SAR EVALUATION REPORT

FCC 47 CFR § 2.1093
IEEE Std 1528-2013

For
GSM/WCDMA/LTE Phone + Bluetooth, 2.4GHz WLAN b/g/n, ANT+ and NFC

FCC ID: A3LSMJ7008
Model Name: SM-J7008

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--	5/11/2015	Initial Issue	--
A	5/26/2015	Report revised based on Reviewer's comments: 1. Sec. 6.3., 9.5., 10.7., 12.: Updated Bluetooth	Kenneth Mak

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1. Attestation of Test Results

Applicant Name		SAMSUNG Electronics Co., LTD.			
FCC ID		A3LSMJ7008			
Model Name		SM-J7008			
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		0.435	0.372	N/A	N/A
Body-worn*		0.727	0.080	N/A	N/A
Hotspot/Wi-Fi Direct		0.727	0.080	N/A	N/A
Simultaneous TX	Head	0.807	0.807	N/A	N/A
	Body-worn*	0.807	0.807	N/A	N/A
	Hotspot/ Wi-Fi Direct	0.807	0.807	N/A	N/A
***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.					
Date Tested		4/14/2015 to 4/23/2015			
Test Results		Pass			

UL Verification Services Inc. tested the above equipment in accordance with the requirements set forth in the above standards. All indications of Pass/Fail in this report are opinions expressed by UL Verification Services Inc. based on interpretations and/or observations of test results. Measurement Uncertainties were not taken into account and are published for informational purposes only. The test results show that the equipment tested is capable of demonstrating compliance with the requirements as documented in this report.

Note: The results documented in this report apply only to the tested sample, under the conditions and modes of operation as described herein. This document may not be altered or revised in any way unless done so by UL Verification Services Inc. and all revisions are duly noted in the revisions section. Any alteration of this document not carried out by UL Verification Services Inc. will constitute fraud and shall nullify the document. This report must not be used by the client to claim product certification, approval, or endorsement by NVLAP, NIST, any agency of the Federal Government, or any agency of any government (NIST Handbook 150, Annex A). This report is written to support regulatory compliance of the applicable standards stated above.

Approved & Released By:	Prepared By:
	
Bobby Bayani Senior Engineer UL Verification Services Inc.	Annie Pang 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 v02
- 447498 D01 General RF Exposure Guidance v05r02
- 447498 D03 Supplement C Cross-Reference
- 648474 D04 Handset SAR v01r02
- 690783 D01 SAR Listings on Grants v01r03
- 865664 D01 SAR measurement 100 MHz to 6 GHz v01r03
- 865664 D02 RF Exposure Reporting v01r01
- 941225 D01 3G SAR Procedures v03
- 941225 D05 SAR for LTE Devices v02r03
- 941225 D06 Hotspot Mode v02

3. Facilities and Accreditation

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

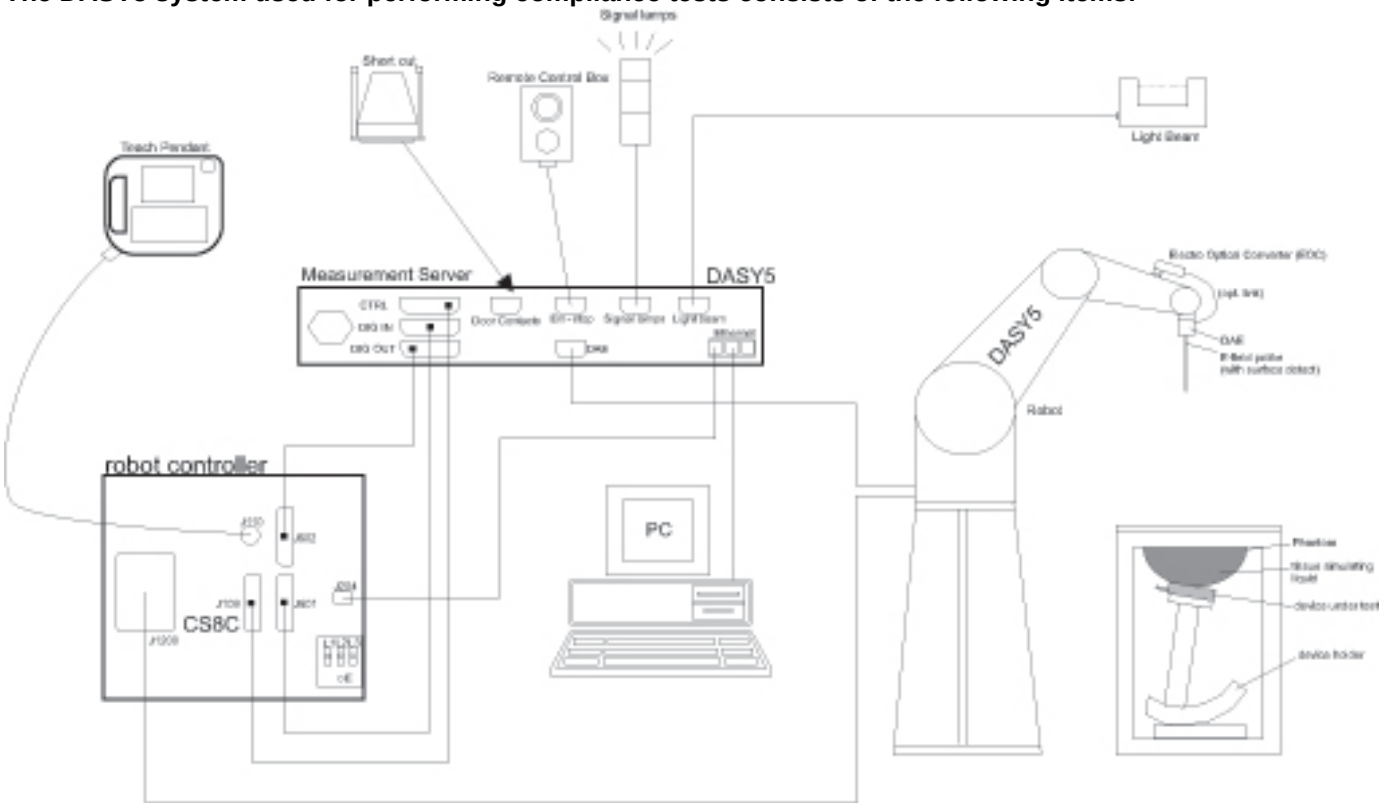
47173 Benicia Street	47266 Benicia Street
SAR Lab A	SAR Lab 1
SAR Lab B	SAR Lab 2
SAR Lab C	SAR Lab 3
SAR Lab D	SAR Lab 4
SAR Lab E	SAR Lab 5
SAR Lab F	
SAR Lab G	
SAR Lab H	

UL Verification Services Inc. is accredited by NVLAP, Laboratory Code 200065-0.

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	½·δ·ln(2) ± 0.5 mm
Maximum probe angle from probe axis to phantom surface normal at the measurement location	30° ± 1°	20° ± 1°
Maximum area scan spatial resolution: Δx_{Area}, Δy_{Area}	≤ 2 GHz: ≤ 15 mm 2 – 3 GHz: ≤ 12 mm	3 – 4 GHz: ≤ 12 mm 4 – 6 GHz: ≤ 10 mm
	When the x or y dimension of the test device, in the measurement plane orientation, is smaller than the above, the measurement resolution must be ≤ the corresponding x or y dimension of the test device with at least one measurement point on the test device.	

Step 3: Zoom Scan

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

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

			≤ 3 GHz	> 3 GHz
Maximum zoom scan spatial resolution: Δx_{Zoom}, Δy_{Zoom}			≤ 2 GHz: ≤ 8 mm 2 – 3 GHz: ≤ 5 mm*	3 – 4 GHz: ≤ 5 mm* 4 – 6 GHz: ≤ 4 mm*
Maximum zoom scan spatial resolution, normal to phantom surface	uniform grid: $\Delta z_{Zoom}(n)$		≤ 5 mm	3 – 4 GHz: ≤ 4 mm 4 – 5 GHz: ≤ 3 mm 5 – 6 GHz: ≤ 2 mm
	graded grid	$\Delta z_{Zoom}(1)$: between 1st two points closest to phantom surface	≤ 4 mm	3 – 4 GHz: ≤ 3 mm 4 – 5 GHz: ≤ 2.5 mm 5 – 6 GHz: ≤ 2 mm
		$\Delta z_{Zoom}(n>1)$: between subsequent points	≤ 1.5·$\Delta z_{Zoom}(n-1)$	
Minimum zoom scan volume	x, y, z		≥ 30 mm	3 – 4 GHz: ≥ 28 mm 4 – 5 GHz: ≥ 25 mm 5 – 6 GHz: ≥ 22 mm

Note: δ is the penetration depth of a plane-wave at normal incidence to the tissue medium; see draft standard IEEE P1528-2011 for details.

