



SAR EVALUATION REPORT

**FCC 47 CFR § 2.1093
IEEE Std 1528-2013**

For
GSM/W-CDMA/LTE + BLUETOOTH, DTS/UNII a/b/g/n/ac, ANT+ & NFC

FCC ID: PY7-PM0792

**Report Number: 15J20224-S1A
Issue Date: 5/7/2015**

Prepared for
**SONY MOBILE COMMUNICATIONS INC.
NYA VATTENTORNET MOBILVAGEN 10
LUND 22188
SWEDEN**

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



NVLAP LAB CODE 200065-0

Revision History

Rev.	Date	Revisions	Revised By
--	4/22/2015	Initial Issue	--
A	5/7/2015	1. Updated Section 1 for highest reported SAR 2. Updated Section 4.3 for test equipment list 3. Updated Section 8 for Dielectric Property Measurements & System Check 4. Updated WLAN SAR data 5. Updated Appendixes B, C,E and F	Devin Chang

Table of Contents

1.	Attestation of Test Results.....	5
2.	Test Specification, Methods and Procedures.....	6
3.	Facilities and Accreditation.....	6
4.	SAR Measurement System & Test Equipment	7
4.1.	<i>SAR Measurement System</i>	<i>7</i>
4.2.	<i>SAR Scan Procedures.....</i>	<i>8</i>
4.3.	<i>Test Equipment</i>	<i>10</i>
5.	Measurement Uncertainty	11
6.	Device Under Test (DUT) Information	11
6.1.	<i>DUT Description</i>	<i>11</i>
6.2.	<i>Wireless Technologies</i>	<i>11</i>
6.3.	<i>Nominal and Maximum Output Power</i>	<i>12</i>
6.4.	<i>General LTE SAR Test and Reporting Considerations</i>	<i>14</i>
7.	RF Exposure Conditions (Test Configurations)	15
8.	Dielectric Property Measurements & System Check	16
8.1.	<i>Dielectric Property Measurements.....</i>	<i>16</i>
8.2.	<i>System Check.....</i>	<i>20</i>
9.	Conducted Output Power Measurements.....	23
9.1.	<i>GSM</i>	<i>23</i>
9.2.	<i>W-CDMA</i>	<i>26</i>
9.4.	<i>LTE</i>	<i>30</i>
9.5.	<i>Wi-Fi 2.4GHz (DTS Bands)</i>	<i>34</i>
9.6.	<i>Wi-Fi 5GHz (U-NII Bands)</i>	<i>35</i>
9.7.	<i>Bluetooth</i>	<i>36</i>
10.	Measured and Reported (Scaled) SAR Results.....	37
10.1.	<i>GSM850.....</i>	<i>38</i>
10.2.	<i>GSM1900.....</i>	<i>38</i>
10.3.	<i>W-CDMA Band V</i>	<i>39</i>
10.4.	<i>W-CDMA Band II</i>	<i>39</i>
10.5.	<i>LTE Band 5 (10MHz Bandwidth).....</i>	<i>40</i>
10.6.	<i>LTE Band 17 (10MHz Bandwidth).....</i>	<i>40</i>
10.7.	<i>Wi-Fi (DTS Band).....</i>	<i>41</i>
10.8.	<i>Wi-Fi (U-NII Band).....</i>	<i>42</i>

10.9.	<i>Bluetooth</i>	43
11.	SAR Measurement Variability	44
12.	Simultaneous Transmission SAR Analysis	45
12.1.	<i>Sum of the SAR for WWAN & Wi-Fi & BT</i>	45
	Appendixes	46
	<i>A_15J20224v0 SAR Photos & Ant. Locations</i>	46
	<i>B_15J20224v1 SAR System Check Plots</i>	46
	<i>C_15J20224v1 SAR Highest Test Plots</i>	46
	<i>D_15J20224v0 SAR Tissue Ingredients</i>	46
	<i>E_15J20224v1 SAR Probe Cal. Certificates</i>	46
	<i>F_15J20224v1 SAR Dipole Cal. Certificates</i>	46

1. Attestation of Test Results

Applicant Name	SONY MOBILE COMMUNICATIONS, INC.				
FCC ID	PY7-PM0792				
Applicable Standards	FCC 47 CFR § 2.1093 Published RF exposure KDB procedures IEEE Std 1528-2013				
SAR Limits (W/Kg)					
Exposure Category	Peak spatial-average(1g of tissue)				
General population / Uncontrolled exposure	1.6				
The Highest Reported SAR (W/kg)					
RF Exposure Conditions	Equipment Class				
	Licensed	DTS	U-NII	DSS (BT)	
Head	0.392	0.355	0.524	N/A	
Body-worn	0.334	0.156	0.087		
Hotspot/Wi-Fi Direct	0.728				
Simultaneous Tx	0.916	0.884	0.916		
Date Tested	3/30/2015 to 4/16/2015 and 5/4/2015 to 5/7/2015				
Test Results	Pass				
UL Verification Services Inc. tested the above equipment in accordance with the requirements set forth in the above standards. All indications of Pass/Fail in this report are opinions expressed by UL Verification Services Inc. based on interpretations and/or observations of test results. Measurement Uncertainties were not taken into account and are published for informational purposes only. The test results show that the equipment tested is capable of demonstrating compliance with the requirements as documented in this report. Note: The results documented in this report apply only to the tested sample, under the conditions and modes of operation as described herein. This document may not be altered or revised in any way unless done so by UL Verification Services Inc. and all revisions are duly noted in the revisions section. Any alteration of this document not carried out by UL Verification Services Inc. will constitute fraud and shall nullify the document. This report must not be used by the client to claim product certification, approval, or endorsement by NVLAP, NIST, any agency of the Federal Government, or any agency of any government (NIST Handbook 150, Annex A). This report is written to support regulatory compliance of the applicable standards stated above.					
Approved & Released By:		Prepared By:			
					
Devin Chang Senior Engineer UL Verification Services Inc.		Coltyce Sanders Laboratory Engineer UL Verification Services Inc.			

2. Test Specification, Methods and Procedures

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

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

3. Facilities and Accreditation

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

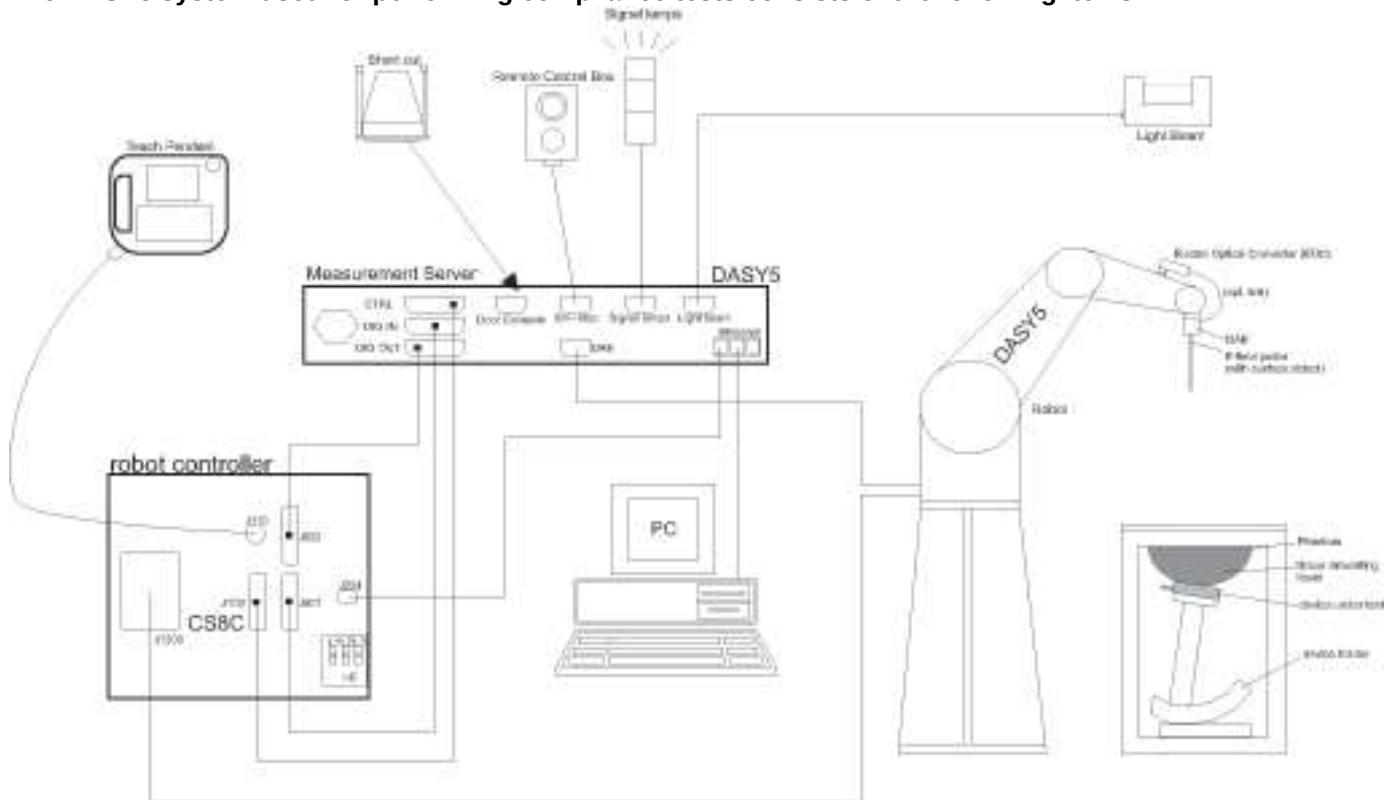
47173 Benicia Street	47266 Benicia Street
SAR Lab A	SAR Lab 1
SAR Lab B	SAR Lab 2
SAR Lab C	SAR Lab 3
SAR Lab D	SAR Lab 4
SAR Lab E	SAR Lab 5
SAR Lab F	
SAR Lab G	
SAR Lab H	

UL Verification Services Inc. is accredited by NVLAP, Laboratory Code 200065-0. The full scope of accreditation can be viewed at <http://ts.nist.gov/standards/scopes/2000650.htm>

4. SAR Measurement System & Test Equipment

4.1. SAR Measurement System

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



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

4.2. SAR Scan Procedures

Step 1: Power Reference Measurement

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

Step 2: Area Scan

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

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

	≤ 3 GHz	> 3 GHz
Maximum distance from closest measurement point (geometric center of probe sensors) to phantom surface	5 ± 1 mm	$\frac{1}{2} \cdot \delta \cdot \ln(2) \pm 0.5$ mm
Maximum probe angle from probe axis to phantom surface normal at the measurement location	$30^\circ \pm 1^\circ$	$20^\circ \pm 1^\circ$
Maximum area scan spatial resolution: $\Delta x_{\text{Area}}, \Delta y_{\text{Area}}$	≤ 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: $\Delta x_{\text{Zoom}}, \Delta y_{\text{Zoom}}$			≤ 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: $\Delta z_{\text{Zoom}}(n)$		≤ 5 mm	3 – 4 GHz: ≤ 4 mm 4 – 5 GHz: ≤ 3 mm 5 – 6 GHz: ≤ 2 mm
	graded grid	$\Delta z_{\text{Zoom}}(1)$: between 1 st two points closest to phantom surface	≤ 4 mm	3 – 4 GHz: ≤ 3 mm 4 – 5 GHz: ≤ 2.5 mm 5 – 6 GHz: ≤ 2 mm
		$\Delta z_{\text{Zoom}}(n>1)$: between subsequent points	$\leq 1.5 \cdot \Delta z_{\text{Zoom}}(n-1)$	
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 <u>reported</u> SAR from the area scan based 1-g SAR estimation procedures of KDB 447498 is ≤ 1.4 W/kg, ≤ 8 mm, ≤ 7 mm and ≤ 5 mm zoom scan resolution may be applied, respectively, for 2 GHz to 3 GHz, 3 GHz to 4 GHz and 4 GHz to 6 GHz.				

Step 4: Power drift measurement

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

Step 5: Z-Scan (FCC only)

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

4.3. Test Equipment

The measuring equipment used to perform the tests documented in this report has been calibrated in accordance with the manufacturers' recommendations, and is traceable to recognized national standards.

