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: PY7-68553C

Report Number: 12132731-S1V1
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Revision History

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1. Attestation of Test Results

Applicant Name	SONY MOBILE COMMUNICATIONS INC.			
FCC ID	PY7-68553C			
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	0.184	0.270	0.250	0.235
Body-worn	0.343	0.017	0.103	0.018
Hotspot/Wi-Fi Direct	0.610	0.035	N/A	0.037
Product specific 10g SAR	N/A	N/A	0.241	N/A
Simultaneous TX	0.721	0.663	0.721	0.721
Date Tested	4/4/2018 to 4/20/2018			
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.

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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	

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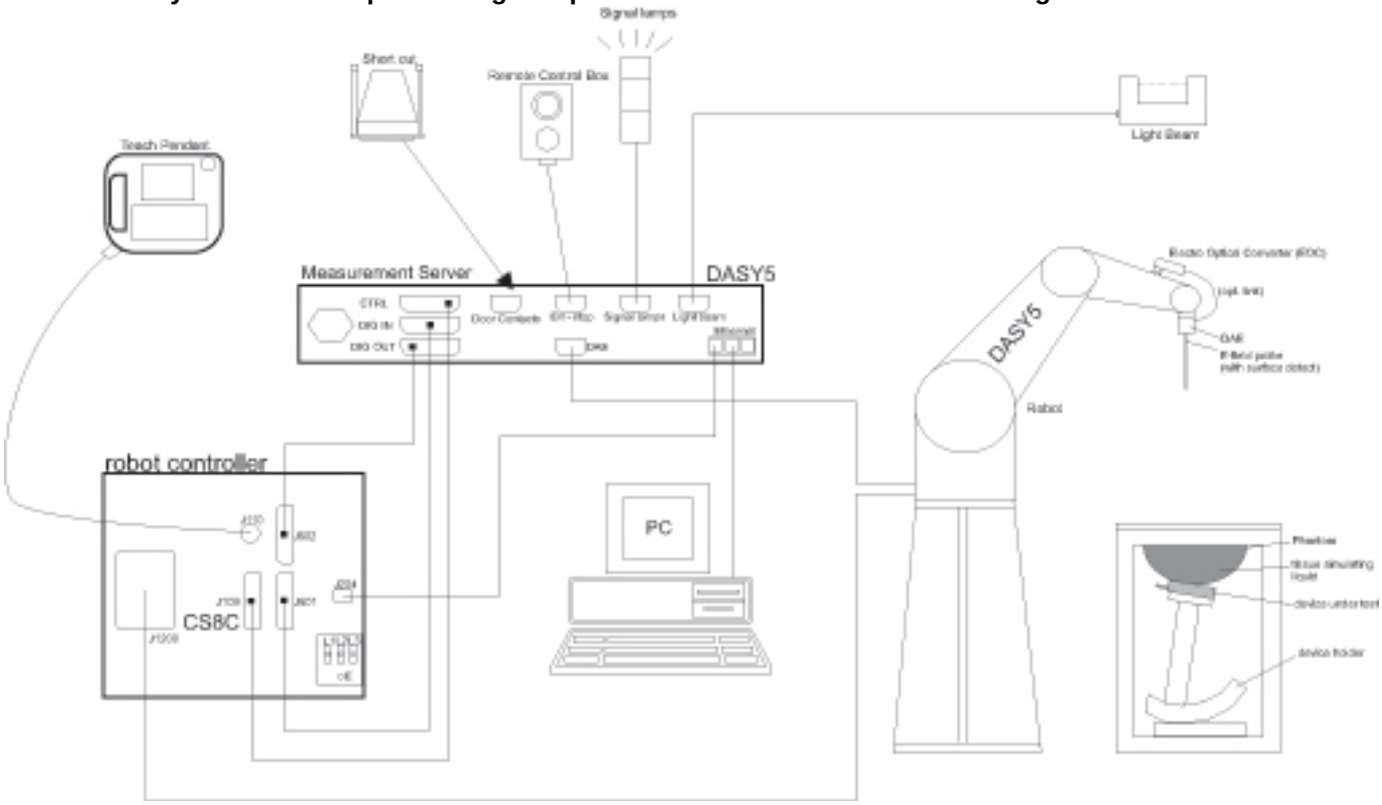
4. SAR Measurement System & Test Equipment

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.

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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.	

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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	$\leq 1.5 \cdot \Delta z_{Zoom}(n-1)$	
Minimum zoom scan volume	x, y, z		≥ 30 mm	3 – 4 GHz: ≥ 28 mm 4 – 5 GHz: ≥ 25 mm 5 – 6 GHz: ≥ 22 mm

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

* When zoom scan is required and the *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.

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4.3. Test Equipment

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

Dielectric Property Measurements

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

System Check

Name of Equipment	Manufacturer	Type/Model	Serial No.	Cal. Due Date
Synthesized Signal Generator	Agilent	N5181A	MY50140610	5/31/2018
Power Meter	Keysight	N1912A	MY55196008	5/12/2018
Power Sensor	Agilent	N1921A	MY53260001	10/27/2018
Power Sensor	Agilent	N1921A	MY52200012	10/27/2018
DC Power Supply	HP	6296A	2841A-05955	N/A
Amplifier	MITEQ	AMF-4D-00400600-50-30P	1795093	N/A
Directional coupler	Werlatone	C8060-102	2149	N/A
Synthesized Signal Generator	Agilent	N5181A	MY50140630	5/16/2018
Power Meter	HP	437B	3125U12345	8/10/2018
Power Meter	HP	437B	3125U11347	8/15/2018
Power Sensor	HP	8481A	3318A92374	8/15/2018
Power Sensor	HP	8481A	1926A27048	8/10/2018
Amplifier	MITEQ	AMF-4D-00400600-50-30P	1795092	N/A
Directional coupler	Werlatone	C8060-102	2141	N/A
DC Power Supply	BK Precision	1611	215-02292	N/A

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Lab Equipment

Name of Equipment	Manufacturer	Type/Model	Serial No.	Cal. Due Date
E-Field Probe (SAR Lab B)	SPEAG	EX3DV4	3772	2/13/2019
E-Field Probe (SAR Lab C)	SPEAG	EX3DV4	3885	10/24/2018
E-Field Probe (SAR Lab D)	SPEAG	EX3DV4	7335	3/16/2019
E-Field Probe (SAR Lab E)	SPEAG	EX3DV4	3989	1/16/2019
E-Field Probe (SAR Lab F)	SPEAG	EX3DV4	3929	3/16/2019
E-Field Probe (SAR Lab G)	SPEAG	EX3DV4	3871	8/23/2018
E-Field Probe (SAR Lab H)	SPEAG	EX3DV4	7483	12/12/2018
Data Acquisition Electronics (SAR Lab B)	SPEAG	DAE4	1380	7/24/2018
Data Acquisition Electronics (SAR Lab C)	SPEAG	DAE4	1343	8/21/2018
Data Acquisition Electronics (SAR Lab D)	SPEAG	DAE4	1352	11/8/2018
Data Acquisition Electronics (SAR Lab E)	SPEAG	DAE4	1259	1/10/2019
Data Acquisition Electronics (SAR Lab F)	SPEAG	DAE4	1377	10/11/2018
Data Acquisition Electronics (SAR Lab G)	SPEAG	DAE4	1359	2/9/2019
Data Acquisition Electronics (SAR Lab H)	SPEAG	DAE4	1257	10/11/2018
System Validation Dipole	SPEAG	D750V3	1071	11/21/2018
System Validation Dipole	SPEAG	D835V2	4d142	10/12/2018
System Validation Dipole	SPEAG	D835V2	4d002	11/21/2018
System Validation Dipole	SPEAG	D900V2	108	11/22/2018
System Validation Dipole	SPEAG	D1750V2	1053	8/24/2018
System Validation Dipole	SPEAG	D1750V2	1077	10/5/2018
System Validation Dipole	SPEAG	D1900V2	5d163	10/5/2018
System Validation Dipole	SPEAG	D1900V2	5d043	11/22/2018
System Validation Dipole	SPEAG	D2450V2	748	2/14/2019
System Validation Dipole	SPEAG	D2600V2	1006	10/5/2018
System Validation Dipole	SPEAG	D5GHzV2	1138	10/26/2018
System Validation Dipole	SPEAG	D5GHzV2	1003	3/13/2019

Other

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

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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.

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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** CB512FHBVT / SAR GSM/UMTS / Conducted CB512FHBWH / SAR LTE (LB/MB) / Conducted CB512FHBXC / SAR LTE HB / Conducted CB512FHBUA / WLAN – 2.4GHz / Conducted CB512FHBUR / WLAN – 2.4GHz / Conducted CB512FHBVC / WLAN – 5GHz / Conducted CB512FHBWD / WLAN – 5GHz / Conducted CB512FH699 / SAR LB GSM/UMTS #1 / Radiated CB512FH66M / SAR LB GSM/UMTS #2 / Radiated CB512FH69F / SAR MB GSM/UMTS #1 / Radiated CB512FH675 / SAR MB GSM/UMTS #2 / Radiated CB512FH678 / SAR LTE LB #1 / Radiated CB512FH685 / SAR LTE LB #2 / Radiated CB512FH67H / SAR LTE MB #1 / Radiated CB512FH68E / SAR LTE MB #2 / Radiated CB512FH672 / SAR LTE HB #1 / Radiated CB512FH68J / SAR LTE HB #2 / Radiated CB512FH68Z / SAR WLAN 2.4GHz # 1 / Radiated CB512FH68W / SAR WLAN 2.4GHz # 2 / Radiated CB512FH69H / SAR WLAN 5GHz # 1 / Radiated
Hardware Version	A
Software Version	0.150

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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)		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 64QAM Rel. 12 Does not support Carrier Aggregation (CA)		100% (FDD) 63.3% (TDD) [2] Refer to §6.4.
	Does this device support SV-LTE (1xRTT-LTE)? ☐ Yes ☒ No			
Wi-Fi	2.4 GHz	802.11b 802.11g 802.11n (HT20)		99.35% (802.11b) [1] 98.25% (802.11g) [1] 97.40% (802.11n) [1]
	5 GHz	802.11a 802.11n (HT20) 802.11n (HT40) 802.11ac (VHT20) 802.11ac (VHT40) 802.11ac (VHT80)		98.21% (802.11a) [1] 97.78% (802.11n HT20) [1] 92.95% (802.11n HT40) [1] 86.69% (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		76.96%(DH5)

Notes:

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

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6.3. General LTE SAR Test and Reporting Considerations

Item	Description						
	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		

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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).

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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

<u>Example for Calculated Duty Cycle for Uplink-Downlink Configuration 0:</u>
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.

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7. RF Exposure Conditions (Test Configurations)

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

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

Notes:

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

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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

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Dielectric Property Measurements Results:

SAR Lab	Date	Band (MHz)	Tissue Type	Frequency (MHz)	Relative Permittivity (εr)			Conductivity (σ)		
					Measured	Target	Delta (%)	Measured	Target	Delta (%)
B	4/9/2018	2600	Head	2600	38.59	39.01	-1.08	1.91	1.96	-2.91
				2495	38.99	39.14	-0.39	1.79	1.85	-3.23
				2690	38.20	38.90	-1.79	2.01	2.06	-2.40
B	4/9/2018	2600	Body	2600	51.33	52.51	-2.25	2.18	2.16	0.98
				2495	51.63	52.64	-1.92	2.06	2.01	2.42
				2690	50.98	52.40	-2.70	2.30	2.29	0.38
C	4/9/2018	1900	Head	1900	39.37	40.00	-1.58	1.39	1.40	-0.86
				1850	39.63	40.00	-0.92	1.34	1.40	-4.14
				1980	39.14	40.00	-2.15	1.47	1.40	4.71
C	4/12/2018	1900	Body	1900	50.73	53.30	-4.82	1.53	1.52	0.39
				1850	50.98	53.30	-4.35	1.49	1.52	-1.91
				1920	50.82	53.30	-4.65	1.56	1.52	2.30
C	4/16/2018	1900	Body	1900	54.28	53.30	1.84	1.54	1.52	1.05
				1850	54.40	53.30	2.06	1.50	1.52	-1.25
				1920	54.23	53.30	1.74	1.57	1.52	2.96
D	4/9/2018	750	Head	750	40.55	41.96	-3.36	0.92	0.89	3.44
				695	41.28	42.24	-2.28	0.87	0.89	-2.05
				790	40.05	41.76	-4.09	0.96	0.90	7.41
D	4/10/2018	750	Head	750	40.77	41.96	-2.84	0.93	0.89	3.87
				695	41.53	42.24	-1.69	0.87	0.89	-1.85
				790	40.21	41.76	-3.70	0.96	0.90	7.14
D	4/10/2018	750	Body	750	54.76	55.55	-1.42	1.00	0.96	4.25
				695	55.62	55.76	-0.25	0.97	0.96	0.77
				790	54.48	55.39	-1.65	1.05	0.97	8.68
D	4/11/2018	750	Body	750	54.58	55.55	-1.74	0.95	0.96	-1.35
				695	54.88	55.76	-1.57	0.87	0.96	-9.07
				790	54.24	55.39	-2.08	0.98	0.97	1.77
D	4/11/2018	1750	Head	1750	39.34	40.08	-1.86	1.33	1.37	-2.70
				1710	39.51	40.15	-1.58	1.29	1.35	-4.04
				1800	39.07	40.00	-2.33	1.40	1.40	0.07
E	4/9/2018	900	Head	900	39.84	41.50	-4.00	1.00	0.97	2.78
				805	41.09	41.68	-1.41	0.90	0.90	0.81
				915	39.67	41.50	-4.41	1.01	0.98	2.96
E	4/11/2018	835	Body	835	52.30	55.20	-5.25	1.05	0.97	8.66
				805	52.56	55.33	-5.01	1.02	0.97	5.34
				905	51.27	55.00	-6.78	1.11	1.05	5.56
E	4/11/2018	835	Body	835	52.85	55.20	-4.26	1.00	0.97	2.70
				805	53.21	55.33	-3.84	0.97	0.97	0.10
				905	52.28	55.00	-4.95	1.06	1.05	0.90

