



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

SAR EVALUATION REPORT

For
GSM/WCDMA Phone + Bluetooth, DTS/UNII a/b/g/n & ANT

**Model: SM-G7108V
FCC ID: A3LSMG7108V**

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1. Attestation of Test Results

Applicant	Samsung Electronics Co., Ltd.			
DUT description	GSM/WCDMA Phone + Bluetooth, DTS/UNII a/b/g/n & ANT			
Model	SM-G7108V			
Test device is	An identical prototype			
Device category	Portable			
Exposure category	General Population/Uncontrolled Exposure			
Date tested	01/29/2014 – 02/04/2014			
The highest reported SAR values	RF exposure condition	Licensed	DTS	UNII
	Head	0.613 W/kg	0.116 W/kg	0.033 W/kg
	Body-worn Accessory	1.067 W/kg	0.111 W/kg	0.220 W/kg
	Wireless Router (Hotspot)	1.067 W/kg	0.111 W/kg	N/A
	Simultaneous Transmission	1.287 W/kg	1.178 W/kg	1.287 W/kg
Applicable Standards	FCC 47 CFR Parts 1 & 2 Published RF Exposure KDB Procedures, and TCB workshop updates IEEE Std 1528-2013			
Test Results	Pass			

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

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

Approved & Released By:

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2. Test Methodology

The tests documented in this report were performed in accordance with FCC 47 CFR Parts 1 & 2, IEEE STD 1528-2013, the following FCC Published RF exposure KDB procedures, and TCB workshop updates:

- 447498 D01 General RF Exposure Guidance v05r02
- 648474 D04 Handset SAR v01r02
- 941225 D01 SAR test for 3G devices v02
- 941225 D02 HSPA and 1x Advanced v02r02
- 941225 D03 SAR Test Reduction GSM GPRS EDGE v01
- 941225 D04 SAR for GSM E GPRS Dual Xfer Mode v01
- 941225 D06 Hot Spot SAR v01r01
- 248227 D01 SAR Meas for 802 11abg v01r02
- 865664 D01 SAR Measurement 100 MHz to 6 GHz v01r03
- 865664 D02 SAR Reporting v01r01
- 690783 D01 SAR Listings on Grants v01r03

3. Facilities and Accreditation

The test sites and measurement facilities used to collect data are located at 47173 Benicia Street, Fremont, California, USA.

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

UL Verification Services Inc. is accredited by NVLAP, Laboratory Code 200065-0. The full scope of accreditation can be viewed at <http://www.ccsemc.com>.

4. Calibration and Uncertainty

4.1. Measuring Instrument Calibration

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

Tissue Dielectric Properties

Name of Equipment	Manufacturer	Type/Model	Serial No.	Cal. Due Date
Network Analyzer	Agilent	8753ES	MY40000980	2/20/2014
Dielectronic Probe kit	SPEAG	DAK-3.5	1103	2/5/2014
Thermometer	Control Company	4242	122529163	9/19/2014

System Performance Check

Name of Equipment	Manufacturer	Type/Model	Serial No.	Cal. Due Date
Synthesized Signal Generator	HP	8665B	3744A01155	3/6/2014
Power Meter	Agilent	N1911A	MY53060002	4/4/2014
Power Meter	Agilent	N1911A	MY53060016	8/3/2014
Power Sensor	Agilent	E9323A	MY53070003	4/3/2014
Power Sensor	Agilent	E9323A	MY53070007	9/30/2014
Amplifier	MITEQ	AMF-4D-00400600-50-30P	1622052	N/A
Directional coupler	Werlatone	C8060-102	2149	N/A
DC Power Supply	KENWOOD	PA36-3A	7060074	N/A
Thermometer	TRACEABLE	4242	122529163	9/19/2014
E-Field Probe	SPEAG	EX3DV4	3929	6/24/2014
E-Field Probe	SPEAG	EX3DV4	3902	7/12/2014
E-Field Probe	SPEAG	EX3DV4	3936	7/22/2014
Data Acquisition Electronics	SPEAG	DAE4	1258	3/6/2014
Data Acquisition Electronics	SPEAG	DAE4	1377	7/17/2014
Data Acquisition Electronics	SPEAG	DAE4	1380	7/17/2014
System Validation Dipole	SPEAG	D835V2	4d142	9/17/2014
System Validation Dipole	SPEAG	D1900V2	5d140	4/18/2014
System Validation Dipole	SPEAG	D1900V2	5d163	9/17/2014
System Validation Dipole	SPEAG	D2450V2	899	9/5/2014
System Validation Dipole	SPEAG	D5GHzV2	1168	12/12/2014

Others

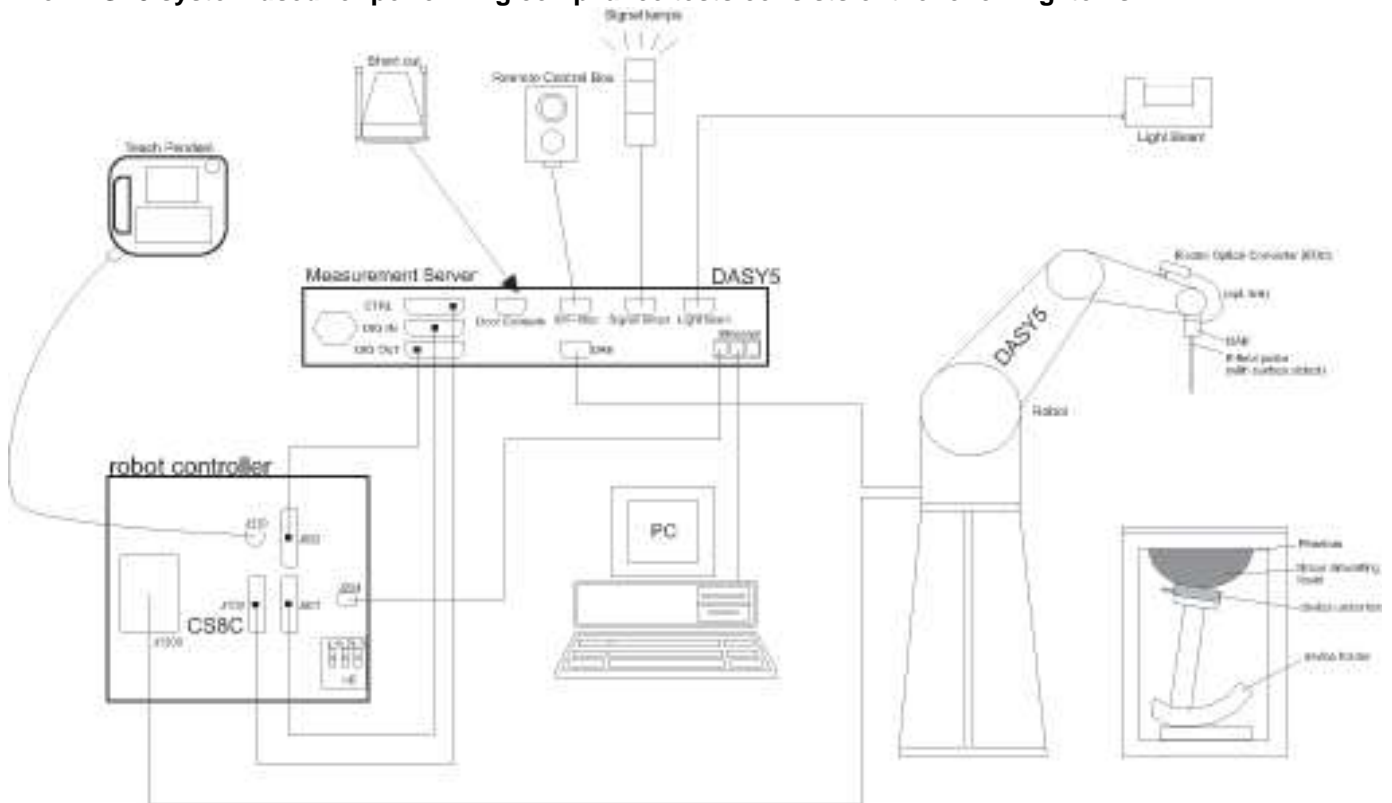
Name of Equipment	Manufacturer	Type/Model	Serial No.	Cal. Due Date
Base Station Simulator	Agilent	8960	MY48360200	3/20/2014
Base Station Simulator	R & S	CMW500	124594-HX	7/2/2014
Base Station Simulator	R & S	CMW500	132909-bp	2/19/2014
Power Meter	Agilent	N1912A	MY53040016	4/4/2014
Power Sensor	Agilent	N1921A	MY52020011	5/13/2014

4.2. Measurement Uncertainty

Per KDB 865664 D01 SAR Measurement 100 MHz to 6 GHz v01r01 Section 2.8.1., when the highest measured 1-g SAR within a frequency band is < 1.5 W/kg, the extensive SAR measurement uncertainty analysis described in IEEE Std 1528-2013 is not required in SAR reports submitted for equipment approval.

