SAR EVALUATION REPORT

CLASS II PERMISSIVE CHANGE

FCC 47 CFR § 2.1093
IEEE Std 1528-2013

For
GSM/WCDMA/LTE PHABLET + BLUETOOTH, DTS/UNII a/b/g/n and NFC

FCC ID: ZNFH740
Model Name: LG-H740, LGH740, H740

Report Number: 15I21442-S1V1
Issue Date: 9/10/2015

Prepared for
LG ELECTRONICS MOBILECOMM USA, INC.
1000 SYLVAN AVENUE
ENGLEWOOD CLIFFS, NEW JERSEY 07632, USA

Prepared by
UL VERIFICATION SERVICES INC.
47173 BENICIA STREET
FREMONT, CA 94538, U.S.A.
TEL: (510) 771-1000
FAX: (510) 661-0888

NVLAP LAB CODE 200065-0

Revision History

Rev.	Date	Revisions	Revised By
V1	9/10/2015	Initial Issue	--

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1. Attestation of Test Results

Applicant Name	LG ELECTRONICS MOBILECOMM USA, INC.			
FCC ID	ZNFH740			
Model Name	LG-H740, LGH740, H740			
Applicable Standards	FCC 47 CFR § 2.1093 Published RF exposure KDB procedures IEEE Std 1528-2013			
SAR Limits (W/Kg)				
Exposure Category	Peak spatial-average(1g of tissue)		Extremities (hands, wrists, ankles, etc.) (10g of tissue)	
General population / Uncontrolled exposure	1.6		4	
The Highest Reported SAR (W/kg)				
RF Exposure Conditions	**Equipment Class**			
	Licensed	**DTS**	**U-NII**	**DSS (BT)**
Head	0.679	0.523	0.321	N/A
Body-worn	0.996	0.291	0.197	
Hotspot/Wi-Fi Direct			0.119	
Extremity (10g)	N/A	N/A	0.288	
Simultaneous Tx	1.287	1.287	1.193	
Date Tested	8/3/2015 to 8/6/2015			
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.	Tony Soares Laboratory Technician UL Verification Services Inc.

2. Test Specification, Methods and Procedures

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

- 248227 D01 802.11 Wi-Fi SAR v02
- 447498 D01 General RF Exposure Guidance v05r02
- 447498 D03 Supplement C Cross-Reference v01
- 648474 D04 Handset SAR v01r02
- 690783 D01 SAR Listings on Grants v01r03
- 865664 D01 SAR measurement 100 MHz to 6 GHz v01r03
- 865664 D02 RF Exposure Reporting v01r01
- 941225 D01 3G SAR Procedures v03
- 941225 D05 SAR for LTE Devices v02r03
- 941225 D05A LTE Rel.10 KDB Inquiry Sheet v01r01
- 941225 D06 Hotspot Mode v02

- TCB workshop October, 2014; Page 36, RF Exposure Procedures Update

3. Facilities and Accreditation

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

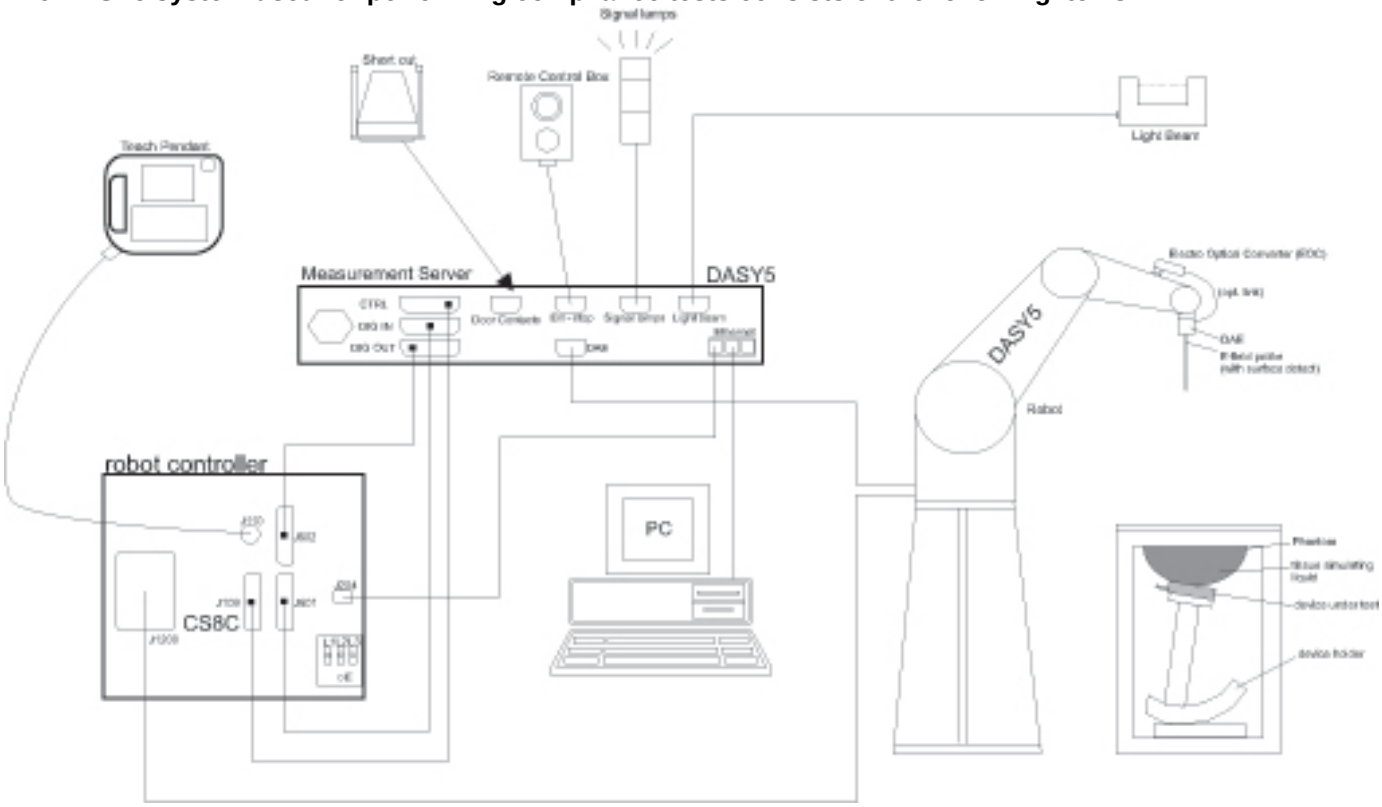
47173 Benicia Street	47266 Benicia Street
SAR Lab A	SAR Lab 1
SAR Lab B	SAR Lab 2
SAR Lab C	SAR Lab 3
SAR Lab D	SAR Lab 4
SAR Lab E	SAR Lab 5
SAR Lab F	
SAR Lab G	
SAR Lab H	

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

4. SAR Measurement System & Test Equipment

4.1. SAR Measurement System

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



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

4.2. SAR Scan Procedures

Step 1: Power Reference Measurement

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

Step 2: Area Scan

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

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

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

Step 3: Zoom Scan

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

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

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

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

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

Step 4: Power drift measurement

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

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	E753ES	MY40001647	7/28/2016
Dielectric Probe kit	SPEAG	DAK-3.5	1082	9/16/2015
Shorting block	SPEAG	DAK-3.5 Short	SM DAK 200 BA	N/A
Thermometer	Control Company	Traceable	122529163	10/8/2015

System Check

Name of Equipment	Manufacturer	Type/Model	Serial No.	Cal. Due Date
Synthesized Signal Generator	Agilent	8665B	3438A00633	8/29/2015
Power Meter	HP	437B	3125U09516	8/27/2015
Power Meter	HP	437B	3125U11347	10/6/2015
Power Sensor	HP	8481A	3318A95392	10/6/2015
Power Sensor	HP	8481A	1926A16917	10/10/2015
Amplifier	MITEQ	AMF-4D-00400600-50-30P	1808938	N/A
Bi-directional coupler	Werlatone, Inc.	C8060-102	2710	N/A
DC Power Supply	HP	6296A	2841A-05955	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
E-Field Probe (SAR Lab 5)	SPEAG	EX3DV4	3773	4/22/2016
Data Acquisition Electronics (SAR Lab 1)	SPEAG	DAE4	1352	11/7/2015
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	1377	8/27/2015
Data Acquisition Electronics (SAR Lab 5)	SPEAG	DAE4	1239	4/16/2016
System Validation Dipole	SPEAG	D750V3	1071	11/13/2015
System Validation Dipole	SPEAG	D835V2	4d117	5/18/2016
System Validation Dipole	SPEAG	D1750V2	1053	8/18/2015
System Validation Dipole	SPEAG	D1900V2	5d163	9/11/2015
System Validation Dipole	SPEAG	D2300V2	1002	3/13/2016
System Validation Dipole	SPEAG	D2450V2	706	5/11/2016
System Validation Dipole	SPEAG	D5GHzV2	1138	9/18/2015
Thermometer (SAR Lab 1)	EXTECH	445703	CCS-205	3/20/2016
Thermometer (SAR Lab 2)	EXTECH	445703	CCS-203	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
Thermometer (SAR Lab 5)	EXTECH	445703	CCS-239	6/5/2016

Other

Name of Equipment	Manufacturer	Type/Model	Serial No.	Cal. Due Date
Power Meter	Agilent	N1912A	MY53060007	9/15/2015
Power Sensor	Agilent	N1921A	MY53260011	6/1/2016
Base Station Simulator	R & S	CMW500	137875-DZ	6/25/2016
Base Station Simulator	Agilent	8960	MY53211024	9/19/2015

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	For Device Dimensions please refer to Appendix A “SAR Photos & Ant. Locations”		
Back Cover	☐ Normal Battery Cover ☒ Normal Battery Cover with NFC ☐ Wireless Charger Battery Cover ☐ Wireless Charger Battery Cover with NFC ☐ The rechargeable battery is not user accessible.		
Battery Options	☒ Standard – Lithium-ion battery, Rating 3.85Vdc, 11.6Wh ☐ Extended (large capacity) ☐ 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 (Wi-Fi 2.4 GHz) ☒ Wi-Fi Direct (Wi-Fi 5.8 GHz)		
Test sample information	**S/N**	**IMEI**	**Notes**
	506CYUK000406-4	353073-07-000406-4	Licensed Radiated/Conducted
	506CYKJ000405	353073-07-000405-6	Licensed Radiated/Conducted
	506CYNL000119	353073-07-000119-3	Licensed Radiated/Conducted
	506CYJZ000412	353073-07-000412-2	BT/Wi-Fi SAR

6.2. Wireless Technologies

<table>
<tr><th>Wireless technologies</th><th>Frequency bands</th><th colspan="2">Operating mode</th><th>Duty Cycle used for SAR testing</th></tr>
<tr><td rowspan="2">GSM</td><td>850
1900</td><td>Voice (GMSK)
GPRS (GMSK)
EGPRS (8PSK)</td><td>GPRS Multi-Slot Class:
☐ Class 8 - 1 Up, 4 Down
☒ Class 10 - 2 Up, 4 Down
☐ Class 12 - 4 Up, 4 Down
☐ Class 33 - 4 Up, 5 Down</td><td>GSM Voice: 12.5%
(E)GPRS: 1 Slot: 12.5%
2 Slots: 25%
3 Slots: 37.5%
4 Slots: 50%</td></tr>
<tr><td colspan="4">☐ Class A = Can be connected to GPRS service and GSM service (voice, SMS), using both at the same time.
Does this device support DTM (Dual Transfer Mode)? ☐ Yes ☐ No
☒ Class B = GPRS connection interrupted during a GSM call, automatically resumed at end of call.
☐ Class C = manual GSM / GPRS mode switching.</td></tr>
<tr><td>W-CDMA (UMTS)</td><td>Band II
Band V</td><td colspan="2">UMTS Rel. 99 (Voice & Data)
HSDPA (Rel. 5)
HSUPA (Rel. 6)
HSPA+ (Rel. 7)</td><td>100%</td></tr>
<tr><td>LTE</td><td>FDD Band 2
FDD Band 4
FDD Band 5
FDD Band 12
FDD Band 17
FDD Band 30</td><td colspan="2">QPSK
16QAM
☒ Rel. 10 Carrier Aggregation (Downlinks Only)
☐ Rel. 10 Carrier Aggregation (1 Uplink and 2 Downlinks)
☐ Rel. 11 Carrier Aggregation (2 Uplink and 2 Downlinks)</td><td>100% (FDD)</td></tr>
<tr><td rowspan="4">Wi-Fi</td><td>2.4 GHz</td><td colspan="2">802.11b
802.11g
802.11n (HT20)</td><td>100%</td></tr>
<tr><td>5 GHz</td><td colspan="2">802.11a
802.11n (HT20)
802.11n (HT40)</td><td>100%</td></tr>
<tr><td colspan="4">Does this device support bands 5.60 ~ 5.65 GHz? ☐ Yes ☒ No</td></tr>
<tr><td colspan="4">Does this device support Band gap channel(s)? ☐ Yes ☒ No</td></tr>
<tr><td>Bluetooth</td><td>2.4 GHz</td><td colspan="2">Version 4.1 LE</td><td>77.5% (DH5)</td></tr>
</table>

