



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

**(CLASS II PERMISSIVE CHANGE)**

**SAR EVALUATION REPORT**

*For*

**CDMA/LTE Phone + Bluetooth, and DTS b/g/n**

**Model: LG-LS660, LGLS660, LS660, LG-LS660P, LGLS660P, LG660P  
FCC ID: ZNFLS660**

**Report Number: 14U18507-S1  
Issue Date: 08/19/2014**

*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

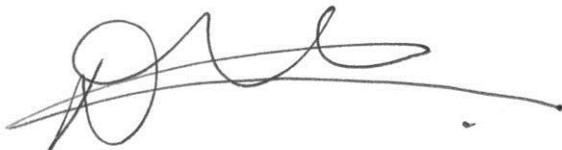
Applicant	LG ELECTRONICS MOBILECOMM U.S.A., INC.			
DUT description	CDMA/LTE Phone + Bluetooth, and DTS b/g/n			
Model	LG-LS660, LGLS660, LS660, LG-LS660P, LGLS660P, LG660P			
Test device is	An identical prototype			
Device category	Portable			
Exposure category	General Population/Uncontrolled Exposure			
Date tested	08/07/2014 – 08/11/2014			
The highest reported SAR values	RF exposure condition	Licensed	DTS	UNII
	Head	1.019 W/kg	0.488 W/kg	N/A
	Body-worn Accessory	1.290 W/kg	0.213 W/kg	
	Wireless Router (Hotspot)			
Simultaneous Transmission	Head: 1.507 W/kg Body: 1.503 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:




Dave Weaver  
 Program Manager  
 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 D04 Handset SAR v01r02
- 941225 D01 SAR test for 3G devices v02
- 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://ts.nist.gov/standards/scopes/2000650.htm>.

## 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
HP Signal Generator	HP	8665B	3546A00784	6/23/2015
Power Meter	HP	437B	3125U16345	6/16/2015
Power Meter	HP	437B	3125U09516	9/30/2014
Power Sensor	Agilent	8481A	2237A31744	10/2/2014
Power Sensor	Agilent	8481A	2349A36506	9/30/2014
Amplifier	MITEQ	AMF-4D-00400600-50-30P	1808939	N/A
Bi-directional coupler	Werlatone, Inc.	C8060-102	2710	N/A
DC Power Supply	Sorensen Ametek	XT15-4	1319A02778	N/A
HP Signal Generator	HP	8665B	3438A00633	7/10/2015
Power Meter	HP	438A	3513U04320	10/2/2014
Power Sensor	Agilent	8481A	2702A66876	9/30/2014
Power Sensor	Agilent	8481A	3318A95392	9/30/2014
Amplifier	MITEQ	AMF-4D-00400600-50-30P	1622052	N/A
Bi-directional coupler	Werlatone, Inc.	C8060-102	2711	N/A
DC Power Supply	HP	6296A	2841A-05955	N/A
E-Field Probe (SAR 1)	SPEAG	EX3DV4	3902	5/19/2015
E-Field Probe (SAR 4)	SPEAG	EX3DV4	3929	5/9/2015
E-Field Probe (SAR 5)	SPEAG	EX3DV4	3991	5/6/2015
Data Acquisition Electronics (SAR 1)	SPEAG	DAE3	427	1/14/2015
Data Acquisition Electronics (SAR 4)	SPEAG	DAE4	1352	9/11/2014
Data Acquisition Electronics (SAR 5)	SPEAG	DAE4	1439	5/14/2015
System Validation Dipole	SPEAG	D835V2	4d002	11/15/2015
System Validation Dipole	SPEAG	D1900V2	5d043	11/12/2015
System Validation Dipole	SPEAG	D2450V2	899	9/10/2014
System Validation Dipole	SPEAG	D2600V2	1006	9/11/2014
Thermometer (SAR Lab 1)	EXTECH	445703	CCS-2305	3/24/2015
Thermometer (SAR Lab 4)	EXTECH	445703	CCS-238	6/3/2015
Thermometer (SAR Lab 5)	EXTECH	445703	CCS-239	6/3/2015

#### Others

Name of Equipment	Manufacturer	Type/Model	Serial No.	Cal. Due Date
Power Sensor	Agilent	N1921A	MY52020011	5/6/2015
Power Meter	Agilent	N1911A	MY53040015	7/10/2015
Base Station Simulator	R & S	CMW500	125236-es	5/29/2015
Base Station Simulator	R & S	CMW500	127733-cy	6/2/2015

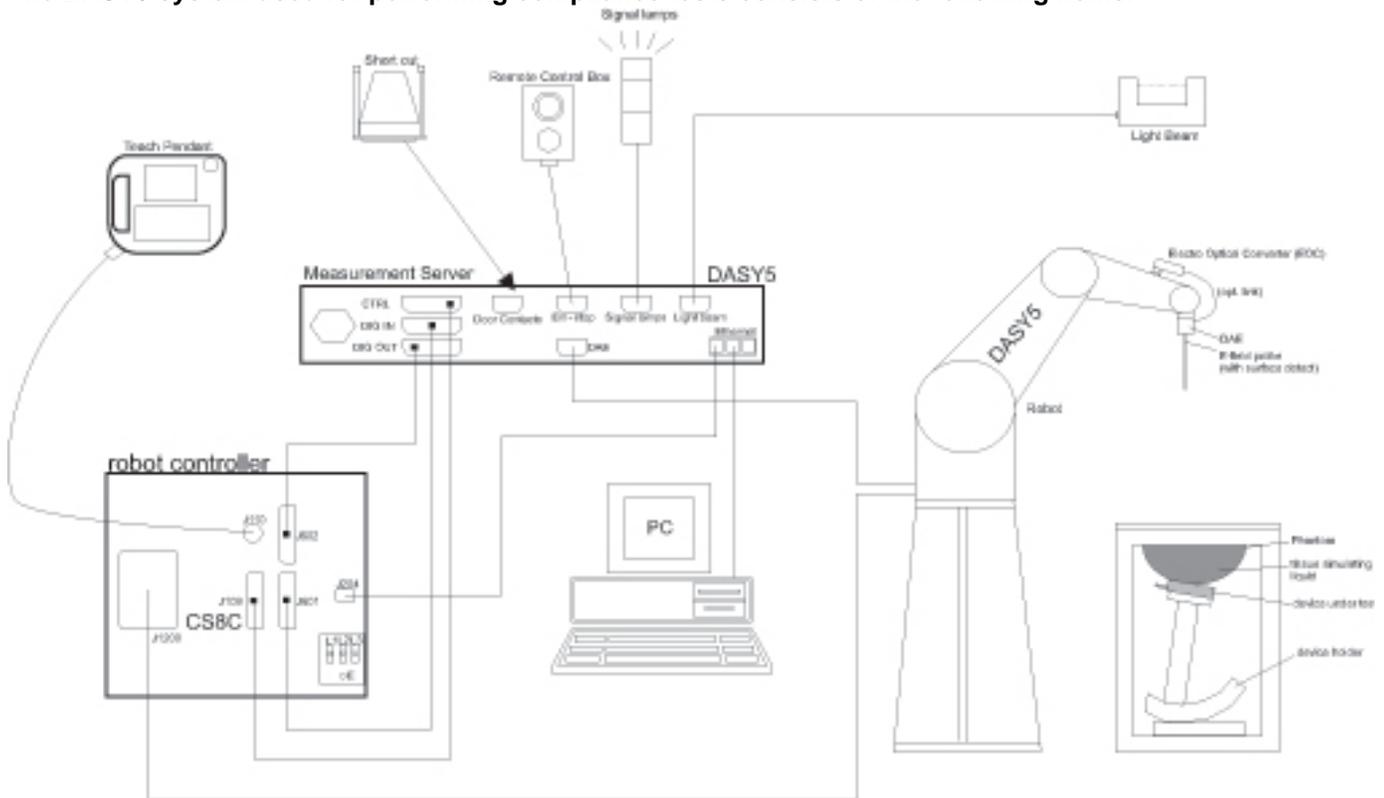
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## 4.2. Measurement Uncertainty

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

	$\leq 3$ GHz	$> 3$ GHz
Maximum distance from closest measurement point (geometric center of probe sensors) to phantom surface	$5 \pm 1$ 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	$30^\circ \pm 1^\circ$	$20^\circ \pm 1^\circ$
Maximum area scan spatial resolution: $\Delta x_{Area}$ , $\Delta y_{Area}$	$\leq 2$ GHz: $\leq 15$ mm 2 – 3 GHz: $\leq 12$ mm	3 – 4 GHz: $\leq 12$ mm 4 – 6 GHz: $\leq 10$ 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 $\leq$ 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 type="checkbox"/> Wi-Fi Direct (Wi-Fi 5 GHz)
Device dimension	Overall (Length x Width): 127 mm x 67 mm Overall Diagonal: 136mm Display Diagonal: 115mm
Back Cover	<input checked="" type="checkbox"/> Normal Battery Cover <input type="checkbox"/> Normal Battery Cover with NFC <input type="checkbox"/> Wireless Charger Battery Cover <input type="checkbox"/> Wireless Charger Battery Cover with NFC
Accessory	<input checked="" type="checkbox"/> Headset
Battery Options	<input checked="" type="checkbox"/> Standard – Lithium-ion battery, Rating 3.8Vdc, 8.0Wh <input type="checkbox"/> Extended (large capacity)

