| | Date(s) of Evaluation | Test Report Serial No. | Test Report Revision No. | |
|---|---|---|---|---|
| | Nov. 25-30, Dec. 1-8, 2010 | 112410EHA-T1062-S15W | Rev. 1.0 (Initial Release) | ilac-MRA / ACCREDITED |
| | Test Report Issue Date | Description of Test(s) | RF Exposure Category | Test Lab Certificate No. 2470.01 |
| | December 21, 2010 | Specific Absorption Rate | General Pop. / Uncontrolled | |

## APPENDIX H - PROBE CALIBRATION

**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
Swiss Calibration Service

Accredited by the Swiss Accreditation Service (SAS)
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    **Celltech**

Certificate No: **EX3-3600_Apr10**

# CALIBRATION CERTIFICATE

| | |
|---|---|
| Object | **EX3DV4 - SN:3600** |
| Calibration procedure(s) | **QA CAL-01.v6, QA CAL-14.v3, QA CAL-23.v3 and QA CAL-25.v2**<br>**Calibration procedure for dosimetric E-field probes** |
| Calibration date: | **April 29, 2010** |

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 (Certificate No.) | Scheduled Calibration |
|---|---|---|---|
| Power meter E4419B | GB41293874 | 1-Apr-10 (No. 217-01136) | Apr-11 |
| Power sensor E4412A | MY41495277 | 1-Apr-10 (No. 217-01136) | Apr-11 |
| Power sensor E4412A | MY41498087 | 1-Apr-10 (No. 217-01136) | Apr-11 |
| Reference 3 dB Attenuator | SN: S5054 (3c) | 30-Mar-10 (No. 217-01159) | Mar-11 |
| Reference 20 dB Attenuator | SN: S5086 (20b) | 30-Mar-10 (No. 217-01161) | Mar-11 |
| Reference 30 dB Attenuator | SN: S5129 (30b) | 30-Mar-10 (No. 217-01160) | Mar-11 |
| Reference Probe ES3DV2 | SN: 3013 | 30-Dec-09 (No. ES3-3013_Dec09) | Dec-10 |
| DAE4 | SN: 660 | 29-Sep-09 (No. DAE4-660_Sep09) | Sep-10 |

| Secondary Standards | ID # | Check Date (in house) | Scheduled Check |
|---|---|---|---|
| RF generator HP 8648C | US3642U01700 | 4-Aug-99 (in house check Oct-09) | In house check: Oct-11 |
| Network Analyzer HP 8753E | US37390585 | 18-Oct-01 (in house check Oct-09) | In house check: Oct10 |

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

Issued: April 29, 2010

This calibration certificate shall not be reproduced except in full without written approval of the laboratory.

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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 |
| ConvF | sensitivity in TSL / NORMx,y,z |
| DCP | diode compression point |
| CF | crest factor (1/duty_cycle) of the RF signal |
| A, B, C | modulation dependent linearization parameters |
| 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., ϑ = 0 is normal to probe axis |

## Calibration is Performed According to the Following Standards:

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

## Methods Applied and Interpretation of Parameters:

- *NORMx,y,z:* Assessed for E-field polarization ϑ = 0 (f ≤ 900 MHz in TEM-cell; f > 1800 MHz: R22 waveguide). NORMx,y,z are only intermediate values, i.e., the uncertainties of NORMx,y,z does not effect the $E^2$-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 with CW signal (no uncertainty required). DCP does not depend on frequency nor media.

- *Ax,y,z; Bx,y,z; Cx,y,z, VRx,y,z:* A, B, C are numerical linearization parameters assessed based on the data of power sweep for specific modulation signal. The parameters do not depend on frequency nor media. VR is the maximum calibration range expressed in RMS voltage across the diode.

- *ConvF and Boundary Effect Parameters:* Assessed in flat phantom using E-field (or Temperature Transfer Standard for f ≤ 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  EX3DV4

## SN:3600

| Manufactured: | January 10, 2007 |
|---|---|
| Last calibrated: | April 28, 2009 |
| Recalibrated: | April 29, 2010 |

### Calibrated for DASY Systems

(Note: non-compatible with DASY2 system!)

