



Test Laboratory: Sporton International Inc. SAR Testing Lab

Date/Time: 7/25/2006 10:57:40 PM

**Body\_GSM850 Ch189\_Keypad Down With 1.5cm Gap\_20060725\_GPRS10\_2D**

**DUT: 662214; Type: Handhold GPS Tracker**

Communication System: GSM850; Frequency: 836.4 MHz; Duty Cycle: 1:4

Medium: MSL\_850 Medium parameters used :  $f = 836.4$  MHz;  $\sigma = 0.964$  mho/m;  $\epsilon_r = 55.4$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Ambient Temperature : 23.7 °C; Liquid Temperature : 20.9 °C

DASY4 Configuration:

- Probe: ET3DV6 - SN1787; ConvF(6.18, 6.18, 6.18); Calibrated: 5/31/2006
- Sensor-Surface: 4mm (Mechanical And Optical Surface Detection)
- Electronics: DAE3 Sn577; Calibrated: 11/11/2005
- Phantom: SAM-A; Type: QD 000 P40 C; Serial: TP-1303
- Measurement SW: DASY4, V4.6 Build 23; Postprocessing SW: SEMCAD, V1.8 Build 161

**Ch189/Area Scan (51x91x1):** Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.227 mW/g

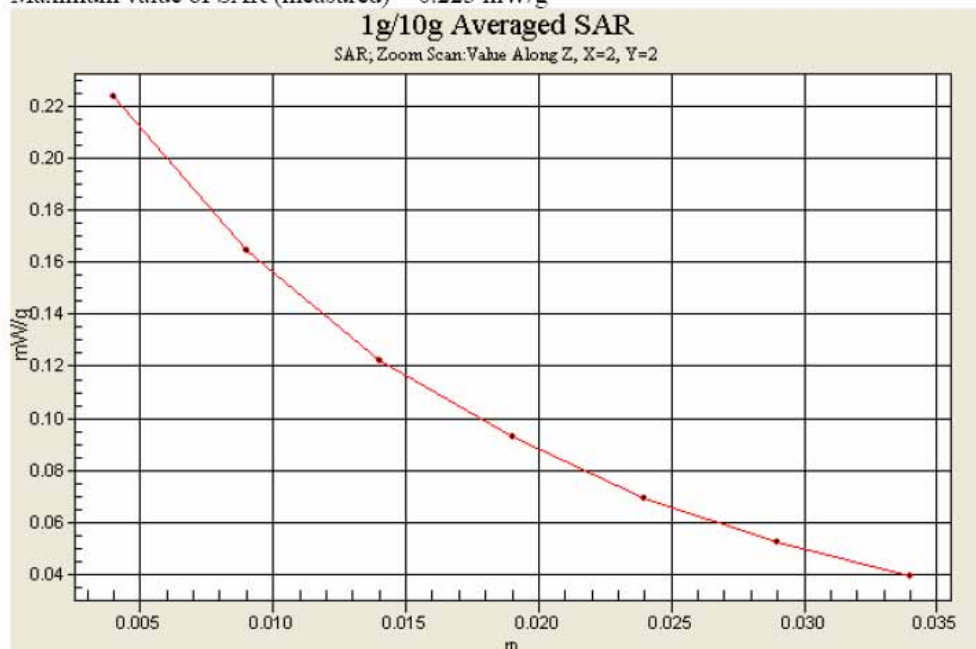
**Ch189/Zoom Scan (5x5x7)/Cube 0:** Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 8.67 V/m; Power Drift = -0.153 dB

Peak SAR (extrapolated) = 0.281 W/kg

**SAR(1 g) = 0.210 mW/g; SAR(10 g) = 0.151 mW/g**

Maximum value of SAR (measured) = 0.223 mW/g





Test Laboratory: Sporton International Inc. SAR Testing Lab

Date/Time: 7/26/2006 2:23:12 AM

**Body\_PCS Ch661\_Keypad Down With 1.5cm Gap\_20060726\_GPRS10\_2D**

**DUT: 662214; Type: Handhold GPS Tracker**

Communication System: PCS; Frequency: 1880 MHz; Duty Cycle: 1:4

Medium: MSL\_1900 Medium parameters used:  $f = 1880$  MHz;  $\sigma = 1.51$  mho/m;  $\epsilon_r = 52$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Ambient Temperature : 23.5 °C; Liquid Temperature : 20.7 °C

