



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

(Class II Permissive Change)

SAR EVALUATION REPORT

For

CDMA/LTE Phone with Bluetooth & WLAN (2.4GHz/5GHz) and NFC

**Model: LG-VS876, VS876, LGVS876, LG-AS876, AS876, and LGAS876
FCC ID: ZNFVS876**

**Report Number: 14U16955-7
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Prepared for

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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..... 13*

 7.3. *RF Output Power Tune-up Tolerance 14*

 7.4. *Simultaneous Transmission Condition 15*

 7.5. *General LTE SAR Test and Reporting Considerations..... 16*

8. RF Exposure Conditions..... 17

 8.1. *Head Exposure Conditions 17*

 8.2. *Body-worn Accessory Exposure Conditions..... 17*

 8.3. *Hotspot Exposure Conditions..... 18*

 8.4. *Wi-Fi Direct Exposure Conditions 18*

9. RF Output Power Measurement 19

 9.1. *CDMA..... 19*

 9.2. *LTE Bands..... 20*

 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 Band..... 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>	40
11.3. <i>System Performance Check Results</i>	41
12. SAR Test Results	43
12.1. <i>CDMA BC0.....</i>	44
12.1.1. <i>Maximum Power</i>	44
12.1.2. <i>Power Reduction.....</i>	44
12.2. <i>CDMA BC1.....</i>	45
12.2.1. <i>Maximum Power</i>	45
12.2.2. <i>Power Reduction.....</i>	45
12.3. <i>LTE Band 4 (20 MHz Bandwidth)</i>	46
12.3.1. <i>Maximum Power</i>	46
12.3.2. <i>Power Reduction.....</i>	46
12.4. <i>LTE Band 13 (10 MHz Bandwidth)</i>	47
12.4.1. <i>Maximum Power</i>	47
12.4.2. <i>Power Reduction.....</i>	47
12.5. <i>Wi-Fi (DTS Bands)</i>	48
12.5.1. <i>2.4 GHz Band.....</i>	48
12.5.2. <i>5.8 GHz Band.....</i>	48
12.5.3. <i>Wi-Fi (UNII Bands)</i>	48
12.6. <i>Bluetooth.....</i>	49
13. SAR Measurement Variability.....	49
13.1. <i>The Highest Measured SAR Configuration in Each Frequency Band</i>	49
13.2. <i>Repeated Measurement Results</i>	50
14. Simultaneous Transmission SAR Analysis.....	51
14.1. <i>Sum of the SAR for CDMA BC0, Wi-Fi 2.4 GHz Band, & BT.....</i>	52
14.2. <i>Sum of the SAR for CDMA BC0, Wi-Fi 5 GHz Bands, & BT</i>	52
14.3. <i>Sum of the SAR for CDMA BC1, Wi-Fi 2.4 GHz Band, & BT.....</i>	53
14.4. <i>Sum of the SAR for CDMA BC1, Wi-Fi 5 GHz Bands, & BT</i>	53
14.5. <i>Sum of the SAR for LTE Band 4, Wi-Fi 2.4 GHz Band, & BT.....</i>	54
14.6. <i>Sum of the SAR for LTE Band 4, Wi-Fi 5 GHz Bands, & BT.....</i>	54

14.7.	Sum of the SAR for LTE Band 13, Wi-Fi 2.4 GHz Band, & BT.....	55
14.8.	Sum of the SAR for LTE Band 13, Wi-Fi 5 GHz Bands, & BT.....	55
14.9.	Sum of the SAR for SV-LTE.....	56
14.9.1.	CDMA (Maximum Power), LTE (Power Reduction), Wi-Fi 2.4 GHz Band, & BT	56
14.9.2.	CDMA (Maximum Power), LTE (Power Reduction), Wi-Fi 5 GHz Bands, & BT	57
14.9.3.	CDMA (Power Reduction), LTE (Maximum Power), Wi-Fi 2.4 GHz Band, & BT	58
14.9.4.	CDMA (Power Reduction), LTE (Maximum Power), Wi-Fi 5 GHz Bands, & BT	59
15.	Appendixes.....	60
15.1.	Photos and Antenna Locations.....	60
15.2.	System Performance Check Plots.....	60
15.3.	Highest SAR Test Plots.....	60
15.4.	Calibration Certificate for E-Field Probe EX3DV4 - SN 3929.....	60
15.5.	Calibration Certificate for E-Field Probe EX3DV4 - SN 3936.....	60
15.6.	Calibration Certificate for E-Field Probe EX3DV4 - SN 3871.....	60
15.7.	Calibration Certificate for E-Field Probe EX3DV4 - SN 3885.....	60
15.8.	Calibration Certificate for D750V3 - SN 1019.....	60
15.9.	Calibration Certificate for D750V3 - SN 1071.....	60
15.10.	Calibration Certificate for D835V2 - SN 4d002.....	60
15.11.	Calibration Certificate for D835V2 - SN 4d142.....	60
15.12.	Calibration Certificate for D1750V2 - SN 1050.....	60
15.13.	Calibration Certificate for D1900V2- SN 5d163.....	60
15.14.	Calibration Certificate for D2450V2 – SN 706.....	60
15.15.	Calibration Certificate for D2450V2 – SN 899.....	60
15.16.	Calibration Certificate for D5GHzV2 – SN 1138.....	60

1. Attestation of Test Results

Applicant	LG ELECTRONICS MOBILECOMM U.S.A., INC.			
DUT description	CDMA/LTE Phone with Bluetooth & WLAN (2.4 / 5GHz) and NFC			
Model	LG-VS876, VS876, LGVS876, LG-AS876, AS876, and LGAS876			
Test device is	An identical prototype			
Device category	Portable			
Exposure category	General Population/Uncontrolled Exposure			
Date tested	2/3/2014 – 3/5/2014			
The highest reported SAR values	RF exposure conditions	Licensed	DTS	UNII
	Head	0.977 W/kg	0.124 W/kg (2.4 GHz) 0.462 W/kg (5.8 GHz)	0.382 W/kg
	Body-worn Accessory	1.180 W/kg	0.068 W/kg (2.4 GHz) 0.148 W/kg (5.8 GHz)	0.106 W/kg
	Wireless Router (Hotspot)	1.180 W/kg	0.068 W/kg (2.4 GHz)	N/A
	Wi-Fi Direct	N/A	0.068 W/kg (2.4 GHz) 0.183 W/kg (5.8 GHz)	N/A
	Simultaneous Transmission	1.560 W/kg	1.560 W/kg	1.518 W/kg
Applicable Standards	FCC 47 CFR Parts 1 & 2 Published RF Exposure KDB Procedures, and TCB workshop updates IEEE Standard 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.

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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 v01r01
- 941225 D01 SAR test for 3G devices v02
- 941225 D05 SAR for LTE Devices v02r03
- 941225 D06 Hot Spot 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 & 47266 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	MY40000980	2/20/2014
PNA Network Analyzer	Agilent	E8363C	MY49030443	12/3/2014
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
Synthesized Signal Generator	Agilent	8665B	3438A00633	6/13/2014
Amplifier	MITEQ	AMF-4D-00400600-50-30P	1808939	N/A
Directional coupler	Werlatone	C8060-102	2710	N/A
DC Power Supply	Sorensen Ametek	XT15-4	1319A02778	N/A
Power Meter	HP	438A	2822A05684	10/10/2014
Power Sensor	Agilent	8481A	2237A31744	10/2/2014
Power Sensor	Agilent	8481A	2349A36506	9/30/2014
Synthesized Signal Generator	HP	8665B	3546A00784	3/26/2014
Amplifier	MITEQ	AMF-4D-00400600-50-30P	1795093	N/A
Bidirectional coupler	Werlatone	C8060-102	2711	N/A
DC Power Supply	Sorensen Ametek	XT20-3	1318A00529	N/A
Power Meter	Agilent	N1912A (P-Series)	MY50001018	8/23/2014
Power Sensor	Agilent	E9323A	MY53070009	4/3/2014
Power Sensor	Agilent	E9323A	US40411556	8/9/2014
E-Field Probe	SPEAG	EX3DV4	3929	6/12/2014
Data Acquisition Electronics	SPEAG	DAE4	1258	3/6/2014
E-Field Probe	SPEAG	EX3DV4	3936	7/22/2014
Data Acquisition Electronics	SPEAG	DAE3	1380	7/15/2014
E-Field Probe	SPEAG	EX3DV4	3871	7/29/2014
Data Acquisition Electronics	SPEAG	DAE4	1239	4/9/2014
E-Field Probe	SPEAG	EX3DV4	3885	9/18/2014
Data Acquisition Electronics	SPEAG	DAE4	1343	7/24/2014
System Validation Dipole	SPEAG	D750V2	1019	3/5/2014
System Validation Dipole	SPEAG	D750V2	1071	11/15/2014
System Validation Dipole	SPEAG	D835V2	4d002	11/15/2014
System Validation Dipole	SPEAG	D835V2	4d142	9/17/2014
System Validation Dipole	SPEAG	D1750V2	1050	4/20/2014
System Validation Dipole	SPEAG	D1900V2	5d163	9/17/2014
System Validation Dipole	SPEAG	D2450V2	706	5/29/2014
System Validation Dipole	SPEAG	D2450V2	899	9/10/2014
System Validation Dipole	SPEAG	D5GHzV2	1138	11/19/2014

Others

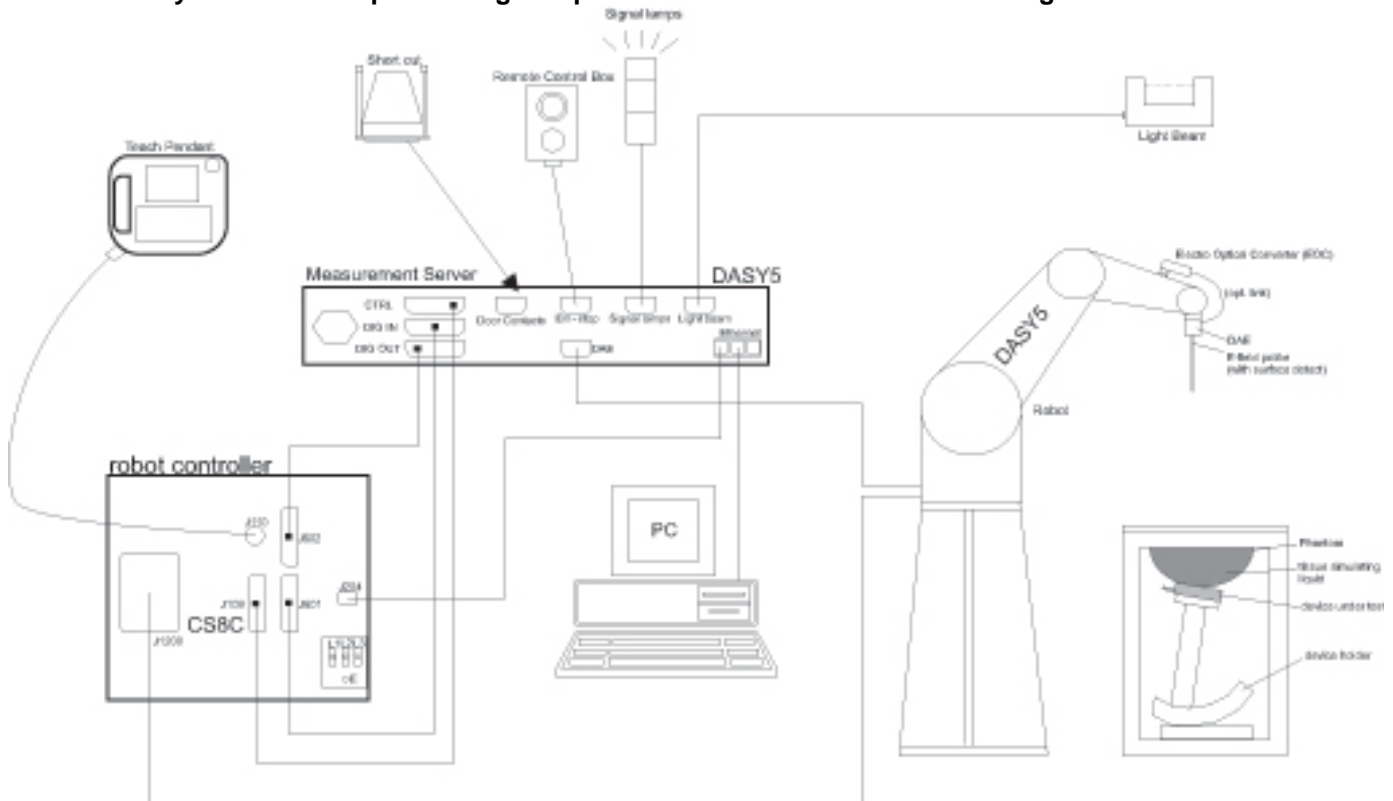
Name of Equipment	Manufacturer	Type/Model	Serial No.	Cal. Due Date
Power Meter	Agilent	N1912A	MY53040016	4/4/2014
Power Sensor	Agilent	N1921A	MY52020011	5/13/2014
Base Station Simulator	R & S	CMW500	132909	2/20/2014

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 Windows XP/7 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	$30^\circ \pm 1^\circ$	$20^\circ \pm 1^\circ$
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 \leq the corresponding x or y dimension of the test device with at least one measurement point on the test device.	

