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

SAR EVALUATION REPORT

For
GSM&WCDMA with Bluetooth and WLAN (CIIPC)

Model: LG-P769, LGP769, P769
FCC ID: ZNFP769

Report Number: 12U14595-7
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Prepared for
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NVLAP LAB CODE 200065-0

Revision History

Rev.	Issue Date	Revisions	Revised By
--	9/28/2012	Initial Issue	--

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1. Attestation of Test Results

Applicant	LG ELECTRONICS MOBILECOMM U.S.A., INC.		
DUT description	GSM&WCDMA with Bluetooth and WLAN		
Model	LG-P769, LGP769, P769		
Test device is	An identical prototype		
Device category	Portable		
Exposure category	General Population/Uncontrolled Exposure		
Date tested	8/20/2012 - 8/22/2012 9/7/2012 – 9/12/2012		
FCC Rule Parts	Freq. Range	Highest 1-g SAR	Limit
22	824-849 MHz	Head: 0.180 W/kg (Right Touch) Body: 0.482 W/kg (Rear w/ 10mm distance) Hotspot: 0.579 W/kg (Rear w/ 10mm distance)	1.6 W/kg
27	1710–1755 MHz	Head: 0.521 W/kg (Left Touch) Body: 0.677 W/kg (Rear with Headset w/ 10 mm distance) Hotspot: 1.070 W/kg (Edge3 w/ 10 mm distance)	
24	1850-1910 MHz	Head: 0.704 W/kg (Right Touch) Body: 1.080 W/kg (Rear w/ 10 mm distance) Hotspot: 1.080 W/kg (Rear w/ 10 mm distance)	
15.247	2412-2462 MHz	Head: 0.672 W/kg (Right Touch) Body: 0.237 W/kg (Rear w/ 10 mm distance) Hotspot: 0.237 W/kg (Rear w/ 10 mm distance)	
	5725-5850 MHz	Head: 0.063 W/kg (Right Touch) Body: 0.417 W/kg (Rear with Headset w/ 10 mm distance)	
15.407	5150-5250 MHz	Head: 0.046 W/kg (Right Touch) Body: 0.098 W/kg (Rear with Headset w/ 10 mm distance)	
	5250-5350 MHz	Head: 0.057 W/kg (Right Touch) Body: 0.127 W/kg (Rear w/ 10 mm distance)	
	5500-5700 MHz	Head: 0.093 W/kg (Right Touch) Body: 0.499 W/kg (Rear with Headset w/ 10 mm distance)	
Simultaneous Transmission Use Condition		1.708 W/kg (SPLSR < 0.3)	
Applicable Standards			Test Results
FCC OET Bulletin 65 Supplement C 01-01, IEEE Std 1528-2003 and 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:

Dave Weaver
Program Manager
UL CCS

Tested By:

Kent Huang
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 & 1528a-2005 and the following KDB Procedures:

- 648474 D01 SAR Handsets Multi Xmiter and Ant, v01r05
- 941225 D01 SAR test for 3G devices v02
- 941225 D03 SAR Test Reduction GSM GPRS EDGE v01
- 248227 D01 SAR meas for 802 11abg v01r02
- 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
Dielectronic Probe kit	HP	85070C	N/A	N/A		
Base Station Simulator	Agilent	8960	MY48360228	11	28	2012
ESA Series Network Analyzer	Agilent	E5071B	MY42100131	2	11	2013
Synthesized Signal Generator	HP	8665B	3438A00633	2	22	2013
E-Field Probe	SPEAG	EX3DV4	3749	1	27	2013
E-Field Probe	SPEAG	EX3DV4	3772	2	16	2013
Thermometer	ERTCO	639-1S	8350	7	30	2013
Data Acquisition Electronics	SPEAG	DAE3	500	6	13	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	D1900V2	5d043	11	10	2012
System Validation Dipole	SPEAG	D2450V2	748	2	7	2013
System Validation Dipole	SPEAG	D5GHzV2	1075	2	14	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		

4.2. Measurement Uncertainty

Measurement uncertainty for 300 MHz to 3 GHz averaged over 1 gram

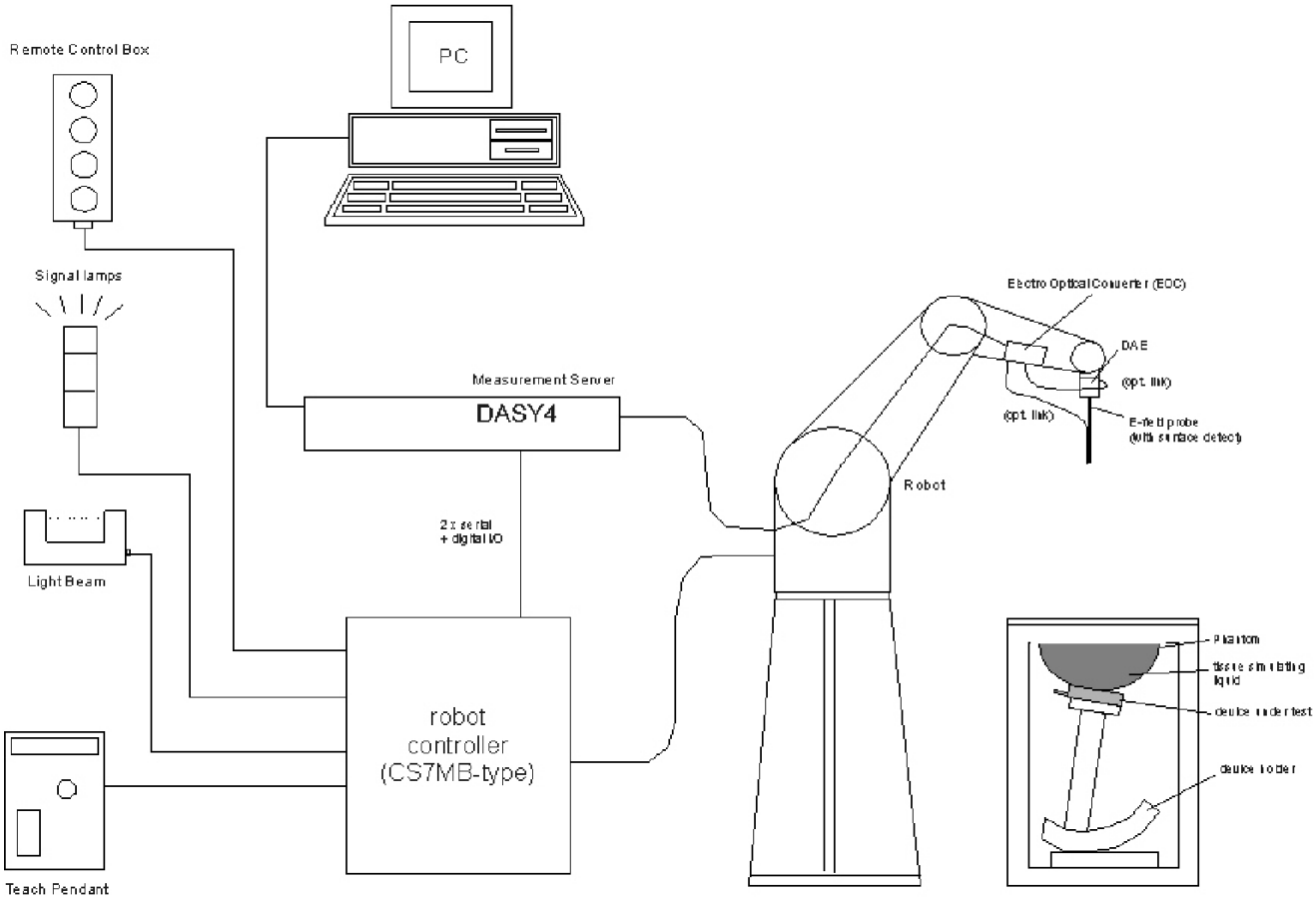
Component	Error, %	Distribution	Divisor	Sensitivity	U (Xi), %
Measurement System					
Probe Calibration (k=1)	**6.00**	Normal	1	1	6.00
Axial Isotropy	1.15	Rectangular	1.732	0.7071	0.47
Hemispherical Isotropy	2.30	Rectangular	1.732	0.7071	0.94
Boundary Effect	0.90	Rectangular	1.732	1	0.52
Probe Linearity	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	**-3.91**	Normal	1	0.64	-2.50
Liquid Permittivity - deviation from target	5.00	Rectangular	1.732	0.6	1.73
Liquid Permittivity - measurement uncertainty	**3.36**	Normal	1	0.6	2.02
				Combined Standard Uncertainty Uc(y) =	10.26
				Expanded Uncertainty U, Coverage Factor = 2, > 95 % Confidence =	20.51 %
				Expanded Uncertainty U, Coverage Factor = 2, > 95 % Confidence =	1.62 dB

Measurement uncertainty for 3 to 6 GHz averaged over 1 gram

Component	Error, %	Distribution	Divisor	Sensitivity	U (Xi), %
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 uncertainty	**2.12**	Normal	1	0.64	1.36
Liquid Permittivity - deviation from target	10.00	Rectangular	1.732	0.6	3.46
Liquid Permittivity - measurement uncertainty	**-3.45**	Normal	1	0.6	-2.07
				Combined Standard Uncertainty Uc(y), %:	10.74
				Expanded Uncertainty U, Coverage Factor = 1.96, > 95 % Confidence =	21.05 %
				Expanded Uncertainty U, Coverage Factor = 1.96, > 95 % Confidence =	1.66 dB

5. Measurement System Description and Setup

The DASY4 system used for performing compliance tests consists of the following items:



- A standard high precision 6-axis robot (Stäubli RX family) with controller, teach pendant and software. An arm extension for accommodating the data acquisition electronics (DAE).
- A dosimetric probe, i.e., an isotropic E-field probe optimized and calibrated for usage in tissue simulating liquid.
- 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 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.
- A probe alignment unit which improves the (absolute) accuracy of the probe positioning.
- A computer operating Windows XP.
- DASY software.
- Remote controls with teach pendant and additional circuitry for robot safety such as warning lamps, etc.
- The SAM twin phantom enabling testing left-hand and right-hand usage.
- The device holder for handheld mobile phones.
- Tissue simulating liquid mixed according to the given recipes.
- Validation dipole kits allowing validating the proper functioning of the system.

6. SAR Measurement Procedures

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 ≥ 7x7x9 (above 4.5 GHz) or 5x5x7 (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 ≥ 7x7x9 (above 4.5 GHz) or 5x5x7 (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 & W-CDMA Phone with Bluetooth & WLAN Model: LG-P769, LGP769, P769	
Normal operation	- Held to head, - Body (Rear and Front sides) with 10 mm separation distance.
Accessory	1. Headset 2. Battery Cover o Normal Battery Cover

7.1. Air Interfaces and Frequency Ranges

Air Interfaces	- GSM, GPRS and EGPRS Class 12 - W-CDMA Rel 99, HSDPA (Rel 6, CAT 6), HSUPA (Rel. 6, CAT10) - Bluetooth Ver 2.1 with EDR
Tx Frequency Ranges	- 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 - 802.11abgn - Bluetooth: 2402 - 2480 MHz

7.2. Simultaneous Transmission

No.	Conditions
1	GSM850 Voice + WiFi
2	GSM1900 Voice + WiFi
3	GSM850 GPRS + WiFi
4	GSM1900 GPRS + WiFi
5	W-CDMA Band V+ WiFi
6	W-CDMA Band II+ WiFi
7	W-CDMA Band IV+ WiFi
1	GSM850 Voice + BT
2	GSM1900 Voice + BT
3	GSM850 GPRS + BT
4	GSM1900 GPRS + BT
5	W-CDMA Band V+ BT
6	W-CDMA Band II+ BT
7	W-CDMA Band IV+ BT

Notes:

1. EGPRS is Rx only

7.3. Hotspot (Wireless router) Exposure Condition

The hotspot mode for this device is supported. The hotspot mode is only applied for WiFi 2.4GHz Band.

8. Summary of Test Configurations

Refer to Section 17 “Antenna Location and Separation Distances” for the specific details of the antenna-to-antenna distances and Section 18 “Setup Photos” for the details of the test positions.

8.1. Head Test Configurations for WWAN and WLAN

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

8.2. Body-worn Accessory Test Configurations for WWAN and WLAN

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

8.3. Personal Router/Hotspot Test Configurations

WWAN Test Configurations

Test Configurations	Antenna-to-edge/surface	SAR Required	Note
Rear	< 25 mm	Yes	
Front	< 25 mm	Yes	
Edge 1	113.5 mm	No	SAR is not required because the distance from the antenna to this edge is > 2.5 cm as per KDB 941225 D06 Hot Spot SAR v01
Edge 2	1.1 mm	Yes	
Edge 3	2.1 mm	Yes	
Edge 4	20.2 mm	Yes	

WLAN 2.4GHz Band Test Configurations

Test Configurations	Antenna-to-edge/surface	SAR Required	Note
Rear	< 25 mm	Yes	
Front	< 25 mm	Yes	
Edge 1	2.1 mm	Yes	
Edge 2	54.8 mm	No	SAR is not required because the distance from the antenna to this edge is > 2.5 cm as per KDB 941225 D06 Hot Spot SAR v01
Edge 3	108.4 mm	No	SAR is not required because the distance from the antenna to this edge is > 2.5 cm as per KDB 941225 D06 Hot Spot SAR v01
Edge 4	1.1 mm	Yes	

9. RF Output Power Measurement

9.1. GSM850

Target Power: 32.5 dBm
Tune-up Tolerance: -1.5 dB / +0.7 dB

GMSK (Voice) Mode

Band	Ch No.	Freq. (MHz)	Avg burst Pwr (dBm)
850	128	824.2	33.1
	190	836.6	33.1
	251	848.8	33.1

Target Power:
GPRS 1 slot 32.5 dBm
GPRS 2 slot 30.5 dBm
GPRS 3 slot 28.5 dBm
GPRS 4 slot 27.0 dBm
Tune-up Tolerance: -1.5 dB / +0.7 dB

GMSK (GPRS) Mode - Coding Scheme: CS1

Band	Ch No.	Freq. (MHz)	Avg burst Pwr (dBm)				Avg burst Pwr (dBm)			
			1 slot	Frame Avg Pwr	2 slots	Frame Avg Pwr	3 slots	Frame Avg Pwr	4 slots	Frame Avg Pwr
850	128	824.2	33.1	24.1	31.1	**25.1**	29.0	24.7	27.5	24.5
	190	836.6	33.1	24.1	31.1	**25.1**	29.1	24.8	27.5	24.5
	251	848.8	33.1	24.1	31.1	**25.1**	29.1	24.8	27.5	24.5

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 27.0 dBm
EGPRS 2 slot 25.0 dBm
EGPRS 3 slot 23.0 dBm
EGPRS 4 slot 22.0 dBm
Tune-up Tolerance: -1.5 dB / +0.7 dB

8PSK (EGPRS) Mode - Coding Scheme: MCS5

Band	Ch No.	Freq. (MHz)	Avg burst Pwr (dBm)				Avg burst Pwr (dBm)			
			1 slot	Frame Avg Pwr	2 slots	Frame Avg Pwr	3 slots	Frame Avg Pwr	4 slots	Frame Avg Pwr
850	128	824.2	27.3	18.3	25.2	**19.2**	23.2	18.9	22.2	19.2
	190	836.6	27.4	18.4	25.3	**19.3**	23.2	18.9	22.3	19.3
	251	848.8	27.4	18.4	25.3	**19.3**	23.2	18.9	22.3	19.3

9.2. GSM1900

Target Power: 30.7 dBm
Tune-up Tolerance: -1.5 dB / +0.7 dB

GMSK (Voice) Mode

Band	Ch No.	Freq. (MHz)	Avg burst Pwr (dBm)
1900	512	1850.2	31.3
	661	1880.0	31.1
	810	1909.8	31.0

Target Power:
GPRS 1 slot 30.7 dBm
GPRS 2 slot 28.7 dBm
GPRS 3 slot 26.7 dBm
GPRS 4 slot 25.2 dBm
Tune-up Tolerance: -1.5 dB / +0.7 dB

GMSK (GPRS) Mode - Coding Scheme: CS1

Band	Ch No.	Freq. (MHz)	Avg burst Pwr (dBm)				Avg burst Pwr (dBm)			
			1 slot	Frame Avg Pwr	2 slots	Frame Avg Pwr	3 slots	Frame Avg Pwr	4 slots	Frame Avg Pwr
1900	512	1850.2	31.3	22.3	29.3	**23.3**	27.4	23.1	25.9	22.9
	661	1880.0	31.2	22.2	29.3	**23.3**	27.3	23.0	25.8	22.8
	810	1909.8	31.0	22.0	29.3	**23.3**	27.4	23.1	25.8	22.8

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 25.3 dBm
EGPRS 2 slot 23.3 dBm
EGPRS 3 slot 21.3 dBm
EGPRS 4 slot 20.3 dBm
Tune-up Tolerance: -1.5 dB / +0.7 dB

8PSK (EGPRS) Mode - Coding Scheme: MCS5

Band	Ch No.	Freq. (MHz)	Avg burst Pwr (dBm)				Avg burst Pwr (dBm)			
			1 slot	Frame Avg Pwr	2 slots	Frame Avg Pwr	3 slots	Frame Avg Pwr	4 slots	Frame Avg Pwr
1900	512	1850.2	25.6	16.6	23.6	**17.6**	21.6	17.3	20.6	17.6
	661	1880.0	25.6	16.6	23.6	**17.6**	21.5	17.2	20.6	17.6
	810	1909.8	25.6	16.6	23.6	**17.6**	21.6	17.3	20.6	17.6

9.3. W-CDMA (UMTS) Band V

Target Power: 23.0 dBm
Tune-up Tolerance: -1.5 dB / +0.7 dB

Release 99 (RMC, 12.2kbps)
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
	βc/βd	8/15

Output power table

Band	Ch No.	Freq. (MHz)	Avg Pwr (dBm)
850 (Band V)	4132	826.4	23.6
	4183	836.6	23.5
	4233	846.6	23.6

HSDPA

The following 4 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	HSDPA	HSDPA	HSDPA	HSDPA
	Subtest	1	2	3	4
WCDMA General Settings	Loopback Mode	Test Mode 1			
	Rel99 RMC	12.2kbps RMC			
	HSDPA FRC	H-Set1			
	Power Control Algorithm	Algorithm 2			
	βc	2/15	12/15	15/15	15/15
	βd	15/15	15/15	8/15	4/15
	Bd (SF)	64			
	βc/βd	2/15	12/15	15/8	15/4
	βhs	4/15	24/15	30/15	30/15
	CM (dB)	0	1	1.5	1.5
HSDPA Specific Settings	D_{ACK}	8			
	D_{NAK}	8			
	DCQI	8			
	Ack-Nack repetition factor	3			
	CQI Feedback (Table 5.2B.4)	4ms			
	CQI Repetition Factor (Table 5.2B.4)	2			
	Ahs =βhs/βc	30/15			

Output power table

Band	Subtest	Ch No.	Freq. (MHz)	Avg Pwr (dBm)
850 (Band V)	1	4132	826.4	23.6
		4183	836.6	23.5
		4233	846.6	23.5
	2	4132	826.4	23.6
		4183	836.6	23.5
		4233	846.6	23.5
	3	4132	826.4	23.0
		4183	836.6	23.0
		4233	846.6	23.0
	4	4132	826.4	22.7
		4183	836.6	22.7
		4233	846.6	22.7

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				
	βc	11/15	6/15	15/15	2/15	15/15
	βd	15/15	15/15	9/15	15/15	15/15
	βec	209/225	12/15	30/15	2/15	24/15
	βc/βd	11/15	6/15	15/9	2/15	15/15
	βhs	22/15	12/15	30/15	4/15	30/15
	βed	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 = βhs/βc	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)	Avg Pwr (dBm)
850 (Band V)	Subtest 1	4132	826.4	23.0
		4183	836.6	23.0
		4233	846.6	22.9
	Subtest 2	4132	826.4	21.3
		4183	836.6	21.2
		4233	846.6	21.2
	Subtest 3	4132	826.4	22.0
		4183	836.6	22.1
		4233	846.6	22.1
	Subtest 4	4132	826.4	21.2
		4183	836.6	21.1
		4233	846.6	21.2
	Subtest 5	4132	826.4	23.1
		4183	836.6	23.0
		4233	846.6	23.1

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..

9.4. W-CDMA (UMTS) Band II

Target Power: 24.0 dBm
Tune-up Tolerance: -1.5 dB / +0.7 dB

Release 99 (RMC, 12.2kbps)
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
	βc/βd	8/15

Output power table

Band	Ch No.	Freq. (MHz)	Avg Pwr (dBm)
1900 (Band II)	9262	1852.4	24.7
	9400	1880.0	24.7
	9538	1907.6	24.6

HSDPA

The following 4 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	HSDPA	HSDPA	HSDPA	HSDPA
	Subtest	1	2	3	4
WCDMA General Settings	Loopback Mode	Test Mode 1			
	Rel99 RMC	12.2kbps RMC			
	HSDPA FRC	H-Set1			
	Power Control Algorithm	Algorithm 2			
	βc	2/15	12/15	15/15	15/15
	βd	15/15	15/15	8/15	4/15
	Bd (SF)	64			
	βc/βd	2/15	12/15	15/8	15/4
	βhs	4/15	24/15	30/15	30/15
	CM (dB)	0	1	1.5	1.5
HSDPA Specific Settings	D_{ACK}	8			
	D_{NAK}	8			
	DCQI	8			
	Ack-Nack repetition factor	3			
	CQI Feedback (Table 5.2B.4)	4ms			
	CQI Repetition Factor (Table 5.2B.4)	2			
	Ahs =βhs/βc	30/15			

Output power table

Band	Subtest	Ch No.	Freq. (MHz)	Avg Pwr (dBm)
1900 (Band II)	1	9262	1852.4	24.7
		9400	1880.0	24.7
		9538	1907.6	24.7
	2	9262	1852.4	23.9
		9400	1880.0	23.8
		9538	1907.6	23.8
	3	9262	1852.4	23.4
		9400	1880.0	23.4
		9538	1907.6	23.4
	4	9262	1852.4	23.2
		9400	1880.0	23.1
		9538	1907.6	23.1

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				
	βc	11/15	6/15	15/15	2/15	15/15
	βd	15/15	15/15	9/15	15/15	15/15
	βec	209/225	12/15	30/15	2/15	24/15
	βc/βd	11/15	6/15	15/9	2/15	15/15
	βhs	22/15	12/15	30/15	4/15	30/15
	βed	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 = βhs/βc	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)	Avg Pwr (dBm)
1900 (Band II)	Subtest 1	9262	1852.4	23.3
		9400	1880.0	23.2
		9538	1907.6	23.2
	Subtest 2	9262	1852.4	21.6
		9400	1880.0	21.5
		9538	1907.6	21.6
	Subtest 3	9262	1852.4	22.5
		9400	1880.0	22.4
		9538	1907.6	22.5
	Subtest 4	9262	1852.4	21.8
		9400	1880.0	21.8
		9538	1907.6	21.9
	Subtest 5	9262	1852.4	23.8
		9400	1880.0	23.6
		9538	1907.6	23.7

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.

9.5. W-CDMA (UMTS) Band IV

Target Power: 24.0 dBm
Tune-up Tolerance: -1.5 dB / +0.7 dB

Release 99 (RMC, 12.2kbps)
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
	βc/βd	8/15

Output power table

Band	Ch No.	Freq. (MHz)	Avg Pwr (dBm)
1700 (Band IV)	1312	1712.4	24.7
	1412	1732.4	24.6
	1862	1752.5	24.6

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
WCDMA General Settings	Loopback Mode	Test Mode 1			
	Rel99 RMC	12.2kbps RMC			
	HSDPA FRC	H-Set1			
	Power Control Algorithm	Algorithm 2			
	βc	2/15	12/15	15/15	15/15
	βd	15/15	15/15	8/15	4/15
	Bd (SF)	64			
	βc/βd	2/15	12/15	15/8	15/4
	βhs	4/15	24/15	30/15	30/15
	CM (dB)	0	1	1.5	1.5
HSDPA Specific Settings	D_{ACK}	8			
	D_{NAK}	8			
	DCQI	8			
	Ack-Nack repetition factor	3			
	CQI Feedback (Table 5.2B.4)	4ms			
	CQI Repetition Factor (Table 5.2B.4)	2			
	Ahs =βhs/βc	30/15			

Output power table

Band	Subtest	Ch No.	Freq. (MHz)	Avg Pwr (dBm)
1700 (Band IV)	1	1312	1712.4	24.7
		1412	1732.4	24.5
		1862	1752.5	24.6
	2	1312	1712.4	23.9
		1412	1732.4	23.8
		1862	1752.5	23.8
	3	1312	1712.4	23.4
		1412	1732.4	23.3
		1862	1752.5	23.3
	4	1312	1712.4	23.2
		1412	1732.4	23.0
		1862	1752.5	23.1

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				
	βc	11/15	6/15	15/15	2/15	15/15
	βd	15/15	15/15	9/15	15/15	15/15
	βec	209/225	12/15	30/15	2/15	24/15
	βc/βd	11/15	6/15	15/9	2/15	15/15
	βhs	22/15	12/15	30/15	4/15	30/15
	βed	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 = βhs/βc	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)	Avg Pwr (dBm)
1700 (Band IV)	Subtest 1	1312	1712.4	23.2
		1412	1732.4	23.1
		1862	1752.5	23.2
	Subtest 2	1312	1712.4	21.5
		1412	1732.4	21.4
		1862	1752.5	21.5
	Subtest 3	1312	1712.4	22.5
		1412	1732.4	22.3
		1862	1752.5	22.4
	Subtest 4	1312	1712.4	21.7
		1412	1732.4	21.6
		1862	1752.5	21.7
	Subtest 5	1312	1712.4	23.8
		1412	1732.4	23.5
		1862	1752.5	23.6

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.

9.6. Wi-Fi (2.4 GHz Band)

Required Test Channels per KDB 248227 D01

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

Notes:
√ = "default test channels"
∇ = possible 802.11g channels with maximum average output ¼ dB ≥ the "default test channels"
= when output power is reduced for channel 1 and /or 11 to meet restricted band requirements the highest output channels closest to each of these channels should be tested.

