APPENDIX B - SYSTEM PERFORMANCE CHECK

835MHz body Validation

Date/Time: 1/03/2007 7:16:51 AM

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

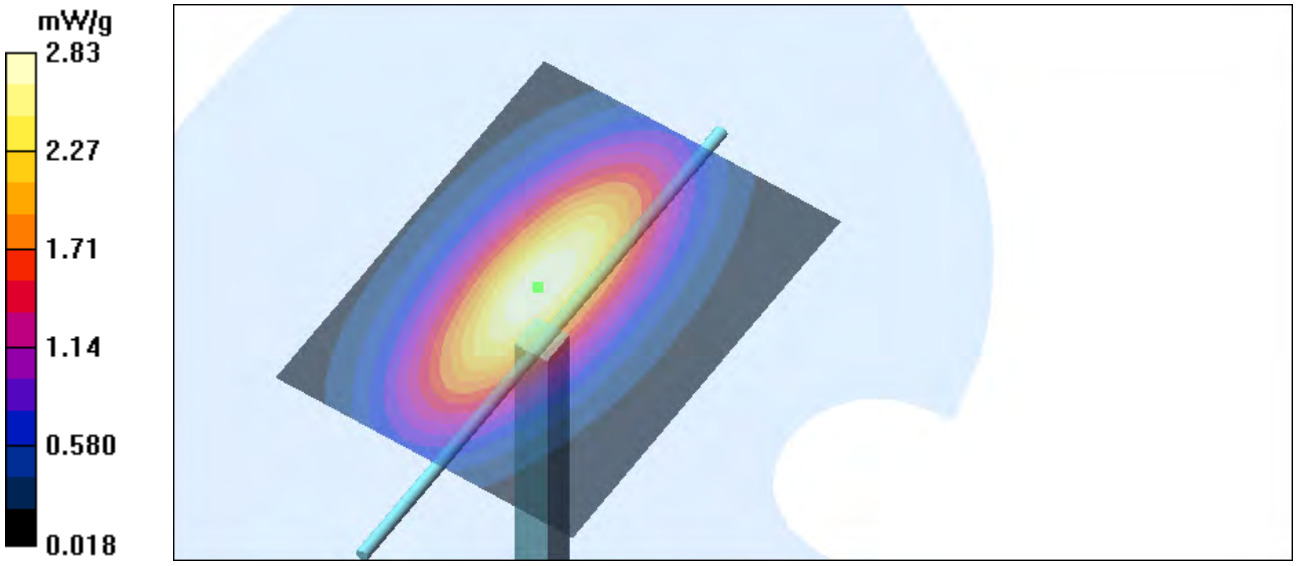
Medium Notes: Ambient Temp: 23.0 deg C; Fluid Temp: 21.0 deg C

Communication System: CW; ; Frequency: 835 MHz;Duty Cycle: 1:1
Medium: M835 Medium parameters used: f = 835 MHz; σ = 0.97 mho/m; ε_r = 55.2; ρ = 1000 kg/m^3
Phantom section: Flat Section

- Probe: EX3DV3 - SN3511; ConvF(9.55, 9.55, 9.55); Calibrated: 1/23/2006
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn584; Calibrated: 9/22/2005
- Phantom: SAM with CRP; Type: SAM; Serial: TP 1310
- Measurement SW: DASY4, V4.7 Build 53; Postprocessing SW: SEMCAD, V1.8 Build 172

Validation/Area Scan (61x81x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 2.83 mW/g

Validation/Zoom Scan (7x7x7) (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 54.4 V/m; Power Drift = -0.003 dB
Peak SAR (extrapolated) = 3.95 W/kg
SAR(1 g) = 2.66 mW/g; SAR(10 g) = 1.76 mW/g
Maximum value of SAR (measured) = 2.87 mW/g



1900MHz body validation

Date/Time: 01/02/2007 7:07:04 AM

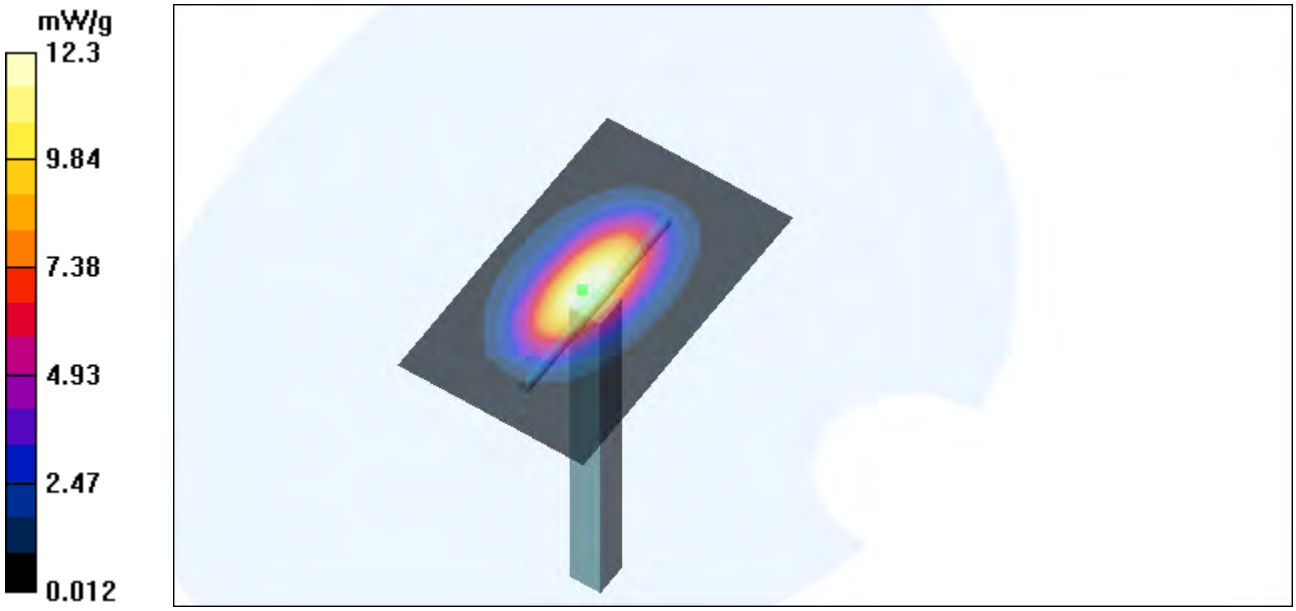
DUT: 1900 MHz validation dipole; Type: Dipole; Serial: 001

Communication System: CW; ; Frequency: 1900 MHz;Duty Cycle: 1:1
Medium: M1900 Medium parameters used: f = 1900 MHz; σ = 1.57 mho/m; ε_r = 55.6; ρ = 1000 kg/m^3
Phantom section: Flat Section

- Probe: EX3DV3 - SN3511; ConvF(8.14, 8.14, 8.14); Calibrated: 1/23/2006
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn584; Calibrated: 9/22/2005
- Phantom: SAM with CRP; Type: SAM; Serial: TP 1310
- Measurement SW: DASY4, V4.7 Build 44; Postprocessing SW: SEMCAD, V1.8 Build 171

Area Scan (61x101x1): Measurement grid: dx=10mm, dy=10mm
Maximum value of SAR (interpolated) = 12.3 mW/g

Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 87.6 V/m; Power Drift = -0.02 dB
Peak SAR (extrapolated) = 19.9 W/kg
SAR(1 g) = 10.9 mW/g; SAR(10 g) = 5.62 mW/g
Maximum value of SAR (measured) = 12.3 mW/g



Validation 2450MHz Body

Date/Time: 12/28/2006 12:36:57 PM

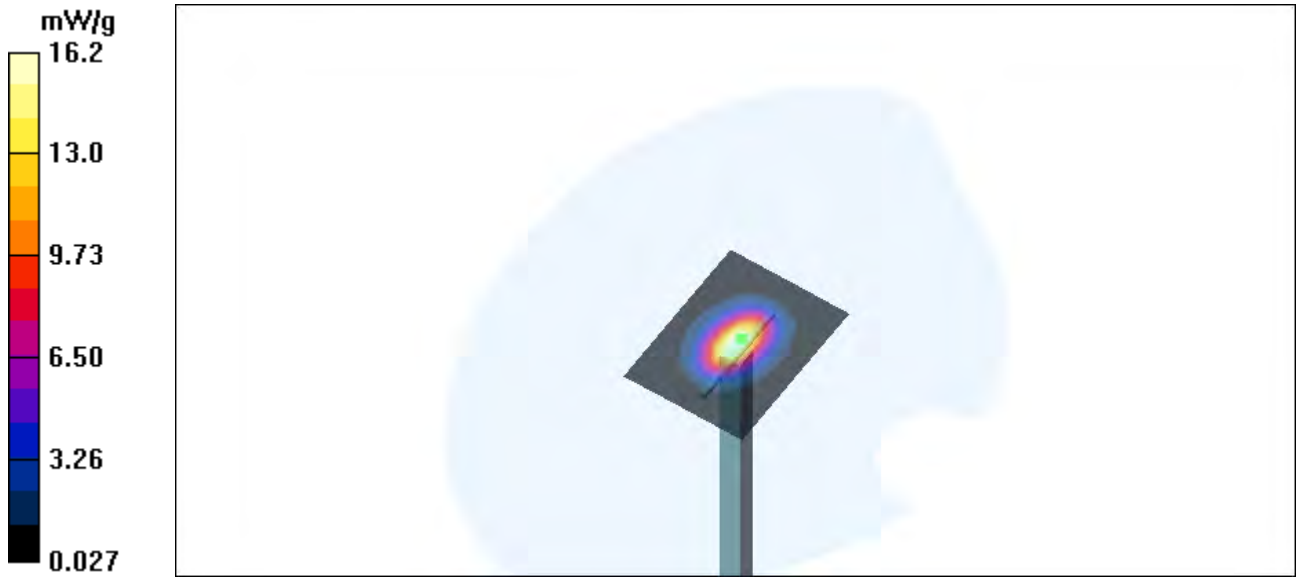
DUT: Dipole 2450 MHz; Type: D2450V2; Serial: 1S2452

Communication System: CW; ; Frequency: 2450 MHz;Duty Cycle: 1:1
Medium: M2450 Medium parameters used: f = 2450 MHz; σ = 2.04 mho/m; ε_r = 54.5; ρ = 1000 kg/m^3
Phantom section: Flat Section

Probe: EX3DV3 - SN3511; ConvF(7.8, 7.8, 7.8); Calibrated: 1/23/2006
Sensor-Surface: 4mm (Mechanical Surface Detection)
Electronics: DAE3 Sn584; Calibrated: 9/22/2005
Phantom: SAM with CRP; Type: SAM; Serial: TP 1310
Measurement SW: DASY4, V4.7 Build 44; Postprocessing SW: SEMCAD, V1.8 Build 171

Area Scan (61x81x1): Measurement grid: dx=10mm, dy=10mm
Maximum value of SAR (interpolated) = 16.2 mW/g

Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 88.7 V/m; Power Drift = -0.010 dB
Peak SAR (extrapolated) = 28.6 W/kg
SAR(1 g) = 13.9 mW/g; SAR(10 g) = 6.36 mW/g
Maximum value of SAR (measured) = 15.8 mW/g



5200MHz Validation

Date/Time: 12/28/2006 7:57:49 AM

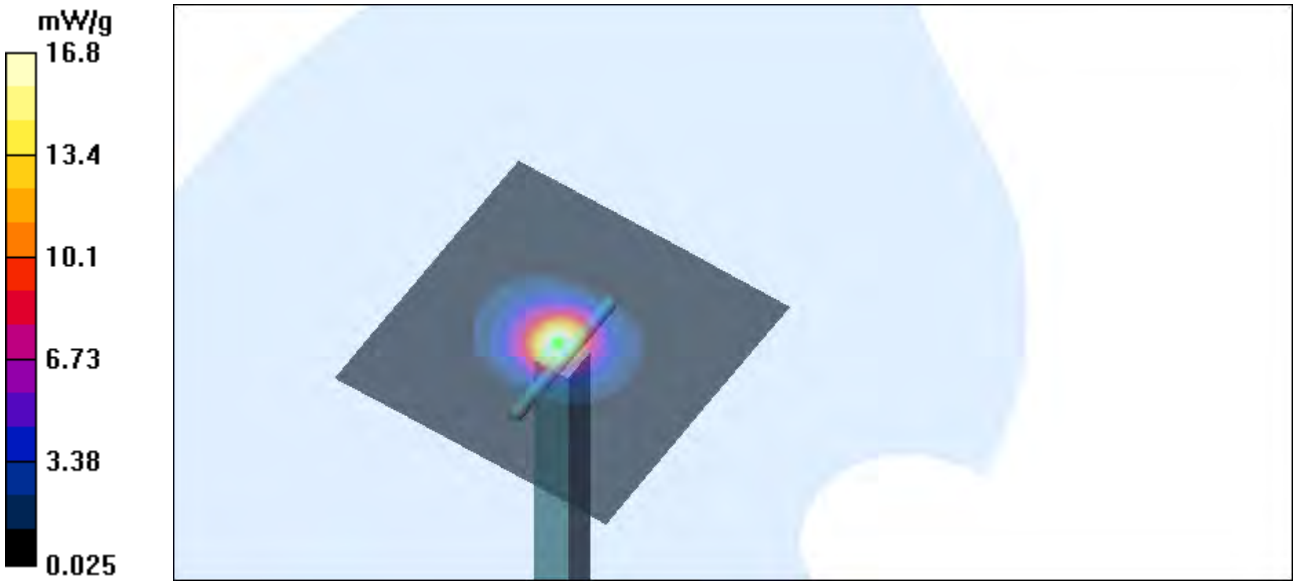
DUT: Dipole 5500 MHz; Type: D5500V2; Serial: D5500V2 - SN:001

Communication System: CW; ; Frequency: 5200 MHz;Duty Cycle: 1:1
Medium: 5500 MHz Body Medium parameters used: f = 5200 MHz; σ = 5.37 mho/m; ε_r = 48.2; ρ = 1000 kg/m^3
Phantom section: Flat Section

- Probe: EX3DV3 - SN3511; ConvF(4.68, 4.68, 4.68); Calibrated: 1/23/2006
- Sensor-Surface: 4mm (Mechanical Surface Detection)Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn584; Calibrated: 9/22/2005
- Phantom: SAM with CRP; Type: SAM; Serial: TP 1310
- Measurement SW: DASY4, V4.7 Build 44; Postprocessing SW: SEMCAD, V1.8 Build 172

Area Scan (81x81x1): Measurement grid: dx=10mm, dy=10mm
Maximum value of SAR (interpolated) = 16.8 mW/g

Zoom Scan (9x9x9)/Cube 0: Measurement grid: dx=4.3mm, dy=4.3mm, dz=3mm
Reference Value = 54.9 V/m; Power Drift = 0.07 dB
Peak SAR (extrapolated) = 77.0 W/kg
SAR(1 g) = 17 mW/g; SAR(10 g) = 5.13 mW/g
Maximum value of SAR (measured) = 32.1 mW/g



5800MHz Validation

Date/Time: 12/27/2006 7:23:39 AM

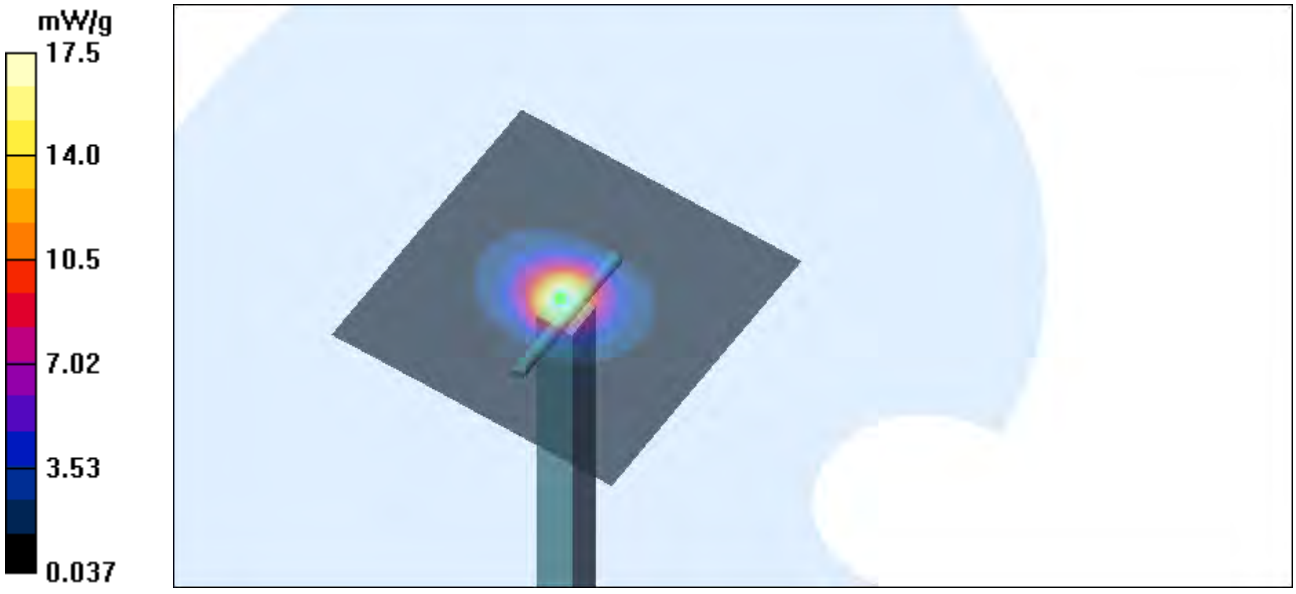
DUT: Dipole 5500 MHz; Type: D5500V2; Serial: D5500V2 - SN:001