6.3. Nominal and Maximum Output Power

KDB 447498 sec.4.1.(3) at the maximum rated output power and within the tune-up tolerance range specified for the product, but not more than 2 dB lower than the maximum tune-up tolerance limit

Upper limit (dB): -1.5 ~ 0.5		Max. RF Output Power (dBm)		
RF Air interface	Mode	Target	Max. tune-up tolerance limit	
			Burst	Frame
GSM850	Voice (1 slot)	32.7	**33.2**	**24.2**
	GPRS 1 slot	32.7	**33.2**	**24.2**
	GPRS 2 slots	31.7	**32.2**	**26.2**
	EGPRS 1 slot	27.2	**27.7**	**18.7**
	EGPRS 2 slots	26.2	**26.7**	**20.7**
GSM1900	Voice (1 slot)	29.2	**29.7**	**20.7**
	GPRS 1 slot	29.2	**29.7**	**20.7**
	GPRS 2 slots	27.2	**27.7**	**21.7**
	EGPRS 1 slot	25.2	**25.7**	**16.7**
	EGPRS 2 slots	24.2	**24.7**	**18.7**

Upper limit (dB): -1.5 ~ 0.5		Max. RF Output Power (dBm)	
RF Air interface	Mode	Target	Max. tune-up tolerance limit
W-CDMA Band II	R99	23.7	**24.2**
	HSDPA	23.7	**24.2**
	HSUPA	23.7	**24.2**
W-CDMA Band V	R99	23.7	**24.2**
	HSDPA	23.7	**24.2**
	HSUPA	23.7	**24.2**
LTE Band 2	QPSK	24.2	**24.7**
	16QAM	23.2	**23.7**
LTE Band 4	QPSK	24.2	**24.7**
	16QAM	23.2	**23.7**
LTE Band 5	QPSK	24.2	**24.7**
	16QAM	23.2	**23.7**
LTE Band 12	QPSK	24.2	**24.7**
	16QAM	23.2	**23.7**
LTE Band 17	QPSK	24.2	**24.7**
	16QAM	23.2	**23.7**
LTE Band 30	QPSK	22.2	**22.7**
	16QAM	21.2	**21.7**

Upper limit (dB): ~ 1.0		Max. RF Output Power (dBm)		
RF Air interface	Mode	CH.	Target	Max. tune-up tolerance limit
WiFi 2.4 GHz	802.11b	2~10	17.5	**18.5**
		1,11	14.5	**15.5**
	802.11g	2~10	14.5	**15.5**
		1,11	11.5	**12.5**
	802.11n HT20	2~10	13.0	**14.0**
		1,11	10.0	**11.0**
WiFi 5 GHz	802.11a	All	12.5	**13.5**
	802.11n HT20	All	11.5	**12.5**
	802.11n HT40	All	10.5	**11.5**
Bluetooth		All	8.0	**9.0**
Bluetooth LE		All	-1.0	**0.0**

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			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 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 30	Frequency range: 2305 - 2315 MHz					
		Channel Bandwidth					
		20 MHz	15 MHz	10 MHz	5 MHz	3 MHz	1.4 MHz
	Low				27685/ 2307.5		
	Mid			27710/ 2310	27710/ 2310		
	High				27735/ 2312.5		

General LTE SAR Test and Reporting Considerations (Continued)

<table>
<tr><td rowspan="22">Carrier Aggregation Combinations
(For supported channels, please refer to the tables above)</td><td>Band 4
Primary</td><td>Channel Bandwidth</td><td>Band 29
Secondary</td><td>Channel Bandwidth</td></tr>
<tr><td></td><td>10, 5 MHz</td><td></td><td>10, 5, 3 MHz</td></tr>
<tr><td>Band 2
Primary</td><td>Channel Bandwidth</td><td>Band 29
Secondary</td><td>Channel Bandwidth</td></tr>
<tr><td></td><td>10, 5 MHz</td><td></td><td>10, 5, 3 MHz</td></tr>
<tr><td>Band 4
Primary</td><td>Channel Bandwidth</td><td>Band 5
Secondary</td><td>Channel Bandwidth</td></tr>
<tr><td></td><td>10, 5 MHz</td><td></td><td>10, 5 MHz</td></tr>
<tr><td>Band 5
Primary</td><td>Channel Bandwidth</td><td>Band 4
Secondary</td><td>Channel Bandwidth</td></tr>
<tr><td></td><td>10, 5 MHz</td><td></td><td>10, 5 MHz</td></tr>
<tr><td>Band 2
Primary</td><td>Channel Bandwidth</td><td>Band 17
Secondary</td><td>Channel Bandwidth</td></tr>
<tr><td></td><td>10, 5 MHz</td><td></td><td>10, 5 MHz</td></tr>
<tr><td>Band 17
Primary</td><td>Channel Bandwidth</td><td>Band 2
Secondary</td><td>Channel Bandwidth</td></tr>
<tr><td></td><td>10, 5 MHz</td><td></td><td>10, 5 MHz</td></tr>
<tr><td>Band 4
Primary</td><td>Channel Bandwidth</td><td>Band 12
Secondary</td><td>Channel Bandwidth</td></tr>
<tr><td></td><td>10, 5, 3, 1.4 MHz</td><td></td><td>10, 5 MHz</td></tr>
<tr><td>Band 12
Primary</td><td>Channel Bandwidth</td><td>Band 4
Secondary</td><td>Channel Bandwidth</td></tr>
<tr><td></td><td>10, 5 MHz</td><td></td><td>10, 5, 3, 1.4 MHz</td></tr>
<tr><td>Band 4
Primary</td><td>Channel Bandwidth</td><td>Band 17
Secondary</td><td>Channel Bandwidth</td></tr>
<tr><td></td><td>10, 5 MHz</td><td></td><td>10, 5 MHz</td></tr>
<tr><td>Band 17
Primary</td><td>Channel Bandwidth</td><td>Band 4
Secondary</td><td>Channel Bandwidth</td></tr>
<tr><td></td><td>10, 5 MHz</td><td></td><td>10, 5 MHz</td></tr>
<tr><td>LTE transmitter and antenna implementation</td><td colspan="4">LTE has one (2) TX/RX antennas and one (2) RX antennas
Refer to Appendix A.</td></tr>
<tr><td>Maximum power reduction (MPR)</td><td colspan="4">
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</td></tr>
<tr><td>Power reduction</td><td colspan="4">No</td></tr>
<tr><td>Spectrum plots for RB configurations</td><td colspan="4">A properly configured base station simulator was used for the SAR and power measurements; therefore, spectrum plots for each RB allocation and offset configuration are not included in the SAR report.</td></tr>
</table>

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 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	No	1
WWAN 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 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	15 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 ±(%)
8/4/2015	Body 2450	e'	52.0500	Relative Permittivity (ϵ_r):	52.05	52.70	-1.23	5
		e''	15.0000	Conductivity (σ):	2.04	1.95	4.79	5
	Body 2410	e'	52.1900	Relative Permittivity (ϵ_r):	52.19	52.76	-1.08	5
		e''	14.8400	Conductivity (σ):	1.99	1.91	4.25	5
	Body 2475	e'	52.0100	Relative Permittivity (ϵ_r):	52.01	52.67	-1.25	5
		e''	15.0400	Conductivity (σ):	2.07	1.99	4.26	5
8/4/2015	Head 2450	e'	37.3200	Relative Permittivity (ϵ_r):	37.32	39.20	-4.80	5
		e''	13.7900	Conductivity (σ):	1.88	1.80	4.37	5
	Head 2410	e'	37.4500	Relative Permittivity (ϵ_r):	37.45	39.28	-4.66	5
		e''	13.6900	Conductivity (σ):	1.83	1.76	4.21	5
	Head 2475	e'	37.2300	Relative Permittivity (ϵ_r):	37.23	39.17	-4.95	5
		e''	13.7800	Conductivity (σ):	1.90	1.83	3.80	5
8/4/2015	Head 2300	e'	37.8300	Relative Permittivity (ϵ_r):	37.83	39.47	-4.16	5
		e''	13.3500	Conductivity (σ):	1.71	1.66	2.62	5
	Head 2310	e'	37.8600	Relative Permittivity (ϵ_r):	37.86	39.45	-4.04	5
		e''	13.4300	Conductivity (σ):	1.72	1.67	3.14	5
	Head 2350	e'	37.6900	Relative Permittivity (ϵ_r):	37.69	39.38	-4.30	5
		e''	13.5700	Conductivity (σ):	1.77	1.71	3.83	5
8/4/2015	Body 2300	e'	51.4000	Relative Permittivity (ϵ_r):	51.40	52.90	-2.84	5
		e''	14.6800	Conductivity (σ):	1.88	1.80	4.10	5
	Body 2310	e'	51.3900	Relative Permittivity (ϵ_r):	51.39	52.89	-2.84	5
		e''	14.7700	Conductivity (σ):	1.90	1.81	4.64	5
	Body 2350	e'	51.3000	Relative Permittivity (ϵ_r):	51.30	52.84	-2.91	5
		e''	14.8600	Conductivity (σ):	1.94	1.85	4.91	5

SAR Lab 2

Date	Freq. (MHz)	Liquid Parameters			Measured	Target	Delta (%)	Limit ±(%)
8/3/2015	Head 1750	e'	38.5200	Relative Permittivity (ϵ_r):	38.52	40.08	-3.90	5
		e''	13.6400	Conductivity (σ):	1.33	1.37	-3.05	5
	Head 1710	e'	38.6600	Relative Permittivity (ϵ_r):	38.66	40.15	-3.70	5
		e''	13.5700	Conductivity (σ):	1.29	1.35	-4.17	5
	Head 1755	e'	38.4400	Relative Permittivity (ϵ_r):	38.44	40.08	-4.08	5
		e''	13.6400	Conductivity (σ):	1.33	1.37	-2.97	5
8/3/2015	Body 1750	e'	51.2900	Relative Permittivity (ϵ_r):	51.29	53.44	-4.03	5
		e''	14.9400	Conductivity (σ):	1.45	1.49	-2.18	5
	Body 1710	e'	51.4100	Relative Permittivity (ϵ_r):	51.41	53.54	-3.98	5
		e''	14.9000	Conductivity (σ):	1.42	1.46	-3.07	5
	Body 1755	e'	51.2200	Relative Permittivity (ϵ_r):	51.22	53.43	-4.13	5
		e''	14.9800	Conductivity (σ):	1.46	1.49	-1.84	5
8/3/2015	Head 750	e'	41.1700	Relative Permittivity (ϵ_r):	41.17	41.96	-1.89	5
		e''	22.1600	Conductivity (σ):	0.92	0.89	3.48	5
	Head 700	e'	41.8600	Relative Permittivity (ϵ_r):	41.86	42.22	-0.85	5
		e''	22.5600	Conductivity (σ):	0.88	0.89	-1.25	5
	Head 725	e'	41.5100	Relative Permittivity (ϵ_r):	41.51	42.09	-1.38	5
		e''	22.2900	Conductivity (σ):	0.90	0.89	0.83	5
8/3/2015	Body 750	e'	53.5300	Relative Permittivity (ϵ_r):	53.53	55.55	-3.63	5
		e''	23.2100	Conductivity (σ):	0.97	0.96	0.50	5
	Body 700	e'	54.0300	Relative Permittivity (ϵ_r):	54.03	55.74	-3.07	5
		e''	23.5600	Conductivity (σ):	0.92	0.96	-4.40	5
	Body 725	e'	53.7900	Relative Permittivity (ϵ_r):	53.79	55.64	-3.33	5
		e''	23.3100	Conductivity (σ):	0.94	0.96	-2.23	5

SAR Lab 3

Date	Freq. (MHz)	Liquid Parameters			Measured	Target	Delta (%)	Limit ±(%)
8/3/2015	Head 1900	e'	38.5300	Relative Permittivity (ϵ_r):	38.53	40.00	-3.68	5
		e''	13.1400	Conductivity (σ):	1.39	1.40	-0.84	5
	Head 1850	e'	38.8200	Relative Permittivity (ϵ_r):	38.82	40.00	-2.95	5
		e''	12.9700	Conductivity (σ):	1.33	1.40	-4.70	5
	Head 1910	e'	38.4600	Relative Permittivity (ϵ_r):	38.46	40.00	-3.85	5
		e''	13.1100	Conductivity (σ):	1.39	1.40	-0.55	5
8/3/2015	Body 1900	e'	50.9800	Relative Permittivity (ϵ_r):	50.98	53.30	-4.35	5
		e''	14.3000	Conductivity (σ):	1.51	1.52	-0.61	5
	Body 1850	e'	51.2500	Relative Permittivity (ϵ_r):	51.25	53.30	-3.85	5
		e''	14.1200	Conductivity (σ):	1.45	1.52	-4.44	5
	Body 1910	e'	50.8700	Relative Permittivity (ϵ_r):	50.87	53.30	-4.56	5
		e''	14.2800	Conductivity (σ):	1.52	1.52	-0.23	5

