Test Laboratory: Sporton International Inc. SAR Testing Lab Date/Time: 08/26/04 19:40:36

Body_802.11b Ch6_Keypad Up With Touch_20040826

Mono_38 Key_SE800hP_2x Battery

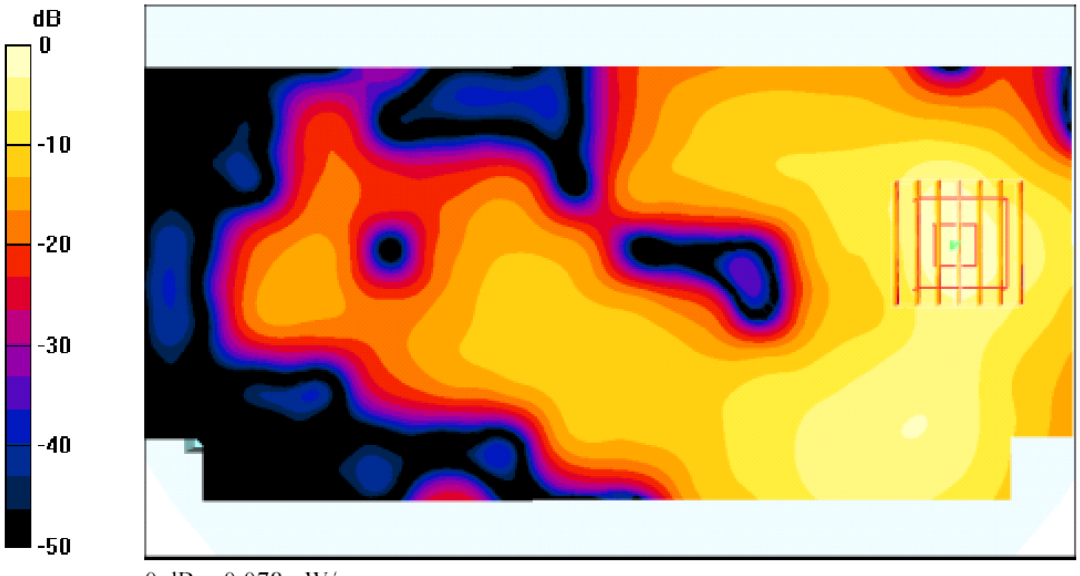
DUT: SYMBOL MC3070 project; Type: Mobile Computer

Communication System: 802.11b ; Frequency: 2437 MHz;Duty Cycle: 1:1
Medium: MSL_2450 Medium parameters used: f = 2437 MHz; σ = 2 mho/m; ε_r = 51.6; ρ = 1000 kg/m^3
Ambient Temperature : 22.2 ℃; Liquid Temperature : 22.3 ℃

DASY4 Configuration:
- Probe: ET3DV6 - SN1788; ConvF(4.5, 4.5, 4.5); Calibrated: 2003/8/29
- Sensor-Surface: 4mm (Mechanical And Optical Surface Detection)
- Electronics: DAE3 Sn577; Calibrated: 2003/11/21
- Phantom: SAM 12; Type: QD 000 P40 C; Serial: TP-1150
- Measurement SW: DASY4, V4.3 Build 16; Postprocessing SW: SEMCAD, V1.8 Build 123

CH6/Area Scan (71x151x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.081 mW/g

CH6/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 1.37 V/m; Power Drift = 0.007 dB
Peak SAR (extrapolated) = 0.153 W/kg
SAR(1 g) = 0.068 mW/g; SAR(10 g) = 0.030 mW/g
Maximum value of SAR (measured) = 0.078 mW/g



0 dB = 0.078mW/g

Test Laboratory: Sporton International Inc. SAR Testing Lab Date/Time: 08/26/04 19:40:36

Body_802.11b Ch11_Keypad Up With Touch_20040826

Mono_38 Key_SE800hP_2x Battery

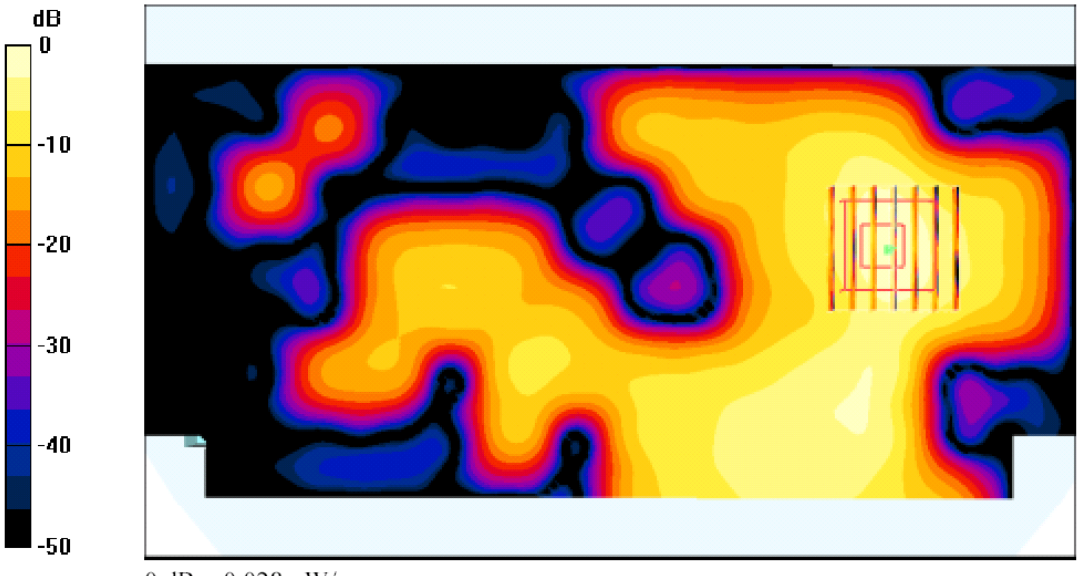
DUT: SYMBOL MC3070 project; Type: Mobile Computer

Communication System: 802.11b ; Frequency: 2462 MHz;Duty Cycle: 1:1
Medium: MSL_2450 Medium parameters used: f = 2462 MHz; σ = 2.02 mho/m; ε_r = 51.6; ρ = 1000 kg/m^3
Ambient Temperature : 22.1 ℃; Liquid Temperature : 22.2 ℃

DASY4 Configuration:
- Probe: ET3DV6 - SN1788; ConvF(4.5, 4.5, 4.5); Calibrated: 2003/8/29
- Sensor-Surface: 4mm (Mechanical And Optical Surface Detection)
- Electronics: DAE3 Sn577; Calibrated: 2003/11/21
- Phantom: SAM 12; Type: QD 000 P40 C; Serial: TP-1150
- Measurement SW: DASY4, V4.3 Build 16; Postprocessing SW: SEMCAD, V1.8 Build 123

CH11/Area Scan (71x151x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.028 mW/g

CH11/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 0.204 V/m; Power Drift = -0.2 dB
Peak SAR (extrapolated) = 0.092 W/kg
SAR(1 g) = 0.025 mW/g; SAR(10 g) = 0.00999 mW/g
Maximum value of SAR (measured) = 0.028 mW/g



0 dB = 0.028mW/g

Test Laboratory: Sporton International Inc. SAR Testing Lab Date/Time: 08/27/04 19:41:09

Body_802.11g Ch1_Keypad Up With Touch_20040827

Mono_38 Key_SE800hP_2x Battery

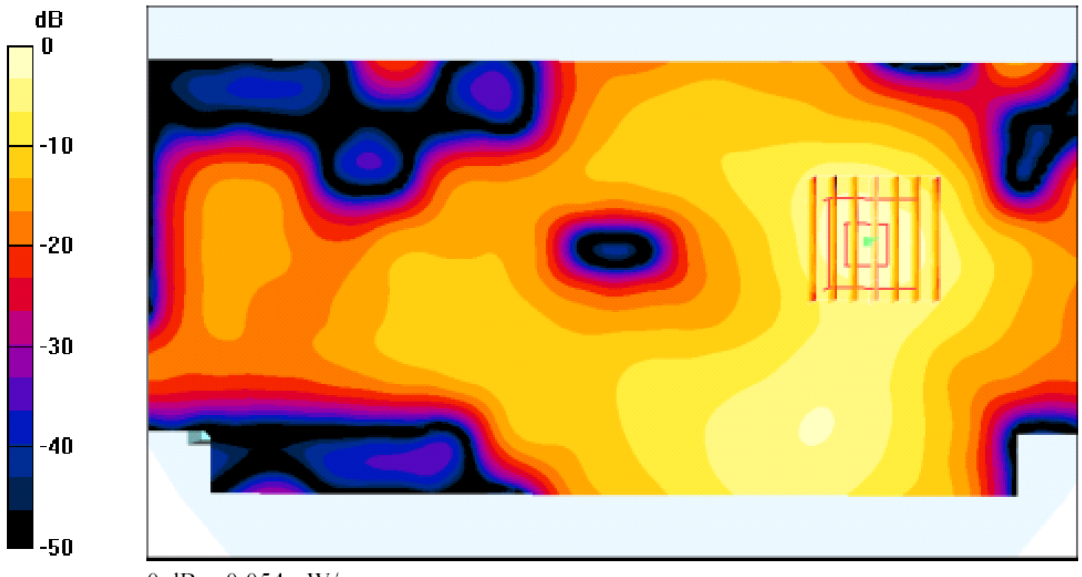
DUT: SYMBOL MC3070 project; Type: Mobile Computer

