



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

SAR EVALUATION REPORT

For
CDMA/LTE Phone + Bluetooth & DTS/UNII a/b/g/n + NFC

**Model: LG-VS880, VS880, LGVS880
FCC ID: ZNFVS880**

**Report Number: 14U17222-S7A
Issue Date: 5/14/2014**

Prepared for
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NVLAP LAB CODE 200065-0

Revision History

<u>Rev.</u>	<u>Issue Date</u>	<u>Revisions</u>	<u>Revised By</u>
--	5/8/2014	Initial Issue	--
A	5/14/2014	Report revised based on reviewer's comment: 1. Sec. 12: Updated note	Kenneth Mak

Table of Contents

1. Attestation of Test Results..... 6

2. Test Methodology 7

3. Facilities and Accreditation 7

4. Calibration and Uncertainty 8

 4.1. *Measuring Instrument Calibration 8*

 4.2. *Measurement Uncertainty..... 8*

5. Measurement System Description and Setup..... 9

6. SAR Measurement Procedure..... 10

 6.1. *Normal SAR Measurement Procedure..... 10*

 6.2. *Volume Scan Procedures 12*

7. Device Under Test..... 13

 7.1. *General Information 13*

 7.2. *Wireless Technologies..... 14*

 7.3. *RF Output Power Tolerance 15*

 7.4. *Simultaneous Transmission Condition 16*

 7.5. *General LTE SAR Test and Reporting Considerations..... 17*

8. RF Exposure Conditions 18

 8.1. *Head Exposure Conditions 18*

 8.2. *Body-worn Accessory Exposure Conditions..... 18*

 8.3. *Hotspot Exposure Conditions..... 19*

 8.4. *Wi-Fi Direct Exposure Conditions 19*

9. RF Output Power Measurement..... 20

 9.1. *CDMA..... 20*

 9.2. *LTE Band..... 21*

 9.3. *SV-LTE..... 26*

 9.3.1. *CDMA BC0 + LTE Band 4 26*

 9.3.2. *CDMA BC1 + LTE Band 4 27*

 9.3.3. *CDMA BC0 + LTE Band 13 28*

 9.3.4. *CDMA BC1 + LTE Band 13 29*

 9.4. *Wi-Fi (2.4 GHz Band)..... 30*

 9.5. *Wi-Fi (5 GHz Bands)..... 31*

 9.6. *Bluetooth 34*

10. Tissue Dielectric Properties	35
10.1. <i>Composition of Ingredients for the Tissue Material Used in the SAR Tests</i>	36
10.2. <i>Tissue Dielectric Parameter Check Results.....</i>	37
11. System Performance Check	40
11.1. <i>System Performance Check Measurement Conditions.....</i>	40
11.2. <i>Reference SAR Values for System Performance Check.....</i>	41
11.3. <i>System Performance Check Results</i>	42
12. SAR Test Results	44
12.1. <i>CDMA BC0.....</i>	45
12.1.1. <i>Maximum Power</i>	45
12.1.2. <i>Power Reduction.....</i>	45
12.2. <i>CDMA BC1.....</i>	46
12.2.1. <i>Maximum Power</i>	46
12.2.2. <i>Power Reduction.....</i>	46
12.3. <i>LTE Band 4 (20MHz Bandwidth)</i>	47
12.3.1. <i>Maximum Power</i>	47
12.3.2. <i>Power Reduction.....</i>	47
12.4. <i>LTE Band 13 (10MHz Bandwidth)</i>	48
12.4.1. <i>Maximum Power</i>	48
12.4.2. <i>Power Reduction.....</i>	48
12.5. <i>Wi-Fi (DTS Band).....</i>	49
12.5.1. <i>2.4 GHz Band.....</i>	49
12.5.2. <i>5.8 GHz Band.....</i>	49
12.6. <i>Wi-Fi (UNII Bands)</i>	49
12.7. <i>Bluetooth.....</i>	50
12.7.1. <i>Standalone SAR Test Exclusion Considerations</i>	50
12.7.2. <i>Estimated SAR.....</i>	50
13. SAR Measurement Variability.....	51
13.1. <i>The Highest Measured SAR Configuration in Each Frequency Band</i>	51
13.2. <i>Repeated Measurement Results</i>	51
14. Simultaneous Transmission SAR Analysis.....	52
14.1. <i>Sum of the SAR for CDMA BC0 & Wi-Fi 2.4GHz Band & BT.....</i>	53
14.2. <i>Sum of the SAR for CDMA BC0 & Wi-Fi 5 GHz Bands & BT.....</i>	53
14.3. <i>Sum of the SAR for CDMA BC1 & Wi-Fi 2.4 GHz Band & BT.....</i>	54
14.4. <i>Sum of the SAR for CDMA BC1 & Wi-Fi 5 GHz Bands & BT.....</i>	54

14.5.	Sum of the SAR for LTE Band 4 & Wi-Fi 2.4 GHz Band & BT	55
14.6.	Sum of the SAR for LTE Band 4 & Wi-Fi 5 GHz Bands & BT	55
14.7.	Sum of the SAR for LTE Band 13 & Wi-Fi 2.4 GHz & BT.....	56
14.8.	Sum of the SAR for LTE Band 13 & Wi-Fi 5 GHz Bands & BT.....	56
14.9.	Sum of the SAR for SV-LTE.....	57
14.9.1.	CDMA (Maximum Power), LTE (Power Reduction), Wi-Fi 2.4 GHz Band, & BT	57
14.9.2.	CDMA (Maximum Power), LTE (Power Reduction), Wi-Fi 5 GHz Bands, & BT	58
14.9.3.	CDMA (Power Reduction), LTE (Maximum Power), Wi-Fi 2.4 GHz Band, & BT	59
14.9.4.	CDMA (Power Reduction), LTE (Maximum Power), Wi-Fi 5 GHz Bands, & BT	60
15.	Appendixes.....	61
15.1.	Photos and Antenna Locations.....	61
15.2.	System Performance Check Plots	61
15.3.	Highest SAR Test Plots.....	61
15.4.	Calibration Certificate for E-Field Probe EX3DV4 - SN 3871	61
15.5.	Calibration Certificate for E-Field Probe EX3DV4 - SN 3885.....	61
15.6.	Calibration Certificate for E-Field Probe EX3DV3 - SN 3749.....	61
15.7.	Calibration Certificate for E-Field Probe EX3DV4 - SN 3901	61
15.8.	Calibration Certificate for E-Field Probe EX3DV4 - SN 3772	61
15.9.	Calibration Certificate for D750V3 - SN 1024	61
15.10.	Calibration Certificate for D835V2 - SN 4d117	61
15.11.	Calibration Certificate for D1750V2 - SN 1077	61
15.12.	Calibration Certificate for D1900V2- SN 5d043	61
15.13.	Calibration Certificate for D1900V2- SN 5d140	61
15.14.	Calibration Certificate for D2450V2 - SN 899	61
15.15.	Calibration Certificate for D5GHzV2 - SN 1003	61

1. Attestation of Test Results

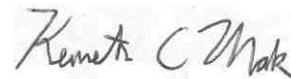
Applicant	LG ELECTRONICS MOBILECOMM U.S.A., INC.			
DUT description	CDMA/LTE Phone + Bluetooth & DTS/UNII a/b/g/n + NFC			
Model	LG-VS880, VS880, LGVS880			
Test device is	An identical prototype			
Device category	Portable			
Exposure category	General Population/Uncontrolled Exposure			
Date tested	3/19/2014 – 3/28/2014			
The highest reported SAR values	RF exposure condition	Licensed	DTS	UNII
	Head	0.419 W/kg	0.100 W/kg	0.019 W/kg
	Body-worn Accessory	1.007 W/kg	0.193 W/kg	0.075 W/kg
	Wireless Router (Hotspot)	1.007 W/kg	0.104 W/kg	N/A
	Wi-Fi Direct	N/A	0.193 W/kg	N/A
	Simultaneous Transmission	1.466 W/kg	1.466 W/kg	1.348 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:

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 WiSE Enginner
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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 D02 HSPA and 1x Advanced v02r02
- 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, Fremont, California, USA.

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

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	8753ES	MY40001647	7/11/2014
Dielectronic Probe kit	SPEAG	DAK-3.5	1082	9/10/2014
Dielectronic Probe kit	SPEAG	DAK-3.5 Short	SM DAK 200 BA	N/A
Thermometer	Control Company	4242	122529162	9/19/2014

System Performance Check

Name of Equipment	Manufacturer	Type/Model	Serial No.	Cal. Due Date
Power Meter	HP	438A	2822A05684	10/10/2014
Power Sensor	HP	8481A	2237A31744	10/2/2014
Synthesized Signal Generator	HP	8665B	3438A00633	6/13/2014
Power Sensor	HP	8481A	2349A36506	9/30/2014
Directional coupler	Werlatone	C8060-102	2710	N/A
Amplifier	MITEQ	AMF-4D-00400600-50-30P	1808939	N/A
DC Power Supply	AMETEK	XT15-4	1319A02778	N/A
E-Field Probe	SPEAG	EX3DV4	3871	7/29/2014
E-Field Probe	SPEAG	EX3DV4	3885	9/18/2014
E-Field Probe	SPEAG	EX3DV4	3749	1/29/2015
E-Field Probe	SPEAG	EX3DV4	3901	2/25/2015
E-Field Probe	SPEAG	EX3DV4	3772	2/26/2015
Data Acquisition Electronics	SPEAG	DAE4	1239	4/9/2014
Data Acquisition Electronics	SPEAG	DAE3	1343	7/24/2014
Data Acquisition Electronics	SPEAG	DAE4	1352	9/11/2014
Data Acquisition Electronics	SPEAG	DAE4	1259	1/23/2015
Data Acquisition Electronics	SPEAG	DAE4	1357	2/17/2015
System Validation Dipole	SPEAG	D750V3	1024	5/28/2014
System Validation Dipole	SPEAG	D835V2	4d117	5/28/2014
System Validation Dipole	SPEAG	D1750V2	1077	9/12/2014
System Validation Dipole	SPEAG	D1900V2	5d043	11/12/2014
System Validation Dipole	SPEAG	D1900V2	5d140	4/18/2014
System Validation Dipole	SPEAG	D2450V2	899	9/10/2014
System Validation Dipole	SPEAG	D5GHzV2	1003	2/26/2015

Others

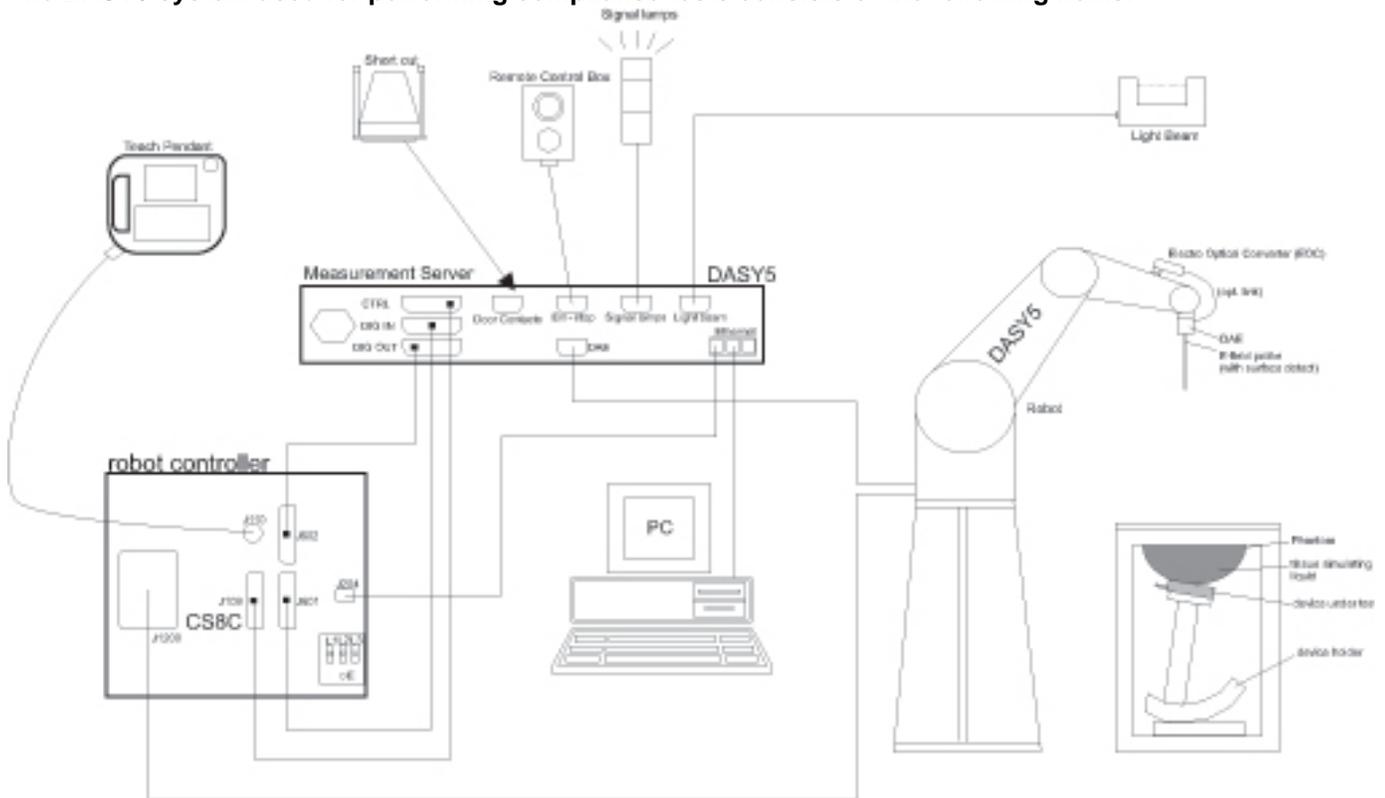
Name of Equipment	Manufacturer	Type/Model	Serial No.	Cal. Due Date
Base Station Simulator	R & S	CMU200	118715	5/20/2014
Base Station Simulator	R & S	CMW500	103764-dn	8/16/2014
Base Station Simulator	R & S	CMW500	103766-ly	8/19/2014
Base Station Simulator	R & S	CMW500	107513-be	7/26/2014
Power Sensor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

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: Δx_{Area} , Δy_{Area}	≤ 2 GHz: ≤ 15 mm 2 – 3 GHz: ≤ 12 mm	3 – 4 GHz: ≤ 12 mm 4 – 6 GHz: ≤ 10 mm
	When the x or y dimension of the test device, in the measurement plane orientation, is smaller than the above, the measurement resolution must be ≤ the corresponding x or y dimension of the test device with at least one measurement point on the test device.	

