SAR EVALUATION REPORT

IEEE Std 1528-2013

For

GSM/WCDMA/LTE Phablet with BT/BLE,DTS/UNII a/b/g/n/ac, NFC, ANT+ and WPT

FCC ID: A3LSMN770F
Model Name: SM-N770F/DS and SM-N770F

Report Number: 13094578-S1V4
Issue Date: 12/4/2019

Prepared for

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NVLAP LAB CODE 200065-0

Revision History

Rev.	Date	Revisions	Revised By
V1	11/18/2019	Initial Issue	--
V2	12/2/2019	Section 1: Updated Table Section 9.6: Added Note Section 10.13: Removed Wi-Fi Direct Appendix C: Updated test plots	Remi Rodberg
V3	12/2/2019	Section 1: Updated Table Section 6.2: Updated Duty Cycle Section 10.12: Updated Duty Cycle	Remi Rodberg
		Section 7: Updated Table	Devin Chang
V4	12/4/2019	Section 10: Updated with appropriate notes	Remi Rodberg

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1. Attestation of Test Results

Applicant Name		SAMSUNG ELECTRONICS CO., LTD.			
FCC ID		A3LSMN770F			
Model Name		SM-N770F & SM-N770F/DS (Model SM-N770F was used for testing)			
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		0.228	0.658	0.875	0.375
Body-worn		0.646	0.098	0.132	0.021
Hotspot		1.371	0.347	0.240	0.078
Product specific (Extremity) 10g SAR		2.628	N/A	0.572	N/A
Simultaneous TX	Head	1.343	1.343	1.343	0.603
	Body-worn	0.894	0.806	0.894	0.667
	Hotspot	1.203	1.203	1.098	0.756
Date Tested		10/28/2019 to 11/14/2019			
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 is capable of demonstrating compliance with the requirements as documented in this report.

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 taken into account 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 duly noted in the revisions section. Any alteration of this document not carried out by UL Verification Services Inc. will constitute fraud and shall nullify the document. This report must not be used by the client to claim product certification, approval, or endorsement by NVLAP, NIST, any agency of the Federal Government, or any agency of the U.S. government.

Approved & Released By:	Prepared By:
	
Devin Chang Senior Test Engineer UL Verification Services Inc.	Remi Rodberg Laboratory Technician UL Verification Services Inc.

2. Test Specification, Methods and Procedures

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

- 248227 D01 802.11 Wi-Fi SAR v02r02
- 447498 D01 General RF Exposure Guidance v06
- 447498 D03 Supplement C Cross-Reference v01
- 648474 D04 Handset SAR v01r03
- 865664 D01 SAR measurement 100 MHz to 6 GHz v01r04
- 865664 D02 RF Exposure Reporting v01r02
- 941225 D01 3G SAR Procedures v03r01
- 941225 D05 SAR for LTE Devices v02r05
- 941225 D05A LTE Rel.10 KDB Inquiry Sheet v01r02
- 941225 D06 Hotspot Mode v02r01
- 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 April 2016; RF Exposure Procedures (LTE Carrier Aggregation for DL)
- TCB workshop October 2016; RF Exposure Procedures (Bluetooth Duty Factor)
- TCB workshop May 2017; RF Exposure Procedures (Broadband Liquid Above 3 GHz)
- TCB workshop April 2018; RF Exposure Procedures (LTE DL CA SAR Test Exclusion)

3. Facilities and Accreditation

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

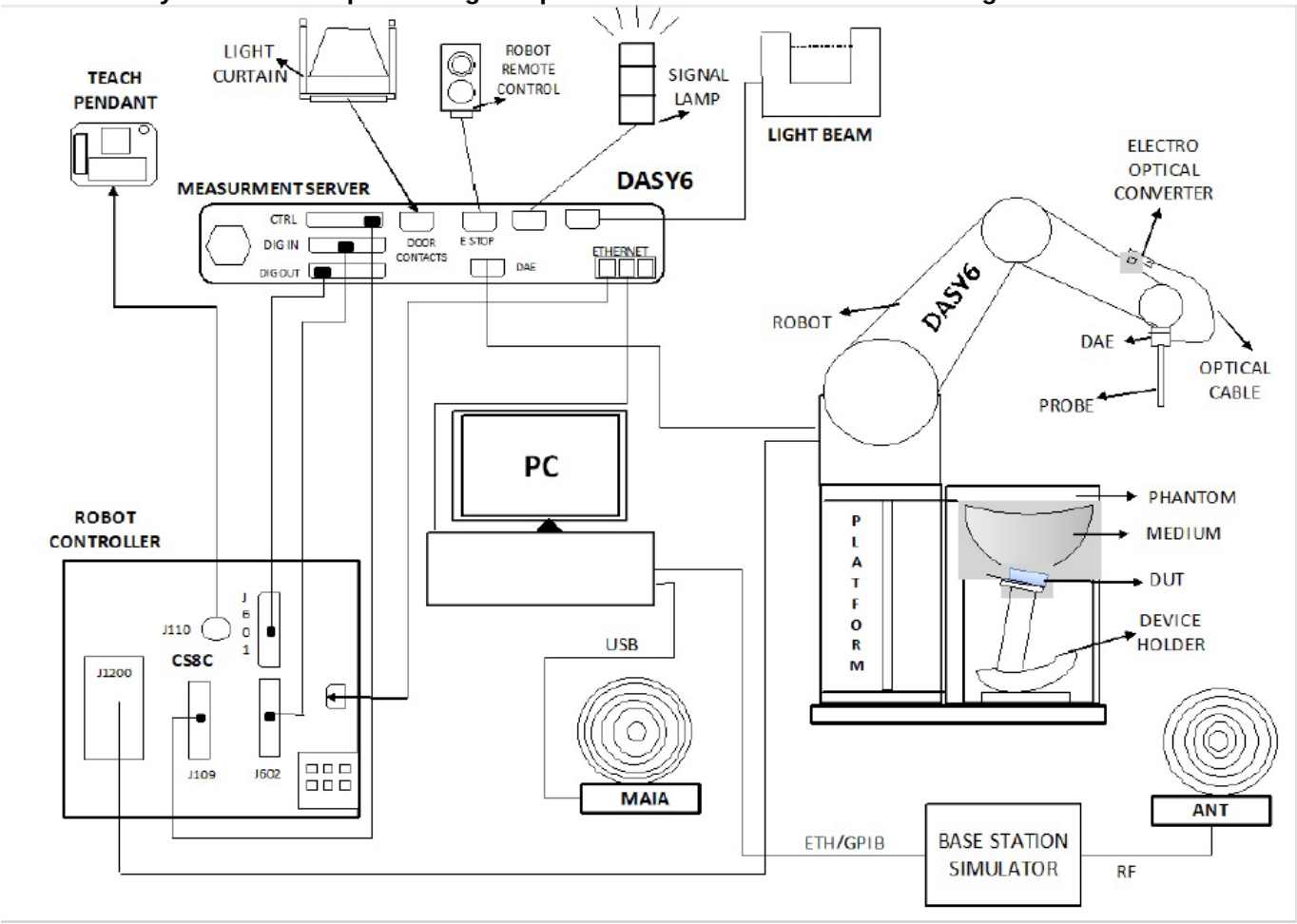
47173 Benicia Street	47266 Benicia Street
SAR Lab A	SAR Lab 1
SAR Lab B	SAR Lab 2
SAR Lab C	SAR Lab 3
SAR Lab D	SAR Lab 4
SAR Lab E	SAR Lab 5
SAR Lab F	SAR Lab 6
SAR Lab G	SAR Lab 7
SAR Lab H	SAR Lab 8

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

4. SAR Measurement System & Test Equipment

4.1. SAR Measurement System

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



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

4.2. SAR Scan Procedures

Step 1: Power Reference Measurement

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

Step 2: Area Scan

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

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

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

Step 3: Zoom Scan

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

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

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

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

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

Step 4: Power drift measurement

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

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
S-Parameter Network Analyzer	R&S	ZNLE6	101273-VA	4/24/2020
Dielectric Probe kit	SPEAG	DAK-3.5	1087	2/6/2020
Shorting Block	SPEAG	DAK-3.5 Short	SM DAK 200 BA	2/6/2020
Thermometer	Fisher Scientific	Traceable	181062309	2/21/2020

System Check

Name of Equipment	Manufacturer	Type/Model	Serial No.	Cal. Due Date
Signal Generator	Rhode & Schwarz	SMB 100A	180970-zC	2/13/2020
Power Sensor	Rhode & Schwarz	NRP18A	100994-RE	2/15/2020
Signal Generator	Rhode & Schwarz	SMB 100A	180968-gX	2/14/2020
Power Sensor	Rhode & Schwarz	NRP18A	100992-iu	2/15/2020

Lab Equipment

Name of Equipment	Manufacturer	Type/Model	Serial No.	Cal. Due Date
E-Field Probe (SAR Lab 1)	SPEAG	EX3DV4	7501	5/21/2020
E-Field Probe (SAR Lab 2)	SPEAG	EX3DV4	7483	11/14/2019*
E-Field Probe (SAR Lab 3)	SPEAG	EX3DV4	7500	4/18/2020
Data Acquisition Electronics (SAR Lab 1)	SPEAG	DAE4	1239	7/10/2020
Data Acquisition Electronics (SAR Lab 2)	SPEAG	DAE4	1359	2/15/2020
Data Acquisition Electronics (SAR Lab 3)	SPEAG	DAE4	1472	3/21/2020
System Validation Dipole	SPEAG	D750V3	1019	3/21/2020
System Validation Dipole	SPEAG	D835V2	4d002	11/28/2019
System Validation Dipole	SPEAG	D1750V2	1050	4/17/2020
System Validation Dipole	SPEAG	D1900V2	5d043	11/29/2019
System Validation Dipole	SPEAG	D1900V2	5d140	4/17/2020
System Validation Dipole	SPEAG	D2450V2	899	3/22/2020
System Validation Dipole	SPEAG	D2600V2	1036	3/22/2020
System Validation Dipole	SPEAG	D5GHzV2	1003	2/19/2020

Note(s):

*Equipment not used past calibration due date.

Other

Name of Equipment	Manufacturer	Type/Model	DNU	Serial No.	Cal. Due Date
Power Meter	Agilent	N1912A		MY55196004	1/30/2020
Power Sensor	Agilent	N1921A		MY52270022	2/6/2020
Power Sensor	Agilent	N1921A		MY53260010	2/6/2020
Base Station Simulator	R & S	R & S		164541-Ci	2/18/2020
Base Station Simulator	R & S	CBT Bluetooth Tester		100900-aC	2/14/2020

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	Refer to Appendix A
Back Cover	The Back Cover is not removable
Battery Options	The rechargeable battery is not user accessible.
Accessory	Headset and SPEN
Wireless Router (Hotspot)	Wi-Fi Hotspot mode permits the device to share its cellular data connection with other Wi-Fi-enabled devices. ☒ Mobile Hotspot (Wi-Fi 2.4 GHz) ☒ Mobile Hotspot (Wi-Fi 5.8 GHz)
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** R38MA039SPF / 352339110058761 / Radiation #9 R38MA039SGN / 352339110058696 / Radiation #10 R38MA039TYD / 352339110059173 / Radiation #6 R38MA039TJP / 352339110059041 / Radiation #7 R38MA039QFA / 352339110058027 / Radiation #5 R38MA039SFP / 352339110058688 / Radiation #13 R38MA039RMJ / 352339110058415 / Radiation #8 R38M908371P / 352339110012032 / Main Conduction #1 R38M908377D / 352339110012099 / Main Conduction #2 R38MA039RER / 352339110058340 / Wi-Fi Conduction
Hardware Version	REV1.0
Software Version	N770F.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. 24) HSUPA (Rel. 6) DC-HSDPA (Rel. 9) HSPA+ (DL only)		100%
LTE	FDD Band 2 FDD Band 4 FDD Band 5 FDD Band 12 FDD Band 13 FDD Band 17 TDD Band 41 FDD Band 66	QPSK 16QAM 64QAM Rel. 10 Carrier Aggregation support downlink only		100% (FDD) 63.3% (TDD) Refer to §6.4
	Does this device support SV-LTE (1xRTT-LTE)? ☐ Yes ☒ No			
Wi-Fi	2.4 GHz	802.11b 802.11g 802.11n (HT20)		98.97% (802.11b) [1] 90.11% (802.11b 11Mbps) [1] 92.48% (802.11g) [1]
	5 GHz	802.11a 802.11n (HT20) 802.11n (HT40) 802.11ac (VHT20) 802.11ac (VHT40) 802.11ac (VHT80)		93.40% (802.11a) [1] 65.46% (802.11ac 80MHz BW) [1]
	Does this device support bands 5.60 ~ 5.65 GHz? ☒ Yes ☐ No			
	Does this device support Band gap channel(s)? ☒ Yes ☐ No			
Bluetooth	2.4 GHz	BR, EDR and LE		76.66% (GFSK) [2]

Notes:

1. Duty cycle for Wi-Fi is referenced from the DTS and UNII report.
2. Duty cycle for Bluetooth is referenced from §9.7

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		
	Band 41[2]	Frequency range: 2496 - 2690 MHz (BW = 194 MHz)					
		Channel Bandwidth					
		20 MHz	15 MHz	10 MHz	5 MHz	3 MHz	1.4 MHz
	Low	**39750 / 2506.0**					
	Mid- Low	**40185 / 2549.5**					
	Mid	**40620 / 2593.0**					
	Mid-High	**41055 / 2636.5**					
	High	**41490 / 2680.0**					

	Band 66	Frequency range: 1710 - 1780 MHz (BW = 70 MHz)					
		Channel Bandwidth					
		20 MHz	15 MHz	10 MHz	5 MHz	3 MHz	1.4 MHz
	Low	**132072/ 1720**	132047/ 1717.5	132022/ 1715	131997/ 1712.5	131987/ 1711.5	131979/ 1710.7
	Mid	**132322/ 1745**	132322/ 1745	132322/ 1745	132322/ 1745	132322/ 1745	132322/ 1745
	High	**132572/ 1770**	132597/ 1772.5	132622/ 1775	132647/ 1777.5	132657/ 1778.5	132665/ 1779.3

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

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

MPR Built-in by design
The manufacturer MPR values are always within the 3GPP maximum MPR allowance but may not follow the default MPR values.
A-MPR (additional MPR) was disabled during SAR testing

Power reduction	Yes
Spectrum plots for RB configurations	A properly configured base station simulator was used for the SAR and power measurements; therefore, spectrum plots for each RB allocation and offset configuration are not included in the SAR report.

Notes:

1. 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 (Earjack), WWAN (Hotspot), WWAN (Grip Sensor), and WLAN. 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	Product Specific 10g
WWAN (Earjack)	W-CDMA B2/4 LTE B2/4/66	N/A	✓	N/A	✓
WWAN (Hotspot)	W-CDMA B2/4 LTE B2/4/66	N/A	N/A	✓	N/A
WWAN (Grip Sensor)	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):

Tune-Up Limits for WWAN (Hotspot) and WWAN (Grip Sensor) are both Reduced Average Powers. Please refer to §9 for all power measurements.

Product Specific 10g Adjusted SAR Calculation

Wireless technologies	Max Tune-up Limit (dBm)	Reduced Tune-Up Limit (dBm)	Power Factor	Reported SAR Limit (W/kg)
W-CDMA B2	25.0	21.0	2.51	0.478
W-CDMA B4	25.0	21.0	2.51	0.478
LTE B2	25.5	21.5	2.51	0.478
LTE B66	25.0	21.5	2.24	0.536

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, Product Specific 10g 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 Product Specific 10g SAR is not required.
2. LTE 50% RB is scaled up to the Max Tune-Up Limit with MPR included.

6.6. Wi-Fi RSDB (Real Simultaneous Dual Band) Activation Conditions

Please refer to table below for activation conditions for RSDB output power levels. These simultaneous conditions apply during both Max and Reduced Power. Refer to §9.6 and §9.7 RSDB Output Power Results for further details.

	# Tx	5 GHz WIFI [dBm]		2.4 GHz WIFI [dBm]		802.11 Modes
		Ant1	Ant2	Ant1	Ant2	
2.4 GHz + 5 GHz RSDB & MIMO	3	A	A	B	-	2.4 GHz: b only 5 GHz: a, n, ac
	3	A	A	-	B	
2.4 GHz + 5 GHz RSDB MIMO	4	A	A	B	B	2.4 GHz: n, g (CDD + STBC only) 5 GHz: n, ac, a (CDD + STBC only)

7. RF Exposure Conditions (Test Configurations)

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

Wireless technologies	RF Exposure Conditions	DUT-to-User Separation	Test Position	Antenna-to-edge/surface	SAR Required	Note
WWAN (Main Ant. 1)	Head	0 mm	Left Touch	N/A	Yes	
			Left Tilt (15°)	N/A	Yes	
			Right Touch	N/A	Yes	
			Right Tilt (15°)	N/A	Yes	
	Body	15 mm	Rear	N/A	Yes	
			Front	N/A	Yes	
	Hotspot	10 mm	Rear	< 25 mm	Yes	
			Front	< 25 mm	Yes	
			Edge 1 (Top)	> 25 mm	No	1
			Edge 2 (Left)	< 25 mm	Yes	
			Edge 3 (Bottom)	< 25 mm	Yes	
			Edge 4 (Right)	< 25 mm	Yes	
	Product Specifc 10g	0 mm	Rear	Refer to notes 2 & 3		
			Front			
			Edge 1 (Top)			
			Edge 2 (Left)			
			Edge 3 (Bottom)			
			Edge 4 (Right)			
WWAN (Main Ant. 2)	Head	0 mm	Left Touch	N/A	Yes	
			Left Tilt (15°)	N/A	Yes	
			Right Touch	N/A	Yes	
			Right Tilt (15°)	N/A	Yes	
	Body	15 mm	Rear	N/A	Yes	
			Front	N/A	Yes	
	Hotspot	10 mm	Rear	< 25 mm	Yes	
			Front	< 25 mm	Yes	
			Edge 1 (Top)	> 25 mm	No	1
			Edge 2 (Left)	> 25 mm	No	1
			Edge 3 (Bottom)	< 25 mm	Yes	
			Edge 4 (Right)	< 25 mm	Yes	
	Product Specifc 10g	0 mm	Rear	Refer to notes 2 & 3		
			Front			
			Edge 1 (Top)			
			Edge 2 (Left)			
			Edge 3 (Bottom)			
			Edge 4 (Right)			

Notes:

1. SAR is not required because the distance from the antenna to the edge is > 25 mm as per KDB 941225 D06 Hot Spot SAR.
2. For Phablet devices: when hotspot mode applies, Product Specific 10-g SAR is required only for the surfaces and edges with hotspot mode 1-g reported SAR > 1.2 W/kg.
3. For Phablet devices: when hotspot mode applies and power reduction applies to hotspot mode, Product Specific 10-g SAR is required for each test position that has an adjusted SAR to maximum power that is > 1.2 W/kg.
4. WWAN Main Antenna #2 supports LTE B41.

Wireless technologies	RF Exposure Conditions	DUT-to-User Separation	Test Position	Antenna-to-edge/surface	SAR Required	Note
WLAN & BT (Ant. 1)	Head	0 mm	Left Touch	N/A	Yes	
			Left Tilt (15°)	N/A	Yes	
			Right Touch	N/A	Yes	
			Right Tilt (15°)	N/A	Yes	
	Body	15 mm	Rear	N/A	Yes	
			Front	N/A	Yes	
	Hotspot (2.4/5.2/5.8 GHz Bands)	10 mm	Rear	< 25 mm	Yes	
			Front	< 25 mm	Yes	
			Edge 1 (Top)	< 25 mm	Yes	
			Edge 2 (Left)	> 25 mm	No	1
			Edge 3 (Bottom)	> 25 mm	No	1
			Edge 4 (Right)	< 25 mm	Yes	
	Product Specifc 10g	0 mm	Rear	Refer to notes 2 & 3		
			Front			
			Edge 1 (Top)			
			Edge 2 (Left)			
			Edge 3 (Bottom)			
			Edge 4 (Right)			
WLAN (Ant. 2)	Head	0 mm	Left Touch	N/A	Yes	
			Left Tilt (15°)	N/A	Yes	
			Right Touch	N/A	Yes	
			Right Tilt (15°)	N/A	Yes	
	Body	15 mm	Rear	N/A	Yes	
			Front	N/A	Yes	
	Hotspot (2.4/5.2/5.8 GHz Bands)	10 mm	Rear	< 25 mm	Yes	
			Front	< 25 mm	Yes	
			Edge 1 (Top)	< 25 mm	Yes	
			Edge 2 (Left)	> 25 mm	No	1
			Edge 3 (Bottom)	> 25 mm	No	1
			Edge 4 (Right)	< 25 mm	Yes	
	Product Specifc 10g	0 mm	Rear	Refer to notes 2 & 3		
			Front			
			Edge 1 (Top)			
			Edge 2 (Left)			
			Edge 3 (Bottom)			
			Edge 4 (Right)			

Notes:

1. SAR is not required because the distance from the antenna to the edge is > 25 mm as per KDB 941225 D06 Hot Spot SAR.
2. For Phablet devices: when Hotspot Mode is not supported, Product Specific 10-g SAR is required for all surfaces and edges with an antenna located at ≤ 25 mm from that surface or edge in direct contact with a flat phantom, to address interactive hand use exposure conditions.
3. For Phablet devices: when hotspot mode applies, Product Specific 10-g SAR is required only for the surfaces and edges with hotspot mode 1-g reported SAR > 1.2 W/kg.
4. Wi-Fi Direct only supported during Hand use conditions.