Band (MHz)	Mode	Ch #	Freq. (MHz)	Target Pwr (dBm)	Avg Pwr (dBm)	Note
2.4	802.11b	1	2412	17.9	16.7	
		6	2437	17.9	17.3	
		11	2462	17.9	17.9	
	802.11g	1	2412	15.7	14.6	
		6	2437	15.7	15.1	
		11	2462	15.7	15.7	
	802.11n (HT20)	1	2412	14.0	12.4	
		6	2437	14.0	13.0	
		11	2462	14.0	13.5	

9.7. Wi-Fi (5 GHz Bands)

Mode		Band	GHz	Channel	"Default Test Channels"	
					802.11a	
802.11a	UNII (15.407)	5.2 GHz	5.180	36	√	
			5.200	40		*
			5.220	44		*
			5.240	48	√	
		5.3 GHz	5.260	52	√	
			5.280	56		*
			5.300	60		*
			5.320	64	√	
		5.5 GHz	5.500	100		
			5.520	104	√	
			5.540	108		*
			5.560	112		*
			5.580	116	√	
			5.600	120		*
			5.620	124	√	
			5.640	128		*
			5.660	132		*
			5.680	136	√	
			5.700	140		*
	DTS (15.247)	5.8 GHz	5.745	149	√	
			5.765	153		*
			5.785	157	√	
			5.805	161		*
			5.825	165	√	

√ = "default test channels"

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

WiFi (5 GHz Bands) (Continued)

Band (MHz)	Mode	Ch #	Freq. (MHz)	Target Pwr (dBm)	Avg Pwr (dBm)	Note
5.2	802.11a	36	5180	14.5	13.5	
		40	5200	14.5	13.4	
		44	5220	14.5	13.4	
		48	5240	14.5	13.4	
	802.11n (HT20)	36	5180	12.8	12.2	
		40	5200	12.8	12.3	
		48	5240	12.8	12.1	
5.3	802.11a	52	5260	14.5	13.3	
		56	5280	14.5	13.3	
		60	5300	14.5	13.3	
		64	5320	14.5	13.3	
	802.11n (HT20)	52	5260	12.8	12.2	
		60	5300	12.8	12.1	
		64	5320	12.8	12.0	
5.5	802.11a	100	5500	14.5	13.5	
		104	5520	14.5	13.5	
		108	5540	14.5	13.5	
		112	5560	14.5	13.5	
		116	5580	14.5	13.5	
		120	5600	14.5		1
		124	5620	14.5		1
		128	5640	14.5		1
		132	5660	14.5	13.5	
		136	5680	14.5	13.5	
		140	5700	14.5	13.3	
	802.11n (HT20)	100	5500	12.8	12.4	
		120	5600	12.8		1
		140	5700	12.8	12.3	
5.8	802.11a	149	5745	14.5	13.5	
		153	5765	14.5	13.4	
		157	5785	14.5	13.4	
		161	5805	14.5	13.3	
		165	5825	14.5	13.3	
	802.11n (HT20)	149	5745	12.8	12.5	
		157	5785	12.8	12.5	
		161	5805	12.8	12.3	

Note(s):

1. Channel 120, 124, and 128 are not supported

9.8. Bluetooth

Version 2.1+EDR, Power class: 1 (100 mW/20 dBm)

Mode	Channel #	Freq. (MHz)	Conducted Avg Power	
			(dBm)	(mW)
V2.1 + EDR, GFSK	0	2402	8.46	7.01
	39	2441	9.73	9.40
	78	2480	10.12	10.28
V2.1 + EDR, π/4 DQPSK	0	2402	6.34	4.31
	39	2441	7.65	5.82
	78	2480	8.00	6.31
V2.1 + EDR, 8-DPSK	0	2402	6.54	4.51
	39	2441	7.82	6.05
	78	2480	8.17	6.56

Note(s):

According to KDB 648474, Table 2, Unlicensed transmitters
When there is simultaneous transmission, Stand-alone SAR not required due to

☒ Output ≤ 2 · P_{Ref} (13.8dBm / 24 mW) and antenna is ≥ 5.0 cm from other antennas
☒ Output ≤ P_{Ref} (10.79dBm / 12 mW)

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^2O	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 ±(%)
8/20/2012	Body 1900	e'	52.1443	Relative Permittivity (ϵ_r):	52.14	53.30	-2.17	5
		e''	14.5433	Conductivity (σ):	1.54	1.52	1.08	5
	Body 1850	e'	52.3297	Relative Permittivity (ϵ_r):	52.33	53.30	-1.82	5
		e''	14.3966	Conductivity (σ):	1.48	1.52	-2.57	5
	Body 1880	e'	52.2074	Relative Permittivity (ϵ_r):	52.21	53.30	-2.05	5
		e''	14.4844	Conductivity (σ):	1.51	1.52	-0.39	5
	Body 1910	e'	52.1180	Relative Permittivity (ϵ_r):	52.12	53.30	-2.22	5
		e''	14.5695	Conductivity (σ):	1.55	1.52	1.80	5
8/20/2012	Head 1900	e'	39.9032	Relative Permittivity (ϵ_r):	39.90	40.00	-0.24	5
		e''	13.2024	Conductivity (σ):	1.39	1.40	-0.37	5
	Head 1850	e'	40.0998	Relative Permittivity (ϵ_r):	40.10	40.00	0.25	5
		e''	13.0773	Conductivity (σ):	1.35	1.40	-3.91	5
	Head 1880	e'	39.9923	Relative Permittivity (ϵ_r):	39.99	40.00	-0.02	5
		e''	13.1553	Conductivity (σ):	1.38	1.40	-1.77	5
	Head 1915	e'	39.8339	Relative Permittivity (ϵ_r):	39.83	40.00	-0.42	5
		e''	13.2413	Conductivity (σ):	1.41	1.40	0.71	5
8/21/2012	Body 835	e'	53.5631	Relative Permittivity (ϵ_r):	53.56	55.20	-2.97	5
		e''	21.1595	Conductivity (σ):	0.98	0.97	1.28	5
	Body 820	e'	53.7175	Relative Permittivity (ϵ_r):	53.72	55.28	-2.82	5
		e''	21.2318	Conductivity (σ):	0.97	0.97	-0.04	5
	Body 850	e'	53.4128	Relative Permittivity (ϵ_r):	53.41	55.16	-3.16	5
		e''	21.0941	Conductivity (σ):	1.00	0.99	0.99	5
8/21/2012	Head 835	e'	42.4589	Relative Permittivity (ϵ_r):	42.46	41.50	2.31	5
		e''	19.3167	Conductivity (σ):	0.90	0.90	-0.35	5
	Head 825	e'	42.5954	Relative Permittivity (ϵ_r):	42.60	41.58	2.45	5
		e''	19.3483	Conductivity (σ):	0.89	0.90	-1.26	5
	Head 850	e'	42.2734	Relative Permittivity (ϵ_r):	42.27	41.50	1.86	5
		e''	19.2806	Conductivity (σ):	0.91	0.92	-0.41	5
08/222012	Body 1750	e'	54.3273	Relative Permittivity (ϵ_r):	54.33	53.44	1.66	5
		e''	15.4403	Conductivity (σ):	1.50	1.49	1.09	5
	Body 1710	e'	54.4026	Relative Permittivity (ϵ_r):	54.40	53.54	1.60	5
		e''	15.4281	Conductivity (σ):	1.47	1.46	0.37	5
	Body 1715	e'	54.3844	Relative Permittivity (ϵ_r):	54.38	53.53	1.59	5
		e''	15.4894	Conductivity (σ):	1.48	1.46	0.85	5
	Body 1730	e'	54.3468	Relative Permittivity (ϵ_r):	54.35	53.49	1.60	5
		e''	15.4279	Conductivity (σ):	1.48	1.47	0.69	5

Date	Freq. (MHz)	Liquid Parameters			Measured	Target	Delta (%)	Limit ±(%)
9/7/2012	Head 2450	e'	38.0468	Relative Permittivity (ϵ_r):	38.05	39.20	-2.94	5
		e''	13.6969	Conductivity (σ):	1.87	1.80	3.66	5
	Head 2410	e'	38.1895	Relative Permittivity (ϵ_r):	38.19	39.28	-2.77	5
		e''	13.5767	Conductivity (σ):	1.82	1.76	3.34	5
	Head 2435	e'	38.0821	Relative Permittivity (ϵ_r):	38.08	39.24	-2.94	5
		e''	13.6316	Conductivity (σ):	1.85	1.78	3.55	5
	Head 2475	e'	37.9143	Relative Permittivity (ϵ_r):	37.91	39.17	-3.20	5
		e''	13.7509	Conductivity (σ):	1.89	1.83	3.58	5
9/7/2012	Body 2450	e'	51.2087	Relative Permittivity (ϵ_r):	51.21	52.70	-2.83	5
		e''	14.1104	Conductivity (σ):	1.92	1.95	-1.42	5
	Body 2410	e'	51.4000	Relative Permittivity (ϵ_r):	51.40	52.76	-2.58	5
		e''	13.9432	Conductivity (σ):	1.87	1.91	-2.05	5
	Body 2435	e'	51.3259	Relative Permittivity (ϵ_r):	51.33	52.73	-2.66	5
		e''	14.0346	Conductivity (σ):	1.90	1.93	-1.60	5
	Body 2460	e'	51.2498	Relative Permittivity (ϵ_r):	51.25	52.69	-2.73	5
		e''	14.1219	Conductivity (σ):	1.93	1.96	-1.65	5
9/7/2012	Head 835	e'	42.8420	Relative Permittivity (ϵ_r):	42.84	41.50	3.23	5
		e''	19.5195	Conductivity (σ):	0.91	0.90	0.70	5
	Head 825	e'	42.9731	Relative Permittivity (ϵ_r):	42.97	41.58	3.36	5
		e''	19.6708	Conductivity (σ):	0.90	0.90	0.39	5
	Head 850	e'	42.6212	Relative Permittivity (ϵ_r):	42.62	41.50	2.70	5
		e''	19.6781	Conductivity (σ):	0.93	0.92	1.64	5
9/7/2012	Head 1900	e'	38.8270	Relative Permittivity (ϵ_r):	38.83	40.00	-2.93	5
		e''	13.3803	Conductivity (σ):	1.41	1.40	0.97	5
	Head 1850	e'	39.0129	Relative Permittivity (ϵ_r):	39.01	40.00	-2.47	5
		e''	13.2334	Conductivity (σ):	1.36	1.40	-2.77	5
	Head 1880	e'	38.9455	Relative Permittivity (ϵ_r):	38.95	40.00	-2.64	5
		e''	13.2108	Conductivity (σ):	1.38	1.40	-1.36	5
	Head 1915	e'	38.8550	Relative Permittivity (ϵ_r):	38.86	40.00	-2.86	5
		e''	13.3067	Conductivity (σ):	1.42	1.40	1.21	5
9/8/2012	Head 5180	e'	35.1216	Relative Permittivity (ϵ_r):	35.12	36.01	-2.48	10
		e''	16.0566	Conductivity (σ):	4.62	4.63	-0.13	5
	Head 5200	e'	35.0649	Relative Permittivity (ϵ_r):	35.06	35.99	-2.57	10
		e''	16.1317	Conductivity (σ):	4.66	4.65	0.29	5
	Head 5500	e'	34.7223	Relative Permittivity (ϵ_r):	34.72	35.65	-2.60	10
		e''	16.2641	Conductivity (σ):	4.97	4.96	0.32	5
	Head 5800	e'	34.3022	Relative Permittivity (ϵ_r):	34.30	35.30	-2.83	10
		e''	16.5549	Conductivity (σ):	5.34	5.27	1.31	5

Date	Freq. (MHz)	Liquid Parameters			Measured	Target	Delta (%)	Limit ±(%)
9/10/2012	Head 5180	e'	35.8890	Relative Permittivity (ϵ_r):	35.89	36.01	-0.34	10
		e"	16.0557	Conductivity (σ):	4.62	4.63	-0.13	5
	Head 5200	e'	35.7850	Relative Permittivity (ϵ_r):	35.79	35.99	-0.57	10
		e"	16.1576	Conductivity (σ):	4.67	4.65	0.45	5
	Head 5500	e'	35.3064	Relative Permittivity (ϵ_r):	35.31	35.65	-0.96	10
		e"	16.2243	Conductivity (σ):	4.96	4.96	0.08	5
	Head 5800	e'	34.8211	Relative Permittivity (ϵ_r):	34.82	35.30	-1.36	10
		e"	16.3523	Conductivity (σ):	5.27	5.27	0.07	5
9/11/2012	Body 5180	e'	47.6268	Relative Permittivity (ϵ_r):	47.63	49.05	-2.90	10
		e"	18.3241	Conductivity (σ):	5.28	5.27	0.12	5
	Body 5200	e'	47.6202	Relative Permittivity (ϵ_r):	47.62	49.02	-2.85	10
		e"	18.4882	Conductivity (σ):	5.35	5.29	0.96	5
	Body 5500	e'	47.0324	Relative Permittivity (ϵ_r):	47.03	48.61	-3.25	10
		e"	18.6692	Conductivity (σ):	5.71	5.64	1.15	5
	Body 5800	e'	48.6841	Relative Permittivity (ϵ_r):	48.68	48.20	1.00	10
		e"	19.2146	Conductivity (σ):	6.20	6.00	3.28	5
	Body 5825	e'	46.5388	Relative Permittivity (ϵ_r):	46.54	48.20	-3.45	10
		e"	18.9175	Conductivity (σ):	6.13	6.00	2.12	5
9/12/2012	Head 5180	e'	35.6515	Relative Permittivity (ϵ_r):	35.65	36.01	-1.00	10
		e"	16.1537	Conductivity (σ):	4.65	4.63	0.48	5
	Head 5200	e'	35.6316	Relative Permittivity (ϵ_r):	35.63	35.99	-1.00	10
		e"	16.1693	Conductivity (σ):	4.68	4.65	0.52	5
	Head 5500	e'	35.2050	Relative Permittivity (ϵ_r):	35.21	35.65	-1.24	10
		e"	16.3924	Conductivity (σ):	5.01	4.96	1.11	5
	Head 5800	e'	34.6965	Relative Permittivity (ϵ_r):	34.70	35.30	-1.71	10
		e"	16.5094	Conductivity (σ):	5.32	5.27	1.03	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 ±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
D1900V2	5d043	11/10/11	1900	1g	40.3	41.1
				10g	21.0	21.7
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

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.						
8/20/2012	D1900V2	5d043	Body	1g	40.6	41.10	-1.22	±10
				10g	21.2	21.70	-2.30	
8/20/2012	D1900V2	5d043	Head	1g	38.5	40.3	-4.47	±10
				10g	19.9	21	-5.24	
8/21/2012	D835V2	4d002	Body	1g	10.10	9.41	7.33	±10
				10g	6.64	6.20	7.10	
8/21/2012	D835V2	4d002	Head	1g	9.34	9.32	0.21	±10
				10g	6.11	6.08	0.49	
8/22/2012	D1750V2	1050	Body	1g	39.1	36.9	5.96	±10
				10g	20.8	19.9	4.52	
8/22/2012	D1750V2	1050	Head	1g	36.9	35.9	2.79	±10
				10g	19.6	19.1	2.62	
9/7/2012	D2450V2	748	Head	1g	51.5	52.7	-2.28	±10
				10g	23.6	24.6	-4.07	
9/7/2012	D2450V2	748	Body	1g	49.8	49.9	-0.20	±10
				10g	23.1	23.4	-1.28	
9/7/2012	D835V2	4d002	Head	1g	9.53	9.32	2.25	±10
				10g	6.24	6.08	2.63	
9/7/2012	D1900V2	5d043	Head	1g	41.4	40.3	2.73	±10
				10g	21.4	21	1.90	
9/8/2012	D5GHzV2 (5.2 GHz)	1075	Head	1g	79.5	79.4	0.13	±10
				10g	22.8	22.8	0.00	
9/9/2012	D5GHzV2 (5.5 GHz)	1075	Head	1g	82.3	85.7	-3.97	±10
				10g	23.5	24.3	-3.29	
9/9/2012	D5GHzV2 (5.2 GHz)	1075	Body	1g	74.5	72.7	2.48	±10
				10g	21.4	20.5	4.39	
9/10/2012	D5GHzV2 (5.8 GHz)	1075	Head	1g	79.7	78.9	1.01	±10
				10g	22.6	22.5	0.44	
9/11/2012	D5GHzV2 (5.5 GHz)	1075	Body	1g	81.3	77.7	4.63	±10
				10g	23.1	21.7	6.45	
9/11/2012	D5GHzV2 (5.8 GHz)	1075	Body	1g	72.9	72.5	0.55	±10
				10g	20.7	20.2	2.48	
9/12/2012	D5GHzV2 (5.8 GHz)	1075	Head	1g	81.8	78.9	3.68	±10
				10g	23.4	22.5	4.00	

12. SAR Test Results

12.1. GSM850

12.1.1. Head SAR

Test Position	Mode	Ch #.	Freq. (MHz)	Power (dBm)		1-g SAR (W/kg)		Note
				Tune-up limit	Measured	Measured	Scaled	
Left Touch	Voice	128	824.20	33.2	33.1			1
		190	836.60	33.2	33.1	0.150	0.153	
		251	848.80	33.2	33.1			1
Left Tilt (15°)	Voice	128	824.20	33.2	33.1			1
		190	836.60	33.2	33.1	0.086	0.088	
		251	848.80	33.2	33.1			1
Right Touch	Voice	128	824.20	33.2	33.1			1
		190	836.60	33.2	33.1	0.145	0.148	
		251	848.80	33.2	33.1			1
Right Tilt (15°)	Voice	128	824.20	33.2	33.1			1
		190	836.60	33.2	33.1	0.080	0.082	
		251	848.80	33.2	33.1			1

VoIP function is supported for this device

Test Position	Mode	Ch #.	Freq. (MHz)	Power (dBm)		1-g SAR (W/kg)		Note
				Tune-up limit	Measured	Measured	Scaled	
Left Touch	GPRS 2 slots	128	824.20	25.2	25.1			1
		190	836.60	25.2	25.1	0.177	0.181	
		251	848.80	25.2	25.1			1
Left Tilt (15°)	GPRS 2 slots	128	824.20	25.2	25.1			1
		190	836.60	25.2	25.1	0.117	0.120	
		251	848.80	25.2	25.1			1
Right Touch	GPRS 2 slots	128	824.20	25.2	25.1			1
		190	836.60	25.2	25.1	**0.180**	**0.184**	
		251	848.80	25.2	25.1			1
Right Tilt (15°)	GPRS 2 slots	128	824.20	25.2	25.1			1
		190	836.60	25.2	25.1	0.115	0.118	
		251	848.80	25.2	25.1			1

Note(s):

1. SAR test was performed in the middle channel only as the measured level was < 50% of the SAR limit as stated in FCC "Public Notice DA 02-1438" by the SCC-34/SC-2. Testing in the low and high channel is optional.

12.1.2. Body-Worn SAR

Test Position	Mode	Dist. (mm)	Ch #.	Freq. (MHz)	Power (dBm)		1-g SAR (W/kg)		Note
					Tune-up limit	Measured	Measured	Scaled	
Rear	Voice	10	128	824.20	33.2	33.1			1
			190	836.60	33.2	33.1	**0.482**	**0.493**	
			190	836.60	33.2	33.1	0.399	0.408	2
			251	848.80	33.2	33.1			1
Front	Voice	10	128	824.20	33.2	33.1			1
			190	836.60	33.2	33.1	0.256	0.262	
			251	848.80	33.2	33.1			1

Note(s):
1. SAR test was performed in the middle channel only as the measured level was < 50% of the SAR limit as stated in FCC "Public Notice DA 02-1438" by the SCC-34/SC-2. Testing in the low and high channel is optional.
2. With headset attached.

12.1.3. Hotspot SAR

Test Position	Mode	Dist. (mm)	Ch #.	Freq. (MHz)	Power (dBm)		1-g SAR (W/kg)		Note
					Tune-up limit	Measured	Measured	Scaled	
Rear	GPRS 2 slots	10	128	824.20	25.2	25.1			1
			190	836.60	25.2	25.1	**0.579**	**0.592**	
			251	848.80	25.2	25.1			1
Front	GPRS 2 slots	10	128	824.20	25.2	25.1			1
			190	836.60	25.2	25.1	0.312	0.319	
			251	848.80	25.2	25.1			1
Edge 2	GPRS 2 slots	10	128	824.20	25.2	25.1			1
			190	836.60	25.2	25.1	0.363	0.371	
			251	848.80	25.2	25.1			1
Edge 3	GPRS 2 slots	10	128	824.20	25.2	25.1			1
			190	836.60	25.2	25.1	0.117	0.120	
			251	848.80	25.2	25.1			1
Edge 4	GPRS 2 slots	10	128	824.20	25.2	25.1			1
			190	836.60	25.2	25.1	0.140	0.143	
			251	848.80	25.2	25.1			1

Note(s):
1. SAR test was performed in the middle channel only as the measured level was < 50% of the SAR limit as stated in FCC "Public Notice DA 02-1438" by the SCC-34/SC-2. Testing in the low and high channel is optional.

12.2. GSM1900

12.2.1. Head SAR

Test Position	Mode	Ch #.	Freq. (MHz)	Power (dBm)		1-g SAR (W/kg)		Note
				Tune-up limit	Measured	Measured	Scaled	
Left Touch	Voice	512	1850.2	31.4	31.3			1
		661	1880.0	31.4	31.1	0.351	0.376	
		810	1909.8	31.4	31.0			1
Left Tilt (15°)	Voice	512	1850.2	31.4	31.3			1
		661	1880.0	31.4	31.1	0.073	0.078	
		810	1909.8	31.4	31.0			1
Right Touch	Voice	512	1850.2	31.4	31.3			1
		661	1880.0	31.4	31.1	0.181	0.194	
		810	1909.8	31.4	31.0			1
Right Tilt (15°)	Voice	512	1850.2	31.4	31.3			1
		661	1880.0	31.4	31.1	0.104	0.111	
		810	1909.8	31.4	31.0			1

VoIP function is supported for this device

Test Position	Mode	Ch #.	Freq. (MHz)	Power (dBm)		1-g SAR (W/kg)		Note
				Tune-up limit	Measured	Measured	Scaled	
Left Touch	GPRS 2 slots	512	1850.2	23.4	23.3			1
		661	1880.0	23.4	23.3	**0.492**	**0.503**	
		810	1909.8	23.4	23.3			1
Left Tilt (15°)	GPRS 2 slots	512	1850.2	23.4	23.3			1
		661	1880.0	23.4	23.3	0.107	0.109	
		810	1909.8	23.4	23.3			1
Right Touch	GPRS 2 slots	512	1850.2	23.4	23.3			1
		661	1880.0	23.4	23.3	0.304	0.311	
		810	1909.8	23.4	23.3			1
Right Tilt (15°)	GPRS 2 slots	512	1850.2	23.4	23.3			1
		661	1880.0	23.4	23.3	0.159	0.163	
		810	1909.8	23.4	23.3			1

Note(s):

1. SAR test was performed in the middle channel only as the measured level was < 50% of the SAR limit as stated in FCC "Public Notice DA 02-1438" by the SCC-34/SC-2. Testing in the low and high channel is optional.

12.2.2. Body-Worn SAR

Test Position	Mode	Dist. (mm)	Ch #.	Freq. (MHz)	Power (dBm)		1-g SAR (W/kg)		Note
					Tune-up limit	Measured	Measured	Scaled	
Rear	Voice	10	512	1850.2	31.4	31.3			1
			661	1880.0	31.4	31.1	0.617	0.661	
			661	1880.0	31.4	31.1	**0.629**	**0.674**	2
			810	1909.8	31.4	31.0			1
Front	Voice	10	512	1850.2	31.4	31.3			1
			661	1880.0	31.4	31.1	0.362	0.388	
			810	1909.8	31.4	31.0			1

Note(s):
1. SAR test was performed in the middle channel only as the measured level was < 50% of the SAR limit as stated in FCC "Public Notice DA 02-1438" by the SCC-34/SC-2. Testing in the low and high channel is optional.
2. With headset attached.

12.2.3. Hotspot SAR

Test Position	Mode	Dist. (mm)	Ch #.	Freq. (MHz)	Power (dBm)		1-g SAR (W/kg)		Note
					Tune-up limit	Measured	Measured	Scaled	
Rear	GPRS 2 slots	10	512	1850.2	23.4	23.3	0.774	0.792	
			661	1880.0	23.4	23.3	0.816	0.835	
			810	1909.8	23.4	23.3	**0.866**	**0.886**	
Front	GPRS 2 slots	10	512	1850.2	23.4	23.3			1
			661	1880.0	23.4	23.3	0.376	0.385	
			810	1909.8	23.4	23.3			1
Edge 2	GPRS 2 slots	10	512	1850.2	23.4	23.3			1
			661	1880.0	23.4	23.3	0.045	0.046	
			810	1909.8	23.4	23.3			1
Edge 3	GPRS 2 slots	10	512	1850.2	23.4	23.3			1
			661	1880.0	23.4	23.3	0.636	0.651	
			810	1909.8	23.4	23.3			1
Edge 4	GPRS 2 slots	10	512	1850.2	23.4	23.3			
			661	1880.0	23.4	23.3	0.263	0.269	
			810	1909.8	23.4	23.3			

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.

12.3. 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 SAR

Test Position	Mode	Ch #.	Freq. (MHz)	Power (dBm)		1-g SAR (W/kg)		Note
				Tune-up limit	Measured	Measured	Scaled	
Left Touch	Rel 99 RMC 12.2kbps	4132	826.4	23.7	23.6			1
		4183	836.6	23.7	23.5	**0.106**	**0.111**	
		4233	846.6	23.7	23.6			1
Left Tilt (15°)	Rel 99 RMC 12.2kbps	4132	826.4	23.7	23.6			1
		4183	836.6	23.7	23.5	0.061	0.063	
		4233	846.6	23.7	23.6			1
Right Touch	Rel 99 RMC 12.2kbps	4132	826.4	23.7	23.6			1
		4183	836.6	23.7	23.5	0.098	0.103	
		4233	846.6	23.7	23.6			1
Right Tilt (15°)	Rel 99 RMC 12.2kbps	4132	826.4	23.7	23.6			1
		4183	836.6	23.7	23.5	0.051	0.054	
		4233	846.6	23.7	23.6			1

12.3.2. Body-Worn SAR

Test Position	Mode	Dist. (mm)	Ch #.	Freq. (MHz)	Power (dBm)		1-g SAR (W/kg)		Note
					Tune-up limit	Measured	Measured	Scaled	
Rear	Rel 99 RMC 12.2kbps	10	4132	826.4	23.7	23.6			1
			4183	836.6	23.7	23.5	**0.355**	**0.372**	
			4183	836.6	23.7	23.5	0.288	0.302	2
			4233	846.6	23.7	23.6			1
Front	Rel 99 RMC 12.2kbps	10	4132	826.4	23.7	23.6			1
			4183	836.6	23.7	23.5	0.184	0.193	
			4233	846.6	23.7	23.6			1

Note(s):

1. SAR test was performed in the middle channel only as the measured level was < 50% of the SAR limit as stated in FCC "Public Notice DA 02-1438" by the SCC-34/SC-2. Testing in the low and high channel is optional.
2. With headset attached.

12.3.3. Hotspot SAR

Test Position	Mode	Dist. (mm)	Ch #.	Freq. (MHz)	Power (dBm)		1-g SAR (W/kg)		Note
					Tune-up limit	Measured	Measured	Scaled	
Rear	Rel 99 RMC 12.2kbps	10	4132	826.4	23.7	23.6			1
			4183	836.6	23.7	23.5	**0.355**	**0.372**	
			4233	846.6	23.7	23.6			1
Front	Rel 99 RMC 12.2kbps	10	4132	826.4	23.7	23.6			1
			4183	836.6	23.7	23.5	0.184	0.193	
			4233	846.6	23.7	23.6			1
Edge 2	Rel 99 RMC 12.2kbps	10	4132	826.4	23.7	23.6			1
			4183	836.6	23.7	23.5	0.203	0.213	
			4233	846.6	23.7	23.6			1
Edge 3	Rel 99 RMC 12.2kbps	10	4132	826.4	23.7	23.6			1
			4183	836.6	23.7	23.5	0.074	0.077	
			4233	846.6	23.7	23.6			1
Edge 4	Rel 99 RMC 12.2kbps	10	4132	826.4	23.7	23.6			1
			4183	836.6	23.7	23.5	0.081	0.085	
			4233	846.6	23.7	23.6			1

Note(s):

1. SAR test was performed in the middle channel only as the measured level was < 50% of the SAR limit as stated in FCC "Public Notice DA 02-1438" by the SCC-34/SC-2. Testing in the low and high channel is optional.

12.4. 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

12.4.1. Head SAR

Test Position	Mode	Ch #.	Freq. (MHz)	Power (dBm)		1-g SAR (W/kg)		Note
				Tune-up limit	Measured	Measured	Scaled	
Left Touch	Rel 99 RMC 12.2kbps	9262	1852.4	24.7	24.7			1
		9400	1880.0	24.7	24.7	**0.704**	**0.704**	
		9538	1907.6	24.7	24.6			1
Left Tilt (15°)	Rel 99 RMC 12.2kbps	9262	1852.4	24.7	24.7			1
		9400	1880.0	24.7	24.7	0.158	0.158	
		9538	1907.6	24.7	24.6			1
Right Touch	Rel 99 RMC 12.2kbps	9262	1852.4	24.7	24.7			1
		9400	1880.0	24.7	24.7	0.414	0.414	
		9538	1907.6	24.7	24.6			1
Right Tilt (15°)	Rel 99 RMC 12.2kbps	9262	1852.4	24.7	24.7			1
		9400	1880.0	24.7	24.7	0.247	0.247	
		9538	1907.6	24.7	24.6			1

12.4.2. Body-Worn SAR

Test Position	Mode	Dist. (mm)	Ch #.	Freq. (MHz)	Power (dBm)		1-g SAR (W/kg)		Note
					Tune-up limit	Measured	Measured	Scaled	
Rear	Rel 99 RMC 12.2kbps	10	9262	1852.4	24.7	24.7	0.977	0.977	
			9400	1880.0	24.7	24.7	1.030	1.030	
			9538	1907.6	24.7	24.7	**1.080**	**1.080**	
			9538	1907.6	24.7	24.6	1.070	1.095	2
Front	Rel 99 RMC 12.2kbps	10	9262	1852.4	24.7	24.7			1
			9400	1880.0	24.7	24.7	0.613	0.613	
			9538	1907.6	24.7	24.6			1

Note(s):

1. SAR test was performed in the middle channel only as the measured level was < 50% of the SAR limit as stated in FCC "Public Notice DA 02-1438" by the SCC-34/SC-2. Testing in the low and high channel is optional.
2. With headset attached

12.4.3. Hotspot SAR

Test Position	Mode	Dist. (mm)	Ch #.	Freq. (MHz)	Power (dBm)		1-g SAR (W/kg)		Note
					Tune-up limit	Measured	Measured	Scaled	
Rear	Rel 99 RMC 12.2kbps	10	9262	1852.4	24.7	24.7	0.977	0.977	
			9400	1880.0	24.7	24.7	1.030	1.030	
			9538	1907.6	24.7	24.6	**1.080**	**1.105**	
Front	Rel 99 RMC 12.2kbps	10	9262	1852.4	24.7	24.7			1
			9400	1880.0	24.7	24.7	0.613	0.613	
			9538	1907.6	24.7	24.6			1
Edge 2	Rel 99 RMC 12.2kbps	10	9262	1852.4	24.7	24.7			1
			9400	1880.0	24.7	24.7	0.097	0.097	
			9538	1907.6	24.7	24.6			1
Edge 3	Rel 99 RMC 12.2kbps	10	9262	1852.4	24.7	24.7			1
			9400	1880.0	24.7	24.7	0.732	0.732	
			9538	1907.6	24.7	24.6			1
Edge 4	Rel 99 RMC 12.2kbps	10	9262	1852.4	24.7	24.7			1
			9400	1880.0	24.7	24.7	0.352	0.352	
			9538	1907.6	24.7	24.6			1

Note(s):

1. SAR test was performed in the middle channel only as the measured level was < 50% of the SAR limit as stated in FCC "Public Notice DA 02-1438" by the SCC-34/SC-2. Testing in the low and high channel is optional.

12.5. 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

12.5.1. Head SAR

Test Position	Mode	Ch #.	Freq. (MHz)	Power (dBm)		1-g SAR (W/kg)		Note
				Tune-up limit	Measured	Measured	Scaled	
Left Touch	Rel 99 RMC 12.2kbps	1312	1712.4	24.7	24.7			1
		1412	1732.4	24.7	24.6	**0.521**	**0.533**	
		1862	1752.5	24.7	24.6			1
Left Tilt (15°)	Rel 99 RMC 12.2kbps	1312	1712.4	24.7	24.7			1
		1412	1732.4	24.7	24.6	0.145	0.148	
		1862	1752.5	24.7	24.6			1
Right Touch	Rel 99 RMC 12.2kbps	1312	1712.4	24.7	24.7			1
		1412	1732.4	24.7	24.6	0.264	0.270	
		1862	1752.5	24.7	24.6			1
Right Tilt (15°)	Rel 99 RMC 12.2kbps	1312	1712.4	24.7	24.7			1
		1412	1732.4	24.7	24.6	0.165	0.169	
		1862	1752.5	24.7	24.6			1

12.5.2. Body-Worn SAR

Test Position	Mode	Dist. (mm)	Ch #.	Freq. (MHz)	Power (dBm)		1-g SAR (W/kg)		Note
					Tune-up limit	Measured	Measured	Scaled	
Rear	Rel 99 RMC 12.2kbps	10	1312	1712.4	24.7	24.7			1
			1412	1732.4	24.7	24.6	**0.677**	**0.693**	
			1412	1732.4	24.7	24.6	0.625	0.640	2
			1862	1752.5	24.7	24.6			1
Front	Rel 99 RMC 12.2kbps	10	1312	1712.4	24.7	24.7			1
			1412	1732.4	24.7	24.6	0.644	0.659	
			1862	1752.5	24.7	24.6			1

Note(s):

1. SAR test was performed in the middle channel only as the measured level was < 50% of the SAR limit as stated in FCC "Public Notice DA 02-1438" by the SCC-34/SC-2. Testing in the low and high channel is optional.
2. With headset attached.

