Sony Ericsson

Company Internal
REPORT

Prepared (also subject responsible if other)		No.		
BA/SEM/BGLINS *Robert Carr*		*BGLI08:013.*		
Approved	Checked	Date	Rev	Reference
LD/SEMC/BGLI/NC Peter Lindeborg	*090108*	*070108*	A	File

Report issued by Accredited SAR Laboratory

For

PY7A3052051 (Z770)

Date of test: 3, 4 January 2008

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

Sony Ericsson Type : AAD-3052051-BV; FCC ID : PY7A3052051; IC:4170B-A3052051

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)

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1 Introduction

In this test report, compliance of the Sony Ericsson PY7A3052051 (Z770) 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 Device Under Test

2.1 Antenna Description

Type	Built in	
Location	Bottom Rear of phone	
Dimensions	Max length	11mm
	Max width	38mm
Configuration	IFA+ Coupling	

2.2 Device description

Device model	PY7A3052051		
Market name	Z770		
Serial numbers (EUT #)	BX9005YPFZ (#9976)		
Mode	GSM1900 – Circuit Switched		
Crest factor	8.3		
Multiple access scheme	TDMA		
Maximum output power setting [dBm]	Ch. 512	Ch. 661	Ch. 810
	31.0	31.0	31.0
Factory tolerance in power setting	±0.5 dB		
Maximum peak output power [dBm]	31.0	31.0	31.0
Mode	GSM1900 – GPRS/EDGE 2Tx		
Crest factor	4.15		
Multiple access scheme	TDMA		
Maximum output power setting [dBm]	Ch. 512	Ch. 661	Ch. 810
	28.4	28.5	28.2
Factory tolerance in power setting	±0.5 dB		
Maximum peak output power [dBm]	28.5	28.5	28.5
Transmitting frequency range [MHz]	1850.2 - 1909.8		
GPRS Multislot class	10		
GPRS Capability class	B		
Prototype or production unit	Preproduction (HW:FP1)		
Device category	Portable		
RF exposure environment	General population / uncontrolled		

3 Test equipment

3.1 Dosimetric system

SAR measurements were made using the DASY4 professional system (software version 4.7, Built 44) 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	448	15-11-2008
E-field probe ET3DV6	1610	14-11-2008
Dipole Validation Kit, D1900V2	539	12-12-2008

3.2 Additional equipment

Description	***Inventory Number***	***Due Date***
Signal generator R&S SMY 02	3.094	24-04-08
Directional coupler HP778D	15.233	None
Power meter R&S NRVD	4.073	24-04-08
Power sensor R&S NRV-Z5	4.074	24-04-08
Power sensor R&S NRV-Z5	4.076	24-04-08
Network analyzer Agilent 8719D	2.022	23-04-08
Dielectric probe kit HP8507C	14.046	Self Cal
R&S CMU200	20011497	08-05-08

4 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 DASY software is also given. Recommended parameters 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/cm³]
1900	Head	Measured, 03-01-08	38.1	1.47	1.00
		Recommended	40.0	1.40	1.00
	Body	Measured, 04-01-08	51.5	1.58	1.00
		Recommended	53.3	1.52	1.00

5 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 22.7-22.9°C and humidity 19-25%. The obtained results are displayed in the table below.

RF noise had been measured in the liquid when all RF equipment in lab was switched off. Measured value was 0.00000289 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/cm³]	
1900	Head	Measured, 03-01-08	38.9 / 20.0	38.1	1.47	1.00	21.4
		Reference	35.9 / 19.1	40.0	1.40	1.00	22.0
	Body	Measured, 04-01-08	39.5 / 21.0	51.5	1.58	1.00	21.9
		Reference	37 / 19.8	53.3	1.52	1.00	22.0

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6 SAR measurement uncertainty

DASY4 SAR measurement uncertainty evaluation for Sony Ericsson PY7A3052051 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***

7 Test results

The measured 1-gram averaged SAR values of the device towards the head and body are provided in Table 1 and Table 2. The ambient humidity and temperature of test facility were (19-25) % and (22.7–22.9) °C respectively. The depth of the head and body tissue simulating liquids were greater than 15.5cm. A base station simulator was used to control the device during the SAR measurements. The phone was supplied with a fully-charged battery for each measurement. For head measurement, the device was tested on the right-hand phantom and the left-hand phantom in two different phones position, cheek (touch) and tilt (cheek + 15deg). For all modes, the device was tested at the lowest, middle and highest frequencies in the transmission band.

For body measurement the DUT was tested with the antenna (back) and display (front) towards the phantom flat section with 15 mm distance in both speech and data mode. Available data modes were GPRS or EDGE. 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 calls the DUT was paired with Sony Ericsson HBH-60.

Band	Channel	Power [dBm]	Position	Liquid T [°C]	Measured SAR [W/kg]	
					Left-hand 1g mass	Right-hand 1g mass
GSM 1900	512	31.0	Cheek	21.4	0.54	0.66
			Tilt	-	-	-
	661	31.0	Cheek	21.4	0.54	0.64
			Tilt	21.4	0.28	0.22
	810	31.0	Cheek	21.4	0.44	0.51
			Tilt	-	-	-

Table1: Head SAR measurement results for Sony Ericsson PY7A3052051 telephone at highest possible output power.

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Band	Channel	Power [dBm]	Position / Mode	Liquid T [°C]	Measured SAR 1g mass [W/kg]
GSM 1900	512	28.4	Back GPRS	21.9	0.84
			Front GPRS	21.9	0.29
		26.6	Back EDGE	21.9	0.35
		31.0	Back Bluetooth	21.9	0.46
			Back PHF	21.9	0.44
	661	28.5	Back GPRS	21.9	0.78
		31.0	Back Bluetooth	21.9	0.43
	810	28.2	Back GPRS	21.9	0.64
		31.0	Back Bluetooth	21.9	0.34

Table2: Body SAR measurement results for Sony Ericsson PY7A3052051 telephone at highest possible output power.

8 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, “Procedure to determine the specific absorption rate (SAR) for hand-held devices used in close proximity to the ear (frequency range of 300MHz to 3GHz,” Std. 62209-1, February, 2005.

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9 Appendix

9.1 Photographs of the device under test

Front & Back

Sides

Back side with battery

Top and Bottom

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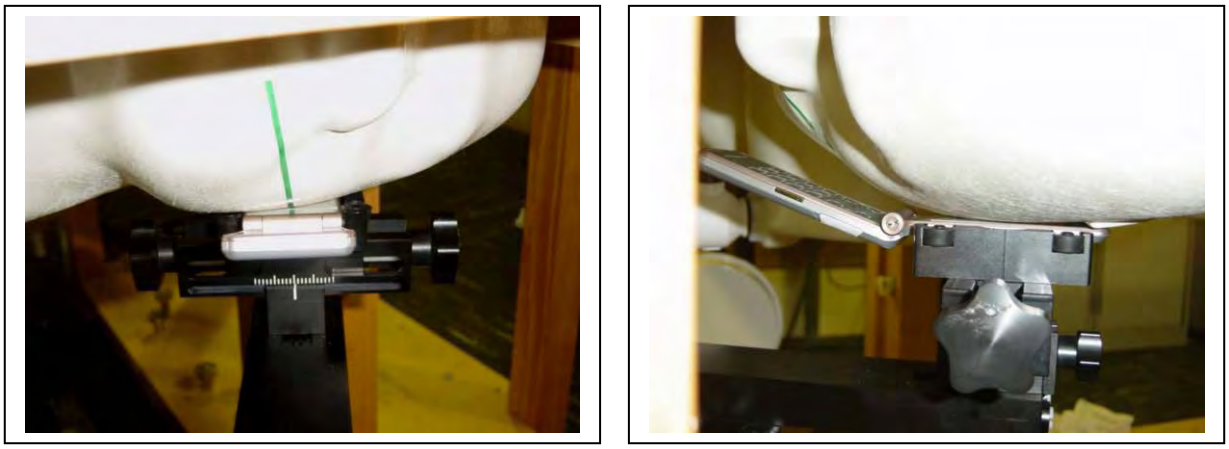
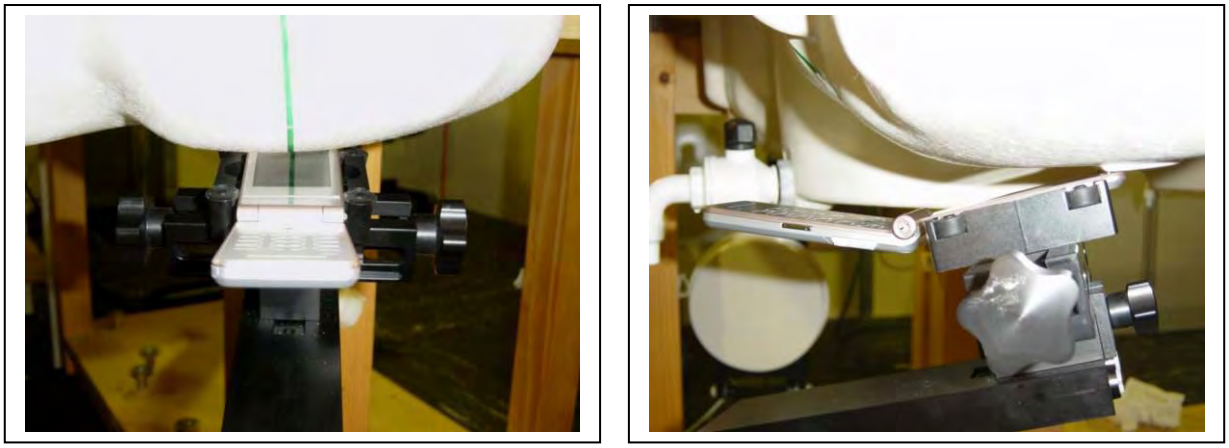
9.2 Device position on SAM Twin Phantom



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



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

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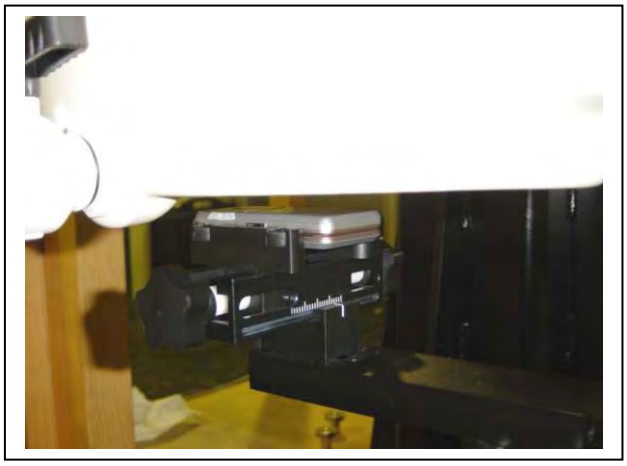
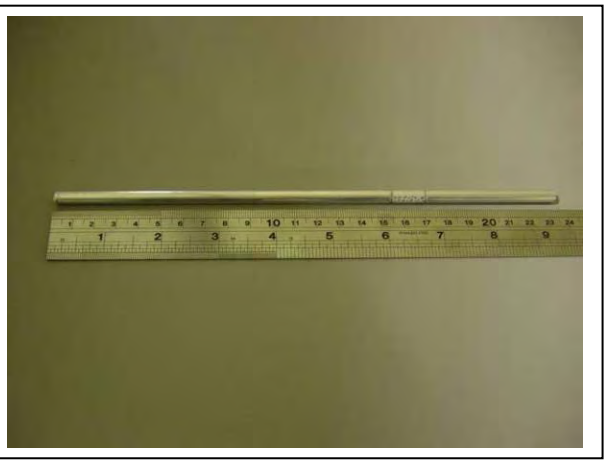
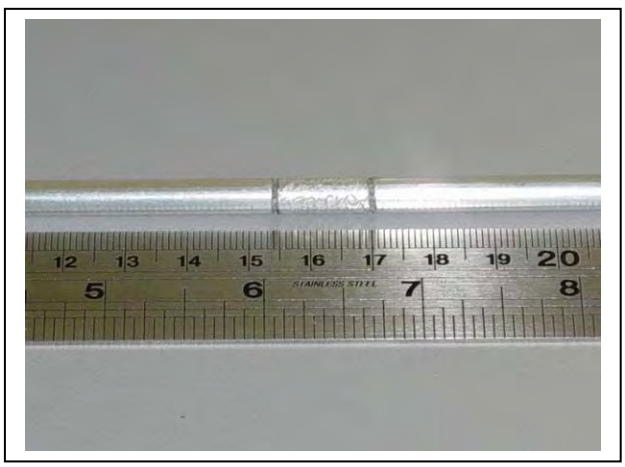


Device position against the body: 15mm distance from Phantom.

9.3 Photographs of TSL Fluid Depths





Pictures to show depth gauge used for measuring TSL depth.
Note: The low end of the scale is a depth of 15.5 cm.

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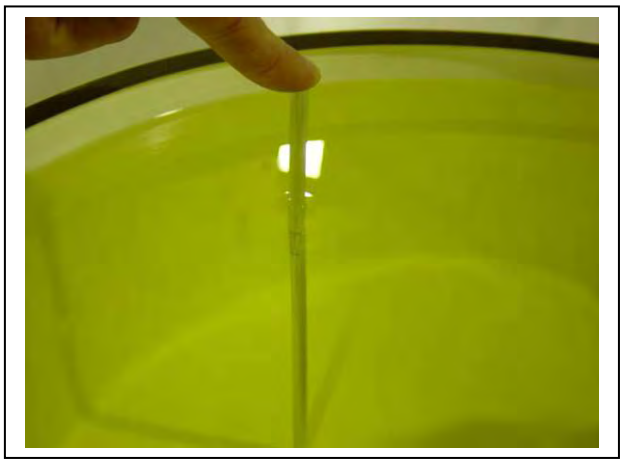
1900 Head



1900 Body

Pictures showing Phantom fluid depths.

