



SAR EVALUATION REPORT

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

The model FCC ID: A3LSMA800S shares the same enclosure and circuit board as model FCC ID: A3LSCV32. The WLAN/Bluetooth circuitry and layout, including antenna, are almost identical between the two units. The WLAN/Bluetooth antenna and surrounding circuitry is the same between these two units, and tune up power targets are identical for WLAN and Bluetooth operations. For this reason the SAR data for the WLAN and Bluetooth operations for FCC ID: A3LSMA800S is considered representative for FCC ID: A3LSCV32.

For
GSM/WCDMA/LTE Phone + BT/BLE, DTS/UNII a/b/g/n/ac, NFC and ANT+

**FCC ID: A3LSCV32
Model Name: SCV32**

**Report Number: 15I21858-S1V3
Issue Date: 11/20/2015**

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NVLAP LAB CODE 200065-0

Revision History

Rev.	Date	Revisions	Revised By
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V2	11/19/2015	Report revised based on Reviewer's comments: 1. Sec 2., 4.3., 6., 8., 9.3., 10.7., 10.8., 11 : Updated 2. Appendix B, C, F updated	Kenneth Mak
V3	11/20/2015	Report revised based on Reviewer's comments: 1. Sec 1., 9.3.: Updated	Kenneth Mak

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1. Attestation of Test Results

Applicant Name		SAMSUNG ELECTRONICS CO., LTD.			
FCC ID		A3LSCV32			
Model Name		SCV32			
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		0.209	1.040	0.531	N/A
Body-worn*		1.156	0.330	0.096	
Hotspot/Wi-Fi Direct		1.048	0.330	0.096	
Simultaneous Tx	Head	1.249		0.740	
	Body-worn*	1.486		1.252	
	Hotspot/ Wi-Fi Direct	1.378		1.144	
Extremity		N/A	N/A	0.149	
<p>Note: The Body-worn minimum separation distance is 15 mm. To cover both body-worn and hotspot RF exposure conditions testing was performed at a separation distance of 10 mm.</p>					
Date Tested		6/19/2015 to 6/23/2015; 9/30/2015 to 10/15/2015; 10/28/2015 to 10/29/2015; 11/16/2015 to 11/19/2015			
Test Results		Pass			
<p>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.</p> <p>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.</p>					
Approved & Released By:			Prepared By:		
					
Kenneth C. Mak Laboratory Engineer UL Verification Services Inc.			Krischelle Aurelio Laboratory Technician 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 802.11 Wi-Fi SAR v02r02
- 447498 D01 General RF Exposure Guidance v06
- 648474 D04 Handset SAR v01r03
- 690783 D01 SAR Listings on Grants v01r03
- 865664 D01 SAR measurement 100 MHz to 6 GHz v01r04
- 865664 D02 RF Exposure Reporting v01r02
- 941225 D01 3G SAR Procedures v03r01
- 941225 D05 SAR for LTE Devices v02r04
- 941225 D06 Hotspot Mode v02r01

3. Facilities and Accreditation

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

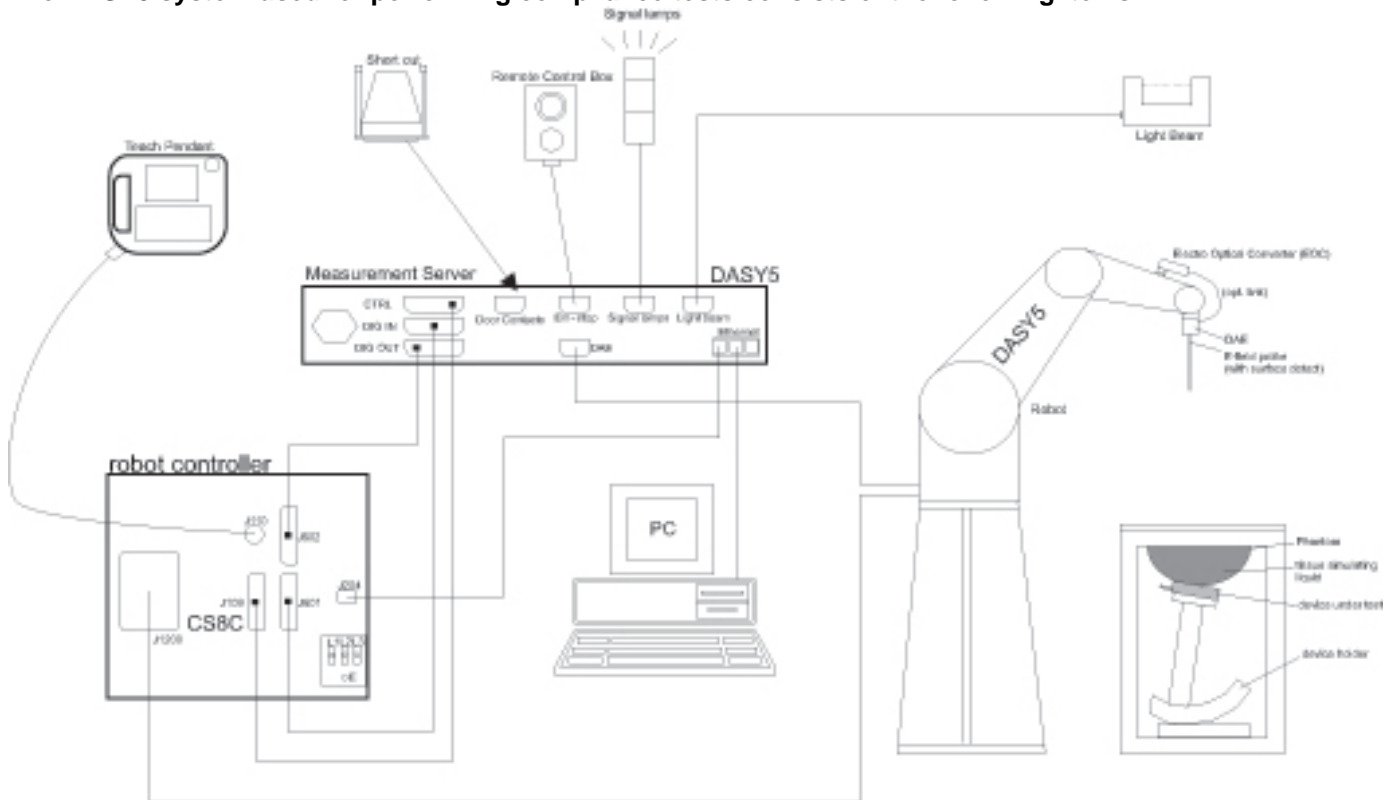
47173 Benicia Street	47266 Benicia Street
SAR Lab A	SAR Lab 1
SAR Lab B	SAR Lab 2
SAR Lab C	SAR Lab 3
SAR Lab D	SAR Lab 4
SAR Lab E	SAR Lab 5
SAR Lab F	
SAR Lab G	
SAR Lab H	

UL Verification Services Inc. is accredited by [NVLAP](#), Laboratory Code 200065-0.

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: 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: $\Delta x_{\text{Zoom}}, \Delta y_{\text{Zoom}}$		≤ 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 <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.

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
Dielectric Probe kit	SPEAG	DAK-3.5	1087	11/11/2015
Dielectric Probe kit	SPEAG	DAK-3.5	1082	9/16/2015
Shorting block	SPEAG	DAK-3.5 Short	SM DAK 200 BA	N/A
Thermometer	Control Company	Traceable	122529163	10/8/2015
Thermometer	Control Company	Traceable	140562250	8/24/2016

Note(s):

DAK-3.5 SN: 1082 and Thermometer SN: 122529163 were used for testing from 6/19/2015 to 6/23/2015.

System Check (Equipment used from 6/19/2015 to 6/23/2015)

Name of Equipment	Manufacturer	Type/Model	Serial No.	Cal. Due Date
Synthesized Signal Generator	Agilent	8665B	3438A00633	7/10/2015
Power Meter	HP	437B	3125U09516	8/27/2015
Power Meter	HP	437B	3125U11347	10/6/2015
Power Sensor	HP	8481A	3318A95392	10/6/2015
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 4)	SPEAG	EX3DV4	3989	3/17/2016
E-Field Probe (SAR Lab 5)	SPEAG	EX3DV4	3773	4/22/2016
Data Acquisition Electronics (SAR Lab 4)	SPEAG	DAE4	1377	8/27/2015
Data Acquisition Electronics (SAR Lab 5)	SPEAG	DAE4	1239	4/16/2016
System Validation Dipole	SPEAG	D2450V2	748	2/20/2016
System Validation Dipole	SPEAG	D2450V2	706	5/11/2016
System Validation Dipole	SPEAG	D5GHzV2	1168	12/4/2015
Thermometer (SAR Lab 4)	EXTECH	445703	CCS-238	6/5/2016
Thermometer (SAR Lab 5)	EXTECH	445703	CCS-239	6/5/2016

System Check (Equipment used from 9/30/2015 to 10/29/2015)

Name of Equipment	Manufacturer	Type/Model	Serial No.	Cal. Due Date
Synthesized Signal Generator	HP	8665B	3744A01155	3/18/2016
Power Meter	HP	437B	3125U16345	6/15/2016
Power Meter	HP	437B	3125U12345	7/31/2016
Power Sensor	HP	8481A	1926A27048	8/3/2016
Power Sensor	HP	8481A	2702A76223	9/3/2016
Amplifier	MITEQ	AMF-4D-00400600-50-30P	1795092	N/A
Directional coupler	Werlatone	C8060-102	2141	N/A
DC Power Supply	BK PRECISION	1611	215-02292	N/A
E-Field Probe (SAR Lab A)	SPEAG	EX3DV4	3901	1/27/2016
E-Field Probe (SAR Lab B)	SPEAG	EX3DV4	3751	11/14/2015
E-Field Probe (SAR Lab E)	SPEAG	EX3DV4	3772	2/23/2016
E-Field Probe (SAR Lab F)	SPEAG	EX3DV4	3929	4/22/2016
E-Field Probe (SAR Lab H)	SPEAG	EX3DV4	7335	3/13/2016
Data Acquisition Electronics (SAR Lab A)	SPEAG	DAE4	1357	2/20/2016
Data Acquisition Electronics (SAR Lab B)	SPEAG	DAE4	1360	3/12/2016
Data Acquisition Electronics (SAR Lab E)	SPEAG	DAE4	1439	7/30/2016
Data Acquisition Electronics (SAR Lab F)	SPEAG	DAE4	1359	2/18/2016
Data Acquisition Electronics (SAR Lab H)	SPEAG	DAE4	1472	3/5/2016
System Validation Dipole	SPEAG	D750V3	1024	5/12/2016
System Validation Dipole	SPEAG	D750V3	1071	11/13/2015
System Validation Dipole	SPEAG	D835V2	4d002	11/13/2015
System Validation Dipole	SPEAG	D1900V2	5d043	11/7/2015
System Validation Dipole	SPEAG	D2600V2	1006	9/21/2016
System Validation Dipole	SPEAG	D5GHzV2	1138	9/23/2016
Thermometer (SAR Lab A)	EXTECH	445703	CCS-206	3/19/2016
Thermometer (SAR Lab B)	EXTECH	445703	CCS-201	5/8/2016
Thermometer (SAR Lab E, F, & H)	EXTECH	445703	CCS-209	3/16/2016

System Check (Equipment used from 11/16/2015 to 11/19/2015)

Name of Equipment	Manufacturer	Type/Model	Serial No.	Cal. Due Date
Synthesized Signal Generator	HP	8665B	3744A01155	3/18/2016
Power Meter	HP	437B	3125U16345	6/15/2016
Power Meter	HP	437B	3125U12345	7/31/2016
Power Sensor	HP	8481A	1926A27048	8/3/2016
Power Sensor	HP	8481A	2702A76223	9/3/2016
Amplifier	MITEQ	AMF-4D-00400600-50-30P	1795092	N/A
Directional coupler	Werlatone	C8060-102	2141	N/A
DC Power Supply	BK PRECISION	1611	215-02292	N/A
E-Field Probe (SAR Lab F)	SPEAG	EX3DV4	3929	4/22/2016
Data Acquisition Electronics (SAR Lab F)	SPEAG	DAE4	1359	2/18/2016
System Validation Dipole	SPEAG	D835V2	4d117	5/18/2016
Thermometer (SAR Lab F)	EXTECH	445703	CCS-209	3/16/2016

Other

Name of Equipment	Manufacturer	Type/Model	Serial No.	Cal. Due Date
Power Meter	Agilent	N1912A	MY53060002	4/7/2017
Power Sensor	Agilent	N1921A	MY52020011	6/1/2016
Base Station Simulator	R & S	CMW500	135387	4/20/2016
Base Station Simulator	R & S	CMW500	137877-ms	8/10/2016

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

Device Dimension	Overall (Length x Width): 157.9 mm x 76.9 mm Overall Diagonal: 167.7 mm Display Diagonal: 144.3 mm												
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. <input checked="" type="checkbox"/> Mobile Hotspot (Wi-Fi 2.4 GHz) <input type="checkbox"/> Mobile Hotspot (Wi-Fi 5.2, Group Client only, and 5.8 GHz, Group Owner)												
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 5.2, Group Client only, and 5.8 GHz, Group Owner)												
Test sample information	<table border="1"> <thead> <tr> <th>S/N</th> <th>IMEI</th> <th>Notes</th> </tr> </thead> <tbody> <tr> <td>0000000000</td> <td>354912070000441</td> <td>Radiated unit</td> </tr> <tr> <td>0000000000</td> <td>354912070002033</td> <td>Radiated unit</td> </tr> <tr> <td>0000000000</td> <td>354912070004013</td> <td>Conducted</td> </tr> </tbody> </table>	S/N	IMEI	Notes	0000000000	354912070000441	Radiated unit	0000000000	354912070002033	Radiated unit	0000000000	354912070004013	Conducted
S/N	IMEI	Notes											
0000000000	354912070000441	Radiated unit											
0000000000	354912070002033	Radiated unit											
0000000000	354912070004013	Conducted											
Hardware Version	REV1.0												
Software Version	Android 5.1.1												

