



## **SAR EVALUATION REPORT**

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

*For*  
**GSM Phone + Bluetooth and WLAN 2.4GHz b/g/n**

**Model: SM-G360H/DS  
FCC ID: A3LSMG360H**

**Report Number: 14I18763-S1  
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## REVISION HISTORY

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### 1. Attestation of Test Results

Applicant Name	SAMSUNG ELECTRONICS CO. LTD.			
Application Purpose	<input checked="" type="checkbox"/> Original Grant <input type="checkbox"/> Class II Permissive Change			
FCC ID	A3LSMG360H			
DUT Description	GSM Phone + Bluetooth and WLAN 2.4GHz b/g/n			
Exposure Category	General Population/Uncontrolled Exposure (1g SAR limit: 1.6 W/kg)			
The highest reported SAR	RF Exposure Conditions	Equipment Class		
		Licensed	DTS	UNII
	Head	0.510 W/kg	0.617 W/kg	N/A
	Body-worn Accessory	0.872 W/kg	0.233 W/kg	N/A
	Wireless Router (Hotspot)	0.875 W/kg	0.233 W/kg	N/A
Simultaneous Transmission	Head: 1.127 W/kg Body: 1.064 W/kg	Head: 1.127 W/kg Body: 1.064 W/kg	N/A	
Highest SAR across exposure conditions	0.875 W/kg			
Applicable Standards	FCC 47 CFR § 2.1093 Published RF exposure KDB procedures IEEE Std 1528-2013			
Test Results	Pass			
Date tested	9/8/2014 – 9/16/2014			
<p>UL Verification Services Inc. tested the above equipment in accordance with the requirements set forth in the above standards. All indications of Pass/Fail in this report are opinions expressed by UL Verification Services Inc. based on interpretations and/or observations of test results. Measurement Uncertainties were not taken into account and are published for informational purposes only. The test results show that the equipment tested is capable of demonstrating compliance with the requirements as documented in this report.</p> <p><b>Note:</b> The results documented in this report apply only to the tested sample, under the conditions and modes of operation as described herein. This document may not be altered or revised in any way unless done so by UL Verification Services Inc. and all revisions are duly noted in the revisions section. Any alteration of this document not carried out by UL Verification Services Inc. will constitute fraud and shall nullify the document. This report must not be used by the client to claim product certification, approval, or endorsement by NVLAP, NIST, any agency of the Federal Government, or any agency of any government (NIST Handbook 150, Annex A). This report is written to support regulatory compliance of the applicable standards stated above.</p>				
Approved & Released By:		Prepared By:		
				
Bobby Bayani Senior Engineer UL Verification Services Inc.		James Kim 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 1528-2003 & 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 D03 SAR Test Reduction GSM GPRS EDGE v01
- 941225 D04 SAR for GSM E GPRS Dual Xfer Mode v01
- 941225 D06 Hotspot Mode 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

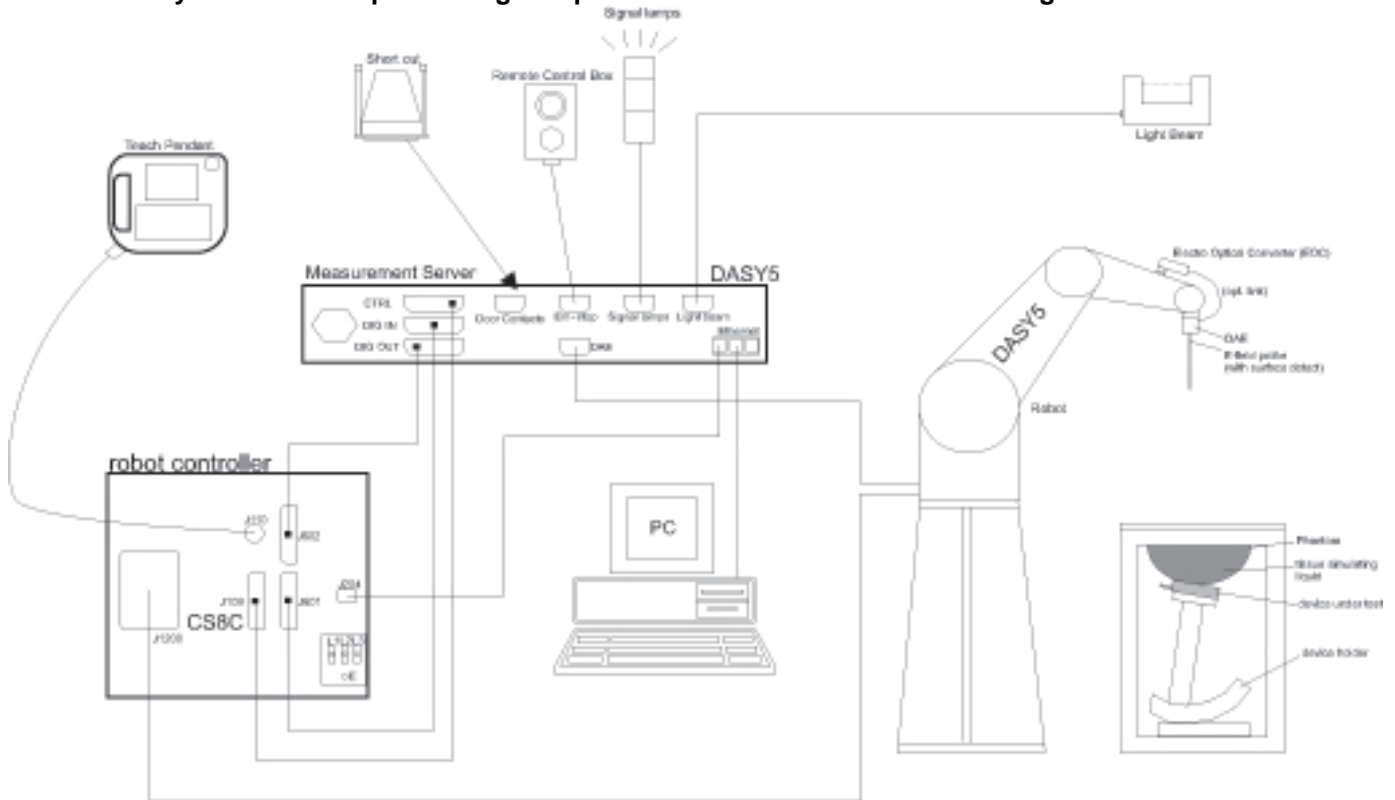
47173 Benicia Street	47266 Benicia Street
SAR Lab A	SAR Lab 1
SAR Lab B	SAR Lab 2
SAR Lab C	SAR Lab 3
SAR Lab D	SAR Lab 4
SAR Lab E	SAR Lab 5
SAR Lab F	
SAR Lab G	
SAR Lab H	

