SAR EVALUATION REPORT

FCC 47 CFR § 2.1093
IEEE Std 1528-2013

For
CDMA/LTE PHONE WITH BT & DTS WLAN b/g/n

FCC ID: ZNFUS375
Model Name: LG-US375,LGUS375, US375, LG-AS375, LGAS375, AS375

Report Number: 16I22599-S1V2
Issue Date: 1/29/2016

Prepared for
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NVLAP LAB CODE 200065-0

Revision History

Rev.	Date	Revisions	Revised By
V1	1/25/2016	Initial Issue	--
V2	1/29/2016	Section 2: Updated KDB List Section 8.2: Updated System check date for Head D750V3 Section 12: Updated Note 3 Appendix B: Updated to V2 to reflect change in Section 8.2	Coltyce Sanders

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1. Attestation of Test Results

Applicant Name	LG ELECTRONICS MOBILECOMM U.S.A., INC.			
FCC ID	ZNFUS375			
Model Name	LG-US375,LGUS375, US375, LG-AS375, LGAS375, AS375			
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)			
General population / Uncontrolled exposure	1.6			
RF Exposure Conditions	Equipment Class - Highest Reported SAR (W/kg)			
	Licensed	DTS	U-NII	DSS (BT)
Head	0.798	0.207	N/A	N/A
Body-worn	1.250	0.054		
Hotspot/Wi-Fi Direct				
Simultaneous Tx	1.304		N/A	1.460
Date Tested	1/5/2016 to 1/12/2016			
Test Results	Pass			

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

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

Approved & Released By:	Prepared By:
	
Devin Chang Senior Engineer UL Verification Services Inc.	Coltyce Sanders Laboratory Engineer UL Verification Services Inc.

2. Test Specification, Methods and Procedures

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

- 248227 D01 802.11 Wi-Fi SAR v02r02
- 447498 D01 General RF Exposure Guidance v06
- 447498 D03 Supplement C Cross-Reference v01
- 648474 D04 Handset SAR v01r03
- 690783 D01 SAR Listings on Grants 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 D06 Hotspot Mode v02r01

3. Facilities and Accreditation

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

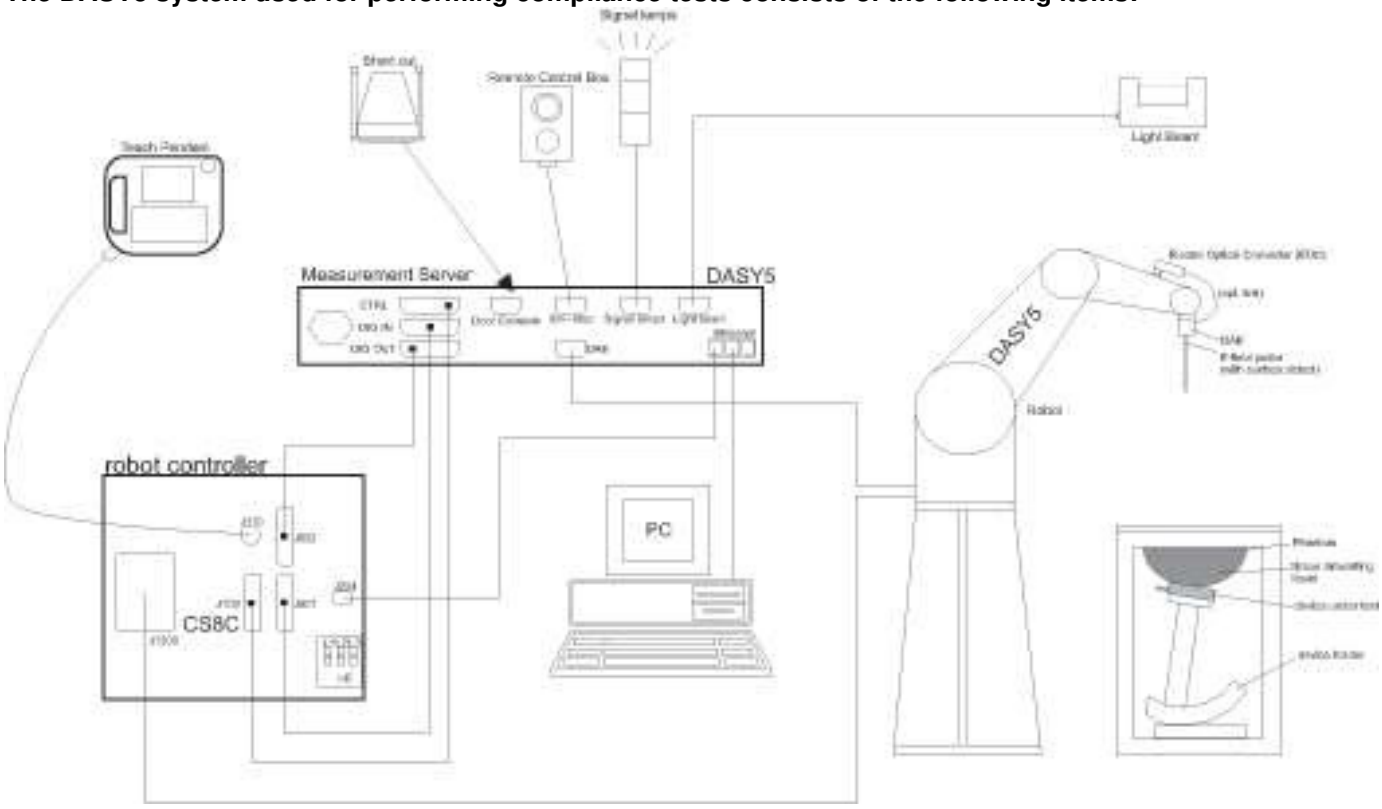
47173 Benicia Street	47266 Benicia Street
SAR Lab A	SAR Lab 1
SAR Lab B	SAR Lab 2
SAR Lab C	SAR Lab 3
SAR Lab D	SAR Lab 4
SAR Lab E	
SAR Lab F	
SAR Lab G	
SAR Lab H	

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

4. SAR Measurement System & Test Equipment

4.1. SAR Measurement System

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



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

4.2. SAR Scan Procedures

Step 1: Power Reference Measurement

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

Step 2: Area Scan

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

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

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

Step 3: Zoom Scan

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

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

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

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

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

Step 4: Power drift measurement

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

Step 5: Z-Scan (FCC only)

The Z Scan measures points along a vertical straight line. The line runs along the Z-axis of a one-dimensional grid. In order to get a reasonable extrapolation the extrapolated distance should not be larger than the step size in Z-direction.

4.3. Test Equipment

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

Dielectric Property Measurements

Name of Equipment	Manufacturer	Type/Model	Serial No.	Cal. Due Date
Network Analyzer	Agilent	8753ES	MY40001647	7/28/2016
Dielectric Probe kit	SPEAG	DAK-3.5	1103	2/17/2016
Shorting block	SPEAG	DAK-3.5 Short	SM DAK 200 BA	2/17/2016
Thermometer	Control Company	Traceable	140493798	8/4/2016

System Check

Name of Equipment	Manufacturer	Type/Model	Serial No.	Cal. Due Date
HP Signal Generator	HP	8665B	3744A01084	5/8/2016
Power Meter	Agilent	N1912A	MY50001018	10/19/2016
Power Sensor	Agilent	E9323A	MY5307005	4/29/2016
Power Sensor	Agilent	E9323A	MY5307007	3/2/2016
Amplifier	MITEQ	AMF-4D-00400600-50-30P	1795093	N/A
Bi-directional coupler	Werlatone, Inc.	C8060-102	2149	N/A
DC Power Supply	Sorensen Ametek	XT 15-4	1319A02778	N/A
Synthesized Signal Generator	HP	8665B	3546A00784	6/27/2016
Power Meter	HP	437B	3125U09248	9/3/2016
Power Meter	HP	437B	3125U09516	9/17/2016
Power Sensor	Agilent	8481A	2349A36506	9/16/2016
Power Sensor	Agilent	8481A	3318A92374	9/16/2016
Amplifier	MITEQ	AMF-4D-00400600-50-30P	1622052	N/A
Bi-directional coupler	Werlatone, Inc.	C8060-102	2711 (T1361)	N/A
DC Power Supply	Sorensen Ametek	XT 15-4	1319A02780	N/A
E-Field Probe (SAR Lab 1)	SPEAG	EX3DV4	7356	4/22/2016
E-Field Probe (SAR Lab 2)	SPEAG	EX3DV4	3990	3/18/2016
E-Field Probe (SAR Lab 3)	SPEAG	EX3DV4	3749	1/26/2016
E-Field Probe (SAR Lab 4)	SPEAG	EX3DV4	3989	3/17/2016
Data Acquisition Electronics (SAR Lab 1)	SPEAG	DAE3	500	5/22/2016
Data Acquisition Electronics (SAR Lab 2)	SPEAG	DAE4	1259	1/14/2016
Data Acquisition Electronics (SAR Lab 3)	SPEAG	DAE4	1434	4/16/2016
Data Acquisition Electronics (SAR Lab 4)	SPEAG	DAE4	1258	5/14/2016
System Validation Dipole	SPEAG	D750V3	1019	3/11/2016
System Validation Dipole	SPEAG	D835V2	4d142	9/23/2016
System Validation Dipole	SPEAG	D1750V2	1050	4/15/2016
System Validation Dipole	SPEAG	D1900V2	5d140	4/14/2016
System Validation Dipole	SPEAG	D1900V2	5d163	9/21/206
System Validation Dipole	SPEAG	D2450V2	899	3/13/2016
Thermometer (SAR Lab 1)	EXTECH	445703	CCS-205	3/20/2016
Thermometer (SAR Lab 2)	EXTECH	445703	CCS-200	3/19/2016
Thermometer (SAR Lab 3)	EXTECH	445703	CCS-237	6/5/2016
Thermometer (SAR Lab 4)	EXTECH	445703	CCS-238	6/5/2016

Other

Name of Equipment	Manufacturer	Type/Model	Serial No.	Cal. Due Date
Power Meter	Agilent	N1912A	MY55196007	7/2/2016
Power Sensor	Agilent	N1921A	MY53260010	7/8/2016
Base Station Simulator	R & S	CMW500	137873	6/19/2016

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, the extensive SAR measurement uncertainty analysis described in IEEE Std 1528-2013 is not required in SAR reports submitted for equipment approval.