5. Measurement System Description and Setup

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



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

6. SAR Measurement Procedure

6.1. Normal SAR Measurement Procedure

Step 1: Power Reference Measurement

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

Step 2: Area Scan

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

Area Scan Parameters extracted from KDB 865664 D01 SAR Measurement 100 MHz to 6 GHz v01r01

	≤ 3 GHz	> 3 GHz
Maximum distance from closest measurement point (geometric center of probe sensors) to phantom surface	5 ± 1 mm	$\frac{1}{2} \cdot \delta \cdot \ln(2) \pm 0.5 \text{ mm}$
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 v01r01

		≤ 3 GHz	> 3 GHz	
Maximum zoom scan spatial resolution: $\Delta x_{Zoom}, \Delta y_{Zoom}$		≤ 2 GHz: ≤ 8 mm 2 – 3 GHz: ≤ 5 mm*	3 – 4 GHz: ≤ 5 mm* 4 – 6 GHz: ≤ 4 mm*	
Maximum zoom scan spatial resolution, normal to phantom surface	uniform grid: $\Delta z_{Zoom}(n)$	≤ 5 mm	3 – 4 GHz: ≤ 4 mm 4 – 5 GHz: ≤ 3 mm 5 – 6 GHz: ≤ 2 mm	
	graded grid	$\Delta z_{Zoom}(1)$: between 1 st two points closest to phantom surface	≤ 4 mm	3 – 4 GHz: ≤ 3 mm 4 – 5 GHz: ≤ 2.5 mm 5 – 6 GHz: ≤ 2 mm
		$\Delta z_{Zoom}(n>1)$: between subsequent points	$\leq 1.5 \cdot \Delta z_{Zoom}(n-1)$	
Minimum zoom scan volume	x, y, z	≥ 30 mm	3 – 4 GHz: ≥ 28 mm 4 – 5 GHz: ≥ 25 mm 5 – 6 GHz: ≥ 22 mm	
Note: δ is the penetration depth of a plane-wave at normal incidence to the tissue medium; see draft standard IEEE P1528-2011 for details. * When zoom scan is required and the <i>reported</i> SAR from the area scan based 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.

6.2. Volume Scan Procedures

Step 1: Repeat Step 1-4 in Section 6.1

Step 2: Volume Scan

Volume Scans are used to assess peak SAR and averaged SAR measurements in largely extended 3-dimensional volumes within any phantom. This measurement does not need any previous area scan. The grid can be anchored to a user specific point or to the current probe location.

Step 3: Power drift measurement

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

7. Device Under Test

7.1. General Information

Operating Configuration(s)	Held to head, Body-worn (Voice call)
Mobile Hotspot	Wi-Fi Hotspot mode permits the device to share its cellular data connection with other Wi-Fi -enabled devices. <input checked="" type="checkbox"/> Mobile Hotspot (Wi-Fi 2.4 GHz) <input type="checkbox"/> Mobile Hotspot (Wi-Fi 5 GHz)
Wi-Fi Direct	Wi-Fi Direct enabled devices transfer data directly between each other <input checked="" type="checkbox"/> Wi-Fi Direct (Wi-Fi 2.4 GHz) <input type="checkbox"/> Wi-Fi Direct (Wi-Fi 5 GHz)
Device dimension	Overall (Length x Width): 147 mm x 75.1 mm Overall Diagonal: 155 mm Display Diagonal: 134 mm
Back Cover	<input checked="" type="checkbox"/> Normal Battery Cover <input type="checkbox"/> Wireless Charger Battery Cover <input type="checkbox"/> Normal Battery Cover with NFC
Accessory	<input checked="" type="checkbox"/> Headset
Battery Options	<input checked="" type="checkbox"/> Standard – Lithium-ion battery, Rating 3.8Vdc, 9.88Wh <input type="checkbox"/> Extended (large capacity)

7.2. Wireless Technologies

Wireless Technology and Frequency Bands	GSM: 850 / 1900 W-CDMA Band: V / II Wi-Fi : 2.4 / 5 GHz Bluetooth: 2.4 GHz.
Mode	GSM - <input checked="" type="checkbox"/> Voice (GMSK) - <input checked="" type="checkbox"/> GPRS (GMSK) - <input checked="" type="checkbox"/> EGPRS (8PSK) W-CDMA - <input checked="" type="checkbox"/> UMTS Rel. 99 (Voice & Data) - <input checked="" type="checkbox"/> HSDPA (Rel. 5, CAT 24) - <input checked="" type="checkbox"/> HSUPA (Rel. 6, CAT 6) Wi-Fi 2.4GHz (802.11b/g/n) - <input checked="" type="checkbox"/> 802.11b - <input checked="" type="checkbox"/> 802.11g - <input checked="" type="checkbox"/> 802.11n (20MHz) Wi-Fi 5GHz - <input checked="" type="checkbox"/> 802.11a - <input checked="" type="checkbox"/> 802.11n (20MHz) - <input checked="" type="checkbox"/> 802.11n (40MHz) Bluetooth Ver. 4.0 (LE)
Duty Cycle	GSM Voice: 12.5%; GPRS 1 Slot: 12.5%; 2 Slots: 25%, 3 Slots: 37.5%, 4 Slots: 50%, W-CDMA: 100% Wi-Fi 802.11a/b/g/n: 100%
GPRS Multi-Slot Class	<input type="checkbox"/> Class 8 - One Up <input type="checkbox"/> Class 10 - Two Up <input checked="" type="checkbox"/> Class 12 - Four Up
DTM (Dual Transfer Mode)	<input type="checkbox"/> Supported
VoIP (GPRS)	<input checked="" type="checkbox"/> Supported
SV-LTE & SV-DO	<input type="checkbox"/> Supported

7.3. RF Output Power Tolerance

Upper limit (dB): 0.5 ~ 1.5		RF Output Power (dBm)							
RF Air interface		Target				Max. tune-up tolerance limit			
Mode	1 Slot	2 Slot	3 Slot	4 Slot	1 Slot	2 Slot	3 Slot	4 Slot	
GSM850	Voice	32.5				33.0			
	GPRS	32.5	31.0	29.0	27.0	33.0	31.5	29.5	27.5
	EGPRS	26.5	26.5	25.5	23.5	27.0	27.0	26.0	24.0
GSM1900	Voice	30.0				30.5			
	GPRS	30.0	29.5	27.5	25.5	30.5	30.0	28.0	26.0
	EGPRS	25.2	25.2	24.5	22.5	25.7	25.7	25.0	23.0

Upper limit (dB): 0.5 ~ -1.5		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
W-CDMA Band II	R99	22.5		23.0
	HSDPA	21.0		21.5
	HSUPA	21.0		21.5

Upper limit (dB): 0.5 ~ -1.5		RF Output Power (dBm)	
RF Air interface	Mode	Target	Max. tune-up tolerance limit
WiFi 2.4 GHz	802.11b	16.0	16.5
	802.11g	13.0	13.5
	802.11n HT20	12.0	12.5

Upper limit (dB): 0.5 ~ -1.5		RF Output Power (dBm)	
RF Air interface	Mode	Target	Max. tune-up tolerance limit
WiFi 5 GHz	802.11a	12.0	12.5
	802.11n HT20	10.0	10.5
	802.11n HT40	10.0	10.5

Upper limit (dB): 0.5 ~ -1.5		RF Output Power (dBm)	
RF Air interface	Mode	Target	Max. tune-up tolerance limit
Bluetooth	GFSK	9.5	10.0
	4.0 LE	6.5	7.0