# DASY - Parameters of Probe: EX3DV4 SN:3600

## Basic Calibration Parameters

|  | Sensor X | Sensor Y | Sensor Z | Unc (k=2) |
|---|---|---|---|---|
| Norm $(\mu V/(V/m)^2)^A$ | 0.51 | 0.51 | 0.40 | ± 10.1% |
| DCP $(mV)^B$ | 90.5 | 88.5 | 85.2 | |

## Modulation Calibration Parameters

| UID | Communication System Name | PAR | | A dB | B dBuV | C | VR mV | $Unc^E$ (k=2) |
|---|---|---|---|---|---|---|---|---|
| 10000 | CW | 0.00 | X | 0.00 | 0.00 | 1.00 | 300 | ± 1.5% |
| | | | Y | 0.00 | 0.00 | 1.00 | 300 | |
| | | | Z | 0.00 | 0.00 | 1.00 | 300 | |

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 Pages 5 and 6).

$^B$ Numerical linearization parameter: uncertainty not required.

$^C$ Uncertainty is determined using the maximum deviation from linear response applying recatangular distribution and is expressed for the square of the field value.

# DASY - Parameters of Probe: EX3DV4 SN:3600

## Calibration Parameter Determined in Head Tissue Simulating Media

| f [MHz] | Validity [MHz]$^C$ | Permittivity | Conductivity | ConvF X | ConvF Y | ConvF Z | Alpha | Depth | Unc (k=2) |
|---------|--------------------|--------------|--------------|---------|---------|---------|-------|-------|-----------|
| 900 | ± 50 / ± 100 | 41.5 ± 5% | 0.97 ± 5% | 7.79 | 7.79 | 7.79 | 0.74 | 0.61 | ± 11.0% |
| 1810 | ± 50 / ± 100 | 40.0 ± 5% | 1.40 ± 5% | 6.79 | 6.79 | 6.79 | 0.59 | 0.70 | ± 11.0% |
| 1950 | ± 50 / ± 100 | 40.0 ± 5% | 1.40 ± 5% | 6.46 | 6.46 | 6.46 | 0.57 | 0.72 | ± 11.0% |
| 2450 | ± 50 / ± 100 | 39.2 ± 5% | 1.80 ± 5% | 6.15 | 6.15 | 6.15 | 0.34 | 0.89 | ± 11.0% |

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

# DASY - Parameters of Probe: EX3DV4 SN:3600

## Calibration Parameter Determined in Body Tissue Simulating Media

| f [MHz] | Validity [MHz][c] | Permittivity | Conductivity | ConvF X | ConvF Y | ConvF Z | Alpha | Depth | Unc (k=2) |
|---------|------------------|--------------|--------------|---------|---------|---------|-------|-------|-----------|
| 900 | ± 50 / ± 100 | 55.0 ± 5% | 1.05 ± 5% | 7.92 | 7.92 | 7.92 | 0.50 | 0.77 | ± 11.0% |
| 1810 | ± 50 / ± 100 | 53.3 ± 5% | 1.52 ± 5% | 6.47 | 6.47 | 6.47 | 0.70 | 0.64 | ± 11.0% |
| 1950 | ± 50 / ± 100 | 53.3 ± 5% | 1.52 ± 5% | 6.53 | 6.53 | 6.53 | 0.64 | 0.67 | ± 11.0% |
| 2450 | ± 50 / ± 100 | 52.7 ± 5% | 1.95 ± 5% | 6.24 | 6.24 | 6.24 | 0.43 | 0.87 | ± 11.0% |
| 5200 | ± 50 / ± 100 | 49.0 ± 5% | 5.30 ± 5% | 3.73 | 3.73 | 3.73 | 0.52 | 1.95 | ± 13.1% |
| 5500 | ± 50 / ± 100 | 48.6 ± 5% | 5.65 ± 5% | 3.30 | 3.30 | 3.30 | 0.58 | 1.95 | ± 13.1% |
| 5800 | ± 50 / ± 100 | 48.2 ± 5% | 6.00 ± 5% | 3.44 | 3.44 | 3.44 | 0.63 | 1.95 | ± 13.1% |

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

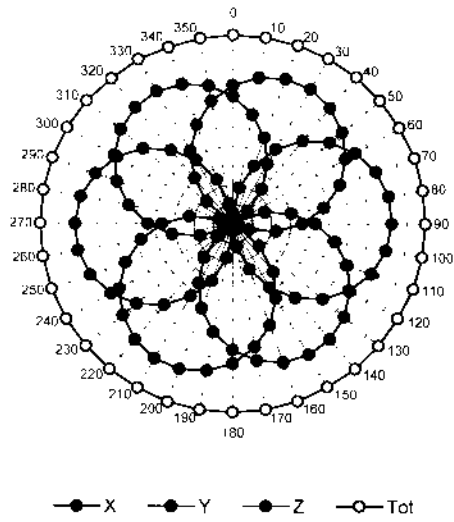and the uncertainty for the indicated frequency band.

