



**FCC OET BULLETIN 65 SUPPLEMENT C 01-01
IEEE Std 1528-2003 and IEEE Std 1528a-2005**

SAR EVALUATION REPORT

For
GSM AND WCDMA PHONE WITH BLUETOOTH, NFC AND WLAN

**Model: E960, LGE960, LG-E960
FCC ID: ZNFE960**

**Report Number: 12U14580-5C
Issue Date: 9/6/2012**

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NVLAP LAB CODE 200065-0

Revision History

<u>Rev.</u>	<u>Issue Date</u>	<u>Revisions</u>	<u>Revised By</u>
--	8/28/2012	Initial issued	--
A	8/30/2012	Corrected HSDPA version from "Release 6" to "Release 5"	Sunny Shih
B	8/31/2012	Corrected HSPA subtest MPR targets	Dave Weaver
C	9/6/2012	Updated simultaneous transmission configurations table of Section 7.3.	Sunny Shih

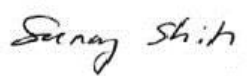
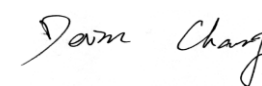
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1. Attestation of Test Results

Applicant	LG ELECTRONICS MOBILECOMM U.S.A., INC.		
DUT description	GSM AND WCDMA PHONE WITH BLUETOOTH, NFC AND WLAN		
Model	E960, LGE960, LG-E960		
Test device is	An identical prototype		
Device category	Portable		
Exposure category	General Population/Uncontrolled Exposure		
Date tested	8/14/2012 – 8/23/2012		
FCC Rule Parts	Freq. Range	Highest 1-g SAR	Limit
22	824-849 MHz	Head: 0.263 W/kg (Right Touch) Body: 0.524 W/kg (Rear with 10mm distance)	1.6 W/kg
24	1850-1910 MHz	Head: 0.476 W/kg (Left Touch) Body & Hotspot: 1.27 W/kg (Rear with 10mm distance)	
27	1710-1755 MHz	Head: 0.546 W/kg (Left Touch) Body & Hotspot: 1.17 W/kg (Rear with 10mm distance)	
15.247	2412-2462 MHz	Head: 0.079 W/kg (Left Touch) Body & Hotspot: 0.232 W/kg (Rear with 10mm distance)	
15.407	5150-5250 MHz	Head: 0.137 W/kg (Left Touch) Body: 0.133 W/kg (Rear with 10mm distance)	
	5250-5350 MHz	Head: 0.124 W/kg (Left Touch) Body: 0.155 W/kg (Rear with 10mm distance)	
	5500-5700 MHz	Head: 0.09 W/kg (Left Touch) Body: 0.178 W/kg (Rear with 10mm distance)	
15.247	5725-5850 MHz	Head: 0.063 W/kg (Left Touch) Body: 0.126 W/kg (Rear with 10mm distance)	
Simultaneous Transmission Condition:		1.502 W/kg (refer to Sec. 14.2.1) (The highest SAR across exposure conditions)	
Applicable Standards			Test Results
FCC OET Bulletin 65 Supplement C 01-01, IEEE Std 1528-2003 and IEEE Std 1528a-2005			Pass
UL CCS 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 CCS 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 CCS and all revisions are duly noted in the revisions section. Any alteration of this document not carried out by UL CCS 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 For UL CCS By:  Tested By: 			
Sunny Shih Engineering Leader UL CCS		Devin Chang SAR Engineer UL CCS	

2. Test Methodology

The tests documented in this report were performed in accordance with FCC OET Bulletin 65 Supplement C Edition 01-01, IEEE STD 1528-2003, IEEE Std 1528a-2005 and the following published KDB Procedures:

- 648474 D01 SAR Handsets Multi Xmitter and Ant, v01r05
- 648474 D03 Handset Wireless Battery Chargers v01
- 248227 D01 SAR meas for 802 11abg v01r02
- 865664 SAR 3 to 6 GHz Rev
- 941225 D01 SAR test for 3G devices v02
- 941225 D03 SAR Test Reduction GSM GPRS EDGE v01
- 941225 D06 Hot Spot SAR v01

3. Facilities and Accreditation

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

UL CCS 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.

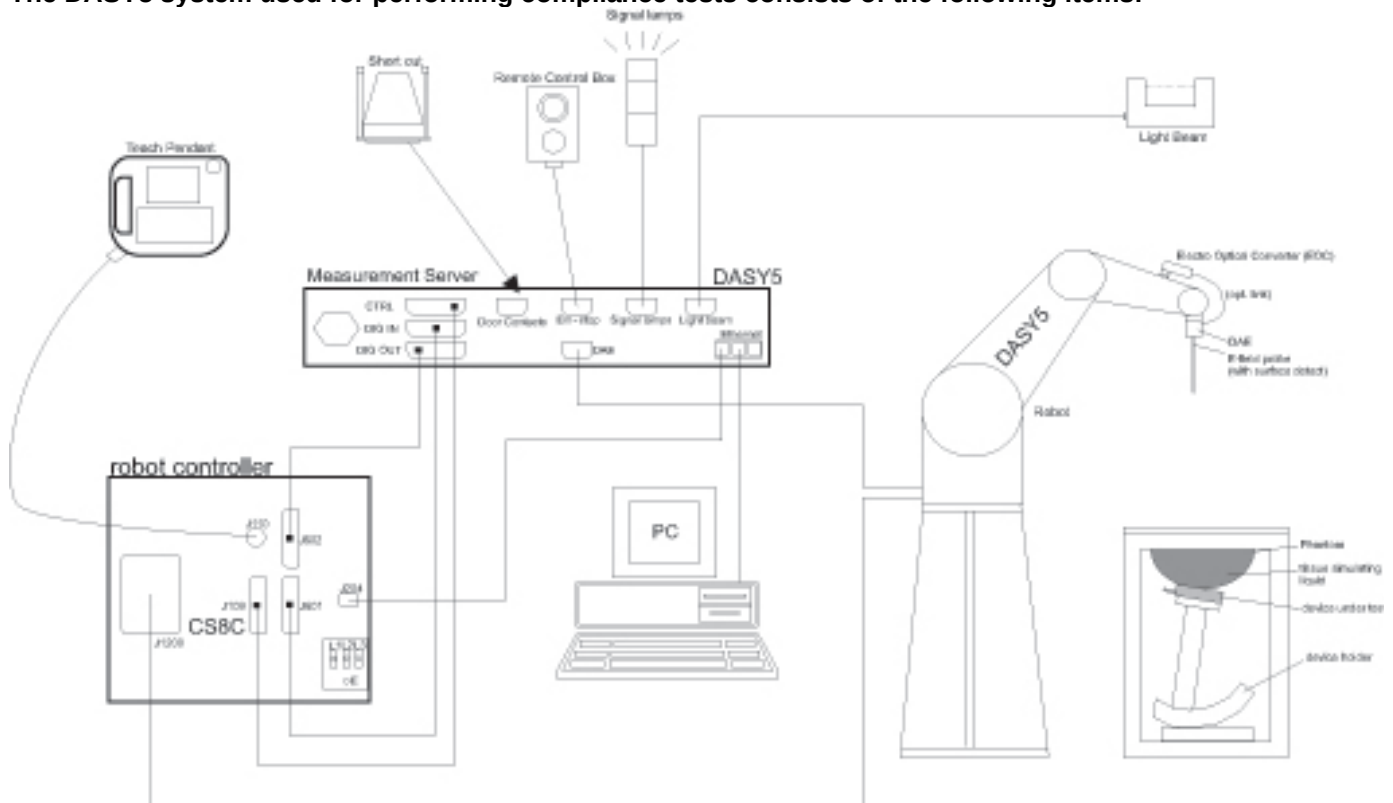
Name of Equipment	Manufacturer	Type/Model	Serial No.	Cal. Due date		
				MM	DD	Year
S-Parameter Network Analyzer	Agilent	8753ES	MY40001647	6	27	2013
Dielectronic Probe kit	HP	85070C	2569	N/A		
ENA Series Network Analyzer	Agilent	E5071B	MY42100131	2	11	2013
Dielectronic Probe kit	HP	85070E	594	N/A		
Synthesized Signal Generator	HP	8665B	3438A00633	2	22	2013
Power Meter	HP	438A	3513U04320	9	17	2013
Power Sensor A	HP	8481A	2237A31744	8	17	2013
Power Sensor B	HP	8481A	3318A95392	8	17	2013
Amplifier	MITEQ	4D00400600-50-30P	1622052	N/A		
Directional coupler	Werlatone	C8060-102	2149	N/A		
Synthesized Signal Generator	HP	8665B	3744A01084	5	3	2013
Power Meter	HP	438A	2822A05684	10	7	2013
Power Sensor A	HP	8481A	2702A66876	8	1	2013
Power Sensor B	HP	8482A	2349A08568	4	14	2013
Amplifier	MITEQ	4D00400600-50-30P	1620606	N/A		
Directional coupler	Werlatone	C8060-102	2141	N/A		
Base Station Simulator	Agilent	8960	GB42361452	4	4	2013
Base Station Simulator	R & S	CMU200	118339	5	20	2013
Thermometer	ERTCO	639-1S	8350	7	30	2013
E-Field Probe	SPEAG	EX3DV4	3772	2	16	2013
E-Field Probe	SPEAG	EX3DV4	3773	3	14	2013
Data Acquisition Electronics	SPEAG	DAE4	1239	6	6	2013
Data Acquisition Electronics	SPEAG	DAE4	1258	3	8	2013
System Validation Dipole	SPEAG	D835V2	4d002	3	6	2013
System Validation Dipole	SPEAG	D1750V2	1050	4	19	2013
System Validation Dipole	SPEAG	D1900V2	5d140	4	12	2013
System Validation Dipole	SPEAG	D2450V2	748	2	7	2013
System Validation Dipole	SPEAG	D5GHzV2	1075	2	14	2013
System Validation Dipole	SPEAG	D5GHzV2	1003	8	23	2012

4.2. Measurement Uncertainty

Measurement uncertainty for 300 MHz to 3 GHz averaged over 1 gram					
Component	Error, %	Distribution	Divisor	Sensitivity	U (X), %
Measurement System					
Probe Calibration (k=1)	6.00	Normal	1	1	6.00
Axial Isotropy	1.15	Rectangular	1.732	0.7071	0.47
Hemispherical Isotropy	2.30	Rectangular	1.732	0.7071	0.94
Boundary Effect	0.90	Rectangular	1.732	1	0.52
Probe Linearity	3.45	Rectangular	1.732	1	1.99
System Detection Limits	1.00	Rectangular	1.732	1	0.58
Readout Electronics	0.30	Normal	1	1	0.30
Response Time	0.80	Rectangular	1.732	1	0.46
Integration Time	2.60	Rectangular	1.732	1	1.50
RF Ambient Conditions - Noise	3.00	Rectangular	1.732	1	1.73
RF Ambient Conditions - Reflections	3.00	Rectangular	1.732	1	1.73
Probe Positioner Mechanical Tolerance	0.40	Rectangular	1.732	1	0.23
Probe Positioning with respect to Phantom	2.90	Rectangular	1.732	1	1.67
Extrapolation, Interpolation and Integration	1.00	Rectangular	1.732	1	0.58
Test Sample Related					
Test Sample Positioning	2.90	Normal	1	1	2.90
Device Holder Uncertainty	3.60	Normal	1	1	3.60
Output Power Variation - SAR Drift	5.00	Rectangular	1.732	1	2.89
Phantom and Tissue Parameters					
Phantom Uncertainty (shape and thickness)	4.00	Rectangular	1.732	1	2.31
Liquid Conductivity - deviation from target	5.00	Rectangular	1.732	0.64	1.85
Liquid Conductivity - measurement	-4.37	Normal	1	0.64	-2.80
Liquid Permittivity - deviation from target	5.00	Rectangular	1.732	0.6	1.73
Liquid Permittivity - measurement uncertainty	3.95	Normal	1	0.6	2.37
Combined Standard Uncertainty Uc(y) =					10.41
Expanded Uncertainty U, Coverage Factor = 2, > 95 % Confidence =				20.81 %	
Expanded Uncertainty U, Coverage Factor = 2, > 95 % Confidence =				1.64 dB	
Measurement uncertainty for 3 to 6 GHz averaged over 1 gram					
Component	Error, %	Distribution	Divisor	Sensitivity	U (X), %
Measurement System					
Probe Calibration (k=1)	6.55	Normal	1	1	6.55
Axial Isotropy	1.15	Rectangular	1.732	0.7071	0.47
Hemispherical Isotropy	2.30	Rectangular	1.732	0.7071	0.94
Boundary Effect	0.90	Rectangular	1.732	1	0.52
Probe Linearity	3.45	Rectangular	1.732	1	1.99
System Detection Limits	1.00	Rectangular	1.732	1	0.58
Readout Electronics	1.00	Normal	1	1	1.00
Response Time	0.80	Rectangular	1.732	1	0.46
Integration Time	2.60	Rectangular	1.732	1	1.50
RF Ambient Conditions - Noise	3.00	Rectangular	1.732	1	1.73
RF Ambient Conditions - Reflections	3.00	Rectangular	1.732	1	1.73
Probe Positioner Mechanical Tolerance	0.40	Rectangular	1.732	1	0.23
Probe Positioning with respect to Phantom	2.90	Rectangular	1.732	1	1.67
Extrapolation, Interpolation and Integration	3.90	Rectangular	1.732	1	2.25
Test Sample Related					
Test Sample Positioning	1.10	Normal	1	1	1.10
Device Holder Uncertainty	3.60	Normal	1	1	3.60
Output Power Variation - SAR Drift	5.00	Rectangular	1.732	1	2.89
Phantom and Tissue Parameters					
Phantom Uncertainty (shape and thickness)	4.00	Rectangular	1.732	1	2.31
Liquid Conductivity - deviation from target	5.00	Rectangular	1.732	0.64	1.85
Liquid Conductivity - measurement	2.52	Normal	1	0.64	1.61
Liquid Permittivity - deviation from target	10.00	Rectangular	1.732	0.6	3.46
Liquid Permittivity - measurement uncertainty	-2.14	Normal	1	0.6	-1.28
Combined Standard Uncertainty Uc(y), %:					10.65
Expanded Uncertainty U, Coverage Factor = 1.96, > 95 % Confidence =				20.88 %	
Expanded Uncertainty U, Coverage Factor = 1.96, > 95 % Confidence =				1.65 dB	

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.

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 $\geq 7 \times 7 \times 9$ (above 4.5 GHz) or $5 \times 5 \times 7$ (below 3 GHz) points 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.

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: 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.

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 $\geq 7 \times 7 \times 9$ (above 4.5 GHz) or $5 \times 5 \times 7$ (below 3 GHz) points 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.

Step 4: 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 5: 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

GSM AND WCDMA BAND PHONE WITH BLUETOOTH, RFID AND WLAN

Model: E960, LGE960, LG-E960

Normal operation	- Held to head, - Body-worn Accessory (Rear and Front sides) with 10 mm separation distance. - Hotspot mode with 10 mm separation distance to all surfaces and edges.
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Accessory	1. Headset 2. Wireless Charging Battery Cover with NFC
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7.1. Band and Air Interfaces

Tx Frequency Bands	- GSM850: 824 - 849 MHz - GSM1900: 1850 - 1910 MHz - W-CDMA Band V: 824 - 849 MHz - W-CDMA Band IV: 1710 - 1755 MHz - W-CDMA Band II: 1850 - 1910 MHz - 802.11ab/g/n: 2412 - 2462 MHz, b / g / HT20 5150 - 5250 MHz, a / HT20 5250 - 5350 MHz, a / HT20 5500 - 5700 MHz, a / HT20 5725 - 5850 MHz, a / HT20 - Bluetooth: 2402 - 2480 MHz (Ver. 4.0 LE)
GPRS Multi-Slot Class	10
DTM Class	Not supported

7.2. Hotspot (Wireless router) Exposure Condition

The device is capable of personal hotspot mode. The hotspot mode can be enabled by the user. However, the 5 GHz bands do not support hotspot mode.

7.3. Simultaneous Transmission Condition

Simultaneous transmission configurations					
No.	Capable Tx configurations	Head SAR	Body SAR	Power Reduction	Note
1	GSM Voice	O	O	No	Standalone GSM Voice
2	GPRS	O	O	No	Standalone GPRS Class 10
3	EDGE	O	O	No	Standalone EDGE Class 10
4	WCDMA Voice	O	O	No	Standalone WCDMA Voice
5	WCDMA Data	O	O	No	Standalone WCDMA data
6	WIFI	O	O	No	Standalone WIFI
7	GSM Voice + WIFI 2.4G&WIFI 5G	O	O	No	GSM Voice + WIFI Data
8	GPRS + WIFI 2.4G	O	O	No	GPRS + WIFI hotspot
9	EDGE + WIFI 2.4G	O	O	No	EDGE + WIFI hotspot
10	GPRS + WIFI 5G	X	X	No	GPRS + WIFI hotspot
11	EDGE + WIFI 5G	X	X	No	EDGE + WIFI hotspot
12	WCDMA Voice + WIFI 2.4G&WIFI 5G	O	O	No	WCDMA Voice + WIFI Data
13	WCDMA Data + WIFI 2.4G&WIFI 5G	O	O	No	WCDMA data + WIFI hotspot
O : Supported , X : Not supported * WiFi 2.4Ghz is supported Hotspot, WiFi 5Ghz is not supported Hotspot. * VoIP is supported (e.g. 3rd part VoIP) * BT and NFC SAR testing is not required					

8. Summary of Test Configurations

Refer to Section 17 “Antenna Locations” for antenna locations

8.1. Head Exposure Conditions for WWAN (Ant. ①) and Wi-Fi/BT (Ant. ④)

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 (Ant. ①) and Wi-Fi/BT (Ant. ④)

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

8.3. Hotspot Mode Exposure Conditions for WWAN (Ant. ①)

Test Configurations	Antenna-to-edge/surface	SAR Required	Note
Rear	< 25 mm	Yes	
Front	< 25 mm	Yes	
Edge 1	109.6 mm	No	SAR is not required because the distance from the WWAN antenna to this edge is > 2.5 cm as per KDB 941225 D06 Hot Spot SAR v01
Edge 2	2.5 mm	Yes	
Edge 3	2.4 mm	Yes	
Edge 4	2.5 mm	Yes	

8.4. Hotspot Mode Exposure Conditions for Wi-Fi/BT (Ant. ④)

Test Configurations	Antenna-to-edge/surface	SAR Required	Note
Rear	< 25 mm	Yes	
Front	< 25 mm	Yes	
Edge 1*	23.7 mm	Yes	
Edge 2*	3.2 mm	Yes	
Edge 3*	> 82 mm	No	SAR is not required because the distance from the Wi-Fi/BT antenna to this edge is > 2.5 cm as per KDB 941225 D06 Hot Spot SAR v01
Edge 4*	> 53 mm	No	SAR is not required because the distance from the Wi-Fi/BT antenna to this edge is > 2.5 cm as per KDB 941225 D06 Hot Spot SAR v01

*: SAR testing under Hotspot Mode test positions is not required as Wi-Fi in the 5 GHz Bands does not support hotspot mode operation.

Notes:

- Edge 1= Top Edge
- Edge 2= Right Edge
- Edge 3= Bottom Edge
- Edge 4= Left Edge

9. RF Output Power Measurement

9.1. GSM850

Target Power: 33.2 dBm

Tune-up Tolerance: -1.5 dB / +0.5 dB

GSM (GMSK) Voice Mode

Band	Ch No.	Freq. (MHz)	Avg burst Pwr (dBm)
850	128	824.2	33.3
	190	836.6	33.5
	251	848.8	33.5

Target Power:

GPRS 1 slot 33.2 dBm

GPRS 2 slot 31.2 dBm

Tune-up Tolerance: -1.5 dB / +0.5 dB

GMSK (GPRS) Mode - Coding Scheme: CS1

Band	Ch No.	Freq. (MHz)	Avg burst Pwr (dBm)			
			1 slot	Frame Avg Pwr	2 slots	Frame Avg Pwr
850	128	824.2	33.3	24.3	31.0	24.9
	190	836.6	33.5	24.5	31.1	25.0
	251	848.8	33.6	24.5	31.1	25.0

Notes:

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

- Head: GMSK Voice Mode
- Body: GMSK (GPRS) mode with 2 time slots, based on the output power measurements above

Target Power:

EGPRS 1 slot 27.2 dBm

EGPRS 2 slot 27.2 dBm

Tune-up Tolerance: -1.5 dB / +0.5 dB

8PSK (EGPRS) Mode - Coding Scheme: MCS5

Band	Ch No.	Freq. (MHz)	Avg burst Pwr (dBm)			
			1 slot	Frame Avg Pwr	2 slots	Frame Avg Pwr
850	128	824.2	27.4	18.4	27.4	21.3
	190	836.6	27.3	18.3	27.2	21.2
	251	848.8	27.4	18.4	27.4	21.3

Notes:

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

- Head: GMSK Voice Mode
- Body: 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. GSM1900

Target Power: 29.7 dBm

Tune-up Tolerance: -1.5 dB / +0.5 dB

GSM (GMSK) Voice Mode

Band	Ch No.	Freq. (MHz)	Avg burst Pwr (dBm)
1900	512	1850.2	30.1
	661	1880.0	30.2
	810	1909.8	30.2

Target Power:

GPRS 1 slot 29.7 dBm

GPRS 2 slot 28.2 dBm

Tune-up Tolerance: -1.5 dB / +0.5 dB

GMSK (GPRS) Mode - Coding Scheme: CS1

Band	Ch No.	Freq. (MHz)	Avg burst Pwr (dBm)			
			1 slot	Frame Avg Pwr	2 slots	Frame Avg Pwr
1900	512	1850.2	30.1	21.1	28.4	22.4
	661	1880.0	30.2	21.2	28.3	22.3
	810	1909.8	30.2	21.2	28.4	22.3

Notes:

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

- Head: GMSK Voice Mode
- Body: GMSK (GPRS) mode with 2 time slots, based on the output power measurements above

Target Power:

EGPRS 1 slot 25.2 dBm

EGPRS 2 slot 25.2 dBm

Tune-up Tolerance: -1.5 dB / +0.5 dB

8PSK (EGPRS) Mode - Coding Scheme: MCS5

Band	Ch No.	Freq. (MHz)	1 slot	Frame Avg Pwr	2 slots	Frame Avg Pwr
1900	512	1850.2	25.6	16.6	25.6	19.6
	661	1880.0	25.6	16.6	25.6	19.6
	810	1909.8	25.6	16.6	25.7	19.7

Notes:

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

- Head: GMSK Voice Mode
- Body: 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

9.3. W-CDMA (UMTS) Band V

Target Power: 23.2 dBm

Tune-up Tolerance: -1.5 dB / +0.5 dB

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

Results

Band	Mode	UL Ch No.	Freq. (MHz)	Avg Pwr (dBm)
W-CDMA (UMTS) Band V	Rel 99 (RMC, 12.2 kbps)	4132	826.4	23.5
		4182	836.4	23.6
		4233	846.6	23.5

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
HSDPA Specific Settings	CM (dB)	0	1	1.5	1.5
	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} = β_{hs}/β_c	30/15			

Results

Band	Mode	UL Ch No.	Freq. (MHz)	Target MPR	Avg Pwr (dBm)
W-CDMA (UMTS) Band V	Subtest 1	4132	826.4	0	23.3
		4182	836.4	0	23.3
		4233	846.6	0	23.3
	Subtest 2	4132	826.4	0	23.3
		4182	836.4	0	23.3
		4233	846.6	0	23.3
	Subtest 3	4132	826.4	0.5	22.7
		4182	836.4	0.5	22.5
		4233	846.6	0.5	22.6
	Subtest 4	4132	826.4	0.5	22.7
		4182	836.4	0.5	22.8
		4233	846.6	0.5	22.8

Note(s):

KDB 941225 D01 – Body SAR is not required for HSDPA when the maximum average output of each RF channel with HSDPA active is less than ¼ dB higher than that measured without HSDPA using 12.2 kbps RMC or the maximum SAR for 12.2 kbps RMC is < 75% of the SAR limit.

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 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

Results

Band	Mode	UL Ch No.	Freq. (MHz)	Target MPR	Avg Pwr (dBm)
WCDMA (UMTS) Band V	Subtest 1	4132	826.4	0	22.9
		4182	836.4	0	23.1
		4233	846.6	0	22.8
	Subtest 2	4132	826.4	2	21.5
		4182	836.4	2	21.6
		4233	846.6	2	21.5
	Subtest 3	4132	826.4	1	22.2
		4182	836.4	1	22.0
		4233	846.6	1	21.7
	Subtest 4	4132	826.4	2	22.5
		4182	836.4	2	22.4
		4233	846.6	2	22.4
	Subtest 5	4132	826.4	0	23.4
		4182	836.4	0	23.3
		4233	846.6	0	23.4

Note(s):

- KDB 941225 D01 – Body SAR is not required for handsets with HSPA capabilities when the maximum average output of each RF channel with HSUPA/HSDPA active is less than ¼ dB higher than that measured without HSUPA/HSDPA using 12.2 kbps RMC and the maximum SAR for 12.2kbps RMC is $\leq 75\%$ of the SAR limit.

HSPA+

Since 16QAM is not used for uplink, the uplink Category and release is same as HSUPA, i.e., CAT 6 Rel 6. Therefore, the RF conducted power is not measured.

9.4. W-CDMA (UMTS) Band IV

Target Power: 23.2 dBm

Tune-up Tolerance: -1.5 dB / +0.5 dB

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

Results

Band	Mode	UL Ch No.	Freq. (MHz)	Avg Pwr (dBm)
W-CDMA (UMTS) Band IV	Rel 99 (RMC, 12.2 kbps)	1312	1712.4	23.4
		1412	1732.4	23.6
		1862	1752.5	23.3

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
HSDPA Specific Settings	CM (dB)	0	1	1.5	1.5
	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} = β_{hs}/β_c	30/15			

Results

Band	Mode	UL Ch No.	Freq. (MHz)	Target MPR	Avg Pwr (dBm)
W-CDMA (UMTS) Band IV	Subtest 1	1312	1712.4	0	23.4
		1412	1732.4	0	23.3
		1862	1752.5	0	23.4
	Subtest 2	1312	1712.4	0	23.4
		1412	1732.4	0	23.4
		1862	1752.5	0	23.3
	Subtest 3	1312	1712.4	0.5	22.9
		1412	1732.4	0.5	22.8
		1862	1752.5	0.5	22.7
	Subtest 4	1312	1712.4	0.5	22.9
		1412	1732.4	0.5	22.8
		1862	1752.5	0.5	22.8

Note(s):

KDB 941225 D01 – Body SAR is not required for HSDPA when the maximum average output of each RF channel with HSDPA active is less than ¼ dB higher than that measured without HSDPA using 12.2 kbps RMC or the maximum SAR for 12.2 kbps RMC is < 75% of the SAR limit.

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 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

Results

Band	Mode	UL Ch No.	Freq. (MHz)	Target MPR	Avg Pwr (dBm)
WCDMA (UMTS) Band IV	Subtest 1	1312	1712.4	0	22.7
		1412	1732.4	0	22.7
		1862	1752.5	0	22.7
	Subtest 2	1312	1712.4	2	21.7
		1412	1732.4	2	21.6
		1862	1752.5	2	21.6
	Subtest 3	1312	1712.4	1	22.2
		1412	1732.4	1	21.9
		1862	1752.5	1	22.0
	Subtest 4	1312	1712.4	2	22.5
		1412	1732.4	2	22.4
		1862	1752.5	2	22.4
	Subtest 5	1312	1712.4	0	23.4
		1412	1732.4	0	23.3
		1862	1752.5	0	23.2

Note(s):

- KDB 941225 D01 – Body SAR is not required for handsets with HSPA capabilities when the maximum average output of each RF channel with HSUPA/HSDPA active is less than ¼ dB higher than that measured without HSUPA/HSDPA using 12.2 kbps RMC and the maximum SAR for 12.2kbps RMC is $\leq 75\%$ of the SAR limit.

HSPA+

Since 16QAM is not used for uplink, the uplink Category and release is same as HSUPA, i.e., CAT 6 Rel 6. Therefore, the RF conducted power is not measured.

9.5. W-CDMA (UMTS) Band II

Target Power: 23.2 dBm

Tune-up Tolerance: -1.5 dB / +0.5 dB

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

Results

Band	Mode	UL Ch No.	Freq. (MHz)	Avg Pwr (dBm)
W-CDMA (UMTS) Band II	Rel 99 (RMC, 12.2 kbps)	9262	1852.4	23.6
		9400	1880.0	23.6
		9538	1907.6	23.7

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
HSDPA Specific Settings	CM (dB)	0	1	1.5	1.5
	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} = β_{hs}/β_c	30/15			

Results

Band	Mode	UL Ch No.	Freq. (MHz)	Target MPR	Avg Pwr (dBm)
W-CDMA (UMTS) Band II	Subtest 1	9262	1852.4	0	23.7
		9400	1880.0	0	23.5
		9538	1907.6	0	23.3
	Subtest 2	9262	1852.4	0	23.7
		9400	1880.0	0	23.6
		9538	1907.6	0	23.5
	Subtest 3	9262	1852.4	0.5	23.1
		9400	1880.0	0.5	23.1
		9538	1907.6	0.5	22.9
	Subtest 4	9262	1852.4	0.5	23.0
		9400	1880.0	0.5	23.0
		9538	1907.6	0.5	22.9

Note(s):

KDB 941225 D01 – Body SAR is not required for HSDPA when the maximum average output of each RF channel with HSDPA active is less than ¼ dB higher than that measured without HSDPA using 12.2 kbps RMC or the maximum SAR for 12.2 kbps RMC is < 75% of the SAR limit.

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 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

Results

Band	Mode	UL Ch No.	Freq. (MHz)	Target MPR	Avg Pwr (dBm)
WCDMA (UMTS) Band II	Subtest 1	9262	1852.4	0	22.7
		9400	1880.0	0	22.8
		9538	1907.6	0	22.7
	Subtest 2	9262	1852.4	2	21.6
		9400	1880.0	2	21.6
		9538	1907.6	2	21.2
	Subtest 3	9262	1852.4	1	22.0
		9400	1880.0	1	21.8
		9538	1907.6	1	21.7
	Subtest 4	9262	1852.4	2	22.4
		9400	1880.0	2	22.3
		9538	1907.6	2	22.3
	Subtest 5	9262	1852.4	0	23.2
		9400	1880.0	0	23.2
		9538	1907.6	0	23.2

Note(s):

KDB 941225 D01 – Body SAR is not required for handsets with HSPA capabilities when the maximum average output of each RF channel with HSUPA/HSDPA active is less than ¼ dB higher than that measured without HSUPA/HSDPA using 12.2 kbps RMC and the maximum SAR for 12.2kbps RMC is ≤ 75% of the SAR limit.

HSPA+

Since 16QAM is not used for uplink, the uplink Category and release is same as HSUPA, i.e., CAT 6 Rel 6. Therefore, the RF conducted power is not measured.

9.6. Wi-Fi (2.4 GHz band)

Band (GHz)	Mode	Ch #	Freq. (MHz)	Measured Avg Pwr(dBm)
2.4	802.11b	1	2412	15.8
		6	2437	15.7
		11	2462	15.6
	802.11g	1	2412	11.7
		6	2437	12.0
		11	2462	11.7
	802.11n (HT20)	1	2412	10.8
		6	2437	11.0
		11	2462	11.1

Note(s):

- 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 802.11a/b channels. As per KDB 248227

9.7. Wi-Fi (5 GHz bands)

Band (GHz)	Mode	Ch #	Freq. (MHz)	Measured Avg Pwr(dBm)	Note
5.2	802.11a	36	5180	13.0	
		40	5200	13.0	
		44	5220	13.0	
		48	5240	13.0	
	802.11n (HT20)	36	5180	12.0	
		40	5200	11.9	
		48	5240	11.9	
5.3	802.11a	52	5260	12.7	
		56	5280	12.7	
		60	5300	12.7	
		64	5320	12.7	
	802.11n (HT20)	52	5260	11.9	
		60	5300	11.6	
		64	5320	12.0	
5.5	802.11a	100	5500	12.9	
		104	5520	12.9	
		108	5540	12.5	
		112	5560	12.5	
		116	5580	12.5	
		120	5600		2
		124	5620		2
		128	5640		2
		132	5660	12.5	
		136	5680	12.5	
		140	5700	12.2	
	802.11n (HT20)	100	5500	11.6	
		116	5580	11.4	
		140	5700	11.5	
5.8	802.11a	149	5745	12.7	
		153	5765	12.5	
		157	5785	12.5	
		161	5805	12.5	
		165	5825	12.8	
	802.11n (HT20)	149	5745	11.6	
		157	5785	11.4	
		165	5825	11.5	

Note(s):

- SAR is not required for 802.HT20 channels when the maximum average output power is less than 1/4 dB higher than that measured on the corresponding 802.11a/b channels. As per KDB 248227
- *: These channels were disabled

9.8. Bluetooth

Refer to Report of Part 15 subpart C 15.247 & Part 15.247 for BT RF conducted power

BT: Max RF Output Power: 9.12 dBm (8.17 mW)

BT LE: Max RF Output Power: 7.32 dBm (LE)

Note(s):

According to KDB 648474, Table 2, Unlicensed transmitters

When there is simultaneous transmission, Stand-alone SAR not required due to

- ☐ Output $\leq 2 \cdot P_{\text{Ref}}$ (13.8dBm / 24 mW) and antenna is ≥ 5.0 cm from other antennas
- ☐ Output $\leq P_{\text{Ref}}$ (10.79dBm / 12 mW) and antenna is ≥ 2.5 cm from other antennas
- ☒ Output $\leq P_{\text{Ref}}$ (10.79dBm / 12 mW) and antenna is < 2.5 cm from other antennas

10. Tissue Dielectric Properties

IEEE Std 1528-2003 Table 2

Target Frequency (MHz)	Head	
	ϵ_r	σ (S/m)
300	45.3	0.87
450	43.5	0.87
835	41.5	0.90
900	41.5	0.97
1450	40.5	1.20
1800 – 2000	40.0	1.40
2450	39.2	1.80
2600	39.0	1.96
3000	38.5	2.40

FCC OET Bulletin 65 Supplement C 01-01

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

10.1. Composition of Ingredients for the Tissue Material Used in the SAR Tests

The following tissue formulations are provided for reference only as some of the parameters have not been thoroughly verified. The composition of ingredients may be modified accordingly to achieve the desired target tissue parameters required for routine SAR evaluation.