Dielectric Property Measurements

Name of Equipment	Manufacturer	Type/Model	Serial No.	Cal. Due Date
Network Analyzer	Agilent	E753ES	MY40000980	4/17/2016
Dielectronic Probe kit	SPEAG	DAK-3.5	1082	9/16/2015
Dielectronic Probe kit	SPEAG	DAK-3.5 Short	SM DAK 200 BA	N/A
Thermometer	Control Company	Traceable	122529163	10/8/2015
Network Analyzer	Agilent	8753ES	MY40001647	7/17/2015
Dielectronic Probe kit	SPEAG	DAK-3.5	1087	11/11/2015
Dielectronic Probe kit	SPEAG	DAK-3.5 Short	SM DAK 200 BA	N/A
Thermometer	Traceable Calibration Control Co.	4242	122529162	10/8/2015

System Check

Name of Equipment	Manufacturer	Type/Model	Serial No.	Cal. Due Date
HP Signal Generator	HP	8665B	3546A00784	6/23/2015
Power Meter	HP	437B	3125U09516	10/6/2015
Power Meter	Agilent	N1911A	MY53060016	8/7/2015
Power Sensor	Agilent	E9323A	MY53070003	5/1/2015
Power Sensor	Agilent	N1921A	MY53260010	7/12/2015
Power Sensor	Agilent	8481A	3318A95392	10/6/2015
Amplifier	MITEQ	AMF-4D-00400600-50-30P	1622052	N/A
Bi-directional coupler	Werlatone, Inc.	C8060-102	2711	N/A
DC Power Supply	Sorensen Ametek	XT20-3	1318A00530	N/A
Synthesized Signal Generator	Agilent	8665B	3438A00633	7/10/2015
Power Meter	HP	437B	3125U11347	8/27/2015
Power Meter	HP	437B	3125U16345	6/16/2015
Power Sensor	HP	8481A	2702A60780	6/16/2015
Power Sensor	HP	8481A	1926A16917	10/10/2015
Amplifier	MITEQ	AMF-4D-00400600-50-30P	1808938	N/A
Bi-directional coupler	Werlatone, Inc.	C8060-102	2710	N/A
DC Power Supply	HP	6296A	2841A-05955	N/A
E-Field Probe (SAR Lab 1)	SPEAG	EX3DV4	3902	5/19/2015
E-Field Probe (SAR Lab 1)	SPEAG	EX3DV4	3929	4/22/2016
E-Field Probe (SAR Lab 2)	SPEAG	EX3DV3	3773	4/22/2015
E-Field Probe (SAR Lab 2)	SPEAG	EX3DV4	3990	3/18/2016
E-Field Probe (SAR Lab 3)	SPEAG	EX3DV4	3749	1/26/2015
E-Field Probe (SAR Lab 4)	SPEAG	EX3DV4	3989	3/17/2016
Data Acquisition Electronics (SAR Lab 1)	SPEAG	DAE4	1352	11/7/2015
Data Acquisition Electronics (SAR Lab 2)	SPEAG	DAE4	1259	1/14/2016
Data Acquisition Electronics (SAR Lab 3)	SPEAG	DAE4	1380	7/23/2015
Data Acquisition Electronics (SAR Lab 4)	SPEAG	DAE4	1377	8/27/2015
System Validation Dipole	SPEAG	D750V3	1024	5/16/2015
System Validation Dipole	SPEAG	D835V2	4d142	9/9/2015
System Validation Dipole	SPEAG	D1900V2	5d163	9/11/2015
System Validation Dipole	SPEAG	D2450V2	899	3/13/2016
System Validation Dipole	SPEAG	D5GHzV2	1168	12/4/2015
Thermometer (SAR Lab 1)	EXTECH	445703	CCS-205	3/19/2016
Thermometer (SAR Lab 2)	EXTECH	445703	CCS-203	3/19/2016
Thermometer (SAR Lab 3)	EXTECH	445703	CCS-237	6/3/2015
Thermometer (SAR Lab 4)	EXTECH	445703	CCS-238	6/3/2015

Other

Name of Equipment	Manufacturer	Type/Model	Serial No.	Cal. Due Date
Power Meter	Agilent	N1912A	MY53060009	5/5/2015
Power Sensor	Agilent	N1921A	MY53020038	3/6/2016
Power Meter	Agilent	N1912A	MY53060007	9/15/2016
Base Station Simulator	R & S	CMW500	135387	7/8/2015
Base Station Simulator	Agilent	8960	MY53211024	9/19/2015

5. Measurement Uncertainty

Per KDB 865664 D01 SAR Measurement 100 MHz to 6 GHz, when the highest measured 1-g SAR within a frequency band is < 1.5 W/kg, the extensive SAR measurement uncertainty analysis described in IEEE Std 1528-2013 is not required in SAR reports submitted for equipment approval.

6. Device Under Test (DUT) Information

6.1. DUT Description

Back Cover	☒ The rechargeable battery is not user accessible.
Battery Options	☒ The rechargeable battery is not user accessible.
Accessory	Headset
Wireless Router (Hotspot)	Wi-Fi Hotspot mode permits the device to share its cellular data connection with other Wi-Fi-enabled devices. ☒ Mobile Hotspot (Wi-Fi 2.4 GHz) ☒ Mobile Hotspot (Wi-Fi 5 GHz, Only U-NII 1 and U-NII 3)
Wi-Fi Direct	Wi-Fi Direct enabled devices transfer data directly between each other ☒ Mobile Hotspot (Wi-Fi 2.4 GHz) ☒ Mobile Hotspot (Wi-Fi 5 GHz, Only U-NII 1 and U-NII 3)

6.2. Wireless Technologies

Wireless technologies	Frequency bands	Operating mode		Duty Cycle used for SAR testing
GSM	850 1900	Voice (GMSK) GPRS (GMSK) EGPRS (8PSK)	GPRS Multi-Slot Class: ☐ Class 8 - 1 Up, 4 Down ☐ Class 10 - 2 Up, 4 Down ☐ Class 12 - 4 Up, 4 Down ☒ Class 33 - 4 Up, 5 Down	GSM Voice: 12.5% (E)GPRS: 1 Slot: 12.5% 2 Slots: 25% 3 Slots: 37.5% 4 Slots: 50%
	☒ Class A = both simultaneously. ☐ Class B = GPRS connection interrupted during a GSM call, automatically resumed at end of call. ☐ Class C = manual GSM / GPRS mode switching. Does this device support DTM (Dual Transfer Mode)? ☒ Yes ☐ No			
W-CDMA (UMTS)	Band II Band V	UMTS Rel. 99 (Voice & Data) HSDPA (Rel. 5) HSUPA (Rel. 6)		100%
LTE	FDD Band 5 FDD Band 17	QPSK 16QAM ☐ Rel. 10 Does not support Carrier Aggregation (CA) ☒ Rel. 10 Carrier Aggregation (Downlink Only) Non-US Operations Supported ☐ Rel. 11 Carrier Aggregation (2 Uplink and 2 Downlinks)		100% (FDD)
	Does this device support SV-LTE (1xRTT-LTE)? ☐ Yes ☒ No			
Wi-Fi	2.4 GHz	802.11b 802.11g 802.11n (HT20)		100%
	5 GHz	802.11a 802.11n (HT20) 802.11n (HT40) 802.11ac (VHT20) 802.11ac (VHT40) 802.11ac (VHT80)		100%
	Does this device support bands 5.60 ~ 5.65 GHz? ☒ Yes ☐ No			
	Does this device support Band gap channel(s)? ☒ Yes ☐ No			
Bluetooth	2.4 GHz	Version 4.1 LE		77.5% (DH5)

6.3. Nominal and Maximum Output Power

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

RF Air interface	Mode		Full Power			Reduce Power		
			Target (dBm)	Tolerance (dB)	Max. Tune-up Limit (dBm)	Target (dBm)	Tolerance (dB)	Max. Tune-up Limit (dBm)
GSM850	GSM	Voice	32.5	-1.3 ~ 0.7	33.2	NOT SUPPORTED		
	GPRS GMSK	Tx Slot 1	32.5	-1.3 ~ 0.7	33.2			
		Tx Slot 2	31.5	-1.3 ~ 0.7	32.2			
		Tx Slot 3	29.5	-1.3 ~ 0.7	30.2			
		Tx Slot 4	28.5	-1.3 ~ 0.7	29.2			
	EGPRS 8PSK	Tx Slot 1	27.0	-2.0 ~ 1.0	28.0			
		Tx Slot 2	25.5	-2.0 ~ 1.0	26.5			
		Tx Slot 3	23.5	-2.0 ~ 1.0	24.5			
		Tx Slot 4	22.5	-2.0 ~ 1.0	23.5			
GSM1900	GSM	Voice	30.0	-1.3 ~ 0.7	30.7	NOT SUPPORTED		
	GPRS GMSK	Tx Slot 1	30.0	-1.3 ~ 0.7	30.7			
		Tx Slot 2	28.5	-1.3 ~ 0.7	29.2			
		Tx Slot 3	26.5	-1.3 ~ 0.7	27.2			
		Tx Slot 4	25.5	-1.3 ~ 0.7	26.2			
	EGPRS 8PSK	Tx Slot 1	26.0	-2.0 ~ 1.0	27.0			
		Tx Slot 2	24.5	-2.0 ~ 1.0	25.5			
		Tx Slot 3	22.5	-2.0 ~ 1.0	23.5			
		Tx Slot 4	21.5	-2.0 ~ 1.0	22.5			

Dual Transfer Mode

RF Air interface	Mode			Full Power			Reduce Power		
				Target (dBm)	Tolerance (dB)	Max. Tune-up Limit (dBm)	Target (dBm)	Tolerance (dB)	Max. Tune-up Limit (dBm)
GSM850	GSM (Voice) + GPRS(Data)	Tx Slot 1	CS	32.5	-1.3 ~ 0.7	33.2	Not Supported		
		Tx Slot 2	CS	31.5	-1.3 ~ 0.7	32.2			
			PS	31.5	-1.3 ~ 0.7	32.2			
		Tx Slot 3	CS	29.5	-1.3 ~ 0.7	30.2			
			PS	29.5	-1.3 ~ 0.7	30.2			
	GSM (Voice) + EGPRS(Data) MCS5-9	Tx Slot 1	CS	32.5	-1.3 ~ 0.7	33.2			
		Tx Slot 2	CS	31.5	-1.3 ~ 0.7	32.2			
			PS	25.5	-2.0 ~ 1.0	26.5			
		Tx Slot 3	CS	29.5	-1.3 ~ 0.7	30.2			
			PS	23.5	-2.0 ~ 1.0	24.5			
GSM1900	GSM (Voice) + GPRS(Data)	Tx Slot 1	CS	30.0	-1.3 ~ 0.7	30.7	Not Supported		
		Tx Slot 2	CS	28.5	-1.3 ~ 0.7	29.2			
			PS	28.5	-1.3 ~ 0.7	29.2			
		Tx Slot 3	CS	26.5	-1.3 ~ 0.7	27.2			
			PS	26.5	-1.3 ~ 0.7	27.2			
	GSM (Voice) + EGPRS(Data) MCS5-9	Tx Slot 1	CS	30.0	-1.3 ~ 0.7	30.7			
		Tx Slot 2	CS	28.5	-1.3 ~ 0.7	29.2			
			PS	24.5	-2.0 ~ 1.0	25.5			
		Tx Slot 3	CS	26.5	-1.3 ~ 0.7	27.2			
			PS	22.5	-2.0 ~ 1.0	23.5			