### 7.2. Wireless Technologies

Wireless Technology and Frequency Bands	CDMA BC 0 / 1 / 10 LTE Band 25 / 26 / 41 Wi-Fi : 2.4 GHz Bluetooth: 2.4 GHz.
Mode	CDMA2000 <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> LTE <ul style="list-style-type: none"> <li>- <input checked="" type="checkbox"/> QPSK</li> <li>- <input checked="" type="checkbox"/> 16QAM</li> </ul> Wi-Fi 2.4GHz (802.11b/g/n) <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> </ul> Bluetooth <ul style="list-style-type: none"> <li>- <input checked="" type="checkbox"/> Version 4.0 LE</li> </ul>
Duty Cycle	CDMA: 100% LTE (TDD): 63.33% Duty Cycle LTE (FDD): 100% Duty Cycle Wi-Fi 802.11b/g/n: 100%
SV-LTE & SV-DO	<input type="checkbox"/> Supported

### 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
CDMA BC0	1xRTT	24.7	25.2
	1xAdvanced	24.7	25.2
	1xEVDO Rel. 0	24.7	25.2
	1xEVDO Rev. A	24.7	25.2
CDMA BC1	1xRTT	24.0	24.5
	1xAdvanced	24.0	24.5
	1xEVDO Rel. 0	24.0	24.5
	1xEVDO Rev. A	24.0	24.5
CDMA BC10	1xRTT	24.7	25.2
	1xAdvanced	24.7	25.2
	1xEVDO Rel. 0	24.7	25.2
	1xEVDO Rev. A	24.7	25.2
LTE Band 25	QPSK	23.2	23.7
LTE Band 26	QPSK	23.2	23.7
LTE Band 41	QPSK	23.2	23.7

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

Upper limit (dB): 1.5 ~		RF Output Power (dBm)	
RF Air interface	Mode	Target	Max. tune-up tolerance limit
Bluetooth		8.5	10.0

Upper limit (dB): 1.5 ~		RF Output Power (dBm)	
RF Air interface	Mode	Target	Max. tune-up tolerance limit
Bluetooth LE		0.0	1.5

### 7.4. Simultaneous Transmission Condition

Item	Capable Transmit Configurations	RF Exposure Condition			Notes
		Head	Body-worn Accessory	Wireless Router (Hotspot) & Wi-Fi Direct	
1	CDMA BC0/1/10 voice + Wi-Fi 2.4GHz	✓	✓	✓	
2	CDMA BC0/1/10 data + Wi-Fi 2.4GHz	✓	✓	✓	
3	LTE B25/26/41 + Wi-Fi 2.4GHz	✓	✓	✓	
4	CDMA BC0/1/10 voice + Bluetooth		✓		
5	CDMA BC0/1/10 data + Bluetooth		✓		
6	LTE B25/26/41 + Bluetooth		✓		

**Notes:**

1. Wi-Fi 2.4GHz supports Hotspot and Wi-Fi Direct.
2. CDMA and LTE support Hotspot.
3. VoIP is supported in CDMA and LTE.
4. Wi-Fi 2.4 GHz Radio cannot transmit simultaneously with Bluetooth Radio.

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

Item	Description																																																																																																																																									
Frequency range, Channel Bandwidth, Numbers and Frequencies	<table border="1"> <tr> <td rowspan="2">Band 25</td> <td colspan="6">Frequency range: 1850 - 1915 MHz</td> </tr> <tr> <td colspan="6">Channel Bandwidth</td> </tr> <tr> <td></td> <td>20 MHz</td> <td>15 MHz</td> <td>10 MHz</td> <td>5 MHz</td> <td>3 MHz</td> <td>1.4 MHz</td> </tr> <tr> <td>Low</td> <td></td> <td></td> <td>26090/ 1855</td> <td>26065/ 1852.5</td> <td>26055/ 1851.5</td> <td></td> </tr> <tr> <td>Mid</td> <td></td> <td></td> <td>26365/ 1882.5</td> <td>26365/ 1882.5</td> <td>26365/ 1882.5</td> <td></td> </tr> <tr> <td>High</td> <td></td> <td></td> <td>26640/ 1910</td> <td>26665/ 1912.5</td> <td>26675/ 1913.5</td> <td></td> </tr> <tr> <td rowspan="2">Band 26</td> <td colspan="6">Frequency range: 814 - 849 MHz</td> </tr> <tr> <td colspan="6">Channel Bandwidth</td> </tr> <tr> <td></td> <td>20 MHz</td> <td>15 MHz</td> <td>10 MHz</td> <td>5 MHz</td> <td>3 MHz</td> <td>1.4 MHz</td> </tr> <tr> <td>Low</td> <td></td> <td></td> <td>26740/ 819</td> <td>26715/ 816.5</td> <td>26705/ 815.5</td> <td>26697/ 814.7</td> </tr> <tr> <td>Mid</td> <td></td> <td></td> <td>26865/ 831.5</td> <td>26865/ 831.5</td> <td>26865/ 831.5</td> <td>26865/ 831.5</td> </tr> <tr> <td>High</td> <td></td> <td></td> <td>26990/ 844</td> <td>27015/ 846.5</td> <td>27025/ 847.5</td> <td>27033/ 848.3</td> </tr> <tr> <td rowspan="2">Band 41</td> <td colspan="6">Frequency range: 2496 - 2690 MHz</td> </tr> <tr> <td colspan="6">Channel Bandwidth</td> </tr> <tr> <td></td> <td>20 MHz</td> <td>15 MHz</td> <td>10 MHz</td> <td>5 MHz</td> <td>3 MHz</td> <td>1.4 MHz</td> </tr> <tr> <td>Low</td> <td>39750/ 2506.0</td> <td>39725/ 2503.5</td> <td>39700/ 2501</td> <td></td> <td></td> <td></td> </tr> <tr> <td>Low-Mid</td> <td>40185/ 2549.5</td> <td>40173/ 2548.3</td> <td>40160/ 2547.0</td> <td></td> <td></td> <td></td> </tr> <tr> <td>Mid</td> <td>40620/ 2593.0</td> <td>40620/ 2593.0</td> <td>40620/ 2593.0</td> <td></td> <td></td> <td></td> </tr> <tr> <td>Mid-High</td> <td>41055/ 2636.5</td> <td>41068/ 2547.8</td> <td>41080/ 2639.0</td> <td></td> <td></td> <td></td> </tr> <tr> <td>High</td> <td>41490/ 2680.0</td> <td>41515/ 2682.5</td> <td>41540/ 2685.0</td> <td></td> <td></td> <td></td> </tr> </table>	Band 25	Frequency range: 1850 - 1915 MHz						Channel Bandwidth							20 MHz	15 MHz	10 MHz	5 MHz	3 MHz	1.4 MHz	Low			26090/ 1855	26065/ 1852.5	26055/ 1851.5		Mid			26365/ 1882.5	26365/ 1882.5	26365/ 1882.5		High			26640/ 1910	26665/ 1912.5	26675/ 1913.5		Band 26	Frequency range: 814 - 849 MHz						Channel Bandwidth							20 MHz	15 MHz	10 MHz	5 MHz	3 MHz	1.4 MHz	Low			26740/ 819	26715/ 816.5	26705/ 815.5	26697/ 814.7	Mid			26865/ 831.5	26865/ 831.5	26865/ 831.5	26865/ 831.5	High			26990/ 844	27015/ 846.5	27025/ 847.5	27033/ 848.3	Band 41	Frequency range: 2496 - 2690 MHz						Channel Bandwidth							20 MHz	15 MHz	10 MHz	5 MHz	3 MHz	1.4 MHz	Low	39750/ 2506.0	39725/ 2503.5	39700/ 2501				Low-Mid	40185/ 2549.5	40173/ 2548.3	40160/ 2547.0				Mid	40620/ 2593.0	40620/ 2593.0	40620/ 2593.0				Mid-High	41055/ 2636.5	41068/ 2547.8	41080/ 2639.0				High	41490/ 2680.0	41515/ 2682.5	41540/ 2685.0			
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LTE transmitter and antenna implementation	LTE has one (1) TX/RX antennas and two (2) RX antennas Refer to Appendix 15.1. Photos and Antenna Locations.																																																																																																																																									
Maximum power reduction (MPR)	<p align="center"><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																																																																																																			
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Power reduction	No																																																																																																																																									
Spectrum plots for RB configurations	A properly configured base station simulator was used for the SAR and power measurements; therefore, spectrum plots for each RB allocation and offset configuration are not included in the SAR report.																																																																																																																																									

### 7.5.1. TDD LTE Considerations

According to KDB 941225 D05 SAR for LTE Devices v02r02, 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	$26336 \cdot T_s$	$4384 \cdot T_s$	$5120 \cdot T_s$	$7680 \cdot T_s$	$4384 \cdot T_s$	$5120 \cdot T_s$
5	$6592 \cdot T_s$			$20480 \cdot T_s$		
6	$19760 \cdot T_s$			$23040 \cdot T_s$		
7	$21952 \cdot T_s$			$12800 \cdot T_s$		
8	$24144 \cdot T_s$			-		
9	$13168 \cdot T_s$	-	-	-	-	-

