21.89	21.67	3.0	22
		12	7	21.96	21.86	21.66	3.0	22
		12	13	21.92	21.83	21.76	3.0	22
		25	0	21.92	21.86	21.70	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	Measured Pwr (dBm)			MPR	Tune-up Limit
				20415	20525	20635		
				825.5 MHz	836.5 MHz	847.5 MHz		
3 MHz	QPSK	1	0	24.69	24.62	24.49	0.0	25
		1	8	24.76	24.78	24.66	0.0	25
		1	14	24.62	24.70	24.55	0.0	25
		8	0	23.71	23.74	23.54	1.0	24
		8	4	23.78	23.73	23.55	1.0	24
		8	7	23.75	23.74	23.59	1.0	24
		15	0	23.74	23.74	23.56	1.0	24
	16QAM	1	0	23.86	24.00	23.55	1.0	24
		1	8	23.88	24.00	23.65	1.0	24
		1	14	23.80	24.00	23.47	1.0	24
		8	0	22.86	22.87	22.71	2.0	23
		8	4	22.88	22.91	22.74	2.0	23
		8	7	22.87	22.89	22.77	2.0	23
		15	0	22.79	22.86	22.69	2.0	23
	64QAM	1	0	22.44	22.55	21.84	2.0	23
		1	8	22.53	22.69	22.70	2.0	23
		1	14	22.41	22.56	22.57	2.0	23
		8	0	21.89	21.90	21.90	3.0	22
		8	4	21.94	21.94	21.94	3.0	22
		8	7	21.93	21.93	21.94	3.0	22
		15	0	21.93	21.84	21.85	3.0	22

BW (MHz)	Mode	RB Allocation	RB offset	Measured Pwr (dBm)			MPR	Tune-up Limit
				20407	20525	20643		
				824.7 MHz	836.5 MHz	848.3 MHz		
1.4 MHz	QPSK	1	0	24.63	24.65	24.52	0.0	25
		1	3	24.68	24.70	24.57	0.0	25
		1	5	24.63	24.63	24.43	0.0	25
		3	0	24.70	24.60	24.51	0.0	25
		3	1	24.72	24.67	24.58	0.0	25
		3	3	24.69	24.69	24.60	0.0	25
		6	0	23.63	23.66	23.64	1.0	24
	16QAM	1	0	24.00	23.83	23.61	1.0	24
		1	3	24.00	23.86	23.64	1.0	24
		1	5	24.00	23.79	23.53	1.0	24
		3	0	23.90	23.78	23.77	1.0	24
		3	1	23.99	23.83	23.84	1.0	24
		3	3	23.94	23.82	23.82	1.0	24
		6	0	22.66	22.88	22.85	2.0	23
	64QAM	1	0	22.36	22.61	22.28	2.0	23
		1	3	22.45	22.73	22.35	2.0	23
		1	5	22.35	22.63	22.28	2.0	23
		3	0	22.39	22.57	22.10	2.0	23
		3	1	22.47	22.65	22.18	2.0	23
		3	3	22.46	22.62	22.17	2.0	23
		6	0	22.00	21.77	21.77	3.0	22

LTE Band 7 Measured Results

BW (MHz)	Mode	RB Allocation	RB offset	Measured Pwr (dBm)			MPR	Tune-up Limit
				20850	21100	21350		
				2510 MHz	2535 MHz	2560 MHz		
20 MHz	QPSK	1	0	21.98	22.27	22.27	0.0	23
		1	49	21.86	22.10	22.00	0.0	23
		1	99	21.77	22.17	21.94	0.0	23
		50	0	22.10	22.30	22.31	0.0	23
		50	24	22.06	22.23	22.21	0.0	23
		50	50	21.94	22.13	22.09	0.0	23
		100	0	22.03	22.19	22.20	0.0	23
	16QAM	1	0	22.45	22.66	22.59	0.0	23
		1	49	22.38	22.49	22.43	0.0	23
		1	99	22.25	22.67	22.39	0.0	23
		50	0	22.11	22.20	22.12	0.0	23
		50	24	22.06	22.17	22.04	0.0	23
		50	50	21.97	22.14	22.00	0.0	23
		100	0	22.06	22.15	22.04	0.0	23
	64QAM	1	0	22.28	22.88	22.43	0.0	23
		1	49	22.26	22.72	22.30	0.0	23
		1	99	22.19	22.88	22.20	0.0	23
		50	0	21.71	21.76	21.70	1.0	22
		50	24	21.69	21.72	21.63	1.0	22
		50	50	21.59	21.68	21.55	1.0	22
		100	0	21.60	21.68	21.55	1.0	22
BW (MHz)	Mode	RB Allocation	RB offset	Measured Pwr (dBm)			MPR	Tune-up Limit
				20825	21100	21375		
				2507.5 MHz	2535 MHz	2562.5 MHz		
15 MHz	QPSK	1	0	22.34	22.59	22.37	0.0	23
		1	37	22.34	22.50	22.29	0.0	23
		1	74	22.28	22.55	22.21	0.0	23
		36	0	22.35	22.55	22.36	0.0	23
		36	20	22.36	22.56	22.38	0.0	23
		36	39	22.29	22.49	22.32	0.0	23
		75	0	22.34	22.50	22.36	0.0	23
	16QAM	1	0	22.36	22.55	21.97	0.0	23
		1	37	22.25	22.43	21.81	0.0	23
		1	74	22.25	22.49	21.75	0.0	23
		36	0	21.95	22.19	22.00	0.0	23
		36	20	21.97	22.20	21.98	0.0	23
		36	39	21.90	22.13	21.89	0.0	23
		75	0	21.95	22.13	21.99	0.0	23
	64QAM	1	0	22.45	22.20	22.27	0.0	23
		1	37	22.48	22.13	22.14	0.0	23
		1	74	22.33	22.15	22.08	0.0	23
		36	0	21.44	21.66	21.50	1.0	22
		36	20	21.41	21.61	21.46	1.0	22
		36	39	21.37	21.60	21.37	1.0	22
		75	0	21.43	21.59	21.44	1.0	22

LTE Band 7 Measured Results (continued)

BW (MHz)	Mode	RB Allocation	RB offset	Measured Pwr (dBm)			MPR	Tune-up Limit
				20800	21100	21400		
				2505 MHz	2535 MHz	2565 MHz		
10 MHz	QPSK	1	0	22.21	22.53	22.32	0.0	23
		1	25	22.25	22.47	22.25	0.0	23
		1	49	22.24	22.54	22.25	0.0	23
		25	0	22.35	22.52	22.33	0.0	23
		25	12	22.35	22.53	22.35	0.0	23
		25	25	22.35	22.49	22.29	0.0	23
		50	0	22.34	22.51	22.33	0.0	23
	16QAM	1	0	21.93	22.47	21.88	0.0	23
		1	25	21.90	22.39	21.80	0.0	23
		1	49	21.89	22.43	21.76	0.0	23
		25	0	22.05	22.17	21.99	0.0	23
		25	12	22.05	22.12	21.99	0.0	23
		25	25	22.03	22.08	21.89	0.0	23
		50	0	21.96	22.13	21.91	0.0	23
	64QAM	1	0	21.95	22.11	22.18	0.0	23
		1	25	21.99	22.08	22.10	0.0	23
		1	49	21.96	22.17	22.06	0.0	23
		25	0	21.46	21.56	21.42	1.0	22
		25	12	21.48	21.60	21.39	1.0	22
		25	25	21.43	21.58	21.39	1.0	22
		50	0	21.36	21.55	21.39	1.0	22
BW (MHz)	Mode	RB Allocation	RB offset	Measured Pwr (dBm)			MPR	Tune-up Limit
				20775	21100	21425		
				2502.5 MHz	2535 MHz	2567.5 MHz		
5 MHz	QPSK	1	0	22.57	22.46	22.36	0.0	23
		1	12	22.68	22.43	22.41	0.0	23
		1	24	22.64	22.42	22.34	0.0	23
		12	0	22.66	22.48	22.37	0.0	23
		12	7	22.67	22.53	22.37	0.0	23
		12	13	22.66	22.48	22.34	0.0	23
		25	0	22.67	22.51	22.35	0.0	23
	16QAM	1	0	22.26	22.57	22.10	0.0	23
		1	12	22.35	22.54	22.06	0.0	23
		1	24	22.25	22.51	22.06	0.0	23
		12	0	22.31	22.22	22.04	0.0	23
		12	7	22.35	22.24	22.04	0.0	23
		12	13	22.30	22.19	22.00	0.0	23
		25	0	22.20	22.14	21.96	0.0	23
	64QAM	1	0	22.40	22.38	21.80	0.0	23
		1	12	22.44	22.36	21.79	0.0	23
		1	24	22.43	22.29	21.79	0.0	23
		12	0	21.81	21.52	21.45	1.0	22
		12	7	21.84	21.54	21.48	1.0	22
		12	13	21.81	21.55	21.46	1.0	22
		25	0	21.77	21.53	21.38	1.0	22

