SAR EVALUATION REPORT

IEEE Std 1528-2013

For

GSM/WCDMA/LTE phone with BT, DTS/UNII a/b/g/n/ac/11ax HE 20/40/80, ANT+ and NFC

FCC ID: A3LSMG970KOR
Model Name: SM-G970N

Report Number: 12563993-S1V3
Issue Date: 1/30/2019

Prepared for

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Revision History

Rev.	Date	Revisions	Revised By
V1	1/25/2019	Initial Issue	--
V2	1/29/2019	Address TCB's questions and updated Appendix C and G	Devin Chang
V3	1/30/2019	Corrected Section 10.3	Lance Fleischer

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1. Attestation of Test Result

Applicant Name		Samsung Electronics Co., Ltd.			
FCC ID		A3LSMG970KOR			
Model Name		SM-G970N			
Applicable Standards		FCC 47 CFR § 2.1093 Published RF exposure KDB procedures IEEE Std 1528-2013			
Exposure Category		SAR Limits (W/Kg)			
		Peak spatial-average (1g of tissue)		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		0.343	0.633	0.329	0.685
Body-worn		0.862	0.147	0.397	0.099
Hotspot		1.367	0.298	0.786	0.177
Simultaneous TX	Head	1.227	1.033	1.227	1.227
	Body-worn	1.532	1.241	1.532	1.532
	Hotspot	1.556	1.546	1.556	1.556
Date Tested		12/10/2018 to 1/29/2019			
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.

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

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2. Test Specification, Methods and Procedures

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

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

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

- TCB workshop October 2014; 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 October 2016; RF Exposure Procedures (DUT Holder Perturbations)
- TCB workshop May 2017; RF Exposure Procedures (Broadband Liquid Above 3 GHz)
- TCB workshop October 2017; RF Exposure Procedures (LTE UL/DL Carrier Aggregation SAR)
- 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 G	
SAR Lab H	

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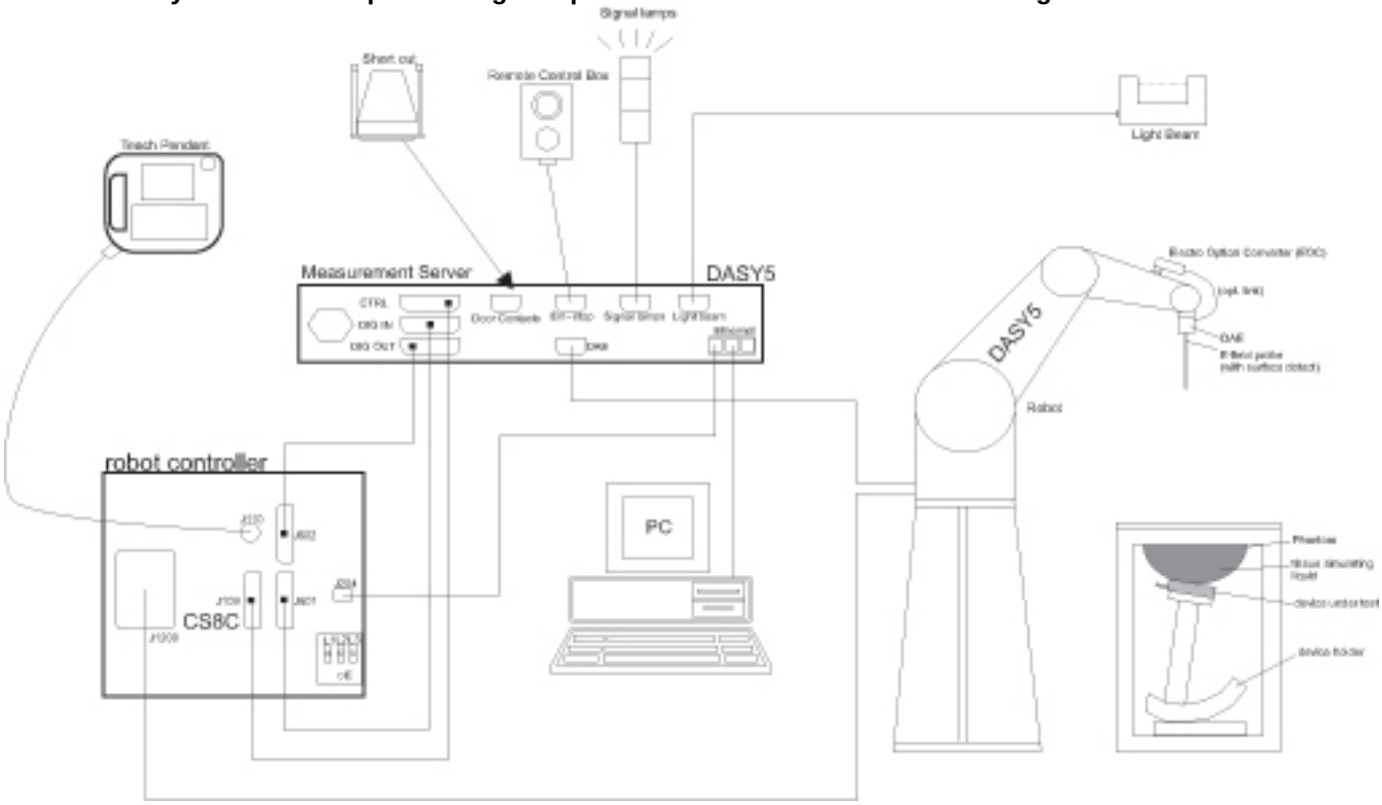
4. SAR Measurement System & Test Equipment

4.1. SAR Measurement System

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



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

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4.2. SAR Scan Procedures

Step 1: Power Reference Measurement

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

Step 2: Area Scan

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

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

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

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Step 3: Zoom Scan

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

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

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

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

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

Step 4: Power drift measurement

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

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4.3. Test Equipment

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

Dielectric Property Measurements

Name of Equipment	Manufacturer	Type/Model	Serial No.	Cal. Due Date
Network Analyzer	Agilent	ZNLE6	1323	7/16/2019
Dielectric Probe kit	SPEAG	DAK-3.5	1082	9/11/2019
Shorting block	SPEAG	DAK-3.5 Short	SM DAK 200 BA	9/11/2019
Thermometer	Traceable Calibration Control Co.	4242	18113673	4/3/2019

System Check

Name of Equipment	Manufacturer	Type/Model	Serial No.	Cal. Due Date
Synthesized Signal Generator	Agilent	N5181A	MY50140610	6/7/2019
Power Meter	Keysight	N1912A	MY55196007	7/23/2019
Power Sensor	Agilent	N1921A	MY53020038	4/23/2019
Power Sensor	Agilent	N1921A	MY53260010	10/17/2019
Amplifier	MITEQ	AMF-4D-00400600-50-30P	1795093	N/A
Directional coupler	Werlatone	C8060-102	2148	N/A
DC Power Supply	Sorensen	1611	1817A2680	N/A
Synthesized Signal Generator	Agilent	N5181A	MY50240680	5/25/2019
Power Meter	Keysight	N1912A	MY55196004	7/26/2019
Power Sensor	Agilent	N1921A	MY52200012	10/18/2019
Power Sensor*	Agilent	N1921A	MY52270022	12/28/2018
Amplifier	MITEQ	AMF-4D-00400600-50-30P	1795092	N/A
Directional coupler	Werlatone	C8060-102	2141	N/A
DC Power Supply	BK Precision	XT 15-4	215-02292	N/A
Synthesized Signal Generator	R & S	SMB 100A	1406	7/4/2019
Power Sensor	R & S	NRP18A	1424	6/19/2019

Note(s):

*Equipment not used past calibration due date.

Lab Equipment

Name of Equipment	Manufacturer	Type/Model	Serial No.	Cal. Due Date
E-Field Probe (SAR Lab A)	SPEAG	EX3DV4	3885	9/18/2019
E-Field Probe (SAR Lab B)	SPEAG	EX3DV4	3772	2/13/2019
E-Field Probe (SAR Lab D)	SPEAG	EX3DV4	3773	4/23/2019
E-Field Probe (SAR Lab E)	SPEAG	EX3DV4	3990	8/17/2019
E-Field Probe (SAR Lab G)	SPEAG	EX3DV4	7463	7/20/2019
E-Field Probe (SAR Lab H)	SPEAG	EX3DV4	7482	7/23/2019
Data Acquisition Electronics (SAR Lab A)	SPEAG	DAE4	1540	2/23/2019
Data Acquisition Electronics (SAR Lab B)	SPEAG	DAE4	1377	9/14/2019
Data Acquisition Electronics (SAR Lab D)	SPEAG	DAE4	1352	11/6/2019
Data Acquisition Electronics (SAR Lab E)	SPEAG	DAE4	1548	5/3/2019
Data Acquisition Electronics (SAR Lab G)	SPEAG	DAE4	1359	2/9/2019
Data Acquisition Electronics (SAR Lab H)	SPEAG	DAE4	1239	7/11/2019
System Validation Dipole	SPEAG	D750V3	1024	5/16/2019
System Validation Dipole	SPEAG	D835V2	4d117	5/16/2019
System Validation Dipole	SPEAG	D835V2	4d142	8/23/2019
System Validation Dipole	SPEAG	D1750V2	1050	4/10/2019
System Validation Dipole	SPEAG	D1900V2	5d163	10/16/2019
System Validation Dipole	SPEAG	D2450V2	899	3/16/2019
System Validation Dipole	SPEAG	D2450V2	706	5/18/2019
System Validation Dipole	SPEAG	D2600V2	1006	10/16/2019
System Validation Dipole	SPEAG	D2600V2	1036	3/16/2019
System Validation Dipole	SPEAG	D5GHzV2	1003	3/13/2019

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Other

Name of Equipment	Manufacturer	Type/Model	Serial No.	Cal. Due Date
Power Meter	Agilent	N1911A	MY50001018	10/18/2019
Power Sensor	Agilent	N1921A	MY52200012	10/18/2019
Power Sensor	Agilent	N1921A	MY53260010	10/17/2019
Base Station Simulator	R & S	CMW500	164541-Ci	2/19/2019
Base Station Simulator	R & S	CMW500	135384-WG	6/1/2019
Spectrum Analyzer/PXA	Agilent	N9030A	MY55410147	1/8/2019
Spectrum Analyzer/PXA	Agilent	N9030A	MY54410193	4/16/2019

Note(s):

*Equipment not used past calibration due date.

5. Measurement Uncertainty

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

Therefore, the measurement uncertainty is not required.

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6. Device Under Test (DUT) Information

6.1. DUT Description

Device Dimension	Refer to Appendix A This is a general size smart phone
Back Cover	The Back Cover is not removable
Battery Options	The rechargeable battery is not user accessible.
Accessory	Headset
Wireless Router (Hotspot)	Wi-Fi Hotspot mode permits the device to share its cellular data connection with other Wi-Fi-enabled devices. ☒ Mobile Hotspot (Wi-Fi 2.4 GHz) ☒ Mobile Hotspot (Wi-Fi 5.8 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	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** R39KB0AHYAE / 352597100074300 / WWAN Conducted R38KA0NA3DD / 352247100206268 / WLAN/BT Conducted R39KAFCYQ / 352597100051837 / WLAN/BT Conducted R39B0AHYQT / 352597100074508 / WWAN/WLAN Radiated R39KB0AHZDD / 352597100074722 / WWAN/WLAN Radiated R39KB0AHYMF / 352597100074474 / WWAN/WLAN Radiated R39KBOAJOCL / 35259710007542 / WWAN/WLAN Radiated R39KB0AHYCP / 352597100074383 / WWAN/WLAN Radiated
Hardware Version	REV0.3
Software Version	G970N.001

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6.2. Wireless Technologies

Wireless technologies	Frequency bands	Operating mode		Duty Cycle used for SAR testing
GSM	850 1900	Voice (GMSK) GPRS (GMSK) 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 (Cat. 14) HSUPA (Cat. 6) HSPA+ (DL only)		100%
LTE	FDD Band 2 FDD Band 4 FDD Band 5 FDD Band 12 FDD Band 13 FDD Band 17 FDD Band 25 FDD Band 26 TDD Band 41 FDD Band 66	QPSK 16QAM 64AQM Rel. 14 Carrier Aggregation – CA not supported for FCC Bands		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) 802.11ax (HE20)		98.85% (802.11b) Ant 1 [1] 99.31% (802.11b) Ant 2 [1]
	5 GHz	802.11a 802.11n (HT20) 802.11n (HT40) 802.11ac (VHT20) 802.11ac (VHT40) 802.11ac (VHT80) 802.11ax (HE20) 802.11ax (HE40) 802.11ax (HE80)		93.79% (802.11a) Ant 1 [2] 93.79% (802.11a) Ant 2 [2] 64.12% (802.11ac VHT80) MIMO [2]
	Does this device support bands 5.60 ~ 5.65 GHz? ☒ Yes ☐ No			
	Does this device support Band gap channel(s)? ☒ Yes ☐ No			
Bluetooth	2.4 GHz	Version 5.0 LE		77.33% (GFSK) [3]
NFC	13.56 MHz	Type A/B/F		N/A[4]

Notes:

1. Duty cycle for DTS is referenced from §9.4
2. Duty cycle for UNII is referenced from §9.5
3. Duty cycle for Bluetooth is referenced from §9.6
4. Measured Duty Cycle is not required due to SAR test exemption.

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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		

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General LTE SAR Test and Reporting Considerations (Continued)

Frequency range, Channel Bandwidth, Numbers and Frequencies

Band 25	Frequency range: 1850 - 1915 MHz (BW = 65 MHz)					
	Channel Bandwidth					
	20 MHz	15 MHz	10 MHz	5 MHz	3 MHz	1.4 MHz
Low	**26140/ 1860**	26115/ 1857.5	26090/ 1855	26065/ 1852.5	26055/ 1851.5	26047/ 1850.7
Mid	**26365/ 1882.5**	26365/ 1882.5	26365/ 1882.5	26365/ 1882.5	26365/ 1882.5	26365/ 1882.5
High	**26590/ 1905**	26615/ 1907.5	26640/ 1910	26665/ 1912.5	26675/ 1913.5	26683/ 1914.3

Band 26	Frequency range: 814 - 849 MHz (BW = 35 MHz)					
	Channel Bandwidth					
	20 MHz	15 MHz	10 MHz	5 MHz	3 MHz	1.4 MHz
Low		26765/ 821.5	26740/ 819	26715/ 816.5	26705/ 815.5	26697/ 814.7
Mid		**26865/ 831.5**	26865/ 831.5	26865/ 831.5	26865/ 831.5	26865/ 831.5
High		26965/ 841.5	26990/ 844	27015/ 846.5	27025/ 847.5	27033/ 848.3

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**					
Low-Mid	**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).

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6.4. LTE (TDD) Considerations

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

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

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

Special subframe configuration	Normal cyclic prefix in downlink			Extended cyclic prefix in downlink		
	DwPTS	UpPTS		DwPTS	UpPTS	
		Normal cyclic prefix in uplink	Extended cyclic prefix in uplink		Normal cyclic prefix in uplink	Extended cyclic prefix in uplink
0	$6592 \cdot T_s$	$(1+X) \cdot 2192 \cdot T_s$	$(1+X) \cdot 2560 \cdot T_s$	$7680 \cdot T_s$	$(1+X) \cdot 2192 \cdot T_s$	$(1+X) \cdot 2560 \cdot T_s$
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.

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6.5. Dynamic Antenna Tuning Test Considerations & Procedure

This Device supports an AIT (Antenna impedance tuner) feature which optimizes antenna matching for actual certain use conditions. The device supports two states of Dynamic Antenna Tuning: default state and auto tuner state.

Default State operates using Index 1 as an intermediate process to initialize itself. Afterwards, it fully transitions into the Default State using the Open Loop Mode Tuner ID and XGND, which remains static. Auto tuner state will dynamically change the impedance of the device to reach the optimal radiated state. Dynamic Antenna Tuning is supported only for LTE Bands 5. Please refer to the Dynamic Antenna Tuning Operation Description for full details.

Single point measurements were performed using a time-sweep method on the worst case test position per test configurations for LTE Bands 5 to determine which Index produced the highest result.

Band			LTE B5		
RF Exposure Conditions			Head	Body-worn	Hotspot
Dist. (mm)			0	15	10
Test Position			Right Touch	Rear	Rear
Ch #.			20525		
Freq. (MHz)			836.5		
Reported 1g SAR (W/kg)			0.214	0.316	0.467
Default States					
Index	Tuner	XGND	Single Point Measurement Value (W/kg)		
2	1200	8000	0.232	0.230	0.332
Auto Tuner States					
1	1200	8000	0.202	0.189	0.281
7	020F	100	0.152	0.173	0.272
11	3080	8000	0.065	0.211	0.105
12	31F0	8000	0.141	0.136	0.218
17	3601	8000	0.204	0.191	0.302
18	3615	8000	0.193	0.177	0.286
19	1040	8000	0.037	0.039	0.065
20	3031	8000	0.025	0.026	0.065
22	020F	28100	0.075	0.076	0.136
25	36A0	8000	0.202	0.189	0.309

Conclusion:

Testing was performed on Indexes that had unique Tuner ID and XGND codes, as shown in the Dynamic Antenna Tuning Operational Description and on Default state. From these single point measurement results, the Default state was determined to be the worst case. Full SAR testing was performed on Default state.

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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 §9.4 and §9.5 RSDB Output Power Results for further details.

	# TX	5GHz WIFI		2.4GHz WIFI		802.11 Modes
		Ant1	Ant2	Ant1	Ant2	
2.4 GHz + 5 GHz RSDB Only	2	✓	-	-	✓	2.4 GHz: b, g, n, ax 5 GHz: a, n, ac, ax
	2	-	✓	✓	-	
	2	✓	-	✓	-	
	2	-	✓	-	✓	
2.4 GHz + 5 GHz RSDB & MIMO	3	✓	✓	✓	-	2.4 GHz: b, g, n, ax 5 GHz: a, n, ac, ax (CDD+STBC Only)
	3	✓	✓	-	✓	
	3	✓	-	✓	✓	2.4 GHz: b, g, n, ax(CDD+STBC Only), 5 GHz: a, n, ac, ax
	3	-	✓	✓	✓	
2.4 GHz + 5 GHz RSDB MIMO	4	✓	✓	✓	✓	2.4 GHz: b, g, n, ax (CDD+STBC Only) 5 GHz: a, n, ac, ax (CDD+STBC Only)

Simultaneous TX condition Bluetooth with 5GHz WIFI (not RSDB)

	# TX	5GHz WIFI		2.4GHz BT
		Ant1	Ant2	Ant 1
2.4 GHz BT + 5 GHz WIFI (Not RSDB)	2	A	-	B
	2	-	A	B
	3	A	A	B

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7. RF Exposure Conditions (Test Configurations)

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

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

Notes:

1. SAR is not required because the distance from the antenna to the edge is > 25 mm as per KDB 941225 D06 Hot Spot SAR.
2. Main Antenna 1-1 supports GSM 850/1900 and W-CDMA bands 2/4/5 and LTE Bands 2/4/5/12/13/17/25/26/66.
3. Main Antenna 1-2 only support LTE Band 41.

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Wireless technologies	RF Exposure Conditions	DUT-to-User Separation	Test Position	Antenna-to-edge/surface	SAR Required	Note
WLAN Antenna 1 (2.4/5 GHz and BT)	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 (2.4/5.8 GHz Bands)	10 mm	Rear	< 25 mm	Yes	
			Front	< 25 mm	Yes	
			Edge 1 (Top)	< 25 mm	Yes	
			Edge 2 (Right)	> 25 mm	No	1
			Edge 3 (Bottom)	> 25 mm	No	1
			Edge 4 (Left)	< 25 mm	Yes	
WLAN Antenna 2 (2.4 GHz)	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	Yes	
			Edge 2 (Right)	> 25 mm	No	1
			Edge 3 (Bottom)	> 25 mm	No	1
			Edge 4 (Left)	< 25 mm	Yes	
WLAN Antenna 2 (5 GHz)	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 (5.8 GHz only)	10 mm	Rear	< 25 mm	Yes	
			Front	< 25 mm	Yes	
			Edge 1 (Top)	< 25 mm	Yes	
			Edge 2 (Right)	> 25 mm	No	1
			Edge 3 (Bottom)	> 25 mm	No	1
			Edge 4 (Left)	< 25 mm	Yes	

Notes:

1. SAR is not required because the distance from the antenna to the edge is > 25 mm as per KDB 941225 D06 Hot Spot SAR.
2. Wi-Fi Direct is only available in Hand use configuration

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8. Dielectric Property Measurements & System Check

8.1. Dielectric Property Measurements

The temperature of the tissue-equivalent medium used during measurement must also be within 18°C to 25°C and within ± 2°C of the temperature when the tissue parameters are characterized.

The dielectric parameters must be measured before the tissue-equivalent medium is used in a series of SAR measurements. The parameters should be re-measured after each 3 – 4 days of use; or earlier if the dielectric parameters can become out of tolerance; for example, when the parameters are marginal at the beginning of the measurement series.

Tissue dielectric parameters were measured at the low, middle and high frequency of each operating frequency range of the test device.

The dielectric constant (εr) and conductivity (σ) of typical tissue-equivalent media recipes are expected to be within ± 5% of the required target values; but for SAR measurement systems that have implemented the SAR error compensation algorithms documented in IEEE Std 1528-2013, to automatically compensate the measured SAR results for deviations between the measured and required tissue dielectric parameters, the tolerance for εr and σ may be relaxed to ± 10%. This is limited to frequencies ≤ 3 GHz.

Tissue Dielectric Parameters

FCC KDB 865664 D01 SAR Measurement 100 MHz to 6 GHz

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

IEEE Std 1528-2013

Refer to Table 3 within the IEEE Std 1528-2013

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Dielectric Property Measurements Results:

SAR Lab	Date	Band (MHz)	Tissue Type	Frequency (MHz)	Relative Permittivity (εr)			Conductivity (σ)		
					Measured	Target	Delta	Measured	Target	Delta
A	12/10/2018	835	Head	835	39.95	41.50	-3.73	0.93	0.90	3.26
				805	40.13	41.68	-3.72	0.92	0.90	2.70
				850	39.89	41.50	-3.88	0.93	0.92	2.09
A	12/10/2018	835	Body	835	53.45	55.20	-3.17	0.99	0.97	1.81
				805	53.86	55.33	-2.66	0.96	0.97	-0.75
				850	53.29	55.16	-3.39	1.00	0.99	1.51
A	1/2/2019	835	Head	835	43.42	41.50	4.63	0.87	0.90	-3.06
				805	43.36	41.68	4.03	0.86	0.90	-3.69
				850	43.38	41.50	4.53	0.88	0.92	-4.02
A	1/2/2019	835	Body	835	53.45	55.20	-3.17	0.95	0.97	-2.56
				805	53.61	55.33	-3.12	0.95	0.97	-2.06
				850	53.29	55.16	-3.39	0.99	0.99	0.34
SAR Lab	Date	Band (MHz)	Tissue Type	Frequency (MHz)	Relative Permittivity (εr)			Conductivity (σ)		
					Measured	Target	Delta	Measured	Target	Delta
B	12/10/2018	750	Head	750	40.29	41.96	-3.98	0.89	0.89	-0.15
				660	41.16	42.42	-2.98	0.86	0.89	-3.19
				800	40.54	41.71	-2.79	0.91	0.90	1.10
B	12/10/2018	750	Body	750	53.04	55.55	-4.51	0.98	0.96	1.57
				660	54.66	55.89	-2.20	0.89	0.96	-7.07
				800	52.73	55.35	-4.74	1.03	0.97	6.32
B	12/22/2018	5750	Body	5750	49.67	48.27	2.89	5.99	5.94	0.86
				5700	49.75	48.34	2.91	5.92	5.88	0.74
				5850	49.55	48.20	2.80	6.14	6.00	2.30
B	1/10/2019	5250	Body	5250	47.36	48.95	-3.25	5.42	5.35	1.29
				5150	47.48	49.09	-3.27	5.31	5.24	1.33
				5350	47.20	48.82	-3.31	5.57	5.47	1.84
B	1/10/2019	5750	Body	5750	46.66	48.27	-3.34	6.03	5.94	1.60
				5700	46.62	48.34	-3.56	6.10	5.88	3.72
				5850	46.46	48.20	-3.61	6.24	6.00	4.03
SAR Lab	Date	Band (MHz)	Tissue Type	Frequency (MHz)	Relative Permittivity (εr)			Conductivity (σ)		
					Measured	Target	Delta	Measured	Target	Delta
D	12/26/2018	2600	Head	2600	38.68	39.01	-0.85	1.94	1.96	-1.33
				2495	38.81	39.14	-0.85	1.84	1.85	-0.41
				2690	38.49	38.90	-1.05	2.01	2.06	-2.35
D	12/26/2018	2600	Body	2600	51.96	52.51	-1.05	2.23	2.16	2.97
				2495	52.20	52.64	-0.84	2.09	2.01	4.01
				2690	51.65	52.40	-1.43	2.34	2.29	2.13
D	1/9/2019	2450	Body	2450	50.22	52.70	-4.71	2.04	1.95	4.62
				2400	50.20	52.77	-4.87	1.97	1.90	3.58
				2480	50.15	52.66	-4.77	2.07	1.99	3.76

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SAR Lab	Date	Band (MHz)	Tissue Type	Frequency (MHz)	Relative Permittivity (εr)			Conductivity (σ)		
					Measured	Target	Delta	Measured	Target	Delta
E	12/20/2018	2450	Head	2450	37.90	39.20	-3.32	1.81	1.80	0.67
				2400	37.97	39.30	-3.38	1.77	1.75	1.22
				2480	37.92	39.16	-3.17	1.83	1.83	-0.02
E	12/20/2018	2450	Body	2450	51.44	52.70	-2.39	2.01	1.95	3.08
				2400	51.49	52.77	-2.43	1.97	1.90	3.63
				2480	51.45	52.66	-2.30	2.03	1.99	2.00
SAR Lab	Date	Band (MHz)	Tissue Type	Frequency (MHz)	Relative Permittivity (εr)			Conductivity (σ)		
					Measured	Target	Delta	Measured	Target	Delta
G	12/10/2018	1750	Head	1750	38.63	40.08	-3.63	1.32	1.37	-3.65
				1710	38.63	40.15	-3.78	1.30	1.35	-3.52
				1755	38.62	40.08	-3.64	1.32	1.37	-3.70
G	12/10/2018	1750	Body	1750	52.00	53.44	-2.70	1.47	1.49	-1.22
				1710	51.98	53.54	-2.92	1.44	1.46	-1.34
				1755	51.99	53.43	-2.69	1.47	1.49	-1.22
G	12/12/2018	1900	Head	1900	41.62	40.00	4.05	1.42	1.40	1.64
				1850	41.54	40.00	3.85	1.40	1.40	-0.21
				1920	41.58	40.00	3.95	1.43	1.40	2.43
G	12/12/2018	1900	Body	1900	51.87	53.30	-2.68	1.57	1.52	3.29
				1850	51.83	53.30	-2.76	1.54	1.52	1.51
				1920	51.83	53.30	-2.76	1.58	1.52	4.21
G	12/13/2018	2450	Head	2450	39.16	39.20	-0.10	1.80	1.80	0.17
				2400	39.21	39.30	-0.22	1.76	1.75	0.65
				2480	39.17	39.16	0.02	1.82	1.83	-0.57
G	12/13/2018	2450	Body	2450	52.51	52.70	-0.36	2.03	1.95	3.90
				2400	52.56	52.77	-0.40	1.98	1.90	4.11
				2480	52.52	52.66	-0.27	2.05	1.99	2.95
G	12/17/2018	5250	Head	5250	35.78	35.93	-0.43	4.55	4.70	-3.24
				5150	36.08	36.05	0.09	4.53	4.60	-1.56
				5350	35.75	35.82	-0.19	4.70	4.80	-2.19
G	12/17/2018	5250	Body	5250	47.96	48.95	-2.03	5.23	5.35	-2.39
				5150	48.29	49.09	-1.62	5.21	5.24	-0.56
				5350	47.99	48.82	-1.69	5.41	5.47	-1.14
G	12/17/2018	5600	Head	5600	35.43	35.53	-0.29	4.99	5.06	-1.47
				5500	35.44	35.65	-0.58	4.81	4.96	-2.92
				5725	35.19	35.39	-0.57	5.15	5.19	-0.75
G	12/17/2018	5600	Body	5600	47.66	48.48	-1.69	5.78	5.76	0.26
				5500	47.61	48.61	-2.06	5.55	5.64	-1.62
				5725	47.41	48.31	-1.86	5.97	5.91	1.02
G	12/17/2018	5750	Head	5750	35.05	35.36	-0.88	5.14	5.21	-1.43
				5700	35.22	35.42	-0.56	5.20	5.16	0.71
				5850	35.01	35.30	-0.82	5.33	5.27	1.06
G	12/17/2018	5750	Body	5750	47.23	48.27	-2.16	5.94	5.94	-0.01
				5700	47.39	48.34	-1.97	6.04	5.88	2.78
				5850	47.23	48.20	-2.01	6.19	6.00	3.23
G	12/21/2018	5250	Head	5250	35.36	35.93	-1.60	4.57	4.70	-2.75
				5150	35.54	36.05	-1.41	4.46	4.60	-3.00
				5350	35.16	35.82	-1.84	4.69	4.80	-2.30

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Dielectric Property Measurements Results (continued):