6. Device Under Test (DUT) Information

6.1. DUT Description

Device Dimension	Overall (Length x Width): 144.6 mm x 71.5 mm Overall Diagonal: 152.82 mm Display Diagonal: 127.19 mm		
Back Cover	☒ Normal Battery Cover ☐ Normal Battery Cover with NFC		
Battery Options	☒ Standard – Lithium-ion battery, Rating 3.8Vdc, 8.1Wh		
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)		
Wi-Fi Direct	Wi-Fi Direct enabled devices transfer data directly between each other ☒ Wi-Fi Direct (Wi-Fi 2.4 GHz)		
Test sample information	**S/N**	**IMEI**	**Notes**
	510CYZP000093	35604507000093	SAR SAMPLE
	510CYYQ00090	35604507000090	WLAN RADIATED SAMPLE
	511CYZP000605	354887070006053	WLAN CONDUCTED SAMPLE
	510CYCV000091	35604507000091	LICENSED CONDUCTED UNIT

6.2. Wireless Technologies

Wireless technologies	Frequency bands	Operating mode	Duty Cycle used for SAR testing
CDMA (CDMA2000)	BC0 BC1	1xRTT (Voice & Data) 1xEV-DO Rel. 0 1xEV-DO Rev. A 1xAdvanced	100%
	Does this device support SV-DO (1xRTT-1xEVDO)? ☐ Yes ☒ No		
LTE	FDD Band 2 FDD Band 4 FDD Band 5 FDD Band 12 FDD Band 17 FDD Band 25	QPSK 16QAM	100% (FDD)
	Does this device support SV-LTE (1xRTT-LTE)? ☐ Yes ☒ No		
Wi-Fi	2.4 GHz	802.11b 802.11g 802.11n (HT20)	100%
Bluetooth	2.4 GHz	Version 4.1 LE	77.5% (DH5)

6.3. Maximum Output Power from Tune-up Procedure

RF Air interface	Mode	Max. RF Output Power (dBm)
CDMA BC0	1xRTT	**25.4**
	1xAdvanced	**25.4**
	1xEVDO Rel. 0	**25.4**
	1xEVDO Rev. A	**25.4**
CDMA BC1	1xRTT	**24.2**
	1xAdvanced	**24.2**
	1xEVDO Rel. 0	**24.2**
	1xEVDO Rev. A	**24.2**
LTE Band 2	QPSK	**23.2**
	16QAM	**22.2**
LTE Band 4	QPSK	**24.6**
	16QAM	**23.6**
LTE Band 5	QPSK	**24.4**
	16QAM	**23.4**
LTE Band 12	QPSK	**24.4**
	16QAM	**23.4**
LTE Band 17	QPSK	**24.4**
	16QAM	**23.4**
LTE Band 25	QPSK	**23.2**
	16QAM	**22.2**

RF Air interface	Mode	Max. RF Output Power (dBm)
WiFi 2.4 GHz	802.11b	**15.0**
	802.11g	**12.0**
	802.11n HT20	**11.0**
Bluetooth		**10.0**
Bluetooth LE		**1.5**

6.4. General LTE SAR Test and Reporting Considerations

Item	Description						
Frequency range, Channel Bandwidth, Numbers and Frequencies	Band 2	Frequency range: 1850 - 1910 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					
		Channel Bandwidth					
		20 MHz	15 MHz	10 MHz	5 MHz	3 MHz	1.4 MHz
	Low		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		20325/ 1747.5	20350/ 1750	20375/ 1752.5	20385/ 1753.5	20393/ 1754.3
	Band 5	Frequency range: 824 - 849 MHz					
		Channel Bandwidth					
		20 MHz	15 MHz	10 MHz	5 MHz	3 MHz	1.4 MHz
	Low				20425/ 826.5	20415/ 825.5	20407/ 824.7
	Mid			20525/ 836.5	20525/ 836.5	20525/ 836.5	20525/ 836.5
	High				20625/ 846.5	20635/ 847.5	20643/ 848.3
	Band 12	Frequency range: 699 – 716 MHz					
		Channel Bandwidth					
		20 MHz	15 MHz	10 MHz	5 MHz	3 MHz	1.4 MHz
	Low				23035/ 701.5	23025/ 700.5	23017/ 699.7
	Mid			23095/ 707.5	23095/ 707.5	23095/ 707.5	23095/ 707.5
	High				23155/ 713.5	23165/ 714.5	23173/ 715.3
	Band 17	Frequency range: 704 - 716 MHz					
		Channel Bandwidth					
		20 MHz	15 MHz	10 MHz	5 MHz	3 MHz	1.4 MHz
	Low				23755/ 706.5		
	Mid			23790/ 710	23790/ 710		
	High				23825/ 713.5		
	Band 25	Frequency range: 1850 - 1915 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

General LTE SAR Test and Reporting Considerations (Continued)

LTE transmitter and antenna implementation	LTE has two (2) Tx/Rx antennas and four (4) Rx antennas Refer to Appendix A.
Maximum power reduction (MPR)	Table 6.2.3-1: Maximum Power Reduction (MPR) for Power Class 3 <table><tr><th rowspan="2">Modulation</th><th colspan="6">Channel bandwidth / Transmission bandwidth (RB)</th><th rowspan="2">MPR (dB)</th></tr><tr><th>1.4 MHz</th><th>3.0 MHz</th><th>5 MHz</th><th>10 MHz</th><th>15 MHz</th><th>20 MHz</th></tr><tr><td>QPSK</td><td>> 5</td><td>> 4</td><td>> 8</td><td>> 12</td><td>> 16</td><td>> 18</td><td>≤ 1</td></tr><tr><td>16 QAM</td><td>≤ 5</td><td>≤ 4</td><td>≤ 8</td><td>≤ 12</td><td>≤ 16</td><td>≤ 18</td><td>≤ 1</td></tr><tr><td>16 QAM</td><td>> 5</td><td>> 4</td><td>> 8</td><td>> 12</td><td>> 16</td><td>> 18</td><td>≤ 2</td></tr></table> MPR Built-in by design A-MPR (additional MPR) was disabled during SAR testing
Power reduction	No
Spectrum plots for RB configurations	A properly configured base station simulator was used for the SAR and power measurements; therefore, spectrum plots for each RB allocation and offset configuration are not included in the SAR report.

7. RF Exposure Conditions (Test Configurations)

Refer to “SAR Photos and Ant locations” Appendix 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 (Antenna 1)	Head	0 mm	Left Touch	N/A	Yes	
			Left Tilt (15°)	N/A	Yes	
			Right Touch	N/A	Yes	
			Right Tilt (15°)	N/A	Yes	
	Body	10 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 (Antenna 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	10 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	
WLAN (Antenna 4)	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	10 mm	Rear	N/A	Yes	
			Front	N/A	Yes	
	Hotspot / Wi-Fi Direct	10 mm	Rear	< 25 mm	Yes	
			Front	< 25 mm	Yes	
			Edge 1 (Top)	< 25 mm	Yes	
			Edge 2 (Right)	< 25 mm	Yes	
			Edge 3 (Bottom)	> 25 mm	No	1
			Edge 4 (Left)	> 25 mm	No	1

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.

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.

Tissue Dielectric Parameters
FCC KDB 865664 D01 SAR Measurement 100 MHz to 6 GHz

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

IEEE Std 1528-2013
Refer to Table 3 within the IEEE Std 1528-2013

Dielectric Property Measurements Results:

SAR Lab 1

Date	Freq. (MHz)	Liquid Parameters			Measured	Target	Delta (%)	Limit ±(%)
1/5/2016	Head 835	e'	41.8800	Relative Permittivity (ϵ_r):	41.88	41.50	0.92	5
		e"	19.6400	Conductivity (σ):	0.91	0.90	1.32	5
	Head 820	e'	42.0400	Relative Permittivity (ϵ_r):	42.04	41.60	1.05	5
		e"	19.6900	Conductivity (σ):	0.90	0.90	-0.08	5
	Head 850	e'	41.6800	Relative Permittivity (ϵ_r):	41.68	41.50	0.43	5
		e"	19.5100	Conductivity (σ):	0.92	0.92	0.78	5
1/5/2016	Body 835	e'	53.6600	Relative Permittivity (ϵ_r):	53.66	55.20	-2.79	5
		e"	21.3800	Conductivity (σ):	0.99	0.97	2.33	5
	Body 820	e'	53.7200	Relative Permittivity (ϵ_r):	53.72	55.28	-2.82	5
		e"	21.4000	Conductivity (σ):	0.98	0.97	0.75	5
	Body 850	e'	53.4000	Relative Permittivity (ϵ_r):	53.40	55.16	-3.19	5
		e"	21.2600	Conductivity (σ):	1.00	0.99	1.79	5

SAR Lab 2

Date	Freq. (MHz)	Liquid Parameters			Measured	Target	Delta (%)	Limit ±(%)
1/5/2016	Body 1750	e'	51.9800	Relative Permittivity (ϵ_r):	51.98	53.44	-2.73	5
		e"	14.7400	Conductivity (σ):	1.43	1.49	-3.49	5
	Body 1710	e'	52.0700	Relative Permittivity (ϵ_r):	52.07	53.54	-2.75	5
		e"	14.6700	Conductivity (σ):	1.39	1.46	-4.56	5
	Body 1755	e'	51.9400	Relative Permittivity (ϵ_r):	51.94	53.43	-2.79	5
		e"	14.8100	Conductivity (σ):	1.45	1.49	-2.96	5
1/5/2016	Head 1750	e'	40.9400	Relative Permittivity (ϵ_r):	40.94	40.08	2.13	5
		e"	13.5800	Conductivity (σ):	1.32	1.37	-3.47	5
	Head 1710	e'	41.0700	Relative Permittivity (ϵ_r):	41.07	40.15	2.30	5
		e"	13.5300	Conductivity (σ):	1.29	1.35	-4.45	5
	Head 1755	e'	40.9100	Relative Permittivity (ϵ_r):	40.91	40.08	2.08	5
		e"	13.6800	Conductivity (σ):	1.33	1.37	-2.69	5