Communication System: 802.11b ; Frequency: 2412 MHz;Duty Cycle: 1:1
Medium: MSL_2450 Medium parameters used: f = 2412 MHz; σ = 1.94 mho/m; ε_r = 51.4; ρ = 1000 kg/m^3
Ambient Temperature : 22.0 ℃; Liquid Temperature : 22.1 ℃

DASY4 Configuration:
- Probe: ET3DV6 - SN1788; ConvF(4.5, 4.5, 4.5); Calibrated: 2003/8/29
- Sensor-Surface: 4mm (Mechanical And Optical Surface Detection)
- Electronics: DAE3 Sn577; Calibrated: 2003/11/21
- Phantom: SAM 12; Type: QD 000 P40 C; Serial: TP-1150
- Measurement SW: DASY4, V4.3 Build 16; Postprocessing SW: SEMCAD, V1.8 Build 123

CH1/Area Scan (71x151x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.044 mW/g

CH1/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 0.403 V/m; Power Drift = 0.1 dB
Peak SAR (extrapolated) = 0.122 W/kg
SAR(1 g) = 0.047 mW/g; SAR(10 g) = 0.021 mW/g
Maximum value of SAR (measured) = 0.054 mW/g



0 dB = 0.054mW/g

Test Laboratory: Sporton International Inc. SAR Testing Lab Date/Time: 08/27/04 19:41:09

Body_802.11g Ch6_Keypad Up With Touch_20040827

Mono_38 Key_SE800hP_2x Battery

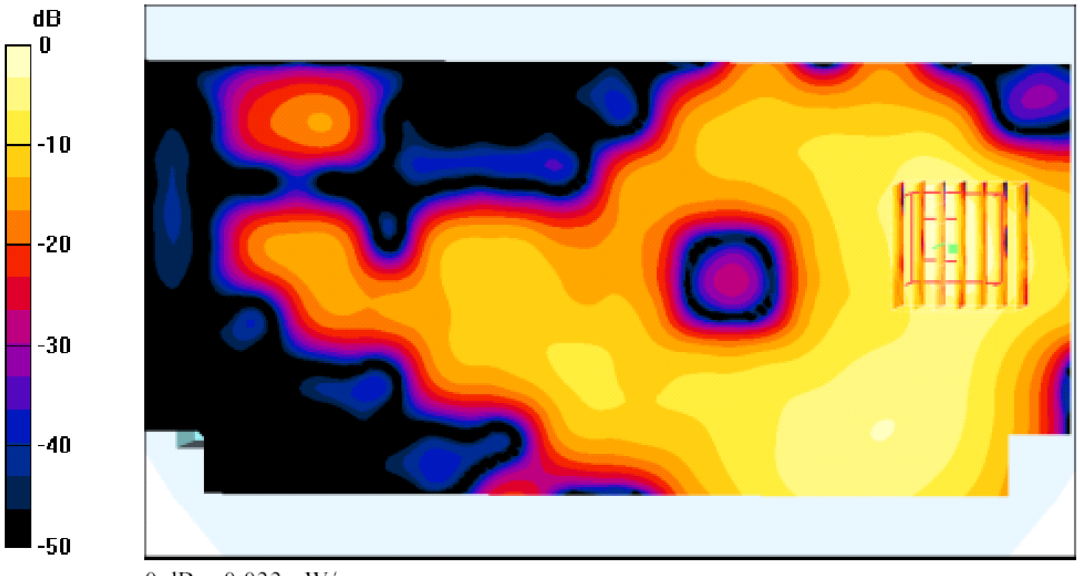
DUT: SYMBOL MC3070 project; Type: Mobile Computer

Communication System: 802.11g; Frequency: 2437 MHz;Duty Cycle: 1:1
Medium: MSL_2450 Medium parameters used: f = 2437 MHz; σ = 2 mho/m; ε_r = 51.6; ρ = 1000 kg/m^3
Ambient Temperature : 22.1 ℃; Liquid Temperature : 22.1 ℃

DASY4 Configuration:
- Probe: ET3DV6 - SN1788; ConvF(4.5, 4.5, 4.5); Calibrated: 2003/8/29
- Sensor-Surface: 4mm (Mechanical And Optical Surface Detection)
- Electronics: DAE3 Sn577; Calibrated: 2003/11/21
- Phantom: SAM 12; Type: QD 000 P40 C; Serial: TP-1150
- Measurement SW: DASY4, V4.3 Build 16; Postprocessing SW: SEMCAD, V1.8 Build 123

CH6/Area Scan (71x151x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.033 mW/g

CH6/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 0.716 V/m; Power Drift = -0.2 dB
Peak SAR (extrapolated) = 0.260 W/kg
SAR(1 g) = 0.028 mW/g; SAR(10 g) = 0.012 mW/g
Maximum value of SAR (measured) = 0.033 mW/g



0 dB = 0.033mW/g

Test Laboratory: Sporton International Inc. SAR Testing Lab Date/Time: 08/27/04 19:41:30

Body_802.11g Ch11_Keypad Up With Touch_20040827

Mono_38 Key_SE800hP_2x Battery

DUT: SYMBOL MC3070 project; Type: Mobile Computer

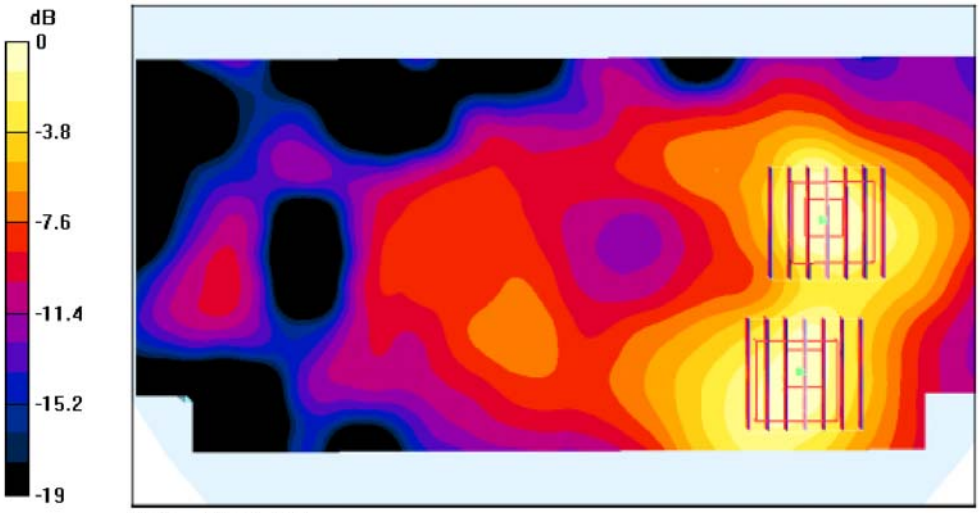
Communication System: 802.11g; Frequency: 2462 MHz;Duty Cycle: 1:1
Medium: MSL_2450 Medium parameters used: f = 2462 MHz; σ = 1.99 mho/m; ε_r = 50.5; ρ = 1000 kg/m^3
Ambient Temperature : 22.2 ℃; Liquid Temperature : 22.1 ℃

DASY4 Configuration:
- Probe: ET3DV6 - SN1787; ConvF(4.5, 4.5, 4.5); Calibrated: 2003/8/29
- Sensor-Surface: 4mm (Mechanical And Optical Surface Detection)
- Electronics: DAE3 Sn577; Calibrated: 2003/11/21
- Phantom: SAM 12; Type: QD 000 P40 C; Serial: TP-1150
- Measurement SW: DASY4, V4.3 Build 16; Postprocessing SW: SEMCAD, V1.8 Build 123

CH11/Area Scan (71x151x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.030 mW/g

CH11/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 1.14 V/m; Power Drift = 0.2 dB
Peak SAR (extrapolated) = 0.063 W/kg
SAR(1 g) = 0.027 mW/g; SAR(10 g) = 0.013 mW/g
Maximum value of SAR (measured) = 0.031 mW/g

CH11/Zoom Scan (7x7x7)/Cube 1: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 1.14 V/m; Power Drift = 0.2 dB
Peak SAR (extrapolated) = 0.048 W/kg
SAR(1 g) = 0.022 mW/g; SAR(10 g) = 0.011 mW/g
Maximum value of SAR (measured) = 0.024 mW/g



0 dB = 0.024mW/g

Test Laboratory: Sporton International Inc. SAR Testing Lab Date/Time: 08/26/04 14:59:36

