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

SAR EVALUATION REPORT

For
Portable Handset

Model: GT-S5380E
FCC ID: A3LGTS5380E

Report Number: 12I14320-5

Issue Date: 4/10/2012

Prepared for
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Revision History

Rev.	Issue Date	Revisions	Revised By
--	4/10/2012	Initial Issue	--

Table of Contents

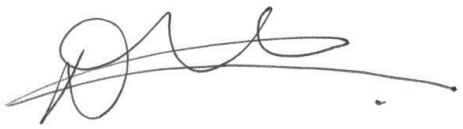
1. Attestation of Test Results

Applicant	SAMSUNG ELECTRONICS CO., LTD.		
DUT description	Portable Handset		
Model	GT-S5380E		
Test device is	A production unit		
Device category	Portable		
Exposure category	General Population/Uncontrolled Exposure		
Date tested	February 29 – March 7, 2012		
FCC Rule Parts	Freq. Range	Highest 1-g SAR	Limit
22	824-849 MHz	Head: 0.147 W/kg (Left Touch) Body: 0.400 W/kg (Rear w/ 10mm distance)	1.6 W/kg
24	1850-1910 MHz	Head: 0.957 W/kg (Left Touch) Body: 0.701 W/kg (Front w/ 10 mm distance)	
15.247	2412-2462 MHz	Head: 0.558 W/kg (Left Tilt) Body: 0.455 W/kg (Rear w/ 10 mm distance)	
Simultaneous transmission condition:		1.486 W/kg (The highest SAR across exposure conditions)	
Applicable Standards			Test Results
FCC OET Bulletin 65 Supplement C 01-01, IEEE Std 1528-2003			Pass

Compliance Certification Services, Inc. (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
Staff Engineer
Compliance Certification Services (UL CCS)

Tested By:

David Rodgers
SAR Engineer
Compliance Certification Services (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, March 2010, IEEE Std 1528-2003, and the following KDB Procedures.

- 648474 D01 SAR Handsets Multi Xmiter and Ant, v01r05
- 248227 D01 SAR meas for 802 11abg v01r02
- 941225 D01 SAR test for 3G devices v02
- 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	GB46160222	6	17	2012
Base Station Simulator	R & S	CMU 200	106291	6	24	2012
ESA Series Network Analyzer	Agilent	E5071B	MY42100131	2	11	2013
Synthesized Signal Generator	HP	83732B	US34490599	7	14	2012
E-Field Probe	SPEAG	EX3DV4	3749	1	27	2013
Thermometer	ERTCO	639-1S	1718	7	19	2012
Data Acquisition Electronics	SPEAG	DAE3	427	1	17	2013
System Validation Dipole	SPEAG	D835V2	4d117	4	15	2012
System Validation Dipole	SPEAG	D1900V2	5d140	4	18	2012
System Validation Dipole	SPEAG	D2450V2	748	2	7	2013
Power Meter	HP	437B	3125U16345	5	13	2012
Power Sensor	HP	8481A	2702A60780	5	13	2012
Amplifier	MITEQ	4D00400600-50-30P	1620606	N/A		
Directional coupler	Werlatone	C8060-102	2141	N/A		

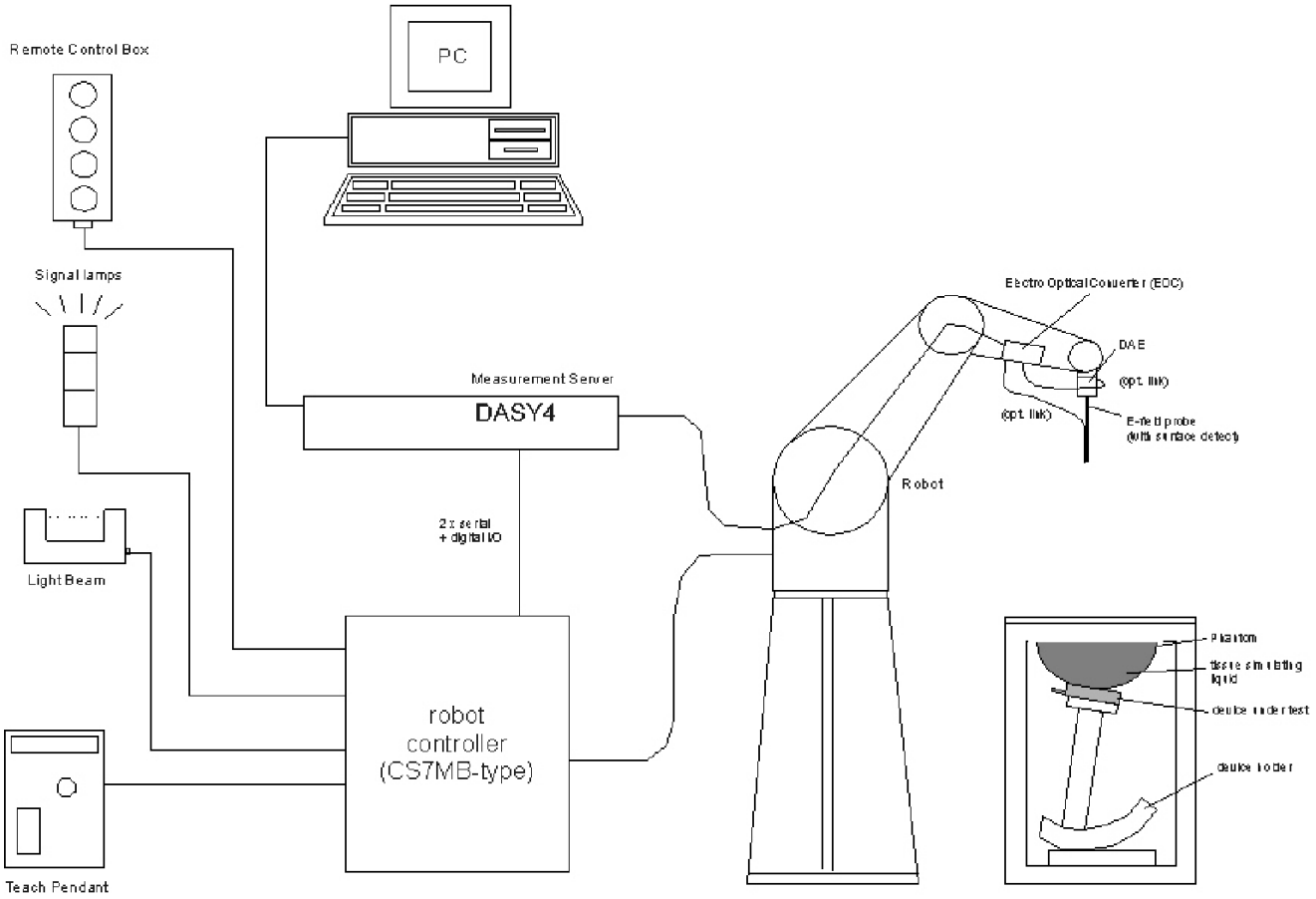
4.2. Measurement Uncertainty

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	**4.26**	Normal	1	0.64	2.73
Liquid Permittivity - deviation from target	5.00	Rectangular	1.732	0.6	1.73
Liquid Permittivity - measurement uncertainty	**-4.41**	Normal	1	0.6	-2.65
				Combined Standard Uncertainty Uc(y) =	10.45
				Expanded Uncertainty U, Coverage Factor = 2, > 95 % Confidence =	20.91 %
				Expanded Uncertainty U, Coverage Factor = 2, > 95 % Confidence =	1.65 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. The probe is equipped with an optical surface detector system.
- 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 2000 or 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
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 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: 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

Cellular/PCS (GSM850/1900) Phone with Bluetooth & WLAN MODEL: GT-S5380E	
Normal operation	Held to head, Body (Rear and Front sides) with 10 mm separation distance. Hotspot (wireless router) with 10 mm separation distance to all sides and edges.
Accessory:	Headset

7.1. Band and Air Interfaces

Air Interfaces	GSM, GPRS and EGPRS (Rx only) 802.11b/g/n Bluetooth Ver 3.0 with HS
Tx Frequency Bands	GSM850: 824 - 849 MHz GSM1900: 1850 - 1910 MHz 802.11b/g/n: 2412 - 2462 MHz, HT20 Bluetooth: 2402 - 2480 MHz
GPRS Multi-slot Classes	12 (4 Uplink)
GPRS Classes	Class B

7.2. Hotspot (Wireless Router) Exposure Conditions

Mode	Band	Tx (MHz)
GPRS + WiFi	835	835/2400
GPRS + WiFi	1900	1900/2400

7.3. Simultaneous Transmission

No.	Conditions
1	GSM835 Voice + WiFi/BT
2	GPRS835 + WiFi/BT
3	GSM1900 Voice + WiFi/BT
4	GPRS1900 + WiFi/BT
Note: WiFi and Bluetooth share the same antenna, and WiFi cannot transmit simultaneously with Bluetooth.	

