Fax: -8475





Phone: +49 (0) 681 598-8454

Accredited testing laboratory

DAR registration number: TTI-P-G 166/98

Federal Motor Transport Authority (KBA) DAR registration number: KBA-P 00070-97

Appendix to test report 2-3816-01-03/04 Calibration data, Phantom certificate and detail information of the DASY4 System

Calibration Data and Phantom Information to test report no.: 2-3816-01-03/04



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|   | Calibration report "1900 MHz System validation dipole |      |
|   | Calibration certificate of Data Aquisition Unit (DAE) |      |
|   | Certificate of "SAM Twin Phantom V4.0/V4.0C"          |      |
|   | Application Note System Performance Check             |      |
|   | - Tr  |      |



# 1 Calibration report "Probe ET3DV6"

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

Client Cetecom

| Dbject(s)  | ET3DV6 - SN:                    | 1558   |   |  |  |  |  |
|--|---------------------------------|--|---|--|--|--|--|
| bbjeci(s)  | L13040-014                      | 1000   |   |  |  |  |  |
| Calibration procedure(s)   | QA CAL-01.v2<br>Calibration pro | 2<br>ocedure for dosimetric E-field prob   | es  |  |  |  |  |
| Calibration date:  | September6,                     | 2004   |   |  |  |  |  |
| Condition of the calibrated item In Tolerance (according to the specific calibration document) |                                 |  |   |  |  |  |  |
| he measurements and the unce   | ertainties with confidence p    | ional standards, which realize the physical units of m<br>probability are given on the following pages and are p<br>any facility: environment temperature 22 +/- 2 degrees | part of the certificate.                        |  |  |  |  |
| Calibration Equipment used (M&   | TE critical for calibration)    |  |   |  |  |  |  |
| Nodel Type   | ID #                            | Cal Date (Calibrated by, Certificate No.)  | Scheduled Calibration                           |  |  |  |  |
| ower meter EPM E4419B  | GB41293874                      | 5-May-04 (METAS, No 251-00388)   | May-05  |  |  |  |  |
| ower sensor E4412A   | MY41495277                      | 5-May-04 (METAS, No 251-00388)   | May-05  |  |  |  |  |
| Reference 20 dB Attenuator   | SN: 5086 (20b)                  | 3-May-04 (METAS, No 251-00389)   | May-05  |  |  |  |  |
| Power sensor HP 8481A<br>RF generator HP 8684C   | MY41092180<br>US3642U01700      | 18-Sep-02 (SPEAG, in house check Oct03)<br>4-Aug-99 (SPEAG, in house check Aug02)  | In house check: Oct 05<br>In house check: Aug05 |  |  |  |  |
| letwork Analyzer HP 8753E  | US37390585                      | 18-Oct-01 (SPEAG, in house check Oct03)  | In house check: Oct 05                          |  |  |  |  |
|  | Name                            | Function   | Signature                                       |  |  |  |  |
| Calibrated by:   | Nico Vetterli                   | Technician   | N. Kter   |  |  |  |  |
| pproved by:  | Katja Pokovic                   | Laboratory Director  | D. Ctel   |  |  |  |  |
|  |                                 |  | Date issued:September6, 2004                    |  |  |  |  |
| his calibration certificate is issue<br>alibration Laboratory of Schmid                        | ed as an intermediate solu      | tion until the accreditation process (based on ISO/IE  | C 17025 International Standard) for             |  |  |  |  |

880-KP0301061-A

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# Probe ET3DV6

# SN:1558

Manufactured: Last calibrated: September 16, 2003 September 6, 2004

Calibrated for DASY Systems

(Note: non-compatible with DASY2 system!)

Page 2 of 8

Calibration Data and Phantom Information to test report no.: 2-3816-01-03/04



#### September 6, 2004 ET3DV6 SN:1558 DASY - Parameters of Probe: ET3DV6 SN:1558 Diode Compression<sup>A</sup> Sensitivity in Free Space 2.03 µV/(V/m)<sup>2</sup> DCP X m٧ NormX 94 **1.92** μV/(V/m)<sup>2</sup> DCP Y NormY 94 mV 1.63 μV/(V/m)<sup>2</sup> m٧ NormZ DCP Z 94 Sensitivity in Tissue Simulating Liquid (Conversion Factors) Please see Page 7. **Boundary Effect** Head 900 MHz Typical SAR gradient: 5 % per mm 3.7 mm 4.7 mm Sensor Center to Phantom Surface Distance 9.6 5.2 SAR<sub>be</sub> [%] Without Correction Algorithm 0.1 02 SAR<sub>be</sub> [%] With Correction Algorithm 1750 MHz Typical SAR gradient: 10 % per mm Head Sensor Center to Phantom Surface Distance 3.7 mm 4.7 mm 13.8 9.0 SAR<sub>be</sub> [%] Without Correction Algorithm SAR<sub>be</sub> [%] With Correction Algorithm 0.2 0.1 Sensor Offset 2.7 Probe Tip to Sensor Center mm in tolerance **Optical Surface Detection** 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

A numerical linearization parameter: uncertainty not required

corresponds to a coverage probability of approximately 95%.

