SAR TEST REPORT (FCC/IC)

RF EXPOSURE EVALUATION	SPECIFIC ABSORPTION RATE

MANUFACTURER / APPLICANT	SENSUS METERING SYSTEMS, INC.			
DEVICE UNDER TEST (DUT)	BODY-WORN FLEXNET MICRO TRANSCEIVER WITH BLUETOOTH			
APPLICABLE RULE PART(S) AND FREQUENCY RANGE(S)	FCC Part 90		FCC Part 24 Subpart D	
	896.0875 - 901.0 MHz		901.0 - 902.0 MHz	
	935.0 - 940.0 MHz		930.0 - 931.0 MHz	
	-		940.0 - 941.0 MHz	
FREQUENCY RANGES APPLIED	896.0875 - 902.0 MHz (< 10 MHz)			
	930.0 - 931.0 MHz (< 10 MHz)			
	935.0 - 941.0 MHz (< 10 MHz)			
DEVICE MODEL(S)	BTXCVR			
DEVICE IDENTIFIER(S)	FCC ID:	SDBBTXCVR	IC:	2220A-BTXCVR
STANDARD(S) APPLIED	FCC 47 CFR §2.1093		IC RSS-102 Issue 2	
PROCEDURE(S) APPLIED	FCC OET 65, Supp. C (01-01)		FCC KDB 447498 D01 v03r03	
	FCC KDB 648474 D01 v01r05		FCC KDB 450824 D01 v01r01	
	IEEE 1528-2003		IEC 62209-1:2005	
RF EXPOSURE CATEGORY	General Population / Uncontrolled			
RF EXPOSURE EVALUATION(S)	Body-worn			
DATE(S) OF EVALUATION(S)	May 01, 2009			
TEST REPORT SERIAL NO.	032509SDB-T960-S24D			
TEST REPORT REVISION NO.	Revision 1.1	Revised Rule Parts & Freq. Ranges	June 19, 2009	
	Revision 1.0	Initial Release	June 16, 2009	
TEST REPORT SIGNATORIES	Testing Performed By		Test Report Prepared By	
	Sean Johnston Celltech Labs Inc.		Jonathan Hughes Celltech Labs Inc.	
TEST LAB AND LOCATION	Celltech Compliance Testing and Engineering Lab			
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TEST LAB CONTACT INFO.	Tel.: 250-765-7650		Fax: 250-765-7645	
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TEST LAB ACCREDITATION(S)	Test Lab Certificate No. 2470.01			

DECLARATION OF COMPLIANCE
SAR RF EXPOSURE EVALUATION

Test Lab Information	**Name**	**CELLTECH LABS INC.**						
	Address	21-364 Lougheed Road, Kelowna, B.C. V1X 7R8 Canada						
Applicant Information	**Name**	**SENSUS METERING SYSTEMS, INC.**						
	Address	400 Perimeter Park Drive, Suite K, Raleigh, North Carolina 27560 United States						
Standard(s) Applied	**FCC**	47 CFR §2.1093		**IC**	RSS-102 Issue 2			
Procedure(s) Applied	**FCC**	OET Bulletin 65, Supplement C (Ed. 01-01)			KDB 447498 D01 v03r03			
		KDB 450824 D01 v01r01			KDB 648474 D01 v01r05			
	IEEE	1528-2003		**IEC**	62209-1:2005			
	IC	RSS-102 Issue 2 - SAR evaluation not required per Section 2.5.1 (maximum source-based time-averaged output power is less than 200 mW for General Public Use)						
Device RF Exposure Category	**FCC/IC**	General Population / Uncontrolled						
Device Identifier(s)	**FCC ID:**	SDBBTXCVR		**IC:**	2220A-BTXCVR			
Device Description	Portable Body-worn Flexnet Micro Transceiver with Bluetooth				**Antenna Type Tested**	Internal		
Device Model(s)	BTXCVR		**Test Sample Serial No.**		SMSUT00541 (Pre-production)			
Applicable Rule Part(s) & Frequency Range(s)	896.0875 - 901.0 MHz (Part 90)		935.0 - 940.0 MHz (Part 90)		-			
	901.0 - 902.0 MHz (Part 24D)		930.0 - 931.0 MHz (Part 24D)		940.0 - 941.0 MHz (Part 24D)			
	Note: The DUT supports transmit frequencies under FCC Rule Part 101 that are categorically excluded							
Frequency Range(s) Applied	896.0875 - 902.0 MHz (< 10 MHz)		930.0 - 931.0 MHz (< 10 MHz)		935.0 - 941.0 MHz (< 10 MHz)			
Measured RF Conducted Output Power Levels	**Transmit Frequency**	**100% Duty Cycle**		**50% Duty Cycle**		**25% Duty Cycle**		
		Peak	**Average**	**Peak**	**Average**	**Peak**	**Average**	
	901.0 MHz	18.3 dBm	18.1 dBm	17.6 dBm	14.2 dBm	17.6 dBm	11.3 dBm	
	930.0 MHz	18.4 dBm	18.3 dBm	18.4 dBm	15.3 dBm	18.2 dBm	12.2 dBm	
	941.0 MHz	18.1 dBm	18.1 dBm	18.2 dBm	15.0 dBm	18.1 dBm	12.0 dBm	
Duty Cycle(s) Tested	100%	50%		25%		(Source-Based Time-Averaged)		
Max. Operating Duty Cycle	4.48%	Packet Length = 88 bytes		Data Rate = 5 kbps		Min. Time between Packets = 3 sec.		
Battery Type(s) Tested	Ni-MH AA (x2)	1.2 V		2450 mAh		Energizer Rechargeable		
Body-worn Accessory Tested	Belt-worn Leather Case	Part No.: CMG-SENSUSF		Contains metallic components				
Max. SAR Level(s) Measured	**Body-worn**	**0.202 W/kg**	1g average	100% Duty Cycle	901.0 MHz			
		0.106 W/kg	1g average	50% Duty Cycle	901.0 MHz			
		0.058 W/kg	1g average	25% Duty Cycle	901.0 MHz			
FCC/IC Spatial Peak SAR Limit	**BODY**	**1.6 W/kg**	**1g average**	**General Population / Uncontrolled Exposure**				

Celltech Labs Inc. declares under its sole responsibility that this wireless portable device was compliant with the Specific Absorption Rate (SAR) RF exposure requirements specified in FCC 47 CFR §2.1093 and Health Canada's Safety Code 6 for the General Population / Uncontrolled Exposure environment. The device was tested in accordance with the measurement standards and procedures specified in FCC OET Bulletin 65, Supplement C (Edition 01-01), Industry Canada RSS-102 Issue 2, IEEE Standard 1528-2003 and IEC International Standard 62209-1:2005. 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.

This test report shall not be reproduced partially, or in full, without the prior written approval of Celltech Labs Inc.

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

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1.0 INTRODUCTION

This measurement report demonstrates that the Sensus Metering Systems, Inc. Model: BTXCVR Portable Body-worn Flexnet Micro Transceiver with Bluetooth complies with the SAR (Specific Absorption Rate) RF exposure requirements specified in FCC 47 CFR §2.1093 (see reference [1]) for the General Population / Uncontrolled Exposure environment. The procedures described in FCC OET Bulletin 65, Supplement C, Edition 01-01 (see reference [2]), IC RSS-102 Issue 2 (see reference [3]), IEEE Standard 1528-2003 (see reference [4]) and IEC International Standard 62209-1:2005 (see reference [5]) were employed. A description of the product and 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

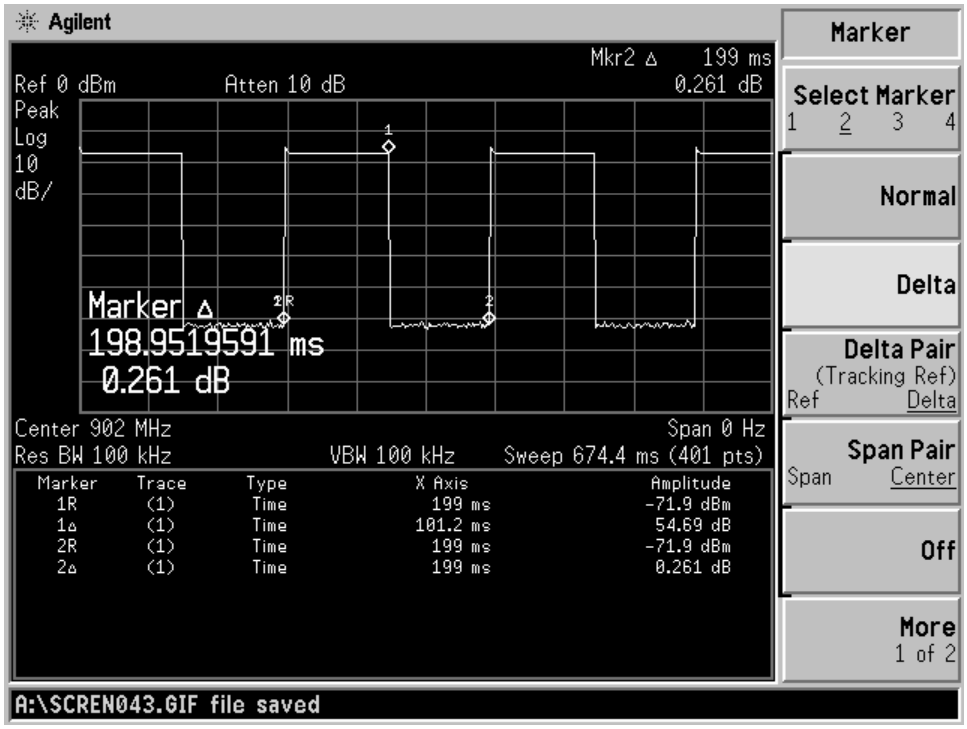
Celltech Labs Inc. SAR measurement facility utilizes the Dosimetric Assessment System (DASY™) manufactured by Schmid & Partner Engineering AG (SPEAG™) of Zurich, Switzerland. The DASY4 measurement system is comprised of the measurement server, robot controller, computer, near-field probe, probe alignment sensor, specific anthropomorphic mannequin (SAM) phantom, and various planar phantoms for brain 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 utilizes a controller with a built in VME-bus computer.

DASY4 System with SAM Twin Phantom V4.0C

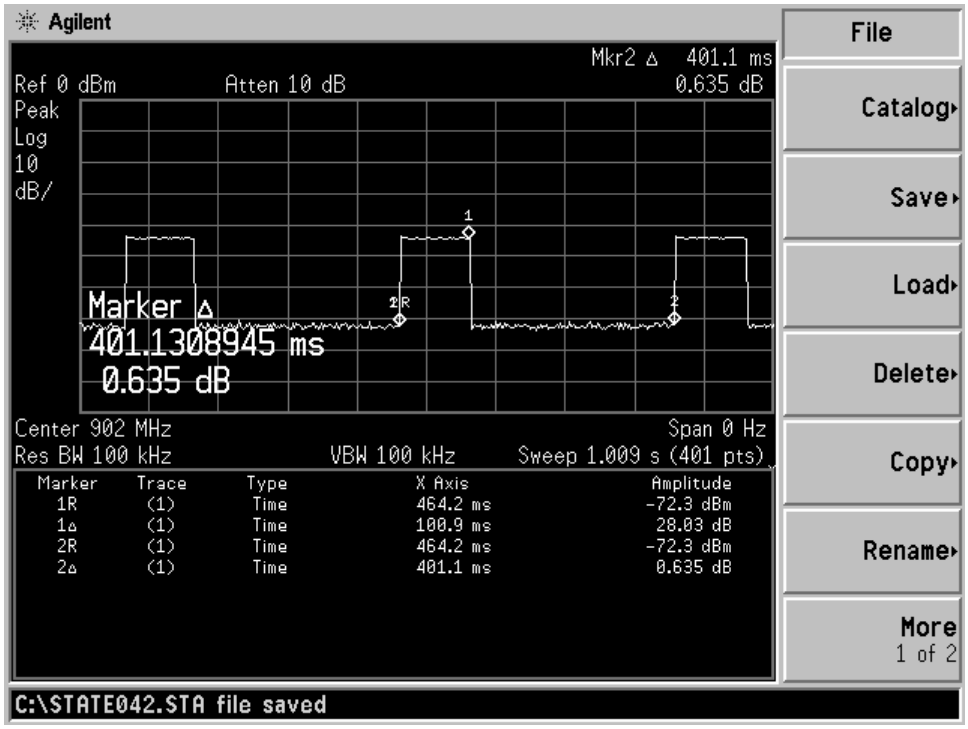
DASY4 Measurement Server

3.0 DUTY CYCLE PLOTS

50% Duty Cycle



25% Duty Cycle



4.0 MEASUREMENT SUMMARY

BODY-WORN SAR EVALUATION RESULTS

Freq. Range Applied		Test Freq.	Test Mode	Duty Cycle	Crest Factor	Battery Type	Body-worn Accessory	DUT Spacing To Planar Phantom		Cond. Power Before Test	SAR Drift During Test	Measured SAR Level	
MHz	Width	MHz						Back	Antenna	dBm	dB	W/kg	
896-902	< 10 MHz	901	CW	100%	1	Ni-MH AA	Carry Case & Belt-Clip	1.5 cm	4.0 cm	18.1	-0.192	0.202	1g
930-931	< 10 MHz	930	CW	100%	1	Ni-MH AA	Carry Case & Belt-Clip	1.5 cm	4.0 cm	18.3	-0.158	0.089	1g
935-941	< 10 MHz	941	CW	100%	1	Ni-MH AA	Carry Case & Belt-Clip	1.5 cm	4.0 cm	18.1	-0.126	0.086	1g
896-902	< 10 MHz	901	CW	50%	2	Ni-MH AA	Carry Case & Belt-Clip	1.5 cm	4.0 cm	14.2	-0.624	0.106	1g
896-902	< 10 MHz	901	CW	25%	4	Ni-MH AA	Carry Case & Belt-Clip	1.5 cm	4.0 cm	11.3	-0.153	0.058	1g