8. Dielectric Property Measurements & System Check

8.1. Dielectric Property Measurements

The temperature of the tissue-equivalent medium used during measurement must also be within 18°C to 25°C and within ± 2°C of the temperature when the tissue parameters are characterized.
The dielectric parameters must be measured before the tissue-equivalent medium is used in a series of SAR measurements. The parameters should be re-measured after each 3 – 4 days of use; or earlier if the dielectric parameters can become out of tolerance; for example, when the parameters are marginal at the beginning of the measurement series.
Tissue dielectric parameters were measured at the low, middle and high frequency of each operating frequency range of the test device.
The dielectric constant (εr) and conductivity (σ) of typical tissue-equivalent media recipes are expected to be within ± 5% of the required target values; but for SAR measurement systems that have implemented the SAR error compensation algorithms documented in IEEE Std 1528-2013, to automatically compensate the measured SAR results for deviations between the measured and required tissue dielectric parameters, the tolerance for εr and σ may be relaxed to ± 10%. This is limited to frequencies ≤ 3 GHz.

Tissue Dielectric Parameters

FCC KDB 865664 D01 SAR Measurement 100 MHz to 6 GHz

Target Frequency (MHz)	Head		Body	
	ε_r	σ (S/m)	ε_r	σ (S/m)
150	52.3	0.76	61.9	0.80
300	45.3	0.87	58.2	0.92
450	43.5	0.87	56.7	0.94
835	41.5	0.90	55.2	0.97
900	41.5	0.97	55.0	1.05
915	41.5	0.98	55.0	1.06
1450	40.5	1.20	54.0	1.30
1610	40.3	1.29	53.8	1.40
1800 – 2000	40.0	1.40	53.3	1.52
2450	39.2	1.80	52.7	1.95
3000	38.5	2.40	52.0	2.73
5000	36.2	4.45	49.3	5.07
5100	36.1	4.55	49.1	5.18
5200	36.0	4.66	49.0	5.30
5300	35.9	4.76	48.9	5.42
5400	35.8	4.86	48.7	5.53
5500	35.6	4.96	48.6	5.65
5600	35.5	5.07	48.5	5.77
5700	35.4	5.17	48.3	5.88
5800	35.3	5.27	48.2	6.00

IEEE Std 1528-2013

Refer to Table 3 within the IEEE Std 1528-2013

Dielectric Property Measurements Results:

SAR Lab	Date	Band (MHz)	Tissue Type	Frequency (MHz)	Relative Permittivity (εr)			Conductivity (σ)		
					Measured	Target	Delta (%)	Measured	Target	Delta (%)
1	10/28/2019	1900	Head	1900	40.21	40.00	0.53	1.45	1.40	3.57
				1850	40.31	40.00	0.78	1.42	1.40	1.50
				1920	40.16	40.00	0.40	1.46	1.40	4.07
1	10/28/2019	1750	Head	1750	40.47	40.08	0.96	1.36	1.37	-0.51
				1710	40.59	40.15	1.11	1.34	1.35	-0.55
				1755	40.47	40.08	0.98	1.37	1.37	-0.50
1	10/31/2019	1900	Head	1900	38.86	40.00	-2.85	1.46	1.40	3.93
				1850	38.94	40.00	-2.65	1.43	1.40	2.07
				1920	38.82	40.00	-2.95	1.46	1.40	4.43
1	10/31/2019	1750	Head	1750	39.11	40.08	-2.43	1.37	1.37	0.15
				1710	39.16	40.15	-2.46	1.35	1.35	0.19
				1755	39.11	40.08	-2.41	1.38	1.37	0.23
1	10/31/2019	5750	Head	5750	33.72	35.36	-4.65	5.42	5.21	4.03
				5700	33.80	35.42	-4.57	5.38	5.16	4.27
				5850	33.58	35.30	-4.87	5.52	5.27	4.78
1	11/4/2019	1750	Head	1750	39.10	40.08	-2.46	1.34	1.37	-1.82
				1710	39.15	40.15	-2.48	1.32	1.35	-1.89
				1755	39.10	40.08	-2.44	1.35	1.37	-1.73
1	11/4/2019	750	Head	750	41.95	41.96	-0.03	0.88	0.89	-1.12
				660	41.71	42.42	-1.68	0.85	0.89	-3.54
				800	41.23	41.71	-1.14	0.89	0.90	-0.34
1	11/12/2019	1750	Head	1750	39.41	40.08	-1.68	1.32	1.37	-3.36
				1710	39.38	40.15	-1.91	1.30	1.35	-3.60
				1755	39.41	40.08	-1.66	1.32	1.37	-3.56
2	10/28/2019	835	Head	835	41.30	41.50	-0.48	0.94	0.90	3.98
				805	41.25	41.68	-1.03	0.93	0.90	3.34
				850	41.21	41.50	-0.70	0.94	0.92	2.68
2	10/28/2019	750	Head	750	42.40	41.96	1.04	0.90	0.89	0.89
				660	41.83	42.42	-1.40	0.87	0.89	-1.43
				800	41.22	41.71	-1.16	0.93	0.90	3.14
2	10/31/2019	5250	Head	5250	35.09	35.93	-2.35	4.58	4.70	-2.70
				5150	35.27	36.05	-2.16	4.49	4.60	-2.50
				5350	34.91	35.82	-2.54	4.66	4.80	-2.97
2	10/31/2019	5600	Head	5600	34.44	35.53	-3.08	4.91	5.06	-3.07
				5500	34.61	35.65	-2.91	4.80	4.96	-3.21
				5725	34.14	35.39	-3.54	5.08	5.19	-2.18
2	11/4/2019	5250	Head	5250	36.35	35.93	1.16	4.65	4.70	-1.17
				5150	36.50	36.05	1.26	4.54	4.60	-1.37
				5350	36.10	35.82	0.78	4.77	4.80	-0.65
2	11/4/2019	5600	Head	5600	35.75	35.53	0.61	5.07	5.06	0.17
				5500	35.88	35.65	0.65	4.93	4.96	-0.60
				5725	35.51	35.39	0.34	5.24	5.19	0.92
2	11/4/2019	5750	Head	5750	35.54	35.36	0.50	5.25	5.21	0.75
				5700	35.61	35.42	0.54	5.19	5.16	0.49
				5850	35.41	35.30	0.31	5.37	5.27	1.82

3	10/28/2019	2450	Head	2450	39.49	39.20	0.74	1.86	1.80	3.06
				2400	39.54	39.30	0.62	1.82	1.75	3.67
				2480	39.40	39.16	0.61	1.87	1.83	1.78
3	10/28/2019	2600	Head	2600	39.25	39.01	0.61	1.96	1.96	-0.11
				2495	39.39	39.14	0.63	1.89	1.85	1.97
				2690	39.08	38.90	0.47	2.03	2.06	-1.67
3	10/31/2019	2450	Head	2450	40.11	39.20	2.32	1.87	1.80	3.94
				2400	40.16	39.30	2.20	1.83	1.75	4.24
				2480	40.01	39.16	2.16	1.89	1.83	2.87
3	11/4/2019	2450	Head	2450	39.63	39.20	0.94	1.86	1.80	3.39
				2400	39.64	39.30	0.87	1.83	1.75	4.47
				2480	39.54	39.16	0.96	1.88	1.83	2.71
3	11/12/2019	1900	Head	1900	40.02	40.00	0.05	1.45	1.40	3.43
				1850	40.09	40.00	0.23	1.42	1.40	1.21
				1920	39.99	40.00	-0.02	1.46	1.40	4.14
3	11/13/2019	2450	Head	2450	38.31	39.20	-2.27	1.82	1.80	1.22
				2400	38.55	39.30	-1.90	1.78	1.75	1.85
				2480	38.24	39.16	-2.35	1.83	1.83	-0.02
3	11/13/2019	5250	Head	5250	35.47	35.93	-1.29	4.50	4.70	-4.21
				5150	35.64	36.05	-1.13	4.40	4.60	-4.37
				5350	35.32	35.82	-1.39	4.61	4.80	-4.03
3	11/13/2019	5600	Head	5600	34.89	35.53	-1.81	4.86	5.06	-3.94
				5500	35.07	35.65	-1.62	4.74	4.96	-4.40
				5725	34.64	35.39	-2.12	5.02	5.19	-3.30
3	11/13/2019	5750	Head	5750	34.64	35.36	-2.04	5.03	5.21	-3.49
				5700	34.72	35.42	-1.98	4.98	5.16	-3.56
				5850	34.48	35.30	-2.32	5.14	5.27	-2.52

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 #	Dipole Cal. Due Data	Measured Results for 1g SAR				Measured Results for 10g SAR				Plot No.
					Zoom Scan to 100 mW	Normalize to 1 W	Target (Ref. Value)	Delta ±10 %	Zoom Scan to 100 mW	Normalize to 1 W	Target (Ref. Value)	Delta ±10 %	
1	10/28/2019	Head	D1750V2 SN:1050	4/17/2020	3.520	35.20	35.40	-0.56	1.890	18.90	18.60	1.61	
1	10/28/2019	Head	D1900V2 SN:5d043	11/29/2019	4.080	40.80	41.80	-2.39	2.130	21.30	21.69	-1.80	
1	10/31/2019	Head	D1750V2 SN:1050	4/17/2020	3.420	34.20	35.40	-3.39	1.840	18.40	18.60	-1.08	
1	10/31/2019	Head	D1900V2 SN:5d043	11/29/2019	4.060	40.60	41.80	**-2.87**	2.110	21.10	21.69	-2.72	1,2
1	10/31/2019	Head	D5GHzV2 SN:1003 (5.75 GHz)	2/19/2020	8.580	85.80	80.70	**6.32**	2.490	24.90	23.00	8.26	3,4
1	11/4/2019	Head	D750V3 SN:1019	3/21/2020	0.818	8.18	8.29	**-1.33**	0.539	5.39	5.44	-0.92	5,6
1	11/4/2019	Head	D1750V2 SN:1050	4/17/2020	3.500	35.00	35.40	-1.13	1.870	18.70	18.60	0.54	
1	11/12/2019	Head	D1750V2 SN:1050	4/17/2020	3.390	33.90	35.40	**-4.24**	1.820	18.20	18.60	-2.15	7,8
2	10/28/2019	Head	D750V3 SN:1019	3/21/2020	0.846	8.46	8.29	**2.05**	0.556	5.56	5.44	2.21	9,10
2	10/28/2019	Head	D835V2 SN:4d002	11/28/2019	0.994	9.94	9.87	**0.71**	0.646	6.46	6.36	1.57	11,12
2	10/31/2019	Head	D5GHzV2 SN:1003 (5.25 GHz)	2/19/2020	7.650	76.50	80.80	**-5.32**	2.200	22.00	23.30	-5.58	13,14
2	10/31/2019	Head	D5GHzV2 SN:1003 (5.60 GHz)	2/19/2020	7.780	77.80	82.70	**-5.93**	2.210	22.10	23.80	-7.14	15,16
2	11/4/2019	Head	D5GHzV2 SN:1003 (5.25 GHz)	2/19/2020	7.820	78.20	80.80	-3.22	2.260	22.60	23.30	-3.00	
2	11/4/2019	Head	D5GHzV2 SN:1003 (5.60 GHz)	2/19/2020	8.140	81.40	82.70	-1.57	2.320	23.20	23.80	-2.52	
2	11/4/2019	Head	D5GHzV2 SN:1003 (5.75 GHz)	2/19/2020	7.680	76.80	80.70	**-4.83**	2.200	22.00	23.00	-4.35	17,18
3	10/28/2019	Head	D2450V2 SN:899	3/22/2020	5.180	51.80	51.60	0.39	2.410	24.10	24.10	0.00	
3	10/28/2019	Head	D2600V2 SN:1036	3/22/2020	5.770	57.70	55.90	**3.22**	2.590	25.90	24.80	4.44	19,20
3	10/31/2019	Head	D2450V2 SN:899	3/22/2020	5.310	53.10	51.60	**2.91**	2.470	24.70	24.10	2.49	21,22
3	11/4/2019	Head	D2450V2 SN:899	3/22/2020	5.280	52.80	51.60	2.33	2.450	24.50	24.10	1.66	
3	11/8/2019	Head	D2450V2 SN:899	3/22/2020	5.060	50.60	51.60	-1.94	2.350	23.50	24.10	-2.49	
3	11/12/2019	Head	D1900V2 SN:5d140	4/17/2020	4.070	40.70	39.50	**3.04**	2.110	21.10	20.60	2.43	23,24
3	11/13/2019	Head	D2450V2 SN:899	3/22/2020	5.190	51.90	51.60	0.58	2.410	24.10	24.10	0.00	
3	11/13/2019	Head	D5GHzV2 SN:1003 (5.25 GHz)	2/19/2020	7.370	73.70	80.80	**-8.79**	2.100	21.00	23.30	-9.87	25,26
3	11/13/2019	Head	D5GHzV2 SN:1003 (5.60 GHz)	2/19/2020	7.920	79.20	82.70	**-4.23**	2.240	22.40	23.80	-5.88	27,28
3	11/13/2019	Head	D5GHzV2 SN:1003 (5.75 GHz)	2/19/2020	7.800	78.00	80.70	**-3.35**	2.200	22.00	23.00	-4.35	29,30

9. Conducted Output Power Measurements

9.1. GSM

Per KDB 941225 D01 3G SAR Procedures:

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

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

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

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

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.

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	32.4	23.3	33.5	24.5
			190	836.6	32.3	23.2		
			251	848.8	32.4	23.4		
		2	128	824.2	30.3	24.3	31.5	25.5
			190	836.6	29.8	23.8		
			251	848.8	29.9	23.9		
		3	128	824.2	28.8	24.6	30.0	**25.7**
			190	836.6	28.6	24.3		
			251	848.8	28.8	24.5		
		4	128	824.2	27.7	24.7	28.5	25.5
			190	836.6	27.6	24.6		
			251	848.8	27.4	24.4		
EDGE (8PSK)	MCS5	1	128	824.2	27.1	18.0	28.0	19.0
			190	836.6	26.9	17.9		
			251	848.8	27.0	17.9		
		2	128	824.2	25.1	19.0	26.0	20.0
			190	836.6	24.8	18.8		
			251	848.8	24.9	18.9		
		3	128	824.2	23.9	19.6	25.0	20.7
			190	836.6	23.7	19.5		
			251	848.8	23.7	19.4		
		4	128	824.2	22.8	19.7	23.5	20.5
			190	836.6	22.4	19.4		
			251	848.8	22.4	19.4		

Notes:

Based on the Tune-up Procedure, GPRS/EDGE (GMSK) mode with 3 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)			
					Measured		Tune-up Limit	
					Burst Pwr	Frame Pwr	Burst Pwr	Frame Pwr
GPRS/EDGE (GMSK)	CS1	1	512	1850.2	29.2	20.2	30.5	21.5
			661	1880.0	29.4	20.4		
			810	1909.8	29.7	20.6		
		2	512	1850.2	26.9	20.9	27.5	21.5
			661	1880.0	27.0	20.9		
			810	1909.8	27.1	21.1		
		3	512	1850.2	24.1	19.8	25.5	21.2
			661	1880.0	24.1	19.8		
			810	1909.8	24.2	19.9		
		4	512	1850.2	23.3	20.3	24.5	**21.5**
			661	1880.0	23.3	20.3		
			810	1909.8	23.4	20.4		
EDGE (8PSK)	MCS5	1	512	1850.2	26.0	17.0	27.5	18.5
			661	1880.0	26.0	17.0		
			810	1909.8	26.1	17.1		
		2	512	1850.2	23.7	17.6	25.0	19.0
			661	1880.0	23.6	17.6		
			810	1909.8	24.0	18.0		
		3	512	1850.2	22.0	17.8	23.0	18.7
			661	1880.0	22.0	17.8		
			810	1909.8	22.1	17.8		
		4	512	1850.2	20.3	17.3	21.5	18.5
			661	1880.0	20.2	17.2		
			810	1909.8	20.2	17.2		

Notes:

Based on the Tune-up Procedure, GPRS/EDGE (GMSK) mode with 4 time slots for Max 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	Proces ses	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.		

HSPA+ Setup Procedures used to establish the test signals

The following 1 Sub-test was completed according to procedures in table C.11.1.4 of 3GPP TS34.121. A summary of these settings is illustrated below:

Table C.11.1.4: β values for transmitter characteristics tests with HS-DPCCH and E-DCH with 16QAM

Sub-test	β_c (Note3)	β_d	β_{HS} (Note1)	β_{ec}	β_{ed} (2xSF2) (Note 4)	β_{ed} (2xSF4) (Note 4)	CM (dB) (Note 2)	MPR (dB) (Note 2)	AG Index (Note 4)	E-TFCI (Note 5)	E-TFCI (boost)
1	1	0	30/15	30/15	β_{ed}1: 30/15 β_{ed}2: 30/15	β_{ed}3: 24/15 β_{ed}4: 24/15	3.5	2.5	14	105	105

Note 1: Δ_{ACK}, Δ_{NACK} and Δ_{CQI} = 30/15 with β_{hs} = 30/15 * β_c .
Note 2: CM = 3.5 and the MPR is based on the relative CM difference, MPR = MAX(CM-1,0).
Note 3: DPDCH is not configured, therefore the β_c is set to 1 and β_d = 0 by default.
Note 4: β_{ed} can not be set directly; it is set by Absolute Grant Value.
Note 5: All the sub-tests require the UE to transmit 2SF2+2SF4 16QAM EDCH and they apply for UE using E-DPDCH category 7. E-DCH TTI is set to 2ms TTI and E-DCH table index = 2. To support these E-DCH configurations DPDCH is not allocated. The UE is signalled to use the extrapolation algorithm.

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, DC-HSDPA and HSPA+. When primary mode and the adjusted SAR is ≤ 1.2 W/kg and secondary mode is ≤ ¼ dB higher than the primary mode

W-CDMA Band II 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)	9262	1852.4	24.6	N/A	25.0	20.6	N/A	21.0
		9400	1880.0	24.6			20.6		
		9538	1907.6	24.6			20.7		
HSDPA	Subtest 1	9262	1852.4	23.5	0	24.0	20.6	0	21.0
		9400	1880.0	23.4			20.5		
		9538	1907.6	23.6			20.6		
	Subtest 2	9262	1852.4	22.5	0	24.0	20.6	0	21.0
		9400	1880.0	22.4			20.5		
		9538	1907.6	22.6			20.6		
	Subtest 3	9262	1852.4	22.5	0.5	23.5	20.6	0	21.0
		9400	1880.0	22.5			20.5		
		9538	1907.6	22.6			20.6		
	Subtest 4	9262	1852.4	21.6	0.5	23.5	20.6	0	21.0
		9400	1880.0	21.5			20.5		
		9538	1907.6	21.6			20.6		
HSUPA	Subtest 1	9262	1852.4	21.4	0	23.5	19.5	0	21.0
		9400	1880.0	21.4			19.5		
		9538	1907.6	21.5			19.5		
	Subtest 2	9262	1852.4	19.3	2	21.5	19.5	0	21.0
		9400	1880.0	19.3			19.5		
		9538	1907.6	19.4			19.5		
	Subtest 3	9262	1852.4	22.3	1	22.5	19.5	0	21.0
		9400	1880.0	22.3			19.5		
		9538	1907.6	22.5			19.5		
	Subtest 4	9262	1852.4	19.2	2	21.5	19.5	0	21.0
		9400	1880.0	19.3			19.5		
		9538	1907.6	19.4			19.5		
	Subtest 5	9262	1852.4	22.4	0	23.5	20.6	0	21.0
		9400	1880.0	22.4			20.5		
		9538	1907.6	22.5			20.6		
DC-HSDPA	Subtest 1	9262	1852.4	23.5	0	24.0	20.6	0	21.0
		9400	1880.0	23.4			20.5		
		9538	1907.6	23.6			20.6		
	Subtest 2	9262	1852.4	22.5	0	24.0	20.6	0	21.0
		9400	1880.0	22.4			20.5		
		9538	1907.6	22.6			20.6		
	Subtest 3	9262	1852.4	21.7	0.5	23.5	20.6	0	21.0
		9400	1880.0	21.5			20.5		
		9538	1907.6	21.6			20.6		
	Subtest 4	9262	1852.4	21.6	0.5	23.5	20.6	0	21.0
		9400	1880.0	21.5			20.5		
		9538	1907.6	21.6			20.6		

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	24.7	N/A	25.0	20.6	N/A	21.0
		1413	1732.6	24.8			20.5		
		1513	1752.6	25.0			20.8		
HSDPA	Subtest 1	1312	1712.4	23.7	0	24.0	20.4	0	21.0
		1413	1732.6	23.8			20.5		
		1513	1752.6	24.0			20.7		
	Subtest 2	1312	1712.4	22.7	0	24.0	20.4	0	21.0
		1413	1732.6	22.7			20.5		
		1513	1752.6	23.0			20.7		
	Subtest 3	1312	1712.4	22.7	0.5	23.5	20.4	0	21.0
		1413	1732.6	22.7			20.5		
		1513	1752.6	23.0			20.7		
	Subtest 4	1312	1712.4	21.8	0.5	23.5	20.2	0	21.0
		1413	1732.6	21.8			20.3		
		1513	1752.6	22.1			20.5		
HSUPA	Subtest 1	1312	1712.4	21.7	0	23.5	19.5	0	21.0
		1413	1732.6	21.7			19.4		
		1513	1752.6	22.0			19.4		
	Subtest 2	1312	1712.4	19.6	2	21.5	19.5	0	21.0
		1413	1732.6	19.6			19.5		
		1513	1752.6	19.9			19.4		
	Subtest 3	1312	1712.4	22.5	1	22.5	19.5	0	21.0
		1413	1732.6	22.5			19.5		
		1513	1752.6	22.5			19.4		
	Subtest 4	1312	1712.4	19.6	2	21.5	19.5	0	21.0
		1413	1732.6	19.6			19.5		
		1513	1752.6	19.9			19.4		
	Subtest 5	1312	1712.4	22.6	0	23.5	20.5	0	21.0
		1413	1732.6	22.7			20.5		
		1513	1752.6	23.0			20.4		
DC-HSDPA	Subtest 1	1312	1712.4	23.7	0	24.0	20.4	0	21.0
		1413	1732.6	23.9			20.6		
		1513	1752.6	24.0			20.7		
	Subtest 2	1312	1712.4	22.7	0	24.0	20.5	0	21.0
		1413	1732.6	22.7			20.7		
		1513	1752.6	23.0			20.7		
	Subtest 3	1312	1712.4	21.7	0.5	23.5	20.5	0	21.0
		1413	1732.6	21.9			20.7		
		1513	1752.6	22.0			20.7		
	Subtest 4	1312	1712.4	21.8	0.5	23.5	20.5	0	21.0
		1413	1732.6	21.8			20.7		
		1513	1752.6	22.1			20.7		

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	24.3	N/A	25.0
		4183	836.6	24.0		
		4233	846.6	24.0		
HSDPA	Subtest 1	4132	826.4	23.4	0	24.0
		4183	836.6	23.1		
		4233	846.6	23.0		
	Subtest 2	4132	826.4	22.4	0	24.0
		4183	836.6	22.1		
		4233	846.6	22.0		
	Subtest 3	4132	826.4	22.4	0.5	23.5
		4183	836.6	22.1		
		4233	846.6	21.9		
	Subtest 4	4132	826.4	21.4	0.5	23.5
		4183	836.6	21.0		
		4233	846.6	21.0		
HSUPA	Subtest 1	4132	826.4	21.3	0	23.0
		4183	836.6	21.0		
		4233	846.6	20.9		
	Subtest 2	4132	826.4	19.2	2	21.0
		4183	836.6	18.9		
		4233	846.6	18.8		
	Subtest 3	4132	826.4	22.0	1	22.0
		4183	836.6	21.9		
		4233	846.6	21.9		
	Subtest 4	4132	826.4	19.3	2	21.0
		4183	836.6	18.9		
		4233	846.6	18.9		
	Subtest 5	4132	826.4	22.5	0	23.0
		4183	836.6	22.7		
		4233	846.6	23.0		
DC-HSDPA	Subtest 1	4132	826.4	23.4	0	24.0
		4183	836.6	23.1		
		4233	846.6	23.0		
	Subtest 2	4132	826.4	22.4	0	24.0
		4183	836.6	22.1		
		4233	846.6	22.0		
	Subtest 3	4132	826.4	21.3	0.5	23.5
		4183	836.6	21.0		
		4233	846.6	21.0		
	Subtest 4	4132	826.4	21.4	0.5	23.5
		4183	836.6	21.0		
		4233	846.6	21.0		

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)

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.

