Sony Ericsson

Company Internal
REPORT

Prepared (also subject responsible if other)		No.		
LD/SEMC/BGGIN/NM *Hamid Kami Shirazi*		*BGGIN06:052*		
Approved	Checked	Date	Rev	Reference
LD/SEMC/BGGI/NM *Ramadan Plicanic*	*060303*	*060216*	A	File

Report issued by Accredited SAR Laboratory

For

PY7A1042011 (J230a)

Date of test: *09, to 15, Feb. 2006*

Laboratory:
Sony Ericsson SAR Test Laboratory
Sonyericsson Mobile Communications AB
Nya Vattentornet
SE-221 82 LUND, Sweden

Testing Engineer:
Hamid Kami Shirazi
Kami.Shirazi@sonyericsson.com
+46 46 232644

Testing Approval
Ramadan Plicanic
Ramadan.Plicanic@sonyericsson.com
+46 46 19 38 62

Statement of Compliance
Sony Ericsson Mobile Communications AB declares under its sole responsibility that the product

Sony Ericsson Type AAA-1042011-BV; FCC ID: PY7A1042011; IC:4170B-A1042011

to which this declaration relates, is in conformity with the appropriate RF exposure standards recommendations and guidelines. It also declares that the product was tested in accordance with the appropriate measurement standards, guidelines and recommended practices. Any deviations from these standards, guidelines and recommended practices are noted below:
(None)

This laboratory is accredited to ISO/IEC 17025 (SWEDAC accreditation no. 1847).

Laboratories are accredited by the Swedish Board for Accreditation and Conformity Assessment (SWEDAC) under the terms of Swedish legislation. The accredited laboratory activities meet the requirements in SS-EN ISO/IEC 17025 (2000). This report may not be reproduced other than in full, except with the prior written approval of the issuing laboratory.
The results and statements contained herein relate only to the items tested. The names of individuals involved may be mentioned only in connection with the statements or results from this report.

Sony Ericsson encourages all feedback, both positive and negative, on this report.

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1 Table of contents

2 Introduction

In this test report, compliance of the Sony Ericsson PY7A1042011 (J230a) portable telephone with RF safety guidelines is demonstrated. The applicable RF safety guidelines and the SAR measurement specifications used for the test are described in the *SAR Measurement Specifications of Wireless Handsets* [1].

3 Device under Test

3.1 Antenna Description

Type	Internal antenna	
Location	Inside, Back, at the Top	
Dimensions	Max length	38mm
	Max width	16mm
Configuration	PIFA	

3.2 Device description

Device model	**PY7A1042011(J230a)**					
Serial number	**WUJI00010G**					
Mode	**GSM 850**	**GSM 850 GPRS1TX**		**GSM1900**	**GSM1900 GPRS1TX**	
Crest Factor	**8**	**8**		**8**	**8**	
Multiple Access Scheme	**TDMA**			**TDMA**		
Maximum Output Power Setting (dBm)	**Ch128**	**Ch190**	**Ch251**	**Ch512**	**Ch661**	**Ch810**
	32.7	**32.0**	**32.5**	**29.6**	**29.6**	**29.8**
Factory Tolerance in Power Setting	**±0.5dBm**			**±0.5dBm**		
Maximum Peak Output Power (dBm)	**33.2**	**32.5**	**33.0**	**30.1**	**30.1**	**30.3**
Transmitting Frequency Range(MHz)	**824.2-848.8**			**1850.2 – 1909.8**		
Prototype or Production Unit	**Preproduction HW P1F**					
Device Category	**Portable**					
RF exposure environment	**General population / uncontrolled**					

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4 Test equipment

4.1 Dosimetric system

SAR measurements were made using the DASY3 professional system (software version 3.1c) with SAM twin phantom, manufactured by Schmid & Partner Engineering AG (SPEAG). The list of calibrated equipment is given below.

Description	***Serial Number***	***Due Date***
DASY3 DAE V1	419	March 2006
E-field probe ETDV6	1585	March 2006
Dipole Validation Kit, D835V2	484	March 2007
Dipole Validation Kit, D1900V2	5d002	March 2007

4.2 Additional equipment

Description	***Inventory Number***	***Due Date***
Signal generator R&S SML03	INV 20007667	Dec. 2007
Power meter R&S NRVZ	INV 20007669	Dec. 2007
Power sensor R&S NRV-Z5	INV 20007672	Dec. 2007
Power sensor R&S NRV-Z5	INV 20007673	Dec. 2007
Network analyzer HP8753C	INV421671	Nov. 2006
S-parameter test set HP85047A	INV 421670	Nov. 2006
Dielectric probe kit HP8507D	INV 200 000 53	Self calibrated
CMU200	INV 20002149	Mars. 2006

5 Electrical parameters on the tissue simulating liquid

Prior to conducting SAR measurements, the relative permittivity, ε_r, and the conductivity, σ, of the tissue simulating liquids were measured with the dielectric probe kit. These values are shown in the table below. The mass density, ρ, entered into the DASY3 software is also given. Recommended limits for permittivity ε_r, conductivity σ and mass density ρ are also shown.

f (MHz)	Tissue type	Limits / Measured	Dielectric Parameters		
			ε_r	σ (S/m)	ρ (g/cm³)
850	Head	Measured, 09/Feb/2006	40.9	0.86	1.00
		Recommended	41.5	0.90	1.00
	Body	Measured, 14/Feb/2006	55.2	1.00	1.00
		Recommended	55.2	0.97	1.00
1900	Head	Measured, 10/Feb/2006	40.0	1.47	1.00
		Recommended	40.0	1.40	1.00
	Body	Measured, 15/Feb./2006	51.3	1.53	1.00
		Recommended	53.3	1.52	1.00

6 System accuracy verification

A system accuracy verification of the DASY3 was performed using the dipole validation kit listed in section 3.1. Measurement made in ambient temperature (22-23) °C and humanity (25-30) %. The obtained results are displayed in the table below.

RF noise had been measured in liquid when all RF equipment in lab was set off. Measured value was 0.0002mW/g in 1g mass

f (MHz)	Tissue type	Measured / Reference	SAR (W/kg) 1g/10g	Dielectric Parameters			Liquid t(°C)
				ε_r	σ (S/m)	ρ (g/cm³)	
850	Head	Measured, 09/Feb/2006	9.54/6.16	40.9	0.86	1.00	22±0.2
		Reference	9.08/5.96	42.2	0.91	1.00	22±0.2
	Body	Measured, 14/Feb/2006	10.0/6.42	55.2	1.00	1.00	22±0.2
		Reference	9.48/6.24	54.9	1.01	1.00	22±0.2
1900	Head	Measured, 10/Feb/2006	40.0/20.5	40.0	1.47	1.00	22±0.2
		Reference	39.2/20.6	39.6	1.45	1.00	22±0.2
	Body	Measured, 15/Feb./2006	40.7/21.1	51.3	1.53	1.00	22±0.2
		Reference	39.6/20.9	51.6	1.58	1.00	22±0.2

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7 SAR measurement uncertainty

SAR measurement uncertainty evaluation for Sonyericsson PY7A1042011 (J230a) phone

Uncertainty Component	Uncer. (%)	Prob Dist.	Div.	C_i	GSM 850-Head	GSM 850-Body	GSM 1900-Head	GSM 1900-Body
Measurement System								
Probe Calibration	±4.8	N	1	1	±4.8	±4.8	±4.8	±4.8
Axial Isotropy	±4.7	R	√3	0.7	±1.9	±1.9	±1.9	±1.9
Spherical Isotropy	±9.6	R	√3	0.7	±3.9	±3.9	±3.9	±3.9
Boundary effect	±1.0	R	√3	1	±1.0	±1.0	±1.0	±1.0
Probe linearity	±4.7	R	√3	1	±2.7	±2.7	±2.7	±2.7
Detection limit	±1.0	R	√3	1	±0.6	±0.6	±0.6	±0.6
Readout electronics	±1.0	N	1	1	±1.0	±1.0	±1.0	±1.0
Response time	±0.8	R	√3	1	±0.5	±0.5	±0.5	±0.5
Integration time	±1.4	R	√3	1	±0.8	±0.8	±0.8	±0.8
RF Ambient Conditions	±3.0	R	√3	1	±1.7	±1.7	±1.7	±1.7
Mech. Constraints of robot	±0.4	R	√3	1	±0.2	±0.2	±0.2	±0.2
Probe positioning	±2.9	R	√3	1	±1.7	±1.7	±1.7	±1.7
Extrap, interpolation and integration	±3.9	R	√3	1	±2.3	±2.3	±2.3	±2.3
Measurement System Uncertainty					***±8.0***	***±8.0***	***±8.0***	***±8.0***
Test Sample Related								
Device positioning	±3.5	N	1	1	±3.5	±3.5	±3.5	±3.5
Device holder uncertainty	±3.5	N	1	1	±3.5	±3.5	±3.5	±3.5
Power drift	-(0.2/2.8/0.5/1.2)	R	√3	1	-0.1	-1.6	-0.3	-0.7
Test Sample Related Uncertainty					***±5.0***	***±5.2***	***±5.0***	***±5.0***
Phantom and Tissue Parameters								
Phantom uncertainty	±4.0	R	√3	1	±2.3	±2.3	±2.3	±2.3
Liquid conductivity (meas)	±(4.4/3.5/5.0/0.7)	N	1	0.64	-2.8	+2.2	+3.2	-0.5
Liquid conductivity (target)	±5.0	R	√3	0.64	±1.8	±1.8	±1.8	±1.8
Liquid Permittivity (meas)	±(1.4/0.0/0.0/3.8)	N	1	0.6	-0.8	±0.0	±0.0	±2.3
Liquid Permittivity (target)	±5.0	R	√3	0.6	±1.7	±1.7	±1.7	±1.7
Phantom and Tissue Parameters Uncertainty					***±4.5***	***±4.0***	***±4.7***	***±4.1***
Combined standard uncertainty					***±10.5***	***±10.4***	***±10.5***	***±10.3***
Extended standard uncertainty (k=2)					***±21.0***	***±20.8***	***±21.0***	***±20.6***

8 Test results

The measured 1-gram and averaged SAR values of the device against the head are provided in Table 1 and body are provided in Table 2. The ambient humidity and temperature of test facility were 22%-23% and 22°C–23°C respectively. The depth of the head and body tissue simulating liquid are 15.5cm and 15cm. A base station simulator was used to control the device during the SAR measurement. The phone was supplied with full-charged battery for each measurement.

For head measurement, the device was tested on the right-hand phantom (corresponding to the right side of the head) and the left-hand phantom in two phone position, cheek (touch) and tilt (cheek + 15deg).

For body measurement phone was tested either the antenna (back) or Front against flat section of the phantom the phantom in both speech and GPRS 1 TX mode and with 15mm distance against flat section of the phantom. For all modes, the device was tested at the lowest, middle and highest frequencies in the transmit band. For hands free measurement a Sony Ericsson head set (HPB-60) is used in order to do the Measurements.

Mode	Channel	Power (dBm)	Phone Position	Liquid t (°C)	SAR (1g) mass (W/kg)	
					Right-hand	Left-hand
1900 GSM Head	512	30.1	Cheek	22±0.2	0.37	0.48
			Tilt	22±0.2	0.37	0.41
	661	30.1	Cheek	22±0.2	0.43	**0.52**
			Tilt	22±0.2	0.45	0.46
	810	30.2	Cheek	22±0.2	0.33	0.40
			Tilt	22±0.2	0.32	0.37
850 GSM Head	128	33.2	Cheek	22±0.2	1.05	0.90
			Tilt	22±0.2	0.57	0.70
	190	32.4	Cheek	22±0.2	1.24	1.16
			Tilt	22±0.2	0.78	0.88
	251	33.0	Cheek	22±0.2	1.35	**1.37**
			Tilt	22±0.2	0.82	0.91

Table1: SAR measurement result for Sony Ericsson PY7A1042011 (J230a) telephone at highest possible output power. The phone has measured against the head.

Mode	Channel	Power (dBm)	Phone Position	Liquid t (°C)	SAR (W/kg) in 1 g mass
GSM 1900 Body	512	30.1	Antenna to phantom, GPRS 1 Slots	22±0.2	0.85
			Antenna to phantom hands free	22±0.2	0.86
	661	30.1	Front to phantom hands free	22±0.2	0.12
			Antenna to phantom hands free	22±0.2	**1.10**
			Antenna to phantom, GPRS 1 Slots	22±0.2	**1.00**
	810	30.2	Antenna to phantom, GPRS 1 Slots	22±0.2	0.70
			Antenna to phantom hands free	22±0.2	0.71
GSM 850 Body	128	33.5	Front to phantom	22±0.2	0.37
			Antenna to phantom hand free	22±0.2	0.54
			Antenna to phantom, GPRS 1 Slots	22±0.2	**0.93**
	190	32.8	Front to phantom	22±0.2	0.57
			Antenna to phantom	22±0.2	0.86
			Antenna to phantom, GPRS 1 Slots	22±0.2	0.85
	251	33.4	Front to phantom	22±0.2	0.48
			Antenna to phantom	22±0.2	0.65
			Antenna to phantom, GPRS 1 Slots	22±0.2	0.65

Table2: SAR measurement result for Sony Ericsson PY7A1042011 (J230a) telephone at highest possible output power. The phone has measured against the body.

9 References

[1 R.Plicanic, “SAR Measurement Specification of Wireless Handsets”, Sony Ericsson SAR Test Laboratory internal document GUG/N 03:141

[2] Basic standard for the Measurement of Specific Absorption Rate related to human exposure to electromagnetic fields from mobile phones (300MHz-3GHz), European Standard EN 50361, July 2001

[3] FCC, “Evaluating Compliance with FCC Guidelines for Human Exposure to Radio Frequency Electromagnetic Fields: Additional Information for Evaluating Compliance of Mobile and Portable Devices with FCC Limits for Human Exposure to Radio Frequency Emissions,” Supplement C (Edition 01-01) to OET Bulletin 65 (Edition 97- 01).

[4] IEEE, “Recommended Practice for Determining the Peak Spatial-Average Specific Absorption Rate (SAR) in the Human Body Due to Wireless Communications Devices: Experimental Techniques,” STD 1528-2003, June, 2003.

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10 Appendix

10.1 Photographs of the device under test

Front & Back sides

Battery & Back

Down Connector

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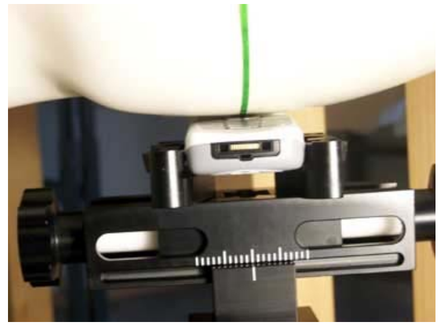
10.2 Device position on SAM Twins Phantom



Device position against the head: Cheek (touch) phone position

Device position against the head: Tilt (cheek+15deg) phone position

Device position against the body: Phone with 15mm distance against flat section of the phantom.

