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BA/SEMC/BGLINS Robert Carr

Approved

LD/SEMC/BGLIMC Peter Lindeborg

Checked

160508

Company Internal
REPORT

No.

BGLI08:411.

Date

140508

Rev

A

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Report issued by Accredited SAR Laboratory**for****PY7A3052091 (W980)****Date of test:** April 29th - May 5th, 2008**Laboratory:** Sony Ericsson SAR Test Laboratory
Sony Ericsson Mobile Communications AB
Maplewood, Chineham Business Park
Basingstoke, RG24 8YB,
England**Testing Engineer:** Robert Carr
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ROBERT CARR

Testing Approval: Peter Lindeborg
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Pl Lindeborg

Statement of Compliance

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

Sony Ericsson Type AAD-3052091-BV; FCC ID PY7A3052091; IC 4170B-A3052091

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 (2005). 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 Introduction

In this test report, compliance of the Sony Ericsson PY7A3052091 (W980) 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].

2 Customer details

Company Name:	Sony Ericsson Mobile Communications AB
Address:	W Building 1-8-15 Konan, Minato-Ku Tokyo Japan
Contact Name:	Tadanaga Hatsugai

3 Device Under Test

3.1 Antenna Description

Type	Internal antenna	
Location	At the base of the lower part of the clam	
Dimensions	Max length	42 mm
	Max width	16 mm
Configuration	PIFA	



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3.2 Device Description

Device model	AAD-3052091-BV					
Market name	W980					
Serial number (EUT #)	CB510YGHMX (#11513)					
Mode	GSM 1900			GSM 850		
Crest factor	8.3			8.3		
Multiple access scheme	TDMA			TDMA		
Channel No.	512	512	661	128	190	251
Maximum output power setting ¹ [dBm]	30.7	30.7	30.7	33.0	33.0	33.0
Factory tolerance in power setting ¹	±0.5 dB			±0.5 dB		
Maximum peak output power ¹ [dBm]	31.2	31.2	31.2	33.5	33.5	33.5
Data mode	GPRS			GPRS		
Crest factor	4.15			4.15		
Maximum output power setting ¹ [dBm]	28.7	28.7	28.7	31.5	31.5	31.5
Factory tolerance in power setting ¹	±0.5 dB			±0.5 dB		
Maximum peak output power ¹ [dBm]	29.2	29.2	29.2	32.0	32.0	32.0
Data mode	EDGE			EDGE		
Crest factor	4.15			4.15		
Maximum output power setting ¹ [dBm]	27.0	27.0	27.0	28.0	28.0	28.0
Factory tolerance in power setting ¹	±0.5 dB			±0.5 dB		
Maximum peak output power ¹ [dBm]	27.5	27.5	27.5	28.5	28.5	28.5
Transmitting frequency range [MHz]	1850.2 - 1909.8			824.2 - 848.8		
GPRS Multislot class	10					
EDGE class	10					
GPRS Capability class	B					
Prototype or production unit	Preproduction					
Hardware version	AP1					
Software version	R3BA010					
Device category	Portable					
RF exposure environment	General population / uncontrolled					

¹ Output power values were supplied by the customer.



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4 Test equipment

4.1 Dosimetric system

SAR measurements were made using the DASY4 professional system (software version 4.7, Build 55) with SAM twin phantom, manufactured by Schmid & Partner Engineering AG (SPEAG). The list of calibrated equipment is given below.

Description	Serial Number	Due Date
DASY4 DAE3	449	2008-12
E-field probe ET3DV6	1611	2008-12
Dipole Validation Kit, D835V2	442	2008-12
Dipole Validation Kit, D1900V2	539	2008-12

4.2 Additional equipment

Description	Inventory Number	Due Date
Signal generator R&S SMY 02	3.094	2009-04
Directional coupler HP778D	15.233	None
Power meter R&S NRVD	4.073	2009-04
Power sensor R&S NRV-Z5	4.074	2009-04
Power sensor R&S NRV-Z5	4.076	2009-04
Network analyzer Agilent 8719D	2.022	2009-04
Dielectric probe kit HP8507C	14.046	Self Cal
R&S CMU200	20011270	2009-04

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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 DASY4 software is also given. Recommended limits for permittivity ϵ_r , conductivity σ and mass density ρ are also shown.

f [MHz]	Tissue type	Measured / Recommended	Dielectric Parameters		Density
			ϵ_r	σ [S/m]	ρ [g/cm ³]
835	Head	Measured, 2008-04-29	40.4	0.87	1.00
		Recommended	41.5	0.90	1.00
835	Body	Measured, 2008-04-29	55.0	0.98	1.00
		Recommended	55.2	0.97	1.00
1900	Head	Measured, 2008-05-01	38.4	1.46	1.00
		Recommended	40.0	1.40	1.00
1900	Body	Measured, 2008-05-02	51.0	1.59	1.00
		Recommended	53.3	1.52	1.00

6 System accuracy verification

A system accuracy verification of the DASY4 was performed using the dipole validation kit listed in section 3.1. The system verification test was conducted on the same day as the measurement of the DUT. The measurements were made at an ambient temperature of 22.4-23.2 °C and humidity 34-36 %. The obtained results are displayed in the table below.

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

f [MHz]	Tissue type	Measured / Reference	SAR [W/kg] 1g / 10g	Dielectric Parameters		Density	Liquid T[°C]
				ϵ_r	σ [S/m]	ρ [g/cm ³]	
835	Head	Measured, 2008-04-29	9.92 / 6.60	40.4	0.87	1.00	22.2
		Reference	9.68 / 6.38	41.5	0.90	1.00	22.0
835	Body	Measured, 2008-04-29	10.1 / 6.68	55.0	0.98	1.00	22.2
		Reference	9.48 / 6.29	55.2	0.97	1.00	22.0
1900	Head	Measured, 2008-05-01	38.8 / 20.4	38.4	1.46	1.00	22.4
		Reference	37.4 / 19.8	40.0	1.40	1.00	22.0
1900	Body	Measured, 2008-05-02	40.4 / 21.1	51.0	1.59	1.00	22.2
		Reference	38.6 / 20.6	53.3	1.52	1.00	22.0



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7 SAR measurement uncertainty

SAR measurement uncertainty evaluation for Sony Ericsson PY7A3052091 (W980) phone According to IEEE 1528

Uncertainty Component	Uncer. (%)	Prob Dist.	Div.	C _i	1g mass
Measurement System					
Probe Calibration	±5.9	N	1	1	±5.9
Axial Isotropy	±4.7	R	√3	0.7	±1.9
Spherical Isotropy	±9.6	R	√3	0.7	±3.9
Boundary effect	±1.0	R	√3	1	±0.6
Probe linearity	±4.7	R	√3	1	±2.7
Detection limit	±1.0	R	√3	1	±0.6
Readout electronics	±0.3	N	1	1	±0.3
Response time	±0.8	R	√3	1	±0.5
Integration time	±2.6	R	√3	1	±1.5
RF Ambient Conditions	±3.0	R	√3	1	±1.7
Mech. Constraints of robot	±0.4	R	√3	1	±0.2
Probe positioning	±2.9	R	√3	1	±1.7
Extrap, interpolation and integration	±1.0	R	√3	1	±0.6
Measurement System Uncertainty					±8.4
Test Sample Related					
Device positioning	±3.5	N	1	1	±3.5
Device holder uncertainty	±3.5	N	1	1	±3.5
Power drift	±5.0	R	√3	1	±2.9
Test Sample Related Uncertainty					±5.5
Phantom and Tissue Parameters					
Phantom uncertainty	±4.0	R	√3	1	±2.3
Liquid conductivity (measured)	±2.5	R	1	0.64	±1.6
Liquid conductivity (target)	±5.0	R	√3	0.64	±1.8
Liquid Permittivity (measured)	±2.5	R	1	0.6	±1.5
Liquid Permittivity (target)	±5.0	R	√3	0.6	±1.7
Phantom and Tissue Parameters Uncertainty					±4.1
Combined standard uncertainty					±10.8
Extended standard uncertainty (k=2)					±21.6

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8 Test results

The ambient humidity and temperature of test facility were 34-36% and 22.4-23.2°C respectively. A base station simulator was used to control the device during the SAR measurement. The DUT was supplied with a fully charged battery for each measurement.

For head measurement, the DUT was tested on the right-hand side, and the left-hand side of the phantom in two phone positions, cheek (touch) and tilt (cheek + 15°). The DUT was tested at the lowest, middle and highest frequencies in the transmission band. The measured 1-gram averaged SAR values of the DUT towards the head are provided in Table 1.

For body measurement the DUT was tested with the back (antenna) and front(display) towards the phantom flat section with 15 mm distance in both speech and data mode. For all modes, the device was tested at the lowest, middle and highest frequencies in the transmission band. For portable hands free (PHF) usage the Sony Ericsson head set HPB-60 was connected to the DUT, and for Bluetooth (BT) the DUT was paired with Sony Ericsson HBH-60. The measured 1-gram averaged SAR values of the DUT towards the body are provided in Table 2.

Band	Channel	Measured output power ² [dBm]	Position	Liquid T [°C]	Measured SAR [W/kg]	
					Left-hand 1g mass	Right-hand 1g mas
GSM 850	128	32.9	Cheek	22.2	0.28	0.30
			Tilt	22.2	-	-
	190	33.0	Cheek	22.2	0.38	0.37
			Tilt	22.2	0.17	0.18
	251	33.0	Cheek	22.2	0.45	0.41
			Tilt	22.2	-	-
GSM 1900	512	30.8	Cheek	22.4	0.36	0.39
			Tilt	22.4	-	-
	661	30.8	Cheek	22.4	0.55	0.53
			Tilt	22.4	0.16	0.18
	810	30.7	Cheek	22.4	0.72	0.70
			Tilt	22.4	-	-

Table 1: SAR measurement result for Sony Ericsson PY7A3052091 telephone at highest possible output power. Measured towards the head.

² Measured output values were provided by the customer.



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Band	Channel	Measured output power ³ [dBm]	Position / Mode	Liquid T [°C]	Measured SAR [W/kg] 1g mass
GSM 850	128	31.4	Back / GPRS	22.2	0.49
		32.9	Back / BT	22.2	0.35
	190	31.4	Back / GPRS	22.2	0.68
		33.0	Back / BT	22.2	0.42
	251	31.4	Back / GPRS	22.2	0.89
			Front / GPRS	22.2	0.50
		27.8	Back / EDGE	22.2	0.41
			Back / BT	22.2	0.48
		33.0	Back / PHF	22.2	0.46
GSM 1900	512	28.6	Back / GPRS	22.2	0.35
		30.8	Back / BT	22.2	0.33
	661	28.8	Back / GPRS	22.2	0.63
		30.8	Back / BT	22.2	0.56
	810	28.8	Back / GPRS	22.2	0.86
		30.7	Back / BT	22.2	0.69
		28.8	Front / GPRS	22.2	0.42
		30.7	Back / PHF	22.2	0.33
		26.8	Back / EDGE	22.2	0.56

Table 2: SAR measurement result for Sony Ericsson PY7A3052091 telephone at highest possible output power. Measured towards the body.

³ Measured output values were provided by the customer.



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9 References

- [1] R.Plicanic. "SAR Measurement Specification of Wireless Handsets". Sony Ericsson SAR Test Laboratory internal document GUG/N 03:141
- [2] 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).
- [3] 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.
- [4] IEC 62209-1. "Procedure to measure the Specific Absorption Rate (SAR) for hand-held mobile wireless devices in the frequency range of 300 MHz to 3 GHz". February 2005.

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10 Appendix

10.1 Photographs of the device under test



Front & Back



Sides



Back side with battery



Top and Bottom

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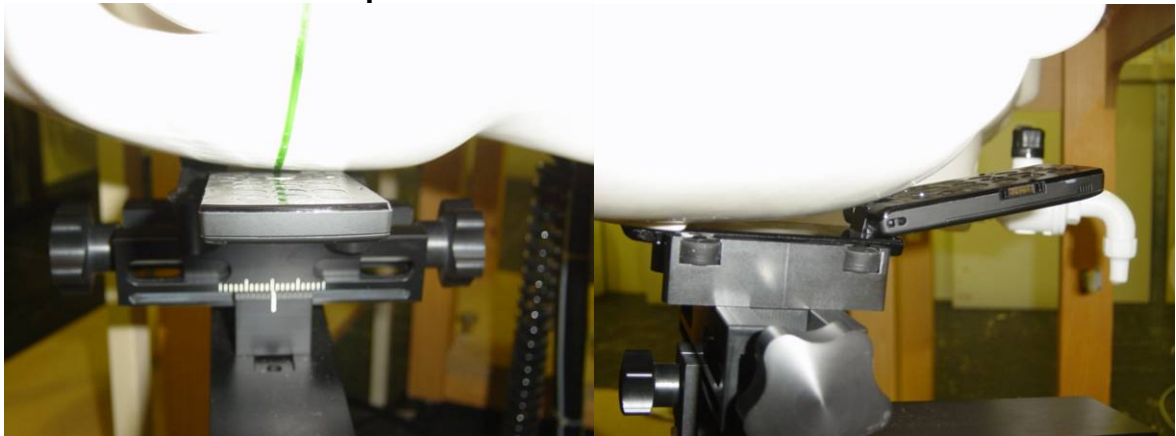
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10.2 Device position at SAM Twin Phantom



DUT position towards the head: Cheek (touch) position



DUT position towards the head: Tilt (touch + 15°) position



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DUT in body position with 15 mm distance



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10.3 Attachments

- System validation
- Measurement plots for head and body position
- Probe calibration
- Dipole calibration

Date/Time: 5/2/2008 1:57:18 PM

Test Laboratory: Sony Ericsson Mobile Communications International AB

Body-Flat15mm-Madonna-1900-Bluetooth-High**DUT: Madonna; Type: DUT; Serial: #11513**

Communication System: DCS 1900; Frequency: 1909.8 MHz; Duty Cycle: 1:8.3

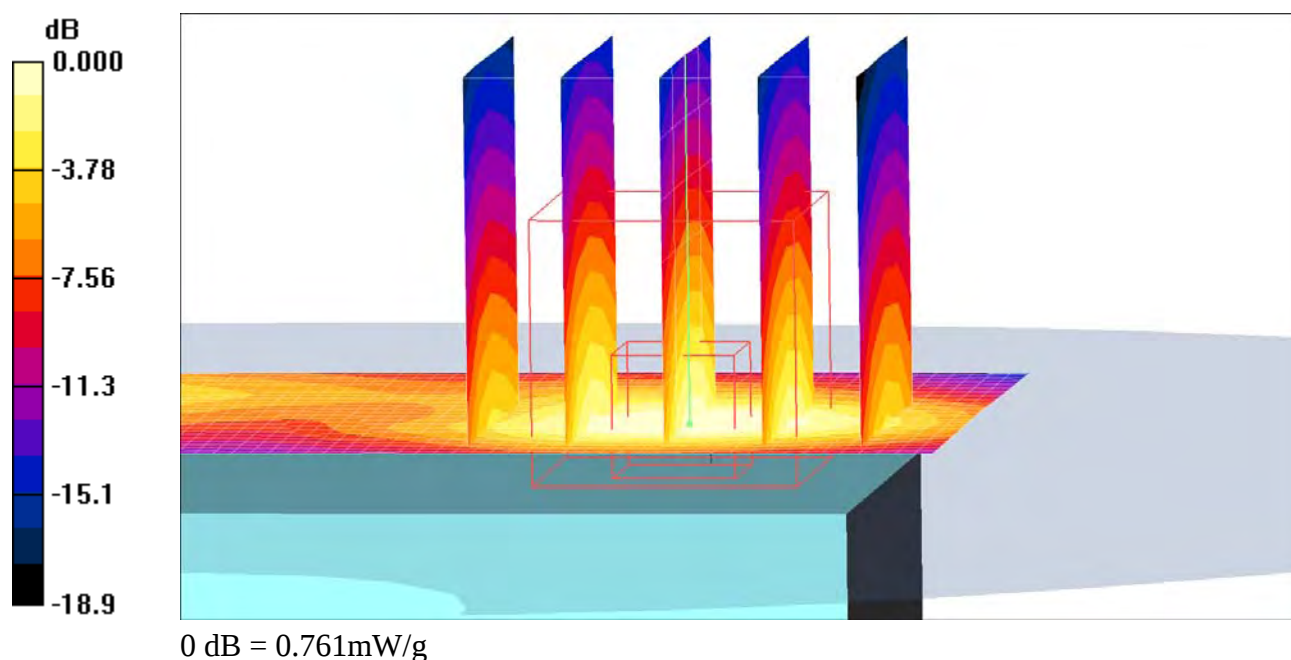
Medium parameters used: $f = 1909.8 \text{ MHz}$; $\sigma = 1.6 \text{ mho/m}$; $\epsilon_r = 51$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section

Measurement Standard: DASY4 (High Precision Assessment)

DASY4 Configuration:

- Probe: ET3DV6 - SN1611; ConvF(4.79, 4.79, 4.79); Calibrated: 12/17/2007
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn449; Calibrated: 12/19/2007
- Phantom: SAM-3; Type: SAM; Serial: 1436
- Measurement SW: DASY4, V4.7 Build 53; Postprocessing SW: SEMCAD, V1.8 Build 172

Body 3/Area Scan (41x71x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$ Maximum value of SAR (interpolated) = 0.829 mW/g **Body 3/Zoom Scan (5x5x7)/Cube 0:** Measurement grid: $dx=8\text{mm}$, $dy=8\text{mm}$, $dz=5\text{mm}$ Reference Value = 9.31 V/m ; Power Drift = -0.026 dB Peak SAR (extrapolated) = 1.26 W/kg **SAR(1 g) = 0.691 mW/g ; SAR(10 g) = 0.370 mW/g** Maximum value of SAR (measured) = 0.761 mW/g 

Date/Time: 5/2/2008 1:35:37 PM

Test Laboratory: Sony Ericsson Mobile Communications International AB

Body-Flat15mm-Madonna-1900-Bluetooth-Low**DUT: Madonna; Type: DUT; Serial: #11513**

Communication System: DCS 1900; Frequency: 1850.2 MHz; Duty Cycle: 1:8.3

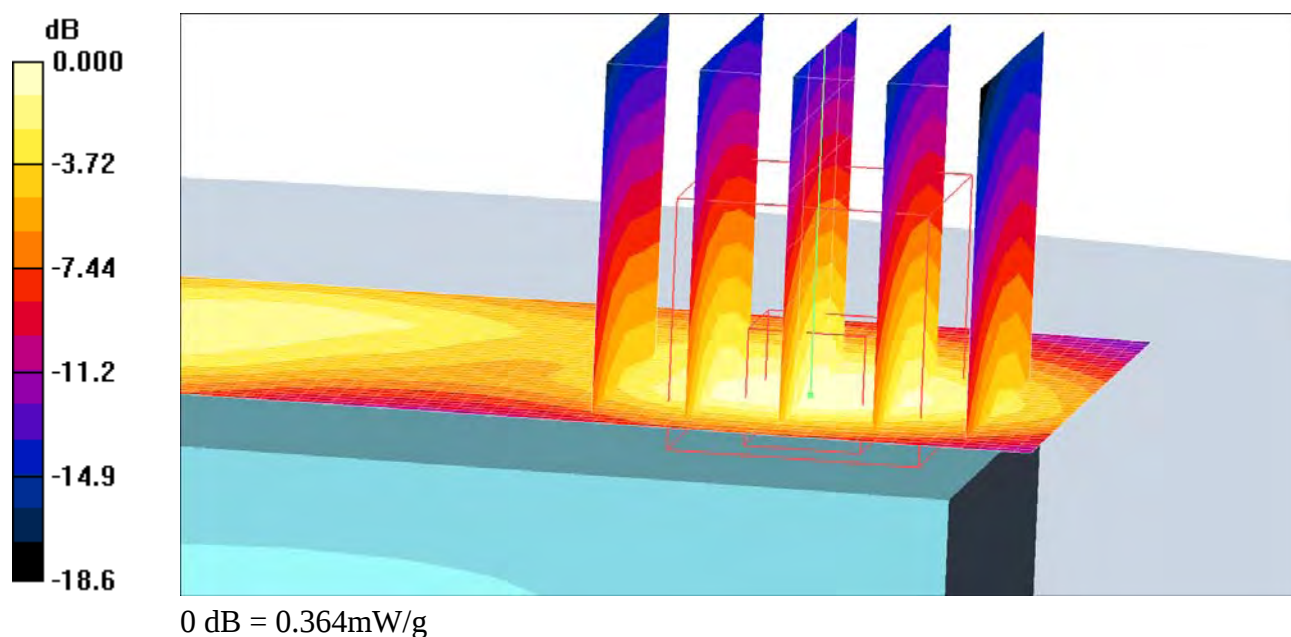
Medium parameters used: $f = 1850.2 \text{ MHz}$; $\sigma = 1.53 \text{ mho/m}$; $\epsilon_r = 51.2$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section

Measurement Standard: DASY4 (High Precision Assessment)

DASY4 Configuration:

- Probe: ET3DV6 - SN1611; ConvF(4.79, 4.79, 4.79); Calibrated: 12/17/2007
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn449; Calibrated: 12/19/2007
- Phantom: SAM-3; Type: SAM; Serial: 1436
- Measurement SW: DASY4, V4.7 Build 53; Postprocessing SW: SEMCAD, V1.8 Build 172

Body/Area Scan (41x71x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$ Maximum value of SAR (interpolated) = 0.387 mW/g **Body/Zoom Scan (5x5x7)/Cube 0:** Measurement grid: $dx=8\text{mm}$, $dy=8\text{mm}$, $dz=5\text{mm}$ Reference Value = 10.1 V/m ; Power Drift = -0.007 dB Peak SAR (extrapolated) = 0.580 W/kg **SAR(1 g) = 0.327 mW/g ; SAR(10 g) = 0.178 mW/g** Maximum value of SAR (measured) = 0.364 mW/g 

Date/Time: 5/2/2008 1:45:54 PM

Test Laboratory: Sony Ericsson Mobile Communications International AB

Body-Flat15mm-Madonna-1900-Bluetooth-Middle**DUT: Madonna; Type: DUT; Serial: #11513**

Communication System: DCS 1900; Frequency: 1880 MHz; Duty Cycle: 1:8.3

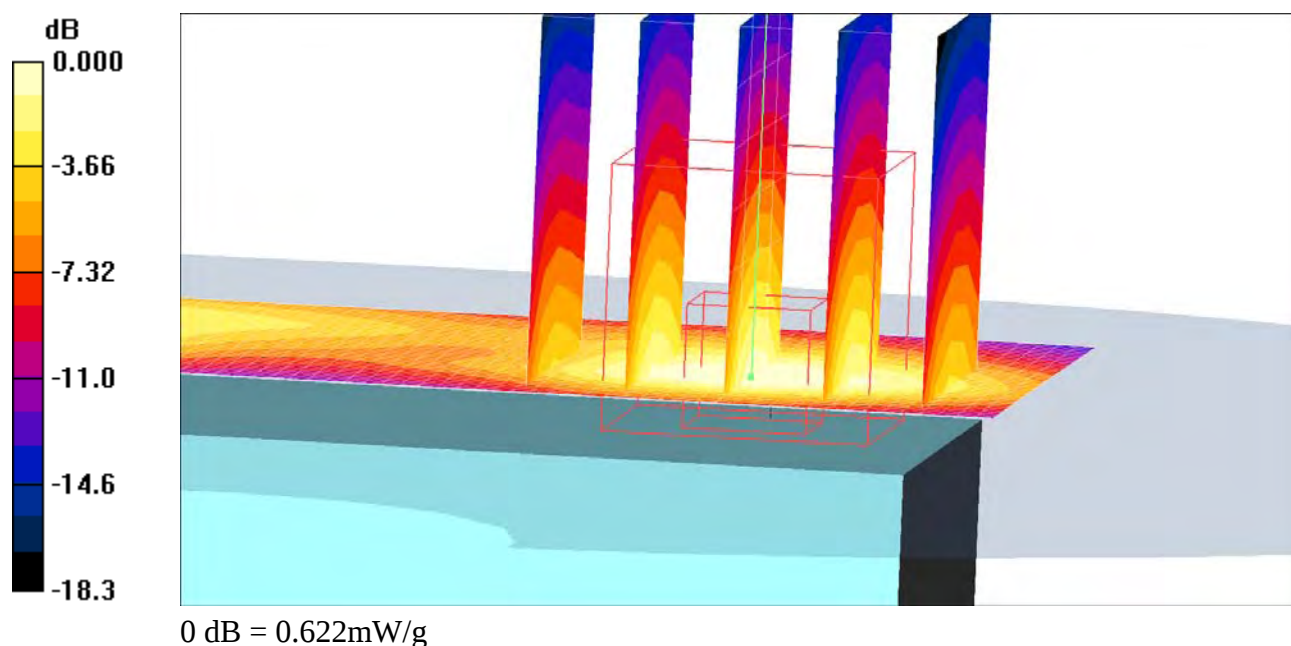
Medium parameters used: $f = 1880 \text{ MHz}$; $\sigma = 1.57 \text{ mho/m}$; $\epsilon_r = 51.1$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section

Measurement Standard: DASY4 (High Precision Assessment)

DASY4 Configuration:

- Probe: ET3DV6 - SN1611; ConvF(4.79, 4.79, 4.79); Calibrated: 12/17/2007
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn449; Calibrated: 12/19/2007
- Phantom: SAM-3; Type: SAM; Serial: 1436
- Measurement SW: DASY4, V4.7 Build 53; Postprocessing SW: SEMCAD, V1.8 Build 172

Body 2/Area Scan (41x71x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$ Maximum value of SAR (interpolated) = 0.678 mW/g **Body 2/Zoom Scan (5x5x7)/Cube 0:** Measurement grid: $dx=8\text{mm}$, $dy=8\text{mm}$, $dz=5\text{mm}$ Reference Value = 10.3 V/m ; Power Drift = -0.024 dB Peak SAR (extrapolated) = 1.01 W/kg **SAR(1 g) = 0.562 mW/g ; SAR(10 g) = 0.303 mW/g** Maximum value of SAR (measured) = 0.622 mW/g 

Date/Time: 5/2/2008 1:21:45 PM

Test Laboratory: Sony Ericsson Mobile Communications International AB

Body-Flat15mm-Madonna-1900-EDGE-High**DUT: Madonna; Type: DUT; Serial: #11513**

Communication System: GPRS 1900; Frequency: 1909.8 MHz; Duty Cycle: 1:4.15

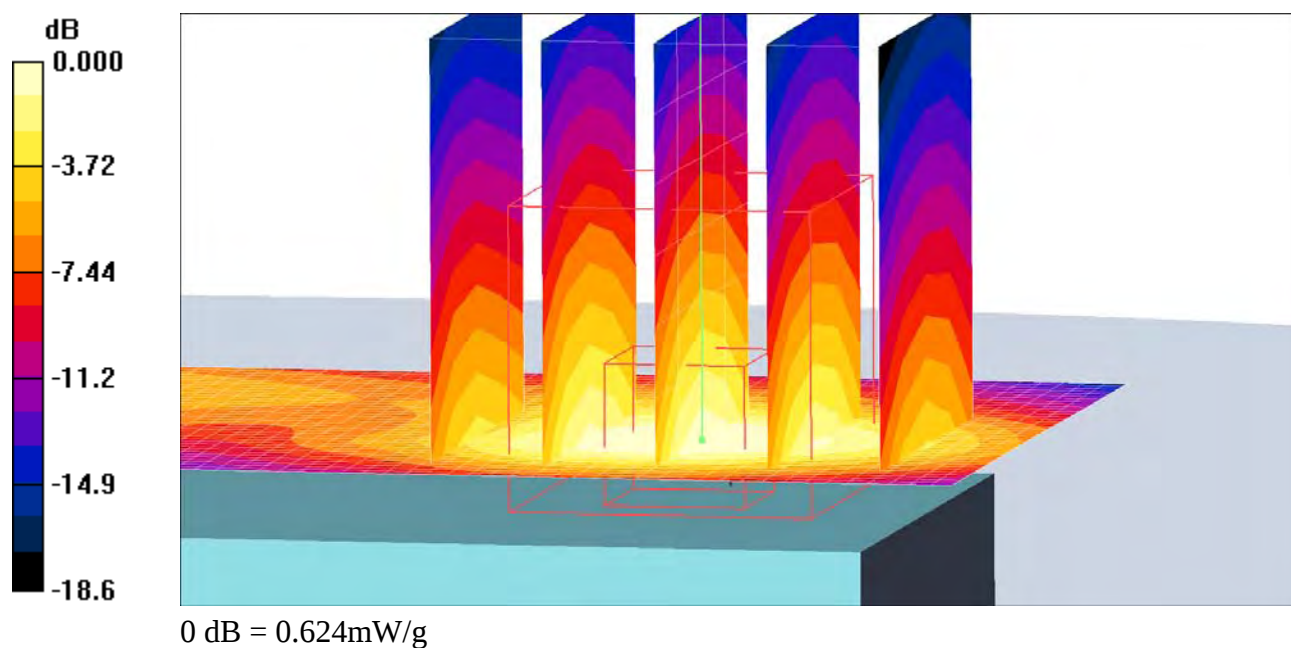
Medium parameters used: $f = 1909.8 \text{ MHz}$; $\sigma = 1.6 \text{ mho/m}$; $\epsilon_r = 51$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section

