SAR EVALUATION REPORT

IEEE Std 1528-2013

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

FCC ID: A3LSMA145M
Model Name: SM-A145M, SM-A145M/DS, SM-A145MB/DS, SM-A145MB

Report Number: 14586572-S1V4
Issue Date: 2023-02-01

Prepared for
SAMSUNG ELECTRONICS CO., LTD.
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Prepared by
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ACCREDITED
CERT #0751.05

Revision History

Rev.	Date	Revisions	Revised By
V1	202-01-17	Initial Issue	--
V2	2023-01-26	Section 1: Updated U-NII Extremity value Section 9.5: Updated U-NII 1 802.11ac VHT80 Reduced Power Tune-Up Limit Section 10.14: Updated worst case highlight	AJ Newcomer
V3	2023-01-31	Section 6.2: Corrected 802.11ac, 80 MHz BW duty cycle	Dave Weaver
V4	2023-02-01	Sections 1, 10.14, 12.2 and 12.3 updated due to duty cycle correction.	Dave Weaver

Table of Contents

1. Attestation of Test Results

Applicant Name		SAMSUNG ELECTRONICS CO., LTD.			
FCC ID		A3LSMA145M			
Model Name		SM-A145M, SM-A145M/DS, SM-A145MB/DS, SM-A145MB			
Applicable Standards		Published RF exposure KDB procedures IEEE Std 1528-2013			
Exposure Category		SAR Limits (W/Kg)			
		Peak spatial-average (1g of tissue)		Extremities (hands, wrists, ankles, etc.) (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		0.402	0.052	0.446	0.080
Body-worn		0.478	0.426	0.453	0.049
Hotspot / BT Tethering		0.453	0.943	0.556	0.106
Extremity / Wi-Fi Direct		N/A	N/A	1.615	N/A
Simultaneous TX	Head	0.868	0.454	0.868	0.868
	Body-worn	0.980	0.904	0.980	0.980
	Hotspot	1.396	1.396	1.115	1.115
Date Tested		11/30/2022 to 1/5/2023			
Test Results		Pass			

UL Verification Services Inc. tested the above equipment in accordance with the requirements set forth in the above standards. The test results show that the equipment tested can demonstrate compliance with the requirements as documented in this report.

This report contains data provided by the customer which can impact the validity of results. UL Verification Services Inc. is only responsible for the validity of results after the integration of the data provided by the customer.

The results documented in this report apply only to the tested sample, under the conditions and modes of operation as described herein. It is the manufacturer's responsibility to assure that additional production units of this model are manufactured with identical electrical and mechanical components. All samples tested were in good operating condition throughout the entire test program. Measurement Uncertainties are published for informational purposes only and were not considered unless noted otherwise.

This document may not be altered or revised in any way unless done so by UL Verification Services Inc. and all revisions are 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 A2LA, NIST, or any agency of the U.S. Government, or any agency of the U.S. government.

Approved & Released By:	Prepared By:
	
Dave Weaver Operations Leader UL Verification Services Inc.	Coltyce Sanders Staff Laboratory Engineer UL Verification Services Inc.

2. Test Specification, Methods and Procedures

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

- 248227 D01 802.11 Wi-Fi SAR v02r02
- 447498 D01 General RF Exposure Guidance v06
- 447498 D03 Supplement C Cross-Reference v01
- 648474 D04 Handset SAR v01r03
- 680106 D01 RF Exposure Wireless Charging Apps v03r01
- 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
- 941225 D07 UMPC Mini Tablet v01r02

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

- TCB Workshop October 2014; RF Exposure Procedures (Other LTE Considerations)
- TCB Workshop April 2015; RF Exposure Procedures (Overlapping LTE Bands)
- TCB Workshop October 2015; RF Exposure Procedures (KDB 941225 D05A)
- TCB Workshop October 2016; RF Exposure Procedures (Bluetooth Duty Factor)
- TCB Workshop October 2016; RF Exposure Procedures (DUT Holder Perturbations)
- TCB Workshop May 2017; RF Exposure Procedures (Broadband Liquid Above 3 GHz)
- TCB Workshop April 2019; RF Exposure Procedures (Tissue Simulating Liquids (TSL))

3. Facilities and Accreditation

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

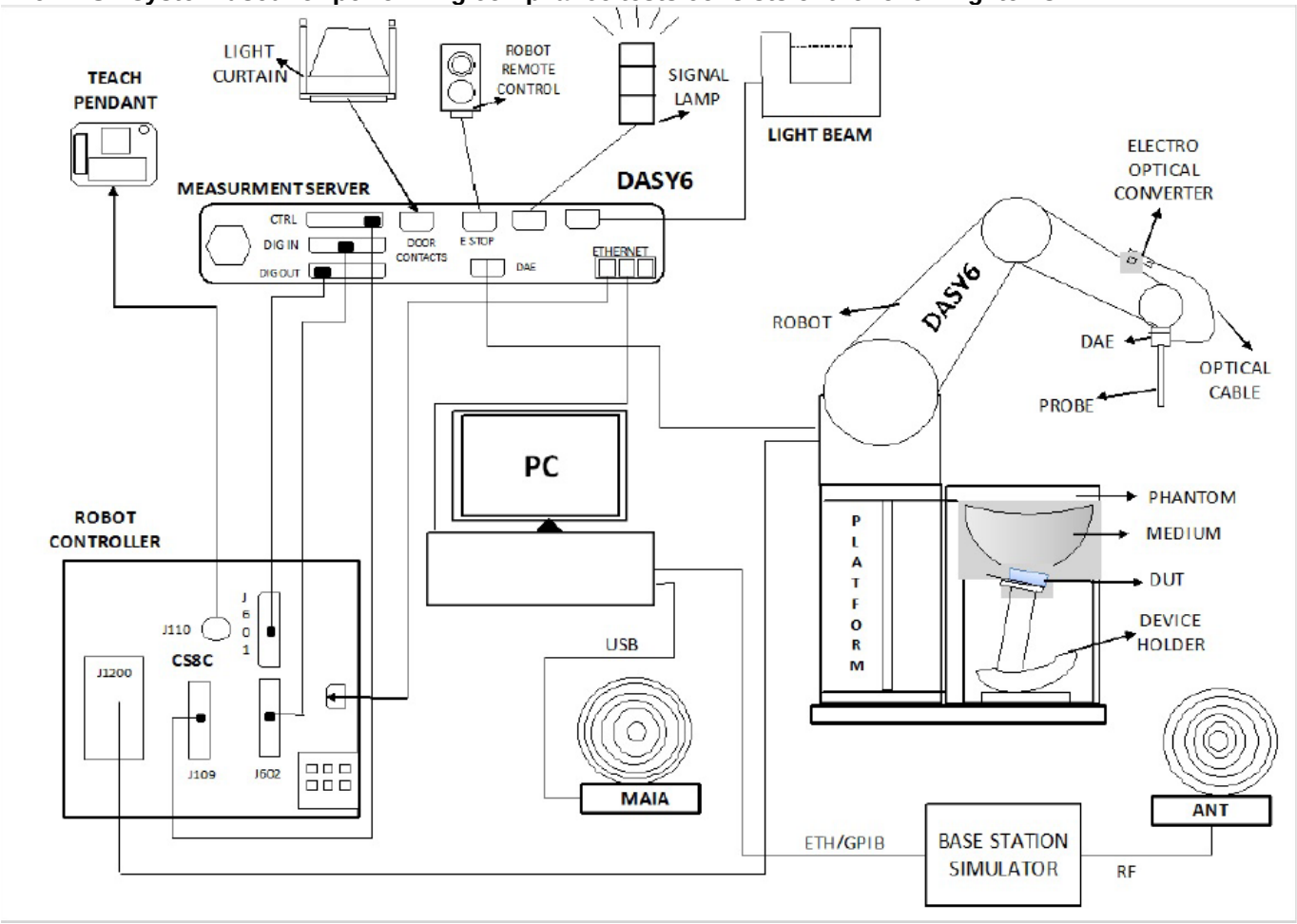
47173 Benicia Street	47266 Benicia Street
SAR Labs A to H	SAR Labs 1 to 14

UL Verification Services Inc. is accredited by A2LA, Certificate Number 0751.05

4. SAR Measurement System & Test Equipment

4.1. SAR Measurement System

The DASY 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 Win7, Win10 and the DASY6/8[1] 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.

[1] DASY8 software used: DASY6.16.2 or DASY8.16.2 and older generations.

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 IEC/IEEE 62209-1528, whereby 3 dB is a requirement when compliance is assessed in accordance with the ARIB standard (Japan). If only one Zoom Scan follows the Area Scan, then only the absolute maximum will be taken as reference. For cases where multiple maximums are detected, the number of Zoom Scans has to be increased accordingly.

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

	≤ 3 GHz	> 3 GHz
Maximum distance from closest measurement point (geometric center of probe sensors) to phantom surface	5 ± 1 mm	½·δ·ln(2) ± 0.5 mm
Maximum probe angle from probe axis to phantom surface normal at the measurement location	30° ± 1°	20° ± 1°
Maximum area scan spatial resolution: Δx_{Area}, Δy_{Area}	≤ 2 GHz: ≤ 15 mm 2 – 3 GHz: ≤ 12 mm	3 – 4 GHz: ≤ 12 mm 4 – 6 GHz: ≤ 10 mm
	When the x or y dimension of the test device, in the measurement plane orientation, is smaller than the above, the measurement resolution must be ≤ the corresponding x or y dimension of the test device with at least one measurement point on the test device.	

Step 3: Zoom Scan

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

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

			≤ 3 GHz	> 3 GHz
Maximum zoom scan spatial resolution: Δx_{Zoom}, Δy_{Zoom}			≤ 2 GHz: ≤ 8 mm 2 – 3 GHz: ≤ 5 mm*	3 – 4 GHz: ≤ 5 mm* 4 – 6 GHz: ≤ 4 mm*
Maximum zoom scan spatial resolution, normal to phantom surface	uniform grid: $\Delta z_{Zoom}(n)$		≤ 5 mm	3 – 4 GHz: ≤ 4 mm 4 – 5 GHz: ≤ 3 mm 5 – 6 GHz: ≤ 2 mm
	graded grid	$\Delta z_{Zoom}(1)$: between 1st two points closest to phantom surface	≤ 4 mm	3 – 4 GHz: ≤ 3 mm 4 – 5 GHz: ≤ 2.5 mm 5 – 6 GHz: ≤ 2 mm
		$\Delta z_{Zoom}(n>1)$: between subsequent points	≤ 1.5·$\Delta z_{Zoom}(n-1)$	
Minimum zoom scan volume	x, y, z		≥ 30 mm	3 – 4 GHz: ≥ 28 mm 4 – 5 GHz: ≥ 25 mm 5 – 6 GHz: ≥ 22 mm

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

* When zoom scan is required and the *reported* SAR from the *area scan based 1-g SAR estimation* procedures of KDB 447498 is ≤ 1.4 W/kg, ≤ 8 mm, ≤ 7 mm and ≤ 5 mm zoom scan resolution may be applied, respectively, for 2 GHz to 3 GHz, 3 GHz to 4 GHz and 4 GHz to 6 GHz.

Step 4: Power drift measurement

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

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
Vector Network Analyzer	ROHDE & SCHWARZ	ZNLE6	101274-mn	2/15/2023
Dielectric Probe kit	SPEAG	DAK-3.5	1082	9/19/2023
Shorting Block	SPEAG	DAK-1.2/3.5 Short	SM DAK 200 BA	3/21/2023
Thermometer	Fisher Scientific	Traceable	122529162	9/8/2023

System Check

Name of Equipment	Manufacturer	Type/Model	Serial No.	Cal. Due Date
Synthesized Signal Generator	RODHE & SCHWARZ	SMB 100A	180968-gX	2/18/2023
Power Sensor	RODHE & SCHWARZ	NRP18A	100992-iu	2/19/2023
Power Meter	HP	437B	3125U11347	1/25/2023
Power Sensor	HP	8481A	3318A92374	1/25/2023
Directional coupler	Werlatone	C8060-102	4064	N/A

Lab Equipment

Name of Equipment	Manufacturer	Type/Model	Serial No.	Cal. Due Date
E-Field Probe (SAR Lab 5)	SPEAG	EX3DV4	7463	5/27/2023
E-Field Probe (SAR Lab 7)	SPEAG	EX3DV4	3991	9/22/2023
Data Acquisition Electronics (SAR Lab 5)	SPEAG	DAE4	1257	9/20/2023
Data Acquisition Electronics (SAR Lab 7)	SPEAG	DAE4	1377	9/15/2023
Thermometer	TRACEABLE	6530CC	181073792	2/3/2023
System Validation Dipole	SPEAG	D750V3	1019	4/26/2023
System Validation Dipole	SPEAG	D900V2	1d143	10/18/2023
System Validation Dipole	SPEAG	D1750V2	1050	4/27/2023
System Validation Dipole	SPEAG	D1900V2	5d163	10/28/2023
System Validation Dipole	SPEAG	D2450V2	899	4/25/2023
System Validation Dipole	SPEAG	D2600V2	1036	4/25/2023
System Validation Dipole	SPEAG	D5GHzV2	1003	2/23/2023
System Validation Dipole	SPEAG	D5GHzV2	1168	11/23/2023

Other

Name of Equipment	Manufacturer	Type/Model	Serial No.	Cal. Due Date
Power Meter	Keysight	N1911A	MY55196011	1/24/2023
Power Sensor	Keysight	N1921A	MY52020011	1/24/2023
Power Sensor	Keysight	N1921A	MY52260009	1/25/2023
Power Meter	Keysight	N1912A	MY55196004	1/26/2023
Wideband Radio Communication Tester	R&S	CMW500	125236-eS	2/15/2023
Wideband Radio Communication Tester	R&S	CMW500	134852-cy	2/20/2023
Bluetooth Tester	R&S	CBT	100987	3/3/2023

5. Measurement Uncertainty

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

6. Device Under Test (DUT) Information

6.1. DUT Description

Device Dimension	Overall (Length x Width): 167.7 mm x 78 mm Overall Diagonal: 185 mm Display Diagonal: 163 mm This is a Phablet Device (display diagonal dimension > 15.0 cm or an overall diagonal dimension > 16.0 cm)
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 Ch 1~11) ☒ Mobile Hotspot (Wi-Fi 5 GHz Ch 149 [20MHz]))
Wi-Fi Direct	Wi-Fi Direct enabled devices transfer data directly between each other Wi-Fi Direct is only available in hand use configuration ☒ Wi-Fi Direct (Wi-Fi 2.4 GHz) ☒ Wi-Fi Direct (Wi-Fi 5.2, 5.8 GHz)
Bluetooth Tethering (Hotspot)	BT Tethering mode permits the device to share its cellular data connection with other devices. ☒ BT Tethering (Bluetooth 2.4 GHz)
Test sample information	**S/N** / **IMEI** / **Notes** R93TA00062N / 359128310002007 359423930002002 / Licensed Conducted 5566260 / 359128310002049 359423930002044 / WLAN/BT Conducted 5566261 / 359128310002056 359423930002051 / WLAN/BT Conducted R93TA0007VK / 359128310002593 359423930002598 / Licensed Radiated R93TA0007PP / 359128310002544 359423930002549 / Licensed Radiated R93TA0007HD / 359128310002486 359423930002481 / Licensed Radiated R93TA0007KH / 359128310002502 359423930002507 / WLAN Radiated R93TA0007JE / 359128310002494 359423930002499 / WLAN Radiated
Hardware Version	REV1.0
Software Version	A145M.001

6.2. Wireless Technologies

Wireless technologies	Frequency bands	Operating mode		Duty Cycle used for SAR testing
GSM	850 1900	Voice (GMSK) GPRS (GMSK) EDGE (8PSK)	GSM Class: B Multi-Slot Class: Class 33 - 4 Up, 5 Down	GSM Voice: 12.5% (E)GPRS: 1 Slot: 12.5% 2 Slots: 25% 3 Slots: 37.5% 4 Slots: 50%
	Does this device support DTM (Dual Transfer Mode)? ☐ Yes ☒ No			
W-CDMA (UMTS)	Band II Band IV Band V	UMTS Rel. 99 (Voice & Data) HSDPA (Rel. 5) HSUPA (Rel. 6) DC-HSDPA (Rel. 8) HSPA+ (Rel. 7) DL only		100%
LTE	FDD Band 2 FDD Band 4 FDD Band 5 FDD Band 12 FDD Band 13 FDD Band 17 FDD Band 26 TDD Band 41 FDD Band 66	QPSK 16QAM Rel. 10 Does not support Carrier Aggregation (CA)		100% (FDD) 63.3% (TDD) Power Class 3 Refer to §6.4
Wi-Fi	2.4 GHz	802.11b 802.11g 802.11n (HT20)		98.52% (802.11b) [1]
	5 GHz	802.11a 802.11n (HT20) 802.11n (HT40) 802.11ac (VHT20) 802.11ac (VHT40) 802.11ac (VHT80)		92.07% (802.11a) [1] 85.22% (802.11n/ac 40MHz BW) [1] 75.67% (802.11ac 80MHz BW) [1]
	Does this device support band 5.60 ~ 5.65 GHz? ☒ Yes ☐ No			
	Does this device support Band gap channel(s)? ☒ Yes ☐ No			
Bluetooth	2.4 GHz	BR, EDR, and LE		76.80% (GFSK) [2]

Notes:

1. Duty cycle for Wi-Fi is referenced from the DTS Report (UL Report # 14586572-E4 and UNII Report (UL Report # 14586572-E5).
2. Refer to §9.6 for Bluetooth Measured Duty Cycle.