Note: CS : circuit switched PS : packet switched

RF Air interface	Mode	Full Power			Reduce Pow er		
		Target (dBm)	Tolerance (dB)	Max. Tune-up Limit (dBm)	Target (dBm)	Tolerance (dB)	Max. Tune-up Limit (dBm)
WCDMA Band II (2)	R99	23.5	-1.3 ~ 0.7	24.2	Not Supported		
	HSDPA	23.5	-4.8 ~ 0.7	24.2			
	HSUPA	23.5	-4.8 ~ 0.7	24.2			
WCDMA Band V (5)	R99	24.0	-1.5 ~ 0.5	24.5	Not Supported		
	HSDPA	24.0	-4.5 ~ 0.5	24.5			
	HSUPA	24.0	-4.5 ~ 0.5	24.5			
RF Air interface	Mode	Full Power			Reduce Pow er		
		Target (dBm)	Tolerance (dB)	Max. Tune-up Limit (dBm)	Target (dBm)	Tolerance (dB)	Max. Tune-up Limit (dBm)
LTE B5	QPSK	23.0	-1.5 ~ 1.1	24.1	Not Supported		
	16QAM	22.0	-1.5 ~ 1.1	23.1			
LTE B17	QPSK	23.0	-1.5 ~ 1.1	24.1	Not Supported		
	16QAM	22.0	-1.5 ~ 1.1	23.1			
RF Air interface	Mode	Band (MHz)	Channel	Ant Chain 0	Ant Chain 1		
				Max. Tune-up Limit (dBm)	Max. Tune-up Limit (dBm)		
Wi-Fi 2.4 GHz	802.11b	2400~2483.5	All	13.5	10.0		
	802.11g	2400~2483.5	1,11	13.5	10.0		
			13	7.8	8.1		
			Other	13.5	10.0		
	802.11n HT20	2400~2483.5	1,11	13.5	10.0		
			12	12.3	10.0		
			13	7.5	7.8		
			Other	13.5	10.0		
Wi-Fi 5 GHz	802.11a	5150~5850	All	12.0	11.0		
	802.11n HT20	5150~5850	All	12.0	11.0		
	802.11n HT40	5150~5850	All	12.0	11.0		
	802.11ac VHT20	5150~5850	All	12.0	11.0		
	802.11ac VHT40	5150~5850	All	12.0	11.0		
	802.11ac VHT80	5150~5250	All	12.0	11.0		
		5250~5350	All	12.0	10.7		
		5470~5725	All	12.0	10.9		
		5725~5850	All	12.0	11.0		
Bluetooth	BDR	2400~2483.5	All	10.5	N/A		
	EDR			8.7	N/A		
	BLE			7.7	N/A		

6.4. General LTE SAR Test and Reporting Considerations

Item	Description																																												
Frequency range, Channel Bandwidth, Numbers and Frequencies	Band 5	Frequency range: 824 - 849 MHz																																											
		Channel Bandwidth																																											
		20 MHz	15 MHz	10 MHz	5 MHz	3 MHz	1.4 MHz																																						
	Low			20450/ 829	20425/ 826.5	20415/ 825.5	20407/ 824.7																																						
	Mid			20525/ 836.5	20525/ 836.5	20525/ 836.5	20525/ 836.5																																						
	High			20600/ 844	20625/ 846.5	20635/ 847.5	20643/ 848.3																																						
	Band 17	Frequency range: 704 - 716 MHz																																											
		Channel Bandwidth																																											
		20 MHz	15 MHz	10 MHz	5 MHz	3 MHz	1.4 MHz																																						
	Low				23755/ 706.5																																								
	Mid			23790/ 710	23790/ 710																																								
	High				23825/ 713.5																																								
LTE transmitter and antenna implementation	LTE has one (1) Tx/Rx antennas and one (1) Rx antennas Refer to Appendix A.																																												
Maximum power reduction (MPR)	Table 6.2.3-1: Maximum Power Reduction (MPR) for Power Class 3 <table border="1"> <thead> <tr> <th rowspan="2">Modulation</th><th colspan="6">Channel bandwidth / Transmission bandwidth (RB)</th><th rowspan="2">MPR (dB)</th></tr> <tr> <th>1.4 MHz</th><th>3.0 MHz</th><th>5 MHz</th><th>10 MHz</th><th>15 MHz</th><th>20 MHz</th></tr> </thead> <tbody> <tr> <td>QPSK</td><td>> 5</td><td>> 4</td><td>> 8</td><td>> 12</td><td>> 16</td><td>> 18</td><td>≤ 1</td></tr> <tr> <td>16 QAM</td><td>≤ 5</td><td>≤ 4</td><td>≤ 8</td><td>≤ 12</td><td>≤ 16</td><td>≤ 18</td><td>≤ 1</td></tr> <tr> <td>64 QAM</td><td>> 5</td><td>> 4</td><td>> 8</td><td>> 12</td><td>> 16</td><td>> 18</td><td>≤ 2</td></tr> </tbody> </table> MPR Built-in by design A-MPR (additional MPR) was disabled during SAR testing							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	64 QAM	> 5	> 4	> 8	> 12	> 16	> 18	≤ 2
Modulation	Channel bandwidth / Transmission bandwidth (RB)						MPR (dB)																																						
	1.4 MHz	3.0 MHz	5 MHz	10 MHz	15 MHz	20 MHz																																							
QPSK	> 5	> 4	> 8	> 12	> 16	> 18	≤ 1																																						
16 QAM	≤ 5	≤ 4	≤ 8	≤ 12	≤ 16	≤ 18	≤ 1																																						
64 QAM	> 5	> 4	> 8	> 12	> 16	> 18	≤ 2																																						
Power reduction	No																																												
Spectrum plots for RB configurations	A properly configured base station simulator was used for the SAR and power measurements; therefore, spectrum plots for each RB allocation and offset configuration are not included in the SAR report.																																												

7. RF Exposure Conditions (Test Configurations)

Refer to “SAR Photos and Ant locations” Appendix for the specific details of the antenna-to-antenna and antenna-to-edge(s) distances.

Wireless technologies	RF Exposure Conditions	DUT-to-User Separation	Test Position	Antenna-to-edge/surface	SAR Required	Note
WWAN	Head	0 mm	Left Touch	N/A	Yes	
			Left Tilt (15°)	N/A	Yes	
			Right Touch	N/A	Yes	
			Right Tilt (15°)	N/A	Yes	
	Body	15 mm	Rear	N/A	Yes	
			Front	N/A	Yes	
	Hotspot	10 mm	Rear	< 25 mm	Yes	
			Front	< 25 mm	Yes	
			Edge 1 (Top)	> 25 mm	No	1
			Edge 2 (Right)	< 25 mm	Yes	
			Edge 3 (Bottom)	< 25 mm	Yes	
			Edge 4 (Left)	< 25 mm	Yes	
WLAN ²	Head	0 mm	Left Touch	N/A	Yes	
			Left Tilt (15°)	N/A	Yes	
			Right Touch	N/A	Yes	
			Right Tilt (15°)	N/A	Yes	
	Body	15 mm	Rear	N/A	Yes	
			Front	N/A	Yes	
	Hotspot / Wi-Fi Direct	10 mm	Rear	< 25 mm	Yes	
			Front	< 25 mm	Yes	
			Edge 1 (Top)	< 25 mm	Yes	
			Edge 2 (Right)	< 25 mm	Yes	
			Edge 3 (Bottom)	> 25 mm	No	1
			Edge 4 (Left)	< 25 mm	Yes	

Notes:

- SAR is not required because the distance from the antenna to the edge is > 25 mm as per KDB 941225 D06 Hot Spot SAR.
- SAR for Wi-Fi 2.4 GHz Body was tested at a more conservative distance of 10 mm.

8. Dielectric Property Measurements & System Check

8.1. Dielectric Property Measurements

The temperature of the tissue-equivalent medium used during measurement must also be within 18°C to 25°C and within $\pm 2^\circ\text{C}$ of the temperature when the tissue parameters are characterized.

The dielectric parameters must be measured before the tissue-equivalent medium is used in a series of SAR measurements. The parameters should be re-measured after each 3 – 4 days of use; or earlier if the dielectric parameters can become out of tolerance; for example, when the parameters are marginal at the beginning of the measurement series.

Tissue dielectric parameters were measured at the low, middle and high frequency of each operating frequency range of the test device.

Tissue Dielectric Parameters

FCC KDB 865664 D01 SAR Measurement 100 MHz to 6 GHz

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

IEEE Std 1528-2013

Refer to Table 3 within the IEEE Std 1528-2013

Dielectric Property Measurements Results:**SAR Lab 1**

Date	Freq. (MHz)	Liquid Parameters			Measured	Target	Delta (%)	Limit ±(%)
4/15/2015	Head 750	e'	41.6900	Relative Permittivity (ϵ_r):	41.69	41.96	-0.65	5
		e"	21.9600	Conductivity (σ):	0.92	0.89	2.54	5
	Head 700	e'	42.4400	Relative Permittivity (ϵ_r):	42.44	42.22	0.53	5
		e"	22.3600	Conductivity (σ):	0.87	0.89	-2.13	5
	Head 710	e'	42.3000	Relative Permittivity (ϵ_r):	42.30	42.17	0.32	5
		e"	22.3200	Conductivity (σ):	0.88	0.89	-0.99	5
4/15/2015	Body 750	e'	55.9200	Relative Permittivity (ϵ_r):	55.92	55.55	0.67	5
		e"	23.3200	Conductivity (σ):	0.97	0.96	0.98	5
	Body 700	e'	56.4900	Relative Permittivity (ϵ_r):	56.49	55.74	1.35	5
		e"	23.7900	Conductivity (σ):	0.93	0.96	-3.47	5
	Body 710	e'	56.3800	Relative Permittivity (ϵ_r):	56.38	55.70	1.22	5
		e"	23.7000	Conductivity (σ):	0.94	0.96	-2.54	5
5/4/2015	Head 5180	e'	36.2200	Relative Permittivity (ϵ_r):	36.22	36.01	0.57	5
		e"	15.6100	Conductivity (σ):	4.50	4.63	-2.90	5
	Head 5200	e'	36.2100	Relative Permittivity (ϵ_r):	36.21	35.99	0.61	5
		e"	15.3800	Conductivity (σ):	4.45	4.65	-4.39	5
	Head 5600	e'	35.4800	Relative Permittivity (ϵ_r):	35.48	35.53	-0.15	5
		e"	15.5800	Conductivity (σ):	4.85	5.06	-4.13	5
	Head 5800	e'	35.3800	Relative Permittivity (ϵ_r):	35.38	35.30	0.23	5
		e"	15.9000	Conductivity (σ):	5.13	5.27	-2.70	5
	Head 5825	e'	35.3500	Relative Permittivity (ϵ_r):	35.35	35.30	0.14	5
		e"	15.6500	Conductivity (σ):	5.07	5.27	-3.82	5
5/4/2015	Body 5180	e'	48.4900	Relative Permittivity (ϵ_r):	48.49	49.05	-1.14	5
		e"	18.7400	Conductivity (σ):	5.40	5.27	2.39	5
	Body 5200	e'	48.5500	Relative Permittivity (ϵ_r):	48.55	49.02	-0.96	5
		e"	18.3500	Conductivity (σ):	5.31	5.29	0.21	5
	Body 5600	e'	47.6000	Relative Permittivity (ϵ_r):	47.60	48.48	-1.81	5
		e"	18.9500	Conductivity (σ):	5.90	5.76	2.42	5
	Body 5800	e'	47.5800	Relative Permittivity (ϵ_r):	47.58	48.20	-1.29	5
		e"	19.3900	Conductivity (σ):	6.25	6.00	4.22	5
	Body 5825	e'	47.5800	Relative Permittivity (ϵ_r):	47.58	48.20	-1.29	5
		e"	19.1000	Conductivity (σ):	6.19	6.00	3.10	5
5/6/2015	Head 5180	e'	37.4500	Relative Permittivity (ϵ_r):	37.45	36.01	3.99	5
		e"	15.6800	Conductivity (σ):	4.52	4.63	-2.47	5
	Head 5200	e'	37.4400	Relative Permittivity (ϵ_r):	37.44	35.99	4.03	5
		e"	15.7500	Conductivity (σ):	4.55	4.65	-2.09	5
	Head 5600	e'	36.6500	Relative Permittivity (ϵ_r):	36.65	35.53	3.14	5
		e"	15.8600	Conductivity (σ):	4.94	5.06	-2.41	5
5/6/2015	Body 5800	e'	46.0000	Relative Permittivity (ϵ_r):	46.00	48.20	-4.56	5
		e"	19.3800	Conductivity (σ):	6.25	6.00	4.17	5
	Body 5825	e'	45.9900	Relative Permittivity (ϵ_r):	45.99	48.20	-4.59	5
		e"	19.3800	Conductivity (σ):	6.28	6.00	4.62	5