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 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

	$\leq 3$ GHz	$> 3$ GHz
Maximum distance from closest measurement point (geometric center of probe sensors) to phantom surface	$5 \pm 1$ mm	$\frac{1}{2} \cdot \delta \cdot \ln(2) \pm 0.5$ mm
Maximum probe angle from probe axis to phantom surface normal at the measurement location	$30^\circ \pm 1^\circ$	$20^\circ \pm 1^\circ$
Maximum area scan spatial resolution: $\Delta x_{Area}$ , $\Delta y_{Area}$	$\leq 2$ GHz: $\leq 15$ mm $2 - 3$ GHz: $\leq 12$ mm	$3 - 4$ GHz: $\leq 12$ mm $4 - 6$ GHz: $\leq 10$ mm
	When the x or y dimension of the test device, in the measurement plane orientation, is smaller than the above, the measurement resolution must be $\leq$ the corresponding x or y dimension of the test device with at least one measurement point on the test device.	

**Step 3: Zoom Scan**

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

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

		$\leq 3$ GHz	$> 3$ GHz	
Maximum zoom scan spatial resolution: $\Delta x_{Zoom}, \Delta y_{Zoom}$		$\leq 2$ GHz: $\leq 8$ mm 2 – 3 GHz: $\leq 5$ mm *	3 – 4 GHz: $\leq 5$ mm * 4 – 6 GHz: $\leq 4$ mm *	
Maximum zoom scan spatial resolution, normal to phantom surface	uniform grid: $\Delta z_{Zoom}(n)$	$\leq 5$ mm	3 – 4 GHz: $\leq 4$ mm 4 – 5 GHz: $\leq 3$ mm 5 – 6 GHz: $\leq 2$ mm	
	graded grid	$\Delta z_{Zoom}(1)$ : between 1 <sup>st</sup> two points closest to phantom surface	$\leq 4$ mm	3 – 4 GHz: $\leq 3$ mm 4 – 5 GHz: $\leq 2.5$ mm 5 – 6 GHz: $\leq 2$ 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	$\geq 30$ mm	3 – 4 GHz: $\geq 28$ mm 4 – 5 GHz: $\geq 25$ mm 5 – 6 GHz: $\geq 22$ mm	
Note: $\delta$ is the penetration depth of a plane-wave at normal incidence to the tissue medium; see draft standard IEEE P1528-2011 for details.				
* When zoom scan is required and the <i>reported</i> SAR from the area scan based <i>1-g SAR estimation</i> procedures of KDB 447498 is $\leq 1.4$ W/kg, $\leq 8$ mm, $\leq 7$ mm and $\leq 5$ 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
Dielectronic Probe kit	SPEAG	DAK-3.5	1103	2/18/2015
Dielectronic Probe kit	SPEAG	DAK-3.5 Short	SM DAK 200 BA	N/A
Thermometer	Control Company	4242	122529162	9/19/2014