SAR Lab	Date	Band (MHz)	Tissue Type	Frequency (MHz)	Relative Permittivity (εr)			Conductivity (σ)		
					Measured	Target	Delta	Measured	Target	Delta
G	12/21/2018	5250	Body	5250	49.36	48.95	0.83	5.21	5.35	-2.63
				5150	49.53	49.09	0.90	5.08	5.24	-3.06
				5350	49.18	48.82	0.74	5.36	5.47	-2.02
G	12/21/2018	5600	Head	5600	34.77	35.53	-2.15	4.96	5.06	-2.04
				5500	34.95	35.65	-1.96	4.84	4.96	-2.46
				5725	34.50	35.39	-2.52	5.12	5.19	-1.41
G	12/21/2018	5600	Body	5600	48.79	48.48	0.64	5.71	5.76	-0.94
				5500	48.95	48.61	0.69	5.55	5.64	-1.69
				5725	48.55	48.31	0.50	5.90	5.91	-0.18
G	12/21/2018	5750	Head	5750	34.47	35.36	-2.52	5.15	5.21	-1.15
				5700	34.58	35.42	-2.37	5.08	5.16	-1.54
				5850	34.32	35.30	-2.78	5.26	5.27	-0.27
G	12/21/2018	5750	Body	5750	48.51	48.27	0.49	5.93	5.94	-0.05
				5700	48.58	48.34	0.49	5.87	5.88	-0.21
				5850	48.35	48.20	0.31	6.08	6.00	1.40
G	12/28/2018	2600	Head	2600	37.98	39.01	-2.64	1.92	1.96	-2.20
				2495	38.11	39.14	-2.64	1.83	1.85	-1.17
				2690	37.81	38.90	-2.80	1.99	2.06	-3.28
G	12/28/2018	2600	Body	2600	51.76	52.51	-1.43	2.17	2.16	0.56
				2495	51.91	52.64	-1.39	2.07	2.01	2.57
				2690	51.58	52.40	-1.56	2.26	2.29	-1.02
G	1/29/2019	5750	Body	5750	46.52	48.27	-3.63	6.03	5.94	1.52
				5700	46.43	48.34	-3.96	6.13	5.88	4.26
				5850	46.23	48.20	-4.09	6.26	6.00	4.33
SAR Lab	Date	Band (MHz)	Tissue Type	Frequency (MHz)	Relative Permittivity (εr)			Conductivity (σ)		
					Measured	Target	Delta	Measured	Target	Delta
H	12/18/2018	2600	Head	2600	38.14	39.01	-2.23	1.96	1.96	-0.21
				2495	38.30	39.14	-2.15	1.87	1.85	1.26
				2690	37.99	38.90	-2.33	2.03	2.06	-1.48
H	12/18/2018	2600	Body	2600	51.61	52.51	-1.72	2.16	2.16	-0.18
				2495	51.79	52.64	-1.62	2.06	2.01	2.17
				2690	51.44	52.40	-1.83	2.24	2.29	-1.89
H	12/26/2018	835	Head	835	41.36	41.50	-0.34	0.91	0.90	1.32
				805	41.43	41.68	-0.60	0.91	0.90	0.86
				850	41.36	41.50	-0.34	0.92	0.92	0.17
H	12/26/2018	835	Body	835	53.84	55.20	-2.46	0.96	0.97	-1.43
				805	53.95	55.33	-2.50	0.95	0.97	-1.97
				850	53.88	55.16	-2.32	0.96	0.99	-2.63
H	1/3/2019	835	Head	835	41.81	41.50	0.75	0.91	0.90	0.77
				805	41.83	41.68	0.36	0.90	0.90	0.10
				850	41.74	41.50	0.58	0.91	0.92	-0.33
H	1/3/2019	835	Body	835	52.79	55.20	-4.37	0.98	0.97	0.53
				805	52.82	55.33	-4.54	0.97	0.97	-0.21
				850	52.74	55.16	-4.38	0.98	0.99	-0.61
SAR Lab	Date	Band (MHz)	Tissue Type	Frequency (MHz)	Relative Permittivity (εr)			Conductivity (σ)		
					Measured	Target	Delta	Measured	Target	Delta
E	1/22/2019	2450	Body	2450	51.48	52.70	-2.31	2.01	1.95	2.97
				2400	51.53	52.77	-2.35	1.97	1.90	3.53
				2480	51.46	52.66	-2.28	2.03	1.99	1.85

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8.2. System Check

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

System Performance Check Measurement Conditions:

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

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System Check Results

The 1-g and 10-g SAR measured with a reference dipole, using the required tissue-equivalent medium at the test frequency, must be within ±10% of the manufacturer calibrated dipole SAR target. 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 %	
A	12/10/2018	Head	D835V2 SN:4d117	5/16/2019	0.983	9.83	9.87	-0.41	0.638	6.38	6.40	-0.31	
A	12/10/2018	Body	D835V2 SN:4d117	5/16/2019	0.996	9.96	10.31	-3.39	0.655	6.55	6.84	-4.24	
A	1/2/2019	Head	D835V2 SN:4d142	8/23/2019	0.989	9.89	9.48	4.32	0.651	6.51	6.10	6.72	
A	1/2/2019	Body	D835V2 SN:4d142	8/23/2019	1.040	10.40	9.68	**7.44**	0.683	6.83	6.36	7.39	1,2
B	12/10/2018	Head	D750V3 SN:1024	5/16/2019	0.807	8.07	8.28	**-2.54**	0.530	5.30	5.41	-2.03	3,4
B	12/10/2018	Body	D750V3 SN:1024	5/16/2019	0.908	9.08	9.03	**0.55**	0.606	6.06	6.05	0.17	5,6
B	12/22/2018	Body	D5GHzV2 SN:1003 (5.75 GHz)	3/13/2019	7.240	72.40	73.90	-2.03	1.990	19.90	20.60	-3.40	
B	1/10/2019	Body	D5GHzV2 SN:1003 (5.25 GHz)	3/13/2019	7.670	76.70	73.60	**4.21**	2.200	22.00	20.50	7.32	7.8
B	1/10/2019	Body	D5GHzV2 SN:1003 (5.75 GHz)	3/13/2019	7.780	77.80	73.90	5.28	2.170	21.70	20.60	5.34	
D	12/26/2018	Head	D2600V2 SN:1036	3/16/2019	5.430	54.30	54.54	-0.44	2.430	24.30	24.56	-1.06	
D	12/26/2018	Body	D2600V2 SN:1036	3/16/2019	5.640	56.40	56.13	**0.48**	2.470	24.70	25.04	-1.36	9,10
D	1/9/2019	Body	D2450V2 SN:899	3/16/2019	5.210	52.10	50.55	**3.07**	2.380	23.80	23.20	2.59	11,12
E	12/20/2018	Head	D2450V2 SN:899	3/16/2019	5.480	54.80	51.75	**5.89**	2.550	25.50	24.20	5.37	13,14
E	12/20/2018	Body	D2450V2 SN:899	3/16/2019	5.180	51.80	50.55	2.47	2.390	23.90	23.20	3.02	
G	12/10/2018	Head	D1750V2 SN:1050	4/10/2019	3.480	34.80	36.50	**-4.66**	1.870	18.70	19.42	-3.71	15,16
G	12/10/2018	Body	D1750V2 SN:1050	4/10/2019	3.730	37.30	37.18	**0.32**	1.980	19.80	19.74	0.30	17,18
G	12/12/2018	Head	D1900V2 SN:5d163	10/16/2019	4.090	40.90	38.77	**5.49**	2.130	21.30	20.10	5.97	19,20
G	12/12/2018	Body	D1900V2 SN:5d163	10/16/2019	4.480	44.80	42.99	**4.21**	2.320	23.20	21.97	5.60	21,22
G	12/13/2018	Head	D2450V2 SN:706	5/18/2019	5.070	50.70	52.60	-3.61	2.350	23.50	24.60	-4.47	
G	12/13/2018	Body	D2450V2 SN:706	5/18/2019	5.230	52.30	50.60	**3.36**	2.420	24.20	23.70	2.11	23,24
G	12/17/2018	Head	D5GHzV2 SN:1003 (5.25 GHz)	3/13/2019	7.940	79.40	80.60	-1.49	2.350	23.50	23.20	1.29	
G	12/17/2018	Body	D5GHzV2 SN:1003 (5.25 GHz)	3/13/2019	7.320	73.20	73.60	-0.54	2.080	20.80	20.50	1.46	
G	12/17/2018	Head	D5GHzV2 SN:1003 (5.60 GHz)	3/13/2019	8.590	85.90	84.50	1.66	2.490	24.90	24.00	3.75	
G	12/17/2018	Body	D5GHzV2 SN:1003 (5.60 GHz)	3/13/2019	8.210	82.10	77.70	5.66	2.310	23.10	21.70	6.45	
G	12/17/2018	Head	D5GHzV2 SN:1003 (5.75 GHz)	3/13/2019	7.740	77.40	78.40	**-1.28**	2.250	22.50	22.20	1.35	25,26
G	12/17/2018	Body	D5GHzV2 SN:1003 (5.75 GHz)	3/13/2019	7.200	72.00	73.90	-2.57	2.040	20.40	20.60	-0.97	
G	12/21/2018	Head	D5GHzV2 SN:1003 (5.25 GHz)	3/13/2019	7.890	78.90	80.60	**-2.11**	2.330	23.30	23.20	0.43	27,28
G	12/21/2018	Body	D5GHzV2 SN:1003 (5.25 GHz)	3/13/2019	7.350	73.50	73.60	-0.14	2.110	21.10	20.50	2.93	
G	12/21/2018	Head	D5GHzV2 SN:1003 (5.60 GHz)	3/13/2019	7.900	79.00	84.50	**-6.51**	2.300	23.00	24.00	-4.17	29,30
G	12/21/2018	Body	D5GHzV2 SN:1003 (5.60 GHz)	3/13/2019	8.370	83.70	77.70	**7.72**	2.380	23.80	21.70	9.68	31,32
G	12/21/2018	Head	D5GHzV2 SN:1003 (5.75 GHz)	3/13/2019	7.920	79.20	78.40	1.02	2.320	23.20	22.20	4.50	
G	12/21/2018	Body	D5GHzV2 SN:1003 (5.75 GHz)	3/13/2019	7.730	77.30	73.90	**4.60**	2.220	22.20	20.60	7.77	32,34
G	12/28/2018	Head	D2600V2 SN:1036	3/16/2019	5.520	55.20	54.54	1.21	2.500	25.00	24.56	1.79	
G	12/28/2018	Body	D2600V2 SN:1036	3/16/2019	5.790	57.90	56.13	**3.15**	2.580	25.80	25.04	3.04	35,36
G	1/29/2019	Body	D5GHzV2 SN:1003 (5.75 GHz)	3/13/2019	7.670	76.70	73.90	3.79	2.160	21.60	20.60	4.85	
H	12/18/2018	Head	D2600V2 SN:1006	10/16/2019	5.770	57.70	59.31	**-2.71**	2.570	25.70	26.43	-2.76	37,38
H	12/18/2018	Body	D2600V2 SN:1006	10/16/2019	5.420	54.20	58.52	-7.38	2.410	24.10	26.15	-7.84	
H	12/26/2018	Head	D835V2 SN:4d142	8/23/2019	1.000	10.00	9.48	**5.49**	0.653	6.53	6.10	7.05	39,40
H	12/26/2018	Body	D835V2 SN:4d142	8/23/2019	0.982	9.82	9.68	1.45	0.648	6.48	6.36	1.89	
H	1/3/2019	Head	D835V2 SN:4d142	8/23/2019	0.908	9.08	9.48	-4.22	0.591	5.91	6.10	-3.11	
H	1/3/2019	Body	D835V2 SN:4d142	8/23/2019	1.010	10.10	9.68	4.34	0.664	6.64	6.36	4.40	
E	1/22/2019	Body	D2450V2 SN:706	5/18/2019	5.370	53.70	50.60	6.13	2.470	24.70	23.70	4.22	41,42

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9. Conducted Output Power Measurements

9.1. GSM

Per KDB 941225 D01 3G SAR Procedures:

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

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

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

Per October 2013 TCB Workshop:

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

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	33.37	24.34	34.00	24.97
			190	836.6	33.42	24.39		
			251	848.8	33.42	24.39		
		2	128	824.2	31.20	25.18	32.00	25.98
			190	836.6	31.18	25.16		
			251	848.8	31.20	25.18		
		3	128	824.2	29.52	25.26	30.50	**26.24**
			190	836.6	29.74	25.48		
			251	848.8	29.86	25.60		
		4	128	824.2	28.56	25.55	29.00	25.99
			190	836.6	28.65	25.64		
			251	848.8	28.71	25.70		
EDGE (8PSK)	MCS5	1	128	824.2	27.01	17.98	27.50	18.47
			190	836.6	27.06	18.03		
			251	848.8	27.11	18.08		
		2	128	824.2	24.85	18.83	25.50	19.48
			190	836.6	25.02	19.00		
			251	848.8	25.00	18.98		
		3	128	824.2	23.80	19.54	24.50	20.24
			190	836.6	23.75	19.49		
			251	848.8	24.04	19.78		
		4	128	824.2	22.36	19.35	23.00	19.99
			190	836.6	22.70	19.69		
			251	848.8	22.48	19.47		

Notes:

1. Head and Body-worn RF Exposure Conditions only supports GMSK Voice mode. SAR testing was performed on GMSK Voice mode.
2. Hotspot RF Exposure Condition supports GPRS/EDGE (GMSK) mode. SAR testing was performed on GPRS/EDGE (GMSK) mode with 3 time slots for Max power based on the Tune-up Procedure.

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GSM1900 Measured Results

Mode	Coding Scheme	Time Slots	Ch No.	Freq. (MHz)	Maximum Average Power (dBm)			
					Measured		Tune-up Limit	
					Burst Pwr	Frame Pwr	Burst Pwr	Frame Pwr
GPRS/EDGE (GMSK)	CS1	1	512	1850.2	30.04	21.01	31.00	**21.97**
			661	1880.0	30.35	21.32		
			810	1909.8	30.15	21.12		
		2	512	1850.2	26.31	20.29	27.50	21.48
			661	1880.0	26.98	20.96		
			810	1909.8	26.54	20.52		
		3	512	1850.2	24.96	20.70	26.00	21.74
			661	1880.0	25.56	21.30		
			810	1909.8	25.31	21.05		
		4	512	1850.2	23.78	20.77	24.50	21.49
			661	1880.0	24.42	21.41		
			810	1909.8	23.95	20.94		
EDGE (8PSK)	MCS5	1	512	1850.2	25.75	16.72	26.50	17.47
			661	1880.0	26.20	17.17		
			810	1909.8	26.10	17.07		
		2	512	1850.2	24.17	18.15	24.50	18.48
			661	1880.0	24.44	18.42		
			810	1909.8	24.24	18.22		
		3	512	1850.2	22.32	18.06	22.50	18.24
			661	1880.0	22.50	18.24		
			810	1909.8	22.50	18.24		
		4	512	1850.2	21.00	17.99	21.00	17.99
			661	1880.0	21.00	17.99		
			810	1909.8	21.00	17.99		

Notes:

1. Head and Body-worn RF Exposure Conditions only supports GMSK Voice mode. SAR testing was performed on GMSK Voice mode
2. Hotspot RF Exposure Condition supports GPRS/EDGE (GMSK) mode. SAR testing was performed on GPRS/EDGE (GMSK) mode with 1 time slot for Max power based on the Tune-up Procedure.

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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	$\beta_{ed}1$: 47/15 $\beta_{ed}2$: 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.

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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	$\beta_{ed}1$: 30/15 $\beta_{ed}2$: 30/15	$\beta_{ed}3$: 24/15 $\beta_{ed}4$: 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.

Since is not support for uplink, the uplink Category and release is same as HSUPA. Therefore, the RF conducted power is not measured.

SAR measurement is not required for the HSDPA, HSUPA 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	24.56	N/A	25.00	21.55	N/A	22.00
		9400	1880.0	24.74			21.71		
		9538	1907.6	24.69			21.68		
HSDPA	Subtest 1	9262	1852.4	23.57	0	24.00	21.50	0	22.00
		9400	1880.0	23.95			21.70		
		9538	1907.6	23.90			21.66		
	Subtest 2	9262	1852.4	23.14	0	24.00	21.50	0	22.00
		9400	1880.0	23.26			21.67		
		9538	1907.6	23.20			21.60		
	Subtest 3	9262	1852.4	22.71	0.5	23.50	21.50	0	22.00
		9400	1880.0	22.60			21.63		
		9538	1907.6	22.70			21.50		
	Subtest 4	9262	1852.4	22.10	0.5	23.50	21.50	0	22.00
		9400	1880.0	22.30			21.50		
		9538	1907.6	22.30			21.60		
HSUPA	Subtest 1	9262	1852.4	23.25	0	24.00	20.35	1	21.00
		9400	1880.0	22.79			20.60		
		9538	1907.6	22.78			20.63		
	Subtest 2	9262	1852.4	21.63	2	22.00	20.36	1	21.00
		9400	1880.0	21.79			20.62		
		9538	1907.6	21.77			20.59		
	Subtest 3	9262	1852.4	22.74	1	23.00	20.36	1	21.00
		9400	1880.0	22.81			20.66		
		9538	1907.6	22.78			20.60		
	Subtest 4	9262	1852.4	21.71	2	22.00	20.37	1	21.00
		9400	1880.0	21.78			20.60		
		9538	1907.6	21.78			20.56		
	Subtest 5	9262	1852.4	23.25	1	23.00	20.35	1	21.00
		9400	1880.0	22.79			20.60		
		9538	1907.6	22.78			20.63		

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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	24.76	N/A	25.00	21.71	N/A	22.00
		1413	1732.6	24.70			21.37		
		1513	1752.6	24.71			21.62		
HSDPA	Subtest 1	1312	1712.4	24.76	0	25.00	21.79	0	22.00
		1413	1732.6	24.41			21.45		
		1513	1752.6	24.70			21.74		
	Subtest 2	1312	1712.4	23.70	1	24.00	21.82	0	22.00
		1413	1732.6	23.46			21.35		
		1513	1752.6	23.50			21.60		
	Subtest 3	1312	1712.4	22.60	2	23.00	21.76	0	22.00
		1413	1732.6	22.50			21.46		
		1513	1752.6	22.80			21.64		
	Subtest 4	1312	1712.4	22.70	2	23.00	21.50	0	22.00
		1413	1732.6	22.60			21.40		
		1513	1752.6	22.70			21.57		
HSUPA	Subtest 1	1312	1712.4	22.82	1	23.00	20.60	1	21.00
		1413	1732.6	22.63			20.35		
		1513	1752.6	22.91			20.58		
	Subtest 2	1312	1712.4	21.83	2	22.00	20.61	1	21.00
		1413	1732.6	21.57			20.36		
		1513	1752.6	21.87			20.57		
	Subtest 3	1312	1712.4	22.80	1	23.00	20.59	1	21.00
		1413	1732.6	22.62			20.35		
		1513	1752.6	22.80			20.57		
	Subtest 4	1312	1712.4	22.91	1	23.00	20.45	1	21.00
		1413	1732.6	22.62			20.60		
		1513	1752.6	22.85			20.50		
	Subtest 5	1312	1712.4	22.82	1	23.00	20.60	1	21.00
		1413	1732.6	22.63			20.35		
		1513	1752.6	22.91			20.58		

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W-CDMA Band V Measured Results

Mode		UL Ch No.	Freq. (MHz)	Maximum Average Power (dBm)		
				Measured Pwr	MPR	Tune-up Limit
Release 99	Rel 99 (RMC, 12.2 kbps)	4132	826.4	24.66	N/A	25.00
		4183	836.6	24.75		
		4233	846.6	24.72		
HSDPA	Subtest 1	4132	826.4	23.29	0	24.00
		4183	836.6	23.36		
		4233	846.6	23.36		
	Subtest 2	4132	826.4	22.31	0.5	23.50
		4183	836.6	22.30		
		4233	846.6	22.20		
	Subtest 3	4132	826.4	22.10	0.5	23.50
		4183	836.6	22.30		
		4233	846.6	22.15		
	Subtest 4	4132	826.4	22.20	0.5	23.50
		4183	836.6	22.30		
		4233	846.6	22.17		
HSUPA	Subtest 1	4132	826.4	22.35	0.5	23.50
		4183	836.6	22.40		
		4233	846.6	22.35		
	Subtest 2	4132	826.4	21.36	1.5	22.50
		4183	836.6	21.44		
		4233	846.6	21.45		
	Subtest 3	4132	826.4	21.35	1.5	22.50
		4183	836.6	21.44		
		4233	846.6	21.46		
	Subtest 4	4132	826.4	21.35	1.5	22.50
		4183	836.6	21.43		
		4233	846.6	21.46		
	Subtest 5	4132	826.4	22.35	0.5	23.50
		4183	836.6	22.40		
		4233	846.6	22.35		

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9.3. LTE

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

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

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

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

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

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 2 (1850-1910 MHz) is covered by LTE Band 25 (1850-1915 MHz)
   - 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)

LTE QPSK configuration has the highest maximum average output power per 3GPP standard.
SAR measurement is not required for the 16QAM and 64QAM. When primary mode and the adjusted SAR is ≤ 1.2 W/kg and secondary mode is ≤ ¼ dB higher than the primary mode.
Please refer to section 6.3. for LTE detail test channels.

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LTE Band 5 Measured Results

BW (MHz)	Mode	RB Allocation	RB offset	Maximum Average Power (dBm)			MPR	Tune-up Limit
				[redacted]	20525	[redacted]		
					836.5 MHz			
10 MHz	QPSK	1	0		24.79		0	25
		1	25		24.57		0	25
		1	49		24.56		0	25
		25	0		22.26		1	24
		25	12		22.22		1	24
		25	25		22.18		1	24
		50	0		22.22		1	24
	16QAM	1	0		22.68		1	24
		1	25		22.34		1	24
		1	49		22.48		1	24
		25	0		21.25		2	23
		25	12		21.22		2	23
		25	25		21.19		2	23
		50	0		21.18		2	23
	64QAM	1	0		21.49		2	23
		1	25		21.24		2	23
		1	49		21.39		2	23
		25	0		20.24		3	22
		25	12		20.18		3	22
		25	25		20.18		3	22
		50	0		20.21		3	22

BW (MHz)	Mode	RB Allocation	RB offset	Maximum Average Power (dBm)			MPR	Tune-up Limit
				20425	20525	20625		
				826.5 MHz	836.5 MHz	846.5 MHz		
5 MHz	QPSK	1	0	24.78	24.70	24.73	0	25
		1	12	24.90	24.58	24.91	0	25
		1	24	24.75	24.68	24.68	0	25
		12	0	22.24	22.22	22.26	1	24
		12	7	22.21	22.20	22.24	1	24
		12	13	22.20	22.21	22.24	1	24
		25	0	22.22	22.23	22.24	1	24
	16QAM	1	0	22.58	22.77	22.57	1	24
		1	12	22.77	22.82	22.29	1	24
		1	24	22.63	22.65	22.61	1	24
		12	0	21.28	21.23	21.29	2	23
		12	7	21.27	21.19	21.30	2	23
		12	13	21.27	21.17	21.28	2	23
		25	0	21.20	21.19	21.27	2	23
	64QAM	1	0	21.57	21.45	21.48	2	23
		1	12	21.25	21.50	21.16	2	23
		1	24	21.45	21.46	21.51	2	23
		12	0	20.18	20.25	20.31	3	22
		12	7	20.19	20.21	20.29	3	22
		12	13	20.21	20.22	20.30	3	22
		25	0	20.20	20.23	20.23	3	22

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LTE Band 5 Measured Results (continued)

BW (MHz)	Mode	RB Allocation	RB offset	Maximum Average Power (dBm)			MPR	Tune-up Limit
				20415	20525	20635		
				825.5 MHz	836.5 MHz	847.5 MHz		
3 MHz	QPSK	1	0	24.78	24.73	24.75	0	25
		1	8	25.00	24.67	25.00	0	25
		1	14	24.78	24.64	24.75	0	25
		8	0	22.23	22.19	22.21	1	24
		8	4	22.20	22.19	22.17	1	24
		8	7	22.20	22.17	22.16	1	24
		15	0	22.23	22.19	22.20	1	24
	16QAM	1	0	22.56	22.51	22.33	1	24
		1	8	22.89	22.49	22.60	1	24
		1	14	22.71	22.37	22.50	1	24
		8	0	21.29	21.26	21.21	2	23
		8	4	21.28	21.22	21.18	2	23
		8	7	21.27	21.24	21.20	2	23
		15	0	21.19	21.23	21.22	2	23
	64QAM	1	0	21.34	21.39	21.63	2	23
		1	8	21.58	21.43	21.35	2	23
		1	14	21.38	21.31	21.42	2	23
		8	0	20.28	20.25	20.21	3	22
		8	4	20.30	20.26	20.18	3	22
		8	7	20.28	20.21	20.20	3	22
		15	0	20.21	20.25	20.22	3	22

BW (MHz)	Mode	RB Allocation	RB offset	Maximum Average Power (dBm)			MPR	Tune-up Limit
				20407	20525	20643		
				824.7 MHz	836.5 MHz	848.3 MHz		
1.4 MHz	QPSK	1	0	24.83	24.81	24.82	0	25
		1	3	24.73	24.72	24.71	0	25
		1	5	24.73	24.73	24.72	0	25
		3	0	24.70	24.61	24.67	0	25
		3	1	24.74	24.59	24.60	0	25
		3	3	24.72	24.62	24.68	0	25
		6	0	22.19	22.22	22.19	1	24
	16QAM	1	0	22.59	22.63	22.49	1	24
		1	3	22.23	22.51	22.36	1	24
		1	5	22.48	22.51	22.37	1	24
		3	0	22.23	22.13	22.22	1	24
		3	1	22.20	22.25	22.15	1	24
		3	3	22.19	22.19	22.28	1	24
		6	0	21.36	21.18	21.34	2	23
	64QAM	1	0	21.15	21.30	21.54	2	23
		1	3	20.98	21.18	21.50	2	23
		1	5	21.29	21.14	21.38	2	23
		3	0	21.19	21.19	21.36	2	23
		3	1	21.23	21.29	21.40	2	23
		3	3	21.30	21.34	21.35	2	23
		6	0	20.27	20.27	20.29	3	22

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LTE Band 12 Measured Results

BW (MHz)	Mode	RB Allocation	RB offset	Maximum Average Power (dBm)			MPR	Tune-up Limit
				[redacted]	23095	[redacted]		
				[redacted]	707.5 MHz	[redacted]		
10 MHz	QPSK	1	0	[redacted]	24.35	[redacted]	0	25
		1	25	[redacted]	24.18	[redacted]	0	25
		1	49	[redacted]	24.24	[redacted]	0	25
		25	0	[redacted]	22.33	[redacted]	1	24
		25	12	[redacted]	22.31	[redacted]	1	24
		25	25	[redacted]	22.29	[redacted]	1	24
		50	0	[redacted]	22.33	[redacted]	1	24
	16QAM	1	0	[redacted]	22.60	[redacted]	1	24
		1	25	[redacted]	22.23	[redacted]	1	24
		1	49	[redacted]	22.50	[redacted]	1	24
		25	0	[redacted]	21.38	[redacted]	2	23
		25	12	[redacted]	21.32	[redacted]	2	23
		25	25	[redacted]	21.34	[redacted]	2	23
		50	0	[redacted]	21.32	[redacted]	2	23
	64QAM	1	0	[redacted]	21.74	[redacted]	2	23
		1	25	[redacted]	21.51	[redacted]	2	23
		1	49	[redacted]	21.69	[redacted]	2	23
		25	0	[redacted]	20.36	[redacted]	3	22
		25	12	[redacted]	20.32	[redacted]	3	22
		25	25	[redacted]	20.30	[redacted]	3	22
		50	0	[redacted]	20.31	[redacted]	3	22

BW (MHz)	Mode	RB Allocation	RB offset	Maximum Average Power (dBm)			MPR	Tune-up Limit
				23035	23095	23155		
				701.5 MHz	707.5 MHz	713.5 MHz		
5 MHz	QPSK	1	0	24.33	24.30	24.23	0	25
		1	12	24.26	24.51	24.15	0	25
		1	24	24.34	24.32	24.20	0	25
		12	0	22.34	22.31	22.33	1	24
		12	7	22.33	22.29	22.33	1	24
		12	13	22.32	22.31	22.33	1	24
		25	0	22.34	22.29	22.31	1	24
	16QAM	1	0	22.58	22.66	22.71	1	24
		1	12	22.62	22.47	22.77	1	24
		1	24	22.63	22.69	22.64	1	24
		12	0	21.50	21.44	21.41	2	23
		12	7	21.41	21.37	21.37	2	23
		12	13	21.42	21.36	21.39	2	23
		25	0	21.35	21.34	21.31	2	23
	64QAM	1	0	21.68	21.65	21.45	2	23
		1	12	21.51	21.37	21.66	2	23
		1	24	21.63	21.65	21.49	2	23
		12	0	20.34	20.32	20.24	3	22
		12	7	20.33	20.31	20.25	3	22
		12	13	20.36	20.31	20.28	3	22
		25	0	20.34	20.33	20.31	3	22

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	24.31	24.30	24.29	0	25
		1	8	24.55	24.12	24.50	0	25
		1	14	24.38	24.20	24.26	0	25
		8	0	22.29	22.28	22.29	1	24
		8	4	22.24	22.28	22.27	1	24
		8	7	22.29	22.24	22.25	1	24
		15	0	22.30	22.31	22.33	1	24
	16QAM	1	0	22.53	22.86	22.73	1	24
		1	8	22.66	22.79	23.09	1	24
		1	14	22.59	22.80	22.81	1	24
		8	0	21.25	21.37	21.37	2	23
		8	4	21.24	21.36	21.40	2	23
		8	7	21.27	21.36	21.37	2	23
		15	0	21.31	21.34	21.39	2	23
	64QAM	1	0	21.52	21.52	21.50	2	23
		1	8	21.38	21.65	21.60	2	23
		1	14	21.38	21.61	21.59	2	23
		8	0	20.33	20.41	20.32	3	22
		8	4	20.31	20.39	20.33	3	22
		8	7	20.31	20.37	20.30	3	22
		15	0	20.34	20.39	20.36	3	22

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LTE Band 12 Measured Results (continued)

BW (MHz)	Mode	RB Allocation	RB offset	Maximum Average Power (dBm)			MPR	Tune-up Limit
				23017	23095	23173		
				699.7 MHz	707.5 MHz	715.3 MHz		
1.4 MHz	QPSK	1	0	24.35	24.41	24.41	0	25
		1	3	24.24	24.31	24.35	0	25
		1	5	24.27	24.33	24.30	0	25
		3	0	24.22	24.24	24.30	0	25
		3	1	24.18	24.25	24.35	0	25
		3	3	24.18	24.25	24.29	0	25
		6	0	22.25	22.30	22.28	1	24
	16QAM	1	0	22.60	22.79	22.58	1	24
		1	3	22.49	22.65	22.32	1	24
		1	5	22.47	22.65	22.50	1	24
		3	0	22.20	22.33	22.44	1	24
		3	1	22.17	22.40	22.42	1	24
		3	3	22.26	22.44	22.42	1	24
		6	0	21.25	21.36	21.32	2	23
	64QAM	1	0	21.59	21.50	21.48	2	23
		1	3	21.59	21.50	21.28	2	23
		1	5	21.44	21.35	21.61	2	23
		3	0	21.30	21.36	21.37	2	23
		3	1	21.36	21.46	21.32	2	23
		3	3	21.34	21.36	21.40	2	23
		6	0	20.33	20.37	20.30	3	22

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LTE Band 13 Measured Results