7.4. Simultaneous Transmission Condition

RF Exposure Condition	Capable Transmit Configurations
Head	<ol style="list-style-type: none"> 1. GSM 850/1900 Voice + Wi-Fi 2.4/5GHz 2. GSM 850/1900 (GPRS/EDGE) + Wi-Fi 2.4/5GHz (VoIP) 3. WCDMA Band II/V + Wi-Fi 2.4/5GHz
Body-worn Accessory	<ol style="list-style-type: none"> 1. GSM 850/1900 Voice + Wi-Fi 2.4/5GHz 2. GSM 850/1900 Voice + BT 3. GSM 850/1900 (GPRS/EDGE) + Wi-Fi 2.4/5GHz (VoIP) 4. GSM 850/1900 (GPRS/EDGE) + BT(VoIP) 5. WCDMA Band II/V + Wi-Fi 2.4/5GHz 6. WCDMA Band II/V + BT
Wireless Router (Hotspot)	<ol style="list-style-type: none"> 1. GSM 850/1900 (GPRS/EDGE) + Wi-Fi 2.4GHz 2. WCDMA Band II/V + Wi-Fi 2.4GHz
<p>Notes:</p> <ol style="list-style-type: none"> 1. Wi-Fi 2.4GHz supports Hotspot and Wi-Fi direct. 2. GPRS/EDGE and WCDMA supports Hotspot. 3. VoIP is supported in WCDMA, GSM. 4. 2.4 GHz WLAN, 2.4 GHz Bluetooth, and 5 GHz WLAN share the same antenna path and cannot transmit simultaneously. 	

8. RF Exposure Conditions

Refer to Appendix “Antenna Locations and Separation Distances” for the specific details of the antenna-to-antenna and antenna-to-edge(s) distances.

8.1. Head Exposure Conditions

For WWAN and Wi-Fi

Test Configurations	SAR Required	Note
Left Touch	Yes	
Left Tilt (15°)	Yes	
Right Touch	Yes	
Right Tilt (15°)	Yes	

8.2. Body-worn Accessory Exposure Conditions

For WWAN

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

For Wi-Fi

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

8.3. Hotspot Exposure Conditions

For WWAN

Test Configurations	Antenna-to-edge/surface	SAR Required	Note
Rear	<25 mm	Yes	
Front	<25 mm	Yes	
Edge 1 (Top)	131 mm	No	SAR is not required because the distance from the antenna to the edge is > 25 mm as per KDB 941225 D06 Hot Spot SAR v01r01
Edge 2 (Right)	2.5 mm	Yes	
Edge 3 (Bottom)	2 mm	Yes	
Edge 4 (Left)	4.1 mm	Yes	

For Wi-Fi

Test Configurations	Antenna-to-edge/surface	SAR Required	Note
Rear	<25 mm	Yes	
Front	<25 mm	Yes	
Edge 1 (Top)	30 mm	No	SAR is not required because the distance from the antenna to the edge is > 25 mm as per KDB 941225 D06 Hot Spot SAR v01r01
Edge 2 (Right)	67 mm	No	SAR is not required because the distance from the antenna to the edge is > 25 mm as per KDB 941225 D06 Hot Spot SAR v01r01
Edge 3 (Bottom)	98 mm	No	SAR is not required because the distance from the antenna to the edge is > 25 mm as per KDB 941225 D06 Hot Spot SAR v01r01
Edge 4 (Left)	3.5 mm	Yes	

9. RF Output Power Measurement

9.1. GSM

GSM (GMSK) - Voice Mode

Band	Ch No.	Freq. (MHz)	Avg burst Pwr (dBm)
850	128	824.2	32.7
	190	836.6	32.7
	251	848.8	33.0

GPRS (GMSK) - Coding Scheme: CS1

Band	Ch No.	Freq. (MHz)	Burst Power (dBm)				Frame Power (dBm)			
			1 slot	2 slots	3slots	4 slots	1 slot	2 slots	3slots	4 slots
850	128	824.2	32.8	31.1	29.2	27.1	23.7	25.1	25.0	24.1
	190	836.6	32.7	31.1	29.2	27.1	23.6	25.1	25.0	24.1
	251	848.8	33.0	31.2	29.4	27.2	24.0	25.2	25.2	24.2

EGPRS (8PSK) - Coding Scheme: MCS5

Band	Ch No.	Freq. (MHz)	Burst Power (dBm)				Frame Power (dBm)			
			1 slot	2 slots	3slots	4 slots	1 slot	2 slots	3slots	4 slots
850	128	824.2	27.0	27.0	26.0	23.9	18.0	21.0	21.7	20.9
	190	836.6	26.9	26.9	25.8	23.8	17.9	20.9	21.5	20.8
	251	848.8	27.0	27.0	26.0	24.0	18.0	21.0	21.7	21.0

Notes:

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

- Head & Body-worn Accessory: GMSK Voice Mode
- Hotspot mode: GMSK (GPRS) mode with 3 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

GSM (GMSK) - Voice Mode

Band	Ch No.	Freq. (MHz)	Avg burst Pwr (dBm)
1900	512	1850.2	30.0
	661	1880.0	30.0
	810	1909.8	30.2

GPRS (GMSK) - Coding Scheme: CS1

Band	Ch No.	Freq. (MHz)	Burst Power (dBm)				Frame Power (dBm)			
			1 slot	2 slots	3slots	4 slots	1 slot	2 slots	3slots	4 slots
1900	512	1850.2	30.0	29.6	27.4	25.3	21.0	23.6	23.2	22.3
	661	1880.0	30.1	29.8	27.5	25.5	21.1	23.8	23.3	22.5
	810	1909.8	30.2	30.0	27.8	25.6	21.2	24.0	23.5	22.6

EGPRS (8PSK) - Coding Scheme: MCS5

Band	Ch No.	Freq. (MHz)	Burst Power (dBm)				Frame Power (dBm)			
			1 slot	2 slots	3slots	4 slots	1 slot	2 slots	3slots	4 slots
1900	512	1850.2	25.7	25.6	24.9	22.9	16.7	19.6	20.6	19.9
	661	1880.0	25.6	25.4	24.8	22.7	16.6	19.4	20.5	19.7
	810	1909.8	25.7	25.5	24.9	22.7	16.7	19.5	20.6	19.7

Notes:

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

- Head & Body-worn Accessory: 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

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 1
	Rel99 RMC	12.2kbps RMC
	Power Control Algorithm	Algorithm2
	β_c/β_d	8/15

Measured Results

Band	Mode	UL Ch No.	Freq. (MHz)	Avg Pwr (dBm)
W-CDMA Band V	Rel 99 (RMC, 12.2 kbps)	4132	826.4	23.5
		4183	836.6	23.5
		4233	846.6	23.5
W-CDMA Band II	Rel 99 (RMC, 12.2 kbps)	9262	1852.4	22.8
		9400	1880.0	22.8
		9538	1907.6	22.8

HSDPA

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-Set1			
	Power Control Algorithm	Algorithm 2			
	β_c	2/15	12/15	15/15	15/15
	β_d	15/15	15/15	8/15	4/15
	Bd (SF)	64			
	β_c/β_d	2/15	12/15	15/8	15/4
	β_{hs}	4/15	24/15	30/15	30/15
MPR (dB)	0	0	0.5	0.5	
HSDPA Specific Settings	D_{ACK}	8			
	D_{NAK}	8			
	DCQI	8			
	Ack-Nack repetition factor	3			
	CQI Feedback (Table 5.2B.4)	4ms			
	CQI Repetition Factor (Table 5.2B.4)	2			
	$A_{hs}=\beta_{hs}/\beta_c$	30/15			

Measured Results

Band	Mode	UL Ch No.	Freq. (MHz)	Avg Pwr (dBm)
W-CDMA Band V	Subtest 1	4132	826.4	22.5
		4183	836.6	22.5
		4233	846.6	22.5
	Subtest 2	4132	826.4	22.4
		4183	836.6	22.5
		4233	846.6	22.5
	Subtest 3	4132	826.4	22.0
		4183	836.6	22.0
		4233	846.6	22.0
	Subtest 4	4132	826.4	21.9
		4183	836.6	22.0
		4233	846.6	21.9
W-CDMA Band II	Subtest 1	9262	1852.4	21.5
		9400	1880.0	21.5
		9538	1907.6	21.4
	Subtest 2	9262	1852.4	21.2
		9400	1880.0	21.1
		9538	1907.6	21.0
	Subtest 3	9262	1852.4	19.8
		9400	1880.0	19.7
		9538	1907.6	19.6
	Subtest 4	9262	1852.4	19.6
		9400	1880.0	20.8
		9538	1907.6	20.6

Maximum output power levels that are possible for all subtests reported.