8. Summary of Test Configurations

8.1. Head Exposure Condition for WWAN and WiFi

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

8.2. Body Exposure Conditions for WWAN

Test Configurations	Antenna-to-edge/surface	SAR Required	Note
Rear (Base/Bottom)	5.6 mm	Yes	
Front	0.7 mm	Yes	
Edge 1	89 mm	No	SAR is not required because the distance from the WWAN antenna to this edge is >2.5 cm as per KDB 941225 D06 Hot Sport SAR v01
Edge 2	2.2 mm	Yes	
Edge 3	2.4 mm	Yes	
Edge 4	2.3 mm	Yes	

8.3. Body Exposure Conditions for WiFi

Test Configurations	Antenna-to-edge/surface	SAR Required	Note
Rear (Base/Bottom)	7.46 mm	Yes	
Front	0.3 mm	Yes	
Edge 1	2.2 mm	Yes	
Edge 2	24 mm	Yes	
Edge 3	95 mm	No	SAR is not required because the distance from the WiFi antenna to this edge is >2.5 cm as per KDB 941225 D06 Hot Sport SAR v01
Edge 4	3.8 mm	Yes	

9. RF Output Power Measurement

9.1. GSM850

GMSK (Voice) Mode

Band	Ch No.	Freq. (MHz)	Avg burst Pwr (dBm)
850	128	824.2	32.5
	190	836.6	32.5
	251	848.8	32.1

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	32.5	23.5	30.4	**24.4**	28.6	24.3	26.9	23.9
	190	836.6	32.8	23.8	30.5	**24.5**	28.6	24.3	26.9	23.9
	251	848.8	32.2	23.2	30.4	**24.4**	28.5	24.2	26.9	23.9

Notes:

The worst-case configuration and mode 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

8PSK (EGPRS) Mode - Coding Scheme: MCS5

This mode is Rx only

9.2. GSM1900

GMSK (Voice) Mode

Band	Ch No.	Freq. (MHz)	Avg burst Pwr (dBm)
1900	512	1850.2	29.5
	661	1880.0	29.4
	810	1909.8	29.6

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	29.6	20.5	27.9	**21.9**	25.9	21.7	24.0	21.0
	661	1880.0	29.6	20.5	28.0	**22.0**	25.9	21.6	24.0	21.0
	810	1909.8	29.6	20.6	28.0	**22.0**	25.9	21.7	24.0	21.0

Notes:

The worst-case configuration and mode 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

8PSK (EGPRS) Mode - Coding Scheme: MCS5

N/A: This mode is Rx only

9.3. Wi-Fi (802.11bgn)

Mode	Channel #	Freq. (MHz)	Conducted Avg Power	
			(dBm)	(mW)
802.11b	1	2412	**14.4**	27.54
	6	2437	**14.4**	27.54
	11	2462	**14.2**	26.30
802.11g	1	2412	14.4	27.54
	6	2437	14.4	27.35
	11	2462	14.2	26.30
802.11n (HT20)	1	2412	13.3	21.23
	6	2437	13.2	20.99
	11	2462	13.0	20.04

9.4. Bluetooth

Mode	Channel #	Freq. (MHz)	Conducted Avg Power	
			(dBm)	(mW)
GFSK	0	2402	4.12	2.58
	39	2441	4.36	2.73
	78	2480	3.31	2.14
8PSK	0	2402	2.12	1.63
	39	2441	2.37	1.73
	78	2480	1.39	1.38

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} (24 mW) and antenna is ≥ 5.0 cm from other antennas
- ☐ Output ≤ P_{Ref} (12 mW) and antenna is ≥ 2.5 cm from other antennas
- ☐ Output ≤ P_{Ref} (12 mW) and antenna is < 2.5 cm from other antennas

10. Tissue Dielectric Properties

IEEE Std 1528-2003 Table 2

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

FCC OET Bulletin 65 Supplement C 01-01

Target Frequency (MHz)	Head		Body	
	ε_r	σ (S/m)	ε_r	σ (S/m)
150	52.3	0.76	61.9	0.8
300	45.3	0.87	58.2	0.92
450	43.5	0.87	56.7	0.94
835	41.5	0.9	55.2	0.97
900	41.5	0.97	55	1.05
915	41.5	0.98	55	1.06
1450	40.5	1.2	54	1.3
1610	40.3	1.29	53.8	1.4
1800 – 2000	40	1.4	53.3	1.52
2450	39.2	1.8	52.7	1.95
3000	38.5	2.4	52	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

10.2. Tissue Dielectric Parameters Check Results

Tissue dielectric parameters 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 ±(%)
3/1/2012	Head 835	e'	42.0262	Relative Permittivity (ϵ_r):	42.03	41.50	1.27	5
		e''	19.0690	Conductivity (σ):	0.89	0.90	-1.63	5
	Head 825	e'	42.1432	Relative Permittivity (ϵ_r):	42.14	41.58	1.36	5
		e''	19.0965	Conductivity (σ):	0.88	0.90	-2.54	5
	Head 850	e'	41.8566	Relative Permittivity (ϵ_r):	41.86	41.50	0.86	5
		e''	19.0371	Conductivity (σ):	0.90	0.92	-1.67	5
3/2/2012	Head 1900	e'	40.6832	Relative Permittivity (ϵ_r):	40.68	40.00	1.71	5
		e''	13.4721	Conductivity (σ):	1.42	1.40	1.66	5
	Head 1855	e'	40.8685	Relative Permittivity (ϵ_r):	40.87	40.00	2.17	5
		e''	13.3497	Conductivity (σ):	1.38	1.40	-1.65	5
	Head 1885	e'	40.7434	Relative Permittivity (ϵ_r):	40.74	40.00	1.86	5
		e''	13.4282	Conductivity (σ):	1.41	1.40	0.53	5
	Head 1915	e'	40.6280	Relative Permittivity (ϵ_r):	40.63	40.00	1.57	5
		e''	13.5127	Conductivity (σ):	1.44	1.40	2.77	5
3/5/2012	Body 1900	e'	51.2471	Relative Permittivity (ϵ_r):	51.25	53.30	-3.85	5
		e''	14.2796	Conductivity (σ):	1.51	1.52	-0.75	5
	Body 1850	e'	51.4307	Relative Permittivity (ϵ_r):	51.43	53.30	-3.51	5
		e''	14.1591	Conductivity (σ):	1.46	1.52	-4.18	5
	Body 1880	e'	51.3232	Relative Permittivity (ϵ_r):	51.32	53.30	-3.71	5
		e''	14.2330	Conductivity (σ):	1.49	1.52	-2.12	5
	Body 1910	e'	51.2066	Relative Permittivity (ϵ_r):	51.21	53.30	-3.93	5
		e''	14.3083	Conductivity (σ):	1.52	1.52	-0.03	5
3/5/2012	Body 835	e'	54.6195	Relative Permittivity (ϵ_r):	54.62	55.20	-1.05	5
		e''	20.9507	Conductivity (σ):	0.97	0.97	0.28	5
	Body 815	e'	54.7802	Relative Permittivity (ϵ_r):	54.78	55.30	-0.93	5
		e''	21.0380	Conductivity (σ):	0.95	0.97	-1.52	5
	Body 820	e'	54.7336	Relative Permittivity (ϵ_r):	54.73	55.28	-0.98	5
		e''	21.0219	Conductivity (σ):	0.96	0.97	-1.03	5
	Body 825	e'	54.6936	Relative Permittivity (ϵ_r):	54.69	55.26	-1.02	5
		e''	20.9946	Conductivity (σ):	0.96	0.97	-0.60	5
	Body 850	e'	54.5142	Relative Permittivity (ϵ_r):	54.51	55.16	-1.17	5
		e''	20.8945	Conductivity (σ):	0.99	0.99	0.04	5
3/6/2012	Body 2450	e'	50.4399	Relative Permittivity (ϵ_r):	50.44	52.70	-4.29	5
		e''	14.9240	Conductivity (σ):	2.03	1.95	4.26	5
	Body 2410	e'	50.5755	Relative Permittivity (ϵ_r):	50.58	52.76	-4.14	5
		e''	14.7688	Conductivity (σ):	1.98	1.91	3.75	5
	Body 2435	e'	50.4879	Relative Permittivity (ϵ_r):	50.49	52.73	-4.25	5
		e''	14.8695	Conductivity (σ):	2.01	1.93	4.25	5
	Body 2460	e'	50.4059	Relative Permittivity (ϵ_r):	50.41	52.69	-4.33	5
		e''	14.9639	Conductivity (σ):	2.05	1.96	4.21	5

Tissue dielectric parameters check results cont.