Measurement Standard: DASY4 (High Precision Assessment)

DASY4 Configuration:

- Probe: ET3DV6 - SN1611; ConvF(4.79, 4.79, 4.79); Calibrated: 12/17/2007
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn449; Calibrated: 12/19/2007
- Phantom: SAM-3; Type: SAM; Serial: 1436
- Measurement SW: DASY4, V4.7 Build 53; Postprocessing SW: SEMCAD, V1.8 Build 172

Body/Area Scan (41x71x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$ Maximum value of SAR (interpolated) = 0.671 mW/g **Body/Zoom Scan (5x5x7)/Cube 0:** Measurement grid: $dx=8\text{mm}$, $dy=8\text{mm}$, $dz=5\text{mm}$ Reference Value = 8.32 V/m ; Power Drift = -0.001 dB Peak SAR (extrapolated) = 1.02 W/kg **SAR(1 g) = 0.560 mW/g ; SAR(10 g) = 0.300 mW/g** Maximum value of SAR (measured) = 0.624 mW/g 

Date/Time: 5/2/2008 2:37:12 PM

Test Laboratory: Sony Ericsson Mobile Communications International AB

Body-Flat15mm-Madonna-1900-Front-To-Back-High**DUT: Madonna; Type: DUT; Serial: #11513**

Communication System: GPRS 1900; Frequency: 1909.8 MHz; Duty Cycle: 1:4.15

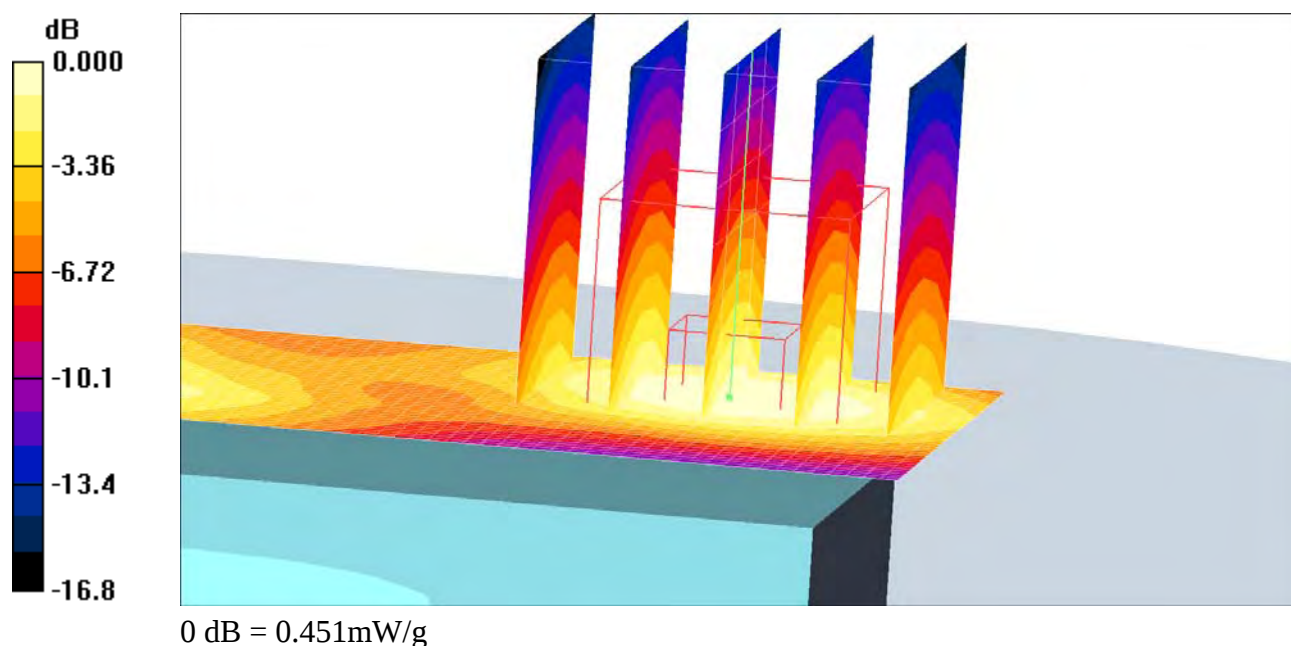
Medium parameters used: $f = 1909.8 \text{ MHz}$; $\sigma = 1.6 \text{ mho/m}$; $\epsilon_r = 51$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section

Measurement Standard: DASY4 (High Precision Assessment)

DASY4 Configuration:

- Probe: ET3DV6 - SN1611; ConvF(4.79, 4.79, 4.79); Calibrated: 12/17/2007
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn449; Calibrated: 12/19/2007
- Phantom: SAM-3; Type: SAM; Serial: 1436
- Measurement SW: DASY4, V4.7 Build 53; Postprocessing SW: SEMCAD, V1.8 Build 172

Body/Area Scan (41x71x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$ Maximum value of SAR (interpolated) = 0.479 mW/g **Body/Zoom Scan (5x5x7)/Cube 0:** Measurement grid: $dx=8\text{mm}$, $dy=8\text{mm}$, $dz=5\text{mm}$ Reference Value = 10.0 V/m ; Power Drift = -0.084 dB Peak SAR (extrapolated) = 0.672 W/kg **SAR(1 g) = 0.416 mW/g ; SAR(10 g) = 0.246 mW/g** Maximum value of SAR (measured) = 0.451 mW/g 

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Test Laboratory: Sony Ericsson Mobile Communications International AB

Body-Flat15mm-Madonna-1900-GPRS-High**DUT: Madonna; Type: DUT; Serial: #11513**

Communication System: GPRS 1900; Frequency: 1909.8 MHz; Duty Cycle: 1:4.15

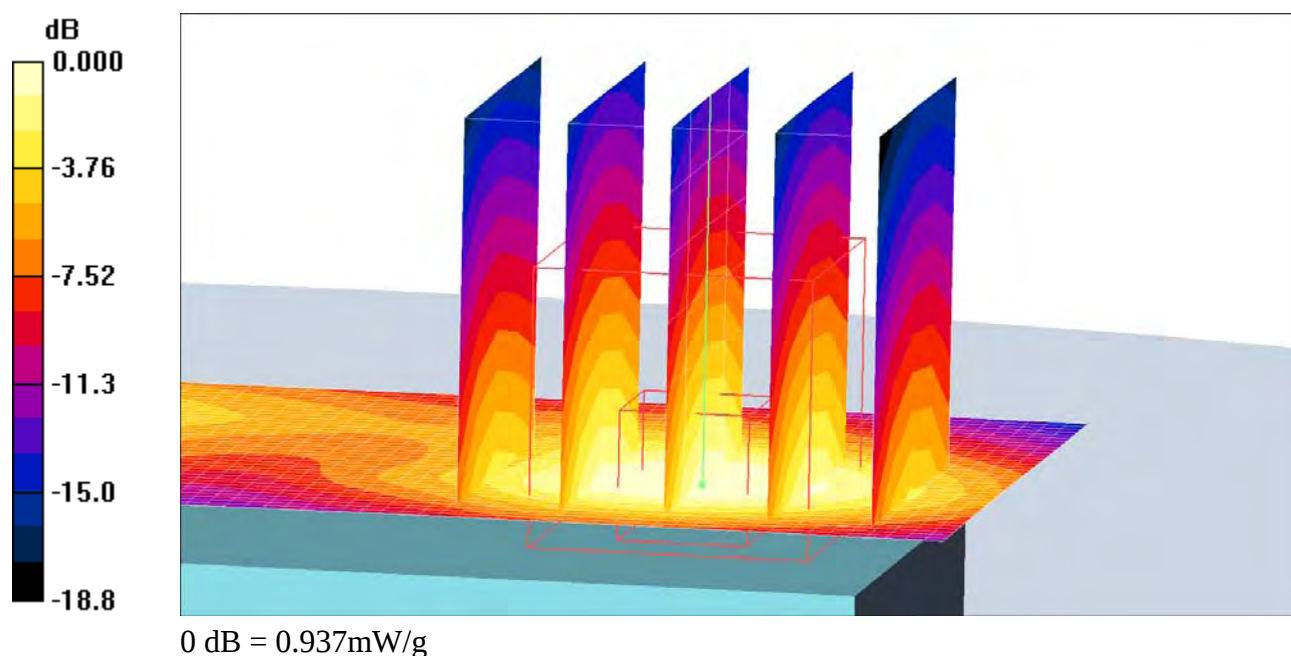
Medium parameters used: $f = 1909.8 \text{ MHz}$; $\sigma = 1.6 \text{ mho/m}$; $\epsilon_r = 51$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section

Measurement Standard: DASY4 (High Precision Assessment)

DASY4 Configuration:

- Probe: ET3DV6 - SN1611; ConvF(4.79, 4.79, 4.79); Calibrated: 12/17/2007
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn449; Calibrated: 12/19/2007
- Phantom: SAM-3; Type: SAM; Serial: 1436
- Measurement SW: DASY4, V4.7 Build 53; Postprocessing SW: SEMCAD, V1.8 Build 172

Body 3/Area Scan (41x71x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$ Maximum value of SAR (interpolated) = 1.04 mW/g **Body 3/Zoom Scan (5x5x7)/Cube 0:** Measurement grid: $dx=8\text{mm}$, $dy=8\text{mm}$, $dz=5\text{mm}$ Reference Value = 10.4 V/m ; Power Drift = -0.086 dB Peak SAR (extrapolated) = 1.52 W/kg **SAR(1 g) = 0.856 mW/g ; SAR(10 g) = 0.460 mW/g** Maximum value of SAR (measured) = 0.937 mW/g 

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Test Laboratory: Sony Ericsson Mobile Communications International AB

Body-Flat15mm-Madonna-1900-GPRS-Low**DUT: Madonna; Type: DUT; Serial: #11513**

Communication System: GPRS 1900; Frequency: 1850.2 MHz; Duty Cycle: 1:4.15

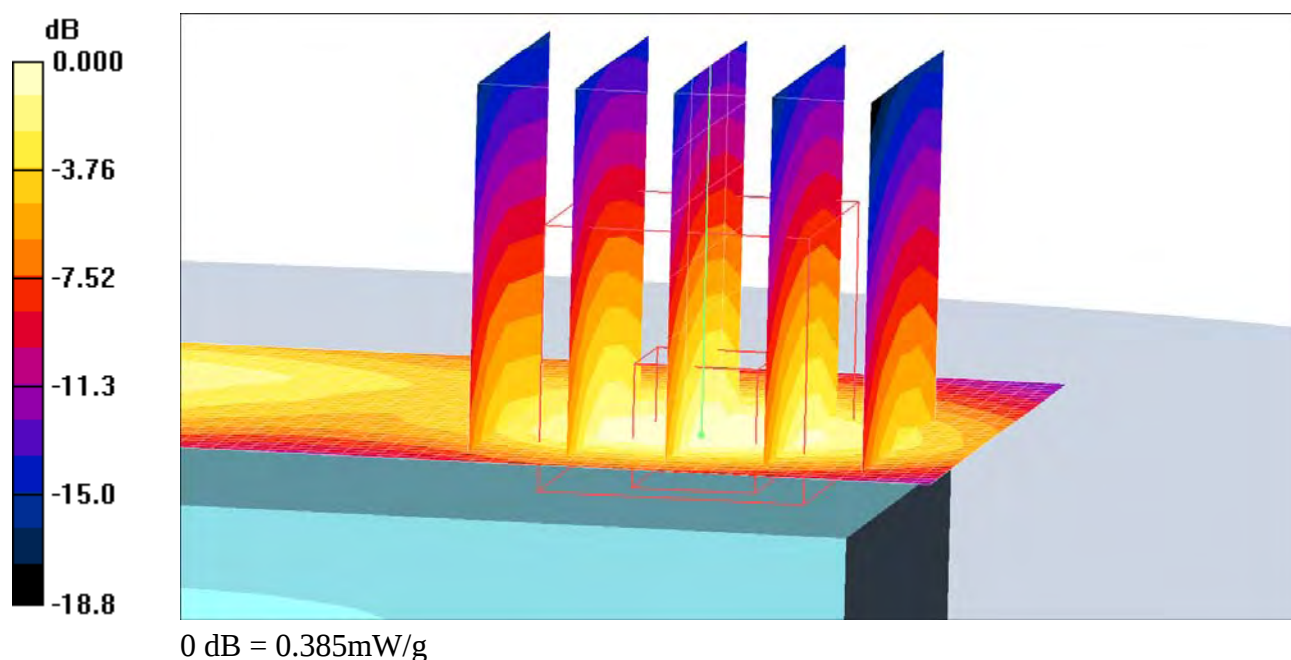
Medium parameters used: $f = 1850.2 \text{ MHz}$; $\sigma = 1.53 \text{ mho/m}$; $\epsilon_r = 51.2$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section

Measurement Standard: DASY4 (High Precision Assessment)

DASY4 Configuration:

- Probe: ET3DV6 - SN1611; ConvF(4.79, 4.79, 4.79); Calibrated: 12/17/2007
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn449; Calibrated: 12/19/2007
- Phantom: SAM-3; Type: SAM; Serial: 1436
- Measurement SW: DASY4, V4.7 Build 53; Postprocessing SW: SEMCAD, V1.8 Build 172

Body/Area Scan (41x71x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$ Maximum value of SAR (interpolated) = 0.418 mW/g **Body/Zoom Scan (5x5x7)/Cube 0:** Measurement grid: $dx=8\text{mm}$, $dy=8\text{mm}$, $dz=5\text{mm}$ Reference Value = 10.4 V/m ; Power Drift = -0.028 dB Peak SAR (extrapolated) = 0.631 W/kg **SAR(1 g) = 0.351 mW/g ; SAR(10 g) = 0.192 mW/g** Maximum value of SAR (measured) = 0.385 mW/g 

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Test Laboratory: Sony Ericsson Mobile Communications International AB

Body-Flat15mm-Madonna-1900-GPRS-Middle**DUT: Madonna; Type: DUT; Serial: #11513**

Communication System: GPRS 1900; Frequency: 1880 MHz; Duty Cycle: 1:4.15

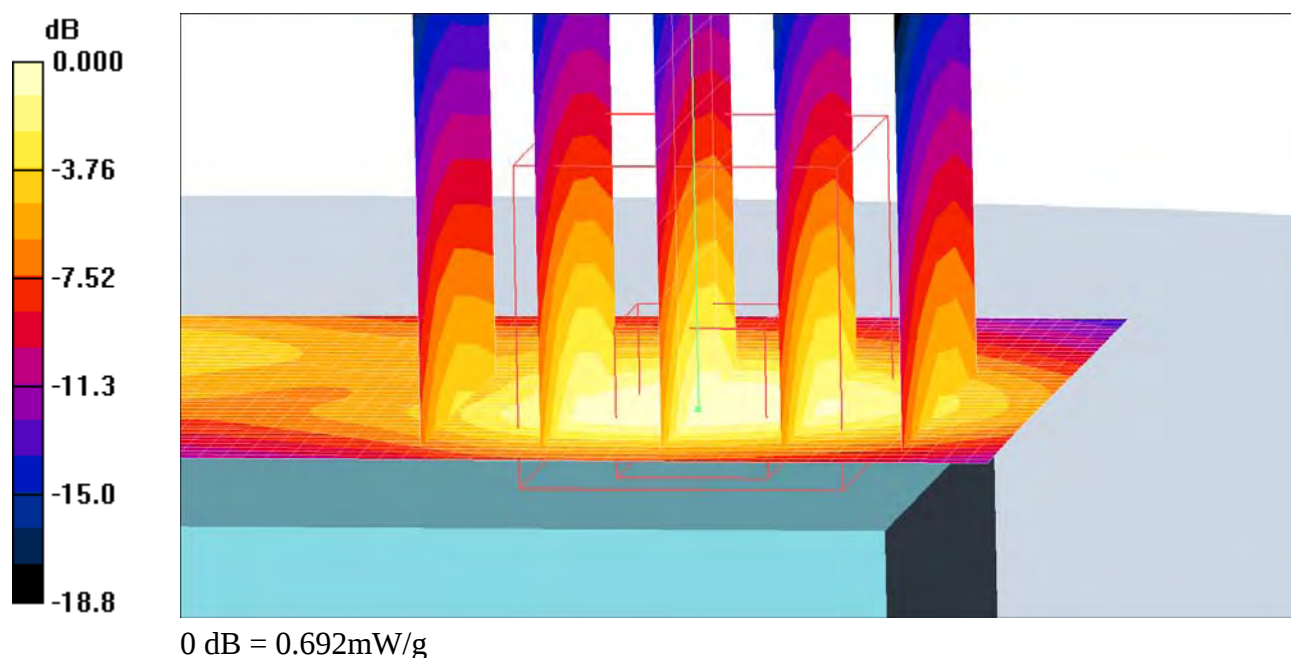
Medium parameters used: $f = 1880 \text{ MHz}$; $\sigma = 1.57 \text{ mho/m}$; $\epsilon_r = 51.1$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section

Measurement Standard: DASY4 (High Precision Assessment)

DASY4 Configuration:

- Probe: ET3DV6 - SN1611; ConvF(4.79, 4.79, 4.79); Calibrated: 12/17/2007
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn449; Calibrated: 12/19/2007
- Phantom: SAM-3; Type: SAM; Serial: 1436
- Measurement SW: DASY4, V4.7 Build 53; Postprocessing SW: SEMCAD, V1.8 Build 172

Body 2/Area Scan (41x71x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$ Maximum value of SAR (interpolated) = 0.747 mW/g **Body 2/Zoom Scan (5x5x7)/Cube 0:** Measurement grid: $dx=8\text{mm}$, $dy=8\text{mm}$, $dz=5\text{mm}$ Reference Value = 10.8 V/m ; Power Drift = -0.044 dB Peak SAR (extrapolated) = 1.12 W/kg **SAR(1 g) = 0.626 mW/g ; SAR(10 g) = 0.338 mW/g** Maximum value of SAR (measured) = 0.692 mW/g 

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Test Laboratory: Sony Ericsson Mobile Communications International AB

Body-Flat15mm-Madonna-1900-PHF-High**DUT: Madonna; Type: DUT; Serial: #11513**

Communication System: DCS 1900; Frequency: 1909.8 MHz; Duty Cycle: 1:8.3

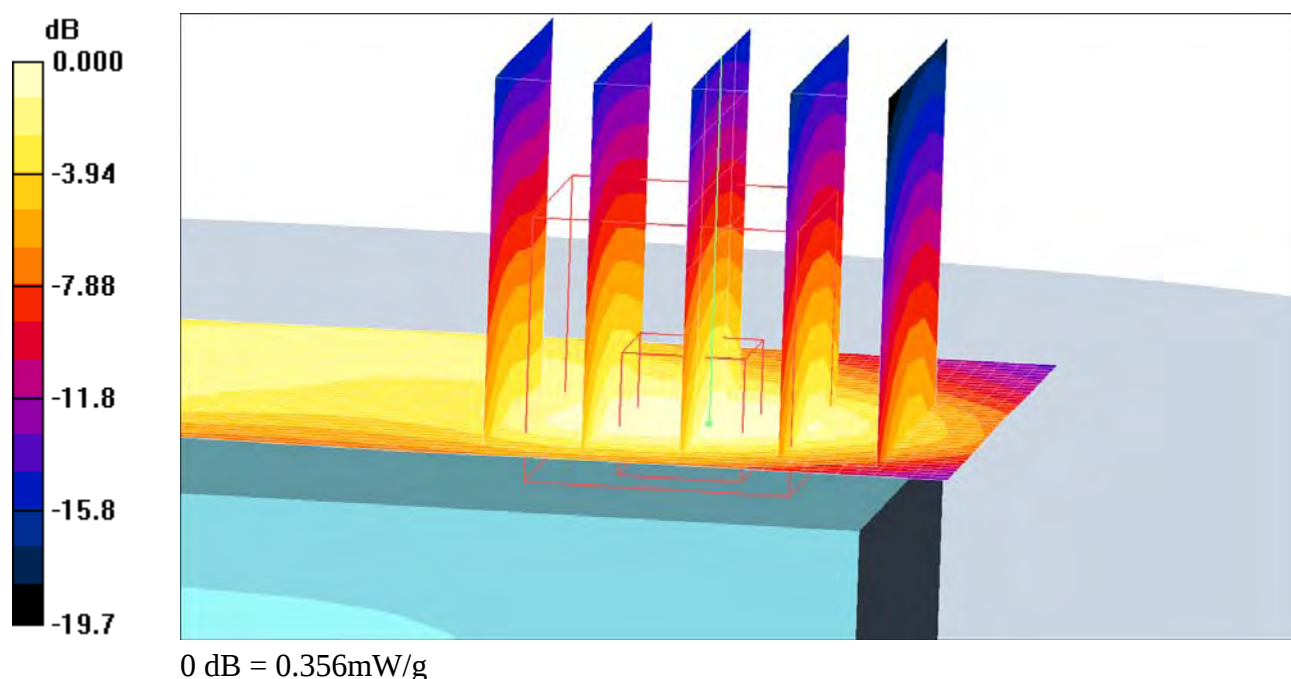
Medium parameters used: $f = 1909.8 \text{ MHz}$; $\sigma = 1.6 \text{ mho/m}$; $\epsilon_r = 51$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section

Measurement Standard: DASY4 (High Precision Assessment)

DASY4 Configuration:

- Probe: ET3DV6 - SN1611; ConvF(4.79, 4.79, 4.79); Calibrated: 12/17/2007
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn449; Calibrated: 12/19/2007
- Phantom: SAM-3; Type: SAM; Serial: 1436
- Measurement SW: DASY4, V4.7 Build 53; Postprocessing SW: SEMCAD, V1.8 Build 172

Body/Area Scan (41x71x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$ Maximum value of SAR (interpolated) = 0.377 mW/g **Body/Zoom Scan (5x5x7)/Cube 0:** Measurement grid: $dx=8\text{mm}$, $dy=8\text{mm}$, $dz=5\text{mm}$ Reference Value = 11.5 V/m ; Power Drift = 0.036 dB Peak SAR (extrapolated) = 0.618 W/kg **SAR(1 g) = 0.327 mW/g ; SAR(10 g) = 0.175 mW/g** Maximum value of SAR (measured) = 0.356 mW/g 

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Test Laboratory: Sony Ericsson Mobile Communications International AB

Body-Flat15mm-Madonna-850-Bluetooth-High**DUT: Madonna; Type: DUT; Serial:#11513**

Communication System: GSM 850; Frequency: 848.8 MHz; Duty Cycle: 1:8.3

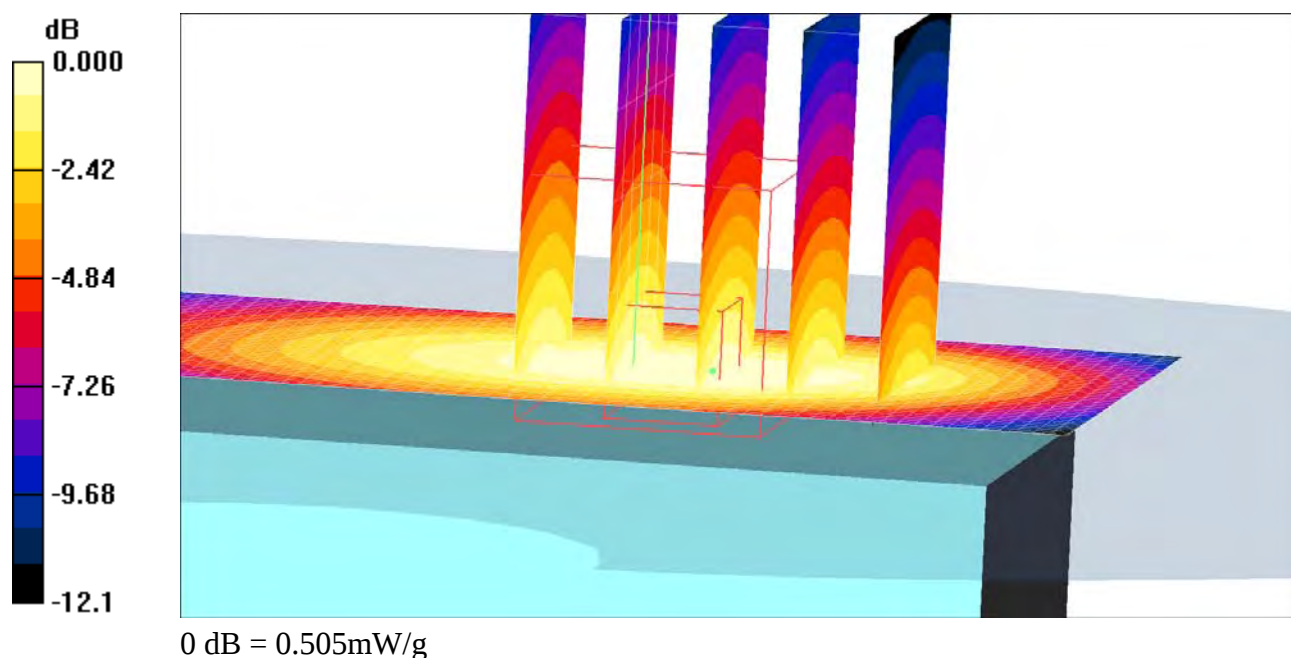
Medium parameters used: $f = 848.8 \text{ MHz}$; $\sigma = 0.99 \text{ mho/m}$; $\epsilon_r = 54.9$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section

Measurement Standard: DASY4 (High Precision Assessment)

DASY4 Configuration:

- Probe: ET3DV6 - SN1611; ConvF(6.49, 6.49, 6.49); Calibrated: 12/17/2007
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn449; Calibrated: 12/19/2007
- Phantom: SAM-3; Type: SAM; Serial: 1436
- Measurement SW: DASY4, V4.7 Build 53; Postprocessing SW: SEMCAD, V1.8 Build 172

Body 3/Area Scan (41x71x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$ Maximum value of SAR (interpolated) = 0.508 mW/g **Body 3/Zoom Scan (7x5x5)/Cube 0:** Measurement grid: $dx=5\text{mm}$, $dy=8\text{mm}$, $dz=8\text{mm}$ Reference Value = 21.4 V/m ; Power Drift = 0.009 dB Peak SAR (extrapolated) = 0.655 W/kg **SAR(1 g) = 0.475 mW/g ; SAR(10 g) = 0.328 mW/g** Maximum value of SAR (measured) = 0.505 mW/g 

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Test Laboratory: Sony Ericsson Mobile Communications International AB

Body-Flat15mm-Madonna-850-Bluetooth-Low**DUT: Madonna; Type: DUT; Serial: #11513**

Communication System: GSM 850; Frequency: 824.2 MHz; Duty Cycle: 1:8.3

Medium parameters used: $f = 824.2$ MHz; $\sigma = 0.97$ mho/m; $\epsilon_r = 55.1$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

Measurement Standard: DASY4 (High Precision Assessment)

DASY4 Configuration:

- Probe: ET3DV6 - SN1611; ConvF(6.49, 6.49, 6.49); Calibrated: 12/17/2007
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn449; Calibrated: 12/19/2007
- Phantom: SAM-3; Type: SAM; Serial: 1436
- Measurement SW: DASY4, V4.7 Build 53; Postprocessing SW: SEMCAD, V1.8 Build 172

Body/Area Scan (41x71x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.374 mW/g

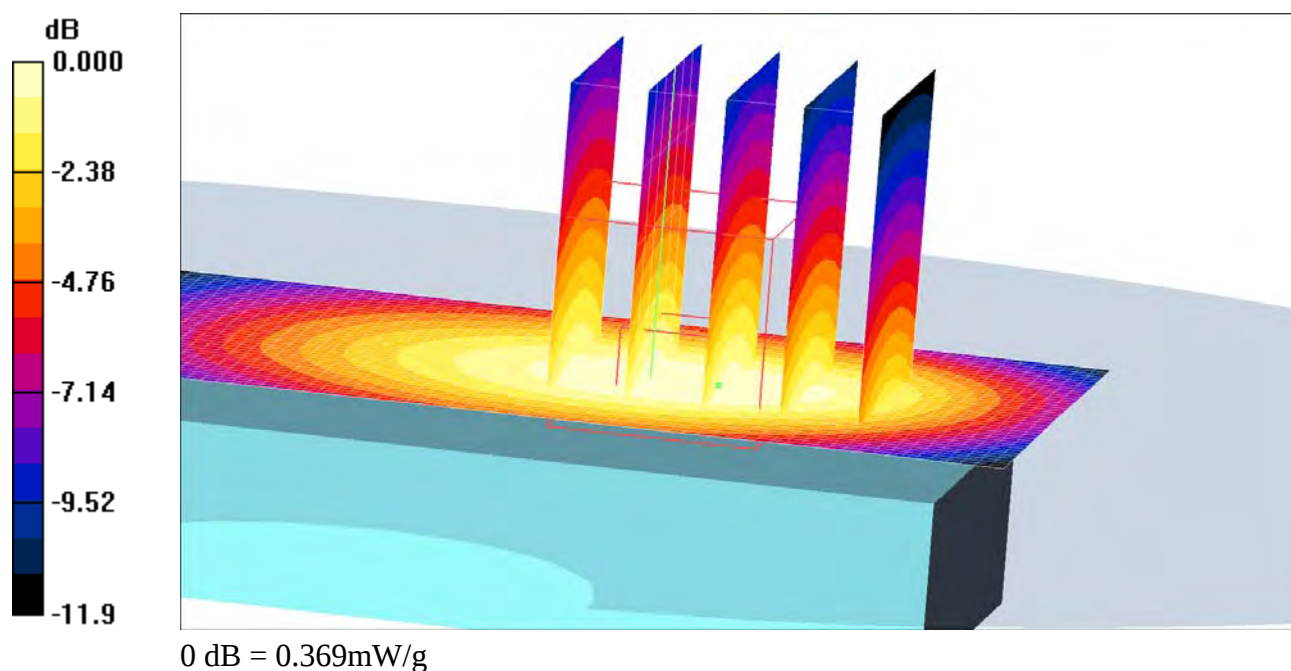
Body/Zoom Scan (7x5x5)/Cube 0: Measurement grid: dx=5mm, dy=8mm, dz=8mm