HSPA (HSDPA & HSUPA)

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	HSPA	HSPA	HSPA	HSPA
	Subtest	1	2	3	4	5
WCDMA General Settings	Loopback Mode	Test Mode 1				
	Rel99 RMC	12.2kbps RMC				
	HSDPA FRC	H-Set1				
	HSUPA Test	HSUPA Loopback				
	Power Control Algorithm	Algorithm2				
	β_c	11/15	6/15	15/15	2/15	15/15
	β_d	15/15	15/15	9/15	15/15	15/15
	β_{ec}	209/225	12/15	30/15	2/15	24/15
	β_c/β_d	11/15	6/15	15/9	2/15	15/15
	β_{hs}	22/15	12/15	30/15	4/15	30/15
	β_{ed}	1309/225	94/75	47/15	56/75	134/15
CM (dB)	1.0	3.0	2.0	3.0	1.0	
MPR (dB)	0	2	1	2	0	
HSDPA Specific Settings	DACK	8				
	DNAK	8				
	DCQI	8				
	Ack-Nack repetition factor	3				
	CQI Feedback (Table 5.2B.4)	4ms				
	CQI Repetition Factor (Table 5.2B.4)	2				
Ahs = β_{hs}/β_c	30/15					
HSUPA Specific Settings	D E-DPCCH	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	E-TFCI 11 E-TFCI PO 4 E-TFCI 67 E-TFCI PO 18 E-TFCI 71 E-TFCI PO 23 E-TFCI 75 E-TFCI PO 26 E-TFCI 81 E-TFCI PO 27		E-TFCI 11 E-TFCI PO 4 E-TFCI 92 E-TFCI PO 18		E-TFCI 11 E-TFCI PO 4 E-TFCI 67 E-TFCI PO 18 E-TFCI 71 E-TFCI PO 23 E-TFCI 75 E-TFCI PO 26 E-TFCI 81 E-TFCI PO 27

Measured Results

Band	Mode	UL Ch No.	Freq. (MHz)	Avg Pwr (dBm)
W-CDMA Band V	Subtest 1	4132	826.4	22.4
		4183	836.6	22.5
		4233	846.6	22.5
	Subtest 2	4132	826.4	21.5
		4183	836.6	21.5
		4233	846.6	21.4
	Subtest 3	4132	826.4	21.1
		4183	836.6	20.8
		4233	846.6	20.6
	Subtest 4	4132	826.4	22.0
		4183	836.6	22.0
		4233	846.6	21.9
	Subtest 5	4132	826.4	22.4
		4183	836.6	22.5
		4233	846.6	22.5
W-CDMA Band II	Subtest 1	9262	1852.4	21.4
		9400	1880.0	21.5
		9538	1907.6	21.2
	Subtest 2	9262	1852.4	20.1
		9400	1880.0	20.6
		9538	1907.6	20.6
	Subtest 3	9262	1852.4	20.5
		9400	1880.0	19.8
		9538	1907.6	19.7
	Subtest 4	9262	1852.4	21.0
		9400	1880.0	21.1
		9538	1907.6	20.9
	Subtest 5	9262	1852.4	21.5
		9400	1880.0	21.4
		9538	1907.6	21.3

9.3. Wi-Fi (2.4 GHz Band)

Required Test Channels per KDB 248227 D01

Mode	Band	GHz	Channel	"Default Test Channels"	
				802.11b	802.11g
802.11b/g	2.4 GHz	2.412	1 [#]	√	∇
		2.437	6	√	∇
		2.462	11 [#]	√	∇

Notes:

√ = "default test channels"

∇ = possible 802.11g channels with maximum average output ¼ dB ≥ the "default test channels"

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

Measured Results

Band (GHz)	Mode	Data Rate	Ch #	Freq. (MHz)	Avg Pwr (dBm)	SAR Test (Yes/No)
2.4 (DTS)	802.11b	1 Mbps	1	2412	16.0	Yes
			6	2437	16.0	
			11	2462	16.0	
	802.11g	6 Mbps	1	2412	13.3	No
			6	2437	13.1	
			11	2462	13.1	
	802.11n (HT20)	MCS0	1	2412	12.4	No
			6	2437	12.2	
			11	2462	12.3	

Note(s):

Per KDB 248227 D01, SAR is not required for 802.11g/HT20 channels when the maximum average output power is less than 1/4 dB higher than that measured on the corresponding 802.11b channels.

Power measurements to determine worst-case data rates

Mode	Ch #	Freq. (MHz)	Data Rate	Avg Pwr (dBm)	SAR test (Yes/No)
802.11b	6	2437	1 Mbps	16.0	Yes
			2 Mbps	16.0	No
			5.5 Mbps	15.9	No
			11 Mbps	15.9	No

9.4. Wi-Fi (5 GHz Bands)

Required Test Channels per KDB 248227 D01

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

√ = "default test channels"

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

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

Measured Results

Band (GHz)	Mode	Data Rate	Ch #	Freq. (MHz)	Avg Pwr (dBm)	SAR Test (Yes/No)
5.2 (UNII)	802.11a	6 Mbps	36	5180	12.3	Yes
			40	5200	12.3	
			44	5220	11.8	
			48	5240	12.2	
	802.11n (HT20)	MCS0	36	5180	10.5	No
			40	5200	10.4	
			48	5240	10.2	
	802.11n (HT40)	MCS0	38	5190	10.4	No
46			5230	10.2		
5.3 (UNII)	802.11a	6 Mbps	52	5260	12.3	Yes
			56	5280	12.5	
			60	5300	12.5	
			64	5320	12.3	
	802.11n (HT20)	MCS0	52	5260	10.3	No
			60	5300	9.7	
			64	5320	10.5	
	802.11n (HT40)	MCS0	54	5270	10.5	No
62			5310	10.5		
5.5 (UNII)	802.11a	6 Mbps	100	5500	12.0	Yes
			104	5520	12.0	
			108	5540	11.6	
			112	5560	12.2	
			116	5580	12.1	
			120	5600	11.6	
			124	5620	12.2	
			128	5640	12.2	
			132	5660	12.2	
			136	5680	12.1	
	140	5700	12.5			
	802.11n (HT20)	MCS0	100	5500	10.1	No
			116	5580	10.0	
			140	5700	10.5	
	802.11n (HT40)	MCS0	102	5510	10.2	No
110			5550	10.5		
134	5670	10.0				
5.8 (DTS)	802.11a	6 Mbps	149	5745	12.5	Yes
			153	5765	12.0	
			157	5785	12.5	
			161	5805	12.2	
			165	5825	12.4	
	802.11n (HT20)	MCS0	149	5745	10.1	No
			157	5785	10.0	
			161	5805	10.5	
	802.11n (HT40)	MCS0	151	5755	10.0	No
			159	5795	10.4	

Note(s):

Per KDB 248227, SAR is not required for 802.11n HT20/HT40 channels when the maximum average output power is less than 1/4 dB higher than that measured on the corresponding 802.11a channels.

Power measurements to determine worst-case data rates

Band	Mode	Ch #	Freq. (MHz)	Data Rate	Avg Pwr (dBm)	SAR test (Yes/No)
5.2 GHz (UNII)	802.11a	36	5180	6 Mbps	12.3	Yes
				9 Mbps	12.2	No
				12 Mbps	12.2	No
				18 Mbps	12.2	No
				24 Mbps	12.1	No
				36 Mbps	12.2	No
				48 Mbps	12.2	No
				54 Mbps	12.2	No
5.3 GHz (UNII)	802.11a	56	5280	6 Mbps	12.5	Yes
				9 Mbps	12.5	No
				12 Mbps	12.4	No
				18 Mbps	12.4	No
				24 Mbps	12.4	No
				36 Mbps	12.4	No
				48 Mbps	12.4	No
				54 Mbps	12.4	No
5.5 GHz (UNII)	802.11a	116	5580	6 Mbps	12.5	Yes
				9 Mbps	12.3	No
				12 Mbps	12.4	No
				18 Mbps	12.4	No
				24 Mbps	12.3	No
				36 Mbps	12.4	No
				48 Mbps	12.4	No
				54 Mbps	12.4	No
5.8 GHz (DTS)	802.11a	149	5745	6 Mbps	12.5	Yes
				9 Mbps	12.5	No
				12 Mbps	12.5	No
				18 Mbps	12.5	No
				24 Mbps	12.5	No
				36 Mbps	12.5	No
				48 Mbps	12.5	No
				54 Mbps	12.5	No

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.