# Frequency Response of E-Field
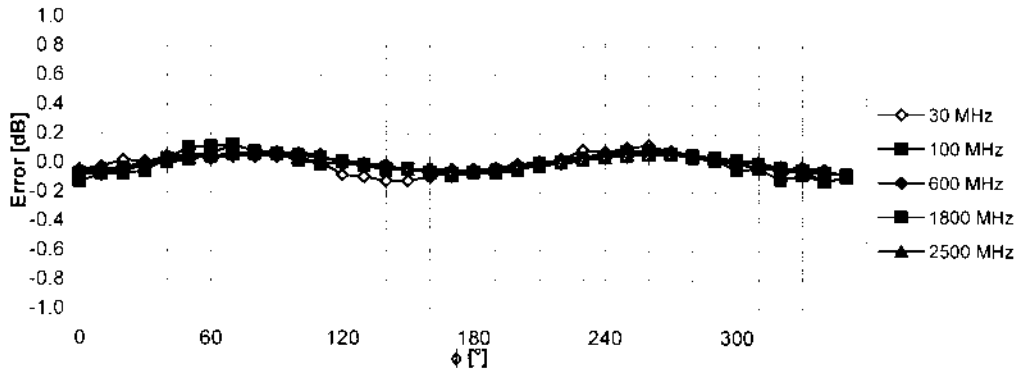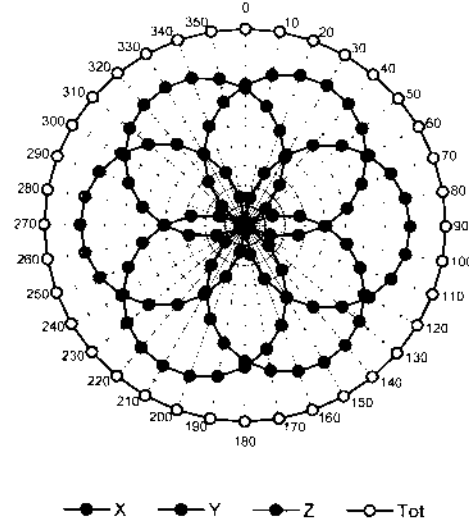
## (TEM-Cell:ifi110 EXX, Waveguide: R22)
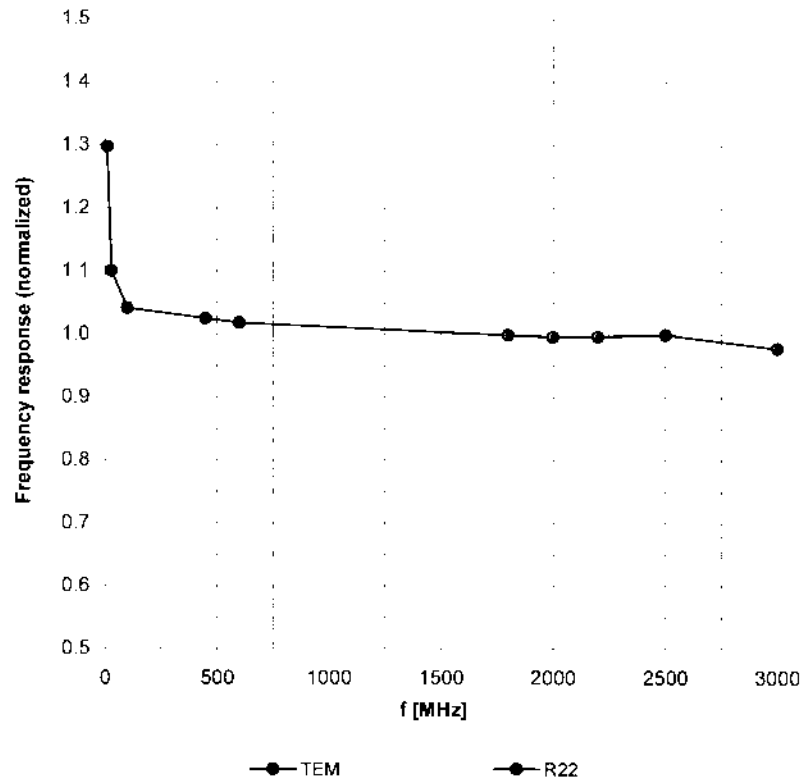


Uncertainty of Frequency Response of E-field: ± 6.3% (k=2)