Step 3: Zoom Scan

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

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

		≤ 3 GHz	> 3 GHz
Maximum zoom scan spatial resolution: $\Delta x_{Zoom}, \Delta y_{Zoom}$		≤ 2 GHz: ≤ 8 mm 2 – 3 GHz: ≤ 5 mm *	3 – 4 GHz: ≤ 5 mm* 4 – 6 GHz: ≤ 4 mm*
Maximum zoom scan spatial resolution, normal to phantom surface	uniform grid: $\Delta z_{Zoom}(n)$	≤ 5 mm	3 – 4 GHz: ≤ 4 mm 4 – 5 GHz: ≤ 3 mm 5 – 6 GHz: ≤ 2 mm
	graded grid	$\Delta z_{Zoom}(1)$: between 1 st two points closest to phantom surface	≤ 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	≥ 30 mm	3 – 4 GHz: ≥ 28 mm 4 – 5 GHz: ≥ 25 mm 5 – 6 GHz: ≥ 22 mm
Note: δ is the penetration depth of a plane-wave at normal incidence to the tissue medium; see draft standard IEEE P1528-2011 for details. * When zoom scan is required and the <i>reported</i> SAR from the area scan based <i>1-g SAR estimation</i> procedures of KDB 447498 is ≤ 1.4 W/kg, ≤ 8 mm, ≤ 7 mm and ≤ 5 mm zoom scan resolution may be applied, respectively, for 2 GHz to 3 GHz, 3 GHz to 4 GHz and 4 GHz to 6 GHz.			

Step 4: Power drift measurement

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

Step 5: Z-Scan (FCC only)

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

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 checked="" type="checkbox"/> Mobile Hotspot (Wi-Fi 5.8 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): 152.1 mm x 79.2 mm Overall Diagonal: 166.2 mm Display Diagonal: 145.4 mm
Back Cover	<input type="checkbox"/> Normal Battery Cover <input type="checkbox"/> Wireless Charger Battery Cover <input checked="" type="checkbox"/> Normal Battery Cover with NFC
Accessory	<input checked="" type="checkbox"/> Headset
Battery Options	<input checked="" type="checkbox"/> Standard – Lithium-ion battery, Rating 3.8Vdc, 3200mAh <input type="checkbox"/> Extended (large capacity)

7.2. Wireless Technologies

Wireless Technology and Frequency Bands	CDMA BC 0 / 1 LTE Band 4 / 13 Wi-Fi : 2.4 / 5 GHz Bluetooth: 2.4 GHz.
Mode	CDMA2000 <ul style="list-style-type: none"> - <input checked="" type="checkbox"/> 1xRTT (Voice & Data) - <input checked="" type="checkbox"/> 1xEVDO Rel. 0 - <input checked="" type="checkbox"/> 1xEVDO Rev. A LTE <ul style="list-style-type: none"> - <input checked="" type="checkbox"/> QPSK - <input checked="" type="checkbox"/> 16QAM Wi-Fi 2.4GHz (802.11b/g/n) <ul style="list-style-type: none"> - <input checked="" type="checkbox"/> 802.11b - <input checked="" type="checkbox"/> 802.11g - <input checked="" type="checkbox"/> 802.11n (HT20) Wi-Fi 5GHz <ul style="list-style-type: none"> - <input checked="" type="checkbox"/> 802.11a - <input checked="" type="checkbox"/> 802.11n (HT20) - <input checked="" type="checkbox"/> 802.11n (HT40) Bluetooth Ver. 4.0 (LE)
Duty Cycle (Used for SAR testing)	CDMA: 100% LTE (FDD): 100% Wi-Fi 802.11a/b/g/n: 100%
VoIP	<input checked="" type="checkbox"/> Supported
SV-LTE	<input checked="" 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	24.9	25.4
	1xEVDO Rel. 0	24.9	25.4
	1xEVDO Rev. A	24.9	25.4
CDMA BC1	1xRTT	24.2	24.7
	1xEVDO Rel. 0	24.2	24.7
	1xEVDO Rev. A	24.2	24.7
LTE Band 4	QPSK	24.2	24.7
LTE Band 13	QPSK	24.2	24.7

Upper limit (dB): 0.7 ~ -1.5		RF Output Power (dBm)	
RF Air interface	Mode	Target	Max. tune-up tolerance limit
WiFi 2.4 GHz	802.11b	16.0	16.7
	802.11g	14.0	14.7
	802.11n HT20	12.0	12.7
WiFi 5 GHz	802.11a	10.5	11.2
	802.11n HT20	10.1	10.8
	802.11n HT40	10.1	10.8
Bluetooth		10.5	11.2
Bluetooth LE		7.5	8.2

7.4. Simultaneous Transmission Condition

RF Exposure Condition	Capable Transmit Configurations
Head	<ol style="list-style-type: none"> 1. CDMA 1xRTT BC0 / BC1 + Wi-Fi 2.4 / 5 GHz 2. CDMA 1xEVDO BC0 / BC1 + Wi-Fi 2.4 / 5 GHz (VoIP) 3. LTE Band 4 / 13 + Wi-Fi 2.4 / 5 GHz 4. CDMA 1x BC0 / BC1 + LTE B4 / B13 + Wi-Fi 2.4 / 5 GHz (SV-LTE + Wi-Fi)
Body-worn Accessory	<ol style="list-style-type: none"> 1. CDMA 1xRTT BC0 / BC1 + Wi-Fi 2.4 / 5 GHz 2. CDMA 1xRTT BC0 / BC1 + BT 3. CDMA 1xEVDO BC0 / BC1 + Wi-Fi 2.4 / 5 GHz (VoIP) 4. CDMA 1xEVDO BC0 / BC1 + BT (VoIP) 5. LTE Band 4 / 13 + Wi-Fi 2.4 / 5 GHz 6. LTE Band 4 / 13 + BT 7. CDMA 1x BC0 / BC1 + LTE B4 / B13 + Wi-Fi 2.4 / 5 GHz (SV-LTE + Wi-Fi) 8. CDMA 1x BC0 / BC1 + LTE B4 / B13 + BT (SV-LTE + BT)
Wireless Router (Hotspot)	<ol style="list-style-type: none"> 1. CDMA 1xEVDO BC0 / BC1 + Wi-Fi 2.4 / 5.8 GHz 2. LTE Band 4 / 13 + Wi-Fi 2.4 / 5.8 GHz 3. CDMA 1x BC0 / BC1 + LTE B4 / B13 + Wi-Fi 2.4 / 5.8 GHz (SV-LTE + Wi-Fi)
Wi-Fi Direct	<ol style="list-style-type: none"> 1. CDMA 1xEVDO BC0 / BC1 + Wi-Fi 2.4 / 5.8 GHz (GO / GC) 2. LTE Band 4 / 13 + Wi-Fi 2.4 / 5.8 GHz (GO / GC) 3. CDMA 1x BC0 / BC1 + LTE B4 / B13 + Wi-Fi 2.4 / 5.8 GHz (SV-LTE + Wi-Fi) (GO / GC)
<p>Notes:</p> <ol style="list-style-type: none"> 1. CDMA 1xEVDO and LTE support Hotspot. 2. VoIP is supported in CDMA, LTE(e.g. 3rd part VoIP and VoLTE) 3. Wi-Fi 2.4 GHz supports Hotspot and Wi-Fi Direct (GO/GC). 4. Wi-Fi 5 GHz supports Hotspot and Wi-Fi Direct: <ul style="list-style-type: none"> UNII I (5.2 GHz): Wi-Fi Direct GC is only supported (SAR Exclusion), Hotspot is not supported UNII II (5.3 GHz): Wi-Fi Direct/Hotspot is not supported UNII III (5.5 GHz): Wi-Fi Direct/Hotspot is not supported UNII IV (5.8 GHz): Wi-Fi Direct GO/GC and Hotspot are supported (except channel 165: Wi-Fi direct/Hotspot not supported) 5. Wi-Fi and Bluetooth cannot transmit simultaneously because they share the same chip. 	

7.5. General LTE SAR Test and Reporting Considerations

Item	Description																																																																														
Frequency range, Channel Bandwidth, Numbers and Frequencies	<table border="1"> <tr> <td rowspan="3">Band 4</td> <td colspan="6">Frequency range: 1710 - 1755 MHz</td> </tr> <tr> <td colspan="6">Channel Bandwidth</td> </tr> <tr> <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>20050</td> <td>20025</td> <td>20000</td> <td>19975</td> <td></td> <td></td> </tr> <tr> <td>Mid</td> <td>20175</td> <td>20175</td> <td>20175</td> <td>20175</td> <td></td> <td></td> </tr> <tr> <td>High</td> <td>20300</td> <td>20325</td> <td>20350</td> <td>20375</td> <td></td> <td></td> </tr> <tr> <td rowspan="5">Band 13</td> <td colspan="6">Frequency range: 777 - 787 MHz</td> </tr> <tr> <td colspan="6">Channel Bandwidth</td> </tr> <tr> <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></td> <td></td> <td></td> </tr> <tr> <td>Mid</td> <td></td> <td>23230</td> <td></td> <td></td> <td></td> </tr> <tr> <td>High</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> </table>	Band 4	Frequency range: 1710 - 1755 MHz						Channel Bandwidth						20 MHz	15 MHz	10 MHz	5 MHz	3 MHz	1.4 MHz	Low	20050	20025	20000	19975			Mid	20175	20175	20175	20175			High	20300	20325	20350	20375			Band 13	Frequency range: 777 - 787 MHz						Channel Bandwidth						20 MHz	15 MHz	10 MHz	5 MHz	3 MHz	1.4 MHz	Low						Mid		23230				High						
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LTE transmitter and antenna implementation	LTE has one TX/RX antenna and one RX only antenna. Refer to Appendix "Antenna Locations and Separation Distances" for antenna locations																																																																														
Maximum power reduction (MPR)	<p style="text-align: center;">Table 6.2.3-1: Maximum Power Reduction (MPR) for Power Class 3</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>> 5</td> <td>> 4</td> <td>> 8</td> <td>> 12</td> <td>> 16</td> <td>> 18</td> <td>≤ 1</td> </tr> <tr> <td>16 QAM</td> <td>≤ 5</td> <td>≤ 4</td> <td>≤ 8</td> <td>≤ 12</td> <td>≤ 16</td> <td>≤ 18</td> <td>≤ 1</td> </tr> <tr> <td>16 QAM</td> <td>> 5</td> <td>> 4</td> <td>> 8</td> <td>> 12</td> <td>> 16</td> <td>> 18</td> <td>≤ 2</td> </tr> </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	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <table border="1"> <thead> <tr> <th>Mode</th> <th>CDMA Current Voice Power for BC0 & BC1</th> <th>LTE B4 & B13 Max Power</th> </tr> </thead> <tbody> <tr> <td rowspan="2">SV-LTE</td> <td>P ≤ 18.2 dBm</td> <td>B4: 24.7 dBm (Limited) B13: 24.7 (Limited)</td> </tr> <tr> <td>P > 18.2 dBm</td> <td>B4: 20.7 dBm (Limited) B13: 20.7 dBm (Limited)</td> </tr> </tbody> </table>	Mode	CDMA Current Voice Power for BC0 & BC1	LTE B4 & B13 Max Power	SV-LTE	P ≤ 18.2 dBm	B4: 24.7 dBm (Limited) B13: 24.7 (Limited)	P > 18.2 dBm	B4: 20.7 dBm (Limited) B13: 20.7 dBm (Limited)																																																																						
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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.																																																																														

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 CDMA, LTE, Wi-Fi, 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 CDMA (①)

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

For LTE (②)

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

For Wi-Fi/Bluetooth (⑤)

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

8.3. Hotspot Exposure Conditions

For CDMA (①)

Test Configurations	Antenna-to-edge/surface	SAR Required	Note
Rear	<25 mm	Yes	
Front	<25 mm	Yes	
Edge 1 (Top)	129.9 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)	53.4 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)	2 mm	Yes	
Edge 4 (Left)	2 mm	Yes	

For LTE (②)

Test Configurations	Antenna-to-edge/surface	SAR Required	Note
Rear	<25 mm	Yes	
Front	<25 mm	Yes	
Edge 1 (Top)	130.9 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)	2 mm	Yes	
Edge 3 (Bottom)	2 mm	Yes	
Edge 4 (Left)	43.7 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

For Wi-Fi/Bluetooth (⑤)

Test Configurations	Antenna-to-edge/surface	SAR Required	Note
Rear	<25 mm	Yes	
Front	<25 mm	Yes	
Edge 1 (Top)	2 mm	Yes	
Edge 2 (Right)	14.3 mm	Yes	
Edge 3 (Bottom)	140.8 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)	44.9 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 (⑤)

