

APPENDIX

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Appendix Photographs of Test Setup

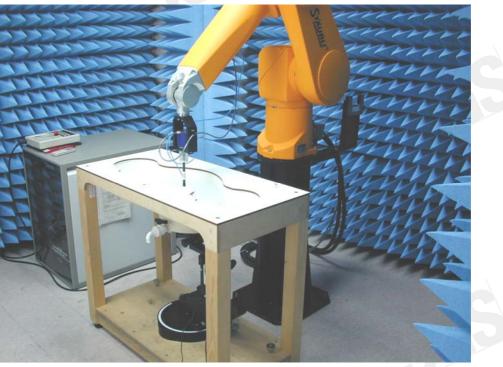


Fig.1 Photograph of the SAR measurement System

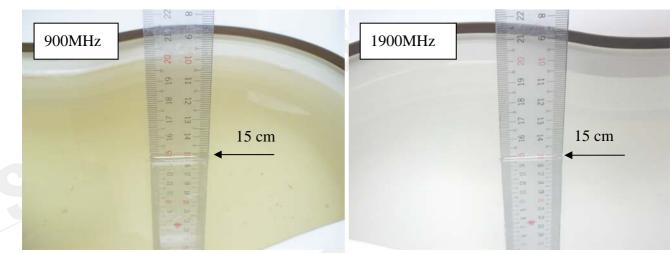


Fig.2.1 Photograph of the Tissue Simulant Fluid liquid depth 15cm for Left-head Side Fig.2.2 Photograph of the Tissue Simulant Fluid liquid depth 15cm for Right-head Side

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Fig.2.3 Photograph of the Tissue Simulant Fluid liquid depth 15cm for Flat (Body)

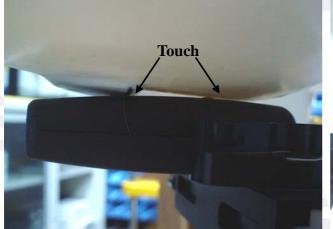


Fig.2.4 Photograph of the Tissue Simulant Fluid liquid depth 15cm for Flat (Body)

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Fig.3 Right Head Section / Cheek-Touch Position



Fig.4 Right Head Section / Ear-Tilt Position(15°)

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Fig.5 Left Head Section / Cheek-Touch Position



Fig.6 Left Head Section / Ear-Tilt Position(15°)

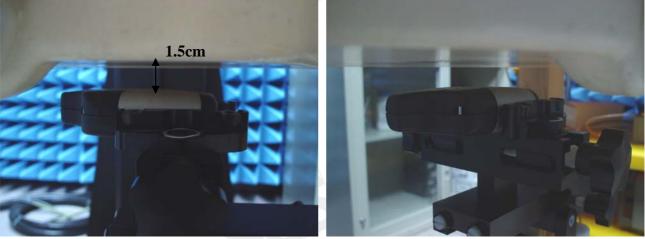


Fig.7 Body Position(Testing in GPRS mode)

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Fig.8 Front view of device



Fig.9 Back view of device

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Fig.10 Connected Charger

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Fig.12 Back view of Battery

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Accredited by the Swiss Federal Office of Metrology and Accreditation Accreditation No.: SCS 108 The Swiss Accreditation Service is one of the signatories to the EA Multilateral Agreement for the recognition of calibration certificates Client SGS (Auden) Certificate No: ET3-1759_Au CALIBRATION CERTIFICATE Certificate No: ET3-1759_Au	
CALIBRATION CERTIFICATE	ig05
Object ET3DV6 - SN:1759	
Calibration procedure(s) QA CAL-01.v5 Calibration procedure for dosimetric E-field probes	
Calibration date: August 30, 2005	
Condition of the calibrated item In Tolerance	
Calibration Equipment used (M&TE critical for calibration)	
Calibration Equipment used (M&TE critical for calibration) Primary Standards ID # Cal Date (Calibrated by, Certificate No.) Scheduled Ca	libration
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Calibration Laboratory of Schmid & Partner Engineering AG Zeughausstrasse 43, 8004 Zurich, Switzerland



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Accreditation No.: SCS 108

Accredited by the Swiss Federal Office of Metrology and Accreditation The Swiss Accreditation Service is one of the signatories to the EA Multilateral Agreement for the recognition of calibration certificates

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 9	9 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) CENELEC EN 50361, "Basic standard for the measurement of Specific Absorption Rate related to human exposure to electromagnetic fields from mobile phones (300 MHz - 3 GHz), July 2001

Methods Applied and Interpretation of Parameters:

- NORMx, y,z: Assessed for E-field polarization 9 = 0 (f ≤ 900 MHz in TEM-cell; f > 1800 MHz: R22 waveguide). NORMx, y,z are only intermediate values, i.e., the uncertainties of NORMx, y,z does not effect the E²-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.