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

SAR measurement is not required for the 16QAM, 64QAM. When the highest maximum output power for 16QAM, 64QAM is ≤ ½ dB higher than the QPSK or when the reported SAR for the QPSK configuration is ≤ 1.45 W/kg.

Please refer to section 6.3. for LTE detail test channels.

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 MHz	QPSK	1	0	24.9	24.7	24.8	0	25.5	21.2	20.7	20.7	0	21.5
		1	49	25.1	24.7	24.7	0	25.5	21.3	20.9	20.9	0	21.5
		1	99	25.2	24.8	24.7	0	25.5	21.3	20.9	20.9	0	21.5
		50	0	24.0	23.6	23.6	1	24.5	21.2	20.8	20.8	0	21.5
		50	24	24.1	23.7	23.7	1	24.5	21.3	20.9	20.9	0	21.5
		50	50	24.1	23.7	23.7	1	24.5	21.3	20.8	20.9	0	21.5
		100	0	24.1	23.7	23.8	1	24.5	21.4	20.9	20.9	0	21.5
	16QAM	1	0	24.2	23.7	23.7	1	24.5	21.5	21.0	21.0	0	21.5
		1	49	24.3	23.9	23.8	1	24.5	21.5	21.2	21.1	0	21.5
		1	99	24.4	23.8	23.9	1	24.5	21.5	21.2	21.2	0	21.5
		50	0	23.0	22.6	22.6	2	23.5	21.3	20.8	20.8	0	21.5
		50	24	23.1	22.7	22.7	2	23.5	21.4	20.9	20.9	0	21.5
		50	50	23.1	22.7	22.7	2	23.5	21.3	20.8	20.9	0	21.5
		100	0	23.2	22.7	22.8	2	23.5	21.4	20.9	20.9	0	21.5
	64QAM	1	0	23.1	22.7	22.7	2	23.5	21.4	21.0	20.9	0	21.5
		1	49	23.2	22.9	22.8	2	23.5	21.5	21.1	21.1	0	21.5
		1	99	23.2	22.2	22.9	2	23.5	21.5	21.0	21.0	0	21.5
		50	0	22.1	21.6	21.6	3	22.5	21.2	20.8	20.8	0	21.5
		50	24	22.2	21.7	21.7	3	22.5	21.3	20.9	20.9	0	21.5
		50	50	22.1	21.7	21.7	3	22.5	21.3	20.8	20.9	0	21.5
		100	0	22.2	21.8	21.8	3	22.5	21.4	20.9	20.9	0	21.5
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 MHz	QPSK	1	0	25.2	24.7	24.8	0	25.5	21.1	20.7	20.8	0	21.5
		1	37	25.4	24.8	24.8	0	25.5	21.3	20.8	20.9	0	21.5
		1	74	25.2	24.8	24.9	0	25.5	21.3	20.8	20.9	0	21.5
		36	0	24.4	23.9	24.0	1	24.5	21.3	20.7	20.9	0	21.5
		36	20	24.5	23.9	24.0	1	24.5	21.3	20.8	21.0	0	21.5
		36	39	24.5	23.9	24.0	1	24.5	21.3	20.8	20.9	0	21.5
		75	0	24.5	24.0	24.1	1	24.5	21.3	20.8	21.0	0	21.5
	16QAM	1	0	24.3	24.0	23.9	1	24.5	21.4	21.0	21.1	0	21.5
		1	37	24.4	24.1	24.0	1	24.5	21.5	21.1	21.2	0	21.5
		1	74	24.4	24.0	24.0	1	24.5	21.5	21.0	21.3	0	21.5
		36	0	23.3	22.9	23.0	2	23.5	21.3	20.8	21.0	0	21.5
		36	20	23.4	22.9	23.0	2	23.5	21.3	20.8	21.0	0	21.5
		36	39	23.3	22.8	23.0	2	23.5	21.3	20.8	20.9	0	21.5
		75	0	23.4	22.9	23.0	2	23.5	21.4	20.8	21.0	0	21.5
	64QAM	1	0	23.3	22.9	23.0	2	23.5	21.4	20.8	21.0	0	21.5
		1	37	23.3	23.0	23.2	2	23.5	21.5	21.0	21.1	0	21.5
		1	74	23.3	22.9	23.2	2	23.5	21.5	20.9	21.1	0	21.5
		36	0	22.3	21.8	21.9	3	22.5	21.3	20.8	20.9	0	21.5
		36	20	22.3	21.9	21.9	3	22.5	21.3	20.8	20.9	0	21.5
		36	39	22.3	21.8	21.9	3	22.5	21.3	20.8	20.9	0	21.5
		75	0	22.4	21.8	22.0	3	22.5	21.4	20.8	21.0	0	21.5
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 MHz	QPSK	1	0	25.3	24.8	24.9	0	25.5	21.2	20.7	20.9	0	21.5
		1	25	25.4	24.9	25.0	0	25.5	21.3	20.8	21.0	0	21.5
		1	49	25.5	24.8	25.1	0	25.5	21.3	20.8	21.0	0	21.5
		25	0	24.3	23.8	23.9	1	24.5	21.3	20.8	20.9	0	21.5
		25	12	24.3	23.8	24.0	1	24.5	21.3	20.8	21.0	0	21.5
		25	25	24.3	23.8	24.0	1	24.5	21.3	20.8	21.0	0	21.5
		50	0	24.3	23.9	24.0	1	24.5	21.3	20.8	21.0	0	21.5
	16QAM	1	0	24.5	23.9	23.9	1	24.5	21.3	21.0	21.3	0	21.5
		1	25	24.5	24.0	24.1	1	24.5	21.5	21.1	21.5	0	21.5
		1	49	24.5	23.9	24.1	1	24.5	21.5	21.0	21.5	0	21.5
		25	0	23.3	22.8	23.0	2	23.5	21.3	20.8	21.0	0	21.5
		25	12	23.3	22.9	23.0	2	23.5	21.4	20.9	21.0	0	21.5
		25	25	23.3	22.9	23.0	2	23.5	21.3	20.9	21.0	0	21.5
		50	0	23.3	22.9	23.0	2	23.5	21.4	20.9	21.0	0	21.5
	64QAM	1	0	23.5	23.0	23.1	2	23.5	21.3	20.9	21.1	0	21.5
		1	25	23.5	23.1	23.2	2	23.5	21.5	21.1	21.2	0	21.5
		1	49	23.5	23.1	23.3	2	23.5	21.5	21.1	21.2	0	21.5
		25	0	22.3	21.8	21.9	3	22.5	21.3	20.8	21.0	0	21.5
		25	12	22.3	21.9	22.0	3	22.5	21.3	20.8	21.0	0	21.5
		25	25	22.3	21.8	22.0	3	22.5	21.3	20.8	21.0	0	21.5
		50	0	22.3	21.8	22.0	3	22.5	21.4	20.8	21.0	0	21.5

LTE Band 2 Measured Results (continued)

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 MHz	QPSK	1	0	25.3	24.8	24.9	0	25.5	21.2	20.8	21.0	0	21.5
		1	12	25.5	24.8	25.0	0	25.5	21.3	20.8	21.1	0	21.5
		1	24	25.5	24.9	25.1	0	25.5	21.4	20.9	21.1	0	21.5
		12	0	24.4	23.9	24.1	1	24.5	21.4	20.8	21.0	0	21.5
		12	7	24.4	23.9	24.0	1	24.5	21.4	20.8	21.0	0	21.5
		12	13	24.4	23.8	24.0	1	24.5	21.4	20.8	21.0	0	21.5
		25	0	24.4	23.9	24.0	1	24.5	21.4	20.8	21.0	0	21.5
	16QAM	1	0	24.5	24.0	24.4	1	24.5	21.5	21.0	21.4	0	21.5
		1	12	24.5	24.1	24.4	1	24.5	21.5	21.1	21.5	0	21.5
		1	24	24.5	24.1	24.3	1	24.5	21.5	21.1	21.5	0	21.5
		12	0	23.4	22.8	23.1	2	23.5	21.4	20.8	21.0	0	21.5
		12	7	23.4	22.9	23.0	2	23.5	21.4	20.9	21.1	0	21.5
		12	13	23.4	22.9	23.0	2	23.5	21.4	20.9	21.1	0	21.5
		25	0	23.4	22.8	23.0	2	23.5	21.4	20.8	21.1	0	21.5
	64QAM	1	0	23.3	23.0	23.3	2	23.5	21.5	20.9	21.2	0	21.5
		1	12	23.3	23.0	23.3	2	23.5	21.5	21.0	21.3	0	21.5
		1	24	23.4	23.1	23.2	2	23.5	21.5	21.0	21.3	0	21.5
		12	0	22.4	21.8	22.1	3	22.5	21.4	20.9	21.0	0	21.5
		12	7	22.3	21.8	22.0	3	22.5	21.3	20.9	21.1	0	21.5
		12	13	22.4	21.8	22.0	3	22.5	21.3	20.9	21.0	0	21.5
		25	0	22.4	21.8	22.0	3	22.5	21.4	20.8	21.0	0	21.5

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 MHz	QPSK	1	0	25.4	24.9	25.1	0	25.5	21.4	20.9	21.0	0	21.5
		1	8	25.5	24.9	25.2	0	25.5	21.5	20.8	21.1	0	21.5
		1	14	25.5	24.8	25.1	0	25.5	21.5	20.8	21.1	0	21.5
		8	0	24.4	23.9	24.1	1	24.5	21.4	20.8	21.0	0	21.5
		8	4	24.5	23.9	24.1	1	24.5	21.4	20.8	21.0	0	21.5
		8	7	24.5	23.9	24.1	1	24.5	21.4	20.8	21.0	0	21.5
		15	0	24.4	23.9	24.0	1	24.5	21.4	20.8	21.0	0	21.5
	16QAM	1	0	24.5	24.1	24.1	1	24.5	21.5	21.1	21.2	0	21.5
		1	8	24.5	24.1	24.0	1	24.5	21.5	21.1	21.3	0	21.5
		1	14	24.5	24.1	24.1	1	24.5	21.5	21.0	21.3	0	21.5
		8	0	23.4	22.9	23.1	2	23.5	21.4	20.9	21.0	0	21.5
		8	4	23.4	22.9	23.1	2	23.5	21.4	20.9	21.0	0	21.5
		8	7	23.4	22.9	23.1	2	23.5	21.4	20.9	21.0	0	21.5
		15	0	23.4	22.9	23.0	2	23.5	21.4	20.8	21.1	0	21.5
	64QAM	1	0	23.5	23.0	23.2	2	23.5	21.5	21.1	21.3	0	21.5
		1	8	23.5	23.1	23.1	2	23.5	21.5	21.2	21.3	0	21.5
		1	14	23.4	23.1	23.2	2	23.5	21.5	21.2	21.2	0	21.5
		8	0	22.4	21.9	22.0	3	22.5	21.3	20.9	21.1	0	21.5
		8	4	22.4	21.9	22.0	3	22.5	21.3	20.9	21.0	0	21.5
		8	7	22.4	21.9	22.0	3	22.5	21.3	20.9	21.0	0	21.5
		15	0	22.5	21.8	22.0	3	22.5	21.4	20.8	21.0	0	21.5

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 MHz	QPSK	1	0	25.5	25.0	24.8	0	25.5	21.5	20.9	20.8	0	21.5
		1	3	25.5	24.9	24.8	0	25.5	21.4	20.9	20.8	0	21.5
		1	5	25.4	24.9	24.7	0	25.5	21.4	20.8	20.8	0	21.5
		3	0	25.4	24.8	24.7	0	25.5	21.4	20.7	20.6	0	21.5
		3	1	25.4	24.8	24.7	0	25.5	21.4	20.8	20.7	0	21.5
		3	3	25.4	24.8	24.7	0	25.5	21.4	20.8	20.7	0	21.5
		6	0	24.5	23.9	23.8	1	24.5	21.4	20.8	20.7	0	21.5
	16QAM	1	0	24.5	24.0	23.8	1	24.5	21.5	21.1	21.1	0	21.5
		1	3	24.4	24.0	24.0	1	24.5	21.5	21.1	21.1	0	21.5
		1	5	24.5	23.9	23.8	1	24.5	21.5	21.0	21.0	0	21.5
		3	0	24.3	23.9	23.7	1	24.5	21.5	20.7	20.7	0	21.5
		3	1	24.4	23.9	23.7	1	24.5	21.5	20.8	20.7	0	21.5
		3	3	24.4	23.8	23.7	1	24.5	21.4	20.8	20.7	0	21.5
		6	0	23.5	23.0	22.7	2	23.5	21.5	20.9	20.7	0	21.5
	64QAM	1	0	23.2	23.1	22.9	2	23.5	21.5	20.9	20.8	0	21.5
		1	3	23.3	23.2	22.8	2	23.5	21.5	20.8	21.0	0	21.5
		1	5	23.5	22.9	22.6	2	23.5	21.5	21.2	20.8	0	21.5
		3	0	23.4	22.9	22.7	2	23.5	21.5	20.8	20.7	0	21.5
		3	1	23.4	22.9	22.7	2	23.5	21.5	20.8	20.7	0	21.5
		3	3	23.4	22.9	22.7	2	23.5	21.5	20.8	20.8	0	21.5
		6	0	22.5	21.9	21.8	3	22.5	21.5	20.9	20.7	0	21.5

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 MHz	QPSK	1	0		24.6		0	25.5
		1	25		24.7		0	25.5
		1	49		24.7		0	25.5
		25	0		23.6		1	24.5
		25	12		23.6		1	24.5
		25	25		23.6		1	24.5
		50	0		23.6		1	24.5
	16QAM	1	0		23.7		1	24.5
		1	25		23.8		1	24.5
		1	49		23.8		1	24.5
		25	0		22.5		2	23.5
		25	12		22.6		2	23.5
		25	25		22.6		2	23.5
		50	0		22.6		2	23.5
	64QAM	1	0		22.6		2	23.5
		1	25		22.7		2	23.5
		1	49		22.7		2	23.5
		25	0		21.6		3	22.5
		25	12		21.6		3	22.5
		25	25		21.6		3	22.5
		50	0		21.6		3	22.5

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 MHz	QPSK	1	0	25.0	24.7	24.5	0	25.5
		1	12	25.1	24.9	24.7	0	25.5
		1	24	25.1	24.9	24.7	0	25.5
		12	0	24.1	23.8	23.6	1	24.5
		12	7	24.1	23.8	23.6	1	24.5
		12	13	24.1	23.8	23.6	1	24.5
		25	0	24.1	23.8	23.6	1	24.5
	16QAM	1	0	24.4	24.1	23.9	1	24.5
		1	12	24.4	24.1	23.9	1	24.5
		1	24	24.4	24.0	23.8	1	24.5
		12	0	23.1	22.8	22.5	2	23.5
		12	7	23.1	22.8	22.6	2	23.5
		12	13	23.0	22.8	22.6	2	23.5
		25	0	23.0	22.7	22.6	2	23.5
	64QAM	1	0	23.1	22.9	23.1	2	23.5
		1	12	23.2	22.9	22.7	2	23.5
		1	24	23.3	23.0	22.6	2	23.5
		12	0	22.0	21.9	21.6	3	22.5
		12	7	22.1	21.9	21.6	3	22.5
		12	13	22.1	21.8	21.5	3	22.5
		25	0	22.0	21.8	21.5	3	22.5

LTE Band 5 Measured Results (continued)

BW (MHz)	Mode	RB Allocation	RB offset	Maximum Average Power (dBm)			MPR	Tune-up Limit
				20415	20525	20635		
				825.5 MHz	836.5 MHz	847.5 MHz		
3 MHz	QPSK	1	0	25.2	24.9	24.6	0	25.5
		1	8	25.2	24.8	24.7	0	25.5
		1	14	25.1	24.8	24.7	0	25.5
		8	0	24.1	23.8	23.7	1	24.5
		8	4	24.1	23.8	23.7	1	24.5
		8	7	24.1	23.8	23.7	1	24.5
		15	0	24.1	23.8	23.6	1	24.5
	16QAM	1	0	24.4	24.0	23.9	1	24.5
		1	8	24.4	24.0	23.9	1	24.5
		1	14	24.3	23.9	23.9	1	24.5
		8	0	23.1	22.8	22.6	2	23.5
		8	4	23.1	22.8	22.6	2	23.5
		8	7	23.1	22.8	22.6	2	23.5
		15	0	23.1	22.8	22.6	2	23.5
	64QAM	1	0	23.2	22.8	22.9	2	23.5
		1	8	23.3	22.8	22.9	2	23.5
		1	14	23.1	22.8	22.9	2	23.5
		8	0	22.1	21.8	21.6	3	22.5
		8	4	22.1	21.8	21.6	3	22.5
		8	7	22.1	21.8	21.6	3	22.5
		15	0	22.0	21.8	21.6	3	22.5

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 MHz	QPSK	1	0	25.2	24.9	24.7	0	25.5
		1	3	25.1	24.9	24.7	0	25.5
		1	5	25.1	24.8	24.7	0	25.5
		3	0	25.0	24.8	24.5	0	25.5
		3	1	25.0	24.8	24.6	0	25.5
		3	3	25.0	24.8	24.6	0	25.5
		6	0	24.1	23.9	23.8	1	24.5
	16QAM	1	0	24.5	24.1	24.0	1	24.5
		1	3	24.4	23.9	23.9	1	24.5
		1	5	24.4	23.9	23.9	1	24.5
		3	0	24.0	23.9	23.5	1	24.5
		3	1	24.0	23.9	23.5	1	24.5
		3	3	24.1	23.8	23.6	1	24.5
		6	0	23.1	22.9	22.7	2	23.5
	64QAM	1	0	23.0	23.5	22.9	2	23.5
		1	3	22.8	22.6	22.8	2	23.5
		1	5	23.2	22.8	22.9	2	23.5
		3	0	23.0	22.7	22.6	2	23.5
		3	1	23.0	22.8	22.6	2	23.5
		3	3	23.0	22.8	22.6	2	23.5
		6	0	22.1	21.9	21.7	3	22.5

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 MHz	QPSK	1	0		23.7		0	25.5
		1	25		23.8		0	25.5
		1	49		23.9		0	25.5
		25	0		22.8		1	24.5
		25	12		22.9		1	24.5
		25	25		22.8		1	24.5
		50	0		22.9		1	24.5
	16QAM	1	0		22.9		1	24.5
		1	25		23.0		1	24.5
		1	49		23.0		1	24.5
		25	0		21.8		2	23.5
		25	12		21.9		2	23.5
		25	25		21.8		2	23.5
		50	0		21.9		2	23.5
	64QAM	1	0		21.9		2	23.5
		1	25		22.0		2	23.5
		1	49		22.0		2	23.5
		25	0		20.9		3	22.5
		25	12		20.9		3	22.5
		25	25		20.9		3	22.5
		50	0		20.9		3	22.5

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 MHz	QPSK	1	0	23.8	23.6	23.7	0	25.5
		1	12	24.0	23.8	23.9	0	25.5
		1	24	23.9	23.8	23.9	0	25.5
		12	0	22.8	22.8	22.8	1	24.5
		12	7	22.8	22.8	22.8	1	24.5
		12	13	22.8	22.8	22.8	1	24.5
		25	0	22.8	22.8	22.8	1	24.5
	16QAM	1	0	23.2	23.0	23.1	1	24.5
		1	12	23.3	23.0	23.1	1	24.5
		1	24	23.2	23.0	23.0	1	24.5
		12	0	21.8	21.8	21.8	2	23.5
		12	7	21.9	21.8	21.8	2	23.5
		12	13	21.8	21.7	21.8	2	23.5
		25	0	21.8	21.7	21.8	2	23.5
	64QAM	1	0	21.9	21.9	22.0	2	23.5
		1	12	22.0	22.1	22.1	2	23.5
		1	24	22.2	22.1	22.1	2	23.5
		12	0	21.0	20.9	20.9	3	22.5
		12	7	21.0	20.8	20.8	3	22.5
		12	13	21.0	20.8	20.8	3	22.5
		25	0	20.9	20.7	20.8	3	22.5