SAR Lab 2

Date	Freq. (MHz)	Liquid Parameters		Measured	Target	Delta (%)	Limit ±(%)	
3/31/2015	Head 1900	e'	40.2300	Relative Permittivity (ϵ_r):	40.23	40.00	0.57	5
		e"	13.6000	Conductivity (σ):	1.44	1.40	2.63	5
	Head 1850	e'	40.5100	Relative Permittivity (ϵ_r):	40.51	40.00	1.28	5
		e"	13.3800	Conductivity (σ):	1.38	1.40	-1.69	5
	Head 1910	e'	40.2100	Relative Permittivity (ϵ_r):	40.21	40.00	0.53	5
		e"	13.6000	Conductivity (σ):	1.44	1.40	3.17	5
3/31/2015	Body 1900	e'	51.5500	Relative Permittivity (ϵ_r):	51.55	53.30	-3.28	5
		e"	14.4500	Conductivity (σ):	1.53	1.52	0.43	5
	Body 1850	e'	51.7400	Relative Permittivity (ϵ_r):	51.74	53.30	-2.93	5
		e"	14.1700	Conductivity (σ):	1.46	1.52	-4.10	5
	Body 1910	e'	51.4200	Relative Permittivity (ϵ_r):	51.42	53.30	-3.53	5
		e"	14.4200	Conductivity (σ):	1.53	1.52	0.75	5
4/7/2015	Head 1900	e'	38.8900	Relative Permittivity (ϵ_r):	38.89	40.00	-2.78	5
		e"	13.3500	Conductivity (σ):	1.41	1.40	0.74	5
	Head 1850	e'	39.0300	Relative Permittivity (ϵ_r):	39.03	40.00	-2.43	5
		e"	13.1700	Conductivity (σ):	1.35	1.40	-3.23	5
	Head 1910	e'	38.9200	Relative Permittivity (ϵ_r):	38.92	40.00	-2.70	5
		e"	13.3500	Conductivity (σ):	1.42	1.40	1.27	5
4/7/2015	Body 1900	e'	51.2300	Relative Permittivity (ϵ_r):	51.23	53.30	-3.88	5
		e"	14.3300	Conductivity (σ):	1.51	1.52	-0.40	5
	Body 1850	e'	51.3600	Relative Permittivity (ϵ_r):	51.36	53.30	-3.64	5
		e"	14.2200	Conductivity (σ):	1.46	1.52	-3.77	5
	Body 1910	e'	51.1800	Relative Permittivity (ϵ_r):	51.18	53.30	-3.98	5
		e"	14.3400	Conductivity (σ):	1.52	1.52	0.19	5

SAR Lab 3

Date	Freq. (MHz)	Liquid Parameters		Measured	Target	Delta (%)	Limit ±(%)	
3/30/2015	Head 835	e'	42.4500	Relative Permittivity (ϵ_r):	42.45	41.50	2.29	5
		e"	19.7200	Conductivity (σ):	0.92	0.90	1.73	5
	Head 820	e'	42.6500	Relative Permittivity (ϵ_r):	42.65	41.60	2.52	5
		e"	19.7100	Conductivity (σ):	0.90	0.90	0.02	5
	Head 850	e'	42.2500	Relative Permittivity (ϵ_r):	42.25	41.50	1.81	5
		e"	19.6400	Conductivity (σ):	0.93	0.92	1.45	5
3/30/2015	Body 835	e'	52.7300	Relative Permittivity (ϵ_r):	52.73	55.20	-4.47	5
		e"	21.4500	Conductivity (σ):	1.00	0.97	2.67	5
	Body 820	e'	52.9400	Relative Permittivity (ϵ_r):	52.94	55.28	-4.23	5
		e"	21.4900	Conductivity (σ):	0.98	0.97	1.17	5
	Body 850	e'	52.5800	Relative Permittivity (ϵ_r):	52.58	55.16	-4.67	5
		e"	21.3600	Conductivity (σ):	1.01	0.99	2.27	5
4/8/2015	Head 835	e'	40.1900	Relative Permittivity (ϵ_r):	40.19	41.50	-3.16	5
		e"	19.4900	Conductivity (σ):	0.90	0.90	0.54	5
	Head 820	e'	40.4300	Relative Permittivity (ϵ_r):	40.43	41.60	-2.82	5
		e"	19.6300	Conductivity (σ):	0.90	0.90	-0.38	5
	Head 850	e'	40.0300	Relative Permittivity (ϵ_r):	40.03	41.50	-3.54	5
		e"	19.3900	Conductivity (σ):	0.92	0.92	0.16	5
4/9/2015	Body 835	e'	53.2200	Relative Permittivity (ϵ_r):	53.22	55.20	-3.59	5
		e"	20.9100	Conductivity (σ):	0.97	0.97	0.08	5
	Body 820	e'	53.4400	Relative Permittivity (ϵ_r):	53.44	55.28	-3.32	5
		e"	21.0600	Conductivity (σ):	0.96	0.97	-0.85	5
	Body 850	e'	53.0400	Relative Permittivity (ϵ_r):	53.04	55.16	-3.84	5
		e"	20.8500	Conductivity (σ):	0.99	0.99	-0.17	5
4/13/2015	Head 835	e'	41.0000	Relative Permittivity (ϵ_r):	41.00	41.50	-1.20	5
		e"	19.0700	Conductivity (σ):	0.89	0.90	-1.62	5
	Head 820	e'	41.2400	Relative Permittivity (ϵ_r):	41.24	41.60	-0.87	5
		e"	19.1000	Conductivity (σ):	0.87	0.90	-3.07	5
	Head 850	e'	40.8500	Relative Permittivity (ϵ_r):	40.85	41.50	-1.57	5
		e"	19.1400	Conductivity (σ):	0.90	0.92	-1.14	5
4/13/2015	Body 835	e'	53.7400	Relative Permittivity (ϵ_r):	53.74	55.20	-2.64	5
		e"	21.7000	Conductivity (σ):	1.01	0.97	3.87	5
	Body 820	e'	53.9300	Relative Permittivity (ϵ_r):	53.93	55.28	-2.44	5
		e"	21.7600	Conductivity (σ):	0.99	0.97	2.44	5
	Body 850	e'	53.6200	Relative Permittivity (ϵ_r):	53.62	55.16	-2.79	5
		e"	21.7200	Conductivity (σ):	1.03	0.99	3.99	5

SAR Lab 4

Date	Freq. (MHz)	Liquid Parameters			Measured	Target	Delta (%)	Limit ±(%)
5/4/2015	Head 2450	e'	37.4100	Relative Permittivity (ϵ_r):	37.41	39.20	-4.57	5
		e"	13.1000	Conductivity (σ):	1.78	1.80	-0.86	5
	Head 2410	e'	37.5000	Relative Permittivity (ϵ_r):	37.50	39.28	-4.53	5
		e"	13.0300	Conductivity (σ):	1.75	1.76	-0.82	5
	Head 2475	e'	37.3100	Relative Permittivity (ϵ_r):	37.31	39.17	-4.74	5
		e"	13.2500	Conductivity (σ):	1.82	1.83	-0.20	5
5/4/2015	Body 2450	e'	50.1500	Relative Permittivity (ϵ_r):	50.15	52.70	-4.84	5
		e"	14.4400	Conductivity (σ):	1.97	1.95	0.88	5
	Body 2410	e'	50.3100	Relative Permittivity (ϵ_r):	50.31	52.76	-4.64	5
		e"	14.4200	Conductivity (σ):	1.93	1.91	1.30	5
	Body 2475	e'	50.2400	Relative Permittivity (ϵ_r):	50.24	52.67	-4.61	5
		e"	14.5900	Conductivity (σ):	2.01	1.99	1.14	5

8.2. System Check

SAR system verification is required to confirm measurement accuracy, according to the tissue dielectric media, probe calibration points and other system operating parameters required for measuring the SAR of a test device. The system verification must be performed for each frequency band and within the valid range of each probe calibration point required for testing the device. The same SAR probe(s) and tissue-equivalent media combinations used with each specific SAR system for system verification must be used for device testing. When multiple probe calibration points are required to cover substantially large transmission bands, independent system verifications are required for each probe calibration point. A system verification must be performed before each series of SAR measurements using the same probe calibration point and tissue-equivalent medium. Additional system verification should be considered according to the conditions of the tissue-equivalent medium and measured tissue dielectric parameters, typically every three to four days when the liquid parameters are re-measured or sooner when marginal liquid parameters are used at the beginning of a series of measurements.

System Performance Check Measurement Conditions:

- The measurements were performed in the flat section of the TWIN SAM or ELI phantom, shell thickness: 2.0 $\pm$ 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 $\geq$ 15.0 cm for SAR measurements $\leq$ 3 GHz and $\geq$ 10.0 cm for measurements $>$ 3 GHz.
- The DASY system with an E-Field Probe was used for the measurements.
- The dipole was mounted on the small tripod so that the dipole feed point was positioned below the center marking of the flat phantom section and the dipole was oriented parallel to the body axis (the long side of the phantom). The standard measuring distance was 10 mm (above 1 GHz) and 15 mm (below 1 GHz) from dipole center to the simulating liquid surface.
- The coarse grid with a grid spacing of 15 mm was aligned with the dipole.
For 5 GHz band - The coarse grid with a grid spacing of 10 mm was aligned with the dipole.
- Special 7x7x7 (below 3 GHz) and/or 8x8x7 (above 3 GHz) fine cube was chosen for the cube.
- Distance between probe sensors and phantom surface was set to 3 mm.
For 5 GHz band - Distance between probe sensors and phantom surface was set to 2.5 mm
- The dipole input power (forward power) was 100 mW.
- The results are normalized to 1 W input power.

Reference Target SAR Values

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

System Dipole	Serial No.	Cal. Date	Freq. (MHz)	Target SAR Values (W/kg)		
				1g/10g	Head	Body
D750V3	1024	5/16/2014	750	1g	8.12	8.77
				10g	5.26	5.79
D835V2	4d142	9/9/2014	835	1g	8.91	9.22
				10g	5.77	6.05
D1900V2	5d163	9/11/2014	1900	1g	40.8	40.6
				10g	21.2	21.4
D2450V2	899	3/13/2015	2450	1g	51.6	48.80
				10g	23.9	22.7
D5GHzV2	1168	12/4/2014	5200	1g	79.3	76
				10g	22.5	21.1
			5600	1g	81.7	82
				10g	23.2	22.7
			5800	1g	78.0	76.2
				10g	22.1	21

System Check Results

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

SAR Lab 1

Date Tested	System Dipole		T.S. Liquid	Measured Results		Target (Ref. Value)	Delta $\pm 10\%$	Plot No.
	Type	Serial #		Zoom Scan to 100 mW	Normalize to 1 W			
4/15/2015	D750V3	1024	Head	1g	0.82	8.2	8.12	0.37
				10g	0.53	5.3	5.26	
4/15/2015	D750V3	1024	Body	1g	0.90	9.0	8.77	2.74
				10g	0.60	6.0	5.79	
5/4/2015	D5GHzV2 (5.2 GHz)	1168	Head	1g	7.19	71.9	79.3	-9.33
				10g	2.05	20.5	22.5	
5/4/2015	D5GHzV2 (5.6 GHz)	1168	Head	1g	7.40	74.0	81.7	-9.42
				10g	2.10	21.0	23.2	
5/4/2015	D5GHzV2 (5.8 GHz)	1168	Head	1g	7.51	75.1	78.0	-3.72
				10g	2.13	21.3	22.1	
5/4/2015	D5GHzV2 (5.2 GHz)	1168	Body	1g	7.94	79.4	76	4.47
				10g	2.26	22.6	21.1	
5/4/2015	D5GHzV2 (5.6 GHz)	1168	Body	1g	8.15	81.5	82	-0.61
				10g	2.28	22.8	22.7	
5/4/2015	D5GHzV2 (5.8 GHz)	1168	Body	1g	7.30	73.0	76.2	-4.20
				10g	2.04	20.4	21	
5/7/2015	D5GHzV2 (5.2 GHz)	1168	Head	1g	8.44	84.4	79.3	6.43
				10g	2.41	24.1	22.5	
5/7/2015	D5GHzV2 (5.6 GHz)	1168	Head	1g	7.84	78.4	81.7	-4.04
				10g	2.19	21.9	23.2	
5/7/2015	D5GHzV2 (5.8 GHz)	1168	Body	1g	7.44	74.4	76.2	-2.36
				10g	2.10	21.0	21	

