DECLARATION OF COMPLIANCE | SAR RF EXPOSURE EVALUATION | FCC & IC C2PC

Test Lab Information	**Name**	**CELLTECH LABS INC.**			
	Address	21-364 Lougheed Road, Kelowna, B.C. V1X 7R8 Canada			
Test Lab Accreditation(s)	**ISO/IEC 17025**	A2LA Test Lab Certificate No. 2470.01			
Applicant Information	**Name**	**HARRIS CORPORATION**			
	Address	221 Jefferson Ridge Parkway, Lynchburg, VA 24501 USA			
Standard(s) Applied	**FCC**	47 CFR §2.1093	**IC**	Health Canada Safety Code 6	
Procedure(s) Applied	**FCC**	OET Bulletin 65, Supplement C	**IC**	RSS-102 Issue 4	
	FCC	KDB 447498 D01v04	**FCC**	KDB 643646 D01v01r01	
	IEEE	1528-2003	**IEC**	62209-2:2010	
Device Classification(s)	**FCC**	Licensed Non-Broadcast Transmitter Held to Face (TNF) - FCC Part 90			
	IC	Land Mobile Radio Transmitter/Receiver (27.41-960 MHz) - RSS-119			
Device Identifier(s)	**FCC ID:**	AQZ-XG-100P00			
	IC:	122D-XG100P00			
Date of Sample Receipt	June 01, 2011				
Date(s) of Evaluation	Aug. 25 - Sep. 1, Sep. 20-21, 2011				
DUT Serial No.	A40200001652				
DUT Part No.	12082-1000-01				
Device Model(s)	Unity XG-100P				
Application Type(s)	**Class II Permissive Change (Add New Antenna - Multi-band Helical 136-870 MHz - P/N: 12082-0295-01)**				
Device-Under-Test (DUT) Description / Transmitter(s)	Portable Push-To-Talk (PTT) Multi-Band Radio Transceiver (Analog FM / Digital P25 FDMA)				
	Class 1 Bluetooth - Pwr = > 60/$f_{(GHz)}$ mW - Manuf. maximum conducted output power spec = 20 dBm (Average) Supports simultaneous transmission - antenna-to-antenna distance (Multi-band PTT to Bluetooth) = ~ 130 mm				
DUT Sample Revision No.s	Software: 12082-8900 1.0.2	RF Hardware: 12082-2010-07	Digital Hardware: 12082-4100-06		
Frequency Bands/Ranges Tested	763 - 775 MHz	793 - 805 MHz	806 - 824 MHz	851 - 869 MHz	
Manufacturer's Rated Output Power	34.2 dBm	2.63 Watts	+0.5 / -0.2 dB	Conducted	763-775 / 793-805 MHz bands
	35.0 dBm	3.16 Watts	+0.5 / -0.2 dB	Conducted	806-824 / 851-869 MHz bands
Antenna Type(s) Tested	Multi-band Helical (136-870 MHz)	Length: 165 mm	P/N: 12082-0295-01 (New)		
Battery Type(s) Tested	See manufacturer's accessory listing (Section 7.0)				
Body-worn Accessories Tested	See manufacturer's accessory listing (Section 7.0)				
Audio Accessories Tested	See manufacturer's accessory listing (Section 7.0)				
Max. SAR Level(s) Evaluated	Face-held	**0.171 W/kg**	1g	50% PTT duty factor	Occupational / Controlled Exposure
	Body-worn	**2.37 W/kg**	1g	50% PTT duty factor	Occupational / Controlled Exposure
FCC/IC Spatial Peak SAR Limit	Head/Body	8.0 W/kg	1g	50% PTT duty factor	Occupational / Controlled Exposure

Celltech Labs Inc. declares under its sole responsibility that this wireless portable device has demonstrated compliance with the Specific Absorption Rate (SAR) RF exposure requirements specified in FCC 47 CFR §2.1093 and Health Canada Safety Code 6 for the Occupational / Controlled Exposure environment. The device was tested in accordance with the measurement procedures specified in FCC OET Bulletin 65, Supplement C (Edition 01-01), Industry Canada RSS-102 Issue 4, IEEE Standard 1528-2003 and IEC International Standard 62209-2:2010. All measurements were performed in accordance with the SAR system manufacturer recommendations.

I attest to the accuracy of data. All measurements were performed by me or were made under my supervision and are correct to the best of my knowledge and belief. I assume full responsibility for the completeness of these measurements and vouch for the qualifications of all persons taking them.

The results and statements contained in this report pertain only to the device(s) evaluated.

Test Report Approved By		**Sean Johnston**	**Lab Manager**	**Celltech Labs Inc.**

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REVISION HISTORY			
REVISION NO.	**DESCRIPTION**	**IMPLEMENTED BY**	**RELEASE DATE**
1.0	1st Release	Jon Hughes	September 30, 2011
1.1	2nd Release 1. Removed reference to “audio accessories with integral antenna” (Section 9.0) 2. Added Section 12.0 3. Added photos of antenna, body-worn and audio accessories not evaluated for SAR (Appendix D) 4. Revised Accessory ID #’s (Sections 7.0, 10.0) Added SAR Data Table Numbering (Section 10.0) 5. Added Reference 16 (Section 25.0) 6. Added Appendix I	Jon Hughes	October 26, 2011

TEST REPORT SIGN-OFF			
DEVICE TESTED BY	**REPORT PREPARED BY**	**QA REVIEW BY**	**REPORT APPROVED BY**
Mike Meaker	Cheri Frangiadakis	Jon Hughes	Sean Johnston

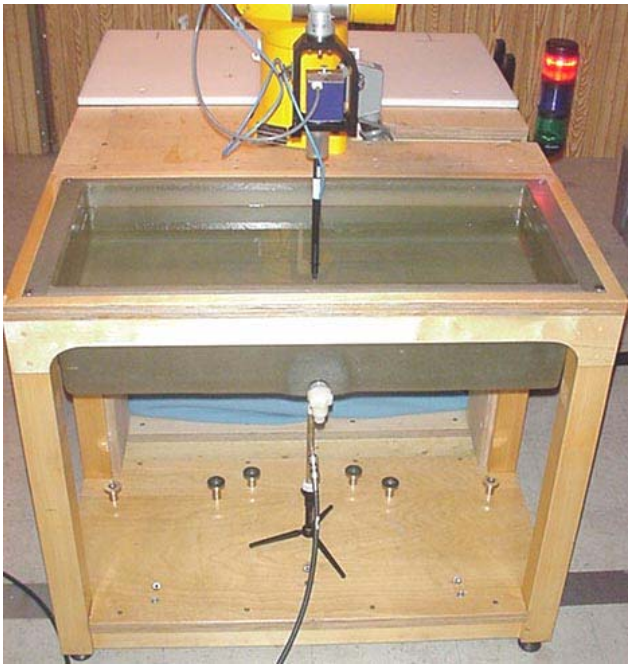
1.0 INTRODUCTION

This measurement report demonstrates that the HARRIS Corporation Model: Unity XG-100P Portable Analog/Digital PTT Multi-Band Radio Transceiver (700/800 Band), with the Class II Permissive Change(s) described in this report, complies with the SAR (Specific Absorption Rate) RF exposure requirements specified in FCC 47 CFR §2.1093 (see reference [1]) and Health Canada's Safety Code 6 (see reference [2]) for the Occupational / Controlled Exposure environment. The measurement procedures described in FCC OET Bulletin 65, Supplement C 01-01 (see reference [3]), IC RSS-102 Issue 4 (see reference [4]), IEEE Standard 1528-2003 (see reference [5]) and International Standard IEC 62209-2:2010 (see reference [6]) were employed. A description of the device, operating configuration, detailed summary of the test results, methodology and procedures used in the evaluation, equipment used and the various provisions of the rules are included within this test report.

2.0 SAR MEASUREMENT SYSTEM

Celltech Labs Inc. SAR measurement facility utilizes the Dosimetric Assessment System (DASY™) manufactured by Schmid & Partner Engineering AG (SPEAG™) of Zurich, Switzerland. The DASY4 measurement system is comprised of the measurement server, robot controller, computer, near-field probe, probe alignment sensor, specific anthropomorphic mannequin (SAM) phantom, and various planar phantoms for head and/or body SAR evaluations. The robot is a six-axis industrial robot performing precise movements to position the probe to the location (points) of maximum electromagnetic field (EMF). A cell controller system contains the power supply, robot controller, teach pendant (Joystick), and remote control, is used to drive the robot motors. The Staubli robot is connected to the cell controller to allow software manipulation of the robot. A data acquisition electronic (DAE) circuit performs the signal amplification, signal multiplexing, AD-conversion, offset measurements, mechanical surface detection, collision detection, etc. is connected to the Electro-optical coupler (EOC). The EOC performs the conversion from the optical into digital electric signal of the DAE and transfers data to the DASY4 measurement server. The DAE4 utilizes a highly sensitive electrometer-grade preamplifier with auto-zeroing, a channel and gain-switching multiplexer, a fast 16-bit AD-converter and a command decoder and control logic unit. Transmission to the DASY4 measurement server is accomplished through an optical downlink for data and status information and an optical uplink for commands and clock lines. The mechanical probe-mounting device includes two different sensor systems for frontal and sidewise probe contacts. The sensor systems are also used for mechanical surface detection and probe collision detection. The robot uses a controller with a built in VME-bus computer.

DASY4 SAR Measurement System with Side Planar Phantom



DASY4 Measurement System with Barski Planar Phantom

3.0 RF CONDUCTED OUTPUT POWER MEASUREMENTS

MEASURED RF CONDUCTED OUTPUT POWER LEVELS					
Test Freq. (MHz)	**Band (MHz)**	**Mode**	**dBm**	**Watts**	**Method**
763.0	763-775	CW	34.2	2.61	Average Conducted
775.0	763-775	CW	34.2	2.63	Average Conducted
793.0	793-805	CW	34.2	2.63	Average Conducted
805.0	793-805	CW	34.1	2.60	Average Conducted
806.0	806-824	CW	35.0	3.16	Average Conducted
824.0	806-824	CW	35.0	3.16	Average Conducted
851.0	851-869	CW	35.1	3.20	Average Conducted
869.0	851-869	CW	35.1	3.20	Average Conducted

Notes

1. The test channels were selected in accordance with the procedures specified in FCC KDB 447498 Section 6) c) (see reference [7]).

2. The RF conducted output power levels of the DUT were measured by Celltech prior to the SAR evaluations using a Gigatronics 8652A Universal Power Meter at the external antenna connector of the radio in accordance with FCC 47 CFR §2.1046 (see reference [13]) and IC RSS-Gen (see reference [14]).

4.0 FCC POWER THRESHOLDS FOR PTT DEVICES ($f \leq 0.5$ GHz)

FCC SAR Evaluation Power Thresholds for PTT Devices, $f \leq 0.5$ GHz*		
Exposure Conditions	***P* mW (General Population)**	***P* mW (Occupational)**
Held to face, $d \geq 2.5$ cm	250	1250
Body-worn, $d \geq 1.5$ cm	200	1000
Body-worn, $d \geq 1.0$ cm	150	750

1. The time-averaged output power, corresponding to the required PTT duty factor, is compared with these thresholds.
2. The closest distance between the user and the device or its antenna is used to determine the power thresholds.

* Per FCC KDB 447498 D01v04 Section 5)b)i) (see reference [7]).

Note: The thresholds specified in the above table do not apply to this radio in the 700/800 MHz band ($f \geq 0.5$ GHz). The output power threshold of $\geq 60/f_{(GHz)}$ mW specified in FCC KDB 447498 (see reference [7]) was applied.

5.0 NO. OF TEST CHANNELS (N_c)

Antenna Part No.	Antenna Type	Test Frequency Range	Band	N_c	Test Frequencies (MHz)
12082-0295-01	Multi-Band Helical (136-870 MHz)	763.0 - 775.0 MHz	FCC/IC	2	763.0, 775.0
		793.0 - 805.0 MHz	FCC/IC	2	793.0, 805.0
		806.0 - 824.0 MHz	FCC/IC	2	806.0, 824.0
		851.0 - 869.0 MHz	FCC/IC	2	851.0, 869.0

Note: The number of test channels (*Nc*) were calculated in accordance with the procedures specified in FCC KDB 447498 Section 6) c) (see reference [7]).

6.0 SAR PROBE CALIBRATION & MEASUREMENT FREQUENCIES

The following procedures are recommended for measurements at 150 MHz - 3 GHz to minimize probe calibration and tissue dielectric parameter discrepancies. In general, SAR measurements below 300 MHz should be within ±50 MHz of the probe calibration frequency. At 300 MHz to 3 GHz, measurements should be within ±100 MHz of the probe calibration frequency. Measurements exceeding 50% of these intervals, ±25 MHz < 300 MHz and ±50 MHz ≥300 MHz, require additional steps (per FCC KDB 450824 D01 v01r01, SAR Probe Calibration and System Verification Considerations for Measurements at 150 MHz - 3 GHz - see reference [9]).

Probe Calibration Frequency	Device Measurement Frequency	Frequency Interval	±50 MHz ≥ 300 MHz
835 MHz	763.0 MHz	72 MHz	> 50 MHz[2]
	775.0 MHz	60 MHz	> 50 MHz[2]
	793.0 MHz	42 MHz	< 50 MHz[1]
	805.0 MHz	30 MHz	< 50 MHz[1]
	806.0 MHz	29 MHz	< 50 MHz[1]
	824.0 MHz	11 MHz	< 50 MHz[1]
	851.0 MHz	16 MHz	< 50 MHz[1]
	869.0 MHz	34 MHz	< 50 MHz[1]

Notes

1. The probe calibration and measurement frequency interval is < 50 MHz; therefore the additional steps were not required.

2. The probe calibration and measurement frequency interval is > 50 MHz; therefore the following additional steps were implemented (per FCC KDB 450824 D01 v01r01): *The measured 1-g SAR may be compensated with respect to +5% tolerances in ε_r and -5% tolerances in σ, computed according to valid SAR sensitivity data, to reduce SAR underestimation and maintain conservativeness.* SAR sensitivity data is per SPEAG DASY4 Manual (see reference [12]). The additional steps were applied to 755.0 MHz test frequency only, due to 763.0 MHz test frequency was not a required test channel per KDB 643646.

Probe Calibration Frequency = 835 MHz					Target Parameters:		Head 41.5 ε_r / 0.9 σ	Body 55.2 ε_r / 0.97 σ		
Test Freq.	Date	Tissue	σ	Sensitivity	ε_r	Sensitivity	% Change	Compensated SAR Level W/kg		
775 MHz	Aug 31	Body	-5.15%[2]	0.59	2.57%	-0.57	4.50%	1.36	1g	50% ptt d/f
775 MHz	Sep 01	Body	-5.15%[2]	0.59	3.42%	-0.57	4.99%	1.40	1g	50% ptt d/f
775 MHz	Sep 21	Head	-5.56%[2]	0.59	3.78%	-0.57	5.43%	0.133	1g	50% ptt d/f

Parameter	ϵ	σ	ρ
f=800 MHz, d=15 mm (ϵ_r=41.5, σ=0.90 S/m)			
SAR Peak	- 0.70	+ 0.86	-
SAR 1 g	- 0.57	+ 0.59	0.10
SAR 10 g	- 0.45	+ 0.35	0.18

Notes

1. The above sensitivity data (Head) from the DASY4 manual (see reference [12]) can be applied to Body tissue parameters (per SPEAG).

2. FCC KDB 450824 refers to probe calibrations with fluid parameter tolerances +/- 5%; SPEAG's current probe calibration is valid for fluid parameter tolerances of +/- 10% (See Appendix F). We have accounted for the > 5% measured fluid parameter tolerance in the measurement uncertainty table (see Section 23) and have still applied the same sensitivity calculation adjustment to the SAR levels as shown in the above table.

7.0 MANUFACTURER'S DISCLOSED ACCESSORY LISTING

Accessory ID # for Test Report	ACCESSORY CATEGORY: ANTENNA		
	Part Number	**Description**	**SAR Evaluation**
1	12082-0295-01	Multi-band Helical (136-870 MHz)	Yes
2	12082-0250-01[1]	Multi-band Helical (136-870 MHz)	No
Accessory ID # for Test Report	**ACCESSORY CATEGORY: BATTERY**		
	Part Number	**Description**	
a	BT-010942-001[2]	Li-ion, 7.4V, 3200mAh - Non-intrinsically Safe	Yes
a	BT-010942-002[2]	Li-ion, 7.4V, 3200mAh - Intrinsically Safe	Yes
b	BKB191210/34[3]	Ni-MH, 7.5V, 2400mAh - Non-intrinsically Safe / Immersible	Yes
b	BKB191210/36[3]	Ni-MH, 7.5V, 2400mAh - Intrinsically Safe / Immersible	Yes
b	BKB191210/44[3]	Ni-MH, 7.5V, 2400mAh - Non-intrinsically Safe / Wind Driven Rain	Yes
c	12082-0304-01	Li-ion, 7.4V, 3650mAh	Yes
d	12082-0300-01	Li-poly, 7.4V, 3500mAh	Yes
e	12082-0309-01	Alkaline battery case - 6 x AA	Yes
Accessory ID # for Test Report	**ACCESSORY CATEGORY: BODY-WORN**		
	Part Number	**Description**	
B1	12082-1291-01	Metal Belt-Clip	Yes
B2	12082-0504-01	Nylon Strap (Used with Nylon Case)	Yes
B3	12082-0505-01	Leather Strap (Used with Leather Case)	Yes
B4	12082-0512-01	Nylon Case - Window - T-Strap	Yes
B5	12082-0510-01[4]	Nylon Case - Full - T-Strap	No
B6	12082-0501-01[5]	Leather Case - Half - T-Strap	No
B7	12082-0500-01	Leather Case - Full - T-Strap	Yes
B8	12082-0507-02[6]	Leather Case - Half - 3" Belt-Loop	No
B9	12082-0507-01[6]	Leather Case - Half - 2.5" Belt-Loop	No
B10	12082-0502-02	Leather Case - Full - 3" Belt-Loop	Yes
B11	12082-0502-01[6]	Leather Case - Full - 2.5" Belt-Loop	No
Accessory ID # for Test Report	**ACCESSORY CATEGORY: AUDIO**		
	Part Number	**Description**	
A1	12082-0600-01[7]	Standard Speaker-Microphone	Yes
A2	12082-0600-02[7,8]	Standard Speaker-Microphone w/ Emergency Button	No
A3	12082-0601-01[7,8]	Standard Speaker-Microphone w/ Emergency Button	No

Manufacturer's disclosed accessory listing information provided by HARRIS Corporation

Notes

1. Antenna not evaluated for SAR (originally evaluated for new FCC ID Certification application submittal).
2. Batteries are similar in construction and were grouped together for the SAR evaluations (see Appendix D).
3. Batteries are similar in construction and were grouped together for the SAR evaluations (see Appendix D).
4. Case is similar in construction to Body-worn Accessory #B4 and was not evaluated for SAR (see Appendix D).
5. Case is similar in construction to Body-worn Accessory #B7 and was not evaluated for SAR (see Appendix D).
6. Case is similar in construction to Body-worn Accessory #B10 and was not evaluated for SAR (see Appendix D).
7. Preliminary evaluations were performed with #A1, #A2, & #A3 audio accessories to establish the default audio acc. (A1).
8. Speaker-microphone audio accessories #A2 & #A3 were not evaluated for SAR based on KDB 643646 Pg. 10 Sect. 1)D)I).