Test Configurations	Antenna-to-edge/surface	SAR Required	Note
Rear	<25 mm	Yes	
Front	<25 mm	Yes	
Edge 1 (Top)	2 mm	Yes	
Edge 2 (Right)	14.3 mm	Yes	
Edge 3 (Bottom)	140.8 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)	44.9 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. CDMA

1xRTT Measured Results

Band	Mode	Ch	Freq. (MHz)	Avg Pwr (dBm)	Power Reduction (dBm)
BC 0	RC1 SO55 (Loopback)	1013	824.70	25.3	18.2
		384	836.52	25.3	18.2
		777	848.31	25.2	17.8
	RC3 SO55 (Loopback)	1013	824.70	25.3	18.2
		384	836.52	25.2	18.1
		777	848.31	25.2	17.8
	RC3 SO32 (+F-SCH)	1013	824.70	25.2	18.2
		384	836.52	25.2	18.0
		777	848.31	25.2	17.8
BC 1	RC1 SO55 (Loopback)	25	1851.25	24.4	18.0
		600	1880.00	24.4	17.8
		1175	1908.75	24.4	17.9
	RC3 SO55 (Loopback)	25	1851.25	24.4	18.0
		600	1880.00	24.4	17.8
		1175	1908.75	24.4	17.8
	RC3 SO32 (+F-SCH)	25	1851.25	24.5	17.9
		600	1880.00	24.4	17.9
		1175	1908.75	24.4	18.0

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	25.3
			384	836.52	25.3
			777	848.31	25.2
BC1	307.2 kbps (2 slot, QPSK)	153.6 kbps	25	1851.25	24.4
			600	1880.00	24.5
			1175	1908.75	24.5

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	25.3
			384	836.52	25.3
			777	848.31	25.3
BC1	307.2k, QPSK/ ACK channel is transmitted at all the slots	4096	25	1851.25	24.4
			600	1880.00	24.5
			1175	1908.75	24.5

9.2. 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 ¹	1.4, 3, 5, 10	Table 6.2.4-5	Table 6.2.4-5
..					
NS_32	-	-	-	-	-

Note 1: Applies to the lower block of Band 23, i.e. a carrier placed in the 2000-2010 MHz region.

LTE Band 4 Measured Results

Band	BW (MHz)	Mode	RB Allocation	RB offset	Target MPR	Meas. MPR	Avg Pwr (dBm)		
							1720 MHz	1732.5 MHz	1745 MHz
LTE Band 4	20	QPSK	1	0	0	0	24.4	24.4	24.5
			1	50	0	0	24.4	24.5	24.5
			1	99	0	0	24.4	24.6	24.3
			50	0	1	1	23.5	23.6	23.7
			50	25	1	1	23.6	23.5	23.6
			50	50	1	1	23.5	23.6	23.6
			100	0	1	1	23.5	23.5	23.6
		16QAM	1	0	1	1	23.7	23.7	23.6
			1	50	1	1	23.6	23.7	23.7
			1	99	1	1	23.6	23.7	23.6
			50	0	2	2	22.6	22.6	22.6
			50	25	2	2	22.5	22.6	22.6
			50	50	2	2	22.5	22.5	22.6
			100	0	2	2	22.6	22.6	22.6
Band	BW (MHz)	Mode	RB Allocation	RB offset	Target MPR	Meas. MPR	Avg Pwr (dBm)		
							1717.5 MHz	1732.5 MHz	1747.5 MHz
LTE Band 4	15	QPSK	1	0	0	0	24.5	24.6	24.7
			1	36	0	0	24.5	24.6	24.6
			1	74	0	0	24.5	24.6	24.4
			36	0	1	1	23.5	23.6	23.7
			36	18	1	1	23.4	23.5	23.6
			36	37	1	1	23.5	23.6	23.6
			75	0	1	1	23.5	23.6	23.6
		16QAM	1	0	1	1	23.4	23.4	23.6
			1	36	1	1	23.3	23.4	23.4
			1	74	1	1	23.3	23.5	23.3
			36	0	2	2	22.4	22.6	22.6
			36	18	2	2	22.4	22.5	22.6
			36	37	2	2	22.5	22.6	22.6
			75	0	2	2	22.5	22.5	22.6
Band	BW (MHz)	Mode	RB Allocation	RB offset	Target MPR	Meas. MPR	Avg Pwr (dBm)		
							1715 MHz	1732.5 MHz	1750 MHz
LTE Band 4	10	QPSK	1	0	0	0	24.5	24.5	24.6
			1	25	0	0	24.5	24.6	24.5
			1	49	0	0	24.5	24.6	24.5
			25	0	1	1	23.5	23.6	23.5
			25	12	1	1	23.4	23.5	23.5
			25	25	1	1	23.4	23.5	23.5
			50	0	1	1	23.4	23.5	23.5
		16QAM	1	0	1	1	23.3	23.4	23.5
			1	25	1	1	23.2	23.4	23.4
			1	49	1	1	23.3	23.4	23.3
			25	0	2	2	22.5	22.5	22.5
			25	12	2	2	22.5	22.5	22.5
			25	25	2	2	22.4	22.5	22.5
			50	0	2	2	22.5	22.5	22.5

LTE Band 4 Measured Results (continued)

Band	BW (MHz)	Mode	RB Allocation	RB offset	Target MPR	Meas. MPR	Avg Pwr (dBm)		
							1712.5 MHz	1732.5 MHz	1752.5 MHz
LTE Band 4	5	QPSK	1	0	0	0	24.6	24.5	24.4
			1	12	0	0	24.5	24.5	24.4
			1	24	0	0	24.6	24.5	24.4
			12	0	1	1	23.5	23.5	23.6
			12	6	1	1	23.5	23.5	23.5
			12	11	1	1	23.5	23.5	23.5
			25	0	1	1	23.4	23.6	23.5
		16QAM	1	0	1	1	23.3	23.3	23.3
			1	12	1	1	23.3	23.4	23.3
			1	24	1	1	23.3	23.4	23.3
			12	0	2	2	22.5	22.6	22.6
			12	6	2	2	22.5	22.6	22.5
			12	11	2	2	22.4	22.6	22.6
			25	0	2	2	22.5	22.6	22.5

LTE Band 4 Power Reduction Measured Results

Band	BW (MHz)	Mode	RB Allocation	RB offset	Target MPR	Meas. MPR	Avg Pwr (dBm)		
							1720 MHz	1732.5 MHz	1745 MHz
LTE Band 4	20	QPSK	1	0	MPR is disabled when Power Reduction is enabled		20.7	20.6	20.5
			1	50			20.7	20.4	20.5
			1	99			20.5	20.6	20.5
			50	0			20.6	20.5	20.5
			50	25			20.6	20.5	20.6
			50	50			20.6	20.5	20.5
			100	0			20.6	20.5	20.7
		16QAM	1	0			20.7	20.7	20.6
			1	50			20.7	20.5	20.6
			1	99			20.7	20.7	20.6
			50	0			20.7	20.6	20.5
			50	25			20.7	20.5	20.7
			50	50			20.6	20.5	20.6
			100	0			20.7	20.5	20.7
LTE Band 4	15	QPSK	1	0	MPR is disabled when Power Reduction is enabled		20.5	20.5	20.5
			1	36			20.6	20.4	20.6
			1	74			20.4	20.5	20.5
			36	0			20.6	20.6	20.6
			36	18			20.6	20.4	20.6
			36	37			20.6	20.4	20.6
			75	0			20.6	20.5	20.7
		16QAM	1	0			20.4	20.3	20.3
			1	36			20.3	20.2	20.4
			1	74			20.2	20.3	20.3
			36	0			20.6	20.6	20.7
			36	18			20.5	20.3	20.6
			36	37			20.5	20.4	20.6
			75	0			20.6	20.4	20.7

Band	BW (MHz)	Mode	RB Allocation	RB offset	Target MPR	Meas. MPR	Avg Pwr (dBm)		
							1715 MHz	1732.5 MHz	1750 MHz
LTE Band 4	10	QPSK	1	0	MPR is disabled when Power Reduction is enabled		20.5	20.5	20.6
			1	25			20.6	20.4	20.6
			1	49			20.5	20.4	20.5
			25	0			20.5	20.5	20.5
			25	12			20.6	20.4	20.6
			25	25			20.5	20.4	20.6
		16QAM	50	0			20.6	20.5	20.6
			1	0			20.4	20.3	20.4
			1	25			20.4	20.3	20.4
			1	49			20.3	20.2	20.2
			25	0			20.6	20.5	20.7
			25	12			20.6	20.4	20.6
			25	25			20.5	20.4	20.6
			50	0			20.6	20.5	20.6
Band	BW (MHz)	Mode	RB Allocation	RB offset	Target MPR	Meas. MPR	Avg Pwr (dBm)		
							1712.5 MHz	1732.5 MHz	1752.5 MHz
LTE Band 4	5	QPSK	1	0	MPR is disabled when Power Reduction is enabled		20.6	20.6	20.6
			1	12			20.6	20.4	20.6
			1	24			20.6	20.5	20.5
			12	0			20.5	20.5	20.6
			12	6			20.6	20.4	20.5
			12	11			20.6	20.4	20.6
		16QAM	25	0			20.6	20.4	20.6
			1	0			20.3	20.2	20.3
			1	12			20.4	20.2	20.4
			1	24			20.4	20.2	20.3
			12	0			20.5	20.5	20.6
			12	6			20.6	20.4	20.6
			12	11			20.6	20.4	20.6
			25	0			20.7	20.5	20.7

LTE Band 13 Measured Results

Band	BW (MHz)	Mode	RB Allocation	RB offset	Target MPR	Meas. MPR	Avg Pwr (dBm)
							782 MHz
LTE Band 13	10	QPSK	1	0	0	0	24.7
			1	25	0	0	24.6
			1	49	0	0	24.6
			25	0	1	1	23.5
			25	12	1	1	23.6
			25	25	1	1	23.5
			50	0	1	1	23.5
		16QAM	1	0	1	1	23.4
			1	25	1	1	23.5
			1	49	1	1	23.4
			25	0	2	2	22.6
			25	12	2	2	22.5
			25	25	2	2	22.4
			50	0	2	2	22.5
Band	BW (MHz)	Mode	RB Allocation	RB offset	Target MPR	Meas. MPR	Avg Pwr (dBm)
							782 MHz
LTE Band 13	10	QPSK	1	0	MPR is disabled when Power Reduction is enabled		20.7
			1	25			20.5
			1	49			20.6
			25	0			20.6
			25	12			20.5
			25	25			20.5
			50	0			20.5
		16QAM	1	0			20.6
			1	25			20.3
			1	49			20.4
			25	0			20.6
			25	12			20.5
			25	25			20.4
			50	0			20.6

Note(s):

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

9.3. SV-LTE

9.3.1. CDMA BC0 + LTE Band 4

Agilent 8960		R&S CMW 500					Agilent 8960		R&S CMW 500										
CDMA BC0 (1xRTT)		LTE Band 4 (20MHz)					CDMA BC0 (1xRTT)		LTE Band 4 (20MHz)										
P > 18.2 dBm		Limit = 20.7 dBm					P ≤ 18.2 dBm		Limit = 24.7 dBm										
Ch. #	Avg Pwr (dBm)	Ch. #	Mod	UL RB Setting	Avg Pwr (dBm)	Ch. #	Avg Pwr (dBm)	Ch. #	Mod	UL RB Setting	Avg Pwr (dBm)								
1013		20175	QPSK	1	0	20.6	1013		20175	QPSK	1	0	24.4						
				1	49	20.6					1	49	24.4						
				1	99	20.6					1	99	24.4						
				50	0	20.6					50	0	23.5						
				50	25	20.7					50	25	23.4						
				50	50	20.7					50	50	23.3						
			100	0	20.7	100				0	23.4								
			16QAM	1	0	20.6				16QAM	1	0	23.6						
				1	49	20.6					1	49	23.6						
				1	99	20.6					1	99	23.6						
				50	0	20.6					50	0	22.6						
				50	25	20.6					50	25	22.5						
				50	50	20.7					50	50	22.5						
			100	0	20.7	100				0	22.5								
			384		20175	QPSK				1	0	20.6	384		20175	QPSK	1	0	24.6
										1	49	20.6					1	49	24.5
										1	99	20.7					1	99	24.4
										50	0	20.7					50	0	23.6
50	25	20.7					50	25	23.5										
50	50	20.7					50	50	23.5										
100	0	20.7				100	0	23.5											
16QAM	1	0				20.5	16QAM	1	0	23.6									
	1	49				20.6		1	49	23.6									
	1	99				20.5		1	99	23.5									
	50	0				20.7		50	0	22.6									
	50	25				20.7		50	25	22.5									
	50	50				20.7		50	50	22.5									
100	0	20.7				100	0	22.5											
777		20175				QPSK	1	0	20.6	777		20175				QPSK	1	0	24.6
							1	49	20.6								1	49	24.5
							1	99	20.6								1	99	24.4
							50	0	20.6								50	0	23.6
			50	25	20.7		50	25	23.6										
			50	50	20.6		50	50	23.5										
			100	0	20.7	100	0	23.5											
			16QAM	1	0	20.5	16QAM	1	0				23.6						
				1	49	20.5		1	49				23.6						
				1	99	20.5		1	99				23.6						
				50	0	20.6		50	0				22.6						
				50	25	20.6		50	25				22.5						
				50	50	20.7		50	50				22.5						
			100	0	20.7	100	0	22.5											