Communication System: CW; ; Frequency: 5800 MHz;Duty Cycle: 1:1
Medium: 5500 MHz Body Medium parameters used: f = 5800 MHz; σ = 6.39 mho/m; ε_r = 48.4; ρ = 1000 kg/m^3
Phantom section: Flat Section

- Probe: EX3DV3 - SN3511; ConvF(4.1, 4.1, 4.1); Calibrated: 1/23/2006
- Sensor-Surface: 4mm (Mechanical Surface Detection)Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn584; Calibrated: 9/22/2005
- Phantom: SAM with CRP; Type: SAM; Serial: TP 1310
- Measurement SW: DASY4, V4.7 Build 53; Postprocessing SW: SEMCAD, V1.8 Build 172

Area Scan (81x81x1): Measurement grid: dx=10mm, dy=10mm
Maximum value of SAR (interpolated) = 17.5 mW/g

Zoom Scan (9x9x9)/Cube 0: Measurement grid: dx=4.3mm, dy=4.3mm, dz=3mm
Reference Value = 53.4 V/m; Power Drift = 0.14 dB
Peak SAR (extrapolated) = 73.0 W/kg
SAR(1 g) = 16.8 mW/g; SAR(10 g) = 5.18 mW/g
Maximum value of SAR (measured) = 32.8 mW/g



APPENDIX C – PROBE CALIBRATION CERTIFICATE

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

S Schweizerischer Kalibrierdienst
C Service suisse d'étalonnage
S Servizio svizzero di taratura
S Swiss Calibration Service

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

Accreditation No.: SCS 108

Client **MET Laboratories**

Certificate No: EX3-3511_Jan06

CALIBRATION CERTIFICATE

Object	EX3DV3 - SN:3511
Calibration procedure(s)	QA CAL-01.v5 and QA CAL-14.v3 Calibration procedure for dosimetric E-field probes
Calibration date:	January 23, 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 E4419B	GB41293874	3-May-05 (METAS, No. 251-00466)	May-06
Power sensor E4412A	MY41495277	3-May-05 (METAS, No. 251-00466)	May-06
Power sensor E4412A	MY41498087	3-May-05 (METAS, No. 251-00466)	May-06
Reference 3 dB Attenuator	SN: S5054 (3c)	11-Aug-05 (METAS, No. 251-00499)	Aug-06
Reference 20 dB Attenuator	SN: S5086 (20b)	3-May-05 (METAS, No. 251-00467)	May-06
Reference 30 dB Attenuator	SN: S5129 (30b)	11-Aug-05 (METAS, No. 251-00500)	Aug-06
Reference Probe ES3DV2	SN: 3013	2-Jan-06 (SPEAG, No. ES3-3013_Jan06)	Jan-07
DAE4	SN: 654	27-Oct-05 (SPEAG, No. DAE4-654_Oct05)	Oct-06

Secondary Standards	ID #	Check Date (in house)	Scheduled Check
RF generator HP 8648C	US3642U01700	4-Aug-99 (SPEAG, in house check Nov-05)	In house check: Nov-07
Network Analyzer HP 8753E	US37390585	18-Oct-01 (SPEAG, in house check Nov-05)	In house check: Nov 06

	Name	Function	Signature
Calibrated by:	Katja Pokovic	Technical Manager	
Approved by:	Niels Kuster	Quality Manager	

Issued: January 23, 2006

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

S Schweizerischer Kalibrierdienst
C Service suisse d'étalonnage
S Servizio svizzero di taratura
S Swiss Calibration Service

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

Accreditation No.: SCS 108

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) 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 $\vartheta = 0$ ($f \leq 900$ 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 EX3DV3

SN:3511

Manufactured:	December 15, 2003
Last calibrated:	January 23, 2004
Recalibrated:	January 23, 2006

Calibrated for DASY Systems

(Note: non-compatible with DASY2 system!)

DASY - Parameters of Probe: EX3DV3 SN:3511

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

NormX	**0.770** ± 10.1%	$\mu V/(V/m)^2$	DCP X	**96** mV
NormY	**0.606** ± 10.1%	$\mu V/(V/m)^2$	DCP Y	**96** mV
NormZ	**0.634** ± 10.1%	$\mu V/(V/m)^2$	DCP Z	**96** 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		**2.0 mm**	**3.0 mm**
SAR_{be} [%]	Without Correction Algorithm	3.3	1.3
SAR_{be} [%]	With Correction Algorithm	0.2	0.4

TSL **1810 MHz** **Typical SAR gradient: 10 % per mm**

Sensor Center to Phantom Surface Distance		**2.0 mm**	**3.0 mm**
SAR_{be} [%]	Without Correction Algorithm	2.5	1.3
SAR_{be} [%]	With Correction Algorithm	0.4	0.4

Sensor Offset

Probe Tip to Sensor Center	**1.0** mm

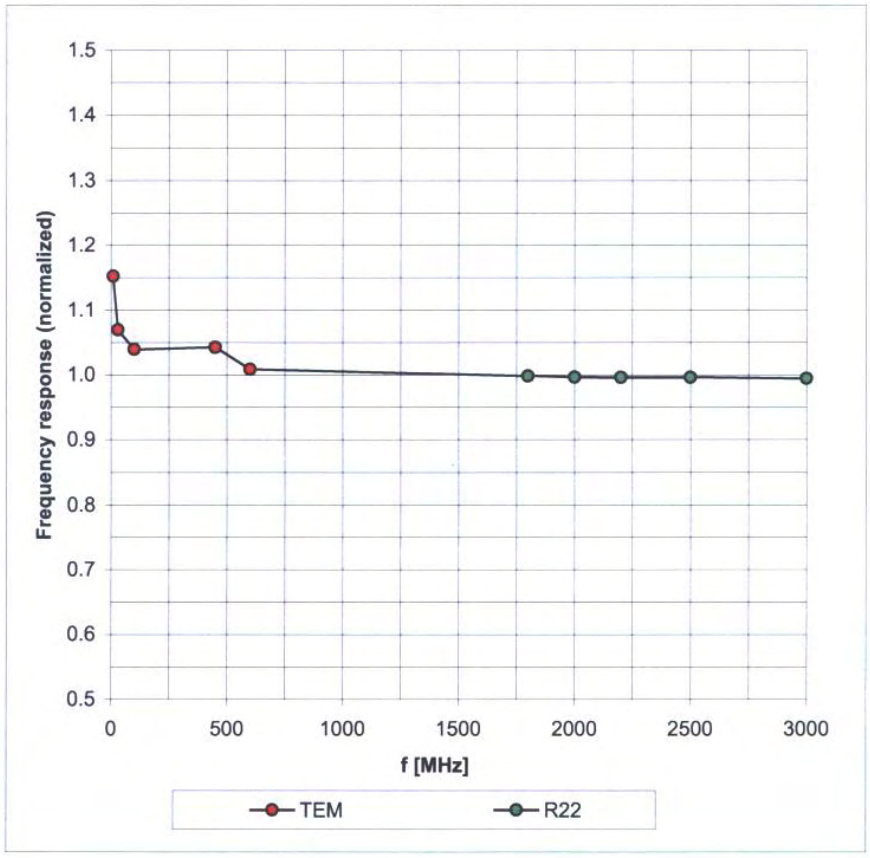
The reported uncertainty of measurement is stated as the standard uncertainty of measurement multiplied by the coverage factor k=2, which for a normal distribution corresponds to a coverage probability of approximately 95%.

[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.

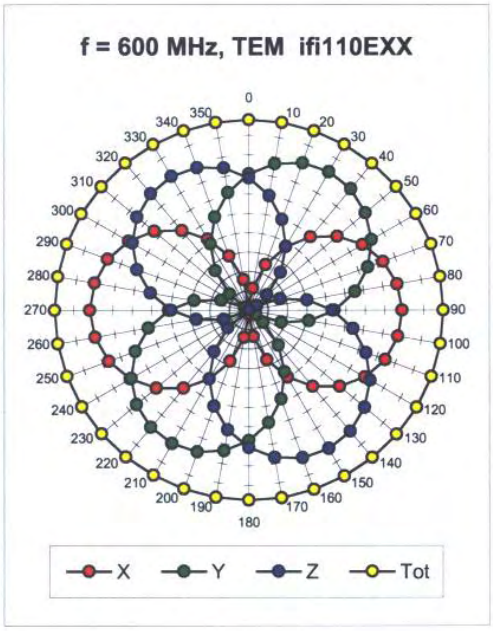
Frequency Response of E-Field

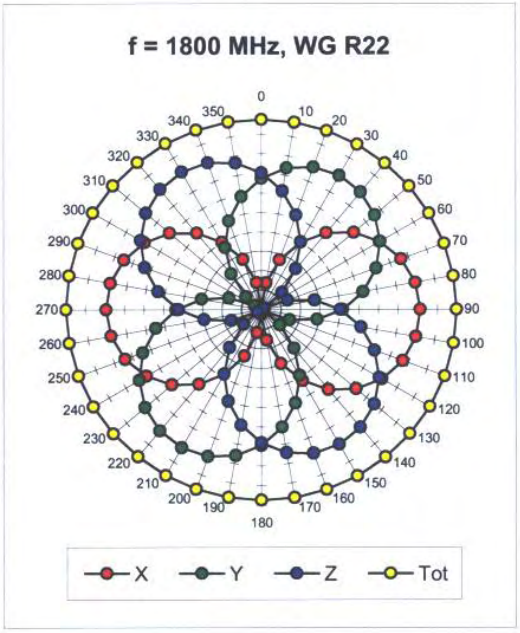
(TEM-Cell:ifi110 EXX, Waveguide: R22)

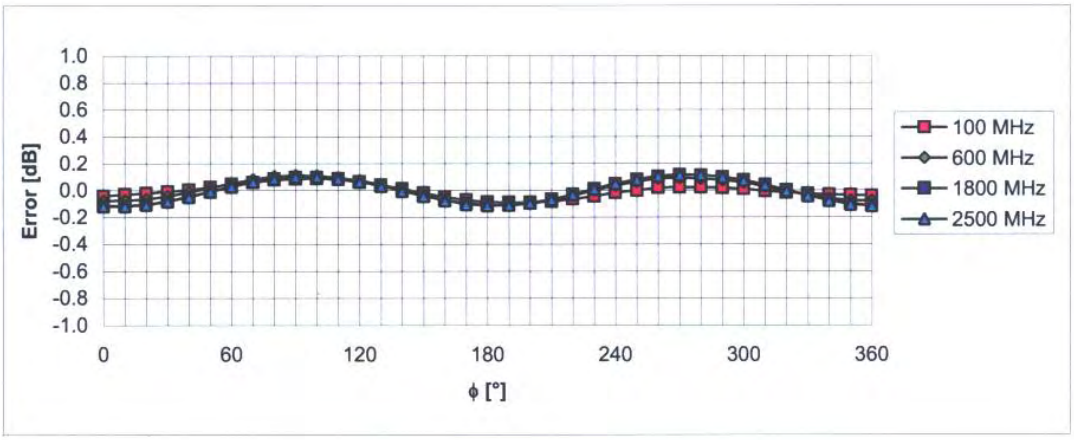


Uncertainty of Frequency Response of E-field: ± 6.3% (k=2)

Receiving Pattern (ϕ), ϑ = 0°



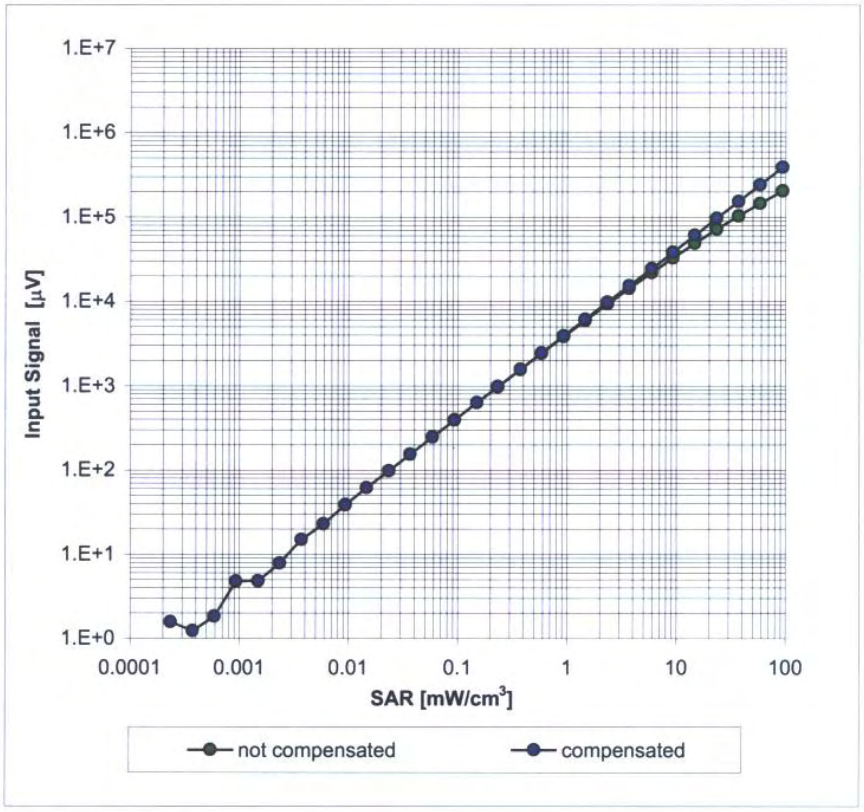


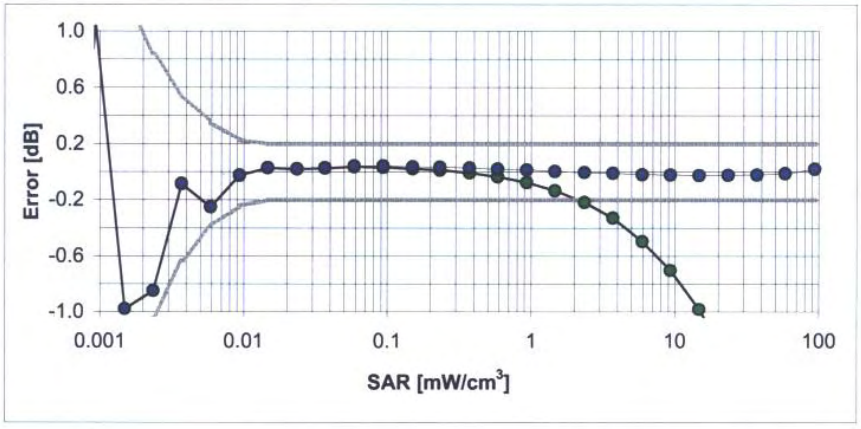


Uncertainty of Axial Isotropy Assessment: ± 0.5% (k=2)

Dynamic Range f(SAR_{head})

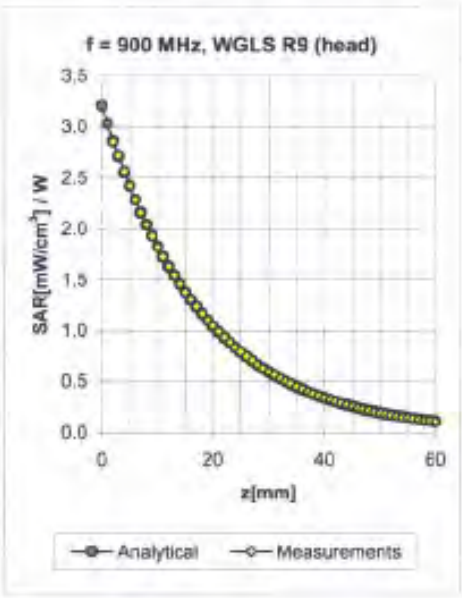
(Waveguide R22, f = 1800 MHz)

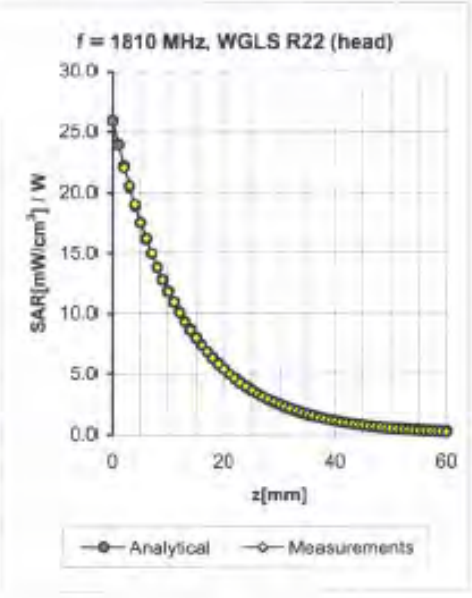




Uncertainty of Linearity Assessment: ± 0.6% (k=2)