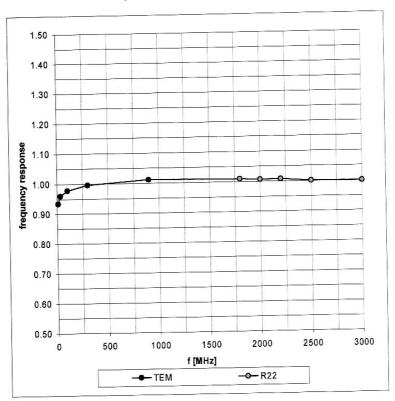
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#### ET3DV6 SN:1558

September 6, 2004

# Frequency Response of E-Field



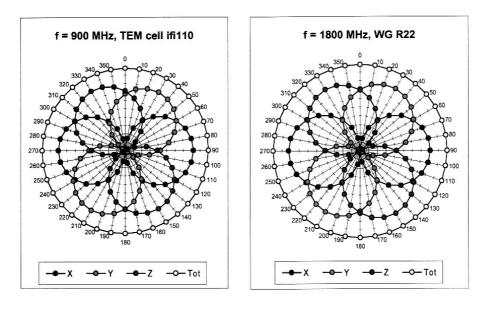
(TEM-Cell:ifi110, Waveguide R22)

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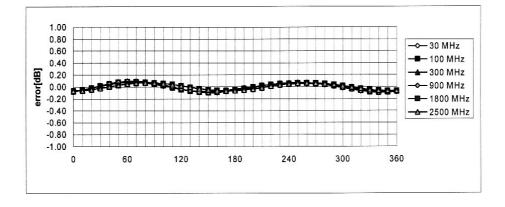


#### ET3DV6 SN:1558

September 6, 2004



## Receiving Pattern ( $\phi$ ), $\theta$ = 0°



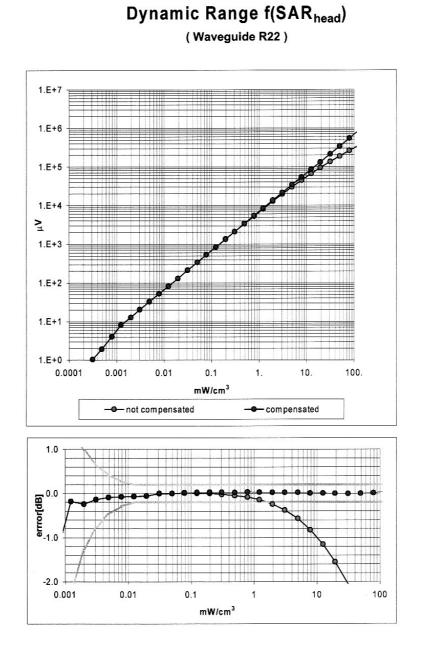
Axial Isotropy Error < ± 0.2 dB

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# CETECOM

#### ET3DV6 SN:1558

September 6, 2004



Probe Linearity Error < ± 0.2 dB

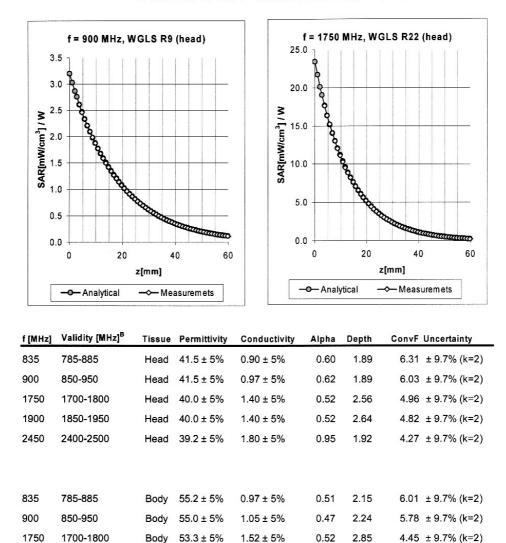
Page 6 of 8

Calibration Data and Phantom Information to test report no.: 2-3816-01-03/04



#### ET3DV6 SN:1558

September 6, 2004



#### **Conversion Factor Assessment**

<sup>8</sup> The total standard uncertainty is calculated as root-sum-square of standard uncertainty of the Conversion Factor at calibration frequency and the standard uncertainty for the indicated frequency band.