SAR LIMIT(S)		BODY	SPATIAL PEAK	RF EXPOSURE CATEGORY
FCC 47 CFR 2.1093	Health Canada Safety Code 6	1.6 W/kg	averaged over 1 gram	General Population / Uncontrolled

Measurement Date	May 01, 2009					Measurement Date	May 01, 2009	Unit
Measured Fluid Type	835 MHz Body		900 MHz Body			Relative Humidity	35	%
	IEEE Target		MHz	Measured	Deviation	Atmospheric Pressure	101.1	kPa
Dielectric Constant ε	55.2	±5%	900	53.5	-3.0%	Ambient Temperature	23.5	°C
			930	54.0	-2.2%	Fluid Temperature	22.1	°C
			940	53.5	-3.0%	Fluid Depth	≥ 15	cm
Conductivity σ (mho/m)	0.97	±5%	900	0.98	+1.0%	ρ (Kg/m^3)	1000	
			930	1.01	+4.2%			
			940	1.02	+5.0%			

Notes

1.	Detailed measurement data and plots showing the maximum SAR location of the DUT are reported in Appendix A.
2.	The transmission bands of the DUT are less than 10 MHz; therefore single channel data only is required to be reported (per FCC OET Bulletin 65, Supplement C, Edition 01-01 - see reference [2]).
3.	The SAR evaluations were firstly performed at 100% duty cycle setting programmed prior to the SAR evaluations using firmware provided by the manufacturer. The maximum SAR channel was then further evaluated at 50% and 25% duty cycle. The purpose of the additional duty cycle evaluations was to show that the measured SAR level would be significantly lower with a maximum source-based time-averaged duty cycle of 4.48% per manufacturer specification, which was not evaluated due to the limitation of the measurement system.
4.	The SAR drift of the DUT was measured by the DASY4 system for the duration of the SAR evaluations.
5.	The Ni-MH AA batteries were fully charged prior to the SAR evaluations.
6.	The fluid temperature was measured prior to and after the SAR evaluations to ensure the temperature remained within +/-2°C of the fluid temperature reported during the dielectric parameter measurements.
7.	The dielectric parameters of the simulated tissue mixture were measured prior to the SAR evaluations using a Dielectric Probe Kit and a Network Analyzer (see Appendix C).

MEASUREMENT SUMMARY (Cont.)

Additional Summary Information (Celltech FCC KDB Inquiry Tracking Number 344446)

1) Justification and Summary for SAR < 0.2 W/kg per FCC KDB 447498 1)c) Footnote 5.

We have evaluated the unit for output power and body-worn SAR with the belt-worn case.

1a. Measured the Average Conducted Power L/M/H Ch. 100 d/c
1b. SAR Measurements L/M/H Ch.s at 100% Duty Cycle setting

2a. Measured the Average Conducted Power Low Ch. @ 50% d/c
2b. SAR Measurement - Low Channel at 50% Duty Cycle setting

3a. Measured the Average Conducted Power Low Ch. @ 25% d/c
3b. SAR Measurement - Low Channel at 25% Duty Cycle setting

MEASUREMENT SUMMARY				
Test Frequency	**FCC Rule Part**	**Source-Based Time-Averaged Duty Cycle**	**Average Conducted Output Power Level**	**SAR Level**
901 MHz	24D, 90	100%	18.1 dBm	0.202 W/kg (1g)
930 MHz	24D	100%	18.3 dBm	0.089 W/kg (1g)
941 MHz	24D	100%	18.1 dBm	0.086 W/kg (1g)
901 MHz	24D, 90	50%	14.2 dBm	0.106 W/kg (1g)
901 MHz	24D, 90	25%	11.3 dBm	0.058 W/kg (1g)

Based on the linearity of the measured conducted power and SAR levels with the corresponding duty cycle the SAR levels at the manufacturer's specified 4.48% source-based time-averaged duty cycle (see below) would be expected to be significantly lower than 0.200 W/kg.

2) From Manufacturer - The duty cycle is hard coded into the firmware and can not be changed. There is no infrastructure or network traffic considering this is for single meter installation. Packets are sent every 3 seconds with a maximum of 36 packets sent per installation. The justification is provided below.

The duty cycle is:

Packet length = 88 bytes
Data rate = 5kbps
Min Time between Packets = 3 seconds
% duty cycle = 4.48%
(88 * 8 * (1/5000) = .1408s .1408 / 3.1408 = 4.48% duty cycle)

The packet length of 140.8ms and the minimum time between packets transmitted of 3 seconds is hard coded into the firmware and can not be changed by an end user. A technician will use the Bluetooth micro transceiver to send configuration data to a newly or previously installed meter device. For a single installation (data sent to configure one meter) there can be a maximum of 36 packets of data transmitted (with a minimum of 6 packets). This includes 6 unique data packets with up to 5 retries on each packet. The Bluetooth micro transceiver is only used with one end point device at a time. The technician will stand a certain distance away from the meter and proceed with an installation. When an installation is complete, the technician will move on to the next meter to be installed.

5.0 DETAILS OF SAR EVALUATION

The Sensus Metering Systems, Inc. Model: BTXCVR Portable Body-worn Flexnet Micro Transceiver with Bluetooth was compliant for localized Specific Absorption Rate (Uncontrolled Exposure) based on the test provisions and conditions described below. The SAR test setup photographs are shown in Appendix D.

Test Configuration(s)

1. The DUT was evaluated for body-worn SAR placed inside the belt-worn case and the back side placed parallel to the outer surface of the SAM phantom (planar section). The belt-clip attached to the belt-worn case was placed parallel to and touching the outer surface of the SAM phantom (planar section). The belt-worn case accessory provided a 1.5 cm spacing from the back of the DUT to the outer surface of the SAM phantom (planar section).
2. The DUT does not support voice audio operation and therefore no audio accessories were evaluated with the DUT.

Simultaneous Transmission

3. The DUT also utilizes a co-located low-power Class 2 Bluetooth transmitter with maximum power rating of 3 dBm according to manufacturer specification. The distance between the Flexnet antenna and Bluetooth antenna is 3.2 cm and the Bluetooth antenna distance to body is 4 cm according to manufacturer specification. Based on the output power, antenna separation distance and measured Body SAR levels of the dominant transmitter (Flexnet), a stand-alone Bluetooth SAR evaluation is not required and its SAR is considered zero in applying the SAR to peak location separation ratio procedure per FCC KDB 648474 (see reference [8]). Subsequently the SAR summation of Flexnet and Bluetooth transmitters is < 1.6 W/kg and therefore a simultaneous SAR evaluation is not required.

Test Mode & Output Power

4. The DUT was configured into test mode using the test software provided by the manufacturer. The source-based time-averaged duty cycles were verified by Celltech Labs Inc. prior to SAR evaluations using a spectrum analyzer.
5. The DUT was evaluated for SAR with CW signal at the maximum output power setting preset by the manufacturer.
6. The average and peak conducted output power levels of the DUT referenced in this report were measured by Celltech Labs Inc. using a Gigatronics power meter and SMA connector in accordance with the procedures described in FCC 47 CFR §2.1046 and IC RSS-Gen.

6.0 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 32 mm x 32 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.

7.0 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 [7]).

Probe Calibration Freq.	Device Measurement Freq.	Frequency Interval	±50 MHz ≥ 300 MHz
835 MHz	901.0 MHz	66 MHz	> 50 MHz[1]
	930.0 MHz	95 MHz	
	941.0 MHz	106 MHz	

1. 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 [9]).

Probe Calibration Frequency = 835 MHz				Probe Nominal Target Dielectric Parameters (BODY):			55.2 ε_r		0.97 σ	
Frequency	Tissue	σ (+/-)	Sensitivity	ε_r (+/-)	Sensitivity	% Change	Meas. SAR (100% d/c)		Compensated SAR	
901.0 MHz	Body	+1.0%	n/a	-3.0%	n/a	n/a	0.202 W/kg	1g	n/a	1g
930.0 MHz	Body	+4.2%	n/a	-2.2%	n/a	n/a	0.089 W/kg	1g	n/a	1g
941.0 MHz	Body	+5.0%	n/a	-3.0%	n/a	n/a	0.086 W/kg	1g	n/a	1g

Chapter 21 SAR Sensitivities

21.1 Introduction

The measured SAR-values in homogeneous phantoms depend strongly on the electrical parameters of the liquid. Liquids with exactly matching parameters are difficult to produce; there is always a small error involved in the production or measurement of the liquid parameters. The following sensitivities allow the estimation of the influence of small parameter errors on the measured SAR values. The calculations are based on an approximation formula [1] for the SAR of an electrical dipole near the phantom surface and a adapted plane wave approximation for the penetration depth. The sensitivities are given in percent SAR change per percent change in the controlling parameter:

$$S(x) = \frac{\mathrm{d}SAR/SAR}{\mathrm{d}x/x} \qquad (21.1)$$

The controlling parameters x are:

ϵ permitivity
σ conductivity
ρ head density (= one over integration volume)

For example: If The liquid permitivity increases by 2 percent and the sensitivity of the SAR to permitivity is -0.6 then the SAR will decrease by 1.2 percent.

21.2 SAR Sensitivity Table

In the following Table, sensitivities are given for surface SAR values and averaged SAR values for 1 g and 10 g cubes and for dipole distances d of 15 mm (for frequencies below 1000 MHz) and 10 mm (for frequencies above 1000 MHz) from the liquid surface. Liquid density was set to ρ=1g/cm^3 as required by the standards.

Liquid parameters are as proposed in the new standards (e.g., IEEE P1528).

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

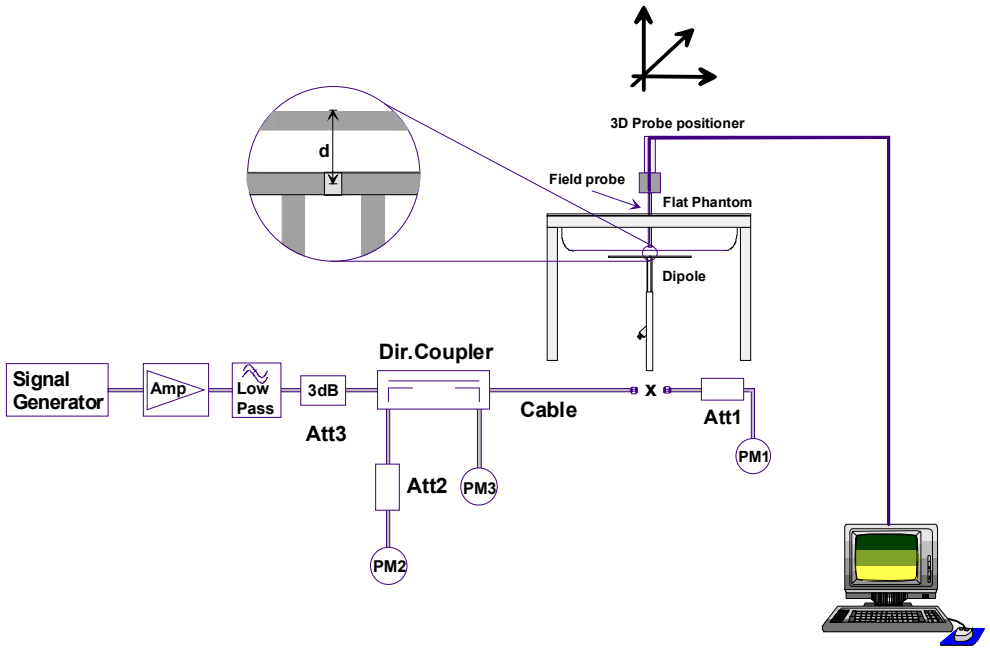
8.0 SYSTEM PERFORMANCE CHECK

Prior to the SAR evaluations a daily system check was performed at the planar section of the SAM phantom with a SPEAG 835 MHz validation dipole (see Appendix B for system performance check test plot) in accordance with the procedures described in IEEE Standard 1528-2003 (see reference [4]) and IEC International Standard 62209-1:2005 (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). 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 EVALUATION

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)	SPEAG Target	Meas.	Dev.	SPEAG Target	Meas.	Dev.	SPEAG Target	Meas.	Dev.						
May 1	Body 835	2.49 (±10%)	2.37	-4.8%	53.9 (±5%)	55.2	+2.4%	1.01 (±5%)	0.96	-4.9%	1000	23.2	21.8	≥ 15	35	101.1

Notes	
	1. The target SAR values are the nominal 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 was measured prior to and after the system performance check to ensure the temperature remained within +/-2°C of the fluid temperature reported during the dielectric parameter measurements.
	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).