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<sub>s</sub>) 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<sub>s</sub> = 1/(15000 x 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, LTE and Wi-Fi

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 WWAN and LTE

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

#### For Wi-Fi

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

### 8.3. Hotspot Exposure Conditions and Wi-Fi Direct

#### For WWAN and LTE

Test Configurations	Antenna-to-edge/surface	SAR Required	Note
Rear	0 mm	Yes	
Front	4.5 mm	Yes	
Edge 1 (Top)	100.5 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 mm	Yes	
Edge 3 (Bottom)	1 mm	Yes	
Edge 4 (Left)	1 mm	Yes	

#### For Wi-Fi

Test Configurations	Antenna-to-edge/surface	SAR Required	Note
Rear	0 mm	Yes	
Front	6.5 mm	Yes	
Edge 1 (Top)	11.4 mm	Yes	
Edge 2 (Right)	58.25 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 3 (Bottom)	103.6 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)	2.25 mm	Yes	

## 9. RF Output Power Measurement

### 9.1. CDMA

#### 1xRTT Measured Results

Band	Mode	Ch	Freq. (MHz)	Avg Pwr (dBm)
BC 0	RC1 SO55 (Loopback)	1013	824.70	24.6
		384	836.52	24.7
		777	848.31	24.7
	RC3 SO55 (Loopback)	1013	824.70	24.6
		384	836.52	24.7
		777	848.31	24.7
	RC3 SO32 (+F-SCH)	1013	824.70	24.6
		384	836.52	24.7
		777	848.31	24.7
BC 1	RC1 SO55 (Loopback)	25	1851.25	24.1
		600	1880.00	24.2
		1175	1908.75	24.2
	RC3 SO55 (Loopback)	25	1851.25	24.1
		600	1880.00	24.2
		1175	1908.75	24.2
	RC3 SO32 (+F-SCH)	25	1851.25	24.1
		600	1880.00	24.2
		1175	1908.75	24.2
BC 10	RC1 SO55 (Loopback)	476	817.9	24.8
		580	820.5	24.7
		684	823.1	24.6
	RC3 SO55 (Loopback)	476	817.9	24.8
		580	820.5	24.7
		684	823.1	24.6
	RC3 SO32 (+F-SCH)	476	817.9	24.8
		580	820.5	24.7
		684	823.1	24.6

**1x Advanced**

**Call box setup procedure**

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

**Measured Results**

Band	Mode	Ch	Freq. (MHz)	Avg Pwr (dBm)
BC 0	Fwd11/Rvs8 SO75 (Loopback)	1013	824.70	24.6
		384	836.52	24.7
		777	848.31	24.7
BC 1	Fwd11/Rvs8 SO75 (Loopback)	25	1851.25	23.8
		600	1880.00	24.0
		1175	1908.75	24.0
BC 10	Fwd11/Rvs8 SO75 (Loopback)	476	817.9	24.8
		580	820.5	24.7
		684	823.1	24.6

**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	24.7
			384	836.52	24.7
			777	848.31	24.9
BC1	307.2 kbps (2 slot, QPSK)	153.6 kbps	25	1851.25	23.8
			600	1880.00	24.0
			1175	1908.75	24.0
BC10	307.2 kbps (2 slot, QPSK)	153.6 kbps	476	817.9	24.8
			580	820.5	24.7
			684	823.1	24.6

**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	24.7
			384	836.52	24.7
			777	848.31	24.9
BC1	307.2k, QPSK/ ACK channel is transmitted at all the slots	4096	25	1851.25	23.8
			600	1880.00	24.0
			1175	1908.75	24.0
BC10	307.2k, QPSK/ ACK channel is transmitted at all the slots	4096	476	817.9	24.8
			580	820.5	24.7
			684	823.1	24.6

## 9.2. LTE Bands

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	Avg Pwr (dBm)		
						26090	26365	26640
						1855 MHz	1882.5 MHz	1910 MHz
LTE Band 25	10	QPSK	1	0	0	23.7	23.7	23.7
			1	25	0	23.6	23.7	23.7
			1	49	0	23.6	23.7	23.5
			25	0	1	22.7	22.7	22.7
			25	12	1	22.7	22.7	22.7
			25	25	1	22.7	22.7	22.7
			50	0	1	22.7	22.7	22.7
		16QAM	1	0	1	22.7	22.7	22.7
			1	25	1	22.5	22.7	22.7
			1	49	1	22.6	22.7	22.5
			25	0	2	21.7	21.7	21.7
			25	12	2	21.7	21.7	21.7
			25	25	2	21.7	21.7	21.7
			50	0	2	21.7	21.7	21.7
Band	BW (MHz)	Mode	RB Allocation	RB offset	Target MPR	Avg Pwr (dBm)		
						26065	26365	26665
						1852.5 MHz	1882.5 MHz	1912.5 MHz
LTE Band 25	5	QPSK	1	0	0	23.7	23.7	23.7
			1	12	0	23.6	23.7	23.7
			1	24	0	23.5	23.7	23.5
			12	0	1	22.7	22.7	22.7
			12	7	1	22.7	22.7	22.7
			12	13	1	22.7	22.7	22.7
			25	0	1	22.7	22.7	22.7
		16QAM	1	0	1	22.6	22.7	22.7
			1	12	1	22.6	22.7	22.7
			1	24	1	22.5	22.7	22.5
			12	0	2	21.7	21.7	21.7
			12	7	2	21.7	21.7	21.7
			12	13	2	21.7	21.7	21.7
			25	0	2	21.7	21.7	21.7
Band	BW (MHz)	Mode	RB Allocation	RB offset	Target MPR	Avg Pwr (dBm)		
						26055	26365	26675
						1851.5 MHz	1882.5 MHz	1913.5 MHz
LTE Band 25	3	QPSK	1	0	0	23.7	23.7	23.7
			1	8	0	23.6	23.7	23.6
			1	14	0	23.6	23.7	23.4
			8	0	1	22.7	22.7	22.7
			8	4	1	22.7	22.7	22.7
			8	7	1	22.7	22.7	22.7
			15	0	1	22.7	22.7	22.7
		16QAM	1	0	1	22.7	22.7	22.7
			1	8	1	22.6	22.7	22.6
			1	14	1	22.6	22.7	22.4
			8	0	2	21.7	21.7	21.7
			8	4	2	21.7	21.7	21.7
			8	7	2	21.7	21.7	21.7
			15	0	2	21.7	21.7	21.7

**LTE Band 26 Measured Results**

Band	BW (MHz)	Mode	RB Allocation	RB offset	Target MPR	Avg Pwr (dBm)		
						26740	26865	26990
						819 MHz	831.5 MHz	844 MHz
LTE Band 26	10	QPSK	1	0	0	23.7	23.7	23.6
			1	25	0	23.6	23.7	23.5
			1	49	0	23.6	23.7	23.7
			25	0	1	22.7	22.7	22.7
			25	12	1	22.7	22.7	22.7
			25	25	1	22.7	22.7	22.7
			50	0	1	22.7	22.7	22.7
		16QAM	1	0	1	22.7	22.6	22.6
			1	25	1	22.6	22.6	22.4
			1	49	1	22.6	22.6	22.7
			25	0	2	21.7	21.7	21.7
			25	12	2	21.7	21.7	21.7
			25	25	2	21.7	21.7	21.7
			50	0	2	21.7	21.7	21.7
Band	BW (MHz)	Mode	RB Allocation	RB offset	Target MPR	Avg Pwr (dBm)		
						26715	26865	27015
						816.5 MHz	831.5 MHz	846.5 MHz
LTE Band 26	5	QPSK	1	0	0	23.7	23.7	23.6
			1	12	0	23.7	23.7	23.7
			1	24	0	23.6	23.7	23.7
			12	0	1	22.7	22.7	22.7
			12	7	1	22.7	22.7	22.7
			12	13	1	22.7	22.7	22.7
			25	0	1	22.7	22.7	22.7
		16QAM	1	0	1	22.7	22.7	22.5
			1	12	1	22.5	22.7	22.6
			1	24	1	22.6	22.7	22.7
			12	0	2	21.7	21.7	21.7
			12	7	2	21.7	21.7	21.7
			12	13	2	21.7	21.7	21.7
			25	0	2	21.7	21.7	21.7
Band	BW (MHz)	Mode	RB Allocation	RB offset	Target MPR	Avg Pwr (dBm)		
						26705	26865	27025
						815.5 MHz	831.5 MHz	847.5 MHz
LTE Band 26	3	QPSK	1	0	0	23.7	23.7	23.7
			1	8	0	23.6	23.7	23.7
			1	14	0	23.7	23.7	23.7
			8	0	1	22.7	22.7	22.7
			8	4	1	22.7	22.7	22.7
			8	7	1	22.7	22.7	22.7
			15	0	1	22.7	22.7	22.7
		16QAM	1	0	1	22.7	22.7	22.7
			1	8	1	22.6	22.6	22.7
			1	14	1	22.6	22.6	22.7
			8	0	2	21.7	21.7	21.7
			8	4	2	21.7	21.7	21.7
			8	7	2	21.7	21.7	21.7
			15	0	2	21.7	21.7	21.7