9.3.2. CDMA BC1 + LTE Band 4

Agilent 8960		R&S CMW 500					Agilent 8960		R&S CMW 500				
CDMA BC1 (1xRTT)		LTE Band 4 (20MHz)					CDMA BC1 (1xRTT)		LTE Band 4 (20MHz)				
P > 18.2 dBm		Limit = 20.7 dBm					P ≤ 18.2 dBm		Limit = 24.7 dBm				
Ch. #	Avg Pwr (dBm)	Ch. #	Mod	UL RB Setting	Avg Pwr (dBm)	Ch. #	Avg Pwr (dBm)	Ch. #	Mod	UL RB Setting	Avg Pwr (dBm)		
25		20175	QPSK	1	0	20.6	25	20175	QPSK	1	0	24.5	
				1	49	20.6				1	49	24.5	
				1	99	20.6				1	99	24.5	
				50	0	20.6				50	0	23.5	
				50	25	20.7				50	25	23.5	
				50	50	20.7				50	50	23.5	
				100	0	20.7				100	0	23.5	
		16QAM	1	0	20.7	16QAM		1	0	23.6			
			1	49	20.6			1	49	23.6			
			1	99	20.6			1	99	23.6			
			50	0	20.6			50	0	22.6			
			50	25	20.6			50	25	22.6			
			50	50	20.7			50	50	22.5			
			100	0	20.7			100	0	22.5			
600		20175	QPSK	1	0	20.6	600	20175	QPSK	1	0	24.5	
				1	49	20.6				1	49	24.5	
				1	99	20.6				1	99	24.5	
				50	0	20.6				50	0	23.6	
				50	25	20.7				50	25	23.5	
				50	50	20.7				50	50	23.5	
				100	0	20.7				100	0	23.5	
		16QAM	1	0	20.6	16QAM		1	0	23.6			
			1	49	20.6			1	49	23.6			
			1	99	20.6			1	99	23.6			
			50	0	20.6			50	0	22.6			
			50	25	20.6			50	25	22.5			
			50	50	20.7			50	50	22.5			
			100	0	20.6			100	0	22.5			
1175		20175	QPSK	1	0	20.6	1175	20175	QPSK	1	0	24.5	
				1	49	20.6				1	49	24.5	
				1	99	20.6				1	99	24.5	
				50	0	20.6				50	0	23.5	
				50	25	20.7				50	25	23.5	
				50	50	20.7				50	50	23.5	
				100	0	20.7				100	0	23.4	
		16QAM	1	0	20.6	16QAM		1	0	23.6			
			1	49	20.6			1	49	23.6			
			1	99	20.6			1	99	23.6			
			50	0	20.6			50	0	22.6			
			50	25	20.6			50	25	22.5			
			50	50	20.6			50	50	22.5			
			100	0	20.7			100	0	22.5			

9.3.3. CDMA BC0 + LTE Band 13

Agilent 8960		R&S CMW 500					Agilent 8960		R&S CMW 500				
CDMA BC0 (1xRTT)		LTE Band 13 (10 MHz)					CDMA BC0 (1xRTT)		LTE Band 13 (10MHz)				
P > 18.2 dBm		Limit = 20.7 dBm					P ≤ 18.2 dBm		Limit = 24.7 dBm				
Ch. #	Avg Pwr (dBm)	Ch. #	Mod	UL RB Setting	Avg Pwr (dBm)	Ch. #	Avg Pwr (dBm)	Ch. #	Mod	UL RB Setting	Avg Pwr (dBm)		
1013		23230	QPSK	1	0	20.6	1013	23230	QPSK	1	0	24.6	
				1	25	20.6				1	25	24.5	
				1	49	20.6				1	49	24.6	
				25	0	20.5				25	0	23.4	
				25	12	20.5				25	12	23.4	
				25	25	20.6				25	25	23.4	
				50	0	20.6				50	0	23.4	
			16QAM	1	0	20.6			16QAM	1	0	23.4	
				1	25	20.7				1	25	23.3	
				1	49	20.7				1	49	23.3	
				25	0	20.7				25	0	22.3	
				25	12	20.6				25	12	22.4	
				25	25	20.6				25	25	22.3	
				50	0	20.6				50	0	22.3	
				50	0	20.6				50	0	22.3	
384		23230	QPSK	1	0	20.6	384	23230	QPSK	1	0	24.5	
				1	25	20.6				1	25	24.6	
				1	49	20.6				1	49	24.5	
				25	0	20.5				25	0	23.4	
				25	12	20.6				25	12	23.5	
				25	25	20.6				25	25	23.4	
				50	0	20.6				50	0	23.4	
			16QAM	1	0	20.6			16QAM	1	0	23.4	
				1	25	20.7				1	25	23.3	
				1	49	20.7				1	49	23.3	
				25	0	20.6				25	0	22.4	
				25	12	20.6				25	12	22.4	
				25	25	20.6				25	25	22.3	
				50	0	20.6				50	0	22.3	
				50	0	20.6				50	0	22.3	
777		23230	QPSK	1	0	20.6	777	23230	QPSK	1	0	24.5	
				1	25	20.6				1	25	24.5	
				1	49	20.6				1	49	24.5	
				25	0	20.6				25	0	23.4	
				25	12	20.5				25	12	23.4	
				25	25	20.6				25	25	23.4	
				50	0	20.6				50	0	23.4	
			16QAM	1	0	20.6			16QAM	1	0	23.4	
				1	25	20.7				1	25	23.3	
				1	49	20.7				1	49	23.3	
				25	0	20.7				25	0	22.4	
				25	12	20.6				25	12	22.4	
				25	25	20.6				25	25	22.3	
				50	0	20.6				50	0	22.3	
				50	0	20.6				50	0	22.3	

9.3.4. CDMA BC1 + LTE Band 13

Agilent 8960		R&S CMW 500					Agilent 8960		R&S CMW 500				
CDMA BC1 (1xRTT)		LTE Band 13 (10 MHz)					CDMA BC1 (1xRTT)		LTE Band 13 (10 MHz)				
P > 18.2 dBm		Limit = 20.7 dBm					P ≤ 18.2 dBm		Limit = 24.7 dBm				
Ch. #	Avg Pwr (dBm)	Ch. #	Mod	UL RB Setting	Avg Pwr (dBm)	Ch. #	Avg Pwr (dBm)	Ch. #	Mod	UL RB Setting	Avg Pwr (dBm)		
25		23230	QPSK	1	0	20.6	25	23230	QPSK	1	0	24.6	
				1	25	20.6				1	25	24.5	
				1	49	20.6				1	49	24.6	
				25	0	20.5				25	0	23.4	
				25	12	20.6				25	12	23.4	
				25	25	20.6				25	25	23.4	
				50	0	20.6				50	0	23.4	
			16QAM	1	0	20.6			16QAM	1	0	23.4	
				1	25	20.7				1	25	23.4	
				1	49	20.7				1	49	23.3	
				25	0	20.7				25	0	22.4	
				25	12	20.6				25	12	22.4	
				25	25	20.6				25	25	22.4	
				50	0	20.6				50	0	22.4	
600		23230	QPSK	1	0	20.6	600	23230	QPSK	1	0	24.6	
				1	25	20.6				1	25	24.6	
				1	49	20.6				1	49	24.6	
				25	0	20.6				25	0	23.5	
				25	12	20.6				25	12	23.5	
				25	25	20.6				25	25	23.5	
				50	0	20.6				50	0	23.4	
			16QAM	1	0	20.7			16QAM	1	0	23.5	
				1	25	20.6				1	25	23.5	
				1	49	20.6				1	49	23.4	
				25	0	20.5				25	0	22.3	
				25	12	20.5				25	12	22.4	
				25	25	20.4				25	25	22.4	
				50	0	20.4				50	0	22.4	
1175		23230	QPSK	1	0	20.4	1175	23230	QPSK	1	0	24.6	
				1	25	20.4				1	25	24.6	
				1	49	20.4				1	49	24.6	
				25	0	20.4				25	0	23.5	
				25	12	20.4				25	12	23.5	
				25	25	20.4				25	25	23.4	
				50	0	20.4				50	0	23.4	
			16QAM	1	0	20.6			16QAM	1	0	23.5	
				1	25	20.6				1	25	23.5	
				1	49	20.5				1	49	23.4	
				25	0	20.5				25	0	22.5	
				25	12	20.5				25	12	22.5	
				25	25	20.4				25	25	22.5	
				50	0	20.4				50	0	22.5	

9.4. 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 [#]	√	∇
		2.437	6	√	∇
		2.462	11 [#]	√	∇

Notes:

√ = "default test channels"

∇ = possible 802.11g channels with maximum average output ¼ dB ≥ 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	Data Rate	Ch #	Freq. (MHz)	Avg Pwr (dBm)	SAR Test (Yes/No)
2.4 (DTS)	802.11b	1 Mbps	1	2412	16.2	Yes
			6	2437	16.4	
			11	2462	16.2	
	802.11g	6 Mbps	1	2412	14.5	No
			6	2437	14.5	
			11	2462	14.3	
	802.11n (HT20)	MCS0	1	2412	12.2	No
			6	2437	12.3	
			11	2462	12.1	

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	16.4	Yes
			2 Mbps	16.3	No
			5.5 Mbps	16.3	No
			11 Mbps	16.3	No

9.5. 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	Data Rate	Ch #	Freq. (MHz)	Avg Pwr (dBm)	SAR Test (Yes/No)
5.2 (UNII)	802.11a	6 Mbps	36	5180	10.4	Yes
			40	5200	10.4	
			44	5220	10.5	
			48	5240	10.5	
	802.11n (HT20)	MCS0	36	5180	10.1	No
			40	5200	10.3	
			48	5240	10.3	
	802.11n (HT40)	MCS0	38	5190	9.5	No
46			5230	9.4		
5.3 (UNII)	802.11a	6 Mbps	52	5260	10.8	Yes
			56	5280	10.7	
			60	5300	10.7	
			64	5320	10.7	
	802.11n (HT20)	MCS0	52	5260	10.4	No
			60	5300	10.4	
			64	5320	10.6	
	802.11n (HT40)	MCS0	54	5270	9.6	No
62			5310	9.6		
5.5 (UNII)	802.11a	6 Mbps	100	5500	10.8	Yes
			104	5520	10.7	
			108	5540	10.7	
			112	5560	10.6	
			116	5580	10.5	
			120	5600	Not Supported	
			124	5620	Not Supported	
			128	5640	Not Supported	
			132	5660	10.2	
			136	5680	10.1	
	140	5700	10.0			
	802.11n (HT20)	MCS0	100	5500	10.6	No
			116	5580	10.4	
			140	5700	9.8	
	802.11n (HT40)	MCS0	102	5510	9.6	No
			110	5550	9.9	
134			5670	9.4		
5.8 (DTS)	802.11a	6 Mbps	149	5745	11.0	Yes
			153	5765	10.9	
			157	5785	10.8	
			161	5805	10.7	
			165	5825	10.6	
	802.11n (HT20)	MCS0	149	5745	10.7	No
			157	5785	10.6	
			161	5805	10.6	
	802.11n (HT40)	MCS0	151	5755	10.6	No
			159	5795	10.3	

Note(s):

Per KDB 248227, SAR is not required for 802.11n HT20/HT40 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	10.4	Yes
				9 Mbps	10.3	No
				12 Mbps	10.3	No
				18 Mbps	10.3	No
				24 Mbps	10.2	No
				36 Mbps	10.2	No
				48 Mbps	10.2	No
				54 Mbps	10.2	No
5.3 GHz (UNII)	802.11a	56	5280	6 Mbps	10.8	Yes
				9 Mbps	10.6	No
				12 Mbps	10.6	No
				18 Mbps	10.6	No
				24 Mbps	10.5	No
				36 Mbps	10.5	No
				48 Mbps	10.4	No
				54 Mbps	10.4	No
5.5 GHz (UNII)	802.11a	116	5580	6 Mbps	10.5	Yes
				9 Mbps	10.3	No
				12 Mbps	10.3	No
				18 Mbps	10.3	No
				24 Mbps	10.3	No
				36 Mbps	10.3	No
				48 Mbps	10.3	No
				54 Mbps	10.3	No
5.8 GHz (DTS)	802.11a	149	5745	6 Mbps	11.0	Yes
				9 Mbps	10.9	No
				12 Mbps	10.9	No
				18 Mbps	10.9	No
				24 Mbps	10.9	No
				36 Mbps	10.9	No
				48 Mbps	10.9	No
				54 Mbps	10.8	No

9.6. Bluetooth

Maximum tune-up tolerance limit is 11.2 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	
	ϵ_r	σ (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	
	ϵ_r	σ (S/m)	ϵ_r	σ (S/m)
150	52.3	0.76	61.9	0.80
300	45.3	0.87	58.2	0.92
450	43.5	0.87	56.7	0.94
835	41.5	0.90	55.2	0.97
900	41.5	0.97	55.0	1.05
915	41.5	0.98	55.0	1.06
1450	40.5	1.20	54.0	1.30
1610	40.3	1.29	53.8	1.40
1800 – 2000	40.0	1.40	53.3	1.52
2450	39.2	1.80	52.7	1.95
3000	38.5	2.40	52.0	2.73
5000	36.2	4.45	49.3	5.07
5100	36.1	4.55	49.1	5.18
5200	36.0	4.66	49.0	5.30
5300	35.9	4.76	48.9	5.42
5400	35.8	4.86	48.7	5.53
5500	35.6	4.96	48.6	5.65
5600	35.5	5.07	48.5	5.77
5700	35.4	5.17	48.3	5.88
5800	35.3	5.27	48.2	6.00

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 A

	Freq. (MHz)	Liquid Parameters		Measured	Target	Delta (%)	Limit ±(%)	
3/26/2014	Head 750	e'	41.1300	Relative Permittivity (ϵ_r):	41.13	41.96	-1.98	5
		e"	21.5000	Conductivity (σ):	0.90	0.89	0.39	5
	Head 700	e'	41.7800	Relative Permittivity (ϵ_r):	41.78	42.22	-1.04	5
		e"	21.9000	Conductivity (σ):	0.85	0.89	-4.14	5
	Head 790	e'	40.6100	Relative Permittivity (ϵ_r):	40.61	41.76	-2.75	5
		e"	21.1800	Conductivity (σ):	0.93	0.90	3.82	5