6.3. General LTE SAR Test and Reporting Considerations

Item	Description						
Frequency range, Channel Bandwidth, Numbers and Frequencies	Band 2	Frequency range: 1850 - 1910 MHz (BW = 60 MHz)					
		Channel Bandwidth					
		20 MHz	15 MHz	10 MHz	5 MHz	3 MHz	1.4 MHz
	Low	**18700 /1860**	18675/ 1857.5	18650/ 1855	18625/ 1852.5	18615/ 1851.5	18607/ 1850.7
	Mid	**18900/ 1880**	18900/ 1880	18900/ 1880	18900/ 1880	18900/ 1880	18900/ 1880
	High	**19100/ 1900**	19125/ 1902.5	19150/ 1905	19175/ 1907.5	19185/ 1908.5	19193/ 1909.3
	Band 4	Frequency range: 1710 - 1755 MHz (BW = 45 MHz)					
		Channel Bandwidth					
		20 MHz [1]	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 (BW = 25 MHz)					
		Channel Bandwidth					
		20 MHz	15 MHz	10 MHz [1]	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 12	Frequency range: 699 – 716 MHz (BW = 17 MHz)					
		Channel Bandwidth					
		20 MHz	15 MHz	10 MHz [1]	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 (BW = 10 MHz)					
		Channel Bandwidth					
		20 MHz	15 MHz	10 MHz [1]	5 MHz [1]	3 MHz	1.4 MHz
	Low				23205/ 779.5		
	Mid			**23230/ 782**	23230/ 782		
	High				23255/ 784.5		
	Band 17	Frequency range: 704 - 716 MHz (BW = 12 MHz)					
		Channel Bandwidth					
		20 MHz	15 MHz	10 MHz [1]	5 MHz [1]	3 MHz	1.4 MHz
	Low			23780/ 709	23755/ 706.5		
	Mid			**23790/ 710**	23790/ 710		
	High			23800/ 711	23825/ 713.5		

<table>
<tr><th>Item</th><th>Description</th></tr>
<tr><td>Frequency range, Channel Bandwidth, Numbers and Frequencies</td><td>
<table>
<tr><td rowspan="3">Band 26</td><td colspan="6">Frequency range: 814 - 849 MHz (BW = 35 MHz)</td></tr>
<tr><td colspan="6">Channel Bandwidth</td></tr>
<tr><td>20 MHz</td><td>15 MHz [1]</td><td>10 MHz</td><td>5 MHz</td><td>3 MHz</td><td>1.4 MHz</td></tr>
<tr><td>Low</td><td></td><td>26765/ 821.5</td><td>26740/ 819</td><td>26715/ 816.5</td><td>26705/ 815.5</td><td>26697/ 814.7</td></tr>
<tr><td>Mid</td><td></td><td>26865/ 831.5</td><td>26865/ 831.5</td><td>26865/ 831.5</td><td>26865/ 831.5</td><td>26865/ 831.5</td></tr>
<tr><td>High</td><td></td><td>26965/ 841.5</td><td>26990/ 844</td><td>27015/ 846.5</td><td>27025/ 847.5</td><td>27033/ 848.3</td></tr>
<tr><td rowspan="3">Band 41[2]</td><td colspan="6">Frequency range: 2496 - 2690 MHz (BW = 194MHz)</td></tr>
<tr><td colspan="6">Channel Bandwidth</td></tr>
<tr><td>20 MHz</td><td>15 `MHz</td><td>10 MHz</td><td>5 MHz</td><td>3 MHz</td><td>1.4 MHz</td></tr>
<tr><td>Low</td><td colspan="4">39750 / 2506.0</td><td></td><td></td></tr>
<tr><td>Mid- Low</td><td colspan="4">40185 / 2549.5</td><td></td><td></td></tr>
<tr><td>Mid</td><td colspan="4">40620 / 2593.0</td><td></td><td></td></tr>
<tr><td>Mid-High</td><td colspan="4">41055 / 2636.5</td><td></td><td></td></tr>
<tr><td>High</td><td colspan="4">41490 / 2680.0</td><td></td><td></td></tr>
<tr><td rowspan="3">Band 66</td><td colspan="6">Frequency range: 1710 - 1780 MHz (BW = 70 MHz)</td></tr>
<tr><td colspan="6">Channel Bandwidth</td></tr>
<tr><td>20 MHz</td><td>15 MHz</td><td>10 MHz</td><td>5 MHz</td><td>3 MHz</td><td>1.4 MHz</td></tr>
<tr><td>Low</td><td>132072/ 1720</td><td>132047/ 1717.5</td><td>132022/ 1715</td><td>131997/ 1712.5</td><td>131987/ 1711.5</td><td>131979/ 1710.7</td></tr>
<tr><td>Mid</td><td>132322/ 1745</td><td>132322/ 1745</td><td>132322/ 1745</td><td>132322/ 1745</td><td>132322/ 1745</td><td>132322/ 1745</td></tr>
<tr><td>High</td><td>132572/ 1770</td><td>132597/ 1772.5</td><td>132622/ 1775</td><td>132647/ 1777.5</td><td>132657/ 1778.5</td><td>132665/ 1779.3</td></tr>
</table>
</td></tr>
<tr><td>LTE transmitter and antenna implementation</td><td>Refer to Appendix A.</td></tr>
<tr><td>Maximum power reduction (MPR)</td><td>
Table 6.2.3-1: Maximum Power Reduction (MPR) for Power Class 1, 2 and 3
<table>
<tr><th rowspan="2">Modulation</th><th colspan="6">Channel bandwidth / Transmission bandwidth (N_{RB})</th><th rowspan="2">MPR (dB)</th></tr>
<tr><th>1.4 MHz</th><th>3.0 MHz</th><th>5 MHz</th><th>10 MHz</th><th>15 MHz</th><th>20 MHz</th></tr>
<tr><td>QPSK</td><td>> 5</td><td>> 4</td><td>> 8</td><td>> 12</td><td>> 16</td><td>> 18</td><td>≤ 1</td></tr>
<tr><td>16 QAM</td><td>≤ 5</td><td>≤ 4</td><td>≤ 8</td><td>≤ 12</td><td>≤ 16</td><td>≤ 18</td><td>≤ 1</td></tr>
<tr><td>16 QAM</td><td>> 5</td><td>> 4</td><td>> 8</td><td>> 12</td><td>> 16</td><td>> 18</td><td>≤ 2</td></tr>
<tr><td>64 QAM</td><td>≤ 5</td><td>≤ 4</td><td>≤ 8</td><td>≤ 12</td><td>≤ 16</td><td>≤ 18</td><td>≤ 2</td></tr>
<tr><td>64 QAM</td><td>> 5</td><td>> 4</td><td>> 8</td><td>> 12</td><td>> 16</td><td>> 18</td><td>≤ 3</td></tr>
<tr><td>256 QAM</td><td colspan="6">≥ 1</td><td>≤ 5</td></tr>
</table>
MPR Built-in by design
The manufacturer MPR values are always within the 3GPP maximum MPR allowance but may not follow the default MPR values.
A-MPR (additional MPR) was disabled during SAR testing
</td></tr>
<tr><td>Power reduction</td><td>Yes</td></tr>
<tr><td>Spectrum plots for RB configurations</td><td>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.</td></tr>
</table>

Notes:

1. Maximum bandwidth 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.
2. LTE band 41 test channels in accordance with October 2014 TCB workshop for all channels bandwidths.
3. SAR Testing for LTE was performed with the same number of RB and RB offsets transmitting on all TTI frames (maximum TTI).

6.4. LTE (TDD) Considerations

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

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

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

Special subframe configuration	Normal cyclic prefix in downlink			Extended cyclic prefix in downlink		
	DwPTS	UpPTS		DwPTS	UpPTS	
		Normal cyclic prefix in uplink	Extended cyclic prefix in uplink		Normal cyclic prefix in uplink	Extended cyclic prefix in uplink
0	$6592 \cdot T_s$	$(1+X) \cdot 2192 \cdot T_s$	$(1+X) \cdot 2560 \cdot T_s$	$7680 \cdot T_s$	$(1+X) \cdot 2192 \cdot T_s$	$(1+X) \cdot 2560 \cdot T_s$
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	$26336 \cdot T_s$			$7680 \cdot T_s$	$(2+X) \cdot 2192 \cdot T_s$	$(2+X) \cdot 2560 \cdot T_s$
5	$6592 \cdot T_s$	$(2+X) \cdot 2192 \cdot T_s$	$(2+X) \cdot 2560 \cdot T_s$	$20480 \cdot T_s$		
6	$19760 \cdot T_s$			$23040 \cdot T_s$		
7	$21952 \cdot T_s$			$12800 \cdot T_s$		
8	$24144 \cdot T_s$			-	-	-
9	$13168 \cdot T_s$			-	-	-
10	$13168 \cdot T_s$	$13152 \cdot T_s$	$12800 \cdot T_s$	-	-	-

Table 4.2-2: Uplink-downlink configurations & 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	63.3%
1	5 ms	D	S	U	U	D	D	S	U	U	D	43.3%
2	5 ms	D	S	U	D	D	D	S	U	D	D	23.3%
3	10 ms	D	S	U	U	U	D	D	D	D	D	31.7%
4	10 ms	D	S	U	U	D	D	D	D	D	D	21.7%
5	10 ms	D	S	U	D	D	D	D	D	D	D	11.7%
6	5 ms	D	S	U	U	U	D	S	U	U	D	53.3%

Calculated Duty Cycle = Extended cyclic prefix in uplink * (T_s) * # of S + # of U / period

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.

6.5. Power Back-off Operation

This device supports multiple power back-off modes: WWAN (Ear-jack), WWAN (Hotspot), WWAN (Grip Sensor), and WWAN (RCV). Each of the power back-off operates within specific exposure conditions for certain technologies. For full details on how each power back-off mode operates, refer to the Operational Description.

Power Back-off mode	Technologies Supported	Exposure Conditions Active			
		Head	Body-worn	Hotspot	Extremity
WWAN (Ear-jack)[1]	GSM 1900 W-CDMA B2/4 LTE B2/4/66	N/A	✓	N/A	N/A
WWAN (Hotspot)[1]	GSM 1900 W-CDMA B2/4 LTE B2/4/66	N/A	N/A	✓	N/A
WWAN (Grip Sensor)[1]	GSM 1900 W-CDMA B2/4 LTE B2/4/66	N/A	N/A	N/A	✓
WLAN	Wi-Fi 2.4GHz Wi-Fi 5GHz	✓	N/A	N/A	N/A

Note(s):
1. Tune-Up Limits for WWAN (Hotspot), WWAN (Grip Sensor), and WWAN (RCV) are all Reduced Average Powers. Please refer to §9 for all conducted power measurements.
2. Back-off priority: RCV → Hotspot → Ear-jack → Grip Sensor
3. Body-worn SAR with ear-jack connected at reduced power is tested when Body-worn measured at max power is > 1.2 W/kg.

Extremity Adjusted SAR Calculation

Wireless technologies	Max Tune-up Limit (dBm)	Reduced Tune-Up Limit (dBm)	Power Factor	Reported SAR Limit (W/kg)
GSM 1900	29.5	26.5	2.00	0.601
W-CDMA B2	25.0	22.0	2.00	0.601
W-CDMA B4	25.0	22.0	2.00	0.601
LTE B2	25.0	22.0	2.00	0.601
LTE B4	25.0	22.0	2.00	0.601
LTE B66	25.0	22.0	2.00	0.601

Note(s):
1. Hotspot mode supports power reduction. When the measured SAR is scaled to the maximum tune-up limit, the adjusted SAR is < 1.2 W/kg. Therefore, Extremity SAR testing is not required for this band in accordance with KDB 648474 §2.5 b. Refer to §10 for Reported SAR results. If the Reported SAR 1g value in §10 is less than the Reported SAR Limit listed above, then Extremity SAR is not required.
2. LTE 50% RB is scaled up to the Max Tune-Up Limit with MPR included.

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.

Antenna	Band	Rear	Front	Edge 1 (Top Edge)	Edge 2 (Right Edge)	Edge 3 (Bottom Edge)	Edge 4 (Left Edge)
Main Ant 1	GSM 850 WCDMA 5 LTE 5/12/13/17/26	Yes	Yes	No	Yes	Yes	Yes
Main Ant 2	GSM 1900 WCDMA B2/4 LTE B2/4/41/66	Yes	Yes	No	No	Yes	Yes
WiFi 2.4G	Wi-Fi 2.4GHz Bluetooth	Yes	Yes	Yes	No	No	Yes
WiFi 5G	Wi-Fi 5GHz	Yes	Yes	Yes	No	No	Yes

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

Dielectric Property Measurements Results

SAR Lab	Date	Band (MHz)	Tissue Type	Frequency (MHz)	Relative Permittivity (εr)			Conductivity (σ)		
					Measured	Target	Delta	Measured	Target	Delta
5	12/5/2022	750	Head	750	42.51	41.96	1.31%	0.87	0.89	-2.06%
				660	42.33	42.42	-0.22%	0.84	0.89	-4.88%
				800	42.20	41.71	1.19%	0.89	0.90	-0.48%
5	12/5/2022	900	Head	900	41.90	41.50	0.96%	0.93	0.97	-4.33%
				805	42.16	41.68	1.15%	0.89	0.90	-0.81%
				915	41.90	41.50	0.96%	0.93	0.98	-4.69%
5	12/5/2022	1750	Head	1750	40.09	40.08	0.01%	1.33	1.37	-2.85%
				1695	40.18	40.17	0.03%	1.30	1.34	-2.61%
				1755	40.08	40.08	0.01%	1.33	1.37	-2.83%
5	12/5/2022	1900	Head	1900	39.91	40.00	-0.23%	1.42	1.40	1.57%
				1850	40.01	40.00	0.02%	1.39	1.40	-0.79%
				1920	39.87	40.00	-0.33%	1.43	1.40	2.43%
5	12/9/2022	1750	Head	1750	40.68	40.08	1.49%	1.31	1.37	-4.23%
				1695	40.77	40.17	1.50%	1.28	1.34	-4.41%
				1755	40.67	40.08	1.48%	1.31	1.37	-4.21%
5	12/12/2022	1900	Head	1900	39.76	40.00	-0.60%	1.39	1.40	-0.43%
				1850	39.82	40.00	-0.45%	1.36	1.40	-2.86%
				1920	39.72	40.00	-0.70%	1.41	1.40	0.57%
7	12/5/2022	2450	Head	2450	40.60	39.20	3.57%	1.82	1.80	0.89%
				2400	40.67	39.30	3.49%	1.78	1.75	1.33%
				2500	40.50	39.14	3.48%	1.86	1.85	0.21%
7	12/5/2022	2600	Head	2600	40.33	39.01	3.38%	1.95	1.96	-0.87%
				2495	40.51	39.14	3.49%	1.85	1.85	0.29%
				2690	40.15	38.90	3.22%	2.02	2.06	-1.77%
7	12/7/2022	5250	Head	5250	37.12	35.93	3.30%	4.54	4.70	-3.51%
				5150	37.29	36.05	3.45%	4.43	4.60	-3.63%
				5350	36.95	35.82	3.16%	4.64	4.80	-3.44%
7	12/7/2022	5600	Head	5600	36.52	35.53	2.78%	4.91	5.06	-2.93%
				5500	36.70	35.65	2.95%	4.80	4.96	-3.10%
				5725	36.30	35.39	2.57%	5.06	5.19	-2.47%
7	12/7/2022	5750	Head	5750	36.26	35.36	2.54%	5.09	5.21	-2.39%
				5700	36.35	35.42	2.63%	5.03	5.16	-2.59%
				5850	36.10	35.30	2.27%	5.20	5.32	-2.31%
7	12/14/2022	5250	Head	5250	36.73	35.93	2.22%	4.63	4.70	-1.45%
				5150	36.91	36.05	2.39%	4.53	4.60	-1.60%
				5350	36.55	35.82	2.04%	4.74	4.80	-1.34%
7	12/14/2022	5600	Head	5600	36.09	35.53	1.57%	5.02	5.06	-0.72%
				5500	36.27	35.65	1.74%	4.91	4.96	-0.93%
				5725	35.84	35.39	1.27%	5.18	5.19	-0.21%
7	12/14/2022	5750	Head	5750	35.80	35.36	1.24%	5.21	5.21	-0.17%
				5700	35.90	35.42	1.36%	5.14	5.16	-0.36%
				5850	35.63	35.30	0.93%	5.32	5.32	-0.06%
7	1/5/2023	5250	Head	5250	35.89	35.93	-0.12%	4.70	4.70	-0.09%
				5150	36.06	36.05	0.04%	4.59	4.60	-0.13%
				5350	35.68	35.82	-0.39%	4.80	4.80	-0.11%

8.2. System Check

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

System Performance Check Measurement Conditions:

- The measurements were performed in the flat section of the TWIN SAM or ELI phantom, shell thickness: 2.0 ±0.2 mm (bottom plate) filled with Body or Head simulating liquid of the following parameters.
- The depth of tissue-equivalent liquid in a phantom must be ≥ 15.0 cm for SAR measurements ≤ 3 GHz and ≥ 10.0 cm for measurements > 3 GHz.
- The DASY system with an E-Field Probe was used for the measurements.
- The dipole was mounted on the small tripod so that the dipole feed point was positioned below the center marking of the flat phantom section and the dipole was oriented parallel to the body axis (the long side of the phantom). The standard measuring distance was 10 mm (above 1 GHz) and 15 mm (below 1 GHz) from dipole center to the simulating liquid surface.
- The coarse grid with a grid spacing of 15 mm was aligned with the dipole.
  For 5 GHz band - The coarse grid with a grid spacing of 10 mm was aligned with the dipole.
- Special 7x7x7 (below 3 GHz) and/or 8x8x7 (above 3 GHz) fine cube was chosen for the cube.
- Distance between probe sensors and phantom surface was set to 3 mm.
  For 5 GHz band - Distance between probe sensors and phantom surface was set to 2.5 mm
- The dipole input power (forward power) was 100 mW.
- The results are normalized to 1 W input power.

System Check Results

The 1-g and 10-g SAR measured with a reference dipole, using the required tissue-equivalent medium at the test frequency, must be within ±10% of the manufacturer calibrated dipole SAR target. Refer to Appendix B for the SAR System Check Plots.

SAR Lab	Date	Tissue Type	Dipole Type & Serial Number	Dipole Cal. Due Date	Measured results for 1-g SAR				Measured results for 10-g SAR				Plot No.
					Zoom Scan at 100 mW	Normalize to 1 W	Target (Ref. Value)	Delta ±10%	Zoom Scan at 100 mW	Normalize to 1 W	Target (Ref. Value)	Delta ±10%	
5	12/5/2022	Head	D750V3 SN:1019	4/26/2023	0.873	8.73	8.62	**1.28%**	0.580	5.80	5.67	2.29%	1
5	12/5/2022	Head	D900V2 SN:1d143	10/18/2023	1.130	11.30	10.90	**3.67%**	0.746	7.46	6.99	6.72%	2
5	12/5/2022	Head	D1750V2 SN:1050	4/27/2023	3.740	37.40	36.40	**2.75%**	2.030	20.30	19.10	6.28%	3
5	12/5/2022	Head	D1900V2 SN:5d163	10/28/2023	4.210	42.10	39.10	**7.67%**	2.230	22.30	20.40	9.31%	4
5	12/9/2022	Head	D1750V2 SN:1050	4/27/2023	3.620	36.20	36.40	-0.55%	1.940	19.40	19.10	1.57%	
5	12/12/2022	Head	D1900V2 SN:5d163	10/28/2023	4.160	41.60	39.10	6.39%	2.190	21.90	20.40	7.35%	
7	12/5/2022	Head	D2450V2 SN:899	4/25/2023	5.310	53.10	52.40	**1.34%**	2.480	24.80	24.70	0.40%	5
7	12/5/2022	Head	D2600V2 SN:1036	4/25/2023	5.830	58.30	56.20	**3.74%**	2.630	26.30	25.00	5.20%	6
7	12/7/2022	Head	D5GHzV2 SN:1003 (5.25 GHz)	2/23/2023	8.620	86.20	81.70	5.51%	2.520	25.20	23.30	8.15%	
7	12/7/2022	Head	D5GHzV2 SN:1003 (5.60 GHz)	2/23/2023	8.800	88.00	83.50	**5.39%**	2.530	25.30	23.60	7.20%	7
7	12/7/2022	Head	D5GHzV2 SN:1003 (5.75 GHz)	2/23/2023	8.050	80.50	79.70	1.00%	2.330	23.30	22.50	3.56%	
7	12/14/2022	Head	D5GHzV2 SN:1003 (5.25 GHz)	2/23/2023	7.590	75.90	81.70	**-7.10%**	2.220	22.20	23.30	-4.72%	8
7	12/14/2022	Head	D5GHzV2 SN:1003 (5.60 GHz)	2/23/2023	8.400	84.00	83.50	0.60%	2.400	24.00	23.60	1.69%	
7	12/14/2022	Head	D5GHzV2 SN:1003 (5.75 GHz)	2/23/2023	7.720	77.20	79.70	**-3.14%**	2.230	22.30	22.50	-0.89%	9
7	1/5/2023	Head	D5GHzV2 SN:1168 (5.25 GHz)	11/23/2023	8.150	81.50	78.00	**4.49%**	2.410	24.10	22.50	7.11%	10

9. Conducted Output Power Measurements

Tune-Up Power Limits provided by the manufacturer are used to scale measured SAR values.

