



**FCC 47 CFR Parts 1 & 2  
Published RF Exposure KDB Procedures  
IEEE Std 1528-2013**

**SAR EVALUATION REPORT**

**(Class II Permissive Change)**

*For*

**GSM/CDMA/WCDMA/LTE Phone + Bluetooth, DTS/UNII a/b/g/n/ac and NFC**

**Model: LG-LS990, LS990, LGLS990  
FCC ID: ZNFLS990**

**Report Number: 14U17849-S7  
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*Prepared for*

**LG ELECTRONICS MOBILECOMM U.S.A., INC.  
1000 SYLVAN AVE.  
ENGLEWOOD CLIFFS, NJ 07632**

*Prepared by*

**UL Verification Services Inc.  
47173 BENICIA STREET  
FREMONT, CA 94538, U.S.A.  
TEL: (510) 771-1000  
FAX: (510) 661-0888**



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### 1. Attestation of Test Results

Applicant	LG ELECTRONICS MOBILECOMM U.S.A., INC.			
DUT description	GSM/CDMA/WCDMA/LTE Phone + Bluetooth, DTS/UNII a/b/g/n/ac and NFC			
Model	LG-LS990, LS990, LGLS990			
Test device is	An identical prototype			
Device category	Portable			
Exposure category	General Population/Uncontrolled Exposure			
Date tested	5/27/2014 – 6/5/2014			
The highest reported SAR values	RF exposure condition	Licensed	DTS	UNII
	Head	0.462 W/kg	0.272 W/kg	0.405 W/kg
	Body-worn Accessory	1.079 W/kg	0.245 W/kg	0.283 W/kg
	Wireless Router (Hotspot)	1.120 W/kg	0.122 W/kg	N/A
	Wi-Fi Direct	N/A	0.245 W/kg	N/A
	Simultaneous Transmission	1.362 W/kg	1.324 W/kg	1.362 W/kg
Applicable Standards	FCC 47 CFR Parts 1 & 2 Published RF Exposure KDB Procedures, and TCB workshop updates IEEE Std 1528-2013			
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.

Nathan Sousa  
 Laboratory Engineer  
 UL Verification Services Inc.

## 2. Test Methodology

The tests documented in this report were performed in accordance with FCC 47 CFR Parts 1 & 2, IEEE STD 1528-2013, the following FCC Published RF exposure KDB procedures, and TCB workshop updates:

- 447498 D01 General RF Exposure Guidance v05r02
- 648474 D03 Wireless Chargers Battery Cover v01r02
- 648474 D04 Handset SAR v01r02
- 941225 D01 SAR test for 3G devices v02
- 941225 D02 HSPA and 1x Advanced v02r02
- 941225 D03 SAR Test Reduction GSM GPRS EDGE v01
- 941225 D04 SAR for GSM E GPRS Dual Xfer Mode v01
- 941225 D05 SAR for LTE Devices v02r03
- 941225 D06 Hotspot Mode SAR v01r01
- 248227 D01 SAR Meas for 802 11abg v01r02
- 865664 D01 SAR Measurement 100 MHz to 6 GHz v01r03
- 865664 D02 SAR Reporting v01r01
- 690783 D01 SAR Listings on Grants v01r03

## 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. The full scope of accreditation can be viewed at <http://www.ccsemc.com>.

## 4. Calibration and Uncertainty

### 4.1. Measuring Instrument Calibration

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.

#### Tissue Dielectric Properties

Name of Equipment	Manufacturer	Type/Model	Serial No.	Cal. Due Date
Network Analyzer	Agilent	E5071B	MY42100131	2/24/2015
Dielectronic Probe kit	SPEAG	DAK-3.5	1087	11/13/2014
Dielectronic Probe kit	SPEAG	DAK-3.5 Short	SM DAK 200 BA	N/A
Thermometer	Control Company	4242	122529163	9/19/2014
Thermometer	EXTECH	445703	CCS-200	3/24/2015

#### System Performance Check

Name of Equipment	Manufacturer	Type/Model	Serial No.	Cal. Due Date
Synthesized Signal Generator	HP	8665B	3438A00633	6/13/2014
Power Meter	HP	438A	2822A05684	10/10/2014
Power Sensor	HP	8481A	2237A31744	10/2/2014
Power Sensor	HP	8481A	2349A36506	9/30/2014
Amplifier	MITEQ	AMF-4D-00400600-50-30P	1808939	N/A
Directional coupler	Werlatone	C8060-102	2710	N/A
DC Power Supply	AMETEK	XT15-4	1319A02778	N/A
E-Field Probe	SPEAG	EX3DV3	3531	11/21/2014
E-Field Probe	SPEAG	EX3DV4	3871	12/11/2014
E-Field Probe	SPEAG	EX3DV4	3936	7/22/2014
Data Acquisition Electronics	SPEAG	DAE4	1359	2/17/2015
Data Acquisition Electronics	SPEAG	DAE3	427	1/21/2015
Data Acquisition Electronics	SPEAG	DAE4	1380	7/25/2014
System Validation Dipole	SPEAG	D835V2	4d002	11/15/2014
System Validation Dipole	SPEAG	D1900V2	5d043	11/12/2014
System Validation Dipole	SPEAG	D2450V2	899	9/10/2014
System Validation Dipole	SPEAG	D2600V2	1006	9/11/2014
System Validation Dipole	SPEAG	D5GHzV2	1138	11/19/2014
Thermometer (SAR Lab 1)	EXTECH	445703	CCS-205	3/24/2015
Thermometer (SAR Lab 2)	EXTECH	445703	CCS-203	3/28/2015
Thermometer (SAR Lab 4)	EXTECH	445703	CCS-238	6/3/2015

#### Others

Name of Equipment	Manufacturer	Type/Model	Serial No.	Cal. Due Date
Power Sensor	Agilent	N1921A	MY52260009	12/12/2014
Power Meter	Agilent	N1912A	MY50001018	8/23/2014
Base Station Simulator	R & S	CMU200	118715	5/20/2014
Base Station Simulator	R & S	CMW500	103764-dn	8/16/2014
Base Station Simulator	R & S	CMW500	103766-ly	8/19/2014
Base Station Simulator	R & S	CMW500	107513-be	7/26/2014

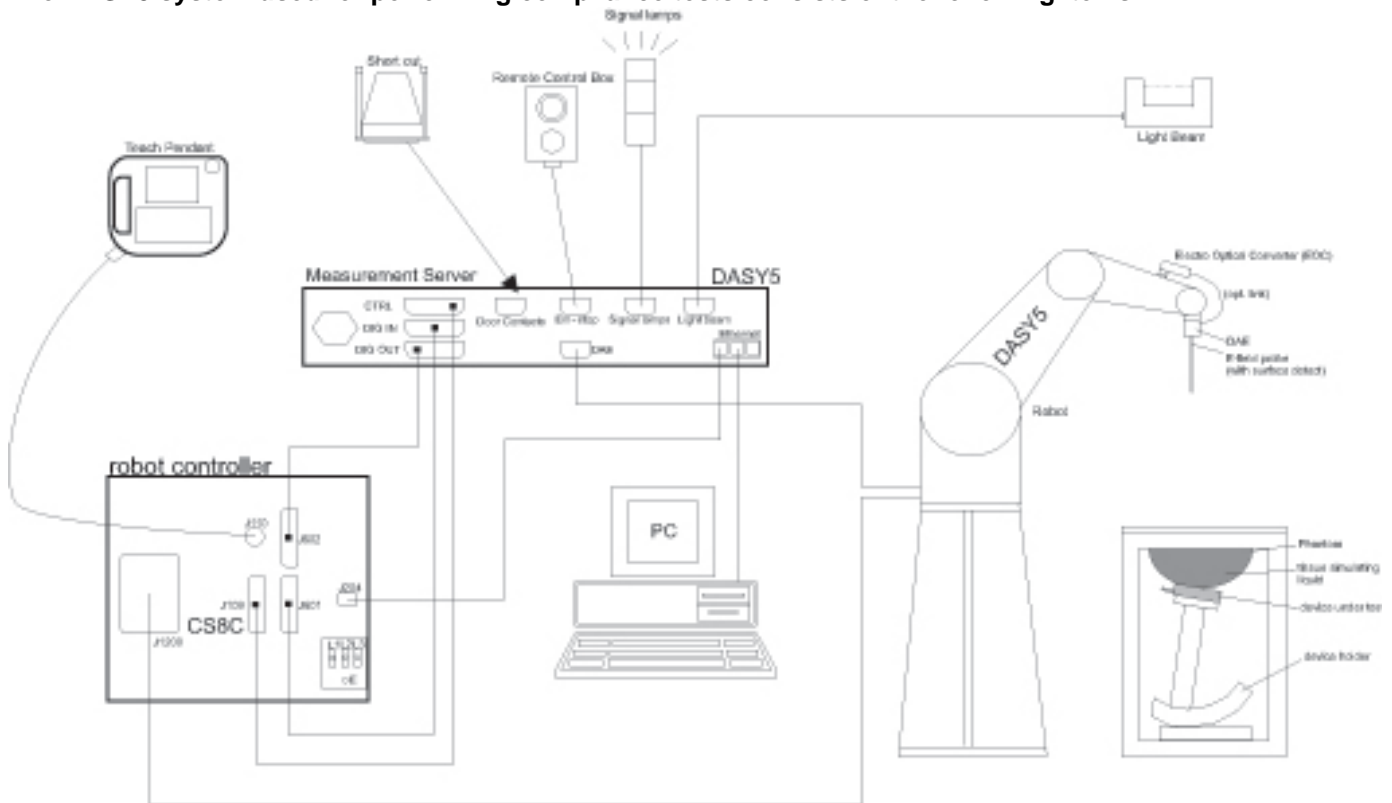
### 4.2. Measurement Uncertainty

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.



## 5. Measurement System Description and Setup

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.

## 6. SAR Measurement Procedure

### 6.1. Normal SAR Measurement Procedure

#### 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	$\frac{1}{2} \cdot \delta \cdot \ln(2) \pm 0.5$ mm
Maximum probe angle from probe axis to phantom surface normal at the measurement location	30° ± 1°	20° ± 1°
Maximum area scan spatial resolution: $\Delta x_{Area}$ , $\Delta y_{Area}$	≤ 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

		$\leq 3$ GHz	$> 3$ GHz
Maximum zoom scan spatial resolution: $\Delta x_{Zoom}, \Delta y_{Zoom}$		$\leq 2$ GHz: $\leq 8$ mm 2 – 3 GHz: $\leq 5$ mm *	3 – 4 GHz: $\leq 5$ mm* 4 – 6 GHz: $\leq 4$ mm*
Maximum zoom scan spatial resolution, normal to phantom surface	uniform grid: $\Delta z_{Zoom}(n)$	$\leq 5$ mm	3 – 4 GHz: $\leq 4$ mm 4 – 5 GHz: $\leq 3$ mm 5 – 6 GHz: $\leq 2$ mm
	graded grid	$\Delta z_{Zoom}(1)$ : between 1 <sup>st</sup> two points closest to phantom surface	$\leq 4$ mm
		$\Delta z_{Zoom}(n>1)$ : between subsequent points	$\leq 1.5 \cdot \Delta z_{Zoom}(n-1)$
Minimum zoom scan volume	x, y, z	$\geq 30$ mm	3 – 4 GHz: $\geq 28$ mm 4 – 5 GHz: $\geq 25$ mm 5 – 6 GHz: $\geq 22$ mm
Note: $\delta$ 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 <i>reported</i> SAR from the area scan based <i>1-g SAR estimation</i> procedures of KDB 447498 is $\leq 1.4$ W/kg, $\leq 8$ mm, $\leq 7$ mm and $\leq 5$ 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.

## 6.2. Volume Scan Procedures

### Step 1: Repeat Step 1-4 in Section 6.1

### Step 2: Volume Scan

Volume Scans are used to assess peak SAR and averaged SAR measurements in largely extended 3-dimensional volumes within any phantom. This measurement does not need any previous area scan. The grid can be anchored to a user specific point or to the current probe location.

### Step 3: 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.

## 7. Device Under Test

### 7.1. General Information

Operating Configuration(s)	Held to head, Body-worn (Voice call)
Mobile Hotspot	Wi-Fi Hotspot mode permits the device to share its cellular data connection with other Wi-Fi -enabled devices. <input checked="" type="checkbox"/> Mobile Hotspot (Wi-Fi 2.4 GHz) <input type="checkbox"/> Mobile Hotspot (Wi-Fi 5 GHz)
Wi-Fi Direct	Wi-Fi Direct enabled devices transfer data directly between each other <input checked="" type="checkbox"/> Wi-Fi Direct (Wi-Fi 2.4 GHz) <input checked="" type="checkbox"/> Wi-Fi Direct (Wi-Fi 5.8 GHz)
Device dimension	Overall (Length x Width): 146.3 mm x 74.6 mm Overall Diagonal: 157.5 mm Display Diagonal: 140.0 mm
Back Cover	<input type="checkbox"/> Normal Battery Cover <input checked="" type="checkbox"/> Normal Battery Cover with NFC <input type="checkbox"/> Wireless Charger Battery Cove <input checked="" type="checkbox"/> Wireless Charger Battery Cover with NFC (with Front Cover) <input checked="" type="checkbox"/> Wireless Charger Battery Cover with NFC (without Front Cover)
Accessory	<input checked="" type="checkbox"/> Headset
Battery Options	<input checked="" type="checkbox"/> Standard – Lithium-ion battery, Rating 3.8Vdc, 3000mAh <input type="checkbox"/> Extended (large capacity)

## 7.2. Wireless Technologies

<p>Wireless Technology and Frequency Bands</p>	<p>GSM: 850 / 1900          CDMA BC 0 / 1 / 10          W-CDMA Band: V / II          LTE (FDD) Band: 25 / 26          LTE (TDD) Band: 41          Wi-Fi : 2.4 / 5 GHz          Bluetooth: 2.4 GHz.</p>
<p>Mode</p>	<p>GSM</p> <ul style="list-style-type: none"> <li>- <input checked="" type="checkbox"/> Voice (GMSK)</li> <li>- <input checked="" type="checkbox"/> GPRS (GMSK)</li> <li>- <input checked="" type="checkbox"/> EGPRS (8PSK)</li> </ul> <p>CDMA2000</p> <ul style="list-style-type: none"> <li>- <input checked="" type="checkbox"/> 1xRTT (Voice &amp; Data)</li> <li>- <input checked="" type="checkbox"/> 1xEVDO Rel. 0</li> <li>- <input checked="" type="checkbox"/> 1xEVDO Rev. A</li> <li>- <input checked="" type="checkbox"/> 1xAdvanced</li> </ul> <p>W-CDMA</p> <ul style="list-style-type: none"> <li>- <input checked="" type="checkbox"/> UMTS Rel. 99 (Voice &amp; Data)</li> <li>- <input checked="" type="checkbox"/> HSDPA (Rel. 5)</li> <li>- <input checked="" type="checkbox"/> HSUPA (Rel. 6)</li> <li>- <input checked="" type="checkbox"/> HSPA+ (Rel. 7)</li> </ul> <p>LTE</p> <ul style="list-style-type: none"> <li>- <input checked="" type="checkbox"/> QPSK</li> <li>- <input checked="" type="checkbox"/> 16QAM</li> </ul> <p>Wi-Fi 2.4GHz (802.11b/g/n/ac)</p> <ul style="list-style-type: none"> <li>- <input checked="" type="checkbox"/> 802.11b</li> <li>- <input checked="" type="checkbox"/> 802.11g</li> <li>- <input checked="" type="checkbox"/> 802.11n (HT20)</li> <li>- <input checked="" type="checkbox"/> 802.11ac (HT20)</li> </ul> <p>Wi-Fi 5GHz (802.11a/n/ac)</p> <ul style="list-style-type: none"> <li>- <input checked="" type="checkbox"/> 802.11a</li> <li>- <input checked="" type="checkbox"/> 802.11n (HT20)</li> <li>- <input checked="" type="checkbox"/> 802.11n (HT40)</li> <li>- <input checked="" type="checkbox"/> 802.11ac (HT20)</li> <li>- <input checked="" type="checkbox"/> 802.11ac (HT40)</li> <li>- <input checked="" type="checkbox"/> 802.11ac (HT80)</li> </ul> <p>Bluetooth</p> <ul style="list-style-type: none"> <li>- <input checked="" type="checkbox"/> Version 4.0 LE</li> </ul>
<p>Duty Cycle (Used for SAR testing)</p>	<p>GSM Voice: 12.5%; GPRS 1 Slot: 12.5%; 2 Slots: 25%          CDMA: 100%          W-CDMA: 100%          LTE (FDD): 100%          LTE (TDD): 63.33%          Wi-Fi 802.11a/b/g/n/ac: 100%</p>
<p>GPRS Multi-Slot Class</p>	<p><input type="checkbox"/> Class 8 - One Up  <input checked="" type="checkbox"/> Class 10 - Two Up  <input type="checkbox"/> Class 12 - Four Up  <input type="checkbox"/> Class 33 - Four Up</p>
<p>VoIP</p>	<p><input checked="" type="checkbox"/> Supported</p>

### 7.3. RF Output Power Tolerance

Upper limit (dB): 0.5 ~ -1.5		RF Output Power (dBm)	
RF Air interface	Mode	Target	Max. tune-up tolerance limit
GSM850	Voice	32.7	33.2
	GPRS 1 slot	32.7	33.2
	GPRS 2 slots	31.2	31.7
	EGPRS 1 slot	27.2	27.7
	EGPRS 2 slots	27.2	27.7
GSM1900	Voice	29.7	30.2
	GPRS 1 slot	29.7	30.2
	GPRS 2 slots	28.2	28.7
	EGPRS 1 slot	25.7	26.2
	EGPRS 2 slots	25.7	26.2
CDMA BC0	1xRTT	25.0	25.5
	1xEVDO Rel. 0	25.0	25.5
	1xEVDO Rev. A	25.0	25.5
	1xAdvanced	25.0	25.5
CDMA BC1	1xRTT	24.4	24.9
	1xEVDO Rel. 0	24.4	24.9
	1xEVDO Rev. A	24.4	24.9
	1xAdvanced	24.4	24.9
CDMA BC10	1xRTT	24.7	25.2
	1xEVDO Rel. 0	24.7	25.2
	1xEVDO Rev. A	24.7	25.2
	1xAdvanced	24.7	25.2
W-CDMA Band V	R99	23.2	23.7
	HSDPA	23.2	23.7
	HSUPA	23.2	23.7
W-CDMA Band II	R99	23.2	23.7
	HSDPA	23.2	23.7
	HSUPA	23.2	23.7
LTE Band 25	QPSK	23.2	23.7
LTE Band 26	QPSK	23.2	23.7
LTE Band 41	QPSK	23.7	24.2

Upper limit (dB): 1.0		RF Output Power (dBm)	
RF Air interface	Mode	Target	Max. tune-up tolerance limit
WiFi 2.4 GHz	802.11b	16.0	17.0
	802.11g	13.0	14.0
	802.11n HT20	12.0	13.0
	802.11ac HT20	10.0	11.0
WiFi 5 GHz	802.11a	12.0	13.0
	802.11n HT20	11.0	12.0
	802.11n HT40	10.0	11.0
	802.11ac HT20	10.0	11.0
	802.11ac HT40	10.0	11.0
	802.11ac HT80	10.0	11.0

Upper limit (dB): 1.5		RF Output Power (dBm)	
RF Air interface	Mode	Target	Max. tune-up tolerance limit
Bluetooth		7.5	9.0

Upper limit (dB): 2.0		RF Output Power (dBm)	
RF Air interface	Mode	Target	Max. tune-up tolerance limit
Bluetooth LE		0.0	2.0