LTE Band 12 Measured Results (continued)

BW (MHz)	Mode	RB Allocation	RB offset	Maximum Average Power (dBm)			MPR	Tune-up Limit
				23025	23095	23165		
				700.5 MHz	707.5 MHz	714.5 MHz		
3 MHz	QPSK	1	0	23.7	23.8	23.8	0	25.5
		1	8	23.8	23.9	23.8	0	25.5
		1	14	23.8	23.9	23.8	0	25.5
		8	0	22.8	22.8	22.8	1	24.5
		8	4	22.9	22.8	22.7	1	24.5
		8	7	22.9	22.8	22.7	1	24.5
		15	0	22.8	22.8	22.7	1	24.5
	16QAM	1	0	23.1	23.0	22.9	1	24.5
		1	8	23.2	23.1	22.9	1	24.5
		1	14	23.1	23.2	22.9	1	24.5
		8	0	21.8	21.8	21.8	2	23.5
		8	4	21.8	21.8	21.7	2	23.5
		8	7	21.8	21.9	21.8	2	23.5
		15	0	21.9	21.9	21.7	2	23.5
	64QAM	1	0	22.1	22.1	21.6	2	23.5
		1	8	22.0	21.9	21.7	2	23.5
		1	14	21.9	22.0	21.8	2	23.5
		8	0	21.0	20.6	20.6	3	22.5
		8	4	21.0	20.5	20.6	3	22.5
		8	7	21.0	20.5	20.6	3	22.5
		15	0	20.9	20.5	20.5	3	22.5

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 MHz	QPSK	1	0	23.7	23.7	23.6	0	25.5
		1	3	23.7	23.6	23.6	0	25.5
		1	5	23.7	23.7	23.6	0	25.5
		3	0	23.7	23.5	23.5	0	25.5
		3	1	23.7	23.5	23.5	0	25.5
		3	3	23.6	23.6	23.5	0	25.5
		6	0	22.7	22.6	22.6	1	24.5
	16QAM	1	0	22.9	23.0	22.8	1	24.5
		1	3	22.8	22.9	22.7	1	24.5
		1	5	22.8	22.8	22.8	1	24.5
		3	0	22.7	22.6	22.6	1	24.5
		3	1	22.7	22.6	22.6	1	24.5
		3	3	22.7	22.7	22.5	1	24.5
		6	0	21.8	21.6	21.7	2	23.5
	64QAM	1	0	21.7	21.7	22.0	2	23.5
		1	3	21.8	21.7	22.2	2	23.5
		1	5	21.7	21.5	21.7	2	23.5
		3	0	21.8	21.6	21.6	2	23.5
		3	1	21.8	21.6	21.6	2	23.5
		3	3	21.8	21.6	21.5	2	23.5
		6	0	20.9	20.7	20.6	3	22.5

LTE Band 13 Measured Results

BW (MHz)	Mode	RB Allocation	RB offset	Maximum Average Power (dBm)			MPR	Tune-up Limit
				[redacted]	23230	[redacted]		
				[redacted]	782 MHz	[redacted]		
10 MHz	QPSK	1	0	[redacted]	23.0	[redacted]	0	25
		1	25	[redacted]	23.2	[redacted]	0	25
		1	49	[redacted]	23.2	[redacted]	0	25
		25	0	[redacted]	22.1	[redacted]	1	24
		25	12	[redacted]	22.2	[redacted]	1	24
		25	25	[redacted]	22.2	[redacted]	1	24
		50	0	[redacted]	22.3	[redacted]	1	24
	16QAM	1	0	[redacted]	22.2	[redacted]	1	24
		1	25	[redacted]	22.4	[redacted]	1	24
		1	49	[redacted]	22.4	[redacted]	1	24
		25	0	[redacted]	21.2	[redacted]	2	23
		25	12	[redacted]	21.2	[redacted]	2	23
		25	25	[redacted]	21.2	[redacted]	2	23
		50	0	[redacted]	21.2	[redacted]	2	23
	64QAM	1	0	[redacted]	21.3	[redacted]	2	23
		1	25	[redacted]	21.5	[redacted]	2	23
		1	49	[redacted]	21.5	[redacted]	2	23
		25	0	[redacted]	20.2	[redacted]	3	22
		25	12	[redacted]	20.3	[redacted]	3	22
		25	25	[redacted]	20.3	[redacted]	3	22
		50	0	[redacted]	20.2	[redacted]	3	22

BW (MHz)	Mode	RB Allocation	RB offset	Maximum Average Power (dBm)			MPR	Tune-up Limit
				[redacted]	23230	[redacted]		
				[redacted]	782 MHz	[redacted]		
5 MHz	QPSK	1	0	[redacted]	23.1	[redacted]	0	25
		1	12	[redacted]	23.2	[redacted]	0	25
		1	24	[redacted]	23.3	[redacted]	0	25
		12	0	[redacted]	22.3	[redacted]	1	24
		12	7	[redacted]	22.3	[redacted]	1	24
		12	13	[redacted]	22.2	[redacted]	1	24
		25	0	[redacted]	22.2	[redacted]	1	24
	16QAM	1	0	[redacted]	22.4	[redacted]	1	24
		1	12	[redacted]	22.5	[redacted]	1	24
		1	24	[redacted]	22.4	[redacted]	1	24
		12	0	[redacted]	21.4	[redacted]	2	23
		12	7	[redacted]	21.3	[redacted]	2	23
		12	13	[redacted]	21.3	[redacted]	2	23
		25	0	[redacted]	21.2	[redacted]	2	23
	64QAM	1	0	[redacted]	21.1	[redacted]	2	23
		1	12	[redacted]	21.2	[redacted]	2	23
		1	24	[redacted]	21.2	[redacted]	2	23
		12	0	[redacted]	20.1	[redacted]	3	22
		12	7	[redacted]	20.1	[redacted]	3	22
		12	13	[redacted]	20.1	[redacted]	3	22
		25	0	[redacted]	20.0	[redacted]	3	22

LTE Band 41 Measured Results

BW (MHz)	Mode	RB Allocation	RB offset	Maximum Average Power (dBm)					MPR	Tune-up Limit
				39750	40185	40620	41055	41490		
				2506 MHz	2549.5 MHz	2593 MHz	2636.5 MHz	2680 MHz		
20 MHz	QPSK	1	0	23.1	23.1	23.4	23.4	23.3	0	25
		1	49	23.2	23.3	23.6	23.6	23.4	0	25
		1	99	23.3	23.3	23.5	23.6	23.5	0	25
		50	0	22.6	22.6	22.9	22.9	22.8	1	24
		50	24	22.7	22.7	23.0	23.0	22.9	1	24
		50	50	22.7	22.7	23.0	23.0	22.9	1	24
		100	0	22.8	22.8	23.1	23.1	23.0	1	24
	16QAM	1	0	22.3	22.6	22.9	23.2	22.8	1	24
		1	49	23.0	22.9	23.3	23.3	22.8	1	24
		1	99	22.5	22.8	23.1	23.3	22.9	1	24
		50	0	21.6	21.6	22.0	22.0	21.8	2	23
		50	24	21.7	21.7	22.0	22.1	21.9	2	23
		50	50	21.7	21.7	22.0	22.0	21.9	2	23
		100	0	21.8	21.8	22.1	22.1	22.0	2	23
	64QAM	1	0	21.1	21.1	21.6	21.5	21.7	2	23
		1	49	21.3	21.0	21.4	22.0	21.3	2	23
		1	99	21.4	21.3	21.6	21.2	21.4	2	23
		50	0	20.6	20.6	20.9	20.9	20.8	3	22
		50	24	20.7	20.7	21.0	21.0	20.9	3	22
		50	50	20.7	20.7	21.0	21.0	20.8	3	22
		100	0	20.7	20.7	21.1	21.1	20.9	3	22

BW (MHz)	Mode	RB Allocation	RB offset	Maximum Average Power (dBm)					MPR	Tune-up Limit
				39750	40185	40620	41055	41490		
				2506 MHz	2549.5 MHz	2593 MHz	2636.5 MHz	2680 MHz		
15 MHz	QPSK	1	0	23.1	23.0	23.4	23.4	23.3	0	25
		1	37	23.2	23.2	23.6	23.5	23.5	0	25
		1	74	23.2	23.3	23.6	23.5	23.4	0	25
		36	0	22.7	22.7	23.0	23.0	22.9	1	24
		36	20	22.7	22.7	23.0	23.0	22.9	1	24
		36	39	22.7	22.7	23.0	23.0	22.9	1	24
		75	0	22.7	22.7	23.1	23.1	23.0	1	24
	16QAM	1	0	22.5	22.8	23.1	22.6	23.0	1	24
		1	37	22.7	23.0	23.3	22.7	22.7	1	24
		1	74	22.6	22.6	23.0	23.1	22.6	1	24
		36	0	21.7	21.7	21.9	22.0	21.8	2	23
		36	20	21.7	21.7	22.0	21.9	21.9	2	23
		36	39	21.7	21.7	22.0	22.0	21.8	2	23
		75	0	21.7	21.7	22.0	22.0	21.9	2	23
	64QAM	1	0	21.4	21.0	21.5	21.5	21.1	2	23
		1	37	21.5	21.0	21.7	21.7	21.2	2	23
		1	74	21.2	21.0	21.6	21.4	21.3	2	23
		36	0	20.6	20.7	21.0	21.0	20.8	3	22
		36	20	20.7	20.7	21.0	21.0	20.9	3	22
		36	39	20.6	20.7	21.0	20.9	20.8	3	22
		75	0	20.7	20.7	21.0	21.0	20.9	3	22

LTE Band 41 Measured Results (continued)

BW (MHz)	Mode	RB Allocation	RB offset	Maximum Average Power (dBm)					MPR	Tune-up Limit
				39750	40185	40620	41055	41490		
				2506 MHz	2549.5 MHz	2593 MHz	2636.5 MHz	2680 MHz		
10 MHz	QPSK	1	0	23.1	23.1	23.4	23.4	23.3	0	25
		1	25	23.2	23.2	23.5	23.5	23.4	0	25
		1	49	23.2	23.2	23.5	23.5	23.4	0	25
		25	0	22.6	22.6	22.9	22.9	22.8	1	24
		25	12	22.7	22.7	23.0	23.0	22.9	1	24
		25	25	22.7	22.7	23.0	23.0	22.8	1	24
		50	0	22.7	22.7	23.0	23.0	22.9	1	24
	16QAM	1	0	22.7	22.5	22.9	23.0	22.7	1	24
		1	25	22.9	22.6	23.0	23.1	22.8	1	24
		1	49	22.9	22.6	23.0	23.1	22.8	1	24
		25	0	21.6	21.6	21.9	21.9	21.8	2	23
		25	12	21.7	21.7	22.0	22.0	21.8	2	23
		25	25	21.7	21.7	21.9	22.0	21.8	2	23
		50	0	21.7	21.7	22.0	22.0	21.9	2	23
	64QAM	1	0	21.0	21.0	21.5	21.2	21.1	2	23
		1	25	21.1	21.0	21.6	21.3	21.2	2	23
		1	49	21.2	21.0	21.6	21.4	21.2	2	23
		25	0	20.6	20.6	20.9	20.8	20.8	3	22
		25	12	20.6	20.7	21.0	20.9	20.9	3	22
		25	25	20.6	20.7	21.0	20.9	20.9	3	22
		50	0	20.7	20.7	21.0	21.0	20.9	3	22

BW (MHz)	Mode	RB Allocation	RB offset	Maximum Average Power (dBm)					MPR	Tune-up Limit
				39750	40185	40620	41055	41490		
				2506 MHz	2549.5 MHz	2593 MHz	2636.5 MHz	2680 MHz		
5 MHz	QPSK	1	0	23.1	23.1	23.4	23.4	23.3	0	25
		1	12	23.2	23.1	23.5	23.5	23.4	0	25
		1	24	23.1	23.1	23.4	23.5	23.4	0	25
		12	0	22.7	22.7	23.0	23.0	22.9	1	24
		12	7	22.7	22.6	22.9	23.0	22.8	1	24
		12	13	22.7	22.6	22.9	23.0	22.9	1	24
		25	0	22.7	22.7	22.9	23.0	22.9	1	24
	16QAM	1	0	22.7	22.5	22.9	22.9	22.6	1	24
		1	12	22.8	22.6	23.0	23.0	22.7	1	24
		1	24	22.7	22.6	23.0	23.0	22.7	1	24
		12	0	21.7	21.6	21.9	22.0	21.8	2	23
		12	7	21.7	21.6	21.9	22.0	21.8	2	23
		12	13	21.7	21.6	21.9	21.9	21.8	2	23
		25	0	21.7	21.6	21.9	22.0	21.8	2	23
	64QAM	1	0	21.6	21.1	21.4	21.4	21.3	2	23
		1	12	21.8	21.2	21.5	21.5	21.4	2	23
		1	24	21.6	21.1	21.5	21.4	21.3	2	23
		12	0	20.7	20.7	21.0	21.0	20.9	3	22
		12	7	20.7	20.6	20.9	21.0	20.8	3	22
		12	13	20.7	20.6	20.9	21.0	20.8	3	22
		25	0	20.6	20.7	20.9	20.9	20.9	3	22

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 MHz	QPSK	1	0	23.0	23.2	23.2	0	25	19.5	19.5	19.5	0	21.5
		1	49	23.1	23.3	23.4	0	25	19.5	19.6	19.6	0	21.5
		1	99	23.2	23.4	23.4	0	25	19.5	19.7	19.7	0	21.5
		50	0	22.1	22.2	22.3	1	24	19.5	19.5	19.5	0	21.5
		50	24	22.2	22.4	22.4	1	24	19.5	19.6	19.6	0	21.5
		50	50	22.2	22.4	22.4	1	24	19.5	19.6	19.6	0	21.5
		100	0	22.3	22.4	22.4	1	24	19.5	19.7	19.7	0	21.5
	16QAM	1	0	22.3	22.3	22.4	1	24	19.6	19.6	19.9	0	21.5
		1	49	22.6	22.5	22.5	1	24	19.8	19.8	20.0	0	21.5
		1	99	22.6	22.6	22.6	1	24	19.8	19.9	20.1	0	21.5
		50	0	21.2	21.2	21.3	2	23	19.5	19.5	19.5	0	21.5
		50	24	21.3	21.4	21.4	2	23	19.5	19.6	19.6	0	21.5
		50	50	21.3	21.4	21.4	2	23	19.5	19.6	19.6	0	21.5
		100	0	21.3	21.4	21.4	2	23	19.5	19.7	19.7	0	21.5
	64QAM	1	0	21.3	21.3	21.4	2	23	19.5	19.5	19.7	0	21.5
		1	49	21.5	21.5	21.5	2	23	19.7	19.7	19.8	0	21.5
		1	99	21.6	21.6	21.6	2	23	19.7	19.8	19.9	0	21.5
		50	0	20.2	20.3	20.3	3	22	19.5	19.5	19.5	0	21.5
		50	24	20.3	20.4	20.4	3	22	19.5	19.6	19.7	0	21.5
		50	50	20.3	20.4	20.4	3	22	19.5	19.6	19.6	0	21.5
		100	0	20.3	20.4	20.4	3	22	19.6	19.7	19.7	0	21.5

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 MHz	QPSK	1	0	23.2	23.4	23.4	0	25	19.3	19.4	19.4	0	21.5
		1	37	23.4	23.6	23.5	0	25	19.5	19.6	19.5	0	21.5
		1	74	23.4	23.6	23.5	0	25	19.4	19.5	19.5	0	21.5
		36	0	22.5	22.6	22.6	1	24	19.4	19.5	19.5	0	21.5
		36	20	22.5	22.6	22.6	1	24	19.4	19.6	19.5	0	21.5
		36	39	22.5	22.6	22.5	1	24	19.4	19.5	19.5	0	21.5
		75	0	22.5	22.7	22.6	1	24	19.4	19.6	19.5	0	21.5
	16QAM	1	0	22.5	22.6	22.6	1	24	19.4	19.7	19.6	0	21.5
		1	37	22.7	22.7	22.7	1	24	19.6	19.9	19.7	0	21.5
		1	74	22.7	22.8	22.7	1	24	19.6	19.9	19.7	0	21.5
		36	0	21.5	21.5	21.5	2	23	19.4	19.5	19.5	0	21.5
		36	20	21.5	21.6	21.5	2	23	19.5	19.5	19.5	0	21.5
		36	39	21.5	21.6	21.5	2	23	19.4	19.5	19.5	0	21.5
		75	0	21.5	21.7	21.6	2	23	19.5	19.6	19.5	0	21.5
	64QAM	1	0	21.6	21.6	21.5	2	23	19.5	19.8	19.6	0	21.5
		1	37	21.8	21.8	21.7	2	23	19.7	20.0	19.7	0	21.5
		1	74	21.8	21.8	21.7	2	23	19.7	20.0	19.7	0	21.5
		36	0	20.4	20.5	20.5	3	22	19.4	19.5	19.4	0	21.5
		36	20	20.4	20.6	20.5	3	22	19.5	19.6	19.5	0	21.5
		36	39	20.4	20.6	20.5	3	22	19.5	19.6	19.5	0	21.5
		75	0	20.5	20.7	20.6	3	22	19.5	19.6	19.6	0	21.5

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 MHz	QPSK	1	0	23.4	23.4	23.3	0	25	19.4	19.5	19.4	0	21.5
		1	25	23.5	23.5	23.4	0	25	19.5	19.6	19.5	0	21.5
		1	49	23.5	23.6	23.5	0	25	19.5	19.6	19.5	0	21.5
		25	0	22.4	22.5	22.4	1	24	19.4	19.5	19.4	0	21.5
		25	12	22.5	22.6	22.5	1	24	19.5	19.6	19.5	0	21.5
		25	25	22.5	22.6	22.5	1	24	19.5	19.6	19.5	0	21.5
		50	0	22.6	22.6	22.5	1	24	19.5	19.6	19.5	0	21.5
	16QAM	1	0	22.6	22.5	22.5	1	24	19.4	19.6	19.4	0	21.5
		1	25	22.8	22.7	22.6	1	24	19.5	19.8	19.5	0	21.5
		1	49	22.9	22.7	22.7	1	24	19.6	19.8	19.6	0	21.5
		25	0	21.5	21.5	21.5	2	23	19.5	19.5	19.4	0	21.5
		25	12	21.6	21.6	21.5	2	23	19.5	19.6	19.5	0	21.5
		25	25	21.6	21.6	21.5	2	23	19.6	19.6	19.5	0	21.5
		50	0	21.6	21.6	21.6	2	23	19.6	19.6	19.5	0	21.5
	64QAM	1	0	21.7	21.7	21.6	2	23	19.6	19.7	19.7	0	21.5
		1	25	21.8	21.8	21.7	2	23	19.7	19.8	19.8	0	21.5
		1	49	21.9	21.9	21.7	2	23	19.7	19.8	19.7	0	21.5
		25	0	20.5	20.6	20.5	3	22	19.5	19.5	19.5	0	21.5
		25	12	20.6	20.7	20.6	3	22	19.6	19.6	19.5	0	21.5
		25	25	20.6	20.7	20.6	3	22	19.6	19.6	19.5	0	21.5
		50	0	20.6	20.6	20.6	3	22	19.6	19.6	19.5	0	21.5

LTE Band 66 Measured Results (continued)

BW (MHz)	Mode	RB Allocation	RB offset	Maximum Average Power (dBm)			MPR	Tune-up Limit	Reduced Average Power (dBm)			MPR	Tune-up Limit
				131997	132322	132647			131997	132322	132647		
				1712.5 MHz	1745 MHz	1777.5 MHz			1712.5 MHz	1745 MHz	1777.5 MHz		
5 MHz	QPSK	1	0	23.4	23.4	23.3	0	25	19.4	19.4	19.3	0	21.5
		1	12	23.5	23.5	23.4	0	25	19.5	19.5	19.4	0	21.5
		1	24	23.5	23.6	23.5	0	25	19.5	19.6	19.4	0	21.5
		12	0	22.5	22.6	22.5	1	24	19.5	19.6	19.5	0	21.5
		12	7	22.5	22.6	22.5	1	24	19.5	19.6	19.4	0	21.5
		12	13	22.5	22.6	22.5	1	24	19.5	19.6	19.4	0	21.5
		25	0	22.5	22.6	22.5	1	24	19.5	19.6	19.4	0	21.5
	16QAM	1	0	22.7	22.9	22.9	1	24	19.9	19.9	19.7	0	21.5
		1	12	22.8	23.0	22.9	1	24	19.9	19.9	19.7	0	21.5
		1	24	22.8	22.9	22.9	1	24	19.9	19.9	19.7	0	21.5
		12	0	21.6	21.6	21.5	2	23	19.6	19.6	19.4	0	21.5
		12	7	21.6	21.6	21.5	2	23	19.5	19.6	19.4	0	21.5
		12	13	21.6	21.6	21.5	2	23	19.5	19.6	19.4	0	21.5
		25	0	21.6	21.6	21.5	2	23	19.5	19.5	19.5	0	21.5
	64QAM	1	0	21.7	21.6	21.6	2	23	19.5	19.6	19.7	0	21.5
		1	12	21.8	21.7	21.7	2	23	19.6	19.8	19.8	0	21.5
		1	24	21.9	21.8	21.8	2	23	19.7	19.8	19.8	0	21.5
		12	0	20.6	20.6	20.5	3	22	19.6	19.7	19.5	0	21.5
		12	7	20.6	20.6	20.5	3	22	19.6	19.6	19.5	0	21.5
		12	13	20.6	20.6	20.5	3	22	19.6	19.6	19.5	0	21.5
		25	0	20.6	20.6	20.5	3	22	19.5	19.6	19.5	0	21.5