* When zoom scan is required and the *reported* SAR from the area scan based *1-g SAR estimation* procedures of KDB 447498 is ≤ 1.4 W/kg, ≤ 8 mm, ≤ 7 mm and ≤ 5 mm zoom scan resolution may be applied, respectively, for 2 GHz to 3 GHz, 3 GHz to 4 GHz and 4 GHz to 6 GHz.

Step 4: Power drift measurement

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

Step 5: Z-Scan (FCC only)

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

4.3. Test Equipment

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

Dielectric Property Measurements

Name of Equipment	Manufacturer	Type/Model	Serial No.	Cal. Due Date
Network Analyzer	Agilent	8753ES	MY40001647	7/17/2015
Dielectric Probe kit	SPEAG	DAK-3.5	1087	11/11/2015
Shorting Block	SPEAG	DAK-3.5 Short	SM DAK 200 BA	N/A
Thermometer	Traceable Calibration Control Co.	4242	122529162	10/8/2015

System Check

Name of Equipment	Manufacturer	Type/Model	Serial No.	Cal. Due Date
Synthesized Signal Generator	HP	8665B	3744A01084	5/20/2015
Power Meter	Agilent	N1912A	MY53040016	5/5/2015
Power Sensor	Agilent	E9323A	MY53070005	5/1/2015
Power Sensor	Agilent	E9323A	MY53070009	5/28/2015
Amplifier	MITEQ	AMF-4D-00400600-50-30P	1795093	N/A
Directional coupler	Werlatone	C8060-102	2149	N/A
DC Power Supply	AMETEK	XT 15-4	1319A02778	N/A
Synthesized Signal Generator	HP	8665B	3744A01155	3/18/2016
Power Meter	HP	437B	3125U11364	8/27/2015
Power Meter	HP	437B	3125U12345	8/15/2015
Power Sensor	HP	8481A	1926A27048	8/15/2015
Power Sensor	HP	8481A	2702A76223	9/17/2015
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
Data Acquisition Electronics (SAR Lab A)	SPEAG	DAE4	1357	2/20/2016
System Validation Dipole	SPEAG	D835V2	4d002	11/13/2015
System Validation Dipole	SPEAG	D1900V2	5d043	11/7/2015
System Validation Dipole	SPEAG	D2450V2	706	5/20/2015
System Validation Dipole	SPEAG	D2600V2	1036	3/13/2016

Other

Name of Equipment	Manufacturer	Type/Model	Serial No.	Cal. Due Date
Power Meter	Agilent	N1912A	MY53040015	2/27/2016
Power Sensor	Agilent	N1921A	MY52270022	12/12/2015
Base Station Simulator	R & S	CMW500	104245-jz	1/14/2016

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): 152.6 mm x 79.6 mm Overall Diagonal: 172 mm Display Diagonal: 138 mm
Back Cover	☒ Normal Battery Cover
Battery Options	☒ Standard – Lithium-ion battery, Rating 4.4 Vdc, 11.55 Wh
Accessory	Headset
Wireless Router (Hotspot)	Wi-Fi Hotspot mode permits the device to share its cellular data connection with other Wi-Fi-enabled devices. ☒ Mobile Hotspot (Wi-Fi 2.4 GHz) ☐ Mobile Hotspot (Wi-Fi 5 GHz)
Wi-Fi Direct	Wi-Fi Direct enabled devices transfer data directly between each other ☒ Wi-Fi Direct (Wi-Fi 2.4 GHz)

6.2. Wireless Technologies

Wireless technologies	Frequency bands	Operating mode		Duty Cycle used for SAR testing
GSM	1900	Voice (GMSK) GPRS (GMSK) EGPRS (8PSK)	GPRS Multi-Slot Class: ☐ Class 8 - 1 Up, 4 Down ☐ Class 10 - 2 Up, 4 Down ☒ Class 12 - 4 Up, 4 Down ☐ Class 33 - 4 Up, 5 Down	GSM Voice: 12.5% (E)GPRS: 1 Slot: 12.5% 2 Slots: 25% 3 Slots: 37.5% 4 Slots: 50%
	☒ Class A = both simultaneously. ☐ Class B = GPRS connection interrupted during a GSM call, automatically resumed at end of call. ☐ Class C = manual GSM / GPRS mode switching. Does this device support DTM (Dual Transfer Mode)? ☐ Yes ☒ No			
W-CDMA (UMTS)	Band V Band II	UMTS Rel. 99 (Voice & Data) HSDPA (Rel. 5) HSUPA (Rel. 6) HSPA+ (Rel. 7)		100%
LTE	TDD Band 41	QPSK 16QAM ☒ Rel. 10 Does not support Carrier Aggregation (CA) ☐ Rel. 10 Carrier Aggregation (1 Uplink and 2 Downlinks) ☐ Rel. 11 Carrier Aggregation (2 Uplink and 2 Downlinks)		63.3% (TDD)
	Does this device support SV-LTE (1xRTT-LTE)? ☐ Yes ☒ No			
Wi-Fi	2.4 GHz	802.11b 802.11g 802.11n (HT20)		100%
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

Upper limit (dB): -1.5 ~ 0.5		Max. RF Output Power (dBm)		
RF Air interface	Mode	Target	Max. tune-up tolerance limit	
			Burst	Frame
GSM1900	Voice (1 slot)	30.0	**30.5**	**21.5**
	GPRS 1 slot	30.0	**30.5**	**21.5**
	GPRS 2 slots	28.0	**28.5**	**22.5**
	GPRS 3 slots	26.0	**26.5**	**22.2**
	GPRS 4 slots	24.5	**25.0**	**22.0**
	EGPRS 1 slot	26.5	**27.0**	**18.0**
	EGPRS 2 slots	25.5	**26.0**	**20.0**
	EGPRS 3 slots	24.5	**25.0**	**20.7**
	EGPRS 4 slots	23.5	**24.0**	**21.0**

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	22.5	**23.0**
	HSUPA	22.5	**23.0**
W-CDMA Band II	R99	22.5	**23.0**
	HSDPA	21.5	**22.0**
	HSUPA	22.0	**22.5**
LTE Band 41	QPSK	24.0	**24.5**

Upper limit (dB): -1.5 ~ 0.5		Max. RF Output Power (dBm)	
RF Air interface	Mode	Target	Max. tune-up tolerance limit
WiFi 2.4 GHz	802.11b	16.0	**16.5**
	802.11g	14.0	**14.5**
	802.11n HT20	13.0	**13.5**
Bluetooth		9.5	**10.0**
Bluetooth LE		1.0	**1.5**

6.4. General LTE SAR Test and Reporting Considerations

<table>
<tr><th>Item</th><th>Description</th></tr>
<tr><td>Frequency range, Channel Bandwidth, Numbers and Frequencies</td><td>
<table>
<tr><td rowspan="3">Band 41</td><td colspan="6">Frequency range: 2555 – 2655 MHz</td></tr>
<tr><td colspan="6">Channel Bandwidth</td></tr>
<tr><td>20 MHz</td><td>15 MHz</td><td>10 MHz</td><td>5 MHz</td><td>3 MHz</td><td>1.4 MHz</td></tr>
<tr><td>Low</td><td>40340
/2565</td><td>40315/
2562.5</td><td>40290/
2560</td><td>40215/
2552.5</td><td></td><td></td></tr>
<tr><td>Mid</td><td>40620/
2593</td><td>40620/
2593</td><td>40620/
2593</td><td>40620/
2593</td><td></td><td></td></tr>
<tr><td>High</td><td>41140/
2645</td><td>41165/
2647.5</td><td>41190/
2650</td><td>41215/
2652.5</td><td></td><td></td></tr>
</table>
</td></tr>
<tr><td>LTE transmitter and antenna implementation</td><td>LTE has one (1) TX/RX antennas and one (1) RX antennas
Refer to Appendix A.</td></tr>
<tr><td>Maximum power reduction (MPR)</td><td>
Table 6.2.3-1: Maximum Power Reduction (MPR) for Power Class 3
<table>
<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>
<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>
</table>
MPR Built-in by design
A-MPR (additional MPR) was disabled during SAR testing
</td></tr>
<tr><td>Power reduction</td><td>No</td></tr>
<tr><td>Spectrum plots for RB configurations</td><td>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.</td></tr>
</table>

6.5. LTE (TDD) Considerations

According to KDB 941225 D05 SAR for LTE Devices, for Time-Division Duplex (TDD) systems, SAR must be tested using a fixed periodic duty factor according to the highest transmission duty factor implemented for the device and supported by the defined 3GPP LTE TDD configurations.