#### 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	3/12/2015
Power Meter	Agilent	N1912A	MY52310061	12/12/2014
Power Sensor	Agilent	E9323A	US40411681	10/4/2014
Power Sensor	Agilent	N1921A	MY52270022	12/12/2014
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	SPEAG	EX3DV4	3751	11/21/2014
E-Field Probe	SPEAG	EX3DV4	3749	1/29/2015
E-Field Probe	SPEAG	EX3DV4	3686	3/18/2015
Data Acquisition Electronics	SPEAG	DAE4	1360	3/17/2015
Data Acquisition Electronics	SPEAG	DAE3	500	5/15/2015
Data Acquisition Electronics	SPEAG	DAE4	1258	5/15/2015
System Validation Dipole	SPEAG	D835V2	4d117	5/16/2015
System Validation Dipole	SPEAG	D1900V2	5d140	4/23/2015
System Validation Dipole	SPEAG	D2450V2	748	2/18/2015
System Validation Dipole	SPEAG	D2450V2	706	5/20/2015

#### Others

Name of Equipment	Manufacturer	Type/Model	Serial No.	Cal. Due Date
Base Station Simulator	R & S	CMW500	135390-w s	7/3/2015
Base Station Simulator	R & S	CMW500	132911-tu	2/27/2015
Base Station Simulator	R & S	CMW500	112268-rf	6/6/2015
Power Meter	Agilent	N1911A	MY53060009	5/5/2015
Power Sensor	Agilent	E9323A	US40411681	10/4/2014

## 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 1528-2003 & 2013 is not required in SAR reports submitted for equipment approval.

## 6. Device Under Test (DUT) Information

### 6.1. DUT Description

Model: SM-G360H/DS	
Device Dimension	Overall (Length x Width): 130 mm x 68 mm Overall Diagonal: 140 mm Display Diagonal: 115.7 mm
Battery Back Cover	<input checked="" type="checkbox"/> Normal Battery Cover
Battery Options	<input checked="" type="checkbox"/> Standard – Lithium-ion battery, Rating 3.85Vdc, 1500Wh
Accessory	Headset
Wireless Router (Hotspot)	Wi-Fi Hotspot mode permits the device to share its cellular data connection with other Wi-Fi-enabled devices. <input checked="" type="checkbox"/> Mobile Hotspot (Wi-Fi 2.4 GHz) <input type="checkbox"/> Mobile Hotspot (Wi-Fi 5 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)

## 6.2. Wireless Technologies

Wireless technologies	Frequency bands	Operating mode	Duty Cycle used for SAR testing
GSM	850, 1900	Voice (GMSK) GPRS (GMSK)	GSM Voice: 12.5%; GPRS: 1 Slot: 12.5%; 2 Slots: 25%, 3 Slots: 37.5%, 4 Slots: 50%,
Wi-Fi	2.4 GHz	802.11b 802.11g 802.11n (HT20)	100%
Bluetooth	2.4 GHz	Version 4.0 LE	N/A

### 6.3. Nominal and Maximum Output Power

Upper limit (dB): 0.5 ~ -1.5		RF Output Power (dBm)	
RF Air interface	Mode	Target	Max. tune-up tolerance limit
GSM850	Voice	32.5	<b>33.0</b>
	GPRS 1 slot	32.5	<b>33.0</b>
	GPRS 2 slots	31.0	<b>31.5</b>
	GPRS 3 slots	29.0	<b>29.5</b>
	GPRS 4 slots	27.0	<b>27.5</b>
GSM1900	Voice	29.2	<b>29.7</b>
	GPRS 1 slot	29.2	<b>29.7</b>
	GPRS 2 slots	27.0	<b>27.5</b>
	GPRS 3 slots	25.5	<b>26.0</b>
	GPRS 4 slots	24.0	<b>24.5</b>

#### EGPRS is Rx only

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	<b>16.5</b>
	802.11g	14.0	<b>14.5</b>
	802.11n HT20	12.0	<b>12.5</b>
Bluetooth		9.0	<b>9.5</b>
Bluetooth LE		9.0	<b>9.5</b>

## 6.4. Simultaneous Transmission Condition

RF Exposure Condition	Capable Transmit Configurations
Head	<ol style="list-style-type: none"> <li>1. GSM 850/1900 Voice + Wi-Fi 2.4GHz</li> <li>2. GSM 850/1900 (GPRS) + Wi-Fi 2.4GHz</li> </ol>
Body-worn Accessory	<ol style="list-style-type: none"> <li>1. GSM 850/1900 Voice + Wi-Fi 2.4GHz</li> <li>2. GSM 850/1900 Voice + BT</li> <li>3. GSM 850/1900 (GPRS) + Wi-Fi 2.4GHz</li> <li>4. GSM 850/1900 (GPRS) + BT</li> </ol>
Wireless Router (Hotspot)	<ol style="list-style-type: none"> <li>1. GSM 850/1900 (GPRS) + Wi-Fi 2.4GHz</li> </ol>
<p>Notes:</p> <ol style="list-style-type: none"> <li>1. Wi-Fi only 2.4GHz supports Hotspot.</li> <li>2. GPRS support Hotspot.</li> <li>3. VoIP is supported in GPRS.</li> <li>4. Wi-Fi 2.4 GHz Radio cannot transmit simultaneously with Bluetooth Radio.</li> </ol>	