Refer to Standalone SAR Test Exclusion Considerations Section.

10. Tissue Dielectric Properties

IEEE Std 1528-2013

Target Frequency (MHz)	Head	
	ϵ_r	σ (S/m)
300	45.3	0.87
450	43.5	0.87
750	41.9	0.89
835	41.5	0.90
900	41.5	0.97
1450	40.5	1.20
1500	40.4	1.23
1640	40.2	1.31
1750	40.1	1.37
1800	40.0	1.40
1900	40.0	1.40
2000	40.0	1.40
2100	39.8	1.49
2300	39.5	1.67
2450	39.2	1.80
2600	39.0	1.96
3000	38.5	2.40
3500	37.9	2.91
4000	37.4	3.43
4500	36.8	3.94
5000	36.2	4.45
5200	36.0	4.66
5400	35.8	4.86
5600	35.5	5.07
5800	35.3	5.27
6000	35.1	5.48

NOTE—For convenience, permittivity and conductivity values at some frequencies that are not part of the original data from Drossos et al. [B60] or the extension to 5800 MHz are provided (i.e., the values shown in italics). These values were linearly interpolated between the values in this table that are immediately above and below these values, except the values at 6000 MHz that were linearly extrapolated from the values at 3000 MHz and 5800 MHz.

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

10.2. Tissue Dielectric Parameter Check Results

The temperature of the tissue-equivalent medium used during measurement must also be within 18°C to 25°C and within ± 2°C of the temperature when the tissue parameters are characterized.

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

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

SAR Room 1

Date	Freq. (MHz)	Liquid Parameters		Measured	Target	Delta (%)	Limit ±(%)	
1/30/2014	Head 1900	e'	39.6200	Relative Permittivity (ϵ_r):	39.62	40.00	-0.95	5
		e"	13.7700	Conductivity (σ):	1.45	1.40	3.91	5
	Head 1850	e'	39.8200	Relative Permittivity (ϵ_r):	39.82	40.00	-0.45	5
		e"	13.6400	Conductivity (σ):	1.40	1.40	0.22	5
	Head 1910	e'	39.5800	Relative Permittivity (ϵ_r):	39.58	40.00	-1.05	5
		e"	13.8100	Conductivity (σ):	1.47	1.40	4.76	5
1/30/2014	Body 1900	e'	54.1200	Relative Permittivity (ϵ_r):	54.12	53.30	1.54	5
		e"	14.5600	Conductivity (σ):	1.54	1.52	1.20	5
	Body 1850	e'	54.2700	Relative Permittivity (ϵ_r):	54.27	53.30	1.82	5
		e"	14.4100	Conductivity (σ):	1.48	1.52	-2.48	5
	Body 1910	e'	54.1000	Relative Permittivity (ϵ_r):	54.10	53.30	1.50	5
		e"	14.6000	Conductivity (σ):	1.55	1.52	2.01	5

SAR Room 3

Date	Freq. (MHz)	Liquid Parameters		Measured	Target	Delta (%)	Limit ±(%)	
1/28/2014	Body 2450	e'	52.4200	Relative Permittivity (ϵ_r):	52.42	52.70	-0.53	5
		e"	14.6900	Conductivity (σ):	2.00	1.95	2.62	5
	Body 2410	e'	52.3500	Relative Permittivity (ϵ_r):	52.35	52.76	-0.78	5
		e"	14.5300	Conductivity (σ):	1.95	1.91	2.08	5
	Body 2475	e'	52.3200	Relative Permittivity (ϵ_r):	52.32	52.67	-0.66	5
		e"	14.7600	Conductivity (σ):	2.03	1.99	2.32	5
1/29/2014	Head 2450	e'	40.3900	Relative Permittivity (ϵ_r):	40.39	39.20	3.04	5
		e"	13.6600	Conductivity (σ):	1.86	1.80	3.38	5
	Head 2410	e'	40.5500	Relative Permittivity (ϵ_r):	40.55	39.28	3.24	5
		e"	13.5200	Conductivity (σ):	1.81	1.76	2.91	5
	Head 2475	e'	40.2600	Relative Permittivity (ϵ_r):	40.26	39.17	2.79	5
		e"	13.7400	Conductivity (σ):	1.89	1.83	3.49	5
1/30/2014	Head 5180	e'	37.5400	Relative Permittivity (ϵ_r):	37.54	36.01	4.24	5
		e"	15.3800	Conductivity (σ):	4.43	4.63	-4.33	5
	Head 5200	e'	37.5100	Relative Permittivity (ϵ_r):	37.51	35.99	4.22	5
		e"	15.4100	Conductivity (σ):	4.46	4.65	-4.20	5
	Head 5600	e'	36.9900	Relative Permittivity (ϵ_r):	36.99	35.53	4.10	5
		e"	15.6300	Conductivity (σ):	4.87	5.06	-3.82	5
	Head 5800	e'	36.7500	Relative Permittivity (ϵ_r):	36.75	35.30	4.11	5
		e"	15.6400	Conductivity (σ):	5.04	5.27	-4.29	5
	Head 5825	e'	36.7200	Relative Permittivity (ϵ_r):	36.72	35.30	4.02	5
		e"	15.7100	Conductivity (σ):	5.09	5.27	-3.45	5

Tissue Dielectric Parameter Check Results (SAR Room 3 continued)

Date	Freq. (MHz)	Liquid Parameters		Measured	Target	Delta (%)	Limit ±(%)	
2/1/2014	Body 5180	e'	48.3300	Relative Permittivity (ϵ_r):	48.33	49.05	-1.46	5
		e"	18.3100	Conductivity (σ):	5.27	5.27	0.04	5
	Body 5200	e'	48.2600	Relative Permittivity (ϵ_r):	48.26	49.02	-1.55	5
		e"	18.3200	Conductivity (σ):	5.30	5.29	0.04	5
	Body 5600	e'	47.6100	Relative Permittivity (ϵ_r):	47.61	48.48	-1.79	5
		e"	18.7300	Conductivity (σ):	5.83	5.76	1.23	5
	Body 5800	e'	47.1300	Relative Permittivity (ϵ_r):	47.13	48.20	-2.22	5
		e"	18.9000	Conductivity (σ):	6.10	6.00	1.59	5
	Body 5825	e'	47.1700	Relative Permittivity (ϵ_r):	47.17	48.20	-2.14	5
		e"	18.9900	Conductivity (σ):	6.15	6.00	2.51	5

SAR Room 4

Date	Freq. (MHz)	Liquid Parameters		Measured	Target	Delta (%)	Limit ±(%)	
1/31/2014	Head 835	e'	42.7900	Relative Permittivity (ϵ_r):	42.79	41.50	3.11	5
		e"	19.9700	Conductivity (σ):	0.93	0.90	3.02	5
	Head 820	e'	42.9300	Relative Permittivity (ϵ_r):	42.93	41.60	3.19	5
		e"	20.0000	Conductivity (σ):	0.91	0.90	1.49	5
	Head 850	e'	42.6500	Relative Permittivity (ϵ_r):	42.65	41.50	2.77	5
		e"	19.9400	Conductivity (σ):	0.94	0.92	3.00	5
1/31/2014	Body 835	e'	53.4500	Relative Permittivity (ϵ_r):	53.45	55.20	-3.17	5
		e"	21.8500	Conductivity (σ):	1.01	0.97	4.58	5
	Body 820	e'	53.5300	Relative Permittivity (ϵ_r):	53.53	55.28	-3.16	5
		e"	21.9100	Conductivity (σ):	1.00	0.97	3.15	5
	Body 850	e'	53.2900	Relative Permittivity (ϵ_r):	53.29	55.16	-3.39	5
		e"	21.8300	Conductivity (σ):	1.03	0.99	4.52	5

11. System Performance Check

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

11.1. System Performance Check Measurement Conditions

- The measurements were performed in the flat section of the TWIN SAM or ELI phantom, shell thickness: 2.0 ±0.2 mm (bottom plate) filled with Body or Head simulating liquid of the following parameters.
- The depth of tissue-equivalent liquid in a phantom must be ≥ 15.0 cm ± 0.5 cm for SAR measurements ≤ 3 GHz and ≥ 10.0 cm ± 0.5 cm for measurements > 3 GHz.
- The DASY system with an E-Field Probe was used for the measurements.
- The dipole was mounted on the small tripod so that the dipole feed point was positioned below the center marking of the flat phantom section and the dipole was oriented parallel to the body axis (the long side of the phantom). The standard measuring distance was 10 mm (above 1 GHz) and 15 mm (below 1 GHz) from dipole center to the simulating liquid surface.
- The coarse grid with a grid spacing of 15 mm was aligned with the dipole.
 For 5 GHz band - The coarse grid with a grid spacing of 10 mm was aligned with the dipole.
- Special 7x7x7 (below 3 GHz) and/or 8x8x7 (above 3 GHz) fine cube was chosen for the cube.
- Distance between probe sensors and phantom surface was set to 3 mm.
 For 5 GHz band - Distance between probe sensors and phantom surface was set to 2.5 mm
- The dipole input power (forward power) was 100 mW.
- The results are normalized to 1 W input power.