SAR was tested with the highest transmission duty factor (63.33%) using Uplink-downlink configuration 0 and Special subframe configuration 7.

LTE TDD Band 41 supports 3GPP TS 36.211 section 4.2 for Type 2 Frame Structure and Table 4.2-2 for uplink-downlink configurations and Table 4.2-1 for Special subframe configurations.

Table 4.2-1: Configuration of special subframe (lengths of DwPTS/GP/UpPTS).

Special subframe configuration	Normal cyclic prefix in downlink			Extended cyclic prefix in downlink		
	DwPTS	UpPTS		DwPTS	UpPTS	
		Normal cyclic prefix in uplink	Extended cyclic prefix in uplink		Normal cyclic prefix in uplink	Extended cyclic prefix in uplink
0	$6592 \cdot T_s$	$2192 \cdot T_s$	$2560 \cdot T_s$	$7680 \cdot T_s$	$2192 \cdot T_s$	$2560 \cdot T_s$
1	$19760 \cdot T_s$			$20480 \cdot T_s$		
2	$21952 \cdot T_s$			$23040 \cdot T_s$		
3	$24144 \cdot T_s$			$25600 \cdot T_s$		
4	$26336 \cdot T_s$			$7680 \cdot T_s$	$4384 \cdot T_s$	$5120 \cdot T_s$
5	$6592 \cdot T_s$	$4384 \cdot T_s$	$5120 \cdot T_s$	$20480 \cdot T_s$		
6	$19760 \cdot T_s$			$23040 \cdot T_s$		
7	$21952 \cdot T_s$			$12800 \cdot T_s$		
8	$24144 \cdot T_s$			-	-	-
9	$13168 \cdot T_s$			-	-	-

Calculated Duty Cycle

Uplink-Downlink Configuration	Downlink-to-Uplink Switch-point Periodicity	Subframe Number										Calculated Duty Cycle (%)
		0	1	2	3	4	5	6	7	8	9	
0	5 ms	D	S	U	U	U	D	S	U	U	U	63.33
1	5 ms	D	S	U	U	D	D	S	U	U	D	43.33
2	5 ms	D	S	U	D	D	D	S	U	D	D	23.33
3	10 ms	D	S	U	U	U	D	D	D	D	D	31.67
4	10 ms	D	S	U	U	D	D	D	D	D	D	21.67
5	10 ms	D	S	U	D	D	D	D	D	D	D	11.67
6	5 ms	D	S	U	U	U	D	S	U	U	D	53.33

Calculated Duty Cycle = Extended cyclic prefix in uplink x (T_s) x # of S + # of U

Example for Calculated Duty Cycle for Uplink-Downlink Configuration 0:
Calculated Duty Cycle = 5120 x [1/(15000 x 2048)] x 2 + 6 ms = 63.33%
where
T_s = 1/(15000 x 2048) seconds

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	Yes	
			Edge 3 (Bottom)	> 25 mm	No	1
			Edge 4 (Left)	> 25 mm	No	1

Notes:

1. SAR is not required because the distance from the antenna to the edge is > 25 mm as per KDB 941225 D06 Hot Spot SAR.
2. 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 ± 2°C of the temperature when the tissue parameters are characterized.

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

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

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 ±(%)
4/14/2015	Head 2600	e'	39.1600	Relative Permittivity (ϵ_r):	39.16	39.01	0.38	5
		e''	13.9100	Conductivity (σ):	2.01	1.96	2.49	5
	Head 2500	e'	39.3500	Relative Permittivity (ϵ_r):	39.35	39.14	0.54	5
		e''	13.6200	Conductivity (σ):	1.89	1.85	2.12	5
	Head 2700	e'	38.5800	Relative Permittivity (ϵ_r):	38.58	38.88	-0.78	5
		e''	13.9700	Conductivity (σ):	2.10	2.07	1.31	5
4/14/2015	Body 2600	e'	50.5200	Relative Permittivity (ϵ_r):	50.52	52.51	-3.79	5
		e''	15.3800	Conductivity (σ):	2.22	2.16	2.90	5
	Body 2500	e'	50.9100	Relative Permittivity (ϵ_r):	50.91	52.64	-3.28	5
		e''	15.1300	Conductivity (σ):	2.10	2.02	4.10	5
	Body 2700	e'	50.1400	Relative Permittivity (ϵ_r):	50.14	52.38	-4.29	5
		e''	15.5200	Conductivity (σ):	2.33	2.30	1.24	5
4/16/2015	Head 1900	e'	38.4300	Relative Permittivity (ϵ_r):	38.43	40.00	-3.93	5
		e''	13.7400	Conductivity (σ):	1.45	1.40	3.68	5
	Head 1850	e'	38.6900	Relative Permittivity (ϵ_r):	38.69	40.00	-3.28	5
		e''	13.5800	Conductivity (σ):	1.40	1.40	-0.22	5
	Head 1910	e'	38.3700	Relative Permittivity (ϵ_r):	38.37	40.00	-4.08	5
		e''	13.7500	Conductivity (σ):	1.46	1.40	4.31	5
4/16/2015	Body 1900	e'	51.6900	Relative Permittivity (ϵ_r):	51.69	53.30	-3.02	5
		e''	14.5300	Conductivity (σ):	1.54	1.52	0.99	5
	Body 1850	e'	51.9500	Relative Permittivity (ϵ_r):	51.95	53.30	-2.53	5
		e''	14.3600	Conductivity (σ):	1.48	1.52	-2.82	5
	Body 1910	e'	51.6500	Relative Permittivity (ϵ_r):	51.65	53.30	-3.10	5
		e''	14.5500	Conductivity (σ):	1.55	1.52	1.66	5
4/17/2015	Body 835	e'	53.5800	Relative Permittivity (ϵ_r):	53.58	55.20	-2.93	5
		e''	21.2800	Conductivity (σ):	0.99	0.97	1.86	5
	Body 820	e'	53.9600	Relative Permittivity (ϵ_r):	53.96	55.28	-2.38	5
		e''	21.4600	Conductivity (σ):	0.98	0.97	1.03	5
	Body 850	e'	53.4100	Relative Permittivity (ϵ_r):	53.41	55.16	-3.17	5
		e''	21.1900	Conductivity (σ):	1.00	0.99	1.45	5
4/20/2015	Head 835	e'	39.8800	Relative Permittivity (ϵ_r):	39.88	41.50	-3.90	5
		e''	19.0000	Conductivity (σ):	0.88	0.90	-1.98	5
	Head 820	e'	40.0000	Relative Permittivity (ϵ_r):	40.00	41.60	-3.85	5
		e''	19.0300	Conductivity (σ):	0.87	0.90	-3.43	5
	Head 850	e'	39.7200	Relative Permittivity (ϵ_r):	39.72	41.50	-4.29	5
		e''	19.0300	Conductivity (σ):	0.90	0.92	-1.70	5
4/23/2015	Head 2450	e'	37.4800	Relative Permittivity (ϵ_r):	37.48	39.20	-4.39	5
		e''	13.5600	Conductivity (σ):	1.85	1.80	2.62	5
	Head 2410	e'	37.9900	Relative Permittivity (ϵ_r):	37.99	39.28	-3.28	5
		e''	13.7100	Conductivity (σ):	1.84	1.76	4.36	5
	Head 2475	e'	37.2600	Relative Permittivity (ϵ_r):	37.26	39.17	-4.87	5
		e''	13.7900	Conductivity (σ):	1.90	1.83	3.87	5
4/23/2015	Body 2450	e'	52.8600	Relative Permittivity (ϵ_r):	52.86	52.70	0.30	5
		e''	14.1200	Conductivity (σ):	1.92	1.95	-1.36	5
	Body 2410	e'	53.5900	Relative Permittivity (ϵ_r):	53.59	52.76	1.57	5
		e''	14.3600	Conductivity (σ):	1.92	1.91	0.88	5
	Body 2475	e'	52.7600	Relative Permittivity (ϵ_r):	52.76	52.67	0.17	5
		e''	14.3600	Conductivity (σ):	1.98	1.99	-0.45	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 ±0.2 mm (bottom plate) filled with Body or Head simulating liquid of the following parameters.
- The depth of tissue-equivalent liquid in a phantom must be ≥ 15.0 cm for SAR measurements ≤ 3 GHz and ≥ 10.0 cm for measurements > 3 GHz.
- The DASY system with an E-Field Probe was used for the measurements.
- The dipole was mounted on the small tripod so that the dipole feed point was positioned below the center marking of the flat phantom section and the dipole was oriented parallel to the body axis (the long side of the phantom). The standard measuring distance was 10 mm (above 1 GHz) and 15 mm (below 1 GHz) from dipole center to the simulating liquid surface.
- The coarse grid with a grid spacing of 15 mm was aligned with the dipole.
  For 5 GHz band - The coarse grid with a grid spacing of 10 mm was aligned with the dipole.
- Special 7x7x7 (below 3 GHz) and/or 8x8x7 (above 3 GHz) fine cube was chosen for the cube.
- Distance between probe sensors and phantom surface was set to 3 mm.
  For 5 GHz band - Distance between probe sensors and phantom surface was set to 2.5 mm
- The dipole input power (forward power) was 100 mW.
- The results are normalized to 1 W input power.