Ingredients (% by weight)	Frequency (MHz)									
	450		835		915		1900		2450	
Tissue Type	Head	Body	Head	Body	Head	Body	Head	Body	Head	Body
Water	38.56	51.16	41.45	52.4	41.05	56.0	54.9	40.4	62.7	73.2
Salt (NaCl)	3.95	1.49	1.45	1.4	1.35	0.76	0.18	0.5	0.5	0.04
Sugar	56.32	46.78	56.0	45.0	56.5	41.76	0.0	58.0	0.0	0.0
HEC	0.98	0.52	1.0	1.0	1.0	1.21	0.0	1.0	0.0	0.0
Bactericide	0.19	0.05	0.1	0.1	0.1	0.27	0.0	0.1	0.0	0.0
Triton X-100	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	36.8	0.0
DGBE	0.0	0.0	0.0	0.0	0.0	0.0	44.92	0.0	0.0	26.7
Dielectric Constant	43.42	58.0	42.54	56.1	42.0	56.8	39.9	54.0	39.8	52.5
Conductivity (S/m)	0.85	0.83	0.91	0.95	1.0	1.07	1.42	1.45	1.88	1.78

Salt: 99+% Pure Sodium Chloride

Sugar: 98+% Pure Sucrose

Water: De-ionized, 16 MΩ+ resistivity

HEC: Hydroxyethyl Cellulose

DGBE: 99+% Di(ethylene glycol) butyl ether, [2-(2-butoxyethoxy)ethanol]

Triton X-100 (ultra pure): Polyethylene glycol mono [4-(1,1, 3, 3-tetramethylbutyl)phenyl]ether

MSL/HSL1750 (Body and Head liquids for 1700 – 1800 MHz)

Item	Head Tissue Simulation Liquids HSL1750 Muscle (body) Tissue Simulation Liquids MSL1750
Type No	SL AAM 175
Manufacturer	SPEAG
-The item is composed of the following ingredients:	
H ² O	Water, 52 – 75%
C8H18O3	Diethylene glycol monobutyl ether (DGBE), 25-48%
NaCl	Sodium Chloride, <1.0%

Simulating Liquids for 5 GHz, Manufactured by SPEAG

Ingredients	(% by weight)
Water	78
Mineral oil	11
Emulsifiers	9
Additives and Salt	2

10.2. Tissue Dielectric Parameter Check Results

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

Date	Freq. (MHz)	Liquid Parameters			Measured	Target	Delta (%)	Limit ±(%)	
8/14/2012	Head 1750	e'	41.5912	Relative Permittivity (ϵ_r):	41.59	40.08	3.76	5	
		e''	13.7533	Conductivity (σ):	1.34	1.37	-2.24	5	
	Head 1720	e'	41.7163	Relative Permittivity (ϵ_r):	41.72	40.13	3.95	5	
		e''	13.6857	Conductivity (σ):	1.31	1.35	-3.19	5	
	Head 1735	e'	41.6514	Relative Permittivity (ϵ_r):	41.65	40.11	3.85	5	
		e''	13.7183	Conductivity (σ):	1.32	1.36	-2.73	5	
8/14/2012	Body 5180	e'	48.2465	Relative Permittivity (ϵ_r):	48.25	49.05	-1.63	10	
		e''	18.5287	Conductivity (σ):	5.34	5.27	1.24	5	
	Body 5200	e'	48.2196	Relative Permittivity (ϵ_r):	48.22	49.02	-1.63	10	
		e''	18.4492	Conductivity (σ):	5.33	5.29	0.75	5	
	Body 5500	e'	47.6249	Relative Permittivity (ϵ_r):	47.62	48.61	-2.03	10	
		e''	18.7309	Conductivity (σ):	5.73	5.64	1.48	5	
	Body 5800	e'	47.1676	Relative Permittivity (ϵ_r):	47.17	48.20	-2.14	10	
		e''	19.0745	Conductivity (σ):	6.15	6.00	2.52	5	
	Body 5825	e'	47.3040	Relative Permittivity (ϵ_r):	47.30	48.20	-1.86	10	
		e''	18.8947	Conductivity (σ):	6.12	6.00	2.00	5	
	8/14/2012	Body 2450	e'	51.7921	Relative Permittivity (ϵ_r):	51.79	52.70	-1.72	5
			e''	14.2409	Conductivity (σ):	1.94	1.95	-0.51	5
Body 2410		e'	51.9321	Relative Permittivity (ϵ_r):	51.93	52.76	-1.57	5	
		e''	14.1021	Conductivity (σ):	1.89	1.91	-0.93	5	
Body 2435		e'	51.8417	Relative Permittivity (ϵ_r):	51.84	52.73	-1.68	5	
		e''	14.1868	Conductivity (σ):	1.92	1.93	-0.53	5	
Body 2475		e'	51.7143	Relative Permittivity (ϵ_r):	51.71	52.67	-1.81	5	
		e''	14.3417	Conductivity (σ):	1.97	1.99	-0.58	5	
8/15/2012	Body 5180	e'	48.8156	Relative Permittivity (ϵ_r):	48.82	49.05	-0.47	10	
		e''	18.2019	Conductivity (σ):	5.24	5.27	-0.55	5	
	Body 5200	e'	48.7388	Relative Permittivity (ϵ_r):	48.74	49.02	-0.57	10	
		e''	18.2251	Conductivity (σ):	5.27	5.29	-0.48	5	
	Body 5500	e'	48.3831	Relative Permittivity (ϵ_r):	48.38	48.61	-0.47	10	
		e''	18.4179	Conductivity (σ):	5.63	5.64	-0.21	5	
	Body 5800	e'	47.8080	Relative Permittivity (ϵ_r):	47.81	48.20	-0.81	10	
		e''	18.6898	Conductivity (σ):	6.03	6.00	0.46	5	
	Body 5825	e'	47.8436	Relative Permittivity (ϵ_r):	47.84	48.20	-0.74	10	
		e''	18.6852	Conductivity (σ):	6.05	6.00	0.87	5	
	8/15/2012	Body 5180	e'	48.5995	Relative Permittivity (ϵ_r):	48.60	49.05	-0.91	10
			e''	18.3943	Conductivity (σ):	5.30	5.27	0.50	5
Body 5200		e'	48.4594	Relative Permittivity (ϵ_r):	48.46	49.02	-1.14	10	
		e''	18.3836	Conductivity (σ):	5.32	5.29	0.39	5	
Body 5500		e'	48.1153	Relative Permittivity (ϵ_r):	48.12	48.61	-1.02	10	
		e''	18.5137	Conductivity (σ):	5.66	5.64	0.31	5	
Body 5800		e'	47.4977	Relative Permittivity (ϵ_r):	47.50	48.20	-1.46	10	
		e''	18.6150	Conductivity (σ):	6.00	6.00	0.06	5	
Body 5825		e'	47.5856	Relative Permittivity (ϵ_r):	47.59	48.20	-1.27	10	
		e''	18.7032	Conductivity (σ):	6.06	6.00	0.96	5	

Tissue Dielectric Parameter Check Results (continued)

Date	Freq. (MHz)		Liquid Parameters		Measured	Target	Delta (%)	Limit ±(%)
8/15/2012	Body 5180	e'	48.5995	Relative Permittivity (ϵ_r):	48.60	49.05	-0.91	10
		e"	18.3943	Conductivity (σ):	5.30	5.27	0.50	5
	Body 5200	e'	48.4594	Relative Permittivity (ϵ_r):	48.46	49.02	-1.14	10
		e"	18.3836	Conductivity (σ):	5.32	5.29	0.39	5
	Body 5500	e'	48.1153	Relative Permittivity (ϵ_r):	48.12	48.61	-1.02	10
		e"	18.5137	Conductivity (σ):	5.66	5.64	0.31	5
	Body 5800	e'	47.4977	Relative Permittivity (ϵ_r):	47.50	48.20	-1.46	10
		e"	18.6150	Conductivity (σ):	6.00	6.00	0.06	5
	Body 5825	e'	47.5856	Relative Permittivity (ϵ_r):	47.59	48.20	-1.27	10
		e"	18.7032	Conductivity (σ):	6.06	6.00	0.96	5
8/15/2012	Head 2450	e'	38.1726	Relative Permittivity (ϵ_r):	38.17	39.20	-2.62	5
		e"	13.5362	Conductivity (σ):	1.84	1.80	2.44	5
	Head 2410	e'	38.3176	Relative Permittivity (ϵ_r):	38.32	39.28	-2.45	5
		e"	13.4188	Conductivity (σ):	1.80	1.76	2.14	5
	Head 2435	e'	38.2632	Relative Permittivity (ϵ_r):	38.26	39.24	-2.48	5
		e"	13.5002	Conductivity (σ):	1.83	1.78	2.55	5
	Head 2475	e'	38.0818	Relative Permittivity (ϵ_r):	38.08	39.17	-2.77	5
		e"	13.6257	Conductivity (σ):	1.88	1.83	2.63	5
8/16/2012	Head 1900	e'	39.7984	Relative Permittivity (ϵ_r):	39.80	40.00	-0.50	5
		e"	13.1545	Conductivity (σ):	1.39	1.40	-0.73	5
	Head 1850	e'	40.0132	Relative Permittivity (ϵ_r):	40.01	40.00	0.03	5
		e"	13.0146	Conductivity (σ):	1.34	1.40	-4.37	5
	Head 1880	e'	39.8786	Relative Permittivity (ϵ_r):	39.88	40.00	-0.30	5
		e"	13.0979	Conductivity (σ):	1.37	1.40	-2.20	5
	Head 1910	e'	39.7631	Relative Permittivity (ϵ_r):	39.76	40.00	-0.59	5
		e"	13.1839	Conductivity (σ):	1.40	1.40	0.01	5
8/17/2012	Head 835	e'	42.9385	Relative Permittivity (ϵ_r):	42.94	41.50	3.47	5
		e"	19.4295	Conductivity (σ):	0.90	0.90	0.23	5
	Head 815	e'	43.1577	Relative Permittivity (ϵ_r):	43.16	41.63	3.67	5
		e"	19.4970	Conductivity (σ):	0.88	0.90	-1.62	5
	Head 850	e'	42.7728	Relative Permittivity (ϵ_r):	42.77	41.50	3.07	5
		e"	19.3875	Conductivity (σ):	0.92	0.92	0.14	5
8/17/2012	Body 1900	e'	53.1134	Relative Permittivity (ϵ_r):	53.11	53.30	-0.35	5
		e"	14.6014	Conductivity (σ):	1.54	1.52	1.49	5
	Body 1850	e'	53.3355	Relative Permittivity (ϵ_r):	53.34	53.30	0.07	5
		e"	14.5017	Conductivity (σ):	1.49	1.52	-1.86	5
	Body 1880	e'	53.2589	Relative Permittivity (ϵ_r):	53.26	53.30	-0.08	5
		e"	14.5535	Conductivity (σ):	1.52	1.52	0.09	5
	Body 1910	e'	53.0766	Relative Permittivity (ϵ_r):	53.08	53.30	-0.42	5
		e"	14.6666	Conductivity (σ):	1.56	1.52	2.48	5
8/19/2012	Body 835	e'	55.7343	Relative Permittivity (ϵ_r):	55.73	55.20	0.97	5
		e"	21.3068	Conductivity (σ):	0.99	0.97	1.98	5
	Body 815	e'	55.8743	Relative Permittivity (ϵ_r):	55.87	55.30	1.05	5
		e"	21.3706	Conductivity (σ):	0.97	0.97	0.04	5
	Body 820	e'	55.9201	Relative Permittivity (ϵ_r):	55.92	55.28	1.16	5
		e"	21.4968	Conductivity (σ):	0.98	0.97	1.21	5
	Body 850	e'	55.5401	Relative Permittivity (ϵ_r):	55.54	55.16	0.69	5
		e"	21.2628	Conductivity (σ):	1.00	0.99	1.80	5

Tissue Dielectric Parameter Check Results (continued)

Date	Freq. (MHz)	Liquid Parameters		Measured	Target	Delta (%)	Limit ±(%)	
8/19/2012	Body 5180	e'	48.4518	Relative Permittivity (ε _r):	48.45	49.05	-1.21	10
		e"	18.5507	Conductivity (σ):	5.34	5.27	1.36	5
	Body 5200	e'	48.4651	Relative Permittivity (ε _r):	48.47	49.02	-1.13	10
		e"	18.5827	Conductivity (σ):	5.37	5.29	1.48	5
	Body 5500	e'	48.0427	Relative Permittivity (ε _r):	48.04	48.61	-1.17	10
		e"	18.5711	Conductivity (σ):	5.68	5.64	0.62	5
	Body 5800	e'	47.6417	Relative Permittivity (ε _r):	47.64	48.20	-1.16	10
		e"	18.8055	Conductivity (σ):	6.06	6.00	1.08	5
	Body 5825	e'	47.3405	Relative Permittivity (ε _r):	47.34	48.20	-1.78	10
		e"	18.7903	Conductivity (σ):	6.09	6.00	1.43	5
8/20/2012	Head 5180	e'	36.1841	Relative Permittivity (ε _r):	36.18	36.01	0.48	10
		e"	16.2007	Conductivity (σ):	4.67	4.63	0.77	5
	Head 5200	e'	36.0511	Relative Permittivity (ε _r):	36.05	35.99	0.17	10
		e"	16.1740	Conductivity (σ):	4.68	4.65	0.55	5
	Head 5500	e'	35.6762	Relative Permittivity (ε _r):	35.68	35.65	0.08	10
		e"	16.3555	Conductivity (σ):	5.00	4.96	0.88	5
	Head 5800	e'	35.2310	Relative Permittivity (ε _r):	35.23	35.30	-0.20	10
		e"	16.3614	Conductivity (σ):	5.28	5.27	0.12	5
	Head 5825	e'	35.1914	Relative Permittivity (ε _r):	35.19	35.30	-0.31	10
		e"	16.6082	Conductivity (σ):	5.38	5.27	2.07	5
8/21/2012	Head 5180	e'	36.0069	Relative Permittivity (ε _r):	36.01	36.01	-0.02	10
		e"	16.2118	Conductivity (σ):	4.67	4.63	0.84	5
	Head 5200	e'	36.0774	Relative Permittivity (ε _r):	36.08	35.99	0.24	10
		e"	16.1996	Conductivity (σ):	4.68	4.65	0.71	5
	Head 5500	e'	35.5248	Relative Permittivity (ε _r):	35.52	35.65	-0.35	10
		e"	16.3896	Conductivity (σ):	5.01	4.96	1.09	5
	Head 5800	e'	35.0912	Relative Permittivity (ε _r):	35.09	35.30	-0.59	10
		e"	16.6174	Conductivity (σ):	5.36	5.27	1.69	5
	Head 5825	e'	35.9785	Relative Permittivity (ε _r):	35.98	35.30	1.92	10
		e"	16.5438	Conductivity (σ):	5.36	5.27	1.68	5
8/21/2012	Body 1720	e'	53.6478	Relative Permittivity (ε _r):	53.65	53.52	0.24	5
		e"	14.8439	Conductivity (σ):	1.42	1.47	-3.27	5
	Body 1735	e'	53.5159	Relative Permittivity (ε _r):	53.52	53.48	0.07	5
		e"	14.8129	Conductivity (σ):	1.43	1.48	-3.24	5
	Body 1750	e'	53.5109	Relative Permittivity (ε _r):	53.51	53.44	0.13	5
		e"	14.9323	Conductivity (σ):	1.45	1.49	-2.23	5
8/22/2012	Body 1900	e'	52.9463	Relative Permittivity (ε _r):	52.95	53.30	-0.66	5
		e"	14.4347	Conductivity (σ):	1.52	1.52	0.33	5
	Body 1850	e'	52.9972	Relative Permittivity (ε _r):	53.00	53.30	-0.57	5
		e"	14.3064	Conductivity (σ):	1.47	1.52	-3.18	5
	Body 1880	e'	52.8856	Relative Permittivity (ε _r):	52.89	53.30	-0.78	5
		e"	14.3092	Conductivity (σ):	1.50	1.52	-1.59	5
	Body 1910	e'	52.7975	Relative Permittivity (ε _r):	52.80	53.30	-0.94	5
		e"	14.4159	Conductivity (σ):	1.53	1.52	0.72	5
8/23/2012	Head 835	e'	42.2078	Relative Permittivity (ε _r):	42.21	41.50	1.71	5
		e"	19.1909	Conductivity (σ):	0.89	0.90	-1.00	5
	Head 815	e'	42.4555	Relative Permittivity (ε _r):	42.46	41.63	1.99	5
		e"	19.2606	Conductivity (σ):	0.87	0.90	-2.81	5
	Head 850	e'	42.0294	Relative Permittivity (ε _r):	42.03	41.50	1.28	5
		e"	19.1523	Conductivity (σ):	0.91	0.92	-1.07	5

Tissue Dielectric Parameter Check Results (continued)

Date	Freq. (MHz)	Liquid Parameters			Measured	Target	Delta (%)	Limit ±(%)
8/23/2012	Head 1900	e'	41.0572	Relative Permittivity (ϵ_r):	41.06	40.00	2.64	5
		e''	13.1461	Conductivity (σ):	1.39	1.40	-0.80	5
	Head 1850	e'	41.0701	Relative Permittivity (ϵ_r):	41.07	40.00	2.68	5
		e''	13.1747	Conductivity (σ):	1.36	1.40	-3.20	5
	Head 1880	e'	41.0575	Relative Permittivity (ϵ_r):	41.06	40.00	2.64	5
		e''	13.1055	Conductivity (σ):	1.37	1.40	-2.15	5
	Head 1910	e'	40.9239	Relative Permittivity (ϵ_r):	40.92	40.00	2.31	5
		e''	13.2082	Conductivity (σ):	1.40	1.40	0.20	5

11. System Performance Check

The system performance check is performed prior to any usage of the system in order to verify SAR system measurement accuracy. The system performance check verifies that the system operates within its specifications of $\pm 10\%$.

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 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	4d002	3/6/12	835	1g	9.32	9.41
				10g	6.08	6.20
D1750V2	1050	4/19/12	1750	1g	35.9	36.9
				10g	19.1	19.9
D1900V2	5d140	4/12/12	1900	1g	39.8	40.2
				10g	20.8	21.3
D2450V2	748	2/7/12	2450	1g	52.7	49.9
				10g	24.6	23.4
D5GHzV2	1075	2/14/12	5200	1g	79.4	72.7
				10g	22.8	20.5
			5500	1g	85.7	77.7
				10g	24.3	21.7
			5800	1g	78.9	72.5
				10g	22.5	20.2
D5GHzV2	1003	8/23/11	5200	1g	76.3	74.4
				10g	21.7	20.8
			5500	1g	80.7	79.9
				10g	23.0	22.3
			5800	1g	76.0	76.2
				10g	21.6	21.2

11.3. System Performance Check Results

Date Tested	System Dipole		T.S. Liquid	SAR Measured (Normalized to 1 W)		Target (Ref. Value)	Delta (%)	Tolerance (%)
	Type	Serial No.						
8/14/2012	D1750V2	1050	Head	1g	34.0	35.9	-5.29	±10
				10g	18.1	19.1	-5.24	
8/14/2012	D5GHzV2 (5.2GHz)	1075	Body	1g	78.3	72.7	7.70	±10
				10g	22.1	20.5	7.80	
8/14/2012	D2450V2 (2450MHz)	748	Body	1g	54.2	49.9	8.62	±10
				10g	25.4	23.4	8.55	
8/15/2012	D5GHzV2 (5.8GHz)	1003	Body	1g	77.5	76.2	1.71	±10
				10g	21.8	21.2	2.83	
8/15/2012	D5GHzV2 (5.2GHz)	1075	Body	1g	75.2	72.7	3.44	±10
				10g	21.3	20.5	3.90	
8/15/2012	D2450V2 (2450MHz)	748	Head	1g	57.3	52.7	8.73	±10
				10g	26.3	24.6	6.91	
8/16/2012	D1900V2	5d140	Head	1g	38.1	39.8	-4.27	±10
				10g	20.1	20.8	-3.37	
8/17/2012	D835V2	4d002	Head	1g	9.84	9.32	5.58	±10
				10g	6.43	6.08	5.76	
8/17/2012	D1900V2	5d140	Body	1g	41.2	40.2	2.49	±10
				10g	21.7	21.3	1.88	
8/19/2012	D835V2	4d002	Body	1g	9.49	9.41	0.85	±10
				10g	6.25	6.2	0.81	
8/19/2012	D5GHzV2 (5.5GHz)	1075	Body	1g	82.4	77.7	6.05	±10
				10g	23.2	21.7	6.91	
8/19/2012	D5GHzV2 (5.6GHz)	1075	Body	1g	74.5	77.7	-4.12	±10
				10g	20.9	21.7	-3.69	
8/20/2012	D5GHzV2 (5.5GHz)	1075	Head	1g	87.4	85.7	1.98	±10
				10g	24.9	24.3	2.47	
8/20/2012	D5GHzV2 (5.6GHz)	1075	Head	1g	80.7	85.7	-5.83	±10
				10g	23.1	24.3	-4.94	
8/21/2012	D5GHzV2 (5.8GHz)	1075	Head	1g	80.9	78.9	2.53	±10
				10g	23.1	22.5	2.67	
8/21/2012	D1750V2	1050	Body	1g	36.7	36.9	-0.54	±10
				10g	19.6	19.9	-1.51	
8/22/2012	D1900V2	5d140	Body	1g	42.5	40.2	5.72	±10
				10g	22.4	21.3	5.16	
8/23/2012	D835V2	4d002	Head	1g	9.26	9.32	-0.64	±10
				10g	6.05	6.08	-0.49	
8/23/2012	D1900V2	5d140	Head	1g	38.8	39.8	-2.51	±10
				10g	20.4	20.8	-1.92	

12. SAR Test Results

12.1. GSM850

12.1.1. Head Exposure Conditions

Test Position	Mode	Ch #.	Freq. (MHz)	Avg Pwr (dBm)	SAR (mW/g)		Note
					1-g	10-g	
Left Touch	GMSK (Voice)	128	824.20	33.3			1
		190	836.60	33.5	0.257	0.198	
		251	848.80	33.5			1
Left Tilt (15°)	GMSK (Voice)	128	824.20	33.3			1
		190	836.60	33.5	0.160	0.125	
		251	848.80	33.5			1
Right Touch	GMSK (Voice)	128	824.20	33.3			1
		190	836.60	33.5	0.263	0.203	
		251	848.80	33.5			1
Right Tilt (15°)	GMSK (Voice)	128	824.20	33.3			1
		190	836.60	33.5	0.152	0.119	
		251	848.80	33.5			1
Test Position	Mode	Ch #.	Freq. (MHz)	Avg Pwr (dBm)	SAR (mW/g)		Note
					1-g	10-g	
Left Touch	GPRS 2 slots	128	824.20	31.0			1
		190	836.60	31.1	0.201	0.155	
		251	848.80	31.1			1
Left Tilt (15°)	GPRS 2 slots	128	824.20	31.0			1
		190	836.60	31.1	0.140	0.108	
		251	848.80	31.1			1
Right Touch	GPRS 2 slots	128	824.20	31.0			1
		190	836.60	31.1	0.222	0.171	
		251	848.80	31.1			1
Right Tilt (15°)	GPRS 2 slots	128	824.20	31.0			1
		190	836.60	31.1	0.131	0.102	
		251	848.80	31.1			1

Note(s):

- According to FCC "Public Notice DA 02-1438" by the SCC-34/SC-2, when the SAR measured for the middle channel is < 50% of the SAR limit, testing for the low and high channel is optional.

12.1.2. Body-worn Accessory Exposure Conditions

Test Position	Mode	Dist. (mm)	Ch #.	Freq. (MHz)	Avg Pwr (dBm)	SAR (mW/g)		Note
						1-g	10-g	
Rear	GMSK (Voice)	10	128	824.20	33.3			1
			190	836.60	33.5	0.524	0.410	
			190	836.60	33.5	0.474	0.318	2
			251	848.80	33.5			1
Front	GMSK (Voice)	10	128	824.20	33.3			1
			190	836.60	33.5	0.250	0.193	
			251	848.80	33.5			1

Note(s):

1. According to FCC "Public Notice DA 02-1438" by the SCC-34/SC-2, when the SAR measured for the middle channel is < 50% of the SAR limit, testing for the low and high channel is optional.
2. With headset attached.

12.1.3. Hotspot Mode Exposure Conditions

Test Position	Mode	Dist. (mm)	Ch #.	Freq. (MHz)	Avg Pwr (dBm)	SAR (mW/g)		Note
						1-g	10-g	
Rear	GPRS 2 slots	10	128	824.20	31.0			1
			190	836.60	31.1	0.372	0.266	
			251	848.80	31.1			1
Front	GPRS 2 slots	10	128	824.20	31.0			1
			190	836.60	31.1	0.196	0.152	
			251	848.80	31.1			1
Edge 2	GPRS 2 slots	10	128	824.20	31.0			1
			190	836.60	31.1	0.197	0.134	
			251	848.80	31.1			1
Edge 3	GPRS 2 slots	10	128	824.20	31.0			1
			190	836.60	31.1	0.235	0.107	
			251	848.80	31.1			1
Edge 4	GPRS 2 slots	10	128	824.20	31.0			1
			190	836.60	31.1	0.189	0.130	
			251	848.80	31.1			1

Note(s):

1. According to FCC "Public Notice DA 02-1438" by the SCC-34/SC-2, when the SAR measured for the middle channel is < 50% of the SAR limit, testing for the low and high channel is optional.

12.2. GSM1900

12.2.1. Head Exposure Conditions

Test Position	Mode	Ch #.	Freq. (MHz)	Avg Pwr (dBm)	SAR (mW/g)		Note
					1-g	10-g	
Left Touch	GMSK (Voice)	512	1850.2	30.1			1
		661	1880.0	30.2	0.286	0.181	
		810	1909.8	30.2			1
Left Tilt (15°)	GMSK (Voice)	512	1850.2	30.1			1
		661	1880.0	30.2	0.141	0.081	
		810	1909.8	30.2			1
Right Touch	GMSK (Voice)	512	1850.2	30.1			1
		661	1880.0	30.2	0.154	0.099	
		810	1909.8	30.2			1
Right Tilt (15°)	GMSK (Voice)	512	1850.2	30.1			1
		661	1880.0	30.2	0.139	0.080	
		810	1909.8	30.2			1
Test Position	Mode	Ch #.	Freq. (MHz)	Avg Pwr (dBm)	SAR (mW/g)		Note
					1-g	10-g	
Left Touch	GPRS 2 slots	512	1850.2	28.4			1
		661	1880.0	28.3	0.308	0.193	
		810	1909.8	28.4			1
Left Tilt (15°)	GPRS 2 slots	512	1850.2	28.4			1
		661	1880.0	28.3	0.155	0.089	
		810	1909.8	28.4			1
Right Touch	GPRS 2 slots	512	1850.2	28.4			1
		661	1880.0	28.3	0.237	0.153	
		810	1909.8	28.4			1
Right Tilt (15°)	GPRS 2 slots	512	1850.2	28.4			1
		661	1880.0	28.3	0.161	0.093	
		810	1909.8	28.4			1

Note(s):

1. According to FCC "Public Notice DA 02-1438" by the SCC-34/SC-2, when the SAR measured for the middle channel is < 50% of the SAR limit, testing for the low and high channel is optional.

12.2.2. Body-worn Accessory Exposure Conditions

Test Position	Mode	Dist. (mm)	Ch #.	Freq. (MHz)	Avg Pwr (dBm)	SAR (mW/g)		Note
						1-g	10-g	
Rear	GMSK (Voice)	10	512	1850.2	30.1	0.551	0.300	
			661	1880.0	30.2	0.796	0.410	
			810	1909.8	30.2	1.130	0.564	
			810	1909.8	30.2	1.090	0.539	2
Front	GMSK (Voice)	10	512	1850.2	30.1			1
			661	1880.0	30.2	0.400	0.217	
			810	1909.8	30.2			1

Note(s):

- According to FCC "Public Notice DA 02-1438" by the SCC-34/SC-2, when the SAR measured for the middle channel is < 50% of the SAR limit, testing for the low and high channel is optional.
- With headset attached.

12.2.3. Hotspot Mode Exposure Conditions

Test Position	Mode	Dist. (mm)	Ch #.	Freq. (MHz)	Avg Pwr (dBm)	SAR (mW/g)		Note
						1-g	10-g	
Rear	GPRS 2 slots	10	512	1850.2	28.4	0.574	0.317	
			661	1880.0	28.3	0.858	0.493	
			810	1909.8	28.4	1.180	0.575	
Front	GPRS 2 slots	10	512	1850.2	28.4			1
			661	1880.0	28.3	0.454	0.247	
			810	1909.8	28.4			1
Edge 2	GPRS 2 slots	10	512	1850.2	28.4			1
			661	1880.0	28.3	0.062	0.037	
			810	1909.8	28.4			1
Edge 3	GPRS 2 slots	10	512	1850.2	28.4			1
			661	1880.0	28.3	0.399	0.209	
			810	1909.8	28.4			1
Edge 4	GPRS 2 slots	10	512	1850.2	28.4			1
			661	1880.0	28.3	0.210	0.122	
			810	1909.8	28.4			1

Note(s):

- According to FCC "Public Notice DA 02-1438" by the SCC-34/SC-2, when the SAR measured for the middle channel is < 50% of the SAR limit, testing for the low and high channel is optional.

12.3. WCDMA (UMTS) Band V

Test mode reduction considerations

Body SAR is not required for handsets with HSPA capabilities when the maximum average output of each RF channel with HSUPA/HSDPA active is less than ¼ dB higher than that measured without HSUPA/HSDPA using 12.2 kbps RMC and the maximum SAR for 12.2kbps RMC is ≤ 75% of the SAR limit as per KDB 941225 D01

12.3.1. Head Exposure Conditions

Test Position	Mode	Ch #.	Freq. (MHz)	Avg Pwr (dBm)	SAR (mW/g)		Note
					1-g	10-g	
Left Touch	Rel 99 RMC 12.2kbps	4132	826.4	23.5			1
		4182	836.4	23.6	0.227	0.175	
		4233	846.6	23.5			1
Left Tilt (15°)	Rel 99 RMC 12.2kbps	4132	826.4	23.5			1
		4182	836.4	23.6	0.134	0.106	
		4233	846.6	23.5			1
Right Touch	Rel 99 RMC 12.2kbps	4132	826.4	23.5			1
		4182	836.4	23.6	0.226	0.174	
		4233	846.6	23.5			1
Right Tilt (15°)	Rel 99 RMC 12.2kbps	4132	826.4	23.5			1
		4182	836.4	23.6	0.140	0.109	
		4233	846.6	23.5			1

12.3.2. Body-worn Accessory & Hotspot Mode Exposure Conditions

Test Position	Mode	Dist. (mm)	Ch #.	Freq. (MHz)	Avg Pwr (dBm)	SAR (mW/g)		Note
						1-g	10-g	
Rear	Rel 99 RMC 12.2kbps	10	4132	826.4	23.5			1
			4182	836.4	23.6	0.468	0.365	
			4182	836.4	23.6	0.328	0.246	2
			4233	846.6	23.5			1
Front	Rel 99 RMC 12.2kbps	10	4132	826.4	23.5			1
			4182	836.4	23.6	0.268	0.207	
			4233	846.6	23.5			1
Edge 2	Rel 99 RMC 12.2kbps	10	4132	826.4	23.5			1
			4182	836.4	23.6	0.278	0.19	
			4233	846.6	23.5			1
Edge 3	Rel 99 RMC 12.2kbps	10	4132	826.4	23.5			1
			4182	836.4	23.6	0.041	0.024	
			4233	846.6	23.5			1
Edge 4	Rel 99 RMC 12.2kbps	10	4132	826.4	23.5			1
			4182	836.4	23.6	0.286	0.195	
			4233	846.6	23.5			1

Note(s):

- According to FCC "Public Notice DA 02-1438" by the SCC-34/SC-2, when the SAR measured for the middle channel is < 50% of the SAR limit, testing for the low and high channel is optional.
- With headset attached.

12.4. WCDMA (UMTS) Band IV

Test mode reduction considerations

Body SAR is not required for handsets with HSPA capabilities when the maximum average output of each RF channel with HSUPA/HSDPA active is less than ¼ dB higher than that measured without HSUPA/HSDPA using 12.2 kbps RMC and the maximum SAR for 12.2kbps RMC is ≤ 75% of the SAR limit as per KDB 941225 D01

12.4.1. Head Exposure Conditions

Test Position	Mode	Ch #.	Freq. (MHz)	Avg Pwr (dBm)	SAR (mW/g)		Note
					1-g	10-g	
Left Touch	Rel 99 RMC 12.2kbps	1312	1712.4	23.4			1
		1412	1732.4	23.6	0.546	0.357	
		1862	1752.5	23.3			1
Left Tilt (15°)	Rel 99 RMC 12.2kbps	1312	1712.4	23.4			1
		1412	1732.4	23.6	0.247	0.166	
		1862	1752.5	23.3			1
Right Touch	Rel 99 RMC 12.2kbps	1312	1712.4	23.4			1
		1412	1732.4	23.6	0.514	0.337	
		1862	1752.5	23.3			1
Right Tilt (15°)	Rel 99 RMC 12.2kbps	1312	1712.4	23.4			1
		1412	1732.4	23.6	0.262	0.161	
		1862	1752.5	23.3			1

12.4.2. Body-worn Accessory & Hotspot Mode Exposure Conditions

Test Position	Mode	Dist. (mm)	Ch #.	Freq. (MHz)	Avg Pwr (dBm)	SAR (mW/g)		Note
						1-g	10-g	
Rear	Rel 99 RMC 12.2kbps	10	1312	1712.4	23.4	1.170	0.689	
			1312	1712.4	23.4	1.150	0.683	2
			1412	1732.4	23.6	1.110	0.658	
			1862	1752.5	23.3	0.978	0.575	
Front	Rel 99 RMC 12.2kbps	10	1312	1712.4	23.4	1.130	0.649	
			1412	1732.4	23.6	0.995	0.571	
			1862	1752.5	23.3	0.926	0.530	
Edge 2	Rel 99 RMC 12.2kbps	10	1312	1712.4	23.4			1
			1412	1732.4	23.6	0.175	0.108	
			1862	1752.5	23.3			1
Edge 3	Rel 99 RMC 12.2kbps	10	1312	1712.4	23.4			1
			1412	1732.4	23.6	0.322	0.191	
			1862	1752.5	23.3			1
Edge 4	Rel 99 RMC 12.2kbps	10	1312	1712.4	23.4			1
			1412	1732.4	23.6	0.453	0.268	
			1862	1752.5	23.3			1

Note(s):

- According to FCC "Public Notice DA 02-1438" by the SCC-34/SC-2, when the SAR measured for the middle channel is < 50% of the SAR limit, testing for the low and high channel is optional.
- With headset attached.