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: <input type="checkbox"/> Class 8 - 1 Up, 4 Down <input type="checkbox"/> Class 10 - 2 Up, 4 Down <input type="checkbox"/> Class 12 - 4 Up, 4 Down <input checked="" type="checkbox"/> 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%
	Does this device support DTM (Dual Transfer Mode)? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No			
W-CDMA (UMTS)	Band V	UMTS Rel. 99 (Voice & Data) HSDPA (Rel. 5) HSUPA (Rel. 6)		100%
LTE	FDD Band 5 FDD Band 13 FDD Band 17 FDD Band 26 TDD Band 41	QPSK 16QAM <input type="checkbox"/> Rel. 10 Does not support Carrier Aggregation (CA) <input checked="" type="checkbox"/> Rel. 10 Carrier Aggregation (1 Uplink and 2 Downlinks) *FCC Bands do not support Carrier Aggregation <input type="checkbox"/> Rel. 11 Carrier Aggregation (2 Uplink and 2 Downlinks)		100% (FDD) 63.3% (TDD)
	Does this device support SV-LTE (1xRTT-LTE)? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> 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 frequencies 5.60 ~ 5.65 GHz? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No			
	Does this device support Band gap channel(s)? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No			
Bluetooth	2.4 GHz	Version 4.1 LE		N/A

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

Upper limit (dB): -1.5 ~ 0.5		Max. RF Output Power (dBm)		
RF Air interface	Mode	Target	Max. tune-up tolerance limit	
			Burst	Frame
GSM850	Voice/GPRS (1 slot)	32.5	33.0	24.0
	GPRS 2 slots	30.0	30.5	24.5
	GPRS 3 slots	27.5	28.0	23.7
	GPRS 4 slots	26.0	26.5	23.5
	EGPRS 1 slot	26.5	27.0	18.0
	EGPRS 2 slots	25.0	25.5	19.5
	EGPRS 3 slots	23.5	24.0	19.7
	EGPRS 4 slots	24.0	24.5	21.5
GSM1900	Voice/GPRS (1 slot)	29.5	30.0	21.0
	GPRS 2 slots	27.0	27.5	21.5
	GPRS 3 slots	25.0	25.5	21.2
	GPRS 4 slots	23.0	23.5	20.5
	EGPRS 1 slot	26.0	26.5	17.5
	EGPRS 2 slots	25.0	25.5	19.5
	EGPRS 3 slots	23.0	23.5	19.2
	EGPRS 4 slots	22.0	22.5	19.5

Upper limit (dB): -1.5 ~ 0.5		Max. RF Output Power (dBm)	
RF Air interface	Mode	Target	Max. tune-up tolerance limit
W-CDMA Band V	R99	23.0	23.5
	HSDPA	22.0	22.5
	HSUPA	22.0	22.5
LTE Band 5	QPSK	23.3	23.8
	16-QAM	22.3	22.8
LTE Band 13	QPSK	23.0	23.5
	16-QAM	22.0	22.5
LTE Band 17	QPSK	23.3	23.8
	16-QAM	22.3	22.8
LTE Band 26	QPSK	23.0	23.5
	16-QAM	22.0	22.5
LTE Band 41	QPSK	23.0	23.5
	16-QAM	22.0	22.5

Upper limit (dB):		0.5			Max. RF Output Power (dBm)	
RF Air interface	Mode	Ch.	Target	Max. tune-up tolerance limit		
WiFi 2.4 GHz	802.11b	1 ~ 11	17.0	17.5		
		12	15.5	16.0		
		13	11.5	12.0		
	802.11g	1 ~ 11	14.0	14.5		
		12	12.5	13.0		
		13	9.5	10.0		
	802.11n HT20	1 ~ 11	12.0	12.5		
		12	11.5	12.0		
		13	10.5	11.0		
WiFi 5 GHz	802.11a	All	10.0	10.5		
	802.11n HT20	All	10.0	10.5		
	802.11n HT40	All	10.0	10.5		
	802.11ac VHT20	All	10.0	10.5		
	802.11ac VHT40	All	10.0	10.5		
	802.11ac VHT80	All	9.5	10.0		
Bluetooth			9.0	9.5		
Bluetooth LE			7.0	7.5		

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 13	Frequency range: 777 - 787 MHz					
		Channel Bandwidth					
		20 MHz	15 MHz	10 MHz	5 MHz	3 MHz	1.4 MHz
	Low				23205/ 779.5		
	Mid			23230/ 782	23230/ 782		
	High				23255/ 784.5		
	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		
	Band 26	Frequency range: 814 - 824 MHz					
		Channel Bandwidth					
		20 MHz	15 MHz	10 MHz	5 MHz	3 MHz	1.4 MHz
	Low				26715/ 816.5	26705/ 815.5	26697/ 814.7
	Mid			26740/ 819	26740/ 819	26740/ 819	26740/ 819
	High				26765/ 821.5	26775/ 822.5	26783/ 823.3
	Band 26	Frequency range: 824 - 849 MHz					
		Channel Bandwidth					
		20 MHz	15 MHz	10 MHz	5 MHz	3 MHz	1.4 MHz
	Low		26865/ 831.5	26840/ 829	26815/ 826.5	26805/ 825.5	26797/ 824.7
	Mid		26915/ 836.5	26915/ 836.5	26915/ 836.5	26915/ 836.5	26915/ 836.5
	High		26965/ 841.5	26990/ 844	27015/ 846.5	27025/ 847.5	27033/ 848.3
Band 41	Frequency range: 2496 - 2690 MHz						
	Channel Bandwidth						
	20 MHz	15 MHz	10 MHz	5 MHz	3 MHz	1.4 MHz	
Low	39750 / 2506.0						
Low-Mid	40185 / 2549.5						
Mid	40620 / 2593.0						
Mid-High	41055 / 2636.5						
High	41490 / 2680.0						
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)	<p style="text-align: center;">Table 6.2.3-1: Maximum Power Reduction (MPR) for Power Class 3</p> <table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th rowspan="2">Modulation</th> <th colspan="6">Channel bandwidth / Transmission bandwidth (RB)</th> <th rowspan="2">MPR (dB)</th> </tr> <tr> <th>1.4 MHz</th> <th>3.0 MHz</th> <th>5 MHz</th> <th>10 MHz</th> <th>15 MHz</th> <th>20 MHz</th> </tr> </thead> <tbody> <tr> <td>QPSK</td> <td>> 5</td> <td>> 4</td> <td>> 8</td> <td>> 12</td> <td>> 16</td> <td>> 18</td> <td>≤ 1</td> </tr> <tr> <td>16 QAM</td> <td>≤ 5</td> <td>≤ 4</td> <td>≤ 8</td> <td>≤ 12</td> <td>≤ 16</td> <td>≤ 18</td> <td>≤ 1</td> </tr> <tr> <td>16 QAM</td> <td>> 5</td> <td>> 4</td> <td>> 8</td> <td>> 12</td> <td>> 16</td> <td>> 18</td> <td>≤ 2</td> </tr> </tbody> </table> <p>MPR Built-in by design A-MPR (additional MPR) was disabled during SAR testing</p>	Modulation	Channel bandwidth / Transmission bandwidth (RB)						MPR (dB)	1.4 MHz	3.0 MHz	5 MHz	10 MHz	15 MHz	20 MHz	QPSK	> 5	> 4	> 8	> 12	> 16	> 18	≤ 1	16 QAM	≤ 5	≤ 4	≤ 8	≤ 12	≤ 16	≤ 18	≤ 1	16 QAM	> 5	> 4	> 8	> 12	> 16	> 18	≤ 2
Modulation	Channel bandwidth / Transmission bandwidth (RB)						MPR (dB)																																
	1.4 MHz	3.0 MHz	5 MHz	10 MHz	15 MHz	20 MHz																																	
QPSK	> 5	> 4	> 8	> 12	> 16	> 18	≤ 1																																
16 QAM	≤ 5	≤ 4	≤ 8	≤ 12	≤ 16	≤ 18	≤ 1																																
16 QAM	> 5	> 4	> 8	> 12	> 16	> 18	≤ 2																																
Power reduction	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	2
			Front	N/A	Yes	2
	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	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	2
			Front	N/A	Yes	2
	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	No	1
			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.
- The Body-worn minimum separation distance is 15 mm. To cover both body-worn and hotspot RF exposure conditions testing was performed at a separation 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 A**

Date	Freq. (MHz)	Liquid Parameters		Measured	Target	Delta (%)	Limit \pm (%)	
10/2/2015	Head 835	e'	40.6300	Relative Permittivity (ϵ_r):	40.63	41.50	-2.10	5
		e"	19.8500	Conductivity (σ):	0.92	0.90	2.40	5
	Head 820	e'	40.8200	Relative Permittivity (ϵ_r):	40.82	41.60	-1.88	5
		e"	19.9200	Conductivity (σ):	0.91	0.90	1.09	5
	Head 850	e'	40.4000	Relative Permittivity (ϵ_r):	40.40	41.50	-2.65	5
		e"	19.7900	Conductivity (σ):	0.94	0.92	2.22	5
10/5/2015	Head 835	e'	40.4300	Relative Permittivity (ϵ_r):	40.43	41.50	-2.58	5
		e"	19.8000	Conductivity (σ):	0.92	0.90	2.14	5
	Head 820	e'	40.6400	Relative Permittivity (ϵ_r):	40.64	41.60	-2.31	5
		e"	19.8400	Conductivity (σ):	0.90	0.90	0.68	5
	Head 850	e'	40.2200	Relative Permittivity (ϵ_r):	40.22	41.50	-3.08	5
		e"	19.7400	Conductivity (σ):	0.93	0.92	1.96	5
10/5/2015	Body 835	e'	52.9300	Relative Permittivity (ϵ_r):	52.93	55.20	-4.11	5
		e"	21.6900	Conductivity (σ):	1.01	0.97	3.82	5
	Body 820	e'	53.0900	Relative Permittivity (ϵ_r):	53.09	55.28	-3.96	5
		e"	21.7500	Conductivity (σ):	0.99	0.97	2.40	5
	Body 850	e'	52.7500	Relative Permittivity (ϵ_r):	52.75	55.16	-4.36	5
		e"	21.5900	Conductivity (σ):	1.02	0.99	3.37	5
10/9/2015	Body 2600	e'	51.0600	Relative Permittivity (ϵ_r):	51.06	52.51	-2.76	5
		e"	14.5200	Conductivity (σ):	2.10	2.16	-2.85	5
	Body 2500	e'	51.3300	Relative Permittivity (ϵ_r):	51.33	52.64	-2.48	5
		e"	14.2600	Conductivity (σ):	1.98	2.02	-1.88	5
	Body 2700	e'	50.7700	Relative Permittivity (ϵ_r):	50.77	52.38	-3.08	5
		e"	14.7300	Conductivity (σ):	2.21	2.30	-3.91	5
10/9/2015	Head 2600	e'	38.3800	Relative Permittivity (ϵ_r):	38.38	39.01	-1.62	5
		e"	14.1100	Conductivity (σ):	2.04	1.96	3.96	5
	Head 2500	e'	38.7800	Relative Permittivity (ϵ_r):	38.78	39.14	-0.91	5
		e"	13.8500	Conductivity (σ):	1.93	1.85	3.84	5
	Head 2700	e'	37.9900	Relative Permittivity (ϵ_r):	37.99	38.88	-2.30	5
		e"	14.3200	Conductivity (σ):	2.15	2.07	3.84	5
10/12/2015	Body 750	e'	54.0300	Relative Permittivity (ϵ_r):	54.03	55.55	-2.73	5
		e"	23.3900	Conductivity (σ):	0.98	0.96	1.28	5
	Body 700	e'	54.5100	Relative Permittivity (ϵ_r):	54.51	55.74	-2.20	5
		e"	23.8800	Conductivity (σ):	0.93	0.96	-3.10	5
	Body 790	e'	53.5800	Relative Permittivity (ϵ_r):	53.58	55.39	-3.27	5
		e"	23.0700	Conductivity (σ):	1.01	0.97	4.89	5
10/12/2015	Head 750	e'	40.6300	Relative Permittivity (ϵ_r):	40.63	41.96	-3.17	5
		e"	21.6000	Conductivity (σ):	0.90	0.89	0.86	5
	Head 700	e'	41.3000	Relative Permittivity (ϵ_r):	41.30	42.22	-2.17	5
		e"	21.9800	Conductivity (σ):	0.86	0.89	-3.79	5
	Head 790	e'	40.0900	Relative Permittivity (ϵ_r):	40.09	41.76	-3.99	5
		e"	21.3300	Conductivity (σ):	0.94	0.90	4.55	5
10/13/2015	Head 2600	e'	39.5700	Relative Permittivity (ϵ_r):	39.57	39.01	1.43	5
		e"	14.0100	Conductivity (σ):	2.03	1.96	3.22	5
	Head 2500	e'	39.9400	Relative Permittivity (ϵ_r):	39.94	39.14	2.05	5
		e"	13.7700	Conductivity (σ):	1.91	1.85	3.24	5
	Head 2700	e'	39.2100	Relative Permittivity (ϵ_r):	39.21	38.88	0.84	5
		e"	14.2100	Conductivity (σ):	2.13	2.07	3.05	5