Step 3: Zoom Scan

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

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

		≤ 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 type="checkbox"/> Mobile Hotspot (Wi-Fi 5 GHz)
Wi-Fi Direct	Wi-Fi Direct enabled devices transfer data directly between each other <input checked="" type="checkbox"/> Wi-Fi Direct (Wi-Fi 2.4 GHz) <input checked="" type="checkbox"/> Wi-Fi Direct (Wi-Fi 5.8 GHz)
VoIP	<input checked="" type="checkbox"/> Supported
Device dimensions	Overall (Length x Width): 131.6 mm x 66 mm Overall Diagonal: 138.9 mm Display Diagonal: 118.9 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 3.8 Vdc, 3000 mAh <input type="checkbox"/> Extended (large capacity)

7.2. Wireless Technologies

Wireless Technology and Frequency Bands	CDMA BC 0 / 1 LTE Band 4 / 13 (FDD) Wi-Fi: 2.4 GHz and 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/ac) <ul style="list-style-type: none"> - <input checked="" type="checkbox"/> 802.11b - <input checked="" type="checkbox"/> 802.11g - <input checked="" type="checkbox"/> 802.11n (20MHz) Wi-Fi 5GHz (802.11a/n/ac) <ul style="list-style-type: none"> - <input checked="" type="checkbox"/> 802.11b - <input checked="" type="checkbox"/> 802.11g - <input checked="" type="checkbox"/> 802.11n (20MHz) - <input checked="" type="checkbox"/> 802.11n (40MHz) Bluetooth Ver. 4.0 (LE)
Duty Cycle (Used for SAR testing)	CDMA: 100% LTE (FDD): 100% Wi-Fi 802.11a/b/g/n: 100% Bluetooth: 76%
SV-LTE	<input checked="" type="checkbox"/> Supported

7.3. RF Output Power Tune-up Tolerance

Upper limit (dB): 0.5		RF Output Power (dBm)	
RF Air interface	Mode	Target	Max. tune-up tolerance limit
CDMA BC0	1xRTT	24.5	25.0
	1xEVDO Rel. 0	24.5	25.0
	1xEVDO Rev. A	24.5	25.0
CDMA BC1	1xRTT	24.5	25.0
	1xEVDO Rel. 0	24.5	25.0
	1xEVDO Rev. A	24.5	25.0
Upper limit (dB): 0.5		RF Output Power (dBm)	
RF Air interface	Mode	Target	Max. tune-up tolerance limit
LTE Band 4	QPSK	23.5	24.0
LTE Band 13	QPSK	23.7	24.2
Upper limit (dB): 0.5		RF Output Power (dBm)	
RF Air interface	Mode	Target	Max. tune-up tolerance limit
WiFi 2.4 GHz	802.11b	14.8	15.3
	802.11g	10.8	11.3
	802.11n HT20	9.9	10.4
Upper limit (dB): 0.5		RF Output Power (dBm)	
RF Air interface	Mode	Target	Max. tune-up tolerance limit
WiFi 5 GHz	802.11a	12.6	13.1
	802.11n HT20	11.8	12.3
	802.11n HT40	11.8	12.3
Upper limit (dB): 0.5		RF Output Power (dBm)	
RF Air interface	Mode	Target	Max. tune-up tolerance limit
Bluetooth		8.8	9.3

7.4. Simultaneous Transmission Condition

RF Exposure Condition	Capable Transmit Configurations				
Head	<ol style="list-style-type: none"> CDMA 1xRTT BC0 / BC1 + Wi-Fi 2.4 / 5 GHz CDMA 1xEVDO BC0 / BC1 + Wi-Fi 2.4 / 5 GHz (VoIP) LTE Band 4 / 13 + Wi-Fi 2.4 / 5 GHz 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"> CDMA 1xRTT BC0 / BC1 + Wi-Fi 2.4 / 5 GHz CDMA 1xRTT BC0 / BC1 + BT CDMA 1xEVDO BC0 / BC1 + Wi-Fi 2.4 / 5 GHz (VoIP) CDMA 1xEVDO BC0 / BC1 + BT (VoIP) LTE Band 4 / 13 + Wi-Fi 2.4 / 5 GHz LTE Band 4 / 13 + BT CDMA 1x BC0 / BC1 + LTE B4 / B13 + Wi-Fi 2.4 / 5 GHz (SV-LTE + Wi-Fi) CDMA 1x BC0 / BC1 + LTE B4 / B13 + BT (SV-LTE + BT) 				
Wireless Router (Hotspot)	<ol style="list-style-type: none"> CDMA 1xEVDO BC0 / BC1 + Wi-Fi 2.4 GHz LTE Band 4 / 13 + Wi-Fi 2.4 GHz CDMA 1x BC0 / BC1 + LTE B4 / B13 + Wi-Fi 2.4 GHz (SV-LTE + Wi-Fi) 				
Wi-Fi Direct	<ol style="list-style-type: none"> CDMA 1xEVDO BC0 / BC1 + Wi-Fi 2.4 / 5.8 GHz (GO / GC) LTE Band 4 / 13 + Wi-Fi 2.4 / 5.8 GHz (GO / GC) CDMA 1x BC0 / BC1 + LTE B4 / B13 + Wi-Fi 2.4 / 5.8 GHz(SV-LTE + Wi-Fi) (GO / GC) 				
Note:					
<ol style="list-style-type: none"> CDMA, LTE, and Wi-Fi 2.4 GHz support Hotspot. CDMA and LTE support VoIP. Wi-Fi 2.4 GHz also supports Wi-Fi Direct Wi-Fi 5 GHz does not support Hotspot, but does support Wi-Fi Direct: <table style="width: 100%; border: none;"> <tr> <td style="width: 50%;">UNII I (5.2 GHz): GC Wi-Fi Direct is only supported (SAR Exclusion)</td> <td style="width: 50%;">UNII III (5.5 GHz): Wi-Fi Direct is not supported</td> </tr> <tr> <td>UNII II (5.3 GHz): Wi-Fi Direct is not supported</td> <td>UNII IV (5.8 GHz): Wi-Fi Direct GC and GO is supported</td> </tr> </table> Wi-Fi and Bluetooth cannot transmit simultaneously because they share the same chip. 		UNII I (5.2 GHz): GC Wi-Fi Direct is only supported (SAR Exclusion)	UNII III (5.5 GHz): Wi-Fi Direct is not supported	UNII II (5.3 GHz): Wi-Fi Direct is not supported	UNII IV (5.8 GHz): Wi-Fi Direct GC and GO is supported
UNII I (5.2 GHz): GC Wi-Fi Direct is only supported (SAR Exclusion)	UNII III (5.5 GHz): Wi-Fi Direct is not supported				
UNII II (5.3 GHz): Wi-Fi Direct is not supported	UNII IV (5.8 GHz): Wi-Fi Direct GC and GO is supported				

7.5. General LTE SAR Test and Reporting Considerations

Item	Description								
Frequency range, Channel Bandwidth, Numbers and Frequencies	Band 4								
	Tx: 1710 to 1755 MHz								
	Rx: 2110 to 2155 MHz								
	Band 13								
	Tx: 777 to 787 MHz								
	Rx: 746 to 756 MHz								
	Band 4								
	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				
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)	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		
	MPR Built-in by design A-MPR (additional MPR) was disabled during SAR testing								
Power reduction	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No								
	Mode	CDMA Current Voice Power for BC0 & BC1			LTE B4 & B13 Max Power				
	SV-LTE	P ≤ 19 dBm			B4: 24 dBm (Limited) B13: 24.2 (Limited)				
		P > 19 dBm			B4: 19 dBm (Limited) B13: 20.2 dBm (Limited)				
Spectrum plots for RB configurations	A properly configured basestation simulator was used for the SAR and power measurements; therefore, spectrum plots for each RB allocation and offset configuration are not included in the SAR report.								

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 (2)

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

For LTE Bands 4 and 13 (3)

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

For Wi-Fi and Bluetooth (1)

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

8.3. Hotspot Exposure Conditions

For CDMA (②)

Test Configurations	Antenna-to-edge/surface	SAR Required	Note
Rear	< 25 mm	Yes	
Front	< 25 mm	Yes	
Edge 1 (Top)	90.6 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)	29 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 Bands 4 and 13 (③)

Test Configurations	Antenna-to-edge/surface	SAR Required	Note
Rear	< 25 mm	Yes	
Front	< 25 mm	Yes	
Edge 1 (Top)	108.6 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)	37 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 and Bluetooth (④)

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)	16 mm	Yes	
Edge 3 (Bottom)	98.6 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 4 (Left)	32 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

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)	16 mm	Yes	
Edge 3 (Bottom)	98.6 mm	No	SAR is not required because the distance from the antenna to the edge is > 25 mm as per KDB 648474 D04 Handset SAR
Edge 4 (Left)	32 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	24.9	19.0
		384	836.52	24.8	18.9
		777	848.31	24.8	18.9
	RC3 SO55 (Loopback)	1013	824.70	24.8	19.0
		384	836.52	24.8	18.9
		777	848.31	24.8	18.9
	RC3 SO32 (+F-SCH)	1013	824.70	24.8	18.9
		384	836.52	24.8	18.9
		777	848.31	24.8	18.9
BC 1	RC1 SO55 (Loopback)	25	1851.25	25.0	19.0
		600	1880.00	24.9	18.9
		1175	1908.75	24.9	18.9
	RC3 SO55 (Loopback)	25	1851.25	25.0	19.0
		600	1880.00	25.0	19.0
		1175	1908.75	25.0	18.9
	RC3 SO32 (+F-SCH)	25	1851.25	25.0	19.0
		600	1880.00	24.9	19.0
		1175	1908.75	24.9	19.0

1xEv-Do Rel. 0 Measured Results

Band	FTAP Rate	Channel	Freq. (MHz)	Avg Pwr (dBm)
BC 0	307.2 kbps (2 slot, QPSK)	1013	824.70	24.9
		384	836.52	24.9
		777	848.31	24.9
BC1	307.2 kbps (2 slot, QPSK)	25	1851.25	25.0
		600	1880.00	25.0
		1175	1908.75	25.0

1xEv-Do Rev. A Measured Results

Band	FETAP Traffic Format	Channel	Freq. (MHz)	Avg Pwr (dBm)
BC 0	307.2k, QPSK/ ACK channel is transmitted at all the slots	1013	824.70	24.9
		384	836.52	24.9
		777	848.31	24.9
BC1	307.2k, QPSK/ ACK channel is transmitted at all the slots	25	1851.25	25.0
		600	1880.00	25.0
		1175	1908.75	25.0

9.2. LTE Bands

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

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

Table 6.2.3-1: Maximum Power Reduction (MPR) for Power Class 3

Modulation	Channel bandwidth / Transmission bandwidth (RB)						MPR (dB)
	1.4 MHz	3.0 MHz	5 MHz	10 MHz	15 MHz	20 MHz	
QPSK	> 5	> 4	> 8	> 12	> 16	> 18	≤ 1
16 QAM	≤ 5	≤ 4	≤ 8	≤ 12	≤ 16	≤ 18	≤ 1
16 QAM	> 5	> 4	> 8	> 12	> 16	> 18	≤ 2

The allowed A-MPR values specified below in Table 6.2.4.-1 of 3GPP TS36.101 are in addition to the allowed MPR requirements. All the measurements below were performed with A-MPR disabled, by using Network Signalling Value of "NS_01".