### 7.4. Simultaneous Transmission Condition

RF Exposure Condition	Capable Transmit Configurations				
Head	<ol style="list-style-type: none"> <li>1. GSM 850 / 1900 Voice + Wi-Fi 2.4 / 5GHz</li> <li>2. GSM 850 / 1900 (GPRS / EDGE) + Wi-Fi 2.4 / 5 GHz (VoIP)</li> <li>3. CDMA 1xRTT BC0 / BC1 / BC10+ Wi-Fi 2.4 / 5 GHz</li> <li>4. CDMA 1xEVDO BC0 / BC1 / BC10 + Wi-Fi 2.4 / 5 GHz (VoIP)</li> <li>5. WCDMA Band V / II + Wi-Fi 2.4 / 5 GHz</li> <li>6. LTE Band 25 / 26 / 41 + Wi-Fi 2.4 / 5 GHz</li> </ol>				
Body-worn Accessory	<ol style="list-style-type: none"> <li>1. GSM 850/1900 Voice + Wi-Fi 2.4 / 5 GHz</li> <li>2. GSM 850/1900 Voice + BT</li> <li>3. GSM 850/1900 (GPRS/EDGE) + Wi-Fi 2.4 / 5 GHz (VoIP)</li> <li>4. GSM 850/1900 (GPRS/EDGE) + BT(VoIP)</li> <li>5. CDMA 1xRTT BC0 / BC1 / BC10 + Wi-Fi 2.4 / 5 GHz</li> <li>6. CDMA 1xRTT BC0 / BC1 / BC10 + BT</li> <li>7. CDMA 1xEVDO BC0 / BC1 / BC10 + Wi-Fi 2.4 / 5 GHz (VoIP)</li> <li>8. CDMA 1xEVDO BC0 / BC1 / BC10 + BT (VoIP)</li> <li>9. WCDMA Band V/II + Wi-Fi 2.4 / 5 GHz</li> <li>10. WCDMA Band V/II + BT</li> <li>11. LTE Band 25 / 26 / 41 + Wi-Fi 2.4 / 5 GHz</li> <li>12. LTE Band 25 / 26 / 41 + BT</li> </ol>				
Wireless Router (Hotspot)	<ol style="list-style-type: none"> <li>1. GSM 850 / 1900 (GPRS / EDGE) + Wi-Fi 2.4 GHz</li> <li>2. CDMA 1xEVDO BC0 / BC1 / BC10 + Wi-Fi 2.4 GHz</li> <li>3. WCDMA Band V / II + Wi-Fi 2.4 GHz</li> <li>4. LTE Band 25 / 26 / 41 + Wi-Fi 2.4 GHz</li> </ol>				
Wi-Fi Direct	<ol style="list-style-type: none"> <li>1. GSM 850 / 1900 (GPRS / EDGE) + Wi-Fi 2.4 / 5.8 GHz (GO / GC)</li> <li>2. CDMA 1xEVDO BC0 / BC1 / BC10 + Wi-Fi 2.4 / 5.8 GHz (GO / GC)</li> <li>3. WCDMA Band V / II + Wi-Fi 2.4 / 5.8 GHz (GO / GC)</li> <li>4. LTE Band 25 / 26 / 41 + Wi-Fi 2.4 / 5.8 GHz (GO / GC)</li> </ol>				
<p>Notes:</p> <ol style="list-style-type: none"> <li>1. GPRS/EDGE, CDMA, W-CDMA, and LTE support VoIP and Hotspot.</li> <li>2. Wi-Fi 2.4 GHz supports Hotspot and Wi-Fi Direct</li> <li>3. Wi-Fi 5 GHz does not support Hotspot, but does support Wi-Fi Direct:                         <table style="width: 100%; border: none;"> <tr> <td style="width: 50%;">UNII I (5.2 GHz): Wi-Fi Direct GC is only supported (SAR Exclusion)</td> <td style="width: 50%;">UNII III (5.5 GHz): Wi-Fi Direct is not supported</td> </tr> <tr> <td>UNII II (5.3 GHz): Wi-Fi Direct is not supported</td> <td>UNII IV (5.8 GHz): Wi-Fi Direct GC and GO is supported</td> </tr> </table> </li> <li>4. Wi-Fi and Bluetooth cannot transmit simultaneously because they share the same chip.</li> </ol>		UNII I (5.2 GHz): Wi-Fi Direct GC is only supported (SAR Exclusion)	UNII III (5.5 GHz): Wi-Fi Direct is not supported	UNII II (5.3 GHz): Wi-Fi Direct is not supported	UNII IV (5.8 GHz): Wi-Fi Direct GC and GO is supported
UNII I (5.2 GHz): Wi-Fi Direct GC is only supported (SAR Exclusion)	UNII III (5.5 GHz): Wi-Fi Direct is not supported				
UNII II (5.3 GHz): Wi-Fi Direct is not supported	UNII IV (5.8 GHz): Wi-Fi Direct GC and GO is supported				



### 7.5. General LTE SAR Test and Reporting Considerations

Item	Description																																						
Frequency range, Channel Bandwidth, Numbers and Frequencies	<b>Band 25</b>																																						
	Tx: 1850 to 1915 MHz   Rx: 1930 to 1995 MHz																																						
	<b>Band 26</b>																																						
	Tx: 814 to 849 MHz   Rx: 859 to 894 MHz																																						
	<b>Band 41</b>																																						
	Tx: 2496 to 2690 MHz   Rx: 2496 to 2690 MHz																																						
	<b>Band 25</b>																																						
	<b>Channel Bandwidth</b>																																						
	20 MHz   15 MHz   10 MHz   5 MHz   3 MHz   1.4 MHz																																						
	Low   26090   26065   26055																																						
	Mid   26365   26365   26365																																						
	High   26640   26665   26675																																						
	<b>Band 26</b>																																						
	<b>Channel Bandwidth</b>																																						
	20 MHz   15 MHz   10 MHz   5 MHz   3 MHz   1.4 MHz																																						
	Low   26740   26715   26705   26697																																						
	Mid   26865   26865   26865   26865																																						
	High   26990   27015   27025   27033																																						
<b>Band 41</b>																																							
<b>Channel Bandwidth</b>																																							
20 MHz   15 MHz   10 MHz   5 MHz   3 MHz   1.4 MHz																																							
Low   39750   39725   39700																																							
Low-Mid   40185   40173   40160																																							
Mid   40620   40620   40620																																							
Mid-High   41055   41068   41080																																							
High   41490   41515   41540																																							
LTE transmitter and antenna implementation	LTE has two TX/RX antennas and two Rx only antennas. Refer to Appendix "Antenna Locations and Separation Distances" for antenna locations																																						
Maximum power reduction (MPR)	<p><b>Table 6.2.3-1: Maximum Power Reduction (MPR) for Power Class 3</b></p> <table border="1"> <thead> <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> </thead> <tbody> <tr> <td>QPSK</td> <td>&gt; 5</td> <td>&gt; 4</td> <td>&gt; 8</td> <td>&gt; 12</td> <td>&gt; 16</td> <td>&gt; 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>&gt; 5</td> <td>&gt; 4</td> <td>&gt; 8</td> <td>&gt; 12</td> <td>&gt; 16</td> <td>&gt; 18</td> <td>≤ 2</td> </tr> </tbody> </table> <p>MPR Built-in by design                      A-MPR (additional MPR) was disabled during SAR testing</p>	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
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																																
Power reduction	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No																																						
Spectrum plots for RB configurations	A properly configured basestation simulator was used for the SAR and power measurements; therefore, spectrum plots for each RB allocation and offset configuration are not included in the SAR report.																																						

### 7.5.1. TDD LTE Considerations

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

SAR was tested with the highest transmission duty factor (63.33%) using Uplink-downlink configuration 0 and Special subframe configuration 7.

LTE TDD Band 41 supports 3GPP TS 36.211 section 4.2 for Type 2 Frame Structure and Table 4.2-2 for uplink-downlink configurations and Table 4.2-1 for Special subframe configurations.

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

Special subframe configuration	Normal cyclic prefix in downlink				Extended cyclic prefix in downlink		
	DwPTS	UpPTS		DwPTS	UpPTS		
		Normal cyclic prefix in uplink	Extended cyclic prefix in uplink		Normal cyclic prefix in uplink	Extended cyclic prefix in uplink	
0	$6592 \cdot T_s$	$2192 \cdot T_s$	$2560 \cdot T_s$	$7680 \cdot T_s$	$2192 \cdot T_s$	$2560 \cdot T_s$	
1	$19760 \cdot T_s$			$20480 \cdot T_s$			
2	$21952 \cdot T_s$			$23040 \cdot T_s$			
3	$24144 \cdot T_s$			$25600 \cdot T_s$			
4	$26336 \cdot T_s$			$7680 \cdot T_s$			
5	$6592 \cdot T_s$	$4384 \cdot T_s$	$5120 \cdot T_s$	$20480 \cdot T_s$	$4384 \cdot T_s$	$5120 \cdot T_s$	
6	$19760 \cdot T_s$			$23040 \cdot T_s$			
7	$21952 \cdot T_s$			$12800 \cdot T_s$			
8	$24144 \cdot T_s$			-			
9	$13168 \cdot T_s$			-			

Table 4.2-2: Uplink-downlink configurations.

Uplink-downlink configuration	Downlink-to-Uplink Switch-point periodicity	Subframe number									
		0	1	2	3	4	5	6	7	8	9
0	5 ms	D	S	U	U	U	D	S	U	U	U
1	5 ms	D	S	U	U	D	D	S	U	U	D
2	5 ms	D	S	U	D	D	D	S	U	D	D
3	10 ms	D	S	U	U	U	D	D	D	D	D
4	10 ms	D	S	U	U	D	D	D	D	D	D
5	10 ms	D	S	U	D	D	D	D	D	D	D
6	5 ms	D	S	U	U	U	D	S	U	U	D

#### Calculated Duty Cycle

Uplink-Downlink Configuration	Downlink-to-Uplink Switch-point Periodicity	Subframe Number										Calculated Duty Cycle (%)
		0	1	2	3	4	5	6	7	8	9	
0	5 ms	D	S	U	U	U	D	S	U	U	U	63.33
1	5 ms	D	S	U	U	D	D	S	U	U	D	43.33
2	5 ms	D	S	U	D	D	D	S	U	D	D	23.33
3	10 ms	D	S	U	U	U	D	D	D	D	D	31.67
4	10 ms	D	S	U	U	D	D	D	D	D	D	21.67
5	10 ms	D	S	U	D	D	D	D	D	D	D	11.67
6	5 ms	D	S	U	U	U	D	S	U	U	D	53.33

Calculated Duty Cycle = Extended cyclic prefix in uplink x ( $T_s$ ) x # of S + # of U

Example for Calculated Duty Cycle for Uplink-Downlink Configuration 0:  
 Calculated Duty Cycle =  $5120 \times [1/(15000 \times 2048)] \times 2 + 6 \text{ ms} = 63.33\%$   
 where  
 $T_s = 1/(15000 \times 2048)$  seconds

## 8. RF Exposure Conditions

Refer to Appendix “Antenna Locations and Separation Distances” for the specific details of the antenna-to-antenna and antenna-to-edge(s) distances.

### 8.1. Head Exposure Conditions

#### For WWAN, WLAN and Bluetooth

Test Configurations	SAR Required	Note
Left Touch	Yes	
Left Tilt (15°)	Yes	
Right Touch	Yes	
Right Tilt (15°)	Yes	

### 8.2. Body-worn Accessory Exposure Conditions

#### For GSM, CDMA, W-CDMA, LTE Band 25/26 (①)

Test Configurations	Antenna-to-edge/surface	SAR Required	Note
Rear	<25 mm	Yes	
Front	<25 mm	Yes	

#### For LTE Band 41(②)

Test Configurations	Antenna-to-edge/surface	SAR Required	Note
Rear	<25 mm	Yes	
Front	<25 mm	Yes	

#### For Wi-Fi/Bluetooth (③)

Test Configurations	Antenna-to-edge/surface	SAR Required	Note
Rear	<25 mm	Yes	
Front	<25 mm	Yes	

### 8.3. Hotspot Exposure Conditions

#### For GSM, CDMA, W-CDMA, LTE Band 25/26 (①)

Test Configurations	Antenna-to-edge/surface	SAR Required	Note
Rear	<25 mm	Yes	
Front	<25 mm	Yes	
Edge 1 (Top)	134.8 mm	No	SAR is not required because the distance from the antenna to the edge is > 25 mm as per KDB 941225 D06 Hot Spot SAR
Edge 2 (Right)	1.5 mm	Yes	
Edge 3 (Bottom)	1.5 mm	Yes	
Edge 4 (Left)	23.1 mm	Yes	

#### For LTE Band 41(②)

Test Configurations	Antenna-to-edge/surface	SAR Required	Note
Rear	<25 mm	Yes	
Front	<25 mm	Yes	
Edge 1 (Top)	108.8 mm	No	SAR is not required because the distance from the antenna to the edge is > 25 mm as per KDB 941225 D06 Hot Spot SAR
Edge 2 (Right)	53.1 mm	No	SAR is not required because the distance from the antenna to the edge is > 25 mm as per KDB 941225 D06 Hot Spot SAR
Edge 3 (Bottom)	1.5 mm	Yes	
Edge 4 (Left)	1.5 mm	Yes	

#### For Wi-Fi/Bluetooth (③)

Test Configurations	Antenna-to-edge/surface	SAR Required	Note
Rear	<25 mm	Yes	
Front	<25 mm	Yes	
Edge 1 (Top)	1.5 mm	Yes	
Edge 2 (Right)	20.5 mm	Yes	
Edge 3 (Bottom)	111.8 mm	No	SAR is not required because the distance from the antenna to the edge is > 25 mm as per KDB 648474 D04 Handset SAR
Edge 4 (Left)	37.5 mm	No	SAR is not required because the distance from the antenna to the edge is > 25 mm as per KDB 648474 D04 Handset SAR

### 8.4. Wi-Fi Direct Exposure Conditions

#### For Wi-Fi (③)

Test Configurations	Antenna-to-edge/surface	SAR Required	Note
Rear	<25 mm	Yes	
Front	<25 mm	Yes	
Edge 1 (Top)	1.5 mm	Yes	
Edge 2 (Right)	20.5 mm	Yes	
Edge 3 (Bottom)	111.8 mm	No	SAR is not required because the distance from the antenna to the edge is > 25 mm as per KDB 648474 D04 Handset SAR
Edge 4 (Left)	37.5 mm	No	SAR is not required because the distance from the antenna to the edge is > 25 mm as per KDB 648474 D04 Handset SAR

## 9. RF Output Power Measurement

### 9.1. GSM

Band	Mode	Coding Scheme	Time Slots	Ch No.	Freq. (MHz)	Burst Pwr (dBm)	Frame Pwr (dBm)	
850	GSM (Voice)	CS1	1	128	824.2	32.6	23.6	
				190	836.6	32.6	23.6	
				251	848.8	32.6	23.6	
	GPRS (GMSK)	CS1	1	1	128	824.2	32.6	23.6
					190	836.6	32.6	23.6
					251	848.8	32.6	23.6
			2	1	128	824.2	31.5	25.5
					190	836.6	31.5	25.5
					251	848.8	31.5	25.5
	EGPRS (8PSK)	MCS5	1	1	128	824.2	27.6	18.6
					190	836.6	27.6	18.6
					251	848.8	27.7	18.7
2			1	128	824.2	27.4	21.4	
				190	836.6	27.4	21.4	
				251	848.8	27.5	21.5	

#### Notes:

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

- Head & Body-worn Accessory: 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

Band	Mode	Coding Scheme	Time Slots	Ch No.	Freq. (MHz)	Burst Pwr (dBm)	Frame Pwr (dBm)	
1900	GSM (Voice)	CS1	1	512	1850.2	30.2	21.2	
				661	1880.0	30.1	21.1	
				810	1909.8	30.1	21.1	
	GPRS (GMSK)	CS1	1	1	512	1850.2	30.1	21.1
					661	1880.0	30.0	21.0
					810	1909.8	30.1	21.1
			2	1	512	1850.2	28.7	22.7
					661	1880.0	28.7	22.7
					810	1909.8	28.7	22.7
	EGPRS (8PSK)	MCS5	1	1	512	1850.2	26.1	17.1
					661	1880.0	26.0	17.0
					810	1909.8	26.0	17.0
			2	1	512	1850.2	26.0	20.0
					661	1880.0	25.9	19.9
					810	1909.8	26.0	20.0

#### Notes:

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

- Head & Body-worn Accessory: 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. CDMA

### 1xRTT Measured Results

Band	Mode	Ch	Freq. (MHz)	Avg Pwr (dBm)
BC 0	RC1 SO55 (Loopback)	1013	824.70	25.5
		384	836.52	25.5
		777	848.31	25.4
	RC3 SO55 (Loopback)	1013	824.70	25.5
		384	836.52	25.5
		777	848.31	25.4
	RC3 SO32 (+F-SCH)	1013	824.70	25.5
		384	836.52	25.4
		777	848.31	25.4
BC 1	RC1 SO55 (Loopback)	25	1851.25	24.6
		600	1880.00	24.7
		1175	1908.75	24.6
	RC3 SO55 (Loopback)	25	1851.25	24.6
		600	1880.00	24.6
		1175	1908.75	24.6
	RC3 SO32 (+F-SCH)	25	1851.25	24.6
		600	1880.00	24.7
		1175	1908.75	24.6
BC10	RC1, SO55 (Loopback)	476	817.90	25.2
		580	820.50	25.2
		684	823.10	25.2
	RC3, SO55 (Loopback)	476	817.90	25.2
		580	820.50	25.2
		684	823.10	25.2
	RC3, SO32 (+F-SCH)	476	817.90	25.2
		580	820.50	25.2
		684	823.10	25.2

### 1x Advanced Measured Results

Band	Mode	Ch	Freq. (MHz)	Avg Pwr (dBm)
BC 0	Fwd11/Rvs8 SO75 (Loopback)	1013	824.70	25.3
		384	836.52	25.2
		777	848.31	25.2
BC 1	Fwd11/Rvs8 SO75 (Loopback)	25	1851.25	24.7
		600	1880.00	24.8
		1175	1908.75	24.7
BC 10	Fwd11/Rvs8 SO75 (Loopback)	476	817.9	24.9
		580	820.5	24.9
		684	823.1	24.9

**1xEv-Do Rel. 0 Measured Results**

Band	FTAP Rate	RTAP Rate	Channel	Freq. (MHz)	Avg Pwr (dBm)
BC 0	307.2 kbps (2 slot, QPSK)	153.6 kbps	1013	824.70	25.5
			384	836.52	25.5
			777	848.31	25.5
BC1	307.2 kbps (2 slot, QPSK)	153.6 kbps	25	1851.25	24.9
			600	1880.00	24.9
			1175	1908.75	24.9
BC10	307.2 kbps (2 slot, QPSK)	153.6 kbps	476	817.90	25.2
			580	820.50	25.2
			684	823.10	25.2

**1xEv-Do Rev. A Measured Results**

Band	FETAP Traffic Format	RETAP Data Payload Size	Channel	Freq. (MHz)	Avg Pwr (dBm)
BC 0	307.2k, QPSK/ ACK channel is transmitted at all the slots	4096	1013	824.70	25.5
			384	836.52	25.5
			777	848.31	25.5
BC1	307.2k, QPSK/ ACK channel is transmitted at all the slots	4096	25	1851.25	24.9
			600	1880.00	24.9
			1175	1908.75	24.9
BC10	307.2k, QPSK/ ACK channel is transmitted at all the slots	4096	476	817.90	25.2
			580	820.50	25.2
			684	823.10	25.2

### 9.3. W-CDMA

#### Release 99

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 1
	Rel99 RMC	12.2kbps RMC
	Power Control Algorithm	Algorithm2
	$\beta_c/\beta_d$	8/15

#### Measured Results

Band	Mode	UL Ch No.	Freq. (MHz)	Avg Pwr (dBm)
W-CDMA Band V	Rel 99 (RMC, 12.2 kbps)	4132	826.4	23.5
		4183	836.6	23.7
		4233	846.6	23.7
W-CDMA Band II	Rel 99 (RMC, 12.2 kbps)	9262	1852.4	23.7
		9400	1880.0	23.7
		9538	1907.6	23.7

#### HSDPA

The following 4 Sub-tests were completed according to Release 5 / 6 procedures in section 5.2 of 3GPP TS34.121-1. 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-Set1			
	Power Control Algorithm	Algorithm 2			
	$\beta_c$	2/15	12/15	15/15	15/15
	$\beta_d$	15/15	15/15	8/15	4/15
	Bd (SF)	64			
	$\beta_c/\beta_d$	2/15	12/15	15/8	15/4
	$\beta_{hs}$	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= $\beta_{hs}/\beta_c$	30/15				



**Measured Results**

Band	Mode	UL Ch No.	Freq. (MHz)	Avg Pwr (dBm)
W-CDMA Band V	Subtest 1	4132	826.4	23.6
		4183	836.6	23.7
		4233	846.6	23.7
	Subtest 2	4132	826.4	23.7
		4183	836.6	23.7
		4233	846.6	23.7
	Subtest 3	4132	826.4	23.2
		4183	836.6	23.2
		4233	846.6	23.2
	Subtest 4	4132	826.4	23.2
		4183	836.6	23.2
		4233	846.6	23.2
W-CDMA Band II	Subtest 1	9262	1852.4	23.7
		9400	1880.0	23.7
		9538	1907.6	23.6
	Subtest 2	9262	1852.4	23.7
		9400	1880.0	23.7
		9538	1907.6	23.6
	Subtest 3	9262	1852.4	23.2
		9400	1880.0	23.2
		9538	1907.6	23.2
	Subtest 4	9262	1852.4	23.2
		9400	1880.0	23.2
		9538	1907.6	23.2

Maximum output power levels that are possible for all subtests reported.