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.

Maximum Output Power (Tune-up Limit) for GSM

SAR is not required for EDGE (8PSK) mode because the maximum output power and tune-up limit is ≤ 1/4dB higher than GPRS/EDGE (GMSK) or the adjusted SAR of the highest reported SAR of GPRS/EDGE (GMSK) is ≤ 1.2W/kg.

Band	Mode	Tune-up Power Limit (dBm)			
		Main Ant 1		Main Ant 2	
		Maximum	Reduced	Maximum	Reduced
GSM 850	Voice/GPRS (1 slot)	34.0	N/A		
	GPRS 2 slots	32.0	N/A		
	GPRS 3 slots	30.0	N/A		
	GPRS 4 slots	29.5	N/A		
	EGPRS 1 slot	27.5	N/A		
	EGPRS 2 slot	25.5	N/A		
	EGPRS 3 slot	23.0	N/A		
	EGPRS 4 slot	22.0	N/A		
GSM 1900	Voice/GPRS (1 slot)			32.0	29.0
	GPRS 2 slots			29.5	26.5
	GPRS 3 slots			27.5	24.0
	GPRS 4 slots			26.0	22.0
	EGPRS 1 slot			26.0	24.0
	EGPRS 2 slot			24.5	21.5
	EGPRS 3 slot			23.0	19.5
	EGPRS 4 slot			21.0	18.5

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
GPRS/EDGE (GMSK)	CS1	1	128	824.2	32.3	23.2	34.0	25.0
			190	836.6	32.3	23.3		
			251	848.8	32.3	23.2		
		2	128	824.2	30.6	24.6	32.0	26.0
			190	836.6	30.3	24.2		
			251	848.8	30.0	24.0		
		3	128	824.2	29.1	24.9	30.0	25.7
			190	836.6	28.8	24.6		
			251	848.8	28.4	24.1		
		4	128	824.2	27.9	24.9	29.5	**26.5**
			190	836.6	27.7	24.6		
			251	848.8	27.5	24.5		
EDGE (8PSK)	MCS5	1	128	824.2	26.4	17.3	27.5	18.5
			190	836.6	26.2	17.1		
			251	848.8	26.1	17.0		
		2	128	824.2	24.7	18.7	25.5	19.5
			190	836.6	24.5	18.4		
			251	848.8	24.3	18.3		
		3	128	824.2	22.8	18.6	23.0	18.7
			190	836.6	22.3	18.1		
			251	848.8	22.1	17.8		
		4	128	824.2	21.4	18.4	22.0	19.0
			190	836.6	21.2	18.2		
			251	848.8	21.1	18.1		

Notes:

Based on the Tune-up Procedure, GPRS/EDGE (GMSK) mode with 4 time slots for Max power have maximum frame-averaged power.

GSM1900 Measured Results

Mode	Coding Scheme	Time Slots	Ch No.	Freq. (MHz)	Maximum Average Power (dBm)				Reduced Average Power (dBm)			
					Measured		Tune-up Limit		Measured		Tune-up Limit	
					Burst Pwr	Frame Pwr	Burst Pwr	Frame Pwr	Burst Pwr	Frame Pwr	Burst Pwr	Frame Pwr
GPRS/EDGE (GMSK)	CS1	1	512	1850.2	31.4	22.3	32.0	23.0	27.9	18.9	29.0	20.0
			661	1880.0	30.9	21.8			28.1	19.1		
			810	1909.8	31.1	22.0			28.2	19.2		
		2	512	1850.2	28.1	22.0	29.5	**23.5**	24.9	18.9	26.5	**20.5**
			661	1880.0	28.4	22.4			25.4	19.4		
			810	1909.8	28.4	22.4			25.9	19.8		
		3	512	1850.2	26.3	22.0	27.5	23.2	22.5	18.2	24.0	19.7
			661	1880.0	26.5	22.2			22.7	18.5		
			810	1909.8	27.0	22.7			23.9	19.6		
		4	512	1850.2	24.7	21.7	26.0	23.0	20.8	17.8	22.0	19.0
			661	1880.0	25.0	22.0			21.2	18.2		
			810	1909.8	25.6	22.6			21.7	18.7		
EDGE (8PSK)	MCS5	1	512	1850.2	25.2	16.2	26.0	17.0	22.9	13.8	24.0	15.0
			661	1880.0	25.3	16.2			23.2	14.2		
			810	1909.8	25.6	16.5			23.5	14.5		
		2	512	1850.2	23.8	17.8	24.5	18.5	20.5	14.5	21.5	15.5
			661	1880.0	23.9	17.9			20.7	14.7		
			810	1909.8	23.8	17.8			21.1	15.1		
		3	512	1850.2	22.3	18.0	23.0	18.7	18.7	14.5	19.5	15.2
			661	1880.0	22.2	18.0			19.0	14.7		
			810	1909.8	22.6	18.4			19.1	14.9		
		4	512	1850.2	20.4	17.4	21.0	18.0	17.3	14.3	18.5	15.5
			661	1880.0	20.8	17.8			17.5	14.5		
			810	1909.8	20.9	17.9			17.9	14.9		

Notes:

Based on the Tune-up Procedure, GPRS/EDGE (GMSK) mode with 2 time slots for Max power and reduced power have maximum frame-averaged power.

9.2. W-CDMA

Per KDB 941225 D01 3G SAR Procedures for W-CDMA:

Maximum output power is verified on the high, middle and low channels and using the appropriate 12.2 kbps RMC with TPC (transmit power control) set to all "1's"

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. A summary of these settings is illustrated below:

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 procedures in table C.10.1.4 of 3GPP TS 34.121-1
A summary of these settings is illustrated below:

Table C.10.1.4: β values for transmitter characteristics tests with HS-DPCCH

Sub-test	β_c	β_d	β_d (SF)	β_c/β_d	β_{HS} (Note1, Note 2)	CM (dB) (Note 3)	MPR (dB) (Note 3)
1	2/15	15/15	64	2/15	4/15	0.0	0.0
2	12/15 (Note 4)	15/15 (Note 4)	64	12/15 (Note 4)	24/15	1.0	0.0
3	15/15	8/15	64	15/8	30/15	1.5	0.5
4	15/15	4/15	64	15/4	30/15	1.5	0.5

Note 1: Δ_{ACK}, Δ_{NACK} and Δ_{CQI} = 30/15 with β_{hs} = 30/15 * β_c.

Note 2: For the HS-DPCCH power mask requirement test in clause 5.2C, 5.7A, and the Error Vector Magnitude (EVM) with HS-DPCCH test in clause 5.13.1A, and HSDPA EVM with phase discontinuity in clause 5.13.1AA, Δ_{ACK} and Δ_{NACK} = 30/15 with β_{hs} = 30/15 * β_c, and Δ_{CQI} = 24/15 with β_{hs} = 24/15 * β_c.

Note 3: CM = 1 for β_c/β_d =12/15, β_{hs}/β_c=24/15. For all other combinations of DPDCH, DPCCH and HS-DPCCH the MPR is based on the relative CM difference. This is applicable for only UEs that support HSDPA in release 6 and later releases.

Note 4: For subtest 2 the β_c/β_d ratio of 12/15 for the TFC during the measurement period (TF1, TF0) is achieved by setting the signalled gain factors for the reference TFC (TF1, TF1) to β_c = 11/15 and β_d = 15/15.

HSUPA Setup Procedures used to establish the test signals

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

Table C.11.1.3: β values for transmitter characteristics tests with HS-DPCCH and E-DCH

Sub-test	β_c	β_d	β_d (SF)	β_c/β_d	β_{HS} (Note1)	β_{ec}	β_{ed} (Note 4) (Note 5)	β_{ed} (SF)	β_{ed} (Codes)	CM (dB) (Note 2)	MPR (dB) (Note 2) (Note 6)	AG Index (Note 5)	E-TFCI
1	11/15 (Note 3)	15/15 (Note 3)	64	11/15 (Note 3)	22/15	209/225	1309/225	4	1	1.0	0.0	20	75
2	6/15	15/15	64	6/15	12/15	12/15	94/75	4	1	3.0	2.0	12	67
3	15/15	9/15	64	15/9	30/15	30/15	β_{ed}1: 47/15 β_{ed}2: 47/15	4 4	2	2.0	1.0	15	92
4	2/15	15/15	64	2/15	4/15	2/15	56/75	4	1	3.0	2.0	17	71
5	15/15	0	-	-	5/15	5/15	47/15	4	1	1.0	0.0	12	67

Note 1: For sub-test 1 to 4, Δ_{ACK}, Δ_{NACK} and Δ_{CQI} = 30/15 with β_{hs} = 30/15 * β_c. For sub-test 5, Δ_{ACK}, Δ_{NACK} and Δ_{CQI} = 5/15 with β_{hs} = 5/15 * β_c.

Note 2: CM = 1 for β_c/β_d =12/15, β_{hs}/β_c=24/15. For all other combinations of DPDCH, DPCCH, HS- DPCCH, E-DPDCH and E-DPCCH the MPR is based on the relative CM difference.

Note 3: For subtest 1 the β_c/β_d ratio of 11/15 for the TFC during the measurement period (TF1, TF0) is achieved by setting the signalled gain factors for the reference TFC (TF1, TF1) to β_c = 10/15 and β_d = 15/15.

Note 4: In case of testing by UE using E-DPDCH Physical Layer category 1, Sub-test 3 is omitted according to TS25.306 Table 5.1g.

Note 5: β_{ed} can not be set directly; it is set by Absolute Grant Value.

Note 6: For subtests 2, 3 and 4, UE may perform E-DPDCH power scaling at max power which could results in slightly smaller MPR values.

DC-HSDPA Setup Procedures used to establish the test signals

The following 4 Sub-tests for DC-HSDPA were completed according to procedures in table C08.1.12 of 3GPP TS 34.121-1. A summary of subtest settings is illustrated below:

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

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

DUT supports HSPA+ DL only. Therefore, conducted power measurements is not required.

Maximum Output Power (Tune-up Limit) for W-CDMA

SAR measurement is not required for the HSDPA, HSUPA, and DC-HSDPA. When primary mode and the adjusted SAR is ≤ 1.2 W/kg and secondary mode is ≤ ¼ dB higher than the primary mode

Band	Mode	Tune-up PowerLimit (dBm)			
		Main Ant 1		Main Ant 2	
		Maximum	Reduced	Maximum	Reduced
W-CDMA Band II	Rel. 99			25.0	22.0
	HSDPA			24.0	22.0
	HSUPA			23.5	22.0
	DC-HSDPA			24.0	22.0
W-CDMA Band IV	Rel. 99			25.0	22.0
	HSDPA			23.0	22.0
	HSUPA			23.0	22.0
	DC-HSDPA			23.0	22.0
W-CDMA Band V	Rel. 99	25.5	N/A		
	HSDPA	23.0	N/A		
	HSUPA	23.0	N/A		
	DC-HSDPA	23.0	N/A		

W-CDMA Band II Measured Results

Mode		UL Ch No.	Freq. (MHz)	Maximum Average Power (dBm)			Reduced Power (second unit)		
				Measured Pwr	MPR	Tune-up Limit	Measured Pwr	MPR	Tune-up Limit
Release 99	Rel 99 (RMC, 12.2 kbps)	9262	1852.4	25.0	N/A	25.0	21.8	N/A	22.0
		9400	1880.0	24.8			21.7		
		9538	1907.6	24.8			21.7		
HSDPA	Subtest 1	9262	1852.4	23.5	0	24.0	21.7	0	22.0
		9400	1880.0	23.3			21.6		
		9538	1907.6	23.4			21.6		
	Subtest 2	9262	1852.4	23.6	0	24.0	21.7	0	22.0
		9400	1880.0	23.3			21.7		
		9538	1907.6	23.4			21.5		
	Subtest 3	9262	1852.4	22.5	0.5	23.5	21.7	0	22.0
		9400	1880.0	22.2			21.6		
		9538	1907.6	22.3			21.7		
	Subtest 4	9262	1852.4	22.9	0.5	23.5	21.8	0	22.0
		9400	1880.0	22.5			21.7		
		9538	1907.6	22.6			21.7		
HSUPA	Subtest 1	9262	1852.4	22.4	0	23.5	20.6	0	22.0
		9400	1880.0	22.1			20.4		
		9538	1907.6	22.3			20.4		
	Subtest 2	9262	1852.4	20.5	2	21.5	20.3	1	21.0
		9400	1880.0	20.1			19.9		
		9538	1907.6	20.2			20.1		
	Subtest 3	9262	1852.4	21.5	1	22.5	20.7	1	21.0
		9400	1880.0	21.2			20.5		
		9538	1907.6	21.3			20.4		
	Subtest 4	9262	1852.4	20.5	2	21.5	20.4	1	21.0
		9400	1880.0	20.1			20.0		
		9538	1907.6	20.2			20.0		
	Subtest 5	9262	1852.4	22.3	0	23.5	21.4	0	22.0
		9400	1880.0	22.2			21.2		
		9538	1907.6	22.3			21.2		
DC-HSDPA	Subtest 1	9262	1852.4	23.4	0	24.0	21.6	0	22.0
		9400	1880.0	23.3			21.5		
		9538	1907.6	23.5			21.6		
	Subtest 2	9262	1852.4	23.5	0	24.0	21.6	0	22.0
		9400	1880.0	23.3			21.5		
		9538	1907.6	23.5			21.5		
	Subtest 3	9262	1852.4	21.9	0.5	23.5	21.5	0	22.0
		9400	1880.0	21.8			21.7		
		9538	1907.6	22.0			21.7		
	Subtest 4	9262	1852.4	22.7	0.5	23.5	21.7	0	22.0
		9400	1880.0	22.5			21.4		
		9538	1907.6	22.7			21.6		

Notes:

It is expected by the manufacturer that MPR for some HSPA subtests may be up to 3dB more than specified by3GPP, but also as low as 0dB according to the chipset implementation in this model.

W-CDMA Band IV Measured Results

Mode		UL Ch No.	Freq. (MHz)	Maximum Average Power (dBm)			Reduced Average Power (dBm)		
				Measured Pwr	MPR	Tune-up Limit	Measured Pwr	MPR	Tune-up Limit
Release 99	Rel 99 (RMC, 12.2 kbps)	1312	1712.4	24.5	N/A	25.0	21.4	N/A	22.0
		1413	1732.6	24.5			21.3		
		1513	1752.6	24.5			21.4		
HSDPA	Subtest 1	1312	1712.4	22.6	0	23.0	21.4	0	22.0
		1413	1732.6	22.4			21.4		
		1513	1752.6	22.6			21.4		
	Subtest 2	1312	1712.4	22.6	0	23.0	21.4	0	22.0
		1413	1732.6	22.4			21.2		
		1513	1752.6	22.6			21.4		
	Subtest 3	1312	1712.4	21.7	0.5	22.5	21.4	0.5	21.5
		1413	1732.6	21.6			21.3		
		1513	1752.6	21.6			21.5		
	Subtest 4	1312	1712.4	21.8	0.5	22.5	21.4	0.5	21.5
		1413	1732.6	21.6			21.3		
		1513	1752.6	21.8			21.4		
HSUPA	Subtest 1	1312	1712.4	21.5	0	23.0	20.5	0	22.0
		1413	1732.6	21.4			20.3		
		1513	1752.6	21.5			20.5		
	Subtest 2	1312	1712.4	19.5	2	21.0	19.5	2	20.0
		1413	1732.6	19.5			19.5		
		1513	1752.6	19.5			19.5		
	Subtest 3	1312	1712.4	21.1	1	22.0	20.5	1	21.0
		1413	1732.6	21.0			20.4		
		1513	1752.6	21.0			20.5		
	Subtest 4	1312	1712.4	19.5	2	21.0	19.5	2	20.0
		1413	1732.6	19.5			19.6		
		1513	1752.6	19.5			19.5		
	Subtest 5	1312	1712.4	21.9	0	23.0	21.0	0	22.0
		1413	1732.6	21.9			21.0		
		1513	1752.6	21.9			21.1		
DC-HSDPA	Subtest 1	1312	1712.4	22.4	0	23.0	21.2	0	22.0
		1413	1732.6	22.3			21.1		
		1513	1752.6	22.4			21.3		
	Subtest 2	1312	1712.4	22.5	0	23.0	21.3	0	22.0
		1413	1732.6	22.3			21.3		
		1513	1752.6	22.4			21.2		
	Subtest 3	1312	1712.4	21.1	0.5	22.5	21.0	0.5	21.5
		1413	1732.6	21.4			21.0		
		1513	1752.6	21.3			20.9		
	Subtest 4	1312	1712.4	21.7	0.5	22.5	21.3	0.5	21.5
		1413	1732.6	21.6			21.3		
		1513	1752.6	21.7			21.3		

Notes:

It is expected by the manufacturer that MPR for some HSPA subtests may be up to 3dB more than specified by3GPP, but also as low as 0dB according to the chipset implementation in this model.

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	24.2	N/A	25.5
		4183	836.6	24.3		
		4233	846.6	24.3		
HSDPA	Subtest 1	4132	826.4	22.1	0	23.0
		4183	836.6	22.4		
		4233	846.6	22.4		
	Subtest 2	4132	826.4	22.1	0	23.0
		4183	836.6	22.4		
		4233	846.6	22.4		
	Subtest 3	4132	826.4	21.2	0.5	22.5
		4183	836.6	21.6		
		4233	846.6	21.5		
	Subtest 4	4132	826.4	21.5	0.5	22.5
		4183	836.6	22.0		
		4233	846.6	21.8		
HSUPA	Subtest 1	4132	826.4	21.8	0	23.0
		4183	836.6	22.1		
		4233	846.6	22.1		
	Subtest 2	4132	826.4	19.5	2	21.0
		4183	836.6	19.8		
		4233	846.6	19.9		
	Subtest 3	4132	826.4	20.7	1	22.0
		4183	836.6	21.1		
		4233	846.6	21.1		
	Subtest 4	4132	826.4	19.5	2	21.0
		4183	836.6	19.9		
		4233	846.6	19.9		
	Subtest 5	4132	826.4	21.7	0	23.0
		4183	836.6	22.0		
		4233	846.6	22.0		
DC-HSDPA	Subtest 1	4132	826.4	22.2	0	23.0
		4183	836.6	22.2		
		4233	846.6	22.1		
	Subtest 2	4132	826.4	22.2	0	23.0
		4183	836.6	22.3		
		4233	846.6	22.2		
	Subtest 3	4132	826.4	20.7	0.5	22.5
		4183	836.6	20.8		
		4233	846.6	20.7		
	Subtest 4	4132	826.4	21.6	0.5	22.5
		4183	836.6	21.6		
		4233	846.6	21.5		

Notes:

It is expected by the manufacturer that MPR for some HSPA subtests may be up to 3dB more than specified by3GPP, but also as low as 0dB according to the chipset implementation in this model.