Reference Value = 18.4 V/m; Power Drift = -0.002 dB

Peak SAR (extrapolated) = 0.481 W/kg

SAR(1 g) = 0.348 mW/g; SAR(10 g) = 0.240 mW/g

Maximum value of SAR (measured) = 0.369 mW/g



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Test Laboratory: Sony Ericsson Mobile Communications International AB

Body-Flat15mm-Madonna-850-Bluetooth-Middle**DUT: Madonna; Type: DUT; Serial: #11513**

Communication System: GSM 850; Frequency: 836.6 MHz; Duty Cycle: 1:8.3

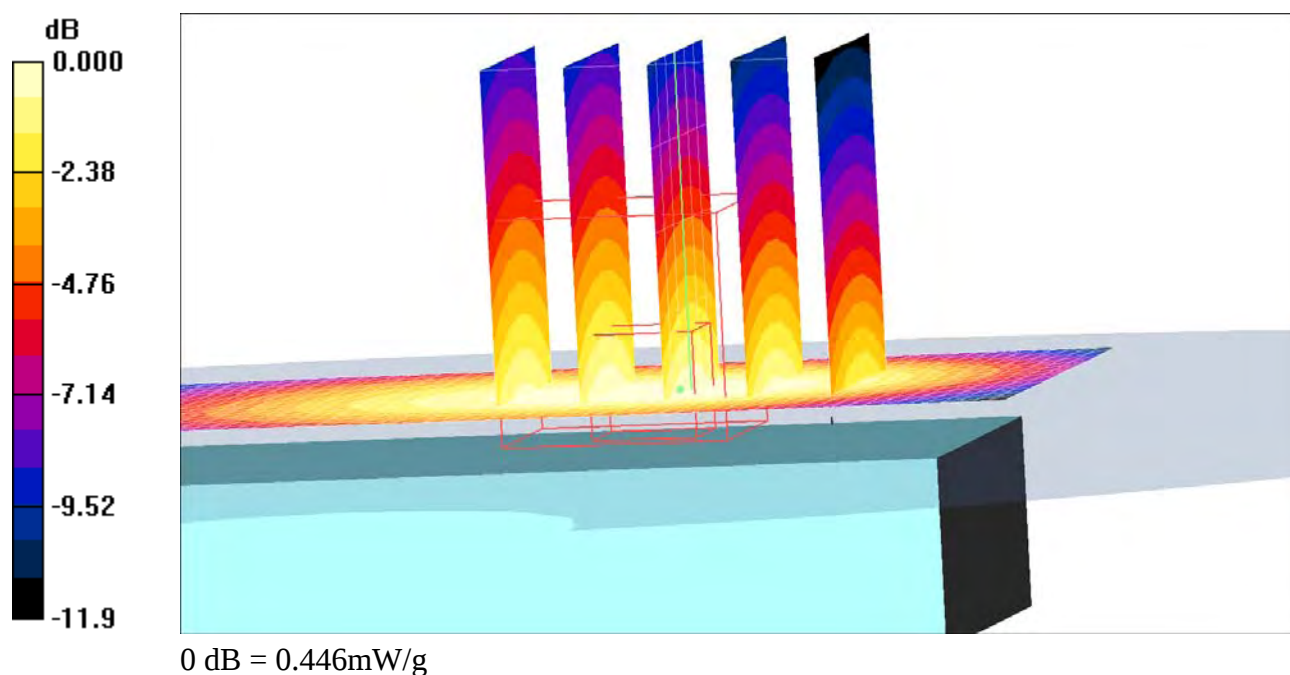
Medium parameters used: $f = 836.6 \text{ MHz}$; $\sigma = 0.98 \text{ mho/m}$; $\epsilon_r = 55$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section

Measurement Standard: DASY4 (High Precision Assessment)

DASY4 Configuration:

- Probe: ET3DV6 - SN1611; ConvF(6.49, 6.49, 6.49); Calibrated: 12/17/2007
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn449; Calibrated: 12/19/2007
- Phantom: SAM-3; Type: SAM; Serial: 1436
- Measurement SW: DASY4, V4.7 Build 53; Postprocessing SW: SEMCAD, V1.8 Build 172

Body 2/Area Scan (41x71x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$ Maximum value of SAR (interpolated) = 0.449 mW/g **Body 2/Zoom Scan (7x5x5)/Cube 0:** Measurement grid: $dx=5\text{mm}$, $dy=8\text{mm}$, $dz=8\text{mm}$ Reference Value = 20.2 V/m ; Power Drift = 0.035 dB Peak SAR (extrapolated) = 0.577 W/kg **SAR(1 g) = 0.420 mW/g ; SAR(10 g) = 0.290 mW/g** Maximum value of SAR (measured) = 0.446 mW/g 

Date/Time: 4/29/2008 4:45:21 PM

Test Laboratory: Sony Ericsson Mobile Communications International AB

Body-Flat15mm-Madonna-850-Edge-High**DUT: Madonna; Type: DUT; Serial: #11513**

Communication System: GSM 850; Frequency: 848.8 MHz; Duty Cycle: 1:4.15

Medium parameters used: $f = 848.8$ MHz; $\sigma = 0.99$ mho/m; $\epsilon_r = 54.9$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

Measurement Standard: DASY4 (High Precision Assessment)

DASY4 Configuration:

- Probe: ET3DV6 - SN1611; ConvF(6.49, 6.49, 6.49); Calibrated: 12/17/2007
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn449; Calibrated: 12/19/2007
- Phantom: SAM-3; Type: SAM; Serial: 1436
- Measurement SW: DASY4, V4.7 Build 53; Postprocessing SW: SEMCAD, V1.8 Build 172

Body/Area Scan (41x71x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.437 mW/g

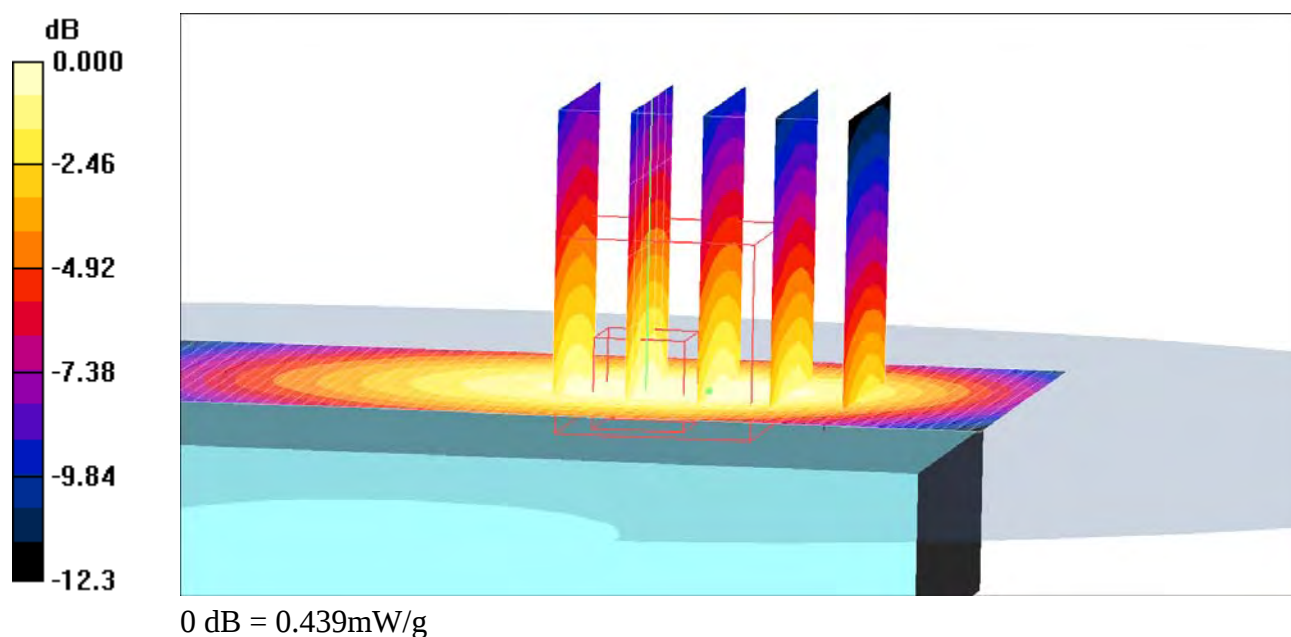
Body/Zoom Scan (7x5x5)/Cube 0: Measurement grid: dx=5mm, dy=8mm, dz=8mm

Reference Value = 20.0 V/m; Power Drift = 0.072 dB

Peak SAR (extrapolated) = 0.547 W/kg

SAR(1 g) = 0.406 mW/g; SAR(10 g) = 0.279 mW/g

Maximum value of SAR (measured) = 0.439 mW/g



Date/Time: 4/29/2008 4:58:29 PM

Test Laboratory: Sony Ericsson Mobile Communications International AB

Body-Flat15mm-Madonna-850-Front-to-Phantom-High**DUT: Madonna; Type: DUT; Serial: #11513**

Communication System: GSM 850; Frequency: 848.8 MHz; Duty Cycle: 1:4.15

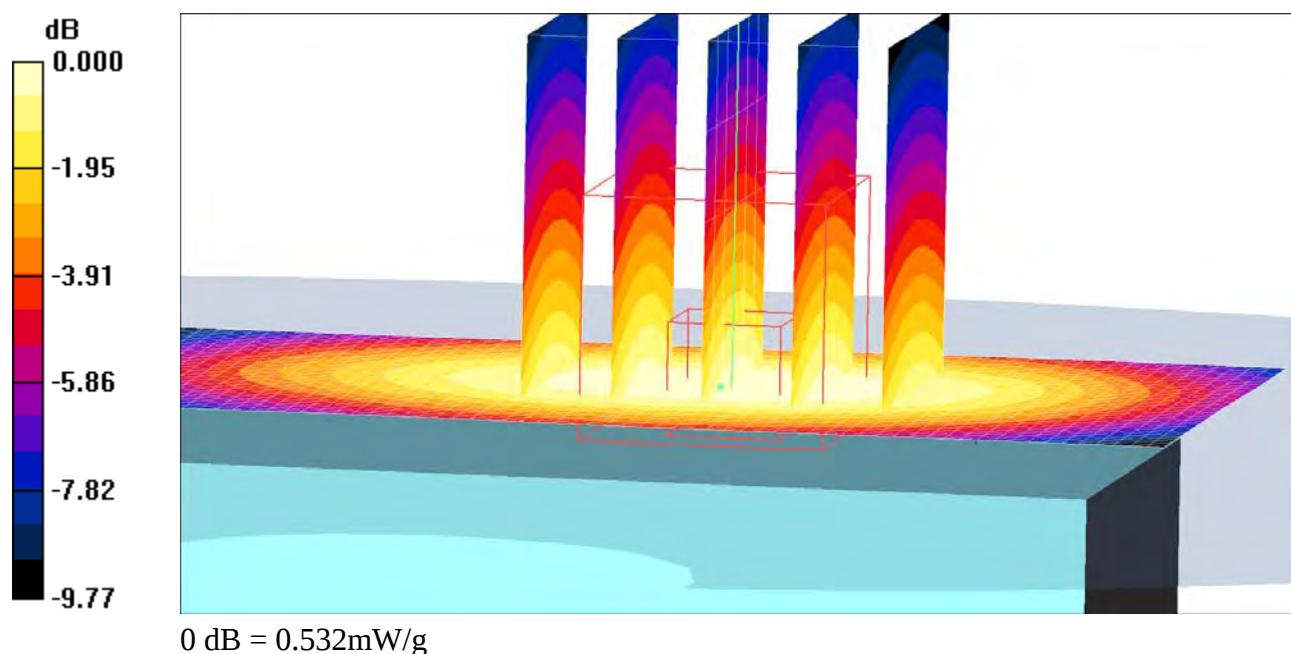
Medium parameters used: $f = 848.8 \text{ MHz}$; $\sigma = 0.99 \text{ mho/m}$; $\epsilon_r = 54.9$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section

Measurement Standard: DASY4 (High Precision Assessment)

DASY4 Configuration:

- Probe: ET3DV6 - SN1611; ConvF(6.49, 6.49, 6.49); Calibrated: 12/17/2007
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn449; Calibrated: 12/19/2007
- Phantom: SAM-3; Type: SAM; Serial: 1436
- Measurement SW: DASY4, V4.7 Build 53; Postprocessing SW: SEMCAD, V1.8 Build 172

Body/Area Scan (41x71x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$ Maximum value of SAR (interpolated) = 0.529 mW/g **Body/Zoom Scan (7x5x5)/Cube 0:** Measurement grid: $dx=5\text{mm}$, $dy=8\text{mm}$, $dz=8\text{mm}$ Reference Value = 23.6 V/m ; Power Drift = -0.083 dB Peak SAR (extrapolated) = 0.638 W/kg **SAR(1 g) = 0.500 mW/g ; SAR(10 g) = 0.364 mW/g** Maximum value of SAR (measured) = 0.532 mW/g 

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Test Laboratory: Sony Ericsson Mobile Communications International AB

Body-Flat15mm-Madonna-850GPRS-High**DUT: Madonna; Type: DUT; Serial: #11513**

Communication System: GSM 850; Frequency: 848.8 MHz; Duty Cycle: 1:4.15

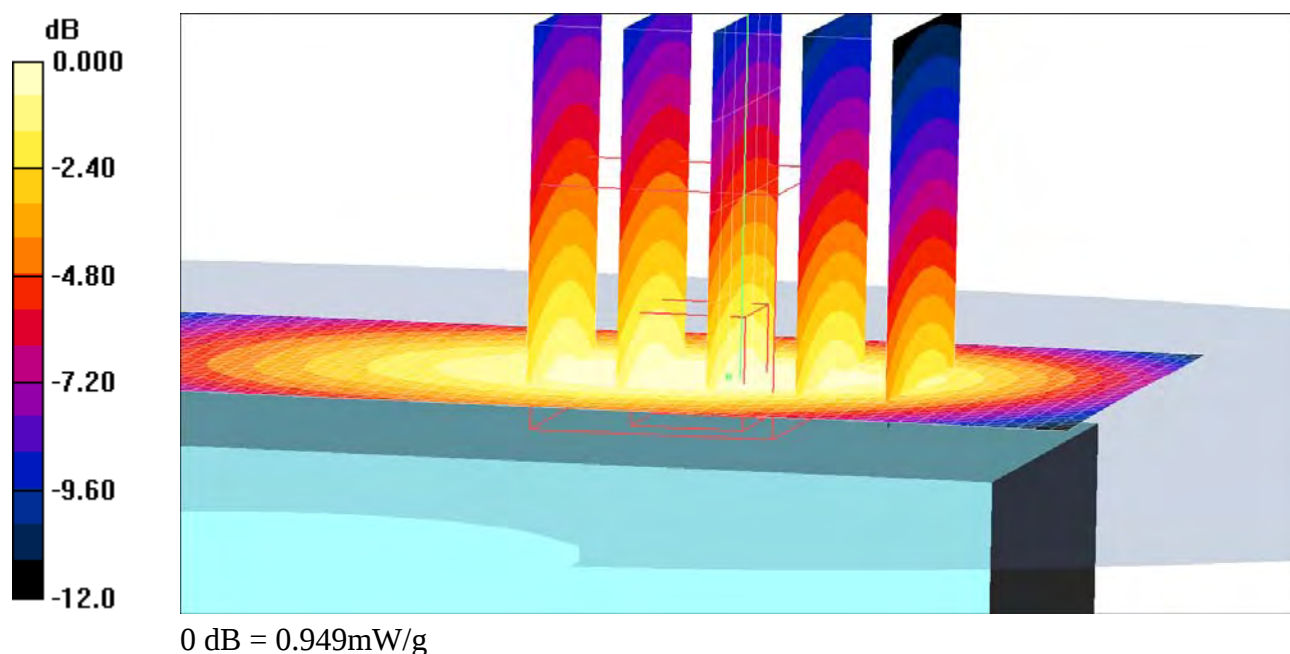
Medium parameters used: $f = 848.8 \text{ MHz}$; $\sigma = 0.99 \text{ mho/m}$; $\epsilon_r = 54.9$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section

Measurement Standard: DASY4 (High Precision Assessment)

DASY4 Configuration:

- Probe: ET3DV6 - SN1611; ConvF(6.49, 6.49, 6.49); Calibrated: 12/17/2007
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn449; Calibrated: 12/19/2007
- Phantom: SAM-3; Type: SAM; Serial: 1436
- Measurement SW: DASY4, V4.7 Build 53; Postprocessing SW: SEMCAD, V1.8 Build 172

Body 3/Area Scan (41x71x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$ Maximum value of SAR (interpolated) = 0.957 mW/g **Body 3/Zoom Scan (7x5x5)/Cube 0:** Measurement grid: $dx=5\text{mm}$, $dy=8\text{mm}$, $dz=8\text{mm}$ Reference Value = 29.5 V/m ; Power Drift = 0.011 dB Peak SAR (extrapolated) = 1.24 W/kg **SAR(1 g) = 0.893 mW/g ; SAR(10 g) = 0.615 mW/g** Maximum value of SAR (measured) = 0.949 mW/g 

Date/Time: 4/29/2008 3:19:33 PM

Test Laboratory: Sony Ericsson Mobile Communications International AB

Body-Flat15mm-Madonna-850GPRS-Low**DUT: Madonna; Type: DUT; Serial:#11513**

Communication System: GSM 850; Frequency: 824.2 MHz; Duty Cycle: 1:4.15

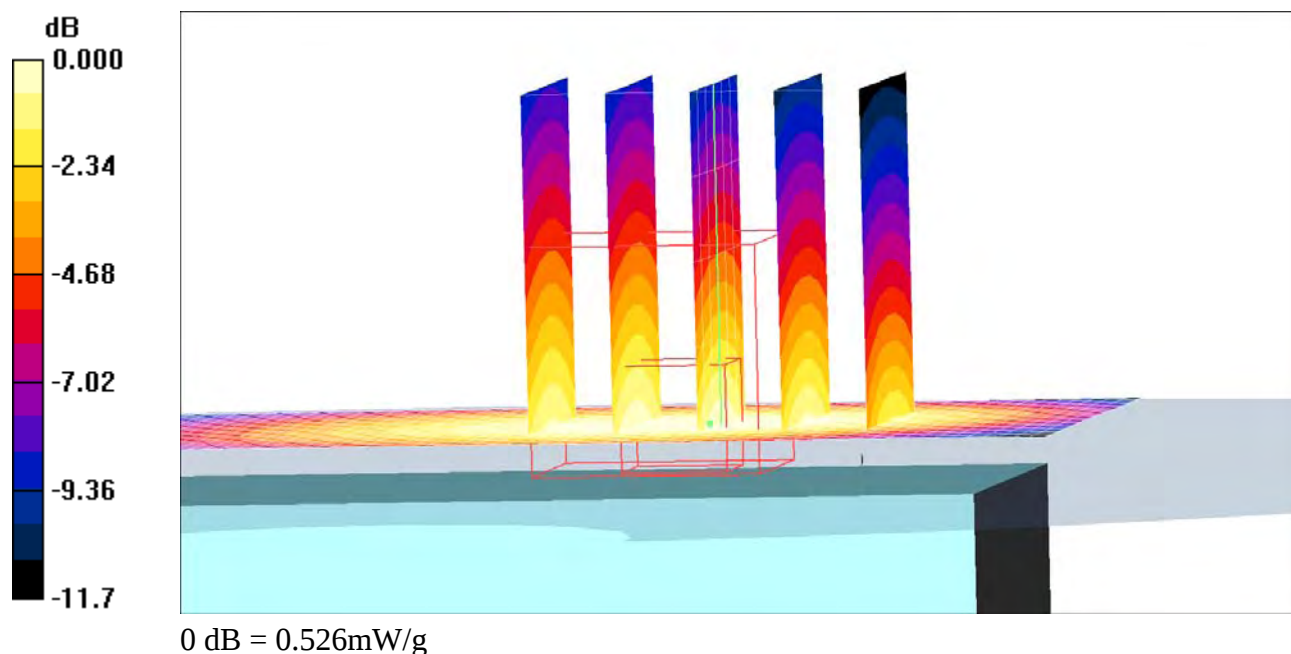
Medium parameters used: $f = 824.2 \text{ MHz}$; $\sigma = 0.97 \text{ mho/m}$; $\epsilon_r = 55.1$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section

Measurement Standard: DASY4 (High Precision Assessment)

DASY4 Configuration:

- Probe: ET3DV6 - SN1611; ConvF(6.49, 6.49, 6.49); Calibrated: 12/17/2007
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn449; Calibrated: 12/19/2007
- Phantom: SAM-3; Type: SAM; Serial: 1436
- Measurement SW: DASY4, V4.7 Build 53; Postprocessing SW: SEMCAD, V1.8 Build 172

Body/Area Scan (41x71x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$ Maximum value of SAR (interpolated) = 0.525 mW/g **Body/Zoom Scan (7x5x5)/Cube 0:** Measurement grid: $dx=5\text{mm}$, $dy=8\text{mm}$, $dz=8\text{mm}$ Reference Value = 21.9 V/m ; Power Drift = 0.025 dB Peak SAR (extrapolated) = 0.678 W/kg **SAR(1 g) = 0.492 mW/g ; SAR(10 g) = 0.341 mW/g** Maximum value of SAR (measured) = 0.526 mW/g 

Date/Time: 4/29/2008 3:07:01 PM

Test Laboratory: Sony Ericsson Mobile Communications International AB

Body-Flat15mm-Madonna-850GPRS-Middle**DUT: Madonna; Type: DUT; Serial: #11513**

Communication System: GSM 850; Frequency: 836.6 MHz; Duty Cycle: 1:4.15

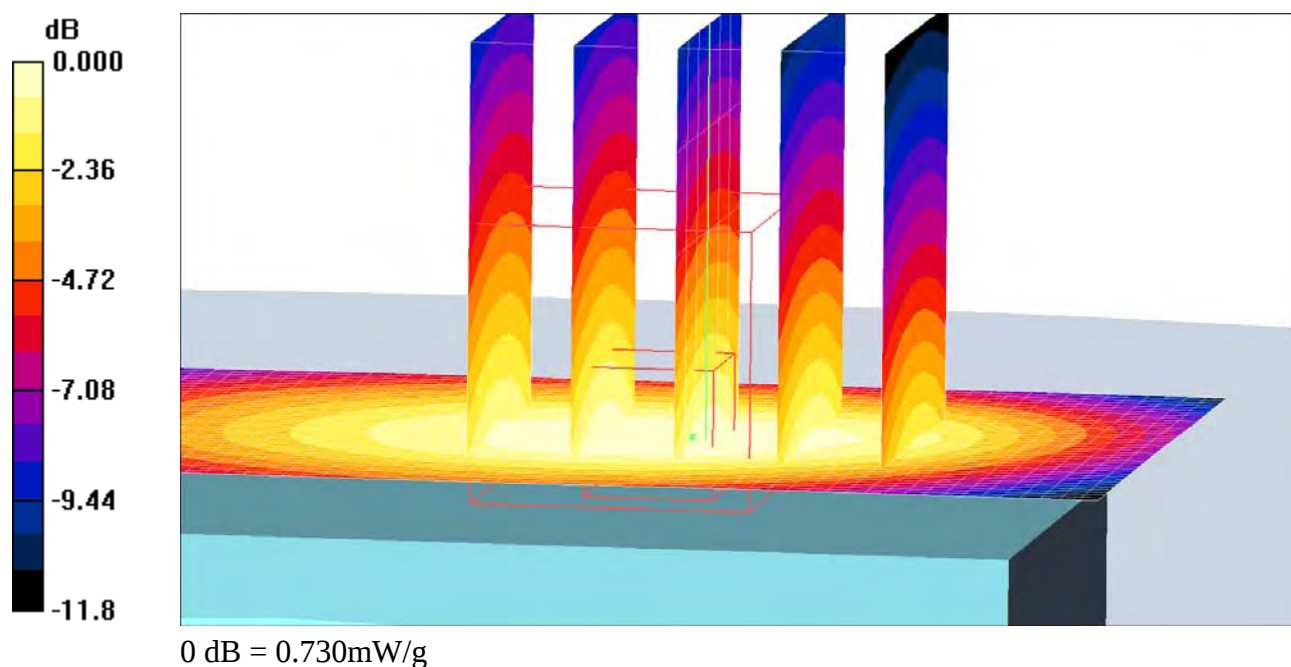
Medium parameters used: $f = 836.6 \text{ MHz}$; $\sigma = 0.98 \text{ mho/m}$; $\epsilon_r = 55$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section

Measurement Standard: DASY4 (High Precision Assessment)

DASY4 Configuration:

- Probe: ET3DV6 - SN1611; ConvF(6.49, 6.49, 6.49); Calibrated: 12/17/2007
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn449; Calibrated: 12/19/2007
- Phantom: SAM-3; Type: SAM; Serial: 1436
- Measurement SW: DASY4, V4.7 Build 53; Postprocessing SW: SEMCAD, V1.8 Build 172

Body 2/Area Scan (41x71x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$ Maximum value of SAR (interpolated) = 0.727 mW/g **Body 2/Zoom Scan (7x5x5)/Cube 0:** Measurement grid: $dx=5\text{mm}$, $dy=8\text{mm}$, $dz=8\text{mm}$ Reference Value = 25.8 V/m ; Power Drift = 0.021 dB Peak SAR (extrapolated) = 0.943 W/kg **SAR(1 g) = 0.684 mW/g ; SAR(10 g) = 0.473 mW/g** Maximum value of SAR (measured) = 0.730 mW/g 

Date/Time: 4/29/2008 4:28:09 PM

Test Laboratory: Sony Ericsson Mobile Communications International AB

Body-Flat15mm-Madonna-850-PHF-High**DUT: Madonna; Type: DUT; Serial: #11513**

Communication System: GSM 850; Frequency: 848.8 MHz; Duty Cycle: 1:8.3

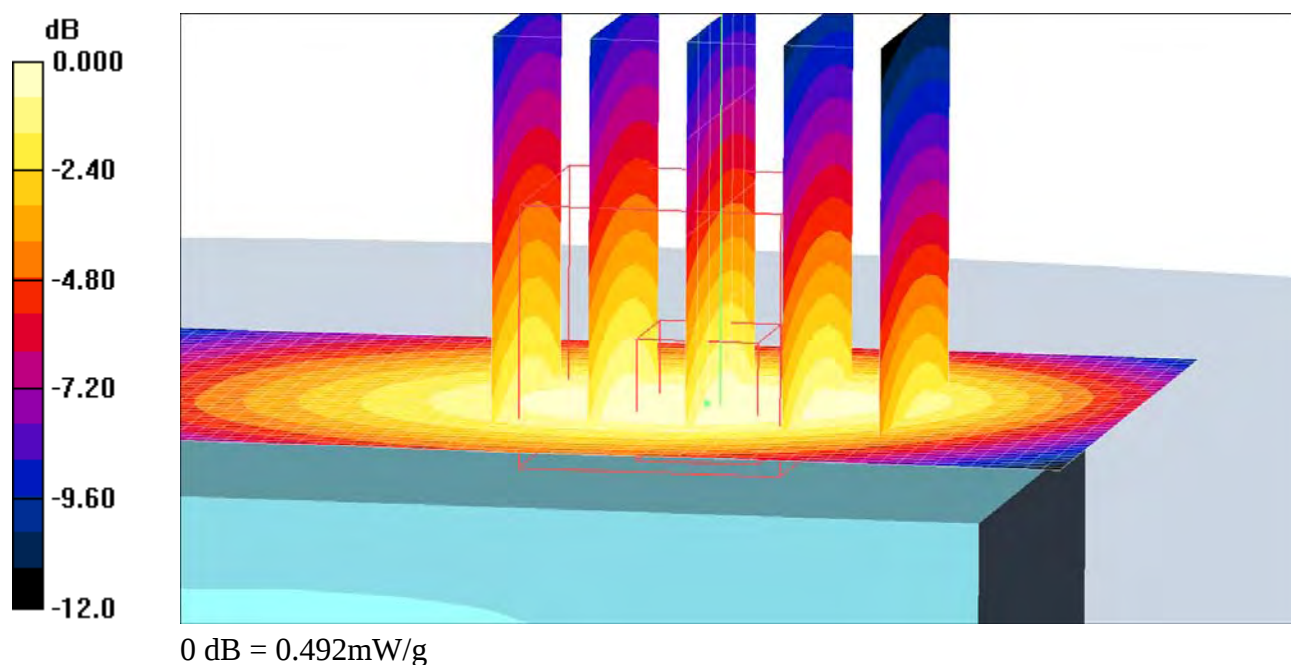
Medium parameters used: $f = 848.8 \text{ MHz}$; $\sigma = 0.99 \text{ mho/m}$; $\epsilon_r = 54.9$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section