Reference Target SAR Values

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

System Dipole	Serial No.	Cal. Date	Freq. (MHz)	Target SAR Values (W/kg)		
				1g/10g	Head	Body
D835V2	4d002	11/13/2014	835	1g	9.23	9.33
				10g	5.99	6.12
D1900V2	5d043	11/7/2014	1900	1g	40.6	40.0
				10g	21.1	21.3
D2450V2	706	5/20/2014	2450	1g	53.0	50.2
				10g	24.5	23.4
D2600V2	1036	3/13/2015	2600	1g	56.1	56.2
				10g	25.0	25.0

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 ±10 %	Plot No.
	Type	Serial #			Zoom Scan to 100 mW	Normalize to 1 W			
4/14/2015	D2600V2	1036	Head	1g	5.46	54.6	56.1	-2.67	1,2
				10g	2.41	24.1	25.0	-3.60	
4/14/2015	D2600V2	1036	Body	1g	5.60	56.0	56.2	-0.36	
				10g	2.45	24.5	25.0	-2.00	
4/16/2014	D1900V2	5d043	Head	1g	4.28	42.8	40.6	5.42	3,4
				10g	2.21	22.1	21.1	4.74	
4/16/2014	D1900V2	5d043	Body	1g	4.13	41.3	40.0	3.25	
				10g	2.15	21.5	21.3	0.94	
4/17/2014	D835V2	4d002	Body	1g	0.928	9.28	9.33	-0.54	
				10g	0.611	6.11	6.12	-0.16	
4/20/2014	D835V2	4d002	Head	1g	0.885	8.85	9.23	-4.12	5,6
				10g	0.580	5.80	5.99	-3.17	
4/23/2015	2450V2	706	Head	1g	5.13	51.3	53.0	-3.21	7,8
				10g	2.34	23.4	24.5	-4.49	
4/23/2015	2450V2	706	Body	1g	4.96	49.6	50.2	-1.20	
				10g	2.29	22.9	23.4	-2.14	

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.

GSM1900 Measured Results

Band	Mode	Coding Scheme	Time Slots	Ch No.	Freq. (MHz)	Max. Pwr	
						Burst (dBm)	Frame (dBm)
1900	GSM (Voice)	CS1	1	512	1850.2	29.5	20.5
				661	1880.0	29.4	20.3
				810	1909.8	29.4	20.4
	GPRS (GMSK)	CS1	1	512	1850.2	29.5	20.5
				661	1880.0	29.4	20.4
				810	1909.8	29.5	20.5
			2	512	1850.2	27.6	21.6
				661	1880.0	27.7	21.7
				810	1909.8	27.6	21.6
			3	512	1850.2	24.8	20.5
				661	1880.0	24.7	20.4
				810	1909.8	24.5	20.2
			4	512	1850.2	23.4	20.4
				661	1880.0	23.3	20.3
				810	1909.8	23.2	20.2
	EGPRS (8PSK)	MCS5	1	512	1850.2	26.2	17.2
				661	1880.0	26.2	17.2
				810	1909.8	26.2	17.2
			2	512	1850.2	25.1	19.1
				661	1880.0	25.1	19.1
				810	1909.8	25.1	19.1
			3	512	1850.2	24.1	19.8
				661	1880.0	24.1	19.8
				810	1909.8	24.1	19.8
			4	512	1850.2	23.1	20.1
				661	1880.0	23.0	20.0
				810	1909.8	23.0	20.0

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
	βc/βd	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	HSDPA	HSDPA	HSDPA	HSDPA
	Subtest	1	2	3	4
W-CDMA General Settings	Loopback Mode	Test Mode 1			
	Rel99 RMC	12.2kbps RMC			
	HSDPA FRC	H-Set 1			
	Power Control Algorithm	Algorithm 2			
	βc	2/15	11/15	15/15	15/15
	βd	15/15	15/15	8/15	4/15
	Bd (SF)	64			
	βc/βd	2/15	12/15	15/8	15/4
	βhs	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			
	Ahs=βhs/βc	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
	βc	11/15	6/15	15/15	2/15	15/15
	βd	15/15	15/15	9/15	15/15	0
	βec	209/225	12/15	30/15	2/15	5/15
	βc/βd	11/15	6/15	15/9	2/15	15/1
	βhs	22/15	12/15	30/15	4/15	5/15
	βed	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				
	Ahs = βhs/βc	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 Channelisation Codes	2xSF2				SF4

HSPA+

Since 16QAM is not used for uplink, the uplink Category and release is same as HSUPA, i.e., Rel. 7 Therefore, the RF conducted power is not measured.

W-CDMA Band V Measured Results

Band	Mode		UL Ch No.	Freq. (MHz)	MPR (dB)	Max. Pwr (dBm)
W-CDMA Band V	Rel 99	RMC, 12.2 kbps	4132	826.4	N/A	21.8
			4183	836.6	N/A	21.9
			4233	846.6	N/A	22.0
	HSDPA	Subtest 1	4132	826.4	0	21.0
			4183	836.6	0	21.0
			4233	846.6	0	21.0
		Subtest 2	4132	826.4	0	21.0
			4183	836.6	0	21.0
			4233	846.6	0	21.0
		Subtest 3	4132	826.4	0.5	20.8
			4183	836.6	0.5	20.9
			4233	846.6	0.5	21.0
		Subtest 4	4132	826.4	0.5	20.8
			4183	836.6	0.5	21.0
			4233	846.6	0.5	21.0
	HSUPA	Subtest 1	4132	826.4	0	21.0
			4183	836.6	0	21.0
			4233	846.6	0	21.0
		Subtest 2	4132	826.4	2	19.6
			4183	836.6	2	20.1
			4233	846.6	2	19.4
		Subtest 3	4132	826.4	1	20.0
			4183	836.6	1	20.0
			4233	846.6	1	20.0
		Subtest 4	4132	826.4	2	20.0
			4183	836.6	2	20.6
			4233	846.6	2	20.5
		Subtest 5	4132	826.4	0	21.0
			4183	836.6	0	21.0
			4233	846.6	0	21.0

W-CDMA Band II Measured Results

Band	Mode		UL Ch No.	Freq. (MHz)	MPR (dB)	Max. Pwr (dBm)
W-CDMA Band II	Rel 99	RMC, 12.2 kbps	9262	1852.4	N/A	21.3
			9400	1880.0	N/A	21.3
			9538	1907.6	N/A	21.2
	HSDPA	Subtest 1	9262	1852.4	0	20.4
			9400	1880.0	0	20.4
			9538	1907.6	0	20.3
		Subtest 2	9262	1852.4	0	20.4
			9400	1880.0	0	20.4
			9538	1907.6	0	20.2
		Subtest 3	9262	1852.4	0.5	20.4
			9400	1880.0	0.5	20.4
			9538	1907.6	0.5	20.2
		Subtest 4	9262	1852.4	0.5	20.4
			9400	1880.0	0.5	20.4
			9538	1907.6	0.5	20.3
	HSUPA	Subtest 1	9262	1852.4	0	21.0
			9400	1880.0	0	21.0
			9538	1907.6	0	21.0
		Subtest 2	9262	1852.4	2	19.0
			9400	1880.0	2	19.0
			9538	1907.6	2	19.0
		Subtest 3	9262	1852.4	1	20.0
			9400	1880.0	1	20.0
			9538	1907.6	1	20.5
		Subtest 4	9262	1852.4	2	19.5
			9400	1880.0	2	19.6
			9538	1907.6	2	20.3
		Subtest 5	9262	1852.4	0	21.0
			9400	1880.0	0	21.0
			9538	1907.6	0	21.0

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 Signalling Value of “NS_01”.