DASY4 Configuration:

- Probe: ET3DV6 - SN1787; ConvF(4.66, 4.66, 4.66); Calibrated: 5/31/2006
- Sensor-Surface: 4mm (Mechanical And Optical Surface Detection)
- Electronics: DAE3 Sn577; Calibrated: 11/11/2005
- Phantom: SAM-A; Type: QD 000 P40 C; Serial: TP-1303
- Measurement SW: DASY4, V4.6 Build 23; Postprocessing SW: SEMCAD, V1.8 Build 161

**Ch661/Area Scan (51x91x1):** Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.241 mW/g

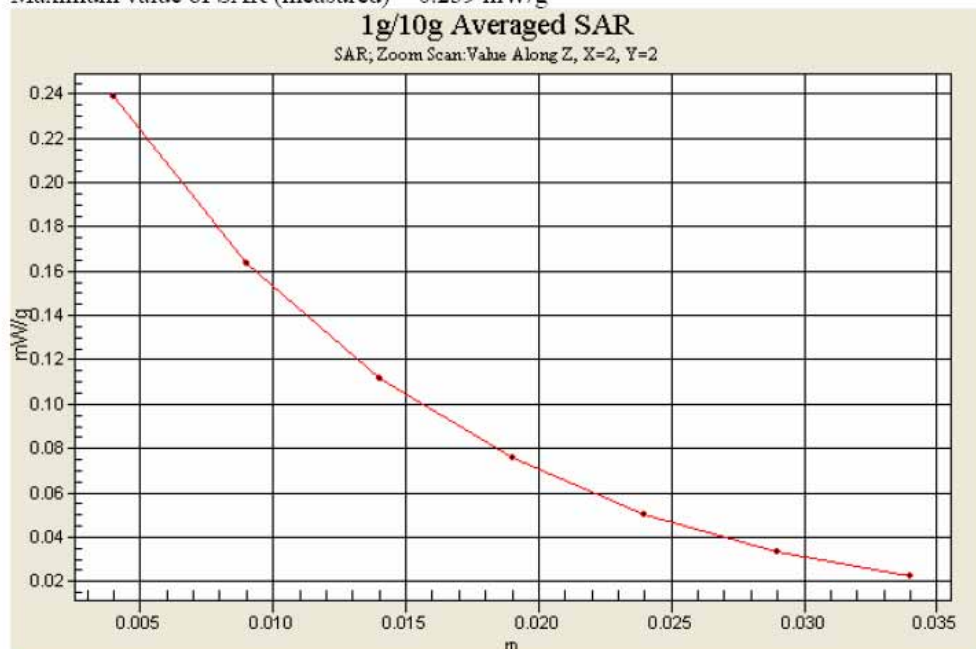
**Ch661/Zoom Scan (5x5x7)/Cube 0:** Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 6.17 V/m; Power Drift = -0.015 dB

Peak SAR (extrapolated) = 0.323 W/kg

**SAR(1 g) = 0.223 mW/g; SAR(10 g) = 0.145 mW/g**

Maximum value of SAR (measured) = 0.239 mW/g





## Appendix C – Calibration Data

Calibration Laboratory of  
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Engineering AG  
Zeughausstrasse 43, 8004 Zurich, Switzerland



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Accreditation No.: SCS 108

Client Sporton (Auden)

Certificate No: D835V2-499\_Mar06

## CALIBRATION CERTIFICATE

Object D835V2 - SN: 499

Calibration procedure(s)  
QA CAL-05.v6  
Calibration procedure for dipole validation kits

Calibration date: March 15, 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 ( $22 \pm 3$ )°C and humidity < 70%.

Calibration Equipment used (M&amp;TE critical for calibration)