12.5.3. Hotspot SAR

Test Position	Mode	Dist. (mm)	Ch #.	Freq. (MHz)	Power (dBm)		1-g SAR (W/kg)		Note
					Tune-up limit	Measured	Measured	Scaled	
Rear	Rel 99 RMC 12.2kbps	10	1312	1712.4	24.7	24.7			1
			1412	1732.4	24.7	24.6	0.677	0.693	
			1862	1752.5	24.7	24.6			1
Front	Rel 99 RMC 12.2kbps	10	1312	1712.4	24.7	24.7			1
			1412	1732.4	24.7	24.6	0.644	0.659	
			1862	1752.5	24.7	24.6			1
Edge 2	Rel 99 RMC 12.2kbps	10	1312	1712.4	24.7	24.7			1
			1412	1732.4	24.7	24.6	0.064	0.065	
			1862	1752.5	24.7	24.6			1
Edge 3	Rel 99 RMC 12.2kbps	10	1312	1712.4	24.7	24.7	1.060	1.060	
			1412	1732.4	24.7	24.6	**1.070**	**1.095**	
			1862	1752.5	24.7	24.6	0.858	0.878	
Edge 4	Rel 99 RMC 12.2kbps	10	1312	1712.4	24.7	24.7			1
			1412	1732.4	24.7	24.6	0.180	0.184	
			1513	1752.5	24.7	24.6			1

Note(s):

1. SAR test was performed in the middle channel only as the measured level was < 50% of the SAR limit as stated in FCC "Public Notice DA 02-1438" by the SCC-34/SC-2. Testing in the low and high channel is optional.

12.6. Wi-Fi (2.4 GHz Band)

12.6.1. Head SAR

Test Position	Mode	Ch #.	Freq. (MHz)	Power (dBm)		1-g SAR (W/kg)		Note
				Tune-up limit	Measured	Measured	Scaled	
Left Touch	802.11b	1	2412	17.9	16.7			1
		6	2437	17.9	17.3			1
		11	2462	17.9	17.9	0.313	0.313	
Left Tilt (15°)	802.11b	1	2412	17.9	16.7			1
		6	2437	17.9	17.3			1
		11	2462	17.9	17.9	0.280	0.280	
Right Touch	802.11b	1	2412	17.9	16.7			1
		6	2437	17.9	17.3			1
		11	2462	17.9	17.9	**0.672**	**0.672**	
Right Tilt (15°)	802.11b	1	2412	17.9	16.7			1
		6	2437	17.9	17.3			1
		11	2462	17.9	17.9	0.466	0.466	1

12.6.2. Body & Hotspot SAR

Test Position	Mode	Dist. (mm)	Ch #.	Freq. (MHz)	Power (dBm)		1-g SAR (W/kg)		Note
					Tune-up limit	Measured	Measured	Scaled	
Rear	802.11b	10	1	2412	17.9	16.7			1
			6	2437	17.9	17.3			
			11	2462	17.9	17.9	**0.237**	**0.237**	
			11	2462	17.9	17.9	0.194	0.194	2
Front	802.11b	10	1	2412	17.9	16.7			1
			6	2437	17.9	17.3			1
			11	2462	17.9	17.9	0.166	0.166	
Edge 1	802.11b	10	1	2412	17.9	16.7			1
			6	2437	17.9	17.3			1
			11	2462	17.9	17.9	0.134	0.134	
Edge 4	802.11b	10	1	2412	17.9	16.7			1
			6	2437	17.9	17.3			1
			11	2462	17.9	17.9	0.132	0.132	

Note(s):
1. 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)
2. With headset attached.

12.7. Wi-Fi (5 GHz Bands)

12.7.1. Head SAR

Band (GHz)	Test Position	Mode	Ch #.	Freq. (MHz)	Power (dBm)		1-g SAR (W/kg)		Note
					Tune-up limit	Measured	Measured	Scaled	
5.2	Left Touch	802.11a	36	5180	14.5	13.5	0.014	0.017	
			48	5240	14.5	13.4	0.013	0.017	
	Left Tilt (15°)	802.11a	36	5180	14.5	13.5	0.014	0.018	
			48	5240	14.5	13.4	0.012	0.015	
	Right Touch	802.11a	36	5180	14.5	13.5	0.041	0.052	
			48	5240	14.5	13.4	**0.046**	**0.059**	
	Right Tilt (15°)	802.11a	36	5180	14.5	13.5	0.028	0.035	
			48	5240	14.5	13.4	0.034	0.044	
5.3	Left Touch	802.11a	52	5260	14.5	13.3	0.026	0.034	
			64	5320	14.5	13.3	0.031	0.040	
	Left Tilt (15°)	802.11a	52	5260	14.5	13.3	0.025	0.033	
			64	5320	14.5	13.3	0.027	0.035	
	Right Touch	802.11a	52	5260	14.5	13.3	0.053	0.070	
			64	5320	14.5	13.3	**0.057**	**0.076**	
	Right Tilt (15°)	802.11a	52	5260	14.5	13.3	0.040	0.052	
			64	5320	14.5	13.3	0.049	0.065	
5.5	Left Touch	802.11a	104	5520	14.5	13.5	0.039	0.049	
			116	5580	14.5	13.5	0.029	0.037	
			124	5620					1
			136	5680	14.5	13.5	0.018	0.022	
	Left Tilt (15°)	802.11a	104	5520	14.5	13.5	0.033	0.042	
			116	5580	14.5	13.5	0.044	0.055	
			124	5620					1
			136	5680	14.5	13.5	0.021	0.027	
	Right Touch	802.11a	104	5520	14.5	13.5	**0.093**	**0.117**	
			116	5580	14.5	13.5	0.086	0.108	
			124	5620					1
			136	5680	14.5	13.5	0.058	0.073	
	Right Tilt (15°)	802.11a	104	5520	14.5	13.5	0.079	0.099	
			116	5580	14.5	13.5	0.059	0.075	
			124	5620					1
			136	5680	14.5	13.5	0.038	0.048	
5.8	Left Touch	802.11a	149	5745	14.5	13.5	0.00159	0.00200	
			157	5785	14.5	13.4	0.00681	0.00877	
			165	5825	14.5	13.3	0.00738	0.00973	
	Left Tilt (15°)	802.11a	149	5745	14.5	13.5	0.00353	0.00444	
			157	5785	14.5	13.4	0.00520	0.00670	
			165	5825	14.5	13.3	0.00520	0.00685	
	Right Touch	802.11a	149	5745	14.5	13.5	0.053	0.066	
			157	5785	14.5	13.4	**0.063**	**0.081**	
			165	5825	14.5	13.3	0.061	0.081	
	Right Tilt (15°)	802.11a	149	5745	14.5	13.5	0.039	0.049	
			157	5785	14.5	13.4	0.046	0.059	
			165	5825	14.5	13.3	0.048	0.063	

Note(s):

1. Channel is not supported for this device

12.7.2. Body-Worn SAR

Band (GHz)	Test Position	Dist. (mm)	Mode	Ch #.	Freq. (MHz)	Power (dBm)		SAR (W/kg)		Note
						Tune-up limit	Measured	Measured	Scaled	
5.2	Rear	10	802.11a	36	5180	14.5	13.5	0.057	0.072	
				48	5240	14.5	13.4	0.091	0.118	
				48	5240	14.5	13.4	**0.098**	**0.127**	1
	Front	10	802.11a	36	5180	14.5	13.5	0.014	0.018	
				48	5240	14.5	13.4	0.016	0.021	
5.3	Rear	10	802.11a	52	5260	14.5	13.3	0.107	0.141	
				64	5320	14.5	13.3	**0.127**	**0.167**	
				64	5320	14.5	13.3	0.127	0.167	1
	Front	10	802.11a	52	5260	14.5	13.3	0.024	0.031	
				64	5320	14.5	13.3	0.017	0.023	
5.5	Rear	10	802.11a	104	5520	14.5	13.5	0.228	0.287	
				116	5580	14.5	13.5	0.242	0.305	
				124	5620					2
				136	5680	14.5	13.5	0.262	0.330	
				136	5680	14.5	13.5	**0.499**	**0.628**	1
	Front	10	802.11a	104	5520	14.5	13.5	0.033	0.042	
				116	5580	14.5	13.5	0.030	0.038	
				124	5620					2
				136	5680	14.5	13.5	0.021	0.027	
5.8	Rear	10	802.11a	149	5745	14.5	13.5	0.312	0.393	
				157	5785	14.5	13.4	0.340	0.438	
				165	5825	14.5	13.3	0.386	0.509	
				165	5825	14.5	13.3	**0.417**	**0.550**	1
	Front	10	802.11a	149	5745	14.5	13.5	0.016	0.020	
				157	5785	14.5	13.4	0.018	0.023	
				165	5825	14.5	13.3	0.013	0.017	

Note(s):
1. With headset attached.
2. Channel is not supported for this device

13. Summary of Highest SAR Values

Results for highest SAR values for each frequency band and mode

Technology/Band	Test configuration		Mode	Highest 1g SAR (W/kg)
GSM850	Head	Right Touch	GPRS 2 slots	0.180
	Body	Rear	GMSK (Voice)	0.482
	Hotspot	Rear	GPRS 2 slots	0.579
GSM1900	Head	Left Touch	GPRS 2 slots	0.492
	Body	Rear with Headset	GMSK (Voice)	0.629
	Hotspot	Rear	GPRS 2 slots	0.866
W-CDMA Band V	Head	Left Touch	Rel99 (RMC, 12.2 kbps)	**0.106**
	Body	Rear	Rel99 (RMC, 12.2 kbps)	**0.355**
	Hotspot	Rear	Rel99 (RMC, 12.2 kbps)	**0.355**
W-CDMA Band II	Head	Left Touch	Rel99 (RMC, 12.2 kbps)	**0.704**
	Body	Rear	Rel6 (HSPA Sub-test5)	**1.080**
	Hotspot	Rear	Rel6 (HSPA Sub-test5)	**1.080**
W-CDMA Band IV	Head	Left Touch	Rel99 (RMC, 12.2 kbps)	**0.521**
	Body	Rear	Rel99 (RMC, 12.2 kbps)	**0.677**
	Hotspot	Edge 3	Rel99 (RMC, 12.2 kbps)	**1.07**
WiFi 2.4GHz	Head	Right Touch	802.11b	0.672
	Body	Rear	802.11b	0.237
	Hotspot	Rear	802.11b	0.237
WiFi 5.2GHz	Head	Right Touch	802.11a	0.046
	Body	Rear with Headset	802.11a	0.098
WiFi 5.3GHz	Head	Right Touch	802.11a	0.057
	Body	Rear	802.11a	0.127
WiFi 5.5GHz	Head	Right Touch	802.11a	0.093
	Body	Rear with Headset	802.11a	0.499
WiFi 5.8GHz	Head	Right Touch	802.11a	0.063
	Body	Rear with Headset	802.11a	0.417

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

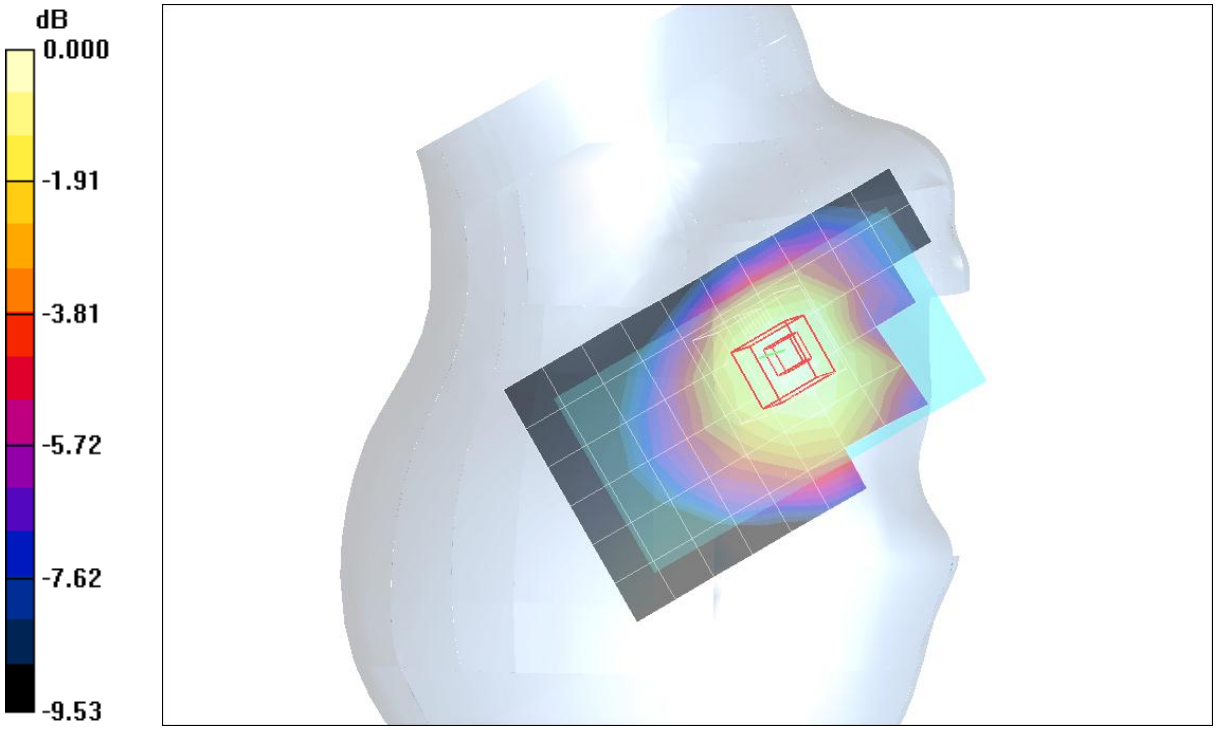
Test Laboratory: UL CCS SAR Lab D Date/Time: 9/7/2012

GSM850

Frequency: 836.6 MHz; Duty Cycle: 1:4; Room Ambient Temperature: 24.0°C; Liquid Temperature: 23.0°C
Medium parameters used (interpolated): f = 836.6 MHz; σ = 0.91 mho/m; ε_r = 42.8; ρ = 1000 kg/m^3 ;
DASY4 Configuration:
- Area Scan setting - Find Secondary Maximum Within: 2.0 dB and with a peak SAR value greater than 0.0012W/kg
- Electronics: DAE3 Sn500; Calibrated: 6/13/2012
- Probe: EX3DV4 - SN3749; ConvF(8.68, 8.68, 8.68); Calibrated: 1/27/2012
- Sensor-Surface: 2.5mm (Mechanical Surface Detection)
- Phantom: SAM A (Twin); Type: SAM A; Serial: 1050

Right Touch/GPRS 2 slots/Ch190/Area Scan (7x11x1): Measurement grid: dx=15mm, dy=15mm
Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (measured) = 0.190 mW/g

Right Touch/GPRS 2 slots/Ch190/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 14.8 V/m; Power Drift = -0.021 dB
Peak SAR (extrapolated) = 0.209 W/kg
SAR(1 g) = 0.180 mW/g; SAR(10 g) = 0.139 mW/g
Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (measured) = 0.197 mW/g



0 dB = 0.197mW/g

Test Laboratory: UL CCS SAR Lab D Date/Time: 9/7/2012

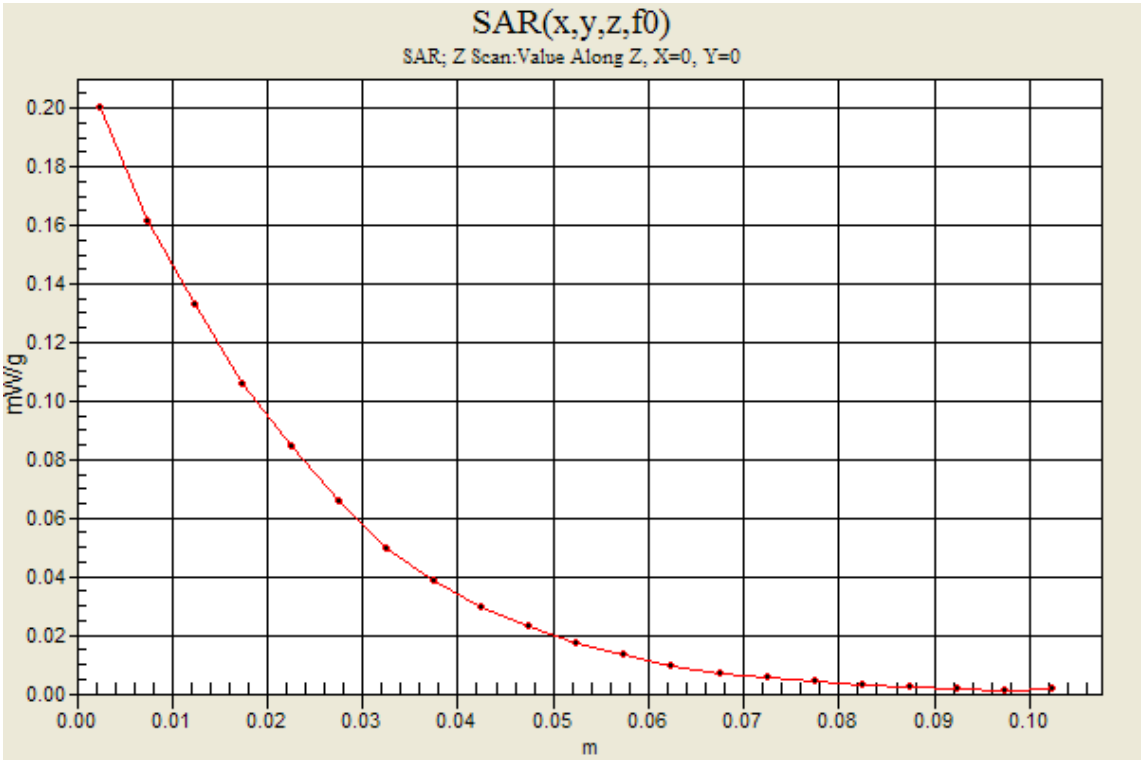
GSM850

Frequency: 836.6 MHz; Duty Cycle: 1:4

Right Touch/GPRS 2 slots/Ch190/Z Scan (1x1x21): Measurement grid: dx=20mm, dy=20mm, dz=5mm

Info: Interpolated medium parameters used for SAR evaluation.

Maximum value of SAR (measured) = 0.200 mW/g



Test Laboratory: UL CCS SAR Lab D Date/Time: 8/21/2012

GSM850

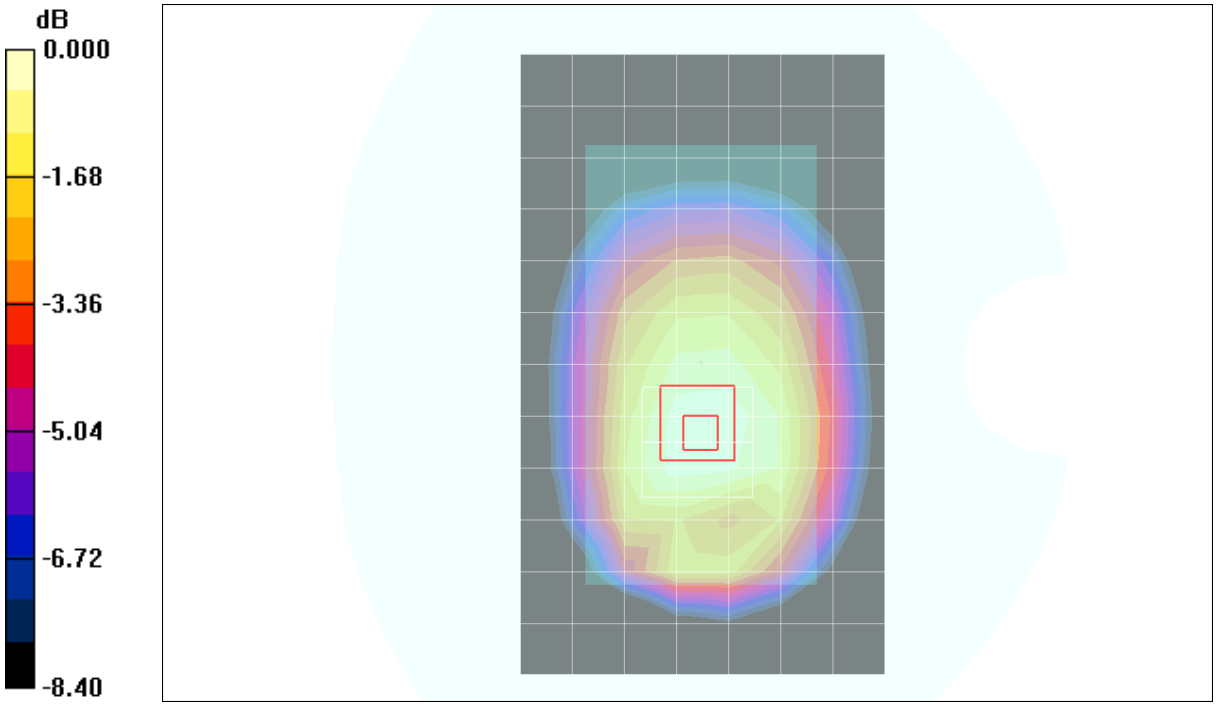
Frequency: 836.6 MHz; Duty Cycle: 1:8; Room Ambient Temperature: 24.0°C; Liquid Temperature: 23.0°C
Medium parameters used (interpolated): f = 836.6 MHz; σ = 0.984 mho/m; ε_r = 53.5; ρ = 1000 kg/m^3 ;
DASY4 Configuration:
- Area Scan setting - Find Secondary Maximum Within: 2.0 dB and with a peak SAR value greater than 0.0012W/kg
- Electronics: DAE3 Sn500; Calibrated: 6/13/2012
- Probe: EX3DV4 - SN3749; ConvF(8.84, 8.84, 8.84); Calibrated: 1/27/2012
- Sensor-Surface: 2.5mm (Mechanical Surface Detection)
- Phantom: SAM A (Twin); Type: SAM A; Serial: 1050

Rear/Voice/Ch190/Area Scan (8x13x1): Measurement grid: dx=15mm, dy=15mm

Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (measured) = 0.523 mW/g

Rear/Voice/Ch190/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 23.4 V/m; Power Drift = -0.096 dB
Peak SAR (extrapolated) = 0.627 W/kg
SAR(1 g) = 0.482 mW/g; SAR(10 g) = 0.356 mW/g
Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (measured) = 0.547 mW/g



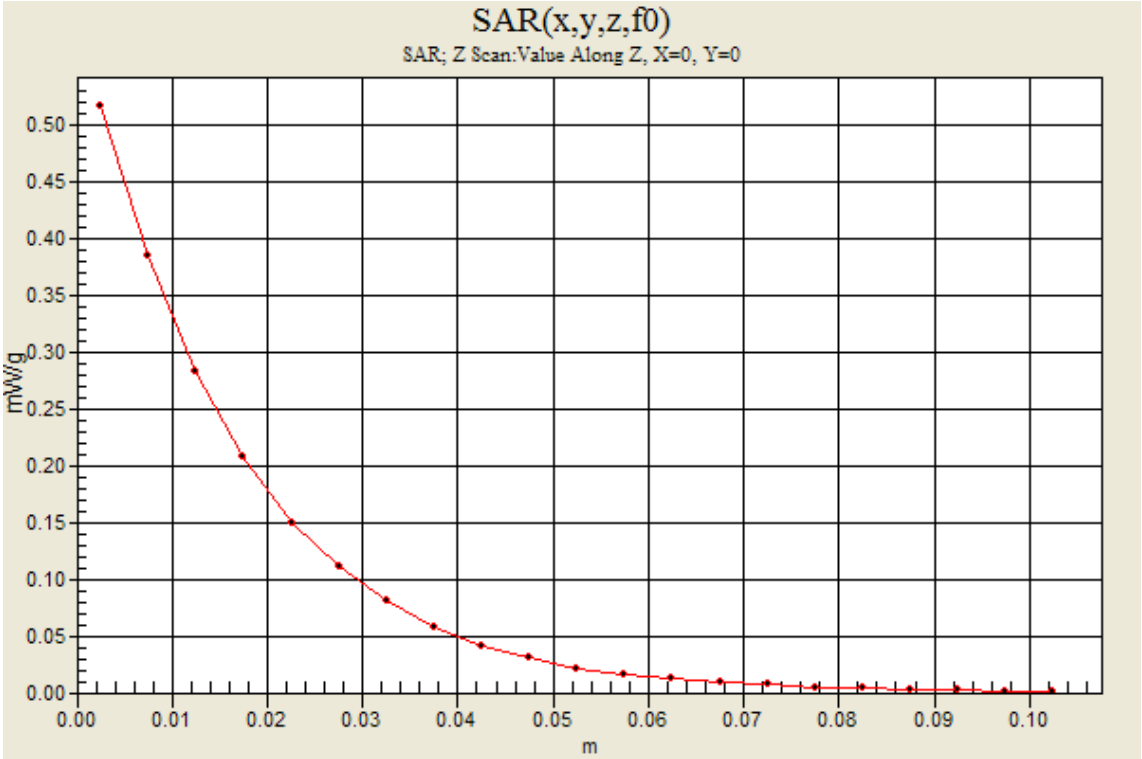
0 dB = 0.547mW/g

Test Laboratory: UL CCS SAR Lab D Date/Time: 8/21/2012

GSM850

Frequency: 836.6 MHz; Duty Cycle: 1:8

Rear/Voice/Ch190/Z Scan (1x1x21): Measurement grid: dx=20mm, dy=20mm, dz=5mm
Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (measured) = 0.517 mW/g



Test Laboratory: UL CCS SAR Lab D Date/Time: 9/7/2012

GSM1900

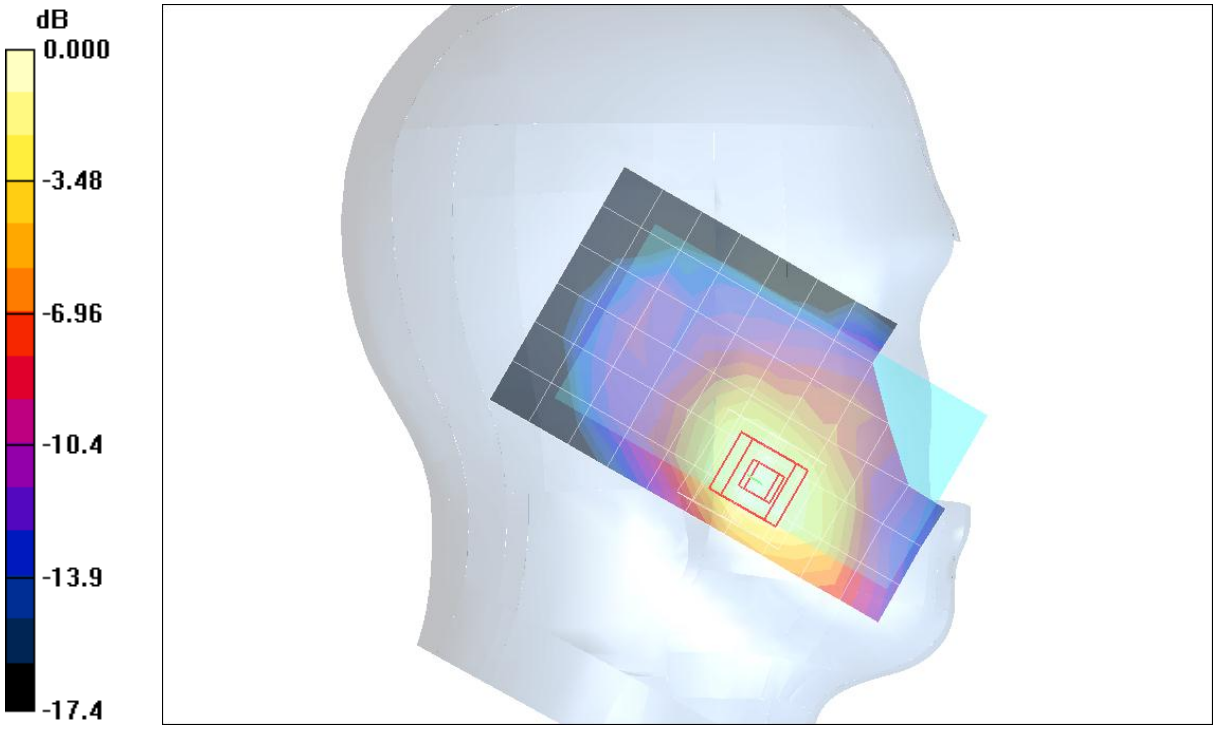
Frequency: 1880 MHz; Duty Cycle: 1:4; Room Ambient Temperature: 24.0°C; Liquid Temperature: 23.0°C
Medium parameters used: f = 1880 MHz; σ = 1.38 mho/m; ε_r = 38.9; ρ = 1000 kg/m^3 ;
DASY4 Configuration:
- Area Scan setting - Find Secondary Maximum Within: 2.0 dB and with a peak SAR value greater than 0.0012W/kg
- Electronics: DAE3 Sn500; Calibrated: 6/13/2012
- Probe: EX3DV4 - SN3749; ConvF(7.67, 7.67, 7.67); Calibrated: 1/27/2012
- Sensor-Surface: 2.5mm (Mechanical Surface Detection)
- Phantom: SAM B (Twin); Type: SAM B; Serial: TP-105

Left Touch/GPRS 2 slots/Ch661/Area Scan (7x11x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (measured) = 0.555 mW/g

Left Touch/GPRS 2 slots/Ch661/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 19.9 V/m; Power Drift = -0.129 dB
Peak SAR (extrapolated) = 0.759 W/kg
SAR(1 g) = 0.492 mW/g; SAR(10 g) = 0.301 mW/g
Maximum value of SAR (measured) = 0.608 mW/g