10.3 Attachment

- Probe & Dipole Calibration
- Measurement plots and system validation
- Annex

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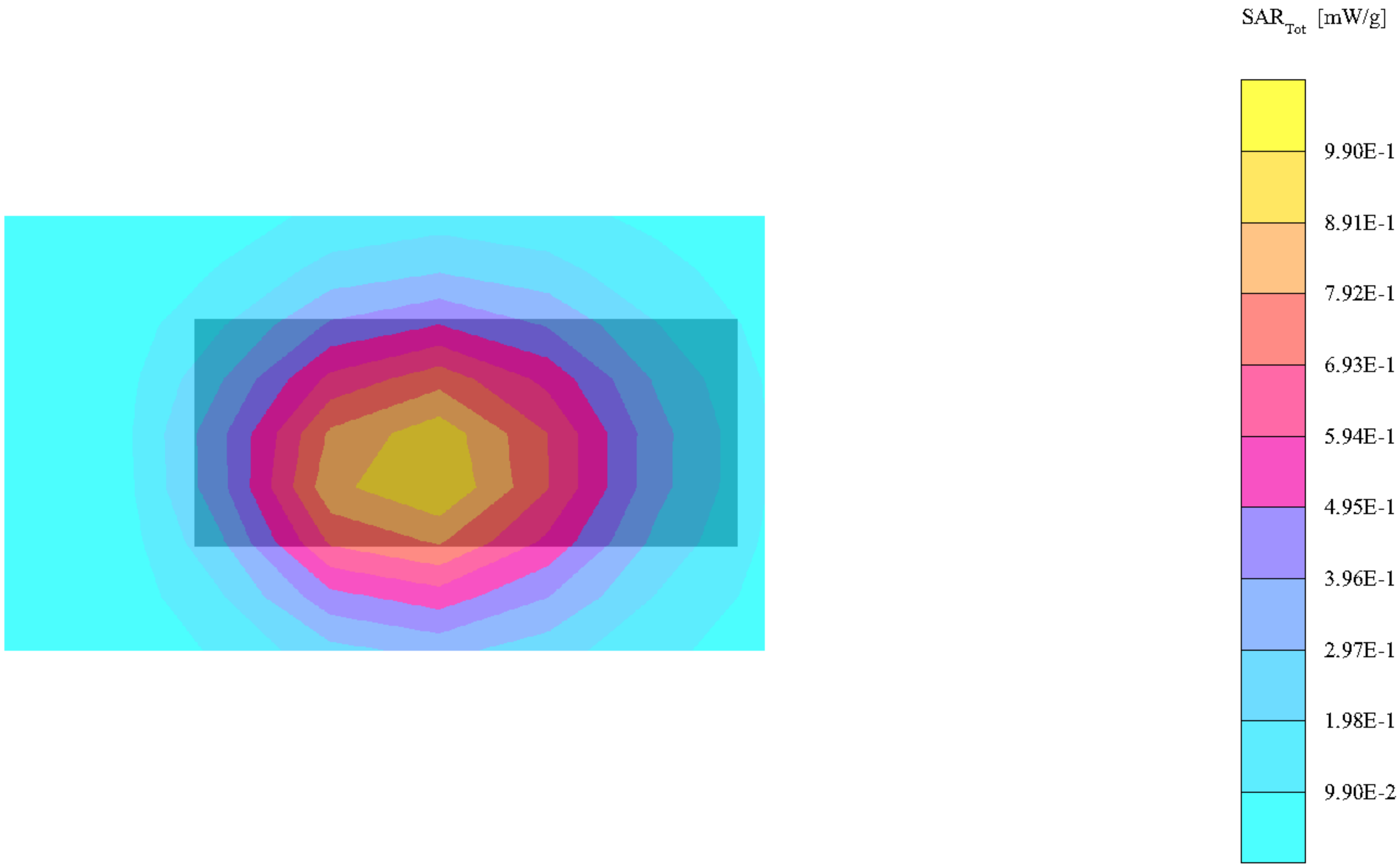
PY7A1042011

SAM 3 Phantom; Flat Section; Position: (270°,90°); Frequency: 824 MHz
Probe: ET3DV6 - SN1585; ConvF(6.65,6.65,6.65); Crest factor: 8.3; Muscle 835: σ = 1.00 mho/m ε_r = 55.2 ρ = 1.00 g/cm³
Cube 5x5x7: SAR (1g): 0.953 mW/g, SAR (10g): 0.659 mW/g, (Worst-case extrapolation)
Coarse: Dx = 10.0, Dy = 20.0, Dz = 10.0
Powerdrift: -0.12 dB
Fia;PY7A1042011;S/N:WUJI00010G,P1F,Frequevcy 824.2MHz(ch128),Back Phone + 15mm distance from flat section of phantom, meas. Power=33,1dBm, Nom.Power=33.2dBm;ambien temprature 22(c-degree)and humidity 22%;. Date:060214



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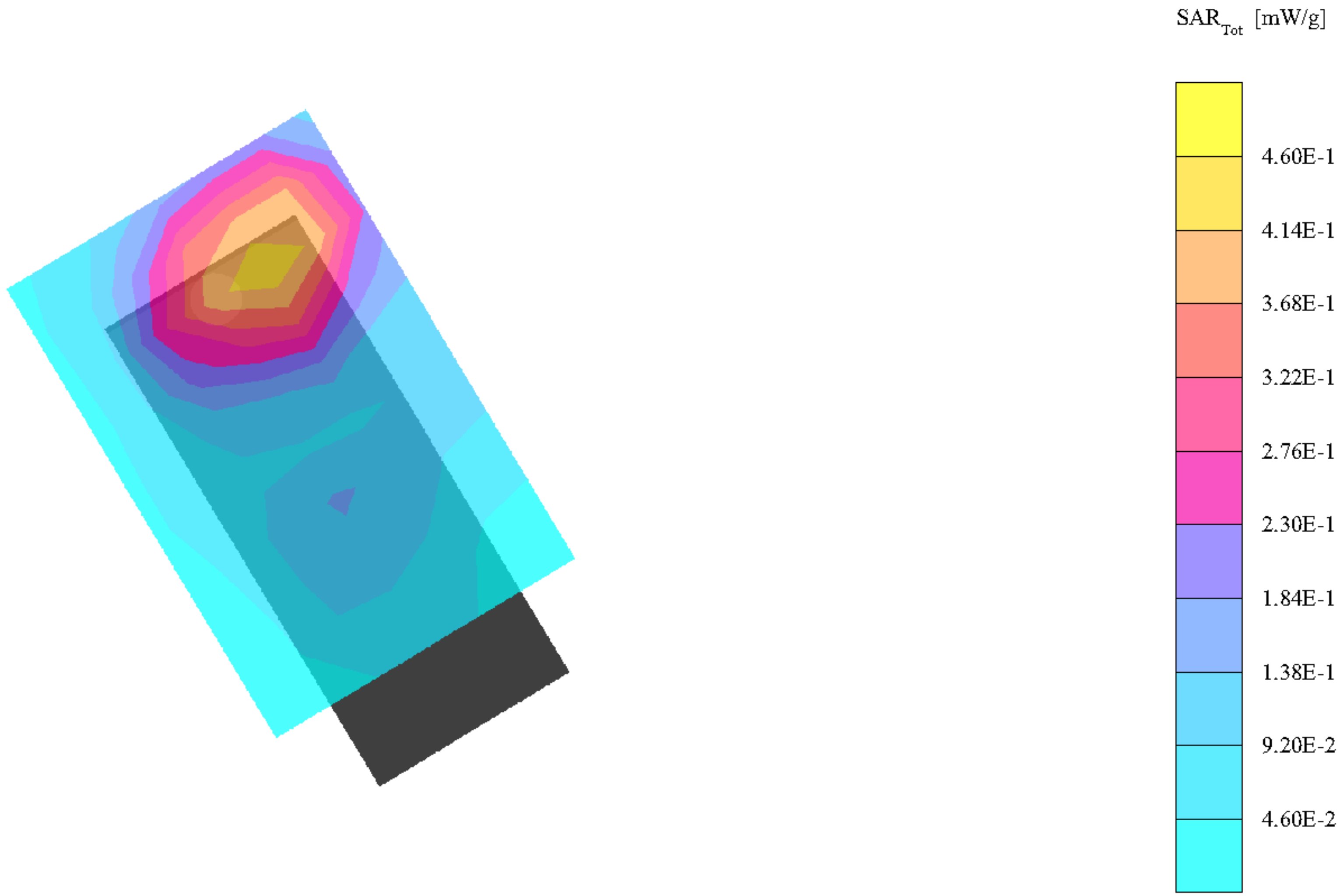
SAM 4 Phantom; Righ Hand Section; Position: (93°,301°); Frequency: 1880 MHz
Probe: ET3DV6 - SN1585; ConvF(5.03,5.03,5.03); Crest factor: 8.3; Head 1900MHz: σ = 1.47 mho/m ε_r = 40.0 ρ = 1.00 g/cm³
Cube 5x5x7: SAR (1g): 0.431 mW/g, SAR (10g): 0.246 mW/g, (Worst-case extrapolation)
Coarse: Dx = 11.0, Dy = 11.0, Dz = 10.0
Powerdrift: 0.00 dB
Fia;PY7A1042011;S/N:WUJI00010G,P1F,Frequevcy 1880MHz(ch661),Right
Hand Side,Cheek(93°) Phone Position, meas. Power=30.1dBm, Nom.Power=30.1dBm;
ambien temprature 23(c-degree)and humidity 25%,Date:060210



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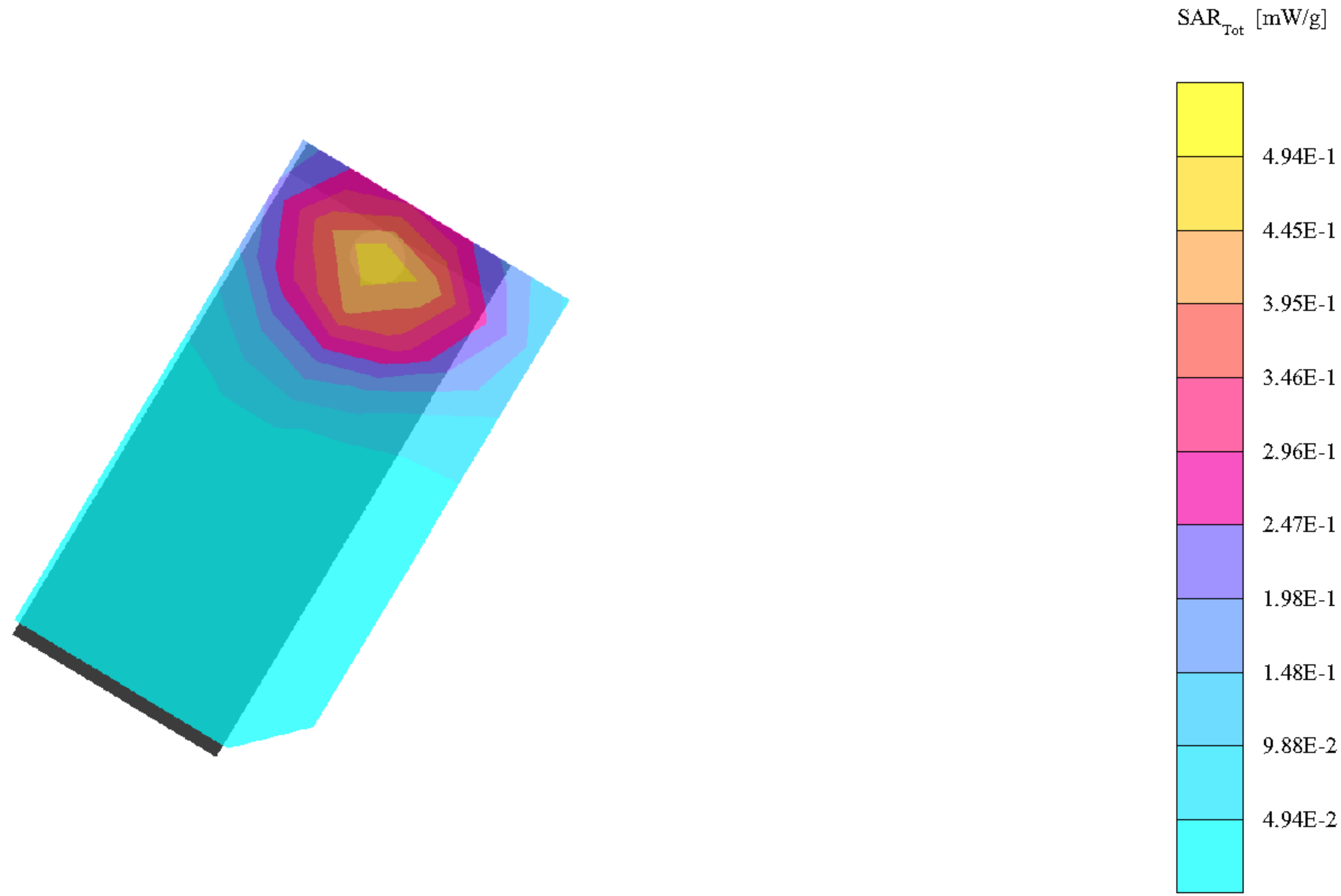
SAM 4 Phantom; Left Hand Section; Position: (108°,59°); Frequency: 1880 MHz
Probe: ET3DV6 - SN1585; ConvF(5.03,5.03,5.03); Crest factor: 8.3; Head 1900MHz: $\sigma = 1.47$ mho/m $\varepsilon_r = 40.0$ $\rho = 1.00$ g/cm³
Cube 5x5x7: SAR (1g): 0.458 mW/g, SAR (10g): 0.258 mW/g, (Worst-case extrapolation)
Coarse: Dx = 11.0, Dy = 11.0, Dz = 11.0
Powerdrift: -0.04 dB
Fia;PY7A1042011;S/N:WUJI00010G,P1F,Frequevcy 1880MHz(ch661),Left
Hand Side,Tilt(108°) Phone Position, meas. Power=30.1dBm, Nom.Power=30.1dBm;
ambien temprature 23(c-degree)and humidity 25%,Date:060210



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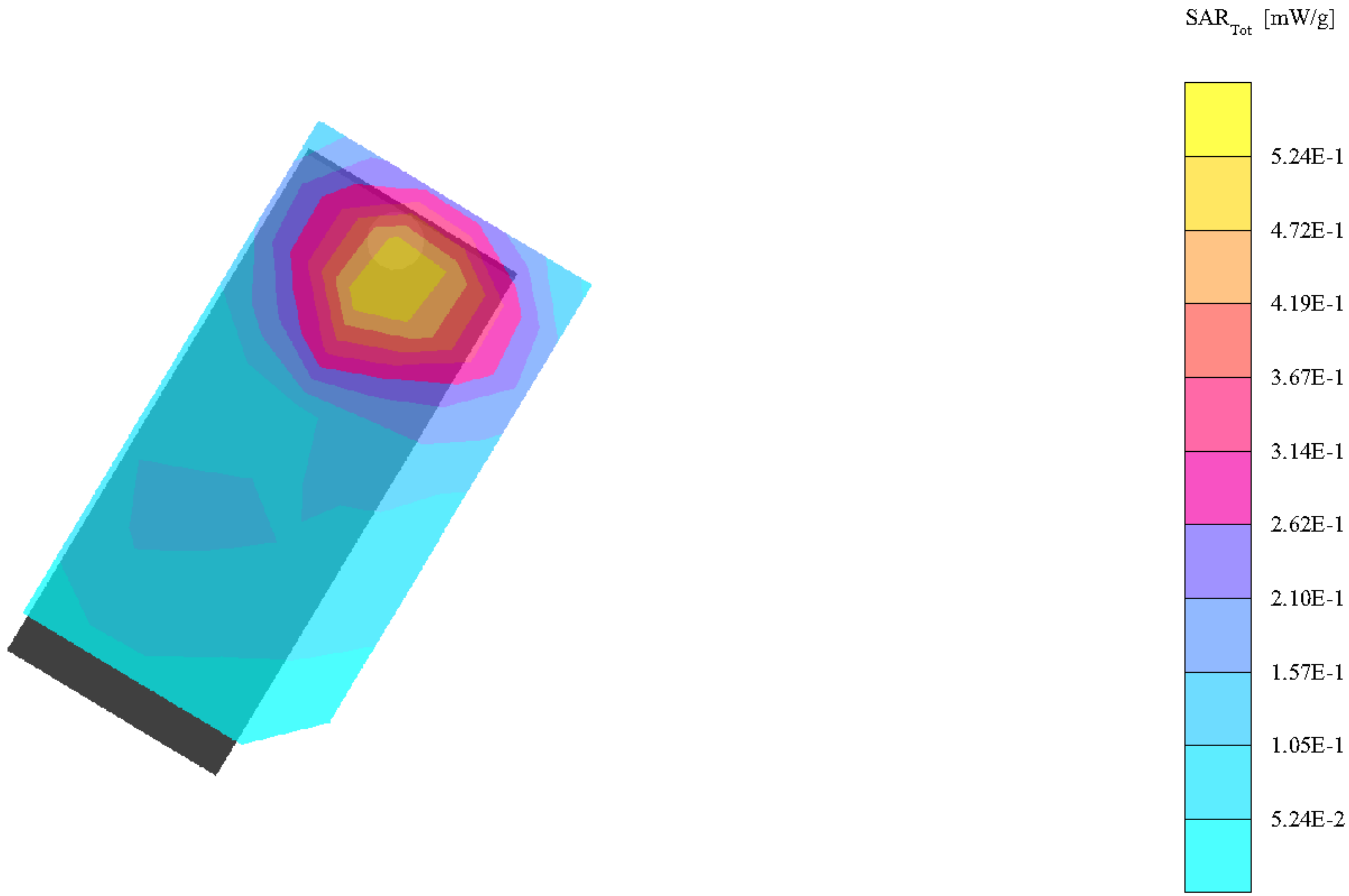
SAM 4 Phantom; Left Hand Section; Position: (93°,59°); Frequency: 1850 MHz
Probe: ET3DV6 - SN1585; ConvF(5.03,5.03,5.03); Crest factor: 8.3; Head 1900MHz: σ = 1.47 mho/m ε_r = 40.0 ρ = 1.00 g/cm³
Cube 5x5x7: SAR (1g): 0.517 mW/g, SAR (10g): 0.284 mW/g, (Worst-case extrapolation)
Coarse: Dx = 11.0, Dy = 11.0, Dz = 11.0
Powerdrift: -0.02 dB
Fia;PY7A1042011;S/N:WUJI00010G,P1F,Frequevcy 1880MHz(ch661),Left
Hand Side,Cheek(93°) Phone Position, meas. Power=30.1dBm, Nom.Power=30.1dBm;
ambien temprature 23(c-degree)and humidity 25%,Date:060210



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SAM 4 Phantom; Flat Section; Position: (270°,90°); Frequency: 1880 MHz

Probe: ET3DV6 - SN1585; ConvF(4.62,4.62,4.62); Crest factor: 8.3; Muscle 1900: σ = 1.53 mho/m ε_r = 51.3 ρ = 1.00 g/cm³

Cube 5x5x7: SAR (1g): 0.116 mW/g, SAR (10g): 0.0709 mW/g, (Worst-case extrapolation)