# Receiving Pattern ($\phi$), $\vartheta = 0°$
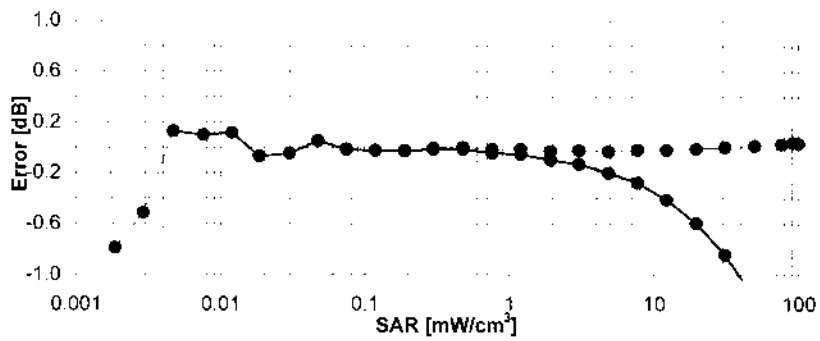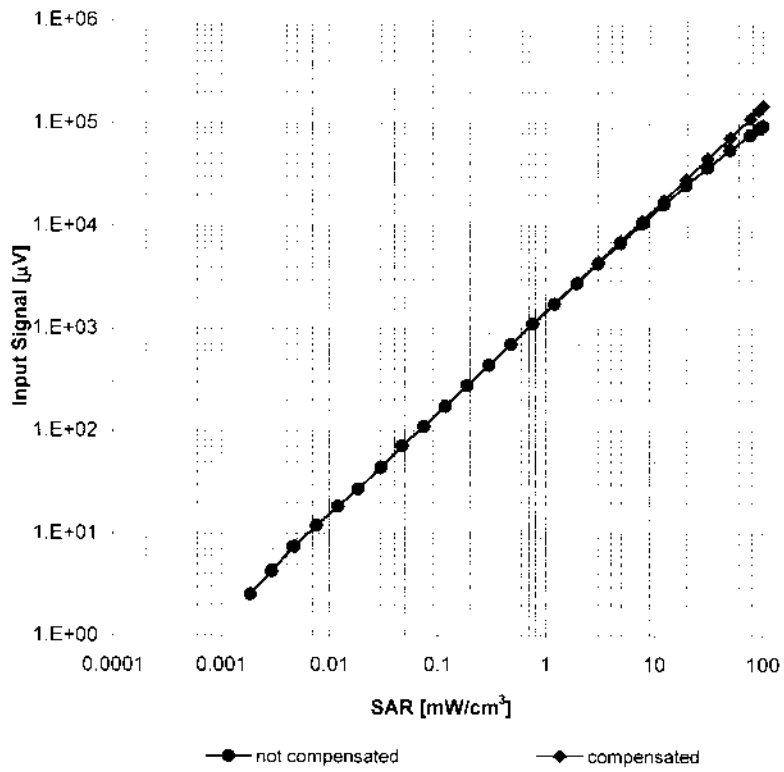
### f = 600 MHz, TEM  ifi110EXX



### f = 1800 MHz, WG R22





**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 = 900 MHz, WGLS R9 (head)



f = 1810 MHz, WGLS R22 (head)

# Deviation from Isotropy in HSL

### Error (φ, ϑ), f = 900 MHz



■ -1.00--0.80   ■ -0.80--0.60   ■ -0.60--0.40   ■ -0 40--0 20   ■ -0.20-0.00

☐ 0.00-0.20   ■ 0.20-0.40   ☐ 0.40-0 60   ■ 0 60-0.80   ■ 0.80-1.00

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

## Other Probe Parameters

| | |
|---|---|
| Sensor Arrangement | Triangular |
| Connector Angle (°) | Not applicable |
| Mechanical Surface Detection Mode | enabled |
| Optical Surface Detection Mode | disabled |
| Probe Overall Length | 337 mm |
| Probe Body Diameter | 10 mm |
| Tip Length | 9 mm |
| Tip Diameter | 2.5 mm |
| Probe Tip to Sensor X Calibration Point | 1 mm |
| Probe Tip to Sensor Y Calibration Point | 1 mm |
| Probe Tip to Sensor Z Calibration Point | 1 mm |
| Recommended Measurement Distance from Surface | 2 mm |

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

| | |
|---|---|
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| **S** | Servizio svizzero di taratura |
| | Swiss Calibration Service |

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Multilateral Agreement for the recognition of calibration certificates