11.2. Reference SAR Values for System Performance Check

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

System Dipole	Serial No.	Cal. Date	Freq. (MHz)	Target SAR Values (mW/g)		
				1g/10g	Head	Body
D835V2	4d142	9/217/2013	835	1g	9.44	9.36
				10g	6.12	6.20
D1900V2	5d163	9/17/2013	1900	1g	40.9	40.1
				10g	21.2	21.2
D1900V2	5d140	4/18/2013	1900	1g	42.1	41.5
				10g	21.5	22.0
D2450V2	899	9/10/2013	2450	1g	51.3	49.70
				10g	23.9	23.3
D5GHZV2	1168	12/12/2013	5200	1g	79.3	75.2
				10g	22.7	21.0
			5600	1g	85.3	80.6
				10g	24.3	22.3
			5800	1g	81.0	75.7
				10g	22.9	20.9

11.3. System Performance Check Results

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

SAR Room 1

Date Tested	System Dipole		T.S. Liquid	Measured Results			Target (Ref. Value)	Delta ±10 %	Est./Zoom Ratio	Plot No.	
	Type	Serial #		Area Scan	Zoom Scan	Normalize to 1 W					
1/30/2014	D1900V2	5d140	Head	1g	4.30	4.17	41.7	41.20	1.21	3.02	
				10g	2.20	2.16	21.6	21.50	0.47		
1/30/2014	D1900V2	5d140	Body	1g	4.13	4.13	41.3	41.50	-0.48	0.00	
				10g	2.11	2.15	21.5	22.00	-2.27		
2/3/2014	D1900V2	5d163	Body	1g	3.86	3.83	38.3	40.10	-4.49	0.78	1,2
				10g	1.98	2.00	20.0	21.20	-5.66		

SAR Room 4

Date Tested	System Dipole		T.S. Liquid	Measured Results			Target (Ref. Value)	Delta ±10 %	Est./Zoom Ratio	Plot No.	
	Type	Serial #		Area Scan	Zoom Scan	Normalize to 1 W					
1/31/2014	D835V2	4d142	Head	1g	1.02	0.97	9.7	9.44	3.07	4.61	3,4
				10g	0.686	0.637	6.4	6.12	4.08		
1/31/2014	D835V2	4d142	Body	1g	0.96	0.94	9.4	9.36	0.53	1.88	
				10g	0.642	0.619	6.2	6.20	-0.16		

SAR Room 3

Date Tested	System Dipole		T.S. Liquid	Measured Results			Target (Ref. Value)	Delta ±10 %	Est./Zoom Ratio	Plot No.	
	Type	Serial #		Area Scan	Zoom Scan	Normalize to 1 W					
1/29/2014	D2450V2	899	Body	1g	5.21	5.29	52.9	49.70	6.44	-1.54	5,6
				10g	2.22	2.44	24.4	23.30	4.72		
1/29/2014	D2450V2	899	Head	1g	5.33	5.20	52.0	51.30	1.36	2.44	
				10g	2.32	2.36	23.6	23.90	-1.26		
1/30/2014	D5GHzV2 (5.2 GHz)	1168	Head	1g	7.54	7.88	78.8	79.30	-0.63	-4.51	
				10g	2.10	2.25	22.5	22.70	-0.88		
1/30/2014	D5GHzV2 (5.6 GHz)	1168	Head	1g	8.08	8.59	85.9	85.30	0.70	-6.31	
				10g	2.23	2.44	24.4	24.30	0.41		
1/30/2014	D5GHzV2 (5.8 GHz)	1168	Head	1g	7.90	8.22	82.2	81.00	1.48	-4.05	
				10g	2.16	2.31	23.1	22.90	0.87		
2/1/2014	D5GHzV2 (5.2 GHz)	1168	Body	1g	7.47	7.91	79.1	75.20	5.19	-5.89	7,8
				10g	2.13	2.24	22.4	21.00	6.67		
2/1/2014	D5GHzV2 (5.6 GHz)	1168	Body	1g	7.95	8.43	84.3	80.60	4.59	-6.04	9,10
				10g	2.26	2.39	23.9	22.30	7.17		
2/1/2014	D5GHzV2 (5.8 GHz)	1168	Body	1g	7.22	7.97	79.7	75.70	5.28	-10.39	11,12
				10g	2.04	2.22	22.2	20.90	6.22		

12. SAR Test Results

SAR Test Reduction criteria are as follows:

KDB 447498 D01 General RF Exposure Guidance v05r0:

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 Section 2.3:

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

KDB 941225 D01 SAR test for 3G devices v02 (pg.12):

Body SAR is also measured for HSPA when the maximum average output of each RF channel with HSPA active is at least $\frac{1}{4}$ dB higher than that measured without HSPA using 12.2 kbps RMC or the maximum SAR for 12.2 kbps RMC is above 75% of the SAR limit. Body SAR for HSPA is measured with E-DCH Sub-test 5, using H-Set 1 and QPSK for FRC and a 12.2 kbps RMC configured in Test Loop Mode 1 with power control algorithm 2.

12.1. GSM850

RF Exposure Conditions	Test Position	Mode	Dist. (mm)	Ch #.	Freq. (MHz)	Power (dBm)		1-g SAR (W/kg)		Plot No.
						Tune-up limit	Meas.	Meas.	Scaled	
Head	Left Touch	Voice	0	190	836.6	33.0	32.7	0.173	0.185	
	Left Tilt	Voice	0	190	836.6	33.0	32.7	0.097	0.104	
	Right Touch	Voice	0	190	836.6	33.0	32.7	0.154	0.165	
	Right Tilt	Voice	0	190	836.6	33.0	32.7	0.093	0.100	
Head (VoIP)	Left Touch	GPRS 3 Slots	0	190	836.6	29.5	29.2	0.243	0.260	13
	Left Tilt	GPRS 3 Slots	0	190	836.6	29.5	29.2	0.128	0.137	
	Right Touch	GPRS 3 Slots	0	190	836.6	29.5	29.2	0.205	0.220	
	Right Tilt	GPRS 3 Slots	0	190	836.6	29.5	29.2	0.133	0.143	
Body	Rear	Voice	10	190	836.6	33.0	32.7	0.247	0.265	
	Front	Voice	10	190	836.6	33.0	32.7	0.199	0.213	
Body (VoIP) & Hotspot	Rear	GPRS 3 Slots	10	190	836.6	29.5	29.2	0.414	0.444	14
	Front	GPRS 3 Slots	10	190	836.6	29.5	29.2	0.270	0.289	
Hotspot	Edge 2	GPRS 3 Slots	10	190	836.6	29.5	29.2	0.089	0.095	
	Edge 3	GPRS 3 Slots	10	190	836.6	29.5	29.2	0.109	0.117	
	Edge 4	GPRS 3 Slots	10	190	836.6	29.5	29.2	0.245	0.263	