Table 6.2.4-1: Additional Maximum Power Reduction (A-MPR)

Network Signalling value	Requirements (sub-clause)	E-UTRA Band	Channel bandwidth (MHz)	Resources Blocks (N_{RB})	A-MPR (dB)
NS_01	6.6.2.1.1	Table 5.5-1	1.4, 3, 5, 10, 15, 20	Table 5.6-1	NA
NS_03	6.6.2.2.1	2, 4, 10, 23, 25, 35, 36	3	>5	≤ 1
			5	>6	≤ 1
			10	>6	≤ 1
			15	>8	≤ 1
			20	>10	≤ 1
NS_04	6.6.2.2.2	41	5	>6	≤ 1
			10, 15, 20	See Table 6.2.4-4	
NS_05	6.6.3.3.1	1	10, 15, 20	≥ 50	≤ 1
NS_06	6.6.2.2.3	12, 13, 14, 17	1.4, 3, 5, 10	Table 5.6-1	n/a
NS_07	6.6.2.2.3	13	10	Table 6.2.4-2	Table 6.2.4-2
	6.6.3.3.2				
NS_08	6.6.3.3.3	19	10, 15	> 44	≤ 3
NS_09	6.6.3.3.4	21	10, 15	> 40	≤ 1
				> 55	≤ 2
NS_10		20	15, 20	Table 6.2.4-3	Table 6.2.4-3
NS_11	6.6.2.2.1	23 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)		
							20050	20175	20300
							1720 MHz	1732.5 MHz	1745 MHz
LTE Band 4	20	QPSK	1	0	0	0	23.9	23.9	24.0
			1	49	0	0	23.9	24.0	24.0
			1	99	0	0	23.7	23.9	24.0
			50	0	1	1	22.9	23.0	22.9
			50	25	1	1	22.9	22.9	22.9
			50	50	1	1	23.0	22.9	22.8
		16QAM	100	0	1	1	23.0	22.9	22.8
			1	0	1	1	23.0	23.0	22.8
			1	49	1	1	22.7	23.0	22.8
			1	99	1	1	22.9	23.0	22.9
			50	0	2	2	22.0	21.9	21.9
			50	25	2	2	22.0	21.8	21.8
			50	50	2	2	22.0	21.8	21.9
			100	0	2	2	22.0	21.8	21.8
Band	BW (MHz)	Mode	RB Allocation	RB offset	Target MPR	Meas. MPR	Avg Pwr (dBm)		
							20050	20175	20300
							1720 MHz	1732.5 MHz	1745 MHz
LTE Band 4 Power Reduction	20	QPSK	1	0	MPR is disabled when Power Reduction is enabled		19.0	18.9	18.9
			1	49			19.0	19.0	18.9
			1	99			18.9	18.8	18.9
			50	0			18.9	19.0	19.0
			50	25			18.9	18.9	19.0
			50	50			18.9	18.9	19.0
		16QAM	100	0			18.9	18.9	19.0
			1	0			18.9	19.0	18.9
			1	49			18.9	19.0	18.9
			1	99			18.9	19.0	18.7
			50	0			18.9	19.0	19.0
			50	25			18.9	19.0	19.0
			50	50			18.9	19.0	18.9
			100	0			18.9	19.0	18.9

LTE Band 4 Measured Results (continued)

Band	BW (MHz)	Mode	RB Allocation	RB offset	Target MPR	Meas. MPR	Avg Pwr (dBm)		
							20025	20175	20325
							1717.5 MHz	1732.5 MHz	1747.5 MHz
LTE Band 4	15	QPSK	1	0	0	0	24.0	24.0	23.9
			1	36	0	0	24.0	24.0	23.9
			1	74	0	0	24.0	24.0	23.9
			36	0	1	1	23.0	22.9	22.9
			36	18	1	1	23.0	22.9	22.9
			36	37	1	1	23.0	22.9	22.9
			75	0	1	1	23.0	22.9	22.9
		16QAM	1	0	1	1	22.8	22.7	22.5
			1	36	1	1	22.7	22.7	22.6
			1	74	1	1	22.7	22.7	22.6
			36	0	2	2	21.9	21.9	22.0
			36	18	2	2	21.9	21.9	22.0
			36	37	2	2	21.9	22.0	21.9
			75	0	2	2	22.0	21.9	21.9
Band	BW (MHz)	Mode	RB Allocation	RB offset	Target MPR	Meas. MPR	Avg Pwr (dBm)		
							20025	20175	20325
							1717.5 MHz	1732.5 MHz	1747.5 MHz
LTE Band 4 Power Reduction	15	QPSK	1	0	MPR is disabled when Power Reduction is enabled		18.9	18.8	19.0
			1	36			18.9	18.8	19.0
			1	74			18.8	18.8	18.9
			36	0			18.9	18.9	18.9
			36	18			19.0	18.8	19.0
			36	37			19.0	18.9	18.9
			75	0			19.0	18.9	18.8
		16QAM	1	0			18.8	18.7	18.7
			1	36			18.6	18.6	18.7
			1	74			18.6	18.7	18.7
			36	0			19.0	18.8	18.9
			36	18			18.9	18.8	19.0
			36	37			18.9	18.8	18.9
			75	0			19.0	18.9	18.9

LTE Band 4 Measured Results (continued)

Band	BW (MHz)	Mode	RB Allocation	RB offset	Target MPR	Meas. MPR	Avg Pwr (dBm)		
							20000	20175	20350
							1715 MHz	1732.5 MHz	1750 MHz
LTE Band 4	10	QPSK	1	0	0	0	24.0	23.9	24.0
			1	25	0	0	24.0	24.0	24.0
			1	49	0	0	23.9	23.9	23.9
			25	0	1	1	22.9	22.9	22.9
			25	12	1	1	23.0	22.8	22.8
			25	25	1	1	23.0	22.8	22.8
		16QAM	50	0	1	1	23.0	22.9	22.8
			1	0	1	1	22.8	22.7	22.7
			1	25	1	1	22.7	22.8	22.7
			1	49	1	1	22.8	22.7	22.6
			25	0	2	2	21.9	22.0	21.9
			25	12	2	2	21.9	22.0	21.8
			25	25	2	2	21.9	22.0	21.8
			50	0	2	2	21.9	21.9	21.9
Band	BW (MHz)	Mode	RB Allocation	RB offset	Target MPR	Meas. MPR	Avg Pwr (dBm)		
							20000	20175	20350
							1715 MHz	1732.5 MHz	1750 MHz
LTE Band 4 Power Reduction	10	QPSK	1	0	MPR is disabled when Power Reduction is enabled		19.0	18.8	18.9
			1	25			19.0	18.8	18.8
			1	49			19.0	18.9	18.7
			25	0			18.9	18.8	19.0
			25	12			18.9	18.9	18.8
			25	25			18.9	18.8	18.8
		16QAM	50	0			18.9	18.9	18.9
			1	0			18.8	18.7	19.0
			1	25			18.8	18.7	18.9
			1	49			18.7	18.7	18.8
			25	0			19.0	18.8	18.9
			25	12			19.0	18.9	18.9
			25	25			18.8	18.9	18.8
			50	0			18.9	18.9	18.8

LTE Band 4 Measured Results (continued)

Band	BW (MHz)	Mode	RB Allocation	RB offset	Target MPR	Meas. MPR	Avg Pwr (dBm)		
							19975	20175	20375
							1712.5 MHz	1732.5 MHz	1752.5 MHz
LTE Band 4	5	QPSK	1	0	0	0	23.7	23.8	24.0
			1	12	0	0	23.7	23.8	24.0
			1	24	0	0	23.7	23.8	24.0
			12	0	1	1	22.9	22.9	22.9
			12	6	1	1	22.9	22.9	22.8
			12	13	1	1	23.0	22.9	22.8
		16QAM	25	0	1	1	22.9	22.8	22.9
			1	0	1	1	23.0	22.7	23.0
			1	12	1	1	23.0	23.0	23.0
			1	24	1	1	22.8	23.0	22.9
			12	0	2	2	21.9	21.9	21.8
			12	6	2	2	21.8	22.0	21.7
			12	13	2	2	21.9	21.9	21.8
			25	0	2	2	22.0	21.9	21.8
LTE Band 4 Power Reduction	5	QPSK	1	0	MPR is disabled when Power Reduction is enabled		18.8	19.0	18.9
			1	12			18.8	18.9	18.8
			1	24			18.8	18.9	18.8
			12	0			19.0	18.9	18.8
			12	6			19.0	19.0	18.8
			12	13			19.0	18.9	18.8
		16QAM	25	0			19.0	18.9	18.8
			1	0			19.0	18.9	18.9
			1	12			19.0	18.8	18.8
			1	24			19.0	18.8	18.8
			12	0			19.0	18.9	18.7
			12	6			19.0	18.9	18.7
			12	13			19.0	18.9	18.7
			25	0			18.9	19.0	18.8

LTE Band 13 Measured Results

Band	BW (MHz)	Mode	RB Allocation	RB offset	Target MPR	Meas. MPR	Avg Pwr (dBm)
							23230
							782 MHz
LTE Band 13	10	QPSK	1	0	0	0	24.1
			1	25	0	0	24.1
			1	49	0	0	24.2
			25	0	1	1	23.1
			25	12	1	1	23.1
			25	25	1	1	23.0
		16QAM	50	0	1	1	23.1
			1	0	1	1	23.0
			1	25	1	1	23.0
			1	49	1	1	23.0
			25	0	2	2	22.0
			25	12	2	2	22.0
			25	25	2	2	22.0
			50	0	2	2	22.1
Band	BW (MHz)	Mode	RB Allocation	RB offset	Target MPR	Meas. MPR	Avg Pwr (dBm)
							23230
							782 MHz
LTE Band 13 Power Reduction	10	QPSK	1	0	MPR is disabled when Power Reduction is enabled		20.2
			1	25			20.1
			1	49			20.2
			25	0			20.1
			25	12			20.1
			25	25			20.1
		16QAM	50	0			20.1
			1	0			20.0
			1	25			19.8
			1	49			19.9
			25	0			20.1
			25	12			20.1
			25	25			20.1
			50	0			20.1

9.3. SV-LTE

9.3.1. CDMA BC0 + LTE Band 4

Agilent 8960		R&S CMW 500			
CDMA BC0 (1xRTT) P > 19.0 dBm		LTE Band 4 (20MHz) Limit = 19.0 dBm			
Ch. #	Avg Pwr (dBm)	Ch. #	Mod	UL RB Setting	Avg Pwr (dBm)
1013		20175	QPSK	1 0	18.8
				1 49	18.9
				1 99	18.8
				50 0	18.8
				50 25	18.8
				50 50	18.8
			16QAM	100 0	18.8
				1 0	18.8
				1 49	18.8
				1 99	18.7
				50 0	18.8
				50 25	18.8
				50 50	18.8
				100 0	18.8
				384	
1 49	18.9				
1 99	18.8				
50 0	18.8				
50 25	18.8				
50 50	18.8				
16QAM	100 0	18.8			
	1 0	18.8			
	1 49	18.7			
	1 99	18.7			
	50 0	18.8			
	50 25	18.8			
	50 50	18.8			
	100 0	18.8			
	777		20175		
1 49				18.9	
1 99				18.8	
50 0				18.8	
50 25				18.8	
50 50				18.8	
16QAM				100 0	18.8
				1 0	18.8
				1 49	18.7
				1 99	18.7
				50 0	18.8
				50 25	18.8
				50 50	18.7
				100 0	18.8

Agilent 8960		R&S CMW 500			
CDMA BC0 (1xRTT) P ≤ 19.0 dBm		LTE Band 4 (20MHz) Limit = 24.0 dBm			
Ch. #	Avg Pwr (dBm)	Ch. #	Mod	UL RB Setting	Avg Pwr (dBm)
1013		20175	QPSK	1 0	24.0
				1 49	24.0
				1 99	24.0
				50 0	23.0
				50 25	22.9
				50 50	22.9
			16QAM	100 0	22.9
				1 0	22.8
				1 49	22.8
				1 99	22.8
				50 0	21.9
				50 25	21.9
				50 50	21.8
				100 0	21.9
				384	
1 49	24.0				
1 99	24.0				
50 0	22.9				
50 25	22.9				
50 50	22.9				
16QAM	100 0	22.9			
	1 0	22.8			
	1 49	22.8			
	1 99	22.8			
	50 0	21.9			
	50 25	21.9			
	50 50	21.9			
	100 0	21.9			
	777		20175		
1 49				24.0	
1 99				24.0	
50 0				22.9	
50 25				22.9	
50 50				22.9	
16QAM				100 0	22.9
				1 0	22.8
				1 49	22.8
				1 99	22.8
				50 0	21.9
				50 25	21.8
				50 50	21.8
				100 0	21.8

9.3.2. CDMA BC1 + LTE Band 4

Agilent 8960		R&S CMW 500				
CDMA BC1 (1xRTT) P > 19.0 dBm		LTE Band 4 (20MHz) Limit = 19.0 dBm				
Ch. #	Avg Pwr (dBm)	Ch. #	Mod	UL RB Setting		Avg Pwr (dBm)
25		20175	QPSK	1	0	18.8
				1	49	18.8
				1	99	18.8
				50	0	18.7
				50	25	18.7
				50	50	18.7
				100	0	18.7
			16QAM	1	0	18.7
				1	49	18.8
				1	99	18.8
				50	0	18.7
				50	25	18.8
				50	50	18.7
				100	0	18.8
				100	0	18.8
600		20175	QPSK	1	0	18.8
				1	49	18.9
				1	99	18.8
				50	0	18.7
				50	25	18.8
				50	50	18.7
				100	0	18.7
			16QAM	1	0	18.8
				1	49	18.7
				1	99	18.7
				50	0	18.7
				50	25	18.7
				50	50	18.8
				100	0	18.8
				100	0	18.8
1175		20175	QPSK	1	0	18.8
				1	49	18.9
				1	99	18.8
				50	0	18.7
				50	25	18.8
				50	50	18.7
				100	0	18.7
			16QAM	1	0	18.8
				1	49	18.7
				1	99	18.7
				50	0	18.7
				50	25	18.7
				50	50	18.7
				100	0	18.7
				100	0	18.7

Agilent 8960		R&S CMW 500				
CDMA BC1 (1xRTT) P ≤ 19.0 dBm		LTE Band 4 (20MHz) Limit = 24.0 dBm				
Ch. #	Avg Pwr (dBm)	Ch. #	Mod	UL RB Setting		Avg Pwr (dBm)
25		20175	QPSK	1	0	24.0
				1	49	24.0
				1	99	24.0
				50	0	22.9
				50	25	22.9
				50	50	22.9
				100	0	22.8
			16QAM	1	0	22.7
				1	49	22.8
				1	99	22.7
				50	0	21.9
				50	25	21.8
				50	50	21.8
				100	0	21.8
				100	0	21.8
600		20175	QPSK	1	0	24.0
				1	49	24.0
				1	99	24.0
				50	0	22.9
				50	25	22.9
				50	50	22.8
				100	0	22.8
			16QAM	1	0	22.7
				1	49	22.8
				1	99	22.8
				50	0	21.9
				50	25	21.8
				50	50	21.8
				100	0	21.8
				100	0	21.8
1175		20175	QPSK	1	0	23.9
				1	49	24.0
				1	99	24.0
				50	0	22.9
				50	25	22.9
				50	50	22.8
				100	0	22.8
			16QAM	1	0	22.7
				1	49	22.7
				1	99	22.7
				50	0	21.9
				50	25	21.8
				50	50	21.8
				100	0	21.8
				100	0	21.8