Date	Freq. (MHz)	Liquid Parameters			Measured	Target	Delta (%)	Limit ±(%)
3/6/2012	Head 2450	e'	37.5178	Relative Permittivity (ϵ_r):	37.52	39.20	-4.29	5
		e''	13.4919	Conductivity (σ):	1.84	1.80	2.11	5
	Head 2410	e'	37.6745	Relative Permittivity (ϵ_r):	37.67	39.28	-4.09	5
		e''	13.3794	Conductivity (σ):	1.79	1.76	1.84	5
	Head 2435	e'	37.5739	Relative Permittivity (ϵ_r):	37.57	39.24	-4.23	5
		e''	13.4492	Conductivity (σ):	1.82	1.78	2.16	5
	Head 2475	e'	37.4402	Relative Permittivity (ϵ_r):	37.44	39.17	-4.41	5
		e''	13.5713	Conductivity (σ):	1.87	1.83	2.22	5
3/7/2012	Body 2450	e'	51.8597	Relative Permittivity (ϵ_r):	51.86	52.70	-1.59	5
		e''	14.4296	Conductivity (σ):	1.97	1.95	0.81	5
	Body 2410	e'	51.9652	Relative Permittivity (ϵ_r):	51.97	52.76	-1.51	5
		e''	14.2630	Conductivity (σ):	1.91	1.91	0.20	5
	Body 2435	e'	51.9030	Relative Permittivity (ϵ_r):	51.90	52.73	-1.56	5
		e''	14.3704	Conductivity (σ):	1.95	1.93	0.75	5
	Body 2460	e'	51.8266	Relative Permittivity (ϵ_r):	51.83	52.69	-1.63	5
		e''	14.4727	Conductivity (σ):	1.98	1.96	0.79	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 fine cube was chosen for 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)	SAR Measured (mW/g)		
				1g/10g	Head	Body
D835V2	4d117	4/15/11	835	1g	9.64	10.1
				10g	6.28	6.60
D1900V2	5d140	4/18/11	1900	1g	41.6	41.2
				10g	21.5	21.6
D2450V2	748	2/7/12	2450	1g	53.6	50.8
				10g	24.8	23.6

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.						
3/1/2012	D835V2	4d117	Head	1g	10.0	9.64	3.73	±10
				10g	6.56	6.28	4.46	
3/2/2012	D1900V2	5d140	Head	1g	40.8	41.6	-1.92	±10
				10g	21.0	21.5	-2.33	
3/2/2012	D1900V2	5d140	Body	1g	42.5	41.6	2.16	±10
				10g	22.4	21.5	4.19	
3/5/2012	D835V2	4d117	Body	1g	9.57	10.1	-5.25	±10
				10g	6.32	6.6	-4.24	
3/6/2012	D2450V2	748	Body	1g	50.5	49.9	1.20	±10
				10g	23.3	23.4	-0.43	
3/6/2012	D2450V2	748	Head	1g	49.5	52.7	-6.07	±10
				10g	22.6	24.6	-8.13	
3/7/2012	D2450V2	748	Body	1g	50.8	49.9	1.80	±10
				10g	23.2	23.4	-0.85	

12. SAR Test Results

12.1. GSM850

Head SAR

Test Position	Mode	Ch #.	Freq. (MHz)	Avg Pwr (dBm)	SAR (mW/g)		Note
					1-g	10-g	
Left Touch	GMSK (Voice)	128	824.20	32.5			1
		190	836.60	32.5	**0.147**	0.107	
		251	848.80	32.1			1
Left Tilt (15°)	GMSK (Voice)	128	824.20	32.5			1
		190	836.60	32.5	0.077	0.057	
		251	848.80	32.1			1
Right Touch	GMSK (Voice)	128	824.20	32.5			1
		190	836.60	32.5	0.100	0.074	
		251	848.80	32.1			1
Right Tilt (15°)	GMSK (Voice)	128	824.20	32.5			1
		190	836.60	32.5	0.066	0.049	
		251	848.80	32.1			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.

Body and Hotspot SAR

Test Position	Mode	Dist. (mm)	Ch #.	Freq. (MHz)	Avg Pwr (dBm)	SAR (mW/g)		Note
						1-g	10-g	
Rear	GPRS 2 slots	10	128	824.20	30.4			1
			190	836.60	30.5	**0.400**	0.285	
			190	836.60	30.5	0.321	0.211	2
			251	848.80	30.4			1
Front	GPRS 2 slots	10	128	824.20	30.4			1
			190	836.60	30.5	0.194	0.142	
			251	848.80	30.4			1
Edge 1	GPRS 2 slots	10	128	824.20	30.4			3
			190	836.60	30.5			3
			251	848.80	30.4			3
Edge 2	GPRS 2 slots	10	128	824.20	30.4			1
			190	836.60	30.5	0.094	0.065	
			251	848.80	30.4			1
Edge 3	GPRS 2 slots	10	128	824.20	30.4			1
			190	836.60	30.5	0.068	0.042	
			251	848.80	30.4			1
Edge 4	GPRS 2 slots	10	128	824.20	30.4			1
			190	836.60	30.5	0.240	0.165	
			251	848.80	30.4			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.
3. SAR is not required due to antenna-to-edge's distance is greater than 2.5 cm.

12.2. GSM1900

Head SAR

Test Position	Mode	Ch #.	Freq. (MHz)	Avg Pwr (dBm)	SAR (mW/g)		Note
					1-g	10-g	
Left Touch	GMSK (Voice)	512	1850.2	29.5	0.914	0.519	
		661	1880.0	29.4	0.950	0.536	
		810	1909.8	29.6	**0.957**	0.539	
Left Tilt (15°)	GMSK (Voice)	512	1850.2	29.5			1
		661	1880.0	29.4			1
		810	1909.8	29.6	0.293	0.175	
Right Touch	GMSK (Voice)	512	1850.2	29.5			1
		661	1880.0	29.4			1
		810	1909.8	29.6	0.680	0.395	
Right Tilt (15°)	GMSK (Voice)	512	1850.2	29.5			1
		661	1880.0	29.4			1
		810	1909.8	29.6	0.342	0.194	

Note(s):
1. SAR test was performed in the highest output power 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.

Body and Hotspot SAR

Test Position	Mode	Dist. (mm)	Ch #.	Freq. (MHz)	Avg Pwr (dBm)	SAR (mW/g)		Note
						1-g	10-g	
Rear	GPRS 2 slots	10	512	1850.2	27.9			1
			661	1880.0	28.0	0.516	0.310	
			810	1909.8	28.0			1
Front	GPRS 2 slots	10	512	1850.2	27.9			1
			661	1880.0	28.0	**0.701**	0.425	
			661	1880.0	28.0	0.673	0.401	2
			810	1909.8	28.0			1
Edge 1	GPRS 2 slots	10	512	1850.2	27.9			3
			661	1880.0	28.0			3
			810	1909.8	28.0			3
Edge 2	GPRS 2 slots	10	512	1850.2	27.9			1
			661	1880.0	28.0	0.184	0.109	
			810	1909.8	28.0			1
Edge 3	GPRS 2 slots	10	512	1850.2	27.9			1
			661	1880.0	28.0	0.633	0.376	
			810	1909.8	28.0			1
Edge 4	GPRS 2 slots	10	512	1850.2	27.9			1
			661	1880.0	28.0	0.228	0.138	
			810	1909.8	28.0			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.
3. SAR is not required due to antenna-to-edge's distance is greater than 2.5 cm.

12.3. Wi-Fi 11bgn

Head SAR

Test Position	Mode	Ch #.	Freq. (MHz)	Avg Pwr (dBm)	SAR (mW/g)		Note
					1-g	10-g	
Left Touch	802.11b	1	2412	14.4			1
		6	2437	14.4	0.529	0.234	
		11	2462	14.2			1
Left Tilt (15°)	802.11b	1	2412	14.4			1
		6	2437	14.4	**0.558**	0.251	
		11	2462	14.2			1
Right Touch	802.11b	1	2412	14.4			1
		6	2437	14.4	0.385	0.182	
		11	2462	14.2			1
Right Tilt (15°)	802.11b	1	2412	14.4			1
		6	2437	14.4	0.468	0.217	
		11	2462	14.2			1

Body and Hotspot SAR

Test Position	Mode	Dist. (mm)	Ch #.	Freq. (MHz)	Avg Pwr (dBm)	SAR (mW/g)		Note
						1-g	10-g	
Rear	802.11b	10	1	2412	14.4			1
			6	2437	14.4	**0.455**	0.222	
			6	2437	14.4	0.434	0.211	2
			11	2462	14.2			1
Front	802.11b	10	1	2412	14.4			1
			6	2437	14.4	0.097	0.048	
			11	2462	14.2			1
Edge 1	802.11b	10	1	2412	14.4			1
			6	2437	14.4	0.222	0.122	
			11	2462	14.2			1
Edge 2	802.11b	10	1	2412	14.4			1
			6	2437	14.4	0.055	0.032	
			11	2462	14.2			1
Edge 3	802.11b	10	1	2412	14.4			3
			6	2437	14.4			3
			11	2462	14.2			3
Edge 4	802.11b	10	1	2412	14.4			1
			6	2437	14.4	0.00053	0.0000136	
			11	2462	14.2			1

Note(s):

1. Testing was performed on the channel with the highest output power only as the SAR was ≤ 0.8 W/kg with the operating frequency band having a range of < 100 MHz. Per KDB 447498 1) e) i)
2. With headset attached.
3. SAR is not required due to antenna-to-edge's distance is greater than 2.5 cm.