8.0 FLUID DIELECTRIC PARAMETERS

FLUID DIELECTRIC PARAMETERS

Date: 08/25/2011		Frequency: 835 MHz			Tissue: Body	
Freq	Test_e	Test_s	Target_e	Target_s	Deviation Permittivity	Deviation Conductivity
0.735	54.97	0.87	55.2	0.97	-0.42%	-10.31%
0.745	54.85	0.86	55.2	0.97	-0.63%	-11.34%
0.755	54.73	0.87	55.2	0.97	-0.85%	-10.31%
0.765	54.91	0.89	55.2	0.97	-0.53%	-8.25%
0.775	54.88	0.9	55.2	0.97	-0.58%	-7.22%
0.785	54.63	0.89	55.2	0.97	-1.03%	-8.25%
0.795	54.33	0.91	55.2	0.97	-1.58%	-6.19%
0.805	54.25	0.92	55.2	0.97	-1.72%	-5.15%
0.815	54.37	0.94	55.2	0.97	-1.50%	-3.09%
0.825	54.21	0.93	55.2	0.97	-1.79%	-4.12%
0.835	53.77	0.96	55.2	0.97	-2.59%	-1.03%
0.845	54.19	0.97	55.2	0.97	-1.83%	0.00%
0.855	54.22	0.97	55.2	0.97	-1.78%	0.00%
0.865	53.86	0.99	55.2	0.97	-2.43%	2.06%
0.869*	54	0.99	55.2	0.97	-2.17%	2.06%
0.875	54.23	0.99	55.2	0.97	-1.76%	2.06%
0.885	53.91	1	55.2	0.97	-2.34%	3.09%
0.895	53.58	1	55.2	0.97	-2.93%	3.09%
0.905	53.62	1.01	55.2	0.97	-2.86%	4.12%
0.915	53.53	1.03	55.2	0.97	-3.03%	6.19%
0.925	53.47	1.05	55.2	0.97	-3.13%	8.25%
0.935	52.99	1.06	55.2	0.97	-4.00%	9.28%

*interpolated using DASY4 software

Test Date	Fluid Type	Ambient Temperature	Fluid Temperature	Fluid Depth	Atmospheric Pressure	Relative Humidity	ρ (Kg/m^3)
Aug 25	835 Body	23.0°C	23.6°C	≥ 15 cm	101.1 kPa	34%	1000

FLUID DIELECTRIC PARAMETERS

Date: 08/26/2011		Frequency: 835 MHz			Tissue: Body	
Freq	Test_e	Test_s	Target_e	Target_s	Deviation Permittivity	Deviation Conductivity
0.735	54.76	0.84	55.2	0.97	-0.80%	-13.40%
0.745	54.65	0.87	55.2	0.97	-1.00%	-10.31%
0.755	54.51	0.87	55.2	0.97	-1.25%	-10.31%
0.765	54.24	0.88	55.2	0.97	-1.74%	-9.28%
0.775	54.45	0.89	55.2	0.97	-1.36%	-8.25%
0.785	54.45	0.9	55.2	0.97	-1.36%	-7.22%
0.795	54.21	0.92	55.2	0.97	-1.79%	-5.15%
0.805	54.21	0.94	55.2	0.97	-1.79%	-3.09%
0.815	53.84	0.93	55.2	0.97	-2.46%	-4.12%
0.824*	53.8	0.939	55.2	0.97	-2.54%	-3.20%
0.825	53.8	0.94	55.2	0.97	-2.54%	-3.09%
0.835	54.14	0.94	55.2	0.97	-1.92%	-3.09%
0.845	53.49	0.95	55.2	0.97	-3.10%	-2.06%
0.855	53.7	0.97	55.2	0.97	-2.72%	0.00%
0.865	53.43	0.97	55.2	0.97	-3.21%	0.00%
0.875	53.53	1	55.2	0.97	-3.03%	3.09%
0.885	53.33	1	55.2	0.97	-3.39%	3.09%
0.895	53.12	1.01	55.2	0.97	-3.77%	4.12%
0.905	53.14	1.02	55.2	0.97	-3.73%	5.15%
0.915	53.39	1.02	55.2	0.97	-3.28%	5.15%
0.925	53.19	1.05	55.2	0.97	-3.64%	8.25%
0.935	52.93	1.06	55.2	0.97	-4.11%	9.28%

*interpolated using DASY4 software

Test Date	Fluid Type	Ambient Temperature	Fluid Temperature	Fluid Depth	Atmospheric Pressure	Relative Humidity	ρ (Kg/m^3)
Aug 26	835 Body	23.0°C	22.4°C	≥ 15 cm	101.1 kPa	37%	1000

FLUID DIELECTRIC PARAMETERS

Date: 08/29/2011 (am)**		Frequency: 835 MHz			Tissue: Body	
Freq	Test_e	Test_s	Target_e	Target_s	Deviation Permittivity	Deviation Conductivity
0.735	53.83	0.84	55.2	0.97	-2.48%	-13.40%
0.745	53.82	0.86	55.2	0.97	-2.50%	-11.34%
0.755	53.4	0.85	55.2	0.97	-3.26%	-12.37%
0.765	53.3	0.88	55.2	0.97	-3.44%	-9.28%
0.775	53.52	0.88	55.2	0.97	-3.04%	-9.28%
0.785	53.15	0.9	55.2	0.97	-3.71%	-7.22%
0.795	53.02	0.9	55.2	0.97	-3.95%	-7.22%
0.805	53.05	0.9	55.2	0.97	-3.89%	-7.22%
0.815	52.88	0.91	55.2	0.97	-4.20%	-6.19%
0.824*	52.7	0.937	55.2	0.97	-4.53%	-3.40%
0.825	52.64	0.94	55.2	0.97	-4.64%	-3.09%
0.835	52.91	0.94	55.2	0.97	-4.15%	-3.09%
0.845	52.67	0.95	55.2	0.97	-4.58%	-2.06%
0.855	52.79	0.96	55.2	0.97	-4.37%	-1.03%
0.865	52.56	0.97	55.2	0.97	-4.78%	0.00%
0.869*	52.6	0.978	55.2	0.97	-4.71%	0.82%
0.875	52.7	0.99	55.2	0.97	-4.53%	2.06%
0.885	52.32	1	55.2	0.97	-5.22%	3.09%
0.895	52.48	1	55.2	0.97	-4.93%	3.09%
0.905	52.27	1.02	55.2	0.97	-5.31%	5.15%
0.915	52.22	1.02	55.2	0.97	-5.40%	5.15%
0.925	52.03	1.04	55.2	0.97	-5.74%	7.22%
0.935	51.88	1.04	55.2	0.97	-6.01%	7.22%

*interpolated using DASY4 software
**Separate fluid parameter measurements were made for 800-band testing (morning, am) and 700-band testing (afternoon, pm)

Test Date	Fluid Type	Ambient Temperature	Fluid Temperature	Fluid Depth	Atmospheric Pressure	Relative Humidity	ρ (Kg/m^3)
Aug 29 (am)	835 Body	24.0°C	22.8°C	≥ 15 cm	101.1 kPa	30%	1000

FLUID DIELECTRIC PARAMETERS

Date: 08/29/2011 (pm)**		Frequency: 835 MHz			Tissue: Body	
Freq	Test_e	Test_s	Target_e	Target_s	Deviation Permittivity	Deviation Conductivity
0.735	55.51	0.86	55.2	0.97	0.56%	-11.34%
0.745	55.42	0.88	55.2	0.97	0.40%	-9.28%
0.755	55.2	0.88	55.2	0.97	0.00%	-9.28%
0.765	55.29	0.91	55.2	0.97	0.16%	-6.19%
0.775	55.02	0.91	55.2	0.97	-0.33%	-6.19%
0.785	54.97	0.92	55.2	0.97	-0.42%	-5.15%
0.793*	54.9	0.928	55.2	0.97	-0.54%	-4.33%
0.795	54.86	0.93	55.2	0.97	-0.62%	-4.12%
0.805	55.17	0.93	55.2	0.97	-0.05%	-4.12%
0.815	55.03	0.94	55.2	0.97	-0.31%	-3.09%
0.825	54.8	0.95	55.2	0.97	-0.72%	-2.06%
0.835	54.73	0.97	55.2	0.97	-0.85%	0.00%
0.845	54.58	0.97	55.2	0.97	-1.12%	0.00%
0.855	54.63	0.98	55.2	0.97	-1.03%	1.03%
0.865	54.37	0.99	55.2	0.97	-1.50%	2.06%
0.875	54.24	1.01	55.2	0.97	-1.74%	4.12%
0.885	54.31	1.02	55.2	0.97	-1.61%	5.15%
0.895	54.1	1.03	55.2	0.97	-1.99%	6.19%
0.905	54.01	1.04	55.2	0.97	-2.16%	7.22%
0.915	54.1	1.04	55.2	0.97	-1.99%	7.22%
0.925	53.74	1.06	55.2	0.97	-2.64%	9.28%
0.935	53.76	1.07	55.2	0.97	-2.61%	10.31%

*interpolated using DASY4 software
**Separate fluid parameter measurements were made for 800-band testing (morning, am) and 700-band testing (afternoon, pm)

Test Date	Fluid Type	Ambient Temperature	Fluid Temperature	Fluid Depth	Atmospheric Pressure	Relative Humidity	ρ (Kg/m^3)
Aug 29 (pm)	835 Body	24.0°C	22.8°C	≥ 15 cm	101.1 kPa	30%	1000

FLUID DIELECTRIC PARAMETERS

Date: 08/30/2011		Frequency: 835 MHz			Tissue: Body	
Freq	Test_e	Test_s	Target_e	Target_s	Deviation Permittivity	Deviation Conductivity
0.735	56.65	0.89	55.2	0.97	2.63%	-8.25%
0.745	56.22	0.89	55.2	0.97	1.85%	-8.25%
0.755	56.58	0.89	55.2	0.97	2.50%	-8.25%
0.765	56.53	0.9	55.2	0.97	2.41%	-7.22%
0.775	56.17	0.91	55.2	0.97	1.76%	-6.19%
0.785	56.25	0.94	55.2	0.97	1.90%	-3.09%
0.793*	56.2	0.948	55.2	0.97	1.81%	-2.27%
0.795	56.21	0.95	55.2	0.97	1.83%	-2.06%
0.805	55.9	0.96	55.2	0.97	1.27%	-1.03%
0.815	55.97	0.99	55.2	0.97	1.39%	2.06%
0.825	56.03	0.98	55.2	0.97	1.50%	1.03%
0.835	55.79	0.97	55.2	0.97	1.07%	0.00%
0.845	55.66	0.99	55.2	0.97	0.83%	2.06%
0.855	55.65	0.99	55.2	0.97	0.82%	2.06%
0.865	55.21	0.99	55.2	0.97	0.02%	2.06%
0.875	55.2	1.01	55.2	0.97	0.00%	4.12%
0.885	55.11	1.02	55.2	0.97	-0.16%	5.15%
0.895	55.05	1.02	55.2	0.97	-0.27%	5.15%
0.905	54.84	1.05	55.2	0.97	-0.65%	8.25%
0.915	55	1.06	55.2	0.97	-0.36%	9.28%
0.925	54.69	1.08	55.2	0.97	-0.92%	11.34%
0.935	54.81	1.08	55.2	0.97	-0.71%	11.34%

*interpolated using DASY4 software

Test Date	Fluid Type	Ambient Temperature	Fluid Temperature	Fluid Depth	Atmospheric Pressure	Relative Humidity	ρ (Kg/m^3)
Aug 30	835 Body	24.0°C	23.0°C	≥ 15 cm	101.1 kPa	36%	1000

FLUID DIELECTRIC PARAMETERS

Date: 08/31/2011		Frequency: 835 MHz			Tissue: Body	
Freq	Test_e	Test_s	Target_e	Target_s	Deviation Permittivity	Deviation Conductivity
0.735	58.56	0.88	55.2	0.97	6.09%	-9.28%
0.745	58.25	0.9	55.2	0.97	5.53%	-7.22%
0.755	58.03	0.9	55.2	0.97	5.13%	-7.22%
0.765	57.54	0.9	55.2	0.97	4.24%	-7.22%
0.775	56.62	0.92	55.2	0.97	2.57%	-5.15%
0.785	56.55	0.91	55.2	0.97	2.45%	-6.19%
0.793*	56.3	0.926	55.2	0.97	1.99%	-4.54%
0.795	56.28	0.93	55.2	0.97	1.96%	-4.12%
0.805	56.47	0.95	55.2	0.97	2.30%	-2.06%
0.815	56.67	0.97	55.2	0.97	2.66%	0.00%
0.825	57	0.99	55.2	0.97	3.26%	2.06%
0.835	57.5	0.99	55.2	0.97	4.17%	2.06%
0.845	57.41	1.02	55.2	0.97	4.00%	5.15%
0.855	57.31	1	55.2	0.97	3.82%	3.09%
0.865	56.77	1	55.2	0.97	2.84%	3.09%
0.875	56.7	1.01	55.2	0.97	2.72%	4.12%
0.885	56.1	1.03	55.2	0.97	1.63%	6.19%
0.895	55.76	1.01	55.2	0.97	1.01%	4.12%
0.905	55.13	1.03	55.2	0.97	-0.13%	6.19%
0.915	55	1.05	55.2	0.97	-0.36%	8.25%
0.925	55.61	1.07	55.2	0.97	0.74%	10.31%
0.935	55.86	1.09	55.2	0.97	1.20%	12.37%

*interpolated using DASY4 software

Test Date	Fluid Type	Ambient Temperature	Fluid Temperature	Fluid Depth	Atmospheric Pressure	Relative Humidity	ρ (Kg/m^3)
Aug 31	835 Body	24.0°C	21.8°C	≥ 15 cm	101.1 kPa	30%	1000

FLUID DIELECTRIC PARAMETERS

Date: 09/1/2011		Frequency: 835 MHz			Tissue: Body	
Freq	Test_e	Test_s	Target_e	Target_s	Deviation Permittivity	Deviation Conductivity
0.735	57.7	0.86	55.2	0.97	4.53%	-11.34%
0.745	57.56	0.87	55.2	0.97	4.28%	-10.31%
0.755	57.45	0.88	55.2	0.97	4.08%	-9.28%
0.765	57.39	0.9	55.2	0.97	3.97%	-7.22%
0.775	57.09	0.92	55.2	0.97	3.42%	-5.15%
0.785	57.01	0.91	55.2	0.97	3.28%	-6.19%
0.795	57.1	0.92	55.2	0.97	3.44%	-5.15%
0.805	57.02	0.93	55.2	0.97	3.30%	-4.12%
0.815	56.81	0.94	55.2	0.97	2.92%	-3.09%
0.824*	56.9	0.949	55.2	0.97	3.08%	-2.16%
0.825	56.9	0.95	55.2	0.97	3.08%	-2.06%
0.835	56.74	0.96	55.2	0.97	2.79%	-1.03%
0.845	56.57	0.97	55.2	0.97	2.48%	0.00%
0.855	56.67	0.99	55.2	0.97	2.66%	2.06%
0.865	56.65	0.98	55.2	0.97	2.63%	1.03%
0.875	56.38	1	55.2	0.97	2.14%	3.09%
0.885	56.41	1.01	55.2	0.97	2.19%	4.12%
0.895	56.24	1.04	55.2	0.97	1.88%	7.22%
0.905	56.06	1.03	55.2	0.97	1.56%	6.19%
0.915	56.01	1.03	55.2	0.97	1.47%	6.19%
0.925	55.98	1.04	55.2	0.97	1.41%	7.22%
0.935	55.82	1.06	55.2	0.97	1.12%	9.28%

*interpolated using DASY4 software

Test Date	Fluid Type	Ambient Temperature	Fluid Temperature	Fluid Depth	Atmospheric Pressure	Relative Humidity	ρ (Kg/m^3)
Sep 1	835 Body	24.0°C	22.7°C	≥ 15 cm	101.1 kPa	32%	1000

FLUID DIELECTRIC PARAMETERS

Date: 09/20/2011		Frequency: 835 MHz			Tissue: Head	
Freq	Test_e	Test_s	Target_e	Target_s	Deviation Permittivity	Deviation Conductivity
0.735	43.59	0.8	41.5	0.9	5.04%	-11.11%
0.745	43.78	0.8	41.5	0.9	5.49%	-11.11%
0.755	43.53	0.82	41.5	0.9	4.89%	-8.89%
0.765	43.32	0.83	41.5	0.9	4.39%	-7.78%
0.775	43.47	0.83	41.5	0.9	4.75%	-7.78%
0.785	42.99	0.85	41.5	0.9	3.59%	-5.56%
0.795	43.13	0.85	41.5	0.9	3.93%	-5.56%
0.805	42.89	0.88	41.5	0.9	3.35%	-2.22%
0.815	42.78	0.89	41.5	0.9	3.08%	-1.11%
0.825	42.9	0.9	41.5	0.9	3.37%	0.00%
0.835	42.51	0.9	41.5	0.9	2.43%	0.00%
0.845	42.45	0.91	41.5	0.9	2.29%	1.11%
0.855	42.32	0.92	41.5	0.9	1.98%	2.22%
0.865	42.23	0.92	41.5	0.9	1.76%	2.22%
0.869*	42	0.92	41.5	0.9	1.20%	2.22%
0.875	41.63	0.92	41.5	0.9	0.31%	2.22%
0.885	41.68	0.93	41.5	0.9	0.43%	3.33%
0.895	41.94	0.95	41.5	0.9	1.06%	5.56%
0.905	41.57	0.97	41.5	0.9	0.17%	7.78%
0.915	41.64	0.99	41.5	0.9	0.34%	10.00%
0.925	41.66	1	41.5	0.9	0.39%	11.11%
0.935	41.39	1	41.5	0.9	-0.27%	11.11%

*interpolated using DASY4 software

Test Date	Fluid Type	Ambient Temperature	Fluid Temperature	Fluid Depth	Atmospheric Pressure	Relative Humidity	ρ (Kg/m^3)
Sep 20	835 Head	23.0°C	22.9°C	≥ 15 cm	101.1 kPa	29%	1000

FLUID DIELECTRIC PARAMETERS

Date: 09/21/2011		Frequency: 835 MHz			Tissue: Head	
Freq	Test_e	Test_s	Target_e	Target_s	Deviation Permittivity	Deviation Conductivity
0.735	43.34	0.8	41.5	0.9	4.43%	-11.11%
0.745	43.26	0.82	41.5	0.9	4.24%	-8.89%
0.755	43.17	0.83	41.5	0.9	4.02%	-7.78%
0.765	42.75	0.84	41.5	0.9	3.01%	-6.67%
0.775	43.07	0.85	41.5	0.9	3.78%	-5.56%
0.785	43.04	0.88	41.5	0.9	3.71%	-2.22%
0.793*	42.8	0.88	41.5	0.9	3.13%	-2.22%
0.795	42.76	0.88	41.5	0.9	3.04%	-2.22%
0.805	42.93	0.9	41.5	0.9	3.45%	0.00%
0.815	42.93	0.9	41.5	0.9	3.45%	0.00%
0.824*	42.6	0.9	41.5	0.9	2.65%	0.00%
0.825	42.56	0.9	41.5	0.9	2.55%	0.00%
0.835	42.53	0.93	41.5	0.9	2.48%	3.33%
0.845	41.98	0.92	41.5	0.9	1.16%	2.22%
0.855	41.75	0.94	41.5	0.9	0.60%	4.44%
0.865	41.86	0.94	41.5	0.9	0.87%	4.44%
0.869*	41.7	0.944	41.5	0.9	0.48%	4.89%
0.875	41.53	0.95	41.5	0.9	0.07%	5.56%
0.885	41.42	0.96	41.5	0.9	-0.19%	6.67%
0.895	41.46	0.98	41.5	0.9	-0.10%	8.89%
0.905	41.8	0.99	41.5	0.9	0.72%	10.00%
0.915	41.44	0.99	41.5	0.9	-0.14%	10.00%
0.925	41.44	1	41.5	0.9	-0.14%	11.11%
0.935	41.14	1.01	41.5	0.9	-0.87%	12.22%

*interpolated using DASY4 software

Test Date	Fluid Type	Ambient Temperature	Fluid Temperature	Fluid Depth	Atmospheric Pressure	Relative Humidity	ρ (Kg/m^3)
Sep 21	835 Head	23.0°C	22.9°C	≥ 15 cm	101.1 kPa	31%	1000

9.0 SAR TEST REDUCTION PROCEDURES (FCC KDB PUB. 643646 D01v01r01)

a. Face-held Configuration - Default Battery Selection - per FCC KDB 643646, Page 2, Section 1) A): *"When multiple standard batteries are supplied with a radio, the battery with the highest capacity is considered the default battery for making head SAR measurements."*

b. Body-worn Configuration - Default Battery Selection - per FCC KDB 643646, Page 5, Section 1) A):*"Start by testing a PTT radio with the thinnest battery and a standard (default) body-worn accessory that are both supplied with the radio and, if applicable, a default audio accessory……..."*

c. Body-worn Configuration - Default Body-worn Accessory Selection - Per FCC KDB 643646, Page 5, Section 1) A): *"When multiple default body-worn accessories are supplied with a radio, the standard body-worn accessory expected to result in the highest SAR based on its construction and exposure conditions is considered the default body-worn accessory for making body-worn measurements."*

d. Body-worn Configuration - Additional Body-worn Accessories - Per FCC KDB 643646, Page 7, Section 4): *"Repeat the above test sequence for additional body-worn accessories by replacing "default body-worn" accessory with each "additional body-worn" accessory. For body-worn accessories with similar construction and operating configurations, test only the body-worn accessory within the group that is expected to result in the highest SAR."*

e. Body-worn Configuration - Default Audio Accessory Selection - Per FCC KDB 643646, Page 10, Section 1): *"For audio accessories with similar construction and operating requirements, test only the audio accessory within the group that is expected to result in the highest SAR, with respect to changes in RF characteristics and exposure conditions for the combination. If it is unclear which audio accessory within a group of similar accessories is expected to result in the highest SAR, good engineering judgment and preliminary testing should be applied to select the accessory that is expected to result in the highest SAR.*

1) For the audio accessories that have not been tested in the body-worn accessories test sequences in the previous section, , the highest SAR for an antenna, body-worn accessory and battery combination tested in the body-worn accessories sequences applicable to an audio accessory is used to determine SAR test requirements according to the following:

A) ≤ 4.0 W/kg, SAR tests for that audio accessory is not necessary

B) > 4.0 W/kg and ¡Ü 6.0 W/kg test that audio accessory using the highest body-worn SAR combination (antenna, battery and body-worn accessory) and channel configuration identified in 1) that is applicable to the audio accessory. Due to the complexity of body-worn and audio accessory combinations, the applicable test combinations must be clearly described and identified in the SAR report

C) > 6.0 W/kg, test on all required channels for that audio accessory

D) When the SAR measured in B) is > 6.0 W/kg, test that audio accessory on the required immediately adjacent channels; testing of the other required channels still needs consideration

I) if the SAR measured in D) is > 7.0 W/kg and it is one of the accessories within a group of similar audio accessories, test all other audio accessories within that group of similar audio accessories using the highest body-worn SAR combination (antenna, battery and body-worn accessory) and channel configuration identified in 1) that is applicable to the audio accessory

a) when the SAR for a similar audio accessory in I) is > 7.0 W/kg, test that audio accessory on all required channels using the combination in I)."