SAR Lab 3

Date	Freq. (MHz)	Liquid Parameters			Measured	Target	Delta (%)	Limit ±(%)
1/5/2016	Body 1900	e'	51.1400	Relative Permittivity (ϵ_r):	51.14	53.30	-4.05	10
		e"	13.9500	Conductivity (σ):	1.47	1.52	-3.04	10
	Body 1850	e'	51.3200	Relative Permittivity (ϵ_r):	51.32	53.30	-3.71	10
		e"	13.8400	Conductivity (σ):	1.42	1.52	-6.34	10
	Body 1910	e'	51.1700	Relative Permittivity (ϵ_r):	51.17	53.30	-4.00	10
		e"	14.0200	Conductivity (σ):	1.49	1.52	-2.04	10
1/5/2016	Head 1900	e'	38.8500	Relative Permittivity (ϵ_r):	38.85	40.00	-2.88	10
		e"	12.9000	Conductivity (σ):	1.36	1.40	-2.65	10
	Head 1850	e'	39.0400	Relative Permittivity (ϵ_r):	39.04	40.00	-2.40	10
		e"	12.7900	Conductivity (σ):	1.32	1.40	-6.02	10
	Head 1910	e'	38.7900	Relative Permittivity (ϵ_r):	38.79	40.00	-3.03	10
		e"	12.9000	Conductivity (σ):	1.37	1.40	-2.14	10
1/6/2016	Head 1900	e'	38.1500	Relative Permittivity (ϵ_r):	38.15	40.00	-4.63	5
		e"	13.2400	Conductivity (σ):	1.40	1.40	-0.09	5
	Head 1850	e'	38.3400	Relative Permittivity (ϵ_r):	38.34	40.00	-4.15	5
		e"	13.0500	Conductivity (σ):	1.34	1.40	-4.11	5
	Head 1910	e'	38.1200	Relative Permittivity (ϵ_r):	38.12	40.00	-4.70	5
		e"	13.2800	Conductivity (σ):	1.41	1.40	0.74	5
1/6/2015	Body 1900	e'	51.5500	Relative Permittivity (ϵ_r):	51.55	53.30	-3.28	5
		e"	14.8000	Conductivity (σ):	1.56	1.52	2.87	5
	Body 1850	e'	51.6700	Relative Permittivity (ϵ_r):	51.67	53.30	-3.06	5
		e"	14.1300	Conductivity (σ):	1.45	1.52	-4.38	5
	Body 1910	e'	51.5300	Relative Permittivity (ϵ_r):	51.53	53.30	-3.32	5
		e"	14.3400	Conductivity (σ):	1.52	1.52	0.19	5
1/10/2016	Head 1900	e'	39.0200	Relative Permittivity (ϵ_r):	39.02	40.00	-2.45	5
		e"	13.3900	Conductivity (σ):	1.41	1.40	1.04	5
	Head 1850	e'	39.3100	Relative Permittivity (ϵ_r):	39.31	40.00	-1.72	5
		e"	13.2500	Conductivity (σ):	1.36	1.40	-2.64	5
	Head 1910	e'	38.9900	Relative Permittivity (ϵ_r):	38.99	40.00	-2.53	5
		e"	13.4700	Conductivity (σ):	1.43	1.40	2.18	5
1/10/2016	Body 1900	e'	51.9600	Relative Permittivity (ϵ_r):	51.96	53.30	-2.51	5
		e"	14.6500	Conductivity (σ):	1.55	1.52	1.82	5
	Body 1850	e'	52.1600	Relative Permittivity (ϵ_r):	52.16	53.30	-2.14	5
		e"	14.4100	Conductivity (σ):	1.48	1.52	-2.48	5
	Body 1910	e'	51.9200	Relative Permittivity (ϵ_r):	51.92	53.30	-2.59	5
		e"	14.6600	Conductivity (σ):	1.56	1.52	2.43	5

SAR Lab 4

Date	Freq. (MHz)	Liquid Parameters			Measured	Target	Delta (%)	Limit ±(%)
1/5/2016	Head 2450	e'	38.0600	Relative Permittivity (ϵ_r):	38.06	39.20	-2.91	5
		e"	13.6100	Conductivity (σ):	1.85	1.80	3.00	5
	Head 2410	e'	38.2700	Relative Permittivity (ϵ_r):	38.27	39.28	-2.57	5
		e"	13.4600	Conductivity (σ):	1.80	1.76	2.46	5
	Head 2475	e'	37.9900	Relative Permittivity (ϵ_r):	37.99	39.17	-3.01	5
		e"	13.6200	Conductivity (σ):	1.87	1.83	2.59	5
1/5/2015	Body 2450	e'	50.9800	Relative Permittivity (ϵ_r):	50.98	52.70	-3.26	5
		e"	14.5800	Conductivity (σ):	1.99	1.95	1.86	5
	Body 2410	e'	51.1400	Relative Permittivity (ϵ_r):	51.14	52.76	-3.07	5
		e"	14.4900	Conductivity (σ):	1.94	1.91	1.79	5
	Body 2475	e'	50.9600	Relative Permittivity (ϵ_r):	50.96	52.67	-3.24	5
		e"	14.6200	Conductivity (σ):	2.01	1.99	1.35	5
1/6/2016	Body 750	e'	53.4000	Relative Permittivity (ϵ_r):	53.40	55.55	-3.86	5
		e"	23.0600	Conductivity (σ):	0.96	0.96	-0.15	5
	Body 700	e'	53.9300	Relative Permittivity (ϵ_r):	53.93	55.74	-3.24	5
		e"	23.4500	Conductivity (σ):	0.91	0.96	-4.85	5
	Body 790	e'	52.9300	Relative Permittivity (ϵ_r):	52.93	55.39	-4.45	5
		e"	22.7500	Conductivity (σ):	1.00	0.97	3.43	5
1/6/2016	Head 750	e'	39.8900	Relative Permittivity (ϵ_r):	39.89	41.96	-4.94	5
		e"	21.5000	Conductivity (σ):	0.90	0.89	0.39	5
	Head 700	e'	40.5100	Relative Permittivity (ϵ_r):	40.51	42.22	-4.05	5
		e"	21.8800	Conductivity (σ):	0.85	0.89	-4.23	5
	Head 725	e'	40.2300	Relative Permittivity (ϵ_r):	40.23	42.09	-4.42	5
		e"	21.6500	Conductivity (σ):	0.87	0.89	-2.06	5

8.2. System Check

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

System Performance Check Measurement Conditions:

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

System Check Results

The 1-g and 10-g SAR measured with a reference dipole, using the required tissue-equivalent medium at the test frequency, must be within 10% of the manufacturer calibrated dipole SAR target.

SAR Room	Date	Tissue Type	Dipole Type _Serial #	Dipole Cal. Due Data	Measured Results for 1g SAR				Measured Results for 10g SAR				Plot No.
					Zoom Scan to 100 mW	Normalize to 1 W	Target (Ref. Value)	Delta ±10 %	Zoom Scan to 100 mW	Normalize to 1 W	Target (Ref. Value)	Delta ±10 %	
1	1/5/2016	Head	D835V2 SN:4d142	9/23/2016	0.91	9.14	9.27	-1.40	0.60	6.01	6.01	0.00	
1	1/5/2016	Body	D835V2 SN:4d142	9/23/2016	0.91	9.13	9.41	**-2.98**	0.60	6.02	6.18	-2.59	1,2
2	1/5/2016	Head	D1750V2 SN:1050	4/15/2016	3.40	34.00	36.40	**-6.59**	1.79	17.90	19.30	-7.25	3,4
2	1/5/2016	Body	D1750V2 SN:1050	4/15/2016	3.56	35.60	37.00	-3.78	1.89	18.90	19.90	-5.03	
3	1/5/2016	Head	D1900V2 SN:5d140	4/14/2016	3.95	39.50	39.90	**-1.00**	2.03	20.30	20.80	-2.40	5,6
3	1/5/2016	Body	D1900V2 SN:5d140	4/14/2016	4.01	40.10	39.90	0.50	2.07	20.70	21.30	-2.82	
3	1/10/2016	Head	D1900V2 SN:5d163	9/21/2016	4.11	41.10	40.10	2.49	2.12	21.20	21.00	0.95	
3	1/10/2016	Body	D1900V2 SN:5d163	9/21/2016	3.89	38.90	39.90	**-2.51**	2.05	20.50	21.00	-2.38	7,8
4	1/5/2016	Head	D2450V2 SN:899	3/13/2016	5.04	50.40	51.60	**-2.33**	2.29	22.90	23.90	-4.18	9,10
4	1/5/2016	Body	D2450V2 SN:899	3/13/2016	4.91	49.10	48.80	0.61	2.24	22.40	22.70	-1.32	
4	1/6/2016	Body	D750V3 SN:1019	3/11/2016	0.85	8.45	8.53	-0.94	0.56	5.64	5.68	-0.70	
4	1/7/2016	Head	D750V3 SN:1019	3/11/2016	0.80	8.00	8.44	**-5.21**	0.53	5.26	5.50	-4.36	11,12

9. Conducted Output Power Measurements

9.1. CDMA

1x Advanced Setup Procedures used to establish the test signals

Call box setup procedure

- Protocol Rev > 6 (IS-2000-0)
- System ID: 331; NID: 65535, Reg. Ch. #.:
- Radio Config (RC) > Fwd11,Rvs8
- Service Option (SO) Setup > SO75 (Loopback)
- Traffic Data Rate > Full
- Rvs Power Ctrl > All Up bits (Maximum TxPout)
- Reverse Power Control Mode: 00-200 to 400 bps
- Smart blanking was disabled.