9.3.3. CDMA BC0 + LTE Band 13

Agilent 8960		R&S CMW 500				
CDMA BC0 (1xRTT) P > 19.0 dBm		LTE Band 13 (10 MHz) Limit = 20.2 dBm				
Ch. #	Avg Pwr (dBm)	Ch. #	Mod	UL RB Setting	Avg Pwr (dBm)	
1013		23230	QPSK	1 0	20.0	
				1 25	20.0	
				1 49	20.0	
				25 0	20.1	
				25 12	20.0	
				25 25	20.0	
			16QAM	50 0	20.1	
				1 0	19.8	
				1 25	19.9	
				1 49	19.9	
				25 0	20.2	
				25 12	20.0	
				25 25	20.0	
				50 0	20.1	
				384		23230
1 25	20.0					
1 49	20.0					
25 0	20.0					
25 12	20.0					
25 25	20.0					
16QAM	50 0	20.0				
	1 0	19.7				
	1 25	19.7				
	1 49	19.8				
	25 0	20.0				
	25 12	20.0				
	25 25	20.0				
	50 0	20.0				
	777		23230			
1 25				19.9		
1 49				20.0		
25 0				20.0		
25 12				20.0		
25 25				20.0		
16QAM				50 0	20.0	
				1 0	19.7	
				1 25	19.7	
				1 49	19.8	
				25 0	20.0	
				25 12	20.0	
				25 25	20.0	
				50 0	20.0	

Agilent 8960		R&S CMW 500				
CDMA BC0 (1xRTT) P ≤ 19.0 dBm		LTE Band 13 (10MHz) Limit = 24.2 dBm				
Ch. #	Avg Pwr (dBm)	Ch. #	Mod	UL RB Setting	Avg Pwr (dBm)	
1013		23230	QPSK	1 0	24.0	
				1 25	24.0	
				1 49	24.0	
				25 0	23.0	
				25 12	22.9	
				25 25	22.9	
			16QAM	50 0	23.0	
				1 0	22.8	
				1 25	22.8	
				1 49	22.9	
				25 0	22.0	
				25 12	21.9	
				25 25	21.9	
				50 0	22.0	
				384		23230
1 25	23.9					
1 49	23.9					
25 0	23.0					
25 12	22.9					
25 25	22.9					
16QAM	50 0	23.0				
	1 0	22.8				
	1 25	22.8				
	1 49	22.8				
	25 0	22.0				
	25 12	22.0				
	25 25	21.9				
	50 0	22.0				
	777		23230			
1 25				24.0		
1 49				24.0		
25 0				23.0		
25 12				23.0		
25 25				22.9		
16QAM				50 0	23.0	
				1 0	22.8	
				1 25	22.8	
				1 49	22.8	
				25 0	22.0	
				25 12	21.9	
				25 25	22.0	
				50 0	22.0	

9.3.4. CDMA BC1 + LTE Band 13

Agilent 8960		R&S CMW 500				
CDMA BC1 (1xRTT) P > 19.0 dBm		LTE Band 13 (10 MHz) Limit = 20.2 dBm				
Ch. #	Avg Pwr (dBm)	Ch. #	Mod	UL RB Setting	Avg Pwr (dBm)	
25		23230	QPSK	1 0	19.9	
				1 25	19.9	
				1 49	20.0	
				25 0	20.0	
				25 12	20.0	
				25 25	19.9	
				50 0	20.0	
			16QAM	1 0	19.7	
				1 25	19.7	
				1 49	19.8	
				25 0	20.0	
				25 12	20.0	
				25 25	20.0	
				50 0	20.0	
				50 0	20.0	
600		23230	QPSK	1 0	19.8	
				1 25	19.9	
				1 49	19.9	
				25 0	20.0	
				25 12	20.0	
				25 25	19.9	
				50 0	20.0	
			16QAM	1 0	19.7	
				1 25	19.7	
				1 49	19.7	
				25 0	20.0	
				25 12	20.0	
				25 25	20.0	
				50 0	20.0	
				50 0	20.0	
1175		23230	QPSK	1 0	19.8	
				1 25	19.9	
				1 49	19.9	
				25 0	20.0	
				25 12	20.0	
				25 25	20.0	
				50 0	20.0	
			16QAM	1 0	19.7	
				1 25	19.7	
				1 49	19.8	
				25 0	20.0	
				25 12	20.0	
				25 25	20.0	
				50 0	20.0	
				50 0	20.0	

Agilent 8960		R&S CMW 500				
CDMA BC1 (1xRTT) P ≤ 19.0 dBm		LTE Band 13 (10 MHz) Limit = 24.2 dBm				
Ch. #	Avg Pwr (dBm)	Ch. #	Mod	UL RB Setting	Avg Pwr (dBm)	
25		23230	QPSK	1 0	24.0	
				1 25	23.9	
				1 49	23.9	
				25 0	23.0	
				25 12	23.0	
				25 25	23.0	
				50 0	23.0	
			16QAM	1 0	22.9	
				1 25	22.9	
				1 49	22.9	
				25 0	22.0	
				25 12	22.0	
				25 25	22.0	
				50 0	22.0	
				50 0	22.0	
600		23230	QPSK	1 0	24.0	
				1 25	23.9	
				1 49	24.0	
				25 0	23.0	
				25 12	23.0	
				25 25	22.9	
				50 0	23.0	
			16QAM	1 0	22.8	
				1 25	22.8	
				1 49	22.9	
				25 0	22.0	
				25 12	22.0	
				25 25	22.0	
				50 0	22.0	
				50 0	22.0	
1175		23230	QPSK	1 0	24.0	
				1 25	23.9	
				1 49	24.0	
				25 0	23.0	
				25 12	22.9	
				25 25	22.9	
				50 0	23.0	
			16QAM	1 0	22.8	
				1 25	22.8	
				1 49	22.8	
				25 0	22.0	
				25 12	21.9	
				25 25	21.9	
				50 0	22.0	
				50 0	22.0	

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	Ch #	Freq. (MHz)	Avg Pwr (dBm)	SAR test (Yes/No)
2.4 (DTS)	802.11b	1	2412	15.0	Yes
		6	2437	15.0	
		11	2462	14.9	
	802.11g	1	2412	10.4	No
		6	2437	10.5	
		11	2462	10.4	
	802.11n (HT20)	1	2412	9.5	No
		6	2437	9.6	
		11	2462	9.5	

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	15.0	Yes
			2 Mbps	15.0	No
			5.5 Mbps	15.0	No
			11 Mbps	15.0	No

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.

9.5. Wi-Fi 5 GHz Band

Required Test Channels per KDB 248227 D01

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

√ = "default test channels"

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

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

Measured Results

Band (GHz)	Mode	Mode	Mode	Ch #	Freq. (MHz)	Avg Pwr (dBm)	SAR Test (Yes/No)
5.2 (UNII)	1 Tx	802.11a	6 Mbps	36	5180	12.6	Yes
				40	5200	13.0	
				44	5220	13.0	
				48	5240	12.9	
	1 Tx	802.11n (HT20)	MCS0	36	5180	11.5	No
				40	5200	11.9	
				48	5240	12.0	
	1 Tx	802.11n (HT40)	MCS0	38	5190	10.0	No
46				5230	10.5		
5.3 (UNII)	1 Tx	802.11a	6 Mbps	52	5260	12.8	Yes
				56	5280	12.9	
				60	5300	12.9	
				64	5320	12.6	
	1 Tx	802.11n (HT20)	MCS0	52	5260	12.1	No
				60	5300	12.0	
				64	5320	12.3	
	1 Tx	802.11n (HT40)	MCS0	54	5270	10.9	No
62				5310	10.8		
5.5 (UNII)	1 Tx	802.11a	6 Mbps	100	5500	12.8	Yes
				104	5520	12.5	
				108	5540	12.8	
				112	5560	13.0	
				116	5580	12.7	
				120	5600	n/a	
				124	5620	n/a	
				128	5640	n/a	
				132	5660	12.8	
				136	5680	13.0	
	140	5700	13.0				
	1 Tx	802.11n (HT20)	MCS0	100	5500	12.2	No
				120	5600	n/a	
				140	5700	12.1	
	1 Tx	802.11n (HT40)	MCS0	102	5510	10.8	No
118				5590	n/a		
134	5670	10.6					
5.8 (DTS)	1 Tx	802.11a	6 Mbps	149	5745	13.0	Yes
				153	5765	13.0	
				157	5785	12.8	
				161	5805	12.8	
				165	5825	12.9	
	1 Tx	802.11n (HT20)	MCS0	149	5745	12.0	No
				157	5785	12.3	
				161	5805	12.0	
	1 Tx	802.11n (HT40)	MCS0	151	5755	10.2	No
				159	5795	11.0	

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	13.0	Yes
				9 Mbps	13.0	No
				12 Mbps	12.9	No
				18 Mbps	13.0	No
				24 Mbps	12.9	No
				36 Mbps	13.0	No
				48 Mbps	12.8	No
				54 Mbps	12.9	No
5.3 GHz (UNII)	802.11a	56	5280	6 Mbps	12.9	Yes
				9 Mbps	13.0	No
				12 Mbps	12.9	No
				18 Mbps	12.9	No
				24 Mbps	12.8	No
				36 Mbps	12.7	No
				48 Mbps	12.7	No
				54 Mbps	12.8	No
5.5 GHz (UNII)	802.11a	116	5580	6 Mbps	13.0	Yes
				9 Mbps	12.9	No
				12 Mbps	12.9	No
				18 Mbps	12.8	No
				24 Mbps	12.9	No
				36 Mbps	12.8	No
				48 Mbps	12.8	No
				54 Mbps	12.7	No
5.8 GHz (DTS)	802.11a	149	5745	6 Mbps	13.0	Yes
				9 Mbps	12.9	No
				12 Mbps	12.8	No
				18 Mbps	12.8	No
				24 Mbps	12.8	No
				36 Mbps	12.8	No
				48 Mbps	12.7	No
				54 Mbps	12.7	No

9.6. Bluetooth

Measured Results

Band (GHz)	Mode	Ch #	Freq. (MHz)	Avg Pwr (dBm)
2.4	V3.0 + EDR, GFSK	0	2402	5.9
		39	2441	5.8
		78	2480	5.3
	V3.0 + EDR, $\pi/4$ DQPSK	0	2402	4.3
		39	2441	4.1
		78	2480	3.7
	V3.0 + EDR, 8-DPSK	0	2402	5.0
		39	2441	4.2
		78	2480	3.7
	V4.0 LE, GFSK	0	2402	2.0
		19	2440	2.0
		39	2480	1.6

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
<i>750</i>	<i>41.9</i>	<i>0.89</i>
835	41.5	0.90
900	41.5	0.97
1450	40.5	1.20
<i>1500</i>	<i>40.4</i>	<i>1.23</i>
<i>1640</i>	<i>40.2</i>	<i>1.31</i>
<i>1750</i>	<i>40.1</i>	<i>1.37</i>
1800	40.0	1.40
1900	40.0	1.40
2000	40.0	1.40
<i>2100</i>	<i>39.8</i>	<i>1.49</i>
<i>2300</i>	<i>39.5</i>	<i>1.67</i>
2450	39.2	1.80
<i>2600</i>	<i>39.0</i>	<i>1.96</i>
3000	38.5	2.40
<i>3500</i>	<i>37.9</i>	<i>2.91</i>
<i>4000</i>	<i>37.4</i>	<i>3.43</i>
<i>4500</i>	<i>36.8</i>	<i>3.94</i>
<i>5000</i>	<i>36.2</i>	<i>4.45</i>
<i>5200</i>	<i>36.0</i>	<i>4.66</i>
<i>5400</i>	<i>35.8</i>	<i>4.86</i>
<i>5600</i>	<i>35.5</i>	<i>5.07</i>
5800	35.3	5.27
<i>6000</i>	<i>35.1</i>	<i>5.48</i>

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

10.1. Composition of Ingredients for the Tissue Material Used in the SAR Tests

The following tissue formulations are provided for reference only as some of the parameters have not been thoroughly verified. The composition of ingredients may be modified accordingly to achieve the desired target tissue parameters required for routine SAR evaluation.