**HSPA (HSDPA & HSUPA)**

The following 5 Sub-tests were completed according to Release 7 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	12.2kbps RMC				
	HSDPA FRC	H-Set 1				
	HSUPA Test	HSPA				
	Power Control Algorithm	Algorithm 2				Algorithm 1
	$\beta_c$	11/15	6/15	15/15	2/15	15/15
	$\beta_d$	15/15	15/15	9/15	15/15	0
	$\beta_{ec}$	209/225	12/15	30/15	2/15	5/15
	$\beta_c/\beta_d$	11/15	11/15	15/9	2/15	15/0
	$\beta_{hs}$	22/15	12/15	30/15	4/15	5/15
	$\beta_{ed}$	1309/225	94/75	47/15 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				
	A <sub>hs</sub> = $\beta_{hs}/\beta_c$	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 Channelisation Codes	2xSF2				SF4	

**Measured Results**

Band	Mode	UL Ch No.	Freq. (MHz)	Avg Pwr (dBm)
W-CDMA Band V	Subtest 1	4132	826.4	23.1
		4183	836.6	22.9
		4233	846.6	22.9
	Subtest 2	4132	826.4	22.1
		4183	836.6	22.2
		4233	846.6	22.1
	Subtest 3	4132	826.4	22.5
		4183	836.6	22.4
		4233	846.6	22.4
	Subtest 4	4132	826.4	22.4
		4183	836.6	22.5
		4233	846.6	22.4
	Subtest 5	4132	826.4	23.7
		4183	836.6	23.7
		4233	846.6	23.7
W-CDMA Band II	Subtest 1	9262	1852.4	23.5
		9400	1880.0	23.7
		9538	1907.6	23.6
	Subtest 2	9262	1852.4	21.7
		9400	1880.0	21.7
		9538	1907.6	21.7
	Subtest 3	9262	1852.4	22.4
		9400	1880.0	22.7
		9538	1907.6	22.5
	Subtest 4	9262	1852.4	21.7
		9400	1880.0	22.6
		9538	1907.6	22.5
	Subtest 5	9262	1852.4	23.7
		9400	1880.0	23.7
		9538	1907.6	23.6

### 9.4. LTE Band

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 Signalling 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	13	10	Table 6.2.4-2	Table 6.2.4-2
	6.6.3.3.2				
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 <sup>1</sup>	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 25 Measured Results**

Band	BW (MHz)	Mode	RB Allocation	RB offset	Target MPR	Meas. MPR	Avg Pwr (dBm)		
							1855 MHz	1882.5 MHz	1910 MHz
LTE Band 25	10	QPSK	1	0	0	0	23.5	23.7	23.5
			1	25	0	0	23.6	23.5	23.5
			1	49	0	0	23.7	23.6	23.6
			25	0	1	1	22.7	22.4	22.6
			25	12	1	1	22.7	22.4	22.6
			25	25	1	1	22.7	22.7	22.6
			50	0	1	1	22.4	22.5	22.6
		16QAM	1	0	1	1	22.3	22.7	22.2
			1	25	1	1	22.4	22.0	22.2
			1	49	1	1	22.4	22.7	22.3
			25	0	2	2	21.6	21.7	21.6
			25	12	2	2	21.6	21.7	21.6
			25	25	2	2	21.6	21.6	21.6
			50	0	2	2	21.6	21.7	21.5
Band	BW (MHz)	Mode	RB Allocation	RB offset	Target MPR	Meas. MPR	Avg Pwr (dBm)		
							1852.5 MHz	1882.5 MHz	1912.5 MHz
LTE Band 25	5	QPSK	1	0	0	0	23.5	23.6	23.6
			1	12	0	0	23.7	23.7	23.7
			1	24	0	0	23.7	23.6	23.5
			12	0	1	1	22.6	22.4	22.5
			12	7	1	1	22.7	22.7	22.6
			12	13	1	1	22.7	22.7	22.7
			25	0	1	1	22.7	22.7	22.6
		16QAM	1	0	1	1	22.2	22.3	22.3
			1	12	1	1	22.3	22.3	22.4
			1	24	1	1	22.4	22.4	22.5
			12	0	2	2	21.6	21.7	21.5
			12	7	2	2	21.6	21.7	21.5
			12	13	2	2	21.7	21.6	21.6
			25	0	2	2	21.7	21.4	21.5
Band	BW (MHz)	Mode	RB Allocation	RB offset	Target MPR	Meas. MPR	Avg Pwr (dBm)		
							1851.5 MHz	1882.5 MHz	1913.5 MHz
LTE Band 25	3	QPSK	1	0	0	0	23.6	23.6	23.6
			1	8	0	0	23.5	23.7	23.6
			1	14	0	0	23.7	23.7	23.7
			8	0	1	1	22.7	22.5	22.3
			8	4	1	1	22.7	22.5	22.3
			8	7	1	1	22.7	22.3	22.4
			15	0	1	1	22.7	22.4	22.4
		16QAM	1	0	1	1	22.3	22.1	22.3
			1	8	1	1	22.3	22.0	22.4
			1	14	1	1	22.4	22.7	22.4
			8	0	2	2	21.6	21.5	21.7
			8	4	2	2	21.6	21.5	21.7
			8	7	2	2	21.6	21.5	21.7
			15	0	2	2	21.6	21.3	21.7

**LTE Band 26 Measured Results**

Band	BW (MHz)	Mode	RB Allocation	RB offset	Target MPR	Meas. MPR	Avg Pwr (dBm)		
							819 MHz	831.5 MHz	844 MHz
LTE Band 26	10	QPSK	1	0	0	0	23.7	23.7	23.7
			1	25	0	0	23.7	23.6	23.7
			1	49	0	0	23.7	23.6	23.7
			25	0	1	1	22.5	22.7	22.5
			25	12	1	1	22.4	22.7	22.4
			25	25	1	1	22.4	22.5	22.4
			50	0	1	1	22.5	22.7	22.5
		16QAM	1	0	1	1	22.5	22.7	22.4
			1	25	1	1	22.5	22.7	22.4
			1	49	1	1	22.5	22.1	22.3
			25	0	2	2	21.7	21.7	21.3
			25	12	2	2	21.7	21.7	21.3
			25	25	2	2	21.7	21.3	21.2
			50	0	2	2	21.7	21.7	21.4
Band	BW (MHz)	Mode	RB Allocation	RB offset	Target MPR	Meas. MPR	Avg Pwr (dBm)		
LTE Band 26	5	QPSK	1	0	0	0	23.4	23.4	23.6
			1	12	0	0	23.4	23.7	23.7
			1	24	0	0	23.7	23.5	23.5
			12	0	1	1	22.4	22.4	22.5
			12	7	1	1	22.4	22.3	22.4
			12	13	1	1	22.3	22.7	22.4
			25	0	1	1	22.4	22.4	22.4
		16QAM	1	0	1	1	22.4	22.5	22.2
			1	12	1	1	22.4	22.5	22.2
			1	24	1	1	22.5	22.7	22.2
			12	0	2	2	21.2	21.7	21.7
			12	7	2	2	21.3	21.7	21.7
			12	13	2	2	21.3	21.7	21.7
			25	0	2	2	21.4	21.7	21.6
Band	BW (MHz)	Mode	RB Allocation	RB offset	Target MPR	Meas. MPR	Avg Pwr (dBm)		
LTE Band 26	3	QPSK	1	0	0	0	23.6	23.5	23.7
			1	8	0	0	23.7	23.7	23.6
			1	14	0	0	23.6	23.5	23.7
			8	0	1	1	22.3	22.4	22.4
			8	4	1	1	22.4	22.3	22.4
			8	7	1	1	22.4	22.5	22.3
			15	0	1	1	22.4	22.4	22.4
		16QAM	1	0	1	1	22.5	22.0	22.5
			1	8	1	1	22.5	22.7	22.4
			1	14	1	1	22.5	22.1	22.4
			8	0	2	2	21.3	21.5	21.7
			8	4	2	2	21.2	21.5	21.7
			8	7	2	2	21.2	21.5	21.7
			15	0	2	2	21.7	21.7	21.7

**LTE Band 26 Measured Results (continued)**

Band	BW (MHz)	Mode	RB Allocation	RB offset	Target MPR	Meas. MPR	Avg Pwr (dBm)		
							814.7 MHz	831.5 MHz	848.3 MHz
LTE Band 26	1.4	QPSK	1	0	0	0	23.5	23.7	23.7
			1	2	0	0	23.5	23.7	23.7
			1	5	0	0	23.5	23.5	23.5
			3	0	0	0	23.7	23.7	23.7
			3	2	0	0	23.7	23.7	23.7
			3	3	0	0	23.7	23.7	23.7
			6	0	1	1	22.5	22.4	22.6
		16QAM	1	0	1	1	22.7	22.3	22.6
			1	2	1	1	22.6	22.3	22.6
			1	5	1	1	22.7	22.6	22.6
			3	0	1	1	22.6	22.7	22.5
			3	2	1	1	22.5	22.7	22.5
			3	3	1	1	22.6	22.7	22.5
			6	0	2	2	21.3	21.3	21.4

**LTE Band 41 Measured Results**

**Procedure used to establish SAR test signal for LTE TDD Band 41**

Set to CMW-500 with following parameters:

- Turn the LTE Signaling off using “ON | OFF” key
- Operating Band: Select Band 41 and TDD
- Go to “Config...”

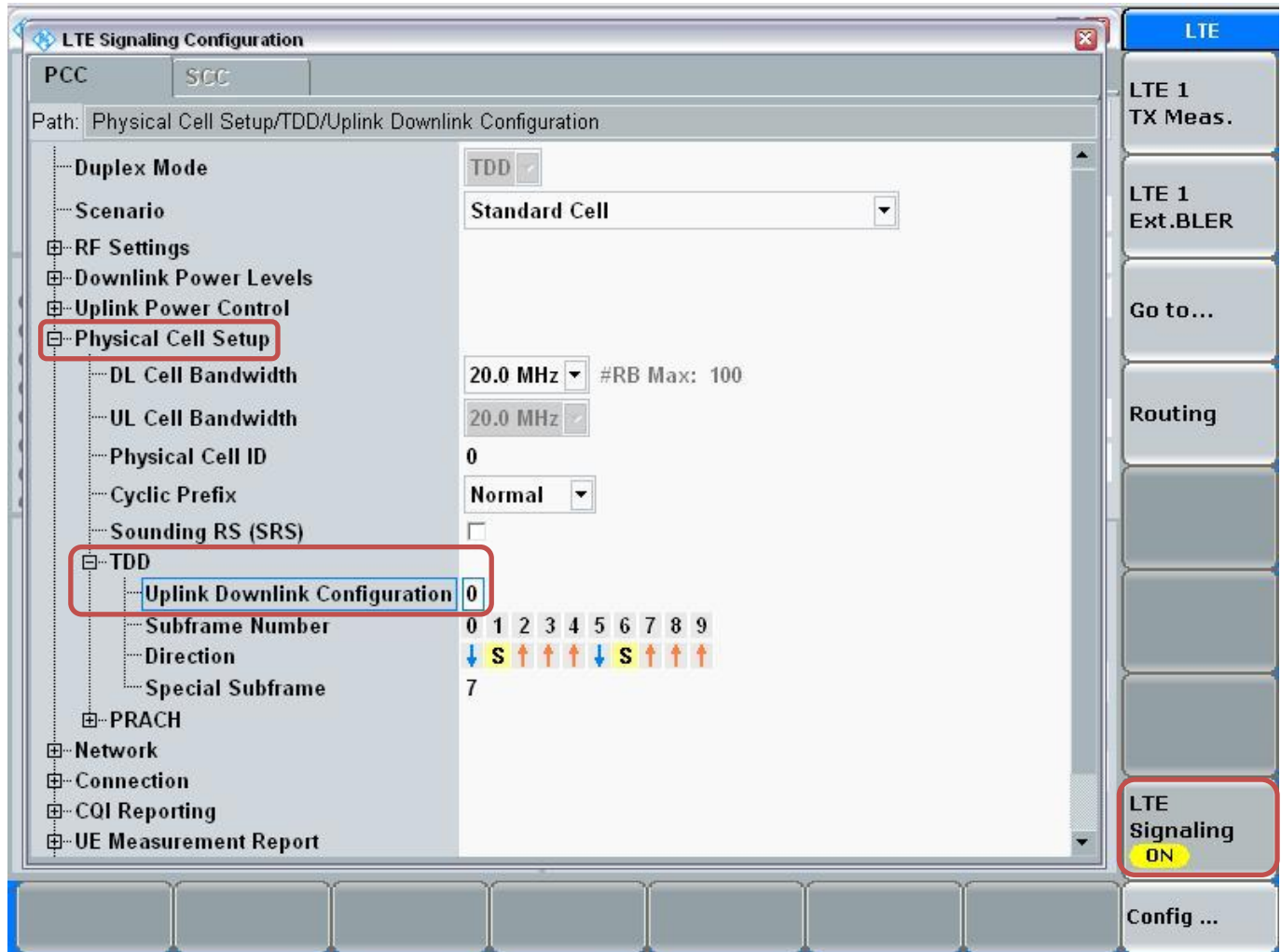
The screenshot displays the 'LTE Signaling 1 - X3.2.10.6' software interface. The main window is divided into several sections:

- Connection Status:** Shows 'Cell' as 'Idle', 'Packet Switched' as 'OFF', and 'RRC State' as 'Idle'.
- Event Log:** Lists system events such as 'State 'Cell Off'', 'State 'Cell On'', 'Signaling Failure', 'Network Originated Detach', 'State 'Connection Established'', 'EPS Dedicated Bearer Established', 'State 'Attached'', and 'EPS Default Bearer Established'.
- UE Info:** Fields for IMEI, IMSI, UE IPv4 Address [0], and UE IPv6 Prefix [0] are shown as empty.
- Connection Setup:**
  - Operating Band:** Set to 'Band 41' and 'TDD'.
  - Channel:** 40620 Ch for both Downlink and Uplink.
  - Frequency:** 2593.0 MHz for both.
  - Cell Bandwidth:** 20.0 MHz for both.
  - RS EPRE:** -85.8 dBm/15kHz.
  - Full Cell BW Pow.:** -55.0 dBm.
  - PUSCH Open Loop Nom. Power:** 23 dBm.
  - PUSCH Closed Loop Target Power:** 23.0 dBm.
  - Scheduling:** RMC.
  - # RB:** 100 for both Downlink and Uplink.
  - RB Pos./Start RB:** low for both.
  - Modulation:** QPSK for both.
  - TBS Idx / Value:** 5 / 8760 for Downlink, 2 / 4584 for Uplink.
  - Throughput:** 3.970 Mbit/s for Downlink, 1.834 Mbit/s for Uplink.
- Right Panel:** Contains buttons for 'LTE 1 TX Meas.', 'LTE 1 Ext.BLER', 'Go to...', 'Routing', 'LTE Signaling OFF' (highlighted with a red box), and 'Config ...' (highlighted with a red box).



Go to "Physical Cell Setup"

- Select "TDD" and Set "Uplink Downlink Configuration" to "0"
- Turn the cell on using "ON | OFF" key



**Connect to EUT**

- Turn the cell on using “ON | OFF” key
- After EUT is Attached
- Select “Connect”

The screenshot displays the 'LTE Signaling 1 - X3.2.10.6' software interface. The main window is divided into several sections:

- Connection Status:** Shows 'Cell' with a signal icon, 'Packet Switched' with a laptop icon, and 'RRC State' as 'Connected'. A red box highlights the 'Attached' status.
- Event Log:** Lists system events such as 'State 'Attached'', 'EPS Default Bearer Established', and 'RRC Connection Established'.
- UE Info:** Displays identifiers including IMEI (001027009999998), IMSI (001010123456789), UE IPv4 Address (192.168.48.129), and UE IPv6 Prefix (fc01:abab:cdcd:efe0::).
- Connection Setup:** Configures parameters for PCC and SCC. Key settings include:
  - Operating Band: Band 41, TDD
  - Channel: 40620 Ch (Downlink and Uplink)
  - Frequency: 2593.0 MHz (Downlink and Uplink)
  - Cell Bandwidth: 20.0 MHz (Downlink and Uplink)
  - RS EPRE: -85.8 dBm/15kHz
  - Full Cell BW Pow.: -55.0 dBm
  - PUSCH Open Loop Nom.Power: 23 dBm
  - PUSCH Closed Loop Target Power: 23.0 dBm
  - Scheduling: RMC
  - # RB: 100 (Downlink and Uplink)
  - RB Pos./Start RB: low (Downlink and Uplink)
  - Modulation: QPSK (Downlink and Uplink)
  - TBS Idx / Value: 5 / 8760 (Downlink), 2 / 4584 (Uplink)
  - Throughput: 3.970 Mbit/s (Downlink), 1.834 Mbit/s (Uplink)
- Bottom Bar:** Contains buttons for 'Detach', 'Connect' (highlighted with a red box), 'Send SMS', 'Handover ...', and 'Config ...'.
- Right Panel:** Includes 'LTE' tab, 'LTE 1 TX Meas.', 'LTE 1 Ext.BLER', 'Go to...', 'Routing', and 'LTE Signaling ON' (highlighted with a red box).

**Max Power Setting**

- Select "LTE 1 TX Meas."
- Press "RESTART | STOP" Soft key

**LTE Signaling 1 - X3.2.10.6**

**Connection Status**  
 Cell: Connection Established  
 Packet Switched: Connection Established  
 RRC State: Connected

**Event Log**  
 03:33:07 [i] State 'Connection Established'  
 03:33:07 [i] EPS Dedicated Bearer Established  
 03:31:31 [i] State 'Attached'  
 03:31:31 [i] EPS Default Bearer Established  
 03:31:31 [i] RRC Connection Established  
 03:31:02 [i] State 'Cell On'  
 03:31:00 [i] State 'Cell Off'  
 03:30:23 [i] State 'Cell On'

**UE Info**  
 IMEI: 001027009999998  
 IMSI: 001010123456789  
 UE IPv4 Address [0]: 192.168.48.129  
 UE IPv6 Prefix [0]: fc01:abab:cdcd:efe0::

**Connection Setup**  
 Scheduling: RMC

	Downlink	Uplink
Operating Band	Band 41	TDD
Channel	40620 Ch	40620 Ch
Frequency	2593.0 MHz	2593.0 MHz
Cell Bandwidth	20.0 MHz	20.0 MHz
RS EPRE	-85.8 dBm/15kHz	
Full Cell BW Pow.	-55.0 dBm	
PUSCH Open Loop Nom.Power		23 dBm
PUSCH Closed Loop Target Power		23.0 dBm
# RB	100	100
RB Pos./Start RB	low 0	low 0
Modulation	QPSK	QPSK
TBS Idx / Value	5 8760	2 4584
Throughput	3.970 Mbit/s	1.834 Mbit/s

**LTE**  
 LTE 1 TX Meas.  
 LTE 1 Ext.BLER  
 Go to...  
 Routing  
 LTE Signaling ON

Buttons: Detach, Disconnect, Send SMS, Handover ..., Config ...

Select "Signaling Parameter"

- Select "TX Power Control (TPC)" > Select "Active TPC Setup" to "Max Power" > Set "Closed Loop Target Power" to "23 dBm"

The screenshot displays the 'LTE Measurement - X3.2.10.6 - TX Measurement' software interface. The main window shows various measurement plots: EVM, Inband Emissions, Equalizer Spectrum Flatness, and Spectrum ACLR. A 'Signaling TPC' dialog box is open, showing the following settings:

TX Power Control (TPC)	
Active TPC Setup	Max Power
Closed Loop Target Power	23.0 dBm

The 'Signaling Parameter' button on the right sidebar is highlighted with a red box. The bottom of the interface features a navigation bar with buttons for 'Cell Setup ...', 'Connection Setup ...', 'DL Error Insertion ...', 'TPC ...', 'Power ...', 'Enable ...', and 'Config ...'. The status bar at the bottom right indicates 'LTE Signaling ON'.



**View TX Power**

- Go to "Display"
- Select "Select View..."
- Select "Spectrum Emission Mask"

LTE Measurement - X3.2.10.6 - TX Measurement

Mode: TDD Freq.: 2593.0 MHz Ref. Level: 45.00 dBm Bandwidth: 20.0 MHz Cyclic Prefix: Normal Meas Subfr.: 0

**Spectrum Emission Mask**

Y-axis: dBm (range -60 to 30)  
 X-axis: MHz (range -30 to 30)

Detected Allocation	NoRB:	100	OffsetRB:	0
	Current		Average	Extreme
OBW	17.790 MHz	17.773 MHz	17.790 MHz	0.013 MHz
	Current	Average	Min	Max
TX Power	23.72 dBm	23.33 dBm	22.10 dBm	24.27 dBm
				StdDev
				0.23 dBm

Statistic Count: 20/20  
 Out of Tolerance: 0.00 %  
 Detected Modulation: QPSK  
 Detected Channel Type: PUSCH  
 View Filter Throughput: 100.0 %

Select View: SpectrumEmissionMask

Margin: On Off  
 Select Trace (SEM) ...  
 Y Scale (SEM) ...  
 X Scale (SEM) ...