Body_802.11b Ch6_Keypad Up With Touch_20040826

Mono_38 Key_SE800hP_2x Battery

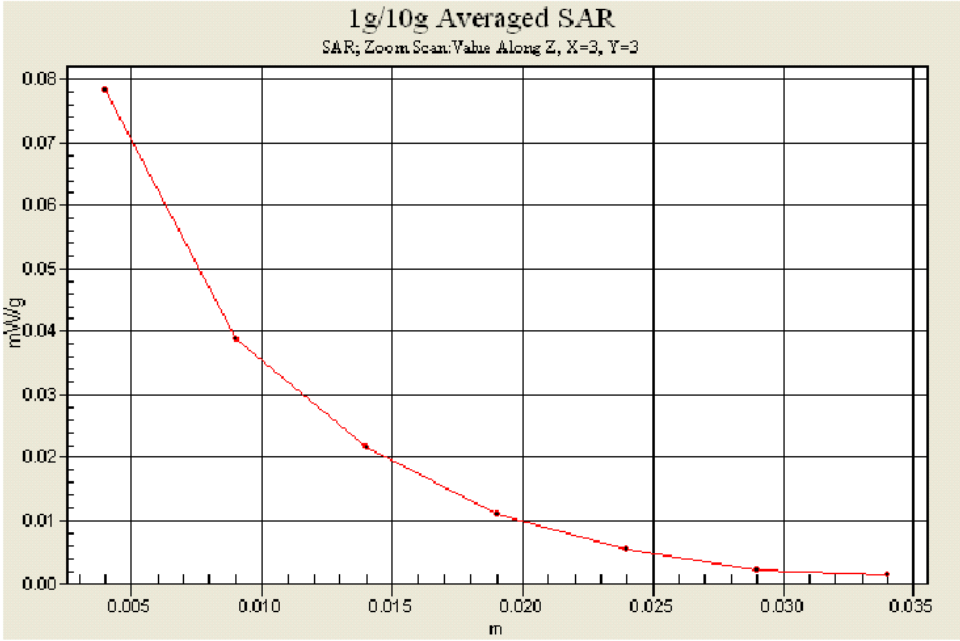
DUT: SYMBOL MC3070 project; Type: Mobile Computer

Communication System: 802.11b ; Frequency: 2437 MHz;Duty Cycle: 1:1
Medium: MSL_2450 Medium parameters used: f = 2437 MHz; σ = 2 mho/m; ε_r = 51.6; ρ = 1000 kg/m^3
Ambient Temperature : 22.2 ℃; Liquid Temperature : 22.3 ℃

DASY4 Configuration:
- Probe: ET3DV6 - SN1788; ConvF(4.5, 4.5, 4.5); Calibrated: 2003/8/29
- Sensor-Surface: 4mm (Mechanical And Optical Surface Detection)
- Electronics: DAE3 Sn577; Calibrated: 2003/11/21
- Phantom: SAM 12; Type: QD 000 P40 C; Serial: TP-1150
- Measurement SW: DASY4, V4.3 Build 16; Postprocessing SW: SEMCAD, V1.8 Build 123

CH6/Area Scan (71x151x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.081 mW/g

CH6/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 2.9 V/m; Power Drift = 0.007 dB
Peak SAR (extrapolated) = 0.153 W/kg
SAR(1 g) = 0.068 mW/g; SAR(10 g) = 0.030 mW/g
Maximum value of SAR (measured) = 0.078 mW/g



Appendix C – Calibration Data

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

Client Auden > Sporton Int. Inc.

CALIBRATION CERTIFICATE

Object(s)	D2450V2 - SN:736
Calibration procedure(s)	QA CAL-05.v2 Calibration procedure for dipole validation kits
Calibration date:	August 27, 2003
Condition of the calibrated item	In Tolerance (according to the specific calibration document)

This calibration statement documents traceability of M&TE used in the calibration procedures and conformity of the procedures with the ISO/IEC 17025 international standard.

All calibrations have been conducted in the closed laboratory facility: environment temperature 22 +/- 2 degrees Celsius and humidity < 75%.

Calibration Equipment used (M&TE critical for calibration)

Model Type	ID #	Cal Date (Calibrated by, Certificate No.)	Scheduled Calibration
RF generator R&S SML-03	100698	27-Mar-2002 (R&S, No. 20-92389)	In house check: Mar-05
Power sensor HP 8481A	MY41092317	18-Oct-02 (Agilent, No. 20021018)	Oct-04
Power sensor HP 8481A	US37292783	30-Oct-02 (METAS, No. 252-0236)	Oct-03
Power meter EPM E442	GB37480704	30-Oct-02 (METAS, No. 252-0236)	Oct-03
Network Analyzer HP 8753E	US37390585	18-Oct-01 (Agilent, No. 24BR1033101)	In house check: Oct 03

	Name	Function	Signature
Calibrated by:	Jodth Mueller	Technician	
Approved by:	Katja Pokovic	Laboratory Director	

Date issued: August 28, 2003

This calibration certificate is issued as an intermediate solution until the accreditation process (based on ISO/IEC 17025 International Standard) for Calibration Laboratory of Schmid & Partner Engineering AG is completed.

880-KP0301061-A Page 1 (1)

Schmid & Partner Engineering AG

s p e a g

Zeughausstrasse 43, 8004 Zurich, Switzerland
Phone +41 1 245 9700, Fax +41 1 245 9779
info@speag.com, http://www.speag.com

DASY

Dipole Validation Kit

Type: D2450V2

Serial: 736

Manufactured: August 26, 2003
Calibrated: August 27, 2003

1. Measurement Conditions

The measurements were performed in the flat section of the SAM twin phantom filled with **head simulating solution** of the following electrical parameters at 2450 MHz:

Relative Dielectricity	**38.2**	± 5%
Conductivity	**1.89 mho/m**	± 5%

The DASY4 System with a dosimetric E-field probe ES3DV2 (SN:3013, Conversion factor 4.8 at 2450 MHz) was used for the measurements.

The dipole was mounted on the small tripod so that the dipole feedpoint was positioned below the center marking of the flat phantom section and the dipole was oriented parallel to the body axis (the long side of the phantom). The standard measuring distance was 10mm from dipole center to the solution surface. Lossless spacer was used during measurements for accurate distance positioning.

The coarse grid with a grid spacing of 15mm was aligned with the dipole. The 7x7x7 fine cube was chosen for cube integration.
The dipole input power (forward power) was 250mW ± 3 %. The results are normalized to 1W input power.

2. SAR Measurement with DASY4 System

Standard SAR-measurements were performed according to the measurement conditions described in section 1. The results (see figure supplied) have been normalized to a dipole input power of 1W (forward power). The resulting averaged SAR-values measured with the dosimetric probe ES3DV2 SN:3013 and applying the advanced extrapolation are:

averaged over 1 cm^3 (1 g) of tissue:	**55.6 mW/g** ± 16.8 % (k=2)[1]
averaged over 10 cm^3 (10 g) of tissue:	**25.0 mW/g** ± 16.2 % (k=2)[1]

[1] validation uncertainty

3. Dipole Impedance and Return Loss

The impedance was measured at the SMA-connector with a network analyzer and numerically transformed to the dipole feedpoint. The transformation parameters from the SMA-connector to the dipole feedpoint are:

Electrical delay:	**1.158 ns**	(one direction)
Transmission factor:	**0.983**	(voltage transmission, one direction)

The dipole was positioned at the flat phantom sections according to section 1 and the distance spacer was in place during impedance measurements.

Feedpoint impedance at 2450 MHz:	Re{Z} = **52.5 Ω**
	Im {Z} = **3.6 Ω**
Return Loss at 2450 MHz	**-27.5 dB**

4. Measurement Conditions

The measurements were performed in the flat section of the SAM twin phantom filled with **body simulating solution** of the following electrical parameters at 2450 MHz:

Relative Dielectricity	**50.8**	± 5%
Conductivity	**2.03 mho/m**	± 5%

The DASY4 System with a dosimetric E-field probe ES3DV2 (SN:3013, Conversion factor 4.2 at 2450 MHz) was used for the measurements.

The dipole was mounted on the small tripod so that the dipole feedpoint was positioned below the center marking of the flat phantom section and the dipole was oriented parallel to the body axis (the long side of the phantom). The standard measuring distance was 10mm from dipole center to the solution surface. Lossless spacer was used during measurements for accurate distance positioning.

The coarse grid with a grid spacing of 15mm was aligned with the dipole. The 7x7x7 fine cube was chosen for cube integration.
The dipole input power (forward power) was 250mW ± 3 %. The results are normalized to 1W input power.

5. SAR Measurement with DASY4 System

Standard SAR-measurements were performed according to the measurement conditions described in section 4. The results (see figure supplied) have been normalized to a dipole input power of 1W (forward power). The resulting averaged SAR-values measured with the dosimetric probe ES3DV2 SN:3013 and applying the advanced extrapolation are:

averaged over 1 cm^3 (1 g) of tissue:	**56.0 mW/g** ± 16.8 % $(k=2)^2$
averaged over 10 cm^3 (10 g) of tissue:	**25.8 mW/g** ± 16.2 % $(k=2)^2$

6. Dipole Impedance and Return Loss

The dipole was positioned at the flat phantom sections according to section 4 and the distance spacer was in place during impedance measurements.