Certificate No: ET3-1759_Aug05

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ET3DV6 SN:1759

August 30, 2005

Probe ET3DV6

SN:1759

Manufactured: Last calibrated: Repaired: Recalibrated: November 12, 2002 March 23, 2005 July 28, 2005 August 30, 2005

Calibrated for DASY Systems (Note: non-compatible with DASY2 system!)

Certificate No: ET3-1759_Aug05

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ET3DV6 SN:1759

August 30, 2005

DASY - Parameters of Probe: ET3DV6 SN:1759

Sensitivity in Free Space^A

Diode Compression^B

NormX	1.97 ± 10.1%	μ V/(V/m) ²	DCP X	93 mV
NormY	1.90 ± 10.1%	μV/(V/m) ²	DCP Y	93 mV
NormZ	1.93 ± 10.1%	μ V/(V/m) ²	DCP Z	93 mV

Sensitivity in Tissue Simulating Liquid (Conversion Factors)

Please see Page 8.

Boundary Effect

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	8.3	4.7
SAR _{be} [%]	With Correction Algorithm	0.0	0.2

TSL

TSL

1810 MHz Typical SAR gradient: 10 % per mm

Sensor Cente	r to Phantom Surface Distance	3.7 mm	4.7 mm
SAR _{be} [%]	Without Correction Algorithm	13.4	9.2
SAR _{be} [%]	With Correction Algorithm	0.8	0.2

Sensor Offset

Probe Tip to Sensor Center

2.7 mm

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

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

^B Numerical linearization parameter: uncertainty not required.

Certificate No: ET3-1759_Aug05

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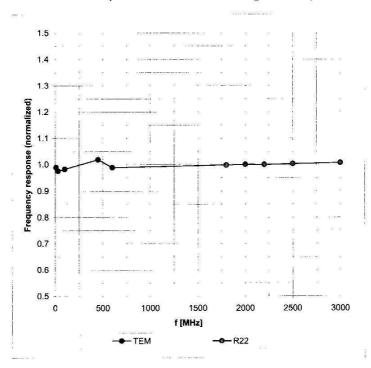
Report No. : ES/2005/C0006 Page : 12 of 21

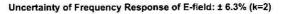
ET3DV6 SN:1759

August 30, 2005

Frequency Response of E-Field

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





Certificate No: ET3-1759_Aug05

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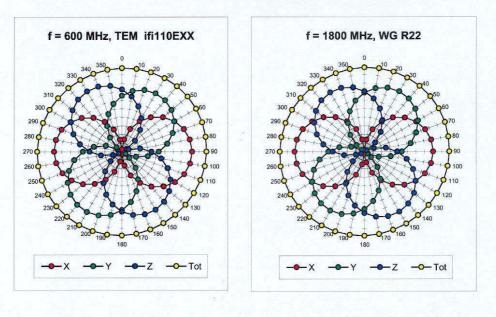
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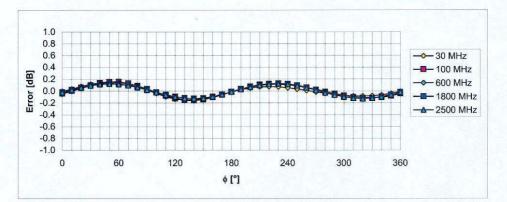
Report No. : ES/2005/C0006 Page : 13 of 21

ET3DV6 SN:1759

August 30, 2005



Receiving Pattern (ϕ **),** ϑ = 0°



⁴ Uncertainty of Axial Isotropy Assessment: ± 0.5% (k=2)