10.0 SAR MEASUREMENT SUMMARY

TABLE 1 — FACE-HELD SAR EVALUATION RESULTS

Device-Under-Test	Unity XG-100P Multi-band PTT Radio Transceiver (700/800 Bands)
Antenna Acc. ID #	1
Test Date(s)	September 20 & 21, 2011

C			1		2		3		4		5		6		7		8		9		10
R	**Test Freq. (MHz)**	**Cond. Power Before Test (W)**	**SAR W/kg 1g**				**SAR W/kg 1g**				**SAR W/kg 1g**				**SAR W/kg 1g**				**SAR W/kg 1g**		
			Battery a - Additional				**Battery b - Additional**				**Battery c - Default**				**Battery d - Additional**				**Battery e - Additional**		
			100% ptt d/f		**50% ptt d/f**		**100% ptt d/f**		**50% ptt d/f**		**100% ptt d/f**		**50% ptt d/f**		**100% ptt d/f**		**50% ptt d/f**		**100% ptt d/f**		**50% ptt d/f**
			Drift (dB)		**50%+droop**		**Drift (dB)**		**50%+droop**		**Drift (dB)**		**50%+droop**		**Drift (dB)**		**50%+droop**		**Drift (dB)**		**50%+droop**
1	763.0	2.61	N/A				N/A				N/A				N/A				N/A		
2	775.0	2.63	F1	0.251	0.126		F2	0.231	0.116		F3	0.224	0.112		F4	0.233	0.117		F5	0.248	0.124
3				-0.624	0.145			-0.552	0.131			-0.731	0.133			-0.649	0.135			-0.657	0.144
4	793.0	2.63	F6	0.235	0.118		F7	0.241	0.121		F8	0.221	0.111		F9	0.239	0.120		F10	0.248	0.124
5				-0.267	0.125			-0.433	0.133			-0.386	0.121			-0.476	0.133			-0.374	0.135
6	805.0	2.60	N/A				N/A				N/A				N/A				N/A		
7	806.0	3.16	N/A				N/A				N/A				N/A				N/A		
8	824.0	3.16	F11	0.342	0.171		F12	0.286	0.143		F13	0.301	0.151		F14	0.310	0.155		F15	0.306	0.153
9				-1.25	0.228			-1.41	0.198			-1.25	0.201			-1.48	0.218			-2.10	0.248
10	851.0	3.20	N/A				N/A				N/A				N/A				N/A		
11	869.0	3.20	F16	0.043	0.021		F17	0.043	0.022		F18	0.043	0.021		F19	0.046	0.023		F20	0.045	0.023
12				-3.04	0.043			-2.94	0.043			-2.07	0.034			-2.26	0.038			-2.14	0.037

SAR LIMITS	HEAD	SPATIAL PEAK	RF EXPOSURE CATEGORY
FCC 47 CFR 2.1093	Health Canada Safety Code 6	8.0 W/kg	1 gram average	Occupational / Controlled

Notes	
C = Column; R = Row	Fx (F = Face) denotes the corresponding Face SAR Plot # as shown in Appendix A
Test Mode = CW (Unmodulated Continuous Wave)	Phantom = Side Planar Phantom
Front of DUT Distance to Planar Phantom (see Appendix D)	**Shortest Antenna Distance to Planar Phantom (see Appendix D)**
2.5 cm	5.0 cm

Test Procedures in accordance with FCC KDB 643646 (see reference [8])

1. For face-held configuration, battery "c" was selected as the default battery based on the highest capacity battery.
2. When the head SAR of an antenna tested on the highest output power channel with the default battery is ≤ 3.5 W/kg (F3, F8, F13, F18), testing of all other required channels is not necessary for that antenna.
3. When the SAR for all antennas tested using the default battery are ≤ 4.0 W/kg (F3, F8, F13, F18), test additional batteries using the antenna and channel configuration that resulted in the highest SAR among all antennas (F1, F2, F4, F5, F6, F7, F9, F10, F11, F12, F14, F15, F16, F17, F19, F20).
4. When test reduction applies, the data table entries for such configurations are denoted with N/A (Not Applicable).

TABLE 2 — BODY-WORN SAR EVALUATION RESULTS

Device-Under-Test	Unity XG-100P Multi-band PTT Radio Transceiver (700/800 Bands)
Antenna Acc. ID #	1
Body-worn Acc. ID #	B1 (Default)
Audio Acc. ID #	A1 (Default)
Test Date(s)	Aug. 25 - 31, 2011

C			1	2		3	4		5	6		7	8		9	10
R	**Test Freq. (MHz)**	**Cond. Power Before Test (W)**	**SAR W/kg 1g**			**SAR W/kg 1g**			**SAR W/kg 1g**			**SAR W/kg 1g**			**SAR W/kg 1g**	
			Battery a - Additional			**Battery b - Default**			**Battery c - Additional**			**Battery d - Additional**			**Battery e - Additional**	
			100% ptt d/f	**50% ptt d/f**		**100% ptt d/f**	**50% ptt d/f**		**100% ptt d/f**	**50% ptt d/f**		**100% ptt d/f**	**50% ptt d/f**		**100% ptt d/f**	**50% ptt d/f**
			Drift (dB)	**50%+droop**		**Drift (dB)**	**50%+droop**		**Drift (dB)**	**50%+droop**		**Drift (dB)**	**50%+droop**		**Drift (dB)**	**50%+droop**
1	763.0	2.61	N/A			N/A			N/A			N/A			N/A	
2	775.0	2.63	B1	2.45	1.23	B2	2.13	1.07	B3	2.06	1.03	B4	2.06	1.03	B5	2.17	1.09
3				-0.475	1.37		-0.713	1.26		-0.464	1.15		-0.259	1.09		-0.294	1.16
4	793.0	2.63	B6	1.67	0.835	B7	1.85	0.925	B8	1.59	0.795	B9	1.70	0.850	B10	1.81	0.905
5				-0.174	0.869		-0.059	0.938		-0.309	0.854		0.467	N/A		-0.465	1.01
6	805.0	2.60	N/A			N/A			N/A			N/A			N/A	
7	806.0	3.16	N/A			N/A			N/A			N/A			N/A	
8	824.0	3.16	B11	1.84	0.920	B12	1.86	0.930	B13	1.97	0.985	B14	2.61	1.31	B15	1.72	0.860
9				-0.563	1.05		-0.426	1.03		-2.52	1.76		-0.203	1.37		-1.33	1.17
10	851.0	3.20	N/A			N/A			N/A			N/A			N/A	
11	869.0	3.20	B16	3.28	1.64	B17	4.73	**2.37**	B18	4.74	2.37	B19	3.44	1.72	B20	2.28	1.14
12				-0.729	1.94		-2.31	4.03		-1.20	3.12		-1.31	2.33		-1.69	1.68

SAR LIMITS	BODY	SPATIAL PEAK	RF EXPOSURE CATEGORY
FCC 47 CFR 2.1093	Health Canada Safety Code 6	8.0 W/kg	1 gram average	Occupational / Controlled

Notes	
C = Column; R = Row	Bx (B = Body) denotes the corresponding Body SAR Plot # as shown in Appendix A
Test Mode = CW (Unmodulated Continuous Wave)	Phantom = Barski Planar Phantom
Back of DUT Distance to Planar Phantom (see Appendix D)	**Shortest Antenna Distance to Planar Phantom (see Appendix D)**
1.0 cm	1.7 cm

Test Procedures in accordance with FCC KDB 643646 (see reference [8])

1. For body-worn configuration, battery “b” was selected as the default battery based on the thinnest battery.

2. When the body SAR of an antenna tested on the highest output power channel with the thinnest battery is ≤ 3.5 W/kg (B2, B7, B12, B17), testing of all other required channels is not necessary for that antenna.

3. When the SAR for all antennas tested on the highest output power channel with the thinnest battery is ≤ 4.0 W/kg (B2, B7, B12, B17), test additional batteries with the default body-worn accessory and default audio accessory using the antenna and channel configuration that resulted in the highest SAR among all antennas (B1, B3, B4, B5, B6, B8, B9, B10, B11, B13, B14, B15, B16, B18, B19, B20).

4. When test reduction applies, the data table entries for such configurations are denoted with N/A (Not Applicable).

TABLE 3 — BODY-WORN SAR EVALUATION RESULTS

Device-Under-Test	Unity XG-100P Multi-band PTT Radio Transceiver (700/800 Bands)
Antenna Acc. ID #	1
Body-worn Acc. ID #	B4 (Additional)
Audio Acc. ID #	A1 (Default)
Test Date(s)	Aug. 25 - Sep. 1, 2011

C			1	2	3	4	5	6	7	8	9	10
R	Test Freq. (MHz)	Cond. Power Before Test (W)	SAR W/kg 1g		SAR W/kg 1g		SAR W/kg 1g		SAR W/kg 1g		SAR W/kg 1g	
			Battery a - Additional		Battery b - Default		Battery c - Additional		Battery d - Additional		Battery e - Additional	
			100% ptt d/f	50% ptt d/f	100% ptt d/f	50% ptt d/f	100% ptt d/f	50% ptt d/f	100% ptt d/f	50% ptt d/f	100% ptt d/f	50% ptt d/f
			Drift (dB)	50%+droop	Drift (dB)	50%+droop	Drift (dB)	50%+droop	Drift (dB)	50%+droop	Drift (dB)	50%+droop
1	763.0	2.61	N/A		N/A		N/A		N/A		N/A	
2	775.0	2.63	B21 2.13	1.07	B22 2.54	1.27	B23 2.17	1.09	B24 2.59	1.30	B25 2.15	1.08
3			-0.552	1.21	-0.428	1.40	-0.554	1.23	-0.550	1.47	-0.556	1.22
4	793.0	2.63	B26 1.59	0.795	B27 1.65	0.825	B28 1.97	0.985	B29 2.37	1.19	B30 1.99	0.995
5			-0.431	0.878	-0.349	0.894	-0.696	1.16	-0.329	1.28	-0.623	1.15
6	805.0	2.60	N/A		N/A		N/A		N/A		N/A	
7	806.0	3.16	N/A		N/A		N/A		N/A		N/A	
8	824.0	3.16	B31 2.40	1.20	B32 1.61	0.805	B33 2.23	1.12	B34 2.48	1.24	B35 1.50	0.750
9			-0.466	1.34	-0.310	0.865	-1.49	1.57	-0.299	1.33	-1.11	0.968
10	851.0	3.20	N/A		N/A		N/A		N/A		N/A	
11	869.0	3.20	B36 2.95	1.48	B37 2.77	1.39	B38 3.37	1.69	B39 3.51	1.76	B40 2.50	1.25
12			-1.08	1.89	-1.20	1.83	-1.00	2.12	-1.09	2.26	-1.70	1.85

SAR LIMITS		BODY	SPATIAL PEAK	RF EXPOSURE CATEGORY
FCC 47 CFR 2.1093	Health Canada Safety Code 6	8.0 W/kg	1 gram average	Occupational / Controlled

Notes

C = Column; R = Row	Bx (B = Body) denotes the corresponding Body SAR Plot # as shown in Appendix A
Test Mode = CW (Unmodulated Continuous Wave)	Phantom = Barski Planar Phantom
Back of DUT Distance to Planar Phantom (see Appendix D)	**Shortest Antenna Distance to Planar Phantom (see Appendix D)**
1.5 cm	2.2 cm

Test Procedures in accordance with FCC KDB 643646 (see reference [8])

1. For body-worn configuration, battery “b” was selected as the default battery based on the thinnest battery.

2. When the body SAR of an antenna tested on the highest output power channel with the thinnest battery is ≤ 3.5 W/kg (B22, B27, B32, B37), testing of all other required channels is not necessary for that antenna.

3. When the SAR for all antennas tested on the highest output power channel with the thinnest battery is ≤ 4.0 W/kg (B22, B27, B32, B37), test additional batteries with the additional body-worn accessory and default audio accessory using the antenna and channel configuration that resulted in the highest SAR among all antennas (B21, B23, B24, B25, B26, B28, B29, B30, B31, B33, B34, B35, B36, B38, B39, B40).

4. When test reduction applies, the data table entries for such configurations are denoted with N/A (Not Applicable).

TABLE 4 — BODY-WORN SAR EVALUATION RESULTS

Device-Under-Test	Unity XG-100P Multi-band PTT Radio Transceiver (700/800 Bands)
Antenna Acc. ID #	1
Body-worn Acc. ID #	B7 (Additional)
Audio Acc. ID #	A1 (Default)
Test Date(s)	Aug. 25 - Sep 1, 2011

C			1	2		3	4		5	6		7	8		9	10
R	**Test Freq. (MHz)**	**Cond. Power Before Test (W)**	**SAR W/kg 1g**			**SAR W/kg 1g**			**SAR W/kg 1g**			**SAR W/kg 1g**			**SAR W/kg 1g**	
			Battery a - Additional			**Battery b - Default**			**Battery c - Additional**			**Battery d - Additional**			**Battery e - Additional**	
			100% ptt d/f	**50% ptt d/f**		**100% ptt d/f**	**50% ptt d/f**		**100% ptt d/f**	**50% ptt d/f**		**100% ptt d/f**	**50% ptt d/f**		**100% ptt d/f**	**50% ptt d/f**
			Drift (dB)	**50%+droop**		**Drift (dB)**	**50%+droop**		**Drift (dB)**	**50%+droop**		**Drift (dB)**	**50%+droop**		**Drift (dB)**	**50%+droop**
1	763.0	2.61	N/A			N/A			N/A			N/A			N/A	
2	775.0	2.63	B41	2.20	1.10	B42	1.85	0.925	B43	2.25	1.13	B44	2.65	1.33	B45	2.08	1.04
3				-0.223	1.16		-0.414	1.02		-0.264	1.20		-0.137	1.37		-0.207	1.09
4	793.0	2.63	B46	2.03	1.02	B47	2.49	1.25	B48	2.14	1.07	B49	2.39	1.20	B50	2.36	1.18
5				-0.306	1.09		-0.178	1.30		-0.299	1.15		-0.114	1.23		-0.274	1.26
6	805.0	2.60	N/A			N/A			N/A			N/A			N/A	
7	806.0	3.16	N/A			N/A			N/A			N/A			N/A	
8	824.0	3.16	B51	1.58	0.790	B52	1.88	0.940	B53	1.55	0.775	B54	2.26	1.13	B55	1.92	0.960
9				-0.146	0.817		-1.48	1.32		-0.097	0.793		-1.61	1.64		-2.11	1.56
10	851.0	3.20	N/A			N/A			N/A			N/A			N/A	
11	869.0	3.20	B56	1.47	0.735	B57	1.45	0.725	B58	1.48	0.740	B59	1.78	0.890	B60	1.29	0.645
12				-1.53	1.05		-1.59	1.05		-1.91	1.15		-1.28	1.20		-2.35	1.11

SAR LIMITS	BODY	SPATIAL PEAK	RF EXPOSURE CATEGORY
FCC 47 CFR 2.1093	Health Canada Safety Code 6	8.0 W/kg	1 gram average	Occupational / Controlled

Notes

C = Column; R = Row	Bx (B = Body) denotes the corresponding Body SAR Plot # as shown in Appendix A
Test Mode = CW (Unmodulated Continuous Wave)	Phantom = Barski Planar Phantom
Back of DUT Distance to Planar Phantom (see Appendix D)	**Shortest Antenna Distance to Planar Phantom (see Appendix D)**
1.5 cm	2.2 cm

Test Procedures in accordance with FCC KDB 643646 (see reference [8])

1. For body-worn configuration, battery “b” was selected as the default battery based on the thinnest battery.

2. When the body SAR of an antenna tested on the highest output power channel with the thinnest battery is ≤ 3.5 W/kg (B42, B47, B52, B57), testing of all other required channels is not necessary for that antenna.

3. When the SAR for all antennas tested on the highest output power channel with the thinnest battery is ≤ 4.0 W/kg (B42, B47, B52, B57), test additional batteries with the additional body-worn accessory and default audio accessory using the antenna and channel configuration that resulted in the highest SAR among all antennas (B41, B43, B44, B45, B46, B48, B49, B50, B51, B53, B54, B55, B56, B58, B59, B60).

4. When test reduction applies, the data table entries for such configurations are denoted with N/A (Not Applicable).

TABLE 5 — BODY-WORN SAR EVALUATION RESULTS

Device-Under-Test	Unity XG-100P Multi-band PTT Radio Transceiver (700/800 Bands)
Antenna Acc. ID #	1
Body-worn Acc. ID #	B10 (Additional)
Audio Acc. ID #	A1 (Default)
Test Date(s)	Aug. 26 - Sep. 1, 2011

C			1	2	3	4	5	6	7	8	9	10
R	Test Freq. (MHz)	Cond. Power Before Test (W)	SAR W/kg 1g		SAR W/kg 1g		SAR W/kg 1g		SAR W/kg 1g		SAR W/kg 1g	
			Battery a - Additional		Battery b - Default		Battery c - Additional		Battery d - Additional		Battery e - Additional	
			100% ptt d/f	50% ptt d/f	100% ptt d/f	50% ptt d/f	100% ptt d/f	50% ptt d/f	100% ptt d/f	50% ptt d/f	100% ptt d/f	50% ptt d/f
			Drift (dB)	50%+droop	Drift (dB)	50%+droop	Drift (dB)	50%+droop	Drift (dB)	50%+droop	Drift (dB)	50%+droop
1	763.0	2.61	N/A		N/A		N/A		N/A		N/A	
2	775.0	2.63	B61 0.433	0.217	B62 0.584	0.292	B63 0.559	0.280	B64 0.406	0.203	B65 0.438	0.219
3			-1.33	0.294	-1.17	0.382	-1.62	0.406	-1.49	0.286	-1.69	0.323
4	793.0	2.63	B66 0.448	0.224	B67 0.438	0.219	B68 0.514	0.257	B69 0.435	0.218	B70 0.337	0.169
5			-0.023	0.225	-0.591	0.251	-0.079	0.262	-0.596	0.249	-2.78	0.320
6	805.0	2.60	N/A		N/A		N/A		N/A		N/A	
7	806.0	3.16	N/A		N/A		N/A		N/A		N/A	
8	824.0	3.16	B71 0.452	0.226	B72 0.506	0.253	B73 0.477	0.239	B74 0.407	0.204	B75 0.360	0.180
9			-1.45	0.316	-1.43	0.352	-1.37	0.327	-1.35	0.278	-0.214	0.189
10	851.0	3.20	N/A		N/A		N/A		N/A		N/A	
11	869.0	3.20	B76 0.235	0.118	B77 0.303	0.152	B78 0.254	0.127	B79 0.314	0.157	B80 0.284	0.142
12			-2.08	0.190	-1.81	0.230	-2.88	0.246	-2.36	0.270	-2.41	0.247

SAR LIMITS		BODY	SPATIAL PEAK	RF EXPOSURE CATEGORY
FCC 47 CFR 2.1093	Health Canada Safety Code 6	8.0 W/kg	1 gram average	Occupational / Controlled

Notes

C = Column; R = Row	Bx (B = Body) denotes the corresponding Body SAR Plot # as shown in Appendix A
Test Mode = CW (Unmodulated Continuous Wave)	Phantom = Barski Planar Phantom
Back of DUT Distance to Planar Phantom (see Appendix D)	**Shortest Antenna Distance to Planar Phantom (see Appendix D)**
4.5 cm	5.5 cm

Test Procedures in accordance with FCC KDB 643646 (see reference [8])

1. For body-worn configuration, battery “b” was selected as the default battery based on the thinnest battery.

2. When the body SAR of an antenna tested on the highest output power channel with the thinnest battery is ≤ 3.5 W/kg (B62, B67, B72, B77), testing of all other required channels is not necessary for that antenna.

3. When the SAR for all antennas tested on the highest output power channel with the thinnest battery is ≤ 4.0 W/kg (B62, B67, B72, B77), test additional batteries with the additional body-worn accessory and default audio accessory using the antenna and channel configuration that resulted in the highest SAR among all antennas (B61, B63, B64, B65, B66, B68, B69, B70, B71, B73, B74, B75, B76, B78, B79, B80).

4. When test reduction applies, the data table entries for such configurations are denoted with N/A (Not Applicable).

11.0 SAR SCALING (TUNE-UP TOLERANCE)

MAX. SAR LEVELS SCALED TO MANUFACTURER'S UPPER TOLERANCE SPECIFICATION

Test Config.	Test Plot #	Test Freq.	Measured Conducted Power	Max. Rated Conducted Power inc. Upper Tolerance	Measured SAR Level (50% PTT d/f)	Power Scaling to Upper Tolerance Spec.	Scaled SAR (50% PTT d/f)
		MHz	Watts	Watts	W/kg (1g)	dB	W/kg (1g)
Face-held	F1	775.0	2.63	2.95	0.126	0.5	0.141
Face-held	F10	793.0	2.63	2.95	0.124	0.5	0.139
Face-held	F11	824.0	3.16	3.55	0.171	0.5	0.192
Face-held	F19	869.0	3.20	3.55	0.023	0.4	0.025
Body-worn	B44	775.0	2.63	2.95	1.33	0.5	1.49
Body-worn	B47	793.0	2.63	2.95	1.25	0.5	1.40
Body-worn	B14	824.0	3.16	3.55	1.31	0.5	1.47
Body-worn	B17	869.0	3.20	3.55	2.37	0.4	2.60

Note(s):
1. The maximum SAR levels, per frequency split and Head/Body configuration are reported in the above table.
2. The manufacturer's upper power tolerance level specification reported was provided by Harris Corporation.

12.0 SIMULTANEOUS TRANSMISSION ASSESSMENT

Co-transmitting Antennas: External Multi-Band Helical (136-870 MHz) and Internal Bluetooth (2402-2480 MHz)
Manuf. Rated Output Power: 20 dBm (Class 1 Bluetooth)
Antenna-to-Antenna Distance: ~ 130 mm

MAX. SAR - 7/800-BAND PTT (50% PTT duty factor + droop)		MAX. SAR (BLUETOOTH)	SUM OF SAR LEVELS (50% PTT duty factor)	FCC/IC SAR LIMIT (Occupational)
Face-held	0.171 W/kg (1g)	0.114 W/kg (1g)	0.285 W/kg (1g)	8.0 W/kg (1g)
Body-worn	2.37 W/kg (1g)	0.033 W/kg (Peak SAR from Area Scan)	2.37 W/kg (1g)	8.0 W/kg (1g)

Summary

SAR evaluation for simultaneous transmission of the 700/800-band PTT and Bluetooth was not required in accordance with the provision of FCC KDB 648474 (see reference [16]) - when simultaneous transmission applies and the sum of the 1-g SAR measured for all simultaneous transmitting antennas is less than the SAR limit, SAR evaluation for simultaneous transmission is not required for all transmitters and antennas.

13.0 DETAILS OF SAR EVALUATION

1. The number of test frequencies and test channels evaluated for SAR were selected in accordance with the procedures described in FCC KDB 447498 Section 6) c) (see reference [7]).
2. The DUT was evaluated for SAR in accordance with the procedures described in FCC KDB 643646 (see reference [8]).
3. The area scan evaluation was performed with a fully charged battery. After the area scan was completed the battery was replaced with a fully charged battery prior to the zoom scan evaluation.
4. The SAR drift of the DUT was measured by the DASY4 system for the duration of the zoom scan evaluations. The measured SAR droop was added to the measured SAR levels to report scaled SAR levels as shown in the SAR test data tables. A SAR-versus-Time droop evaluation was also performed and is shown in Appendix A.
5. For some of the zoom scans a 5x5x7 point scan was used instead of a 7x7x7 point (see Appendix A). This was due to the extremely high drift that was occurring over the duration of the zoom scan. A 5x5x7 zoom scan takes less time, and therefore reduces the amount of drift during the test.
6. The fluid temperature remained within +/-2°C from the dielectric parameter measurement to the completion of the SAR test.
7. The dielectric parameters of the simulated tissue mixtures were measured prior to the SAR evaluations using a Dielectric Probe Kit and a Network Analyzer (see Appendix C).
8. The DUT was tested at the maximum conducted output power level setting preset by the manufacturer in unmodulated continuous transmit operation (Continuous Wave mode at 100% duty cycle) with the transmit key constantly depressed. For a push-to-talk device the 50% duty cycle compensation reported assumes a transmit/receive cycle of equal time base.