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SAR Lab	Date	Band (MHz)	Tissue Type	Frequency (MHz)	Relative Permittivity (εr)			Conductivity (σ)		
					Measured	Target	Delta (%)	Measured	Target	Delta (%)
F	4/16/2018	2450	Head	2450	39.08	39.20	-0.31	1.82	1.80	0.83
				2400	39.22	39.30	-0.20	1.76	1.75	0.59
				2480	38.99	39.16	-0.44	1.85	1.83	1.18
F	4/18/2018	2450	Body	2450	51.76	52.70	-1.78	1.87	1.95	-4.00
				2400	51.98	52.77	-1.50	1.83	1.90	-3.79
				2480	51.65	52.66	-1.92	1.91	1.99	-4.02
G	4/12/2018	5200	Head	5200	35.41	35.99	-1.61	4.50	4.65	-3.29
				5150	35.55	36.05	-1.38	4.40	4.60	-4.39
				5350	35.22	35.82	-1.67	4.66	4.80	-2.97
G	4/12/2018	5600	Head	5600	34.74	35.53	-2.23	4.98	5.06	-1.65
				5500	34.94	35.65	-1.99	4.85	4.96	-2.22
				5725	34.51	35.39	-2.49	5.11	5.19	-1.49
G	4/12/2018	5800	Head	5800	34.50	35.30	-2.27	5.16	5.27	-2.03
				5700	34.59	35.42	-2.34	5.08	5.16	-1.66
				5850	34.46	35.30	-2.38	5.25	5.27	-0.40
G	4/16/2018	1750	Body	1750	51.74	53.44	-3.18	1.53	1.49	3.02
				1710	51.75	53.54	-3.35	1.50	1.46	2.77
				1755	51.75	53.43	-3.14	1.53	1.49	2.54
H	4/12/2018	5200	Body	5200	47.87	49.02	-2.35	5.17	5.29	-2.41
				5150	48.05	49.09	-2.11	5.05	5.24	-3.48
				5350	47.72	48.82	-2.25	5.37	5.47	-1.78
H	4/12/2018	5600	Body	5600	47.33	48.48	-2.37	5.72	5.76	-0.71
				5500	47.46	48.61	-2.37	5.59	5.64	-1.04
				5725	47.03	48.31	-2.65	5.90	5.91	-0.06
H	4/12/2018	5800	Body	5800	47.01	48.20	-2.47	5.96	6.00	-0.70
				5700	47.22	48.34	-2.32	5.86	5.88	-0.27
				5850	46.98	48.20	-2.53	6.05	6.00	0.82
H	4/16/2018	5250	Body	5250	47.75	48.95	-2.46	5.40	5.35	0.90
				5200	47.87	49.02	-2.35	5.38	5.29	1.57
				5350	47.58	48.82	-2.53	5.53	5.47	1.01
H	4/16/2018	5600	Body	5600	47.11	48.48	-2.82	5.90	5.76	2.34
				5500	47.32	48.61	-2.66	5.70	5.64	0.91
				5725	46.77	48.31	-3.18	6.06	5.91	2.59
H	4/16/2018	5750	Body	5750	46.72	48.27	-3.22	6.08	5.94	2.44
				5700	46.86	48.34	-3.07	6.03	5.88	2.56
				5850	46.61	48.20	-3.30	6.27	6.00	4.43

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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.

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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 %	
B	4/9/2018	Head	D2600V2 SN:1006	10/5/2018	5.420	54.20	55.73	-2.75	2.330	23.30	25.08	-7.10	1,2
B	4/9/2018	Body	D2600V2 SN:1006	10/5/2018	5.480	54.80	56.13	-2.37	2.380	23.80	25.00	-4.80	
C	4/9/2018	Head	D1900V2 SN:5d163	10/5/2018	4.010	40.10	38.77	3.43	2.060	20.60	20.10	2.49	
C	4/12/2018	Body	D1900V2 SN:5d163	10/5/2018	4.010	40.10	42.99	-6.72	2.070	20.70	21.97	-5.78	3,4
C	4/16/2018	Body	D1900V2 SN:5d043	11/22/2018	3.970	39.70	41.00	-3.17	2.040	20.40	20.90	-2.39	5,6
D	4/9/2018	Head	D750V3 SN:1071	11/21/2018	0.931	9.31	8.59	8.38	0.615	6.15	5.73	7.33	7,8
D	4/10/2018	Body	D750V3 SN:1071	11/21/2018	0.883	8.83	8.52	3.64	0.590	5.90	5.69	3.69	
D	4/11/2018	Head	D1750V2 SN:1053	8/24/2018	3.770	37.70	39.45	-4.44	1.980	19.80	20.58	-3.79	9,10
E	4/9/2018	Head	D900V2 SN:108	11/22/2018	1.120	11.20	10.70	4.67	0.721	7.21	6.88	4.80	11,12
E	4/11/2018	Body	D835V2 SN:4d142	10/12/2018	1.030	10.30	9.63	6.96	0.673	6.73	6.27	7.34	13,14
E	4/16/2018	Body	D835V2 SN:4d002	11/21/2018	1.010	10.10	10.23	-1.27	0.663	6.63	6.80	-2.50	15,16
F	4/16/2018	Head	D2450V2 SN:748	2/14/2019	5.300	53.00	52.94	0.11	2.380	23.80	24.60	-3.25	
F	4/18/2018	Body	D2450V2 SN:748	2/14/2019	5.040	50.40	50.95	-1.08	2.310	23.10	23.80	-2.94	17,18
G	4/12/2018	Head	D5GHzV2 SN:1138 (5.2 GHz)	10/26/2018	7.410	74.10	77.70	-4.63	2.130	21.30	22.20	-4.05	
G	4/12/2018	Head	D5GHzV2 SN:1138 (5.6 GHz)	10/26/2018	7.770	77.70	83.20	-6.61	2.190	21.90	23.70	-7.59	19,20
G	4/12/2018	Head	D5GHzV2 SN:1138 (5.8 GHz)	10/26/2018	7.630	76.30	79.70	-4.27	2.160	21.60	22.70	-4.85	
G	4/16/2018	Body	D1750V2 SN:1077	10/5/2018	3.760	37.60	37.34	0.70	2.000	20.00	19.98	0.10	21,22
H	4/12/2018	Body	D5GHzV2 SN:1138 (5.2 GHz)	10/26/2018	7.400	74.00	73.40	0.82	2.100	21.00	20.60	1.94	
H	4/12/2018	Body	D5GHzV2 SN:1138 (5.6 GHz)	10/26/2018	8.280	82.80	79.50	4.15	2.320	23.20	22.30	4.04	
H	4/12/2018	Body	D5GHzV2 SN:1138 (5.8 GHz)	10/26/2018	7.300	73.00	76.80	-4.95	2.030	20.30	21.30	-4.69	23,24
H	4/16/2018	Body	D5GHzV2 SN:1003 (5.25 GHz)	3/13/2019	7.280	72.80	73.60	-1.09	2.060	20.60	20.50	0.49	
H	4/16/2018	Body	D5GHzV2 SN:1003 (5.60 GHz)	3/13/2019	8.210	82.10	77.70	5.66	2.300	23.00	21.70	5.99	25,26
H	4/16/2018	Body	D5GHzV2 SN:1003 (5.75 GHz)	3/13/2019	7.140	71.40	73.90	-3.38	2.000	20.00	20.60	-2.91	

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9. Conducted Output Power Measurements

9.1. GSM

Per KDB 941225 D01 3G SAR Procedures:

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

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

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

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

GSM850 Measured Results

Mode	Coding Scheme	Time Slots	Ch No.	Freq. (MHz)	Maximum Average Power (dBm)			
					Measured		Tune-up Limit	
					Burst Pwr	Frame Pwr	Burst Pwr	Frame Pwr
GSM/ GPRS	CS1	1	128	824.2	32.80	23.77	33.20	24.17
			190	836.6	32.80	23.77		
			251	848.8	32.70	23.67		
GPRS/EDGE (GMSK)	CS1	2	128	824.2	30.80	24.78	31.20	25.18
			190	836.6	30.70	24.68		
			251	848.8	30.60	24.58		
		3	128	824.2	28.50	24.24	29.20	24.94
			190	836.6	28.60	24.34		
			251	848.8	28.50	24.24		
		4	128	824.2	27.70	24.69	28.20	**25.19**
			190	836.6	27.70	24.69		
			251	848.8	27.50	24.49		
EDGE (8PSK)	MCS5	1	128	824.2	27.10	18.07	28.00	18.97
			190	836.6	27.00	17.97		
			251	848.8	27.00	17.97		
		2	128	824.2	25.70	19.68	26.50	20.48
			190	836.6	25.80	19.78		
			251	848.8	25.60	19.58		
		3	128	824.2	23.60	19.34	24.50	20.24
			190	836.6	23.50	19.24		
			251	848.8	23.50	19.24		
		4	128	824.2	22.50	19.49	23.50	20.49
			190	836.6	22.50	19.49		
			251	848.8	22.40	19.39		

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

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

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GSM1900 Measured Results

Mode	Coding Scheme	Time Slots	Ch No.	Freq. (MHz)	Maximum Average Power (dBm)			
					Measured		Tune-up Limit	
					Burst Pwr	Frame Pwr	Burst Pwr	Frame Pwr
GSM/GPRS	CS1	1	512	1850.2	29.10	20.07	29.70	20.67
			661	1880.0	29.20	20.17		
			810	1909.8	29.30	20.27		
GPRS/EDGE (GMSK)	CS1	2	512	1850.2	27.10	21.08	27.70	21.68
			661	1880.0	27.30	21.28		
			810	1909.8	27.20	21.18		
		3	512	1850.2	25.10	20.84	25.70	21.44
			661	1880.0	25.20	20.94		
			810	1909.8	25.20	20.94		
		4	512	1850.2	24.00	20.99	24.70	**21.69**
			661	1880.0	24.10	21.09		
			810	1909.8	24.10	21.09		
EDGE (8PSK)	MCS5	1	512	1850.2	25.40	16.37	27.00	17.97
			661	1880.0	25.60	16.57		
			810	1909.8	25.50	16.47		
		2	512	1850.2	24.40	18.38	25.50	19.48
			661	1880.0	24.50	18.48		
			810	1909.8	24.40	18.38		
		3	512	1850.2	22.30	18.04	23.50	19.24
			661	1880.0	22.50	18.24		
			810	1909.8	22.40	18.14		
		4	512	1850.2	21.40	18.39	22.50	19.49
			661	1880.0	21.50	18.49		
			810	1909.8	21.40	18.39		

Notes:

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

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

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GSM850 DTM Measured Results

Mode	Coding Scheme	Time Slots	Ch No.	Freq. (MHz)	Maximum Average Power (dBm)							
					Measured				Tune-up Limit			
					CS Burst Pwr	PS Burst Pwr	CS Frame Pwr	PS Frame Pwr	CS Burst Pwr	PS Burst Pwr	CS Frame Pwr	PS Frame Pwr
GSM (Voice) + GPRS/EDGE (GMSK)	CS1	1	128	824.2	32.80		23.77		33.20		24.17	
			190	836.6	32.80		23.77					
			251	848.8	32.70		23.67					
		2	128	824.2	30.85	31.00	24.83	24.98	31.20	31.20	25.18	25.18
			190	836.6	30.75	30.95	24.73	24.93				
			251	848.8	30.65	30.83	24.63	24.81				
		3	128	824.2	28.50	28.70	24.24	24.44	29.20	29.20	24.94	24.94
			190	836.6	28.70	28.90	24.44	24.64				
			251	848.8	28.60	28.85	24.34	24.59				
GSM (Voice) + EDGE (8PSK)	MCS5	1	128	824.2	32.80		23.77		33.20		24.17	
			190	836.6	32.80		23.77					
			251	848.8	32.70		23.67					
		2	128	824.2	30.70	25.60	24.68	19.58	31.20	26.50	25.18	20.48
			190	836.6	30.90	25.30	24.88	19.28				
			251	848.8	30.70	25.50	24.68	19.48				
		3	128	824.2	28.70	23.50	24.44	19.24	29.20	24.50	24.94	20.24
			190	836.6	28.60	23.20	24.34	18.94				
			251	848.8	28.50	23.40	24.24	19.14				

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.