LTE Band 12 Measured Results

BW (MHz)	Mode	RB Allocation	RB offset	Measured Pwr (dBm)			MPR	Tune-up Limit
				[redacted]	23095	[redacted]		
					707.5 MHz			
10 MHz	QPSK	1	0		24.60		0.0	25
		1	25		24.62		0.0	25
		1	49		24.79		0.0	25
		25	0		23.71		1.0	24
		25	12		23.71		1.0	24
		25	25		23.66		1.0	24
		50	0		23.70		1.0	24
	16QAM	1	0		23.53		1.0	24
		1	25		23.56		1.0	24
		1	49		23.68		1.0	24
		25	0		22.83		2.0	23
		25	12		22.82		2.0	23
		25	25		22.76		2.0	23
		50	0		22.77		2.0	23
	64QAM	1	0		22.30		2.0	23
		1	25		22.34		2.0	23
		1	49		22.49		2.0	23
		25	0		21.91		3.0	22
		25	12		21.89		3.0	22
		25	25		21.85		3.0	22
		50	0		21.84		3.0	22

BW (MHz)	Mode	RB Allocation	RB offset	Measured Pwr (dBm)			MPR	Tune-up Limit
				23035	23095	23155		
				701.5 MHz	707.5 MHz	713.5 MHz		
5 MHz	QPSK	1	0	24.38	24.69	24.77	0.0	25
		1	12	24.70	24.70	24.80	0.0	25
		1	24	24.68	24.68	24.70	0.0	25
		12	0	23.60	23.66	23.72	1.0	24
		12	7	23.78	23.70	23.81	1.0	24
		12	13	23.76	23.69	23.79	1.0	24
		25	0	23.66	23.67	23.79	1.0	24
	16QAM	1	0	23.95	23.76	23.84	1.0	24
		1	12	24.00	23.81	23.88	1.0	24
		1	24	24.00	23.82	23.84	1.0	24
		12	0	22.83	22.84	22.83	2.0	23
		12	7	22.98	22.85	22.95	2.0	23
		12	13	22.99	22.79	22.92	2.0	23
		25	0	22.84	22.80	22.82	2.0	23
	64QAM	1	0	22.63	22.49	22.26	2.0	23
		1	12	22.55	22.53	22.28	2.0	23
		1	24	22.57	22.51	22.35	2.0	23
		12	0	21.88	21.76	21.83	3.0	22
		12	7	21.96	21.75	21.98	3.0	22
		12	13	21.95	21.73	21.92	3.0	22
		25	0	21.91	21.77	21.92	3.0	22

Note(s):

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

LTE Band 12 Measured Results (continued)

BW (MHz)	Mode	RB Allocation	RB offset	Measured Pwr (dBm)			MPR	Tune-up Limit
				23025	23095	23165		
				700.5 MHz	707.5 MHz	714.5 MHz		
3 MHz	QPSK	1	0	24.45	24.60	24.74	0.0	25
		1	8	24.64	24.76	24.94	0.0	25
		1	14	24.72	24.65	24.76	0.0	25
		8	0	23.50	23.65	23.79	1.0	24
		8	4	23.64	23.70	23.92	1.0	24
		8	7	23.70	23.67	23.92	1.0	24
		15	0	23.63	23.68	23.79	1.0	24
	16QAM	1	0	23.54	23.97	23.71	1.0	24
		1	8	23.77	24.00	23.86	1.0	24
		1	14	23.76	24.00	23.66	1.0	24
		8	0	22.67	22.84	22.95	2.0	23
		8	4	22.79	22.87	23.00	2.0	23
		8	7	22.89	22.86	23.00	2.0	23
		15	0	22.74	22.81	22.88	2.0	23
	64QAM	1	0	22.59	22.28	22.64	2.0	23
		1	8	22.59	22.43	22.80	2.0	23
		1	14	22.49	22.33	22.67	2.0	23
		8	0	21.67	21.80	21.91	3.0	22
		8	4	21.81	21.85	22.00	3.0	22
		8	7	21.87	21.84	22.00	3.0	22
		15	0	21.90	21.79	21.86	3.0	22
BW (MHz)	Mode	RB Allocation	RB offset	Measured Pwr (dBm)			MPR	Tune-up Limit
				23017	23095	23173		
				699.7 MHz	707.5 MHz	715.3 MHz		
1.4 MHz	QPSK	1	0	24.38	24.60	24.84	0.0	25
		1	3	24.46	24.66	24.90	0.0	25
		1	5	24.39	24.57	24.74	0.0	25
		3	0	24.39	24.62	24.72	0.0	25
		3	1	24.43	24.68	24.77	0.0	25
		3	3	24.43	24.67	24.76	0.0	25
		6	0	23.43	23.59	23.79	1.0	24
	16QAM	1	0	23.45	23.99	23.87	1.0	24
		1	3	23.64	24.00	23.92	1.0	24
		1	5	23.51	23.98	23.83	1.0	24
		3	0	23.67	23.82	23.82	1.0	24
		3	1	23.70	23.88	23.91	1.0	24
		3	3	23.72	23.89	23.87	1.0	24
		6	0	22.74	22.60	22.98	2.0	23
	64QAM	1	0	22.43	22.28	22.73	2.0	23
		1	3	22.49	22.37	22.83	2.0	23
		1	5	22.45	22.22	22.71	2.0	23
		3	0	22.23	22.30	22.67	2.0	23
		3	1	22.32	22.40	22.74	2.0	23
		3	3	22.34	22.38	22.72	2.0	23
		6	0	21.71	21.98	21.86	3.0	22

LTE Band 13 Measured Results

BW (MHz)	Mode	RB Allocation	RB offset	Measured Pwr (dBm)			MPR	Tune-up Limit
				[redacted]	23230	[redacted]		
				[redacted]	782 MHz	[redacted]		
10 MHz	QPSK	1	0	[redacted]	24.56	[redacted]	0.0	25
		1	25	[redacted]	24.72	[redacted]	0.0	25
		1	49	[redacted]	24.52	[redacted]	0.0	25
		25	0	[redacted]	23.86	[redacted]	1.0	24
		25	12	[redacted]	23.84	[redacted]	1.0	24
		25	25	[redacted]	23.80	[redacted]	1.0	24
		50	0	[redacted]	23.79	[redacted]	1.0	24
	16QAM	1	0	[redacted]	23.45	[redacted]	1.0	24
		1	25	[redacted]	23.68	[redacted]	1.0	24
		1	49	[redacted]	23.46	[redacted]	1.0	24
		25	0	[redacted]	22.93	[redacted]	2.0	23
		25	12	[redacted]	22.91	[redacted]	2.0	23
		25	25	[redacted]	22.90	[redacted]	2.0	23
		50	0	[redacted]	22.86	[redacted]	2.0	23
	64QAM	1	0	[redacted]	22.54	[redacted]	2.0	23
		1	25	[redacted]	22.59	[redacted]	2.0	23
		1	49	[redacted]	22.51	[redacted]	2.0	23
		25	0	[redacted]	21.93	[redacted]	3.0	22
		25	12	[redacted]	21.94	[redacted]	3.0	22
		25	25	[redacted]	21.85	[redacted]	3.0	22
		50	0	[redacted]	21.89	[redacted]	3.0	22

BW (MHz)	Mode	RB Allocation	RB offset	Measured Pwr (dBm)			MPR	Tune-up Limit
				[redacted]	23230	[redacted]		
				[redacted]	782 MHz	[redacted]		
5 MHz	QPSK	1	0	[redacted]	24.68	[redacted]	0.0	25
		1	12	[redacted]	24.71	[redacted]	0.0	25
		1	24	[redacted]	24.73	[redacted]	0.0	25
		12	0	[redacted]	23.82	[redacted]	1.0	24
		12	7	[redacted]	23.81	[redacted]	1.0	24
		12	13	[redacted]	23.78	[redacted]	1.0	24
		25	0	[redacted]	23.79	[redacted]	1.0	24
	16QAM	1	0	[redacted]	23.86	[redacted]	1.0	24
		1	12	[redacted]	23.82	[redacted]	1.0	24
		1	24	[redacted]	23.52	[redacted]	1.0	24
		12	0	[redacted]	22.82	[redacted]	2.0	23
		12	7	[redacted]	22.85	[redacted]	2.0	23
		12	13	[redacted]	22.82	[redacted]	2.0	23
		25	0	[redacted]	22.75	[redacted]	2.0	23
	64QAM	1	0	[redacted]	22.16	[redacted]	2.0	23
		1	12	[redacted]	22.23	[redacted]	2.0	23
		1	24	[redacted]	22.25	[redacted]	2.0	23
		12	0	[redacted]	21.89	[redacted]	3.0	22
		12	7	[redacted]	21.89	[redacted]	3.0	22
		12	13	[redacted]	21.86	[redacted]	3.0	22
		25	0	[redacted]	21.83	[redacted]	3.0	22