SAR Lab 4

Date	Freq. (MHz)	Liquid Parameters			Measured	Target	Delta (%)	Limit ±(%)
8/4/2015	Head 5180	e'	34.9000	Relative Permittivity (ϵ_r):	34.90	36.01	-3.09	5
		e''	15.3500	Conductivity (σ):	4.42	4.63	-4.52	5
	Head 5200	e'	34.8400	Relative Permittivity (ϵ_r):	34.84	35.99	-3.20	5
		e''	15.3000	Conductivity (σ):	4.42	4.65	-4.88	5
	Head 5600	e'	34.3900	Relative Permittivity (ϵ_r):	34.39	35.53	-3.22	5
		e''	15.5700	Conductivity (σ):	4.85	5.06	-4.19	5
	Head 5800	e'	34.0600	Relative Permittivity (ϵ_r):	34.06	35.30	-3.51	5
		e''	15.6100	Conductivity (σ):	5.03	5.27	-4.47	5
	Head 5825	e'	34.0900	Relative Permittivity (ϵ_r):	34.09	35.30	-3.43	5
		e''	15.5700	Conductivity (σ):	5.04	5.27	-4.31	5
8/4/2015	Body 5180	e'	48.6900	Relative Permittivity (ϵ_r):	48.69	49.05	-0.73	5
		e''	19.1200	Conductivity (σ):	5.51	5.27	4.47	5
	Body 5200	e'	48.6200	Relative Permittivity (ϵ_r):	48.62	49.02	-0.82	5
		e''	19.1500	Conductivity (σ):	5.54	5.29	4.58	5
	Body 5600	e'	47.6300	Relative Permittivity (ϵ_r):	47.63	48.48	-1.75	5
		e''	19.4200	Conductivity (σ):	6.05	5.76	4.96	5
	Body 5800	e'	47.2700	Relative Permittivity (ϵ_r):	47.27	48.20	-1.93	5
		e''	19.4400	Conductivity (σ):	6.27	6.00	4.49	5
	Body 5825	e'	47.2600	Relative Permittivity (ϵ_r):	47.26	48.20	-1.95	5
		e''	19.3700	Conductivity (σ):	6.27	6.00	4.56	5

SAR Lab 5

Date	Freq. (MHz)	Liquid Parameters			Measured	Target	Delta (%)	Limit ±(%)
8/3/2015	Head 835	e'	40.3800	Relative Permittivity (ϵ_r):	40.38	41.50	-2.70	5
		e''	19.0600	Conductivity (σ):	0.88	0.90	-1.67	5
	Head 820	e'	40.5600	Relative Permittivity (ϵ_r):	40.56	41.60	-2.51	5
		e''	19.0400	Conductivity (σ):	0.87	0.90	-3.38	5
	Head 850	e'	40.1600	Relative Permittivity (ϵ_r):	40.16	41.50	-3.23	5
		e''	18.9900	Conductivity (σ):	0.90	0.92	-1.91	5
8/3/2015	Body 835	e'	52.7300	Relative Permittivity (ϵ_r):	52.73	55.20	-4.47	5
		e''	21.5800	Conductivity (σ):	1.00	0.97	3.29	5
	Body 820	e'	52.9400	Relative Permittivity (ϵ_r):	52.94	55.28	-4.23	5
		e''	21.6400	Conductivity (σ):	0.99	0.97	1.88	5
	Body 850	e'	52.6200	Relative Permittivity (ϵ_r):	52.62	55.16	-4.60	5
		e''	21.4800	Conductivity (σ):	1.02	0.99	2.84	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.

Reference Target SAR Values

The reference SAR values can be obtained from the calibration certificate of system validation dipoles

System Dipole	Serial No.	Cal. Date	Freq. (MHz)	Target SAR Values (W/kg)		
				1g/10g	Head	Body
D750V3	1071	11/13/2014	750	1g	8.22	8.52
				10g	5.39	5.64
D835V2	4d117	5/18/2015	835	1g	9.08	9.38
				10g	5.93	6.20
D1750V2	1053	8/18/2014	1750	1g	36.9	38.0
				10g	19.6	20.4
D1900V2	5d163	9/11/2014	1900	1g	40.8	40.6
				10g	21.2	21.4
D2300V2	1002	3/13/2015	2300	1g	47.7	49.1
				10g	23.0	23.7
D2450V2	706	5/11/2015	2450	1g	52.6	51.3
				10g	24.6	24.0
D5GHzV2	1138	9/18/2014	5200	1g	81.4	75.4
				10g	23.3	21.0
			5600	1g	85.1	81.9
				10g	24.2	22.6
			5800	1g	80.6	75.2
				10g	23.0	20.8

System Check Results

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

SAR Lab 1

Date Tested	System Dipole		T.S. Liquid		Measured Results		Target (Ref. Value)	Delta ±10 %	Plot No.
	Type	Serial #			Zoom Scan to 100 mW	Normalize to 1 W			
8/4/2015	D2450V2	706	Head	1g	5.51	55.1	52.60	4.75	
				10g	2.50	25.0	24.60	1.63	
8/4/2015	D2450V2	706	Body	1g	5.62	56.2	51.30	**9.55**	1, 2
				10g	2.57	25.7	24.00	7.08	
8/4/2015	D2300V2	1002	Head	1g	5.13	51.3	47.7	**7.55**	3, 4
				10g	2.40	24.0	23.0	4.35	
8/4/2015	D2300V2	1002	Body	1g	4.88	48.8	49.1	-0.61	
				10g	2.32	23.2	23.7	-2.11	

SAR Lab 2

Date Tested	System Dipole		T.S. Liquid		Measured Results		Target (Ref. Value)	Delta ±10 %	Plot No.
	Type	Serial #			Zoom Scan to 100 mW	Normalize to 1 W			
8/3/2015	D1750V2	1053	Head	1g	3.61	36.1	36.90	**-2.17**	5, 6
				10g	1.90	19.0	19.60	-3.06	
8/3/2015	D1750V2	1053	Body	1g	3.75	37.5	38.00	-1.32	
				10g	2.00	20.0	20.40	-1.96	
8/3/2015	D750V3	1071	Head	1g	0.869	8.7	8.22	**5.72**	7, 8
				10g	0.570	5.7	5.39	5.75	
8/3/2015	D750V3	1071	Body	1g	0.866	8.7	8.52	1.64	
				10g	0.577	5.8	5.64	2.30	

SAR Lab 3

Date Tested	System Dipole		T.S. Liquid		Measured Results		Target (Ref. Value)	Delta ±10 %	Plot No.
	Type	Serial #			Zoom Scan to 100 mW	Normalize to 1 W			
8/3/2105	D1900V2	5d163	Head	1g	4.12	41.2	40.8	0.98	
				10g	2.14	21.4	21.2	0.94	
8/3/2105	D1900V2	5d163	Body	1g	4.14	41.4	40.60	**1.97**	9, 10
				10g	2.15	21.5	21.4	0.47	

SAR Lab 4

Date Tested	System Dipole		T.S. Liquid		Measured Results		Target (Ref. Value)	Delta ±10 %	Plot No.
	Type	Serial #			Zoom Scan to 100 mW	Normalize to 1 W			
8/4/2015	D5GHzV2 (5.2GHz)	1138	Head	1g	8.43	84.3	81.4	3.56	
				10g	2.41	24.1	23.3	3.43	
8/4/2015	D5GHzV2 (5.6GHz)	1138	Head	1g	8.31	83.1	85.1	-2.35	
				10g	2.38	23.8	24.2	-1.65	
8/4/2015	D5GHzV2 (5.8GHz)	1138	Head	1g	7.98	79.8	80.6	-0.99	
				10g	2.28	22.8	23.0	-0.87	
8/4/2015	D5GHzV2 (5.2GHz)	1138	Body	1g	7.54	75.4	75.40	0.00	
				10g	2.13	21.3	21.0	1.43	
8/4/2015	D5GHzV2 (5.6GHz)	1138	Body	1g	8.63	86.3	81.9	**5.37**	11, 12
				10g	2.42	24.2	22.6	**7.08**	
8/4/2015	D5GHzV2 (5.8GHz)	1138	Body	1g	7.88	78.8	75.2	4.79	
				10g	2.20	22.0	20.8	5.77	

SAR Lab 5

Date Tested	System Dipole		T.S. Liquid		Measured Results		Target (Ref. Value)	Delta ±10 %	Plot No.
	Type	Serial #			Zoom Scan to 100 mW	Normalize to 1 W			
8/3/2015	D835V2	4d117	Head	1g	0.966	9.7	9.08	6.39	
				10g	0.636	6.4	5.93	7.25	
8/3/2015	D835V2	4d117	Body	1g	1.02	10.2	9.38	**8.74**	13, 14
				10g	0.672	6.7	6.2	8.39	

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.

GSM850 Measured Results

Band	Mode	Coding Scheme	Time Slots	Ch No.	Freq. (MHz)	Max. Pwr	
						Burst (dBm)	Frame (dBm)
850	GSM (Voice)	CS1	1	128	824.2	33.0	24.0
				190	836.6	33.0	23.9
				251	848.8	33.0	24.0
	GPRS (GMSK)	CS1	1	128	824.2	33.0	24.0
				190	836.6	33.0	24.0
				251	848.8	33.1	24.0
			2	128	824.2	32.2	26.2
				190	836.6	32.1	26.0
				251	848.8	32.2	26.1
	EGPRS (8PSK)	MCS5	1	128	824.2	27.5	18.5
				190	836.6	27.4	18.4
				251	848.8	27.5	18.4
			2	128	824.2	26.5	20.4
				190	836.6	26.3	20.3
				251	848.8	26.4	20.4

Notes:

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

- Head & Body-worn: GMSK Voice Mode
- Hotspot mode: GMSK (GPRS) mode with 2 time slots based on the output power measurements above.
- SAR is not required for EGPRS (8PSK) mode because its output power is less than that of GPRS Mode

GSM1900 Measured Results

Band	Mode	Coding Scheme	Time Slots	Ch No.	Freq. (MHz)	Max. Pwr	
						Burst (dBm)	Frame (dBm)
1900	GSM (Voice)	CS1	1	512	1850.2	29.4	20.4
				661	1880.0	29.5	20.5
				810	1909.8	29.6	20.6
	GPRS (GMSK)	CS1	1	512	1850.2	29.5	20.5
				661	1880.0	29.6	20.6
				810	1909.8	29.6	20.5
			2	512	1850.2	27.6	21.5
				661	1880.0	27.4	21.4
				810	1909.8	27.3	21.3
	EGPRS (8PSK)	MCS5	1	512	1850.2	25.6	16.5
				661	1880.0	25.5	16.5
				810	1909.8	25.5	16.5
			2	512	1850.2	24.5	18.5
				661	1880.0	24.5	18.5
				810	1909.8	24.4	18.4

Notes:

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

- Head & Body-worn: GMSK Voice Mode
- Hotspot mode: GMSK (GPRS) mode with 2 time slots based on the output power measurements above.
- SAR is not required for EGPRS (8PSK) mode because its output power is less than that of GPRS Mode

9.2. W-CDMA

Release 99 Setup Procedures used to establish the test signals

The following tests were completed according to the test requirements outlined in section 5.2 of the 3GPP TS34.121-1 specification. The DUT supports power Class 3, which has a nominal maximum output power of 24 dBm (+1.7/-3.7).