CDMA BC0 Measured Results

Band	Mode		Ch No.	Freq. (MHz)	Max. Pwr (dBm)
BC 0	1xRTT	RC1 SO55 (Loopback)	1013	824.70	25.2
			384	836.52	25.2
			777	848.31	25.2
		RC3 SO55 (Loopback)	1013	824.70	25.2
			384	836.52	25.1
			777	848.31	25.1
		RC3 SO32 (+F-SCH)	1013	824.70	25.2
			384	836.52	25.2
			777	848.31	25.2
	1xAdvanced	Fwd11/Rvs8 SO75 (Loopback)	1013	824.70	25.2
			384	836.52	25.1
			777	848.31	25.1
	1xEVDO Rel. 0	FTAP Rate: 307.2 kbps(2 slot, QPSK) RTAP Rate: 153.6 kbps	1013	824.70	24.9
			384	836.52	25.1
			777	848.31	25.1
	1xEVDO Rev. A	FETAP: 307.2k, QPSK/ ACK RETAP: 4096	1013	824.70	24.9
			384	836.52	25.1
			777	848.31	25.1

CDMA BC1 Measured Results

Band	Mode		Ch No.	Freq. (MHz)	Max. Pwr (dBm)
BC 1	1xRTT	RC1 SO55 (Loopback)	25	1851.25	24.0
			600	1880.00	24.1
			1175	1908.75	24.0
		RC3 SO55 (Loopback)	25	1851.25	24.2
			600	1880.00	24.2
			1175	1908.75	24.2
		RC3 SO32 (+F-SCH)	25	1851.25	24.2
			600	1880.00	24.2
			1175	1908.75	24.2
	1xAdvanced	Fwd11/Rvs8 SO75 (Loopback)	25	1851.25	24.0
			600	1880.00	24.1
			1175	1908.75	24.0
	1xEVDO Rel. 0	FTAP Rate: 307.2 kbps(2 slot, QPSK) RTAP Rate: 153.6 kbps	25	1851.25	24.0
			600	1880.00	24.0
			1175	1908.75	23.9
	1xEVDO Rev. A	FETAP: 307.2k, QPSK/ ACK RETAP: 4096	25	1851.25	24.0
			600	1880.00	24.0
			1175	1908.75	24.0

9.2. 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 3

Modulation	Channel bandwidth / Transmission bandwidth (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

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 (sub-clause)	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	NA
NS_03	6.6.2.2.1	2, 4,10, 23, 25, 35, 36	3	>5	≤ 1
			5	>6	≤ 1
			10	>6	≤ 1
			15	>8	≤ 1
			20	>10	≤ 1
NS_04	6.6.2.2.2	41	5	>6	≤ 1
			10, 15, 20	See Table 6.2.4-4	
NS_05	6.6.3.3.1	1	10,15,20	≥ 50	≤ 1
NS_06	6.6.2.2.3	12, 13, 14, 17	1.4, 3, 5, 10	Table 5.6-1	n/a
NS_07	6.6.2.2.3 6.6.3.3.2	13	10	Table 6.2.4-2	Table 6.2.4-2
NS_08	6.6.3.3.3	19	10, 15	> 44	≤ 3
NS_09	6.6.3.3.4	21	10, 15	> 40	≤ 1
				> 55	≤ 2
NS_10		20	15, 20	Table 6.2.4-3	Table 6.2.4-3
NS_11	6.6.2.2.1	23[1]	1.4, 3, 5, 10	Table 6.2.4-5	Table 6.2.4-5
..					
NS_32	-	-	-	-	-
Note 1: Applies to the lower block of Band 23, i.e. a carrier placed in the 2000-2010 MHz region.					

LTE Band 2 Measured Results

Band	BW (MHz)	Mode	RB Allocation	RB offset	MPR	Max. Avg Pwr (dBm)		
						1860 MHz	1880 MHz	1900 MHz
LTE Band 2	20	QPSK	1	0	0	22.8	23.0	22.9
			1	49	0	23.1	23.1	22.9
			1	99	0	22.8	22.8	22.8
			50	0	1	22.1	22.0	22.0
			50	24	1	22.1	22.0	22.0
			50	50	1	22.0	22.0	22.0
			100	0	1	22.0	22.0	22.0
		16QAM	1	0	1	22.2	21.9	22.1
			1	49	1	22.1	22.0	21.8
			1	99	1	22.0	22.0	21.8
			50	0	2	21.1	21.0	21.1
			50	24	2	21.1	21.1	21.1
			50	50	2	21.0	21.2	21.0
			100	0	2	21.1	21.0	21.0
Band	BW (MHz)	Mode	RB Allocation	RB offset	MPR	Max. Avg Pwr (dBm)		
						1857.5 MHz	1880 MHz	1902.5 MHz
LTE Band 2	15	QPSK	1	0	0	22.8	22.9	22.8
			1	37	0	22.9	23.2	22.7
			1	74	0	22.8	22.8	22.7
			36	0	1	21.8	21.8	21.7
			36	20	1	21.8	21.7	21.7
			36	39	1	21.8	21.6	21.6
			75	0	1	21.9	21.6	21.7
		16QAM	1	0	1	22.2	22.2	21.7
			1	37	1	22.2	22.2	21.8
			1	74	1	22.1	22.2	21.8
			36	0	2	20.8	20.7	20.7
			36	20	2	21.0	20.6	20.5
			36	39	2	20.9	20.6	20.6
			75	0	2	20.7	20.7	20.8
Band	BW (MHz)	Mode	RB Allocation	RB offset	MPR	Max. Avg Pwr (dBm)		
						1855 MHz	1880 MHz	1905 MHz
LTE Band 2	10	QPSK	1	0	0	22.8	22.8	22.9
			1	25	0	23.0	22.9	22.8
			1	49	0	22.7	22.6	22.8
			25	0	1	21.7	21.8	21.7
			25	12	1	21.8	21.8	21.7
			25	25	1	21.8	21.7	21.7
			50	0	1	21.8	21.7	21.7
		16QAM	1	0	1	22.2	22.0	21.8
			1	25	1	22.2	22.1	22.2
			1	49	1	22.0	21.9	22.0
			25	0	2	20.7	20.8	20.7
			25	12	2	20.7	20.9	20.8
			25	25	2	20.8	20.8	20.7
			50	0	2	20.9	20.7	20.7

LTE Band 2 Measured Results (continued)

Band	BW (MHz)	Mode	RB Allocation	RB offset	MPR	Max. Avg Pwr (dBm)		
						1852.5 MHz	1880 MHz	1907.5 MHz
LTE Band 2	5	QPSK	1	0	0	22.5	22.5	22.6
			1	12	0	22.6	22.8	22.7
			1	24	0	22.5	22.5	22.8
			12	0	1	21.8	21.7	21.6
			12	7	1	21.8	21.8	21.7
			12	13	1	21.8	21.6	21.7
			25	0	1	21.7	21.7	21.7
		16QAM	1	0	1	21.7	21.7	21.6
			1	12	1	21.9	21.5	21.7
			1	24	1	21.7	21.6	21.6
			12	0	2	20.7	20.6	20.6
			12	7	2	20.8	20.5	21.0
			12	13	2	20.7	20.7	20.9
			25	0	2	20.8	20.8	21.0

Band	BW (MHz)	Mode	RB Allocation	RB offset	MPR	Max. Avg Pwr (dBm)		
						1851.5 MHz	1880 MHz	1908.5 MHz
LTE Band 2	3	QPSK	1	0	0	22.8	22.7	22.5
			1	8	0	23.0	22.7	22.8
			1	14	0	22.8	22.5	22.8
			8	0	1	21.8	21.7	21.6
			8	4	1	21.8	21.7	21.8
			8	7	1	21.8	21.7	21.7
			15	0	1	21.8	21.8	21.7
		16QAM	1	0	1	22.2	22.0	21.6
			1	8	1	22.2	22.1	21.5
			1	14	1	22.2	21.8	22.0
			8	0	2	20.5	20.9	20.9
			8	4	2	20.6	20.9	21.0
			8	7	2	20.9	20.9	20.9
			15	0	2	20.9	20.6	20.9

Band	BW (MHz)	Mode	RB Allocation	RB offset	MPR	Max. Avg Pwr (dBm)		
						1850.7 MHz	1880 MHz	1909.3 MHz
LTE Band 2	1.4	QPSK	1	0	0	22.7	22.7	22.5
			1	3	0	22.6	22.7	22.7
			1	5	0	22.7	22.7	22.7
			3	0	0	22.7	22.7	22.7
			3	1	0	22.7	22.7	22.7
			3	3	0	22.6	22.7	22.9
			6	0	1	21.6	21.7	21.7
		16QAM	1	0	1	22.2	22.2	21.9
			1	3	1	22.2	22.2	22.0
			1	5	1	22.2	22.2	21.9
			3	0	1	21.9	21.8	21.7
			3	1	1	22.0	21.7	21.7
			3	3	1	21.9	21.7	21.5
			6	0	2	20.8	20.4	20.7

LTE Band 4 Measured Results

Band	BW (MHz)	Mode	RB Allocation	RB offset	MPR	Max. Avg Pwr (dBm)		
							1732.5 MHz	
LTE Band 4	20	QPSK	1	0	0		24.5	
			1	49	0		24.6	
			1	99	0		24.4	
			50	0	1		23.3	
			50	24	1		23.3	
			50	50	1		23.1	
			100	0	1		23.2	
		16QAM	1	0	1		23.0	
			1	49	1		23.1	
			1	99	1		22.9	
			50	0	2		22.3	
			50	24	2		22.2	
			50	50	2		22.1	
			100	0	2		22.3	