Certificate No: ET3-1759_Aug05

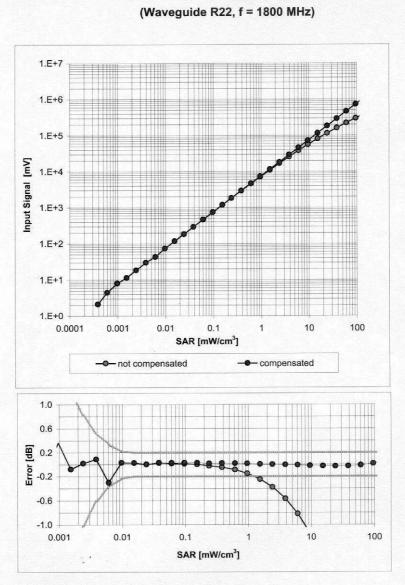
Page 6 of 9

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ET3DV6 SN:1759

August 30, 2005



Dynamic Range f(SAR_{head})

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

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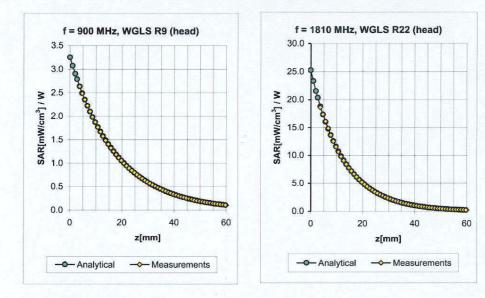
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ET3DV6 SN:1759

August 30, 2005



Conversion Factor Assessment

f [MHz]	Validity [MHz] ^c	TSL	Permittivity	Conductivity	Alpha	Depth	ConvF Uncertainty
900	± 50 / ± 100	Head	41.5 ± 5%	0.97 ± 5%	0.48	2.00	6.15 ± 11.0% (k=2)
1810	± 50 / ± 100	Head	40.0 ± 5%	1.40 ± 5%	0.58	2.42	5.11 ± 11.0% (k=2)
2000	± 50 / ± 100	Head	40.0 ± 5%	1.40 ± 5%	0.58	2.56	4.72 ± 11.0% (k=2)
2450	± 50 / ± 100	Head	39.2 ± 5%	1.80 ± 5%	0.69	2.15	4.39 ± 11.8% (k=2)
900	± 50 / ± 100	Body	55.0 ± 5%	1.05 ± 5%	0.46	2.16	5.93 ± 11.0% (k=2)
1750	± 50 / ± 100	Body	53.4 ± 5%	1.49 ± 5%	0.53	2.87	4.40 ± 11.0% (k=2)
1900	± 50 / ± 100	Body	53.3 ± 5%	1.52 ± 5%	0.53	2.98	4.33 ± 11.0% (k=2)
2000	± 50 / ± 100	Body	53.3 ± 5%	1.52 ± 5%	0.59	2.54	4.20 ± 11.0% (k=2)
2450	± 50 / ± 100	Body	52.7 ± 5%	1.95 ± 5%	0.70	1.95	4.08 ± 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.