| Primary Standards           | ID #             | Cal Date (Calibrated by, Certificate No.) | Scheduled Calibration  |
|-----------------------------|------------------|-------------------------------------------|------------------------|
| Power meter EPM-442A        | GB37480704       | 04-Oct-05 (METAS, No. 251-00516)          | Oct-06                 |
| Power sensor HP 8481A       | US37282783       | 04-Oct-05 (METAS, No. 251-00516)          | Oct-06                 |
| Reference 20 dB Attenuator  | SN: 5066 (20g)   | 11-Aug-05 (METAS, No 251-00499)           | Aug-06                 |
| Reference 10 dB Attenuator  | SN: 5047.2 (10r) | 11-Aug-05 (METAS, No 251-00498)           | Aug-06                 |
| Reference Probe ET3DV6      | SN 1507          | 28-Oct-05 (SPEAG, No. ET3-1507_Oct05)     | Oct-06                 |
| DAE4                        | SN 801           | 15-Dec-05 (SPEAG, No. DAE4-801_Dec05)     | Dec-06                 |
| Secondary Standards         | ID #             | Check Date (in house)                     | Scheduled Check        |
| Power sensor HP 8481A       | MY41092317       | 18-Oct-02 (SPEAG, in house check Oct-05)  | In house check: Oct-07 |
| RF generator Agilent E4421B | MY41000675       | 11-May-05 (SPEAG, in house check Nov-05)  | In house check: Nov-07 |
| Network Analyzer HP 8753E   | US37390585 S4206 | 18-Oct-01 (SPEAG, in house check Nov-05)  | In house check: Nov-06 |

|                |                       |                                   |               |
|----------------|-----------------------|-----------------------------------|---------------|
| Calibrated by: | Name<br>Judith Müller | Function<br>Laboratory Technician | Signature<br> |
| Approved by:   | Name<br>Katja Pokovic | Function<br>Technical Manager     | Signature<br> |

Issued: March 16, 2006

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Certificate No: D835V2-499\_Mar06

Page 1 of 9



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Accreditation No.: SCS 108

**Glossary:**

|       |                                 |
|-------|---------------------------------|
| TSL   | tissue simulating liquid        |
| ConvF | sensitivity in TSL / NORM x,y,z |
| N/A   | not applicable or not measured  |

**Calibration is Performed According to the Following Standards:**

- 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
- 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
- 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", Supplement C (Edition 01-01) to Bulletin 65

**Additional Documentation:**

- 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 Parameters with 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.
- 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. The Return Loss 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 1 W at the antenna connector.
- SAR for nominal TSL parameters:** The measured TSL parameters are used to calculate the nominal SAR result.

**Measurement Conditions**

DASY system configuration, as far as not given on page 1.

|                              |                           |             |
|------------------------------|---------------------------|-------------|
| DASY Version                 | DASY4                     | V4.7        |
| Extrapolation                | Advanced Extrapolation    |             |
| Phantom                      | Modular Flat Phantom V4.9 |             |
| Distance Dipole Center - TSL | 15 mm                     | with Spacer |
| Area Scan resolution         | dx, dy = 15 mm            |             |
| Zoom Scan Resolution         | dx, dy, dz = 5 mm         |             |
| Frequency                    | 835 MHz $\pm$ 1 MHz       |             |

**Head TSL parameters**

The following parameters and calculations were applied.

|                                  | Temperature         | Permittivity   | Conductivity        |
|----------------------------------|---------------------|----------------|---------------------|
| Nominal Head TSL parameters      | 22.0 °C             | 41.5           | 0.90 mho/m          |
| Measured Head TSL parameters     | (22.0 $\pm$ 0.2) °C | 42.1 $\pm$ 6 % | 0.94mho/m $\pm$ 6 % |
| Head TSL temperature during test | (22.2 $\pm$ 0.2) °C | ---            | ---                 |

**SAR result with Head TSL**

|                                                               |                    |                                                  |
|---------------------------------------------------------------|--------------------|--------------------------------------------------|
| <b>SAR averaged over 1 cm<sup>3</sup> (1 g) of Head TSL</b>   | condition          |                                                  |
| SAR measured                                                  | 250 mW input power | 2.35 mW / g                                      |
| SAR normalized                                                | normalized to 1W   | 9.40 mW / g                                      |
| SAR for nominal Head TSL parameters <sup>1</sup>              | normalized to 1W   | <b>9.24 mW / g <math>\pm</math> 17.0 % (k=2)</b> |
| <b>SAR averaged over 10 cm<sup>3</sup> (10 g) of Head TSL</b> | condition          |                                                  |
| SAR measured                                                  | 250 mW input power | 1.53 mW / g                                      |
| SAR normalized                                                | normalized to 1W   | 6.12 mW / g                                      |
| SAR for nominal Head TSL parameters <sup>1</sup>              | normalized to 1W   | <b>6.07 mW / g <math>\pm</math> 16.5 % (k=2)</b> |

<sup>1</sup> Correction to nominal TSL parameters according to d), chapter "SAR Sensitivities"

**Body TSL parameters**

The following parameters and calculations were applied.