Ingredients (% by weight)	Frequency (MHz)									
	450		835		915		1900		2450	
Tissue Type	Head	Body	Head	Body	Head	Body	Head	Body	Head	Body
Water	38.56	51.16	41.45	52.4	41.05	56.0	54.9	40.4	62.7	73.2
Salt (NaCl)	3.95	1.49	1.45	1.4	1.35	0.76	0.18	0.5	0.5	0.04
Sugar	56.32	46.78	56.0	45.0	56.5	41.76	0.0	58.0	0.0	0.0
HEC	0.98	0.52	1.0	1.0	1.0	1.21	0.0	1.0	0.0	0.0
Bactericide	0.19	0.05	0.1	0.1	0.1	0.27	0.0	0.1	0.0	0.0
Triton X-100	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	36.8	0.0
DGBE	0.0	0.0	0.0	0.0	0.0	0.0	44.92	0.0	0.0	26.7
Dielectric Constant	43.42	58.0	42.54	56.1	42.0	56.8	39.9	54.0	39.8	52.5
Conductivity (S/m)	0.85	0.83	0.91	0.95	1.0	1.07	1.42	1.45	1.88	1.78

Salt: 99+% Pure Sodium Chloride Sugar: 98+% Pure Sucrose
 Water: De-ionized, 16 MΩ+ resistivity HEC: Hydroxyethyl Cellulose
 DGBE: 99+% Di(ethylene glycol) butyl ether, [2-(2-butoxyethoxy)ethanol]
 Triton X-100 (ultra pure): Polyethylene glycol mono [4-(1,1, 3, 3-tetramethylbutyl)phenyl]ether

MSL/HSL750 (Body and Head liquids for 700 – 800 MHz)

Item	Head Tissue Simulation Liquids HSL750 Muscle (body) Tissue Simulation Liquids MSL750
Type No	SL AAH 075
Manufacturer	SPEAG
The item is composed of the following ingredients:	
H ² O	Water, 35 – 58%
Sucrose	Sugar, white, refined, 40-60%
NaCl	Sodium Chloride, 0-6%
Hydroxyethyl-cellulose	Medium Viscosity (CAS# 9004-62-0), <0.3%
Preventol-D7	Preservative: aqueous preparation, (CAS# 55965-84-9), containing 5-chloro-2-methyl-3(2H)-isothiazolone and 2-methyl-3(2H)-isothiazolone, 0.1-0.7%

MSL/HSL1750 (Body and Head liquids for 1700 – 1800 MHz)

Item	Head Tissue Simulation Liquids HSL1750 Muscle (body) Tissue Simulation Liquids MSL1750
Type No	SL AAM 175
Manufacturer	SPEAG
-The item is composed of the following ingredients:	
H ² O	Water, 52 – 75%
C8H18O3	Diethylene glycol monobutyl ether (DGBE), 25-48%
NaCl	Sodium Chloride, <1.0%

Simulating Liquids for 5 GHz, Manufactured by SPEAG

Ingredients	(% by weight)
Water	78
Mineral oil	11
Emulsifiers	9
Additives and Salt	2

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

Date	Freq. (MHz)	Liquid Parameters		Measured	Target	Delta (%)	Limit ±(%)	
2/7/2014	Body 2450	e'	53.1900	Relative Permittivity (ϵ_r):	53.19	52.70	0.93	5
		e"	14.8200	Conductivity (σ):	2.02	1.95	3.53	5
	Body 2410	e'	53.3600	Relative Permittivity (ϵ_r):	53.36	52.76	1.14	5
		e"	14.6400	Conductivity (σ):	1.96	1.91	2.85	5
	Body 2475	e'	53.1000	Relative Permittivity (ϵ_r):	53.10	52.67	0.82	5
		e"	14.9300	Conductivity (σ):	2.05	1.99	3.50	5
2/17/2014	Head 2450	e'	39.4500	Relative Permittivity (ϵ_r):	39.45	39.20	0.64	5
		e"	13.2300	Conductivity (σ):	1.80	1.80	0.13	5
	Head 2410	e'	39.6000	Relative Permittivity (ϵ_r):	39.60	39.28	0.82	5
		e"	13.1000	Conductivity (σ):	1.76	1.76	-0.28	5
	Head 2475	e'	39.3500	Relative Permittivity (ϵ_r):	39.35	39.17	0.46	5
		e"	13.3200	Conductivity (σ):	1.83	1.83	0.33	5

SAR Lab F

Date	Freq. (MHz)	Liquid Parameters		Measured	Target	Delta (%)	Limit ±(%)		
2/7/2014	Body 5180	e'	46.9000	Relative Permittivity (ϵ_r):	46.90	49.05	-4.38	5	
		e"	18.8300	Conductivity (σ):	5.42	5.27	2.89	5	
	Body 5200	e'	46.8600	Relative Permittivity (ϵ_r):	46.86	49.02	-4.41	5	
		e"	18.7800	Conductivity (σ):	5.43	5.29	2.55	5	
	Body 5600	e'	46.1800	Relative Permittivity (ϵ_r):	46.18	48.48	-4.74	5	
		e"	19.1800	Conductivity (σ):	5.97	5.76	3.67	5	
	Body 5800	e'	45.8500	Relative Permittivity (ϵ_r):	45.85	48.20	-4.88	5	
		e"	19.3700	Conductivity (σ):	6.25	6.00	4.11	5	
	Body 5825	e'	45.8000	Relative Permittivity (ϵ_r):	45.80	48.20	-4.98	5	
		e"	19.4000	Conductivity (σ):	6.28	6.00	4.72	5	
	2/13/2014	Head 5180	e'	36.9400	Relative Permittivity (ϵ_r):	36.94	36.01	2.57	5
			e"	15.6200	Conductivity (σ):	4.50	4.63	-2.84	5
Head 5200		e'	36.9200	Relative Permittivity (ϵ_r):	36.92	35.99	2.58	5	
		e"	15.6300	Conductivity (σ):	4.52	4.65	-2.83	5	
Head 5600		e'	36.3500	Relative Permittivity (ϵ_r):	36.35	35.53	2.30	5	
		e"	15.8100	Conductivity (σ):	4.92	5.06	-2.71	5	
Head 5800		e'	36.1200	Relative Permittivity (ϵ_r):	36.12	35.30	2.32	5	
		e"	15.9300	Conductivity (σ):	5.14	5.27	-2.52	5	
Head 5825		e'	36.1000	Relative Permittivity (ϵ_r):	36.10	35.30	2.27	5	
		e"	15.9700	Conductivity (σ):	5.17	5.27	-1.85	5	

SAR Lab 1

Date	Freq. (MHz)	Liquid Parameters		Measured	Target	Delta (%)	Limit ±(%)	
2/3/2014	Body 1900	e'	52.3500	Relative Permittivity (ϵ_r):	52.35	53.30	-1.78	5
		e"	14.2900	Conductivity (σ):	1.51	1.52	-0.68	5
	Body 1850	e'	52.4100	Relative Permittivity (ϵ_r):	52.41	53.30	-1.67	5
		e"	14.2300	Conductivity (σ):	1.46	1.52	-3.70	5
	Body 1910	e'	52.3000	Relative Permittivity (ϵ_r):	52.30	53.30	-1.88	5
		e"	14.3000	Conductivity (σ):	1.52	1.52	-0.09	5
2/5/2014	Body 1750	e'	51.8800	Relative Permittivity (ϵ_r):	51.88	53.44	-2.92	5
		e"	15.7800	Conductivity (σ):	1.54	1.49	3.32	5
	Body 1710	e'	52.0300	Relative Permittivity (ϵ_r):	52.03	53.54	-2.83	5
		e"	15.7000	Conductivity (σ):	1.49	1.46	2.14	5
	Body 1755	e'	51.8500	Relative Permittivity (ϵ_r):	51.85	53.43	-2.95	5
		e"	15.7900	Conductivity (σ):	1.54	1.49	3.47	5
2/6/2014	Head 1900	e'	39.6200	Relative Permittivity (ϵ_r):	39.62	40.00	-0.95	5
		e"	13.2400	Conductivity (σ):	1.40	1.40	-0.09	5
	Head 1850	e'	39.8300	Relative Permittivity (ϵ_r):	39.83	40.00	-0.43	5
		e"	13.1000	Conductivity (σ):	1.35	1.40	-3.75	5
	Head 1910	e'	39.5700	Relative Permittivity (ϵ_r):	39.57	40.00	-1.08	5
		e"	13.2500	Conductivity (σ):	1.41	1.40	0.51	5
2/7/2014	Body 750	e'	54.7500	Relative Permittivity (ϵ_r):	54.75	55.55	-1.43	5
		e"	23.2600	Conductivity (σ):	0.97	0.96	0.72	5
	Body 700	e'	55.3300	Relative Permittivity (ϵ_r):	55.33	55.74	-0.73	5
		e"	23.6500	Conductivity (σ):	0.92	0.96	-4.04	5
	Body 790	e'	54.2700	Relative Permittivity (ϵ_r):	54.27	55.39	-2.03	5
		e"	22.9600	Conductivity (σ):	1.01	0.97	4.39	5
2/10/2014	Head 1750	e'	40.0200	Relative Permittivity (ϵ_r):	40.02	40.08	-0.16	5
		e"	13.8600	Conductivity (σ):	1.35	1.37	-1.48	5
	Head 1710	e'	40.1200	Relative Permittivity (ϵ_r):	40.12	40.15	-0.07	5
		e"	13.7600	Conductivity (σ):	1.31	1.35	-2.83	5
	Head 1755	e'	40.0300	Relative Permittivity (ϵ_r):	40.03	40.08	-0.12	5
		e"	13.8900	Conductivity (σ):	1.36	1.37	-1.19	5
3/3/2014	Head 1750	e'	38.5300	Relative Permittivity (ϵ_r):	38.53	40.08	-3.88	5
		e"	13.9500	Conductivity (σ):	1.36	1.37	-0.84	5
	Head 1710	e'	38.7200	Relative Permittivity (ϵ_r):	38.72	40.15	-3.55	5
		e"	13.8600	Conductivity (σ):	1.32	1.35	-2.12	5
	Head 1755	e'	38.5100	Relative Permittivity (ϵ_r):	38.51	40.08	-3.91	5
		e"	13.9600	Conductivity (σ):	1.36	1.37	-0.69	5
3/3/2014	Body 1750	e'	51.3200	Relative Permittivity (ϵ_r):	51.32	53.44	-3.97	5
		e"	15.0600	Conductivity (σ):	1.47	1.49	-1.40	5
	Body 1710	e'	52.2200	Relative Permittivity (ϵ_r):	52.22	53.54	-2.47	5
		e"	14.6200	Conductivity (σ):	1.39	1.46	-4.89	5
	Body 1755	e'	51.2800	Relative Permittivity (ϵ_r):	51.28	53.43	-4.02	5
		e"	15.1200	Conductivity (σ):	1.48	1.49	-0.92	5

SAR Lab 4

Date	Freq. (MHz)	Liquid Parameters		Measured	Target	Delta (%)	Limit ±(%)	
2/6/2014	Body 835	e'	57.5900	Relative Permittivity (ϵ_r):	57.59	55.20	4.33	5
		e"	21.5700	Conductivity (σ):	1.00	0.97	3.24	5
	Body 820	e'	57.8000	Relative Permittivity (ϵ_r):	57.80	55.28	4.56	5
		e"	21.5700	Conductivity (σ):	0.98	0.97	1.55	5
	Body 850	e'	57.3400	Relative Permittivity (ϵ_r):	57.34	55.16	3.96	5
		e"	21.5400	Conductivity (σ):	1.02	0.99	3.13	5
2/12/2014	Body 2450	e'	52.2700	Relative Permittivity (ϵ_r):	52.27	52.70	-0.82	5
		e"	14.4100	Conductivity (σ):	1.96	1.95	0.67	5
	Body 2410	e'	52.4100	Relative Permittivity (ϵ_r):	52.41	52.76	-0.66	5
		e"	14.2700	Conductivity (σ):	1.91	1.91	0.25	5
	Body 2475	e'	52.1700	Relative Permittivity (ϵ_r):	52.17	52.67	-0.95	5
		e"	14.5200	Conductivity (σ):	2.00	1.99	0.66	5
2/13/2014	Head 835	e'	42.7100	Relative Permittivity (ϵ_r):	42.71	41.50	2.92	5
		e"	20.0000	Conductivity (σ):	0.93	0.90	3.17	5
	Head 820	e'	42.9400	Relative Permittivity (ϵ_r):	42.94	41.60	3.21	5
		e"	20.0500	Conductivity (σ):	0.91	0.90	1.75	5
	Head 850	e'	42.5200	Relative Permittivity (ϵ_r):	42.52	41.50	2.46	5
		e"	19.9400	Conductivity (σ):	0.94	0.92	3.00	5
2/13/2014	Head 750	e'	40.3200	Relative Permittivity (ϵ_r):	40.32	41.96	-3.91	5
		e"	21.5600	Conductivity (σ):	0.90	0.89	0.67	5
	Head 700	e'	40.7400	Relative Permittivity (ϵ_r):	40.74	42.22	-3.50	5
		e"	21.8200	Conductivity (σ):	0.85	0.89	-4.49	5
	Head 790	e'	39.8100	Relative Permittivity (ϵ_r):	39.81	41.76	-4.66	5
		e"	21.2900	Conductivity (σ):	0.94	0.90	4.36	5
3/3/2014	Body 750	e'	55.7500	Relative Permittivity (ϵ_r):	55.75	55.55	0.37	5
		e"	23.3500	Conductivity (σ):	0.97	0.96	1.11	5
	Body 700	e'	56.2900	Relative Permittivity (ϵ_r):	56.29	55.74	0.99	5
		e"	23.8100	Conductivity (σ):	0.93	0.96	-3.39	5
	Body 790	e'	55.3200	Relative Permittivity (ϵ_r):	55.32	55.39	-0.13	5
		e"	23.0300	Conductivity (σ):	1.01	0.97	4.71	5
3/3/2014	Head 750	e'	40.5200	Relative Permittivity (ϵ_r):	40.52	41.96	-3.44	5
		e"	21.6700	Conductivity (σ):	0.90	0.89	1.19	5
	Head 700	e'	41.1600	Relative Permittivity (ϵ_r):	41.16	42.22	-2.51	5
		e"	22.1700	Conductivity (σ):	0.86	0.89	-2.96	5
	Head 790	e'	40.0100	Relative Permittivity (ϵ_r):	40.01	41.76	-4.18	5
		e"	21.3400	Conductivity (σ):	0.94	0.90	4.60	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	1019	3/5/2013	750	1g	8.50	8.68
				10g	5.59	5.75
D750V3	1071	11/15/2013	750	1g	8.46	8.64
				10g	5.51	5.72
D835V2	4d002	11/15/2013	835	1g	9.49	9.43
				10g	6.18	6.21
D835V2	4d142	9/17/2013	835	1g	9.44	9.36
				10g	6.12	6.20
D1750V2	1050	4/20/2013	1750	1g	36.5	37.1
				10g	19.4	20.1
D1900V2	5d163	9/17/2013	1900	1g	40.9	40.1
				10g	21.2	21.2
D2450V2	706	5/29/2013	2450	1g	53.7	49.9
				10g	25.0	23.3
D2450V2	899	9/10/2013	2450	1g	51.3	49.7
				10g	23.9	23.3
D5GHzV2	1138	11/19/2013	5200	1g	78.5	72.9
				10g	22.5	20.4
			5600	1g	82.7	78.3
				10g	23.5	21.7
			5800	1g	78.3	72.8
				10g	22.4	20.1