Accreditation No.: **SCS 108**

Client    **Northwest EMC**

Certificate No: **EX3-3746_Nov10**

# CALIBRATION CERTIFICATE

| | |
|---|---|
| Object | **EX3DV4 - SN:3746** |
| Calibration procedure(s) | **QA CAL-01.v6, QA CAL-14.v3, QA CAL-23.v3 and QA CAL-25.v2**<br>**Calibration procedure for dosimetric E-field probes** |
| Calibration date | **November 11, 2010** |

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 (Certificate No.) | Scheduled Calibration |
|---|---|---|---|
| Power meter E4419B | GB41293874 | 1-Apr-10 (No. 217-01136) | Apr-11 |
| Power sensor E4412A | MY41495277 | 1-Apr-10 (No. 217-01136) | Apr-11 |
| Power sensor E4412A | MY41498087 | 1-Apr-10 (No. 217-01136) | Apr-11 |
| Reference 3 dB Attenuator | SN: S5054 (3c) | 30-Mar-10 (No. 217-01159) | Mar-11 |
| Reference 20 dB Attenuator | SN: S5086 (20b) | 30-Mar-10 (No. 217-01161) | Mar-11 |
| Reference 30 dB Attenuator | SN: S5129 (30b) | 30-Mar-10 (No. 217-01160) | Mar-11 |
| Reference Probe ES3DV2 | SN: 3013 | 30-Dec-09 (No. ES3-3013_Dec09) | Dec-10 |
| DAE4 | SN: 660 | 20-Apr-10 (No. DAE4-660 Apr10) | Apr-11 |

| Secondary Standards | ID # | Check Date (in house) | Scheduled Check |
|---|---|---|---|
| RF generator HP 8648C | US3642U01700 | 4-Aug-99 (in house check Oct-09) | In house check: Oct-11 |
| Network Analyzer HP 8753E | US37390585 | 18-Oct-01 (in house check Oct-10) | In house check: Oct-11 |

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

Issued: November 11, 2010

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

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**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 |
| ConvF | sensitivity in TSL / NORMx,y,z |
| DCP | diode compression point |
| CF | crest factor (1/duty_cycle) of the RF signal |
| A, B, C | modulation dependent linearization parameters |
| Polarization $\varphi$ | $\varphi$ rotation around probe axis |
| Polarization $\vartheta$ | $\vartheta$ rotation around an axis that is in the plane normal to probe axis (at measurement center), i.e., $\vartheta = 0$ is normal to probe axis |

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

## Methods Applied and Interpretation of Parameters:
- *NORMx,y,z:* Assessed for E-field polarization $\vartheta = 0$ (f ≤ 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 with CW signal (no uncertainty required). DCP does not depend on frequency nor media.
- *Ax,y,z; Bx,y,z; Cx,y,z; VRx,y,z:* A, B, C are numerical linearization parameters assessed based on the data of power sweep for specific modulation signal. The parameters do not depend on frequency nor media. *VR* is the maximum calibration range expressed in RMS voltage across the diode.
- *ConvF and Boundary Effect Parameters:* Assessed in flat phantom using E-field (or Temperature Transfer Standard for f ≤ 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  EX3DV4

# SN:3746

| | |
|---|---|
| Manufactured: | March 26, 2010 |
| Calibrated: | November 11, 2010 |

## Calibrated for DASY/EASY Systems

(Note: non-compatible with DASY2 system!)

# DASY/EASY - Parameters of Probe: EX3DV4 SN:3746

## Basic Calibration Parameters

| | Sensor X | Sensor Y | Sensor Z | Unc (k=2) |
|---|---|---|---|---|
| Norm ($\mu$V/(V/m)$^2$)$^A$ | 0.47 | 0.49 | 0.50 | ± 10.1% |
| DCP (mV)$^B$ | 94.5 | 94.5 | 95.5 | |

## Modulation Calibration Parameters

| UID | Communication System Name | PAR | | A dB | B dBuV | C | VR mV | Unc$^E$ (k=2) |
|---|---|---|---|---|---|---|---|---|
| 10000 | CW | 0.00 | X | 0.00 | 0.00 | 1.00 | 110.5 | ± 2.9 % |
| | | | Y | 0.00 | 0.00 | 1.00 | 114.3 | |
| | | | Z | 0.00 | 0.00 | 1.00 | 111.2 | |
| 10061 | IEEE 802.11b WiFi 2.4 GHz | 3.60 | X | 3.86 | 70.08 | 19.28 | 77.9 | ± 2.1 % |
| | (DSSS, 11 Mbps) | | Y | 2.62 | 65.07 | 16.74 | 78.0 | |
| | | | Z | 3.03 | 66.48 | 17.70 | 77.6 | |
| 10069 | IEEE 802.11a/h WiFi 5 GHz | 12.20 | X | 11.72 | 66.82 | 21.98 | 80.1 | ± 6.1 % |
| | (OFDM, 54 Mbps) | | Y | 10.64 | 65.22 | 21.04 | 73.9 | |
| | | | Z | 11.40 | 66.10 | 21.47 | 79.3 | |
| 10077 | IEEE 802.11g WiFi 2.4 GHz | 13.12 | X | 11.10 | 65.64 | 21.82 | 69.7 | ± 6.9 % |
| | (DSSS/OFDM, 54 Mbps) | | Y | 11.26 | 67.57 | 23.06 | 93.9 | |
| | | | Z | 10.95 | 65.59 | 21.88 | 69.1 | |