Feedpoint impedance at 2450 MHz:	Re{Z} = **48.7 Ω**
	Im {Z} = **4.8 Ω**
Return Loss at 2450 MHz	**-25.8 dB**

7. Handling

Do not apply excessive force to the dipole arms, because they might bend. Bending of the dipole arms stresses the soldered connections near the feedpoint leading to a damage of the dipole.

8. Design

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.

Small end caps have been added to the dipole arms in order to improve matching when loaded according to the position as explained in Sections 1and 4. The SAR data are not affected by this change. The overall dipole length is still according to the Standard.

9. Power Test

After long term use with 40W radiated power, only a slight warming of the dipole near the feedpoint can be measured.

---

[2] validation uncertainty

Date/Time: 08/27/03 15:43:04

Test Laboratory: SPEAG, Zurich, Switzerland
File Name: SN736_SN3013_M2450_270803.da4

DUT: Dipole 2450 MHz; Type: D2450V2; Serial: D2450V2 - SN736
Program: Dipole Calibration

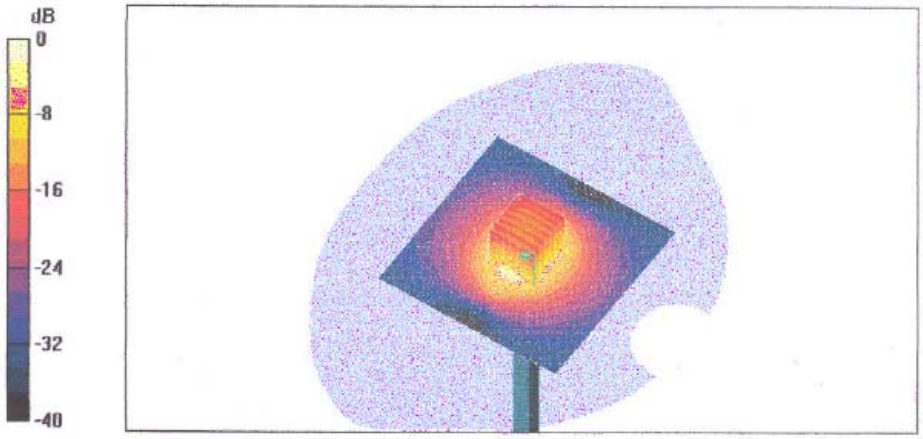
Communication System: CW-2450; Frequency: 2450 MHz;Duty Cycle: 1:1
Medium: Muscle 2450 MHz (σ = 2.03 mho/m, ε_r = 50.75, ρ = 1000 kg/m^3)
Phantom section: Flat Section
Measurement Standard: DASY4 (High Precision Assessment)

DASY4 Configuration:

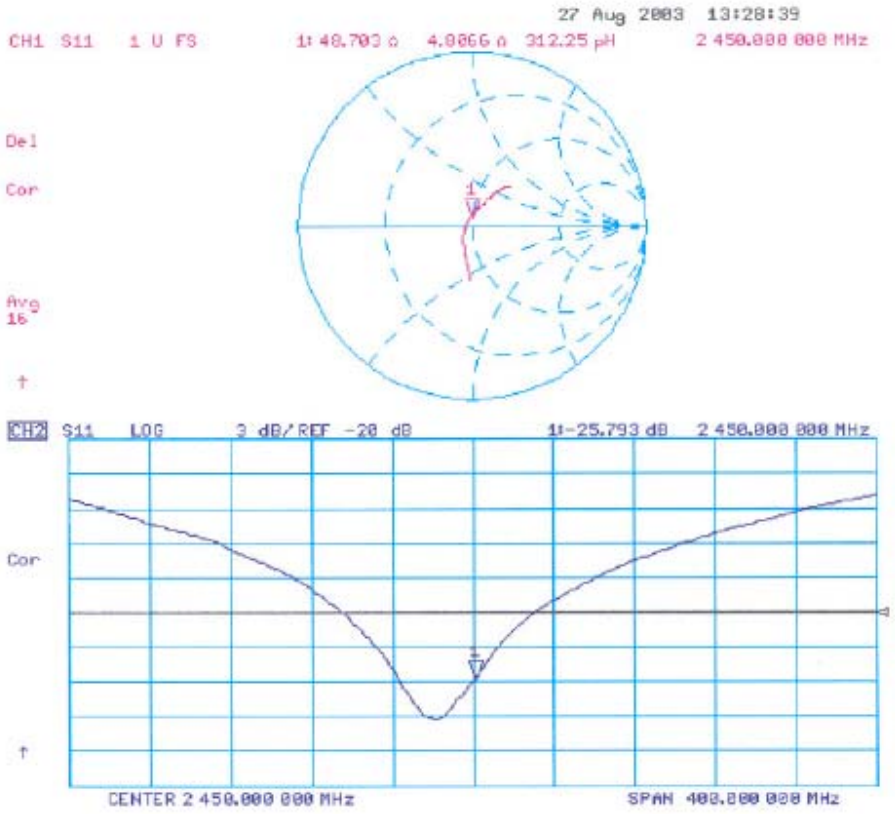
- Probe: ES3DV2 - SN3013; ConvF(4.2, 4.2, 4.2); Calibrated: 1/19/2003
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 - SN411; Calibrated: 1/16/2003
- Phantom: SAM with CRP - TP1006; Type: SAM 4.0; Serial: TP:1006
- Measurement SW: DASY4, V4.1 Build 47; Postprocessing SW: SEMCAD, V1.6 Build 115

Pin = 250 mW; d = 10 mm/Area Scan (81x81x1): *Measurement grid: dx=15mm, dy=15mm*
Reference Value = 91 V/m
Power Drift = -0.02 dB
Maximum value of SAR = 15.7 mW/g

Pin = 250 mW; d = 10 mm/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Peak SAR (extrapolated) = 27.8 W/kg
SAR(1 g) = 14 mW/g; SAR(10 g) = 6.46 mW/g
Reference Value = 91 V/m
Power Drift = -0.02 dB
Maximum value of SAR = 16 mW/g



0 dB = 16mW/g



Date/Time: 08/27/03 11:42:12

Test Laboratory: SPEAG, Zurich, Switzerland
File Name: SN736_SN3013_HSL2450_270803.da4

DUT: Dipole 2450 MHz; Type: D2450V2; Serial: D2450V2 - SN736
Program: Dipole Calibration

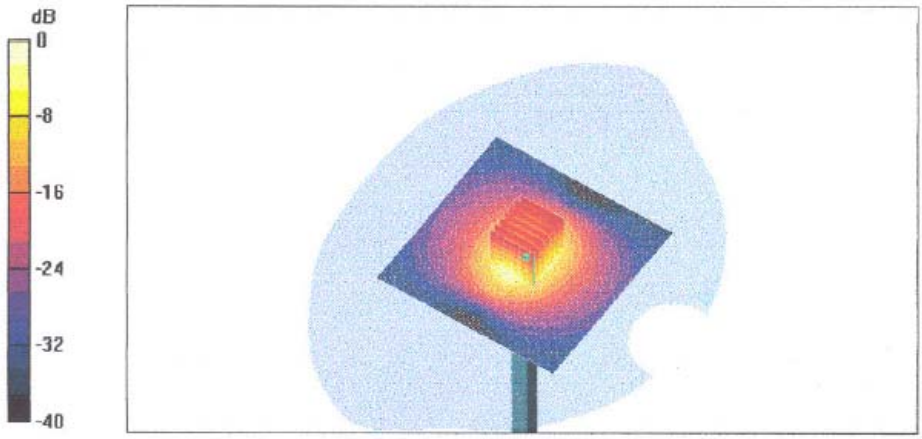
Communication System: CW-2450; Frequency: 2450 MHz;Duty Cycle: 1:1
Medium: HSL 2450 MHz (σ = 1.89 mho/m, ε_r = 38.19, ρ = 1000 kg/m^3)
Phantom section: Flat Section
Measurement Standard: DASY4 (High Precision Assessment)

DASY4 Configuration:

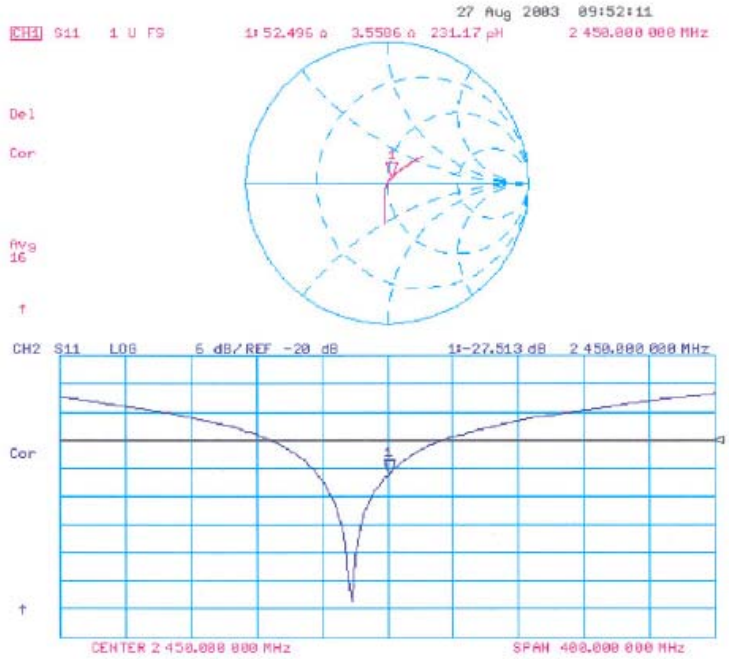
- Probe: ES3DV2 - SN3013; ConvF(4.8, 4.8, 4.8); Calibrated: 1/19/2003
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 - SN411; Calibrated: 1/16/2003
- Phantom: SAM with CRP - TP1006; Type: SAM 4.0; Serial: TP:1006
- Measurement SW: DASY4, V4.1 Build 47; Postprocessing SW: SEMCAD, V1.6 Build 115