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9.4 Attachments

- Measurement plots and system validation
- Dipole calibration

Date/Time: 1/3/2008 11:44:15 AM

Test Laboratory: Sony Ericsson Mobile Communications International AB

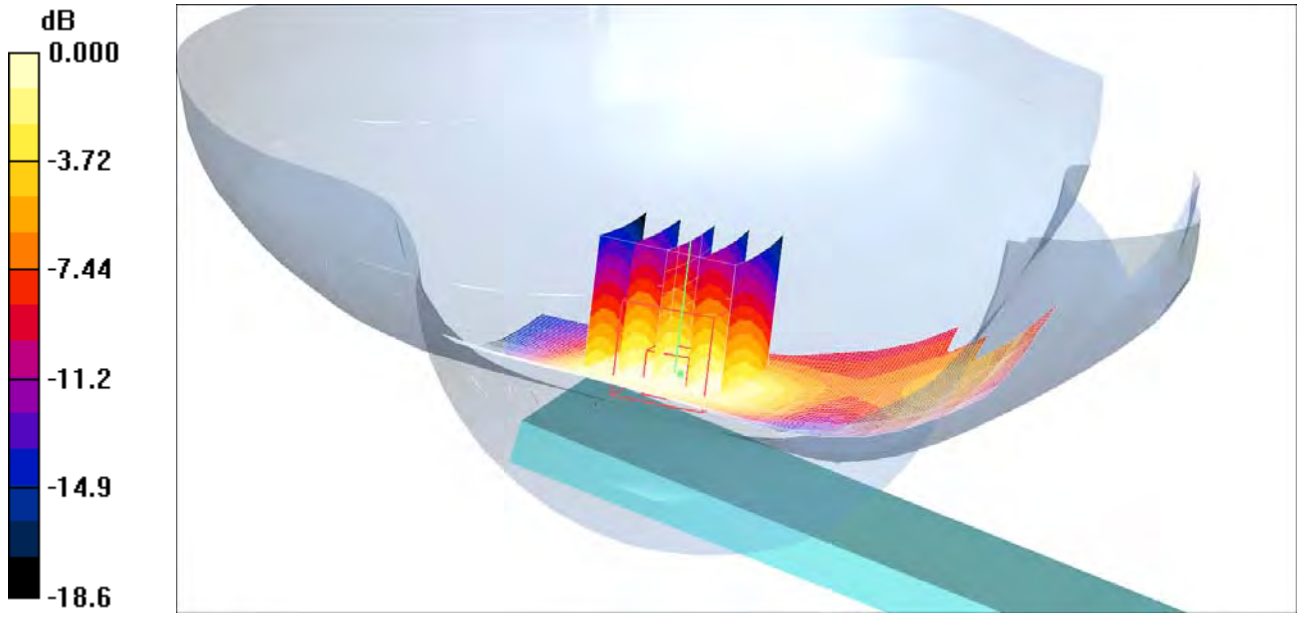
Becky-LeftHandSide-GSM1900-Tilt-Middle

DUT: Becky; Type: DUT; Serial: #9976

Communication System: DCS 1900; Frequency: 1880 MHz;Duty Cycle: 1:8.3
Medium parameters used: f = 1880 MHz; σ = 1.46 mho/m; ε_r = 38.2; ρ = 1000 kg/m^3
Phantom section: Left Section
Measurement Standard: DASY4 (High Precision Assessment)

DASY4 Configuration:

- Probe: ET3DV6 - SN1610; ConvF(5.18, 5.18, 5.18); Calibrated: 11/14/2007
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn448; Calibrated: 15/11/2007
- 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 (71x131x1): Measurement grid: dx=10mm, dy=10mm
  Maximum value of SAR (interpolated) = 0.304 mW/g
  Tilt position - Middle/Zoom Scan (5x5x7) (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
  Reference Value = 11.8 V/m; Power Drift = 0.014 dB
  Peak SAR (extrapolated) = 0.439 W/kg
  SAR(1 g) = 0.282 mW/g; SAR(10 g) = 0.174 mW/g
  Maximum value of SAR (measured) = 0.298 mW/g



0 dB = 0.298mW/g

Date/Time: 1/3/2008 12:04:09 PM

Test Laboratory: Sony Ericsson Mobile Communications International AB

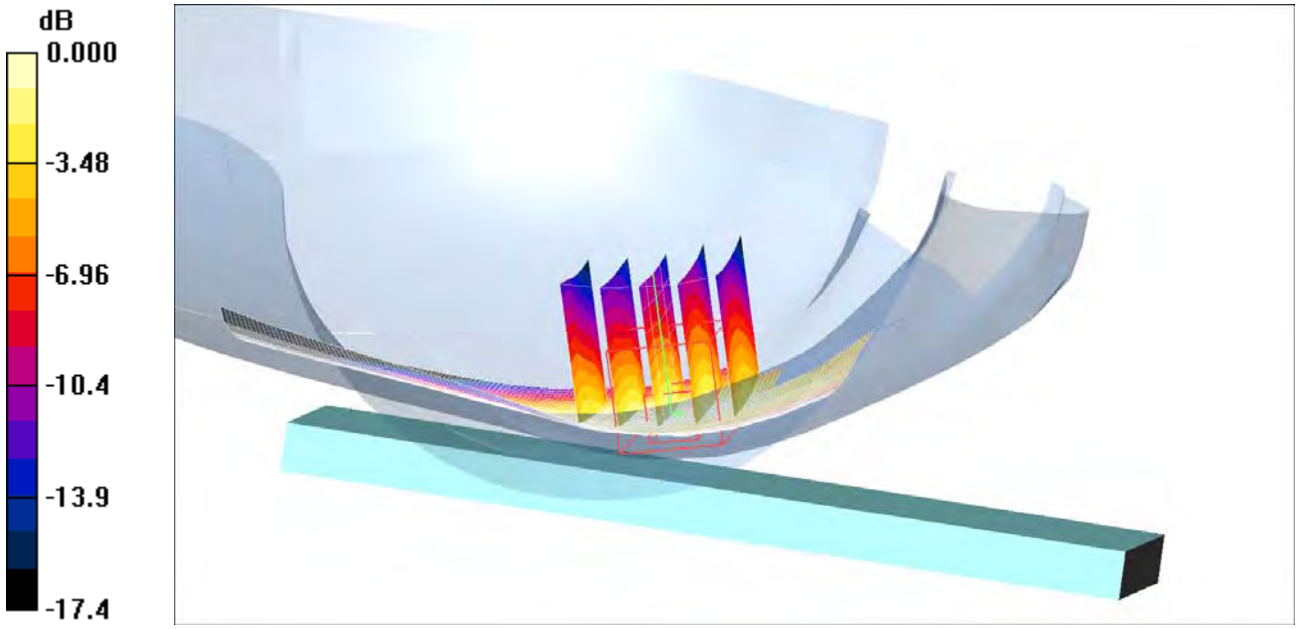
Becky-LeftHandSide-GSM1900-Touch-Low

DUT: Becky; Type: DUT; Serial: #9976

Communication System: DCS 1900; Frequency: 1850.2 MHz;Duty Cycle: 1:8.3
Medium parameters used: f = 1850.2 MHz; σ = 1.43 mho/m; ε_r = 38.3; ρ = 1000 kg/m^3
Phantom section: Left Section
Measurement Standard: DASY4 (High Precision Assessment)

DASY4 Configuration:

- Probe: ET3DV6 - SN1610; ConvF(5.18, 5.18, 5.18); Calibrated: 11/14/2007
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn448; Calibrated: 15/11/2007
- 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 (71x131x1): Measurement grid: dx=10mm, dy=10mm
  Maximum value of SAR (interpolated) = 0.611 mW/g
  Touch - Low/Zoom Scan (5x5x7) (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
  Reference Value = 5.81 V/m; Power Drift = 0.069 dB
  Peak SAR (extrapolated) = 0.893 W/kg
  SAR(1 g) = 0.536 mW/g; SAR(10 g) = 0.321 mW/g
  Maximum value of SAR (measured) = 0.598 mW/g



0 dB = 0.598mW/g

Date/Time: 1/3/2008 11:25:03 AM

Test Laboratory: Sony Ericsson Mobile Communications International AB

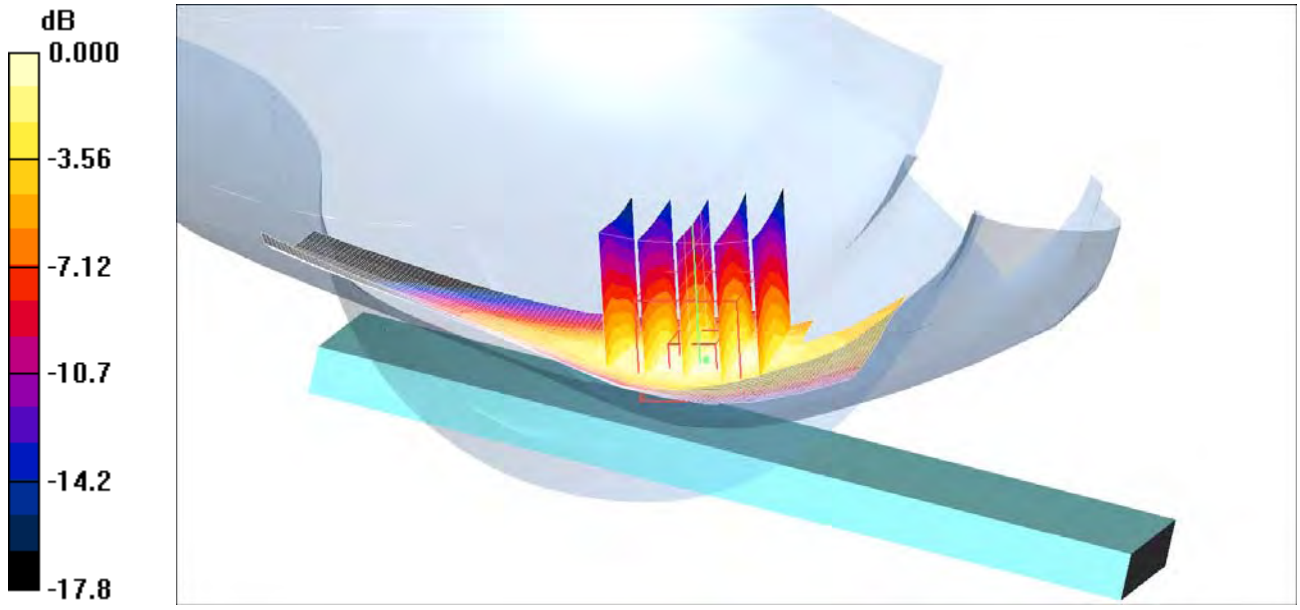
Becky-LeftHandSide-GSM1900-Touch-Middle

DUT: Becky; Type: DUT; Serial: #9976

Communication System: DCS 1900; Frequency: 1880 MHz;Duty Cycle: 1:8.3
Medium parameters used: f = 1880 MHz; σ = 1.46 mho/m; ε_r = 38.2; ρ = 1000 kg/m^3
Phantom section: Left Section
Measurement Standard: DASY4 (High Precision Assessment)

DASY4 Configuration:

- Probe: ET3DV6 - SN1610; ConvF(5.18, 5.18, 5.18); Calibrated: 11/14/2007
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn448; Calibrated: 15/11/2007
- 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 (71x131x1): Measurement grid: dx=10mm, dy=10mm
  Maximum value of SAR (interpolated) = 0.612 mW/g
  Touch position - Middle/Zoom Scan (5x5x7) (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
  Reference Value = 5.74 V/m; Power Drift = -0.075 dB
  Peak SAR (extrapolated) = 0.931 W/kg
  SAR(1 g) = 0.543 mW/g; SAR(10 g) = 0.320 mW/g
  Maximum value of SAR (measured) = 0.606 mW/g



0 dB = 0.606mW/g

Date/Time: 1/3/2008 12:22:05 PM

Test Laboratory: Sony Ericsson Mobile Communications International AB

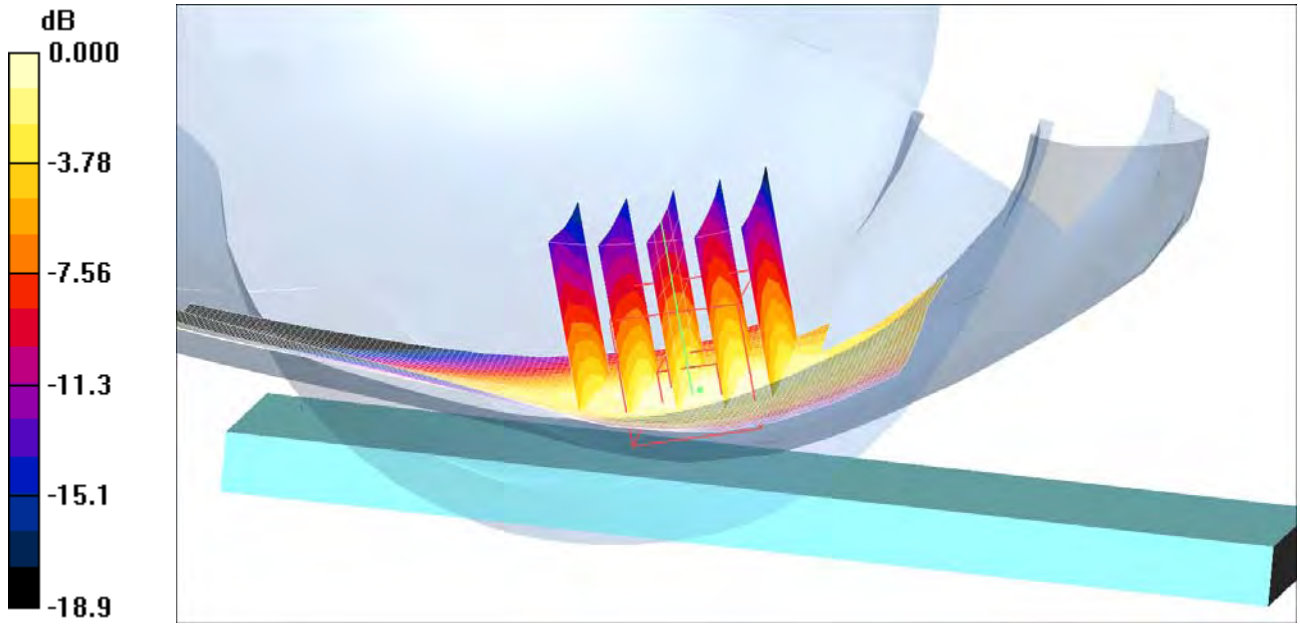
Becky-LeftHandSide-GSM1900-Touch-High

DUT: Becky; Type: DUT; Serial: #9976

Communication System: DCS 1900; Frequency: 1909.8 MHz;Duty Cycle: 1:8.3
Medium parameters used: f = 1909.8 MHz; σ = 1.49 mho/m; ε_r = 38; ρ = 1000 kg/m^3
Phantom section: Left Section
Measurement Standard: DASY4 (High Precision Assessment)

DASY4 Configuration:

- Probe: ET3DV6 - SN1610; ConvF(5.18, 5.18, 5.18); Calibrated: 11/14/2007
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn448; Calibrated: 15/11/2007
- 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 (71x131x1): Measurement grid: dx=10mm, dy=10mm
  Maximum value of SAR (interpolated) = 0.493 mW/g
  Touch - High/Zoom Scan (5x5x7) (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
  Reference Value = 4.70 V/m; Power Drift = -0.083 dB
  Peak SAR (extrapolated) = 0.741 W/kg
  SAR(1 g) = 0.435 mW/g; SAR(10 g) = 0.254 mW/g
  Maximum value of SAR (measured) = 0.486 mW/g



0 dB = 0.486mW/g

Date/Time: 1/3/2008 1:35:37 PM

Test Laboratory: Sony Ericsson Mobile Communications International AB

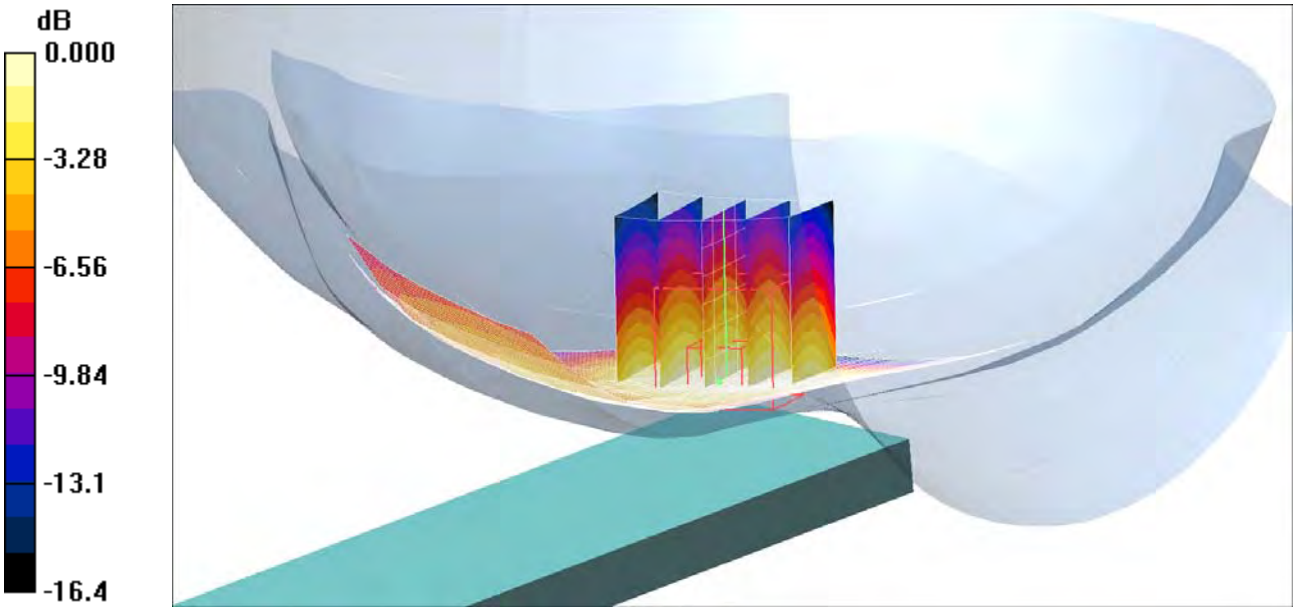
Becky-RightHandSide-GSM1900-Tilt-Middle

DUT: Becky; Type: DUT; Serial: #9976

Communication System: DCS 1900; Frequency: 1880 MHz;Duty Cycle: 1:8.3
Medium parameters used: f = 1880 MHz; σ = 1.46 mho/m; ε_r = 38.2; ρ = 1000 kg/m^3
Phantom section: Right Section
Measurement Standard: DASY4 (High Precision Assessment)