SAR Lab B

Date	Freq. (MHz)	Liquid Parameters		Measured	Target	Delta (%)	Limit ±(%)	
9/30/2015	Head 1900	e'	38.7800	Relative Permittivity (ϵ_r):	38.78	40.00	-3.05	5
		e"	13.6100	Conductivity (σ):	1.44	1.40	2.70	5
	Head 1850	e'	39.0200	Relative Permittivity (ϵ_r):	39.02	40.00	-2.45	5
		e"	13.4300	Conductivity (σ):	1.38	1.40	-1.32	5
	Head 1910	e'	38.7600	Relative Permittivity (ϵ_r):	38.76	40.00	-3.10	5
		e"	13.6200	Conductivity (σ):	1.45	1.40	3.32	5
9/30/2015	Body 1900	e'	53.5200	Relative Permittivity (ϵ_r):	53.52	53.30	0.41	5
		e"	14.9500	Conductivity (σ):	1.58	1.52	3.91	5
	Body 1850	e'	53.7100	Relative Permittivity (ϵ_r):	53.71	53.30	0.77	5
		e"	14.7800	Conductivity (σ):	1.52	1.52	0.02	5
	Body 1910	e'	53.5100	Relative Permittivity (ϵ_r):	53.51	53.30	0.39	5
		e"	14.9600	Conductivity (σ):	1.59	1.52	4.53	5
10/8/2015	Head 1900	e'	39.1700	Relative Permittivity (ϵ_r):	39.17	40.00	-2.08	5
		e"	13.2700	Conductivity (σ):	1.40	1.40	0.14	5
	Head 1850	e'	39.3900	Relative Permittivity (ϵ_r):	39.39	40.00	-1.53	5
		e"	13.1500	Conductivity (σ):	1.35	1.40	-3.38	5
	Head 1910	e'	39.1400	Relative Permittivity (ϵ_r):	39.14	40.00	-2.15	5
		e"	13.3200	Conductivity (σ):	1.41	1.40	1.04	5
10/8/2015	Body 1900	e'	52.0600	Relative Permittivity (ϵ_r):	52.06	53.30	-2.33	5
		e"	14.5200	Conductivity (σ):	1.53	1.52	0.92	5
	Body 1850	e'	52.2300	Relative Permittivity (ϵ_r):	52.23	53.30	-2.01	5
		e"	14.4100	Conductivity (σ):	1.48	1.52	-2.48	5
	Body 1910	e'	52.0200	Relative Permittivity (ϵ_r):	52.02	53.30	-2.40	5
		e"	14.5500	Conductivity (σ):	1.55	1.52	1.66	5

SAR Lab E

Date	Freq. (MHz)	Liquid Parameters		Measured	Target	Delta (%)	Limit ±(%)	
10/28/2015	Head 750	e'	40.4400	Relative Permittivity (ϵ_r):	40.44	41.96	-3.63	5
		e"	21.3600	Conductivity (σ):	0.89	0.89	-0.26	5
	Head 700	e'	41.1600	Relative Permittivity (ϵ_r):	41.16	42.22	-2.51	5
		e"	21.7100	Conductivity (σ):	0.85	0.89	-4.97	5
	Head 785	e'	39.9500	Relative Permittivity (ϵ_r):	39.95	41.78	-4.38	5
		e"	21.2800	Conductivity (σ):	0.93	0.90	3.69	5
10/28/2015	Body 750	e'	54.0800	Relative Permittivity (ϵ_r):	54.08	55.55	-2.64	5
		e"	22.9700	Conductivity (σ):	0.96	0.96	-0.54	5
	Body 700	e'	54.6200	Relative Permittivity (ϵ_r):	54.62	55.74	-2.01	5
		e"	23.5300	Conductivity (σ):	0.92	0.96	-4.52	5
	Body 785	e'	53.7600	Relative Permittivity (ϵ_r):	53.76	55.41	-2.98	5
		e"	22.8900	Conductivity (σ):	1.00	0.97	3.45	5

SAR Lab F

Date	Freq. (MHz)	Liquid Parameters		Measured	Target	Delta (%)	Limit ±(%)		
10/7/2015	Head 835	e'	41.8900	Relative Permittivity (ϵ_r):	41.89	41.50	0.94	5	
		e"	20.2900	Conductivity (σ):	0.94	0.90	4.67	5	
	Head 820	e'	42.0400	Relative Permittivity (ϵ_r):	42.04	41.60	1.05	5	
		e"	20.3700	Conductivity (σ):	0.93	0.90	3.37	5	
	Head 850	e'	41.7200	Relative Permittivity (ϵ_r):	41.72	41.50	0.53	5	
		e"	20.2500	Conductivity (σ):	0.96	0.92	4.60	5	
10/7/2015	Body 835	e'	52.9300	Relative Permittivity (ϵ_r):	52.93	55.20	-4.11	5	
		e"	21.9300	Conductivity (σ):	1.02	0.97	4.97	5	
	Body 820	e'	53.1100	Relative Permittivity (ϵ_r):	53.11	55.28	-3.92	5	
		e"	21.8700	Conductivity (σ):	1.00	0.97	2.96	5	
	Body 850	e'	52.6800	Relative Permittivity (ϵ_r):	52.68	55.16	-4.49	5	
		e"	21.9100	Conductivity (σ):	1.04	0.99	4.90	5	
10/13/2015	Body 835	e'	53.0800	Relative Permittivity (ϵ_r):	53.08	55.20	-3.84	5	
		e"	21.8600	Conductivity (σ):	1.01	0.97	4.63	5	
	Body 820	e'	53.2600	Relative Permittivity (ϵ_r):	53.26	55.28	-3.65	5	
		e"	21.9100	Conductivity (σ):	1.00	0.97	3.15	5	
	Body 850	e'	52.9300	Relative Permittivity (ϵ_r):	52.93	55.16	-4.04	5	
		e"	21.7900	Conductivity (σ):	1.03	0.99	4.33	5	
10/14/2015	Body 5180	e'	47.2900	Relative Permittivity (ϵ_r):	47.29	49.05	-3.58	5	
		e"	17.9200	Conductivity (σ):	5.16	5.27	-2.09	5	
	Body 5200	e'	47.2900	Relative Permittivity (ϵ_r):	47.29	49.02	-3.53	5	
		e"	17.9000	Conductivity (σ):	5.18	5.29	-2.25	5	
	Body 5600	e'	46.6800	Relative Permittivity (ϵ_r):	46.68	48.48	-3.71	5	
		e"	18.1400	Conductivity (σ):	5.65	5.76	-1.96	5	
	Body 5800	e'	46.4100	Relative Permittivity (ϵ_r):	46.41	48.20	-3.71	5	
		e"	18.2700	Conductivity (σ):	5.89	6.00	-1.80	5	
	Body 5825	e'	46.3600	Relative Permittivity (ϵ_r):	46.36	48.20	-3.82	5	
		e"	18.3200	Conductivity (σ):	5.93	6.00	-1.11	5	
	11/16/2015	Head 835	e'	42.2200	Relative Permittivity (ϵ_r):	42.22	41.50	1.73	5
			e"	19.4700	Conductivity (σ):	0.90	0.90	0.44	5
Head 820		e'	42.4000	Relative Permittivity (ϵ_r):	42.40	41.60	1.92	5	
		e"	19.5400	Conductivity (σ):	0.89	0.90	-0.84	5	
Head 850		e'	42.0500	Relative Permittivity (ϵ_r):	42.05	41.50	1.33	5	
		e"	19.4800	Conductivity (σ):	0.92	0.92	0.62	5	
11/16/2015	Body 835	e'	54.1300	Relative Permittivity (ϵ_r):	54.13	55.20	-1.94	5	
		e"	21.7300	Conductivity (σ):	1.01	0.97	4.01	5	
	Body 820	e'	54.2100	Relative Permittivity (ϵ_r):	54.21	55.28	-1.93	5	
		e"	21.8100	Conductivity (σ):	0.99	0.97	2.68	5	
	Body 850	e'	53.9400	Relative Permittivity (ϵ_r):	53.94	55.16	-2.21	5	
		e"	21.7200	Conductivity (σ):	1.03	0.99	3.99	5	

SAR Lab H

Date	Freq. (MHz)	Liquid Parameters		Measured	Target	Delta (%)	Limit ±(%)		
10/5/2015	Head 5180	e'	36.2000	Relative Permittivity (ϵ_r):	36.20	36.01	0.52	5	
		e"	15.6700	Conductivity (σ):	4.51	4.63	-2.53	5	
	Head 5200	e'	36.1400	Relative Permittivity (ϵ_r):	36.14	35.99	0.42	5	
		e"	15.6900	Conductivity (σ):	4.54	4.65	-2.46	5	
	Head 5600	e'	35.5700	Relative Permittivity (ϵ_r):	35.57	35.53	0.10	5	
		e"	15.8300	Conductivity (σ):	4.93	5.06	-2.59	5	
	Head 5800	e'	35.2800	Relative Permittivity (ϵ_r):	35.28	35.30	-0.06	5	
		e"	15.9500	Conductivity (σ):	5.14	5.27	-2.39	5	
	Head 5825	e'	35.2600	Relative Permittivity (ϵ_r):	35.26	35.30	-0.11	5	
		e"	15.9300	Conductivity (σ):	5.16	5.27	-2.10	5	
	10/5/2015	Body 5180	e'	48.1700	Relative Permittivity (ϵ_r):	48.17	49.05	-1.79	5
			e"	18.1300	Conductivity (σ):	5.22	5.27	-0.94	5
Body 5200		e'	48.1300	Relative Permittivity (ϵ_r):	48.13	49.02	-1.81	5	
		e"	18.1700	Conductivity (σ):	5.25	5.29	-0.78	5	
Body 5600		e'	47.5900	Relative Permittivity (ϵ_r):	47.59	48.48	-1.83	5	
		e"	18.4500	Conductivity (σ):	5.74	5.76	-0.28	5	
Body 5800		e'	47.2900	Relative Permittivity (ϵ_r):	47.29	48.20	-1.89	5	
		e"	18.6000	Conductivity (σ):	6.00	6.00	-0.03	5	
Body 5825		e'	47.2600	Relative Permittivity (ϵ_r):	47.26	48.20	-1.95	5	
		e"	18.6100	Conductivity (σ):	6.03	6.00	0.46	5	

SAR Lab 4

Date	Freq. (MHz)	Liquid Parameters		Measured	Target	Delta (%)	Limit ±(%)	
6/19/2015	Body 2450	e'	51.3800	Relative Permittivity (ϵ_r):	51.38	52.70	-2.50	5
		e"	14.8100	Conductivity (σ):	2.02	1.95	3.46	5
	Body 2410	e'	51.6800	Relative Permittivity (ϵ_r):	51.68	52.76	-2.05	5
		e"	14.6900	Conductivity (σ):	1.97	1.91	3.20	5
	Body 2475	e'	51.3500	Relative Permittivity (ϵ_r):	51.35	52.67	-2.50	5
		e"	15.0300	Conductivity (σ):	2.07	1.99	4.19	5
6/19/2015	Head 2450	e'	39.6000	Relative Permittivity (ϵ_r):	39.60	39.20	1.02	5
		e"	13.3500	Conductivity (σ):	1.82	1.80	1.04	5
	Head 2410	e'	39.8700	Relative Permittivity (ϵ_r):	39.87	39.28	1.50	5
		e"	13.1800	Conductivity (σ):	1.77	1.76	0.33	5
	Head 2475	e'	39.4400	Relative Permittivity (ϵ_r):	39.44	39.17	0.69	5
		e"	13.5000	Conductivity (σ):	1.86	1.83	1.69	5
6/22/2015	Head 2450	e'	39.3300	Relative Permittivity (ϵ_r):	39.33	39.20	0.33	5
		e"	13.8500	Conductivity (σ):	1.89	1.80	4.82	5
	Head 2410	e'	39.4400	Relative Permittivity (ϵ_r):	39.44	39.28	0.41	5
		e"	13.7800	Conductivity (σ):	1.85	1.76	4.89	5
	Head 2475	e'	39.2800	Relative Permittivity (ϵ_r):	39.28	39.17	0.28	5
		e"	13.8800	Conductivity (σ):	1.91	1.83	4.55	5
6/26/2015	Head 2450	e'	38.7300	Relative Permittivity (ϵ_r):	38.73	39.20	-1.20	5
		e"	13.5800	Conductivity (σ):	1.85	1.80	2.78	5
	Head 2410	e'	38.8600	Relative Permittivity (ϵ_r):	38.86	39.28	-1.07	5
		e"	13.4600	Conductivity (σ):	1.80	1.76	2.46	5
	Head 2475	e'	38.5900	Relative Permittivity (ϵ_r):	38.59	39.17	-1.48	5
		e"	13.6400	Conductivity (σ):	1.88	1.83	2.74	5

SAR Lab 5

Date	Freq. (MHz)	Liquid Parameters		Measured	Target	Delta (%)	Limit ±(%)		
6/22/2015	Head 5180	e'	36.8600	Relative Permittivity (ϵ_r):	36.86	36.01	2.35	5	
		e"	15.9800	Conductivity (σ):	4.60	4.63	-0.60	5	
	Head 5200	e'	36.9600	Relative Permittivity (ϵ_r):	36.96	35.99	2.69	5	
		e"	16.1300	Conductivity (σ):	4.66	4.65	0.27	5	
	Head 5600	e'	36.3300	Relative Permittivity (ϵ_r):	36.33	35.53	2.24	5	
		e"	16.0700	Conductivity (σ):	5.00	5.06	-1.11	5	
	Head 5800	e'	36.0600	Relative Permittivity (ϵ_r):	36.06	35.30	2.15	5	
		e"	16.3600	Conductivity (σ):	5.28	5.27	0.12	5	
	Head 5825	e'	36.0300	Relative Permittivity (ϵ_r):	36.03	35.30	2.07	5	
		e"	16.3600	Conductivity (σ):	5.30	5.27	0.55	5	
	6/22/2015	Body 5180	e'	47.1500	Relative Permittivity (ϵ_r):	47.15	49.05	-3.87	5
			e"	18.5500	Conductivity (σ):	5.34	5.27	1.36	5
Body 5200		e'	47.3800	Relative Permittivity (ϵ_r):	47.38	49.02	-3.34	5	
		e"	18.5400	Conductivity (σ):	5.36	5.29	1.24	5	
Body 5600		e'	46.4500	Relative Permittivity (ϵ_r):	46.45	48.48	-4.18	5	
		e"	18.8100	Conductivity (σ):	5.86	5.76	1.67	5	
Body 5800		e'	46.0800	Relative Permittivity (ϵ_r):	46.08	48.20	-4.40	5	
		e"	19.2300	Conductivity (σ):	6.20	6.00	3.36	5	
Body 5825		e'	46.1000	Relative Permittivity (ϵ_r):	46.10	48.20	-4.36	5	
		e"	19.2200	Conductivity (σ):	6.23	6.00	3.75	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.