Certificate No: ET3-1759_Aug05

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Uncertainty Analysis

	Uncertainty	Prob.	Div.	(c_i)	(c_i)	Std. Unc.	Std. Unc.	(v_i)
Error Description	value	Dist.		1g	10g	(1g)	(10g)	v_{eff}
Measurement System								
Probe Calibration	$\pm 4.8 \%$	Ν	1	1	1	$\pm 4.8\%$	$\pm 4.8 \%$	∞
Axial Isotropy	$\pm 4.7 \%$	R	$\sqrt{3}$	0.7	0.7	$\pm 1.9\%$	$\pm 1.9 \%$	∞
Hemispherical Isotropy	$\pm 9.6~\%$	R	$\sqrt{3}$	0.7	0.7	$\pm 3.9\%$	$\pm 3.9\%$	∞
Boundary Effects	$\pm 1.0 \%$	R	$\sqrt{3}$	1	1	$\pm 0.6\%$	$\pm 0.6 \%$	∞
Linearity	$\pm 4.7 \%$	R	$\sqrt{3}$	1	1	$\pm 2.7\%$	$\pm 2.7 \%$	∞
System Detection Limits	$\pm 1.0 \%$	R	$\sqrt{3}$	1	1	$\pm 0.6\%$	$\pm 0.6 \%$	∞
Readout Electronics	$\pm 1.0 \%$	Ν	1	1	1	$\pm 1.0 \%$	$\pm 1.0 \%$	∞
Response Time	$\pm 0.8 \%$	R	$\sqrt{3}$	1	1	$\pm 0.5\%$	$\pm 0.5\%$	∞
Integration Time	$\pm 2.6 \%$	R	$\sqrt{3}$	1	1	$\pm 1.5\%$	$\pm 1.5 \%$	∞
RF Ambient Conditions	$\pm 3.0 \%$	R	$\sqrt{3}$	1	1	$\pm 1.7\%$	$\pm 1.7 \%$	∞
Probe Positioner	$\pm 0.4 \%$	R	$\sqrt{3}$	1	1	$\pm 0.2 \%$	$\pm 0.2 \%$	∞
Probe Positioning	$\pm 2.9 \%$	R	$\sqrt{3}$	1	1	$\pm 1.7\%$	$\pm 1.7 \%$	∞
Max. SAR Eval.	$\pm 1.0 \%$	R	$\sqrt{3}$	1	1	$\pm 0.6\%$	$\pm 0.6 \%$	∞
Test Sample Related								
Device Positioning	$\pm 2.9 \%$	Ν	1	1	1	$\pm 2.9\%$	$\pm 2.9 \%$	875
Device Holder	$\pm 3.6~\%$	Ν	1	1	1	$\pm 3.6\%$	$\pm 3.6\%$	5
Power Drift	$\pm 5.0 \%$	R	$\sqrt{3}$	1	1	$\pm 2.9 \%$	$\pm 2.9 \%$	∞
Phantom and Setup								
Phantom Uncertainty	$\pm 4.0\%$	R	$\sqrt{3}$	1	1	$\pm 2.3\%$	$\pm 2.3 \%$	∞
Liquid Conductivity (target)	$\pm 5.0 \%$	R	$\sqrt{3}$	0.64	0.43	$\pm 1.8\%$	$\pm 1.2 \%$	∞
Liquid Conductivity (meas.)	$\pm 2.5 \%$	Ν	1	0.64	0.43	$\pm 1.6\%$	$\pm 1.1 \%$	∞
Liquid Permittivity (target)	$\pm 5.0 \%$	R	$\sqrt{3}$	0.6	0.49	$\pm 1.7\%$	$\pm 1.4 \%$	∞
Liquid Permittivity (meas.)	$\pm 2.5 \%$	Ν	1	0.6	0.49	$\pm 1.5\%$	$\pm 1.2 \%$	∞
Combined Std. Uncertainty						$\pm 10.3\%$	$\pm 10.0 \%$	331
Expanded STD Uncertain	ty	1				$\pm 20.6\%$	$\pm 20.1\%$	

DASY4 Uncertainty Budget According to IEEE P1528 [1]

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Phantom description

Schmid & Partne Engineering AG

Zaughausstrasse 43, 8004 Zurich, Switzerland, Phone +41 1 245 97 00, Fax +41 1 245 67

Certificate of conformity / First Article Inspection

Item	SAM Twin Phantom V4.0		
Туре No	QD 000 P40 CA		
Series No	TP-1150 and higher	<u> </u>	
Manufacturer / Origin	Untersee Composites Hauptstr. 69 CH-8559 Fruthwilen Switzerland		

Tests

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The series production process used allows the limitation to test of first articles. Complete tests were made on the pre-series Type No. QD 000 P40 AA, Serial No. TP-1001 and on the series first article Type No. QD 000 P40 BA, Serial No. TP-1006. Certain parameters have been retested using further series units (called samples).

		Details	Units tested
Test Shape	Requirement Compliance with the geometry	IT'IS CAD File (*)	First article, Samples
Material thickness	according to the CAD model. Compliant with the requirements	2mm +/- 0.2mm in specific areas	First article, Samples
Material parameters	according to the standards Dielectric parameters for required frequencies	200 MHz – 3 GHz Relative permittivity < 5 Loss tangent < 0.05.	Material sample TP 104-5
Material resistivity	The material has been tested to be compatible with the liquids defined in the standards	Liquid type HSL 1800 and others according to the standard.	Pre-series, First article

Standards

CENELEC EN 50361

IEEE P1528-200x draft 6.5

*IEC PT 62209 draft 0.9 Ì3

The IT'IS CAD file is derived from [2] and is also within the tolerance requirements of the shapes of [1] and [3].