DASY4 Configuration:

- Probe: ET3DV6 - SN1610; ConvF(5.18, 5.18, 5.18); Calibrated: 11/14/2007
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn448; Calibrated: 15/11/2007
- 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 (71x131x1): Measurement grid: dx=10mm, dy=10mm
  Maximum value of SAR (interpolated) = 0.231 mW/g
  Tilt position - Middle/Zoom Scan (5x5x7) (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
  Reference Value = 11.7 V/m; Power Drift = 0.095 dB
  Peak SAR (extrapolated) = 0.327 W/kg
  SAR(1 g) = 0.217 mW/g; SAR(10 g) = 0.140 mW/g
  Maximum value of SAR (measured) = 0.232 mW/g



0 dB = 0.232mW/g

Date/Time: 1/3/2008 1:58:03 PM

Test Laboratory: Sony Ericsson Mobile Communications International AB

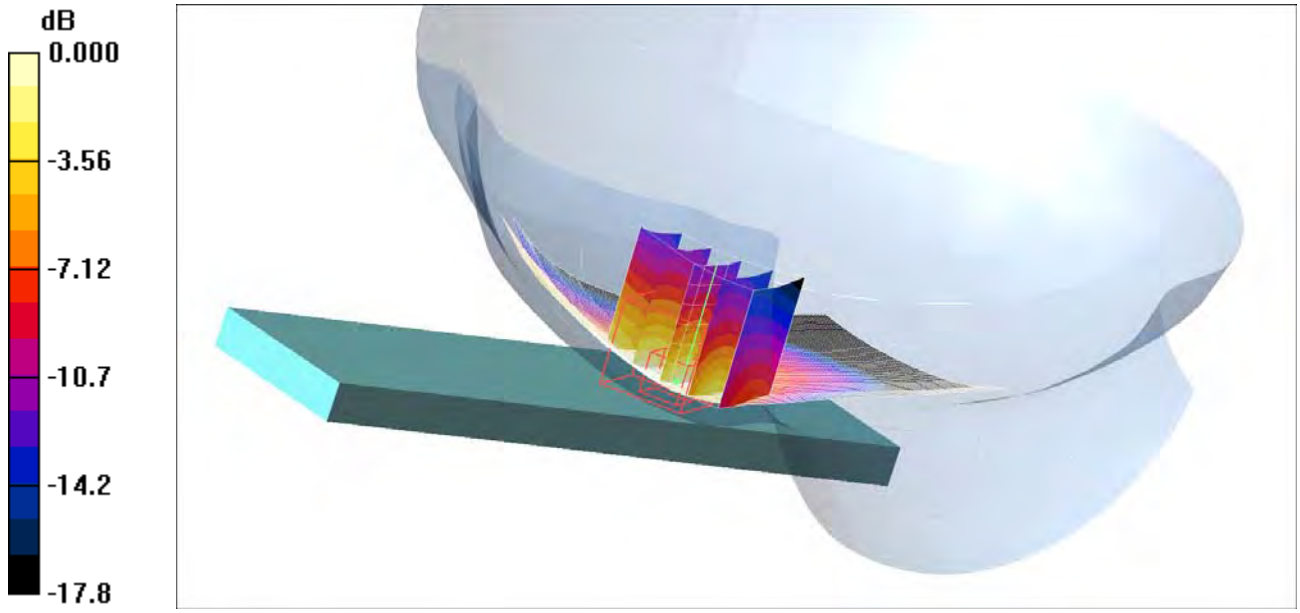
Becky-RightHandSide-GSM1900-Touch-Low

DUT: Becky; Type: DUT; Serial: #9976

Communication System: DCS 1900; Frequency: 1850.2 MHz;Duty Cycle: 1:8.3
Medium parameters used: f = 1850.2 MHz; σ = 1.43 mho/m; ε_r = 38.3; ρ = 1000 kg/m^3
Phantom section: Right Section
Measurement Standard: DASY4 (High Precision Assessment)

DASY4 Configuration:

- Probe: ET3DV6 - SN1610; ConvF(5.18, 5.18, 5.18); Calibrated: 11/14/2007
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn448; Calibrated: 15/11/2007
- 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 (71x131x1): Measurement grid: dx=10mm, dy=10mm
  Maximum value of SAR (interpolated) = 0.725 mW/g
  Touch - Low/Zoom Scan (5x5x7) (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
  Reference Value = 5.52 V/m; Power Drift = -0.052 dB
  Peak SAR (extrapolated) = 1.18 W/kg
  SAR(1 g) = 0.655 mW/g; SAR(10 g) = 0.371 mW/g
  Maximum value of SAR (measured) = 0.721 mW/g



0 dB = 0.721mW/g

Date/Time: 1/3/2008 12:54:03 PM

Test Laboratory: Sony Ericsson Mobile Communications International AB

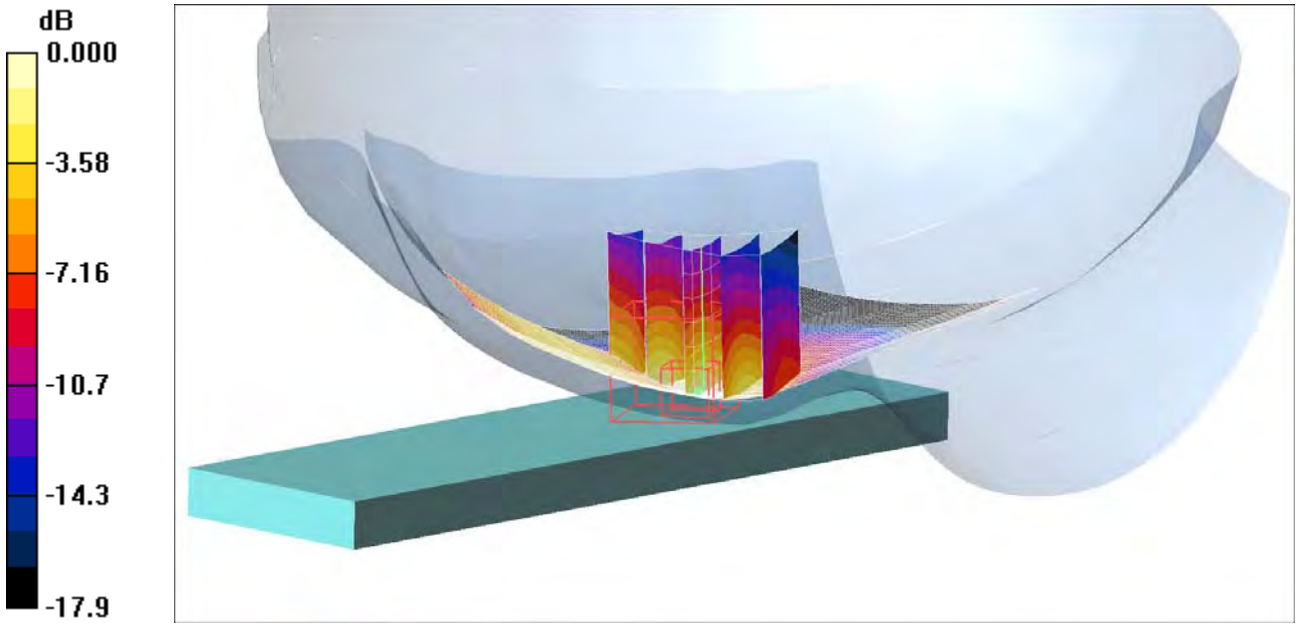
Becky-RightHandSide-GSM1900-Touch-Middle

DUT: Becky; Type: DUT; Serial: #9976

Communication System: DCS 1900; Frequency: 1880 MHz;Duty Cycle: 1:8.3
Medium parameters used: f = 1880 MHz; σ = 1.46 mho/m; ε_r = 38.2; ρ = 1000 kg/m^3
Phantom section: Right Section
Measurement Standard: DASY4 (High Precision Assessment)

DASY4 Configuration:

- Probe: ET3DV6 - SN1610; ConvF(5.18, 5.18, 5.18); Calibrated: 11/14/2007
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn448; Calibrated: 15/11/2007
- 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 (71x131x1): Measurement grid: dx=10mm, dy=10mm
  Maximum value of SAR (interpolated) = 0.719 mW/g
  Touch position - Middle/Zoom Scan (5x5x7) (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
  Reference Value = 5.25 V/m; Power Drift = -0.028 dB
  Peak SAR (extrapolated) = 1.16 W/kg
  SAR(1 g) = 0.639 mW/g; SAR(10 g) = 0.357 mW/g
  Maximum value of SAR (measured) = 0.699 mW/g



0 dB = 0.699mW/g

Date/Time: 1/3/2008 2:18:58 PM

Test Laboratory: Sony Ericsson Mobile Communications International AB

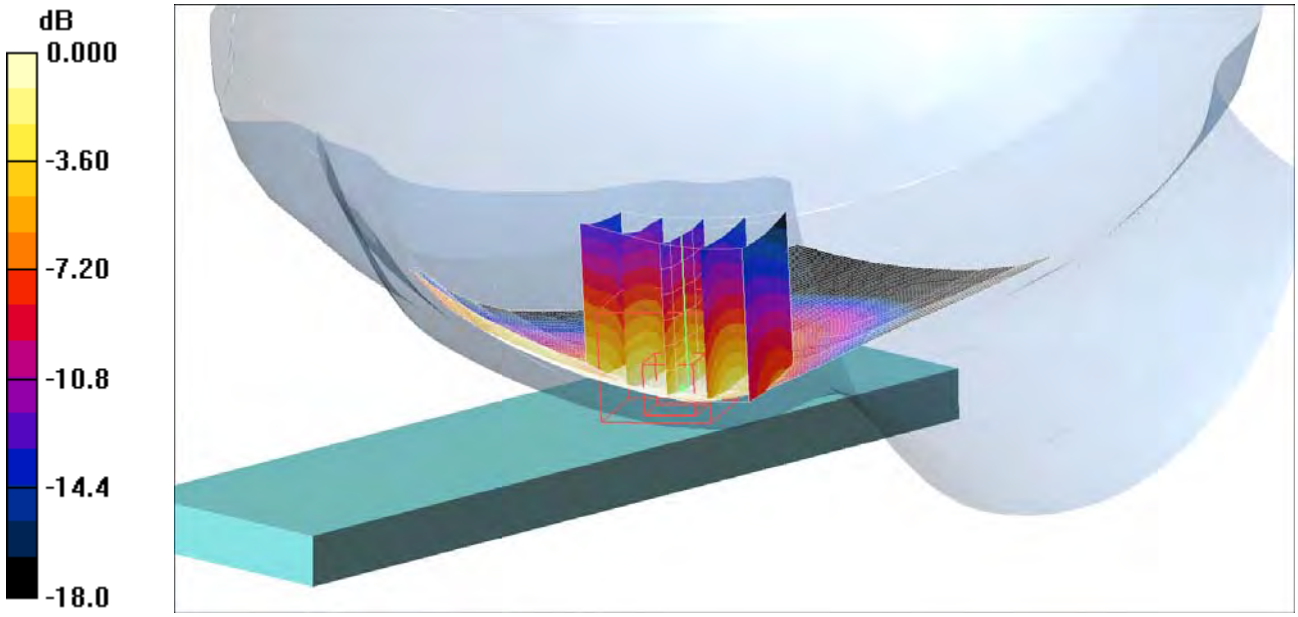
Becky-RightHandSide-GSM1900-Touch-High

DUT: Becky; Type: DUT; Serial: #9976

Communication System: DCS 1900; Frequency: 1909.8 MHz;Duty Cycle: 1:8.3
Medium parameters used: f = 1909.8 MHz; σ = 1.49 mho/m; ε_r = 38; ρ = 1000 kg/m^3
Phantom section: Right Section
Measurement Standard: DASY4 (High Precision Assessment)

DASY4 Configuration:

- Probe: ET3DV6 - SN1610; ConvF(5.18, 5.18, 5.18); Calibrated: 11/14/2007
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn448; Calibrated: 15/11/2007
- 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 (71x131x1): Measurement grid: dx=10mm, dy=10mm
  Maximum value of SAR (interpolated) = 0.569 mW/g
  Touch - High/Zoom Scan (5x5x7) (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
  Reference Value = 4.58 V/m; Power Drift = -0.065 dB
  Peak SAR (extrapolated) = 0.947 W/kg
  SAR(1 g) = 0.511 mW/g; SAR(10 g) = 0.282 mW/g
  Maximum value of SAR (measured) = 0.562 mW/g



0 dB = 0.562mW/g

Date/Time: 1/4/2008 10:26:35 AM

Test Laboratory: Sony Ericsson Mobile Communications International AB

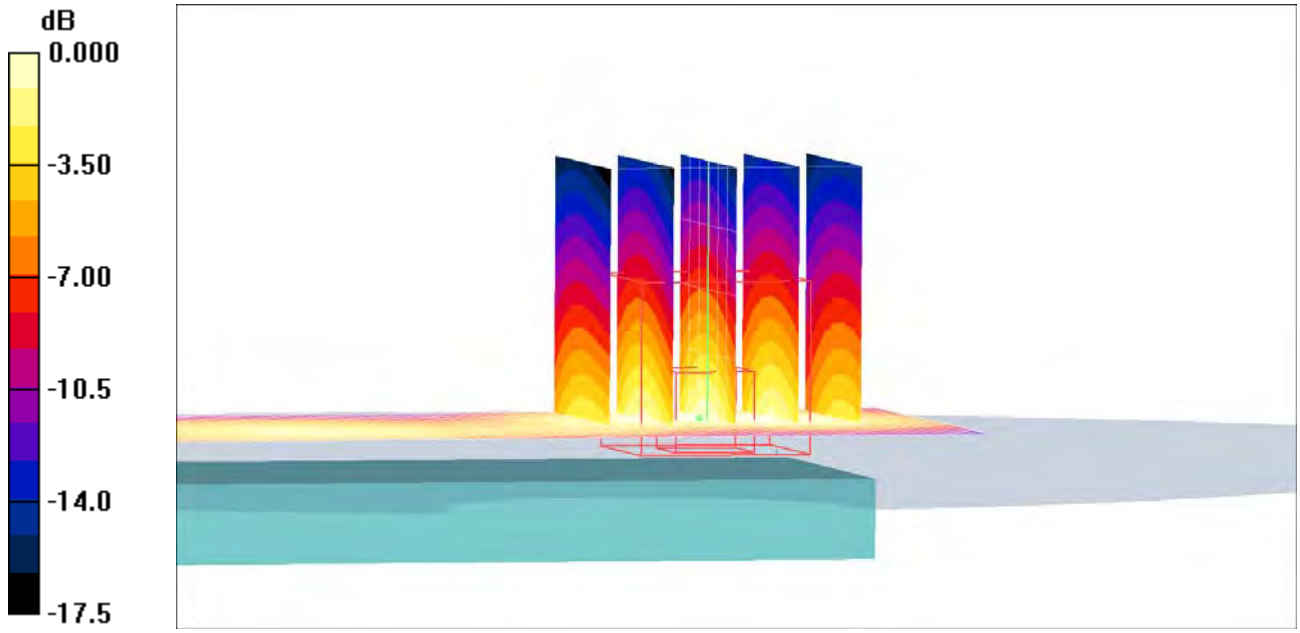
Body-Flat15mm-Becky-1900Bluetooth-Low

DUT: Becky; Type: DUT; Serial: #9976

Communication System: DCS 1900; Frequency: 1850.2 MHz;Duty Cycle: 1:8.3
Medium parameters used: f = 1850.2 MHz; σ = 1.52 mho/m; ε_r = 51.6; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY4 (High Precision Assessment)