12.5. WCDMA (UMTS) Band II

Test mode reduction considerations

Body SAR is not required for handsets with HSPA capabilities when the maximum average output of each RF channel with HSUPA/HSDPA active is less than ¼ dB higher than that measured without HSUPA/HSDPA using 12.2 kbps RMC and the maximum SAR for 12.2kbps RMC is ≤ 75% of the SAR limit as per KDB 941225 D01

12.5.1. Head Exposure Conditions

Test Position	Mode	Ch #.	Freq. (MHz)	Avg Pwr (dBm)	SAR (mW/g)		Note
					1-g	10-g	
Left Touch	Rel 99 RMC 12.2kbps	9262	1852.4	23.6			1
		9400	1880.0	23.6	0.476	0.300	
		9538	1907.6	23.7			1
Left Tilt (15°)	Rel 99 RMC 12.2kbps	9262	1852.4	23.6			1
		9400	1880.0	23.6	0.242	0.141	
		9538	1907.6	23.7			1
Right Touch	Rel 99 RMC 12.2kbps	9262	1852.4	23.6			1
		9400	1880.0	23.6	0.333	0.215	
		9538	1907.6	23.7			1
Right Tilt (15°)	Rel 99 RMC 12.2kbps	9262	1852.4	23.6			1
		9400	1880.0	23.6	0.268	0.155	
		9538	1907.6	23.7			1

12.5.2. Body-worn Accessory & Hotspot Mode Exposure Conditions

Test Position	Mode	Dist. (mm)	Ch #.	Freq. (MHz)	Avg Pwr (dBm)	SAR (mW/g)		Note
						1-g	10-g	
Rear	Rel 99 RMC 12.2kbps	10	9262	1852.4	23.6	0.854	0.508	
			9400	1880.0	23.6	0.919	0.503	
			9538	1907.6	23.7	1.270	0.651	
			9538	1907.6	23.7	1.250	0.638	2
Rear	HSDPA Subtest 1	10	9262	1852.4	23.7	0.836	0.498	
			9400	1880.0	23.5	0.907	0.494	
			9538	1907.6	23.3	1.230	0.630	
Rear	HSUPA Subtest 5	10	9262	1852.4	23.2	0.759	0.439	
			9400	1880.0	23.2	0.855	0.456	
			9538	1907.6	23.2	1.110	0.582	
Front	Rel 99 RMC 12.2kbps	10	9262	1852.4	23.6			1
			9400	1880.0	23.6	0.688	0.372	
			9538	1907.6	23.7			1
Edge 2	Rel 99 RMC 12.2kbps	10	9262	1852.4	23.6			1
			9400	1880.0	23.6	0.121	0.073	
			9538	1907.6	23.7			1
Edge 3	Rel 99 RMC 12.2kbps	10	9262	1852.4	23.6			1
			9400	1880.0	23.6	0.451	0.239	
			9538	1907.6	23.7			1
Edge 4	Rel 99 RMC 12.2kbps	10	9262	1852.4	23.6			1
			9400	1880.0	23.6	0.325	0.190	
			9538	1907.6	23.7			1

Note(s):

- According to FCC "Public Notice DA 02-1438" by the SCC-34/SC-2, when the SAR measured for the middle channel is < 50% of the SAR limit, testing for the low and high channel is optional.
- With headset attached.

12.6. Wi-Fi (2.4 GHz Band)

12.6.1. Head Exposure Conditions

Test Position	Mode	Ch #.	Freq. (MHz)	Avg Pwr (dBm)	SAR (mW/g)		Note
					1-g	10-g	
Left Touch	802.11b	1	2412	15.8			1
		6	2437	15.7	0.079	0.038	
		11	2462	15.6			1
Left Tilt (15°)	802.11b	1	2412	15.8			1
		6	2437	15.7	0.036	0.018	
		11	2462	15.6			1
Right Touch	802.11b	1	2412	15.8			1
		6	2437	15.7	0.034	0.017	
		11	2462	15.6			1
Right Tilt (15°)	802.11b	1	2412	15.8			1
		6	2437	15.7	0.040	0.020	
		11	2462	15.6			1

12.6.2. Body-worn Accessory & Hotspot Mode Exposure Conditions

Test Position	Mode	Dist. (mm)	Ch #.	Freq. (MHz)	Avg Pwr (dBm)	SAR (mW/g)		Note
						1-g	10-g	
Rear	802.11b	10	1	2412	15.8			1
			6	2437	15.7	0.216	0.105	
			6	2437	15.7	0.232	0.113	2
			11	2462	15.6			1
Front	802.11b	10	1	2412	15.8			1
			6	2437	15.7	0.044	0.023	
			11	2462	15.6			1
Edge 1	802.11b	10	1	2412	15.8			1
			6	2437	15.7	0.031	0.017	
			11	2462	15.6			1
Edge 2	802.11b	10	1	2412	15.8			1
			6	2437	15.7	0.110	0.053	
			11	2462	15.6			1

Note(s):

- For frequency bands with an operating range of < 100 MHz, when the SAR measured for the highest output power channel within is ≤ 0.8 W/kg, SAR for the remaining channels is not required. Per KDB 447498 1) e) i)
- With headset attached.

12.7. Wi-Fi (5 GHz Bands)

12.7.1. Head Exposure Conditions

Test Position	Mode	Ch #.	Freq. (MHz)	Avg Pwr (dBm)	SAR (mW/g)	
					1-g	10-g
Left Touch	802.11a (5.2 GHz)	36	5180	13.0	0.133	0.032
		48	5240	13.0	0.137	0.034
Left Tilt (15°)		36	5180	13.0	0.086	0.023
		48	5240	13.0	0.085	0.023
Right Touch		36	5180	13.0	0.070	0.021
		48	5240	13.0	0.067	0.022
Right Tilt (15°)		36	5180	13.0	0.059	0.018
		48	5240	13.0	0.060	0.021
Left Touch	802.11a (5.3 GHz)	52	5260	12.7	0.124	0.030
		64	5320	12.7	0.114	0.031
Left Tilt (15°)		52	5260	12.7	0.065	0.017
		64	5320	12.7	0.080	0.021
Right Touch		52	5260	12.7	0.060	0.019
		64	5320	12.7	0.049	0.015
Right Tilt (15°)		52	5260	12.7	0.068	0.026
		64	5320	12.7	0.059	0.023
Left Touch	802.11a (5.5 GHz)	104	5520	12.9	0.090	0.027
		116	5580	12.5	0.083	0.026
		132	5660	12.5	0.069	0.021
		136	5680	12.5	0.076	0.025
Left Tilt (15°)		104	5520	12.9	0.058	0.022
		116	5580	12.5	0.061	0.020
		132	5660	12.5	0.060	0.023
		136	5680	12.5	0.052	0.021
Right Touch		104	5520	12.9	0.029	0.010
		116	5580	12.5	0.037	0.011
		132	5660	12.5	0.035	0.011
		136	5680	12.5	0.032	0.011
Right Tilt (15°)		104	5520	12.9	0.022	0.008
		116	5580	12.5	0.024	0.009
		132	5660	12.5	0.024	0.010
		136	5680	12.5	0.030	0.014
Left Touch	802.11a (5.8 GHz)	149	5745	12.7	0.063	0.021
		157	5785	12.5	0.061	0.019
		165	5825	12.8	0.053	0.016
Left Tilt (15°)		149	5745	12.7	0.046	0.018
		157	5785	12.5	0.032	0.014
		165	5825	12.8	0.024	0.009
Right Touch		149	5745	12.7	0.022	0.007
		157	5785	12.5	0.024	0.008
		165	5825	12.8	0.020	0.006
Right Tilt (15°)		149	5745	12.7	0.00653	0.000996
		157	5785	12.5	0.00974	0.00223
		165	5825	12.8	0.00952	0.00216

12.7.2. Body-worn Accessory Exposure Conditions

Hotspot SAR is not required for WiFi in the 5 GHz Bands as these transmission bands do not support hotspot mode operation.

Test Position	Mode	Dist. (mm)	Ch #.	Freq. (MHz)	Avg Pwr (dBm)	SAR (mW/g)		Note
						1-g	10-g	
Rear	802.11a (5.2 GHz)	10	36	5180	13.0	0.127	0.036	
			48	5240	13.0	0.133	0.039	
			48	5240	13.0	0.128	0.038	1
Front		10	36	5180	13.0	0.034	0.00922	
			48	5240	13.0	0.0099	0.00132	
Rear	802.11a (5.3 GHz)	10	52	5260	12.7	0.155	0.047	
			64	5320	12.7	0.145	0.046	1
			64	5320	12.7	0.141	0.045	
Front		10	52	5260	12.7	0.024	0.008	
			64	5320	12.7	0.026	0.00696	
Rear	802.11a (5.5 GHz)	10	104	5520	12.9	0.125	0.034	
			116	5580	12.5	0.160	0.051	
			132	5660	12.5	0.126	0.039	
			136	5680	12.5	0.178	0.052	
			136	5680	12.5	0.164	0.051	1
Front		10	104	5520	12.9	0.035	0.010	
			116	5580	12.5	0.041	0.010	
			132	5660	12.5	0.036	0.010	
			136	5680	12.5	0.030	0.006	
Rear	802.11a (5.8 GHz)	10	149	5745	12.7	0.114	0.035	
			157	5785	12.5	0.126	0.038	
			157	5785	12.5	0.102	0.030	1
			165	5825	12.8	0.103	0.031	
Front		10	149	5745	12.7	0.017	0.00607	
			157	5785	12.5	0.019	0.00727	
			165	5825	12.8	0.017	0.0047	

Note(s):

1. With headset attached.

13. Summary of Highest SAR Values

Results of highest SAR values for each frequency band and mode

Technology/Band	Test configuration		Mode	Highest 1g SAR (W/kg)
GSM850 (part 22)	Head	Right Touch	GSM	0.263
	Head	Right Touch	GPRS 2 slots	0.222
	Body	Rear	GMSK (Voice)	0.524
	Hotspot	Rear	GPRS 2 slots	0.372
GSM1900 (part 24)	Head	Left Touch	GSM	0.286
	Head	Left Touch	GPRS 2 slots	0.308
	Body	Rear	GMSK (Voice)	1.130
	Hotspot	Rear	GPRS 2 slots	1.180
W-CDMA Band V (part 22)	Head	Left Touch	Rel 99 RMC 12.2kbps	0.227
	Body & Hotspot	Rear	Rel 99 RMC 12.2kbps	0.468
W-CDMA Band IV (part 27)	Head	Left Touch	Rel 99 RMC 12.2kbps	0.546
	Body & Hotspot	Rear	Rel 99 RMC 12.2kbps	1.170
W-CDMA Band II (part 24)	Head	Left Touch	Rel 99 RMC 12.2kbps	0.476
	Body & Hotspot	Rear	Rel 99 RMC 12.2kbps	1.270
	Body & Hotspot	Rear	HSDPA Subtest 1	1.230
	Body & Hotspot	Rear	HSUPA Subtest 5	1.110
WiFi 2.4 GHz (part 15.247)	Head	Left Touch	802.11b 1Mbps	0.079
	Body & Hotspot	Rear	802.11b 1Mbps w/ headset	0.232
WiFi 5.2 GHz (part 15.407)	Head	Left Touch	802.11a 6Mbps	0.137
	Body	Rear	802.11a 6Mbps	0.133
WiFi 5.3 GHz (15.407)	Head	Left Touch	802.11a 6Mbps	0.124
	Body	Rear	802.11a 6Mbps	0.155
WiFi 5.5 GHz (part 15.407)	Head	Left Touch	802.11a 6Mbps	0.090
	Body	Rear	802.11a 6Mbps	0.178
WiFi 5.8 GHz (part 15.247)	Head	Left Touch	802.11a 6Mbps	0.063
	Body	Rear	802.11a 6Mbps	0.126

13.1. Scaled SAR Values to the Maximum Tune-up Tolerances

The following measured results were scaled to the maximum tune-up tolerance, according to the output power of the channel tested for the highest measured results in each frequency band.

Test Configuration		Mode	Ch #.	Freq. (MHz)	Power (dBm)		SAR (W/kg)	
					Max. tune-up limit	Measured	Measured	Scaled
Body	Rear	GSM850 (GMSK)	190	836.6	33.7	33.5	0.524	0.555
Body&Hotspot	Rear	W-CDMA BAND IV	1312	1712.4	23.7	23.4	1.170	1.254
Body&Hotspot	Rear	W-CDMA BAND II	9538	1907.6	23.7	23.7	1.270	1.270
Body&Hotspot	Rear	802.11b	6	2437.0	16.0	16.0	0.232	0.232
Head	Left Touch	802.11a	48	5240.0	13.0	13.0	0.137	0.137
Body&Hotspot	Rear	802.11a	52	5260.0	13.0	12.7	0.155	0.166
Body&Hotspot	Rear	802.11a	136	5680.0	13.0	12.5	0.178	0.200
Body&Hotspot	Rear	802.11a	157	5785.0	13.0	12.5	0.126	0.141

13.2. SAR Plots (from Summary of Highest SAR Values)

Test Laboratory: UL CCS SAR Lab C

Date: 8/17/2012

GSM850

Frequency: 836.6 MHz; Duty Cycle: 1:8.00018; Room Ambient Temperature: 24.0°C; Liquid Temperature: 23.0°C
Medium parameters used (interpolated): $f = 836.6$ MHz; $\sigma = 0.904$ mho/m; $\epsilon_r = 42.921$; $\rho = 1000$ kg/m³

DASY5 Configuration:

- Area Scan setting - Find Secondary Maximum Within: 2.0 dB and with a peak SAR value greater than 0.0012W/kg
- Electronics: DAE4 Sn1239; Calibrated: 6/6/2012
- Probe: EX3DV4 - SN3773; ConvF(8.79, 8.79, 8.79); Calibrated: 3/14/2012
- Sensor-Surface: 2.5mm (Mechanical Surface Detection (Locations From Previous Scan Used)), Sensor-Surface: 2.5mm (Mechanical Surface Detection)
- Phantom: SAM; Type: QD000P40CD; Serial: 1632

RHS/Touch_GMSK_ch 190/Area Scan (8x11x1): Measurement grid: dx=15mm, dy=15mm

[Info: Interpolated medium parameters used for SAR evaluation.](#)

Maximum value of SAR (measured) = 0.295 mW/g

RHS/Touch_GMSK_ch 190/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

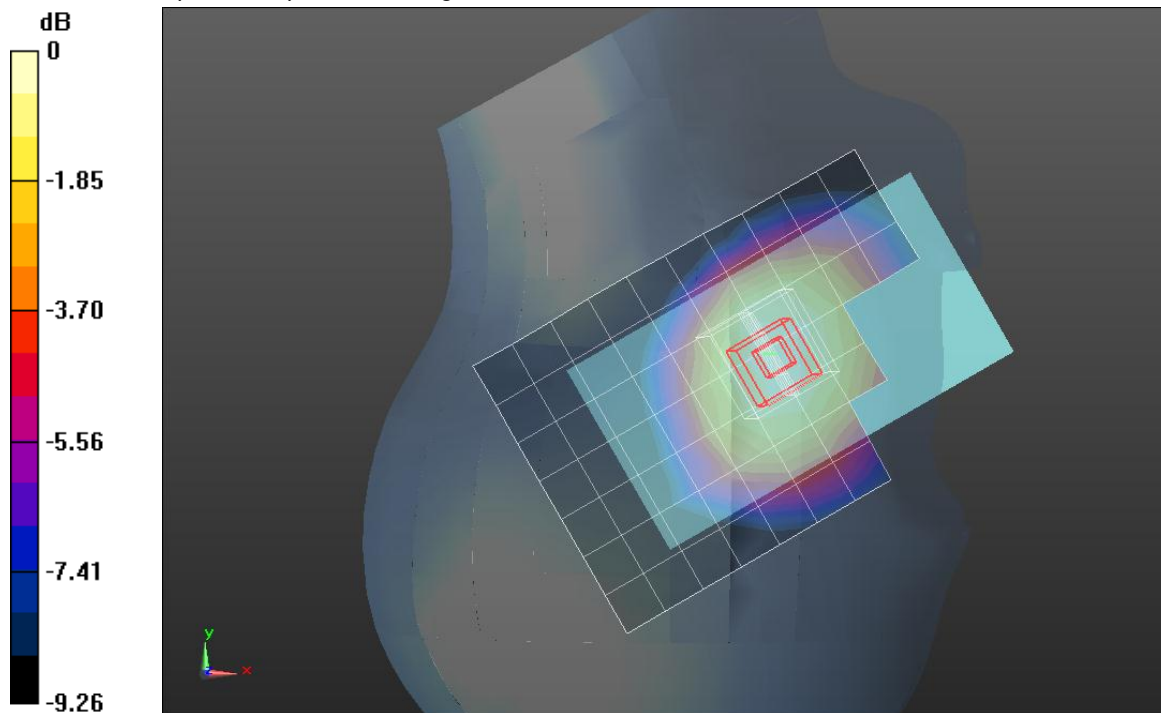
Reference Value = 18.213 V/m; Power Drift = -0.02 dB

Peak SAR (extrapolated) = 0.3240

SAR(1 g) = 0.263 mW/g; SAR(10 g) = 0.203 mW/g

[Info: Interpolated medium parameters used for SAR evaluation.](#)

Maximum value of SAR (measured) = 0.293 mW/g



0 dB = 0.290mW/g = -10.75 dB mW/g

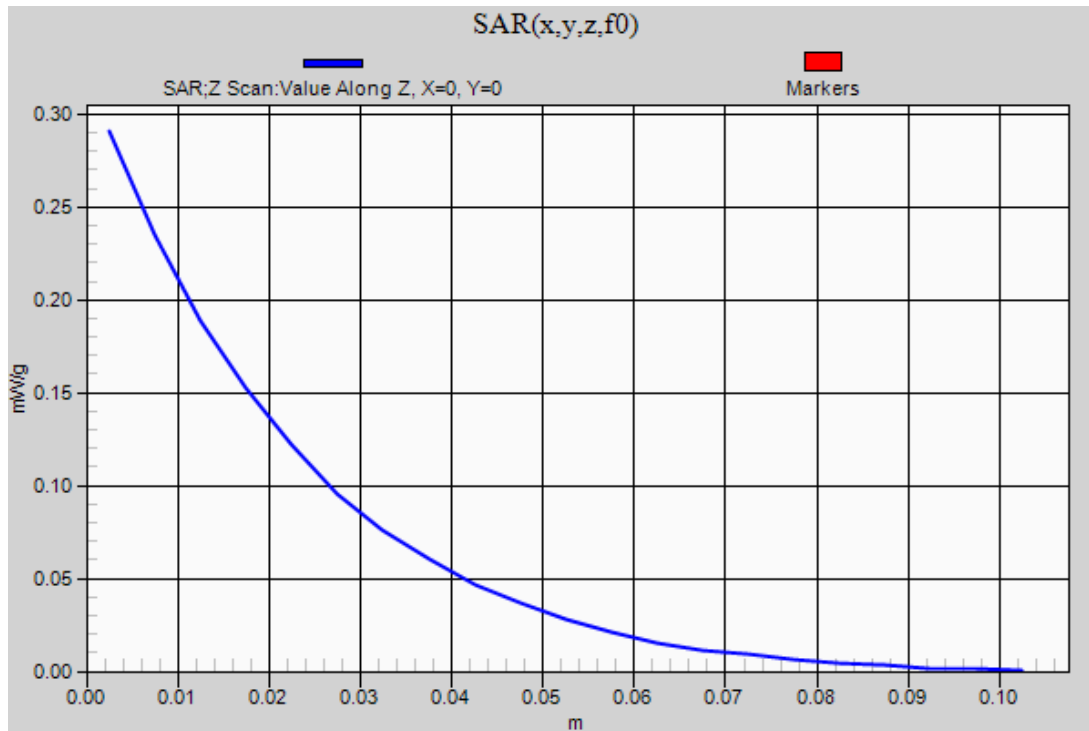
GSM850

Frequency: 836.6 MHz; Duty Cycle: 1:8.00018

RHS/Touch_GMSK_ch 190/Z Scan (1x1x21): Measurement grid: dx=20mm, dy=20mm, dz=5mm

[Info: Interpolated medium parameters used for SAR evaluation.](#)

Maximum value of SAR (measured) = 0.291 mW/g



GSM850

Frequency: 836.6 MHz; Duty Cycle: 1:4.00037; Room Ambient Temperature: 24.0°C; Liquid Temperature: 23.0°C
Medium parameters used (interpolated): $f = 836.6$ MHz; $\sigma = 0.893$ mho/m; $\epsilon_r = 42.188$; $\rho = 1000$ kg/m³

DASY5 Configuration:

- Area Scan setting - Find Secondary Maximum Within: 2.0 dB and with a peak SAR value greater than 0.0012W/kg
- Electronics: DAE4 Sn1239; Calibrated: 6/6/2012
- Probe: EX3DV4 - SN3773; ConvF(8.79, 8.79, 8.79); Calibrated: 3/14/2012
- Sensor-Surface: 2.5mm (Mechanical Surface Detection)
- Phantom: SAM; Type: QD000P40CD; Serial: 1632

RHS/Touch_GPRS 2slot_ch 190/Area Scan (8x11x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (measured) = 0.248 mW/g

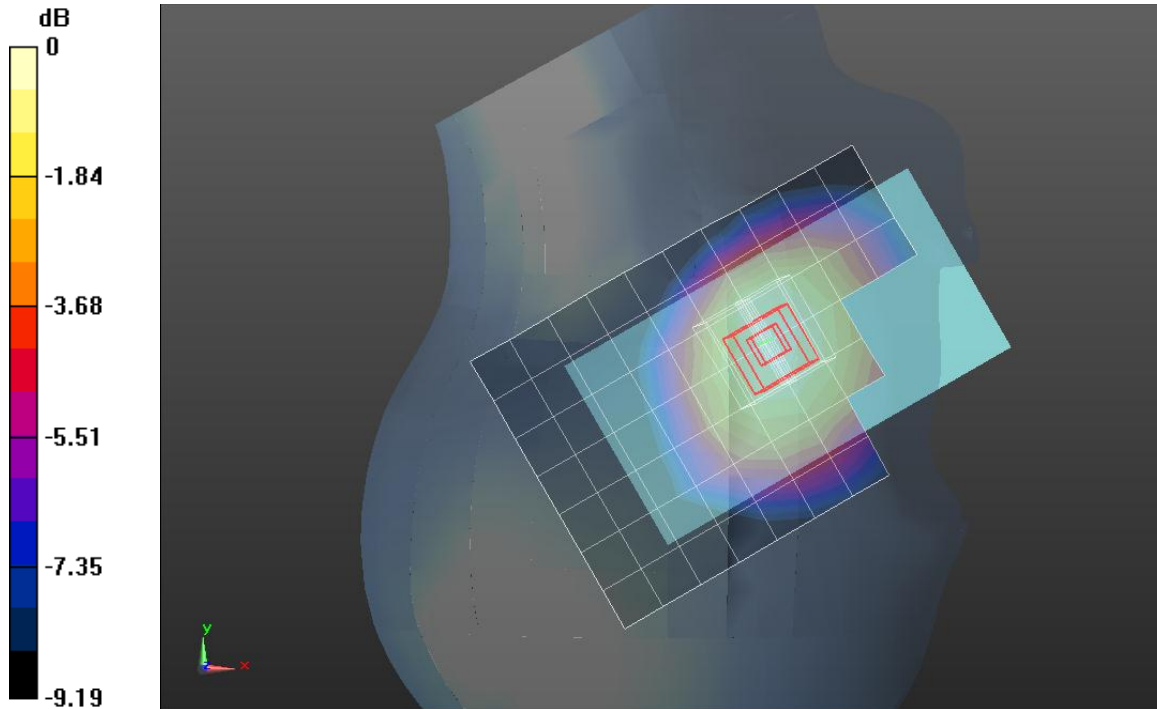
RHS/Touch_GPRS 2slot_ch 190/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 16.753 V/m; Power Drift = 0.01 dB

Peak SAR (extrapolated) = 0.2740

SAR(1 g) = 0.222 mW/g; SAR(10 g) = 0.171 mW/g

Maximum value of SAR (measured) = 0.245 mW/g

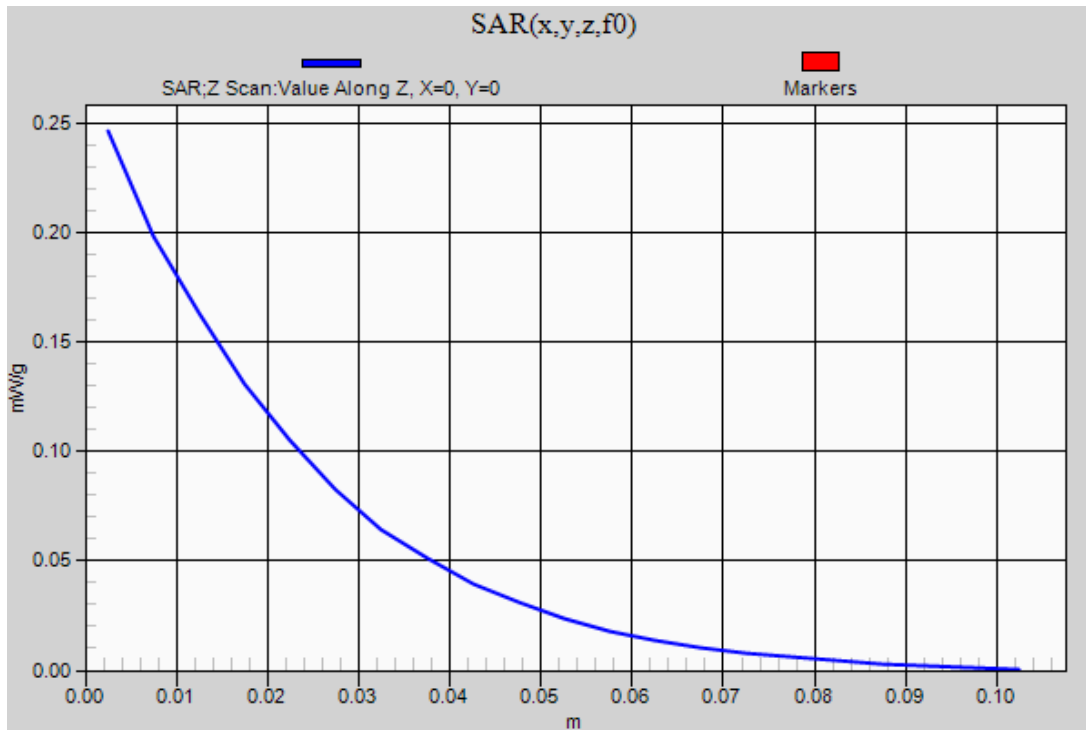


0 dB = 0.250mW/g = -12.04 dB mW/g

GSM850

Frequency: 836.6 MHz; Duty Cycle: 1:4.00037

RHS/Touch_GPRS 2slot_ch 190/Z Scan (1x1x21): Measurement grid: dx=20mm, dy=20mm, dz=5mm
Maximum value of SAR (measured) = 0.246 mW/g



GSM850

Frequency: 836.6 MHz; Duty Cycle: 1:8.00018; Room Ambient Temperature: 24.0°C; Liquid Temperature: 23.0°C
Medium parameters used (interpolated): $f = 836.6$ MHz; $\sigma = 0.993$ mho/m; $\epsilon_r = 55.694$; $\rho = 1000$ kg/m³

DASY5 Configuration:

- Area Scan setting - Find Secondary Maximum Within: 2.0 dB and with a peak SAR value greater than 0.0012W/kg
- Electronics: DAE4 Sn1239; Calibrated: 6/6/2012
- Probe: EX3DV4 - SN3773; ConvF(8.74, 8.74, 8.74); Calibrated: 3/14/2012
- Sensor-Surface: 2.5mm (Mechanical Surface Detection)
- Phantom: ELI v5.0 (B); Type: QDOVA001BB; Serial: 1099

Rear/GSM Voice_ch 190/Area Scan (8x12x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (measured) = 0.584 mW/g

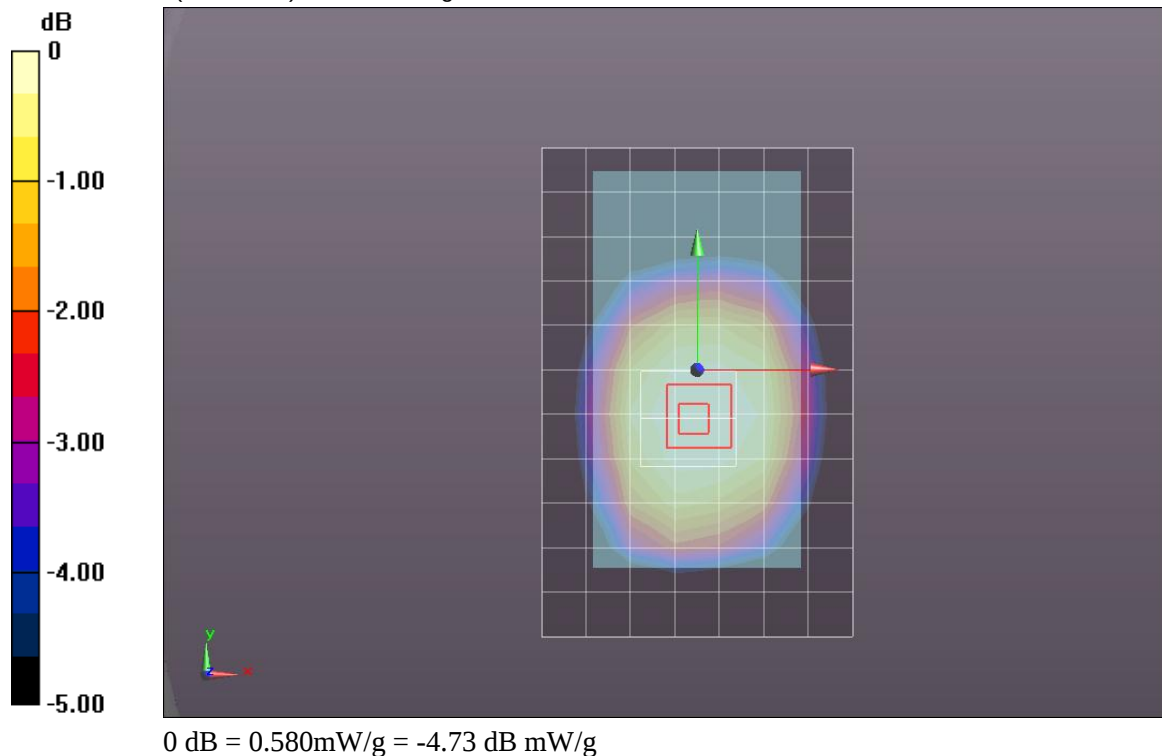
Rear/GSM Voice_ch 190/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 24.598 V/m; Power Drift = -0.03 dB

Peak SAR (extrapolated) = 0.6530

SAR(1 g) = 0.524 mW/g; SAR(10 g) = 0.410 mW/g

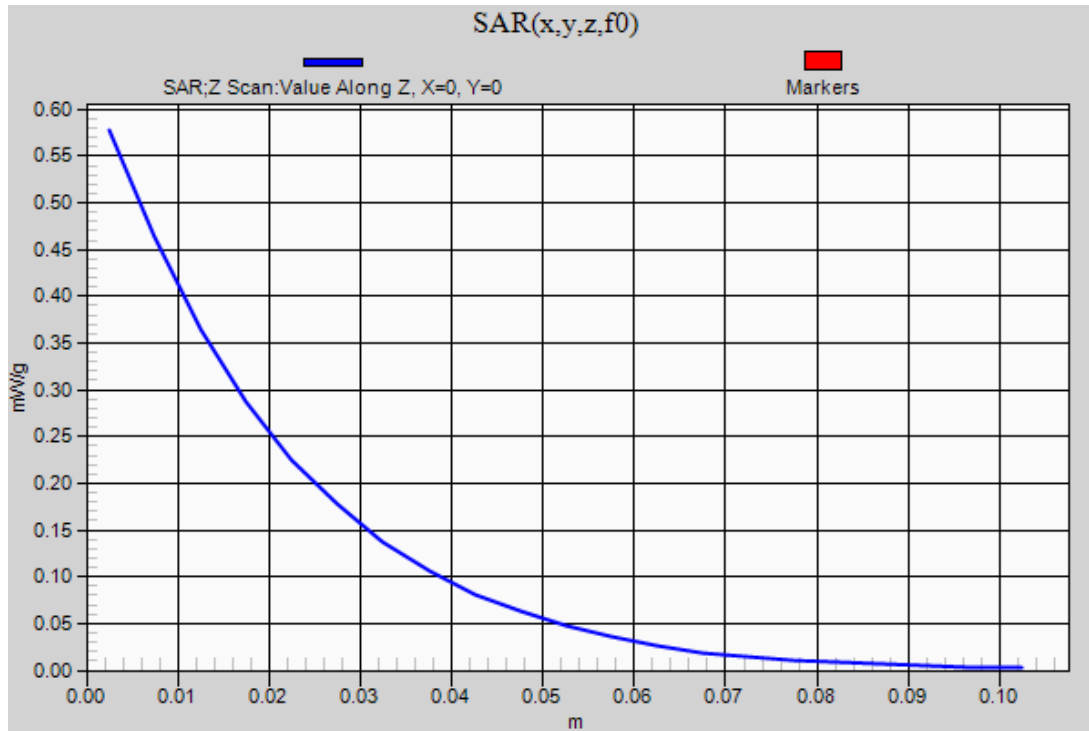
Maximum value of SAR (measured) = 0.581 mW/g



GSM850

Frequency: 836.6 MHz; Duty Cycle: 1:8.00018

Rear/GSM Voice_ch 190/Z Scan (1x1x21): Measurement grid: dx=20mm, dy=20mm, dz=5mm
Maximum value of SAR (measured) = 0.577 mW/g



GSM850

Frequency: 836.6 MHz; Duty Cycle: 1:4.00037; Room Ambient Temperature: 24.0°C; Liquid Temperature: 23.0°C
Medium parameters used (interpolated): $f = 836.6$ MHz; $\sigma = 0.993$ mho/m; $\epsilon_r = 55.694$; $\rho = 1000$ kg/m³