14.0 SAR EVALUATION PROCEDURES

a. (i) The evaluation was performed in the applicable area of the phantom depending on the type of device being tested. For devices held to the ear during normal operation, both the left and right ear positions were evaluated using the SAM phantom.

(ii) For body-worn and face-held devices a planar phantom was used.

b. The SAR was determined by a pre-defined procedure within the DASY4 software. Upon completion of a reference and optical surface check, the exposed region of the phantom was scanned near the inner surface with a grid spacing of 15mm x 15mm.

An area scan was determined as follows:

c. Based on the defined area scan grid, a more detailed grid is created to increase the points by a factor of 10. The interpolation function then evaluates all field values between corresponding measurement points.

d. A linear search is applied to find all the candidate maxima. Subsequently, all maxima are removed that are >2 dB from the global maximum. The remaining maxima are then used to position the cube scans.

A 1g and 10g spatial peak SAR was determined as follows:

e. Extrapolation is used to find the points between the dipole center of the probe and the surface of the phantom. This data cannot be measured, since the center of the dipoles is 2.7 mm away from the tip of the probe and the distance between the surface and the lowest measuring point is 1.4 mm (see probe calibration document in Appendix F). The extrapolation was based on trivariate quadratics computed from the previously calculated 3D interpolated points nearest the phantom surface.

f. Interpolated data is used to calculate the average SAR over 1g and 10g cubes by spatially discretizing the entire measured cube. The volume used to determine the averaged SAR is a 1mm grid (42875 interpolated points).

g. A zoom scan volume of 30 mm x 30 mm x 30 mm (5 x 5 x 7 points) centered at the peak SAR location determined from the area scan is used for all zoom scans for devices with a transmit frequency < 800 MHz. Zoom scans for frequencies ≥ 800 MHz are determined with a scan volume of 30 mm x 30 mm x 30 mm (7 x 7 x 7) to ensure complete capture of the peak spatial-average SAR.

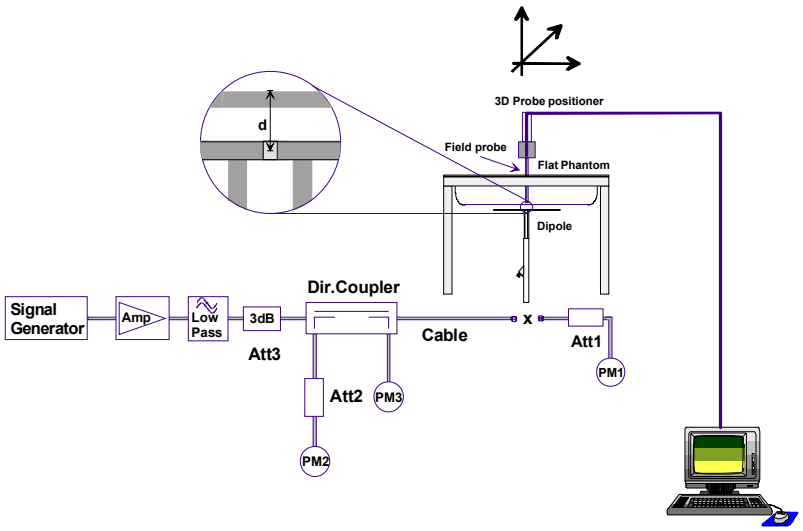
15.0 SYSTEM PERFORMANCE CHECK

Prior to the SAR evaluations, system checks were performed with a planar phantom and 835 MHz SPEAG dipole (see Appendix B for system performance check test plots) in accordance with the procedures described in IEEE Standard 1528-2003 (see reference [5]). The dielectric parameters of the simulated tissue mixture were measured prior to the system performance check using a Dielectric Probe Kit and a Network Analyzer (see Appendix C for measured fluid dielectric parameters). A forward power of 250 mW was applied to the dipole and the system was verified to a tolerance of ±10% from the system manufacturer's dipole calibration target SAR value (see Appendix E for system manufacturer's dipole calibration procedures).

SYSTEM PERFORMANCE CHECK EVALUATIONS

Test Date	Equiv. Tissue	SAR 1g (W/kg)			Dielectric Constant ε_r			Conductivity σ (mho/m)			ρ (Kg/m^3)	Amb. Temp. (°C)	Fluid Temp. (°C)	Fluid Depth (cm)	Humid. (%)	Barom. Press. (kPa)
	Freq. (MHz)	Target	Meas.	Dev.	Target	Meas.	Dev.	Target	Meas.	Dev.						
Aug 25	Body 835	2.49 ±10%	2.32	-6.8%	55.2 ±5%	53.8	-2.5%	0.97 ±5%	0.96	-1.0%	1000	23.0	23.6	≥ 15	34	101.1
Aug 29	Body 835	2.49 ±10%	2.39	-4.0%	55.2 ±5%	54.7	-0.9%	0.97 ±5%	0.97	0.0%	1000	24.0	22.8	≥ 15	30	101.1
Aug 31	Body 835	2.49 ±10%	2.42	-2.8%	55.2 ±5%	57.5	+4.2%	0.97 ±5%	0.99	+2.1%	1000	24.0	21.8	≥ 15	30	101.1
Sep 20	Head 835	2.35 ±10%	2.27	-3.4%	41.5 ±5%	42.5	+2.4%	0.90 ±5%	0.90	0.0%	1000	23.0	22.9	≥ 15	29	101.1

Notes		
	1.	The target SAR values are the measured values from the dipole calibration performed by SPEAG (see Appendix E).
	2.	The target dielectric parameters are the nominal values from the dipole calibration performed by SPEAG (see Appendix E).
	3.	The fluid temperature remained within +/-2°C from the dielectric parameter measurement to the completion of the system performance check.
	4.	The dielectric parameters of the simulated tissue mixture were measured prior to the system performance check using a Dielectric Probe Kit and a Network Analyzer (see Appendix C).
	5.	System Performance Checks were not performed on all SAR evaluation test dates based on compliance with the following provision per TCBC Workshop Presentation April 5-7, 2011 (Kwok Chan Presentation File 04-06-2011-FCC 4 RF Exposure Guidance 040611- KC): SAR System Verification when head and body tissue dielectric parameters are required to test a device, separate SAR system verifications are required - daily verification of each liquid is usually not necessary when liquid parameter tolerances are maintained in a controlled environment - typically every few days is sufficient or when liquid is changed



System Performance Check Measurement Setup Diagram (IEEE 1528-2003)

835 MHz SPEAG Validation Dipole Setup

16.0 SIMULATED EQUIVALENT TISSUES

The simulated equivalent tissue recipes in the table below are derived from the SAR system manufacturer's suggested recipes in the DASY4 manual (see references [10] and [11]) in accordance with the procedures and requirements specified in IEEE Standard 1528-2003 (see reference [5]). The ingredient percentage may have been adjusted minimally in order to achieve the appropriate target dielectric parameters within the specified tolerance.

SIMULATED TISSUE MIXTURES					
INGREDIENT	Water	**835 MHz Head Tissue Mixture**	40.71 %	**835 MHz Body Tissue Mixture**	53.79 %
	Sugar		56.63 %		45.13 %
	Salt		1.48 %		0.98 %
	HEC		0.99 %		--
	Bactericide		0.19 %		0.10 %

17.0 SAR LIMITS

SAR RF EXPOSURE LIMITS			
FCC 47 CFR 2.1093	**Health Canada Safety Code 6**	**(General Population / Uncontrolled Exposure)**	**(Occupational / Controlled Exposure)**
Spatial Average (averaged over the whole body)		0.08 W/kg	0.4 W/kg
Spatial Peak (averaged over any 1 g of tissue)		1.6 W/kg	**8.0 W/kg**
Spatial Peak (hands/wrists/feet/ankles averaged over 10 g)		4.0 W/kg	20.0 W/kg
The Spatial Average value of the SAR averaged over the whole body.			
The Spatial Peak value of the SAR averaged over any 1 gram of tissue (defined as a tissue volume in the shape of a cube) and over the appropriate averaging time.			
The Spatial Peak value of the SAR averaged over any 10 grams of tissue (defined as a tissue volume in the shape of a cube) and over the appropriate averaging time.			
Uncontrolled environments are defined as locations where there is potential exposure of individuals who have no knowledge or control of their potential exposure.			
Controlled environments are defined as locations where there is potential exposure of individuals who have knowledge of their potential exposure and can exercise control over their exposure.			

18.0 ROBOT SYSTEM SPECIFICATIONS

Specifications	
Positioner	Stäubli Unimation Corp. Robot Model: RX60L
Repeatability	0.02 mm
No. of axis	6
Data Acquisition Electronic (DAE) System	
Cell Controller	
Processor	AMD Athlon XP 2400+
Clock Speed	2.0 GHz
Operating System	Windows XP Professional
Data Converter	
Features	Signal Amplifier, multiplexer, A/D converter, and control logic
Software	Measurement Software: DASY4, V4.7 Build 44
	Postprocessing Software: SEMCAD, V1.8 Build 171
Connecting Lines	Optical downlink for data and status info., Optical uplink for commands and clock
DASY4 Measurement Server	
Function	Real-time data evaluation for field measurements and surface detection
Hardware	PC/104 166MHz Pentium CPU; 32 MB chipdisk; 64 MB RAM
Connections	COM1, COM2, DAE, Robot, Ethernet, Service Interface
E-Field Probe	
Model	ET3DV6
Serial No.	1590
Construction	Triangular core fiber optic detection system
Frequency	10 MHz to 6 GHz
Linearity	±0.2 dB (30 MHz to 3 GHz)
Phantom 1	
Type	SAM V4.0C
Shell Material	Fiberglass
Thickness	2.0 ±0.1 mm
Volume	Approx. 25 liters
Phantom 2	
Type	Side Planar Phantom
Shell Material	Plexiglass
Bottom Thickness	2.0 mm ± 0.1 mm
Inner Dimensions	72.6 cm (L) x 20.3 cm (W) x 20.3 cm (H)
Phantom 3	
Type	Barski Planar Phantom
Shell Material	Fiberglass
Thickness	2.0 ±0.1 mm
Volume	Approx. 70 liters

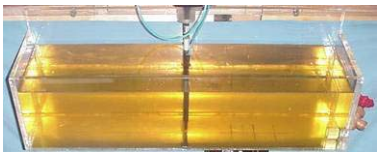
19.0 PROBE SPECIFICATION

Construction:	Symmetrical design with triangular core; Built-in shielding against static charges PEEK enclosure material (resistant to organic solvents, glycol)
Calibration:	In air from 10 MHz to 2.5 GHz In head simulating tissue at frequencies of 900 MHz and 1.8 GHz (accuracy ± 8%)
Frequency:	10 MHz to > 6 GHz; Linearity: ± 0.2 dB (30 MHz to 3 GHz)
Directivity:	± 0.2 dB in head tissue (rotation around probe axis) ± 0.4 dB in head tissue (rotation normal to probe axis)
Dynamic Range:	5 μW/g to > 100 mW/g; Linearity: ± 0.2 dB
Surface Detect:	± 0.2 mm repeatability in air and clear liquids over diffuse reflecting surfaces
Dimensions:	Overall length: 330 mm; Tip length: 16 mm; Body diameter: 12 mm; Tip diameter: 6.8 mm Distance from probe tip to dipole centers: 2.7 mm
Application:	General dosimetry up to 3 GHz; Compliance tests of mobile phone

ET3DV6 E-Field Probe

20.0 PHANTOM(S)

The side planar phantom is constructed of Plexiglas material with a 2.0 mm shell thickness for face-held and body-worn SAR evaluations of portable radio transceivers. The side planar phantom is mounted on the side of the DASY4 compact system table.



Plexiglas Side Planar Phantom

The Barski Planar Phantom is a fiberglass shell phantom with a 2.0 mm (+/- 0.2mm) thick device measurement area at the center of the phantom for SAR evaluations of devices with a larger surface area than the planar section of the SAM phantom. The planar phantom is integrated in a wooden table. The planar phantom was used for the DUT SAR evaluations and the system performance check evaluations. See Appendix G for dimensions and specifications of the Barski planar phantom.

Barski Planar Phantom

The SAM Twin Phantom V4.0C is a fiberglass shell phantom with a 2.0 mm (+/- 0.2 mm) shell thickness for left and right head and flat planar area integrated in a wooden table. The shape of the fiberglass shell corresponds to the phantom defined by SCC34-SC2. The device holder positions are adjusted to the standard measurement positions in the three sections. See Appendix H for specifications of the SAM Twin Phantom V4.0C.

SAM Twin Phantom V4.0C

21.0 DEVICE HOLDER

The DASY4 device holder has two scales for device rotation (with respect to the body axis) and the device inclination (with respect to the line between the ear openings). The plane between the ear openings and the mouth tip has a rotation angle of 65°. The bottom plate contains three pair of bolts for locking the device holder. The device holder positions are adjusted to the standard measurement positions in the three sections.

Device Holder

22.0 TEST EQUIPMENT LIST

TEST EQUIPMENT		ASSET NO.	SERIAL NO.	DATE CALIBRATED	CALIBRATION INTERVAL
USED	DESCRIPTION				
x	Schmid & Partner DASY4 System	-	-	-	-
x	-DASY4 Measurement Server	00158	1078	CNR	CNR
x	-Robot	00046	599396-01	CNR	CNR
x	-DAE4	00019	353	27Apr10	Biennial
x	-ET3DV6 E-Field Probe	00017	1590	22Jun11	Annual
x	-D835V2 Validation Dipole	00217	4d075	20Apr09	Triennial
x	Side Planar Phantom	00156	161	CNR	CNR
x	Barski Planar Phantom	00155	03-01	CNR	CNR
x	SPEAG SAM Twin Phantom V4.0C	00154	1033	CNR	CNR
x	HP 85070C Dielectric Probe Kit	00033	none	CNR	CNR
x	Gigatronics 8652A Power Meter	00007	1835272	04May10	Biennial
x	Gigatronics 80701A Power Sensor	00014	1833699	04May10	Biennial
x	HP 8753ET Network Analyzer	00134	US39170292	04May10	Biennial
x	Rohde & Schwarz SMR20 Signal Generator	00006	100104	CNR	CNR
x	Amplifier Research 5S1G4 Power Amplifier	00106	26235	CNR	CNR
Abbr.	CNR = Calibration Not Required				

23.0 JUSTIFICATION FOR EXTENDED DIPOLE CALIBRATION

SAR dipoles calibrated less than two years ago but more than one year ago were confirmed by maintaining return loss (< -20dB, within 20% of prior calibration) and impedance (within 5Ω from prior calibration) requirements per extended calibrations as specified in FCC KDB 450824 (see reference [9]).

SPEAG D835V3 SN: 4d075						
Date of Measurement	Frequency	Fluid Type	Return Loss (dB)	Δ %	Impedance (Ω)	Δ Ω
Apr. 20, 2009	835 MHz	Head	-29.1	-	51.8	-
Jun. 29, 2011			-27.3	-6.2%	48.6	-3.2
Apr. 20, 2009	835 MHz	Body	-26.7	-	48.0	-
Apr. 20, 2011			-24.0	10.1%	51.3	3.3

24.0 MEASUREMENT UNCERTAINTIES

UNCERTAINTY BUDGET FOR DEVICE EVALUATION

Uncertainty Component	IEEE 1528 Section	Uncertainty Value ±%	Probability Distribution	Divisor	ci 1g	ci 10g	Uncertainty Value ±% (1g)	Uncertainty Value ±% (10g)	V_i or V_{eff}
Measurement System									
Probe Calibration (835 MHz)	E.2.1	6.0	Normal	1	1	1	6.0	6.0	∞
Axial Isotropy	E.2.2	4.7	Rectangular	1.732050808	0.7	0.7	1.9	1.9	∞
Hemispherical Isotropy	E.2.2	9.6	Rectangular	1.732050808	0.7	0.7	3.9	3.9	∞
Boundary Effect	E.2.3	1	Rectangular	1.732050808	1	1	0.6	0.6	∞
Linearity	E.2.4	4.7	Rectangular	1.732050808	1	1	2.7	2.7	∞
System Detection Limits	E.2.5	1	Rectangular	1.732050808	1	1	0.6	0.6	∞
Readout Electronics	E.2.6	0.3	Normal	1	1	1	0.3	0.3	∞
Response Time	E.2.7	0.8	Rectangular	1.732050808	1	1	0.5	0.5	∞
Integration Time	E.2.8	2.6	Rectangular	1.732050808	1	1	1.5	1.5	∞
RF Ambient Conditions	E.6.1	3	Rectangular	1.732050808	1	1	1.7	1.7	∞
Probe Positioner Mechanical Tolerance	E.6.2	0.4	Rectangular	1.732050808	1	1	0.2	0.2	∞
Probe Positioning wrt Phantom Shell	E.6.3	2.9	Rectangular	1.732050808	1	1	1.7	1.7	∞
Extrapolation, interpolation & integration algorithms for max. SAR evaluation	E.5	1	Rectangular	1.732050808	1	1	0.6	0.6	∞
Test Sample Related									
Test Sample Positioning	E.4.2	2.9	Normal	1	1	1	2.9	2.9	12
Device Holder Uncertainty	E.4.1	3.6	Normal	1	1	1	3.6	3.6	8
SAR Drift Measurement	6.6.2	5	Rectangular	1.732050808	1	1	2.9	2.9	∞
Phantom and Tissue Parameters									
Phantom Uncertainty	E.3.1	4	Rectangular	1.732050808	1	1	2.3	2.3	∞
Liquid Conductivity (target)	E.3.2	5	Rectangular	1.732050808	0.64	0.43	1.8	1.2	∞
Liquid Conductivity (measured)	E.3.3	5.56	Normal	1	0.64	0.43	3.6	2.4	∞
Liquid Permittivity (target)	E.3.2	5	Rectangular	1.732050808	0.6	0.49	1.7	1.4	∞
Liquid Permittivity (measured)	E.3.3	4.71	Normal	1	0.6	0.49	2.8	2.3	∞
Combined Standard Uncertainty			**RSS**				**11.56**	**11.00**	
Expanded Uncertainty (95% Confidence Interval)			**k=2**				**23.11**	**22.01**	

Measurement Uncertainty Table in accordance with IEEE Standard 1528-2003

This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2

25.0 REFERENCES

[1] Federal Communications Commission - "Radiofrequency radiation exposure evaluation: portable devices", Rule Part 47 CFR §2.1093.

[2] Health Canada - "Limits of Human Exposure to Radiofrequency Electromagnetic Fields in the Frequency Range from 3 kHz to 300 GHz", Safety Code 6: 1999.

[3] Federal Communications Commission - "Evaluating Compliance with FCC Guidelines for Human Exposure to Radio frequency Electromagnetic Fields", OET Bulletin 65, Supplement C (Edition 01-01), FCC, Washington, D.C.: June 2001.

[4] Industry Canada - "Radio Frequency (RF) Exposure Compliance of Radiocommunication Apparatus (All Frequency Bands)", Radio Standards Specification RSS-102 Issue 4: March 2010.

[5] IEEE Standard 1528-2003 - "Recommended Practice for Determining the Peak Spatial-Average Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques": December 2003.

[6] International Standard IEC 62209-2 Edition 1.0 2010-03 - "Human exposure to radio frequency fields from hand-held & body-mounted wireless communication devices - Part 2: Procedure to determine the specific absorption rate (SAR) for wireless communication devices used in close proximity to the human body (frequency range of 30 MHz to 6 GHz)".

[7] Federal Communications Commission, Office of Engineering and Technology - "Mobile and Portable Device RF Exposure Procedures and Equipment Authorization Policies"; KDB 447498 D01v04: November 2009.

[8] Federal Communications Commission, Office of Engineering and Technology - "SAR Test Reduction Considerations for Occupational PTT Radios", KDB 643646 D01v01r01: April 2011.

[9] Federal Communications Commission, Office of Engineering and Technology - "Application Note: SAR Probe Calibration and System Verification Considerations for Measurements at 150 MHz - 3 GHz"; KDB 450824 D01 v01r01: January 2007.

[10] Schmid & Partner Engineering AG - DASY4 Manual V4.6, Chapter 16 Application Note, Head Tissue Recipe: Sept. 2005.

[11] Schmid & Partner Engineering AG - DASY4 Manual V4.6, Chapter 17 Application Note, Body Tissue Recipe: Sept. 2005.

[12] Schmid & Partner Engineering AG - DASY4 Manual V4.6, Chapter 22 Application Note, SAR Sensitivities: Sept. 2005.

[13] Federal Communications Commission - "Measurements Required: RF Power Output"; Rule Part 47 CFR §2.1046.

[14] Industry Canada - "General Requirements and Information for the Certification of Radiocommunication Equipment", Radio Standards Specification RSS-Gen Issue 2: June 2007.

[15] ISO/IEC 17025 - "General requirements for the competence of testing and calibration laboratories (ISO/IEC 17025:2005)."

[16] Federal Communications Commission, Office of Engineering and Technology - "SAR Evaluation Considerations for Handsets with Multiple Transmitters and Antennas"; KDB 648474 D01v01r05: September 2008.