## 7. RF Exposure Conditions (Test Configurations)

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

### 7.1. Head

#### For WWAN and Wi-Fi

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

### 7.2. Body-worn Accessory

#### 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	

### 7.3. Wireless Router (Hotspot) & Wi-Fi Direct

#### For WWAN

Test Configurations	Antenna-to-edge/surface	SAR Required	Note
Rear	<25 mm	Yes	
Front	<25 mm	Yes	
Edge 1 (Top)	116.5 mm	No	SAR is not required because the distance from the antenna to the edge is > 25 mm as per KDB 941225 D06 Hot Spot SAR
Edge 2 (Right)	4 mm	Yes	
Edge 3 (Bottom)	1.3 mm	Yes	
Edge 4 (Left)	1.3 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)	1.3 mm	Yes	
Edge 2 (Right)	1.3 mm	Yes	
Edge 3 (Bottom)	118.7 mm	No	SAR is not required because the distance from the antenna to the edge is > 25 mm as per KDB 648474 D04 Handset SAR
Edge 4 (Left)	53.8 mm	No	SAR is not required because the distance from the antenna to the edge is > 25 mm as per KDB 648474 D04 Handset SAR

## 8. Conducted Output Power Measurements

### 8.1. GSM850 and GSM1900

#### GSM850 Measured Results

Band	Mode	Coding Scheme	Time Slots	Ch No.	Freq. (MHz)	Burst Pwr (dBm)	Frame Pwr (dBm)	
850	GSM (Voice)	CS1	1	128	824.2	32.3	23.3	
				190	836.6	32.4	23.4	
				251	848.8	32.4	23.4	
	GPRS (GMSK)	CS1	1	1	128	824.2	32.3	23.3
					190	836.6	32.4	23.4
					251	848.8	32.4	23.4
			2	128	824.2	31.0	25.0	
					190	836.6	31.0	25.0
					251	848.8	31.0	25.0
			3	128	824.2	28.8	24.5	
					190	836.6	28.9	24.6
					251	848.8	28.9	24.6
			4	128	824.2	26.6	23.6	
					190	836.6	26.7	23.7
					251	848.8	26.7	23.7

#### 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

**GSM1900 Measured Results**

Band	Mode	Coding Scheme	Time Slots	Ch No.	Freq. (MHz)	Burst Pwr (dBm)	Frame Pwr (dBm)	
1900	GSM (Voice)	CS1	1	512	1850.2	29.6	20.6	
				661	1880.0	29.6	20.6	
				810	1909.8	29.5	20.5	
	GPRS (GMSK)	CS1	1	1	512	1850.2	29.6	20.6
					661	1880.0	29.6	20.6
					810	1909.8	29.5	20.5
			2	1	512	1850.2	27.5	21.5
					661	1880.0	27.5	21.5
					810	1909.8	27.5	21.5
			3	1	512	1850.2	25.8	21.5
					661	1880.0	25.9	21.6
					810	1909.8	25.8	21.5
			4	1	512	1850.2	23.7	20.7
					661	1880.0	23.7	20.7
					810	1909.8	23.6	20.6

**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

## 8.2. Wi-Fi (2.4 GHz Band)

### 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	16.4	Yes
			6	2437	16.4	
			11	2462	16.4	
	802.11g	6 Mbps	1	2412	14.5	No
			6	2437	14.5	
			11	2462	14.5	
	802.11n (HT20)	MCS0	1	2412	12.0	No
			6	2437	12.0	
			11	2462	12.0	

### 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	16.4	Yes
			2 Mbps	16.4	No
			5.5 Mbps	16.4	No
			11 Mbps	16.4	No

### 8.3. Bluetooth

Maximum tune-up tolerance limit is 9.5 dBm from the rated nominal maximum output power. This power level qualifies for exclusion of SAR testing.

## 9. Dielectric Property Measurements

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

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

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

### 9.1. Tissue Dielectric Parameters

#### FCC KDB 865664 D01 SAR Measurement 100 MHz to 6 GHz

Target Frequency (MHz)	Head		Body	
	$\epsilon_r$	$\sigma$ (S/m)	$\epsilon_r$	$\sigma$ (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