Mode	Subtest	Rel99
WCDMA General Settings	Loopback Mode	Test Mode 2
	Rel99 RMC	12.2kbps RMC
	Power Control Algorithm	Algorithm2
	βc/βd	8/15

HSDPA Setup Procedures used to establish the test signals

The following 4 Sub-tests were completed according to Release 5 procedures in section 5.2 of 3GPP TS34.121. A summary of these settings are illustrated below:

	Mode	HSDPA	HSDPA	HSDPA	HSDPA
	Subtest	1	2	3	4
W-CDMA General Settings	Loopback Mode	Test Mode 1			
	Rel99 RMC	12.2kbps RMC			
	HSDPA FRC	H-Set 1			
	Power Control Algorithm	Algorithm 2			
	βc	2/15	11/15	15/15	15/15
	βd	15/15	15/15	8/15	4/15
	Bd (SF)	64			
	βc/βd	2/15	11/15	15/8	15/4
	βhs	4/15	24/15	30/15	30/15
	MPR (dB)	0	0	0.5	0.5
HSDPA Specific Settings	D_{ACK}	8			
	D_{NAK}	8			
	DCQI	8			
	Ack-Nack repetition factor	3			
	CQI Feedback (Table 5.2B.4)	4ms			
	CQI Repetition Factor (Table 5.2B.4)	2			
	Ahs=βhs/βc	30/15			

HSPA (HSDPA & HSUPA) Setup Procedures used to establish the test signals

The following 5 Sub-tests were completed according to Release 6 procedures in section 5.2 of 3GPP TS34.121. A summary of these settings are illustrated below:

	Mode	HSPA				
	Subtest	1	2	3	4	5
WCDMA General Settings	Loopback Mode	Test Mode 1				
	Rel99 RMC	12.2 kbps RMC				
	HSDPA FRC	H-Set 1				
	HSUPA Test	HSPA				
	Power Control Algorithm	Algorithm 2				Algorithm 1
	βc	11/15	6/15	15/15	2/15	15/15
	βd	15/15	15/15	9/15	15/15	0
	βec	209/225	12/15	30/15	2/15	5/15
	βc/βd	11/15	6/15	15/9	2/15	15/1
	βhs	22/15	12/15	30/15	4/15	5/15
	βed	1309/225	94/75	47/15	56/75	47/15
	CM (dB)	1	3	2	3	1
	MPR (dB)	0	2	1	2	0
HSDPA Specific Settings	DACK	8				0
	DNAK	8				0
	DCQI	8				0
	Ack-Nack repetition factor	3				
	CQI Feedback (Table 5.2B.4)	4ms				
	CQI Repetition Factor (Table 5.2B.4)	2				
	Ahs = βhs/βc	30/15				
HSUPA Specific Settings	E-DPDCCH	6	8	8	5	7
	DHARQ	0	0	0	0	0
	AG Index	20	12	15	17	21
	ETFCI (from 34.121 Table C.11.1.3)	75	67	92	71	81
	Associated Max UL Data Rate kbps	242.1	174.9	482.8	205.8	308.9
	Reference E-TFCIs	5	5	2	5	1
	Reference E-TFCI	11	11	11	11	67
	Reference E-TFCI PO	4	4	4	4	18
	Reference E-TFCI	67	67	92	67	67
	Reference E-TFCI PO	18	18	18	18	18
	Reference E-TFCI	71	71	71	71	71
	Reference E-TFCI PO	23	23	23	23	23
	Reference E-TFCI	75	75	75	75	75
	Reference E-TFCI PO	26	26	26	26	26
	Reference E-TFCI	81	81	81	81	81
	Reference E-TFCI PO	27	27	27	27	27
	Maximum Channelization Codes	2xSF2				SF4

HSPA+

Since 16QAM is not used for uplink, the uplink Category and release is same as HSUPA, i.e., Rel. 7 Therefore, the RF conducted power is not measured.

W-CDMA Band II Measured Results

Band	Mode		UL Ch No.	Freq. (MHz)	MPR (dB)	Max. Pwr (dBm)
W-CDMA Band II	Rel 99	RMC, 12.2 kbps	9262	1852.4	N/A	24.1
			9400	1880.0	N/A	24.1
			9538	1907.6	N/A	24.1
	HSDPA	Subtest 1	9262	1852.4	0	24.1
			9400	1880.0	0	24.0
			9538	1907.6	0	24.0
		Subtest 2	9262	1852.4	0	24.1
			9400	1880.0	0	24.0
			9538	1907.6	0	24.0
		Subtest 3	9262	1852.4	0.5	23.7
			9400	1880.0	0.5	23.5
			9538	1907.6	0.5	23.5
		Subtest 4	9262	1852.4	0.5	23.6
			9400	1880.0	0.5	23.5
			9538	1907.6	0.5	23.5
	HSUPA	Subtest 1	9262	1852.4	0	23.4
			9400	1880.0	0	23.4
			9538	1907.6	0	23.4
		Subtest 2	9262	1852.4	2	22.2
			9400	1880.0	2	22.2
			9538	1907.6	2	22.1
		Subtest 3	9262	1852.4	1	23.2
			9400	1880.0	1	23.2
			9538	1907.6	1	23.2
		Subtest 4	9262	1852.4	2	22.2
			9400	1880.0	2	22.2
			9538	1907.6	2	22.1
		Subtest 5	9262	1852.4	0	24.2
			9400	1880.0	0	24.1
			9538	1907.6	0	24.2

W-CDMA Band V Measured Results

Band	Mode		UL Ch No.	Freq. (MHz)	MPR (dB)	Max. Pwr (dBm)
W-CDMA Band V	Rel 99	RMC, 12.2 kbps	4132	826.4	N/A	24.0
			4183	836.6	N/A	24.2
			4233	846.6	N/A	24.2
	HSDPA	Subtest 1	4132	826.4	0	24.1
			4183	836.6	0	24.2
			4233	846.6	0	24.1
		Subtest 2	4132	826.4	0	24.0
			4183	836.6	0	24.1
			4233	846.6	0	24.1
		Subtest 3	4132	826.4	0.5	23.5
			4183	836.6	0.5	23.6
			4233	846.6	0.5	23.6
		Subtest 4	4132	826.4	0.5	23.4
			4183	836.6	0.5	23.6
			4233	846.6	0.5	23.6
	HSUPA	Subtest 1	4132	826.4	0	23.0
			4183	836.6	0	23.7
			4233	846.6	0	23.6
		Subtest 2	4132	826.4	2	22.0
			4183	836.6	2	22.2
			4233	846.6	2	22.1
		Subtest 3	4132	826.4	1	23.0
			4183	836.6	1	23.1
			4233	846.6	1	23.1
		Subtest 4	4132	826.4	2	22.1
			4183	836.6	2	22.0
			4233	846.6	2	22.0
		Subtest 5	4132	826.4	0	24.0
			4183	836.6	0	24.0
			4233	846.6	0	24.0

9.3. LTE

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

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

Table 6.2.3-1: Maximum Power Reduction (MPR) for Power Class 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	Target MPR	Max. Avg Pwr (dBm)		
						1860 MHz	1880 MHz	1900 MHz
LTE Band 2	20	QPSK	1	0	0	24.6	24.7	24.7
			1	49	0	24.6	24.6	24.5
			1	99	0	24.4	24.6	24.6
			50	0	1	23.4	23.6	23.5
			50	24	1	23.5	23.6	23.6
			50	50	1	23.4	23.7	23.4
			100	0	1	23.4	23.6	23.5
		16QAM	1	0	1	22.8	23.2	23.4
			1	49	1	23.3	23.6	23.7
			1	99	1	22.9	23.3	23.5
			50	0	2	22.4	22.6	22.5
			50	24	2	22.4	22.6	22.5
			50	50	2	22.3	22.6	22.5
			100	0	2	22.4	22.6	22.5

Band	BW (MHz)	Mode	RB Allocation	RB offset	Target MPR	Max. Avg Pwr (dBm)		
						1857.5 MHz	1880 MHz	1902.5 MHz
LTE Band 2	15	QPSK	1	0	0	24.6	24.4	24.7
			1	37	0	24.4	24.6	24.7
			1	74	0	24.5	24.7	24.7
			36	0	1	23.5	23.6	23.6
			36	20	1	23.5	23.6	23.7
			36	39	1	23.4	23.5	23.7
			75	0	1	23.4	23.6	23.6
		16QAM	1	0	1	23.7	23.2	23.2
			1	37	1	23.6	23.4	23.3
			1	74	1	23.4	23.2	23.3
			36	0	2	22.3	22.5	22.6
			36	20	2	22.4	22.5	22.6
			36	39	2	22.3	22.5	22.5
			75	0	2	22.4	22.5	22.6

Band	BW (MHz)	Mode	RB Allocation	RB offset	Target MPR	Max. Avg Pwr (dBm)		
						1855 MHz	1880 MHz	1905 MHz
LTE Band 2	10	QPSK	1	0	0	24.5	24.6	24.5
			1	25	0	24.6	24.7	24.6
			1	49	0	24.4	24.7	24.5
			25	0	1	23.6	23.6	23.7
			25	12	1	23.5	23.7	23.7
			25	25	1	23.4	23.5	23.5
			50	0	1	23.5	23.6	23.6
		16QAM	1	0	1	23.5	23.2	23.1
			1	25	1	23.6	23.7	23.7
			1	49	1	23.3	23.3	23.3
			25	0	2	22.5	22.6	22.7
			25	12	2	22.5	22.7	22.7
			25	25	2	22.4	22.5	22.6
			50	0	2	22.3	22.3	22.6

LTE Band 2 Measured Results (continued)

Band	BW (MHz)	Mode	RB Allocation	RB offset	Target MPR	Max. Avg Pwr (dBm)		
						1852.5 MHz	1880 MHz	1907.5 MHz
LTE Band 2	5	QPSK	1	0	0	24.5	24.5	24.7
			1	12	0	24.7	24.7	24.6
			1	24	0	24.3	24.6	24.6
			12	0	1	23.4	23.6	23.6
			12	7	1	23.5	23.6	23.5
			12	13	1	23.4	23.4	23.4
			25	0	1	23.5	23.5	23.5
		16QAM	1	0	1	23.1	22.8	23.1
			1	12	1	23.4	23.3	23.3
			1	24	1	22.7	22.7	23.0
			12	0	2	22.4	22.3	22.4
			12	7	2	22.5	22.4	22.5
			12	13	2	22.4	22.3	22.4
			25	0	2	22.4	22.5	22.5

Band	BW (MHz)	Mode	RB Allocation	RB offset	Target MPR	Max. Avg Pwr (dBm)		
						1851.5 MHz	1880 MHz	1908.5 MHz
LTE Band 2	3	QPSK	1	0	0	24.4	24.7	24.5
			1	8	0	24.4	24.6	24.6
			1	14	0	24.4	24.5	24.6
			8	0	1	23.5	23.6	23.7
			8	4	1	23.5	23.5	23.7
			8	7	1	23.4	23.5	23.5
			15	0	1	23.5	23.5	23.5
		16QAM	1	0	1	23.5	23.1	23.3
			1	8	1	23.5	23.5	23.4
			1	14	1	23.5	22.9	23.2
			8	0	2	22.5	22.5	22.2
			8	4	2	22.6	22.5	22.3
			8	7	2	22.6	22.5	22.2
			15	0	2	22.5	22.2	22.5

Band	BW (MHz)	Mode	RB Allocation	RB offset	Target MPR	Max. Avg Pwr (dBm)		
						1850.7 MHz	1880 MHz	1909.3 MHz
LTE Band 2	1.4	QPSK	1	0	0	24.3	24.5	24.7
			1	3	0	24.5	24.6	24.6
			1	5	0	24.5	24.6	24.6
			3	0	0	24.6	24.7	24.7
			3	1	0	24.5	24.7	24.7
			3	3	0	24.5	24.7	24.6
			6	0	1	23.5	23.6	23.5
		16QAM	1	0	1	23.1	23.2	23.7
			1	3	1	23.1	23.2	23.7
			1	5	1	23.2	23.0	23.2
			3	0	1	23.3	23.4	23.3
			3	1	1	23.5	23.5	23.3
			3	3	1	23.5	23.4	23.2
			6	0	2	22.3	22.5	22.6

LTE Band 4 Measured Results

Band	BW (MHz)	Mode	RB Allocation	RB offset	Target MPR	Max. Avg Pwr (dBm)		
						1720 MHz	1732.5 MHz	1745 MHz
LTE Band 4	20	QPSK	1	0	0		24.7	
			1	49	0		24.5	
			1	99	0		24.4	
			50	0	1		23.3	
			50	24	1		23.4	
			50	50	1		23.3	
			100	0	1		23.4	
		16QAM	1	0	1		23.1	
			1	49	1		23.4	
			1	99	1		22.8	
			50	0	2		22.2	
			50	24	2		22.3	
			50	50	2		22.3	
			100	0	2		22.2	

Band	BW (MHz)	Mode	RB Allocation	RB offset	Target MPR	Max. Avg Pwr (dBm)		
						1717.5 MHz	1732.5 MHz	1747.5 MHz
LTE Band 4	15	QPSK	1	0	0	24.4	24.6	24.6
			1	37	0	24.6	24.5	24.5
			1	74	0	24.3	24.4	24.4
			36	0	1	23.2	23.3	23.4
			36	20	1	23.4	23.4	23.2
			36	39	1	23.4	23.4	23.2
			75	0	1	23.3	23.4	23.3
		16QAM	1	0	1	22.8	23.4	23.3
			1	37	1	23.5	23.7	23.5
			1	74	1	23.2	23.7	23.1
			36	0	2	22.1	22.3	22.3
			36	20	2	22.3	22.2	22.3
			36	39	2	22.3	22.5	22.3
			75	0	2	22.4	22.4	22.4