Coarse: Dx = 15.0, Dy = 15.0, Dz = 10.0

Powerdrift: -0.04 dB

Fia;PY7A1042011;S/N:WUJI00010G,P1F,Frequevcy 1880MHz(ch512),Front Phone + 15mm distance from flat section of phantom, meas. Power=30,1dBm, Nom.Power=30.1dBm;ambien temprature 22(c-degree)and humidity 22%;Hands Free;Date:060215

PY7A1042011

SAM 4 Phantom; Flat Section; Position: (270°,90°); Frequency: 1880 MHz
Probe: ET3DV6 - SN1585; ConvF(4.62,4.62,4.62); Crest factor: 8.3; Muscle 1900: σ = 1.53 mho/m ε_r = 51.3 ρ = 1.00 g/cm³
Cube 5x5x7: SAR (1g): 1.10 mW/g, SAR (10g): 0.589 mW/g, (Worst-case extrapolation)
Coarse: Dx = 15.0, Dy = 15.0, Dz = 10.0
Powerdrift: -0.05 dB
Fia;PY7A1042011;S/N:WUJI00010G,P1F,Frequevcy 1880MHz(ch661),Back Phone + 15mm
distance from flat section of phantom, meas. Power=30,1dBm, Nom.Power=30.1dBm;ambien
temprature 22(c-degree)and humidity 22%;Hands Free;Date:060215

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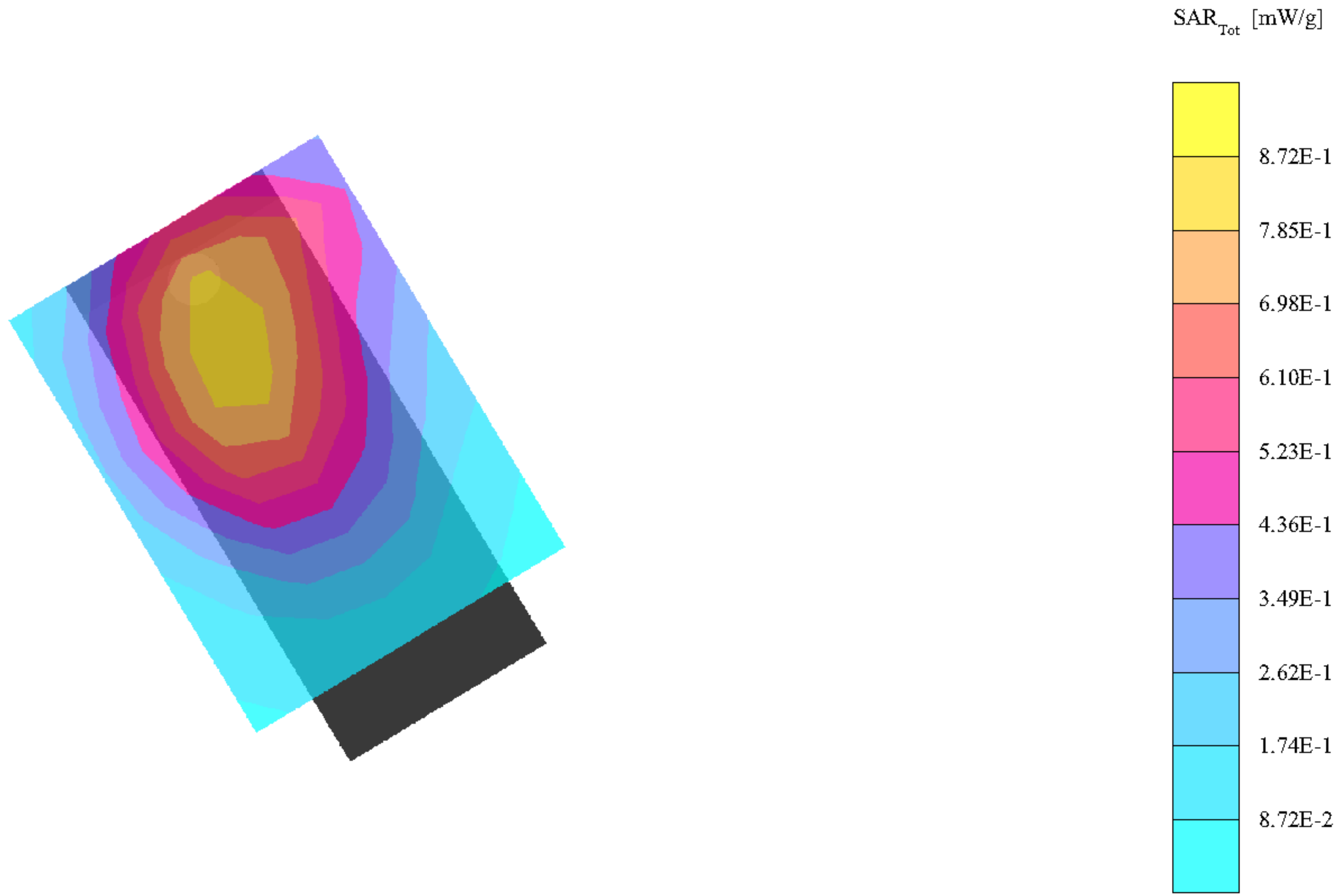
SAM 3 Phantom; Righ Hand Section; Position: (108°,301°); Frequency: 849 MHz
Probe: ET3DV6 - SN1585; ConvF(6.95,6.95,6.95); Crest factor: 8.3; Head 835-900MHz: σ = 0.86 mho/m ε_r = 40.9 ρ = 1.00 g/cm³
Cube 5x5x7: SAR (1g): 0.824 mW/g, SAR (10g): 0.571 mW/g, (Worst-case extrapolation)
Coarse: Dx = 11.0, Dy = 11.0, Dz = 11.0
Powerdrift: -0.02 dB
Fia;PY7A1042011;S/N:WUJI00010G,P1F,Frequevcy 848.8MHz(ch251),Right
Hand Side,Tilt(108°) Phone Position, meas. Power=33.0dBm, Nom.Power=33.0dBm;
ambien temprature 22(c-degree)and humidity 22%,Date:060209



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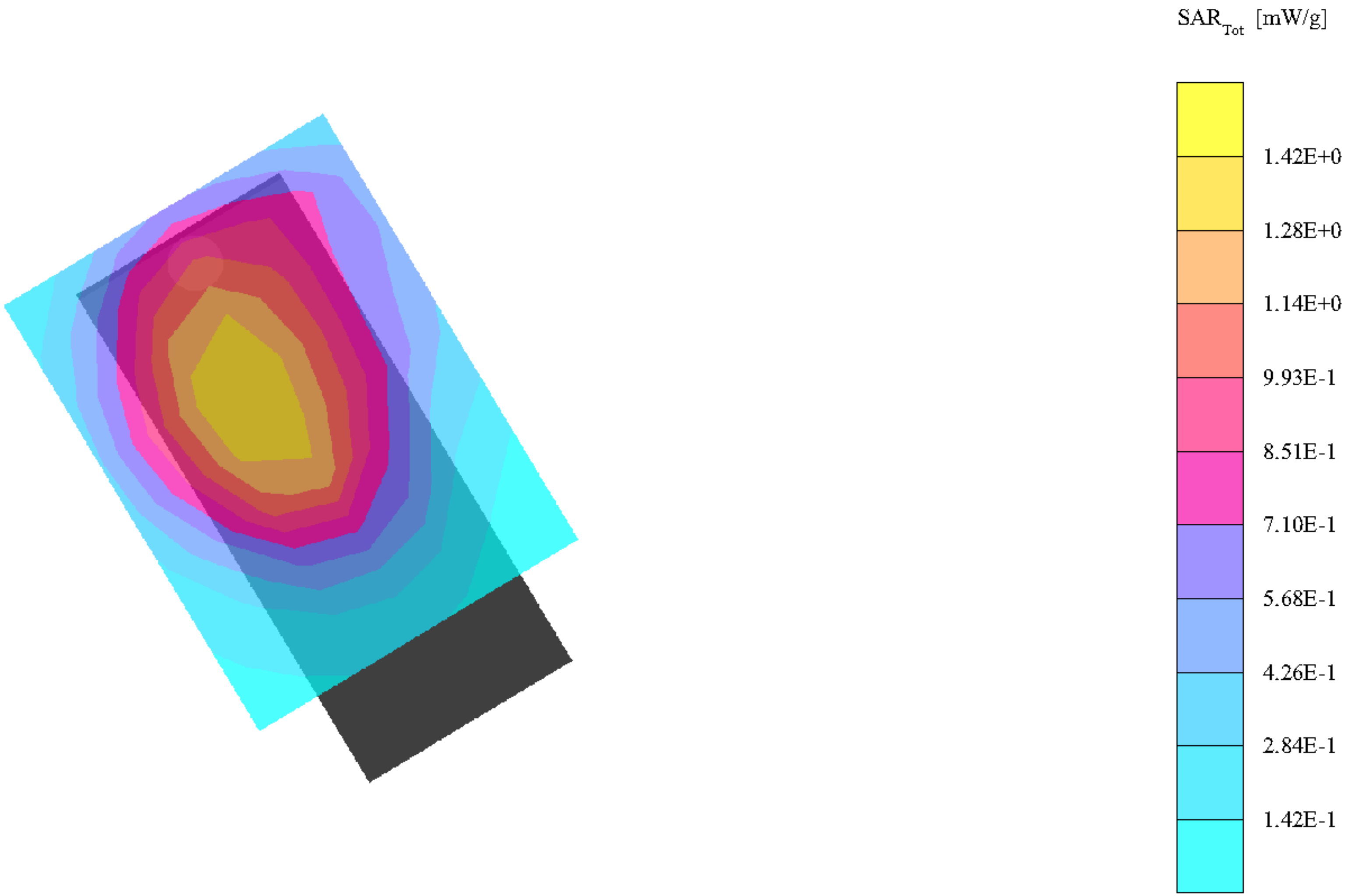
PY7A1042011

SAM 3 Phantom; Righ Hand Section; Position: (93°,301°); Frequency: 849 MHz
Probe: ET3DV6 - SN1585; ConvF(6.95,6.95,6.95); Crest factor: 8.3; Head 835-900MHz: σ = 0.86 mho/m ε_r = 40.9 ρ = 1.00 g/cm³
Cube 5x5x7: SAR (1g): 1.35 mW/g, SAR (10g): 0.931 mW/g, (Worst-case extrapolation)
Coarse: Dx = 11.0, Dy = 11.0, Dz = 11.0
Powerdrift: -0.03 dB
Fia;PY7A1042011;S/N:WUJI00010G,P1F,Frequevcy 848.8MHz(ch251),Right
Hand Side,Cheek(93°) Phone Position, meas. Power=33.0dBm, Nom.Power=33.0dBm;
ambien temprature 22(c-degree)and humidity 22%,Date:060209



02/09/06 Hamid Kami Shirazi

PY7A1042011

SAM 3 Phantom; Left Hand Section; Position: (108°,59°); Frequency: 849 MHz

Probe: ET3DV6 - SN1585; ConvF(6.95,6.95,6.95); Crest factor: 8.3; Head 835-900MHz: σ = 0.86 mho/m ε_r = 40.9 ρ = 1.00 g/cm³

Cube 5x5x7: SAR (1g): 0.912 mW/g, SAR (10g): 0.609 mW/g, (Worst-case extrapolation)

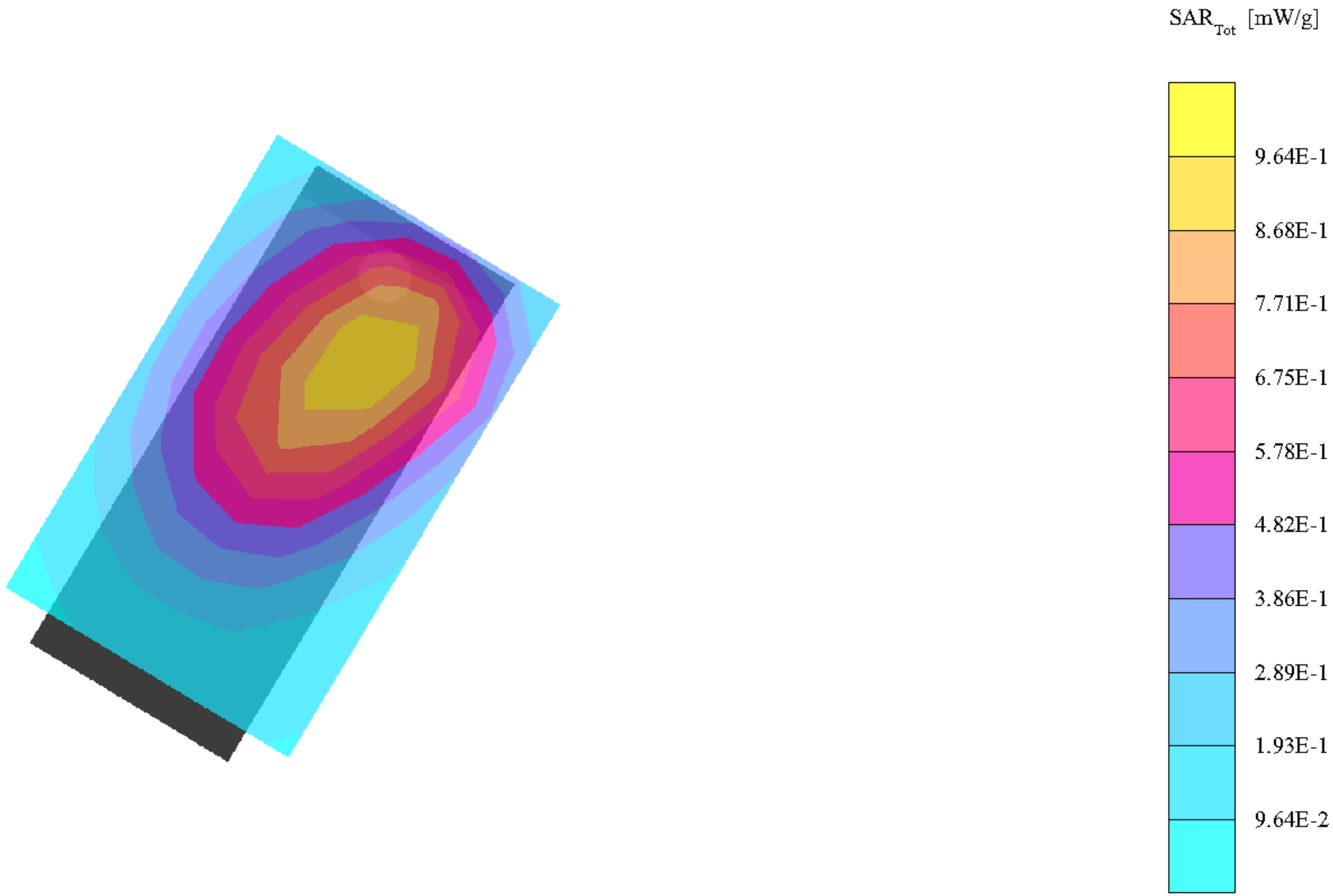
Coarse: Dx = 12.0, Dy = 10.0, Dz = 10.0

Powerdrift: -0.05 dB

Fia;PY7A1042011;S/N:WUJI00010G,P1F,Frequevcy 848.8MHz(ch251),Left

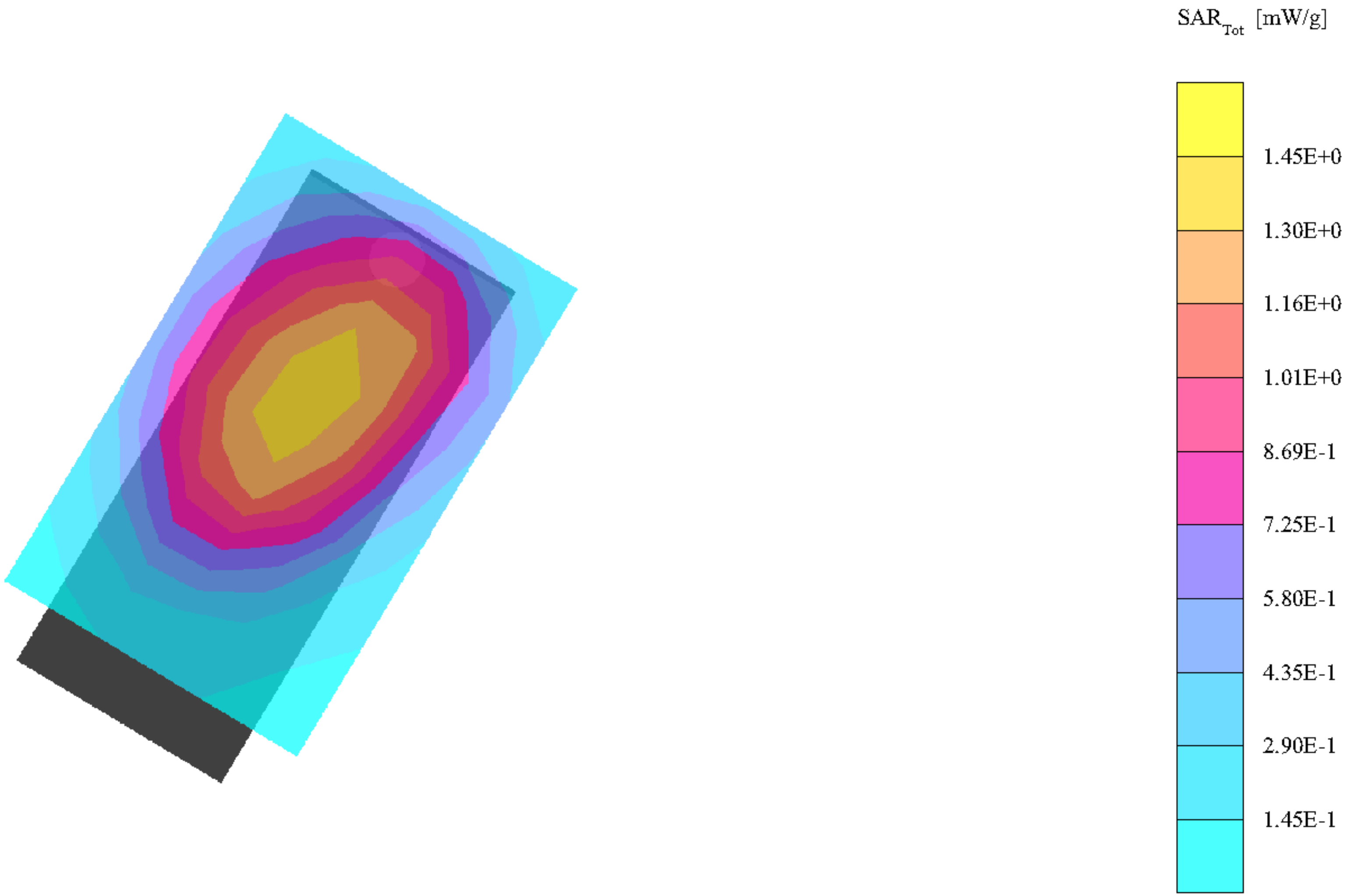
Hand Side,Tilt(108°) Phone Position, meas. Power=33.0dBm, Nom.Power=33.0dBm;