APPENDIX B - SYSTEM PERFORMANCE CHECK PLOTS

Date Tested: 08/25/2011

System Performance Check - 835 MHz Dipole - Body

DUT: Dipole 835 MHz; Type: D835V2; Serial: 4d075; Calibrated: 04/20/2009

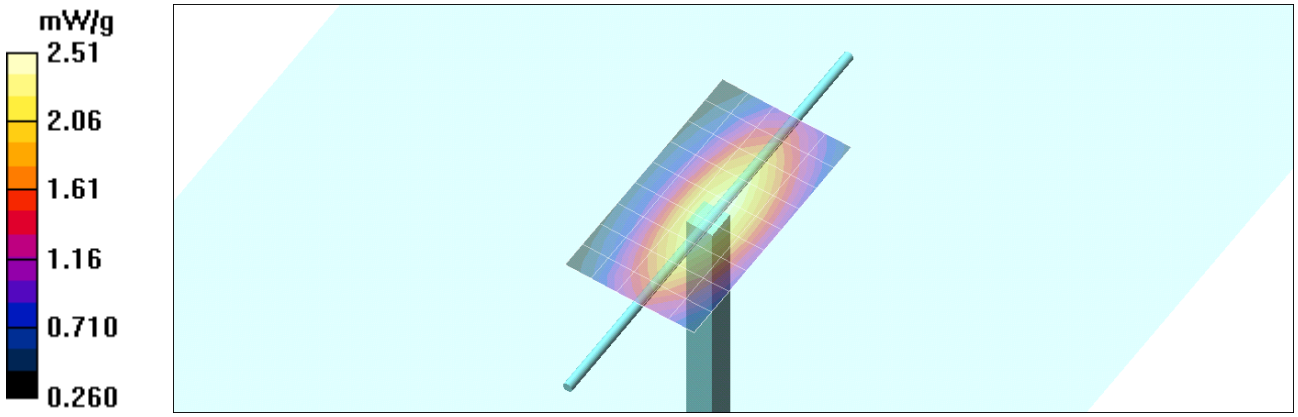
Ambient Temp: 23C; Fluid Temp: 23.6C; Barometric Pressure: 101.1 kPa; Humidity: 34%

Communication System: CW
Frequency: 835 MHz; Duty Cycle: 1:1
Medium: M835 Medium parameters used: f = 835 MHz; σ = 0.96 mho/m; ε_r = 53.8; ρ = 1000 kg/m^3

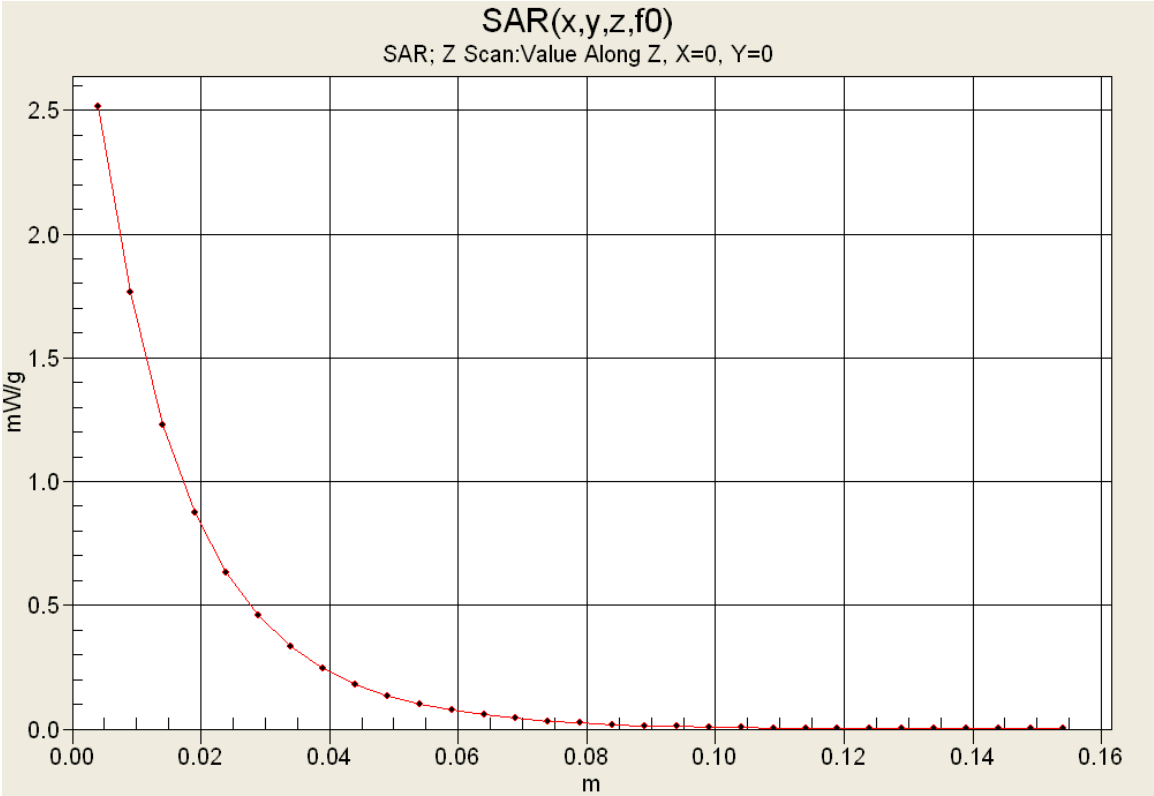
- Probe: ET3DV6 - SN1590; ConvF(6.37, 6.37, 6.37); Calibrated: 22/06/2011
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn353; Calibrated: 27/04/2010
- Phantom: Barski Industries; Type: Fiberglas Planar; Serial: 03-01
- Measurement SW: DASY4, V4.7 Build 44; Postprocessing SW: SEMCAD, V1.8 Build 171

Body d=15mm Pin=250mW/Area Scan (6x10x1): Measurement grid: dx=10mm, dy=10mm
Maximum value of SAR (measured) = 2.51 mW/g

Body d=15mm Pin=250mW/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 51.5 V/m; Power Drift = 0.002 dB
Peak SAR (extrapolated) = 3.26 W/kg
SAR(1 g) = 2.32 mW/g; SAR(10 g) = 1.55 mW/g



Z-Axis Scan



Date Tested: 08/29/2011

System Performance Check - 835 MHz Dipole - Body

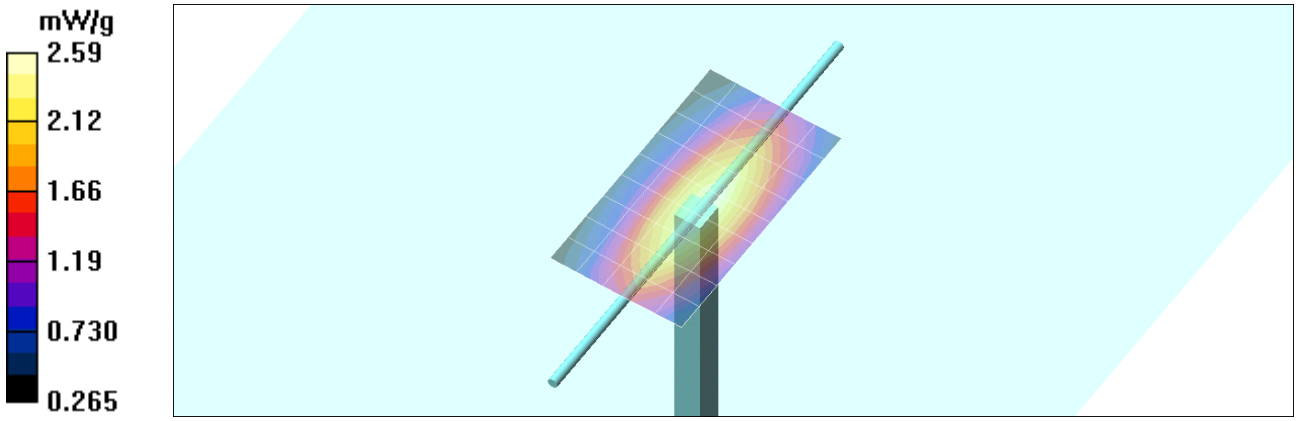
DUT: Dipole 835 MHz; Type: D835V2; Serial: 4d075; Calibrated: 04/20/2009

Ambient Temp: 24C; Fluid Temp: 22.8C; Barometric Pressure: 101.1 kPa; Humidity: 30%

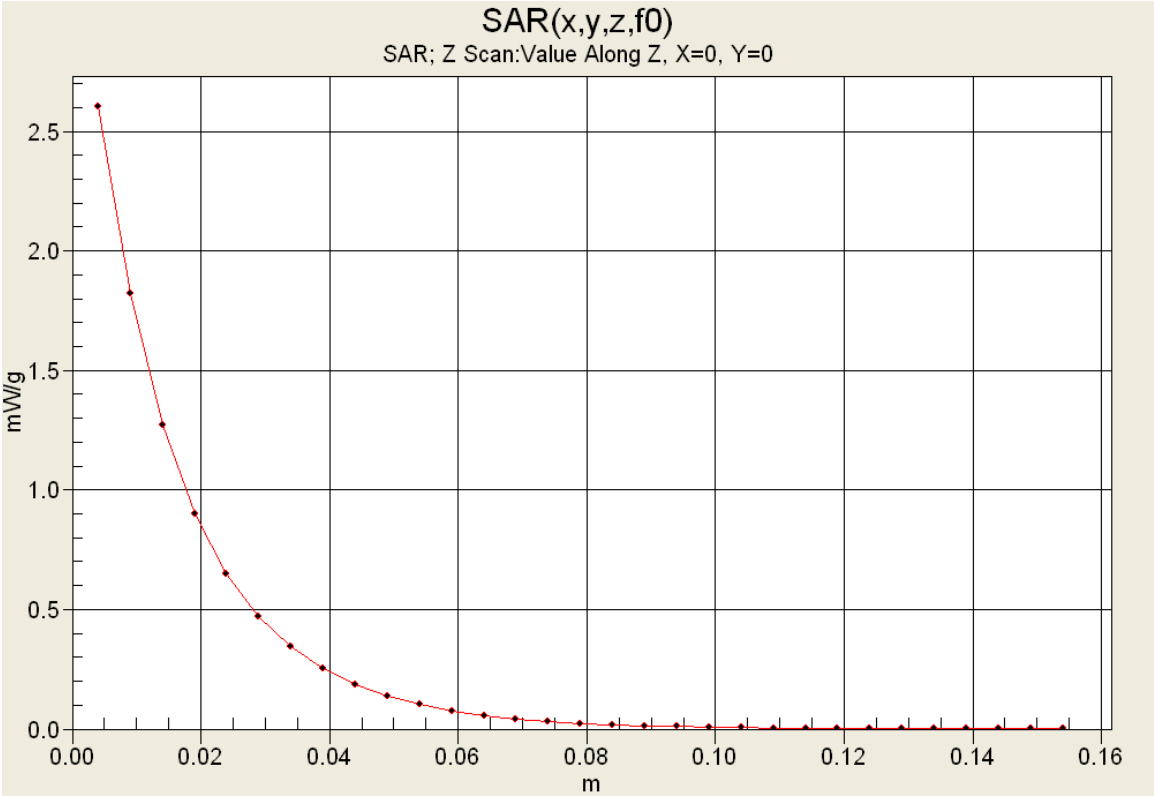
Communication System: CW
Frequency: 835 MHz; Duty Cycle: 1:1
Medium: M835 Medium parameters used: f = 835 MHz; σ = 0.97 mho/m; ε_r = 54.7; ρ = 1000 kg/m^3

- Probe: ET3DV6 - SN1590; ConvF(6.37, 6.37, 6.37); Calibrated: 22/06/2011
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn353; Calibrated: 27/04/2010
- Phantom: Barski Industries; Type: Fiberglas Planar; Serial: 03-01
- Measurement SW: DASY4, V4.7 Build 44; Postprocessing SW: SEMCAD, V1.8 Build 171

Body d=15mm Pin=250mW/Area Scan (6x10x1): Measurement grid: dx=10mm, dy=10mm
Maximum value of SAR (measured) = 2.62 mW/g
Body d=15mm Pin=250mW/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 52.1 V/m; Power Drift = -0.009 dB
Peak SAR (extrapolated) = 3.35 W/kg
SAR(1 g) = 2.39 mW/g; SAR(10 g) = 1.59 mW/g
Maximum value of SAR (measured) = 2.59 mW/g



Z-Axis Scan



Date Tested: 08/31/2011

System Performance Check - 835 MHz Dipole - Body

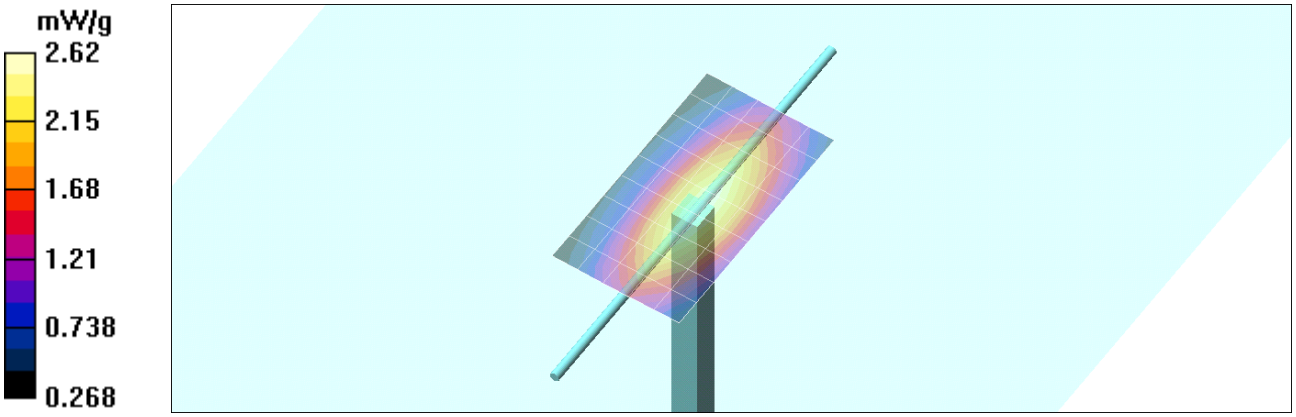
DUT: Dipole 835 MHz; Type: D835V2; Serial: 4d075; Calibrated: 04/20/2009

Ambient Temp: 24C; Fluid Temp: 21.8C; Barometric Pressure: 101.1 kPa; Humidity: 30%

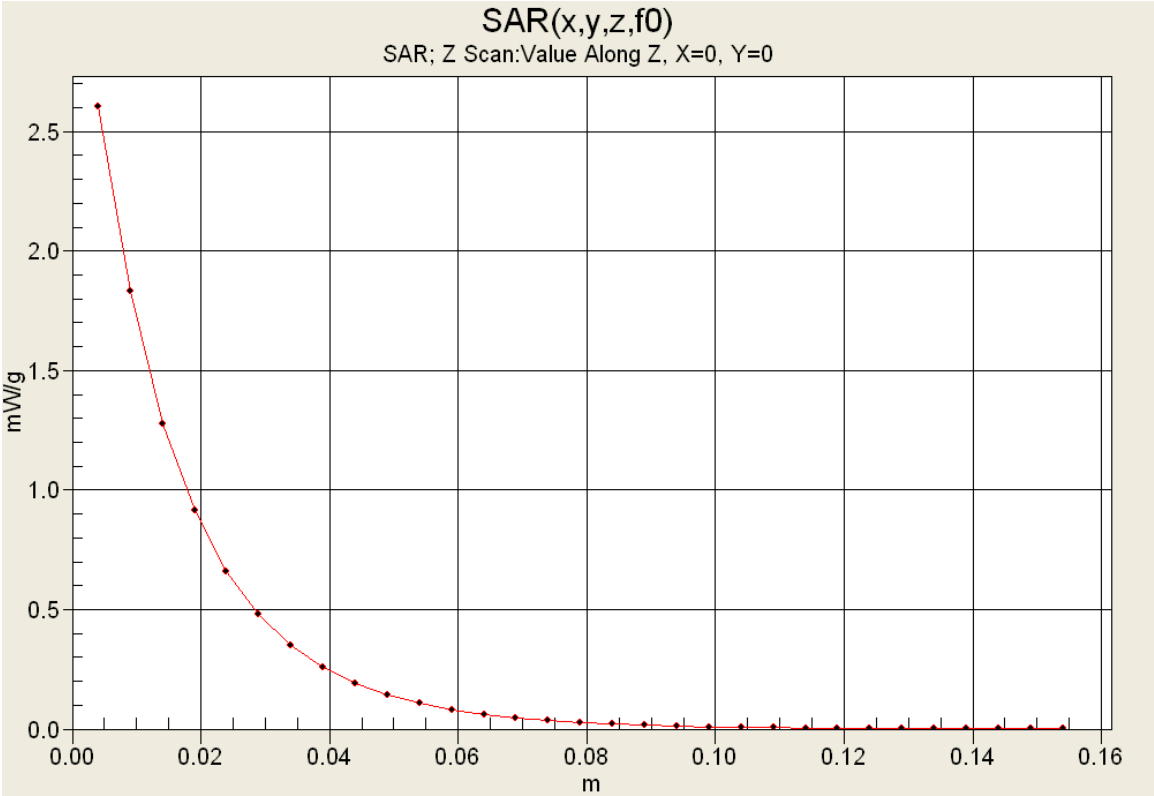
Communication System: CW
Frequency: 835 MHz; Duty Cycle: 1:1
Medium: M835 Medium parameters used: f = 835 MHz; σ = 0.99 mho/m; ε_r = 57.5; ρ = 1000 kg/m^3

- Probe: ET3DV6 - SN1590; ConvF(6.37, 6.37, 6.37); Calibrated: 22/06/2011
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn353; Calibrated: 27/04/2010
- Phantom: Barski Industries; Type: Fiberglas Planar; Serial: 03-01
- Measurement SW: DASY4, V4.7 Build 44; Postprocessing SW: SEMCAD, V1.8 Build 171

Body d=15mm Pin=250mW/Area Scan (6x10x1): Measurement grid: dx=10mm, dy=10mm
Maximum value of SAR (measured) = 2.62 mW/g
Body d=15mm Pin=250mW/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 51.4 V/m; Power Drift = -0.023 dB
Peak SAR (extrapolated) = 3.36 W/kg
SAR(1 g) = 2.42 mW/g; SAR(10 g) = 1.62 mW/g



Z-Axis Scan



Date Tested: 09/20/2011

System Performance Check - 835 MHz Dipole - Head

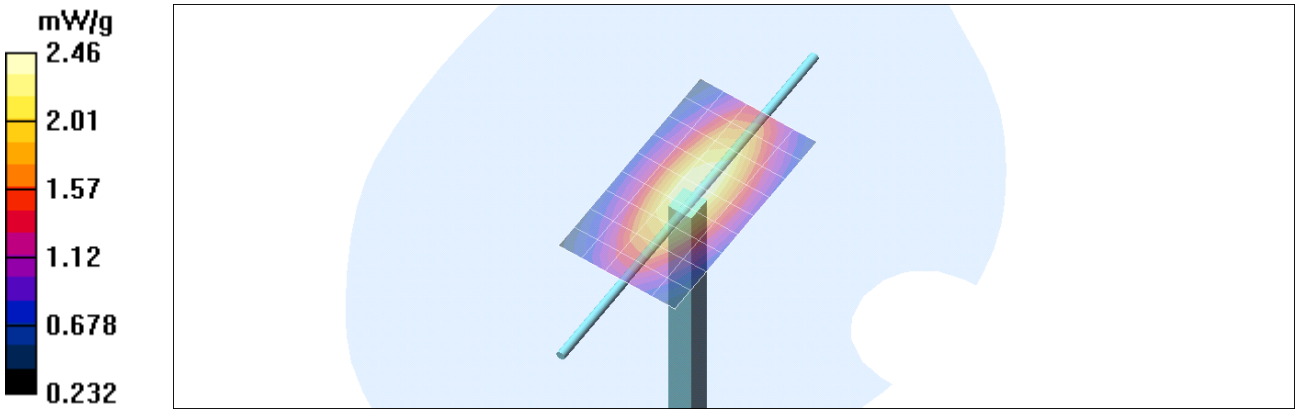
DUT: Dipole 835 MHz; Type: D835V2; Serial: 4d075; Calibrated: 04/20/2009

Ambient Temp: 23C; Fluid Temp: 22.9C; Barometric Pressure: 101.1 kPa; Humidity: 29%

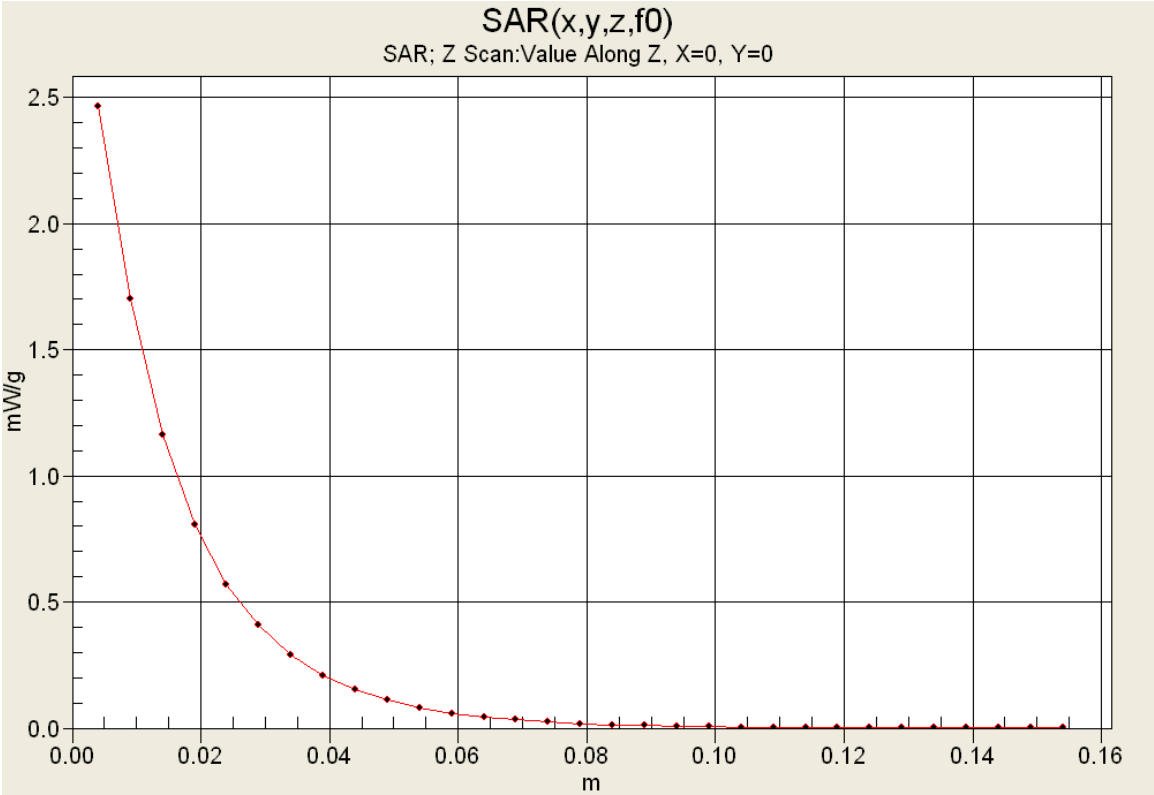
Communication System: CW
Frequency: 835 MHz; Duty Cycle: 1:1
Medium: HSL835 Medium parameters used: f = 835 MHz; σ = 0.9 mho/m; ε_r = 42.5; ρ = 1000 kg/m^3