SAR Lab 2

Date Tested	System Dipole		T.S. Liquid	Measured Results		Target (Ref. Value)	Delta $\pm 10\%$	Plot No.
	Type	Serial #		Zoom Scan to 100 mW	Normalize to 1 W			
3/31/2015	D1900V2	5d163	Head	1g	3.87	38.7	40.8	-5.15
				10g	1.99	19.9	21.2	-6.13
3/31/2015	D1900V2	5d163	Body	1g	4.14	41.4	40.6	1.97
				10g	2.13	21.3	21.4	-0.47
4/7/2015	D1900V2	5d163	Head	1g	4.08	40.8	40.8	0.00
				10g	2.11	21.1	21.2	-0.47
4/7/2015	D1900V2	5d163	Body	1g	4.37	43.7	40.6	7.64
				10g	2.27	22.7	21.4	6.07

SAR Lab 3

Date Tested	System Dipole		T.S. Liquid	Measured Results		Target (Ref. Value)	Delta $\pm 10\%$	Plot No.
	Type	Serial #		Zoom Scan to 100 mW	Normalize to 1 W			
3/30/2015	D835V2	4d142	Head	1g	0.96	9.6	8.91	7.41
				10g	0.63	6.3	5.77	8.84
3/30/2015	D835V2	4d142	Body	1g	1.01	10.1	9.22	9.54
				10g	0.66	6.6	6.05	9.42
4/9/2015	D835V2	4d142	Head	1g	0.95	9.5	8.91	6.51
				10g	0.63	6.3	5.77	8.49
4/9/2015	D835V2	4d142	Body	1g	0.99	9.9	9.22	7.70
				10g	0.66	6.6	6.05	8.26
4/13/2015	D835V2	4d142	Head	1g	0.91	9.1	8.91	2.47
				10g	0.60	6.0	5.77	4.16
4/13/2015	D835V2	4d142	Body	1g	0.98	9.8	9.22	6.29
				10g	0.65	6.5	6.05	6.61

SAR Lab 4

Date Tested	System Dipole		T.S. Liquid	Measured Results		Target (Ref. Value)	Delta $\pm 10\%$	Plot No.
	Type	Serial #		Zoom Scan to 100 mW	Normalize to 1 W			
5/4/2015	D2450V2	899	Head	1g	5.08	50.8	51.6	-1.55
				10g	2.30	23.0	23.9	-3.77
5/4/2015	D2450V2	899	Body	1g	5.28	52.8	48.80	8.20
				10g	2.45	24.5	22.7	7.93

9. Conducted Output Power Measurements

9.1. GSM

GSM850 Measured Results

Band	Mode	Coding Scheme	Time Slots	Ch No.	Freq. (MHz)	Burst Pwr (dBm)	Frame Pwr (dBm)	Maximum Frame Pwr
850	GSM (Voice)	CS1	1	128	824.2	32.4	23.4	24.17
				190	836.6	32.4	23.4	
				251	848.8	32.5	23.5	
	GPRS (GMSK)	CS1	1	128	824.2	32.4	23.4	24.17
				190	836.6	32.4	23.4	
				251	848.8	32.5	23.5	
			2	128	824.2	31.4	25.4	26.18
				190	836.6	31.2	25.2	
				251	848.8	31.2	25.2	
			3	128	824.2	29.9	25.6	25.94
				190	836.6	29.8	25.5	
				251	848.8	29.8	25.5	
			4	128	824.2	28.9	25.9	26.19
				190	836.6	28.9	25.9	
				251	848.8	28.8	25.8	
	EGPRS (8PSK)	MCS5	1	128	824.2	26.9	17.9	18.97
				190	836.6	26.9	17.9	
				251	848.8	26.8	17.8	
			2	128	824.2	25.5	19.5	20.48
				190	836.6	25.5	19.5	
				251	848.8	25.4	19.4	
			3	128	824.2	23.2	18.9	20.24
				190	836.6	23.2	18.9	
				251	848.8	23.1	18.8	
			4	128	824.2	22.8	19.8	20.49
				190	836.6	22.7	19.7	
				251	848.8	22.6	19.6	

Notes:

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

- Head & Body-worn: GMSK Voice Mode
- Hotspot mode: GMSK (GPRS) mode with 4 time slots based on the output power measurements above.
- SAR is not required for EGPRS (8PSK) mode because its output power is less than that of GPRS Mode

GSM1900 Measured Results

Band	Mode	Coding Scheme	Time Slots	Ch No.	Freq. (MHz)	Burst Pwr (dBm)	Frame Pwr (dBm)	Maximum Frame PWR
1900	GSM (Voice)	CS1	1	512	1850.2	29.6	20.6	21.67
				661	1880.0	29.8	20.8	
				810	1909.8	29.8	20.8	
	GPRS (GMSK)	CS1	1	512	1850.2	29.6	20.6	21.67
				661	1880.0	29.8	20.8	
				810	1909.8	29.8	20.8	
			2	512	1850.2	28.9	22.9	23.18
				661	1880.0	29.1	23.1	
				810	1909.8	29.1	23.1	
			3	512	1850.2	27.2	22.9	22.94
				661	1880.0	27.2	22.9	
				810	1909.8	27.2	22.9	
			4	512	1850.2	26.0	23.0	23.19
				661	1880.0	26.2	23.2	
				810	1909.8	26.2	23.2	
	EGPRS (8PSK)	MCS5	1	512	1850.2	25.2	16.2	17.97
				661	1880.0	25.4	16.4	
				810	1909.8	25.5	16.5	
			2	512	1850.2	23.8	17.8	19.48
				661	1880.0	23.9	17.9	
				810	1909.8	24.0	18.0	
			3	512	1850.2	22.0	17.7	19.24
				661	1880.0	22.1	17.8	
				810	1909.8	22.3	18.0	
			4	512	1850.2	21.0	18.0	19.49
				661	1880.0	21.1	18.1	
				810	1909.8	21.3	18.3	

Notes:

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

- Head & Body-worn: GMSK Voice Mode
- Hotspot mode: GMSK (GPRS) mode with 4 time slots, based on the output power measurements above.
- SAR is not required for EGPRS (8PSK) mode because its output power is less than that of GPRS Mode

GSM850 DTM Measured Results

Band	Mode	Coding Scheme	Time Slots	Ch No.	Freq. (MHz)	Max Pwr				Max Pwr	
						CS		PS		Maximum Frame Pwr	
						Burst (dBm)	Frame (dBm)	Burst (dBm)	Frame (dBm)	CS	PS
850	GSM(Voice) + GPRS(GMSK)	CS1	1	128	824.2	32.4	23.4			24.17	
				190	836.6	32.4	23.4				
				251	848.8	32.5	23.5				
			2	128	824.2	31.5	25.5	31.1	25.1	26.18	26.18
				190	836.6	31.5	25.5	31.1	25.1		
				251	848.8	31.2	25.2	30.8	24.8		
			3	128	824.2	29.6	25.3	29.6	25.3	25.94	25.94
				190	836.6	29.6	25.3	29.6	25.3		
				251	848.8	29.5	25.2	29.5	25.2		
	GSM(Voice) + EGPRS(8PSK)	MCS5	1	128	824.2	32.4	23.4			24.17	
				190	836.6	32.4	23.4				
				251	848.8	32.5	23.5				
			2	128	824.2	31.2	25.2	25.6	19.6	26.18	20.48
				190	836.6	31.2	25.2	25.6	19.6		
				251	848.8	30.9	24.9	25.5	19.5		
			3	128	824.2	29.7	25.4	23.5	19.2	25.94	20.24
				190	836.6	29.7	25.4	23.5	19.2		
				251	848.8	29.6	25.3	23.3	19.0		

Notes:

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

- GSM (Voice) + GMSK (GPRS) mode with 2 time slots, based on the output power measurements above.
- SAR is not required for GSM (Voice) + EGPRS (8PSK) mode because its output power is less than that of GSM (Voice) + GMSK (GPRS) mode.

GSM1900 DTM Measured Results

Band	Mode	Coding Scheme	Time Slots	Ch No.	Freq. (MHz)	Max Pwr				Max Pwr	
						CS		PS		Maximum Frame Pwr	
						Burst (dBm)	Frame (dBm)	Burst (dBm)	Frame (dBm)	CS	PS
1900	GSM(Voice) + GPRS(GMSK)	CS1	1	512	1850.2	29.6	20.6			21.67	
				661	1880.0	29.8	20.8				
				810	1909.8	29.8	20.8				
			2	512	1850.2	28.2	22.2	28.2	22.2	23.18	23.18
				661	1880.0	28.6	22.6	28.6	22.6		
				810	1909.8	28.5	22.5	28.5	22.5		
			3	512	1850.2	26.2	21.9	26.2	21.9	22.94	22.94
				661	1880.0	26.4	22.1	26.4	22.1		
				810	1909.8	26.6	22.3	26.6	22.3		
	GSM(Voice) + EGPRS(8PSK)	MCS5	1	512	1850.2	29.6	20.6			21.67	
				661	1880.0	29.8	20.8				
				810	1909.8	29.8	20.8				
			2	512	1850.2	28.7	22.7	23.7	17.7	23.18	19.48
				661	1880.0	28.9	22.9	23.9	17.9		
				810	1909.8	28.5	22.5	23.9	17.9		
			3	512	1850.2	26.9	22.6	21.9	17.6	22.94	19.24
				661	1880.0	27.0	22.7	21.9	17.6		
				810	1909.8	27.2	22.9	22.2	17.9		

Notes:

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

- GSM (Voice) + GMSK (GPRS) mode with 2 time slots, based on the output power measurements above.
- SAR is not required for GSM (Voice) + EGPRS (8PSK) mode because its output power is less than that of GSM (Voice) + GMSK (GPRS) mode.

9.2. W-CDMA

Release 99 Setup Procedures used to establish the test signals

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

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

HSDPA Setup Procedures used to establish the test signals

The following 4 Sub-tests were completed according to Release 7 procedures in section 5.2 of 3GPP TS34.121. A summary of these settings are illustrated below:

	Mode	HSDPA	HSDPA	HSDPA	HSDPA
	Subtest	1	2	3	4
W-CDMA General Settings	Loopback Mode	Test Mode 1			
	Rel99 RMC	12.2kbps RMC			
	HSDPA FRC	H-Set 1			
	Power Control Algorithm	Algorithm 2			
	β_c	2/15	11/15	15/15	15/15
	β_d	15/15	15/15	8/15	4/15
	Bd (SF)	64			
	β_c/β_d	2/15	12/15	15/8	15/4
	β_{hs}	4/15	24/15	30/15	30/15
	MPR (dB)	0	0	0.5	0.5
HSDPA Specific Settings	D_{ACK}	8			
	D_{NAK}	8			
	DCQI	8			
	Ack-Nack repetition factor	3			
	CQI Feedback (Table 5.2B.4)	4ms			
	CQI Repetition Factor (Table 5.2B.4)	2			
	$A_{hs}=\beta_{hs}/\beta_c$	30/15			