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 A

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				
10/2/2015	D835V2	4d002	Head	1g	0.968	9.68	9.23	4.88	
				10g	0.635	6.35	5.99	6.01	
10/5/2015	D835V2	4d002	Head	1g	0.921	9.21	9.23	-0.22	
				10g	0.604	6.04	5.99	0.83	
10/5/2015	D835V2	4d002	Body	1g	0.991	9.91	9.33	6.22	1, 2
				10g	0.652	6.52	6.12	6.54	
10/9/2015	D2600V2	1006	Body	1g	5.82	58.2	55.3	5.24	
				10g	2.55	25.5	24.8	2.82	
10/9/2015	D2600V2	1006	Head	1g	6.03	60.3	56.9	5.98	3, 4
				10g	2.63	26.3	25.5	3.14	
10/12/2015	D750V3	1024	Head	1g	0.762	7.62	8.10	-5.93	5, 6
				10g	0.500	5.00	5.33	-6.19	
10/12/2015	D750V3	1024	Body	1g	0.820	8.20	8.41	-2.50	
				10g	0.547	5.47	5.60	-2.32	
10/13/2015	D2600V2	1006	Head	1g	5.80	58.0	56.9	1.93	
				10g	2.54	25.4	25.5	-0.39	

SAR Lab B

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				
9/30/2015	D1900V2	5d043	Head	1g	4.08	40.8	40.6	0.49	
				10g	2.10	21.0	21.1	-0.47	
9/30/2015	D1900V2	5d043	Body	1g	4.13	41.3	40.0	3.25	
				10g	2.14	21.4	21.3	0.47	
10/8/2015	D1900V2	5d043	Head	1g	4.05	40.5	40.6	-0.25	
				10g	2.09	20.9	21.1	-0.95	
10/8/2015	D1900V2	5d043	Body	1g	4.15	41.5	40.0	3.75	7, 8
				10g	2.14	21.4	21.3	0.47	

SAR Lab E

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				
10/28/2015	D750V3	1071	Head	1g	0.774	7.74	8.22	-5.84	9, 10
				10g	0.509	5.09	5.39	-5.57	
10/28/2015	D750V3	1071	Body	1g	0.887	8.87	8.52	4.11	
				10g	0.590	5.90	5.64	4.61	

SAR Lab F

Date Tested	System Dipole		T.S. Liquid	Measured Results		Target (Ref. Value)	Delta ±10 %	Plot No.	
	Type	Serial #		Zoom Scan to 100 mW	Normalize to 1 W				
10/7/2015	D835V2	4d002	Head	1g	0.962	9.62	9.23	4.23	11, 12
				10g	0.631	6.31	5.99	5.34	
10/7/2015	D835V2	4d002	Body	1g	0.970	9.70	9.33	3.97	
				10g	0.639	6.39	6.12	4.41	
10/14/2015	D5GHzV2 (5.2GHz)	1138	Body	1g	7.20	72.0	76.9	-6.37	
				10g	2.05	20.5	21.5	-4.65	
10/14/2015	D5GHzV2 (5.6GHz)	1138	Body	1g	8.10	81.0	81.6	-0.74	
				10g	2.25	22.5	22.8	-1.32	
10/14/2015	D5GHzV2 (5.8GHz)	1138	Body	1g	7.29	72.9	77.9	-6.42	13, 14
				10g	2.04	20.4	21.6	-5.56	
11/16/2015	D835V2	4d117	Head	1g	0.894	8.94	9.08	-1.54	
				10g	0.587	5.87	5.93	-1.01	
11/16/2015	D835V2	4d117	Body	1g	0.991	9.91	9.38	5.65	15,16
				10g	0.653	6.53	6.20	5.32	

SAR Lab H

Date Tested	System Dipole		T.S. Liquid	Measured Results		Target (Ref. Value)	Delta ±10 %	Plot No.	
	Type	Serial #		Zoom Scan to 100 mW	Normalize to 1 W				
10/5/2015	D5GHzV2 (5.2GHz)	1138	Head	1g	7.72	77.2	81.7	-5.51	17,18
				10g	2.21	22.1	23.5	-5.96	
10/5/2015	D5GHzV2 (5.6GHz)	1138	Head	1g	8.24	82.4	84.7	-2.72	
				10g	2.34	23.4	24.2	-3.31	
10/5/2015	D5GHzV2 (5.8GHz)	1138	Head	1g	7.82	78.2	81.6	-4.17	
				10g	2.23	22.3	23.1	-3.46	
10/5/2015	D5GHzV2 (5.2GHz)	1138	Body	1g	7.95	79.5	76.9	3.38	
				10g	2.23	22.3	21.5	3.72	
10/5/2015	D5GHzV2 (5.6GHz)	1138	Body	1g	8.33	83.3	81.6	2.08	
				10g	2.32	23.2	22.8	1.75	
10/5/2015	D5GHzV2 (5.8GHz)	1138	Body	1g	7.82	78.2	77.9	0.39	
				10g	2.19	21.9	21.6	1.39	

SAR Lab 4

Date Tested	System Dipole		T.S. Liquid	Measured Results		Target (Ref. Value)	Delta ±10 %	Plot No.	
	Type	Serial #		Zoom Scan to 100 mW	Normalize to 1 W				
6/19/2015	D2450V2	748	Body	1g	5.32	53.2	50.3	5.77	19,20
				10g	2.44	24.4	23.5	3.83	
6/22/2015	D2450V2	706	Head	1g	5.44	54.4	52.6	3.42	21,22
				10g	2.46	24.6	24.6	0.00	
6/26/2015	D2450V2	748	Head	1g	5.16	51.6	52.7	-2.09	
				10g	2.34	23.4	24.6	-4.88	

SAR Lab 5

Date Tested	System Dipole		T.S. Liquid	Measured Results		Target (Ref. Value)	Delta ±10 %	Plot No.	
	Type	Serial #		Zoom Scan to 100 mW	Normalize to 1 W				
6/11/2015	D5GHzV2 (5.2GHz)	1168	Body	1g	7.35	73.5	76.0	-3.29	
				10g	2.07	20.7	21.1	-1.90	
6/11/2015	D5GHzV2 (5.6GHz)	1168	Body	1g	7.77	77.7	82.0	-5.24	
				10g	2.17	21.7	22.7	-4.41	
6/11/2015	D5GHzV2 (5.8GHz)	1168	Body	1g	7.89	78.9	76.2	3.54	
				10g	2.21	22.1	21.0	5.24	
6/12/2015	D5GHzV2 (5.2GHz)	1168	Head	1g	7.35	73.5	79.3	-7.31	
				10g	2.11	21.1	22.5	-6.22	
6/12/2015	D5GHzV2 (5.6GHz)	1168	Head	1g	7.86	78.6	81.7	-3.79	
				10g	2.22	22.2	23.2	-4.31	
6/12/2015	D5GHzV2 (5.8GHz)	1168	Head	1g	7.46	74.6	78.0	-4.36	
				10g	2.11	21.1	22.1	-4.52	
6/22/2015	D5GHzV2 (5.2GHz)	1168	Head	1g	7.21	72.1	79.3	-9.08	23,24
				10g	2.06	20.6	22.5	-8.44	
6/22/2015	D5GHzV2 (5.6GHz)	1168	Head	1g	7.72	77.2	81.7	-5.51	
				10g	2.17	21.7	23.2	-6.47	
6/22/2015	D5GHzV2 (5.8GHz)	1168	Head	1g	7.19	71.9	78.0	-7.82	
				10g	2.04	20.4	22.1	-7.69	
6/22/2015	D5GHzV2 (5.2GHz)	1168	Body	1g	7.31	73.1	76.0	-3.82	
				10g	2.06	20.6	21.1	-2.37	
6/22/2015	D5GHzV2 (5.6GHz)	1168	Body	1g	7.93	79.3	82.0	-3.29	
				10g	2.21	22.1	22.7	-2.64	
6/22/2015	D5GHzV2 (5.8GHz)	1168	Body	1g	7.28	72.8	76.2	-4.46	
				10g	2.04	20.4	21.0	-2.86	

9. Conducted Output Power Measurements

9.1. GSM

Per KDB 941225 D01 3G SAR Procedures:

SAR test reduction for GPRS and EDGE modes is determined by the source-based time-averaged output power specified for production units, including tune-up tolerance. The data mode with highest specified time-averaged output power should be tested for SAR compliance in the applicable exposure conditions. For modes with the same specified maximum output power and tolerance, the higher number time-slot configuration should be tested.

GSM850 Measured Results

Band	Mode	Coding Scheme	Time Slots	Ch No.	Freq. (MHz)	Avg. Pwr		Frame Pwr Maximum			
						Burst (dBm)	Frame (dBm)				
850	GSM (Voice)	CS1	1	128	824.2	32.4	23.4	23.97			
				190	836.6	33.0	24.0				
				251	848.8	32.5	23.5				
	GPRS (GMSK)	CS1	1	1	128	824.2	32.4	23.4	23.97		
					190	836.6	32.9	23.9			
					251	848.8	32.6	23.6			
			2	1	128	824.2	29.0	23.0	24.48		
					190	836.6	29.8	23.8			
					251	848.8	29.2	23.2			
			3	1	128	824.2	26.5	22.2	23.74		
					190	836.6	27.3	23.0			
					251	848.8	27.0	22.7			
			4	1	128	824.2	25.0	22.0	23.49		
					190	836.6	25.5	22.5			
					251	848.8	25.0	22.0			
			EGPRS (8PSK)	MCS5	1	1	128	824.2	27.0	18.0	17.97
							190	836.6	27.0	18.0	
							251	848.8	27.0	18.0	
	2	1			128	824.2	24.5	18.5	19.48		
					190	836.6	24.7	18.7			
					251	848.8	24.5	18.5			
	3	1			128	824.2	22.3	18.0	19.74		
					190	836.6	22.5	18.2			
					251	848.8	22.4	18.1			
4	1	128			824.2	22.7	19.7	21.49			
		190			836.6	22.9	19.9				
		251			848.8	22.8	19.8				

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

GSM1900 Measured Results

Band	Mode	Coding Scheme	Time Slots	Ch No.	Freq. (MHz)	Avg. Pwr		Frame Pwr Maximum			
						Burst (dBm)	Frame (dBm)				
1900	GSM (Voice)	CS1	1	512	1850.2	29.3	20.3	20.97			
				661	1880.0	29.5	20.5				
				810	1909.8	29.4	20.4				
	GPRS (GMSK)	CS1	1	1	512	1850.2	29.2	20.2	20.97		
					661	1880.0	29.2	20.2			
					810	1909.8	29.2	20.2			
			2	1	512	1850.2	26.6	20.6	21.48		
					661	1880.0	26.5	20.5			
					810	1909.8	26.5	20.5			
			3	1	512	1850.2	24.7	20.4	21.24		
					661	1880.0	24.5	20.2			
					810	1909.8	24.6	20.3			
			4	1	512	1850.2	22.8	19.8	20.49		
					661	1880.0	22.7	19.7			
					810	1909.8	22.7	19.7			
			EGPRS (8PSK)	MCS5	1	1	512	1850.2	26.1	17.1	17.47
							661	1880.0	26.3	17.3	
							810	1909.8	26.3	17.3	
	2	1			512	1850.2	23.5	17.5	19.48		
					661	1880.0	23.5	17.5			
					810	1909.8	23.5	17.5			
	3	1			512	1850.2	21.8	17.5	19.24		
					661	1880.0	21.8	17.5			
					810	1909.8	21.9	17.6			
4	1	512			1850.2	20.8	17.8	19.49			
		661			1880.0	20.9	17.9				
		810			1909.8	20.8	17.8				

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

9.2. 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 5 procedures in section 5.2 of 3GPP TS34.121. A summary of these settings are illustrated below:

Mode	Subtest	HSDPA	HSDPA	HSDPA	HSDPA
		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	11/15	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
CM (dB)	1	3	2	3	1	
MPR (dB)	0	2	1	2	0	
HSDPA Specific Settings	DACK	8				0
	DNAK	8				0
	DCQI	8				0
	Ack-Nack repetition factor	3				
	CQI Feedback (Table 5.2B.4)	4ms				
	CQI Repetition Factor (Table 5.2B.4)	2				
A _{hs} = β_{hs}/β_c	30/15					
HSUPA Specific Settings	E-DPDCCH	6	8	8	5	7
	DHARQ	0	0	0	0	0
	AG Index	20	12	15	17	21
	ETFCI (from 34.121 Table C.11.1.3)	75	67	92	71	81
	Associated Max UL Data Rate kbps	242.1	174.9	482.8	205.8	308.9
	Reference E-TFCIs	5	5	2	5	1
	Reference E-TFCI	11	11	11	11	67
	Reference E-TFCI PO	4	4	4	4	18
	Reference E-TFCI	67	67	92	67	67
	Reference E-TFCI PO	18	18	18	18	18
	Reference E-TFCI	71	71	71	71	71
	Reference E-TFCI PO	23	23	23	23	23
	Reference E-TFCI	75	75	75	75	75
	Reference E-TFCI PO	26	26	26	26	26
	Reference E-TFCI	81	81	81	81	81
Reference E-TFCI PO	27	27	27	27	27	
Maximum Channelization Codes	2xSF2				SF4	

W-CDMA Band V 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	22.9	
			4183	836.6	N/A	22.9	
			4233	846.6	N/A	22.8	
	HSDPA	Subtest 1	4132	826.4	0	22.5	
			4183	836.6	0	22.5	
			4233	846.6	0	22.4	
		Subtest 2	4132	826.4	0	21.7	
			4183	836.6	0	21.7	
			4233	846.6	0	21.7	
		Subtest 3	4132	826.4	0.5	21.9	
			4183	836.6	0.5	21.9	
			4233	846.6	0.5	22.0	
		Subtest 4	4132	826.4	0.5	21.9	
			4183	836.6	0.5	21.8	
			4233	846.6	0.5	21.7	
		HSUPA	Subtest 1	4132	826.4	0	21.9
				4183	836.6	0	22.2
				4233	846.6	0	22.5
	Subtest 2		4132	826.4	2	19.9	
			4183	836.6	2	19.5	
			4233	846.6	2	19.5	
	Subtest 3		4132	826.4	1	21.1	
			4183	836.6	1	21.0	
			4233	846.6	1	21.0	
	Subtest 4		4132	826.4	2	19.6	
			4183	836.6	2	19.5	
			4233	846.6	2	19.5	
	Subtest 5		4132	826.4	0	21.6	
			4183	836.6	0	21.3	
			4233	846.6	0	21.3	