System Performance Check Measurement Setup Diagram

835 MHz Validation Dipole Setup

9.0 SIMULATED EQUIVALENT TISSUES

The simulated equivalent Body tissue recipe in the table below is derived from the SAR system manufacturer's suggested recipe in the DASY4 manual (see reference [10]) in accordance with the procedures and requirements specified in IEEE Standard 1528-2003 (see reference [4]) and IEC Standard 62209-1:2005 (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 MIXTURE	
INGREDIENT	**835/900 MHz Body**
Water	53.79 %
Sugar	45.13 %
Salt	0.98 %
Bactericide	0.10 %

10.0 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.			

11.0 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(s)	
Type	SAM V4.0C
Shell Material	Fiberglass
Thickness	2.0 ±0.1 mm
Volume	Approx. 25 liters

12.0 PROBE SPECIFICATION (ET3DV6)

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 brain 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 brain tissue (rotation around probe axis) ± 0.4 dB in brain 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

13.0 SAM PHANTOM V4.0C

The SAM 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 G for specifications of the SAM phantom V4.0C).

SAM Twin Phantom V4.0C

14.0 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

15.0 TEST EQUIPMENT LIST

TEST EQUIPMENT		ASSET NO.	SERIAL NO.	DATE CALIBRATED	CALIBRATION DUE DATE
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	28Apr09	28Apr10
x	-ET3DV6 E-Field Probe	00017	1590	21Jul08	21Jul09
x	-D835V2 Validation Dipole	00217	4d075	20Apr09	20Apr10
x	-SAM Phantom V4.0C	00154	1033	CNR	CNR
x	HP 85070C Dielectric Probe Kit	00033	US39240170	CNR	CNR
x	Gigatronics 8652A Power Meter	00007	1835272	23Apr08	21Jul09
x	Gigatronics 80701A Power Sensor	00014	1833699	23Apr08	21Jul09
x	HP 8753ET Network Analyzer	00134	US39170292	28Apr08	28Apr10
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				

16.0 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	5.5	Normal	1	1	1	5.5	5.5	∞
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	Normal	1	0.64	0.43	3.2	2.2	∞
Liquid Permittivity (target)	E.3.2	5	Rectangular	1.732050808	0.6	0.49	1.7	1.4	∞
Liquid Permittivity (measured)	E.3.3	3	Normal	1	0.6	0.49	1.8	1.5	∞
Combined Standard Uncertainty			**RSS**				**10.98**	**10.54**	
Expanded Uncertainty (95% Confidence Interval)			**k=2**				**21.97**	**21.08**	

Measurement Uncertainty Table in accordance with IEEE Standard 1528-2003 and IEC International Standard 62209-1:2005

17.0 REFERENCES

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

[2] 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.

[3] Industry Canada - “Radio Frequency Exposure Compliance of Radiocommunication Apparatus (All Frequency Bands)”, Radio Standards Specification RSS-102 Issue 2: November 2005.

[4] 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.

[5] IEC International Standard 62209-1:2005 - “Human exposure to radio frequency fields from hand-held and body-mounted wireless communication devices - Human models, instrumentation, and procedures.”

[6] Federal Communications Commission, Office of Engineering and Technology - “Mobile and Portable Device RF Exposure Procedures and Equipment Authorization Policies”; KDB 447498 D01 v03r03: January 2009.

[7] 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.

[8] Federal Communications Commission, Office of Engineering and Technology - “SAR Evaluation Considerations for Handsets with Multiple Transmitters and Antennas”; KDB 648474 D01 v01r05: September 2008.

[9] Schmid & Partner Engineering AG - DASY4 Manual V4.6, Chapter 21 Application Note, SAR Sensitivities: Sept. 2005.

[10] Schmid & Partner Engineering AG - DASY4 Manual V4.6, Chapter 18 Application Note, Body Tissue Recipe: Sept. 2005.

APPENDIX A - SAR MEASUREMENT DATA

Date Tested: 05/01/2009

Body-worn SAR - 100% Duty Cycle - 901.0 MHz

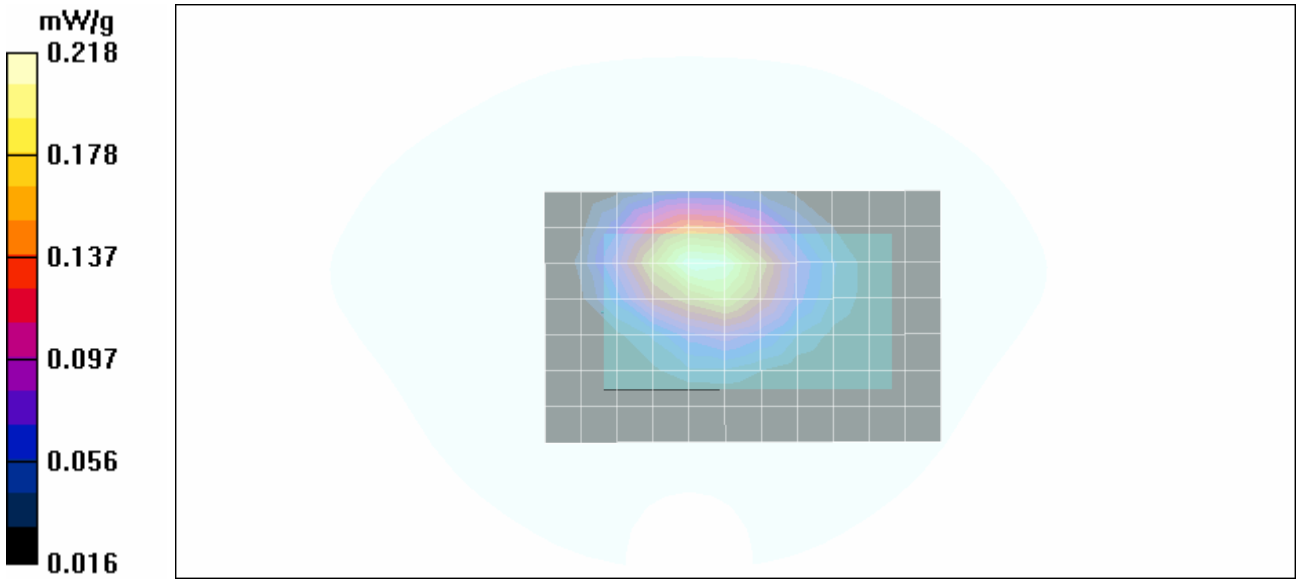
DUT: Sensus Metering Systems BTXCVR; Type: Body-worn Flexnet Micro Transceiver; Serial: SMSUT00541

Body-worn Accessory: Belt-worn Leather Case (Part No. CMG-SENSUSF)

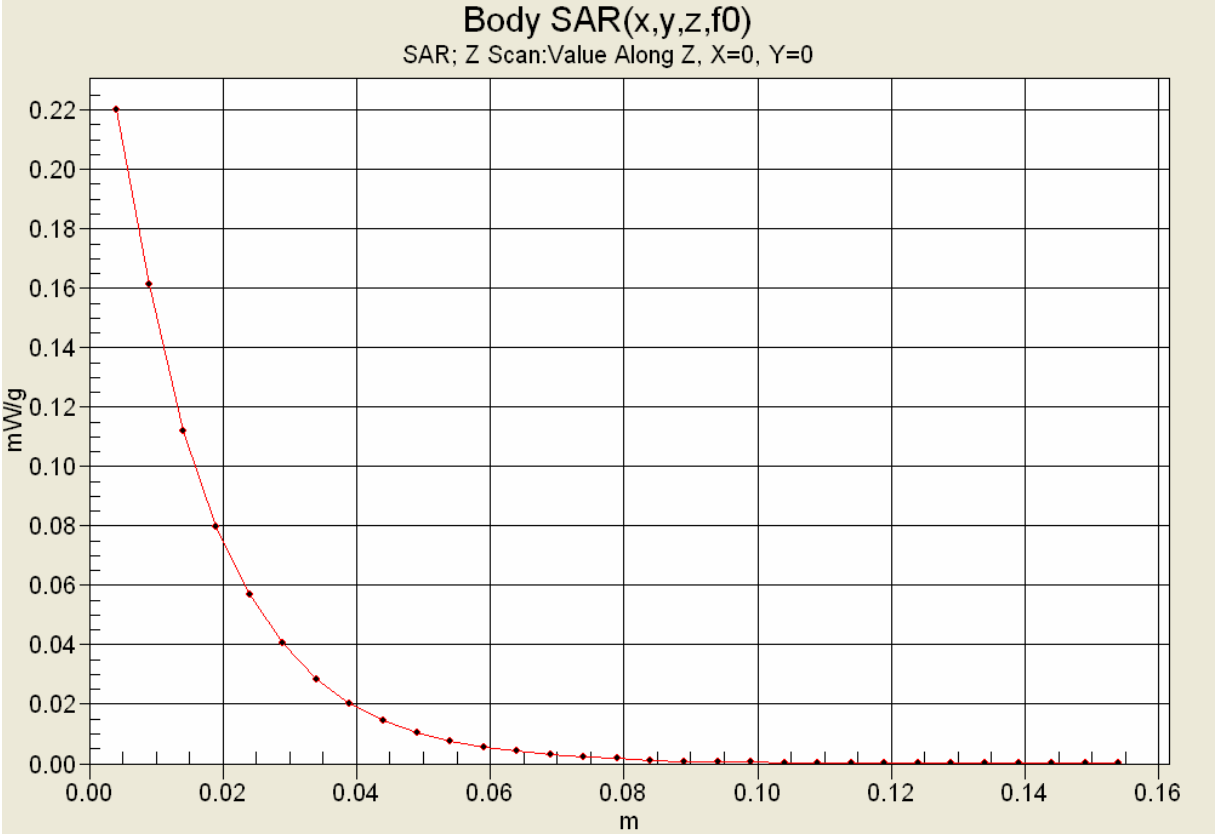
Ambient Temp: 23.5°C; Fluid Temp: 22.1°C; Barometric Pressure: 101.1 kPa; Humidity: 35%

Communication System: CW
Frequency: 901 MHz; Duty Cycle: 1:1
Medium: M900 Medium parameters used: f = 901 MHz; σ = 0.98 mho/m; ε_r = 53.5; ρ = 1000 kg/m^3
- Probe: ET3DV6 - SN1590; ConvF(6.39, 6.39, 6.39); Calibrated: 21/07/2008
- Sensor-Surface: 4mm (Mechanical And Optical Surface Detection)
- Electronics: DAE4 Sn353; Calibrated: 28/04/2009
- Phantom: SAM 4.0; Type: Fiberglas; Serial: 1033
- Measurement SW: DASY4, V4.7 Build 44; Postprocessing SW: SEMCAD, V1.8 Build 171

Body-worn SAR - 1.5 cm Belt-worn Case Spacing from Back Side of DUT to SAM Phantom (Planar Section)
Area Scan (8x12x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 0.214 mW/g
Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 11.2 V/m; Power Drift = -0.192 dB
Peak SAR (extrapolated) = 0.261 W/kg
SAR(1 g) = 0.202 mW/g; SAR(10 g) = 0.139 mW/g
Maximum value of SAR (measured) = 0.218 mW/g