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

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

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

Measured Results

Band	Mode		UL Ch No.	Freq. (MHz)	MPR (dB)	Avg Pwr (dBm)
W-CDMA Band V	Rel 99	RMC, 12.2 kbps	4132	826.4	N/A	24.0
			4183	836.6	N/A	24.0
			4233	846.6	N/A	23.9
	HSDPA	Subtest 1	4132	826.4	0	23.1
			4183	836.6	0	23.0
			4233	846.6	0	23.0
		Subtest 2	4132	826.4	0	23.1
			4183	836.6	0	23.0
			4233	846.6	0	23.0
		Subtest 3	4132	826.4	0.5	22.6
			4183	836.6	0.5	22.7
			4233	846.6	0.5	22.5
		Subtest 4	4132	826.4	0.5	22.6
			4183	836.6	0.5	22.7
			4233	846.6	0.5	22.5
	HSUPA	Subtest 1	4132	826.4	0	23.0
			4183	836.6	0	23.0
			4233	846.6	0	23.0
		Subtest 2	4132	826.4	2	21.8
			4183	836.6	2	21.5
			4233	846.6	2	21.5
		Subtest 3	4132	826.4	1	21.8
			4183	836.6	1	22.1
			4233	846.6	1	21.9
		Subtest 4	4132	826.4	2	21.8
			4183	836.6	2	21.5
			4233	846.6	2	21.5
		Subtest 5	4132	826.4	0	23.0
			4183	836.6	0	23.0
			4233	846.6	0	23.0

Band	Mode		UL Ch No.	Freq. (MHz)	MPR (dB)	Avg Pwr (dBm)
W-CDMA Band II	Rel 99	RMC, 12.2 kbps	9262	1852.4	N/A	23.8
			9400	1880.0	N/A	23.7
			9538	1907.6	N/A	23.8
	HSDPA	Subtest 1	9262	1852.4	0	22.8
			9400	1880.0	0	22.7
			9538	1907.6	0	22.7
		Subtest 2	9262	1852.4	0	22.8
			9400	1880.0	0	22.7
			9538	1907.6	0	22.7
		Subtest 3	9262	1852.4	0.5	22.3
			9400	1880.0	0.5	22.2
			9538	1907.6	0.5	22.2
		Subtest 4	9262	1852.4	0.5	22.3
			9400	1880.0	0.5	22.2
			9538	1907.6	0.5	22.2
	HSUPA	Subtest 1	9262	1852.4	0	22.8
			9400	1880.0	0	22.7
			9538	1907.6	0	22.7
		Subtest 2	9262	1852.4	2	21.5
			9400	1880.0	2	21.7
			9538	1907.6	2	21.7
		Subtest 3	9262	1852.4	1	21.6
			9400	1880.0	1	21.7
			9538	1907.6	1	21.8
		Subtest 4	9262	1852.4	2	21.5
			9400	1880.0	2	21.7
			9538	1907.6	2	21.7
		Subtest 5	9262	1852.4	0	22.8
			9400	1880.0	0	22.7
			9538	1907.6	0	22.7

9.4. LTE

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

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

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

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

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

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

Network Signalling value	Requirements (sub-clause)	E-UTRA Band	Channel bandwidth (MHz)	Resources Blocks (N_{RB})	A-MPR (dB)
NS_01	6.6.2.1.1	Table 5.5-1	1.4, 3, 5, 10, 15, 20	Table 5.6-1	NA
NS_03	6.6.2.2.1	2, 4, 10, 23, 25, 35, 36	3	>5	≤ 1
			5	>6	≤ 1
			10	>6	≤ 1
			15	>8	≤ 1
			20	>10	≤ 1
NS_04	6.6.2.2.2	41	5	>6	≤ 1
			10, 15, 20	See Table 6.2.4-4	
NS_05	6.6.3.3.1	1	10, 15, 20	≥ 50	≤ 1
NS_06	6.6.2.2.3	12, 13, 14, 17	1.4, 3, 5, 10	Table 5.6-1	n/a
NS_07	6.6.2.2.3	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 5 Measured Results

Band	BW (MHz)	Mode	RB Allocation	RB offset	Target MPR	Max. Avg Pwr (dBm)		
						829 MHz	836.5 MHz	844 MHz
LTE Band 5	10	QPSK	1	0	0	22.8	22.9	23.0
			1	25	0	22.8	23.1	23.0
			1	49	0	22.8	22.7	22.9
			25	0	1	21.7	21.8	21.7
			25	12	1	21.8	21.8	21.9
			25	25	1	21.6	21.7	21.9
			50	0	1	21.6	21.7	21.8
		16QAM	1	0	1	21.9	22.3	21.8
			1	25	1	22.1	22.2	22.2
			1	49	1	21.8	22.0	21.9
			25	0	2	20.7	20.8	20.8
			25	12	2	20.8	20.8	21.0
			25	25	2	20.7	20.8	21.0
			50	0	2	20.7	20.8	20.9
Band	BW (MHz)	Mode	RB Allocation	RB offset	Target MPR	Max. Avg Pwr (dBm)		
						826.5 MHz	836.5 MHz	846.5 MHz
LTE Band 5	5	QPSK	1	0	0	22.6	22.9	22.8
			1	12	0	23.0	22.8	22.8
			1	24	0	22.8	22.8	22.7
			12	0	1	21.5	21.7	21.8
			12	7	1	21.6	21.7	21.9
			12	13	1	21.6	21.6	21.9
			25	0	1	21.6	21.6	21.8
		16QAM	1	0	1	21.6	22.0	22.6
			1	12	1	21.7	22.0	22.6
			1	24	1	21.8	21.9	22.4
			12	0	2	20.6	20.8	20.8
			12	7	2	20.7	20.8	20.9
			12	13	2	20.7	20.8	20.8
			25	0	2	20.8	20.6	20.8
Band	BW (MHz)	Mode	RB Allocation	RB offset	Target MPR	Max. Avg Pwr (dBm)		
						825.5 MHz	836.5 MHz	847.5 MHz
LTE Band 5	3	QPSK	1	0	0	22.9	22.9	23.2
			1	8	0	23.4	23.0	23.5
			1	14	0	22.9	22.9	23.0
			8	0	1	21.8	21.9	21.9
			8	4	1	21.8	21.8	21.9
			8	7	1	21.9	21.9	22.0
			15	0	1	21.9	21.8	21.9
		16QAM	1	0	1	21.9	22.4	22.3
			1	8	1	21.8	22.3	22.0
			1	14	1	21.9	22.4	22.1
			8	0	2	20.9	20.7	21.1
			8	4	2	20.9	20.8	21.2
			8	7	2	21.0	20.8	21.2
			15	0	2	20.9	20.9	20.9

LTE Band 5 Measured Results (continued)

Band	BW (MHz)	Mode	RB Allocation	RB offset	Target MPR	Max. Avg Pwr (dBm)		
						824.7 MHz	836.5 MHz	848.3 MHz
LTE Band 5	1.4	QPSK	1	0	0	22.5	23.0	22.9
			1	3	0	22.6	22.5	22.9
			1	5	0	22.5	22.1	22.7
			3	0	0	22.5	22.1	22.7
			3	1	0	22.6	22.2	22.7
			3	3	0	22.6	22.2	22.7
			6	0	1	21.5	21.2	21.6
		16QAM	1	0	1	21.6	22.6	22.0
			1	3	1	21.7	22.4	21.9
			1	5	1	21.6	22.6	21.9
			3	0	1	21.6	22.5	21.8
			3	1	1	21.6	22.5	21.8
			3	3	1	21.6	22.6	21.8
			6	0	2	20.7	21.4	20.8

LTE Band 17 Measured Results

Band	BW (MHz)	Mode	RB Allocation	RB offset	Target MPR	Max. Avg Pwr (dBm)
						710 MHz
LTE Band 17	10	QPSK	1	0	0	23.2
			1	25	0	23.1
			1	49	0	23.0
			25	0	1	22.1
			25	12	1	22.1
			25	25	1	22.0
			50	0	1	22.1
		16QAM	1	0	1	22.5
			1	25	1	22.7
			1	49	1	22.2
			25	0	2	21.1
			25	12	2	21.1
			25	25	2	21.0
			50	0	2	21.1
Band	BW (MHz)	Mode	RB Allocation	RB offset	Target MPR	Max. Avg Pwr (dBm)
						710 MHz
LTE Band 17	5	QPSK	1	0	0	23.1
			1	12	0	23.2
			1	24	0	23.1
			12	0	1	22.0
			12	7	1	22.1
			12	13	1	22.1
			25	0	1	22.1
		16QAM	1	0	1	22.2
			1	12	1	22.3
			1	24	1	22.2
			12	0	2	21.1
			12	7	2	21.1
			12	13	2	21.1
			25	0	2	21.1

Note(s):

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

9.5. Wi-Fi 2.4GHz (DTS Bands)

SISO Measured Results

Band (GHz)	Mode	Data Rate	Ch #	Freq. (MHz)	Chain 0 Avg Pwr (dBm)	Max Output Power (dBm)	Chain1 Avg Pwr (dBm)	Max Output Power (dBm)	SAR Test (Yes/No)	Note(s)			
2.4	802.11b	1 Mbps	1	2412	12.8	13.5	8.6	10.0	Yes				
			6	2437	13.1		9.4						
			11	2462	12.8		9.1						
			12	2467	12.7		9.2						
			13	2472	9.7		9.3						
	802.11g	6 Mbps	1	2412	Not Required	13.5	Not Required	10.0	No	1			
			6	2437									
			11	2462		7.8		8.1					
			12	2467									
			13	2472									
	802.11n (HT20)	MCS0	1	2412	Not Required	13.5	Not Required	10.0	No	1			
			6	2437									
			11	2462		12.3		7.8					
			12	2467									
			13	2472									

Note(s):

- Output Power and SAR is not required for 802.11n HT20 channels when the highest reported SAR for DSSS is adjusted by the ratio of OFDM to DSSS specified maximum output power and the adjusted SAR is ≤ 1.2 W/kg.

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

MIMO Measured Results

Band (GHz)	Mode	Data Rate	Ch #	Freq. (MHz)	Chain 0 Avg Pwr (dBm)	Max Output Power (dBm)	SAR Test (Yes/No)	Chain 1 Avg Pwr (dBm)	Max Output Power (dBm)	SAR Test (Yes/No)
5.3 UNII-2A	802.11a	6 Mbps	52	5260	Not required	12.0	No	Not required	11.0	No
			56	5280						
			60	5300						
			64	5320						
	802.11n (HT20)	6.5 Mbps	52	5260	Not required	12.0	No	Not required	11.0	No
			56	5280						
			60	5300						
	802.11n (HT40)	13.5 Mbps	54	5270	Not required	12.0	No	Not required	11.0	No
			62	5310						
	802.11ac (VHT20)	6.5 Mbps	52	5260	Not required	12.0	No	Not required	11.0	No
			56	5280						
			60	5300						
			64	5320						
	802.11ac (VHT40)	13.5 Mbps	54	5270	Not required	12.0	No	Not required	11.0	No
			62	5310						
	802.11ac (VHT80)	29.3 Mbps	58	5290	10.5	12.0	Yes	9.4	10.7	Yes
5.6 UNII-2C	802.11a	6 Mbps	100	5500	Not required	12.0	No	Not required	11.0	No
			104	5520						
			108	5540						
			112	5560						
			116	5580						
			120	5600						
			124	5620						
			128	5640						
			132	5660						
			136	5680						
			140	5700						
			144	5720						
	802.11n (HT20)	6.5 Mbps	100	5500	Not required	12.0	No	Not required	11.0	No
			104	5520						
			108	5540						
			112	5560						
			116	5580						
			120	5600						
			124	5620						
			128	5640						
			132	5660						
			136	5680						
			140	5700						
			144	5720						
	802.11n (HT40)	13.5 Mbps	102	5510	Not required	12.0	No	Not required	11.0	No
			110	5550						
			118	5590						
			126	5630						
			134	5670						
			142	5710						

MIMO Measured Results (continued)