9.3. 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
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 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	23.3	23.5	23.3
			1	25	0	23.3	23.5	23.3
			1	49	0	23.3	23.4	23.3
			25	0	1	22.1	22.2	22.2
			25	12	1	22.1	22.2	22.2
			25	25	1	22.0	22.0	22.0
		16QAM	1	0	1	22.0	22.1	22.1
			1	25	1	22.0	22.0	22.0
			1	49	1	22.0	22.1	22.1
			25	0	2	21.1	21.1	21.2
			25	12	2	21.0	21.0	21.0
			25	25	2	21.1	21.0	21.2
			50	0	2	21.1	21.0	21.2
			50	0	2	21.1	21.0	21.2
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	23.4	23.4	23.5
			1	12	0	23.4	23.3	23.5
			1	24	0	23.4	23.2	23.4
			12	0	1	22.2	22.2	22.2
			12	7	1	22.2	22.2	22.1
			12	13	1	22.2	22.1	22.1
		16QAM	25	0	1	22.2	22.2	22.1
			1	0	1	22.4	22.3	22.2
			1	12	1	22.4	22.2	22.1
			1	24	1	22.4	22.2	22.2
			12	0	2	21.1	21.1	21.1
			12	7	2	21.1	21.1	21.1
			12	13	2	21.1	21.0	21.0
			25	0	2	21.1	21.1	21.0
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	23.5	23.4	23.4
			1	8	0	23.5	23.4	23.4
			1	14	0	23.5	23.4	23.4
			8	0	1	22.1	22.2	22.2
			8	4	1	22.2	22.2	22.1
			8	7	1	22.2	22.2	22.1
		16QAM	15	0	1	22.2	22.2	22.1
			1	0	1	22.6	22.5	22.3
			1	8	1	22.5	22.5	22.4
			1	14	1	22.6	22.2	22.1
			8	0	2	21.0	21.1	20.1
			8	4	2	21.1	21.1	20.8
			8	7	2	21.1	21.1	20.8
			15	0	2	21.1	21.1	20.9

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	23.4	23.4	23.4
			1	3	0	23.5	23.5	23.3
			1	5	0	23.5	23.5	23.3
			3	0	0	23.3	23.4	23.3
			3	1	0	23.3	23.3	23.3
			3	3	0	23.3	23.3	23.2
		16QAM	6	0	1	22.2	22.1	22.1
			1	0	1	22.5	22.4	22.5
			1	3	1	22.4	22.4	22.4
			1	5	1	22.5	22.3	22.4
			3	0	1	22.2	22.2	22.1
			3	1	1	22.2	22.2	22.0
			3	3	1	22.2	22.2	21.9
			6	0	2	21.1	21.0	20.9

LTE Band 13 Measured Results

Band	BW (MHz)	Mode	RB Allocation	RB offset	Target MPR	Max. Avg Pwr (dBm)
						782 MHz
LTE Band 13	10	QPSK	1	0	0	23.2
			1	25	0	23.3
			1	49	0	23.2
			25	0	1	22.0
			25	12	1	21.9
			25	25	1	22.0
		16QAM	50	0	1	21.9
			1	0	1	22.0
			1	25	1	22.1
			1	49	1	22.1
			25	0	2	20.9
			25	12	2	21.0
			25	25	2	21.0
			50	0	2	20.9
Band	BW (MHz)	Mode	RB Allocation	RB offset	Target MPR	Max. Avg Pwr (dBm)
						782 MHz
LTE Band 13	5	QPSK	1	0	0	23.1
			1	12	0	23.1
			1	24	0	23.3
			12	0	1	21.9
			12	6	1	22.0
			12	11	1	22.0
			25	0	1	21.9
		16QAM	1	0	1	21.9
			1	12	1	21.9
			1	24	1	22.0
			12	0	2	20.8
			12	6	2	20.8
			12	11	2	20.8
			25	0	2	20.8

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

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	23.4
			1	25	0	23.4
			1	49	0	23.3
			25	0	1	22.2
			25	12	1	22.3
			25	25	1	22.1
		16QAM	50	0	1	22.2
			1	0	1	22.1
			1	25	1	22.2
			1	49	1	22.2
			25	0	2	21.3
			25	12	2	21.2
			25	25	2	21.3
			50	0	2	21.3
Band	BW (MHz)	Mode	RB Allocation	RB offset	Target MPR	Max. Avg Pwr (dBm)
						710 MHz
LTE Band 17	5	QPSK	1	0	0	23.3
			1	12	0	23.3
			1	24	0	23.3
			12	0	1	22.2
			12	6	1	22.1
			12	11	1	22.1
		16QAM	25	0	1	22.2
			1	0	1	22.1
			1	12	1	22.2
			1	24	1	22.2
			12	0	2	21.0
			12	6	2	21.2
			12	11	2	21.0
			25	0	2	21.0

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

LTE Band 26 Measured Results

Band	BW (MHz)	Mode	RB Allocation	RB offset	Target MPR	FCC Part 90			FCC Part 22			
						Max. Avg Pwr (dBm)			Max. Avg Pwr (dBm)			
						831.5 MHz	836.5 MHz	841.5 MHz	831.5 MHz	836.5 MHz	841.5 MHz	
LTE Band 26	15	QPSK	1	0	0				23.3	23.3	23.3	
			1	36	0				23.3	23.4	23.3	
			1	74	0				23.2	23.2	23.3	
			36	0	1				22.0	22.2	22.1	
			36	18	1				22.0	22.1	22.0	
			36	37	1				22.0	22.0	22.0	
			75	0	1				22.0	22.1	22.0	
		16QAM	1	0	1				22.1	22.2	22.2	
			1	36	1				22.2	22.2	22.0	
			1	74	1				22.1	22.0	22.0	
			36	0	2				21.1	21.1	21.0	
			36	18	2				21.0	21.0	20.9	
			36	37	2				21.0	21.0	20.8	
			75	0	2				21.0	21.0	21.0	
Band	BW (MHz)	Mode	RB Allocation	RB offset	Target MPR	Max. Avg Pwr (dBm)			Max. Avg Pwr (dBm)			
LTE Band 26	10	QPSK	1	0	0		819 MHz			829 MHz	836.5 MHz	844 MHz
			1	25	0		23.5			23.5	23.3	23.5
			1	49	0		23.4			23.5	23.4	23.5
			1	49	0		23.5			23.4	23.5	23.5
			25	0	1		22.4			22.5	22.4	22.4
			25	12	1		22.4			22.5	22.4	22.3
			25	25	1		22.4			22.4	22.5	22.3
		16QAM	50	0	1		22.4			22.3	22.4	22.5
			1	0	1		22.4			22.4	22.4	22.5
			1	25	1		22.5			22.3	22.5	22.5
			1	49	1		22.5			22.5	22.3	22.5
			25	0	2		21.4			21.4	21.4	21.4
			25	12	2		21.3			21.3	21.4	21.3
			25	25	2		21.3			21.2	21.3	21.2
50	0	2		21.3			21.2	21.4	21.3			
Band	BW (MHz)	Mode	RB Allocation	RB offset	Target MPR	Max. Avg Pwr (dBm)			Max. Avg Pwr (dBm)			
LTE Band 26	5	QPSK	1	0	0		816.5 MHz	819 MHz	821.5 MHz	826.5 MHz	836.5 MHz	846.5 MHz
			1	12	0		23.4	23.5	23.5	23.4	23.4	23.5
			1	12	0		23.5	23.3	23.4	23.5	23.4	23.5
			1	24	0		23.5	23.4	23.5	23.4	23.5	23.5
			12	0	1		22.4	22.4	22.5	22.4	22.3	22.4
			12	7	1		22.3	22.5	22.5	22.4	22.4	22.2
			12	13	1		22.2	22.4	22.4	22.4	22.4	22.3
		16QAM	25	0	1		22.3	22.4	22.4	22.4	22.3	22.3
			1	0	1		22.5	22.5	22.3	22.4	22.4	22.4
			1	12	1		22.5	22.4	22.3	22.4	22.4	22.3
			1	24	1		22.5	22.5	22.4	22.4	22.4	22.3
			12	0	2		21.3	21.3	21.4	21.4	21.3	21.2
			12	7	2		21.2	21.3	21.3	21.2	21.2	21.1
			12	13	2		21.2	21.4	21.3	21.3	21.2	21.2
25	0	2		21.2	21.3	21.4	21.3	21.4	21.1			

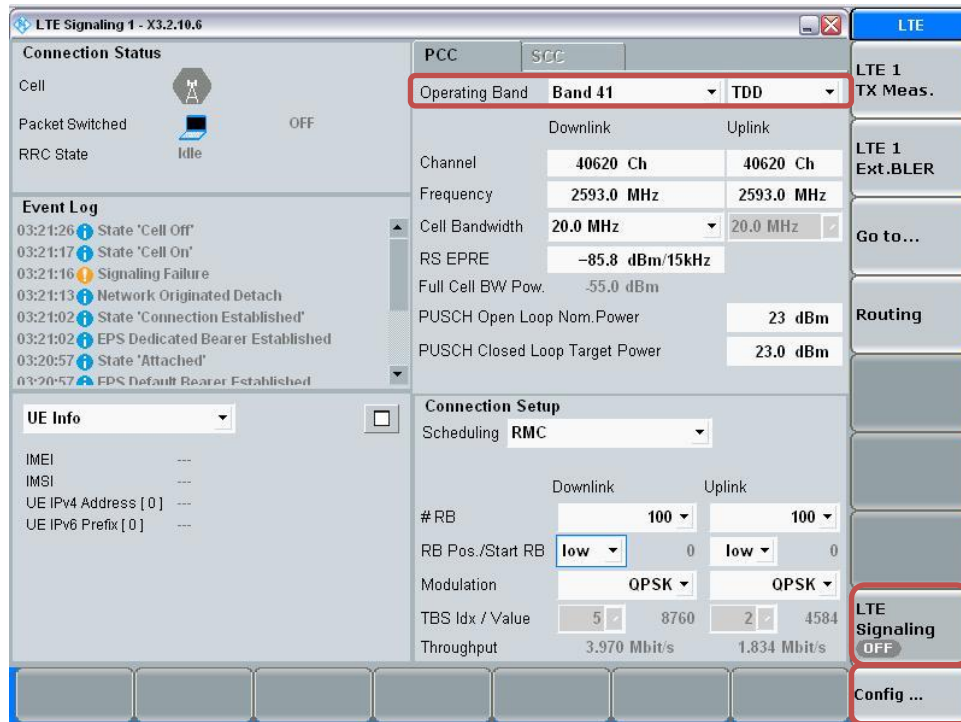
Band	BW (MHz)	Mode	RB Allocation	RB offset	Target MPR	Max. Avg Pwr (dBm)			Max. Avg Pwr (dBm)		
						815.5 MHz	819 MHz	822.5 MHz	825.5 MHz	836.5 MHz	847.5 MHz
LTE Band 26	3	QPSK	1	0	0	23.4	23.3	23.2	23.3	23.3	23.3
			1	8	0	23.4	23.3	23.3	23.3	23.3	23.2
			1	14	0	23.3	23.2	23.3	23.4	23.3	23.2
			8	0	1	22.0	22.3	22.4	22.2	22.4	21.9
			8	4	1	22.1	22.2	22.3	22.3	22.3	21.8
			8	7	1	22.0	22.2	22.3	22.3	22.4	21.9
			15	0	1	22.0	22.3	22.3	22.4	22.3	22.0
		16QAM	1	0	1	22.3	22.3	22.3	22.3	22.3	22.3
			1	8	1	22.2	22.3	22.3	22.4	22.2	22.2
			1	14	1	22.2	22.3	22.3	22.4	22.3	22.3
			8	0	2	21.0	21.2	21.3	21.3	21.3	20.9
			8	4	2	20.9	21.2	21.4	21.3	21.3	20.8
			8	7	2	20.9	21.3	21.4	21.3	21.3	20.8
			15	0	2	20.9	21.4	21.4	21.3	21.3	20.9
Band	BW (MHz)	Mode	RB Allocation	RB offset	Target MPR	Max. Avg Pwr (dBm)			Max. Avg Pwr (dBm)		
						814.7 MHz	819 MHz	823.3 MHz	824.7 MHz	836.5 MHz	848.3 MHz
LTE Band 26	1.4	QPSK	1	0	0	23.2	23.3	23.3	23.4	23.2	23.2
			1	3	0	23.2	23.2	23.4	23.2	23.2	23.1
			1	5	0	23.3	23.3	23.4	23.3	23.1	23.1
			3	0	0	23.2	23.3	23.3	23.4	23.1	23.1
			3	1	0	23.2	23.3	23.2	23.3	23.1	23.1
			3	3	0	23.1	23.3	23.3	23.3	23.2	23.0
			6	0	1	22.1	22.3	22.3	22.1	22.1	21.9
		16QAM	1	0	1	22.3	22.4	22.3	22.2	22.1	22.4
			1	3	1	22.3	22.2	22.3	22.0	22.1	22.3
			1	5	1	22.2	22.3	22.2	22.0	22.1	22.3
			3	0	1	21.9	22.2	22.3	22.0	22.1	22.0
			3	1	1	21.9	22.1	22.3	22.0	22.0	22.0
			3	3	1	21.9	22.1	22.3	22.1	22.1	21.9
			6	0	2	20.9	21.2	21.3	21.3	21.1	20.8