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

Band	BW (MHz)	Mode	RB Allocation	RB offset	Target MPR	Avg Pwr (dBm)		
						26697	26865	27033
						814.7 MHz	831.5 MHz	848.3 MHz
LTE Band 26	1.4	QPSK	1	0	0	23.7	23.7	23.7
			1	3	0	23.7	23.7	23.7
			1	5	0	23.7	23.7	23.7
			3	0	0	23.7	23.7	23.7
			3	1	0	23.7	23.7	23.7
			3	3	0	23.7	23.7	23.7
		16QAM	6	0	1	22.7	22.7	22.7
			1	0	1	22.7	22.7	22.7
			1	3	1	22.7	22.7	22.7
			1	5	1	22.7	22.7	22.7
			3	0	1	22.7	22.7	22.7
			3	1	1	22.7	22.7	22.7
			3	3	1	22.7	22.7	22.7
			6	0	2	21.7	21.7	21.7

### LTE Band 41 Measured Results

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

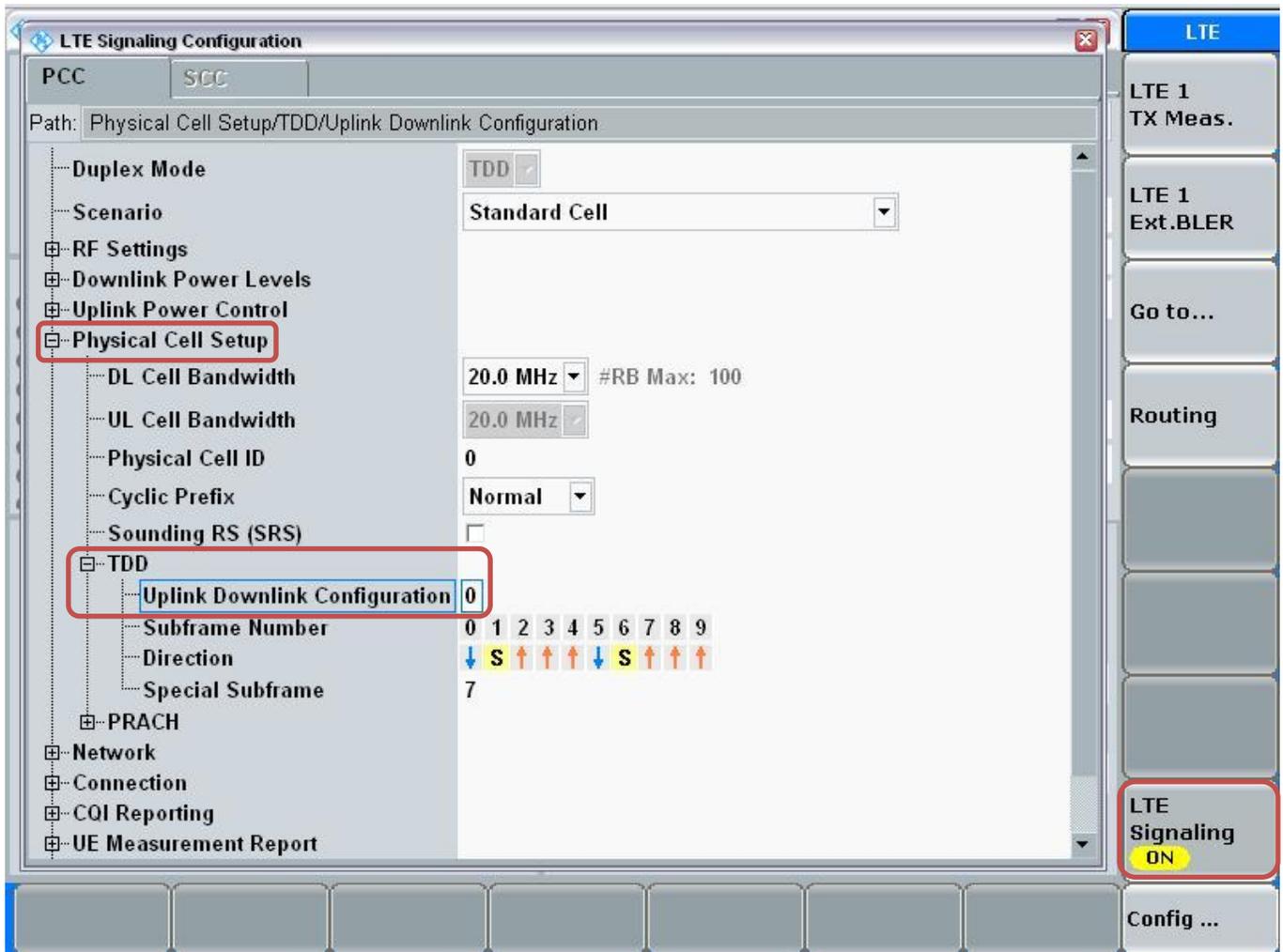
Set to CMW-500 with following parameters:

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

The screenshot shows 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 various system events such as 'State Cell Off', 'Signaling Failure', and 'EPS Default Bearer Established'.
- UE Info:** Fields for IMEI, IMSI, UE IPv4 Address, and UE IPv6 Prefix are shown as empty.
- Connection Setup:** Configured for 'PCC' and 'SCC' with 'Scheduling' set to 'RMC'. It shows parameters for Downlink and Uplink, including Channel (40620 Ch), Frequency (2593.0 MHz), Cell Bandwidth (20.0 MHz), RS EPRE (-85.8 dBm/15kHz), Full Cell BW Pow. (-55.0 dBm), PUSCH Open Loop Nom. Power (23 dBm), and PUSCH Closed Loop Target Power (23.0 dBm). Modulation is set to QPSK. Throughput is 3.970 Mbit/s for Downlink and 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 in red), and 'Config ...' (highlighted in red).

- 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' interface. On the left, the 'Connection Status' section shows the cell is 'Attached' and 'Connected'. Below this is an 'Event Log' with several entries, including 'State 'Attached'', 'EPS Default Bearer Established', and 'RRC Connection Established'. The 'UE Info' section lists IMEI (001027009999998), IMSI (001010123456789), UE IPv4 Address (192.168.48.129), and UE IPv6 Prefix (fc01:abab:cdcd:efe0::). The main area shows 'Connection Setup' for PCC and SCC, with parameters like Operating Band (Band 41), Frequency (2593.0 MHz), and Power levels. A 'Connect' button is highlighted with a red box. On the right, a vertical toolbar contains buttons for 'LTE 1 TX Meas.', 'LTE 1 Ext.BLER', 'Go to...', 'Routing', and 'LTE Signaling ON', with the latter also highlighted by a red box.

**Max Power Setting**

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

The screenshot displays the 'LTE Signaling 1 - X3.2.10.6' interface. On the left, the 'Connection Status' section shows 'Cell' with a signal strength icon, 'Packet Switched' with a laptop icon, and 'RRC State' as 'Connected'. Below this is an 'Event Log' with several entries including 'State 'Connection Established'', 'EPS Dedicated Bearer Established', 'State 'Attached'', 'EPS Default Bearer Established', 'RRC Connection Established', 'State 'Cell On'', 'State 'Cell Off'', and 'State 'Cell On''. The 'UE Info' section lists IMEI (001027009999998), IMSI (001010123456789), UE IPv4 Address [0] (192.168.48.129), and UE IPv6 Prefix [0] (fc01:abab:cdcd:efe0::). The main 'Connection Setup' area is divided into 'PCC' and 'SCC' tabs. Under 'PCC', parameters include Operating Band (Band 41), Channel (40620 Ch), Frequency (2593.0 MHz), Cell Bandwidth (20.0 MHz), RS EPRE (-85.8 dBm/15kHz), Full Cell BW Pow. (-55.0 dBm), PUSCH Open Loop Nom. Power (23 dBm), and PUSCH Closed Loop Target Power (23.0 dBm). Under 'SCC', parameters include Scheduling (RMC), # RB (100), RB Pos./Start RB (low), Modulation (QPSK), TBS Idx / Value (5 / 8760), and Throughput (3.970 Mbit/s). On the right side, there is a vertical menu with buttons: 'LTE', 'LTE 1 TX Meas.' (highlighted with a red box), 'LTE 1 Ext.BLER', 'Go to...', 'Routing', and 'LTE Signaling ON' (highlighted with a red box). At the bottom, there are buttons for 'Detach', 'Disconnect', 'Send SMS', 'Handover ...', and '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 'Active TPC Setup' dropdown set to 'Max Power' and the 'Closed Loop Target Power' set to '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 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**

dBm

MHz

Detected Allocation NoRB: 100 OffsetRB: 0

	Current	Average	Extreme	StdDev
OBW	17.790 MHz	17.773 MHz	17.790 MHz	0.013 MHz

	Current	Average	Min	Max	StdDev
TX Power	23.72 dBm	23.33 dBm	22.10 dBm	24.27 dBm	0.23 dBm

Statistic Count Out of Tolerance Detected Modulation Detected Channel Type View Filter Throughput

20 / 20	0.00 %	QPSK	PUSCH	100.0 %
---------	--------	------	-------	---------

Select View

SpectrumEmissionMask

Select View ...