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

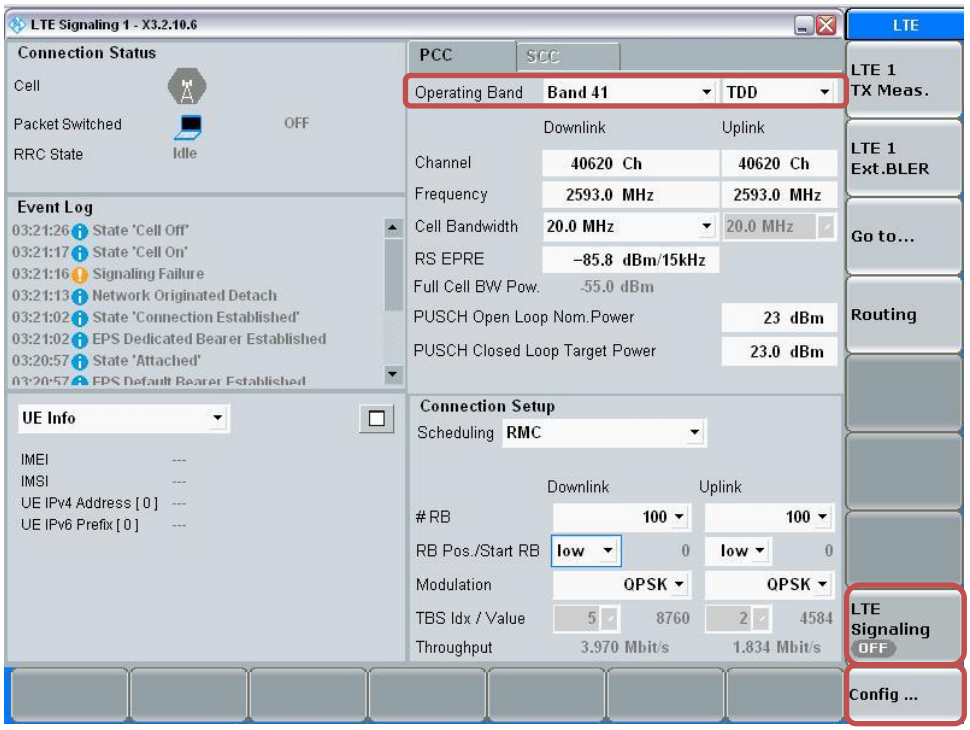
Network Signalling value	Requirements (sub-clause)	E-UTRA Band	Channel bandwidth (MHz)	Resources Blocks (N_{RB})	A-MPR (dB)
NS_01	6.6.2.1.1	Table 5.5-1	1.4, 3, 5, 10, 15, 20	Table 5.6-1	NA
NS_03	6.6.2.2.1	2, 4,10, 23, 25, 35, 36	3	>5	≤ 1
			5	>6	≤ 1
			10	>6	≤ 1
			15	>8	≤ 1
			20	>10	≤ 1
NS_04	6.6.2.2.2	41	5	>6	≤ 1
			10, 15, 20	See Table 6.2.4-4	
NS_05	6.6.3.3.1	1	10,15,20	≥ 50	≤ 1
NS_06	6.6.2.2.3	12, 13, 14, 17	1.4, 3, 5, 10	Table 5.6-1	n/a
NS_07	6.6.2.2.3 6.6.3.3.2	13	10	Table 6.2.4-2	Table 6.2.4-2
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 41 Measured Results

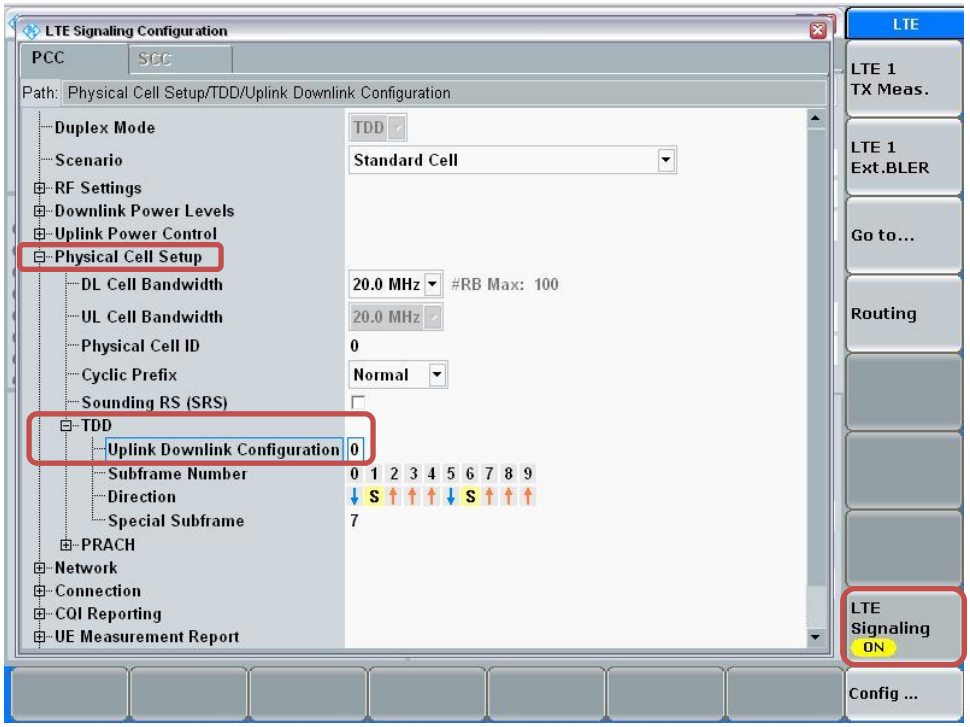
Procedure used to establish SAR test signal for LTE TDD Band 41

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….”

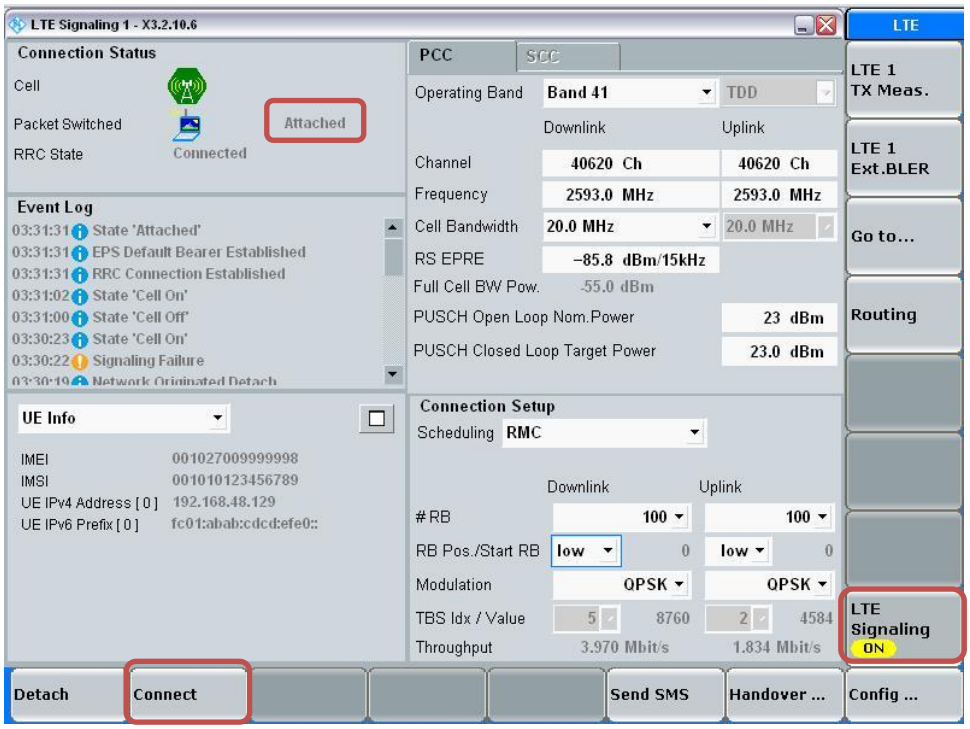


- Go to “Physical Cell Setup”
- Select “TDD” and Set “Uplink Downlink Configuration” to “0”
- Turn the cell on using “ON | OFF” key