13. Summary of Highest SAR Values

Results for highest SAR values for each frequency band and mode

Technology/Band	Test configuration		Mode	Separation distance (mm)	Highest 1g SAR (W/kg)
GSM850	Head:	Left Touch	GSM	0	0.147
	Body:	Rear	GPRS 2 Slots	10	0.400
GSM1900	Head:	Left Touch	GSM	0	0.957
	Body:	Front	GPRS 2 Slots	10	0.701
WiFi 2.4 GHz	Head	Left Tilt	802.11b 1Mbps	0	0.558
	Body:	Rear	802.11b 1Mbps	10	0.455

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

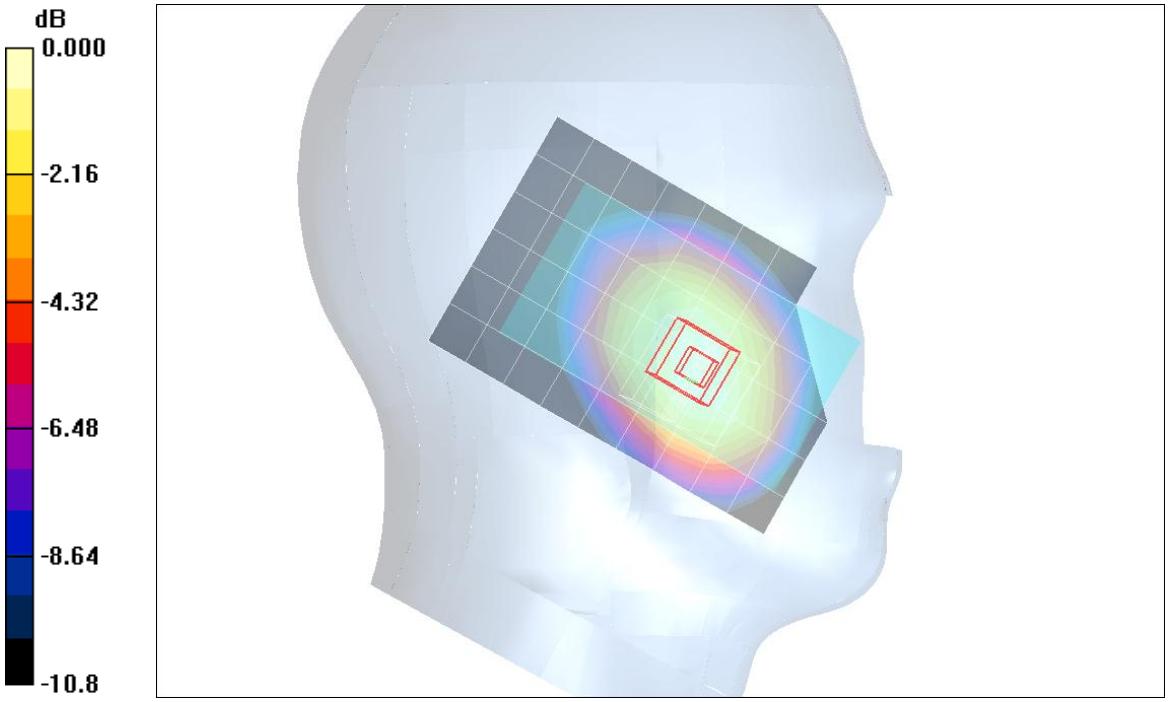
Test Laboratory: UL CCS SAR Lab D Date/Time: 3/1/2012 8:47:29 PM

GSM 850

Frequency: 836.6 MHz; Duty Cycle: 1:8.3; Room Ambient Temperature: 24.0°C; Liquid Temperature: 23.0°C
Medium parameters used (interpolated): f = 836.6 MHz; σ = 0.887 mho/m; ε_r = 42; ρ = 1000 kg/m^3 ;
DASY4 Configuration:
- Electronics: DAE3 Sn427; Calibrated: 1/17/2012
- Probe: EX3DV4 - SN3749; ConvF(8.68, 8.68, 8.68); 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

Left Touch_GSM_M ch 190/Area Scan (7x10x1): Measurement grid: dx=15mm, dy=15mm
Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (measured) = 0.164 mW/g

Left Touch_GSM_M ch 190/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 13.8 V/m; Power Drift = 0.015 dB
Peak SAR (extrapolated) = 0.196 W/kg
SAR(1 g) = 0.147 mW/g; SAR(10 g) = 0.107 mW/g
Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (measured) = 0.169 mW/g



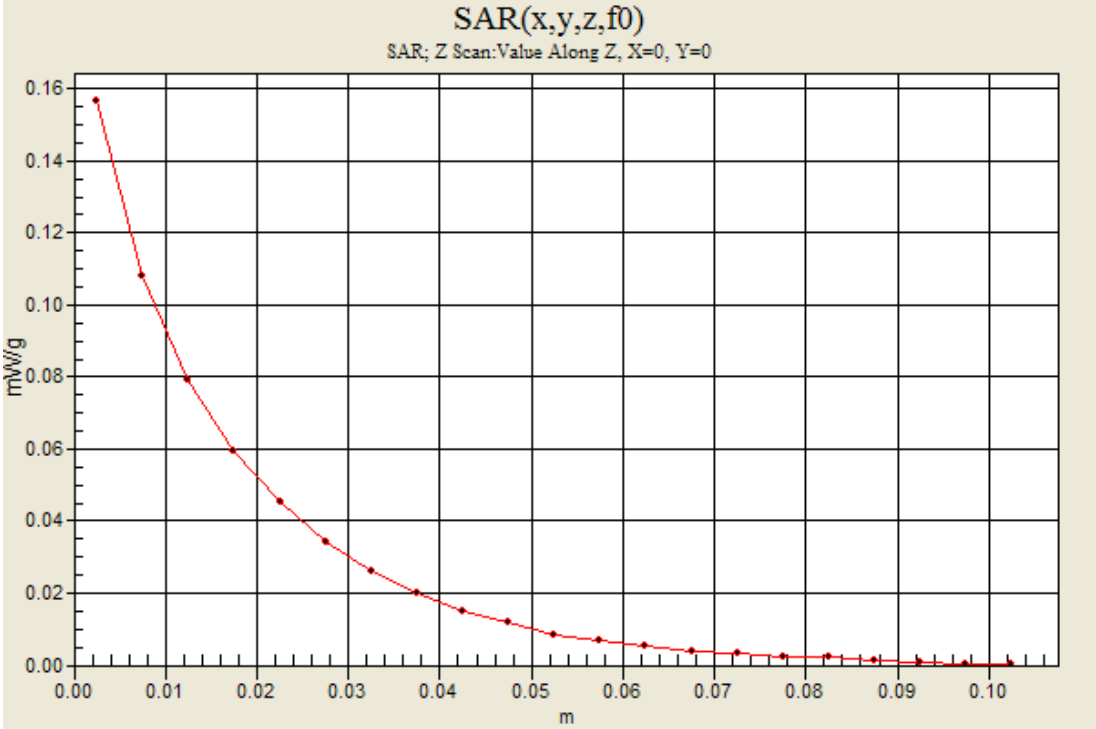
0 dB = 0.169mW/g

Test Laboratory: UL CCS SAR Lab D
Date/Time: 3/1/2012 8:57:53 PM

GSM 850

Frequency: 836.6 MHz; Duty Cycle: 1:8.3

Left Touch_GSM_M ch 190/Z Scan (1x1x21): Measurement grid: dx=20mm, dy=20mm, dz=5mm
Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (measured) = 0.157 mW/g