BW (MHz)	Mode	RB Allocation	RB offset	Maximum Average Power (dBm)				
				[redacted]	23230 782 MHz	[redacted]	MPR	Tune-up Limit
10 MHz	QPSK	1	0	[redacted]	24.58	[redacted]	0	25
		1	25	[redacted]	24.58	[redacted]	0	25
		1	49	[redacted]	24.59	[redacted]	0	25
		25	0	[redacted]	22.14	[redacted]	1	24
		25	12	[redacted]	22.12	[redacted]	1	24
		25	25	[redacted]	22.11	[redacted]	1	24
		50	0	[redacted]	22.11	[redacted]	1	24
	16QAM	1	0	[redacted]	22.40	[redacted]	1	24
		1	25	[redacted]	22.15	[redacted]	1	24
		1	49	[redacted]	22.32	[redacted]	1	24
		25	0	[redacted]	21.19	[redacted]	2	23
		25	12	[redacted]	21.18	[redacted]	2	23
		25	25	[redacted]	21.16	[redacted]	2	23
		50	0	[redacted]	21.13	[redacted]	2	23
	64QAM	1	0	[redacted]	21.32	[redacted]	2	23
		1	25	[redacted]	21.10	[redacted]	2	23
		1	49	[redacted]	21.17	[redacted]	2	23
		25	0	[redacted]	20.14	[redacted]	3	22
		25	12	[redacted]	20.14	[redacted]	3	22
		25	25	[redacted]	20.10	[redacted]	3	22
		50	0	[redacted]	20.10	[redacted]	3	22

BW (MHz)	Mode	RB Allocation	RB offset	Maximum Average Power (dBm)				
				[redacted]	23230 782 MHz	[redacted]	MPR	Tune-up Limit
5 MHz	QPSK	1	0	[redacted]	24.62	[redacted]	0	25
		1	12	[redacted]	24.78	[redacted]	0	25
		1	24	[redacted]	24.62	[redacted]	0	25
		12	0	[redacted]	22.12	[redacted]	1	24
		12	7	[redacted]	22.11	[redacted]	1	24
		12	13	[redacted]	22.10	[redacted]	1	24
		25	0	[redacted]	22.10	[redacted]	1	24
	16QAM	1	0	[redacted]	22.49	[redacted]	1	24
		1	12	[redacted]	22.43	[redacted]	1	24
		1	24	[redacted]	22.53	[redacted]	1	24
		12	0	[redacted]	21.16	[redacted]	2	23
		12	7	[redacted]	21.14	[redacted]	2	23
		12	13	[redacted]	21.10	[redacted]	2	23
		25	0	[redacted]	21.11	[redacted]	2	23
	64QAM	1	0	[redacted]	21.22	[redacted]	2	23
		1	12	[redacted]	21.35	[redacted]	2	23
		1	24	[redacted]	21.26	[redacted]	2	23
		12	0	[redacted]	20.07	[redacted]	3	22
		12	7	[redacted]	20.02	[redacted]	3	22
		12	13	[redacted]	20.05	[redacted]	3	22
		25	0	[redacted]	20.11	[redacted]	3	22

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LTE Band 25 Measured Results

BW (MHz)	Mode	RB Allocation	RB offset	Maximum Average Power (dBm)					Reduced Average Power (dBm)				
				26140	26365	26590	MPR	Tune-up Limit	26140	26365	26590	MPR	Tune-up Limit
				1860 MHz	1882.5 MHz	1905 MHz			1860 MHz	1882.5 MHz	1905 MHz		
20 MHz	QPSK	1	0	24.27	24.34	24.20	0	25	21.32	21.39	21.18	0	22
		1	49	23.99	24.24	24.02	0	25	21.04	21.25	21.03	0	22
		1	99	24.02	24.20	23.90	0	25	21.09	21.20	20.96	0	22
		50	0	22.25	22.31	22.19	1	24	21.27	21.28	21.19	0	22
		50	24	22.15	22.25	22.15	1	24	21.21	21.25	21.16	0	22
		50	50	22.08	22.22	22.07	1	24	21.12	21.21	21.08	0	22
		100	0	22.14	22.25	22.14	1	24	21.18	21.24	21.12	0	22
	16QAM	1	0	22.56	22.85	22.36	1	24	21.70	21.77	21.51	0	22
		1	49	22.17	22.61	22.10	1	24	21.37	21.53	21.16	0	22
		1	99	22.23	22.69	22.16	1	24	21.34	21.57	21.28	0	22
		50	0	21.25	21.27	21.17	2	23	21.29	21.27	21.18	0	22
		50	24	21.15	21.23	21.15	2	23	21.19	21.25	21.14	0	22
		50	50	21.06	21.19	21.07	2	23	21.10	21.20	21.07	0	22
		100	0	21.10	21.19	21.12	2	23	21.12	21.18	21.10	0	22
	64QAM	1	0	21.89	21.90	21.75	2	23	21.97	21.99	21.69	0	22
		1	49	21.61	21.66	21.52	2	23	21.67	21.69	21.39	0	22
		1	99	21.51	21.68	21.43	2	23	21.54	21.76	21.36	0	22
		50	0	20.46	20.54	20.48	3	22	20.48	20.54	20.50	0	22
		50	24	20.35	20.48	20.43	3	22	20.37	20.51	20.45	0	22
		50	50	20.25	20.42	20.33	3	22	20.27	20.44	20.36	0	22
		100	0	20.35	20.46	20.41	3	22	20.36	20.47	20.42	0	22

BW (MHz)	Mode	RB Allocation	RB offset	Maximum Average Power (dBm)					Reduced Average Power (dBm)				
				26115	26365	26615	MPR	Tune-up Limit	26115	26365	26615	MPR	Tune-up Limit
				1857.5 MHz	1882.5 MHz	1907.5 MHz			1857.5 MHz	1882.5 MHz	1907.5 MHz		
15 MHz	QPSK	1	0	24.27	24.32	24.20	0	25	21.28	21.36	21.22	0	22
		1	37	24.32	24.16	24.31	0	25	21.46	21.24	21.37	0	22
		1	74	24.03	24.20	23.91	0	25	21.05	21.21	20.98	0	22
		36	0	22.25	22.33	22.21	1	24	21.27	21.32	21.19	0	22
		36	20	22.19	22.28	22.14	1	24	21.22	21.27	21.13	0	22
		36	39	22.15	22.28	22.11	1	24	21.18	21.25	21.08	0	22
		75	0	22.22	22.31	22.19	1	24	21.27	21.33	21.19	0	22
	16QAM	1	0	22.39	22.71	22.59	1	24	21.53	21.81	21.50	0	22
		1	37	22.42	22.62	22.76	1	24	21.49	21.69	21.70	0	22
		1	74	22.15	22.58	22.32	1	24	21.22	21.65	21.27	0	22
		36	0	21.23	21.31	21.19	2	23	21.27	21.29	21.20	0	22
		36	20	21.15	21.25	21.13	2	23	21.20	21.24	21.13	0	22
		36	39	21.10	21.24	21.07	2	23	21.14	21.24	21.07	0	22
		75	0	21.19	21.26	21.17	2	23	21.21	21.28	21.15	0	22
	64QAM	1	0	21.86	21.66	21.95	2	23	21.79	21.81	21.76	0	22
		1	37	21.70	21.57	21.89	2	23	21.60	21.75	21.46	0	22
		1	74	21.50	21.43	21.70	2	23	21.42	21.58	21.51	0	22
		36	0	20.47	20.54	20.51	3	22	20.48	20.58	20.55	0	22
		36	20	20.40	20.49	20.45	3	22	20.40	20.53	20.49	0	22
		36	39	20.34	20.45	20.38	3	22	20.34	20.49	20.41	0	22
		75	0	20.42	20.55	20.46	3	22	20.42	20.56	20.48	0	22

BW (MHz)	Mode	RB Allocation	RB offset	Maximum Average Power (dBm)					Reduced Average Power (dBm)				
				26090	26365	26640	MPR	Tune-up Limit	26090	26365	26640	MPR	Tune-up Limit
				1855 MHz	1882.5 MHz	1910 MHz			1855 MHz	1882.5 MHz	1910 MHz		
10 MHz	QPSK	1	0	24.23	24.32	24.16	0	25	21.23	21.31	21.13	0	22
		1	25	24.15	24.15	24.09	0	25	21.13	21.14	21.03	0	22
		1	49	24.16	24.24	23.98	0	25	21.11	21.21	20.99	0	22
		25	0	22.21	22.28	22.15	1	24	21.19	21.25	21.12	0	22
		25	12	22.17	22.25	22.09	1	24	21.16	21.24	21.09	0	22
		25	25	22.15	22.25	22.04	1	24	21.15	21.23	21.05	0	22
		50	0	22.17	22.25	22.09	1	24	21.17	21.24	21.10	0	22
	16QAM	1	0	22.29	22.67	22.57	1	24	21.37	21.65	21.62	0	22
		1	25	22.11	22.34	22.42	1	24	21.12	21.26	21.46	0	22
		1	49	22.18	22.52	22.40	1	24	21.26	21.53	21.45	0	22
		25	0	21.22	21.29	21.20	2	23	21.21	21.27	21.18	0	22
		25	12	21.16	21.25	21.13	2	23	21.15	21.25	21.12	0	22
		25	25	21.14	21.27	21.07	2	23	21.13	21.25	21.06	0	22
		50	0	21.16	21.22	21.10	2	23	21.14	21.20	21.07	0	22
	64QAM	1	0	21.76	21.82	21.58	2	23	21.78	21.75	21.63	0	22
		1	25	21.62	21.60	21.28	2	23	21.60	21.55	21.31	0	22
		1	49	21.66	21.77	21.29	2	23	21.66	21.71	21.33	0	22
		25	0	20.36	20.51	20.45	3	22	20.42	20.54	20.46	0	22
		25	12	20.32	20.50	20.40	3	22	20.37	20.52	20.41	0	22
		25	25	20.26	20.47	20.33	3	22	20.34	20.49	20.33	0	22
		50	0	20.33	20.50	20.41	3	22	20.33	20.50	20.40	0	22

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LTE Band 25 Measured Results (continued)

BW (MHz)	Mode	RB Allocation	RB offset	Maximum Average Power (dBm)					Reduced Average Power (dBm)				
				26065	26365	26665	MPR	Tune-up Limit	26065	26365	26665	MPR	Tune-up Limit
				1852.5 MHz	1882.5 MHz	1912.5 MHz			1852.5 MHz	1882.5 MHz	1912.5 MHz		
5 MHz	QPSK	1	0	24.16	24.26	24.03	0	25	21.19	21.21	21.07	0	22
		1	12	24.17	24.22	24.15	0	25	21.17	21.17	21.18	0	22
		1	24	24.17	24.29	23.96	0	25	21.20	21.20	21.03	0	22
		12	0	22.19	22.25	22.03	1	24	21.19	21.23	21.01	0	22
		12	7	22.14	22.23	22.00	1	24	21.16	21.21	20.97	0	22
		12	13	22.17	22.24	22.00	1	24	21.20	21.23	20.96	0	22
		25	0	22.16	22.25	22.00	1	24	21.16	21.21	20.98	0	22
	16QAM	1	0	22.60	22.69	22.35	1	24	21.57	21.44	21.40	0	22
		1	12	22.57	22.82	22.23	1	24	21.54	21.54	21.36	0	22
		1	24	22.48	22.73	22.35	1	24	21.46	21.47	21.39	0	22
		12	0	21.17	21.18	21.05	2	23	21.21	21.32	21.05	0	22
		12	7	21.16	21.18	21.05	2	23	21.19	21.27	21.02	0	22
		12	13	21.16	21.21	21.00	2	23	21.20	21.28	20.96	0	22
		25	0	21.16	21.30	21.00	2	23	21.15	21.26	20.98	0	22
	64QAM	1	0	21.57	22.02	21.46	2	23	21.64	21.71	21.75	0	22
		1	12	21.07	21.75	21.53	2	23	21.71	21.48	21.64	0	22
		1	24	21.54	21.90	21.43	2	23	21.64	21.73	21.59	0	22
		12	0	20.42	20.50	20.28	3	22	20.37	20.58	20.41	0	22
		12	7	20.39	20.48	20.30	3	22	20.35	20.54	20.33	0	22
		12	13	20.39	20.50	20.32	3	22	20.35	20.56	20.35	0	22
		25	0	20.39	20.49	20.30	3	22	20.41	20.51	20.30	0	22

BW (MHz)	Mode	RB Allocation	RB offset	Maximum Average Power (dBm)					Reduced Average Power (dBm)				
				26055	26365	26675	MPR	Tune-up Limit	26055	26365	26675	MPR	Tune-up Limit
				1851.5 MHz	1882.5 MHz	1913.5 MHz			1851.5 MHz	1882.5 MHz	1913.5 MHz		
3 MHz	QPSK	1	0	24.21	24.29	23.96	0	25	21.20	21.31	21.03	0	22
		1	8	24.39	24.22	24.18	0	25	21.44	21.13	21.28	0	22
		1	14	24.21	24.25	23.94	0	25	21.25	21.21	21.08	0	22
		8	0	22.16	22.26	22.00	1	24	21.20	21.22	20.97	0	22
		8	4	22.14	22.24	22.00	1	24	21.13	21.20	20.95	0	22
		8	7	22.16	22.22	22.00	1	24	21.14	21.20	20.94	0	22
		15	0	22.13	22.23	22.00	1	24	21.17	21.22	20.95	0	22
	16QAM	1	0	22.38	22.58	22.23	1	24	21.07	21.66	21.21	0	22
		1	8	22.45	22.44	22.50	1	24	21.19	21.60	21.51	0	22
		1	14	22.41	22.45	22.32	1	24	21.17	21.49	21.22	0	22
		8	0	21.14	21.30	21.05	2	23	21.23	21.22	21.00	0	22
		8	4	21.13	21.30	21.05	2	23	21.21	21.27	21.00	0	22
		8	7	21.14	21.31	21.03	2	23	21.24	21.25	21.00	0	22
		15	0	21.17	21.22	21.00	2	23	21.18	21.17	20.96	0	22
	64QAM	1	0	21.32	21.52	21.58	2	23	21.49	21.69	21.44	0	22
		1	8	21.54	21.60	21.33	2	23	21.80	21.70	21.20	0	22
		1	14	21.48	21.49	21.50	2	23	21.60	21.75	21.27	0	22
		8	0	20.37	20.61	20.36	3	22	20.42	20.48	20.35	0	22
		8	4	20.34	20.61	20.34	3	22	20.40	20.49	20.32	0	22
		8	7	20.35	20.57	20.33	3	22	20.38	20.48	20.33	0	22
		15	0	20.28	20.51	20.27	3	22	20.36	20.54	20.28	0	22

BW (MHz)	Mode	RB Allocation	RB offset	Maximum Average Power (dBm)					Reduced Average Power (dBm)				
				26047	26365	26683	MPR	Tune-up Limit	26047	26365	26683	MPR	Tune-up Limit
				1850.7 MHz	1882.5 MHz	1914.3 MHz			1850.7 MHz	1882.5 MHz	1914.3 MHz		
1.4 MHz	QPSK	1	0	24.22	24.32	24.02	0	25	21.20	21.32	21.04	0	22
		1	3	24.10	24.22	23.89	0	25	21.04	21.18	20.91	0	22
		1	5	24.16	24.26	23.94	0	25	21.14	21.27	20.95	0	22
		3	0	24.06	24.12	23.89	0	25	21.05	21.11	20.89	0	22
		3	1	23.97	24.14	23.90	0	25	20.98	21.14	20.97	0	22
		3	3	24.03	24.17	23.84	0	25	21.07	21.17	20.90	0	22
		6	0	22.16	22.25	22.00	1	24	21.13	21.23	20.91	0	22
	16QAM	1	0	22.39	22.75	22.20	1	24	21.42	21.69	21.18	0	22
		1	3	22.19	22.59	22.00	1	24	21.22	21.54	20.94	0	22
		1	5	22.24	22.62	22.09	1	24	21.29	21.58	21.10	0	22
		3	0	22.04	22.26	22.00	1	24	21.11	21.21	21.00	0	22
		3	1	22.00	22.32	22.00	1	24	21.04	21.32	21.01	0	22
		3	3	22.13	22.33	22.00	1	24	21.16	21.35	21.02	0	22
		6	0	21.20	21.27	21.00	2	23	21.21	21.23	21.04	0	22
	64QAM	1	0	21.32	21.32	21.59	2	23	21.64	21.50	21.50	0	22
		1	3	21.14	21.27	21.61	2	23	21.58	21.35	21.51	0	22
		1	5	21.45	21.16	21.44	2	23	21.44	21.64	21.35	0	22
		3	0	21.35	21.37	21.29	2	23	21.55	21.37	21.41	0	22
		3	1	21.45	21.43	21.33	2	23	21.50	21.39	21.42	0	22
		3	3	21.47	21.45	21.29	2	23	21.52	21.48	21.42	0	22
		6	0	20.41	20.40	20.27	3	22	20.35	20.56	20.34	0	22

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LTE Band 26 Measured Results

BW (MHz)	Mode	RB Allocation	RB offset	Maximum Average Power (dBm)			MPR	Tune-up Limit
					26865			
					831.5 MHz			
15 MHz	QPSK	1	0		24.16		0	25
		1	37		24.05		0	25
		1	74		23.87		0	25
		36	0		22.16		1	24
		36	20		22.10		1	24
		36	39		22.04		1	24
		75	0		22.15		1	24
	16QAM	1	0		22.45		1	24
		1	37		22.34		1	24
		1	74		22.22		1	24
		36	0		21.21		2	23
		36	20		21.13		2	23
		36	39		21.08		2	23
		75	0		21.17		2	23
	64QAM	1	0		21.47		2	23
		1	37		21.44		2	23
		1	74		21.19		2	23
		36	0		20.19		3	22
		36	20		20.10		3	22
		36	39		20.05		3	22
		75	0		20.13		3	22

BW (MHz)	Mode	RB Allocation	RB offset	Maximum Average Power (dBm)			MPR	Tune-up Limit
				26740	26865	26990		
				819 MHz	831.5 MHz	844 MHz		
10 MHz	QPSK	1	0	24.22	24.17	24.15	0	25
		1	25	24.11	23.97	24.04	0	25
		1	49	24.09	23.96	23.98	0	25
		25	0	22.18	22.12	22.12	1	24
		25	12	22.15	22.08	22.06	1	24
		25	25	22.12	22.04	22.06	1	24
		50	0	22.17	22.08	22.10	1	24
	16QAM	1	0	22.67	22.50	22.29	1	24
		1	25	22.49	22.13	22.07	1	24
		1	49	22.60	22.29	22.20	1	24
		25	0	21.19	21.13	21.13	2	23
		25	12	21.13	21.11	21.10	2	23
		25	25	21.11	21.06	21.09	2	23
		50	0	21.15	21.06	21.13	2	23
	64QAM	1	0	21.44	21.42	21.16	2	23
		1	25	21.29	21.20	21.00	2	23
		1	49	21.40	21.30	21.00	2	23
		25	0	20.12	20.14	20.16	3	22
		25	12	20.07	20.08	20.13	3	22
		25	25	20.06	20.06	20.12	3	22
		50	0	20.12	20.09	20.13	3	22

BW (MHz)	Mode	RB Allocation	RB offset	Maximum Average Power (dBm)			MPR	Tune-up Limit
				26715	26865	27015		
				816.5 MHz	831.5 MHz	846.5 MHz		
5 MHz	QPSK	1	0	24.21	24.13	24.15	0	25
		1	12	24.37	24.20	24.13	0	25
		1	24	24.17	24.09	24.13	0	25
		12	0	22.19	22.10	22.13	1	24
		12	7	22.17	22.05	22.11	1	24
		12	13	22.17	22.07	22.08	1	24
		25	0	22.16	22.07	22.09	1	24
	16QAM	1	0	22.59	22.49	22.53	1	24
		1	12	22.35	22.41	22.58	1	24
		1	24	22.57	22.49	22.43	1	24
		12	0	21.16	21.13	21.17	2	23
		12	7	21.15	21.11	21.14	2	23
		12	13	21.16	21.12	21.15	2	23
		25	0	21.16	21.05	21.14	2	23
	64QAM	1	0	21.65	21.12	21.37	2	23
		1	12	21.43	21.25	21.30	2	23
		1	24	21.49	21.11	21.40	2	23
		12	0	20.24	20.10	20.24	3	22
		12	7	20.18	20.07	20.16	3	22
		12	13	20.19	20.09	20.17	3	22
		25	0	20.14	20.09	20.13	3	22

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LTE Band 26 Measured Results (continued)

BW (MHz)	Mode	RB Allocation	RB offset	Maximum Average Power (dBm)			MPR	Tune-up Limit
				26705	26865	27025		
				815.5 MHz	831.5 MHz	847.5 MHz		
3 MHz	QPSK	1	0	24.49	24.28	24.21	0	25
		1	8	24.37	24.48	24.33	0	25
		1	14	24.40	24.28	24.21	0	25
		8	0	22.43	22.23	22.18	1	24
		8	4	22.44	22.21	22.16	1	24
		8	7	22.41	22.19	22.14	1	24
		15	0	22.43	22.21	22.17	1	24
	16QAM	1	0	22.92	22.42	22.50	1	24
		1	8	22.74	22.52	22.92	1	24
		1	14	22.76	22.41	22.65	1	24
		8	0	21.47	21.26	21.21	2	23
		8	4	21.43	21.25	21.24	2	23
		8	7	21.45	21.26	21.19	2	23
		15	0	21.45	21.24	21.17	2	23
	64QAM	1	0	21.30	21.66	21.27	2	23
		1	8	21.68	21.07	21.36	2	23
		1	14	21.56	21.49	21.33	2	23
		8	0	20.38	20.21	20.18	3	22
		8	4	20.42	20.19	20.22	3	22
		8	7	20.36	20.18	20.17	3	22
		15	0	20.36	20.24	20.15	3	22

BW (MHz)	Mode	RB Allocation	RB offset	Maximum Average Power (dBm)			MPR	Tune-up Limit
				26697	26865	27033		
				814.7 MHz	831.5 MHz	848.3 MHz		
1.4 MHz	QPSK	1	0	24.52	24.31	24.28	0	25
		1	3	24.45	24.25	24.19	0	25
		1	5	24.43	24.22	24.23	0	25
		3	0	24.41	24.23	24.18	0	25
		3	1	24.40	24.24	24.06	0	25
		3	3	24.40	24.21	24.11	0	25
		6	0	22.42	22.23	22.19	1	24
	16QAM	1	0	22.47	22.54	22.53	1	24
		1	3	22.48	22.33	22.41	1	24
		1	5	22.52	22.37	22.34	1	24
		3	0	22.45	22.27	22.16	1	24
		3	1	22.37	22.12	22.17	1	24
		3	3	22.46	22.21	22.26	1	24
		6	0	21.45	21.26	21.24	2	23
	64QAM	1	0	21.68	21.85	21.45	2	23
		1	3	21.67	21.76	21.35	2	23
		1	5	21.55	21.47	21.41	2	23
		3	0	21.52	21.30	21.16	2	23
		3	1	21.55	21.21	21.25	2	23
		3	3	21.53	21.23	21.26	2	23
		6	0	20.44	20.27	20.24	3	22

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LTE Band 41 Measured Result

BW (MHz)	Mode	RB Allocation	RB offset	Maximum Average Power (dBm)							Reduced Average Power (dBm)						
				39750	40185	40620	41055	41490	MPR	Tune-up Limit	39750	40185	40620	41055	41490	MPR	Tune-up Limit
				2506 MHz	2549.5 MHz	2593 MHz	2636.5 MHz	2680 MHz			2506 MHz	2549.5 MHz	2593 MHz	2636.5 MHz	2680 MHz		
20 MHz	QPSK	1	0	23.32	22.96	23.14	23.23	23.34	0	24	20.02	19.66	19.78	20.07	20.09	0	21.5
		1	49	23.14	22.85	22.95	23.10	23.16	0	24	19.84	19.58	19.66	19.98	20.00	0	21.5
		1	99	23.03	22.76	22.89	22.92	23.23	0	24	19.91	19.55	19.63	19.87	20.00	0	21.5
		50	0	21.74	21.46	21.61	21.67	21.81	1	23	20.49	20.18	20.29	20.54	20.62	0	21.5
		50	24	21.67	21.39	21.55	21.61	21.75	1	23	20.46	20.16	20.26	20.50	20.60	0	21.5
		50	50	21.60	21.33	21.49	21.54	21.69	1	23	20.45	20.13	20.24	20.49	20.58	0	21.5
		100	0	21.65	21.38	21.54	21.59	21.73	1	23	20.45	20.15	20.24	20.51	20.58	0	21.5
	16QAM	1	0	21.61	21.56	21.83	21.80	21.79	1	23	19.93	19.85	19.90	19.87	20.47	0	21.5
		1	49	21.75	21.46	21.28	21.73	22.08	1	23	19.86	19.81	19.59	20.38	20.17	0	21.5
		1	99	21.63	21.45	21.53	21.74	21.77	1	23	20.24	19.77	19.64	20.28	20.07	0	21.5
		50	0	20.69	20.46	20.58	20.63	20.80	2	22	20.47	20.18	20.27	20.54	20.63	0	21.5
		50	24	20.61	20.34	20.51	20.56	20.76	2	22	20.45	20.17	20.24	20.54	20.60	0	21.5
		50	50	20.56	20.33	20.47	20.52	20.64	2	22	20.50	20.16	20.20	20.54	20.59	0	21.5
		100	0	20.63	20.35	20.49	20.58	20.69	2	22	20.41	20.11	20.24	20.54	20.57	0	21.5
	64QAM	1	0	20.67	20.08	19.86	20.44	21.05	2	22	20.28	19.76	19.39	19.96	20.10	0	21.5
		1	49	20.17	20.02	19.68	19.97	20.39	2	22	20.23	19.58	19.10	20.17	19.73	0	21.5
		1	99	20.18	19.63	19.50	20.21	20.85	2	22	19.59	19.66	19.42	20.11	20.30	0	21.5
		50	0	19.65	19.40	19.62	19.65	19.77	3	21	19.51	19.21	19.29	19.52	19.63	0	21.5
		50	24	19.60	19.34	19.55	19.60	19.72	3	21	19.46	19.19	19.28	19.53	19.57	0	21.5
		50	50	19.55	19.28	19.49	19.55	19.66	3	21	19.47	19.17	19.28	19.53	19.59	0	21.5
		100	0	19.58	19.31	19.50	19.55	19.68	3	21	19.41	19.12	19.23	19.51	19.53	0	21.5

BW (MHz)	Mode	RB Allocation	RB offset	Maximum Average Power (dBm)							Reduced Average Power (dBm)						
				39750	40185	40620	41055	41490	MPR	Tune-up Limit	39750	40185	40620	41055	41490	MPR	Tune-up Limit
				2506 MHz	2549.5 MHz	2593 MHz	2636.5 MHz	2680 MHz			2506 MHz	2549.5 MHz	2593 MHz	2636.5 MHz	2680 MHz		
15 MHz	QPSK	1	0	23.21	22.98	23.13	23.27	23.41	0	24	20.00	19.67	19.80	19.95	20.08	0	21.5
		1	37	23.21	22.77	22.91	23.10	23.13	0	24	19.94	19.55	19.55	19.82	19.83	0	21.5
		1	74	23.14	22.80	23.02	23.04	23.15	0	24	19.82	19.54	19.68	19.80	19.92	0	21.5
		36	0	21.71	21.43	21.58	21.65	21.79	1	23	20.49	20.11	20.25	20.51	20.59	0	21.5
		36	20	21.67	21.39	21.53	21.60	21.74	1	23	20.47	20.09	20.22	20.49	20.56	0	21.5
		36	39	21.64	21.34	21.51	21.55	21.71	1	23	20.46	20.10	20.20	20.48	20.56	0	21.5
		75	0	21.73	21.44	21.59	21.64	21.79	1	23	20.53	20.17	20.27	20.55	20.63	0	21.5
	16QAM	1	0	21.54	21.15	21.46	21.72	21.73	1	23	19.84	19.77	19.92	20.03	20.39	0	21.5
		1	37	21.29	20.90	21.24	21.50	21.55	1	23	19.51	19.53	19.74	19.81	19.87	0	21.5
		1	74	21.37	21.12	21.27	21.27	21.56	1	23	19.75	19.77	19.79	19.88	20.12	0	21.5
		36	0	20.69	20.45	20.55	20.58	20.82	2	22	20.44	20.17	20.23	20.47	20.59	0	21.5
		36	20	20.64	20.40	20.51	20.53	20.73	2	22	20.38	20.10	20.20	20.42	20.56	0	21.5
		36	39	20.61	20.37	20.46	20.49	20.69	2	22	20.42	20.13	20.20	20.46	20.58	0	21.5
		75	0	20.70	20.42	20.55	20.61	20.74	2	22	20.50	20.18	20.27	20.54	20.63	0	21.5
	64QAM	1	0	20.21	20.02	20.20	20.17	21.11	2	22	19.77	19.51	19.78	20.30	20.06	0	21.5
		1	37	19.97	19.73	19.98	19.87	20.58	2	22	19.59	19.29	19.69	19.99	19.79	0	21.5
		1	74	20.21	19.85	20.06	19.95	20.65	2	22	19.59	19.44	19.73	20.23	19.86	0	21.5
		36	0	19.64	19.36	19.52	19.59	19.67	3	21	19.38	19.18	19.22	19.52	19.56	0	21.5
		36	20	19.58	19.31	19.47	19.55	19.64	3	21	19.36	19.16	19.19	19.41	19.54	0	21.5
		36	39	19.62	19.23	19.43	19.50	19.61	3	21	19.48	19.08	19.16	19.42	19.58	0	21.5
		75	0	19.64	19.40	19.53	19.58	19.72	3	21	19.47	19.16	19.22	19.51	19.59	0	21.5