Margin On Off

Select Trace (SEM) ...

Y Scale (SEM) ...

X Scale (SEM) ...

Display

Multi Evaluation RUN

RF Settings

Trigger

Marker

Signaling Parameter

LTE Signaling ON

Config ...

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

Band	BW (MHz)	Mode	RB Allocation	RB offset	Target MPR	Avg Pwr (dBm)				
						39750	40185	40620	41055	41490
						2506 MHz	2549.5 MHz	2593 MHz	2636.5 MHz	2680 MHz
LTE Band 41	20	QPSK	1	0	0	23.7	23.7	23.7	23.7	23.7
			1	49	0	23.7	23.7	23.7	23.7	23.7
			1	99	0	23.7	23.7	23.7	23.7	23.7
			50	0	1	22.7	22.7	22.7	22.7	22.7
			50	24	1	22.7	22.7	22.7	22.7	22.7
			50	50	1	22.7	22.6	22.7	22.6	22.7
			100	0	1	22.7	22.7	22.7	22.7	22.7
		16QAM	1	0	1	22.5	22.4	22.4	22.3	22.7
			1	49	1	22.7	22.5	22.3	22.1	22.7
			1	99	1	22.6	22.4	22.2	22.1	22.7
			50	0	2	21.7	21.7	21.7	21.7	21.7
			50	24	2	21.7	21.7	21.7	21.7	21.7
			50	50	2	21.7	21.5	21.7	21.6	21.7
			100	0	2	21.7	21.6	21.7	21.7	21.7
Band	BW (MHz)	Mode	RB Allocation	RB offset	Target MPR	Avg Pwr (dBm)				
						39725	40173	40620	41068	41515
						2503.5 MHz	2548.3 MHz	2593 MHz	2637.8 MHz	2682.5 MHz
LTE Band 41	15	QPSK	1	0	0	23.5	23.7	23.7	23.5	23.4
			1	37	0	23.7	23.7	23.7	23.5	23.7
			1	74	0	23.7	23.7	23.7	23.5	23.7
			36	0	1	22.7	22.7	22.7	22.5	22.7
			36	20	1	22.7	22.7	22.7	22.5	22.7
			36	39	1	22.7	22.7	22.7	22.4	22.0
			75	0	1	22.7	22.7	22.7	22.3	22.0
		16QAM	1	0	1	22.7	22.7	22.5	22.5	22.1
			1	37	1	22.7	22.7	22.5	22.5	22.2
			1	74	1	22.7	22.7	22.4	22.0	22.7
			36	0	2	21.7	21.7	21.7	21.5	21.7
			36	20	2	21.7	21.7	21.7	21.7	21.7
			36	39	2	21.7	21.7	21.7	21.0	21.7
			75	0	2	21.7	21.7	21.7	21.0	21.5
Band	BW (MHz)	Mode	RB Allocation	RB offset	Target MPR	Avg Pwr (dBm)				
						39700	40160	40620	41080	41540
						2501 MHz	2547 MHz	2593 MHz	2639 MHz	2685 MHz
LTE Band 41	10	QPSK	1	0	0	23.5	23.6	23.7	23.7	23.4
			1	25	0	23.6	23.6	23.7	23.7	23.5
			1	49	0	23.7	23.6	23.7	23.6	23.4
			25	0	1	22.7	22.7	22.7	22.6	22.7
			25	12	1	22.7	22.7	22.7	22.6	22.7
			25	25	1	22.7	22.7	22.7	22.5	22.7
			50	0	1	22.7	22.7	22.7	22.6	22.7
		16QAM	1	0	1	22.7	22.7	22.5	22.3	22.7
			1	25	1	22.0	22.7	22.5	22.2	22.7
			1	49	1	22.0	22.7	22.4	22.1	22.7
			25	0	2	21.7	21.7	21.7	21.6	21.7
			25	12	2	21.7	21.7	21.6	21.6	21.7
			25	25	2	21.7	21.7	21.7	21.6	21.7
			50	0	2	21.7	21.6	21.7	21.6	21.7

### 9.3. 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	16.4	Yes
			6	2437	16.7	
			11	2462	16.7	
	802.11g	6 Mbps	1	2412	13.0	No
			6	2437	13.0	
			11	2462	13.1	
	802.11n (HT20)	MCS0	1	2412	12.1	No
			6	2437	12.2	
			11	2462	12.2	

#### Note(s):

Per KDB 248227 D01, SAR is not required for 802.11g/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	16.7	Yes
			2 Mbps	16.6	No
			5.5 Mbps	16.7	No
			11 Mbps	16.7	No

### 9.4. Bluetooth

Maximum tune-up tolerance limit is 10.0 dBm from the rated nominal maximum output power. This power level qualifies for exclusion of SAR testing.

Refer to Standalone SAR Test Exclusion Considerations Section.

## 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

	Freq. (MHz)	Liquid Parameters		Measured	Target	Delta (%)	Limit ±(%)	
8/7/2014	Head 2450	e'	38.0600	Relative Permittivity ( $\epsilon_r$ ):	38.06	39.20	-2.91	5
		e"	13.8600	Conductivity ( $\sigma$ ):	1.89	1.80	4.90	5
	Head 2410	e'	38.2300	Relative Permittivity ( $\epsilon_r$ ):	38.23	39.28	-2.67	5
		e"	13.7000	Conductivity ( $\sigma$ ):	1.84	1.76	4.28	5
	Head 2475	e'	37.9700	Relative Permittivity ( $\epsilon_r$ ):	37.97	39.17	-3.06	5
		e"	13.9300	Conductivity ( $\sigma$ ):	1.92	1.83	4.93	5
8/8/2014	Body 2450	e'	50.3300	Relative Permittivity ( $\epsilon_r$ ):	50.33	52.70	-4.50	5
		e"	14.9300	Conductivity ( $\sigma$ ):	2.03	1.95	4.30	5
	Body 2410	e'	50.4700	Relative Permittivity ( $\epsilon_r$ ):	50.47	52.76	-4.34	5
		e"	14.8300	Conductivity ( $\sigma$ ):	1.99	1.91	4.18	5
	Body 2475	e'	50.2600	Relative Permittivity ( $\epsilon_r$ ):	50.26	52.67	-4.57	5
		e"	14.9900	Conductivity ( $\sigma$ ):	2.06	1.99	3.92	5

### AR Lab 4

	Freq. (MHz)	Liquid Parameters		Measured	Target	Delta (%)	Limit ±(%)	
8/7/2014	Body 1900	e'	51.6700	Relative Permittivity ( $\epsilon_r$ ):	51.67	53.30	-3.06	5
		e"	14.1900	Conductivity ( $\sigma$ ):	1.50	1.52	-1.37	5
	Body 1850	e'	51.8600	Relative Permittivity ( $\epsilon_r$ ):	51.86	53.30	-2.70	5
		e"	14.0900	Conductivity ( $\sigma$ ):	1.45	1.52	-4.65	5
	Body 1910	e'	51.6400	Relative Permittivity ( $\epsilon_r$ ):	51.64	53.30	-3.11	5
		e"	14.2300	Conductivity ( $\sigma$ ):	1.51	1.52	-0.58	5
8/8/2014	Head 835	e'	41.8600	Relative Permittivity ( $\epsilon_r$ ):	41.86	41.50	0.87	5
		e"	19.9300	Conductivity ( $\sigma$ ):	0.93	0.90	2.81	5
	Head 820	e'	42.0300	Relative Permittivity ( $\epsilon_r$ ):	42.03	41.60	1.03	5
		e"	19.9500	Conductivity ( $\sigma$ ):	0.91	0.90	1.24	5
	Head 850	e'	41.6800	Relative Permittivity ( $\epsilon_r$ ):	41.68	41.50	0.43	5
		e"	19.8900	Conductivity ( $\sigma$ ):	0.94	0.92	2.74	5
8/8/2014	Body 835	e'	53.7000	Relative Permittivity ( $\epsilon_r$ ):	53.70	55.20	-2.72	5
		e"	21.7600	Conductivity ( $\sigma$ ):	1.01	0.97	4.15	5
	Body 820	e'	53.8600	Relative Permittivity ( $\epsilon_r$ ):	53.86	55.28	-2.56	5
		e"	21.8500	Conductivity ( $\sigma$ ):	1.00	0.97	2.87	5
	Body 850	e'	53.5500	Relative Permittivity ( $\epsilon_r$ ):	53.55	55.16	-2.91	5
		e"	21.7000	Conductivity ( $\sigma$ ):	1.03	0.99	3.90	5