Band	BW (MHz)	Mode	RB Allocation	RB offset	MPR	Max. Avg Pwr (dBm)		
						1717.5 MHz	1732.5 MHz	1747.5 MHz
LTE Band 4	15	QPSK	1	0	0	24.3	24.2	24.3
			1	37	0	24.1	24.6	24.4
			1	74	0	24.0	24.1	24.2
			36	0	1	23.0	23.2	23.2
			36	20	1	23.1	23.2	23.2
			36	39	1	23.1	23.1	23.2
			75	0	1	23.0	23.1	23.2
		16QAM	1	0	1	23.6	23.6	23.4
			1	37	1	23.4	23.6	23.5
			1	74	1	23.4	23.6	23.4
			36	0	2	22.2	22.3	22.5
			36	20	2	22.2	22.1	22.3
			36	39	2	22.3	22.0	22.3
			75	0	2	22.1	22.2	22.1

Band	BW (MHz)	Mode	RB Allocation	RB offset	MPR	Max. Avg Pwr (dBm)		
						1715 MHz	1732.5 MHz	1750 MHz
LTE Band 4	10	QPSK	1	0	0	24.0	24.2	24.1
			1	25	0	24.0	24.4	24.2
			1	49	0	24.0	24.0	24.1
			25	0	1	23.1	23.2	23.2
			25	12	1	23.0	23.2	23.2
			25	25	1	23.0	23.1	23.1
			50	0	1	23.1	23.2	23.2
		16QAM	1	0	1	23.4	23.3	23.4
			1	25	1	23.5	23.2	23.6
			1	49	1	23.3	23.1	23.3
			25	0	2	22.2	22.3	22.3
			25	12	2	22.1	22.3	22.3
			25	25	2	22.0	21.9	22.1
			50	0	2	22.1	22.2	22.3

Note(s):

20 MHz Bandwidth does not support at least three non-overlapping channels. 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 per KDB 941225 D05 SAR for LTE Devices.

LTE Band 4 Measured Results (continued)

Band	BW (MHz)	Mode	RB Allocation	RB offset	MPR	Max. Avg Pwr (dBm)		
						1712.5 MHz	1732.5 MHz	1752.5 MHz
LTE Band 4	5	QPSK	1	0	0	24.0	24.0	24.3
			1	12	0	24.4	24.2	24.2
			1	24	0	24.0	24.1	24.1
			12	0	1	22.9	23.0	23.2
			12	7	1	22.9	23.2	23.1
			12	13	1	22.9	23.1	23.2
			25	0	1	22.9	23.0	23.2
		16QAM	1	0	1	23.3	23.1	23.6
			1	12	1	23.1	22.9	23.1
			1	24	1	22.9	23.0	23.0
			12	0	2	22.0	22.0	22.3
			12	7	2	22.1	22.0	22.3
			12	13	2	22.1	22.1	22.5
			25	0	2	21.9	22.1	22.5

Band	BW (MHz)	Mode	RB Allocation	RB offset	MPR	Max. Avg Pwr (dBm)		
						1711.5 MHz	1732.5 MHz	1753.5 MHz
LTE Band 4	3	QPSK	1	0	0	24.1	24.3	24.4
			1	8	0	23.8	24.1	24.5
			1	14	0	23.8	24.1	24.3
			8	0	1	23.0	23.2	23.2
			8	4	1	22.9	23.0	23.2
			8	7	1	22.9	23.1	23.1
			15	0	1	22.9	23.0	23.2
		16QAM	1	0	1	23.1	23.2	23.4
			1	8	1	23.3	23.1	23.4
			1	14	1	23.2	23.1	23.5
			8	0	2	22.0	22.4	21.9
			8	4	2	22.1	22.4	22.1
			8	7	2	22.1	22.3	22.0
			15	0	2	22.0	22.3	22.2

Band	BW (MHz)	Mode	RB Allocation	RB offset	MPR	Max. Avg Pwr (dBm)		
						1710.7 MHz	1732.5 MHz	1754.3 MHz
LTE Band 4	1.4	QPSK	1	0	0	23.9	24.1	24.2
			1	3	0	24.1	24.1	24.2
			1	5	0	24.1	24.1	24.1
			3	0	0	24.1	24.1	24.2
			3	1	0	24.0	24.1	24.2
			3	3	0	24.0	24.1	24.1
			6	0	1	23.0	23.0	23.1
		16QAM	1	0	1	23.3	23.4	23.5
			1	3	1	23.3	23.2	23.5
			1	5	1	23.3	23.1	23.3
			3	0	1	23.4	22.9	23.2
			3	1	1	23.2	22.9	23.3
			3	3	1	23.2	23.4	23.1
			6	0	2	21.9	22.2	22.2

LTE Band 5 Measured Results

Band	BW (MHz)	Mode	RB Allocation	RB offset	MPR	Max. Avg Pwr (dBm)
						836.5 MHz
LTE Band 5	10	QPSK	1	0	0	24.0
			1	25	0	24.2
			1	49	0	23.9
			25	0	1	23.0
			25	12	1	22.9
			25	25	1	23.0
			50	0	1	22.9
		16QAM	1	0	1	23.2
			1	25	1	23.2
			1	49	1	22.8
			25	0	2	22.0
			25	12	2	22.0
			25	25	2	22.3
			50	0	2	22.1

Band	BW (MHz)	Mode	RB Allocation	RB offset	MPR	Max. Avg Pwr (dBm)		
						826.5 MHz	836.5 MHz	846.5 MHz
LTE Band 5	5	QPSK	1	0	0	23.9	23.7	24.0
			1	12	0	24.1	24.0	23.9
			1	24	0	23.9	23.8	24.0
			12	0	1	22.9	23.0	22.8
			12	7	1	23.0	22.9	22.9
			12	13	1	22.9	22.8	22.9
			25	0	1	23.0	22.9	22.9
		16QAM	1	0	1	23.3	22.8	23.4
			1	12	1	23.1	22.6	22.9
			1	24	1	23.2	22.8	22.8
			12	0	2	22.1	22.0	22.0
			12	7	2	22.0	21.9	21.9
			12	13	2	21.9	22.0	22.0
			25	0	2	22.1	22.1	22.0

Band	BW (MHz)	Mode	RB Allocation	RB offset	MPR	Max. Avg Pwr (dBm)		
						825.5 MHz	836.5 MHz	847.5 MHz
LTE Band 5	3	QPSK	1	0	0	23.9	24.0	23.9
			1	8	0	23.9	24.0	24.0
			1	14	0	23.8	24.0	23.9
			8	0	1	23.0	22.9	23.0
			8	4	1	22.9	22.9	23.0
			8	7	1	22.9	22.9	23.1
			15	0	1	23.0	22.9	22.9
		16QAM	1	0	1	23.2	23.4	23.2
			1	8	1	23.3	23.3	23.1
			1	14	1	23.2	23.4	23.2
			8	0	2	22.1	22.2	21.7
			8	4	2	22.1	22.1	21.8
			8	7	2	22.1	21.8	22.0
			15	0	2	21.9	21.8	22.0

Note(s):

10 MHz Bandwidth does not support at least three non-overlapping channels. 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 per KDB 941225 D05 SAR for LTE Devices.

LTE Band 5 Measured Results (continued)

Band	BW (MHz)	Mode	RB Allocation	RB offset	MPR	Max. Avg Pwr (dBm)		
						824.7 MHz	836.5 MHz	848.3 MHz
LTE Band 5	1.4	QPSK	1	0	0	23.8	23.8	24.1
			1	3	0	24.2	23.9	24.0
			1	5	0	24.1	23.8	23.9
			3	0	0	24.0	24.0	24.0
			3	1	0	23.9	24.1	23.9
			3	3	0	24.1	24.1	23.9
			6	0	1	23.0	22.9	22.9
		16QAM	1	0	1	23.3	23.1	23.4
			1	3	1	23.4	23.2	23.4
			1	5	1	23.3	23.1	23.4
			3	0	1	23.0	22.9	23.2
			3	1	1	22.9	22.9	23.2
			3	3	1	23.0	22.8	23.2
			6	0	2	21.7	21.9	21.9

LTE Band 12 Measured Results

Band	BW (MHz)	Mode	RB Allocation	RB offset	MPR	Max. Avg Pwr (dBm)		
							707.5 MHz	
LTE Band 12	10	QPSK	1	0	0		24.1	
			1	25	0		24.3	
			1	49	0		24.1	
			25	0	1		23.1	
			25	12	1		23.0	
			25	25	1		22.9	
			50	0	1		23.1	
		16QAM	1	0	1		23.0	
			1	25	1		23.2	
			1	49	1		23.0	
			25	0	2		22.1	
			25	12	2		22.0	
			25	25	2		22.0	
			50	0	2		22.1	

Band	BW (MHz)	Mode	RB Allocation	RB offset	MPR	Max. Avg Pwr (dBm)		
						701.5 MHz	707.5 MHz	713.5 MHz
LTE Band 12	5	QPSK	1	0	0	24.1	24.1	24.2
			1	12	0	24.4	24.3	24.1
			1	24	0	24.2	24.1	24.1
			12	0	1	23.0	23.1	23.0
			12	7	1	23.1	23.0	23.0
			12	13	1	23.0	22.9	23.0
			25	0	1	23.0	23.1	23.1
		16QAM	1	0	1	23.1	23.0	22.8
			1	12	1	23.4	23.2	23.4
			1	24	1	23.4	23.0	23.2
			12	0	2	22.0	22.1	22.1
			12	7	2	22.2	22.0	22.1
			12	13	2	22.1	22.0	22.3
			25	0	2	22.1	22.1	22.0

Band	BW (MHz)	Mode	RB Allocation	RB offset	MPR	Max. Avg Pwr (dBm)		
						700.5 MHz	707.5 MHz	714.5 MHz
LTE Band 12	3	QPSK	1	0	0	24.2	24.3	24.1
			1	8	0	24.1	24.2	24.2
			1	14	0	24.1	24.1	24.0
			8	0	1	23.0	23.2	23.2
			8	4	1	23.0	23.0	23.1
			8	7	1	23.0	23.1	23.2
			15	0	1	23.1	23.2	23.2
		16QAM	1	0	1	22.8	23.1	23.4
			1	8	1	23.4	23.0	23.4
			1	14	1	23.2	23.4	23.2
			8	0	2	22.1	22.3	22.2
			8	4	2	22.1	22.2	22.1
			8	7	2	22.3	22.3	22.2
			15	0	2	22.0	22.1	22.3

Note(s):

10 MHz Bandwidth does not support at least three non-overlapping channels. 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 per KDB 941225 D05 SAR for LTE Devices.