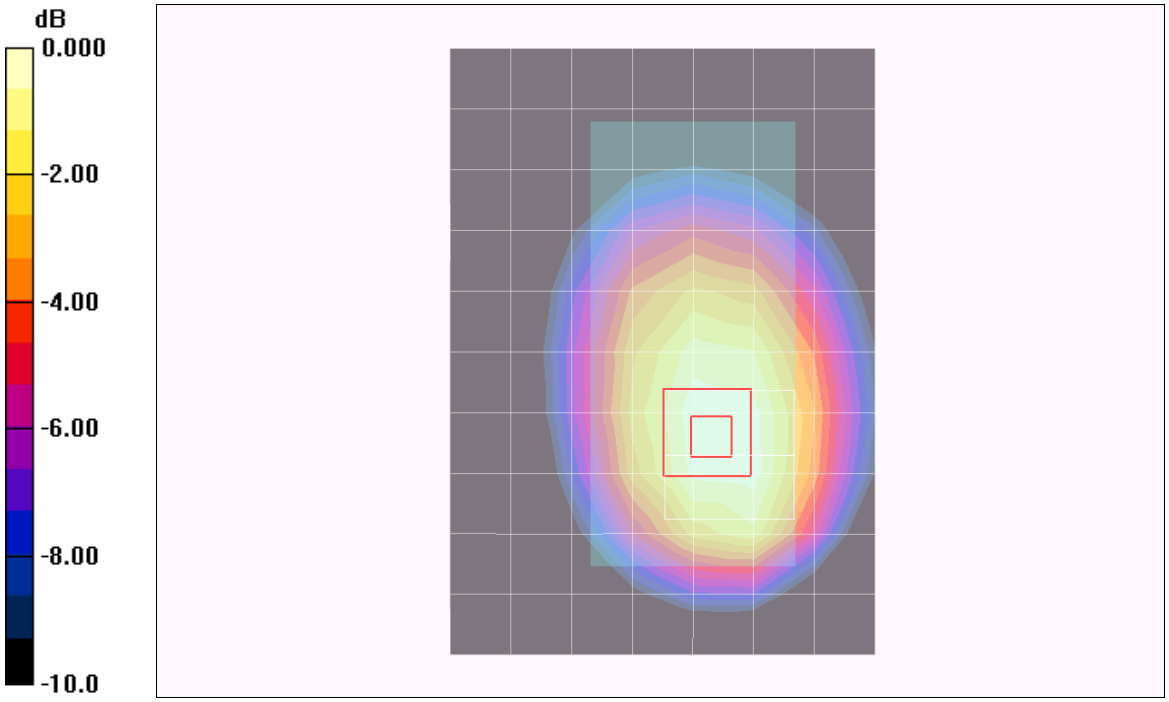
Test Laboratory: UL CCS SAR Lab D
Date/Time: 3/5/2012 2:48:12 PM

GPRS 850

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 = 0.975 mho/m; ε_r = 54.6; ρ = 1000 kg/m^3 ;
DASY4 Configuration:
- Electronics: DAE3 Sn427; Calibrated: 1/17/2012
- Probe: EX3DV4 - SN3749; ConvF(8.84, 8.84, 8.84); 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_GPRS 2 Slots M ch_190/Area Scan (8x11x1): Measurement grid: dx=15mm, dy=15mm
Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (measured) = 0.430 mW/g

Rear_GPRS 2 Slots M ch_190/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 21.5 V/m; Power Drift = -0.057 dB
Peak SAR (extrapolated) = 0.537 W/kg
SAR(1 g) = 0.400 mW/g; SAR(10 g) = 0.285 mW/g
Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (measured) = 0.454 mW/g



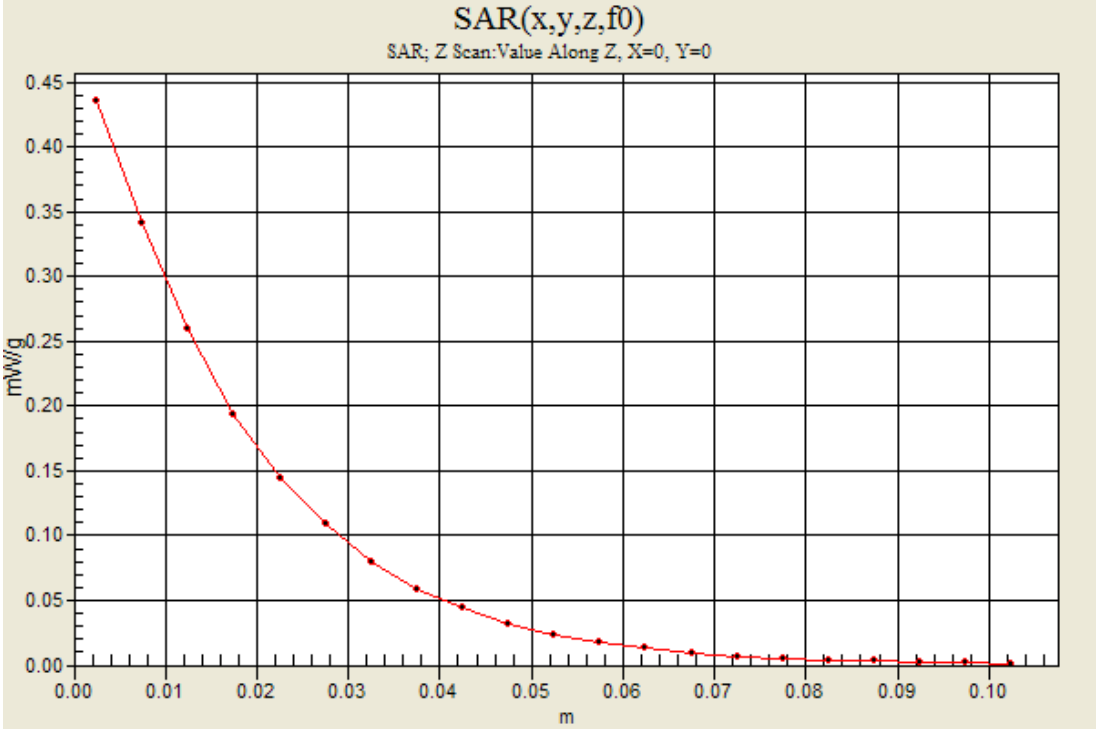
0 dB = 0.454mW/g

Test Laboratory: UL CCS SAR Lab D
Date/Time: 3/5/2012 2:58:25 PM

GPRS 850

Frequency: 836.6 MHz; Duty Cycle: 1:4

Rear_GPRS 2 Slots M ch_190/Z Scan (1x1x21): Measurement grid: dx=20mm, dy=20mm, dz=5mm
Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (measured) = 0.435 mW/g



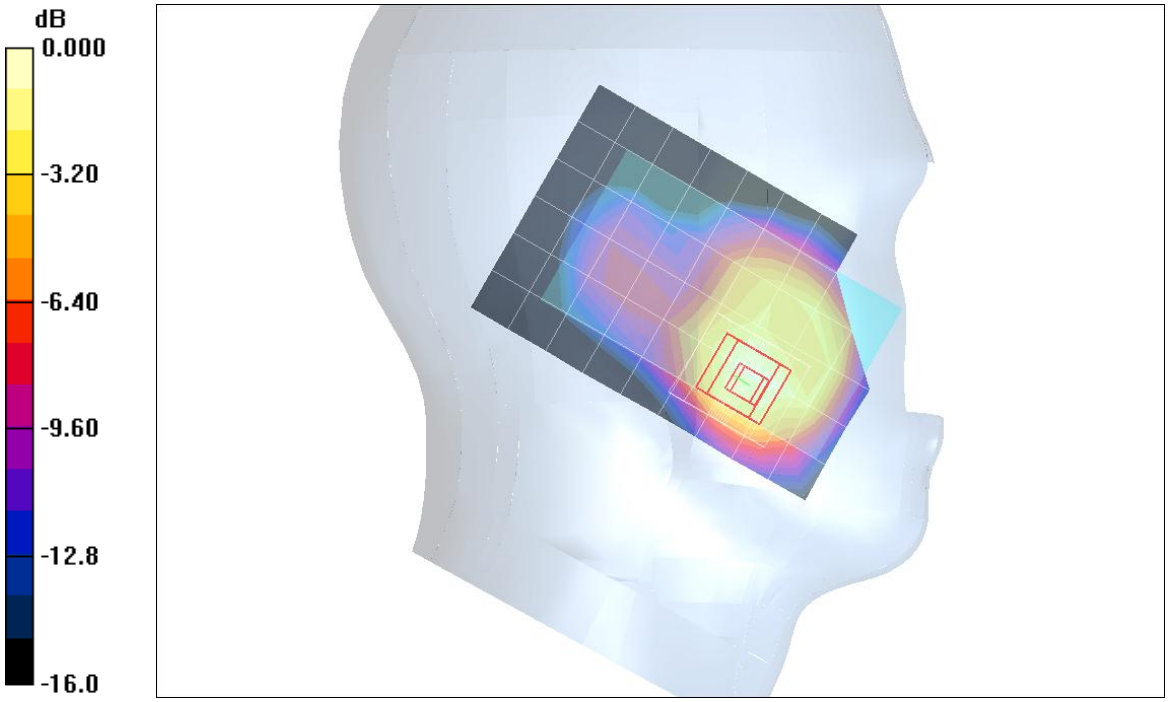
Test Laboratory: UL CCS SAR Lab D
Date/Time: 3/2/2012 1:43:10 PM