DASY4 Configuration:

- Probe: ET3DV6 - SN1610; ConvF(4.68, 4.68, 4.68); Calibrated: 11/14/2007
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn448; Calibrated: 15/11/2007
- Phantom: SAM-3; Type: SAM; Serial: 1436
- Measurement SW: DASY4, V4.7 Build 53; Postprocessing SW: SEMCAD, V1.8 Build 172
  Body/Area Scan (41x81x1): Measurement grid: dx=15mm, dy=15mm
  Maximum value of SAR (interpolated) = 0.510 mW/g
  Body/Zoom Scan (7x5x5)/Cube 0: Measurement grid: dx=5mm, dy=8mm, dz=8mm
  Reference Value = 11.0 V/m; Power Drift = -0.087 dB
  Peak SAR (extrapolated) = 0.777 W/kg
  SAR(1 g) = 0.458 mW/g; SAR(10 g) = 0.255 mW/g
  Maximum value of SAR (measured) = 0.510 mW/g



0 dB = 0.510mW/g

Date/Time: 1/4/2008 10:40:05 AM

Test Laboratory: Sony Ericsson Mobile Communications International AB

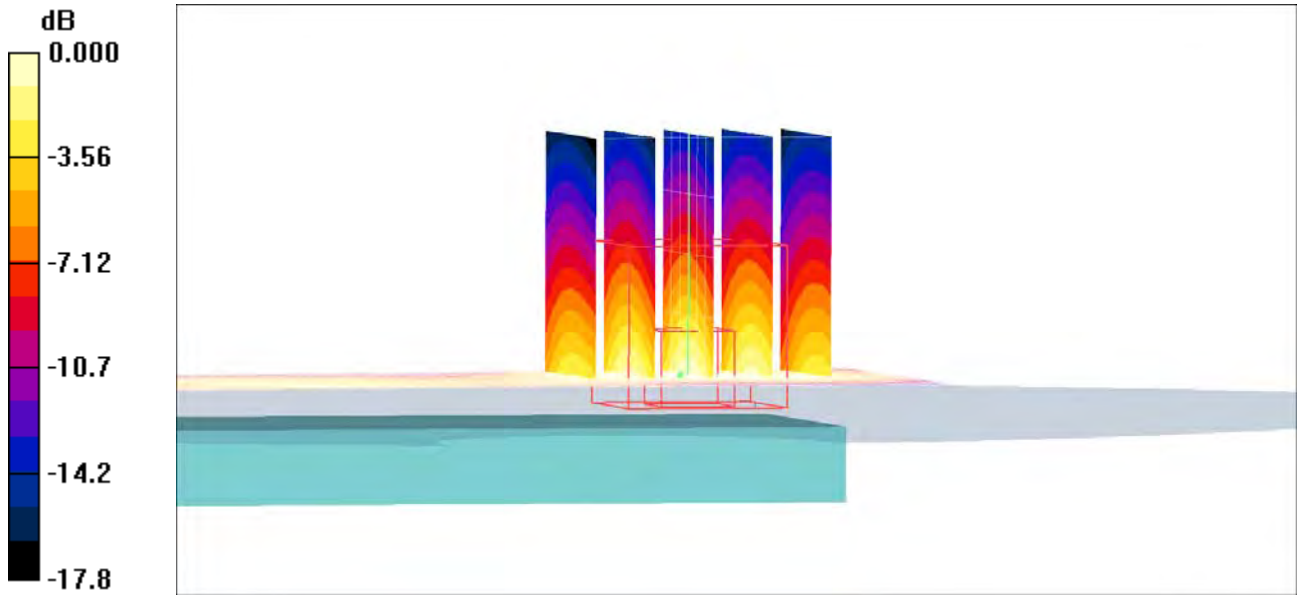
Body-Flat15mm-Becky-1900Bluetooth-Middle

DUT: Becky; Type: DUT; Serial: #9976

Communication System: DCS 1900; Frequency: 1880 MHz;Duty Cycle: 1:8.3
Medium parameters used: f = 1880 MHz; σ = 1.56 mho/m; ε_r = 51.5; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY4 (High Precision Assessment)

DASY4 Configuration:

- Probe: ET3DV6 - SN1610; ConvF(4.68, 4.68, 4.68); Calibrated: 11/14/2007
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn448; Calibrated: 15/11/2007
- 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 (41x81x1): Measurement grid: dx=15mm, dy=15mm
  Maximum value of SAR (interpolated) = 0.472 mW/g
  Body 2/Zoom Scan (7x5x5)/Cube 0: Measurement grid: dx=5mm, dy=8mm, dz=8mm
  Reference Value = 9.38 V/m; Power Drift = -0.052 dB
  Peak SAR (extrapolated) = 0.733 W/kg
  SAR(1 g) = 0.428 mW/g; SAR(10 g) = 0.238 mW/g
  Maximum value of SAR (measured) = 0.475 mW/g



0 dB = 0.475mW/g

Date/Time: 1/4/2008 10:56:55 AM

Test Laboratory: Sony Ericsson Mobile Communications International AB

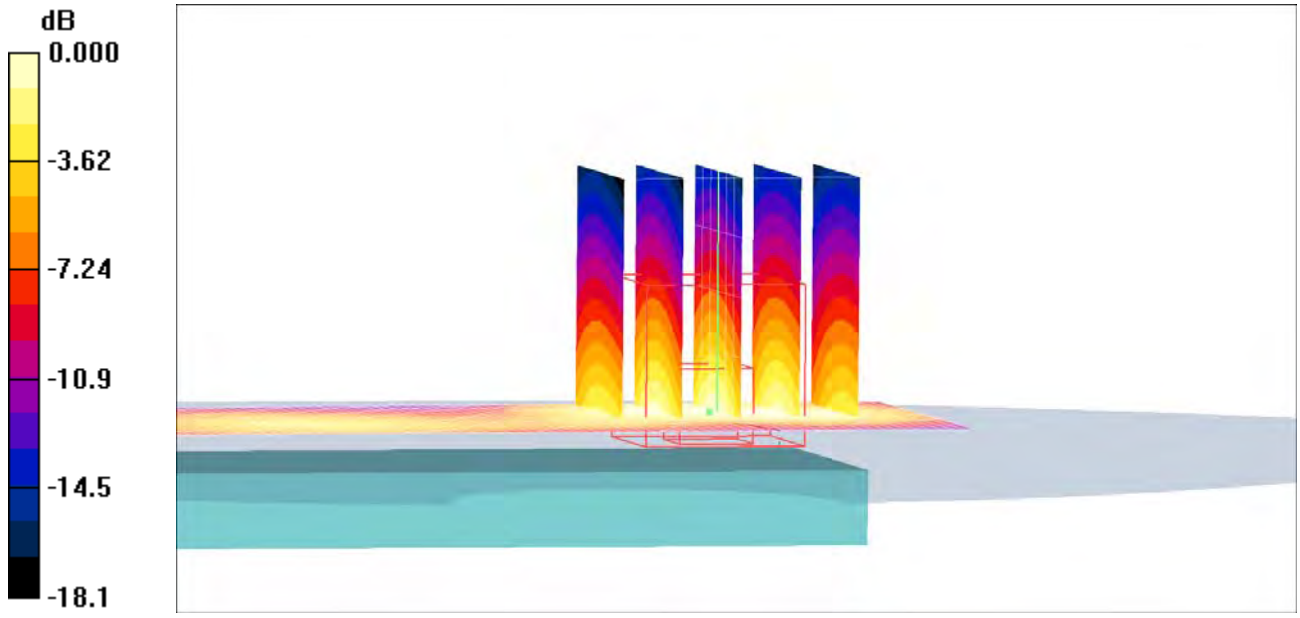
Body-Flat15mm-Becky-1900Bluetooth-High

DUT: Becky; Type: DUT; Serial: #9976

Communication System: DCS 1900; Frequency: 1909.8 MHz;Duty Cycle: 1:8.3
Medium parameters used: f = 1909.8 MHz; σ = 1.59 mho/m; ε_r = 51.5; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY4 (High Precision Assessment)

DASY4 Configuration:

- Probe: ET3DV6 - SN1610; ConvF(4.68, 4.68, 4.68); Calibrated: 11/14/2007
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn448; Calibrated: 15/11/2007
- 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 (41x81x1): Measurement grid: dx=15mm, dy=15mm
  Maximum value of SAR (interpolated) = 0.376 mW/g
  Body 3/Zoom Scan (7x5x5)/Cube 0: Measurement grid: dx=5mm, dy=8mm, dz=8mm
  Reference Value = 7.73 V/m; Power Drift = -0.104 dB
  Peak SAR (extrapolated) = 0.583 W/kg
  SAR(1 g) = 0.339 mW/g; SAR(10 g) = 0.188 mW/g
  Maximum value of SAR (measured) = 0.375 mW/g



0 dB = 0.375mW/g

Date/Time: 1/4/2008 11:16:47 AM

Test Laboratory: Sony Ericsson Mobile Communications International AB

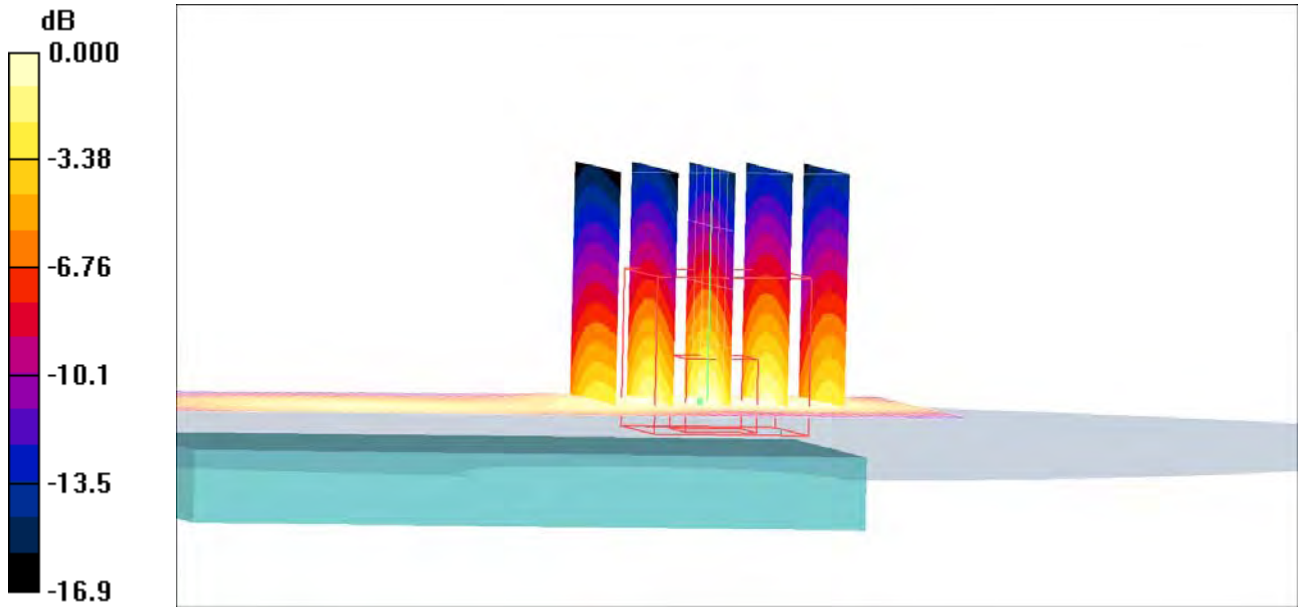
Body-Flat15mm-Becky-1900PHF-Low

DUT: Becky; Type: DUT; Serial: #9976

Communication System: DCS 1900; Frequency: 1850.2 MHz;Duty Cycle: 1:8.3
Medium parameters used: f = 1850.2 MHz; σ = 1.52 mho/m; ε_r = 51.6; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY4 (High Precision Assessment)

DASY4 Configuration:

- Probe: ET3DV6 - SN1610; ConvF(4.68, 4.68, 4.68); Calibrated: 11/14/2007
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn448; Calibrated: 15/11/2007
- Phantom: SAM-3; Type: SAM; Serial: 1436
- Measurement SW: DASY4, V4.7 Build 53; Postprocessing SW: SEMCAD, V1.8 Build 172
  Body/Area Scan (41x81x1): Measurement grid: dx=15mm, dy=15mm
  Maximum value of SAR (interpolated) = 0.499 mW/g
  Body/Zoom Scan (7x5x5)/Cube 0: Measurement grid: dx=5mm, dy=8mm, dz=8mm
  Reference Value = 12.0 V/m; Power Drift = -0.210 dB
  Peak SAR (extrapolated) = 0.748 W/kg
  SAR(1 g) = 0.443 mW/g; SAR(10 g) = 0.248 mW/g
  Maximum value of SAR (measured) = 0.492 mW/g



0 dB = 0.492mW/g

Date/Time: 1/4/2008 9:22:40 AM

Test Laboratory: Sony Ericsson Mobile Communications International AB

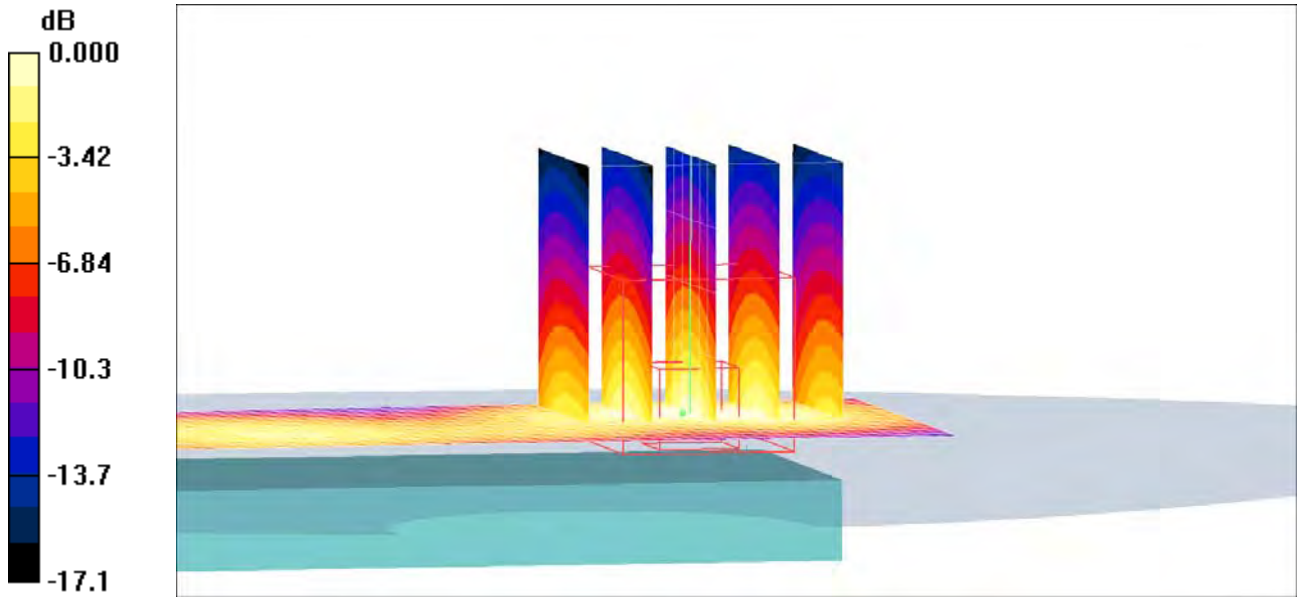
Body-Flat15mm-Becky-1900GPRS-Low

DUT: Becky; Type: DUT; Serial: #9976

Communication System: GPRS 1900; Frequency: 1850.2 MHz;Duty Cycle: 1:4.15
Medium parameters used: f = 1850.2 MHz; σ = 1.52 mho/m; ε_r = 51.6; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY4 (High Precision Assessment)