- Probe: ET3DV6 - SN1590; ConvF(6.5, 6.5, 6.5); Calibrated: 22/06/2011
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn353; Calibrated: 27/04/2010
- Phantom: SAM 4.0; Type: Fiberglas; Serial: 1033
- Measurement SW: DASY4, V4.7 Build 44; Postprocessing SW: SEMCAD, V1.8 Build 171

Head d=15mm Pin=250mW/Area Scan (6x10x1): Measurement grid: dx=10mm, dy=10mm
Maximum value of SAR (measured) = 2.39 mW/g
Head d=15mm Pin=250mW/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 54.0 V/m; Power Drift = 0.008 dB
Peak SAR (extrapolated) = 3.19 W/kg
SAR(1 g) = 2.27 mW/g; SAR(10 g) = 1.5 mW/g
Maximum value of SAR (measured) = 2.46 mW/g



Z-Axis Scan



APPENDIX C - MEASURED FLUID DIELECTRIC PARAMETERS

835 MHz Body

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Celltech Labs
Test Result for UIM Dielectric Parameter
25/Aug/2011
Frequency (GHz)
FCC_eB FCC Limits for Body Epsilon
FCC_sB FCC Limits for Body Sigma
Test_e Epsilon of UIM
Test_s Sigma of UIM

****

Freq	FCC_eB	FCC_sB	Test_e	Test_s
0.7350	55.59	0.96	54.97	0.87
0.7450	55.55	0.96	54.85	0.86
0.7550	55.51	0.96	54.73	0.87
0.7650	55.47	0.96	54.91	0.89
0.7750	55.43	0.97	54.88	0.90
0.7850	55.39	0.97	54.63	0.89
0.7950	55.36	0.97	54.33	0.91
0.8050	55.32	0.97	54.25	0.92
0.8150	55.28	0.97	54.37	0.94
0.8250	55.24	0.97	54.21	0.93
0.8350	55.20	0.97	53.77	0.96
0.8450	55.17	0.98	54.19	0.97
0.8550	55.14	0.99	54.22	0.97
0.8650	55.11	1.01	53.86	0.99
0.8750	55.08	1.02	54.23	0.99
0.8850	55.05	1.03	53.91	1.00
0.8950	55.02	1.04	53.58	1.00
0.9050	55.00	1.05	53.62	1.01
0.9150	55.00	1.06	53.53	1.03
0.9250	54.98	1.06	53.47	1.05
0.9350	54.96	1.07	52.99	1.06

835 MHz Body

****

Celltech Labs
Test Result for UIM Dielectric Parameter
26/Aug/2011
Frequency (GHz)
FCC_eB FCC Limits for Body Epsilon
FCC_sB FCC Limits for Body Sigma
Test_e Epsilon of UIM
Test_s Sigma of UIM

****

Freq	FCC_eB	FCC_sB	Test_e	Test_s
0.7350	55.59	0.96	54.76	0.84
0.7450	55.55	0.96	54.65	0.87
0.7550	55.51	0.96	54.51	0.87
0.7650	55.47	0.96	54.24	0.88
0.7750	55.43	0.97	54.45	0.89
0.7850	55.39	0.97	54.45	0.90
0.7950	55.36	0.97	54.21	0.92
0.8050	55.32	0.97	54.21	0.94
0.8150	55.28	0.97	53.84	0.93
0.8250	55.24	0.97	53.80	0.94
0.8350	55.20	0.97	54.14	0.94
0.8450	55.17	0.98	53.49	0.95
0.8550	55.14	0.99	53.70	0.97
0.8650	55.11	1.01	53.43	0.97
0.8750	55.08	1.02	53.53	1.00
0.8850	55.05	1.03	53.33	1.00
0.8950	55.02	1.04	53.12	1.01
0.9050	55.00	1.05	53.14	1.02
0.9150	55.00	1.06	53.39	1.02
0.9250	54.98	1.06	53.19	1.05
0.9350	54.96	1.07	52.93	1.06

835 MHz Body

****

Celltech Labs
Test Result for UIM Dielectric Parameter
29/Aug/2011 (am)
Frequency (GHz)
FCC_eB FCC Limits for Body Epsilon
FCC_sB FCC Limits for Body Sigma
Test_e Epsilon of UIM
Test_s Sigma of UIM

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Freq	FCC_eB	FCC_sB	Test_e	Test_s
0.7350	55.59	0.96	53.83	0.84
0.7450	55.55	0.96	53.82	0.86
0.7550	55.51	0.96	53.40	0.85
0.7650	55.47	0.96	53.30	0.88
0.7750	55.43	0.97	53.52	0.88
0.7850	55.39	0.97	53.15	0.90
0.7950	55.36	0.97	53.02	0.90
0.8050	55.32	0.97	53.05	0.90
0.8150	55.28	0.97	52.88	0.91
0.8250	55.24	0.97	52.64	0.94
0.8350	55.20	0.97	52.91	0.94
0.8450	55.17	0.98	52.67	0.95
0.8550	55.14	0.99	52.79	0.96
0.8650	55.11	1.01	52.56	0.97
0.8750	55.08	1.02	52.70	0.99
0.8850	55.05	1.03	52.32	1.00
0.8950	55.02	1.04	52.48	1.00
0.9050	55.00	1.05	52.27	1.02
0.9150	55.00	1.06	52.22	1.02
0.9250	54.98	1.06	52.03	1.04
0.9350	54.96	1.07	51.88	1.04

835 MHz Body

****

Celltech Labs
Test Result for UIM Dielectric Parameter
29/Aug/2011 (pm)
Frequency (GHz)
FCC_eB FCC Limits for Body Epsilon
FCC_sB FCC Limits for Body Sigma
Test_e Epsilon of UIM
Test_s Sigma of UIM

****

Freq	FCC_eB	FCC_sB	Test_e	Test_s
0.7350	55.59	0.96	55.51	0.86
0.7450	55.55	0.96	55.42	0.88
0.7550	55.51	0.96	55.20	0.88
0.7650	55.47	0.96	55.29	0.91
0.7750	55.43	0.97	55.02	0.91
0.7850	55.39	0.97	54.97	0.92
0.7950	55.36	0.97	54.86	0.93
0.8050	55.32	0.97	55.17	0.93
0.8150	55.28	0.97	55.03	0.94
0.8250	55.24	0.97	54.80	0.95
0.8350	55.20	0.97	54.73	0.97
0.8450	55.17	0.98	54.58	0.97
0.8550	55.14	0.99	54.63	0.98
0.8650	55.11	1.01	54.37	0.99
0.8750	55.08	1.02	54.24	1.01
0.8850	55.05	1.03	54.31	1.02
0.8950	55.02	1.04	54.10	1.03
0.9050	55.00	1.05	54.01	1.04
0.9150	55.00	1.06	54.10	1.04
0.9250	54.98	1.06	53.74	1.06
0.9350	54.96	1.07	53.76	1.07

835 MHz Body

****

Celltech Labs
Test Result for UIM Dielectric Parameter
30/Aug/2011
Frequency (GHz)
FCC_eB FCC Limits for Body Epsilon
FCC_sB FCC Limits for Body Sigma
Test_e Epsilon of UIM
Test_s Sigma of UIM

****

Freq	FCC_eB	FCC_sB	Test_e	Test_s
0.7350	55.59	0.96	56.65	0.89
0.7450	55.55	0.96	56.22	0.89
0.7550	55.51	0.96	56.58	0.89
0.7650	55.47	0.96	56.53	0.90
0.7750	55.43	0.97	56.17	0.91
0.7850	55.39	0.97	56.25	0.94
0.7950	55.36	0.97	56.21	0.95
0.8050	55.32	0.97	55.90	0.96
0.8150	55.28	0.97	55.97	0.99
0.8250	55.24	0.97	56.03	0.98
0.8350	55.20	0.97	55.79	0.97
0.8450	55.17	0.98	55.66	0.99
0.8550	55.14	0.99	55.65	0.99
0.8650	55.11	1.01	55.21	0.99
0.8750	55.08	1.02	55.20	1.01
0.8850	55.05	1.03	55.11	1.02
0.8950	55.02	1.04	55.05	1.02
0.9050	55.00	1.05	54.84	1.05
0.9150	55.00	1.06	55.00	1.06
0.9250	54.98	1.06	54.69	1.08
0.9350	54.96	1.07	54.81	1.08

835 MHz Body

****

Celltech Labs
Test Result for UIM Dielectric Parameter
31/Aug/2011
Frequency (GHz)
FCC_eB FCC Limits for Body Epsilon
FCC_sB FCC Limits for Body Sigma
Test_e Epsilon of UIM
Test_s Sigma of UIM

****

Freq	FCC_eB	FCC_sB	Test_e	Test_s
0.7350	55.59	0.96	58.56	0.88
0.7450	55.55	0.96	58.25	0.90
0.7550	55.51	0.96	58.03	0.90
0.7650	55.47	0.96	57.54	0.90
0.7750	55.43	0.97	56.62	0.92
0.7850	55.39	0.97	56.55	0.91
0.7950	55.36	0.97	56.28	0.93
0.8050	55.32	0.97	56.47	0.95
0.8150	55.28	0.97	56.67	0.97
0.8250	55.24	0.97	57.00	0.99
0.8350	55.20	0.97	57.50	0.99
0.8450	55.17	0.98	57.41	1.02
0.8550	55.14	0.99	57.31	1.00
0.8650	55.11	1.01	56.77	1.00
0.8750	55.08	1.02	56.70	1.01
0.8850	55.05	1.03	56.10	1.03
0.8950	55.02	1.04	55.76	1.01
0.9050	55.00	1.05	55.13	1.03
0.9150	55.00	1.06	55.00	1.05
0.9250	54.98	1.06	55.61	1.07
0.9350	54.96	1.07	55.86	1.09

835 MHz Body

****

Celltech Labs
Test Result for UIM Dielectric Parameter
01/Sep/2011
Frequency (GHz)
FCC_eB FCC Limits for Body Epsilon
FCC_sB FCC Limits for Body Sigma
Test_e Epsilon of UIM
Test_s Sigma of UIM

****

Freq	FCC_eB	FCC_sB	Test_e	Test_s
0.7350	55.59	0.96	57.70	0.86
0.7450	55.55	0.96	57.56	0.87
0.7550	55.51	0.96	57.45	0.88
0.7650	55.47	0.96	57.39	0.90
0.7750	55.43	0.97	57.09	0.92
0.7850	55.39	0.97	57.01	0.91
0.7950	55.36	0.97	57.10	0.92
0.8050	55.32	0.97	57.02	0.93
0.8150	55.28	0.97	56.81	0.94
0.8250	55.24	0.97	56.90	0.95
0.8350	55.20	0.97	56.74	0.96
0.8450	55.17	0.98	56.57	0.97
0.8550	55.14	0.99	56.67	0.99
0.8650	55.11	1.01	56.65	0.98
0.8750	55.08	1.02	56.38	1.00
0.8850	55.05	1.03	56.41	1.01
0.8950	55.02	1.04	56.24	1.04
0.9050	55.00	1.05	56.06	1.03
0.9150	55.00	1.06	56.01	1.03
0.9250	54.98	1.06	55.98	1.04
0.9350	54.96	1.07	55.82	1.06

835 MHz Head

****

Celltech Labs
Test Result for UIM Dielectric Parameter
20/Sep/2011
Frequency (GHz)
FCC_eH FCC OET 65 Supplement C (June 2001) Limits for Head Epsilon
FCC_sH FCC OET 65 Supplement C (June 2001) Limits for Head Sigma
Test_e Epsilon of UIM
Test_s Sigma of UIM

****

Freq	FCC_eH	FCC_sH	Test_e	Test_s
0.7350	42.02	0.89	43.59	0.80
0.7450	41.97	0.89	43.78	0.80
0.7550	41.92	0.89	43.53	0.82
0.7650	41.86	0.89	43.32	0.83
0.7750	41.81	0.90	43.47	0.83
0.7850	41.76	0.90	42.99	0.85
0.7950	41.71	0.90	43.13	0.85
0.8050	41.66	0.90	42.89	0.88
0.8150	41.60	0.90	42.78	0.89
0.8250	41.55	0.90	42.90	0.90
0.8350	41.50	0.90	42.51	0.90
0.8450	41.50	0.91	42.45	0.91
0.8550	41.50	0.92	42.32	0.92
0.8650	41.50	0.93	42.23	0.92
0.8750	41.50	0.94	41.63	0.92
0.8850	41.50	0.95	41.68	0.93
0.8950	41.50	0.96	41.94	0.95
0.9050	41.50	0.97	41.57	0.97
0.9150	41.50	0.98	41.64	0.99
0.9250	41.48	0.98	41.66	1.00
0.9350	41.46	0.99	41.39	1.00

835 MHz Head

****

Celltech Labs
Test Result for UIM Dielectric Parameter
21/Sep/2011
Frequency (GHz)
FCC_eH FCC OET 65 Supplement C (June 2001) Limits for Head Epsilon
FCC_sH FCC OET 65 Supplement C (June 2001) Limits for Head Sigma
Test_e Epsilon of UIM
Test_s Sigma of UIM

****

Freq	FCC_eH	FCC_sH	Test_e	Test_s
0.7350	42.02	0.89	43.34	0.80
0.7450	41.97	0.89	43.26	0.82
0.7550	41.92	0.89	43.17	0.83
0.7650	41.86	0.89	42.75	0.84
0.7750	41.81	0.90	43.07	0.85
0.7850	41.76	0.90	43.04	0.88
0.7950	41.71	0.90	42.76	0.88
0.8050	41.66	0.90	42.93	0.90
0.8150	41.60	0.90	42.93	0.90
0.8250	41.55	0.90	42.56	0.90
0.8350	41.50	0.90	42.53	0.93
0.8450	41.50	0.91	41.98	0.92
0.8550	41.50	0.92	41.75	0.94
0.8650	41.50	0.93	41.86	0.94
0.8750	41.50	0.94	41.53	0.95
0.8850	41.50	0.95	41.42	0.96
0.8950	41.50	0.96	41.46	0.98
0.9050	41.50	0.97	41.80	0.99
0.9150	41.50	0.98	41.44	0.99
0.9250	41.48	0.98	41.44	1.00
0.9350	41.46	0.99	41.14	1.01

APPENDIX E - DIPOLE CALIBRATION

Calibration Laboratory of
Schmid & Partner
Engineering AG
Zeughausstrasse 43, 8004 Zurich, Switzerland

S Schweizerischer Kalibrierdienst
C Service suisse d'étalonnage
S Servizio svizzero di taratura
S Swiss Calibration Service

Accredited by the Swiss Accreditation Service (SAS)
The Swiss Accreditation Service is one of the signatories to the EA Multilateral Agreement for the recognition of calibration certificates

Accreditation No.: SCS 108

Client Celltech

Certificate No: D835V2-4d075_Apr09

CALIBRATION CERTIFICATE

Object	D835V2 - SN: 4d075
Calibration procedure(s)	QA CAL-05.v7 Calibration procedure for dipole validation kits
Calibration date:	April 20, 2009
Condition of the calibrated item	In Tolerance

This calibration certificate documents the traceability to national standards, which realize the physical units of measurements (SI).
The measurements and the uncertainties with confidence probability are given on the following pages and are part of the certificate.

All calibrations have been conducted in the closed laboratory facility: environment temperature (22 ± 3)°C and humidity < 70%.

Calibration Equipment used (M&TE critical for calibration)

Primary Standards	ID #	Cal Date (Certificate No.)	Scheduled Calibration
Power meter EPM-442A	GB37480704	08-Oct-08 (No. 217-00898)	Oct-09
Power sensor HP 8481A	US37292783	08-Oct-08 (No. 217-00898)	Oct-09
Reference 20 dB Attenuator	SN: 5086 (20g)	31-Mar-09 (No. 217-01025)	Mar-10
Type-N mismatch combination	SN: 5047.2 / 06327	31-Mar-09 (No. 217-01029)	Mar-10
Reference Probe ES3DV2	SN: 3025	28-Apr-08 (No. ES3-3025_Apr08)	Apr-09
DAE4	SN: 601	07-Mar-09 (No. DAE4-601_Mar09)	Mar-10

Secondary Standards	ID #	Check Date (in house)	Scheduled Check
Power sensor HP 8481A	MY41092317	18-Oct-02 (in house check Oct-07)	In house check: Oct-09
RF generator R&S SMT-06	100005	4-Aug-99 (in house check Oct-07)	In house check: Oct-09
Network Analyzer HP 8753E	US37390585 S4206	18-Oct-01 (in house check Oct-08)	In house check: Oct-09

	Name	Function	Signature
Calibrated by:	Jeton Kastrati	Laboratory Technician	
Approved by:	Katja Pokovic	Technical Manager	

Issued: April 22, 2009

Glossary:

TSL	tissue simulating liquid
ConvF	sensitivity in TSL / NORM x,y,z
N/A	not applicable or not measured

Calibration is Performed According to the Following Standards:

a) IEEE Std 1528-2003, "IEEE Recommended Practice for Determining the Peak Spatial-Averaged Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques", December 2003
b) IEC 62209-1, "Procedure to measure the Specific Absorption Rate (SAR) for hand-held devices used in close proximity to the ear (frequency range of 300 MHz to 3 GHz)", February 2005
c) Federal Communications Commission Office of Engineering & Technology (FCC OET), "Evaluating Compliance with FCC Guidelines for Human Exposure to Radiofrequency Electromagnetic Fields; Additional Information for Evaluating Compliance of Mobile and Portable Devices with FCC Limits for Human Exposure to Radiofrequency Emissions", Supplement C (Edition 01-01) to Bulletin 65

Additional Documentation:

d) DASY4/5 System Handbook

Methods Applied and Interpretation of Parameters:

- *Measurement Conditions:* Further details are available from the Validation Report at the end of the certificate. All figures stated in the certificate are valid at the frequency indicated.
- *Antenna Parameters with TSL:* The dipole is mounted with the spacer to position its feed point exactly below the center marking of the flat phantom section, with the arms oriented parallel to the body axis.
- *Feed Point Impedance and Return Loss:* These parameters are measured with the dipole positioned under the liquid filled phantom. The impedance stated is transformed from the measurement at the SMA connector to the feed point. The Return Loss ensures low reflected power. No uncertainty required.
- *Electrical Delay:* One-way delay between the SMA connector and the antenna feed point. No uncertainty required.
- *SAR measured:* SAR measured at the stated antenna input power.
- *SAR normalized:* SAR as measured, normalized to an input power of 1 W at the antenna connector.
- *SAR for nominal TSL parameters:* The measured TSL parameters are used to calculate the nominal SAR result.

Measurement Conditions

DASY system configuration, as far as not given on page 1.

DASY Version	DASY5	V5.0
Extrapolation	Advanced Extrapolation	
Phantom	Modular Flat Phantom V4.9	
Distance Dipole Center - TSL	15 mm	with Spacer
Zoom Scan Resolution	dx, dy, dz = 5 mm	
Frequency	835 MHz ± 1 MHz	

Head TSL parameters

The following parameters and calculations were applied.

	Temperature	**Permittivity**	**Conductivity**
Nominal Head TSL parameters	22.0 °C	41.5	0.90 mho/m
Measured Head TSL parameters	(22.0 ± 0.2) °C	41.1 ± 6 %	0.89 mho/m ± 6 %
Head TSL temperature during test	(22.1 ± 0.2) °C	----	----

SAR result with Head TSL

SAR averaged over 1 cm^3 (1 g) of Head TSL	Condition	
SAR measured	250 mW input power	2.35 mW / g
SAR normalized	normalized to 1W	9.40 mW / g
SAR for nominal Head TSL parameters [1]	normalized to 1W	**9.46 mW /g ± 17.0 % (k=2)**

SAR averaged over 10 cm^3 (10 g) of Head TSL	condition	
SAR measured	250 mW input power	1.54 mW / g
SAR normalized	normalized to 1W	6.16 mW / g
SAR for nominal Head TSL parameters [1]	normalized to 1W	**6.19 mW /g ± 16.5 % (k=2)**

[1] Correction to nominal TSL parameters according to d), chapter "SAR Sensitivities"

Body TSL parameters

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Body TSL parameters	22.0 °C	55.2	0.97 mho/m
Measured Body TSL parameters	(22.0 ± 0.2) °C	53.9 ± 6 %	1.01 mho/m ± 6 %
Body TSL temperature during test	(22.1 ± 0.2) °C	----	----

SAR result with Body TSL

SAR averaged over 1 cm^3 (1 g) of Body TSL	Condition	
SAR measured	250 mW input power	2.49 mW / g
SAR normalized	normalized to 1W	9.96 mW / g
SAR for nominal Body TSL parameters [2]	normalized to 1W	**9.61 mW / g ± 17.0 % (k=2)**

SAR averaged over 10 cm^3 (10 g) of Body TSL	condition	
SAR measured	250 mW input power	1.64 mW / g
SAR normalized	normalized to 1W	6.56 mW / g
SAR for nominal Body TSL parameters [2]	normalized to 1W	**6.39 mW / g ± 16.5 % (k=2)**

[2] Correction to nominal TSL parameters according to d), chapter "SAR Sensitivities"

Appendix

Antenna Parameters with Head TSL

Impedance, transformed to feed point	51.8 Ω - 3.1 jΩ
Return Loss	- 29.1 dB

Antenna Parameters with Body TSL

Impedance, transformed to feed point	48.0 Ω - 4.1 jΩ
Return Loss	- 26.7 dB

General Antenna Parameters and Design

Electrical Delay (one direction)	1.401 ns

After long term use with 100W radiated power, only a slight warming of the dipole near the feedpoint can be measured.

The dipole is made of standard semirigid coaxial cable. The center conductor of the feeding line is directly connected to the second arm of the dipole. The antenna is therefore short-circuited for DC-signals.
No excessive force must be applied to the dipole arms, because they might bend or the soldered connections near the feedpoint may be damaged.