|                                  | Temperature     | Permittivity | Conductivity     |
|----------------------------------|-----------------|--------------|------------------|
| Nominal Body TSL parameters      | 22.0 °C         | 55.2         | 0.97 mho/m       |
| Measured Body TSL parameters     | (22.0 ± 0.2) °C | 56.8 ± 6 %   | 0.98 mho/m ± 6 % |
| Body TSL temperature during test | (21.4 ± 0.2) °C | ----         | ----             |

**SAR result with Body TSL**

| SAR averaged over 1 cm <sup>3</sup> (1 g) of Body TSL | condition          |                            |
|-------------------------------------------------------|--------------------|----------------------------|
| SAR measured                                          | 250 mW input power | 2.45 mW / g                |
| SAR normalized                                        | normalized to 1W   | 9.80 mW / g                |
| SAR for nominal Body TSL parameters <sup>2</sup>      | normalized to 1W   | 9.91 mW / g ± 17.0 % (k=2) |

| SAR averaged over 10 cm <sup>3</sup> (10 g) of Body TSL | condition          |                            |
|---------------------------------------------------------|--------------------|----------------------------|
| SAR measured                                            | 250 mW input power | 1.62 mW / g                |
| SAR normalized                                          | normalized to 1W   | 6.48 mW / g                |
| SAR for nominal Body TSL parameters <sup>2</sup>        | normalized to 1W   | 6.55 mW / g ± 16.5 % (k=2) |

<sup>2</sup> Correction to nominal TSL parameters according to d), chapter "SAR Sensitivities"

**Appendix****Antenna Parameters with Head TSL**

|                                      |                               |
|--------------------------------------|-------------------------------|
| Impedance, transformed to feed point | 52.1 $\Omega$ - 2.9 $j\Omega$ |
| Return Loss                          | -29.1 dB                      |

**Antenna Parameters with Body TSL**

|                                      |                               |
|--------------------------------------|-------------------------------|
| Impedance, transformed to feed point | 47.9 $\Omega$ - 5.1 $j\Omega$ |
| Return Loss                          | -24.9 dB                      |

**General Antenna Parameters and Design**

|                                  |         |
|----------------------------------|---------|
| Electrical Delay (one direction) | 1.391ns |
|----------------------------------|---------|

After long term use with 100W radiated power, only a slight warming of the dipole near the feedpoint can be measured.

The dipole is made of standard semirigid coaxial cable. The center conductor of the feeding line is directly connected to the second arm of the dipole. The antenna is therefore short-circuited for DC-signals.  
No excessive force must be applied to the dipole arms, because they might bend or the soldered connections near the feedpoint may be damaged.

**Additional EUT Data**

|                 |               |
|-----------------|---------------|
| Manufactured by | SPEAG         |
| Manufactured on | July 10, 2003 |

## DASY4 Validation Report for Head TSL

Date/Time: 15.03.2006 12:51:44

Test Laboratory: SPEAG, Zurich, Switzerland

**DUT: Dipole 835 MHz; Type: D835V2; Serial: D835V2 - SN:499**

Communication System: CW; Frequency: 835 MHz; Duty Cycle: 1:1

Medium: HSL U10 BB;

Medium parameters used:  $f = 835$  MHz;  $\sigma = 0.942$  mho/m;  $\epsilon_r = 42.1$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Phantom section: Flat Section

Measurement Standard: DASY4 (High Precision Assessment)

### DASY4 Configuration:

- Probe: ET3DV6 - SN1507 (HF); ConvF(6.09, 6.09, 6.09); Calibrated: 28.10.2005
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 15.12.2005
- Phantom: Flat Phantom 4.9L; Type: QD000P49AA; ;
- Measurement SW: DASY4, V4.7 Build 14; Postprocessing SW: SEMCAD, V1.8 Build 165