LTE Band 41 Measured Results

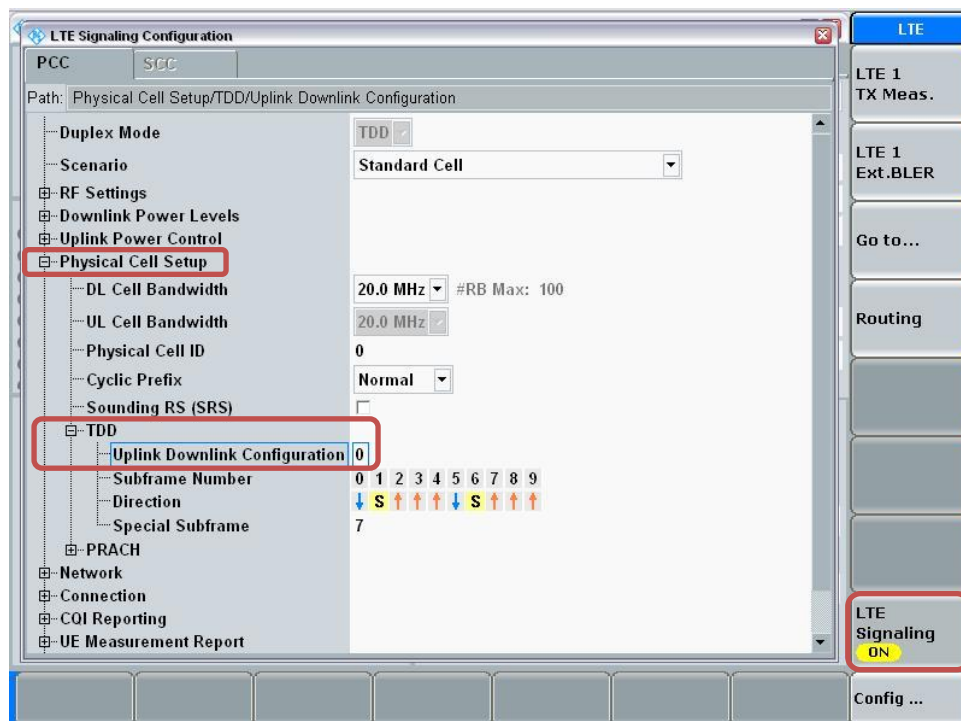
Procedure used to establish SAR test signal for LTE TDD Band 41

Set to CMW-500 with following parameters:

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

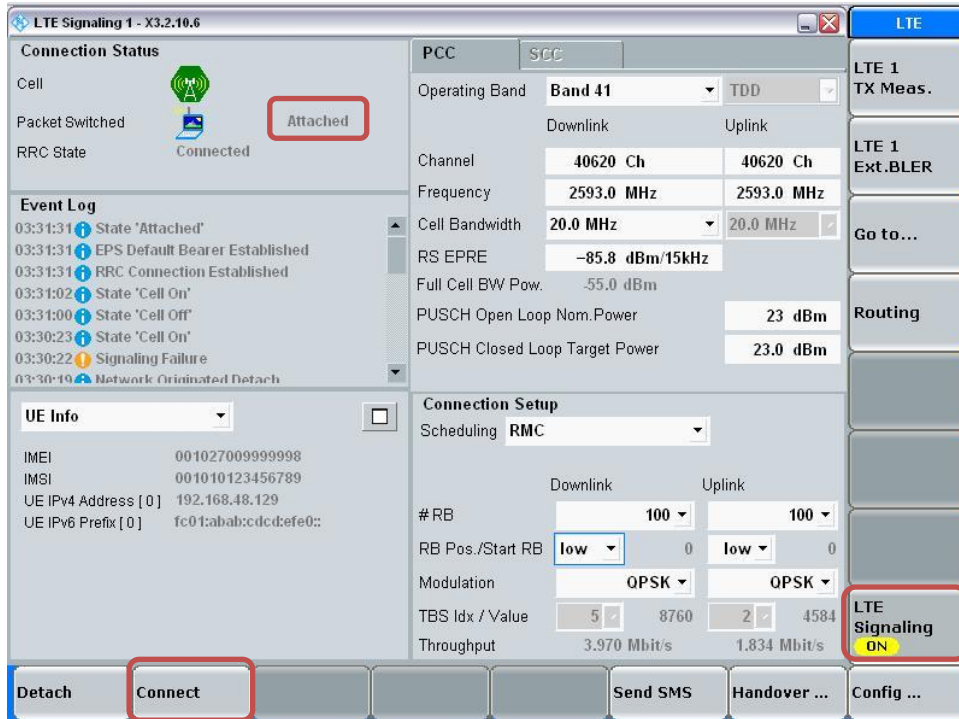


- Go to “Physical Cell Setup”
- Select “TDD” and Set “Uplink Downlink Configuration” to “0”
- Turn the cell on using “ON | OFF” key



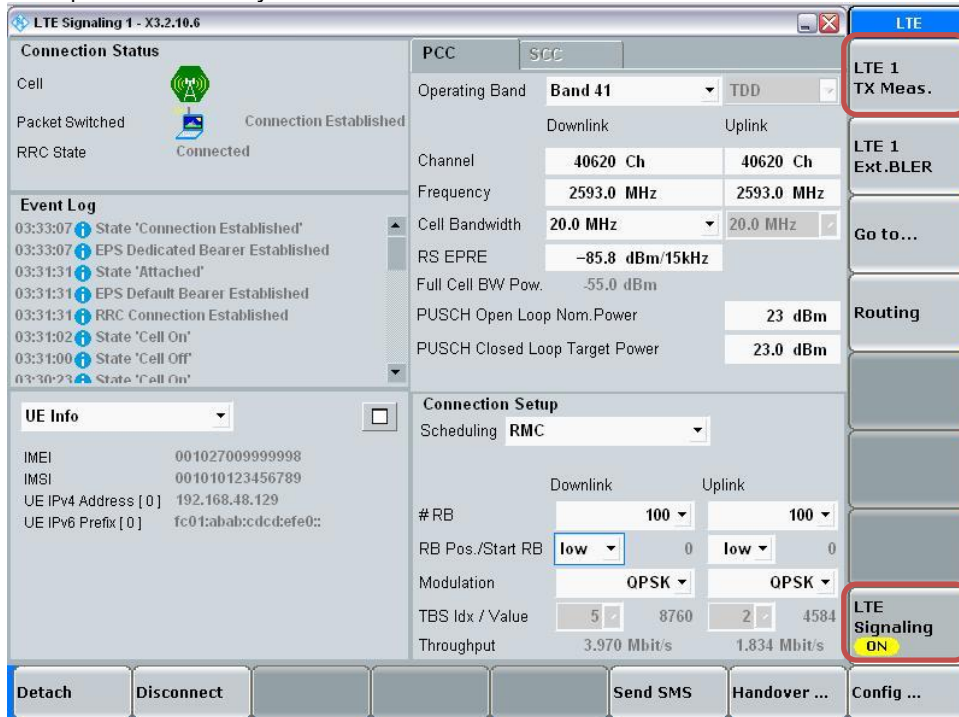
Connect to EUT

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

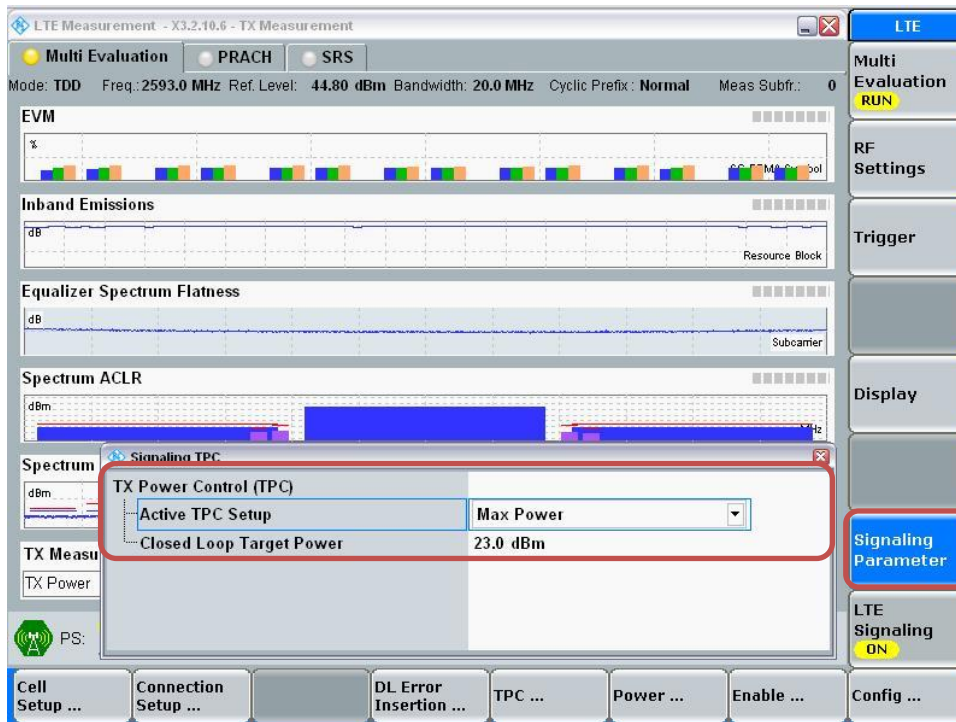


Max Power Setting

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



- Select “Signaling Parameter”
- Select “TX Power Control (TPC)” > Select “Active TPC Setup” to “Max Power” > Set “Closed Loop Target Power” to “23 dBm”



View TX Power

- Go to “Display”
- Select “Select View...”
- Select “Spectrum Emission Mask”



LTE Band 41 Measured Results

Band	BW (MHz)	Mode	RB Allocation	RB offset	Target MPR	Max. Avg Pwr (dBm)				
						2506 MHz	2549.5 MHz	2593 MHz	2636.5 MHz	2680 MHz
LTE Band 41	20	QPSK	1	0	0	23.3	23.2	23.3	23.2	23.2
			1	50	0	23.2	23.0	23.1	23.0	23.1
			1	99	0	23.1	22.9	23.0	22.8	23.0
			50	0	1	22.0	22.0	22.1	22.0	22.0
			50	25	1	22.0	22.0	22.0	22.0	21.9
			50	50	1	22.0	21.9	22.0	21.9	22.0
		16QAM	100	0	1	22.0	21.9	22.0	22.0	22.0
			1	0	1	22.0	22.0	22.0	22.0	21.9
			1	50	1	22.0	21.9	22.0	21.9	22.0
			1	99	1	22.0	21.9	22.0	22.0	22.0
			50	0	2	21.2	21.2	21.3	21.0	21.2
			50	25	2	21.2	21.2	21.2	21.0	21.1
			50	50	2	21.2	21.2	21.2	21.1	21.2
			100	0	2	21.2	21.1	21.2	21.0	21.2
LTE Band 41	15	QPSK	1	0	0	23.1	23.3	22.6	22.9	22.7
			1	36	0	23.1	23.1	22.6	22.9	22.7
			1	74	0	23.0	23.0	22.5	22.7	22.7
			36	0	1	22.0	21.9	21.6	21.8	21.7
			36	18	1	22.1	22.0	21.7	21.7	21.7
			36	37	1	22.1	22.0	21.6	21.7	21.6
		16QAM	75	0	1	21.9	21.9	21.6	21.7	21.6
			1	0	1	22.3	22.1	21.5	22.2	22.1
			1	36	1	22.3	22.4	21.5	21.8	22.0
			1	74	1	22.2	21.9	21.7	21.6	22.0
			36	0	2	20.9	21.0	20.6	20.9	20.7
			36	18	2	21.1	21.0	20.6	20.8	20.6
			36	37	2	21.0	20.9	20.6	20.7	20.6
			75	0	2	20.9	20.9	20.6	20.7	20.6
LTE Band 41	10	QPSK	1	0	0	23.1	23.2	22.7	22.9	22.6
			1	25	0	23.2	23.1	22.7	22.9	22.7
			1	49	0	23.1	23.1	22.6	22.8	22.6
			25	0	1	22.1	22.0	21.6	21.8	21.7
			25	12	1	22.1	22.0	21.7	21.8	21.7
			25	25	1	22.1	21.9	21.6	21.6	21.6
		16QAM	50	0	1	22.0	21.9	21.6	21.7	21.6
			1	0	1	22.1	21.8	21.5	21.8	22.1
			1	25	1	22.1	21.7	21.5	21.7	22.0
			1	49	1	22.1	21.7	21.5	21.7	22.1
			25	0	2	21.0	20.9	20.6	20.8	20.7
			25	12	2	21.0	20.9	20.6	20.8	20.7
			25	25	2	21.1	20.8	20.5	20.6	20.6
			50	0	2	20.9	20.8	20.5	20.7	20.6

Band	BW (MHz)	Mode	RB Allocation	RB offset	Target MPR	Max. Avg Pwr (dBm)				
						2506 MHz	2549.5 MHz	2593 MHz	2636.5 MHz	2680 MHz
LTE Band 41	5	QPSK	1	0	0	23.1	23.2	22.8	22.7	22.7
			1	12	0	23.1	23.0	22.8	22.8	22.7
			1	24	0	23.1	23.0	22.7	22.7	22.7
			12	0	1	22.0	22.0	21.6	21.8	21.7
			12	7	1	22.0	21.9	21.7	21.8	21.7
			12	13	1	22.1	21.9	21.7	21.8	21.7
			25	0	1	22.0	21.9	21.7	21.8	21.7
		16QAM	1	0	1	22.3	22.4	21.7	21.7	21.9
			1	12	1	22.2	21.9	21.5	21.7	21.8
			1	24	1	22.0	21.9	21.5	21.5	21.8
			12	0	2	20.8	20.9	20.5	20.7	20.7
			12	7	2	20.9	20.9	20.6	20.7	20.7
			12	13	2	20.9	20.9	20.4	20.6	20.7
			25	0	2	20.9	20.9	20.6	20.6	20.6

9.4. Wi-Fi 2.4GHz (DTS Band)

Measured Results

Band (GHz)	Mode	Data Rate	Ch #	Freq. (MHz)	Avg Pwr (dBm)	Max Output Power (dBm)	SAR Test (Yes/No)	Note(s)
2.4	802.11b	1 Mbps	1	2412	17.1	17.5	Yes	
			6	2437	16.8			
			11	2462	17.5			
			12	2467	15.5	16.0	No	
			13	2472	11.5	12.0		
	802.11g	6 Mbps	1	2412	Not Required	14.5	No	
			6	2437				
			11	2462				
			12	2467		13.0		
	13	2472	10.0					
	802.11n (HT20)	6.5 Mbps	1	2412		12.5	No	
			6	2437				
			11	2462				
12			2467	12.0				
13			2472	11.0				

Note(s):

- Output Power and SAR is not required for 802.11g/n 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.