DASY5 Configuration:

- Area Scan setting - Find Secondary Maximum Within: 2.0 dB and with a peak SAR value greater than 0.0012W/kg
- Electronics: DAE4 Sn1239; Calibrated: 6/6/2012
- Probe: EX3DV4 - SN3773; ConvF(8.74, 8.74, 8.74); Calibrated: 3/14/2012
- Sensor-Surface: 2.5mm (Mechanical Surface Detection (Locations From Previous Scan Used)), Sensor-Surface: 2.5mm (Mechanical Surface Detection)
- Phantom: ELI v5.0 (B); Type: QDOVA001BB; Serial: 1099

Rear/GPRS 2 slot_ch 190/Area Scan (8x12x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (measured) = 0.370 mW/g

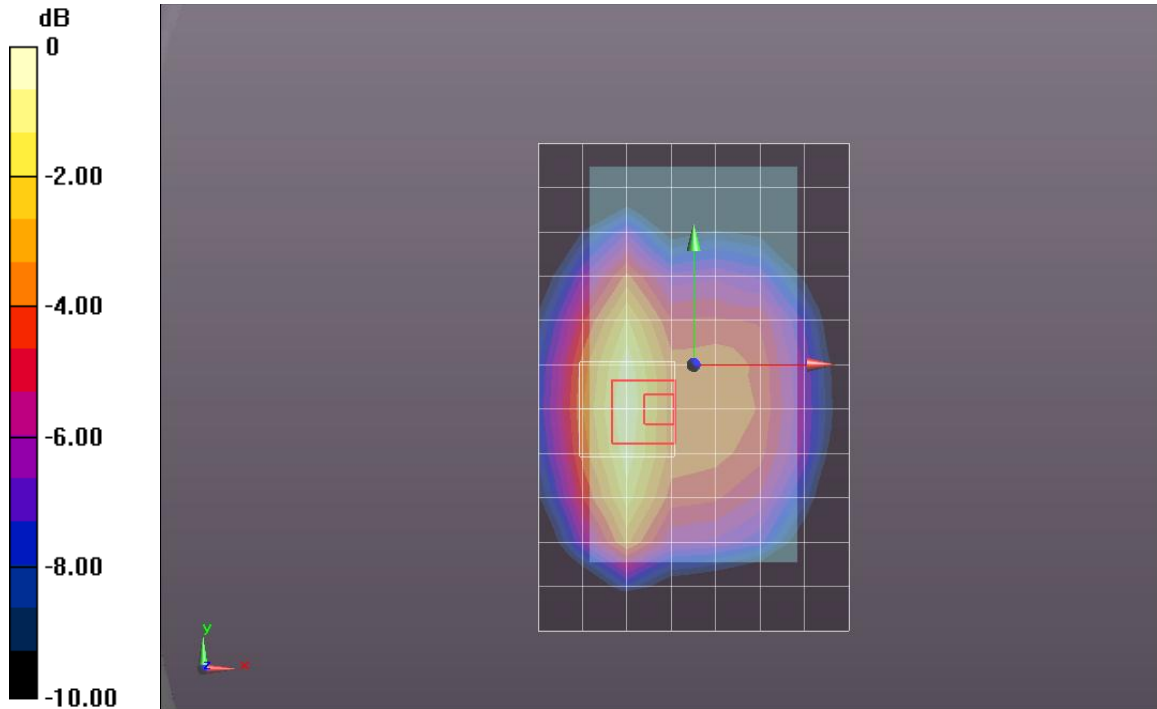
Rear/GPRS 2 slot_ch 190/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 19.678 V/m; Power Drift = -0.05 dB

Peak SAR (extrapolated) = 0.4710

SAR(1 g) = 0.372 mW/g; SAR(10 g) = 0.266 mW/g

Maximum value of SAR (measured) = 0.421 mW/g

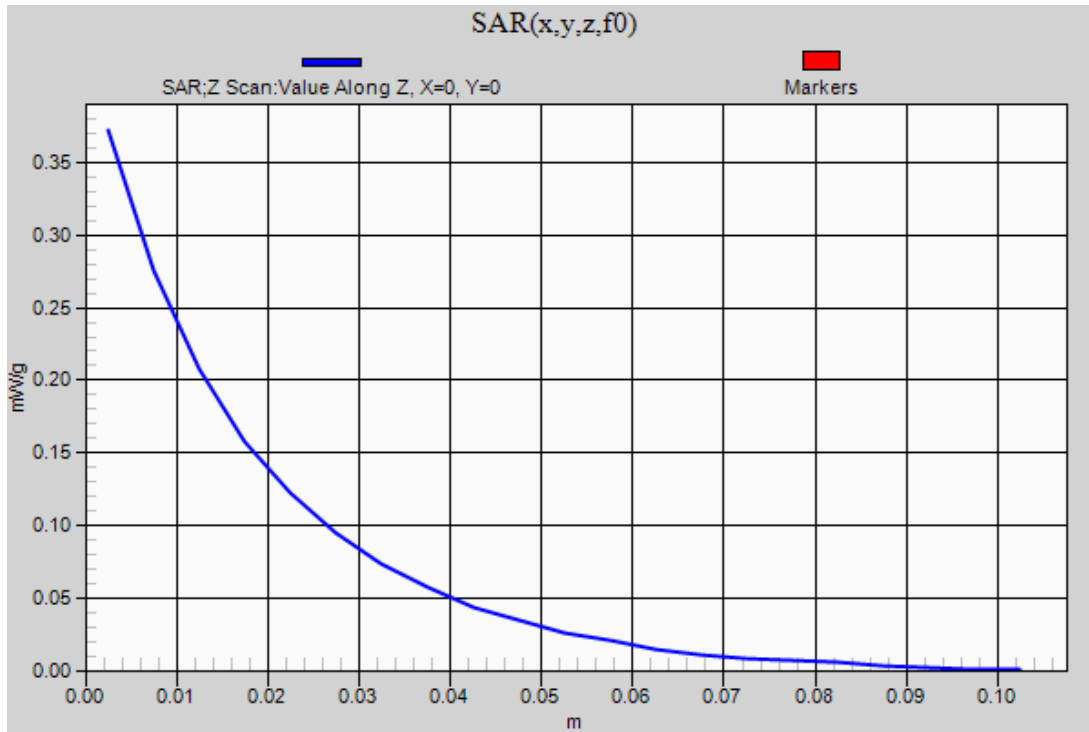


0 dB = 0.420mW/g = -7.54 dB mW/g

GSM850

Frequency: 836.6 MHz; Duty Cycle: 1:4.00037

Rear/GPRS 2 slot_ch 190/Z Scan (1x1x21): Measurement grid: dx=20mm, dy=20mm, dz=5mm
Maximum value of SAR (measured) = 0.372 mW/g



GSM1900

Frequency: 1880 MHz; Duty Cycle: 1:8.00018; Room Ambient Temperature: 24.0°C; Liquid Temperature: 23.0°C
Medium parameters used: $f = 1880$ MHz; $\sigma = 1.37$ mho/m; $\epsilon_r = 39.879$; $\rho = 1000$ kg/m³

DASY5 Configuration:

- Area Scan setting - Find Secondary Maximum Within: 2.0 dB and with a peak SAR value greater than 0.0012W/kg
- Electronics: DAE4 Sn1239; Calibrated: 6/6/2012
- Probe: EX3DV4 - SN3773; ConvF(7.51, 7.51, 7.51); Calibrated: 3/14/2012
- Sensor-Surface: 2.5mm (Mechanical Surface Detection)
- Phantom: SAM; Type: QD000P40CD; Serial: 1632

LHS/Touch_GMSK_ch 661/Area Scan (8x11x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (measured) = 0.307 mW/g

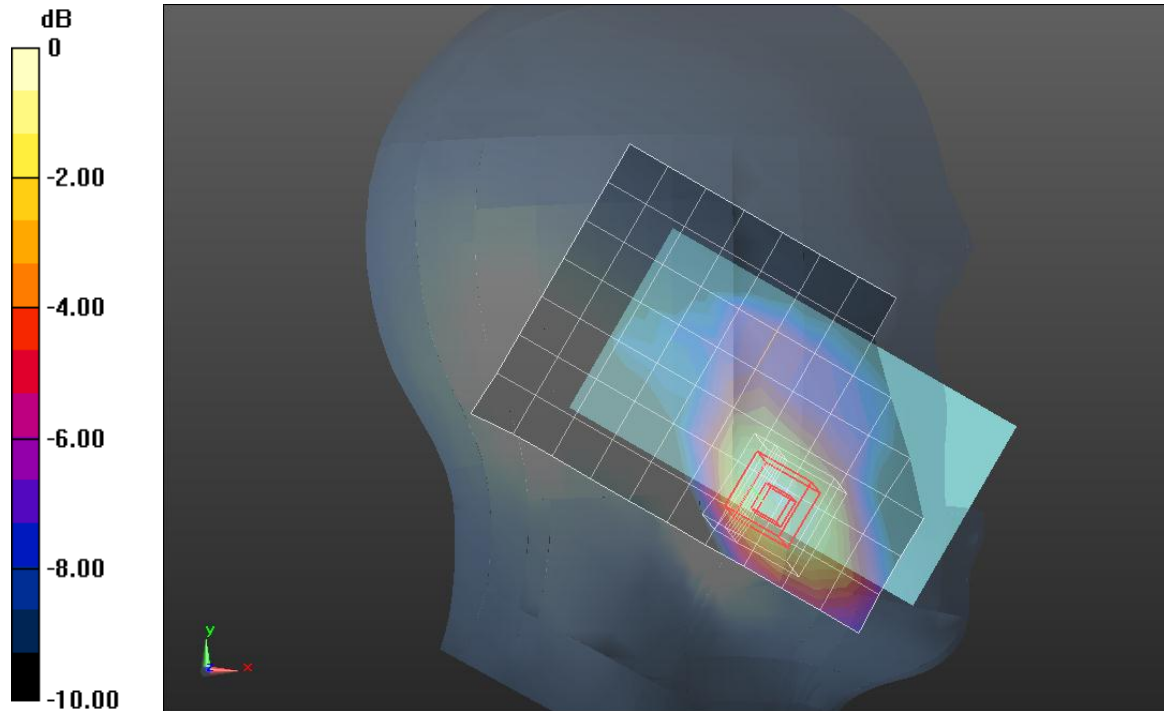
LHS/Touch_GMSK_ch 661/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 14.944 V/m; Power Drift = 0.04 dB

Peak SAR (extrapolated) = 0.4160

SAR(1 g) = 0.286 mW/g; SAR(10 g) = 0.181 mW/g

Maximum value of SAR (measured) = 0.343 mW/g



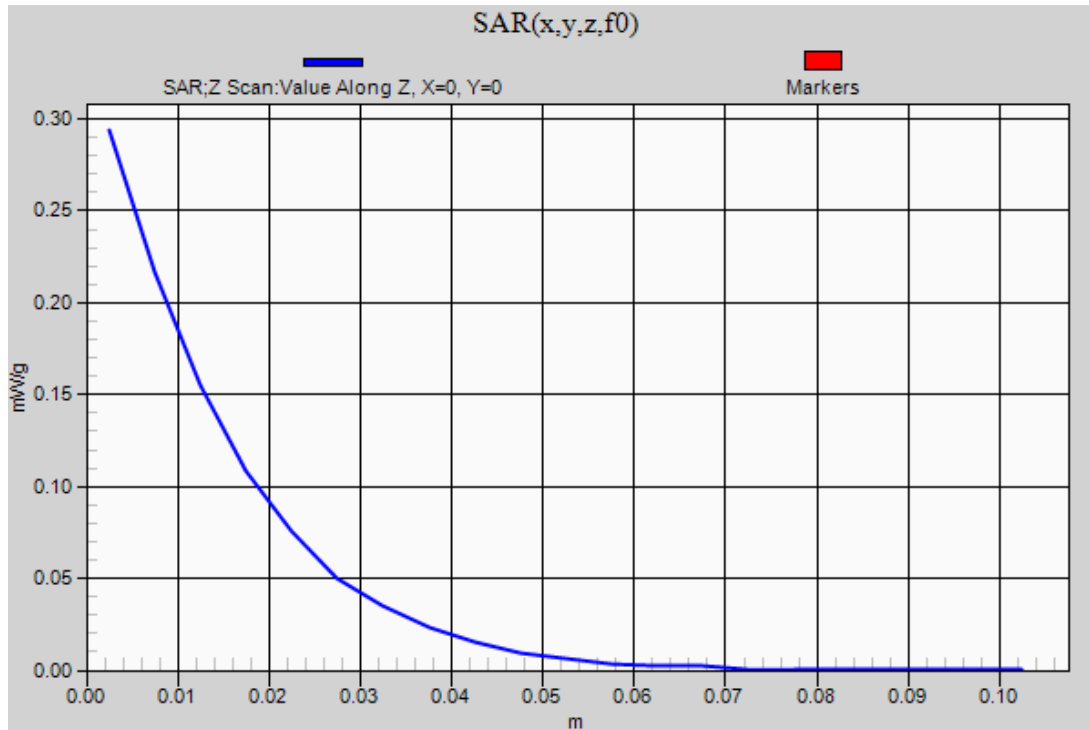
0 dB = 0.340mW/g = -9.37 dB mW/g

GSM1900

Frequency: 1880 MHz; Duty Cycle: 1:8.00018

LHS/Touch_GMSK_ch 661/Z Scan (1x1x21): Measurement grid: dx=20mm, dy=20mm, dz=5mm

Maximum value of SAR (measured) = 0.294 mW/g



GSM1900

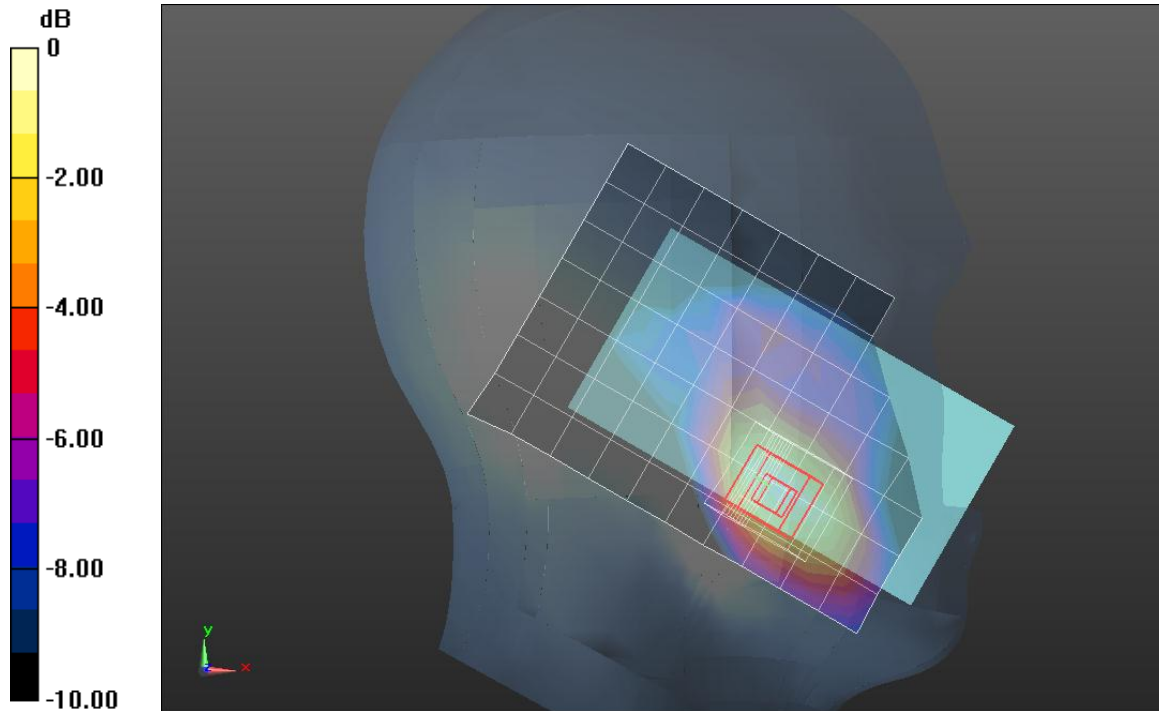
Frequency: 1880 MHz; Duty Cycle: 1:4.00037; Room Ambient Temperature: 24.0°C; Liquid Temperature: 23.0°C
Medium parameters used: $f = 1880$ MHz; $\sigma = 1.371$ mho/m; $\epsilon_r = 41.057$; $\rho = 1000$ kg/m³

DASY5 Configuration:

- Area Scan setting - Find Secondary Maximum Within: 2.0 dB and with a peak SAR value greater than 0.0012W/kg
- Electronics: DAE4 Sn1239; Calibrated: 6/6/2012
- Probe: EX3DV4 - SN3773; ConvF(7.51, 7.51, 7.51); Calibrated: 3/14/2012
- Sensor-Surface: 2.5mm (Mechanical Surface Detection)
- Phantom: SAM; Type: QD000P40CD; Serial: 1632

LHS/Touch_GPRS 2 slot_ch 661/Area Scan (8x11x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 0.370 mW/g

LHS/Touch_GPRS 2 slot_ch 661/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 16.434 V/m; Power Drift = -0.03 dB
Peak SAR (extrapolated) = 0.4630
SAR(1 g) = 0.308 mW/g; SAR(10 g) = 0.193 mW/g
Maximum value of SAR (measured) = 0.365 mW/g

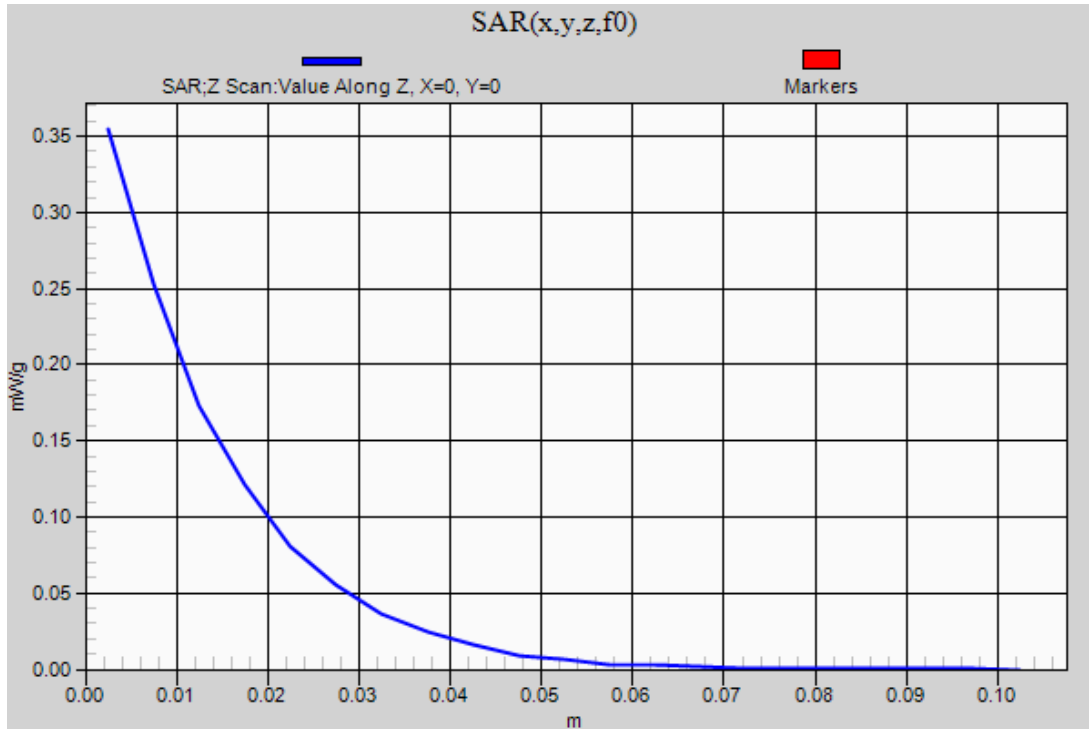


0 dB = 0.370mW/g = -8.64 dB mW/g

GSM1900

Frequency: 1880 MHz; Duty Cycle: 1:4.00037

LHS/Touch_GPRS 2 slot_ch 661/Z Scan (1x1x21): Measurement grid: dx=20mm, dy=20mm, dz=5mm
Maximum value of SAR (measured) = 0.355 mW/g



GSM1900

Frequency: 1909.8 MHz; Duty Cycle: 1:8.00018; Room Ambient Temperature: 24.0°C; Liquid Temperature: 23.0°C
Medium parameters used: $f = 1910$ MHz; $\sigma = 1.558$ mho/m; $\epsilon_r = 53.077$; $\rho = 1000$ kg/m³

DASY5 Configuration:

- Area Scan setting - Find Secondary Maximum Within: 2.0 dB and with a peak SAR value greater than 0.0012W/kg
- Electronics: DAE4 Sn1239; Calibrated: 6/6/2012
- Probe: EX3DV4 - SN3773; ConvF(7.11, 7.11, 7.11); Calibrated: 3/14/2012
- Sensor-Surface: 2.5mm (Mechanical Surface Detection)
- Phantom: ELI v5.0 (B); Type: QDOVA001BB; Serial: 1099

Rear/GSM Voice_ch 810/Area Scan (8x12x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (measured) = 1.323 mW/g

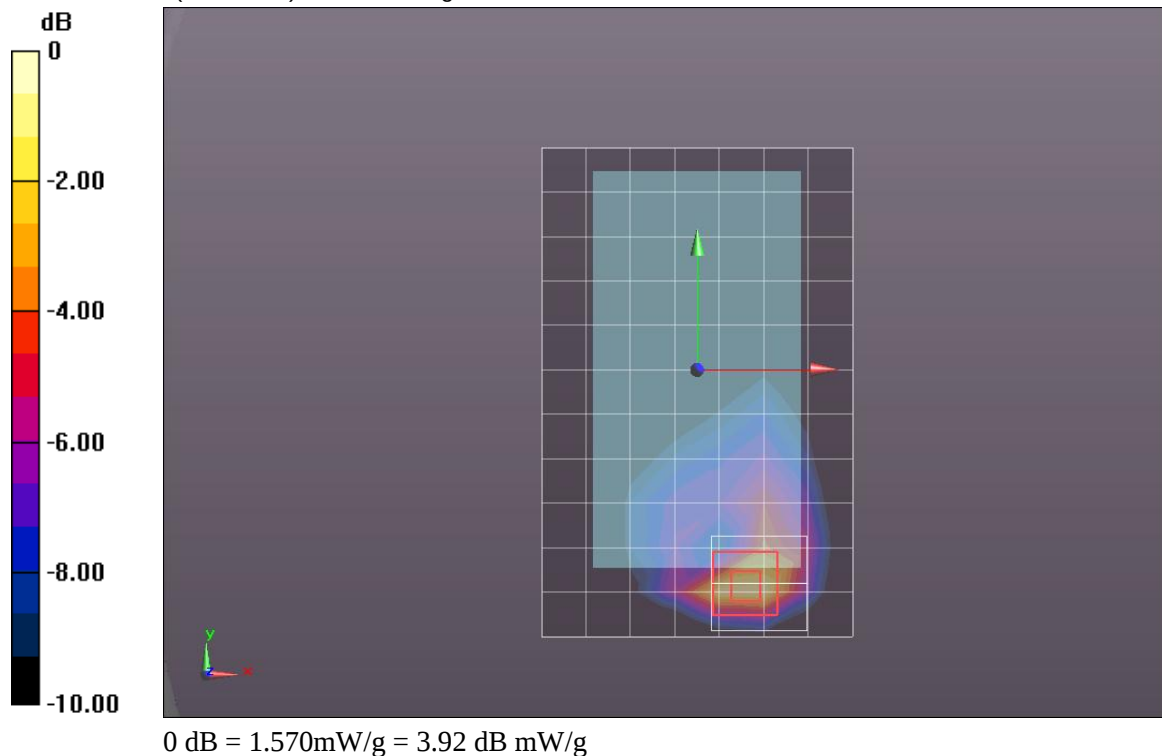
Rear/GSM Voice_ch 810/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 29.221 V/m; Power Drift = 0.07 dB

Peak SAR (extrapolated) = 2.0870

SAR(1 g) = 1.13 mW/g; SAR(10 g) = 0.564 mW/g

Maximum value of SAR (measured) = 1.569 mW/g

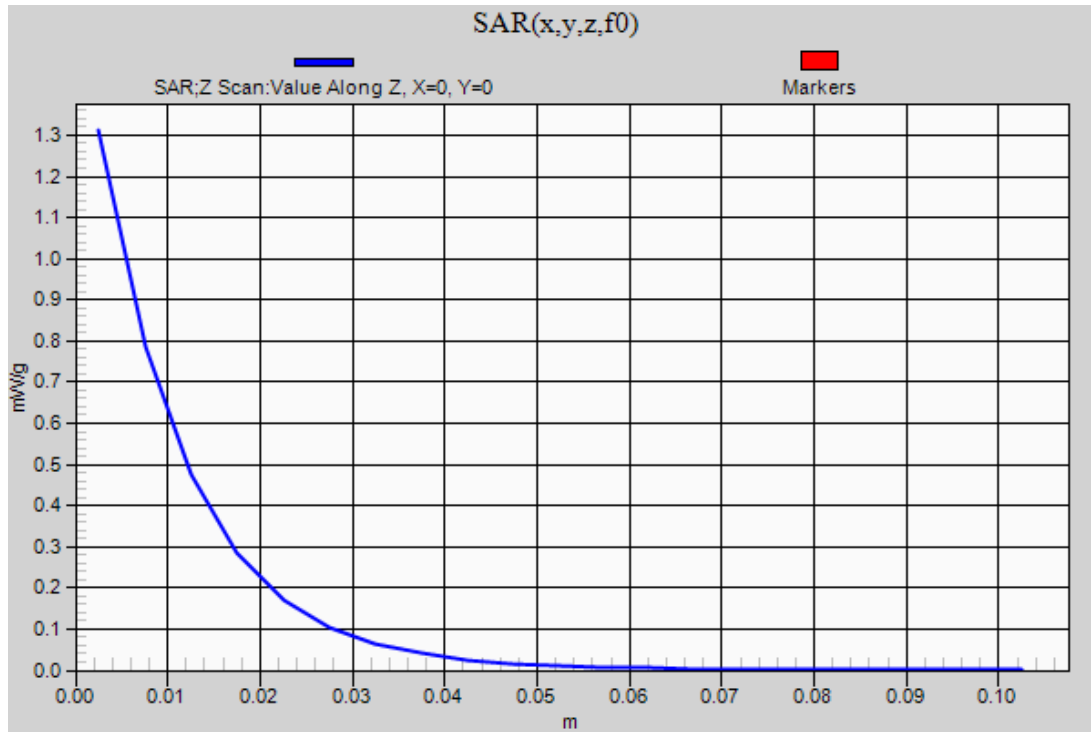


GSM1900

Frequency: 1909.8 MHz; Duty Cycle: 1:8.00018

Rear/GSM Voice_ch 810/Z Scan (1x1x21): Measurement grid: dx=20mm, dy=20mm, dz=5mm

Maximum value of SAR (measured) = 1.312 mW/g



GSM1900

Frequency: 1909.8 MHz; Duty Cycle: 1:4.00037; Room Ambient Temperature: 24.0°C; Liquid Temperature: 23.0°C
Medium parameters used: $f = 1910$ MHz; $\sigma = 1.558$ mho/m; $\epsilon_r = 53.077$; $\rho = 1000$ kg/m³

DASY5 Configuration:

- Area Scan setting - Find Secondary Maximum Within: 2.0 dB and with a peak SAR value greater than 0.0012W/kg
- Electronics: DAE4 Sn1239; Calibrated: 6/6/2012
- Probe: EX3DV4 - SN3773; ConvF(7.11, 7.11, 7.11); Calibrated: 3/14/2012
- Sensor-Surface: 2.5mm (Mechanical Surface Detection (Locations From Previous Scan Used)), Sensor-Surface: 2.5mm (Mechanical Surface Detection)
- Phantom: ELI v5.0 (B); Type: QDOVA001BB; Serial: 1099

Rear/GPRS 2 slot_ch 810/Area Scan (8x12x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (measured) = 1.272 mW/g

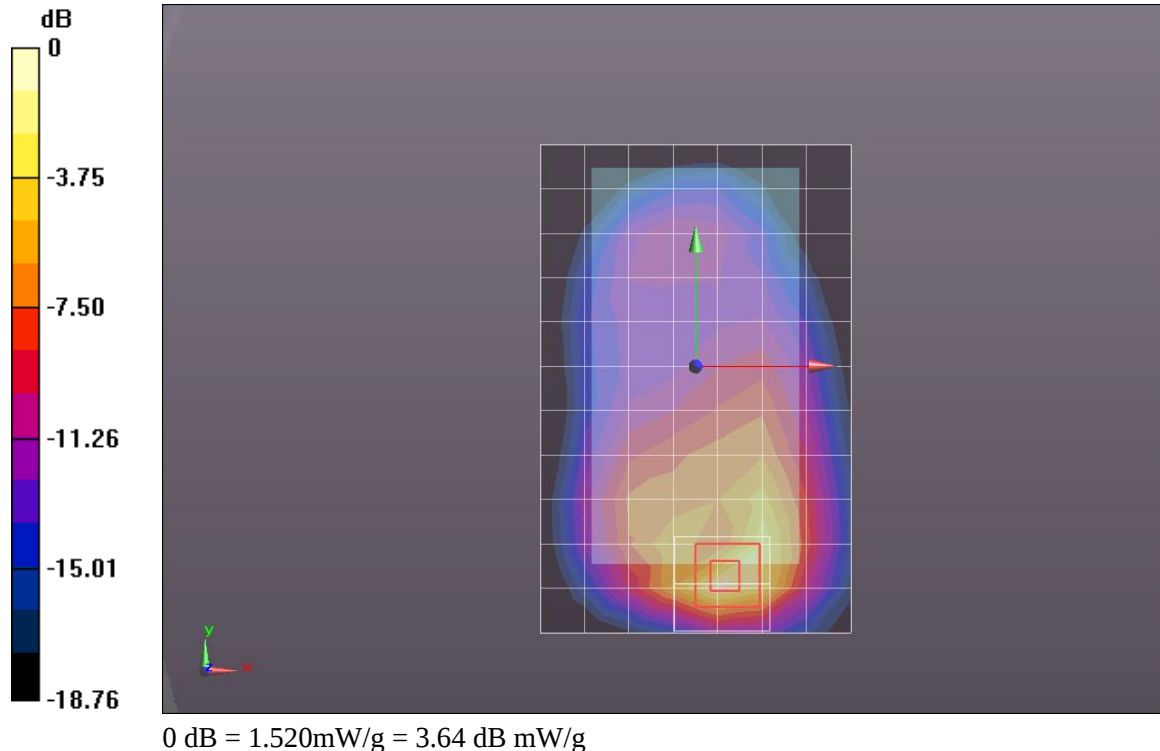
Rear/GPRS 2 slot_ch 810/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 28.807 V/m; Power Drift = 0.17 dB

Peak SAR (extrapolated) = 2.2080

SAR(1 g) = 1.18 mW/g; SAR(10 g) = 0.575 mW/g

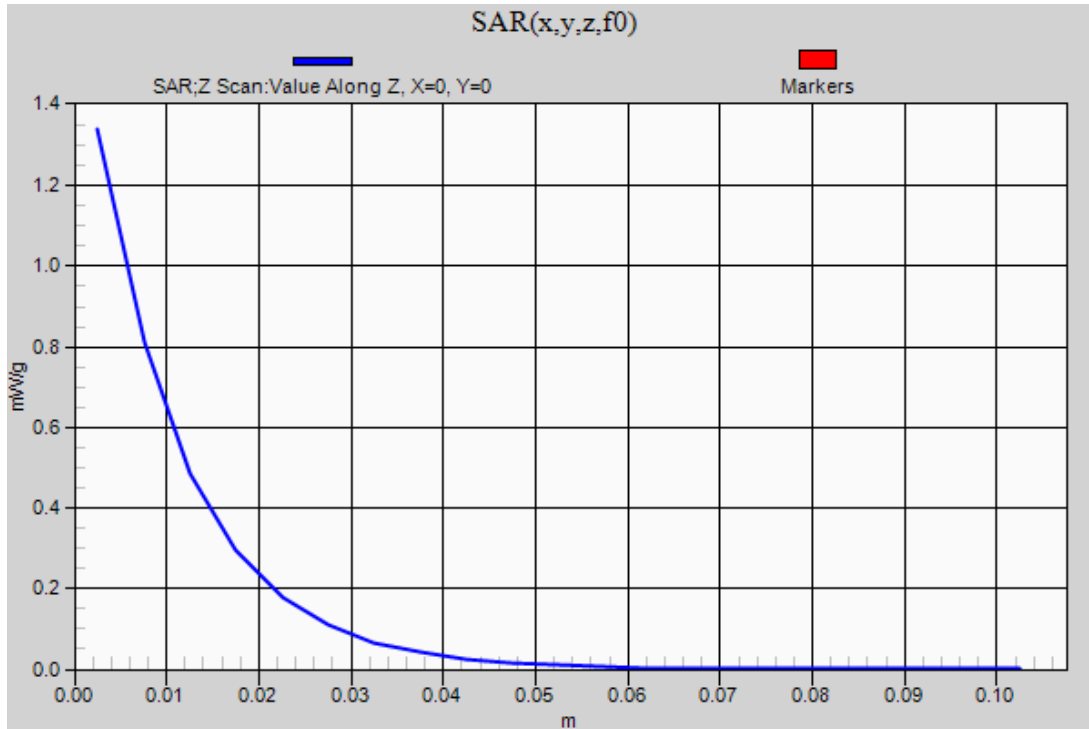
Maximum value of SAR (measured) = 1.522 mW/g



GSM1900

Frequency: 1909.8 MHz; Duty Cycle: 1:4.00037

Rear/GPRS 2 slot_ch 810/Z Scan (1x1x21): Measurement grid: dx=20mm, dy=20mm, dz=5mm
Maximum value of SAR (measured) = 1.340 mW/g



W-CDMA Band V

Frequency: 836.4 MHz; Duty Cycle: 1:1; Room Ambient Temperature: 24.0°C; Liquid Temperature: 23.0°C
Medium parameters used (interpolated): $f = 836.4$ MHz; $\sigma = 0.904$ mho/m; $\epsilon_r = 42.923$; $\rho = 1000$ kg/m³

DASY5 Configuration:

- Area Scan setting - Find Secondary Maximum Within: 2.0 dB and with a peak SAR value greater than 0.0012W/kg
- Electronics: DAE4 Sn1239; Calibrated: 6/6/2012
- Probe: EX3DV4 - SN3773; ConvF(8.79, 8.79, 8.79); Calibrated: 3/14/2012
- Sensor-Surface: 2.5mm (Mechanical Surface Detection (Locations From Previous Scan Used)), Sensor-Surface: 2.5mm (Mechanical Surface Detection)
- Phantom: SAM; Type: QD000P40CD; Serial: 1632

LHS/Touch_R99_ch 4182/Area Scan (8x11x1): Measurement grid: dx=15mm, dy=15mm

[Info: Interpolated medium parameters used for SAR evaluation.](#)

Maximum value of SAR (measured) = 0.249 mW/g

LHS/Touch_R99_ch 4182/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

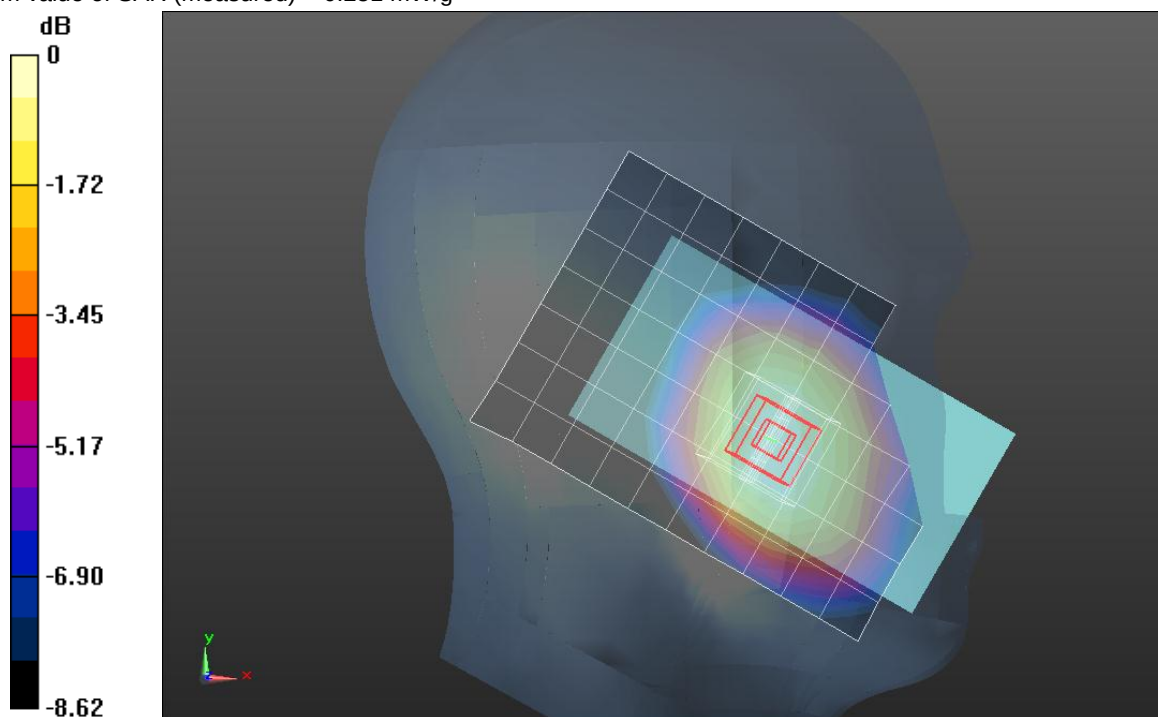
Reference Value = 16.775 V/m; Power Drift = 0.03 dB

Peak SAR (extrapolated) = 0.2760

SAR(1 g) = 0.227 mW/g; SAR(10 g) = 0.175 mW/g

[Info: Interpolated medium parameters used for SAR evaluation.](#)

Maximum value of SAR (measured) = 0.251 mW/g



0 dB = 0.250mW/g = -12.04 dB mW/g

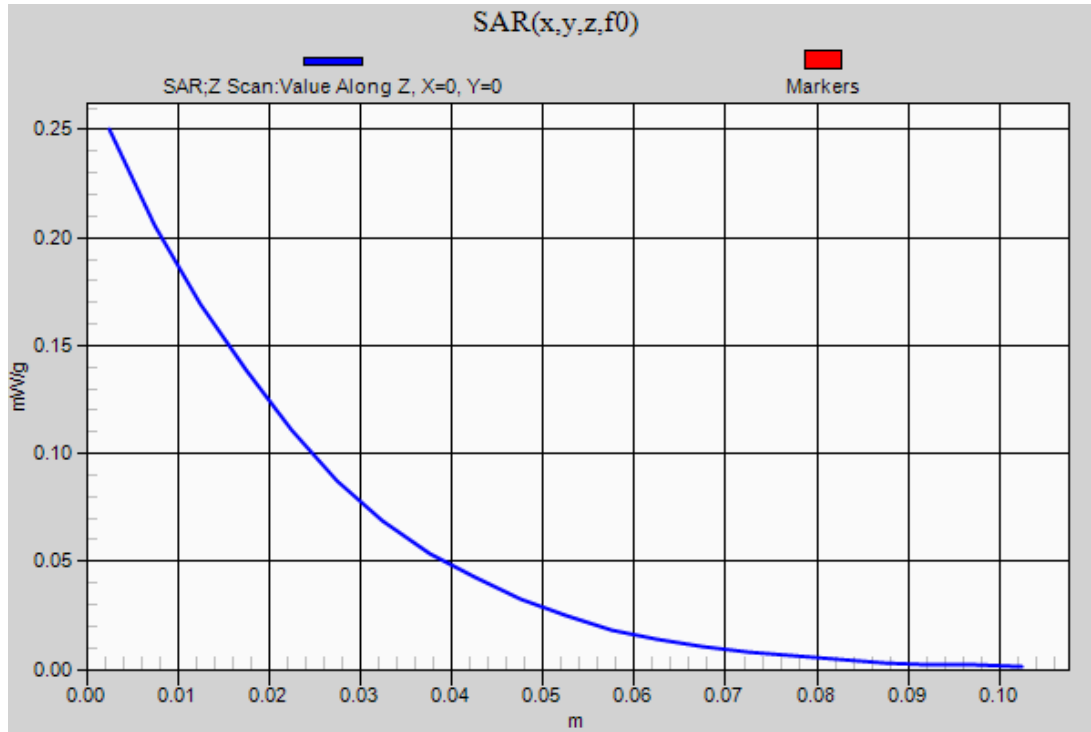
W-CDMA Band V

Frequency: 836.4 MHz; Duty Cycle: 1:1

LHS/Touch_R99_ch 4182/Z Scan (1x1x21): Measurement grid: dx=20mm, dy=20mm, dz=5mm

[Info: Interpolated medium parameters used for SAR evaluation.](#)

Maximum value of SAR (measured) = 0.250 mW/g



W-CDMA Band V

Frequency: 836.4 MHz; Duty Cycle: 1:1; Room Ambient Temperature: 24.0°C; Liquid Temperature: 23.0°C
Medium parameters used (interpolated): $f = 836.4$ MHz; $\sigma = 0.993$ mho/m; $\epsilon_r = 55.699$; $\rho = 1000$ kg/m³

DASY5 Configuration:

- Area Scan setting - Find Secondary Maximum Within: 2.0 dB and with a peak SAR value greater than 0.0012W/kg
- Electronics: DAE4 Sn1239; Calibrated: 6/6/2012
- Probe: EX3DV4 - SN3773; ConvF(8.74, 8.74, 8.74); Calibrated: 3/14/2012
- Sensor-Surface: 2.5mm (Mechanical Surface Detection)
- Phantom: ELI v5.0 (B); Type: QDOVA001BB; Serial: 1099

Rear/R99_ch 4182/Area Scan (8x12x1): Measurement grid: dx=15mm, dy=15mm

[Info: Interpolated medium parameters used for SAR evaluation.](#)

Maximum value of SAR (measured) = 0.515 mW/g

Rear/R99_ch 4182/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

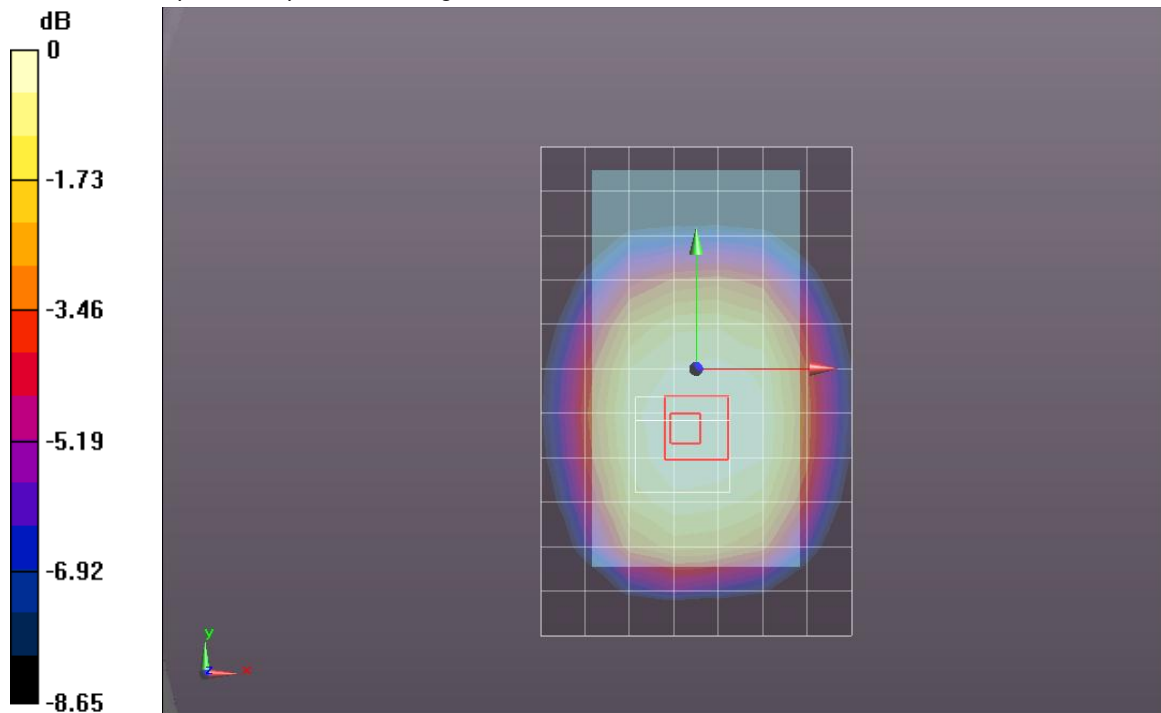
Reference Value = 23.324 V/m; Power Drift = -0.01 dB

Peak SAR (extrapolated) = 0.5820

SAR(1 g) = 0.468 mW/g; SAR(10 g) = 0.365 mW/g

[Info: Interpolated medium parameters used for SAR evaluation.](#)

Maximum value of SAR (measured) = 0.518 mW/g



0 dB = 0.520mW/g = -5.68 dB mW/g

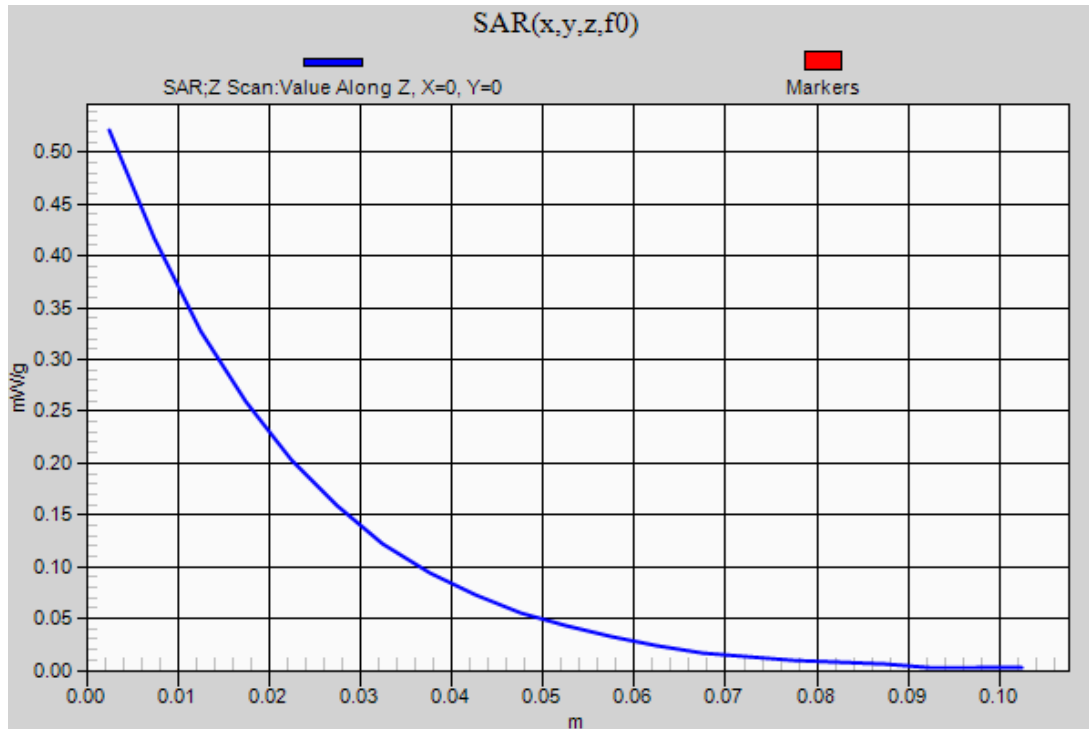
W-CDMA Band V

Frequency: 836.4 MHz; Duty Cycle: 1:1

Rear/R99_ch 4182/Z Scan (1x1x21): Measurement grid: dx=20mm, dy=20mm, dz=5mm

[Info: Interpolated medium parameters used for SAR evaluation.](#)

Maximum value of SAR (measured) = 0.521 mW/g



W-CDMA Band IV

Frequency: 1732.4 MHz; Duty Cycle: 1:1; Room Ambient Temperature: 24.0°C; Liquid Temperature: 23.0°C
Medium parameters used (interpolated): $f = 1732.4$ MHz; $\sigma = 1.322$ mho/m; $\epsilon_r = 41.663$; $\rho = 1000$ kg/m³

DASY5 Configuration:

- Area Scan setting - Find Secondary Maximum Within: 2.0 dB and with a peak SAR value greater than 0.0012W/kg
- Electronics: DAE4 Sn1239; Calibrated: 6/6/2012
- Probe: EX3DV4 - SN3773; ConvF(7.89, 7.89, 7.89); Calibrated: 3/14/2012
- Sensor-Surface: 2.5mm (Mechanical Surface Detection)
- Phantom: SAM; Type: QD000P40CD; Serial: 1632

LHS/Touch_R99_ch 1412/Area Scan (8x11x1): Measurement grid: dx=15mm, dy=15mm

[Info: Interpolated medium parameters used for SAR evaluation.](#)

Maximum value of SAR (measured) = 0.554 mW/g

LHS/Touch_R99_ch 1412/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

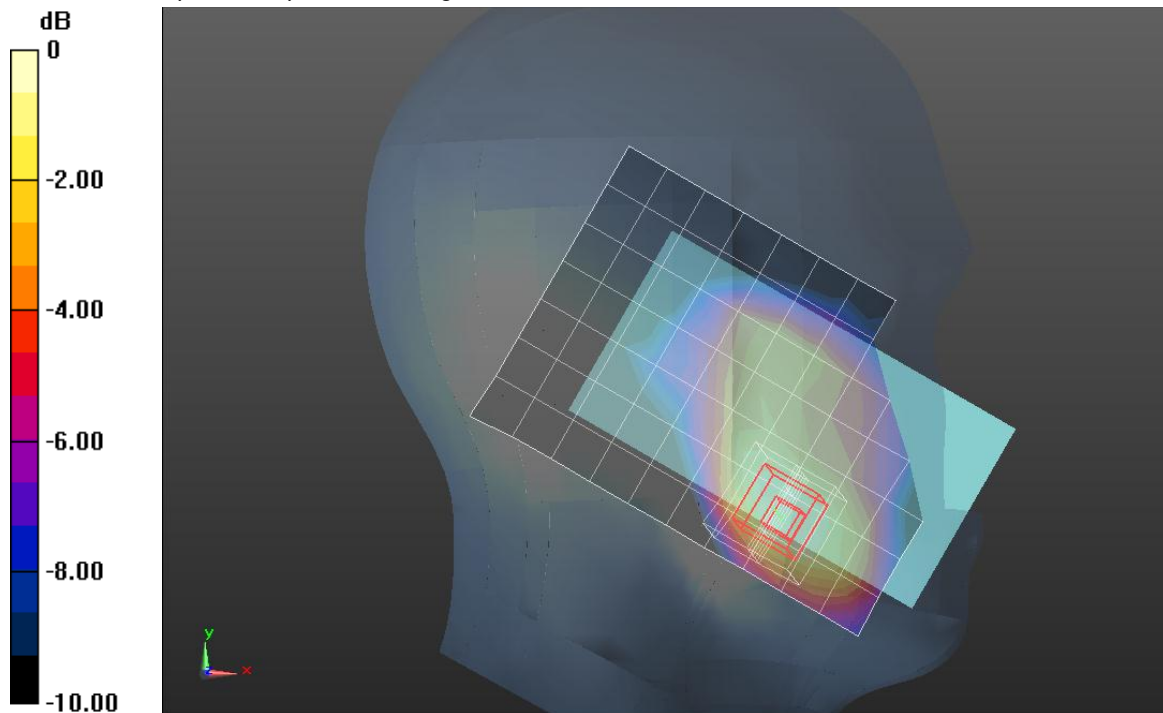
Reference Value = 20.601 V/m; Power Drift = 0.17 dB

Peak SAR (extrapolated) = 0.7840

SAR(1 g) = 0.546 mW/g; SAR(10 g) = 0.357 mW/g

[Info: Interpolated medium parameters used for SAR evaluation.](#)

Maximum value of SAR (measured) = 0.659 mW/g



0 dB = 0.660mW/g = -3.61 dB mW/g

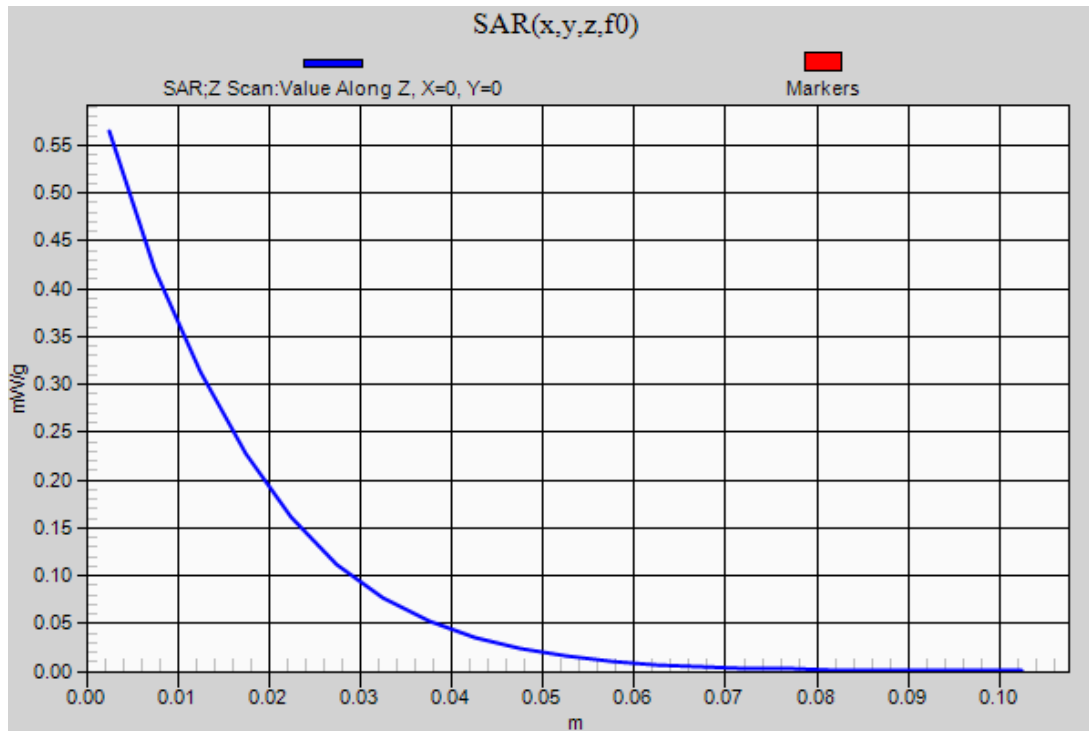
W-CDMA Band IV

Frequency: 1732.4 MHz; Duty Cycle: 1:1

LHS/Touch_R99_ch 1412/Z Scan (1x1x21): Measurement grid: dx=20mm, dy=20mm, dz=5mm

[Info: Interpolated medium parameters used for SAR evaluation.](#)

Maximum value of SAR (measured) = 0.564 mW/g



W-CDMA Band IV

Frequency: 1712.4 MHz; Duty Cycle: 1:1; Room Ambient Temperature: 24.0°C; Liquid Temperature: 23.0°C
Medium parameters used (interpolated): $f = 1712.4$ MHz; $\sigma = 1.415$ mho/m; $\epsilon_r = 53.613$; $\rho = 1000$ kg/m³

DASY5 Configuration:

- Area Scan setting - Find Secondary Maximum Within: 2.0 dB and with a peak SAR value greater than 0.0012W/kg
- Electronics: DAE4 Sn1239; Calibrated: 6/6/2012
- Probe: EX3DV4 - SN3773; ConvF(7.37, 7.37, 7.37); Calibrated: 3/14/2012
- Sensor-Surface: 2.5mm (Mechanical Surface Detection (Locations From Previous Scan Used)), Sensor-Surface: 2.5mm (Mechanical Surface Detection)
- Phantom: ELI v5.0 (B); Type: QDOVA001BB; Serial: 1099

Rear/R99_ch 1312/Area Scan (8x12x1): Measurement grid: dx=15mm, dy=15mm

[Info: Interpolated medium parameters used for SAR evaluation.](#)

Maximum value of SAR (measured) = 1.255 mW/g

Rear/R99_ch 1312/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

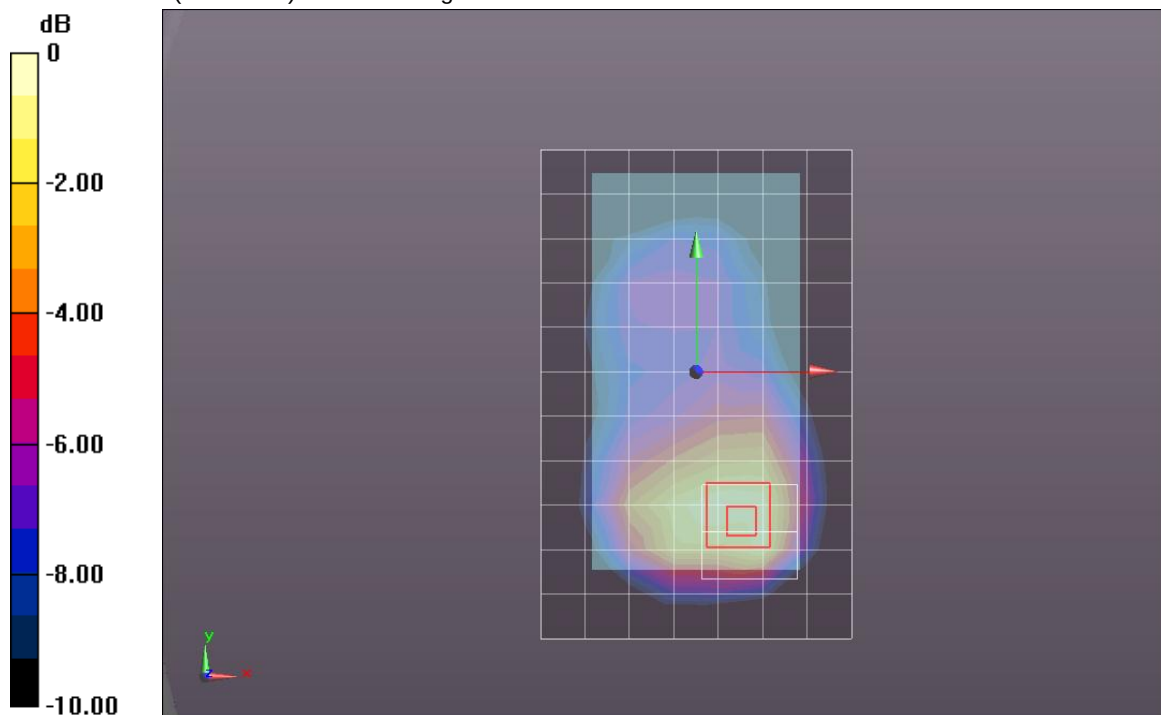
Reference Value = 30.147 V/m; Power Drift = 0.04 dB

Peak SAR (extrapolated) = 1.9570

SAR(1 g) = 1.17 mW/g; SAR(10 g) = 0.689 mW/g

[Info: Interpolated medium parameters used for SAR evaluation.](#)

Maximum value of SAR (measured) = 1.444 mW/g



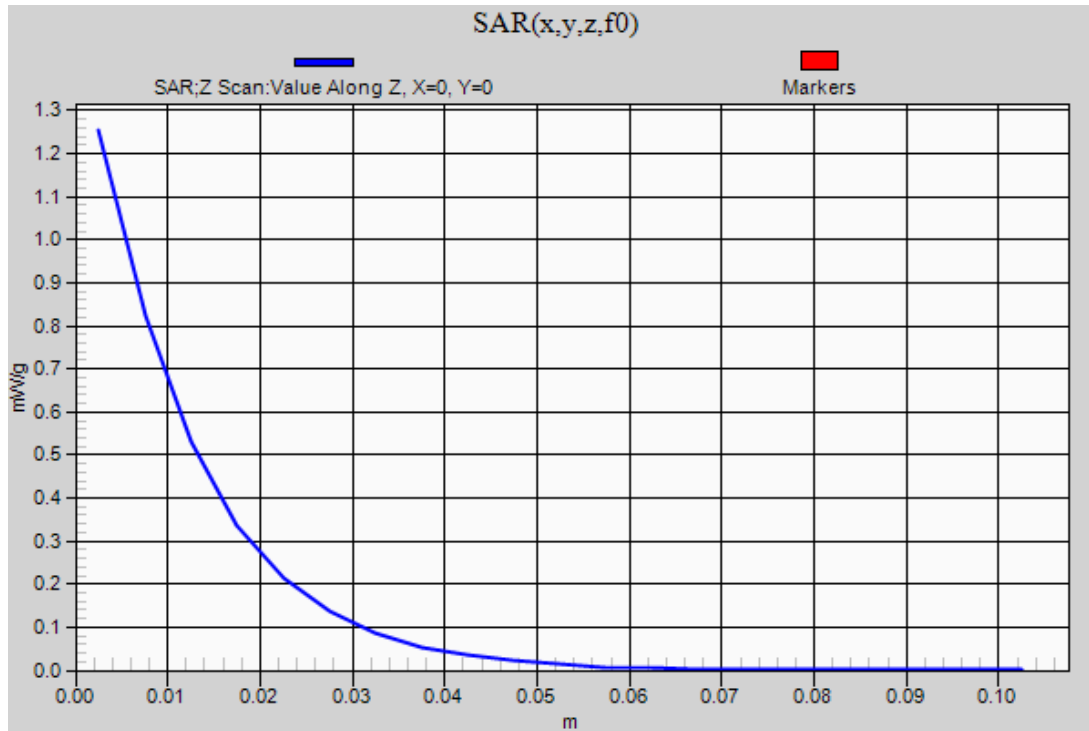
W-CDMA Band IV

Frequency: 1712.4 MHz; Duty Cycle: 1:1

Rear/R99_ch 1312/Z Scan (1x1x21): Measurement grid: dx=20mm, dy=20mm, dz=5mm

[Info: Interpolated medium parameters used for SAR evaluation.](#)

Maximum value of SAR (measured) = 1.254 mW/g



W-CDMA Band II

Frequency: 1880 MHz; Duty Cycle: 1:1; Room Ambient Temperature: 24.0°C; Liquid Temperature: 23.0°C
Medium parameters used: $f = 1880$ MHz; $\sigma = 1.37$ mho/m; $\epsilon_r = 39.879$; $\rho = 1000$ kg/m³

DASY5 Configuration:

- Area Scan setting - Find Secondary Maximum Within: 2.0 dB and with a peak SAR value greater than 0.0012W/kg
- Electronics: DAE4 Sn1239; Calibrated: 6/6/2012
- Probe: EX3DV4 - SN3773; ConvF(7.51, 7.51, 7.51); Calibrated: 3/14/2012
- Sensor-Surface: 2.5mm (Mechanical Surface Detection)
- Phantom: SAM; Type: QD000P40CD; Serial: 1632

LHS/Touch_R99_ch 9400/Area Scan (8x11x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (measured) = 0.536 mW/g

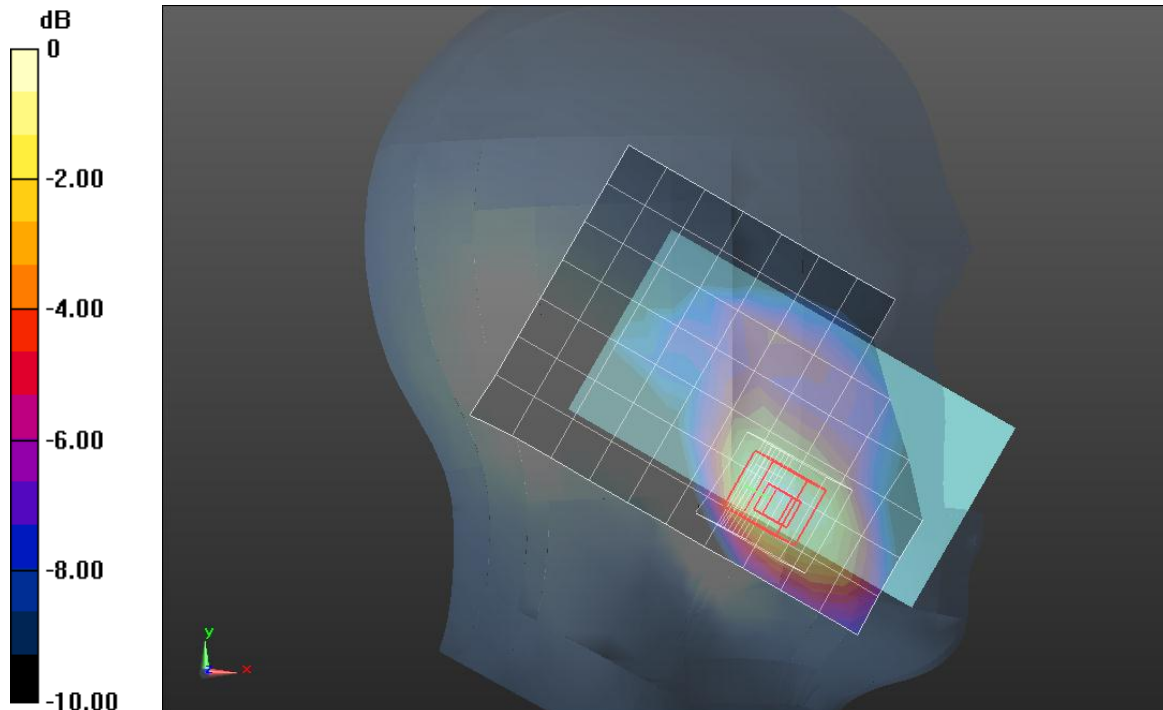
LHS/Touch_R99_ch 9400/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 19.896 V/m; Power Drift = 0.06 dB

Peak SAR (extrapolated) = 0.7020

SAR(1 g) = 0.476 mW/g; SAR(10 g) = 0.300 mW/g

Maximum value of SAR (measured) = 0.571 mW/g



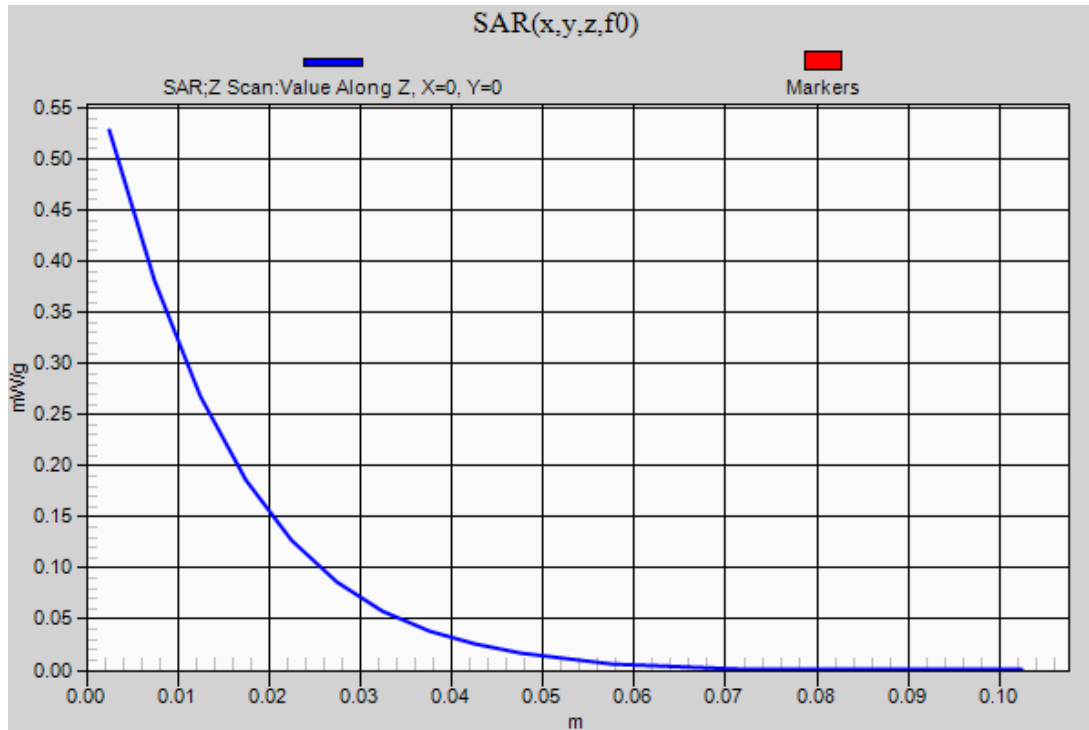
0 dB = 0.570mW/g = -4.88 dB mW/g

W-CDMA Band II

Frequency: 1880 MHz; Duty Cycle: 1:1

LHS/Touch_R99_ch 9400/Z Scan (1x1x21): Measurement grid: dx=20mm, dy=20mm, dz=5mm