Z-Axis Scan



Date Tested: 05/01/2009

Body-worn SAR - 100% Duty Cycle - 930.0 MHz

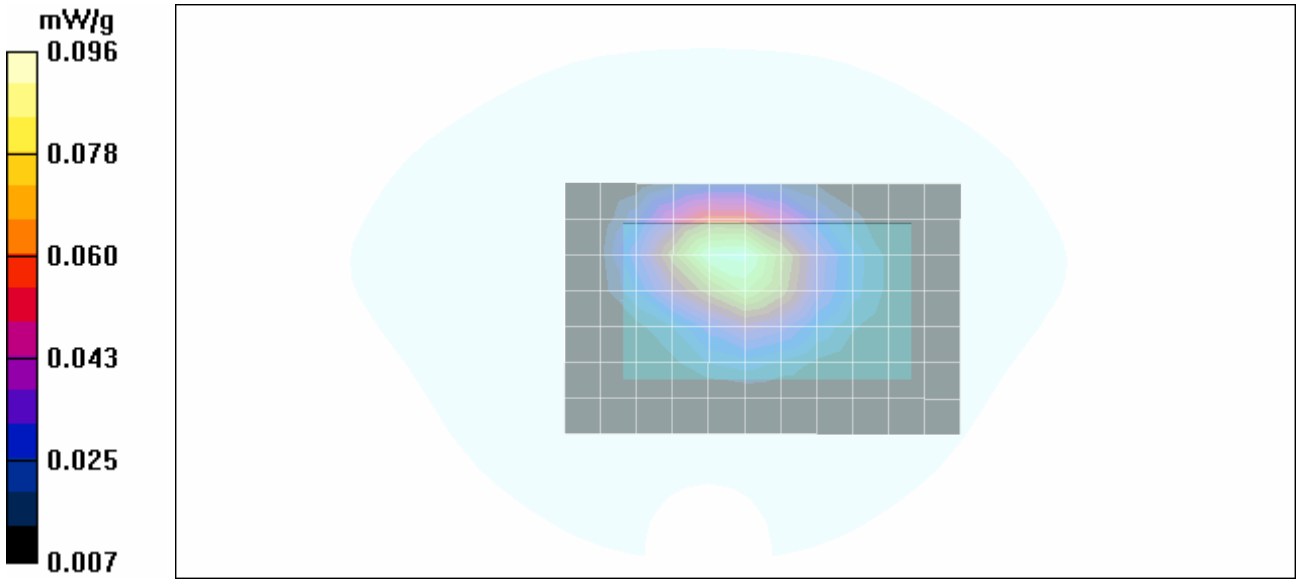
DUT: Sensus Metering Systems BTXCVR; Type: Body-worn Flexnet Micro Transceiver; Serial: SMSUT00541

Body-worn Accessory: Belt-worn Leather Case (Part No. CMG-SENSUSF)

Ambient Temp: 23.5°C; Fluid Temp: 22.1°C; Barometric Pressure: 101.1 kPa; Humidity: 35%

Communication System: CW
Frequency: 930 MHz; Duty Cycle: 1:1
Medium: M900 Medium parameters used: f = 930 MHz; σ = 1.01 mho/m; ε_r = 54; ρ = 1000 kg/m^3
- Probe: ET3DV6 - SN1590; ConvF(6.39, 6.39, 6.39); Calibrated: 21/07/2008
- Sensor-Surface: 4mm (Mechanical And Optical Surface Detection)
- Electronics: DAE4 Sn353; Calibrated: 28/04/2009
- Phantom: SAM 4.0; Type: Fiberglas; Serial: 1033
- Measurement SW: DASY4, V4.7 Build 44; Postprocessing SW: SEMCAD, V1.8 Build 171

Body-worn SAR - 1.5 cm Belt-worn Case Spacing from Back Side of DUT to SAM Phantom (Planar Section)
Area Scan (8x12x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 0.093 mW/g
Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 7.36 V/m; Power Drift = -0.158 dB
Peak SAR (extrapolated) = 0.116 W/kg
SAR(1 g) = 0.089 mW/g; SAR(10 g) = 0.061 mW/g
Maximum value of SAR (measured) = 0.096 mW/g



Date Tested: 05/01/2009

Body-worn SAR - 100% Duty Cycle - 941.0 MHz

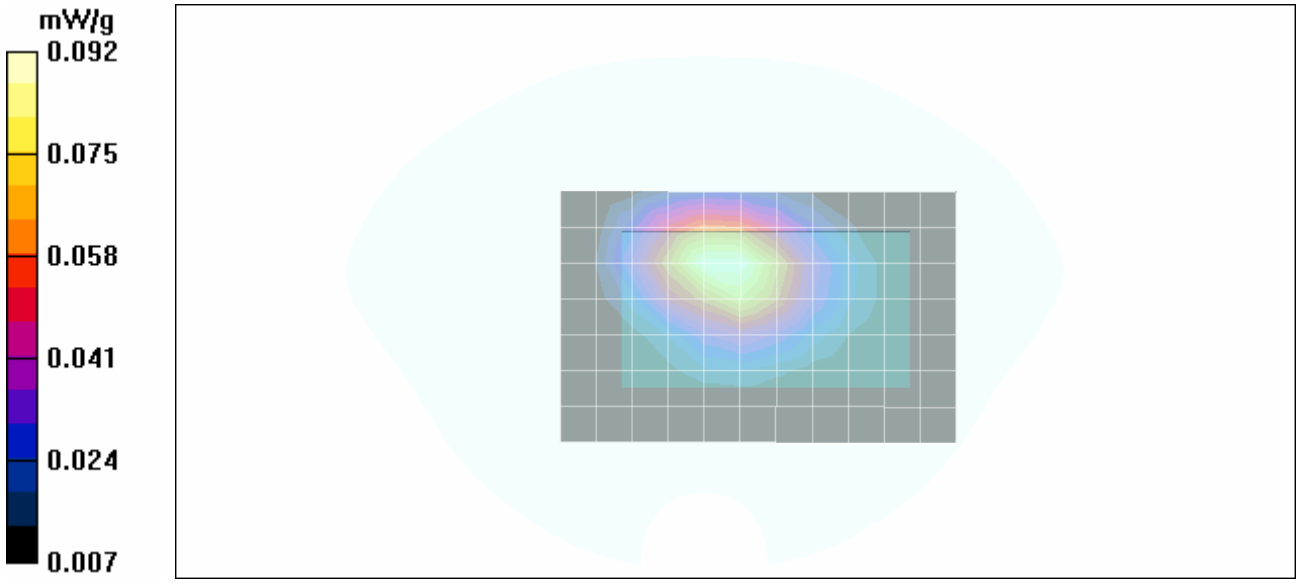
DUT: Sensus Metering Systems BTXCVR; Type: Body-worn Flexnet Micro Transceiver; Serial: SMSUT00541

Body-worn Accessory: Belt-worn Leather Case (Part No. CMG-SENSUSF)

Ambient Temp: 23.5°C; Fluid Temp: 22.1°C; Barometric Pressure: 101.1 kPa; Humidity: 35%

Communication System: CW
Frequency: 941 MHz; Duty Cycle: 1:1
Medium: M900 Medium parameters used: f = 941 MHz; σ = 1.02 mho/m; ε_r = 53.5; ρ = 1000 kg/m^3
- Probe: ET3DV6 - SN1590; ConvF(6.39, 6.39, 6.39); Calibrated: 21/07/2008
- Sensor-Surface: 4mm (Mechanical And Optical Surface Detection)
- Electronics: DAE4 Sn353; Calibrated: 28/04/2009
- Phantom: SAM 4.0; Type: Fiberglas; Serial: 1033
- Measurement SW: DASY4, V4.7 Build 44; Postprocessing SW: SEMCAD, V1.8 Build 171

Body-worn SAR - 1.5 cm Belt-worn Case Spacing from Back Side of DUT to SAM Phantom (Planar Section)
Area Scan (8x12x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 0.091 mW/g
Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 7.01 V/m; Power Drift = -0.126 dB
Peak SAR (extrapolated) = 0.111 W/kg
SAR(1 g) = 0.086 mW/g; SAR(10 g) = 0.058 mW/g
Maximum value of SAR (measured) = 0.092 mW/g



Date Tested: 05/01/2009

Body-worn SAR - 50% Duty Cycle - 901.0 MHz

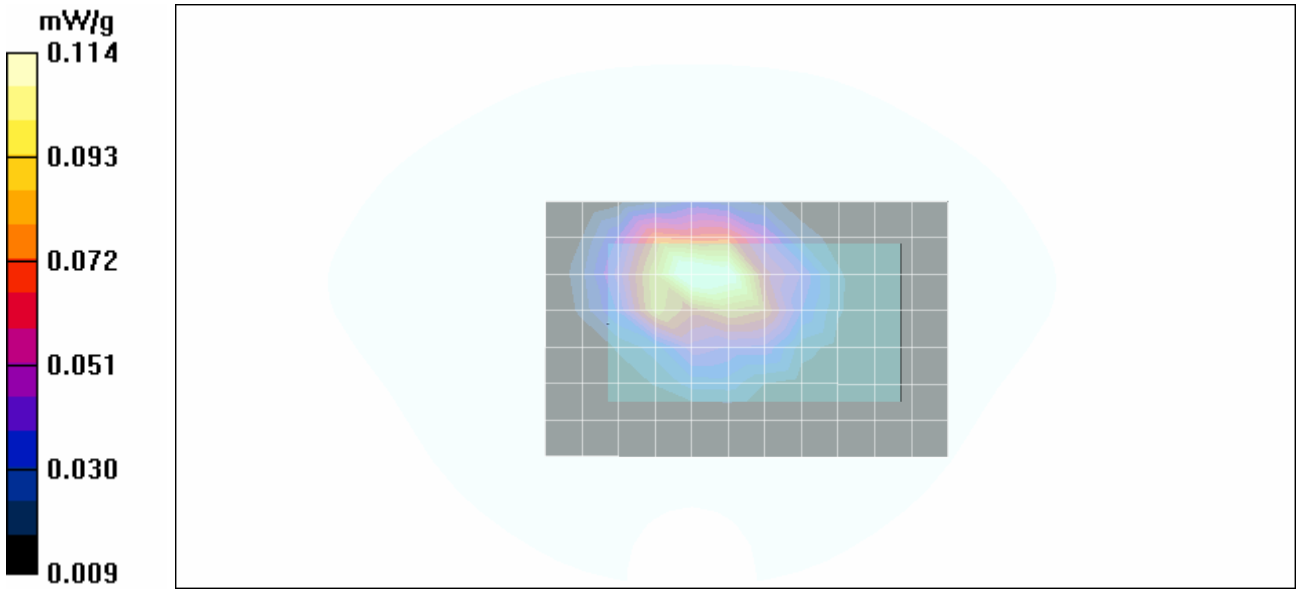
DUT: Sensus Metering Systems BTXCVR; Type: Body-worn Flexnet Micro Transceiver; Serial: SMSUT00541

Body-worn Accessory: Belt-worn Leather Case (Part No. CMG-SENSUSF)

Ambient Temp: 23.5°C; Fluid Temp: 22.1°C; Barometric Pressure: 101.1 kPa; Humidity: 35%

Communication System: CW
Frequency: 901 MHz; Duty Cycle: 1:2
Medium: M900 Medium parameters used: f = 901 MHz; σ = 0.98 mho/m; ε_r = 53.5; ρ = 1000 kg/m^3
- Probe: ET3DV6 - SN1590; ConvF(6.39, 6.39, 6.39); Calibrated: 21/07/2008
- Sensor-Surface: 4mm (Mechanical And Optical Surface Detection)
- Electronics: DAE4 Sn353; Calibrated: 28/04/2009
- Phantom: SAM 4.0; Type: Fiberglas; Serial: 1033
- Measurement SW: DASY4, V4.7 Build 44; Postprocessing SW: SEMCAD, V1.8 Build 171

Body-worn SAR - 1.5 cm Belt-worn Case Spacing from Back Side of DUT to SAM Phantom (Planar Section)
Area Scan (8x12x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 0.128 mW/g
Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 8.81 V/m; Power Drift = -0.624 dB
Peak SAR (extrapolated) = 0.137 W/kg
SAR(1 g) = 0.106 mW/g; SAR(10 g) = 0.072 mW/g
Maximum value of SAR (measured) = 0.114 mW/g