GSM1900 DTM Measured Results

Mode	Coding Scheme	Time Slots	Ch No.	Freq. (MHz)	Maximum Average Power (dBm)							
					Measured				Tune-up Limit			
					CS Burst Pwr	PS Burst Pwr	CS Frame Pwr	PS Frame Pwr	CS Burst Pwr	PS Burst Pwr	CS Frame Pwr	PS Frame Pwr
GSM (Voice) + GPRS/EDGE (GMSK)	CS1	1	512	1850.2	29.10		20.07		29.70		20.67	
			661	1880.0	29.20		20.17					
			810	1909.8	29.30		20.27					
		2	512	1850.2	27.00	27.20	20.98	21.18	27.70	27.70	21.68	21.68
			661	1880.0	27.30	27.45	21.28	21.43				
			810	1909.8	27.20	27.40	21.18	21.38				
		3	512	1850.2	24.90	25.10	20.64	20.84	25.70	25.70	21.44	21.44
			661	1880.0	25.25	25.40	20.99	21.14				
			810	1909.8	25.15	25.30	20.89	21.04				
GSM (Voice) + EDGE (8PSK)	MCS5	1	512	1850.2	29.10		20.07		29.70		20.67	
			661	1880.0	29.30		20.27					
			810	1909.8	29.30		20.27					
		2	512	1850.2	27.00	24.50	20.98	18.48	27.70	25.50	21.68	19.48
			661	1880.0	27.20	24.80	21.18	18.78				
			810	1909.8	27.20	24.60	21.18	18.58				
		3	512	1850.2	25.00	22.40	20.74	18.14	25.70	23.50	21.44	19.24
			661	1880.0	25.20	22.50	20.94	18.24				
			810	1909.8	25.20	22.30	20.94	18.04				

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.

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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			

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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

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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	24.20		
HSDPA	Subtest 1	4132	826.4	23.30	0	24.20
		4183	836.6	23.30		
		4233	846.6	23.10		
	Subtest 2	4132	826.4	23.30	0	24.20
		4183	836.6	23.30		
		4233	846.6	23.10		
	Subtest 3	4132	826.4	22.80	0.5	23.70
		4183	836.6	22.80		
		4233	846.6	22.70		
	Subtest 4	4132	826.4	22.80	0.5	23.70
		4183	836.6	22.80		
		4233	846.6	22.70		
HSUPA	Subtest 1	4132	826.4	23.30	0	24.20
		4183	836.6	23.30		
		4233	846.6	23.20		
	Subtest 2	4132	826.4	21.30	2	22.20
		4183	836.6	21.30		
		4233	846.6	21.10		
	Subtest 3	4132	826.4	22.30	1	23.20
		4183	836.6	22.30		
		4233	846.6	22.20		
	Subtest 4	4132	826.4	21.30	2	22.20
		4183	836.6	21.30		
		4233	846.6	21.10		
	Subtest 5	4132	826.4	23.30	0	24.20
		4183	836.6	23.30		
		4233	846.6	23.20		

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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

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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

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LTE Band 4 Measured Results

BW (MHz)	Mode	RB Allocation	RB offset	Maximum Average Power (dBm)			MPR	Tune-up Limit
				[redacted]	20175	[redacted]		
					1732.5 MHz			
20 MHz	QPSK	1	0	[redacted]	21.42	[redacted]	0.0	22
		1	49	[redacted]	21.24	[redacted]	0.0	22
		1	99	[redacted]	21.35	[redacted]	0.0	22
		50	0	[redacted]	21.50	[redacted]	0.0	22
		50	24	[redacted]	21.47	[redacted]	0.0	22
		50	50	[redacted]	21.42	[redacted]	0.0	22
		100	0	[redacted]	21.44	[redacted]	0.0	22
	16QAM	1	0	[redacted]	21.51	[redacted]	0.0	22
		1	49	[redacted]	21.33	[redacted]	0.0	22
		1	99	[redacted]	21.46	[redacted]	0.0	22
		50	0	[redacted]	21.14	[redacted]	0.0	22
		50	24	[redacted]	21.09	[redacted]	0.0	22
		50	50	[redacted]	21.04	[redacted]	0.0	22
		100	0	[redacted]	21.08	[redacted]	0.0	22
	64QAM	1	0	[redacted]	21.66	[redacted]	0.0	22
		1	49	[redacted]	21.47	[redacted]	0.0	22
		1	99	[redacted]	21.53	[redacted]	0.0	22
		50	0	[redacted]	21.11	[redacted]	0.0	22
		50	24	[redacted]	21.07	[redacted]	0.0	22
		50	50	[redacted]	21.01	[redacted]	0.0	22
		100	0	[redacted]	21.01	[redacted]	0.0	22

BW (MHz)	Mode	RB Allocation	RB offset	Maximum Average Power (dBm)			MPR	Tune-up Limit
				20025	20175	20325		
				1717.5 MHz	1732.5 MHz	1747.5 MHz		
15 MHz	QPSK	1	0	21.40	21.39	21.30	0.0	22
		1	37	21.34	21.26	21.26	0.0	22
		1	74	21.30	21.33	21.24	0.0	22
		36	0	21.30	21.43	21.25	0.0	22
		36	20	21.32	21.36	21.31	0.0	22
		36	39	21.28	21.37	21.28	0.0	22
		75	0	21.35	21.34	21.32	0.0	22
	16QAM	1	0	21.34	21.33	20.84	0.0	22
		1	37	21.29	21.18	20.73	0.0	22
		1	74	21.29	21.29	20.66	0.0	22
		36	0	20.85	21.07	20.86	0.0	22
		36	20	20.90	21.02	20.91	0.0	22
		36	39	20.87	21.01	20.88	0.0	22
		75	0	20.93	20.99	20.93	0.0	22
	64QAM	1	0	21.50	21.12	21.26	0.0	22
		1	37	21.52	20.97	21.19	0.0	22
		1	74	21.52	21.03	21.15	0.0	22
		36	0	20.86	21.10	20.93	0.0	22
		36	20	20.98	21.07	20.96	0.0	22
		36	39	20.95	21.03	20.93	0.0	22
		75	0	21.00	21.02	20.95	0.0	22

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LTE Band 4 Measured Results (continued)

BW (MHz)	Mode	RB Allocation	RB offset	Maximum Average Power (dBm)			MPR	Tune-up Limit
				20000	20175	20350		
				1715 MHz	1732.5 MHz	1750 MHz		
10 MHz	QPSK	1	0	21.27	21.40	21.31	0.0	22
		1	25	21.14	21.23	21.22	0.0	22
		1	49	21.27	21.34	21.24	0.0	22
		25	0	21.30	21.38	21.32	0.0	22
		25	12	21.25	21.39	21.29	0.0	22
		25	25	21.35	21.36	21.28	0.0	22
		50	0	21.38	21.35	21.28	0.0	22
	16QAM	1	0	20.91	21.31	20.87	0.0	22
		1	25	20.81	21.15	20.65	0.0	22
		1	49	20.89	21.27	20.62	0.0	22
		25	0	20.97	21.04	20.92	0.0	22
		25	12	20.93	20.98	20.92	0.0	22
		25	25	21.01	21.02	20.88	0.0	22
		50	0	21.00	20.99	20.89	0.0	22
	64QAM	1	0	21.03	21.10	21.19	0.0	22
		1	25	20.94	20.95	21.13	0.0	22
		1	49	21.07	21.04	21.12	0.0	22
		25	0	20.92	21.07	20.95	0.0	22
		25	12	20.93	21.07	20.95	0.0	22
		25	25	21.04	21.02	20.90	0.0	22
		50	0	20.99	21.03	20.93	0.0	22

BW (MHz)	Mode	RB Allocation	RB offset	Maximum Average Power (dBm)			MPR	Tune-up Limit
				19975	20175	20375		
				1712.5 MHz	1732.5 MHz	1752.5 MHz		
5 MHz	QPSK	1	0	21.26	21.42	21.39	0.0	22
		1	12	21.21	21.34	21.43	0.0	22
		1	24	21.20	21.45	21.34	0.0	22
		12	0	21.28	21.31	21.29	0.0	22
		12	7	21.27	21.39	21.39	0.0	22
		12	13	21.23	21.36	21.29	0.0	22
		25	0	21.29	21.42	21.30	0.0	22
	16QAM	1	0	21.37	21.05	21.05	0.0	22
		1	12	21.32	20.99	21.06	0.0	22
		1	24	21.31	21.11	20.91	0.0	22
		12	0	20.96	20.97	20.97	0.0	22
		12	7	20.98	21.07	21.06	0.0	22
		12	13	20.98	21.05	20.93	0.0	22
		25	0	20.91	21.01	20.90	0.0	22
	64QAM	1	0	21.05	21.15	20.78	0.0	22
		1	12	21.01	21.14	20.84	0.0	22
		1	24	21.05	21.17	20.74	0.0	22
		12	0	20.88	20.81	20.90	0.0	22
		12	7	20.89	20.91	20.97	0.0	22
		12	13	20.87	20.90	20.86	0.0	22
		25	0	20.86	20.92	20.82	0.0	22

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LTE Band 4 Measured Results (continued)

BW (MHz)	Mode	RB Allocation	RB offset	Maximum Average Power (dBm)			MPR	Tune-up Limit
				19965	20175	20385		
				1711.5 MHz	1732.5 MHz	1753.5 MHz		
3 MHz	QPSK	1	0	21.24	21.27	21.36	0.0	22
		1	8	21.31	21.37	21.32	0.0	22
		1	14	21.20	21.35	21.21	0.0	22
		8	0	21.25	21.26	21.23	0.0	22
		8	4	21.28	21.29	21.24	0.0	22
		8	7	21.26	21.34	21.26	0.0	22
		15	0	21.24	21.35	21.27	0.0	22
	16QAM	1	0	20.90	21.21	20.83	0.0	22
		1	8	20.94	21.28	20.74	0.0	22
		1	14	20.84	21.30	20.62	0.0	22
		8	0	20.88	20.89	20.94	0.0	22
		8	4	20.89	20.93	20.97	0.0	22
		8	7	20.88	21.03	20.96	0.0	22
		15	0	20.80	20.99	20.90	0.0	22
	64QAM	1	0	20.95	20.88	21.13	0.0	22
		1	8	21.00	20.98	21.11	0.0	22
		1	14	20.89	20.95	20.98	0.0	22
		8	0	20.70	20.81	20.78	0.0	22
		8	4	20.74	20.84	20.82	0.0	22
		8	7	20.73	20.92	20.81	0.0	22
		15	0	20.79	20.90	20.73	0.0	22

BW (MHz)	Mode	RB Allocation	RB offset	Maximum Average Power (dBm)			MPR	Tune-up Limit
				19957	20175	20393		
				1710.7 MHz	1732.5 MHz	1754.3 MHz		
1.4 MHz	QPSK	1	0	21.21	21.20	21.31	0.0	22
		1	3	21.27	21.25	21.38	0.0	22
		1	5	21.22	21.19	21.30	0.0	22
		3	0	21.22	21.18	21.24	0.0	22
		3	1	21.28	21.22	21.31	0.0	22
		3	3	21.28	21.23	21.31	0.0	22
		6	0	21.22	21.11	21.26	0.0	22
	16QAM	1	0	20.83	21.07	20.89	0.0	22
		1	3	20.88	21.16	20.93	0.0	22
		1	5	20.80	21.07	20.85	0.0	22
		3	0	20.98	20.95	20.85	0.0	22
		3	1	21.04	21.00	20.91	0.0	22
		3	3	21.03	20.99	20.89	0.0	22
		6	0	20.95	20.66	20.99	0.0	22
	64QAM	1	0	21.08	20.89	20.82	0.0	22
		1	3	21.19	20.96	20.91	0.0	22
		1	5	21.05	20.90	20.79	0.0	22
		3	0	21.06	20.70	20.83	0.0	22
		3	1	21.12	20.75	20.90	0.0	22
		3	3	21.11	20.78	20.92	0.0	22
		6	0	20.68	20.82	21.00	0.0	22

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LTE Band 5 Measured Results

BW (MHz)	Mode	RB Allocation	RB offset	Maximum Average Power (dBm)			MPR	Tune-up Limit
				[redacted]	20525 836.5 MHz	[redacted]		
10 MHz	QPSK	1	0	[redacted]	24.42	[redacted]	0.0	25
		1	25	[redacted]	24.47	[redacted]	0.0	25
		1	49	[redacted]	24.37	[redacted]	0.0	25
		25	0	[redacted]	23.59	[redacted]	1.0	24
		25	12	[redacted]	23.55	[redacted]	1.0	24
		25	25	[redacted]	23.50	[redacted]	1.0	24
		50	0	[redacted]	23.50	[redacted]	1.0	24
	16QAM	1	0	[redacted]	23.47	[redacted]	1.0	24
		1	25	[redacted]	23.45	[redacted]	1.0	24
		1	49	[redacted]	23.28	[redacted]	1.0	24
		25	0	[redacted]	22.68	[redacted]	2.0	23
		25	12	[redacted]	22.66	[redacted]	2.0	23
		25	25	[redacted]	22.57	[redacted]	2.0	23
		50	0	[redacted]	22.60	[redacted]	2.0	23
	64QAM	1	0	[redacted]	22.32	[redacted]	2.0	23
		1	25	[redacted]	22.34	[redacted]	2.0	23
		1	49	[redacted]	22.22	[redacted]	2.0	23
		25	0	[redacted]	21.71	[redacted]	3.0	22
		25	12	[redacted]	21.66	[redacted]	3.0	22
		25	25	[redacted]	21.61	[redacted]	3.0	22
		50	0	[redacted]	21.61	[redacted]	3.0	22