ambien temprature 22(c-degree)and humidity 22%,Date:060209



PY7A1042011

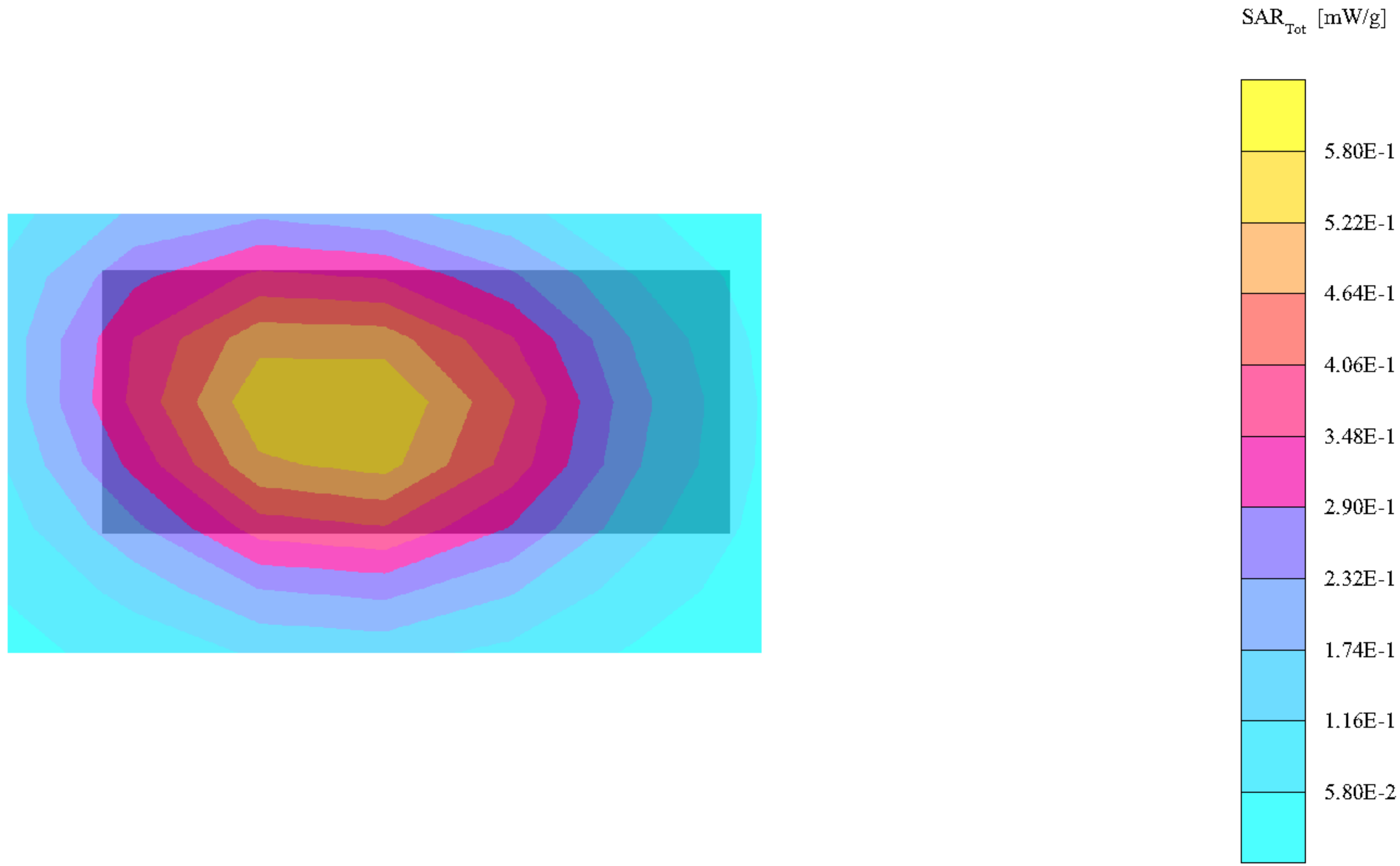
SAM 3 Phantom; Left Hand Section; Position: (93°,59°); Frequency: 849 MHz
Probe: ET3DV6 - SN1585; ConvF(6.95,6.95,6.95); Crest factor: 8.3; Head 835-900MHz: σ = 0.86 mho/m ε_r = 40.9 ρ = 1.00 g/cm³
Cube 5x5x7: SAR (1g): 1.37 mW/g, SAR (10g): 0.928 mW/g, (Worst-case extrapolation)
Coarse: Dx = 12.0, Dy = 10.0, Dz = 10.0
Powerdrift: -0.01 dB
Fia;PY7A1042011;S/N:WUJI00010G,P1F,Frequevcy 848.8MHz(ch251),Left
Hand Side,Cheek(93°) Phone Position, meas. Power=33.0dBm, Nom.Power=33.0dBm;
ambien temprature 22(c-degree)and humidity 22%,Date:060209



02/14/06 Hamid Kami Shirazi

PY7A1042011

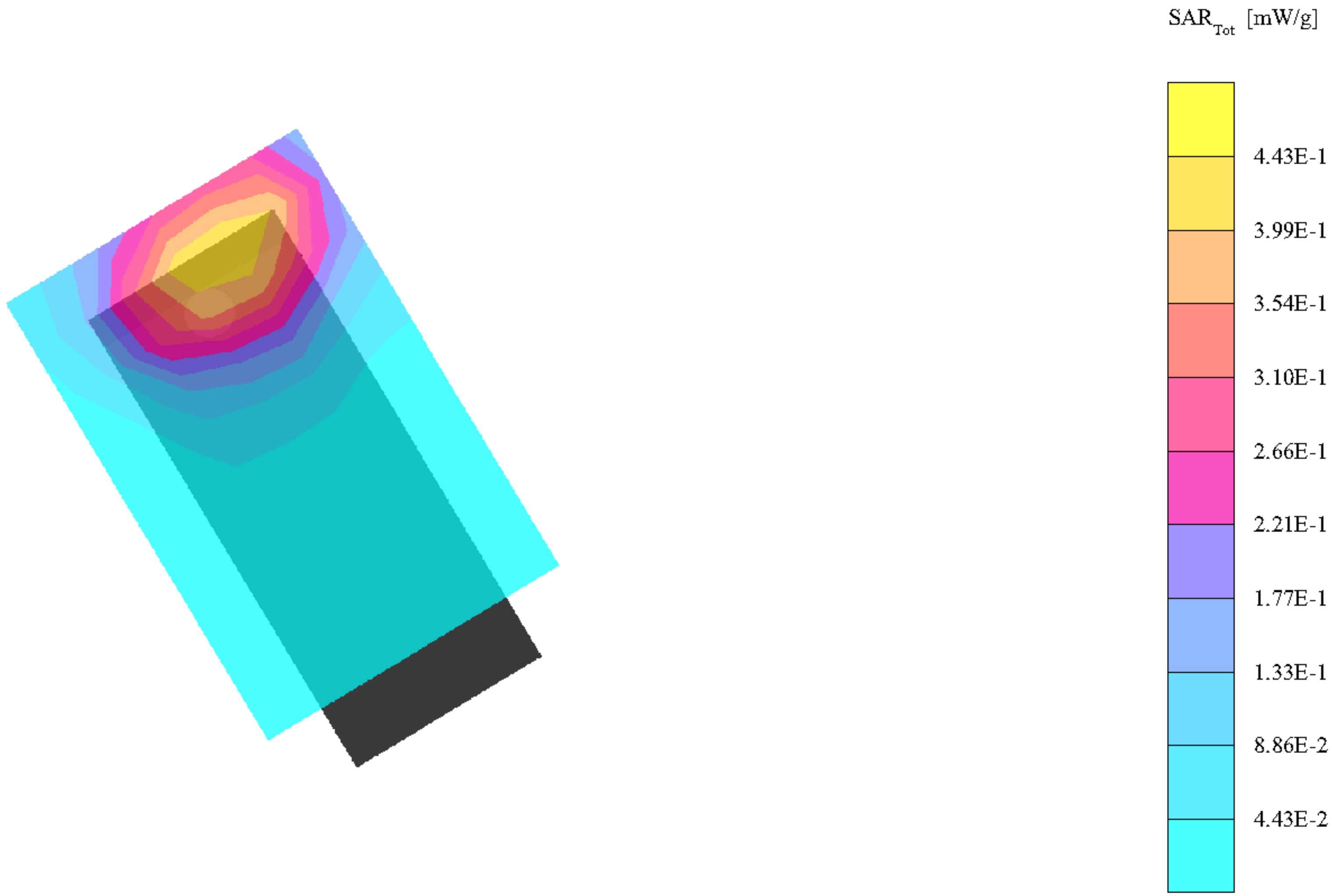
SAM 3 Phantom; Flat Section; Position: (270°,90°); Frequency: 837 MHz
Probe: ET3DV6 - SN1585; ConvF(6.65,6.65,6.65); Crest factor: 8.3; Muscle 835: σ = 1.00 mho/m ε_r = 55.2 ρ = 1.00 g/cm³
Cube 5x5x7: SAR (1g): 0.556 mW/g, SAR (10g): 0.389 mW/g, (Worst-case extrapolation)
Coarse: Dx = 10.0, Dy = 20.0, Dz = 10.0
Powerdrift: -0.12 dB
Fia;PY7A1042011;S/N:WUJI00010G,P1F,Frequevcy 836.6MHz(ch190),Front Phone + 15mm distance from flat section of phantom, meas. Power=32.5dBm, Nom.Power=32.5dBm;ambien temprature 22(c-degree)and humidity 22%;. Date:060214



02/10/06 Hamid Kami Shirazi

PY7A1042011

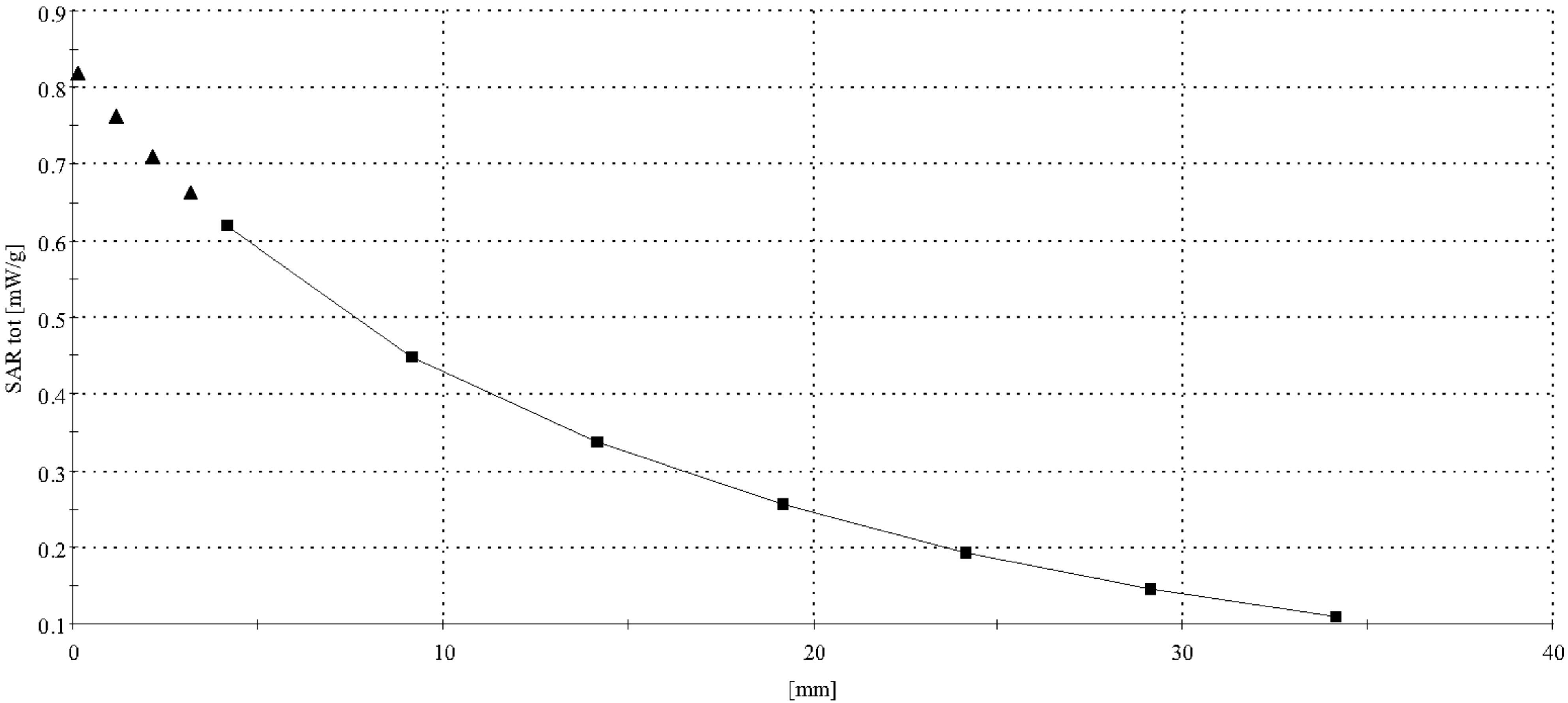
SAM 4 Phantom; Righ Hand Section; Position: (108°,301°); Frequency: 1880 MHz
Probe: ET3DV6 - SN1585; ConvF(5.03,5.03,5.03); Crest factor: 8.3; Head 1900MHz: σ = 1.47 mho/m ε_r = 40.0 ρ = 1.00 g/cm³
Cube 5x5x7: SAR (1g): 0.450 mW/g, SAR (10g): 0.254 mW/g, (Worst-case extrapolation)
Coarse: Dx = 11.0, Dy = 11.0, Dz = 10.0
Powerdrift: -0.05 dB
Fia;PY7A1042011;S/N:WUJI00010G,P1F,Frequevcy 1880MHz(ch661),Right
Hand Side,Tilt(108°) Phone Position, meas. Power=30.1dBm, Nom.Power=30.1dBm;
ambien temprature 23(c-degree)and humidity 25%,Date:060210



PY7A1042011

SAM 3 Phantom; Flat Section; Position: (270°,90°); Frequency: 824 MHz
Probe: ET3DV6 - SN1585; ConvF(6.65,6.65,6.65); Crest factor: 8.3; Muscle 835: $\sigma = 1.00$ mho/m $\varepsilon_r = 55.2$ $\rho = 1.00$ g/cm³
Cube 5x5x7: SAR (1g): 0.927 mW/g, SAR (10g): 0.641 mW/g, (Worst-case extrapolation)
Cube 5x5x7: Dx = 8.0, Dy = 8.0, Dz = 5.0