**Pin = 250 mW; d = 10 mm/Area Scan (71x81x1);** Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 2.54 mW/g

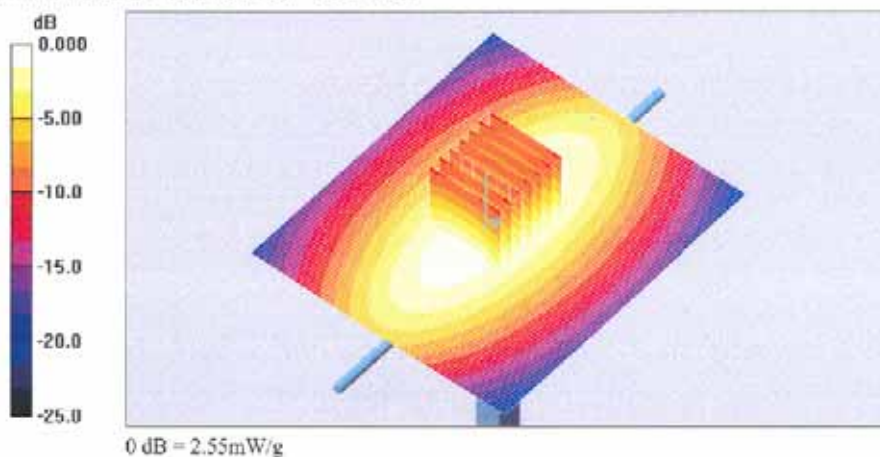
**Pin = 250 mW; d = 10 mm/Zoom Scan (7x7x7)/Cube 0;** Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 53.7 V/m; Power Drift = -0.008 dB

Peak SAR (extrapolated) = 3.53 W/kg

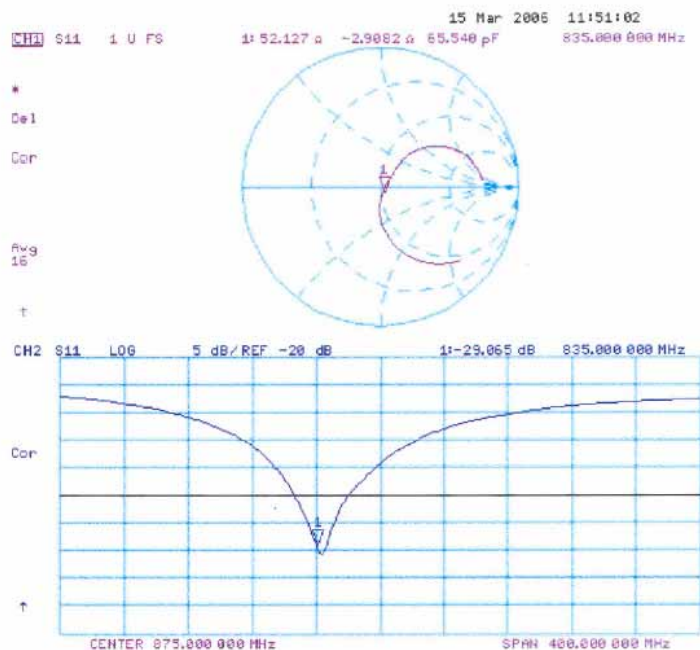
SAR(1 g) = 2.35 mW/g; SAR(10 g) = 1.53 mW/g

Maximum value of SAR (measured) = 2.55 mW/g





Impedance Measurement Plot for Head TSL



## DASY4 Validation Report for Body TSL

Date/Time: 14.03.2006 12:37:15

Test Laboratory: SPEAG, Zurich, Switzerland

**DUT: Dipole 835 MHz; Type: D835V2; Serial: D835V2 - SN:499**

Communication System: CW; Frequency: 835 MHz; Duty Cycle: 1:1

Medium: MSL U10;

Medium parameters used:  $f = 835$  MHz;  $\sigma = 0.972$  mho/m;  $\epsilon_r = 56.9$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Phantom section: Flat Section

Measurement Standard: DASY4 (High Precision Assessment)

DASY4 Configuration:

- Probe: ET3DV6 - SN1507 (HF); ConvF(5.84, 5.84, 5.84); Calibrated: 28.10.2005
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 15.12.2005
- Phantom: Flat Phantom 4.9L; Type: QD000P49AA; ;
- Measurement SW: DASY4, V4.7 Build 14; Postprocessing SW: SEMCAD, V1.8 Build 165