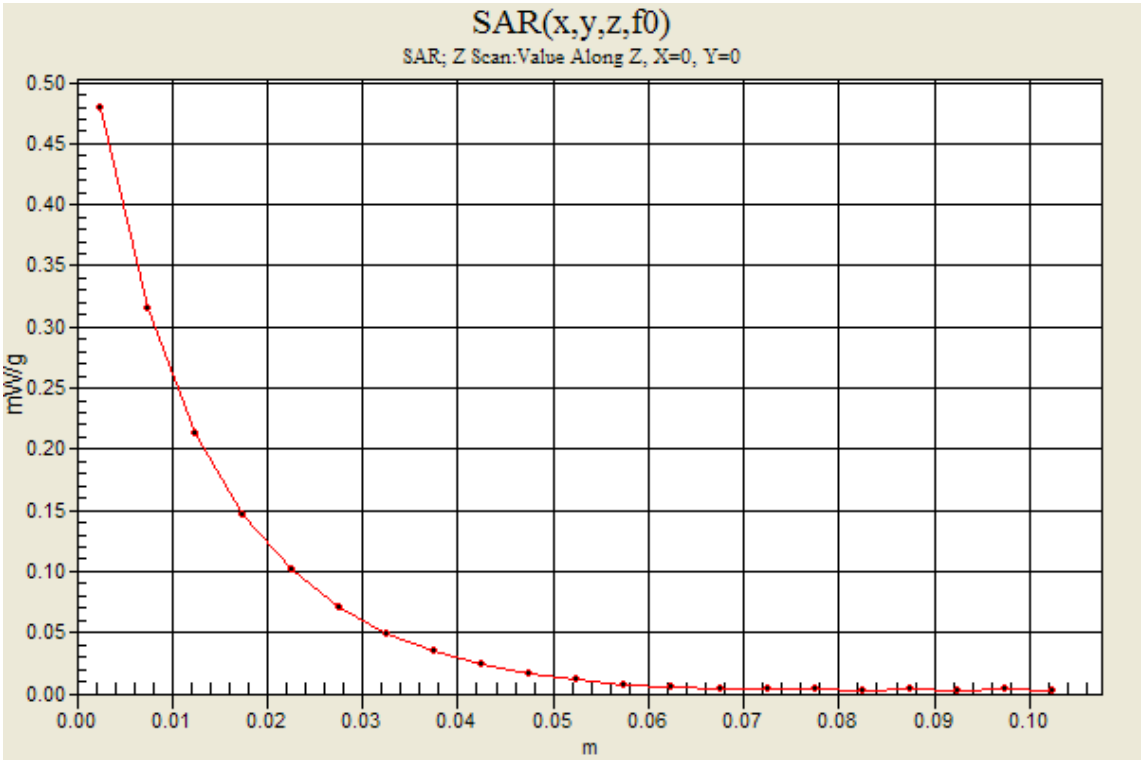
0 dB = 0.608mW/g

Test Laboratory: UL CCS SAR Lab D Date/Time: 9/7/2012

GSM1900

Frequency: 1880 MHz; Duty Cycle: 1:4

Left Touch/GPRS 2 slots/Ch661/Z Scan (1x1x21): Measurement grid: dx=20mm, dy=20mm, dz=5mm
Maximum value of SAR (measured) = 0.479 mW/g



Test Laboratory: UL CCS SAR Lab D Date/Time: 8/20/2012

GSM1900

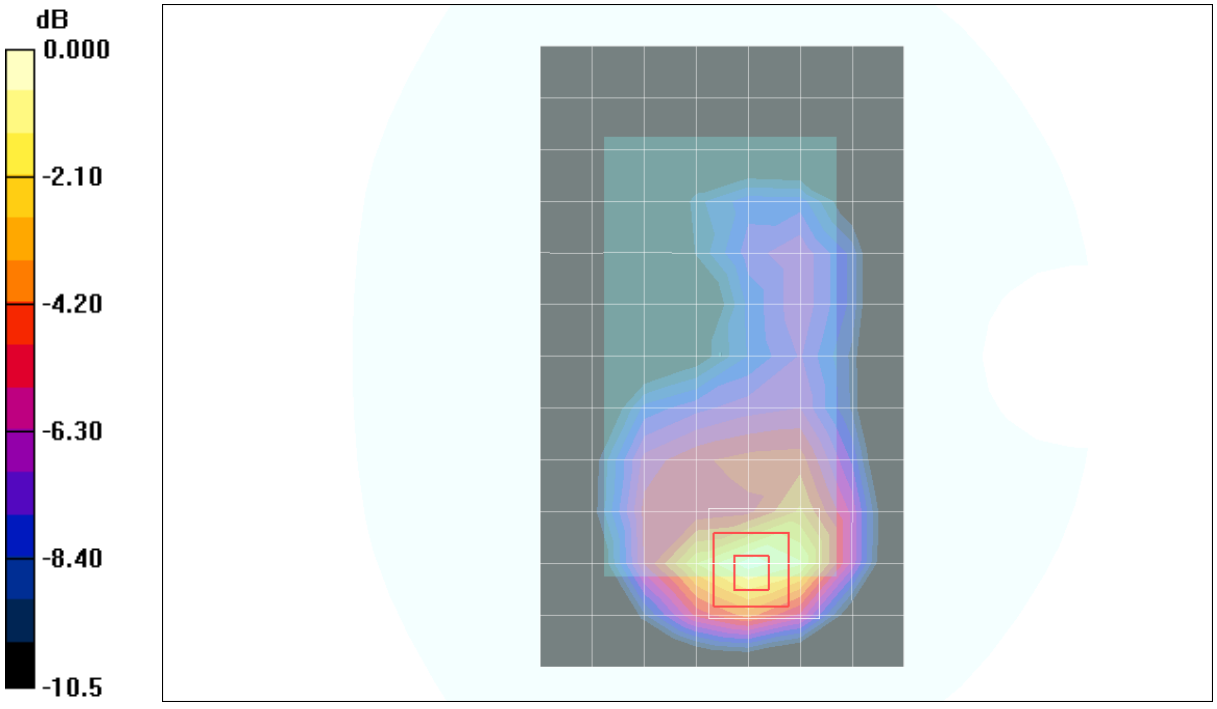
Frequency: 1880 MHz; Duty Cycle: 1:8; Room Ambient Temperature: 24.0°C; Liquid Temperature: 23.0°C
Medium parameters used: f = 1880 MHz; σ = 1.51 mho/m; ε_r = 52.2; ρ = 1000 kg/m^3 ;
DASY4 Configuration:
- Area Scan setting - Find Secondary Maximum Within: 2.0 dB and with a peak SAR value greater than 0.0012W/kg
- Electronics: DAE3 Sn500; Calibrated: 6/13/2012
- Probe: EX3DV4 - SN3749; ConvF(6.97, 6.97, 6.97); Calibrated: 1/27/2012
- Sensor-Surface: 2.5mm (Mechanical Surface Detection (Locations From Previous Scan Used))Sensor-Surface: 2.5mm (Mechanical Surface Detection)
- Phantom: SAM A (Twin); Type: SAM A; Serial: 1050

Rear with Headset/GMSK (Voice)/Ch661/Area Scan (8x13x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (measured) = 0.740 mW/g

Rear with Headset/GMSK (Voice)/Ch661/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 23.0 V/m; Power Drift = -0.183 dB
Peak SAR (extrapolated) = 1.06 W/kg
SAR(1 g) = 0.629 mW/g; SAR(10 g) = 0.345 mW/g
Maximum value of SAR (measured) = 0.790 mW/g



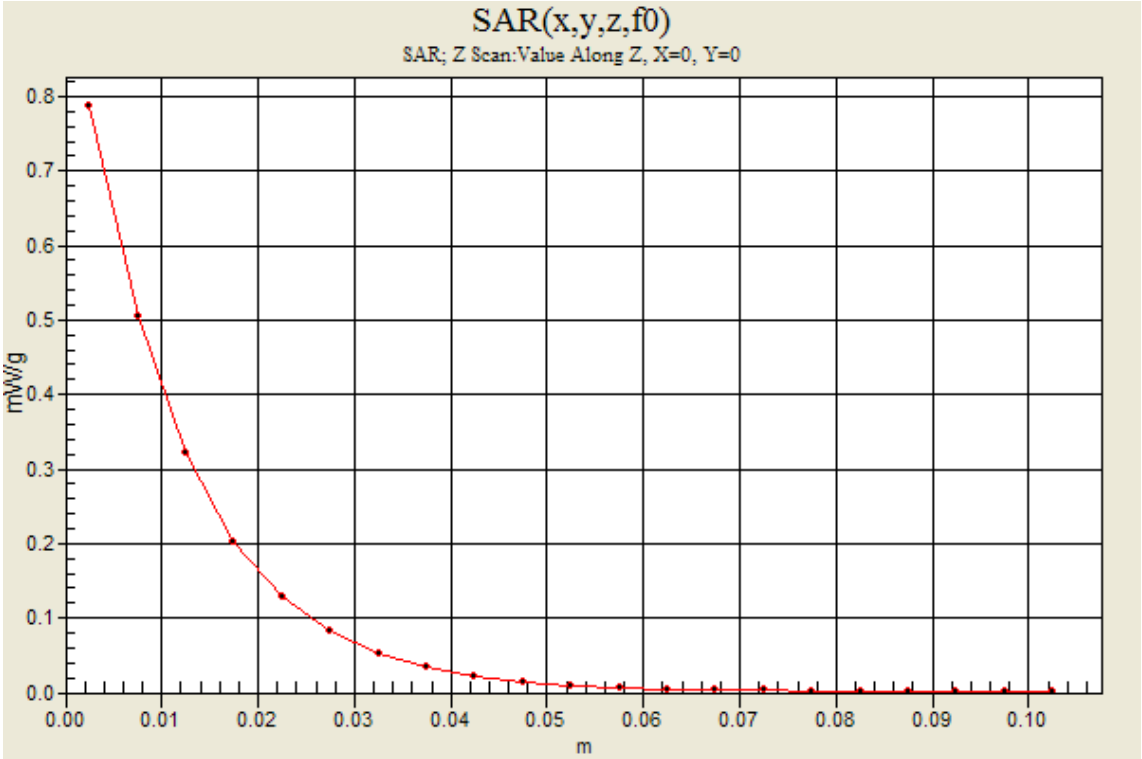
0 dB = 0.790mW/g

Test Laboratory: UL CCS SAR Lab D Date/Time: 8/20/2012

GSM1900

Frequency: 1880 MHz; Duty Cycle: 1:8

Rear with Headset/GMSK (Voice)/Ch661/Z Scan (1x1x21): Measurement grid: dx=20mm, dy=20mm, dz=5mm
Maximum value of SAR (measured) = 0.787 mW/g



Test Laboratory: UL CCS SAR Lab D Date/Time: 8/20/2012

GSM1900

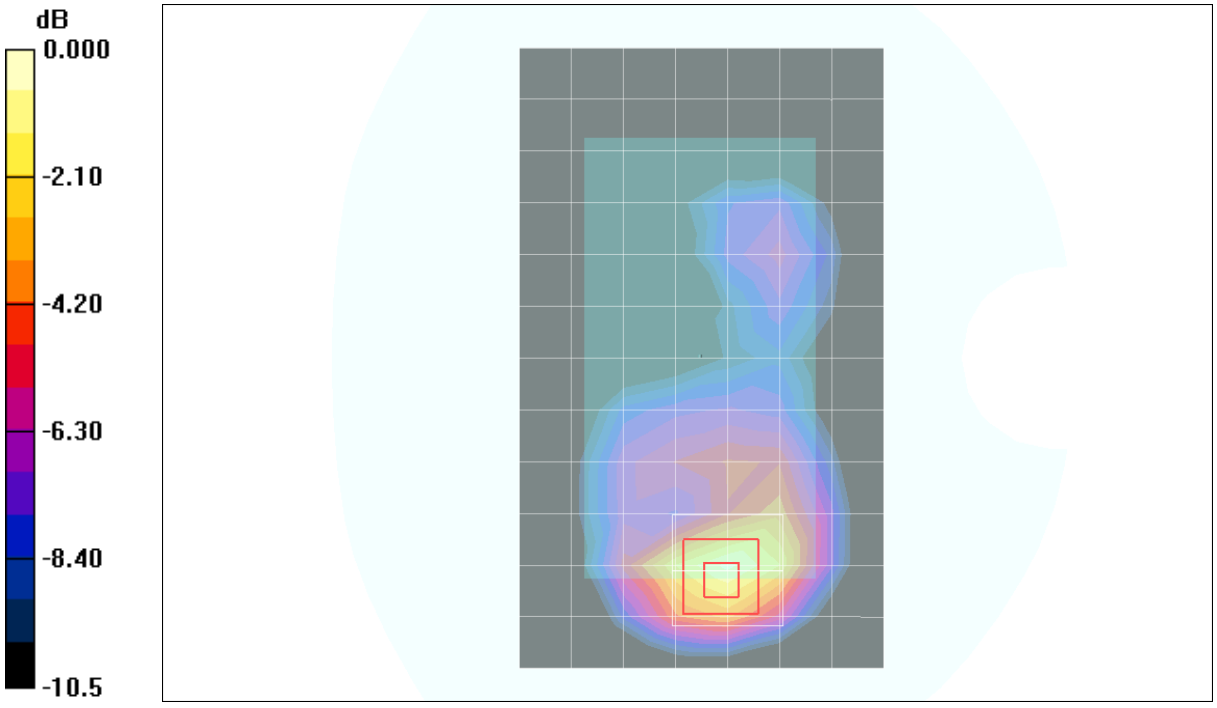
Frequency: 1909.8 MHz; Duty Cycle: 1:4; Room Ambient Temperature: 24.0°C; Liquid Temperature: 23.0°C
Medium parameters used: f = 1910 MHz; σ = 1.55 mho/m; ε_r = 52.1; ρ = 1000 kg/m^3 ;
DASY4 Configuration:
- Area Scan setting - Find Secondary Maximum Within: 2.0 dB and with a peak SAR value greater than 0.0012W/kg
- Electronics: DAE3 Sn500; Calibrated: 6/13/2012
- Probe: EX3DV4 - SN3749; ConvF(6.97, 6.97, 6.97); Calibrated: 1/27/2012
- Sensor-Surface: 2.5mm (Mechanical Surface Detection (Locations From Previous Scan Used))Sensor-Surface: 2.5mm (Mechanical Surface Detection)
- Phantom: SAM A (Twin); Type: SAM A; Serial: 1050

Rear/GPRS 2 slots/Ch810/Area Scan (8x13x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (measured) = 1.02 mW/g

Rear/GPRS 2 slots/Ch810/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 26.3 V/m; Power Drift = -0.157 dB
Peak SAR (extrapolated) = 1.48 W/kg
SAR(1 g) = 0.866 mW/g; SAR(10 g) = 0.466 mW/g
Maximum value of SAR (measured) = 1.12 mW/g



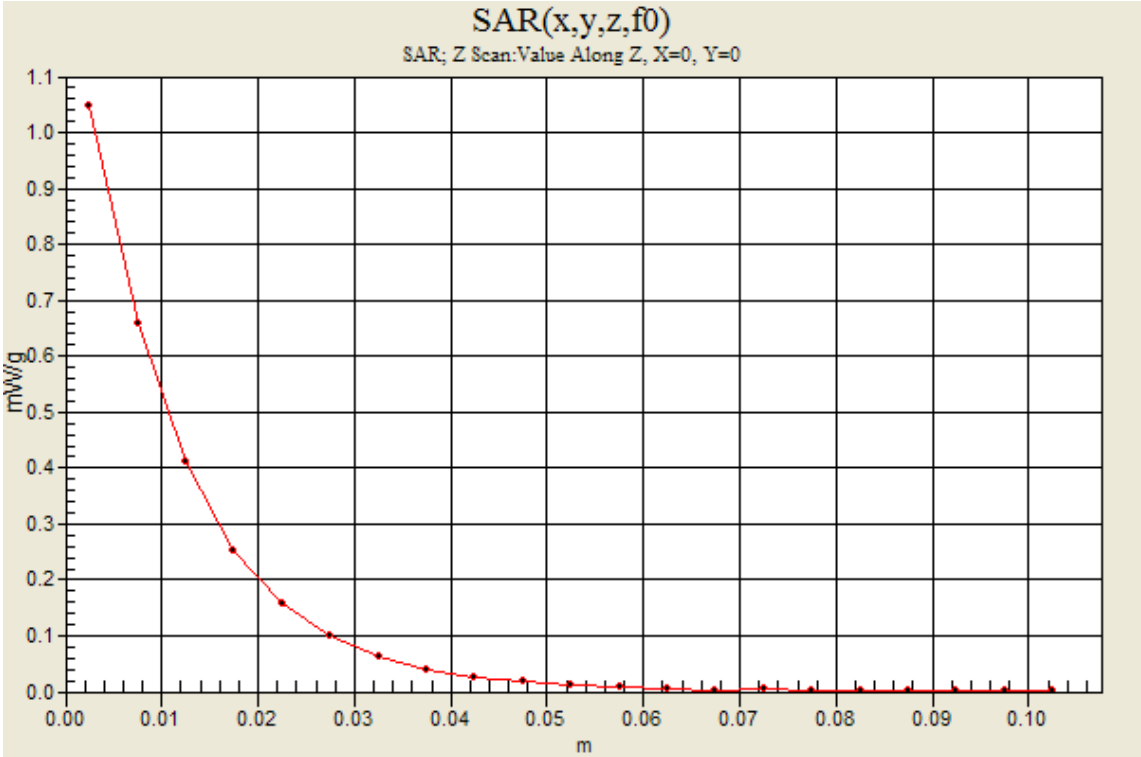
0 dB = 1.12mW/g

Test Laboratory: UL CCS SAR Lab D Date/Time: 8/20/2012

GSM1900

Frequency: 1909.8 MHz; Duty Cycle: 1:4

Rear/GPRS 2 slots/Ch810/Z Scan (1x1x21): Measurement grid: dx=20mm, dy=20mm, dz=5mm
Maximum value of SAR (measured) = 1.05 mW/g



Test Laboratory: UL CCS SAR Lab D Date/Time: 8/21/2012

W-CDMA Band V

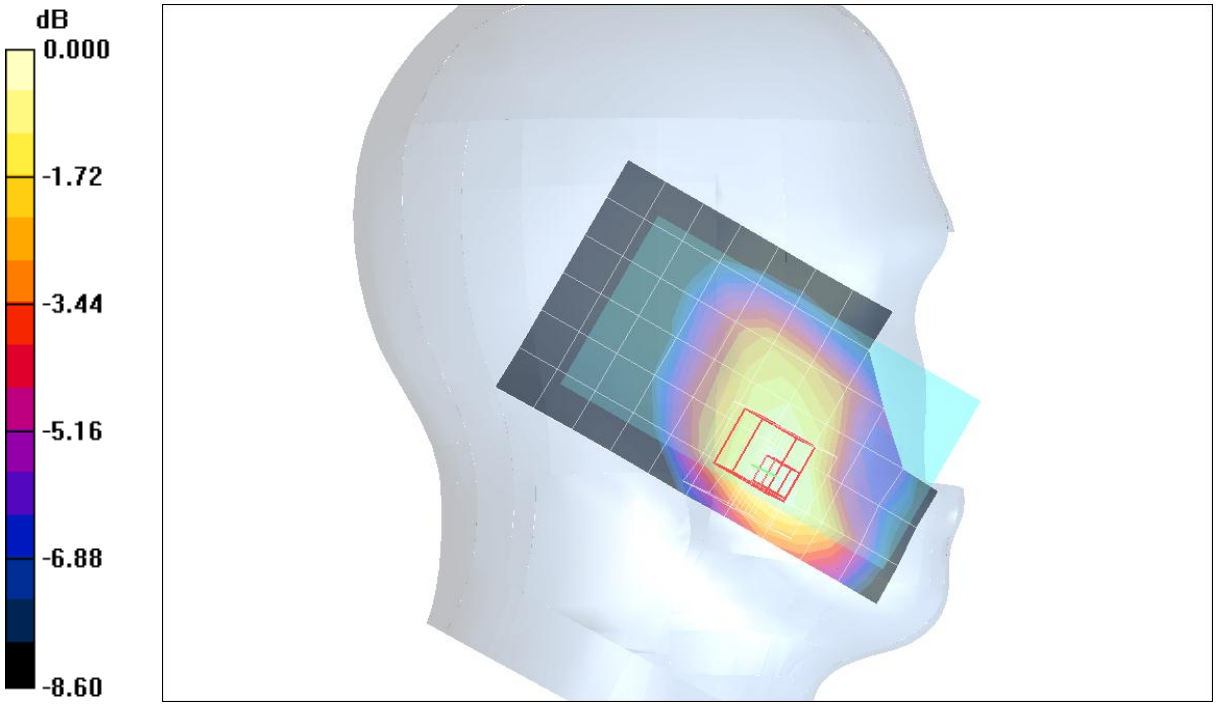
Frequency: 836.6 MHz; Duty Cycle: 1:1; Room Ambient Temperature: 24.0°C; Liquid Temperature: 23.0°C
Medium parameters used (interpolated): f = 836.6 MHz; σ = 0.899 mho/m; ε_r = 42.4; ρ = 1000 kg/m^3 ;
DASY4 Configuration:
- Area Scan setting - Find Secondary Maximum Within: 2.0 dB and with a peak SAR value greater than 0.0012W/kg
- Electronics: DAE3 Sn500; Calibrated: 6/13/2012
- Probe: EX3DV4 - SN3749; ConvF(8.68, 8.68, 8.68); Calibrated: 1/27/2012
- Sensor-Surface: 2.5mm (Mechanical Surface Detection)
- Phantom: SAM B (Twin); Type: SAM B; Serial: TP-105

Left Touch/Rel.99/Ch4183/Area Scan (7x11x1): Measurement grid: dx=15mm, dy=15mm

Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (measured) = 0.119 mW/g

Left Touch/Rel.99/Ch4183/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 12.2 V/m; Power Drift = -0.119 dB
Peak SAR (extrapolated) = 0.149 W/kg
SAR(1 g) = 0.106 mW/g; SAR(10 g) = 0.074 mW/g
Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (measured) = 0.125 mW/g



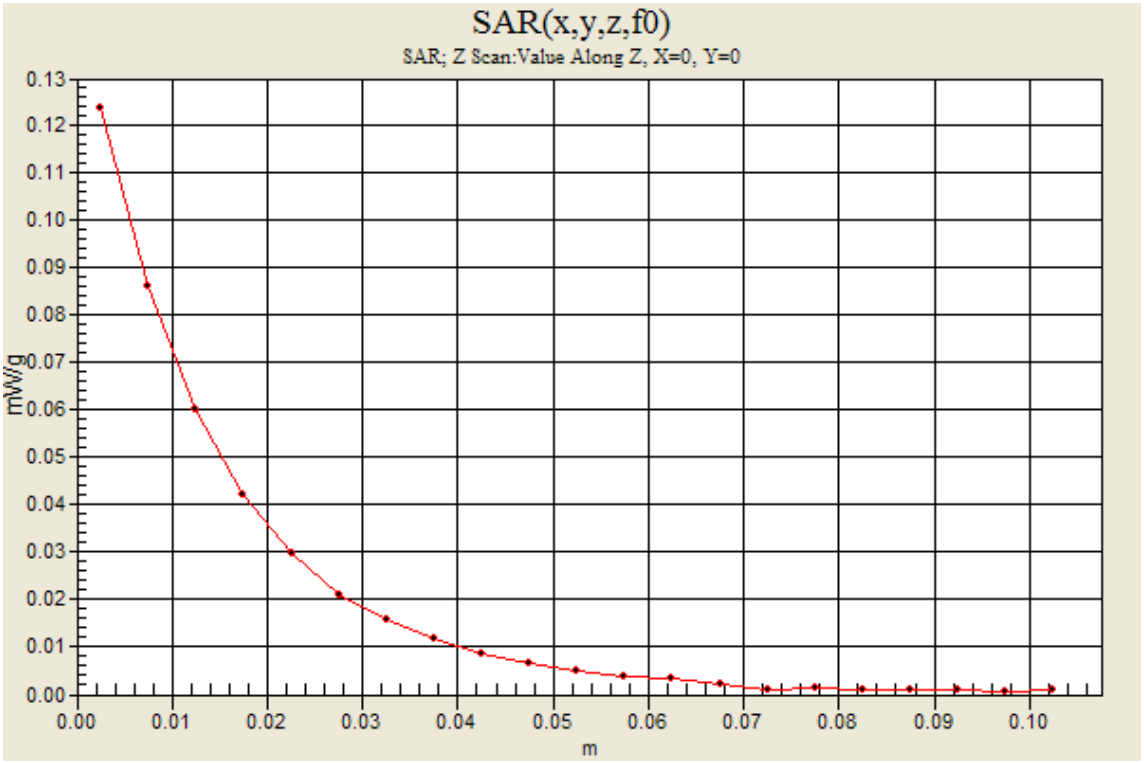
0 dB = 0.125mW/g

Test Laboratory: UL CCS SAR Lab D Date/Time: 8/21/2012

W-CDMA Band V

Frequency: 836.6 MHz; Duty Cycle: 1:1

Left Touch/Rel.99/Ch4183/Z Scan (1x1x21): Measurement grid: dx=20mm, dy=20mm, dz=5mm
Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (measured) = 0.124 mW/g



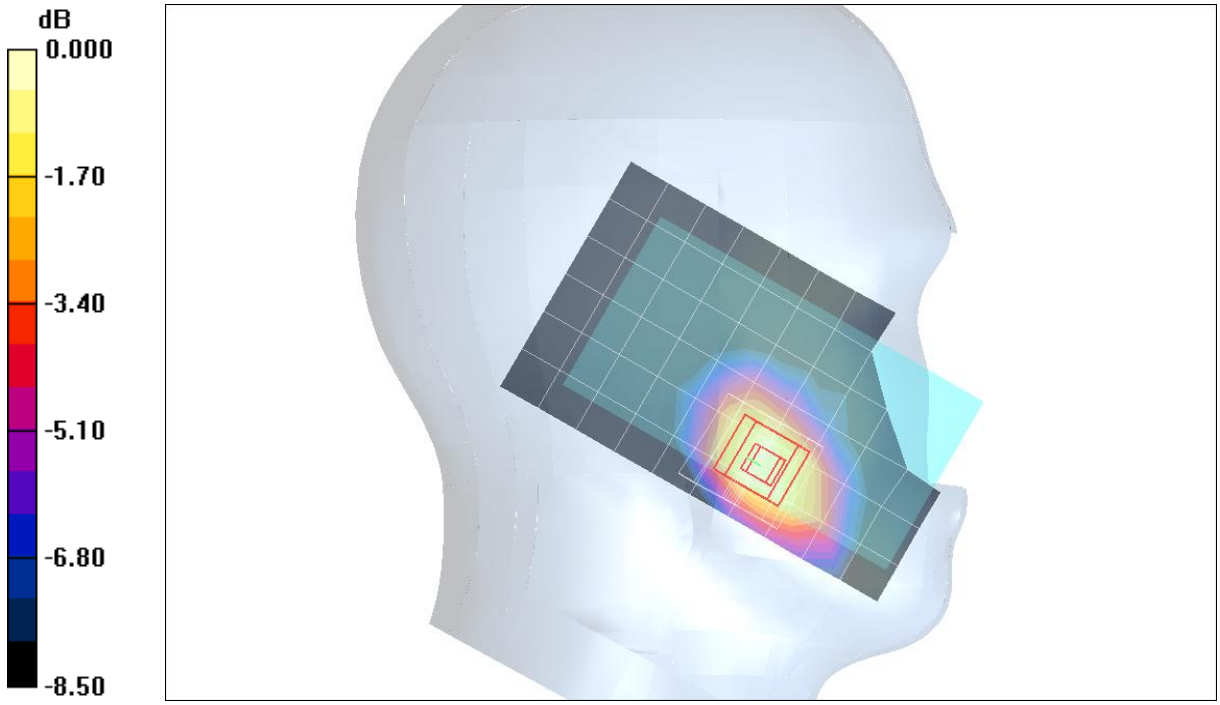
Test Laboratory: UL CCS SAR Lab D Date/Time: 8/20/2012

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; σ = 1.38 mho/m; ε_r = 40; ρ = 1000 kg/m^3 ;
DASY4 Configuration:
- Area Scan setting - Find Secondary Maximum Within: 2.0 dB and with a peak SAR value greater than 0.0012W/kg
- Electronics: DAE3 Sn500; Calibrated: 6/13/2012
- Probe: EX3DV4 - SN3749; ConvF(7.67, 7.67, 7.67); Calibrated: 1/27/2012
- Sensor-Surface: 2.5mm (Mechanical Surface Detection)
- Phantom: SAM B (Twin); Type: SAM B; Serial: TP-105

Left Touch/Rel.99/Ch9400/Area Scan (7x11x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 0.743 mW/g

Left Touch/Rel.99/Ch9400/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 23.5 V/m; Power Drift = -0.174 dB
Peak SAR (extrapolated) = 1.07 W/kg
SAR(1 g) = 0.704 mW/g; SAR(10 g) = 0.429 mW/g
Maximum value of SAR (measured) = 0.862 mW/g



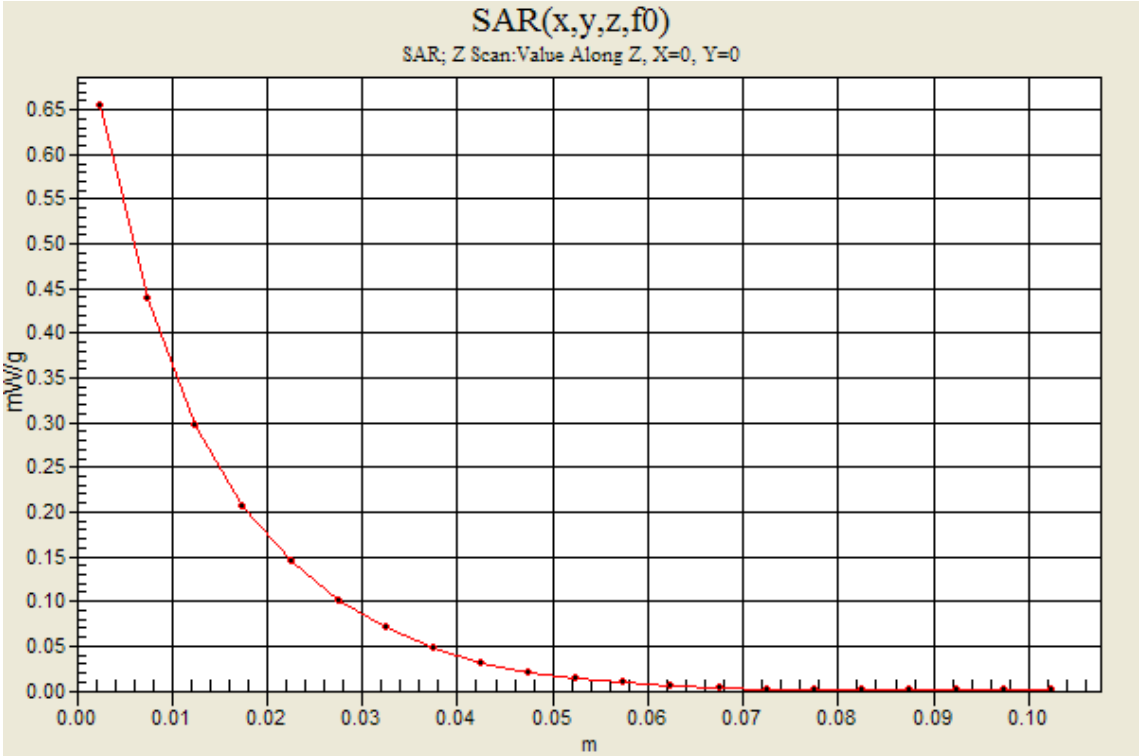
0 dB = 0.862mW/g

Test Laboratory: UL CCS SAR Lab D Date/Time: 8/20/2012

W-CDMA Band II

Frequency: 1880 MHz; Duty Cycle: 1:1

Left Touch/Rel.99/Ch9400/Z Scan (1x1x21): Measurement grid: dx=20mm, dy=20mm, dz=5mm
Maximum value of SAR (measured) = 0.655 mW/g