**LTE Band 41 Measured Results (continued)**

Band	BW (MHz)	Mode	RB Allocation	RB offset	Target MPR	Meas. MPR	Avg Pwr (dBm)				
							2506 MHz	2549.5 MHz	2593 MHz	2636.5 MHz	2680 MHz
LTE Band 41	20	QPSK	1	0	0	0	24.2	24.2	24.2	24.1	24.2
			1	49	0	0	24.2	24.2	24.1	24.1	24.2
			1	99	0	0	24.2	24.2	24.0	24.1	24.1
			50	0	1	1	23.2	23.2	23.2	23.1	23.0
			50	24	1	1	23.2	23.2	23.2	23.1	23.0
			50	50	1	1	23.2	23.2	23.1	23.0	23.2
		16QAM	100	0	1	1	23.2	23.2	23.2	23.1	23.0
			1	0	1	1	23.1	23.1	22.7	22.6	23.2
			1	49	1	1	23.0	23.2	22.7	22.6	23.2
			1	99	1	1	23.1	23.2	22.5	22.6	23.2
			50	0	2	2	22.2	22.2	22.1	22.1	22.2
			50	24	2	2	22.2	22.2	22.1	22.2	22.0
			50	50	2	2	22.2	22.2	22.1	22.1	22.2
			100	0	2	2	22.2	22.2	22.2	22.1	22.1
Band	BW (MHz)	Mode	RB Allocation	RB offset	Target MPR	Meas. MPR	Avg Pwr (dBm)				
							2503.5 MHz	2548.3 MHz	2593 MHz	2637.75 MHz	2682.5 MHz
LTE Band 41	15	QPSK	1	0	0	0	24.1	24.2	24.2	24.2	24.1
			1	37	0	0	24.1	24.2	24.2	24.2	24.2
			1	74	0	0	24.2	24.2	24.2	24.2	24.2
			36	0	1	1	23.0	23.2	23.2	23.2	23.0
			36	20	1	1	23.1	23.2	23.0	23.1	23.1
			36	39	1	1	23.1	23.2	23.2	23.0	23.1
			75	0	1	1	23.1	23.2	23.1	23.1	23.1
		16QAM	1	0	1	1	23.2	23.2	23.1	23.1	23.1
			1	37	1	1	23.2	23.2	23.0	23.2	23.2
			1	74	1	1	23.2	23.2	23.0	23.0	23.2
			36	0	2	2	22.1	22.2	22.1	22.0	22.1
			36	20	2	2	22.1	22.2	22.2	22.0	22.1
			36	39	2	2	22.1	22.2	22.2	22.2	22.2
			75	0	2	2	22.0	22.0	22.1	22.0	22.0
Band	BW (MHz)	Mode	RB Allocation	RB offset	Target MPR	Meas. MPR	Avg Pwr (dBm)				
							2501 MHz	2547 MHz	2593 MHz	2639 MHz	2685 MHz
LTE Band 41	10	QPSK	1	0	0	0	24.2	24.2	24.2	24.2	23.9
			1	25	0	0	24.1	24.2	24.2	24.2	24.1
			1	49	0	0	24.2	24.2	24.2	24.2	24.1
			25	0	1	1	23.0	23.2	23.1	23.1	23.1
			25	12	1	1	23.1	23.2	23.1	23.1	23.1
			25	25	1	1	23.1	23.2	23.1	23.1	23.1
			50	0	1	1	23.2	23.2	23.1	23.1	23.2
		16QAM	1	0	1	1	23.1	23.2	23.1	23.0	23.2
			1	25	1	1	23.1	23.2	23.0	23.0	23.2
			1	49	1	1	23.2	23.2	22.9	23.0	23.2
			25	0	2	2	22.0	22.0	22.0	21.9	22.0
			25	12	2	2	22.0	22.0	21.9	21.9	22.1
			25	25	2	2	22.1	22.0	21.9	21.8	22.0
			50	0	2	2	22.0	22.0	22.1	22.0	22.1

### 9.5. Wi-Fi (2.4 GHz Band)

Required Test Channels per KDB 248227 D01

Mode	Band	GHz	Channel	"Default Test Channels"	
				802.11b	802.11g
802.11b/g	2.4 GHz	2.412	1 <sup>#</sup>	√	∇
		2.437	6	√	∇
		2.462	11 <sup>#</sup>	√	∇

**Notes:**

√ = "default test channels"

∇ = possible 802.11g channels with maximum average output ¼ dB ≥ the "default test channels"

<sup>#</sup> = when output power is reduced for channel 1 and /or 11 to meet restricted band requirements the highest output channels closest to each of these channels should be tested.

#### Measured Results

Band (GHz)	Mode	Data Rate	Ch #	Freq. (MHz)	Avg Pwr (dBm)	SAR Test (Yes/No)
2.4 (DTS)	802.11b	1 Mbps	1	2412	16.5	Yes
			6	2437	16.5	
			11	2462	16.5	
	802.11g	6 Mbps	1	2412	13.2	No
			6	2437	13.5	
			11	2462	13.5	
	802.11n (HT20)	MCS0	1	2412	12.1	No
			6	2437	12.4	
			11	2462	12.4	
	802.11ac (HT20)	MCS0	1	2412	10.2	Yes
			6	2437	10.5	
			11	2462	10.5	

**Note(s):**

Per KDB 248227 D01, SAR is not required for 802.11g/n (HT20) channels when the maximum average output power is less than 1/4 dB higher than that measured on the corresponding 802.11b channels.

#### Power measurements to determine worst-case data rates

Mode	Ch #	Freq. (MHz)	Data Rate	Avg Pwr (dBm)	SAR test (Yes/No)
802.11b	6	2437	1 Mbps	16.5	Yes
			2 Mbps	16.5	No
			5.5 Mbps	16.5	No
			11 Mbps	16.5	No

### 9.6. Wi-Fi (5 GHz Bands)

#### Required Test Channels per KDB 248227 D01

Mode		Band	GHz	Channel	"Default Test Channels"	
					802.11a	
802.11a	UNII (15.407)	5.2 GHz	5.180	36	√	
			5.200	40		*
			2.220	44		*
			5.240	48	√	
		5.3 GHz	5.260	52	√	
			5.280	56		*
			5.300	60		*
			5.320	64	√	
		5.5 GHz	5.500	100		
			5.520	104	√	
			5.540	108		*
			5.560	112		*
	5.580		116	√		
	5.600		120		*	
	5.620		124	√		
	5.640		128		*	
	5.8 GHz	5.660	132		*	
		5.680	136	√		
		5.700	140		*	
		5.745	149	√		
DTS (15.247)	5.8 GHz	5.765	153		*	
		5.785	157	√		
		5.805	161		*	
		5.825	165	√		

√ = "default test channels"

\* = possible 802.11a channels with maximum average output > the "default test channels"

# = when output power is reduced for channel 1 and /or 11 to meet restricted band requirements the highest output channels closest to each of these channels should be tested.



**Measured Results**

Band (GHz)	Mode	Mode	Ch #	Freq. (MHz)	Avg Pwr (dBm)	SAR Test (Yes/No)
5.2 (UNII)	802.11a	6 Mbps	36	5180	12.0	Yes
			40	5200	11.9	
			44	5220	11.9	
			48	5240	12.0	
	802.11n (HT20)	MCS0	36	5180	10.7	No
			40	5200	10.7	
			48	5240	10.8	
	802.11n (HT40)	MCS0	38	5190	10.1	No
			46	5230	10.2	
	802.11ac (VHT20)	MCS0	36	5180	9.9	Yes
			40	5200	9.9	
			48	5240	10.1	
802.11ac (VHT40)	MCS0	38	5190	10.5	No	
		46	5230	10.5		
802.11ac (VHT80)	MCS0	42	5210	10.0	No	
5.3 (UNII)	802.11a	6 Mbps	52	5260	12.3	Yes
			56	5280	12.4	
			60	5300	12.5	
			64	5320	12.5	
	802.11n (HT20)	MCS0	52	5260	10.9	No
			60	5300	11.2	
			64	5320	11.3	
	802.11n (HT40)	MCS0	54	5270	10.2	No
			62	5310	10.4	
	802.11ac (VHT20)	MCS0	52	5260	10.0	Yes
			60	5300	10.3	
			64	5320	10.3	
	802.11ac (VHT40)	MCS0	54	5270	10.1	No
			62	5310	10.5	
802.11ac (VHT80)	MCS0	58	5290	10.0	No	

**Note(s):**

Per KDB 248227, SAR is not required for 802.11n (HT20/HT40) and 802.11ac (HT40/HT80) channels when the maximum average output power is less than 1/4 dB higher than that measured on the corresponding 802.11a channels.

**Measured Results (continued)**

Band (GHz)	Mode	Mode	Ch #	Freq. (MHz)	Avg Pwr (dBm)	SAR Test (Yes/No)
5.5 (UNII)	802.11a	6 Mbps	100	5500	12.3	Yes
			104	5520	12.3	
			108	5540	12.3	
			112	5560	12.3	
			116	5580	12.3	
			120	5600	Not Supported	
			124	5620	Not Supported	
			128	5640	Not Supported	
			132	5660	12.5	
			136	5680	12.5	
	140	5700	12.5			
	802.11n (HT20)	MCS0	100	5500	11.3	No
			116	5580	11.3	
			140	5700	11.5	
	802.11n (HT40)	MCS0	102	5510	10.5	No
			110	5550	10.5	
			134	5670	10.5	
	802.11ac (VHT20)	MCS0	100	5500	10.3	Yes
			116	5580	10.3	
			136	5680	10.4	
	802.11ac (VHT40)	MCS0	102	5510	10.5	No
110			5550	10.5		
142			5710	10.5		
802.11ac (VHT80)	MCS0	106	5530	10.5	No	
		138	5690	10.5		
5.8 (DTS)	802.11a	6 Mbps	149	5745	12.5	Yes
			153	5765	12.5	
			157	5785	12.5	
			161	5805	12.5	
			165	5825	12.5	
	802.11n (HT20)	MCS0	149	5745	11.4	No
			157	5785	11.5	
			161	5805	11.5	
	802.11n (HT40)	MCS0	151	5755	10.1	No
			159	5795	10.0	
	802.11ac (VHT20)	MCS0	149	5745	10.3	Yes
			157	5785	9.9	
			165	5825	10.1	
	802.11ac (VHT40)	MCS0	151	5755	10.2	No
			159	5795	10.2	
802.11ac (VHT80)	MCS0	155	5775	10.5	No	

**Note(s):**

Per KDB 248227, SAR is not required for 802.11n (HT20/HT40) and 802.11ac (HT40/HT80) channels when the maximum average output power is less than 1/4 dB higher than that measured on the corresponding 802.11a channels.

**Power measurements to determine worst-case data rates**

Band	Mode	Ch #	Freq. (MHz)	Data Rate	Avg Pwr (dBm)	SAR test (Yes/No)
5.2 GHz (UNII)	802.11a	36	5180	6 Mbps	12.0	Yes
				9 Mbps	11.9	No
				12 Mbps	12.0	No
				18 Mbps	11.9	No
				24 Mbps	12.0	No
				36 Mbps	12.0	No
				48 Mbps	12.0	No
				54 Mbps	12.0	No
5.3 GHz (UNII)	802.11a	64	5280	6 Mbps	12.7	Yes
				9 Mbps	12.6	No
				12 Mbps	12.7	No
				18 Mbps	12.7	No
				24 Mbps	12.7	No
				36 Mbps	12.7	No
				48 Mbps	12.7	No
				54 Mbps	12.7	No
5.5 GHz (UNII)	802.11a	136	5580	6 Mbps	12.7	Yes
				9 Mbps	12.7	No
				12 Mbps	12.6	No
				18 Mbps	12.6	No
				24 Mbps	12.7	No
				36 Mbps	12.7	No
				48 Mbps	12.7	No
				54 Mbps	12.7	No
5.8 GHz (DTS)	802.11a	149	5745	6 Mbps	12.8	Yes
				9 Mbps	12.6	No
				12 Mbps	12.7	No
				18 Mbps	12.6	No
				24 Mbps	12.8	No
				36 Mbps	12.8	No
				48 Mbps	12.8	No
				54 Mbps	12.8	No

**9.7. Bluetooth**

Maximum tune-up tolerance limit is 9.0 dBm from the rated nominal maximum output power. This power level qualifies for exclusion of SAR testing.

## 10. Tissue Dielectric Properties

### IEEE Std 1528-2013

Target Frequency (MHz)	Head	
	$\epsilon_r$	$\sigma$ (S/m)
300	45.3	0.87
450	43.5	0.87
750	41.9	0.89
835	41.5	0.90
900	41.5	0.97
1450	40.5	1.20
1500	40.4	1.23
1640	40.2	1.31
1750	40.1	1.37
1800	40.0	1.40
1900	40.0	1.40
2000	40.0	1.40
2100	39.8	1.49
2300	39.5	1.67
2450	39.2	1.80
2600	39.0	1.96
3000	38.5	2.40
3500	37.9	2.91
4000	37.4	3.43
4500	36.8	3.94
5000	36.2	4.45
5200	36.0	4.66
5400	35.8	4.86
5600	35.5	5.07
5800	35.3	5.27
6000	35.1	5.48

NOTE—For convenience, permittivity and conductivity values at some frequencies that are not part of the original data from Drossos et al. [B60] or the extension to 5800 MHz are provided (i.e., the values shown in italics). These values were linearly interpolated between the values in this table that are immediately above and below these values, except the values at 6000 MHz that were linearly extrapolated from the values at 3000 MHz and 5800 MHz.

### FCC KDB 865664 D01 SAR Measurement 100 MHz to 6 GHz

Target Frequency (MHz)	Head		Body	
	$\epsilon_r$	$\sigma$ (S/m)	$\epsilon_r$	$\sigma$ (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



## 10.2. Tissue Dielectric Parameter Check Results

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.

### SAR Lab 1

Date	Freq. (MHz)	Liquid Parameters		Measured	Target	Delta (%)	Limit ±(%)	
5/27/2014	Head 2600	e'	37.5600	Relative Permittivity ( $\epsilon_r$ ):	37.56	39.01	-3.72	5
		e"	14.0100	Conductivity ( $\sigma$ ):	2.03	1.96	3.22	5
	Head 2500	e'	37.9200	Relative Permittivity ( $\epsilon_r$ ):	37.92	39.14	-3.11	5
		e"	13.7500	Conductivity ( $\sigma$ ):	1.91	1.85	3.09	5
	Head 2700	e'	37.1600	Relative Permittivity ( $\epsilon_r$ ):	37.16	38.88	-4.44	5
		e"	14.2000	Conductivity ( $\sigma$ ):	2.13	2.07	2.97	5
5/27/2014	Body 2600	e'	50.3600	Relative Permittivity ( $\epsilon_r$ ):	50.36	52.51	-4.10	5
		e"	15.2300	Conductivity ( $\sigma$ ):	2.20	2.16	1.90	5
	Body 2500	e'	50.6500	Relative Permittivity ( $\epsilon_r$ ):	50.65	52.64	-3.77	5
		e"	14.9400	Conductivity ( $\sigma$ ):	2.08	2.02	2.80	5
	Body 2700	e'	50.0100	Relative Permittivity ( $\epsilon_r$ ):	50.01	52.38	-4.53	5
		e"	15.4600	Conductivity ( $\sigma$ ):	2.32	2.30	0.85	5
5/27/2014	Body 2450	e'	50.7551	Relative Permittivity ( $\epsilon_r$ ):	50.76	52.70	-3.69	5
		e"	14.8319	Conductivity ( $\sigma$ ):	2.02	1.95	3.62	5
	Body 2410	e'	50.8605	Relative Permittivity ( $\epsilon_r$ ):	50.86	52.76	-3.60	5
		e"	14.7404	Conductivity ( $\sigma$ ):	1.98	1.91	3.55	5
	Body 2475	e'	50.7032	Relative Permittivity ( $\epsilon_r$ ):	50.70	52.67	-3.73	5
		e"	14.8875	Conductivity ( $\sigma$ ):	2.05	1.99	3.21	5
5/27/2014	Head 2450	e'	38.0544	Relative Permittivity ( $\epsilon_r$ ):	38.05	39.20	-2.92	5
		e"	13.6386	Conductivity ( $\sigma$ ):	1.86	1.80	3.22	5
	Head 2410	e'	38.1957	Relative Permittivity ( $\epsilon_r$ ):	38.20	39.28	-2.76	5
		e"	13.5429	Conductivity ( $\sigma$ ):	1.81	1.76	3.09	5
	Head 2475	e'	37.9898	Relative Permittivity ( $\epsilon_r$ ):	37.99	39.17	-3.01	5
		e"	13.7013	Conductivity ( $\sigma$ ):	1.89	1.83	3.20	5

**SAR Lab 1 (continued)**

Date	Freq. (MHz)	Liquid Parameters		Measured	Target	Delta (%)	Limit ±(%)		
5/30/2014	Head 5180	e'	37.0600	Relative Permittivity ( $\epsilon_r$ ):	37.06	36.01	2.91	5	
		e"	15.6600	Conductivity ( $\sigma$ ):	4.51	4.63	-2.59	5	
	Head 5200	e'	37.0200	Relative Permittivity ( $\epsilon_r$ ):	37.02	35.99	2.86	5	
		e"	15.6700	Conductivity ( $\sigma$ ):	4.53	4.65	-2.58	5	
	Head 5600	e'	36.4800	Relative Permittivity ( $\epsilon_r$ ):	36.48	35.53	2.66	5	
		e"	15.8300	Conductivity ( $\sigma$ ):	4.93	5.06	-2.59	5	
	Head 5800	e'	36.2100	Relative Permittivity ( $\epsilon_r$ ):	36.21	35.30	2.58	5	
		e"	15.9300	Conductivity ( $\sigma$ ):	5.14	5.27	-2.52	5	
	Head 5825	e'	36.1700	Relative Permittivity ( $\epsilon_r$ ):	36.17	35.30	2.46	5	
		e"	15.9500	Conductivity ( $\sigma$ ):	5.17	5.27	-1.97	5	
	6/2/2014	Body 5180	e'	46.9100	Relative Permittivity ( $\epsilon_r$ ):	46.91	49.05	-4.36	5
			e"	18.3900	Conductivity ( $\sigma$ ):	5.30	5.27	0.48	5
Body 5200		e'	46.8800	Relative Permittivity ( $\epsilon_r$ ):	46.88	49.02	-4.36	5	
		e"	18.4100	Conductivity ( $\sigma$ ):	5.32	5.29	0.53	5	
Body 5600		e'	46.2300	Relative Permittivity ( $\epsilon_r$ ):	46.23	48.48	-4.64	5	
		e"	18.7000	Conductivity ( $\sigma$ ):	5.82	5.76	1.07	5	
Body 5800		e'	45.9300	Relative Permittivity ( $\epsilon_r$ ):	45.93	48.20	-4.71	5	
		e"	18.8600	Conductivity ( $\sigma$ ):	6.08	6.00	1.37	5	
Body 5825		e'	45.8800	Relative Permittivity ( $\epsilon_r$ ):	45.88	48.20	-4.81	5	
		e"	18.8800	Conductivity ( $\sigma$ ):	6.12	6.00	1.92	5	

**SAR Lab 2**

Date	Freq. (MHz)	Liquid Parameters		Measured	Target	Delta (%)	Limit ±(%)	
5/27/2014	Body 1900	e'	51.2600	Relative Permittivity ( $\epsilon_r$ ):	51.26	53.30	-3.83	5
		e"	14.6100	Conductivity ( $\sigma$ ):	1.54	1.52	1.55	5
	Body 1850	e'	51.4800	Relative Permittivity ( $\epsilon_r$ ):	51.48	53.30	-3.41	5
		e"	14.5000	Conductivity ( $\sigma$ ):	1.49	1.52	-1.87	5
	Body 1910	e'	51.2200	Relative Permittivity ( $\epsilon_r$ ):	51.22	53.30	-3.90	5
		e"	14.6300	Conductivity ( $\sigma$ ):	1.55	1.52	2.22	5
5/27/2014	Head 1900	e'	38.4600	Relative Permittivity ( $\epsilon_r$ ):	38.46	40.00	-3.85	5
		e"	13.3500	Conductivity ( $\sigma$ ):	1.41	1.40	0.74	5
	Head 1850	e'	38.7000	Relative Permittivity ( $\epsilon_r$ ):	38.70	40.00	-3.25	5
		e"	13.2300	Conductivity ( $\sigma$ ):	1.36	1.40	-2.79	5
	Head 1910	e'	38.4100	Relative Permittivity ( $\epsilon_r$ ):	38.41	40.00	-3.98	5
		e"	13.3700	Conductivity ( $\sigma$ ):	1.42	1.40	1.42	5
5/29/2014	Head 835	e'	39.7500	Relative Permittivity ( $\epsilon_r$ ):	39.75	41.50	-4.22	5
		e"	19.4800	Conductivity ( $\sigma$ ):	0.90	0.90	0.49	5
	Head 820	e'	39.9300	Relative Permittivity ( $\epsilon_r$ ):	39.93	41.60	-4.02	5
		e"	19.5100	Conductivity ( $\sigma$ ):	0.89	0.90	-0.99	5
	Head 850	e'	39.5700	Relative Permittivity ( $\epsilon_r$ ):	39.57	41.50	-4.65	5
		e"	19.4300	Conductivity ( $\sigma$ ):	0.92	0.92	0.36	5
5/29/2014	Body 835	e'	52.9800	Relative Permittivity ( $\epsilon_r$ ):	52.98	55.20	-4.02	5
		e"	21.6200	Conductivity ( $\sigma$ ):	1.00	0.97	3.48	5
	Body 820	e'	53.1400	Relative Permittivity ( $\epsilon_r$ ):	53.14	55.28	-3.87	5
		e"	21.6800	Conductivity ( $\sigma$ ):	0.99	0.97	2.07	5
	Body 850	e'	52.8200	Relative Permittivity ( $\epsilon_r$ ):	52.82	55.16	-4.24	5
		e"	21.5500	Conductivity ( $\sigma$ ):	1.02	0.99	3.18	5