Date Tested: 05/01/2009

Body-worn SAR - 25% Duty Cycle - 901.0 MHz

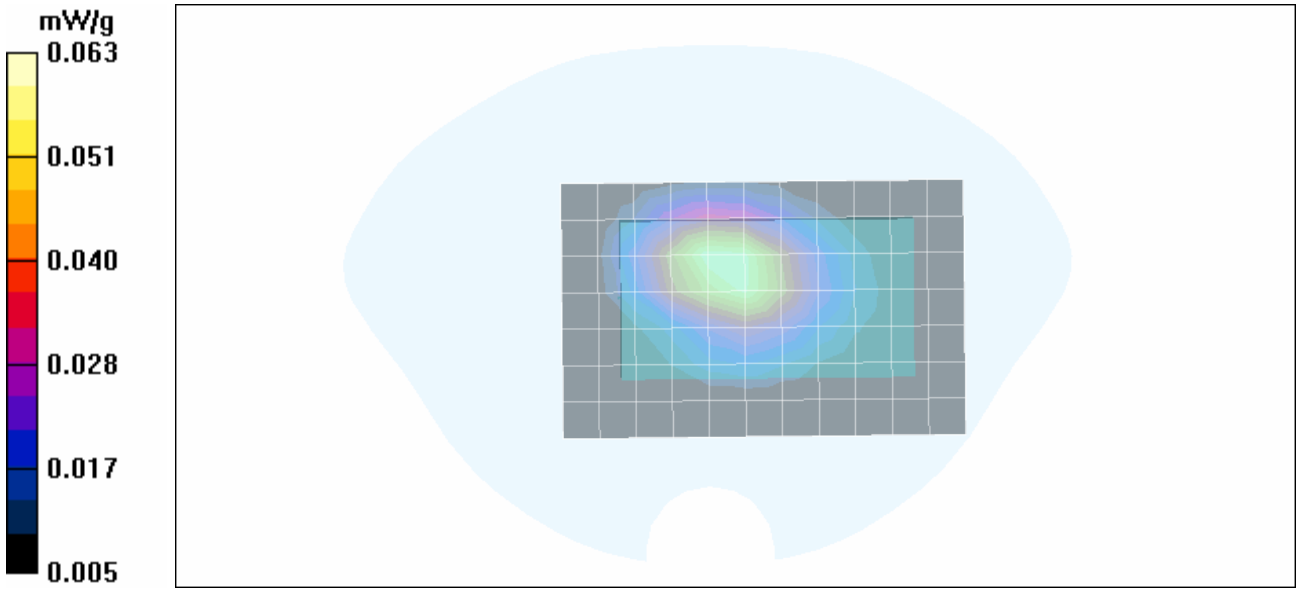
DUT: Sensus Metering Systems BTXCVR; Type: Body-worn Flexnet Micro Transceiver; Serial: SMSUT00541

Body-worn Accessory: Belt-worn Leather Case (Part No. CMG-SENSUSF)

Ambient Temp: 23.5°C; Fluid Temp: 22.1°C; Barometric Pressure: 101.1 kPa; Humidity: 35%

Communication System: CW
Frequency: 901 MHz; Duty Cycle: 1:4
Medium: M900 Medium parameters used: f = 901 MHz; σ = 0.98 mho/m; ε_r = 53.5; ρ = 1000 kg/m^3
- Probe: ET3DV6 - SN1590; ConvF(6.39, 6.39, 6.39); Calibrated: 21/07/2008
- Sensor-Surface: 4mm (Mechanical And Optical Surface Detection)
- Electronics: DAE4 Sn353; Calibrated: 28/04/2009
- Phantom: SAM 4.0; Type: Fiberglas; Serial: 1033
- Measurement SW: DASY4, V4.7 Build 44; Postprocessing SW: SEMCAD, V1.8 Build 171

Body-worn SAR - 1.5 cm Belt-worn Case Spacing from Back Side of DUT to SAM Phantom (Planar Section)
Area Scan (8x12x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 0.059 mW/g
Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 6.52 V/m; Power Drift = -0.153 dB
Peak SAR (extrapolated) = 0.075 W/kg
SAR(1 g) = 0.058 mW/g; SAR(10 g) = 0.040 mW/g
Maximum value of SAR (measured) = 0.063 mW/g



APPENDIX B - SYSTEM PERFORMANCE CHECK DATA

Date Tested: 05/01/2009

System Performance Check - 835 MHz Dipole - MSL

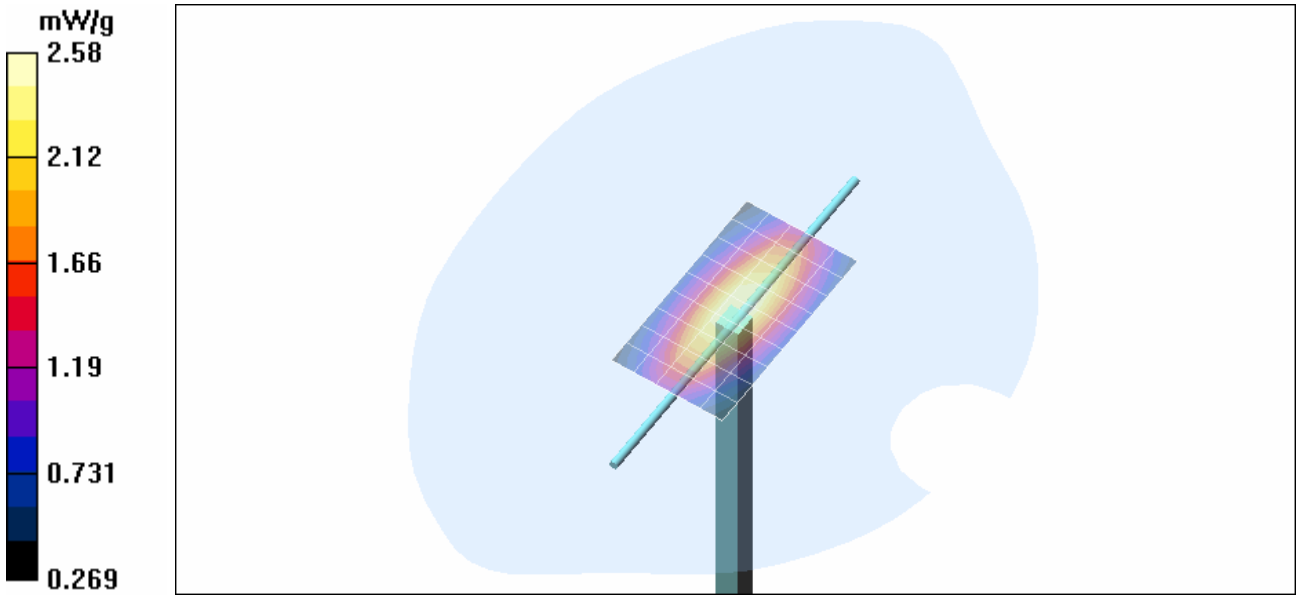
DUT: Dipole 835 MHz; Type: D835V2; Serial: 4d075; Calibration: 04/20/2009

Ambient Temp: 23.2°C; Fluid Temp: 21.8°C; Barometric Pressure: 101.1 kPa; Humidity: 35%

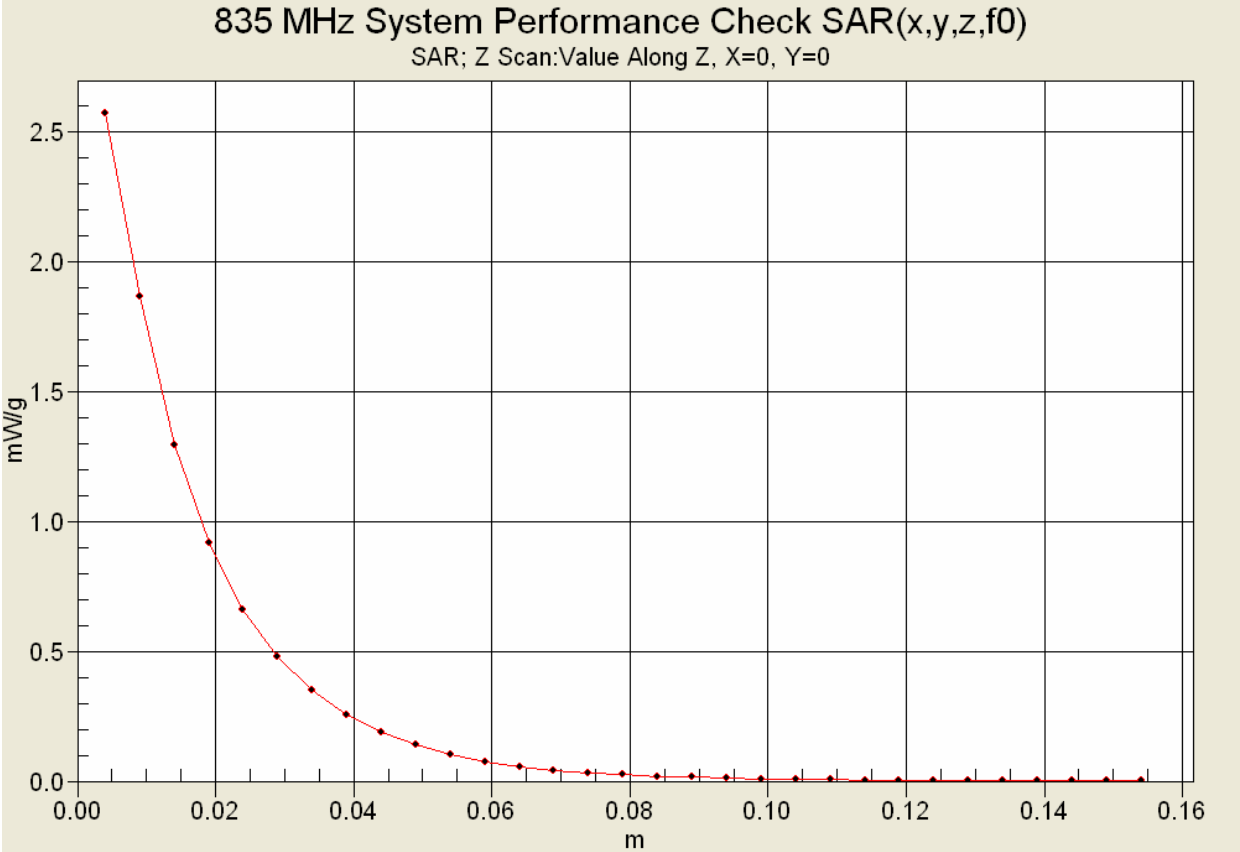
Communication System: CW
Forward Conducted Power: 250 mW
Frequency: 835 MHz; Duty Cycle: 1:1
Medium: M835 Medium parameters used: f = 835 MHz; σ = 0.96 mho/m; ε_r = 55.2; ρ = 1000 kg/m^3

- Probe: ET3DV6 - SN1590; ConvF(6.39, 6.39, 6.39); Calibrated: 21/07/2008
- Sensor-Surface: 4mm (Mechanical And Optical Surface Detection)
- Electronics: DAE4 Sn353; Calibrated: 28/04/2009
- Phantom: SAM 4.0; Type: Fiberglas; Serial: 1033
- Measurement SW: DASY4, V4.7 Build 44; Postprocessing SW: SEMCAD, V1.8 Build 171

System Performance Check - 835 MHz Dipole
Area Scan (6x10x1): Measurement grid: dx=10mm, dy=10mm
Maximum value of SAR (measured) = 2.48 mW/g
Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 54.6 V/m; Power Drift = -0.019 dB
Peak SAR (extrapolated) = 3.10 W/kg
SAR(1 g) = 2.37 mW/g; SAR(10 g) = 1.6 mW/g
Maximum value of SAR (measured) = 2.58 mW/g



Z-Axis Scan



APPENDIX C - MEASURED FLUID DIELECTRIC PARAMETERS

835 MHz System Performance Check (Body)

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Celltech Labs
Test Result for UIM Dielectric Parameter
01/May/2009
Frequency (GHz)
FCC_eH FCC Bulletin 65 Supplement C (June 2001) Limits for Head Epsilon
FCC_sH FCC Bulletin 65 Supplement C (June 2001) Limits for Head Sigma
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	56.14	0.87
0.7450	55.55	0.96	56.01	0.88
0.7550	55.51	0.96	56.04	0.88
0.7650	55.47	0.96	55.67	0.89
0.7750	55.43	0.97	55.80	0.91
0.7850	55.39	0.97	55.51	0.90
0.7950	55.36	0.97	55.72	0.93
0.8050	55.32	0.97	55.41	0.94
0.8150	55.28	0.97	55.41	0.96
0.8250	55.24	0.97	55.23	0.96
0.8350	55.20	0.97	55.16	0.96
0.8450	55.17	0.98	55.21	0.97
0.8550	55.14	0.99	55.04	1.00
0.8650	55.11	1.01	55.31	0.99
0.8750	55.08	1.02	55.01	1.01
0.8850	55.05	1.03	55.00	1.03
0.8950	55.02	1.04	54.97	1.02
0.9050	55.00	1.05	54.71	1.02
0.9150	55.00	1.06	54.77	1.03
0.9250	54.98	1.06	54.41	1.05
0.9350	54.96	1.07	54.47	1.05

Note: Due to the difference between the 835 MHz measured fluid dielectric parameters in the validation dipole calibration document and the 835 MHz nominal fluid dielectric parameters stated in the probe calibration document by the system manufacturer (SPEAG), separate fluid dielectric parameter measurements were required for the 835 MHz system performance check and the 900 MHz SAR evaluations in order to achieve the specified target dielectric parameters within the required tolerance for the system performance check and DUT evaluations respectively.