Band (GHz)	Mode	Data Rate	Ch #	Freq. (MHz)	Chain 0 Avg Pwr (dBm)	Max Output Power (dBm)	SAR Test (Yes/No)	Chain 1 Avg Pwr (dBm)	Max Output Power (dBm)	SAR Test (Yes/No)
5.6 UNII-2C	802.11ac (VHT20)	6.5 Mbps	100	5500	Not required	12.0	No	Not required	11.0	No
			104	5520						
			108	5540						
			112	5560						
			116	5580						
			120	5600						
			124	5620						
			128	5640						
			132	5660						
			136	5680						
			140	5700						
			144	5720						
	802.11ac (VHT40)	13.5 Mbps	102	5510	Not required	12.0	No	Not required	11.0	No
			110	5550						
			118	5590						
			126	5630						
			134	5670						
	802.11ac (VHT80)	29.3 Mbps	142	5710	10.0 10.3 10.6	12.0	Yes	9.6 9.5 9.8	10.9	Yes
			106	5530						
			122	5610						
			138	5690						
5.8 UNII-3	802.11a	6 Mbps	149	5745	Not required	12.0	No	Not required	11.0	No
			153	5765						
			157	5785						
			161	5805						
			165	5825						
	802.11n (HT20)	6.5 Mbps	149	5745	Not required	12.0	No	Not required	11.0	No
			153	5765						
			157	5785						
			161	5805						
			165	5825						
	802.11n (HT40)	13.5 Mbps	151	5755	Not required	12.0	No	Not required	11.0	No
			159	5795						
			149	5745						
	802.11ac (VHT20)	6.5 Mbps	153	5765	Not required	12.0	No	Not required	11.0	No
			157	5785						
			161	5805						
			165	5825						
			151	5755						
	802.11ac (VHT40)	13.5 Mbps	159	5795	Not required	12.0	No	Not required	11.0	No
			155	5775						
	802.11ac (VHT80)	29.3 Mbps	155	5775	10.2	12.0	Yes	9.4	11.0	Yes

Note(s):

- Output Power and SAR measurement is not required for 802.11a, 802.11n HT20/HT40, and 802.11ac VHT20/VHT40 channels when the specified tune-up tolerances for 802.11a, 802.11n HT20/HT40, and 802.11ac VHT20/VHT40 are $\leq$ 802.11ac VHT80 and the measured SAR is $\leq$ 1.2 W/Kg.
- When the same transmission mode configurations have the same maximum output power on the same channel for the 802.11 a/g/n/ac modes, the channel in the lower order/sequence 802.11 mode (i.e. a, g, n then ac) is selected.
- When the specified maximum output power is the same for both UNII band I and UNII band 2A, begin SAR measurement in UNII band 2A; and if the highest reported SAR for UNII band 2A is
 - $\leq$ 1.2 W/kg, SAR is not required for UNII band I
 - $>$ 1.2 W/kg, both bands should be tested independently for SAR.

9.7. Bluetooth

Maximum tune-up tolerance limit is 10.5 dBm. This power level qualifies for exclusion of SAR testing.

10. Measured and Reported (Scaled) SAR Results

SAR Test Reduction criteria are as follows:

KDB 447498 D01 General RF Exposure Guidance:

Testing of other required channels within the operating mode of a frequency band is not required when the reported 1-g or 10-g SAR for the mid-band or highest output power channel is:

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

KDB 648474 D04 Handset SAR:

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

KDB 941225 D01 SAR test for 3G devices:

When the maximum output power and tune-up tolerance specified for production units in a secondary mode is $\leq \frac{1}{4}$ dB higher than the primary mode or when the highest reported SAR of the primary mode is scaled by the ratio of specified maximum output power and tune-up tolerance of secondary to primary mode and the adjusted SAR is ≤ 1.2 W/kg, SAR measurement is not required for the secondary mode

KDB 941225 D05 SAR for LTE Devices:

SAR test reduction is applied using the following criteria:

- Start with the largest channel bandwidth and measure SAR for QPSK with 1 RB, and 50% RB allocation, using the RB offset and required test channel combination with the highest maximum output power among RB offsets at the upper edge, middle and lower edge of each required test channel.
- When the reported SAR is > 0.8 W/kg, testing for other Channels is performed at the highest output power level for 1RB, and 50% RB configuration for that channel.
- Testing for 100% RB configuration is performed at the highest output power level for 100% RB configuration across the Low, Mid and High Channel when the highest reported SAR for 1 RB and 50% RB are > 0.8 W/kg. Testing for the remaining required channels is not needed because the reported SAR for 100% RB Allocation < 1.45 W/kg.
- Testing for 16-QAM modulation is not required because the reported SAR for QPSK is < 1.45 W/Kg and its output power is not more than 0.5 dB higher than that of QPSK.
- Testing for the other channel bandwidths is not required because the reported SAR for the highest channel bandwidth is < 1.45 W/Kg and its output power is not more than 0.5 dB higher than that of the highest channel bandwidth.

10.1. GSM850

RF Exposure Conditions	Mode	Dist. (mm)	Test Position	Ch #.	Freq. (MHz)	Power (dBm)		1-g SAR (W/kg)		Plot No.
						Tune-up limit	Meas.	Meas.	Scaled	
Head	Voice	0	Left Touch	190	836.6	33.2	32.4	0.174	0.209	1
			Left Tilt	190	836.6	33.2	32.4	0.100	0.120	
			Right Touch	190	836.6	33.2	32.4	0.233	0.280	
			Right Tilt	190	836.6	33.2	32.4	0.120	0.144	
Head VoIP	GPRS 4 Slots	0	Left Touch	190	836.6	29.2	28.9	0.255	0.273	2
			Left Tilt	190	836.6	29.2	28.9	0.153	0.164	
			Right Touch	190	836.6	29.2	28.9	0.343	0.368	
			Right Tilt	190	836.6	29.2	28.9	0.170	0.182	
Body-worn	Voice	15	Rear	190	836.6	33.2	32.4	0.233	0.280	3
			Front	190	836.6	33.2	32.4	0.227	0.273	
Body-worn(VoIP) & Hotspot	GPRS 4 Slots	10	Rear	190	836.6	29.2	28.9	0.480	0.514	
			Front	190	836.6	29.2	28.9	0.367	0.393	
			Edge 2	190	836.6	29.2	28.9	0.419	0.449	
			Edge 3	190	836.6	29.2	28.9	0.225	0.241	
			Edge 4	190	836.6	29.2	28.9	0.103	0.110	

DTM (Dual Transfer Mode)

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	
Body-worn(VoIP) & Hotspot	DTM 2 Slots	10	Rear	190	836.6	32.2	31.5	0.501	0.589	4

10.2. GSM1900

RF Exposure Conditions	Mode	Dist. (mm)	Test Position	Ch #.	Freq. (MHz)	Power (dBm)		1-g SAR (W/kg)		Plot No.
						Tune-up limit	Meas.	Meas.	Scaled	
Head	Voice	0	Left Touch	661	1880.0	30.7	29.8	0.155	0.191	5
			Left Tilt	661	1880.0	30.7	29.8	0.044	0.054	
			Right Touch	661	1880.0	30.7	29.8	0.083	0.102	
			Right Tilt	661	1880.0	30.7	29.8	0.060	0.074	
Head VoIP	GPRS 4 Slots	0	Left Touch	661	1880.0	26.2	26.2	0.224	0.224	6
			Left Tilt	661	1880.0	26.2	26.2	0.054	0.054	
			Right Touch	661	1880.0	26.2	26.2	0.125	0.125	
			Right Tilt	661	1880.0	26.2	26.2	0.079	0.079	
Body-worn	Voice	15	Rear	661	1880.0	30.7	29.8	0.118	0.145	7
			Front	661	1880.0	30.7	29.8	0.128	0.157	
Body-worn(VoIP) & Hotspot	GPRS 4 Slots	10	Rear	661	1880.0	26.2	26.2	0.355	0.355	
			Front	661	1880.0	26.2	26.2	0.404	0.404	
			Edge 2	661	1880.0	26.2	26.2	0.051	0.051	
			Edge 3	661	1880.0	26.2	26.2	0.560	0.560	
			Edge 4	661	1880.0	26.2	26.2	0.256	0.256	

DTM (Dual Transfer Mode)

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	
Body-worn(VoIP) & Hotspot	DTM 2 Slots	10	Edge 3	661	1880.0	29.2	28.6	0.565	0.649	8

10.3. W-CDMA Band V

RF Exposure Conditions	Mode	Dist. (mm)	Test Position	Ch #.	Freq. (MHz)	Power (dBm)		1-g SAR (W/kg)		Plot No.
						Tune-up limit	Meas.	Meas.	Scaled	
Head	Rel 99 RMC	0	Left Touch	4183	836.6	24.5	23.5	0.185	0.233	9
			Left Tilt	4183	836.6	24.5	23.5	0.113	0.142	
			Right Touch	4183	836.6	24.5	23.5	0.267	0.336	
			Right Tilt	4183	836.6	24.5	23.5	0.127	0.160	
Body-worn	Rel 99 RMC	15	Rear	4183	836.6	24.5	23.5	0.265	0.334	10
			Front	4183	836.6	24.5	23.5	0.258	0.325	
Hotspot	Rel 99 RMC	10	Rear	4183	836.6	24.5	23.3	0.351	0.463	11
			Front	4183	836.6	24.5	23.3	0.315	0.415	
			Edge 2	4183	836.6	24.5	23.3	0.332	0.438	
			Edge 3	4183	836.6	24.5	23.3	0.178	0.235	
			Edge 4	4183	836.6	24.5	23.3	0.069	0.091	

10.4. W-CDMA Band II

RF Exposure Conditions	Mode	Dist. (mm)	Test Position	Ch #.	Freq. (MHz)	Power (dBm)		1-g SAR (W/kg)		Plot No.
						Tune-up limit	Meas.	Meas.	Scaled	
Head	Rel 99 RMC	0	Left Touch	9400	1880.0	24.2	23.7	0.349	0.392	12
			Left Tilt	9400	1880.0	24.2	23.7	0.085	0.095	
			Right Touch	9400	1880.0	24.2	23.7	0.162	0.182	
			Right Tilt	9400	1880.0	24.2	23.7	0.111	0.125	
Body-worn	Rel 99 RMC	15	Rear	9400	1880.0	24.2	23.7	0.221	0.248	
			Front	9400	1880.0	24.2	23.7	0.218	0.245	
Hotspot	Rel 99 RMC	10	Rear	9400	1880.0	24.2	23.7	0.501	0.562	
			Front	9400	1880.0	24.2	23.7	0.543	0.609	
			Edge 2	9400	1880.0	24.2	23.7	0.067	0.075	
			Edge 3	9400	1880.0	24.2	23.7	0.649	0.728	
			Edge 4	9400	1880.0	24.2	23.7	0.296	0.332	

10.5. LTE Band 5 (10MHz Bandwidth)

RF Exposure Conditions	Mode	Dist. (mm)	Test Position	Ch #.	Freq. (MHz)	RB Allocation	RB offset	Power (dBm)		1-g SAR (W/kg)		Plot No.
								Tune-up limit	Meas.	Meas.	Scaled	
Head	QPSK	0	Left Touch	20525	836.5	1	25	24.1	23.1	0.216	0.272	14
						25	12	23.1	21.8	0.173	0.233	
			Left Tilt	20525	836.5	1	25	24.1	23.1	0.112	0.141	
						25	12	23.1	21.8	0.091	0.123	
			Right Touch	20525	836.5	1	25	24.1	23.1	0.282	0.355	
						25	12	23.1	21.8	0.222	0.299	
			Right Tilt	20525	836.5	1	25	24.1	23.1	0.134	0.169	
						25	12	23.1	21.8	0.104	0.140	
Body-worn	QPSK	15	Rear	20525	836.5	1	25	24.1	23.1	0.243	0.306	15
						25	12	23.1	21.8	0.200	0.270	
			Front	20525	836.5	1	25	24.1	23.1	0.265	0.334	
						25	12	23.1	21.8	0.219	0.295	
Hotspot	QPSK	10	Rear	20525	836.5	1	25	24.1	23.1	0.316	0.398	16
						25	12	23.1	21.8	0.254	0.343	
			Front	20525	836.5	1	25	24.1	23.1	0.322	0.405	
						25	12	23.1	21.8	0.320	0.432	
			Edge 2	20525	836.5	1	25	24.1	23.1	0.310	0.390	
						25	12	23.1	21.8	0.254	0.343	
			Edge 3	20525	836.5	1	25	24.1	23.1	0.105	0.132	
						25	12	23.1	21.8	0.082	0.111	
			Edge 4	20525	836.5	1	25	24.1	23.1	0.101	0.127	
						25	12	23.1	21.8	0.084	0.113	