Test Laboratory: UL CCS SAR Lab D Date/Time: 8/20/2012

W-CDMA Band II

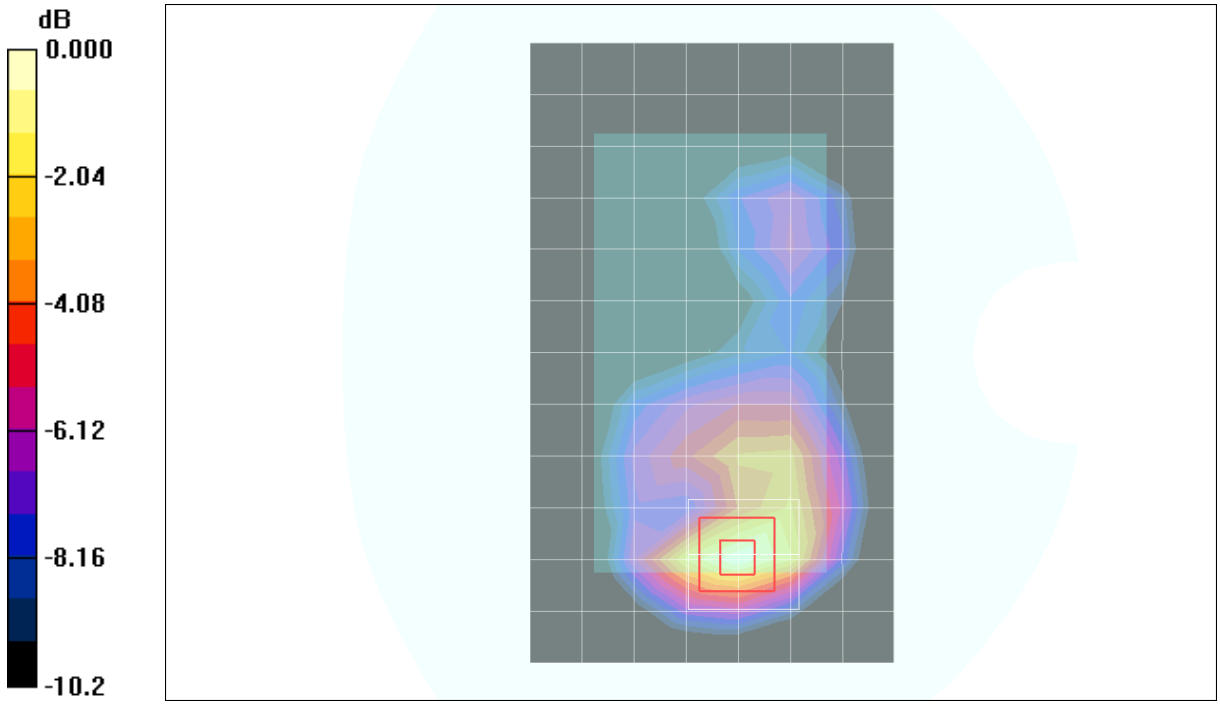
Frequency: 1907.6 MHz; Duty Cycle: 1:1; Room Ambient Temperature: 24.0°C; Liquid Temperature: 23.0°C
Medium parameters used (interpolated): f = 1907.6 MHz; σ = 1.55 mho/m; ε_r = 52.1; ρ = 1000 kg/m^3 ;
DASY4 Configuration:
- Area Scan setting - Find Secondary Maximum Within: 2.0 dB and with a peak SAR value greater than 0.0012W/kg
- Electronics: DAE3 Sn500; Calibrated: 6/13/2012
- Probe: EX3DV4 - SN3749; ConvF(6.97, 6.97, 6.97); Calibrated: 1/27/2012
- Sensor-Surface: 2.5mm (Mechanical Surface Detection (Locations From Previous Scan Used))Sensor-Surface: 2.5mm (Mechanical Surface Detection)
- Phantom: SAM A (Twin); Type: SAM A; Serial: 1050

Rear/Rel.99/Ch9538/Area Scan (8x13x1): Measurement grid: dx=15mm, dy=15mm

Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (measured) = 1.44 mW/g

Rear/Rel.99/Ch9538/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 30.9 V/m; Power Drift = -0.003 dB
Peak SAR (extrapolated) = 1.84 W/kg
SAR(1 g) = 1.08 mW/g; SAR(10 g) = 0.583 mW/g
Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (measured) = 1.43 mW/g



0 dB = 1.43mW/g

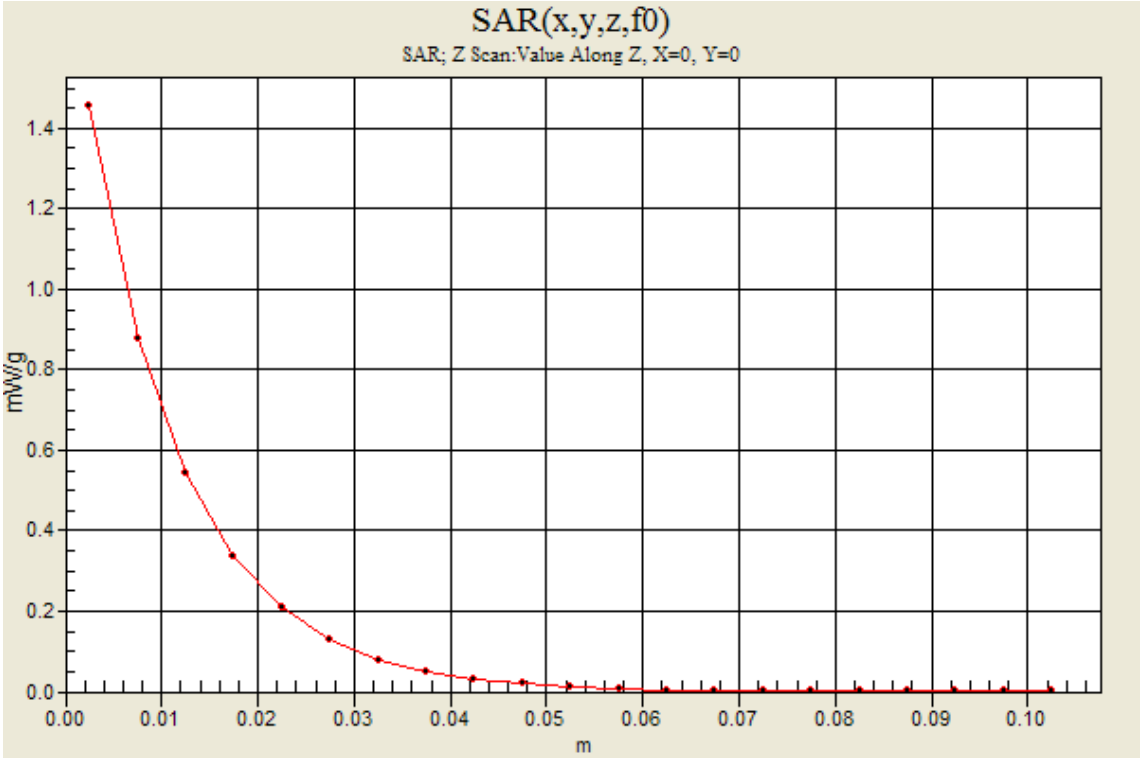
Test Laboratory: UL CCS SAR Lab D
Date/Time: 8/20/2012

W-CDMA Band II

Frequency: 1907.6 MHz; Duty Cycle: 1:1

Rear/Rel.99/Ch9538/Z Scan (1x1x21): Measurement grid: dx=20mm, dy=20mm, dz=5mm

Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (measured) = 1.46 mW/g



Test Laboratory: UL CCS SAR Lab D Date/Time: 8/22/2012

W-CDMA Band IV

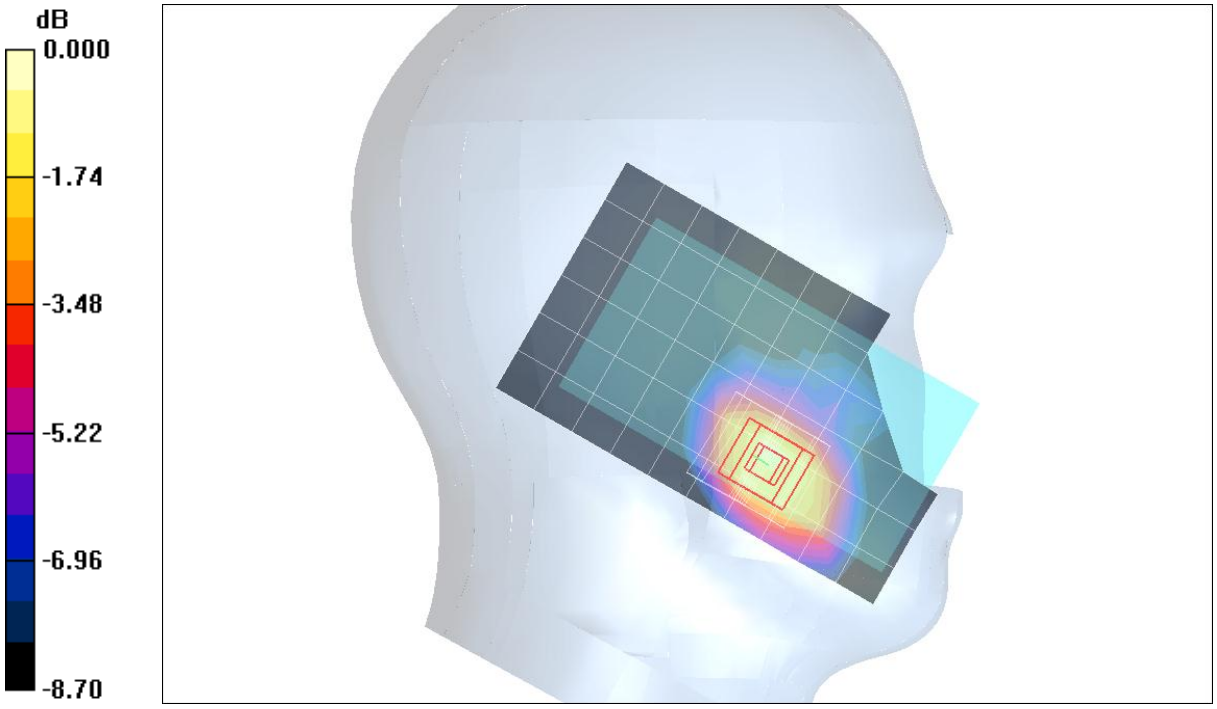
Frequency: 1732.4 MHz; Duty Cycle: 1:1; Room Ambient Temperature: 24.0°C; Liquid Temperature: 23.0°C
Medium parameters used (interpolated): f = 1732.4 MHz; σ = 1.36 mho/m; ε_r = 39.1; ρ = 1000 kg/m^3 ;
DASY4 Configuration:
- Area Scan setting - Find Secondary Maximum Within: 2.0 dB and with a peak SAR value greater than 0.0012W/kg
- Electronics: DAE3 Sn500; Calibrated: 6/13/2012
- Probe: EX3DV4 - SN3749; ConvF(7.99, 7.99, 7.99); Calibrated: 1/27/2012
- Sensor-Surface: 2.5mm (Mechanical Surface Detection)
- Phantom: SAM B (Twin); Type: SAM B; Serial: TP-105

Left Touch/Rel.99/Ch1412/Area Scan (7x11x1): Measurement grid: dx=15mm, dy=15mm

Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (measured) = 0.525 mW/g

Left Touch/Rel.99/Ch1412/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 20.1 V/m; Power Drift = 0.031 dB
Peak SAR (extrapolated) = 0.782 W/kg
SAR(1 g) = 0.521 mW/g; SAR(10 g) = 0.320 mW/g
Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (measured) = 0.644 mW/g



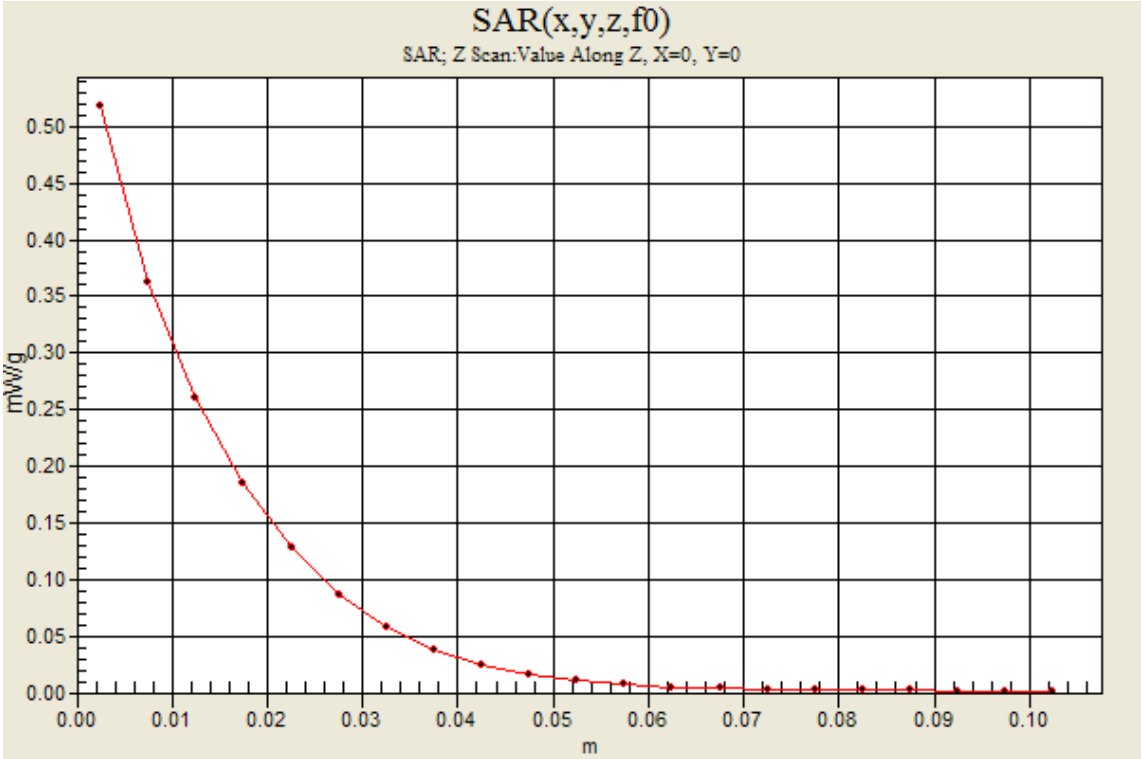
0 dB = 0.644mW/g

Test Laboratory: UL CCS SAR Lab D
Date/Time: 8/22/2012

W-CDMA Band IV

Frequency: 1732.4 MHz; Duty Cycle: 1:1

Left Touch/Rel.99/Ch1412/Z Scan (1x1x21): Measurement grid: dx=20mm, dy=20mm, dz=5mm
Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (measured) = 0.518 mW/g



Test Laboratory: UL CCS SAR Lab D Date/Time: 8/22/2012

W-CDMA Band IV

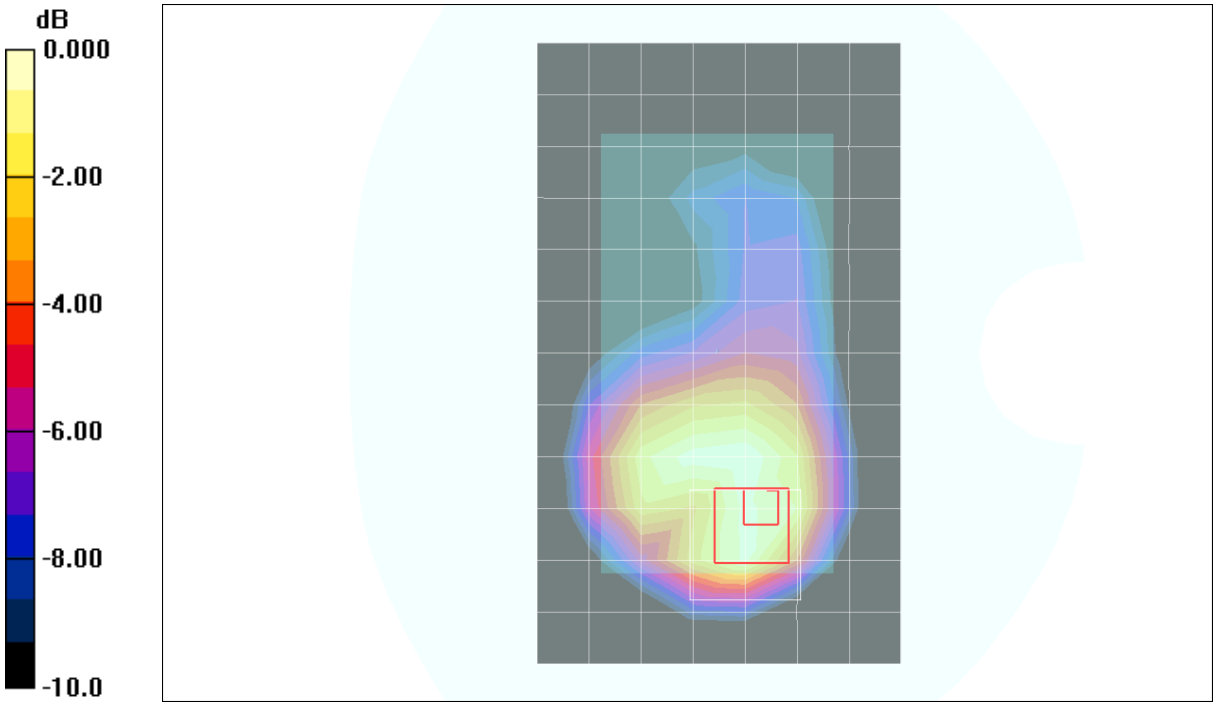
Frequency: 1732.4 MHz; Duty Cycle: 1:1; Room Ambient Temperature: 24.0°C; Liquid Temperature: 23.0°C
Medium parameters used (interpolated): f = 1732.4 MHz; σ = 1.49 mho/m; ε_r = 54.3; ρ = 1000 kg/m^3 ;
DASY4 Configuration:
- Area Scan setting - Find Secondary Maximum Within: 2.0 dB and with a peak SAR value greater than 0.0012W/kg
- Electronics: DAE3 Sn500; Calibrated: 6/13/2012
- Probe: EX3DV4 - SN3749; ConvF(7.23, 7.23, 7.23); Calibrated: 1/27/2012
- Sensor-Surface: 2.5mm (Mechanical Surface Detection)
- Phantom: SAM A (Twin); Type: SAM A; Serial: 1050

Rear/Rel.99/Ch1412/Area Scan (8x13x1): Measurement grid: dx=15mm, dy=15mm

Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (measured) = 0.858 mW/g

Rear/Rel.99/Ch1412/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 24.2 V/m; Power Drift = -0.005 dB
Peak SAR (extrapolated) = 1.12 W/kg
SAR(1 g) = 0.677 mW/g; SAR(10 g) = 0.412 mW/g
Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (measured) = 0.849 mW/g



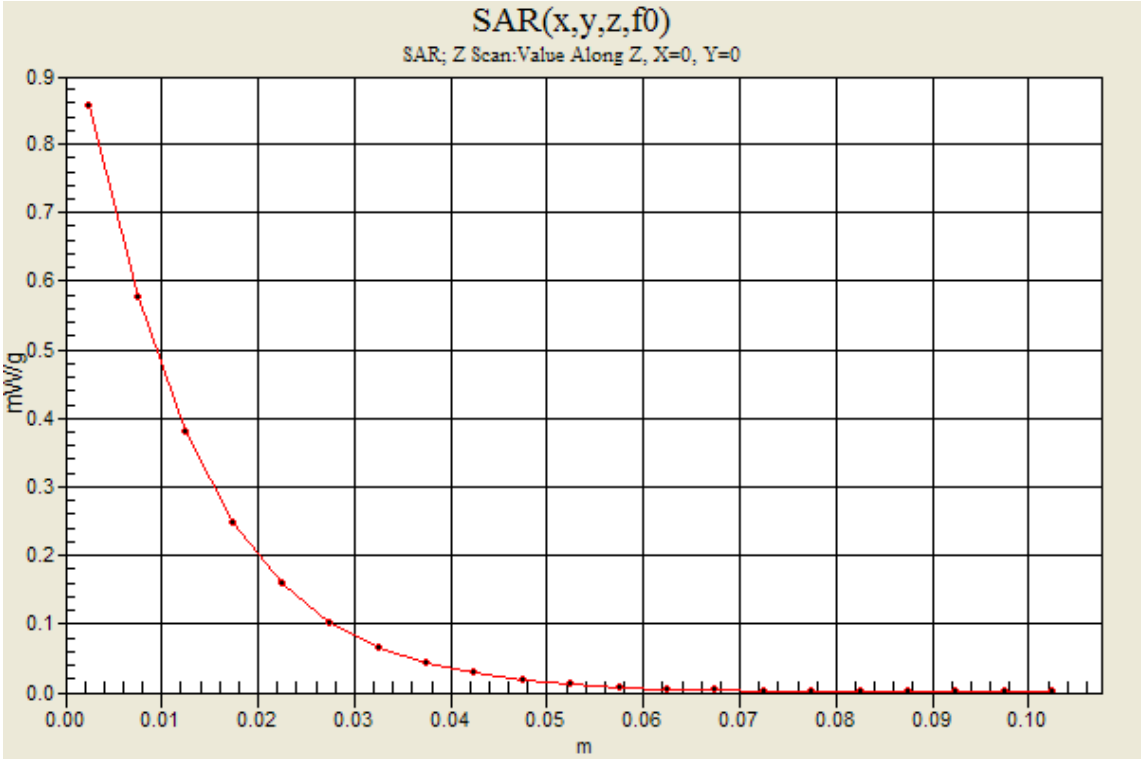
0 dB = 0.849mW/g

Test Laboratory: UL CCS SAR Lab D
Date/Time: 8/22/2012

W-CDMA Band IV

Frequency: 1732.4 MHz; Duty Cycle: 1:1

Rear/Rel.99/Ch1412/Z Scan (1x1x21): Measurement grid: dx=20mm, dy=20mm, dz=5mm
Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (measured) = 0.856 mW/g



Test Laboratory: UL CCS SAR Lab D Date/Time: 9/7/2012

WiFi 2.4GHz Band

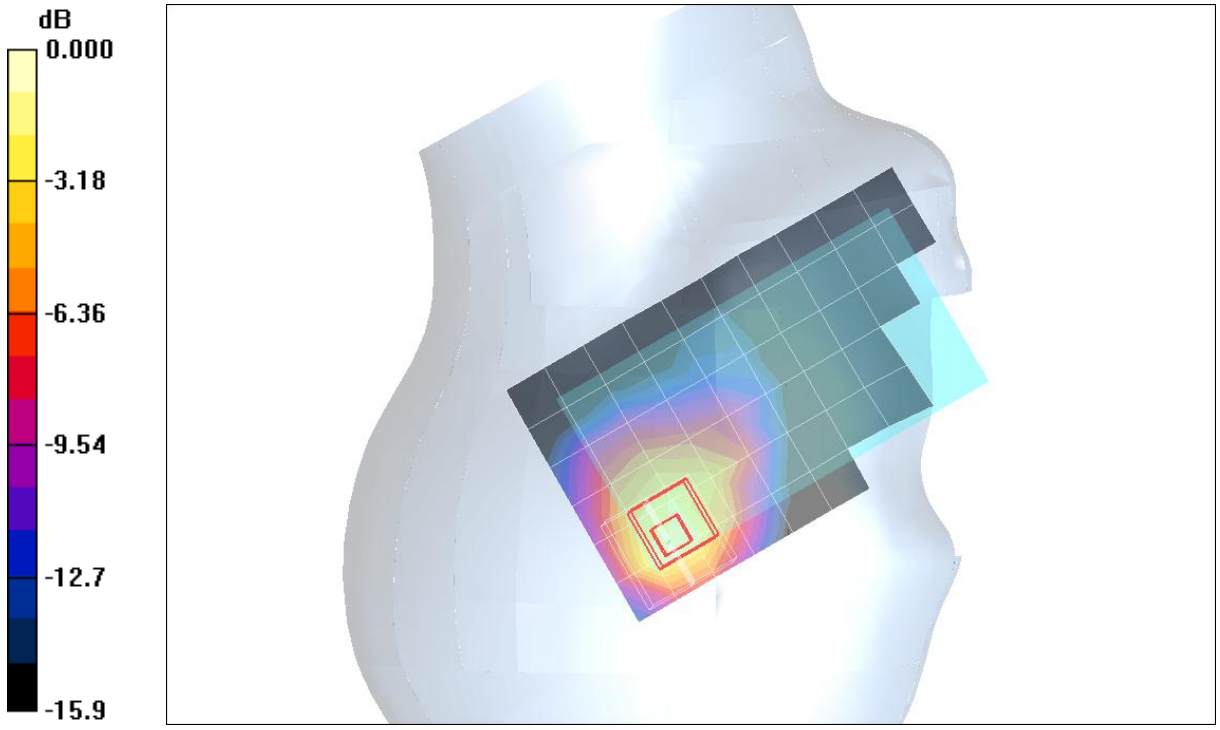
Frequency: 2462 MHz; Duty Cycle: 1:1; Room Ambient Temperature: 24.0°C; Liquid Temperature: 23.0°C
Medium parameters used (interpolated): f = 2462 MHz; σ = 1.88 mho/m; ε_r = 38; ρ = 1000 kg/m^3 ;
DASY4 Configuration:
- Area Scan setting - Find Secondary Maximum Within: 2.0 dB and with a peak SAR value greater than 0.0012W/kg
- Electronics: DAE3 Sn500; Calibrated: 6/13/2012
- Probe: EX3DV4 - SN3749; ConvF(6.76, 6.76, 6.76); Calibrated: 1/27/2012
- Sensor-Surface: 2.5mm (Mechanical Surface Detection)
- Phantom: SAM B (Twin); Type: SAM B; Serial: TP-105

Right Touch/802.11b/Ch11/Area Scan (7x11x1): Measurement grid: dx=15mm, dy=15mm

Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (measured) = 0.691 mW/g

Right Touch/802.11b/Ch11/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 19.3 V/m; Power Drift = 0.076 dB
Peak SAR (extrapolated) = 1.39 W/kg
SAR(1 g) = 0.672 mW/g; SAR(10 g) = 0.327 mW/g
Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (measured) = 0.921 mW/g



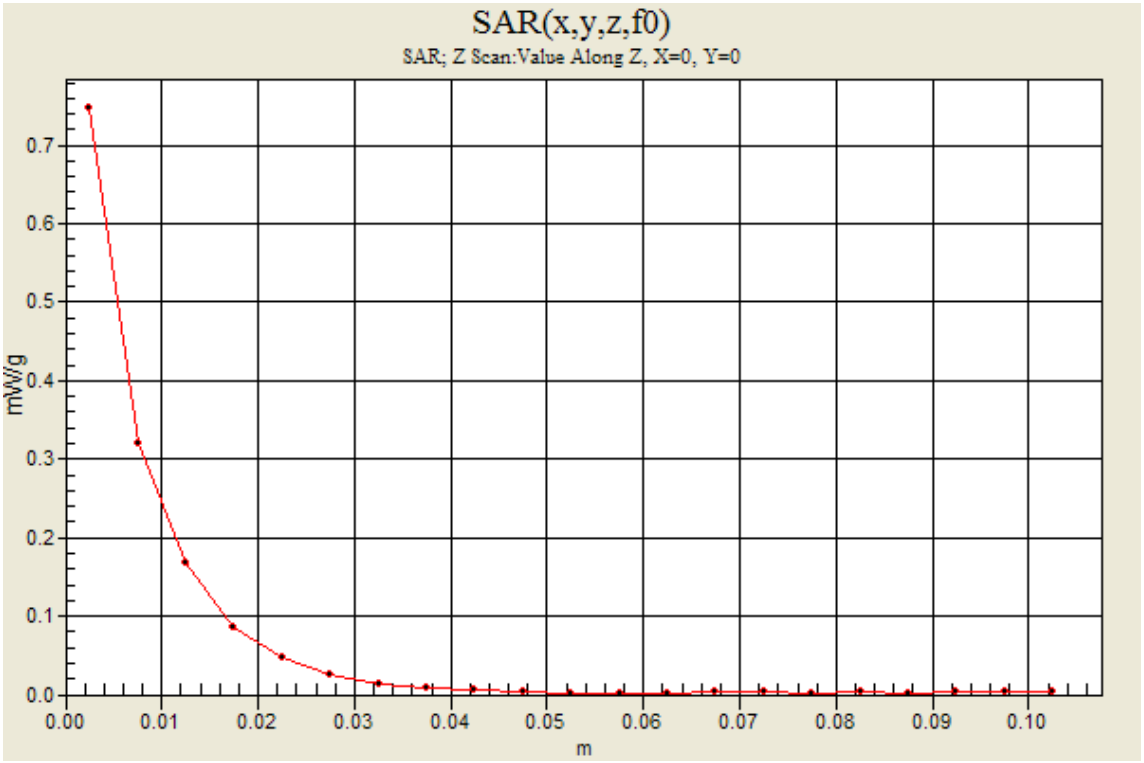
0 dB = 0.921mW/g

Test Laboratory: UL CCS SAR Lab D Date/Time: 9/7/2012

WiFi 2.4GHz Band

Frequency: 2462 MHz; Duty Cycle: 1:1

Right Touch/802.11b/Ch11/Z Scan (1x1x21): Measurement grid: dx=20mm, dy=20mm, dz=5mm
Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (measured) = 0.748 mW/g