Maximum value of SAR (measured) = 0.528 mW/g



W-CDMA Band II

Frequency: 1907.6 MHz; Duty Cycle: 1:1; Room Ambient Temperature: 24.0°C; Liquid Temperature: 23.0°C
Medium parameters used (interpolated): $f = 1907.6$ MHz; $\sigma = 1.558$ mho/m; $\epsilon_r = 53.07$; $\rho = 1000$ kg/m³

DASY5 Configuration:

- Area Scan setting - Find Secondary Maximum Within: 2.0 dB and with a peak SAR value greater than 0.0012W/kg
- Electronics: DAE4 Sn1239; Calibrated: 6/6/2012
- Probe: EX3DV4 - SN3773; ConvF(7.11, 7.11, 7.11); Calibrated: 3/14/2012
- Sensor-Surface: 2.5mm (Mechanical Surface Detection)
- Phantom: ELI v5.0 (B); Type: QDOVA001BB; Serial: 1099

Rear/R99_ch 9538/Area Scan (8x12x1): Measurement grid: dx=15mm, dy=15mm

[Info: Interpolated medium parameters used for SAR evaluation.](#)

Maximum value of SAR (measured) = 1.315 mW/g

Rear/R99_ch 9538/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

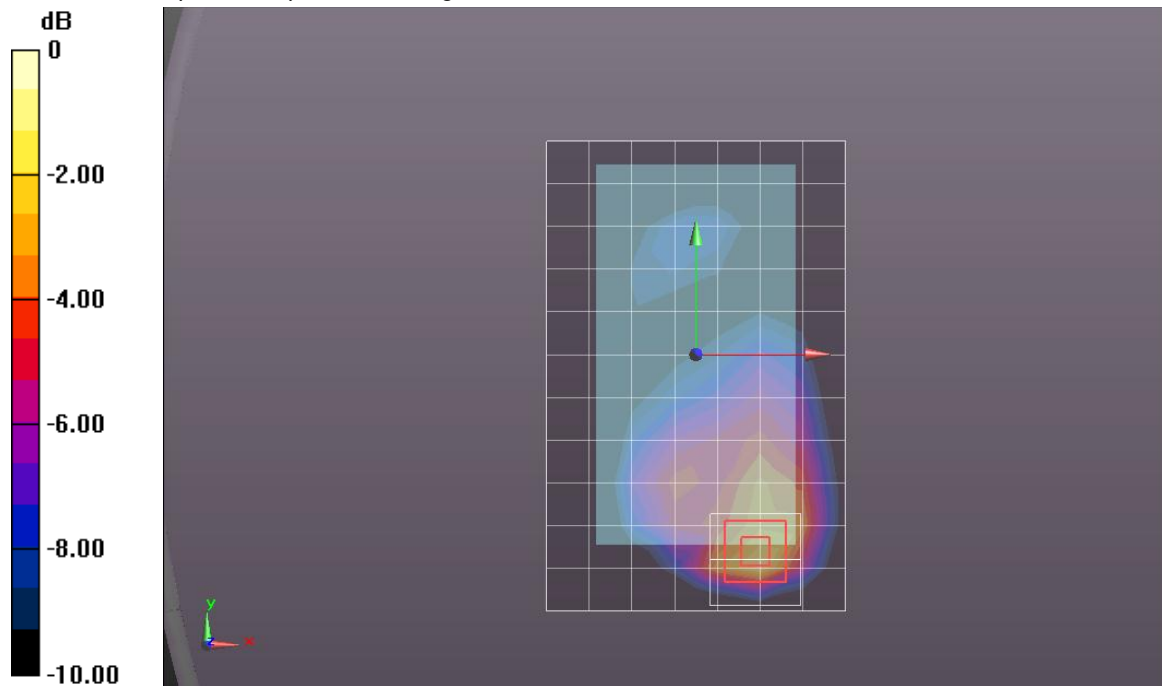
Reference Value = 29.282 V/m; Power Drift = 0.01 dB

Peak SAR (extrapolated) = 2.3100

SAR(1 g) = 1.27 mW/g; SAR(10 g) = 0.651 mW/g

[Info: Interpolated medium parameters used for SAR evaluation.](#)

Maximum value of SAR (measured) = 1.672 mW/g



0 dB = 1.670mW/g = 4.45 dB mW/g

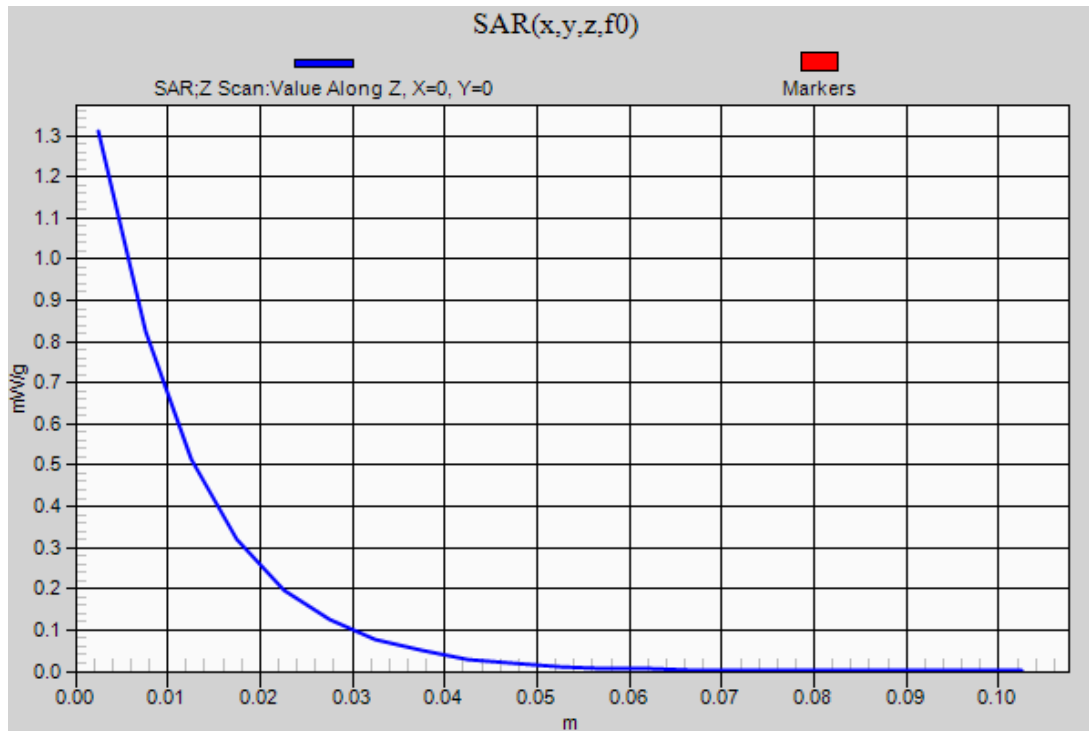
W-CDMA Band II

Frequency: 1907.6 MHz; Duty Cycle: 1:1

Rear/R99_ch 9538/Z Scan (1x1x21): Measurement grid: dx=20mm, dy=20mm, dz=5mm

[Info: Interpolated medium parameters used for SAR evaluation.](#)

Maximum value of SAR (measured) = 1.310 mW/g



W-CDMA Band II

Frequency: 1907.6 MHz; Duty Cycle: 1:1; Room Ambient Temperature: 24.0°C; Liquid Temperature: 23.0°C
Medium parameters used (interpolated): $f = 1907.6$ MHz; $\sigma = 1.558$ mho/m; $\epsilon_r = 53.07$; $\rho = 1000$ kg/m³

DASY5 Configuration:

- Area Scan setting - Find Secondary Maximum Within: 2.0 dB and with a peak SAR value greater than 0.0012W/kg
- Electronics: DAE4 Sn1239; Calibrated: 6/6/2012
- Probe: EX3DV4 - SN3773; ConvF(7.11, 7.11, 7.11); Calibrated: 3/14/2012
- Sensor-Surface: 2.5mm (Mechanical Surface Detection)
- Phantom: ELI v5.0 (B); Type: QDOVA001BB; Serial: 1099

Rear/HSDPA Subtest 1_ch 9538/Area Scan (8x12x1): Measurement grid: dx=15mm, dy=15mm

[Info: Interpolated medium parameters used for SAR evaluation.](#)

Maximum value of SAR (measured) = 1.325 mW/g

Rear/HSDPA Subtest 1_ch 9538/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

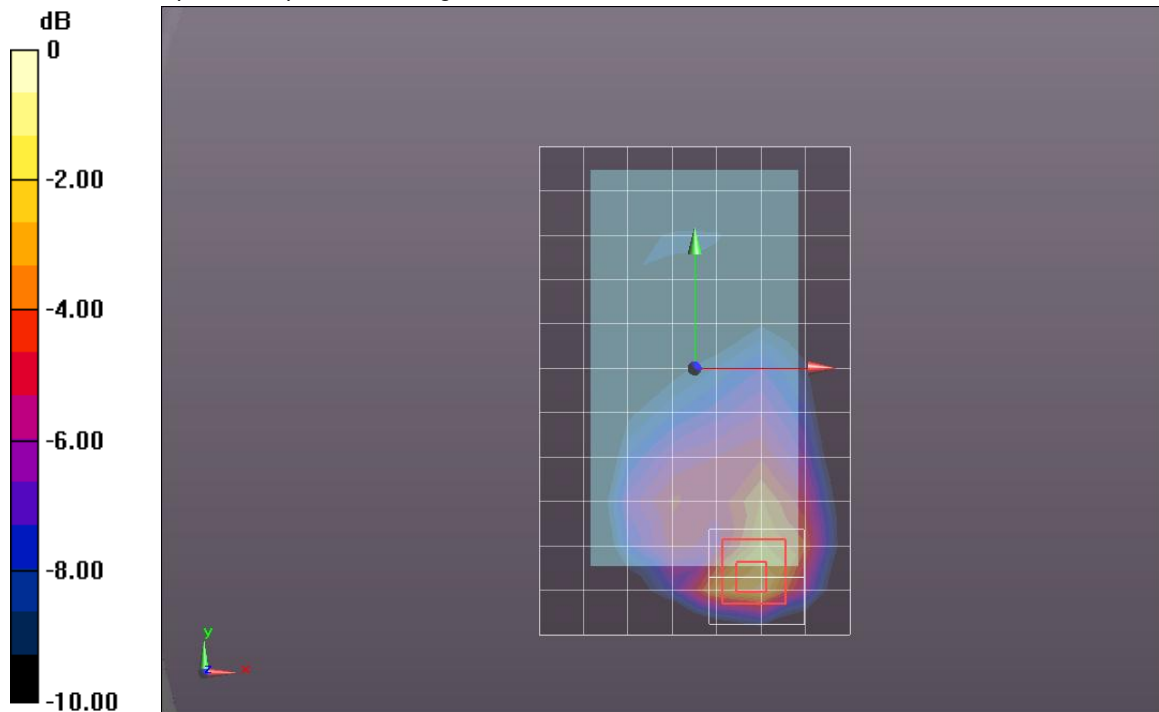
Reference Value = 28.995 V/m; Power Drift = 0.16 dB

Peak SAR (extrapolated) = 2.2500

SAR(1 g) = 1.23 mW/g; SAR(10 g) = 0.630 mW/g

[Info: Interpolated medium parameters used for SAR evaluation.](#)

Maximum value of SAR (measured) = 1.702 mW/g



0 dB = 1.700mW/g = 4.61 dB mW/g

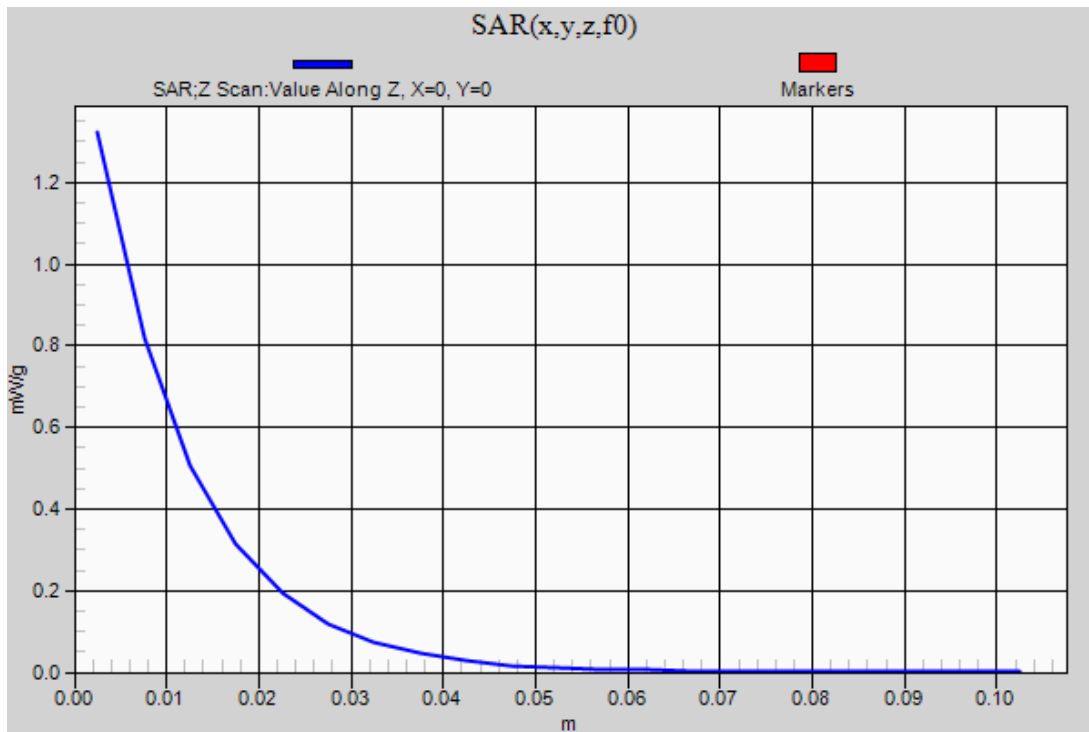
W-CDMA Band II

Frequency: 1907.6 MHz; Duty Cycle: 1:1

Rear/HSDPA Subtest 1_ch 9538/Z Scan (1x1x21): Measurement grid: dx=20mm, dy=20mm, dz=5mm

[Info: Interpolated medium parameters used for SAR evaluation.](#)

Maximum value of SAR (measured) = 1.323 mW/g



W-CDMA Band II

Frequency: 1907.6 MHz; Duty Cycle: 1:1; Room Ambient Temperature: 24.0°C; Liquid Temperature: 23.0°C
Medium parameters used (interpolated): $f = 1907.6$ MHz; $\sigma = 1.524$ mho/m; $\epsilon_r = 52.802$; $\rho = 1000$ kg/m³

DASY5 Configuration:

- Area Scan setting - Find Secondary Maximum Within: 2.0 dB and with a peak SAR value greater than 0.0012W/kg
- Electronics: DAE4 Sn1239; Calibrated: 6/6/2012
- Probe: EX3DV4 - SN3773; ConvF(7.11, 7.11, 7.11); Calibrated: 3/14/2012
- Sensor-Surface: 2.5mm (Mechanical Surface Detection (Locations From Previous Scan Used)), Sensor-Surface: 2.5mm (Mechanical Surface Detection)
- Phantom: ELI v5.0 (B); Type: QDOVA001BB; Serial: 1099

Rear/HSUPA subtest 5_ch 9538/Area Scan (8x12x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 1.043 mW/g

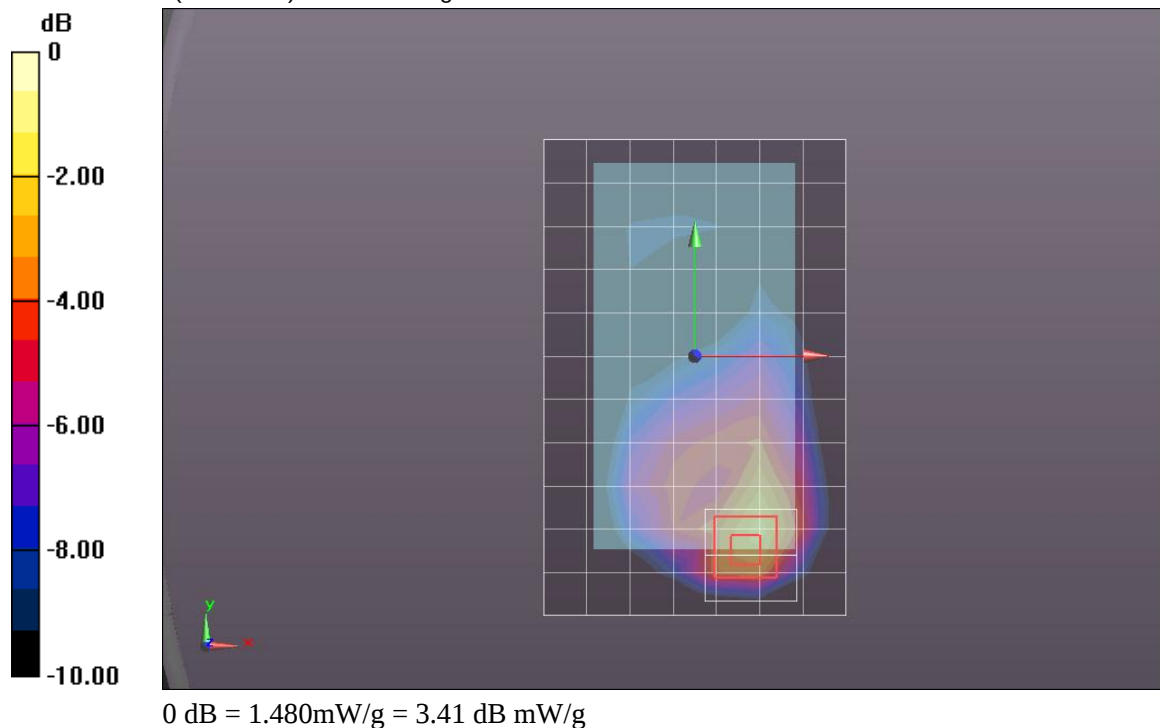
Rear/HSUPA subtest 5_ch 9538/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 27.501 V/m; Power Drift = -0.03 dB

Peak SAR (extrapolated) = 1.9940

SAR(1 g) = 1.11 mW/g; SAR(10 g) = 0.582 mW/g

Maximum value of SAR (measured) = 1.477 mW/g



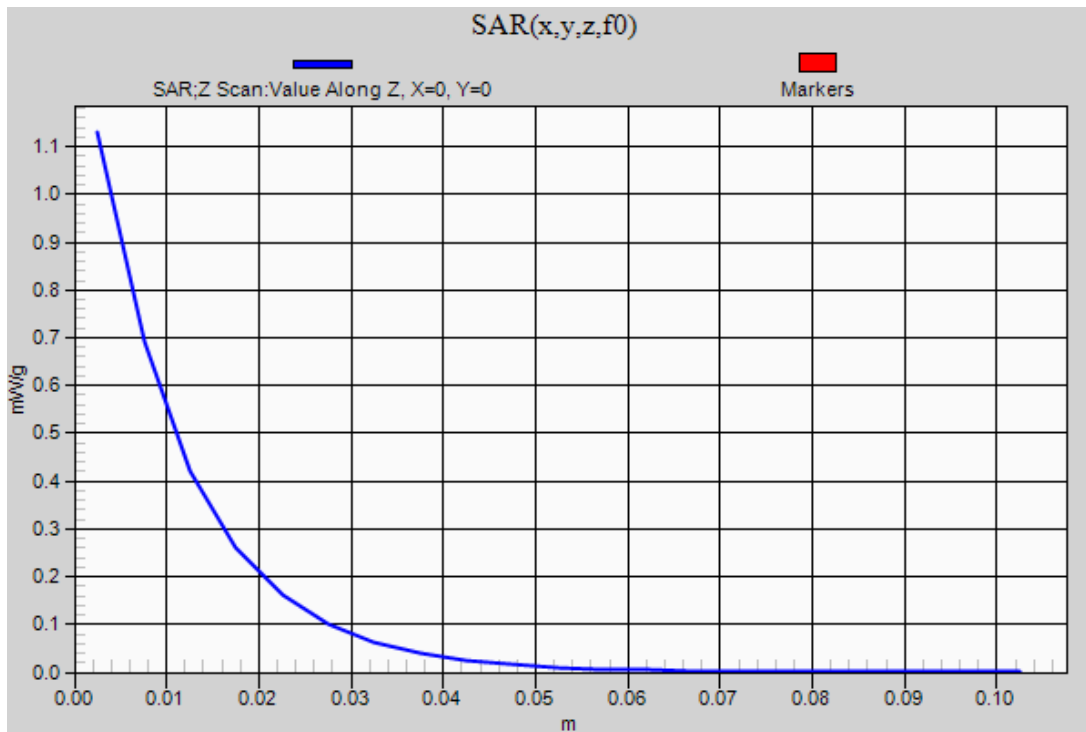
W-CDMA Band II

Frequency: 1907.6 MHz; Duty Cycle: 1:1

Rear/HSUPA subtest 5_ch 9538/Z Scan (1x1x21): Measurement grid: dx=20mm, dy=20mm, dz=5mm

[Info: Interpolated medium parameters used for SAR evaluation.](#)

Maximum value of SAR (measured) = 1.130 mW/g



WiFi 2.4GHz

Frequency: 2437 MHz; Duty Cycle: 1:1; Room Ambient Temperature: 24.0°C; Liquid Temperature: 23.0°C
Medium parameters used (interpolated): $f = 2437$ MHz; $\sigma = 1.829$ mho/m; $\epsilon_r = 38.232$; $\rho = 1000$ kg/m³

DASY5 Configuration:

- Area Scan setting - Find Secondary Maximum Within: 2.0 dB and with a peak SAR value greater than 0.0012W/kg
- Electronics: DAE4 Sn1258; Calibrated: 3/8/2012
- Probe: EX3DV4 - SN3772; ConvF(6.64, 6.64, 6.64); Calibrated: 2/16/2012
- Sensor-Surface: 2.5mm (Mechanical Surface Detection (Locations From Previous Scan Used)), Sensor-Surface: 2.5mm (Mechanical Surface Detection)
- Phantom: SAM v5.0 (B); Type: QD000P40CD; Serial: 1628

LHS/Touch_802.11b_ch 6/Area Scan (7x11x1): Measurement grid: dx=15mm, dy=15mm

[Info: Interpolated medium parameters used for SAR evaluation.](#)

Maximum value of SAR (measured) = 0.098 mW/g

LHS/Touch_802.11b_ch 6/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

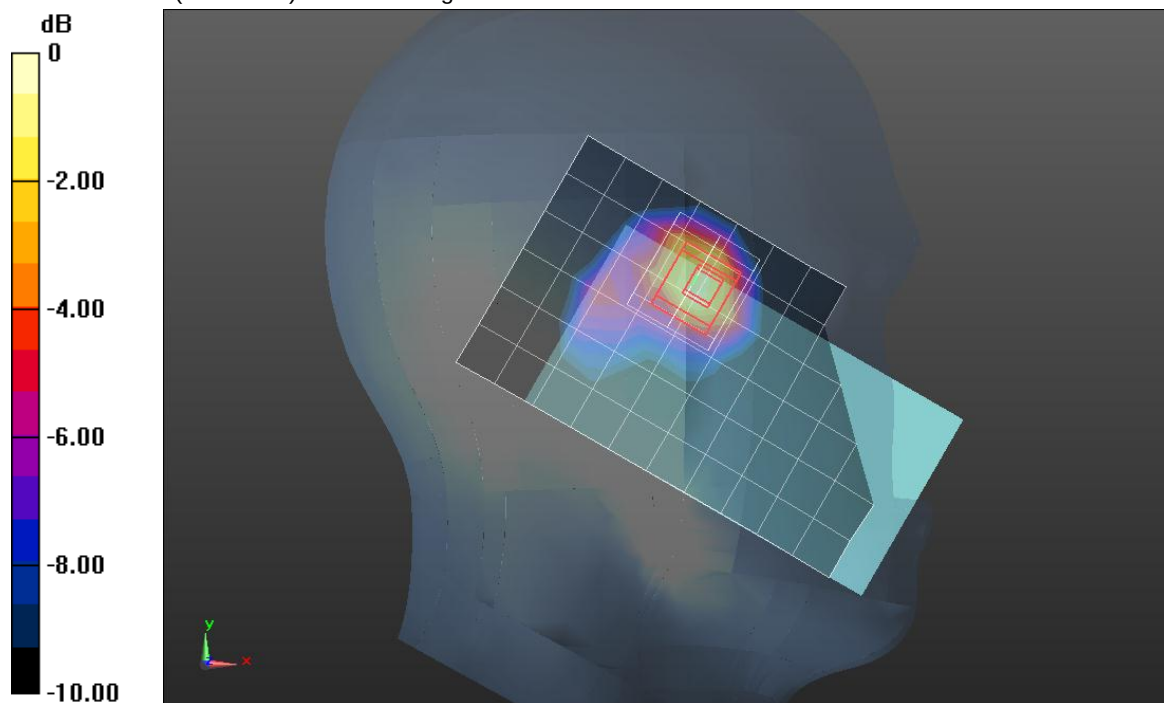
Reference Value = 7.521 V/m; Power Drift = -0.08 dB

Peak SAR (extrapolated) = 0.1800

SAR(1 g) = 0.079 mW/g; SAR(10 g) = 0.038 mW/g

[Info: Interpolated medium parameters used for SAR evaluation.](#)

Maximum value of SAR (measured) = 0.111 mW/g



0 dB = 0.110mW/g = -19.17 dB mW/g

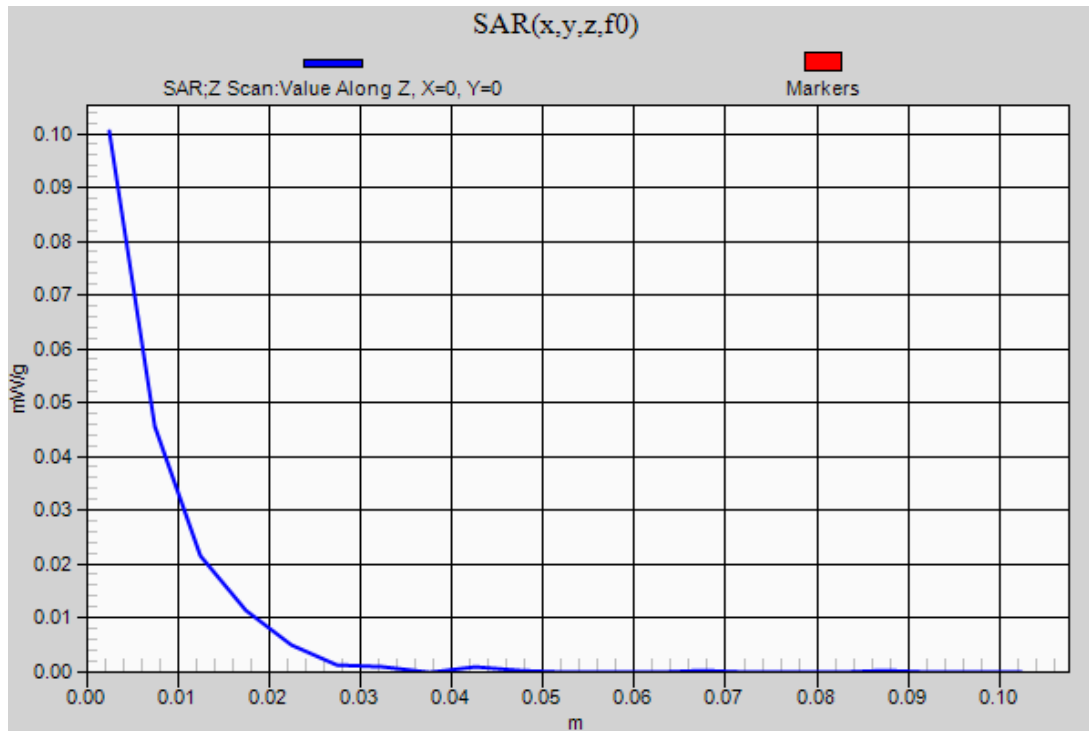
WiFi 2.4GHz

Frequency: 2437 MHz; Duty Cycle: 1:1

LHS/Touch_802.11b_ch 6/Z Scan (1x1x21): Measurement grid: dx=20mm, dy=20mm, dz=5mm

[Info: Interpolated medium parameters used for SAR evaluation.](#)

Maximum value of SAR (measured) = 0.100 mW/g



WiFi 2.4GHz

Frequency: 2437 MHz; Duty Cycle: 1:1; Room Ambient Temperature: 24.0°C; Liquid Temperature: 23.0°C
Medium parameters used (interpolated): $f = 2437$ MHz; $\sigma = 1.924$ mho/m; $\epsilon_r = 51.834$; $\rho = 1000$ kg/m³

DASY5 Configuration:

- Area Scan setting - Find Secondary Maximum Within: 2.0 dB and with a peak SAR value greater than 0.0012W/kg
- Electronics: DAE4 Sn1239; Calibrated: 6/6/2012
- Probe: EX3DV4 - SN3773; ConvF(6.67, 6.67, 6.67); Calibrated: 3/14/2012
- Sensor-Surface: 2.5mm (Mechanical Surface Detection (Locations From Previous Scan Used)), Sensor-Surface: 2.5mm (Mechanical Surface Detection)
- Phantom: ELI v5.0 (B); Type: QDOVA001BB; Serial: 1099

Rear/802.11b_ch 6 w/Headset/Area Scan (8x12x1): Measurement grid: dx=15mm, dy=15mm

[Info: Interpolated medium parameters used for SAR evaluation.](#)

Maximum value of SAR (measured) = 0.258 mW/g

Rear/802.11b_ch 6 w/Headset/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

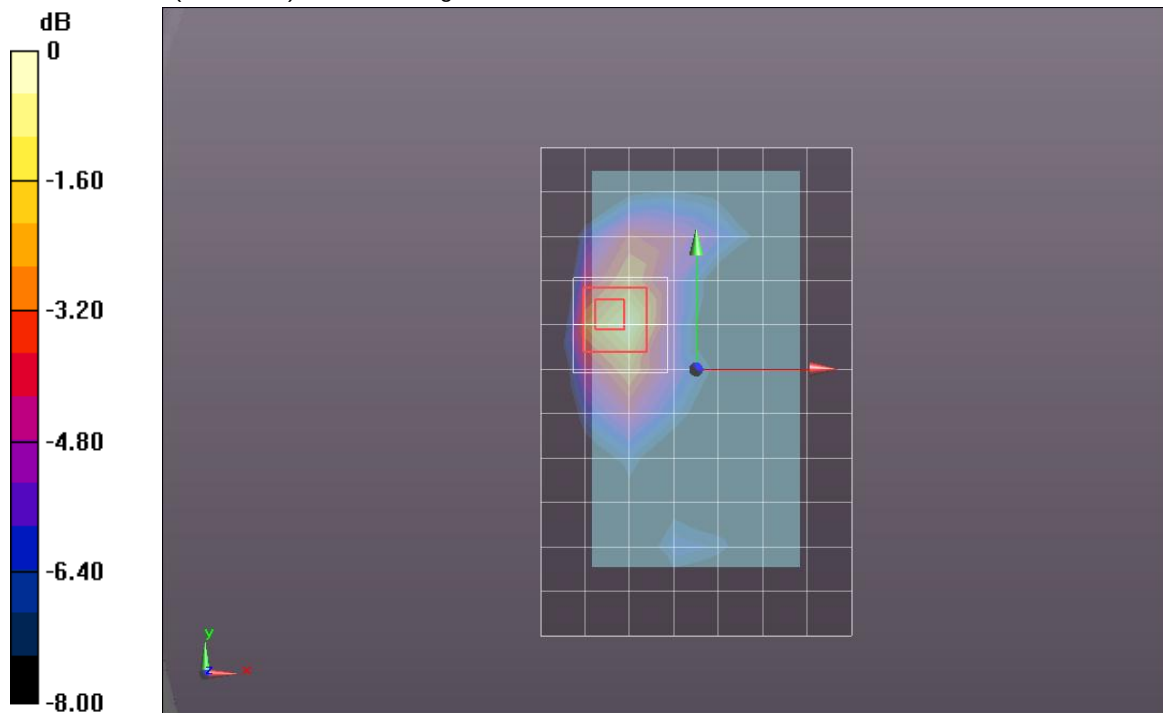
Reference Value = 11.467 V/m; Power Drift = 0.17 dB

Peak SAR (extrapolated) = 0.4610

SAR(1 g) = 0.232 mW/g; SAR(10 g) = 0.113 mW/g

[Info: Interpolated medium parameters used for SAR evaluation.](#)

Maximum value of SAR (measured) = 0.288 mW/g



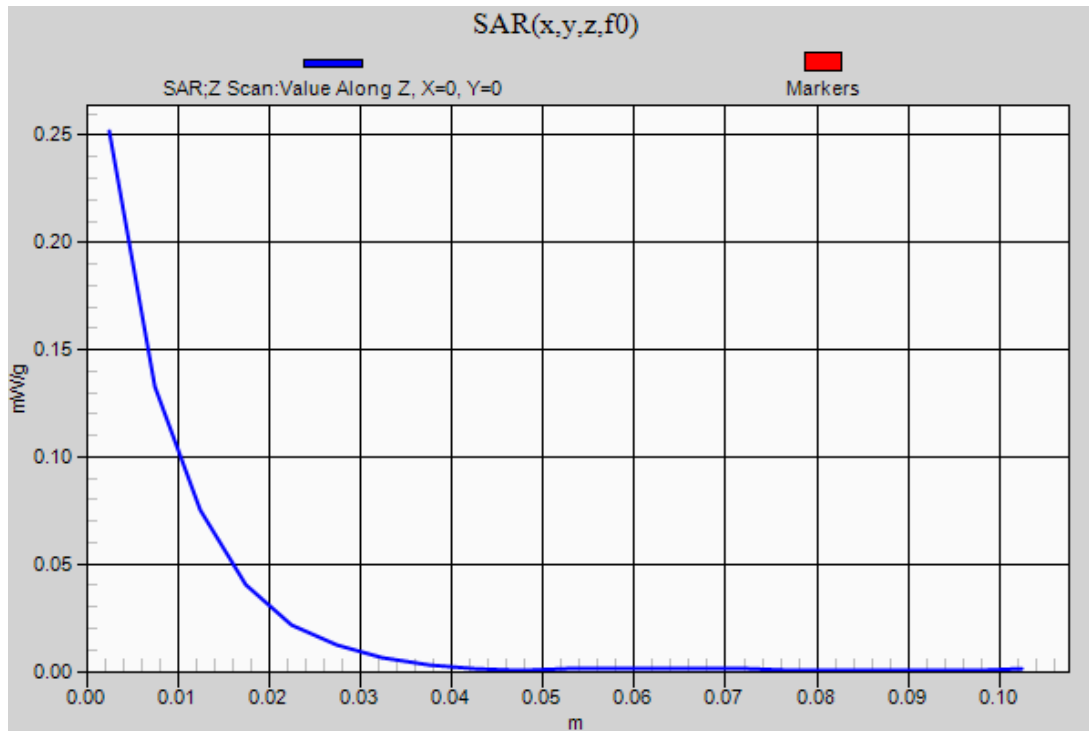
WiFi 2.4GHz

Frequency: 2437 MHz; Duty Cycle: 1:1

Rear/802.11b_ch 6 w/Headset/Z Scan (1x1x21): Measurement grid: dx=20mm, dy=20mm, dz=5mm