9.3. LTE

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

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

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

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

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

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

Network Signalling value	Requirements (subclause)	E-UTRA Band	Channel bandwidth (MHz)	Resources Blocks (N_{RB})	A-MPR (dB)
NS_01	6.6.2.1.1	Table 5.5-1	1.4, 3, 5, 10, 15, 20	Table 5.6-1	N/A

Maximum Output Power (Tune-up Limit) for LTE

According to April 2015 TCB workshop, SAR test exclusion can be applied for testing overlapping LTE bands as follows:

a) The maximum output power, including tolerance, for the smaller band must be ≤ the larger band to qualify for the SAR test exclusion.
b) The channel bandwidth and other operating parameters for the smaller band must be fully supported by the larger band.
   - LTE Band 4 (1710-1755 MHz) is covered by LTE Band 66 (1710-1780 MHz)
   - LTE Band 17 (704-716 MHz) is covered by LTE Band 12 (699-716 MHz)

For some LTE Bands, certain channel bandwidths do not support at least three non-overlapping channels. When a device supports overlapping channel assignments 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. Please refer to section 6.3. for a detailed list of LTE test channels

- LTE Band 4 (1710-1755 MHz)
- LTE Band 5 (824-849 MHz)
- LTE Band 12 (699-716 MHz)
- LTE Band 13 (777-787 MHz)
- LTE Band 17 (704-716 MHz)
- LTE Band 26 (814-849 MHz)

LTE QPSK configuration has the highest maximum average output power per 3GPP standard.

SAR measurement is not required for 16QAM. When the highest maximum output power for 16QAM is ≤ ½ dB higher than the QPSK or when the reported SAR for the QPSK configuration is ≤ 1.45 W/kg.

Band	Mode	Tune-up PowerLimit (dBm)			
		Main Ant 1		Main Ant 2	
		Maximum	Reduced	Maximum	Reduced
LTE Band 2	QPSK			25.0	22.0
	16QAM			24.0	22.0
LTE Band 4	QPSK			25.0	22.0
	16QAM			24.0	22.0
LTE Band 5	QPSK	25.5	N/A		
	16QAM	24.5	N/A		
LTE Band 12	QPSK	25.5	N/A		
	16QAM	24.5	N/A		
LTE Band 13	QPSK	25.0	N/A		
	16QAM	24.0	N/A		
LTE Band 17	QPSK	25.5	N/A		
	16QAM	24.5	N/A		
LTE Band 26	QPSK	25.0	N/A		
	16QAM	24.0	N/A		
LTE Band 41	QPSK			24.0	N/A
	16QAM			23.0	N/A
LTE Band 66	QPSK			25.0	22.0
	16QAM			24.0	22.0

LTE Band 2 Measured Results

BW (MHz)	Mode	RB Allocation	RB Offset	Maximum Average Power (dBm)					Reduced Average Power (dBm)				
				18700	18900	19100	MPR	Tune-up Limit	18700	18900	19100	MPR	Tune-up Limit
				1860 MHz	1880 MHz	1900 MHz			1860 MHz	1880 MHz	1900 MHz		
20	QPSK	1	0	24.3	24.5	24.6	0	25.0	21.2	21.4	21.5	0	22.0
		1	49	24.4	24.5	24.6	0	25.0	21.3	21.4	21.5	0	22.0
		1	99	24.4	24.6	24.7	0	25.0	21.3	21.5	21.6	0	22.0
		50	0	23.4	23.4	23.5	1	24.0	21.3	21.4	21.5	0	22.0
		50	24	23.4	23.4	23.6	1	24.0	21.4	21.4	21.5	0	22.0
		50	50	23.5	23.5	23.6	1	24.0	21.4	21.5	21.5	0	22.0
		100	0	23.4	23.5	23.6	1	24.0	21.4	21.4	21.5	0	22.0
	16QAM	1	0	23.0	23.2	23.2	1	24.0	21.1	21.3	21.4	0	22.0
		1	49	23.1	23.2	23.3	1	24.0	21.2	21.4	21.5	0	22.0
		1	99	23.2	23.3	23.3	1	24.0	21.2	21.4	21.5	0	22.0
		50	0	22.3	22.4	22.5	2	23.0	21.3	21.4	21.5	0	22.0
		50	24	22.4	22.4	22.5	2	23.0	21.3	21.4	21.5	0	22.0
		50	50	22.4	22.4	22.5	2	23.0	21.4	21.4	21.6	0	22.0
		100	0	22.4	22.5	22.5	2	23.0	21.4	21.5	21.5	0	22.0

BW (MHz)	Mode	RB Allocation	RB offset	Maximum Average Power (dBm)					Reduced Average Power (dBm)				
				18675	18900	19125	MPR	Tune-up Limit	18675	18900	19125	MPR	Tune-up Limit
				1857.5 MHz	1880 MHz	1902.5 MHz			1857.5 MHz	1880 MHz	1902.5 MHz		
15	QPSK	1	0	24.3	24.5	24.5	0	25.0	21.2	21.3	21.4	0	22.0
		1	37	24.4	24.6	24.6	0	25.0	21.2	21.3	21.4	0	22.0
		1	74	24.4	24.6	24.6	0	25.0	21.3	21.4	21.4	0	22.0
		36	0	23.4	23.4	23.5	1	24.0	21.3	21.3	21.4	0	22.0
		36	20	23.4	23.5	23.5	1	24.0	21.3	21.4	21.4	0	22.0
		36	39	23.4	23.5	23.5	1	24.0	21.3	21.4	21.4	0	22.0
		75	0	23.4	23.5	23.5	1	24.0	21.3	21.4	21.4	0	22.0
	16QAM	1	0	23.2	23.3	23.4	1	24.0	21.3	21.2	21.3	0	22.0
		1	37	23.2	23.4	23.4	1	24.0	21.3	21.3	21.3	0	22.0
		1	74	23.3	23.4	23.5	1	24.0	21.3	21.3	21.4	0	22.0
		36	0	22.3	22.4	22.3	2	23.0	21.3	21.4	21.5	0	22.0
		36	20	22.3	22.4	22.4	2	23.0	21.3	21.4	21.5	0	22.0
		36	39	22.3	22.5	22.4	2	23.0	21.3	21.4	21.5	0	22.0
		75	0	22.4	22.4	22.4	2	23.0	21.3	21.4	21.4	0	22.0

BW (MHz)	Mode	RB Allocation	RB offset	Maximum Average Power (dBm)					Reduced Average Power (dBm)				
				18650	18900	19150	MPR	Tune-up Limit	18650	18900	19150	MPR	Tune-up Limit
				1855 MHz	1880 MHz	1905 MHz			1855 MHz	1880 MHz	1905 MHz		
10	QPSK	1	0	24.3	24.5	24.5	0	25.0	21.2	21.4	21.4	0	22.0
		1	25	24.4	24.5	24.5	0	25.0	21.3	21.4	21.4	0	22.0
		1	49	24.4	24.6	24.6	0	25.0	21.3	21.4	21.4	0	22.0
		25	0	23.4	23.4	23.4	1	24.0	21.2	21.4	21.4	0	22.0
		25	12	23.4	23.4	23.5	1	24.0	21.3	21.4	21.4	0	22.0
		25	25	23.4	23.5	23.5	1	24.0	21.3	21.3	21.4	0	22.0
		50	0	23.4	23.5	23.5	1	24.0	21.3	21.4	21.4	0	22.0
	16QAM	1	0	23.0	23.3	23.3	1	24.0	20.9	21.1	21.3	0	22.0
		1	25	23.0	23.3	23.3	1	24.0	20.9	21.1	21.3	0	22.0
		1	49	23.1	23.3	23.3	1	24.0	21.0	21.2	21.3	0	22.0
		25	0	22.3	22.5	22.5	2	23.0	21.3	21.4	21.4	0	22.0
		25	12	22.3	22.4	22.4	2	23.0	21.3	21.4	21.4	0	22.0
		25	25	22.3	22.5	22.5	2	23.0	21.3	21.4	21.4	0	22.0
		50	0	22.4	22.4	22.5	2	23.0	21.3	21.4	21.4	0	22.0

BW (MHz)	Mode	RB Allocation	RB offset	Maximum Average Power (dBm)					Reduced Average Power (dBm)				
				18625	18900	19175	MPR	Tune-up Limit	18625	18900	19175	MPR	Tune-up Limit
				1852.5 MHz	1880 MHz	1907.5 MHz			1852.5 MHz	1880 MHz	1907.5 MHz		
5	QPSK	1	0	24.3	24.4	24.5	0	25.0	21.2	21.3	21.4	0	22.0
		1	12	24.2	24.4	24.5	0	25.0	21.2	21.3	21.4	0	22.0
		1	24	24.3	24.5	24.5	0	25.0	21.2	21.4	21.4	0	22.0
		12	0	23.3	23.4	23.5	1	24.0	21.2	21.4	21.4	0	22.0
		12	7	23.3	23.4	23.5	1	24.0	21.2	21.4	21.5	0	22.0
		12	13	23.4	23.4	23.5	1	24.0	21.3	21.3	21.4	0	22.0
		25	0	23.4	23.4	23.5	1	24.0	21.2	21.4	21.4	0	22.0
	16QAM	1	0	23.4	23.3	23.5	1	24.0	21.1	21.3	21.4	0	22.0
		1	12	23.4	23.3	23.5	1	24.0	21.1	21.3	21.4	0	22.0
		1	24	23.5	23.3	23.5	1	24.0	21.1	21.3	21.4	0	22.0
		12	0	22.3	22.4	22.5	2	23.0	21.2	21.3	21.5	0	22.0
		12	7	22.3	22.3	22.5	2	23.0	21.2	21.3	21.5	0	22.0
		12	13	22.3	22.4	22.5	2	23.0	21.2	21.3	21.5	0	22.0
		25	0	22.4	22.4	22.4	2	23.0	21.3	21.4	21.4	0	22.0

LTE Band 2 Measured Results (continued)

BW (MHz)	Mode	RB Allocation	RB offset	Maximum Average Power (dBm)					Reduced Average Power (dBm)				
				18615	18900	19185	MPR	Tune-up Limit	18615	18900	19185	MPR	Tune-up Limit
				1851.5 MHz	1880 MHz	1908.5 MHz			1851.5 MHz	1880 MHz	1908.5 MHz		
3	QPSK	1	0	24.3	24.5	24.5	0	25.0	21.4	21.3	21.5	0	22.0
		1	8	24.3	24.5	24.5	0	25.0	21.3	21.4	21.5	0	22.0
		1	14	24.3	24.5	24.5	0	25.0	21.4	21.4	21.5	0	22.0
		8	0	23.3	23.4	23.4	1	24.0	21.3	21.3	21.4	0	22.0
		8	4	23.3	23.4	23.4	1	24.0	21.3	21.3	21.4	0	22.0
		8	7	23.3	23.4	23.4	1	24.0	21.3	21.3	21.4	0	22.0
		15	0	23.3	23.5	23.4	1	24.0	21.3	21.4	21.4	0	22.0
	16QAM	1	0	23.0	23.4	23.4	1	24.0	21.1	21.2	21.5	0	22.0
		1	8	23.0	23.4	23.3	1	24.0	21.1	21.2	21.4	0	22.0
		1	14	23.0	23.4	23.3	1	24.0	21.1	21.2	21.5	0	22.0
		8	0	22.3	22.3	22.3	2	23.0	21.2	21.4	21.5	0	22.0
		8	4	22.3	22.3	22.3	2	23.0	21.3	21.4	21.4	0	22.0
		8	7	22.3	22.3	22.3	2	23.0	21.3	21.4	21.4	0	22.0
		15	0	22.2	22.4	22.4	2	23.0	21.3	21.4	21.4	0	22.0

BW (MHz)	Mode	RB Allocation	RB offset	Maximum Average Power (dBm)					Reduced Average Power (dBm)				
				18607	18900	19193	MPR	Tune-up Limit	18607	18900	19193	MPR	Tune-up Limit
				1850.7 MHz	1880 MHz	1909.3 MHz			1850.7 MHz	1880 MHz	1909.3 MHz		
1.4	QPSK	1	0	24.3	24.4	24.4	0	25.0	21.3	21.3	21.4	0	22.0
		1	3	24.3	24.4	24.4	0	25.0	21.3	21.3	21.4	0	22.0
		1	5	24.3	24.4	24.4	0	25.0	21.3	21.4	21.5	0	22.0
		3	0	24.3	24.4	24.4	0	25.0	21.3	21.4	21.4	0	22.0
		3	1	24.3	24.4	24.4	0	25.0	21.3	21.4	21.4	0	22.0
		3	3	24.3	24.4	24.4	0	25.0	21.3	21.4	21.4	0	22.0
		6	0	23.4	23.4	23.4	1	24.0	21.3	21.4	21.4	0	22.0
	16QAM	1	0	23.3	23.1	23.3	1	24.0	21.2	21.3	21.3	0	22.0
		1	3	23.3	23.1	23.3	1	24.0	21.1	21.3	21.4	0	22.0
		1	5	23.4	23.1	23.3	1	24.0	21.1	21.3	21.4	0	22.0
		3	0	23.4	23.5	23.4	1	24.0	21.3	21.3	21.4	0	22.0
		3	1	23.3	23.4	23.4	1	24.0	21.3	21.3	21.4	0	22.0
		3	3	23.3	23.4	23.4	1	24.0	21.3	21.3	21.4	0	22.0
		6	0	22.2	22.3	22.3	2	23.0	21.2	21.3	21.4	0	22.0

LTE Band 5 Measured Results

BW (MHz)	Mode	RB Allocation	RB Offset	Maximum Average Power (dBm)			MPR	Tune-up Limit
				[redacted]	20525	[redacted]		
					836.5 MHz			
10	QPSK	1	0		25.0		0	25.5
		1	25		24.9		0	25.5
		1	49		24.9		0	25.5
		25	0		23.9		1	24.5
		25	12		23.9		1	24.5
		25	25		23.9		1	24.5
		50	0		23.9		1	24.5
	16QAM	1	0		23.6		1	24.5
		1	25		23.6		1	24.5
		1	49		23.6		1	24.5
		25	0		22.9		2	23.5
		25	12		22.9		2	23.5
		25	25		22.9		2	23.5
		50	0		22.8		2	23.5

BW (MHz)	Mode	RB Allocation	RB offset	Maximum Average Power (dBm)			MPR	Tune-up Limit
				20425	20525	20625		
				826.5 MHz	836.5 MHz	846.5 MHz		
5	QPSK	1	0	24.9	24.9	24.9	0	25.5
		1	12	24.9	24.9	24.9	0	25.5
		1	24	24.9	24.9	24.8	0	25.5
		12	0	23.9	23.9	23.9	1	24.5
		12	7	23.9	23.9	23.9	1	24.5
		12	13	23.9	23.9	23.9	1	24.5
		25	0	23.9	23.9	23.9	1	24.5
	16QAM	1	0	23.5	23.6	23.5	1	24.5
		1	12	23.5	23.6	23.5	1	24.5
		1	24	23.5	23.6	23.5	1	24.5
		12	0	22.9	22.9	22.9	2	23.5
		12	7	22.9	22.9	22.9	2	23.5
		12	13	22.9	22.9	22.9	2	23.5
		25	0	22.9	22.8	22.9	2	23.5

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	QPSK	1	0	24.9	24.8	24.9	0	25.5
		1	8	24.9	24.8	25.0	0	25.5
		1	14	24.9	24.9	25.0	0	25.5
		8	0	23.9	23.9	23.8	1	24.5
		8	4	23.9	23.9	23.8	1	24.5
		8	7	23.9	23.9	23.8	1	24.5
		15	0	23.9	23.9	23.9	1	24.5
	16QAM	1	0	23.7	23.7	24.0	1	24.5
		1	8	23.5	23.8	23.8	1	24.5
		1	14	23.7	23.7	23.6	1	24.5
		8	0	22.8	22.9	22.9	2	23.5
		8	4	22.8	22.9	22.8	2	23.5
		8	7	22.8	22.9	22.9	2	23.5
		15	0	22.8	22.9	22.9	2	23.5

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	QPSK	1	0	25.0	24.9	24.9	0	25.5
		1	3	25.0	24.9	24.9	0	25.5
		1	5	25.0	24.9	24.9	0	25.5
		3	0	24.9	24.9	24.8	0	25.5
		3	1	24.9	24.9	24.8	0	25.5
		3	3	24.9	24.9	24.8	0	25.5
		6	0	23.9	23.9	23.9	1	24.5
	16QAM	1	0	23.9	23.9	23.9	1	24.5
		1	3	23.8	23.9	23.9	1	24.5
		1	5	23.9	23.9	23.9	1	24.5
		3	0	24.0	24.0	23.8	1	24.5
		3	1	24.0	24.0	23.8	1	24.5
		3	3	24.0	24.0	23.8	1	24.5
		6	0	23.0	22.8	22.9	2	23.5

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	QPSK	1	0		24.4		0	25.5
		1	25		24.4		0	25.5
		1	49		24.4		0	25.5
		25	0		23.5		1	24.5
		25	12		23.5		1	24.5
		25	25		23.5		1	24.5
		50	0		23.5		1	24.5
	16QAM	1	0		23.0		1	24.5
		1	25		23.0		1	24.5
		1	49		23.0		1	24.5
		25	0		22.4		2	23.5
		25	12		22.4		2	23.5
		25	25		22.5		2	23.5
		50	0		22.5		2	23.5

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	QPSK	1	0	24.6	24.6	24.5	0	25.5
		1	12	24.6	24.5	24.5	0	25.5
		1	24	24.6	24.5	24.5	0	25.5
		12	0	23.6	23.4	23.5	1	24.5
		12	7	23.6	23.5	23.5	1	24.5
		12	13	23.6	23.5	23.5	1	24.5
		25	0	23.6	23.4	23.5	1	24.5
	16QAM	1	0	23.4	23.3	23.0	1	24.5
		1	12	23.4	23.3	23.1	1	24.5
		1	24	23.4	23.3	23.1	1	24.5
		12	0	22.6	22.4	22.5	2	23.5
		12	7	22.5	22.4	22.6	2	23.5
		12	13	22.5	22.5	22.5	2	23.5
		25	0	22.5	22.5	22.5	2	23.5

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	QPSK	1	0	24.5	24.5	24.5	0	25.5
		1	8	24.5	24.5	24.5	0	25.5
		1	14	24.4	24.5	24.4	0	25.5
		8	0	23.4	23.4	23.4	1	24.5
		8	4	23.4	23.4	23.4	1	24.5
		8	7	23.4	23.4	23.4	1	24.5
		15	0	23.4	23.4	23.4	1	24.5
	16QAM	1	0	23.1	23.2	23.2	1	24.5
		1	8	23.1	23.2	23.2	1	24.5
		1	14	23.0	23.2	23.1	1	24.5
		8	0	22.4	22.4	22.4	2	23.5
		8	4	22.4	22.4	22.4	2	23.5
		8	7	22.4	22.4	22.4	2	23.5
		15	0	22.4	22.4	22.3	2	23.5

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	QPSK	1	0	24.5	24.5	24.4	0	25.5
		1	3	24.5	24.5	24.4	0	25.5
		1	5	24.5	24.5	24.4	0	25.5
		3	0	24.5	24.4	24.3	0	25.5
		3	1	24.5	24.4	24.4	0	25.5
		3	3	24.5	24.4	24.4	0	25.5
		6	0	23.5	23.4	23.4	1	24.5
	16QAM	1	0	23.4	23.4	23.2	1	24.5
		1	3	23.4	23.3	23.2	1	24.5
		1	5	23.4	23.3	23.2	1	24.5
		3	0	23.4	23.3	23.3	1	24.5
		3	1	23.4	23.4	23.3	1	24.5
		3	3	23.4	23.3	23.3	1	24.5
		6	0	22.4	22.3	22.3	2	23.5