Note(s):

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

LTE Band 17 Measured Results

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

LTE Band 41 Measured Results

BW (MHz)	Mode	RB Allocation	RB offset	Measured Pwr (dBm)					MPR	Tune-up Limit
				39750	40185	40620	41055	41490		
				2506 MHz	2549.5 MHz	2593 MHz	2636.5 MHz	2680 MHz		
20 MHz	QPSK	1	0	22.11	22.12	22.03	22.10	22.21	0.0	23
		1	49	21.88	21.96	21.73	21.92	21.98	0.0	23
		1	99	21.72	21.86	21.64	21.77	21.75	0.0	23
		50	0	21.99	22.08	21.99	22.03	22.10	0.0	23
		50	24	21.92	21.93	21.91	22.00	22.07	0.0	23
		50	50	21.82	21.91	21.80	21.95	21.90	0.0	23
		100	0	21.90	21.94	21.88	21.86	21.91	0.0	23
	16QAM	1	0	21.95	21.84	22.11	21.89	21.70	0.0	23
		1	49	21.74	21.76	21.93	21.79	21.59	0.0	23
		1	99	21.76	21.74	21.87	21.69	21.47	0.0	23
		50	0	21.94	22.03	21.98	21.88	21.75	0.0	23
		50	24	21.89	22.00	21.94	21.91	21.82	0.0	23
		50	50	21.82	21.92	21.85	21.79	21.70	0.0	23
		100	0	21.88	21.98	21.89	21.78	21.71	0.0	23
	64QAM	1	0	22.05	21.91	22.39	22.01	21.76	0.0	23
		1	49	21.90	21.86	22.19	21.92	21.65	0.0	23
		1	99	21.86	21.81	22.14	21.79	21.52	0.0	23
		50	0	21.52	21.56	21.46	21.39	21.29	1.0	22
		50	24	21.46	21.55	21.43	21.43	21.35	1.0	22
		50	50	21.41	21.46	21.38	21.34	21.23	1.0	22
		100	0	21.48	21.51	21.39	21.33	21.20	1.0	22

BW (MHz)	Mode	RB Allocation	RB offset	Measured Pwr (dBm)					MPR	Tune-up Limit
				39750	40185	40620	41055	41490		
				2506 MHz	2549.5 MHz	2593 MHz	2636.5 MHz	2680 MHz		
15 MHz	QPSK	1	0	22.29	22.34	22.38	22.28	22.33	0.0	23
		1	37	22.21	22.33	22.24	22.26	22.15	0.0	23
		1	74	22.17	22.24	22.18	22.13	22.06	0.0	23
		36	0	22.29	22.38	22.32	22.27	22.25	0.0	23
		36	20	22.26	22.37	22.29	22.30	22.23	0.0	23
		36	39	22.24	22.31	22.24	22.23	22.14	0.0	23
		75	0	22.24	22.38	22.27	22.20	22.17	0.0	23
	16QAM	1	0	21.91	21.90	22.01	21.88	21.87	0.0	23
		1	37	21.79	21.88	21.87	21.78	21.68	0.0	23
		1	74	21.77	21.84	21.81	21.70	21.63	0.0	23
		36	0	21.90	22.00	21.95	21.85	21.83	0.0	23
		36	20	21.90	21.95	21.93	21.88	21.80	0.0	23
		36	39	21.83	21.93	21.86	21.81	21.74	0.0	23
		75	0	21.87	21.95	21.88	21.83	21.81	0.0	23
	64QAM	1	0	21.84	22.19	21.56	21.78	22.14	0.0	23
		1	37	21.71	22.16	21.41	21.71	22.00	0.0	23
		1	74	21.67	22.14	21.33	21.64	21.85	0.0	23
		36	0	21.39	21.59	21.49	21.31	21.40	1.0	22
		36	20	21.37	21.55	21.45	21.40	21.35	1.0	22
		36	39	21.34	21.47	21.38	21.33	21.29	1.0	22
		75	0	21.44	21.51	21.36	21.30	21.34	1.0	22

LTE Band 41 Measured Results (continued)

BW (MHz)	Mode	RB Allocation	RB offset	Measured Pwr (dBm)					MPR	Tune-up Limit
				39750	40185	40620	41055	41490		
				2506 MHz	2549.5 MHz	2593 MHz	2636.5 MHz	2680 MHz		
10 MHz	QPSK	1	0	22.29	22.33	22.29	22.34	22.27	0.0	23
		1	25	22.21	22.27	22.25	22.27	22.13	0.0	23
		1	49	22.18	22.28	22.20	22.22	22.13	0.0	23
		25	0	22.31	22.41	22.32	22.33	22.25	0.0	23
		25	12	22.29	22.40	22.32	22.37	22.21	0.0	23
		25	25	22.28	22.39	22.25	22.30	22.21	0.0	23
		50	0	22.31	22.35	22.32	22.31	22.21	0.0	23
	16QAM	1	0	21.96	21.92	21.87	22.05	21.83	0.0	23
		1	25	21.87	21.86	21.80	21.95	21.67	0.0	23
		1	49	21.92	21.87	21.75	21.88	21.65	0.0	23
		25	0	21.89	21.98	21.89	21.91	21.81	0.0	23
		25	12	21.92	21.97	21.89	21.89	21.81	0.0	23
		25	25	21.88	21.93	21.83	21.89	21.74	0.0	23
		50	0	21.93	21.93	21.90	21.92	21.75	0.0	23
	64QAM	1	0	21.97	22.30	21.48	22.03	22.10	0.0	23
		1	25	21.90	22.19	21.43	21.93	21.98	0.0	23
		1	49	21.89	22.20	21.41	21.88	21.92	0.0	23
		25	0	21.37	21.49	21.42	21.35	21.31	1.0	22
		25	12	21.34	21.46	21.40	21.32	21.27	1.0	22
		25	25	21.30	21.43	21.38	21.28	21.19	1.0	22
		50	0	21.38	21.46	21.34	21.35	21.25	1.0	22

BW (MHz)	Mode	RB Allocation	RB offset	Measured Pwr (dBm)					MPR	Tune-up Limit
				39750	40185	40620	41055	41490		
				2506 MHz	2549.5 MHz	2593 MHz	2636.5 MHz	2680 MHz		
5 MHz	QPSK	1	0	22.14	22.27	22.18	22.29	22.33	0.0	23
		1	12	22.12	22.24	22.13	22.21	22.27	0.0	23
		1	24	22.12	22.21	22.09	22.18	22.28	0.0	23
		12	0	22.23	22.31	22.19	22.31	22.41	0.0	23
		12	7	22.27	22.31	22.23	22.29	22.40	0.0	23
		12	13	22.25	22.28	22.18	22.28	22.39	0.0	23
		25	0	22.26	22.29	22.19	22.31	22.35	0.0	23
	16QAM	1	0	21.67	21.80	21.84	21.96	21.92	0.0	23
		1	12	21.67	21.78	21.81	21.87	21.86	0.0	23
		1	24	21.63	21.72	21.77	21.92	21.87	0.0	23
		12	0	21.86	21.82	21.84	21.89	21.98	0.0	23
		12	7	21.86	21.85	21.84	21.92	21.97	0.0	23
		12	13	21.85	21.85	21.81	21.88	21.93	0.0	23
		25	0	21.83	21.86	21.75	21.93	21.93	0.0	23
	64QAM	1	0	22.03	22.10	21.58	22.01	21.44	0.0	23
		1	12	21.93	21.98	21.56	21.99	22.08	0.0	23
		1	24	21.88	21.92	21.54	21.93	22.06	0.0	23
		12	0	21.35	21.31	21.40	21.34	21.37	1.0	22
		12	7	21.32	21.27	21.41	21.29	21.33	1.0	22
		12	13	21.28	21.19	21.38	21.31	21.31	1.0	22
		25	0	21.35	21.25	21.44	21.26	21.18	1.0	22