11.3. System Performance Check Results

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

SAR Lab A

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					
2/7/2014	D2450V2	899	Body	1g	5.31	5.28	52.8	49.7	6.24	0.56	1, 2
				10g	2.31	2.41	24.1	23.3	3.43		
2/17/2014	D2450V2	899	Head	1g	5.17	5.04	50.4	51.3	-1.75	2.51	
				10g	2.23	2.27	22.7	23.9	-5.02		

SAR Lab 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					
2/7/2014	D5GHzV2 (5.2 GHz)	1138	Body	1g	7.54	7.78	77.8	72.9	6.72	-3.18	3, 4
				10g	2.06	2.20	22.0	20.4	7.84		
	D5GHzV2 (5.6 GHz)			1g	6.91	7.39	73.9	78.3	-5.62	-6.95	5, 6
				10g	1.88	2.07	20.7	21.7	-4.61		
	D5GHzV2 (5.8 GHz)			1g	6.90	7.45	74.5	72.8	2.34	-7.97	
				10g	1.89	2.10	21.0	20.1	4.48		
2/13/2014	D5GHzV2 (5.2 GHz)	1138	Head	1g	7.56	7.93	79.3	78.5	1.02	-4.89	
				10g	2.07	2.26	22.6	22.5	0.44		
	D5GHzV2 (5.6 GHz)			1g	7.48	8.02	80.2	82.7	-3.02	-7.22	
				10g	2.03	2.27	22.7	23.5	-3.40		
	D5GHzV2 (5.8 GHz)			1g	7.52	8.09	80.9	78.3	3.32	-7.58	7, 8
				10g	2.05	2.28	22.8	22.4	1.79		

SAR Lab 1

Date Tested	System Dipole		T.S. Liquid	Measured Results			Target (Ref. Value)	Delta ±10 %	Est./Zoom Ratio	Plot No.	
	Type	Serial #		Area Scan	Zoom Scan	Normalize to 1 W					
2/3/2014	D1900V2	5d163	Body	1g	3.86	3.83	38.3	40.1	-4.49	0.78	9,10
				10g	1.98	2.00	20.0	21.2	-5.66		
2/5/2014	D1750V2	1050	Body	1g	3.88	3.81	38.1	37.1	2.70	1.80	11,12
				10g	2.02	2.04	20.4	20.1	1.49		
2/6/2014	D1900V2	5d163	Head	1g	4.24	3.94	39.4	40.9	-3.67	7.08	
				10g	2.17	2.02	20.2	21.2	-4.72		
2/6/2014	D750V3	1019	Body	1g	0.855	0.853	8.53	8.68	-1.73	0.23	13,14
				10g	0.579	0.567	5.67	5.75	-1.39		
2/10/2014	D1750V2	1050	Head	1g	3.73	3.59	35.9	36.5	-1.64	3.75	
				10g	1.98	1.91	19.1	19.4	-1.55		
3/3/2014	D1750V2	1050	Body	1g	3.70	3.62	36.20	37.1	-2.43	2.16	
				10g	1.94	1.94	19.40	20.1	-3.48		
3/3/2014	D1750V2	1050	Head	1g	3.70	3.60	36.00	36.5	-1.37	2.70	
				10g	1.99	1.90	19.00	19.4	-2.06		

SAR Lab 4

Date Tested	System Dipole		T.S. Liquid	Measured Results			Target (Ref. Value)	Delta ±10 %	Est./Zoom Ratio	Plot No.	
	Type	Serial #		Area Scan	Zoom Scan	Normalize to 1 W					
2/6/2014	D835V2	4d142	Body	1g	1.04	1.01	10.1	9.36	7.91	2.88	15,16
				10g	0.696	0.666	6.66	6.20	7.42		
2/13/2014	D835V2	4d002	Head	1g	1.02	0.989	9.89	9.49	4.21	3.04	17,18
				10g	0.687	0.648	6.48	6.18	4.85		
2/13/2014	D750V3	1019	Head	1g	0.850	0.823	8.23	8.50	-3.18	3.18	19,20
				10g	0.578	0.549	5.49	5.59	-1.79		
2/12/2014	D2450V2	706	Body	1g	4.80	4.85	48.5	49.9	-2.81	-1.04	21,22
				10g	2.08	2.25	22.5	23.3	-3.43		
3/3/2014	D750V3	1071	Body	1g	0.894	0.863	8.63	8.46	2.01	3.47	
				10g	0.604	0.572	5.72	5.51	3.81		
3/3/2014	D750V3	1071	Head	1g	0.848	0.818	8.18	8.46	-3.31	3.54	23,24
				10g	0.576	0.533	5.33	5.51	-3.27		

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.

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	836.52	25.0	24.8	0.341	0.357	1
			Left Tilt	384	836.52	25.0	24.8	0.222	0.232	
			Right Touch	384	836.52	25.0	24.8	0.253	0.265	
			Right Tilt	384	836.52	25.0	24.8	0.184	0.193	
	1xEVDO (Rel. 0)	0	Left Touch	384	836.52	25.0	24.9	0.348	0.356	
			Left Tilt	384	836.52	25.0	24.9	0.223	0.228	
			Right Touch	384	836.52	25.0	24.9	0.248	0.254	
			Right Tilt	384	836.52	25.0	24.9	0.191	0.195	
Body-worn & Hotspot	1xRTT (RC3 SO32)	10	Rear	384	836.52	25.0	24.8	0.672	0.704	2
			Front	384	836.52	25.0	24.8	0.343	0.359	
	1xEVDO (Rel. 0)	10	Rear	384	836.52	25.0	24.9	0.677	0.693	
			Front	384	836.52	25.0	24.9	0.353	0.361	
Hotspot	1xRTT (RC3 SO32)	10	Edge 3	384	836.52	25.0	24.8	0.216	0.226	
			Edge 4	384	836.52	25.0	24.8	0.608	0.637	
	1xEVDO (Rel. 0)	10	Edge 3	384	836.52	25.0	24.9	0.219	0.224	
			Edge 4	384	836.52	25.0	24.9	0.611	0.625	

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	836.52	19.0	18.9	0.090	0.092	
			Left Tilt	384	836.52	19.0	18.9	0.058	0.059	
			Right Touch	384	836.52	19.0	18.9	0.067	0.069	
			Right Tilt	384	836.52	19.0	18.9	0.049	0.050	
Body-worn & Hotspot	1xRTT (RC3 SO32)	10	Rear	384	836.52	19.0	18.9	0.177	0.181	
			Front	384	836.52	19.0	18.9	0.088	0.090	
Hotspot	1xRTT (RC3 SO32)	10	Edge 3	384	836.52	19.0	18.9	0.047	0.048	
			Edge 4	384	836.52	19.0	18.9	0.194	0.199	

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	25	1851.25	25.0	25.0	0.795	0.795	
				600	1880	25.0	25.0	0.820	0.820	
				1175	1908.75	25.0	25.0	0.977	0.977	
			Left Tilt	600	1880.00	25.0	25.0	0.269	0.269	
			Right Touch	600	1880.00	25.0	25.0	0.404	0.404	
	Right Tilt	600	1880.00	25.0	25.0	0.270	0.270			
	1xEVDO (Rel. 0)	0	Left Touch	600	1880.00	25.0	25.0	0.759	0.759	
			Left Tilt	600	1880.00	25.0	25.0	0.244	0.244	
			Right Touch	600	1880.00	25.0	25.0	0.381	0.381	
Right Tilt			600	1880.00	25.0	25.0	0.254	0.254		
Body-worn & Hotspot	1xRTT (RC3 SO32)	10	Rear	25	1851.25	25.0	25.0	1.090	1.090	
				600	1880.00	25.0	24.9	1.070	1.095	
				1175	1908.75	25.0	24.9	1.020	1.044	
	Front	600	1880.00	25.0	24.9	0.658	0.673			
	1xEVDO (Rel. 0)	10	Rear	25	1851.25	25.0	25.0	1.180	1.180	
				600	1880.00	25.0	25.0	1.110	1.110	
				1175	1908.75	25.0	25.0	1.160	1.160	
Front				600	1880.00	25.0	25.0	0.676	0.676	
Hotspot	1xRTT (RC3 SO32)	10	Edge 3	600	1880.00	25.0	24.9	0.172	0.176	
			Edge 4	600	1880.00	25.0	24.9	0.504	0.516	
	1xEVDO (Rel. 0)	10	Edge 3	600	1880.00	25.0	25.0	0.147	0.147	
			Edge 4	600	1880.00	25.0	25.0	0.646	0.646	

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	1880.00	19.0	19.0	0.220	0.220	
			Left Tilt	600	1880.00	19.0	19.0	0.077	0.077	
			Right Touch	600	1880.00	19.0	19.0	0.119	0.119	
			Right Tilt	600	1880.00	19.0	19.0	0.082	0.082	
Body-worn & Hotspot	1xRTT (RC3 SO32)	10	Rear	600	1880.00	19.0	19.0	0.292	0.292	
			Front	600	1880.00	19.0	19.0	0.202	0.202	
Hotspot	1xRTT (RC3 SO32)	10	Edge 3	600	1880.00	19.0	19.0	0.049	0.049	
			Edge 4	600	1880.00	19.0	19.0	0.129	0.129	

12.3. LTE Band 4 (20 MHz Bandwidth)

12.3.1. Maximum Power

RF Exposure Conditions	Mode	Dist. (mm)	Test Position	UL Ch #.	Freq. (MHz)	RB Allocation	RB offset	Power (dBm)		1-g SAR (W/kg)		Plot No.
								Tune-up limit	Meas.	Meas.	Scaled	
Head	QPSK	0	Left Touch	20175	1732.5	1	49	24.0	24.0	0.238	0.238	
						50	0	23.0	23.0	0.191	0.191	
			Left Tilt	20175	1732.5	1	49	24.0	24.0	0.160	0.160	
						50	0	23.0	23.0	0.124	0.124	
			Right Touch	20175	1732.5	1	49	24.0	24.0	0.522	0.522	5
						50	0	23.0	23.0	0.413	0.413	
Right Tilt	20175	1732.5	1	49	24.0	24.0	0.150	0.150				
			50	0	23.0	23.0	0.126	0.126				
Body-worn & Hotspot	QPSK	10	Rear	20050	1720.0	1	0	24.0	23.9	1.080	1.105	
						50	0	23.0	22.9	0.905	0.926	
						100	0	23.0	23.0	0.922	0.922	
				20175	1732.5	1	49	24.0	24.0	1.120	1.120	6
						50	0	23.0	23.0	0.922	0.922	
						20300	1745.0	1	0	24.0	24.0	1.070
			50	0	23.0	22.9		0.898	0.919			
			Front	20175	1732.5	1	49	24.0	24.0	0.739	0.739	
50	0	23.0				23.0	0.597	0.597				
Hotspot	QPSK	10	Edge 2	20175	1732.5	1	49	24.0	24.0	0.312	0.312	
						50	0	23.0	23.0	0.259	0.259	
			Edge 3	20175	1732.5	1	49	24.0	24.0	0.312	0.312	
						50	0	23.0	23.0	0.261	0.261	