Band	BW (MHz)	Mode	RB Allocation	RB offset	Target MPR	Max. Avg Pwr (dBm)		
						1715 MHz	1732.5 MHz	1750 MHz
LTE Band 4	10	QPSK	1	0	0	24.3	24.5	24.4
			1	25	0	24.7	24.7	24.3
			1	49	0	24.5	24.5	24.4
			25	0	1	23.1	23.4	23.3
			25	12	1	23.4	23.4	23.3
			25	25	1	23.4	23.4	23.1
			50	0	1	23.3	23.3	23.2
		16QAM	1	0	1	23.1	23.7	23.5
			1	25	1	23.4	23.7	23.5
			1	49	1	23.5	23.7	23.5
			25	0	2	22.1	22.5	22.5
			25	12	2	22.4	22.3	22.5
			25	25	2	22.4	22.4	22.3
			50	0	2	22.1	22.3	22.2

Note(s):

20 MHz Bandwidth does not support at least three non-overlapping channels in certain channel bandwidths. When a device supports overlapping channel assignment in a channel bandwidth configuration, the middle channel of the group of overlapping channels should be selected for testing per KDB 941225 D05 SAR for LTE Devices

LTE Band 4 Measured Results (continued)

Band	BW (MHz)	Mode	RB Allocation	RB offset	Target MPR	Max. Avg Pwr (dBm)		
						1712.5 MHz	1732.5 MHz	1752.5 MHz
LTE Band 4	5	QPSK	1	0	0	24.4	24.3	24.3
			1	12	0	24.5	24.5	24.4
			1	24	0	24.3	24.6	24.5
			12	0	1	23.2	23.4	23.2
			12	7	1	23.1	23.4	23.3
			12	13	1	23.1	23.3	23.2
			25	0	1	23.1	23.4	23.2
		16QAM	1	0	1	22.8	23.0	23.0
			1	12	1	23.0	23.4	23.3
			1	24	1	22.8	23.1	23.2
			12	0	2	21.9	22.3	22.1
			12	7	2	21.9	22.4	22.1
			12	13	2	21.9	22.2	22.0
			25	0	2	22.0	22.3	22.2

Band	BW (MHz)	Mode	RB Allocation	RB offset	Target MPR	Max. Avg Pwr (dBm)		
						1711.5 MHz	1732.5 MHz	1753.5 MHz
LTE Band 4	3	QPSK	1	0	0	24.3	24.5	24.6
			1	8	0	24.3	24.5	24.7
			1	14	0	24.1	24.5	24.6
			8	0	1	23.1	23.3	23.7
			8	4	1	23.3	23.4	23.7
			8	7	1	23.2	23.3	23.7
			15	0	1	23.2	23.4	23.6
		16QAM	1	0	1	23.0	23.5	23.3
			1	8	1	23.1	23.6	23.5
			1	14	1	22.9	23.7	23.0
			8	0	2	22.1	22.5	22.5
			8	4	2	21.9	22.3	22.5
			8	7	2	22.1	22.3	22.4
			15	0	2	22.0	22.3	22.5

Band	BW (MHz)	Mode	RB Allocation	RB offset	Target MPR	Max. Avg Pwr (dBm)		
						1710.7 MHz	1732.5 MHz	1754.3 MHz
LTE Band 4	1.4	QPSK	1	0	0	24.4	24.4	24.6
			1	3	0	24.4	24.2	24.6
			1	5	0	24.4	24.2	24.4
			3	0	0	24.4	24.3	24.3
			3	1	0	24.3	24.3	24.5
			3	3	0	24.3	24.3	24.3
			6	0	1	23.2	23.3	23.3
		16QAM	1	0	1	23.1	23.5	23.5
			1	3	1	23.0	23.0	23.5
			1	5	1	23.2	23.1	23.5
			3	0	1	23.2	23.3	23.3
			3	1	1	23.0	23.2	23.6
			3	3	1	22.9	23.1	23.4
			6	0	2	21.8	22.2	22.2

LTE Band 5 Measured Results

Band	BW (MHz)	Mode	RB Allocation	RB offset	Target MPR	Max. Avg Pwr (dBm)		
						829 MHz	836.5 MHz	844 MHz
LTE Band 5	10	QPSK	1	0	0		24.5	
			1	25	0		24.6	
			1	49	0		24.6	
			25	0	1		23.4	
			25	12	1		23.3	
			25	25	1		23.5	
			50	0	1		23.5	
		16QAM	1	0	1		23.3	
			1	25	1		23.5	
			1	49	1		23.7	
			25	0	2		22.4	
			25	12	2		22.5	
			25	25	2		22.5	
			50	0	2		22.4	

Band	BW (MHz)	Mode	RB Allocation	RB offset	Target MPR	Max. Avg Pwr (dBm)		
						826.5 MHz	836.5 MHz	846.5 MHz
LTE Band 5	5	QPSK	1	0	0	24.3	24.5	24.6
			1	12	0	24.6	24.5	24.6
			1	24	0	24.5	24.2	24.5
			12	0	1	23.4	23.2	23.4
			12	7	1	23.4	23.3	23.5
			12	13	1	23.3	23.4	23.4
			25	0	1	23.4	23.4	23.5
		16QAM	1	0	1	23.0	23.0	23.1
			1	12	1	23.2	23.0	23.3
			1	24	1	23.0	23.1	22.9
			12	0	2	22.4	22.1	22.4
			12	7	2	22.5	22.3	22.4
			12	13	2	22.3	22.2	22.3
			25	0	2	22.4	22.3	22.4

Band	BW (MHz)	Mode	RB Allocation	RB offset	Target MPR	Max. Avg Pwr (dBm)		
						825.5 MHz	836.5 MHz	847.5 MHz
LTE Band 5	3	QPSK	1	0	0	24.6	24.6	24.5
			1	8	0	24.7	24.5	24.6
			1	14	0	24.2	24.6	24.6
			8	0	1	23.5	23.3	23.6
			8	4	1	23.6	23.0	23.6
			8	7	1	23.5	23.2	23.6
			15	0	1	23.5	23.2	23.6
		16QAM	1	0	1	23.5	23.1	23.0
			1	8	1	23.5	23.4	23.4
			1	14	1	23.4	23.1	23.0
			8	0	2	22.5	22.3	22.3
			8	4	2	22.5	22.2	22.2
			8	7	2	22.5	22.2	22.2
			15	0	2	22.4	22.0	22.5

Note(s):

10 MHz Bandwidth does not support at least three non-overlapping channels in certain channel bandwidths. When a device supports overlapping channel assignment in a channel bandwidth configuration, the middle channel of the group of overlapping channels should be selected for testing per KDB 941225 D05 SAR for LTE Devices

LTE Band 5 Measured Results (continued)

Band	BW (MHz)	Mode	RB Allocation	RB offset	Target MPR	Max. Avg Pwr (dBm)		
						824.7 MHz	836.5 MHz	848.3 MHz
LTE Band 5	1.4	QPSK	1	0	0	24.4	24.2	24.5
			1	3	0	24.5	24.2	24.6
			1	5	0	24.4	24.2	24.4
			3	0	0	24.5	24.2	24.7
			3	1	0	24.7	24.2	24.5
			3	3	0	24.4	24.2	24.4
			6	0	1	23.4	23.3	23.4
		16QAM	1	0	1	23.4	23.1	23.0
			1	3	1	23.1	23.3	23.0
			1	5	1	23.1	23.0	23.0
			3	0	1	23.3	23.0	23.2
			3	1	1	23.4	23.0	23.1
			3	3	1	23.5	22.8	22.9
			6	0	2	22.5	22.3	22.3

LTE Band 12 Measured Results

Band	BW (MHz)	Mode	RB Allocation	RB offset	Target MPR	Max. Avg Pwr (dBm)		
						704 MHz	707.5 MHz	711 MHz
LTE Band 12	10	QPSK	1	0	0	24.5	24.3	24.3
			1	25	0	24.7	24.5	24.4
			1	49	0	24.4	24.5	24.3
			25	0	1	23.2	23.3	23.3
			25	12	1	23.5	23.4	23.5
			25	25	1	23.4	23.4	23.4
			50	0	1	23.3	23.4	23.5
		16QAM	1	0	1	23.1	23.2	23.1
			1	25	1	23.6	23.4	23.5
			1	49	1	23.1	23.5	23.3
			25	0	2	22.3	22.5	22.6
			25	12	2	22.4	22.4	22.6
			25	25	2	22.4	22.5	22.5
			50	0	2	22.3	22.4	22.5

Band	BW (MHz)	Mode	RB Allocation	RB offset	Target MPR	Max. Avg Pwr (dBm)		
						701.5 MHz	707.5 MHz	713.5 MHz
LTE Band 12	5	QPSK	1	0	0	24.6	24.7	24.5
			1	12	0	24.7	24.6	24.6
			1	24	0	24.5	24.5	24.6
			12	0	1	23.5	23.2	23.4
			12	7	1	23.4	23.1	23.5
			12	13	1	23.3	23.2	23.3
			25	0	1	23.5	23.3	23.4
		16QAM	1	0	1	23.1	22.8	23.1
			1	12	1	22.9	23.0	23.7
			1	24	1	23.0	23.1	23.0
			12	0	2	22.2	22.2	22.5
			12	7	2	22.3	22.0	22.3
			12	13	2	22.2	22.2	22.2
			25	0	2	22.4	22.3	22.3

Band	BW (MHz)	Mode	RB Allocation	RB offset	Target MPR	Max. Avg Pwr (dBm)		
						700.5 MHz	707.5 MHz	714.5 MHz
LTE Band 12	3	QPSK	1	0	0	24.5	24.6	24.7
			1	8	0	24.6	24.4	24.6
			1	14	0	24.4	24.3	24.4
			8	0	1	23.5	23.1	23.5
			8	4	1	23.2	23.2	23.3
			8	7	1	23.4	23.3	23.4
			15	0	1	23.3	23.2	23.3
		16QAM	1	0	1	23.1	23.6	23.2
			1	8	1	23.5	23.5	23.7
			1	14	1	23.1	23.1	22.9
			8	0	2	22.4	22.2	22.2
			8	4	2	22.3	22.0	22.3
			8	7	2	22.4	22.2	22.1
			15	0	2	21.9	22.1	22.1

LTE Band 12 Measured Results (continued)

Band	BW (MHz)	Mode	RB Allocation	RB offset	Target MPR	Max. Avg Pwr (dBm)		
						699.7 MHz	707.5 MHz	715.3 MHz
LTE Band 12	1.4	QPSK	1	0	0	24.3	24.2	24.2
			1	3	0	24.4	24.1	24.3
			1	5	0	24.5	24.1	24.5
			3	0	0	24.3	24.3	24.3
			3	1	0	24.3	24.4	24.6
			3	3	0	24.6	24.3	24.4
			6	0	1	23.4	23.0	23.3
		16QAM	1	0	1	22.9	23.2	23.2
			1	3	1	23.1	22.9	23.2
			1	5	1	23.0	22.8	23.3
			3	0	1	23.2	23.0	22.9
			3	1	1	23.0	23.2	23.1
			3	3	1	23.2	23.0	23.1
			6	0	2	22.4	22.1	22.2

LTE Band 17 Measured Results

SAR for LTE Band 17 is covered by LTE Band 12 due to similar frequency range, same maximum tune-up limit and same channel bandwidth.

LTE Band 30 Measured Results

Band	BW (MHz)	Mode	RB Allocation	RB offset	Target MPR	Max. Avg Pwr (dBm)
						2310 MHz
LTE Band 30	10	QPSK	1	0	0	22.5
			1	25	0	22.6
			1	49	0	22.5
			25	0	1	21.6
			25	12	1	21.5
			25	25	1	21.5
			50	0	1	21.6
		16QAM	1	0	1	21.5
			1	25	1	21.7
			1	49	1	21.5
			25	0	2	20.6
			25	12	2	20.4
			25	25	2	20.5
			50	0	2	20.5

Band	BW (MHz)	Mode	RB Allocation	RB offset	Target MPR	Max. Avg Pwr (dBm)
						2310 MHz
LTE Band 30	5	QPSK	1	0	0	22.6
			1	12	0	22.7
			1	24	0	22.3
			12	0	1	21.6
			12	7	1	21.5
			12	13	1	21.4
			25	0	1	21.5
		16QAM	1	0	1	21.3
			1	12	1	21.2
			1	24	1	20.8
			12	0	2	20.3
			12	7	2	20.3
			12	13	2	20.2
			25	0	2	20.2

Note(s):

10/5 MHz Bandwidths does not support at least three non-overlapping channels in certain channel bandwidths. When a device supports overlapping channel assignment in a channel bandwidth configuration, the middle channel of the group of overlapping channels should be selected for testing per KDB 941225 D05 SAR for LTE Devices

LTE Rel. 10 Carrier Aggregation

The following power measurements were performed with a single carrier uplink; CA for this particular project is only supported in the downlinks. The CA combination is one (1) Uplink and two (2) Downlinks.