**Tissue Dielectric Parameter Check Results (continued)**

**SAR Lab 5**

	Freq. (MHz)	Liquid Parameters		Measured	Target	Delta (%)	Limit ±(%)	
8/8/2014	Body 1900	e'	51.2700	Relative Permittivity ( $\epsilon_r$ ):	51.27	53.30	-3.81	5
		e"	14.2500	Conductivity ( $\sigma$ ):	1.51	1.52	-0.96	5
	Body 1850	e'	51.4500	Relative Permittivity ( $\epsilon_r$ ):	51.45	53.30	-3.47	5
		e"	14.0600	Conductivity ( $\sigma$ ):	1.45	1.52	-4.85	5
	Body 1910	e'	51.2400	Relative Permittivity ( $\epsilon_r$ ):	51.24	53.30	-3.86	5
		e"	14.2800	Conductivity ( $\sigma$ ):	1.52	1.52	-0.23	5
8/8/2014	Head 1900	e'	39.4600	Relative Permittivity ( $\epsilon_r$ ):	39.46	40.00	-1.35	5
		e"	13.6100	Conductivity ( $\sigma$ ):	1.44	1.40	2.70	5
	Head 1850	e'	39.6500	Relative Permittivity ( $\epsilon_r$ ):	39.65	40.00	-0.88	5
		e"	13.4700	Conductivity ( $\sigma$ ):	1.39	1.40	-1.03	5
	Head 1910	e'	39.4100	Relative Permittivity ( $\epsilon_r$ ):	39.41	40.00	-1.48	5
		e"	13.6300	Conductivity ( $\sigma$ ):	1.45	1.40	3.40	5
8/11/2014	Head 2600	e'	38.0800	Relative Permittivity ( $\epsilon_r$ ):	38.08	39.01	-2.39	5
		e"	14.0000	Conductivity ( $\sigma$ ):	2.02	1.96	3.15	5
	Head 2500	e'	38.5400	Relative Permittivity ( $\epsilon_r$ ):	38.54	39.14	-1.53	5
		e"	13.7900	Conductivity ( $\sigma$ ):	1.92	1.85	3.39	5
	Head 2700	e'	37.6200	Relative Permittivity ( $\epsilon_r$ ):	37.62	38.88	-3.25	5
		e"	14.2000	Conductivity ( $\sigma$ ):	2.13	2.07	2.97	5
8/11/2014	Body 2600	e'	50.8843	Relative Permittivity ( $\epsilon_r$ ):	50.88	52.51	-3.10	5
		e"	15.2882	Conductivity ( $\sigma$ ):	2.21	2.16	2.29	5
	Body 2500	e'	51.1776	Relative Permittivity ( $\epsilon_r$ ):	51.18	52.64	-2.77	5
		e"	15.0751	Conductivity ( $\sigma$ ):	2.10	2.02	3.73	5
	Body 2700	e'	50.5861	Relative Permittivity ( $\epsilon_r$ ):	50.59	52.38	-3.43	5
		e"	15.4997	Conductivity ( $\sigma$ ):	2.33	2.30	1.11	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 (W/kg)		
				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

### 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 Room 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					
8/7/2014	D2450V2	899	Head	1g	5.71	5.55	55.5	51.30	<b>8.19</b>	2.80	1, 2
				10g	2.490	2.490	24.9	23.90	4.18		
8/8/2014	D2450V2	899	Body	1g	4.77	4.77	47.7	49.70	-4.02	0.00	
				10g	2.080	2.210	22.1	23.30	-5.15		

#### SAR Room 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					
8/7/2014	D1900V2	5d043	Body	1g	3.89	3.84	38.4	39.00	<b>-1.54</b>	1.29	3, 4
				10g	1.950	2.010	20.1	20.80	-3.37		
8/8/2014	D835V2	4d002	Head	1g	1.04	1.01	10.1	9.49	6.43	2.88	
				10g	0.699	0.664	6.6	6.18	7.44		
8/8/2014	D835V2	4d002	Body	1g	1.05	1.01	10.10	9.43	<b>7.10</b>	3.81	5, 6
				10g	0.70	0.67	6.69	6.21	7.73		

#### SAR Room 5

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					
8/8/2014	D1900V2	5d043	Body	1g	4.26	4.22	42.2	39.00	<b>8.21</b>	0.94	7, 8
				10g	2.140	2.200	22.0	20.80	5.77		
8/8/2014	D1900V2	5d043	Head	1g	3.95	3.92	39.2	40.10	-2.24	0.76	
				10g	2.080	2.030	20.3	21.10	-3.79		
8/11/2014	D2600V2	1006	Head	1g	6.62	6.15	61.50	56.50	<b>8.85</b>	7.10	9, 10
				10g	2.91	2.72	27.20	25.20	7.94		
8/11/2014	D2600V2	1006	Body	1g	6.19	6.04	60.40	55.70	8.44	2.42	
				10g	2.70	2.66	26.60	24.80	7.26		

## 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 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 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.

### **KDB 248227 D01 SAR Measurements Procedures for 802.11 a/b/g Transmitters v01r02 (pg.6):**

Each channel should be tested at the lowest data rate in each a-b/g mode or 4.9 GHz channel BW configuration.

When the extrapolated maximum peak SAR for the maximum output channel is  $\leq 1.6$  W/kg and the 1-g averaged SAR is  $\leq 0.8$  W/kg, testing of other channels in the "default test channels" or "required test channels" configuration is optional.

### 12.1. CDMA BC0

RF Exposure Conditions	Mode	Dist. (mm)	Test Position	Ch #.	Freq. (MHz)	Power (dBm)		1-g SAR (W/kg)		Plot
						Tune-up limit	Meas.	Meas.	Scaled	
Head	1xRTT (RC3 SO55)	0	Left Touch	384	836.52	25.2	24.7	0.584	0.655	
			Left Tilt	384	836.52	25.2	24.7	0.330	0.370	
			Right Touch	384	836.52	25.2	24.7	0.477	0.535	
			Right Tilt	384	836.52	25.2	24.7	0.300	0.337	
	1xEVDO (Rel. 0)		Left Touch	384	836.52	25.2	24.7	0.593	<b>0.665</b>	1
			Left Tilt	384	836.52	25.2	24.7	0.330	0.370	
			Right Touch	384	836.52	25.2	24.7	0.498	0.559	
			Right Tilt	384	836.52	25.2	24.7	0.308	0.346	
Body	1xRTT (RC3 SO32)	10	Rear	1013	824.70	25.2	24.6	0.724	0.831	
				384	836.52	25.2	24.7	0.776	0.871	
				777	848.31	25.2	24.7	0.845	<b>0.948</b>	2
	1xEVDO (Rel. 0)		Front	384	836.52	25.2	24.7	0.575	0.645	
			Rear	384	836.52	25.2	24.7	0.649	0.728	
			Front	384	836.52	25.2	24.7	0.562	0.631	
Hotspot	1xRTT (RC3 SO32)	10	Edge 2	384	836.52	25.2	24.7	0.296	0.332	
			Edge 3	384	836.52	25.2	24.7	0.295	0.331	
			Edge 4	384	836.52	25.2	24.7	0.634	0.711	
	1xEVDO (Rel. 0)		Edge 2	384	836.52	25.2	24.7	0.510	0.572	
			Edge 3	384	836.52	25.2	24.7	0.287	0.322	
			Edge 4	1013	824.70	25.2	24.7	0.785	0.881	
				384	836.52	25.2	24.7	0.722	0.810	
				777	848.31	25.2	24.9	0.715	0.766	

### 12.2. CDMA BC1

RF Exposure Conditions	Mode	Dist. (mm)	Test Position	Ch #.	Freq. (MHz)	Power (dBm)		1-g SAR (W/kg)		Plot	Notes
						Tune-up limit	Meas.	Meas.	Scaled		
Head	1xRTT (RC3 SO55)	0	Left Touch	600	1880.00	24.5	24.2	0.400	0.429		
			Left Tilt	600	1880.00	24.5	24.2	0.203	0.218		
			Right Touch	25	1851.25	24.5	24.1	0.698	0.765		
				600	1880.00	24.5	24.2	0.800	0.857		
			Right Tilt	600	1880.00	24.5	24.2	0.272	0.291		
	1xEVDO (Rel. 0)		Left Touch	600	1880.00	24.5	24.0	0.396	0.444		
			Left Tilt	600	1880.00	24.5	24.0	0.170	0.191		
			Right Touch	25	1851.25	24.5	23.8	0.701	0.824		
				600	1880.00	24.5	24.0	0.828	0.929		
			Right Tilt	1175	1908.75	24.5	24.0	0.908	1.019	3	
		600	1880.00	24.5	24.0	0.258	0.289				
Body	1xRTT (RC3 SO32)	10	Rear	25	1851.25	24.5	24.1	0.941	1.032		
				600	1880.00	24.5	24.2	0.971	1.040		
				1175	1908.75	24.5	24.2	0.937	1.004		
			Front	25	1851.25	24.5	24.1	0.881	0.966		
				600	1880.00	24.5	24.2	0.944	1.012		
				1175	1908.75	24.5	24.2	0.996	1.067		
	Rear		25	1851.25	24.5	23.8	1.040	1.222			
			600	1880.00	24.5	24.0	1.150	1.290	4		
			600	1880.00	24.5	24.0	0.972	1.091		1	
	Front		1175	1908.75	24.5	24.0	0.988	1.109			
			25	1851.25	24.5	23.8	1.010	1.187			
			600	1880.00	24.5	24.0	1.110	1.245			
		1175	1908.75	24.5	24.0	1.070	1.201				
Hotspot	1xRTT (RC3 SO32)	10	Edge 2	600	1880.00	24.5	24.2	0.296	0.317		
			Edge 3	25	1851.25	24.5	24.1	0.729	0.799		
				600	1880.00	24.5	24.2	0.750	0.804		
				1175	1908.75	24.5	24.2	0.857	0.918		
			Edge 4	600	1880.00	24.5	24.2	0.139	0.149		
	1xEVDO (Rel. 0)		Edge 2	600	1880.00	24.5	24.0	0.345	0.387		
			Edge 3	25	1851.25	24.5	23.8	0.669	0.786		
				600	1880.00	24.5	24.0	0.783	0.879		
				1175	1908.75	24.5	24.0	0.891	1.000		
			Edge 4	600	1880.00	24.5	24.0	0.139	0.156		