**SAR Lab 2 (continued)**

Date	Freq. (MHz)	Liquid Parameters		Measured	Target	Delta (%)	Limit ±(%)	
6/2/2014	Head 835	e'	42.4800	Relative Permittivity ( $\epsilon_r$ ):	42.48	41.50	2.36	5
		e"	20.2300	Conductivity ( $\sigma$ ):	0.94	0.90	4.36	5
	Head 820	e'	42.6400	Relative Permittivity ( $\epsilon_r$ ):	42.64	41.60	2.49	5
		e"	20.3300	Conductivity ( $\sigma$ ):	0.93	0.90	3.17	5
	Head 850	e'	42.3900	Relative Permittivity ( $\epsilon_r$ ):	42.39	41.50	2.14	5
		e"	20.1700	Conductivity ( $\sigma$ ):	0.95	0.92	4.18	5
6/2/2014	Head 1900	e'	39.4100	Relative Permittivity ( $\epsilon_r$ ):	39.41	40.00	-1.48	5
		e"	13.4200	Conductivity ( $\sigma$ ):	1.42	1.40	1.27	5
	Head 1850	e'	39.6500	Relative Permittivity ( $\epsilon_r$ ):	39.65	40.00	-0.88	5
		e"	13.2900	Conductivity ( $\sigma$ ):	1.37	1.40	-2.35	5
	Head 1910	e'	39.3700	Relative Permittivity ( $\epsilon_r$ ):	39.37	40.00	-1.58	5
		e"	13.4400	Conductivity ( $\sigma$ ):	1.43	1.40	1.95	5
6/2/2014	Body 1900	e'	50.7200	Relative Permittivity ( $\epsilon_r$ ):	50.72	53.30	-4.84	5
		e"	14.5400	Conductivity ( $\sigma$ ):	1.54	1.52	1.06	5
	Body 1850	e'	50.9500	Relative Permittivity ( $\epsilon_r$ ):	50.95	53.30	-4.41	5
		e"	14.4000	Conductivity ( $\sigma$ ):	1.48	1.52	-2.55	5
	Body 1910	e'	50.7000	Relative Permittivity ( $\epsilon_r$ ):	50.70	53.30	-4.88	5
		e"	14.5700	Conductivity ( $\sigma$ ):	1.55	1.52	1.80	5
6/3/2014	Body 835	e'	54.9400	Relative Permittivity ( $\epsilon_r$ ):	54.94	55.20	-0.47	5
		e"	21.9000	Conductivity ( $\sigma$ ):	1.02	0.97	4.82	5
	Body 820	e'	55.0300	Relative Permittivity ( $\epsilon_r$ ):	55.03	55.28	-0.45	5
		e"	21.9900	Conductivity ( $\sigma$ ):	1.00	0.97	3.53	5
	Body 850	e'	54.8300	Relative Permittivity ( $\epsilon_r$ ):	54.83	55.16	-0.59	5
		e"	21.8800	Conductivity ( $\sigma$ ):	1.03	0.99	4.76	5

**SAR Lab 4**

Date	Freq. (MHz)	Liquid Parameters		Measured	Target	Delta (%)	Limit ±(%)	
6/2/2014	Body 1900	e'	50.6800	Relative Permittivity ( $\epsilon_r$ ):	50.68	53.30	-4.92	5
		e"	14.6000	Conductivity ( $\sigma$ ):	1.54	1.52	1.48	5
	Body 1850	e'	50.9300	Relative Permittivity ( $\epsilon_r$ ):	50.93	53.30	-4.45	5
		e"	14.4600	Conductivity ( $\sigma$ ):	1.49	1.52	-2.14	5
	Body 1910	e'	50.6700	Relative Permittivity ( $\epsilon_r$ ):	50.67	53.30	-4.93	5
		e"	14.6200	Conductivity ( $\sigma$ ):	1.55	1.52	2.15	5
6/2/2014	Head 1900	e'	38.1300	Relative Permittivity ( $\epsilon_r$ ):	38.13	40.00	-4.67	5
		e"	13.3800	Conductivity ( $\sigma$ ):	1.41	1.40	0.97	5
	Head 1850	e'	38.3800	Relative Permittivity ( $\epsilon_r$ ):	38.38	40.00	-4.05	5
		e"	13.2600	Conductivity ( $\sigma$ ):	1.36	1.40	-2.57	5
	Head 1910	e'	38.0800	Relative Permittivity ( $\epsilon_r$ ):	38.08	40.00	-4.80	5
		e"	13.4100	Conductivity ( $\sigma$ ):	1.42	1.40	1.73	5



## 11. System Performance 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 remeasured or sooner when marginal liquid parameters are used at the beginning of a series of measurements.

### 11.1. 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.

### 11.2. Reference SAR Values for System Performance Check

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 (mW/g)		
				1g/10g	Head	Body
D835V2	4d002	11/15/2013	835	1g	9.49	9.43
				10g	6.18	6.21
D1900V2	5d043	11/12/2013	1900	1g	40.1	39.0
				10g	21.1	20.8
D2450V2	899	9/10/2013	2450	1g	51.3	49.7
				10g	23.9	23.3
D2600V2	1006	9/11/2013	2600	1g	56.5	55.7
				10g	25.2	24.8
D5GHzV2	1138	11/19/2013	5200	1g	78.5	72.9
				10g	22.5	20.4
			5600	1g	82.7	78.3
				10g	23.5	21.7
			5800	1g	78.3	72.8
				10g	22.4	20.1

### 11.3. System Performance 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 %	Est./Zoom Ratio	Plot No.	
	Type	Serial #		Area Scan	Zoom Scan	Normalize to 1 W					
5/27/2014	D2600V2	1006	Head	1g	6.10	5.82	58.20	56.5	3.01	4.59	
				10g	2.68	2.57	25.70	25.2	1.98		
5/27/2014	D2600V2	1006	Body	1g	5.99	5.82	58.20	55.7	<b>4.49</b>	2.84	1, 2
				10g	2.63	2.57	25.70	24.8	3.63		
5/28/2014	D2450V2	899	Head	1g	5.25	5.18	51.80	51.30	0.97	1.33	
				10g	2.28	2.37	23.70	23.90	-0.84		
5/28/2014	D2450V2	899	Body	1g	5.42	5.32	53.20	49.70	<b>7.04</b>	1.85	3, 4
				10g	2.35	2.47	24.70	23.30	6.01		
5/30/2014	D5GHzV2 5.2GHz	1138	Head	1g	6.96	7.40	74.00	78.50	<b>-5.73</b>	-6.32	
				10g	1.95	2.15	21.50	22.50	-4.44		
5/30/2014	D5GHzV2 5.6GHz	1138	Head	1g	7.34	7.79	77.90	82.70	<b>-5.80</b>	-6.13	
				10g	1.99	2.21	22.10	23.50	-5.96		
5/30/2014	D5GHzV2 5.8GHz	1138	Head	1g	7.04	7.56	75.60	78.30	-3.45	-7.39	
				10g	1.92	2.14	21.40	22.40	-4.46		
6/2/2014	D5GHzV2 5.2GHz	1138	Body	1g	6.35	6.89	68.90	72.90	-5.49	-8.50	
				10g	1.80	1.94	19.40	20.40	-4.90		
6/2/2014	D5GHzV2 5.6GHz	1138	Body	1g	7.38	7.85	78.50	78.30	0.26	-6.37	
				10g	2.05	2.18	21.80	21.70	0.46		
6/2/2014	D5GHzV2 5.8GHz	1138	Body	1g	6.26	6.77	67.70	72.80	<b>-7.01</b>	-8.15	5, 6
				10g	1.75	1.88	18.80	20.10	-6.47		

#### SAR Lab 2

Date Tested	System Dipole		T.S. Liquid	Measured Results			Target (Ref. Value)	Delta ±10 %	Est./Zoom Ratio	Plot No.	
	Type	Serial #		Area Scan	Zoom Scan	Normalize to 1 W					
5/27/2014	D1900V2	5d043	Body	1g	4.21	4.04	40.4	39.0	3.59	4.04	
				10g	2.13	2.12	21.2	20.8	1.92		
5/27/2014	D1900V2	5d043	Head	1g	4.08	3.91	39.1	40.1	-2.49	4.17	
				10g	2.11	2.02	20.2	21.1	-4.27		
5/29/2014	D835V2	4d002	Head	1g	1.00	0.98	9.8	9.50	2.84	2.20	
				10g	0.67	0.64	6.4	6.20	3.87		
5/29/2014	D835V2	4d002	Body	1g	1.03	1.02	10.2	9.43	<b>8.17</b>	0.97	7, 8
				10g	0.692	0.673	6.7	6.21	8.37		
6/2/2014	D835V2	4d002	Head	1g	1.00	0.98	9.8	9.50	3.26	1.90	
				10g	0.679	0.65	6.5	6.20	4.35		
6/2/2014	D1900V2	5d043	Body	1g	4.23	4.13	41.3	39.0	<b>5.90</b>	2.36	9, 10
				10g	2.16	2.17	21.7	20.8	4.33		
6/3/2014	D1900V2	5d043	Head	1g	4.30	4.17	41.70	40.1	3.99	3.02	
				10g	2.27	2.17	21.70	21.1	2.84		
6/3/2014	D835V2	4d002	Body	1g	1.02	1.00	10.00	9.43	6.04	1.96	
				10g	0.69	0.66	6.63	6.21	6.76		

**SAR Lab 4**

Date Tested	System Dipole		T.S. Liquid	Measured Results			Target (Ref. Value)	Delta ±10 %	Est./Zoom Ratio	Plot No.	
	Type	Serial #		Area Scan	Zoom Scan	Normalize to 1 W					
6/2/2014	D1900V2	5d043	Body	1g	3.94	3.91	39.10	39.0	0.26	0.76	
				10g	1.98	2.05	20.50	20.8	-1.44		
6/2/2014	D1900V2	5d043	Head	1g	4.03	3.94	39.40	40.1	<b>-1.75</b>	2.23	11, 12
				10g	2.08	2.04	20.40	21.1	-3.32		

## 12. SAR Test 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:

- $\leq 0.8$  W/kg or 2.0 W/kg, for 1-g or 10-g respectively, when the transmission band is  $\leq 100$  MHz
- $\leq 0.6$  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
- $\leq 0.4$  W/kg or 1.0 W/kg, for 1-g or 10-g respectively, when the transmission band is  $\geq 200$  MHz

### **KDB 648474 D03 Wireless Chargers Battery Cover:**

Initially, the handset must be tested according to all applicable SAR test procedures using the normal battery cover (without the wireless charging hardware). The highest SAR measured for each wireless technology (1xRTT, EVDO, WCDMA, GSM, Wi-Fi etc.), frequency band, operating mode (different modes/configurations within each wireless technology) and exposure condition (head, body-worn accessory, hotspot mode etc.) must be repeated using the wireless charging battery cover (Left, right, touch and tilt positions are grouped as a single exposure condition.). In addition, for test cases where the measured SAR for a handset with normal battery cover is greater than 1.2 W/kg, these tests should be repeated with the wireless charging battery cover.

### **KDB 648474 D04 Handset SAR:**

With headset attached, when the reported SAR for body-worn accessory, measured without a headset connected to the handset, is  $> 1.2$  W/kg, the highest reported SAR configuration for that wireless mode and frequency band should be repeated for that body-worn accessory with a headset attached to the handset.

### **KDB 941225 D01 SAR test for 3G devices:**

Body SAR is also measured for HSPA when the maximum average output of each RF channel with HSPA active is at least  $\frac{1}{4}$  dB higher than that measured without HSPA using 12.2 kbps RMC or the maximum SAR for 12.2 kbps RMC is above 75% of the SAR limit. Body SAR for HSPA is measured with E-DCH Sub-test 5, using H-Set 1 and QPSK for FRC and a 12.2 kbps RMC configured in Test Loop Mode 1 with power control algorithm 2.

### **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.

### **April 2013 TCB Workshop Updates:**

Apply usual 802.11 test exclusion considerations, but include 802.11ac SAR for highest 802.11a configuration in each frequency band and each exposure condition.

### 12.1. GSM850

RF Exposure Conditions	Mode	Dist. (mm)	Test Position	Ch #.	Freq. (MHz)	Power (dBm)		1-g SAR (W/kg)		Plot No.	Note
						Tune-up limit	Meas.	Meas.	Scaled		
Head	Voice	0	Left Touch	190	836.6	33.2	32.6	0.239	0.274		
			Left Tilt	190	836.6	33.2	32.6	0.165	0.189		
			Right Touch	190	836.6	33.2	32.6	0.286	<b>0.328</b>	1	
			Right Tilt	190	836.6	33.2	32.6	0.173	0.199		
Head VoIP	GPRS 2 Slots	0	Left Touch	190	836.6	31.7	31.5	0.328	0.343		
			Left Tilt	190	836.6	31.7	31.5	0.250	0.262		
			Right Touch	190	836.6	31.7	31.5	0.370	<b>0.387</b>	2	
				190	836.6	31.7	31.5	0.350	0.366		1
				190	836.6	31.7	31.5	0.341	0.357		2
			Right Tilt	190	836.6	31.7	31.5	0.230	0.241		
Body-worn	Voice	10	Rear	190	836.6	33.2	32.6	0.370	<b>0.425</b>	3	
			Front	190	836.6	33.2	32.6	0.290	0.333		
Body-worn(VoIP) & Hotspot	GPRS 2 Slots	10	Rear	190	836.6	31.7	31.5	0.503	0.527		
				190	836.6	31.7	31.5	0.389	0.407		1
				190	836.6	31.7	31.5	0.444	0.465		2
			Front	190	836.6	31.7	31.5	0.401	0.420		
			Edge 2	190	836.6	31.7	31.5	0.506	<b>0.530</b>	4	
				190	836.6	31.7	31.5	0.488	0.511		1
				190	836.6	31.7	31.5	0.386	0.404		2
			Edge 3	190	836.6	31.7	31.5	0.473	0.495		
			Edge 4	190	836.6	31.7	31.5	0.206	0.216		

### 12.2. GSM1900

RF Exposure Conditions	Mode	Dist. (mm)	Test Position	Ch #.	Freq. (MHz)	Power (dBm)		1-g SAR (W/kg)		Plot No.	Note
						Tune-up limit	Meas.	Meas.	Scaled		
Head	Voice	0	Left Touch	661	1880.0	30.2	30.1	0.085	<b>0.087</b>	5	
			Left Tilt	661	1880.0	30.2	30.1	0.045	0.046		
			Right Touch	661	1880.0	30.2	30.1	0.083	0.085		
			Right Tilt	661	1880.0	30.2	30.1	0.040	0.041		
Head VoIP	GPRS 2 Slots	0	Left Touch	661	1880.0	28.7	28.7	0.106	0.106		
			Left Tilt	661	1880.0	28.7	28.7	0.058	0.058		
			Right Touch	661	1880.0	28.7	28.7	0.118	<b>0.118</b>	6	
				661	1880.0	28.7	28.7	0.112	0.112		1
				661	1880.0	28.7	28.7	0.099	0.099		2
			Right Tilt	661	1880.0	28.7	28.7	0.048	0.048		
Body-worn	Voice	10	Rear	661	1880.0	30.2	30.1	0.377	<b>0.386</b>	7	
			Front	661	1880.0	30.2	30.1	0.196	0.201		
Body-worn(VoIP) & Hotspot	GPRS 2 Slots	10	Rear	661	1880.0	28.7	28.7	0.492	0.492		
				661	1880.0	28.7	28.7	0.438	0.438		1
				661	1880.0	28.7	28.7	0.460	0.460		2
			Front	661	1880.0	28.7	28.7	0.288	0.288		
			Edge 2	661	1880.0	28.7	28.7	0.125	0.125		
			Edge 3	661	1880.0	28.7	28.7	0.526	<b>0.526</b>	8	
				661	1880.0	28.7	28.7	0.403	0.403		1
				661	1880.0	28.7	28.7	0.495	0.495		2
			Edge 4	661	1880.0	28.7	28.7	0.108	0.108		

**Note:**

Per 648474 D03 Wireless Chargers Battery Cover, SAR test was repeated using wireless charging battery cover from the highest SAR measured for each mode.

1. Wireless Charger Battery Cover with NFC (with Front Cover)
2. Wireless Charger Battery Cover with NFC (without Front Cover)

### 12.3. CDMA BC0

RF Exposure Conditions	Mode	Dist. (mm)	Test Position	Ch #.	Freq. (MHz)	Power (dBm)		1-g SAR (W/kg)		Plot No.	Note
						Tune-up limit	Meas.	Meas.	Scaled		
Head	1xRTT (RC3 SO55)	0	Left Touch	384	836.5	25.5	25.5	0.388	0.388		
			Left Tilt	384	836.5	25.5	25.5	0.258	0.258		
			Right Touch	384	836.5	25.5	25.5	0.443	<b>0.443</b>	9	
				384	836.5	25.5	25.5	0.368	0.368		1
				384	836.5	25.5	25.5	0.411	0.411		2
	Right Tilt		384	836.5	25.5	25.5	0.261	0.261			
	1xEVDO (Rel. 0)		Left Touch	384	836.5	25.5	25.5	0.401	0.401		
			Left Tilt	384	836.5	25.5	25.5	0.255	0.255		
			Right Touch	384	836.5	25.5	25.5	0.437	0.437		
Right Tilt		384	836.5	25.5	25.5	0.261	0.261				
Body-worn & Hotspot	1xRTT (RC3 SO32)	10	Rear	384	836.5	25.5	25.4	0.718	0.735		
	1xEVDO (Rel. 0)	10	Front	384	836.5	25.5	25.4	0.601	0.615		
			Rear	384	836.5	25.5	25.5	0.745	<b>0.745</b>	10	
				384	836.5	25.5	25.5	0.489	0.489		1
				384	836.5	25.5	25.5	0.628	0.628		2
			Front	384	836.5	25.5	25.5	0.648	0.648		
Hotspot	1xRTT (RC3 SO32)	10	Edge 2	384	836.5	25.5	25.4	0.564	0.577		
	Edge 3		384	836.5	25.5	25.4	0.550	0.563			
	Edge 4		384	836.5	25.5	25.4	0.264	0.270			
	1xEVDO (Rel. 0)		Edge 2	384	836.5	25.5	25.5	0.641	0.641		
			Edge 3	384	836.5	25.5	25.5	0.551	0.551		
			Edge 4	384	836.5	25.5	25.5	0.338	0.338		

**Note:**

Per 648474 D03 Wireless Chargers Battery Cover, SAR test was repeated using wireless charging battery cover from the highest SAR measured for each mode.

1. Wireless Charger Battery Cover with NFC (with Front Cover)
2. Wireless Charger Battery Cover with NFC (without Front Cover)

### 12.4. CDMA BC1

RF Exposure Conditions	Mode	Dist. (mm)	Test Position	Ch #.	Freq. (MHz)	Power (dBm)		1-g SAR (W/kg)		Plot No.	Note
						Tune-up limit	Meas.	Meas.	Scaled		
Head	1xRTT (RC3 SO55)	0	Left Touch	600	1880.0	24.9	24.6	0.256	0.274		
			Left Tilt	600	1880.0	24.9	24.6	0.229	0.245		
			Right Touch	600	1880.0	24.9	24.6	0.273	<b>0.293</b>	11	
				600	1880.0	24.9	24.6	0.123	0.132		1
				600	1880.0	24.9	24.6	0.216	0.231		2
	Right Tilt		600	1880.0	24.9	24.6	0.108	0.116			
	1xEVDO (Rel. 0)		Left Touch	600	1880.0	24.9	24.9	0.236	0.236		
			Left Tilt	600	1880.0	24.9	24.9	0.110	0.110		
Right Touch		600	1880.0	24.9	24.9	0.250	0.250				
			Right Tilt	600	1880.0	24.9	24.9	0.103	0.103		
Body-worn & Hotspot	1xRTT (RC3 SO32)	10	Rear	25	1851.3	24.9	24.6	0.943	1.010		
				600	1880.0	24.9	24.7	1.030	<b>1.079</b>	12	
				600	1880.0	24.9	24.7	0.772	0.808		1
				600	1880.0	24.9	24.7	0.804	0.842		2
				1175	1908.8	24.9	24.6	0.947	1.015		
	Front		600	1880.0	24.9	24.7	0.632	0.662			
	1xEVDO (Rel. 0)		Rear	25	1851.3	24.9	24.9	0.813	0.813		
				600	1880.0	24.9	24.9	0.918	0.918		
				1175	1908.8	24.9	24.9	0.836	0.836		
			Front	600	1880.0	24.9	24.9	0.616	0.616		
Hotspot	1xRTT (RC3 SO32)	10	Edge 2	600	1880.0	24.9	24.7	0.184	0.193		
				25	1851.3	24.9	24.6	0.928	0.994		
			Edge 3	600	1880.0	24.9	24.7	0.943	0.987		
				1175	1908.8	24.9	24.6	0.882	0.945		
	600			1880.0	24.9	24.7	0.142	0.149			
	Edge 4		600	1880.0	24.9	24.9	0.246	0.246			
	1xEVDO (Rel. 0)		Edge 3	25	1851.3	24.9	24.9	1.040	1.040		
				600	1880.0	24.9	24.9	1.120	<b>1.120</b>	13	
				600	1880.0	24.9	24.9	0.812	0.812		1
			600	1880.0	24.9	24.9	0.848	0.848		2	
			1175	1908.8	24.9	24.9	0.967	0.967			
Edge 4		600	1880.0	24.9	24.9	0.228	0.228				

**Note:**

Per 648474 D03 Wireless Chargers Battery Cover, SAR test was repeated using wireless charging battery cover from the highest SAR measured for each mode.