Conversion Factor Assessment



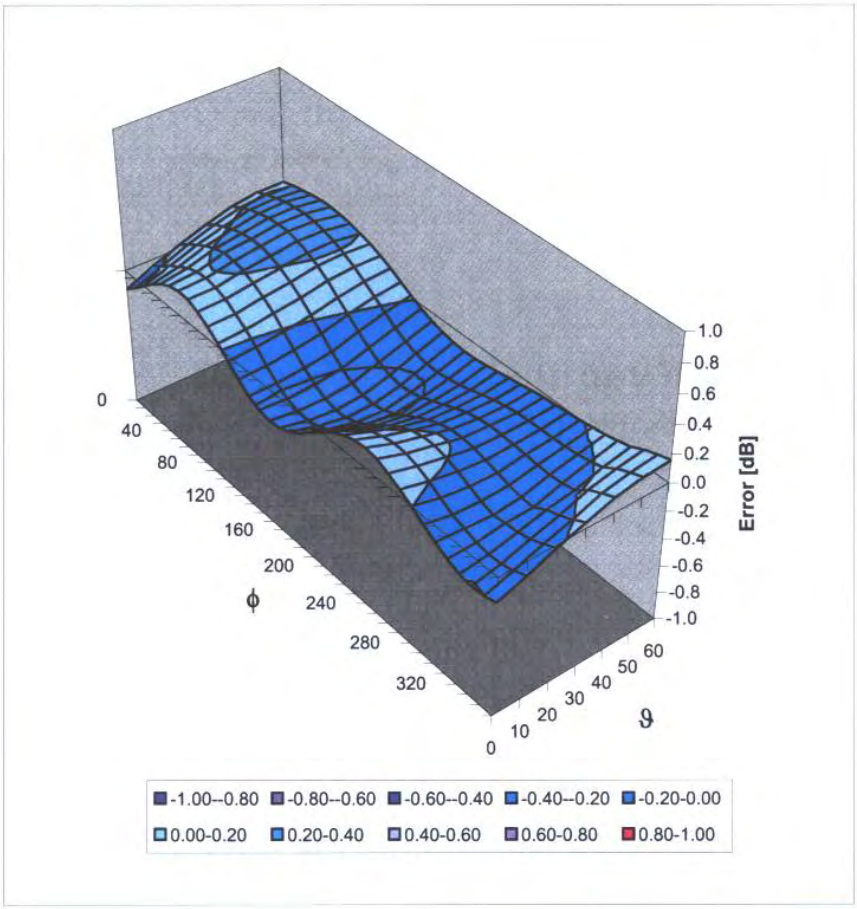


f [MHz]	Validity [MHz][F]	TSL	Permittivity	Conductivity	Alpha	Depth	ConvF Uncertainty
900	± 50 / ± 100	Head	41.5 ± 5%	0.97 ± 5%	0.58	0.70	9.68 ± 11.0% (k=2)
1810	± 50 / ± 100	Head	40.0 ± 5%	1.40 ± 5%	0.29	0.86	8.41 ± 11.0% (k=2)
2450	± 50 / ± 100	Head	39.2 ± 5%	1.80 ± 5%	0.49	0.55	7.64 ± 11.8% (k=2)
5200	± 50 / ± 100	Head	35.6 ± 5%	4.66 ± 5%	0.49	1.10	5.10 ± 13.1% (k=2)
5500	± 50 / ± 100	Head	35.6 ± 5%	4.96 ± 5%	0.49	1.10	4.70 ± 13.1% (k=2)
5800	± 50 / ± 100	Head	35.3 ± 5%	5.30 ± 5%	0.49	1.10	4.47 ± 13.1% (k=2)
900	± 50 / ± 100	Body	55.0 ± 5%	1.05 ± 5%	0.57	0.72	9.55 ± 11.0% (k=2)
1810	± 50 / ± 100	Body	53.3 ± 5%	1.52 ± 5%	0.21	1.95	8.14 ± 11.0% (k=2)
2450	± 50 / ± 100	Body	52.7 ± 5%	1.95 ± 5%	0.99	0.39	7.80 ± 11.8% (k=2)
5200	± 50 / ± 100	Body	49.0 ± 5%	5.30 ± 5%	0.44	1.69	4.68 ± 13.1% (k=2)
5500	± 50 / ± 100	Body	48.6 ± 5%	5.65 ± 5%	0.45	1.68	4.30 ± 13.1% (k=2)
5800	± 50 / ± 100	Body	48.2 ± 5%	6.00 ± 5%	0.46	1.69	4.10 ± 13.1% (k=2)

[F] 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)

APPENDIX D – DIPOLE CALIBRATION CERTIFICATE

CALIBRATION CERTIFICATE

Object:	835MHz Validation Dipole; serial # 493
Calibration Procedure:	Calibration procedure for a validation dipole
Calibration Date:	October 4, 2005
Condition of the Calibrated Item:	In Tolerance

This calibration certificate documents the traceability to national standards, which realize the physical units of measurements (SI). The measurements and the uncertainties with confidence probability are given on the following pages and are part of the certificate.

All calibrations have been conducted in a closed laboratory facility: environment temperature (21 ± 3) ^{o}C and humidity < 70%

Calibration equipment used

Model Type	Serial Number	MET Asset #	Cal Date
Anritsu Power Meter ML2488A	6K00001832	1S2430	June 2005
Anritsu Power Sensor	030864	1S2432	Jan 2005
HP E4418B Power Meter	GB40205140	1S2276	June 2005
HP 8482A Power Sensor	2607A11286	1S2140	June 2005
83650B Signal Generator	3844A00910	1S2278	June 2005
HP 8722D Vector Network Analyzer	3S36140188	1S2272	March 2006

Calibrated by: Shawn McMillen (Name) Senior Engineer (Function)  (Signature)

This calibration certificate shall not be reproduced except in full

Date of Issue: October 04, 2005

Calibration procedure for validation dipole

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 Communication 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 (300MHz – 3GHz), 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", Bulletin 65 Supplement C (Edition01-01).

Additional Documents

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 check: The antenna is checked for straightness using a straight edge placed parallel to the dipole arms prior to installing it against the phantom surface.
- Antenna Parameters with Tissue Simulating Liquid (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.
- Antenna flatness: The spacer thickness used for the 835MHz dipole is 15.0mm +/- 0.2mm. To insure the antenna is within +/- 2 degrees of flatness to the phantom surface use a caliper to measure the dipole ends from the surface of the phantom.
- Vector Network Analyzer: The network analyzer is calibrated as per the user's manual.
- 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. A Return Loss >20dB 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 1W at the antenna connector. No Uncertainty required
- SAR for nominal TSL parameters: The measured TSL parameters are used to calculate the SAR results.

Measurement Conditions

DASY system configuration

DASY Version	DASY4	V4.6
Extrapolation	Advanced Extrapolation	
Phantom	Planar Validation Phantom	1S2443
Dipole Spacer		
Distance Dipole Center-TSL	15.00mm ± 0.2mm	With spacer
Area Scan resolution	dx, dy = 10mm	
Zoom Scan resolution	dx, dy, dz = 5mm	
Frequency	835MHz ± 1MHz	

Head TSL Parameters

The following parameters and calculations were applied

	Temperature	**Permittivity**	**Conductivity**
Nominal Head TSL Parameters	22.0 °C	41.5	0.90
Measured Head TSL Parameters		41.0 ±5%	0.90 ±5%
Head TSL Temperature during Test	21.0 °C	--	--

Body TSL Parameters

The following parameters and calculations were applied

	Temperature	**Permittivity**	**Conductivity**
Nominal Head TSL Parameters	22.0 °C	55.2	0.97
Measured Head TSL Parameters		54.4 ±5%	0.94 ±5%
Head TSL Temperature during Test	21.8 °C	--	--

Measurement Uncertainty of Dipole Calibration

Error Description	**Uncertainty Value ±%**	**Probability Distribution**	**Divisor**	c_i **1g**	**Standard Uncertainty ±% (1g)**
Anritsu Power Meter ML2488A	± 1.4	normal	2	1	± 0.7
Anritsu Power Sensor	± 1.4	normal	2	1	± 0.7
HP E4418B Power Meter	± 0.2	normal	2	1	± 0.1
HP 8482A Power Sensor	± 0.8	normal	2	1	± 0.4
83650B Signal Generator	± 2.0	normal	2	1	± 1.0
HP 8722D Vector Network Analyzer	± 2.0	normal	2	1	± 1.0
Combined Standard Uncertainty					± 3.9

SAR results with Head TSL and system uncertainty

SAR averaged over 1 cm^3 (1g) of Head TSL	Condition	
SAR Normalized	Normalized to 1 W	10.52 mW/g
SAR for nominal Head TSL Parameters	Normalized to 1W	10.52 ± 24.29% mW/g (k=2)

SAR averaged over 1 cm^3 (10g) of Head TSL	Condition	
SAR Normalized	Normalized to 1 W	6.84 mW/g
SAR for nominal Head TSL Parameters	Normalized to 1W	6.84 ± 23.51% mW/g (k=2)

SAR results with Body TSL and system uncertainty

SAR averaged over 1 cm^3 (1g) of Body TSL	Condition	
SAR Normalized	Normalized to 1 W	10.92 mW/g
SAR for nominal Head TSL Parameters	Normalized to 1W	10.92 ± 24.29% mW/g (k=2)

SAR averaged over 1 cm^3 (10g) of Body TSL	Condition	
SAR Normalized	Normalized to 1 W	7.00 mW/g
SAR for nominal Head TSL Parameters	Normalized to 1W	7.00 ± 23.51% mW/g (k=2)

835MHz Dipole Calibration for Head

Date/Time: 10/4/2005 1:25:15 PM

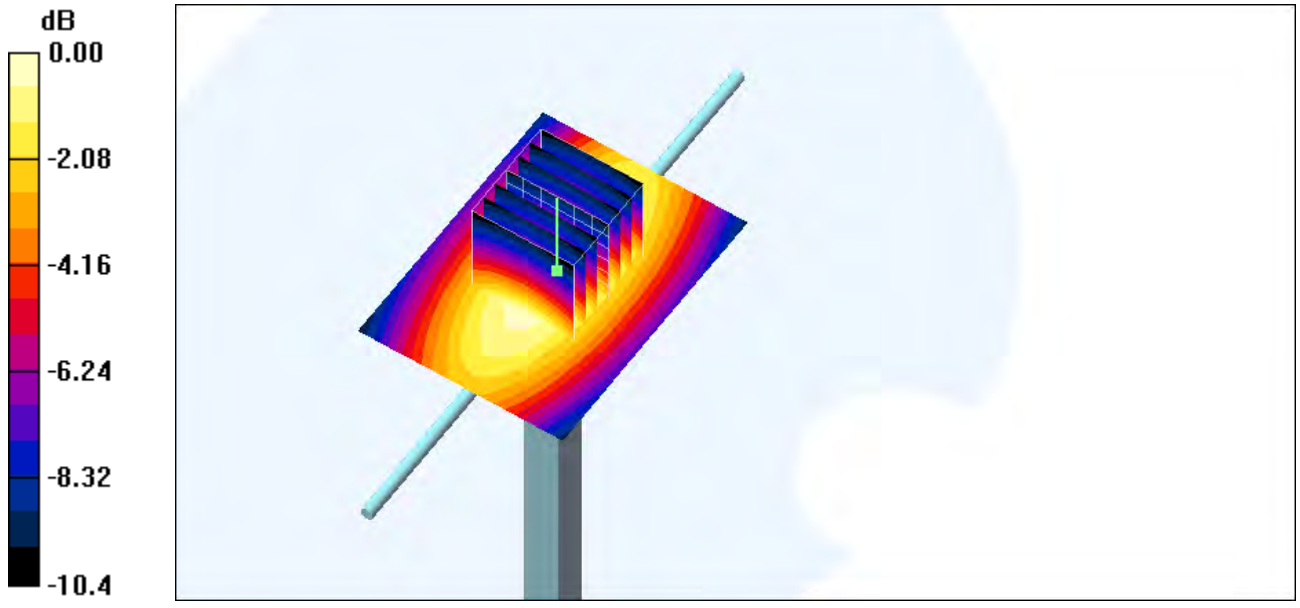
DUT: Dipole 835 MHz; Type: D835V2; Serial: D835V2 - SN:493

Communication System: CW; ; Frequency: 835 MHz;Duty Cycle: 1:1
Medium: HSL835 Medium parameters used: f = 835 MHz; σ = 0.9 mho/m; ε_r = 41.0; ρ = 1000 kg/m^3
Phantom section: Flat Section

- Probe: ET3DV6 - SN1793; ConvF(6.27, 6.27, 6.27); Calibrated: 9/20/2005
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn584; Calibrated: 9/22/2005
- Phantom: SAM with CRP; Type: SAM; Serial: TP 1310

Area Scan (61x81x1): Measurement grid: dx=10mm, dy=10mm
Maximum value of SAR (interpolated) = 2.84 mW/g

Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 58.0 V/m; Power Drift = -0.016 dB
Peak SAR (extrapolated) = 3.96 W/kg
SAR(1 g) = 2.63 mW/g; SAR(10 g) = 1.71 mW/g
Maximum value of SAR (measured) = 2.84 mW/g



0 dB = 2.84mW/g

835MHz Dipole Calibration for Body

Date/Time: 10/4/2005 2:06:38 PM

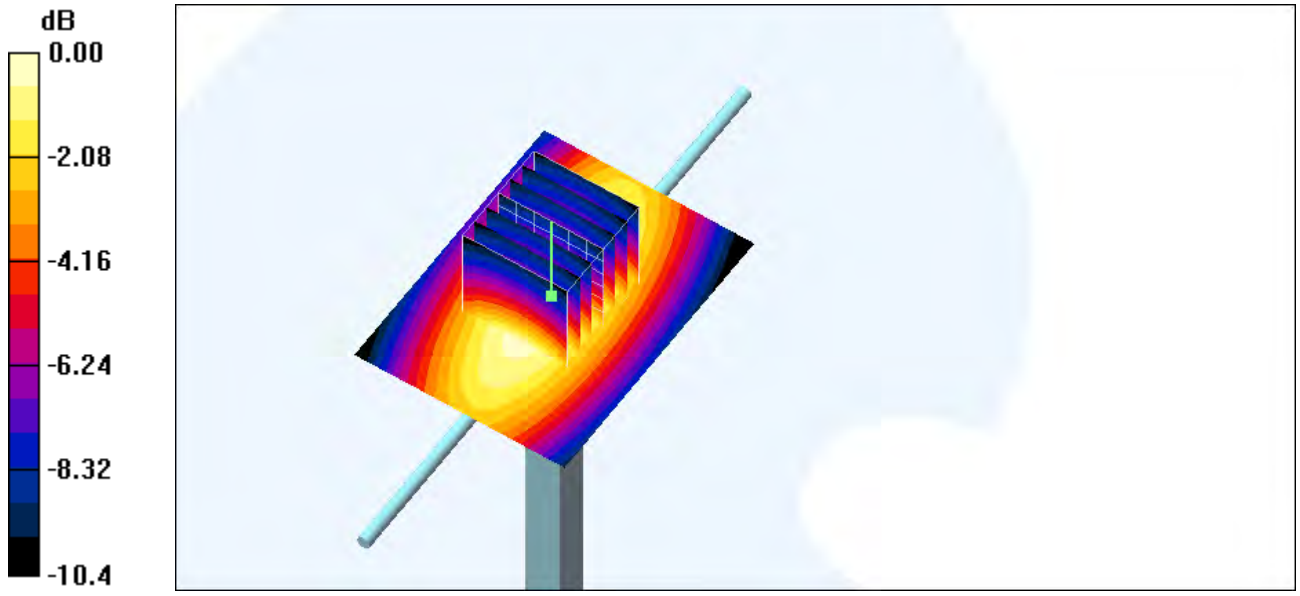
DUT: Dipole 835 MHz; Type: D835V2; Serial: D835V2 - SN:493

Communication System: CW; ; Frequency: 835 MHz;Duty Cycle: 1:1
Medium: M900 Medium parameters used: f = 835 MHz; σ = 0.94 mho/m; ε_r = 54.4; ρ = 1000 kg/m^3
Phantom section: Flat Section