BW (MHz)	Mode	RB Allocation	RB offset	Maximum Average Power (dBm)			MPR	Tune-up Limit	Reduced Average Power (dBm)			MPR	Tune-up Limit
				131987	132322	132657			131987	132322	132657		
				1711.5 MHz	1745 MHz	1778.5 MHz			1711.5 MHz	1745 MHz	1778.5 MHz		
3 MHz	QPSK	1	0	23.6	23.6	23.4	0	25	19.6	19.6	19.4	0	21.5
		1	8	23.6	23.6	23.5	0	25	19.6	19.5	19.5	0	21.5
		1	14	23.6	23.6	23.5	0	25	19.6	19.6	19.5	0	21.5
		8	0	22.6	22.6	22.4	1	24	19.5	19.5	19.4	0	21.5
		8	4	22.5	22.5	22.4	1	24	19.5	19.5	19.4	0	21.5
		8	7	22.6	22.5	22.4	1	24	19.5	19.5	19.4	0	21.5
		15	0	22.6	22.6	22.4	1	24	19.5	19.5	19.4	0	21.5
	16QAM	1	0	22.6	22.6	22.6	1	24	19.8	19.7	19.7	0	21.5
		1	8	22.6	22.8	22.6	1	24	19.7	20.0	19.6	0	21.5
		1	14	22.6	22.7	22.6	1	24	19.7	19.8	19.8	0	21.5
		8	0	21.6	21.6	21.5	2	23	19.6	19.6	19.5	0	21.5
		8	4	21.6	21.6	21.5	2	23	19.6	19.6	19.6	0	21.5
		8	7	21.6	21.6	21.5	2	23	19.6	19.6	19.5	0	21.5
		15	0	21.6	21.6	21.5	2	23	19.5	19.6	19.5	0	21.5
	64QAM	1	0	22.0	21.7	21.2	2	23	19.6	19.9	19.5	0	21.5
		1	8	21.9	21.9	21.5	2	23	19.7	19.7	19.6	0	21.5
		1	14	21.7	21.9	21.5	2	23	19.8	19.7	19.7	0	21.5
		8	0	20.6	20.6	20.5	3	22	19.5	19.5	19.5	0	21.5
		8	4	20.6	20.6	20.5	3	22	19.5	19.5	19.4	0	21.5
		8	7	20.6	20.6	20.5	3	22	19.5	19.5	19.4	0	21.5
		15	0	20.6	20.5	20.5	3	22	19.5	19.5	19.5	0	21.5

BW (MHz)	Mode	RB Allocation	RB offset	Maximum Average Power (dBm)			MPR	Tune-up Limit	Reduced Average Power (dBm)			MPR	Tune-up Limit
				131979	132322	132665			131979	132322	132665		
				1710.7 MHz	1745 MHz	1779.3 MHz			1710.7 MHz	1745 MHz	1779.3 MHz		
1.4 MHz	QPSK	1	0	23.6	23.6	23.8	0	25	19.6	19.6	19.8	0	21.5
		1	3	23.6	23.6	23.7	0	25	19.6	19.6	19.7	0	21.5
		1	5	23.6	23.6	23.7	0	25	19.6	19.6	19.7	0	21.5
		3	0	23.5	23.5	23.7	0	25	19.5	19.5	19.6	0	21.5
		3	1	23.6	23.6	23.7	0	25	19.5	19.5	19.7	0	21.5
		3	3	23.5	23.5	23.7	0	25	19.5	19.5	19.6	0	21.5
		6	0	22.6	22.5	22.7	1	24	19.6	19.6	19.7	0	21.5
	16QAM	1	0	22.8	22.6	22.9	1	24	19.9	19.9	19.9	0	21.5
		1	3	22.7	22.6	22.9	1	24	19.7	19.8	19.7	0	21.5
		1	5	22.7	22.6	22.9	1	24	19.7	19.7	19.7	0	21.5
		3	0	22.6	22.7	22.7	1	24	19.6	19.6	19.8	0	21.5
		3	1	22.6	22.7	22.8	1	24	19.7	19.6	19.8	0	21.5
		3	3	22.5	22.6	22.7	1	24	19.6	19.6	19.8	0	21.5
		6	0	21.7	21.7	21.8	2	23	19.7	19.7	19.8	0	21.5
	64QAM	1	0	21.7	21.7	21.7	2	23	19.5	19.5	19.7	0	21.5
		1	3	21.6	21.6	21.7	2	23	19.6	19.5	19.7	0	21.5
		1	5	21.7	21.8	21.8	2	23	19.7	19.7	19.8	0	21.5
		3	0	21.5	21.6	21.8	2	23	19.6	19.5	19.8	0	21.5
		3	1	21.6	21.6	21.8	2	23	19.6	19.6	19.8	0	21.5
		3	3	21.6	21.6	21.8	2	23	19.6	19.6	19.8	0	21.5
		6	0	20.6	20.6	20.7	3	22	19.6	19.6	19.7	0	21.5

9.4. LTE Carrier Aggregation

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

For inter-band carrier aggregation with uplink assigned to one E-UTRA band (Table 5.6A-1), the requirements in subclause 6.2.3 apply.

For inter-band carrier aggregation with one component carrier per operating band and the uplink active in two E-UTRA bands, the requirements in subclause 6.2.3 apply for each uplink component carrier.

For intra-band contiguous carrier aggregation the allowed Maximum Power Reduction (MPR) for the maximum output power applicable to the DUT in table below. In case the modulation format is different on different component carriers then the MPR is determined by the rules applied to higher order of those modulations.

Modulation	CA bandwidth Class B and C / Smallest Component Carrier Transmission Bandwidth Configuration				MPR (dB)
	25 RB	50 RB	75 RB	100 RB	
QPSK	> 8 and ≤ 25	> 12 and ≤ 50	> 16 and ≤ 75	> 18 and ≤ 100	≤ 1
QPSK	> 25	> 50	> 75	> 100	≤ 2
16 QAM	≤ 8	≤ 12	≤ 16	≤ 18	≤ 1
16 QAM	> 8 and ≤ 25	> 12 and ≤ 50	> 16 and ≤ 75	> 18 and ≤ 100	≤ 2
16 QAM	> 25	> 50	> 75	> 100	≤ 3
64 QAM	≤ 8 and allocation wholly contained within a single CC	≤ 12 and allocation wholly contained within a single CC	≤ 16 and allocation wholly contained within a single CC	≤ 18 and allocation wholly contained within a single CC	≤ 2
64 QAM	> 8 or allocation extends across two CC's	> 12 or allocation extends across two CC's	> 16 or allocation extends across two CC's	> 18 or allocation extends across two CC's	≤ 3

For PUCCH and SRS transmissions, the allowed MPR is according to that specified for PUSCH WPDK modulation for the corresponding transmission bandwidth.

For intra-band contiguous carrier aggregation bandwidth class C with non-contiguous resource allocation, the allowed Maximum Power Reduction (MPR) for the maximum output power in Table 6.2.2A-1 is specified as follows

$$MPR = CEIL\ \{\min(M_A, M_{IM5}), 0.5\}$$

Where M_A is defined as follows

$$M_A = \begin{cases} 8.2 & ;0 \le A < 0.025 \\ 9.2 - 40A & ;0.025 \le A < 0.05 \\ 8 - 16A & ;0.05 \le A < 0.25 \\ 4.83 - 3.33A & ;0.25 \le A \le 0.4 \end{cases}$$

$3.83 – 0.83A$;$0.4 \le A \le 1$

and M_{IM5} is defined as follows

$M_{IM5} =$ 4.5 ; $\Delta_{IM5} < 1.5 * BW_{Channel\_CA}$

6.0 ; $1.5 * BW_{Channel\_CA} \le \Delta_{IM5} < BW_{Channel\_CA}/2 + \Delta f_{ooB}$

M_A ; $\Delta_{IM5} \ge BW_{Channel\_CA}/2 + \Delta f_{ooB}$

Where

$A = N_{RB\_alloc} / N_{RB\_agg}$

$\Delta_{IM5} = \max(\left| F_{C\_agg} – (3*F_{agg\_alloc\_low} – 2*F_{agg\_alloc\_high}) \right|, \left| F_{C\_agg} – (3*F_{agg\_alloc\_high} – 2*F_{agg\_alloc\_low}) \right|)$

CEIL{M_A, 0.5} means rounding upwards to closest 0.5dB, i.e. MPR ∈ [3.0, 3.5, 4.0, 4.5, 5.0, 5.5, 6.0, 6.5, 7.0, 7.5, 8.0, 8.5]

For intra-band carrier aggregation, the MPR is evaluated per slot and given by the maximum value taken over the transmission(s) on all component carriers within the slot; the maximum MPR over the two slots is then applied for the entire subframe.

For intra-band non-contiguous carrier aggregation with one uplink carrier on the PCC, the requirements in the subclause 6.2.3 apply. For intra-band non-contiguous aggregation with two uplink carriers the MPR is defined tfor those E-UTRA bands where maximum possible $W_{GAP} \le 42.2$ MHz as follows

MPR = CEIL{M_A, 0.5}

Where M_N is defined as follows

$M_N =$ -0.125N + 18.25 ; $2 \le N \le 50$

-0.0333 N + 13.67 ; $50 < N \le 200$

Where $N = N_{RB\_alloc}$ is the number of allocated resource blocks.

For the UE maximum output power modified by MPR, the power limits specified in subclause 6.2.5A apply.

9.5. LTE Down-Link Carrier Aggregation

The tables below show the supported frequency bands of the device for DL Inter-band and DL Intra-band combinations.

Power measurements were performed on the channel with the highest maximum output power from Tune-up Procedure on WWAN antennas.

When carrier aggregation is limited to downlink only, uplink maximum output power (single carrier) is measured for the supported combinations of downlink carrier aggregation listed in the table below. In applying the power measurement procedures of KDB 941225 D05A and April 2018 TCB workshop for DL CA to qualify for UL SAR test exclusion, power measurement is required only for the subset in each row with the largest combination of frequency bands and CCs (far right most configuration highlighted in the table below).

Index	2CC	Restriction	Completely Covered by Measurement Superset
2CC# 1	CA_2C		No
2CC# 2	CA_2A_2A		No
2CC# 3	CA_2A_5A		No
2CC# 4	CA_2A_12A		No
2CC# 5	CA_2A_13A		No
2CC# 6	CA_2A_17A		No
2CC# 7	CA_4A_4A		No
2CC# 8	CA_4A_5A		No
2CC# 9	CA_4A_12A		3CC# 1
2CC# 10	CA_4A_13A		No
2CC# 11	CA_4A_17A		No
2CC# 12	CA_5B		No
2CC# 13	CA_5A_5A		No
2CC# 14	CA_5A_41A		No
2CC# 15	CA_12B		No
2CC# 16	CA_12A_12A		No
2CC# 17	CA_41C		No
2CC# 18	CA_41A_41A		No
2CC# 19	CA_66B		No
2CC# 20	CA_66C		No
2CC# 21	CA_66A_12A		No
2CC# 22	CA_66A_66A		No

Index	3CC	Restriction	Completely Covered by Measurement Superset
3CC# 1	CA_4A_12A_12A		No
3CC# 2	CA_41A_41C		No

In applying the power measurement procedures of KDB 941225 D05A for DL CA to qualify for UL SAR test exclusion, power measurement is required only for the CA configuration with the largest aggregated DL CA BW in each frequency band, independently for contiguous and non-contiguous CA; however, if the same frequency band is used for both contiguous and non-contiguous CA, power measurement was performed using the configuration with the largest aggregated BW and maximum output power among contiguous and non-contiguous CA.

2CC DL CA Measured Results

E-UTRA CA configuration	CC1 (UL)					CC2 (DL)			Aggregated BW	CA Inactive (dBm)	CA Active (dBm)	Delta
	Mode	BW (MHz)	Channel	Freq (MHz)	RB,Offset	BW (MHz)	Channel	Freq (MHz)				
CA_2C	QPSK	20	18801	1870.1	1,0	20	999	1969.9	40	24.80	24.76	-0.04
CA_2A-2A	QPSK	20	18700	1860	1,0	20	1100	1980	40	25.15	25.11	-0.04
CA_2A-5A	QPSK	20	18900	1880	1,0	10	2600	889	30	24.62	24.72	0.10
CA_2A-12A	QPSK	20	18900	1880	1,0	10	5095	737.5	30	24.62	24.70	0.08
CA_2A-13A	QPSK	20	18900	1880	1,0	10	5230	751	30	24.62	24.81	0.19
CA_2A-17A	QPSK	20	18900	1880	1,0	10	5790	740	30	24.62	24.72	0.10
CA_4A-4A	QPSK	20	20175	1732.5	1,0	20	2300	2145	30	24.14	24.10	-0.04
CA_4A-5A	QPSK	20	20175	1732.5	1,0	10	2525	881.5	30	24.14	24.06	-0.08
CA_4A-12A	QPSK	20	20175	1732.5	1,0	10	5095	737.5	30	24.14	24.08	-0.06
CA_4A-13A	QPSK	20	20175	1732.5	1,0	10	5230	751	30	24.14	24.10	-0.04
CA_4A-17A	QPSK	20	20175	1732.5	1,0	10	5790	740	30	24.14	24.09	-0.05
CA_5B	QPSK	10	20450	829	1,0	10	2549	883.9	20	24.95	25.04	0.09
CA_5A-5A	QPSK	10	20450	829	1,0	10	2600	889	20	24.95	25.04	0.09
CA_5A-41A	QPSK	10	20525	836.5	1,0	20	41490	2680	30	24.93	24.96	0.03
CA_12B	QPSK	5	23048	702.8	1,0	10	5120	740	15	24.24	24.19	-0.05
CA_12A-12A	QPSK	5	23035	701.5	1,0	5	5155	743.5	10	24.20	24.18	-0.02
CA_41C	QPSK	20	39750	2506	1,0	20	39948	2525.8	40	23.77	23.78	0.01
CA_41A-41A	QPSK	20	39750	2506	1,0	20	41490	2680	40	23.77	23.75	-0.02
CA_66B	QPSK	10	132022	1715	1,0	10	66585	2124.9	20	23.32	23.32	0.00
CA_66C	QPSK	20	132072	1720	1,0	20	66734	2139.8	40	23.21	23.23	0.02
CA_66A-12A	QPSK	20	132322	1745	1,0	10	5095	737.5	30	23.41	23.38	-0.03
CA_66A-66A	QPSK	20	132072	1720	1,0	20	67236	2190	40	23.21	23.28	0.07

3CC DL CA Measured Results

E-UTRA CA configuration	CC1 (UL)					CC2 (DL)			CC3 (DL)			Aggregated BW	CA Inactive (dBm)	CA Active (dBm)	Delta
	Mode	BW (MHz)	Channel	Freq (MHz)	RB,Offset	BW (MHz)	Channel	Freq (MHz)	BW (MHz)	Channel	Freq (MHz)				
CA_41A-41C	QPSK	20	39750	2506	1,0	20	41292	2660.2	20	41490	2680	60	23.77	23.86	0.09
CA_4A-12A-12A	QPSK	20	20175	1732.5	1,0	5	5035	731.5	5	5155	743.5	30	24.20	24.26	0.06

9.6. 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.

For “Not required”, SAR Test reduction was applied from KDB 248227 guidance, Sec. 2.1, b), 1) when the same maximum power is specified for multiple transmission modes in a frequency band, the largest channel bandwidth, lowest order modulation, lowest data rate and lowest order 802.11b/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.

Wi-Fi 2.4GHz Measured Results

Maximum Conducted Power

Band	Mode	Ch #	Freq. (MHz)	ANT 1 Average Power (dBm)			ANT 2 Average Power (dBm)		
				Meas Pwr	Tune-up	SAR Test (Yes/No)	Meas Pwr	Tune-up	SAR Test (Yes/No)
DSSS 2.4 GHz	802.11b 11 Mbps	1	2412	18.6	19.0	Yes	18.6	19.0	Yes
		6	2437	19.0	19.0		18.9	19.0	
		11	2462	18.5	19.0		18.9	19.0	
		12	2467		3.5			3.5	
		13	2472		1.5			1.5	
OFDM 2.4 GHz	802.11g 6 Mbps	1	2412	16.5	16.5	No	16.3	16.5	No
		2	2417	16.7	17.0		16.6	17.0	
		6	2437	16.8	17.0		16.7	17.0	
		10	2457	16.6	17.0		16.6	17.0	
		11	2462	16.4	16.5		16.3	16.5	
		12	2467		3.5			3.5	
		13	2472		1.5			1.5	
	802.11n (HT20)	1	2412	15.9	16.0	No	15.8	16.0	No
		6	2437	15.8	16.0		15.7	16.0	
		11	2462	15.8	16.0		15.7	16.0	
		12	2467		3.5			3.5	
		13	2472		1.5			1.5	

Note(s):

1. 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
2. For 802.11b, Data rate 11Mbps was chosen for SAR testing due to highest Tune-up limit

Reduced Conducted (Power Receiver + Proximity Sensor Active)

Band	Mode	Ch #	Freq. (MHz)	ANT 1 Average Power (dBm)			ANT 2 Average Power (dBm)		
				Meas Pwr	Tune-up	SAR Test (Yes/No)	Meas Pwr	Tune-up	SAR Test (Yes/No)
DSSS 2.4 GHz	802.11b 1 Mbps	1	2412	15.6	16.0	Yes	15.8	16.0	Yes
		6	2437	15.9	16.0		15.9	16.0	
		11	2462	15.8	16.0		15.8	16.0	
		12	2467		3.5			3.5	
		13	2472		1.5			1.5	
OFDM 2.4 GHz	802.11g 6 Mbps	1	2412	15.7	16.0	No	15.9	16.0	No
		6	2437	16.0	16.0		15.8	16.0	
		11	2462	15.7	16.0		15.9	16.0	
		12	2467		3.5			3.5	
		13	2472		1.5			1.5	
	802.11n (HT20)	1	2412	15.9	16.0	No	15.8	16.0	No
		6	2437	15.8	16.0		15.7	16.0	
		11	2462	15.8	16.0		15.7	16.0	
		12	2467		3.5			3.5	
		13	2472		1.5			1.5	

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

RSDB (Real Simultaneous Dual Band) Conducted Power

Band	Mode	Ch #	Freq. (MHz)	ANT 1 Average Power (dBm)			ANT 2 Average Power (dBm)		
				Meas Pwr	Tune-up	SAR Test (Yes/No)	Meas Pwr	Tune-up	SAR Test (Yes/No)
DSSS 2.4 GHz	802.11b 1 Mbps	1	2412	13.9	14.0	Yes	13.5	14.0	Yes
		6	2437	13.6	14.0		13.8	14.0	
		11	2462	13.6	14.0		13.6	14.0	
		12	2467		3.5			3.5	
		13	2472		1.5			1.5	
OFDM 2.4 GHz	802.11g 6 Mbps	1	2412	13.7	14.0	No	13.6	14.0	No
		6	2437	13.7	14.0		13.6	14.0	
		11	2462	13.6	14.0		13.6	14.0	
		12	2467		3.5			3.5	
		13	2472		1.5			1.5	
	802.11n (HT20)	1	2412	13.5	14.0	No	13.5	14.0	No
		6	2437	13.7	14.0		13.7	14.0	
		11	2462	13.6	14.0		13.7	14.0	
		12	2467		3.5			3.5	
		13	2472		1.5			1.5	

Note(s):

1. 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
2. These conducted measurements are used during the Simultaneous conditions described in Section 6.6.

9.7. 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.

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

When the 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.

Wi-Fi Direct is supported in U-NII Band 1. Therefore, Wi-Fi Direct was tested separately for SAR for U-NII Band 1.