SAR Lab B

	Freq. (MHz)	Liquid Parameters		Measured	Target	Delta (%)	Limit ±(%)	
3/24/2014	Head 835	e'	41.7700	Relative Permittivity (ϵ_r):	41.77	41.50	0.65	5
		e"	19.7100	Conductivity (σ):	0.92	0.90	1.68	5
	Head 820	e'	41.9800	Relative Permittivity (ϵ_r):	41.98	41.60	0.91	5
		e"	19.7400	Conductivity (σ):	0.90	0.90	0.18	5
	Head 850	e'	41.6000	Relative Permittivity (ϵ_r):	41.60	41.50	0.24	5
		e"	19.6800	Conductivity (σ):	0.93	0.92	1.65	5

SAR Lab D

	Freq. (MHz)	Liquid Parameters		Measured	Target	Delta (%)	Limit ±(%)		
3/21/2014	Body 835	e'	52.7400	Relative Permittivity (ϵ_r):	52.74	55.20	-4.46	5	
		e"	21.7000	Conductivity (σ):	1.01	0.97	3.87	5	
	Body 820	e'	52.8600	Relative Permittivity (ϵ_r):	52.86	55.28	-4.37	5	
		e"	21.7900	Conductivity (σ):	0.99	0.97	2.59	5	
	Body 850	e'	52.5900	Relative Permittivity (ϵ_r):	52.59	55.16	-4.65	5	
		e"	21.6300	Conductivity (σ):	1.02	0.99	3.56	5	
3/25/2014	Body 5180	e'	50.8600	Relative Permittivity (ϵ_r):	50.86	49.05	3.70	5	
		e"	18.7400	Conductivity (σ):	5.40	5.27	2.39	5	
	Body 5200	e'	50.8600	Relative Permittivity (ϵ_r):	50.86	49.02	3.75	5	
		e"	18.7900	Conductivity (σ):	5.43	5.29	2.61	5	
	Body 5600	e'	50.2100	Relative Permittivity (ϵ_r):	50.21	48.48	3.57	5	
		e"	19.1800	Conductivity (σ):	5.97	5.76	3.67	5	
	Body 5800	e'	49.8600	Relative Permittivity (ϵ_r):	49.86	48.20	3.44	5	
		e"	19.4100	Conductivity (σ):	6.26	6.00	4.33	5	
	Body 5825	e'	49.8600	Relative Permittivity (ϵ_r):	49.86	48.20	3.44	5	
		e"	19.4300	Conductivity (σ):	6.29	6.00	4.89	5	
	3/27/2014	Head 1750	e'	40.6700	Relative Permittivity (ϵ_r):	40.67	40.08	1.46	5
			e"	14.0800	Conductivity (σ):	1.37	1.37	0.08	5
Head 1710		e'	40.8300	Relative Permittivity (ϵ_r):	40.83	40.15	1.70	5	
		e"	13.9600	Conductivity (σ):	1.33	1.35	-1.42	5	
Head 1755		e'	40.6400	Relative Permittivity (ϵ_r):	40.64	40.08	1.40	5	
		e"	14.0900	Conductivity (σ):	1.37	1.37	0.23	5	

SAR Lab E

	Freq. (MHz)	Liquid Parameters		Measured	Target	Delta (%)	Limit ±(%)	
3/20/2014	Body 2450	e'	51.9900	Relative Permittivity (ϵ_r):	51.99	52.70	-1.35	5
		e"	14.4900	Conductivity (σ):	1.97	1.95	1.23	5
	Body 2410	e'	52.1400	Relative Permittivity (ϵ_r):	52.14	52.76	-1.17	5
		e"	14.2900	Conductivity (σ):	1.91	1.91	0.39	5
	Body 2475	e'	51.8900	Relative Permittivity (ϵ_r):	51.89	52.67	-1.48	5
		e"	14.5700	Conductivity (σ):	2.01	1.99	1.01	5
3/20/2014	Head 2450	e'	39.1000	Relative Permittivity (ϵ_r):	39.10	39.20	-0.26	5
		e"	13.4800	Conductivity (σ):	1.84	1.80	2.02	5
	Head 2410	e'	39.2700	Relative Permittivity (ϵ_r):	39.27	39.28	-0.02	5
		e"	13.3500	Conductivity (σ):	1.79	1.76	1.62	5
	Head 2475	e'	38.9900	Relative Permittivity (ϵ_r):	38.99	39.17	-0.46	5
		e"	13.5500	Conductivity (σ):	1.86	1.83	2.06	5

SAR Lab F

Freq. (MHz)		Liquid Parameters		Measured	Target	Delta (%)	Limit ±(%)	
3/19/2014	Body 1900	e'	52.0700	Relative Permittivity (ϵ_r):	52.07	53.30	-2.31	5
		e"	14.4400	Conductivity (σ):	1.53	1.52	0.36	5
	Body 1850	e'	52.2700	Relative Permittivity (ϵ_r):	52.27	53.30	-1.93	5
		e"	14.3000	Conductivity (σ):	1.47	1.52	-3.22	5
	Body 1910	e'	52.0500	Relative Permittivity (ϵ_r):	52.05	53.30	-2.35	5
		e"	14.4800	Conductivity (σ):	1.54	1.52	1.17	5
3/19/2014	Body 1750	e'	52.3300	Relative Permittivity (ϵ_r):	52.33	53.44	-2.08	5
		e"	15.2900	Conductivity (σ):	1.49	1.49	0.11	5
	Body 1710	e'	52.4400	Relative Permittivity (ϵ_r):	52.44	53.54	-2.06	5
		e"	15.2000	Conductivity (σ):	1.45	1.46	-1.12	5
	Body 1755	e'	52.3200	Relative Permittivity (ϵ_r):	52.32	53.43	-2.07	5
		e"	15.2900	Conductivity (σ):	1.49	1.49	0.19	5
3/24/2014	Body 750	e'	53.5100	Relative Permittivity (ϵ_r):	53.51	55.55	-3.67	5
		e"	23.0700	Conductivity (σ):	0.96	0.96	-0.10	5
	Body 700	e'	54.0500	Relative Permittivity (ϵ_r):	54.05	55.74	-3.03	5
		e"	23.5400	Conductivity (σ):	0.92	0.96	-4.48	5
	Body 790	e'	53.1000	Relative Permittivity (ϵ_r):	53.10	55.39	-4.14	5
		e"	22.8300	Conductivity (σ):	1.00	0.97	3.80	5
3/25/2014	Body 1900	e'	51.1800	Relative Permittivity (ϵ_r):	51.18	53.30	-3.98	5
		e"	14.2200	Conductivity (σ):	1.50	1.52	-1.17	5
	Body 1850	e'	51.3400	Relative Permittivity (ϵ_r):	51.34	53.30	-3.68	5
		e"	14.1000	Conductivity (σ):	1.45	1.52	-4.58	5
	Body 1910	e'	51.1400	Relative Permittivity (ϵ_r):	51.14	53.30	-4.05	5
		e"	14.2300	Conductivity (σ):	1.51	1.52	-0.58	5
3/25/2014	Body 1750	e'	52.4400	Relative Permittivity (ϵ_r):	52.44	53.44	-1.87	5
		e"	14.7500	Conductivity (σ):	1.44	1.49	-3.42	5
	Body 1710	e'	52.5700	Relative Permittivity (ϵ_r):	52.57	53.54	-1.82	5
		e"	14.6600	Conductivity (σ):	1.39	1.46	-4.63	5
	Body 1755	e'	52.4100	Relative Permittivity (ϵ_r):	52.41	53.43	-1.91	5
		e"	14.7700	Conductivity (σ):	1.44	1.49	-3.22	5
3/26/2014	Head 5180	e'	37.2800	Relative Permittivity (ϵ_r):	37.28	36.01	3.52	5
		e"	15.9200	Conductivity (σ):	4.59	4.63	-0.98	5
	Head 5200	e'	37.2600	Relative Permittivity (ϵ_r):	37.26	35.99	3.53	5
		e"	15.9400	Conductivity (σ):	4.61	4.65	-0.91	5
	Head 5600	e'	36.7000	Relative Permittivity (ϵ_r):	36.70	35.53	3.28	5
		e"	16.1700	Conductivity (σ):	5.03	5.06	-0.50	5
	Head 5800	e'	36.4000	Relative Permittivity (ϵ_r):	36.40	35.30	3.12	5
		e"	16.2700	Conductivity (σ):	5.25	5.27	-0.44	5
	Head 5825	e'	36.3600	Relative Permittivity (ϵ_r):	36.36	35.30	3.00	5
		e"	16.3500	Conductivity (σ):	5.30	5.27	0.49	5
3/28/2014	Head 1900	e'	38.5400	Relative Permittivity (ϵ_r):	38.54	40.00	-3.65	5
		e"	13.2500	Conductivity (σ):	1.40	1.40	-0.01	5
	Head 1850	e'	38.7600	Relative Permittivity (ϵ_r):	38.76	40.00	-3.10	5
		e"	13.1600	Conductivity (σ):	1.35	1.40	-3.31	5
	Head 1910	e'	38.5100	Relative Permittivity (ϵ_r):	38.51	40.00	-3.73	5
		e"	13.2800	Conductivity (σ):	1.41	1.40	0.74	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 ± 0.5 cm for SAR measurements ≤ 3 GHz and ≥ 10.0 cm ± 0.5 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
D750V3	1024	5/28/2013	750	1g	8.52	8.71
				10g	5.58	5.71
D835V2	4d117	5/28/2013	835	1g	9.54	9.40
				10g	6.21	6.16
D1750V2	1077	9/12/2013	1750	1g	37.6	37.7
				10g	20.0	20.3
D1900V2	5d140	4/18/2013	1900	1g	41.2	41.5
				10g	21.5	22.0
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
D5GHzV2	1003	2/26/2014	5200	1g	77.7	73.5
				10g	22.2	20.5
			5600	1g	81.8	79.6
				10g	23.2	22.1
			5800	1g	78.3	73.8
				10g	22.1	20.4

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 A

Date Tested	System Dipole		T.S. Liquid	Measured Results			Target (Ref. Value)	Delta $\pm 10\%$	Est./Zoom Ratio	Plot No.	
	Type	Serial #		Area Scan	Zoom Scan	Normalize to 1 W					
3/26/2014	D750V3	1024	Head	1g	0.858	0.831	8.31	8.52	-2.46	3.15	1, 2
				10g	0.584	0.542	5.42	5.58	-2.87		

SAR Lab B

Date Tested	System Dipole		T.S. Liquid	Measured Results			Target (Ref. Value)	Delta $\pm 10\%$	Est./Zoom Ratio	Plot No.	
	Type	Serial #		Area Scan	Zoom Scan	Normalize to 1 W					
3/24/2014	D835V2	4d117	Head	1g	1.04	1.00	10.0	9.54	4.82	3.85	3, 4
				10g	0.697	0.658	6.58	6.21	5.96		

SAR Lab D

Date Tested	System Dipole		T.S. Liquid	Measured Results			Target (Ref. Value)	Delta $\pm 10\%$	Est./Zoom Ratio	Plot No.	
	Type	Serial #		Area Scan	Zoom Scan	Normalize to 1 W					
3/21/2014	D835V2	4d117	Body	1g	0.915	0.900	9.00	9.40	-4.26	1.64	5, 6
				10g	0.613	0.594	5.94	6.16	-3.57		
3/25/2014	D5200V2	1003	Body	1g	7.14	7.56	75.6	73.5	2.86	-5.88	
				10g	1.95	2.13	21.3	20.5	3.90		
	D5600V2		Body	1g	7.54	7.73	77.3	79.6	-2.89	-2.52	
				10g	2.02	2.15	21.5	22.1	-2.71		
3/27/2014	D1750V2	1077	Head	1g	3.78	3.69	36.9	37.6	-1.86	2.38	9, 10
				10g	2.04	1.97	19.7	20.0	-1.50		

SAR Lab E

Date Tested	System Dipole		T.S. Liquid	Measured Results			Target (Ref. Value)	Delta $\pm 10\%$	Est./Zoom Ratio	Plot No.	
	Type	Serial #		Area Scan	Zoom Scan	Normalize to 1 W					
3/20/2014	D2450V2	899	Body	1g	4.87	4.87	48.7	49.7	-2.01	0.00	11, 12
				10g	2.11	2.26	22.6	23.3	-3.00		
3/20/2014	D2450V2	899	Head	1g	5.21	5.14	51.4	51.3	0.19	1.34	
				10g	2.30	2.34	23.4	23.9	-2.09		

SAR Room F

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					
3/19/2014	D1900V2	5d140	Body	1g	3.97	3.99	39.9	41.5	-3.86	-0.50	13, 14
				10g	2.00	2.11	21.1	22.0	-4.09		
3/19/2014	D1750V2	1077	Body	1g	3.87	3.77	37.7	37.7	0.00	2.58	
				10g	2.01	2.01	20.1	20.3	-0.99		
3/24/2014	D750V3	1024	Body	1g	0.881	0.866	8.66	8.71	-0.57	1.70	15, 16
				10g	0.597	0.576	5.76	5.71	0.88		
3/25/2014	D1900V2	5d140	Body	1g	4.02	4.00	40.0	41.5	-3.61	0.50	
				10g	2.02	2.11	21.1	22.0	-4.09		
3/25/2014	D1750V2	1077	Body	1g	3.91	3.84	38.4	37.7	1.86	1.79	17, 18
				10g	2.04	2.06	20.6	20.3	1.48		
3/26/2014	D5200V2	1003	Head	1g	7.06	7.65	76.5	77.7	-1.54	-8.36	
				10g	2.02	2.19	21.9	22.2	-1.35		
	D5600V2		Head	1g	7.35	8.11	81.1	81.8	-0.86	-10.34	
				10g	2.08	2.30	23.0	23.2	-0.86		
	D5800V2		Head	1g	6.90	7.57	75.7	78.3	-3.32	-9.71	19, 20
				10g	1.91	2.13	21.3	22.1	-3.62		
3/28/2014	D1900V2	5d043	Head	1g	4.17	4.12	41.2	40.1	2.74	1.20	21, 22
				10g	2.17	2.14	21.4	21.1	1.42		

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:

- ≤ 0.8 W/kg or 2.0 W/kg, for 1-g or 10-g respectively, when the transmission band is ≤ 100 MHz
- ≤ 0.6 W/kg or 1.5 W/kg, for 1-g or 10-g respectively, when the transmission band is between 100 MHz and 200 MHz
- ≤ 0.4 W/kg or 1.0 W/kg, for 1-g or 10-g respectively, when the transmission band is ≥ 200 MHz

KDB 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 648474 D04 Handset SAR:

Additional 1-g SAR testing at 5 mm is not required. For hotspot mode, 10-g extremity SAR is not required for the surfaces and edges since all 1-g reported SAR < 1.2 W/kg.