Test Laboratory: UL CCS SAR Lab D Date/Time: 9/7/2012

WiFi 2.4GHz Band

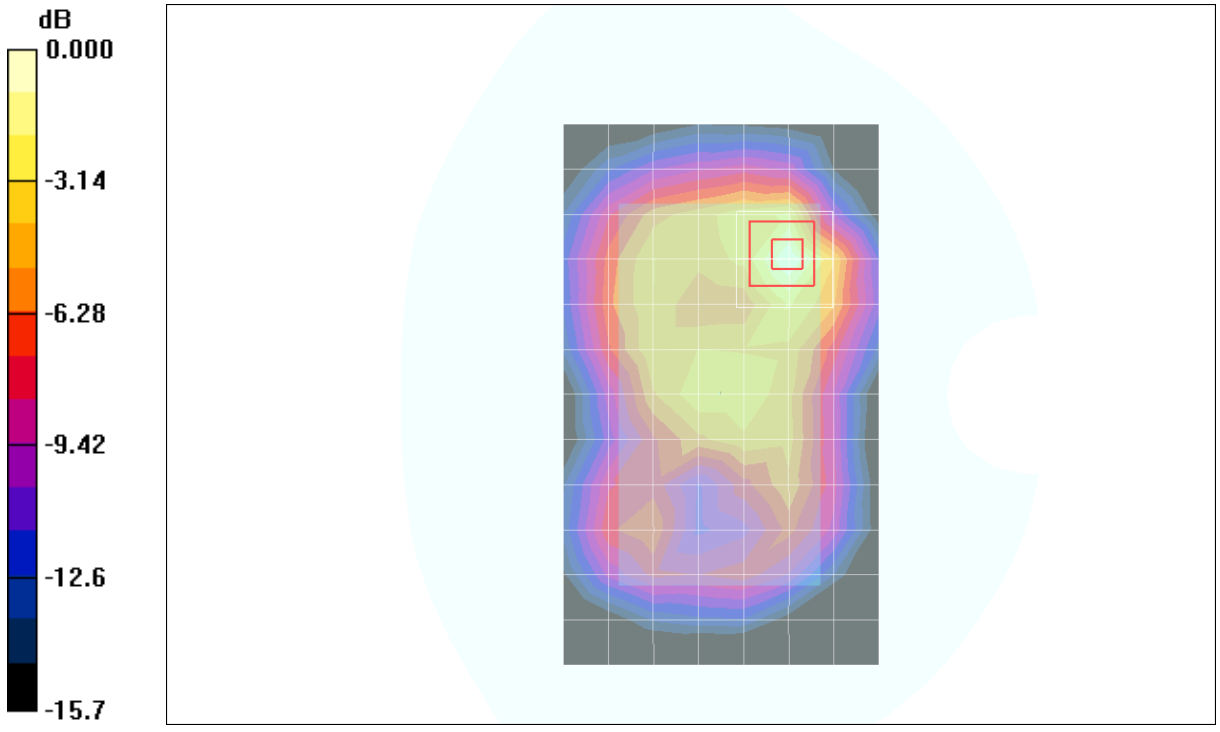
Frequency: 2462 MHz; Duty Cycle: 1:1; Room Ambient Temperature: 24.0°C; Liquid Temperature: 23.0°C
Medium parameters used (interpolated): f = 2462 MHz; σ = 1.94 mho/m; ε_r = 51.2; ρ = 1000 kg/m^3 ;
DASY4 Configuration:
- Area Scan setting - Find Secondary Maximum Within: 2.0 dB and with a peak SAR value greater than 0.0012W/kg
- Electronics: DAE3 Sn500; Calibrated: 6/13/2012
- Probe: EX3DV4 - SN3749; ConvF(6.66, 6.66, 6.66); Calibrated: 1/27/2012
- Sensor-Surface: 2.5mm (Mechanical Surface Detection)
- Phantom: SAM A (Twin); Type: SAM A; Serial: 1050

Rear/802.11b/Ch11/Area Scan (8x13x1): Measurement grid: dx=15mm, dy=15mm

Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (measured) = 0.342 mW/g

Rear/802.11b/Ch11/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 13.3 V/m; Power Drift = -0.160 dB
Peak SAR (extrapolated) = 0.497 W/kg
SAR(1 g) = 0.237 mW/g; SAR(10 g) = 0.115 mW/g
Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (measured) = 0.329 mW/g



0 dB = 0.329mW/g

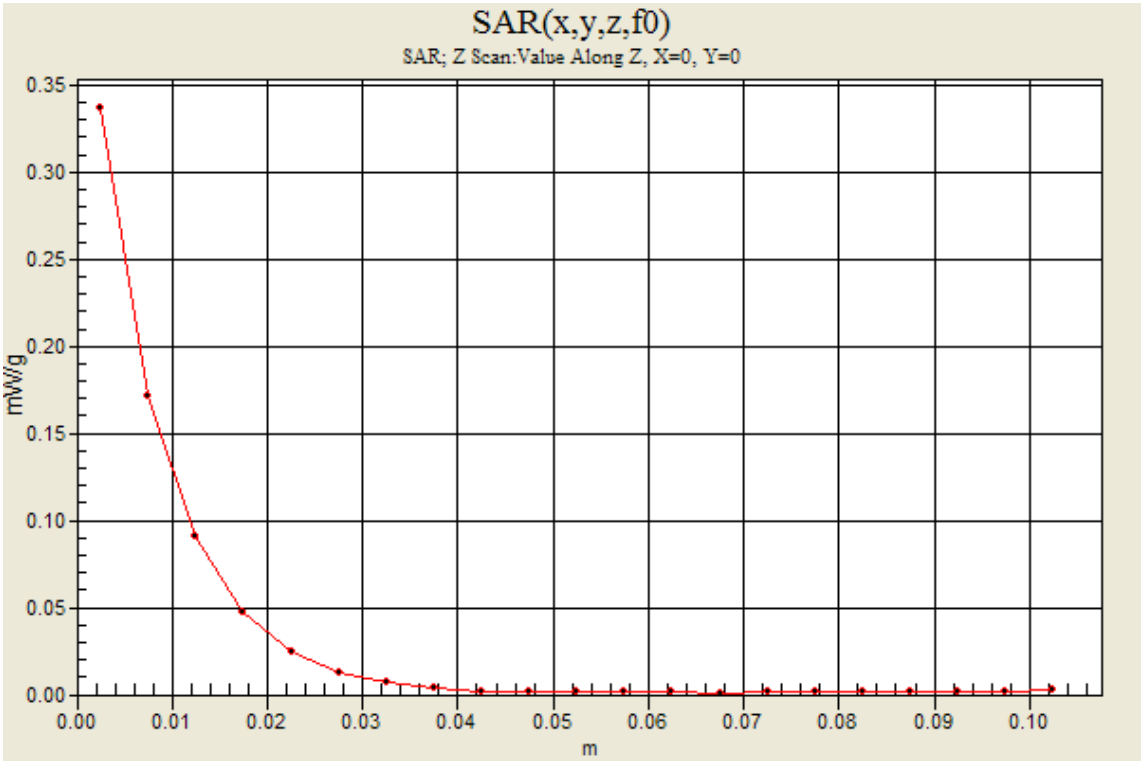
Test Laboratory: UL CCS SAR Lab D Date/Time: 9/7/2012

WiFi 2.4GHz Band

Frequency: 2462 MHz; Duty Cycle: 1:1

Rear/802.11b/Ch11/Z Scan (1x1x21): Measurement grid: dx=20mm, dy=20mm, dz=5mm

Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (measured) = 0.337 mW/g



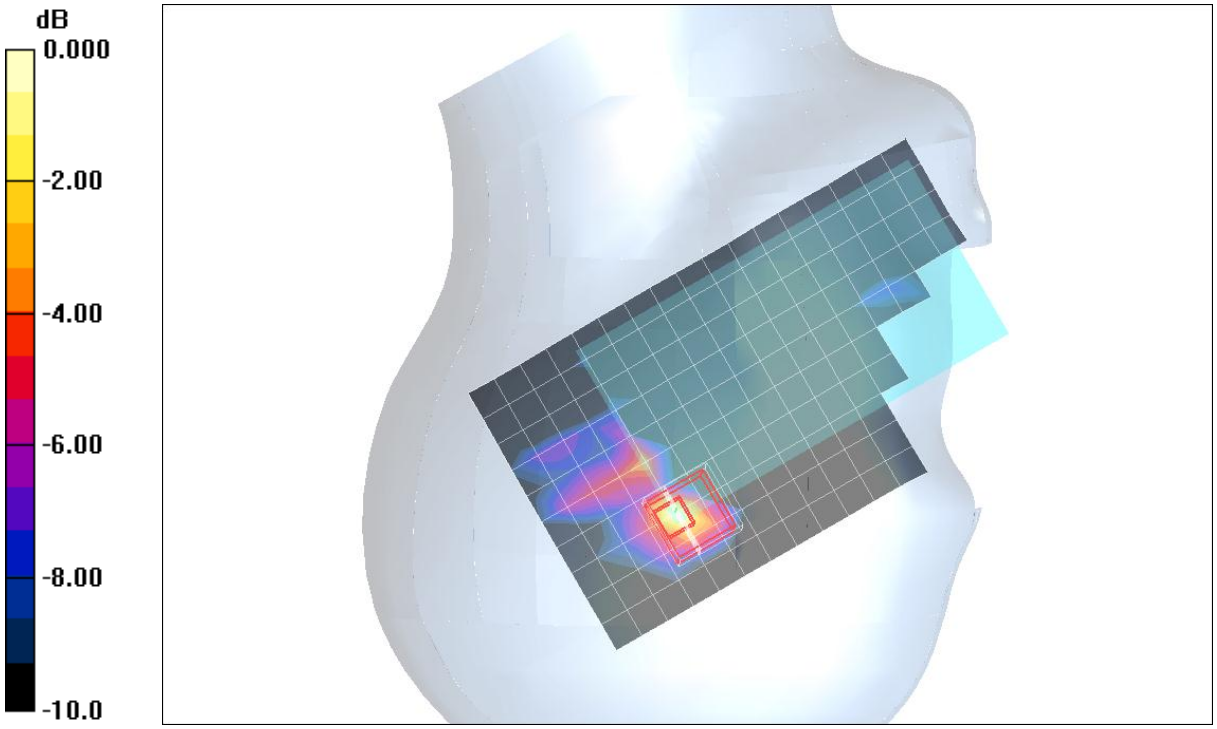
Test Laboratory: UL CCS SAR Lab D Date/Time: 9/8/2012

WiFi 5.2GHz Band

Frequency: 5240 MHz; Duty Cycle: 1:1; Room Ambient Temperature: 25.0°C; Liquid Temperature: 24.0°C
Medium parameters used: f = 5240 MHz; σ = 4.72 mho/m; ε_r = 35; ρ = 1000 kg/m^3 ;
DASY4 Configuration:
- Area Scan setting - Find Secondary Maximum Within: 2.0 dB and with a peak SAR value greater than 0.0012W/kg
- Electronics: DAE3 Sn500; Calibrated: 6/13/2012
- Probe: EX3DV4 - SN3749; ConvF(4.68, 4.68, 4.68); Calibrated: 1/27/2012
- Sensor-Surface: 2.5mm (Mechanical Surface Detection (Locations From Previous Scan Used))Sensor-Surface: 2.5mm (Mechanical Surface Detection)
- Phantom: SAM B (Twin); Type: SAM B; Serial: TP-105

Right Touch/802.11a/Ch48/Area Scan (11x18x1): Measurement grid: dx=10mm, dy=10mm
Maximum value of SAR (measured) = 0.109 mW/g

Right Touch/802.11a/Ch48/Zoom Scan (7x7x9)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=2.5mm
Reference Value = 4.77 V/m; Power Drift = 0.162 dB
Peak SAR (extrapolated) = 0.300 W/kg
SAR(1 g) = 0.046 mW/g; SAR(10 g) = 0.013 mW/g
Maximum value of SAR (measured) = 0.097 mW/g



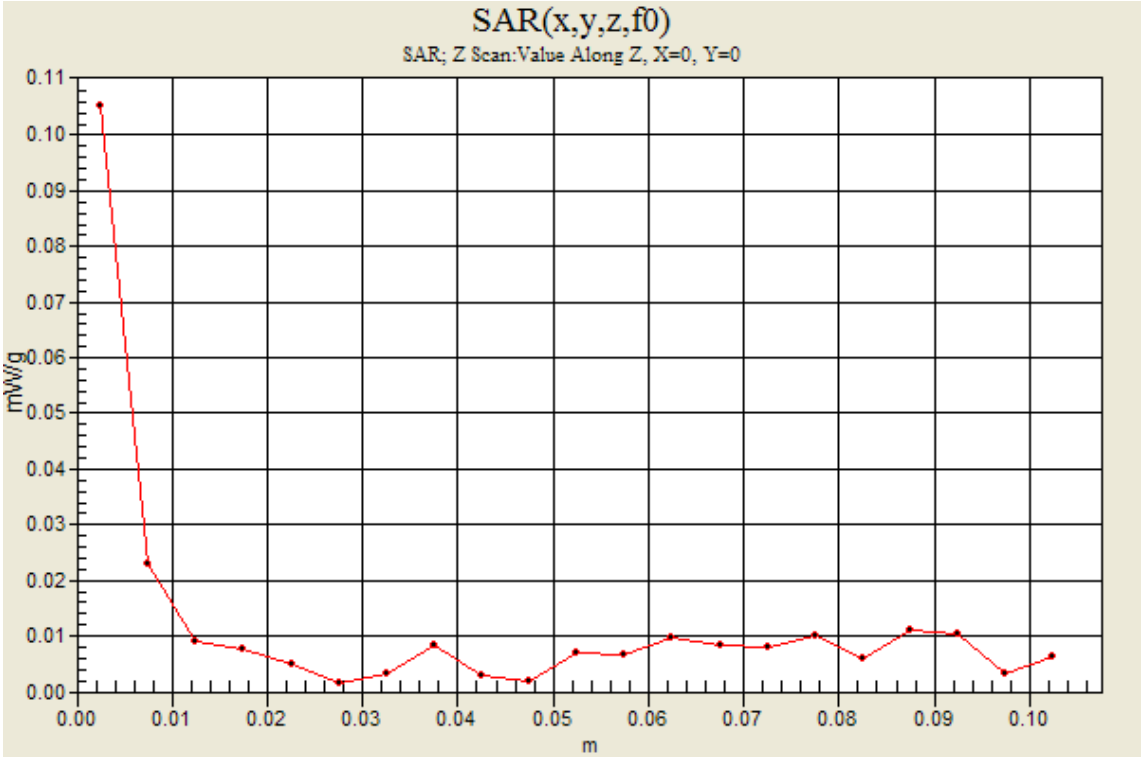
0 dB = 0.097mW/g

Test Laboratory: UL CCS SAR Lab D Date/Time: 9/8/2012

WiFi 5.2GHz Band

Frequency: 5240 MHz; Duty Cycle: 1:1

Right Touch/802.11a/Ch48/Z Scan (1x1x21): Measurement grid: dx=20mm, dy=20mm, dz=5mm
Maximum value of SAR (measured) = 0.105 mW/g



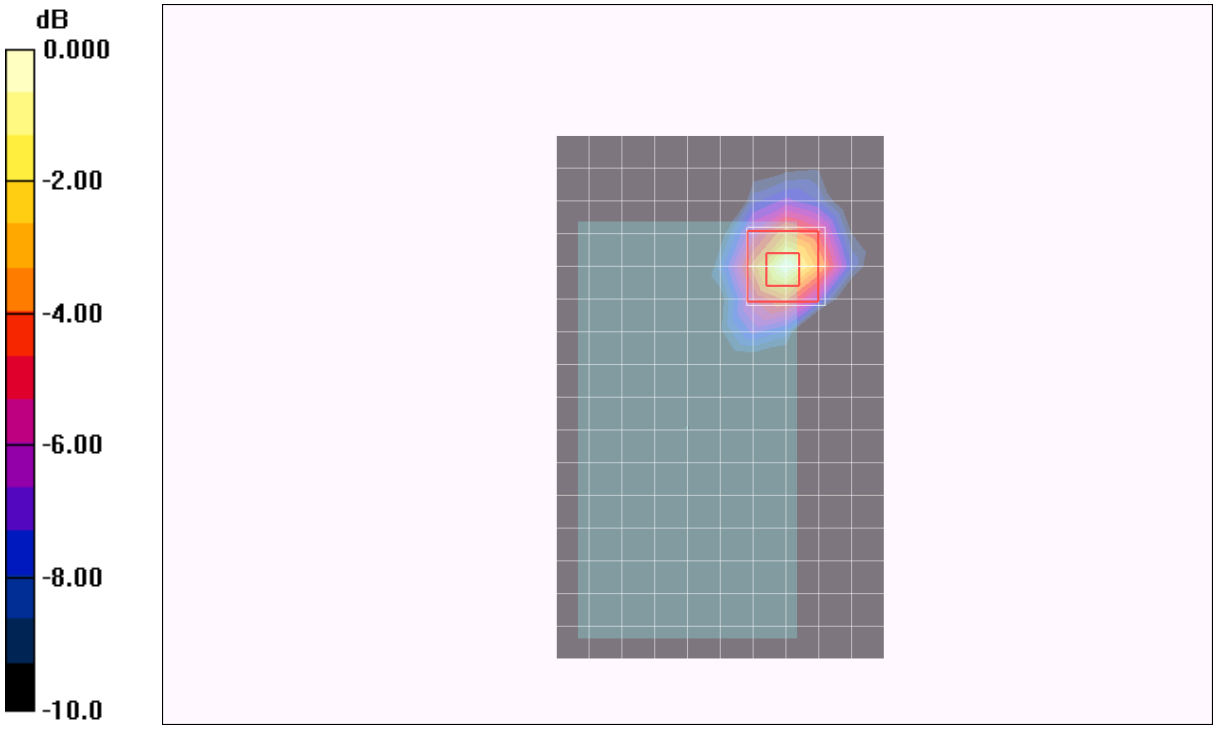
Test Laboratory: UL CCS SAR Lab D Date/Time: 9/9/2012

WiFi 5.2GHz Band

Frequency: 5240 MHz; Duty Cycle: 1:1; Room Ambient Temperature: 25.0°C; Liquid Temperature: 24.0°C
Medium parameters used: f = 5240 MHz; σ = 5.37 mho/m; ε_r = 48.2; ρ = 1000 kg/m^3 ;
DASY4 Configuration:
- Area Scan setting - Find Secondary Maximum Within: 2.0 dB and with a peak SAR value greater than 0.0012W/kg
- Electronics: DAE3 Sn500; Calibrated: 6/13/2012
- Probe: EX3DV4 - SN3749; ConvF(4.23, 4.23, 4.23); Calibrated: 1/27/2012
- Sensor-Surface: 2.5mm (Mechanical Surface Detection (Locations From Previous Scan Used))Sensor-Surface: 2.5mm (Mechanical Surface Detection)
- Phantom: Flat Phantom ELI4.0; Type: QDOVA001BB; Serial: SN:1017

Rear with Headset/802.11a/Ch48/Area Scan (11x17x1): Measurement grid: dx=10mm, dy=10mm
Maximum value of SAR (measured) = 0.178 mW/g

Rear with Headset/802.11a/Ch48/Zoom Scan (7x7x9)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=2.5mm
Reference Value = 6.19 V/m; Power Drift = -0.129 dB
Peak SAR (extrapolated) = 0.335 W/kg
SAR(1 g) = 0.098 mW/g; SAR(10 g) = 0.030 mW/g
Maximum value of SAR (measured) = 0.173 mW/g

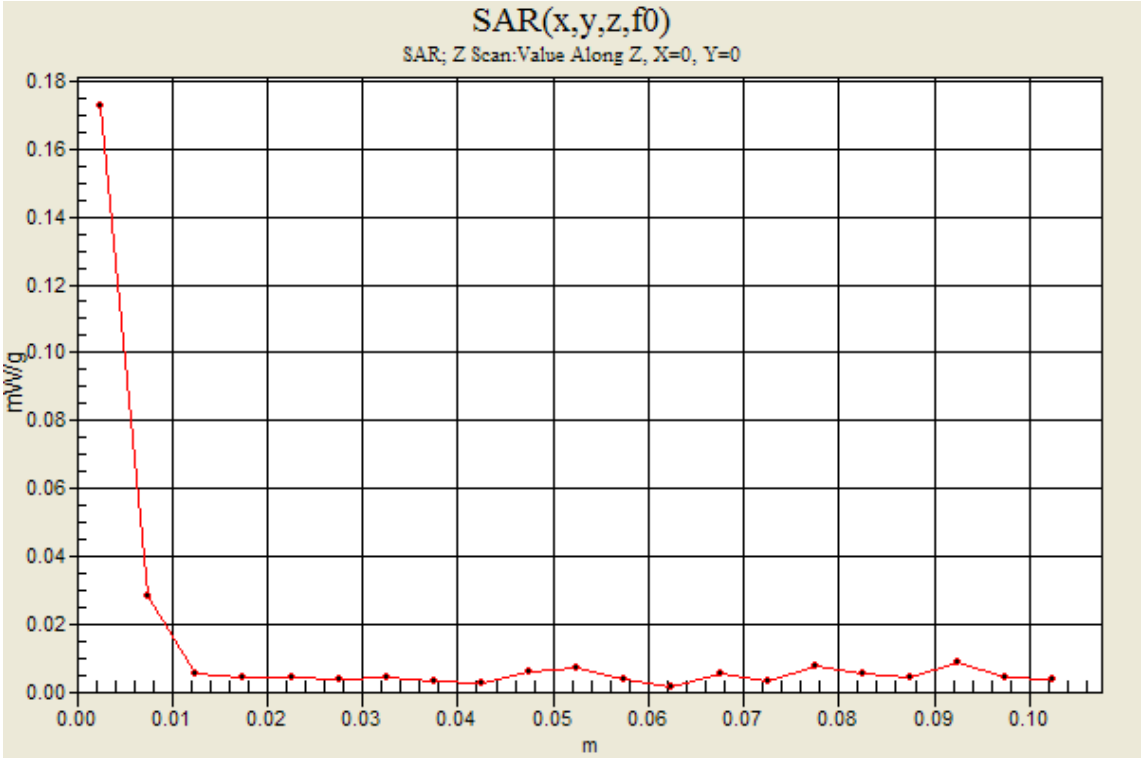


Test Laboratory: UL CCS SAR Lab D Date/Time: 9/9/2012

WiFi 5.2GHz Band

Frequency: 5240 MHz; Duty Cycle: 1:1

Rear with Headset/802.11a/Ch48/Z Scan (1x1x21): Measurement grid: dx=20mm, dy=20mm, dz=5mm
Maximum value of SAR (measured) = 0.173 mW/g



Test Laboratory: UL CCS SAR Lab D Date/Time: 9/8/2012

WiFi 5.3GHz Band

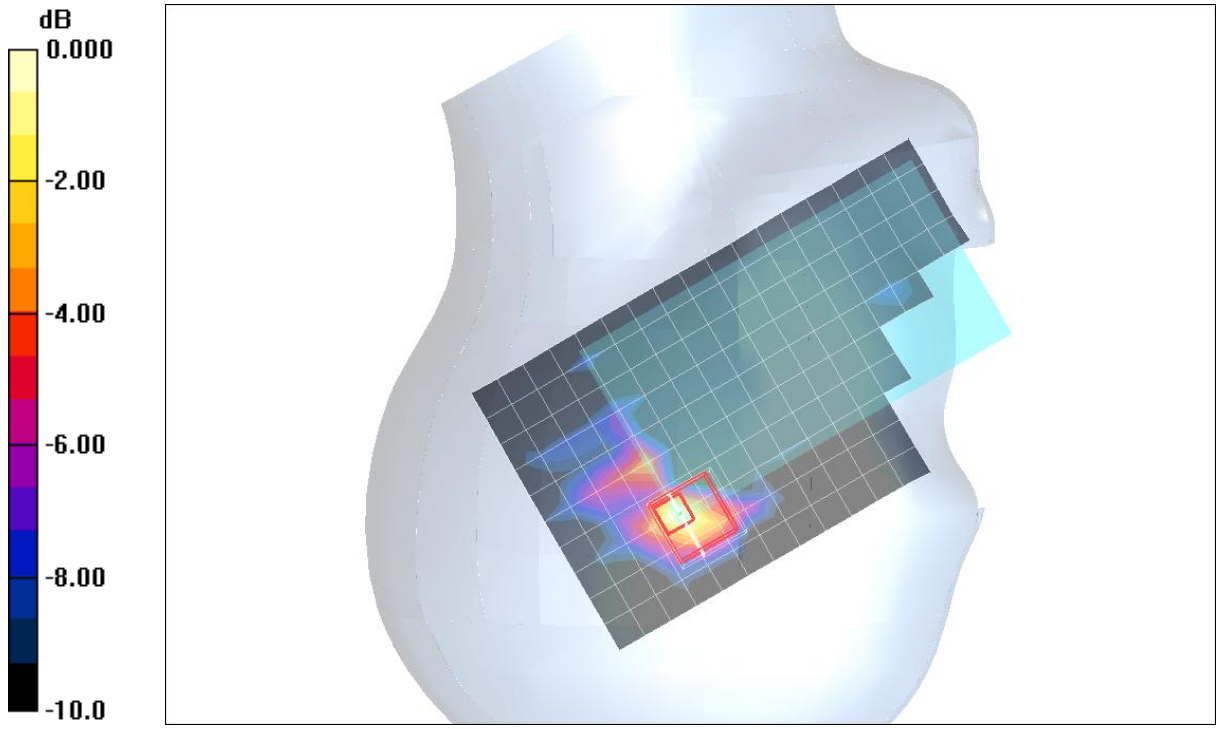
Frequency: 5320 MHz; Duty Cycle: 1:1; Room Ambient Temperature: 25.0°C; Liquid Temperature: 24.0°C
Medium parameters used: f = 5320 MHz; σ = 4.78 mho/m; ε_r = 35; ρ = 1000 kg/m^3 ;
DASY4 Configuration:
- Area Scan setting - Find Secondary Maximum Within: 2.0 dB and with a peak SAR value greater than 0.0012W/kg
- Electronics: DAE3 Sn500; Calibrated: 6/13/2012
- Probe: EX3DV4 - SN3749; ConvF(4.41, 4.41, 4.41); Calibrated: 1/27/2012
- Sensor-Surface: 2.5mm (Mechanical Surface Detection (Locations From Previous Scan Used))Sensor-Surface: 2.5mm (Mechanical Surface Detection)
- Phantom: SAM B (Twin); Type: SAM B; Serial: TP-105

Right Touch/802.11a/Ch64/Area Scan (11x18x1): Measurement grid: dx=10mm, dy=10mm

Maximum value of SAR (measured) = 0.159 mW/g

Right Touch/802.11a/Ch64/Zoom Scan (7x7x9)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=2.5mm

Reference Value = 5.69 V/m; Power Drift = 0.144 dB
Peak SAR (extrapolated) = 0.343 W/kg
SAR(1 g) = 0.057 mW/g; SAR(10 g) = 0.016 mW/g
Maximum value of SAR (measured) = 0.124 mW/g



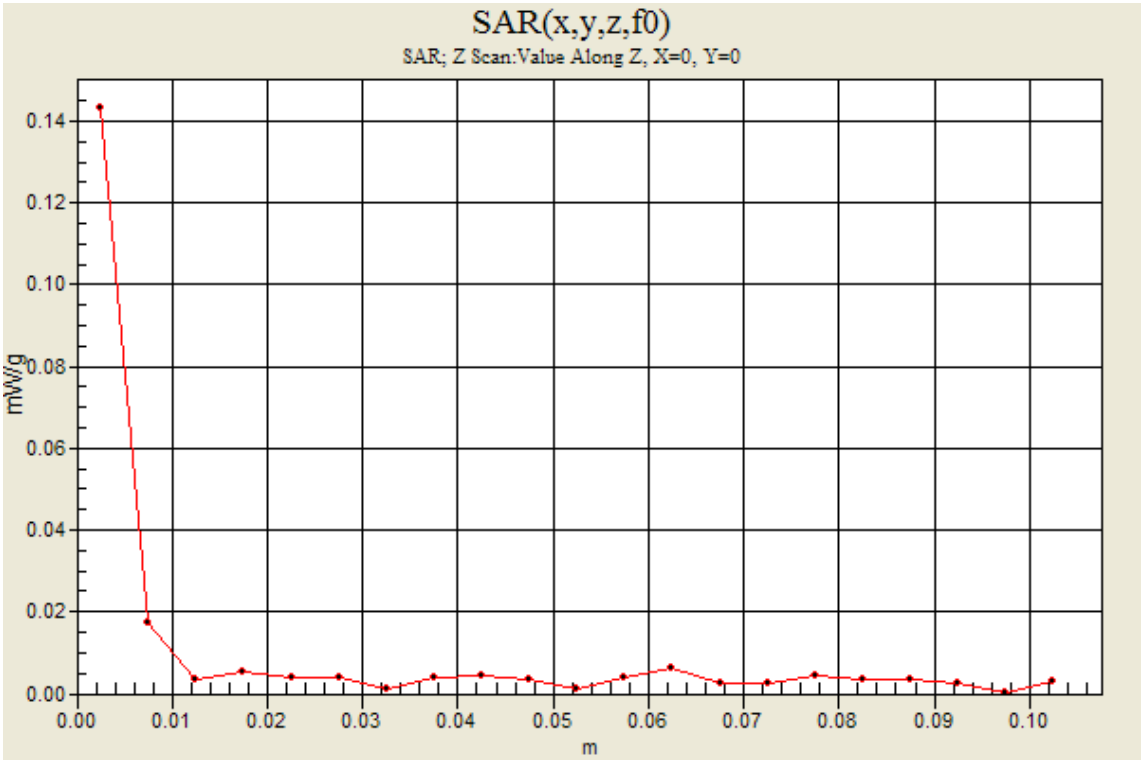
0 dB = 0.124mW/g

Test Laboratory: UL CCS SAR Lab D Date/Time: 9/8/2012

WiFi 5.3GHz Band

Frequency: 5320 MHz; Duty Cycle: 1:1

Right Touch/802.11a/Ch64/Z Scan (1x1x21): Measurement grid: dx=20mm, dy=20mm, dz=5mm
Maximum value of SAR (measured) = 0.143 mW/g