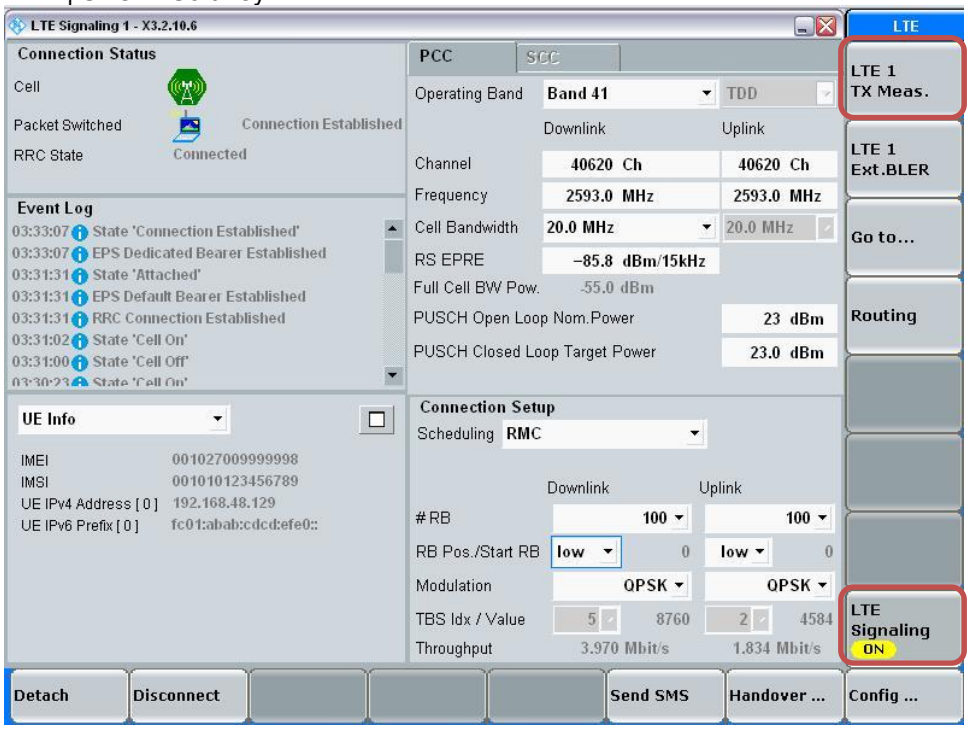
Connect to EUT

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

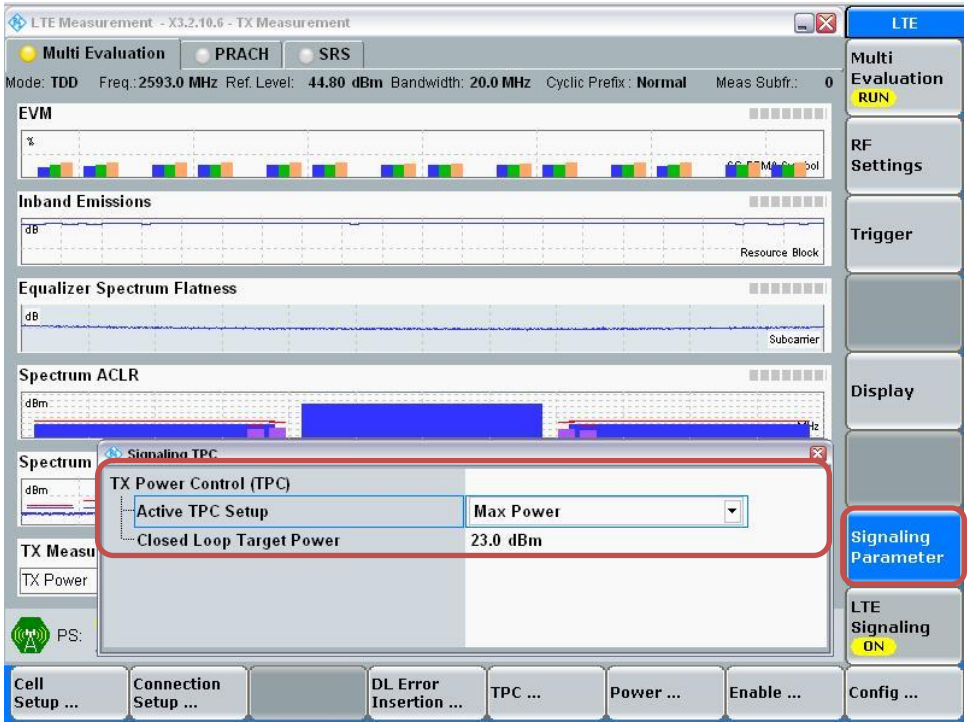


Max Power Setting

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

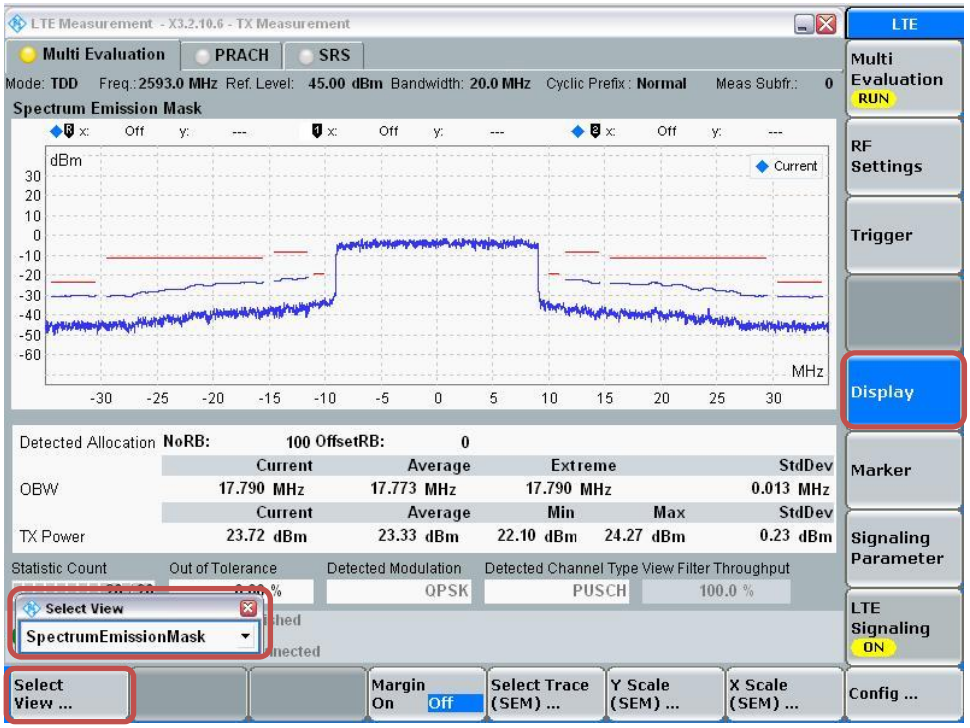


- Select “Signaling Parameter”
- Select “TX Power Control (TPC)” > Select “Active TPC Setup” to “Max Power” > Set “Closed Loop Target Power” to “23 dBm”



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)		
						2565 MHz	2593 MHz	2645 MHz
LTE Band 41	20	QPSK	1	0	0	23.7	23.9	23.0
			1	50	0	23.9	23.7	22.5
			1	99	0	23.9	23.8	21.5
			50	0	1	22.9	22.6	22.8
			50	25	1	22.8	22.6	22.5
			50	50	1	22.8	22.5	21.9
			100	0	1	22.8	22.6	22.4
		16QAM	1	0	1	23.0	23.1	22.3
			1	50	1	23.0	23.0	21.8
			1	99	1	23.2	23.2	20.6
			50	0	2	22.1	21.9	22.2
			50	25	2	22.0	21.8	21.8
			50	50	2	22.0	21.8	21.3
			100	0	2	22.0	21.8	22.0