LTE Band 12 Measured Results (continued)

Band	BW (MHz)	Mode	RB Allocation	RB offset	MPR	Max. Avg Pwr (dBm)		
						699.7 MHz	707.5 MHz	715.3 MHz
LTE Band 12	1.4	QPSK	1	0	0	24.1	24.1	24.2
			1	3	0	24.1	24.2	24.3
			1	5	0	24.1	24.1	24.1
			3	0	0	23.9	24.2	24.3
			3	1	0	23.9	24.3	24.2
			3	3	0	23.9	24.1	24.3
			6	0	1	23.0	23.0	23.3
		16QAM	1	0	1	23.4	23.4	23.4
			1	3	1	23.4	23.4	23.4
			1	5	1	23.4	23.4	23.2
			3	0	1	23.2	23.1	23.1
			3	1	1	23.2	23.1	23.2
			3	3	1	23.2	23.1	23.0
			6	0	2	22.1	21.8	22.1

LTE Band 17 Measured Results

Band	BW (MHz)	Mode	RB Allocation	RB offset	MPR	Max. Avg Pwr (dBm)
						710 MHz
LTE Band 17	10	QPSK	1	0	0	24.1
			1	25	0	24.2
			1	42	0	24.0
			25	0	1	22.9
			25	12	1	22.8
			25	25	1	22.8
			50	0	1	22.7
		16QAM	1	0	1	23.1
			1	25	1	22.9
			1	42	1	22.8
			25	0	2	22.0
			25	12	2	22.0
			25	25	2	21.8
			50	0	2	21.7
Band	BW (MHz)	Mode	RB Allocation	RB offset	MPR	Max. Avg Pwr (dBm)
						710 MHz
LTE Band 17	5	QPSK	1	0	0	23.8
			1	12	0	23.8
			1	24	0	23.6
			12	0	1	22.8
			12	7	1	22.8
			12	13	1	22.8
			25	0	1	22.7
		16QAM	1	0	1	23.0
			1	12	1	23.0
			1	24	1	22.8
			12	0	2	21.7
			12	7	2	21.7
			12	13	2	21.6
			25	0	2	21.8

Note(s):

10 and 5 MHz Bandwidths do not support at least three non-overlapping channels. 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 per KDB 941225 D05 SAR for LTE Devices.

LTE Band 25 Measured Results

Band	BW (MHz)	Mode	RB Allocation	RB offset	MPR	Max. Avg Pwr (dBm)		
						1860 MHz	1882.5 MHz	1905 MHz
LTE Band 25	20	QPSK	1	0	0	22.9	22.8	22.8
			1	49	0	22.8	22.5	23.0
			1	99	0	22.6	22.5	22.8
			50	0	1	21.4	21.5	21.3
			50	24	1	21.4	21.3	21.3
			50	50	1	21.4	21.2	21.3
			100	0	1	21.4	21.2	21.4
		16QAM	1	0	1	22.0	22.0	21.7
			1	49	1	22.1	22.1	21.9
			1	99	1	21.7	21.7	21.7
			50	0	2	20.4	20.7	20.5
			50	24	2	20.4	20.4	20.2
			50	50	2	20.5	20.4	20.2
			100	0	2	20.3	20.3	20.4

Band	BW (MHz)	Mode	RB Allocation	RB offset	MPR	Max. Avg Pwr (dBm)		
						1857.5 MHz	1882.5 MHz	1907.5 MHz
LTE Band 25	15	QPSK	1	0	0	22.7	22.8	22.7
			1	37	0	22.7	22.9	22.7
			1	74	0	22.7	22.7	22.7
			36	0	1	21.8	21.7	21.7
			36	20	1	21.8	21.8	21.7
			36	39	1	21.8	21.7	21.6
			75	0	1	21.7	21.7	21.6
		16QAM	1	0	1	22.2	22.0	22.1
			1	37	1	22.2	22.2	22.0
			1	74	1	22.2	22.2	22.1
			36	0	2	20.7	20.8	20.8
			36	20	2	20.7	20.8	20.8
			36	39	2	20.6	20.6	20.8
			75	0	2	20.8	20.7	20.8

Band	BW (MHz)	Mode	RB Allocation	RB offset	MPR	Max. Avg Pwr (dBm)		
						1855 MHz	1882.5 MHz	1910 MHz
LTE Band 25	10	QPSK	1	0	0	22.6	22.9	22.9
			1	25	0	22.5	22.8	22.8
			1	49	0	22.7	22.6	22.7
			25	0	1	21.7	21.7	21.6
			25	12	1	21.7	21.8	21.7
			25	25	1	21.7	21.7	21.7
			50	0	1	21.7	21.7	21.7
		16QAM	1	0	1	22.0	22.0	22.2
			1	25	1	22.1	22.2	22.2
			1	49	1	22.0	22.2	21.9
			25	0	2	21.1	20.6	20.6
			25	12	2	20.9	20.7	20.6
			25	25	2	20.9	20.6	20.6
			50	0	2	20.7	20.8	20.8

LTE Band 25 Measured Results (continued)

Band	BW (MHz)	Mode	RB Allocation	RB offset	MPR	Max. Avg Pwr (dBm)		
						1852.5 MHz	1882.5 MHz	1912.5 MHz
LTE Band 25	5	QPSK	1	0	0	22.6	22.6	22.5
			1	12	0	22.6	22.9	22.7
			1	24	0	22.5	22.6	22.6
			12	0	1	21.7	21.7	21.7
			12	7	1	21.7	21.7	21.7
			12	13	1	21.8	21.7	21.7
			25	0	1	21.7	21.7	21.7
		16QAM	1	0	1	21.9	21.5	21.4
			1	12	1	21.3	21.7	21.2
			1	24	1	21.5	22.0	21.3
			12	0	2	20.6	20.6	20.5
			12	7	2	20.6	20.5	20.6
			12	13	2	20.8	20.7	20.8
			25	0	2	20.9	20.7	20.8

Band	BW (MHz)	Mode	RB Allocation	RB offset	MPR	Max. Avg Pwr (dBm)		
						1851.5 MHz	1882.5 MHz	1913.5 MHz
LTE Band 25	3	QPSK	1	0	0	22.5	22.8	22.7
			1	8	0	22.4	22.8	22.8
			1	14	0	22.5	22.8	22.7
			8	0	1	21.6	21.7	21.7
			8	4	1	21.7	21.8	21.8
			8	7	1	21.6	21.7	21.7
			15	0	1	21.6	21.7	21.8
		16QAM	1	0	1	21.9	21.6	22.1
			1	8	1	22.0	21.6	21.9
			1	14	1	21.9	21.6	21.9
			8	0	2	20.9	20.8	20.4
			8	4	2	20.9	21.0	20.5
			8	7	2	21.0	20.9	20.4
			15	0	2	20.6	20.8	20.8

Band	BW (MHz)	Mode	RB Allocation	RB offset	MPR	Max. Avg Pwr (dBm)		
						1850.7 MHz	1882.5 MHz	1914.3 MHz
LTE Band 25	1.4	QPSK	1	0	0	22.5	22.6	22.6
			1	3	0	22.4	22.6	22.9
			1	5	0	22.4	22.4	22.9
			3	0	0	22.6	22.8	22.9
			3	1	0	22.6	22.7	22.9
			3	3	0	22.7	22.7	22.9
			6	0	1	21.5	21.7	21.8
		16QAM	1	0	1	21.8	22.2	22.2
			1	3	1	21.6	22.2	22.2
			1	5	1	21.7	22.2	22.2
			3	0	1	21.7	21.8	21.4
			3	1	1	21.5	21.9	21.5
			3	3	1	21.6	21.9	22.0
			6	0	2	20.7	20.8	20.9

9.3. Wi-Fi 2.4GHz (DTS Band)

Measured Results

Band (GHz)	Mode	Data Rate	Ch #	Freq. (MHz)	Avg Pwr (dBm)	Max Output Power (dBm)	SAR Test (Yes/No)
2.4	802.11b	1 Mbps	1	2412	13.8	15.0	Yes
			6	2437	14.0		
			11	2462	**14.6**		
	802.11g	6 Mbps	1	2412	Not Required	12.0	No
			6	2437			
			11	2462			
	802.11n (HT20)	6.5 Mbps	1	2412		11.0	No
			6	2437			
			11	2462			

Note(s):

Output Power and SAR is not required for 802.11g/n HT20 channels 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.

9.4. Bluetooth

Maximum tune-up tolerance limit is 10.0 dBm. This power level qualifies for exclusion of SAR testing.

10. Measured and Reported (Scaled) SAR Results

SAR Test Reduction criteria are as follows:

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.

KDB 248227 D01 SAR meas for 802.11 v02r02:
SAR test reduction for 802.11 Wi-Fi transmission mode configurations are considered separately for DSSS and OFDM. An initial test position is determined to reduce the number of tests required for certain exposure configurations with multiple test positions. An initial test configuration is determined for each frequency band and aggregated band according to maximum output power, channel bandwidth, wireless mode configurations and other operating parameters to streamline the measurement requirements. For 2.4 GHz DSSS, either the initial test position or DSSS procedure is applied to reduce the number of SAR tests; these are mutually exclusive. For OFDM, an initial test position is only applicable to next to the ear, UMPC mini-tablet and hotspot mode configurations, which is tested using the initial test configuration to facilitate test reduction. For other exposure conditions with a fixed test position, SAR test reduction is determined using only the initial test configuration.