12.1. CDMA BC0

12.1.1. Maximum Power

RF Exposure Conditions	Mode	Dist. (mm)	Test Position	Ch #.	Freq. (MHz)	Power (dBm)		1-g SAR (W/kg)		Plot No.
						Tune-up limit	Meas.	Meas.	Scaled	
Head	1xRTT (RC3 SO55)	0	Left Touch	384	836.5	25.4	25.2	0.328	0.343	
			Left Tilt	384	836.5	25.4	25.2	0.195	0.204	
			Right Touch	384	836.5	25.4	25.2	0.294	0.308	
			Righttt Tilt	384	836.5	25.4	25.2	0.207	0.217	
	1xEVDO (Rel. 0)		Left Touch	384	836.5	25.4	25.3	0.409	0.419	1
			Left Tilt	384	836.5	25.4	25.3	0.265	0.271	
			Right Touch	384	836.5	25.4	25.3	0.377	0.386	
			Righttt Tilt	384	836.5	25.4	25.3	0.249	0.255	
Body-worn & Hotspot	1xRTT (RC3 SO32)	10	Rear	1013	824.7	25.4	25.2	0.638	0.668	
				384	836.5	25.4	25.2	0.849	0.889	
				777	848.3	25.4	25.2	0.943	0.987	2
			Front	384	836.5	25.4	25.2	0.522	0.547	
	1xEVDO (Rel. 0)		Rear	1013	824.7	25.4	25.3	0.605	0.619	
				384	836.5	25.4	25.3	0.866	0.886	
				777	848.3	25.4	25.2	0.881	0.923	
			Front	384	836.5	25.4	25.3	0.470	0.481	
Hotspot	1xRTT (RC3 SO32)	10	Edge 3	384	836.5	25.4	25.2	0.337	0.353	
			Edge 4	384	836.5	25.4	25.2	0.346	0.362	
	1xEVDO (Rel. 0)		Edge 3	384	836.5	25.4	25.3	0.310	0.317	
			Edge 4	384	836.5	25.4	25.3	0.368	0.377	

12.1.2. Power Reduction

RF Exposure Conditions	Mode	Dist. (mm)	Test Position	Ch #.	Freq. (MHz)	Power (dBm)		1-g SAR (W/kg)		Plot No.
						Tune-up limit	Meas.	Meas.	Scaled	
Head	1xRTT (RC3 SO55)	0	Left Touch	384	836.5	18.2	18.1	0.062	0.063	
		0	Left Tilt	384	836.5	18.2	18.1	0.035	0.036	
		0	Right Touch	384	836.5	18.2	18.1	0.056	0.057	
		0	Righttt Tilt	384	836.5	18.2	18.1	0.034	0.035	
Body-worn & Hotspot	1xRTT (RC3 SO32)	10	Rear	384	836.5	18.2	18.0	0.131	0.137	
		10	Front	384	836.5	18.2	18.0	0.077	0.081	
Hotspot	1xRTT (RC3 SO32)	10	Edge 3	384	836.5	18.2	18.0	0.053	0.055	
		10	Edge 4	384	836.5	18.2	18.0	0.063	0.066	

12.2. CDMA BC1

12.2.1. Maximum Power

RF Exposure Conditions	Mode	Dist. (mm)	Test Position	Ch #.	Freq. (MHz)	Power (dBm)		1-g SAR (W/kg)		Plot No.
						Tune-up limit	Meas.	Meas.	Scaled	
Head	1xRTT (RC3 SO55)	0	Left Touch	600	1880.0	24.7	24.4	0.299	0.320	
			Left Tilt	600	1880.0	24.7	24.4	0.163	0.175	
			Right Touch	600	1880.0	24.7	24.4	0.244	0.261	
			Right Tilt	600	1880.0	24.7	24.4	0.175	0.188	
	1xEVDO (Rel. 0)		Left Touch	600	1880.0	24.7	24.5	0.317	0.332	3
			Left Tilt	600	1880.0	24.7	24.5	0.159	0.166	
			Right Touch	600	1880.0	24.7	24.5	0.290	0.304	
			Right Tilt	600	1880.0	24.7	24.5	0.181	0.190	
Body-worn & Hotspot	1xRTT (RC3 SO32)	10	Rear	25	1851.3	24.7	24.5	0.962	1.007	4
				600	1880.0	24.7	24.4	0.934	1.001	
				1175	1908.8	24.7	24.4	0.939	1.006	
	Front		600	1880.0	24.7	24.4	0.720	0.771		
	1xEVDO (Rel. 0)		Rear	25	1851.3	24.7	24.4	0.882	0.945	
				600	1880.0	24.7	24.5	0.887	0.929	
				1175	1908.8	24.7	24.5	0.901	0.943	
				Front	600	1880.0	24.7	24.5	0.634	0.664
Hotspot		600		1880.0	24.7	24.5	0.634	0.664		
Hotspot	1xRTT (RC3 SO32)	10	Edge 3	600	1880.0	24.7	24.4	0.448	0.480	
			Edge 4	600	1880.0	24.7	24.4	0.419	0.449	
	1xEVDO (Rel. 0)		Edge 3	600	1880.0	24.7	24.5	0.503	0.527	
			Edge 4	600	1880.0	24.7	24.5	0.348	0.364	

12.2.2. Power Reduction

RF Exposure Conditions	Mode	Dist. (mm)	Test Position	Ch #.	Freq. (MHz)	Power (dBm)		1-g SAR (W/kg)		Plot No.
						Tune-up limit	Meas.	Meas.	Scaled	
Head	1xRTT (RC3 SO55)	0	Left Touch	600	1880.0	18.2	17.8	0.051	0.056	
			Left Tilt	600	1880.0	18.2	17.8	0.027	0.030	
			Right Touch	600	1880.0	18.2	17.8	0.030	0.033	
			Right Tilt	600	1880.0	18.2	17.8	0.031	0.034	
Body-worn & Hotspot	1xRTT (RC3 SO32)	10	Rear	600	1880.0	18.2	17.9	0.144	0.154	
			Front	600	1880.0	18.2	17.9	0.101	0.108	
Hotspot	1xRTT (RC3 SO32)	10	Edge 3	600	1880.0	18.2	17.9	0.063	0.068	
			Edge 4	600	1880.0	18.2	17.9	0.055	0.059	

12.3. LTE Band 4 (20MHz Bandwidth)

12.3.1. Maximum Power

RF Exposure Conditions	Mode	Dist. (mm)	Test Position	Ch #.	Freq. (MHz)	RB Allocation	RB offset	Power (dBm)		1-g SAR (W/kg)		Plot No.
								Tune-up limit	Meas.	Meas.	Scaled	
Head	QPSK	0	Left Touch	20175	1732.5	1	99	24.7	24.6	0.192	0.196	
						50	0	23.7	23.6	0.167	0.171	
			Left Tilt	20175	1732.5	1	99	24.7	24.6	0.167	0.171	
						50	0	23.7	23.6	0.138	0.141	
			Right Touch	20175	1732.5	1	99	24.7	24.6	0.409	0.419	5
						50	0	23.7	23.6	0.327	0.335	
			Rightt Tilt	20175	1732.5	1	99	24.7	24.6	0.169	0.173	
						50	0	23.7	23.6	0.138	0.141	
Body-worn & Hotspot	QPSK	10	Rear	20050	1720.0	1	99	24.7	24.4	0.819	0.878	
				20175	1732.5	1	99	24.7	24.6	0.846	0.866	
				50	0	23.7	23.6	0.664	0.679			
			Front	20300	1745.0	1	0	24.7	24.5	0.882	0.924	6
				20175	1732.5	1	99	24.7	24.6	0.646	0.661	
				50	0	23.7	23.6	0.496	0.508			
Hotspot	QPSK	10	Edge 2	20175	1732.5	1	99	24.7	24.6	0.378	0.387	
						50	0	23.7	23.6	0.289	0.296	
			Edge 3	20175	1732.5	1	99	24.7	24.6	0.546	0.559	
						50	0	23.7	23.6	0.397	0.406	

12.3.2. Power Reduction

RF Exposure Conditions	Mode	Dist. (mm)	Test Position	Ch #.	Freq. (MHz)	RB Allocation	RB offset	Power (dBm)		1-g SAR (W/kg)		Plot No.
								Tune-up limit	Meas.	Meas.	Scaled	
Head	QPSK	0	Left Touch	20175	1732.5	1	99	20.7	20.6	0.080	0.082	
						50	0	20.7	20.5	0.089	0.093	
			Left Tilt	20175	1732.5	1	99	20.7	20.6	0.061	0.062	
						50	0	20.7	20.5	0.063	0.066	
			Right Touch	20175	1732.5	1	99	20.7	20.6	0.119	0.122	
						50	0	20.7	20.5	0.113	0.118	
			Rightt Tilt	20175	1732.5	1	99	20.7	20.6	0.056	0.057	
						50	0	20.7	20.5	0.054	0.057	
Body-worn & Hotspot	QPSK	10	Rear	20175	1732.5	1	99	20.7	20.6	0.223	0.228	
						50	0	20.7	20.5	0.225	0.236	
			Front	20175	1732.5	1	99	20.7	20.6	0.208	0.213	
						50	0	20.7	20.5	0.199	0.208	
Hotspot	QPSK	10	Edge 2	20175	1732.5	1	99	20.7	20.6	0.127	0.130	
						50	0	20.7	20.5	0.124	0.130	
			Edge 3	20175	1732.5	1	99	20.7	20.6	0.188	0.192	
						50	0	20.7	20.5	0.181	0.190	

12.4. LTE Band 13 (10MHz Bandwidth)

12.4.1. Maximum Power

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	23230	782.0	1	0	24.7	24.7	0.241	0.241	7		
								23.7	23.6	0.177	0.181			
			Left Tilt	23230	782.0	1	0	24.7	24.7	23.7	23.6	0.133	0.133	
			Right Touch	23230	782.0	1	0	24.7	24.7	23.7	23.6	0.236	0.236	
			Rightt Tilt	23230	782.0	1	0	24.7	24.7	23.7	23.6	0.168	0.168	
Body-worn & Hotspot	QPSK	10	Rear	23230	782.0	1	0	24.7	24.7	0.621	0.621	8		
								23.7	23.6	0.473	0.484			
			Front	23230	782.0	1	0	24.7	24.7	23.7	23.6	0.387	0.387	
Hotspot	QPSK	10	Edge 2	23230	782.0	1	0	24.7	24.7	0.371	0.371			
								23.7	23.6	0.266	0.272			
			Edge 3	23230	782.0	1	0	24.7	24.7	23.7	23.6	0.317	0.317	

12.4.2. Power Reduction

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	23230	782.0	1	0	20.7	20.7	0.098	0.098			
								20.7	20.5	0.084	0.088			
			Left Tilt	23230	782.0	1	0	20.7	20.7	20.7	20.5	0.054	0.054	
			Right Touch	23230	782.0	1	0	20.7	20.7	20.7	20.5	0.097	0.097	
			Rightt Tilt	23230	782.0	1	0	20.7	20.7	20.7	20.5	0.068	0.068	
Body-worn & Hotspot	QPSK	10	Rear	23230	782.0	1	0	20.7	20.7	0.266	0.266			
								20.7	20.5	0.229	0.240			
			Front	23230	782.0	1	0	20.7	20.7	20.7	20.5	0.177	0.177	
Hotspot	QPSK	10	Edge 2	23230	782.0	1	0	20.7	20.7	0.247	0.247			
								20.7	20.5	0.204	0.214			
			Edge 3	23230	782.0	1	0	20.7	20.7	20.7	20.5	0.136	0.136	

12.5. Wi-Fi (DTS Band)

12.5.1. 2.4 GHz Band

RF Exposure Conditions	Mode	Dist. (mm)	Test Position	Ch #.	Freq. (MHz)	Power (dBm)		1-g SAR (W/kg)		Plot No.
						Tune-up limit	Meas.	Meas.	Scaled	
Head	802.11b 1 Mbps	0	Left Touch	6	2437.0	16.7	16.4	0.082	0.088	9
			Left Tilt	6	2437.0	16.7	16.4	0.093	0.100	
			Right Touch	6	2437.0	16.7	16.4	0.053	0.056	
			Rightt Tilt	6	2437.0	16.7	16.4	0.057	0.061	
Body-worn, Hotspot, & Wi-Fi Direct	802.11b 1 Mbps	10	Rear	6	2437.0	16.7	16.4	0.097	0.104	10
			Front	6	2437.0	16.7	16.4	0.029	0.031	
Hotspot & Wi-Fi Direct	802.11b 1 Mbps	10	Edge 1	6	2437.0	16.7	16.4	0.047	0.051	
			Edge 2	6	2437.0	16.7	16.4	0.025	0.027	