BW (MHz)	Mode	RB Allocation	RB offset	Maximum Average Power (dBm)			MPR	Tune-up Limit
				20425 826.5 MHz	20525 836.5 MHz	20625 846.5 MHz		
5 MHz	QPSK	1	0	24.57	24.45	24.54	0.0	25
		1	12	24.52	24.45	24.46	0.0	25
		1	24	24.49	24.43	24.21	0.0	25
		12	0	23.50	23.53	23.45	1.0	24
		12	7	23.51	23.53	23.43	1.0	24
		12	13	23.45	23.52	23.45	1.0	24
		25	0	23.49	23.54	23.49	1.0	24
	16QAM	1	0	23.77	24.00	23.69	1.0	24
		1	12	23.69	24.00	23.62	1.0	24
		1	24	23.71	24.00	23.37	1.0	24
		12	0	22.70	22.76	22.61	2.0	23
		12	7	22.67	22.76	22.63	2.0	23
		12	13	22.64	22.74	22.62	2.0	23
		25	0	22.64	22.68	22.56	2.0	23
	64QAM	1	0	22.36	22.29	22.01	2.0	23
		1	12	22.27	22.34	21.91	2.0	23
		1	24	22.27	22.31	21.87	2.0	23
		12	0	21.67	21.58	21.60	3.0	22
		12	7	21.66	21.56	21.58	3.0	22
		12	13	21.62	21.54	21.57	3.0	22
		25	0	21.61	21.59	21.53	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

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LTE Band 5 Measured Results (continued)

BW (MHz)	Mode	RB Allocation	RB offset	Maximum Average Power (dBm)			MPR	Tune-up Limit
				20415	20525	20635		
				825.5 MHz	836.5 MHz	847.5 MHz		
3 MHz	QPSK	1	0	24.46	24.35	24.41	0.0	25
		1	8	24.51	24.51	24.46	0.0	25
		1	14	24.40	24.38	24.16	0.0	25
		8	0	23.44	23.46	23.39	1.0	24
		8	4	23.48	23.49	23.43	1.0	24
		8	7	23.48	23.50	23.44	1.0	24
		15	0	23.47	23.49	23.42	1.0	24
	16QAM	1	0	23.48	23.52	23.83	1.0	24
		1	8	23.52	23.65	23.87	1.0	24
		1	14	23.38	23.53	23.57	1.0	24
		8	0	22.65	22.58	22.56	2.0	23
		8	4	22.66	22.62	22.59	2.0	23
		8	7	22.66	22.63	22.57	2.0	23
		15	0	22.57	22.53	22.54	2.0	23
	64QAM	1	0	22.26	22.02	22.25	2.0	23
		1	8	22.31	22.22	22.31	2.0	23
		1	14	22.21	22.09	22.20	2.0	23
		8	0	21.54	21.57	21.55	3.0	22
		8	4	21.56	21.62	21.60	3.0	22
		8	7	21.52	21.61	21.58	3.0	22
		15	0	21.59	21.61	21.50	3.0	22

BW (MHz)	Mode	RB Allocation	RB offset	Maximum Average Power (dBm)			MPR	Tune-up Limit
				20407	20525	20643		
				824.7 MHz	836.5 MHz	848.3 MHz		
1.4 MHz	QPSK	1	0	24.44	24.43	24.35	0.0	25
		1	3	24.38	24.38	24.41	0.0	25
		1	5	24.50	24.47	24.49	0.0	25
		3	0	24.47	24.52	24.51	0.0	25
		3	1	24.48	24.50	24.47	0.0	25
		3	3	24.49	24.48	24.50	0.0	25
		6	0	23.42	23.58	23.42	1.0	24
	16QAM	1	0	23.49	23.45	23.48	1.0	24
		1	3	23.41	23.45	23.47	1.0	24
		1	5	23.49	23.55	23.54	1.0	24
		3	0	23.89	23.90	23.91	1.0	24
		3	1	23.88	23.90	23.90	1.0	24
		3	3	23.89	23.89	23.90	1.0	24
		6	0	22.45	22.81	22.61	2.0	23
	64QAM	1	0	22.37	22.16	21.96	2.0	23
		1	3	22.47	22.23	22.04	2.0	23
		1	5	22.34	22.15	21.91	2.0	23
		3	0	22.34	21.93	22.01	2.0	23
		3	1	22.37	22.02	22.07	2.0	23
		3	3	22.36	22.04	22.08	2.0	23
		6	0	21.51	21.57	21.74	3.0	22

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LTE Band 7 Measured Results

BW (MHz)	Mode	RB Allocation	RB offset	Maximum Average Power (dBm)			MPR	Tune-up Limit
				20850	21100	21350		
				2510 MHz	2535 MHz	2560 MHz		
20 MHz	QPSK	1	0	22.20	22.19	22.14	0.0	23
		1	49	22.04	22.10	22.10	0.0	23
		1	99	22.03	22.02	22.11	0.0	23
		50	0	22.18	22.23	22.12	0.0	23
		50	24	22.25	22.18	22.20	0.0	23
		50	50	22.17	22.15	22.13	0.0	23
		100	0	22.25	22.16	22.19	0.0	23
	16QAM	1	0	22.22	22.26	22.28	0.0	23
		1	49	22.05	22.13	22.22	0.0	23
		1	99	22.00	22.08	22.32	0.0	23
		50	0	21.81	21.84	21.75	0.0	23
		50	24	21.87	21.78	21.82	0.0	23
		50	50	21.75	21.75	21.75	0.0	23
		100	0	21.82	21.75	21.81	0.0	23
	64QAM	1	0	22.07	22.50	22.17	0.0	23
		1	49	21.99	22.37	22.11	0.0	23
		1	99	21.91	22.32	22.09	0.0	23
		50	0	21.45	21.27	21.41	1.0	22
		50	24	21.49	21.25	21.47	1.0	22
		50	50	21.39	21.02	21.30	1.0	22
		100	0	21.44	21.09	21.38	1.0	22

BW (MHz)	Mode	RB Allocation	RB offset	Maximum Average Power (dBm)			MPR	Tune-up Limit
				20825	21100	21375		
				2507.5 MHz	2535 MHz	2562.5 MHz		
15 MHz	QPSK	1	0	22.33	22.25	22.25	0.0	23
		1	37	22.21	22.10	22.16	0.0	23
		1	74	22.30	22.03	22.19	0.0	23
		36	0	22.27	22.21	22.19	0.0	23
		36	20	22.24	22.19	22.14	0.0	23
		36	39	22.31	22.14	22.10	0.0	23
		75	0	22.33	22.12	22.14	0.0	23
	16QAM	1	0	22.30	21.69	22.22	0.0	23
		1	37	22.20	21.61	22.09	0.0	23
		1	74	22.14	21.56	22.15	0.0	23
		36	0	21.94	21.77	21.74	0.0	23
		36	20	21.90	21.77	21.73	0.0	23
		36	39	21.96	21.74	21.67	0.0	23
		75	0	21.99	21.74	21.72	0.0	23
	64QAM	1	0	22.58	21.97	22.19	0.0	23
		1	37	22.54	21.88	22.06	0.0	23
		1	74	22.54	21.83	22.10	0.0	23
		36	0	21.49	21.39	21.37	1.0	22
		36	20	21.43	21.37	21.36	1.0	22
		36	39	21.50	21.31	21.30	1.0	22
		75	0	21.56	21.35	21.34	1.0	22

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LTE Band 7 Measured Results (continued)

BW (MHz)	Mode	RB Allocation	RB offset	Maximum Average Power (dBm)			MPR	Tune-up Limit
				20800	21100	21400		
				2505 MHz	2535 MHz	2565 MHz		
10 MHz	QPSK	1	0	22.27	22.21	22.20	0.0	23
		1	25	22.19	22.12	22.12	0.0	23
		1	49	22.17	22.10	22.10	0.0	23
		25	0	22.29	22.17	22.17	0.0	23
		25	12	22.28	22.16	22.16	0.0	23
		25	25	22.24	22.15	22.13	0.0	23
		50	0	22.26	22.13	22.13	0.0	23
	16QAM	1	0	21.92	22.08	22.08	0.0	23
		1	25	21.76	22.02	22.03	0.0	23
		1	49	21.75	22.01	22.00	0.0	23
		25	0	21.95	21.75	21.77	0.0	23
		25	12	21.94	21.76	21.79	0.0	23
		25	25	21.91	21.75	21.75	0.0	23
		50	0	21.86	21.74	21.75	0.0	23
	64QAM	1	0	22.15	21.93	22.09	0.0	23
		1	25	22.05	21.90	22.17	0.0	23
		1	49	22.03	21.87	22.14	0.0	23
		25	0	21.50	21.40	21.38	1.0	22
		25	12	21.50	21.40	21.37	1.0	22
		25	25	21.47	21.38	21.44	1.0	22
		50	0	21.41	21.33	21.32	1.0	22

BW (MHz)	Mode	RB Allocation	RB offset	Maximum Average Power (dBm)			MPR	Tune-up Limit
				20775	21100	21425		
				2502.5 MHz	2535 MHz	2567.5 MHz		
5 MHz	QPSK	1	0	22.02	22.23	22.25	0.0	23
		1	12	22.01	22.20	22.23	0.0	23
		1	24	22.01	22.17	22.21	0.0	23
		12	0	22.08	22.11	22.22	0.0	23
		12	7	22.08	22.13	22.24	0.0	23
		12	13	22.06	22.15	22.22	0.0	23
		25	0	22.09	22.15	22.23	0.0	23
	16QAM	1	0	22.15	21.87	21.90	0.0	23
		1	12	22.13	21.84	21.88	0.0	23
		1	24	22.06	21.82	21.87	0.0	23
		12	0	21.79	21.78	21.89	0.0	23
		12	7	21.80	21.80	21.91	0.0	23
		12	13	21.77	21.78	21.84	0.0	23
		25	0	21.71	21.74	21.78	0.0	23
	64QAM	1	0	21.92	22.06	21.76	0.0	23
		1	12	21.89	22.04	21.76	0.0	23
		1	24	21.90	21.96	21.71	0.0	23
		12	0	21.26	21.19	21.41	1.0	22
		12	7	21.29	21.25	21.42	1.0	22
		12	13	21.26	21.19	21.40	1.0	22
		25	0	21.22	21.25	21.36	1.0	22

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LTE Band 12 Measured Results

BW (MHz)	Mode	RB Allocation	RB offset	Maximum Average Power (dBm)			MPR	Tune-up Limit
				[redacted]	23095	[redacted]		
					707.5 MHz			
10 MHz	QPSK	1	0		24.19		0.0	25
		1	25		24.31		0.0	25
		1	49		24.46		0.0	25
		25	0		23.35		1.0	24
		25	12		23.50		1.0	24
		25	25		23.67		1.0	24
		50	0		23.47		1.0	24
	16QAM	1	0		23.14		1.0	24
		1	25		23.26		1.0	24
		1	49		23.37		1.0	24
		25	0		22.48		2.0	23
		25	12		22.62		2.0	23
		25	25		22.74		2.0	23
		50	0		22.51		2.0	23
	64QAM	1	0		22.03		2.0	23
		1	25		22.18		2.0	23
		1	49		22.36		2.0	23
		25	0		21.59		3.0	22
		25	12		21.69		3.0	22
		25	25		21.85		3.0	22
		50	0		21.65		3.0	22

BW (MHz)	Mode	RB Allocation	RB offset	Maximum Average Power (dBm)			MPR	Tune-up Limit
				23035	23095	23155		
				701.5 MHz	707.5 MHz	713.5 MHz		
5 MHz	QPSK	1	0	23.91	24.38	23.53	0.0	25
		1	12	24.37	24.60	24.63	0.0	25
		1	24	24.36	24.71	24.72	0.0	25
		12	0	23.14	23.44	23.44	1.0	24
		12	7	23.35	23.55	23.55	1.0	24
		12	13	23.43	23.59	23.60	1.0	24
		25	0	23.23	23.49	23.51	1.0	24
	16QAM	1	0	23.46	23.46	23.45	1.0	24
		1	12	24.00	23.71	23.68	1.0	24
		1	24	23.90	23.81	23.80	1.0	24
		12	0	22.37	22.62	22.63	2.0	23
		12	7	22.60	22.73	22.74	2.0	23
		12	13	22.67	22.77	22.77	2.0	23
		25	0	22.41	22.62	22.63	2.0	23
	64QAM	1	0	22.35	21.89	22.02	2.0	23
		1	12	22.61	21.94	22.07	2.0	23
		1	24	22.69	21.91	22.05	2.0	23
		12	0	21.23	21.59	21.35	3.0	22
		12	7	21.48	21.60	21.46	3.0	22
		12	13	21.54	21.57	21.45	3.0	22
		25	0	21.41	21.65	21.62	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