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

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

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

10.1. CDMA BC0

RF Exposure Conditions	Mode	Dist. (mm)	Test Position	Ch #	Freq. (MHz)	Power (dBm)		1-g SAR (W/kg)		Plot No.
						Tune-up limit	Meas.	Meas.	Scaled	
Head	1xRTT (RC3 SO55)	0	Left Touch	384	836.5	25.4	25.1	0.509	0.545	
			Left Tilt	384	836.5	25.4	25.1	0.346	0.371	
			Right Touch	384	836.5	25.4	25.1	0.700	**0.750**	1
			Right Tilt	384	836.5	25.4	25.1	0.415	0.445	
	1xEVDO (Rel. 0)	0	Left Touch	384	836.5	25.4	25.1	0.516	0.553	
			Left Tilt	384	836.5	25.4	25.1	0.314	0.336	
			Right Touch	384	836.5	25.4	25.1	0.672	0.720	
			Right Tilt	384	836.5	25.4	25.1	0.379	0.406	
Body-worn & Hotspot	1xRTT (RC3 SO32)	10	Rear	384	836.5	25.4	25.2	0.710	**0.743**	2
			Front	384	836.5	25.4	25.2	0.576	0.603	
Hotspot	1xRTT (RC3 SO32)	10	Edge 2	384	836.5	25.4	25.2	0.537	0.562	
			Edge 3	384	836.5	25.4	25.2	0.305	0.319	
			Edge 4	384	836.5	25.4	25.2	0.332	0.348	

10.2. CDMA BC1

RF Exposure Conditions	Mode	Dist. (mm)	Test Position	Ch #	Freq. (MHz)	Power (dBm)		1-g SAR (W/kg)		Plot No.
						Tune-up limit	Meas.	Meas.	Scaled	
Head	1xRTT (RC3 SO55)	0	Left Touch	600	1880.0	24.2	24.2	0.689	0.689	
			Left Tilt	600	1880.0	24.2	24.2	0.460	0.460	
			Right Touch	600	1880.0	24.2	24.2	0.798	**0.798**	3
			Right Tilt	600	1880.0	24.2	24.2	0.293	0.293	
	1xEVDO (Rel. 0)	0	Left Touch	600	1880.0	24.2	24.0	0.719	0.753	
			Left Tilt	600	1880.0	24.2	24.0	0.426	0.446	
			Right Touch	600	1880.0	24.2	24.0	0.729	0.763	
			Right Tilt	600	1880.0	24.2	24.0	0.319	0.334	
Body-worn & Hotspot	1xRTT (RC3 SO32)	10	Rear	25	1851.3	24.2	24.2	0.951	0.951	
				600	1880.0	24.2	24.2	1.110	1.110	
				1175	1908.8	24.2	24.2	1.110	1.110	
			Front	25	1851.3	24.2	24.2	1.020	1.020	
				600	1880.0	24.2	24.2	1.190	1.190	
				1175	1908.8	24.2	24.2	1.250	**1.250**	4
			Front w/Headset	25	1851.3	24.2	24.2	0.644	0.644	
				600	1880.0	24.2	24.2	0.864	0.864	
				1175	1908.8	24.2	24.2	0.756	0.756	
	1xEVDO (Rel. 0)	10	Front	25	1851.3	24.2	24.0	0.919	0.962	
				600	1880.0	24.2	24.0	1.090	1.141	
				1175	1908.8	24.2	23.9	1.010	1.082	
Hotspot	1xRTT (RC3 SO32)	10	Edge 3	600	1880.0	24.2	24.2	0.725	0.725	
			Edge 4	600	1880.0	24.2	24.2	0.738	0.738	

10.3. LTE Band 2 (20MHz Bandwidth)

RF Exposure Conditions	Mode	Dist. (mm)	Test Position	Ch #.	Freq. (MHz)	RB Allocation	RB offset	Power (dBm)		1-g SAR (W/kg)		Plot No.
								Tune-up limit	Meas.	Meas.	Scaled	
Head	QPSK	0	Left Touch	18900	1880.0	1	49	23.2	23.1	0.582	0.596	
						50	0	22.2	22.0	0.470	0.492	
			Left Tilt	18900	1880.0	1	49	23.2	23.1	0.341	0.349	
						50	0	22.2	22.0	0.279	0.292	
			Right Touch	18900	1880.0	1	49	23.2	23.1	0.623	**0.638**	5
						50	0	22.2	22.0	0.473	0.495	
			Right Tilt	18900	1880.0	1	49	23.2	23.1	0.245	0.251	
						50	0	22.2	22.0	0.200	0.209	
Body-worn & Hotspot	QPSK	10	Rear	18700	1860.0	1	49	23.2	23.1	0.983	1.006	
						50	0	22.2	22.1	0.738	0.755	
				18900	1880.0	1	49	23.2	23.1	0.956	0.978	
						50	0	22.2	22.0	0.756	0.792	
				19100	1900.0	1	0	23.2	22.9	0.883	0.946	
						50	0	22.2	22.0	0.702	0.735	
			Front	18700	1860.0	1	49	23.2	23.1	0.931	0.953	
						50	0	22.2	22.1	0.765	0.783	
				18900	1880.0	1	49	23.2	23.1	1.020	1.044	
						50	0	22.2	22.0	0.755	0.791	
				19100	1900.0	1	0	23.2	22.9	0.986	**1.057**	6
						50	0	22.2	22.0	0.789	0.826	
Hotspot	QPSK	10	Edge 3	18900	1880.0	1	49	23.2	23.1	0.554	0.567	
						50	0	22.2	22.0	0.450	0.471	
			Edge 4	18900	1880.0	1	49	23.2	23.1	0.606	0.620	
						50	0	22.2	22.0	0.481	0.504	

10.4. LTE Band 4 (20MHz Bandwidth)

RF Exposure Conditions	Mode	Dist. (mm)	Test Position	Ch #.	Freq. (MHz)	RB Allocation	RB offset	Power (dBm)		1-g SAR (W/kg)		Plot No.
								Tune-up limit	Meas.	Meas.	Scaled	
Head	QPSK	0	Left Touch	20175	1732.5	1	49	24.6	24.6	0.489	**0.494**	7
						50	24	23.6	23.3	0.368	0.396	
			Left Tilt	20175	1732.5	1	49	24.6	24.6	0.278	0.281	
						50	24	23.6	23.3	0.202	0.217	
			Right Touch	20175	1732.5	1	49	24.6	24.6	0.413	0.417	
						50	24	23.6	23.3	0.314	0.338	
			Right Tilt	20175	1732.5	1	49	24.6	24.6	0.162	0.163	
						50	24	23.6	23.3	0.127	0.137	
Body-worn & Hotspot	QPSK	10	Rear	20175	1732.5	1	49	24.6	24.6	0.795	**0.802**	8
						50	24	23.6	23.3	0.639	0.688	
			Front	20175	1732.5	1	49	24.6	24.6	0.785	0.792	
						50	24	23.6	23.3	0.625	0.673	
Hotspot	QPSK	10	Edge 3	20175	1732.5	1	49	24.6	24.6	0.415	0.419	
						50	24	23.6	23.3	0.322	0.347	
			Edge 4	20175	1732.5	1	49	24.6	24.6	0.395	0.399	
						50	24	23.6	23.3	0.298	0.321	

10.5. LTE Band 5 (10MHz Bandwidth)

RF Exposure Conditions	Mode	Dist. (mm)	Test Position	Ch #.	Freq. (MHz)	RB Allocation	RB offset	Power (dBm)		1-g SAR (W/kg)		Plot No.
								Tune-up limit	Meas.	Meas.	Scaled	
Head	QPSK	0	Left Touch	20525	836.5	1	25	24.4	24.2	0.533	0.558	
						25	0	23.4	23.0	0.413	0.453	
			Left Tilt	20525	836.5	1	25	24.4	24.2	0.316	0.331	
						25	0	23.4	23.0	0.242	0.265	
			Right Touch	20525	836.5	1	25	24.4	24.2	0.630	**0.660**	9
						25	0	23.4	23.0	0.486	0.533	
			Right Tilt	20525	836.5	1	25	24.4	24.2	0.345	0.361	
						25	0	23.4	23.0	0.276	0.303	
Body-worn & Hotspot	QPSK	10	Rear	20525	836.5	1	25	24.4	24.2	0.658	**0.689**	10
						25	0	23.4	23.0	0.468	0.513	
			Front	20525	836.5	1	25	24.4	24.2	0.569	0.596	
						25	0	23.4	23.0	0.438	0.480	
Hotspot	QPSK	10	Edge 2	20525	836.5	1	25	24.4	24.2	0.426	0.446	
						25	0	23.4	23.0	0.342	0.375	
			Edge 3	20525	836.5	1	25	24.4	24.2	0.426	0.446	
						25	0	23.4	23.0	0.310	0.340	
			Edge 4	20525	836.5	1	25	24.4	24.2	0.260	0.272	
						25	0	23.4	23.0	0.210	0.230	

10.6. LTE Band 12 (10MHz Bandwidth)

RF Exposure Conditions	Mode	Dist. (mm)	Test Position	Ch #.	Freq. (MHz)	RB Allocation	RB offset	Power (dBm)		1-g SAR (W/kg)		Plot No.
								Tune-up limit	Meas.	Meas.	Scaled	
Head	QPSK	0	Left Touch	23095	707.5	1	25	24.4	24.3	0.287	0.294	
						25	0	23.4	23.1	0.214	0.229	
			Left Tilt	23095	707.5	1	25	24.4	24.3	0.179	0.183	
						25	0	23.4	23.1	0.128	0.137	
			Right Touch	23095	707.5	1	25	24.4	24.3	0.337	**0.345**	11
						25	0	23.4	23.1	0.250	0.268	
			Right Tilt	23095	707.5	1	25	24.4	24.3	0.163	0.167	
						25	0	23.4	23.1	0.129	0.138	
Body-worn & Hotspot	QPSK	10	Rear	23095	707.5	1	25	24.4	24.3	0.523	**0.535**	12
						25	0	23.4	23.1	0.362	0.388	
			Front	23095	707.5	1	25	24.4	24.3	0.288	0.295	
						25	0	23.4	23.1	0.248	0.266	
Hotspot	QPSK	10	Edge 2	23095	707.5	1	25	24.4	24.3	0.465	0.476	
						25	0	23.4	23.1	0.286	0.306	
			Edge 3	23095	707.5	1	25	24.4	24.3	0.162	0.166	
						25	0	23.4	23.1	0.122	0.131	
			Edge 4	23095	707.5	1	25	24.4	24.3	0.283	0.290	
						25	0	23.4	23.1	0.203	0.218	