Band	BW (MHz)	Mode	RB Allocation	RB offset	Target MPR	Max. Avg Pwr (dBm)		
						2562.5 MHz	2593 MHz	2647.5 MHz
LTE Band 41	15	QPSK	1	0	0	24.0	24.0	23.0
			1	36	0	23.9	23.8	22.5
			1	74	0	24.0	23.8	22.0
			36	0	1	23.2	23.1	22.7
			36	18	1	23.0	22.9	22.4
			36	37	1	23.2	22.9	22.1
			75	0	1	23.2	22.9	22.4
		16QAM	1	0	1	23.3	23.5	22.7
			1	36	1	23.2	23.4	22.0
			1	74	1	23.1	23.5	21.7
			36	0	2	22.2	22.2	22.0
			36	18	2	22.2	22.0	21.7
			36	37	2	22.4	22.0	21.5
			75	0	2	22.4	22.1	21.5

Band	BW (MHz)	Mode	RB Allocation	RB offset	Target MPR	Max. Avg Pwr (dBm)		
						2560 MHz	2593 MHz	2650 MHz
LTE Band 41	10	QPSK	1	0	0	23.8	24.0	22.6
			1	25	0	23.7	23.7	22.0
			1	49	0	24.2	24.0	21.8
			25	0	1	23.0	22.9	22.5
			25	12	1	23.0	22.8	22.2
			25	25	1	23.2	22.9	22.0
			50	0	1	23.0	22.9	22.2
		16QAM	1	0	1	23.1	23.0	22.4
			1	25	1	23.1	23.3	22.0
			1	49	1	23.1	23.0	21.7
			25	0	2	22.1	22.2	21.8
			25	12	2	22.1	22.0	21.5
			25	25	2	22.2	22.0	21.4
			50	0	2	22.1	22.2	21.7

LTE Band 41 Measured Results (continued)

Band	BW (MHz)	Mode	RB Allocation	RB offset	Target MPR	Max. Avg Pwr (dBm)		
						2552.5 MHz	2593 MHz	2652.5 MHz
LTE Band 41	5	QPSK	1	0	0	23.7	24.0	22.4
			1	12	0	23.7	23.8	22.0
			1	24	0	23.9	24.0	22.1
			12	0	1	22.9	22.9	22.2
			12	7	1	22.7	22.7	22.0
			12	13	1	22.8	22.8	22.0
			25	0	1	22.9	22.9	22.1
		16QAM	1	0	1	23.0	23.3	21.8
			1	12	1	23.1	23.2	21.5
			1	24	1	23.0	23.2	21.5
			12	0	2	21.9	22.1	21.4
			12	7	2	21.9	22.0	21.3
			12	13	2	22.1	22.1	21.2
			25	0	2	21.9	22.0	21.3

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	16.5	16.5	Yes	
			6	2437	**16.4**			
			11	2462	16.4			
	802.11g	6 Mbps	1	2412	Not Required	14.5	No	1
			6	2437				
			11	2462				
	802.11n (HT20)	6.5 Mbps	1	2412		13.5	No	1
			6	2437				
			11	2462				

Note(s):

1. 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. Bluetooth

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

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 ≤ ¼ 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. 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	30.5	29.4	0.184	0.237	
			Left Tilt	661	1880.0	30.5	29.4	0.077	0.099	
			Right Touch	661	1880.0	30.5	29.4	0.095	0.122	
			Right Tilt	661	1880.0	30.5	29.4	0.080	0.103	
Head VoIP	GPRS 2 Slots	0	Left Touch	661	1880.0	28.5	27.7	0.229	0.275	1
			Left Tilt	661	1880.0	28.5	27.7	0.097	0.117	
			Right Touch	661	1880.0	28.5	27.7	0.124	0.149	
			Right Tilt	661	1880.0	28.5	27.7	0.103	0.124	
Body-worn	Voice	10	Rear	661	1880.0	30.5	29.4	0.227	0.292	
			Front	661	1880.0	30.5	29.4	0.257	0.331	
Body-worn(VoIP) & Hotspot	GPRS 2 Slots	10	Rear	661	1880.0	28.5	27.7	0.287	0.345	
			Front	661	1880.0	28.5	27.7	0.329	0.396	2
Hotspot			Edge 2	661	1880.0	28.5	27.7	0.052	0.062	
			Edge 3	661	1880.0	28.5	27.7	0.222	0.267	
			Edge 4	661	1880.0	28.5	27.7	0.157	0.189	

10.2. 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	21.9	0.039	0.056	3
			Left Tilt	4183	836.6	23.5	21.9	0.017	0.025	
			Right Touch	4183	836.6	23.5	21.9	0.023	0.033	
			Right Tilt	4183	836.6	23.5	21.9	0.014	0.020	
Body-worn & Hotspot	Rel 99 RMC	10	Rear	4183	836.6	23.5	21.9	0.073	0.106	
			Front	4183	836.6	23.5	21.9	0.081	0.117	4
Hotspot	Rel 99 RMC	10	Edge 2	4183	836.6	23.5	21.9	0.008	0.011	
			Edge 3	4183	836.6	23.5	21.9	0.023	0.033	
			Edge 4	4183	836.6	23.5	21.9	0.036	0.052	

10.3. W-CDMA Band II

RF Exposure Conditions	Mode	Dist. (mm)	Test Position	Ch #.	Freq. (MHz)	Power (dBm)		1-g SAR (W/kg)		Plot No.
						Tune-up limit	Meas.	Meas.	Scaled	
Head	Rel 99 RMC	0	Left Touch	9400	1880.0	23.0	21.3	0.294	0.435	5
			Left Tilt	9400	1880.0	23.0	21.3	0.103	0.152	
			Right Touch	9400	1880.0	23.0	21.3	0.155	0.229	
			Right Tilt	9400	1880.0	23.0	21.3	0.119	0.176	
Body-worn & Hotspot	Rel 99 RMC	10	Rear	9400	1880.0	23.0	21.3	0.468	0.692	
			Front	9400	1880.0	23.0	21.3	0.474	0.701	6
Hotspot	Rel 99 RMC	10	Edge 2	9400	1880.0	23.0	21.3	0.065	0.096	
			Edge 3	9400	1880.0	23.0	21.3	0.308	0.456	
			Edge 4	9400	1880.0	23.0	21.3	0.191	0.283	

10.5. LTE Band 41 (20MHz Bandwidth)

RF Exposure Conditions	Mode	Dist. (mm)	Test Position	Ch #.	Freq. (MHz)	RB Allocation	RB offest	Power (dBm)		1-g SAR (W/kg)		Plot No.
								Tune-up limit	Meas.	Meas.	Scaled	
Head	QPSK	0	Left Touch	40620	2593.0	1	0	24.5	23.9	0.154	0.177	7
						50	0	23.5	22.6	0.107	0.132	
			Left Tilt	40620	2593.0	1	0	24.5	23.9	0.052	0.060	
						50	0	23.5	22.6	0.040	0.049	
			Right Touch	40620	2593.0	1	0	24.5	23.9	0.070	0.080	
						50	0	23.5	22.6	0.047	0.058	
			Right Tilt	40620	2593.0	1	0	24.5	23.9	0.125	0.144	
						50	0	23.5	22.6	0.094	0.116	
Body-worn & Hotspot	QPSK	10	Rear	40620	2593.0	1	0	24.5	23.9	0.417	0.479	
						50	0	23.5	22.6	0.328	0.404	
			Front	40620	2593.0	1	0	24.5	23.9	0.633	0.727	8
						50	0	23.5	22.6	0.491	0.604	
Hotspot	QPSK	10	Edge 2	40620	2593.0	1	0	24.5	23.9	0.070	0.080	
						50	0	23.5	22.6	0.056	0.069	
			Edge 3	40620	2593.0	1	0	24.5	23.9	0.565	0.649	
						50	0	23.5	22.6	0.433	0.533	
			Edge 4	40620	2593.0	1	0	24.5	23.9	0.288	0.331	
						50	0	23.5	22.6	0.219	0.269	

10.6. 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)		Plot No.	Notes
								Tune-up limit	Meas.	Meas.	Scaled		
2.4GHz	802.11b 1 Mbps	Head	0	Left Touch	6	2437	0.369	16.5	16.4				
				Left Tilt	6	2437	0.504	16.5	16.4	0.364	0.372	9	1
				Right Touch	6	2437	0.283	16.5	16.4				
				Right Tilt	6	2437	0.298	16.5	16.4				
		Body-worn & Hotspot & Wi-Fi Direct	10	Rear	6	2437	0.118	16.5	16.4	0.078	0.080	10	1
				Front	6	2437	0.068	16.5	16.4				
				Edge 1	6	2437	0.098	16.5	16.4				
				Edge 2	6	2437	0.021	16.5	16.4				

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*.
3. Testing for a second channel was required because the *reported* SAR for this test position was >0.8 W/kg.
4. Additional testing required in order satisfying FCC simultaneous transmission limit criteria.