[Info: Interpolated medium parameters used for SAR evaluation.](#)

Maximum value of SAR (measured) = 0.252 mW/g



WiFi 5GHz

Frequency: 5240 MHz; Duty Cycle: 1:1; Room Ambient Temperature: 25.0°C; Liquid Temperature: 24.0°C
Medium parameters used: $f = 5240$ MHz; $\sigma = 4.783$ mho/m; $\epsilon_r = 35.717$; $\rho = 1000$ kg/m³

DASY5 Configuration:

- Area Scan setting - Find Secondary Maximum Within: 2.0 dB and with a peak SAR value greater than 0.0012W/kg
- Electronics: DAE4 Sn1239; Calibrated: 6/6/2012
- Probe: EX3DV4 - SN3773; ConvF(4.68, 4.68, 4.68); Calibrated: 3/14/2012
- Sensor-Surface: 2.5mm (Mechanical Surface Detection (Locations From Previous Scan Used)), Sensor-Surface: 2mm (Mechanical Surface Detection)
- Phantom: SAM; Type: QD000P40CD; Serial: 1632

LHS/Touch_802.11a_ch 48/Area Scan (10x16x1): Measurement grid: dx=10mm, dy=10mm
Maximum value of SAR (measured) = 0.233 mW/g

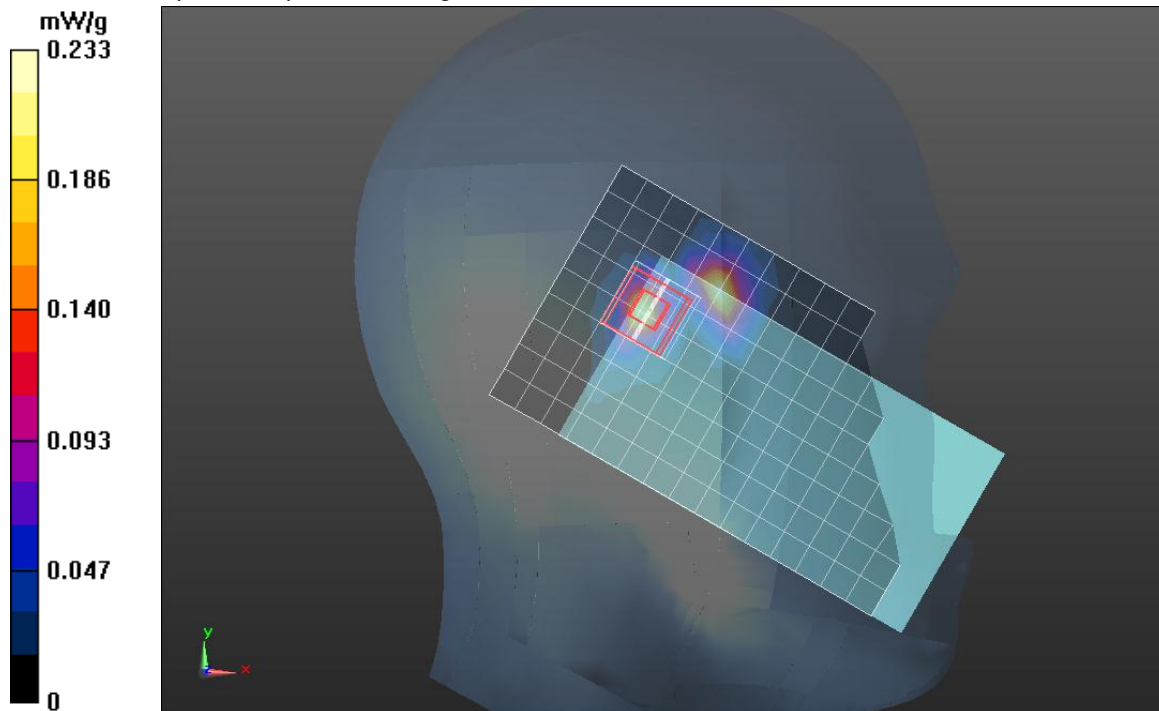
LHS/Touch_802.11a_ch 48/Zoom Scan (7x7x9)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=2.5mm

Reference Value = 7.119 V/m; Power Drift = 0.15 dB

Peak SAR (extrapolated) = 0.5300

SAR(1 g) = 0.137 mW/g; SAR(10 g) = 0.034 mW/g

Maximum value of SAR (measured) = 0.314 mW/g

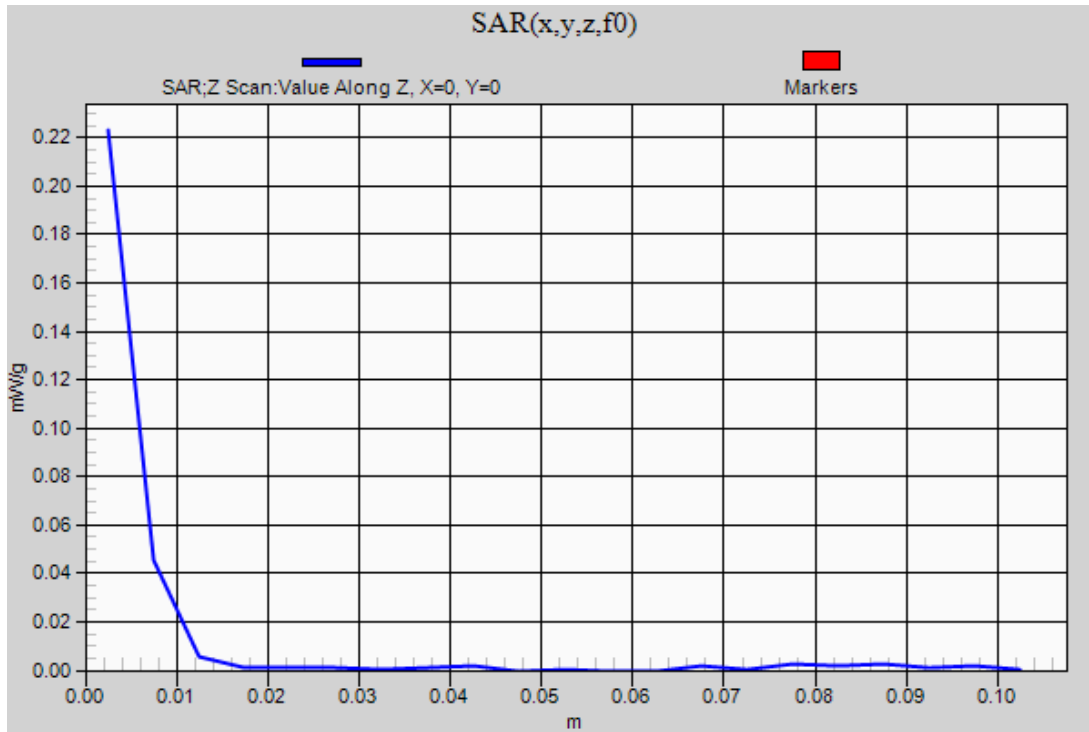


WiFi 5GHz

Frequency: 5240 MHz; Duty Cycle: 1:1

LHS/Touch_802.11a_ch 48/Z Scan (1x1x21): Measurement grid: dx=20mm, dy=20mm, dz=5mm

Maximum value of SAR (measured) = 0.223 mW/g



WiFi 5GHz

Frequency: 5260 MHz; Duty Cycle: 1:1; Room Ambient Temperature: 25.0°C; Liquid Temperature: 24.0°C
Medium parameters used: $f = 5260$ MHz; $\sigma = 4.793$ mho/m; $\epsilon_r = 35.814$; $\rho = 1000$ kg/m³

DASY5 Configuration:

- Area Scan setting - Find Secondary Maximum Within: 2.0 dB and with a peak SAR value greater than 0.0012W/kg
- Electronics: DAE4 Sn1239; Calibrated: 6/6/2012
- Probe: EX3DV4 - SN3773; ConvF(4.34, 4.34, 4.34); Calibrated: 3/14/2012
- Sensor-Surface: 2.5mm (Mechanical Surface Detection (Locations From Previous Scan Used)), Sensor-Surface: 2mm (Mechanical Surface Detection)
- Phantom: SAM; Type: QD000P40CD; Serial: 1632

LHS/Touch_802.11a_ch 52/Area Scan (10x16x1): Measurement grid: dx=10mm, dy=10mm
Maximum value of SAR (measured) = 0.227 mW/g

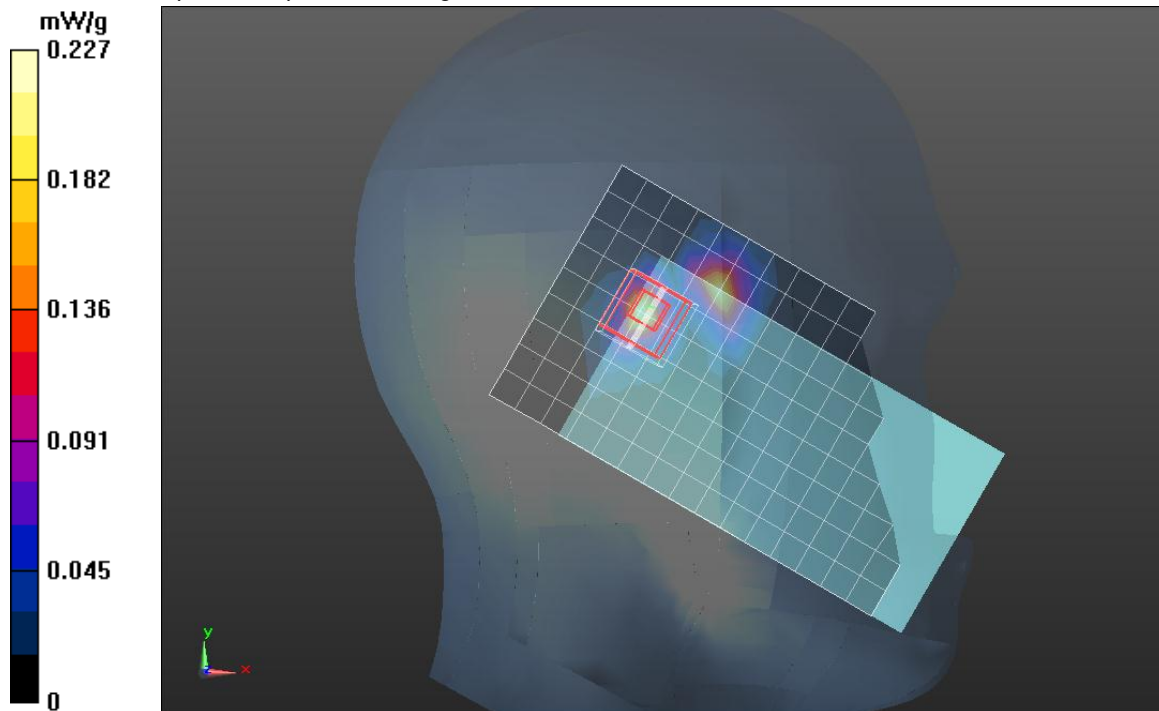
LHS/Touch_802.11a_ch 52/Zoom Scan (7x7x9)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=2.5mm

Reference Value = 7.098 V/m; Power Drift = 0.06 dB

Peak SAR (extrapolated) = 0.4940

SAR(1 g) = 0.124 mW/g; SAR(10 g) = 0.030 mW/g

Maximum value of SAR (measured) = 0.292 mW/g

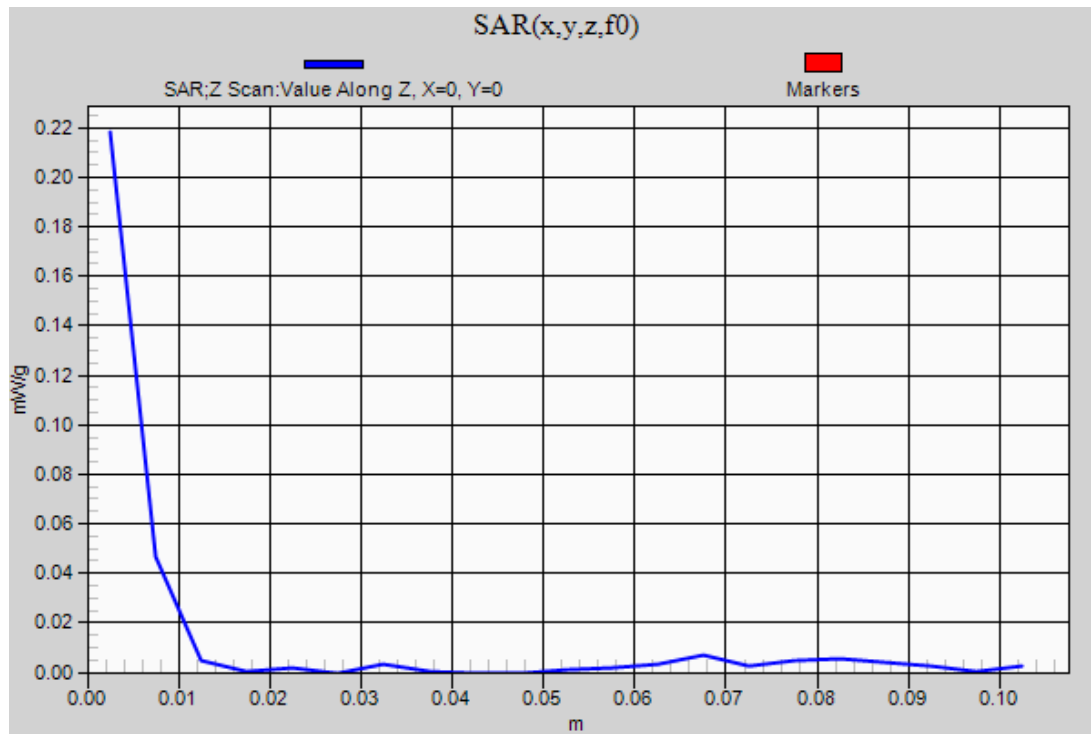


WiFi 5GHz

Frequency: 5260 MHz; Duty Cycle: 1:1

LHS/Touch_802.11a_ch 52/Z Scan (1x1x21): Measurement grid: dx=20mm, dy=20mm, dz=5mm

Maximum value of SAR (measured) = 0.218 mW/g



WiFi 5GHz

Frequency: 5520 MHz; Duty Cycle: 1:1; Room Ambient Temperature: 25.0°C; Liquid Temperature: 24.0°C

Medium parameters used: $f = 5520$ MHz; $\sigma = 5.05$ mho/m; $\epsilon_r = 35.733$; $\rho = 1000$ kg/m³

DASY5 Configuration:

- Area Scan setting - Find Secondary Maximum Within: 2.0 dB and with a peak SAR value greater than 0.0012W/kg
- Electronics: DAE4 Sn1239; Calibrated: 6/6/2012
- Probe: EX3DV4 - SN3773; ConvF(4.36, 4.36, 4.36); Calibrated: 3/14/2012
- Sensor-Surface: 2.5mm (Mechanical Surface Detection (Locations From Previous Scan Used)), Sensor-Surface: 2mm (Mechanical Surface Detection)
- Phantom: SAM; Type: QD000P40CD; Serial: 1632

LHS/Touch_802.11a_ch 104/Area Scan (10x16x1): Measurement grid: dx=10mm, dy=10mm
Maximum value of SAR (measured) = 0.128 mW/g

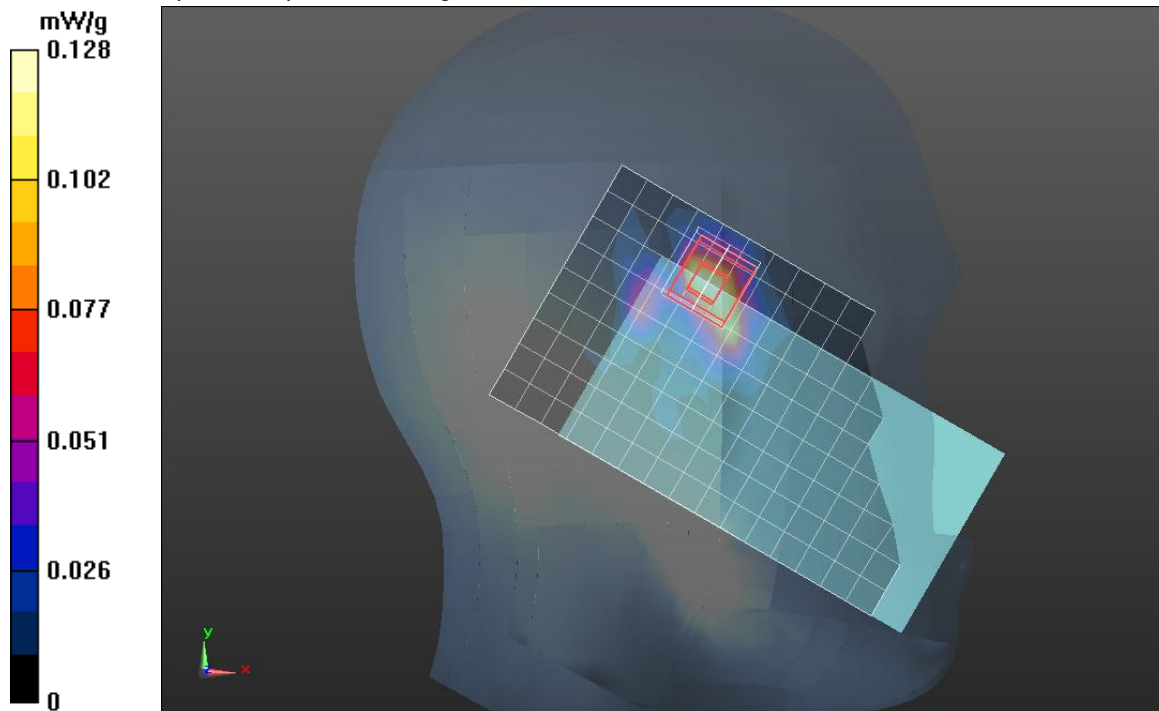
LHS/Touch_802.11a_ch 104/Zoom Scan (7x7x9)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=2.5mm

Reference Value = 5.309 V/m; Power Drift = -0.10 dB

Peak SAR (extrapolated) = 0.3340

SAR(1 g) = 0.090 mW/g; SAR(10 g) = 0.027 mW/g

Maximum value of SAR (measured) = 0.185 mW/g

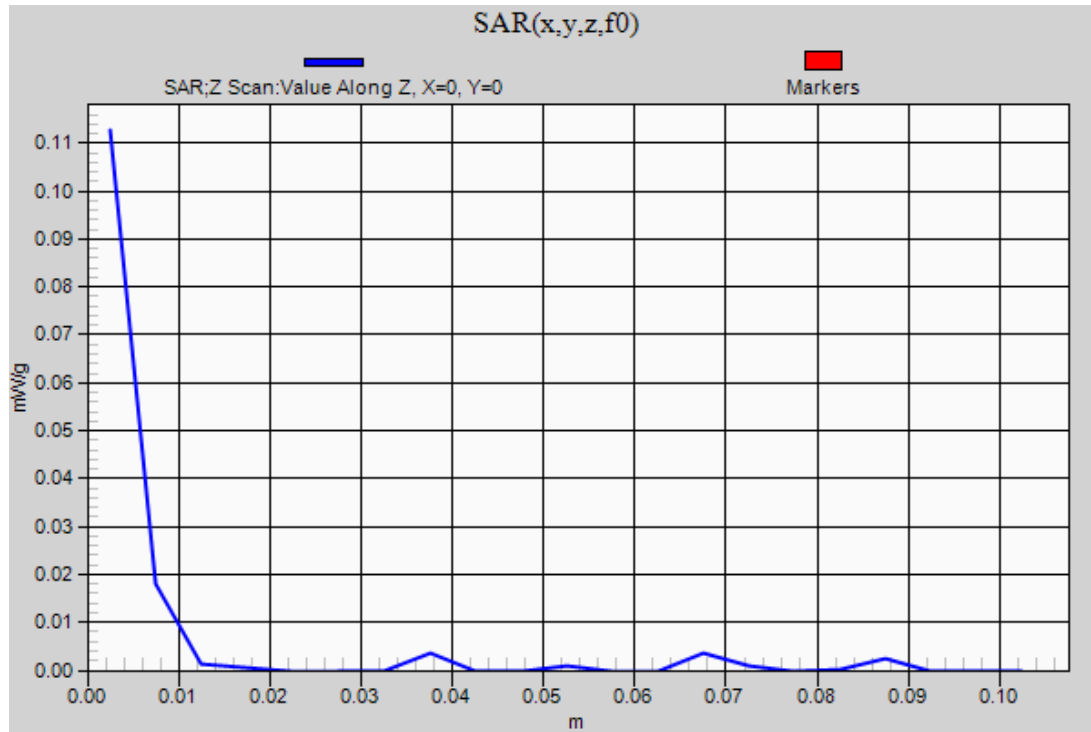


WiFi 5GHz

Frequency: 5520 MHz; Duty Cycle: 1:1

LHS/Touch_802.11a_ch 104/Z Scan (1x1x21): Measurement grid: dx=20mm, dy=20mm, dz=5mm

Maximum value of SAR (measured) = 0.113 mW/g



WiFi 5GHz

Frequency: 5745 MHz; Duty Cycle: 1:1; Room Ambient Temperature: 25.0°C; Liquid Temperature: 24.0°C

Medium parameters used: $f = 5745$ MHz; $\sigma = 5.28$ mho/m; $\epsilon_r = 34.987$; $\rho = 1000$ kg/m³

DASY5 Configuration:

- Area Scan setting - Find Secondary Maximum Within: 2.0 dB and with a peak SAR value greater than 0.0012W/kg
- Electronics: DAE4 Sn1239; Calibrated: 6/6/2012
- Probe: EX3DV4 - SN3773; ConvF(4.06, 4.06, 4.06); Calibrated: 3/14/2012
- Sensor-Surface: 2.5mm (Mechanical Surface Detection), Sensor-Surface: 2mm (Mechanical Surface Detection)
- Phantom: SAM; Type: QD000P40CD; Serial: 1632

LHS/Touch_802.11a_ch 149/Area Scan (10x16x1): Measurement grid: dx=10mm, dy=10mm

Maximum value of SAR (measured) = 0.114 mW/g

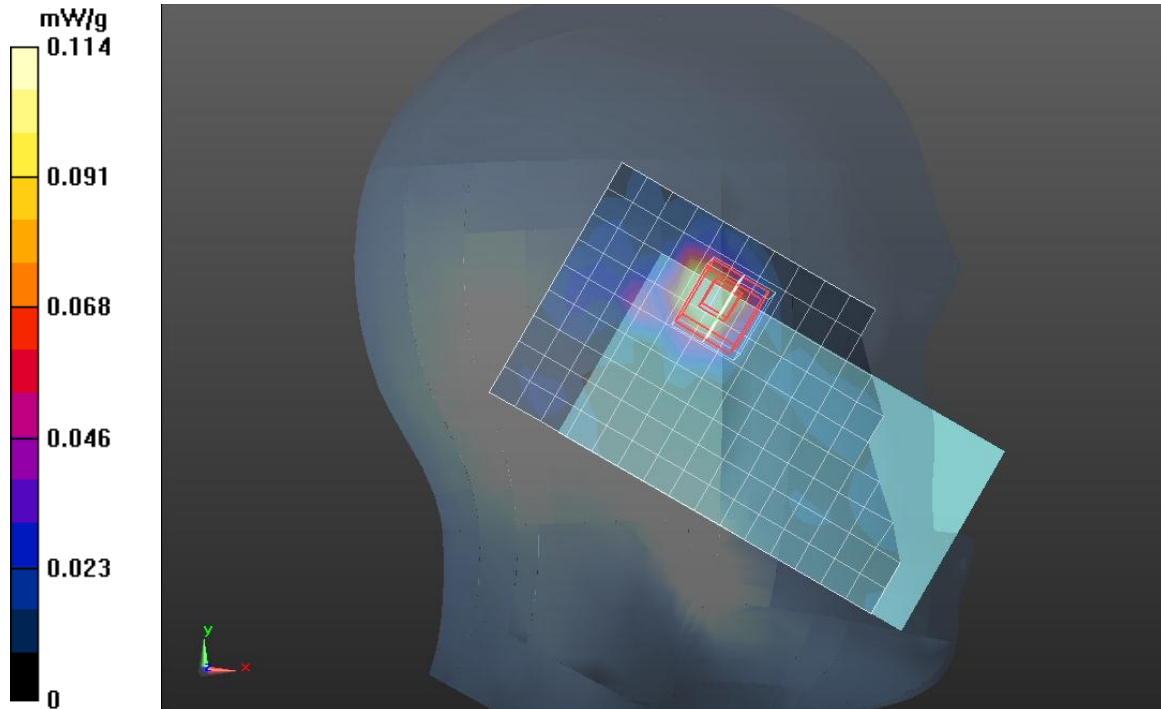
LHS/Touch_802.11a_ch 149/Zoom Scan (7x7x9)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=2.5mm

Reference Value = 4.657 V/m; Power Drift = -0.19 dB

Peak SAR (extrapolated) = 0.2350

SAR(1 g) = 0.063 mW/g; SAR(10 g) = 0.021 mW/g

Maximum value of SAR (measured) = 0.160 mW/g

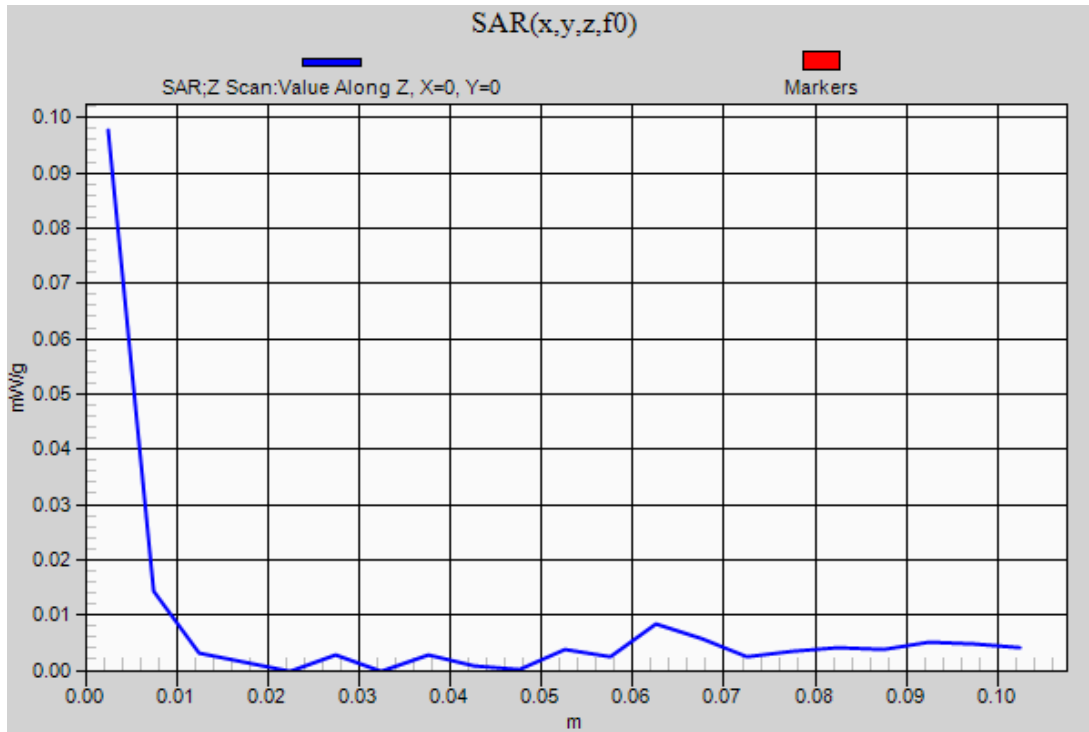


WiFi 5GHz

Frequency: 5745 MHz; Duty Cycle: 1:1

LHS/Touch_802.11a_ch 149/Z Scan (1x1x21): Measurement grid: dx=20mm, dy=20mm, dz=5mm

Maximum value of SAR (measured) = 0.098 mW/g



WiFi 5 GHz

Frequency: 5240 MHz; Duty Cycle: 1:1; Room Ambient Temperature: 25.0°C; Liquid Temperature: 24.0°C

Medium parameters used: $f = 5240$ MHz; $\sigma = 5.41$ mho/m; $\epsilon_r = 48.107$; $\rho = 1000$ kg/m³

DASY5 Configuration:

- Area Scan setting - Find Secondary Maximum Within: 2.0 dB and with a peak SAR value greater than 0.0012W/kg
- Electronics: DAE4 Sn1258; Calibrated: 3/8/2012
- Probe: EX3DV4 - SN3772; ConvF(4.17, 4.17, 4.17); Calibrated: 2/16/2012
- Sensor-Surface: 2.5mm (Mechanical Surface Detection (Locations From Previous Scan Used)), Sensor-Surface: 2mm (Mechanical Surface Detection)
- Phantom: ELI v5.0 (A); Type: QDOVA001BB; Serial: 1119

Rear/802.11a_Ch 48/Area Scan (13x15x1): Measurement grid: dx=10mm, dy=10mm

Maximum value of SAR (measured) = 0.194 mW/g

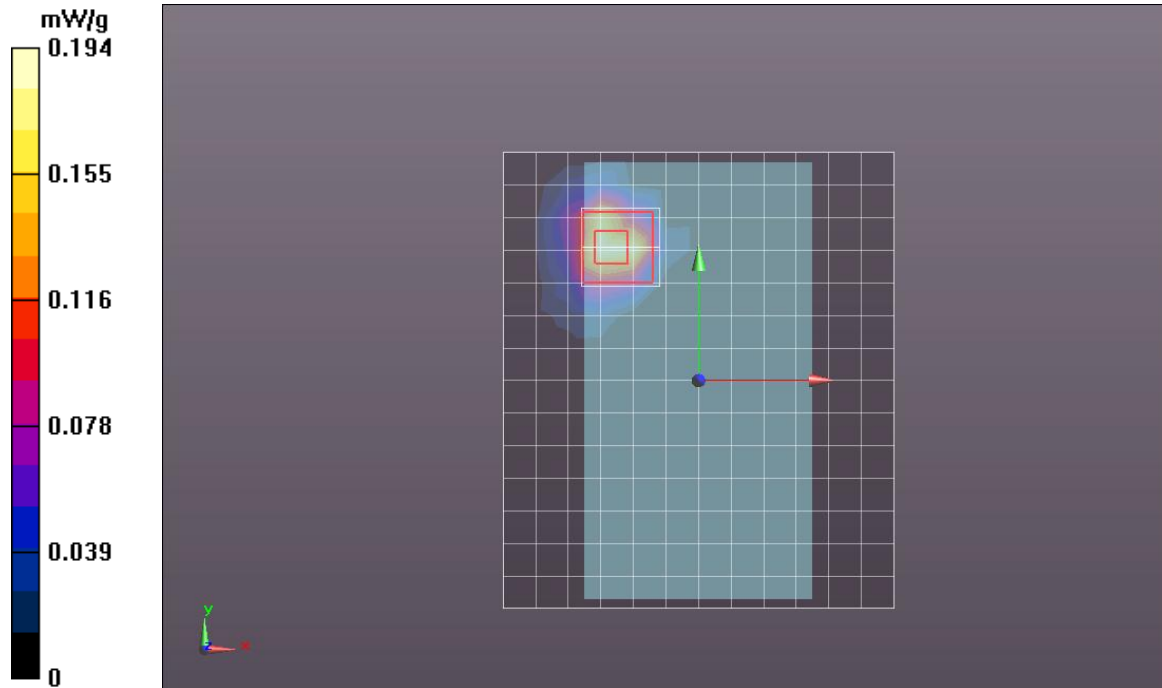
Rear/802.11a_Ch 48/Zoom Scan (7x7x9)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=2.5mm