BW (MHz)	Mode	RB Allocation	RB offset	Maximum Average Power (dBm)							Reduced Average Power (dBm)						
				39750	40185	40620	41055	41490	MPR	Tune-up Limit	39750	40185	40620	41055	41490	MPR	Tune-up Limit
				2506 MHz	2549.5 MHz	2593 MHz	2636.5 MHz	2680 MHz			2506 MHz	2549.5 MHz	2593 MHz	2636.5 MHz	2680 MHz		
10 MHz	QPSK	1	0	23.17	22.87	23.09	23.10	23.22	0	24	19.94	19.56	19.75	19.98	20.04	0	21.5
		1	25	22.96	22.85	23.07	22.90	23.20	0	24	19.80	19.62	19.75	19.80	20.10	0	21.5
		1	49	23.01	22.81	22.96	22.94	23.18	0	24	19.85	19.53	19.66	19.84	19.99	0	21.5
		25	0	21.70	21.42	21.58	21.64	21.79	1	23	20.49	20.16	20.27	20.53	20.61	0	21.5
		25	12	21.68	21.40	21.54	21.61	21.78	1	23	20.48	20.13	20.26	20.54	20.62	0	21.5
		25	25	21.64	21.37	21.53	21.59	21.73	1	23	20.48	20.15	20.24	20.52	20.61	0	21.5
		50	0	21.66	21.38	21.55	21.62	21.75	1	23	20.46	20.16	20.25	20.53	20.59	0	21.5
	16QAM	1	0	21.82	21.43	21.53	21.74	21.92	1	23	20.07	19.54	19.70	20.20	20.05	0	21.5
		1	25	21.69	21.29	21.41	21.60	21.76	1	23	20.00	19.52	19.69	20.13	19.93	0	21.5
		1	49	21.76	21.31	21.43	21.67	21.79	1	23	20.06	19.57	19.70	20.16	19.95	0	21.5
		25	0	20.70	20.42	20.60	20.68	20.77	2	22	20.53	20.21	20.31	20.56	20.63	0	21.5
		25	12	20.70	20.39	20.58	20.66	20.76	2	22	20.50	20.18	20.30	20.55	20.64	0	21.5
		25	25	20.66	20.37	20.57	20.63	20.73	2	22	20.53	20.21	20.30	20.56	20.63	0	21.5
		50	0	20.64	20.41	20.54	20.60	20.77	2	22	20.48	20.20	20.29	20.54	20.64	0	21.5
	64QAM	1	0	20.00	20.04	19.87	20.06	20.44	2	22	20.24	19.59	19.61	20.19	20.07	0	21.5
		1	25	19.86	19.91	19.77	19.85	20.33	2	22	20.20	19.42	19.61	20.16	19.92	0	21.5
		1	49	19.96	19.89	19.69	19.95	20.30	2	22	20.19	19.60	19.54	20.08	20.06	0	21.5
		25	0	19.68	19.44	19.58	19.67	19.79	3	21	19.51	19.25	19.28	19.57	19.69	0	21.5
		25	12	19.67	19.40	19.53	19.63	19.75	3	21	19.50	19.24	19.26	19.54	19.68	0	21.5
		25	25	19.64	19.38	19.53	19.62	19.75	3	21	19.49	19.22	19.26	19.57	19.68	0	21.5
		50	0	19.63	19.41	19.54	19.61	19.75	3	21	19.46	19.16	19.25	19.55	19.61	0	21.5

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LTE Band 41 Measured Results (continued)

BW (MHz)	Mode	RB Allocation	RB offset	Maximum Average Power (dBm)					MPR	Tune-up Limit	Reduced Average Power (dBm)					MPR	Tune-up Limit
				39750	40185	40620	41055	41490			39750	40185	40620	41055	41490		
				2506 MHz	2549.5 MHz	2593 MHz	2636.5 MHz	2680 MHz			2506 MHz	2549.5 MHz	2593 MHz	2636.5 MHz	2680 MHz		
5 MHz	QPSK	1	0	23.20	22.97	23.09	23.14	23.25	0	24	19.97	19.60	19.73	20.00	20.11	0	21.5
		1	12	23.09	22.78	22.97	22.94	23.13	0	24	19.83	19.50	19.51	19.87	19.96	0	21.5
		1	24	23.13	22.84	22.99	23.07	23.17	0	24	19.92	19.55	19.65	19.91	20.04	0	21.5
		12	0	21.66	21.38	21.53	21.58	21.72	1	23	20.45	20.11	20.21	20.48	20.58	0	21.5
		12	7	21.63	21.36	21.49	21.54	21.69	1	23	20.43	20.11	20.19	20.47	20.56	0	21.5
		12	13	21.61	21.35	21.50	21.53	21.70	1	23	20.43	20.09	20.18	20.46	20.55	0	21.5
		25	0	21.65	21.38	21.51	21.58	21.72	1	23	20.47	20.14	20.22	20.51	20.59	0	21.5
	16QAM	1	0	21.59	21.53	21.58	21.48	21.75	1	23	19.95	19.51	19.79	20.06	19.95	0	21.5
		1	12	21.52	21.37	21.47	21.34	21.64	1	23	19.82	19.54	19.59	19.99	19.84	0	21.5
		1	24	21.60	21.51	21.50	21.49	21.77	1	23	19.91	19.56	19.81	20.00	19.98	0	21.5
		12	0	20.64	20.38	20.46	20.59	20.76	2	22	20.40	20.11	20.20	20.40	20.61	0	21.5
		12	7	20.61	20.35	20.44	20.57	20.74	2	22	20.39	20.11	20.18	20.40	20.58	0	21.5
		12	13	20.59	20.35	20.45	20.55	20.73	2	22	20.41	20.10	20.17	20.42	20.54	0	21.5
		25	0	20.66	20.35	20.49	20.61	20.72	2	22	20.45	20.17	20.23	20.50	20.60	0	21.5
	64QAM	1	0	20.11	19.90	20.14	20.13	20.23	2	22	19.94	19.74	19.61	20.04	20.10	0	21.5
		1	12	19.87	19.71	20.05	19.92	20.08	2	22	19.82	19.66	19.42	19.91	20.06	0	21.5
		1	24	19.96	19.76	20.15	19.98	20.14	2	22	19.86	19.78	19.55	19.94	20.17	0	21.5
		12	0	19.59	19.42	19.50	19.56	19.76	3	21	19.47	19.12	19.20	19.54	19.54	0	21.5
		12	7	19.56	19.39	19.46	19.54	19.74	3	21	19.44	19.11	19.18	19.53	19.53	0	21.5
		12	13	19.56	19.39	19.45	19.53	19.72	3	21	19.43	19.12	19.19	19.53	19.53	0	21.5
		25	0	19.58	19.40	19.48	19.54	19.73	3	21	19.45	19.11	19.22	19.52	19.59	0	21.5

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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	24.08	23.96	24.08	0	25	21.17	20.94	21.12	0	22
		1	49	23.78	23.92	23.98	0	25	21.03	20.64	21.02	0	22
		1	99	23.99	23.87	23.90	0	25	21.02	20.86	20.94	0	22
		50	0	22.11	21.95	22.14	1	24	21.11	20.94	21.12	0	22
		50	24	22.08	21.93	22.11	1	24	21.07	20.91	21.08	0	22
		50	50	22.04	21.91	22.07	1	24	21.03	20.89	21.05	0	22
		100	0	22.07	21.92	22.08	1	24	21.06	20.91	21.07	0	22
	16QAM	1	0	22.57	22.38	22.50	1	24	21.48	21.37	21.58	0	22
		1	49	22.36	22.21	22.20	1	24	21.13	21.22	21.39	0	22
		1	99	22.45	22.28	22.35	1	24	21.39	21.29	21.41	0	22
		50	0	21.10	20.94	21.13	2	23	21.08	20.94	21.13	0	22
		50	24	21.07	20.91	21.09	2	23	21.03	20.92	21.10	0	22
		50	50	21.04	20.91	21.05	2	23	21.02	20.89	21.06	0	22
		100	0	21.04	20.85	21.08	2	23	21.03	20.88	21.01	0	22
	64QAM	1	0	21.55	21.23	21.57	2	23	21.42	21.39	21.53	0	22
		1	49	21.44	20.97	21.39	2	23	21.15	21.17	21.45	0	22
		1	99	21.42	21.11	21.42	2	23	21.26	21.29	21.39	0	22
		50	0	20.03	19.88	20.10	3	22	20.06	19.89	20.14	0	22
		50	24	20.00	19.86	20.08	3	22	20.03	19.87	20.12	0	22
		50	50	19.96	19.84	20.04	3	22	20.00	19.84	20.09	0	22
		100	0	19.99	19.85	20.07	3	22	20.00	19.87	20.09	0	22

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	24.08	23.92	24.11	0	25	21.07	20.92	21.08	0	22
		1	37	24.24	23.78	24.22	0	25	21.29	20.82	21.26	0	22
		1	74	23.98	23.85	23.92	0	25	20.96	20.84	20.94	0	22
		36	0	22.16	21.96	22.09	1	24	21.12	20.93	21.06	0	22
		36	20	22.13	21.94	22.05	1	24	21.09	20.90	21.02	0	22
		36	39	22.12	21.93	22.03	1	24	21.07	20.89	21.01	0	22
		75	0	22.18	21.97	22.10	1	24	21.14	20.97	21.09	0	22
	16QAM	1	0	22.44	22.37	22.49	1	24	21.23	21.14	21.50	0	22
		1	37	22.65	22.32	22.62	1	24	21.24	21.20	21.63	0	22
		1	74	22.36	22.28	22.32	1	24	21.11	21.07	21.35	0	22
		36	0	21.11	20.98	21.06	2	23	21.09	20.93	21.06	0	22
		36	20	21.08	20.95	21.02	2	23	21.06	20.92	21.02	0	22
		36	39	21.07	20.95	21.02	2	23	21.04	20.90	21.00	0	22
		75	0	21.15	20.98	21.10	2	23	21.12	20.96	21.07	0	22
	64QAM	1	0	21.28	21.14	21.37	2	23	21.51	21.23	21.38	0	22
		1	37	21.33	21.24	21.43	2	23	21.25	21.33	21.40	0	22
		1	74	21.17	21.03	21.23	2	23	21.39	21.13	21.22	0	22
		36	0	20.15	19.93	20.09	3	22	20.13	19.93	20.09	0	22
		36	20	20.11	19.91	20.05	3	22	20.09	19.90	20.05	0	22
		36	39	20.09	19.89	20.03	3	22	20.08	19.88	20.03	0	22
		75	0	20.12	19.93	20.08	3	22	20.10	19.95	20.11	0	22

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	24.12	23.90	24.04	0	25	21.14	20.94	21.01	0	22
		1	25	24.10	23.79	23.97	0	25	21.07	20.81	20.94	0	22
		1	49	24.11	23.85	23.98	0	25	21.10	20.89	20.96	0	22
		25	0	22.14	21.93	22.04	1	24	21.10	20.92	21.01	0	22
		25	12	22.11	21.91	21.99	1	24	21.10	20.94	21.00	0	22
		25	25	22.11	21.91	22.00	1	24	21.08	20.90	20.97	0	22
		50	0	22.11	21.91	22.02	1	24	21.09	20.91	20.99	0	22
	16QAM	1	0	22.50	22.34	22.54	1	24	21.43	21.27	21.42	0	22
		1	25	22.30	22.09	22.38	1	24	21.20	21.00	21.29	0	22
		1	49	22.47	22.25	22.50	1	24	21.40	21.18	21.36	0	22
		25	0	21.14	20.92	21.04	2	23	21.10	20.91	21.00	0	22
		25	12	21.12	20.91	21.00	2	23	21.08	20.92	20.97	0	22
		25	25	21.12	20.90	20.98	2	23	21.07	20.89	20.95	0	22
		50	0	21.12	20.89	20.98	2	23	21.08	20.87	20.96	0	22
	64QAM	1	0	21.24	21.21	21.33	2	23	21.20	21.17	21.19	0	22
		1	25	21.10	21.05	21.22	2	23	20.95	21.01	21.08	0	22
		1	49	21.14	21.21	21.29	2	23	21.09	21.17	21.18	0	22
		25	0	20.14	19.92	20.01	3	22	20.16	19.96	20.06	0	22
		25	12	20.11	19.89	19.98	3	22	20.13	19.95	20.03	0	22
		25	25	20.11	19.89	19.97	3	22	20.12	19.95	20.01	0	22
		50	0	20.10	19.87	19.98	3	22	20.11	19.91	20.02	0	22

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LTE Band 66 Measured Results (continued)

BW (MHz)	Mode	RB Allocation	RB offset	Maximum Average Power (dBm)					Reduced Average Power (dBm)				
				131997	132322	132647	MPR	Tune-up Limit	131997	132322	132647	MPR	Tune-up Limit
				1712.5 MHz	1745 MHz	1777.5 MHz			1712.5 MHz	1745 MHz	1777.5 MHz		
5 MHz	QPSK	1	0	24.04	23.88	24.00	0	25	21.08	20.94	20.99	0	22
		1	12	24.19	23.90	24.04	0	25	21.11	21.00	21.19	0	22
		1	24	24.08	23.92	24.00	0	25	21.12	20.97	21.00	0	22
		12	0	22.11	21.90	21.99	1	24	21.10	20.89	20.95	0	22
		12	7	22.10	21.89	21.97	1	24	21.08	20.87	20.94	0	22
		12	13	22.09	21.90	21.96	1	24	21.07	20.90	20.94	0	22
		25	0	22.09	21.89	21.97	1	24	21.08	20.89	20.97	0	22
	16QAM	1	0	22.44	22.30	22.29	1	24	21.55	21.26	21.39	0	22
		1	12	22.26	22.22	22.36	1	24	21.49	21.29	21.10	0	22
		1	24	22.46	22.25	22.30	1	24	21.47	21.31	21.42	0	22
		12	0	21.06	20.92	21.00	2	23	21.16	20.92	20.99	0	22
		12	7	21.06	20.91	20.98	2	23	21.11	20.94	20.98	0	22
		12	13	21.07	20.92	20.96	2	23	21.17	20.94	20.98	0	22
		25	0	21.09	20.89	20.92	2	23	21.11	20.87	20.96	0	22
	64QAM	1	0	21.48	21.22	21.21	2	23	21.46	21.13	21.19	0	22
		1	12	21.32	21.09	21.41	2	23	21.24	21.01	21.35	0	22
		1	24	21.37	21.26	21.26	2	23	21.36	21.19	21.21	0	22
		12	0	20.17	19.90	19.98	3	22	20.09	19.99	20.13	0	22
		12	7	20.13	19.97	19.96	3	22	20.10	19.96	19.98	0	22
		12	13	20.12	19.96	19.98	3	22	20.09	19.94	19.98	0	22
		25	0	20.06	19.88	19.98	3	22	20.07	19.87	20.01	0	22

BW (MHz)	Mode	RB Allocation	RB offset	Maximum Average Power (dBm)					Reduced Average Power (dBm)				
				131987	132322	132657	MPR	Tune-up Limit	131987	132322	132657	MPR	Tune-up Limit
				1711.5 MHz	1745 MHz	1778.5 MHz			1711.5 MHz	1745 MHz	1778.5 MHz		
3 MHz	QPSK	1	0	23.89	23.94	24.04	0	25	20.96	20.93	20.93	0	22
		1	8	24.09	23.77	24.24	0	25	21.20	20.74	21.20	0	22
		1	14	23.94	23.87	24.02	0	25	20.98	20.90	20.97	0	22
		8	0	21.92	21.91	22.00	1	24	20.87	20.89	20.95	0	22
		8	4	21.87	21.90	21.98	1	24	20.87	20.90	20.96	0	22
		8	7	21.91	21.89	21.96	1	24	20.89	20.90	20.94	0	22
		15	0	21.90	21.88	21.95	1	24	20.88	20.87	20.93	0	22
	16QAM	1	0	22.17	22.35	22.31	1	24	21.10	21.13	21.33	0	22
		1	8	22.38	22.34	22.65	1	24	21.14	21.32	21.63	0	22
		1	14	22.28	22.21	22.35	1	24	20.98	21.03	21.38	0	22
		8	0	20.95	20.90	20.89	2	23	20.92	20.93	20.88	0	22
		8	4	20.92	20.86	20.91	2	23	20.92	20.95	20.90	0	22
		8	7	20.95	20.90	20.90	2	23	20.94	20.95	20.91	0	22
		15	0	20.87	20.84	20.96	2	23	20.88	20.86	20.93	0	22
	64QAM	1	0	21.13	21.23	21.15	2	23	20.95	21.15	21.02	0	22
		1	8	20.76	21.42	21.22	2	23	20.92	21.16	21.20	0	22
		1	14	21.04	21.22	21.29	2	23	20.79	21.23	21.11	0	22
		8	0	19.97	20.00	20.02	3	22	19.98	19.94	19.94	0	22
		8	4	19.95	19.98	20.00	3	22	19.95	19.95	19.96	0	22
		8	7	19.93	19.96	19.97	3	22	19.93	19.95	19.90	0	22
		15	0	19.89	19.89	19.94	3	22	19.89	19.89	19.92	0	22

BW (MHz)	Mode	RB Allocation	RB offset	Maximum Average Power (dBm)					Reduced Average Power (dBm)				
				131979	132322	132665	MPR	Tune-up Limit	131979	132322	132665	MPR	Tune-up Limit
				1710.7 MHz	1745 MHz	1779.3 MHz			1710.7 MHz	1745 MHz	1779.3 MHz		
1.4 MHz	QPSK	1	0	23.70	23.99	23.80	0	25	20.76	21.00	20.81	0	22
		1	3	23.61	23.88	23.70	0	25	20.67	20.86	20.74	0	22
		1	5	23.63	23.92	23.73	0	25	20.68	20.92	20.74	0	22
		3	0	23.53	23.78	23.66	0	25	20.55	20.76	20.65	0	22
		3	1	23.50	23.86	23.68	0	25	20.49	20.85	20.70	0	22
		3	3	23.52	23.86	23.72	0	25	20.54	20.84	20.69	0	22
		6	0	21.56	21.90	21.74	1	24	20.60	20.87	20.68	0	22
	16QAM	1	0	21.95	22.40	21.88	1	24	20.91	21.41	20.95	0	22
		1	3	21.78	22.29	21.70	1	24	20.84	21.27	20.68	0	22
		1	5	21.82	22.26	21.82	1	24	20.80	21.31	20.86	0	22
		3	0	21.56	21.93	21.81	1	24	20.59	20.87	20.82	0	22
		3	1	21.51	22.01	21.83	1	24	20.51	20.92	20.78	0	22
		3	3	21.64	22.00	21.79	1	24	20.65	20.96	20.76	0	22
		6	0	20.62	20.92	20.75	2	23	20.67	20.84	20.78	0	22
	64QAM	1	0	20.81	20.93	21.17	2	23	20.73	21.25	21.09	0	22
		1	3	20.75	20.84	21.12	2	23	20.63	21.19	20.93	0	22
		1	5	20.66	21.07	21.02	2	23	20.88	21.09	20.93	0	22
		3	0	20.59	20.93	20.79	2	23	20.67	20.93	20.74	0	22
		3	1	20.64	20.98	20.83	2	23	20.79	20.93	20.81	0	22
		3	3	20.66	20.98	20.80	2	23	20.75	20.95	20.75	0	22
		6	0	19.60	20.04	19.78	3	22	19.75	20.00	19.75	0	22

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9.4. Wi-Fi 2.4GHz (DTS Band)

When the proximity sensor is active in a held-to-ear user scenario, the output power level is reduced. The maximum allowed output powers in all conditions are included in the maximum power document.

Refer to Operational Description for WLAN explanation.

Wi-Fi 2.4GHz Measured Results

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/ax mode is used for SAR measurement, on the highest measured output power channel in the initial test configuration, for each frequency band. Additional output power measurements were not deemed necessary.

SAR testing is not required for OFDM mode(s) when the highest reported SAR for DSSS is adjusted by the ratio of OFDM to DSSS specified maximum output power and the adjusted SAR is ≤ 1.2 W/kg.

Band	Mode	Data Rate	Ch #	Freq. (MHz)	Wi-Fi Antenna #1 Average Power (dBm)						Wi-Fi Antenna #2 Average Power (dBm)					
					Maximum Average Power			Reduced Average Power			Maximum Average Power			Reduced Average Power		
					Meas Pwr	Tune-up	SAR Test (Yes/No)	Meas Pwr	Tune-up	SAR Test (Yes/No)	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	18.80	19.00	Yes	15.90	16.00	Yes	18.80	19.00	Yes	15.80	16.00	Yes
			6	2437	18.80	19.00		16.00	16.00		18.90	19.00		15.90	16.00	
			11	2462	18.75	19.00		15.80	16.00		18.80	19.00		15.80	16.00	
OFDM 2.4 GHz	802.11g	6 Mbps	1	2412		15.50	No		15.50	No		15.50	No		15.50	No
			6	2437		17.00			16.00			17.00			16.00	
			11	2462		15.50			15.50			15.50			15.50	
	802.11n (HT20)	6.5 Mbps	1	2412		16.00	No		15.00	No		16.00	No		15.00	No
			6	2437		17.00			16.00			17.00			16.00	
			11	2462		15.00			15.00			15.00			15.00	
OFDMA 2.4 GHz	802.11ax (HE20)	7.3 Mbps	1	2412		15.50	No		15.50	No		15.50	No		15.50	No
			6	2437		17.00			16.00			17.00			16.00	
			11	2462		15.50			15.50			15.50			15.50	

Note(s):

- These conducted measurements are used during the Simultaneous condition WWAN + 2.4GHz MIMO.
- Maximum Average Power is in reference to Proximity Sensor Inactive and Reduced Average Power is in reference to Proximity Sensor Active.
- Additionally, SAR is not required for Channels 12 and 13 because the tune-up limit and the measured output power for these two channels are no greater than those for the default test channels.

RSDB (Real Simultaneous Dual Band)

Band	Mode	Data Rate	Ch #	Freq. (MHz)	Wi-Fi Antenna #1 Average Power (dBm)						Wi-Fi Antenna #2 Average Power (dBm)					
					Maximum Average Power			Reduced Average Power			Maximum Average Power			Reduced Average Power		
					Meas Pwr	Tune-up	SAR Test (Yes/No)	Meas Pwr	Tune-up	SAR Test (Yes/No)	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	13.80	14.00	Yes	13.80	14.00	Yes	13.90	14.00	Yes	13.90	14.00	Yes
			6	2437	14.00	14.00		14.00	14.00		14.00	14.00		14.00	14.00	
			11	2462	13.90	14.00		13.90	14.00		13.80	14.00		13.80	14.00	
OFDM 2.4 GHz	802.11g	6 Mbps	1	2412		14.00	No		14.00	No		14.00	No		14.00	No
			6	2437		14.00			14.00			14.00			14.00	
			11	2462		14.00			14.00			14.00			14.00	
	802.11n (HT20)	6.5 Mbps	1	2412		14.00	No		14.00	No		14.00	No		14.00	No
			6	2437		14.00			14.00			14.00			14.00	
			11	2462		14.00			14.00			14.00			14.00	
OFDMA 2.4 GHz	802.11ax (HE20)	7.3 Mbps	1	2412		14.00	No		14.00	No		14.00	No		14.00	No
			6	2437		14.00			14.00			14.00			14.00	
			11	2462		14.00			14.00			14.00			14.00	

Note(s):

- These conducted measurements are used during the Simultaneous condition WWAN + 2.4GHz + 5GHz and WWAN + 2.4GHz MIMO + 5GHz MIMO.
- Maximum Average Power is in reference to Proximity Sensor Inactive and Reduced Average Power is in reference to Proximity Sensor Active.
- Additionally, SAR is not required for Channels 12 and 13 because the tune-up limit and the measured output power for these two channels are no greater than those for the default test channels.

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Duty Factor Measured Results

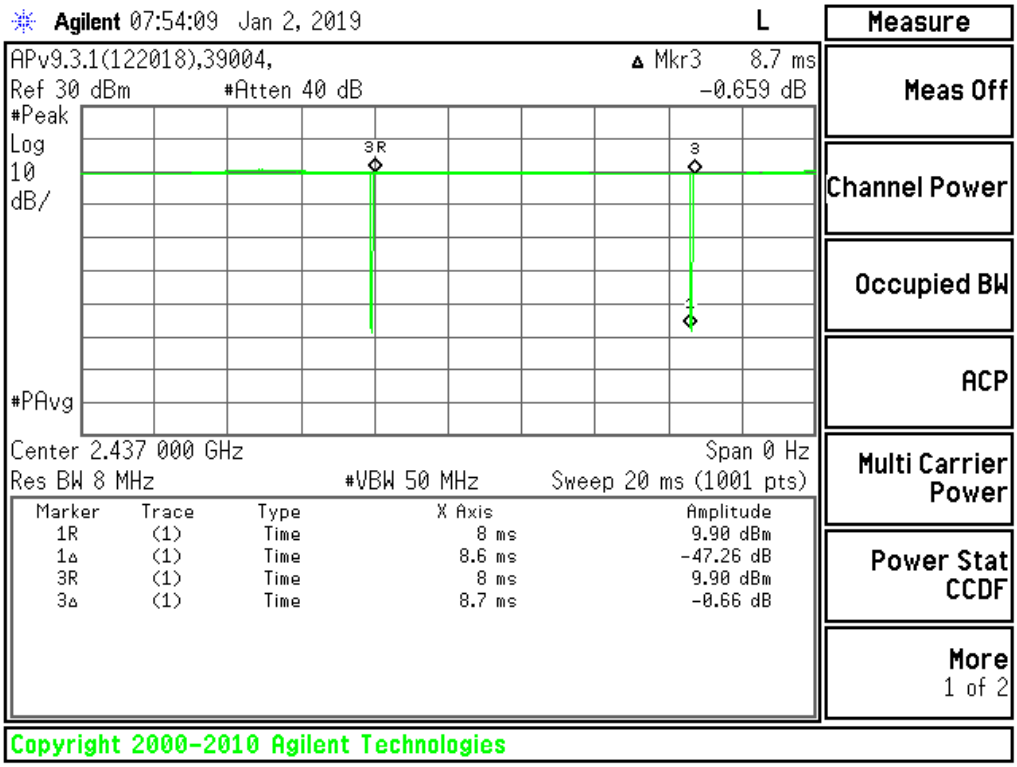
Antenna 1

Mode	Type	T on (ms)	Period (ms)	Duty Cycle	Crest Factor (1/duty cycle)
802.11b	1 Mbps	8.60	8.70	98.85%	1.01

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

Duty Cycle plots

802.11b - SISO



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Antenna 2

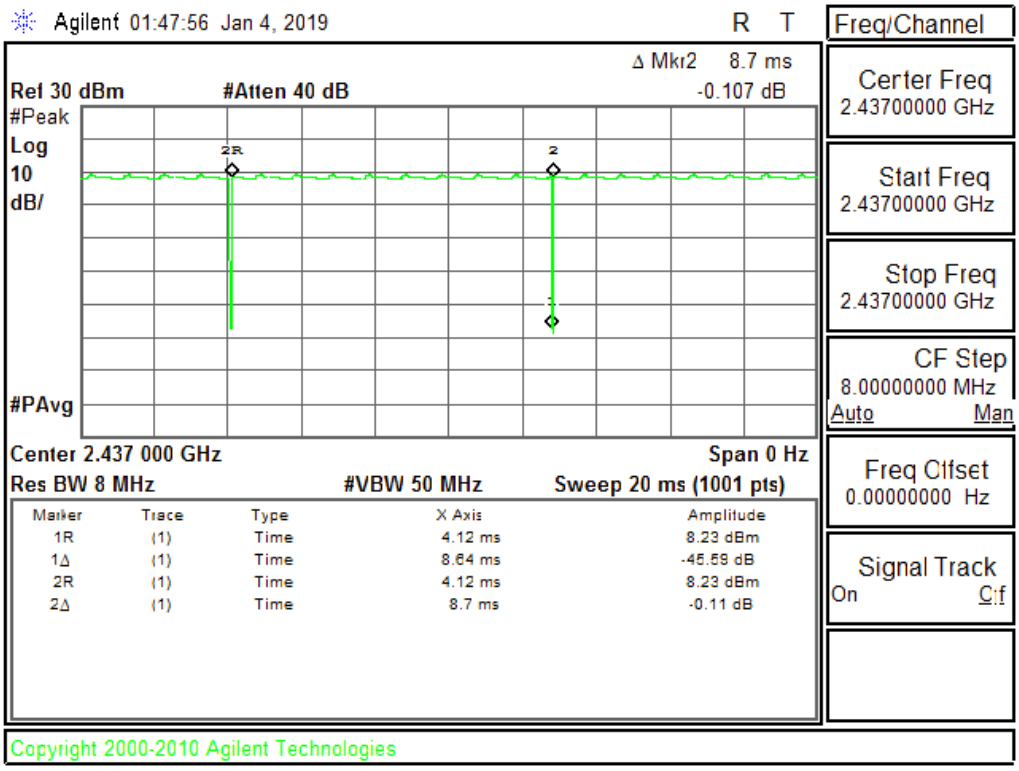
Mode	Type	T on (ms)	Period (ms)	Duty Cycle	Crest Factor (1/duty cycle)
802.11b	1 Mbps	8.64	8.70	99.31%	1.01

Note(s):

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

Duty Cycle plots

802.11b - SISO



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

When the proximity sensor is active in a held-to-ear user scenario, the output power level is reduced. The maximum allowed output powers in all conditions are included in the maximum power document.

Refer to Operational Description for WLAN explanation.

When the same transmission mode configurations have the same maximum output power on the same channel for the 802.11 a/n/ac/ax modes, the channel in the lower order/sequence 802.11 mode (i.e. a, g, n then ac) 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.

Wi-Fi 5 GHz Measured Results

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/n/ac/ax 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.