LTE CA combinations			PCC				SCC			LTE Rel 10 Tx. Power [dBm]
PCC	+	SCC	Bandwidth (MHz)	Frequency (MHz)	Channel	RB/Offset	Bandwidth (MHz)	Frequency (MHz)	Channel	
4	+	29	10	1732.5	20175	1/25	5	722.5	9715	24.7
2	+	29	10	1880.0	18900	1/25	10	722.5	9715	24.7
4	+	5	10	1732.5	20175	1/25	10	881.5	2525	24.7
5	+	4	10	836.5	20525	1/25	10	2132.5	2175	24.6
2	+	17	10	1880.0	18900	1/25	10	740.0	5790	24.7
17	+	2	10	710.0	23790	1/25	5	1960.0	900	24.7
4	+	12	10	1732.5	20175	1/25	5	737.5	5095	24.7
12	+	4	5	707.5	23095	1/12	10	2132.5	2175	24.6
4	+	17	10	1732.5	20175	1/25	10	740.0	5790	24.7
17	+	4	10	710.0	23790	1/25	10	2132.5	2175	24.7

Note:

Per KDB 941225 D05A LTE Rel. 10 KDB Inquiry Sheet: SAR is excluded for Carrier Aggregation when measured power does not exceed LTE Release 8 by more than a $^1/_4$ dBm

9.4. 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)	Note(s)
2.4	802.11b	1 Mbps	1	2412	15.5	15.5	Yes	
			6	**2437**	**18.5**	18.5		
			11	2462	15.4	15.5		
	802.11g	6 Mbps	1	2412	Not Required	12.5	No	1
			6	2437		15.5		
			11	2462		12.5		
	802.11n (HT20)	6.5 Mbps	1	2412		11.0	No	1
			6	2437		14.0		
			11	2462		11.0		

Note(s):

1. Per KDB 248227 D01 802.11 Wi-Fi SAR: 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.

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

Measured Results

Band (GHz)	Mode	Data Rate	Ch #	Freq. (MHz)	Avg Pwr (dBm)	Max Output Power (dBm)	SAR Test (Yes/No)	Note(s)
5.3 (U-NII 2A)	802.11a	6 Mbps	52	5260	13.5	13.5	Yes	
			56	5280	13.4			
			60	**5300**	**13.3**			
			64	5320	13.0			
	802.11n (HT20)	6.5 Mbps	52	5260	Not Required	12.5	No	1
			56	5280				
			60	5300				
			64	5320				
	802.11n (HT40)	13.5 Mbps	54	5270	Not Required	11.5	No	1
			62	5310				
5.5 (U-NII 2C)	802.11a	6 Mbps	100	5500	12.8	13.5	Yes	
			116	**5580**	**12.9**			
			124	5620	TDWR			
			140	5700	13.0			
	802.11n (HT20)	6.5 Mbps	100	5500	Not Required	12.5	No	1
			116	5580				
			124	5620				
			140	5700				
	802.11n (HT40)	13.5 Mbps	102	5510	Not Required	11.5	No	1
			118	5590				
			134	5670				
5.8 (U-NII 3)	802.11a	6 Mbps	149	5745	13.0	13.5	Yes	
			157	5785	13.0			
			165	**5825**	**12.9**			
	802.11n (HT20)	6.5 Mbps	149	5745	Not Required	12.5	No	1
			157	5785				
			165	5825				
	802.11n (HT40)	13.5 Mbps	151	5755	Not Required	11.5	No	1
			159	5795				

Note(s):

Per KDB 248227 D01 802.11 Wi-Fi SAR:

1. Output Power and SAR measurement is not required for 802.11n HT20/HT40 channels when the specified tune-up tolerances for 802.11n HT20/HT40 are lower than 802.11a by more than ½ dB and the measured SAR is ≤ 1.2 W/Kg.
2. When the same transmission mode configurations have the same maximum output power on the same channel for the 802.11 a/g/n/ac modes, the channel in the lower order/sequence 802.11 mode (i.e. a, g, n then ac) is selected.
3. When the specified maximum output power is the same for both UNII band I and UNII band 2A, begin SAR measurement in UNII band 2A; and if the highest *reported* SAR for UNII band 2A is
   - ≤ 1.2 W/kg, SAR is not required for UNII band I
   - > 1.2 W/kg, both bands should be tested independently for SAR.

9.6. Bluetooth

Maximum tune-up tolerance limit is 9.00 dBm from the rated nominal maximum output power. 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 648474 D04 Handset SAR (Phablet Only):
When Hotspot mode does not apply, SAR is required for all surfaces and edges with an antenna located at ≤ 25 mm from that surface or edge in direct contact with a flat phantom, for 10-g extremity SAR to address interactive hand use exposure conditions, for when 1-g SAR was measured at a test separation distance greater than 5 mm. 1-g SAR testing at 5 mm is not required.
When hotspot mode applies, 10-g extremity SAR is required only for the surfaces and edges with hotspot mode 1-g SAR > 1.2 W/kg.

KDB 941225 D01 SAR test for 3G devices:
When the maximum output power and tune-up tolerance specified for production units in a secondary mode is ≤ ¼ dB higher than the primary mode or when the highest reported SAR of the primary mode is scaled by the ratio of specified maximum output power and tune-up tolerance of secondary to primary mode and the adjusted SAR is ≤ 1.2 W/kg, SAR measurement is not required for the secondary mode

KDB 941225 D05 SAR for LTE Devices:
SAR test reduction is applied using the following criteria:

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

KDB 248227 D01 SAR meas for 802.11 v02:

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

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

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

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

10.1. GSM850

RF Exposure Conditions	Mode	Dist. (mm)	Test Position	Ch #.	Freq. (MHz)	Power (dBm)		1-g SAR (W/kg)		Plot No.
						Tune-up limit	Meas.	Meas.	Scaled	
Head	Voice	0	Left Touch	190	836.6	33.2	33.0	0.198	0.209	
			Left Tilt	190	836.6	33.2	33.0	0.109	0.115	
			Right Touch	190	836.6	33.2	33.0	0.239	**0.253**	1
			Right Tilt	190	836.6	33.2	33.0	0.126	0.133	
Head VoIP	GPRS 2 Slots	0	Left Touch	190	836.6	32.2	32.1	0.288	0.298	
			Left Tilt	190	836.6	32.2	32.1	0.162	0.168	
			Right Touch	190	836.6	32.2	32.1	0.352	**0.364**	2
			Right Tilt	190	836.6	32.2	32.1	0.193	0.200	
Body-worn	Voice	10	Rear	190	836.6	33.2	33.0	0.375	**0.396**	3
			Front	190	836.6	33.2	33.0	0.202	0.213	
Body-worn(VoIP) & Hotspot	GPRS 2 Slots	10	Rear	190	836.6	32.2	32.1	0.588	**0.609**	4
			Front	190	836.6	32.2	32.1	0.308	0.319	
Hotspot			Edge 2	190	836.6	32.2	32.1	0.319	0.330	
			Edge 3	190	836.6	32.2	32.1	0.319	0.330	

10.2. GSM1900

RF Exposure Conditions	Mode	Dist. (mm)	Test Position	Ch #.	Freq. (MHz)	Power (dBm)		1-g SAR (W/kg)		Plot No.
						Tune-up limit	Meas.	Meas.	Scaled	
Head	Voice	0	Left Touch	661	1880.0	29.7	29.5	0.204	**0.214**	5
			Left Tilt	661	1880.0	29.7	29.5	0.098	0.103	
			Right Touch	661	1880.0	29.7	29.5	0.107	0.112	
			Right Tilt	661	1880.0	29.7	29.5	0.072	0.075	
Head VoIP	GPRS 2 Slots	0	Left Touch	661	1880.0	27.7	27.4	0.284	**0.304**	6
			Left Tilt	661	1880.0	27.7	27.4	0.133	0.143	
			Right Touch	661	1880.0	27.7	27.4	0.148	0.159	
			Right Tilt	661	1880.0	27.7	27.4	0.101	0.108	
Body-worn	Voice	10	Rear	661	1880.0	29.7	29.5	0.226	**0.237**	7
			Front	661	1880.0	29.7	29.5	0.189	0.198	
Body-worn(VoIP) & Hotspot	GPRS 2 Slots	10	Rear	661	1880.0	27.7	27.4	0.327	**0.350**	8
			Front	661	1880.0	27.7	27.4	0.253	0.271	
Hotspot			Edge 3	661	1880.0	27.7	27.4	0.189	0.203	
			Edge 4	661	1880.0	27.7	27.4	0.258	0.276	

10.3. W-CDMA Band II

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	Rel 99 RMC	0	Left Touch	9400	1880.0	24.2	24.1	0.657	**0.679**	9
			Left Tilt	9400	1880.0	24.2	24.1	0.334	0.345	
			Right Touch	9400	1880.0	24.2	24.1	0.329	0.340	
			Right Tilt	9400	1880.0	24.2	24.1	0.245	0.253	
Body-worn & Hotspot	Rel 99 RMC	10	Rear	9400	1880.0	24.2	24.1	0.691	**0.714**	10
			Front	9400	1880.0	24.2	24.1	0.581	0.600	
Hotspot		10	Edge 3	9400	1880.0	24.2	24.1	0.396	0.409	
			Edge 4	9400	1880.0	24.2	24.1	0.563	0.581	

10.4. W-CDMA Band V

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	Rel 99 RMC	0	Left Touch	4183	836.6	24.2	24.2	0.251	0.253	
			Left Tilt	4183	836.6	24.2	24.2	0.141	0.142	
			Right Touch	4183	836.6	24.2	24.2	0.302	**0.304**	11
			Right Tilt	4183	836.6	24.2	24.2	0.154	0.155	
Body-worn & Hotspot	Rel 99 RMC	10	Rear	4183	836.6	24.2	24.2	0.510	**0.514**	12
			Front	4183	836.6	24.2	24.2	0.277	0.279	
Hotspot	Rel 99 RMC	10	Edge 2	4183	836.6	24.2	24.2	0.303	0.305	
			Edge 3	4183	836.6	24.2	24.2	0.264	0.266	

10.5. LTE Band 2 (20MHz Bandwidth)

RF Exposure Conditions	Mode	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	0	Left Touch	18900	1880.0	1	0	24.7	24.7	0.603	**0.609**	13
						50	50	23.7	23.7	0.492	0.492	
			Left Tilt	18900	1880.0	1	0	24.7	24.7	0.325	0.328	
						50	50	23.7	23.7	0.239	0.239	
			Right Touch	18900	1880.0	1	0	24.7	24.7	0.344	0.347	
						50	50	23.7	23.7	0.264	0.264	
			Right Tilt	18900	1880.0	1	0	24.7	24.7	0.266	0.268	
						50	50	23.7	23.7	0.186	0.186	
Body-worn & Hotspot	QPSK	10	Rear	18700	1860.0	1	49	24.7	24.6	0.946	0.968	
				18900	1880.0	1	0	24.7	24.7	0.933	0.942	
						50	50	23.7	23.7	0.720	0.720	
				19100	1900.0	1	49	24.7	24.5	0.951	**0.996**	14
			Front	18900	1880.0	1	0	24.7	24.7	0.653	0.659	
						50	50	23.7	23.7	0.508	0.508	
Hotspot	QPSK	10	Edge 3	18900	1880.0	1	0	24.7	24.7	0.425	0.429	
						50	50	23.7	23.7	0.310	0.310	
			Edge 4	18900	1880.0	1	0	24.7	24.7	0.631	0.637	
						50	50	23.7	23.7	0.498	0.498	

10.6. LTE Band 4 (20MHz Bandwidth)

RF Exposure Conditions	Mode	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	0	Left Touch	20175	1732.5	1	0	24.7	24.7	0.667	**0.669**	15
						50	0	23.7	23.3	0.568	0.621	
			Left Tilt	20175	1732.5	1	0	24.7	24.7	0.329	0.330	
						50	0	23.7	23.3	0.260	0.284	
			Right Touch	20175	1732.5	1	0	24.7	24.7	0.339	0.340	
						50	0	23.7	23.3	0.268	0.293	
			Right Tilt	20175	1732.5	1	0	24.7	24.7	0.251	0.252	
						50	0	23.7	23.3	0.180	0.197	
Body & Hotspot	QPSK	10	Rear	20175	1732.5	1	0	24.7	24.7	0.733	**0.735**	16
						50	0	23.7	23.3	0.550	0.602	
			Front	20175	1732.5	1	0	24.7	24.7	0.665	0.667	
						50	0	23.7	23.3	0.554	0.606	
Hotspot	QPSK	10	Edge 3	20175	1732.5	1	0	24.7	24.7	0.571	0.572	
						50	0	23.7	23.3	0.436	0.477	
			Edge 4	20175	1732.5	1	0	24.7	24.7	0.424	0.425	
						50	0	23.7	23.3	0.324	0.354	