## 9.2. Dielectric Property Measurements Results

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

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

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

### SAR Lab B

Date Tested	Freq. (MHz)	Liquid Parameters		Measured	Target	Delta (%)	Limit $\pm$ (%)	
9/8/2014	Head 2450	e'	39.4900	Relative Permittivity ( $\epsilon_r$ ):	39.49	39.20	0.74	5
		e"	13.7300	Conductivity ( $\sigma$ ):	1.87	1.80	3.91	5
	Head 2410	e'	39.6400	Relative Permittivity ( $\epsilon_r$ ):	39.64	39.28	0.92	5
		e"	13.6000	Conductivity ( $\sigma$ ):	1.82	1.76	3.52	5
	Head 2475	e'	39.4100	Relative Permittivity ( $\epsilon_r$ ):	39.41	39.17	0.62	5
		e"	13.7600	Conductivity ( $\sigma$ ):	1.89	1.83	3.64	5
9/11/2014	Body 2450	e'	51.6600	Relative Permittivity ( $\epsilon_r$ ):	51.66	52.70	-1.97	5
		e"	14.5500	Conductivity ( $\sigma$ ):	1.98	1.95	1.65	5
	Body 2410	e'	51.8900	Relative Permittivity ( $\epsilon_r$ ):	51.89	52.76	-1.65	5
		e"	14.5200	Conductivity ( $\sigma$ ):	1.95	1.91	2.01	5
	Body 2475	e'	51.5200	Relative Permittivity ( $\epsilon_r$ ):	51.52	52.67	-2.18	5
		e"	14.6700	Conductivity ( $\sigma$ ):	2.02	1.99	1.70	5

### SAR Lab C

Date Tested	Freq. (MHz)	Liquid Parameters		Measured	Target	Delta (%)	Limit $\pm$ (%)	
9/8/2014	Head 835	e'	41.3100	Relative Permittivity ( $\epsilon_r$ ):	41.31	41.50	-0.46	5
		e"	20.1000	Conductivity ( $\sigma$ ):	0.93	0.90	3.69	5
	Head 820	e'	41.4900	Relative Permittivity ( $\epsilon_r$ ):	41.49	41.60	-0.27	5
		e"	20.1200	Conductivity ( $\sigma$ ):	0.92	0.90	2.10	5
	Head 850	e'	41.0800	Relative Permittivity ( $\epsilon_r$ ):	41.08	41.50	-1.01	5
		e"	20.0100	Conductivity ( $\sigma$ ):	0.95	0.92	3.36	5
9/11/2014	Body 835	e'	53.3500	Relative Permittivity ( $\epsilon_r$ ):	53.35	55.20	-3.35	5
		e"	21.7800	Conductivity ( $\sigma$ ):	1.01	0.97	4.25	5
	Body 820	e'	53.5100	Relative Permittivity ( $\epsilon_r$ ):	53.51	55.28	-3.20	5
		e"	21.8600	Conductivity ( $\sigma$ ):	1.00	0.97	2.92	5
	Body 850	e'	53.1800	Relative Permittivity ( $\epsilon_r$ ):	53.18	55.16	-3.58	5
		e"	21.7000	Conductivity ( $\sigma$ ):	1.03	0.99	3.90	5
9/11/2014	Head 835	e'	40.4500	Relative Permittivity ( $\epsilon_r$ ):	40.45	41.50	-2.53	5
		e"	19.4100	Conductivity ( $\sigma$ ):	0.90	0.90	0.13	5
	Head 820	e'	40.6200	Relative Permittivity ( $\epsilon_r$ ):	40.62	41.60	-2.36	5
		e"	19.4400	Conductivity ( $\sigma$ ):	0.89	0.90	-1.35	5
	Head 850	e'	40.2100	Relative Permittivity ( $\epsilon_r$ ):	40.21	41.50	-3.11	5
		e"	19.4000	Conductivity ( $\sigma$ ):	0.92	0.92	0.21	5
9/16/2014	Body 835	e'	52.5500	Relative Permittivity ( $\epsilon_r$ ):	52.55	55.20	-4.80	5
		e"	21.9200	Conductivity ( $\sigma$ ):	1.02	0.97	4.92	5
	Body 820	e'	52.6000	Relative Permittivity ( $\epsilon_r$ ):	52.60	55.28	-4.84	5
		e"	21.9700	Conductivity ( $\sigma$ ):	1.00	0.97	3.43	5
	Body 850	e'	52.4500	Relative Permittivity ( $\epsilon_r$ ):	52.45	55.16	-4.91	5
		e"	21.8300	Conductivity ( $\sigma$ ):	1.03	0.99	4.52	5