12.5.2. 5.8 GHz Band

RF Exposure Conditions	Mode	Dist. (mm)	Test Position	Ch #.	Freq. (MHz)	Power (dBm)		1-g SAR (W/kg)		Plot No.
						Tune-up limit	Meas.	Meas.	Scaled	
Head	802.11a 6 Mbps	0	Left Touch	149	5745.0	11.2	11.0	0.000	0.000	
			Left Tilt	149	5745.0	11.2	11.0	0.000	0.000	
			Right Touch	149	5745.0	11.2	11.0	0.000	0.000	
			Rightt Tilt	149	5745.0	11.2	11.0	0.000	0.000	
Body-worn, Hotspot, & Wi-Fi Direct	802.11a 6 Mbps	10	Rear	149	5745.0	11.2	11.0	0.184	0.193	11
			Front	149	5745.0	11.2	11.0	0.011	0.012	
Hotspot & Wi-Fi Direct	802.11a 6 Mbps	10	Edge 1	149	5745.0	11.2	11.0	0.060	0.063	
			Edge 2	149	5745.0	11.2	11.0	0.012	0.013	

12.6. Wi-Fi (UNII Bands)

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	802.11a 6 Mbps	0	Left Touch	48	5240.0	11.2	10.5	0.000	0.000		
				52	5260.0	11.2	10.8	0.000	0.000		
				100	5500.0	11.2	10.8	0.000	0.000		
			Left Tilt	48	5240.0	11.2	10.5	0.004	0.005		
				52	5260.0	11.2	10.8	0.005	0.005		
				100	5500.0	11.2	10.8	0.008	0.009		
			Right Touch	48	5240.0	11.2	10.5	0.013	0.015		
				52	5260.0	11.2	10.8	0.009	0.010		
				100	5500.0	11.2	10.8	0.013	0.014		
			Rightt Tilt	48	5240.0	11.2	10.5	0.016	0.019		12
				52	5260.0	11.2	10.8	0.017	0.019		
				100	5500.0	11.2	10.8	0.010	0.011		
Body-worn	802.11a 6 Mbps	10	Rear	48	5240.0	11.2	10.5	0.038	0.045		
				52	5260.0	11.2	10.8	0.042	0.046		
				100	5500.0	11.2	10.8	0.068	0.075		
			Front	48	5240.0	11.2	10.5	0.016	0.019		13
				52	5260.0	11.2	10.8	0.011	0.012		
				100	5500.0	11.2	10.8	0.017	0.019		

12.7. Bluetooth

12.7.1. 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)			
11.2	13	10	2.480	2.1

Conclusion:

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

12.7.2. 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:

- $(\text{max. power of channel, including tune-up tolerance, mW}) / (\text{min. test separation distance, mm})] \cdot [\sqrt{f_{(\text{GHz})}/x}]$ 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	13	10	2.480	0.273

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)
750	LTE Band 13	N/A	N/A	N/A
850	CDMA BC0	N/A	0.943 W/kg	N/A
1750	LTE Band 4	N/A	0.882 W/kg	N/A
1900	CDMA BC1	N/A	0.962 W/kg	N/A
2400	Wi-Fi 802.11b/g/n	N/A	N/A	N/A
5200	802.11a/n	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

Frequency band	Test Position	Mode	Ch #.	Freq. (MHz)	Meas. SAR (W/kg)		Largest to Smallest SAR Ratio	Note
					Original	Repeated		
CDMA BC0	Rear	1xRTT (RC3 SO32)	777	848.31	0.943	0.833	1.13	1
CDMA BC1	Rear	1xRTT (RC3 SO32)	25	1851.25	0.962	0.890	1.08	1
LTE Band 4	Rear	QPSK	20300	1745.00	0.882	0.850	1.04	1

Hotspot Mode/Wi-Fi Direct Exposure Condition

Not Applicable.

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:

SAR₁ 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

SAR₂ 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 CDMA BC0 & Wi-Fi 2.4GHz 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)	0.419	0.088		0.507	No
	Left Tilt	WWAN + Wi-Fi(DTS)	0.271	0.100		0.371	No
	Right Touch	WWAN + Wi-Fi(DTS)	0.386	0.056		0.442	No
	Right Tilt	WWAN + Wi-Fi(DTS)	0.255	0.061		0.316	No
Body-worn Accessory & Hotspot	Rear	WWAN + Wi-Fi(DTS)	0.987	0.104		1.091	No
		WWAN + BT	0.987		0.273	1.260	No
	Front	WWAN + Wi-Fi(DTS)	0.547	0.031		0.578	No
		WWAN + BT	0.547		0.273	0.820	No
Hotspot	Edge 1	WWAN + Wi-Fi(DTS)		0.051		0.051	No
	Edge 2	WWAN + Wi-Fi(DTS)		0.027		0.027	No
	Edge 3	WWAN + Wi-Fi(DTS)	0.353			0.353	No
	Edge 4	WWAN + Wi-Fi(DTS)	0.377			0.377	No

14.2. 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)	0.419	0.000			0.419	No
		WWAN + Wi-Fi(UNII)	0.419		0.000		0.419	No
	Left Tilt	WWAN + Wi-Fi(DTS)	0.271	0.000			0.271	No
		WWAN + Wi-Fi(UNII)	0.271		0.009		0.280	No
	Right Touch	WWAN + Wi-Fi(DTS)	0.386	0.000			0.386	No
		WWAN + Wi-Fi(UNII)	0.386		0.015		0.401	No
Right Tilt	WWAN + Wi-Fi(DTS)	0.255	0.000			0.255	No	
	WWAN + Wi-Fi(UNII)	0.255		0.019		0.274	No	
Body-worn Accessory & Hotspot	Rear	WWAN + Wi-Fi(DTS)	0.987	0.193			1.180	No
		WWAN + Wi-Fi(UNII)	0.987		0.075		1.062	No
		WWAN + BT	0.987			0.273	1.260	No
	Front	WWAN + Wi-Fi(DTS)	0.547	0.012			0.559	No
		WWAN + Wi-Fi(UNII)	0.547		0.019		0.566	No
		WWAN + BT	0.547			0.273	0.820	No
Hotspot	Edge 1	WWAN + Wi-Fi(DTS)		0.063			0.063	No
	Edge 2	WWAN + Wi-Fi(DTS)		0.013			0.013	No
	Edge 3	WWAN + Wi-Fi(DTS)	0.353				0.353	No
	Edge 4	WWAN + Wi-Fi(DTS)	0.377				0.377	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 BC1 & 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 BC1	Wi-Fi (DTS)	Bluetooth		
Head	Left Touch	WWAN + Wi-Fi(DTS)	0.332	0.088		0.420	No
	Left Tilt	WWAN + Wi-Fi(DTS)	0.175	0.100		0.275	No
	Right Touch	WWAN + Wi-Fi(DTS)	0.304	0.056		0.360	No
	Right Tilt	WWAN + Wi-Fi(DTS)	0.190	0.061		0.251	No
Body-worn Accessory & Hotspot	Rear	WWAN + Wi-Fi(DTS)	1.007	0.104		1.111	No
		WWAN + BT	1.007		0.273	1.280	No
	Front	WWAN + Wi-Fi(DTS)	0.771	0.031		0.802	No
		WWAN + BT	0.771		0.273	1.044	No
Hotspot	Edge 1	WWAN + Wi-Fi(DTS)		0.051		0.051	No
	Edge 2	WWAN + Wi-Fi(DTS)		0.027		0.027	No
	Edge 3	WWAN + Wi-Fi(DTS)	0.527			0.527	No
	Edge 4	WWAN + Wi-Fi(DTS)	0.449			0.449	No

14.4. 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)	0.332	0.000			0.332	No
		WWAN + Wi-Fi(UNII)	0.332		0.000		0.332	No
	Left Tilt	WWAN + Wi-Fi(DTS)	0.175	0.000			0.175	No
		WWAN + Wi-Fi(UNII)	0.175		0.009		0.184	No
	Right Touch	WWAN + Wi-Fi(DTS)	0.304	0.000			0.304	No
		WWAN + Wi-Fi(UNII)	0.304		0.015		0.319	No
Right Tilt	WWAN + Wi-Fi(DTS)	0.190	0.000			0.190	No	
	WWAN + Wi-Fi(UNII)	0.190		0.019		0.209	No	
Body-worn Accessory & Hotspot	Rear	WWAN + Wi-Fi(DTS)	1.007	0.193			1.200	No
		WWAN + Wi-Fi(UNII)	1.007		0.075		1.082	No
		WWAN + BT	1.007			0.273	1.280	No
	Front	WWAN + Wi-Fi(DTS)	0.771	0.012			0.783	No
		WWAN + Wi-Fi(UNII)	0.771		0.019		0.790	No
		WWAN + BT	0.771			0.273	1.044	No
Hotspot	Edge 1	WWAN + Wi-Fi(DTS)		0.063			0.063	No
	Edge 2	WWAN + Wi-Fi(DTS)		0.013			0.013	No
	Edge 3	WWAN + Wi-Fi(DTS)	0.527				0.527	No
	Edge 4	WWAN + Wi-Fi(DTS)	0.449				0.449	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 4 & Wi-Fi 2.4 GHz Band & BT

RF Exposure conditions	Test Position		Simultaneous Transmission Scenario			Σ 1-g SAR (mW/g)	SPLSR (Yes/ No)
			LTE Band 4	Wi-Fi (DTS)	Bluetooth		
Head	Left Touch	WWAN + Wi-Fi(DTS)	0.196	0.088		0.284	No
	Left Tilt	WWAN + Wi-Fi(DTS)	0.171	0.100		0.271	No
	Right Touch	WWAN + Wi-Fi(DTS)	0.419	0.056		0.475	No
	Right Tilt	WWAN + Wi-Fi(DTS)	0.173	0.061		0.234	No
Body-worn Accessory & Hotspot	Rear	WWAN + Wi-Fi(DTS)	0.924	0.104		1.028	No
		WWAN + BT	0.924		0.273	1.197	No
	Front	WWAN + Wi-Fi(DTS)	0.661	0.031		0.692	No
		WWAN + BT	0.661		0.273	0.934	No
Hotspot	Edge 1	WWAN + Wi-Fi(DTS)		0.051		0.051	No
	Edge 2	WWAN + Wi-Fi(DTS)	0.387	0.027		0.414	No
	Edge 3	WWAN + Wi-Fi(DTS)	0.559			0.559	No
	Edge 4	WWAN + Wi-Fi(DTS)				0.000	No

14.6. Sum of the SAR for LTE Band 4 & 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 4	Wi-Fi (DTS)	Wi-Fi (UNII)	Bluetooth		
Head	Left Touch	WWAN + Wi-Fi(DTS)	0.196	0.000			0.196	No
		WWAN + Wi-Fi(UNII)	0.196		0.000		0.196	No
	Left Tilt	WWAN + Wi-Fi(DTS)	0.171	0.000			0.171	No
		WWAN + Wi-Fi(UNII)	0.171		0.009		0.180	No
	Right Touch	WWAN + Wi-Fi(DTS)	0.419	0.000			0.419	No
		WWAN + Wi-Fi(UNII)	0.419		0.015		0.434	No
Right Tilt	WWAN + Wi-Fi(DTS)	0.173	0.000			0.173	No	
	WWAN + Wi-Fi(UNII)	0.173		0.019		0.192	No	
Body-worn Accessory & Hotspot	Rear	WWAN + Wi-Fi(DTS)	0.924	0.193			1.117	No
		WWAN + Wi-Fi(UNII)	0.924		0.075		0.999	No
		WWAN + BT	0.924			0.273	1.197	No
	Front	WWAN + Wi-Fi(DTS)	0.661	0.012			0.673	No
		WWAN + Wi-Fi(UNII)	0.661		0.019		0.680	No
		WWAN + BT	0.661			0.273	0.934	No
Hotspot	Edge 1	WWAN + Wi-Fi(DTS)		0.063			0.063	No
	Edge 2	WWAN + Wi-Fi(DTS)	0.387	0.013			0.400	No
	Edge 3	WWAN + Wi-Fi(DTS)	0.559				0.559	No
	Edge 4	WWAN + Wi-Fi(DTS)					0.000	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 LTE Band 13 & 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 13	Wi-Fi (DTS)	Bluetooth		
Head	Left Touch	WWAN + Wi-Fi(DTS)	0.241	0.088		0.329	No
	Left Tilt	WWAN + Wi-Fi(DTS)	0.133	0.100		0.233	No
	Right Touch	WWAN + Wi-Fi(DTS)	0.236	0.056		0.292	No
	Right Tilt	WWAN + Wi-Fi(DTS)	0.168	0.061		0.229	No
Body-worn Accessory & Hotspot	Rear	WWAN + Wi-Fi(DTS)	0.621	0.104		0.725	No
		WWAN + BT	0.621		0.273	0.894	No
	Front	WWAN + Wi-Fi(DTS)	0.387	0.031		0.418	No
		WWAN + BT	0.387		0.273	0.660	No
Hotspot	Edge 1	WWAN + Wi-Fi(DTS)		0.051		0.051	No
	Edge 2	WWAN + Wi-Fi(DTS)	0.371	0.027		0.398	No
	Edge 3	WWAN + Wi-Fi(DTS)	0.317			0.317	No
	Edge 4	WWAN + Wi-Fi(DTS)				0.000	No