Measurement Standard: DASY4 (High Precision Assessment)

DASY4 Configuration:

- Probe: ET3DV6 - SN1611; ConvF(6.49, 6.49, 6.49); Calibrated: 12/17/2007
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn449; Calibrated: 12/19/2007
- Phantom: SAM-3; Type: SAM; Serial: 1436
- Measurement SW: DASY4, V4.7 Build 53; Postprocessing SW: SEMCAD, V1.8 Build 172

Body/Area Scan (41x71x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$ Maximum value of SAR (interpolated) = 0.492 mW/g **Body/Zoom Scan (7x5x5)/Cube 0:** Measurement grid: $dx=5\text{mm}$, $dy=8\text{mm}$, $dz=8\text{mm}$ Reference Value = 20.0 V/m ; Power Drift = -0.019 dB Peak SAR (extrapolated) = 0.641 W/kg **SAR(1 g) = 0.458 mW/g ; SAR(10 g) = 0.312 mW/g** Maximum value of SAR (measured) = 0.492 mW/g 

Date/Time: 5/1/2008 1:00:38 PM

Test Laboratory: Sony Ericsson Mobile Communications International AB

Madonna-LeftHandSide-GSM1900-Tilt-Middle**DUT: Madonna; Type: DUT; Serial: #11513**

Communication System: DCS 1900; Frequency: 1880 MHz; Duty Cycle: 1:8.3

Medium parameters used: $f = 1880$ MHz; $\sigma = 1.43$ mho/m; $\epsilon_r = 38.4$; $\rho = 1000$ kg/m³

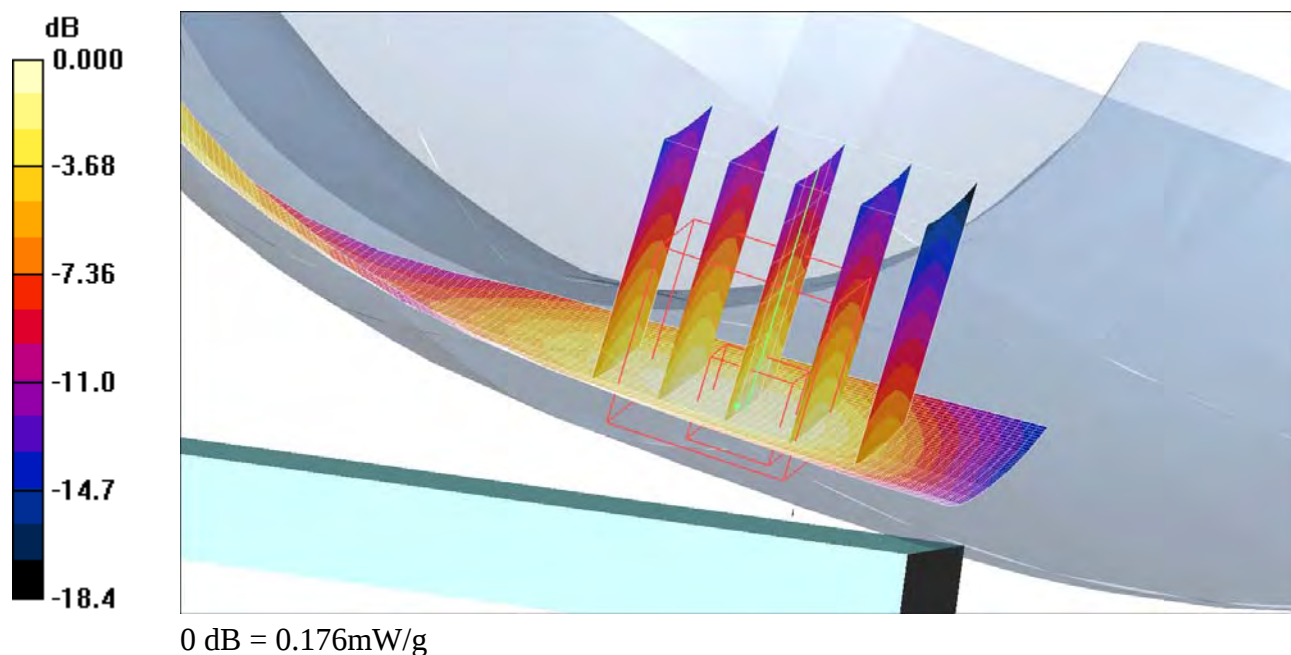
Phantom section: Left Section

Measurement Standard: DASY4 (High Precision Assessment)

DASY4 Configuration:

- Probe: ET3DV6 - SN1611; ConvF(5.17, 5.17, 5.17); Calibrated: 12/17/2007
 - Sensor-Surface: 4mm (Mechanical Surface Detection)
 - Electronics: DAE3 Sn449; Calibrated: 12/19/2007
 - Phantom: SAM-1; Type: SAM; Serial: 1437
 - Measurement SW: DASY4, V4.7 Build 53; Postprocessing SW: SEMCAD, V1.8 Build 172
- Tilt position - Middle/Area Scan (61x121x1):** Measurement grid: dx=10mm, dy=10mm
Maximum value of SAR (interpolated) = 0.179 mW/g

Tilt position - Middle/Zoom Scan (5x5x7) (5x5x7)/Cube 0: Measurement grid:
dx=8mm, dy=8mm, dz=5mm
Reference Value = 10.1 V/m; Power Drift = -0.121 dB
Peak SAR (extrapolated) = 0.238 W/kg
SAR(1 g) = 0.161 mW/g; SAR(10 g) = 0.098 mW/g
Maximum value of SAR (measured) = 0.176 mW/g



Date/Time: 5/1/2008 12:05:12 PM

Test Laboratory: Sony Ericsson Mobile Communications International AB

Madonna-LeftHandSide-GSM1900-Touch-High**DUT: Madonna; Type: DUT; Serial: #11513**

Communication System: DCS 1900; Frequency: 1909.8 MHz; Duty Cycle: 1:8.3

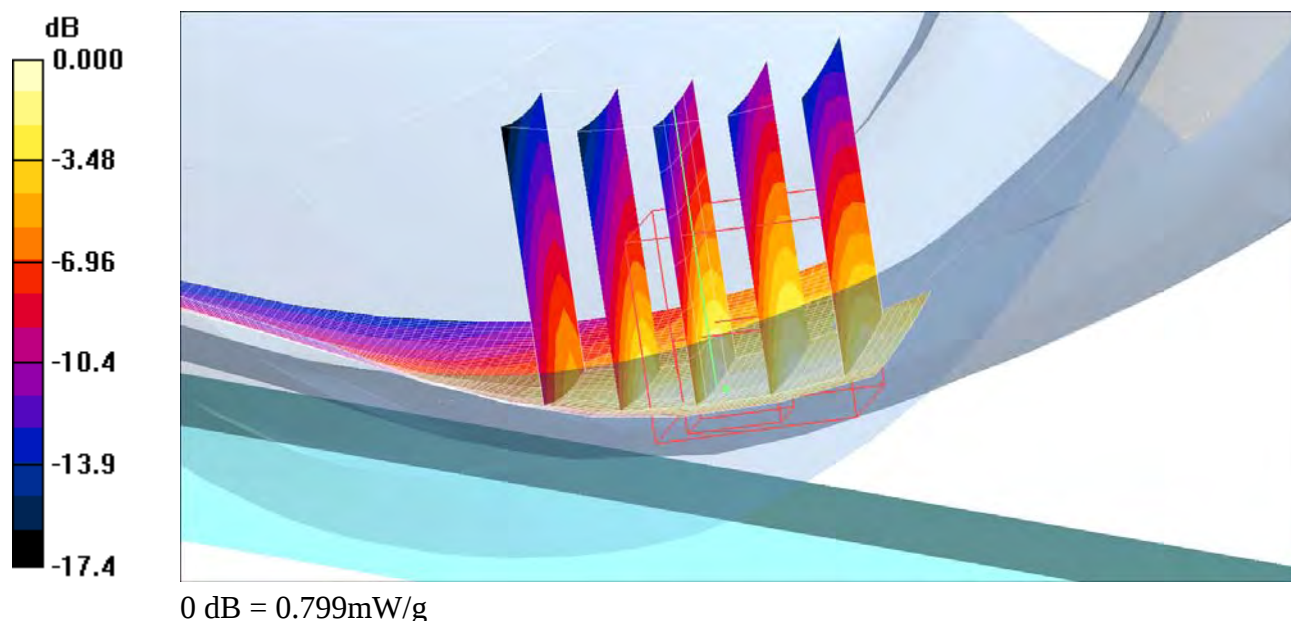
Medium parameters used: $f = 1909.8 \text{ MHz}$; $\sigma = 1.47 \text{ mho/m}$; $\epsilon_r = 38.3$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Left Section

Measurement Standard: DASY4 (High Precision Assessment)

DASY4 Configuration:

- Probe: ET3DV6 - SN1611; ConvF(5.17, 5.17, 5.17); Calibrated: 12/17/2007
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn449; Calibrated: 12/19/2007
- Phantom: SAM-1; Type: SAM; Serial: 1437
- Measurement SW: DASY4, V4.7 Build 53; Postprocessing SW: SEMCAD, V1.8 Build 172

Touch - High/Area Scan (61x121x1): Measurement grid: $dx=10\text{mm}$, $dy=10\text{mm}$ Maximum value of SAR (interpolated) = 0.841 mW/g **Touch - High/Zoom Scan (5x5x7) (5x5x7)/Cube 0:** Measurement grid: $dx=8\text{mm}$, $dy=8\text{mm}$, $dz=5\text{mm}$ Reference Value = 7.92 V/m ; Power Drift = 0.003 dB Peak SAR (extrapolated) = 1.21 W/kg **SAR(1 g) = 0.722 mW/g ; SAR(10 g) = 0.419 mW/g** Maximum value of SAR (measured) = 0.799 mW/g 

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Test Laboratory: Sony Ericsson Mobile Communications International AB

Madonna-LeftHandSide-GSM1900-Touch-Low**DUT: Madonna; Type: DUT; Serial: #11513**

Communication System: DCS 1900; Frequency: 1850.2 MHz; Duty Cycle: 1:8.3

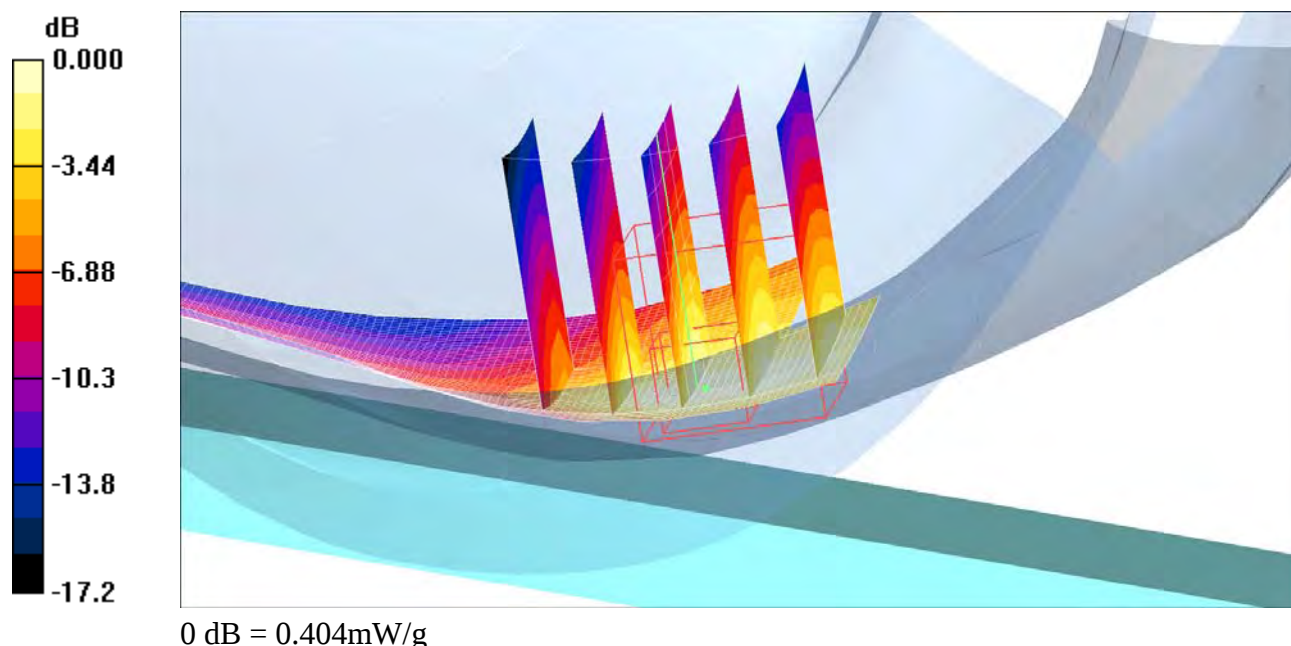
Medium parameters used: $f = 1850.2 \text{ MHz}$; $\sigma = 1.41 \text{ mho/m}$; $\epsilon_r = 38.5$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Left Section

Measurement Standard: DASY4 (High Precision Assessment)

DASY4 Configuration:

- Probe: ET3DV6 - SN1611; ConvF(5.17, 5.17, 5.17); Calibrated: 12/17/2007
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn449; Calibrated: 12/19/2007
- Phantom: SAM-1; Type: SAM; Serial: 1437
- Measurement SW: DASY4, V4.7 Build 53; Postprocessing SW: SEMCAD, V1.8 Build 172

Touch - Low/Area Scan (61x121x1): Measurement grid: $dx=10\text{mm}$, $dy=10\text{mm}$ Maximum value of SAR (interpolated) = 0.418 mW/g **Touch - Low/Zoom Scan (5x5x7) (5x5x7)/Cube 0:** Measurement grid: $dx=8\text{mm}$, $dy=8\text{mm}$, $dz=5\text{mm}$ Reference Value = 5.87 V/m ; Power Drift = -0.032 dB Peak SAR (extrapolated) = 0.596 W/kg **SAR(1 g) = 0.363 mW/g ; SAR(10 g) = 0.217 mW/g** Maximum value of SAR (measured) = 0.404 mW/g 

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Test Laboratory: Sony Ericsson Mobile Communications International AB

Madonna-LeftHandSide-GSM1900-Touch-Middle**DUT: Madonna; Type: DUT; Serial: #11513**

Communication System: DCS 1900; Frequency: 1880 MHz; Duty Cycle: 1:8.3

Medium parameters used: $f = 1880$ MHz; $\sigma = 1.43$ mho/m; $\epsilon_r = 38.4$; $\rho = 1000$ kg/m³

Phantom section: Left Section

Measurement Standard: DASY4 (High Precision Assessment)

DASY4 Configuration:

- Probe: ET3DV6 - SN1611; ConvF(5.17, 5.17, 5.17); Calibrated: 12/17/2007
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn449; Calibrated: 12/19/2007
- Phantom: SAM-1; Type: SAM; Serial: 1437
- Measurement SW: DASY4, V4.7 Build 53; Postprocessing SW: SEMCAD, V1.8 Build 172

Touch position - Middle/Area Scan (61x121x1): Measurement grid: dx=10mm, dy=10mm

Maximum value of SAR (interpolated) = 0.632 mW/g

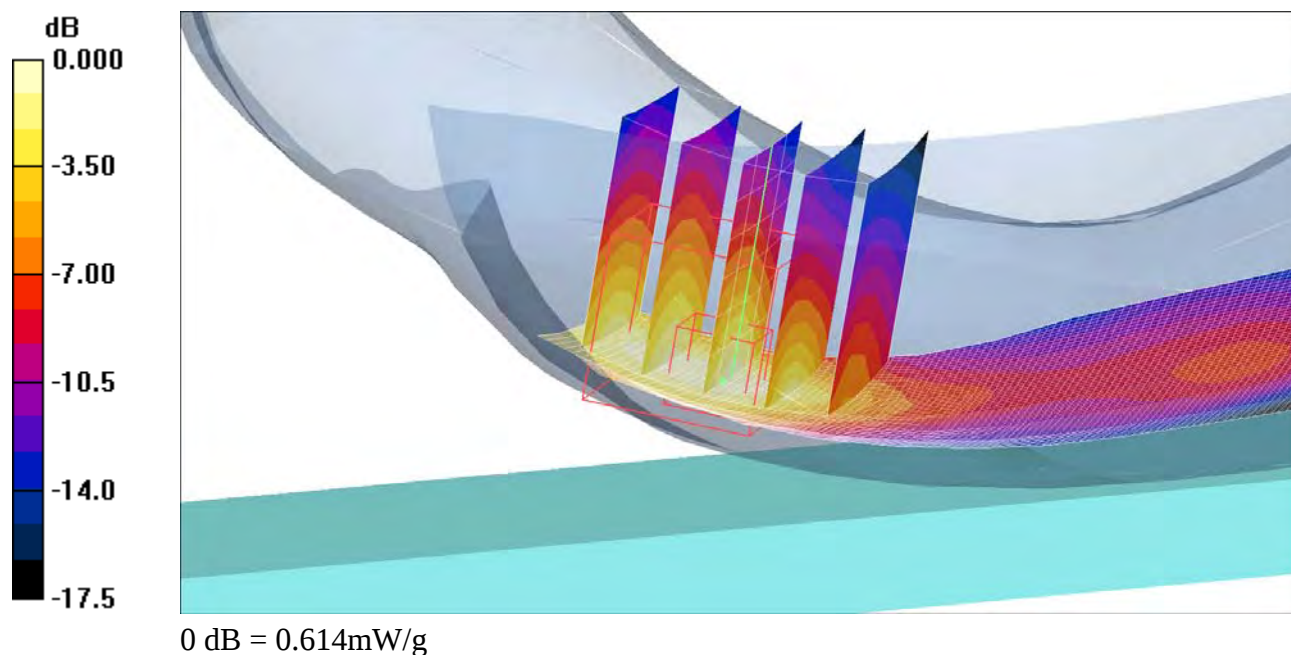
Touch position - Middle/Zoom Scan (5x5x7) (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 7.13 V/m; Power Drift = -0.115 dB

Peak SAR (extrapolated) = 0.917 W/kg

SAR(1 g) = 0.551 mW/g; SAR(10 g) = 0.320 mW/g

Maximum value of SAR (measured) = 0.614 mW/g



Date/Time: 4/29/2008 10:52:45 AM

Test Laboratory: Sony Ericsson Mobile Communications International AB

Madonna-LeftHandSide-GSM850-Tilt-Middle**DUT: Madonna; Type: DUT; Serial: #11513**

Communication System: GSM 850; Frequency: 836.6 MHz; Duty Cycle: 1:8.3

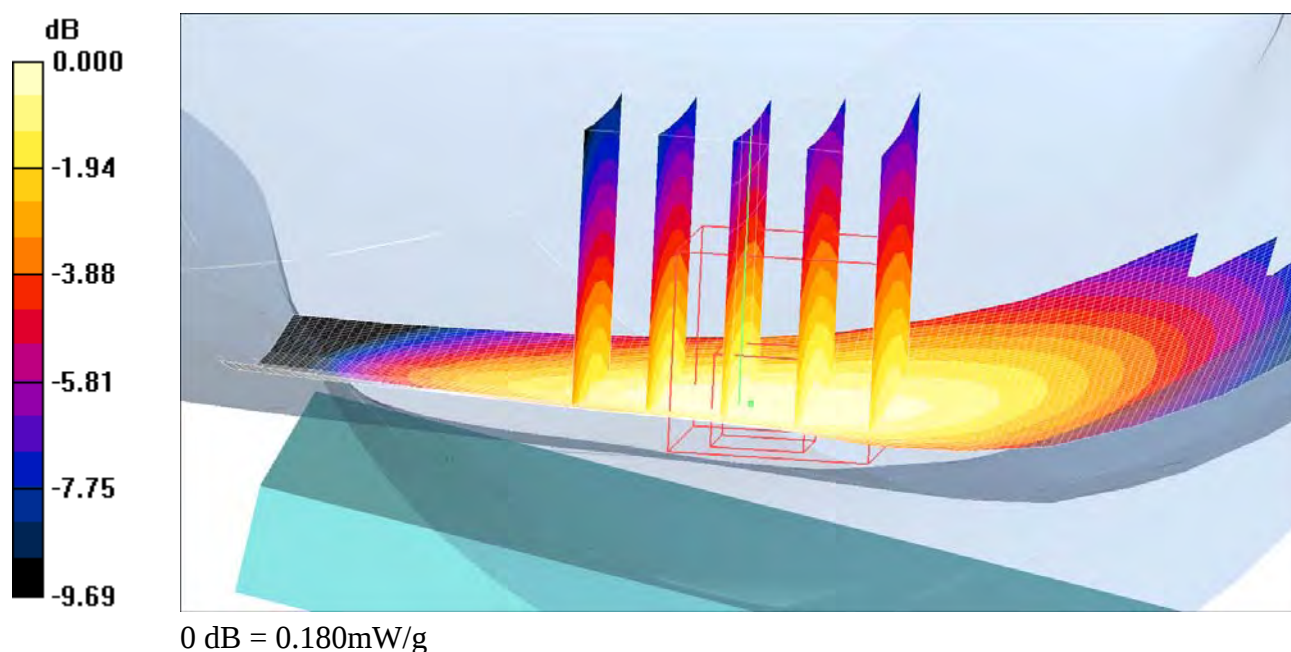
Medium parameters used: $f = 836.6 \text{ MHz}$; $\sigma = 0.87 \text{ mho/m}$; $\epsilon_r = 40.4$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Left Section

Measurement Standard: DASY4 (High Precision Assessment)

DASY4 Configuration:

- Probe: ET3DV6 - SN1611; ConvF(6.63, 6.63, 6.63); Calibrated: 12/17/2007
 - Sensor-Surface: 4mm (Mechanical Surface Detection)
 - Electronics: DAE3 Sn449; Calibrated: 12/19/2007
 - Phantom: SAM-2; Type: SAM; Serial: 1025
 - Measurement SW: DASY4, V4.7 Build 53; Postprocessing SW: SEMCAD, V1.8 Build 172
- Tilt position - Middle/Area Scan (61x121x1):** Measurement grid: $dx=10\text{mm}$, $dy=10\text{mm}$
Maximum value of SAR (interpolated) = 0.185 mW/g
- Tilt position - Middle/Zoom Scan (5x5x7) (5x5x7)/Cube 0:** Measurement grid:
 $dx=8\text{mm}$, $dy=8\text{mm}$, $dz=5\text{mm}$
Reference Value = 10.9 V/m ; Power Drift = -0.110 dB
Peak SAR (extrapolated) = 0.209 W/kg
SAR(1 g) = 0.171 mW/g ; SAR(10 g) = 0.127 mW/g
Maximum value of SAR (measured) = 0.180 mW/g



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Test Laboratory: Sony Ericsson Mobile Communications International AB

Madonna-LeftHandSide-GSM850-Touch-High**DUT: Madonna; Type: DUT; Serial: #11513**

Communication System: GSM 850; Frequency: 848.8 MHz; Duty Cycle: 1:8.3

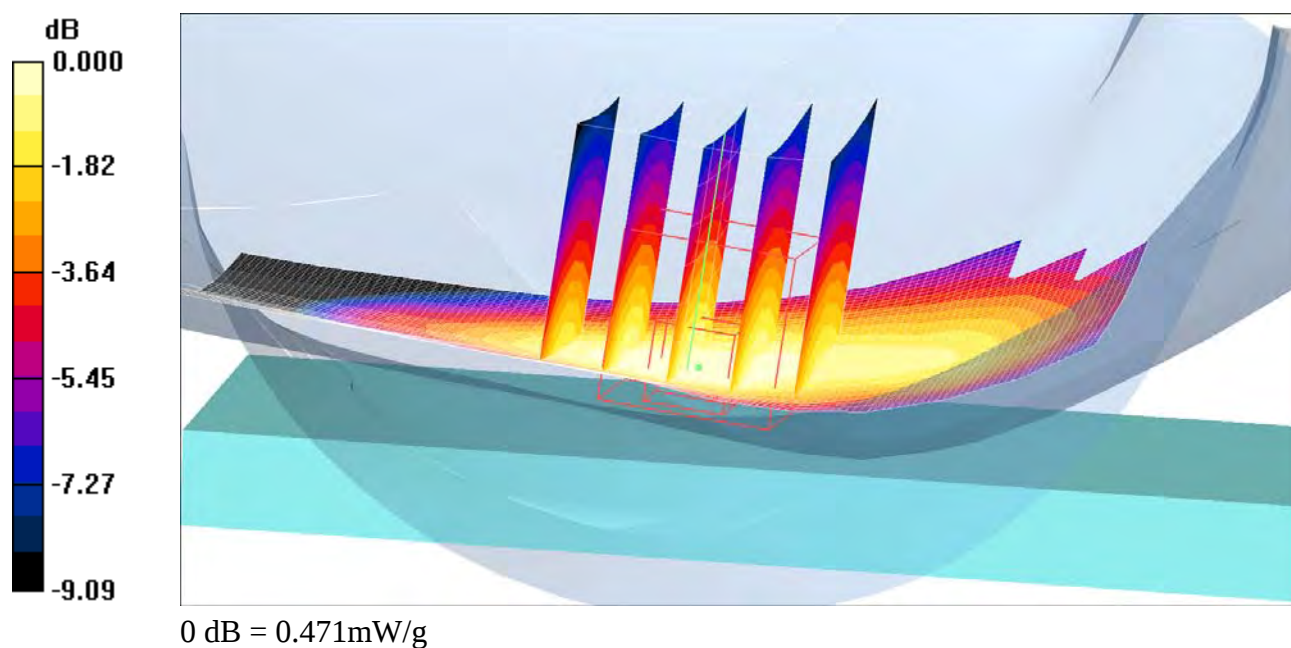
Medium parameters used: $f = 848.8 \text{ MHz}$; $\sigma = 0.88 \text{ mho/m}$; $\epsilon_r = 40.3$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Left Section

Measurement Standard: DASY4 (High Precision Assessment)

DASY4 Configuration:

- Probe: ET3DV6 - SN1611; ConvF(6.63, 6.63, 6.63); Calibrated: 12/17/2007
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn449; Calibrated: 12/19/2007
- Phantom: SAM-2; Type: SAM; Serial: 1025
- Measurement SW: DASY4, V4.7 Build 53; Postprocessing SW: SEMCAD, V1.8 Build 172

Touch - High/Area Scan (61x121x1): Measurement grid: $dx=10\text{mm}$, $dy=10\text{mm}$ Maximum value of SAR (interpolated) = 0.482 mW/g **Touch - High/Zoom Scan (5x5x7) (5x5x7)/Cube 0:** Measurement grid: $dx=8\text{mm}$, $dy=8\text{mm}$, $dz=5\text{mm}$ Reference Value = 13.6 V/m ; Power Drift = -0.047 dB Peak SAR (extrapolated) = 0.542 W/kg **SAR(1 g) = 0.445 mW/g ; SAR(10 g) = 0.324 mW/g** Maximum value of SAR (measured) = 0.471 mW/g 

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Test Laboratory: Sony Ericsson Mobile Communications International AB

Madonna-LeftHandSide-GSM850-Touch-Low**DUT: Madonna; Type: DUT; Serial: #11513**

Communication System: GSM 850; Frequency: 824.2 MHz; Duty Cycle: 1:8.3

Medium parameters used: $f = 824.2$ MHz; $\sigma = 0.86$ mho/m; $\epsilon_r = 40.6$; $\rho = 1000$ kg/m³

Phantom section: Left Section

Measurement Standard: DASY4 (High Precision Assessment)

DASY4 Configuration:

- Probe: ET3DV6 - SN1611; ConvF(6.63, 6.63, 6.63); Calibrated: 12/17/2007
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn449; Calibrated: 12/19/2007
- Phantom: SAM-2; Type: SAM; Serial: 1025
- Measurement SW: DASY4, V4.7 Build 53; Postprocessing SW: SEMCAD, V1.8 Build 172

Touch - Low/Area Scan (61x121x1): Measurement grid: dx=10mm, dy=10mm

Maximum value of SAR (interpolated) = 0.305 mW/g

Touch - Low/Zoom Scan (5x5x7) (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 11.3 V/m; Power Drift = -0.038 dB

Peak SAR (extrapolated) = 0.338 W/kg

SAR(1 g) = 0.283 mW/g; SAR(10 g) = 0.210 mW/g

Maximum value of SAR (measured) = 0.300 mW/g



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Test Laboratory: Sony Ericsson Mobile Communications International AB

Madonna-LeftHandSide-GSM850-Touch-Middle**DUT: Madonna; Type: DUT; Serial: #11513**

Communication System: GSM 850; Frequency: 836.6 MHz; Duty Cycle: 1:8.3

Medium parameters used: $f = 836.6$ MHz; $\sigma = 0.87$ mho/m; $\epsilon_r = 40.4$; $\rho = 1000$ kg/m³

Phantom section: Left Section

Measurement Standard: DASY4 (High Precision Assessment)

DASY4 Configuration:

- Probe: ET3DV6 - SN1611; ConvF(6.63, 6.63, 6.63); Calibrated: 12/17/2007
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn449; Calibrated: 12/19/2007
- Phantom: SAM-2; Type: SAM; Serial: 1025
- Measurement SW: DASY4, V4.7 Build 53; Postprocessing SW: SEMCAD, V1.8 Build 172

Touch position - Middle/Area Scan (61x121x1): Measurement grid: dx=10mm, dy=10mm

Maximum value of SAR (interpolated) = 0.405 mW/g

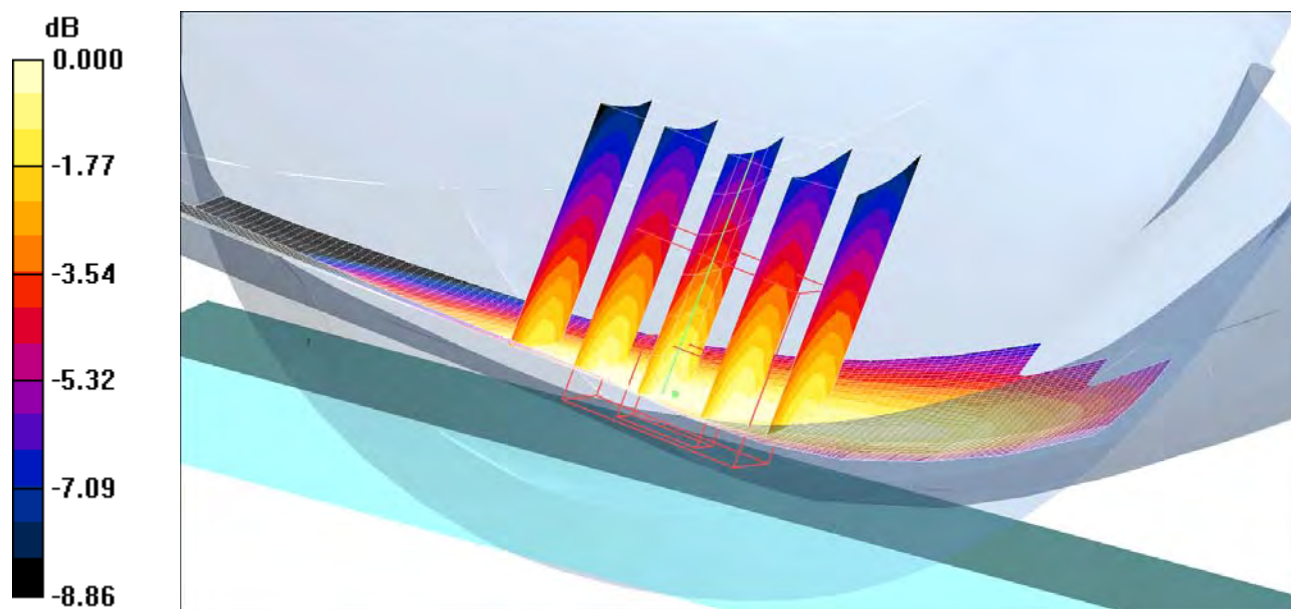
Touch position - Middle/Zoom Scan (5x5x7) (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 12.9 V/m; Power Drift = -0.158 dB

Peak SAR (extrapolated) = 0.455 W/kg

SAR(1 g) = 0.379 mW/g; SAR(10 g) = 0.278 mW/g

Maximum value of SAR (measured) = 0.399 mW/g



0 dB = 0.399mW/g

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Test Laboratory: Sony Ericsson Mobile Communications International AB

Madonna-RightHandSide-GSM1900-Tilt-Middle**DUT: Madonna; Type: DUT; Serial: #11513**

Communication System: DCS 1900; Frequency: 1880 MHz; Duty Cycle: 1:8.3

Medium parameters used: $f = 1880$ MHz; $\sigma = 1.43$ mho/m; $\epsilon_r = 38.4$; $\rho = 1000$ kg/m³

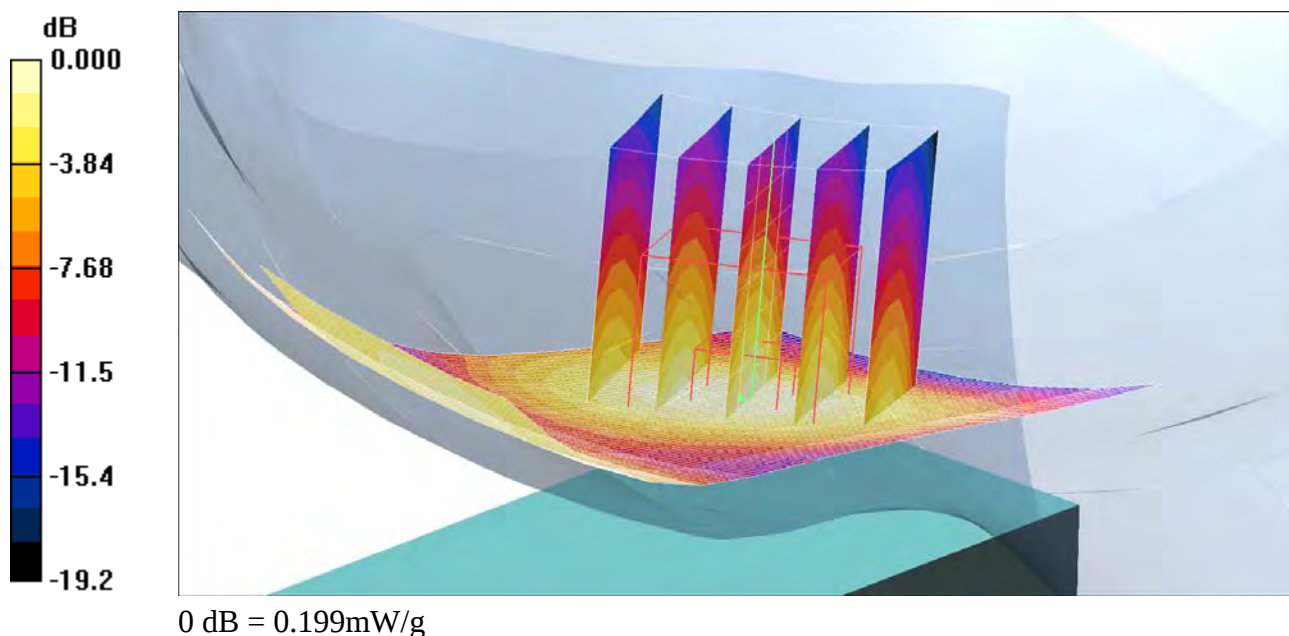
Phantom section: Right Section

Measurement Standard: DASY4 (High Precision Assessment)

DASY4 Configuration:

- Probe: ET3DV6 - SN1611; ConvF(5.17, 5.17, 5.17); Calibrated: 12/17/2007
 - Sensor-Surface: 4mm (Mechanical Surface Detection)
 - Electronics: DAE3 Sn449; Calibrated: 12/19/2007
 - Phantom: SAM-1; Type: SAM; Serial: 1437
 - Measurement SW: DASY4, V4.7 Build 53; Postprocessing SW: SEMCAD, V1.8 Build 172
- Tilt position - Middle/Area Scan (61x121x1):** Measurement grid: dx=10mm, dy=10mm
Maximum value of SAR (interpolated) = 0.199 mW/g

Tilt position - Middle/Zoom Scan (5x5x7) (5x5x7)/Cube 0: Measurement grid:
dx=8mm, dy=8mm, dz=5mm
Reference Value = 10.2 V/m; Power Drift = -0.119 dB
Peak SAR (extrapolated) = 0.274 W/kg
SAR(1 g) = 0.180 mW/g; SAR(10 g) = 0.106 mW/g
Maximum value of SAR (measured) = 0.199 mW/g



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Test Laboratory: Sony Ericsson Mobile Communications International AB

Madonna-RightHandSide-GSM1900-Touch-High**DUT: Madonna; Type: DUT; Serial: #11513**

Communication System: DCS 1900; Frequency: 1909.8 MHz; Duty Cycle: 1:8.3

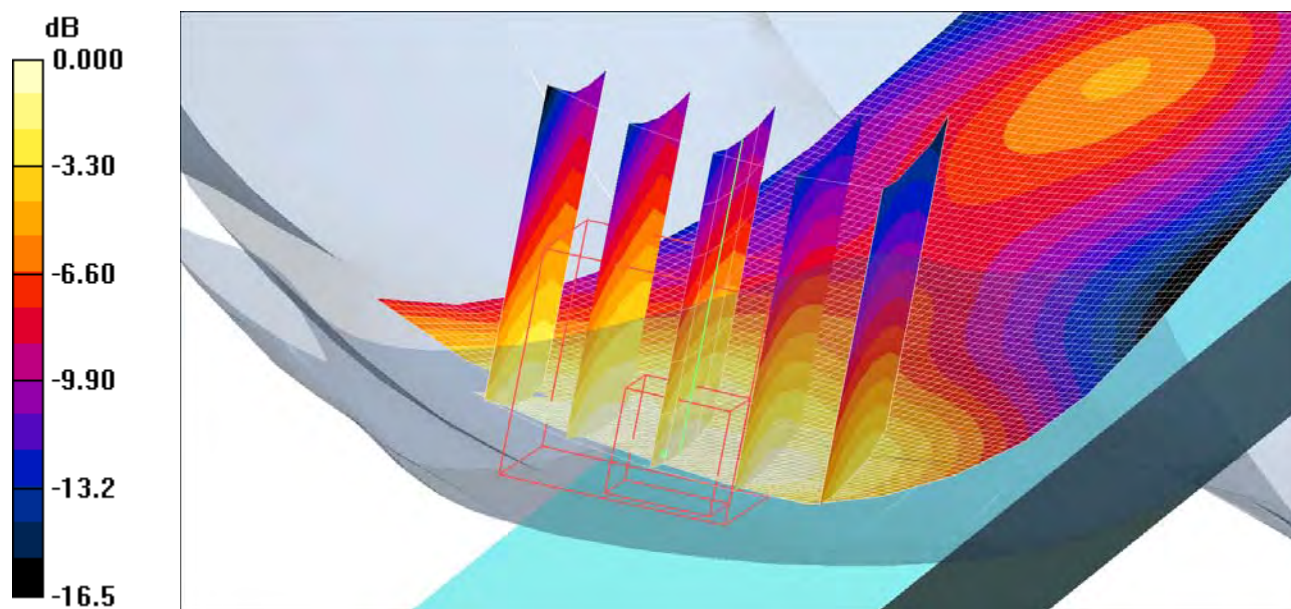
Medium parameters used: $f = 1909.8 \text{ MHz}$; $\sigma = 1.47 \text{ mho/m}$; $\epsilon_r = 38.3$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Right Section

Measurement Standard: DASY4 (High Precision Assessment)

DASY4 Configuration:

- Probe: ET3DV6 - SN1611; ConvF(5.17, 5.17, 5.17); Calibrated: 12/17/2007
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn449; Calibrated: 12/19/2007
- Phantom: SAM-1; Type: SAM; Serial: 1437
- Measurement SW: DASY4, V4.7 Build 53; Postprocessing SW: SEMCAD, V1.8 Build 172

Touch - High/Area Scan (61x121x1): Measurement grid: $dx=10\text{mm}$, $dy=10\text{mm}$ Maximum value of SAR (interpolated) = 0.761 mW/g **Touch - High/Zoom Scan (5x5x7) (5x5x7)/Cube 0:** Measurement grid: $dx=8\text{mm}$, $dy=8\text{mm}$, $dz=5\text{mm}$ Reference Value = 9.44 V/m ; Power Drift = 0.000 dB Peak SAR (extrapolated) = 1.04 W/kg **SAR(1 g) = 0.702 mW/g ; SAR(10 g) = 0.451 mW/g** Maximum value of SAR (measured) = 0.752 mW/g 

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Test Laboratory: Sony Ericsson Mobile Communications International AB

Madonna-RightHandSide-GSM1900-Touch-Low**DUT: Madonna; Type: DUT; Serial: #11513**

Communication System: DCS 1900; Frequency: 1850.2 MHz; Duty Cycle: 1:8.3

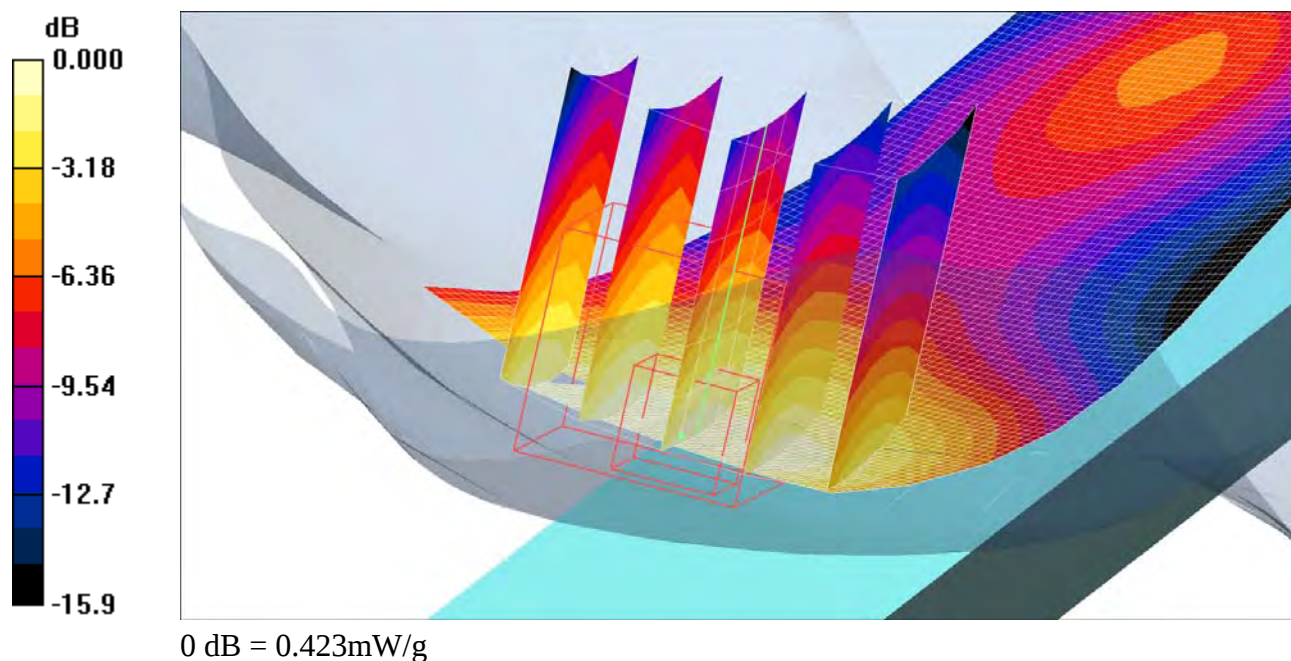
Medium parameters used: $f = 1850.2 \text{ MHz}$; $\sigma = 1.41 \text{ mho/m}$; $\epsilon_r = 38.5$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Right Section

Measurement Standard: DASY4 (High Precision Assessment)

DASY4 Configuration:

- Probe: ET3DV6 - SN1611; ConvF(5.17, 5.17, 5.17); Calibrated: 12/17/2007
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn449; Calibrated: 12/19/2007
- Phantom: SAM-1; Type: SAM; Serial: 1437
- Measurement SW: DASY4, V4.7 Build 53; Postprocessing SW: SEMCAD, V1.8 Build 172

Touch - Low/Area Scan (61x121x1): Measurement grid: $dx=10\text{mm}$, $dy=10\text{mm}$ Maximum value of SAR (interpolated) = 0.430 mW/g **Touch - Low/Zoom Scan (5x5x7) (5x5x7)/Cube 0:** Measurement grid: $dx=8\text{mm}$, $dy=8\text{mm}$, $dz=5\text{mm}$ Reference Value = 6.74 V/m ; Power Drift = -0.008 dB Peak SAR (extrapolated) = 0.554 W/kg **SAR(1 g) = 0.393 mW/g ; SAR(10 g) = 0.262 mW/g** Maximum value of SAR (measured) = 0.423 mW/g 

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Test Laboratory: Sony Ericsson Mobile Communications International AB

Madonna-RightHandSide-GSM1900-Touch-Middle**DUT: Madonna; Type: DUT; Serial: #11513**

Communication System: DCS 1900; Frequency: 1880 MHz; Duty Cycle: 1:8.3

Medium parameters used: $f = 1880$ MHz; $\sigma = 1.43$ mho/m; $\epsilon_r = 38.4$; $\rho = 1000$ kg/m³

Phantom section: Right Section

Measurement Standard: DASY4 (High Precision Assessment)

DASY4 Configuration:

- Probe: ET3DV6 - SN1611; ConvF(5.17, 5.17, 5.17); Calibrated: 12/17/2007
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn449; Calibrated: 12/19/2007
- Phantom: SAM-1; Type: SAM; Serial: 1437
- Measurement SW: DASY4, V4.7 Build 53; Postprocessing SW: SEMCAD, V1.8 Build 172

Touch position - Middle/Area Scan (61x121x1): Measurement grid: dx=10mm, dy=10mm

Maximum value of SAR (interpolated) = 0.577 mW/g

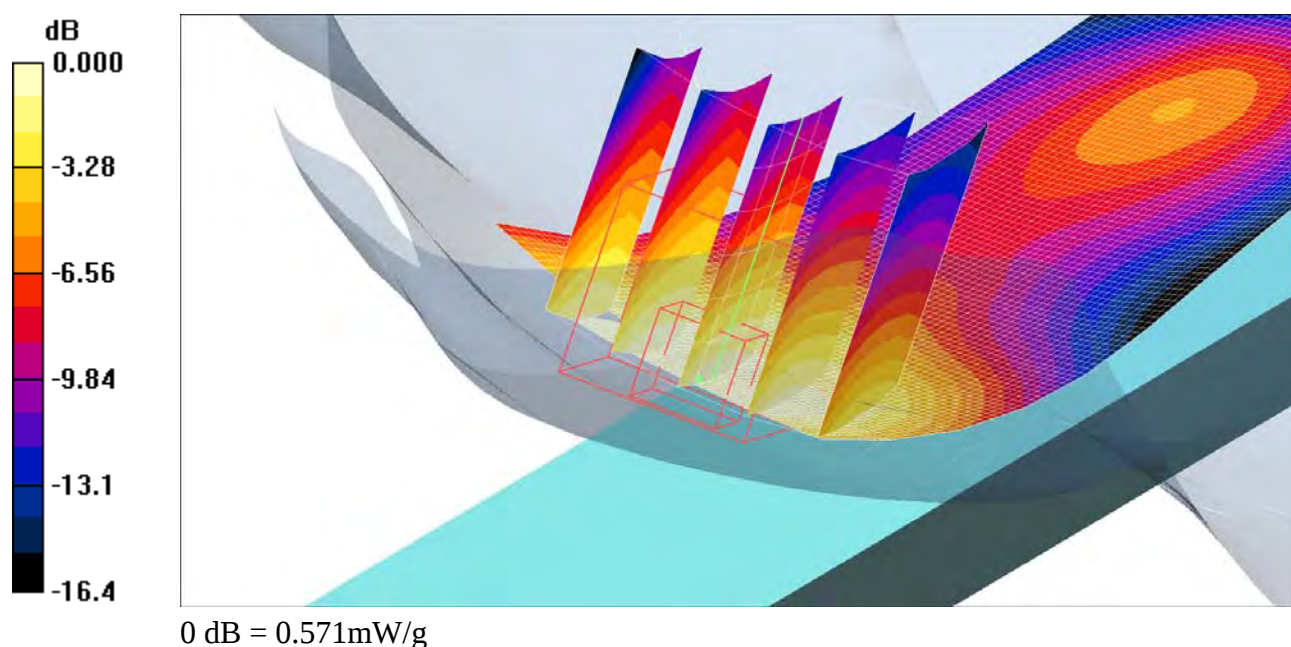
Touch position - Middle/Zoom Scan (5x5x7) (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 8.36 V/m; Power Drift = -0.013 dB

Peak SAR (extrapolated) = 0.759 W/kg

SAR(1 g) = 0.531 mW/g; SAR(10 g) = 0.353 mW/g

Maximum value of SAR (measured) = 0.571 mW/g



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Test Laboratory: Sony Ericsson Mobile Communications International AB

Madonna-RightHandSide-GSM850-Tilt-Middle**DUT: Madonna; Type: DUT; Serial: #11513**

Communication System: GSM 850; Frequency: 836.6 MHz; Duty Cycle: 1:8.3

Medium parameters used: $f = 836.6$ MHz; $\sigma = 0.87$ mho/m; $\epsilon_r = 40.4$; $\rho = 1000$ kg/m³

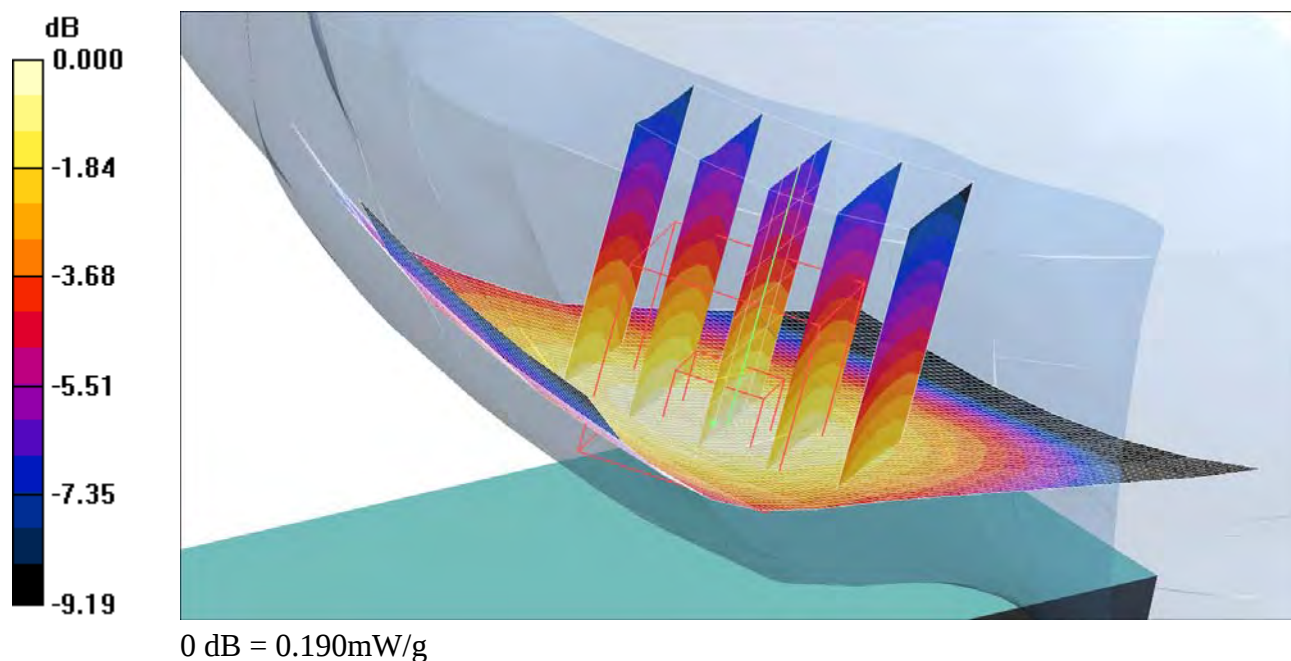
Phantom section: Right Section

Measurement Standard: DASY4 (High Precision Assessment)

DASY4 Configuration:

- Probe: ET3DV6 - SN1611; ConvF(6.63, 6.63, 6.63); Calibrated: 12/17/2007
 - Sensor-Surface: 4mm (Mechanical Surface Detection)
 - Electronics: DAE3 Sn449; Calibrated: 12/19/2007
 - Phantom: SAM-2; Type: SAM; Serial: 1025
 - Measurement SW: DASY4, V4.7 Build 53; Postprocessing SW: SEMCAD, V1.8 Build 172
- Tilt position - Middle/Area Scan (61x121x1):** Measurement grid: dx=10mm, dy=10mm
Maximum value of SAR (interpolated) = 0.189 mW/g

Tilt position - Middle/Zoom Scan (5x5x7) (5x5x7)/Cube 0: Measurement grid:
dx=8mm, dy=8mm, dz=5mm
Reference Value = 10.7 V/m; Power Drift = -0.038 dB
Peak SAR (extrapolated) = 0.216 W/kg
SAR(1 g) = 0.178 mW/g; SAR(10 g) = 0.132 mW/g
Maximum value of SAR (measured) = 0.190 mW/g



Date/Time: 4/29/2008 1:46:11 PM

Test Laboratory: Sony Ericsson Mobile Communications International AB

Madonna-RightHandSide-GSM850-Touch-High**DUT: Madonna; Type: DUT; Serial: #11513**

Communication System: GSM 850; Frequency: 848.8 MHz; Duty Cycle: 1:8.3

Medium parameters used: $f = 848.8$ MHz; $\sigma = 0.88$ mho/m; $\epsilon_r = 40.3$; $\rho = 1000$ kg/m³

Phantom section: Right Section

Measurement Standard: DASY4 (High Precision Assessment)

DASY4 Configuration:

- Probe: ET3DV6 - SN1611; ConvF(6.63, 6.63, 6.63); Calibrated: 12/17/2007
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn449; Calibrated: 12/19/2007
- Phantom: SAM-2; Type: SAM; Serial: 1025
- Measurement SW: DASY4, V4.7 Build 53; Postprocessing SW: SEMCAD, V1.8 Build 172

Touch - High/Area Scan (61x121x1): Measurement grid: dx=10mm, dy=10mm

Maximum value of SAR (interpolated) = 0.448 mW/g

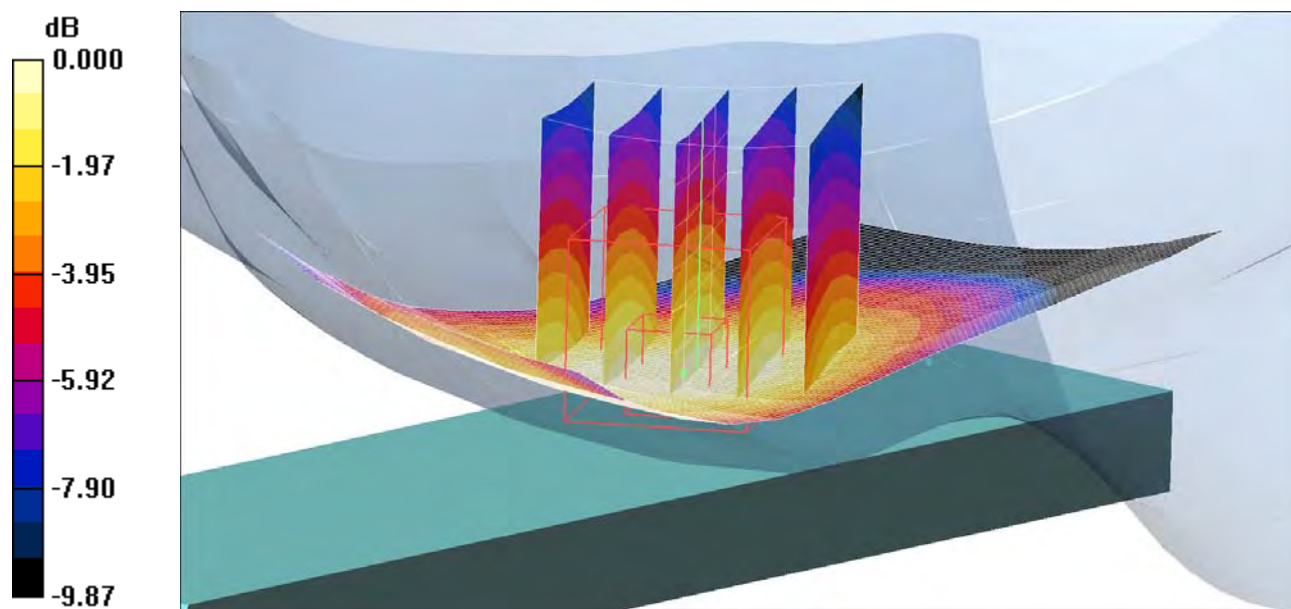
Touch - High/Zoom Scan (5x5x7) (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 12.6 V/m; Power Drift = -0.009 dB

Peak SAR (extrapolated) = 0.494 W/kg

SAR(1 g) = 0.412 mW/g; SAR(10 g) = 0.303 mW/g

Maximum value of SAR (measured) = 0.432 mW/g



0 dB = 0.432mW/g

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Test Laboratory: Sony Ericsson Mobile Communications International AB

Madonna-RightHandSide-GSM850-Touch-Low**DUT: Madonna; Type: DUT; Serial: #11513**

Communication System: GSM 850; Frequency: 824.2 MHz; Duty Cycle: 1:8.3

Medium parameters used: $f = 824.2$ MHz; $\sigma = 0.86$ mho/m; $\epsilon_r = 40.6$; $\rho = 1000$ kg/m³

Phantom section: Right Section

Measurement Standard: DASY4 (High Precision Assessment)

DASY4 Configuration:

- Probe: ET3DV6 - SN1611; ConvF(6.63, 6.63, 6.63); Calibrated: 12/17/2007
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn449; Calibrated: 12/19/2007
- Phantom: SAM-2; Type: SAM; Serial: 1025
- Measurement SW: DASY4, V4.7 Build 53; Postprocessing SW: SEMCAD, V1.8 Build 172

Touch - Low/Area Scan (61x121x1): Measurement grid: dx=10mm, dy=10mm

Maximum value of SAR (interpolated) = 0.324 mW/g

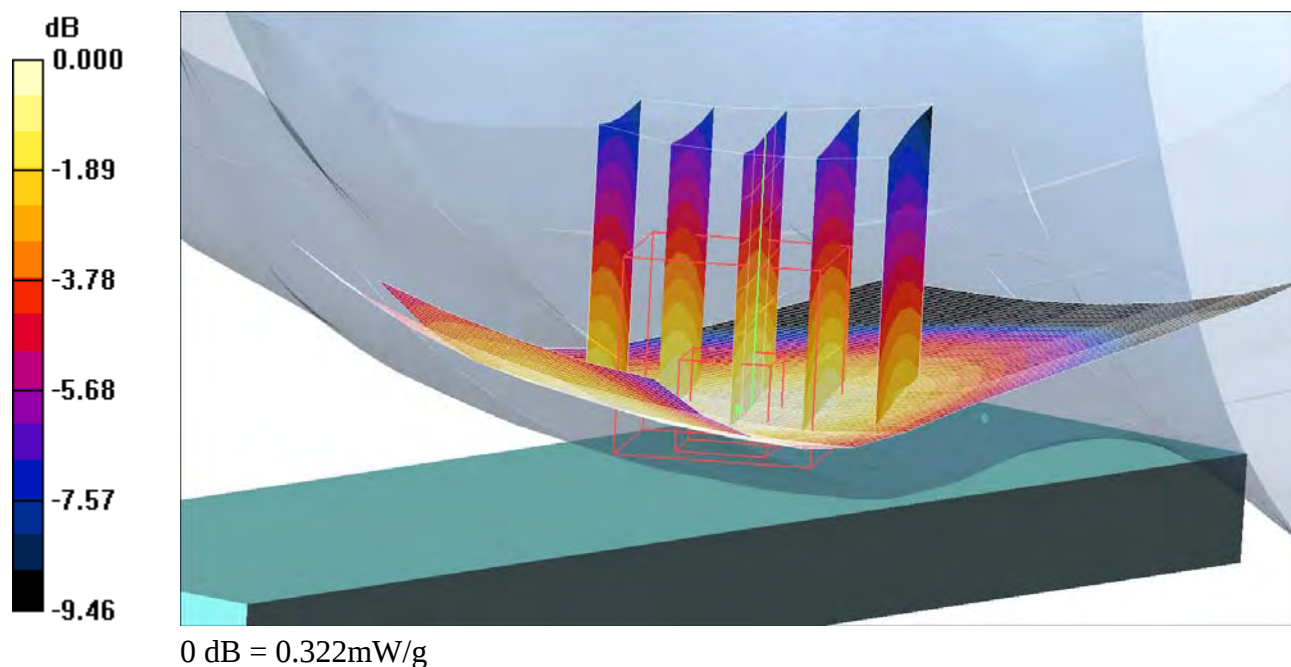
Touch - Low/Zoom Scan (5x5x7) (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 11.4 V/m; Power Drift = -0.088 dB

Peak SAR (extrapolated) = 0.370 W/kg

SAR(1 g) = 0.308 mW/g; SAR(10 g) = 0.229 mW/g

Maximum value of SAR (measured) = 0.322 mW/g



Date/Time: 4/29/2008 12:49:33 PM

Test Laboratory: Sony Ericsson Mobile Communications International AB

Madonna-RightHandSide-GSM850-Touch-Middle**DUT: Madonna; Type: DUT; Serial: #11513**

Communication System: GSM 850; Frequency: 836.6 MHz; Duty Cycle: 1:8.3

Medium parameters used: $f = 836.6$ MHz; $\sigma = 0.87$ mho/m; $\epsilon_r = 40.4$; $\rho = 1000$ kg/m³

Phantom section: Right Section

Measurement Standard: DASY4 (High Precision Assessment)

DASY4 Configuration:

- Probe: ET3DV6 - SN1611; ConvF(6.63, 6.63, 6.63); Calibrated: 12/17/2007
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn449; Calibrated: 12/19/2007
- Phantom: SAM-2; Type: SAM; Serial: 1025
- Measurement SW: DASY4, V4.7 Build 53; Postprocessing SW: SEMCAD, V1.8 Build 172

Touch position - Middle/Area Scan (61x121x1): Measurement grid: dx=10mm, dy=10mm

Maximum value of SAR (interpolated) = 0.398 mW/g

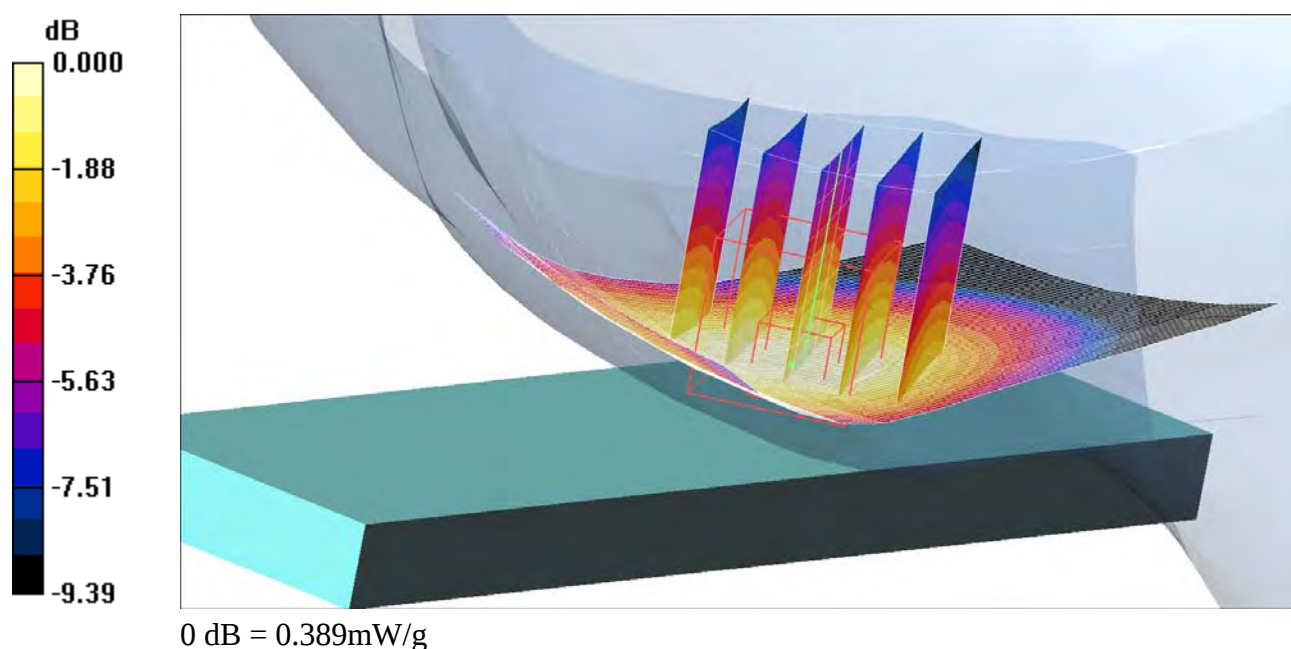
Touch position - Middle/Zoom Scan (5x5x7) (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 12.2 V/m; Power Drift = -0.113 dB

Peak SAR (extrapolated) = 0.448 W/kg

SAR(1 g) = 0.368 mW/g; SAR(10 g) = 0.271 mW/g

Maximum value of SAR (measured) = 0.389 mW/g



Date/Time: 4/29/2008 9:24:45 AM

Test Laboratory: Sony Ericsson Mobile Communications International AB

SystemPerformanceCheck-D850-29-04-08**DUT: Dipole 835 MHz; Type: D835V2; Serial: D835V2 - SN:442**

Communication System: CW; Frequency: 835 MHz; Duty Cycle: 1:1

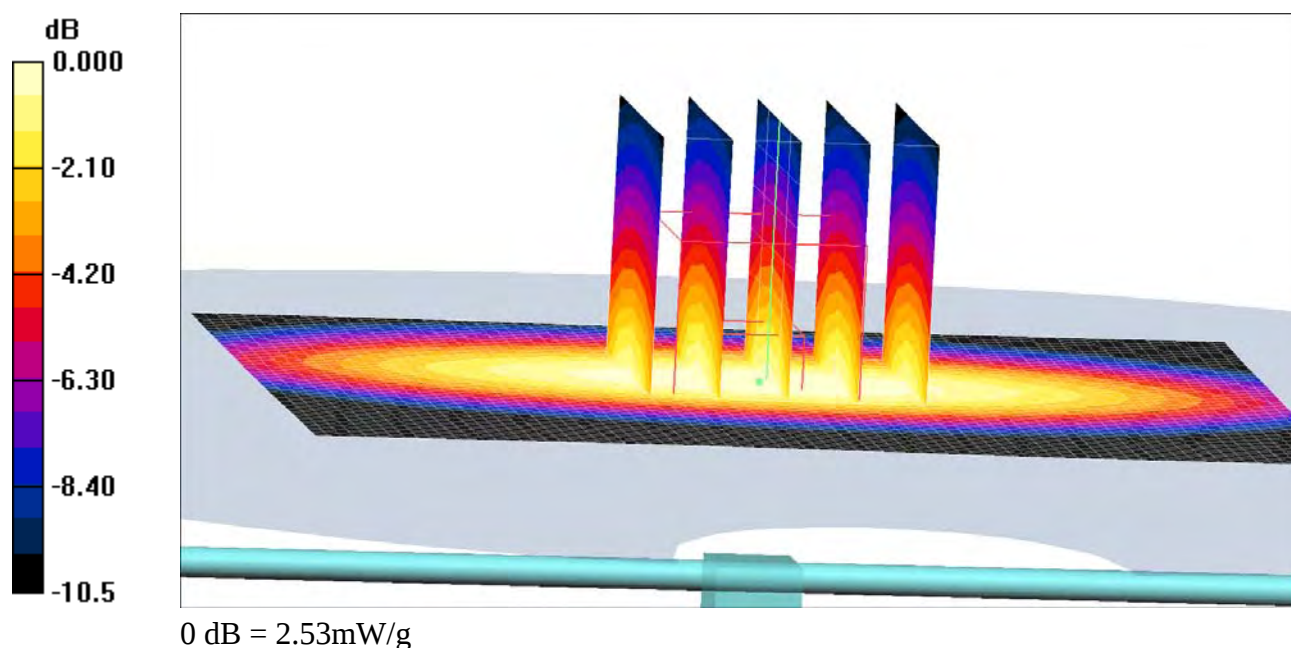
Medium parameters used: $f = 835 \text{ MHz}$; $\sigma = 0.87 \text{ mho/m}$; $\epsilon_r = 40.4$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section

Measurement Standard: DASY4 (High Precision Assessment)

DASY4 Configuration:

- Probe: ET3DV6 - SN1611; ConvF(6.63, 6.63, 6.63); Calibrated: 12/17/2007
 - Sensor-Surface: 4mm (Mechanical Surface Detection)
 - Electronics: DAE3 Sn449; Calibrated: 12/19/2007
 - Phantom: SAM-2; Type: SAM; Serial: 1025
 - Measurement SW: DASY4, V4.7 Build 53; Postprocessing SW: SEMCAD, V1.8 Build 172
- d=15mm, Pin=250mW/Area Scan (61x81x1):** Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 2.53 mW/g
- d=15mm, Pin=250mW/Zoom Scan (7x7x7) (5x5x7)/Cube 0:** Measurement grid:
dx=8mm, dy=8mm, dz=5mm
Reference Value = 56.6 V/m; Power Drift = -0.014 dB
Peak SAR (extrapolated) = 3.25 W/kg
SAR(1 g) = 2.35 mW/g; SAR(10 g) = 1.56 mW/g
Maximum value of SAR (measured) = 2.53 mW/g



Date/Time: 5/1/2008 10:00:32 AM

Test Laboratory: Sony Ericsson Mobile Communications International AB

Validation-D1900-01-05-08**DUT: Dipole 1900 MHz; Type: D1900V2; Serial: D1900V2 - SN:539**

Communication System: CW; Frequency: 1900 MHz; Duty Cycle: 1:1

Medium parameters used: $f = 1900$ MHz; $\sigma = 1.46$ mho/m; $\epsilon_r = 38.4$; $\rho = 1000$ kg/m³

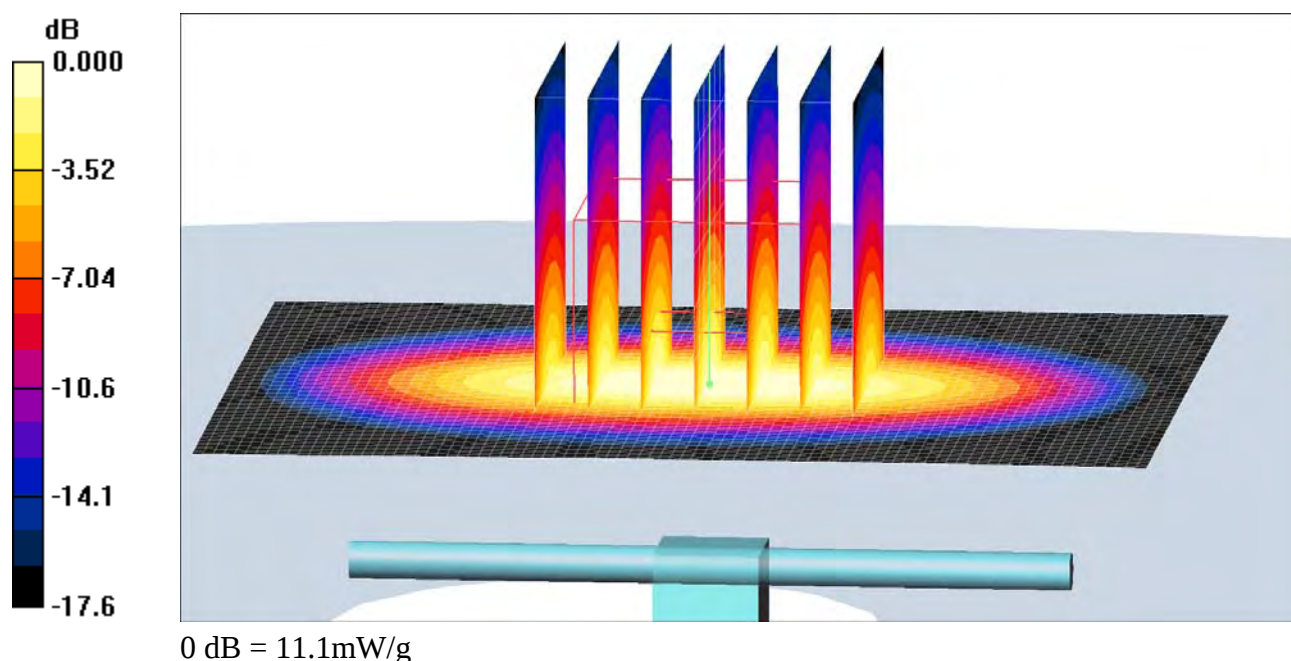
Phantom section: Flat Section

Measurement Standard: DASY4 (High Precision Assessment)

DASY4 Configuration:

- Probe: ET3DV6 - SN1611; ConvF(5.17, 5.17, 5.17); Calibrated: 12/17/2007
 - Sensor-Surface: 4mm (Mechanical Surface Detection)
 - Electronics: DAE3 Sn449; Calibrated: 12/19/2007
 - Phantom: SAM-1; Type: SAM; Serial: 1437
 - Measurement SW: DASY4, V4.7 Build 53; Postprocessing SW: SEMCAD, V1.8 Build 172
- d=10mm, Pin=250mW/Area Scan (81x91x1):** Measurement grid: dx=10mm, dy=10mm
Maximum value of SAR (interpolated) = 11.1 mW/g

d=10mm, Pin=250mW/Zoom Scan (7x7x7) (7x7x7)/Cube 0: Measurement grid:
dx=5mm, dy=5mm, dz=5mm
Reference Value = 92.4 V/m; Power Drift = -0.012 dB
Peak SAR (extrapolated) = 17.0 W/kg
SAR(1 g) = 9.75 mW/g; SAR(10 g) = 5.11 mW/g
Maximum value of SAR (measured) = 11.1 mW/g



Date/Time: 5/2/2008 10:36:22 AM

Test Laboratory: Sony Ericsson Mobile Communications International AB

Validation-D1900-02-05-08-Body**DUT: Dipole 1900 MHz; Type: D1900V2; Serial: D1900V2 - SN:539**

Communication System: CW; Frequency: 1900 MHz; Duty Cycle: 1:1

Medium parameters used: $f = 1900$ MHz; $\sigma = 1.59$ mho/m; $\epsilon_r = 51$; $\rho = 1000$ kg/m³

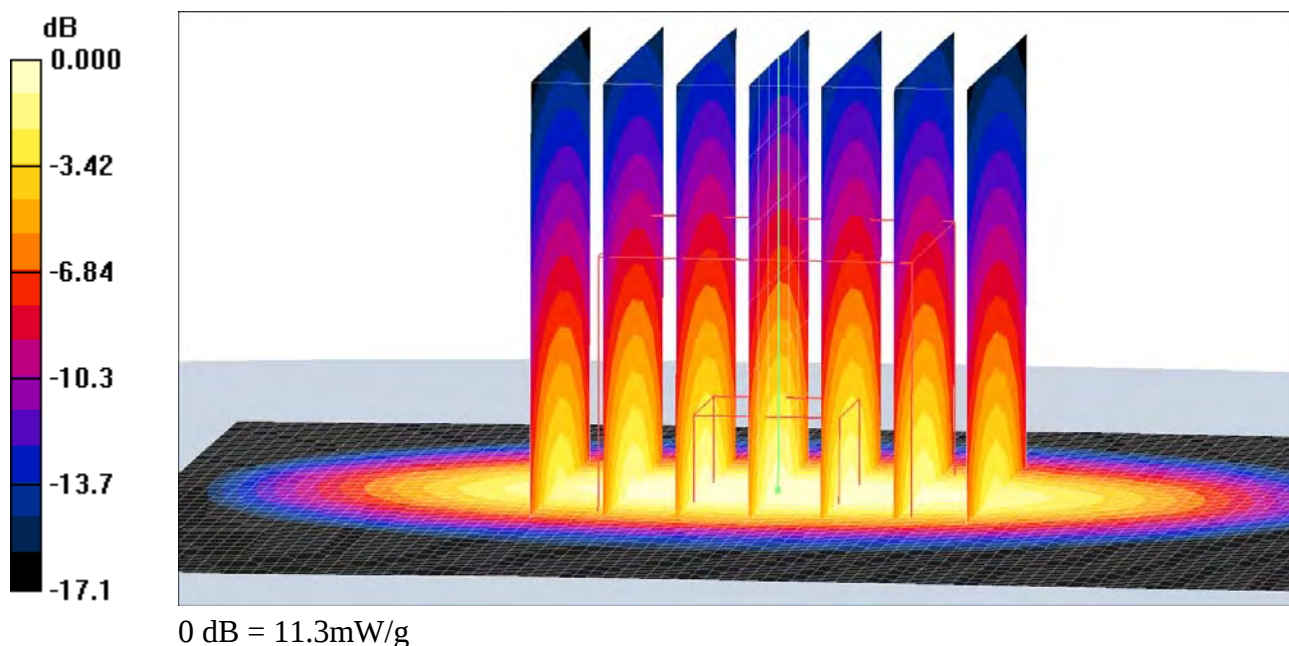
Phantom section: Flat Section

Measurement Standard: DASY4 (High Precision Assessment)

DASY4 Configuration:

- Probe: ET3DV6 - SN1611; ConvF(4.79, 4.79, 4.79); Calibrated: 12/17/2007
 - Sensor-Surface: 4mm (Mechanical Surface Detection)
 - Electronics: DAE3 Sn449; Calibrated: 12/19/2007
 - Phantom: SAM-3; Type: SAM; Serial: 1436
 - Measurement SW: DASY4, V4.7 Build 53; Postprocessing SW: SEMCAD, V1.8 Build 172
- d=10mm, Pin=250mW/Area Scan (81x91x1):** Measurement grid: dx=10mm, dy=10mm
Maximum value of SAR (interpolated) = 11.5 mW/g

d=10mm, Pin=250mW/Zoom Scan (7x7x7) (7x7x7)/Cube 0: Measurement grid:
dx=5mm, dy=5mm, dz=5mm
Reference Value = 83.6 V/m; Power Drift = 0.025 dB
Peak SAR (extrapolated) = 17.5 W/kg
SAR(1 g) = 10 mW/g; SAR(10 g) = 5.27 mW/g
Maximum value of SAR (measured) = 11.3 mW/g



Date/Time: 4/29/2008 2:30:21 PM

Test Laboratory: Sony Ericsson Mobile Communications International AB

Validation-D850-Body-29-04-08**DUT: Dipole 835 MHz; Type: D835V2; Serial: D835V2 - SN:442**

Communication System: CW; Frequency: 835 MHz; Duty Cycle: 1:1

Medium parameters used: $f = 835 \text{ MHz}$; $\sigma = 0.98 \text{ mho/m}$; $\epsilon_r = 55$; $\rho = 1000 \text{ kg/m}^3$

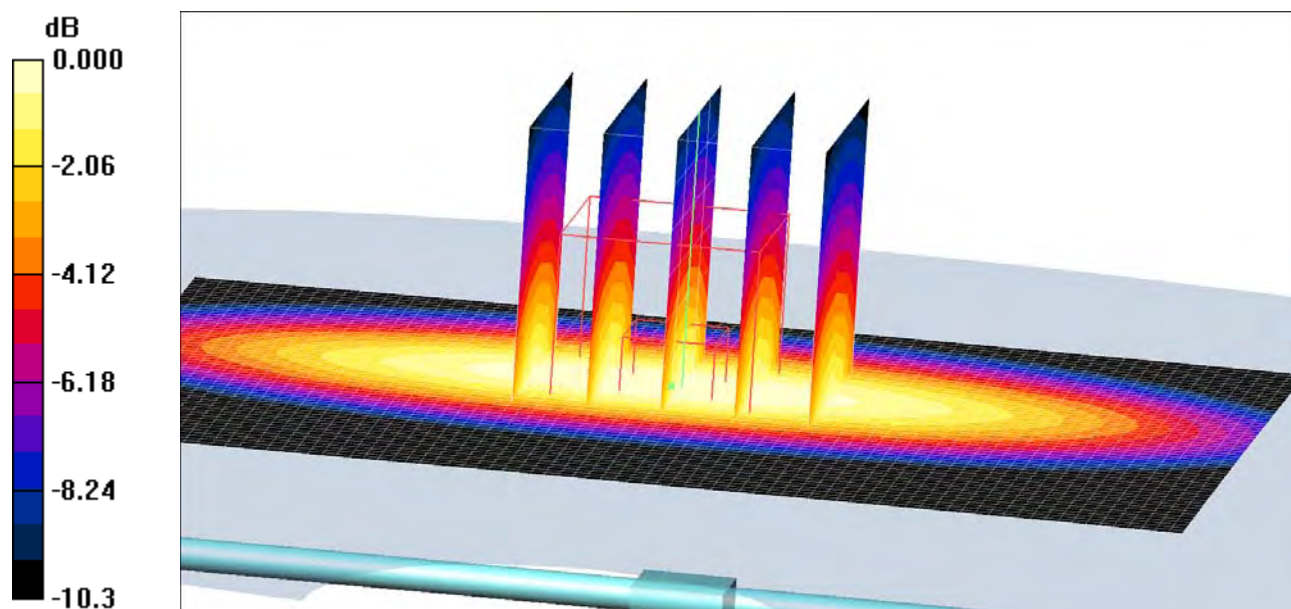
Phantom section: Flat Section

Measurement Standard: DASY4 (High Precision Assessment)

DASY4 Configuration:

- Probe: ET3DV6 - SN1611; ConvF(6.49, 6.49, 6.49); Calibrated: 12/17/2007
 - Sensor-Surface: 4mm (Mechanical Surface Detection)
 - Electronics: DAE3 Sn449; Calibrated: 12/19/2007
 - Phantom: SAM-3; Type: SAM; Serial: 1436
 - Measurement SW: DASY4, V4.7 Build 53; Postprocessing SW: SEMCAD, V1.8 Build 172
- d=15mm, Pin=250mW/Area Scan (61x81x1):** Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$
Maximum value of SAR (interpolated) = 2.62 mW/g

d=15mm, Pin=250mW/Zoom Scan (7x7x7) (5x5x7)/Cube 0: Measurement grid:
 $dx=8\text{mm}$, $dy=8\text{mm}$, $dz=5\text{mm}$
Reference Value = 53.5 V/m; Power Drift = -0.003 dB
Peak SAR (extrapolated) = 3.36 W/kg
SAR(1 g) = 2.43 mW/g; SAR(10 g) = 1.61 mW/g
Maximum value of SAR (measured) = 2.64 mW/g



0 dB = 2.64mW/g



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Accreditation No.: **SCS 108**

Client **Ericsson UK**

Certificate No: **D1900V2-539_Dec06**

CALIBRATION CERTIFICATE

Object **D1900V2 - SN: 539**

Calibration procedure(s) **QA CAL-05.v6
Calibration procedure for dipole validation kits**

Calibration date: **December 12, 2006**

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 $(22 \pm 3)^{\circ}\text{C}$ and humidity $< 70\%$.