1. Wireless Charger Battery Cover with NFC (with Front Cover)
2. Wireless Charger Battery Cover with NFC (without Front Cover)

### 12.5. CDMA BC10

RF Exposure Conditions	Mode	Dist. (mm)	Test Position	Ch #.	Freq. (MHz)	Power (dBm)		1-g SAR (W/kg)		Plot No.	Note
						Tune-up limit	Meas.	Meas.	Scaled		
Head	1xRTT (RC3 SO55)	0	Left Touch	580	820.5	25.2	25.2	0.374	0.374		
			Left Tilt	580	820.5	25.2	25.2	0.288	0.288		
			Right Touch	580	820.5	25.2	25.2	0.462	<b>0.462</b>	14	
				580	820.5	25.2	25.2	0.438	0.438		1
				580	820.5	25.2	25.2	0.407	0.407		2
	Right Tilt		580	820.5	25.2	25.2	0.275	0.275			
	1xEVDO (Rel. 0)		Left Touch	580	820.5	25.2	25.2	0.399	0.399		
			Left Tilt	580	820.5	25.2	25.2	0.263	0.263		
			Right Touch	580	820.5	25.2	25.2	0.458	0.458		
Right Tilt		580	820.5	25.2	25.2	0.280	0.280				
Body-worn & Hotspot	1xRTT (RC3 SO32)	10	Rear	580	820.5	25.2	25.2	0.540	<b>0.540</b>	15	
				580	820.5	25.2	25.2	0.480	0.480		1
				580	820.5	25.2	25.2	0.459	0.459		2
	Front		580	820.5	25.2	25.2	0.432	0.432			
	1xEVDO (Rel. 0)		Rear	580	820.5	25.2	25.2	0.519	0.519		
Front		580	820.5	25.2	25.2	0.484	0.484				
Hotspot	1xRTT (RC3 SO32)	10	Edge 2	580	820.5	25.2	25.2	0.530	0.530		
			Edge 3	580	820.5	25.2	25.2	0.516	0.516		
			Edge 4	580	820.5	25.2	25.2	0.226	0.226		
	1xEVDO (Rel. 0)		Edge 2	580	820.5	25.2	25.2	0.508	0.508		
			Edge 3	580	820.5	25.2	25.2	0.501	0.501		
			Edge 4	580	820.5	25.2	25.2	0.272	0.272		

### 12.6. W-CDMA Band V

RF Exposure Conditions	Mode	Dist. (mm)	Test Position	Ch #.	Freq. (MHz)	Power (dBm)		1-g SAR (W/kg)		Plot No.	Note
						Tune-up limit	Meas.	Meas.	Scaled		
Head	Rel 99 RMC	0	Left Touch	4183	836.6	23.7	23.7	0.319	0.319		
			Left Tilt	4183	836.6	23.7	23.7	0.205	0.205		
			Right Touch	4183	836.6	23.7	23.7	0.388	<b>0.388</b>	16	
				4183	836.6	23.7	23.7	0.376	0.376		1
				4183	836.6	23.7	23.7	0.354	0.354		2
			Right Tilt	4183	836.6	23.7	23.7	0.212	0.212		
Body-worn & Hotspot	Rel 99 RMC	10	Rear	4183	836.6	23.7	23.7	0.664	<b>0.664</b>	17	
				4183	836.6	23.7	23.7	0.572	0.572		1
				4183	836.6	23.7	23.7	0.632	0.632		2
				Front	4183	836.6	23.7	23.7	0.538	0.538	
Hotspot	Rel 99 RMC	10	Edge 2	4183	836.6	23.7	23.7	0.509	0.509		
			Edge 3	4183	836.6	23.7	23.7	0.416	0.416		
			Edge 4	4183	836.6	23.7	23.7	0.230	0.230		

**Note:**

Per 648474 D03 Wireless Chargers Battery Cover, SAR test was repeated using wireless charging battery cover from the highest SAR measured for each mode.

1. Wireless Charger Battery Cover with NFC (with Front Cover)
2. Wireless Charger Battery Cover with NFC (without Front Cover)



### 12.7. W-CDMA Band II

RF Exposure Conditions	Mode	Dist. (mm)	Test Position	Ch #.	Freq. (MHz)	Power (dBm)		1-g SAR (W/kg)		Plot No.	Note
						Tune-up limit	Meas.	Meas.	Scaled		
Head	Rel 99 RMC	0	Left Touch	9400	1880.0	23.7	23.7	0.182	0.182		
			Left Tilt	9400	1880.0	23.7	23.7	0.094	0.094		
			Right Touch	9400	1880.0	23.7	23.7	0.202	<b>0.202</b>	18	
				9400	1880.0	23.7	23.7	0.177	0.177		1
			Right Tilt	9400	1880.0	23.7	23.7	0.156	0.156		2
				9400	1880.0	23.7	23.7	0.075	0.075		
Body-worn & Hotspot	Rel 99 RMC	10	Rear	9262	1852.4	23.7	23.7	0.709	0.709		
				9400	1880.0	23.7	23.7	0.816	<b>0.816</b>	19	
				9400	1880.0	23.7	23.7	0.683	0.683		1
				9400	1880.0	23.7	23.7	0.719	0.719		2
				9538	1907.6	23.7	23.7	0.772	0.772		
			Front	9400	1880.0	23.7	23.7	0.399	0.399		
Hotspot	Rel 99 RMC	10	Edge 2	9400	1880.0	23.7	23.7	0.154	0.154		
			Edge 3	9262	1852.4	23.7	23.7	0.800	0.800		
				9400	1880.0	23.7	23.7	0.861	<b>0.861</b>	20	
				9400	1880.0	23.7	23.7	0.620	0.620		1
				9400	1880.0	23.7	23.7	0.781	0.781		2
				9538	1907.6	23.7	23.7	0.712	0.712		
Edge 4	9400	1880.0	23.7	23.7	0.136	0.136					

**Note:**

Per 648474 D03 Wireless Chargers Battery Cover, SAR test was repeated using wireless charging battery cover from the highest SAR measured for each mode.

1. Wireless Charger Battery Cover with NFC (with Front Cover)
2. Wireless Charger Battery Cover with NFC (without Front Cover)

### 12.8. LTE Band 25 (10MHz Bandwidth)

RF Exposure Conditions	Mode	Dist. (mm)	Test Position	UL Ch #.	Freq. (MHz)	RB Allocation	RB offset	Power (dBm)		1-g SAR (W/kg)		Plot No.	Note			
								Tune-up limit	Meas.	Meas.	Scaled					
Head	QPSK	0	Left Touch	26365	1882.5	1	0	23.7	23.7	0.193	0.193					
						1	0	23.7	23.7	0.149	0.149		1			
						1	0	23.7	23.7	0.200	<b>0.200</b>	21	2			
						25	25	22.7	22.7	0.136	0.136					
			Left Tilt	26365	1882.5	1	0	23.7	23.7	0.104	0.104					
						25	25	22.7	22.7	0.072	0.072					
						Right Touch	26365	1882.5	1	0	23.7	23.7	0.169	0.169		
									25	25	22.7	22.7	0.112	0.112		
		Right Tilt	26365	1882.5	1	0	23.7	23.7	0.098	0.098						
					25	25	22.7	22.7	0.073	0.073						
		Body-worn & Hotspot	QPSK	10	Rear	26365	1882.5	1	0	23.7	23.7	0.697	0.697			
								1	0	23.7	23.7	0.785	<b>0.785</b>	22	1	
1	0							23.7	23.7	0.591	0.591		2			
25	25							22.7	22.7	0.512	0.512					
Front	26365				1882.5	1	0	23.7	23.7	0.434	0.434					
						25	25	22.7	22.7	0.311	0.311					
Hotspot	QPSK	10	Edge 2	26365	1882.5	1	0	23.7	23.7	0.169	0.169					
						25	25	22.7	22.7	0.122	0.122					
			Edge 3	26365	1882.5	1	0	23.7	23.7	0.786	0.786					
						1	0	23.7	23.7	0.625	0.625		1			
						1	0	23.7	23.7	0.797	<b>0.797</b>	23	2			
						25	25	22.7	22.7	0.586	0.586					
			Edge 4	26365	1882.5	1	0	23.7	23.7	0.170	0.170					
						25	25	22.7	22.7	0.123	0.123					

**Note:**

Per 648474 D03 Wireless Chargers Battery Cover, SAR test was repeated using wireless charging battery cover from the highest SAR measured for each mode.

1. Wireless Charger Battery Cover with NFC (with Front Cover)
2. Wireless Charger Battery Cover with NFC (without Front Cover)

### 12.9. LTE Band 26 (10MHz Bandwidth)

RF Exposure Conditions	Mode	Dist. (mm)	Test Position	UL Ch #.	Freq. (MHz)	RB Allocation	RB offset	Power (dBm)		1-g SAR (W/kg)		Plot No.	Note
								Tune-up limit	Meas.	Meas.	Scaled		
Head	QPSK	0	Left Touch	26865	831.5	1	0	23.7	23.7	0.318	0.318		
						25	0	22.7	22.7	0.246	0.246		
			Left Tilt	26865	831.5	1	0	23.7	23.7	0.211	0.211		
						25	0	22.7	22.7	0.162	0.162		
			Right Touch	26865	831.5	1	0	23.7	23.7	0.374	<b>0.374</b>	24	
						1	0	23.7	23.7	0.370	0.370		1
						1	0	23.7	23.7	0.353	0.353		2
						25	0	22.7	22.7	0.285	0.285		
Right Tilt	26865	831.5	1	0	23.7	23.7	0.253	0.253					
			25	0	22.7	22.7	0.183	0.183					
Body-worn & Hotspot	QPSK	10	Rear	26865	831.5	1	0	23.7	23.7	0.611	<b>0.611</b>	25	
						1	0	23.7	23.7	0.435	0.435		1
						1	0	23.7	23.7	0.357	0.357		2
						25	0	22.7	22.7	0.442	0.442		
			Front	26865	831.5	1	0	23.7	23.7	0.534	0.534		
						25	0	22.7	22.7	0.394	0.394		
Hotspot	QPSK	10	Edge 2	26865	831.5	1	0	23.7	23.7	0.593	0.593		
						25	0	22.7	22.7	0.433	0.433		
			Edge 3	26865	831.5	1	0	23.7	23.7	0.418	0.418		
						25	0	22.7	22.7	0.328	0.328		
			Edge 4	26865	831.5	1	0	23.7	23.7	0.344	0.344		
						25	0	22.7	22.7	0.247	0.247		

**Note:**

Per 648474 D03 Wireless Chargers Battery Cover, SAR test was repeated using wireless charging battery cover from the highest SAR measured for each mode.

1. Wireless Charger Battery Cover with NFC (with Front Cover)
2. Wireless Charger Battery Cover with NFC (without Front Cover)

### 12.10. LTE Band 41 (20MHz Bandwidth)

RF Exposure Conditions	Mode	Dist. (mm)	Test Position	UL Ch #.	Freq. (MHz)	RB Allocation	RB offset	Power (dBm)		1-g SAR (W/kg)		Plot No.	Note
								Tune-up limit	Meas.	Meas.	Scaled		
Head	QPSK	0	Left Touch	40620	2593.0	1	0	24.2	24.2	0.070	0.070		
						50	0	23.2	23.1	0.056	0.057		
			Left Tilt	40620	2593.0	1	0	24.2	24.2	0.034	0.034		
						50	0	23.2	23.1	0.022	0.022		
			Right Touch	40620	2593.0	1	0	24.2	24.2	0.113	0.113		
						1	0	24.2	24.2	0.121	<b>0.121</b>	26	1
						1	0	24.2	24.2	0.093	0.093		2
						50	0	23.2	23.1	0.085	0.087		
Right Tilt	40620	2593.0	1	0	24.2	24.2	0.041	0.041					
			50	0	23.2	23.1	0.030	0.031					
Body-worn & Hotspot	QPSK	10	Rear	40620	2593.0	1	0	24.2	24.2	0.354	0.354		
						1	0	24.2	24.2	0.360	0.360		1
						1	0	24.2	24.2	0.379	<b>0.379</b>	27	2
						50	0	23.2	23.1	0.287	0.294		
			Front	40620	2593.0	1	0	24.2	24.2	0.252	0.252		
						50	0	23.2	23.1	0.197	0.202		
Hotspot	QPSK	10	Edge 3	40620	2593.0	1	0	24.2	24.2	0.345	0.345		
						50	0	23.2	23.1	0.274	0.280		
			Edge 4	40620	2593.0	1	0	24.2	24.2	0.274	0.274		
						50	0	23.2	23.1	0.202	0.207		

**Note:**

Per 648474 D03 Wireless Chargers Battery Cover, SAR test was repeated using wireless charging battery cover from the highest SAR measured for each mode.

1. Wireless Charger Battery Cover with NFC (with Front Cover)
2. Wireless Charger Battery Cover with NFC (without Front Cover)

## 12.11. Wi-Fi (DTS Band)

### 12.11.1. 2.4 GHz Band

RF Exposure Conditions	Mode	Dist. (mm)	Test Position	Ch #.	Freq. (MHz)	Power (dBm)		1-g SAR (W/kg)		Plot No.	Note	
						Tune-up limit	Meas.	Meas.	Scaled			
Head	802.11b 1 Mbps	0	Left Touch	6	2437	17.0	16.5	0.215	0.241			
				6	2437	17.0	16.5	0.235	<b>0.264</b>	28	1	
				6	2437	17.0	16.5	0.156	0.175		2	
			Left Tilt	6	2437	17.0	16.5	0.211	0.237			
				Right Touch	6	2437	17.0	16.5	0.133	0.149		
					6	2437	17.0	16.5	0.120	0.135		
Body-worn, Hotspot, & Wi-Fi Direct	802.11b 1 Mbps	10	Rear	6	2437	17.0	16.5	0.109	<b>0.122</b>	29		
				6	2437	17.0	16.5	0.099	0.111		1	
				6	2437	17.0	16.5	0.086	0.096		2	
			Front	6	2437	17.0	16.5	0.046	0.051			
Hotspot & Wi-Fi Direct	802.11b 1 Mbps	10	Edge 1	6	2437	17.0	16.5	0.036	0.040			
			Edge 2	6	2437	17.0	16.5	0.022	0.024			

### 12.11.2. 5.8 GHz Band

RF Exposure Conditions	Mode	Dist. (mm)	Test Position	Ch #.	Freq. (MHz)	Power (dBm)		1-g SAR (W/kg)		Plot No.	Note	
						Tune-up limit	Meas.	Meas.	Scaled			
Head	802.11a 6 Mbps	0	Left Touch	165	5825	13.0	12.5	0.118	0.132			
				165	5825	13.0	12.5	0.179	0.201			
			Left Tilt	165	5825	13.0	12.5	0.141	0.158			
				Right Touch	165	5825	13.0	12.5	0.242	<b>0.272</b>	30	
			Right Tilt		165	5825	13.0	12.5	0.188	0.211		1
					165	5825	13.0	12.5	0.203	0.228		2
Body-worn & Wi-Fi Direct	802.11a 6 Mbps	10	Rear	165	5825	13.0	12.5	0.218	<b>0.245</b>	31		
				165	5825	13.0	12.5	0.188	0.211		1	
				165	5825	13.0	12.5	0.184	0.206		2	
			Front	165	5825	13.0	12.5	0.023	0.026			
Wi-Fi Direct	802.11a 6 Mbps	10	Edge 1	165	5825	13.0	12.5	0.144	0.162			
			Edge 2	165	5825	13.0	12.5	<0.001	<0.001			

**Note:**

Per 648474 D03 Wireless Chargers Battery Cover, SAR test was repeated using wireless charging battery cover from the highest SAR measured for each mode.

1. Wireless Charger Battery Cover with NFC (with Front Cover)
2. Wireless Charger Battery Cover with NFC (without Front Cover)

### 12.12. Wi-Fi (UNII Band)

RF Exposure Conditions	Mode	Dist. (mm)	Test Position	Ch #.	Freq. (MHz)	Power (dBm)		1-g SAR (W/kg)		Plot No.	Note
						Tune-up limit	Meas.	Meas.	Scaled		
Head	802.11a 6 Mbps	0	Left Touch	48	5240.0	13.0	12.0	0.265	0.334		
				64	5320.0	13.0	12.5	0.177	0.199		
				136	5680.0	13.0	12.5	0.116	0.130		
			Left Tilt	48	5240.0	13.0	12.0	0.282	0.355		
				64	5320.0	13.0	12.5	0.194	0.218		
				136	5680.0	13.0	12.5	0.151	0.169		
			Right Touch	48	5240.0	13.0	12.0	0.233	0.293		
				64	5320.0	13.0	12.5	0.195	0.219		
				136	5680.0	13.0	12.5	0.127	0.142		
			Right Tilt	48	5240.0	13.0	12.0	0.322	<b>0.405</b>	32	
				48	5240.0	13.0	12.0	0.320	0.403		1
				48	5240.0	13.0	12.0	0.277	0.349		2
				64	5320.0	13.0	12.5	0.212	0.238		
				64	5320.0	13.0	12.0	0.260	0.327		1
64	5320.0	13.0		12.0	0.171	0.215		2			
136	5680.0	13.0		12.5	0.173	0.194					
136	5680.0	13.0		12.5	0.156	0.175		1			
Body-worn	802.11a 6 Mbps	10	Rear	48	5240.0	13.0	12.0	0.225	<b>0.283</b>	33	
				48	5240.0	13.0	12.0	0.225	0.283		1
				48	5240.0	13.0	12.0	0.125	0.157		2
				64	5320.0	13.0	12.5	0.208	0.233		
				64	5320.0	13.0	12.5	0.180	0.202		1
				64	5320.0	13.0	12.5	0.096	0.107		2
				136	5680.0	13.0	12.5	0.235	0.264		
				136	5680.0	13.0	12.5	0.213	0.239		1
				136	5680.0	13.0	12.5	0.117	0.131		2
			Front	48	5240.0	13.0	12.0	0.020	0.025		
				64	5320.0	13.0	12.5	0.036	0.040		
				136	5680.0	13.0	12.5	0.015	0.017		

**Note:**

Per 648474 D03 Wireless Chargers Battery Cover, SAR test was repeated using wireless charging battery cover from the highest SAR measured for each mode.

1. Wireless Charger Battery Cover with NFC (with Front Cover)
2. Wireless Charger Battery Cover with NFC (without Front Cover)

### 12.13. Additional Testing in 802.11ac Mode for Highest 802.11a/b mode

#### Test exclusion considerations for 802.11ac mode:

Apply usual 802.11 test exclusion considerations, but include 802.11ac SAR for highest 802.11a/b configuration in each frequency band and each exposure condition according to April 2013 TCB Workshop Updates.

Additional testing in 802.11ac mode was performed in HT20 mode so that the same channels from the 802.11a mode could be tested.