GSM 1900

Frequency: 1909.8 MHz; Duty Cycle: 1:8; Room Ambient Temperature: 24.0°C; Liquid Temperature: 23.0°C
Medium parameters used: f = 1910 MHz; σ = 1.43 mho/m; ε_r = 40.6; ρ = 1000 kg/m^3 ;
DASY4 Configuration:
- Electronics: DAE3 Sn427; Calibrated: 1/17/2012
- Probe: EX3DV4 - SN3749; ConvF(7.67, 7.67, 7.67); Calibrated: 1/27/2012
- Sensor-Surface: 2.5mm (Mechanical Surface Detection)
- Phantom: SAM A (Twin); Type: SAM A; Serial: 1050

Left Touch_GSM_H ch 810/Area Scan (7x10x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 1.05 mW/g

Left Touch_GSM_H ch 810/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 26.2 V/m; Power Drift = 0.002 dB
Peak SAR (extrapolated) = 1.54 W/kg
SAR(1 g) = 0.957 mW/g; SAR(10 g) = 0.539 mW/g
Maximum value of SAR (measured) = 1.21 mW/g



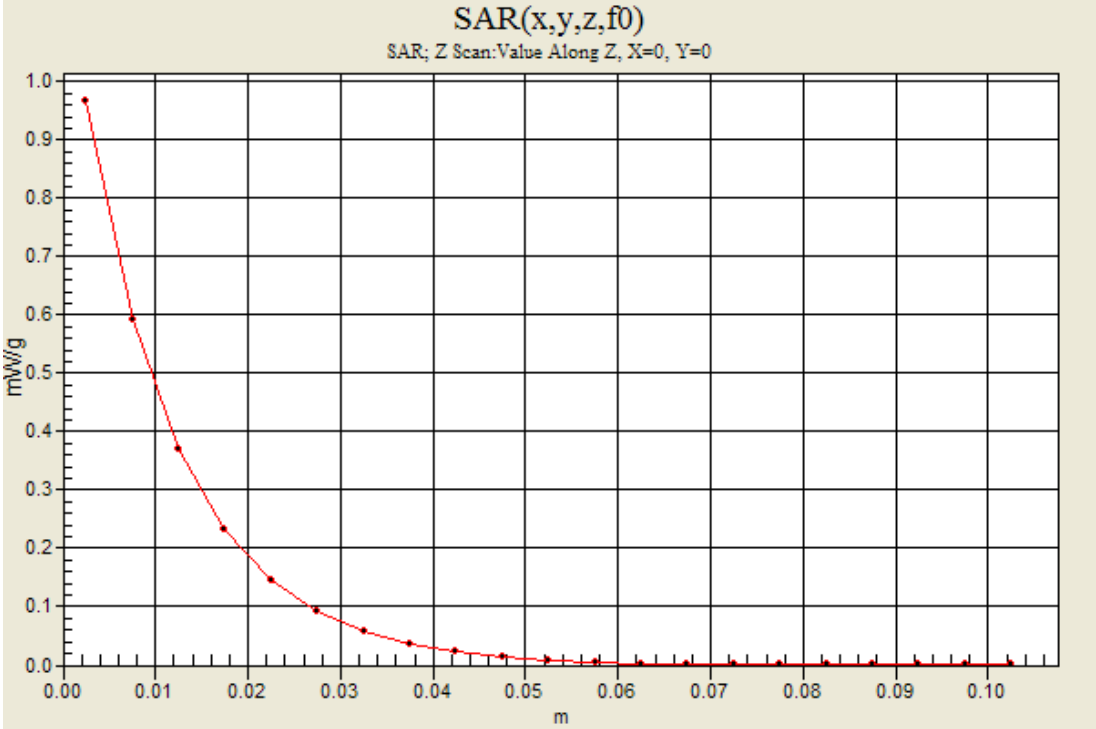
0 dB = 1.21mW/g

Test Laboratory: UL CCS SAR Lab D
Date/Time: 3/2/2012 1:55:55 PM

GSM 1900

Frequency: 1909.8 MHz; Duty Cycle: 1:8

Left Touch_GSM_H ch 810/Z Scan (1x1x21): Measurement grid: dx=20mm, dy=20mm, dz=5mm
Maximum value of SAR (measured) = 0.967 mW/g



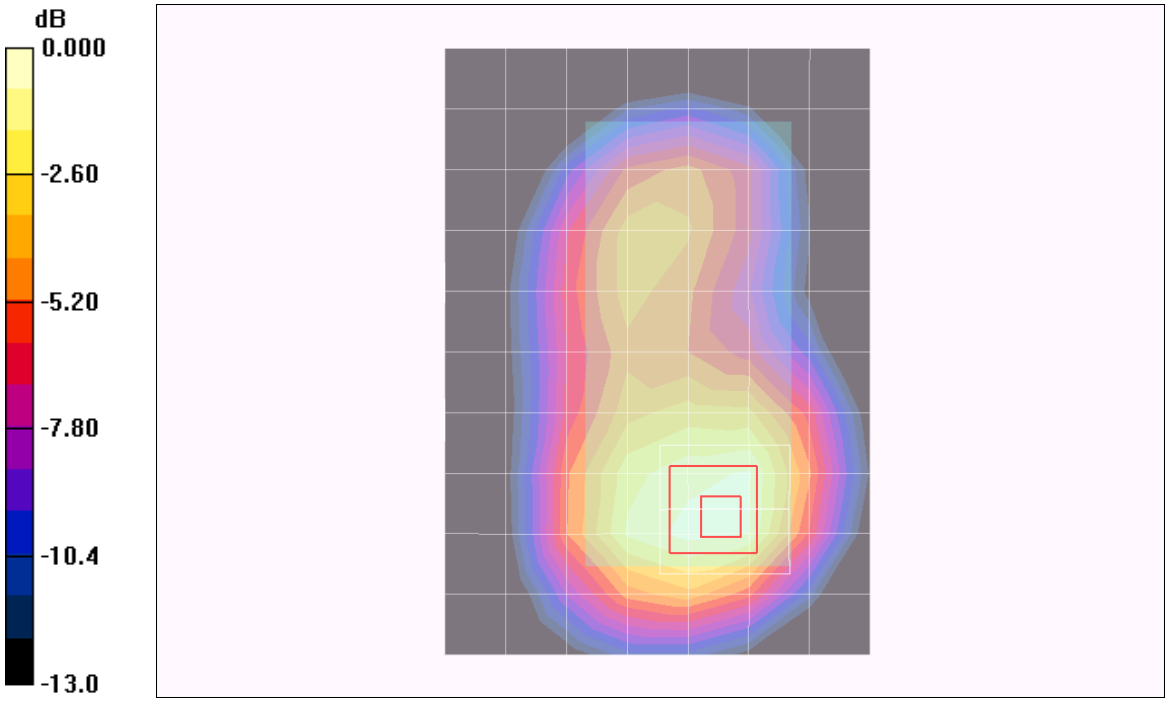
Test Laboratory: UL CCS SAR Lab D
Date/Time: 3/2/2012 9:54:29 PM

GPRS 1900

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 = 1.49 mho/m; ε_r = 51.3; ρ = 1000 kg/m^3 ;
DASY4 Configuration:
- Electronics: DAE3 Sn427; Calibrated: 1/17/2012
- Probe: EX3DV4 - SN3749; ConvF(6.97, 6.97, 6.97); Calibrated: 1/27/2012
- Sensor-Surface: 2.5mm (Mechanical Surface Detection)
- Phantom: Flat Phantom ELI4.0; Type: QDOVA001BB; Serial: SN:1017

Front _GPRS 2 Slots M ch 661/Area Scan (8x11x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 0.783 mW/g

Front _GPRS 2 Slots M ch 661/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 23.2 V/m; Power Drift = -0.197 dB
Peak SAR (extrapolated) = 1.12 W/kg
SAR(1 g) = 0.701 mW/g; SAR(10 g) = 0.425 mW/g
Maximum value of SAR (measured) = 0.876 mW/g