Wi-Fi 5GHz Measured Results

Maximum Conducted Power

Band	Mode	Ch #	Freq. (MHz)	ANT 1 Average Power (dBm)			ANT 2 Average Power (dBm)		
				Meas Pwr	Tune-up	SAR Test (Yes/No)	Meas Pwr	Tune-up	SAR Test (Yes/No)
UNII-1 5.2 GHz	802.11a	36	5180	16.8	17.0	Yes	16.7	17.0	Yes
		40	5200	16.8	17.0		16.8	17.0	
		44	5220	16.9	17.0		16.8	17.0	
		48	5240	16.6	17.0		16.9	17.0	
	802.11n (HT20)	36	5180		17.0	No		17.0	No
		40	5200		17.0			17.0	
		44	5220		17.0			17.0	
		48	5240		17.0			17.0	
	802.11ac (VHT20)	36	5180		17.0	No		17.0	No
		40	5200		17.0			17.0	
		44	5220		17.0			17.0	
		48	5240		17.0			17.0	
	802.11n (HT40)	38	5190		16.0	No		16.0	No
		46	5230		16.0			16.0	
	802.11ac (VHT40)	38	5190		16.0	No		16.0	No
		46	5230		16.0			16.0	
	802.11ac (VHT80)	42	5210		15.0	No		15.0	No

Band	Mode	Ch #	Freq. (MHz)	ANT 1 Average Power (dBm)			ANT 2 Average Power (dBm)		
				Meas Pwr	Tune-up	SAR Test (Yes/No)	Meas Pwr	Tune-up	SAR Test (Yes/No)
UNII-2A 5.3 GHz	802.11a	52	5260	16.7	17.0	Yes	16.9	17.0	Yes
		56	5280	16.7	17.0		16.9	17.0	
		60	5300	16.6	17.0		16.9	17.0	
		64	5320	16.8	17.0		16.5	17.0	
	802.11n (HT20)	52	5260		17.0	No		17.0	No
		56	5280		17.0			17.0	
		60	5300		17.0			17.0	
		64	5320		17.0			17.0	
	802.11ac (VHT20)	52	5260		17.0	No		17.0	No
		56	5280		17.0			17.0	
		60	5300		17.0			17.0	
		64	5320		17.0			17.0	
	802.11n (HT40)	54	5270		16.0	No		16.0	No
		62	5310		16.0			16.0	
	802.11ac (VHT40)	54	5270		16.0	No		16.0	No
		62	5310		16.0			16.0	
	802.11ac (VHT80)	58	5290		15.0	No		15.0	No

Maximum Conducted Power (Continued)

Band	Mode	Ch #	Freq. (MHz)	ANT 1 Average Power (dBm)			ANT 2 Average Power (dBm)		
				Meas Pwr	Tune-up	SAR Test (Yes/No)	Meas Pwr	Tune-up	SAR Test (Yes/No)
UNII-2C 5.5 GHz	802.11a	100	5500	16.8	17.0	Yes	16.7	17.0	Yes
		116	5580	16.7	17.0		16.7	17.0	
		124	5620	16.7	17.0		16.7	17.0	
		144	5720	17.0	17.0		16.8	17.0	
	802.11n (HT20)	100	5500		17.0	No		17.0	No
		116	5580		17.0			17.0	
		124	5620		17.0			17.0	
		144	5720		17.0			17.0	
	802.11ac (VHT20)	100	5500		17.0	No		17.0	No
		116	5580		17.0			17.0	
		124	5620		17.0			17.0	
		144	5720		17.0			17.0	
	802.11n (HT40)	102	5510		16.0	No		16.0	No
		118	5590		16.0			16.0	
		126	5630		16.0			16.0	
		142	5710		16.0			16.0	
	802.11ac (VHT40)	102	5510		16.0	No		16.0	No
		118	5590		16.0			16.0	
		126	5630		16.0			16.0	
		142	5710		16.0			16.0	
	802.11ac (VHT80)	106	5530		15.0	No		15.0	No
		122	5610		15.0			15.0	
		138	5690		15.0			15.0	

Band	Mode	Ch #	Freq. (MHz)	ANT 1 Average Power (dBm)			ANT 2 Average Power (dBm)		
				Meas Pwr	Tune-up	SAR Test (Yes/No)	Meas Pwr	Tune-up	SAR Test (Yes/No)
UNII-3 5.8 GHz	802.11a	149	5745	16.6	17.0	Yes	16.5	17.0	Yes
		157	5785	16.6	17.0		16.8	17.0	
		165	5825	16.6	17.0		16.7	17.0	
	802.11n (HT20)	149	5745		17.0	No		17.0	No
		157	5785		17.0			17.0	
		165	5825		17.0			17.0	
	802.11ac (VHT20)	149	5745		17.0	No		17.0	No
		157	5785		17.0			17.0	
		165	5825		17.0			17.0	
	802.11n (HT40)	151	5755		16.0	No		16.0	No
		159	5795		16.0			16.0	
	802.11ac (VHT40)	151	5755		16.0	No		16.0	No
		159	5795		16.0			16.0	
	802.11ac (VHT80)	155	5775		15.0	No		15.0	No

Reduced (Power Receiver + Proximity Sensor Active) & RSDB Conducted Power

Band	Mode	Ch #	Freq. (MHz)	ANT 1 Average Power (dBm)			ANT 2 Average Power (dBm)		
				Meas Pwr	Tune-up	SAR Test (Yes/No)	Meas Pwr	Tune-up	SAR Test (Yes/No)
UNII-1 5.2 GHz	802.11a	36	5180		14.0	No		14.0	No
		40	5200		14.0			14.0	
		44	5220		14.0			14.0	
		48	5240		14.0			14.0	
	802.11n (HT20)	36	5180		14.0	No		14.0	No
		40	5200		14.0			14.0	
		44	5220		14.0			14.0	
		48	5240		14.0			14.0	
	802.11ac (VHT20)	36	5180		14.0	No		14.0	No
		40	5200		14.0			14.0	
		44	5220		14.0			14.0	
		48	5240		14.0			14.0	
	802.11n (HT40)	38	5190		14.0	No		14.0	No
		46	5230		14.0			14.0	
	802.11ac (VHT40)	38	5190		14.0	No		14.0	No
		46	5230		14.0			14.0	
	802.11ac (VHT80)	42	5210	13.7	14.0	Yes	13.9	14.0	Yes

Band	Mode	Ch #	Freq. (MHz)	ANT 1 Average Power (dBm)			ANT 2 Average Power (dBm)		
				Meas Pwr	Tune-up	SAR Test (Yes/No)	Meas Pwr	Tune-up	SAR Test (Yes/No)
UNII-2A 5.3 GHz	802.11a	52	5260		14.0	No		14.0	No
		56	5280		14.0			14.0	
		60	5300		14.0			14.0	
		64	5320		14.0			14.0	
	802.11n (HT20)	52	5260		14.0	No		14.0	No
		56	5280		14.0			14.0	
		60	5300		14.0			14.0	
		64	5320		14.0			14.0	
	802.11ac (VHT20)	52	5260		14.0	No		14.0	No
		56	5280		14.0			14.0	
		60	5300		14.0			14.0	
		64	5320		14.0			14.0	
	802.11n (HT40)	54	5270		14.0	No		14.0	No
		62	5310		14.0			14.0	
	802.11ac (VHT40)	54	5270		14.0	No		14.0	No
		62	5310		14.0			14.0	
	802.11ac (VHT80)	58	5290	13.7	14.0	Yes	13.8	14.0	Yes

Note(s):

These conducted measurements are used during the Simultaneous conditions described in Section 6.6.

Reduced (Power Receiver + Proximity Sensor Active) & RSDB Conducted Power (Continued)

Band	Mode	Ch #	Freq. (MHz)	ANT 1 Average Power (dBm)			ANT 2 Average Power (dBm)		
				Meas Pwr	Tune-up	SAR Test (Yes/No)	Meas Pwr	Tune-up	SAR Test (Yes/No)
UNII-2C 5.5 GHz	802.11a	100	5500		14.0	No		14.0	No
		116	5580		14.0			14.0	
		124	5620		14.0			14.0	
		144	5720		14.0			14.0	
	802.11n (HT20)	100	5500		14.0	No		14.0	No
		116	5580		14.0			14.0	
		124	5620		14.0			14.0	
		144	5720		14.0			14.0	
	802.11ac (VHT20)	100	5500		14.0	No		14.0	No
		116	5580		14.0			14.0	
		124	5620		14.0			14.0	
		144	5720		14.0			14.0	
	802.11n (HT40)	102	5510		14.0	No		14.0	No
		118	5590		14.0			14.0	
		126	5630		14.0			14.0	
		142	5710		14.0			14.0	
	802.11ac (VHT40)	102	5510		14.0	No		14.0	No
		118	5590		14.0			14.0	
		126	5630		14.0			14.0	
		142	5710		14.0			14.0	
	802.11ac (VHT80)	106	5530	13.6	14.0	Yes	13.7	14.0	Yes
		122	5610	13.9	14.0		13.6	14.0	
		138	5690	13.7	14.0		13.6	14.0	

Band	Mode	Ch #	Freq. (MHz)	ANT 1 Average Power (dBm)			ANT 2 Average Power (dBm)		
				Meas Pwr	Tune-up	SAR Test (Yes/No)	Meas Pwr	Tune-up	SAR Test (Yes/No)
UNII-3 5.8 GHz	802.11a	149	5745		14.0	No		14.0	No
		157	5785		14.0			14.0	
		165	5825		14.0			14.0	
	802.11n (HT20)	149	5745		14.0	No		14.0	No
		157	5785		14.0			14.0	
		165	5825		14.0			14.0	
	802.11ac (VHT20)	149	5745		14.0	No		14.0	No
		157	5785		14.0			14.0	
		165	5825		14.0			14.0	
	802.11n (HT40)	151	5755		14.0	No		14.0	No
		159	5795		14.0			14.0	
	802.11ac (VHT40)	151	5755		14.0	No		14.0	No
		159	5795		14.0			14.0	
	802.11ac (VHT80)	155	5775	13.7	14.0	Yes	13.9	14.0	Yes

Note(s):

These conducted measurements are used during the Simultaneous conditions described in Section 6.6.

9.8. Bluetooth

Maximum Output Power (Tune-up Limit) for Bluetooth

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

Bluetooth Measured Results

Band	Mode	Ch #	Freq. (MHz)	Chain 0 Average Power (dBm)		
				Meas Pwr	Tune-up	SAR Test (Yes/No)
2.4	BR GFSK	0	2402	16.0	16.0	Yes
		39	2441	16.0	16.0	
		78	2480	16.0	16.0	

Duty Factor Measured Results

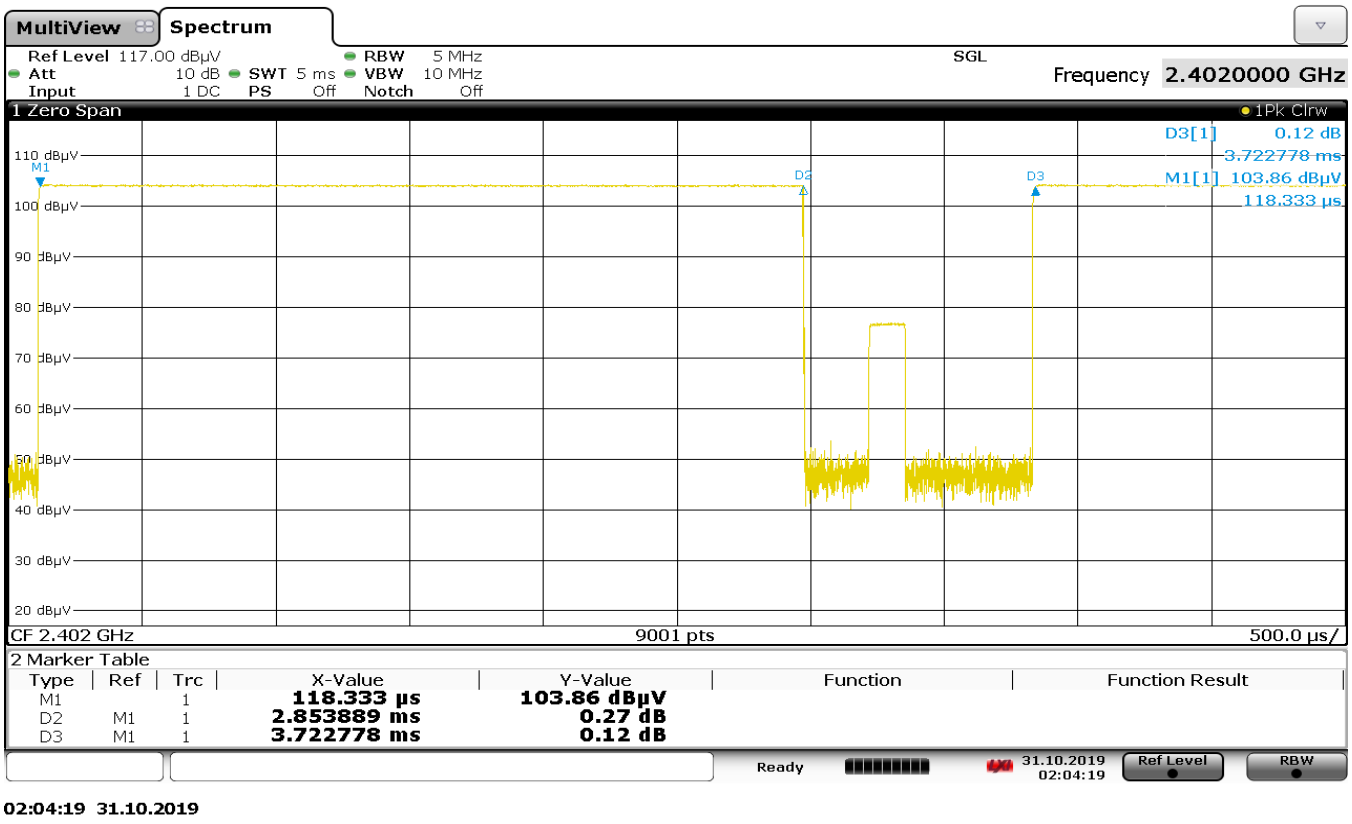
Mode	Type	T on (ms)	Period (ms)	Duty Cycle	Crest Factor (1/duty cycle)
GFSK	DH5	2.853889	3.722778	76.66%	1.30

Note(s):

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

Duty Cycle plots

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. GSM850

RF Exposure Conditions	Mode	Power 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 3 Slots	N/A	0	Left Touch	190	836.6	30.0	28.6	0.093	0.129	
				Left Tilt	190	836.6	30.0	28.6	0.057	0.079	
				Right Touch	190	836.6	30.0	28.6	0.119	**0.164**	1
				Right Tilt	190	836.6	30.0	28.6	0.055	0.076	
Body-worn	GPRS 3 Slots	N/A	15	Rear	190	836.6	30.0	28.6	0.108	**0.149**	2
				Front	190	836.6	30.0	28.6	0.076	0.105	
Hotspot	GPRS 3 Slots	N/A	10	Rear	190	836.6	30.0	28.6	0.208	**0.287**	3
				Front	190	836.6	30.0	28.6	0.163	0.225	
				Edge 2	190	836.6	30.0	28.6	0.078	0.108	
				Edge 3	190	836.6	30.0	28.6	0.133	0.184	
				Edge 4	190	836.6	30.0	28.6	0.036	0.050	

10.2. GSM1900

RF Exposure Conditions	Mode	Power 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	N/A	0	Left Touch	661	1880.0	24.5	23.3	0.051	**0.067**	4
				Left Tilt	661	1880.0	24.5	23.3	0.027	0.036	
				Right Touch	661	1880.0	24.5	23.3	0.037	0.049	
				Right Tilt	661	1880.0	24.5	23.3	0.029	0.038	
Body-worn	GPRS 4 Slots	N/A	15	Rear	661	1880.0	24.5	23.3	0.282	**0.372**	5
				Front	661	1880.0	24.5	23.3	0.183	0.241	
Hotspot	GPRS 4 Slots	N/A	10	Rear	661	1880.0	24.5	23.3	0.479	0.631	
				Front	661	1880.0	24.5	23.3	0.400	0.527	
				Edge 2	661	1880.0	24.5	23.3	0.052	0.068	
				Edge 3	512	1850.2	24.5	23.3	0.884	1.165	
					661	1880.0	24.5	23.3	1.040	**1.371**	6
					810	1909.8	24.5	23.4	1.060	1.366	
				Edge 4	661	1880.0	24.5	23.3	0.090	0.119	

RF Exposure Conditions	Mode	Power Back-off	Dist. (mm)	Test Position	Ch #.	Freq. (MHz)	Power (dBm)		10-g SAR (W/kg)		Plot No.
							Tune-up Limit	Meas.	Meas.	Scaled	
Product Specific (Extremity) 10g	GPRS 4 Slots	N/A	0	Edge 3	512	1850.2	24.5	23.3	1.750	2.307	
					661	1880.0	24.5	23.3	1.820	2.399	
					810	1909.8	24.5	23.4	2.040	**2.628**	7

10.3. W-CDMA Band II

RF Exposure Conditions	Mode	Power 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	N/A	0	Left Touch	9400	1880.0	25.0	24.6	0.049	**0.054**	8
				Left Tilt	9400	1880.0	25.0	24.6	0.026	0.029	
				Right Touch	9400	1880.0	25.0	24.6	0.026	0.029	
				Rightt Tilt	9400	1880.0	25.0	24.6	0.026	0.029	
Body-worn	Rel 99 RMC 12.2 kbps	N/A	15	Rear	9400	1880.0	25.0	24.6	0.210	**0.230**	9
				Front	9400	1880.0	25.0	24.6	0.209	0.229	
Hotspot	Rel 99 RMC 12.2 kbps	ON	10	Rear	9400	1880.0	21.0	20.6	0.407	0.446	
				Front	9400	1880.0	21.0	20.6	0.378	0.414	
				Edge 2	9400	1880.0	21.0	20.6	0.046	0.051	
				Edge 3	9400	1880.0	21.0	20.6	0.728	**0.798**	10
				Edge 4	9400	1880.0	21.0	20.6	0.074	0.081	
RF Exposure Conditions	Mode	Power Back-off	Dist. (mm)	Test Position	Ch #.	Freq. (MHz)	Power (dBm)		10-g SAR (W/kg)		Plot No.
							Tune-up Limit	Meas.	Meas.	Scaled	
Product Specfic (Extremity) 10g	Rel 99 RMC 12.2 kbps	N/A	11	Edge 3	9400	1880.0	25.0	24.6	0.461	0.505	
		ON	0	Edge 3	9400	1880.0	21.0	20.6	1.710	**1.875**	11

Note(s):

Body-worn SAR tested at full power without ear-jack connected because no SAR values were over 1.2 W/kg, even though there is power back-off function for body-worn head call with ear-jack connected for WCDMA BII

10.4. W-CDMA Band IV

RF Exposure Conditions	Mode	Power 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	N/A	0	Left Touch	1413	1732.6	25.0	24.8	0.099	**0.104**	12
				Left Tilt	1413	1732.6	25.0	24.8	0.036	0.038	
				Right Touch	1413	1732.6	25.0	24.8	0.064	0.067	
				Right Tilt	1413	1732.6	25.0	24.8	0.042	0.044	
Body-worn	Rel 99 RMC 12.2 kbps	N/A	15	Rear	1413	1732.6	25.0	24.8	0.414	**0.434**	13
				Front	1413	1732.6	25.0	24.8	0.391	0.409	
Hotspot	Rel 99 RMC 12.2 kbps	ON	10	Rear	1413	1732.6	21.0	20.5	0.296	0.332	
				Front	1413	1732.6	21.0	20.5	0.289	0.324	
				Edge 2	1413	1732.6	21.0	20.5	0.023	0.026	
				Edge 3	1413	1732.6	21.0	20.5	0.624	**0.700**	14
				Edge 4	1413	1732.6	21.0	20.5	0.051	0.058	

RF Exposure Conditions	Mode	Power Back-off	Dist. (mm)	Test Position	Ch #.	Freq. (MHz)	Power (dBm)		10-g SAR (W/kg)		Plot No.
							Tune-up Limit	Meas.	Meas.	Scaled	
Product Specific (Extremity) 10g	Rel 99 RMC 12.2 kbps	N/A	11	Edge 3	1413	1732.6	25.0	24.8	0.638	0.668	
		ON	0	Edge 3	1312	1712.4	21.0	20.6	1.870	2.050	
					1413	1732.6	21.0	20.5	1.900	2.132	
					1513	1752.6	21.0	20.8	2.080	**2.178**	15

Note(s):

Body-worn SAR tested at full power without ear-jack connected because no SAR values were over 1.2 W/kg, even though there is power back-off function for body-worn head call with ear-jack connected for WCDMA BIV

10.5. W-CDMA Band V

RF Exposure Conditions	Mode	Power 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	N/A	0	Left Touch	4183	836.6	25.0	24.0	0.121	0.152	
				Left Tilt	4183	836.6	25.0	24.0	0.072	0.091	
				Right Touch	4183	836.6	25.0	24.0	0.167	**0.210**	16
				Rightt Tilt	4183	836.6	25.0	24.0	0.080	0.101	
Body-worn	Rel 99 RMC 12.2 kbps	N/A	15	Rear	4183	836.6	25.0	24.0	0.255	**0.321**	17
				Front	4183	836.6	25.0	24.0	0.186	0.234	
Hotspot	Rel 99 RMC 12.2 kbps	N/A	10	Rear	4183	836.6	25.0	24.0	0.488	**0.614**	18
				Front	4183	836.6	25.0	24.0	0.368	0.463	
				Edge 2	4183	836.6	25.0	24.0	0.171	0.215	
				Edge 3	4183	836.6	25.0	24.0	0.317	0.399	
				Edge 4	4183	836.6	25.0	24.0	0.050	0.063	

10.6. LTE Band 2 (20MHz Bandwidth)

RF Exposure Conditions	Mode	Power Back-off	Dist. (mm)	Test Position	Ch #.	Freq. (MHz)	RB Allocation	RB offest	Power (dBm)		1-g SAR (W/kg)		Plot No.
									Tune-up Limit	Meas.	Meas.	Scaled	
Head	QPSK	N/A	0	Left Touch	18900	1880.0	1	99	25.5	24.8	0.151	**0.177**	19
							50	24	24.5	23.7	0.119	0.143	
				Left Tilt	18900	1880.0	1	99	25.5	24.8	0.094	0.110	
							50	24	24.5	23.7	0.076	0.091	
				Right Touch	18900	1880.0	1	99	25.5	24.8	0.105	0.123	
							50	24	24.5	23.7	0.081	0.097	
				Right Tilt	18900	1880.0	1	99	25.5	24.8	0.091	0.107	
							50	24	24.5	23.7	0.070	0.084	
Body-worn	QPSK	N/A	15	Rear	18900	1880.0	1	99	25.5	24.8	0.550	**0.646**	20
							50	24	24.5	23.7	0.442	0.531	
				Front	18900	1880.0	1	99	25.5	24.8	0.517	0.607	
							50	24	24.5	23.7	0.414	0.498	
Hotspot	QPSK	ON	10	Rear	18900	1880.0	1	49	21.5	20.9	0.396	0.455	
							50	24	21.5	20.9	0.439	0.504	
				Front	18900	1880.0	1	49	21.5	20.9	0.356	0.409	
							50	24	21.5	20.9	0.365	0.419	
				Edge 2	18900	1880.0	1	49	21.5	20.9	0.049	0.057	
							50	24	21.5	20.9	0.050	0.058	
				Edge 3	18700	1860.0	1	49	21.5	21.3	0.957	1.002	
							50	24	21.5	21.3	0.970	1.016	
							100	0	21.5	21.4	0.965	0.987	
					18900	1880.0	1	49	21.5	20.9	0.900	1.033	
							50	24	21.5	20.9	0.893	1.025	
					19100	1900.0	1	49	21.5	20.9	1.050	1.206	
							50	24	21.5	20.9	1.070	**1.229**	21
				Edge 4	18900	1880.0	1	49	21.5	20.9	0.096	0.110	
							50	24	21.5	20.9	0.097	0.112	