Pin = 250 mW; d = 10 mm/Area Scan (81x81x1): *Measurement grid: dx=15mm, dy=15mm*
Reference Value = 91.5 V/m
Power Drift = -0.04 dB
Maximum value of SAR = 15.3 mW/g

Pin = 250 mW; d = 10 mm/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Peak SAR (extrapolated) = 30.2 W/kg
SAR(1 g) = 13.9 mW/g; SAR(10 g) = 6.25 mW/g
Reference Value = 91.5 V/m
Power Drift = -0.04 dB
Maximum value of SAR = 15.5 mW/g



0 dB = 15.5mW/g



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

Client Auden > Sporton Int. Inc.

CALIBRATION CERTIFICATE

Object(s) ET3DV6 - SN:1788

Calibration procedure(s) QA CAL-01 v2
Calibration procedure for dosimetric E-field probes

Calibration date: August 29, 2003

Condition of the calibrated item In Tolerance (according to the specific calibration document)

This calibration statement documents traceability of M&TE used in the calibration procedures and conformity of the procedures with the ISO/IEC 17025 international standard.

All calibrations have been conducted in the closed laboratory facility: environment temperature 22 +/- 2 degrees Celsius and humidity < 75%.

Calibration Equipment used (M&TE critical for calibration)

Model Type	ID #	Cal Date (Calibrated by, Certificate No.)	Scheduled Calibration
RF generator HP 8684C	US3642U01700	4-Aug-99 (SPEAG, in house check Aug-02)	In house check: Aug-05
Power sensor E4412A	MY41495277	2-Apr-03 (METAS, No 252-0250)	Apr-04
Power sensor HP 8481A	MY41092180	18-Sep-02 (Agilent, No. 20020918)	Sep-03
Power meter EPM E4419B	GB41293874	2-Apr-03 (METAS, No 252-0250)	Apr-04
Network Analyzer HP 8753E	US37390585	18-Oct-01 (Agilent, No. 24BR1033101)	In house check: Oct 03
Fluke Process Calibrator Type 702	SN: 6295803	3-Sep-01 (ELCAL, No.2360)	Sep-03

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

Date issued: August 28, 2003

This calibration certificate is issued as an intermediate solution until the accreditation process (based on ISO/IEC 17025 International Standard) for Calibration Laboratory of Schmid & Partner Engineering AG is completed.

880-KP0301061-A Page 1 (1)

Schmid & Partner Engineering AG

s p e a g

Zeughausstrasse 43, 8004 Zurich, Switzerland
Phone +41 1 245 9700, Fax +41 1 245 9779
info@speag.com, http://www.speag.com

Probe ET3DV6

SN:1788

Manufactured: May 28, 2003
Last calibration: August 29, 2003

Calibrated for DASY Systems

(Note: non-compatible with DASY2 system!)

ET3DV6 SN:1788 August 29, 2003

DASY - Parameters of Probe: ET3DV6 SN:1788

Sensitivity in Free Space

Diode Compression

NormX	1.68 $\mu V/(V/m)^2$	DCP X	95	mV
NormY	1.62 $\mu V/(V/m)^2$	DCP Y	95	mV
NormZ	1.71 $\mu V/(V/m)^2$	DCP Z	95	mV

Sensitivity in Tissue Simulating Liquid

Head 900 MHz ε_r = 41.5 ± 5% σ = 0.97 ± 5% mho/m

Valid for f=800-1000 MHz with Head Tissue Simulating Liquid according to EN 50361, P1528-200X

ConvF X	6.6 ± 9.5% (k=2)	Boundary effect:	
ConvF Y	6.6 ± 9.5% (k=2)	Alpha	0.34
ConvF Z	6.6 ± 9.5% (k=2)	Depth	2.48

Head 1800 MHz ε_r = 40.0 ± 5% σ = 1.40 ± 5% mho/m

Valid for f=1710-1910 MHz with Head Tissue Simulating Liquid according to EN 50361, P1528-200X

ConvF X	5.3 ± 9.5% (k=2)	Boundary effect:	
ConvF Y	5.3 ± 9.5% (k=2)	Alpha	0.43
ConvF Z	5.3 ± 9.5% (k=2)	Depth	2.80

Boundary Effect

Head 900 MHz Typical SAR gradient: 5 % per mm

Probe Tip to Boundary		1 mm	2 mm
SAR_{be} [%]	Without Correction Algorithm	8.7	5.0
SAR_{be} [%]	With Correction Algorithm	0.3	0.5

Head 1800 MHz Typical SAR gradient: 10 % per mm

Probe Tip to Boundary		1 mm	2 mm
SAR_{be} [%]	Without Correction Algorithm	12.8	8.9
SAR_{be} [%]	With Correction Algorithm	0.3	0.1