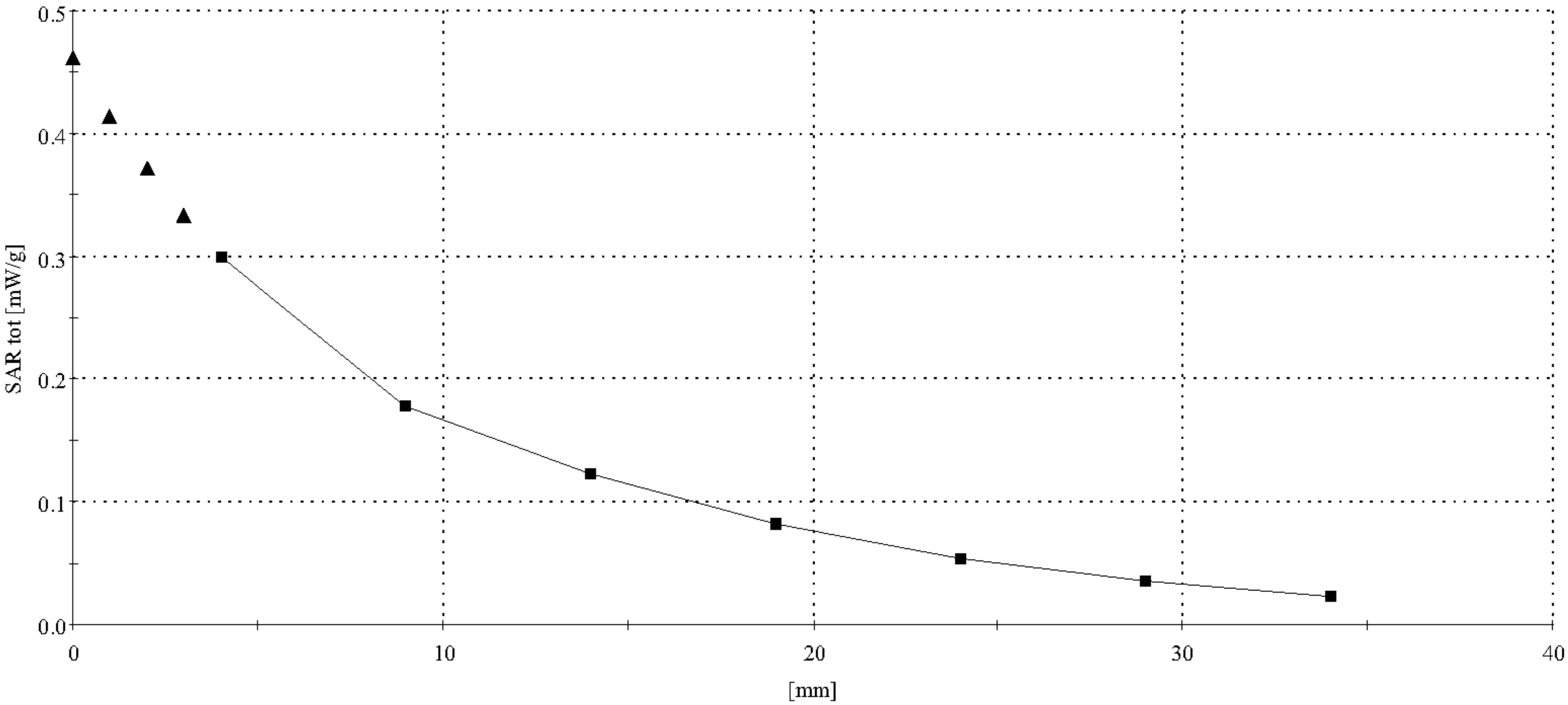
Fia;PY7A1042011;S/N:WUJI00010G,P1F,Frequevcy 824.2MHz(ch128),Back Phone + 15mm distance from flat section of phantom, meas. Power=33,1dBm, Nom.Power=33.2dBm;ambien temprature 22(c-degree)and humidity 22%;. Date:Data Communication 060214



PY7A1042011

SAM 4 Phantom; Flat Section; Position: (270°,90°); Frequency: 1880 MHz
Probe: ET3DV6 - SN1585; ConvF(4.62,4.62,4.62); Crest factor: 8.3; Muscle 1900: $\sigma = 1.53$ mho/m $\varepsilon_r = 51.3$ $\rho = 1.00$ g/cm³
Cube 5x5x7: SAR (1g): 1.00 mW/g, SAR (10g): 0.538 mW/g, (Worst-case extrapolation)
Cube 5x5x7: Dx = 8.0, Dy = 8.0, Dz = 5.0

Fia;PY7A1042011;S/N:WUJI00010G,P1F,Frequevcy 1880MHz(ch661),Back Phone + 15mm distance from flat section of phantom, meas. Power=30,1dBm, Nom.Power=30.1dBm;ambien temprature 22(c-degree)and humidity 22%;;Date:060215



02/09/06 Hamid Kami Shirazi

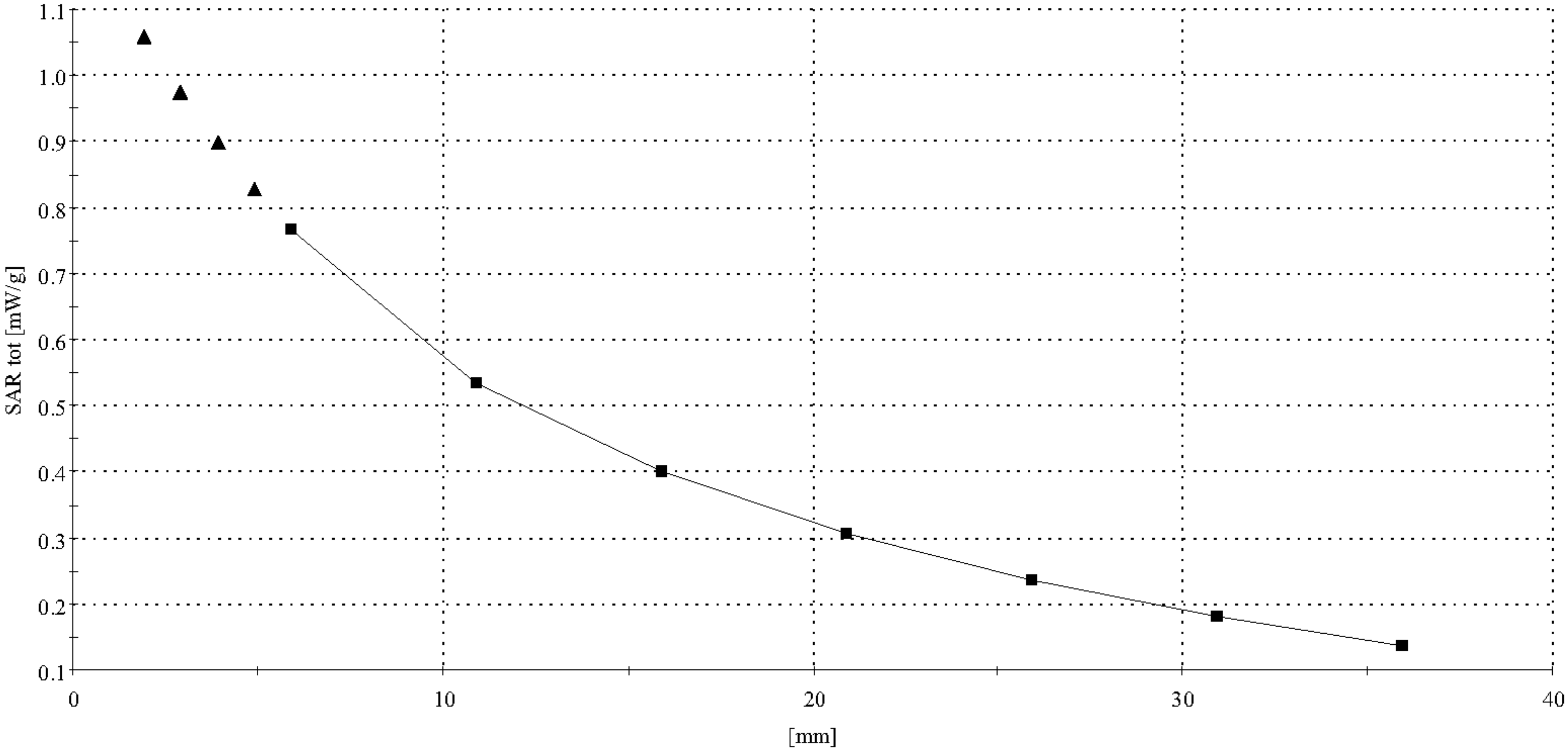
PY7A1042011

SAM 3 Phantom; Righ Hand Section; Position: (93°,301°); Frequency: 837 MHz

Probe: ET3DV6 - SN1585; ConvF(6.95,6.95,6.95); Crest factor: 8.3; Head 835-900MHz: σ = 0.86 mho/m ε_r = 40.9 ρ = 1.00 g/cm³

Cube 5x5x7: SAR (1g): 1.24 mW/g, SAR (10g): 0.858 mW/g, (Worst-case extrapolation)

Cube 5x5x7: Dx = 8.0, Dy = 8.0, Dz = 5.0



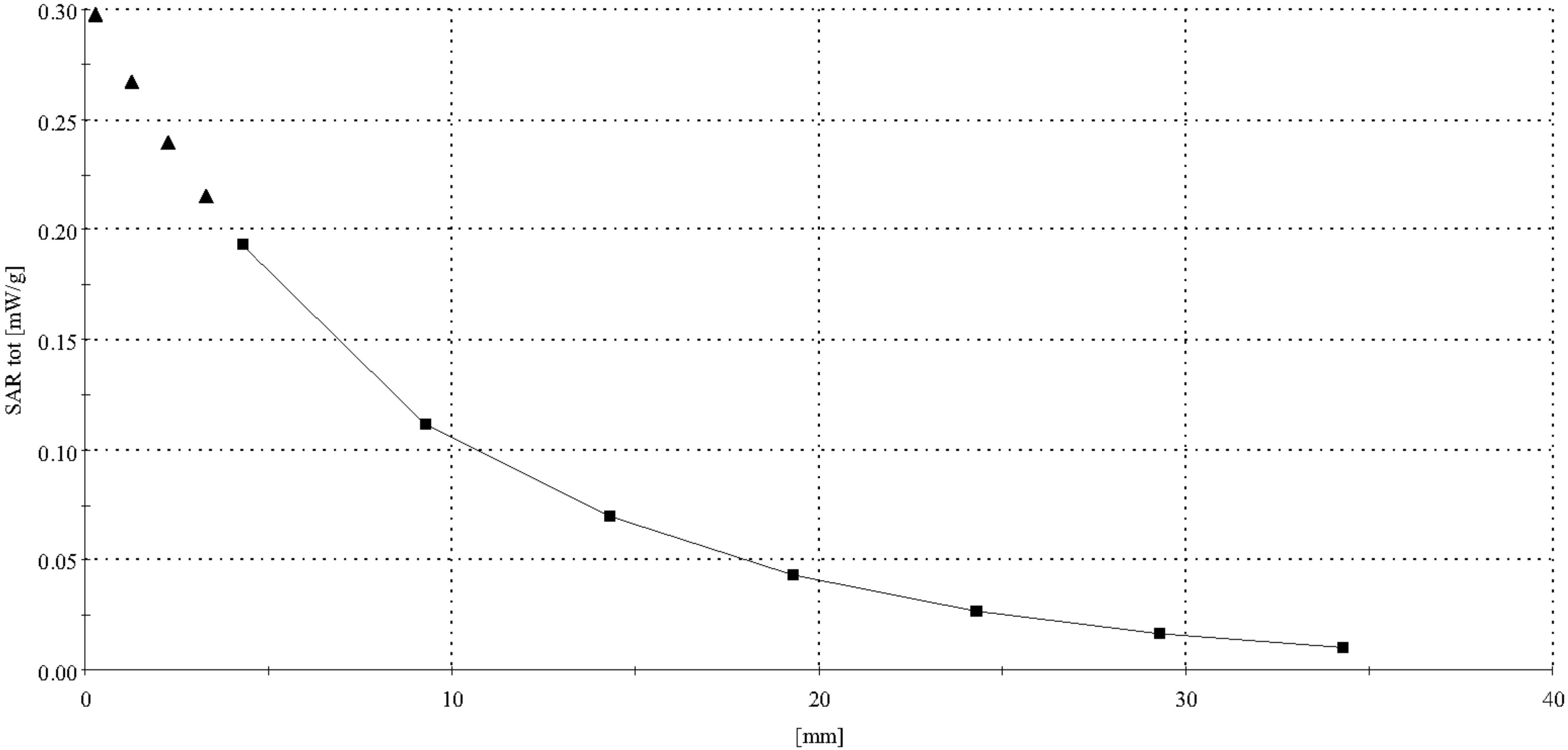
PY7A1042011

SAM 4 Phantom; Left Hand Section; Position: (93°,59°); Frequency: 1850 MHz

Probe: ET3DV6 - SN1585; ConvF(5.03,5.03,5.03); Crest factor: 8.3; Head 1900MHz: σ = 1.47 mho/m ε_r = 40.0 ρ = 1.00 g/cm³

Cube 5x5x7: SAR (1g): 0.483 mW/g, SAR (10g): 0.269 mW/g, (Worst-case extrapolation)

Cube 5x5x7: Dx = 8.0, Dy = 8.0, Dz = 5.0



02/15/06 Hamid Kami Shirazi

D1900 V2

SAM 4 Phantom; Flat Section; Position: (90°,90°); Frequency: 1900 MHz

Probe: ET3DV6 - SN1585; ConvF(4.62,4.62,4.62); Crest factor: 1.0; Muscle 1900: σ = 1.53 mho/m ε_r = 51.3 ρ = 1.00 g/cm³

Cubes (2): SAR (1g): 4.07 mW/g ± 0.03 dB, SAR (10g): 2.11 mW/g ± 0.06 dB, (Worst-case extrapolation)

Coarse: Dx = 17.0, Dy = 17.0, Dz = 17.0

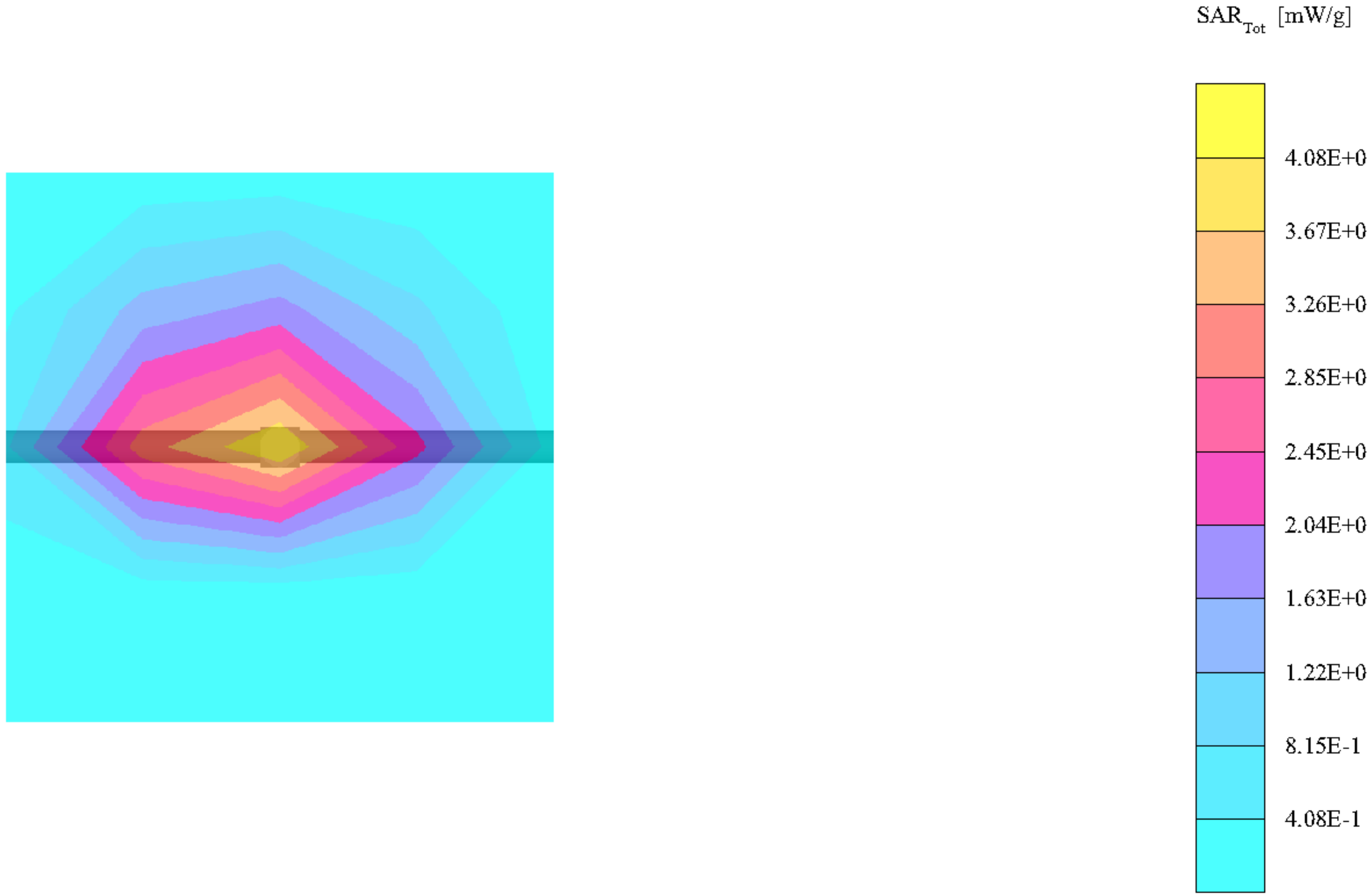
Powerdrift: -0.03 dB

P=100mW, d=10mm, 1900MHz dipol D1900V2 s/n 5d002

Target values: 1g mass 39.6 mW/g, 10g mass 20.9 mW/g

Measured values: 1g mass 40.7mW/g(+2.8%), 10g mass 21.1mW/g(+1.0%)