Additional EUT Data

Manufactured by	SPEAG
Manufactured on	November 09, 2007

DASY5 Validation Report for Head TSL

Date/Time: 14.04.2009 11:20:38

Test Laboratory: SPEAG, Zurich, Switzerland

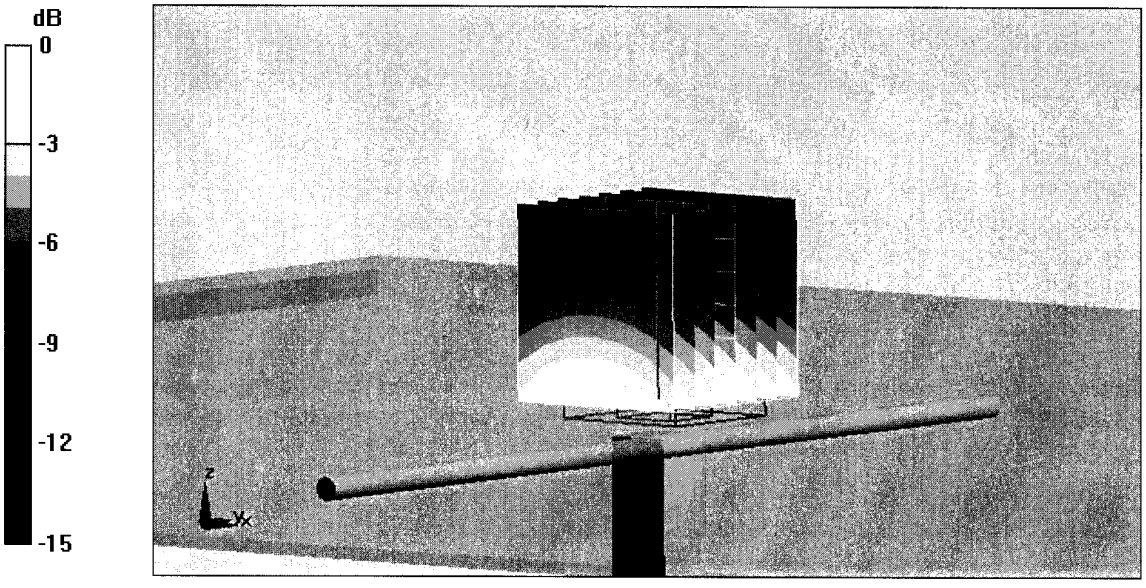
DUT: Dipole 835 MHz; Type: D835V2; Serial: D835V2 - SN:4d075

Communication System: CW-835; Frequency: 835 MHz; Duty Cycle: 1:1
Medium: HSL 900 MHz
Medium parameters used: f = 835 MHz; σ = 0.89 mho/m; ε_r = 41.1; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC)

DASY5 Configuration:

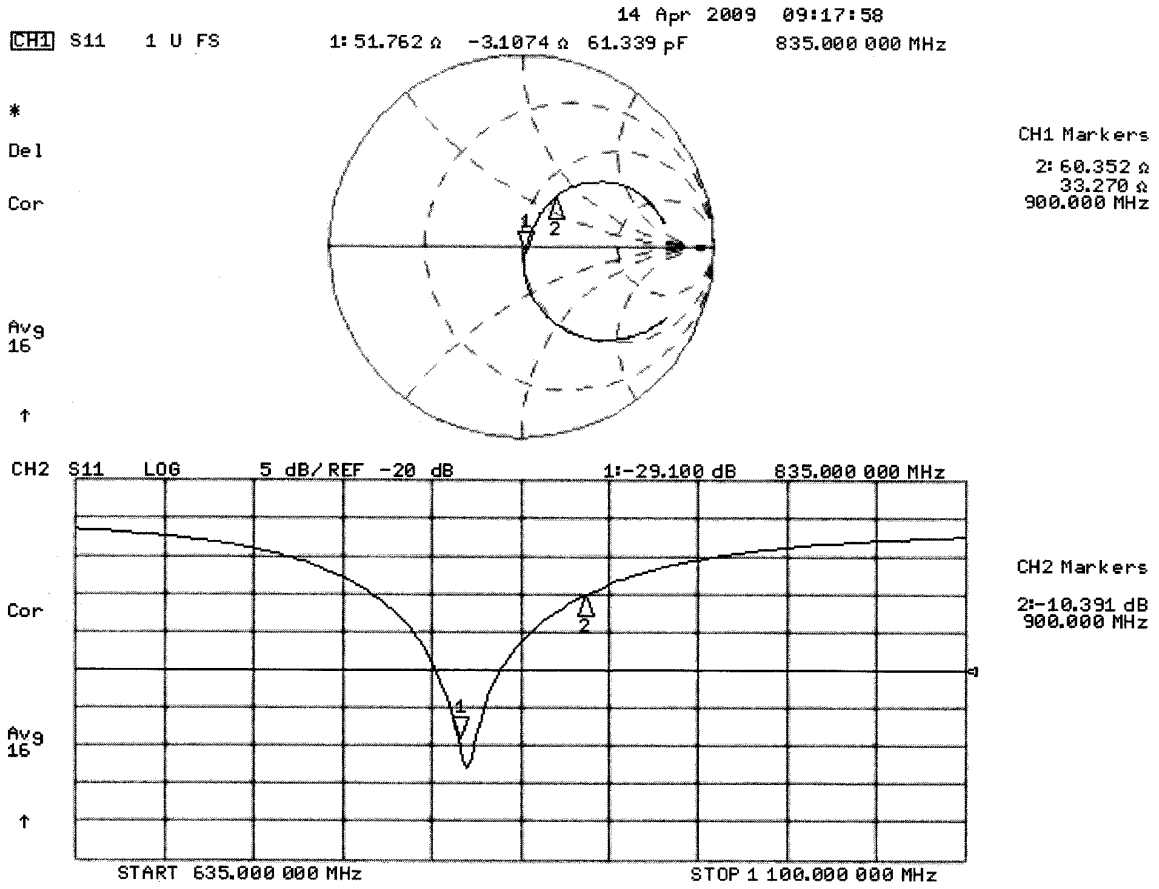
- Probe: ES3DV2 - SN3025; ConvF(5.97, 5.97, 5.97); Calibrated: 28.04.2008
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 07.03.2009
- Phantom: Flat Phantom 4.9L; Type: QD000P49AA; Serial: 1001
- Measurement SW: DASY5, V5.0 Build 120; SEMCAD X Version 13.4 Build 45

Pin=250mW; dip=15mm/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 57 V/m; Power Drift = 0.011 dB
Peak SAR (extrapolated) = 3.47 W/kg
SAR(1 g) = 2.35 mW/g; SAR(10 g) = 1.54 mW/g
Maximum value of SAR (measured) = 2.74 mW/g



0 dB = 2.74mW/g

Impedance Measurement Plot for Head TSL



DASY5 Validation Report for Body TSL

Date/Time: 20.04.2009 09:57:39

Test Laboratory: SPEAG, Zurich, Switzerland

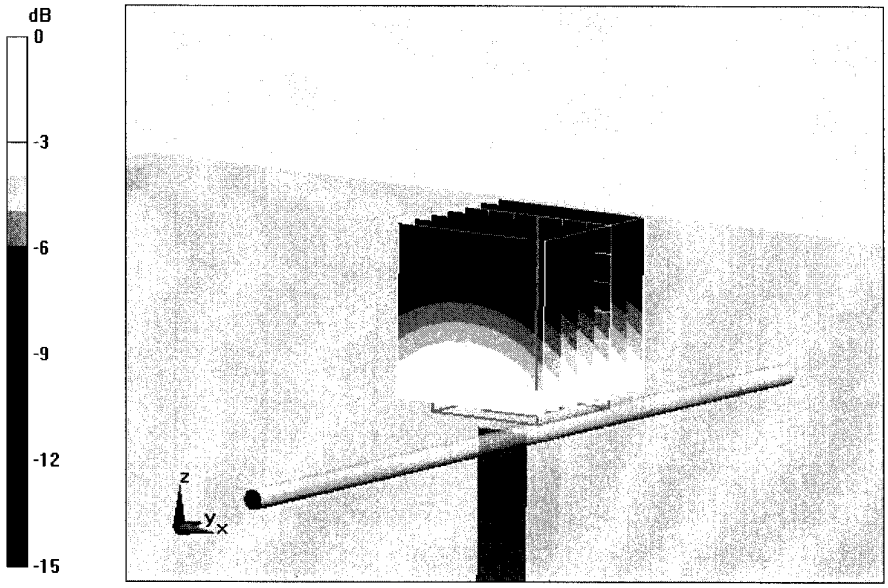
DUT: Dipole 835 MHz; Type: D835V2; Serial: D835V2 - SN:4d075

Communication System: CW; Frequency: 835 MHz; Duty Cycle: 1:1
Medium: MSL900
Medium parameters used: f = 835 MHz; σ = 1.01 mho/m; ε_r = 53.9; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC)

DASY5 Configuration:

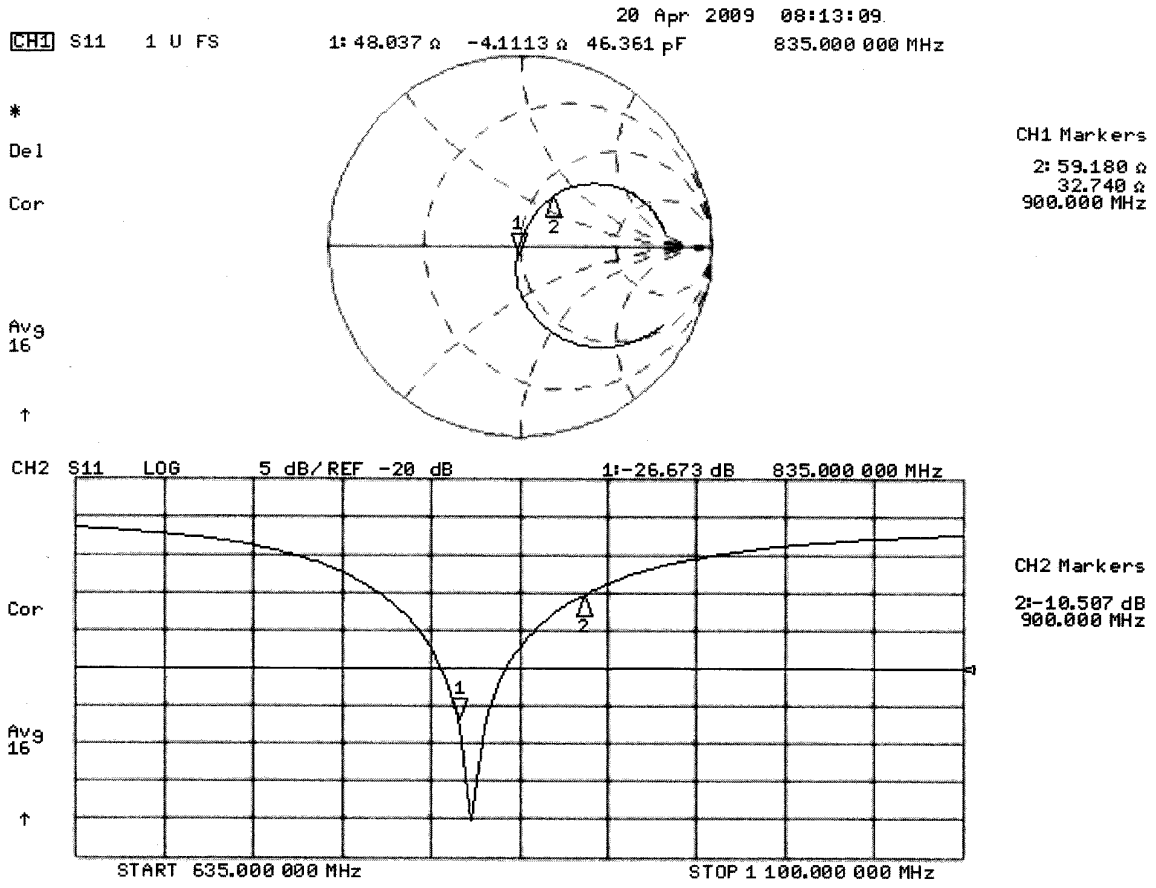
- Probe: ES3DV2 - SN3025; ConvF(5.9, 5.9, 5.9); Calibrated: 28.04.2008
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 07.03.2009
- Phantom: Flat Phantom 4.9L; Type: QD000P49AA; Serial: 1001
- Measurement SW: DASY5, V5.0 Build 120; SEMCAD X Version 13.4 Build 45

Pin = 250mW, d = 15mm/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 55.4 V/m; Power Drift = -0.00173 dB
Peak SAR (extrapolated) = 3.61 W/kg
SAR(1 g) = 2.49 mW/g; SAR(10 g) = 1.64 mW/g
Maximum value of SAR (measured) = 2.9 mW/g



0 dB = 2.9mW/g

Impedance Measurement Plot for Body TSL



APPENDIX F - PROBE CALIBRATION

Calibration Laboratory of
Schmid & Partner
Engineering AG
Zeughausstrasse 43, 8004 Zurich, Switzerland

S Schweizerischer Kalibrierdienst
C Service suisse d'étalonnage
S Servizio svizzero di taratura
Swiss Calibration Service

Accredited by the Swiss Accreditation Service (SAS)
The Swiss Accreditation Service is one of the signatories to the EA Multilateral Agreement for the recognition of calibration certificates

Accreditation No.: SCS 108

Client Celltech

Certificate No: ET3-1590_Jun11

CALIBRATION CERTIFICATE

Object: ET3DV6 - SN:1590

Calibration procedure(s): QA CAL-01.v8, QA CAL-12.v7, QA CAL-23.v4, QA CAL-25.v4
Calibration procedure for dosimetric E-field probes

Calibration date: June 22, 2011

This calibration certificate documents the traceability to national standards, which realize the physical units of measurements (SI).
The measurements and the uncertainties with confidence probability are given on the following pages and are part of the certificate.

All calibrations have been conducted in the closed laboratory facility: environment temperature (22 ± 3)°C and humidity < 70%.

Calibration Equipment used (M&TE critical for calibration)

Primary Standards	ID	Cal Date (Certificate No.)	Scheduled Calibration
Power meter E4419B	GB41293874	31-Mar-11 (No. 217-01372)	Apr-12
Power sensor E4412A	MY41498087	31-Mar-11 (No. 217-01372)	Apr-12
Reference 3 dB Attenuator	SN: S5054 (3c)	29-Mar-11 (No. 217-01369)	Apr-12
Reference 20 dB Attenuator	SN: S5086 (20b)	29-Mar-11 (No. 217-01367)	Apr-12
Reference 30 dB Attenuator	SN: S5129 (30b)	29-Mar-11 (No. 217-01370)	Apr-12
Reference Probe ES3DV2	SN: 3013	29-Dec-10 (No. ES3-3013_Dec10)	Dec-11
DAE4	SN: 654	3-May-11 (No. DAE4-654_May11)	May-12
Secondary Standards	ID	Check Date (in house)	Scheduled Check
RF generator HP 8648C	US3642U01700	4-Aug-99 (in house check Oct-09)	In house check: Oct-11
Network Analyzer HP 8753E	US37390585	18-Oct-01 (in house check Oct-10)	In house check: Oct-11

	Name	Function	Signature
Calibrated by:	Jeton Kastrati	Laboratory Technician	
Approved by:	Katja Pokovic	Technical Manager	

Issued: June 23, 2011

Calibration Laboratory of
Schmid & Partner
Engineering AG
Zeughausstrasse 43, 8004 Zurich, Switzerland

S Schweizerischer Kalibrierdienst
C Service suisse d'étalonnage
S Servizio svizzero di taratura
S Swiss Calibration Service

Accredited by the Swiss Accreditation Service (SAS)
The Swiss Accreditation Service is one of the signatories to the EA Multilateral Agreement for the recognition of calibration certificates

Accreditation No.: SCS 108

Glossary:

TSL	tissue simulating liquid
NORMx,y,z	sensitivity in free space
ConvF	sensitivity in TSL / NORMx,y,z
DCP	diode compression point
CF	crest factor (1/duty_cycle) of the RF signal
A, B, C	modulation dependent linearization parameters
Polarization φ	φ rotation around probe axis
Polarization ϑ	ϑ rotation around an axis that is in the plane normal to probe axis (at measurement center), i.e., $\vartheta = 0$ is normal to probe axis

Calibration is Performed According to the Following Standards:

a) IEEE Std 1528-2003, "IEEE Recommended Practice for Determining the Peak Spatial-Averaged Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques", December 2003
b) IEC 62209-1, "Procedure to measure the Specific Absorption Rate (SAR) for hand-held devices used in close proximity to the ear (frequency range of 300 MHz to 3 GHz)", February 2005

Methods Applied and Interpretation of Parameters:

- *NORMx,y,z:* Assessed for E-field polarization $\vartheta = 0$ ($f \le 900$ MHz in TEM-cell; $f > 1800$ MHz: R22 waveguide). NORMx,y,z are only intermediate values, i.e., the uncertainties of NORMx,y,z does not affect the E^2-field uncertainty inside TSL (see below *ConvF*).
- *NORM(f)x,y,z = NORMx,y,z * frequency_response* (see Frequency Response Chart). This linearization is implemented in DASY4 software versions later than 4.2. The uncertainty of the frequency response is included in the stated uncertainty of *ConvF*.
- *DCPx,y,z:* DCP are numerical linearization parameters assessed based on the data of power sweep with CW signal (no uncertainty required). DCP does not depend on frequency nor media.
- *PAR:* PAR is the Peak to Average Ratio that is not calibrated but determined based on the signal characteristics
- *Ax,y,z; Bx,y,z; Cx,y,z, VRx,y,z: A, B, C* are numerical linearization parameters assessed based on the data of power sweep for specific modulation signal. The parameters do not depend on frequency nor media. *VR* is the maximum calibration range expressed in RMS voltage across the diode.
- *ConvF and Boundary Effect Parameters:* Assessed in flat phantom using E-field (or Temperature Transfer Standard for $f \le 800$ MHz) and inside waveguide using analytical field distributions based on power measurements for $f > 800$ MHz. The same setups are used for assessment of the parameters applied for boundary compensation (alpha, depth) of which typical uncertainty values are given. These parameters are used in DASY4 software to improve probe accuracy close to the boundary. The sensitivity in TSL corresponds to *NORMx,y,z * ConvF* whereby the uncertainty corresponds to that given for *ConvF*. A frequency dependent *ConvF* is used in DASY version 4.4 and higher which allows extending the validity from ± 50 MHz to ± 100 MHz.
- *Spherical isotropy (3D deviation from isotropy)*: in a field of low gradients realized using a flat phantom exposed by a patch antenna.
- *Sensor Offset*: The sensor offset corresponds to the offset of virtual measurement center from the probe tip (on probe axis). No tolerance required.

Probe ET3DV6

SN:1590

Manufactured: March 19, 2001
Calibrated: June 22, 2011

Calibrated for DASY/EASY Systems
(Note: non-compatible with DASY2 system!)

DASY/EASY - Parameters of Probe: ET3DV6 - SN:1590

Basic Calibration Parameters

	Sensor X	Sensor Y	Sensor Z	Unc (k=2)
Norm ($\mu V/(V/m)^2$)[A]	1.93	2.00	1.66	± 10.1 %
DCP (mV)[B]	96.0	98.7	88.6	

Modulation Calibration Parameters

UID	Communication System Name	PAR		A dB	B dB	C dB	VR mV	Unc[E] (k=2)
10000	CW	0.00	X	0.00	0.00	1.00	104.2	±2.7 %
			Y	0.00	0.00	1.00	117.7	
			Z	0.00	0.00	1.00	129.9	

The reported uncertainty of measurement is stated as the standard uncertainty of measurement multiplied by the coverage factor k=2, which for a normal distribution corresponds to a coverage probability of approximately 95%.

[A] The uncertainties of NormX,Y,Z do not affect the E^2-field uncertainty inside TSL (see Pages 5 and 6).
[B] Numerical linearization parameter: uncertainty not required.
[E] Uncertainty is determined using the max. deviation from linear response applying rectangular distribution and is expressed for the square of the field value.

DASY/EASY - Parameters of Probe: ET3DV6 - SN:1590

Calibration Parameter Determined in Head Tissue Simulating Media

f (MHz) [C]	Relative Permittivity [F]	Conductivity (S/m) [F]	ConvF X	ConvF Y	ConvF Z	Alpha	Depth (mm)	Unct. (k=2)
450	43.5	0.87	7.30	7.30	7.30	0.18	2.10	± 13.4 %
835	41.5	0.90	6.50	6.50	6.50	0.38	2.55	± 12.0 %
900	41.5	0.97	6.39	6.39	6.39	0.39	2.47	± 12.0 %

[C] Frequency validity of ± 100 MHz only applies for DASY v4.4 and higher (see Page 2), else it is restricted to ± 50 MHz. The uncertainty is the RSS of the ConvF uncertainty at calibration frequency and the uncertainty for the indicated frequency band.
[F] At frequencies below 3 GHz, the validity of tissue parameters (ε and σ) can be relaxed to ± 10% if liquid compensation formula is applied to measured SAR values. At frequencies above 3 GHz, the validity of tissue parameters (ε and σ) is restricted to ± 5%. The uncertainty is the RSS of the ConvF uncertainty for indicated target tissue parameters.