Calibration Equipment used (M&TE critical for calibration)

Primary Standards	ID #	Cal Date (Calibrated by, Certificate No.)	Scheduled Calibration
Power meter EPM-442A	GB37480704	03-Oct-06 (METAS, No. 217-00608)	Oct-07
Power sensor HP 8481A	US37292783	03-Oct-06 (METAS, No. 217-00608)	Oct-07
Reference 20 dB Attenuator	SN: 5086 (20g)	10-Aug-06 (METAS, No 217-00591)	Aug-07
Reference 10 dB Attenuator	SN: 5047.2 (10r)	10-Aug-06 (METAS, No 217-00591)	Aug-07
Reference Probe ET3DV6	SN: 1507	19-Oct-06 (SPEAG, No. ET3-1507_Oct06)	Oct-07
Reference Probe ES3DV3	SN: 3025	19-Oct-06 (SPEAG, No. ES3-3025_Oct06)	Oct-07
DAE4	SN: 601	15-Dec-05 (SPEAG, No. DAE4-601_Dec05)	Dec-06
Secondary Standards	ID #	Check Date (in house)	Scheduled Check
Power sensor HP 8481A	MY41092317	18-Oct-02 (SPEAG, in house check Oct-05)	In house check: Oct-07
RF generator Agilent E4421B	MY41000675	11-May-05 (SPEAG, in house check Nov-05)	In house check: Nov-07
Network Analyzer HP 8753E	US37390585 S4206	18-Oct-01 (SPEAG, in house check Oct-06)	In house check: Oct-07

Calibrated by: **Mike Moll** **Mike Moll** **Laboratory Technician** **M. Moll**

Approved by: **Katja Pokovic** **Katja Pokovic** **Technical Manager**

Issued: December 13, 2006

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Accreditation No.: **SCS 108**

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:

- 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
- 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
- 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:

- DASY4 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	DASY4	V4.7
Extrapolation	Advanced Extrapolation	
Phantom	Modular Flat Phantom V5.0	
Distance Dipole Center - TSL	10 mm	with Spacer
Area Scan Resolution	dx, dy = 15 mm	
Zoom Scan Resolution	dx, dy, dz = 5 mm	
Frequency	1900 MHz $\pm$ 1 MHz	

Head TSL parameters

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Head TSL parameters	22.0 °C	40.0	1.40 mho/m
Measured Head TSL parameters	(22.0 $\pm$ 0.2) °C	38.4 $\pm$ 6 %	1.40 mho/m $\pm$ 6 %
Head TSL temperature during test	(21.2 $\pm$ 0.2) °C	---	---

SAR result with Head TSL

SAR averaged over 1 cm³ (1 g) of Head TSL	condition	
SAR measured	250 mW input power	9.18 mW / g
SAR normalized	normalized to 1W	36.7 mW / g
SAR for nominal Head TSL parameters ¹	normalized to 1W	35.9 mW / g $\pm$ 17.0 % (k=2)

SAR averaged over 10 cm³ (10 g) of Head TSL	Condition	
SAR measured	250 mW input power	4.85 mW / g
SAR normalized	normalized to 1W	19.4 mW / g
SAR for nominal Head TSL parameters ¹	normalized to 1W	19.1 mW / g $\pm$ 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	53.3	1.52 mho/m
Measured Body TSL parameters	(22.0 ± 0.2) °C	51.8 ± 6 %	1.54 mho/m ± 6 %
Body TSL temperature during test	(21.6 ± 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	9.49 mW / g
SAR normalized	normalized to 1W	38.0 mW / g
SAR for nominal Body TSL parameters ²	normalized to 1W	37.0 mW / g ± 17.0 % (k=2)

SAR averaged over 10 cm ³ (10 g) of Body TSL	condition	
SAR measured	250 mW input power	5.05 mW / g
SAR normalized	normalized to 1W	20.2 mW / g
SAR for nominal Body TSL parameters ²	normalized to 1W	19.8 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	$54.1 \Omega + 0.9 j\Omega$
Return Loss	- 27.9 dB

Antenna Parameters with Body TSL

Impedance, transformed to feed point	$49.0 \Omega + 2.7 j\Omega$
Return Loss	- 30.7 dB

General Antenna Parameters and Design

Electrical Delay (one direction)	1.200 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	July 26, 2001

DASY4 Validation Report for Head TSL

Date/Time: 11.12.2006 17:13:38

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole 1900 MHz; Type: D1900V2; Serial: D1900V2 - SN:539

Communication System: CW; Frequency: 1900 MHz; Duty Cycle: 1:1

Medium: HSL U10 BB;

Medium parameters used: $f = 1900$ MHz; $\sigma = 1.4$ mho/m; $\epsilon_r = 38.4$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

Measurement Standard: DASY4 (High Precision Assessment)

DASY4 Configuration:

- Probe: ET3DV6 - SN1507 (HF); ConvF(4.97, 4.97, 4.97); Calibrated: 19.10.2006
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 15.12.2005
- Phantom: Flat Phantom 5.0 (front); Type: QD000P50AA; ;
- Measurement SW: DASY4, V4.7 Build 44; Postprocessing SW: SEMCAD, V1.8 Build 171

Pin = 250 mW; d = 10 mm/Area Scan (101x101x1):

Measurement grid: dx=10mm, dy=10mm

Maximum value of SAR (interpolated) = 10.3 mW/g

Pin = 250 mW; d = 10 mm/Zoom Scan (7x7x7)/Cube 0:

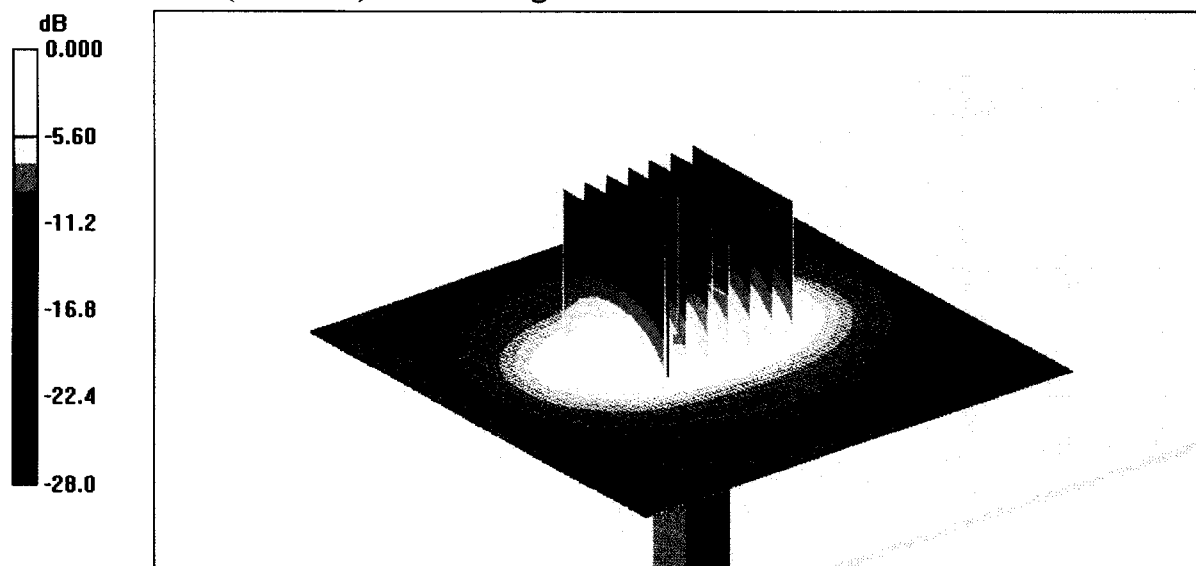
Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 86.4 V/m; Power Drift = 0.045 dB

Peak SAR (extrapolated) = 15.7 W/kg

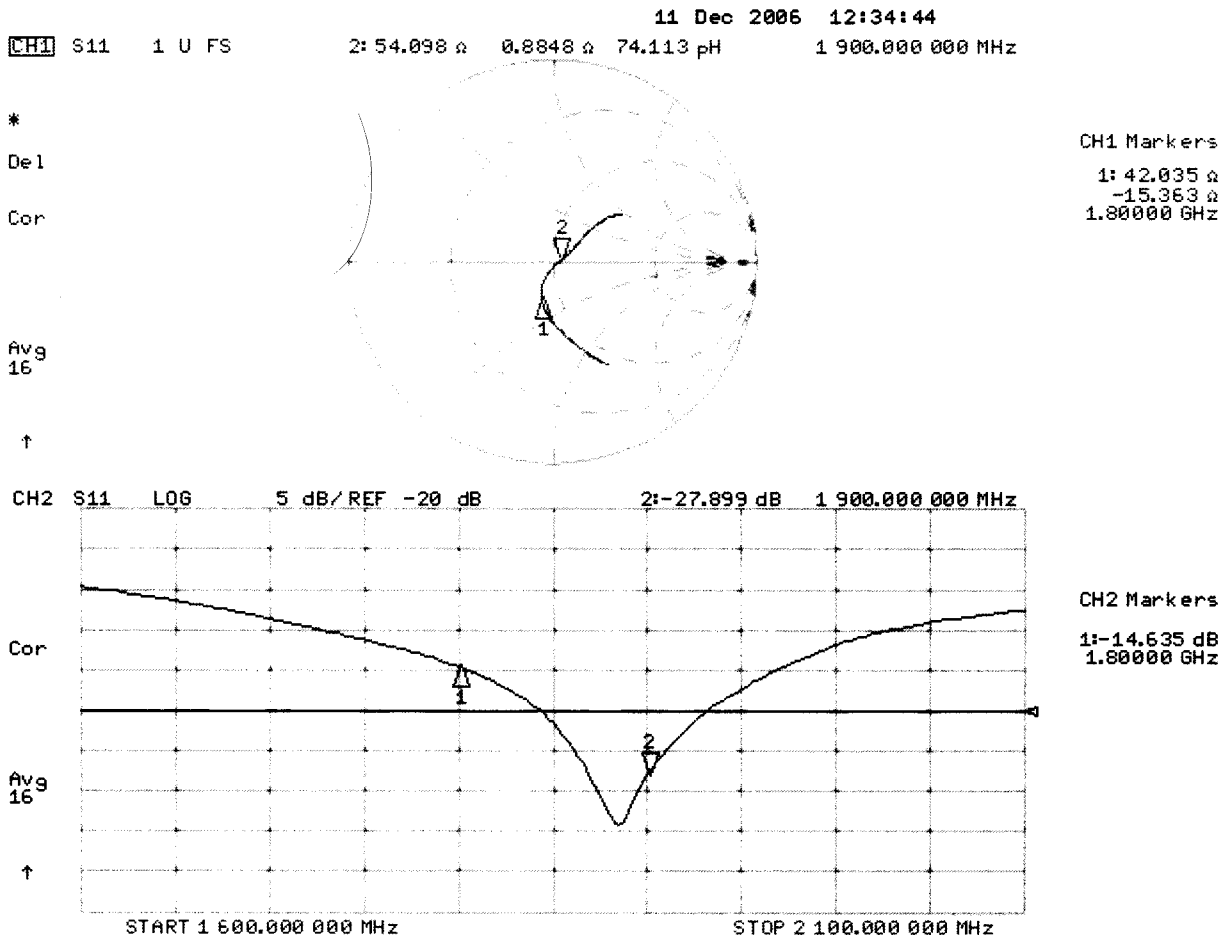
SAR(1 g) = 9.18 mW/g; SAR(10 g) = 4.85 mW/g

Maximum value of SAR (measured) = 10.5 mW/g



0 dB = 10.5mW/g

Impedance Measurement Plot for Head TSL



DASY4 Validation Report for Body TSL

Date/Time: 12.12.2006 15:22:28

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole 1900 MHz; Type: D1900V2; Serial: D1900V2 - SN:539

Communication System: CW; Frequency: 1900 MHz; Duty Cycle: 1:1

Medium: MSL U10 BB;

Medium parameters used: $f = 1900$ MHz; $\sigma = 1.54$ mho/m; $\epsilon_r = 51.8$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

Measurement Standard: DASY4 (High Precision Assessment)

DASY4 Configuration:

- Probe: ET3DV6 - SN1507 (HF); ConvF(4.43, 4.43, 4.43); Calibrated: 19.10.2006
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 15.12.2005
- Phantom: Flat Phantom 5.0 (front); Type: QD000P50AA; ;
- Measurement SW: DASY4, V4.7 Build 44; Postprocessing SW: SEMCAD, V1.8 Build 171

Pin = 250 mW; d = 10 mm/Zoom Scan (7x7x7)/Cube 0:

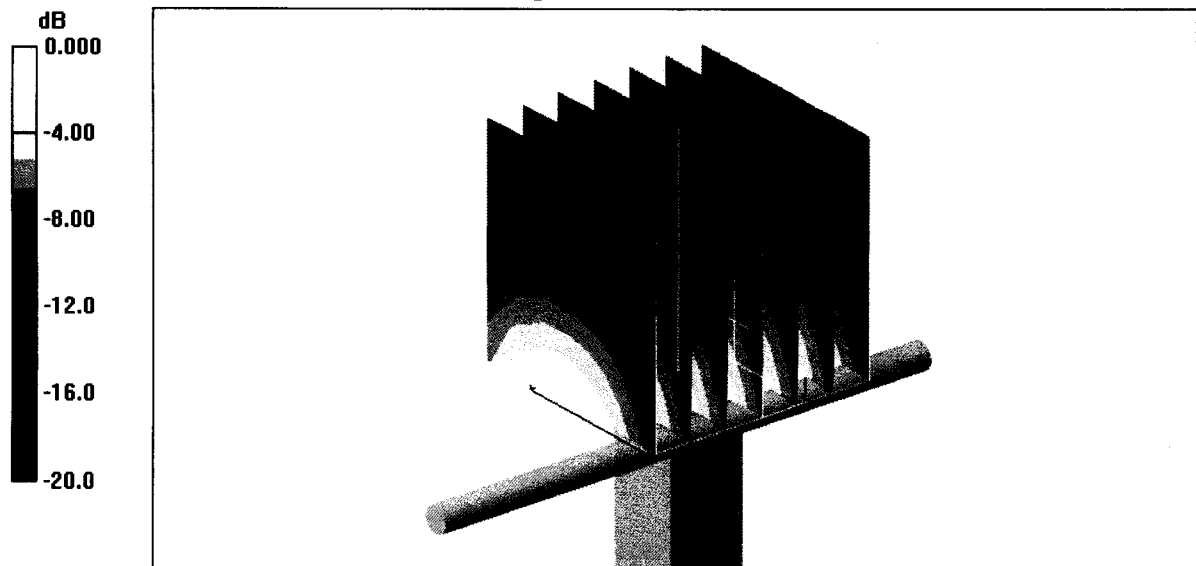
Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 89.4 V/m; Power Drift = -0.001 dB

Peak SAR (extrapolated) = 15.8 W/kg

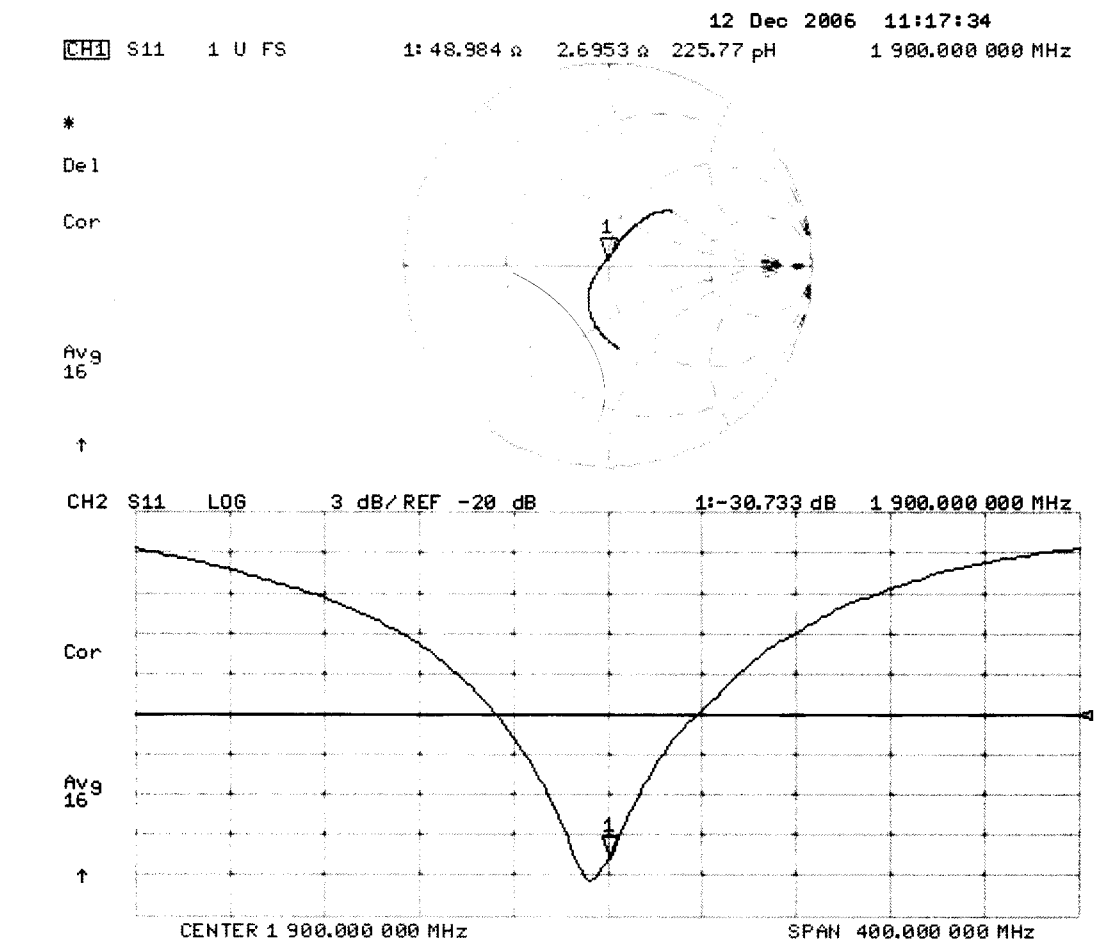
SAR(1 g) = 9.49 mW/g; SAR(10 g) = 5.05 mW/g

Maximum value of SAR (measured) = 10.5 mW/g



0 dB = 10.5mW/g

Impedance Measurement Plot for Body TSL





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Accreditation No.: **SCS 108**

Client **Ericsson UK**

Certificate No: **D835V2-442_Dec06**

CALIBRATION CERTIFICATE

Object **D835V2 - SN: 442**

Calibration procedure(s) **QA CAL-05.v6
Calibration procedure for dipole validation kits**

Calibration date: **December 06, 2006**

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 EPM-442A	GB37480704	03-Oct-06 (METAS, No. 217-00608)	Oct-07
Power sensor HP 8481A	US37292783	03-Oct-06 (METAS, No. 217-00608)	Oct-07
Reference 20 dB Attenuator	SN: 5086 (20g)	10-Aug-06 (METAS, No 217-00591)	Aug-07
Reference 10 dB Attenuator	SN: 5047.2 (10r)	10-Aug-06 (METAS, No 217-00591)	Aug-07
Reference Probe ET3DV6 (HF)	SN 1507	19-Oct-06 (SPEAG, No. ET3-1507_Oct06)	Oct-07
DAE4	SN 601	15-Dec-05 (SPEAG, No. DAE4-601_Dec05)	Dec-06
Secondary Standards	ID #	Check Date (in house)	Scheduled Check
Power sensor HP 8481A	MY41092317	18-Oct-02 (SPEAG, in house check Oct-05)	In house check: Oct-07
RF generator Agilent E4421B	MY41000675	11-May-05 (SPEAG, in house check Nov-05)	In house check: Nov-07
Network Analyzer HP 8753E	US37390585 S4206	18-Oct-01 (SPEAG, in house check Oct-06)	In house check: Oct-07

Calibrated by:	Name Claudio Leubler	Function Laboratory Technician	Signature
Approved by:	Name Katja Pokovic	Technical Manager	

Issued: December 8, 2006

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Accreditation No.: **SCS 108**

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:

- 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
- 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
- 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:

- DASY4 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	DASY4	V4.7
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 $\pm$ 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 $\pm$ 0.2) °C	41.7 $\pm$ 6 %	0.90 mho/m $\pm$ 6 %
Head TSL temperature during test	(22.8 $\pm$ 0.2) °C	—	—

SAR result with Head TSL

SAR averaged over 1 cm³ (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	9.43 mW / g $\pm$ 17.0 % (k=2)

SAR averaged over 10 cm³ (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	6.17 mW / g $\pm$ 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	54.1 ± 6 %	1.00 mho/m ± 6 %
Body TSL temperature during test	(22.0 ± 0.2) °C	—	—

SAR result with Body TSL

SAR averaged over 1 cm³ (1 g) of Body TSL	condition	
SAR measured	250 mW input power	2.51 mW / g
SAR normalized	normalized to 1W	10.0 mW / g
SAR for nominal Body TSL parameters ²	normalized to 1W	9.70 mW / g ± 17.0 % (k=2)

SAR averaged over 10 cm³ (10 g) of Body TSL	condition	
SAR measured	250 mW input power	1.67 mW / g
SAR normalized	normalized to 1W	6.68 mW / g
SAR for nominal Body TSL parameters ²	normalized to 1W	6.51 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	50.3 Ω - 7.5 j Ω
Return Loss	- 22.5 dB

Antenna Parameters with Body TSL

Impedance, transformed to feed point	46.2 Ω - 9.7 j Ω
Return Loss	- 19.4 dB

General Antenna Parameters and Design

Electrical Delay (one direction)	1.390 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	July 26, 2001

DASY4 Validation Report for Head TSL

Date/Time: 05.12.2006 12:25:28

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole 835 MHz; Type: D835V2; Serial: D835V2 - SN: 442

Communication System: CW; Frequency: 835 MHz; Duty Cycle: 1:1

Medium: HSL 900 MHz;

Medium parameters used: $f = 835 \text{ MHz}$; $\sigma = 0.902 \text{ mho/m}$; $\epsilon_r = 42$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section

Measurement Standard: DASY4 (High Precision Assessment)

DASY4 Configuration:

- Probe: ET3DV6 - SN1507 (HF); ConvF(6.09, 6.09, 6.09); Calibrated: 19.10.2006
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 15.12.2005
- Phantom: Flat Phantom 4.9L; Type: QD000P49AA; ;
- Measurement SW: DASY4, V4.7 Build 46; Postprocessing SW: SEMCAD, V1.8 Build 171

Pin = 250 mW; d = 15 mm/Zoom Scan (7x7x7)/Cube 0:

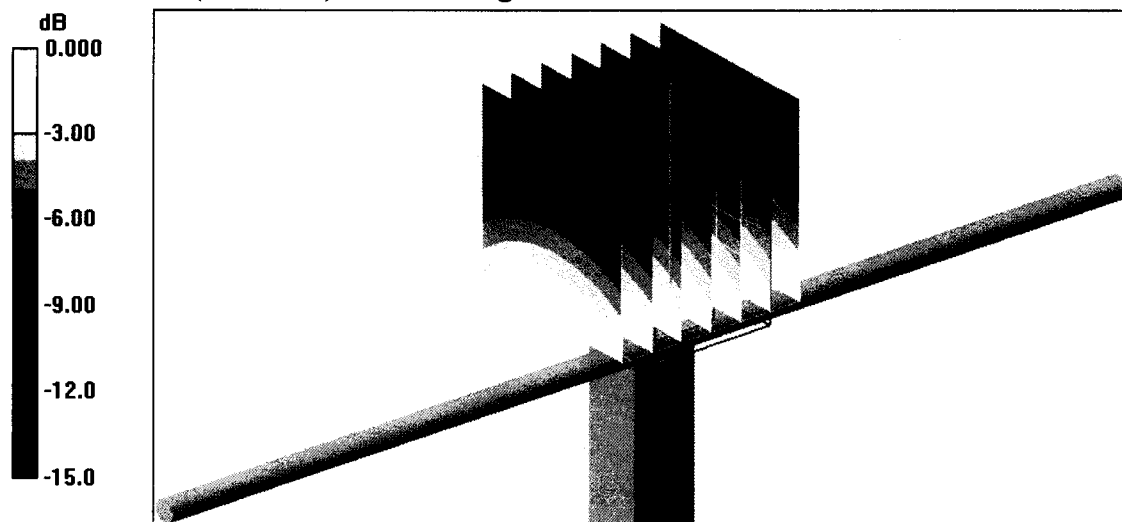
Measurement grid: $dx=5\text{mm}$, $dy=5\text{mm}$, $dz=5\text{mm}$

Reference Value = 55.5 V/m; Power Drift = -0.017 dB

Peak SAR (extrapolated) = 3.40 W/kg

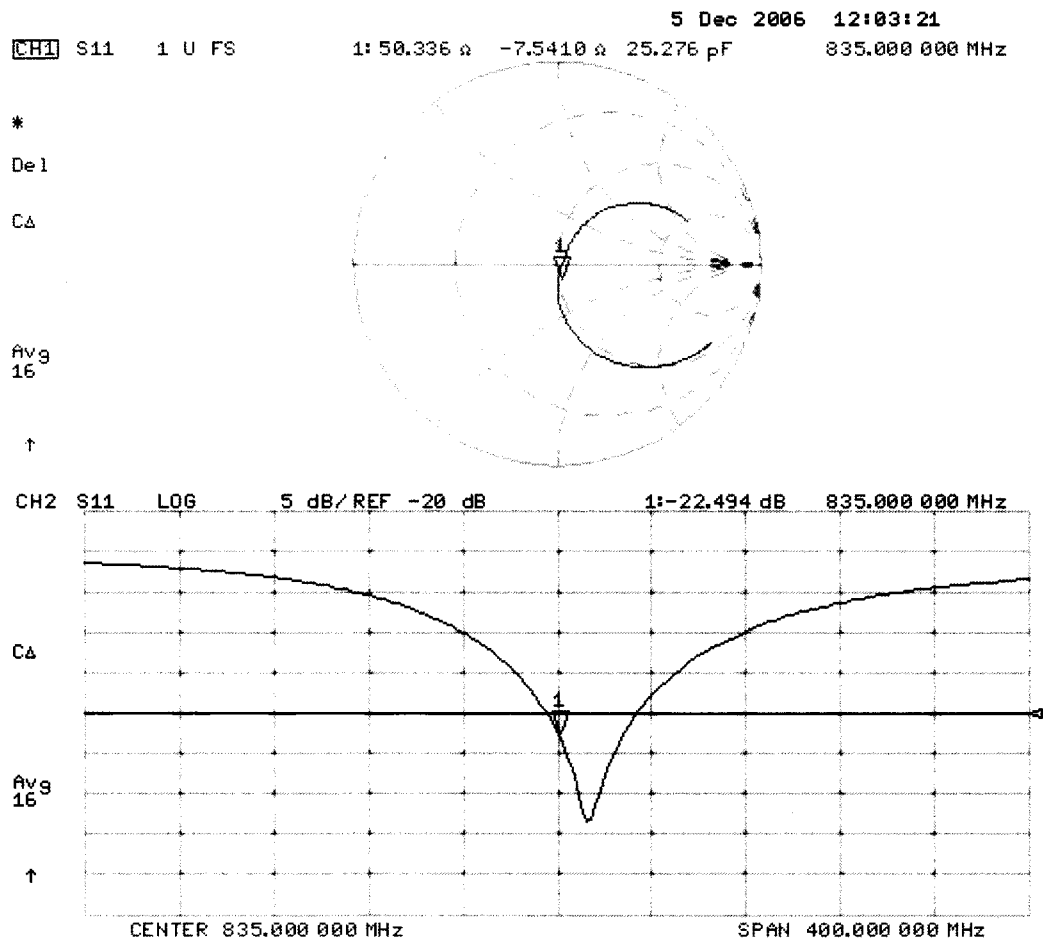
SAR(1 g) = 2.35 mW/g; SAR(10 g) = 1.54 mW/g

Maximum value of SAR (measured) = 2.55 mW/g



0 dB = 2.55mW/g

Impedance Measurement Plot for Head TSL



DASY4 Validation Report for Body TSL

Date/Time: 06.12.2006 13:07:13

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole 835 MHz; Type: D835V2; Serial: D835V2 - SN:442

Communication System: CW; Frequency: 835 MHz; Duty Cycle: 1:1

Medium: MSL900;

Medium parameters used: $f = 835 \text{ MHz}$; $\sigma = 1 \text{ mho/m}$; $\epsilon_r = 54.1$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section

Measurement Standard: DASY4 (High Precision Assessment)

DASY4 Configuration:

- Probe: ET3DV6 - SN1507 (HF); ConvF(5.75, 5.75, 5.75); Calibrated: 19.10.2006
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 15.12.2005
- Phantom: Flat Phantom 4.9L; Type: QD000P49AA; ;
- Measurement SW: DASY4, V4.7 Build 46; Postprocessing SW: SEMCAD, V1.8 Build 171

Pin = 250 mW; d = 15 mm/Zoom Scan (7x7x7)/Cube 0:

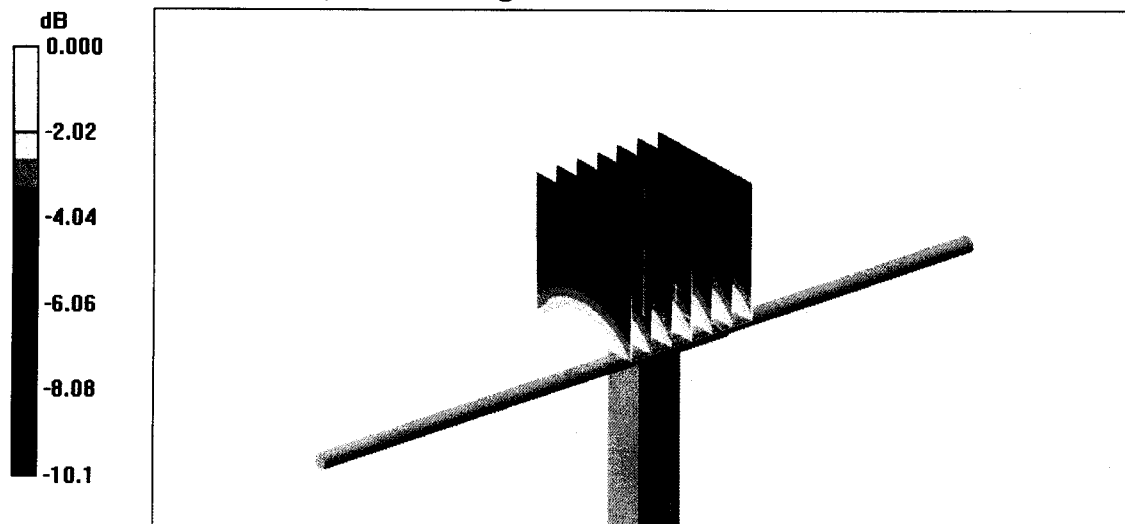
Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 54.7 V/m; Power Drift = -0.002 dB

Peak SAR (extrapolated) = 3.49 W/kg

SAR(1 g) = 2.51 mW/g; SAR(10 g) = 1.67 mW/g

Maximum value of SAR (measured) = 2.72 mW/g



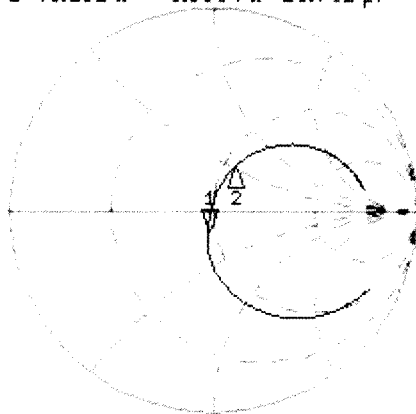
0 dB = 2.72mW/g

Impedance Measurement Plot for Body TSL

6 Dec 2006 10:32:17
CH1 S11 1 U FS 1: 46.182 Ω -9.6504 Ω 19.751 pF 835.000 000 MHz

*
Del
Cor

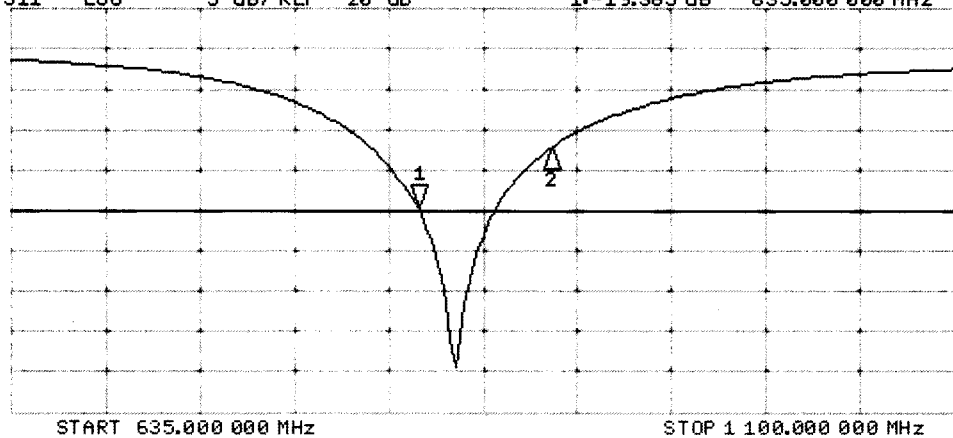
Avg
16
↑



CH2 S11 LOG 5 dB/REF -20 dB 1: -19.385 dB 835.000 000 MHz

Cor

Avg
16
↑





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Client **Sony Ericsson UK**

Certificate No: **DAE3-449_Dec07**

CALIBRATION CERTIFICATE

Object **DAE3 - SD 000 D03 AA - SN: 449**

Calibration procedure(s) **QA CAL-06.v12**
Calibration procedure for the data acquisition electronics (DAE)

Calibration date: **December 19, 2007**

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 $(22 \pm 3)^{\circ}\text{C}$ and humidity $< 70\%$.