RF Exposure Conditions	Mode	Power Back-off	Dist. (mm)	Test Position	Ch #.	Freq. (MHz)	RB Allocation	RB offest	Power (dBm)		10-g SAR (W/kg)		Plot No.
									Tune-up Limit	Meas.	Meas.	Scaled	
Product Specific (Extremity) 10g	QPSK	N/A	11	Edge 3	18900	1880.0	1	99	25.5	24.8	1.290	1.516	
							50	24	24.5	23.7	1.040	1.250	
		ON	0	Edge 3	18700	1860.0	1	49	21.5	21.3	1.840	1.927	
							50	24	21.5	21.3	2.050	2.147	
							100	0	21.5	21.4	2.070	2.118	
					18900	1880.0	1	49	21.5	20.9	1.850	2.124	
							50	24	21.5	20.9	1.980	**2.273**	22
					19100	1900.0	1	49	21.5	20.9	1.940	2.227	
							50	24	21.5	20.9	1.880	2.159	

Note(s):

Body-worn SAR tested at full power without ear-jack connected because no SAR values were over 1.2 W/kg, even though there is power back-off function for body-worn head call with ear-jack connected for LTE B2

10.7. LTE Band 5 (10MHz Bandwidth)

RF Exposure Conditions	Mode	Power Back-off	Dist. (mm)	Test Position	Ch #.	Freq. (MHz)	RB Allocation	RB offest	Power (dBm)		1-g SAR (W/kg)		Plot No.
									Tune-up Limit	Meas.	Meas.	Scaled	
Head	QPSK	N/A	0	Left Touch	20525	836.5	1	25	25.5	24.7	0.135	0.162	
							25	0	24.5	23.6	0.100	0.123	
				Left Tilt (15°)	20525	836.5	1	25	25.5	24.7	0.075	0.090	
							25	0	24.5	23.6	0.057	0.070	
				Right Touch	20525	836.5	1	25	25.5	24.7	0.190	**0.228**	23
							25	0	24.5	23.6	0.141	0.173	
				Right Tilt (15°)	20525	836.5	1	25	25.5	24.7	0.078	0.094	
							25	0	24.5	23.6	0.059	0.073	
Body-worn	QPSK	N/A	15	Rear	20525	836.5	1	25	25.5	24.7	0.205	**0.246**	24
							25	0	24.5	23.6	0.153	0.188	
				Front	20525	836.5	1	25	25.5	24.7	0.200	0.240	
							25	0	24.5	23.6	0.149	0.183	
Hotspot	QPSK	N/A	10	Rear	20525	836.5	1	25	25.5	24.7	0.590	**0.709**	25
							25	0	24.5	23.6	0.447	0.550	
				Front	20525	836.5	1	25	25.5	24.7	0.404	0.486	
							25	0	24.5	23.6	0.303	0.373	
				Edge 2	20525	836.5	1	25	25.5	24.7	0.180	0.216	
							25	0	24.5	23.6	0.146	0.180	
				Edge 3	20525	836.5	1	25	25.5	24.7	0.352	0.423	
							25	0	24.5	23.6	0.267	0.328	
				Edge 4	20525	836.5	1	25	25.5	24.7	0.069	0.083	
							25	0	24.5	23.6	0.053	0.065	

10.8. LTE Band 12 (10MHz Bandwidth)

RF Exposure Conditions	Mode	Power Back-off	Dist. (mm)	Test Position	Ch #.	Freq. (MHz)	RB Allocation	RB offest	Power (dBm)		1-g SAR (W/kg)		Plot No.
									Tune-up Limit	Meas.	Meas.	Scaled	
Head	QPSK	N/A	0	Left Touch	23095	707.5	1	49	25.5	23.9	0.083	0.120	
							25	12	24.5	22.9	0.062	0.090	
				Left Tilt (15°)	23095	707.5	1	49	25.5	23.9	0.050	0.072	
							25	12	24.5	22.9	0.037	0.053	
				Right Touch	23095	707.5	1	49	25.5	23.9	0.095	**0.137**	26
							25	12	24.5	22.9	0.072	0.104	
				Right Tilt (15°)	23095	707.5	1	49	25.5	23.9	0.048	0.069	
							25	12	24.5	22.9	0.036	0.052	
Body-worn	QPSK	N/A	15	Rear	23095	707.5	1	49	25.5	23.9	0.208	**0.301**	27
							25	12	24.5	22.9	0.161	0.233	
				Front	23095	707.5	1	49	25.5	23.9	0.176	0.254	
							25	12	24.5	22.9	0.139	0.201	
Hotspot	QPSK	N/A	10	Rear	23095	707.5	1	49	25.5	23.9	0.287	**0.415**	28
							25	12	24.5	22.9	0.219	0.317	
				Front	23095	707.5	1	49	25.5	23.9	0.207	0.299	
							25	12	24.5	22.9	0.158	0.228	
				Edge 2	23095	707.5	1	49	25.5	23.9	0.214	0.309	
							25	12	24.5	22.9	0.172	0.249	
				Edge 3	23095	707.5	1	49	25.5	23.9	0.157	0.227	
							25	12	24.5	22.9	0.117	0.169	
				Edge 4	23095	707.5	1	49	25.5	23.9	0.140	0.202	
							25	12	24.5	22.9	0.115	0.166	

10.9. LTE Band 13 (10MHz Bandwidth)

RF Exposure Conditions	Mode	Power Back-off	Dist. (mm)	Test Position	Ch #.	Freq. (MHz)	RB Allocation	RB offest	Power (dBm)		1-g SAR (W/kg)		Plot No.
									Tune-up Limit	Meas.	Meas.	Scaled	
Head	QPSK	N/A	0	Left Touch	23230	782.0	1	25	25.0	23.2	0.061	0.093	
							25	12	24.0	22.2	0.048	0.073	
				Left Tilt (15°)	23230	782.0	1	25	25.0	23.2	0.037	0.057	
							25	12	24.0	22.2	0.029	0.044	
				Right Touch	23230	782.0	1	25	25.0	23.2	0.087	**0.131**	29
							25	12	24.0	22.2	0.068	0.104	
				Right Tilt (15°)	23230	782.0	1	25	25.0	23.2	0.042	0.064	
							25	12	24.0	22.2	0.033	0.050	
Body-worn	QPSK	N/A	15	Rear	23230	782.0	1	25	25.0	23.2	0.123	**0.186**	30
							25	12	24.0	22.2	0.097	0.147	
				Front	23230	782.0	1	25	25.0	23.2	0.093	0.141	
							25	12	24.0	22.2	0.075	0.114	
Hotspot	QPSK	N/A	10	Rear	23230	782.0	1	25	25.0	23.2	0.281	**0.425**	31
							25	12	24.0	22.2	0.220	0.333	
				Front	23230	782.0	1	25	25.0	23.2	0.157	0.238	
							25	12	24.0	22.2	0.125	0.189	
				Edge 2	23230	782.0	1	25	25.0	23.2	0.066	0.100	
							25	12	24.0	22.2	0.053	0.080	
				Edge 3	23230	782.0	1	25	25.0	23.2	0.142	0.215	
							25	12	24.0	22.2	0.111	0.168	
				Edge 4	23230	782.0	1	25	25.0	23.2	0.061	0.092	
							25	12	24.0	22.2	0.047	0.071	

10.10. LTE Band 41 (20MHz Bandwidth)

RF Exposure Conditions	Mode	Power Back-off	Dist. (mm)	Test Position	Ch #.	Freq. (MHz)	RB Allocation	RB offest	Power (dBm)		1-g SAR (W/kg)		Plot No.
									Tune-up Limit	Meas.	Meas.	Scaled	
Head	QPSK	N/A	0	Left Touch	40620	2593.0	1	49	25.0	23.6	0.037	**0.051**	32
							50	24	24.0	23.0	0.030	0.038	
				Left Tilt	40620	2593.0	1	49	25.0	23.6	0.009	0.013	
							50	24	24.0	23.0	0.009	0.011	
				Right Touch	40620	2593.0	1	49	25.0	23.6	0.029	0.040	
							50	24	24.0	23.0	0.023	0.029	
				Right Tilt	40620	2593.0	1	49	25.0	23.6	0.020	0.028	
							50	24	24.0	23.0	0.017	0.021	
Body-worn	QPSK	N/A	15	Rear	40620	2593.0	1	49	25.0	23.6	0.111	**0.153**	33
							50	24	24.0	23.0	0.092	0.115	
				Front	40620	2593.0	1	49	25.0	23.6	0.094	0.130	
							50	24	24.0	23.0	0.078	0.098	
Hotspot	QPSK	N/A	10	Rear	40620	2593.0	1	49	25.0	23.6	0.197	0.272	
							50	24	24.0	23.0	0.164	0.206	
				Front	40620	2593.0	1	49	25.0	23.6	0.181	0.250	
							50	24	24.0	23.0	0.152	0.191	
				Edge 3	40620	2593.0	1	49	25.0	23.6	0.479	**0.661**	34
							50	24	24.0	23.0	0.402	0.506	
				Edge 4	40620	2593.0	1	49	25.0	23.6	0.109	0.150	
							50	24	24.0	23.0	0.091	0.115	

10.11. LTE Band 66 (20MHz Bandwidth)

RF Exposure Conditions	Mode	Power Back-off	Dist. (mm)	Test Position	Ch #.	Freq. (MHz)	RB Allocation	RB offest	Power (dBm)		1-g SAR (W/kg)		Plot No.
									Tune-up Limit	Meas.	Meas.	Scaled	
Head	QPSK	N/A	0	Left Touch	132322	1745.0	1	99	25.0	23.4	0.070	**0.101**	35
							50	24	24.0	22.4	0.054	0.078	
				Left Tilt	132322	1745.0	1	99	25.0	23.4	0.025	0.036	
							50	24	24.0	22.4	0.017	0.025	
				Right Touch	132322	1745.0	1	99	25.0	23.4	0.030	0.043	
							50	24	24.0	22.4	0.029	0.042	
				Right Tilt	132322	1745.0	1	99	25.0	23.4	0.028	0.040	
							50	24	24.0	22.4	0.022	0.032	
Body-worn	QPSK	N/A	15	Rear	132322	1745.0	1	99	25.0	23.4	0.299	**0.432**	36
							50	24	24.0	22.4	0.233	0.337	
				Front	132322	1745.0	1	99	25.0	23.4	0.246	0.356	
							50	24	24.0	22.4	0.191	0.276	
Hotspot	QPSK	ON	10	Rear	132322	1745.0	1	99	21.5	19.7	0.205	0.310	
							50	24	21.5	19.6	0.202	0.313	
				Front	132322	1745.0	1	99	21.5	19.7	0.181	0.274	
							50	24	21.5	19.6	0.176	0.273	
				Edge 2	132322	1745.0	1	99	21.5	19.7	0.024	0.036	
							50	24	21.5	19.6	0.023	0.036	
				Edge 3	132322	1745.0	1	99	21.5	19.7	0.470	0.711	
							50	24	21.5	19.6	0.464	**0.719**	37
				Edge 4	132322	1745.0	1	99	21.5	19.7	0.039	0.059	
							50	24	21.5	19.6	0.038	0.059	

RF Exposure Conditions	Mode	Power Back-off	Dist. (mm)	Test Position	Ch #.	Freq. (MHz)	RB Allocation	RB offest	Power (dBm)		10-g SAR (W/kg)		Plot No.
									Tune-up Limit	Meas.	Meas.	Scaled	
Product Specific (Extremity) 10g	QPSK	N/A	11	Edge 3	132322	1745.0	1	99	25.0	23.4	0.515	0.744	
							50	24	24.0	22.4	0.404	0.584	
		ON	0	Edge 3	132322	1745.0	1	99	21.5	19.7	1.290	1.952	
							50	24	21.5	19.6	1.270	**1.967**	38

Note(s):

Body-worn SAR tested at full power without ear-jack connected because no SAR values were over 1.2 W/kg, even though there is power back-off function for body-worn head call with ear-jack connected for LTE B66

10.12. 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.

802.11b SISO Mode

RF Exposure Conditions	Mode	Power Back-off	Antenna	Dist. (mm)	Test Position	Ch #.	Freq. (MHz)	Duty Cycle	Area Scan Max. SAR (W/kg)	Power (dBm)		1-g SAR (W/kg)		Plot No.
										Tune-up Limit	Meas.	Meas.	Scaled	
Head	802.11b 1 Mbps SISO	ON	ANT 1	0	Left Touch	6	2437	98.97%	0.065	16.0	15.9			
					Left Tilt	6	2437	98.97%	0.030	16.0	15.9			
					Right Touch	6	2437	98.97%	**0.378**	16.0	15.9	0.261	**0.271**	39
					Right Tilt	6	2437	98.97%	0.138	16.0	15.9			
			ANT 2	0	Left Touch	6	2437	98.97%	0.244	16.0	15.9			
					Left Tilt	6	2437	98.97%	0.184	16.0	15.9			
					Right Touch	6	2437	98.97%	**0.754**	16.0	15.9	0.635	**0.658**	40
					Right Tilt	6	2437	98.97%	0.642	16.0	15.9	0.468	0.485	
Body-worn	802.11b 11 Mbps SISO	N/A	ANT 1	15	Rear	6	2437	90.11%	**0.046**	19.0	19.0	0.035	**0.039**	41
					Front	6	2437	90.11%	0.040	19.0	19.0			
			ANT 2	15	Rear	6	2437	90.11%	**0.133**	19.0	18.9	0.086	**0.098**	42
					Front	6	2437	90.11%	0.119	19.0	18.9			
Hotspot	802.11b 11 Mbps SISO	N/A	ANT 1	10	Rear	6	2437	90.11%	0.105	19.0	19.0			
					Front	6	2437	90.11%	0.091	19.0	19.0			
					Edge 1	6	2437	90.11%	0.017	19.0	19.0			
					Edge 2	6	2437	90.11%	0.005	19.0	19.0			
					Edge 4	6	2437	90.11%	**0.282**	19.0	19.0	0.132	**0.147**	43
			ANT 2	10	Rear	6	2437	90.11%	0.298	19.0	18.9			
					Front	6	2437	90.11%	0.284	19.0	18.9			
					Edge 1	6	2437	90.11%	0.127	19.0	18.9			
					Edge 2	6	2437	90.11%	0.014	19.0	18.9			
					Edge 4	6	2437	90.11%	**0.488**	19.0	18.9	0.304	**0.347**	44

802.11b SISO Mode (RSDB)

RF Exposure Conditions	Mode	Power Back-off	Antenna	Dist. (mm)	Test Position	Ch #.	Freq. (MHz)	Duty Cycle	Area Scan Max. SAR (W/kg)	Power (dBm)		1-g SAR (W/kg)		Plot No.
										Tune-up Limit	Meas.	Meas.	Scaled	
Head	802.11b 1 Mbps SISO	ON	ANT 1	0	Right Touch	1	2412	98.97%	0.267	14.0	13.9	0.160	0.165	
			ANT 2	0	Right Touch	6	2437	98.97%	0.525	14.0	13.8	0.413	0.437	
					Right Tilt	6	2437	98.97%	0.462	14.0	13.8	0.305	0.323	
Body-worn	802.11b 1 Mbps SISO	ON	ANT 1	15	Rear	1	2412	98.97%	0.016	14.0	13.9	0.011	0.011	
			ANT 2	15	Rear	6	2437	98.97%	0.034	14.0	13.8	0.022	0.023	
Hotspot	802.11b 1 Mbps SISO	ON	ANT 1	10	Edge 4	1	2412	98.97%	0.074	14.0	13.9	0.051	0.053	
			ANT 2	10	Edge 4	6	2437	98.97%	0.137	14.0	13.8	0.101	0.107	

802.11g Mode (RSDB)

RF Exposure Conditions	Mode	Power Back-off	Antenna	Dist. (mm)	Test Position	Ch #.	Freq. (MHz)	Duty Cycle	Area Scan Max. SAR (W/kg)	Power (dBm)		1-g SAR (W/kg)		Plot No.
										Tune-up Limit	Meas.	Meas.	Scaled	
Head	802.11g 6 Mbps MIMO	ON	1 + 2	0	Left Touch	6	2437	92.48%	0.244	14.0	13.6			
					Left Tilt	6	2437	92.48%	0.184	14.0	13.6			
					Right Touch	6	2437	92.48%	0.560	14.0	13.6	0.454	0.538	
					Right Tilt	6	2437	92.48%	0.301	14.0	13.6	0.238	0.282	
RF Exposure Conditions	Mode	Power Back-off	Antenna	Dist. (mm)	Test Position	Ch #.	Freq. (MHz)	Duty Cycle	Area Scan Max. SAR (W/kg)	Power (dBm)		1-g SAR (W/kg)		Plot No.
										Tune-up Limit	Meas.	Meas.	Scaled	
Body-worn	802.11g 6 Mbps SISO	ON	ANT 1	15	Rear	6	2437	92.48%	0.016	14.0	13.7	0.010	0.012	
			ANT 2	15	Rear	6	2437	92.48%	0.024	14.0	13.6	0.013	0.015	
Hotspot	802.11g 6 Mbps SISO	ON	ANT 1	10	Edge 4	6	2437	92.48%	0.065	14.0	13.7	0.044	0.051	
			ANT 2	10	Edge 4	6	2437	92.48%	0.079	14.0	13.6	0.054	0.064	

Note(s):

Head SAR results used for DTS and U-NII are MIMO. Body-worn and Hotspot SAR Results are SISO. Head results use MIMO since the Sum of SAR was >1.6 W/kg.

10.13. Wi-Fi (U-NII Band)

When the specified maximum output power is the same for both UNII band I and UNII band 2A, begin SAR measurement in UNII band 2A; and if the highest *reported* SAR for UNII band 2A is

- ≤ 1.2 W/kg, SAR is not required for UNII band I
- > 1.2 W/kg, both bands should be tested independently for SAR.

U-NII-2A

RF Exposure Conditions	Mode	Power Back-off	Antenna	Dist. (mm)	Test Position	Ch #.	Freq. (MHz)	Duty Cycle	Area Scan Max. SAR (W/kg)	Power (dBm)		1-g SAR (W/kg)		Plot No.
										Tune-up Limit	Meas.	Meas.	Scaled	
Head	802.11ac VHT80 SISO	ON	ANT 1	0	Left Touch	58	5290	65.46%	0.028	14.0	13.7			
					Left Tilt	58	5290	65.46%	0.011	14.0	13.7			
					Right Touch	58	5290	65.46%	**0.229**	14.0	13.7	0.080	0.131	
					Right Tilt	58	5290	65.46%	0.048	14.0	13.7			
			ANT 2	0	Left Touch	58	5290	65.46%	0.121	14.0	13.8			
					Left Tilt	58	5290	65.46%	0.130	14.0	13.8			
					Right Touch	58	5290	65.46%	0.367	14.0	13.8			
					Right Tilt	58	5290	65.46%	**0.403**	14.0	13.8	0.167	0.267	
Body-worn	802.11a 6 Mbps SISO	OFF	ANT 1	15	Rear	64	5320	93.40%	**0.070**	17.0	16.8	0.027	**0.030**	45
					Front	64	5320	93.40%	0.021	17.0	16.8			
			ANT 2	15	Rear	60	5300	93.40%	**0.083**	17.0	16.9	0.033	**0.036**	46
					Front	60	5300	93.40%	0.042	17.0	16.9			

RF Exposure Conditions	Mode	Power Back-off	Antenna	Dist. (mm)	Test Position	Ch #.	Freq. (MHz)	Duty Cycle	Area Scan Max. SAR (W/kg)	Power (dBm)		10-g SAR (W/kg)		Plot No.
										Tune-up Limit	Meas.	Meas.	Scaled	
Product Specific (Extremity) 10g	802.11a 6 Mbps SISO	N/A	ANT 1	0	Rear	64	5320	93.40%	2.550	17.0	16.8			
					Front	64	5320	93.40%	1.910	17.0	16.8			
					Edge 1	64	5320	93.40%	0.170	17.0	16.8			
					Edge 2	64	5320	93.40%	0.026	17.0	16.8			
					Edge 4	64	5320	93.40%	**3.890**	17.0	16.8	0.354	**0.397**	47
			ANT 2	0	Rear	60	5300	93.40%	5.520	17.0	16.9			
					Front	60	5300	93.40%	3.000	17.0	16.9			
					Edge 1	60	5300	93.40%	2.430	17.0	16.9			
					Edge 2	60	5300	93.40%	0.493	17.0	16.9			
					Edge 4	60	5300	93.40%	**7.490**	17.0	16.9	0.506	**0.554**	48

RF Exposure Conditions	Mode	Power Back-off	Antenna	Dist. (mm)	Test Position	Ch #.	Freq. (MHz)	Duty Cycle	Area Scan Max. SAR (W/kg)	Power (dBm)		1-g SAR (W/kg)		Plot No.
										Tune-up Limit	Meas.	Meas.	Scaled	
Head	802.11ac VHT80 MIMO	ON	1 + 2	0	Left Touch	58	5290	65.46%	0.028	14.0	13.7			
					Left Tilt	58	5290	65.46%	0.011	14.0	13.7			
					Right Touch	58	5290	65.46%	0.386	14.0	13.7	0.180	**0.295**	49
					Right Tilt	58	5290	65.46%	**0.430**	14.0	13.7	0.160	0.262	

Note(s):

Head SAR results used for DTS and U-NII are MIMO. Body-worn and Hotspot SAR Results are SISO. Additional testing was performed on MIMO to satisfy Sum of SAR combinations.