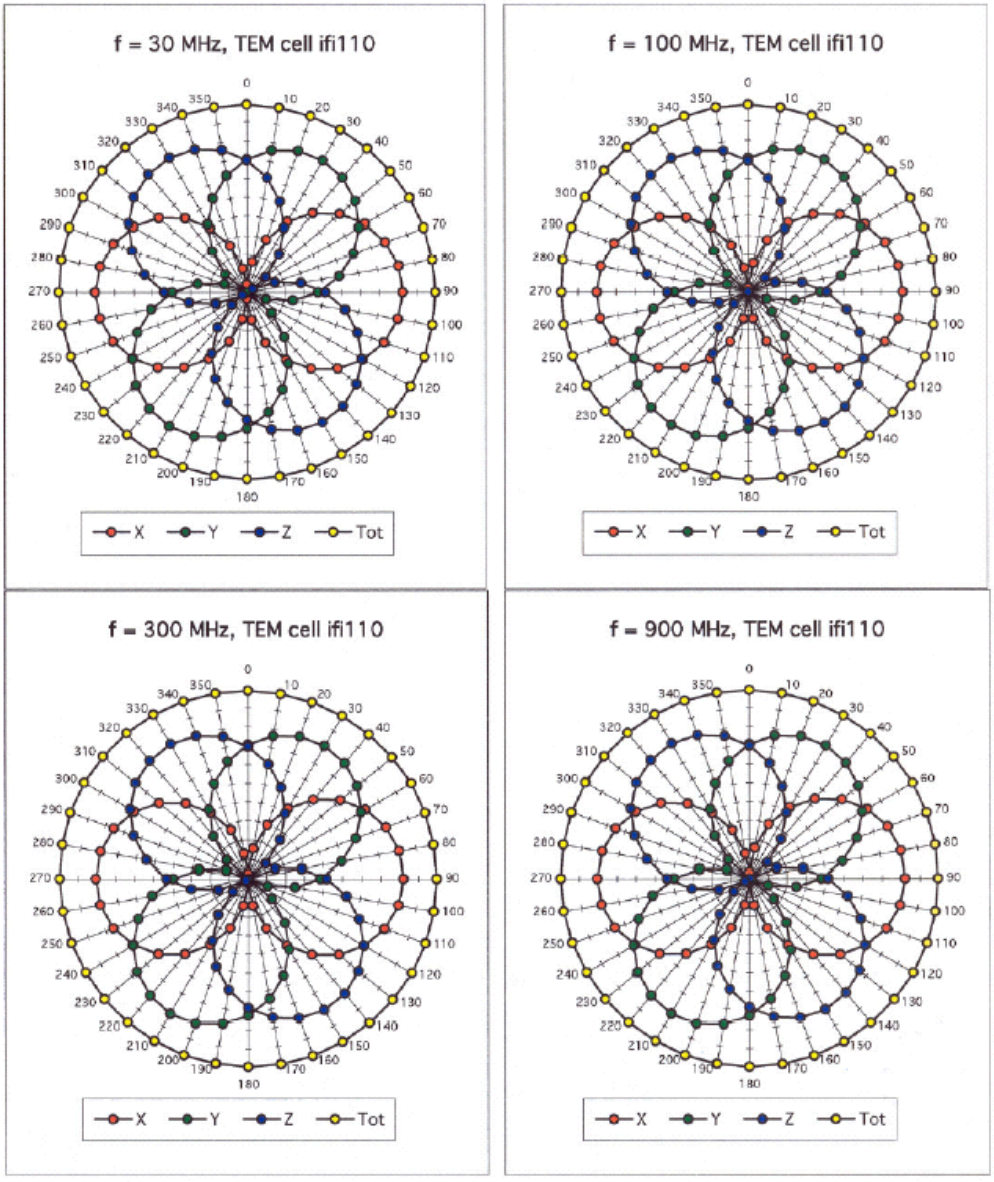
Sensor Offset

Probe Tip to Sensor Center	2.7	mm
Optical Surface Detection	1.6 ± 0.2	mm

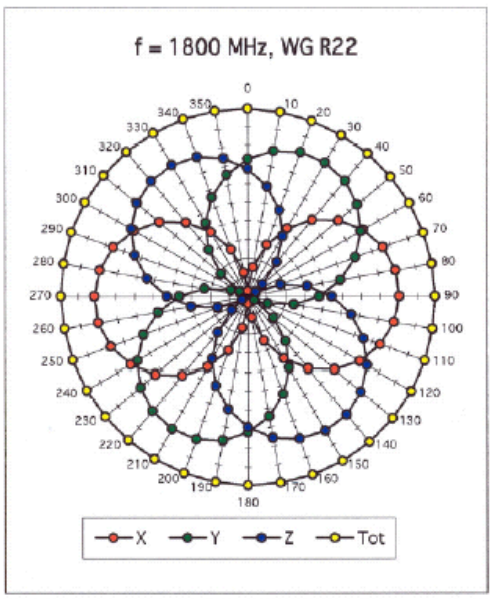
ET3DV6 SN:1788

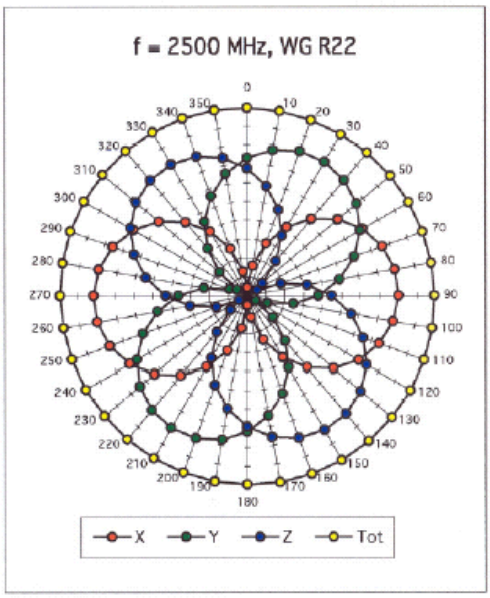
August 29, 2003

Receiving Pattern (ϕ), θ = 0°

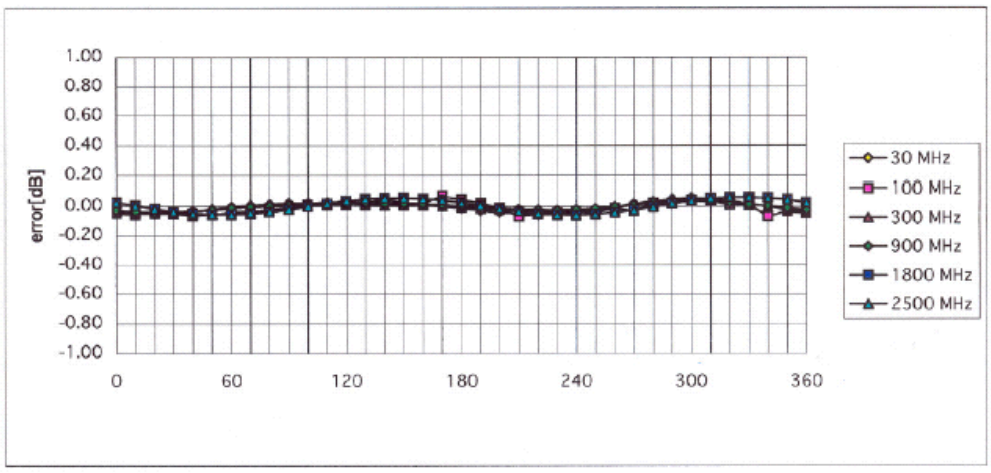


ET3DV6 SN:1788 August 29, 2003





Isotropy Error (ϕ), θ = 0°

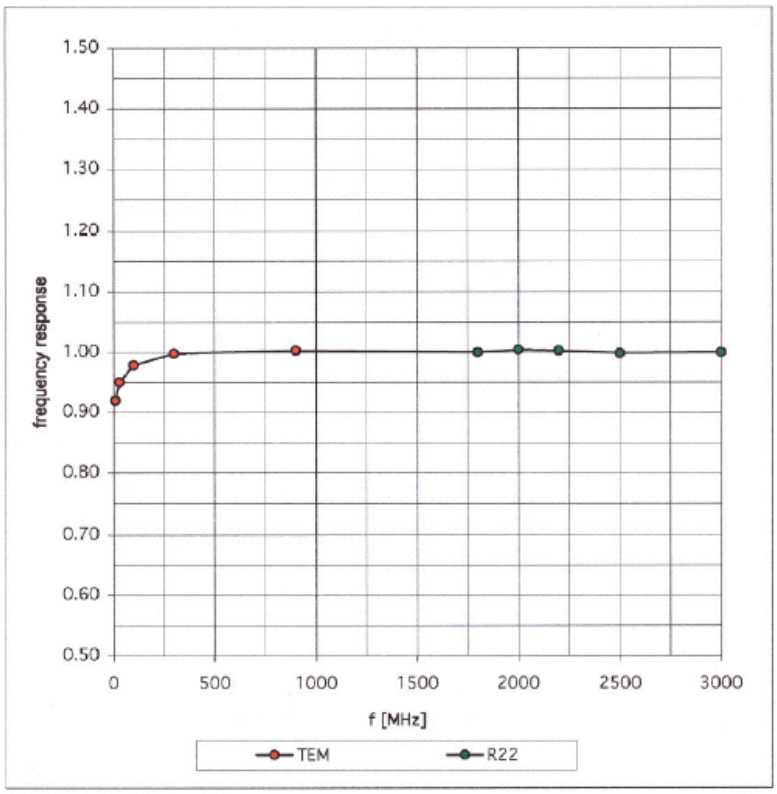


ET3DV6 SN:1788

August 29, 2003

Frequency Response of E-Field

(TEM-Cell:ifi110, Waveguide R22)

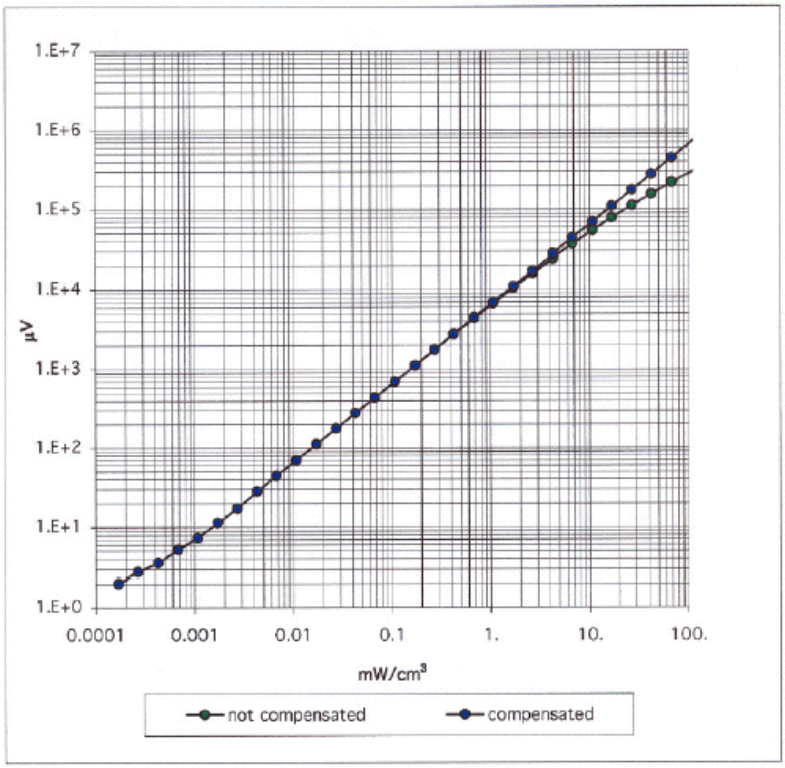


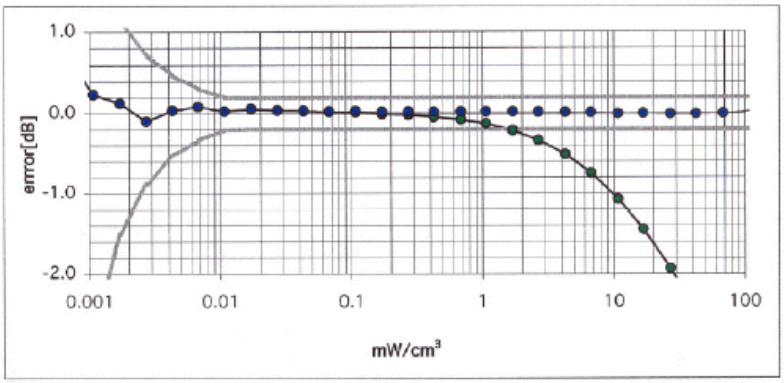
ET3DV6 SN:1788

August 29, 2003

Dynamic Range f(SAR_{brain})