**SAR Lab H**

Date Tested	Freq. (MHz)	Liquid Parameters		Measured	Target	Delta (%)	Limit ±(%)	
9/9/2014	Head 1900	e'	39.8100	Relative Permittivity ( $\epsilon_r$ ):	39.81	40.00	-0.47	5
		e"	13.5900	Conductivity ( $\sigma$ ):	1.44	1.40	2.55	5
	Head 1850	e'	39.9600	Relative Permittivity ( $\epsilon_r$ ):	39.96	40.00	-0.10	5
		e"	13.4300	Conductivity ( $\sigma$ ):	1.38	1.40	-1.32	5
	Head 1910	e'	39.8100	Relative Permittivity ( $\epsilon_r$ ):	39.81	40.00	-0.47	5
		e"	13.5900	Conductivity ( $\sigma$ ):	1.44	1.40	3.09	5
9/9/2014	Body 1900	e'	54.1900	Relative Permittivity ( $\epsilon_r$ ):	54.19	53.30	1.67	5
		e"	14.7400	Conductivity ( $\sigma$ ):	1.56	1.52	2.45	5
	Body 1850	e'	54.3800	Relative Permittivity ( $\epsilon_r$ ):	54.38	53.30	2.03	5
		e"	14.7400	Conductivity ( $\sigma$ ):	1.52	1.52	-0.25	5
	Body 1910	e'	54.1700	Relative Permittivity ( $\epsilon_r$ ):	54.17	53.30	1.63	5
		e"	14.8000	Conductivity ( $\sigma$ ):	1.57	1.52	3.41	5
9/16/2014	Body 1900	e'	51.9600	Relative Permittivity ( $\epsilon_r$ ):	51.96	53.30	-2.51	5
		e"	14.9500	Conductivity ( $\sigma$ ):	1.58	1.52	3.91	5
	Body 1850	e'	52.0400	Relative Permittivity ( $\epsilon_r$ ):	52.04	53.30	-2.36	5
		e"	14.9500	Conductivity ( $\sigma$ ):	1.54	1.52	1.17	5
	Body 1910	e'	51.9300	Relative Permittivity ( $\epsilon_r$ ):	51.93	53.30	-2.57	5
		e"	14.9500	Conductivity ( $\sigma$ ):	1.59	1.52	4.46	5

## 10. 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 remeasured or sooner when marginal liquid parameters are used at the beginning of a series of measurements.

### 10.1. 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	4d117	5/16/2014	850	1g	9.23	9.61
				10g	5.98	6.31
D1900V2	5d140	4/23/2014	1900	1g	40.1	40.2
				10g	21.0	21.3
D2450V2	748	2/18/2014	2450	1g	51.6	50.7
				10g	24.0	23.7
D2450V2	706	5/20/2014	2450	1g	53.0	50.2
				10g	24.5	23.4

## 10.2. 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 B

Date Tested	System Dipole		T.S. Liquid	Measured Results			Target (Ref. Value)	Delta $\pm 10\%$	Est./Zoom Ratio	Plot No.	
	Type	Serial #		Area Scan	Zoom Scan	Normalize to 1 W					
9/8/2014	D2450V2	SN 706	Head	1g	4.86	4.95	49.5	53.0	-6.60	-1.85	1,2
				10g	2.120	2.26	22.6	24.5	-7.76		
9/11/2014	D2450V2	SN 748	Body	1g	5.07	5.17	51.7	50.7	1.97	-1.97	3,4
				10g	2.110	2.37	23.7	23.7	0.00		

### SAR Lab C

Date Tested	System Dipole		T.S. Liquid	Measured Results			Target (Ref. Value)	Delta $\pm 10\%$	Est./Zoom Ratio	Plot No.	
	Type	Serial #		Area Scan	Zoom Scan	Normalize to 1 W					
9/8/2014	D835V2	4d117	Head	1g	0.92	0.90	9.0	9.23	-2.60	2.39	
				10g	0.619	0.588	5.9	5.98	-1.67		
9/11/2014	D835V2	4d117	Body	1g	1.02	0.98	9.8	9.61	2.19	3.73	
				10g	0.680	0.644	6.4	6.31	2.06		
9/11/2014	D835V2	4d117	Head	1g	0.93	0.92	9.2	9.23	-0.54	1.29	
				10g	0.625	0.599	6.0	5.98	0.17		
9/16/2014	D835V2	4d117	Body	1g	1.02	1.00	10.0	9.61	4.06	1.96	5,6
				10g	0.680	0.657	6.6	6.31	4.12		

### SAR Lab H

Date Tested	System Dipole		T.S. Liquid	Measured Results			Target (Ref. Value)	Delta $\pm 10\%$	Est./Zoom Ratio	Plot No.	
	Type	Serial #		Area Scan	Zoom Scan	Normalize to 1 W					
9/9/2014	D1900V2	5d140	Body	1g	4.34	4.24	42.4	40.2	5.47	2.30	
				10g	2.210	2.090	20.9	21.3	-1.88		
9/9/2014	D1900V2	5d140	Head	1g	4.40	4.16	41.6	40.1	3.74	5.45	
				10g	2.270	2.130	21.3	21.0	1.43		
9/16/2014	D1900V2	5d140	Body	1g	4.34	4.32	43.2	40.2	7.46	0.46	7,8
				10g	2.210	2.230	22.3	21.3	4.69		

## 11. 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:

- $\leq 0.8$  W/kg or 2.0 W/kg, for 1-g or 10-g respectively, when the transmission band is  $\leq 100$  MHz
- $\leq 0.6$  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
- $\leq 0.4$  W/kg or 1.0 W/kg, for 1-g or 10-g respectively, when the transmission band is  $\geq 200$  MHz

**KDB 648474 D04 Handset SAR:**

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

**KDB 941225 D01 SAR test for 3G devices:**

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.