RSDB mode

RF Exposure Conditions	Mode	Power Back-off	Antenna	Dist. (mm)	Test Position	Ch #.	Freq. (MHz)	Duty Cycle	Area Scan Max. SAR (W/kg)	Power (dBm)		1-g SAR (W/kg)		Plot No.
										Tune-up Limit	Meas.	Meas.	Scaled	
Body-Worn	802.11ac VHT80 SISO	ON	ANT 1	15	Rear	58	5290	65.46%	1.880	14.0	13.7	0.011	0.018	
			ANT 2	15	Rear	58	5290	65.46%	0.043	14.0	13.8	0.014	0.022	

RF Exposure Conditions	Mode	Power Back-off	Antenna	Dist. (mm)	Test Position	Ch #.	Freq. (MHz)	Duty Cycle	Area Scan Max. SAR (W/kg)	Power (dBm)		10-g SAR (W/kg)		Plot No.
										Tune-up Limit	Meas.	Meas.	Scaled	
Product Specific (Extremity) 10g	802.11ac VHT80 SISO	ON	ANT 1	0	Edge 4	58	5290	65.46%	3.080	14.0	13.7	0.219	0.358	
			ANT 2	0	Edge 4	58	5290	65.46%	2.990	14.0	13.8	0.225	0.360	

UNII-2C

RF Exposure Conditions	Mode	Power Back-off	Antenna	Dist. (mm)	Test Position	Ch #.	Freq. (MHz)	Duty Cycle	Area Scan Max. SAR (W/kg)	Power (dBm)		1-g SAR (W/kg)		Plot No.
										Tune-up Limit	Meas.	Meas.	Scaled	
Head	802.11ac VHT80 SISO	ON	ANT 1	0	Left Touch	122	5610	65.46%	0.049	14.0	13.9			
					Left Tilt	122	5610	65.46%	0.027	14.0	13.9			
					Right Touch	122	5610	65.46%	**0.525**	14.0	13.9	0.169	0.264	
					Right Tilt	122	5610	65.46%	0.083	14.0	13.9			
			ANT 2	0	Left Touch	106	5530	65.46%	0.303	14.0	13.7			
					Left Tilt	106	5530	65.46%	0.327	14.0	13.7			
					Right Touch	106	5530	65.46%	0.732	14.0	13.7	0.279	0.457	
					Right Tilt	106	5530	65.46%	**0.972**	14.0	13.7	0.327	0.535	
Body-Worn	802.11a 6 Mbps SISO	OFF	ANT 1	15	Rear	144	5720	93.40%	**0.233**	17.0	17.0	0.094	**0.100**	50
					Front	144	5720	93.40%	0.048	17.0	17.0			
			ANT 2	15	Rear	144	5720	93.40%	**0.260**	17.0	16.8	0.111	**0.124**	51
					Front	144	5720	93.40%	0.081	17.0	16.8			

RF Exposure Conditions	Mode	Power Back-off	Antenna	Dist. (mm)	Test Position	Ch #.	Freq. (MHz)	Duty Cycle	Area Scan Max. SAR (W/kg)	Power (dBm)		10-g SAR (W/kg)		Plot No.
										Tune-up Limit	Meas.	Meas.	Scaled	
Product Specific (Extremity) 10g	802.11a 6 Mbps SISO	N/A	ANT 1	0	Rear	144	5720	93.40%	**5.520**	17.0	17.0	0.532	**0.570**	52
					Front	144	5720	93.40%	0.907	17.0	17.0			
					Edge 1	144	5720	93.40%	0.864	17.0	17.0			
					Edge 2	144	5720	93.40%	0.038	17.0	17.0			
					Edge 4	144	5720	93.40%	5.060	17.0	17.0			
			ANT 2	0	Rear	144	5720	93.40%	2.390	17.0	16.8			
					Front	144	5720	93.40%	3.920	17.0	16.8			
					Edge 1	144	5720	93.40%	4.900	17.0	16.8			
					Edge 2	144	5720	93.40%	0.385	17.0	16.8			
					Edge 4	144	5720	93.40%	**7.460**	17.0	16.8	0.510	**0.572**	53

RF Exposure Conditions	Mode	Power Back-off	Antenna	Dist. (mm)	Test Position	Ch #.	Freq. (MHz)	Duty Cycle	Area Scan Max. SAR (W/kg)	Power (dBm)		1-g SAR (W/kg)		Plot No.
										Tune-up Limit	Meas.	Meas.	Scaled	
Head	802.11ac VHT80 MIMO	ON	1 + 2	0	Left Touch	122	5610	65.46%	0.049	14.0	13.9			
					Left Tilt	122	5610	65.46%	0.027	14.0	13.9			
					Right Touch	122	5610	65.46%	**0.717**	14.0	13.9	0.367	0.574	
					Right Tilt	122	5610	65.46%	**0.630**	14.0	13.9	0.394	**0.616**	54

Note(s):

Head SAR results used for DTS and U-NII are MIMO. Body-worn and Hotspot SAR Results are SISO. Additional testing was performed on MIMO to satisfy Sum of SAR combinations.

RSDB Mode

RF Exposure Conditions	Mode	Power Back-off	Antenna	Dist. (mm)	Test Position	Ch #.	Freq. (MHz)	Duty Cycle	Area Scan Max. SAR (W/kg)	Power (dBm)		1-g SAR (W/kg)		Plot No.
										Tune-up Limit	Meas.	Meas.	Scaled	
Body-worn	802.11ac VHT80 SISO	ON	ANT 1	15	Rear	122	5610	65.46%	0.121	14.0	13.9	0.049	0.077	
			ANT 2	15	Rear	106	5530	65.46%	0.079	14.0	13.7	0.030	0.049	

RF Exposure Conditions	Mode	Power Back-off	Antenna	Dist. (mm)	Test Position	Ch #.	Freq. (MHz)	Duty Cycle	Area Scan Max. SAR (W/kg)	Power (dBm)		10-g SAR (W/kg)		Plot No.
										Tune-up Limit	Meas.	Meas.	Scaled	
Product Specific (Extremity) 10g	802.11ac VHT80 SISO	ON	ANT 1	0	Rear	122	5610	65.46%	2.700	14.0	13.9	0.263	0.411	
			ANT 2	0	Edge 4	106	5530	65.46%	3.250	14.0	13.7	0.241	0.394	

UNII-3

RF Exposure Conditions	Mode	Power Back-off	Antenna	Dist. (mm)	Test Position	Ch #.	Freq. (MHz)	Duty Cycle	Area Scan Max. SAR (W/kg)	Power (dBm)		1-g SAR (W/kg)		Plot No.
										Tune-up Limit	Meas.	Meas.	Scaled	
Head	802.11ac VHT80 SISO	ON	ANT 1	0	Left Touch	155	5775	65.46%	0.070	14.0	13.7			
					Left Tilt	155	5775	65.46%	0.087	14.0	13.7			
					Right Touch	155	5775	65.46%	**0.339**	14.0	13.7	0.125	0.205	
					Right Tilt	155	5775	65.46%	0.112	14.0	13.7			
			ANT 2	0	Left Touch	155	5775	65.46%	0.553	14.0	13.9			
					Left Tilt	155	5775	65.46%	0.545	14.0	13.9			
					Right Touch	155	5775	65.46%	**1.110**	14.0	13.9	0.498	0.778	
					Right Tilt	155	5775	65.46%	0.852	14.0	13.9	0.560	**0.875**	55
Body-worn	802.11a 6Mbps SISO	N/A	ANT 1	15	Rear	157	5785	93.40%	**0.230**	17.0	16.6	0.099	**0.116**	56
					Front	157	5785	93.40%	0.045	17.0	16.6			
			ANT 2	15	Rear	157	5785	93.40%	**0.275**	17.0	16.8	0.118	**0.132**	57
					Front	157	5785	93.40%	0.106	17.0	16.8			
Hotspot	802.11a 6Mbps SISO	N/A	ANT 1	10	Rear	157	5785	93.40%	**0.290**	17.0	16.6	0.127	**0.149**	58
					Front	157	5785	93.40%	0.080	17.0	16.6			
					Edge 1	157	5785	93.40%	0.122	17.0	16.6			
					Edge 2	157	5785	93.40%	0.038	17.0	16.6			
					Edge 4	157	5785	93.40%	0.288	17.0	16.6			
			ANT 2	10	Rear	157	5785	93.40%	0.306	17.0	16.8			
					Front	157	5785	93.40%	0.215	17.0	16.8			
					Edge 1	157	5785	93.40%	**0.512**	17.0	16.8	0.214	**0.240**	59
					Edge 2	157	5785	93.40%	0.039	17.0	16.8			
					Edge 4	157	5785	93.40%	0.199	17.0	16.8			

RF Exposure Conditions	Mode	Power Back-off	Antenna	Dist. (mm)	Test Position	Ch #.	Freq. (MHz)	Duty Cycle	Area Scan Max. SAR (W/kg)	Power (dBm)		1-g SAR (W/kg)		Plot No.
										Tune-up Limit	Meas.	Meas.	Scaled	
Head	802.11ac VHT80 MIMO	ON	1 + 2	0	Left Touch	155	5775	65.46%	0.553	14.0	13.9			
					Left Tilt	155	5775	65.46%	0.545	14.0	13.9			
					Right Touch	155	5775	65.46%	0.728	14.0	13.9	0.369	**0.577**	60
					Right Tilt	155	5775	65.46%	0.603	14.0	13.9	0.289	0.452	

Note(s):

Head SAR results used for DTS and U-NII are MIMO. Body-worn and Hotspot SAR Results are SISO. Additional testing was performed on MIMO to satisfy Sum of SAR combinations.

RSDB Mode

RF Exposure Conditions	Mode	Power Back-off	Antenna	Dist. (mm)	Test Position	Ch #.	Freq. (MHz)	Duty Cycle	Area Scan Max. SAR (W/kg)	Power (dBm)		1-g SAR (W/kg)		Plot No.
										Tune-up Limit	Meas.	Meas.	Scaled	
Body-worn	802.11ac VHT80 SISO	ON	ANT 1	15	Rear	155	5775	65.46%	0.086	14.0	13.7	0.031	0.051	
			ANT 2	15	Rear	155	5775	65.46%	0.089	14.0	13.9	0.036	0.056	
Hotspot	802.11ac VHT80 SISO	ON	ANT 1	10	Rear	155	5775	65.46%	0.156	14.0	13.7	0.058	0.095	
			ANT 2	10	Edge 1	155	5775	65.46%	0.221	14.0	13.9	0.088	0.138	

10.14. Bluetooth

RF Exposure Conditions	Mode	Dist. (mm)	Test Position	Ch #.	Freq. (MHz)	Power (dBm)		1-g SAR (W/kg)		Plot No.
						Tune-up Limit	Meas.	Meas.	Scaled	
Head	GFSK	0	Left Touch	39	2441	16.0	16.0	0.078	0.078	
			Left Tilt	39	2441	16.0	16.0	0.057	0.057	
			Right Touch	39	2441	16.0	16.0	0.375	**0.375**	61
			Right Tilt	39	2441	16.0	16.0	0.279	0.279	
Body-worn	GFSK	15	Rear	39	2441	16.0	16.0	0.021	**0.021**	62
			Front	39	2441	16.0	16.0	0.019	0.019	
Hotspot	GFSK	10	Rear	39	2441	16.0	16.0	0.047	0.047	
			Front	39	2441	16.0	16.0	0.044	0.044	
			Edge 1	39	2441	16.0	16.0	0.024	0.024	
			Edge 4	39	2441	16.0	16.0	0.078	**0.078**	63

11. SAR Measurement Variability

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

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

Frequency Band (MHz)	Air Interface	RF Exposure Conditions	Test Position	Repeated SAR (Yes/No)	Highest Measured SAR (W/kg)	First Repeated	
						Measured SAR (W/kg)	Largest to Smallest SAR Ratio
1900	LTE Band 2	Hotspot	Edge 3	Yes	1.070	1.070	1.00

Note(s):
Second Repeated Measurement is not required since the ratio of the largest to smallest SAR for the original and first repeated measurement is < 1.20.

Product Specific 10g SAR

Frequency Band (MHz)	Air Interface	RF Exposure Conditions	Test Position	Repeated SAR (Yes/No)	Highest Measured SAR (W/kg)	First	
						Measured SAR (W/kg)	Largest to Smallest SAR Ratio
1700	WCDMA Band IV	Product Specific (Extremity) 10g	Edge 3	Yes	2.080	2.030	1.02
1900	GSM 1900	Product Specific (Extremity) 10g	Edge 3	Yes	2.040	2.020	1.01

Note(s):
Second Repeated Measurement is not required since the ratio of the largest to smallest SAR for the original and first repeated measurement is < 1.20.

12. Simultaneous Transmission Conditions

Capable Transmit Configuration	Head	Body-Worn Accessory	Wireless Router	Phablet	Notes
GSM Voice + 2.4 GHz Wi-Fi	Yes	Yes	N/A	Yes	
GSM Voice + 5 GHz Wi-Fi	Yes	Yes	N/A	Yes	
GSM Voice + 2.4 GHz Bluetooth	Yes^	Yes	N/A	Yes	^Bluetooth Tethering is considered
GSM Voice + 2.4 GHz Wi-Fi MIMO	Yes	Yes	N/A	Yes	
GSM Voice + 5 GHz Wi-Fi MIMO	Yes	Yes	N/A	Yes	
GSM Voice + 2.4 GHz Wi-Fi_Ant.1 +5GHz Wi-Fi MIMO	Yes	Yes	N/A	Yes	Wi-Fi RSDB Combination
GSM Voice + 2.4 GHz Wi-Fi_Ant.2 +5GHz Wi-Fi MIMO	Yes	Yes	N/A	Yes	Wi-Fi RSDB Combination
GSM Voice + 2.4GHz Wi-Fi MIMO +5 GHz Wi-Fi MIMO	Yes	Yes	N/A	Yes	Wi-Fi RSDB Combination
UMTS + 2.4 GHz Wi-Fi	Yes	Yes	Yes	Yes	
UMTS + 5 GHz Wi-Fi	Yes	Yes	Yes	Yes	
UMTS + 2.4 GHz Bluetooth	Yes^	Yes	Yes^	Yes	^Bluetooth Tethering is considered
UMTS + 2.4 GHz Wi-Fi MIMO	Yes	Yes	Yes	Yes	
UMTS + 5 GHz Wi-Fi MIMO	Yes	Yes	Yes	Yes	
UMTS + 2.4 GHz Wi-Fi_Ant.1 +5GHz Wi-Fi MIMO	Yes	Yes	Yes	Yes	Wi-Fi RSDB Combination
UMTS + 2.4 GHz Wi-Fi_Ant.2 +5GHz Wi-Fi MIMO	Yes	Yes	Yes	Yes	Wi-Fi RSDB Combination
UMTS + 2.4GHz Wi-Fi MIMO +5 GHz Wi-Fi MIMO	Yes	Yes	Yes	Yes	Wi-Fi RSDB Combination
LTE + 2.4 GHz Wi-Fi	Yes	Yes	Yes	Yes	
LTE + 5 GHz Wi-Fi	Yes	Yes	Yes	Yes	
LTE + 2.4 GHz Bluetooth	Yes^	Yes	Yes^	Yes	^Bluetooth Tethering is considered
LTE + 2.4 GHz Wi-Fi MIMO	Yes	Yes	Yes	Yes	
LTE + 5 GHz Wi-Fi MIMO	Yes	Yes	Yes	Yes	
LTE + 2.4 GHz Wi-Fi_Ant.1 +5GHz Wi-Fi MIMO	Yes	Yes	Yes	Yes	Wi-Fi RSDB Combination
LTE + 2.4 GHz Wi-Fi_Ant.2 +5GHz Wi-Fi MIMO	Yes	Yes	Yes	Yes	Wi-Fi RSDB Combination
LTE + 2.4GHz Wi-Fi MIMO +5 GHz Wi-Fi MIMO	Yes	Yes	Yes	Yes	Wi-Fi RSDB Combination
GPRS/EDGE + 2.4 GHz Wi-Fi	Yes	Yes	Yes	Yes	
GPRS/EDGE + 5 GHz Wi-Fi	Yes	Yes	Yes	Yes	
GPRS/EDGE + 2.4 GHz Bluetooth	Yes^	Yes	Yes^	Yes	^Bluetooth Tethering is considered
GPRS/EDGE + 2.4 GHz Wi-Fi MIMO	Yes	Yes	Yes	Yes	
GPRS/EDGE + 5 GHz Wi-Fi MIMO	Yes	Yes	Yes	Yes	
GPRS/EDGE + 2.4 GHz Wi-Fi_Ant.1 +5GHz Wi-Fi MIMO	Yes	Yes	Yes	Yes	Wi-Fi RSDB Combination
GPRS/EDGE + 2.4 GHz Wi-Fi_Ant.2 +5GHz Wi-Fi MIMO	Yes	Yes	Yes	Yes	Wi-Fi RSDB Combination
GPRS/EDGE + 2.4GHz Wi-Fi MIMO +5 GHz Wi-Fi MIMO	Yes	Yes	Yes	Yes	Wi-Fi RSDB Combination

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.

12.1.2. SAR to Peak Location Ratio (SPLSR)

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

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

Where:

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

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

Ri is the separation distance between the pair of simultaneous transmitting antennas. When the SAR is measured, for both antennas in the pair, it is determined by the actual x, y and z coordinates in the 1-g SAR for each SAR peak location, based on the extrapolated and interpolated result in the zoom scan measurement, using the formula of

$$[(x_1-x_2)^2 + (y_1-y_2)^2 + (z_1-z_2)^2]$$

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

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

When an individual antenna transmits at on two bands simultaneously, the sum of the highest *reported* SAR for the frequency bands should be used to determine SAR_1.or SAR_2. When SPLSR is necessary, the smallest distance between the peak SAR locations for the antenna pair with respect to the peaks from each antenna should be used.

The antennas in all antenna pairs that do not qualify for simultaneous transmission SAR test exclusion must be tested for SAR compliance, according to the enlarged zoom scan and volume scan post-processing procedures in KDB Publication 865664 D01

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

RF Exposure conditions	Test Position	Standalone SAR (W/kg)						∑ 1-g SAR (W/kg)		
		WWAN	DTS		U-NII		BT	WWAN + BT	WWAN + DTS	WWAN + U-NII
		①	Ant #1 ②	Ant #2 ③	Ant #1 ④	Ant #2 ⑤	Ant #1 ⑥	① + ⑥	① + ② + ③	① + ④ + ⑤
Head	Left Touch	0.177	0.271	0.485	0.264	0.778	0.078	0.255	0.933	1.219
	Left Tilt	0.110	0.271	0.485	0.264	0.778	0.057	0.167	0.866	1.152
	Right Touch	0.228	0.271	0.658	0.264	0.778	0.375	0.603	1.157	1.270
	Right Tilt	0.107	0.271	0.485	0.264	0.875	0.279	0.386	0.863	1.246
Body-worn	Rear	0.646	0.039	0.098	0.116	0.132	0.021	0.667	0.783	0.894
	Front	0.607	0.039	0.098	0.116	0.132	0.019	0.626	0.744	0.855
Hotspot/ BT Tethering	Rear	0.709	0.147	0.347	0.149	0.240	0.047	0.756	1.203	1.098
	Front	0.527	0.147	0.347	0.149	0.240	0.044	0.571	1.021	0.916
	Edge 1		0.147	0.347	0.149	0.240	0.024		0.494	0.389
	Edge 4	0.202	0.147	0.347	0.149	0.240	0.078	0.280	0.696	0.591

12.3. Sum of the SAR for WWAN & RSDB Mode (DTS 802.11b SISO & UNII MIMO)

RF Exposure conditions	Test Position	Standalone SAR (W/kg)					∑ 1-g SAR (W/kg)	
		WWAN	DTS		U-NII		WWAN+DTS+U-NII	WWAN+DTS+U-NII
		①	Ant #1 ②	Ant #2 ③	Ant #1 ④	Ant #2 ⑤	① + ③ + ④ + ⑤	① + ② + ④ + ⑤
Head	Left Touch	0.177	0.165	0.323	0.452		0.952	0.794
	Left Tilt	0.110	0.165	0.323	0.452		0.885	0.727
	Right Touch	0.228	0.165	0.437	0.577		1.242	0.970
	Right Tilt	0.107	0.165	0.323	0.452		0.882	0.724
Body-worn	Rear	0.646	0.011	0.023	0.077	0.056	0.802	0.790
	Front	0.607	0.011	0.023	0.077	0.056	0.763	0.751
Hotspot/ BT Tethering	Rear	0.709	0.053	0.107	0.095	0.138	1.049	0.995
	Front	0.527	0.053	0.107	0.095	0.138	0.867	0.813
	Edge 1		0.053	0.107	0.095	0.138	0.340	0.286
	Edge 4	0.202	0.053	0.107	0.095	0.138	0.542	0.488

Note(s):

Head SAR results used for U-NII are MIMO. Body-worn and Hotspot SAR Results are SISO. Additional testing was performed on MIMO to satisfy Sum of SAR combinations.

12.4. Sum of the SAR for WWAN & RSDB Mode (DTS 802.11g MIMO & UNII MIMO)

RF Exposure conditions	Test Position	Standalone SAR (W/kg)					∑ 1-g SAR (W/kg)
		WWAN	DTS		U-NII		WWAN+DTS+U-NII
		①	Ant #1 ②	Ant #2 ③	Ant #1 ④	Ant #2 ⑤	① + ② + ③ + ④ + ⑤
Head	Left Touch	0.177	0.282		0.452		0.911
	Left Tilt	0.110	0.282		0.452		0.844
	Right Touch	0.228	0.538		0.577		1.343
	Right Tilt	0.107	0.282		0.452		0.841
Body-worn	Rear	0.646	0.012	0.015	0.077	0.056	0.806
	Front	0.607	0.012	0.015	0.077	0.056	0.767
Hotspot	Rear	0.709	0.051	0.064	0.095	0.138	1.057
	Front	0.527	0.051	0.064	0.095	0.138	0.875
	Edge 1		0.051	0.064	0.095	0.138	0.348
	Edge 4	0.202	0.051	0.064	0.095	0.138	0.550

Note(s):
Head SAR results used for DTS and U-NII are MIMO. Body-worn and Hotspot SAR Results are SISO. Additional testing was performed on MIMO to satisfy Sum of SAR combinations.

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

END OF REPORT