12.3.2. Power Reduction

RF Exposure Conditions	Mode	Dist. (mm)	Test Position	UL Ch #.	Freq. (MHz)	RB Allocation	RB offset	Power (dBm)		1-g SAR (W/kg)		Plot No.
								Tune-up limit	Meas.	Meas.	Scaled	
Head	QPSK	0	Left Touch	20175	1732.5	1	49	19.0	19.0	0.066	0.066	
						50	0	19.0	19.0	0.054	0.054	
			Left Tilt	20175	1732.5	1	49	19.0	19.0	0.042	0.042	
						50	0	19.0	19.0	0.033	0.033	
			Right Touch	20175	1732.5	1	49	19.0	19.0	0.190	0.190	
						50	0	19.0	19.0	0.153	0.153	
Right Tilt	20175	1732.5	1	49	19.0	19.0	0.043	0.043				
			50	0	19.0	19.0	0.036	0.036				
Body-worn & Hotspot	QPSK	10	Rear	20175	1732.5	1	49	19.0	19.0	0.308	0.308	
						50	0	19.0	19.0	0.256	0.256	
			Front	20175	1732.5	1	49	19.0	19.0	0.212	0.212	
						50	0	19.0	19.0	0.176	0.176	
Hotspot	QPSK	10	Edge 3	20175	1732.5	1	49	19.0	19.0	0.093	0.093	
						50	0	19.0	19.0	0.074	0.074	
			Edge 4	20175	1732.5	1	49	19.0	19.0	0.096	0.096	
						50	0	19.0	19.0	0.082	0.082	

12.4. LTE Band 13 (10 MHz Bandwidth)

12.4.1. Maximum Power

RF Exposure Conditions	Mode	Dist. (mm)	Test Position	UL Ch #.	Freq. (MHz)	RB Allocation	RB offset	Power (dBm)		1-g SAR (W/kg)		Plot No.
								Tune-up limit	Meas.	Meas.	Scaled	
Head	QPSK	0	Left Touch	23230	782.0	1	49	24.2	24.2	0.289	0.289	
								23.2	23.1	0.229	0.234	
			Left Tilt	23230	782.0	1	49	24.2	24.2	0.198	0.198	
			Right Touch	23230	782.0	1	49	24.2	24.2	0.341	0.341	7
Right Tilt	23230	782.0	1	49	24.2	24.2	0.209	0.209				
										23.2	23.1	0.155
Body-worn & Hotspot	QPSK	10	Rear	23230	782.0	1	49	24.2	24.2	0.646	0.646	
								23.2	23.1	0.550	0.563	
			Front	23230	782.0	1	49	24.2	24.2	0.422	0.422	
Hotspot	QPSK	10	Edge 2	23230	782.0	1	49	24.2	24.2	0.659	0.659	8
								23.2	23.1	0.571	0.584	
			Edge 3	23230	782.0	1	49	24.2	24.2	0.171	0.171	

12.4.2. Power Reduction

RF Exposure Conditions	Mode	Dist. (mm)	Test Position	UL Ch #.	Freq. (MHz)	RB Allocation	RB offset	Power (dBm)		1-g SAR (W/kg)		Plot No.
								Tune-up limit	Meas.	Meas.	Scaled	
Head	QPSK	0	Left Touch	23230	782.0	1	49	20.2	20.2	0.117	0.117	
								20.2	20.1	0.088	0.090	
			Left Tilt	23230	782.0	1	49	20.2	20.2	0.074	0.074	
			Right Touch	23230	782.0	1	49	20.2	20.2	0.153	0.153	
Right Tilt	23230	782.0	1	49	20.2	20.2	0.091	0.091				
										20.2	20.1	0.064
Body-worn & Hotspot	QPSK	10	Rear	23230	782.0	1	49	20.2	20.2	0.250	0.250	
								20.2	20.1	0.201	0.206	
			Front	23230	782.0	1	49	20.2	20.2	0.176	0.176	
Hotspot	QPSK	10	Edge 3	23230	782.0	1	49	20.2	20.2	0.268	0.268	
								20.2	20.1	0.215	0.220	
			Edge 4	23230	782.0	1	49	20.2	20.2	0.070	0.070	

12.5. Wi-Fi (DTS Bands)

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	0	Left Touch	6	2437	15.3	15.0	0.116	0.124	9
			Left Tilt	6	2437	15.3	15.0	0.092	0.099	
			Right Touch	6	2437	15.3	15.0	0.079	0.085	
			Right Tilt	6	2437	15.3	15.0	0.075	0.080	
Body-worn, Hotspot, and Wi-Fi Direct	802.11b	10	Rear	6	2437	15.3	15.0	0.063	0.068	10
			Front	6	2437	15.3	15.0	0.029	0.031	
Hotspot and Wi-Fi Direct	802.11b	10	Edge 1	6	2437	15.3	15.0	0.039	0.042	
			Edge 2	6	2437	15.3	15.0	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	0	Left Touch	149	5745	13.1	13.0	0.418	0.428	
			Left Tilt	149	5745	13.1	13.0	0.451	0.462	11
			Right Touch	149	5745	13.1	13.0	0.373	0.382	
			Right Tilt	149	5745	13.1	13.0	0.399	0.408	
Body-worn & Wi-Fi Direct	802.11a	10	Rear	149	5745	13.1	13.0	0.145	0.148	12
			Front	149	5745	13.1	13.0	0.080	0.082	
Wi-Fi Direct	802.11a	10	Edge 1	149	5745	13.1	13.0	0.179	0.183	13
			Edge 2	149	5745	13.1	13.0	0.000	0.000	

12.5.3. 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	0	Left Touch	44	5220	13.1	13.0	0.254	0.260	
				56	5280	13.1	12.9	0.347	0.363	
				136	5680	13.1	13.0	0.355	0.363	
		0	Left Tilt	44	5220	13.1	13.0	0.227	0.232	
				56	5280	13.1	12.9	0.312	0.327	
				136	5680	13.1	13.0	0.373	0.382	14
		0	Right Touch	44	5220	13.1	13.0	0.177	0.181	
				56	5280	13.1	12.9	0.236	0.247	
				136	5680	13.1	13.0	0.311	0.318	
		0	Right Tilt	44	5220	13.1	13.0	0.169	0.173	
				56	5280	13.1	12.9	0.231	0.242	
				136	5680	13.1	13.0	0.370	0.379	
Body	802.11a	10	Rear	44	5220	13.1	13.0	0.056	0.057	
				56	5280	13.1	12.9	0.099	0.104	
				136	5680	13.1	13.0	0.104	0.106	15
		10	Front	44	5220	13.1	13.0	0.051	0.052	
				56	5280	13.1	12.9	0.068	0.071	
				136	5680	13.1	13.0	0.045	0.046	

12.6. Bluetooth

RF Exposure Conditions	Test Position	Mode	Dist. (mm)	Ch #.	Freq. (MHz)	Power (dBm)		1-g SAR (W/kg)		Plot No.
						Tune-up limit	Meas.	Meas.	Scaled	
Body	Rear	GFSK	10	39	2441	9.3	5.8	0.005	0.011	16
Body	Front	GFSK	10	39	2441	9.3	5.8	0.000	0.000	

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	N/A	N/A
1750	LTE Band 4	N/A	1.120 W/kg	N/A
1900	CDMA BC1	0.977 W/kg	1.180 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

RF Exposure Conditions	Test Position	Mode	Dist. (mm)	Ch #.	Freq. (MHz)	Meas. SAR (W/kg)		Largest to Smallest SAR Ratio
						Original	Repeated	
Head	1xRTT (SO55)	Left Touch	0	1175	1908.75	0.977	0.938	1.04

Body-worn Accessory and Hotspot Mode Exposure Condition

RF Exposure Conditions	Test Position	Mode	Dist. (mm)	Ch #.	Freq. (MHz)	Meas. SAR (W/kg)		Largest to Smallest SAR Ratio
						Original	Repeated	
Body-worn & Hotspot	Rear	1xEVDO (Rel. 0)	10	25	1851.24	1.180	1.090	1.08
Body-worn & Hotspot	Rear	QPSK	10	20175	1732.5	1.120	1.090	1.03

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 2.4 GHz Band, & BT

RF Exposure conditions	Test Position	Simultaneous Transmission Scenario			Σ 1-g SAR (W/kg)	SPLSR (Yes/ No)
		CDMA BC0	WiFi DTS Band	Bluetooth		
Head	Left Touch	0.357	0.124		0.481	No
	Left Tilt	0.232	0.099		0.331	No
	RightTouch	0.265	0.085		0.350	No
	RightTilt	0.195	0.080		0.275	No
Body-worn, Hotspot, and Wi-Fi Direct	Rear	0.704	0.068		0.772	No
		0.704		0.011	0.715	No
	Front	0.361	0.031		0.392	No
		0.361		0.000	0.361	No
Hotspot and Wi-Fi Direct	Edge 1		0.042		0.042	No
	Edge 2		0.027		0.027	No
	Edge 3	0.226			0.226	No
	Edge 4	0.637			0.637	No

SAR to Peak Location Separation Ratio (SPLSR)

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

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

RF Exposure conditions	Test Position	Simultaneous Transmission Scenario				Σ 1-g SAR (W/kg)	SPLSR (Yes/ No)
		CDMA BC0	WiFi 5.8 GHz DTS Band	WiFi UNII Band	Bluetooth		
Head	Left Touch	0.357	0.428			0.785	No
		0.357		0.363		0.720	No
	Left Tilt	0.232	0.462			0.694	No
		0.232		0.382		0.614	No
	Right Touch	0.265	0.382			0.647	No
		0.265		0.318		0.583	No
Right Tilt	0.195	0.408			0.603	No	
	0.195		0.379		0.574	No	
Body-worn, Hotspot, and Wi-Fi Direct	Rear	0.704	0.148			0.852	No
		0.704		0.106		0.810	No
		0.704			0.011	0.715	No
	Front	0.361	0.082			0.443	No
		0.361		0.071		0.432	No
		0.361			0.000	0.361	No
Hotspot and Wi-Fi Direct	Edge 1		0.183			0.183	No
	Edge 2		0.000			0.000	No
	Edge 3	0.226				0.226	No
	Edge 4	0.637				0.637	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 (W/kg)	SPLSR (Yes/ No)
		CDMA BC1	WiFi DTS Band	Bluetooth		
Head	Left Touch	0.977	0.124		1.101	No
	Left Tilt	0.269	0.099		0.368	No
	RightTouch	0.404	0.085		0.489	No
	RightTilt	0.270	0.080		0.350	No
Body-worn, Hotspot, and Wi-Fi Direct	Rear	1.180	0.068		1.248	No
		1.180		0.011	1.191	No
	Front	0.676	0.031		0.707	No
		0.676		0.000	0.676	No
Hotspot and Wi-Fi Direct	Edge 1		0.042		0.042	No
	Edge 2		0.027		0.027	No
	Edge 3	0.176			0.176	No
	Edge 4	0.646			0.646	No

SAR to Peak Location Separation Ratio (SPLSR)

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

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

RF Exposure conditions	Test Position	Simultaneous Transmission Scenario				Σ 1-g SAR (W/kg)	SPLSR (Yes/ No)
		CDMA BC1	WiFi 5.8 GHz DTS Band	WiFi UNII Band	Bluetooth		
Head	Left Touch	0.977	0.428			1.405	No
		0.977		0.363		1.340	No
	Left Tilt	0.269	0.462			0.731	No
		0.269		0.382		0.651	No
	Right Touch	0.404	0.382			0.786	No
		0.404		0.318		0.722	No
Right Tilt	0.270	0.408			0.678	No	
	0.270		0.379		0.649	No	
Body-worn, Hotspot, and Wi-Fi Direct	Rear	1.180	0.148			1.328	No
		1.180		0.106		1.286	No
		1.180			0.011	1.191	No
	Front	0.676	0.082			0.758	No
		0.676		0.071		0.747	No
		0.676			0.000	0.676	No
Hotspot and Wi-Fi Direct	Edge 1		0.183			0.183	No
	Edge 2		0.000			0.000	No
	Edge 3	0.176				0.176	No
	Edge 4	0.646				0.646	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 (W/kg)	SPLSR (Yes/ No)
		LTE Band 4	WiFi DTS Band	Bluetooth		
Head	Left Touch	0.238	0.124		0.362	No
	Left Tilt	0.160	0.099		0.259	No
	RightTouch	0.522	0.085		0.607	No
	RightTilt	0.150	0.080		0.230	No
Body-worn, Hotspot, and Wi-Fi Direct	Rear	1.120	0.068		1.188	No
		1.120		0.011	1.131	No
	Front	0.739	0.031		0.770	No
		0.739		0.000	0.739	No
Hotspot and Wi-Fi Direct	Edge 1		0.042		0.042	No
	Edge 2	0.312	0.027		0.339	No
	Edge 3	0.312			0.312	No
	Edge 4					

SAR to Peak Location Separation Ratio (SPLSR)

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

14.6. Sum of the SAR for LTE Band 4, Wi-Fi 5 GHz Bands, & BT

RF Exposure conditions	Test Position	Simultaneous Transmission Scenario				Σ 1-g SAR (W/kg)	SPLSR (Yes/ No)
		LTE Band 4	WiFi 5.8 GHz DTS Band	WiFi UNII Band	Bluetooth		
Head	Left Touch	0.238	0.428			0.666	No
		0.238		0.363		0.601	No
	Left Tilt	0.160	0.462			0.622	No
		0.160		0.382		0.542	No
	Right Touch	0.522	0.382			0.904	No
		0.522		0.318		0.840	No
	Right Tilt	0.150	0.408			0.558	No
		0.150		0.379		0.529	No
Body-worn, Hotspot, and Wi-Fi Direct	Rear	1.120	0.148			1.268	No
		1.120		0.106		1.226	No
		1.120			0.011	1.131	No
	Front	0.739	0.082			0.821	No
		0.739		0.071		0.810	No
		0.739			0.000	0.739	No
Hotspot and Wi-Fi Direct	Edge 1		0.183			0.183	No
	Edge 2	0.312	0.000			0.312	No
	Edge 3	0.312				0.312	No
	Edge 4						

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 Band, & BT

RF Exposure conditions	Test Position	Simultaneous Transmission Scenario			Σ 1-g SAR (W/kg)	SPLSR (Yes/ No)
		LTE Band 13	WiFi DTS Band	Bluetooth		
Head	Left Touch	0.289	0.124		0.413	No
	Left Tilt	0.198	0.099		0.297	No
	RightTouch	0.341	0.085		0.426	No
	RightTilt	0.209	0.080		0.289	No
Body-worn, Hotspot, and Wi-Fi Direct	Rear	0.646	0.068		0.714	No
		0.646		0.011	0.657	No
	Front	0.422	0.031		0.453	No
		0.422		0.000	0.422	No
Hotspot and Wi-Fi Direct	Edge 1		0.042		0.042	No
	Edge 2	0.659	0.027		0.686	No
	Edge 3	0.171			0.171	No
	Edge 4					

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.