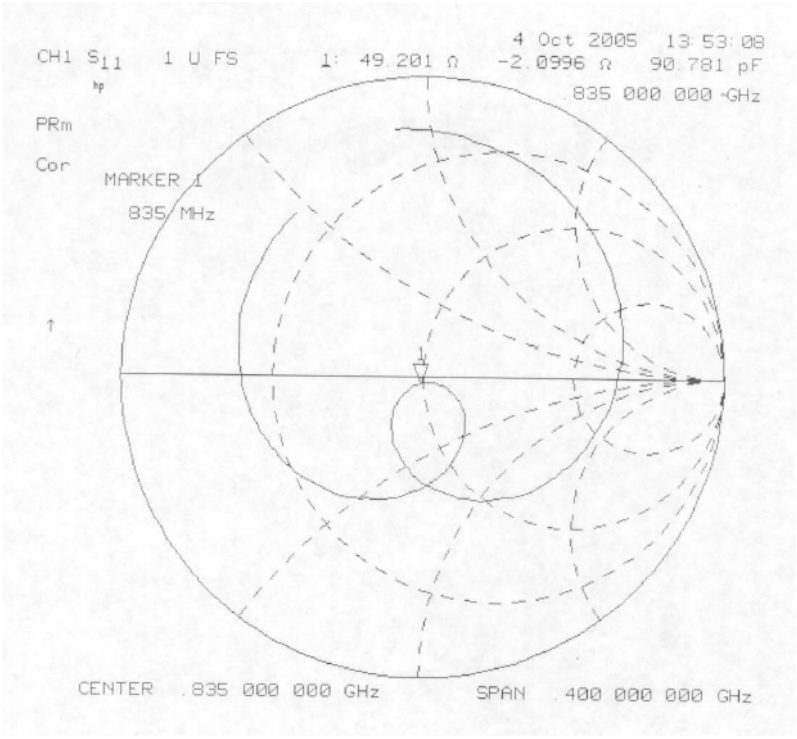
- Probe: ET3DV6 - SN1793; ConvF(6.3, 6.3, 6.3); Calibrated: 9/20/2005
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn584; Calibrated: 9/22/2005
- Phantom: SAM with CRP; Type: SAM; Serial: TP 1310

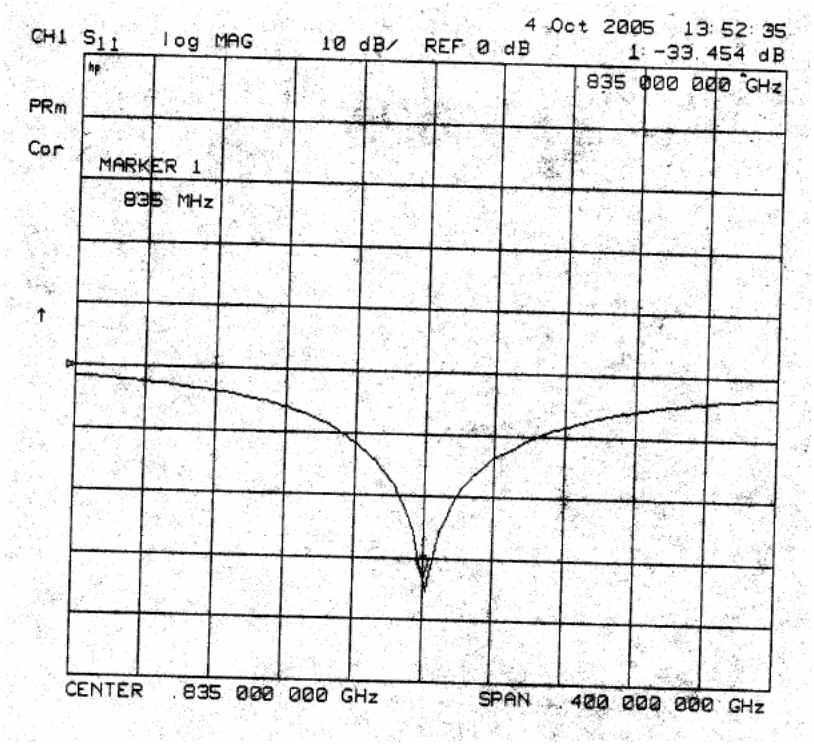
Area Scan (61x81x1): Measurement grid: dx=10mm, dy=10mm
Maximum value of SAR (interpolated) = 2.90 mW/g

Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 55.6 V/m; Power Drift = 0.018 dB
Peak SAR (extrapolated) = 4.57 W/kg
SAR(1 g) = 2.73 mW/g; SAR(10 g) = 1.75 mW/g
Maximum value of SAR (measured) = 2.92 mW/g



0 dB = 2.92mW/g


CH1 S11 1 U FS
1: 49.201 Ω -2.0996 Ω 90.781 pF
4 Oct 2005 13:53:08
835 000 000 GHz
PRm
Cor
MARKER 1
835 MHz
CENTER .835 000 000 GHz
SPAN .400 000 000 GHz


CH1 S11 log MAG 10 dB/ REF 0 dB
4 Oct 2005 13:52:35
1: -33.454 dB
835 000 000 GHz
PRm
Cor
MARKER 1
835 MHz
CENTER .835 000 000 GHz
SPAN .400 000 000 GHz

CALIBRATION CERTIFICATE

Object: 1900MHz Validation Dipole

Calibration Procedure: Calibration procedure for a validation dipole

Calibration Date: Dec 1, 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 a closed laboratory facility: environment temperature (22 ± 3) ^{o}C and humidity < 70%

Calibration equipment used

Model Type	Serial Number	MET Asset #	Cal Date
Anritsu Power Meter ML2488A	6K00001832	1S2430	June 2006
Anritsu Power Sensor	030864	1S2432	Jan 2006
HP E4418B Power Meter	GB40205140	1S2276	June 2006
HP 8482A Power Sensor	2607A11286	1S2140	June 2006
83650B Signal Generator	3844A00910	1S2278	June 2006
HP 8722D Vector Network Analyzer	3S36140188	1S2272	March 2006

Calibrated by: Shawn McMillen (Name) Senior Engineer (Function)  (Signature)

This calibration certificate shall not be reproduced except in full

Date of Issue: Dec 1, 2006

Calibration procedure for validation dipole

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 Communication 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 (300MHz – 3GHz), 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", Bulletin 65 Supplement C (Edition01-01).

Additional Documents

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 check: The antenna is checked for straightness using a straight edge placed parallel to the dipole arms prior to installing it against the phantom surface.
- 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.
- Antenna flatness: The spacer thickness used for the 1900MHz dipole is 10.00mm +/- 0.2mm. To insure the antenna is within +/- 2 degrees of flatness to the phantom surface use a caliper to measure the dipole ends from the surface of the phantom.
- Vector Network Analyzer: The network analyzer is calibrated as per the user's manual.
- 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. A Return Loss >20dB 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 1W at the antenna connector. No Uncertainty required
- SAR for nominal head and muscle parameters: The measured TSL parameters are used to calculate the SAR results.

Measurement Conditions

DASY system configuration

DASY Version	DASY4	V4.7
Extrapolation	Advanced Extrapolation	
Phantom	Planar Validation Phantom	
Dipole Spacer		
Distance Dipole Center-TSL	10.00mm ± 0.2mm	With spacer
Area Scan resolution	dx, dy = 10mm	
Zoom Scan resolution	dx, dy, dz = 5mm	
Frequency	1900MHz ± 1MHz	

Body TSL Parameters

	Temperature	**Permittivity**	**Conductivity**
Nominal Body TSL Parameters	22.0 °C	52.7	1.95
Measured Body TSL Parameters		52.7 ±5%	1.95 ±5%
Body TSL Temperature during Test	22.0 °C	--	--

Measurement Uncertainty of Dipole Calibration

Error Description	**Uncertainty Value ±%**	**Probability Distribution**	**Divisor**	c_i **1g**	**Standard Uncertainty ±% (1g)**
Anritsu Power Meter ML2488A	± 1.4	normal	2	1	± 0.7
Anritsu Power Sensor	± 1.4	normal	2	1	± 0.7
HP E4418B Power Meter	± 0.2	normal	2	1	± 0.1
HP 8482A Power Sensor	± 0.8	normal	2	1	± 0.4
83650B Signal Generator	± 2.0	normal	2	1	± 1.0
HP 8722D Vector Network Analyzer	± 2.0	normal	2	1	± 1.0
Combined Standard Uncertainty					± 3.9

SAR results with Body TSL and system uncertainty

SAR averaged over 1 cm^3 (1g) of Body TSL	Condition	
SAR Normalized	Normalized to 1 W	42.0 mW/g
SAR for nominal Head TSL Parameters	Normalized to 1W	42.0 ± 24.29% mW/g (k=2)

SAR averaged over 1 cm^3 (10g) of Body TSL	Condition	
SAR Normalized	Normalized to 1 W	21.7 mW/g
SAR for nominal Head TSL Parameters	Normalized to 1W	21.7 ± 23.51% mW/g (k=2)

1900MHz body calibration

Date/Time: 12/01/2006 10:07:04 AM

DUT: 1900 MHz validation dipole; Type: Dipole; Serial: 001

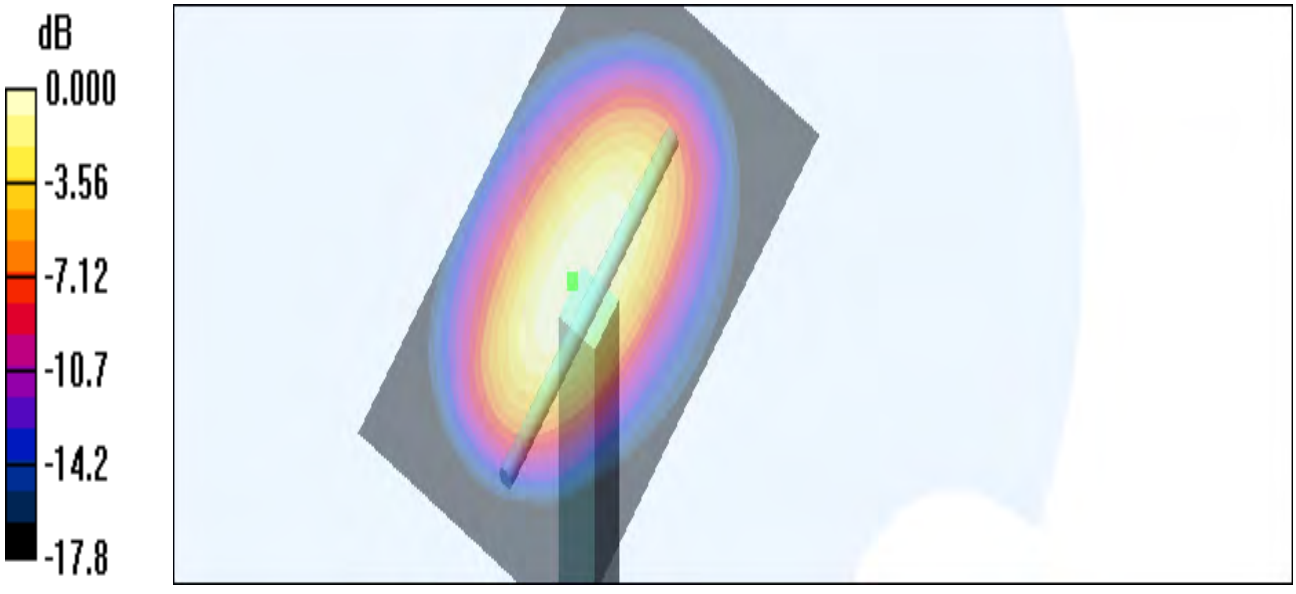
Medium Notes: Ambient Temp: 24.0 deg C, Fluid Temp: 22.3 deg C

Communication System: CW; ; Frequency: 1900 MHz;Duty Cycle: 1:1
Medium: M1900 Medium parameters used: f = 1900 MHz; σ = 1.52 mho/m; ε_r = 53.3; ρ = 1000 kg/m^3
Phantom section: Flat Section

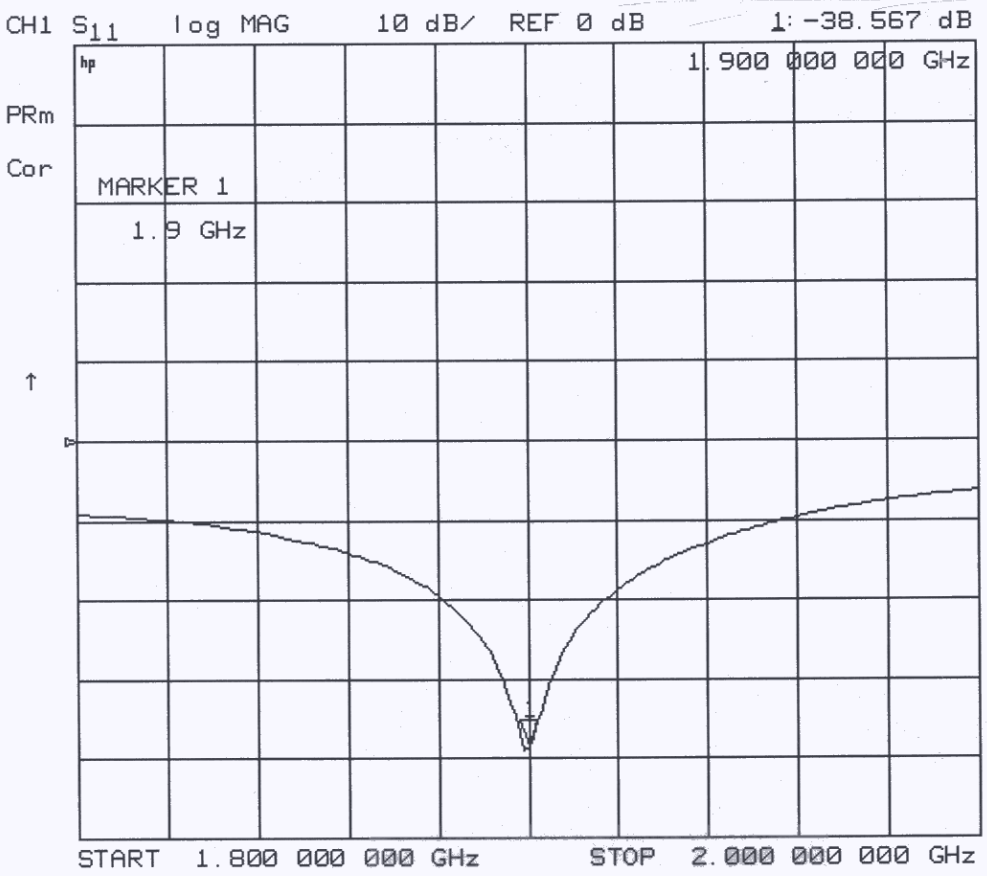
- Probe: EX3DV3 - SN3511; ConvF(8.14, 8.14, 8.14); Calibrated: 1/23/2006
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn584; Calibrated: 9/22/2005
- Phantom: SAM with CRP; Type: SAM; Serial: TP 1310
- Measurement SW: DASY4, V4.7 Build 44; Postprocessing SW: SEMCAD, V1.8 Build 172

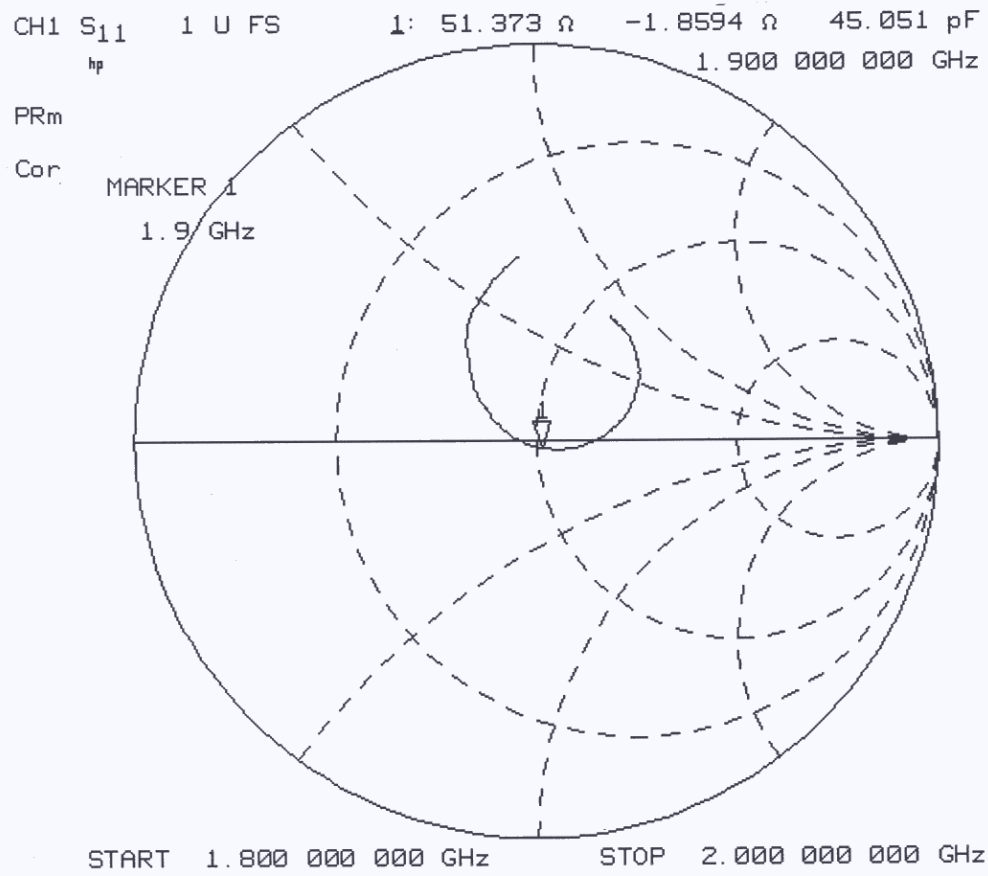
Area Scan (61x101x1): Measurement grid: dx=10mm, dy=10mm
Maximum value of SAR (interpolated) = 11.9 mW/g

Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 87.6 V/m; Power Drift = -0.003 dB
Peak SAR (extrapolated) = 19.3 W/kg
SAR(1 g) = 10.5 mW/g; SAR(10 g) = 5.44 mW/g
Maximum value of SAR (measured) = 11.9 mW/g



0 dB = 11.9mW/g


CH1 S11 log MAG 10 dB/ REF 0 dB 1: -38.567 dB
1.900 000 000 GHz
PRm
Cor
MARKER 1
1.9 GHz
START 1.800 000 000 GHz
STOP 2.000 000 000 GHz


CH1 S11 1 U FS 1: 51.373 Ω -1.8594 Ω 45.051 pF
1.900 000 000 GHz
PRm
Cor
MARKER 1
1.9 GHz
START 1.800 000 000 GHz
STOP 2.000 000 000 GHz

CALIBRATION CERTIFICATE

Object: 2450MHz Validation Dipole

Calibration Procedure: Calibration procedure for a validation dipole

Calibration Date: March 9, 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 a closed laboratory facility: environment temperature (22 ± 3) ^{o}C and humidity < 70%

Calibration equipment used

Model Type	Serial Number	MET Asset #	Cal Date
Anritsu Power Meter ML2488A	6K00001832	1S2430	June 2005
Anritsu Power Sensor	030864	1S2432	Jan 2005
HP E4418B Power Meter	GB40205140	1S2276	June 2005
HP 8482A Power Sensor	2607A11286	1S2140	June 2005
83650B Signal Generator	3844A00910	1S2278	June 2005
HP 8722D Vector Network Analyzer	3S36140188	1S2272	March 2006

Calibrated by: Shawn McMillen (Name) Senior Engineer (Function)  (Signature)

This calibration certificate shall not be reproduced except in full

Date of Issue: March 9, 2006

Calibration procedure for validation dipole

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 Communication 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 (300MHz – 3GHz), 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", Bulletin 65 Supplement C (Edition01-01).