 $1.52 \pm 5\%$ 

 $1.95 \pm 5\%$ 

0.57

1.01

2.83

1.69

4.32 ± 9.7% (k=2)

4.06 ± 9.7% (k=2)

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1900

2450

1850-1950

2400-2500

Body

Body

 $53.3 \pm 5\%$ 

52.7 ± 5%

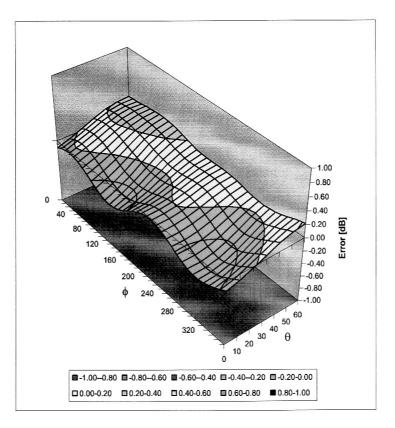


ET3DV6 SN:1558

September 6, 2004

### Deviation from Isotropy in HSL

Error ( $\theta$ ,  $\phi$ ), f = 900 MHz



Spherical Isotropy Error < ± 0.4 dB

Page 8 of 8



Calibration Data and Phantom Information to test report no.: 2-3816-01-03/04

| Calibration Laboratory<br>Schmid & Partner<br>Engineering AG<br>Zeughausstrasse 43, 8004 Zurich,  |  |   |   |  |  |  |
|---|--|---|---|--|--|--|
| Engineering AG<br>Zeughausstrasse 43, 8004 Zurich,  | . Switzerland  |   |   |  |  |  |
| Zeughausstrasse 43, 8004 Zurich,  | Switzerland  |   |   |  |  |  |
|   |  |   |   |  |  |  |
|   |  |   |   |  |  |  |
| Client Ceteco   | m  |   |   |  |  |  |
| CALIBRATION   | ERTIFICAT  | ſE  |   |  |  |  |
|   | ET3DV6 - SN  |   |   |  |  |  |
| Object(s)   | ETODVO-SN.   | 1009  |   |  |  |  |
| Calibration procedure(s)  | QA CAL-01.V2   |   |   |  |  |  |
|   | Calibration pr   | ocedure for dosimetric Field prol   | Des   |  |  |  |
|   |  |   |   |  |  |  |
| Calibration date:   | July 18, 2004  |   |   |  |  |  |
| Condition of the calibrated item  | In Tolerance (according to the specific calibration document)  |   |   |  |  |  |
| This calibration certificate docume   | ents the traceability to na  | according to the specific calibrat<br>tional standards, which realize physical units of m<br>probability are given on the following pages and are   | easurements (SI).   |  |  |  |
| This calibration certificate docume<br>The measurements and the uncer<br>All calibrations have been conduct   | ents the traceability to na<br>tainties with confidence<br>and in the closed laborate  | tional standards, which realiate physical units of m<br>probability are given on the following pages and are<br>pry facility: enviroment temperature 22 +/ 2 degrees (  | easurements (SI).<br>e part of the certificate.   |  |  |  |
| This calibration certificate docume<br>The measurements and the uncer<br>All calibrations have been conduct<br>Calibration Equipment used (M&T  | ents the traceability to na<br>tainties with confidence<br>ted in the closed laborato<br>E critical for calibration)   | tional standards, which realize physical units of m<br>probability are given on the following pages and are<br>pry facility: enviroment temperature 22 +# 2 degrees (   | easurements (SI).<br>a part of the certificate.<br>Celsius and humidity < `   |  |  |  |
| This calibration certificate docume<br>The measurements and the uncer<br>All calibrations have been conduct<br>Calibration Equipment used (M&T<br>Model Type<br>Power meter EPM E4419B  | ents the traceability to na<br>tainties with confidence<br>ted in the closed laborato<br>E critical for calibration)<br>ID #<br>GB41293874   | tional standards, which realize physical units of m<br>probability are given on the following pages and are<br>by facility: environent temperature 22 +/ 2 degrees (<br>Cal Date (Calibrated by, Certificate No.)<br>5-May-04 (METAS, No 251-00388)   | easurements (SI).<br>part of the certificate.<br>Celsius and humidity <<br>Celsius Celsius and humidity <<br>Scheduled Calibrati<br>May-05  |  |  |  |
| This calibration certificate docume<br>The measurements and the uncer<br>All calibrations have been conduct<br>Calibration Equipment used (M&T<br>Model Type<br>Power meter EPM E44198<br>Power sensor E4412A   | ents the traceability to na<br>tainties with confidence<br>led in the closed laborato<br>E critical for calibration)<br>ID #<br>GB41293874<br>MY41495277   | tional standards, which realiate physical units of m<br>probability are given on the following pages and are<br>bry facility: environent temperature 22 +/ 2 degrees (<br>Cal Date (Calibrated by, Certificate No.)<br>5-May-04 (METAS, No 251-00388)<br>5-May-04 (METAS, No 251-00388)   | easurements (SI).<br>part of the certificate.<br>Celsius and humidity <<br>Celsius and humidity <<br>Scheduled Calibrati<br>May-05<br>May-05  |  |  |  |