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LTE Band 12 Measured Results (continued)

BW (MHz)	Mode	RB Allocation	RB offset	Maximum Average Power (dBm)			MPR	Tune-up Limit
				23025	23095	23165		
				700.5 MHz	707.5 MHz	714.5 MHz		
3 MHz	QPSK	1	0	23.99	24.47	24.54	0.0	25
		1	8	24.22	24.63	24.58	0.0	25
		1	14	24.39	24.59	24.24	0.0	25
		8	0	23.08	23.52	23.55	1.0	24
		8	4	23.08	23.52	23.58	1.0	24
		8	7	23.26	23.54	23.55	1.0	24
		15	0	23.18	23.55	23.57	1.0	24
	16QAM	1	0	23.39	23.40	23.62	1.0	24
		1	8	23.74	23.56	23.66	1.0	24
		1	14	23.78	23.51	23.38	1.0	24
		8	0	22.26	22.71	22.66	2.0	23
		8	4	22.35	22.72	22.70	2.0	23
		8	7	22.42	22.76	22.70	2.0	23
		15	0	22.33	22.67	22.61	2.0	23
	64QAM	1	0	22.26	22.52	22.35	2.0	23
		1	8	22.61	22.69	22.40	2.0	23
		1	14	22.61	22.60	22.26	2.0	23
		8	0	21.31	21.81	21.60	3.0	22
		8	4	21.40	21.74	21.65	3.0	22
		8	7	21.43	21.82	21.65	3.0	22
		15	0	21.42	21.69	21.68	3.0	22

BW (MHz)	Mode	RB Allocation	RB offset	Maximum Average Power (dBm)			MPR	Tune-up Limit
				23017	23095	23173		
				699.7 MHz	707.5 MHz	715.3 MHz		
1.4 MHz	QPSK	1	0	23.88	24.45	23.45	0.0	25
		1	3	24.00	24.67	24.66	0.0	25
		1	5	24.10	24.49	24.48	0.0	25
		3	0	23.88	24.38	24.38	0.0	25
		3	1	23.92	24.39	24.40	0.0	25
		3	3	24.02	24.40	24.43	0.0	25
		6	0	22.95	23.42	23.44	1.0	24
	16QAM	1	0	23.29	23.54	23.54	1.0	24
		1	3	23.41	23.63	23.61	1.0	24
		1	5	23.43	23.57	23.57	1.0	24
		3	0	23.16	23.52	23.51	1.0	24
		3	1	23.16	23.57	23.58	1.0	24
		3	3	23.19	23.53	23.53	1.0	24
		6	0	21.98	22.62	22.63	2.0	23
	64QAM	1	0	22.32	22.29	21.55	2.0	23
		1	3	22.34	22.38	22.52	2.0	23
		1	5	22.40	22.23	22.41	2.0	23
		3	0	22.12	22.30	22.38	2.0	23
		3	1	22.10	22.39	22.45	2.0	23
		3	3	22.04	22.41	22.43	2.0	23
		6	0	21.28	21.97	21.55	3.0	22

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LTE Band 13 Measured Results

BW (MHz)	Mode	RB Allocation	RB offset	Maximum Average Power (dBm)			MPR	Tune-up Limit
				[redacted]	23230 782 MHz	[redacted]		
10 MHz	QPSK	1	0	[redacted]	24.38	[redacted]	0.0	25
		1	25	[redacted]	24.31	[redacted]	0.0	25
		1	49	[redacted]	24.24	[redacted]	0.0	25
		25	0	[redacted]	23.43	[redacted]	1.0	24
		25	12	[redacted]	23.41	[redacted]	1.0	24
		25	25	[redacted]	23.33	[redacted]	1.0	24
		50	0	[redacted]	23.37	[redacted]	1.0	24
	16QAM	1	0	[redacted]	23.38	[redacted]	1.0	24
		1	25	[redacted]	23.33	[redacted]	1.0	24
		1	49	[redacted]	23.24	[redacted]	1.0	24
		25	0	[redacted]	22.51	[redacted]	2.0	23
		25	12	[redacted]	22.53	[redacted]	2.0	23
		25	25	[redacted]	22.47	[redacted]	2.0	23
		50	0	[redacted]	22.45	[redacted]	2.0	23
	64QAM	1	0	[redacted]	22.17	[redacted]	2.0	23
		1	25	[redacted]	22.10	[redacted]	2.0	23
		1	49	[redacted]	22.00	[redacted]	2.0	23
		25	0	[redacted]	21.60	[redacted]	3.0	22
		25	12	[redacted]	21.58	[redacted]	3.0	22
		25	25	[redacted]	21.52	[redacted]	3.0	22
		50	0	[redacted]	21.51	[redacted]	3.0	22

BW (MHz)	Mode	RB Allocation	RB offset	Maximum Average Power (dBm)			MPR	Tune-up Limit
				[redacted]	23230 782 MHz	[redacted]		
5 MHz	QPSK	1	0	[redacted]	24.49	[redacted]	0.0	25
		1	12	[redacted]	24.42	[redacted]	0.0	25
		1	24	[redacted]	24.42	[redacted]	0.0	25
		12	0	[redacted]	23.39	[redacted]	1.0	24
		12	7	[redacted]	23.36	[redacted]	1.0	24
		12	13	[redacted]	23.36	[redacted]	1.0	24
		25	0	[redacted]	23.42	[redacted]	1.0	24
	16QAM	1	0	[redacted]	23.62	[redacted]	1.0	24
		1	12	[redacted]	23.58	[redacted]	1.0	24
		1	24	[redacted]	23.58	[redacted]	1.0	24
		12	0	[redacted]	22.58	[redacted]	2.0	23
		12	7	[redacted]	22.57	[redacted]	2.0	23
		12	13	[redacted]	22.52	[redacted]	2.0	23
		25	0	[redacted]	22.52	[redacted]	2.0	23
	64QAM	1	0	[redacted]	21.91	[redacted]	2.0	23
		1	12	[redacted]	21.86	[redacted]	2.0	23
		1	24	[redacted]	21.84	[redacted]	2.0	23
		12	0	[redacted]	21.55	[redacted]	3.0	22
		12	7	[redacted]	21.53	[redacted]	3.0	22
		12	13	[redacted]	21.50	[redacted]	3.0	22
		25	0	[redacted]	21.48	[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.

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LTE Band 41 Measured Results

BW (MHz)	Mode	RB Allocation	RB offset	Maximum Average Power (dBm)					MPR	Tune-up Limit
				39750	40185	40620	41055	41490		
				2506 MHz	2549.5 MHz	2593 MHz	2636.5 MHz	2680 MHz		
20 MHz	QPSK	1	0	22.14	22.23	22.36	22.35	22.38	0.0	23
		1	49	22.09	22.10	22.17	22.26	22.19	0.0	23
		1	99	22.04	22.26	22.12	22.24	22.17	0.0	23
		50	0	22.17	22.17	22.27	22.28	22.32	0.0	23
		50	24	22.13	22.26	22.25	22.32	22.24	0.0	23
		50	50	22.06	22.19	22.16	22.23	22.14	0.0	23
		100	0	22.11	22.23	22.19	22.24	22.23	0.0	23
	16QAM	1	0	21.54	21.62	22.04	21.90	21.92	0.0	23
		1	49	21.45	21.50	21.85	21.79	21.70	0.0	23
		1	99	21.44	21.70	21.77	21.79	21.68	0.0	23
		50	0	21.77	21.74	21.90	21.87	21.84	0.0	23
		50	24	21.73	21.83	21.88	21.89	21.79	0.0	23
		50	50	21.65	21.80	21.78	21.79	21.67	0.0	23
		100	0	21.72	21.82	21.78	21.80	21.75	0.0	23
	64QAM	1	0	22.01	21.80	22.29	21.80	21.65	0.0	23
		1	49	21.80	21.72	22.12	21.65	21.59	0.0	23
		1	99	21.78	21.71	22.05	21.81	21.54	0.0	23
		50	0	21.44	21.37	21.40	21.28	21.33	1.0	22
		50	24	21.35	21.40	21.35	21.34	21.27	1.0	22
		50	50	21.30	21.33	21.31	21.28	21.23	1.0	22
		100	0	21.10	21.26	21.32	21.26	21.25	1.0	22

BW (MHz)	Mode	RB Allocation	RB offset	Maximum Average Power (dBm)					MPR	Tune-up Limit
				39750	40185	40620	41055	41490		
				2506 MHz	2549.5 MHz	2593 MHz	2636.5 MHz	2680 MHz		
15 MHz	QPSK	1	0	22.07	22.17	22.31	22.28	22.30	0.0	23
		1	37	22.08	22.09	22.20	22.25	22.16	0.0	23
		1	74	21.99	22.10	22.10	22.15	22.15	0.0	23
		36	0	22.13	22.09	22.25	22.26	22.27	0.0	23
		36	20	22.09	22.21	22.19	22.29	22.23	0.0	23
		36	39	22.07	22.15	22.13	22.23	22.17	0.0	23
		75	0	22.08	22.19	22.21	22.21	22.21	0.0	23
	16QAM	1	0	21.63	21.78	21.93	21.83	21.85	0.0	23
		1	37	21.56	21.68	21.83	21.80	21.70	0.0	23
		1	74	21.57	21.70	21.74	21.72	21.72	0.0	23
		36	0	21.70	21.73	21.90	21.84	21.85	0.0	23
		36	20	21.66	21.81	21.83	21.89	21.79	0.0	23
		36	39	21.64	21.75	21.77	21.83	21.73	0.0	23
		75	0	21.69	21.76	21.81	21.81	21.80	0.0	23
	64QAM	1	0	21.78	22.06	21.45	21.57	21.95	0.0	23
		1	37	21.62	22.06	21.34	21.43	21.91	0.0	23
		1	74	21.61	21.94	21.26	21.53	21.89	0.0	23
		36	0	21.33	21.36	21.40	21.15	21.33	1.0	22
		36	20	21.29	21.43	21.38	21.24	21.29	1.0	22
		36	39	21.25	21.38	21.31	21.22	21.26	1.0	22
		75	0	21.25	21.28	21.32	21.27	21.23	1.0	22

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LTE Band 41 Measured Results (continued)

BW (MHz)	Mode	RB Allocation	RB offset	Maximum Average Power (dBm)					MPR	Tune-up Limit
				39750	40185	40620	41055	41490		
				2506 MHz	2549.5 MHz	2593 MHz	2636.5 MHz	2680 MHz		
10 MHz	QPSK	1	0	22.04	22.09	22.22	22.34	22.29	0.0	23
		1	25	22.07	22.03	22.17	22.27	22.15	0.0	23
		1	49	22.07	22.08	22.15	22.24	22.22	0.0	23
		25	0	22.14	22.09	22.25	22.32	22.24	0.0	23
		25	12	22.11	22.25	22.23	22.31	22.21	0.0	23
		25	25	22.11	22.16	22.20	22.26	22.17	0.0	23
		50	0	22.13	22.16	22.22	22.28	22.19	0.0	23
	16QAM	1	0	21.55	21.63	21.97	21.88	21.82	0.0	23
		1	25	21.55	21.57	21.86	21.82	21.69	0.0	23
		1	49	21.60	21.65	21.83	21.73	21.78	0.0	23
		25	0	21.71	21.65	21.81	21.94	21.81	0.0	23
		25	12	21.72	21.77	21.82	21.91	21.77	0.0	23
		25	25	21.68	21.76	21.80	21.86	21.74	0.0	23
		50	0	21.73	21.75	21.85	21.90	21.80	0.0	23
	64QAM	1	0	22.12	21.47	21.86	21.94	21.21	0.0	23
		1	25	21.99	21.38	21.80	21.87	21.25	0.0	23
		1	49	22.07	21.31	21.76	21.97	21.24	0.0	23
		25	0	21.31	21.43	21.28	21.13	21.26	1.0	22
		25	12	21.28	21.38	21.26	21.25	21.28	1.0	22
		25	25	21.26	21.35	21.20	21.21	21.23	1.0	22
		50	0	21.28	21.31	21.30	21.21	21.21	1.0	22

BW (MHz)	Mode	RB Allocation	RB offset	Maximum Average Power (dBm)					MPR	Tune-up Limit
				39750	40185	40620	41055	41490		
				2506 MHz	2549.5 MHz	2593 MHz	2636.5 MHz	2680 MHz		
5 MHz	QPSK	1	0	22.00	22.22	22.22	22.31	22.22	0.0	23
		1	12	21.98	22.01	22.21	22.28	22.17	0.0	23
		1	24	21.95	22.10	22.15	22.24	22.16	0.0	23
		12	0	22.08	22.11	22.23	22.36	22.24	0.0	23
		12	7	22.10	22.11	22.24	22.34	22.23	0.0	23
		12	13	22.06	22.18	22.20	22.28	22.18	0.0	23
		25	0	22.10	22.22	22.22	22.30	22.19	0.0	23
	16QAM	1	0	21.53	21.57	21.72	21.81	21.86	0.0	23
		1	12	21.49	21.55	21.73	21.81	21.83	0.0	23
		1	24	21.49	21.64	21.71	21.76	21.78	0.0	23
		12	0	21.69	21.71	21.78	21.84	21.82	0.0	23
		12	7	21.69	21.70	21.80	21.86	21.86	0.0	23
		12	13	21.66	21.77	21.74	21.84	21.82	0.0	23
		25	0	21.69	21.75	21.79	21.90	21.79	0.0	23
	64QAM	1	0	21.42	21.80	22.15	21.55	21.88	0.0	23
		1	12	21.39	21.77	22.14	21.51	21.86	0.0	23
		1	24	21.34	21.83	22.10	21.48	21.78	0.0	23
		12	0	21.21	21.10	21.42	21.34	21.17	1.0	22
		12	7	21.22	21.13	21.43	21.35	21.20	1.0	22
		12	13	21.20	21.19	21.39	21.32	21.19	1.0	22
		25	0	21.26	21.18	21.26	21.38	21.17	1.0	22