Additional Documents

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 check: The antenna is checked for straightness using a straight edge placed parallel to the dipole arms prior to installing it against the phantom surface.
- 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.
- Antenna flatness: The spacer thickness used for the 2450MHz dipole is 10.00mm +/- 0.2mm. To insure the antenna is within +/- 2 degrees of flatness to the phantom surface use a caliper to measure the dipole ends from the surface of the phantom.
- Vector Network Analyzer: The network analyzer is calibrated as per the user's manual.
- 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. A Return Loss >20dB 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 1W at the antenna connector. No Uncertainty required
- SAR for nominal head and muscle parameters: The measured TSL parameters are used to calculate the SAR results.

Measurement Conditions

DASY system configuration

DASY Version	DASY4	V4.6
Extrapolation	Advanced Extrapolation	
Phantom	Planar Validation Phantom	1S2450
Dipole Spacer		
Distance Dipole Center-TSL	10.00mm ± 0.2mm	With spacer
Area Scan resolution	dx, dy = 10mm	
Zoom Scan resolution	dx, dy, dz = 5mm	
Frequency	2450MHz ± 1MHz	

Head TSL Parameters

The following parameters and calculations were applied

	Temperature	**Permittivity**	**Conductivity**
Nominal Head TSL Parameters	22.0 °C	39.2	1.80
Measured Head TSL Parameters		39.5 ±5%	1.80 ±5%
Head TSL Temperature during Test	21.8 °C	--	--

BodyTSL Parameters

	Temperature	**Permittivity**	**Conductivity**
Nominal Body TSL Parameters	22.0 °C	52.7	1.95
Measured Body TSL Parameters		52.7 ±5%	1.95 ±5%
Body TSL Temperature during Test	22.0 °C	--	--

Measurement Uncertainty of Dipole Calibration

Error Description	**Uncertainty Value ±%**	**Probability Distribution**	**Divisor**	c_i **1g**	**Standard Uncertainty ±% (1g)**
Anritsu Power Meter ML2488A	± 1.4	normal	2	1	± 0.7
Anritsu Power Sensor	± 1.4	normal	2	1	± 0.7
HP E4418B Power Meter	± 0.2	normal	2	1	± 0.1
HP 8482A Power Sensor	± 0.8	normal	2	1	± 0.4
83650B Signal Generator	± 2.0	normal	2	1	± 1.0
HP 8722D Vector Network Analyzer	± 2.0	normal	2	1	± 1.0
Combined Standard Uncertainty					± 3.9

SAR results with Head TSL and system uncertainty

SAR averaged over 1 cm^3 (1g) of Head TSL	Condition	
SAR Normalized	Normalized to 1 W	56.8 mW/g
SAR for nominal Head TSL Parameters	Normalized to 1W	56.8 ± 24.29% mW/g (k=2)

SAR averaged over 1 cm^3 (10g) of Head TSL	Condition	
SAR Normalized	Normalized to 1 W	25.6 mW/g
SAR for nominal Head TSL Parameters	Normalized to 1W	25.6 ± 23.51% mW/g (k=2)

SAR results with Body TSL and system uncertainty

SAR averaged over 1 cm^3 (1g) of BodyTSL	Condition	
SAR Normalized	Normalized to 1 W	53.6 mW/g
SAR for nominal Body TSL Parameters	Normalized to 1W	53.6 ± 24.29% mW/g (k=2)

SAR averaged over 1 cm^3 (10g) of Body TSL	Condition	
SAR Normalized	Normalized to 1 W	24.4 mW/g
SAR for nominal Body TSL Parameters	Normalized to 1W	24.4 ± 23.51% mW/g (k=2)

2450MHz Head Calibration

Date/Time: 3/09/2006 3:31:59 PM

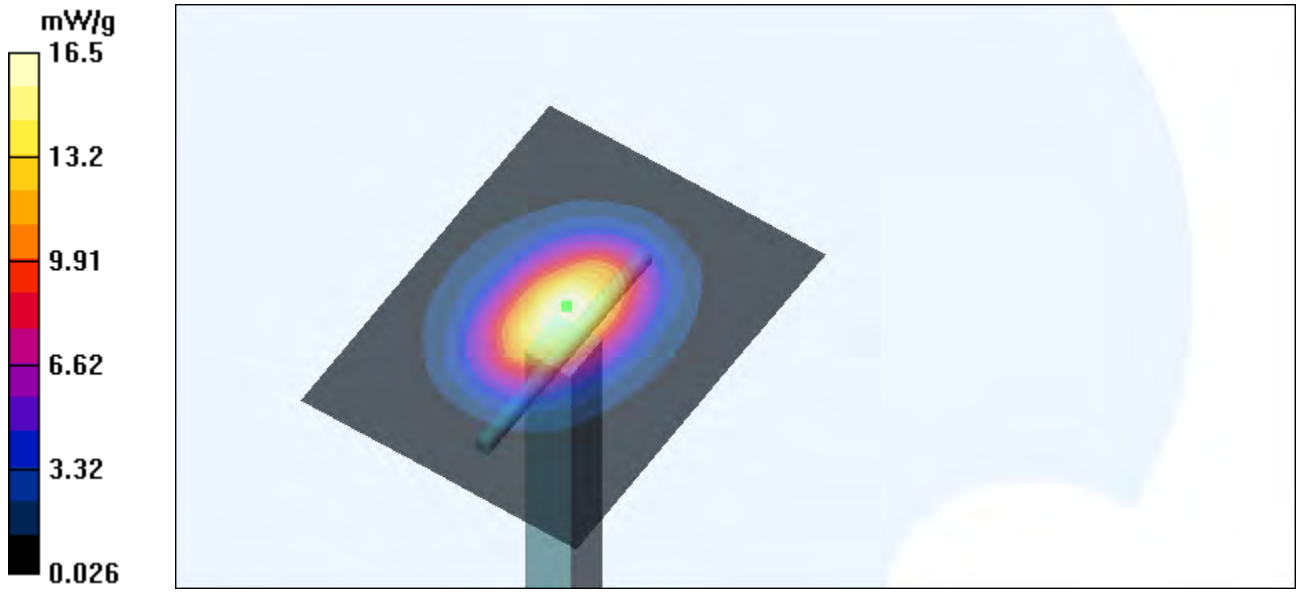
DUT: Dipole 2450 MHz; Type: D2450V2; Serial: 1S2452

Communication System: CW; ; Frequency: 2450 MHz;Duty Cycle: 1:1
Medium: HSL2450 Medium parameters used: f = 2450 MHz; σ = 1.8 mho/m; ε_r = 39.5; ρ = 1000 kg/m^3
Phantom section: Flat Section

Probe: EX3DV3 - SN3511; ConvF(7.64, 7.64, 7.64); Calibrated: 1/23/2006
Sensor-Surface: 4mm (Mechanical Surface Detection)
Electronics: DAE3 Sn584; Calibrated: 9/22/2005
Phantom: SAM with CRP; Type: SAM; Serial: TP 1310
Measurement SW: DASY4, V4.6 Build 23; Postprocessing SW: SEMCAD, V1.8 Build 160

Area Scan (61x81x1): Measurement grid: dx=10mm, dy=10mm
Maximum value of SAR (interpolated) = 16.5 mW/g

Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 93.0 V/m; Power Drift = -0.015 dB
Peak SAR (extrapolated) = 31.1 W/kg
SAR(1 g) = 14.2 mW/g; SAR(10 g) = 6.42 mW/g
Maximum value of SAR (measured) = 16.0 mW/g



2450MHz Body calibration

Date/Time: 3/09/2006 9:06:50 AM

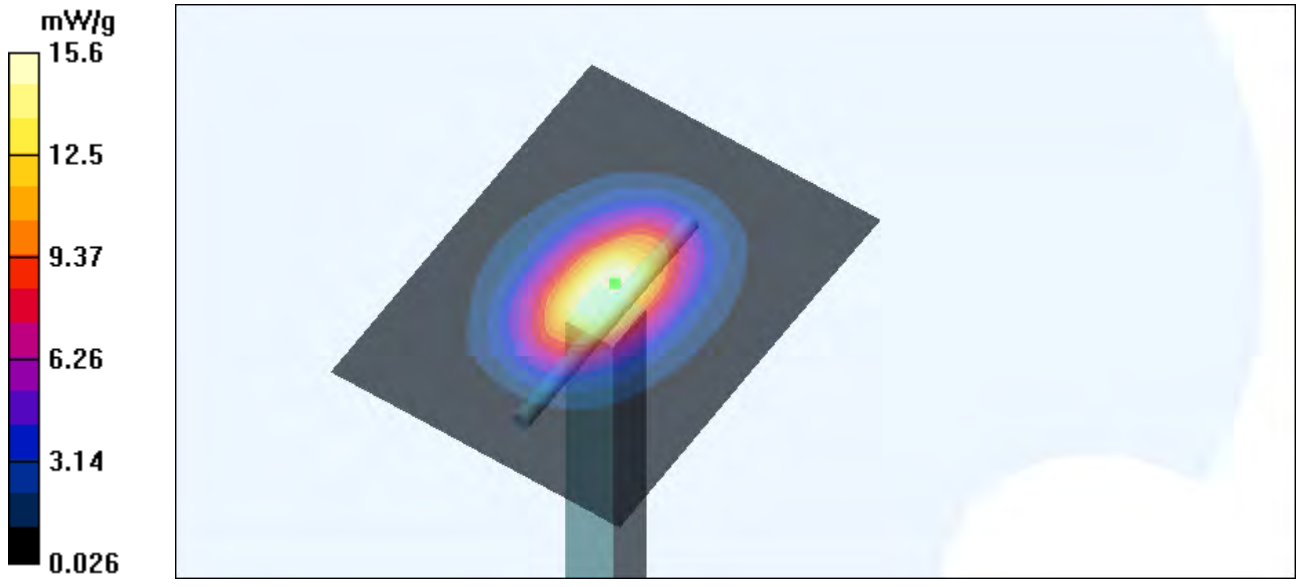
DUT: Dipole 2450 MHz; Type: D2450V2; Serial: 1S2452

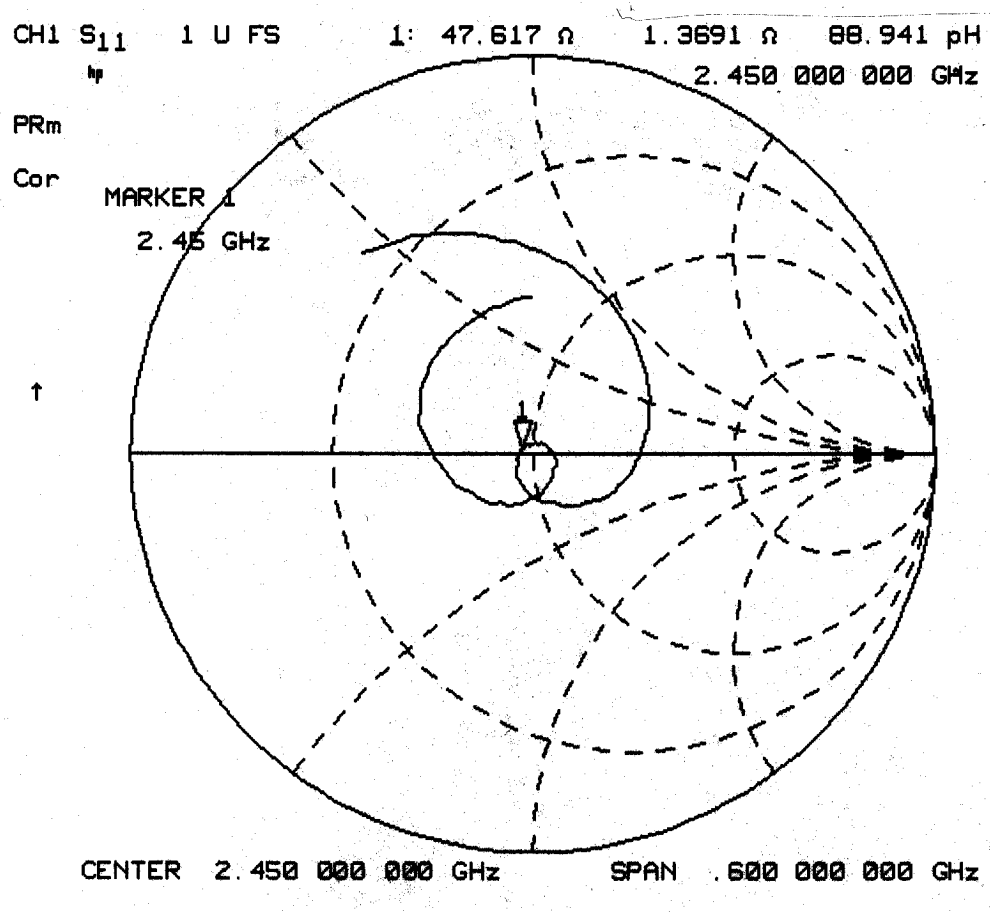
Communication System: CW; ; Frequency: 2450 MHz;Duty Cycle: 1:1
Medium: M2450 Medium parameters used: f = 2450 MHz; σ = 1.95 mho/m; ε_r = 52.7; ρ = 1000 kg/m^3
Phantom section: Flat Section

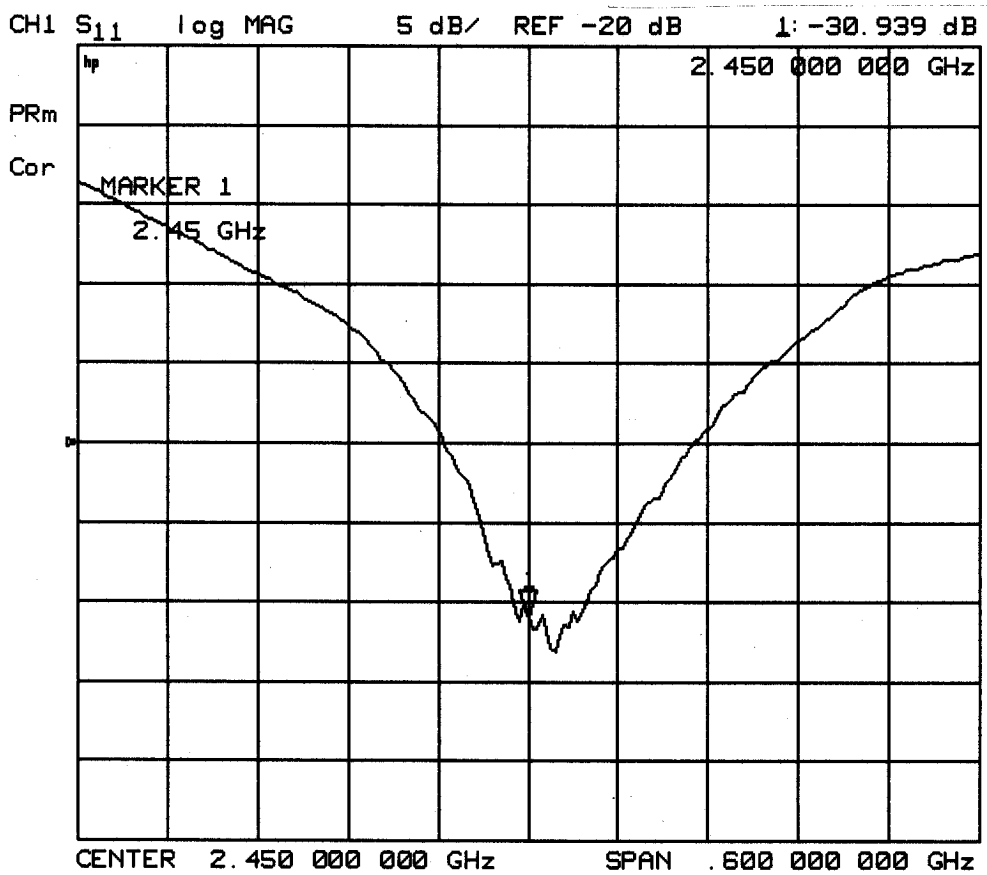
Probe: EX3DV3 - SN3511; ConvF(7.8, 7.8, 7.8); Calibrated: 1/23/2006
Sensor-Surface: 4mm (Mechanical Surface Detection)
Electronics: DAE3 Sn584; Calibrated: 9/22/2005
Phantom: SAM with CRP; Type: SAM; Serial: TP 1310
Measurement SW: DASY4, V4.6 Build 23; Postprocessing SW: SEMCAD, V1.8 Build 160