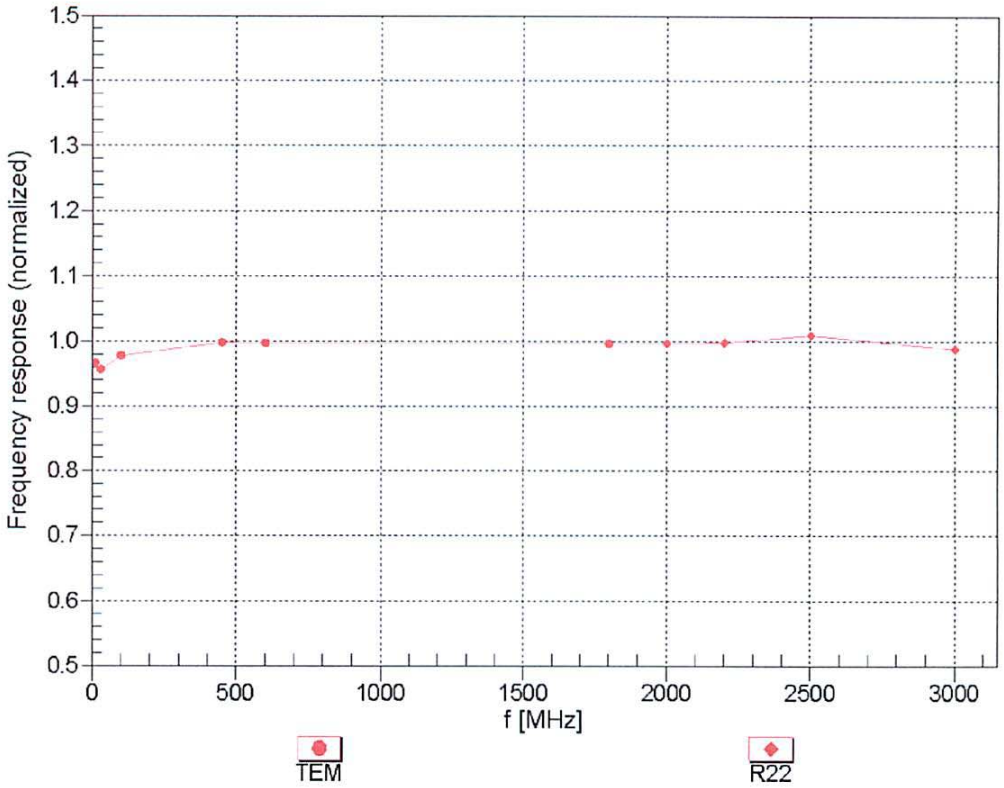
DASY/EASY - Parameters of Probe: ET3DV6- SN:1590

Calibration Parameter Determined in Body Tissue Simulating Media

f (MHz) [C]	Relative Permittivity [F]	Conductivity (S/m) [F]	ConvF X	ConvF Y	ConvF Z	Alpha	Depth (mm)	Unct. (k=2)
450	56.7	0.94	7.82	7.82	7.82	0.12	2.04	± 13.4 %
835	55.2	0.97	6.37	6.37	6.37	0.42	2.33	± 12.0 %
900	55.0	1.05	6.27	6.27	6.27	0.40	2.45	± 12.0 %

[C] Frequency validity of ± 100 MHz only applies for DASY v4.4 and higher (see Page 2), else it is restricted to ± 50 MHz. The uncertainty is the RSS of the ConvF uncertainty at calibration frequency and the uncertainty for the indicated frequency band.
[F] At frequencies below 3 GHz, the validity of tissue parameters (ε and σ) can be relaxed to ± 10% if liquid compensation formula is applied to measured SAR values. At frequencies above 3 GHz, the validity of tissue parameters (ε and σ) is restricted to ± 5%. The uncertainty is the RSS of the ConvF uncertainty for indicated target tissue parameters.

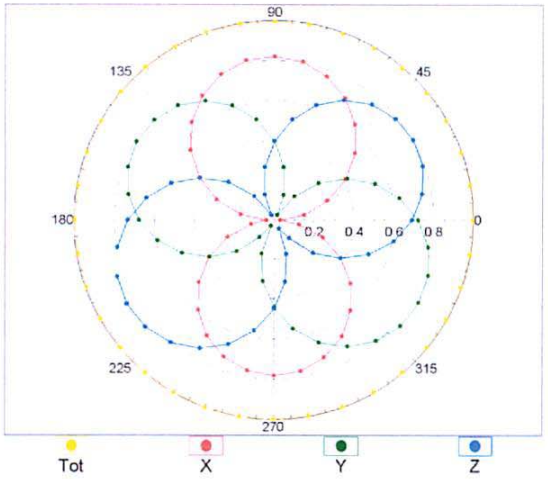
Frequency Response of E-Field
(TEM-Cell:ifi110 EXX, Waveguide: R22)



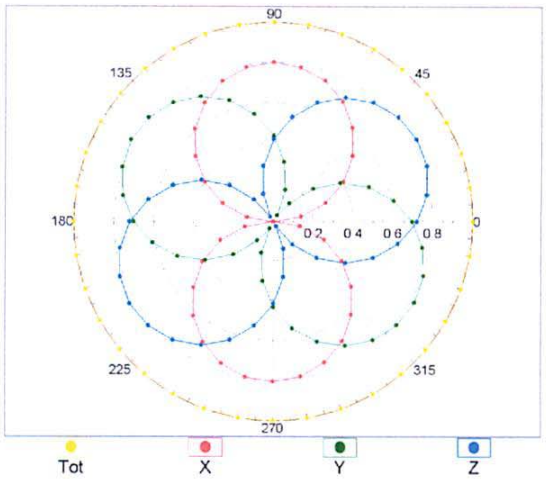
Uncertainty of Frequency Response of E-field: ± 6.3% (k=2)

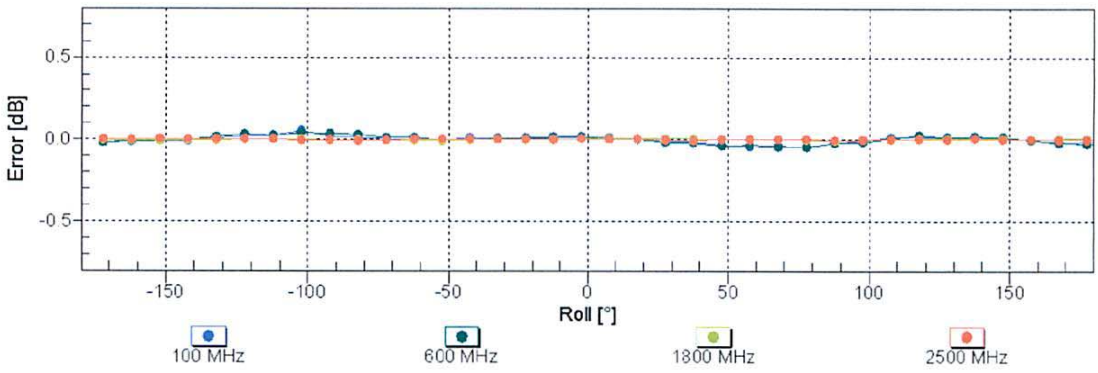
Receiving Pattern (ϕ), ϑ = 0°

f=600 MHz,TEM



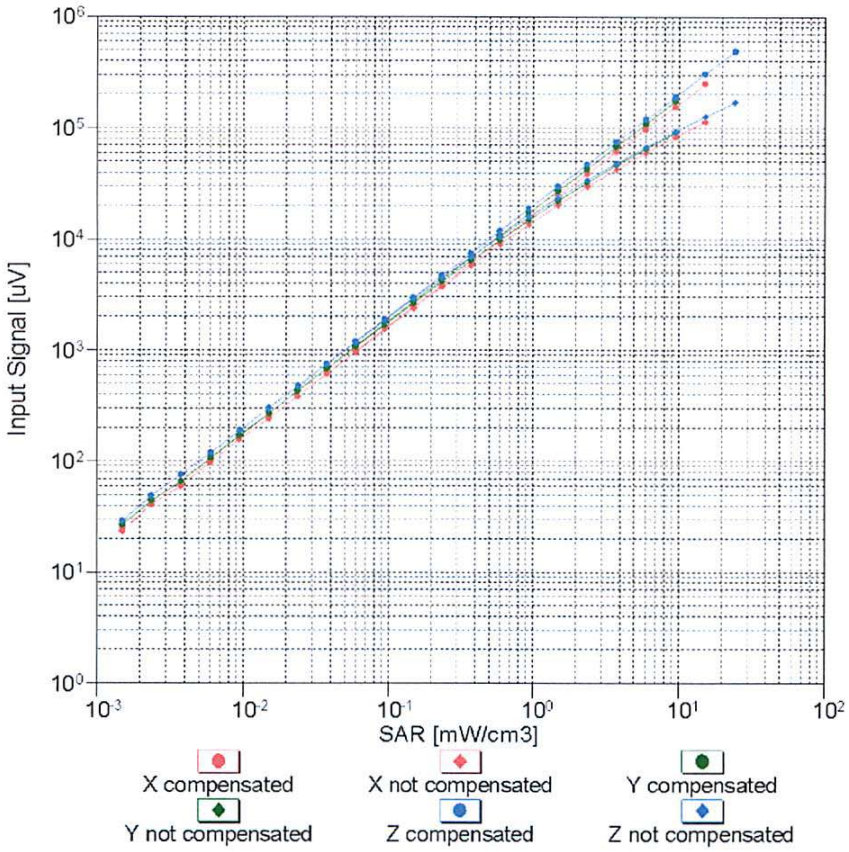
f=1800 MHz,R22

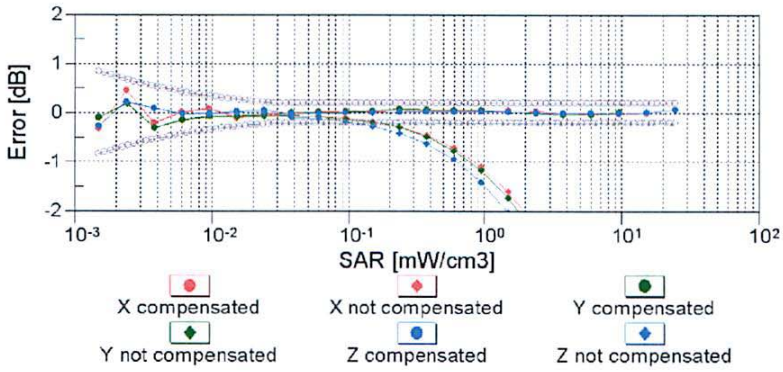




Uncertainty of Axial Isotropy Assessment: ± 0.5% (k=2)

Dynamic Range f(SAR_{head})
(TEM cell , f = 900 MHz)

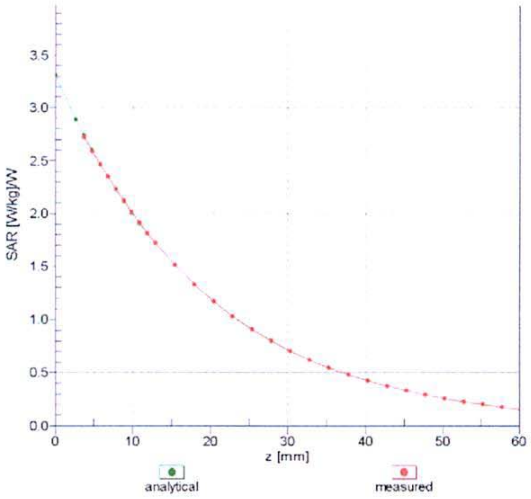




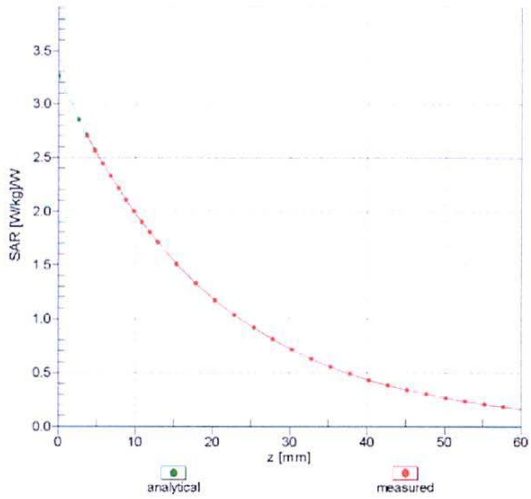
Uncertainty of Linearity Assessment: ± 0.6% (k=2)

Conversion Factor Assessment

f = 835 MHz,WGLS R9 (H_convF)

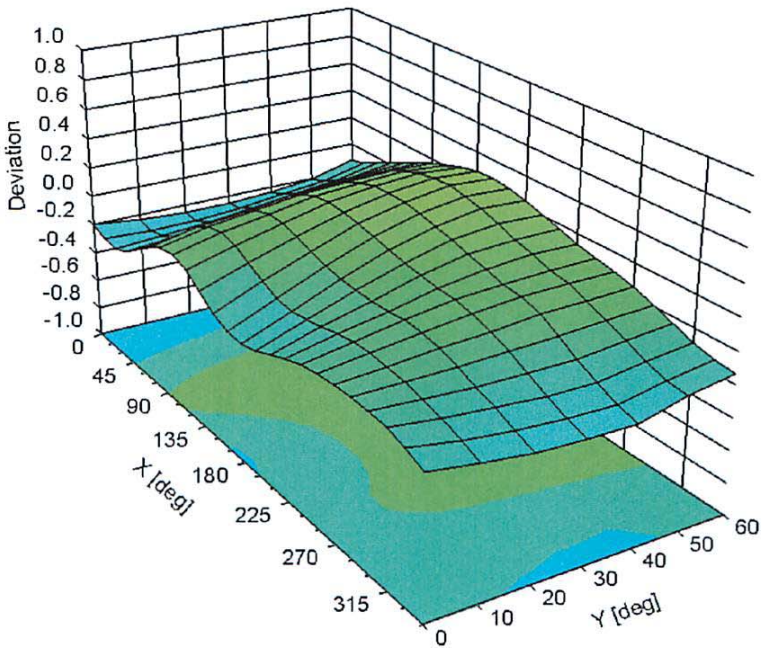


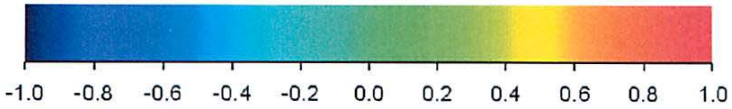
f = 835 MHz,WGLS R9 (M_convF)



Deviation from Isotropy in Liquid

Error (ϕ, ϑ), f = 900 MHz





Uncertainty of Spherical Isotropy Assessment: ± 2.6% (k=2)

DASY/EASY - Parameters of Probe: ET3DV6 - SN:1590

Other Probe Parameters

Sensor Arrangement	Triangular
Connector Angle (°)	Not applicable
Mechanical Surface Detection Mode	enabled
Optical Surface Detection Mode	enabled
Probe Overall Length	337 mm
Probe Body Diameter	10 mm
Tip Length	10 mm
Tip Diameter	6.8 mm
Probe Tip to Sensor X Calibration Point	2.7 mm
Probe Tip to Sensor Y Calibration Point	2.7 mm
Probe Tip to Sensor Z Calibration Point	2.7 mm
Recommended Measurement Distance from Surface	4 mm

APPENDIX G - BARSKI PLANAR PHANTOM CERTIFICATE OF CONFORMITY

2378 Westlake Road
Kelowna, B.C. Canada
V1Z-2V2

BARSKI INDUSTRIES (1985) LTD.

Ph. # 250-769-6848
Fax # 250-769-6334
E-mail: barskiind@shaw.ca
Web: www.bcfiberglass.com

FIBERGLASS FABRICATORS

Certificate of Conformity

Item : Flat Planar Phantom Unit # 03-01
Date: June 16, 2003
Manufacturer: Barski Industries (1985 Ltd)

Test	Requirement	Details
Shape	Compliance to geometry according to drawing	Supplied CAD drawing
Material Thickness	Compliant with the requirements	2mm +/- 0.2mm in measurement area
Material Parameters	Dielectric parameters for required frequencies Based on Dow Chemical technical data	100 MHz-5 GHz Relative permittivity<5 Loss Tangent<0.05

Conformity

Based on the above information, we certify this product to be compliant to the requirements specified.

Signature: 

Daniel Chailler

Fiberglass Planar Phantom - Top View

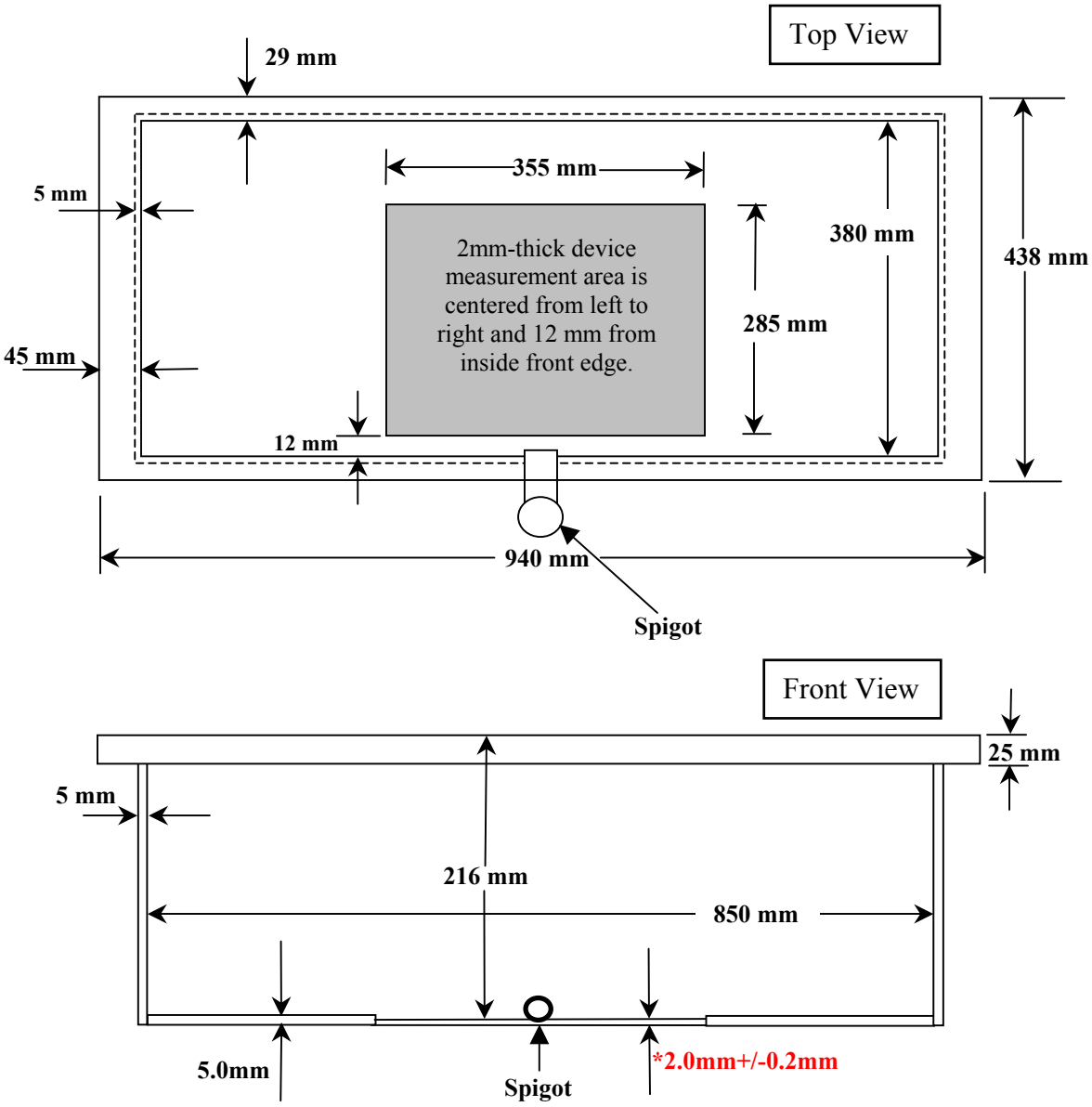
Fiberglass Planar Phantom - Front View

Fiberglass Planar Phantom - Back View

Fiberglass Planar Phantom - Bottom View

Dimensions of Fiberglass Planar Phantom

(Manufactured by Barski Industries Ltd. - Unit# 03-01)



Note: Measurements that aren't repeated for the opposite sides are the same as the side measured. This drawing is not to scale.

APPENDIX H - SAM TWIN PHANTOM V4.0C CERTIFICATE OF CONFORMITY

Schmid & Partner Engineering AG

Zeughausstrasse 43, 8004 Zurich, Switzerland, Phone +41 1 245 97 00, Fax +41 1 245 97 79

Certificate of conformity / First Article Inspection

Item	SAM Twin Phantom V4.0
Type No	QD 000 P40 BA
Series No	TP-1002 and higher
Manufacturer / Origin	Untersee Composites Hauptstr. 69 CH-8559 Fruthwilen Switzerland

Tests

The series production process used allows the limitation to test of first articles.
Complete tests were made on the pre-series Type No. QD 000 P40 AA, Serial No. TP-1001 and on the series first article Type No. QD 000 P40 BA, Serial No. TP-1006. Certain parameters have been retested using further series units (called samples).

Test	Requirement	Details	Units tested
Shape	Compliance with the geometry according to the CAD model.	IT'IS CAD File (*)	First article, Samples
Material thickness	Compliant with the requirements according to the standards	2mm +/- 0.2mm in specific areas	First article, Samples
Material parameters	Dielectric parameters for required frequencies	200 MHz – 3 GHz Relative permittivity < 5 Loss tangent < 0.05.	Material sample TP 104-5
Material resistivity	The material has been tested to be compatible with the liquids defined in the standards	Liquid type HSL 1800 and others according to the standard.	Pre-series, First article

Standards

[1] CENELEC EN 50361
[2] IEEE P1528-200x draft 6.5
[3] IEC PT 62209 draft 0.9
(*) The IT'IS CAD file is derived from [2] and is also within the tolerance requirements of the shapes of [1] and [3].

Conformity

Based on the sample tests above, we certify that this item is in compliance with the uncertainty requirements of SAR measurements specified in standard [1] and draft standards [2] and [3].

Date 18.11.2001

Signature / Stamp

Schmid & Partner Engineering AG
Zeughausstrasse 43, CH-8004 Zurich
Tel. +41 1 245 97 00, Fax +41 1 245 97 79

APPENDIX I - AUDIO ACCESSORY COMBINATIONS (FCC KDB 643646 D01v01r01)

Body SAR Test Considerations for Audio Accessories without Built-in Antenna - Audio Accessory Combinations (FCC KDB 643646 D01v01r01 Page 9)																				
Audio Acc. ID #	Battery a				Battery b				Battery c				Battery d				Battery e			
	Antenna 1				Antenna 1				Antenna 1				Antenna 1				Antenna 1			
	Bw#B1	Bw#B4	Bw#B7	Bw#B10	Bw#B1	Bw#B4	Bw#B7	Bw#B10	Bw#B1	Bw#B4	Bw#B7	Bw#B10	Bw#B1	Bw#B4	Bw#B7	Bw#B10	Bw#B1	Bw#B4	Bw#B7	Bw#B10
A1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
A2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
A3	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1

Notes:

1. All audio accessory options can be utilized with an antenna, battery and body-worn combination.
2. The accessory combinations evaluated for SAR are highlighted in yellow.
3. Please refer to Section 7.0 of the SAR report for description of accessory ID #.
4. Bw = Body-worn accessory