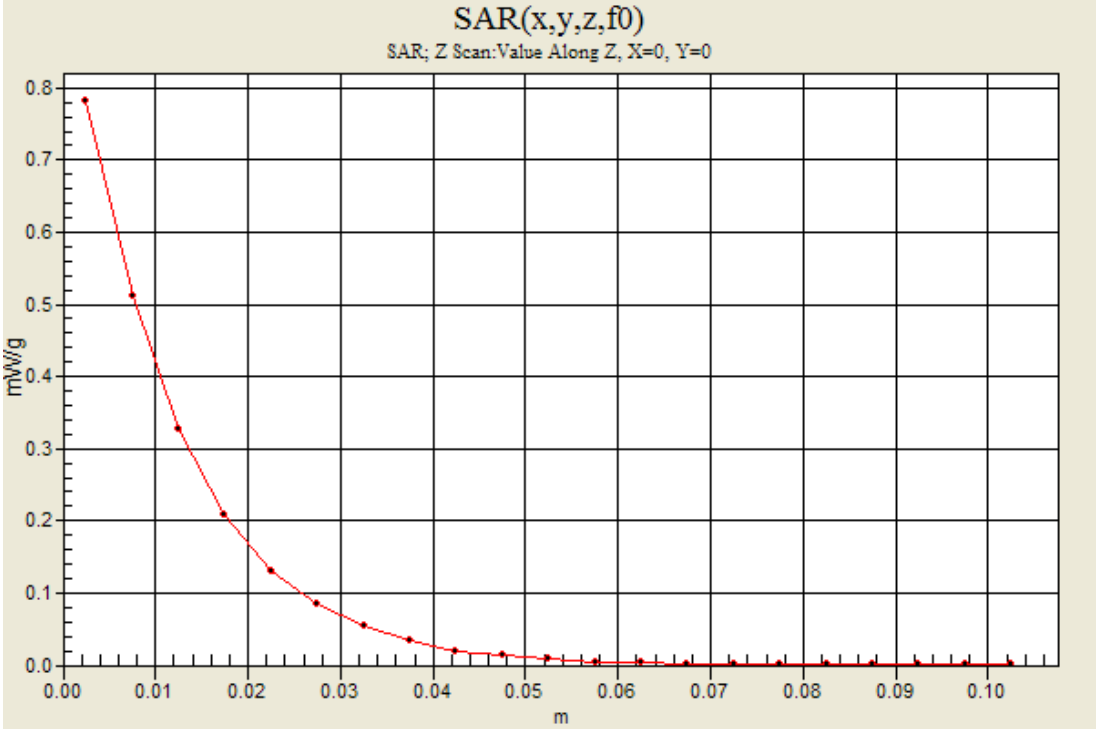
0 dB = 0.876mW/g

Test Laboratory: UL CCS SAR Lab D
Date/Time: 3/2/2012 10:11:15 PM

GPRS1900

Frequency: 1880 MHz; Duty Cycle: 1:4

Front _GPRS 2 Slots M ch 661/Z Scan (1x1x21): Measurement grid: dx=20mm, dy=20mm, dz=5mm
Maximum value of SAR (measured) = 0.782 mW/g



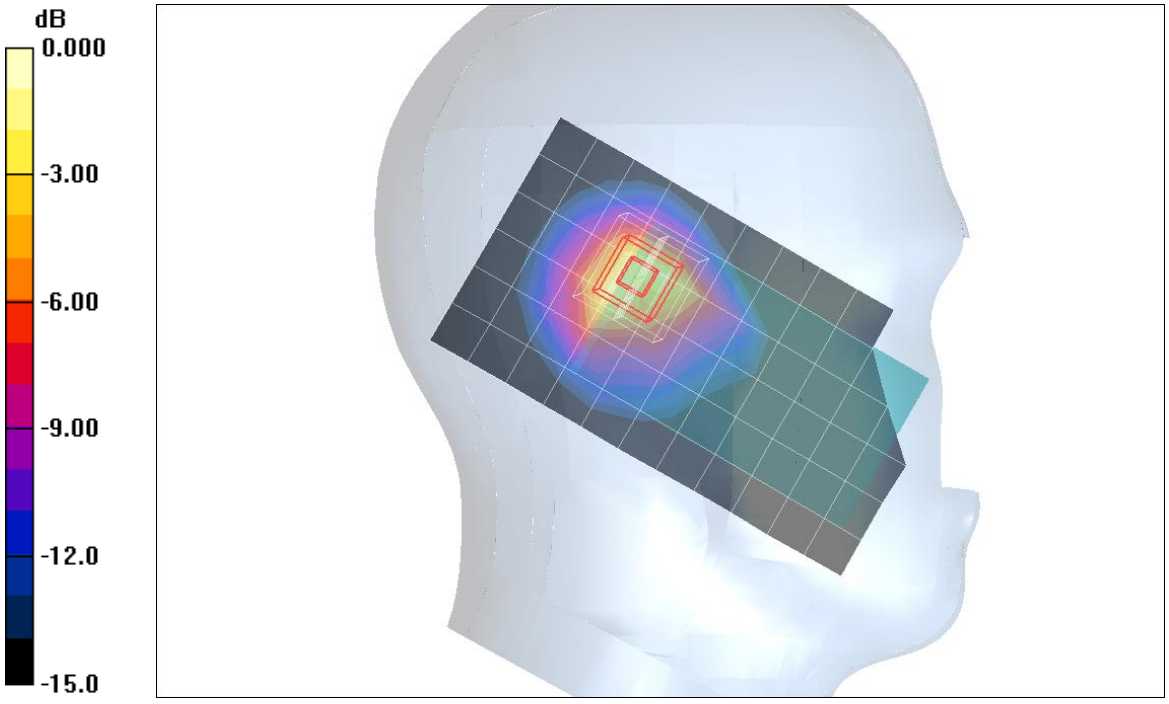
Test Laboratory: UL CCS SAR Lab D
Date/Time: 3/6/2012 10:36:40 PM

WiFi

Frequency: 2437 MHz; Duty Cycle: 1:1; Room Ambient Temperature: 24.0°C; Liquid Temperature: 23.0°C
Medium parameters used (interpolated): f = 2437 MHz; σ = 1.82 mho/m; ε_r = 37.6; ρ = 1000 kg/m^3 ;
DASY4 Configuration:
- Electronics: DAE3 Sn427; Calibrated: 1/17/2012
- Probe: EX3DV4 - SN3749; ConvF(6.76, 6.76, 6.76); 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

Left Tilt_802.11b_M ch 6/Area Scan (7x12x1): Measurement grid: dx=15mm, dy=15mm
Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (measured) = 0.555 mW/g

Left Tilt_802.11b_M ch 6/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 17.5 V/m; Power Drift = -0.027 dB
Peak SAR (extrapolated) = 1.19 W/kg
SAR(1 g) = 0.558 mW/g; SAR(10 g) = 0.251 mW/g
Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (measured) = 0.802 mW/g



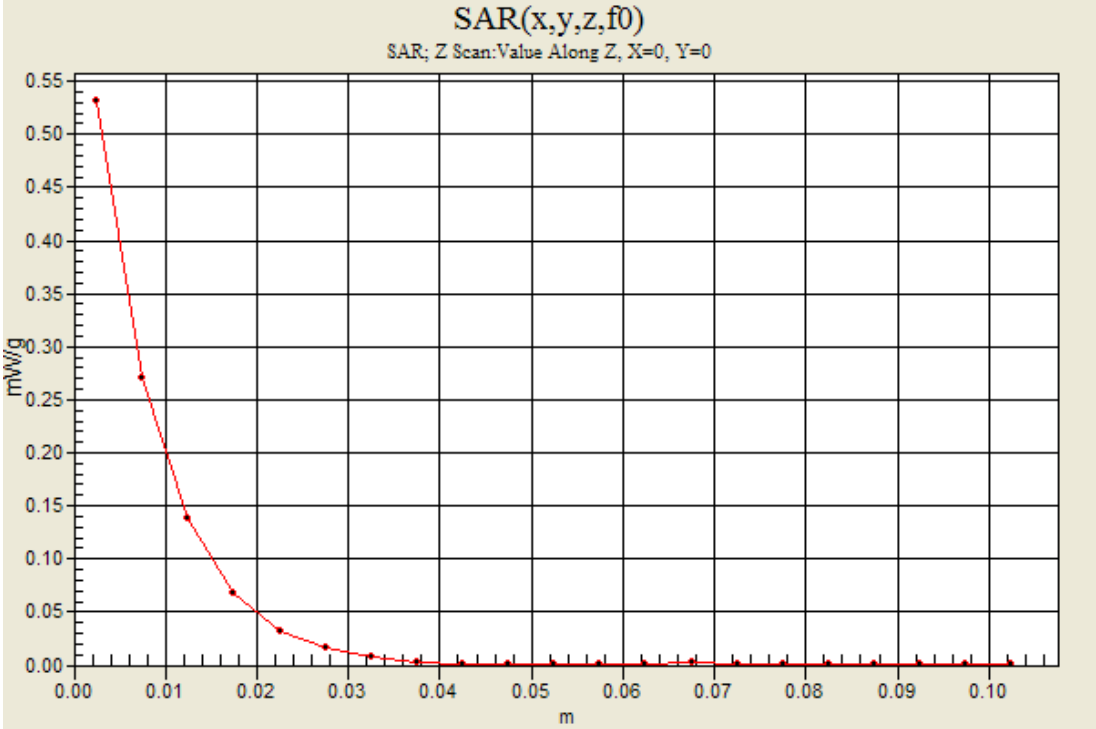
0 dB = 0.802mW/g

Test Laboratory: UL CCS SAR Lab D
Date/Time: 3/6/2012 10:47:16 PM

WiFi

Frequency: 2437 MHz; Duty Cycle: 1:1

Left Tilt_802.11b_M ch 6/Z Scan (1x1x21): Measurement grid: dx=20mm, dy=20mm, dz=5mm
Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (measured) = 0.531 mW/g