Area Scan (61x81x1): Measurement grid: dx=10mm, dy=10mm
Maximum value of SAR (interpolated) = 15.6 mW/g

Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 89.1 V/m; Power Drift = -0.047 dB
Peak SAR (extrapolated) = 27.6 W/kg
SAR(1 g) = 13.4 mW/g; SAR(10 g) = 6.12 mW/g
Maximum value of SAR (measured) = 15.3 mW/g




CH1 S11 1 U FS
1: 47.617 Ω 1.3691 Ω 88.941 pH
2.450 000 000 GHz
PRm
Cor
MARKER 1
2.45 GHz
CENTER 2.450 000 000 GHz
SPAN .600 000 000 GHz


CH1 S11 log MAG 5 dB/ REF -20 dB
1: -30.939 dB
2.450 000 000 GHz
PRm
Cor
MARKER 1
2.45 GHz
CENTER 2.450 000 000 GHz
SPAN .600 000 000 GHz

CALIBRATION CERTIFICATE

Object: 5000MHz Validation Dipole serial #001

Calibration Procedure: Calibration procedure for a validation dipole

Calibration Date: August 22, 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 a closed laboratory facility: environment temperature (22 ± 3) ^{o}C and humidity < 70%

Calibration equipment used

Model Type	Serial Number	MET Asset #	Cal Date
Anritsu Power Meter ML2488A	6K00001832	1S2430	June 2006
Anritsu Power Sensor	030864	1S2432	Jan 2006
HP E4418B Power Meter	GB40205140	1S2276	June 2006
HP 8482A Power Sensor	2607A11286	1S2140	June 2006
83650B Signal Generator	3844A00910	1S2278	June 2006
HP 8722D Vector Network Analyzer	3S36140188	1S2272	March 2006

Calibrated by: Shawn McMillen (Name) Senior Engineer (Function)  (Signature)

This calibration certificate shall not be reproduced except in full

Date of Issue: August 22, 2006

Calibration procedure for validation dipole

Calibration is performed according to the following standards:

a) IEC Std 62209 Part 2, "Evaluation of Human Exposure to Radio Frequency Fields from Handheld and Body-Mounted Wireless Communication Devices in the Frequency Range of 30MHz- 6GHz: Human models, Instrumentation and Procedures" Part 2: "Procedure to determine the Specific Absorption Rate (SAR) for including accessories and multiple transmitter", Draft Version 0.9, December 2004.
b) 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", Bulletin 65 Supplement C (Edition01-01).

Additional Documents

c) 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 check: The antenna is checked for straightness using a straight edge placed parallel to the dipole arms prior to installing it against the phantom surface.
- 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.
- Antenna flatness: The spacer thickness used for the 5000MHz dipole is 10.00mm +/- 0.2mm. To insure the antenna is within +/- 2 degrees of flatness to the phantom surface use a caliper to measure the dipole ends from the surface of the phantom.
- Vector Network Analyzer: The network analyzer is calibrated as per the user's manual.
- 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. A Return Loss >20dB 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 1W at the antenna connector. No Uncertainty required
- SAR for nominal head and muscle parameters: The measured TSL parameters are used to calculate the SAR results.

Measurement Conditions

DASY system configuration

DASY Version	DASY4	V4.6
Extrapolation	Advanced Extrapolation	
Phantom	Planar Validation Phantom	
Dipole Spacer		
Distance Dipole Center-TSL	10.0mm ± 0.2mm	With spacer
Area Scan resolution	dx, dy = 10mm	
Zoom Scan resolution	dx, dy, = 4.3mm, dz = 3mm	
Frequency	5200MHz ± 1MHz 5500MHz ± 1MHz 5800MHz ± 1MHz	

Head TSL Parameters @ 5200 MHz

The following parameters and calculations were applied

	Temperature	**Permittivity**	**Conductivity**
Nominal Head TSL Parameters	22.0 ^{o}C	36.0	4.66
Measured Head TSL Parameters		37.4 ±5%	4.70 ±5%
Head TSL Temperature during Test	22.0 ^{o}C	--	--

SAR results with Head TSL @ 5200 MHz

SAR averaged over 1 cm^3 (1g) of Head TSL	Condition	22.3 mW/g
SAR Normalized	Normalized to 1 W	89.2 mW/g
SAR for nominal Head TSL Parameters	Normalized to 1W	89.2 ± 23.32% mW/g (k=2)

SAR averaged over 1 cm^3 (10g) of Head TSL	Condition	6.81 mW/g
SAR Normalized	Normalized to 1 W	27.2 mW/g
SAR for nominal Head TSL Parameters	Normalized to 1W	27.2 ± 21.46% mW/g (k=2)

Head TSL Parameters @ 5500 MHz

The following parameters and calculations were applied

	Temperature	Permittivity	Conductivity
Nominal Head TSL Parameters	22.0 °C	35.6	4.96
Measured Head TSL Parameters		37.1 ±5%	5.04 ±5%
Head TSL Temperature during Test	21.9 °C	--	--

SAR results with Head TSL @ 5500 MHz

SAR averaged over 1 cm^3 (1g) of Head TSL	Condition	20.9 mW/g
SAR Normalized	Normalized to 1 W	83.6 mW/g
SAR for nominal Head TSL Parameters	Normalized to 1W	83.6 ± 23.32% mW/g (k=2)

SAR averaged over 1 cm^3 (10g) of Head TSL	Condition	6.41 mW/g
SAR Normalized	Normalized to 1 W	25.6 mW/g
SAR for nominal Head TSL Parameters	Normalized to 1W	25.6 ± 21.46% mW/g (k=2)

Head TSL Parameters @ 5800 MHz

The following parameters and calculations were applied

	Temperature	Permittivity	Conductivity
Nominal Head TSL Parameters	22.0 °C	35.3	5.27
Measured Head TSL Parameters		36.4 ±5%	5.31 ±5%
Head TSL Temperature during Test	22.0 °C	--	--

SAR results with Head TSL @ 5800 MHz

SAR averaged over 1 cm^3 (1g) of Head TSL	Condition	20.5 mW/g
SAR Normalized	Normalized to 1 W	82.0 mW/g
SAR for nominal Head TSL Parameters	Normalized to 1W	82.0 ± 23.32% mW/g (k=2)

SAR averaged over 1 cm^3 (10g) of Head TSL	Condition	6.35 mW/g
SAR Normalized	Normalized to 1 W	25.4 mW/g
SAR for nominal Head TSL Parameters	Normalized to 1W	25.4 ± 21.46% mW/g (k=2)

Body TSL Parameters @ 5200 MHz

The following parameters and calculations were applied

	Temperature	Permittivity	Conductivity
Nominal Body TSL Parameters	22.0 °C	49.0	5.30
Measured Body TSL Parameters		48.2 ±5%	5.37 ±5%
Body TSL Temperature during Test	22.0 °C	--	--

SAR results with Body TSL @ 5200 MHz

SAR averaged over 1 cm^3 (1g) of Body TSL	Condition	17.0
SAR Normalized	Normalized to 1 W	68.0 mW/g
SAR for nominal Body TSL Parameters	Normalized to 1W	68.0 ± 23.32% mW/g (k=2)

SAR averaged over 1 cm^3 (10g) of Body TSL	Condition	5.13
SAR Normalized	Normalized to 1 W	20.5 mW/g
SAR for nominal Body TSL Parameters	Normalized to 1W	20.5 ± 21.46% mW/g (k=2)

Body TSL Parameters @ 5500 MHz

The following parameters and calculations were applied

	Temperature	Permittivity	Conductivity
Nominal Body TSL Parameters	22.0 °C	47.8	5.65
Measured Body TSL Parameters		47.8 ±5%	5.80 ±5%
Body TSL Temperature during Test	22.0 °C	--	--

SAR results with Body TSL @ 5500 MHz

SAR averaged over 1 cm^3 (1g) of Body TSL	Condition	16.8
SAR Normalized	Normalized to 1 W	67.2 mW/g
SAR for nominal Body TSL Parameters	Normalized to 1W	67.2 ± 23.32% mW/g (k=2)

SAR averaged over 1 cm^3 (10g) of Body TSL	Condition	5.24
SAR Normalized	Normalized to 1 W	20.9 mW/g
SAR for nominal Body TSL Parameters	Normalized to 1W	20.9 ± 21.46% mW/g (k=2)

Body TSL Parameters @ 5800 MHz

The following parameters and calculations were applied

	Temperature	**Permittivity**	**Conductivity**
Nominal Body TSL Parameters	22.0 °C	48.2	6.00
Measured Body TSL Parameters		47.1 ±5%	6.15 ±5%
Body TSL Temperature during Test	22.0 °C	--	--

SAR results with Body TSL @ 5800 MHz

SAR averaged over 1 cm^3 (1g) of Body TSL	Condition	16.2
SAR Normalized	Normalized to 1 W	64.8 mW/g
SAR for nominal Body TSL Parameters	Normalized to 1W	64.8 ± 23.32% mW/g (k=2)

SAR averaged over 1 cm^3 (10g) of Body TSL	Condition	4.99
SAR Normalized	Normalized to 1 W	19.6 mW/g
SAR for nominal Body TSL Parameters	Normalized to 1W	19.6 ± 21.46% mW/g (k=2)

5200MHz Head

Date/Time: 8/21/2006 3:28:44 PM

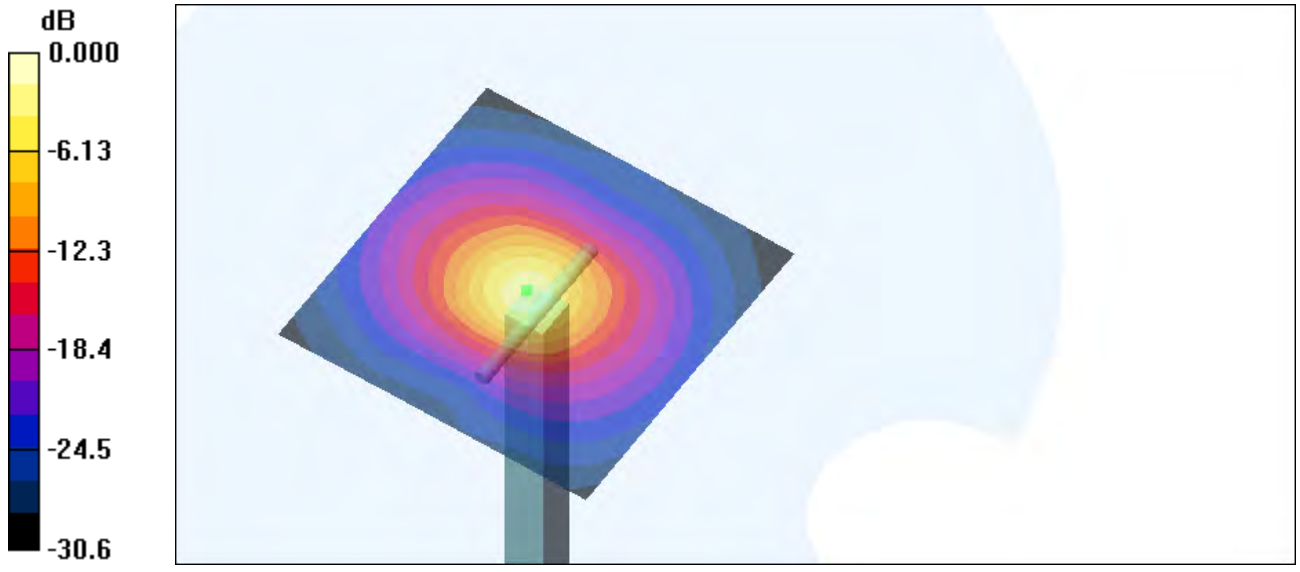
DUT: Dipole ; Type: 5000 MHz; Serial: SN:001

Communication System: CW; ; Frequency: 5200 MHz;Duty Cycle: 1:1
Medium: 5500 MHz Head Medium parameters used: f = 5200 MHz; σ = 4.7 mho/m; ε_r = 37.4; ρ = 1000 kg/m^3
Phantom section: Flat Section

Probe: EX3DV3 - SN3511; ConvF(5.1, 5.1, 5.1); Calibrated: 1/23/2006
Sensor-Surface: 4mm (Mechanical Surface Detection)Sensor-Surface: 2mm (Mechanical Surface Detection)
Electronics: DAE3 Sn584; Calibrated: 9/22/2005
Phantom: SAM with CRP; Type: SAM; Serial: TP 1310
Measurement SW: DASY4, V4.7 Build 44; Postprocessing SW: SEMCAD, V1.8 Build 171

Area Scan (81x81x1): Measurement grid: dx=10mm, dy=10mm
Maximum value of SAR (interpolated) = 22.1 mW/g

Zoom Scan (9x9x9)/Cube 0: Measurement grid: dx=4.3mm, dy=4.3mm, dz=3mm
Reference Value = 67.2 V/m; Power Drift = -0.023 dB
Peak SAR (extrapolated) = 101.4 W/kg
SAR(1 g) = 22.3 mW/g; SAR(10 g) = 6.81 mW/g
Maximum value of SAR (measured) = 41.7 mW/g



0 dB = 41.7mW/g

5500MHz Head

Date/Time: 8/21/2006 2:45:05 PM

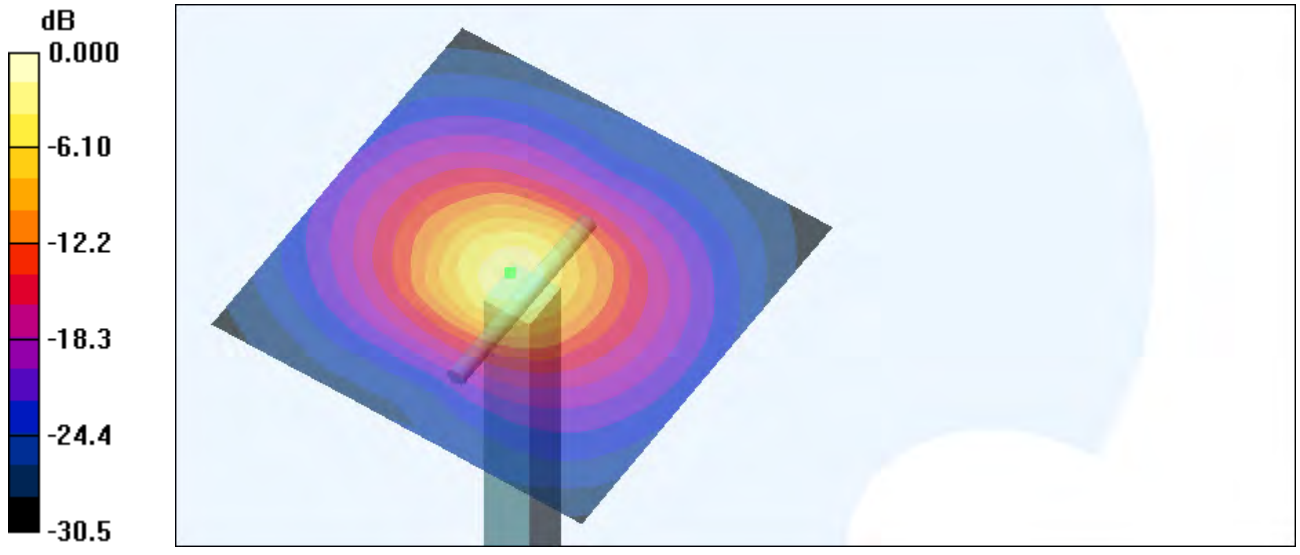
DUT: Dipole ; Type: 5000 MHz; Serial: SN:001