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9.4. Wi-Fi 2.4GHz (DTS Band)

Measured Results

Band	Mode	Data Rate	Ch #	Freq. (MHz)	Chain 0 Average Power (dBm)			Chain 1 Average Power (dBm)		
					Meas Pwr	Tune-up	SAR Test (Yes/No)	Meas Pwr	Tune-up	SAR Test (Yes/No)
DSSS 2.4 GHz	802.11b	1 Mbps	1	2412	11.40	12.01	Yes	8.40	9.68	Yes
			6	2437	11.50	12.01		8.80	9.68	
			11	2462	11.40	12.01		8.70	9.68	
			12	2467	11.40	12.01		8.30	9.68	
			13	2472	10.50	10.79		8.50	9.68	
OFDM 2.4 GHz	802.11g	6 Mbps	1	2412	Not Required	12.17	No	Not Required	9.63	No
			6	2437		12.17			9.63	
			11	2462		12.17			9.63	
			12	2467		10.85			5.65	
			13	2472		2.85			-2.35	
	802.11n (HT20)	6.5 Mbps	1	2412		12.18	No		9.52	No
			6	2437		12.18			9.52	
			11	2462		12.18			9.52	
			12	2467		10.87			5.65	
			13	2472		1.87			-3.35	

Note(s):

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

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

Measured Results

Band	Mode	Data Rate	Ch #	Freq. (MHz)	Chain 0 Average Power (dBm)			Chain 1 Average Power (dBm)		
					Meas Pwr	Tune-up	SAR Test (Yes/No)	Meas Pwr	Tune-up	SAR Test (Yes/No)
UNII-1 5.2 GHz	802.11a	6 Mbps	36	5180	Not Required	12.14	No	Not Required	9.76	No
			40	5200		12.14			9.76	
			44	5220		12.14			9.76	
			48	5240		12.14			9.76	
	802.11n (HT20)	6.5 Mbps	36	5180		12.97	No	10.03	11.06	Yes
			40	5200		12.97		10.04	11.06	
			44	5220		12.97		10.17	11.06	
			48	5240		12.97		9.92	11.06	
	802.11ac (VHT20)	6.5 Mbps	36	5180		12.17	No	Not Required	9.85	No
			40	5200		12.17			9.85	
			44	5220		12.17			9.85	
			48	5240		12.17			9.85	
	802.11n (HT40)	13.5 Mbps	38	5190		12.97	No		10.56	No
			46	5230		12.97			10.56	
	802.11ac (VHT40)	13.5 Mbps	38	5190		12.17	No		8.15	No
			46	5230		12.17			9.85	
	802.11ac (VHT80)	29.3 Mbps	42	5210		12.17	No		9.85	No

Band	Mode	Data Rate	Ch #	Freq. (MHz)	Chain 0 Average Power (dBm)			Chain 1 Average Power (dBm)		
					Meas Pwr	Tune-up	SAR Test (Yes/No)	Meas Pwr	Tune-up	SAR Test (Yes/No)
UNII-2A 5.3 GHz	802.11a	6 Mbps	52	5260	Not Required	12.19	No	Not Required	9.93	No
			56	5280		12.19			9.93	
			60	5300		12.19			9.93	
			64	5320		12.19			9.93	
	802.11n (HT20)	6.5 Mbps	52	5260		13.36	No		10.74	No
			56	5280		13.36			10.74	
			60	5300		13.36			10.74	
			64	5320		13.36			10.74	
	802.11ac (VHT20)	6.5 Mbps	52	5260		11.75	No		9.83	No
			56	5280		11.75			9.83	
			60	5300		11.75			9.83	
			64	5320		11.75			9.83	
	802.11n (HT40)	13.5 Mbps	54	5270	11.80	13.36	Yes		10.74	No
			62	5310	11.80	13.36			10.74	
	802.11ac (VHT40)	13.5 Mbps	54	5270	Not Required	11.75	No		9.83	No
			62	5310		11.75			8.59	
	802.11ac (VHT80)	29.3 Mbps	58	5290		11.75	No		9.83	No

Note(s):

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

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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	10.01	11.31	Yes	8.49	9.64	Yes
			116	5580	9.72	11.31		8.10	9.64	
			124	5620	9.79	11.31		8.26	9.64	
			144	5720	9.82	11.31		8.26	9.64	
	802.11n (HT20)	6.5 Mbps	100	5500	Not Required	11.29	No	Not Required	9.42	No
			116	5580		11.29			9.42	
			124	5620		11.29			9.42	
			144	5720		11.29			9.42	
	802.11ac (VHT20)	6.5 Mbps	100	5500		11.03	No		9.42	No
			116	5580		11.03			9.42	
			124	5620		11.03			9.42	
			144	5720		11.03			9.42	
	802.11n (HT40)	13.5 Mbps	102	5510		11.29	No		9.42	No
			118	5590		11.29			9.42	
			126	5630		11.29			9.42	
			142	5710		11.29			9.42	
	802.11ac (VHT40)	13.5 Mbps	102	5510		11.03	No		9.42	No
			118	5590		11.03			9.42	
			126	5630		11.03			9.42	
			142	5710		11.03			9.42	
	802.11ac (VHT80)	29.3 Mbps	106	5530		11.03	No		9.52	No
			122	5610		11.03			9.52	
			138	5690		11.03			9.52	

Band	Mode	Data Rate	Ch #	Freq. (MHz)	Chain 0 Average Power (dBm)			Chain 1 Average Power (dBm)		
					Meas Pwr	Tune-up	SAR Test (Yes/No)	Meas Pwr	Tune-up	SAR Test (Yes/No)
UNII-3 5.8 GHz	802.11a	6 Mbps	149	5745	Not Required	12.48	No	Not Required	10.18	No
			157	5785		12.48			10.18	
			165	5825		12.48			10.18	
	802.11n (HT20)	6.5 Mbps	149	5745		12.65	No		10.23	No
			157	5785		12.65			10.23	
			165	5825		12.65			10.23	
	802.11ac (VHT20)	6.5 Mbps	149	5745		12.65	No		9.91	No
			157	5785		12.65			9.91	
			165	5825		12.65			9.91	
	802.11n (HT40)	13.5 Mbps	151	5755		12.65	No	8.60	10.23	Yes
			159	5795		12.65		10.00	10.23	
	802.11ac (VHT40)	13.5 Mbps	151	5755		12.65	No	Not Required	9.91	No
			159	5795		12.65			9.91	
	802.11ac (VHT80)	29.3 Mbps	155	5775	11.42	13.25	Yes		9.91	No

Note(s):

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

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9.6. Bluetooth

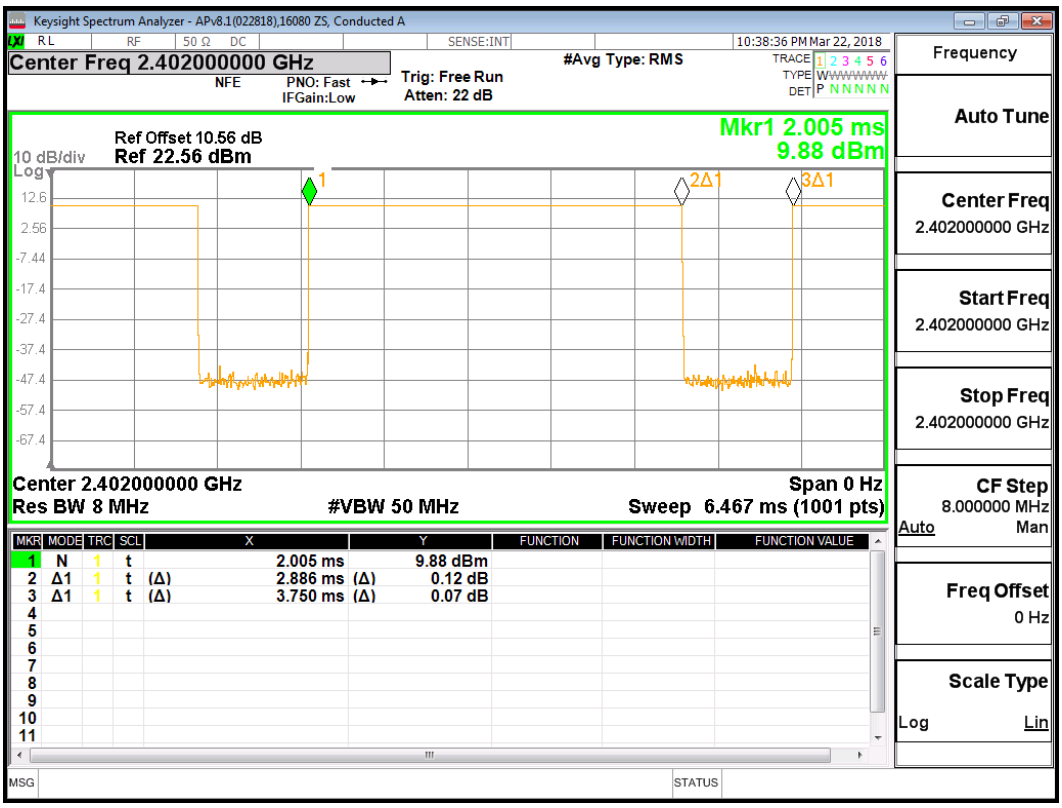
Band	Mode	Ch #	Freq. (MHz)	Chain 0 Average Power (dBm)		
				Meas Pwr	Tune-up	SAR Test (Yes/No)
2.4	GFSK	0	2402	9.90	10.74	Yes
		39	2441	10.37	11.73	
		78	2480	9.52	10.51	
	EDR, π/4 DQPSK	0	2402	7.33	8.22	No
		39	2441	8.10	9.05	
		78	2480	7.15	8.14	
	EDR, 8-DPSK	0	2402	7.35	8.22	No
		39	2441	8.12	9.05	
		78	2480	7.17	8.14	
	LE, GFSK	0	2402	3.50	5.16	No
		19	2440	4.65	5.82	
		39	2480	4.13	4.99	

Duty Factor Measured Results

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

Duty Cycle plot

GFSK



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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

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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*.

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10.1. GSM850

RF Exposure Conditions	Mode	Dist. (mm)	Test Position	Ch #.	Freq. (MHz)	Power (dBm)		1-g SAR (W/kg)		Plot No.
						Tune-up Limit	Meas.	Meas.	Scaled	
Head	GPRS 4 Slots	0	Left Touch	190	836.6	28.20	27.70	0.116	0.130	1
			Left Tilt	190	836.6	28.20	27.70	0.061	0.068	
			Right Touch	190	836.6	28.20	27.70	0.090	0.101	
			Right Tilt	190	836.6	28.20	27.70	0.053	0.059	
Body-worn	GPRS 4 Slots	15	Rear	190	836.6	28.20	27.70	0.254	0.285	
			Front	190	836.6	28.20	27.70	0.298	0.334	2
Hotspot	GPRS 4 Slots	10	Rear	190	836.6	28.20	27.70	0.374	0.420	
			Front	190	836.6	28.20	27.70	0.370	0.415	
			Edge 2	190	836.6	28.20	27.70	0.110	0.123	
			Edge 3	190	836.6	28.20	27.70	0.227	0.255	
			Edge 4	190	836.6	28.20	27.70	0.358	0.402	
Hotspot	DTM 2 Slots	10	Rear	190	836.6	31.20	30.95	0.443	0.469	3

10.2. GSM1900

RF Exposure Conditions	Mode	Dist. (mm)	Test Position	Ch #.	Freq. (MHz)	Power (dBm)		1-g SAR (W/kg)		Plot No.
						Tune-up Limit	Meas.	Meas.	Scaled	
Head	GPRS 4 Slots	0	Left Touch	661	1880.0	24.70	24.10	0.136	0.156	4
			Left Tilt	661	1880.0	24.70	24.10	0.047	0.054	
			Right Touch	661	1880.0	24.70	24.10	0.128	0.147	
			Right Tilt	661	1880.0	24.70	24.10	0.063	0.072	
Body-worn	GPRS 4 Slots	15	Rear	661	1880.0	24.70	24.10	0.054	0.062	
			Front	661	1880.0	24.70	24.10	0.084	0.096	5
Hotspot	GPRS 4 Slots	10	Rear	661	1880.0	24.70	24.10	0.100	0.115	
			Front	661	1880.0	24.70	24.10	0.149	0.171	
			Edge 2	661	1880.0	24.70	24.10	0.034	0.039	
			Edge 3	661	1880.0	24.70	24.10	0.324	0.372	6
			Edge 4	661	1880.0	24.70	24.10	0.083	0.095	
Hotspot	DTM 2 Slots	10	Edge 3	661	1880.0	27.70	27.45	0.347	0.368	