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

Measured Results

Band (GHz)	Mode	Data Rate	Ch #	Freq. (MHz)	Avg Pwr (dBm)	Max Output Power (dBm)	SAR Test (Yes/No)	Note(s)
5.2 (U-NII 1)	802.11a	6 Mbps	36	5180	10.1	10.5	No	3
			40	5200	10.3			
			44	5220	10.1			
			48	5240	10.3			
	802.11n (HT20)	6.5 Mbps	36	5180	9.5	10.5	No	3
			40	5200	9.5			
			44	5220	9.6			
			48	5240	9.6			
	802.11n (HT40)	13.5 Mbps	38	5190	10.0	10.5	No	3
			46	5230	10.1			
	802.11ac (VHT20)	6.5 Mbps	36	5180	9.5	10.5	No	3
			40	5200	9.5			
			44	5220	9.6			
			48	5240	9.6			
802.11ac (VHT40)	13.5 Mbps	38	5190	10.1	10.5	No	3	
		46	5230	10.2				
802.11ac (VHT80)	29.3 Mbps	42	5210	Not Required	10.0	No	1	
5.3 (U-NII 2A)	802.11a	6 Mbps	52	5260	10.5	10.5	No	2
			56	5280	10.5			
			60	5300	10.5			
			64	5320	10.5			
	802.11n (HT20)	6.5 Mbps	52	5260	10.2	10.5	No	2
			56	5280	10.4			
			60	5300	10.3			
			64	5320	10.4			
	802.11n (HT40)	13.5 Mbps	54	5270	10.4	10.5	Yes	
			62	5310	10.2			
	802.11ac (VHT20)	6.5 Mbps	52	5260	10.4	10.5	No	2
			56	5280	10.4			
			60	5300	10.3			
			64	5320	10.2			
802.11ac (VHT40)	13.5 Mbps	54	5270	10.3	10.5	No	2	
		62	5310	10.4				
802.11ac (VHT80)	29.3 Mbps	58	5290	Not Required	10.0	No	1	

Band (GHz)	Mode	Data Rate	Ch #	Freq. (MHz)	Avg Pwr (dBm)	Max Output Power (dBm)	SAR Test (Yes/No)	Note(s)
5.5 (U-NII 2C)	802.11a	6 Mbps	100	5500	10.0	10.5	No	2
			116	5580	9.9			
			124	5620	9.7			
			140	5700	9.1			
	802.11n (HT20)	6.5 Mbps	100	5500	9.8	10.5	No	2
			116	5580	9.5			
			124	5620	9.2			
	802.11n (HT40)	13.5 Mbps	102	5510	10.0	10.5	Yes	
			118	5590	10.2			
			134	5670	9.8			
	802.11ac (VHT20)	6.5 Mbps	100	5500	9.8	10.5	No	2
			116	5580	9.5			
			124	5620	9.0			
			140	5700	10.4			
802.11ac (VHT40)	13.5 Mbps	102	5510	10.4	10.5	No	2	
		118	5590	10.2				
		134	5670	9.7				
802.11ac (VHT80)	29.3 Mbps	106	5530	Not Required	10.0	No	1	
		122	5610					
5.8 (U-NII 3)	802.11a	6 Mbps	149	5745	10.0	10.5	No	2
			157	5785	9.5			
			165	5825	10.5			
	802.11n (HT20)	6.5 Mbps	149	5745	9.6	10.5	No	2
			157	5785	10.5			
			165	5825	10.3			
	802.11n (HT40)	13.5 Mbps	151	5755	10.2	10.5	Yes	
			159	5795	9.8			
	802.11ac (VHT20)	6.5 Mbps	149	5745	9.7	10.5	No	2
			157	5785	10.5			
			165	5825	10.3			
	802.11ac (VHT40)	13.5 Mbps	151	5755	10.0	10.5	No	2
			159	5795	9.7			
	802.11ac (VHT80)	29.3 Mbps	155	5775	Not Required	10.0	No	1

Note(s):

- Output Power and SAR measurement is not required for 802.11ac VHT80 channels when the specified tune-up tolerances for 802.11ac VHT80 are lower than 802.11a by more than ½ dB and the measured SAR is ≤ 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
 - ≤ 1.2 W/kg, SAR is not required for UNII band I
 - > 1.2 W/kg, both bands should be tested independently for SAR.

9.6. Bluetooth

Maximum tune-up tolerance limit is 9.50 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.

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

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.

KDB 248227 D01 SAR meas for 802.11 v02:

SAR test reduction for 802.11 Wi-Fi transmission mode configurations are considered separately for DSSS and OFDM. An initial test position is determined to reduce the number of tests required for certain exposure configurations with multiple test positions. An initial test configuration is determined for each frequency band and aggregated band according to maximum output power, channel bandwidth, wireless mode configurations and other operating parameters to streamline the measurement requirements. For 2.4 GHz DSSS, either the initial test position or DSSS procedure is applied to reduce the number of SAR tests; these are mutually exclusive. For OFDM, an initial test position is only applicable to next to the ear, UMPC mini-tablet and hotspot mode configurations, which is tested using the initial test configuration to facilitate test reduction. For other exposure conditions with a fixed test position, SAR test reduction is determined using only the initial test configuration.

The multiple test positions require SAR measurements in head, hotspot mode or UMPC mini-tablet configurations may be reduced according to the highest reported SAR determined using the initial test position(s) by applying the DSSS or OFDM SAR measurement procedures in the required wireless mode test configuration(s). The initial test position(s) is measured using the highest measured maximum output power channel in the required wireless mode test configuration(s). When the reported SAR for the initial test position is:

- ≤ 0.4 W/kg, further SAR measurement is not required for the other test positions in that exposure configuration and wireless mode combination within the frequency band or aggregated band. DSSS and OFDM configurations are considered separately according to the required SAR procedures.
- > 0.4 W/kg, SAR is repeated using the same wireless mode test configuration tested in the initial test position to measure the subsequent next closet/smallest test separation distance and maximum coupling test position, on the highest maximum output power channel, until the reported SAR is ≤ 0.8 W/kg or all required test positions are tested.
 - For subsequent test positions with equivalent test separation distance or when exposure is dominated by coupling conditions, the position for maximum coupling condition should be tested.
 - When it is unclear, all equivalent conditions must be tested.
- For all positions/configurations tested using the initial test position and subsequent test positions, when the reported SAR is > 0.8 W/kg, measure the SAR for these positions/configurations on the subsequent next highest measured output power channel(s) until the reported SAR is ≤ 1.2 W/kg or all required test channels are considered.
 - The additional power measurements required for this step should be limited to those necessary for identifying subsequent highest output power channels to apply the test reduction.
- When the specified maximum output power is the same for both UNII 1 and UNII 2A, begin SAR measurements in UNII 2A with the channel with the highest measured output power. If the reported SAR for UNII 2A is ≤ 1.2 W/kg, SAR is not required for UNII 1; otherwise treat the remaining bands separately and test them independently for SAR.
- When the specified maximum output power is different between UNII 1 and UNII 2A, begin SAR with the band that has the higher specified maximum output. If the highest reported SAR for the band with the highest specified power is ≤ 1.2 W/kg, testing for the band with the lower specified output power is not required; otherwise test the remaining bands independently for SAR.

To determine the initial test position, Area Scans were performed to determine the position with the *Maximum Value of SAR (measured)*. The position that produced the highest *Maximum Value of SAR* is considered the worst case position; thus used as the initial test position.

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	33.0	33.0	0.102	0.102	
			Left Tilt	190	836.6	33.0	33.0	0.067	0.067	
			Right Touch	190	836.6	33.0	33.0	0.187	0.187	
			Right Tilt	190	836.6	33.0	33.0	0.072	0.072	
Head (VoIP)	GPRS 2 Slots	0	Left Touch	190	836.6	30.5	29.8	0.099	0.117	
			Left Tilt	190	836.6	30.5	29.8	0.069	0.081	
			Right Touch	190	836.6	30.5	29.8	0.178	0.209	1
			Right Tilt	190	836.6	30.5	29.8	0.076	0.089	
Body-worn	Voice	10	Rear	128	824.2	33.0	32.4	0.757	0.869	
				190	836.6	33.0	33.0	0.911	0.911	
				251	848.8	33.0	32.5	1.030	1.156	2
			Front	190	836.6	33.0	33.0	0.716	0.716	
Body (VoIP) & Hotspot	GPRS 2 Slots	10	Rear	128	824.2	30.5	29.0	0.721	1.018	
				190	836.6	30.5	29.8	0.856	1.006	
				251	848.8	30.5	29.2	0.769	1.037	3
			Front	190	836.6	30.5	29.8	0.698	0.820	
			Edge 2	190	836.6	30.5	29.8	0.213	0.250	
			Edge 3	190	836.6	30.5	29.8	0.405	0.476	
			Edge 4	190	836.6	30.5	29.8	0.062	0.073	

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	30.0	29.5	0.121	0.136	4
			Left Tilt	661	1880.0	30.0	29.5	0.070	0.078	
			Right Touch	661	1880.0	30.0	29.5	0.106	0.119	
			Right Tilt	661	1880.0	30.0	29.5	0.098	0.110	
Head (VoIP)	GPRS 2 Slots	0	Left Touch	661	1880.0	27.5	26.5	0.088	0.111	
			Left Tilt	661	1880.0	27.5	26.5	0.034	0.043	
			Right Touch	661	1880.0	27.5	26.5	0.057	0.072	
			Right Tilt	661	1880.0	27.5	26.5	0.060	0.076	
Body-worn	Voice	10	Rear	661	1880.0	30.0	29.5	0.467	0.524	5
			Front	661	1880.0	30.0	29.5	0.404	0.453	
Body (VoIP) & Hotspot	GPRS 2 Slots	10	Rear	661	1880.0	27.5	26.5	0.539	0.679	
			Front	661	1880.0	27.5	26.5	0.525	0.661	
			Edge 2	661	1880.0	27.5	26.5	0.137	0.172	
			Edge 3	512	1850.2	27.5	26.6	0.688	0.846	
				661	1880.0	27.5	26.5	0.707	0.890	6
			810	1909.8	27.5	26.5	0.701	0.883		
Edge 4	661	1880.0	27.5	26.5	0.088	0.111				

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	23.5	22.9	0.087	0.100	7
			Left Tilt	4183	836.6	23.5	22.9	0.065	0.075	
			Right Touch	4183	836.6	23.5	22.9	0.163	0.187	
			Right Tilt	4183	836.6	23.5	22.9	0.069	0.079	
Body-worn & Hotspot	Rel 99 RMC	10	Rear	4132	826.4	23.5	22.9	0.670	0.769	8
				4183	836.6	23.5	22.9	0.790	0.907	
				4233	846.6	23.5	22.8	0.892	1.048	
			Front	4183	836.6	23.5	22.9	0.619	0.711	
Hotspot	Rel 99 RMC	10	Edge 2	4183	836.6	23.5	22.9	0.197	0.226	
			Edge 3	4183	836.6	23.5	22.9	0.375	0.431	
			Edge 4	4183	836.6	23.5	22.9	0.051	0.059	

10.4. 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	0	23.8	23.5	0.097	0.104	9
						25	0	22.8	22.2	0.075	0.086	
			Left Tilt	20525	836.5	1	0	23.8	23.5	0.069	0.074	
						25	0	22.8	22.2	0.051	0.059	
			Right Touch	20525	836.5	1	0	23.8	23.5	0.195	0.209	
						25	0	22.8	22.2	0.145	0.166	
			Right Tilt	20525	836.5	1	0	23.8	23.5	0.073	0.078	
						25	0	22.8	22.2	0.054	0.062	
Body-worn & Hotspot	QPSK	10	Rear	20525	836.5	1	0	23.8	23.5	0.665	0.713	10
						25	0	22.8	22.2	0.515	0.591	
			Front	20525	836.5	1	0	23.8	23.5	0.601	0.644	
						25	0	22.8	22.2	0.473	0.543	
Hotspot	QPSK	10	Edge 2	20525	836.5	1	0	23.8	23.5	0.202	0.216	
						25	0	22.8	22.2	0.157	0.180	
			Edge 3	20525	836.5	1	0	23.8	23.5	0.392	0.420	
						25	0	22.8	22.2	0.271	0.311	
			Edge 4	20525	836.5	1	0	23.8	23.5	0.086	0.092	
						25	0	22.8	22.2	0.068	0.078	

10.5. LTE Band 13 (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	23230	782.0	1	25	23.5	23.3	0.042	0.044	
						25	0	22.5	22.0	0.029	0.033	
			Left Tilt	23230	782.0	1	25	23.5	23.3	0.026	0.027	
						25	0	22.5	22.0	0.018	0.020	
			Right Touch	23230	782.0	1	25	23.5	23.3	0.052	0.054	11
						25	0	22.5	22.0	0.039	0.044	
Right Tilt	23230	782.0	1	25	23.5	23.3	0.028	0.029				
			25	0	22.5	22.0	0.021	0.024				
Body-worn & Hotspot	QPSK	10	Rear	23230	782.0	1	25	23.5	23.3	0.287	0.301	12
						25	0	22.5	22.0	0.207	0.232	
			Front	23230	782.0	1	25	23.5	23.3	0.222	0.232	
						25	0	22.5	22.0	0.160	0.180	
Hotspot	QPSK	10	Edge 2	23230	782.0	1	25	23.5	23.3	0.098	0.103	
						25	0	22.5	22.0	0.071	0.079	
			Edge 3	23230	782.0	1	25	23.5	23.3	0.134	0.140	
						25	0	22.5	22.0	0.094	0.105	
			Edge 4	23230	782.0	1	25	23.5	23.3	0.037	0.039	
						25	0	22.5	22.0	0.029	0.032	