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Band	Mode	Data Rate	Ch #	Freq. (MHz)	Wi-Fi Antenna #1 Average Power (dBm)						Wi-Fi Antenna #2 Average Power (dBm)					
					Maximum Average Power			Reduced Average Power			Maximum Average Power			Reduced Average Power		
					Meas Pwr	Tune-up	SAR Test (Yes/No)	Meas Pwr	Tune-up	SAR Test (Yes/No)	Meas Pwr	Tune-up	SAR Test (Yes/No)	Meas Pwr	Tune-up	SAR Test (Yes/No)
UNII-1 5.2 GHz	802.11a	6 Mbps	36	5180	16.80	17.00	Yes	Not required	14.00	No	16.80	17.00	Yes	Not required	14.00	No
			40	5200	17.00	17.00			14.00		17.00	17.00			14.00	
			44	5220	16.70	17.00			14.00		17.00	17.00			14.00	
			48	5240	16.70	17.00			14.00		16.90	17.00			14.00	
	802.11n (HT20)	6.5 Mbps	36	5180	Not required	17.00	No	Not required	14.00	No	Not required	17.00	No	Not required	14.00	No
			40	5200		17.00			14.00			17.00			14.00	
			44	5220		17.00			14.00			17.00			14.00	
			48	5240		17.00			14.00			17.00			14.00	
	802.11ac (VHT20)	6.5 Mbps	36	5180	Not required	17.00	No	Not required	14.00	No	Not required	17.00	No	Not required	14.00	No
			40	5200		17.00			14.00			17.00			14.00	
			44	5220		17.00			14.00			17.00			14.00	
			48	5240		17.00			14.00			17.00			14.00	
	802.11ax (HE20)	7.3 Mbps	36	5180	Not required	17.00	No	Not required	14.00	No	Not required	17.00	No	Not required	14.00	No
			40	5200		17.00			14.00			17.00			14.00	
			44	5220		17.00			14.00			17.00			14.00	
			48	5240		17.00			14.00			17.00			14.00	
	802.11n (HT40)	13.5 Mbps	38	5190	Not required	16.00	No	Not required	14.00	No	Not required	16.00	No	Not required	14.00	No
			46	5230		16.00			14.00			16.00			14.00	
	802.11ac (VHT40)	13.5 Mbps	38	5190	Not required	16.00	No	Not required	14.00	No	Not required	16.00	No	Not required	14.00	No
			46	5230		16.00			14.00			16.00			14.00	
	802.11ax (HE40)	14.6 Mbps	38	5190	Not required	16.00	No	Not required	14.00	No	Not required	16.00	No	Not required	14.00	No
			46	5230		16.00			14.00			16.00			14.00	
	802.11ac (VHT80)	29.3 Mbps	42	5210	Not required	15.00	No	14.00	14.00	No	Not required	15.00	No	13.90	14.00	No
	802.11ax (HE80)	30.6 Mbps	42	5210	Not required	15.00	No	13.80	14.00	No	Not required	15.00	No	13.80	14.00	No

Band	Mode	Data Rate	Ch #	Freq. (MHz)	Wi-Fi Antenna #1 Average Power (dBm)						Wi-Fi Antenna #2 Average Power (dBm)					
					Maximum Average Power			Reduced Average Power			Maximum Average Power			Reduced Average Power		
					Meas Pwr	Tune-up	SAR Test (Yes/No)	Meas Pwr	Tune-up	SAR Test (Yes/No)	Meas Pwr	Tune-up	SAR Test (Yes/No)	Meas Pwr	Tune-up	SAR Test (Yes/No)
UNII-2A 5.3 GHz	802.11a	6 Mbps	52	5260	16.80	17.00	Yes	Not required	14.00	No	17.00	17.00	Yes	Not required	14.00	No
			56	5280	17.00	17.00			14.00		17.00	17.00			14.00	
			60	5300	17.00	17.00			14.00		17.00	17.00			14.00	
			64	5320	17.00	17.00			14.00		17.00	17.00			14.00	
	802.11n (HT20)	6.5 Mbps	52	5260	Not required	17.00	No	Not required	14.00	No	Not required	17.00	No	Not required	14.00	No
			56	5280		17.00			14.00			17.00			14.00	
			60	5300		17.00			14.00			17.00			14.00	
			64	5320		17.00			14.00			17.00			14.00	
	802.11ac (VHT20)	6.5 Mbps	52	5260	Not required	17.00	No	Not required	14.00	No	Not required	17.00	No	Not required	14.00	No
			56	5280		17.00			14.00			17.00			14.00	
			60	5300		17.00			14.00			17.00			14.00	
			64	5320		17.00			14.00			17.00			14.00	
	802.11ax (HE20)	7.3 Mbps	52	5260	Not required	17.00	No	Not required	14.00	No	Not required	17.00	No	Not required	14.00	No
			56	5280		17.00			14.00			17.00			14.00	
			60	5300		17.00			14.00			17.00			14.00	
			64	5320		17.00			14.00			17.00			14.00	
	802.11n (HT40)	13.5 Mbps	54	5270	Not required	16.00	No	Not required	14.00	No	Not required	16.00	No	Not required	14.00	No
			62	5310		16.00			14.00			16.00			14.00	
	802.11ac (VHT40)	13.5 Mbps	54	5270	Not required	16.00	No	Not required	14.00	No	Not required	16.00	No	Not required	14.00	No
			62	5310		16.00			14.00			16.00			14.00	
	802.11ax (HE40)	14.6 Mbps	54	5270	Not required	16.00	No	Not required	14.00	No	Not required	16.00	No	Not required	14.00	No
			62	5310		16.00			14.00			16.00			14.00	
	802.11ac (VHT80)	29.3 Mbps	58	5290	Not required	15.00	No	13.80	14.00	Yes	Not required	15.00	No	13.60	14.00	Yes
	802.11ax (HE80)	30.6 Mbps	58	5290	Not required	15.00	No	13.70	14.00	No	Not required	15.00	No	13.80	14.00	No

Note(s):

- These conducted measurements are used during the Simultaneous condition WWAN + 5GHz MIMO and WWAN + 5GHz MIMO + BT.
- Maximum Average Power is in reference to Proximity Sensor Inactive and Reduced Average Power is in reference to Proximity Sensor Active.

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Band	Mode	Data Rate	Ch #	Freq. (MHz)	Wi-Fi Antenna #1 Average Power (dBm)						Wi-Fi Antenna #2 Average Power (dBm)					
					Maximum Average Power			Reduced Average Power			Maximum Average Power			Reduced Average Power		
					Meas Pwr	Tune-up	SAR Test (Yes/No)	Meas Pwr	Tune-up	SAR Test (Yes/No)	Meas Pwr	Tune-up	SAR Test (Yes/No)	Meas Pwr	Tune-up	SAR Test (Yes/No)
UNII-2C 5.5 GHz	802.11a	6 Mbps	100	5500	16.90	17.00	Yes	Not required	14.00	No	16.70	17.00	Yes	Not required	14.00	No
			116	5580	17.00	17.00			14.00		16.80	17.00			14.00	
			124	5620	16.80	17.00			14.00		16.80	17.00			14.00	
			140	5700	16.70	17.00			14.00		17.00	17.00			14.00	
			144	5720	16.70	17.00			14.00		16.70	17.00			14.00	
	802.11n (HT20)	6.5 Mbps	100	5500	Not required	17.00	No	Not required	14.00	No	Not required	17.00	No	Not required	14.00	No
			116	5580		17.00			14.00			17.00			14.00	
			124	5620		17.00			14.00			17.00			14.00	
			140	5700		17.00			14.00			17.00			14.00	
			144	5720		17.00			14.00			17.00			14.00	
	802.11ac (VHT20)	6.5 Mbps	100	5500	Not required	17.00	No	Not required	14.00	No	Not required	17.00	No	Not required	14.00	No
			116	5580		17.00			14.00			17.00			14.00	
			124	5620		17.00			14.00			17.00			14.00	
			140	5700		17.00			14.00			17.00			14.00	
			144	5720		17.00			14.00			17.00			14.00	
	802.11ax (HE20)	7.3 Mbps	100	5500	Not required	17.00	No	Not required	14.00	No	Not required	17.00	No	Not required	14.00	No
			116	5580		17.00			14.00			17.00			14.00	
			124	5620		17.00			14.00			17.00			14.00	
			140	5700		17.00			14.00			17.00			14.00	
			144	5720		17.00			14.00			17.00			14.00	
	802.11n (HT40)	13.5 Mbps	102	5510	Not required	16.00	No	Not required	14.00	No	Not required	16.00	No	Not required	14.00	No
			118	5590		16.00			14.00			16.00			14.00	
			126	5630		16.00			14.00			16.00			14.00	
			134	5670		16.00			14.00			16.00			14.00	
			142	5710		16.00			14.00			16.00			14.00	
	802.11ac (VHT40)	13.5 Mbps	102	5510	Not required	16.00	No	Not required	14.00	No	Not required	16.00	No	Not required	14.00	No
			118	5590		16.00			14.00			16.00			14.00	
			126	5630		16.00			14.00			16.00			14.00	
			134	5670		16.00			14.00			16.00			14.00	
			142	5710		16.00			14.00			16.00			14.00	
	802.11ax (HE40)	14.6 Mbps	102	5510	Not required	16.00	No	Not required	14.00	No	Not required	16.00	No	Not required	14.00	No
			118	5590		16.00			14.00			16.00			14.00	
			126	5630		16.00			14.00			16.00			14.00	
			134	5670		16.00			14.00			16.00			14.00	
			142	5710		16.00			14.00			16.00			14.00	
	802.11ac (VHT80)	29.3 Mbps	106	5530	Not required	15.00	No	13.80	14.00	Yes	Not required	15.00	No	13.70	14.00	Yes
			122	5610		15.00		14.00	14.00			15.00		14.00	14.00	
			138	5690		15.00		13.90	14.00			15.00		13.80	14.00	
	802.11ax (HE80)	30.6 Mbps	106	5530	Not required	15.00	No	13.80	14.00	No	Not required	15.00	No	13.70	14.00	No
			122	5610		15.00		13.80	14.00			15.00		13.70	14.00	
			138	5690		15.00		13.70	14.00			15.00		13.70	14.00	

Band	Mode	Data Rate	Ch #	Freq. (MHz)	Wi-Fi Antenna #1 Average Power (dBm)						Wi-Fi Antenna #2 Average Power (dBm)					
					Maximum Average Power			Reduced Average Power			Maximum Average Power			Reduced Average Power		
					Meas Pwr	Tune-up	SAR Test (Yes/No)	Meas Pwr	Tune-up	SAR Test (Yes/No)	Meas Pwr	Tune-up	SAR Test (Yes/No)	Meas Pwr	Tune-up	SAR Test (Yes/No)
UNII-3 5.8 GHz	802.11a	6 Mbps	149	5745	16.70	17.00	Yes	Not required	14.00	No	16.80	17.00	Yes	Not required	14.00	No
			157	5785	17.00	17.00			14.00		17.00	17.00			14.00	
			165	5825	16.90	17.00			14.00		16.80	17.00			14.00	
	802.11n (HT20)	6.5 Mbps	149	5745	Not required	17.00	No	Not required	14.00	No	Not required	17.00	No	Not required	14.00	No
			157	5785		17.00			14.00			17.00			14.00	
			165	5825		17.00			14.00			17.00			14.00	
	802.11ac (VHT20)	6.5 Mbps	149	5745	Not required	17.00	No	Not required	14.00	No	Not required	17.00	No	Not required	14.00	No
			157	5785		17.00			14.00			17.00			14.00	
			165	5825		17.00			14.00			17.00			14.00	
	802.11ax (HE20)	7.3 Mbps	149	5745	Not required	17.00	No	Not required	14.00	No	Not required	17.00	No	Not required	14.00	No
			157	5785		17.00			14.00			17.00			14.00	
			165	5825		17.00			14.00			17.00			14.00	
	802.11n (HT40)	13.5 Mbps	151	5755	Not required	16.00	No	Not required	14.00	No	Not required	16.00	No	Not required	14.00	No
			159	5795		16.00			14.00			16.00			14.00	
	802.11ac (VHT40)	13.5 Mbps	151	5755	Not required	16.00	No	Not required	14.00	No	Not required	16.00	No	Not required	14.00	No
			159	5795		16.00			14.00			16.00			14.00	
	802.11ax (HE40)	14.6 Mbps	151	5755	Not required	16.00	No	Not required	14.00	No	Not required	16.00	No	Not required	14.00	No
			159	5795		16.00			14.00			16.00			14.00	
	802.11ac (VHT80)	29.3 Mbps	155	5775	Not required	15.00	No	14.00	14.00	Yes	Not required	15.00	No	13.80	14.00	Yes
	802.11ax (HE80)	30.6 Mbps	155	5775	Not required	15.00	No	13.90	14.00	No	Not required	15.00	No	13.70	14.00	No

Note(s):

- These conducted measurements are used during the Simultaneous condition WWAN + 5GHz MIMO and WWAN + 5GHz MIMO + BT.
- Maximum Average Power is in reference to Proximity Sensor Inactive and Reduced Average Power is in reference to Proximity Sensor Active.

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RSDB (Real Simultaneous Dual Band) Conducted Power

Band	Mode	Data Rate	Ch #	Freq. (MHz)	Wi-Fi Antenna #1 Average Power (dBm)						Wi-Fi Antenna #2 Average Power (dBm)					
					Maximum Average Power			Reduced Average Power			Maximum Average Power			Reduced Average Power		
					Meas Pwr	Tune-up	SAR Test (Yes/No)	Meas Pwr	Tune-up	SAR Test (Yes/No)	Meas Pwr	Tune-up	SAR Test (Yes/No)	Meas Pwr	Tune-up	SAR Test (Yes/No)
UNII-1 5.2 GHz	802.11a	6 Mbps	36	5180	Not required	14.00	No	Not required	14.00	No	Not required	14.00	No	Not required	14.00	No
			40	5200		14.00			14.00			14.00			14.00	
			44	5220		14.00			14.00			14.00			14.00	
			48	5240		14.00			14.00			14.00			14.00	
	802.11n (HT20)	6.5 Mbps	36	5180	Not required	14.00	No	Not required	14.00	No	Not required	14.00	No	Not required	14.00	No
			40	5200		14.00			14.00			14.00			14.00	
			44	5220		14.00			14.00			14.00			14.00	
			48	5240		14.00			14.00			14.00			14.00	
	802.11ac (VHT20)	6.5 Mbps	36	5180	Not required	14.00	No	Not required	14.00	No	Not required	14.00	No	Not required	14.00	No
			40	5200		14.00			14.00			14.00			14.00	
			44	5220		14.00			14.00			14.00			14.00	
			48	5240		14.00			14.00			14.00			14.00	
	802.11ax (HE20)	7.3 Mbps	36	5180	Not required	14.00	No	Not required	14.00	No	Not required	14.00	No	Not required	14.00	No
			40	5200		14.00			14.00			14.00			14.00	
			44	5220		14.00			14.00			14.00			14.00	
			48	5240		14.00			14.00			14.00			14.00	
	802.11n (HT40)	13.5 Mbps	38	5190	Not required	14.00	No	Not required	14.00	No	Not required	14.00	No	Not required	14.00	No
			46	5230		14.00			14.00			14.00			14.00	
	802.11ac (VHT40)	13.5 Mbps	38	5190	Not required	14.00	No	Not required	14.00	No	Not required	14.00	No	Not required	14.00	No
			46	5230		14.00			14.00			14.00			14.00	
	802.11ax (HE40)	14.6 Mbps	38	5190	Not required	14.00	No	Not required	14.00	No	Not required	14.00	No	Not required	14.00	No
			46	5230		14.00			14.00			14.00			14.00	
	802.11ac (VHT80)	29.3 Mbps	42	5210	14.00	14.00	**Yes**	14.00	14.00	No	13.90	14.00	**Yes**	13.90	14.00	No
	802.11ax (HE80)	30.6 Mbps	42	5210	13.80	14.00	No	13.80	14.00	No	13.80	14.00	No	13.80	14.00	No

Band	Mode	Data Rate	Ch #	Freq. (MHz)	Wi-Fi Antenna #1 Average Power (dBm)						Wi-Fi Antenna #2 Average Power (dBm)					
					Maximum Average Power			Reduced Average Power			Maximum Average Power			Reduced Average Power		
					Meas Pwr	Tune-up	SAR Test (Yes/No)	Meas Pwr	Tune-up	SAR Test (Yes/No)	Meas Pwr	Tune-up	SAR Test (Yes/No)	Meas Pwr	Tune-up	SAR Test (Yes/No)
UNII-2A 5.3 GHz	802.11a	6 Mbps	52	5260	Not required	14.00	No	Not required	14.00	No	Not required	14.00	No	Not required	14.00	No
			56	5280		14.00			14.00			14.00			14.00	
			60	5300		14.00			14.00			14.00			14.00	
			64	5320		14.00			14.00			14.00			14.00	
	802.11n (HT20)	6.5 Mbps	52	5260	Not required	14.00	No	Not required	14.00	No	Not required	14.00	No	Not required	14.00	No
			56	5280		14.00			14.00			14.00			14.00	
			60	5300		14.00			14.00			14.00			14.00	
			64	5320		14.00			14.00			14.00			14.00	
	802.11ac (VHT20)	6.5 Mbps	52	5260	Not required	14.00	No	Not required	14.00	No	Not required	14.00	No	Not required	14.00	No
			56	5280		14.00			14.00			14.00			14.00	
			60	5300		14.00			14.00			14.00			14.00	
			64	5320		14.00			14.00			14.00			14.00	
	802.11ax (HE20)	7.3 Mbps	52	5260	Not required	14.00	No	Not required	14.00	No	Not required	14.00	No	Not required	14.00	No
			56	5280		14.00			14.00			14.00			14.00	
			60	5300		14.00			14.00			14.00			14.00	
			64	5320		14.00			14.00			14.00			14.00	
	802.11n (HT40)	13.5 Mbps	54	5270	Not required	14.00	No	Not required	14.00	No	Not required	14.00	No	Not required	14.00	No
			62	5310		14.00			14.00			14.00			14.00	
	802.11ac (VHT40)	13.5 Mbps	54	5270	Not required	14.00	No	Not required	14.00	No	Not required	14.00	No	Not required	14.00	No
			62	5310		14.00			14.00			14.00			14.00	
	802.11ax (HE40)	14.6 Mbps	54	5270	Not required	14.00	No	Not required	14.00	No	Not required	14.00	No	Not required	14.00	No
			62	5310		14.00			14.00			14.00			14.00	
	802.11ac (VHT80)	29.3 Mbps	58	5290	13.80	14.00	**Yes**	13.80	14.00	**Yes**	13.60	14.00	**Yes**	13.60	14.00	**Yes**
	802.11ax (HE80)	30.6 Mbps	58	5290	13.70	14.00	No	13.70	14.00	No	13.80	14.00	No	13.80	14.00	No

Note(s):

- These conducted measurements are used during the Simultaneous condition WWAN + 2.4GHz + 5GHz and WWAN + 2.4GHz MIMO + 5GHz MIMO.
- Maximum Average Power is in reference to Proximity Sensor Inactive and Reduced Average Power is in reference to Proximity Sensor Active.

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RSDB (Real Simultaneous Dual Band) Conducted Power Continued

Band	Mode	Data Rate	Ch #	Freq. (MHz)	Wi-Fi Antenna #1 Average Power (dBm)						Wi-Fi Antenna #2 Average Power (dBm)					
					Maximum Average Power			Reduced Average Power			Maximum Average Power			Reduced Average Power		
					Meas Pwr	Tune-up	SAR Test (Yes/No)	Meas Pwr	Tune-up	SAR Test (Yes/No)	Meas Pwr	Tune-up	SAR Test (Yes/No)	Meas Pwr	Tune-up	SAR Test (Yes/No)
UNII-2C 5.5 GHz	802.11a	6 Mbps	100	5500	Not required	14.00	No	Not required	14.00	No	Not required	14.00	No	Not required	14.00	No
			116	5580		14.00			14.00			14.00			14.00	
			124	5620		14.00			14.00			14.00			14.00	
			140	5700		14.00			14.00			14.00			14.00	
			144	5720		14.00			14.00			14.00			14.00	
	802.11n (HT20)	6.5 Mbps	100	5500	Not required	14.00	No	Not required	14.00	No	Not required	14.00	No	Not required	14.00	No
			116	5580		14.00			14.00			14.00			14.00	
			124	5620		14.00			14.00			14.00			14.00	
			140	5700		14.00			14.00			14.00			14.00	
			144	5720		14.00			14.00			14.00			14.00	
	802.11ac (VHT20)	6.5 Mbps	100	5500	Not required	14.00	No	Not required	14.00	No	Not required	14.00	No	Not required	14.00	No
			116	5580		14.00			14.00			14.00			14.00	
			124	5620		14.00			14.00			14.00			14.00	
			140	5700		14.00			14.00			14.00			14.00	
			144	5720		14.00			14.00			14.00			14.00	
	802.11ax (HE20)	7.3 Mbps	100	5500	Not required	14.00	No	Not required	14.00	No	Not required	14.00	No	Not required	14.00	No
			116	5580		14.00			14.00			14.00			14.00	
			124	5620		14.00			14.00			14.00			14.00	
			140	5700		14.00			14.00			14.00			14.00	
			144	5720		14.00			14.00			14.00			14.00	
	802.11n (HT40)	13.5 Mbps	102	5510	Not required	14.00	No	Not required	14.00	No	Not required	14.00	No	Not required	14.00	No
			118	5590		14.00			14.00			14.00			14.00	
			126	5630		14.00			14.00			14.00			14.00	
			134	5670		14.00			14.00			14.00			14.00	
			142	5710		14.00			14.00			14.00			14.00	
	802.11ac (VHT40)	13.5 Mbps	102	5510	Not required	14.00	No	Not required	14.00	No	Not required	14.00	No	Not required	14.00	No
			118	5590		14.00			14.00			14.00			14.00	
			126	5630		14.00			14.00			14.00			14.00	
			134	5670		14.00			14.00			14.00			14.00	
			142	5710		14.00			14.00			14.00			14.00	
	802.11ax (HE40)	14.6 Mbps	102	5510	Not required	14.00	No	Not required	14.00	No	Not required	14.00	No	Not required	14.00	No
			118	5590		14.00			14.00			14.00			14.00	
			126	5630		14.00			14.00			14.00			14.00	
			134	5670		14.00			14.00			14.00			14.00	
			142	5710		14.00			14.00			14.00			14.00	
	802.11ac (VHT80)	29.3 Mbps	106	5530	13.80	14.00	**Yes**	13.80	14.00	**Yes**	13.70	14.00	**Yes**	13.70	14.00	**Yes**
			122	5610	14.00	14.00		14.00	14.00		14.00	14.00		14.00	14.00	
			138	5690	13.90	14.00		13.90	14.00		13.80	14.00		13.80	14.00	
	802.11ax (HE80)	30.6 Mbps	106	5530	13.80	14.00	No	13.80	14.00	No	13.70	14.00	No	13.70	14.00	No
			122	5610	13.80	14.00		13.80	14.00		13.70	14.00		13.70	14.00	
			138	5690	13.70	14.00		13.70	14.00		13.70	14.00		13.70	14.00	

Band	Mode	Data Rate	Ch #	Freq. (MHz)	Wi-Fi Antenna #1 Average Power (dBm)						Wi-Fi Antenna #2 Average Power (dBm)					
					Maximum Average Power			Reduced Average Power			Maximum Average Power			Reduced Average Power		
					Meas Pwr	Tune-up	SAR Test (Yes/No)	Meas Pwr	Tune-up	SAR Test (Yes/No)	Meas Pwr	Tune-up	SAR Test (Yes/No)	Meas Pwr	Tune-up	SAR Test (Yes/No)
UNII-3 5.8 GHz	802.11a	6 Mbps	149	5745	Not required	14.00	No	Not required	14.00	No	Not required	14.00	No	Not required	14.00	No
			157	5785		14.00			14.00			14.00			14.00	
			165	5825		14.00			14.00			14.00			14.00	
	802.11n (HT20)	6.5 Mbps	149	5745	Not required	14.00	No	Not required	14.00	No	Not required	14.00	No	Not required	14.00	No
			157	5785		14.00			14.00			14.00			14.00	
			165	5825		14.00			14.00			14.00			14.00	
	802.11ac (VHT20)	6.5 Mbps	149	5745	Not required	14.00	No	Not required	14.00	No	Not required	14.00	No	Not required	14.00	No
			157	5785		14.00			14.00			14.00			14.00	
			165	5825		14.00			14.00			14.00			14.00	
	802.11ax (HE20)	7.3 Mbps	149	5745	Not required	14.00	No	Not required	14.00	No	Not required	14.00	No	Not required	14.00	No
			157	5785		14.00			14.00			14.00			14.00	
			165	5825		14.00			14.00			14.00			14.00	
	802.11n (HT40)	13.5 Mbps	151	5755	Not required	14.00	No	Not required	14.00	No	Not required	14.00	No	Not required	14.00	No
			159	5795		14.00			14.00			14.00			14.00	
	802.11ac (VHT40)	13.5 Mbps	151	5755	Not required	14.00	No	Not required	14.00	No	Not required	14.00	No	Not required	14.00	No
			159	5795		14.00			14.00			14.00			14.00	
	802.11ax (HE40)	14.6 Mbps	151	5755	Not required	14.00	No	Not required	14.00	No	Not required	14.00	No	Not required	14.00	No
			159	5795		14.00			14.00			14.00			14.00	
	802.11ac (VHT80)	29.3 Mbps	155	5775	14.00	14.00	**Yes**	14.00	14.00	**Yes**	13.80	14.00	**Yes**	13.80	14.00	**Yes**
	802.11ax (HE80)	30.6 Mbps	155	5775	13.90	14.00	No	13.90	14.00	No	13.70	14.00	No	13.70	14.00	No

Note(s):

- These conducted measurements are used during the Simultaneous condition WWAN + 2.4GHz + 5GHz and WWAN + 2.4GHz MIMO + 5GHz MIMO.
- Maximum Average Power is in reference to Proximity Sensor Inactive and Reduced Average Power is in reference to Proximity Sensor Active.

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Duty Factor Measured Results

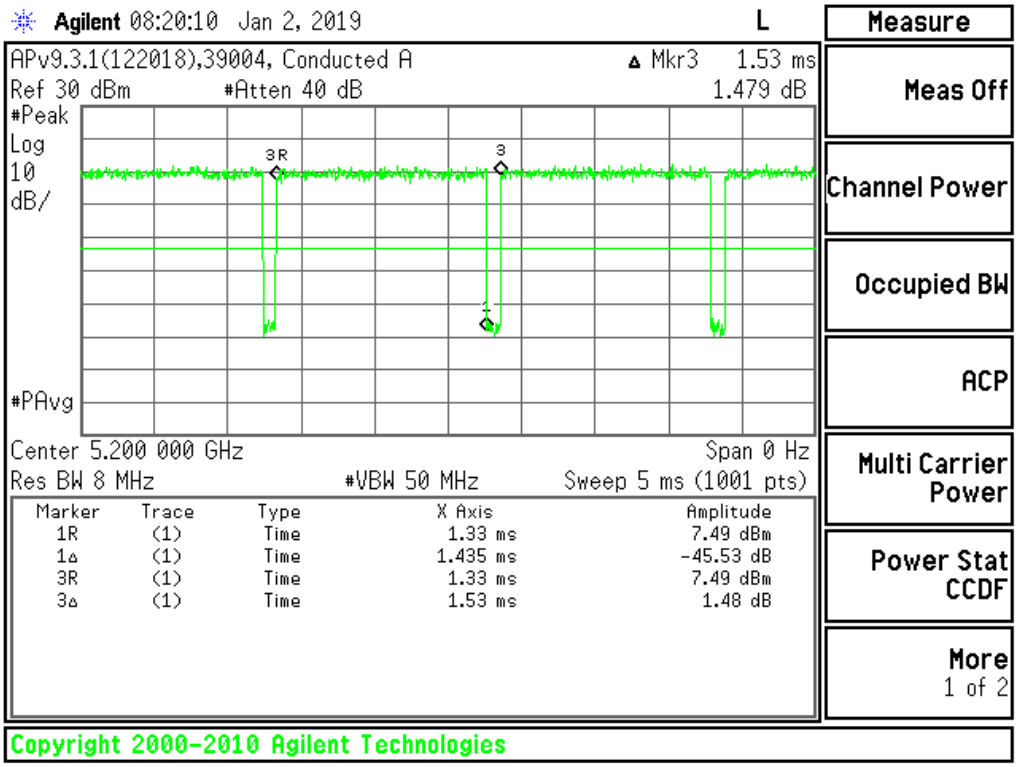
Antenna 1

Mode	Type	T on (ms)	Period (ms)	Duty Cycle	Crest Factor (1/duty cycle)
802.11a	6 Mbps	1.435	1.530	93.79%	1.07

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

Duty Cycle plots

802.11a – SISO



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Duty Factor Measured Results

Antenna 2

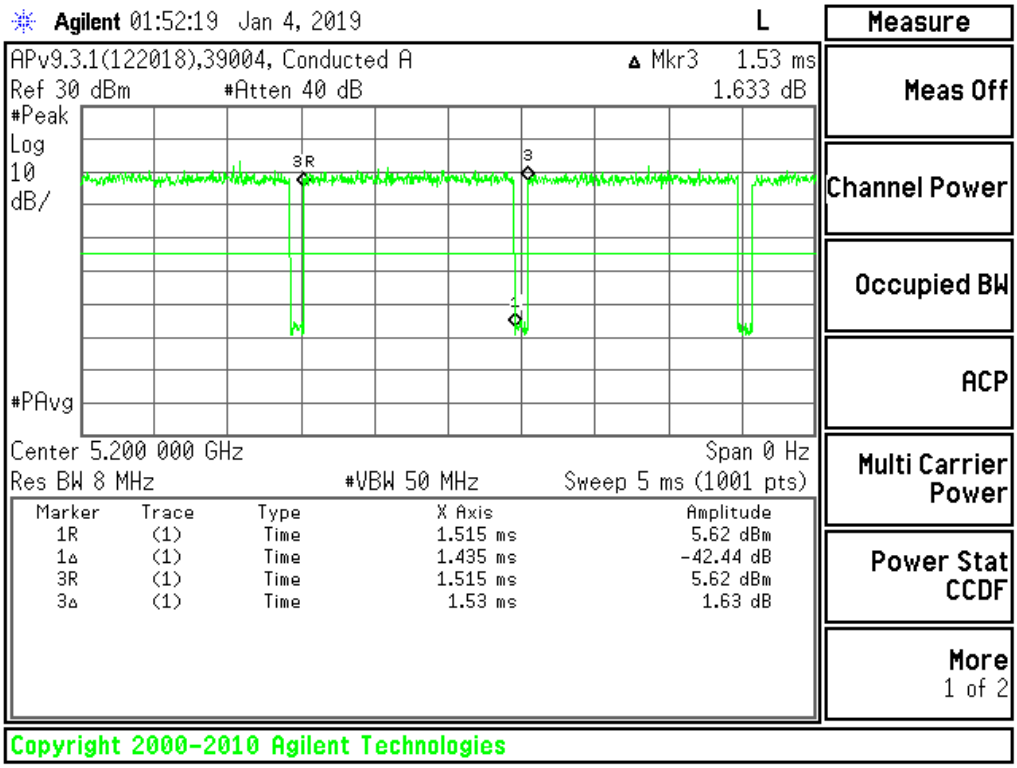
Mode	Type	T on (ms)	Period (ms)	Duty Cycle	Crest Factor (1/duty cycle)
802.11a	6 Mbps	1.435	1.530	93.79%	1.07

Note(s):

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

Duty Cycle plots

802.11a – SISO



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Duty Factor Measured Results

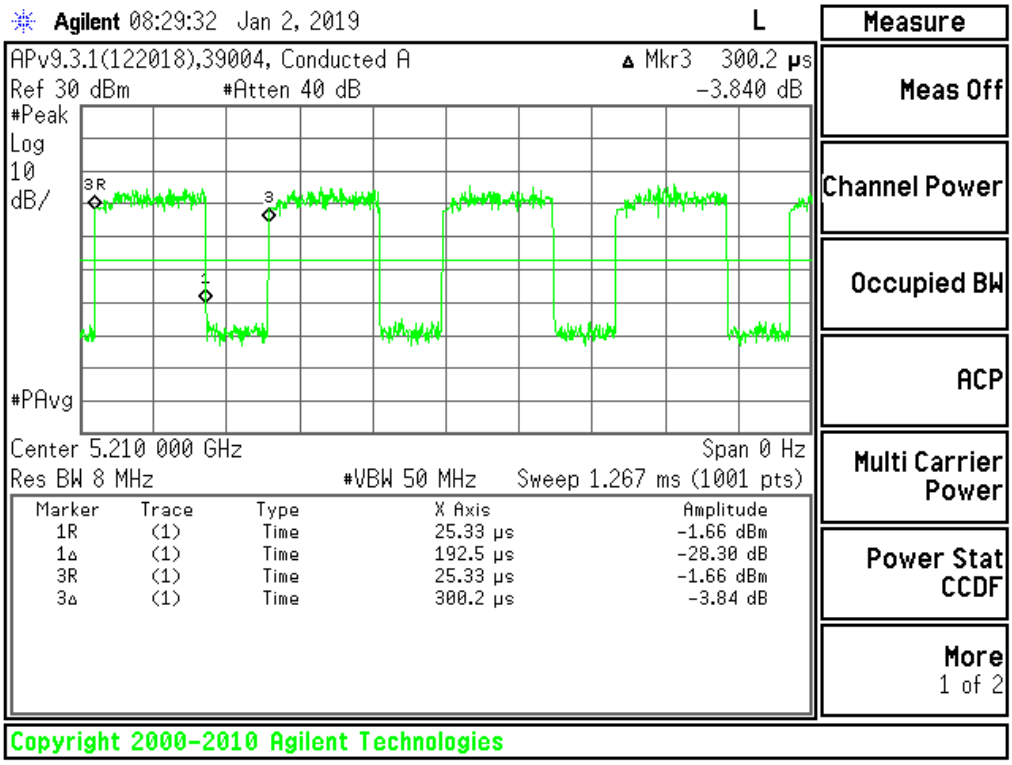
Mode	Type	T on (ms)	Period (ms)	Duty Cycle	Crest Factor (1/duty cycle)
802.11ac	VHT80	0.193	0.300	64.12%	1.56

Note(s):

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

Duty Cycle plot

802.11ac - MIMO



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9.6. Bluetooth

Bluetooth Measured Results

SAR measurement is not required for the QPSK, 8PSK, and BLE. When the secondary mode is ≤ ¼ dB higher than the primary mode.