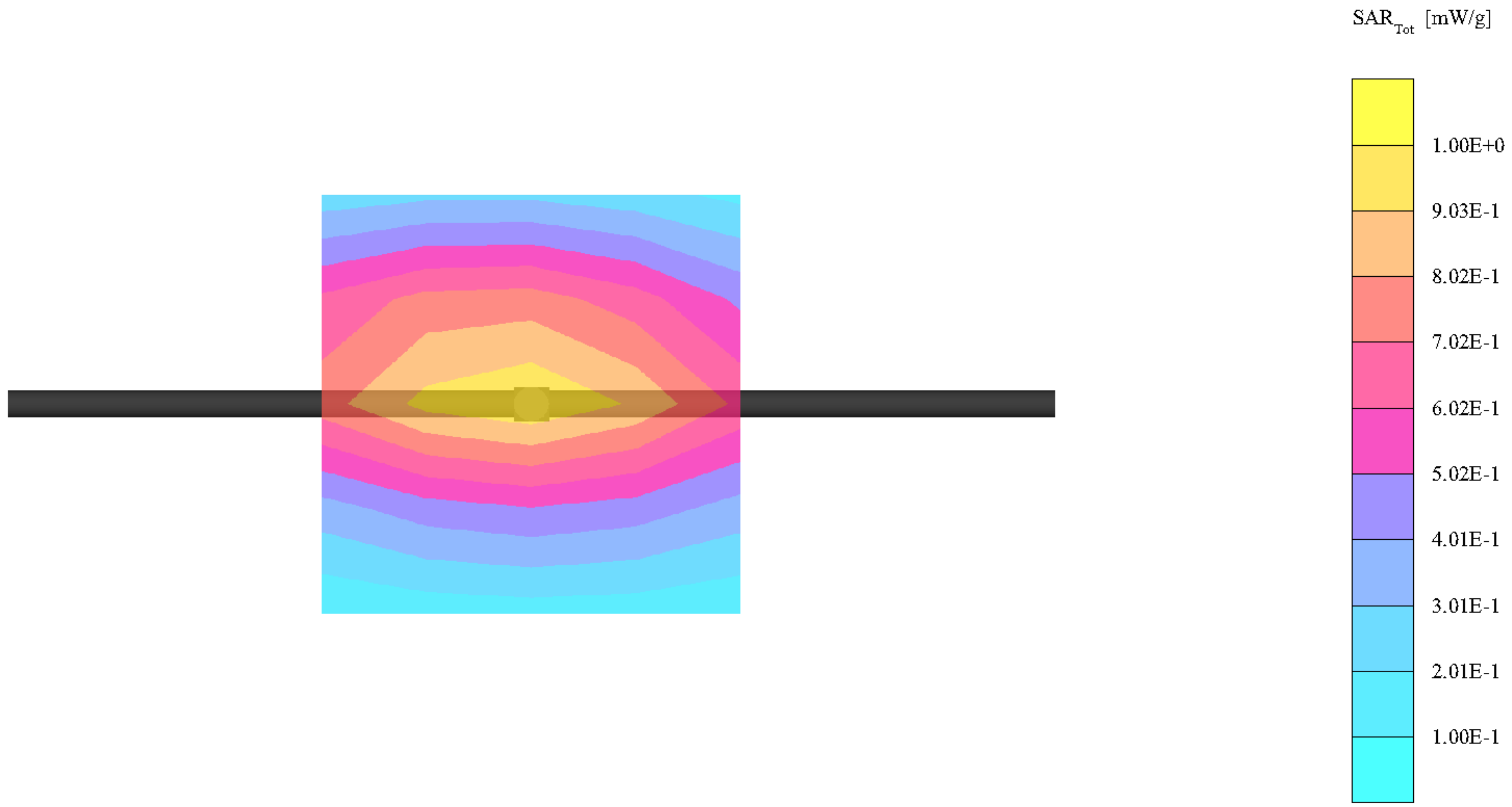
LIQUID'S Temprature 22C,Ambeint Temprature 24C ,humidity22%



02/09/06 Hamid Kami Shirazi

D835 V2

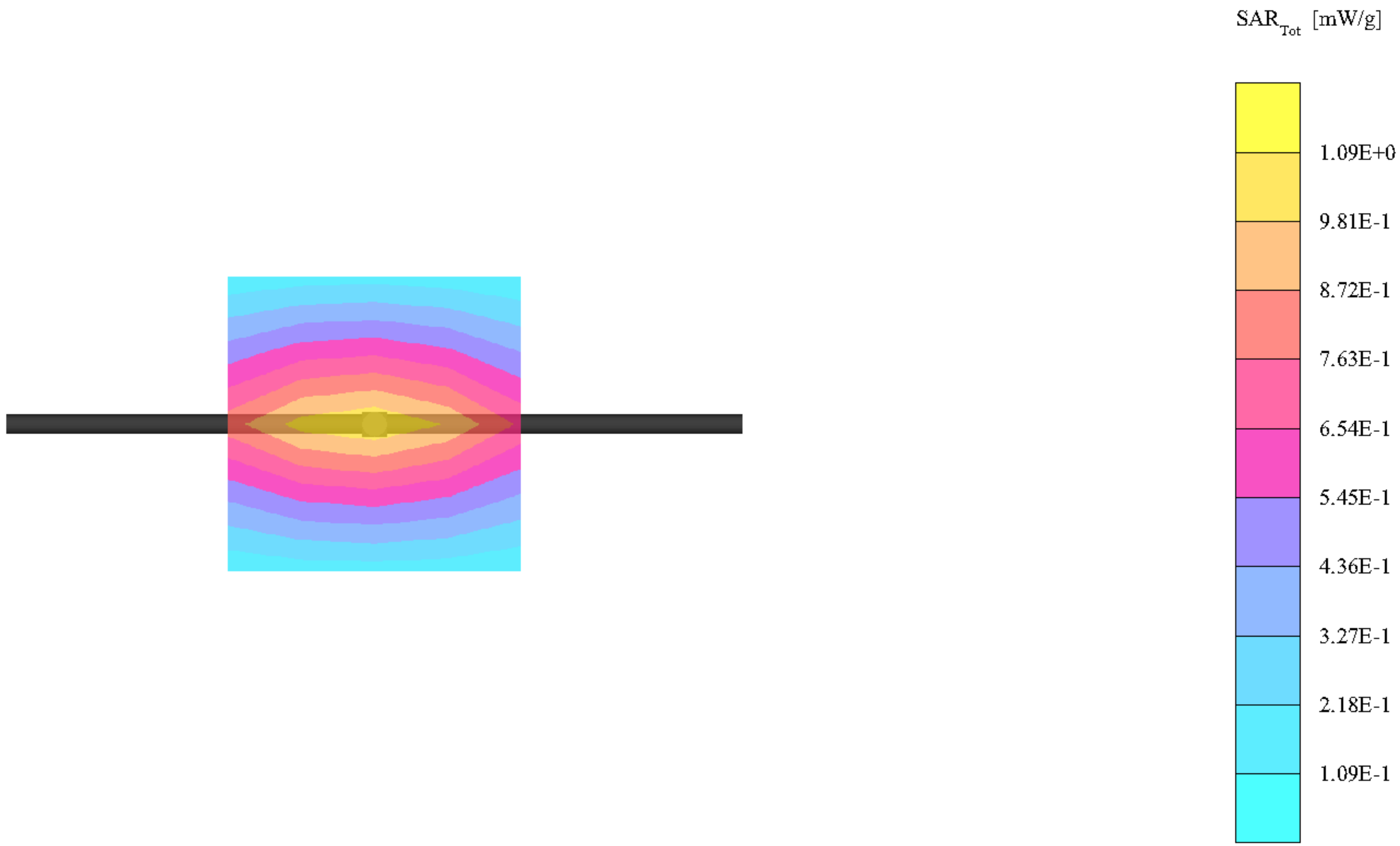
SAM 3 Phantom; Flat Section; Position: (90°,90°); Frequency: 835 MHz
Probe: ET3DV6 - SN1585; ConvF(6.95,6.95,6.95); Crest factor: 1.0; Head 835-900MHz: σ = 0.86 mho/m ε_r = 40.9 ρ = 1.00 g/cm³
Cubes (2): SAR (1g): 0.954 mW/g ± 0.01 dB, SAR (10g): 0.616 mW/g ± 0.01 dB, (Worst-case extrapolation)
Coarse: Dx = 15.0, Dy = 15.0, Dz = 10.0
Powerdrift: -0.02 dB
P=100mW, d=15mm, 835MHz dipole D835V2 s/n 484
Target values: 1g mass 9.08 mW/g, 10g mass 5.96 mW/g
Measured values: 1g mass9.54mW/g(+5%), 10g mass 6.16mW/g(+3.4%)
LIQUID'S Temprature 22C,Ambeint Temprature 24C ,humidity 22%



02/14/06 Hamid Kami Shirazi

D835 V2

SAM 3 Phantom; Flat Section; Position: (90°,90°); Frequency: 835 MHz
Probe: ET3DV6 - SN1585; ConvF(6.65,6.65,6.65); Crest factor: 1.0; Muscle 835: $\sigma = 1.00$ mho/m $\varepsilon_r = 55.2$ $\rho = 1.00$ g/cm³
Cubes (2): SAR (1g): 1.00 mW/g ± 0.03 dB, SAR (10g): 0.642 mW/g ± 0.03 dB, (Worst-case extrapolation)
Coarse: Dx = 15.0, Dy = 15.0, Dz = 10.0
Powerdrift: -0.00 dB
P=100mW, d=15mm, 835MHz dipole D835V2 s/n 484
Target values: 1g mass 9.48mW/g, 10g mass 6.24mW/g
Measured values: 1g mass 10.0mW/g(+5.5%), 10g mass 6.48mW/g(+2.9%)
LIQUID'S Temprature 22C,Ambeint Temprature 22C ,humidity 22%



Sony Ericsson Mobile Communications AB

D1900 V2

SAM 4 Phantom; Flat Section; Position: (90°,90°); Frequency: 1900 MHz

Probe: ET3DV6 - SN1585; ConvF(5.03,5.03,5.03); Crest factor: 1.0; Head 1900MHz: $\sigma = 1.47$ mho/m $\varepsilon_r = 40.0$ $\rho = 1.00$ g/cm³

Cubes (2): SAR (1g): 4.00 mW/g ± 0.02 dB, SAR (10g): 2.05 mW/g ± 0.02 dB, (Worst-case extrapolation)

Coarse: Dx = 17.0, Dy = 17.0, Dz = 17.0

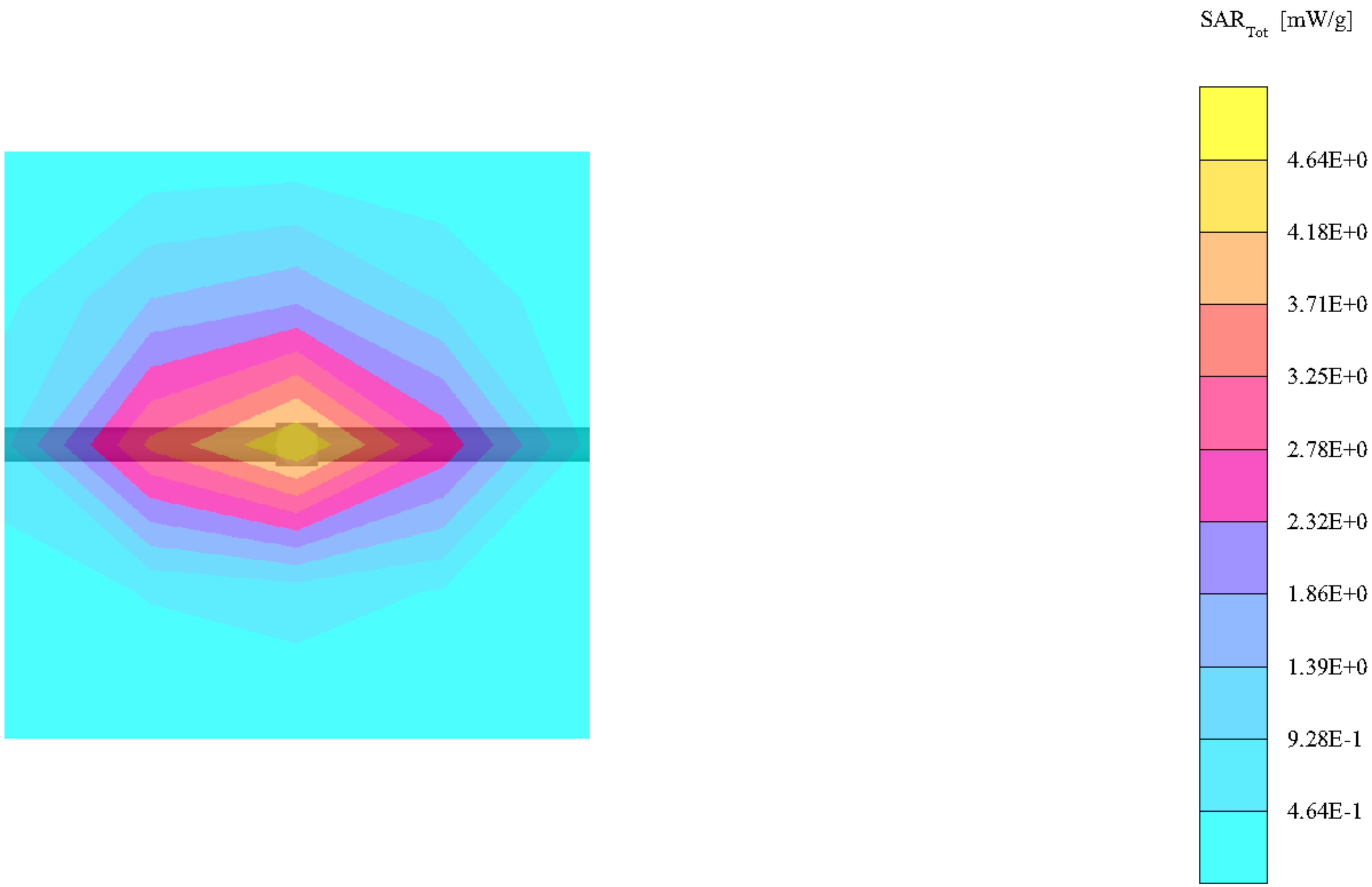
Powerdrift: 0.02 dB

P=100mW, d=10mm, 1900MHz dipol D1900V2 s/n 5d002

Target values: 1g mass 39.2 mW/g, 10g mass 20.6 mW/g

Measured values: 1g mass 40.0mW/g(+2.0%), 10g mass 20.5mW/g(-0.5%)

LIQUID'S Temprature 23C,Ambeint Temprature 22C ,humidity25%)



DASY4 Validation Report for Head TSL

Date/Time: 09.03.2005 15:20:45

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole 1900 MHz; Type: D1900V2; Serial: D1900V2 - SN:5d002

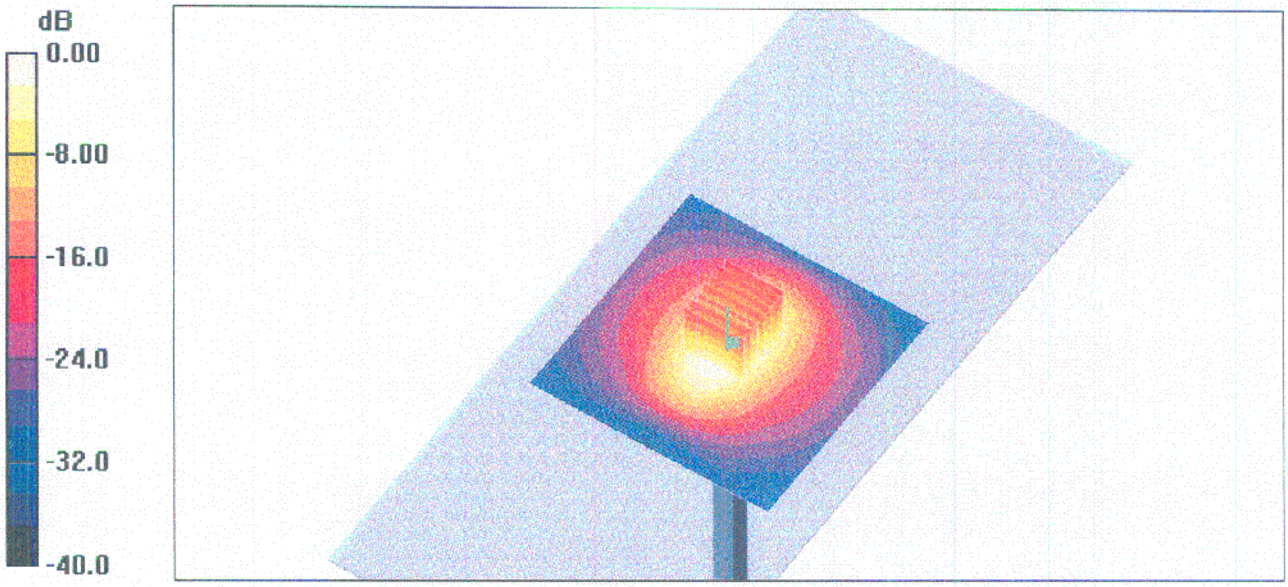
Communication System: CW-1900; Frequency: 1900 MHz;Duty Cycle: 1:1
Medium: HSL 1900 MHz;
Medium parameters used: f = 1900 MHz; σ = 1.46 mho/m; ε_r = 39.5; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY4 (High Precision Assessment)