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	QPSK	1	0		24.1		0	25.0
		1	25		24.2		0	25.0
		1	49		24.2		0	25.0
		25	0		23.1		1	24.0
		25	12		23.1		1	24.0
		25	25		23.1		1	24.0
		50	0		23.2		1	24.0
	16QAM	1	0		23.1		1	24.0
		1	25		23.1		1	24.0
		1	49		23.1		1	24.0
		25	0		22.2		2	23.0
		25	12		22.2		2	23.0
		25	25		22.2		2	23.0
		50	0		22.2		2	23.0

BW (MHz)	Mode	RB Allocation	RB offset	Maximum Average Power (dBm)			MPR	Tune-up Limit
				[redacted]	23230 / 782 MHz	[redacted]		
5	QPSK	1	0		24.2		0	25.0
		1	12		24.2		0	25.0
		1	24		24.2		0	25.0
		12	0		23.2		1	24.0
		12	7		23.1		1	24.0
		12	13		23.2		1	24.0
		25	0		23.2		1	24.0
	16QAM	1	0		23.0		1	24.0
		1	12		23.0		1	24.0
		1	24		23.0		1	24.0
		12	0		22.1		2	23.0
		12	7		22.1		2	23.0
		12	13		22.1		2	23.0
		25	0		22.2		2	23.0

LTE Band 26 Measured Results

BW (MHz)	Mode	RB Allocation	RB Offset	Maximum Average Power (dBm)			MPR	Tune-up Limit
				[redacted]	26865	[redacted]		
					831.5 MHz			
15	QPSK	1	0		24.1		0	25.0
		1	37		24.2		0	25.0
		1	74		23.5		0	25.0
		36	0		23.2		1	24.0
		36	20		23.2		1	24.0
		36	39		23.2		1	24.0
		75	0		23.2		1	24.0
	16QAM	1	0		23.1		1	24.0
		1	37		23.0		1	24.0
		1	74		23.0		1	24.0
		36	0		22.2		2	23.0
		36	20		22.2		2	23.0
		36	39		22.2		2	23.0
		75	0		22.2		2	23.0

BW (MHz)	Mode	RB Allocation	RB offset	Maximum Average Power (dBm)			MPR	Tune-up Limit
				26740	26865	26990		
				819 MHz	831.5 MHz	844 MHz		
10	QPSK	1	0	24.6	24.2	24.3	0	25.0
		1	25	24.5	24.2	24.3	0	25.0
		1	49	24.5	24.2	24.2	0	25.0
		25	0	23.5	23.2	23.3	1	24.0
		25	12	23.5	23.2	23.3	1	24.0
		25	25	23.4	23.2	23.2	1	24.0
		50	0	23.5	23.2	23.3	1	24.0
	16QAM	1	0	23.4	22.9	23.3	1	24.0
		1	25	23.4	22.9	23.2	1	24.0
		1	49	23.3	22.8	23.1	1	24.0
		25	0	22.6	22.2	22.3	2	23.0
		25	12	22.5	22.2	22.3	2	23.0
		25	25	22.5	22.2	22.3	2	23.0
		50	0	22.5	22.3	22.2	2	23.0

BW (MHz)	Mode	RB Allocation	RB offset	Maximum Average Power (dBm)			MPR	Tune-up Limit
				26715	26865	27015		
				816.5 MHz	831.5 MHz	846.5 MHz		
5	QPSK	1	0	24.4	24.3	24.4	0	25.0
		1	12	24.4	24.2	24.3	0	25.0
		1	24	24.4	24.3	24.3	0	25.0
		12	0	23.5	23.2	23.3	1	24.0
		12	7	23.5	23.2	23.3	1	24.0
		12	13	23.4	23.2	23.3	1	24.0
		25	0	23.4	23.2	23.3	1	24.0
	16QAM	1	0	23.3	23.0	23.3	1	24.0
		1	12	23.2	23.0	23.3	1	24.0
		1	24	23.2	23.0	23.3	1	24.0
		12	0	22.4	22.2	22.4	2	23.0
		12	7	22.4	22.1	22.4	2	23.0
		12	13	22.4	22.2	22.4	2	23.0
		25	0	22.4	22.2	22.3	2	23.0

BW (MHz)	Mode	RB Allocation	RB offset	Maximum Average Power (dBm)			MPR	Tune-up Limit
				26705	26865	27025		
				815.5 MHz	831.5 MHz	847.5 MHz		
3	QPSK	1	0	24.5	24.2	24.4	0	25.0
		1	8	24.5	24.2	24.4	0	25.0
		1	14	24.5	24.2	24.3	0	25.0
		8	0	23.5	23.2	23.3	1	24.0
		8	4	23.4	23.2	23.3	1	24.0
		8	7	23.5	23.1	23.3	1	24.0
		15	0	23.4	23.2	23.3	1	24.0
	16QAM	1	0	23.4	23.0	23.4	1	24.0
		1	8	23.4	23.0	23.4	1	24.0
		1	14	23.4	23.0	23.3	1	24.0
		8	0	22.5	22.2	22.3	2	23.0
		8	4	22.5	22.2	22.3	2	23.0
		8	7	22.5	22.2	22.3	2	23.0
		15	0	22.5	22.3	22.3	2	23.0

LTE Band 26 Measured Results (continued)

BW (MHz)	Mode	RB Allocation	RB offset	Maximum Average Power (dBm)			MPR	Tune-up Limit
				26697	26865	27033		
				814.7 MHz	831.5 MHz	848.3 MHz		
1.4	QPSK	1	0	24.5	24.2	24.4	0	25.0
		1	3	24.5	24.2	24.4	0	25.0
		1	5	24.5	24.2	24.4	0	25.0
		3	0	24.5	24.2	24.3	0	25.0
		3	1	24.5	24.2	24.3	0	25.0
		3	3	24.4	24.2	24.3	0	25.0
		6	0	23.5	23.2	23.3	1	24.0
	16QAM	1	0	23.2	22.9	23.3	1	24.0
		1	3	23.2	22.9	23.3	1	24.0
		1	5	23.2	23.0	23.3	1	24.0
		3	0	23.5	23.2	23.3	1	24.0
		3	1	23.5	23.2	23.3	1	24.0
		3	3	23.5	23.2	23.3	1	24.0
		6	0	22.6	22.2	22.3	2	23.0

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	QPSK	1	0	23.7	23.5	23.4	23.5	23.7	0	24.0
		1	49	23.6	23.5	23.4	23.5	23.7	0	24.0
		1	99	23.5	23.5	23.3	23.5	23.6	0	24.0
		50	0	22.6	22.5	22.4	22.5	22.6	1	23.0
		50	24	22.6	22.5	22.4	22.6	22.6	1	23.0
		50	50	22.6	22.5	22.4	22.6	22.6	1	23.0
		100	0	22.6	22.5	22.4	22.5	22.6	1	23.0
	16QAM	1	0	22.6	22.3	22.4	22.5	22.4	1	23.0
		1	49	22.5	22.6	22.3	22.2	22.6	1	23.0
		1	99	22.4	22.4	21.8	22.2	22.5	1	23.0
		50	0	21.6	21.5	21.4	21.6	21.6	2	22.0
		50	24	21.6	21.4	21.4	21.5	21.6	2	22.0
		50	50	21.6	21.4	21.4	21.5	21.6	2	22.0
		100	0	21.5	21.4	21.4	21.5	21.6	2	22.0

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	QPSK	1	0	23.5	23.6	23.5	23.5	23.6	0	24.0
		1	37	23.6	23.5	23.5	23.5	23.6	0	24.0
		1	74	23.5	23.5	23.4	23.5	23.6	0	24.0
		36	0	22.6	22.6	22.5	22.6	22.7	1	23.0
		36	20	22.6	22.5	22.5	22.6	22.6	1	23.0
		36	39	22.6	22.5	22.4	22.6	22.6	1	23.0
		75	0	22.6	22.5	22.5	22.6	22.7	1	23.0
	16QAM	1	0	22.5	22.2	22.1	22.4	22.4	1	23.0
		1	37	22.5	22.3	21.9	22.4	22.4	1	23.0
		1	74	22.4	22.3	22.1	22.4	22.4	1	23.0
		36	0	21.6	21.5	21.4	21.6	21.6	2	22.0
		36	20	21.5	21.5	21.4	21.6	21.6	2	22.0
		36	39	21.6	21.5	21.4	21.6	21.6	2	22.0
		75	0	21.5	21.5	21.4	21.5	21.7	2	22.0

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	QPSK	1	0	23.6	23.5	23.4	23.6	23.6	0	24.0
		1	25	23.6	23.5	23.4	23.6	23.6	0	24.0
		1	49	23.5	23.5	23.4	23.5	23.6	0	24.0
		25	0	22.6	22.5	22.4	22.5	22.6	1	23.0
		25	12	22.6	22.5	22.4	22.6	22.6	1	23.0
		25	25	22.6	22.5	22.4	22.6	22.6	1	23.0
		50	0	22.6	22.5	22.4	22.6	22.6	1	23.0
	16QAM	1	0	22.4	22.3	22.3	22.4	22.4	1	23.0
		1	25	22.4	22.3	22.2	22.4	22.5	1	23.0
		1	49	22.4	22.3	22.2	22.4	22.5	1	23.0
		25	0	21.6	21.5	21.4	21.6	21.6	2	22.0
		25	12	21.6	21.5	21.4	21.6	21.6	2	22.0
		25	25	21.6	21.5	21.4	21.6	21.6	2	22.0
		50	0	21.6	21.5	21.4	21.5	21.7	2	22.0

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	QPSK	1	0	23.5	23.5	23.4	23.5	23.6	0	24.0
		1	12	23.6	23.5	23.4	23.5	23.6	0	24.0
		1	24	23.6	23.4	23.3	23.5	23.6	0	24.0
		12	0	22.6	22.5	22.4	22.6	22.6	1	23.0
		12	7	22.6	22.6	22.4	22.6	22.6	1	23.0
		12	13	22.6	22.5	22.4	22.6	22.6	1	23.0
		25	0	22.6	22.5	22.4	22.6	22.6	1	23.0
	16QAM	1	0	22.4	22.4	22.2	22.4	22.5	1	23.0
		1	12	22.4	22.5	22.3	22.4	22.5	1	23.0
		1	24	22.4	22.4	22.3	22.4	22.5	1	23.0
		12	0	21.5	21.5	21.3	21.5	21.6	2	22.0
		12	7	21.5	21.5	21.3	21.5	21.6	2	22.0
		12	13	21.5	21.5	21.3	21.5	21.6	2	22.0
		25	0	21.6	21.5	21.4	21.6	21.7	2	22.0

LTE Band 66 Measured Results

BW (MHz)	Mode	RB Allocation	RB Offset	Maximum Average Power (dBm)					Reduced Average Power (dBm)				
				132072	132322	132572	MPR	Tune-up Limit	132072	132322	132572	MPR	Tune-up Limit
				1720 MHz	1745 MHz	1770 MHz			1720 MHz	1745 MHz	1770 MHz		
20	QPSK	1	0	24.0	24.2	24.2	0	25.0	20.5	20.6	20.7	0	22.0
		1	49	24.0	24.1	24.2	0	25.0	20.5	20.6	20.7	0	22.0
		1	99	24.0	24.2	24.3	0	25.0	20.5	20.6	20.7	0	22.0
		50	0	23.0	23.1	23.1	1	24.0	20.5	20.6	20.6	0	22.0
		50	24	23.0	23.1	23.1	1	24.0	20.5	20.6	20.7	0	22.0
		50	50	23.0	23.1	23.1	1	24.0	20.6	20.6	20.7	0	22.0
		100	0	22.9	23.1	23.1	1	24.0	20.5	20.6	20.7	0	22.0
	16QAM	1	0	22.7	22.9	22.9	1	24.0	20.4	20.5	20.7	0	22.0
		1	49	22.7	22.9	23.0	1	24.0	20.4	20.5	20.8	0	22.0
		1	99	22.8	22.9	22.9	1	24.0	20.4	20.5	20.8	0	22.0
		50	0	21.9	22.0	22.0	2	23.0	20.5	20.7	20.7	0	22.0
		50	24	21.8	22.0	22.0	2	23.0	20.5	20.7	20.7	0	22.0
		50	50	21.8	22.0	22.0	2	23.0	20.6	20.7	20.7	0	22.0
		100	0	21.9	22.0	22.0	2	23.0	20.6	20.7	20.8	0	22.0

BW (MHz)	Mode	RB Allocation	RB Offset	Maximum Average Power (dBm)					Reduced Average Power (dBm)				
				132047	132322	132597	MPR	Tune-up Limit	132047	132322	132597	MPR	Tune-up Limit
				1717.5 MHz	1745 MHz	1772.5 MHz			1717.5 MHz	1745 MHz	1772.5 MHz		
15	QPSK	1	0	24.0	24.1	24.1	0	25.0	20.5	20.5	20.7	0	22.0
		1	37	24.0	24.1	24.1	0	25.0	20.5	20.5	20.7	0	22.0
		1	74	24.0	24.1	24.2	0	25.0	20.5	20.5	20.8	0	22.0
		36	0	23.0	23.1	23.2	1	24.0	20.5	20.6	20.7	0	22.0
		36	20	23.0	23.1	23.2	1	24.0	20.5	20.6	20.7	0	22.0
		36	39	23.0	23.1	23.2	1	24.0	20.5	20.6	20.8	0	22.0
		75	0	23.0	23.1	23.2	1	24.0	20.5	20.6	20.7	0	22.0
	16QAM	1	0	22.8	22.7	22.8	1	24.0	20.5	20.5	20.8	0	22.0
		1	37	22.8	22.7	22.8	1	24.0	20.4	20.5	20.8	0	22.0
		1	74	22.8	22.8	22.9	1	24.0	20.5	20.5	20.8	0	22.0
		36	0	21.8	21.9	22.0	2	23.0	20.5	20.6	20.8	0	22.0
		36	20	21.8	21.9	22.0	2	23.0	20.5	20.7	20.8	0	22.0
		36	39	21.8	21.9	22.0	2	23.0	20.5	20.7	20.8	0	22.0
		75	0	21.8	22.0	22.0	2	23.0	20.5	20.7	20.8	0	22.0

BW (MHz)	Mode	RB Allocation	RB Offset	Maximum Average Power (dBm)					Reduced Average Power (dBm)				
				132022	132322	132622	MPR	Tune-up Limit	132022	132322	132622	MPR	Tune-up Limit
				1715 MHz	1745 MHz	1775 MHz			1715 MHz	1745 MHz	1775 MHz		
10	QPSK	1	0	24.0	24.1	24.3	0	25.0	20.6	20.6	20.7	0	22.0
		1	25	24.0	24.1	24.3	0	25.0	20.6	20.6	20.7	0	22.0
		1	49	24.0	24.1	24.3	0	25.0	20.6	20.6	20.7	0	22.0
		25	0	23.0	23.0	23.1	1	24.0	20.5	20.6	20.7	0	22.0
		25	12	23.0	23.1	23.1	1	24.0	20.5	20.6	20.7	0	22.0
		25	25	23.0	23.0	23.1	1	24.0	20.5	20.6	20.7	0	22.0
		50	0	23.0	23.0	23.1	1	24.0	20.5	20.6	20.7	0	22.0
	16QAM	1	0	22.6	22.7	23.0	1	24.0	20.4	20.6	20.7	0	22.0
		1	25	22.6	22.7	23.0	1	24.0	20.3	20.6	20.7	0	22.0
		1	49	22.6	22.7	23.0	1	24.0	20.4	20.6	20.8	0	22.0
		25	0	21.9	21.9	22.0	2	23.0	20.6	20.6	20.8	0	22.0
		25	12	21.9	21.9	22.1	2	23.0	20.6	20.6	20.8	0	22.0
		25	25	21.9	21.9	22.1	2	23.0	20.6	20.7	20.8	0	22.0
		50	0	21.9	21.9	22.1	2	23.0	20.6	20.7	20.7	0	22.0

BW (MHz)	Mode	RB Allocation	RB Offset	Maximum Average Power (dBm)					Reduced Average Power (dBm)				
				131997	132322	132647	MPR	Tune-up Limit	131997	132322	132647	MPR	Tune-up Limit
				1712.5 MHz	1745 MHz	1777.5 MHz			1712.5 MHz	1745 MHz	1777.5 MHz		
5	QPSK	1	0	24.0	24.0	24.1	0	25.0	20.5	20.6	20.7	0	22.0
		1	12	23.9	23.9	24.1	0	25.0	20.4	20.6	20.7	0	22.0
		1	24	24.0	23.9	24.2	0	25.0	20.5	20.6	20.7	0	22.0
		12	0	23.0	23.1	23.1	1	24.0	20.5	20.6	20.7	0	22.0
		12	7	23.0	23.1	23.1	1	24.0	20.5	20.6	20.7	0	22.0
		12	13	23.0	23.1	23.1	1	24.0	20.5	20.6	20.7	0	22.0
		25	0	23.0	23.1	23.1	1	24.0	20.5	20.6	20.7	0	22.0
	16QAM	1	0	22.8	22.8	23.0	1	24.0	20.4	20.5	20.7	0	22.0
		1	12	22.7	22.8	22.9	1	24.0	20.4	20.4	20.7	0	22.0
		1	24	22.8	22.8	23.0	1	24.0	20.5	20.5	20.7	0	22.0
		12	0	21.9	21.9	22.0	2	23.0	20.5	20.6	20.9	0	22.0
		12	7	21.9	21.9	22.0	2	23.0	20.5	20.6	20.9	0	22.0
		12	13	21.9	21.9	22.0	2	23.0	20.5	20.6	20.9	0	22.0
		25	0	21.8	22.0	22.0	2	23.0	20.6	20.7	20.7	0	22.0

LTE Band 66 Measured Results (continued)

BW (MHz)	Mode	RB Allocation	RB Offset	Maximum Average Power (dBm)					Reduced Average Power (dBm)				
				131987	132322	132657	MPR	Tune-up Limit	131987	132322	132657	MPR	Tune-up Limit
				1711.5 MHz	1745 MHz	1778.5 MHz			1711.5 MHz	1745 MHz	1778.5 MHz		
3	QPSK	1	0	24.0	24.1	24.2	0	25.0	20.6	20.6	20.8	0	22.0
		1	8	24.0	24.1	24.2	0	25.0	20.6	20.6	20.7	0	22.0
		1	14	24.0	24.2	24.2	0	25.0	20.6	20.6	20.8	0	22.0
		8	0	23.0	23.0	23.1	1	24.0	20.5	20.6	20.7	0	22.0
		8	4	23.0	23.0	23.1	1	24.0	20.5	20.6	20.7	0	22.0
		8	7	22.9	23.0	23.1	1	24.0	20.5	20.6	20.7	0	22.0
		15	0	23.0	23.1	23.1	1	24.0	20.5	20.6	20.7	0	22.0
	16QAM	1	0	22.9	22.8	23.0	1	24.0	20.4	20.6	20.7	0	22.0
		1	8	22.9	22.8	23.0	1	24.0	20.4	20.6	20.7	0	22.0
		1	14	22.9	22.8	23.0	1	24.0	20.3	20.6	20.7	0	22.0
		8	0	21.9	21.9	22.1	2	23.0	20.6	20.7	20.8	0	22.0
		8	4	21.8	21.9	22.1	2	23.0	20.6	20.7	20.8	0	22.0
		8	7	21.8	21.9	22.1	2	23.0	20.6	20.7	20.8	0	22.0
		15	0	21.9	22.0	22.1	2	23.0	20.6	20.7	20.8	0	22.0

BW (MHz)	Mode	RB Allocation	RB Offset	Maximum Average Power (dBm)					Reduced Average Power (dBm)				
				131979	132322	132665	MPR	Tune-up Limit	131979	132322	132665	MPR	Tune-up Limit
				1710.7 MHz	1745 MHz	1779.3 MHz			1710.7 MHz	1745 MHz	1779.3 MHz		
1.4	QPSK	1	0	24.0	24.0	24.2	0	25.0	20.7	20.7	20.8	0	22.0
		1	3	24.0	24.0	24.2	0	25.0	20.6	20.7	20.8	0	22.0
		1	5	24.1	24.0	24.3	0	25.0	20.6	20.7	20.8	0	22.0
		3	0	24.0	24.0	24.1	0	25.0	20.6	20.6	20.7	0	22.0
		3	1	24.0	24.0	24.1	0	25.0	20.6	20.6	20.7	0	22.0
		3	3	24.0	24.0	24.2	0	25.0	20.6	20.6	20.7	0	22.0
		6	0	23.0	23.0	23.2	1	24.0	20.6	20.6	20.8	0	22.0
	16QAM	1	0	22.7	23.0	23.0	1	24.0	20.7	20.5	20.6	0	22.0
		1	3	22.7	23.0	23.0	1	24.0	20.6	20.5	20.6	0	22.0
		1	5	22.7	23.1	23.1	1	24.0	20.7	20.5	20.6	0	22.0
		3	0	23.1	23.1	23.1	1	24.0	20.6	20.6	20.7	0	22.0
		3	1	23.1	23.1	23.1	1	24.0	20.6	20.7	20.8	0	22.0
		3	3	23.1	23.1	23.1	1	24.0	20.6	20.6	20.8	0	22.0
		6	0	21.8	21.9	22.0	2	23.0	20.6	20.7	20.7	0	22.0

9.4. Wi-Fi 2.4GHz (DTS Band)

Maximum Output Power (Tune-up Limit) for Wi-Fi 2.4 GHz

The maximum output power specified for production units are determined for all applicable 802.11 transmission modes in each standalone and aggregated frequency band. Maximum output power is measured for the highest maximum output power configuration(s) in each frequency band according to the default power measurement procedures.