| This calibration certificate docume<br>The measurements and the uncer<br>All calibrations have been conduct<br>Calibration Equipment used (M&T<br>Model Type<br>Power meter EPM E4419B  | ents the traceability to na<br>tainties with confidence<br>led in the closed laborato<br>E critical for calibration)<br>ID #<br>GB41293874<br>MY41495277<br>SN: 5086 (20b)   | tional standards, which realize physical units of m<br>probability are given on the following pages and are<br>by facility: environent temperature 22 +/ 2 degrees (<br>Cal Date (Calibrated by, Certificate No.)<br>5-May-04 (METAS, No 251-00388)   | easurements (SI).<br>part of the certificate.<br>Celsius and humidity <<br>Celsius Celsius and humidity <<br>Scheduled Calibrati<br>May-05  |  |  |  |
| This calibration certificate docume<br>The measurements and the uncer<br>All calibrations have been conduct<br>Calibration Equipment used (M&T<br>Model Type<br>Power meter EPM E44198<br>Power sensor E4412A<br>Reference 20 dB Attenuator<br>Fluke Process Calibrator Type 700<br>Power sensor HP 8481A   | ents the traceability to na<br>tainties with confidence<br>ted in the closed laborato<br>E critical for calibration)<br>ID #<br>GB41293874<br>MY41495277<br>SN: 5086 (20b)<br>2 SN: 6295803<br>MY41092180  | tional standards, which realize physical units of m<br>probability are given on the following pages and are<br>ory facility: environent temperature 22 +/ 2 degrees (<br>Cal Date (Calibrated by, Certificate No.)<br>5-May-04 (METAS, No 251-00388)<br>3-May-04 (METAS, No 251-00388)<br>3-May-04 (METAS, No 251-00389)<br>8-Sep-03 (Sintrel SCS No. 5030020)<br>18-Sep-02 (SPEAG, in house check Oo03)  | easurements (SI).<br>part of the certificate.<br>Celsius and humidity <<br>Scheduled Calibrati<br>May-05<br>May-05<br>May-05<br>Sep-04<br>In house check: Oc                          |  |  |  |
| This calibration certificate docume<br>The measurements and the uncer<br>All calibrations have been conduct<br>Calibration Equipment used (M&T<br>Model Type<br>Power meter EPM E44198<br>Power sensor E4412A<br>Reference 20 dB Attenuator<br>Fluke Process Calibrator Type 70:<br>Power sensor HP 8481A<br>RF generator HP 8684C  | ents the traceability to na<br>tainties with confidence<br>ted in the closed laborato<br>E critical for calibration)<br>ID #<br>GB41293874<br>MY41495277<br>SN: 5086 (20b)<br>2 SN: 6295803<br>MY41092180<br>US3642U01700  | tional standards, which realize physical units of m<br>probability are given on the following pages and are<br>ony facility: environent temperature 22 +/ 2 degrees (<br>Cal Date (Calibrated by, Certificate No.)<br>5-May-04 (METAS, No 251-00388)<br>3-May-04 (METAS, No 251-00388)<br>3-May-04 (METAS, No 251-00388)<br>3-May-04 (METAS, No 251-00389)<br>8-Sep-03 (Sintrel SCS No. 5030020)<br>18-Sep-03 (SPEAG, in house check Cod03)<br>4-Aug-99 (SPEAG, in house check Aug02)                       | easurements (SI).<br>part of the certificate.<br>Celsius and humidity <<br>Scheduled Calibrati<br>May-05<br>May-05<br>May-05<br>Sep-04<br>In house check: Oc<br>In house check: Au    |  |  |  |
| This calibration certificate docume<br>The measurements and the uncer<br>All calibrations have been conduct<br>Calibration Equipment used (M&T<br>Model Type<br>Power meter EPM E44198<br>Power sensor E4412A<br>Reference 20 dB Attenuator<br>Fluke Process Calibrator Type 700<br>Power sensor HP 8481A   | ents the traceability to na<br>tainties with confidence<br>ted in the closed laborato<br>E critical for calibration)<br>ID #<br>GB41293874<br>MY41495277<br>SN: 5086 (20b)<br>2 SN: 6295803<br>MY41092180  | tional standards, which realize physical units of m<br>probability are given on the following pages and are<br>ory facility: environent temperature 22 +/ 2 degrees (<br>Cal Date (Calibrated by, Certificate No.)<br>5-May-04 (METAS, No 251-00388)<br>3-May-04 (METAS, No 251-00388)<br>3-May-04 (METAS, No 251-00389)<br>8-Sep-03 (Sintrel SCS No. 5030020)<br>18-Sep-02 (SPEAG, in house check Oo03)  | easurements (SI).<br>part of the certificate.<br>Celsius and humidity <<br>Scheduled Calibrati<br>May-05<br>May-05<br>May-05<br>Sep-04<br>In house check: Oc                          |  |  |  |
| This calibration certificate docume<br>The measurements and the uncer<br>All calibrations have been conduct<br>Calibration Equipment used (M&T<br>Model Type<br>Power meter EPM E44198<br>Power sensor E4412A<br>Reference 20 dB Attenuator<br>Fluke Process Calibrator Type 702<br>Power sensor HP 8481A<br>RF generator HP 8684C<br>Network Analyzer HP 8753E                   | ents the traceability to na<br>tainties with confidence<br>and in the closed laborato<br>E critical for calibration)<br>ID #<br>GB41293874<br>MY41495277<br>SN: 5086 (20b)<br>2 SN: 6295803<br>MY41092180<br>US3642U01700<br>US37390585<br>Name                  | tional standards, which realiate physical units of m<br>probability are given on the following pages and are<br>ory facility: environent temperature 22 +/ 2 degrees (<br>Cal Date (Calibrated by, Certificate No.)<br>5-May-04 (METAS, No 251-00388)<br>3-May-04 (METAS, No 251-00388)<br>3-May-04 (METAS, No 251-00389)<br>8-Sep-03 (Sintrel SCS No. 5030020)<br>18-Sep-02 (SPEAG, in house check Cod03)<br>4-Aug-99 (SPEAG, in house check Cod03)<br>18-Oct-01 (SPEAG, in house check Cod03)<br>Function | easurements (SI).<br>part of the certificate.<br>Celsius and humidity <<br>Scheduled Calibrati<br>May-05<br>May-05<br>Sep-04<br>In house check: Oc<br>In house check: Oc<br>Signature |  |  |  |