10.7. 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:

[(max. power of channel, including tune-up tolerance, mW) / (min. test separation distance, mm)]·[√f(GHz)] ≤ 3.0, for 1-g SAR and ≤ 7.5 for 10-g extremity SAR, where

- $f_{(GHz)}$ 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:

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

Body-worn Accessory Exposure Conditions

Max. tune-up tolerance limit		Min. test separation distance (mm)	Frequency (GHz)	SAR test exclusion Result*	Test Configuration	Estimated 1-g SAR (W/kg)
(dBm)	(mW)					
10.0	10	10	2.480	1.6	Rear/Front	0.210

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
850	WCDMA Band V	Body & Hotspot	Front	No	0.081	N/A	N/A
1900	GSM 1900	Body & Hotspot	Front	No	0.329	N/A	N/A
	WCDMA Band II	Body & Hotspot	Front	No	0.474	N/A	N/A
2400	Wi-Fi 802.11b/g/n	Head	Left Tilt	No	0.364	N/A	N/A
2600	LTE Band 41	Body & Hotspot	Front	No	0.633	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

KDB 447498 D01 General RF Exposure Guidance introduces a new formula for calculating the SAR to Peak Location Ratio (SPLSR) between pairs of simultaneously transmitting antennas:

$$SPLSR = (SAR_1 + SAR_2)^{1.5} / Ri$$

Where:

SAR_1 is the highest measured or estimated SAR for the first of a pair of simultaneous transmitting antennas, in a specific test operating mode and exposure condition

SAR_2 is the highest measured or estimated SAR for the second of a pair of simultaneous transmitting antennas, in the same test operating mode and exposure condition as the first

Ri is the separation distance between the pair of simultaneous transmitting antennas. When the SAR is measured, for both antennas in the pair, it is determined by the actual x, y and z coordinates in the 1-g SAR for each SAR peak location, based on the extrapolated and interpolated result in the zoom scan measurement, using the formula of $[(x_1-x_2)^2 + (y_1-y_2)^2 + (z_1-z_2)^2]$

In order for a pair of simultaneous transmitting antennas with the sum of 1-g SAR > 1.6 W/kg to qualify for exemption from Simultaneous Transmission SAR measurements, it has to satisfy the condition of:

$$(SAR_1 + SAR_2)^{1.5} / Ri < 0.04$$

Simultaneous Transmission Condition

RF Exposure Condition	Item	Capable Transmit Configurations		
Head	1	GSM(Voice)	+	DTS
	2	GSM(GPRS/EDGE)	+	DTS
	3	W-CDMA	+	DTS
	4	LTE	+	DTS
Body-worn	5	GSM(Voice)	+	DTS
	6	GSM(Voice)	+	BT
	7	GSM(GPRS/EDGE)	+	DTS
	8	GSM(GPRS/EDGE)	+	BT
	9	W-CDMA	+	DTS
	10	W-CDMA	+	BT
	11	LTE	+	DTS
	12	LTE	+	BT
Hotspot & Wi-Fi Direct	13	GSM(GPRS/EDGE)	+	DTS
	14	W-CDMA	+	DTS
	15	LTE	+	DTS

Notes:

1. DTS supports Hotspot.
2. GPRS/EDGE, W-CDMA, and LTE support Hotspot.
3. VoIP is supported in GPRS/EDGE, W-CDMA, and LTE.
4. DTS Radio cannot transmit simultaneously with Bluetooth Radio.

12.1. Sum of the SAR for GSM1900 & Wi-Fi & BT

RF Exposure conditions	Test Position	① WWAN	② DTS	③ BT	①+② WWAN +DTS		①+③ WWAN +BT	
					∑1-g SAR (mW/g)	SPLSR (Yes/ No)	∑1-g SAR (mW/g)	SPLSR (Yes/ No)
Head	Left Touch	0.275	0.372		0.647	No		
	Left Tilt	0.117	0.372		0.489	No		
	Right Touch	0.149	0.372		0.521	No		
	Right Tilt	0.124	0.372		0.496	No		
Body-worn & Hotspot	Rear	0.345	0.080	0.210	0.425	No	0.555	No
	Front	0.396	0.080	0.210	0.476	No	0.606	No
Hotspot	Edge 1		0.080					
	Edge 2	0.062	0.080		0.142	No		
	Edge 3	0.267	0.080		0.347	No		
	Edge 4	0.189	0.080		0.269	No		

12.2. Sum of the SAR for W-CDMA Band V & Wi-Fi & BT

RF Exposure conditions	Test Position	① WWAN	② DTS	③ BT	①+② WWAN +DTS		①+③ WWAN +BT	
					∑1-g SAR (mW/g)	SPLSR (Yes/ No)	∑1-g SAR (mW/g)	SPLSR (Yes/ No)
Head	Left Touch	0.056	0.372		0.428	No		
	Left Tilt	0.025	0.372		0.397	No		
	Right Touch	0.033	0.372		0.405	No		
	Right Tilt	0.020	0.372		0.392	No		
Body-worn & Hotspot	Rear	0.106	0.080	0.210	0.186	No	0.316	No
	Front	0.117	0.080	0.210	0.197	No	0.327	No
Hotspot	Edge 1		0.080					
	Edge 2	0.011	0.080		0.091	No		
	Edge 3	0.033	0.080		0.113	No		
	Edge 4	0.052	0.080		0.132	No		

12.3. Sum of the SAR for W-CDMA Band II & Wi-Fi & BT

RF Exposure conditions	Test Position	① WWAN	② DTS	③ BT	①+② WWAN +DTS		①+③ WWAN +BT	
					∑1-g SAR (mW/g)	SPLSR (Yes/ No)	∑1-g SAR (mW/g)	SPLSR (Yes/ No)
Head	Left Touch	0.435	0.372		0.807	No		
	Left Tilt	0.152	0.372		0.524	No		
	Right Touch	0.229	0.372		0.601	No		
	Right Tilt	0.176	0.372		0.548	No		
Body-worn & Hotspot	Rear	0.692	0.080	0.210	0.772	No	0.902	No
	Front	0.701	0.080	0.210	0.781	No	0.911	No
Hotspot	Edge 1		0.080					
	Edge 2	0.096	0.080		0.176	No		
	Edge 3	0.456	0.080		0.536	No		
	Edge 4	0.283	0.080		0.363	No		

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

RF Exposure conditions	Test Position	① WWAN	② DTS	③ BT	①+② WWAN +DTS		①+③ WWAN +BT	
					∑1-g SAR (mW/g)	SPLSR (Yes/ No)	∑1-g SAR (mW/g)	SPLSR (Yes/ No)
Head	Left Touch	0.177	0.372		0.549	No		
	Left Tilt	0.060	0.372		0.432	No		
	Right Touch	0.080	0.372		0.452	No		
	Right Tilt	0.144	0.372		0.516	No		
Body-worn & Hotspot	Rear	0.479	0.080	0.210	0.559	No	0.689	No
	Front	0.727	0.080	0.210	0.807	No	0.937	No
Hotspot	Edge 1		0.080					
	Edge 2	0.080	0.080		0.160	No		
	Edge 3	0.649	0.080		0.729	No		
	Edge 4	0.331	0.080		0.411	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.

A_15I20557v0 SAR Photos & Ant. Locations

B_15I20557v0 SAR System Check Plots

C_15I20557v0 SAR Highest Test Plots

D_15I20557v0 SAR Tissue Ingredients

E_15I20557v0 SAR Probe Cal. Certificates

F_15I20557v0 SAR Dipole Cal. Certificates

END OF REPORT