DASY4 Configuration:

- Probe: ET3DV6 - SN1610; ConvF(4.68, 4.68, 4.68); Calibrated: 11/14/2007
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn448; Calibrated: 15/11/2007
- Phantom: SAM-3; Type: SAM; Serial: 1436
- Measurement SW: DASY4, V4.7 Build 53; Postprocessing SW: SEMCAD, V1.8 Build 172
  Body/Area Scan (41x81x1): Measurement grid: dx=15mm, dy=15mm
  Maximum value of SAR (interpolated) = 0.946 mW/g
  Body/Zoom Scan (7x5x5)/Cube 0: Measurement grid: dx=5mm, dy=8mm, dz=8mm
  Reference Value = 14.8 V/m; Power Drift = 0.046 dB
  Peak SAR (extrapolated) = 1.41 W/kg
  SAR(1 g) = 0.839 mW/g; SAR(10 g) = 0.469 mW/g
  Maximum value of SAR (measured) = 0.935 mW/g



0 dB = 0.935mW/g

Date/Time: 1/4/2008 9:42:02 AM

Test Laboratory: Sony Ericsson Mobile Communications International AB

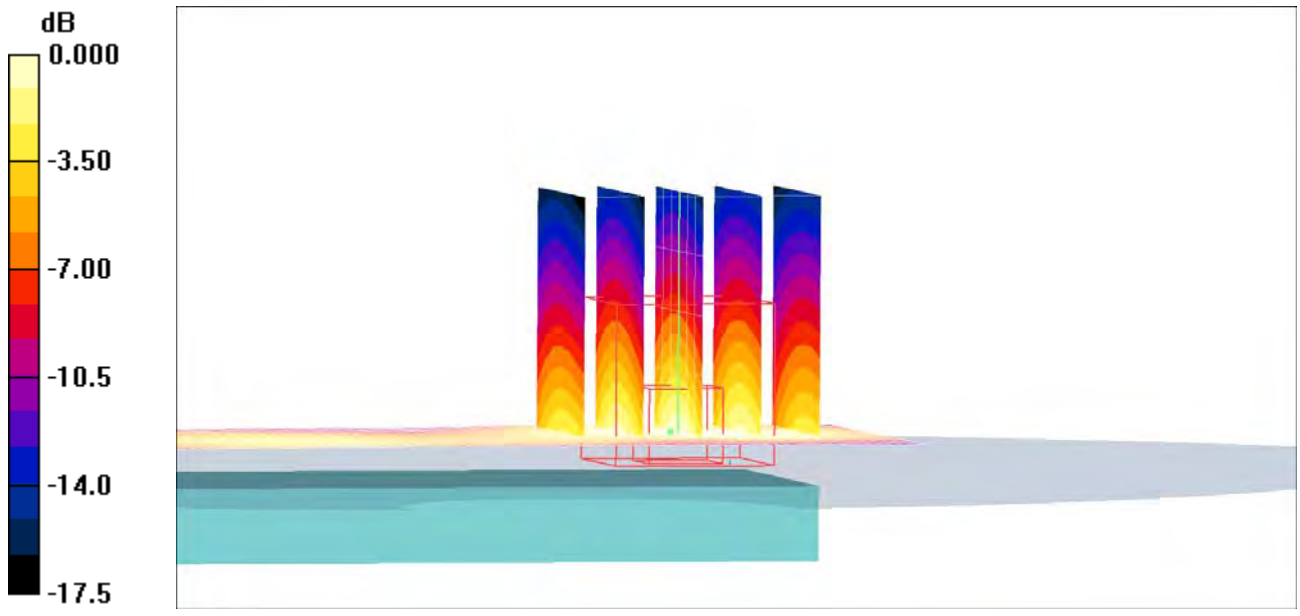
Body-Flat15mm-Becky-1900GPRS-Middle

DUT: Becky; Type: DUT; Serial: #9976

Communication System: GPRS 1900; Frequency: 1880 MHz;Duty Cycle: 1:4.15
Medium parameters used: f = 1880 MHz; σ = 1.56 mho/m; ε_r = 51.5; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY4 (High Precision Assessment)

DASY4 Configuration:

- Probe: ET3DV6 - SN1610; ConvF(4.68, 4.68, 4.68); Calibrated: 11/14/2007
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn448; Calibrated: 15/11/2007
- 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 (41x81x1): Measurement grid: dx=15mm, dy=15mm
  Maximum value of SAR (interpolated) = 0.878 mW/g
  Body 2/Zoom Scan (7x5x5)/Cube 0: Measurement grid: dx=5mm, dy=8mm, dz=8mm
  Reference Value = 13.0 V/m; Power Drift = -0.066 dB
  Peak SAR (extrapolated) = 1.34 W/kg
  SAR(1 g) = 0.775 mW/g; SAR(10 g) = 0.431 mW/g
  Maximum value of SAR (measured) = 0.866 mW/g



0 dB = 0.866mW/g

Date/Time: 1/4/2008 9:55:23 AM

Test Laboratory: Sony Ericsson Mobile Communications International AB

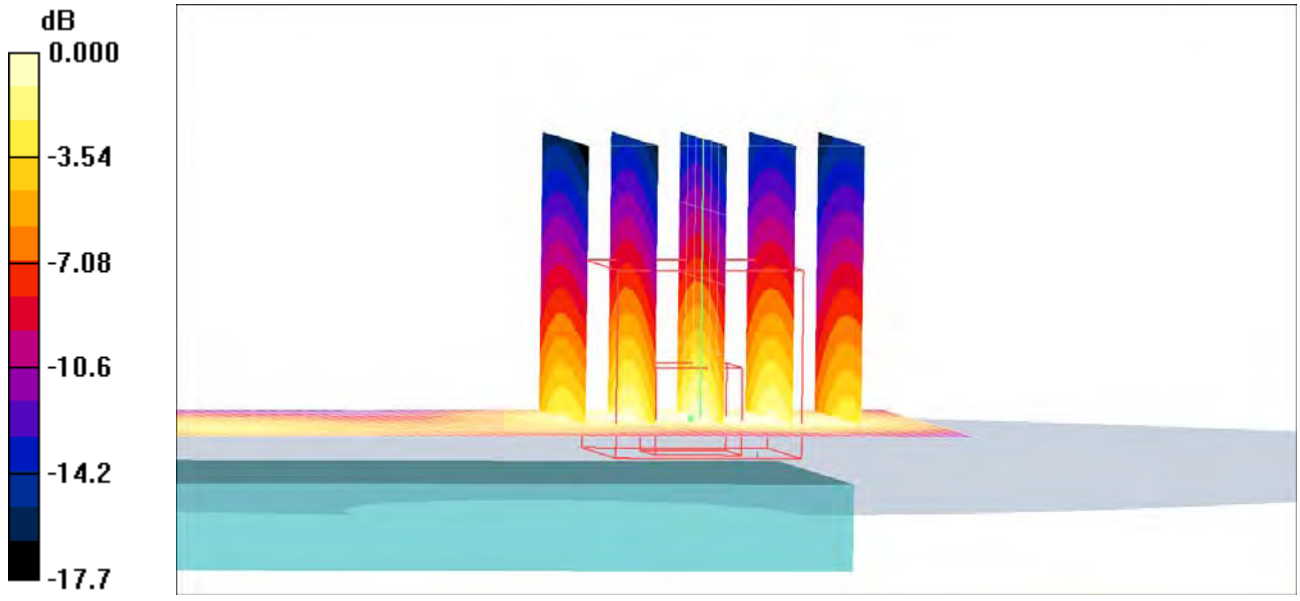
Body-Flat15mm-Becky-1900GPRS-High

DUT: Becky; Type: DUT; Serial: #9976

Communication System: GPRS 1900; Frequency: 1909.8 MHz;Duty Cycle: 1:4.15
Medium parameters used: f = 1909.8 MHz; σ = 1.59 mho/m; ε_r = 51.5; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY4 (High Precision Assessment)

DASY4 Configuration:

- Probe: ET3DV6 - SN1610; ConvF(4.68, 4.68, 4.68); Calibrated: 11/14/2007
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn448; Calibrated: 15/11/2007
- 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 (41x81x1): Measurement grid: dx=15mm, dy=15mm
  Maximum value of SAR (interpolated) = 0.708 mW/g
  Body 3/Zoom Scan (7x5x5)/Cube 0: Measurement grid: dx=5mm, dy=8mm, dz=8mm
  Reference Value = 10.7 V/m; Power Drift = 0.011 dB
  Peak SAR (extrapolated) = 1.09 W/kg
  SAR(1 g) = 0.635 mW/g; SAR(10 g) = 0.353 mW/g
  Maximum value of SAR (measured) = 0.704 mW/g



0 dB = 0.704mW/g

Date/Time: 1/4/2008 10:10:18 AM

Test Laboratory: Sony Ericsson Mobile Communications International AB

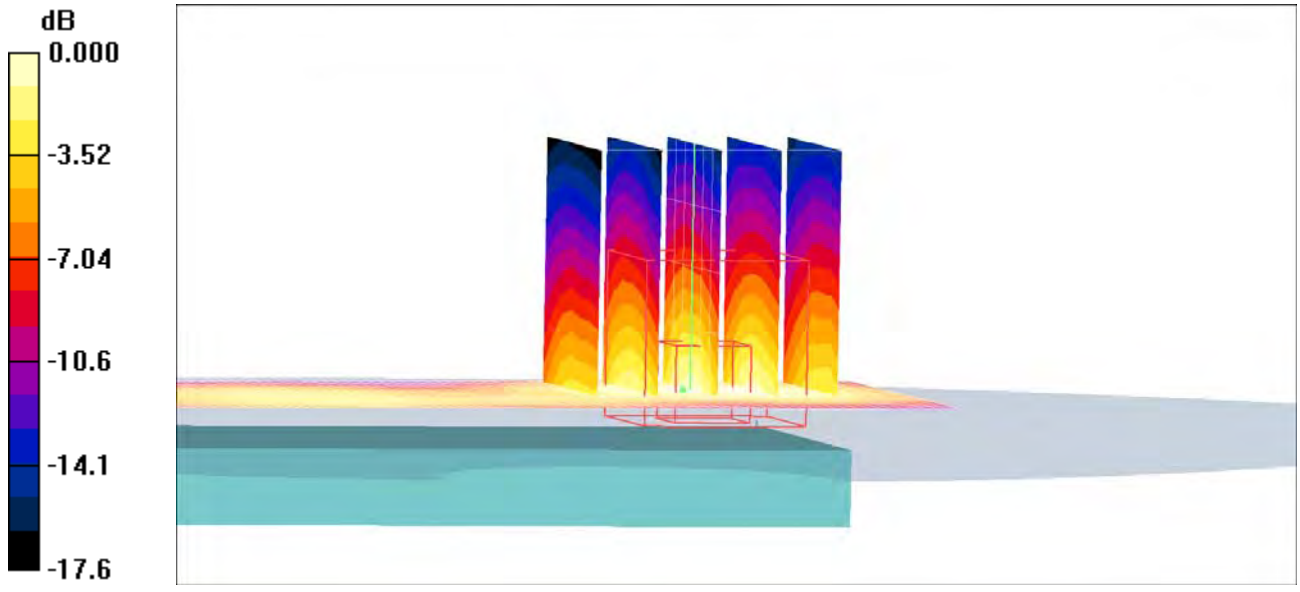
Body-Flat15mm-Becky-1900EDGE-Low

DUT: Becky; Type: DUT; Serial: #9976

Communication System: GPRS 1900; Frequency: 1850.2 MHz;Duty Cycle: 1:4.15
Medium parameters used: f = 1850.2 MHz; σ = 1.52 mho/m; ε_r = 51.6; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY4 (High Precision Assessment)

DASY4 Configuration:

- Probe: ET3DV6 - SN1610; ConvF(4.68, 4.68, 4.68); Calibrated: 11/14/2007
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn448; Calibrated: 15/11/2007
- Phantom: SAM-3; Type: SAM; Serial: 1436
- Measurement SW: DASY4, V4.7 Build 53; Postprocessing SW: SEMCAD, V1.8 Build 172
  Body/Area Scan (41x81x1): Measurement grid: dx=15mm, dy=15mm
  Maximum value of SAR (interpolated) = 0.389 mW/g
  Body/Zoom Scan (7x5x5)/Cube 0: Measurement grid: dx=5mm, dy=8mm, dz=8mm
  Reference Value = 9.52 V/m; Power Drift = 0.079 dB
  Peak SAR (extrapolated) = 0.599 W/kg
  SAR(1 g) = 0.346 mW/g; SAR(10 g) = 0.192 mW/g
  Maximum value of SAR (measured) = 0.396 mW/g



0 dB = 0.396mW/g

Date/Time: 1/4/2008 11:33:57 AM

Test Laboratory: Sony Ericsson Mobile Communications International AB

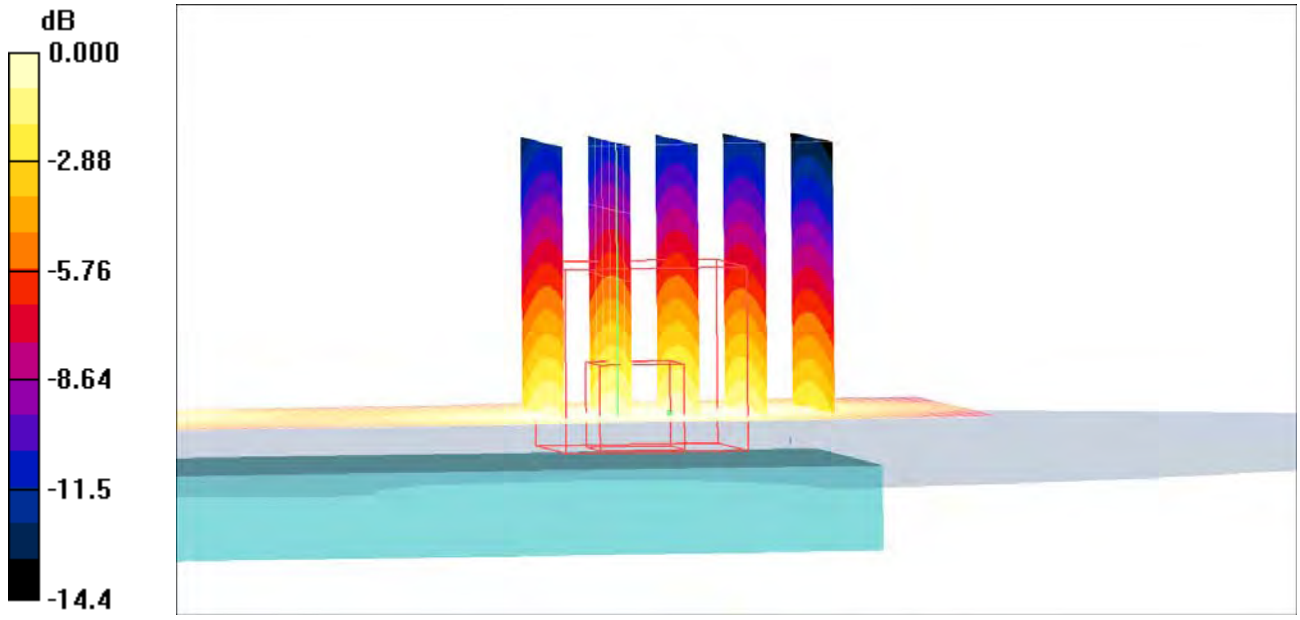
Body-Flat15mm-Becky-1900GPRS-Front-To-Phantom-Low