Band	Mode	Ch #	Freq. (MHz)	Wi-Fi Antenna #1 (dBm) Average Power (dBm)		
				Meas Pwr	Tune-up	SAR Test (Yes/No)
2.4	GFSK	0	2402	15.75	17.00	Yes
		39	2441	16.65	17.00	
		78	2480	15.52	17.00	

Duty Factor Measured Results

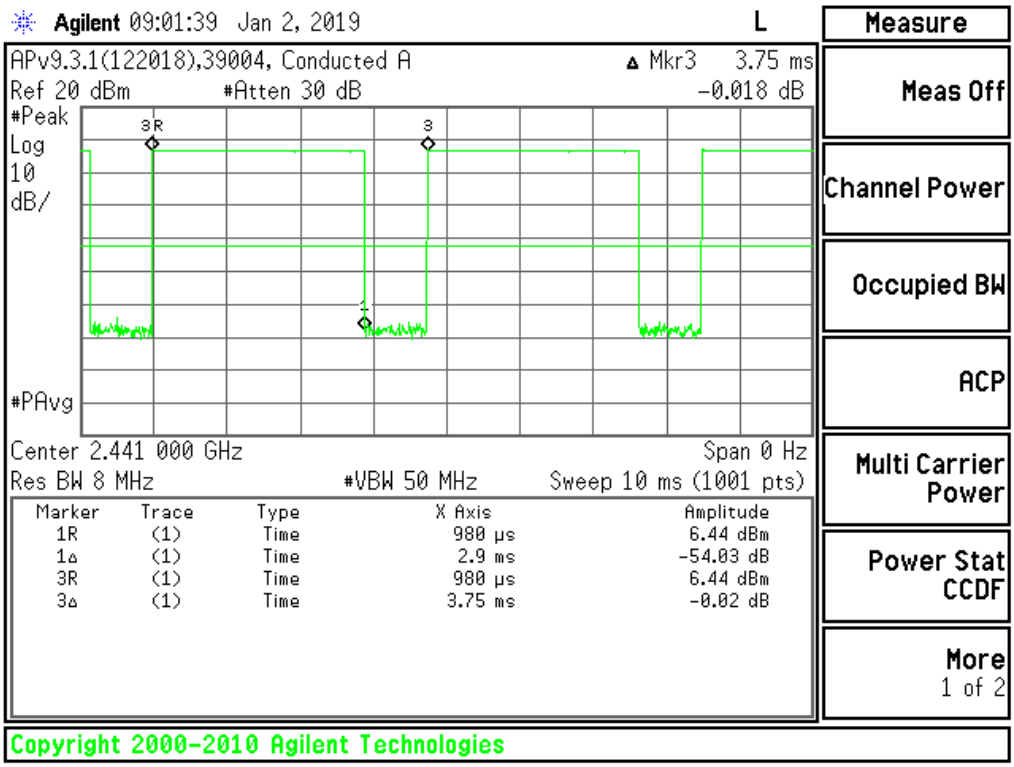
Mode	Type	T on (ms)	Period (ms)	Duty Cycle	Crest Factor (1/duty cycle)
GFSK	DH5	2.9	3.75	77.33%	1.29

Note(s):

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

Duty Cycle plot

GFSK



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10. Measured and Reported (Scaled) SAR Results

SAR Test Reduction criteria are as follows:

- Reported SAR(W/kg) for WWAN 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 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.

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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). Initial Test Position SAR Test Reduction Procedure is outlined in KDB 248227 D01 §5.1.1. To determine the initial test position, Area Scans were performed to determine the position with the Maximum Value of SAR (measured). The position that produced the highest Maximum Value of SAR is considered the worst case position; thus used as the initial test position.

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10.1. GSM850

RF Exposure Conditions	Mode	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	GSM Voice	OFF	0	Left Touch	190	836.6	34.0	33.42	0.167	0.191	
				Left Tilt	190	836.6	34.0	33.42	0.107	0.122	
				Right Touch	190	836.6	34.0	33.42	0.206	**0.235**	1
				Right Tilt	190	836.6	34.0	33.42	0.105	0.120	
Body-worn	GSM Voice	OFF	15	Rear	190	836.6	34.0	33.42	0.256	**0.293**	2
				Front	190	836.6	34.0	33.42	0.222	0.254	
Hotspot	GPRS 3 Slots	OFF	10	Rear	190	836.6	30.5	29.74	0.002	0.002	
				Front	190	836.6	30.5	29.74	0.002	0.002	
				Edge 2	190	836.6	30.5	29.74	0.003	**0.003**	3
				Edge 3	190	836.6	30.5	29.74	0.001	0.001	
				Edge 4	190	836.6	30.5	29.74	0.001	0.001	

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	GSM Voice	OFF	0	Left Touch	661	1880.0	31.00	30.35	0.126	**0.146**	4
				Left Tilt	661	1880.0	31.00	30.35	0.041	0.048	
				Right Touch	661	1880.0	31.00	30.35	0.067	0.078	
				Right Tilt	661	1880.0	31.00	30.35	0.037	0.043	
Body-worn	GSM Voice	OFF	15	Rear	661	1880.0	31.00	30.35	0.342	**0.397**	5
				Front	661	1880.0	31.00	30.35	0.230	0.267	
Hotspot	GPRS 1 Slot	OFF	10	Rear	512	1850.2	31.00	30.04	0.693	0.864	
					661	1880.0	31.00	30.35	0.717	0.833	
					810	1909.8	31.00	30.15	0.728	0.885	
				Front	661	1880.0	31.00	30.35	0.488	0.567	
				Edge 2	661	1880.0	31.00	30.35	0.061	0.071	
				Edge 3	512	1850.2	31.00	30.04	1.010	1.260	
					661	1880.0	31.00	30.35	1.050	1.220	
					810	1909.8	31.00	30.15	1.100	**1.338**	6
				Edge 4	661	1880.0	31.00	30.35	0.133	0.154	

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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	OFF	0	Left Touch	9400	1880.0	25.00	24.74	0.256	**0.272**	7
				Left Tilt	9400	1880.0	25.00	24.74	0.068	0.072	
				Right Touch	9400	1880.0	25.00	24.74	0.150	0.159	
				Rightt Tilt	9400	1880.0	25.00	24.74	0.078	0.083	
Body-worn	Rel 99 RMC 12.2 kbps	OFF	15	Rear	9400	1880.0	25.00	24.74	0.615	**0.653**	8
				Front	9400	1880.0	25.00	24.74	0.439	0.466	
Hotspot	Rel 99 RMC 12.2 kbps	ON	10	Rear	9400	1880.0	22.00	21.71	0.511	0.546	
				Front	9400	1880.0	22.00	21.71	0.375	0.401	
				Edge 2	9400	1880.0	22.00	21.71	0.045	0.048	
				Edge 3	9262	1852.1	22.00	21.55	0.790	0.876	
					9400	1880.0	22.00	21.71	0.762	0.815	
					9538	1907.6	22.00	21.68	0.905	**0.974**	9
				Edge 4	9400	1880.0	22.00	21.71	0.137	0.146	

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	OFF	0	Left Touch	1413	1732.6	25.00	24.70	0.283	**0.303**	10
				Left Tilt	1413	1732.6	25.00	24.70	0.084	0.090	
				Right Touch	1413	1732.6	25.00	24.70	0.212	0.227	
				Rightt Tilt	1413	1732.6	25.00	24.70	0.084	0.090	
Body-worn	Rel 99 RMC 12.2 kbps	OFF	15	Rear	1413	1732.6	25.00	24.70	0.631	**0.676**	11
				Front	1413	1732.6	25.00	24.70	0.403	0.432	
Hotspot	Rel 99 RMC 12.2 kbps	ON	10	Rear	1413	1732.6	22.00	21.37	0.462	0.534	
				Front	1413	1732.6	22.00	21.37	0.303	0.350	
				Edge 2	1413	1732.6	22.00	21.37	0.053	0.061	
				Edge 3	1312	1712.4	22.00	21.71	0.802	0.857	
					1413	1732.6	22.00	21.37	0.866	1.001	
					1513	1752.6	22.00	21.62	0.969	**1.058**	12
				Edge 4	1413	1732.6	22.00	21.37	0.118	0.136	

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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	OFF	0	Left Touch	4183	836.6	25.00	24.75	0.197	0.209	
				Left Tilt	4183	836.6	25.00	24.75	0.105	0.111	
				Right Touch	4183	836.6	25.00	24.75	0.222	**0.235**	13
				Rightt Tilt	4183	836.6	25.00	24.75	0.126	0.133	
Body-worn	Rel 99 RMC 12.2 kbps	OFF	15	Rear	4183	836.6	25.00	24.75	0.274	**0.290**	14
				Front	4183	836.6	25.00	24.75	0.252	0.267	
Hotspot	Rel 99 RMC 12.2 kbps	OFF	10	Rear	4183	836.6	25.00	24.75	0.510	**0.540**	15
				Front	4183	836.6	25.00	24.75	0.408	0.432	
				Edge 2	4183	836.6	25.00	24.75	0.224	0.237	
				Edge 3	4183	836.6	25.00	24.75	0.340	0.360	
				Edge 4	4183	836.6	25.00	24.75	0.110	0.117	

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10.6. LTE Band 5 (10MHz Bandwidth)

LTE Band 5 Measured Results:

RF Exposure Conditions	Mode	Power back-off	DAT Tuner State	Dist. (mm)	Test Position	Ch #.	Freq. (MHz)	RB Allocation	RB offest	Power (dBm)		1-g SAR (W/kg)		Plot No.
										Tune-up Limit	Meas.	Meas.	Scaled	
Head	QPSK	OFF	Default	0	Left Touch	20525	836.5	1	0	25.0	24.79	0.178	0.187	
								25	0	24.0	22.26	0.103	0.154	
					Left Tilt	20525	836.5	1	0	25.0	24.79	0.102	0.107	
								25	0	24.0	22.26	0.059	0.088	
					Right Touch	20525	836.5	1	0	25.0	24.79	0.204	**0.214**	16
								25	0	24.0	22.26	0.122	0.182	
					Right Tilt	20525	836.5	1	0	25.0	24.79	0.095	0.100	
								25	0	24.0	22.26	0.055	0.082	
Body-worn	QPSK	OFF	Default	15	Rear	20525	836.5	1	0	25.0	24.79	0.302	**0.317**	17
								25	0	24.0	22.26	0.194	0.290	
					Front	20525	836.5	1	0	25.0	24.79	0.293	0.308	
								25	0	24.0	22.26	0.181	0.270	
Hotspot	QPSK	OFF	Default	10	Rear	20525	836.5	1	0	25.0	24.79	0.446	**0.468**	18
								25	0	24.0	22.26	0.288	0.430	
					Front	20525	836.5	1	0	25.0	24.79	0.389	0.408	
								25	0	24.0	22.26	0.251	0.375	
					Edge 2	20525	836.5	1	0	25.0	24.79	0.305	0.320	
								25	0	24.0	22.26	0.177	0.264	
					Edge 3	20525	836.5	1	0	25.0	24.79	0.221	0.232	
								25	0	24.0	22.26	0.146	0.218	
					Edge 4	20525	836.5	1	0	25.0	24.79	0.186	0.195	
								25	0	24.0	22.26	0.095	0.141	

Note(s):

Default Tuner State, using Index 2, was used for all SAR RF Exposure Conditions, based off the results obtained using the single point measurements in §6.5.

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10.7. 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	OFF	0	Left Touch	23095	707.5	1	0	25.0	24.35	0.106	0.123	
							25	0	24.0	22.33	0.065	0.095	
				Left Tilt	23095	707.5	1	0	25.0	24.35	0.074	0.086	
							25	0	24.0	22.33	0.046	0.068	
				Right Touch	23095	707.5	1	0	25.0	24.35	0.118	**0.137**	19
							25	0	24.0	22.33	0.075	0.110	
				Right Tilt	23095	707.5	1	0	25.0	24.35	0.067	0.078	
							25	0	24.0	22.33	0.043	0.063	
Body-worn	QPSK	OFF	15	Rear	23095	707.5	1	0	25.0	24.35	0.237	**0.275**	20
							25	0	24.0	22.33	0.151	0.222	
				Front	23095	707.5	1	0	25.0	24.35	0.206	0.239	
							25	0	24.0	22.33	0.132	0.194	
Hotspot	QPSK	OFF	10	Rear	23095	707.5	1	0	25.0	24.35	0.323	**0.375**	21
							25	0	24.0	22.33	0.207	0.304	
				Front	23095	707.5	1	0	25.0	24.35	0.247	0.287	
							25	0	24.0	22.33	0.157	0.231	
				Edge 2	23095	707.5	1	0	25.0	24.35	0.190	0.221	
							25	0	24.0	22.33	0.123	0.181	
				Edge 3	23095	707.5	1	0	25.0	24.35	0.113	0.131	
							25	0	24.0	22.33	0.074	0.109	
				Edge 4	23095	707.5	1	0	25.0	24.35	0.204	0.237	
							25	0	24.0	22.33	0.132	0.194	

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10.8. 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	OFF	0	Left Touch	23230	782.0	1	49	25.0	24.59	0.112	0.123	
							25	0	24.0	22.14	0.066	0.101	
				Left Tilt	23230	782.0	1	49	25.0	24.59	0.091	0.100	
							25	0	24.0	22.14	0.051	0.078	
				Right Touch	23230	782.0	1	49	25.0	24.59	0.150	**0.165**	22
							25	0	24.0	22.14	0.083	0.127	
				Right Tilt	23230	782.0	1	49	25.0	24.59	0.104	0.114	
							25	0	24.0	22.14	0.056	0.086	
Body-worn	QPSK	OFF	15	Rear	23230	782.0	1	49	25.0	24.59	0.244	**0.268**	23
							25	0	24.0	22.14	0.138	0.212	
				Front	23230	782.0	1	49	25.0	24.59	0.194	0.213	
							25	0	24.0	22.14	0.108	0.166	
Hotspot	QPSK	OFF	10	Rear	23230	782.0	1	49	25.0	24.59	0.317	**0.348**	24
							25	0	24.0	22.14	0.183	0.281	
				Front	23230	782.0	1	49	25.0	24.59	0.203	0.223	
							25	0	24.0	22.14	0.109	0.167	
				Edge 2	23230	782.0	1	49	25.0	24.59	0.249	0.274	
							25	0	24.0	22.14	0.125	0.192	
				Edge 3	23230	782.0	1	49	25.0	24.59	0.150	0.165	
							25	0	24.0	22.14	0.079	0.121	
				Edge 4	23230	782.0	1	49	25.0	24.59	0.160	0.176	
							25	0	24.0	22.14	0.089	0.137	

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10.9. LTE Band 25 (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	OFF	0	Left Touch	26365	1882.5	1	0	25.00	24.34	0.285	**0.332**	25
							50	0	24.00	22.31	0.177	0.261	
				Left Tilt	26365	1882.5	1	0	25.00	24.34	0.095	0.111	
							50	0	24.00	22.31	0.054	0.080	
				Right Touch	26365	1882.5	1	0	25.00	24.34	0.177	0.206	
							50	0	24.00	22.31	0.106	0.156	
				Right Tilt	26365	1882.5	1	0	25.00	24.34	0.103	0.120	
							50	0	24.00	22.31	0.062	0.091	
Body-worn	QPSK	OFF	15	Rear	26140	1860.0	1	0	25.00	24.27	0.729	**0.862**	26
					26365	1882.5	1	0	25.00	24.34	0.691	0.804	
							50	0	24.00	22.31	0.445	0.656	
					26590	1905.0	1	0	25.00	24.20	0.716	0.861	
				Front	26365	1882.5	1	0	25.00	24.34	0.524	0.610	
							50	0	24.00	22.31	0.324	0.478	
Hotspot	QPSK	ON	10	Rear	26365	1882.5	1	0	22.00	21.39	0.665	0.765	
							50	0	22.00	21.28	0.651	0.768	
				Front	26365	1882.5	1	0	22.00	21.39	0.465	0.535	
							50	0	22.00	21.28	0.460	0.543	
				Edge 2	26365	1882.5	1	0	22.00	21.39	0.064	0.074	
							50	0	22.00	21.28	0.066	0.078	
				Edge 3	26140	1860.0	1	0	22.00	21.32	0.943	1.102	
							50	0	22.00	21.27	0.928	1.097	
					26365	1882.5	1	0	22.00	21.39	0.944	1.087	
							50	0	22.00	21.28	0.948	1.119	
					26590	1905.0	1	0	22.00	21.18	0.954	1.152	
							50	0	22.00	21.19	1.040	1.253	
							100	0	22.00	21.12	1.060	**1.298**	27
				Edge 4	26365	1882.5	1	0	22.00	21.39	0.175	0.202	
							50	0	22.00	21.28	0.170	0.201	

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10.10. LTE Band 26 (15MHz 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	OFF	0	Left Touch	26865	831.5	1	0	25.0	24.16	0.139	0.169	
							36	0	24.0	22.16	0.093	0.142	
				Left Tilt	26865	831.5	1	0	25.0	24.16	0.071	0.086	
							36	0	24.0	22.16	0.046	0.070	
				Right Touch	26865	831.5	1	0	25.0	24.16	0.175	**0.212**	28
							36	0	24.0	22.16	0.114	0.174	
				Right Tilt	26865	831.5	1	0	25.0	24.16	0.078	0.095	
							36	0	24.0	22.16	0.049	0.075	
Body-worn	QPSK	OFF	15	Rear	26865	831.5	1	0	25.0	24.16	0.228	**0.277**	29
							36	0	24.0	22.16	0.148	0.226	
				Front	26865	831.5	1	0	25.0	24.16	0.202	0.245	
							36	0	24.0	22.16	0.132	0.202	
Hotspot	QPSK	OFF	10	Rear	26865	831.5	1	0	25.0	24.16	0.391	**0.474**	30
							36	0	24.0	22.16	0.247	0.377	
				Front	26865	831.5	1	0	25.0	24.16	0.314	0.381	
							36	0	24.0	22.16	0.205	0.313	
				Edge 2	26865	831.5	1	0	25.0	24.16	0.233	0.283	
							36	0	24.0	22.16	0.151	0.231	
				Edge 3	26865	831.5	1	0	25.0	24.16	0.240	0.291	
							36	0	24.0	22.16	0.156	0.238	
				Edge 4	26865	831.5	1	0	25.0	24.16	0.115	0.140	
							36	0	24.0	22.16	0.072	0.110	

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10.11. 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	OFF	0	Left Touch	40620	2593.0	1	0	24.0	23.14	0.060	0.073	
							50	0	23.0	21.61	0.035	0.048	
				Left Tilt	40620	2593.0	1	0	24.0	23.14	0.032	0.039	
							50	0	23.0	21.61	0.021	0.029	
				Right Touch	40620	2593.0	1	0	24.0	23.14	0.108	**0.132**	31
							50	0	23.0	21.61	0.071	0.098	
				Right Tilt	40620	2593.0	1	0	24.0	23.14	0.060	0.073	
							50	0	23.0	21.61	0.040	0.055	
Body-worn	QPSK	OFF	15	Rear	40620	2593.0	1	0	24.0	23.14	0.315	**0.384**	32
							50	0	23.0	21.61	0.204	0.281	
				Front	40620	2593.0	1	0	24.0	23.14	0.195	0.238	
							50	0	23.0	21.61	0.126	0.174	
Hotspot	QPSK	ON	10	Rear	40620	2593.0	1	0	21.50	19.78	0.336	0.499	
							50	0	21.50	20.29	0.343	0.453	
				Front	40620	2593.0	1	0	21.50	19.78	0.117	0.174	
							50	0	21.50	20.29	0.202	0.267	
				Edge 2	40620	2593.0	1	0	21.50	19.78	0.056	0.083	
							50	0	21.50	20.29	0.058	0.077	
				Edge 3	39750	2506.0	1	0	21.50	20.02	0.450	0.633	
					40185	2549.5	1	0	21.50	19.66	0.517	0.789	
					40620	2593.0	1	0	21.50	19.78	0.543	**0.807**	33
							50	0	21.50	20.29	0.589	0.778	
					41055	2636.5	1	0	21.50	20.07	0.303	0.421	
					41490	2680.0	1	0	21.50	20.09	0.380	0.526	
				Edge 4	40620	2593.0	1	0	21.50	19.78	0.050	0.074	
							50	0	21.50	20.29	0.090	0.119	

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10.12. 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	OFF	0	Left Touch	132322	1745.0	1	0	25.00	23.96	0.270	**0.343**	34
							50	0	24.00	21.95	0.155	0.249	
				Left Tilt	132322	1745.0	1	0	25.00	23.96	0.089	0.113	
							50	0	24.00	21.95	0.050	0.080	
				Right Touch	132322	1745.0	1	0	25.00	23.96	0.126	0.160	
							50	0	24.00	21.95	0.077	0.123	
				Right Tilt	132322	1745.0	1	0	25.00	23.96	0.069	0.088	
							50	0	24.00	21.95	0.041	0.066	
Body-worn	QPSK	OFF	15	Rear	132322	1745.0	1	0	25.00	23.96	0.615	**0.781**	35
							50	0	24.00	21.95	0.386	0.619	
				Front	132322	1745.0	1	0	25.00	23.96	0.446	0.566	
							50	0	24.00	21.95	0.281	0.451	
Hotspot	QPSK	ON	10	Rear	132072	1720.0	1	0	22.00	21.17	0.559	0.677	
							50	0	22.00	21.11	0.562	0.690	
					132322	1745.0	1	0	22.00	20.94	0.644	0.822	
							50	0	22.00	20.94	0.651	0.832	
					132572	1770.0	1	0	22.00	21.12	0.677	0.829	
							50	0	22.00	21.12	0.671	0.822	
							100	0	22.00	21.07	0.662	0.820	
				Front	132322	1745.0	1	0	22.00	20.94	0.441	0.563	
							50	0	22.00	20.94	0.446	0.570	
				Edge 2	132322	1745.0	1	0	22.00	20.94	0.061	0.078	
							50	0	22.00	20.94	0.060	0.077	
				Edge 3	132072	1720.0	1	0	22.00	21.17	0.909	1.101	
							50	0	22.00	21.11	0.911	1.119	
					132322	1745.0	1	0	22.00	20.94	1.060	1.353	
							50	0	22.00	20.94	1.070	**1.367**	36
					132572	1770.0	1	0	22.00	21.12	1.030	1.261	
							50	0	22.00	21.12	1.030	1.262	
							100	0	22.00	21.07	1.000	1.239	
				Edge 4	132322	1745.0	1	0	22.00	20.94	0.163	0.208	
							50	0	22.00	20.94	0.167	0.213	

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10.13. Wi-Fi (DTS Band)

When the proximity sensor is active in a held-to-ear user scenario, the output power level is reduced. The maximum allowed output powers in all conditions are included in the maximum power document.

Refer to Operational Description for WLAN explanation.

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

Antenna	Mode	RF Exposure Conditions	Power Back-off	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	
Wi-Fi Antenna #1	802.11b 1 Mbps	Head	ON	0	Left Touch	6	2437	98.85%	0.199	16.0	16.00			
					Left Tilt	6	2437	98.85%	0.254	16.0	16.00			
					Right Touch	6	2437	98.85%	0.921	16.0	16.00	0.538	0.544	
					Right Tilt	6	2437	98.85%	**0.838**	16.0	16.00	0.626	**0.633**	37
		Body-worn	OFF	15	Rear	6	2437	98.85%	**0.183**	19.0	18.80	0.139	**0.147**	38
					Front	6	2437	98.85%	0.128	19.0	18.80			
		Hotspot	OFF	10	Rear	6	2437	98.85%	**0.368**	19.0	18.80	0.281	**0.298**	39
					Front	6	2437	98.85%	0.254	19.0	18.80			
					Edge 1	6	2437	98.85%	0.342	19.0	18.80			
					Edge 4	6	2437	98.85%	0.284	19.0	18.80			
Wi-Fi Antenna #2	802.11b 1 Mbps	Head	ON	0	Left Touch	6	2437	99.31%	0.065	16.0	15.90			
					Left Tilt	6	2437	99.31%	0.105	16.0	15.90			
					Right Touch	6	2437	99.31%	0.128	16.0	15.90	0.087	0.090	
					Right Tilt	6	2437	99.31%	**0.136**	16.0	15.90	0.108	**0.111**	40
		Body-worn	OFF	15	Rear	6	2437	99.31%	**0.066**	19.0	18.90	0.046	**0.047**	41
					Front	6	2437	99.31%	0.034	19.0	18.90			
		Hotspot	OFF	10	Rear	6	2437	99.31%	0.157	19.0	18.90			
					Front	6	2437	99.31%	0.062	19.0	18.90			
					Edge 1	6	2437	99.31%	**0.186**	19.0	18.90	0.126	**0.130**	42
					Edge 4	6	2437	99.31%	0.023	19.0	18.90			

Note(s):

- Head SAR testing is performed with Proximity Sensor Active.
- Body-worn and Hotspot SAR testing is performed with Proximity Sensor Inactive.

10.14. Wi-Fi (DTS Band) RSDB (Real Simultaneous Dual Band)

Antenna	Mode	RF Exposure Conditions	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	
Wi-Fi Antenna #1	802.11b 1 Mbps	Head	0	Right Tilt	6	2437	98.95%	**0.374**	14.0	14.00	0.287	**0.290**	43
		Body-worn	15	Rear	6	2437	98.85%	**0.043**	14.0	14.00	0.028	**0.029**	44
		Hotspot	10	Rear	6	2437	98.85%	**0.102**	14.0	14.00	0.068	**0.069**	45
Wi-Fi Antenna #2	802.11b 1 Mbps	Head	0	Right Tilt	11	2462	99.31%	**0.106**	14.0	14.00	0.061	**0.061**	46
		Body-worn	15	Rear	11	2462	99.31%	**0.018**	14.0	14.00	0.014	**0.014**	47
		Hotspot	10	Rear	11	2462	99.31%	**0.050**	14.0	14.00	0.033	**0.033**	48

Note(s):

- Head SAR testing is performed with Proximity Sensor Active.
- Body-worn and Hotspot SAR testing is performed with Proximity Sensor Inactive.

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10.15. Wi-Fi (U-NII Bands)

When the proximity sensor is active in a held-to-ear user scenario, the output power level is reduced. The maximum allowed output powers in all conditions are included in the maximum power document.

Refer to Operational Description for WLAN explanation.

UNII-1 &2A

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

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

Antenna	Mode	RF Exposure Conditions	Power Back-off	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	
Wi-Fi Antenna #1	802.11ac VHT80	Head	ON	0	Left Touch	58	5290	64.12%	0.184	14.0	13.80			
					Left Tilt	58	5290	64.12%	0.240	14.0	13.80			
					Right Touch	58	5290	64.12%	**0.543**	14.0	13.80	0.200	**0.327**	51
					Right Tilt	58	5290	64.12%	0.497	14.0	13.80			
Wi-Fi Antenna #1	802.11a 6 Mbps	Body-worn	OFF	15	Rear	64	5320	93.79%	**0.255**	17.0	17.00	0.109	**0.116**	52
					Front	64	5320	93.79%	0.018	17.0	17.00			
Wi-Fi Antenna #2	802.11ac VHT80	Head	ON	0	Left Touch	58	5290	64.12%	**0.059**	14.0	13.60	<0.01	**<0.01**	53
					Left Tilt	58	5290	64.12%	0.001	14.0	13.60			
					Right Touch	58	5290	64.12%	0.022	14.0	13.60			
					Right Tilt	58	5290	64.12%	0.028	14.0	13.60			
Wi-Fi Antenna #2	802.11a 6 Mbps	Body-worn	OFF	15	Rear	56	5280	93.79%	**0.169**	17.0	17.00	0.088	**0.094**	54
					Front	56	5280	93.79%	0.004	17.0	17.00			

Note(s):

Highest Reported 1-g SAR for U-NII 2A mode is < 1.2 W/kg, therefore full SAR testing is not required for U-NII 1 mode.