900/930/940 MHz DUT Evaluation (Body)

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Celltech Labs
Test Result for UIM Dielectric Parameter
01/May/2009
Frequency (GHz)
FCC_eH FCC Bulletin 65 Supplement C (June 2001) Limits for Head Epsilon
FCC_sH FCC Bulletin 65 Supplement C (June 2001) Limits for Head Sigma
FCC_eB FCC Limits for Body Epsilon
FCC_sB FCC Limits for Body Sigma
Test_e Epsilon of UIM
Test_s Sigma of UIM

****

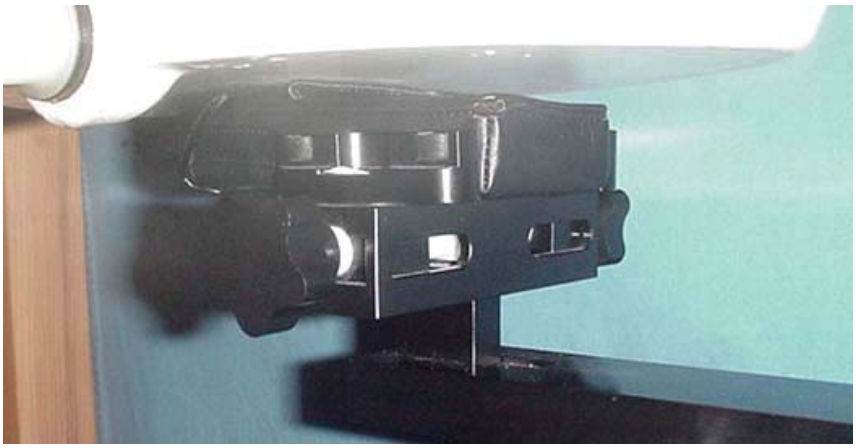
Freq	FCC_eB	FCC_sB	Test_e	Test_s
0.8000	55.34	0.97	54.45	0.87
0.8050	55.32	0.97	54.58	0.88
0.8100	55.30	0.97	54.58	0.87
0.8150	55.28	0.97	54.37	0.89
0.8200	55.26	0.97	54.51	0.91
0.8250	55.24	0.97	54.44	0.91
0.8300	55.22	0.97	54.74	0.90
0.8350	55.20	0.97	54.43	0.92
0.8400	55.18	0.98	54.74	0.92
0.8450	55.17	0.98	54.53	0.92
0.8500	55.15	0.99	54.70	0.93
0.8550	55.14	0.99	54.53	0.92
0.8600	55.12	1.00	54.60	0.93
0.8650	55.11	1.01	54.36	0.92
0.8700	55.09	1.01	54.15	0.94
0.8750	55.08	1.02	54.35	0.93
0.8800	55.06	1.03	53.78	0.94
0.8850	55.05	1.03	54.13	0.94
0.8900	55.03	1.04	53.82	0.96
0.8950	55.02	1.04	53.81	0.98
0.9000	55.00	1.05	53.53	0.98
0.9050	55.00	1.05	53.98	0.97
0.9100	55.00	1.06	53.79	1.00
0.9150	55.00	1.06	53.59	1.01
0.9200	54.99	1.06	53.46	1.01
0.9250	54.98	1.06	53.40	1.01
0.9300	54.97	1.07	53.98	1.01
0.9350	54.96	1.07	53.56	1.01
0.9400	54.95	1.07	53.51	1.02
0.9450	54.94	1.07	53.70	1.03
0.9500	54.93	1.08	53.77	1.03

Note: Due to the difference between the 835 MHz measured fluid dielectric parameters in the validation dipole calibration document and the 835 MHz nominal fluid dielectric parameters stated in the probe calibration document by the system manufacturer (SPEAG), separate fluid dielectric parameter measurements were required for the 835 MHz system performance check and the 900 MHz SAR evaluations in order to achieve the specified target dielectric parameters within the required tolerance for the system performance check and DUT evaluations respectively.

APPENDIX D - SAR TEST SETUP & DUT PHOTOGRAPHS

BODY-WORN SAR TEST SETUP PHOTOGRAPHS

1.5 cm Accessory Spacing from Back Side of DUT to SAM Phantom (Planar Section)
DUT with Belt-worn Leather Case Accessory (Part No.: CMG-SENSUSF)



DUT PHOTOGRAPHS

Front Side of DUT with Belt-worn Case Accessory

Back Side of DUT with Belt-worn Case Accessory

Left and Right Sides of DUT installed in Belt-worn Leather Case Accessory

DUT PHOTOGRAPHS

Top end of DUT installed in Belt-worn Leather Case Accessory

Bottom end of DUT installed in Belt-worn Case Accessory

Belt-worn Leather Case Accessory Part No.: CMG-SENSUSF

DUT PHOTOGRAPHS

Front Side of DUT

Back Side of DUT

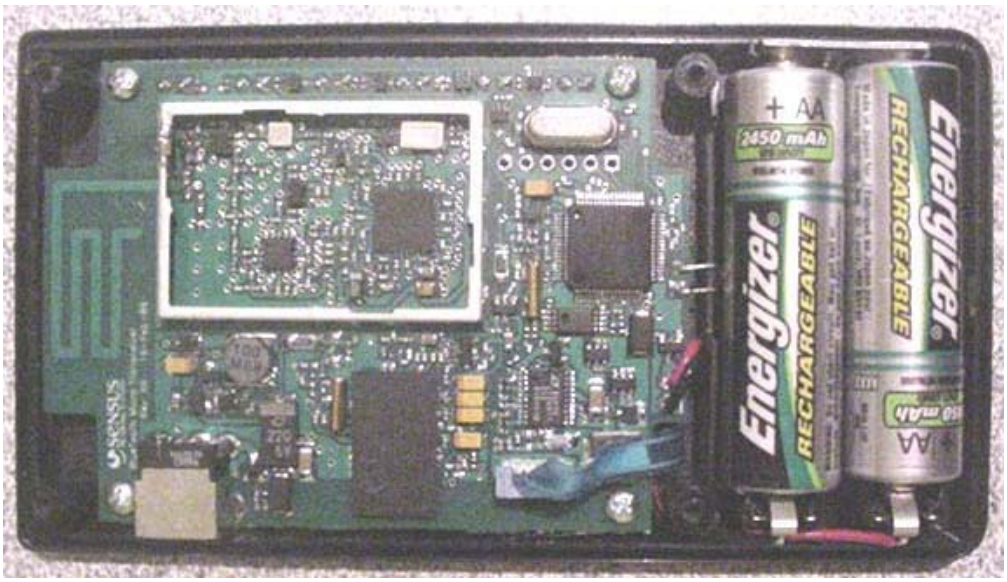
Top end of DUT

Bottom end of DUT

DUT PHOTOGRAPHS

Back Side of DUT with Ni-MH AA Batteries

Left and Right Sides of DUT



PCB and Antenna Location

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

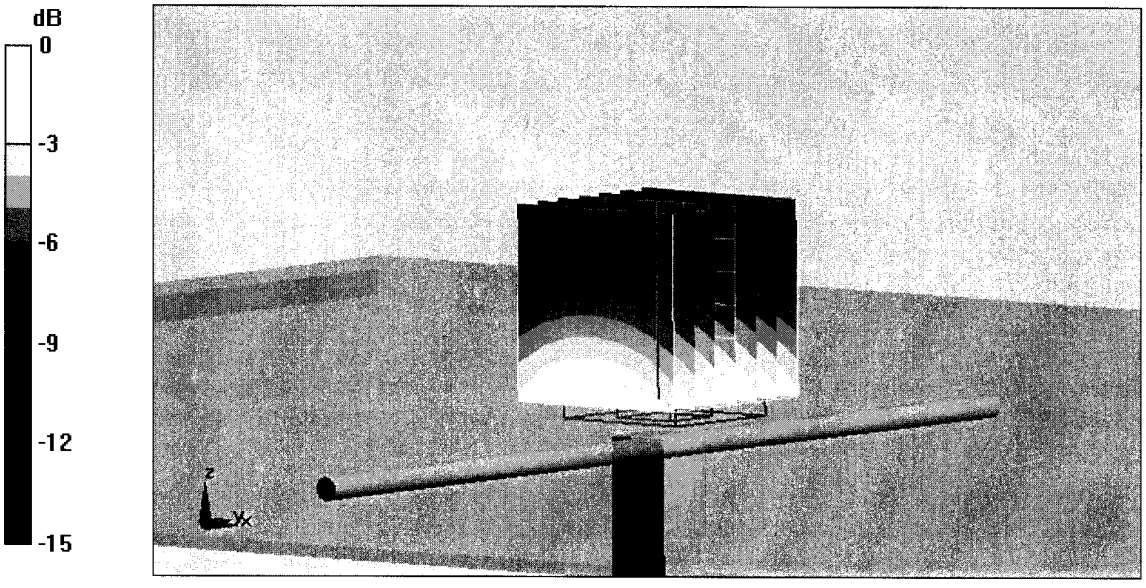
DUT: Dipole 835 MHz; Type: D835V2; Serial: D835V2 - SN:4d075

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:

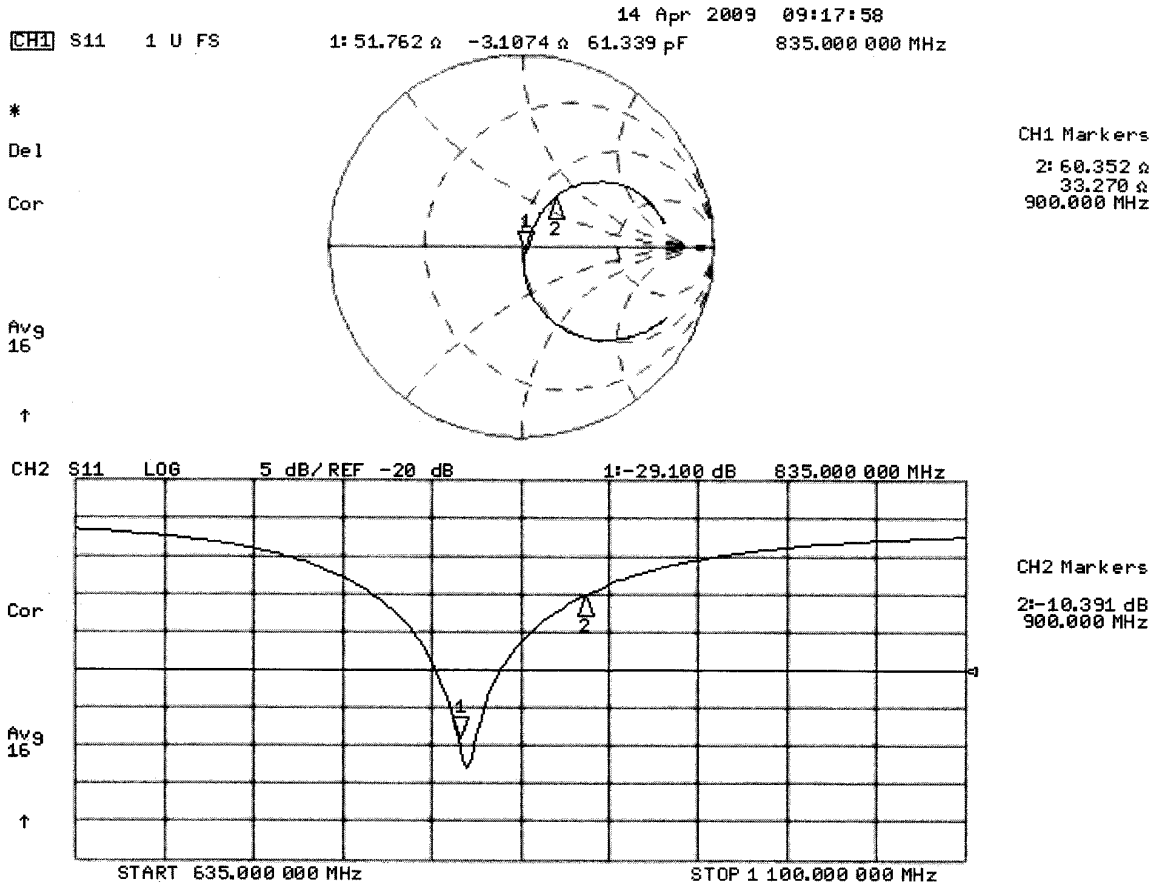
- Probe: ES3DV2 - SN3025; ConvF(5.97, 5.97, 5.97); Calibrated: 28.04.2008
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 07.03.2009
- Phantom: Flat Phantom 4.9L; Type: QD000P49AA; Serial: 1001
- Measurement SW: DASY5, V5.0 Build 120; SEMCAD X Version 13.4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