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 Pages 5 and 6)

$^B$ Numerical linearization parameter: uncertainty not required.

$^E$ Uncertainty is determined using the maximum deviation from linear response applying recatangular distribution and is expressed for the square of the field value.

# DASY/EASY - Parameters of Probe: EX3DV4 SN:3746

## Calibration Parameter Determined in Head Tissue Simulating Media

| f [MHz] | Validity [MHz][c] | Permittivity | Conductivity | ConvF X | ConvF Y | ConvF Z | Alpha | Depth Unc (k=2) |
|---------|-------------------|--------------|--------------|---------|---------|---------|-------|-----------------|
| 2450 | ± 50 / ± 100 | 39.2 ± 5% | 1.80 ± 5% | 6.69 | 6.69 | 6.69 | 0.43 | 0.76  ± 11.0% |
| 5200 | ± 50 / ± 100 | 36.0 ± 5% | 4.66 ± 5% | 5.08 | 5.08 | 5.08 | 0.99 | 0.67  ± 13.1% |
| 5300 | ± 50 / ± 100 | 35.9 ± 5% | 4.76 ± 5% | 4.59 | 4.59 | 4.59 | 0.49 | 1.39  ± 13.1% |
| 5500 | ± 50 / ± 100 | 35.6 ± 5% | 4.96 ± 5% | 4.37 | 4.37 | 4.37 | 0.47 | 1.59  ± 13.1% |
| 5800 | ± 50 / ± 100 | 35.3 ± 5% | 5.27 ± 5% | 4.14 | 4.14 | 4.14 | 0.47 | 1.76  ± 13.1% |

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

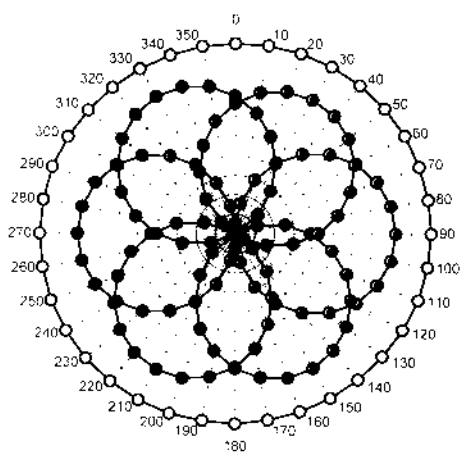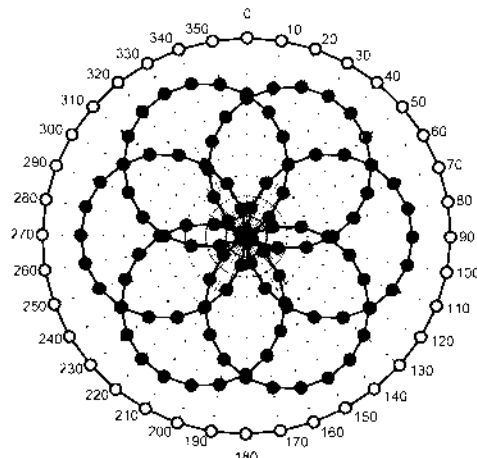# DASY/EASY - Parameters of Probe: EX3DV4 SN:3746