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10.3. W-CDMA Band V

RF Exposure Conditions	Mode	Pw r Back-off	Dist. (mm)	Test Position	Ch #.	Freq. (MHz)	Pow er (dBm)		1-g SAR (W/kg)		Plot No.
							Tune-up Limit	Meas.	Meas.	Scaled	
Head	Rel. 99 RMC 12.2 kbps	OFF	0	Left Touch	4183	836.6	24.90	24.30	0.160	0.184	7
				Left Tilt	4183	836.6	24.90	24.30	0.069	0.079	
				Right Touch	4183	836.6	24.90	24.30	0.121	0.139	
				Right Tilt	4183	836.6	24.90	24.30	0.073	0.084	
Body-w orn	Rel. 99 RMC 12.2 kbps	OFF	15	Rear	4183	836.6	24.90	24.30	0.257	0.295	8
				Front	4183	836.6	24.90	24.30	0.257	0.295	
Hotspot	Rel. 99 RMC 12.2 kbps	OFF	10	Rear	4183	836.6	24.90	24.30	0.383	0.440	
				Front	4183	836.6	24.90	24.30	0.393	0.451	9
				Edge 2	4183	836.6	24.90	24.30	0.125	0.144	
				Edge 3	4183	836.6	24.90	24.30	0.261	0.300	
				Edge 4	4183	836.6	24.90	24.30	0.350	0.402	

10.4. LTE Band 4 (20MHz Bandwidth)

RF Exposure Conditions	Mode	Pw r Back-off	Dist. (mm)	Test Position	Ch #.	Freq. (MHz)	RB Allocation	RB offest	Pow er (dBm)		1-g SAR (W/kg)		Plot No.
									Tune-up Limit	Meas.	Meas.	Scaled	
Head	QPSK	OFF	0	Left Touch	20175	1732.5	1	0	22.00	21.42	0.117	0.134	
							50	0	22.00	21.50	0.116	0.130	
				Left Tilt (15°)	20175	1732.5	1	0	22.00	21.42	0.057	0.065	
							50	0	22.00	21.50	0.057	0.064	
				Right Touch	20175	1732.5	1	0	22.00	21.42	0.138	0.158	10
							50	0	22.00	21.50	0.131	0.147	
				Right Tilt (15°)	20175	1732.5	1	0	22.00	21.42	0.065	0.074	
							50	0	22.00	21.50	0.065	0.073	
Body-w orn	QPSK	OFF	15	Rear	20175	1732.5	1	0	22.00	21.42	0.195	0.223	
							50	0	22.00	21.50	0.192	0.215	
				Front	20175	1732.5	1	0	22.00	21.42	0.272	0.311	11
							50	0	22.00	21.50	0.269	0.302	
Hotspot	QPSK	OFF	10	Rear	20175	1732.5	1	0	22.00	21.42	0.306	0.350	
							50	0	22.00	21.50	0.302	0.339	
				Front	20175	1732.5	1	0	22.00	21.42	0.425	0.486	
							50	0	22.00	21.50	0.420	0.471	
				Edge 2	20175	1732.5	1	0	22.00	21.42	0.040	0.046	
							50	0	22.00	21.50	0.040	0.045	
				Edge 3	20175	1732.5	1	0	22.00	21.42	0.534	0.610	12
							50	0	22.00	21.50	0.521	0.584	
				Edge 4	20175	1732.5	1	0	22.00	21.42	0.229	0.262	
							50	0	22.00	21.50	0.225	0.252	

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10.5. LTE Band 5 (10MHz 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)		Plot No.
									Tune-up Limit	Meas.	Meas.	Scaled	
Head	QPSK	OFF	0	Left Touch	20525	836.5	1	25	25.00	24.47	0.151	0.171	13
							25	0	24.00	23.59	0.122	0.134	
				Left Tilt	20525	836.5	1	25	25.00	24.47	0.065	0.074	
							25	0	24.00	23.59	0.054	0.059	
				Right Touch	20525	836.5	1	25	25.00	24.47	0.133	0.150	
							25	0	24.00	23.59	0.109	0.120	
				Right Tilt	20525	836.5	1	25	25.00	24.47	0.061	0.069	
							25	0	24.00	23.59	0.049	0.054	
Body-worn	QPSK	OFF	15	Rear	20525	836.5	1	25	25.00	24.47	0.237	0.268	
							25	0	24.00	23.59	0.191	0.210	
				Front	20525	836.5	1	25	25.00	24.47	0.249	0.281	14
							25	0	24.00	23.59	0.199	0.219	
Hotspot	QPSK	OFF	10	Rear	20525	836.5	1	25	25.00	24.47	0.353	0.399	
							25	0	24.00	23.59	0.285	0.313	
				Front	20525	836.5	1	25	25.00	24.47	0.354	0.400	
							25	0	24.00	23.59	0.291	0.320	
				Edge 2	20525	836.5	1	25	25.00	24.47	0.144	0.163	
							25	0	24.00	23.59	0.115	0.126	
				Edge 3	20525	836.5	1	25	25.00	24.47	0.251	0.284	
							25	0	24.00	23.59	0.203	0.223	
				Edge 4	20525	836.5	1	25	25.00	24.47	0.357	0.403	15
							25	0	24.00	23.59	0.293	0.322	

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10.6. LTE Band 7 (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)		Plot No.
									Tune-up Limit	Meas.	Meas.	Scaled	
Head	QPSK	OFF	0	Left Touch	21100	2535.0	1	0	23.00	22.19	0.045	0.054	
							50	0	23.00	22.23	0.045	0.054	
				Left Tilt (15°)	21100	2535.0	1	0	23.00	22.19	0.019	0.023	
							50	0	23.00	22.23	0.017	0.020	
				Right Touch	21100	2535.0	1	0	23.00	22.19	0.076	0.092	
							50	0	23.00	22.23	0.084	0.100	16
				Right Tilt (15°)	21100	2535.0	1	0	23.00	22.19	0.020	0.024	
							50	0	23.00	22.23	0.011	0.013	
Body	QPSK	OFF	15	Rear	21100	2535.0	1	0	23.00	22.19	0.050	0.060	17
							50	0	23.00	22.23	0.049	0.059	
				Front	21100	2535.0	1	0	23.00	22.19	0.043	0.052	
							50	0	23.00	22.23	0.044	0.053	
Hotspot	QPSK	OFF	10	Rear	21100	2535.0	1	0	23.00	22.19	0.107	0.129	
							50	0	23.00	22.23	0.106	0.127	
				Front	21100	2535.0	1	0	23.00	22.19	0.109	0.131	18
							50	0	23.00	22.23	0.102	0.122	
				Edge 2	21100	2535.0	1	0	23.00	22.19	0.046	0.055	
							50	0	23.00	22.23	0.047	0.056	
				Edge 3	21100	2535.0	1	0	23.00	22.19	0.105	0.127	
							50	0	23.00	22.23	0.097	0.116	
				Edge 4	21100	2535.0	1	0	23.00	22.19	0.027	0.033	
							50	0	23.00	22.23	0.026	0.031	

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10.7. LTE Band 12 (10MHz 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)		Plot No.
									Tune-up Limit	Meas.	Meas.	Scaled	
Head	QPSK	OFF	0	Left Touch	23095	707.5	1	49	25.00	24.46	0.062	0.070	19
							25	25	24.00	23.67	0.045	0.049	
				Left Tilt	23095	707.5	1	49	25.00	24.46	0.025	0.028	
							25	25	24.00	23.67	0.017	0.018	
				Right Touch	23095	707.5	1	49	25.00	24.46	0.054	0.061	
							25	25	24.00	23.67	0.038	0.041	
				Right Tilt	23095	707.5	1	49	25.00	24.46	0.022	0.024	
							25	25	24.00	23.67	0.014	0.015	
Body-worn	QPSK	OFF	15	Rear	23095	707.5	1	49	25.00	24.46	0.111	0.126	
							25	25	24.00	23.67	0.081	0.087	
				Front	23095	707.5	1	49	25.00	24.46	0.143	0.162	20
							25	25	24.00	23.67	0.108	0.117	
Hotspot	QPSK	OFF	10	Rear	23095	707.5	1	49	25.00	24.46	0.155	0.176	
							25	25	24.00	23.67	0.112	0.121	
				Front	23095	707.5	1	49	25.00	24.46	0.239	0.271	21
							25	25	24.00	23.67	0.181	0.195	
				Edge 2	23095	707.5	1	49	25.00	24.46	0.056	0.064	
							25	25	24.00	23.67	0.041	0.044	
				Edge 3	23095	707.5	1	49	25.00	24.46	0.093	0.105	
							25	25	24.00	23.67	0.068	0.073	
				Edge 4	23095	707.5	1	49	25.00	24.46	0.165	0.187	
							25	25	24.00	23.67	0.117	0.126	

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10.8. LTE Band 13 (10MHz 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)		Plot No.
									Tune-up Limit	Meas.	Meas.	Scaled	
Head	QPSK	OFF	0	Left Touch	23230	782.0	1	0	25.00	24.38	0.158	0.182	22
							25	0	24.00	23.43	0.142	0.162	
				Left Tilt	23230	782.0	1	0	25.00	24.38	0.081	0.093	
							25	0	24.00	23.43	0.070	0.080	
				Right Touch	23230	782.0	1	0	25.00	24.38	0.128	0.148	
							25	0	24.00	23.43	0.108	0.123	
				Right Tilt	23230	782.0	1	0	25.00	24.38	0.076	0.087	
							25	0	24.00	23.43	0.065	0.074	
Body-worn	QPSK	OFF	15	Rear	23230	782.0	1	0	25.00	24.38	0.297	0.343	23
							25	0	24.00	23.43	0.255	0.291	
				Front	23230	782.0	1	0	25.00	24.38	0.293	0.338	
							25	0	24.00	23.43	0.252	0.287	
Hotspot	QPSK	OFF	10	Rear	23230	782.0	1	0	25.00	24.38	0.427	0.493	24
							25	0	24.00	23.43	0.369	0.421	
				Front	23230	782.0	1	0	25.00	24.38	0.420	0.484	
							25	0	24.00	23.43	0.356	0.406	
				Edge 2	23230	782.0	1	0	25.00	24.38	0.129	0.149	
							25	0	24.00	23.43	0.112	0.128	
				Edge 3	23230	782.0	1	0	25.00	24.38	0.263	0.303	
							25	0	24.00	23.43	0.221	0.252	
				Edge 4	23230	782.0	1	0	25.00	24.38	0.384	0.443	
							25	0	24.00	23.43	0.329	0.375	

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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)		Plot No.
									Tune-up Limit	Meas.	Meas.	Scaled	
Head	QPSK	OFF	0	Left Touch	40620	2593.0	1	0	23.00	22.36	0.030	0.035	
							50	0	23.00	22.27	0.029	0.034	
				Left Tilt (15°)	40620	2593.0	1	0	23.00	22.36	0.013	0.015	
							50	0	23.00	22.27	0.013	0.015	
				Right Touch	40620	2593.0	1	0	23.00	22.36	0.054	0.063	
							50	0	23.00	22.27	0.054	0.064	25
				Right Tilt (15°)	40620	2593.0	1	0	23.00	22.36	0.013	0.015	
							50	0	23.00	22.27	0.012	0.014	
Body-worn	QPSK	OFF	15	Rear	40620	2593.0	1	0	23.00	22.36	0.038	0.044	26
							50	0	23.00	22.27	0.037	0.044	
				Front	40620	2593.0	1	0	23.00	22.36	0.034	0.039	
							50	0	23.00	22.27	0.035	0.041	
Hotspot	QPSK	OFF	10	Rear	40620	2593.0	1	0	23.00	22.36	0.066	0.076	
							50	0	23.00	22.27	0.066	0.078	27
				Front	40620	2593.0	1	0	23.00	22.36	0.063	0.073	
							50	0	23.00	22.27	0.062	0.073	
				Edge 2	40620	2593.0	1	0	23.00	22.36	0.043	0.050	
							50	0	23.00	22.27	0.039	0.046	
				Edge 3	40620	2593.0	1	0	23.00	22.36	0.041	0.048	
							50	0	23.00	22.27	0.040	0.047	
				Edge 4	40620	2593.0	1	0	23.00	22.36	0.012	0.014	
							50	0	23.00	22.27	0.013	0.015	

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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 Factor	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	0.054	1.007	12.01	11.50			
				Left Tilt	6	2437	0.059	1.007	12.01	11.50			
				Right Touch	6	2437	0.233	1.007	12.01	11.50	0.114	0.129	
				Right Tilt	6	2437	0.194	1.007	12.01	11.50			
Body-worn	802.11b 1 Mbps	Chain 0	15	Rear	6	2437	0.009	1.007	12.01	11.50			
				Front	6	2437	0.018	1.007	12.01	11.50	0.014	0.016	
Hot Spot	802.11b 1 Mbps	Chain 0	10	Rear	6	2437	0.023	1.007	12.01	11.50			
				Front	6	2437	0.041	1.007	12.01	11.50	0.031	0.035	28
				Edge 1	6	2437	0.022	1.007	12.01	11.50			
				Edge 4	6	2437	0.018	1.007	12.01	11.50			
Head	802.11b 1 Mbps	Chain 1	0	Left Touch	6	2437	0.121	1.007	9.68	8.80			
				Left Tilt	6	2437	0.186	1.007	9.68	8.80			
				Right Touch	6	2437	0.368	1.007	9.68	8.80	0.219	0.270	29
				Right Tilt	6	2437	0.294	1.007	9.68	8.80			
Body-worn	802.11b 1 Mbps	Chain 1	15	Rear	6	2437	0.009	1.007	9.68	8.80			
				Front	6	2437	0.018	1.007	9.68	8.80	0.014	0.017	30
Hot Spot	802.11b 1 Mbps	Chain 1	10	Rear	6	2437	0.009	1.007	9.68	8.80			
				Front	6	2437	0.014	1.007	9.68	8.80			
				Edge 2	6	2437	0.018	1.007	9.68	8.80	0.015	0.018	

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.