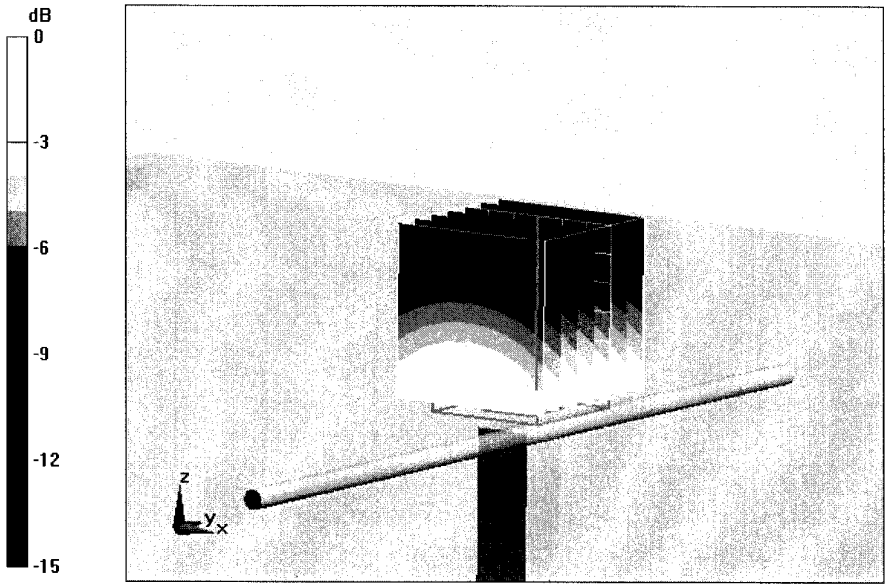
DUT: Dipole 835 MHz; Type: D835V2; Serial: D835V2 - SN:4d075

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:

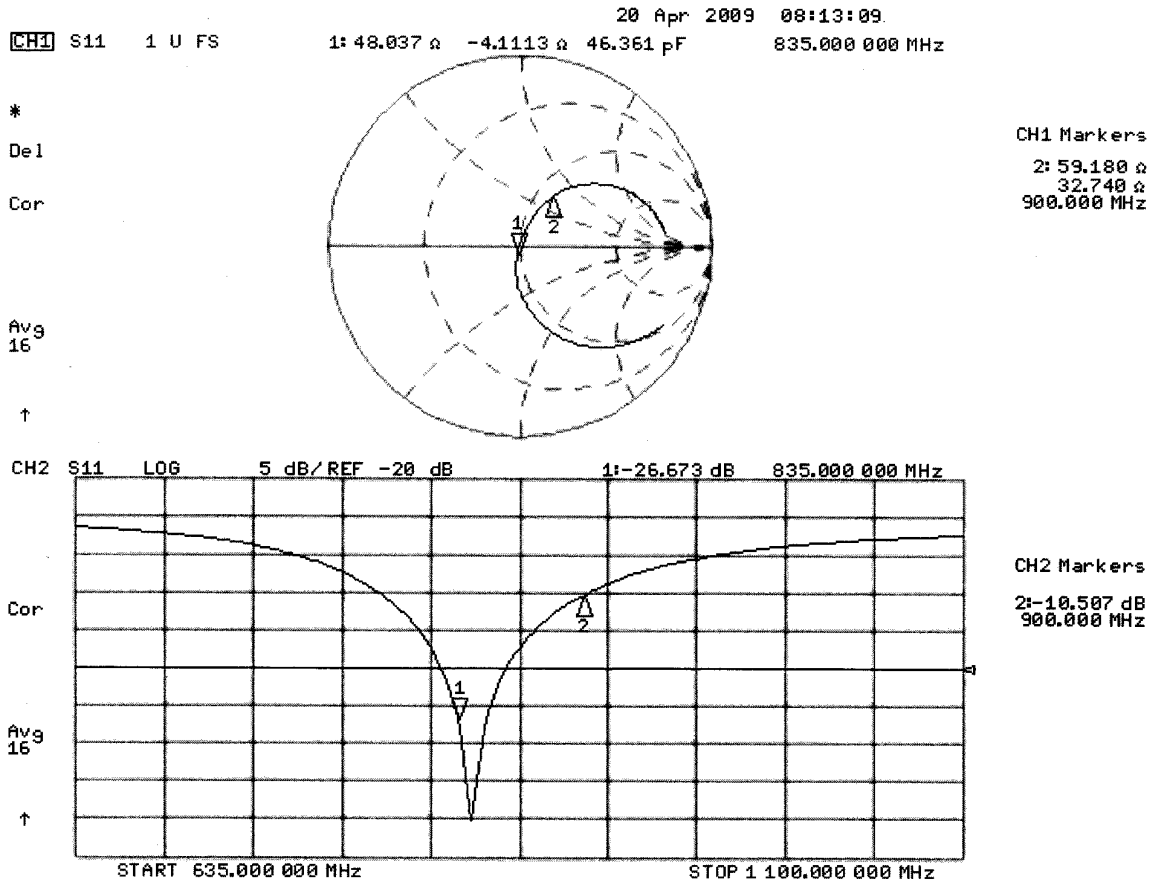
- Probe: ES3DV2 - SN3025; ConvF(5.9, 5.9, 5.9); Calibrated: 28.04.2008
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 07.03.2009
- Phantom: Flat Phantom 4.9L; Type: QD000P49AA; Serial: 1001
- Measurement SW: DASY5, V5.0 Build 120; SEMCAD X Version 13.4 Build 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
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: ET3-1590_Jul08

CALIBRATION CERTIFICATE

Object	ET3DV6 - SN:1590
Calibration procedure(s)	QA CAL-01.v6, QA CAL-12.v5 and QA CAL-23.v3 Calibration procedure for dosimetric E-field probes
Calibration date:	July 21, 2008
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 E4419B	GB41293874	1-Apr-08 (No. 217-00788)	Apr-09
Power sensor E4412A	MY41495277	1-Apr-08 (No. 217-00788)	Apr-09
Power sensor E4412A	MY41498087	1-Apr-08 (No. 217-00788)	Apr-09
Reference 3 dB Attenuator	SN: S5054 (3c)	1-Jul-08 (No. 217-00865)	Jul-09
Reference 20 dB Attenuator	SN: S5086 (20b)	31-Mar-08 (No. 217-00787)	Apr-09
Reference 30 dB Attenuator	SN: S5129 (30b)	1-Jul-08 (No. 217-00866)	Jul-09
Reference Probe ES3DV2	SN: 3013	2-Jan-08 (No. ES3-3013_Jan08)	Jan-09
DAE4	SN: 660	3-Sep-07 (No. DAE4-660_Sep07)	Sep-08

Secondary Standards	ID #	Check Date (in house)	Scheduled Check
RF generator HP 8648C	US3642U01700	4-Aug-99 (in house check Oct-07)	In house check: Oct-09
Network Analyzer HP 8753E	US37390585	18-Oct-01 (in house check Oct-07)	In house check: Oct-08

	Name	Function	Signature
Calibrated by:	Katja Pokovic	Technical Manager	
Approved by:	Niels Kuster	Quality Manager	

Issued: July 21, 2008

Glossary:

TSL	tissue simulating liquid
NORMx,y,z	sensitivity in free space
ConvF	sensitivity in TSL / NORMx,y,z
DCP	diode compression point
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 $\vartheta = 0$ ($f \leq 900$ 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 effect 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 (no uncertainty required). DCP does not depend on frequency nor media.
- *ConvF and Boundary Effect Parameters:* Assessed in flat phantom using E-field (or Temperature Transfer Standard for $f \leq 800$ 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
Last calibrated:	May 20, 2005
Recalibrated:	July 21, 2008

Calibrated for DASY Systems

(Note: non-compatible with DASY2 system!)

DASY - Parameters of Probe: ET3DV6 SN:1590

Sensitivity in Free Space[A] Diode Compression[B]

NormX	**1.81** ± 10.1%	$\mu V/(V/m)^2$	DCP X	**87** mV
NormY	**2.00** ± 10.1%	$\mu V/(V/m)^2$	DCP Y	**92** mV
NormZ	**1.72** ± 10.1%	$\mu V/(V/m)^2$	DCP Z	**85** mV

Sensitivity in Tissue Simulating Liquid (Conversion Factors)

Please see Page 8.

Boundary Effect

TSL **835 MHz** **Typical SAR gradient: 5 % per mm**

Sensor Center to Phantom Surface Distance		**3.7 mm**	**4.7 mm**
SAR_{be} [%]	Without Correction Algorithm	10.7	7.2
SAR_{be} [%]	With Correction Algorithm	0.8	0.5

Sensor Offset

Probe Tip to Sensor Center	**2.7** mm

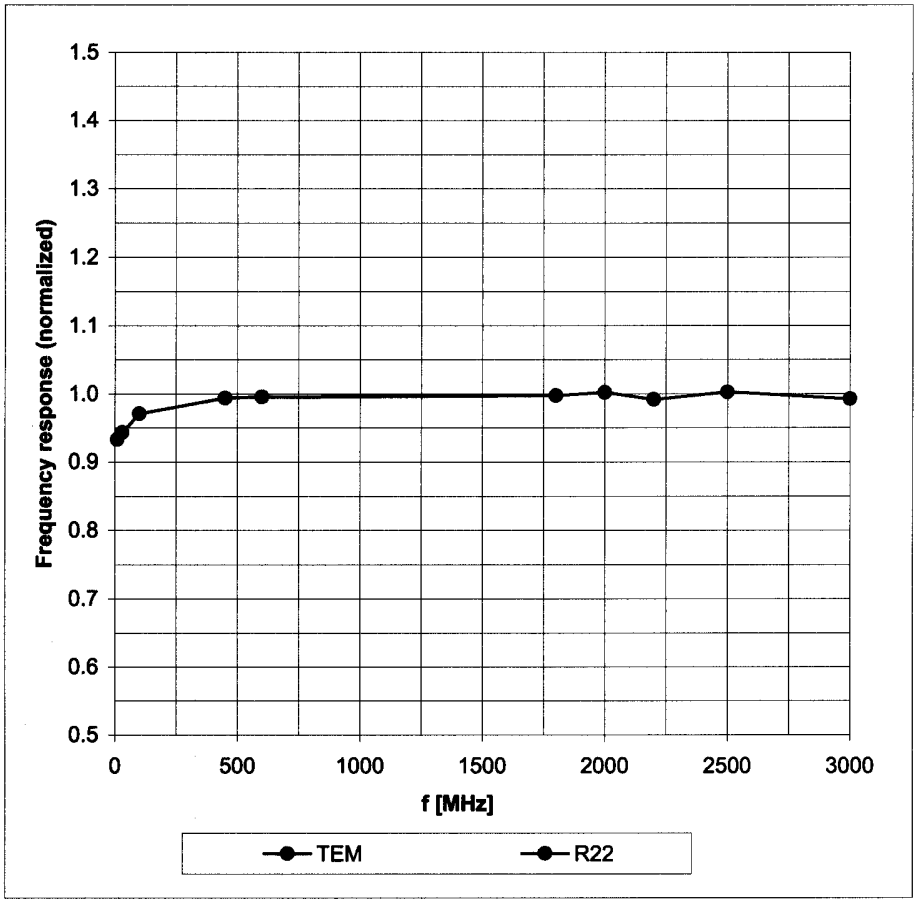
The reported uncertainty of measurement is stated as the standard uncertainty of measurement multiplied by the coverage factor k=2, which for a normal distribution corresponds to a coverage probability of approximately 95%.

[A] The uncertainties of NormX,Y,Z do not affect the E^2-field uncertainty inside TSL (see Page 8).

[B] Numerical linearization parameter: uncertainty not required.