9.4. Wi-Fi 2.4GHz (DTS Band)

Measured Results

Band	Mode	Data Rate	Ch #	Freq. (MHz)	Chain 0 Average Power (dBm)			Chain 1 Average Power (dBm)		
					Meas Pwr	Tune-up	SAR Test (Yes/No)	Meas Pwr	Tune-up	SAR Test (Yes/No)
DSSS 2.4 GHz	802.11b	1 Mbps	1	2412	12.50	13.50	Yes	12.20	13.20	Yes
			6	2437	12.50	13.50		11.80	13.20	
			11	2462	12.50	13.50		12.20	13.20	
			12	2467	12.20	13.50		11.90	13.20	
			13	2472	10.70	12.00		12.00	13.20	
OFDM 2.4 GHz	802.11g	6 Mbps	1	2412	13.10	13.80	No	12.20	13.20	No
			6	2437	13.00	13.80		11.90	13.20	
			11	2462	12.60	13.80		12.40	13.20	
			12	2467	9.80	11.00		9.10	10.30	
			13	2472	1.90	3.00		1.00	2.30	
	802.11n (HT20)	6.5 Mbps	1	2412	13.10	13.90	No	12.10	13.20	No
			6	2437	13.00	13.90		11.80	13.20	
			11	2462	13.00	13.90		12.30	13.20	
			12	2467	10.10	11.10		9.00	10.30	
			13	2472	0.30	1.60		0.00	0.80	

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.
3. Additionally, SAR is not required for Channels 12 and 13 because the tune-up limit and the measured output power for these two channels are no greater than those for the default test channels.

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

Measured Results

Band	Mode	Data Rate	Ch #	Freq. (MHz)	Chain 0 Average Power (dBm)			Chain 1 Average Power (dBm)		
					Meas Pwr	Tune-up	SAR Test (Yes/No)	Meas Pwr	Tune-up	SAR Test (Yes/No)
UNII-1 5.2 GHz	802.11a	6 Mbps	36	5180	11.00	12.50	Yes	10.23	11.80	No
			40	5200	11.00	12.50		10.30	11.80	
			44	5220	11.20	12.50		10.60	11.80	
			48	5240	11.20	12.50		11.20	11.80	
	802.11n (HT20)	6.5 Mbps	36	5180	10.90	12.40	No	10.80	11.90	No
			40	5200	11.00	12.40		10.80	11.90	
			44	5220	11.00	12.40		11.10	11.90	
			48	5240	11.10	12.40		11.10	11.90	
	802.11ac (VHT20)	6.5 Mbps	36	5180	10.90	12.40	No	10.70	11.90	No
			40	5200	11.00	12.40		10.80	11.90	
			44	5220	11.10	12.40		10.50	11.90	
			48	5240	11.20	12.40		11.00	11.90	
	802.11n (HT40)	13.5 Mbps	38	5190	10.80	12.40	No	10.32	10.90	No
			46	5230	11.00	12.40		11.42	11.90	
	802.11ac (VHT40)	13.5 Mbps	38	5190	10.80	12.40	No	9.50	10.90	No
			46	5230	10.90	12.40		11.00	11.90	
	802.11ac (VHT80)	29.3 Mbps	42	5210	10.90	12.40	No	10.30	11.90	No

Band	Mode	Data Rate	Ch #	Freq. (MHz)	Chain 0 Average Power (dBm)			Chain 1 Average Power (dBm)		
					Meas Pwr	Tune-up	SAR Test (Yes/No)	Meas Pwr	Tune-up	SAR Test (Yes/No)
UNII-2A 5.3 GHz	802.11a	6 Mbps	52	5260	11.30	12.30	No	10.80	12.00	Yes
			56	5280	11.40	12.30		11.30	12.00	
			60	5300	11.00	12.30		11.20	12.00	
			64	5320	10.90	12.30		11.10	12.00	
	802.11n (HT20)	6.5 Mbps	52	5260	11.10	12.20	No	10.80	11.90	No
			56	5280	11.30	12.20		11.30	11.90	
			60	5300	11.00	12.20		11.10	11.90	
			64	5320	10.80	12.20		11.00	11.90	
	802.11ac (VHT20)	6.5 Mbps	52	5260	11.20	12.30	No	10.70	11.90	No
			56	5280	11.30	12.30		11.20	11.90	
			60	5300	11.00	12.30		11.10	11.90	
			64	5320	10.80	12.30		11.00	11.90	
	802.11n (HT40)	13.5 Mbps	54	5270	11.00	12.20	No	11.20	11.90	No
			62	5310	10.70	12.20		10.90	11.90	
	802.11ac (VHT40)	13.5 Mbps	54	5270	10.90	12.30	No	11.20	11.90	No
			62	5310	11.30	12.30		10.90	11.60	
	802.11ac (VHT80)	29.3 Mbps	58	5290	10.90	12.30	No	10.60	11.90	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	10.70	12.00	No	10.90	11.70	Yes
			116	5580	10.90	12.00		10.70	11.70	
			124	5620	10.70	12.00		10.70	11.70	
			144	5720	11.00	12.00		10.70	11.70	
	802.11n (HT20)	6.5 Mbps	100	5500	10.60	12.00	No	10.20	11.60	No
			116	5580	10.80	12.00		10.50	11.60	
			124	5620	11.20	12.00		10.70	11.60	
			144	5720	10.90	12.00		10.60	11.60	
	802.11ac (VHT20)	6.5 Mbps	100	5500	10.60	12.00	No	10.70	11.60	No
			116	5580	10.80	12.00		10.50	11.60	
			124	5620	11.20	12.00		10.60	11.60	
			144	5720	10.90	12.00		10.60	11.60	
	802.11n (HT40)	13.5 Mbps	102	5510	10.60	12.00	No	10.50	11.60	No
			118	5590	10.70	12.00		10.60	11.60	
			126	5630	10.90	12.00		11.00	11.60	
			142	5710	10.90	12.00		10.60	11.60	
	802.11ac (VHT40)	13.5 Mbps	102	5510	10.50	12.00	No	10.50	11.60	No
			118	5590	10.70	12.00		10.60	11.60	
			126	5630	10.90	12.00		11.00	11.60	
			142	5710	10.80	12.00		10.60	11.60	
	802.11ac (VHT80)	29.3 Mbps	106	5530	10.50	12.00	Yes	10.10	11.60	No
			122	5610	10.60	12.00		10.20	11.60	
			138	5690	10.50	12.00		10.40	11.60	

Band	Mode	Data Rate	Ch #	Freq. (MHz)	Chain 0 Average Power (dBm)			Chain 1 Average Power (dBm)		
					Meas Pwr	Tune-up	SAR Test (Yes/No)	Meas Pwr	Tune-up	SAR Test (Yes/No)
UNII-3 5.8 GHz	802.11a	6 Mbps	149	5745	8.60	10.10	No	8.70	9.80	No
			157	5785	8.90	10.10		8.50	9.80	
			165	5825	8.60	10.10		8.20	9.80	
	802.11n (HT20)	6.5 Mbps	149	5745	8.60	10.10	No	8.60	9.80	No
			157	5785	8.80	10.10		8.40	9.80	
			165	5825	8.60	10.10		8.10	9.80	
	802.11ac (VHT20)	6.5 Mbps	149	5745	8.60	10.10	No	8.50	9.80	No
			157	5785	8.80	10.10		8.30	9.80	
			165	5825	8.60	10.10		8.20	9.80	
	802.11n (HT40)	13.5 Mbps	151	5755	8.90	10.10	No	8.20	9.80	No
			159	5795	8.70	10.10		8.10	9.80	
	802.11ac (VHT40)	13.5 Mbps	151	5755	8.90	10.10	No	8.30	9.80	No
			159	5795	8.70	10.10		8.10	9.80	
	802.11ac (VHT80)	29.3 Mbps	155	5775	8.40	10.10	Yes	8.10	9.80	Yes

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.