DASY4 Configuration:

- Probe: ET3DV6 - SN1507; ConvF(4.96, 4.96, 4.96); Calibrated: 26.10.2004
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 07.01.2005
- Phantom: Flat Phantom 5.0; Type: QD000P50AA; Serial: 1001;
- Measurement SW: DASY4, V4.5 Build 19; Postprocessing SW: SEMCAD, V1.8 Build 146

Pin = 250 mW; d = 10 mm/Area Scan (81x81x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 11.4 mW/g

Pin = 250 mW; d = 10 mm/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 91.4 V/m; Power Drift = 0.037 dB
Peak SAR (extrapolated) = 16.9 W/kg
SAR(1 g) = 9.81 mW/g; SAR(10 g) = 5.15 mW/g
Maximum value of SAR (measured) = 11.0 mW/g



0 dB = 11.0mW/g

DASY4 Validation Report for Head TSL

Date/Time: 08.03.2005 10:35:22

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole 835 MHz; Type: D835V2; Serial: D835V2 - SN484

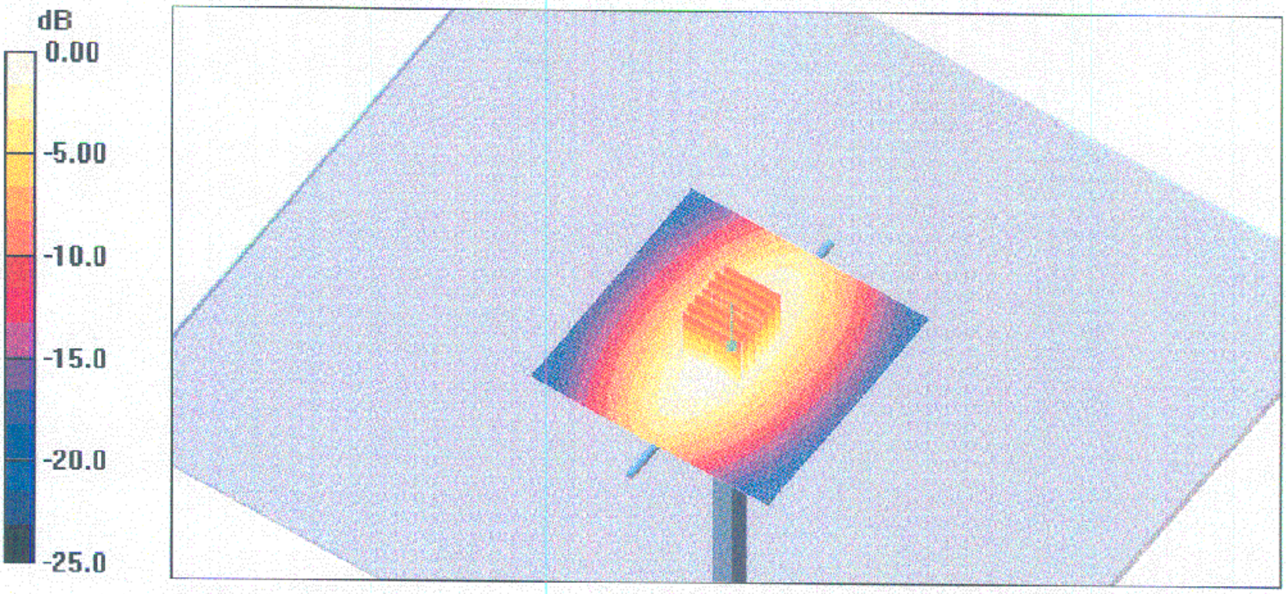
Communication System: CW-835; Frequency: 835 MHz;Duty Cycle: 1:1
Medium: HSL 835 MHz;
Medium parameters used: f = 835 MHz; $\sigma = 0.91$ mho/m; $\varepsilon_r = 42$; $\rho = 1000$ kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY4 (High Precision Assessment)

DASY4 Configuration:

- Probe: ET3DV6 - SN1507; ConvF(6.24, 6.24, 6.24); Calibrated: 26.10.2004
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 07.01.2005
- Phantom: Flat Phantom 4.9L; Type: QD000P49AA; Serial: 1001;
- Measurement SW: DASY4, V4.5 Build 19; Postprocessing SW: SEMCAD, V1.8 Build 144

Pin = 250 mW; d = 15 mm/Area Scan (81x81x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 2.46 mW/g

Pin = 250 mW; d = 15 mm/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 54.0 V/m; Power Drift = 0.015 dB
Peak SAR (extrapolated) = 3.29 W/kg
SAR(1 g) = 2.27 mW/g; SAR(10 g) = 1.49 mW/g
Maximum value of SAR (measured) = 2.44 mW/g



0 dB = 2.44mW/g

DASY4 Validation Report for Body TSL

Date/Time: 14.03.2005 10:51:59

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole 835 MHz; Type: D835V2; Serial: D835V2 - SN484

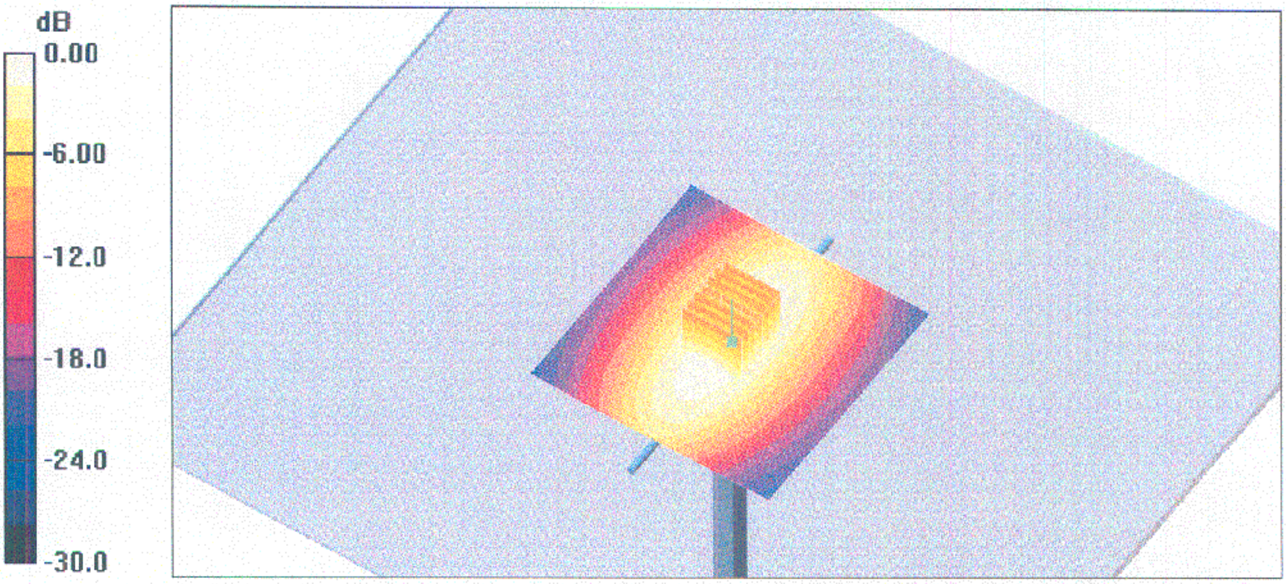
Communication System: CW-835; Frequency: 835 MHz;Duty Cycle: 1:1
Medium: M900;
Medium parameters used: f = 835 MHz; σ = 1.01 mho/m; ε_r = 54.9; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY4 (High Precision Assessment)

DASY4 Configuration:

- Probe: ET3DV6 - SN1507; ConvF(5.98, 5.98, 5.98); Calibrated: 26.10.2004
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 07.01.2005
- Phantom: Flat Phantom 4.9L; Type: QD000P49AA; Serial: 1001;
- Measurement SW: DASY4, V4.5 Build 19; Postprocessing SW: SEMCAD, V1.8 Build 146

Pin = 250 mW; d = 15 mm/Area Scan (81x81x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 2.57 mW/g

Pin = 250 mW; d = 15 mm/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 52.6 V/m; Power Drift = 0.025 dB
Peak SAR (extrapolated) = 3.36 W/kg
SAR(1 g) = 2.37 mW/g; SAR(10 g) = 1.56 mW/g
Maximum value of SAR (measured) = 2.58 mW/g



0 dB = 2.58mW/g

DASY4 Validation Report for Body TSL

Date/Time: 15.03.2005 15:20:32

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole 1900 MHz; Type: D1900V2; Serial: D1900V2 - SN:5d002

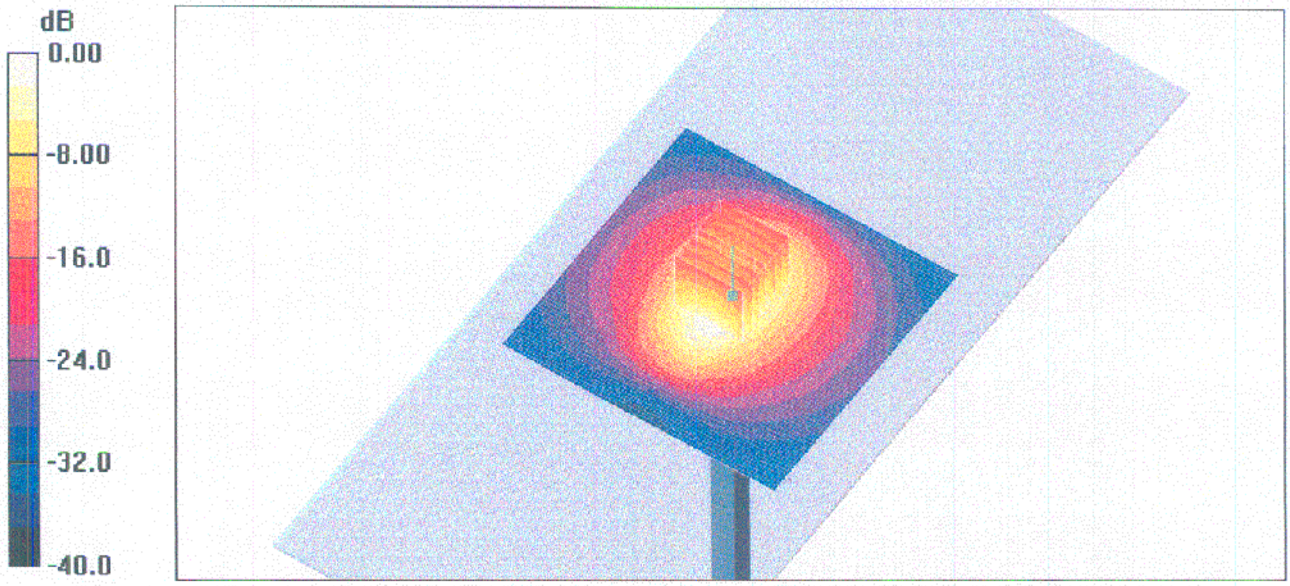
Communication System: CW-1900; Frequency: 1900 MHz;Duty Cycle: 1:1
Medium: MSL 1900 MHz;
Medium parameters used: f = 1900 MHz; $\sigma = 1.57$ mho/m; $\varepsilon_r = 52.2$; $\rho = 1000$ kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY4 (High Precision Assessment)

DASY4 Configuration:

- Probe: ET3DV6 - SN1507; ConvF(4.43, 4.43, 4.43); Calibrated: 26.10.2004
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 07.01.2005
- Phantom: Flat Phantom 5.0; Type: QD000P50AA; Serial: 1001;
- Measurement SW: DASY4, V4.5 Build 19; Postprocessing SW: SEMCAD, V1.8 Build 146

Pin = 250 mW; d = 10 mm/Area Scan (81x81x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 11.4 mW/g

Pin = 250 mW; d = 10 mm/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 87.3 V/m; Power Drift = 0.061 dB
Peak SAR (extrapolated) = 16.8 W/kg
SAR(1 g) = 9.91 mW/g; SAR(10 g) = 5.23 mW/g
Maximum value of SAR (measured) = 11.3 mW/g



0 dB = 11.3mW/g

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 Federal Office of Metrology and Accreditation
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 Sony Ericsson Lund

Certificate No: ET3-1585_Mar05

CALIBRATION CERTIFICATE

Object	ET3DV6 - SN:1585
Calibration procedure(s)	QA CAL-01.v5 Calibration procedure for dosimetric E-field probes
Calibration date:	March 16, 2005
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 (Calibrated by, Certificate No.)	Scheduled Calibration
Power meter E4419B	GB41293874	5-May-04 (METAS, No. 251-00388)	May-05
Power sensor E4412A	MY41495277	5-May-04 (METAS, No. 251-00388)	May-05
Reference 3 dB Attenuator	SN: S5054 (3c)	10-Aug-04 (METAS, No. 251-00403)	Aug-05
Reference 20 dB Attenuator	SN: S5086 (20b)	3-May-04 (METAS, No. 251-00389)	May-05
Reference 30 dB Attenuator	SN: S5129 (30b)	10-Aug-04 (METAS, No. 251-00404)	Aug-05
Reference Probe ES3DV2	SN: 3013	7-Jan-05 (SPEAG, No. ES3-3013_Jan05)	Jan-06
DAE4	SN: 617	19-Jan-05 (SPEAG, No. DAE4-617_Jan05)	Jan-06

Secondary Standards	ID #	Check Date (in house)	Scheduled Check
Power sensor HP 8481A	MY41092180	18-Sep-02 (SPEAG, in house check Oct-03)	In house check: Oct 05
RF generator HP 8648C	US3642U01700	4-Aug-99 (SPEAG, in house check Dec-03)	In house check: Dec-05
Network Analyzer HP 8753E	US37390585	18-Oct-01 (SPEAG, in house check Nov-04)	In house check: Nov 05

	Name	Function	Signature
Calibrated by:	Nico Vetterli	Laboratory Technician	
Approved by:	Katja Pokovic	Technical Manager	

Issued: March 16, 2005

Glossary:

TSL	tissue simulating liquid
NORMx,y,z	sensitivity in free space
ConF	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., ϑ = 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) CENELEC EN 50361, "Basic standard for the measurement of Specific Absorption Rate related to human exposure to electromagnetic fields from mobile phones (300 MHz - 3 GHz), July 2001

Methods Applied and Interpretation of Parameters:

- *NORMx,y,z:* Assessed for E-field polarization ϑ = 0 (f ≤ 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 ≤ 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:1585

Manufactured:	May 7, 2001
Last calibrated:	March 18, 2004
Recalibrated:	March 16, 2005

Calibrated for DASY Systems

(Note: non-compatible with DASY2 system!)

DASY - Parameters of Probe: ET3DV6 SN:1585

Sensitivity in Free Space[A]

NormX	**1.85** ± 10.1%	$\mu V/(V/m)^2$
NormY	**1.72** ± 10.1%	$\mu V/(V/m)^2$
NormZ	**1.90** ± 10.1%	$\mu V/(V/m)^2$

Diode Compression[B]

DCP X	**93** mV
DCP Y	**93** mV
DCP Z	**93** mV

Sensitivity in Tissue Simulating Liquid (Conversion Factors)

Please see Page 8.