(Waveguide R22)

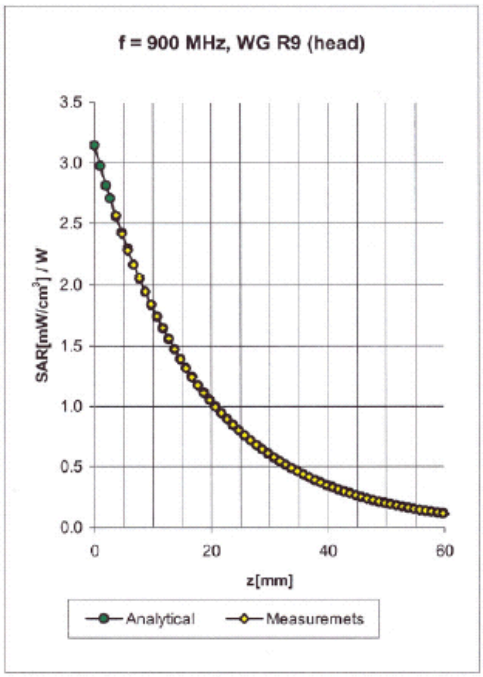


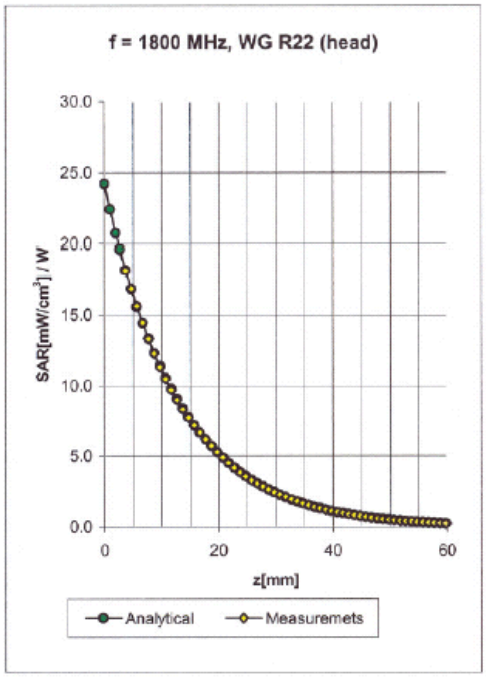


ET3DV6 SN:1788

August 29, 2003

Conversion Factor Assessment





Head 900 MHz ε_r = 41.5 ± 5% σ = 0.97 ± 5% mho/m

Valid for f=800-1000 MHz with Head Tissue Simulating Liquid according to EN 50361, P1528-200X

ConvF X	6.6 ± 9.5% (k=2)	Boundary effect:	
ConvF Y	6.6 ± 9.5% (k=2)	Alpha	0.34
ConvF Z	6.6 ± 9.5% (k=2)	Depth	2.48

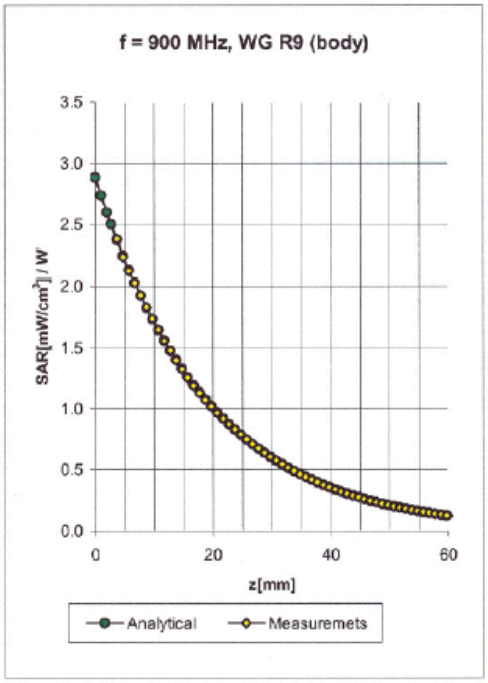
Head 1800 MHz ε_r = 40.0 ± 5% σ = 1.40 ± 5% mho/m

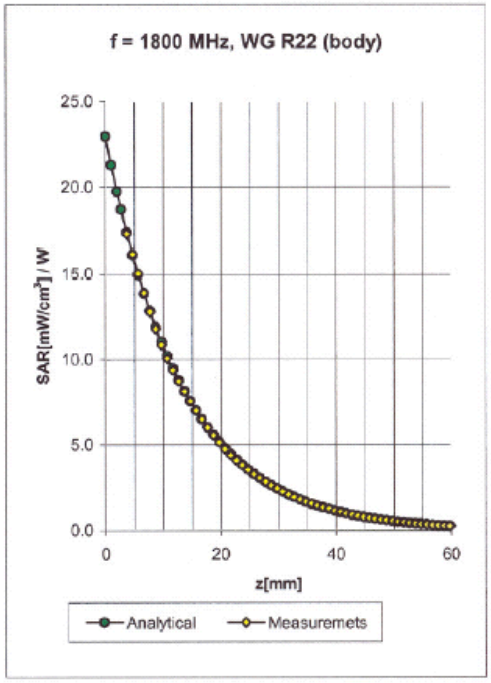
Valid for f=1710-1910 MHz with Head Tissue Simulating Liquid according to EN 50361, P1528-200X

ConvF X	5.3 ± 9.5% (k=2)	Boundary effect:	
ConvF Y	5.3 ± 9.5% (k=2)	Alpha	0.43
ConvF Z	5.3 ± 9.5% (k=2)	Depth	2.80

ET3DV6 SN:1788 August 29, 2003

Conversion Factor Assessment





Body 900 MHz ε_r = 55.0 ± 5% σ = 1.05 ± 5% mho/m

Valid for f=800-1000 MHz with Body Tissue Simulating Liquid according to OET 65 Suppl. C

ConvF X	6.5 ±9.5% (k=2)	Boundary effect:	
ConvF Y	6.5 ±9.5% (k=2)	Alpha	0.31
ConvF Z	6.5 ±9.5% (k=2)	Depth	2.92

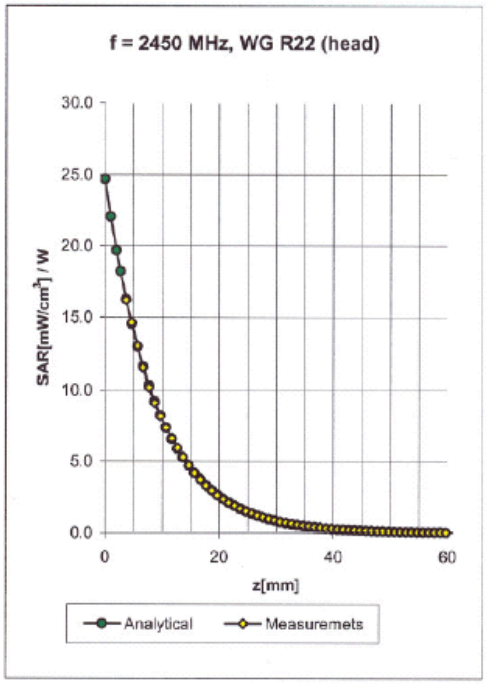
Body 1800 MHz ε_r = 53.3 ± 5% σ = 1.52 ± 5% mho/m

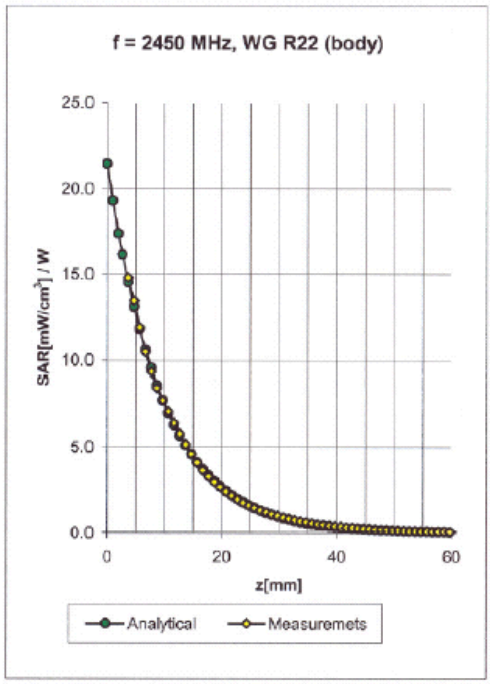
Valid for f=1710-1910 MHz with Body Tissue Simulating Liquid according to OET 65 Suppl. C