9.6. Bluetooth

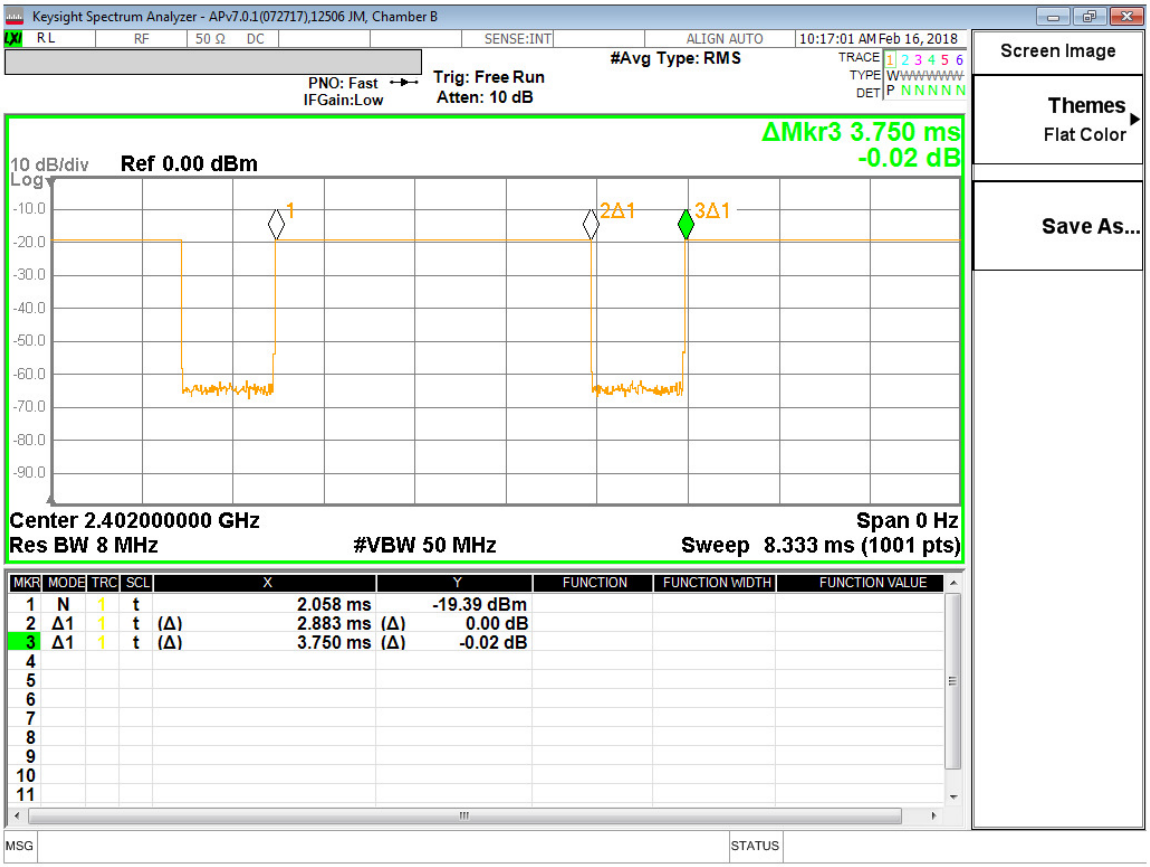
Band	Mode	Ch #	Freq. (MHz)	Chain 0 Average Power (dBm)		
				Meas Pwr	Tune-up	SAR Test (Yes/No)
2.4	GFSK	0	2402	9.25	10.30	Yes
		39	2441	9.97	10.90	
		78	2480	9.29	10.00	
	EDR, π/4 DQPSK	0	2402	7.25	7.40	No
		39	2441	8.28	8.20	
		78	2480	6.41	7.30	
	EDR, 8-DPSK	0	2402	7.25	7.40	No
		39	2441	8.28	8.20	
		78	2480	6.41	7.30	
	LE, GFSK	0	2402	3.65	4.00	No
		19	2440	5.14	5.40	
		39	2480	4.70	4.90	

Duty Factor Measured Results

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

Duty Cycle plot

GFSK



10. Measured and Reported (Scaled) SAR Results

SAR Test Reduction criteria are as follows:

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

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

KDB 447498 D01 General RF Exposure Guidance:

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

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

KDB 648474 D04 Handset SAR:

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

KDB 648474 D04 Handset SAR (Phablet Only):

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

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

KDB 941225 D01 SAR test for 3G devices:

When the maximum output power and tune-up tolerance specified for production units in a secondary mode is ≤ 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	28.2	27.9	0.283	0.303	1
			Left Tilt	190	836.6	28.2	27.9	0.083	0.089	
			Right Touch	190	836.6	28.2	27.9	0.235	0.252	
			Right Tilt	190	836.6	28.2	27.9	0.098	0.105	
Body-worn	GPRS 4 Slots	15	Rear	190	836.6	28.2	27.9	0.181	0.194	
			Front	190	836.6	28.2	27.9	0.213	0.228	2
Hotspot	GPRS 4 Slots	10	Rear	190	836.6	28.2	27.9	0.289	0.310	3
			Front	190	836.6	28.2	27.9	0.280	0.300	
			Edge 2	190	836.6	28.2	27.9	0.145	0.155	
			Edge 3	190	836.6	28.2	27.9	0.082	0.088	
			Edge 4	190	836.6	28.2	27.9	0.200	0.214	
Hotspot	DTM (2 Slots)	10	Rear	190	836.6	31.2	30.9	0.287	0.308	

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	23.7	23.1	0.231	0.265	4
			Left Tilt	661	1880.0	23.7	23.1	0.066	0.076	
			Right Touch	661	1880.0	23.7	23.1	0.154	0.177	
			Right Tilt	661	1880.0	23.7	23.1	0.069	0.079	
Body-worn	GPRS 4 Slots	15	Rear	661	1880.0	23.7	23.1	0.114	0.131	
			Front	661	1880.0	23.7	23.1	0.167	0.192	5
Hotspot	GPRS 4 Slots	10	Rear	661	1880.0	23.7	23.1	0.157	0.180	
			Front	661	1880.0	23.7	23.1	0.319	0.366	
			Edge 2	661	1880.0	23.7	23.1	0.049	0.056	
			Edge 3	661	1880.0	23.7	23.1	0.348	0.400	6
			Edge 4	661	1880.0	23.7	23.1	0.333	0.382	
Hotspot	DTM (2 Slots)	10	Edge 3	661	1880.0	26.7	26.2	0.323	0.362	

10.3. 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 12.2 kbps	0	Left Touch	4183	836.6	24.9	24.3	0.277	0.318	7
			Left Tilt	4183	836.6	24.9	24.3	0.089	0.102	
			Right Touch	4183	836.6	24.9	24.3	0.244	0.280	
			Right Tilt	4183	836.6	24.9	24.3	0.107	0.123	
Body-worn	Rel 99 RMC 12.2 kbps	15	Rear	4183	836.6	24.9	24.3	0.202	0.232	
			Front	4183	836.6	24.9	24.3	0.215	0.247	8
Hotspot	Rel 99 RMC 12.2 kbps	10	Rear	4183	836.6	24.9	24.3	0.268	0.308	
			Front	4183	836.6	24.9	24.3	0.289	0.332	9
			Edge 2	4183	836.6	24.9	24.3	0.170	0.195	
			Edge 3	4183	836.6	24.9	24.3	0.104	0.119	
			Edge 4	4183	836.6	24.9	24.3	0.167	0.192	

10.4. 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	23.0	22.6	0.310	0.338	
						50	0	23.0	22.6	0.314	0.348	10
			Left Tilt (15°)	20175	1732.5	1	0	23.0	22.6	0.056	0.061	
						50	0	23.0	22.6	0.062	0.068	
			Right Touch	20175	1732.5	1	0	23.0	22.6	0.194	0.212	
						50	0	23.0	22.6	0.202	0.224	
			Right Tilt (15°)	20175	1732.5	1	0	23.0	22.6	0.073	0.080	
						50	0	23.0	22.6	0.075	0.083	
Body-worn	QPSK	15	Rear	20175	1732.5	1	0	23.0	22.6	0.189	0.206	
						50	0	23.0	22.6	0.170	0.189	
			Front	20175	1732.5	1	0	23.0	22.6	0.211	0.230	
						50	0	23.0	22.6	0.221	0.245	11
Hotspot	QPSK	10	Rear	20175	1732.5	1	0	23.0	22.6	0.321	0.350	
						50	0	23.0	22.6	0.323	0.358	
			Front	20175	1732.5	1	0	23.0	22.6	0.439	0.479	
						50	0	23.0	22.6	0.478	0.530	
			Edge 2	20175	1732.5	1	0	23.0	22.6	0.053	0.058	
						50	0	23.0	22.6	0.052	0.058	
			Edge 3	20175	1732.5	1	0	23.0	22.6	0.493	0.538	
						50	0	23.0	22.6	0.498	0.552	
			Edge 4	20175	1732.5	1	0	23.0	22.6	0.599	0.654	
						50	0	23.0	22.6	0.606	0.672	12