| This calibration certificate docume<br>The measurements and the uncer<br>All calibrations have been conduct<br>Calibration Equipment used (M&T<br>Model Type<br>Power meter EPM E44198<br>Power sensor E4412A<br>Reference 20 dB Attenuator<br>Fluke Process Calibrator Type 70:<br>Power sensor HP 8481A<br>RF generator HP 8684C  | ents the traceability to na<br>tainties with confidence<br>ted in the closed laborator<br>E critical for calibration)<br>ID #<br>GB41293874<br>MY41495277<br>SN: 5086 (20b)<br>2 SN: 6295803<br>MY41092180<br>US3642U01700<br>US37390585                         | tional standards, which realiate physical units of m<br>probability are given on the following pages and are<br>ory facility: environent temperature 22 +/ 2 degrees (<br>Cal Date (Calibrated by, Certificate No.)<br>5-May-04 (METAS, No 251-00388)<br>3-May-04 (METAS, No 251-00388)<br>3-May-04 (METAS, No 251-00389)<br>8-Sep-03 (Sintrel SCS No. 5030020)<br>18-Sep-02 (SPEAG, in house check Cod03)<br>4-Aug-99 (SPEAG, in house check Cod03)<br>18-Oct-01 (SPEAG, in house check Cod03)<br>Function | easurements (SI).<br>part of the certificate.<br>Celsius and humidity <<br>Scheduled Calibrati<br>May-05<br>May-05<br>Sep-04<br>In house check: Oc<br>In house check: Oc<br>Signature |  |  |  |
| This calibration certificate docume<br>The measurements and the uncer<br>All calibrations have been conduct<br>Calibration Equipment used (M&T<br>Model Type<br>Power meter EPM E44198<br>Power sensor E4412A<br>Reference 20 dB Attenuator<br>Fluke Process Calibrator Type 702<br>Power sensor HP 8481A<br>RF generator HP 8684C<br>Network Analyzer HP 8753E                   | ents the traceability to na<br>tainties with confidence<br>and in the closed laborato<br>E critical for calibration)<br>ID #<br>GB41293874<br>MY41495277<br>SN: 5086 (20b)<br>2 SN: 6295803<br>MY41092180<br>US3642U01700<br>US37390585<br>Name                  | tional standards, which realiate physical units of m<br>probability are given on the following pages and are<br>ory facility: environent temperature 22 +/ 2 degrees (<br>Cal Date (Calibrated by, Certificate No.)<br>5-May-04 (METAS, No 251-00388)<br>3-May-04 (METAS, No 251-00388)<br>3-May-04 (METAS, No 251-00389)<br>8-Sep-03 (Sintrel SCS No. 5030020)<br>18-Sep-02 (SPEAG, in house check Cod03)<br>4-Aug-99 (SPEAG, in house check Cod03)<br>18-Oct-01 (SPEAG, in house check Cod03)<br>Function | easurements (SI).<br>part of the certificate.<br>Celsius and humidity <<br>Scheduled Calibrati<br>May-05<br>May-05<br>Sep-04<br>In house check: Oc<br>In house check: Oc<br>Signature |  |  |  |
| This calibration certificate docume<br>The measurements and the uncer<br>All calibrations have been conduct<br>Calibration Equipment used (M&T<br>Model Type<br>Power meter EPM E44198<br>Power sensor E4412A<br>Reference 20 dB Attenuator<br>Fluke Process Calibrator Type 70:<br>Power sensor HP 8481A<br>RF generator HP 8684C<br>Network Analyzer HP 8753E<br>Calibrated by: | ents the traceability to na<br>tainties with confidence<br>ted in the closed laborato<br>E critical for calibration)<br>ID #<br>GB41293874<br>MY41495277<br>SN: 5086 (20b)<br>2 SN: 6295803<br>MY41092180<br>US3642U01700<br>US37390585<br>Name<br>Nico Vetterli | tional standards, which realiate physical units of m<br>probability are given on the following pages and are<br>ory facility: environent temperature 22 +/ 2 degrees (<br>Cal Date (Calibrated by, Certificate No.)<br>5-May-04 (METAS, No 251-00388)<br>3-May-04 (METAS, No 251-00388)<br>3-May-04 (METAS, No 251-00389)<br>8-Sep-03 (Sintrel SCS No. 5030020)<br>18-Sep-02 (SPEAG, in house check Cod03)<br>4-Aug-99 (SPEAG, in house check Cod03)<br>18-Oct-01 (SPEAG, in house check Cod03)<br>Function | easurements (SI).<br>part of the certificate.<br>Celsius and humidity <<br>Scheduled Calibrat<br>May-05<br>May-05<br>May-05<br>Sep-04<br>In house check: Oc<br>In house check: Oc     |  |  |  |