12.2. GSM1900

RF Exposure Conditions	Test Position	Mode	Dist. (mm)	Ch #.	Freq. (MHz)	Power (dBm)		1-g SAR (W/kg)		Plot No.
						Tune-up limit	Meas.	Meas.	Scaled	
Head	Left Touch	Voice	0	661	1880.0	30.5	30.0	0.144	0.162	
	Left Tilt	Voice	0	661	1880.0	30.5	30.0	0.069	0.077	
	Right Touch	Voice	0	661	1880.0	30.5	30.0	0.122	0.137	
	Right Tilt	Voice	0	661	1880.0	30.5	30.0	0.065	0.073	
Head (VoIP)	Left Touch	GPRS 2 Slots	0	661	1880.0	30.0	29.8	0.221	0.231	15
	Left Tilt	GPRS 2 Slots	0	661	1880.0	30.0	29.8	0.110	0.115	
	Right Touch	GPRS 2 Slots	0	661	1880.0	30.0	29.8	0.195	0.204	
	Right Tilt	GPRS 2 Slots	0	661	1880.0	30.0	29.8	0.106	0.111	
Body	Rear	Voice	10	661	1880.0	30.5	30.0	0.614	0.689	
	Front	Voice	10	661	1880.0	30.5	30.0	0.372	0.417	
Body (VoIP) & Hotspot	Rear	GPRS 2 Slots	10	512	1850.2	30.0	29.6	0.973	1.067	
	Rear	GPRS 2 Slots	10	661	1880.0	30.0	29.8	0.977	1.023	16
	Rear	GPRS 2 Slots	10	810	1909.8	30.0	30.0	0.784	0.777	
	Front	GPRS 2 Slots	10	661	1880.0	30.0	29.8	0.535	0.560	
Hotspot	Edge 2	GPRS 2 Slots	10	661	1880.0	30.0	29.8	0.106	0.111	
	Edge 3	GPRS 2 Slots	10	661	1880.0	30.0	29.8	0.704	0.737	
	Edge 4	GPRS 2 Slots	10	661	1880.0	30.0	29.8	0.124	0.130	

12.3. W-CDMA Band V

RF Exposure Conditions	Test Position	Mode	Dist. (mm)	Ch #.	Freq. (MHz)	Power (dBm)		1-g SAR (W/kg)		Plot No.
						Tune-up limit	Meas.	Meas.	Scaled	
Head	Left Touch	Rel 99 RMC	0	4183	836.6	23.5	23.5	0.237	0.237	
	Left Tilt	Rel 99 RMC	0	4183	836.6	23.5	23.5	0.129	0.129	
	Right Touch	Rel 99 RMC	0	4183	836.6	23.5	23.5	0.244	0.244	17
	Right Tilt	Rel 99 RMC	0	4183	836.6	23.5	23.5	0.163	0.163	
Body & Hotspot	Rear	Rel 99 RMC	10	4183	836.6	23.5	23.5	0.385	0.385	18
	Front	Rel 99 RMC	10	4183	836.6	23.5	23.5	0.284	0.284	
Hotspot	Edge 2	Rel 99 RMC	10	4183	836.6	23.5	23.5	0.207	0.207	
	Edge 3	Rel 99 RMC	10	4183	836.6	23.5	23.5	0.233	0.233	
	Edge 4	Rel 99 RMC	10	4183	836.6	23.5	23.5	0.220	0.220	

12.4. W-CDMA Band II

RF Exposure Conditions	Test Position	Mode	Dist. (mm)	Ch #.	Freq. (MHz)	Power (dBm)		1-g SAR (W/kg)		Plot No.
						Tune-up limit	Meas.	Meas.	Scaled	
Head	Left Touch	Rel 99 RMC	0	9400	1880.0	23.5	22.8	0.321	0.377	
	Left Tilt	Rel 99 RMC	0	9400	1880.0	23.5	22.8	0.171	0.201	
	Right Touch	Rel 99 RMC	0	9400	1880.0	23.5	22.8	0.522	0.613	19
	Right Tilt	Rel 99 RMC	0	9400	1880.0	23.5	22.8	0.184	0.216	
Body & Hotspot	Rear	Rel 99 RMC	10	9400	1880.0	23.5	22.8	0.476	0.559	20
	Front	Rel 99 RMC	10	9400	1880.0	23.5	22.8	0.366	0.430	
Hotspot	Edge 2	Rel 99 RMC	10	9400	1880.0	23.5	22.8	0.310	0.364	
	Edge 3	Rel 99 RMC	10	9400	1880.0	23.5	22.8	0.183	0.215	
	Edge 4	Rel 99 RMC	10	9400	1880.0	23.5	22.8	0.123	0.145	

12.5. Wi-Fi (DTS Band)

RF Exposure Conditions	Test Position	Mode	Dist. (mm)	Ch #.	Freq. (MHz)	Power (dBm)		1-g SAR (W/kg)		Plot No.
						Tune-up limit	Meas.	Meas.	Scaled	
Head	Left Touch	802.11b	0	6	2437	16.5	16.0	0.019	0.022	
	Left Tilt	802.11b	0	6	2437	16.5	16.0	0.014	0.016	
	Right Touch	802.11b	0	6	2437	16.5	16.0	0.103	0.116	21
	Right Tilt	802.11b	0	6	2437	16.5	16.0	0.032	0.036	
Body & Hotspot	Rear	802.11b	10	6	2437	16.5	16.0	0.099	0.111	22
	Front	802.11b	10	6	2437	16.5	16.0	0.018	0.021	
Hotspot	Edge 4	802.11b	10	6	2437	16.5	16.0	0.052	0.059	
RF Exposure Conditions	Test Position	Mode	Dist. (mm)	Ch #.	Freq. (MHz)	Power (dBm)		1-g SAR (W/kg)		Plot No.
Head	Left Touch	802.11a	N/A	149	5745	12.5	12.5	<0.001	<0.001	
	Left Tilt	802.11a	N/A	149	5745	12.5	12.5	<0.001	<0.001	
	Right Touch	802.11a	N/A	149	5745	12.5	12.5	0.045	0.045	23
	Right Tilt	802.11a	N/A	149	5745	12.5	12.5	0.005	0.005	
Body & Hotspot	Rear	802.11a	10	149	5745	12.5	12.5	0.102	0.102	24
	Front	802.11a	10	149	5745	12.5	12.5	<0.001	<0.001	
Hotspot	Edge 4	802.11a	10	149	5745	12.5	12.5	0.067	0.067	

12.6. Wi-Fi (UNII Band)

RF Exposure Conditions	Test Position	Mode	Dist. (mm)	Ch #.	Freq. (MHz)	Power (dBm)		1-g SAR (W/kg)		Plot No.
						Tune-up limit	Meas.	Meas.	Scaled	
Head	Left Touch	802.11a	0	36	5200	12.5	12.3	<0.001	<0.001	
				56	5280	12.5	12.5	<0.001	<0.001	
				140	5700	12.5	12.5	<0.001	<0.001	
	Left Tilt	802.11a	0	36	5200	12.5	12.3	<0.001	<0.001	
				56	5280	12.5	12.5	<0.001	<0.001	
				140	5700	12.5	12.5	<0.001	<0.001	
	Right Touch	802.11a	0	36	5200	12.5	12.3	0.022	0.023	25
				56	5280	12.5	12.5	0.033	0.033	26
				140	5700	12.5	12.5	<0.001	<0.001	27
	Right Tilt	802.11a	0	36	5200	12.5	12.3	<0.001	<0.001	
				56	5280	12.5	12.5	<0.001	<0.001	
				140	5700	12.5	12.5	<0.001	<0.001	
Body	Rear	802.11a	10	36	5200	12.5	12.3	0.200	0.209	28
				56	5280	12.5	12.5	0.220	0.220	29
				140	5700	12.5	12.5	0.082	0.082	30
	Front	802.11a	10	36	5200	12.5	12.3	<0.001	<0.001	
				56	5280	12.5	12.5	<0.001	<0.001	
				140	5700	12.5	12.5	<0.001	<0.001	

12.7. Bluetooth

12.7.1. Standalone SAR Test Exclusion Considerations

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

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

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

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

Body-worn Accessory Exposure Conditions

Max. tune-up tolerance limit		Min. test separation distance (mm)	Frequency (GHz)	Result
(dBm)	(mW)			
10.0	10	10	2.480	1.6

Conclusion:

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

12.7.2. Estimated SAR

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

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

Estimated SAR Result for Body-worn Accessory Conditions:

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

13. SAR Measurement Variability

In accordance with published RF Exposure KDB procedure 865664 D01 SAR measurement 100 MHz to 6 GHz v01r01. These additional measurements are repeated after the completion of all measurements requiring the same head or body tissue-equivalent medium in a frequency band. The test device should be returned to ambient conditions (normal room temperature) with the battery fully charged before it is re-mounted on the device holder for the repeated measurement(s) to minimize any unexpected variations in the repeated results.