10.5. 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	49	25.0	24.7	0.249	0.265	13
						25	0	24.0	23.8	0.218	0.229	
			Left Tilt	20525	836.5	1	49	25.0	24.7	0.092	0.098	
						25	0	24.0	23.8	0.080	0.084	
			Right Touch	20525	836.5	1	49	25.0	24.7	0.233	0.248	
						25	0	24.0	23.8	0.194	0.204	
			Right Tilt	20525	836.5	1	49	25.0	24.7	0.106	0.113	
						25	0	24.0	23.8	0.092	0.097	
Body-worn	QPSK	15	Rear	20525	836.5	1	49	25.0	24.7	0.196	0.209	
						25	0	24.0	23.8	0.160	0.168	
			Front	20525	836.5	1	49	25.0	24.7	0.210	0.223	14
						25	0	24.0	23.8	0.180	0.189	
Hotspot	QPSK	10	Rear	20525	836.5	1	49	25.0	24.7	0.276	0.294	
						25	0	24.0	23.8	0.210	0.220	
			Front	20525	836.5	1	49	25.0	24.7	0.306	0.326	15
						25	0	24.0	23.8	0.237	0.249	
			Edge 2	20525	836.5	1	49	25.0	24.7	0.186	0.198	
						25	0	24.0	23.8	0.151	0.158	
			Edge 3	20525	836.5	1	49	25.0	24.7	0.123	0.131	
						25	0	24.0	23.8	0.096	0.101	
			Edge 4	20525	836.5	1	49	25.0	24.7	0.152	0.162	
						25	0	24.0	23.8	0.123	0.129	

10.6. 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	23.0	22.3	0.027	0.032	
						50	0	23.0	22.3	0.025	0.029	
			Left Tilt	21100	2535.0	1	0	23.0	22.3	0.017	0.021	
						50	0	23.0	22.3	0.012	0.014	
			Right Touch	21100	2535.0	1	0	23.0	22.3	0.030	0.035	16
						50	0	23.0	22.3	0.027	0.032	
			Right Tilt	21100	2535.0	1	0	23.0	22.3	0.005	0.006	
						50	0	23.0	22.3	0.008	0.009	
Body-worn	QPSK	15	Rear	21100	2535.0	1	0	23.0	22.3	0.043	0.051	
						50	0	23.0	22.3	0.039	0.046	
			Front	21100	2535.0	1	0	23.0	22.3	0.057	0.068	17
						50	0	23.0	22.3	0.055	0.065	
Hotspot	QPSK	10	Rear	21100	2535.0	1	0	23.0	22.3	0.098	0.116	
						50	0	23.0	22.3	0.097	0.114	
			Front	21100	2535.0	1	0	23.0	22.3	0.126	0.149	18
						50	0	23.0	22.3	0.120	0.141	
			Edge 2	21100	2535.0	1	0	23.0	22.3	0.070	0.083	
						50	0	23.0	22.3	0.068	0.080	
			Edge 3	21100	2535.0	1	0	23.0	22.3	0.069	0.082	
						50	0	23.0	22.3	0.068	0.080	
			Edge 4	21100	2535.0	1	0	23.0	22.3	0.009	0.010	
						50	0	23.0	22.3	0.008	0.009	

10.7. LTE Band 12 (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	23095	707.5	1	49	25.0	24.8	0.147	0.154	19
						25	0	24.0	23.7	0.109	0.117	
			Left Tilt (15°)	23095	707.5	1	49	25.0	24.8	0.042	0.044	
						25	0	24.0	23.7	0.031	0.033	
			Right Touch	23095	707.5	1	49	25.0	24.8	0.108	0.113	
						25	0	24.0	23.7	0.074	0.079	
			Right Tilt (15°)	23095	707.5	1	49	25.0	24.8	0.043	0.045	
						25	0	24.0	23.7	0.029	0.031	
Body-worn	QPSK	15	Rear	23095	707.5	1	49	25.0	24.8	0.158	0.166	
						25	12	24.0	23.7	0.121	0.129	
			Front	23095	707.5	1	49	25.0	24.8	0.165	0.173	20
						25	12	24.0	23.7	0.124	0.132	
Hotspot	QPSK	10	Rear	23095	707.5	1	49	25.0	24.8	0.189	0.198	
						25	12	24.0	23.7	0.145	0.155	
			Front	23095	707.5	1	49	25.0	24.8	0.208	0.218	21
						25	12	24.0	23.7	0.161	0.172	
			Edge 2	23095	707.5	1	49	25.0	24.8	0.153	0.161	
						25	12	24.0	23.7	0.114	0.122	
			Edge 3	23095	707.5	1	49	25.0	24.8	0.020	0.021	
						25	12	24.0	23.7	0.018	0.019	
			Edge 4	23095	707.5	1	49	25.0	24.8	0.114	0.120	
						25	12	24.0	23.7	0.097	0.104	

10.8. 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	25	25.0	24.7	0.281	0.300	22
						25	0	24.0	23.9	0.232	0.240	
			Left Tilt (15°)	23230	782.0	1	25	25.0	24.7	0.122	0.130	
						25	0	24.0	23.9	0.097	0.100	
			Right Touch	23230	782.0	1	25	25.0	24.7	0.262	0.279	
						25	0	24.0	23.9	0.205	0.212	
			Right Tilt (15°)	23230	782.0	1	25	25.0	24.7	0.125	0.133	
						25	0	24.0	23.9	0.100	0.103	
Body-worn	QPSK	15	Rear	23230	782.0	1	25	25.0	24.7	0.258	0.275	
						25	0	24.0	23.9	0.223	0.230	
			Front	23230	782.0	1	25	25.0	24.7	0.298	0.318	23
						25	0	24.0	23.9	0.256	0.264	
Hotspot	QPSK	10	Rear	23230	782.0	1	25	25.0	24.7	0.333	0.355	
						25	0	24.0	23.9	0.288	0.297	
			Front	23230	782.0	1	25	25.0	24.7	0.362	0.386	24
						25	0	24.0	23.9	0.313	0.323	
			Edge 2	23230	782.0	1	25	25.0	24.7	0.289	0.308	
						25	0	24.0	23.9	0.246	0.254	
			Edge 3	23230	782.0	1	25	25.0	24.7	0.084	0.090	
						25	0	24.0	23.9	0.079	0.082	
			Edge 4	23230	782.0	1	25	25.0	24.7	0.093	0.099	
						25	0	24.0	23.9	0.077	0.080	

10.9. LTE Band 17 (10MHz Bandwidth)

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

10.10. LTE Band 41 (20MHz Bandwidth)

RF Exposure Conditions	Mode	Pwr Back-off	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	OFF	0	Left Touch	40620	2593.0	1	0	23.0	22.0	0.010	0.012	
							50	0	23.0	22.0	0.007	0.009	
				Left Tilt (15°)	40620	2593.0	1	0	23.0	22.0	0.001	0.002	
							50	0	23.0	22.0	0.005	0.006	
				Right Touch	40620	2593.0	1	0	23.0	22.0	0.012	0.015	
							50	0	23.0	22.0	0.022	0.028	25
				Right Tilt (15°)	40620	2593.0	1	0	23.0	22.0	0.004	0.005	
							50	0	23.0	22.0	0.005	0.007	
Body-worn	QPSK	OFF	15	Rear	40620	2593.0	1	0	23.0	22.0	0.027	0.034	
							50	0	23.0	22.0	0.028	0.035	
				Front	40620	2593.0	1	0	23.0	22.0	0.030	0.038	
							50	0	23.0	22.0	0.031	0.039	26
Hotspot	QPSK	OFF	10	Rear	40620	2593.0	1	0	23.0	22.0	0.066	0.083	
							50	0	23.0	22.0	0.065	0.082	
				Front	40620	2593.0	1	0	23.0	22.0	0.075	0.094	27
							50	0	23.0	22.0	0.074	0.093	
				Edge 2	40620	2593.0	1	0	23.0	22.0	0.036	0.045	
							50	0	23.0	22.0	0.039	0.049	
				Edge 3	40620	2593.0	1	0	23.0	22.0	0.036	0.045	
							50	0	23.0	22.0	0.038	0.048	
				Edge 4	40620	2593.0	1	0	23.0	22.0	0.014	0.018	
							50	0	23.0	22.0	0.010	0.013	