Test Laboratory: UL CCS SAR Lab D Date/Time: 9/9/2012

WiFi 5.3GHz Band

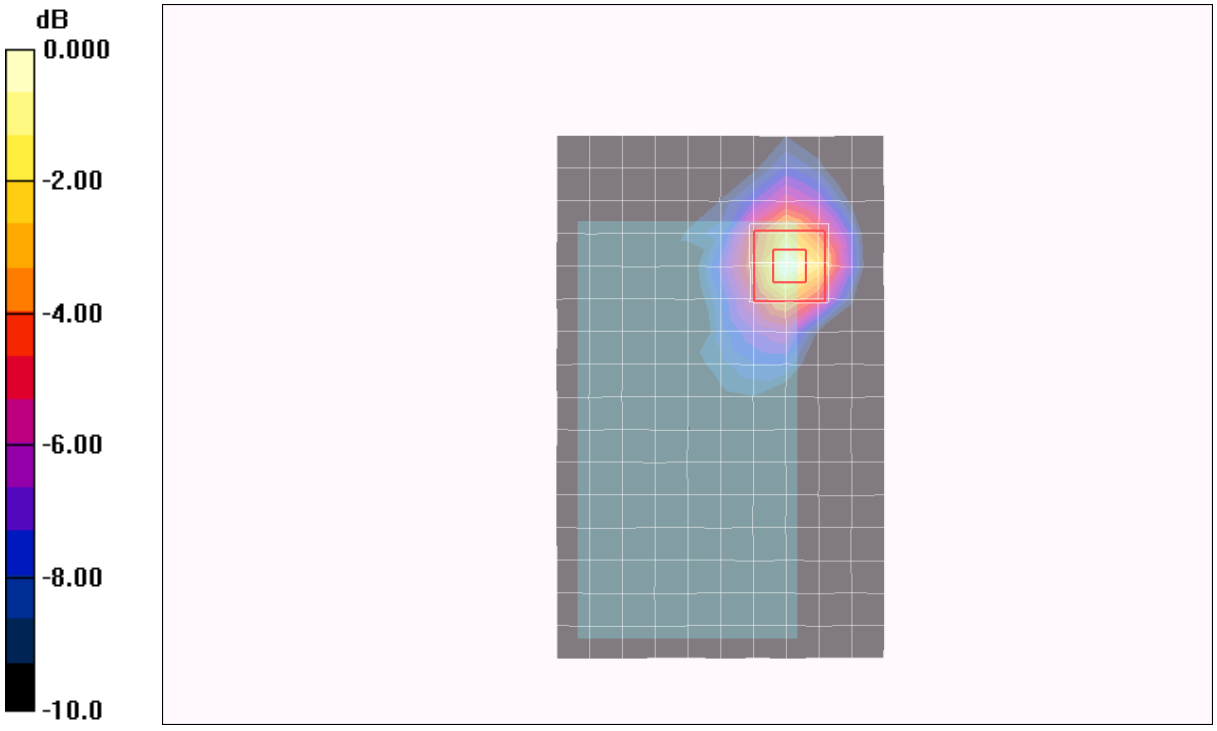
Frequency: 5320 MHz; Duty Cycle: 1:1; Room Ambient Temperature: 25.0°C; Liquid Temperature: 24.0°C
Medium parameters used: f = 5320 MHz; σ = 5.46 mho/m; ε_r = 48.1; ρ = 1000 kg/m^3 ;
DASY4 Configuration:
- Area Scan setting - Find Secondary Maximum Within: 2.0 dB and with a peak SAR value greater than 0.0012W/kg
- Electronics: DAE3 Sn500; Calibrated: 6/13/2012
- Probe: EX3DV4 - SN3749; ConvF(4.11, 4.11, 4.11); Calibrated: 1/27/2012
- Sensor-Surface: 2.5mm (Mechanical Surface Detection (Locations From Previous Scan Used))Sensor-Surface: 2.5mm (Mechanical Surface Detection)
- Phantom: Flat Phantom ELI4.0; Type: QDOVA001BB; Serial: SN:1017

Rear/802.11a/Ch64/Area Scan (11x17x1): Measurement grid: dx=10mm, dy=10mm

Maximum value of SAR (measured) = 0.237 mW/g

Rear/802.11a/Ch64/Zoom Scan (7x7x9)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=2.5mm

Reference Value = 6.89 V/m; Power Drift = -0.088 dB
Peak SAR (extrapolated) = 0.445 W/kg
SAR(1 g) = 0.127 mW/g; SAR(10 g) = 0.041 mW/g
Maximum value of SAR (measured) = 0.219 mW/g

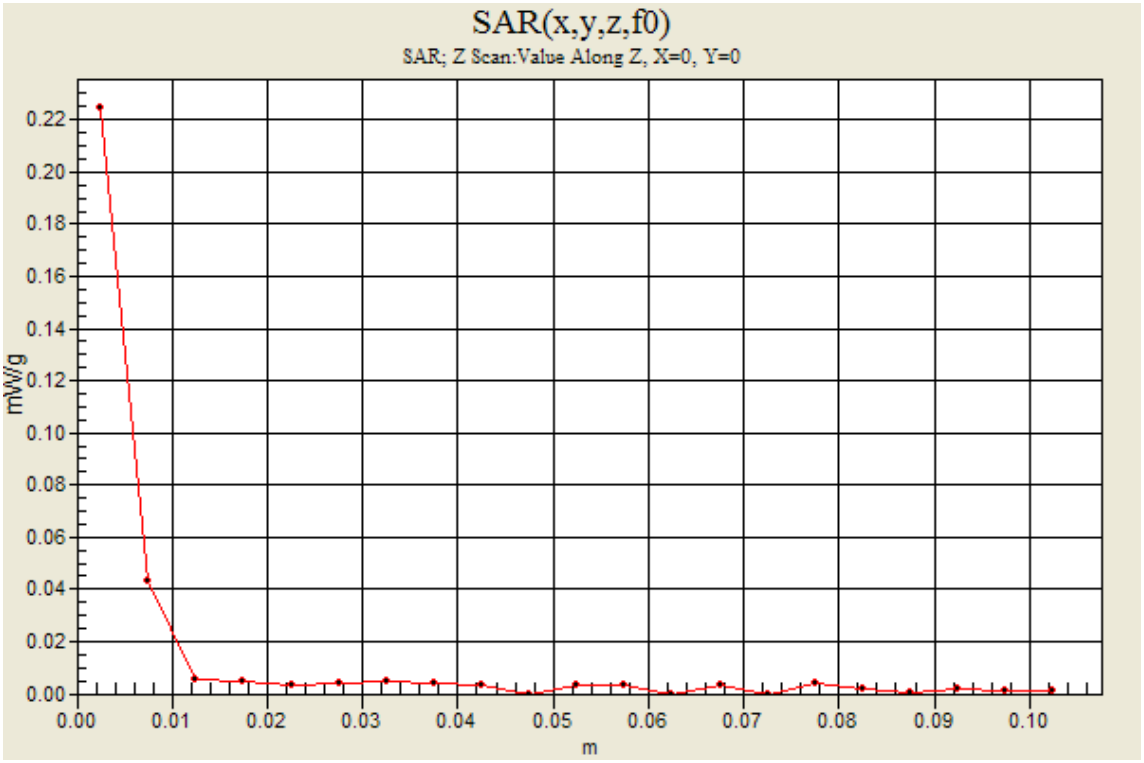


Test Laboratory: UL CCS SAR Lab D Date/Time: 9/9/2012

WiFi 5.3GHz Band

Frequency: 5320 MHz; Duty Cycle: 1:1

Rear/802.11a/Ch64/Z Scan (1x1x21): Measurement grid: dx=20mm, dy=20mm, dz=5mm
Maximum value of SAR (measured) = 0.225 mW/g



Test Laboratory: UL CCS SAR Lab D Date/Time: 9/12/2012

WiFi 5.5GHz Band

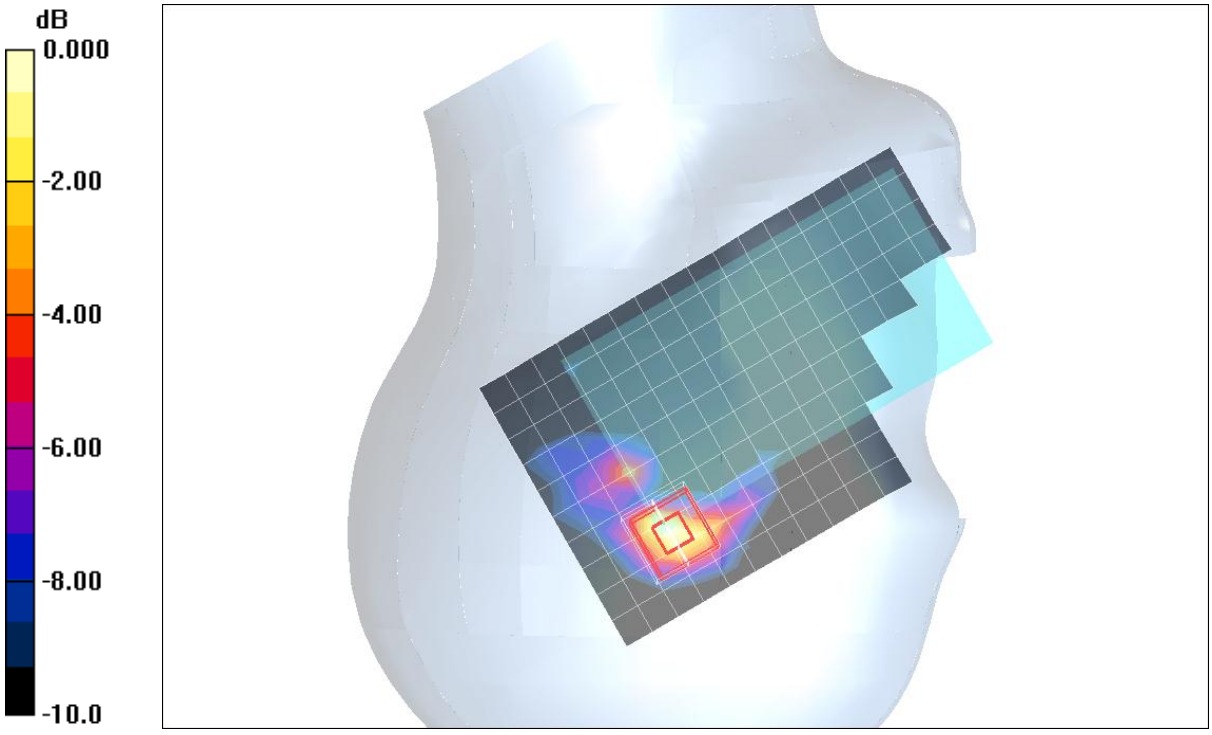
Frequency: 5520 MHz; Duty Cycle: 1:1; Room Ambient Temperature: 25.0°C; Liquid Temperature: 24.0°C
Medium parameters used: f = 5520 MHz; σ = 5 mho/m; ε_r = 35.2; ρ = 1000 kg/m^3 ;
DASY4 Configuration:
- Area Scan setting - Find Secondary Maximum Within: 2.0 dB and with a peak SAR value greater than 0.0012W/kg
- Electronics: DAE3 Sn500; Calibrated: 6/13/2012
- Probe: EX3DV4 - SN3749; ConvF(4.19, 4.19, 4.19); Calibrated: 1/27/2012
- Sensor-Surface: 2.5mm (Mechanical Surface Detection)
- Phantom: SAM B (Twin); Type: SAM B; Serial: TP-105

Right Touch/802.11a/Ch104/Area Scan (11x17x1): Measurement grid: dx=10mm, dy=10mm

Maximum value of SAR (measured) = 0.207 mW/g

Right Touch/802.11a/Ch104/Zoom Scan (7x7x9)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=2.5mm

Reference Value = 6.64 V/m; Power Drift = -0.147 dB
Peak SAR (extrapolated) = 0.344 W/kg
SAR(1 g) = 0.093 mW/g; SAR(10 g) = 0.032 mW/g
Maximum value of SAR (measured) = 0.188 mW/g



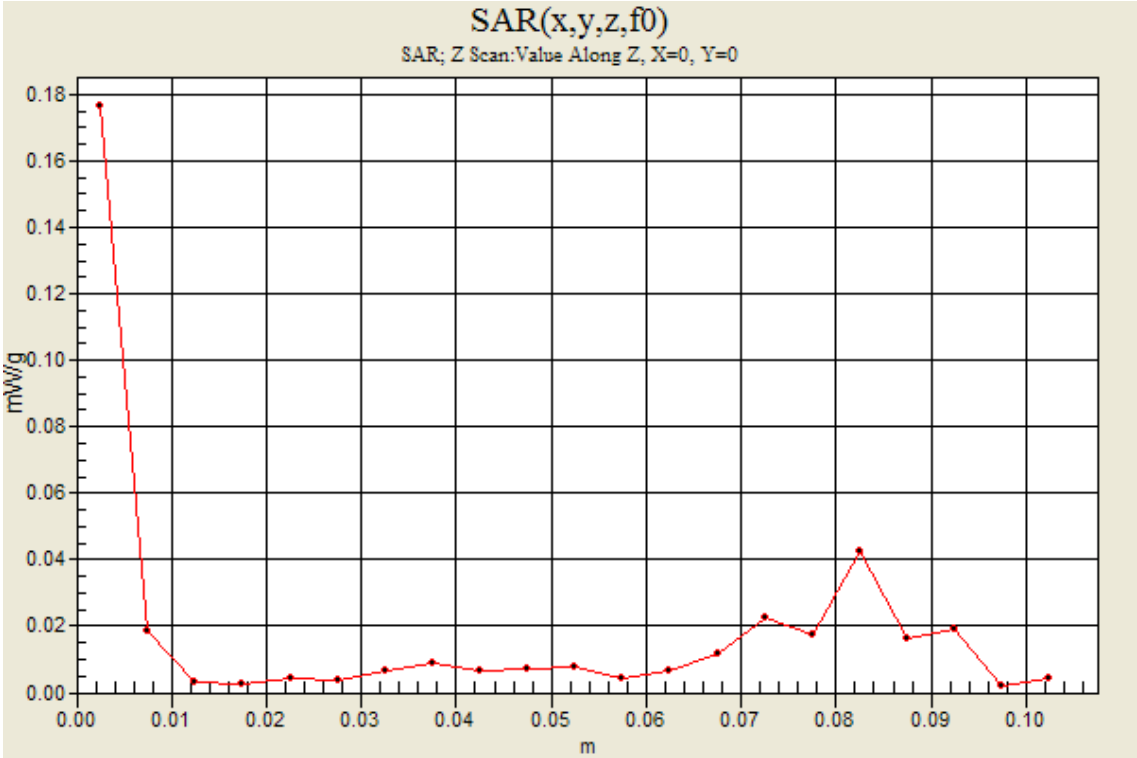
0 dB = 0.188mW/g

Test Laboratory: UL CCS SAR Lab D Date/Time: 9/12/2012

WiFi 5.5GHz Band

Frequency: 5520 MHz; Duty Cycle: 1:1

Right Touch/802.11a/Ch104/Z Scan (1x1x21): Measurement grid: dx=20mm, dy=20mm, dz=5mm
Maximum value of SAR (measured) = 0.177 mW/g



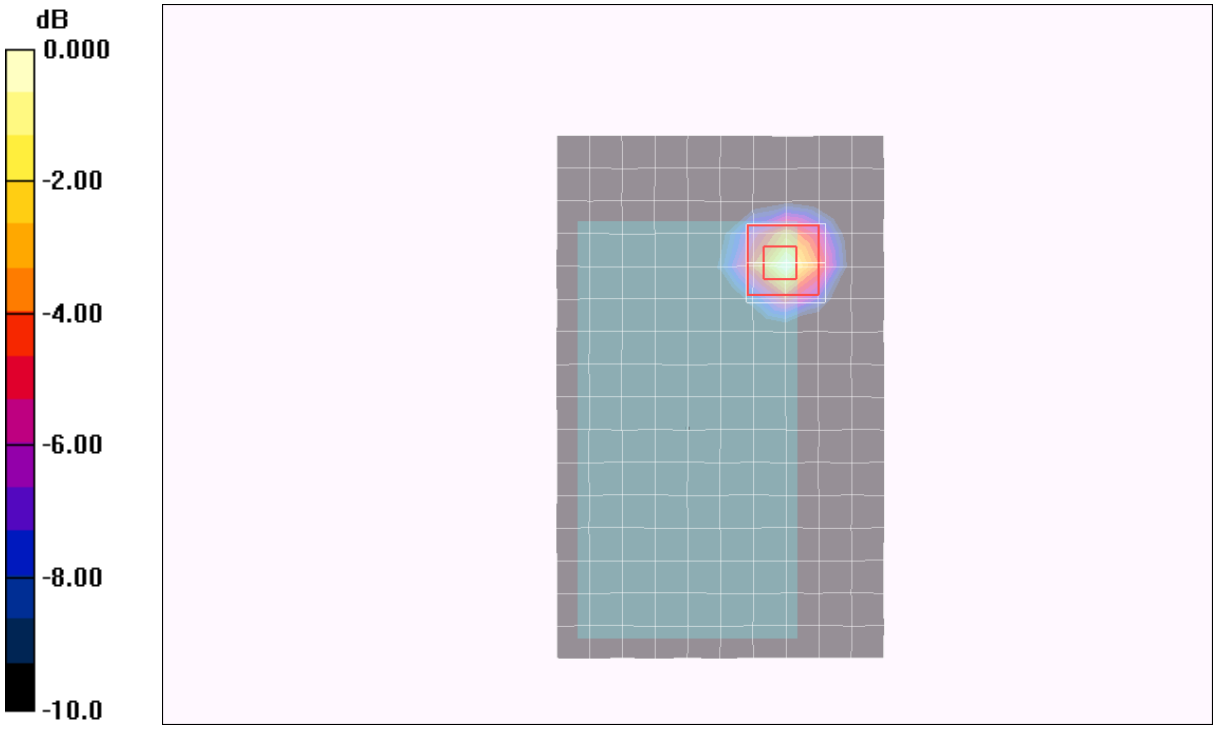
Test Laboratory: UL CCS SAR Lab D Date/Time: 9/11/2012

WiFi 5.5GHz Band

Frequency: 5680 MHz; Duty Cycle: 1:1; Room Ambient Temperature: 25.0°C; Liquid Temperature: 24.0°C
Medium parameters used: f = 5680 MHz; σ = 5.95 mho/m; ε_r = 46.8; ρ = 1000 kg/m^3 ;
DASY4 Configuration:
- Area Scan setting - Find Secondary Maximum Within: 2.0 dB and with a peak SAR value greater than 0.0012W/kg
- Electronics: DAE3 Sn500; Calibrated: 6/13/2012
- Probe: EX3DV4 - SN3749; ConvF(3.57, 3.57, 3.57); Calibrated: 1/27/2012
- Sensor-Surface: 2.5mm (Mechanical Surface Detection (Locations From Previous Scan Used))Sensor-Surface: 2.5mm (Mechanical Surface Detection)
- Phantom: Flat Phantom ELI4.0; Type: QDOVA001BB; Serial: SN:1017

Rear with Headset/802.11a/Ch136/Area Scan (11x17x1): Measurement grid: dx=10mm, dy=10mm
Maximum value of SAR (measured) = 0.873 mW/g

Rear with Headset/802.11a/Ch136/Zoom Scan (7x7x9)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=2.5mm
Reference Value = 12.8 V/m; Power Drift = 0.134 dB
Peak SAR (extrapolated) = 1.92 W/kg
SAR(1 g) = 0.499 mW/g; SAR(10 g) = 0.146 mW/g
Maximum value of SAR (measured) = 0.847 mW/g

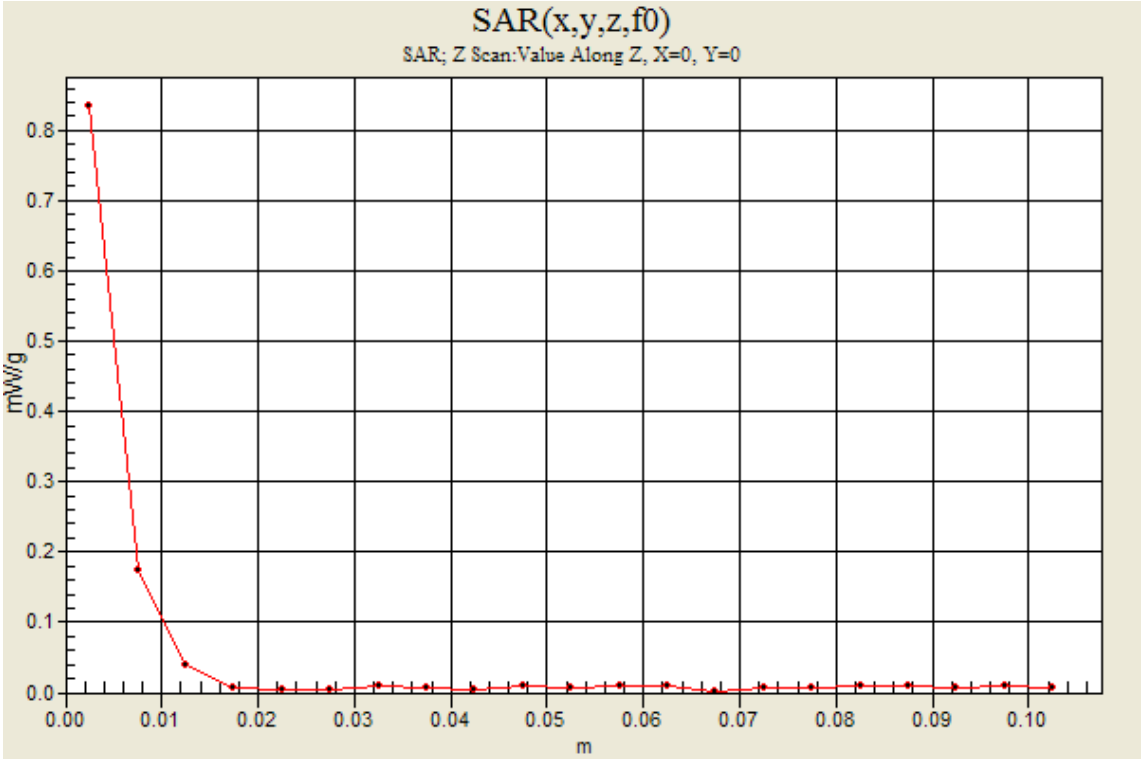


Test Laboratory: UL CCS SAR Lab D Date/Time: 9/11/2012

WiFi 5.5GHz Band

Frequency: 5680 MHz; Duty Cycle: 1:1

Rear with Headset/802.11a/Ch136/Z Scan (1x1x21): Measurement grid: dx=20mm, dy=20mm, dz=5mm
Maximum value of SAR (measured) = 0.835 mW/g



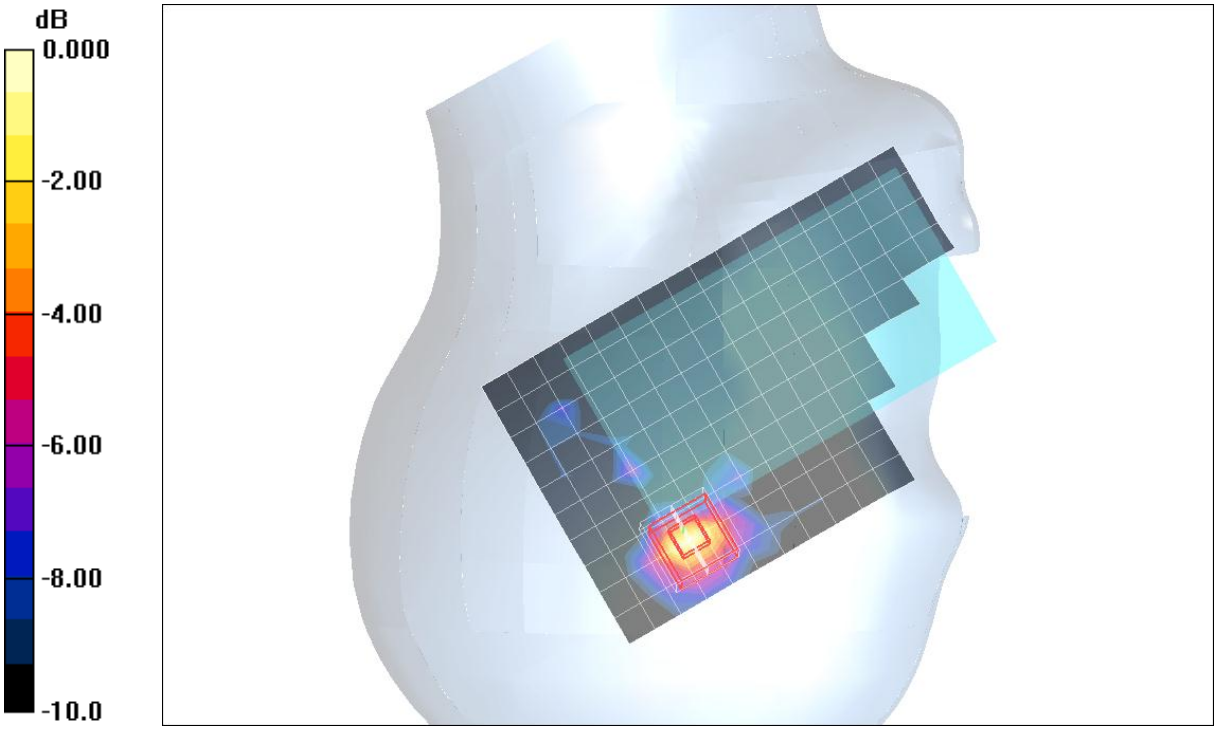
Test Laboratory: UL CCS SAR Lab D Date/Time: 9/10/2012

WiFi 5.8GHz Band

Frequency: 5785 MHz; Duty Cycle: 1:1; Room Ambient Temperature: 25.0°C; Liquid Temperature: 24.0°C
Medium parameters used: f = 5785 MHz; σ = 5.25 mho/m; ε_r = 34.9; ρ = 1000 kg/m^3 ;
DASY4 Configuration:
- Area Scan setting - Find Secondary Maximum Within: 2.0 dB and with a peak SAR value greater than 0.0012W/kg
- Electronics: DAE3 Sn500; Calibrated: 6/13/2012
- Probe: EX3DV4 - SN3749; ConvF(4.04, 4.04, 4.04); Calibrated: 1/27/2012
- Sensor-Surface: 2.5mm (Mechanical Surface Detection (Locations From Previous Scan Used))Sensor-Surface: 2.5mm (Mechanical Surface Detection)
- Phantom: SAM B (Twin); Type: SAM B; Serial: TP-105

Right Touch/802.11a/Ch157/Area Scan (11x17x1): Measurement grid: dx=10mm, dy=10mm
Maximum value of SAR (measured) = 0.096 mW/g

Right Touch/802.11a/Ch157/Zoom Scan (7x7x9)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=2.5mm
Reference Value = 4.71 V/m; Power Drift = 0.169 dB
Peak SAR (extrapolated) = 0.397 W/kg
SAR(1 g) = 0.063 mW/g; SAR(10 g) = 0.019 mW/g
Maximum value of SAR (measured) = 0.104 mW/g



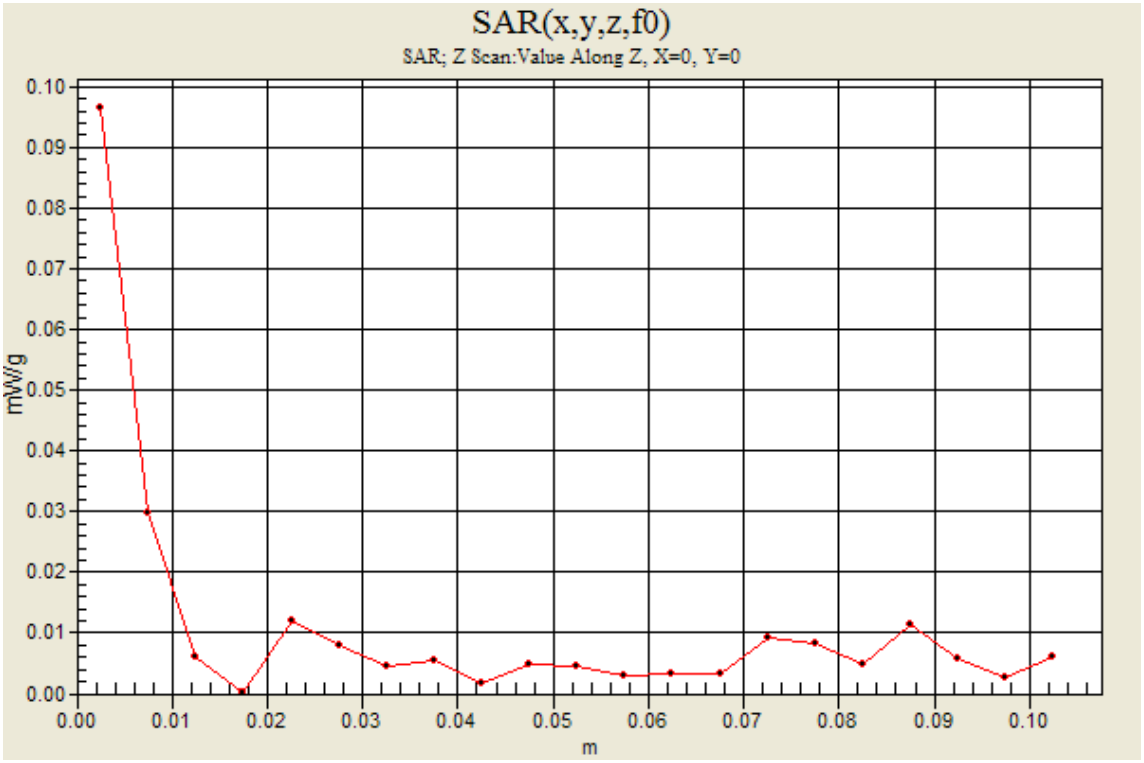
0 dB = 0.104mW/g

Test Laboratory: UL CCS SAR Lab D Date/Time: 9/10/2012

WiFi 5.8GHz Band

Frequency: 5785 MHz; Duty Cycle: 1:1

Right Touch/802.11a/Ch157/Z Scan (1x1x21): Measurement grid: dx=20mm, dy=20mm, dz=5mm
Maximum value of SAR (measured) = 0.097 mW/g