- 1) Repeated measurement is not required when the original highest measured SAR is < 0.80 W/kg; steps 2) through 4) do not apply.
- 2) When the original highest measured SAR is ≥ 0.80 W/kg, repeat that measurement once.
- 3) Perform a second repeated measurement only if the ratio of largest to smallest SAR for the original and first repeated measurements is > 1.20 or when the original or repeated measurement is ≥ 1.45 W/kg (~ 10% from the 1-g SAR limit).
- 4) Perform a third repeated measurement only if the original, first or second repeated measurement is ≥ 1.5 W/kg and the ratio of largest to smallest SAR for the original, first and second repeated measurements is > 1.20.

13.1. The Highest Measured SAR Configuration in Each Frequency Band

Frequency Band (MHz)	Air Interface	Head (W/kg)	Body-worn Accessory (W/kg)	Hotspot/Wi-Fi Direct (W/kg)
850	GSM 850		0.414 W/kg	
	WCDMA Band V		0.385 W/kg	
1900	GSM 1900		0.977 W/kg	
	WCDMA Band II	0.522 W/kg		
2400	Wi-Fi 802.11b/g/n	0.103 W/kg		
5200	Wi-Fi 802.11a/n		0.200 W/kg	
5300	Wi-Fi 802.11a/n		0.220 W/kg	
5500	Wi-Fi 802.11a/n		0.082 W/kg	
5800	Wi-Fi 802.11a/n		0.102 W/kg	

13.2. Repeated Measurement Results

Head Exposure Condition

Not Applicable.

Body-worn Accessory Exposure Condition

Frequency band	Test Position	Mode	Ch #.	Freq. (MHz)	Meas. SAR (W/kg)		Largest to Smallest SAR Ratio	Note
					Original	Repeated		
GSM1900	Rear	GPRS 2slot	661	1880.0	0.977	0.946	1.03	1

Hotspot Mode Exposure Conditions

Not Applicable.

Note(s):

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

14. Simultaneous Transmission SAR Analysis

KDB 447498 D01 General RF Exposure Guidance v05, introduces a new formula for calculating the SAR to Peak Location Ratio (SPLSR) between pairs of simultaneously transmitting antennas:

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

Where:

SAR₁ is the highest reported or estimated SAR for the first of a pair of simultaneous transmitting antennas, in a specific test operating mode and exposure condition

SAR₂ is the highest reported or estimated SAR for the second of a pair of simultaneous transmitting antennas, in the same test operating mode and exposure condition as the first

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

A new threshold of 0.04 is also introduced in the draft KDB. Thus, 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:

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

14.1. Sum of the SAR for GSM850 & Wi-Fi & BT

RF Exposure conditions	Test Position	Simultaneous Transmission Scenario				Σ 1-g SAR (mW/g)	SPLSR (Yes/ No)
		GSM 850	WiFi DTS Band	WiFi UNII Band	Bluetooth		
Head	Left Touch	0.260	0.022			0.282	No
		0.260		0.001		0.261	No
	Left Tilt	0.137	0.016			0.153	No
		0.137		0.001		0.138	No
	Right Touch	0.220	0.116			0.336	No
		0.220		0.033		0.253	No
Right Tilt	0.143	0.036			0.179	No	
	0.143		0.001		0.144	No	
Body-worn Accessory & Hotspot	Rear	0.444	0.111			0.555	No
		0.444		0.220		0.664	No
		0.444			0.210	0.654	No
	Front	0.289	0.021			0.310	No
		0.289		0.001		0.290	No
		0.289			0.210	0.499	No
Edge	Edge 2	0.095	0			0.095	No
	Edge 3	0.117	0			0.117	No
	Edge 4	0.263	0.067			0.330	No

SAR to Peak Location Separation Ratio (SPLSR)

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

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

RF Exposure conditions	Test Position	Simultaneous Transmission Scenario				Σ 1-g SAR (mW/g)	SPLSR (Yes/ No)
		GSM 1900	WiFi DTS Band	WiFi UNII Band	Bluetooth		
Head	Left Touch	0.231	0.022			0.253	No
		0.231		0.001		0.232	No
	Left Tilt	0.115	0.016			0.131	No
		0.115		0.001		0.116	No
	Right Touch	0.204	0.116			0.320	No
		0.204		0.033		0.237	No
Right Tilt	0.111	0.036			0.147	No	
	0.111		0.001		0.112	No	
Body-worn Accessory & Hotspot	Rear	1.067	0.111			1.178	No
		1.067		0.220		1.287	No
		1.067			0.210	1.277	No
	Front	0.560	0.021			0.581	No
		0.560		0.001		0.561	No
		0.560			0.210	0.770	No
Edge	Edge 2	0.111	0			0.111	No
	Edge 3	0.737	0			0.737	No
	Edge 4	0.130	0.067			0.197	No

SAR to Peak Location Separation Ratio (SPLSR)

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

14.3. Sum of the SAR for WCDMA Band V & Wi-Fi & BT

RF Exposure conditions	Test Position	Simultaneous Transmission Scenario				Σ 1-g SAR (mW/g)	SPLSR (Yes/ No)
		W-CDMA Band V	WiFi DTS Band	WiFi UNII Band	Bluetooth		
Head	Left Touch	0.237	0.022			0.259	No
		0.237		0.001		0.238	No
	Left Tilt	0.129	0.016			0.145	No
		0.129		0.001		0.130	No
	Right Touch	0.244	0.116			0.360	No
		0.244		0.033		0.277	No
Right Tilt	0.163	0.036			0.199	No	
	0.163		0.001		0.164	No	
Body-worn Accessory & Hotspot	Rear	0.385	0.111			0.496	No
		0.385		0.220		0.605	No
		0.385			0.210	0.595	No
	Front	0.284	0.021			0.305	No
		0.284		0.001		0.285	No
		0.284			0.210	0.494	No
Edge	Edge 2	0.207	0			0.207	No
	Edge 3	0.233	0			0.233	No
	Edge 4	0.220	0.067			0.287	No

SAR to Peak Location Separation Ratio (SPLSR)

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

14.4. Sum of the SAR for WCDMA Band II & Wi-Fi & BT

RF Exposure conditions	Test Position	Simultaneous Transmission Scenario				Σ 1-g SAR (mW/g)	SPLSR (Yes/ No)
		W-CDMA Band II	WiFi DTS Band	WiFi UNII Band	Bluetooth		
Head	Left Touch	0.377	0.022			0.399	No
		0.377		0.001		0.378	No
	Left Tilt	0.201	0.016			0.217	No
		0.201		0.001		0.202	No
	Right Touch	0.613	0.116			0.729	No
		0.613		0.033		0.646	No
Right Tilt	0.216	0.036			0.252	No	
	0.216		0.001		0.217	No	
Body-worn Accessory & Hotspot	Rear	0.559	0.111			0.670	No
		0.559		0.220		0.779	No
		0.559			0.210	0.769	No
	Front	0.430	0.021			0.451	No
		0.430		0.001		0.431	No
		0.430			0.210	0.640	No
Edge	Edge 2	0.364	0			0.364	No
	Edge 3	0.215	0			0.215	No
	Edge 4	0.145	0.067			0.212	No

SAR to Peak Location Separation Ratio (SPLSR)

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

15. Appendixes

Refer to separated files for the following appendixes.

- 15.1. Photos and Antenna Locations**
- 15.2. System Performance Check Plots**
- 15.3. Highest SAR Test Plots**
- 15.4. Calibration Certificate for E-Field Probe EX3DV4 - SN 3902**
- 15.5. Calibration Certificate for E-Field Probe EX3DV4 - SN 3936**
- 15.6. Calibration Certificate for E-Field Probe EX3DV4 - SN 3929**
- 15.7. Calibration Certificate for D835V2 - SN 4d142**
- 15.8. Calibration Certificate for D1900V2- SN 5d140**
- 15.9. Calibration Certificate for D1900V2- SN 5d163**
- 15.10. Calibration Certificate for D2450V2 - SN 899**
- 15.11. Calibration Certificate for D5GHzV2 - SN 1168**

END OF REPORT