Communication System: CW; ; Frequency: 5500 MHz;Duty Cycle: 1:1
Medium: 5500 MHz Head Medium parameters used: f = 5500 MHz; σ = 5.08 mho/m; ε_r = 36.5; ρ = 1000 kg/m^3
Phantom section: Flat Section

Probe: EX3DV3 - SN3511; ConvF(4.7, 4.7, 4.7); Calibrated: 1/23/2006
Sensor-Surface: 4mm (Mechanical Surface Detection)Sensor-Surface: 2mm (Mechanical Surface Detection)
Electronics: DAE3 Sn584; Calibrated: 9/22/2005
Phantom: SAM with CRP; Type: SAM; Serial: TP 1310
Measurement SW: DASY4, V4.7 Build 44; Postprocessing SW: SEMCAD, V1.8 Build 171

Area Scan (81x81x1): Measurement grid: dx=10mm, dy=10mm
Maximum value of SAR (interpolated) = 22.0 mW/g

Zoom Scan (9x9x9)/Cube 0: Measurement grid: dx=4.3mm, dy=4.3mm, dz=3mm
Reference Value = 65.4 V/m; Power Drift = -0.039 dB
Peak SAR (extrapolated) = 83.5 W/kg
SAR(1 g) = 20.9 mW/g; SAR(10 g) = 6.41 mW/g
Maximum value of SAR (measured) = 39.6 mW/g



0 dB = 39.6mW/g

5800MHz Head

Date/Time: 8/21/2006 4:22:21 PM

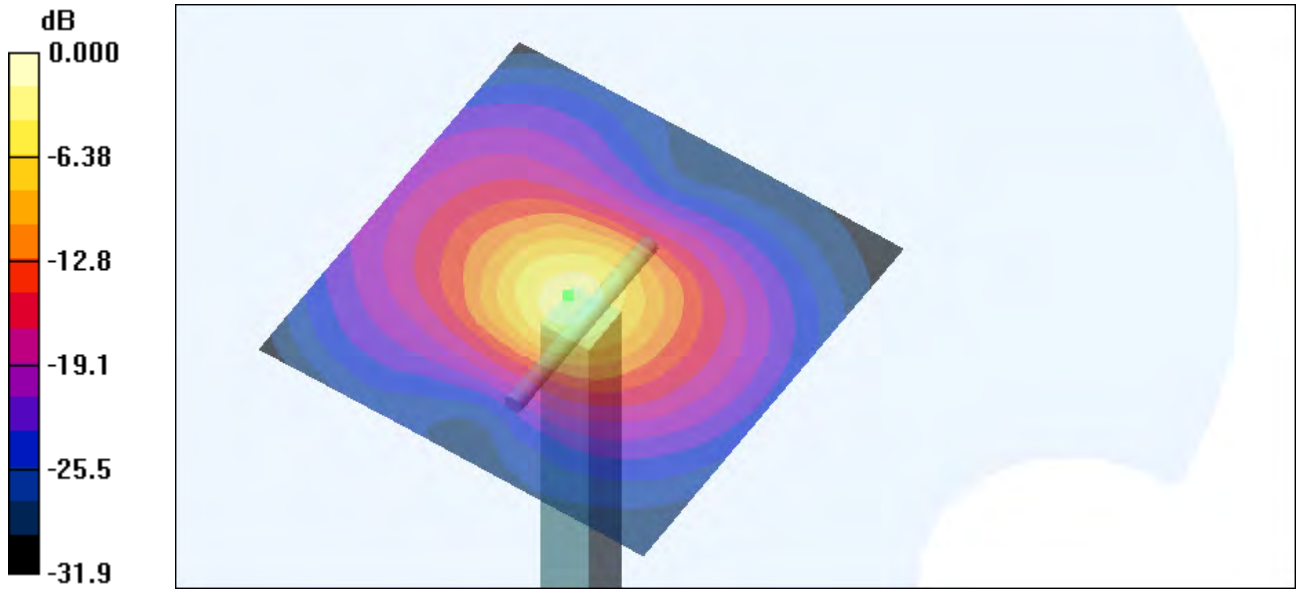
DUT: Dipole ; Type: 5000 MHz; Serial: SN:001

Communication System: CW; ; Frequency: 5800 MHz;Duty Cycle: 1:1
Medium: 5800 MHz Head Medium parameters used: f = 5800 MHz; σ = 5.31 mho/m; ε_r = 36.4; ρ = 1000 kg/m^3
Phantom section: Flat Section

Probe: EX3DV3 - SN3511; ConvF(4.47, 4.47, 4.47); Calibrated: 1/23/2006
Sensor-Surface: 4mm (Mechanical Surface Detection)Sensor-Surface: 2mm (Mechanical Surface Detection)
Electronics: DAE3 Sn584; Calibrated: 9/22/2005
Phantom: SAM with CRP; Type: SAM; Serial: TP 1310
Measurement SW: DASY4, V4.7 Build 44; Postprocessing SW: SEMCAD, V1.8 Build 171

Area Scan (81x81x1): Measurement grid: dx=10mm, dy=10mm
Maximum value of SAR (interpolated) = 18.5 mW/g

Zoom Scan (9x9x9)/Cube 0: Measurement grid: dx=4.3mm, dy=4.3mm, dz=3mm
Reference Value = 58.2 V/m; Power Drift = -0.016 dB
Peak SAR (extrapolated) = 103.7 W/kg
SAR(1 g) = 20.5 mW/g; SAR(10 g) = 6.35 mW/g
Maximum value of SAR (measured) = 38.3 mW/g



0 dB = 38.3mW/g

5200MHz Body

Date/Time: 8/21/2006 5:57:49 PM

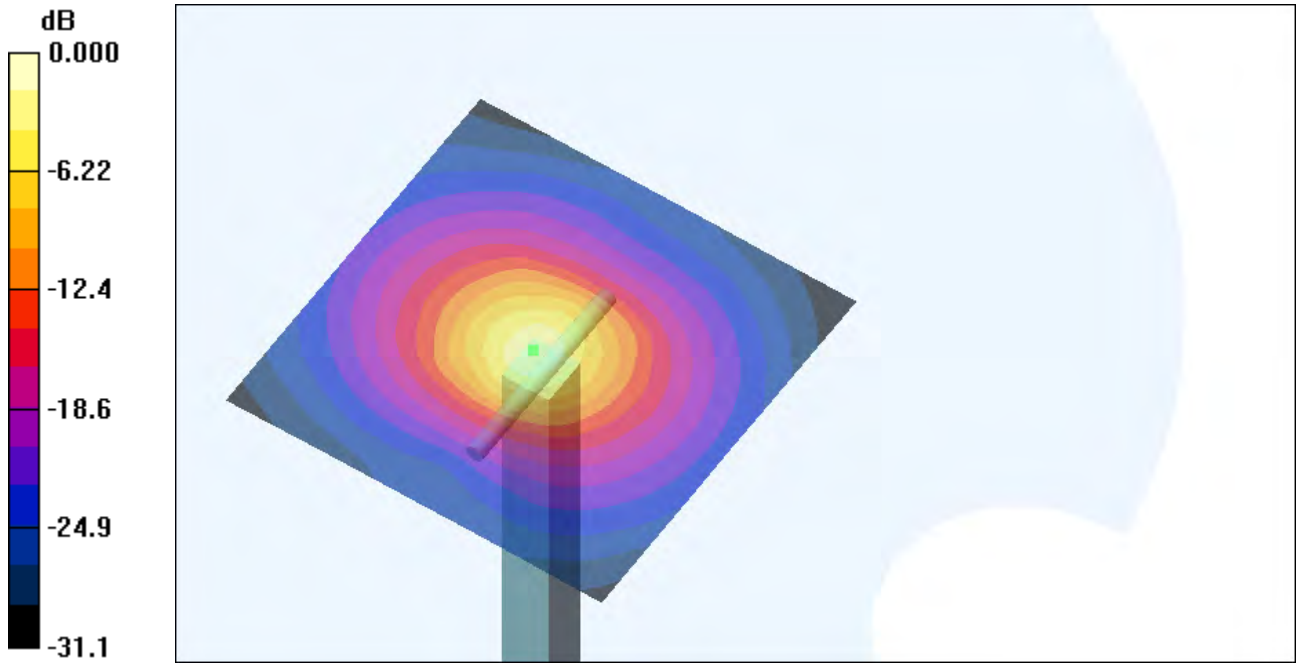
DUT: Dipole ; Type: 5000 MHz; Serial: SN:001

Communication System: CW; ; Frequency: 5200 MHz;Duty Cycle: 1:1
Medium: 5200 MHz Body Medium parameters used: f = 5200 MHz; σ = 5.37 mho/m; ε_r = 48.2; ρ = 1000 kg/m^3
Phantom section: Flat Section

Probe: EX3DV3 - SN3511; ConvF(4.68, 4.68, 4.68); Calibrated: 1/23/2006
Sensor-Surface: 4mm (Mechanical Surface Detection)Sensor-Surface: 2mm (Mechanical Surface Detection)
Electronics: DAE3 Sn584; Calibrated: 9/22/2005
Phantom: SAM with CRP; Type: SAM; Serial: TP 1310
Measurement SW: DASY4, V4.7 Build 44; Postprocessing SW: SEMCAD, V1.8 Build 171

Area Scan (81x81x1): Measurement grid: dx=10mm, dy=10mm
Maximum value of SAR (interpolated) = 16.8 mW/g

Zoom Scan (9x9x9)/Cube 0: Measurement grid: dx=4.3mm, dy=4.3mm, dz=3mm
Reference Value = 54.9 V/m; Power Drift = 0.096 dB
Peak SAR (extrapolated) = 77.0 W/kg
SAR(1 g) = 17 mW/g; SAR(10 g) = 5.13 mW/g
Maximum value of SAR (measured) = 32.1 mW/g



0 dB = 32.1mW/g

5500MHz Body

Date/Time: 8/22/2006 1:17:09 PM

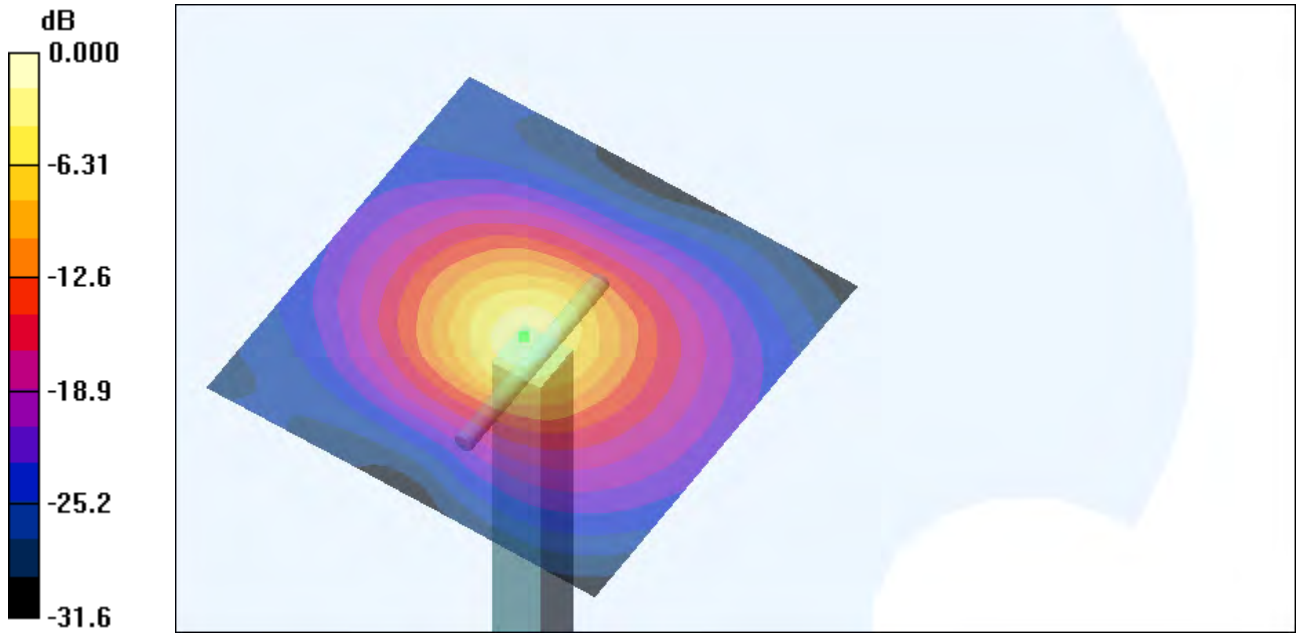
DUT: Dipole ; Type: 5000 MHz; Serial: SN:001

Communication System: CW; ; Frequency: 5500 MHz;Duty Cycle: 1:1
Medium: 5500 MHz Body Medium parameters used: f = 5500 MHz; σ = 5.8 mho/m; ε_r = 47.8; ρ = 1000 kg/m^3
Phantom section: Flat Section

Probe: EX3DV3 - SN3511; ConvF(4.3, 4.3, 4.3); Calibrated: 1/23/2006
Sensor-Surface: 4mm (Mechanical Surface Detection)Sensor-Surface: 2mm (Mechanical Surface Detection)
Electronics: DAE3 Sn584; Calibrated: 9/22/2005
Phantom: SAM with CRP; Type: SAM; Serial: TP 1310
Measurement SW: DASY4, V4.7 Build 44; Postprocessing SW: SEMCAD, V1.8 Build 171

Area Scan (81x81x1): Measurement grid: dx=10mm, dy=10mm
Maximum value of SAR (interpolated) = 17.3 mW/g

Zoom Scan (9x9x9)/Cube 0: Measurement grid: dx=4.3mm, dy=4.3mm, dz=3mm
Reference Value = 55.3 V/m; Power Drift = 0.01 dB
Peak SAR (extrapolated) = 67.3 W/kg
SAR(1 g) = 16.8 mW/g; SAR(10 g) = 5.24 mW/g
Maximum value of SAR (measured) = 32.2 mW/g



0 dB = 32.2mW/g

5800MHz Body

Date/Time: 8/22/2006 2:23:39 PM

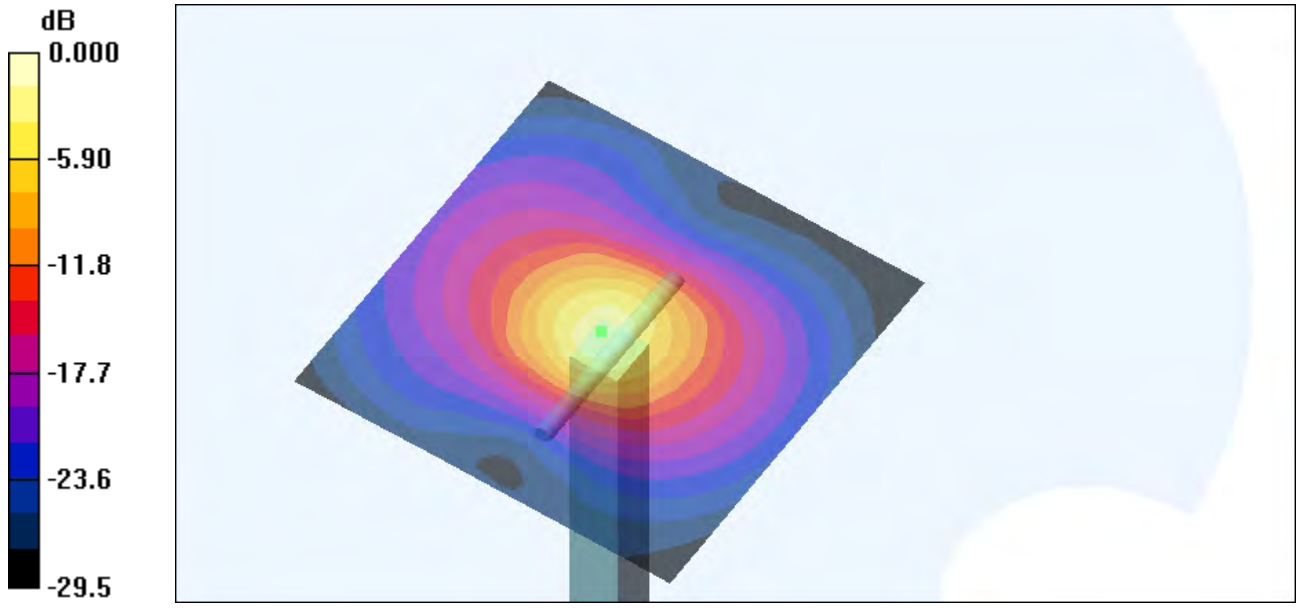
DUT: Dipole ; Type: 5000 MHz; Serial: SN:001

Communication System: CW; ; Frequency: 5800 MHz;Duty Cycle: 1:1
Medium: 5800 MHz Body Medium parameters used: f = 5800 MHz; σ = 6.15 mho/m; ε_r = 47.1; ρ = 1000 kg/m^3
Phantom section: Flat Section