**Note(s):**

1. With headset attached. According to KDB 648474 Section 2.3, 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.

### 12.3. CDMA BC10

RF Exposure Conditions	Mode	Dist. (mm)	Test Position	Ch #.	Freq. (MHz)	Power (dBm)		1-g SAR (W/kg)		Plot No.
						Tune-up limit	Meas.	Meas.	Scaled	
Head	1xRTT (RC3 SO55)	0	Left Touch	580	820.5	25.2	24.7	0.475	<b>0.533</b>	5
			Left Tilt	580	820.5	25.2	24.7	0.277	0.311	
			Right Touch	580	820.5	25.2	24.7	0.413	0.463	
			Right Tilt	580	820.5	25.2	24.7	0.288	0.323	
	1xEVDO (Rel. 0)		Left Touch	580	820.5	25.2	24.7	0.464	0.521	
			Left Tilt	580	820.5	25.2	24.7	0.279	0.313	
			Right Touch	580	820.5	25.2	24.7	0.394	0.442	
			Right Tilt	580	820.5	25.2	24.7	0.299	0.335	
Body	1xRTT (RC3 SO32)	10	Rear	476	817.9	25.2	24.8	0.860	<b>0.943</b>	6
				580	820.5	25.2	24.7	0.794	0.891	
				684	823.1	25.2	24.6	0.728	0.836	
			Front	580	820.5	25.2	24.7	0.561	0.629	
	1xEVDO (Rel. 0)		Rear	476	817.9	25.2	24.8	0.796	0.873	
				580	820.5	25.2	24.7	0.758	0.850	
				684	823.1	25.2	24.6	0.700	0.804	
			Front	580	820.5	25.2	24.7	0.488	0.548	
Hotspot	1xRTT (RC3 SO32)	10	Edge 2	580	820.5	25.2	24.7	0.398	0.447	
			Edge 3	580	820.5	25.2	24.7	0.230	0.258	
			Edge 4	580	820.5	25.2	24.7	0.658	0.738	
	1xEVDO (Rel. 0)		Edge 2	580	820.5	25.2	24.7	0.330	0.370	
			Edge 3	580	820.5	25.2	24.7	0.240	0.269	
			Edge 4	580	820.5	25.2	24.7	0.660	0.741	

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

RF Exposure Conditions	Mode	Dist. (mm)	Test Position	Ch #.	Freq. (MHz)	RB Allocation	RB offset	Power (dBm)		1-g SAR (W/kg)		Plot No.
								Tune-up limit	Meas.	Meas.	Scaled	
Head	QPSK	0	Left Touch	26365	1882.5	1	0	23.7	23.7	0.425	0.425	
						25	0	22.7	22.7	0.320	0.320	
			Left Tilt	26365	1882.5	1	0	23.7	23.7	0.200	0.200	
						25	0	22.7	22.7	0.148	0.148	
			Right Touch	26365	1882.5	1	0	23.7	23.7	0.694	<b>0.694</b>	7
						25	0	22.7	22.7	0.537	0.537	
			Right Tilt	26365	1882.5	1	0	23.7	23.7	0.243	0.243	
						25	0	22.7	22.7	0.185	0.185	
Body & Hotspot	QPSK	10	Rear	26365	1882.5	1	0	23.7	23.7	0.780	0.780	
						25	0	22.7	22.7	0.597	0.597	
			Front	26090	1855.0	1	0	23.7	23.7	0.734	0.734	
						25	0	22.7	22.7	0.642	0.642	
				26365	1882.5	1	0	23.7	23.7	0.811	<b>0.811</b>	8
						25	0	22.7	22.7	0.642	0.642	
26640	1910.0	1	0	23.7	23.7	0.762	0.762					
		25	0	22.7	22.7	0.642	0.642					
Hotspot	QPSK	10	Edge 2	26365	1882.5	1	0	23.7	23.7	0.302	0.302	
						25	0	22.7	22.7	0.230	0.230	
			Edge 3	26365	1882.5	1	0	23.7	23.7	0.722	0.722	
						25	0	22.7	22.7	0.560	0.560	
			Edge 4	26365	1882.5	1	0	23.7	23.7	0.100	0.100	
						25	0	22.7	22.7	0.076	0.076	

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

RF Exposure Conditions	Mode	Dist. (mm)	Test Position	Ch #.	Freq. (MHz)	RB Allocation	RB offset	Power (dBm)		1-g SAR (W/kg)		Plot No.	
								Tune-up limit	Meas.	Meas.	Scaled		
Head	QPSK	0	Left Touch	26865	831.5	1	0	23.7	23.7	0.197	0.197	9	
						25	0	22.7	22.7	0.245	0.245		
			Left Tilt	26865	831.5	1	0	23.7	23.7	0.052	0.052		
						25	0	22.7	22.7	0.063	0.063		
			Right Touch	26865	831.5	1	0	23.7	23.7	0.302	<b>0.302</b>		
						25	0	22.7	22.7	0.200	0.200		
Right Tilt	26865	831.5	1	0	23.7	23.7	0.062	0.062					
			25	0	22.7	22.7	0.062	0.062					
Body & Hotspot	QPSK	10	Rear	26865	831.5	1	0	23.7	23.7	0.244	0.244		
						25	0	22.7	22.7	0.290	0.290		
			Front	26865	831.5	1	0	23.7	23.7	0.213	0.213		
						25	0	22.7	22.7	0.308	<b>0.308</b>		
Hotspot	QPSK	10	Edge 2	26865	831.5	1	0	23.7	23.7	0.113	0.113		
						25	0	22.7	22.7	0.099	0.099		
			Edge 3	26865	831.5	1	0	23.7	23.7	0.198	0.198		
						25	0	22.7	22.7	0.161	0.161		
			Edge 4	26865	831.5	1	0	23.7	23.7	0.439	<b>0.439</b>		11
						25	0	22.7	22.7	0.321	0.321		

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

RF Exposure Conditions	Mode	Dist. (mm)	Test Position	Ch #.	Freq. (MHz)	RB Allocation	RB offset	Power (dBm)		1-g SAR (W/kg)		Plot No.		
								Tune-up limit	Meas.	Meas.	Scaled			
Head	QPSK	0	Left Touch	40620	2593.0	1	0	23.7	23.7	0.275	0.275	12		
						50	0	22.7	22.7	0.223	0.223			
			Left Tilt	40620	2593.0	1	0	23.7	23.7	0.221	0.221			
						50	0	22.7	22.7	0.181	0.181			
			Right Touch	40620	2593.0	1	0	23.7	23.7	0.657	<b>0.657</b>			
						50	0	22.7	22.7	0.539	0.539			
Right Tilt	40620	2593.0	1	0	23.7	23.7	0.148	0.148						
			50	0	22.7	22.7	0.125	0.125						
Body & Hotspot	QPSK	10	Rear	40620	2593.0	1	0	23.7	23.7	0.547	0.547	13		
						40185	2549.5	1	0	23.7	23.7		0.485	0.485
						50	0	22.7	22.7	0.692	0.692			
						41055	2636.5	1	0	23.7	23.7		0.609	0.609
			Front	40620	2593.0	1	0	23.7	23.7	0.836	<b>0.836</b>			
						50	0	22.7	22.7	0.351	0.351			
						41490	2680.0	1	0	23.7	23.7		0.423	0.423
						50	0	22.7	22.7	0.351	0.351			
Hotspot	QPSK	10	Edge 2	40620	2593.0	1	0	23.7	23.7	0.278	0.278	14		
						50	0	22.7	22.7	0.227	0.227			
			Edge 3	40620	2593.0	1	0	23.7	23.7	0.639	0.639			
						40185	2549.5	1	0	23.7	23.7		0.588	0.588
						50	0	22.7	22.7	0.718	0.718			
						41055	2636.5	1	0	23.7	23.7		0.622	0.622
			Edge 4	40620	2593.0	1	0	23.7	23.7	1.130	<b>1.130</b>			
						50	0	22.7	22.7	0.100	0.100			