Boundary Effect

TSL **900 MHz** **Typical SAR gradient: 5 % per mm**

Sensor Center to Phantom Surface Distance		**3.7 mm**	**4.7 mm**
SAR_{be} [%]	Without Correction Algorithm	7.8	4.0
SAR_{be} [%]	With Correction Algorithm	0.4	0.1

TSL **1750 MHz** **Typical SAR gradient: 10 % per mm**

Sensor Center to Phantom Surface Distance		**3.7 mm**	**4.7 mm**
SAR_{be} [%]	Without Correction Algorithm	12.7	8.7
SAR_{be} [%]	With Correction Algorithm	0.4	0.3

Sensor Offset

Probe Tip to Sensor Center **2.7** mm

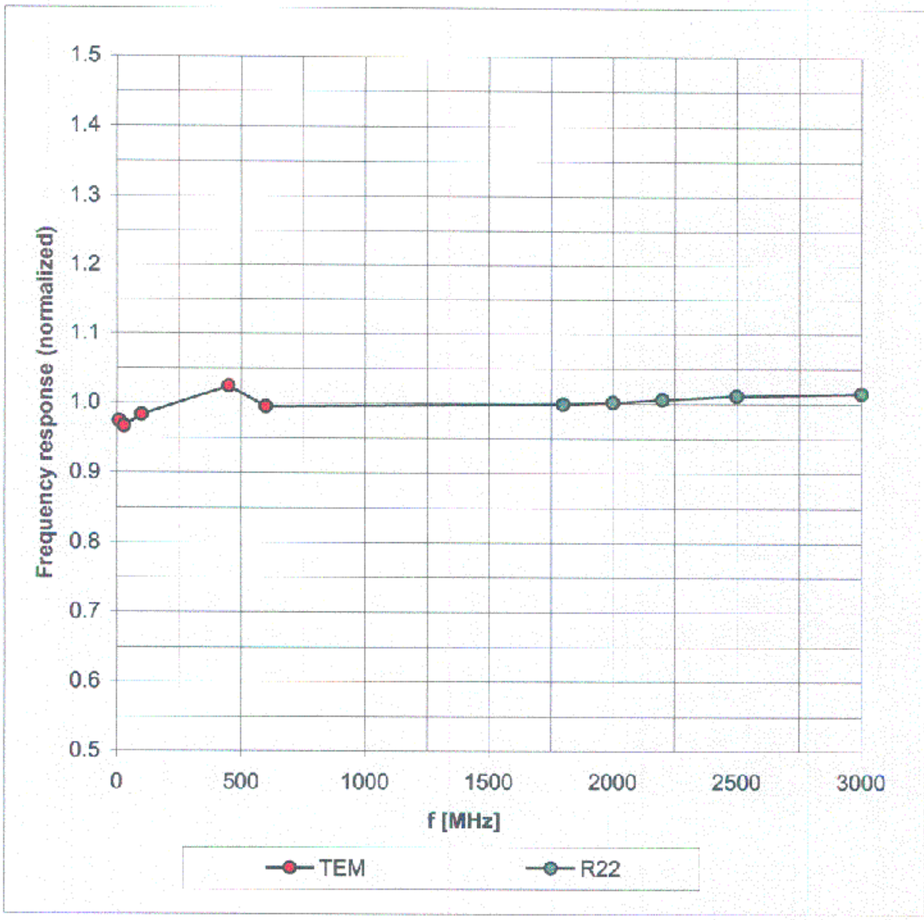
The reported uncertainty of measurement is stated as the standard uncertainty of measurement multiplied by the coverage factor k=2, which for a normal distribution corresponds to a coverage probability of approximately 95%.

[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.

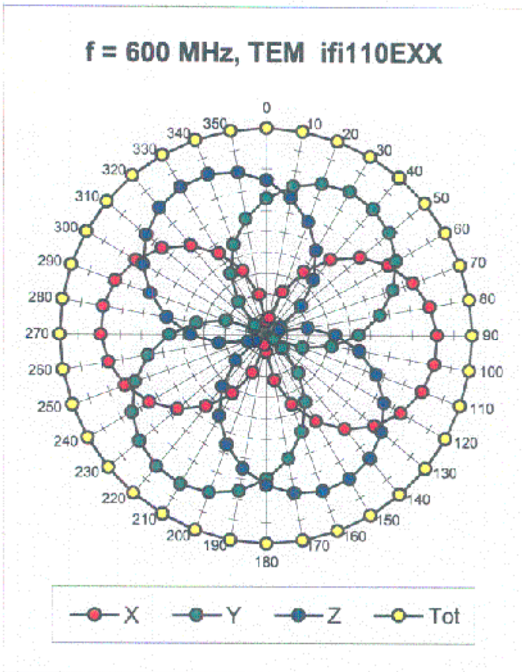
Frequency Response of E-Field

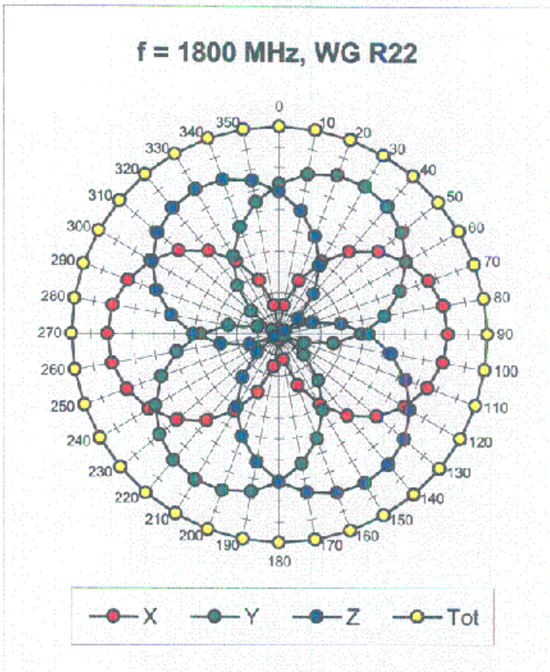
(TEM-Cell:ifi110 EXX, Waveguide: R22)

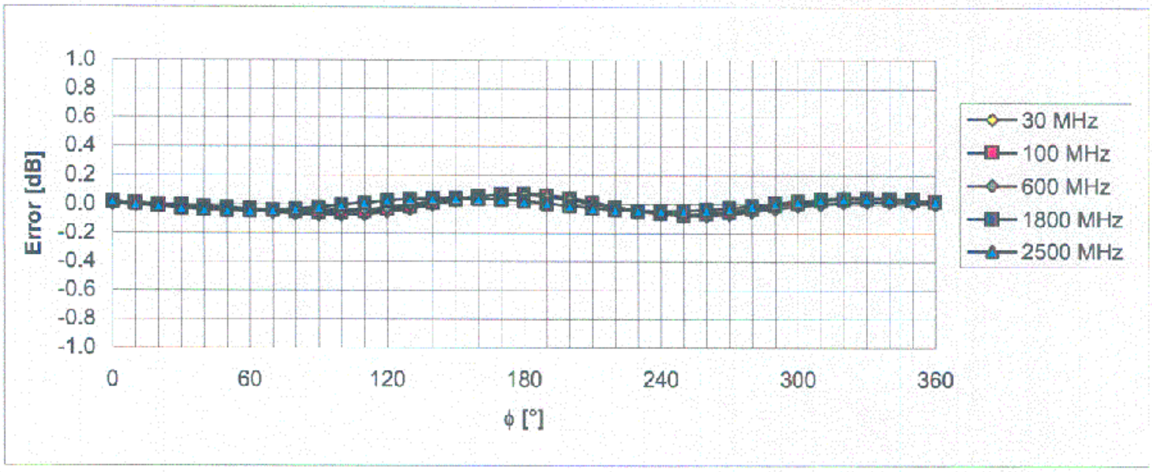


Uncertainty of Frequency Response of E-field: ± 6.3% (k=2)

Receiving Pattern (ϕ), $\vartheta = 0°$



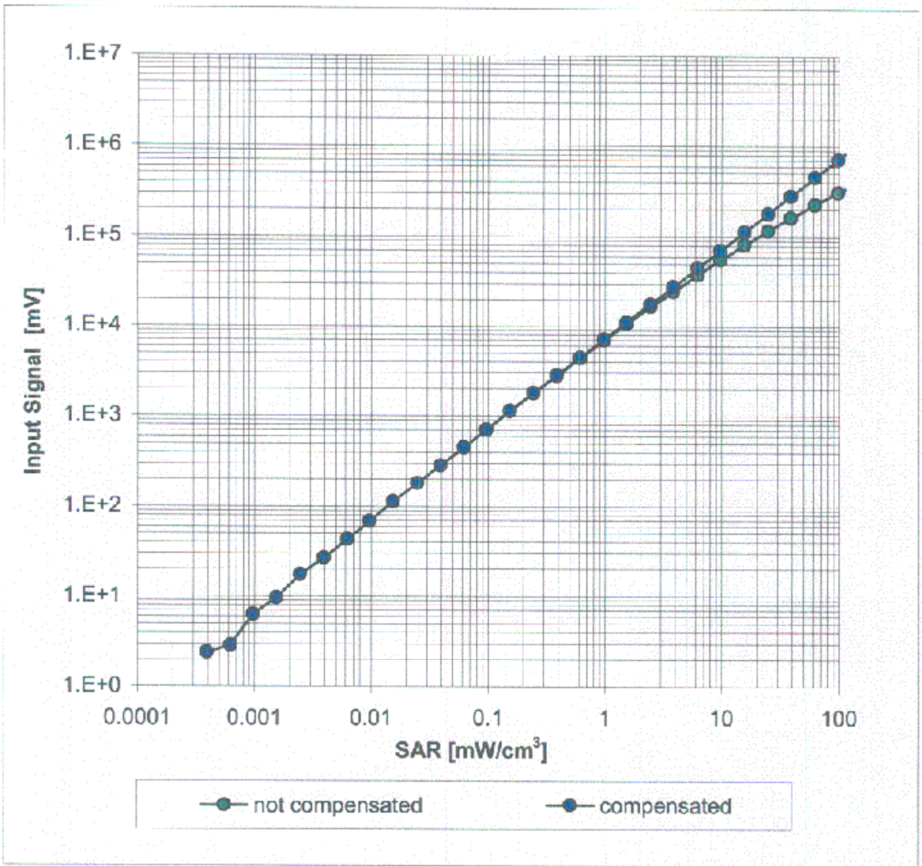


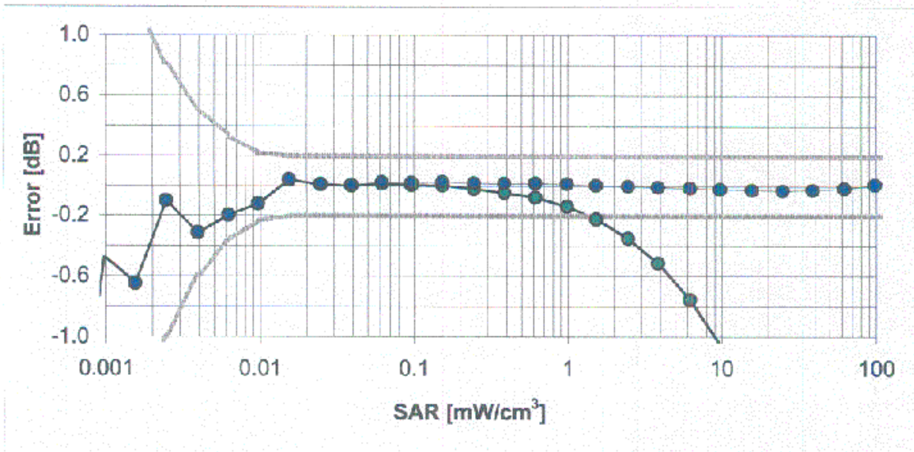


Uncertainty of Axial Isotropy Assessment: ± 0.5% (k=2)

Dynamic Range f(SAR_{head})

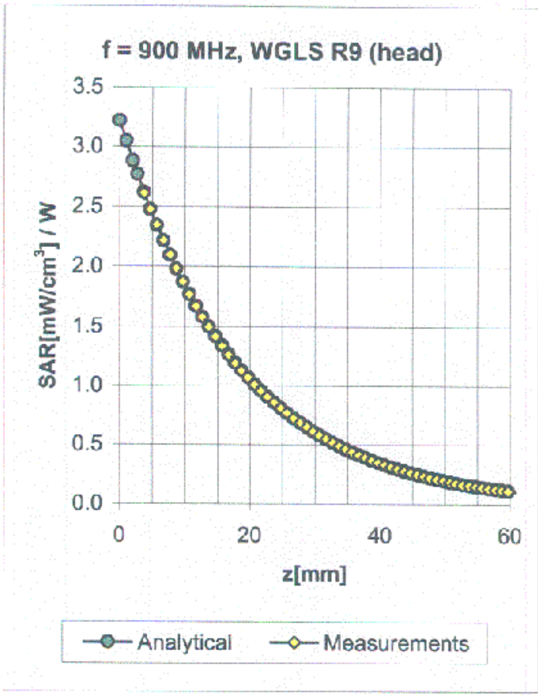
(Waveguide R22, f = 1800 MHz)

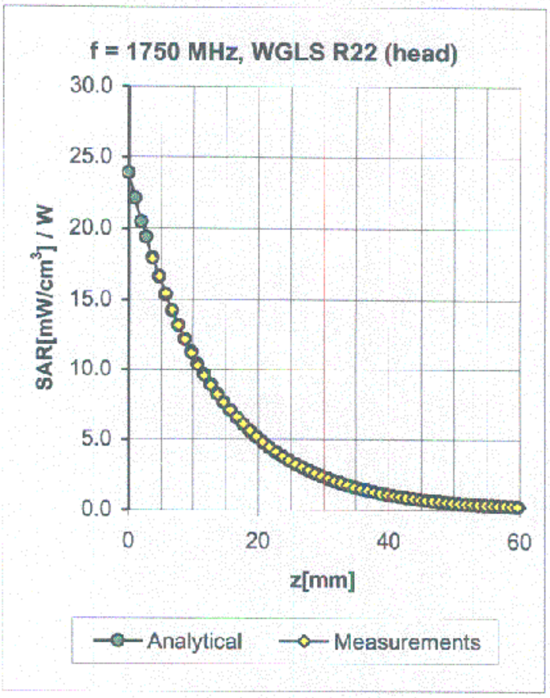




Uncertainty of Linearity Assessment: ± 0.6% (k=2)

Conversion Factor Assessment



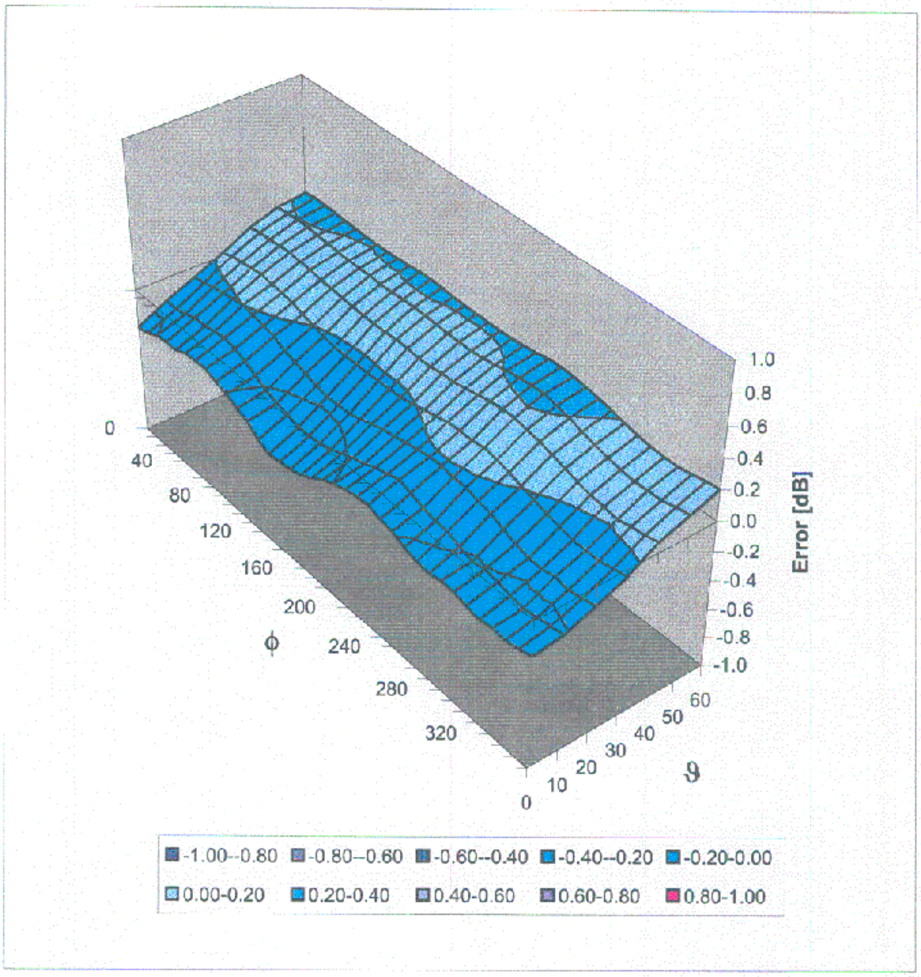


f [MHz]	Validity [MHz][C]	TSL	Permittivity	Conductivity	Alpha	Depth	ConvF	Uncertainty
835	± 50 / ± 100	Head	41.5 ± 5%	0.90 ± 5%	0.99	1.46	6.95	± 11.0% (k=2)
900	± 50 / ± 100	Head	41.5 ± 5%	0.97 ± 5%	0.91	1.49	6.73	± 11.0% (k=2)
1750	± 50 / ± 100	Head	40.1 ± 5%	1.37 ± 5%	0.53	2.45	5.30	± 11.0% (k=2)
1900	± 50 / ± 100	Head	40.0 ± 5%	1.40 ± 5%	0.51	2.64	5.03	± 11.0% (k=2)
2000	± 50 / ± 100	Head	40.0 ± 5%	1.40 ± 5%	0.51	2.70	4.87	± 11.0% (k=2)
2450	± 50 / ± 100	Head	39.2 ± 5%	1.80 ± 5%	0.59	2.38	4.60	± 11.8% (k=2)
835	± 50 / ± 100	Body	55.2 ± 5%	0.97 ± 5%	0.96	1.54	6.65	± 11.0% (k=2)
1900	± 50 / ± 100	Body	53.3 ± 5%	1.52 ± 5%	0.50	2.96	4.62	± 11.0% (k=2)
2450	± 50 / ± 100	Body	52.7 ± 5%	1.95 ± 5%	0.58	2.20	4.16	± 11.8% (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)