Reference Value = 6.598 V/m; Power Drift = -0.02 dB

Peak SAR (extrapolated) = 0.4850

SAR(1 g) = 0.133 mW/g; SAR(10 g) = 0.039 mW/g

Maximum value of SAR (measured) = 0.270 mW/g

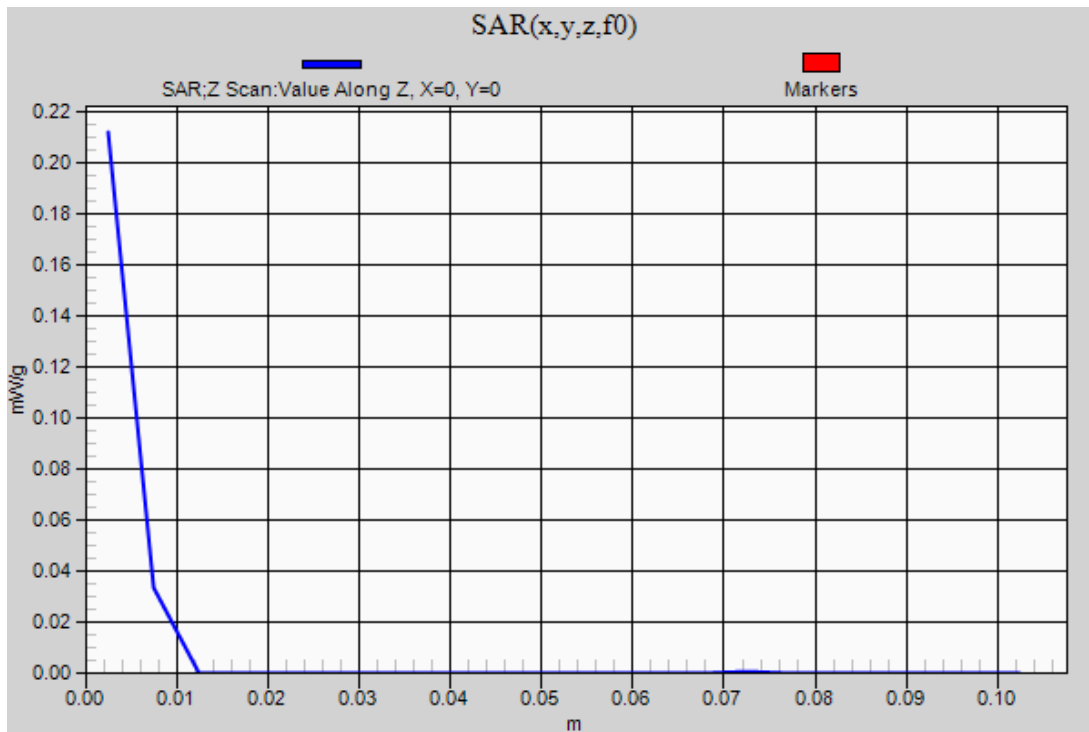


WiFi 5 GHz

Frequency: 5240 MHz; Duty Cycle: 1:1

Rear/802.11a_Ch 48/Z Scan (1x1x21): Measurement grid: dx=20mm, dy=20mm, dz=5mm

Maximum value of SAR (measured) = 0.212 mW/g



WiFi 5 GHz

Frequency: 5260 MHz; Duty Cycle: 1:1; Room Ambient Temperature: 25.0°C; Liquid Temperature: 24.0°C
Medium parameters used: $f = 5260$ MHz; $\sigma = 5.407$ mho/m; $\epsilon_r = 48.424$; $\rho = 1000$ kg/m³

DASY5 Configuration:

- Area Scan setting - Find Secondary Maximum Within: 2.0 dB and with a peak SAR value greater than 0.0012W/kg
- Electronics: DAE4 Sn1258; Calibrated: 3/8/2012
- Probe: EX3DV4 - SN3772; ConvF(3.99, 3.99, 3.99); Calibrated: 2/16/2012
- Sensor-Surface: 2.5mm (Mechanical Surface Detection), Sensor-Surface: 2mm (Mechanical Surface Detection)
- Phantom: ELI v5.0 (A); Type: QDOVA001BB; Serial: 1119

Rear/802.11a_Ch 52/Area Scan (11x15x1): Measurement grid: dx=10mm, dy=10mm

Maximum value of SAR (measured) = 0.247 mW/g

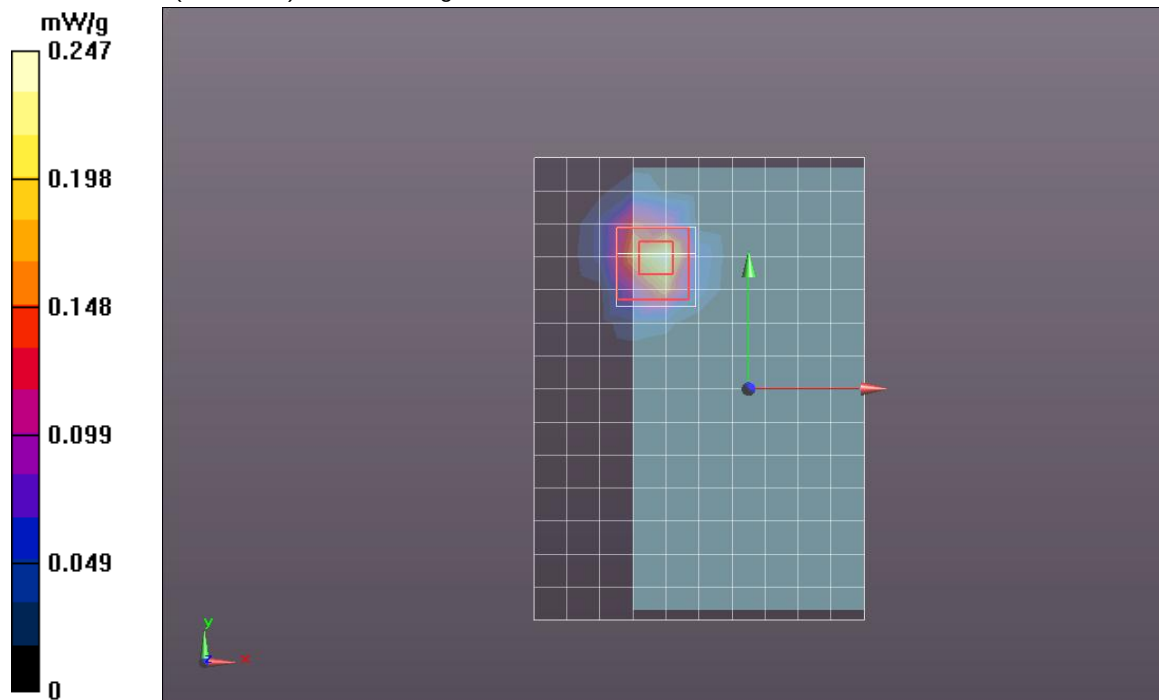
Rear/802.11a_Ch 52/Zoom Scan (7x7x9)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=2.5mm

Reference Value = 7.314 V/m; Power Drift = 0.12 dB

Peak SAR (extrapolated) = 0.5360

SAR(1 g) = 0.155 mW/g; SAR(10 g) = 0.047 mW/g

Maximum value of SAR (measured) = 0.310 mW/g

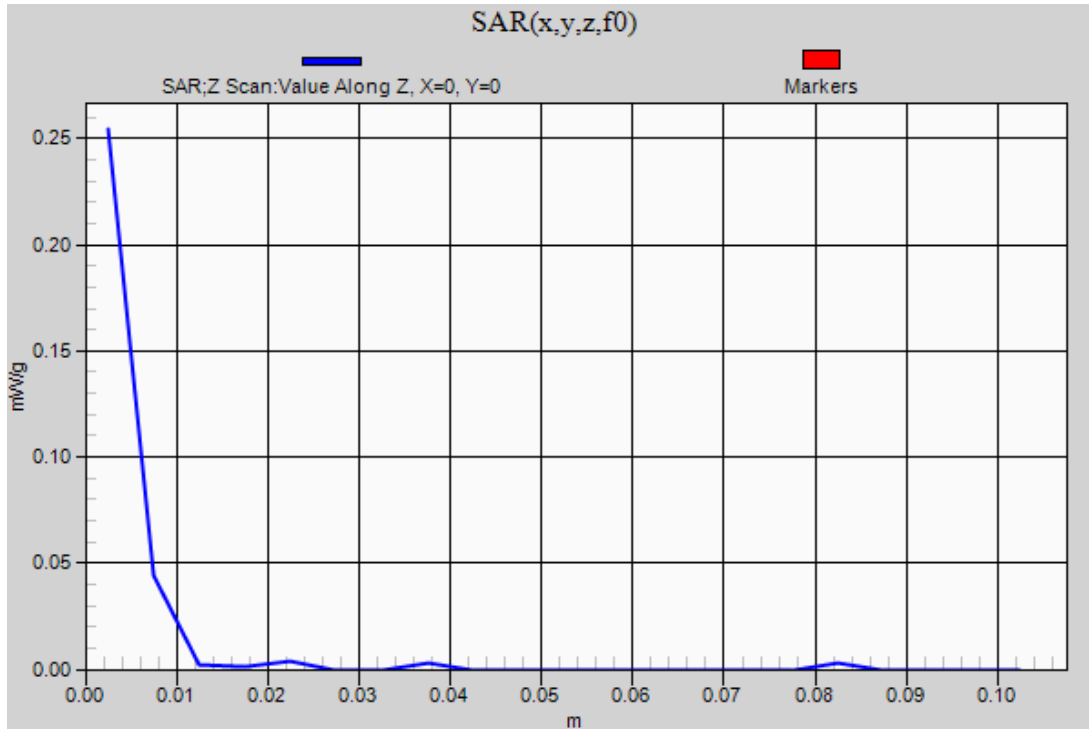


WiFi 5 GHz

Frequency: 5260 MHz; Duty Cycle: 1:1

Rear/802.11a_Ch 52/Z Scan (1x1x21): Measurement grid: dx=20mm, dy=20mm, dz=5mm

Maximum value of SAR (measured) = 0.254 mW/g



WiFi 5 GHz

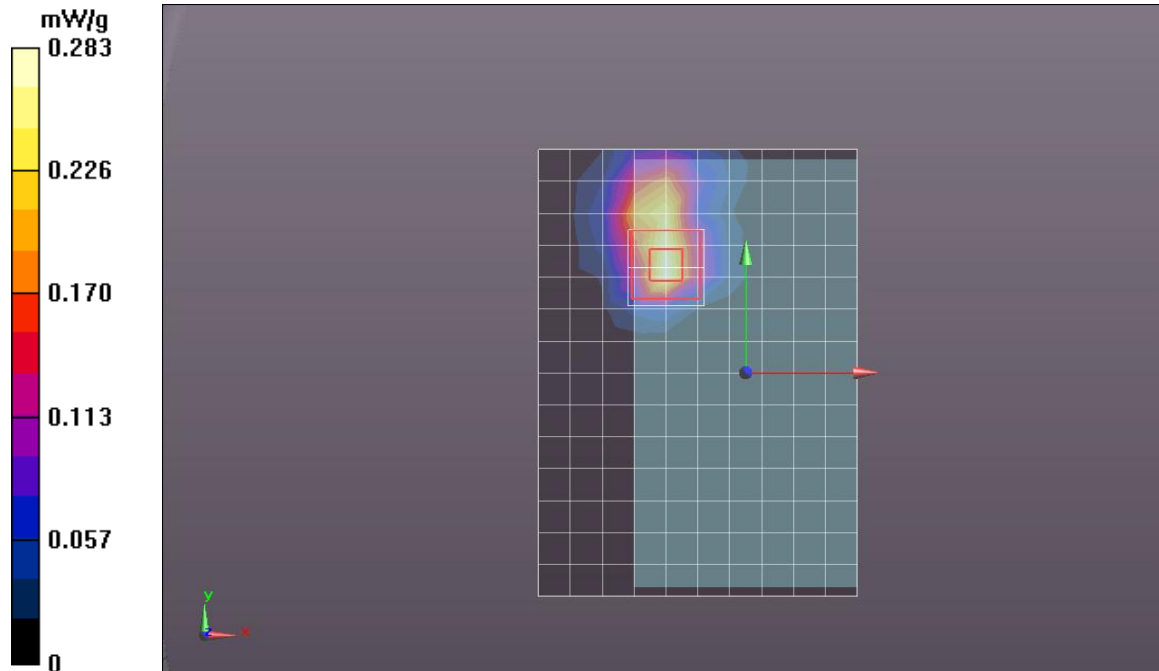
Frequency: 5680 MHz; Duty Cycle: 1:1; Room Ambient Temperature: 25.0°C; Liquid Temperature: 24.0°C
Medium parameters used: $f = 5680$ MHz; $\sigma = 5.922$ mho/m; $\epsilon_r = 47.633$; $\rho = 1000$ kg/m³

DASY5 Configuration:

- Area Scan setting - Find Secondary Maximum Within: 2.0 dB and with a peak SAR value greater than 0.0012W/kg
- Electronics: DAE4 Sn1258; Calibrated: 3/8/2012
- Probe: EX3DV4 - SN3772; ConvF(3.26, 3.26, 3.26); Calibrated: 2/16/2012
- Sensor-Surface: 2.5mm (Mechanical Surface Detection (Locations From Previous Scan Used)), Sensor-Surface: 2mm (Mechanical Surface Detection)
- Phantom: ELI v5.0 (A); Type: QDOVA001BB; Serial: 1119

Rear/802.11a_Ch 136/Area Scan (11x15x1): Measurement grid: dx=10mm, dy=10mm
Maximum value of SAR (measured) = 0.283 mW/g

Rear/802.11a_Ch 136/Zoom Scan (7x7x9)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=2.5mm
Reference Value = 7.513 V/m; Power Drift = -0.14 dB
Peak SAR (extrapolated) = 1.3550
SAR(1 g) = 0.178 mW/g; SAR(10 g) = 0.052 mW/g
Maximum value of SAR (measured) = 0.406 mW/g

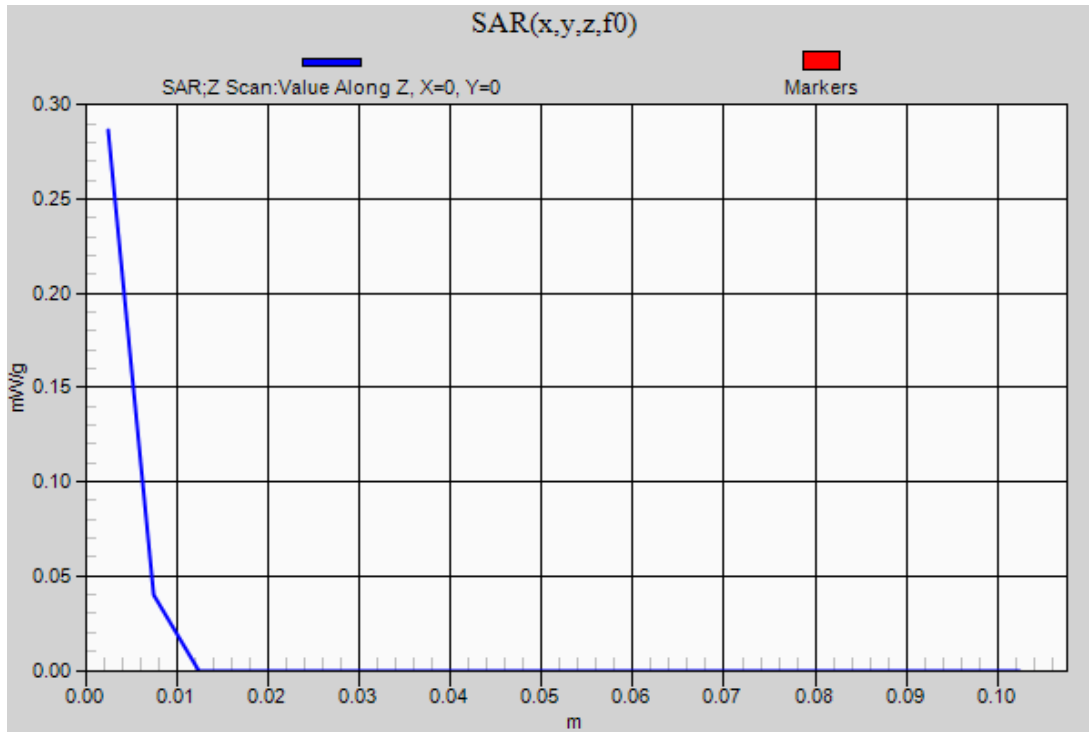


WiFi 5 GHz

Frequency: 5680 MHz; Duty Cycle: 1:1

Rear/802.11a_Ch 136/Z Scan (1x1x21): Measurement grid: dx=20mm, dy=20mm, dz=5mm

Maximum value of SAR (measured) = 0.287 mW/g



WiFi 5 GHz

Frequency: 5785 MHz; Duty Cycle: 1:1; Room Ambient Temperature: 25.0°C; Liquid Temperature: 24.0°C

Medium parameters used: $f = 5785$ MHz; $\sigma = 6.024$ mho/m; $\epsilon_r = 47.89$; $\rho = 1000$ kg/m³

DASY5 Configuration:

- Area Scan setting - Find Secondary Maximum Within: 2.0 dB and with a peak SAR value greater than 0.0012W/kg
- Electronics: DAE4 Sn1239; Calibrated: 6/6/2012
- Probe: EX3DV4 - SN3773; ConvF(3.57, 3.57, 3.57); Calibrated: 3/14/2012
- Sensor-Surface: 2.5mm (Mechanical Surface Detection (Locations From Previous Scan Used)), Sensor-Surface: 2mm (Mechanical Surface Detection)
- Phantom: ELI v5.0 (A); Type: QDOVA001BB; Serial: 1117

Rear/802.11a_Ch 157/Area Scan (11x15x1): Measurement grid: dx=10mm, dy=10mm

Maximum value of SAR (measured) = 0.195 mW/g

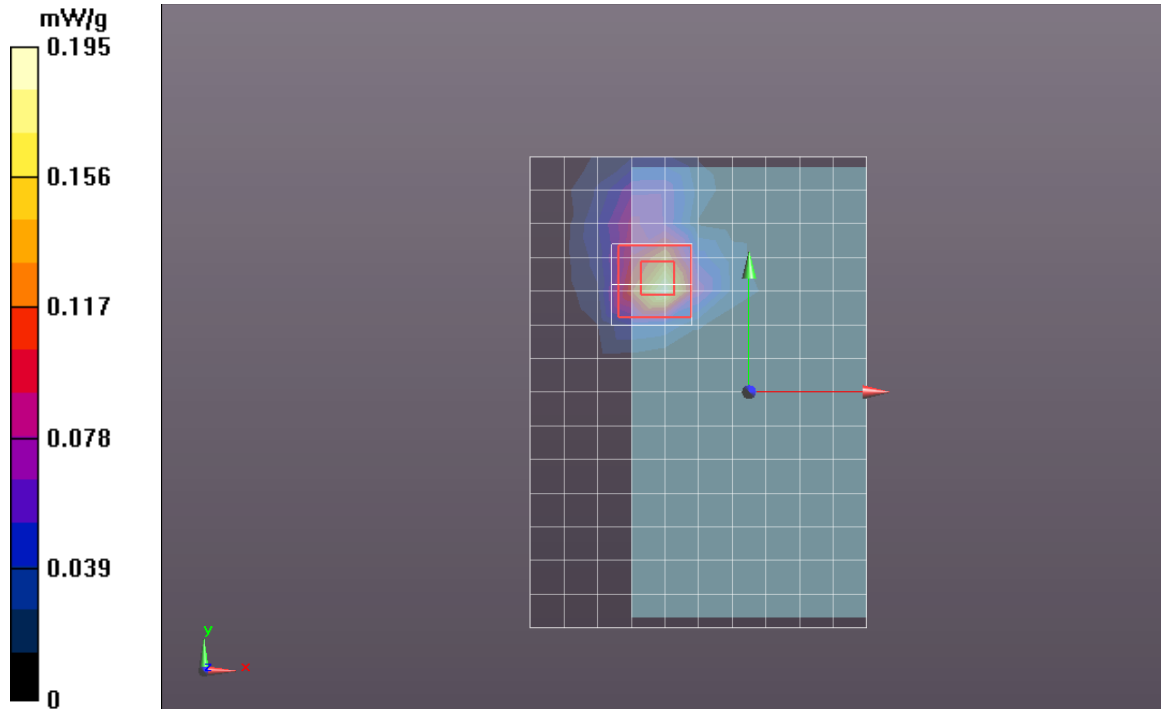
Rear/802.11a_Ch 157/Zoom Scan (7x7x9)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=2.5mm

Reference Value = 6.130 V/m; Power Drift = 0.12 dB

Peak SAR (extrapolated) = 0.4690

SAR(1 g) = 0.126 mW/g; SAR(10 g) = 0.038 mW/g

Maximum value of SAR (measured) = 0.254 mW/g

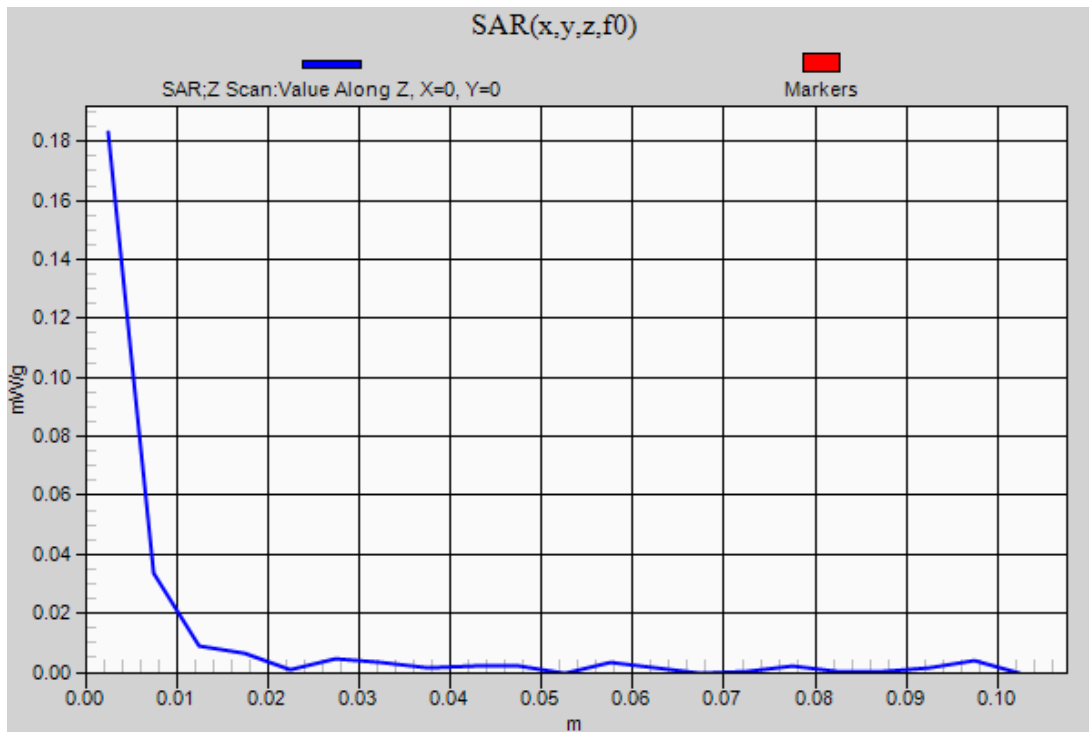


WiFi 5 GHz

Frequency: 5785 MHz; Duty Cycle: 1:1

Rear/802.11a_Ch 157/Z Scan (1x1x21): Measurement grid: dx=20mm, dy=20mm, dz=5mm

Maximum value of SAR (measured) = 0.183 mW/g



14. Simultaneous Transmission SAR Analysis

The Bluetooth's output power is $\leq 2 \cdot P_{\text{Ref}}$ (9.12 dBm / 8.17 mW), which stand-alone SAR evaluation is not required. Therefore, simultaneous transmission SAR evaluation is not required.

14.1. Head Exposure Conditions

14.1.1. Sum of the SAR for GSM, W-CDMA & Wi-Fi in the 2.4 GHz Band

Sum of the SAR with Measured Values

Test Position	Voice					Data	Σ 1-g SAR (mW/g)
	GSM 850	GSM 1900	WCDMA Band V	WCDMA Band IV	WCDMA Band II	WiFi 2.4 GHz	
Left Touch	0.257					0.079	0.336
		0.286				0.079	0.365
			0.227			0.079	0.306
				0.546		0.079	0.625
					0.476	0.079	0.555
Left Tilt	0.160					0.036	0.196
		0.141				0.036	0.177
			0.134			0.036	0.170
				0.247		0.036	0.283
					0.242	0.036	0.278
Right Touch	0.263					0.034	0.297
		0.154				0.034	0.188
			0.226			0.034	0.260
				0.514		0.034	0.548
					0.333	0.034	0.367
Right Tilt	0.152					0.040	0.192
		0.139				0.040	0.179
			0.140			0.040	0.180
				0.262		0.040	0.302
					0.268	0.040	0.308

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.

Conclusion:

Simultaneous transmission SAR measurement (Volume Scan) is not required because the sum of the 1-g SAR is < 1.6 W/kg under all conditions.

14.1.2. Sum of the SAR for GSM & WiFi in the 5 GHz Bands

Sum of the SAR with Measured Values

Test Position	Voice		Data				Σ 1-g SAR (mW/g)
	GSM850	GSM 1900	WiFi 5.2 GHz	WiFi 5.3 GHz	WiFi 5.5 GHz	WiFi 5.8 GHz	
Left Touch	0.257		0.137				0.394
	0.257			0.124			0.381
	0.257				0.090		0.347
	0.257					0.063	0.320
		0.286	0.137				0.423
		0.286		0.124			0.410
		0.286			0.090		0.376
		0.286				0.063	0.349
Left Tilt	0.160		0.086				0.246
	0.160			0.080			0.240
	0.160				0.061		0.221
	0.160					0.046	0.206
		0.141	0.086				0.227
		0.141		0.080			0.221
		0.141			0.061		0.202
		0.141				0.046	0.187
Right Touch	0.263		0.070				0.333
	0.263			0.060			0.323
	0.263				0.037		0.300
	0.263					0.024	0.287
		0.154	0.070				0.224
		0.154		0.060			0.214
		0.154			0.037		0.191
		0.154				0.024	0.178
RightTilt	0.152		0.060				0.212
	0.152			0.068			0.220
	0.152				0.030		0.182
	0.152					0.00974	0.162
		0.139	0.060				0.199
		0.139		0.068			0.207
		0.139			0.030		0.169
		0.139				0.00974	0.149

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.

Conclusion:

- Simultaneous transmission SAR measurement (Volume Scan) is not required because the sum of the 1-g SAR is < 1.6 W/kg under all conditions.

14.1.3. Sum of the SAR for W-CDMA & WiFi in the 5 GHz Bands

Sum of the SAR with Measured Values

Test Position	Voice			Data				Σ 1-g SAR (mW/g)
	WCDMA Band V	WCDMA Band IV	WCDMA Band II	WiFi 5.2 GHz	WiFi 5.3 GHz	WiFi 5.85GHz	WiFi 5.8 GHz	
Left Touch	0.227			0.137				0.364
	0.227				0.124			0.351
	0.227					0.090		0.317
	0.227						0.063	0.290
		0.546		0.137				0.683
		0.546			0.124			0.670
		0.546				0.090		0.636
		0.546					0.063	0.609
			0.476	0.137				0.613
			0.476		0.124			0.600
			0.476			0.090		0.566
			0.476				0.063	0.539
Left Tilt	0.134			0.086				0.220
	0.134				0.080			0.214
	0.134					0.061		0.195
	0.134						0.046	0.180
		0.247		0.086				0.333
		0.247			0.080			0.327
		0.247				0.061		0.308
		0.247					0.046	0.293
			0.242	0.086				0.328
			0.242		0.080			0.322
			0.242			0.061		0.303
			0.242				0.046	0.288
Right Touch	0.226			0.070				0.296
	0.226				0.060			0.286
	0.226					0.037		0.263
	0.226						0.024	0.250
		0.514		0.070				0.584
		0.514			0.060			0.574
		0.514				0.037		0.551
		0.514					0.024	0.538
			0.333	0.070				0.403
			0.333		0.060			0.393
			0.333			0.037		0.370
			0.333				0.024	0.357
RightTilt	0.14			0.060				0.200
	0.14				0.068			0.208
	0.14					0.030		0.170
	0.14						0.00974	0.150
		0.262		0.060				0.322
		0.262			0.068			0.330
		0.262				0.030		0.292
		0.262					0.00974	0.272
			0.268	0.060				0.328
			0.268		0.068			0.336
			0.268			0.030		0.298
			0.268				0.00974	0.278

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.

Conclusion:

- Simultaneous transmission SAR measurement (Volume Scan) is not required because the sum of the 1-g SAR is < 1.6 W/kg under all conditions.

14.2. Body Exposure Conditions

14.2.1. Sum of the SAR for GSM & Wi-Fi in the 2.4 GHz Band

Sum of the SAR with Measured Values

Test Position	Voice					Data	Σ 1-g SAR (mW/g)	Note
	GSM850	GSM1900	WCDMA Band V	WCDMA Band IV	WCDMA Band II	WiFi 2.4 GHz		
Rear	0.524					0.232	0.756	
		1.130				0.232	1.362	
			0.468			0.232	0.700	
				1.170		0.232	1.402	
					1.270	0.232	1.502	1
Front	0.250					0.044	0.294	
		0.400				0.044	0.444	
			0.268			0.044	0.312	
				1.130		0.044	1.174	
					0.688	0.044	0.732	

Note:

- SAR data for W-CDMA Band II (1.27 mW/g) and WiFi 2.4 GHz (0.232 mW/g) were measured based on the maximum tune-up tolerance.

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.

Conclusion:

- Simultaneous transmission SAR measurement (Volume Scan) is not required because the sum of the 1-g SAR is < 1.6 W/kg under all conditions.

14.2.2. Sum of the SAR for GSM & Wi-Fi in the 5 GHz Bands

Sum of the SAR with Measured Values

Test Position	Voice		Data				Σ 1-g SAR (mW/g)
	GSM850	GSM 1900	WiFi 5.2 GHz	WiFi 5.3 GHz	WiFi 5.5 GHz	WiFi 5.8 GHz	
Rear	0.524		0.133				0.657
	0.524			0.155			0.679
	0.524				0.178		0.702
	0.524					0.126	0.650
		1.130	0.133				1.263
		1.130		0.155			1.285
		1.130			0.178		1.308
		1.130				0.126	1.256
Front	0.250		0.034				0.284
	0.250			0.026			0.276
	0.250				0.041		0.291
	0.250					0.019	0.269
		0.400	0.034				0.434
		0.400		0.026			0.426
		0.400			0.041		0.441
		0.400				0.019	0.419

Note(s):

- The SAR summation in the table above evaluates the SAR exposure for body-worn voice calls with WiFi in the 5 GHz bands transmitting simultaneously.

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.

Conclusion:

- Simultaneous transmission SAR measurement (Volume Scan) is not required because the sum of the 1-g SAR is < 1.6 W/kg under all conditions.

14.2.3. Sum of the SAR for W-CDMA & Wi-Fi in the 5 GHz Bands

Sum of the SAR with Measured Values

Test Position	Voice			Data				Σ 1-g SAR (mW/g)	Note
	W-CDMA Band V	W-CDMA Band IV	W-CDMA Band II	WiFi 5.2 GHz	WiFi 5.3 GHz	WiFi 5.5GHz	WiFi 5.8 GHz		
Rear	0.468			0.133				0.601	
	0.468				0.155			0.623	
	0.468					0.178		0.646	
	0.468						0.126	0.594	
		1.170		0.133				1.303	
		1.170			0.155			1.325	
		1.170				0.178		1.348	
		1.170					0.126	1.296	
			1.270	0.133				1.403	
			1.270		0.155			1.425	
			1.270			0.200		1.470	1
			1.270				0.126	1.396	
Front	0.268			0.034				0.302	
	0.268				0.026			0.294	
	0.268					0.041		0.309	
	0.268						0.019	0.287	
		1.130		0.034				1.164	
		1.130			0.026			1.156	
		1.130				0.041		1.171	
		1.130					0.019	1.149	
			0.688	0.034				0.722	
			0.688		0.026			0.714	
			0.688			0.041		0.729	
			0.688				0.019	0.707	

Note(s):

- SAR data for W-CDMA Band II (1.27 mW/g) was measured based on the maximum tune-up tolerance. WiFi 5 GHz (0.2 mW/g) was scaled up value based on the maximum tune-up tolerance.
- The SAR summation in the table above evaluates the SAR exposure for body-worn voice calls with WiFi in the 5 GHz bands transmitting simultaneously

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.

Conclusion:

Simultaneous transmission SAR measurement (Volume Scan) is not required because the sum of the 1-g SAR is < 1.6 W/kg under all conditions.

14.3. Hotspot Mode Exposure Conditions

14.3.1. Sum of the SAR for GSM, W-CDMA & Wi-Fi in the 2.4 GHz Band

Sum of the SAR with Measured Values

Test Position	Data						Σ 1-g SAR (mW/g)	Note
	GSM850	GSM1900	WCDMA Band V	WCDMA Band IV	WCDMA Band II	WiFi 2.4 GHz		
Rear	0.372					0.232	0.604	
		1.180				0.232	1.412	
			0.468			0.232	0.700	
				1.170		0.232	1.402	
					1.270	0.232	1.502	1
Front	0.196					0.044	0.240	
		0.454				0.044	0.498	
			0.268			0.044	0.312	
				1.130		0.044	1.174	
					0.688	0.044	0.732	
Edge 1	0					0.031	0.031	
		0				0.031	0.031	
			0			0.031	0.031	
				0		0.031	0.031	
					0	0.031	0.031	
Edge 2	0.197					0.110	0.307	
		0.062				0.110	0.172	
			0.278			0.110	0.388	
				0.175		0.110	0.285	
					0.121	0.110	0.231	
Edge 3	0.235					0	0.235	
		0.399				0	0.399	
			0.041			0	0.041	
				0.322		0	0.322	
					0.451	0	0.451	
Edge 4	0.189					0	0.189	
		0.210				0	0.210	
			0.286			0	0.286	
				0.453		0	0.453	
					0.325	0	0.325	

Note:

- SAR data for W-CDMA Band II (1.27 mW/g) and WiFi 2.4 GHz (0.232 mW/g) were measured based on the maximum tune-up tolerance.

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.

Conclusion:

Simultaneous transmission SAR measurement (Volume Scan) is not required because the sum of the 1-g SAR is < 1.6 W/kg under all conditions.

15. Appendixes

Refer to separated files for the following appendixes.

- 15.1. System Performance Check Plots
- 15.2. SAR Test Plots for GSM850
- 15.3. SAR Test Plots for GSM1900
- 15.4. SAR Test Plots for W-CDMA (UMTS) Band V
- 15.5. SAR Test Plots for W-CDMA (UMTS) Band IV
- 15.6. SAR Test Plots for W-CDMA (UMTS) Band II
- 15.7. SAR Test Plots for Wi-Fi 2.4 GHz Band
- 15.8. SAR Test Plots for Wi-Fi 5 GHz Bands
- 15.9. Calibration Certificate for E-Field Probe EX3DV4 - SN 3772
- 15.10. Calibration Certificate for E-Field Probe EX3DV4 - SN 3773
- 15.11. Calibration Certificate for D835V2 - SN 4d002
- 15.12. Calibration Certificate for D1750V2 - SN 1050
- 15.13. Calibration Certificate for D1900V2 - SN 5d140
- 15.14. Calibration Certificate for D2450V2 - SN 748
- 15.15. Calibration Certificate for D5GHzV2 - SN 1075
- 15.16. Calibration Certificate for D5GHzV2 - SN 1003