#### 12.13.1. 2.4 GHz Band

RF Exposure Conditions	Mode	Dist. (mm)	Test Position	Ch #.	Freq. (MHz)	Power (dBm)		1-g SAR (W/kg)		Plot No.	Notes
						Tune-up limit	Meas.	Meas.	Scaled		
Head	802.11ac (HT20) MCS0	0	Left Touch	6	2437	11.0	10.5	0.046	0.052		
				6	2437	11.0	10.5	0.048	0.053		1
				6	2437	11.0	10.5	0.035	0.039		2
Body-worn & Hotspot	802.11ac (HT20) MCS0	0	Rear	6	2437	11.0	10.5	0.022	0.025		
				6	2437	11.0	10.5	0.023	0.026		1
				6	2437	11.0	10.5	0.012	0.014		2

#### 12.13.2. 5 GHz Band

RF Exposure Conditions	Mode	Dist. (mm)	Test Position	Ch #.	Freq. (MHz)	Power (dBm)		1-g SAR (W/kg)		Plot No.	Notes
						Tune-up limit	Meas.	Meas.	Scaled		
Head	802.11ac (HT20) MCS0	0	Right Tilt	48	5240.0	10.5	10.1	0.201	0.220		
				48	5240.0	10.5	10.1	0.205	0.225		1
				48	5240.0	10.5	10.1	0.162	0.178		2
				64	5320.0	10.5	10.3	0.153	0.160		
				64	5320.0	10.5	10.3	0.147	0.154		1
				64	5320.0	10.5	10.3	0.105	0.110		2
				136	5680.0	10.5	10.4	0.089	0.091		
				136	5680.0	10.5	10.4	0.088	0.090		1
				136	5680.0	10.5	10.4	0.096	0.098		2
				165	5825.0	10.5	10.1	0.134	0.147		
				165	5825.0	10.5	10.1	0.134	0.147		1
165	5825.0	10.5	10.1	0.113	0.124		2				
Body-worn	802.11ac (HT20) MCS0	10	Rear	48	5240.0	10.5	10.1	0.132	0.145		
				48	5240.0	10.5	10.1	0.126	0.138		1
				48	5240.0	10.5	10.1	0.128	0.140		2
				64	5320.0	10.5	10.3	0.130	0.136		
				64	5320.0	10.5	10.3	0.089	0.094		1
				64	5320.0	10.5	10.3	0.113	0.118		2
				136	5680.0	10.5	10.4	0.144	0.147		
				136	5680.0	10.5	10.4	0.118	0.121		1
Body-worn & Wi-Fi Direct	802.11ac (HT20) MCS0	10	Rear	165	5825.0	10.5	10.1	0.103	0.113		
				165	5825.0	10.5	10.1	0.107	0.117		1
				165	5825.0	10.5	10.1	0.113	0.124		2

#### Note:

Per 648474 D03 Wireless Chargers Battery Cover, SAR test was repeated using wireless charging battery cover from the highest SAR measured for each mode.

1. Wireless Charger Battery Cover with NFC (with Front Cover)
2. Wireless Charger Battery Cover with NFC (without Front Cover)

## 12.14. Bluetooth

### 12.14.1. Standalone SAR Test Exclusion Considerations

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

$[(\text{max. power of channel, including tune-up tolerance, mW}) / (\text{min. test separation distance, mm})] \cdot [\sqrt{f(\text{GHz})}] \leq 3.0$ , for 1-g SAR and  $\leq 7.5$  for 10-g extremity SAR, where

- $f_{(\text{GHz})}$  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  $\leq 50$  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.

#### Body-worn Accessory Exposure Conditions

Max. tune-up tolerance limit		Min. test separation distance (mm)	Frequency (GHz)	Result
(dBm)	(mW)			
9.0	8	10	2.480	1.3

#### Conclusion:

The computed value is  $< 3$ ; therefore, Bluetooth qualifies for Standalone SAR test exclusion.

### 12.14.2. Estimated SAR

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:

- $(\text{max. power of channel, including tune-up tolerance, mW}) / (\text{min. test separation distance, mm})] \cdot [\sqrt{f_{(\text{GHz})}/x}] \text{ W/kg}$  for test separation distances  $\leq 50$  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.

#### Estimated SAR Result for Body-worn Accessory Conditions:

Test Configuration	Max. tune-up tolerance limit (mW)	Min. test separation distance (mm)	Frequency (GHz)	Estimated 1-g SAR (W/kg)
Rear/Front	8	10	2.480	0.168



### 13. SAR Measurement Variability

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

- 1) Repeated measurement is not required when the original highest measured SAR is < 0.80 W/kg; steps 2) through 4) do not apply.
- 2) When the original highest measured SAR is ≥ 0.80 W/kg, repeat that measurement once.
- 3) Perform a second repeated measurement only if the ratio of largest to smallest SAR for the original and first repeated measurements is > 1.20 or when the original or repeated measurement is ≥ 1.45 W/kg (~ 10% from the 1-g SAR limit).
- 4) Perform a third repeated measurement only if the original, first or second repeated measurement is ≥ 1.5 W/kg and the ratio of largest to smallest SAR for the original, first and second repeated measurements is > 1.20.

#### 13.1. The Highest Measured SAR Configuration in Each Frequency Band

Frequency Band (MHz)	Air Interface	Head (W/kg)	Body-worn & Hotspot (W/kg)	Hotspot/Wi-Fi Direct (W/kg)
850	GSM 850	N/A	N/A	N/A
	CDMA BC0	N/A	N/A	N/A
	CDMA BC10	N/A	N/A	N/A
	W-CDMA Band V	N/A	N/A	N/A
	LTE Band 26	N/A	N/A	N/A
1900	GSM 1900	N/A	N/A	N/A
	CDMA BC1	N/A	1.030	1.120
	W-CDMA Band II	N/A	N/A	N/A
	LTE Band 25	N/A	N/A	N/A
2400	Wi-Fi 802.11b/g/n/ac	N/A	N/A	N/A
2600	LTE Band 41	N/A	N/A	N/A
5200	802.11a/n/ac	N/A	N/A	N/A
5300		N/A	N/A	N/A
5500		N/A	N/A	N/A
5800		N/A	N/A	N/A

### 13.2. Repeated Measurement Results

#### Head Exposure Condition

Not Applicable.

#### Body-worn Accessory and Hotspot Mode Exposure Conditions

RF Exposure Conditions	Dist. (mm)	Mode	Test Position	Ch #.	Freq. (MHz)	Meas. SAR (W/kg)		Largest to Smallest SAR Ratio	Note
						Original	Repeated		
Body	10	1xRTT (RC3 SO32)	Rear	600	1880.00	1.030	0.933	1.10	1

#### Hotspot Mode/Wi-Fi Direct Exposure Condition

RF Exposure Conditions	Dist. (mm)	Mode	Test Position	Ch #.	Freq. (MHz)	Meas. SAR (W/kg)		Largest to Smallest SAR Ratio	Note
						Original	Repeated		
Hotspot	10	1xEVDO (Rel. 0)	Edge 3	600	1880.00	1.120	1.060	1.06	1

#### Note(s):

1. 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.

## 14. Simultaneous Transmission SAR Analysis

KDB 447498 D01 General RF Exposure Guidance, introduces a new formula for calculating the SAR to Peak Location Ratio (SPLSR) between pairs of simultaneously transmitting antennas:

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

Where:

**SAR<sub>1</sub>** is the highest reported or estimated SAR for the first of a pair of simultaneous transmitting antennas, in a specific test operating mode and exposure condition

**SAR<sub>2</sub>** is the highest reported or estimated SAR for the second of a pair of simultaneous transmitting antennas, in the same test operating mode and exposure condition as the first

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

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

A new threshold of 0.04 is also introduced in the KDB 447498. Thus, in order for a pair of simultaneously transmitting antennas, with the sum of 1-g SAR > 1.6 W/kg, to qualify for exemption from Simultaneous Transmission SAR measurements, it has to satisfy the condition of:

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

### 14.1. Sum of the SAR for GSM 850 & Wi-Fi 2.4 GHz Band & BT

RF Exposure conditions	Test Position		Simultaneous Transmission Scenario			Σ 1-g SAR (mW/g)	SPLSR (Yes/ No)
			GSM 850	Wi-Fi (DTS)	Bluetooth		
Head	Left Touch	WWAN + Wi-Fi(DTS)	0.343	0.264		0.607	No
	Left Tilt	WWAN + Wi-Fi(DTS)	0.262	0.237		0.499	No
	Right Touch	WWAN + Wi-Fi(DTS)	0.387	0.149		0.536	No
	Right Tilt	WWAN + Wi-Fi(DTS)	0.241	0.135		0.376	No
Body-worn Accessory & Hotspot	Rear	WWAN + Wi-Fi(DTS)	0.527	0.122		0.649	No
		WWAN + BT	0.527		0.168	0.695	No
	Front	WWAN + Wi-Fi(DTS)	0.420	0.051		0.471	No
		WWAN + BT	0.420		0.168	0.588	No
Hotspot	Edge 1	WWAN + Wi-Fi(DTS)		0.040		0.040	No
	Edge 2	WWAN + Wi-Fi(DTS)	0.503	0.024		0.527	No
	Edge 3	WWAN + Wi-Fi(DTS)	0.495			0.495	No
	Edge 4	WWAN + Wi-Fi(DTS)	0.216			0.216	No

### 14.2. Sum of the SAR for GSM 850 & Wi-Fi 5 GHz Bands & BT

RF Exposure conditions	Test Position		Simultaneous Transmission Scenario				Σ 1-g SAR (mW/g)	SPLSR (Yes/ No)
			GSM 850	Wi-Fi (DTS)	Wi-Fi (UNII)	Bluetooth		
Head	Left Touch	WWAN + Wi-Fi(DTS)	0.343	0.132			0.475	No
		WWAN + Wi-Fi(UNII)	0.343		0.334		0.677	No
	Left Tilt	WWAN + Wi-Fi(DTS)	0.262	0.201			0.463	No
		WWAN + Wi-Fi(UNII)	0.262		0.355		0.617	No
	Right Touch	WWAN + Wi-Fi(DTS)	0.387	0.158			0.545	No
		WWAN + Wi-Fi(UNII)	0.387		0.293		0.680	No
Right Tilt	WWAN + Wi-Fi(DTS)	0.241	0.272			0.513	No	
	WWAN + Wi-Fi(UNII)	0.241		0.405		0.646	No	
Body-worn Accessory & Hotspot	Rear	WWAN + Wi-Fi(DTS)	0.527	0.245			0.772	No
		WWAN + Wi-Fi(UNII)	0.527		0.283		0.810	No
		WWAN + BT	0.527			0.168	0.695	No
	Front	WWAN + Wi-Fi(DTS)	0.420	0.026			0.446	No
		WWAN + Wi-Fi(UNII)	0.420		0.040		0.460	No
		WWAN + BT	0.420			0.168	0.588	No
Hotspot	Edge 1	WWAN + Wi-Fi(DTS)		0.162			0.162	No
	Edge 2	WWAN + Wi-Fi(DTS)	0.503	0.000			0.503	No
	Edge 3	WWAN + Wi-Fi(DTS)	0.495				0.495	No
	Edge 4	WWAN + Wi-Fi(DTS)	0.216				0.216	No

#### SAR to Peak Location Separation Ratio (SPLSR)

As the Sum of the SAR is not greater than 1.6 W/kg SPLSR assessment is not required.

**14.3. Sum of the SAR for GSM 1900 & Wi-Fi 2.4 GHz Band & BT**

RF Exposure conditions	Test Position		Simultaneous Transmission Scenario			Σ 1-g SAR (mW/g)	SPLSR (Yes/ No)
			GSM 1900	Wi-Fi (DTS)	Bluetooth		
Head	Left Touch	WWAN + Wi-Fi(DTS)	0.106	0.264		0.370	No
	Left Tilt	WWAN + Wi-Fi(DTS)	0.058	0.237		0.295	No
	Right Touch	WWAN + Wi-Fi(DTS)	0.118	0.149		0.267	No
	Right Tilt	WWAN + Wi-Fi(DTS)	0.048	0.135		0.183	No
Body-worn Accessory & Hotspot	Rear	WWAN + Wi-Fi(DTS)	0.492	0.122		0.614	No
		WWAN + BT	0.492		0.168	0.660	No
	Front	WWAN + Wi-Fi(DTS)	0.288	0.051		0.339	No
		WWAN + BT	0.288		0.168	0.456	No
Hotspot	Edge 1	WWAN + Wi-Fi(DTS)		0.040		0.040	No
	Edge 2	WWAN + Wi-Fi(DTS)	0.125	0.024		0.149	No
	Edge 3	WWAN + Wi-Fi(DTS)	0.526			0.526	No
	Edge 4	WWAN + Wi-Fi(DTS)	0.108			0.108	No

**14.4. Sum of the SAR for GSM 1900 & Wi-Fi 5 GHz Bands & BT**

RF Exposure conditions	Test Position		Simultaneous Transmission Scenario				Σ 1-g SAR (mW/g)	SPLSR (Yes/ No)
			GSM 1900	Wi-Fi (DTS)	Wi-Fi (UNII)	Bluetooth		
Head	Left Touch	WWAN + Wi-Fi(DTS)	0.106	0.132			0.238	No
		WWAN + Wi-Fi(UNII)	0.106		0.334		0.440	No
	Left Tilt	WWAN + Wi-Fi(DTS)	0.058	0.201			0.259	No
		WWAN + Wi-Fi(UNII)	0.058		0.355		0.413	No
	Right Touch	WWAN + Wi-Fi(DTS)	0.118	0.158			0.276	No
		WWAN + Wi-Fi(UNII)	0.118		0.293		0.411	No
Right Tilt	WWAN + Wi-Fi(DTS)	0.048	0.272			0.320	No	
	WWAN + Wi-Fi(UNII)	0.048		0.405		0.453	No	
Body-worn Accessory & Hotspot	Rear	WWAN + Wi-Fi(DTS)	0.492	0.245			0.737	No
		WWAN + Wi-Fi(UNII)	0.492		0.283		0.775	No
		WWAN + BT	0.492			0.168	0.660	No
	Front	WWAN + Wi-Fi(DTS)	0.288	0.026			0.314	No
		WWAN + Wi-Fi(UNII)	0.288		0.040		0.328	No
		WWAN + BT	0.288			0.168	0.456	No
Hotspot	Edge 1	WWAN + Wi-Fi(DTS)		0.162			0.162	No
	Edge 2	WWAN + Wi-Fi(DTS)	0.125	0.000			0.125	No
	Edge 3	WWAN + Wi-Fi(DTS)	0.526				0.526	No
	Edge 4	WWAN + Wi-Fi(DTS)	0.108				0.108	No

**SAR to Peak Location Separation Ratio (SPLSR)**

As the Sum of the SAR is not greater than 1.6 W/kg SPLSR assessment is not required.

### 14.5. Sum of the SAR for CDMA BC0 & Wi-Fi 2.4 GHz Band & BT

RF Exposure conditions	Test Position		Simultaneous Transmission Scenario			Σ 1-g SAR (mW/g)	SPLSR (Yes/ No)
			CDMA BC0	Wi-Fi (DTS)	Bluetooth		
Head	Left Touch	WWAN + Wi-Fi(DTS)	0.401	0.264		0.665	No
	Left Tilt	WWAN + Wi-Fi(DTS)	0.258	0.237		0.495	No
	Right Touch	WWAN + Wi-Fi(DTS)	0.443	0.149		0.592	No
	Right Tilt	WWAN + Wi-Fi(DTS)	0.261	0.135		0.396	No
Body-worn Accessory & Hotspot	Rear	WWAN + Wi-Fi(DTS)	0.745	0.122		0.867	No
		WWAN + BT	0.745		0.168	0.913	No
	Front	WWAN + Wi-Fi(DTS)	0.648	0.051		0.699	No
		WWAN + BT	0.648		0.168	0.816	No
Hotspot	Edge 1	WWAN + Wi-Fi(DTS)		0.040		0.040	No
	Edge 2	WWAN + Wi-Fi(DTS)	0.641	0.024		0.665	No
	Edge 3	WWAN + Wi-Fi(DTS)	0.563			0.563	No
	Edge 4	WWAN + Wi-Fi(DTS)	0.338			0.338	No

### 14.6. Sum of the SAR for CDMA BC0 & Wi-Fi 5 GHz Bands & BT

RF Exposure conditions	Test Position		Simultaneous Transmission Scenario				Σ 1-g SAR (mW/g)	SPLSR (Yes/ No)
			CDMA BC0	Wi-Fi (DTS)	Wi-Fi (UNII)	Bluetooth		
Head	Left Touch	WWAN + Wi-Fi(DTS)	0.435	0.132			0.567	No
		WWAN + Wi-Fi(UNII)	0.435		0.334		0.769	No
	Left Tilt	WWAN + Wi-Fi(DTS)	0.329	0.201			0.530	No
		WWAN + Wi-Fi(UNII)	0.329		0.355		0.684	No
	Right Touch	WWAN + Wi-Fi(DTS)	0.561	0.158			0.719	No
		WWAN + Wi-Fi(UNII)	0.561		0.293		0.854	No
Right Tilt	WWAN + Wi-Fi(DTS)	0.322	0.272			0.594	No	
	WWAN + Wi-Fi(UNII)	0.322		0.405		0.727	No	
Body-worn Accessory & Hotspot	Rear	WWAN + Wi-Fi(DTS)	0.675	0.245			0.920	No
		WWAN + Wi-Fi(UNII)	0.675		0.283		0.958	No
		WWAN + BT	0.675			0.168	0.843	No
	Front	WWAN + Wi-Fi(DTS)	0.629	0.026			0.655	No
		WWAN + Wi-Fi(UNII)	0.629		0.040		0.669	No
		WWAN + BT	0.629			0.168	0.797	No
Hotspot	Edge 1	WWAN + Wi-Fi(DTS)		0.162			0.162	No
	Edge 2	WWAN + Wi-Fi(DTS)	0.539	0.000			0.539	No
	Edge 3	WWAN + Wi-Fi(DTS)	0.642				0.642	No
	Edge 4	WWAN + Wi-Fi(DTS)	0.225				0.225	No

#### SAR to Peak Location Separation Ratio (SPLSR)

As the Sum of the SAR is not greater than 1.6 W/kg SPLSR assessment is not required.

### 14.7. Sum of the SAR for CDMA BC1 & Wi-Fi 2.4 GHz & BT

RF Exposure conditions	Test Position		Simultaneous Transmission Scenario			Σ 1-g SAR (mW/g)	SPLSR (Yes/ No)
			CDMA BC1	Wi-Fi (DTS)	Bluetooth		
Head	Left Touch	WWAN + Wi-Fi(DTS)	0.274	0.264		0.538	No
	Left Tilt	WWAN + Wi-Fi(DTS)	0.245	0.237		0.482	No
	Right Touch	WWAN + Wi-Fi(DTS)	0.293	0.149		0.442	No
	Right Tilt	WWAN + Wi-Fi(DTS)	0.116	0.135		0.251	No
Body-worn Accessory & Hotspot	Rear	WWAN + Wi-Fi(DTS)	1.079	0.122		1.201	No
		WWAN + BT	1.079		0.168	1.247	No
	Front	WWAN + Wi-Fi(DTS)	0.662	0.051		0.713	No
		WWAN + BT	0.662		0.168	0.830	No
Hotspot	Edge 1	WWAN + Wi-Fi(DTS)		0.040		0.040	No
	Edge 2	WWAN + Wi-Fi(DTS)	0.246	0.024		0.270	No
	Edge 3	WWAN + Wi-Fi(DTS)	1.120			1.120	No
	Edge 4	WWAN + Wi-Fi(DTS)	0.228			0.228	No

### 14.8. Sum of the SAR for CDMA BC1 & Wi-Fi 5 GHz Bands & BT

RF Exposure conditions	Test Position		Simultaneous Transmission Scenario				Σ 1-g SAR (mW/g)	SPLSR (Yes/ No)
			CDMA BC1	Wi-Fi (DTS)	Wi-Fi (UNII)	Bluetooth		
Head	Left Touch	WWAN + Wi-Fi(DTS)	0.274	0.132			0.406	No
		WWAN + Wi-Fi(UNII)	0.274		0.334		0.608	No
	Left Tilt	WWAN + Wi-Fi(DTS)	0.245	0.201			0.446	No
		WWAN + Wi-Fi(UNII)	0.245		0.355		0.600	No
	Right Touch	WWAN + Wi-Fi(DTS)	0.293	0.158			0.451	No
		WWAN + Wi-Fi(UNII)	0.293		0.293		0.586	No
Right Tilt	WWAN + Wi-Fi(DTS)	0.116	0.272			0.388	No	
	WWAN + Wi-Fi(UNII)	0.116		0.405		0.521	No	
Body-worn Accessory & Hotspot	Rear	WWAN + Wi-Fi(DTS)	1.079	0.245			1.324	No
		WWAN + Wi-Fi(UNII)	1.079		0.283		1.362	No
		WWAN + BT	1.079			0.168	1.247	No
	Front	WWAN + Wi-Fi(DTS)	0.662	0.026			0.688	No
		WWAN + Wi-Fi(UNII)	0.662		0.040		0.702	No
		WWAN + BT	0.662			0.168	0.830	No
Hotspot	Edge 1	WWAN + Wi-Fi(DTS)		0.162			0.162	No
	Edge 2	WWAN + Wi-Fi(DTS)	0.246	0.000			0.246	No
	Edge 3	WWAN + Wi-Fi(DTS)	1.120				1.120	No
	Edge 4	WWAN + Wi-Fi(DTS)	0.228				0.228	No

#### SAR to Peak Location Separation Ratio (SPLSR)

As the Sum of the SAR is not greater than 1.6 W/kg SPLSR assessment is not required.