10.7. LTE Band 5 (10MHz Bandwidth)

RF Exposure Conditions	Mode	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	0	Left Touch	20525	836.5	1	49	24.7	24.6	0.246	0.253	
						25	0	23.7	23.4	0.177	0.189	
			Left Tilt	20525	836.5	1	49	24.7	24.6	0.139	0.143	
						25	0	23.7	23.4	0.105	0.112	
			Right Touch	20525	836.5	1	49	24.7	24.6	0.313	**0.323**	17
						25	0	23.7	23.4	0.240	0.256	
			Right Tilt	20525	836.5	1	49	24.7	24.6	0.159	0.164	
						25	0	23.7	23.4	0.117	0.125	
Body-worn & Hotspot	QPSK	10	Rear	20525	836.5	1	49	24.7	24.6	0.533	**0.549**	18
						25	0	23.7	23.4	0.386	0.412	
			Front	20525	836.5	1	49	24.7	24.6	0.262	0.270	
						25	0	23.7	23.4	0.192	0.205	
Hotspot	QPSK	10	Edge 2	20525	836.5	1	49	24.7	24.6	0.279	0.287	
						25	0	23.7	23.4	0.226	0.241	
			Edge 3	20525	836.5	1	49	24.7	24.6	0.287	0.296	
						25	0	23.7	23.4	0.209	0.223	

10.8. LTE Band 12 (10MHz Bandwidth)

RF Exposure Conditions	Mode	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	0	Left Touch	23095	707.5	1	49	24.7	24.5	0.187	0.195	
						25	0	23.7	23.3	0.145	0.160	
			Left Tilt	23095	707.5	1	49	24.7	24.5	0.108	0.113	
						25	0	23.7	23.3	0.090	0.099	
			Right Touch	23095	707.5	1	49	24.7	24.5	0.226	**0.236**	19
						25	0	23.7	23.3	0.185	0.204	
			Right Tilt	23095	707.5	1	49	24.7	24.5	0.116	0.121	
						25	0	23.7	23.3	0.097	0.107	
Body-worn & Hotspot	QPSK	10	Rear	23095	707.5	1	49	24.7	24.5	0.421	**0.440**	20
						25	0	23.7	23.3	0.348	0.383	
			Front	23095	707.5	1	49	24.7	24.5	0.256	0.267	
						25	0	23.7	23.3	0.201	0.221	
Hotspot	QPSK	10	Edge 2	23095	707.5	1	49	24.7	24.5	0.484	**0.506**	21
						25	0	23.7	23.3	0.415	0.457	
			Edge 3	23095	707.5	1	49	24.7	24.5	0.136	0.142	
						25	0	23.7	23.3	0.106	0.117	

10.9. LTE Band 17 (10MHz Bandwidth)

SAR for LTE Band 17 is covered by LTE Band 12 due to similar frequency range, same maximum tune-up limit and same channel bandwidth.

10.10. LTE Band 30 (10MHz Bandwidth)

RF Exposure Conditions	Mode	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	0	Left Touch	27710	2310.0	1	0	22.7	22.5	0.259	**0.271**	22
						25	0	21.7	21.6	0.256	0.261	
			Left Tilt	27710	2310.0	1	0	22.7	22.5	0.079	0.083	
						25	0	21.7	21.6	0.068	0.069	
			Right Touch	27710	2310.0	1	0	22.7	22.5	0.114	0.119	
						25	0	21.7	21.6	0.102	0.104	
			Right Tilt	27710	2310.0	1	0	22.7	22.5	0.094	0.098	
						25	0	21.7	21.6	0.092	0.094	
Body-worn & Hotspot	QPSK	10	Rear	27710	2310.0	1	0	22.7	22.5	0.166	0.174	
						25	0	21.7	21.6	0.160	0.163	
			Front	27710	2310.0	1	0	22.7	22.5	0.237	**0.248**	23
						25	0	21.7	21.6	0.233	0.237	
Hotspot	QPSK	10	Edge 3	27710	2310.0	1	0	22.7	22.5	0.132	0.138	
						25	0	21.7	21.6	0.130	0.132	
			Edge 4	27710	2310.0	1	0	22.7	22.5	0.162	0.170	
						25	0	21.7	21.6	0.155	0.158	

10.11. 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)		Notes	Plot No.
								Tune-up limit	Meas.	Meas.	Scaled		
2.4GHz	802.11b 1 Mbps	Head	0	Left Touch	6	2437.0	0.596	18.5	18.5	0.523	**0.523**	2	24
				Left Tilt	6	2437.0	0.469	18.5	18.5	0.445	0.445		
				Right Touch	6	2437.0	0.215						
				Right Tilt	6	2437.0	0.207						
		Body-worn & Hotspot & Wi-Fi Direct	10	Rear	6	2437.0	0.324	18.5	18.5	0.291	**0.291**	1	25
				Front	6	2437.0	0.120						
				Edge 1	6	2437.0	0.131						
				Edge 2	6	2437.0	0.073						

Note(s):

1. Highest *reported* SAR is ≤ 0.4 W/kg. Therefore, further SAR measurements within this exposure condition are not required.
2. Highest *reported* SAR is > 0.4 W/kg. Due to the highest *reported* SAR for this test position, other test positions in Head exposure condition were evaluated until a SAR ≤ 0.8 W/kg was *reported*.

10.12. Wi-Fi (U-NII 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)		10-g SAR (W/kg)		Notes	Plot No.
								Tune-up limit	Meas.	Meas.	Scaled	Meas.	Scaled		
5.3 GHz U-NII 2A	802.11a 6 Mbps	Head	0	Left Touch	60	5300.0	0.445	13.5	13.3	0.307	**0.321**			1	26
				Left Tilt	60	5300.0	0.279								
				Right Touch	60	5300.0	0.117								
				Right Tilt	60	5300.0	0.167								
		Body-worn	10	Rear	60	5300.0	0.333	13.5	13.3	0.188	**0.197**			1	27
				Front	60	5300.0	0.138								
		Extremity	0	Rear	60	5300.0	1.890								
				Edge 1	60	5300.0	0.259								
				Edge 2	60	5300.0	2.270	13.5	13.3			0.275	**0.288**	1,3	28
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)		10-g SAR (W/kg)		Notes	Plot No.
								Tune-up limit	Meas.	Meas.	Scaled	Meas.	Scaled		
5.5 GHz U-NII 2C	802.11a 6 Mbps	Head	0	Left Touch	140	5700.0	0.342	13.5	13.0	0.217	**0.243**			1	29
				Left Tilt	140	5700.0	0.270								
				Right Touch	140	5700.0	0.095								
				Right Tilt	140	5700.0	0.137								
		Body-worn	10	Rear	140	5700.0	0.272	13.5	13.0	0.124	**0.139**			1	30
				Front	140	5700.0	0.109								
		Extremity	0	Rear	140	5700.0	2.160	13.5	13.0			0.241	**0.270**	1,3	31
				Edge 1	140	5700.0	0.176								
				Edge 2	140	5700.0	1.690								

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)		Notes	Plot No.
								Tune-up limit	Meas.	Meas.	Scaled		
5.8 GHz U-NII 3	802.11a 6 Mbps	Head	0	Left Touch	165	5825.0	0.253	13.5	12.9	0.117	**0.134**	1	32
				Left Tilt	165	5825.0	0.230						
				Right Touch	165	5825.0	0.090						
				Right Tilt	165	5825.0	0.129						
		Body-worn & Hotspot & Wi-Fi Direct	10	Rear	165	5825.0	0.208	13.5	12.9	0.104	**0.119**	1	33
				Front	165	5825.0	0.083						
				Edge 1	165	5825.0	0.135						
				Edge 2	165	5825.0	0.141						

Note(s):

1. Highest *reported* SAR is ≤ 0.4 W/kg (1-g) or ≤ 1.00 W/kg (10-g); respectively. Therefore, further SAR measurements within this exposure condition are not required.
2. Highest *reported* SAR is > 0.4 W/kg (1-g) or > 1.00 W/kg (10-g); respectively. Due to the highest *reported* SAR for this test position, other test positions in Head exposure condition were evaluated until a SAR ≤ 0.8 W/kg (1-g) or ≤ 2.00 W/kg (10-g); respectively, was *reported*.
3. 10-g Extremity SAR is required for this frequency band when Hotspot Mode is not supported.

10.13. 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)					
9.0	8	10	2.480	1.3	Rear/Front	0.168

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 <1.6 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		Second Repeated		Third Repeated
						Measured SAR (W/kg)	Largest to Smallest SAR Ratio	Measured SAR (W/kg)	Largest to Smallest SAR Ratio	Measured SAR (W/kg)
700	LTE Band 12	Hotspot	Edge 2	No	0.484	N/A	N/A	N/A	N/A	N/A
850	GSM 850	Body & Hotspot	Rear	No	0.588	N/A	N/A	N/A	N/A	N/A
	WCDMA Band V	Body & Hotspot	Rear	No	0.510	N/A	N/A	N/A	N/A	N/A
	LTE Band 5	Body & Hotspot	Rear	No	0.533	N/A	N/A	N/A	N/A	N/A
1900	GSM 1900	Body & Hotspot	Rear	No	0.327	N/A	N/A	N/A	N/A	N/A
	WCDMA Band II	Body & Hotspot	Rear	No	0.691	N/A	N/A	N/A	N/A	N/A
	LTE Band 2	Body & Hotspot	Rear	Yes	0.951	0.948	1.00	N/A	N/A	N/A
1700	LTE Band 4	Body & Hotspot	Rear	No	0.733	N/A	N/A	N/A	N/A	N/A
2300	LTE Band 30	Head	Left Touch	No	0.259	N/A	N/A	N/A	N/A	N/A
2400	Wi-Fi 802.11b/g/n	Head	Left Touch	No	0.523	N/A	N/A	N/A	N/A	N/A
5300	Wi-Fi 802.11a/n	Head	Left Touch	No	0.307	N/A	N/A	N/A	N/A	N/A
5500	Wi-Fi 802.11a/n	Head	Left Touch	No	0.217	N/A	N/A	N/A	N/A	N/A
5800	Wi-Fi 802.11a/n	Head	Left Touch	No	0.117	N/A	N/A	N/A	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 not > 1.20.

Frequency Band (MHz)	Air Interface	RF Exposure Conditions	Test Position	Repeated SAR (Yes/No)	Highest Measured SAR (W/kg)	First Repeated		Second Repeated		Third Repeated
						Measured SAR (W/kg)	Largest to Smallest SAR Ratio	Measured SAR (W/kg)	Largest to Smallest SAR Ratio	Measured SAR (W/kg)
5300	Wi-Fi 802.11a/n	Extremity	Edge 2	No	0.275	N/A	N/A	N/A	N/A	N/A
5500	Wi-Fi 802.11a/n	Extremity	Rear	No	0.241	N/A	N/A	N/A	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 not > 3.00.

12. Simultaneous Transmission SAR Analysis

Simultaneous Transmission Condition

RF Exposure Condition	Item	Capable Transmit Configurations				
Head	1	GSM(Voice)	+	DTS		
	2	GSM(Voice)	+	U-NII		
	3	GSM(GPRS/EDGE)	+	DTS		
	4	GSM(GPRS/EDGE)	+	U-NII		
	5	W-CDMA	+	DTS		
	6	W-CDMA	+	U-NII		
	7	LTE	+	DTS		
	8	LTE	+	U-NII		
Body-worn	9	GSM(Voice)	+	DTS		
	10	GSM(Voice)	+	U-NII		
	11	GSM(Voice)	+	BT		
	12	GSM(Voice)	+	U-NII	+	BT
	13	GSM(GPRS/EDGE)	+	DTS		
	14	GSM(GPRS/EDGE)	+	U-NII		
	15	GSM(GPRS/EDGE)	+	BT		
	16	GSM(GPRS/EDGE)	+	U-NII	+	BT
	17	W-CDMA	+	DTS		
	18	W-CDMA	+	U-NII		
	19	W-CDMA	+	BT		
	20	W-CDMA	+	U-NII	+	BT
	21	LTE	+	DTS		
	22	LTE	+	U-NII		
	23	LTE	+	BT		
	24	LTE	+	U-NII	+	BT
Hotspot & Wi-Fi Direct	25	GSM(GPRS/EDGE)	+	DTS		
	26	GSM(GPRS/EDGE)	+	U-NII 3		
	27	W-CDMA	+	DTS		
	28	W-CDMA	+	U-NII 3		
	29	LTE	+	DTS		
	30	LTE	+	U-NII 3		

Notes:

1. DTS and U-NII 3 supports Hotspot and Wi-Fi Direct.
2. GPRS/EDGE, W-CDMA, and LTE support Hotspot.
3. VoIP is supported in GPRS/EDGE, W-CDMA, and LTE.
4. DTS Radio cannot transmit simultaneously with Bluetooth Radio.
5. U-NII Radio can transmit simultaneously with Bluetooth Radio.
6. Extremity SAR was only performed for UNII-2A/C because UNII-2A/C do not support Hotspot mode.