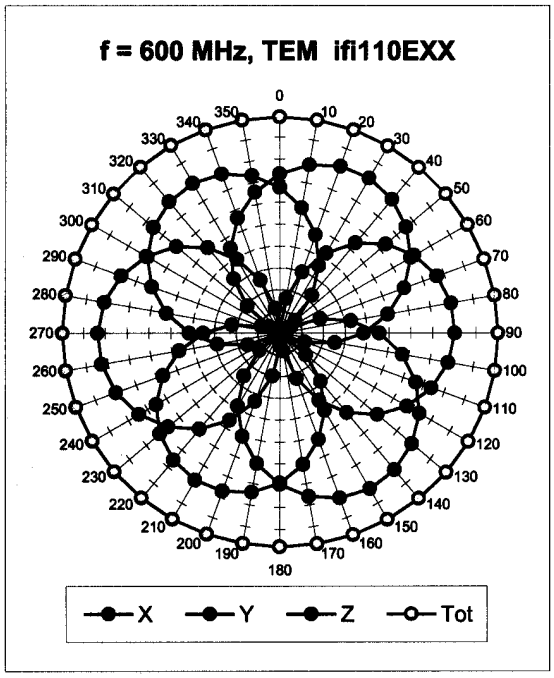
Frequency Response of E-Field

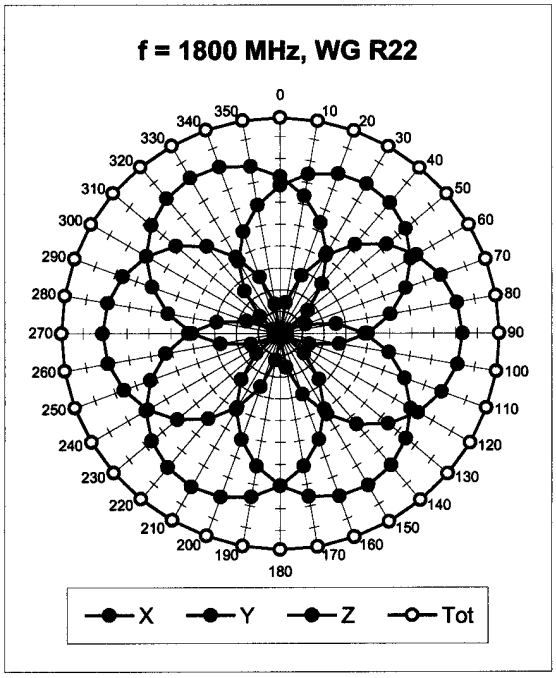
(TEM-Cell:ifi110 EXX, Waveguide: R22)

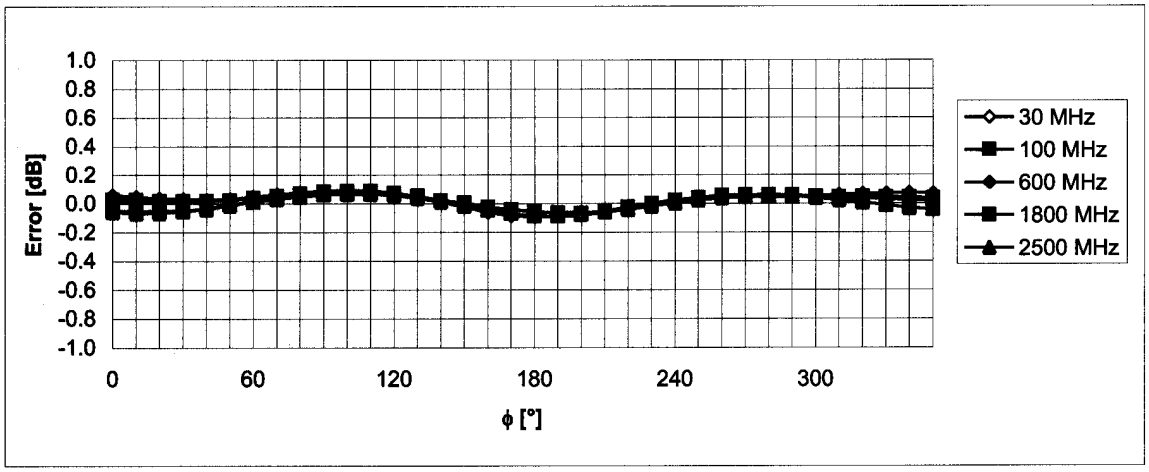


Uncertainty of Frequency Response of E-field: ± 6.3% (k=2)

Receiving Pattern (ϕ), ϑ = 0°



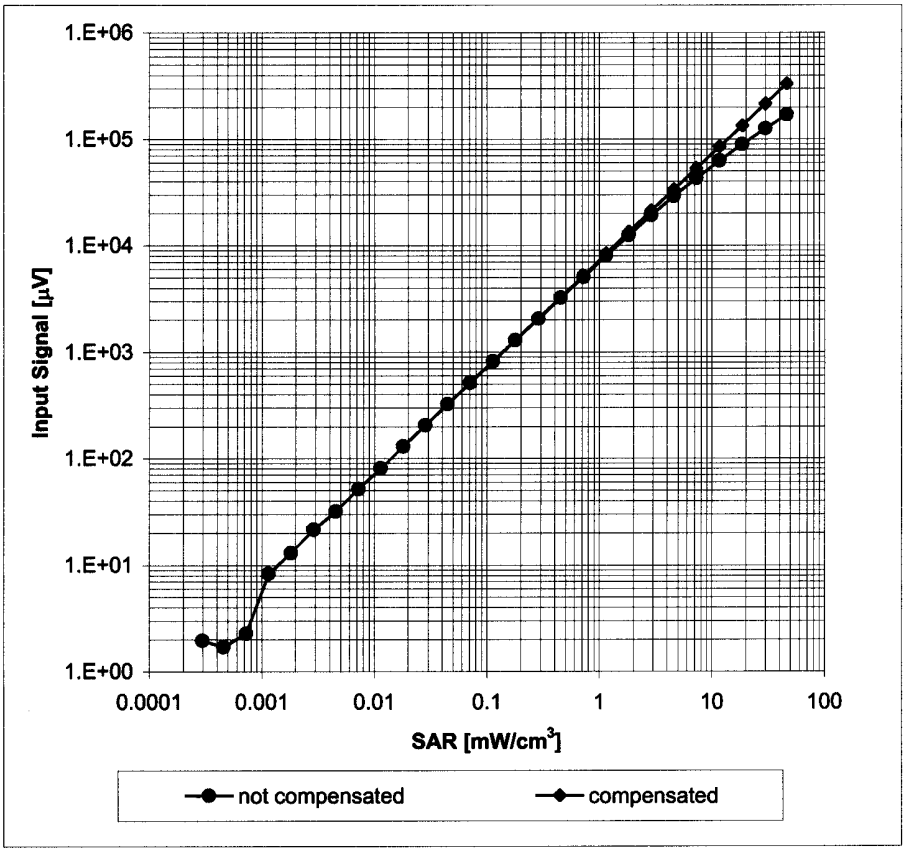


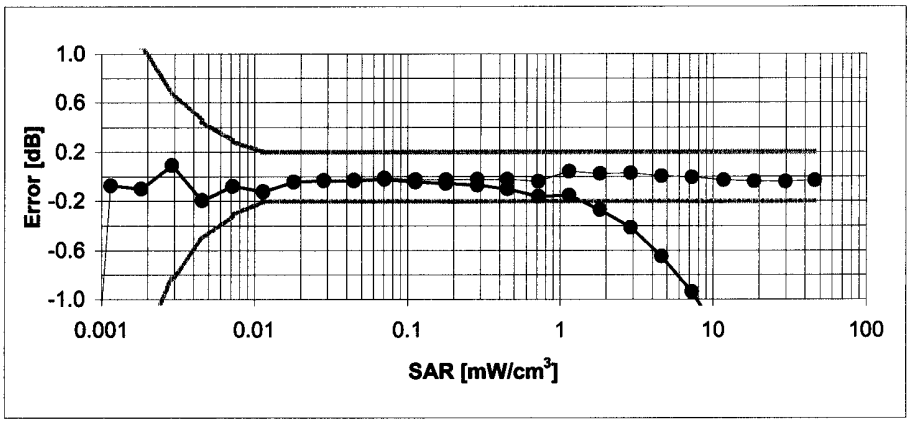


Uncertainty of Axial Isotropy Assessment: ± 0.5% (k=2)

Dynamic Range f(SAR_{head})

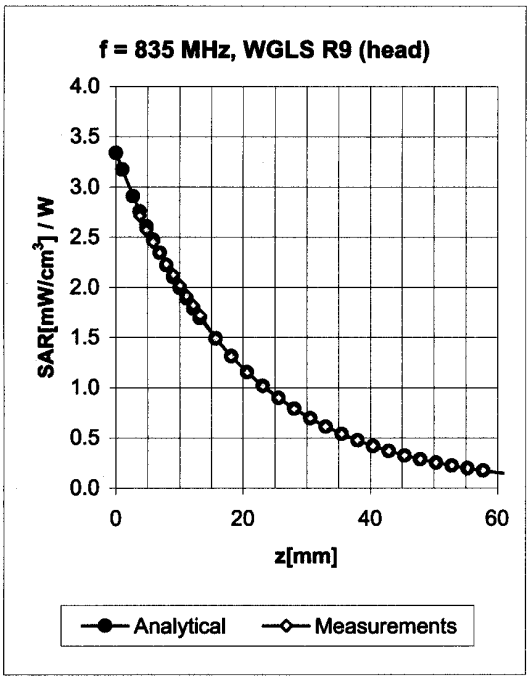
(Waveguide R22, f = 1800 MHz)

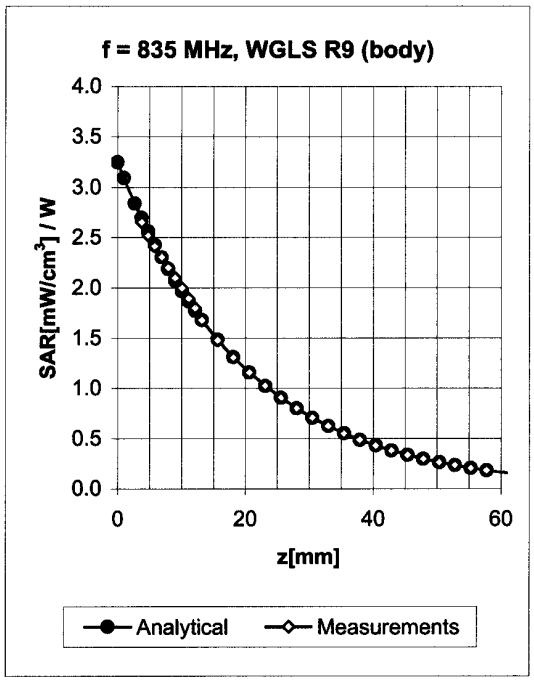




Uncertainty of Linearity Assessment: ± 0.6% (k=2)

Conversion Factor Assessment



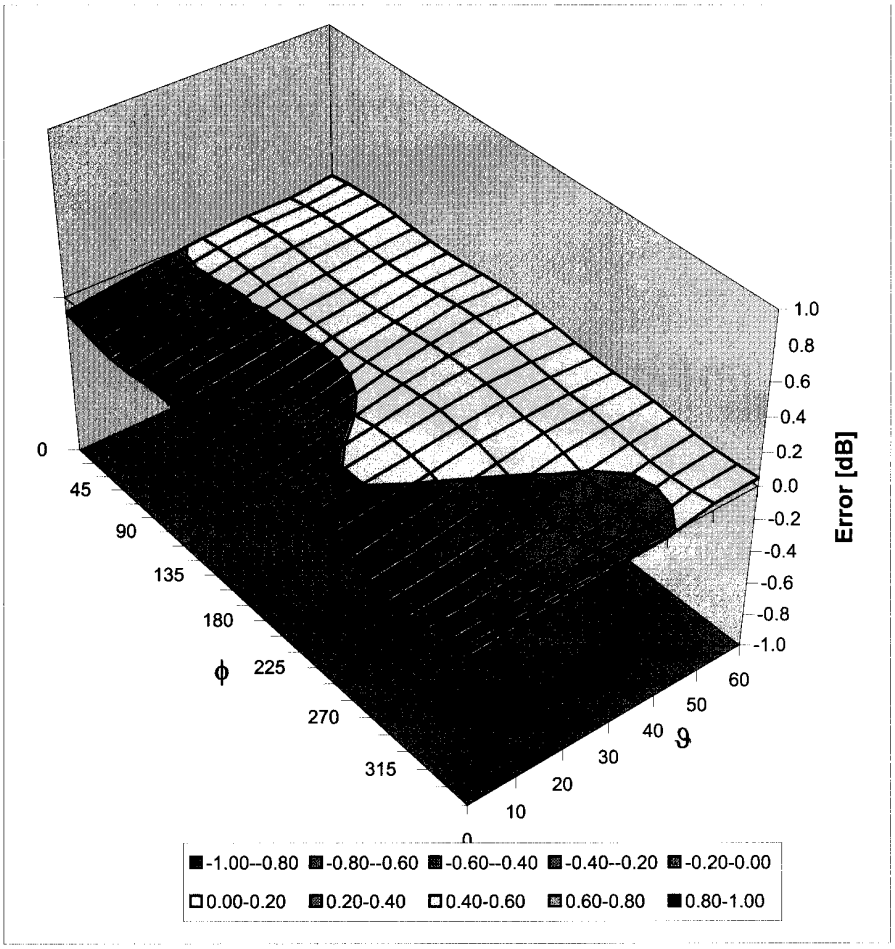


f [MHz]	Validity [MHz][C]	TSL	Permittivity	Conductivity	Alpha	Depth	ConvF Uncertainty	
450	± 50 / ± 100	Head	43.5 ± 5%	0.87 ± 5%	0.34	1.75	7.66	± 13.3% (k=2)
835	± 50 / ± 100	Head	41.5 ± 5%	0.90 ± 5%	0.32	3.52	6.54	± 11.0% (k=2)
450	± 50 / ± 100	Body	56.7 ± 5%	0.94 ± 5%	0.28	1.77	8.27	± 13.3% (k=2)
835	± 50 / ± 100	Body	55.2 ± 5%	0.97 ± 5%	0.36	3.31	6.39	± 11.0% (k=2)

[C] **The validity of ± 100 MHz only applies for DASY v4.4 and higher (see Page 2). The uncertainty is the RSS of the ConvF uncertainty at calibration frequency and the uncertainty for the indicated frequency band.**

Deviation from Isotropy in HSL

Error (ϕ, ϑ), f = 900 MHz



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

APPENDIX G - SAM PHANTOM 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

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