**14.9. Sum of the SAR for CDMA BC10 & Wi-Fi 2.4 GHz & BT**

RF Exposure conditions	Test Position		Simultaneous Transmission Scenario			Σ 1-g SAR (mW/g)	SPLSR (Yes/ No)
			CDMA BC10	Wi-Fi (DTS)	Bluetooth		
Head	Left Touch	WWAN + Wi-Fi(DTS)	0.399	0.264		0.663	No
	Left Tilt	WWAN + Wi-Fi(DTS)	0.288	0.237		0.525	No
	Right Touch	WWAN + Wi-Fi(DTS)	0.462	0.149		0.611	No
	Right Tilt	WWAN + Wi-Fi(DTS)	0.280	0.135		0.415	No
Body-worn Accessory & Hotspot	Rear	WWAN + Wi-Fi(DTS)	0.540	0.122		0.662	No
		WWAN + BT	0.540		0.168	0.708	No
	Front	WWAN + Wi-Fi(DTS)	0.484	0.051		0.535	No
		WWAN + BT	0.484		0.168	0.652	No
Hotspot	Edge 1	WWAN + Wi-Fi(DTS)		0.040		0.040	No
	Edge 2	WWAN + Wi-Fi(DTS)	0.530	0.024		0.554	No
	Edge 3	WWAN + Wi-Fi(DTS)	0.516			0.516	No
	Edge 4	WWAN + Wi-Fi(DTS)	0.272			0.272	No

**14.10. Sum of the SAR for CDMA BC10 & Wi-Fi 5 GHz Bands & BT**

RF Exposure conditions	Test Position		Simultaneous Transmission Scenario				Σ 1-g SAR (mW/g)	SPLSR (Yes/ No)
			CDMA BC10	Wi-Fi (DTS)	Wi-Fi (UNII)	Bluetooth		
Head	Left Touch	WWAN + Wi-Fi(DTS)	0.399	0.132			0.531	No
		WWAN + Wi-Fi(UNII)	0.399		0.334		0.733	No
	Left Tilt	WWAN + Wi-Fi(DTS)	0.288	0.201			0.489	No
		WWAN + Wi-Fi(UNII)	0.288		0.355		0.643	No
	Right Touch	WWAN + Wi-Fi(DTS)	0.462	0.158			0.620	No
		WWAN + Wi-Fi(UNII)	0.462		0.293		0.755	No
Right Tilt	WWAN + Wi-Fi(DTS)	0.280	0.272			0.552	No	
	WWAN + Wi-Fi(UNII)	0.280		0.405		0.685	No	
Body-worn Accessory & Hotspot	Rear	WWAN + Wi-Fi(DTS)	0.540	0.245			0.785	No
		WWAN + Wi-Fi(UNII)	0.540		0.283		0.823	No
		WWAN + BT	0.540			0.168	0.708	No
	Front	WWAN + Wi-Fi(DTS)	0.484	0.026			0.510	No
		WWAN + Wi-Fi(UNII)	0.484		0.040		0.524	No
		WWAN + BT	0.484			0.168	0.652	No
Hotspot	Edge 1	WWAN + Wi-Fi(DTS)		0.162			0.162	No
	Edge 2	WWAN + Wi-Fi(DTS)	0.530	0.000			0.530	No
	Edge 3	WWAN + Wi-Fi(DTS)	0.516				0.516	No
	Edge 4	WWAN + Wi-Fi(DTS)	0.272				0.272	No

**SAR to Peak Location Separation Ratio (SPLSR)**

As the Sum of the SAR is not greater than 1.6 W/kg SPLSR assessment is not required.



### 14.11. Sum of the SAR for W-CDMA Band V & Wi-Fi 2.4 GHz & BT

RF Exposure conditions	Test Position		Simultaneous Transmission Scenario			Σ 1-g SAR (mW/g)	SPLSR (Yes/ No)
			W-CDMA Band V	Wi-Fi (DTS)	Bluetooth		
Head	Left Touch	WWAN + Wi-Fi(DTS)	0.319	0.264		0.583	No
	Left Tilt	WWAN + Wi-Fi(DTS)	0.205	0.237		0.442	No
	Right Touch	WWAN + Wi-Fi(DTS)	0.388	0.149		0.537	No
	Right Tilt	WWAN + Wi-Fi(DTS)	0.212	0.135		0.347	No
Body-worn Accessory & Hotspot	Rear	WWAN + Wi-Fi(DTS)	0.664	0.122		0.786	No
		WWAN + BT	0.664		0.168	0.832	No
	Front	WWAN + Wi-Fi(DTS)	0.538	0.051		0.589	No
		WWAN + BT	0.538		0.168	0.706	No
Hotspot	Edge 1	WWAN + Wi-Fi(DTS)		0.040		0.040	No
	Edge 2	WWAN + Wi-Fi(DTS)	0.509	0.024		0.533	No
	Edge 3	WWAN + Wi-Fi(DTS)	0.416			0.416	No
	Edge 4	WWAN + Wi-Fi(DTS)	0.230			0.230	No

### 14.12. Sum of the SAR for W-CDMA Band V & Wi-Fi 5 GHz Bands & BT

RF Exposure conditions	Test Position		Simultaneous Transmission Scenario				Σ 1-g SAR (mW/g)	SPLSR (Yes/ No)
			W-CDMA Band V	Wi-Fi (DTS)	Wi-Fi (UNII)	Bluetooth		
Head	Left Touch	WWAN + Wi-Fi(DTS)	0.319	0.132			0.451	No
		WWAN + Wi-Fi(UNII)	0.319		0.334		0.653	No
	Left Tilt	WWAN + Wi-Fi(DTS)	0.205	0.201			0.406	No
		WWAN + Wi-Fi(UNII)	0.205		0.355		0.560	No
	Right Touch	WWAN + Wi-Fi(DTS)	0.388	0.158			0.546	No
		WWAN + Wi-Fi(UNII)	0.388		0.293		0.681	No
Right Tilt	WWAN + Wi-Fi(DTS)	0.212	0.272			0.484	No	
	WWAN + Wi-Fi(UNII)	0.212		0.405		0.617	No	
Body-worn Accessory & Hotspot	Rear	WWAN + Wi-Fi(DTS)	0.664	0.245			0.909	No
		WWAN + Wi-Fi(UNII)	0.664		0.283		0.947	No
		WWAN + BT	0.664			0.168	0.832	No
	Front	WWAN + Wi-Fi(DTS)	0.538	0.026			0.564	No
		WWAN + Wi-Fi(UNII)	0.538		0.040		0.578	No
		WWAN + BT	0.538			0.168	0.706	No
Hotspot	Edge 1	WWAN + Wi-Fi(DTS)		0.162			0.162	No
	Edge 2	WWAN + Wi-Fi(DTS)	0.509	0.000			0.509	No
	Edge 3	WWAN + Wi-Fi(DTS)	0.416				0.416	No
	Edge 4	WWAN + Wi-Fi(DTS)	0.230				0.230	No

**SAR to Peak Location Separation Ratio (SPLSR)**

As the Sum of the SAR is not greater than 1.6 W/kg SPLSR assessment is not required.

**14.13. Sum of the SAR for W-CDMA Band II & Wi-Fi 2.4 GHz & BT**

RF Exposure conditions	Test Position		Simultaneous Transmission Scenario			Σ 1-g SAR (mW/g)	SPLSR (Yes/ No)
			W-CDMA Band II	Wi-Fi (DTS)	Bluetooth		
Head	Left Touch	WWAN + Wi-Fi(DTS)	0.182	0.264		0.446	No
	Left Tilt	WWAN + Wi-Fi(DTS)	0.094	0.237		0.331	No
	Right Touch	WWAN + Wi-Fi(DTS)	0.202	0.149		0.351	No
	Right Tilt	WWAN + Wi-Fi(DTS)	0.075	0.135		0.210	No
Body-worn Accessory & Hotspot	Rear	WWAN + Wi-Fi(DTS)	0.816	0.122		0.938	No
		WWAN + BT	0.816		0.168	0.984	No
	Front	WWAN + Wi-Fi(DTS)	0.399	0.051		0.450	No
		WWAN + BT	0.399		0.168	0.567	No
Hotspot	Edge 1	WWAN + Wi-Fi(DTS)		0.040		0.040	No
	Edge 2	WWAN + Wi-Fi(DTS)	0.154	0.024		0.178	No
	Edge 3	WWAN + Wi-Fi(DTS)	0.861			0.861	No
	Edge 4	WWAN + Wi-Fi(DTS)	0.136			0.136	No

**14.14. Sum of the SAR for W-CDMA Band II & Wi-Fi 5 GHz Bands & BT**

RF Exposure conditions	Test Position		Simultaneous Transmission Scenario				Σ 1-g SAR (mW/g)	SPLSR (Yes/ No)
			W-CDMA Band II	Wi-Fi (DTS)	Wi-Fi (UNII)	Bluetooth		
Head	Left Touch	WWAN + Wi-Fi(DTS)	0.182	0.132			0.314	No
		WWAN + Wi-Fi(UNII)	0.182		0.334		0.516	No
	Left Tilt	WWAN + Wi-Fi(DTS)	0.094	0.201			0.295	No
		WWAN + Wi-Fi(UNII)	0.094		0.355		0.449	No
	Right Touch	WWAN + Wi-Fi(DTS)	0.202	0.158			0.360	No
		WWAN + Wi-Fi(UNII)	0.202		0.293		0.495	No
Right Tilt	WWAN + Wi-Fi(DTS)	0.075	0.272			0.347	No	
	WWAN + Wi-Fi(UNII)	0.075		0.405		0.480	No	
Body-worn Accessory & Hotspot	Rear	WWAN + Wi-Fi(DTS)	0.816	0.245			1.061	No
		WWAN + Wi-Fi(UNII)	0.816		0.283		1.099	No
		WWAN + BT	0.816			0.168	0.984	No
	Front	WWAN + Wi-Fi(DTS)	0.399	0.026			0.425	No
		WWAN + Wi-Fi(UNII)	0.399		0.040		0.439	No
		WWAN + BT	0.399			0.168	0.567	No
Hotspot	Edge 1	WWAN + Wi-Fi(DTS)		0.162			0.162	No
	Edge 2	WWAN + Wi-Fi(DTS)	0.154	0.000			0.154	No
	Edge 3	WWAN + Wi-Fi(DTS)	0.861				0.861	No
	Edge 4	WWAN + Wi-Fi(DTS)	0.136				0.136	No

**SAR to Peak Location Separation Ratio (SPLSR)**

As the Sum of the SAR is not greater than 1.6 W/kg SPLSR assessment is not required.

### 14.15. Sum of the SAR for LTE Band 25 & Wi-Fi 2.4 GHz & BT

RF Exposure conditions	Test Position		Simultaneous Transmission Scenario			Σ 1-g SAR (mW/g)	SPLSR (Yes/ No)
			LTE Band 25	Wi-Fi (DTS)	Bluetooth		
Head	Left Touch	WWAN + Wi-Fi(DTS)	0.200	0.264		0.464	No
	Left Tilt	WWAN + Wi-Fi(DTS)	0.104	0.237		0.341	No
	Right Touch	WWAN + Wi-Fi(DTS)	0.169	0.149		0.318	No
	Right Tilt	WWAN + Wi-Fi(DTS)	0.098	0.135		0.233	No
Body-worn Accessory & Hotspot	Rear	WWAN + Wi-Fi(DTS)	0.785	0.122		0.907	No
		WWAN + BT	0.785		0.168	0.953	No
	Front	WWAN + Wi-Fi(DTS)	0.434	0.051		0.485	No
		WWAN + BT	0.434		0.168	0.602	No
Hotspot	Edge 1	WWAN + Wi-Fi(DTS)		0.040		0.040	No
	Edge 2	WWAN + Wi-Fi(DTS)	0.169	0.024		0.193	No
	Edge 3	WWAN + Wi-Fi(DTS)	0.797			0.797	No
	Edge 4	WWAN + Wi-Fi(DTS)	0.170			0.170	No

### 14.16. Sum of the SAR for LTE Band 25 & Wi-Fi 5 GHz Bands & BT

RF Exposure conditions	Test Position		Simultaneous Transmission Scenario				Σ 1-g SAR (mW/g)	SPLSR (Yes/ No)
			LTE Band 25	Wi-Fi (DTS)	Wi-Fi (UNII)	Bluetooth		
Head	Left Touch	WWAN + Wi-Fi(DTS)	0.200	0.132			0.332	No
		WWAN + Wi-Fi(UNII)	0.200		0.334		0.534	No
	Left Tilt	WWAN + Wi-Fi(DTS)	0.104	0.201			0.305	No
		WWAN + Wi-Fi(UNII)	0.104		0.355		0.459	No
	Right Touch	WWAN + Wi-Fi(DTS)	0.169	0.158			0.327	No
		WWAN + Wi-Fi(UNII)	0.169		0.293		0.462	No
Right Tilt	WWAN + Wi-Fi(DTS)	0.098	0.272			0.370	No	
	WWAN + Wi-Fi(UNII)	0.098		0.405		0.503	No	
Body-worn Accessory & Hotspot	Rear	WWAN + Wi-Fi(DTS)	0.785	0.245			1.030	No
		WWAN + Wi-Fi(UNII)	0.785		0.283		1.068	No
		WWAN + BT	0.785			0.168	0.953	No
	Front	WWAN + Wi-Fi(DTS)	0.434	0.026			0.460	No
		WWAN + Wi-Fi(UNII)	0.434		0.040		0.474	No
		WWAN + BT	0.434			0.168	0.602	No
Hotspot	Edge 1	WWAN + Wi-Fi(DTS)		0.162			0.162	No
	Edge 2	WWAN + Wi-Fi(DTS)	0.169	0.000			0.169	No
	Edge 3	WWAN + Wi-Fi(DTS)	0.797				0.797	No
	Edge 4	WWAN + Wi-Fi(DTS)	0.170				0.170	No

**SAR to Peak Location Separation Ratio (SPLSR)**

As the Sum of the SAR is not greater than 1.6 W/kg SPLSR assessment is not required.

**14.17. Sum of the SAR for LTE Band 26 & Wi-Fi 2.4 GHz & BT**

RF Exposure conditions	Test Position		Simultaneous Transmission Scenario			Σ 1-g SAR (mW/g)	SPLSR (Yes/ No)
			LTE Band 26	Wi-Fi (DTS)	Bluetooth		
Head	Left Touch	WWAN + Wi-Fi(DTS)	0.318	0.264		0.582	No
	Left Tilt	WWAN + Wi-Fi(DTS)	0.211	0.237		0.448	No
	Right Touch	WWAN + Wi-Fi(DTS)	0.374	0.149		0.523	No
	Right Tilt	WWAN + Wi-Fi(DTS)	0.253	0.135		0.388	No
Body-worn Accessory & Hotspot	Rear	WWAN + Wi-Fi(DTS)	0.611	0.122		0.733	No
		WWAN + BT	0.611		0.168	0.779	No
	Front	WWAN + Wi-Fi(DTS)	0.534	0.051		0.585	No
		WWAN + BT	0.534		0.168	0.702	No
Hotspot	Edge 1	WWAN + Wi-Fi(DTS)		0.040		0.040	No
	Edge 2	WWAN + Wi-Fi(DTS)	0.593	0.024		0.617	No
	Edge 3	WWAN + Wi-Fi(DTS)	0.418			0.418	No
	Edge 4	WWAN + Wi-Fi(DTS)	0.344			0.344	No

**14.18. Sum of the SAR for LTE Band 26 & Wi-Fi 5 GHz Bands & BT**

RF Exposure conditions	Test Position		Simultaneous Transmission Scenario				Σ 1-g SAR (mW/g)	SPLSR (Yes/ No)
			LTE Band 26	Wi-Fi (DTS)	Wi-Fi (UNII)	Bluetooth		
Head	Left Touch	WWAN + Wi-Fi(DTS)	0.318	0.132			0.450	No
		WWAN + Wi-Fi(UNII)	0.318		0.334		0.652	No
	Left Tilt	WWAN + Wi-Fi(DTS)	0.211	0.201			0.412	No
		WWAN + Wi-Fi(UNII)	0.211		0.355		0.566	No
	Right Touch	WWAN + Wi-Fi(DTS)	0.374	0.158			0.532	No
		WWAN + Wi-Fi(UNII)	0.374		0.293		0.667	No
Right Tilt	WWAN + Wi-Fi(DTS)	0.253	0.272			0.525	No	
	WWAN + Wi-Fi(UNII)	0.253		0.405		0.658	No	
Body-worn Accessory & Hotspot	Rear	WWAN + Wi-Fi(DTS)	0.611	0.245			0.856	No
		WWAN + Wi-Fi(UNII)	0.611		0.283		0.894	No
		WWAN + BT	0.611			0.168	0.779	No
	Front	WWAN + Wi-Fi(DTS)	0.534	0.026			0.560	No
		WWAN + Wi-Fi(UNII)	0.534		0.040		0.574	No
		WWAN + BT	0.534			0.168	0.702	No
Hotspot	Edge 1	WWAN + Wi-Fi(DTS)		0.162			0.162	No
	Edge 2	WWAN + Wi-Fi(DTS)	0.593	0.000			0.593	No
	Edge 3	WWAN + Wi-Fi(DTS)	0.418				0.418	No
	Edge 4	WWAN + Wi-Fi(DTS)	0.344				0.344	No

**SAR to Peak Location Separation Ratio (SPLSR)**

As the Sum of the SAR is not greater than 1.6 W/kg SPLSR assessment is not required.

**14.19. Sum of the SAR for LTE Band 41 & Wi-Fi 2.4 GHz & BT**

RF Exposure conditions	Test Position		Simultaneous Transmission Scenario			Σ 1-g SAR (mW/g)	SPLSR (Yes/ No)
			LTE Band 41	Wi-Fi (DTS)	Bluetooth		
Head	Left Touch	WWAN + Wi-Fi(DTS)	0.070	0.264		0.334	No
	Left Tilt	WWAN + Wi-Fi(DTS)	0.034	0.237		0.271	No
	Right Touch	WWAN + Wi-Fi(DTS)	0.121	0.149		0.270	No
	Right Tilt	WWAN + Wi-Fi(DTS)	0.041	0.135		0.176	No
Body-worn Accessory & Hotspot	Rear	WWAN + Wi-Fi(DTS)	0.379	0.122		0.501	No
		WWAN + BT	0.379		0.168	0.547	No
	Front	WWAN + Wi-Fi(DTS)	0.252	0.051		0.303	No
		WWAN + BT	0.252		0.168	0.420	No
Hotspot	Edge 1	WWAN + Wi-Fi(DTS)		0.040		0.040	No
	Edge 2	WWAN + Wi-Fi(DTS)		0.024		0.024	No
	Edge 3	WWAN + Wi-Fi(DTS)	0.345			0.345	No
	Edge 4	WWAN + Wi-Fi(DTS)	0.274			0.274	No

**14.20. Sum of the SAR for LTE Band 41 & Wi-Fi 5 GHz Bands & BT**

RF Exposure conditions	Test Position		Simultaneous Transmission Scenario				Σ 1-g SAR (mW/g)	SPLSR (Yes/ No)
			LTE Band 41	Wi-Fi (DTS)	Wi-Fi (UNII)	Bluetooth		
Head	Left Touch	WWAN + Wi-Fi(DTS)	0.064	0.132			0.196	No
		WWAN + Wi-Fi(UNII)	0.064		0.334		0.398	No
	Left Tilt	WWAN + Wi-Fi(DTS)	0.032	0.201			0.233	No
		WWAN + Wi-Fi(UNII)	0.032		0.355		0.387	No
	Right Touch	WWAN + Wi-Fi(DTS)	0.099	0.158			0.257	No
		WWAN + Wi-Fi(UNII)	0.099		0.293		0.392	No
	Right Tilt	WWAN + Wi-Fi(DTS)	0.039	0.272			0.311	No
		WWAN + Wi-Fi(UNII)	0.039		0.405		0.444	No
Body-worn Accessory & Hotspot	Rear	WWAN + Wi-Fi(DTS)	0.286	0.245			0.531	No
		WWAN + Wi-Fi(UNII)	0.286		0.283		0.569	No
		WWAN + BT	0.286			0.168	0.454	No
	Front	WWAN + Wi-Fi(DTS)	0.126	0.026			0.152	No
		WWAN + Wi-Fi(UNII)	0.126		0.040		0.166	No
		WWAN + BT	0.126			0.168	0.294	No
Hotspot	Edge 1	WWAN + Wi-Fi(DTS)		0.162			0.162	No
	Edge 2	WWAN + Wi-Fi(DTS)		0.000			0.000	No
	Edge 3	WWAN + Wi-Fi(DTS)	0.401				0.401	No
	Edge 4	WWAN + Wi-Fi(DTS)	0.221				0.221	No

**SAR to Peak Location Separation Ratio (SPLSR)**

As the Sum of the SAR is not greater than 1.6 W/kg SPLSR assessment is not required.

## **15. Appendixes**

**Refer to separated files for the following appendixes.**

- 15.1. Photos and Antenna Locations**
- 15.2. System Performance Check Plots**
- 15.3. Highest SAR Test Plots**
- 15.4. Calibration Certificate for E-Field Probe EX3DV4 - SN 3531**
- 15.5. Calibration Certificate for E-Field Probe EX3DV4 - SN 3871**
- 15.6. Calibration Certificate for E-Field Probe EX3DV4 - SN 3936**
- 15.7. Calibration Certificate for D835V2 - SN 4d002**
- 15.8. Calibration Certificate for D1900V2- SN 5d043**
- 15.9. Calibration Certificate for D2450V2 - SN 899**
- 15.10. Calibration Certificate for D2600V2 - SN 1006**
- 15.11. Calibration Certificate for D5GHzV2 – SN 1138**

**END OF REPORT**