ConvF X	5.0 ±9.5% (k=2)	Boundary effect:	
ConvF Y	5.0 ±9.5% (k=2)	Alpha	0.51
ConvF Z	5.0 ±9.5% (k=2)	Depth	2.78

ET3DV6 SN:1788 August 29, 2003

Conversion Factor Assessment





Head 2450 MHz ε_r = 39.2 ± 5% σ = 1.80 ± 5% mho/m

Valid for f=2400-2500 MHz with Head Tissue Simulating Liquid according to EN 50361, P1528-200X

ConvF X	4.7 ± 8.9% (k=2)	Boundary effect:	
ConvF Y	4.7 ± 8.9% (k=2)	Alpha	0.99
ConvF Z	4.7 ± 8.9% (k=2)	Depth	1.81

Body 2450 MHz ε_r = 52.7 ± 5% σ = 1.95 ± 5% mho/m

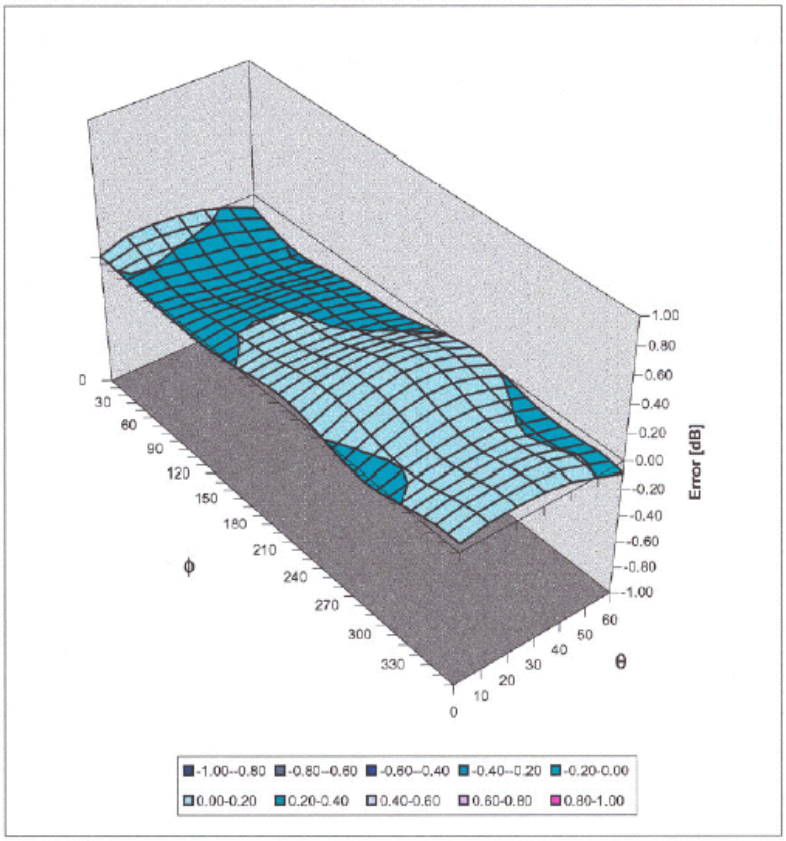
Valid for f=2400-2500 MHz with Body Tissue Simulating Liquid according to OET 65 Suppl. C

ConvF X	4.5 ± 8.9% (k=2)	Boundary effect:	
ConvF Y	4.5 ± 8.9% (k=2)	Alpha	1.01
ConvF Z	4.5 ± 8.9% (k=2)	Depth	1.74

ET3DV6 SN:1788 August 29, 2003

Deviation from Isotropy in HSL

Error (θ,ϕ), f = 900 MHz



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

Client **Sporton (Auden)**

CALIBRATION CERTIFICATE

Object(s)	DAE3 – SD 000 D03 AA – SN:577
Calibration procedure(s)	QA CAL-06.v4 Calibration procedure for the data acquisition unit (DAE)
Calibration date:	21.11.2003
Condition of the calibrated item	In Tolerance (according to the specific calibration document)

This calibration statement documents traceability of M&TE used in the calibration procedures and conformity of the procedures with the ISO/IEC 17025 international standard

All calibrations have been conducted in the closed laboratory facility: environment temperature 22 +/- 2 degrees Celsius and humidity < 75%.

Calibration Equipment used (M&TE critical for calibration)

Model Type	ID #	Cal Date	Scheduled Calibration
Fluke Process Calibrator Type 702	SN: 6295803	8-Sep-03	Sep-05

	Name	Function	Signature
Calibrated by:	Philipp Storchenegger	Technician	
Approved by:	Fin Bomholt	R&D Director	

Date issued: 21.11.2003

This calibration certificate is issued as an intermediate solution until the accreditation process (based on ISO/IEC 17025 International Standard) for Calibration Laboratory of Schmid & Partner Engineering AG is completed.

DAE3 SN: 577 DATE: 21.11.2003

1. Cal Lab. Incoming Inspection & Pre Test

Modification Status	Note Status here → → → →	BC
Visual Inspection	Note anomalies.....	None
	.....	.....
Pre Test	**Indication**	**Yes/No**
Probe Touch	Function	Yes
Probe Collision	Function	Yes
Probe Touch&Collision	Function	Yes

2. DC Voltage Measurement

A/D - Converter Resolution nominal

High Range: 1LSB = 6.1μV , full range = 400 mV

Low Range: 1LSB = 61nV , full range = 4 mV

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

Calibration Factors	**X**	**Y**	**Z**
High Range	404.434	403.889	404.352
Low Range	3.94303	3.94784	3.9501
Connector Angle to be used	in DASY System	127 °	

High Range	**Input**	**Reading in μV**	**% Error**
Channel X + Input	200mV	200000.6	0.00
	20mV	20000.9	0.00
Channel X - Input	20mV	-19992.7	-0.04
Channel Y + Input	200mV	200000.6	0.00
	20mV	19999.1	0.00
Channel Y - Input	20mV	-19994.7	-0.03
Channel Z + Input	200mV	199999.8	0.00
	20mV	19998.1	-0.01
Channel Z - Input	20mV	-19999.2	0.00

Low Range	**Input**	**Reading in μV**	**% Error**
Channel X + Input	2mV	1999.94	0.00
	0.2mV	199.08	-0.46
Channel X - Input	0.2mV	-200.24	0.12
Channel Y + Input	2mV	1999.98	0.00
	0.2mV	199.50	-0.25
Channel Y - Input	0.2mV	-200.80	0.40
Channel Z + Input	2mV	1999.98	0.00
	0.2mV	199.11	-0.44
Channel Z - Input	0.2mV	-201.12	0.56

DAE3 SN: 577 DATE: 21.11.2003

3. Common mode sensitivity

DASY measurement parameters:
Auto Zero Time: 3 sec, Measuring time: 3 sec
High/Low Range

in µV	Common mode Input Voltage	High Range Reading	Low Range Reading
Channel X	200mV	12.00	11.9
	- 200mV	-10.76	-12.44
Channel Y	200mV	-8.55	-8.51
	- 200mV	7.58	6.67
Channel Z	200mV	-0.86	-0.58
	- 200mV	-0.85	-0.77

4. Channel separation

DASY measurement parameters:
Auto Zero Time: 3 sec, Measuring time: 3 sec
High Range

in µV	Input Voltage	Channel X	Channel Y	Channel Z
Channel X	200mV	-	1.96	0.28
Channel Y	200mV	0.66	-	3.59
Channel Z	200mV	-0.89	-0.11	-

5.1 AD-Converter Values with Input Voltage set to 2.0 VDC

in Zero Low	Low Range Max - Min	Max.	Min
Channel X	17	16137	16120
Channel Y	27	16767	16740
Channel Z	8	15103	15077

5.2 AD-Converter Values with inputs shorted

in LSB	Low Range	High Range
Channel X	16134	15955
Channel Y	16740	15960
Channel Z	15093	16252

6. Input Offset Measurement

DAE3 SN: 577 DATE: 21.11.2003

DASY measurement parameters:
Auto Zero Time: 3 sec, Measuring time: 3 sec
Number of measurements: 100, Low Range

Input 10MΩ

in µV	Average	min. Offset	max. Offset	Std. Deviation
Channel X	-0.64	-1.84	0.71	0.49
Channel Y	-1.77	-3.93	0.94	0.58
Channel Z	-2.21	-3.14	-0.81	0.34

Input shorted

in µV	Average	min. Offset	max. Offset	Std. Deviation
Channel X	0.12	-1.34	1.45	0.69
Channel Y	-0.69	-1.39	0.30	0.26
Channel Z	-0.94	-1.58	-0.30	0.23

7. Input Offset Current

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

8. Input Resistance

In MOhm	Calibrating	Measuring
Channel X	0.2000	197.1
Channel Y	0.1999	200.3
Channel Z	0.2001	198.3

9. Low Battery Alarm Voltage

in V	Alarm Level
Supply (+ Vcc)	7.58
Supply (- Vcc)	-7.65

10. Power Consumption

in mA	Switched off	Stand by	Transmitting
Supply (+ Vcc)	0.00	5.65	13.7
Supply (- Vcc)	-0.01	-7.69	-8.97