12.1. Sum of the SAR for GSM850 & Wi-Fi & BT

RF Exposure conditions	Test Position	① WWAN	② DTS	③ U-NII	④ BT	① + ② WWAN + DTS		① + ③ WWAN + U-NII		① + ③ + ④ WWAN + U-NII + BT	
						∑ 1-g SAR (mW/g)	SPLSR (Yes/ No)	∑ 1-g SAR (mW/g)	SPLSR (Yes/ No)	∑ 1-g SAR (mW/g)	SPLSR (Yes/ No)
Head	Left Touch	0.298	0.523	0.321		0.821	No	0.619	No		
	Left Tilt	0.168	0.445	0.321		0.613	No	0.489	No		
	Right Touch	0.364	0.523	0.321		0.887	No	0.685	No		
	Right Tilt	0.200	0.523	0.321		0.723	No	0.521	No		
Body-worn & Hotspot	Rear	0.609	0.291	0.197	0.168	0.900	No	0.806	No	0.974	No
	Front	0.319	0.291	0.197	0.168	0.610	No	0.516	No	0.684	No
Hotspot	Edge 1		0.291	0.119		0.291	No	0.119	No		
	Edge 2	0.330	0.291	0.119		0.621	No	0.449	No		
	Edge 3	0.330				0.330	No	0.330	No		
	Edge 4										

12.2. Sum of the SAR for GSM1900 & Wi-Fi & BT

RF Exposure conditions	Test Position	① WWAN	② DTS	③ U-NII	④ BT	① + ② WWAN + DTS		① + ③ WWAN + U-NII		① + ③ + ④ WWAN + U-NII + BT	
						∑ 1-g SAR (mW/g)	SPLSR (Yes/ No)	∑ 1-g SAR (mW/g)	SPLSR (Yes/ No)	∑ 1-g SAR (mW/g)	SPLSR (Yes/ No)
Head	Left Touch	0.304	0.523	0.321		0.827	No	0.625	No		
	Left Tilt	0.143	0.445	0.321		0.588	No	0.464	No		
	Right Touch	0.159	0.523	0.321		0.682	No	0.480	No		
	Right Tilt	0.108	0.523	0.321		0.631	No	0.429	No		
Body-worn & Hotspot	Rear	0.350	0.291	0.197	0.168	0.641	No	0.547	No	0.715	No
	Front	0.271	0.291	0.197	0.168	0.562	No	0.468	No	0.636	No
Hotspot	Edge 1		0.291	0.119		0.291	No	0.119	No		
	Edge 2		0.291	0.119		0.291	No	0.119	No		
	Edge 3	0.203				0.203	No	0.203	No		
	Edge 4	0.276				0.276	No	0.276	No		

12.3. Sum of the SAR for WCDMA Band II & Wi-Fi & BT

RF Exposure conditions	Test Position	① WWAN	② DTS	③ U-NII	④ BT	① + ② WWAN + DTS		① + ③ WWAN + U-NII		① + ③ + ④ WWAN + U-NII + BT	
						∑ 1-g SAR (mW/g)	SPLSR (Yes/ No)	∑ 1-g SAR (mW/g)	SPLSR (Yes/ No)	∑ 1-g SAR (mW/g)	SPLSR (Yes/ No)
Head	Left Touch	0.679	0.523	0.321		1.202	No	1.000	No		
	Left Tilt	0.345	0.445	0.321		0.790	No	0.666	No		
	Right Touch	0.340	0.523	0.321		0.863	No	0.661	No		
	Right Tilt	0.253	0.523	0.321		0.776	No	0.574	No		
Body-worn & Hotspot	Rear	0.714	0.291	0.197	0.168	1.005	No	0.911	No	1.079	No
	Front	0.600	0.291	0.197	0.168	0.891	No	0.797	No	0.965	No
Hotspot	Edge 1		0.291	0.197		0.291	No	0.197	No		
	Edge 2		0.291	0.197		0.497	No	0.403	No		
	Edge 3	0.409				0.409	No	0.409	No		
	Edge 4	0.581				0.581	No	0.581	No		

12.4. Sum of the SAR for WCDMA Band V & Wi-Fi & BT

RF Exposure conditions	Test Position	① WWAN	② DTS	③ U-NII	④ BT	① + ② WWAN + DTS		① + ③ WWAN + U-NII		① + ③ + ④ WWAN + U-NII + BT	
						∑ 1-g SAR (mW/g)	SPLSR (Yes/ No)	∑ 1-g SAR (mW/g)	SPLSR (Yes/ No)	∑ 1-g SAR (mW/g)	SPLSR (Yes/ No)
Head	Left Touch	0.253	0.523	0.321		0.776	No	0.574	No		
	Left Tilt	0.142	0.445	0.321		0.587	No	0.463	No		
	Right Touch	0.304	0.523	0.321		0.827	No	0.625	No		
	Right Tilt	0.155	0.523	0.321		0.678	No	0.476	No		
Body-worn & Hotspot	Rear	0.514	0.291	0.197	0.168	0.805	No	0.711	No	0.879	No
	Front	0.279	0.291	0.197	0.168	0.570	No	0.476	No	0.644	No
Hotspot	Edge 1		0.291	0.119		0.291	No	0.119	No		
	Edge 2	0.305	0.291	0.119		0.596	No	0.424	No		
	Edge 3	0.266				0.266	No	0.266	No		
	Edge 4										

12.5. Sum of the SAR for LTE Band 2 & Wi-Fi & BT

RF Exposure conditions	Test Position	① WWAN	② DTS	③ U-NII	④ BT	① + ② WWAN + DTS		① + ③ WWAN + U-NII		① + ③ + ④ WWAN + U-NII + BT	
						∑ 1-g SAR (mW/g)	SPLSR (Yes/ No)	∑ 1-g SAR (mW/g)	SPLSR (Yes/ No)	∑ 1-g SAR (mW/g)	SPLSR (Yes/ No)
Head	Left Touch	0.609	0.523	0.321		1.132	No	0.930	No		
	Left Tilt	0.328	0.445	0.321		0.773	No	0.649	No		
	Right Touch	0.347	0.523	0.321		0.870	No	0.668	No		
	Right Tilt	0.268	0.523	0.321		0.791	No	0.589	No		
Body-worn & Hotspot	Rear	0.996	0.291	0.197	0.168	**1.287**	No	**1.193**	No	1.361	No
	Front	0.659	0.291	0.197	0.168	0.950	No	0.856	No	1.024	No
Hotspot	Edge 1		0.291	0.119		0.291	No	0.119	No		
	Edge 2		0.291	0.119		0.291	No	0.119	No		
	Edge 3	0.429				0.429	No	0.429	No		
	Edge 4	0.637				0.637	No	0.637	No		

12.6. Sum of the SAR for LTE Band 4 & Wi-Fi & BT

RF Exposure conditions	Test Position	① WWAN	② DTS	③ U-NII	④ BT	① + ② WWAN + DTS		① + ③ WWAN + U-NII		① + ③ + ④ WWAN + U-NII + BT	
						∑ 1-g SAR (mW/g)	SPLSR (Yes/ No)	∑ 1-g SAR (mW/g)	SPLSR (Yes/ No)	∑ 1-g SAR (mW/g)	SPLSR (Yes/ No)
Head	Left Touch	0.669	0.523	0.321		1.192	No	0.990	No		
	Left Tilt	0.330	0.445	0.321		0.775	No	0.651	No		
	Right Touch	0.340	0.523	0.321		0.863	No	0.661	No		
	Right Tilt	0.252	0.523	0.321		0.775	No	0.573	No		
Body-worn & Hotspot	Rear	0.735	0.291	0.197	0.168	1.026	No	0.932	No	1.100	No
	Front	0.667	0.291	0.197	0.168	0.958	No	0.864	No	1.032	No
Hotspot	Edge 1		0.291	0.119		0.291	No	0.119	No		
	Edge 2		0.291	0.119		0.291	No	0.119	No		
	Edge 3	0.572				0.572	No	0.572	No		
	Edge 4	0.425				0.425	No	0.425	No		

12.7. Sum of the SAR for LTE Band 5 & Wi-Fi & BT

RF Exposure conditions	Test Position	① WWAN	② DTS	③ U-NII	④ BT	① + ② WWAN + DTS		① + ③ WWAN + U-NII		① + ③ + ④ WWAN + U-NII + BT	
						∑ 1-g SAR (mW/g)	SPLSR (Yes/ No)	∑ 1-g SAR (mW/g)	SPLSR (Yes/ No)	∑ 1-g SAR (mW/g)	SPLSR (Yes/ No)
Head	Left Touch	0.253	0.523	0.321		0.776	No	0.574	No		
	Left Tilt	0.143	0.445	0.321		0.588	No	0.464	No		
	Right Touch	0.323	0.523	0.321		0.846	No	0.644	No		
	Right Tilt	0.164	0.523	0.321		0.687	No	0.485	No		
Body-worn & Hotspot	Rear	0.549	0.291	0.197	0.168	0.840	No	0.746	No	0.914	No
	Front	0.270	0.291	0.197	0.168	0.561	No	0.467	No	0.635	No
Hotspot	Edge 1		0.291	0.119		0.291	No	0.119	No		
	Edge 2	0.287	0.291	0.119		0.578	No	0.406	No		
	Edge 3	0.296				0.296	No	0.296	No		
	Edge 4					0.000	No	0.000	No		

12.8. Sum of the SAR for LTE Band 12 & Wi-Fi & BT

RF Exposure conditions	Test Position	① WWAN	② DTS	③ U-NII	④ BT	① + ② WWAN + DTS		① + ③ WWAN + U-NII		① + ③ + ④ WWAN + U-NII + BT	
						∑ 1-g SAR (mW/g)	SPLSR (Yes/ No)	∑ 1-g SAR (mW/g)	SPLSR (Yes/ No)	∑ 1-g SAR (mW/g)	SPLSR (Yes/ No)
Head	Left Touch	0.195	0.523	0.321		0.718	No	0.516	No		
	Left Tilt	0.113	0.445	0.321		0.558	No	0.434	No		
	Right Touch	0.272	0.523	0.321		0.795	No	0.593	No		
	Right Tilt	0.121	0.523	0.321		0.644	No	0.442	No		
Body-worn & Hotspot	Rear	0.440	0.291	0.197	0.168	0.731	No	0.637	No	0.805	No
	Front	0.267	0.291	0.197	0.168	0.558	No	0.464	No	0.632	No
Hotspot	Edge 1		0.291	0.119		0.291	No	0.119	No		
	Edge 2	0.506	0.291	0.119		0.797	No	0.625	No		
	Edge 3	0.142				0.142	No	0.142	No		
	Edge 4										

12.9. Sum of the SAR for LTE Band 17 & Wi-Fi & BT

Covered by LTE Band 12 due to similar frequency range, same maximum tune-up limit and same channel bandwidth.

12.10. Sum of the SAR for LTE Band 30 & Wi-Fi & BT

RF Exposure conditions	Test Position	① WWAN	② DTS	③ U-NII	④ BT	① + ② WWAN + DTS		① + ③ WWAN + U-NII		① + ③ + ④ WWAN + U-NII + BT	
						∑ 1-g SAR (mW/g)	SPLSR (Yes/ No)	∑ 1-g SAR (mW/g)	SPLSR (Yes/ No)	∑ 1-g SAR (mW/g)	SPLSR (Yes/ No)
Head	Left Touch	0.271	0.523	0.321		0.794	No	0.592	No		
	Left Tilt	0.083	0.445	0.321		0.528	No	0.404	No		
	Right Touch	0.119	0.523	0.321		0.642	No	0.440	No		
	Right Tilt	0.098	0.523	0.321		0.621	No	0.419	No		
Body-worn & Hotspot	Rear	0.174	0.291	0.197	0.168	0.465	No	0.371	No	0.539	No
	Front	0.248	0.291	0.197	0.168	0.539	No	0.445	No	0.613	No
Hotspot	Edge 1		0.291	0.119		0.291	No	0.119	No		
	Edge 2		0.291	0.119		0.291	No	0.119	No		
	Edge 3	0.138				0.138	No	0.138	No		
	Edge 4	0.170				0.170	No	0.170	No		

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.

Appendixes

Refer to separated files for the following appendixes.

15I21442-S1V1 SAR_App A Photos & Ant. Locations

15I21442-S1V1 SAR_App B System Check Plots

15I21442-S1V1 SAR_App C Highest Test Plots

15I21442-S1V1 SAR_App D Tissue Ingredients

15I21442-S1V1 SAR_App E Probe Cal. Certificates

15I21442-S1V1 SAR_App F Dipole Cal. Certificates

END OF REPORT