10.7. LTE Band 17 (10MHz Bandwidth)

RF Exposure Conditions	Mode	Dist. (mm)	Test Position	Ch #.	Freq. (MHz)	RB Allocation	RB offset	Power (dBm)		1-g SAR (W/kg)		Plot No.
								Tune-up limit	Meas.	Meas.	Scaled	
Head	QPSK	0	Left Touch	23790	710.0	1	25	24.4	24.2	0.253	0.265	
						25	0	23.4	22.9	0.197	0.221	
			Left Tilt	23790	710.0	1	25	24.4	24.2	0.139	0.146	
						25	0	23.4	22.9	0.115	0.129	
			Right Touch	23790	710.0	1	25	24.4	24.2	0.291	**0.305**	13
						25	0	23.4	22.9	0.230	0.258	
			Right Tilt	23790	710.0	1	25	24.4	24.2	0.151	0.158	
						25	0	23.4	22.9	0.121	0.136	
Body-worn & Hotspot	QPSK	10	Rear	23790	710.0	1	25	24.4	24.2	0.520	**0.545**	14
						25	0	23.4	22.9	0.383	0.430	
			Front	23790	710.0	1	25	24.4	24.2	0.399	0.418	
						25	0	23.4	22.9	0.292	0.328	
Hotspot	QPSK	10	Edge 2	23790	710.0	1	25	24.4	24.2	0.508	0.532	
						25	0	23.4	22.9	0.329	0.369	
			Edge 3	23790	710.0	1	25	24.4	24.2	0.151	0.158	
						25	0	23.4	22.9	0.124	0.139	
			Edge 4	23790	710.0	1	25	24.4	24.2	0.310	0.325	
						25	0	23.4	22.9	0.222	0.249	

10.8. LTE Band 25 (20MHz Bandwidth)

RF Exposure Conditions	Mode	Dist. (mm)	Test Position	Ch #.	Freq. (MHz)	RB Allocation	RB offset	Power (dBm)		1-g SAR (W/kg)		Plot No.
								Tune-up limit	Meas.	Meas.	Scaled	
Head	QPSK	0	Left Touch	26365	1882.5	1	0	23.2	22.8	0.573	**0.628**	15
						50	0	22.2	21.5	0.444	0.522	
			Left Tilt	26365	1882.5	1	0	23.2	22.8	0.388	0.425	
						50	0	22.2	21.5	0.285	0.335	
			Right Touch	26365	1882.5	1	0	23.2	22.8	0.573	0.628	
						50	0	22.2	21.5	0.447	0.525	
			Right Tilt	26365	1882.5	1	0	23.2	22.8	0.252	0.276	
						50	0	22.2	21.5	0.179	0.210	
Body-worn & Hotspot	QPSK	10	Rear	26140	1860.0	1	0	23.2	22.9	0.890	0.954	
				26365	1882.5	1	0	23.2	22.8	0.836	0.917	
						50	0	22.2	21.5	0.633	0.744	
				26590	1905.0	1	49	23.2	23.0	0.843	0.883	
			Front	26140	1860.0	1	0	23.2	22.9	0.888	0.952	
						50	0	22.2	21.4	0.688	0.827	
				26365	1882.5	1	0	23.2	22.8	0.921	**1.010**	16
						50	0	22.2	21.5	0.681	0.800	
				26590	1905.0	1	49	23.2	23.0	0.854	0.894	
						50	0	22.2	21.3	0.655	0.806	
Hotspot	QPSK	10	Edge 3	26365	1882.5	1	0	23.2	22.8	0.477	0.523	
						50	0	22.2	21.5	0.367	0.431	
			Edge 4	26365	1882.5	1	0	23.2	22.8	0.588	0.645	
						50	0	22.2	21.5	0.450	0.529	

10.9. Wi-Fi (DTS Band)

Frequency Band	Mode	RF Exposure Conditions	Dist. (mm)	Test Position	Ch #.	Freq. (MHz)	Area Scan Max. SAR (W/kg)	Power (dBm)		1-g SAR (W/kg)		Plot No.
								Tune-up limit	Meas.	Meas.	Scaled	
2.4GHz	802.11b 1 Mbps	Head	0	Left Touch	11	2462.0	0.225	15.0	14.6	0.189	**0.207**	17
				Left Tilt	11	2462.0	0.139	15.0	14.6			
				Right Touch	11	2462.0	0.111	15.0	14.6			
				Right Tilt	11	2462.0	0.066	15.0	14.6			
		Body-worn & Hotspot & Wi-Fi Direct	10	Rear	11	2462.0	0.062	15.0	14.6	0.049	**0.054**	18
				Front	11	2462.0	0.045	15.0	14.6			
				Edge 1	11	2462.0	0.021	15.0	14.6			
				Edge 2	11	2462.0	0.022	15.0	14.6			

10.10. Bluetooth

Standalone SAR Test Exclusion Considerations & Estimated SAR

The 1-g and 10-g SAR test exclusion thresholds for 100 MHz to 6 GHz at test separation distances ≤ 50 mm are determined by:

[(max. power of channel, including tune-up tolerance, mW) / (min. test separation distance, mm)]·[√f(GHz)] ≤ 3.0, for 1-g SAR and ≤ 7.5 for 10-g extremity SAR, where

- $f_{(GHz)}$ is the RF channel transmit frequency in GHz
- Power and distance are rounded to the nearest mW and mm before calculation
- The result is rounded to one decimal place for comparison

The test exclusions are applicable only when the minimum test separation distance is ≤ 50 mm and for transmission frequencies between 100 MHz and 6 GHz. When the minimum test separation distance is < 5 mm, a distance of 5 mm is applied to determine SAR test exclusion.

When the standalone SAR test exclusion is applied to an antenna that transmits simultaneously with other antennas, the standalone SAR must be estimated according to following to determine simultaneous transmission SAR test exclusion:

- *(max. power of channel, including tune-up tolerance, mW) / (min. test separation distance, mm)]·[√$f_{(GHz)}$/x]* W/kg for test separation distances ≤ 50 mm;
  where x = 7.5 for 1-g SAR, and x = 18.75 for 10-g SAR.
- 0.4 W/kg for 1-g SAR and 1.0 W/kg for 10-g SAR, when the test separation distances is > 50 mm.

Body-worn Accessory Exposure Conditions

Max. tune-up tolerance limit		Min. test separation distance (mm)	Frequency (GHz)	SAR test exclusion Result*	Test Configuration	Estimated 1-g SAR (W/kg)
(dBm)	(mW)					
10.0	10	10	2.480	1.6	Rear/Front	0.210

Conclusion:

*: The computed value is ≤ 3; therefore, Bluetooth qualifies for Standalone SAR test exclusion.

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 3 (1-g or 10-g respectively) 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 or 3 (1-g or 10-g respectively).

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	Body & Hotspot	Rear	No	0.523	N/A	N/A
	LTE Band 17	Body & Hotspot	Rear	No	0.520	N/A	N/A
850	CDMA BC0	Body & Hotspot	Rear	No	0.710	N/A	N/A
	LTE Band 5	Body & Hotspot	Rear	No	0.658	N/A	N/A
1900	CDMA BC1	Body & Hotspot	Front	Yes	1.250	1.220	1.02
	LTE Band 2	Body & Hotspot	Front	No	1.020	N/A	N/A
	LTE Band 25	Body & Hotspot	Front	No	0.921	N/A	N/A
1700	LTE Band 4	Body & Hotspot	Rear	No	0.795	N/A	N/A
2400	Wi-Fi 802.11b/g/n	Head	Left Touch	No	0.185	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.

12. Simultaneous Transmission SAR Analysis

Simultaneous Transmission Condition

RF Exposure Condition	Item	Capable Transmit Configurations		
Head	1	CDMA	+	DTS
	2	LTE	+	DTS
Body-worn & Hotspot/Wi-Fi Direct	3	CDMA	+	DTS
	4	CDMA	+	BT
	5	LTE	+	DTS
	6	LTE	+	BT

Notes:

1. DTS supports Hotspot and Wi-Fi Direct.
2. CDMA and LTE support Hotspot.
3. VoIP is not supported in CDMA and LTE.
4. DTS Radio cannot transmit simultaneously with Bluetooth Radio.
5. CDMA and LTE can not transmit simultaneously since they share the same chip.

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

RF Exposure conditions	① WWAN	② DTS	③ BT	① + ② WWAN + DTS		① + ③ WWAN + BT	
				∑ 1-g SAR	SPLSR (Yes/ No)	∑ 1-g SAR	SPLSR (Yes/ No)
Head	0.798	0.207		1.005	No		
Body-Worn & Hotspot/Wi-Fi Direct	1.250	0.054	0.210	**1.304**	No	**1.460**	No

Conclusion:

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

Appendixes

Refer to separated files for the following appendixes.

16I22599-S1V1 SAR_App A Photos & Ant. Locations

16I22599-S1V2 SAR_App B System Check Plots

16I22599-S1V1 SAR_App C Highest Test Plots

16I22599-S1V1 SAR_App D Tissue Ingredients

16I22599-S1V1 SAR_App E Probe Cal. Certificates

16I22599-S1V1 SAR_App F Dipole Cal. Certificates

END OF REPORT