**11.1. GSM850**

RF Exposure Conditions	Mode	Dist. (mm)	Test Position	Ch #.	Freq. (MHz)	Power (dBm)		1-g SAR (W/kg)		10-g SAR (W/kg)		Plot No.
						Tune-up limit	Meas.	Meas.	Scaled	Meas.	Scaled	
Head	Voice	0	Left Touch	190	836.6	33.0	32.4	0.274	0.315	0.207	0.238	1
			Left Tilt	190	836.6	33.0	32.4	0.189	0.217	0.146	0.168	
			Right Touch	190	836.6	33.0	32.4	0.246	0.282	0.188	0.216	
			Right Tilt	190	836.6	33.0	32.4	0.196	0.225	0.151	0.173	
Head VoIP	GPRS 2 Slots	0	Left Touch	190	836.6	31.5	31.0	0.368	0.413	0.277	0.311	2
			Left Tilt	190	836.6	31.5	31.0	0.317	0.356	0.244	0.274	
			Right Touch	190	836.6	31.5	31.0	0.310	0.348	0.238	0.267	
			Right Tilt	190	836.6	31.5	31.0	0.299	0.335	0.228	0.256	
Body-worn	Voice	10	Rear	190	836.6	33.0	32.4	0.375	0.431	0.284	0.326	3
			Front	190	836.6	33.0	32.4	0.332	0.381	0.257	0.295	
Body-worn(VoIP) & Hotspot	GPRS 2 Slots	10	Rear	128	824.2	31.5	31.0	0.708	0.794	0.540	0.606	
				190	836.6	31.5	31.0	0.725	0.813	0.551	0.618	
				251	848.8	31.5	31.0	0.777	0.872	0.589	0.661	
			Front	190	836.6	31.5	31.0	0.468	0.525	0.361	0.405	
Hotspot	GPRS 2 Slots	10	Edge 2	190	836.6	31.5	31.0	0.257	0.288	0.177	0.199	
			Edge 3	190	836.6	31.5	31.0	0.080	0.090	0.048	0.054	
			Edge 4	128	824.2	31.5	31.0	0.779	0.874	0.544	0.610	
				190	836.6	31.5	31.0	0.780	0.875	0.542	0.608	4
				251	848.8	31.5	31.0	0.750	0.842	0.520	0.583	

**11.2. GSM1900**

RF Exposure Conditions	Mode	Dist. (mm)	Test Position	Ch #.	Freq. (MHz)	Power (dBm)		1-g SAR (W/kg)		10-g SAR (W/kg)		Plot No.
						Tune-up limit	Meas.	Meas.	Scaled	Meas.	Scaled	
Head	Voice	0	Left Touch	661	1880.0	29.7	29.6	0.465	0.476	0.283	0.290	5
			Left Tilt	661	1880.0	29.7	29.6	0.154	0.158	0.092	0.094	
			Right Touch	661	1880.0	29.7	29.6	0.244	0.250	0.159	0.163	
			Right Tilt	661	1880.0	29.7	29.6	0.132	0.135	0.076	0.078	
Head VoIP	GPRS 3 Slots	0	Left Touch	661	1880.0	26.0	25.9	0.498	0.510	0.306	0.313	6
			Left Tilt	661	1880.0	26.0	25.9	0.185	0.189	0.106	0.108	
			Right Touch	661	1880.0	26.0	25.9	0.280	0.287	0.177	0.181	
			Right Tilt	661	1880.0	26.0	25.9	0.156	0.160	0.088	0.090	
Body-worn	Voice	10	Rear	661	1880.0	29.7	29.6	0.430	0.440	0.257	0.263	7
			Front	661	1880.0	29.7	29.6	0.314	0.321	0.199	0.204	
Body-worn(VoIP) & Hotspot	GPRS 3 Slots	10	Rear	661	1880.0	26.0	25.9	0.530	0.542	0.314	0.321	8
			Front	661	1880.0	26.0	25.9	0.434	0.444	0.269	0.275	
Hotspot	GPRS 3 Slots	10	Edge 2	661	1880.0	26.0	25.9	0.352	0.360	0.200	0.205	
			Edge 3	661	1880.0	26.0	25.9	0.192	0.196	0.119	0.122	
			Edge 4	661	1880.0	26.0	25.9	0.301	0.308	0.172	0.176	