Calibration Data and Phantom Information to test report no.: 2-3816-01-03/04



# Probe ET3DV6

# SN:1559

Manufactured: Last calibrated: Recalibrated: December 1, 2000 April 16, 2003 July 18, 2004

Calibrated for DASY Systems

(Note: non-compatible with DASY2 system):

Page 2 of 8



#### ET3DV6 SN:1559

July 18, 2004

#### DASY - Parameters of Probe: ET3DV6 SN:1559

Sensitivity in Free Space

Diode Compression<sup>A</sup>

| NormX  | <b>1.76</b> μV/(V/m) <sup>2</sup> | DCP X | 94 | ۳V  |
|--------|-----------------------------------|-------|----|-----|
| Norm Y | <b>1.56</b> μV/(V/m) <sup>2</sup> | DCP Y | 94 | m٧  |
| NormZ  | 1.71 μV/(V/m) <sup>2</sup>        | DCP Z | 94 | Vrr |

Sensitivity in Tissue Simulating Liquid (Conversion Factors)

#### Plese see Page 7.

#### **Boundary Effect**

#### Head

900 MHz Typical SAR gradient: 5 % per mm

| Sensor Cente | r to Phantom Surface Distance | 3,7 mm | 4.7 mm |  |
|--------------|-------------------------------|--------|--------|--|
| SAR., [%]    | Without Correction Algorithm  | 85     | 47     |  |
| SAR., [%]    | With Correction Algorithm     | 0.0    | 0.1    |  |

#### Head

1750 MHz Typical SAR gradient: 10 % per mm

| Sensor Cente | r to Phantom Surface Distance | 3.7 mm 4 | 1.7 mm |  |
|--------------|-------------------------------|----------|--------|--|
| SAR, [%]     | Without Correction Argorithm  | 12.2     | 77     |  |
| SAR. [%]     | With Correction Algorithm     | 0.0      | 03     |  |

#### Sensor Offset

| Probe Tip to Sensor Ceriter | 2.7 mm       |
|-----------------------------|--------------|
| Optical Surface Detection   | in tolerance |

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%.