UNII-2C

Antenna	Mode	RF Exposure Conditions	Power Back-off	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	
Wi-Fi Antenna #1	802.11ac VHT80	Head	ON	0	Left Touch	122	5610	64.12%	0.138	14.0	14.00			
					Left Tilt	122	5610	64.12%	0.184	14.0	14.00			
					Right Touch	122	5610	64.12%	**0.535**	14.0	14.00	0.211	**0.329**	55
					Right Tilt	122	5610	64.12%	0.417	14.0	14.00			
Wi-Fi Antenna #1	802.11a 6 Mbps	Body-worn	OFF	15	Rear	116	5580	93.79%	**0.569**	17.0	17.00	0.239	**0.255**	56
					Front	116	5580	93.79%	0.112	17.0	17.00			
Wi-Fi Antenna #2	802.11ac VHT80	Head	ON	0	Left Touch	122	5610	64.12%	**0.028**	14.0	14.00			
					Left Tilt	122	5610	64.12%	0.030	14.0	14.00			
					Right Touch	122	5610	64.12%	0.061	14.0	14.00	<0.01	**<0.01**	57
					Right Tilt	122	5610	64.12%	0.036	14.0	14.00			
Wi-Fi Antenna #2	802.11a 6 Mbps	Body-worn	OFF	15	Rear	140	5700	93.79%	**0.565**	17.0	17.00	0.234	**0.249**	58
					Front	140	5700	93.79%	0.013	17.0	17.00			

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UNII-3

Antenna	Mode	RF Exposure Conditions	Power Back-off	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	
Wi-Fi Antenna #1	802.11ac VHT80	Head	ON	0	Left Touch	155	5775	64.12%	0.078	14.0	14.00			
					Left Tilt	155	5775	64.12%	0.094	14.0	14.00			
					Right Touch	155	5775	64.12%	**0.220**	14.0	14.00	0.096	**0.150**	59
					Right Tilt	155	5775	64.12%	0.208	14.0	14.00			
Wi-Fi Antenna #1	802.11a 6 Mbps	Body-worn	OFF	15	Rear	157	5785	93.79%	**0.256**	17.0	17.00	0.113	**0.120**	60
					Front	157	5785	93.79%	0.056	17.0	17.00			
wi-Fi Antenna #1	802.11a 6 Mbps	Hotspot	OFF	10	Rear	157	5785	93.79%	**0.460**	17.0	17.00	0.204	**0.218**	61
					Front	157	5785	93.79%	0.090	17.0	17.00			
					Edge 1	157	5785	93.79%	0.160	17.0	17.00			
					Edge 4	157	5785	93.79%	0.190	17.0	17.00			
Wi-Fi Antenna #2	802.11ac VHT80	Head	ON	0	Left Touch	155	5775	64.12%	**0.030**	14.0	13.80	<0.01	**<0.01**	62
					Left Tilt	155	5775	64.12%	0.006	14.0	13.80			
					Right Touch	155	5775	64.12%	0.019	14.0	13.80			
					Right Tilt	155	5775	64.12%	0.008	14.0	13.80			
Wi-Fi Antenna #2	802.11a 6 Mbps	Body-worn	OFF	15	Rear	157	5785	93.79%	**0.868**	17.0	17.00	0.372	**0.397**	63
					Front	157	5785	93.79%	0.014	17.0	17.00	<0.01	<0.01	
Wi-Fi Antenna #2	802.11a 6 Mbps	Hotspot	OFF	10	Rear	157	5785	93.79%	**1.720**	17.0	17.00	0.737	**0.786**	64
						165	5825	93.79%	1.460	17.0	16.80	0.684	0.764	
					Front	157	5785	93.79%	0.017	17.0	17.00			
					Edge 1	157	5785	93.79%	0.147	17.0	17.00			
					Edge 4	157	5785	93.79%	0.230	17.0	17.00	0.100	0.107	

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10.16. Wi-Fi (U-NII Bands) RSDB (Real Simultaneous Dual Band)

When the proximity sensor is active in a held-to-ear user scenario, the output power level is reduced. The maximum allowed output powers in all conditions are included in the maximum power document.

Refer to Operational Description for WLAN explanation.

UNII-1 & 2A

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

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

Antenna	Mode	RF Exposure Conditions	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	
Wi-Fi Antenna #1	802.11ac VHT80	Head	0	Left Touch	58	5290	64.12%	0.184	14.0	13.80			
				Left Tilt	58	5290	64.12%	0.240	14.0	13.80			
				Right Touch	58	5290	64.12%	**0.543**	14.0	13.80	0.200	**0.327**	67
				Right Tilt	58	5290	64.12%	0.497	14.0	13.80			
		Body worn	15	Rear	58	5290	64.12%	**0.137**	14.0	13.80	0.056	**0.091**	68
				Front	58	5290	64.12%	0.021	14.0	13.80			
Wi-Fi Antenna #2	802.11ac VHT80	Head	0	Left Touch	58	5290	64.12%	**0.059**	14.0	13.60	<0.01	**<0.01**	69
				Left Tilt	58	5290	64.12%	0.001	14.0	13.60			
				Right Touch	58	5290	64.12%	0.022	14.0	13.60			
				Right Tilt	58	5290	64.12%	0.028	14.0	13.60			
		Body worn	15	Rear	58	5290	64.12%	**0.095**	14.0	13.60	0.033	**0.056**	70
				Front	58	5290	64.12%	0.021	14.0	13.60			

Note(s):

Highest Reported 1-g SAR for U-NII 2A mode is < 1.2 W/kg, therefore SAR testing is not required for U-NII 1 mode.

UNII-2C

Antenna	Mode	RF Exposure Conditions	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	
Wi-Fi Antenna #1	802.11ac VHT80	Head	0	Left Touch	122	5610	64.12%	0.138	14.0	14.00			
				Left Tilt	122	5610	64.12%	0.184	14.0	14.00			
				Right Touch	122	5610	64.12%	**0.535**	14.0	14.00	0.211	**0.329**	71
				Right Tilt	122	5610	64.12%	0.417	14.0	14.00			
		Body worn	15	Rear	122	5610	64.12%	**0.188**	14.0	14.00	0.078	**0.122**	72
				Front	122	5610	64.12%	0.027	14.0	14.00			
Wi-Fi Antenna #2	802.11ac VHT80	Head	0	Left Touch	122	5610	64.12%	0.028	14.0	14.00			
				Left Tilt	122	5610	64.12%	0.030	14.0	14.00			
				Right Touch	122	5610	64.12%	**0.061**	14.0	14.00	<0.01	**<0.01**	73
				Right Tilt	122	5610	64.12%	0.036	14.0	14.00			
		Body worn	15	Rear	122	5610	64.12%	**0.209**	14.0	14.00	0.076	**0.119**	74
				Front	122	5610	64.12%	0.021	14.0	14.00			

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UNII-3

Antenna	Mode	RF Exposure Conditions	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	
Wi-Fi Antenna #1	802.11ac VHT80	Head	0	Left Touch	155	5775	64.12%	0.078	14.0	14.00			
				Left Tilt	155	5775	64.12%	0.094	14.0	14.00			
				Right Touch	155	5775	64.12%	**0.220**	14.0	14.00	0.096	**0.150**	75
				Right Tilt	155	5775	64.12%	0.208	14.0	14.00			
		Body-worn	15	Rear	155	5775	64.12%	**0.114**	14.0	14.00	0.041	**0.064**	76
				Front	155	5775	64.12%	0.061	14.0	14.00			
		Hotspot	10	Rear	155	5775	64.12%	**0.219**	14.0	14.00	0.099	**0.154**	77
				Front	155	5775	64.12%	0.039	14.0	14.00			
				Edge 1	155	5775	64.12%	0.090	14.0	14.00			
				Edge 4	155	5775	64.12%	0.106	14.0	14.00			
Wi-Fi Antenna #2	802.11ac VHT80	Head	0	Left Touch	155	5775	64.12%	**0.030**	14.0	13.80	<0.01	**<0.01**	78
				Left Tilt	155	5775	64.12%	0.006	14.0	13.80			
				Right Touch	155	5775	64.12%	0.019	14.0	13.80			
				Right Tilt	155	5775	64.12%	0.008	14.0	13.80			
		Body-worn	15	Rear	155	5775	64.12%	0.335	14.0	13.80	0.131	**0.214**	79
				Front	155	5775	64.12%	0.017	14.0	13.80			
		Hotspot	10	Rear	155	5775	64.12%	**0.523**	14.0	13.80	0.248	**0.405**	80
				Front	155	5775	64.12%	0.021	14.0	13.80			
				Edge 1	155	5775	64.12%	0.045	14.0	13.80			
				Edge 4	155	5775	64.12%	0.091	14.0	13.80	0.028	0.046	

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10.17. Bluetooth

Antenna	Mode	RF Exposure Conditions	Dist. (mm)	Test Position	Ch #.	Freq. (MHz)	Power (dBm)		1-g SAR (W/kg)		Plot No.
							Tune-up limit	Meas.	Meas.	Scaled	
Antenna #1	GFSK	Head	0	Left Touch	39	2441	17.0	16.65	0.085	0.092	
				Left Tilt	39	2441	17.0	16.65	0.115	0.125	
				Right Touch	39	2441	17.0	16.65	0.602	0.653	
				Right Tilt	39	2441	17.0	16.65	0.632	**0.685**	81
		Body-worn	15	Rear	39	2441	17.0	16.65	0.091	**0.099**	82
				Front	39	2441	17.0	16.65	0.051	0.055	
		BT Tethering	10	Rear	39	2441	17.0	16.65	0.163	**0.177**	83
				Front	39	2441	17.0	16.65	0.098	0.106	
				Edge 1	39	2441	17.0	16.65	0.128	0.139	
				Edge 4	39	2441	17.0	16.65	0.128	0.139	

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11. SAR Measurement Variability

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

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

Frequency Band (MHz)	Air Interface	RF Exposure Conditions	Test Position	Repeated SAR (Yes/No)	Highest Measured SAR (W/kg)	First Repeated	
						Measured SAR (W/kg)	Largest to Smallest SAR Ratio
700	LTE Band 12	Hotspot	Rear	No	0.323	N/A	N/A
	LTE Band 13	Hotspot	Rear	No	0.317	N/A	N/A
850	GSM 850	Body	Rear	No	0.256	N/A	N/A
	WCDMA Band V	Hotspot	Rear	No	0.510	N/A	N/A
	LTE Band 5	Hotspot	Rear	No	0.446	N/A	N/A
	LTE Band 26	Hotspot	Rear	No	0.391	N/A	N/A
1700	WCDMA Band IV	Hotspot	Edge 3	No	0.969	N/A	N/A
	LTE Band 66	Hotspot	Edge 3	Yes	1.070	1.070	1.00
1900	GSM 1900	Hotspot	Edge 3	Yes	1.100	1.030	1.07
	WCDMA Band II	Hotspot	Edge 3	No	0.905	N/A	N/A
	LTE Band 25	Hotspot	Edge 3	No	1.060	N/A	N/A
2400	Wi-Fi 802.11b/g/ax	Head	Right Tilt	No	0.626	N/A	N/A
	BT	Head	Right Tilt	No	0.632	N/A	N/A
2600	LTE Band 41	Hotspot	Edge 3	No	0.589	N/A	N/A
5300	Wi-Fi 802.11a/n/ac/ax	Head	Right Touch	No	0.200	N/A	N/A
5500	Wi-Fi 802.11a/n/ac/ax	Body	Rear	No	0.239	N/A	N/A
5800	Wi-Fi 802.11a/n/ac/ax	Hotspot	Rear	No	0.737	N/A	N/A

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.

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12. Simultaneous Transmission Conditions

No.	Capable Transmit Configuration	Head	Body-Worn Accessory	Wireless Router	Notes
1	GSM voice + 2.4 GHz WI-FI	Yes	Yes	N/A	
2	GSM voice + 5 GHz WI-FI	Yes	Yes	N/A	
3	GSM voice + 2.4 GHz Bluetooth	Yes^	Yes	N/A	^Bluetooth Tethering is considered
4	GSM voice + 2.4 GHz WI-FI MIMO	Yes	Yes	N/A	
5	GSM voice + 5 GHz WI-FI MIMO	Yes	Yes	N/A	
6	GSM voice + 5 GHz WI-FI + 2.4 GHz Bluetooth	Yes^	Yes	N/A	^Bluetooth Tethering is considered
7	GSM voice + 5 GHz WI-FI MIMO + 2.4 GHz Bluetooth	Yes^	Yes	N/A	^Bluetooth Tethering is considered
8	GSM voice + 2.4 GHz WI-FI + 5 GHz WI-FI	Yes	Yes	N/A	Wi-Fi RSDB Combination
9	GSM voice + 2.4 GHz WI-FI MIMO + 5 GHz WI-FI MIMO	Yes	Yes	N/A	Wi-Fi RSDB Combination
10	UMTS + 2.4 GHz WI-FI	Yes	Yes	Yes	
11	UMTS + 5 GHz WI-FI	Yes	Yes	Yes	
12	UMTS + 2.4 GHz Bluetooth	Yes^	Yes	Yes^	^Bluetooth Tethering is considered
13	UMTS + 2.4 GHz WI-FI MIMO	Yes	Yes	Yes	
14	UMTS + 5 GHz WI-FI MIMO	Yes	Yes	Yes	
15	UMTS + 5 GHz WI-FI + 2.4 GHz Bluetooth	Yes^	Yes	Yes^	^Bluetooth Tethering is considered
16	UMTS + 5 GHz WI-FI MIMO + 2.4 GHz Bluetooth	Yes^	Yes	Yes^	^Bluetooth Tethering is considered
17	UMTS + 2.4 GHz WI-FI + 5 GHz WI-FI	Yes	Yes	Yes	Wi-Fi RSDB Combination
18	UMTS + 2.4 GHz WI-FI MIMO + 5 GHz WI-FI MIMO	Yes	Yes	Yes	Wi-Fi RSDB Combination
19	LTE + 2.4 GHz WI-FI	Yes	Yes	Yes	
20	LTE + 5 GHz WI-FI	Yes	Yes	Yes	
21	LTE + 2.4 GHz Bluetooth	Yes^	Yes	Yes^	^Bluetooth Tethering is considered
22	LTE + 2.4 GHz WI-FI MIMO	Yes	Yes	Yes	
23	LTE + 5 GHz WI-FI MIMO	Yes	Yes	Yes	
24	LTE + 5 GHz WI-FI + 2.4 GHz Bluetooth	Yes^	Yes	Yes^	^Bluetooth Tethering is considered
25	LTE + 5 GHz WI-FI MIMO + 2.4 GHz Bluetooth	Yes^	Yes	Yes^	^Bluetooth Tethering is considered
26	LTE + 2.4 GHz WI-FI + 5 GHz WI-FI	Yes	Yes	Yes	Wi-Fi RSDB Combination
27	LTE + 2.4 GHz WI-FI MIMO + 5 GHz WI-FI MIMO	Yes	Yes	Yes	Wi-Fi RSDB Combination
28	GPRS/EDGE + 2.4 GHz WI-FI	N/A	N/A	Yes	
29	GPRS/EDGE + 5 GHz WI-FI	N/A	N/A	Yes	
30	GPRS/EDGE + 2.4 GHz Bluetooth	N/A	N/A	Yes^	^Bluetooth Tethering is considered
31	GPRS/EDGE + 2.4 GHz WI-FI MIMO	N/A	N/A	Yes	
32	GPRS/EDGE + 5 GHz WI-FI MIMO	N/A	N/A	Yes	
33	GPRS/EDGE + 5 GHz WI-FI + 2.4 GHz Bluetooth	N/A	N/A	Yes^	^Bluetooth Tethering is considered
34	GPRS/EDGE + 5 GHz WI-FI MIMO + 2.4 GHz Bluetooth	N/A	N/A	Yes^	^Bluetooth Tethering is considered
35	GPRS/EDGE + 2.4 GHz WI-FI + 5 GHz WI-FI	N/A	N/A	Yes	Wi-Fi RSDB Combination
36	GPRS/EDGE + 2.4 GHz WI-FI MIMO + 5 GHz WI-FI MIMO	N/A	N/A	Yes	Wi-Fi RSDB Combination

Note(s):

1. DTS Radio cannot transmit simultaneously with Bluetooth Radio.

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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

The antennas for the unlicensed transmitters are closely situated. As a result, the associated SAR hotspots are also closely situated. Some of the sum of SAR calculations yielded results over 1.6 W/kg. The SPSLR calculations for these situations were performed by treating the unlicensed SAR values as a single transmitter. The most conservative distance between all the unlicensed hotspots to the licensed hotspot was used for the value of *d* in the SPSLR calculation.

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12.2. Sum of the SAR for GSM850 & 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	WWAN + U-NII + BT	WWAN + U-NII + BT
		①	Ant #1 ②	Ant #2 ③	Ant #1 ④	Ant #2 ⑤	Ant #1 ⑥	① + ⑥	① + ② + ③	① + ④ + ⑤	① + ⑤ + ⑥	① + ④ + ⑤ + ⑥
Head	Left Touch	0.191	0.544	0.090	0.329	0.010	0.092	0.283	0.825	0.530	0.293	0.622
	Left Tilt	0.122	0.544	0.090	0.329	0.010	0.125	0.247	0.756	0.461	0.257	0.586
	Right Touch	0.235	0.544	0.090	0.329	0.010	0.653	0.888	0.869	0.574	0.898	**1.227**
	Right Tilt	0.120	0.633	0.111	0.329	0.010	0.685	0.805	0.864	0.459	0.815	1.144
Body-worn	Rear	0.293	0.147	0.047	0.255	0.397	0.099	0.392	0.487	0.945	0.789	1.044
	Front	0.254	0.147	0.047	0.255	0.010	0.055	0.309	0.448	0.519	0.319	0.574
Hotspot	Rear	0.002	0.298	0.130	0.218	0.786	0.177	0.179	0.430	1.006	0.965	1.183
	Front	0.002	0.298	0.130	0.218	0.107	0.106	0.108	0.430	0.327	0.215	0.433
	Edge 1		0.298	0.130	0.218	0.107	0.139		0.428	0.325	0.246	0.464
	Edge 2	0.003						0.003				
	Edge 3	0.001						0.001				
	Edge 4	0.001	0.298	0.130	0.218	0.107	0.139	0.140	0.429	0.326	0.247	0.465

Conclusion:

Simultaneous transmission SAR measurement (Volume Scan) is not required because either the sum of the 1-g SAR is < 1.6 W/kg or the SPLSR is ≤ 0.04 for all circumstances that require SPLSR calculation.

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12.3. Sum of the SAR for GSM1900 & 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	WWAN + U-NII + BT	WWAN + U-NII + BT
		①	Ant #1 ②	Ant #2 ③	Ant #1 ④	Ant #2 ⑤	Ant #1 ⑥	① + ⑥	① + ② + ③	① + ④ + ⑤	① + ⑤ + ⑥	① + ④ + ⑤ + ⑥
Head	Left Touch	0.146	0.544	0.090	0.329	0.010	0.092	0.238	0.780	0.485	0.248	0.577
	Left Tilt	0.048	0.544	0.090	0.329	0.010	0.125	0.173	0.682	0.387	0.183	0.512
	Right Touch	0.078	0.544	0.090	0.329	0.010	0.653	0.731	0.712	0.417	0.741	1.070
	Right Tilt	0.043	0.633	0.111	0.329	0.010	0.685	0.728	0.787	0.382	0.738	1.067
Body-worn	Rear	0.397	0.147	0.047	0.255	0.397	0.099	0.496	0.591	1.049	0.893	1.148
	Front	0.267	0.147	0.047	0.255	0.010	0.055	0.322	0.461	0.532	0.332	0.587
Hotspot	Rear	0.885	0.298	0.130	0.218	0.786	0.177	1.062	1.313	1.889	1.848	2.066
	Front	0.567	0.298	0.130	0.218	0.107	0.106	0.673	0.995	0.892	0.780	0.998
	Edge 1		0.298	0.130	0.218	0.107	0.139		0.428	0.325	0.246	
	Edge 2	0.071										0.071
	Edge 3	1.338										1.338
	Edge 4	0.154	0.298	0.130	0.218	0.107	0.139	0.293	0.582	0.479	0.400	0.618

Conclusion:

SPLSR analysis is required because the Sum of the SAR is > 1.6 W/kg.

SAR to Peak Location Separation Ratio (SPLSR)

RF Exposure Conditions	Test Position	Standalone SAR (W/kg)				∑ 1-g SAR (W/kg)		Calculated distance (mm)	SPLSR (≤ 0.04)	Volume Scan (Yes/ No)
		WWAN	U-NII		BT					
			Ant #1	Ant #2	Ant #1					
Hotspot	Rear	0.885	0.218	0.786	0.177	+ + +	2.066			
		0.885	0.218			+	1.103	137.3	0.01	No
		0.885		0.786		+	1.671	128.1	0.02	No
		0.885			0.177	+	1.062	144.2	0.01	No
			0.218	0.786		+	1.004	11.0	0.09	Yes
				0.786	0.177	+	0.963	17.6	0.05	Yes

RF Exposure Conditions	Test Position	Mode	①	Peak SAR	X	Y	Z	d: Calculated distance (mm)	
				W/kg	m	m	m		
Hotspot	Rear	GSM 1900	④	1.080	-0.002	-0.072	-0.180	① + ④	137.3
		Ant #1 U-NII	①	0.524	0.028	0.062	-0.180		
		GSM 1900	⑤	1.080	-0.002	-0.072	-0.180	① + ⑤	128.1
		Ant #2 U-NII	①	2.030	0.026	0.053	-0.180		
		GSM 1900	⑥	1.080	-0.002	-0.072	-0.180	① + ⑥	144.2
		Ant #1 BT	④	0.264	0.024	0.070	-0.178		
Hotspot	Rear	Ant #1 U-NII	⑤	0.524	0.028	0.062	-0.180	④ + ⑤	11.0
		Ant #2 U-NII	⑤	2.030	0.026	0.053	-0.174		
		Ant #2 U-NII	⑥	2.030	0.026	0.053	-0.174	⑤ + ⑥	17.6
		Ant #1 BT		0.264	0.024	0.070	-0.179		

The Peak Location Separation Distance is computed by using the formula: SQRT((X1-X2)^2+(Y1-Y2)^2+(Z1-Z2)^2)

Conclusion:

Simultaneous transmission SAR measurement (Volume Scan) is required because the SPLSR is > 0.04

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12.4. Sum of the SAR for WCDMA Band II & 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	WWAN + U-NII + BT	WWAN + U-NII + BT
		①	Ant #1 ②	Ant #2 ③	Ant #1 ④	Ant #2 ⑤	Ant #1 ⑥	① + ⑥	① + ② + ③	① + ④ + ⑤	① + ⑤ + ⑥	① + ④ + ⑤ + ⑥
Head	Left Touch	0.272	0.544	0.090	0.329	0.010	0.092	0.364	0.906	0.611	0.374	0.703
	Left Tilt	0.072	0.544	0.090	0.329	0.010	0.125	0.197	0.706	0.411	0.207	0.536
	Right Touch	0.159	0.544	0.090	0.329	0.010	0.653	0.812	0.793	0.498	0.822	1.151
	Right Tilt	0.083	0.633	0.111	0.329	0.010	0.685	0.768	0.827	0.422	0.778	1.107
Body-worn	Rear	0.653	0.147	0.047	0.255	0.397	0.099	0.752	0.847	1.305	1.149	1.404
	Front	0.466	0.147	0.047	0.255	0.010	0.055	0.521	0.660	0.731	0.531	0.786
Hotspot	Rear	0.546	0.298	0.130	0.218	0.786	0.177	0.723	0.974	1.550	1.509	1.727
	Front	0.401	0.298	0.130	0.218	0.107	0.106	0.507	0.829	0.726	0.614	0.832
	Edge 1		0.298	0.130	0.218	0.107	0.139		0.428	0.325	0.246	0.464
	Edge 2	0.048										
	Edge 3	0.974										
	Edge 4	0.146	0.298	0.130	0.218	0.107	0.139	0.285	0.574	0.471	0.392	0.610

Conclusion:

SPLSR analysis is required because the Sum of the SAR is > 1.6 W/kg.

SAR to Peak Location Separation Ratio (SPLSR)

RF Exposure Conditions	Test Position	Standalone SAR (W/kg)				∑ 1-g SAR (W/kg)		Calculated distance (mm)	SPLSR (≤ 0.04)	Volume Scan (Yes/ No)
		WWAN	U-NII		BT					
			Ant #1	Ant #2	Ant #1					
Hotspot	Rear	0.546	0.218	0.786	0.177	+ + +	1.727			
		0.546	0.218			+	0.764	142.7	0.00	No
		0.546		0.786		+	1.332	126.0	0.01	No
		0.546			0.177	+	0.723	142.2	0.00	No
			0.218	0.786		+	1.004	16.8	0.06	Yes
				0.786	0.177	+	0.963	17.6	0.05	Yes

RF Exposure Conditions	Test Position	Mode	①	Peak SAR W/kg	X m	Y m	Z m	d: Calculated distance (mm)	
Hotspot	Rear	UMTS Band II	④	0.739	0.001	-0.071	-0.180	① + ④	142.7
		Ant #1 U-NII	①	0.716	0.031	0.069	-0.180		
		UMTS Band II	⑤	0.739	0.001	-0.071	-0.180	① + ⑤	126.0
		Ant #2 U-NII	①	2.030	0.026	0.053	-0.180		
		UMTS Band II	⑥	0.739	0.001	-0.071	-0.180	① + ⑥	142.2
		Ant #1 BT	④	0.264	0.024	0.070	-0.178		
Hotspot	Rear	Ant #1 U-NII	⑤	0.716	0.031	0.069	-0.174	④ + ⑤	16.8
		Ant #2 U-NII	⑤	2.030	0.026	0.053	-0.174		
		Ant #2 U-NII	⑥	2.030	0.026	0.053	-0.174	⑤ + ⑥	17.6
		Ant #1 BT		0.264	0.024	0.070	-0.179		

The Peak Location Separation Distance is computed by using the formula: SQRT((X1-X2)^2+(Y1-Y2)^2+(Z1-Z2)^2)

Conclusion:

Simultaneous transmission SAR measurement (Volume Scan) is required because the SPLSR is > 0.04

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12.5. Sum of the SAR for WCDMA Band IV & 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	WWAN + U-NII + BT	WWAN + U-NII + BT
		①	Ant #1 ②	Ant #2 ③	Ant #1 ④	Ant #2 ⑤	Ant #1 ⑥	① + ⑥	① + ② + ③	① + ④ + ⑤	① + ⑤ + ⑥	① + ④ + ⑤ + ⑥
Head	Left Touch	0.303	0.544	0.090	0.329	0.010	0.092	0.395	0.937	0.642	0.405	0.734
	Left Tilt	0.090	0.544	0.090	0.329	0.010	0.125	0.215	0.724	0.429	0.225	0.554
	Right Touch	0.227	0.544	0.090	0.329	0.010	0.653	0.880	0.861	0.566	0.890	1.219
	Right Tilt	0.090	0.633	0.111	0.329	0.010	0.685	0.775	0.834	0.429	0.785	1.114
Body-worn	Rear	0.676	0.147	0.047	0.255	0.397	0.099	0.775	0.870	1.328	1.172	1.427
	Front	0.432	0.147	0.047	0.255	0.010	0.055	0.487	0.626	0.697	0.497	0.752
Hotspot	Rear	0.534	0.298	0.130	0.218	0.786	0.177	0.711	0.962	1.538	1.497	1.715
	Front	0.350	0.298	0.130	0.218	0.107	0.106	0.456	0.778	0.675	0.563	0.781
	Edge 1		0.298	0.130	0.218	0.107	0.139		0.428	0.325	0.246	0.464
	Edge 2	0.061										
	Edge 3	1.058										
	Edge 4	0.136	0.298	0.130	0.218	0.107	0.139	0.275	0.564	0.461	0.382	0.600

Conclusion:

SPLSR analysis is required because the Sum of the SAR is > 1.6 W/kg.

SAR to Peak Location Separation Ratio (SPLSR)

RF Exposure Conditions	Test Position	Standalone SAR (W/kg)				∑ 1-g SAR (W/kg)		Calculated distance (mm)	SPLSR (≤ 0.04)	Volume Scan (Yes/ No)
		WWAN	U-NII		BT					
			Ant #1	Ant #2	Ant #1					
Hotspot	Rear	0.534	0.218	0.786	0.177	+ + +	1.715			
		0.534	0.218			+	0.752	132.1	0.00	No
		0.534		0.786		+	1.320	122.9	0.01	No
		0.534			0.177	+	0.711	139.2	0.00	No
			0.218	0.786		+	1.004	11.0	0.09	Yes
				0.786	0.177	+	0.963	17.6	0.05	Yes

RF Exposure Conditions	Test Position	Mode	①	Peak SAR W/kg	X m	Y m	Z m	d: Calculated distance (mm)	
Hotspot	Rear	UMTS Band IV	④	0.654	0.005	-0.068	-0.180	① + ④	132.1
		Ant #1 U-NII	①	0.524	0.028	0.062	-0.180		
		UMTS Band IV	⑤	0.654	0.005	-0.068	-0.180	① + ⑤	122.9
		Ant #2 U-NII	①	2.030	0.026	0.053	-0.180		
		UMTS Band IV	⑥	0.654	0.005	-0.068	-0.180	① + ⑥	139.2
		Ant #1 BT	④	0.264	0.024	0.070	-0.178		
Hotspot	Rear	Ant #1 U-NII	⑤	0.524	0.028	0.062	-0.180	④ + ⑤	11.0
		Ant #2 U-NII	⑤	2.030	0.026	0.053	-0.174		
		Ant #2 U-NII	⑥	2.030	0.026	0.053	-0.174	⑤ + ⑥	17.6
		Ant #1 BT		0.264	0.024	0.070	-0.179		

The Peak Location Separation Distance is computed by using the formula: SQRT((X1-X2)^2+(Y1-Y2)^2+(Z1-Z2)^2)

Conclusion:

Simultaneous transmission SAR measurement (Volume Scan) is required because the SPLSR is > 0.04

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12.6. Sum of the SAR for WCDMA Band V & 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	WWAN + U-NII + BT	WWAN + U-NII + BT
		①	Ant #1 ②	Ant #2 ③	Ant #1 ④	Ant #2 ⑤	Ant #1 ⑥	① + ⑥	① + ② + ③	① + ④ + ⑤	① + ⑤ + ⑥	① + ④ + ⑤ + ⑥
Head	Left Touch	0.209	0.544	0.090	0.329	0.010	0.092	0.301	0.843	0.548	0.311	0.640
	Left Tilt	0.111	0.544	0.090	0.329	0.010	0.125	0.236	0.745	0.450	0.246	0.575
	Right Touch	0.235	0.544	0.090	0.329	0.010	0.653	0.888	0.869	0.574	0.898	1.227
	Right Tilt	0.133	0.633	0.111	0.329	0.010	0.685	0.818	0.877	0.472	0.828	1.157
Body-worn	Rear	0.290	0.147	0.047	0.255	0.397	0.099	0.389	0.484	0.942	0.786	1.041
	Front	0.267	0.147	0.047	0.255	0.010	0.055	0.322	0.461	0.532	0.332	0.587
Hotspot	Rear	0.540	0.298	0.130	0.218	0.786	0.177	0.717	0.968	1.544	1.503	1.721
	Front	0.432	0.298	0.130	0.218	0.107	0.106	0.538	0.860	0.757	0.645	0.863
	Edge 1		0.298	0.130	0.218	0.107	0.139		0.428	0.325	0.246	0.464
	Edge 2	0.237										
	Edge 3	0.360										
	Edge 4	0.117	0.298	0.130	0.218	0.107	0.139	0.256	0.545	0.442	0.363	0.581

Conclusion:

SPLSR analysis is required because the Sum of the SAR is > 1.6 W/kg.