Conformity

Based on the sample tests above, we certify that this item is in compliance with the uncertainty requirements of SAR measurements specified in standard [1] and draft standards [2] and [3].

Date

28.02.2002

Signature / Stamp

F. Bombult

Schmid & Partner Engineering AG 43, CH-8004 2 1 245 97 79

Doc No 881-00 000 P40 CA -8

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Paoe



System Validation from Original equipment supplier SPEAG Schmid & Partner of GSM 900MHz & 1900MHz (HSL& Muscle)

DASY4 Validation Report for Head TSL

Date/Time: 06.02.2006 15:37:06

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole 900 MHz; Type: D900V2; Serial: D900V2 - SN:178

Communication System: CW-900; Frequency: 900 MHz; Duty Cycle: 1:1 Medium: HSL U10 BB; Medium parameters used: f = 900 MHz; σ = 0.96 mho/m; ϵ_r = 42.7; ρ = 1000 kg/m³ Phantom section: Flat Section Measurement Standard: DASY4 (High Precision Assessment)

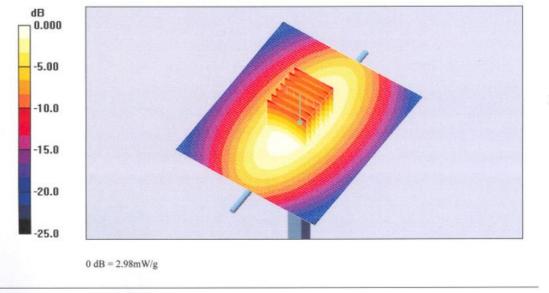
DASY4 Configuration:

- Probe: ET3DV6 SN1507 (HF); ConvF(5.8, 5.8, 5.8); Calibrated: 28.10.2005
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 15.12.2005
- Phantom: Flat Phantom 4.9L; Type: QD000P49AA
- Measurement SW: DASY4, V4.6 Build 47; Postprocessing SW: SEMCAD, V1.8 Build 160

Pin = 250 mW; d = 10 mm/Area Scan (71x81x1):

Measurement grid: dx=15mm, dy=15mm Maximum value of SAR (interpolated) = 2.98 mW/g

Pin = 250 mW; d = 10 mm/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm Reference Value = 58.5 V/m; Power Drift = -0.123 dB Peak SAR (extrapolated) = 4.15 W/kg SAR(1 g) = 2.75 mW/g; SAR(10 g) = 1.77 mW/g Maximum value of SAR (measured) = 2.98 mW/g



Certificate No: D900V2-178_Feb06

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DASY4 Validation Report for Body TSL

Date/Time: 07.02.2006 16:55:51

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole 900 MHz; Type: D900V2; Serial: D900V2 - SN:178

Communication System: CW900; Frequency: 900 MHz; Duty Cycle: 1:1 Medium: MSL U10; Medium parameters used: f = 900 MHz; $\sigma = 1$ mho/m; $\epsilon_r = 56.6$; $\rho = 1000$ kg/m³ Phantom section: Flat Section Measurement Standard: DASY4 (High Precision Assessment) DASY4 Configuration:

• Probe: ET3DV6 - SN1507 (HF); ConvF(5.76, 5.76, 5.76); Calibrated: 28.10.2005

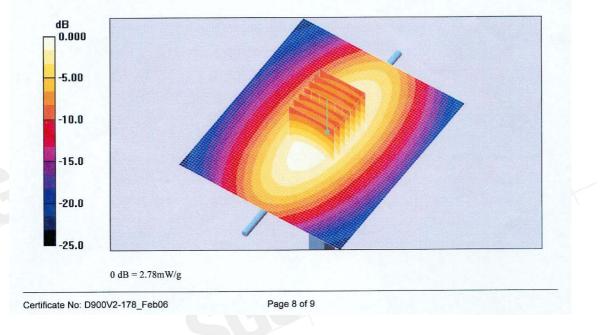
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 15.12.2005
- Phantom: Flat Phantom 4.9L; Type: QD000P49AA
- Measurement SW: DASY4, V4.6 Build 47; Postprocessing SW: SEMCAD, V1.8 Build 160

Pin = 250 mW; d = 10 mm/Area Scan (71x81x1):