**11.3. Wi-Fi (DTS Band)**

Freq. Band	RF Exposure Conditions	Mode	Dist. (mm)	Test Position	Ch #.	Freq. (MHz)	Power (dBm)		1-g SAR (W/kg)		10-g SAR (W/kg)		Plot No.
							Tune-up limit	Meas.	Meas.	Scaled	Meas.	Scaled	
2.4 GHz	Head	802.11b 1 Mbps	0	Left Touch	6	2437.0	16.5	16.4	0.603	0.617	0.300	0.299	9
				Left Tilt	6	2437.0	16.5	16.4	0.456	0.467	0.214	0.213	
				Right Touch	6	2437.0	16.5	16.4	0.427	0.437	0.233	0.232	
				Right Tilt	6	2437.0	16.5	16.4	0.430	0.440	0.228	0.227	
	Body-worn & Hotspot	802.11b 1 Mbps	10	Rear	6	2437.0	16.5	16.4	0.188	0.192	0.096	0.096	
				Front	6	2437.0	16.5	16.4	0.161	0.165	0.086	0.086	
	Hotspot	802.11b 1 Mbps	10	Edge 1	6	2437.0	16.5	16.4	0.228	0.233	0.120	0.120	10
				Edge 2	6	2437.0	16.5	16.4	0.132	0.135	0.067	0.067	

## 11.4. Bluetooth

### 11.4.1. 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  $\leq 50$  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  $\leq 7.5$  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  $\leq 50$  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)			
9.5	9	10	2.480	1.4

#### Conclusion:

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

### 11.4.2. 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  $\leq 50$  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	9	10	2.480	0.189

## 12. SAR Measurement Variability

In accordance with published RF Exposure KDB procedure 865664 D01 SAR measurement 100 MHz to 6 GHz v01. 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  $\geq 0.80$  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  $\geq 1.45$  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  $\geq 1.5$  W/kg and the ratio of largest to smallest SAR for the original, first and second repeated measurements is  $> 1.20$ .

### 12.1. The Highest Measured SAR Configuration in Each Frequency Band

N/A

### 12.2. Repeated Measurement Results

#### Head

N/A

#### Body-worn Accessory

N/A

#### Wireless Router (Hotspot)

N/A

### 13. 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:

$$\mathbf{SPLSR} = (\mathbf{SAR}_1 + \mathbf{SAR}_2)^{1.5} / \mathbf{Ri}$$

Where:

**SAR<sub>1</sub>** 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<sub>2</sub>** 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  $[(x_1-x_2)^2 + (y_1-y_2)^2 + (z_1-z_2)^2]$

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:

$$(\mathbf{SAR}_1 + \mathbf{SAR}_2)^{1.5} / \mathbf{Ri} < 0.04$$

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

RF Exposure conditions	Test Position		Simultaneous Transmission Scenario			$\Sigma$ 1-g SAR (mW/g)	SPLSR (Yes/ No)
			① GSM850	② Wi-Fi(DTS)	③ Bluetooth		
Head	Left Touch	① + ②	0.413	0.617		1.030	No
	Left Tilt	① + ②	0.356	0.467		0.823	No
	Right Touch	① + ②	0.348	0.437		0.785	No
	Right Tilt	① + ②	0.335	0.440		0.775	No
Body-worn Accessory & Hotspot	Rear	① + ②	0.872	0.192		1.064	No
		① + ③	0.872		0.189	1.061	No
	Front	① + ②	0.525	0.165		0.690	No
		① + ③	0.525		0.189	0.714	No
Hotspot	Edge 2	① + ②	0.288	0.135		0.423	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.

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

RF Exposure conditions	Test Position		Simultaneous Transmission Scenario			$\Sigma$ 1-g SAR (mW/g)	SPLSR (Yes/ No)
			① GSM1900	② Wi-Fi(DTS)	③ Bluetooth		
Head	Left Touch	① + ②	0.510	0.617		1.127	No
	Left Tilt	① + ②	0.189	0.467		0.656	No
	Right Touch	① + ②	0.287	0.437		0.724	No
	Right Tilt	① + ②	0.160	0.440		0.600	No
Body-worn Accessory & Hotspot	Rear	① + ②	0.542	0.192		0.734	No
		① + ③	0.542		0.189	0.731	No
	Front	① + ②	0.444	0.165		0.609	No
		① + ③	0.444		0.189	0.633	No
Hotspot	Edge 2	① + ②	0.360	0.135		0.495	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. Appendixes

Refer to separated files for the following appendixes.

- 14.1. Photos and Antenna Locations
- 14.2. System Performance Check Plots
- 14.3. Highest SAR Test Plots
- 14.4. Calibration Certificate for E-Field Probe EX3DV4 - SN 3751
- 14.5. Calibration Certificate for E-Field Probe EX3DV4 - SN 3749
- 14.6. Calibration Certificate for E-Field Probe EX3DV4 - SN 3686
- 14.7. Calibration Certificate for D835V2 - SN 4d117
- 14.8. Calibration Certificate for D1900V2 - SN 5d140
- 14.9. Calibration Certificate for D2450V2 - SN 706
- 14.10. Calibration Certificate for D2450V2 - SN 748
- 14.11. Tissue Material Ingredients

END OF REPORT