SAR to Peak Location Separation Ratio (SPLSR)

RF Exposure Conditions	Test Position	Standalone SAR (W/kg)				∑ 1-g SAR (W/kg)		Calculated distance (mm)	SPLSR (≤ 0.04)	Volume Scan (Yes/ No)
		WWAN	U-NII		BT					
			Ant #1	Ant #2	Ant #1					
Hotspot	Rear	0.540	0.218	0.786	0.177	+ + +	1.721			
		0.540	0.218			+	0.758	129.7	0.01	No
		0.540		0.786		+	1.326	120.5	0.01	No
		0.540			0.177	+	0.717	136.9	0.00	No
			0.218	0.786		+	1.004	11.0	0.09	Yes
				0.786	0.177	+	0.963	17.6	0.05	Yes

RF Exposure Conditions	Test Position	Mode	①	Peak SAR	X	Y	Z	d: Calculated distance (mm)	
				W/kg	m	m	m		
Hotspot	Rear	UMTS Band V	④	0.759	0.012	-0.067	-0.175	① + ④	129.7
		Ant #1 U-NII	①	0.524	0.028	0.062	-0.180		
		UMTS Band V	⑤	0.759	0.012	-0.067	-0.175	① + ⑤	120.5
		Ant #2 U-NII	①	2.030	0.026	0.053	-0.180		
		UMTS Band V	⑥	0.759	0.012	-0.067	-0.175	① + ⑥	136.9
		Ant #1 BT	④	0.264	0.024	0.070	-0.178		
Hotspot	Rear	Ant #1 U-NII	⑤	0.524	0.028	0.062	-0.180	④ + ⑤	11.0
		Ant #2 U-NII	⑤	2.030	0.026	0.053	-0.174		
		Ant #2 U-NII	⑥	2.030	0.026	0.053	-0.174	⑤ + ⑥	17.6
		Ant #1 BT		0.264	0.024	0.070	-0.179		

The Peak Location Separation Distance is computed by using the formula: SQRT((X1-X2)^2+(Y1-Y2)^2+(Z1-Z2)^2)

Conclusion:

Simultaneous transmission SAR measurement (Volume Scan) is required because the SPLSR is > 0.04

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12.7. Sum of the SAR for LTE Band 5 & 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	WWAN + U-NII + BT	WWAN + U-NII + BT
		①	Ant #1 ②	Ant #2 ③	Ant #1 ④	Ant #2 ⑤	Ant #1 ⑥	① + ⑥	① + ② + ③	① + ④ + ⑤	① + ⑤ + ⑥	① + ④ + ⑤ + ⑥
Head	Left Touch	0.187	0.544	0.090	0.329	0.010	0.092	0.279	0.821	0.526	0.289	0.618
	Left Tilt	0.107	0.544	0.090	0.329	0.010	0.125	0.232	0.741	0.446	0.242	0.571
	Right Touch	0.214	0.544	0.090	0.329	0.010	0.653	0.867	0.848	0.553	0.877	1.206
	Right Tilt	0.100	0.633	0.111	0.329	0.010	0.685	0.785	0.844	0.439	0.795	1.124
Body-worn	Rear	0.317	0.147	0.047	0.255	0.397	0.099	0.416	0.511	0.969	0.813	1.068
	Front	0.308	0.147	0.047	0.255	0.010	0.055	0.363	0.502	0.573	0.373	0.628
Hotspot	Rear	0.468	0.298	0.130	0.218	0.786	0.177	0.645	0.896	1.472	1.431	1.649
	Front	0.408	0.298	0.130	0.218	0.107	0.106	0.514	0.836	0.733	0.621	0.839
	Edge 1		0.298	0.130	0.218	0.107	0.139		0.428	0.325	0.246	0.464
	Edge 2	0.320						0.320				
	Edge 3	0.232										
	Edge 4	0.195	0.298	0.130	0.218	0.107	0.139	0.334	0.623	0.520	0.441	0.659

Conclusion:

SPLSR analysis is required because the Sum of the SAR is > 1.6 W/kg.

SAR to Peak Location Separation Ratio (SPLSR)

RF Exposure Conditions	Test Position	Standalone SAR (W/kg)				∑ 1-g SAR (W/kg)		Calculated distance (mm)	SPLSR (≤ 0.04)	Volume Scan (Yes/ No)
		WWAN	U-NII		BT					
			Ant #1	Ant #2	Ant #1					
Hotspot	Rear	0.468	0.218	0.786	0.177	+ + +	1.649			
		0.468	0.218			+	0.686	107.7	0.01	No
		0.468		0.786		+	1.254	98.6	0.01	No
		0.468			0.177	+	0.645	115.1	0.00	No
			0.218	0.786		+	1.004	11.0	0.09	Yes
				0.786	0.177	+	0.963	17.6	0.05	Yes

RF Exposure Conditions	Test Position	Mode	①	Peak SAR	X	Y	Z	d: Calculated distance (mm)	
				W/kg	m	m	m		
Hotspot	Rear	LTE Band 5	④	0.597	0.017	-0.045	-0.175	① + ④	107.7
		Ant #1 U-NII	①	0.524	0.028	0.062	-0.180		
		LTE Band 5	⑤	0.597	0.017	-0.045	-0.175	① + ⑤	98.6
		Ant #2 U-NII	①	2.030	0.026	0.053	-0.180		
		LTE Band 5	⑥	0.597	0.017	-0.045	-0.175	① + ⑥	115.1
		Ant #1 BT	④	0.264	0.024	0.070	-0.178		
Hotspot	Rear	Ant #1 U-NII	⑤	0.524	0.028	0.062	-0.180	④ + ⑤	11.0
		Ant #2 U-NII	⑤	2.030	0.026	0.053	-0.174		
		Ant #2 U-NII	⑥	2.030	0.026	0.053	-0.174	⑤ + ⑥	17.6
		Ant #1 BT		0.264	0.024	0.070	-0.179		

The Peak Location Separation Distance is computed by using the formula: SQRT((X1-X2)^2+(Y1-Y2)^2+(Z1-Z2)^2)

Conclusion:

Simultaneous transmission SAR measurement (Volume Scan) is required because the SPLSR is > 0.04

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12.8. Sum of the SAR for LTE Band 12 & 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	WWAN + U-NII + BT	WWAN + U-NII + BT
		①	Ant #1 ②	Ant #2 ③	Ant #1 ④	Ant #2 ⑤	Ant #1 ⑥	① + ⑥	① + ② + ③	① + ④ + ⑤	① + ⑤ + ⑥	① + ④ + ⑤ + ⑥
Head	Left Touch	0.123	0.544	0.090	0.329	0.010	0.092	0.215	0.757	0.462	0.225	0.554
	Left Tilt	0.086	0.544	0.090	0.329	0.010	0.125	0.211	0.720	0.425	0.221	0.550
	Right Touch	0.137	0.544	0.090	0.329	0.010	0.653	0.790	0.771	0.476	0.800	1.129
	Right Tilt	0.078	0.633	0.111	0.329	0.010	0.685	0.763	0.822	0.417	0.773	1.102
Body-worn	Rear	0.275	0.147	0.047	0.255	0.397	0.099	0.374	0.469	0.927	0.771	1.026
	Front	0.239	0.147	0.047	0.255	0.010	0.055	0.294	0.433	0.504	0.304	0.559
Hotspot	Rear	0.375	0.298	0.130	0.218	0.786	0.177	0.552	0.803	1.379	1.338	**1.556**
	Front	0.287	0.298	0.130	0.218	0.107	0.106	0.393	0.715	0.612	0.500	0.718
	Edge 1		0.298	0.130	0.218	0.107	0.139		0.428	0.325	0.246	0.464
	Edge 2	0.221										
	Edge 3	0.131										
	Edge 4	0.237	0.298	0.130	0.218	0.107	0.139	0.376	0.665	0.562	0.483	0.701

Conclusion:

Simultaneous transmission SAR measurement (Volume Scan) is not required because either the sum of the 1-g SAR is < 1.6 W/kg or the SPLSR is ≤ 0.04 for all circumstances that require SPLSR calculation.

12.9. Sum of the SAR for LTE Band 13 & 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	WWAN + U-NII + BT	WWAN + U-NII + BT
		①	Ant #1 ②	Ant #2 ③	Ant #1 ④	Ant #2 ⑤	Ant #1 ⑥	① + ⑥	① + ② + ③	① + ④ + ⑤	① + ⑤ + ⑥	① + ④ + ⑤ + ⑥
Head	Left Touch	0.123	0.544	0.090	0.329	0.010	0.092	0.215	0.757	0.462	0.225	0.554
	Left Tilt	0.100	0.544	0.090	0.329	0.010	0.125	0.225	0.734	0.439	0.235	0.564
	Right Touch	0.165	0.544	0.090	0.329	0.010	0.653	0.818	0.799	0.504	0.828	1.157
	Right Tilt	0.114	0.633	0.111	0.329	0.010	0.685	0.799	0.858	0.453	0.809	1.138
Body-worn	Rear	0.268	0.147	0.047	0.255	0.397	0.099	0.367	0.462	0.920	0.764	1.019
	Front	0.213	0.147	0.047	0.255	0.010	0.055	0.268	0.407	0.478	0.278	0.533
Hotspot	Rear	0.348	0.298	0.130	0.218	0.786	0.177	0.525	0.776	1.352	1.311	1.529
	Front	0.223	0.298	0.130	0.218	0.107	0.106	0.329	0.651	0.548	0.436	0.654
	Edge 1		0.298	0.130	0.218	0.107	0.139		0.428	0.325	0.246	0.464
	Edge 2	0.274										
	Edge 3	0.165										
	Edge 4	0.176	0.298	0.130	0.218	0.107	0.139	0.315	0.604	0.501	0.422	0.640

Conclusion:

Simultaneous transmission SAR measurement (Volume Scan) is not required because either the sum of the 1-g SAR is < 1.6 W/kg or the SPLSR is ≤ 0.04 for all circumstances that require SPLSR calculation.

12.10. Sum of the SAR for LTE Band 25 & 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	WWAN + U-NII + BT	WWAN + U-NII + BT
		①	Ant #1 ②	Ant #2 ③	Ant #1 ④	Ant #2 ⑤	Ant #1 ⑥	① + ⑥	① + ② + ③	① + ④ + ⑤	① + ⑤ + ⑥	① + ④ + ⑤ + ⑥
Head	Left Touch	0.332	0.544	0.090	0.329	0.010	0.092	0.424	0.966	0.671	0.434	0.763
	Left Tilt	0.111	0.544	0.090	0.329	0.010	0.125	0.236	0.745	0.450	0.246	0.575
	Right Touch	0.206	0.544	0.090	0.329	0.010	0.653	0.859	0.840	0.545	0.869	1.198
	Right Tilt	0.120	0.633	0.111	0.329	0.010	0.685	0.805	0.864	0.459	0.815	1.144
Body-worn	Rear	0.862	0.147	0.047	0.255	0.397	0.099	0.961	1.056	1.514	1.358	1.613
	Front	0.826	0.147	0.047	0.255	0.010	0.055	0.881	1.020	1.091	0.891	1.146
Hotspot	Rear	0.786	0.298	0.130	0.218	0.786	0.177	0.963	1.214	1.790	1.749	1.967
	Front	0.543	0.298	0.130	0.218	0.107	0.106	0.649	0.971	0.868	0.756	0.974
	Edge 1		0.298	0.130	0.218	0.107	0.139		0.428	0.325	0.246	0.464
	Edge 2	0.078										
	Edge 3	1.298										
	Edge 4	0.202	0.298	0.130	0.218	0.107	0.139	0.341	0.630	0.527	0.448	0.666

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Conclusion:

SPLSR analysis is required because the Sum of the SAR is > 1.6 W/kg.

SAR to Peak Location Separation Ratio (SPLSR)

RF Exposure Conditions	Test Position	Standalone SAR (W/kg)				∑ 1-g SAR (W/kg)		Calculated distance (mm)	SPLSR (≤ 0.04)	Volume Scan (Yes/ No)
		WWAN	U-NII		BT					
			Ant #1	Ant #2	Ant #1					
Body-Worn	Rear	0.862	0.255	0.397	0.099	+ + +	1.613			
		0.862	0.255			+	1.117	141.5	0.01	No
		0.862		0.397		+	1.259	126.2	0.01	No
		0.862			0.099	+	0.961	140.8	0.01	No
			0.255	0.397		+	0.652	16.1	0.03	No
				0.397	0.099	+	0.496	14.9	0.02	No
Hotspot	Rear	0.768	0.218	0.786	0.177	+ + +	1.949			
		0.768	0.218			+	0.986	135.4	0.01	No
		0.768		0.786		+	1.554	126.2	0.02	No
		0.768			0.177	+	0.945	142.4	0.01	No
			0.218	0.786		+	1.004	11.0	0.09	Yes
				0.786	0.177	+	0.963	17.6	0.05	Yes

RF Exposure Conditions	Test Position	Mode	①	Peak SAR	X	Y	Z	d: Calculated distance (mm)	
				W/kg	m	m	m		
Body-worn	Rear	LTE Band 25	④	1.020	0.002	-0.069	-0.180	① + ④	141.5
		Ant #1 U-NII	①	0.597	0.033	0.069	-0.180		
		LTE Band 25	⑤	1.020	0.002	-0.069	-0.180	① + ⑤	126.2
		Ant #2 U-NII	①	0.925	0.025	0.055	-0.180		
		LTE Band 25	⑥	1.020	0.002	-0.069	-0.180	① + ⑥	140.8
		Ant #1 BT	④	0.154	0.025	0.070	-0.178		
Body-worn	Rear	Ant #1 U-NII	⑤	0.597	0.033	0.069	-0.180	④ + ⑤	16.1
		Ant #2 U-NII	⑤	0.925	0.025	0.055	-0.180		
		Ant #2 U-NII	⑥	0.925	0.025	0.055	-0.180	⑤ + ⑥	14.9
		Ant #1 BT	①	0.154	0.025	0.070	-0.178		
Hotspot	Rear	LTE Band 25	④	0.947	0.000	-0.071	-0.180	① + ④	135.4
		Ant #1 U-NII	①	0.524	0.028	0.062	-0.180		
		LTE Band 25	⑤	0.947	0.000	-0.071	-0.180	① + ⑤	126.2
		Ant #2 U-NII	①	2.030	0.026	0.053	-0.180		
		LTE Band 25	⑥	0.947	0.000	-0.071	-0.180	① + ⑥	142.4
		Ant #1 BT	④	0.264	0.024	0.070	-0.178		
Hotspot	Rear	Ant #1 U-NII	⑤	0.524	0.028	0.062	-0.180	④ + ⑤	11.0
		Ant #2 U-NII	⑤	2.030	0.026	0.053	-0.174		
		Ant #2 U-NII	⑥	2.030	0.026	0.053	-0.174	⑤ + ⑥	17.6
		Ant #1 BT		0.264	0.024	0.070	-0.179		

The Peak Location Separation Distance is computed by using the formula: SQRT((X1-X2)^2+(Y1-Y2)^2+(Z1-Z2)^2)

Conclusion:

Simultaneous transmission SAR measurement (Volume Scan) is required because the SPLSR is > 0.04

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12.11. Sum of the SAR for LTE Band 26 & 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	WWAN + U-NII + BT	WWAN + U-NII + BT
		①	Ant #1 ②	Ant #2 ③	Ant #1 ④	Ant #2 ⑤	Ant #1 ⑥	① + ⑥	① + ② + ③	① + ④ + ⑤	① + ⑤ + ⑥	① + ④ + ⑤ + ⑥
Head	Left Touch	0.169	0.544	0.090	0.329	0.010	0.092	0.261	0.803	0.508	0.271	0.600
	Left Tilt	0.086	0.544	0.090	0.329	0.010	0.125	0.211	0.720	0.425	0.221	0.550
	Right Touch	0.212	0.544	0.090	0.329	0.010	0.653	0.865	0.846	0.551	0.875	1.204
	Right Tilt	0.095	0.633	0.111	0.329	0.010	0.685	0.780	0.839	0.434	0.790	1.119
Body-worn	Rear	0.277	0.147	0.047	0.255	0.397	0.099	0.376	0.471	0.929	0.773	1.028
	Front	0.245	0.147	0.047	0.255	0.010	0.055	0.300	0.439	0.510	0.310	0.565
Hotspot	Rear	0.474	0.298	0.130	0.218	0.786	0.177	0.651	0.902	**1.478**	1.437	1.655
	Front	0.381	0.298	0.130	0.218	0.107	0.106	0.487	0.809	0.706	0.594	0.812
	Edge 1		0.298	0.130	0.218	0.107	0.139		0.428	0.325	0.246	0.464
	Edge 2	0.283										
	Edge 3	0.291										
	Edge 4	0.140	0.298	0.130	0.218	0.107	0.139	0.279	0.568	0.465	0.386	0.604

Conclusion:

SPLSR analysis is required because the Sum of the SAR is > 1.6 W/kg.

SAR to Peak Location Separation Ratio (SPLSR)

RF Exposure Conditions	Test Position	Standalone SAR (W/kg)				∑ 1-g SAR (W/kg)		Calculated distance (mm)	SPLSR (≤ 0.04)	Volume Scan (Yes/ No)
		WWAN	U-NII		BT					
			Ant #1	Ant #2	Ant #1					
Hotspot	Rear	0.474	0.218	0.786	0.177	+ + +	1.655			
		0.474	0.218			+	0.692	128.0	0.00	No
		0.474		0.786		+	1.260	118.8	0.01	No
		0.474			0.177	+	0.651	135.3	0.00	No
			0.218	0.786		+	1.004	11.0	0.09	Yes
				0.786	0.177	+	0.963	17.6	0.05	Yes

RF Exposure Conditions	Test Position	Mode	①	Peak SAR	X	Y	Z	d: Calculated distance (mm)	
				W/kg	m	m	m		
Hotspot	Rear	LTE Band 26	④	0.564	0.013	-0.065	-0.175	① + ④	128.0
		Ant #1 U-NII	①	0.524	0.028	0.062	-0.180		
		LTE Band 26	⑤	0.564	0.013	-0.065	-0.175	① + ⑤	118.8
		Ant #2 U-NII	①	2.030	0.026	0.053	-0.180		
		LTE Band 26	⑥	0.564	0.013	-0.065	-0.175	① + ⑥	135.3
		Ant #1 BT	④	0.264	0.024	0.070	-0.178		
Hotspot	Rear	Ant #1 U-NII	⑤	0.524	0.028	0.062	-0.180	④ + ⑤	11.0
		Ant #2 U-NII	⑤	2.030	0.026	0.053	-0.174		
		Ant #2 U-NII	⑥	2.030	0.026	0.053	-0.174	⑤ + ⑥	17.6
		Ant #1 BT		0.264	0.024	0.070	-0.179		

The Peak Location Separation Distance is computed by using the formula: SQRT((X1-X2)^2+(Y1-Y2)^2+(Z1-Z2)^2)

Conclusion:

Simultaneous transmission SAR measurement (Volume Scan) is required because the SPLSR is > 0.04

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12.12. Sum of the SAR for LTE Band 41 & 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	WWAN + U-NII + BT	WWAN + U-NII + BT
		①	Ant #1 ②	Ant #2 ③	Ant #1 ④	Ant #2 ⑤	Ant #1 ⑥	① + ⑥	① + ② + ③	① + ④ + ⑤	① + ⑤ + ⑥	① + ④ + ⑤ + ⑥
Head	Left Touch	0.073	0.544	0.090	0.329	0.010	0.092	0.165	0.707	0.412	0.175	0.504
	Left Tilt	0.039	0.544	0.090	0.329	0.010	0.125	0.164	0.673	0.378	0.174	0.503
	Right Touch	0.132	0.544	0.090	0.329	0.010	0.653	0.785	0.766	0.471	0.795	1.124
	Right Tilt	0.073	0.633	0.111	0.329	0.010	0.685	0.758	0.817	0.412	0.768	1.097
Body-worn	Rear	0.384	0.147	0.047	0.255	0.397	0.099	0.483	0.578	1.036	0.880	1.135
	Front	0.238	0.147	0.047	0.255	0.010	0.055	0.293	0.432	0.503	0.303	0.558
Hotspot	Rear	0.499	0.298	0.130	0.218	0.786	0.177	0.676	0.927	1.503	1.462	1.680
	Front	0.267	0.298	0.130	0.218	0.107	0.106	0.373	0.695	0.592	0.480	0.698
	Edge 1		0.298	0.130	0.218	0.107	0.139		0.428	0.325	0.246	0.464
	Edge 2	0.083						0.083				
	Edge 3	0.807										
	Edge 4	0.119	0.298	0.130	0.218	0.107	0.139	0.258	0.547	0.444	0.365	0.583

Conclusion:

SPLSR analysis is required because the Sum of the SAR is > 1.6 W/kg.

SAR to Peak Location Separation Ratio (SPLSR)

RF Exposure Conditions	Test Position	Standalone SAR (W/kg)				∑ 1-g SAR (W/kg)		Calculated distance (mm)	SPLSR (≤ 0.04)	Volume Scan (Yes/ No)
		WWAN	U-NII		BT					
			Ant #1	Ant #2	Ant #1					
Hotspot	Rear	0.499	0.218	0.786	0.177	+ + +	1.68			
		0.499	0.218			+	0.717	135.1	0.00	No
		0.499		0.786		+	1.285	125.9	0.01	No
		0.499			0.177	+	0.676	141.7	0.00	No
			0.218	0.786		+	1.004	11.0	0.09	Yes
				0.786	0.177	+	0.963	17.6	0.05	Yes

RF Exposure Conditions	Test Position	Mode	①	Peak SAR	X	Y	Z	d: Calculated distance (mm)	
				W/kg	m	m	m		
Hotspot	Rear	LTE Band 41	④	0.528	-0.007	-0.068	-0.181	① + ④	135.1
		Ant #1 U-NII	①	0.524	0.028	0.062	-0.180		
		LTE Band 41	⑤	0.528	-0.007	-0.068	-0.181	① + ⑤	125.9
		Ant #2 U-NII	①	2.030	0.026	0.053	-0.180		
		LTE Band 41	⑥	0.528	-0.007	-0.068	-0.181	① + ⑥	141.7
		Ant #1 BT	④	0.264	0.024	0.070	-0.178		
Hotspot	Rear	Ant #1 U-NII	⑤	0.524	0.028	0.062	-0.180	④ + ⑤	11.0
		Ant #2 U-NII	⑤	2.030	0.026	0.053	-0.174		
		Ant #2 U-NII	⑥	2.030	0.026	0.053	-0.174	⑤ + ⑥	17.6
		Ant #1 BT		0.264	0.024	0.070	-0.179		

The Peak Location Separation Distance is computed by using the formula: SQRT((X1-X2)^2+(Y1-Y2)^2+(Z1-Z2)^2)

Conclusion:

Simultaneous transmission SAR measurement (Volume Scan) is required because the SPLSR is > 0.04

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12.13. Sum of the SAR for LTE Band 66 & 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	WWAN + U-NII + BT	WWAN + U-NII + BT
		①	Ant #1 ②	Ant #2 ③	Ant #1 ④	Ant #2 ⑤	Ant #1 ⑥	① + ⑥	① + ② + ③	① + ④ + ⑤	① + ⑤ + ⑥	① + ④ + ⑤ + ⑥
Head	Left Touch	0.343	0.544	0.090	0.329	0.010	0.092	0.435	0.977	0.682	0.445	0.774
	Left Tilt	0.113	0.544	0.090	0.329	0.010	0.125	0.238	0.747	0.452	0.248	0.577
	Right Touch	0.160	0.544	0.090	0.329	0.010	0.653	0.813	0.794	0.499	0.823	1.152
	Right Tilt	0.088	0.633	0.111	0.329	0.010	0.685	0.773	0.832	0.427	0.783	1.112
Body-worn	Rear	0.781	0.147	0.047	0.255	0.397	0.099	0.880	0.975	1.433	1.277	**1.532**
	Front	0.566	0.147	0.047	0.255	0.010	0.055	0.621	0.760	0.831	0.631	0.886
Hotspot	Rear	0.832	0.298	0.130	0.218	0.786	0.177	1.009	1.260	1.836	1.795	2.013
	Front	0.570	0.298	0.130	0.218	0.107	0.106	0.676	0.998	0.895	0.783	1.001
	Edge 1		0.298	0.130	0.218	0.107	0.139		0.428	0.325	0.246	0.464
	Edge 2	0.078										
	Edge 3	1.367										
	Edge 4	0.213	0.298	0.130	0.218	0.107	0.139	0.352	0.641	0.538	0.459	0.677

Conclusion:

SPLSR analysis is required because the Sum of the SAR is > 1.6 W/kg.

SAR to Peak Location Separation Ratio (SPLSR)

RF Exposure Conditions	Test Position	Standalone SAR (W/kg)				∑ 1-g SAR (W/kg)		Calculated distance (mm)	SPLSR (≤ 0.04)	Volume Scan (Yes/ No)
		WWAN	U-NII		BT					
			Ant #1	Ant #2	Ant #1					
Hotspot	Rear	0.832	0.218	0.786	0.177	+ + +	2.013			
		0.832	0.218			+	1.050	135.7	0.01	No
		0.832		0.786		+	1.618	126.5	0.02	No
		0.832			0.177	+	1.009	142.9	0.01	No
			0.218	0.786		+	1.004	11.0	0.09	Yes
				0.786	0.177	+	0.963	17.6	0.05	Yes

RF Exposure Conditions	Test Position	Mode	①	Peak SAR	X	Y	Z	d: Calculated distance (mm)	
				W/kg	m	m	m		
Hotspot	Rear	LTE Band 66	④	0.805	0.007	-0.072	-0.180	① + ④	135.7
		Ant #1 U-NII	①	0.524	0.028	0.062	-0.180		
		LTE Band 66	⑤	0.805	0.007	-0.072	-0.180	① + ⑤	126.5
		Ant #2 U-NII	①	2.030	0.026	0.053	-0.180		
		LTE Band 66	⑥	0.805	0.007	-0.072	-0.180	① + ⑥	142.9
		Ant #1 BT	④	0.264	0.024	0.070	-0.178		
Hotspot	Rear	Ant #1 U-NII	⑤	0.524	0.028	0.062	-0.180	④ + ⑤	11.0
		Ant #2 U-NII	⑤	2.030	0.026	0.053	-0.174		
		Ant #2 U-NII	⑥	2.030	0.026	0.053	-0.174	⑤ + ⑥	17.6
		Ant #1 BT		0.264	0.024	0.070	-0.179		

The Peak Location Separation Distance is computed by using the formula: SQRT((X1-X2)^2+(Y1-Y2)^2+(Z1-Z2)^2)

Conclusion:

Simultaneous transmission SAR measurement (Volume Scan) is required because the SPLSR is > 0.04

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12.14. Worst Case Sum of the SAR for WWAN & Wi-Fi (RSDB)

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	WWAN+DTS+U-NII	WWAN+DTS+U-NII	WWAN+DTS+U-NII	WWAN+DTS+U-NII	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	①+②+⑤	①+②+④	①+③+⑤	①+③+④+⑤	①+②+④+⑤	①+②+③+④	①+②+③+⑤	①+②+③+④+⑤
Head	Left Touch	0.343	0.290	0.061	0.329	0.010	0.733	0.643	0.962	0.414	0.743	0.972	1.023	0.704	**1.033**
	Left Tilt	0.122	0.290	0.061	0.329	0.010	0.512	0.422	0.741	0.193	0.522	0.751	0.802	0.483	0.812
	Right Touch	0.242	0.290	0.061	0.329	0.010	0.632	0.542	0.861	0.313	0.642	0.871	0.922	0.603	0.932
	Right Tilt	0.138	0.290	0.061	0.329	0.010	0.528	0.438	0.757	0.209	0.538	0.767	0.818	0.499	0.828
Body-worn	Rear	0.862	0.029	0.014	0.122	0.214	0.998	1.105	1.013	1.090	1.212	1.227	1.027	1.119	**1.241**
	Front	0.610	0.029	0.014	0.122	0.214	0.746	0.853	0.761	0.838	0.960	0.975	0.775	0.867	0.989
Hotspot	Rear	0.885	0.069	0.033	0.154	0.405	1.072	1.359	1.108	1.323	1.477	1.513	1.141	1.392	**1.546**
	Front	0.570	0.069	0.033	0.154	0.046	0.757	0.685	0.793	0.649	0.803	0.839	0.826	0.718	0.872
	Edge 1		0.069	0.033	0.154	0.046	0.187	0.115	0.223	0.079	0.364	0.269	0.256	0.148	0.302
	Edge 2	0.320													
	Edge 3	1.367													
	Edge 4	0.237	0.069	0.033	0.154	0.046	0.424	0.352	0.460	0.316	0.470	0.506	0.493	0.385	0.539

Conclusion:

Simultaneous transmission SAR measurement (Volume Scan) is not required because either the sum of the 1-g SAR is < 1.6 W/kg or the SPLSR is ≤ 0.04 for all circumstances that require SPLSR calculation.

12.15. Volume Scan

Test Position	Mode	Antenna	Dist. (mm)	Ch #.	Freq. (MHz)	Volume Scan 1-g SAR (W/kg)		Plot No.
						Measured	Combined Multi-Band	
Rear	802.11a	1	10	157	5785.0	0.170	1.1	Appendix G
		2	10	157	5785.0	0.938		
	802.11a	2	10	157	5785.0	0.938	1.08	
	GFSK	1	10	39	2441.0	0.160		

Conclusion:

The combined 1g SAR is < 1.6 W/kg and is therefore compliant. Refer to Appendix G for the Test plots

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Appendixes

Refer to separated files for the following appendixes.

Appendix A: SAR Setup Photos

Appendix B: SAR System Check Plots

Appendix C: SAR Highest Test Plots

Appendix D: SAR Tissue Ingredients

Appendix E: SAR Probe Certificates

Appendix F: SAR Dipole Certificates

Appendix G: SAR Volume Scan

END OF REPORT

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