## Calibration Parameter Determined in Body Tissue Simulating Media

| f [MHz] | Validity [MHz]$^c$ | Permittivity | Conductivity | ConvF X | ConvF Y | ConvF Z | Alpha | Depth | Unc (k=2) |
|---------|--------------------|--------------|--------------|---------|---------|---------|-------|-------|-----------|
| 2450 | ± 50 / ± 100 | 52.7 ± 5% | 1.95 ± 5% | 6.81 | 6.81 | 6.81 | 0.48 | 0.73 | ± 11.0% |
| 5200 | ± 50 / ± 100 | 49.0 ± 5% | 5.30 ± 5% | 4.16 | 4.16 | 4.16 | 0.51 | 1.76 | ± 13.1% |
| 5300 | ± 50 / ± 100 | 48.9 ± 5% | 5.42 ± 5% | 3.80 | 3.80 | 3.80 | 0.54 | 1.88 | ± 13.1% |
| 5500 | ± 50 / ± 100 | 48.6 ± 5% | 5.65 ± 5% | 3.69 | 3.69 | 3.69 | 0.54 | 2.02 | ± 13.1% |
| 5800 | ± 50 / ± 100 | 48.2 ± 5% | 6.00 ± 5% | 3.87 | 3.87 | 3.87 | 0.53 | 1.94 | ± 13.1% |

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

# Receiving Pattern ($\phi$), $\vartheta$ = 0°
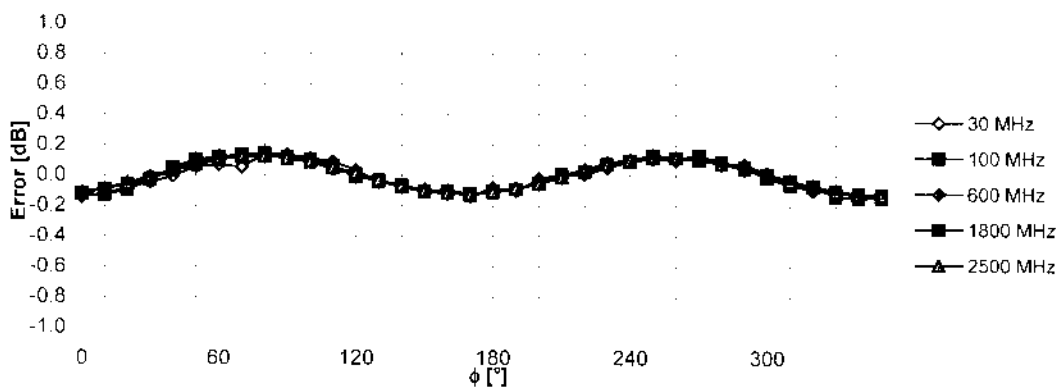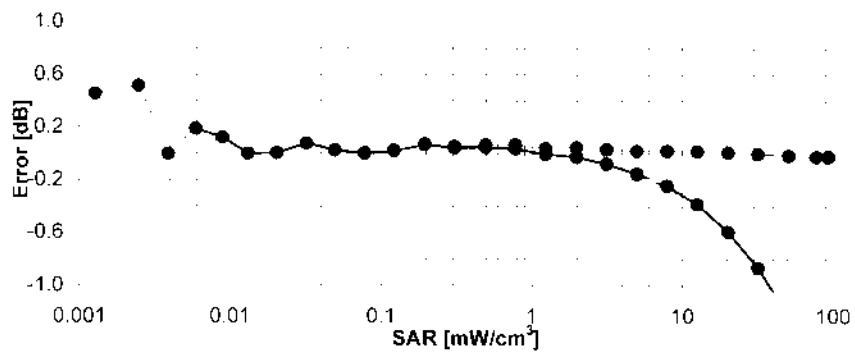
### f = 600 MHz, TEM ifi110EXX