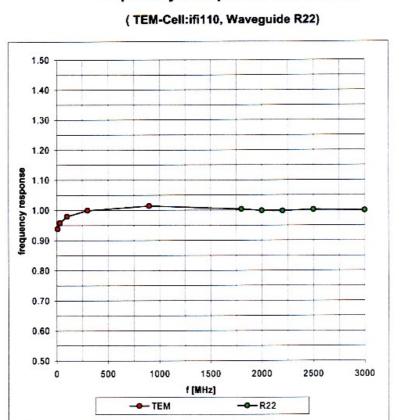
<sup>6</sup> numerical linearization parameter uncertainly not recurred.

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#### ET3DV6 SN:1559

July 18, 2004



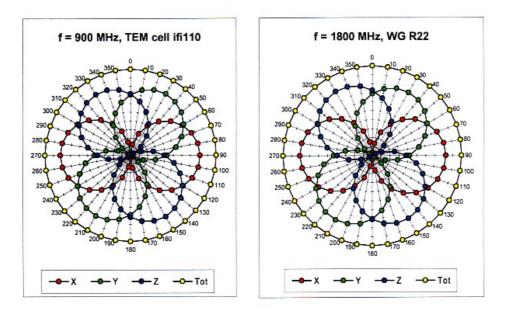
## Frequency Response of E-Field

Page 4 of 8

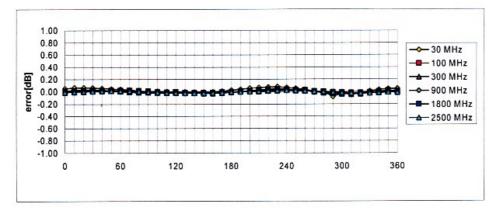


#### ET3DV6 SN:1559

July 18, 2004



## Receiving Pattern ( $\phi$ ), $\theta$ = 0°



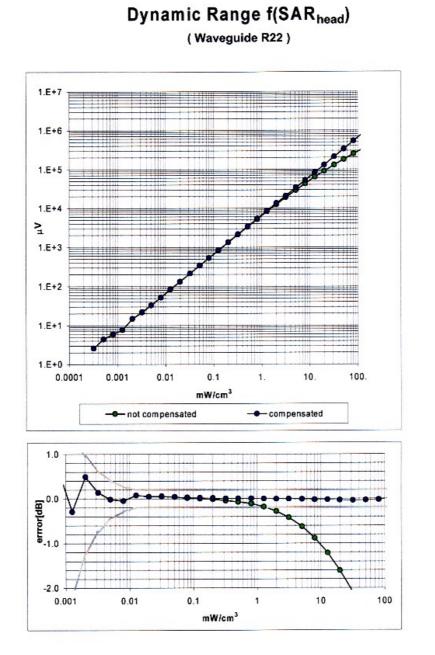
Axial Isotropy Error < ± 0.2 dB

Page 5 of 8

# CETECOM

#### ET3DV6 SN:1559

July 18, 2004



Probe Linearity Error < ± 0.2 dB

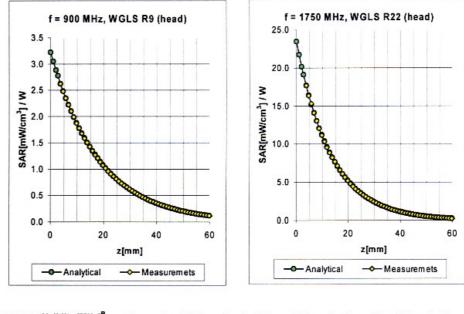
Page 6 of 8

Calibration Data and Phantom Information to test report no.: 2-3816-01-03/04



#### ET3DV6 SN:1559

July 18, 2004



#### **Conversion Factor Assessment**

| f [MHz] | Validity [MHz] <sup>B</sup> | Tissue | Permittivity | Conductivity | Alpha | Depth | ConvF Uncertainty  |
|---------|-----------------------------|--------|--------------|--------------|-------|-------|--------------------|
| 900     | 850-950                     | Head   | 41.5 ± 5%    | 0.97 ± 5%    | 0.53  | 1.93  | 6.59 ± 9.7% (k=2)  |
| 1750    | 1700-1800                   | Head   | 40.0 ± 5%    | 1.40 ± 5%    | 0.46  | 2.58  | 5.37 ± 9.7% (k=2)  |
| 1900    | 1850-1950                   | Head   | 40.0 ± 5%    | 1.40 ± 5%    | 0.48  | 2.79  | 5.13 ± 9.7% (k=2)  |
| 2450    | 2400-2500                   | Head   | 39.2 ± 5%    | 1.80 ± 5%    | 0.81  | 1.92  | 4.56 ± 9.7% (k=2)  |
|         |                             |        |              |              |       |       |                    |
| 450     | 400-500                     | Body   | 56.7 ± 5%    | 0.94 ± 5%    | 0.29  | 2.46  | 7.13 ± 15.5% (k=2) |
| 900     | 850-950                     | Body   | 55.0 ± 5%    | 1.05 ± 5%    | 0.46  | 2.26  | 6.21 ± 9.7% (k=2)  |
| 1750    | 1700-1800                   | Body   | 53.3 ± 5%    | 1.52 ± 5%    | 0.48  | 2.94  | 4.60 ± 9.7% (k=2)  |
| 1900    | 1850-1950                   | Body   | 53.3 ± 5%    | 1.52 ± 5%    | 0.53  | 2.90  | 4.40 ± 9.7% (k=2)  |
| 2450    | 2400-2500                   | Body   | 52.7 ± 5%    | 1.95 ± 5%    | 1.11  | 1.55  | 4.21 ± 9.7% (k=2)  |

<sup>B</sup> The total standard uncertainty is calculated as root-sum-square of standard uncertainty of the Conversion Factor at calibration frequency and the standard uncertainty for the indicated frequency band.

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Calibration Data and Phantom Information to test report no.: 2-3816-01-03/04

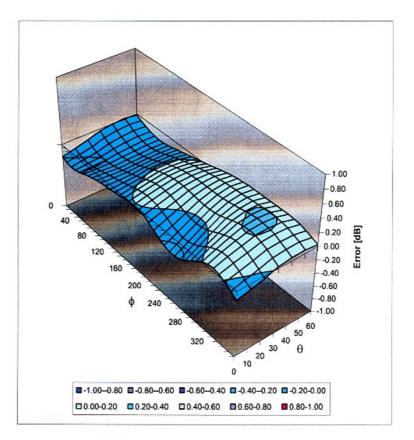


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## Deviation from Isotropy in HSL

Error (θ, φ), f = 900 MHz