10.11. Wi-Fi (DTS Band)

RF Exposure Conditions	Mode	Antenna	Dist. (mm)	Test Position	Ch #.	Freq. (MHz)	Area Scan Max. SAR (W/kg)	Duty Cycle	Power (dBm)		1-g SAR (W/kg)		Plot No.
									Tune-up Limit	Meas.	Meas.	Scaled	
Head	802.11b 1 Mbps	Chain 0	0	Left Touch	6	2437	0.240	99.35%	13.5	12.5			
				Left Tilt	6	2437	0.280	99.35%	13.5	12.5			
				Right Touch	6	2437	0.511	99.35%	13.5	12.5			
				Right Tilt	6	2437	0.523	99.35%	13.5	12.5	0.276	0.350	28
Body-worn	802.11b 1 Mbps	Chain 0	15	Rear	6	2437	0.024	99.35%	13.5	12.5			
				Front	6	2437	0.033	99.35%	13.5	12.5	0.021	0.027	29
Hotspot	802.11b 1 Mbps	Chain 0	10	Rear	6	2437	0.042	99.35%	13.5	12.5			
				Front	6	2437	0.067	99.35%	13.5	12.5			
				Edge 1	6	2437	0.046	99.35%	13.5	12.5			
				Edge 4	6	2437	0.113	99.35%	13.5	12.5	0.085	0.108	30
Head	802.11b 1 Mbps	Chain 1	0	Left Touch	11	2462	0.182	99.35%	13.2	12.2	0.093	0.118	31
				Left Tilt	11	2462	0.041	99.35%	13.2	12.2			
				Right Touch	11	2462	0.089	99.35%	13.2	12.2			
				Right Tilt	11	2462	0.021	99.35%	13.2	12.2			
Body-worn	802.11b 1 Mbps	Chain 1	15	Rear	11	2462	0.005	99.35%	13.2	12.2			
				Front	11	2462	0.005	99.35%	13.2	12.2	0.003	0.004	32
Hotspot	802.11b 1 Mbps	Chain 1	10	Rear	11	2462	0.021	99.35%	13.2	12.2	0.020	0.025	33
				Front	11	2462	0.010	99.35%	13.2	12.2			
				Edge 2	11	2462	0.010	99.35%	13.2	12.2			

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.

10.12. Wi-Fi (U-NII Band)

U-NII-1 & U-NII-2A

RF Exposure Conditions	Mode	Antenna	Dist. (mm)	Test Position	Ch #.	Freq. (MHz)	Area Scan Max. SAR (W/kg)	Duty Cycle	Power (dBm)		1-g SAR (W/kg)		Plots No.
									Tune-up Limit	Meas.	Meas.	Scaled	
Head	802.11a	Chain 0	0	Left Touch	44	5220	0.212	98.16%	12.5	11.2			
				Left Tilt	44	5220	0.174	98.16%	12.5	11.2			
				Right Touch	44	5220	0.881	98.16%	12.5	11.2	0.342	0.470	34
				Right Tilt	44	5220	0.721	98.16%	12.5	11.2	0.279	0.383	
Body	802.11a	Chain 0	15	Rear	44	5220	0.035	98.16%	12.5	11.2			
				Front	44	5220	0.040	98.16%	12.5	11.2	0.010	0.013	35
Head	802.11a	Chain 1	0	Left Touch	56	5280	0.242	98.16%	12.0	11.3	0.097	0.116	36
				Left Tilt	56	5280	0.110	98.16%	12.0	11.3			
				Right Touch	56	5280	0.107	98.16%	12.0	11.3			
				Right Tilt	56	5280	0.071	98.16%	12.0	11.3			
Body	802.11a	Chain 1	15	Rear	56	5280	0.024	98.16%	12.0	11.3	0.004	0.004	37
				Front	56	5280	0.022	98.16%	12.0	11.3			

RF Exposure Conditions	Mode	Antenna	Dist. (mm)	Test Position	Ch #.	Freq. (MHz)	Area Scan Max. SAR (W/kg)	Duty Cycle	Power (dBm)		10-g SAR (W/kg)		Plots No.
									Tune-up Limit	Meas.	Meas.	Scaled	
Product specific	802.11a	Chain 0	0	Rear	44	5220	0.405	98.16%	12.5	11.2			
				Front	44	5220	1.220	98.16%	12.5	11.2	0.156	0.214	38
				Edge 1	44	5220	0.563	98.16%	12.5	11.2			
				Edge 4	44	5220	0.830	98.16%	12.5	11.2			
Product specific	802.11a	Chain 1	0	Rear	56	5280	0.344	98.16%	12.0	11.3			
				Front	56	5280	0.357	98.16%	12.0	11.3			
				Edge 2	56	5280	0.358	98.16%	12.0	11.3	0.030	0.036	39

U-NII-2C

RF Exposure Conditions	Mode	Antenna	Dist. (mm)	Test Position	Ch #.	Freq. (MHz)	Area Scan Max. SAR (W/kg)	Duty Cycle	Power (dBm)		1-g SAR (W/kg)		Plot No.
									Tune-up Limit	Meas.	Meas.	Scaled	
Head	802.11ac (VHT80)	Chain 0	0	Left Touch	122	5610	0.249	88.44%	12.0	10.6			
				Left Tilt	122	5610	0.252	88.44%	12.0	10.6			
				Right Touch	122	5610	0.778	88.44%	12.0	10.6	0.341	0.532	40
				Right Tilt	122	5610	0.699	88.44%	12.0	10.6	0.277	0.432	
Body	802.11ac (VHT80)	Chain 0	15	Rear	122	5610	0.655	88.44%	12.0	10.6	0.038	0.059	41
				Front	122	5610	0.044	88.44%	12.0	10.6			
Head	802.11a	Chain 1	0	Left Touch	100	5500	0.133	98.16%	11.7	10.9	0.035	0.043	42
				Left Tilt	100	5500	0.029	98.16%	11.7	10.9			
				Right Touch	100	5500	0.040	98.16%	11.7	10.9			
				Right Tilt	100	5500	0.014	98.16%	11.7	10.9			
Body	802.11a	Chain 1	15	Rear	100	5500	0.047	98.16%	11.7	10.9	0.010	0.012	43
				Front	100	5500	0.007	98.16%	11.7	10.9			

RF Exposure Conditions	Mode	Antenna	Dist. (mm)	Test Position	Ch #.	Freq. (MHz)	Area Scan Max. SAR (W/kg)	Duty Cycle	Power (dBm)		10-g SAR (W/kg)		Plot No.
									Tune-up Limit	Meas.	Meas.	Scaled	
Product specific	802.11ac (VHT80)	Chain 0	0	Rear	122	5610	0.858	88.44%	12.0	10.6	0.073	0.114	
				Front	122	5610	1.670	88.44%	12.0	10.6	0.244	0.381	44
				Edge 1	122	5610	0.400	88.44%	12.0	10.6			
				Edge 4	122	5610	0.029	88.44%	12.0	10.6			
Product specific	802.11a	Chain 1	0	Rear	100	5500	0.904	98.16%	11.7	10.9	0.066	0.081	45
				Front	100	5500	0.280	98.16%	11.7	10.9			
				Edge 2	100	5500	0.378	98.16%	11.7	10.9			

U-NII-3

RF Exposure Conditions	Mode	Antenna	Dist. (mm)	Test Position	Ch #.	Freq. (MHz)	Area Scan Max. SAR (W/kg)	Duty Cycle	Power (dBm)		1-g SAR (W/kg)		Plot No.
									Tune-up Limit	Meas.	Meas.	Scaled	
Head	802.11ac (VHT80)	Chain 0	0	Left Touch	155	5775	0.174	88.44%	10.1	8.4			
				Left Tilt	155	5775	0.232	88.44%	10.1	8.4			
				Right Touch	155	5775	0.384	88.44%	10.1	8.4	0.218	0.365	46
				Right Tilt	155	5775	0.291	88.44%	10.1	8.4			
Body	802.11ac (VHT80)	Chain 0	15	Rear	155	5775	0.091	88.44%	10.1	8.4	0.032	0.054	47
				Front	155	5775	0.039	88.44%	10.1	8.4			
Head	802.11ac (VHT80)	Chain 1	0	Left Touch	155	5775	0.080	88.44%	9.8	8.1	0.031	0.052	48
				Left Tilt	155	5775	0.013	88.44%	9.8	8.1			
				Right Touch	155	5775	0.034	88.44%	9.8	8.1			
				Right Tilt	155	5775	0.006	88.44%	9.8	8.1			
Body	802.11ac (VHT80)	Chain 1	15	Rear	155	5775	0.012	88.44%	9.8	8.1	<0.001	<0.001	49
				Front	155	5775	0.010	88.44%	9.8	8.1			