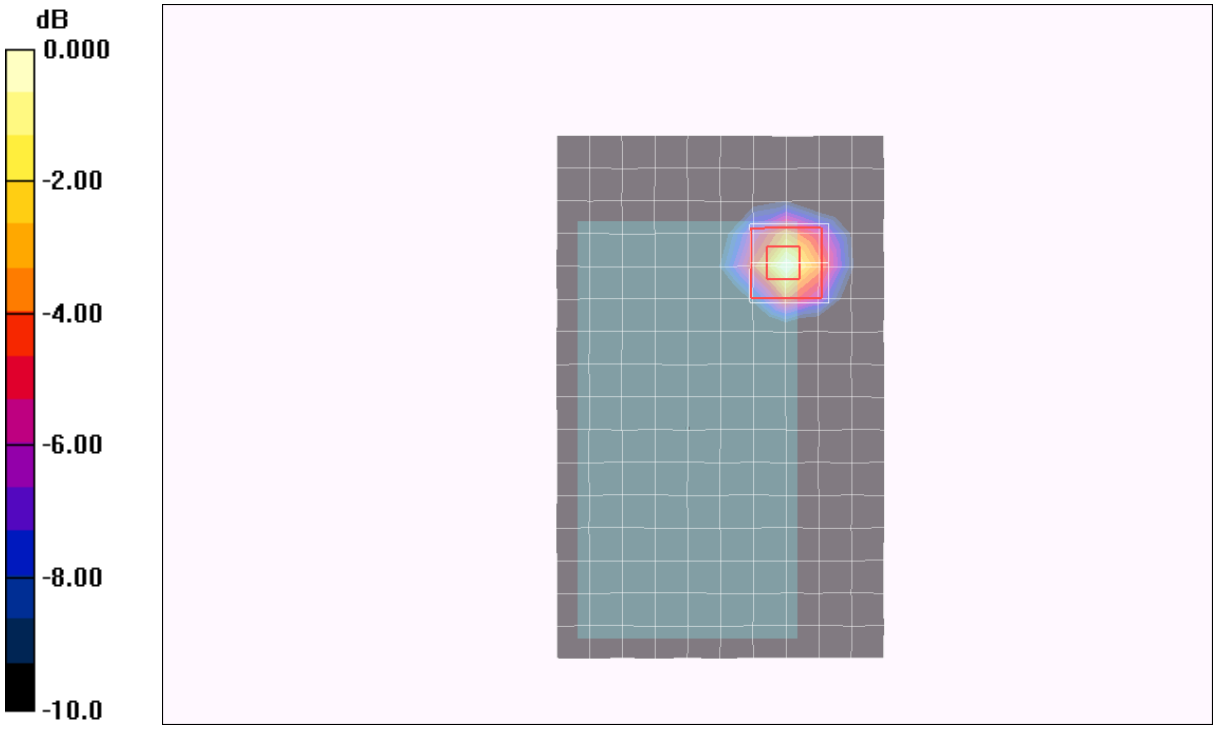
Test Laboratory: UL CCS SAR Lab D Date/Time: 9/11/2012

WiFi 5.8GHz Band

Frequency: 5825 MHz; Duty Cycle: 1:1; Room Ambient Temperature: 25.0°C; Liquid Temperature: 24.0°C
Medium parameters used: f = 5825 MHz; σ = 6.13 mho/m; ε_r = 46.5; ρ = 1000 kg/m^3 ;
DASY4 Configuration:
- Area Scan setting - Find Secondary Maximum Within: 2.0 dB and with a peak SAR value greater than 0.0012W/kg
- Electronics: DAE3 Sn500; Calibrated: 6/13/2012
- Probe: EX3DV4 - SN3749; ConvF(3.81, 3.81, 3.81); Calibrated: 1/27/2012
- Sensor-Surface: 2.5mm (Mechanical Surface Detection (Locations From Previous Scan Used))Sensor-Surface: 2.5mm (Mechanical Surface Detection)
- Phantom: Flat Phantom ELI4.0; Type: QDOVA001BB; Serial: SN:1017

Rear with Headset/802.11a/Ch165/Area Scan (11x17x1): Measurement grid: dx=10mm, dy=10mm
Maximum value of SAR (measured) = 0.749 mW/g

Rear with Headset/802.11a/Ch165/Zoom Scan (7x7x9)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=2.5mm
Reference Value = 12.0 V/m; Power Drift = -0.025 dB
Peak SAR (extrapolated) = 1.82 W/kg
SAR(1 g) = 0.417 mW/g; SAR(10 g) = 0.123 mW/g
Maximum value of SAR (measured) = 0.705 mW/g

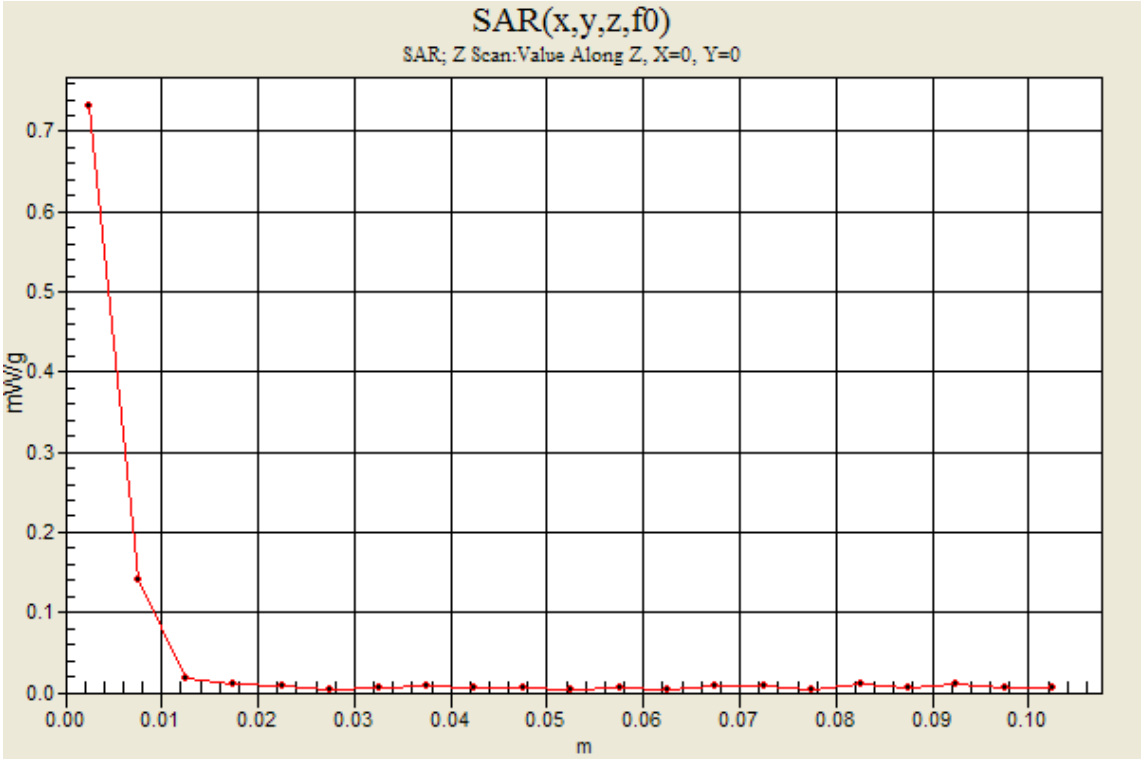


Test Laboratory: UL CCS SAR Lab D Date/Time: 9/11/2012

WiFi 5.8GHz Band

Frequency: 5825 MHz; Duty Cycle: 1:1

Rear with Headset/802.11a/Ch165/Z Scan (1x1x21): Measurement grid: dx=20mm, dy=20mm, dz=5mm
Maximum value of SAR (measured) = 0.732 mW/g



14. Simultaneous Transmission SAR Analysis

The Bluetooth output power is ≤ 2·P_{Ref} (13.8 dBm / 24 mW), for which stand-alone SAR evaluation is not required. Therefore, simultaneous transmission SAR evaluation is not required.

14.1. Sum of the 1-g SAR of Head Exposure Condition

Sum of the 1-g SAR for WWAN and WiFi 2.4GHz Band

Test Position	GSM850	GSM1900	W-CDMA (UMTS) Band V	W-CDMA (UMTS) Band II	W-CDMA (UMTS) Band IV	WiFi 2.4 GHz Band	∑ 1-g SAR (mW/g)
Left Touch	0.177					0.313	0.490
		0.503				0.313	0.816
			0.106			0.313	0.419
				0.704		0.313	1.017
					0.521	0.313	0.834
Left Tilt	0.117					0.280	0.397
		0.107				0.280	0.387
			0.061			0.280	0.341
				0.158		0.280	0.438
					0.145	0.280	0.425
Right Touch	0.180					0.672	0.852
		0.304				0.672	0.976
			0.098			0.672	0.770
				0.414		0.672	**1.086**
					0.264	0.672	0.936
Right Tilt	0.115					0.466	0.581
		0.159				0.466	0.625
			0.051			0.466	0.517
				0.247		0.466	0.713
					0.165	0.466	0.631

Sum of the 1-g Scaled SAR for WWAN and WiFi 2.4GHz Band

Test Position	GSM850	GSM1900	W-CDMA (UMTS) Band V	W-CDMA (UMTS) Band II	W-CDMA (UMTS) Band IV	WiFi 2.4 GHz Band	∑ 1-g SAR (mW/g)
Left Touch	0.181					0.313	0.494
		0.503				0.313	0.816
			0.111			0.313	0.424
				0.704		0.313	1.017
					0.533	0.313	0.846
Left Tilt	0.120					0.280	0.400
		0.109				0.280	0.389
			0.063			0.280	0.343
				0.158		0.280	0.438
					0.148	0.280	0.428
Right Touch	0.184					0.672	0.856
		0.311				0.672	0.983
			0.103			0.672	0.775
				0.414		0.672	**1.086**
					0.270	0.672	0.942
Right Tilt	0.118					0.466	0.584
		0.163				0.466	0.629
			0.054			0.466	0.520
				0.247		0.466	0.713
					0.169	0.466	0.635

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.

Sum of the 1-g SAR for WWAN and WiFi 5.2GHz Band

Test Position	GSM850	GSM1900	W-CDMA (UMTS) Band V	W-CDMA (UMTS) Band II	W-CDMA (UMTS) Band IV	WiFi 5.2 GHz Band	∑ 1-g SAR (mW/g)
Left Touch	0.177					0.014	0.191
		0.503				0.014	0.517
			0.106			0.014	0.120
				0.704		0.014	0.718
					0.521	0.014	**0.535**
Left Tilt	0.117					0.014	0.131
		0.107				0.014	0.121
			0.061			0.014	0.075
				0.158		0.014	0.172
					0.145	0.014	0.159
Right Touch	0.180					0.046	0.226
		0.304				0.046	0.350
			0.098			0.046	0.144
				0.414		0.046	0.460
					0.264	0.046	0.310
Right Tilt	0.115					0.034	0.149
		0.159				0.034	0.193
			0.051			0.034	0.085
				0.247		0.034	0.281
					0.165	0.034	0.199

Sum of the 1-g scaled SAR for WWAN and WiFi 5.2GHz Band

Test Position	GSM850	GSM1900	W-CDMA (UMTS) Band V	W-CDMA (UMTS) Band II	W-CDMA (UMTS) Band IV	WiFi 5.2 GHz Band	∑ 1-g SAR (mW/g)
Left Touch	0.181					0.017	0.198
		0.503				0.017	0.520
			0.111			0.017	0.128
				0.704		0.017	0.721
					0.533	0.017	**0.550**
Left Tilt	0.120					0.018	0.138
		0.109				0.018	0.127
			0.063			0.018	0.081
				0.158		0.018	0.176
					0.148	0.018	0.166
Right Touch	0.184					0.059	0.243
		0.311				0.059	0.370
			0.103			0.059	0.162
				0.414		0.059	0.473
					0.270	0.059	0.329
Right Tilt	0.118					0.044	0.162
		0.163				0.044	0.207
			0.054			0.044	0.098
				0.247		0.044	0.291
					0.169	0.044	0.213

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.

Sum of the 1-g SAR for WWAN and WiFi 5.3GHz Band

Test Position	GSM850	GSM1900	W-CDMA (UMTS) Band V	W-CDMA (UMTS) Band II	W-CDMA (UMTS) Band IV	WiFi 5.3 GHz Band	∑ 1-g SAR (mW/g)
Left Touch	0.177					0.031	0.208
		0.503				0.031	0.534
			0.106			0.031	0.137
				0.704		0.031	0.735
					0.521	0.031	0.552
Left Tilt	0.117					0.027	0.144
		0.107				0.027	0.134
			0.061			0.027	0.088
				0.158		0.027	0.185
					0.145	0.027	0.172
Right Touch	0.180					0.057	0.237
		0.304				0.057	0.361
			0.098			0.057	0.155
				0.414		0.057	**0.471**
					0.264	0.057	0.321
Right Tilt	0.115					0.049	0.164
		0.159				0.049	0.208
			0.051			0.049	0.100
				0.247		0.049	0.296
					0.165	0.049	0.214

Sum of the 1-g Scaled SAR for WWAN and WiFi 5.3GHz Band

Test Position	GSM850	GSM1900	W-CDMA (UMTS) Band V	W-CDMA (UMTS) Band II	W-CDMA (UMTS) Band IV	WiFi 5.3 GHz Band	∑ 1-g SAR (mW/g)
Left Touch	0.181					0.040	0.221
		0.503				0.040	0.543
			0.111			0.040	0.151
				0.704		0.040	0.744
					0.533	0.040	0.573
Left Tilt	0.120					0.035	0.155
		0.109				0.035	0.144
			0.063			0.035	0.098
				0.158		0.035	0.193
					0.148	0.035	0.183
Right Touch	0.184					0.076	0.260
		0.311				0.076	0.387
			0.103			0.076	0.179
				0.414		0.076	**0.490**
					0.270	0.076	0.346
Right Tilt	0.118					0.065	0.183
		0.163				0.065	0.228
			0.054			0.065	0.119
				0.247		0.065	0.312
					0.169	0.065	0.234

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.

Sum of the 1-g SAR for WWAN and WiFi 5.5GHz Band

Test Position	GSM850	GSM1900	W-CDMA (UMTS) Band V	W-CDMA (UMTS) Band II	W-CDMA (UMTS) Band IV	WiFi 5.5 GHz Band	∑ 1-g SAR (mW/g)
Left Touch	0.177					0.039	0.216
		0.503				0.039	0.542
			0.106			0.039	0.145
				0.704		0.039	0.743
					0.521	0.039	0.560
Left Tilt	0.117					0.044	0.161
		0.107				0.044	0.151
			0.061			0.044	0.105
				0.158		0.044	0.202
					0.145	0.044	0.189
Right Touch	0.180					0.093	0.273
		0.304				0.093	0.397
			0.098			0.093	0.191
				0.414		0.093	**0.507**
					0.264	0.093	0.357
Right Tilt	0.115					0.079	0.194
		0.159				0.079	0.238
			0.051			0.079	0.130
				0.247		0.079	0.326
					0.165	0.079	0.244

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.

Sum of the 1-g Scaled SAR for WWAN and WiFi 5.5GHz Band

Test Position	GSM850	GSM1900	W-CDMA (UMTS) Band V	W-CDMA (UMTS) Band II	W-CDMA (UMTS) Band IV	WiFi 5.5 GHz Band	∑ 1-g SAR (mW/g)
Left Touch	0.181					0.049	0.230
		0.503				0.049	0.552
			0.111			0.049	0.160
				0.704		0.049	0.753
					0.533	0.049	0.582
Left Tilt	0.120					0.055	0.175
		0.109				0.055	0.164
			0.063			0.055	0.118
				0.158		0.055	0.213
					0.148	0.055	0.203
Right Touch	0.184					0.117	0.301
		0.311				0.117	0.428
			0.103			0.117	0.220
				0.414		0.117	**0.531**
					0.270	0.117	0.387
Right Tilt	0.118					0.099	0.217
		0.163				0.099	0.262
			0.054			0.099	0.153
				0.247		0.099	0.346
					0.169	0.099	0.268

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.

Sum of the 1-g SAR for WWAN and WiFi 5.8GHz Band

Test Position	GSM850	GSM1900	W-CDMA (UMTS) Band V	W-CDMA (UMTS) Band II	W-CDMA (UMTS) Band IV	WiFi 5.8 GHz Band	∑ 1-g SAR (mW/g)
Left Touch	0.177					0.00738	0.184
		0.503				0.00738	0.510
			0.106			0.00738	0.113
				0.704		0.00738	0.711
					0.521	0.00738	**0.528**
Left Tilt	0.117					0.00520	0.122
		0.107				0.00520	0.112
			0.061			0.00520	0.066
				0.158		0.00520	0.163
					0.145	0.00520	0.150
Right Touch	0.180					0.063	0.243
		0.304				0.063	0.367
			0.098			0.063	0.161
				0.414		0.063	0.477
					0.264	0.063	0.327
Right Tilt	0.115					0.048	0.163
		0.159				0.048	0.207
			0.051			0.048	0.099
				0.247		0.048	0.295
					0.165	0.048	0.213

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.

Sum of the 1-g Scaled SAR for WWAN and WiFi 5.8GHz Band

Test Position	GSM850	GSM1900	W-CDMA (UMTS) Band V	W-CDMA (UMTS) Band II	W-CDMA (UMTS) Band IV	WiFi 5.8 GHz Band	∑ 1-g SAR (mW/g)
Left Touch	0.181					0.00973	0.191
		0.503				0.00973	0.513
			0.111			0.00973	0.121
				0.704		0.00973	0.714
					0.533	0.00973	**0.543**
Left Tilt	0.120					0.00685	0.127
		0.109				0.00685	0.116
			0.063			0.00685	0.070
				0.158		0.00685	0.165
					0.148	0.00685	0.155
Right Touch	0.184					0.081	0.265
		0.311				0.081	0.392
			0.103			0.081	0.184
				0.414		0.081	0.495
					0.270	0.081	0.351
Right Tilt	0.118					0.063	0.181
		0.163				0.063	0.226
			0.054			0.063	0.117
				0.247		0.063	0.310
					0.169	0.063	0.232

14.2. Sum of the 1-g SAR of Body Exposure Condition

Sum of the 1-g SAR for WWAN and WiFi 2.4GHz Band

Test Position	GSM850	GSM1900	W-CDMA (UMTS) Band V	W-CDMA (UMTS) Band II	W-CDMA (UMTS) Band IV	WiFi 2.4 GHz Band	∑ 1-g SAR (mW/g)
Rear	0.482					0.237	0.719
		0.629				0.237	0.866
			0.355			0.237	0.592
				1.080		0.237	**1.317**
					0.677	0.237	0.914
Front	0.256					0.166	0.422
		0.362				0.166	0.528
			0.184			0.166	0.350
				0.613		0.166	0.779
					0.644	0.166	0.810

Sum of the 1-g Scaled SAR for WWAN and WiFi 2.4GHz Band

Test Position	GSM850	GSM1900	W-CDMA (UMTS) Band V	W-CDMA (UMTS) Band II	W-CDMA (UMTS) Band IV	WiFi 2.4 GHz Band	∑ 1-g SAR (mW/g)
Rear	0.493					0.237	0.730
		0.674				0.237	0.911
			0.372			0.237	0.609
				1.080		0.237	**1.317**
					0.693	0.237	0.930
Front	0.262					0.166	0.428
		0.388				0.166	0.554
			0.193			0.166	0.359
				0.613		0.166	0.779
					0.659	0.166	0.825

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.

Sum of the 1-g SAR for WWAN and WiFi 5.2GHz Band

Test Position	GSM850	GSM1900	W-CDMA (UMTS) Band V	W-CDMA (UMTS) Band II	W-CDMA (UMTS) Band IV	WiFi 5.2 GHz Band	∑ 1-g SAR (mW/g)
Rear	0.482					0.098	0.580
		0.629				0.098	0.727
			0.355			0.098	0.453
				1.080		0.098	**1.178**
					0.677	0.098	0.775
Front	0.256					0.016	0.272
		0.362				0.016	0.378
			0.184			0.016	0.200
				0.613		0.016	0.629
					0.644	0.016	0.660

Sum of the 1-g Scaled SAR for WWAN and WiFi 5.2GHz Band

Test Position	GSM850	GSM1900	W-CDMA (UMTS) Band V	W-CDMA (UMTS) Band II	W-CDMA (UMTS) Band IV	WiFi 5.2 GHz Band	∑ 1-g SAR (mW/g)
Rear	0.493					0.127	0.620
		0.674				0.127	0.801
			0.372			0.127	0.499
				1.080		0.127	**1.207**
					0.693	0.127	0.820
Front	0.262					0.021	0.283
		0.388				0.021	0.409
			0.193			0.021	0.214
				0.613		0.021	0.634
					0.659	0.021	0.680

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.

Sum of the 1-g SAR for WWAN and WiFi 5.3GHz Band

Test Position	GSM850	GSM1900	W-CDMA (UMTS) Band V	W-CDMA (UMTS) Band II	W-CDMA (UMTS) Band IV	WiFi 5.3 GHz Band	∑ 1-g SAR (mW/g)
Rear	0.482					0.127	0.609
		0.629				0.127	0.756
			0.355			0.127	0.482
				1.080		0.127	**1.207**
					0.677	0.127	0.804
Front	0.256					0.024	0.280
		0.362				0.024	0.386
			0.184			0.024	0.208
				0.613		0.024	0.637
					0.644	0.024	0.668

Sum of the 1-g Scaled SAR for WWAN and WiFi 5.3GHz Band

Test Position	GSM850	GSM1900	W-CDMA (UMTS) Band V	W-CDMA (UMTS) Band II	W-CDMA (UMTS) Band IV	WiFi 5.3 GHz Band	∑ 1-g SAR (mW/g)
Rear	0.493					0.167	0.660
		0.674				0.167	0.841
			0.372			0.167	0.539
				1.080		0.167	**1.247**
					0.693	0.167	0.860
Front	0.262					0.031	0.293
		0.388				0.031	0.419
			0.193			0.031	0.224
				0.613		0.031	0.644
					0.659	0.031	0.690

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.

Sum of the 1-g SAR for WWAN and WiFi 5.5GHz Band

Test Position	GSM850	GSM1900	W-CDMA (UMTS) Band V	W-CDMA (UMTS) Band II	W-CDMA (UMTS) Band IV	WiFi 5.5 GHz Band	∑ 1-g SAR (mW/g)
Rear	0.482					0.499	0.981
		0.629				0.499	1.128
			0.355			0.499	0.854
				1.080		0.499	**1.579**
					0.677	0.499	1.176
Front	0.256					0.033	0.289
		0.362				0.033	0.395
			0.184			0.033	0.217
				0.613		0.033	0.646
					0.644	0.033	0.677

Sum of the 1-g Scaled SAR for WWAN and WiFi 5.5GHz Band

Test Position	GSM850	GSM1900	W-CDMA (UMTS) Band V	W-CDMA (UMTS) Band II	W-CDMA (UMTS) Band IV	WiFi 5.5 GHz Band	∑ 1-g SAR (mW/g)
Rear	0.493					0.628	1.121
		0.674				0.628	1.302
			0.372			0.628	1.000
				1.080		0.628	**1.708**
					0.693	0.628	1.321
Front	0.262					0.042	0.304
		0.388				0.042	0.430
			0.193			0.042	0.235
				0.613		0.042	0.655
					0.659	0.042	0.701

SAR to Peak Location Separation Ratio (SPLSR)

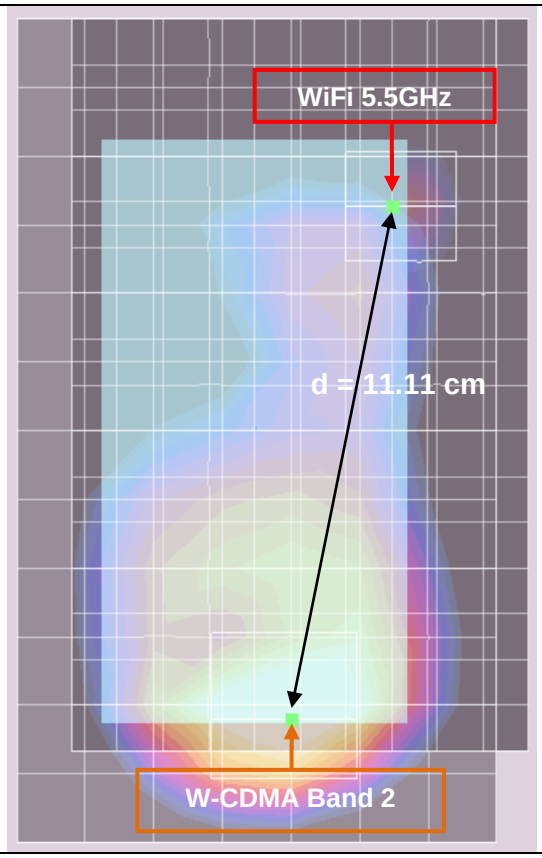
Test Position	Worst-case combination		∑ 1-g SAR (mW/g)	Calculated distance (cm)	SPLSR	Figure
	W-CDMA Band 2	WiFi 5.5GHz Baned				
Rear	1.08	0.628	1.708	11.11	0.154	1

Conclusion:

- Simultaneous transmission SAR measurement (Volume Scan) is not required because the SAR to peak location separation ratios is < 0.3..

SAR Peak Location Separation Distance

Figure (1)



Mode	Peak SAR	X	Y	Z
	mW/g	m	m	m
W-CDMA Band 2	1.440	0.00656	-0.06	-0.179
WiFi 5.5GHz Band	0.473	0.028	0.049	-0.179

Separation distance (cm)
11.11

Note: SQRT((X1-X2)^2+(Y1-Y2)^2+(Z1-Z2)^2)

Sum of the 1-g SAR for WWAN and WiFi 5.8GHz Band

Test Position	GSM850	GSM1900	W-CDMA (UMTS) Band V	W-CDMA (UMTS) Band II	W-CDMA (UMTS) Band IV	WiFi 5.8 GHz Band	∑ 1-g SAR (mW/g)
Rear	0.482					0.417	0.899
		0.629				0.417	1.046
			0.355			0.417	0.772
				1.080		0.417	**1.497**
					0.677	0.417	1.094
Front	0.256					0.018	0.274
		0.362				0.018	0.380
			0.184			0.018	0.202
				0.613		0.018	0.631
					0.644	0.018	0.662

Sum of the 1-g Scaled SAR for WWAN and WiFi 5.8GHz Band

Test Position	GSM850	GSM1900	W-CDMA (UMTS) Band V	W-CDMA (UMTS) Band II	W-CDMA (UMTS) Band IV	WiFi 5.8 GHz Band	∑ 1-g SAR (mW/g)
Rear	0.493					0.550	1.043
		0.674				0.550	1.224
			0.372			0.550	0.922
				1.080		0.550	**1.630**
					0.693	0.550	1.243
Front	0.262					0.023	0.285
		0.388				0.023	0.411
			0.193			0.023	0.216
				0.613		0.023	0.636
					0.659	0.023	0.682

SAR to Peak Location Separation Ratio (SPLSR)

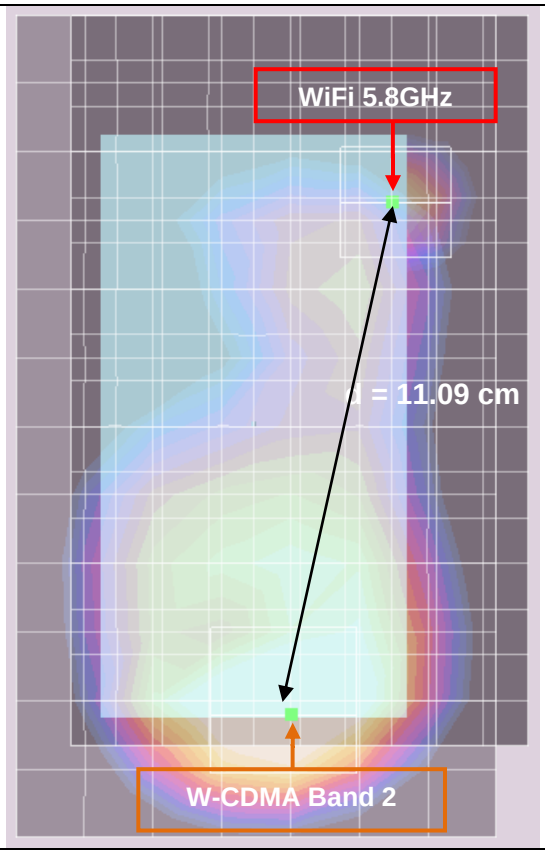
Test Position	Worst-case combination		∑ 1-g SAR (mW/g)	Calculated distance (cm)	SPLSR	Figure
	W-CDMA Band 2	WiFi 5.8GHz Baned				
Rear	1.08	0.550	1.630	11.09	0.147	2

Conclusion:

- Simultaneous transmission SAR measurement (Volume Scan) is not required because the SAR to peak location separation ratios is < 0.3..

SAR Peak Location Separation Distance

Figure (2)



Mode	Peak SAR	X	Y	Z
	mW/g	m	m	m
W-CDMA Band 2	1.440	0.00656	-0.06	-0.179
WiFi 5.8GHz Band	0.698	0.027	0.049	-0.179

Separation distance (cm)
11.09

Note: SQRT((X1-X2)^2+(Y1-Y2)^2+(Z1-Z2)^2)

14.3. Sum of the 1-g SAR of Hotspot Exposure Condition

Sum of the 1-g SAR for WWAN and WiFi 2.4GHz Band

Test Position	GSM850	GSM1900	W-CDMA (UMTS) Band V	W-CDMA (UMTS) Band II	W-CDMA (UMTS) Band IV	WiFi 2.4 GHz Band	∑ 1-g SAR (mW/g)
Rear	0.579					0.237	0.816
		0.866				0.237	1.103
			0.355			0.237	0.592
				1.080		0.237	**1.317**
					0.677	0.237	0.914
Front	0.312					0.166	0.478
		0.375				0.166	0.541
			0.184			0.166	0.350
				0.613		0.166	0.779
					0.644	0.166	0.810
Edge 4	0.140					0.132	0.272
		0.263				0.132	0.395
			0.081			0.132	0.213
				0.352		0.132	0.484
					0.180	0.132	0.312

Sum of the 1-g Scaled SAR for WWAN and WiFi 2.4GHz Band

Test Position	GSM850	GSM1900	W-CDMA (UMTS) Band V	W-CDMA (UMTS) Band II	W-CDMA (UMTS) Band IV	WiFi 2.4 GHz Band	∑ 1-g SAR (mW/g)
Rear	0.592					0.237	0.829
		0.886				0.237	1.123
			0.372			0.237	0.609
				1.105		0.237	**1.342**
					0.693	0.237	0.930
Front	0.219					0.166	0.385
		0.385				0.166	0.551
			0.193			0.166	0.359
				0.613		0.166	0.779
					0.659	0.166	0.825
Edge 4	0.143					0.132	0.275
		0.269				0.132	0.401
			0.085			0.132	0.217
				0.352		0.132	0.484
					0.184	0.132	0.316

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.

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 Band V

15.5. SAR Test Plots for W-CDMA Band II

15.6. SAR Test Plots for W-CDMA Band IV

15.7. SAR Test Plots for WiFi 2.4GHz Band

15.8. SAR Test Plots for WiFi 5 GHz Bands

15.9. Calibration Certificate for E-Field Probe EX3DV4 - SN 3749

15.10. Calibration Certificate for E-Field Probe EX3DV4 - SN 3772

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 706

15.15. Calibration Certificate for D5GHzV2 - SN 1075

15.16. Calibration Certificate for D1900V2 - SN 5d043