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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 Factor	Power (dBm)		1-g SAR (W/kg)		Plot No.
									Tune-up Limit	Meas.	Meas.	Scaled	
Head	802.11n HT 40	Chain 0	0	Left Touch	62	5310	0.248	1.070	13.36	11.80			
				Left Tilt	62	5310	0.192	1.070	13.36	11.80			
				Right Touch	62	5310	0.398	1.070	13.36	11.80	0.163	0.250	31
				Right Tilt	62	5310	0.385	1.070	13.36	11.80			
Body-worn	802.11n HT 40	Chain 0	15	Rear	62	5310	0.175	1.070	13.36	11.80	0.067	0.103	32
				Front	62	5310	0.034	1.070	13.36	11.80			
Head	802.11n HT 20	Chain 1	0	Left Touch	44	5220	0.151	1.021	11.06	10.17	0.054	0.068	
				Left Tilt	44	5220	0.034	1.021	11.06	10.17			
				Right Touch	44	5220	0.080	1.021	11.06	10.17			
				Right Tilt	44	5220	0.011	1.021	11.06	10.17			
Body-worn	802.11n HT 20	Chain 1	15	Rear	44	5220	0.018	1.021	11.06	10.17	0.002	0.002	
				Front	44	5220	0.004	1.021	11.06	10.17			

RF Exposure Conditions	Mode	Antenna	Dist. (mm)	Test Position	Ch #.	Freq. (MHz)	Area Scan Max. SAR (W/kg)	Duty Cycle Factor	Power (dBm)		10-g SAR (W/kg)		Plot No.
									Tune-up Limit	Meas.	Meas.	Scaled	
Product Specific	802.11n HT 40	Chain 0	0	Rear	62	5310	0.625	1.070	13.36	11.80	0.089	0.136	33
				Front	62	5310	0.696	1.070	13.36	11.80			
				Edge 1	62	5310	0.441	1.070	13.36	11.80			
				Edge 4	62	5310	0.475	1.070	13.36	11.80			
Product Specific	802.11n HT 20	Chain 1	0	Rear	44	5220	0.164	1.021	11.06	10.17			
				Front	44	5220	0.320	1.021	11.06	10.17	0.024	0.030	
				Edge 1	44	5220	0.006	1.021	11.06	10.17			
				Edge 2	44	5220	0.099	1.021	11.06	10.17			

U-NII-2C

RF Exposure Conditions	Mode	Antenna	Dist. (mm)	Test Position	Ch #.	Freq. (MHz)	Area Scan Max. SAR (W/kg)	Duty Cycle Factor	Power (dBm)		1-g SAR (W/kg)		Plot No.
									Tune-up Limit	Meas.	Meas.	Scaled	
Head	802.11a	Chain 0	0	Left Touch	100	5500	0.153	1.019	11.31	10.01			
				Left Tilt	100	5500	0.144	1.019	11.31	10.01			
				Right Touch	100	5500	0.201	1.019	11.31	10.01	0.089	0.122	34
				Right Tilt	100	5500	0.165	1.019	11.31	10.01			
Body-worn	802.11a	Chain 0	15	Rear	100	5500	0.084	1.019	11.31	10.01	0.034	0.046	35
				Front	100	5500	0.014	1.019	11.31	10.01			
Head	802.11a	Chain 1	0	Left Touch	100	5500	0.076	1.019	9.64	8.49	0.032	0.042	
				Left Tilt	100	5500	0.014	1.019	9.64	8.49			
				Right Touch	100	5500	0.033	1.019	9.64	8.49			
				Right Tilt	100	5500	0.008	1.019	9.64	8.49			
Body-worn	802.11a	Chain 1	15	Rear	100	5500	0.009	1.019	9.64	8.49			
				Front	100	5500	0.032	1.019	9.64	8.49	<0.001	<0.001	

RF Exposure Conditions	Mode	Antenna	Dist. (mm)	Test Position	Ch #.	Freq. (MHz)	Area Scan Max. SAR (W/kg)	Duty Cycle Factor	Power (dBm)		10-g SAR (W/kg)		Plot No.
									Tune-up Limit	Meas.	Meas.	Scaled	
Product Specific	802.11a	Chain 0	0	Rear	100	5500	0.538	1.019	11.31	10.01	0.068	0.093	36
				Front	100	5500	0.229	1.019	11.31	10.01			
				Edge 1	100	5500	0.137	1.019	11.31	10.01			
				Edge 4	100	5500	0.320	1.019	11.31	10.01			
Product Specific	802.11a	Chain 1	0	Rear	100	5500	0.099	1.019	9.64	8.49			
				Front	100	5500	0.216	1.019	9.64	8.49	0.015	0.020	
				Edge 1	100	5500	0.039	1.019	9.64	8.49			
				Edge 2	100	5500	0.072	1.019	9.64	8.49			

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U-NII-3

RF Exposure Conditions	Mode	Antenna	Dist. (mm)	Test Position	Ch #.	Freq. (MHz)	Area Scan Max. SAR (W/kg)	Duty Cycle Factor	Power (dBm)		1-g SAR (W/kg)		Plot No.
									Tune-up Limit	Meas.	Meas.	Scaled	
Head	802.11ac VHT 80	Chain 0	0	Left Touch	155	5775	0.113	1.131	13.25	11.42			
				Left Tilt	155	5775	0.130	1.131	13.25	11.42	0.038	0.065	
				Right Touch	155	5775	0.121	1.131	13.25	11.42			
				Right Tilt	155	5775	0.101	1.131	13.25	11.42			
Body-worn	802.11ac VHT 80	Chain 0	15	Rear	155	5775	0.059	1.131	13.25	11.42	0.023	0.040	37
				Front	155	5775	0.036	1.131	13.25	11.42			
Head	802.11n HT 40	Chain 1	0	Left Touch	159	5795	0.125	1.070	10.23	10.00			
				Left Tilt	159	5795	0.025	1.070	10.23	10.00			
				Right Touch	159	5795	0.149	1.070	10.23	10.00			
				Right Tilt	159	5795	0.209	1.070	10.23	10.00	0.069	0.078	38
Body-worn	802.11n HT 40	Chain 1	15	Rear	159	5795	0.007	1.070	10.23	10.00	<0.001	<0.001	
				Front	159	5795	0.006	1.070	10.23	10.00			

RF Exposure Conditions	Mode	Antenna	Dist. (mm)	Test Position	Ch #.	Freq. (MHz)	Area Scan Max. SAR (W/kg)	Duty Cycle Factor	Power (dBm)		10-g SAR (W/kg)		Plot No.
									Tune-up Limit	Meas.	Meas.	Scaled	
Product Specific	802.11ac VHT 80	Chain 0	0	Rear	155	5775	1.090	1.131	13.25	11.42	0.140	0.241	39
				Front	155	5775	0.259	1.131	13.25	11.42			
				Edge 1	155	5775	0.097	1.131	13.25	11.42			
				Edge 4	155	5775	1.030	1.131	13.25	11.42			
Product Specific	802.11n HT 40	Chain 1	0	Rear	159	5795	0.097	1.070	10.23	10.00			
				Front	159	5795	0.256	1.070	10.23	10.00	0.023	0.026	
				Edge 1	159	5795	0.005	1.070	10.23	10.00			
				Edge 2	159	5795	0.069	1.070	10.23	10.00			

10.13. Bluetooth

RF Exposure Conditions	Mode	Antenna	Dist. (mm)	Test Position	Ch #.	Freq. (MHz)	Duty Cycle Factor	Power (dBm)		1-g SAR (W/kg)		Plot No.
								Tune-up Limit	Meas.	Meas.	Scaled	
Head	GFSK	Chain 0	0	Left Touch	39	2441	1.302	11.73	10.4	0.043	0.076	
				Left Tilt	39	2441	1.302	11.73	10.4	0.049	0.087	
				Right Touch	39	2441	1.302	11.73	10.4	0.132	0.235	40
				Right Tilt	39	2441	1.302	11.73	10.4	0.112	0.199	
Body-worn	GFSK	Chain 0	15	Rear	39	2441	1.302	11.73	10.4	0.005	0.008	
				Front	39	2441	1.302	11.73	10.4	0.010	0.018	41
Hotspot	GFSK	Chain 0	10	Rear	39	2441	1.302	11.73	10.4	0.011	0.020	
				Front	39	2441	1.302	11.73	10.4	0.018	0.031	
				Edge 1	39	2441	1.302	11.73	10.4	0.019	0.035	
				Edge 4	39	2441	1.302	11.7	10.4	0.021	0.037	42

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11. SAR Measurement Variability

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

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

Frequency Band (MHz)	Air Interface	RF Exposure Conditions	Test Position	Repeated SAR (Yes/No)	Highest Measured SAR (W/kg)
700	LTE Band 12	Hotspot	Front	No	0.239
	LTE Band 13	Hotspot	Rear	No	0.427
850	GSM 850	Hotspot	Rear	No	0.443
	WCDMA Band V	Hotspot	Front	No	0.393
	LTE Band 5	Hotspot	Edge 4	No	0.357
1700	LTE Band 4	Hotspot	Edge 3	No	0.534
1900	GSM 1900	Hotspot	Edge 3	No	0.347
2400	Wi-Fi 802.11b/g/n	Head	Right Touch	No	0.219
2400	BT	Head	Right Touch	No	0.132
2500	LTE Band 7	Hotspot	Front	No	0.109
2600	LTE Band 41	Hotspot	Rear	No	0.066
5300	Wi-Fi 802.11a/n/ac	Head	Right Touch	No	0.163
5500	Wi-Fi 802.11a/n/ac	Head	Right Touch	No	0.089
5800	Wi-Fi 802.11a/n/ac	Head	Right Tilt	No	0.069

Note(s):

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

Frequency Band (MHz)	Air Interface	RF Exposure Conditions	Test Position	Repeated SAR (Yes/No)	Highest Measured SAR (W/kg)
5300	Wi-Fi 802.11a/n/ac	Product specific	Rear	No	0.089
5500	Wi-Fi 802.11a/n/ac	Product specific	Rear	No	0.068
5800	Wi-Fi 802.11a/n/ac	Product specific	Rear	No	0.140

Note(s):

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

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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

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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	0.184	0.129	0.270	0.250	0.078	0.076	0.260	0.313	0.583	0.391	0.512	0.588	0.404
	Left Tilt	0.079	0.129	0.270	0.250	0.078	0.087	0.166	0.208	0.478	0.286	0.407	0.494	0.415
	Right Touch	0.158	0.129	0.270	0.250	0.078	0.235	0.393	0.287	0.557	0.365	0.486	0.721	0.563
	Right Tilt	0.084	0.129	0.270	0.250	0.078	0.199	0.283	0.213	0.483	0.291	0.412	0.611	0.527
Body-worn	Rear	0.343	0.016	0.017	0.103	0.002	0.008	0.351	0.359	0.376	0.361	0.448	0.456	0.113
	Front	0.338	0.016	0.017	0.103	0.002	0.018	0.356	0.354	0.371	0.356	0.443	0.461	0.123
Hotspot	Rear	0.493	0.035	0.018			0.020	0.513	0.528	0.546		0.493	0.513	
	Front	0.486	0.035	0.018			0.031	0.517	0.521	0.539		0.486	0.517	
	Edge 2	0.163	0.035	0.018			0.037	0.200	0.198	0.216				
	Edge 3	0.610	0.035	0.018			0.037	0.647	0.645	0.663				
	Edge 4	0.443	0.035	0.018			0.037	0.480	0.478	0.496				

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.

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Appendixes

Refer to separated files for the following appendixes.

12132731-S1V1 Appendix A: SAR Setup Photos

12132731-S1V1 Appendix B: SAR System Check Plots

12132731-S1V1 Appendix C: Highest SAR Test Plots

12132731-S1V1 Appendix D: SAR Liquid Tissue Ingredients

12132731-S1V1 Appendix E: SAR Probe Calibration Certificates

12132731-S1V1 Appendix F: SAR Dipole Calibration Certificates

END OF REPORT

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