14.8. Sum of the SAR for LTE Band 13 & 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 13	Wi-Fi (DTS)	Wi-Fi (UNII)	Bluetooth		
Head	Left Touch	WWAN + Wi-Fi(DTS)	0.241	0.000			0.241	No
		WWAN + Wi-Fi(UNII)	0.241		0.000		0.241	No
	Left Tilt	WWAN + Wi-Fi(DTS)	0.133	0.000			0.133	No
		WWAN + Wi-Fi(UNII)	0.133		0.009		0.142	No
	Right Touch	WWAN + Wi-Fi(DTS)	0.236	0.000			0.236	No
		WWAN + Wi-Fi(UNII)	0.236		0.015		0.251	No
Right Tilt	WWAN + Wi-Fi(DTS)	0.168	0.000			0.168	No	
	WWAN + Wi-Fi(UNII)	0.168		0.019		0.187	No	
Body-worn Accessory & Hotspot	Rear	WWAN + Wi-Fi(DTS)	0.621	0.193			0.814	No
		WWAN + Wi-Fi(UNII)	0.621		0.075		0.696	No
		WWAN + BT	0.621			0.273	0.894	No
	Front	WWAN + Wi-Fi(DTS)	0.387	0.012			0.399	No
		WWAN + Wi-Fi(UNII)	0.387		0.019		0.406	No
		WWAN + BT	0.387			0.273	0.660	No
Hotspot	Edge 1	WWAN + Wi-Fi(DTS)		0.063			0.063	No
	Edge 2	WWAN + Wi-Fi(DTS)	0.371	0.013			0.384	No
	Edge 3	WWAN + Wi-Fi(DTS)	0.317				0.317	No
	Edge 4	WWAN + Wi-Fi(DTS)					0.000	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 SV-LTE

14.9.1. CDMA (Maximum Power), LTE (Power Reduction), Wi-Fi 2.4 GHz Band, & BT

RF Exposure Conditions	Test Position	Voice (Maximum Power)		Data (Reduced Power)		Data		Σ 1-g SAR (W/kg)
		CDMA BC0	CDMA BC1	LTE Band 4	LTE Band 13	WiFi DTS Band	Bluetooth	
Head	Left Touch	0.343		0.093		0.088		0.524
		0.343			0.098	0.088		0.529
			0.320	0.093		0.088		0.501
			0.320		0.098	0.088		0.506
	Left Tilt	0.204		0.066		0.100		0.370
		0.204			0.054	0.100		0.358
			0.175	0.066		0.100		0.341
			0.175		0.054	0.100		0.329
	Right Touch	0.308		0.122		0.056		0.486
		0.308			0.097	0.056		0.461
			0.261	0.122		0.056		0.439
			0.261		0.097	0.056		0.414
	Right Tilt	0.217		0.057		0.061		0.335
		0.217			0.068	0.061		0.346
			0.188	0.057		0.061		0.306
			0.188		0.068	0.061		0.317
Body-worn, Hotspot, and Wi-Fi Direct	Rear	0.987		0.236		0.104		1.327
		0.987		0.236			0.273	1.496
		0.987			0.266	0.104		1.357
		0.987			0.266		0.273	1.526
			1.007	0.236		0.104		1.347
			1.007	0.236			0.273	1.516
			1.007		0.266	0.104		1.377
			1.007		0.266		0.273	1.546
	Front	0.547		0.213		0.031		0.791
		0.547		0.213			0.273	1.033
		0.547			0.177	0.031		0.755
		0.547			0.177		0.273	0.997
			0.771	0.213		0.031		1.015
			0.771	0.213			0.273	1.257
			0.771		0.177	0.031		0.979
			0.771		0.177		0.273	1.221
Hotspot and Wi-Fi Direct	Edge 1					0.051		0.051
	Edge 2			0.130		0.027		0.157
					0.247	0.027		0.274
	Edge 3	0.353		0.192				0.545
		0.353			0.136			0.489
			0.480	0.192				0.672
			0.480		0.136			0.616
	Edge 4	0.362						0.362
		0.449					0.449	

14.9.2. CDMA (Maximum Power), LTE (Power Reduction), Wi-Fi 5 GHz Bands, & BT

RF Exposure Conditions	Test Position	Voice (Maximum Power)		Data (Reduced Power)		Data			Σ 1-g SAR (W/kg)	
		CDMA BC0	CDMA BC1	LTE Band 4	LTE Band 13	WiFi 5.8 GHz DTS Band	WiFi UNII Band	Bluetooth		
Head	Left Touch	0.343		0.093		0.000			0.436	
		0.343		0.093			0.000		0.436	
		0.343			0.098	0.000			0.441	
		0.343			0.098		0.000		0.441	
			0.320	0.093		0.000			0.413	
			0.320	0.093			0.000		0.413	
	Left Tilt		0.320		0.098	0.000			0.418	
			0.320		0.098		0.000		0.418	
		0.204		0.066		0.000			0.270	
		0.204		0.066			0.009		0.279	
		0.204			0.054	0.000			0.258	
		0.204			0.054		0.009		0.267	
	Right Touch		0.175	0.066		0.000			0.241	
			0.175	0.066			0.009		0.250	
			0.175		0.054	0.000			0.229	
			0.175		0.054		0.009		0.238	
		0.308		0.122		0.000			0.430	
		0.308		0.122			0.015		0.445	
	Right Tilt		0.308		0.097	0.000			0.405	
			0.308		0.097		0.015		0.420	
			0.261	0.122		0.000			0.383	
			0.261	0.122			0.015		0.398	
			0.261		0.097	0.000			0.358	
			0.261		0.097		0.015		0.373	
	Body-worn, Hotspot, and Wi-Fi Direct	Rear	0.217		0.057		0.000			0.274
			0.217		0.057			0.019		0.293
			0.217			0.068	0.000			0.285
			0.217			0.068		0.019		0.304
				0.188	0.057		0.000			0.245
				0.188	0.057			0.019		0.264
				0.188		0.068	0.000			0.256
				0.188		0.068		0.019		0.275
			0.987		0.236		0.193			1.416
			0.987		0.236			0.075		1.298
	0.987		0.236				0.273	1.496		
	0.987			0.266	0.193			1.446		
0.987			0.266		0.075		1.328			
0.987			0.266			0.273	1.526			
Body-worn, Hotspot, and Wi-Fi Direct	Front	1.007	0.236		0.193			1.436		
		1.007	0.236			0.075		1.318		
		1.007	0.236				0.273	1.516		
		1.007		0.266	0.193			1.466		
		1.007		0.266		0.075		1.348		
		1.007		0.266			0.273	1.546		
		0.547		0.213		0.012			0.772	
		0.547		0.213			0.019		0.779	
		0.547		0.213				0.273	1.033	
		0.547			0.177	0.012			0.736	
	0.547			0.177		0.019		0.743		
	0.547			0.177			0.273	0.997		
		0.771	0.213		0.012			0.996		
		0.771	0.213			0.019		1.003		
		0.771	0.213				0.273	1.257		
		0.771		0.177	0.012			0.960		
		0.771		0.177		0.019		0.967		
		0.771		0.177			0.273	1.221		
Hotspot and Wi-Fi Direct	Edge 1					0.063			0.063	
	Edge 2			0.130		0.013			0.143	
	Edge 3			0.192	0.247	0.013			0.260	
		0.353							0.545	
		0.353			0.136				0.489	
	Edge 4		0.480	0.192					0.672	
			0.480		0.136				0.616	
		0.362							0.362	
		0.449						0.449		

14.9.3. CDMA (Power Reduction), LTE (Maximum Power), Wi-Fi 2.4 GHz Band, & BT

RF Exposure Conditions	Test Position	Voice (Reduced Power)		Data (Maximum Power)		Data		Σ 1-g SAR (W/kg)
		CDMA BC0	CDMA BC1	LTE Band 4	LTE Band 13	WiFi DTS Band	Bluetooth	
Head	Left Touch	0.063		0.196		0.088		0.347
		0.063			0.241	0.088		0.392
			0.056	0.196		0.088		0.340
			0.056		0.241	0.088		0.385
	Left Tilt	0.036		0.171		0.100		0.307
		0.036			0.133	0.100		0.269
			0.030	0.171		0.100		0.301
			0.030		0.133	0.100		0.263
	Right Touch	0.057		0.419		0.056		0.532
		0.057			0.236	0.056		0.349
			0.033	0.419		0.056		0.508
			0.033		0.236	0.056		0.325
	Right Tilt	0.035		0.173		0.061		0.269
		0.035			0.168	0.061		0.264
			0.034	0.173		0.061		0.268
			0.034		0.168	0.061		0.263
Body-worn, Hotspot, and Wi-Fi Direct	Rear	0.137		0.924		0.104		1.165
		0.137		0.924			0.273	1.334
		0.137			0.621	0.104		0.862
		0.137			0.621		0.273	1.031
			0.154	0.924		0.104		1.182
			0.154	0.924			0.273	1.351
			0.154		0.621	0.104		0.879
			0.154		0.621		0.273	1.048
	Front	0.081		0.661		0.031		0.773
		0.081		0.661			0.273	1.015
		0.081			0.387	0.031		0.499
		0.081			0.387		0.273	0.741
			0.108	0.661		0.031		0.800
			0.108	0.661			0.273	1.042
			0.108		0.387	0.031		0.526
			0.108		0.387		0.273	0.768
Hotspot and Wi-Fi Direct	Edge 1					0.051		0.051
	Edge 2			0.387		0.027		0.414
	Edge 3				0.371	0.027		0.398
		0.055		0.559				0.614
		0.055			0.317			0.372
	Edge 4		0.068	0.559				0.627
			0.068		0.317			0.385
		0.066						0.066
		0.059					0.059	

14.9.4. CDMA (Power Reduction), LTE (Maximum Power), Wi-Fi 5 GHz Bands, & BT

RF Exposure Conditions	Test Position	Voice (Power Reduction)		Data (Maximum Power)		Data			Σ 1-g SAR (W/kg)
		CDMA BC0	CDMA BC1	LTE Band 4	LTE Band 13	WiFi 5.8 GHz DTS Band	WiFi UNII Band	Bluetooth	
Head	Left Touch	0.063		0.196		0.000			0.259
		0.063		0.196			0.000		0.259
		0.063			0.241	0.000			0.304
		0.063			0.241		0.000		0.304
			0.056	0.196		0.000			0.252
			0.056	0.196			0.000		0.252
			0.056		0.241	0.000			0.297
			0.056		0.241		0.000		0.297
	Left Tilt	0.036		0.171		0.000			0.207
		0.036		0.171			0.009		0.216
		0.036			0.133	0.000			0.169
		0.036			0.133		0.009		0.178
			0.030	0.171		0.000			0.201
			0.030	0.171			0.009		0.210
			0.030		0.133	0.000			0.163
			0.030		0.133		0.009		0.172
	Right Touch	0.057		0.419		0.000			0.476
		0.057		0.419			0.015		0.491
		0.057			0.236	0.000			0.293
		0.057			0.236		0.015		0.308
			0.033	0.419		0.000			0.452
			0.033	0.419			0.015		0.467
			0.033		0.236	0.000			0.269
			0.033		0.236		0.015		0.284
	Right Tilt	0.035		0.173		0.000			0.208
		0.035		0.173			0.019		0.227
		0.035			0.168	0.000			0.203
		0.035			0.168		0.019		0.222
			0.034	0.173		0.000			0.207
			0.034	0.173			0.019		0.226
		0.034		0.168	0.000			0.202	
		0.034		0.168		0.019		0.221	
Body-worn, Hotspot, and Wi-Fi Direct	Rear	0.137		0.924		0.193			1.254
		0.137		0.924			0.075		1.136
		0.137		0.924				0.273	1.334
		0.137			0.621	0.193			0.951
		0.137			0.621		0.075		0.833
		0.137			0.621			0.273	1.031
			0.154	0.924		0.193			1.271
			0.154	0.924			0.075		1.153
			0.154	0.924				0.273	1.351
			0.154		0.621	0.193			0.968
	Front	0.081		0.661		0.012			0.754
		0.081		0.661			0.019		0.761
		0.081		0.661				0.273	1.015
		0.081			0.387	0.012			0.480
		0.081			0.387		0.019		0.487
		0.081			0.387			0.273	0.741
			0.108	0.661		0.012			0.781
			0.108	0.661			0.019		0.788
			0.108	0.661				0.273	1.042
			0.108		0.387	0.012			0.507
Hotspot and Wi-Fi Direct	Edge 1					0.063			0.063
	Edge 2			0.387		0.013			0.400
	Edge 3	0.055		0.559					0.614
		0.055			0.317				0.372
			0.068	0.559					0.627
	Edge 4		0.068		0.317				0.385
		0.066							0.066
			0.059						0.059

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 3871**
- 15.5. Calibration Certificate for E-Field Probe EX3DV4 - SN 3885**
- 15.6. Calibration Certificate for E-Field Probe EX3DV3 - SN 3749**
- 15.7. Calibration Certificate for E-Field Probe EX3DV4 - SN 3901**
- 15.8. Calibration Certificate for E-Field Probe EX3DV4 - SN 3772**
- 15.9. Calibration Certificate for D750V3 - SN 1024**
- 15.10. Calibration Certificate for D835V2 - SN 4d117**
- 15.11. Calibration Certificate for D1750V2 - SN 1077**
- 15.12. Calibration Certificate for D1900V2- SN 5d043**
- 15.13. Calibration Certificate for D1900V2- SN 5d140**
- 15.14. Calibration Certificate for D2450V2 - SN 899**
- 15.15. Calibration Certificate for D5GHzV2 - SN 1003**

END OF REPORT