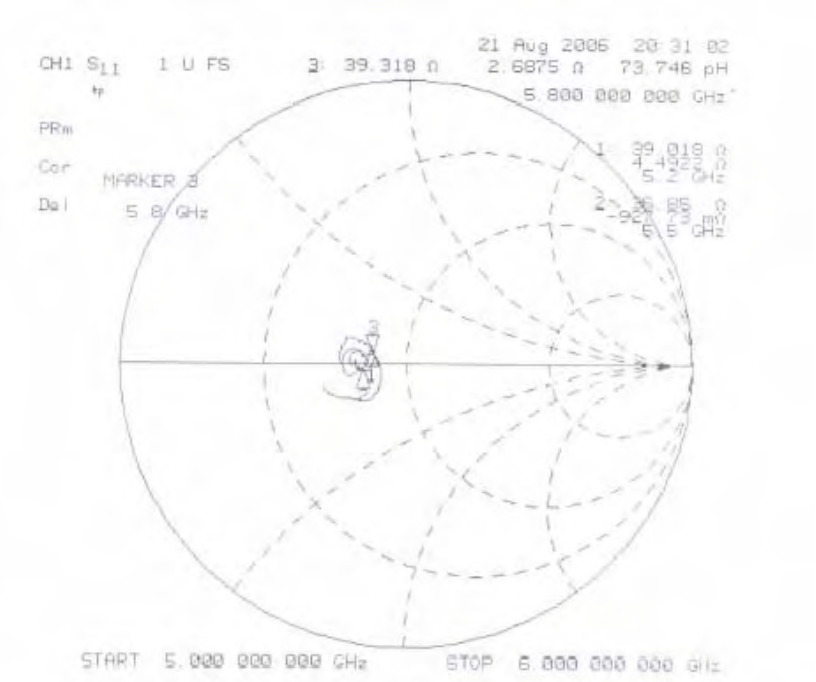
Probe: EX3DV3 - SN3511; ConvF(4.1, 4.1, 4.1); Calibrated: 1/23/2006
Sensor-Surface: 4mm (Mechanical Surface Detection)Sensor-Surface: 2mm (Mechanical Surface Detection)
Electronics: DAE3 Sn584; Calibrated: 9/22/2005
Phantom: SAM with CRP; Type: SAM; Serial: TP 1310
Measurement SW: DASY4, V4.7 Build 44; Postprocessing SW: SEMCAD, V1.8 Build 171

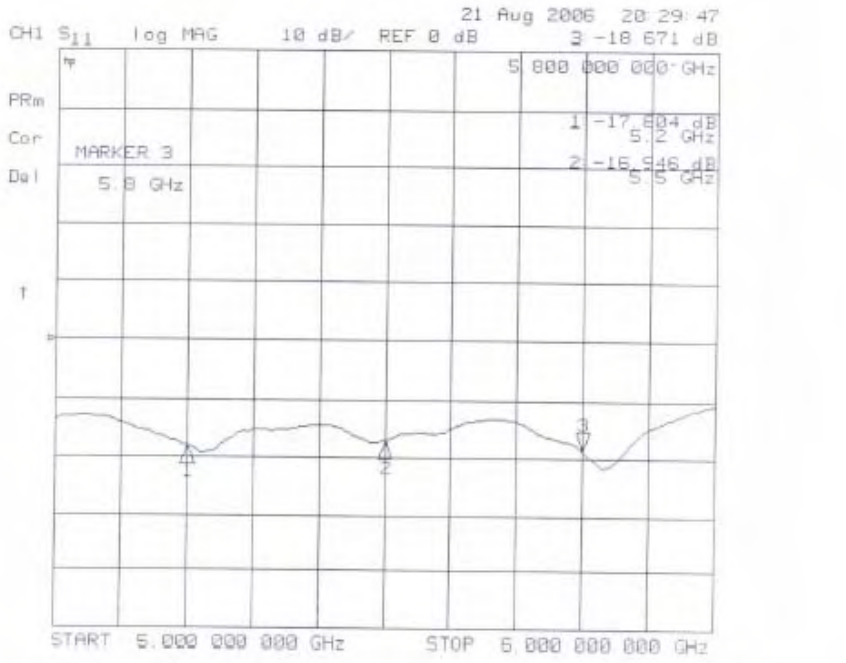
Area Scan (81x81x1): Measurement grid: dx=10mm, dy=10mm
Maximum value of SAR (interpolated) = 16.8 mW/g

Zoom Scan (9x9x9)/Cube 0: Measurement grid: dx=4.3mm, dy=4.3mm, dz=3mm
Reference Value = 53.4 V/m; Power Drift = 0.04 dB
Peak SAR (extrapolated) = 70.2 W/kg
SAR(1 g) = 16.2 mW/g; SAR(10 g) = 4.99 mW/g
Maximum value of SAR (measured) = 31.6 mW/g

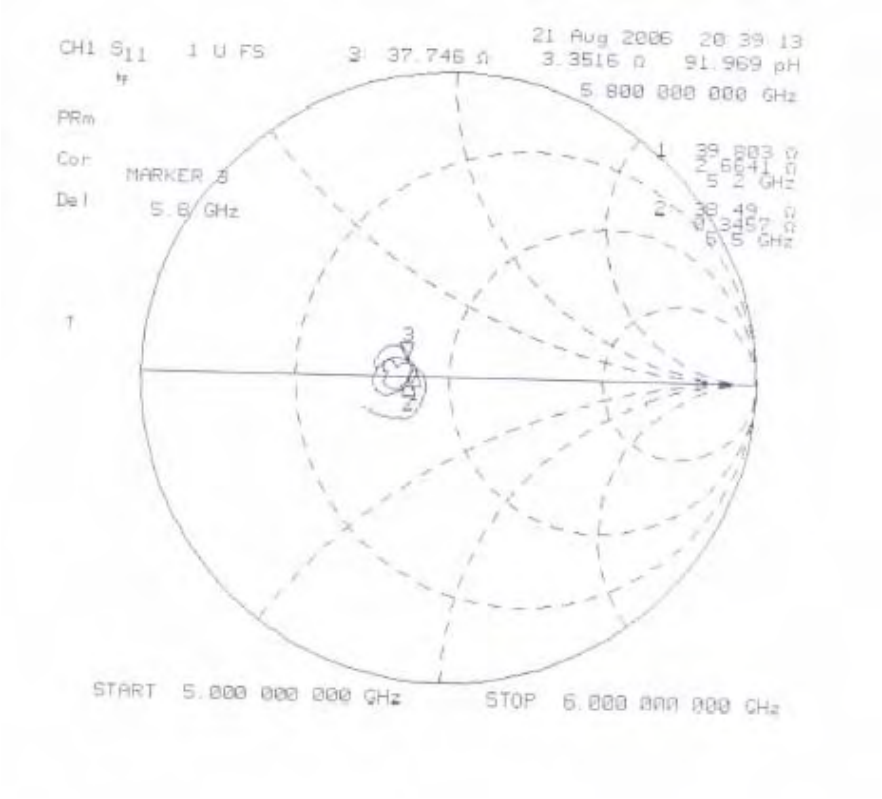


0 dB = 31.6mW/g





5000MHz Dipole with HSL Fluid



5000MHz Dipole with MSL Fluid

APPENDIX E - MEASURED FLUID DIELECTRIC PARAMETERS

835MHz Body

January 03, 2007 07:55 AM

Frequency	e'	e''
800.000000 MHz	55.2779	21.1217
804.000000 MHz	55.2385	21.1354
808.000000 MHz	55.2158	21.1147
812.000000 MHz	55.1674	21.1147
816.000000 MHz	55.1360	21.0973
820.000000 MHz	55.0881	21.0637
824.000000 MHz	55.0424	21.0798
828.000000 MHz	54.9939	21.0858
832.000000 MHz	54.9512	21.0453
836.000000 MHz	54.9017	21.0740
840.000000 MHz	54.8700	21.0299
844.000000 MHz	54.8496	21.0147
848.000000 MHz	54.8059	21.0084
852.000000 MHz	54.7556	20.9829
856.000000 MHz	54.7143	20.9651
860.000000 MHz	54.6657	20.9828
864.000000 MHz	54.6127	20.9589
868.000000 MHz	54.5807	20.9595
872.000000 MHz	54.5607	20.9340
876.000000 MHz	54.5226	20.9157
880.000000 MHz	54.4682	20.9359
884.000000 MHz	54.4534	20.9193
888.000000 MHz	54.4051	20.9107
892.000000 MHz	54.3639	20.9046
896.000000 MHz	54.3044	20.8902
900.000000 MHz	54.2681	20.8930
904.000000 MHz	54.2234	20.8992
908.000000 MHz	54.1955	20.8674
912.000000 MHz	54.1432	20.8769
916.000000 MHz	54.1200	20.8539
920.000000 MHz	54.0742	20.8505
924.000000 MHz	54.0486	20.8443
928.000000 MHz	53.9687	20.8294
932.000000 MHz	53.9377	20.8818
936.000000 MHz	53.9135	20.8495
940.000000 MHz	53.8428	20.8265
944.000000 MHz	53.8146	20.8065
948.000000 MHz	53.7682	20.8145
952.000000 MHz	53.7374	20.7857
956.000000 MHz	53.7132	20.7594
960.000000 MHz	53.6782	20.7780
964.000000 MHz	53.6332	20.7357
968.000000 MHz	53.6029	20.7622
972.000000 MHz	53.5451	20.7457
976.000000 MHz	53.5070	20.7508

1900MHz Body

January 02, 2007 09:36 AM

Frequency	e'	e''
1.800000000 GHz	56.1241	14.6461
1.804000000 GHz	56.1036	14.6599
1.808000000 GHz	56.1013	14.6723
1.812000000 GHz	56.0854	14.6820
1.816000000 GHz	56.0926	14.7160
1.820000000 GHz	56.0608	14.7407
1.824000000 GHz	56.0216	14.7571
1.828000000 GHz	55.9785	14.7850
1.832000000 GHz	55.9553	14.8134
1.836000000 GHz	55.9272	14.8160
1.840000000 GHz	55.9131	14.8207
1.844000000 GHz	55.9130	14.8198
1.848000000 GHz	55.9088	14.8383
1.852000000 GHz	55.8971	14.8447
1.856000000 GHz	55.8871	14.8764
1.860000000 GHz	55.8657	14.8998
1.864000000 GHz	55.8214	14.9148
1.868000000 GHz	55.7834	14.9162
1.872000000 GHz	55.7713	14.9005
1.876000000 GHz	55.7102	14.9247
1.880000000 GHz	55.7260	14.8820
1.884000000 GHz	55.7198	14.9030
1.888000000 GHz	55.7216	14.9084
1.892000000 GHz	55.7121	14.9097
1.896000000 GHz	55.6986	14.9378
1.900000000 GHz	55.6757	14.9561
1.904000000 GHz	55.6493	14.9703
1.908000000 GHz	55.6462	14.9845
1.912000000 GHz	55.6165	14.9715
1.916000000 GHz	55.5812	14.9873
1.920000000 GHz	55.5653	14.9991
1.924000000 GHz	55.5362	15.0051
1.928000000 GHz	55.5170	14.9938
1.932000000 GHz	55.5132	15.0015
1.936000000 GHz	55.4809	15.0149
1.940000000 GHz	55.4832	15.0166
1.944000000 GHz	55.4629	15.0335
1.948000000 GHz	55.4522	15.0446
1.952000000 GHz	55.4324	15.0727
1.956000000 GHz	55.4127	15.0930
1.960000000 GHz	55.3949	15.0885
1.964000000 GHz	55.3738	15.1067
1.968000000 GHz	55.3793	15.1132
1.972000000 GHz	55.3374	15.0917
1.976000000 GHz	55.3563	15.0921

2450MHz Body

December 28, 2006 11:50 AM

Frequency	e'	e''
2.400000000 GHz	55.8985	14.7590
2.402000000 GHz	55.9055	14.8028
2.404000000 GHz	55.8244	14.7118
2.406000000 GHz	55.7085	14.7445
2.408000000 GHz	55.7681	14.7066
2.410000000 GHz	55.7912	14.7408
2.412000000 GHz	55.7400	14.8082
2.414000000 GHz	55.8234	14.6743
2.416000000 GHz	55.6759	14.7527
2.418000000 GHz	55.6710	14.9003
2.420000000 GHz	55.7225	14.9071
2.422000000 GHz	55.7006	14.8672
2.424000000 GHz	55.6531	14.7676
2.426000000 GHz	55.6073	14.9238
2.428000000 GHz	55.8185	14.7593
2.430000000 GHz	55.6534	14.8518
2.432000000 GHz	55.7199	14.7739
2.434000000 GHz	55.5810	14.8166
2.436000000 GHz	55.7029	14.8486
2.438000000 GHz	55.7985	14.7592
2.440000000 GHz	55.7112	14.8883
2.442000000 GHz	55.8376	15.0145
2.444000000 GHz	55.7174	14.9383
2.446000000 GHz	55.7491	15.0150
2.448000000 GHz	55.8100	14.9830
2.450000000 GHz	55.7481	14.9796
2.452000000 GHz	55.7631	15.0299
2.454000000 GHz	55.7651	15.0653
2.456000000 GHz	55.6885	15.0280
2.458000000 GHz	55.7197	15.1481
2.460000000 GHz	55.7244	15.1206
2.462000000 GHz	55.7596	15.0876
2.464000000 GHz	55.7455	15.0410
2.466000000 GHz	55.7400	15.0793
2.468000000 GHz	55.8329	15.0511
2.470000000 GHz	55.8877	15.0871
2.472000000 GHz	55.8833	15.1409
2.474000000 GHz	55.7943	15.0837
2.476000000 GHz	55.8667	15.2042
2.478000000 GHz	55.9220	15.0856
2.480000000 GHz	55.8686	15.1606
2.482000000 GHz	55.7846	15.1856
2.484000000 GHz	55.9120	15.1916
2.486000000 GHz	55.9422	15.1781
2.488000000 GHz	55.7982	15.2962

5-6GHz Body

December 27, 2006 08:38 AM

Frequency	e'	e''
5.000000000 GHz	48.6872	19.1917
5.020000000 GHz	48.3650	18.9718
5.040000000 GHz	48.4188	18.9844
5.060000000 GHz	48.1634	19.0203
5.080000000 GHz	48.1236	19.1210
5.100000000 GHz	48.3053	19.2359
5.120000000 GHz	48.3316	19.2965
5.140000000 GHz	48.3125	19.2490
5.160000000 GHz	48.2440	19.2974
5.180000000 GHz	48.2853	19.4008
5.200000000 GHz	48.2821	19.4468
5.220000000 GHz	48.2955	19.4975
5.240000000 GHz	48.3224	19.5568
5.260000000 GHz	48.3479	19.5793
5.280000000 GHz	48.3248	19.6452
5.300000000 GHz	48.3556	19.7217
5.320000000 GHz	48.3678	19.7541
5.340000000 GHz	48.4040	19.8172
5.360000000 GHz	48.3635	19.8108
5.380000000 GHz	48.3559	19.8228
5.400000000 GHz	48.3091	19.8742
5.420000000 GHz	48.2881	19.8834
5.440000000 GHz	48.3795	19.9135
5.460000000 GHz	48.4585	19.9758
5.480000000 GHz	48.4153	19.9376
5.500000000 GHz	48.4162	19.8728
5.520000000 GHz	48.4717	19.8151
5.540000000 GHz	48.3290	19.7910
5.560000000 GHz	48.3601	19.7951
5.580000000 GHz	48.4165	19.8414
5.600000000 GHz	48.2870	19.6703
5.620000000 GHz	48.2789	19.6279
5.640000000 GHz	48.2841	19.5481
5.660000000 GHz	48.2816	19.5653
5.680000000 GHz	48.2089	19.4993
5.700000000 GHz	48.0999	19.3364
5.720000000 GHz	48.1173	19.3683
5.740000000 GHz	48.1176	19.4346
5.760000000 GHz	47.9191	19.5652
5.780000000 GHz	47.8381	19.6247
5.800000000 GHz	47.8591	19.7707
5.820000000 GHz	47.7635	19.8092
5.840000000 GHz	47.6052	19.9602
5.860000000 GHz	47.5306	20.0186
5.880000000 GHz	47.4724	20.1507

APPENDIX F – PHANTOM CERTIFICATE OF CONFORMITY

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

Certificate of conformity / First Article Inspection

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

Tests

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).

Test	Requirement	Details	Units tested
Shape	Compliance with the geometry according to the CAD model.	IT'IS CAD File (*)	First article, Samples
Material thickness	Compliant with the requirements according to the standards	2mm +/- 0.2mm in specific areas; 6mm +/- 0.2mm at ERP	First article, Samples
Material parameters	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 if handled and cleaned according to the instructions	DEGMBE based simulating liquids	Pre-series, First article, Samples

Standards

[1] CENELEC EN 50361
[2] IEEE Std 1528-200x Draft CD 1.1 (Dec 02)
[3] IEC 62209/CD (Nov 02)
(*) 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 7.8.2003

Signature / Stamp

s p e a g
Schmid & Partner Engineering AG
Zeughausstrasse 43, 8004 Zurich, Switzerland
Phone +41 1 245 9700, Fax +41 1 245 9779
info@speag.com, http://www.speag.com