Spherical Isotropy Error < ± 0.4 dB

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# 3 Calibration report "900 MHz System validation dipole"

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

| Client Cetecol  | nm               |  |                                   |  |  |  |  |
|---|------------------|--|-----------------------------------|--|--|--|--|
| CALIBRATION C   | ERTIEICATE       |  |                                   |  |  |  |  |
| Object(s)   | D900V2 - SN:10   | 2  |                                   |  |  |  |  |
| Calibration procedure(s) QA CAL-05.v2<br>Calibration procedure for dipole validation kits                 |                  |  |                                   |  |  |  |  |
| Calibration date: February 4, 2003  |                  |  |                                   |  |  |  |  |
| Condition of the calibrated item  | In Tolerance (ac | cording to the specific calibration                          | document)                         |  |  |  |  |
| 17025 international standard.<br>All calibrations have been conducted<br>Calibration Equipment used (M&TE |                  | acility: environment temperature 22 +/- 2 degrees (          | Celsius and humidity < 75%.       |  |  |  |  |
| Model Type  | ID #             | Cal Date   | Scheduled Calibration             |  |  |  |  |
| RF generator HP 8684C   | US3642U01700     | 4-Aug-99 (in house check Aug-02)                             | In house check: Aug-05            |  |  |  |  |
| Power sensor E4412A   | MY41495277       | 8-Mar-02   | Mar-03                            |  |  |  |  |
| Power sensor HP 8481A   | MY41092180       | 18-Sep-02  | Sep-03                            |  |  |  |  |
| Power meter EPM E4419B  | GB41293874       | 13-Sep-02  | Sep-03                            |  |  |  |  |
| Network Analyzer HP 8753E   | US38432426       | 3-May-00   | In house check: May 03            |  |  |  |  |
| Fluke Process Calibrator Type 702   | SN: 6295803      | 3-Sep-01   | Sep-03                            |  |  |  |  |
|   | Name             | Function   | Signature                         |  |  |  |  |
| Calibrated by:  | Nica Vetterli    | Technician   | D.Vellah                          |  |  |  |  |
| Approved by:  | Katja Pokovic    | Laboratory Director  | D. Vella<br>Schonie Katza         |  |  |  |  |
|   |                  |  | Date issued: February 7, 2003     |  |  |  |  |
| This calibration certificate is issued a<br>Calibration Laboratory of Schmid &                            |                  | until the accreditation process (based on ISO/IEC completed. | 17025 International Standard) for |  |  |  |  |

880-KP0301061-A

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