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 802.11b/g/n 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.

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.

Band	Mode	Channel	Frequency (MHz)	Tune-up Power Limit (dBm)	
				WiFi 2.4G	
				Maximum	Reduced (RCV ON)
DSSS 2.4 GHz	802.11b	1	2412	19.0	12.0
		6	2437	19.0	12.0
		11	2462	19.0	12.0
		12	2467	19.0	12.0
		13	2472	17.0	12.0
OFDM 2.4 GHz	802.11g	1	2412	15.0	12.0
		6	2437	17.0	12.0
		11	2462	15.0	12.0
		12	2467	12.0	12.0
		13	2472	5.0	5.0
	802.11n (HT20)	1	2412	15.0	12.0
		6	2437	17.0	12.0
		11	2462	15.0	12.0
		12	2467	12.0	12.0
		13	2472	5.0	5.0

Wi-Fi 2.4GHz Measured Results

Band	Mode	Ch #	Freq. (MHz)	WiFi 2.4G Max Avg Power (dBm)			WiFi 2.4G Red Avg Power (dBm) RCV On		
				Meas Pwr	Tune-up	SAR Test (Yes/No)	Meas Pwr	Tune-up	SAR Test (Yes/No)
DSSS 2.4 GHz	802.11b	1	2412	18.2	19.0	Yes	11.0	12.0	Yes
		6	2437	18.0	19.0		11.4	12.0	
		11	2462	18.1	19.0		11.4	12.0	
		12	2467	18.1	19.0		11.6	12.0	
		13	2472	16.1	17.0		11.3	12.0	
OFDM 2.4 GHz	802.11g	1	2412		15.0	No		12.0	No
		6	2437		17.0			12.0	
		11	2462		15.0			12.0	
		12	2467		12.0			12.0	
		13	2472		5.0			5.0	
	802.11n (HT20)	1	2412		15.0	No		12.0	No
		6	2437		17.0			12.0	
		11	2462		15.0			12.0	
		12	2467		12.0			12.0	
		13	2472		5.0			5.0	

Note(s):

SAR is not required for channel 12 and 13 because the tune-up limit and the measured output power for these two channels are not greater than those for the default test channels. Refer to KDB 248227 D01 section 3.1

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

Maximum Output Power (Tune-up Limit) for Wi-Fi 5 GHz

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 transmission mode is selected.

The maximum output power specified for production units are determined for all applicable 802.11 transmission modes in each standalone and aggregated frequency band. Maximum output power is measured for the highest maximum output power configuration(s) in each frequency band according to the default power measurement procedures.

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

When the 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.

Band	Mode	Channel	Frequency (MHz)	Tune-up PowerLimit (dBm)	
				WiFi 5G	
				Maximum	Reduced (RCV ON)
U-NII-1 5.2 GHz	802.11a	36	5180	14.5	11.0
		40	5200	16.0	11.0
		48	5240	16.0	11.0
	802.11n (HT20)	36	5180	14.5	11.0
		40	5200	16.0	11.0
		48	5240	16.0	11.0
	802.11ac (VHT20)	36	5180	14.5	11.0
		40	5200	16.0	11.0
		48	5240	16.0	11.0
	802.11n (HT40)	38	5190	11.0	11.0
		46	5230	15.0	11.0
	802.11ac (VHT40)	38	5190	11.0	11.0
		46	5230	15.0	11.0
	802.11ac (VHT80)	42	5210	13.0	9.0
Band	Mode	Channel	Frequency (MHz)	Tune-up PowerLimit (dBm)	
				WiFi 5G	
				Maximum	Reduced (RCV ON)
UNII-2A 5.3 GHz	802.11a	52	5260	16.0	11.0
		60	5300	16.0	11.0
		64	5320	16.0	11.0
	802.11n (HT20)	52	5260	16.0	11.0
		60	5300	16.0	11.0
		64	5320	16.0	11.0
	802.11ac (VHT20)	52	5260	16.0	11.0
		60	5300	16.0	11.0
		64	5320	16.0	11.0
	802.11n (HT40)	54	5270	15.0	11.0
		62	5310	13.0	11.0
	802.11ac (VHT40)	54	5270	15.0	11.0
		62	5310	13.0	11.0
	802.11ac (VHT80)	58	5290	9.0	9.0

Maximum Output Power (Tune-up Limit) for Wi-Fi 5 GHz (continued)

Band	Mode	Channel	Frequency (MHz)	Tune-up Power Limit (dBm)	
				WiFi 5G	
				Maximum	Reduced (RCV ON)
UNII-2C 5.5 GHz	802.11a	100	5500	15.0	11.0
		116	5580	16.0	11.0
		124	5620	16.0	11.0
		144	5720	16.0	11.0
	802.11n (HT20)	100	5500	15.0	11.0
		116	5580	16.0	11.0
		124	5620	16.0	11.0
		144	5720	16.0	11.0
	802.11ac (VHT20)	100	5500	15.0	11.0
		116	5580	16.0	11.0
		124	5620	16.0	11.0
		144	5720	16.0	11.0
	802.11n (HT40)	102	5510	11.5	11.0
		110	5550	15.0	11.0
		134	5670	15.0	11.0
		142	5710	15.0	11.0
	802.11ac (VHT40)	102	5510	11.5	11.0
		110	5550	15.0	11.0
		134	5670	15.0	11.0
		142	5710	15.0	11.0
	802.11ac (VHT80)	106	5530	10.0	10.0
		122	5610	13.0	11.0
		138	5690	13.0	11.0

Band	Mode	Channel	Frequency (MHz)	Tune-up Power Limit (dBm)	
				WiFi 5G	
				Maximum	Reduced (RCV ON)
UNII-3 5.8 GHz	802.11a	149	5745	16.0	11.0
		157	5785	16.0	11.0
		165	5825	16.0	11.0
	802.11n (HT20)	149	5745	16.0	11.0
		157	5785	16.0	11.0
		165	5825	16.0	11.0
	802.11ac (VHT20)	149	5745	16.0	11.0
		157	5785	16.0	11.0
		165	5825	16.0	11.0
	802.11n (HT40)	151	5755	15.0	11.0
		159	5795	15.0	11.0
	802.11ac (VHT40)	151	5755	15.0	11.0
		159	5795	15.0	11.0
	802.11ac (VHT80)	155	5775	13.0	11.0

Wi-Fi 5 GHz Measured Results

Band	Mode	Ch #	Freq. (MHz)	WiFi 5G Max Avg Power (dBm)			WiFi 5G Red Avg Power (dBm) RCV On		
				Meas Pwr	Tune-up	SAR Test (Yes/No)	Meas Pwr	Tune-up	SAR Test (Yes/No)
UNII-1 5.2 GHz	802.11a	36	5180		14.5	No		11.0	No
		40	5200		16.0			11.0	
		48	5240		16.0			11.0	
	802.11n (HT20)	36	5180		14.5	No		11.0	No
		40	5200		16.0			11.0	
		44	5220		16.0			11.0	
		48	5240		16.0			11.0	
	802.11ac (VHT20)	36	5180		14.5	No		11.0	No
		40	5200		16.0			11.0	
		44	5220		16.0			11.0	
		48	5240		16.0			11.0	
	802.11n (HT40)	38	5190		11.0	No		11.0	No
		46	5230		15.0			11.0	
	802.11ac (VHT40)	38	5190		11.0	No		11.0	No
		46	5230		15.0			11.0	
	802.11ac (VHT80)	42	5210		13.0	No		9.0	No

Band	Mode	Ch #	Freq. (MHz)	WiFi 5G Max Avg Power (dBm)			WiFi 5G Red Avg Power (dBm) RCV On		
				Meas Pwr	Tune-up	SAR Test (Yes/No)	Meas Pwr	Tune-up	SAR Test (Yes/No)
UNII-2A 5.3 GHz	802.11a	52	5260	15.8	16.0	Yes		11.0	No
		60	5300	15.7	16.0			11.0	
		64	5320	14.3	16.0			11.0	
	802.11n (HT20)	52	5260		16.0	No		11.0	No
		56	5280		16.0			11.0	
		60	5300		16.0			11.0	
		64	5320		16.0			11.0	
	802.11ac (VHT20)	52	5260		16.0	No		11.0	No
		56	5280		16.0			11.0	
		60	5300		16.0			11.0	
		64	5320		16.0			11.0	
	802.11n (HT40)	54	5270		15.0	No	10.4	11.0	Yes
		62	5310		13.0		10.4	11.0	
	802.11ac (VHT40)	54	5270		15.0	No		11.0	No
		62	5310		13.0			11.0	
	802.11ac (VHT80)	58	5290		9.0	No		9.0	No

Wi-Fi 5 GHz Measured Results (continued)

Band	Mode	Ch #	Freq. (MHz)	WiFi 5G Max Avg Power (dBm)			WiFi 5G Red Avg Power (dBm) RCV On		
				Meas Pwr	Tune-up	SAR Test (Yes/No)	Meas Pwr	Tune-up	SAR Test (Yes/No)
UNII-2C 5.5 GHz	802.11a	100	5500	14.7	15.0	Yes		11.0	No
		116	5580	15.6	16.0			11.0	
		124	5620	14.3	16.0			11.0	
		144	5720	15.3	16.0			11.0	
	802.11n (HT20)	100	5500		15.0	No		11.0	No
		116	5580		16.0			11.0	
		124	5620		16.0			11.0	
		144	5720		16.0			11.0	
	802.11ac (VHT20)	100	5500		15.0	No		11.0	No
		116	5580		16.0			11.0	
		124	5620		16.0			11.0	
		144	5720		16.0			11.0	
	802.11n (HT40)	102	5510		11.5	No		11.0	No
		110	5550		15.0			11.0	
		134	5670		15.0			11.0	
		142	5710		15.0			11.0	
	802.11ac (VHT40)	102	5510		11.5	No		11.0	No
		110	5550		15.0			11.0	
		134	5670		15.0			11.0	
		142	5710		15.0			11.0	
	802.11ac (VHT80)	106	5530		10.0	No	9.9	10.0	Yes
		122	5610		13.0		10.9	11.0	
		138	5690		13.0		10.8	11.0	

Band	Mode	Ch #	Freq. (MHz)	WiFi 5G Max Avg Power (dBm)			WiFi 5G Red Avg Power (dBm) RCV On		
				Meas Pwr	Tune-up	SAR Test (Yes/No)	Meas Pwr	Tune-up	SAR Test (Yes/No)
UNII-3 5.8 GHz	802.11a	149	5745	15.2	16.0	Yes		11.0	No
		157	5785	15.4	16.0			11.0	
		165	5825	15.8	16.0			11.0	
	802.11n (HT20)	149	5745		16.0	No		11.0	No
		157	5785		16.0			11.0	
		165	5825		16.0			11.0	
	802.11ac (VHT20)	149	5745		16.0	No		11.0	No
		157	5785		16.0			11.0	
		165	5825		16.0			11.0	
	802.11n (HT40)	151	5755		15.0	No		11.0	No
		159	5795		15.0			11.0	
	802.11ac (VHT40)	151	5755		15.0	No		11.0	No
		159	5795		15.0			11.0	
	802.11ac (VHT80)	155	5775		13.0	No	10.5	11.0	Yes

9.6. Bluetooth

Maximum Output Power (Tune-up Limit) for Bluetooth

From October 2016 TCB workshop, Power and SAR were measured with the device connected to a call box with hopping disabled using DH5 modulation. The duty cycle value from the device is taken from the Duty Cycle plot below.

SAR measurement is not required for the EDR and LE. When the secondary mode is ≤ ¼ dB higher than the primary mode.

Band	Mode	Channel	Frequency (MHz)	Tune-up Power Limit (dBm)	
				WiFi 2.4G	
				Maximum	Reduced
Bluetooth 2.4 GHz	BR GFSK	0	2412	9.5	N/A
		39	2437	9.5	N/A
		78	2462	9.5	N/A
	EDR π/4 DQPSK	0	2412	8.0	N/A
		39	2437	8.0	N/A
		78	2462	8.0	N/A
	EDR 8DPSK	0	2412	8.0	N/A
		39	2437	8.0	N/A
		78	2462	8.0	N/A
	LE GFSK	0	2402	6.5	N/A
		19	2440	6.5	N/A
		39	2480	6.5	N/A

Bluetooth Measured Results

Band	Mode	Ch #	Freq. (MHz)	WiFi 2.4G Max Avg Power (dBm)		
				Meas Pwr	Tune-up	SAR Test (Yes/No)
Bluetooth 2.4 GHz	BR GFSK	0	2402	9.3	9.5	Yes
		39	2441	9.3	9.5	
		78	2480	9.2	9.5	
	EDR, π/4 DQPSK	0	2402		8.0	No
		39	2441		8.0	
		78	2480		8.0	
	EDR, 8-DPSK	0	2402		8.0	No
		39	2441		8.0	
		78	2480		8.0	
	LE, GFSK	0	2402		6.5	No
		19	2440		6.5	
		39	2480		6.5	

Bluetooth Duty Factor Results

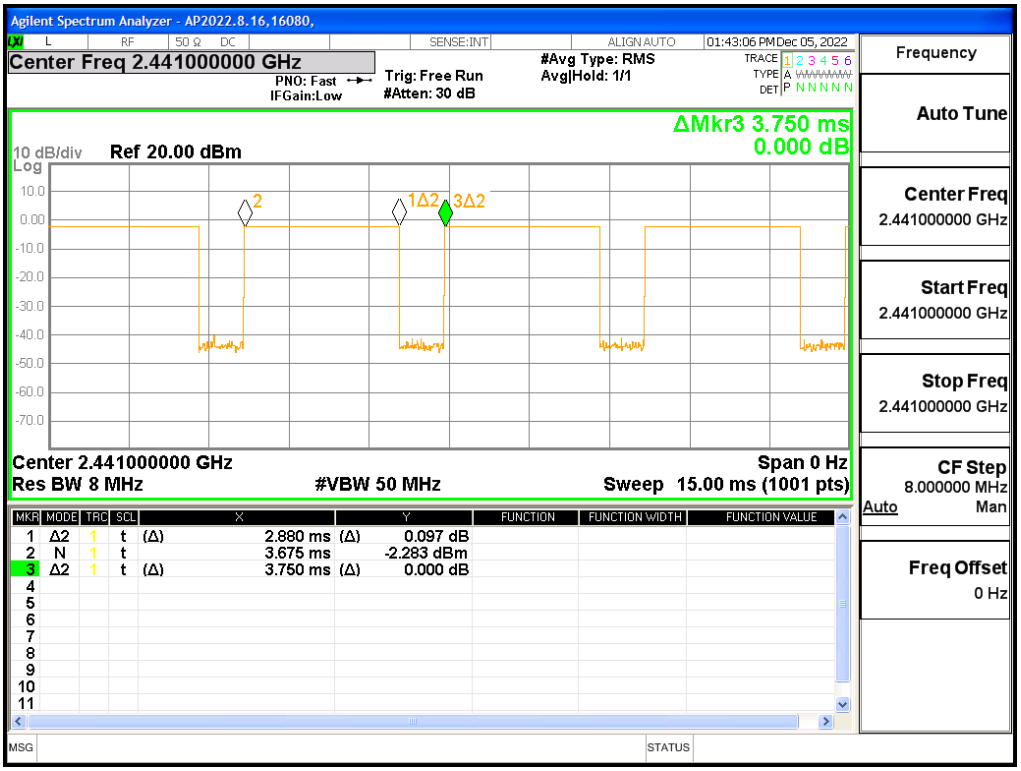
Band	Mode	Type	T on (ms)	Period (ms)	Duty Cycle	Crest Factor (1/duty cycle)
Bluetooth	GFSK	DH5	2.88	3.750	76.80%	1.30

Note(s):

Duty Cycle = (T on / period) * 100%

Duty Cycle plots

Bluetooth GFSK



10. Measured and Reported (Scaled) SAR Results

SAR Test Reduction criteria are as follows:

- Reported SAR(W/kg) for WWAN and Bluetooth = Measured SAR *Tune-up Scaling Factor
- Reported SAR(W/kg) for Wi-Fi = Measured SAR * Tune-up scaling factor * Duty Cycle scaling factor
- Duty Cycle scaling factor = 1 / Duty cycle (%)

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):

For smart phones, with a display diagonal dimension > 15.0 cm or an overall diagonal dimension > 16.0 cm.
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; however, when power reduction applies to hotspot mode the measured SAR must be scaled to the maximum output power, including tolerance, allowed for phablet modes to compare with the 1.2 W/kg SAR test reduction threshold.

KDB 941225 D01 SAR test for 3G devices:

When the maximum output power and tune-up tolerance specified for production units in a secondary mode is ≤ ¼ dB higher than the primary mode or when the highest reported SAR of the primary mode is scaled by the ratio of specified maximum output power and tune-up tolerance of secondary to primary mode and the adjusted SAR is ≤ 1.2 W/kg, SAR measurement is not required for the secondary mode.