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	23.8	23.4	0.033	0.036	13
						25	12	22.8	22.3	0.024	0.027	
			Left Tilt	23790	710.0	1	0	23.8	23.4	0.018	0.020	
						25	12	22.8	22.3	0.014	0.016	
			Right Touch	23790	710.0	1	0	23.8	23.4	0.026	0.029	
						25	12	22.8	22.3	0.021	0.023	
Right Tilt	23790	710.0	1	0	23.8	23.4	0.011	0.012				
			25	12	22.8	22.3	0.009	0.011				
Body-worn & Hotspot	QPSK	10	Rear	23790	710.0	1	0	23.8	23.4	0.134	0.147	14
						25	12	22.8	22.3	0.097	0.108	
			Front	23790	710.0	1	0	23.8	23.4	0.092	0.101	
						25	12	22.8	22.3	0.070	0.078	
Hotspot	QPSK	10	Edge 2	23790	710.0	1	0	23.8	23.4	0.084	0.092	
						25	12	22.8	22.3	0.073	0.082	
			Edge 3	23790	710.0	1	0	23.8	23.4	0.024	0.026	
						25	12	22.8	22.3	0.017	0.019	
			Edge 4	23790	710.0	1	0	23.8	23.4	0.081	0.088	
						25	12	22.8	22.3	0.065	0.073	

10.7. LTE Band 26 Part 90 (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	26740	819.0	1	0	23.5	23.5	0.061	0.061	15	
						25	0	22.5	22.4	0.049	0.050		
			Left Tilt	26740	819.0	1	0	23.5	23.5	0.041	0.041		
						25	0	22.5	22.4	0.032	0.033		
			Right Touch	26740	819.0	1	0	23.5	23.5	0.121	0.121		
						25	0	22.5	22.4	0.097	0.099		
Right Tilt	26740	819.0	1	0	23.5	23.5	0.055	0.055					
			25	0	22.5	22.4	0.042	0.043					
Body-worn & Hotspot	QPSK	10	Rear	26740	819.0	1	0	23.5	23.5	0.619	0.619	16	
						25	0	22.5	22.4	0.489	0.500		
			Front	26740	819.0	1	0	23.5	23.5	0.462	0.462		
						25	0	22.5	22.4	0.370	0.379		
Hotspot	QPSK	10	Edge 2	26740	819.0	1	0	23.5	23.5	0.162	0.162		
						25	0	22.5	22.4	0.131	0.134		
			Edge 3	26740	819.0	1	0	23.5	23.5	0.274	0.274		
						25	0	22.5	22.4	0.232	0.237		
			Edge 4	26740	819.0	1	0	23.5	23.5	0.047	0.047		
						25	0	22.5	22.4	0.035	0.036		

10.8. LTE Band 26 Part 22 (15MHz 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	26915	836.5	1	36	23.5	23.4	0.103	0.105	17	
						36	0	22.5	22.2	0.074	0.080		
			Left Tilt	26915	836.5	1	36	23.5	23.4	0.076	0.077		
						36	0	22.5	22.2	0.056	0.060		
			Right Touch	26915	836.5	1	36	23.5	23.4	0.174	0.178		
						36	0	22.5	22.2	0.128	0.137		
Right Tilt	26915	836.5	1	36	23.5	23.4	0.075	0.077					
			36	0	22.5	22.2	0.055	0.059					
Body-worn & Hotspot	QPSK	10	Rear	26865	831.5	1	36	23.5	23.3	0.760	0.796	18	
				26915	836.5	1	36	23.5	23.4	0.860	0.880		
						36	0	22.5	22.2	0.564	0.604		
			Front	26915	836.5	1	36	23.5	23.4	0.674	0.690		
						36	0	22.5	22.2	0.490	0.525		
Hotspot	QPSK	10	Edge 2	26915	836.5	1	36	23.5	23.4	0.249	0.255		
						36	0	22.5	22.2	0.189	0.203		
			Edge 3	26915	836.5	1	36	23.5	23.4	0.479	0.490		
						36	0	22.5	22.2	0.353	0.378		
			Edge 4	26915	836.5	1	36	23.5	23.4	0.068	0.070		
						36	0	22.5	22.2	0.047	0.050		

10.9. LTE Band 41 (20MHz Bandwidth)

RF Exposure Conditions	Mode	Dist. (mm)	Test Position	Ch #.	Freq. (MHz)	RB Allocation	RB offset	Power (dBm)		1-g SAR (W/kg)		Plot No.
								Tune-up limit	Meas.	Meas.	Scaled	
Head	QPSK	0	Left Touch	40620	2593.5	1	0	23.5	23.3	0.026	0.027	
						50	0	22.5	22.1	0.016	0.018	
			Left Tilt	40620	2593.5	1	0	23.5	23.3	0.010	0.010	
						50	0	22.5	22.1	0.006	0.006	
			Right Touch	40620	2593.5	1	0	23.5	23.3	0.056	0.058	19
						50	0	22.5	22.1	0.044	0.048	
Right Tilt	40620	2593.5	1	0	23.5	23.3	0.017	0.018				
			50	0	22.5	22.1	0.012	0.013				
Body-worn & Hotspot	QPSK	10	Rear	40620	2593.5	1	0	23.5	23.3	0.366	0.383	20
						50	0	22.5	22.1	0.272	0.298	
			Front	40620	2593.5	1	0	23.5	23.3	0.329	0.345	
						50	0	22.5	22.1	0.247	0.271	
Hotspot	QPSK	10	Edge 2	40620	2593.5	1	0	23.5	23.3	0.055	0.057	
						50	0	22.5	22.1	0.039	0.043	
			Edge 3	40620	2593.5	1	0	23.5	23.3	0.625	0.654	21
						50	0	22.5	22.1	0.469	0.514	
			Edge 4	40620	2593.5	1	0	23.5	23.3	0.132	0.138	
						50	0	22.5	22.1	0.100	0.110	

10.10. Wi-Fi (DTS Band)

Frequency Band	Mode	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	802.11b 1 Mbps	Head	0	Left Touch	11	2462.0	1.010	17.5	17.5	0.788	0.788	2	
				Left Tilt	11	2462.0	1.260	17.5	17.5	0.955	0.955	2	
				Right Touch	1	2412.0	1.030	17.5	17.1	0.972	1.066	3	
					6	2437.0	0.723	17.5	16.8	0.705	0.828		
					11	2462.0	0.987	17.5	17.5	1.030	1.030		
				Right Tilt	1	2412.0	0.901	17.5	17.1	0.934	1.024	3	
					6	2437.0	0.780	17.5	16.8	0.825	0.969		
					11	2462.0	0.972	17.5	17.5	1.040	1.040		
		Body-worn & Hotspot & Wi-Fi Direct	10	Rear	11	2462.0	0.156	17.5	17.5				
				Front	11	2462.0	0.202	17.5	17.5				
				Edge 1	11	2462.0	0.344	17.5	17.5	0.330	0.330	1	23
Edge 4	11			2462.0	0.085	17.5	17.5						

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 this exposure condition were evaluated until a SAR ≤ 0.8 W/kg was reported.
- Testing for a second channel was required because the reported SAR for this test position was >0.8 W/kg.

10.11. Wi-Fi (U-NII Band)

Frequency Band	Mode	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		
5.3 GHz U-NII 2A	802.11n (HT40)	Head	0	Left Touch	54	5270.0	0.219	10.5	10.4				
				Left Tilt	54	5270.0	0.151	10.5	10.4				
				Right Touch	54	5270.0	0.538	10.5	10.4	0.336	0.344	1	24
				Right Tilt	54	5270.0	0.337	10.5	10.4				
		Body-worn	10	Rear	54	5270.0	0.041	10.5	10.4	0.024	0.025	1	25
				Front	54	5270.0	0.039	10.5	10.4				
5.3GHz	802.11n (HT40)	Extremity	0	Rear	54	5270.0	0.803	10.5	10.4	0.046	0.047		
5.5 GHz U-NII 2C	802.11n (HT40)	Head	0	Left Touch	118	5590.0	0.384	10.5	10.2				
				Left Tilt	118	5590.0	0.279	10.5	10.2				
				Right Touch	118	5590.0	0.613	10.5	10.2	0.469	0.503		26
				Right Tilt	118	5590.0	0.515	10.5	10.2	0.352	0.377	2	
		Body-worn	10	Rear	118	5590.0	0.117	10.5	10.2	0.048	0.051	1	27
				Front	118	5590.0	0.081	10.5	10.2				
5.5GHz	802.11n (HT40)	Extremity	0	Rear	118	5590.0	0.970	10.5	10.2	0.102	0.109		

Frequency Band	Mode	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		
5.8 GHz U-NII 3	802.11n (HT40)	Head	0	Left Touch	151	5755.0	0.480	10.5	10.2	0.241	0.258	2	
				Left Tilt	151	5755.0	0.298	10.5	10.2				
				Right Touch	151	5755.0	0.673	10.5	10.2	0.496	0.531		28
				Right Tilt	151	5755.0	0.465	10.5	10.2				
		Body-worn & Wi-Fi Direct	10	Rear	151	5755.0	0.165	10.5	10.2	0.089	0.096	1	29
				Front	151	5755.0	0.085	10.5	10.2				
				Edge 1	151	5755.0	0.033	10.5	10.2				
		Edge 4	151	5755.0	0.024	10.5	10.2						
Frequency Band	Mode	RF Exposure Conditions	Dist. (mm)	Test Position	Ch #.	Freq. (MHz)	Area Scan Max. SAR (W/kg)	Power (dBm)		10-g SAR (W/kg)		Notes	Plot No.
5.8GHz	802.11n (HT40)	Extremity	0	Rear	151	5755.0	0.365	10.5	10.2	0.139	0.149		30

Note(s):

1. Highest reported SAR is ≤ 0.4 W/kg. Therefore, further SAR measurements within this exposure condition are not required.
2. 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.

10.12. 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:

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

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)					
9.5	9	10	2.480	1.4	Rear/Front	0.189

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 13	Body & Hotspot	Rear	No	0.287	N/A	N/A
	LTE Band 17	Body & Hotspot	Rear	No	0.134	N/A	N/A
850	LTE Band 26	Body & Hotspot	Rear	No	0.922	N/A	N/A
	GSM850	Body	Rear	Yes	1.030	1.000	1.03
	WCDMA Band V	Body & Hotspot	Rear	No	0.892	N/A	N/A
	LTE Band 5	Body & Hotspot	Rear	No	0.665	N/A	N/A
1900	GSM 1900	Body & Hotspot	Edge 3	No	0.707	N/A	N/A
2400	Wi-Fi 802.11b/g/n	Head	Right Tilt	Yes	1.040	0.993	1.05
2600	LTE Band 41	Head	Right Tilt	No	0.625	N/A	N/A
5300	Wi-Fi 802.11a/n/ac	Head	Right Touch	No	0.336	N/A	N/A
5500	Wi-Fi 802.11a/n/ac	Head	Right Touch	No	0.469	N/A	N/A
5800	Wi-Fi 802.11a/n/ac	Head	Right Touch	No	0.496	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)	+	DTS		
	4	GSM(GPRS)	+	U-NII		
	5	W-CDMA	+	DTS		
	6	W-CDMA	+	U-NII		
	9	LTE	+	DTS		
	10	LTE	+	U-NII		
Body-w orn	11	GSM(Voice)	+	DTS		
	12	GSM(Voice)	+	U-NII		
	13	GSM(Voice)	+	BT		
	14	GSM(Voice)	+	U-NII	+	BT
	15	GSM(GPRS)	+	DTS		
	16	GSM(GPRS)	+	U-NII		
	17	GSM(GPRS)	+	BT		
	18	GSM(GPRS)	+	U-NII	+	BT
	19	W-CDMA	+	DTS		
	20	W-CDMA	+	U-NII		
	21	W-CDMA	+	BT		
	22	W-CDMA	+	U-NII	+	BT
	27	LTE	+	DTS		
	28	LTE	+	U-NII		
29	LTE	+	BT			
30	LTE	+	U-NII	+	BT	
Hotspot & Wi-Fi Direct	31	GSM(GPRS)	+	DTS		
	32	GSM(GPRS)	+	U-NII		
	33	W-CDMA	+	DTS		
	34	W-CDMA	+	U-NII		
	37	LTE	+	DTS		
	38	LTE	+	U-NII		

Notes:

1. Wi-Fi 2.4GHz supports Hotspot and Wi-Fi Direct
2. Wi-Fi 5.8GHz supports Hotspot and Wi-Fi Direct
3. GPRS, W-CDMA and LTE support Hotspot.
4. VoIP is supported in GPRS, W-CDMA and LTE.
5. DTS Radio cannot transmit simultaneously w ith Bluetooth Radio.
6. U-NII Radio can transmit simultaneously w ith 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	
					∑ 1-g SAR (mW/g)	SPLSR (Yes/ No)	∑ 1-g SAR (mW/g)	SPLSR (Yes/ No)	∑ 1-g SAR (mW/g)	SPLSR (Yes/ No)
Head	0.209	1.040	0.531		1.249	No	0.740	No		
Body-worn & Hotspot	1.156	0.330	0.096	0.189	1.486	No	1.252	No	1.441	No
Hotspot	1.048	0.330	0.096		1.378	No	1.144	No		

Conclusion:

Simultaneous transmission SAR measurement (Volume Scan) is not required because the either sum of the 1-g SAR is < 1.6 W/kg or the SPLSR is ≤ 0.04 for all circumstances that require SPLSR calculation.

Appendixes

Refer to separated files for the following appendixes.

15I21858-S1V1 SAR_App A Photos & Ant. Locations

15I21858-S1V2 SAR_App B System Check Plots

15I21858-S1V3 SAR_App C Highest Test Plots

15I21858-S1V1 SAR_App D Tissue Ingredients

15I21858-S1V1 SAR_App E Probe Cal. Certs

15I21858-S1V2 SAR_App F Dipole Cal. Certs

END OF REPORT