DUT: Becky; Type: DUT; Serial: #9976

Communication System: GPRS 1900; Frequency: 1850.2 MHz;Duty Cycle: 1:4.15
Medium parameters used: f = 1850.2 MHz; σ = 1.52 mho/m; ε_r = 51.6; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY4 (High Precision Assessment)

DASY4 Configuration:

- Probe: ET3DV6 - SN1610; ConvF(4.68, 4.68, 4.68); Calibrated: 11/14/2007
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn448; Calibrated: 15/11/2007
- Phantom: SAM-3; Type: SAM; Serial: 1436
- Measurement SW: DASY4, V4.7 Build 53; Postprocessing SW: SEMCAD, V1.8 Build 172
  Body/Area Scan (41x81x1): Measurement grid: dx=15mm, dy=15mm
  Maximum value of SAR (interpolated) = 0.309 mW/g
  Body/Zoom Scan (7x5x5)/Cube 0: Measurement grid: dx=5mm, dy=8mm, dz=8mm
  Reference Value = 12.2 V/m; Power Drift = -0.194 dB
  Peak SAR (extrapolated) = 0.427 W/kg
  SAR(1 g) = 0.287 mW/g; SAR(10 g) = 0.186 mW/g
  Maximum value of SAR (measured) = 0.304 mW/g



0 dB = 0.304mW/g

Date/Time: 1/3/2008 8:31:08 AM

Test Laboratory: Sony Ericsson Mobile Communications International AB

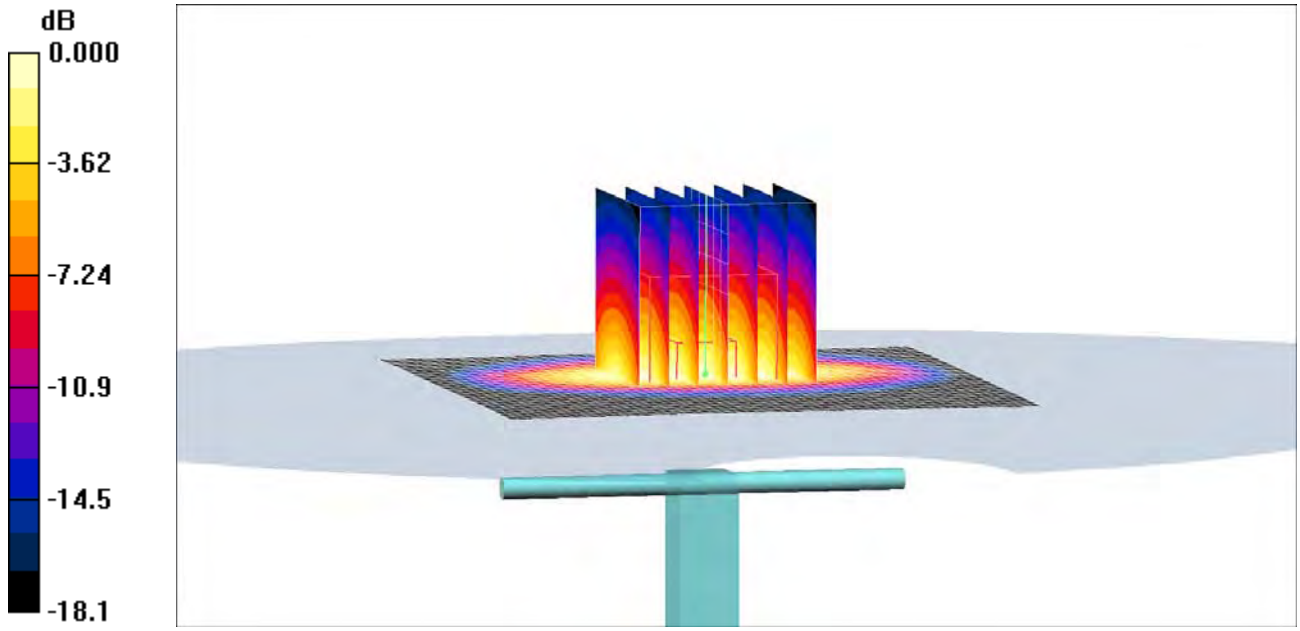
Validation-D1900-03-01-08-Head

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; σ = 1.47 mho/m; ε_r = 38.1; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY4 (High Precision Assessment)

DASY4 Configuration:

- Probe: ET3DV6 - SN1610; ConvF(5.18, 5.18, 5.18); Calibrated: 11/14/2007
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn448; Calibrated: 15/11/2007
- 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 (61x61x1): Measurement grid: dx=15mm, dy=15mm
  Maximum value of SAR (interpolated) = 11.3 mW/g
  d=10mm, Pin=250mW/Zoom Scan (7x7x7) (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
  Reference Value = 80.8 V/m; Power Drift = 0.161 dB
  Peak SAR (extrapolated) = 18.3 W/kg
  SAR(1 g) = 9.73 mW/g; SAR(10 g) = 5.01 mW/g
  Maximum value of SAR (measured) = 10.9 mW/g



0 dB = 10.9mW/g

Date/Time: 1/4/2008 8:38:59 AM

Test Laboratory: Sony Ericsson Mobile Communications International AB

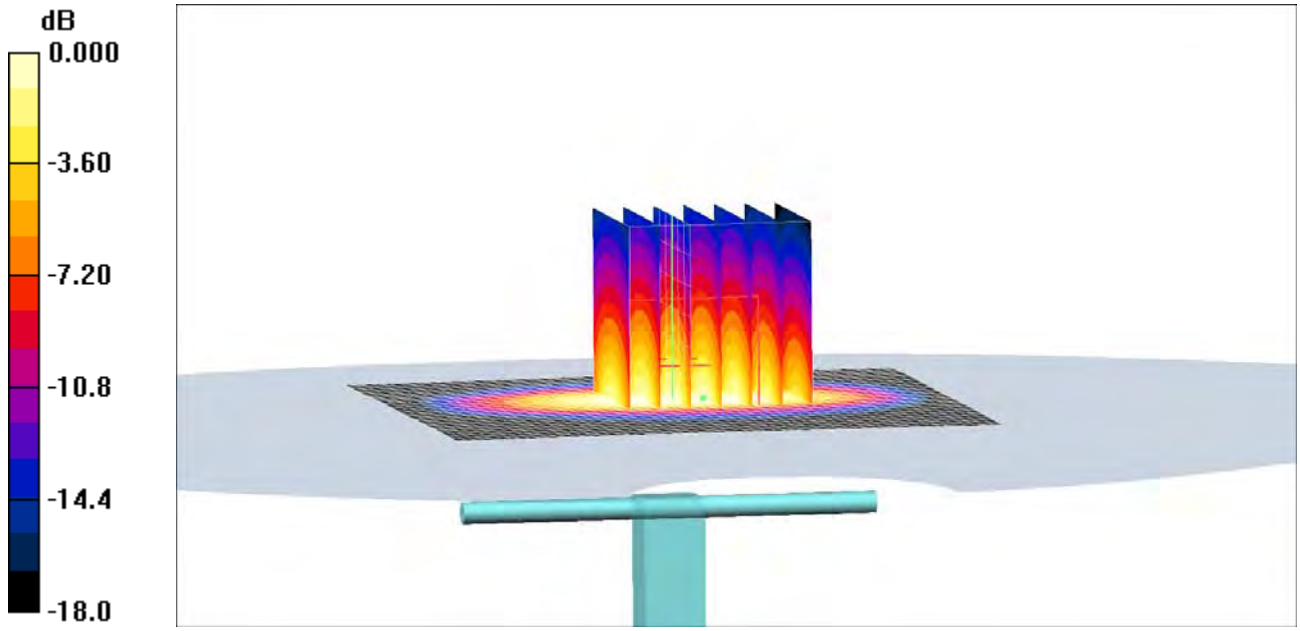
Validation-D1900-Body-04-01-08

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; σ = 1.58 mho/m; ε_r = 51.5; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY4 (High Precision Assessment)

DASY4 Configuration:

- Probe: ET3DV6 - SN1610; ConvF(4.68, 4.68, 4.68); Calibrated: 11/14/2007
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn448; Calibrated: 15/11/2007
- 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 (61x61x1): Measurement grid: dx=15mm, dy=15mm
  Maximum value of SAR (interpolated) = 12.5 mW/g
  d=10mm, Pin=250mW/Zoom Scan (7x7x7) (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
  Reference Value = 87.9 V/m; Power Drift = -0.044 dB
  Peak SAR (extrapolated) = 17.9 W/kg
  SAR(1 g) = 9.87 mW/g; SAR(10 g) = 5.15 mW/g
  Maximum value of SAR (measured) = 11.1 mW/g



0 dB = 11.1mW/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 ± 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	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

	Name	Function	Signature
Calibrated by:	Mike Meili	Laboratory Technician	
Approved by:	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:

a) IEEE Std 1528-2003, "IEEE Recommended Practice for Determining the Peak Spatial-Averaged Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques", December 2003
b) CENELEC EN 50361, "Basic standard for the measurement of Specific Absorption Rate related to human exposure to electromagnetic fields from mobile phones (300 MHz - 3 GHz), July 2001
c) Federal Communications Commission Office of Engineering & Technology (FCC OET), "Evaluating Compliance with FCC Guidelines for Human Exposure to Radiofrequency Electromagnetic Fields; Additional Information for Evaluating Compliance of Mobile and Portable Devices with FCC Limits for Human Exposure to Radiofrequency Emissions", Supplement C (Edition 01-01) to Bulletin 65

Additional Documentation:

d) DASY4 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 ± 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 ± 0.2) °C	38.4 ± 6 %	1.40 mho/m ± 6 %
Head TSL temperature during test	(21.2 ± 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 ± 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 ± 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 cm³ (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 cm³ (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 Ω + 0.9 jΩ
Return Loss	- 27.9 dB

Antenna Parameters with Body TSL

Impedance, transformed to feed point	49.0 Ω + 2.7 jΩ
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; σ = 1.4 mho/m; ε_r = 38.4; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY4 (High Precision Assessment)

DASY4 Configuration:

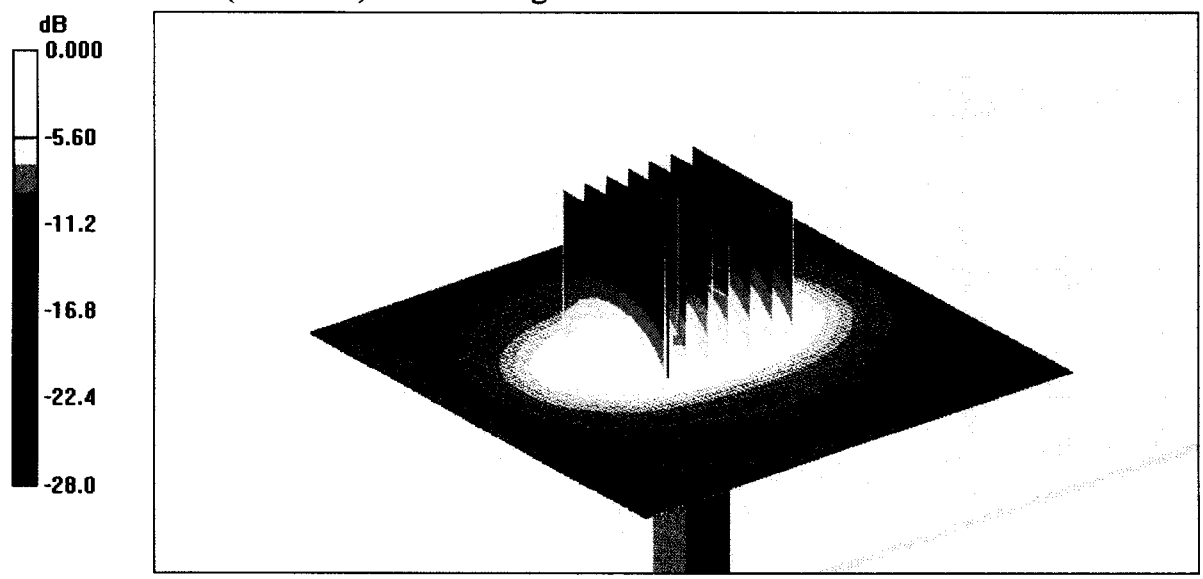
- Probe: ET3DV6 - SN1507 (HF); ConvF(4.97, 4.97, 4.97); Calibrated: 19.10.2006
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 15.12.2005
- Phantom: Flat Phantom 5.0 (front); Type: QD000P50AA; ;
- Measurement SW: DASY4, V4.7 Build 44; Postprocessing SW: SEMCAD,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

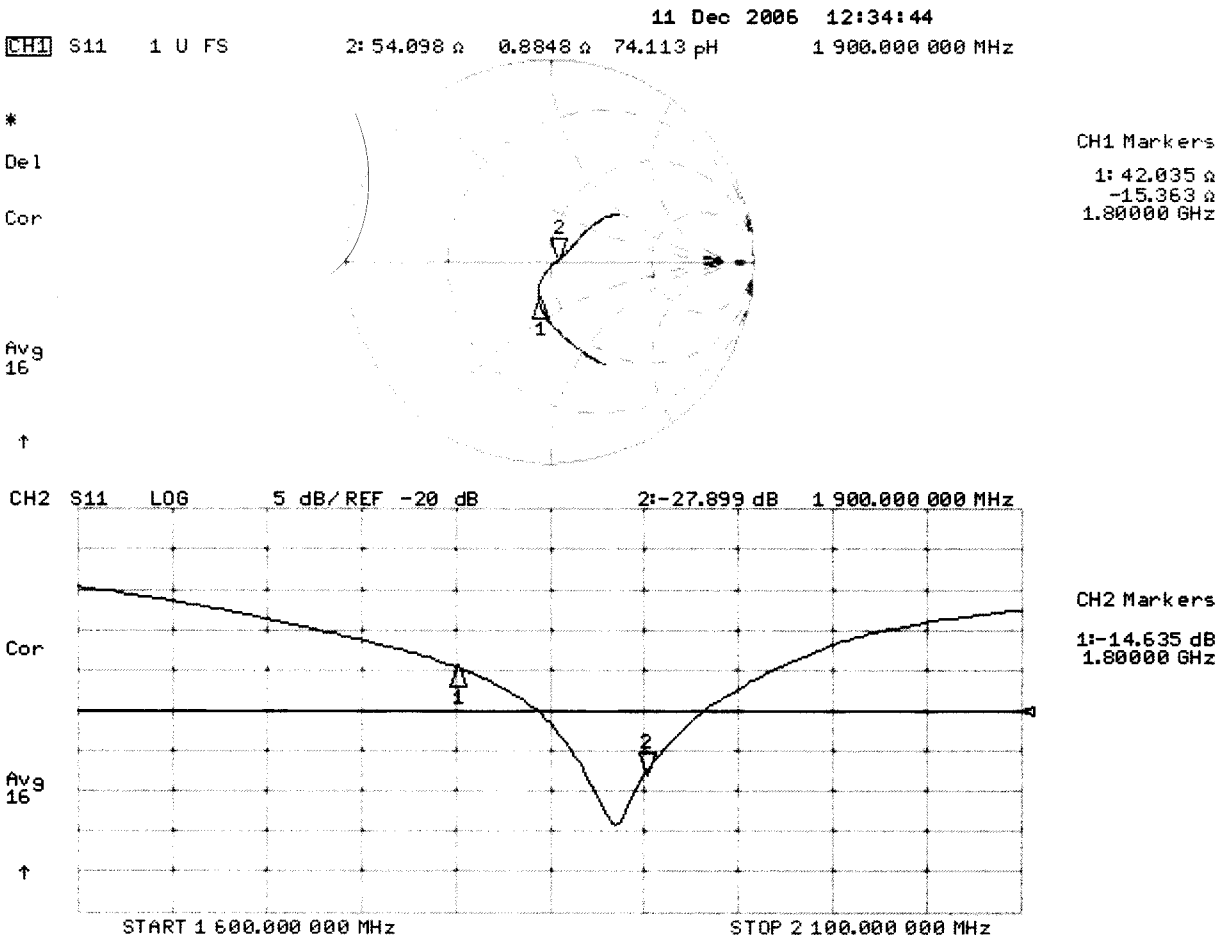
Pin = 250 mW; d = 10 mm/Zoom Scan (7x7x7)/Cube 0:

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

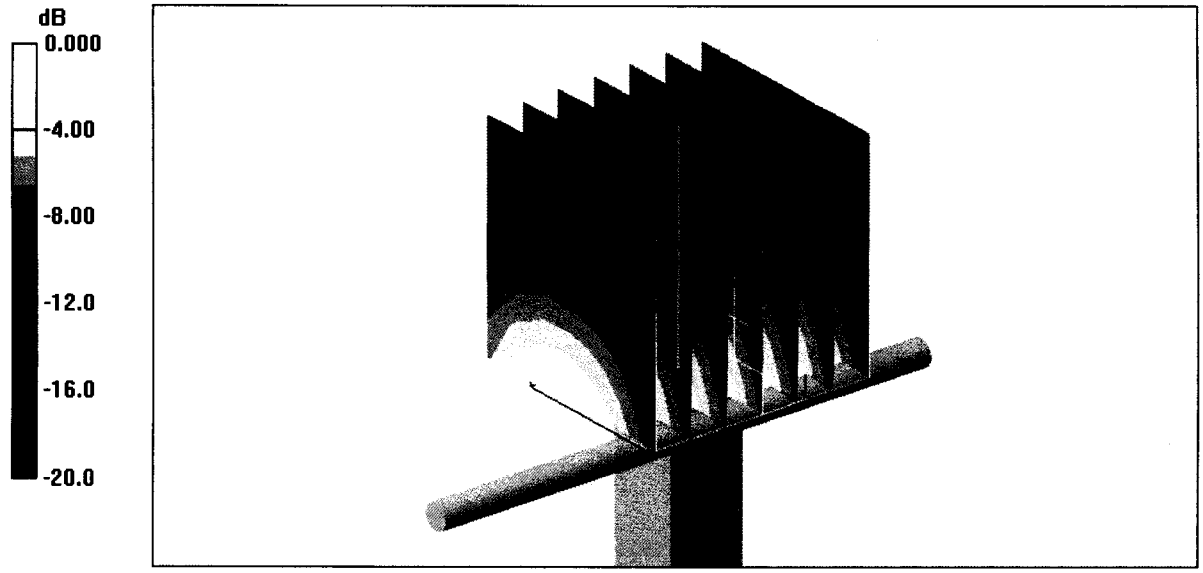
Communication System: CW; Frequency: 1900 MHz;Duty Cycle: 1:1
Medium: MSL U10 BB;
Medium parameters used: f = 1900 MHz; σ = 1.54 mho/m; ε_r = 51.8; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY4 (High Precision Assessment)

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

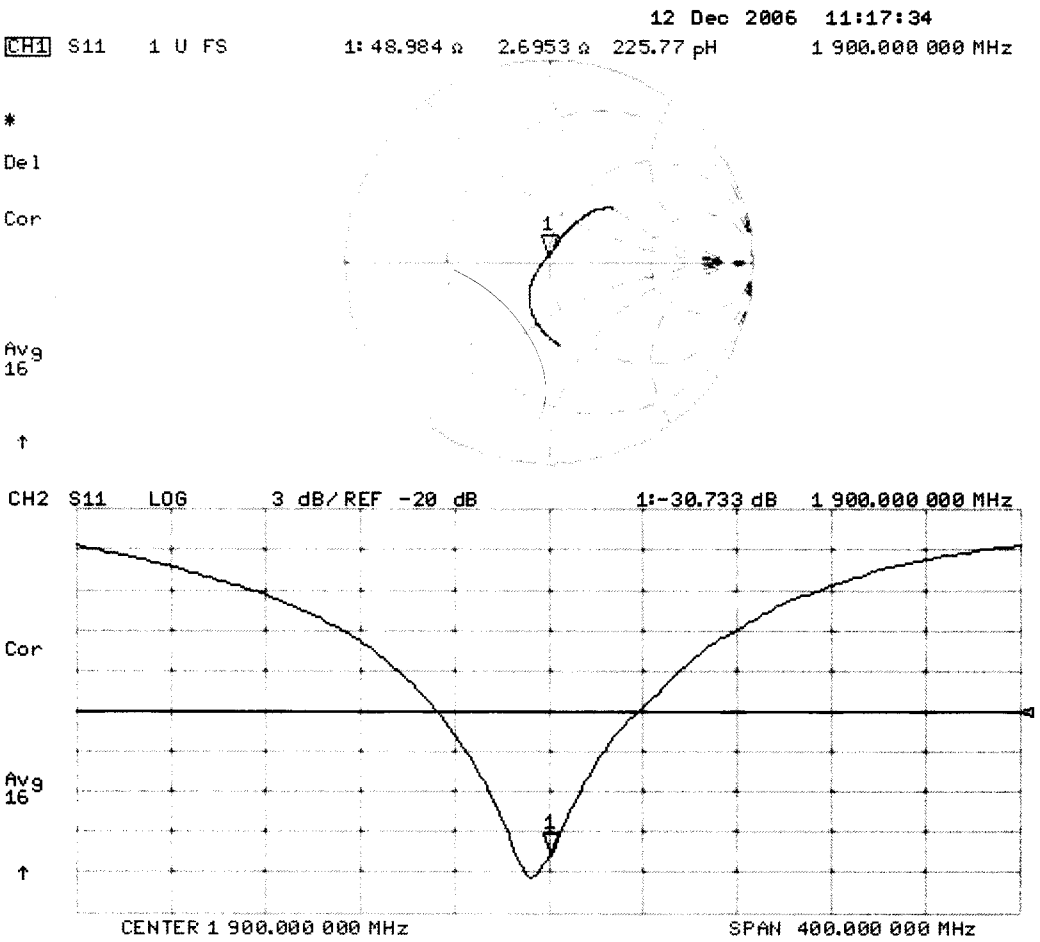
Pin = 250 mW; d = 10 mm/Zoom Scan (7x7x7)/Cube 0:

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 Sony Ericsson UK

Certificate No: DAE3-448_Nov07

CALIBRATION CERTIFICATE

Object	DAE3 - SD 000 D03 AE - SN: 448
Calibration procedure(s)	QA CAL-06.v12 Calibration procedure for the data acquisition electronics (DAE)
Calibration date:	November 15, 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 ± 3)°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	

Issued: November 15, 2007

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 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 =	6.1μV ,	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	403.816 ± 0.1% (k=2)	404.070 ± 0.1% (k=2)	403.834 ± 0.1% (k=2)
Low Range	3.95937 ± 0.7% (k=2)	3.96143 ± 0.7% (k=2)	3.93067 ± 0.7% (k=2)

Connector Angle

Connector Angle to be used in DASY system	277 ° ± 1 °

Appendix

1. DC Voltage Linearity

High Range		Input (μV)	Reading (μV)	Error (%)
Channel X	+ Input	200000	200000.1	0.00
Channel X	+ Input	20000	20008.04	0.04
Channel X	- Input	20000	-20002.96	0.01
Channel Y	+ Input	200000	199999.5	0.00
Channel Y	+ Input	20000	20005.57	0.03
Channel Y	- Input	20000	-20005.68	0.03
Channel Z	+ Input	200000	199999.3	0.00
Channel Z	+ Input	20000	20006.62	0.03
Channel Z	- Input	20000	-20004.64	0.02

Low Range		Input (μV)	Reading (μV)	Error (%)
Channel X	+ Input	2000	1999.9	0.00
Channel X	+ Input	200	201.18	0.59
Channel X	- Input	200	-199.65	-0.17
Channel Y	+ Input	2000	2000	0.00
Channel Y	+ Input	200	199.43	-0.28
Channel Y	- Input	200	-200.60	0.30
Channel Z	+ Input	2000	2000.1	0.00
Channel Z	+ Input	200	199.20	-0.40
Channel Z	- Input	200	-200.60	0.30

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	10.80	9.16
	- 200	-8.06	-8.82
Channel Y	200	-9.03	-8.67
	- 200	7.38	7.30
Channel Z	200	11.34	10.22
	- 200	-11.97	-11.93

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	-	1.80	0.18
Channel Y	200	0.22	-	3.40
Channel Z	200	-2.84	-0.85	-

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	16252	17093
Channel Y	16361	17876
Channel Z	16104	15739

5. Input Offset Measurement

DASY measurement parameters: Auto Zero Time: 3 sec; Measuring time: 3 sec
Input 10MΩ

	Average (μV)	min. Offset (μV)	max. Offset (μV)	Std. Deviation (μV)
Channel X	0.19	-1.33	1.54	0.41
Channel Y	-0.76	-2.61	0.61	0.29
Channel Z	-0.83	-2.27	0.40	0.38

6. Input Offset Current

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

7. Input Resistance

	Zeroing (MOhm)	Measuring (MOhm)
Channel X	0.2000	199.7
Channel Y	0.1999	200.9
Channel Z	0.1999	201.1

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 GMK

CALIBRATION CERTIFICATE

Object	ET3DV6 - SN:1610
Calibration procedure(s)	QA CAL-01.v6 Calibration procedure for dosimetric E-field probes
Calibration date:	November 14, 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 ± 3)°C and humidity < 70%.

Calibration Equipment used (M&TE critical for calibration)

Primary Standards	ID #	Cal Date (Calibrated by, Certificate No.)	Scheduled Calibration
Power meter E4419B	GB41293874	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: November 14, 2007

Glossary:

TSL	tissue simulating liquid
NORMx,y,z	sensitivity in free space
ConF	sensitivity in TSL / NORMx,y,z
DCP	diode compression point
Polarization φ	φ rotation around probe axis
Polarization ϑ	ϑ rotation around an axis that is in the plane normal to probe axis (at measurement center), i.e., $\vartheta = 0$ is normal to probe axis

Calibration is Performed According to the Following Standards:

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

Methods Applied and Interpretation of Parameters:

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

Probe ET3DV6

SN:1610

Manufactured:	July 27, 2001
Last calibrated:	November 17, 2006
Recalibrated:	November 14, 2007

Calibrated for DASY Systems

(Note: non-compatible with DASY2 system!)

DASY - Parameters of Probe: ET3DV6 SN:1610

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

NormX	**1.73** ± 10.1%	$\mu V/(V/m)^2$	DCP X	**93** mV
NormY	**1.70** ± 10.1%	$\mu V/(V/m)^2$	DCP Y	**95** mV
NormZ	**1.74** ± 10.1%	$\mu V/(V/m)^2$	DCP Z	**92** 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	10.3	6.1
SAR_{be} [%]	With Correction Algorithm	1.6	0.7

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	9.9	6.1
SAR_{be} [%]	With Correction Algorithm	0.0	0.8

Sensor Offset

Probe Tip to Sensor Center	**2.7** mm

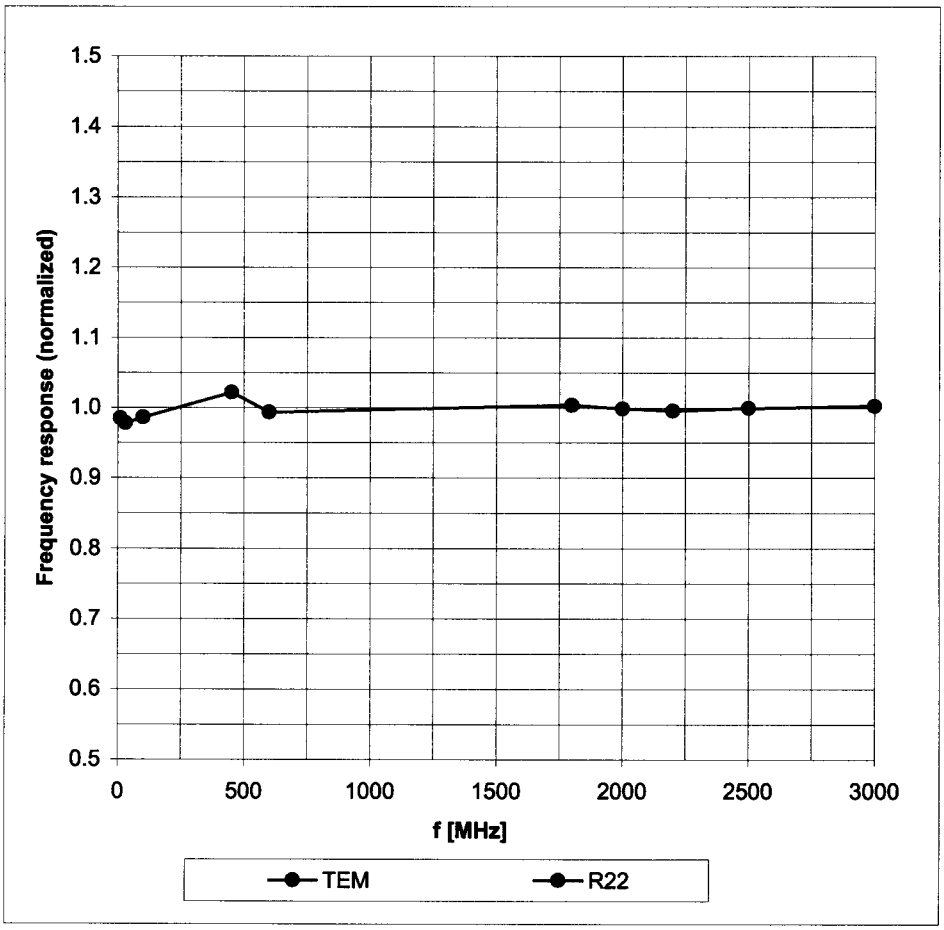
The reported uncertainty of measurement is stated as the standard uncertainty of measurement multiplied by the coverage factor k=2, which for a normal distribution corresponds to a coverage probability of approximately 95%.

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

[B] Numerical linearization parameter: uncertainty not required.