Calibration Equipment used (M&TE critical for calibration)

Primary Standards	ID #	Cal Date (Calibrated by, Certificate No.)	Scheduled Calibration
Fluke Process Calibrator Type 702	SN: 6295803	04-Oct-07 (Elcal AG, No: 6467)	Oct-08
Keithley Multimeter Type 2001	SN: 0810278	03-Oct-07 (Elcal AG, No: 6465)	Oct-08
Secondary Standards	ID #	Check Date (in house)	Scheduled Check
Calibrator Box V1.1	SE UMS 006 AB 1004	25-Jun-07 (SPEAG, in house check)	In house check Jun-08

	Name	Function	Signature
Calibrated by:	Dominique Steffen	Technician	

Approved by:	Fin Bomholt	R&D Director	
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Issued: December 19, 2007

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Accreditation No.: **SCS 108**

Glossary

DAE data acquisition electronics
Connector angle information used in DASY system to align probe sensor X to the robot coordinate system.

Methods Applied and Interpretation of Parameters

- *DC Voltage Measurement:* Calibration Factor assessed for use in DASY system by comparison with a calibrated instrument traceable to national standards. The figure given corresponds to the full scale range of the voltmeter in the respective range.
- *Connector angle:* The angle of the connector is assessed measuring the angle mechanically by a tool inserted. Uncertainty is not required.
- The following parameters as documented in the Appendix contain technical information as a result from the performance test and require no uncertainty.
 - *DC Voltage Measurement Linearity:* Verification of the Linearity at +10% and -10% of the nominal calibration voltage. Influence of offset voltage is included in this measurement.
 - *Common mode sensitivity:* Influence of a positive or negative common mode voltage on the differential measurement.
 - *Channel separation:* Influence of a voltage on the neighbor channels not subject to an input voltage.
 - *AD Converter Values with inputs shorted:* Values on the internal AD converter corresponding to zero input voltage
 - *Input Offset Measurement:* Output voltage and statistical results over a large number of zero voltage measurements.
 - *Input Offset Current:* Typical value for information; Maximum channel input offset current, not considering the input resistance.
 - *Input resistance:* DAE input resistance at the connector, during internal auto-zeroing and during measurement.
 - *Low Battery Alarm Voltage:* Typical value for information. Below this voltage, a battery alarm signal is generated.
 - *Power consumption:* Typical value for information. Supply currents in various operating modes.

DC Voltage Measurement

A/D - Converter Resolution nominal

High Range: 1LSB = 6.1 μ V , full range = -100...+300 mV

Low Range: 1LSB = 61nV , full range = -1.....+3mV

DASY measurement parameters: Auto Zero Time: 3 sec; Measuring time: 3 sec

Calibration Factors	X	Y	Z
High Range	404.892 $\pm$ 0.1% (k=2)	404.957 $\pm$ 0.1% (k=2)	404.528 $\pm$ 0.1% (k=2)
Low Range	3.94219 $\pm$ 0.7% (k=2)	3.95677 $\pm$ 0.7% (k=2)	3.95923 $\pm$ 0.7% (k=2)

Connector Angle

Connector Angle to be used in DASY system	233 $^{\circ}$ $\pm$ 1 $^{\circ}$
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Appendix

1. DC Voltage Linearity

High Range	Input (μV)	Reading (μV)	Error (%)
Channel X + Input	200000	199999.7	0.00
Channel X + Input	20000	20007.02	0.04
Channel X - Input	20000	-20003.86	0.02
Channel Y + Input	200000	200000.4	0.00
Channel Y + Input	20000	20005.01	0.03
Channel Y - Input	20000	-20008.55	0.04
Channel Z + Input	200000	200000.6	0.00
Channel Z + Input	20000	20006.95	0.03
Channel Z - Input	20000	-20005.58	0.03

Low Range	Input (μV)	Reading (μV)	Error (%)
Channel X + Input	2000	2000	0.00
Channel X + Input	200	200.33	0.17
Channel X - Input	200	-200.46	0.23
Channel Y + Input	2000	1999.9	0.00
Channel Y + Input	200	199.21	-0.39
Channel Y - Input	200	-200.57	0.28
Channel Z + Input	2000	2000.1	0.00
Channel Z + Input	200	199.62	-0.19
Channel Z - Input	200	-201.37	0.69

2. Common mode sensitivity

DASY measurement parameters: Auto Zero Time: 3 sec; Measuring time: 3 sec

	Common mode Input Voltage (mV)	High Range Average Reading (μV)	Low Range Average Reading (μV)
Channel X	200	4.36	3.86
	- 200	-2.50	-3.85
Channel Y	200	5.30	4.87
	- 200	-6.23	-6.48
Channel Z	200	0.97	0.68
	- 200	-2.22	-2.68

3. Channel separation

DASY measurement parameters: Auto Zero Time: 3 sec; Measuring time: 3 sec

	Input Voltage (mV)	Channel X (μV)	Channel Y (μV)	Channel Z (μV)
Channel X	200	-	2.56	-1.06
Channel Y	200	1.69	-	2.41
Channel Z	200	0.03	-0.93	-

4. AD-Converter Values with inputs shorted

DASY measurement parameters: Auto Zero Time: 3 sec; Measuring time: 3 sec

	High Range (LSB)	Low Range (LSB)
Channel X	16046	16816
Channel Y	15882	15247
Channel Z	16286	17653

5. Input Offset Measurement

DASY measurement parameters: Auto Zero Time: 3 sec; Measuring time: 3 sec

Input 10M Ω

	Average (μ V)	min. Offset (μ V)	max. Offset (μ V)	Std. Deviation (μ V)
Channel X	-0.74	-2.14	1.35	0.32
Channel Y	-1.16	-2.25	0.17	0.33
Channel Z	-0.87	-2.13	1.54	0.37

6. Input Offset Current

Nominal Input circuitry offset current on all channels: <25fA

7. Input Resistance

	Zeroing (MOhm)	Measuring (MOhm)
Channel X	0.2001	198.4
Channel Y	0.2000	198.8
Channel Z	0.1998	200.7

8. Low Battery Alarm Voltage (verified during pre test)

Typical values	Alarm Level (VDC)
Supply (+ Vcc)	+7.9
Supply (- Vcc)	-7.6

9. Power Consumption (verified during pre test)

Typical values	Switched off (mA)	Stand by (mA)	Transmitting (mA)
Supply (+ Vcc)	+0.0	+6	+14
Supply (- Vcc)	-0.01	-8	-9



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Client **Sony Ericsson UK**

Certificate No: **ET3-1611_Dec07**

CALIBRATION CERTIFICATE

Object **ET3DV6 - SN:1611**

Calibration procedure(s) **QA CAL-01.v6
Calibration procedure for dosimetric E-field probes**

Calibration date: **December 17, 2007**

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 $(22 \pm 3)^{\circ}\text{C}$ 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	29-Mar-07 (METAS, No. 217-00670)	Mar-08
Power sensor E4412A	MY41495277	29-Mar-07 (METAS, No. 217-00670)	Mar-08
Power sensor E4412A	MY41498087	29-Mar-07 (METAS, No. 217-00670)	Mar-08
Reference 3 dB Attenuator	SN: S5054 (3c)	8-Aug-07 (METAS, No. 217-00719)	Aug-08
Reference 20 dB Attenuator	SN: S5086 (20b)	29-Mar-07 (METAS, No. 217-00671)	Mar-08
Reference 30 dB Attenuator	SN: S5129 (30b)	8-Aug-07 (METAS, No. 217-00720)	Aug-08
Reference Probe ES3DV2	SN: 3013	4-Jan-07 (SPEAG, No. ES3-3013_Jan07)	Jan-08
DAE4	SN: 654	20-Apr-07 (SPEAG, No. DAE4-654_Apr07)	Apr-08

Secondary Standards	ID #	Check Date (in house)	Scheduled Check
RF generator HP 8648C	US3642U01700	4-Aug-99 (SPEAG, in house check Oct-07)	In house check: Oct-09
Network Analyzer HP 8753E	US37390585	18-Oct-01 (SPEAG, 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: December 17, 2007

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Accreditation No.: **SCS 108**

Glossary:

TSL	tissue simulating liquid
NORM _{x,y,z}	sensitivity in free space
ConF	sensitivity in TSL / NORM _{x,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:

- 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
- 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:

- NORM_{x,y,z}**: Assessed for E-field polarization $\vartheta = 0$ ($f \leq 900$ MHz in TEM-cell; $f > 1800$ MHz: R22 waveguide). NORM_{x,y,z} are only intermediate values, i.e., the uncertainties of NORM_{x,y,z} does not effect the E²-field uncertainty inside TSL (see below *ConvF*).
- NORM(f)_{x,y,z} = NORM_{x,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*.
- DCP_{x,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 NORM_{x,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:1611

Manufactured:	July 27, 2001
Last calibrated:	December 12, 2006
Recalibrated:	December 17, 2007

Calibrated for DASY Systems

(Note: non-compatible with DASY2 system!)

DASY - Parameters of Probe: ET3DV6 SN:1611

Sensitivity in Free Space^A

Diode Compression^B

NormX	1.72 ± 10.1%	$\mu\text{V}/(\text{V}/\text{m})^2$	DCP X	93 mV
NormY	1.86 ± 10.1%	$\mu\text{V}/(\text{V}/\text{m})^2$	DCP Y	93 mV
NormZ	1.82 ± 10.1%	$\mu\text{V}/(\text{V}/\text{m})^2$	DCP Z	94 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	9.8	5.7
SAR _{be} [%]	With Correction Algorithm	0.3	0.2

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	8.0
SAR _{be} [%]	With Correction Algorithm	0.0	0.3

Sensor Offset

Probe Tip to Sensor Center **2.7 mm**

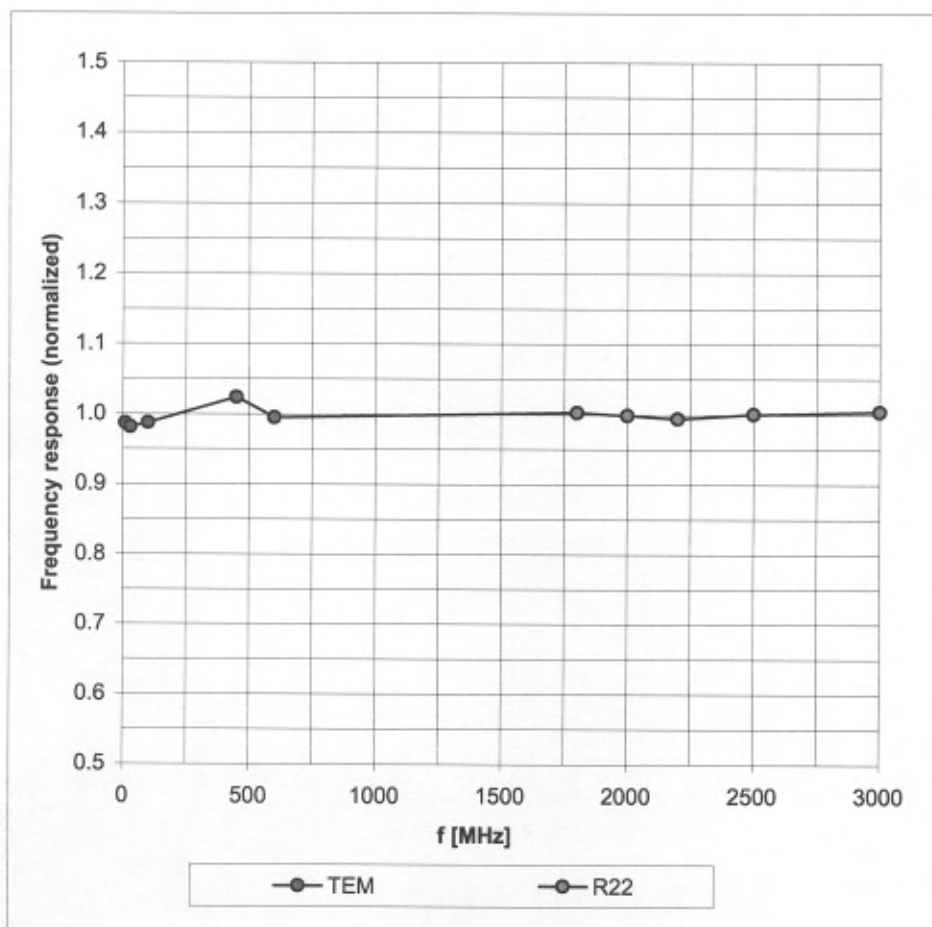
The reported uncertainty of measurement is stated as the standard uncertainty of measurement multiplied by the coverage factor $k=2$, which for a normal distribution corresponds to a coverage probability of approximately 95%.

^A The uncertainties of NormX,Y,Z do not affect the E²-field uncertainty inside TSL (see Page 8).

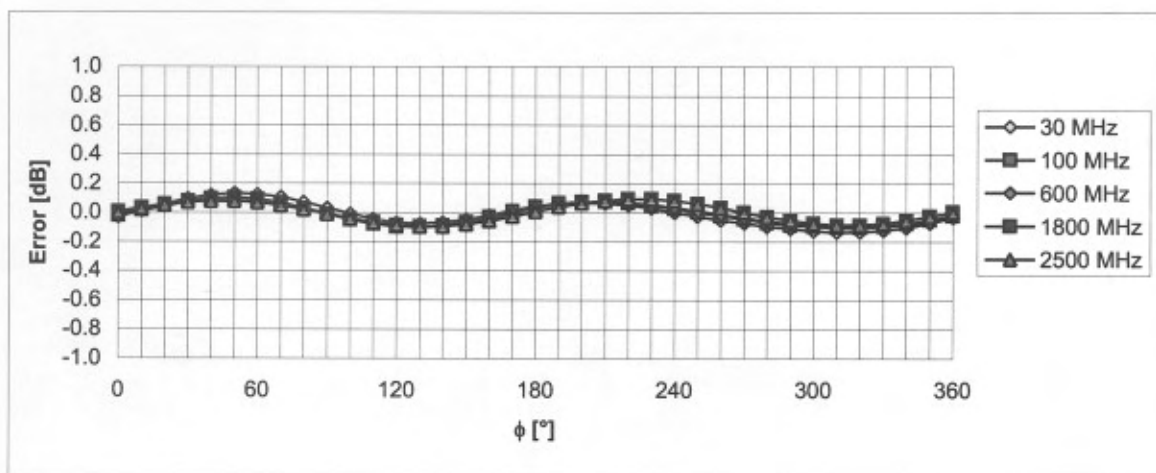
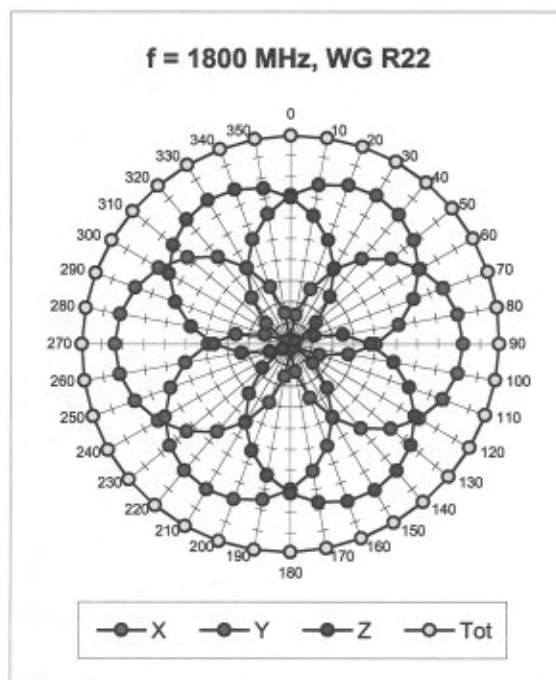
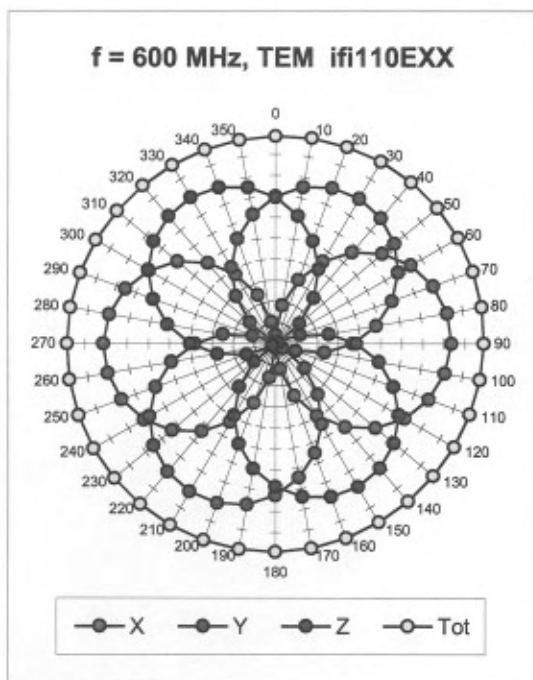
^B Numerical linearization parameter: uncertainty not required.

Frequency Response of E-Field

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



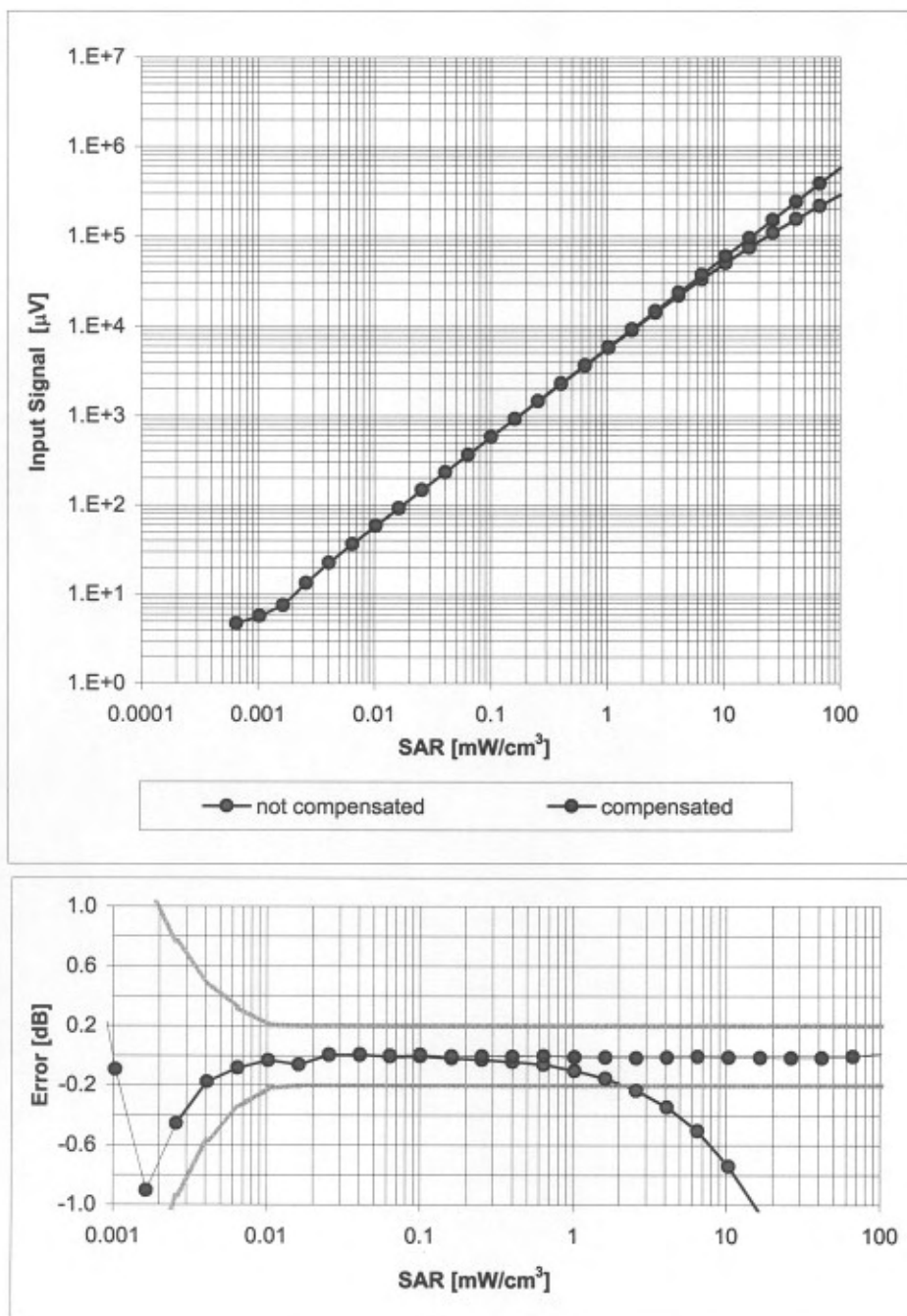
Uncertainty of Frequency Response of E-field: $\pm 6.3\%$ ($k=2$)

Receiving Pattern (ϕ), $\vartheta = 0^\circ$ 

Uncertainty of Axial Isotropy Assessment: $\pm 0.5\%$ ($k=2$)

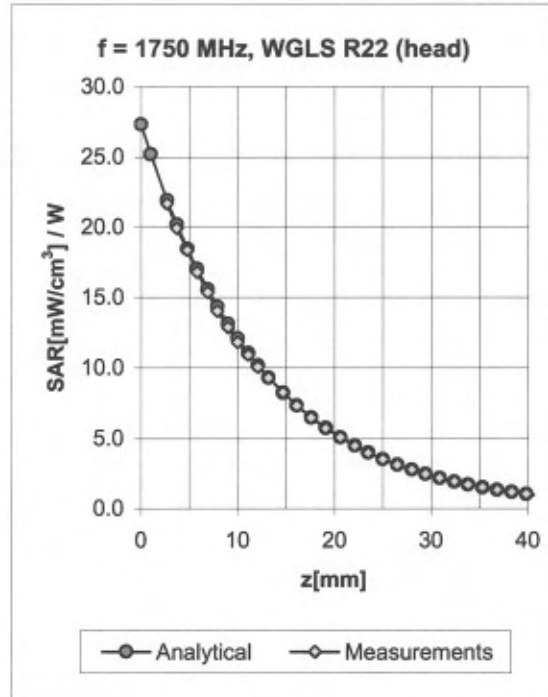
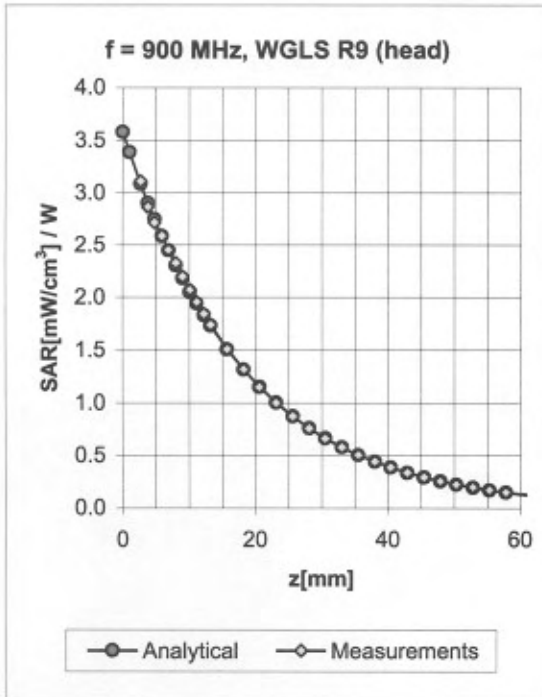
Dynamic Range $f(\text{SAR}_{\text{head}})$

(Waveguide R22, $f = 1800$ MHz)



Uncertainty of Linearity Assessment: $\pm 0.6\%$ ($k=2$)

Conversion Factor Assessment

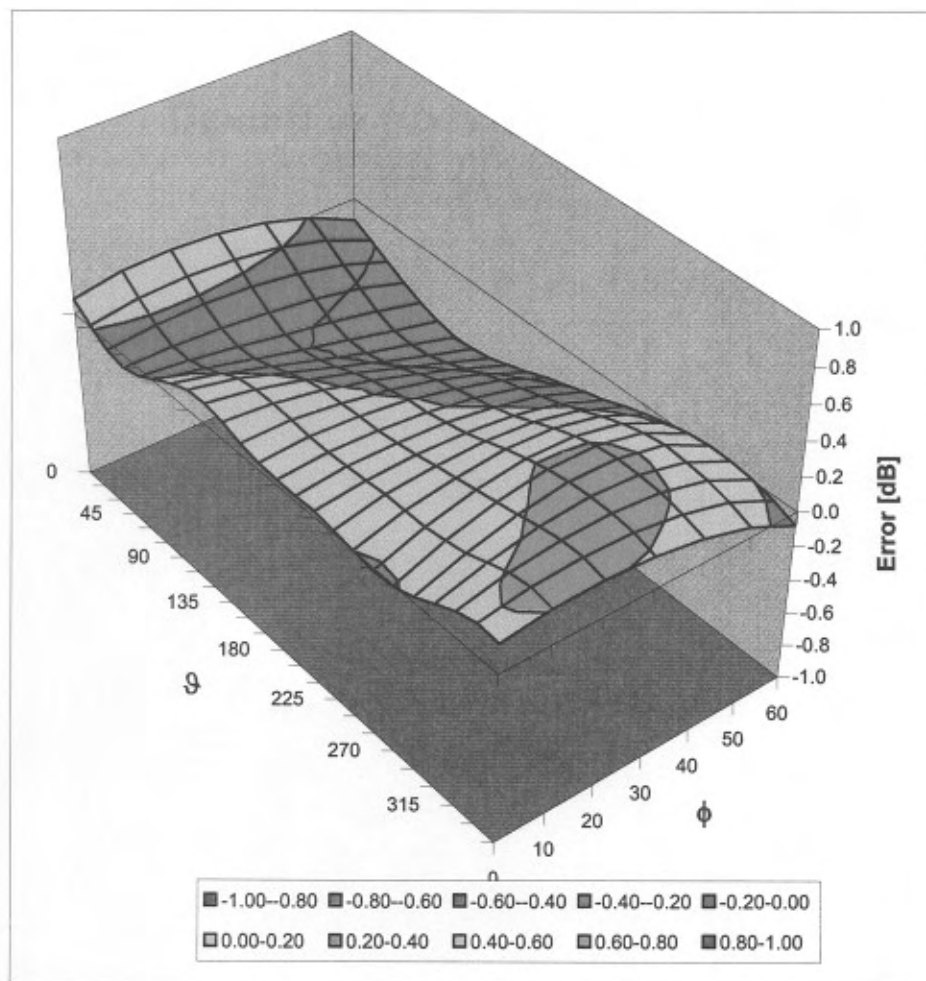


f [MHz]	Validity [MHz] ^c	TSL	Permittivity	Conductivity	Alpha	Depth	ConvF Uncertainty
835	± 50 / ± 100	Head	41.5 ± 5%	0.90 ± 5%	0.55	2.22	6.63 ± 11.0% (k=2)
900	± 50 / ± 100	Head	41.5 ± 5%	0.97 ± 5%	0.52	2.30	6.48 ± 11.0% (k=2)
1750	± 50 / ± 100	Head	40.1 ± 5%	1.37 ± 5%	0.48	2.95	5.34 ± 11.0% (k=2)
1900	± 50 / ± 100	Head	40.0 ± 5%	1.40 ± 5%	0.51	2.68	5.17 ± 11.0% (k=2)
2450	± 50 / ± 100	Head	39.2 ± 5%	1.80 ± 5%	0.70	1.91	4.55 ± 11.8% (k=2)
835	± 50 / ± 100	Body	55.2 ± 5%	0.97 ± 5%	0.70	1.91	6.49 ± 11.0% (k=2)
900	± 50 / ± 100	Body	55.0 ± 5%	1.05 ± 5%	0.66	2.01	6.24 ± 11.0% (k=2)
1750	± 50 / ± 100	Body	53.4 ± 5%	1.49 ± 5%	0.48	3.07	4.98 ± 11.0% (k=2)
1900	± 50 / ± 100	Body	53.3 ± 5%	1.52 ± 5%	0.52	2.64	4.79 ± 11.0% (k=2)
2450	± 50 / ± 100	Body	52.7 ± 5%	1.95 ± 5%	0.74	1.75	4.15 ± 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: $\pm 2.6\%$ ($k=2$)