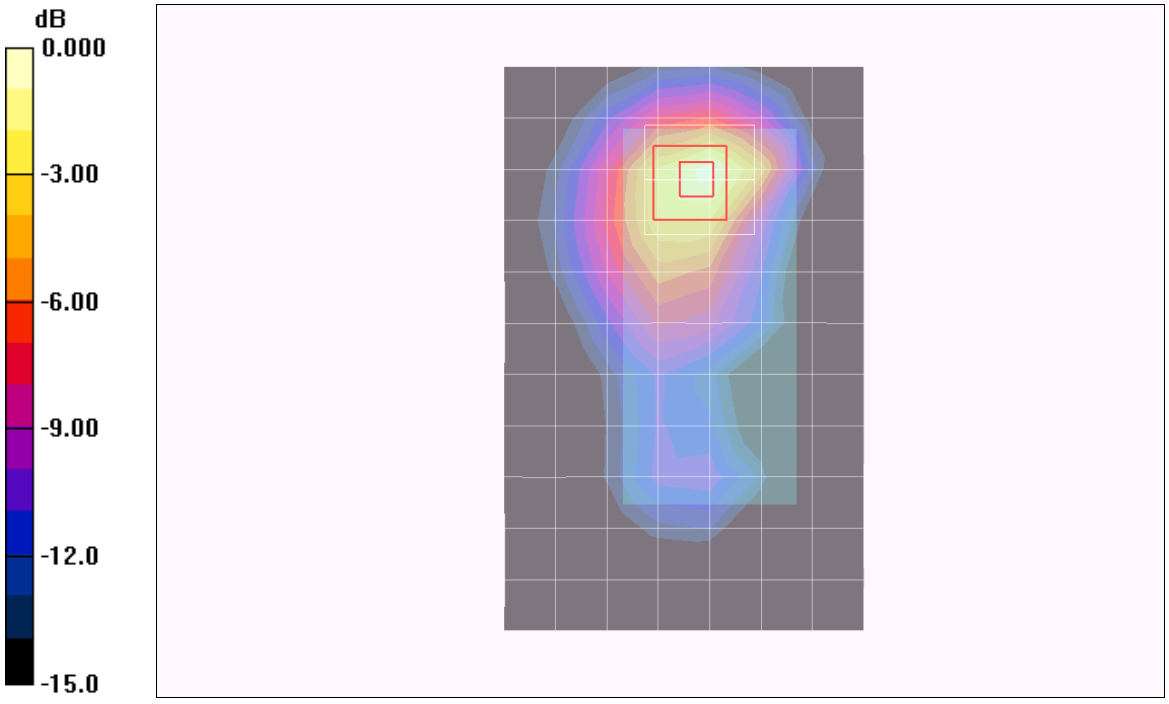
Test Laboratory: UL CCS SAR Lab D
Date/Time: 3/6/2012 11:25:24 PM

WiFi

Frequency: 2437 MHz; Duty Cycle: 1:1; Room Ambient Temperature: 24.0°C; Liquid Temperature: 23.0°C
Medium parameters used (interpolated): f = 2437 MHz; σ = 2.02 mho/m; ε_r = 50.5; ρ = 1000 kg/m^3 ;
DASY4 Configuration:
- Electronics: DAE3 Sn427; Calibrated: 1/17/2012
- Probe: EX3DV4 - SN3749; ConvF(6.66, 6.66, 6.66); 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_802.11b_M ch 6/Area Scan (8x12x1): Measurement grid: dx=15mm, dy=15mm
Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (measured) = 0.597 mW/g

Rear_802.11b_M ch 6/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 17.1 V/m; Power Drift = 0.098 dB
Peak SAR (extrapolated) = 0.929 W/kg
SAR(1 g) = 0.455 mW/g; SAR(10 g) = 0.222 mW/g
Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (measured) = 0.640 mW/g



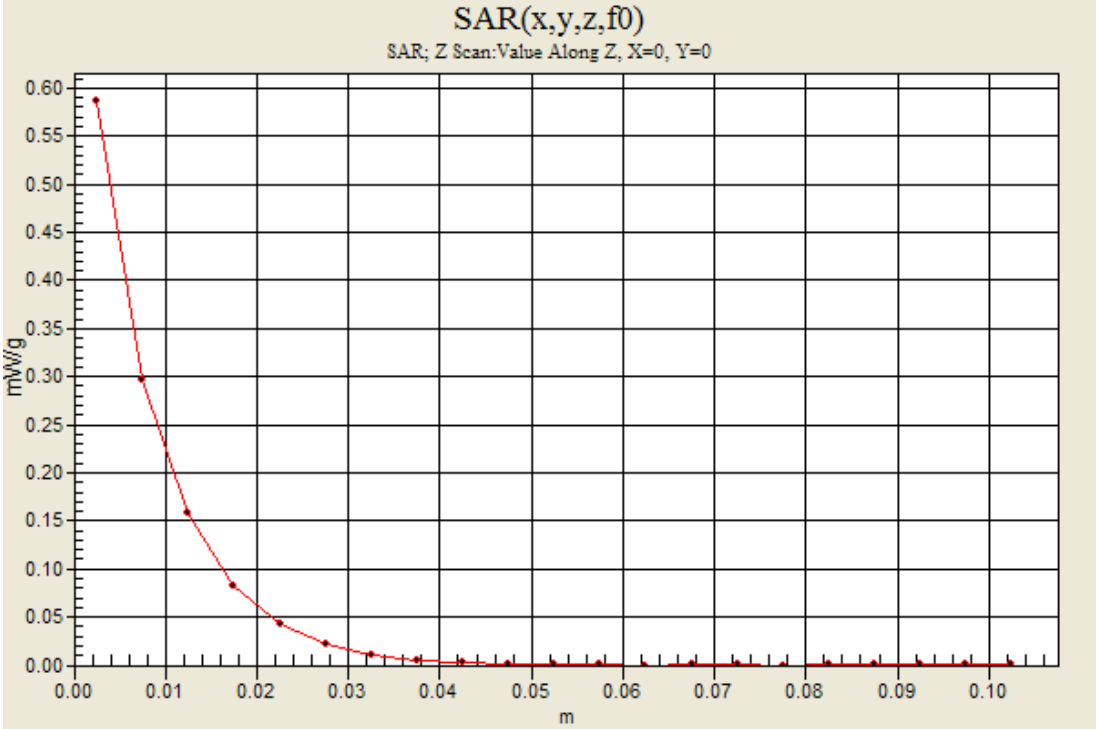
0 dB = 0.640mW/g

Test Laboratory: UL CCS SAR Lab D
Date/Time: 3/6/2012 11:35:55 PM

WiFi

Frequency: 2437 MHz; Duty Cycle: 1:1

Rear_802.11b_M ch 6/Z Scan (1x1x21): Measurement grid: dx=20mm, dy=20mm, dz=5mm
Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (measured) = 0.587 mW/g



14. Simultaneous Transmission SAR Analysis

14.1. Head exposure condition (WWAN + WiFi)

Test Position	Data/Voice			∑ 1g SAR (mW/g)
	GSM850	GSM1900	WiFi	
Left Touch	0.147		0.529	0.676
		0.957	0.529	**1.486**
Left Tilt	0.077		0.558	0.635
		0.293	0.558	0.851
Right Touch	0.100		0.385	0.485
		0.680	0.385	1.065
Right Tilt	0.066		0.468	0.534
		0.342	0.468	0.810

14.2. Body exposure condition (WWAN + WiFi)

Test Position	GSM850	GSM1900	WiFi	∑ 1-g SAR (W/kg)
Rear	0.400		0.455	**0.855**
		0.516	0.455	0.971
Front	0.194		0.097	0.291
		0.701	0.097	0.798
Edge 1	0*		0.222	NA
		0*	0.222	NA
Edge 2	0.094		0.055	0.149
		0.184	0.055	0.239
Edge 3	0.068		0*	NA
		0.633	0*	NA
Edge 4	0.240		0.0005	0.241
		0.228	0.0005	0.229

* 0 indicates that SAR assessment was not performed and therefore simultaneous transmission analysis was not required.

Conclusion:

Simultaneous transmission SAR measurement (volume scan) is not required due to the sum of the 1-g SAR is < 1.6 W/kg.