10.6. LTE Band 17 (10MHz Bandwidth)

RF Exposure Conditions	Mode	Dist. (mm)	Test Position	Ch #.	Freq. (MHz)	RB Allocation	RB offset	Power (dBm)		1-g SAR (W/kg)		Plot No.
								Tune-up limit	Meas.	Meas.	Scaled	
Head	QPSK	0	Left Touch	23790	710.0	1	0	24.1	23.2	0.076	0.093	17
						25	0	23.1	22.1	0.073	0.091	
			Left Tilt	23790	710.0	1	0	24.1	23.2	0.025	0.030	
						25	0	23.1	22.1	0.029	0.036	
			Right Touch	23790	710.0	1	0	24.1	23.2	0.085	0.104	
						25	0	23.1	22.1	0.082	0.103	
			Right Tilt	23790	710.0	1	0	24.1	23.2	0.031	0.038	
						25	0	23.1	22.1	0.032	0.040	
Body-worn	QPSK	15	Rear	23790	710.0	1	0	24.1	23.2	0.123	0.150	18
						25	0	23.1	22.1	0.109	0.137	
			Front	23790	710.0	1	0	24.1	23.2	0.116	0.141	
						25	0	23.1	22.1	0.105	0.132	
Hotspot	QPSK	10	Rear	23790	710.0	1	0	24.1	23.2	0.152	0.185	19
						25	0	23.1	22.1	0.138	0.173	
			Front	23790	710.0	1	0	24.1	23.2	0.148	0.180	
						25	0	23.1	22.1	0.133	0.167	
			Edge 2	23790	710.0	1	0	24.1	23.2	0.105	0.128	
						25	0	23.1	22.1	0.098	0.123	
			Edge 3	23790	710.0	1	0	24.1	23.2	0.011	0.013	
						25	0	23.1	22.1	0.010	0.013	
			Edge 4	23790	710.0	1	0	24.1	23.2	0.072	0.088	
						25	0	23.1	22.1	0.066	0.083	

10.7. Wi-Fi (DTS Band)

Frequency Band	Mode & Ant.	RF Exposure Conditions	Dist. (mm)	Test Position	Ch #.	Freq. (MHz)	Area Scan Max. SAR (W/kg)	Power (dBm)		1-g SAR (W/kg)		Notes	Plot No.
								Tune-up limit	Meas.	Meas.	Scaled		
2.4GHz	SISO 802.11b 1 Mbps Main	Head	0	Left Touch	6	2437.0	0.311	13.5	13.1	0.324	0.355	1	20
				Left Tilt	6	2437.0	0.181	13.5	13.1				
				Right Touch	6	2437.0	0.163	13.5	13.1				
				Right Tilt	6	2437.0	0.093	13.5	13.1				
		Body-worn	15	Rear	6	2437.0	0.028	13.5	13.1				
				Front	6	2437.0	0.025	13.5	13.1				
		Body-worn & Hotspot & Wi-Fi Direct	10	Rear	6	2437.0	0.128	13.5	13.1	0.142	0.156	1	21
				Front	6	2437.0	0.119	13.5	13.1				
				Edge 1	6	2437.0	0.047	13.5	13.1				
				Edge 2	6	2437.0	0.021	13.5	13.1				
	SISO 802.11b 1 Mbps Aux	Head	0	Left Touch	6	2437.0	0.052	10.0	9.4				
				Left Tilt	6	2437.0	0.018	10.0	9.4				
				Right Touch	6	2437.0	0.166	10.0	9.4	0.137	0.157	1	
				Right Tilt	6	2437.0	0.052	10.0	9.4				
		Body-worn	15	Rear	6	2437.0	0.005	10.0	9.4				
				Front	6	2437.0	0.009	10.0	9.4				
		Body-worn & Hotspot & Wi-Fi Direct	10	Rear	6	2437.0	0.016	10.0	9.4				
				Front	6	2437.0	0.018	10.0	9.4	0.014	0.016	1	
				Edge 1	6	2437.0	0.000	10.0	9.4				
				Edge 4	6	2437.0	0.009	10.0	9.4				

Note(s):

- Highest reported SAR is ≤ 0.4 W/kg. Therefore, further SAR measurements within this exposure condition are not required.

10.8. Wi-Fi (U-NII Band)

Frequency Band	Mode & Ant.	RF Exposure Conditions	Dist. (mm)	Test Position	Ch #.	Freq. (MHz)	Area Scan Max. SAR (W/kg)	Power (dBm) Main		Power (dBm) Sub		1-g SAR (W/kg) Main		1-g SAR (W/kg) Sub		Notes	Plot No.
								Tune-up limit	Meas.	Tune-up limit	Meas.	Meas.	Scaled	Meas.	Scaled		
5.3 GHz U-NII 2A	MIMO 802.11ac (VHT80) 29.3 Mbps	Head	0	Left Touch	58	5290	0.400	12.0	10.5	10.7	9.4						
				Left Tilt	58	5290	0.215	12.0	10.5	10.7	9.4						
				Right Touch	58	5290	0.412	12.0	10.5	10.7	9.4	0.019	0.027	0.206	0.278	1	22
				Right Tilt	58	5290	0.202	12.0	10.5	10.7	9.4						
		Body-worn	15	Rear	58	5290	0.068	12.0	10.5	10.7	9.4	0.025	0.035	0.027	0.036	1	23
				Front	58	5290	0.060	12.0	10.5	10.7	9.4						
Frequency Band	Mode & Ant.	RF Exposure Conditions	Dist. (mm)	Test Position	Ch #.	Freq. (MHz)	Area Scan Max. SAR (W/kg)	Tune-up limit	Meas.	Tune-up limit	Meas.	Meas.	Scaled	Meas.	Scaled	Notes	Plot No.
5.5 GHz U-NII 2A	MIMO 802.11ac (VHT80) 29.3 Mbps	Head	0	Left Touch	122	5610	0.683	12.0	10.3	10.9	9.5	0.335	0.496	0.162	0.224	1	
				Left Tilt	122	5610	0.238	12.0	10.3	10.9	9.5						
				Right Touch	122	5610	0.615	12.0	10.3	10.9	9.5	0.354	0.524	0.367	0.507	2	24
				Right Tilt	122	5610	0.278	12.0	10.3	10.9	9.5						
		Body-worn	15	Rear	122	5610	0.069	12.0	10.3	10.9	9.5	0.025	0.037	0.028	0.039	1	25
				Front	122	5610	0.068	12.0	10.3	10.9	9.5						
Frequency Band	Mode & Ant.	RF Exposure Conditions	Dist. (mm)	Test Position	Ch #.	Freq. (MHz)	Area Scan Max. SAR (W/kg)	Tune-up limit	Meas.	Tune-up limit	Meas.	Meas.	Scaled	Meas.	Scaled	Notes	Plot No.
5.8 GHz U-NII 3	MIMO 802.11ac (VHT80) 29.3 Mbps	Head	0	Left Touch	155	5775	0.509	12.0	10.2	11.0	9.4						
				Left Tilt	155	5775	0.211	12.0	10.2	11.0	9.4						
				Right Touch	155	5775	0.575	12.0	10.2	11.0	9.4	0.046	0.070	0.269	0.389	1	26
				Right Tilt	155	5775	0.245	12.0	10.2	11.0	9.4						
		Body-worn	15	Rear	155	5775	0.042	12.0	10.2	11.0	9.4						
				Front	155	5775	0.031	12.0	10.2	11.0	9.4						
		Body-worn & Hotspot & Wi-Fi Direct	10	Rear	155	5775	0.069	12.0	10.2	11.0	9.4	0.028	0.042	0.060	0.087	1	27
				Front	155	5775	0.044	12.0	10.2	11.0	9.4						
				Edge 1	155	5775	0.000	12.0	10.2	11.0	9.4						
				Edge 2	155	5775	0.002	12.0	10.2	11.0	9.4						

Note(s):

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

10.9. Bluetooth

Standalone SAR Test Exclusion Considerations & Estimated SAR

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

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

- $f_{(\text{GHz})}$ is the RF channel transmit frequency in GHz
- Power and distance are rounded to the nearest mW and mm before calculation
- The result is rounded to one decimal place for comparison

The test exclusions are applicable only when the minimum test separation distance is ≤ 50 mm and for transmission frequencies between 100 MHz and 6 GHz. When the minimum test separation distance is < 5 mm, a distance of 5 mm is applied to determine SAR test exclusion.

When the standalone SAR test exclusion is applied to an antenna that transmits simultaneously with other antennas, the standalone SAR must be estimated according to following to determine simultaneous transmission SAR test exclusion:

- $(\text{max. power of channel, including tune-up tolerance, mW}) / (\text{min. test separation distance, mm}) \cdot [\sqrt{f_{(\text{GHz})}/x}]$ W/kg for test separation distances ≤ 50 mm;
where $x = 7.5$ for 1-g SAR, and $x = 18.75$ for 10-g SAR.
- 0.4 W/kg for 1-g SAR and 1.0 W/kg for 10-g SAR, when the test separation distances is > 50 mm.

Body-worn Accessory Exposure Conditions

Max. tune-up tolerance limit		Min. test separation distance (mm)	Frequency (GHz)	SAR test exclusion Result*	Test Configuration	Estimated 1-g SAR (W/kg)
(dBm)	(mW)					
10.5	11	15	2.480	1.2	Rear/Front	0.154

Conclusion:

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

11. SAR Measurement Variability

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

- 1) Repeated measurement is not required when the original highest measured SAR is < 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.

Frequency Band (MHz)	Air Interface	RF Exposure Conditions	Test Position	Repeated SAR (Yes/No)	Highest Measured SAR (W/kg)	Repeated Measured SAR (W/kg)	Largest to Smallest SAR Ratio
700	LTE Band 17	Hotspot	Rear	No	0.152	N/A	N/A
850	GSM 850	Hotspot	Rear	No	0.501	N/A	N/A
	WCDMA Band V	Hotspot	Rear	No	0.351	N/A	N/A
	LTE Band 5	Hotspot	Front	No	0.322	N/A	N/A
1900	GSM 1900	Hotspot	Edge 3	No	0.565	N/A	N/A
	WCDMA Band II	Hotspot	Edge 3	No	0.649	N/A	N/A
2400	Wi-Fi 802.11b/g/n	Head	Left Touch	No	0.324	N/A	N/A
5300	Wi-Fi 802.11a/n/ac	Head	Right Touch	No	0.206	N/A	N/A
5500	Wi-Fi 802.11a/n/ac	Head	Right Touch	No	0.367	N/A	N/A
5800	Wi-Fi 802.11a/n/ac	Head	Right Touch	No	0.269	N/A	N/A

Note(s):

Second Repeated Measurement is not required since the ratio of the largest to smallest SAR for the original and first repeated measurement is not > 1.20.

12. Simultaneous Transmission SAR Analysis

Simultaneous Transmission Condition

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

Notes:

1. DTS and U-NII 1 and U-NII 3 supports Hotspot and Wi-Fi Direct.

2. GPRS/EDGE and W-CDMA support Hotspot.

3. VoIP is supported in GPRS/EDGE and W-CDMA.

4. DTS Radio cannot transmit simultaneously with Bluetooth Radio.

5. U-NII Radio can transmit simultaneously with Bluetooth Radio.

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

RF Exposure conditions	① WWAN	② DTS	③ U-NII	④ BT	①+② WWAN+DTS		①+③ WWAN+U-NII		①+③+④ WWAN+U-NII+BT	
					Σ 1g SAR (mW/g)	SPLSR (Yes/ No)	Σ 1g SAR (mW/g)	SPLSR (Yes/ No)	Σ 1g SAR (mW/g)	SPLSR (Yes/ No)
Head	0.392	0.355	0.524		0.747	No	0.916	No		
Body-worn	0.334	0.156	0.087	0.154	0.490	No	0.421	No	0.575	No
Hotspot	0.728	0.156	0.087		0.884	No	0.815	No		

Note(s):

Appendixes

Refer to separated files for the following appendixes.

A_15J20224v0 SAR Photos & Ant. Locations

B_15J20224v1 SAR System Check Plots

C_15J20224v1 SAR Highest Test Plots

D_15J20224v0 SAR Tissue Ingredients

E_15J20224v1 SAR Probe Cal. Certificates

F_15J20224v1 SAR Dipole Cal. Certificates

END OF REPORT