KDB 941225 D05 SAR for LTE Devices:

SAR test reduction is applied using the following criteria:

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

KDB 248227 D01 SAR meas for 802.11:

SAR test reduction for 802.11 Wi-Fi transmission mode configurations are considered separately for DSSS and OFDM. An initial test position is determined to reduce the number of tests required for certain exposure configurations with multiple test positions. An initial test configuration is determined for each frequency band and aggregated band according to maximum output power, channel bandwidth, wireless mode configurations and other operating parameters to streamline the measurement requirements. For 2.4 GHz DSSS, either the initial test position or DSSS procedure is applied to reduce the number of SAR tests; these are mutually exclusive. For OFDM, an initial test position is only applicable to next to the ear, UMPC mini-tablet and hotspot mode configurations, which is tested using the initial test configuration to facilitate test reduction. For other exposure conditions with a fixed test position, SAR test reduction is determined using only the initial test configuration.

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

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

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

10.1. GSM 850

RF Exposure Conditions	Mode	Antenna	Pwr Back-off	Dist. (mm)	Test Position	Ch #.	Freq. (MHz)	Power (dBm)		1-g SAR (W/kg)		Plot No.
								Tune-up Limit	Meas.	Meas.	Scaled	
Head	GPRS 4 Slots	Main Ant 1	N/A	0	Left Cheek	190	836.6	29.5	27.7	0.056	**0.085**	1
					Left Tilt	190	836.6	29.5	27.7	0.029	0.044	
					Right Cheek	190	836.6	29.5	27.7	0.055	0.083	
					Right Tilt	190	836.6	29.5	27.7	0.027	0.041	
Body-worn	GPRS 4 Slots	Main Ant 1	N/A	15	Back	190	836.6	29.5	27.7	0.060	0.091	
					Front	190	836.6	29.5	27.7	0.135	**0.204**	2
Hotspot	GPRS 4 Slots	Main Ant 1	N/A	10	Back	190	836.6	29.5	27.7	0.137	0.207	
					Front	190	836.6	29.5	27.7	0.139	0.210	
					Edge Right	190	836.6	29.5	27.7	0.153	**0.232**	3
					Edge Bottom	190	836.6	29.5	27.7	0.063	0.095	
					Edge Left	190	836.6	29.5	27.7	0.030	0.045	

10.2. GSM 1900

RF Exposure Conditions	Mode	Antenna	Pwr Back-off	Dist. (mm)	Test Position	Ch #.	Freq. (MHz)	Power (dBm)		1-g SAR (W/kg)		Plot No.
								Tune-up Limit	Meas.	Meas.	Scaled	
Head	GPRS 2 Slots	Main Ant 2	N/A	0	Left Cheek	661	1880.0	29.5	28.4	0.140	**0.180**	4
					Left Tilt	661	1880.0	29.5	28.4	0.067	0.086	
					Right Cheek	661	1880.0	29.5	28.4	0.098	0.126	
					Right Tilt	661	1880.0	29.5	28.4	0.051	0.066	
Body-worn	GPRS 2 Slots	Main Ant 2	N/A	15	Back	661	1880.0	29.5	28.4	0.153	**0.197**	5
					Front	661	1880.0	29.5	28.4	0.150	0.193	
Hotspot	GPRS 2 Slots	Main Ant 2	ON	10	Back	661	1880.0	26.5	25.4	0.153	**0.197**	6
					Front	661	1880.0	26.5	25.4	0.129	0.166	
					Edge Bottom	661	1880.0	26.5	25.4	0.092	0.119	
					Edge Left	661	1880.0	26.5	25.4	0.111	0.143	

10.3. W-CDMA Band II

RF Exposure Conditions	Mode	Antenna	Pwr Back-off	Dist. (mm)	Test Position	Ch #.	Freq. (MHz)	Power (dBm)		1-g SAR (W/kg)		Plot No.
								Tune-up Limit	Meas.	Meas.	Scaled	
Head	Rel 99 RMC 12.2 kbps	Main Ant 2	N/A	0	Left Cheek	9400	1880.0	25.0	24.8	0.188	**0.197**	7
					Left Tilt	9400	1880.0	25.0	24.8	0.115	0.120	
					Right Cheek	9400	1880.0	25.0	24.8	0.139	0.146	
					Right Tilt	9400	1880.0	25.0	24.8	0.081	0.085	
Body-worn	Rel 99 RMC 12.2 kbps	Main Ant 2	N/A	15	Back	9400	1880.0	25.0	24.8	0.230	**0.241**	8
					Front	9400	1880.0	25.0	24.8	0.179	0.187	
Hotspot	Rel 99 RMC 12.2 kbps	Main Ant 2	ON	10	Back	9400	1880.0	22.0	21.7	0.382	**0.409**	9
					Front	9400	1880.0	22.0	21.7	0.289	0.310	
					Edge Bottom	9400	1880.0	22.0	21.7	0.253	0.271	
					Edge Left	9400	1880.0	22.0	21.7	0.266	0.285	

10.4. W-CDMA Band IV

RF Exposure Conditions	Mode	Antenna	Pwr Back-off	Dist. (mm)	Test Position	Ch #.	Freq. (MHz)	Power (dBm)		1-g SAR (W/kg)		Plot No.
								Tune-up Limit	Meas.	Meas.	Scaled	
Head	Rel 99 RMC 12.2 kbps	Main Ant 2	N/A	0	Left Cheek	1413	1732.6	25.0	24.5	0.139	**0.156**	10
					Left Tilt	1413	1732.6	25.0	24.5	0.095	0.107	
					Right Cheek	1413	1732.6	25.0	24.5	0.090	0.101	
					Right Tilt	1413	1732.6	25.0	24.5	0.067	0.075	
Body-worn	Rel 99 RMC 12.2 kbps	Main Ant 2	N/A	15	Back	1413	1732.6	25.0	24.5	0.158	**0.177**	11
					Front	1413	1732.6	25.0	24.5	0.153	0.172	
Hotspot	Rel 99 RMC 12.2 kbps	Main Ant 2	ON	10	Back	1413	1732.6	22.0	21.3	0.323	**0.379**	12
					Front	1413	1732.6	22.0	21.3	0.245	0.288	
					Edge Bottom	1413	1732.6	22.0	21.3	0.210	0.247	
					Edge Left	1413	1732.6	22.0	21.3	0.198	0.233	

10.5. W-CDMA Band V

RF Exposure Conditions	Mode	Antenna	Pwr Back-off	Dist. (mm)	Test Position	Ch #.	Freq. (MHz)	Power (dBm)		1-g SAR (W/kg)		Plot No.
								Tune-up Limit	Meas.	Meas.	Scaled	
Head	Rel 99 RMC 12.2 kbps	Main Ant 1	N/A	0	Left Cheek	4183	836.6	25.5	24.3	0.247	0.326	
					Left Tilt	4183	836.6	25.5	24.3	0.149	0.196	
					Right Cheek	4183	836.6	25.5	24.3	0.301	**0.397**	13
					Right Tilt	4183	836.6	25.5	24.3	0.153	0.202	
Body-worn	Rel 99 RMC 12.2 kbps	Main Ant 1	N/A	15	Back	4183	836.6	25.5	24.3	0.068	0.090	
					Front	4183	836.6	25.5	24.3	0.200	**0.264**	14
Hotspot	Rel 99 RMC 12.2 kbps	Main Ant 1	N/A	10	Back	4183	836.6	25.5	24.3	0.134	0.177	
					Front	4183	836.6	25.5	24.3	0.201	**0.265**	15
					Edge Right	4183	836.6	25.5	24.3	0.060	0.079	
					Edge Bottom	4183	836.6	25.5	24.3	0.079	0.104	
					Edge Left	4183	836.6	25.5	24.3	0.036	0.047	

10.6. LTE Band 2 (20MHz Bandwidth)

RF Exposure Conditions	Mode	Antenna	Pwr Back-off	Dist. (mm)	Test Position	Ch #.	Freq. (MHz)	RB Allocation	RB Offset	Power (dBm)		1-g SAR (W/kg)		Plot No.
										Tune-up Limit	Meas.	Meas.	Scaled	
Head	QPSK	Main Ant 2	N/A	0	Left Cheek	18900	1880.0	1	99	25.0	24.6	0.367	**0.402**	16
								50	50	24.0	23.5	0.289	0.324	
					Left Tilt	18900	1880.0	1	99	25.0	24.6	0.190	0.208	
								50	50	24.0	23.5	0.150	0.168	
					Right Cheek	18900	1880.0	1	99	25.0	24.6	0.271	0.297	
								50	50	24.0	23.5	0.209	0.235	
					Right Tilt	18900	1880.0	1	99	25.0	24.6	0.157	0.172	
								50	50	24.0	23.5	0.121	0.136	
Body-worn	QPSK	Main Ant 2	N/A	15	Back	18900	1880.0	1	99	25.0	24.6	0.436	**0.478**	17
								50	50	24.0	23.5	0.340	0.381	
					Front	18900	1880.0	1	99	25.0	24.6	0.420	0.461	
								50	50	24.0	23.5	0.334	0.375	
Hotspot	QPSK	Main Ant 2	ON	10	Back	18900	1880.0	1	99	22.0	21.5	0.383	**0.430**	18
								50	50	22.0	21.5	0.376	0.422	
					Front	18900	1880.0	1	99	22.0	21.5	0.340	0.381	
								50	50	22.0	21.5	0.303	0.340	
					Edge Bottom	18900	1880.0	1	99	22.0	21.5	0.282	0.316	
								50	50	22.0	21.5	0.275	0.309	
					Edge Left	18900	1880.0	1	99	22.0	21.5	0.284	0.319	
								50	50	22.0	21.5	0.273	0.306	

10.7. LTE Band 5 (10MHz Bandwidth)

RF Exposure Conditions	Mode	Antenna	Pwr Back-off	Dist. (mm)	Test Position	Ch #.	Freq. (MHz)	RB Allocation	RB Offset	Power (dBm)		1-g SAR (W/kg)		Plot No.
										Tune-up Limit	Meas.	Meas.	Scaled	
Head	QPSK	Main Ant 1	N/A	0	Left Cheek	20525	836.5	1	0	25.5	25.0	0.270	0.303	
								25	0	24.5	23.9	0.214	0.246	
					Left Tilt	20525	836.5	1	0	25.5	25.0	0.166	0.186	
								25	0	24.5	23.9	0.133	0.153	
					Right Cheek	20525	836.5	1	0	25.5	25.0	0.314	**0.352**	19
								25	0	24.5	23.9	0.251	0.288	
					Right Tilt	20525	836.5	1	0	25.5	25.0	0.161	0.181	
								25	0	24.5	23.9	0.128	0.147	
Body-worn	QPSK	Main Ant 1	N/A	15	Back	20525	836.5	1	0	25.5	25.0	0.064	0.072	
								25	0	24.5	23.9	0.055	0.063	
					Front	20525	836.5	1	0	25.5	25.0	0.214	**0.240**	20
								25	0	24.5	23.9	0.168	0.193	
Hotspot	QPSK	Main Ant 1	N/A	10	Back	20525	836.5	1	0	25.5	25.0	0.120	0.135	
								25	0	24.5	23.9	0.109	0.125	
					Front	20525	836.5	1	0	25.5	25.0	0.214	**0.240**	21
								25	0	24.5	23.9	0.172	0.197	
					Edge Right	20525	836.5	1	0	25.5	25.0	0.056	0.063	
								25	0	24.5	23.9	0.050	0.057	
					Edge Bottom	20525	836.5	1	0	25.5	25.0	0.080	0.090	
								25	0	24.5	23.9	0.070	0.080	
					Edge Left	20525	836.5	1	0	25.5	25.0	0.031	0.035	
								25	0	24.5	23.9	0.027	0.031	

10.8. LTE Band 12 (10MHz Bandwidth)

RF Exposure Conditions	Mode	Antenna	Pwr Back-off	Dist. (mm)	Test Position	Ch #.	Freq. (MHz)	RB Allocation	RB Offset	Power (dBm)		1-g SAR (W/kg)		Plot No.
										Tune-up Limit	Meas.	Meas.	Scaled	
Head	QPSK	Main Ant 1	N/A	0	Left Cheek	23095	707.5	1	25	25.5	24.4	0.155	0.200	
								25	0	24.5	23.5	0.118	0.149	
					Left Tilt	23095	707.5	1	25	25.5	24.4	0.080	0.103	
								25	0	24.5	23.5	0.063	0.079	
					Right Cheek	23095	707.5	1	25	25.5	24.4	0.172	**0.222**	22
								25	0	24.5	23.5	0.132	0.166	
					Right Tilt	23095	707.5	1	25	25.5	24.4	0.098	0.126	
								25	0	24.5	23.5	0.075	0.094	
Body-worn	QPSK	Main Ant 1	N/A	15	Back	23095	707.5	1	25	25.5	24.4	0.182	**0.234**	23
								25	0	24.5	23.5	0.139	0.175	
					Front	23095	707.5	1	25	25.5	24.4	0.136	0.175	
								25	0	24.5	23.5	0.103	0.130	
Hotspot	QPSK	Main Ant 1	N/A	10	Back	23095	707.5	1	25	25.5	24.4	0.183	0.236	
								25	0	24.5	23.5	0.140	0.176	
					Front	23095	707.5	1	25	25.5	24.4	0.198	0.255	
								25	0	24.5	23.5	0.155	0.195	
					Edge Right	23095	707.5	1	25	25.5	24.4	0.326	**0.420**	24
								25	0	24.5	23.5	0.261	0.329	
					Edge Bottom	23095	707.5	1	25	25.5	24.4	0.071	0.091	
								25	0	24.5	23.5	0.053	0.067	
					Edge Left	23095	707.5	1	25	25.5	24.4	0.152	0.196	
								25	0	24.5	23.5	0.125	0.157	

10.9. LTE Band 13 (10MHz Bandwidth)

RF Exposure Conditions	Mode	Antenna	Pwr Back-off	Dist. (mm)	Test Position	Ch #.	Freq. (MHz)	RB Allocation	RB Offset	Power (dBm)		1-g SAR (W/kg)		Plot No.
										Tune-up Limit	Meas.	Meas.	Scaled	
Head	QPSK	Main Ant 1	N/A	0	Left Cheek	23230	782.0	1	25	25.0	24.2	0.146	0.176	
								25	0	24.0	23.1	0.115	0.141	
					Left Tilt	23230	782.0	1	25	25.0	24.2	0.086	0.103	
								25	0	24.0	23.1	0.068	0.084	
					Right Cheek	23230	782.0	1	25	25.0	24.2	0.193	**0.232**	25
								25	0	24.0	23.1	0.152	0.187	
					Right Tilt	23230	782.0	1	25	25.0	24.2	0.103	0.124	
								25	0	24.0	23.1	0.080	0.098	
Body-worn	QPSK	Main Ant 1	N/A	15	Back	23230	782.0	1	25	25.0	24.2	0.228	**0.274**	26
								25	0	24.0	23.1	0.179	0.220	
					Front	23230	782.0	1	25	25.0	24.2	0.190	0.228	
								25	0	24.0	23.1	0.124	0.153	
Hotspot	QPSK	Main Ant 1	N/A	10	Back	23230	782.0	1	25	25.0	24.2	0.377	**0.453**	27
								25	0	24.0	23.1	0.289	0.356	
					Front	23230	782.0	1	25	25.0	24.2	0.149	0.179	
								25	0	24.0	23.1	0.118	0.145	
					Edge Right	23230	782.0	1	25	25.0	24.2	0.240	0.289	
								25	0	24.0	23.1	0.187	0.230	
					Edge Bottom	23230	782.0	1	25	25.0	24.2	0.238	0.286	
								25	0	24.0	23.1	0.184	0.226	
					Edge Left	23230	782.0	1	25	25.0	24.2	0.114	0.137	
								25	0	24.0	23.1	0.090	0.111	

10.10. LTE Band 26 (15MHz Bandwidth)

RF Exposure Conditions	Mode	Antenna	Pwr Back-off	Dist. (mm)	Test Position	Ch #.	Freq. (MHz)	RB Allocation	RB Offset	Power (dBm)		1-g SAR (W/kg)		Plot No.
										Tune-up Limit	Meas.	Meas.	Scaled	
Head	QPSK	Main Ant 1	N/A	0	Left Cheek	26865	831.5	1	37	25.0	24.2	0.230	0.277	
								36	0	24.0	23.2	0.170	0.204	
					Left Tilt	26865	831.5	1	37	25.0	24.2	0.023	0.028	
								36	0	24.0	23.2	0.019	0.023	
					Right Cheek	26865	831.5	1	37	25.0	24.2	0.274	**0.329**	28
								36	0	24.0	23.2	0.202	0.243	
					Right Tilt	26865	831.5	1	37	25.0	24.2	0.139	0.167	
								36	0	24.0	23.2	0.102	0.123	
Body-worn	QPSK	Main Ant 1	N/A	15	Back	26865	831.5	1	37	25.0	24.2	0.049	0.059	
								36	0	24.0	23.2	0.044	0.053	
					Front	26865	831.5	1	37	25.0	24.2	0.179	**0.215**	29
								36	0	24.0	23.2	0.135	0.162	
Hotspot	QPSK	Main Ant 1	N/A	10	Back	26865	831.5	1	37	25.0	24.2	0.093	0.112	
								36	0	24.0	23.2	0.078	0.094	
					Front	26865	831.5	1	37	25.0	24.2	0.191	0.230	
								36	0	24.0	23.2	0.142	0.171	
					Edge Right	26865	831.5	1	37	25.0	24.2	0.215	**0.258**	30
								36	0	24.0	23.2	0.167	0.201	
					Edge Bottom	26865	831.5	1	37	25.0	24.2	0.058	0.070	
								36	0	24.0	23.2	0.048	0.058	
					Edge Left	26865	831.5	1	37	25.0	24.2	0.025	0.030	
								36	0	24.0	23.2	0.021	0.025	

10.11. LTE Band 41 PC3 (20MHz Bandwidth)

RF Exposure Conditions	Mode	Antenna	Pwr Back-off	Dist. (mm)	Test Position	Ch #.	Freq. (MHz)	RB Allocation	RB Offset	Power (dBm)		1-g SAR (W/kg)		Plot No.
										Tune-up Limit	Meas.	Meas.	Scaled	
Head	QPSK	Main Ant 2	N/A	0	Left Cheek	40620	2593.0	1	0	24.0	23.4	0.178	**0.204**	31
								50	0	23.0	22.4	0.137	0.157	
					Left Tilt	40620	2593.0	1	0	24.0	23.4	0.061	0.070	
								50	0	23.0	22.4	0.045	0.052	
					Right Cheek	40620	2593.0	1	0	24.0	23.4	0.121	0.139	
								50	0	23.0	22.4	0.091	0.104	
					Right Tilt	40620	2593.0	1	0	24.0	23.4	0.107	0.123	
								50	0	23.0	22.4	0.082	0.094	
Body-worn	QPSK	Main Ant 2	N/A	15	Back	40620	2593.0	1	0	24.0	23.4	0.148	**0.170**	32
								50	0	23.0	22.4	0.116	0.133	
					Front	40620	2593.0	1	0	24.0	23.4	0.123	0.141	
								50	0	23.0	22.4	0.096	0.110	
Hotspot	QPSK	Main Ant 2	N/A	10	Back	40620	2593.0	1	0	24.0	23.4	0.261	**0.300**	33
								50	0	23.0	22.4	0.204	0.234	
					Front	40620	2593.0	1	0	24.0	23.4	0.222	0.255	
								50	0	23.0	22.4	0.172	0.197	
					Edge Bottom	40620	2593.0	1	0	24.0	23.4	0.115	0.132	
								50	0	23.0	22.4	0.089	0.102	
					Edge Left	40620	2593.0	1	0	24.0	23.4	0.257	0.295	
								50	0	23.0	22.4	0.202	0.232	

10.12. LTE Band 66 (20MHz Bandwidth)

RF Exposure Conditions	Mode	Antenna	Pwr Back-off	Dist. (mm)	Test Position	Ch #.	Freq. (MHz)	RB Allocation	RB Offset	Power (dBm)		1-g SAR (W/kg)		Plot No.
										Tune-up Limit	Meas.	Meas.	Scaled	
Head	QPSK	Main Ant 2	N/A	0	Left Cheek	132322	1745.0	1	99	25.0	24.2	0.217	**0.261**	34
								50	50	24.0	23.1	0.171	0.210	
					Left Tilt	132322	1745.0	1	99	25.0	24.2	0.161	0.194	
								50	50	24.0	23.1	0.126	0.155	
					Right Cheek	132322	1745.0	1	99	25.0	24.2	0.170	0.204	
								50	50	24.0	23.1	0.130	0.160	
					Right Tilt	132322	1745.0	1	99	25.0	24.2	0.117	0.141	
								50	50	24.0	23.1	0.092	0.113	
Body-worn	QPSK	Main Ant 2	N/A	15	Back	132322	1745.0	1	99	25.0	24.2	0.124	0.149	
								50	50	24.0	23.1	0.122	0.150	
					Front	132322	1745.0	1	99	25.0	24.2	0.197	**0.237**	35
								50	50	24.0	23.1	0.153	0.188	
Hotspot	QPSK	Main Ant 2	ON	10	Back	132322	1745.0	1	99	22.0	20.6	0.186	0.257	
								50	50	22.0	20.6	0.193	**0.266**	36
					Front	132322	1745.0	1	99	22.0	20.6	0.148	0.204	
								50	50	22.0	20.6	0.147	0.203	
					Edge Bottom	132322	1745.0	1	99	22.0	20.6	0.129	0.178	
								50	50	22.0	20.6	0.128	0.177	
					Edge Left	132322	1745.0	1	99	22.0	20.6	0.143	0.197	
								50	50	22.0	20.6	0.142	0.196	

10.13. Wi-Fi (DTS Band)

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.