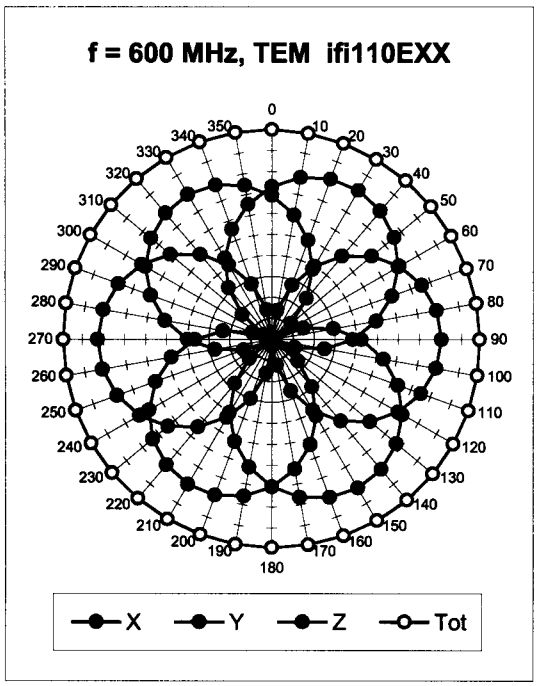
Frequency Response of E-Field

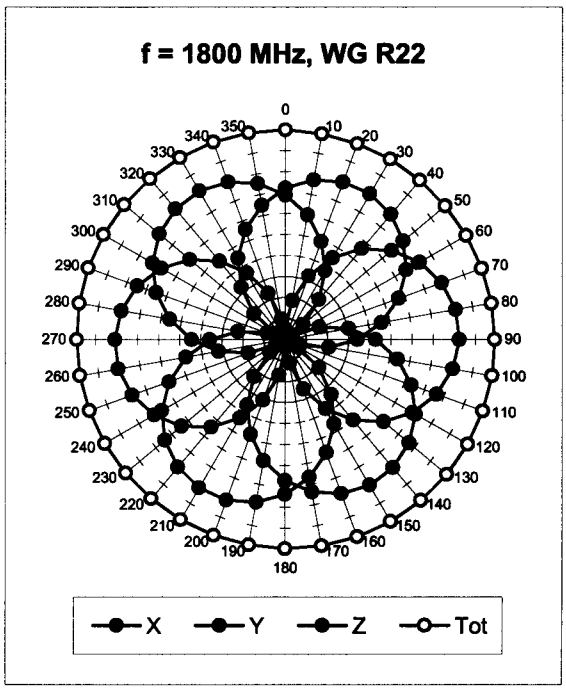
(TEM-Cell:ifi110 EXX, Waveguide: R22)

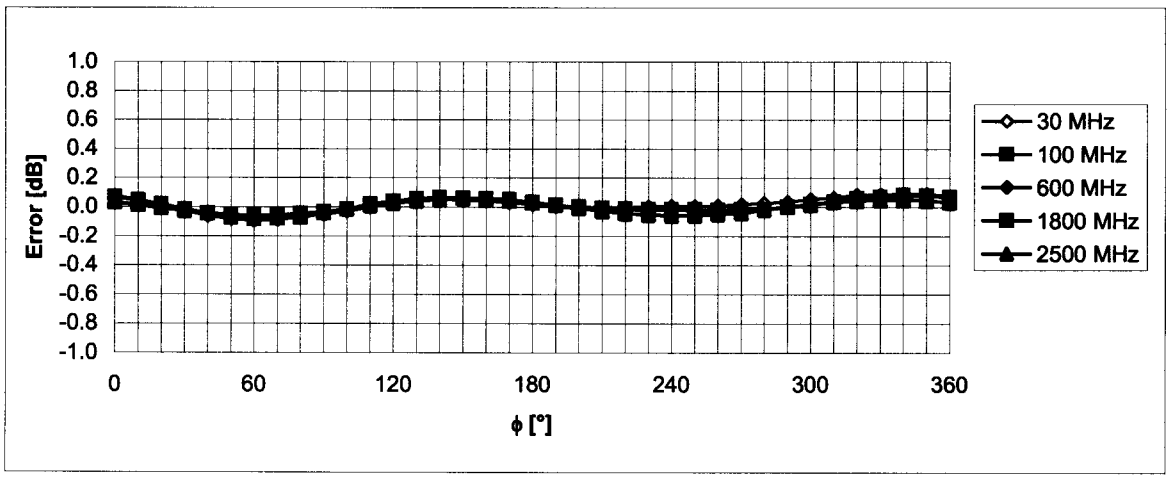


Uncertainty of Frequency Response of E-field: ± 6.3% (k=2)

Receiving Pattern (ϕ), ϑ = 0°



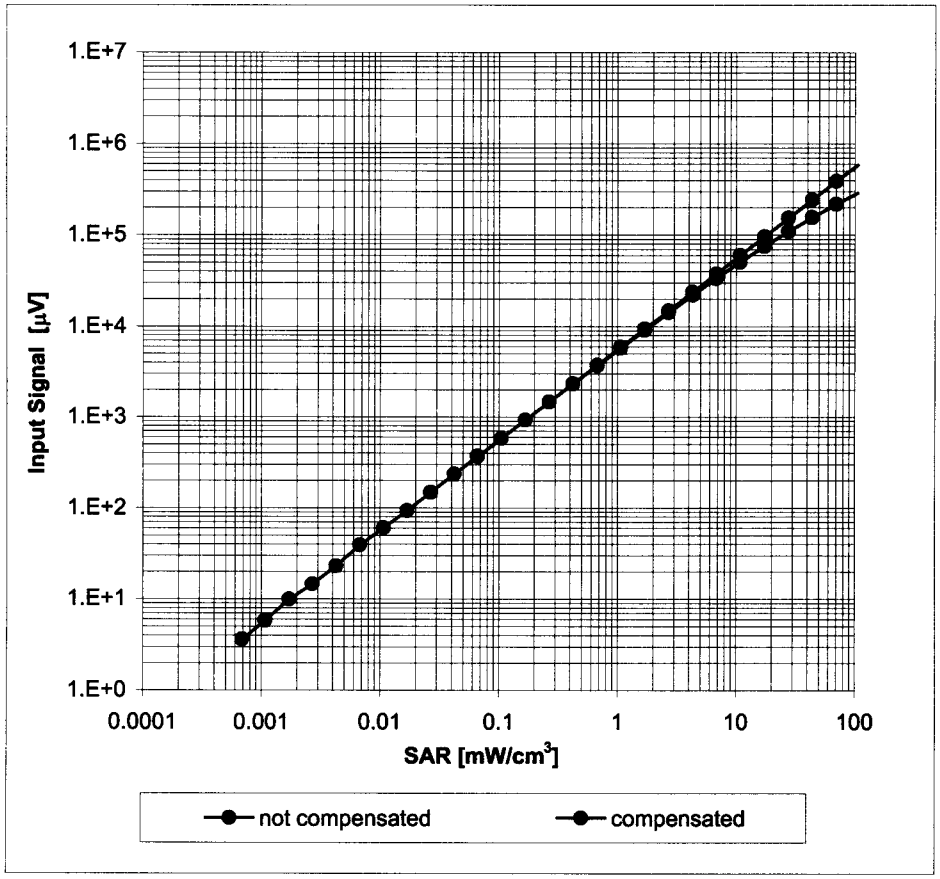


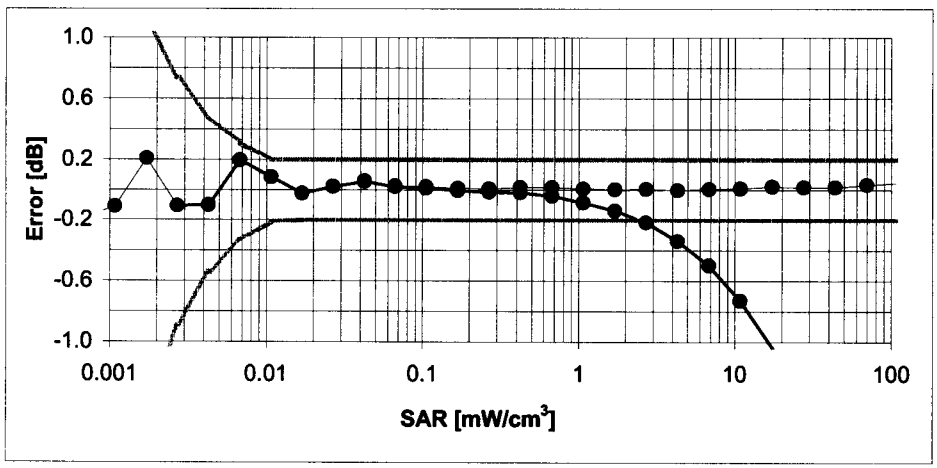


Uncertainty of Axial Isotropy Assessment: ± 0.5% (k=2)

Dynamic Range f(SAR_{head})

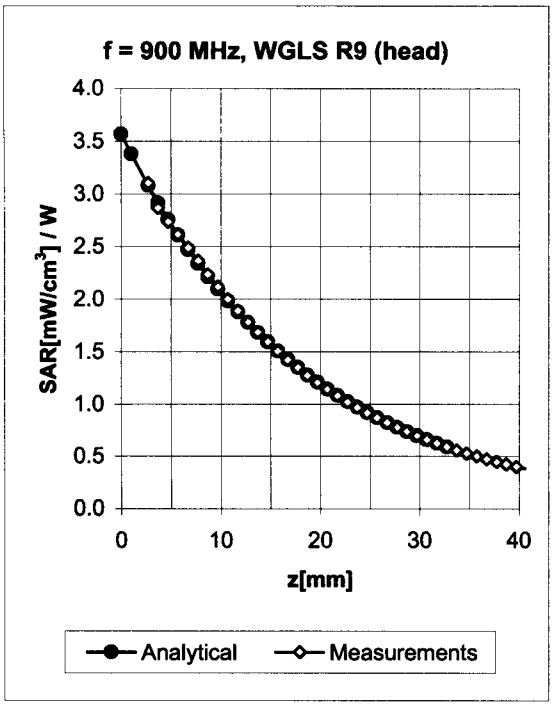
(Waveguide R22, f = 1800 MHz)

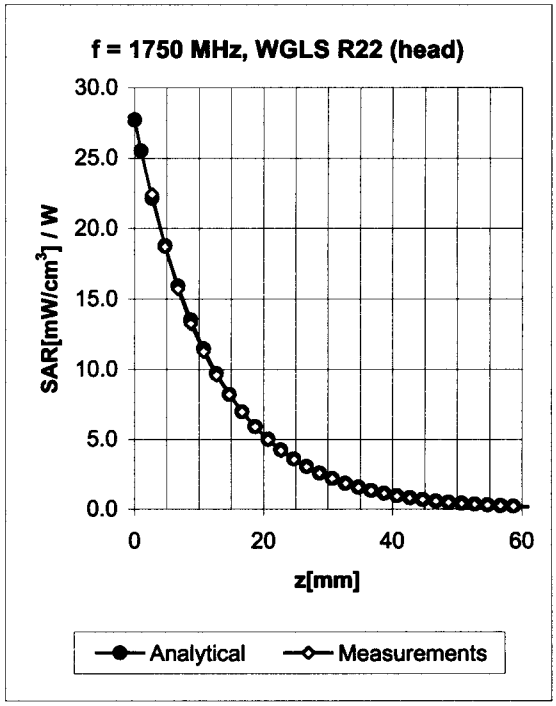




Uncertainty of Linearity Assessment: ± 0.6% (k=2)

Conversion Factor Assessment



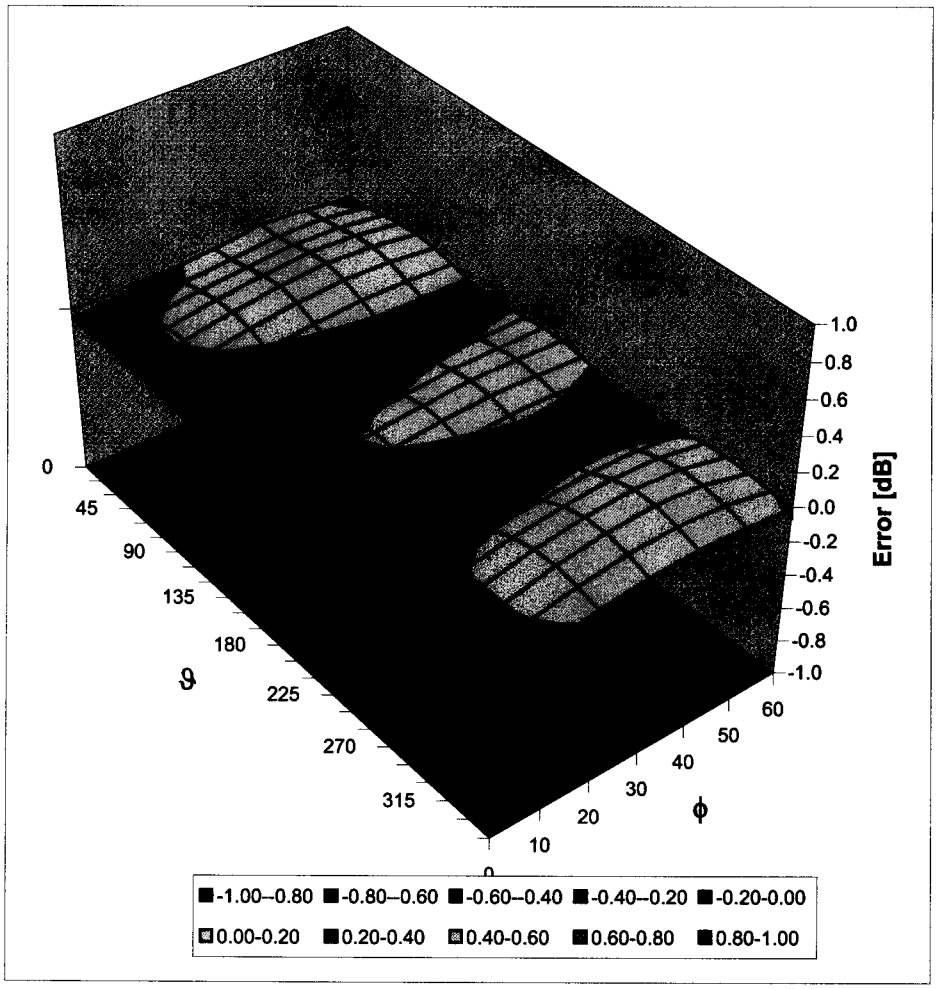


f [MHz]	Validity [MHz][c]	TSL	Permittivity	Conductivity	Alpha	Depth	ConvF Uncertainty
835	± 50 / ± 100	Head	41.5 ± 5%	0.90 ± 5%	0.76	1.87	6.69 ± 11.0% (k=2)
900	± 50 / ± 100	Head	41.5 ± 5%	0.97 ± 5%	0.73	1.94	6.59 ± 11.0% (k=2)
1750	± 50 / ± 100	Head	40.1 ± 5%	1.37 ± 5%	0.81	1.69	5.35 ± 11.0% (k=2)
1900	± 50 / ± 100	Head	40.0 ± 5%	1.40 ± 5%	0.87	1.65	5.18 ± 11.0% (k=2)
2450	± 50 / ± 100	Head	39.2 ± 5%	1.80 ± 5%	0.78	1.91	4.70 ± 11.8% (k=2)
835	± 50 / ± 100	Body	55.2 ± 5%	0.97 ± 5%	0.76	1.93	6.39 ± 11.0% (k=2)
900	± 50 / ± 100	Body	55.0 ± 5%	1.05 ± 5%	0.66	2.00	6.07 ± 11.0% (k=2)
1750	± 50 / ± 100	Body	53.4 ± 5%	1.49 ± 5%	0.77	1.94	4.89 ± 11.0% (k=2)
1900	± 50 / ± 100	Body	53.3 ± 5%	1.52 ± 5%	0.74	1.99	4.68 ± 11.0% (k=2)
2450	± 50 / ± 100	Body	52.7 ± 5%	1.95 ± 5%	0.90	1.73	4.09 ± 11.8% (k=2)

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

Deviation from Isotropy in HSL

Error (ϕ, ϑ), f = 900 MHz



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