### f = 1800 MHz, WG R22



—●— X    —●— Y    —●— Z    —○— Tot

—●— X    —●— Y    —●— Z    —○— Tot
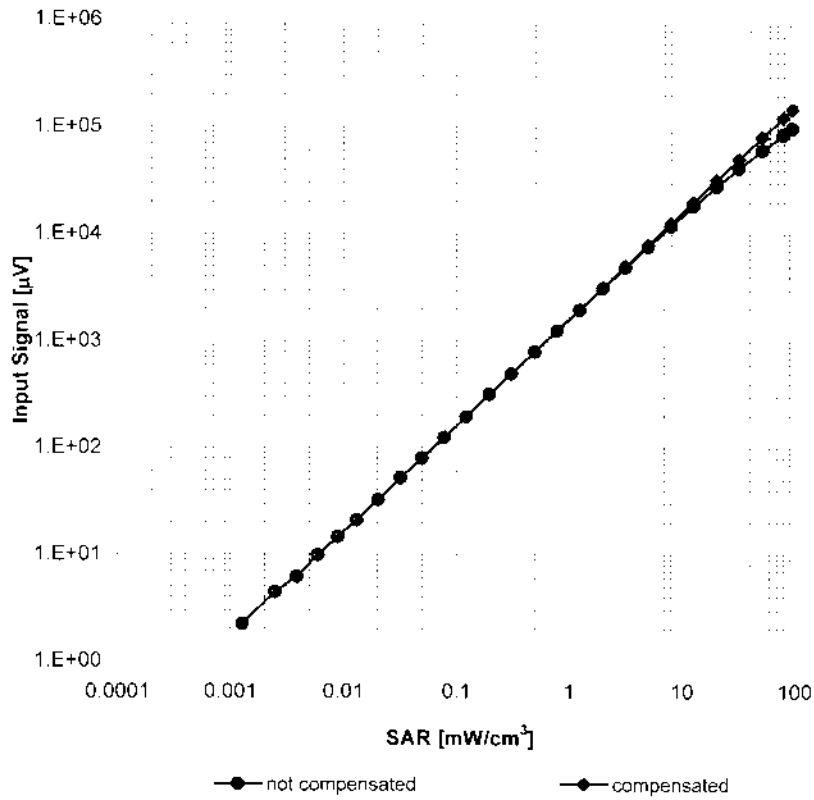


—◇— 30 MHz
—■— 100 MHz
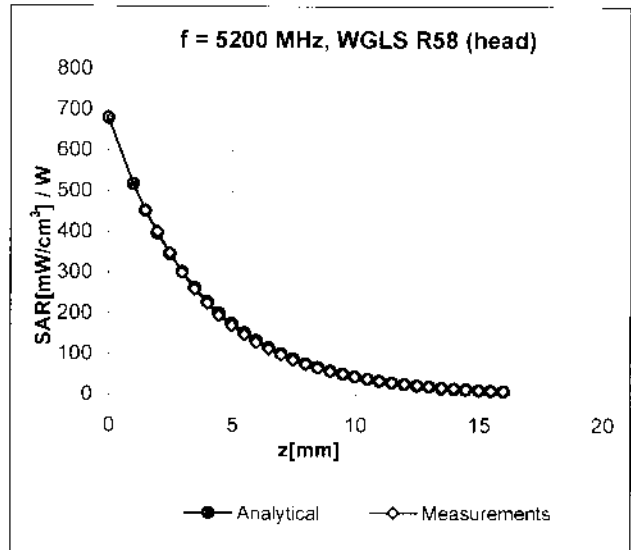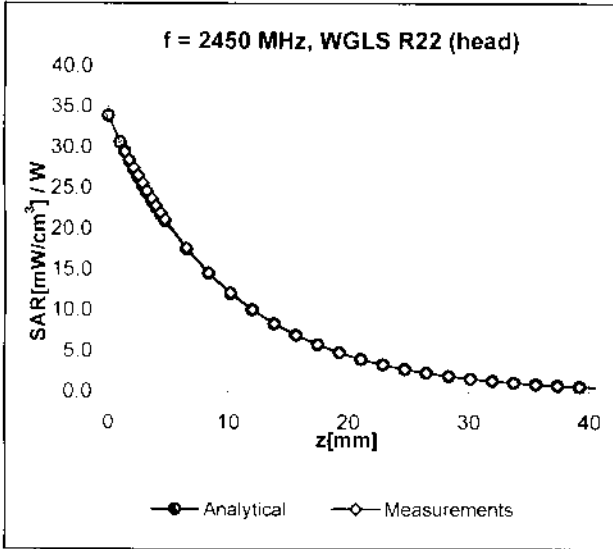—◆— 600 MHz
—■— 1800 MHz
—△— 2500 MHz

**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 = 2450 MHz, WGLS R22 (head)**



**f = 5200 MHz, WGLS R58 (head)**



# Deviation from Isotropy in HSL

## Error (φ, ϑ), f = 900 MHz



■-1.00--0.80 ■-0.80--0.60 ■-0.60 -0 40 ■-0.40--0.20 ▨-0.20-0 00

□0.00-0.20 ■0 20-0 40 □0 40-0.60 ■0.60-0.80 ■0.80-1.00

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

# Other Probe Parameters

| | |
|---|---:|
| Sensor Arrangement | Triangular |
| Connector Angle (°) | Not applicable |
| Mechanical Surface Detection Mode | enabled |
| Optical Surface Detection Mode | disabled |
| Probe Overall Length | 337 mm |
| Probe Body Diameter | 10 mm |
| Tip Length | 9 mm |
| Tip Diameter | 2.5 mm |
| Probe Tip to Sensor X Calibration Point | 1 mm |
| Probe Tip to Sensor Y Calibration Point | 1 mm |
| Probe Tip to Sensor Z Calibration Point | 1 mm |
| Recommended Measurement Distance from Surface | 2 mm |