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.

RF Exposure Conditions	Mode	Antenna	Pwr Back-off	Dist. (mm)	Test Position	Ch #.	Freq. (MHz)	Area Scan SAR (W/kg)	Duty Cycle	Power (dBm)		1-g SAR (W/kg)		Plot No.
										Tune-up Limit	Meas.	Meas.	Scaled	
Head	802.11b	WiFi 2.4G	RCV ON	0	Left Cheek	6	2437	0.017	98.5%	12.0	11.4			
					Left Tilt	6	2437	0.009	98.5%	12.0	11.4			
					Right Cheek	6	2437	0.046	98.5%	12.0	11.4	0.045	**0.052**	37
					Right Tilt	6	2437	0.019	98.5%	12.0	11.4			
Body-worn	802.11b	WiFi 2.4G	N/A	15	Back	1	2412	0.337	98.5%	19.0	18.2	0.349	**0.426**	38
					Front	1	2412	0.083	98.5%	19.0	18.2	0.085	0.104	
Hotspot	802.11b	WiFi 2.4G	N/A	10	Back	1	2412	0.724	98.5%	19.0	18.2	0.773	**0.943**	39
						11	2462	0.584	98.5%	19.0	18.1	0.616	0.769	
					Front	1	2412	0.147	98.5%	19.0	18.2			
					Edge Top	1	2412	0.075	98.5%	19.0	18.2			
					Edge Left	1	2412	0.321	98.5%	19.0	18.2	0.322	0.393	

Adjusted SAR for OFDM modes

RF Exposure Condition	Antenna	Pwr Back-off	DSSS Max. Power		OFDM Max. Power		Reported 1g SAR for DSSS (W/kg)	Adjusted 1g SAR for OFDM (W/kg)
			dBm	mW	dBm	mW		
Head	WiFi 2.4G	RCV ON	12.0	15.8	12.0	15.8	0.052	0.052
Body-worn	WiFi 2.4G	N/A	19.0	79.4	17.0	50.1	0.426	0.269
Hotspot	WiFi 2.4G	N/A	19.0	79.4	17.0	50.1	0.943	0.595

Notes:

SAR testing is not required for OFDM mode(s) since the adjusted SAR is ≤ 1.2 W/kg.

10.14. Wi-Fi (U-NII Band)

UNII-1 & 2A

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.

RF Exposure Conditions	Mode	Antenna	Pwr Back-off	Dist. (mm)	Test Position	Ch #.	Freq. (MHz)	Area Scan Max. SAR (W/kg)	Duty Cycle	Power (dBm)		1-g SAR (W/kg)		Plot No.
										Tune-up Limit	Meas.	Meas.	Scaled	
Head	802.11n HT40	WiFi 5G	RCV ON	0	Left Cheek	54	5270	0.233	85.2%	11.0	10.4			
					Left Tilt	54	5270	0.282	85.2%	11.0	10.4	0.279	0.376	
					Right Cheek	54	5270	0.175	85.2%	11.0	10.4			
					Right Tilt	54	5270	0.246	85.2%	11.0	10.4	0.310	**0.418**	40
Body-worn	802.11a 6 Mbps	WiFi 5G	N/A	15	Back	52	5260	0.365	92.1%	16.0	15.8	0.356	**0.405**	41
					Front	52	5260	0.100	92.1%	16.0	15.8	0.095	0.108	
RF Exposure Conditions	Mode	Antenna	Pwr Back-off	Dist. (mm)	Test Position	Ch #.	Freq. (MHz)	Area Scan Max. SAR (W/kg)	Duty Cycle	Power (dBm)		10-g SAR (W/kg)		Plot No.
										Tune-up Limit	Meas.	Meas.	Scaled	
Extremity	802.11a 6 Mbps	WiFi 5G	N/A	0	Back	52	5260	1.360	92.1%	16.0	15.8	1.42	**1.615**	42
					Front	52	5260	0.283	92.1%	16.0	15.8			
					Edge Top	52	5260	1.160	92.1%	16.0	15.8	1.25	1.422	
					Edge Left	52	5260	0.267	92.1%	16.0	15.8			

Adjusted SAR for UNII-1 &2A

RF Exposure Condition	Antenna	Pwr Back-off	UNII-2A Max. Power		UNII-1 Max. Power		Reported 1g SAR for UNII-2A (W/kg)	Adjusted 1g SAR for UNII-1 (W/kg)
			dBm	mW	dBm	mW		
Head	WiFi 5G	RCV ON	11.0	12.6	11.0	12.6	0.418	0.418
Body-worn	WiFi 5G	N/A	16.0	39.8	16.0	39.8	0.405	0.405
RF Exposure Condition	Antenna	Pwr Back-off	UNII-2A Max. Power		UNII-1 Max. Power		Reported 10g SAR for UNII-2A (W/kg)	Adjusted 10g SAR for UNII-1 (W/kg)
			dBm	mW	dBm	mW		
Extremity	WiFi 5G	N/A	16.0	39.8	16.0	39.8	1.615	1.615

Notes:

SAR testing is not required for UNII-1 since the adjusted SAR is ≤ 1.2 W/kg (1g) or 3 W/kg (10g).

UNII-2C

RF Exposure Conditions	Mode	Antenna	Pwr Back-off	Dist. (mm)	Test Position	Ch #.	Freq. (MHz)	Area Scan Max. SAR (W/kg)	Duty Cycle	Power (dBm)		1-g SAR (W/kg)		Plot No.
										Tune-up Limit	Meas.	Meas.	Scaled	
Head	802.11ac VHT80	WiFi 5G	RCV ON	0	Left Cheek	122	5610	0.307	75.7%	11.0	10.9	0.284	0.384	
					Left Tilt	122	5610	0.347	75.7%	11.0	10.9	0.330	**0.446**	43
					Right Cheek	122	5610	0.187	75.7%	11.0	10.9			
					Right Tilt	122	5610	0.243	75.7%	11.0	10.9			
Body-worn	802.11a 6 Mbps	WiFi 5G	N/A	15	Back	116	5580	0.390	92.1%	16.0	15.6	0.380	**0.453**	44
					Front	116	5580	0.101	92.1%	16.0	15.6	0.101	0.120	
RF Exposure Conditions	Mode	Antenna	Pwr Back-off	Dist. (mm)	Test Position	Ch #.	Freq. (MHz)	Area Scan Max. SAR (W/kg)	Duty Cycle	Power (dBm)		10-g SAR (W/kg)		Plot No.
										Tune-up Limit	Meas.	Meas.	Scaled	
Extremity	802.11a 6 Mbps	WiFi 5G	N/A	0	Back	116	5580	1.100	92.1%	16.0	15.6	0.894	1.065	
					Front	116	5580	0.273	92.1%	16.0	15.6			
					Edge Top	116	5580	1.180	92.1%	16.0	15.6	1.24	**1.477**	45
					Edge Left	116	5580	0.214	92.1%	16.0	15.6			

UNII-3

RF Exposure Conditions	Mode	Antenna	Pwr Back-off	Dist. (mm)	Test Position	Ch #.	Freq. (MHz)	Area Scan SAR (W/kg)	Duty Cycle	Power (dBm)		1-g SAR (W/kg)		Plot No.
										Tune-up Limit	Meas.	Meas.	Scaled	
Head	802.11ac VHT80	WiFi 5G	RCV ON	0	Left Cheek	155	5775	0.252	75.7%	11.0	10.5			
					Left Tilt	155	5775	0.282	75.7%	11.0	10.5	0.252	**0.374**	46
					Right Cheek	155	5775	0.169	75.7%	11.0	10.5			
					Right Tilt	155	5775	0.203	75.7%	11.0	10.5			
Body-worn	802.11a 6 Mbps	WiFi 5G	N/A	15	Back	165	5825	0.140	92.1%	16.0	15.8	0.128	**0.146**	47
					Front	165	5825	0.037	92.1%	16.0	15.8			
Hotspot	802.11a 6 Mbps	WiFi 5G	N/A	10	Back	149	5745	0.405	92.1%	16.0	15.2	0.426	**0.556**	48
					Front	149	5745	0.113	92.1%	16.0	15.2			
					Edge Top	149	5745	0.371	92.1%	16.0	15.2	0.370	0.483	
					Edge Left	149	5745	0.141	92.1%	16.0	15.2			
RF Exposure Conditions	Mode	Antenna	Pwr Back-off	Dist. (mm)	Test Position	Ch #.	Freq. (MHz)	Area Scan SAR (W/kg)	Duty Cycle	Power (dBm)		10-g SAR (W/kg)		Plot No.
										Tune-up Limit	Meas.	Meas.	Scaled	
Extremity	802.11a 6 Mbps	WiFi 5G	N/A	0	Back	165	5825	0.328	92.1%	16.0	15.8			
					Front	165	5825	0.111	92.1%	16.0	15.8			
					Edge Top	165	5825	0.442	92.1%	16.0	15.8	0.464	**0.528**	49
					Edge Left	165	5825	0.084	92.1%	16.0	15.8			

Notes:

For UNII-3 band:

- Hotspot mode is only supported on Channel 149. Therefore, Channel 149 was selected for Hotspot mode SAR testing.
- Channel 165 has the highest measured output power. Since Hotspot mode is not supported on Channel 165, Extremity SAR was measured on this channel to satisfy Phablet SAR requirements.

10.15. Bluetooth

RF Exposure Conditions	Mode	Antenna	Pwr Back-off	Dist. (mm)	Test Position	Ch #.	Freq. (MHz)	Power (dBm)		1-g SAR (W/kg)		Plot No.
								Tune-up Limit	Meas.	Meas.	Scaled	
Head	GFSK	WiFi 2.4G	N/A	0	Left Cheek	39	2441	9.5	9.3	0.026	0.027	
					Left Tilt	39	2441	9.5	9.3	0.015	0.016	
					Right Cheek	39	2441	9.5	9.3	0.076	**0.080**	50
					Right Tilt	39	2441	9.5	9.3	0.031	0.032	
Body-worn	GFSK	WiFi 2.4G	N/A	15	Back	39	2441	9.5	9.3	0.047	**0.049**	51
					Front	39	2441	9.5	9.3	0.012	0.013	
BT Tethering	GFSK	WiFi 2.4G	N/A	10	Back	39	2441	9.5	9.3	0.101	**0.106**	52
					Front	39	2441	9.5	9.3	0.022	0.023	
					Edge Top	39	2441	9.5	9.3	0.007	0.007	
					Edge Left	39	2441	9.5	9.3	0.057	0.060	

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.

Note(s):

Repeated measurement is not required since the original highest measured SAR is <0.8 W/kg (1-g) or 2 W/kg (10-g).

12. Simultaneous Transmission Conditions

RF Exposure Condition	Item	Capable Transmit Configurations				
Head	1	WWAN Main Ant 1	+	DTS		
	2	WWAN Main Ant 1	+	U-NII		
	3	WWAN Main Ant 1	+	U-NII	+	BT
	4	WWAN Main Ant 2	+	DTS		
	5	WWAN Main Ant 2	+	U-NII		
	6	WWAN Main Ant 2	+	U-NII	+	BT
Body-worn	9	WWAN Main Ant 1	+	DTS		
	10	WWAN Main Ant 1	+	U-NII		
	11	WWAN Main Ant 1	+	U-NII	+	BT
	12	WWAN Main Ant 2	+	DTS		
	13	WWAN Main Ant 2	+	U-NII		
	14	WWAN Main Ant 2	+	U-NII	+	BT
Hotspot	15	WWAN Main Ant 1	+	DTS		
	16	WWAN Main Ant 1	+	U-NII		
	17	WWAN Main Ant 1	+	U-NII	+	BT
	18	WWAN Main Ant 2	+	DTS		
	19	WWAN Main Ant 2	+	U-NII		
	20	WWAN Main Ant 2	+	U-NII	+	BT
Extremity	21	WWAN Main Ant 1	+	DTS		
	22	WWAN Main Ant 1	+	U-NII		
	23	WWAN Main Ant 1	+	U-NII	+	BT
	24	WWAN Main Ant 2	+	DTS		
	25	WWAN Main Ant 2	+	U-NII		
	26	WWAN Main Ant 2	+	U-NII	+	BT

Notes:

1. Only DTS Ch 1~11 and U-NII 3 Ch 149 (20 MHz) supports Hotspot.
2. GPRS/EDGE, W-CDMA, and LTE support Hotspot.
3. VoIP is supported in GPRS/EDGE, W-CDMA and LTE.
4. DTS Radio cannot transmit simultaneously with Bluetooth Radio.
5. U-NII Radio can transmit simultaneously with Bluetooth Radio.
6. Extremity Sum of SAR Analysis is only required when WWAN Phablet SAR is required. Refer to §6.5.

12.1. Simultaneous transmission SAR test exclusion considerations

KDB 447498 D01 General RF Exposure Guidance provides two procedures for determining simultaneous transmission SAR test exclusion: Sum of SAR and SAR to Peak Location Ratio (SPLSR)

12.1.1. Sum of SAR

To qualify for simultaneous transmission SAR test exclusion based upon Sum of SAR the sum of the reported standalone SARs for all simultaneously transmitting antennas shall be below the applicable standalone SAR limit. If the sum of the SARs is above the applicable limit then simultaneous transmission SAR test exclusion may still apply if the requirements of the SAR to Peak Location Ratio (SPLSR) evaluation are met.

12.2. Sum of the SAR for WWAN Main Ant 1 & Wi-Fi & BT

RF Exposure conditions	Test Position	Standalone SAR (W/kg)				∑ 1-g SAR (W/kg)			
		WWAN	DTS	NII	DSS	1+2	1+3	1+4	1+3+4
		Main Ant 1	WiFi 2.4G	WiFi 5G	BT				
		1	2	3	4				
Head	Left Cheek	0.326	0.052	0.391	0.027	0.378	0.717	0.353	0.744
	Left Tilt	0.196	0.052	0.446	0.016	0.248	0.642	0.212	0.658
	Right Cheek	0.397	0.052	0.391	0.080	0.449	0.788	0.477	**0.868**
	Right Tilt	0.202	0.052	0.418	0.032	0.254	0.620	0.234	0.652
Body-worn	Back	0.274	0.426	0.453	0.049	0.700	0.727	0.323	0.776
	Front	0.264	0.104	0.120	0.013	0.368	0.384	0.277	0.397
Hotspot	Back	0.453	0.943	0.556	0.106	**1.396**	1.009	0.559	**1.115**
	Front	0.265	0.393	0.483	0.023	0.658	0.748	0.288	0.771
	Edge Top		0.393	0.483	0.007	0.393	0.483	0.007	0.490
	Edge Right	0.420				0.420	0.420	0.420	0.420
	Edge Bottom	0.286				0.286	0.286	0.286	0.286
	Edge Left	0.196	0.393	0.483	0.060	0.589	0.679	0.256	0.739

Conclusion:

Simultaneous transmission SAR measurement (Volume Scan) is not required because the sum of the 1-g SAR is < 1.6

12.3. Sum of the SAR for WWAN Main Ant 2 & Wi-Fi & BT

RF Exposure conditions	Test Position	Standalone SAR (W/kg)				∑ 1-g SAR (W/kg)			
		WWAN	DTS	NII	DSS	1+2	1+3	1+4	1+3+4
		Main Ant 2	WiFi 2.4G	WiFi 5G	BT				
		1	2	3	4				
Head	Left Cheek	0.402	0.052	0.391	0.027	**0.454**	0.793	0.429	0.820
	Left Tilt	0.208	0.052	0.446	0.016	0.260	0.654	0.224	0.670
	Right Cheek	0.297	0.052	0.391	0.080	0.349	0.688	0.377	0.768
	Right Tilt	0.172	0.052	0.418	0.032	0.224	0.590	0.204	0.622
Body-worn	Back	0.478	0.426	0.453	0.049	**0.904**	0.931	0.527	**0.980**
	Front	0.461	0.104	0.120	0.013	0.565	0.581	0.474	0.594
Hotspot	Back	0.430	0.943	0.483	0.106	1.373	0.913	0.536	1.019
	Front	0.381	0.393	0.483	0.023	0.774	0.864	0.404	0.887
	Edge Top		0.393	0.483	0.007	0.393	0.483	0.007	0.490
	Edge Bottom	0.316				0.316	0.316	0.316	0.316
	Edge Left	0.319	0.393	0.483	0.060	0.712	0.802	0.379	0.862

Conclusion:

Simultaneous transmission SAR measurement (Volume Scan) is not required because the sum of the 1-g SAR is < 1.6

Appendixes

Refer to separated files for the following appendixes.

Appendix A: SAR Setup Photos

Appendix B: SAR System Check Plots

Appendix C: SAR Highest Test Plots

Appendix D: SAR Tissue Ingredients

Appendix E: SAR Probe Certificates

Appendix F: SAR Dipole Certificates

Appendix G: Proximity Sensor

END OF REPORT