RF Exposure Conditions	Mode	Antenna	Dist. (mm)	Test Position	Ch #.	Freq. (MHz)	Area Scan Max. SAR (W/kg)	Duty Cycle	Power (dBm)		10-g SAR (W/kg)		Plot No.
									Tune-up Limit	Meas.	Meas.	Scaled	
Product specific	802.11ac (VHT80)	Chain 0	0	Rear	155	5775	0.804	88.44%	10.1	8.4			
				Front	155	5775	1.360	88.44%	10.1	8.4	0.122	0.204	50
				Edge 1	155	5775	0.174	88.44%	10.1	8.4			
				Edge 4	155	5775	0.830	88.44%	10.1	8.4			
Product specific	802.11ac (VHT80)	Chain 1	0	Rear	155	5775	0.276	88.44%	9.8	8.1			
				Front	155	5775	0.546	88.44%	9.8	8.1	0.034	0.057	51
				Edge 2	155	5775	0.183	88.44%	9.8	8.1			

10.13. Bluetooth

RF Exposure Conditions	Mode	Antenna	Dist. (mm)	Test Position	Ch #.	Freq. (MHz)	Duty Cycle	Power (dBm)		1-g SAR (W/kg)		Plots No.
								Tune-up Limit	Meas.	Meas.	Scaled	
Head	GFSK	Chain 0	0	Left Touch	39	2441	76.88%	10.90	9.97	0.065	0.105	52
				Left Tilt	39	2441	76.88%	10.90	9.97	0.018	0.029	
				Right Touch	39	2441	76.88%	10.90	9.97	0.034	0.054	
				Right Tilt	39	2441	76.88%	10.90	9.97	0.033	0.053	
Body-worn	GFSK	Chain 0	15	Rear	39	2441	76.88%	10.90	9.97	0.007	0.012	53
				Front	39	2441	76.88%	10.90	9.97	0.007	0.011	
Hotspot	GFSK	Chain 0	10	Rear	39	2441	76.88%	10.90	9.97	0.018	0.029	
				Front	39	2441	76.88%	10.90	9.97	0.017	0.027	
				Edge 1	39	2441	76.88%	10.90	9.97	0.017	0.027	
				Edge 4	39	2441	76.88%	10.90	9.97	0.042	0.067	54

11. SAR Measurement Variability

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

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

Frequency Band (MHz)	Air Interface	RF Exposure Conditions	Test Position	Repeated SAR (Yes/No)	Highest Measured SAR (W/kg)	First Repeated	
						Measured SAR (W/kg)	Largest to Smallest SAR Ratio
700	LTE Band 12	Hotspot	Front	No	0.208	N/A	N/A
	LTE Band 13	Hotspot	Front	No	0.362	N/A	N/A
850	GSM 850	Hotspot	Rear	No	0.289	N/A	N/A
	WCDMA Band V	Hotspot	Front	No	0.289	N/A	N/A
	LTE Band 5	Hotspot	Front	No	0.306	N/A	N/A
1700	LTE Band 4	Hotspot	Edge 4	No	0.606	N/A	N/A
1900	GSM 1900	Hotspot	Edge 3	No	0.348	N/A	N/A
2400	Wi-Fi 802.11b/g/n	Head	Right Tilt	No	0.276	N/A	N/A
2400	BT	Head	Left Touch	No	0.065	N/A	N/A
2500	LTE Band 7	Hotspot	Front	No	0.126	N/A	N/A
2600	LTE Band 41	Hotspot	Front	No	0.075	N/A	N/A
5200	Wi-Fi 802.11a/n/ac	Head	Right Touch	No	0.342	N/A	N/A
5300	Wi-Fi 802.11a/n/ac	Head	Left Touch	No	0.097	N/A	N/A
5500	Wi-Fi 802.11a/n/ac	Head	Right Touch	No	0.341	N/A	N/A
5800	Wi-Fi 802.11a/n/ac	Head	Right Touch	No	0.218	N/A	N/A

Note(s):

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

Frequency Band (MHz)	Air Interface	RF Exposure Conditions	Test Position	Repeated SAR (Yes/No)	Highest Measured SAR (W/kg)	First Repeated	
						Measured SAR (W/kg)	Largest to Smallest SAR Ratio
5200	Wi-Fi 802.11a/n/ac	Product specific	Front	No	0.156	N/A	N/A
5300	Wi-Fi 802.11a/n/ac	Product specific	Front	No	0.030	N/A	N/A
5500	Wi-Fi 802.11a/n/ac	Product specific	Front	No	0.244	N/A	N/A
5800	Wi-Fi 802.11a/n/ac	Product specific	Front	No	0.122	N/A	N/A

Note(s):

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

12. Simultaneous Transmission SAR Analysis

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

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

Where:

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 Chain 0 / BT	WLAN Chain 1
1	GSM/GPRS/Edge	BT/BLE	(None)
2	GSM/GPRS/Edge	WLAN 2.4G	(None)
3	GSM/GPRS/Edge	WLAN 2.4G	WLAN 2.4G
4	GSM/GPRS/Edge	WLAN 2.4G	WLAN 5G
5	GSM/GPRS/Edge	WLAN 5G	WLAN 5G
6	GSM/GPRS/Edge	BT WLAN 5G	WLAN 5G
7	UMTS/HSPA	BT/BLE	(None)
8	UMTS/HSPA	WLAN 2.4G	(None)
9	UMTS/HSPA	WLAN 2.4G	WLAN 2.4G
10	UMTS/HSPA	WLAN 2.4G	WLAN 5G
11	UMTS/HSPA	WLAN 5G	WLAN 5G
12	UMTS/HSPA	BT WLAN 5G	WLAN 5G
13	LTE	BT/BLE	(None)
14	LTE	WLAN 2.4G	(None)
15	LTE	WLAN 2.4G	WLAN 2.4G
16	LTE	WLAN 2.4G	WLAN 5G
17	LTE	WLAN 5G	WLAN 5G
18	LTE	BT WLAN 5G	WLAN 5G
19	(None)	BT WLAN 5G	WLAN 5G

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

RF Exposure conditions	Test Position	Standalone SAR (W/kg)						∑ 1-g SAR (W/kg)						
		WWAN	DTS		U-NII		BT	WWAN + BT	WWAN + DTS	WWAN + DTS	WWAN + DTS + U-NII	WWAN + U-NII	WWAN+U-NII+BT	U-NII+BT
		①	Chain 0 ②	Chain 1 ③	Chain 0 ④	Chain 1 ⑤	Chain 0 ⑥	① + ⑥	① + ②	① + ② + ③	① + ② + ⑤	① + ④ + ⑤	① + ④ + ⑤ + ⑥	④ + ⑤ + ⑥
Head	Left Touch	0.348	0.350	0.118	0.532	0.116	0.105	0.453	0.698	0.816	0.814	0.996	1.101	0.753
	Left Tilt	0.130	0.350	0.118	0.532	0.116	0.029	0.159	0.480	0.598	0.596	0.778	0.807	0.677
	Right Touch	0.280	0.350	0.118	0.532	0.116	0.054	0.334	0.630	0.748	0.746	0.928	0.982	0.702
	Right Tilt	0.133	0.350	0.118	0.432	0.116	0.053	0.186	0.483	0.601	0.599	0.681	0.734	0.601
Body-worn	Rear	0.275	0.027	0.004	0.059	0.012	0.012	0.287	0.302	0.306	0.314	0.346	0.358	0.083
	Front	0.318	0.027	0.004	0.059	0.012	0.011	0.329	0.345	0.349	0.357	0.389	0.400	0.082
Hotspot	Rear	0.358	0.108	0.025			0.029	0.387	0.466	0.491		0.358	0.387	
	Front	0.530	0.108	0.025			0.027	0.557	0.638	0.663		0.530	0.557	
	Edge 2	0.308	0.108	0.025			0.067	0.375	0.416	0.441				
	Edge 3	0.552	0.108	0.025			0.067	0.619	0.660	0.685				
	Edge 4	0.672	0.108	0.025			0.067	0.739	0.780	0.805				

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.

12132671-S1V1 Appendix A: SAR Setup Photos

12132671-S1V1 Appendix B: SAR System Check Plots

12132671-S1V1 Appendix C: Highest SAR Test Plots

12132671-S1V1 Appendix D: SAR Liquid Tissue Ingredients

12132671-S1V1 Appendix E: SAR Probe Calibration Certificates

12132671-S1V1 Appendix F: SAR Dipole Calibration Certificates

END OF REPORT