14.8. 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 (W/kg)	SPLSR (Yes/ No)
		LTE Band 13	WiFi 5.8 GHz DTS Band	WiFi UNII Band	Bluetooth		
Head	Left Touch	0.289	0.428			0.717	No
		0.289		0.363		0.652	No
	Left Tilt	0.198	0.462			0.660	No
		0.198		0.382		0.580	No
	Right Touch	0.341	0.382			0.723	No
		0.341		0.318		0.659	No
Right Tilt	0.209	0.408			0.617	No	
	0.209		0.379		0.588	No	
Body-worn, Hotspot, and Wi-Fi Direct	Rear	0.646	0.148			0.794	No
		0.646		0.106		0.752	No
		0.646			0.011	0.657	No
	Front	0.422	0.082			0.504	No
		0.422		0.071		0.493	No
		0.422			0.000	0.422	No
Hotspot and Wi-Fi Direct	Edge 1		0.183			0.183	No
	Edge 2	0.659	0.000			0.659	No
	Edge 3	0.171				0.171	No
	Edge 4						

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	0.357		0.066		0.124		0.547
		0.357			0.117	0.124		0.598
			0.977	0.066		0.124		1.167
			0.977		0.117	0.124		1.218
	Left Tilt	0.232		0.042		0.099		0.373
		0.232			0.074	0.099		0.405
			0.269	0.042		0.099		0.410
			0.269		0.074	0.099		0.442
	Right Touch	0.265		0.190		0.085		0.540
		0.265			0.153	0.085		0.503
			0.404	0.190		0.085		0.679
			0.404		0.153	0.085		0.642
	Right Tilt	0.193		0.043		0.080		0.316
		0.193			0.091	0.080		0.364
		0.270	0.043		0.080		0.393	
		0.270		0.091	0.080		0.441	
Body-worn, Hotspot, and Wi-Fi Direct	Rear	0.704		0.308		0.068		1.080
		0.704		0.308			0.011	1.023
		0.704			0.250	0.068		1.022
		0.704			0.250		0.011	0.965
			1.095	0.308		0.068		1.471
			1.095	0.308			0.011	1.414
			1.095		0.250	0.068		1.413
			1.095		0.250		0.011	1.356
	Front	0.359		0.212		0.031		0.602
		0.359		0.212			0.000	0.571
		0.359			0.176	0.031		0.566
		0.359			0.176		0.000	0.535
			0.673	0.212		0.031		0.916
			0.673	0.212			0.000	0.885
	0.673		0.176	0.031		0.880		
	0.673		0.176		0.000	0.849		
Hotspot and Wi-Fi Direct	Edge 1					0.042		0.042
	Edge 2			0.093		0.027		0.120
	Edge 3				0.268	0.027		0.295
		0.226		0.096				0.322
		0.226			0.070			0.296
			0.176	0.096				0.272
	Edge 4		0.176		0.070			0.246
		0.637						0.637
		0.646					0.646	

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	0.357		0.066		0.428			0.851	
		0.357		0.066			0.363		0.786	
		0.357			0.117	0.428			0.902	
		0.357			0.117		0.363		0.837	
			0.977	0.066		0.428			1.471	
			0.977	0.066			0.363		1.406	
			0.977		0.117	0.428			1.522	
			0.977		0.117		0.363		1.457	
	Left Tilt	0.232		0.042		0.462			0.736	
		0.232		0.042			0.382		0.656	
		0.232			0.074	0.462			0.768	
		0.232			0.074		0.382		0.688	
			0.269	0.042		0.462			0.773	
			0.269	0.042			0.382		0.693	
			0.269		0.074	0.462			0.805	
			0.269		0.074		0.382		0.725	
	Right Touch	0.265		0.190		0.382			0.837	
		0.265		0.190			0.318		0.773	
		0.265			0.153	0.382			0.800	
		0.265			0.153		0.318		0.736	
			0.404	0.190		0.382			0.976	
			0.404	0.190			0.318		0.912	
			0.404		0.153	0.382			0.939	
			0.404		0.153		0.318		0.875	
	Right Tilt	0.193		0.043		0.408			0.644	
		0.193		0.043			0.379		0.615	
		0.193			0.091	0.408			0.692	
		0.193			0.091		0.379		0.663	
			0.270	0.043		0.408			0.721	
			0.270	0.043			0.379		0.692	
			0.270		0.091	0.408			0.769	
			0.270		0.091		0.379		0.740	
	Body-worn, Hotspot, and Wi-Fi Direct	Rear	0.704		0.308		0.148			1.160
			0.704		0.308			0.106		1.118
			0.704		0.308				0.011	1.023
			0.704			0.250	0.148			1.102
0.704					0.250		0.106		1.060	
0.704					0.250			0.011	0.965	
			1.095	0.308		0.148			1.551	
			1.095	0.308			0.106		1.509	
			1.095	0.308				0.011	1.414	
			1.095		0.250	0.148			1.493	
			1.095		0.250		0.106		1.451	
			1.095		0.250			0.011	1.356	
Front		0.359		0.212		0.082			0.653	
		0.359		0.212			0.071		0.642	
		0.359		0.212				0.000	0.571	
		0.359			0.176	0.082			0.617	
		0.359			0.176		0.071		0.606	
		0.359			0.176			0.000	0.535	
			0.673	0.212		0.082			0.967	
			0.673	0.212			0.071		0.956	
			0.673	0.212				0.000	0.885	
			0.673		0.176	0.082			0.931	
			0.673		0.176		0.071		0.920	
			0.673		0.176			0.000	0.849	
Hotspot and Wi-Fi Direct	Edge 1					0.183			0.183	
	Edge 2			0.093		0.000			0.093	
	Edge 3	0.226		0.096					0.322	
		0.226			0.070				0.296	
			0.176	0.096					0.272	
			0.176		0.070				0.246	
	Edge 4	0.637							0.637	
			0.516						0.516	

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	0.092		0.238		0.124		0.454
		0.092			0.289	0.124		0.505
			0.220	0.238		0.124		0.582
			0.220		0.289	0.124		0.633
	Left Tilt	0.059		0.160		0.099		0.318
		0.059			0.198	0.099		0.356
			0.077	0.160		0.099		0.336
			0.077		0.198	0.099		0.374
	Right Touch	0.069		0.522		0.085		0.676
		0.069			0.341	0.085		0.495
			0.119	0.522		0.085		0.726
			0.119		0.341	0.085		0.545
	Right Tilt	0.050		0.150		0.080		0.280
		0.050			0.209	0.080		0.339
			0.082	0.150		0.080		0.312
			0.082		0.209	0.080		0.371
Body-worn, Hotspot, and Wi-Fi Direct	Rear	0.181		1.120		0.068		1.369
		0.181		1.120			0.011	1.312
		0.181			0.646	0.068		0.895
		0.181			0.646		0.011	0.838
			0.292	1.120		0.068		1.480
			0.292	1.120			0.011	1.423
			0.292		0.646	0.068		1.006
			0.292		0.646		0.011	0.949
	Front	0.090		0.739		0.031		0.860
		0.090		0.739			0.000	0.829
		0.090			0.422	0.031		0.543
		0.090			0.422		0.000	0.512
			0.202	0.739		0.031		0.972
			0.202	0.739			0.000	0.941
			0.202		0.422	0.031		0.655
			0.202		0.422		0.000	0.624
Hotspot and Wi-Fi Direct	Edge 1					0.042		0.042
	Edge 2			0.312		0.027		0.339
	Edge 3				0.659	0.027		0.686
		0.048		0.312				0.360
		0.048			0.171			0.219
			0.049	0.312				0.361
	Edge 4		0.049		0.171			0.220
		0.199						0.199
		0.129					0.129	

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	0.092		0.238		0.428			0.758	
		0.092		0.238			0.363		0.693	
		0.092			0.289	0.428			0.809	
		0.092			0.289		0.363		0.744	
			0.220	0.238		0.428			0.886	
			0.220	0.238			0.363		0.821	
	Left Tilt		0.220		0.289	0.428			0.937	
			0.220		0.289		0.363		0.872	
		0.059		0.160		0.462			0.681	
		0.059		0.160			0.382		0.601	
		0.059			0.198	0.462			0.719	
		0.059			0.198		0.382		0.639	
	Right Touch		0.077	0.160		0.462			0.699	
			0.077	0.160			0.382		0.619	
			0.077		0.198	0.462			0.737	
			0.077		0.198		0.382		0.657	
		0.069		0.522		0.382			0.973	
		0.069		0.522			0.318		0.909	
	Right Tilt	0.069			0.341	0.382			0.792	
		0.069	0.119	0.522	0.341	0.318			0.728	
			0.119	0.522		0.318			1.023	
			0.119		0.341	0.382			0.959	
			0.119		0.341		0.318		0.842	
			0.119		0.341		0.318		0.778	
	Body-worn, Hotspot, and Wi-Fi Direct	Rear	0.050		0.150		0.408			0.608
			0.050		0.150			0.379		0.579
			0.050			0.209	0.408			0.667
			0.050			0.209		0.379		0.638
				0.082	0.150		0.408			0.640
				0.082	0.150			0.379		0.611
		Front		0.082		0.209	0.408			0.699
				0.082		0.209		0.379		0.670
			0.181		1.120		0.148			1.449
			0.181		1.120			0.106		1.407
			0.181		1.120				0.011	1.312
			0.181			0.646	0.148			0.975
Hotspot and Wi-Fi Direct	Edge 1	0.181		0.646		0.106		0.933		
		0.181		0.646			0.011	0.838		
			0.292	1.120		0.148			1.560	
			0.292	1.120			0.106		1.518	
			0.292	1.120				0.011	1.423	
			0.292		0.646	0.148			1.086	
	Edge 2		0.292		0.646		0.106		1.044	
			0.292		0.646			0.011	0.949	
		0.090		0.739		0.082			0.911	
		0.090		0.739			0.071		0.900	
		0.090		0.739				0.000	0.829	
		0.090			0.422	0.082			0.594	
	Edge 3	0.090			0.422		0.071		0.583	
		0.090			0.422			0.000	0.512	
			0.202	0.739		0.082			1.023	
			0.202	0.739			0.071		1.012	
			0.202	0.739				0.000	0.941	
			0.202		0.422	0.082			0.706	
Edge 4		0.202		0.422		0.071		0.695		
		0.202		0.422			0.000	0.624		
	Edge 1					0.183		0.183		
	Edge 2			0.312		0.000		0.312		
	Edge 3				0.659	0.000			0.659	
		0.048		0.312					0.360	
0.048				0.171				0.219		
Edge 4		0.049	0.312					0.361		
		0.049		0.171				0.220		
	0.199							0.199		
		0.129						0.129		

15. Appendixes

Refer to the 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 3929**
- 15.5. Calibration Certificate for E-Field Probe EX3DV4 - SN 3936**
- 15.6. Calibration Certificate for E-Field Probe EX3DV4 - SN 3871**
- 15.7. Calibration Certificate for E-Field Probe EX3DV4 - SN 3885**
- 15.8. Calibration Certificate for D750V3 - SN 1019**
- 15.9. Calibration Certificate for D750V3 - SN 1071**
- 15.10. Calibration Certificate for D835V2 - SN 4d002**
- 15.11. Calibration Certificate for D835V2 - SN 4d142**
- 15.12. Calibration Certificate for D1750V2 - SN 1050**
- 15.13. Calibration Certificate for D1900V2- SN 5d163**
- 15.14. Calibration Certificate for D2450V2 – SN 706**
- 15.15. Calibration Certificate for D2450V2 – SN 899**
- 15.16. Calibration Certificate for D5GHzV2 – SN 1138**

END OF REPORT