### 12.7. Wi-Fi (DTS Band)

RF Exposure Conditions	Mode	Dist. (mm)	Test Position	Ch #.	Freq. (MHz)	Power (dBm)		1-g SAR (W/kg)		Plot No.
						Tune-up limit	Meas.	Meas.	Scaled	
Head	802.11b 1 Mbps	0	Left Touch	6	2437.0	17.0	16.7	0.260	0.279	
			Left Tilt	6	2437.0	17.0	16.7	0.207	0.222	
			Right Touch	6	2437.0	17.0	16.7	0.455	<b>0.488</b>	15
			Right Tilt	6	2437.0	17.0	16.7	0.239	0.256	
Body-worn & Hotspot	802.11b 1 Mbps	10	Rear	6	2437.0	17.0	16.7	0.199	<b>0.213</b>	16
			Front	6	2437.0	17.0	16.7	0.092	0.098	
Hotspot	802.11b 1 Mbps	10	Edge 1	6	2437.0	17.0	16.7	0.126	0.135	
			Edge 4	6	2437.0	17.0	16.7	0.088	0.094	

### 12.8. Bluetooth

#### 12.8.1. 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 ≤ 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 ≤ 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 ≤ 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)			
10.0	10	10	2.480	1.6

#### Conclusion:

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

#### 12.8.2. 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 ≤ 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	10	10	2.480	<b>0.210</b>

### 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 Accessory (W/kg)	Hotspot/Wi-Fi Direct (W/kg)	Repeated SAR (Yes/No)
850	CDMA BC0				
	CDMA BC10		0.860		Yes
	LTE Band 26				
1900	CDMA BC1		1.150		Yes
	LTE Band 25				
2400	Wi-Fi 802.11b/g/n	0.455			No
2600	LTE Band 41			1.130	Yes

#### 13.2. Repeated Measurement Results

##### Head Exposure Condition

Not Applicable.

##### Body-worn Accessory & Hotspot Exposure Conditions

Frequency band	Test Position	Mode	Ch #.	Freq. (MHz)	Meas. SAR (W/kg)		Largest to Smallest SAR Ratio	Note
					Original	Repeated		
CDMA BC10	Rear	1xRTT (RC3 SO32)	476	817.9	0.860	0.802	1.07	1
CDMA BC1	Rear	1xEVDO (Rel. 0)	600	1908.8	1.150	1.130	1.02	1

##### Hotspot Mode Exposure Conditions

Frequency band	Test Position	Mode	Ch #.	Freq. (MHz)	Meas. SAR (W/kg)		Largest to Smallest SAR Ratio	Note
					Original	Repeated		
LTE Band 41	Edge 3	QPSK	41490	2680.0	1.130	1.110	1.02	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

### 14.1. Sum of the SAR for CDMA BC0 & Wi-Fi & BT

RF Exposure conditions	Test Position		Simultaneous Transmission Scenario			Σ 1-g SAR (mW/g)	SPLSR (Yes/ No)
			① CDMA BC0	② Wi-Fi(DTS)	③ Bluetooth		
Head	Left Touch	① + ②	0.665	0.279		0.944	No
	Left Tilt	① + ②	0.370	0.222		0.592	No
	Right Touch	① + ②	0.559	0.488		1.047	No
	Right Tilt	① + ②	0.346	0.256		0.602	No
Body-worn Accessory & Hotspot	Rear	① + ②	0.948	0.213		1.161	No
		① + ③	0.948		0.210	1.158	No
	Front	① + ②	0.645	0.098		0.743	No
		① + ③	0.645		0.210	0.855	No
Hotspot	Edge 1	① + ②		0.135		0.135	No
	Edge 2	① + ②	0.572			0.572	No
	Edge 3	① + ②	0.331			0.331	No
	Edge 4	① + ②	0.881	0.094		0.975	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.

### 14.2. Sum of the SAR for CDMA BC1 & Wi-Fi & BT

RF Exposure conditions	Test Position		Simultaneous Transmission Scenario			Σ 1-g SAR (mW/g)	SPLSR (Yes/ No)
			① CDMA BC1	② Wi-Fi(DTS)	③ Bluetooth		
Head	Left Touch	① + ②	0.444	0.279		0.723	No
	Left Tilt	① + ②	0.218	0.222		0.440	No
	Right Touch	① + ②	1.019	0.488		1.507	No
	Right Tilt	① + ②	0.291	0.256		0.547	No
Body-worn Accessory & Hotspot	Rear	① + ②	1.290	0.213		1.503	No
		① + ③	1.290		0.210	1.500	No
	Front	① + ②	1.245	0.098		1.343	No
		① + ③	1.245		0.210	1.455	No
Hotspot	Edge 1	① + ②		0.135		0.135	No
	Edge 2	① + ②	0.387			0.387	No
	Edge 3	① + ②	1.000			1.000	No
	Edge 4	① + ②	0.156	0.094		0.250	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 CDMA BC10 & Wi-Fi & BT

RF Exposure conditions	Test Position		Simultaneous Transmission Scenario			Σ 1-g SAR (mW/g)	SPLSR (Yes/ No)
			① CDMA BC10	② Wi-Fi(DTS)	③ Bluetooth		
Head	Left Touch	① + ②	0.533	0.279		0.812	No
	Left Tilt	① + ②	0.313	0.222		0.535	No
	Right Touch	① + ②	0.463	0.488		0.951	No
	Right Tilt	① + ②	0.335	0.256		0.591	No
Body-worn Accessory & Hotspot	Rear	① + ②	0.943	0.213		1.156	No
		① + ③	0.943		0.210	1.153	No
	Front	① + ②	0.629	0.098		0.727	No
		① + ③	0.629		0.210	0.839	No
Hotspot	Edge 1	① + ②		0.135		0.135	No
	Edge 2	① + ②	0.447			0.447	No
	Edge 3	① + ②	0.269			0.269	No
	Edge 4	① + ②	0.741	0.094		0.835	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.

### 14.4. Sum of the SAR for LTE Band 25 & Wi-Fi & BT

RF Exposure conditions	Test Position		Simultaneous Transmission Scenario			Σ 1-g SAR (mW/g)	SPLSR (Yes/ No)
			① LTE B25	② Wi-Fi(DTS)	③ Bluetooth		
Head	Left Touch	① + ②	0.425	0.279		0.704	No
	Left Tilt	① + ②	0.200	0.222		0.422	No
	Right Touch	① + ②	0.694	0.488		1.182	No
	Right Tilt	① + ②	0.243	0.256		0.499	No
Body-worn Accessory & Hotspot	Rear	① + ②	0.780	0.213		0.993	No
		① + ③	0.780		0.210	0.990	No
	Front	① + ②	0.811	0.098		0.909	No
		① + ③	0.811		0.210	1.021	No
Hotspot	Edge 1	① + ②		0.135		0.135	No
	Edge 2	① + ②	0.302			0.302	No
	Edge 3	① + ②	0.722			0.722	No
	Edge 4	① + ②	0.100	0.094		0.194	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 LTE Band 26 & Wi-Fi & BT**

RF Exposure conditions	Test Position		Simultaneous Transmission Scenario			Σ 1-g SAR (mW/g)	SPLSR (Yes/ No)
			① LTE B26	② Wi-Fi(DTS)	③ Bluetooth		
Head	Left Touch	① + ②	0.245	0.279		0.524	No
	Left Tilt	① + ②	0.063	0.222		0.285	No
	Right Touch	① + ②	0.302	0.488		0.790	No
	Right Tilt	① + ②	0.062	0.256		0.318	No
Body-worn Accessory & Hotspot	Rear	① + ②	0.290	0.213		0.503	No
		① + ③	0.290		0.210	0.500	No
	Front	① + ②	0.308	0.098		0.406	No
		① + ③	0.308		0.210	0.518	No
Hotspot	Edge 1	① + ②		0.135		0.135	No
	Edge 2	① + ②	0.113			0.113	No
	Edge 3	① + ②	0.198			0.198	No
	Edge 4	① + ②	0.439	0.094		0.533	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.

**14.6. Sum of the SAR for LTE Band 41 & Wi-Fi & BT**

RF Exposure conditions	Test Position		Simultaneous Transmission Scenario			Σ 1-g SAR (mW/g)	SPLSR (Yes/ No)
			① LTE B41	② Wi-Fi(DTS)	③ Bluetooth		
Head	Left Touch	① + ②	0.275	0.279		0.554	No
	Left Tilt	① + ②	0.221	0.222		0.443	No
	Right Touch	① + ②	0.657	0.488		1.145	No
	Right Tilt	① + ②	0.148	0.256		0.404	No
Body-worn Accessory & Hotspot	Rear	① + ②	0.836	0.213		1.049	No
		① + ③	0.836		0.210	1.046	No
	Front	① + ②	0.423	0.098		0.521	No
		① + ③	0.423		0.210	0.633	No
Hotspot	Edge 1	① + ②		0.135		0.135	No
	Edge 2	① + ②	0.278			0.278	No
	Edge 3	① + ②	1.130			1.130	No
	Edge 4	① + ②	0.100	0.094		0.194	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 3902**
- 15.5. Calibration Certificate for E-Field Probe EX3DV3 - SN 3929**
- 15.6. Calibration Certificate for E-Field Probe EX3DV4 - SN 3991**
- 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**

**END OF REPORT**