Measurement grid: dx=15mm, dy=15mm Maximum value of SAR (interpolated) = 2.81 mW/g

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

Measurement grid: dx=5mm, dy=5mm, dz=5mm Reference Value = 55.0 V/m; Power Drift = -0.020 dB Peak SAR (extrapolated) = 3.70 W/kg SAR(1 g) = 2.57 mW/g; SAR(10 g) = 1.69 mW/g Maximum value of SAR (measured) = 2.78 mW/g



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DASY4 Validation Report for Head TSL

Date/Time: 14.03.2006 15:20:51

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole 1900 MHz; Type: D1900V2; Serial: D1900V2 - SN:5d027

Communication System: CW; Frequency: 1900 MHz;Duty Cycle: 1:1 Medium: HSL U10 BB; Medium parameters used: f = 1900 MHz; o = 1.42 mho/m; c_t = 39.4; p = 1000 kg/m³ Phantom section: Flat Section Measurement Standard: DASY4 (High Precision Assessment)

DASY4 Configuration:

- Proba: ET3DV6 SNL507 (HF); ConsF(4.34, 4.74, 4.74); Calibrated: 28.10.2005
- Sensor-Serface: 4mm (Mechanical Sorface Detection)
- Electronics: DAG4 Sar601; Calibrated: 15.13.2005
- Phantom: Plat Phantom 5.0 (boat); Type: QD000P50AA; ;
- Monument SW: DASY4, V4.7 Build 14; Postprocessing SW: SEMCAD, V1.8 Build 165

Pin = 250 mW; d = 10 mm/Area Sean (71x71x1); Measurement grid: dx=15mm, dy=15mm Maximum value of SAR (interpolated) = 11.9 mW/g

Pin = 250 mW; d = 10 mm/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 96.0 V/m; Power Drifi = -0.001 dB Peak SAR (extrapolated) = 17.1 W/kg SAR(1 g) = 9.97 mW/g; SAR(10 g) = 5.25 mW/g Maximum value of SAR (measured) = 11.3 mW/g



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DASY4 Validation Report for Body TSL

Date/Time: 21.03.2006 12:56:12

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole 1900 MHz; Type: D1900V2; Serial: D1900V2 - SN:5d027

Communication System: CW; Frequency: 1900 MHz;Duty Cycle: 1:1 Medium: MSL U10; Medium parameters used: l' = 1900 MHz; $\sigma = 1.54$ mho/m; $v_s = 54.7$; $\rho = 1000$ kg/m³ Phantom section: Flat Section Measurement Standard: DASY4 (High Precision Assessment)

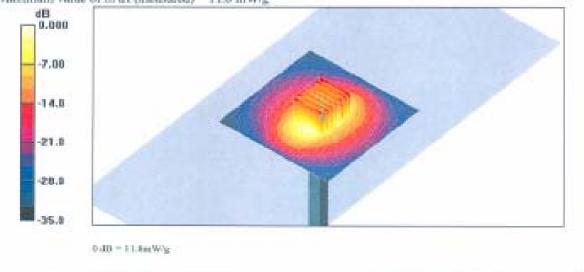
DASY4 Configuration:

- Proba: ET3DV8 SN1597 (HP); Coard7(4.3, 4.3, 4.3); Calibrated: 28.10.2015
- Sensor-Surface: Anon (Mechanical Surface Detection)
- Electronics: DAE4 Sa601; Calibrated 15.12.2005
- Phantom: Flat Phantom 5.0 (Bront); Type: QD000P58AA; ;
- Monument SW: DASY4, V4.6 Build 23; Posperoensing SW: SEMEAD, V1.8 Build 161

Pin = 250 mW; d = 10 mm 2/Area Scan (71x71x1): Measurement grid: dx=15mm, dy=15mm. Maximum value of SAR (interpolated) = 12.1 mW/g

Pin = 250 mW; d = 10 mm 2/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx-5mm, dy-5mm, dz~5mm

Reference Value = 90.5 V/m; Power Drift = 0.045 dB Peak SAR (extrapolated) = 17.7 W/kg SAR(1 g) = 10.3 mW/g; SAR(10 g) = 5.5 mW/g Maximum value of SAR (measured) = 11.8 mW/g



Certificate No: D1900V2-6d027_Mar06

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