**Pin = 250 mW; d = 10 mm/Area Scan (71x81x1):** Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 2.63 mW/g

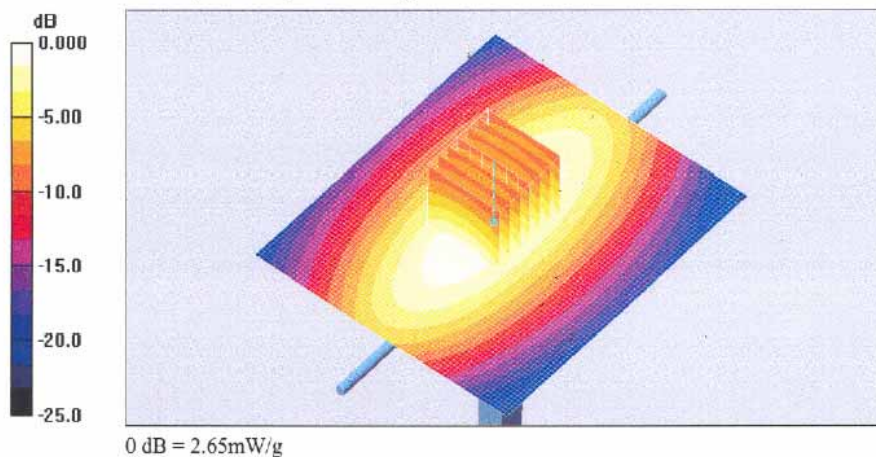
**Pin = 250 mW; d = 10 mm/Zoom Scan (7x7x7)/Cube 0:** Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 53.3 V/m; Power Drift = 0.026 dB

Peak SAR (extrapolated) = 3.51 W/kg

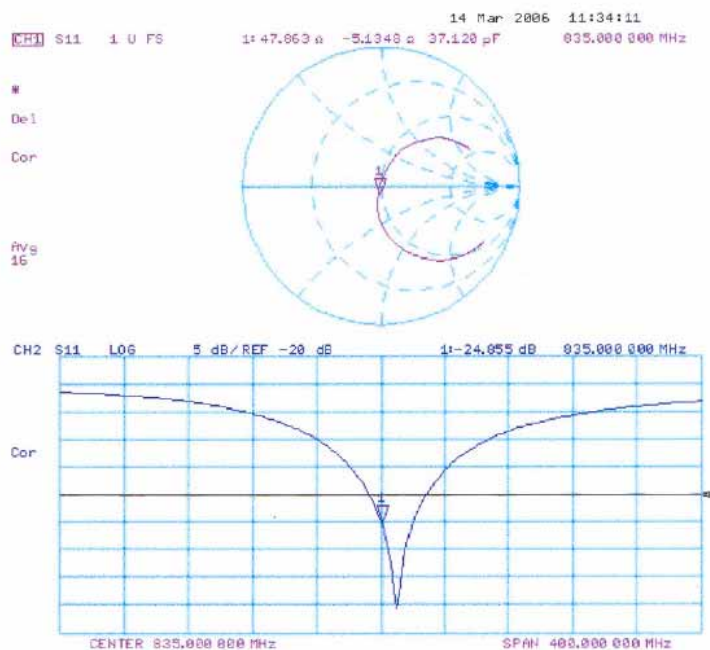
**SAR(1 g) = 2.45 mW/g; SAR(10 g) = 1.62 mW/g**

Maximum value of SAR (measured) = 2.65 mW/g





Impedance Measurement Plot Body TSL





## FCC/IC SAR Test Report

Test Report No : FA662214-1-2-02

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Accreditation No.: SCS 108

Client Sporton (Auden)

Certificate No: D1900V2-5d041\_Mar06

### CALIBRATION CERTIFICATE

Object D1900V2 - SN: 5d041

Calibration procedure(s) QA CAL-05.v6  
Calibration procedure for dipole validation kits

Calibration date: March 21, 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 ( $22 \pm 3$ )°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 EPM-442A        | GB37480704       | 04-Oct-05 (METAS, No. 251-00516)          | Oct-06                 |
| Power sensor HP 8481A       | US37292783       | 04-Oct-05 (METAS, No. 251-00516)          | Oct-06                 |
| Reference 20 dB Attenuator  | SN: 5086 (20g)   | 11-Aug-05 (METAS, No 251-00498)           | Aug-06                 |
| Reference 10 dB Attenuator  | SN: 5047.2 (10r) | 11-Aug-05 (METAS, No 251-00498)           | Aug-06                 |
| Reference Probe ET3DV6      | SN: 1507         | 28-Oct-05 (SPEAG, No. ET3-1507_Oct05)     | Oct-06                 |
| DAE4                        | SN: 601          | 15-Dec-05 (SPEAG, No. DAE4-601_Dec05)     | Dec-06                 |
| Secondary Standards         | ID #             | Check Date (in house)                     | Scheduled Check        |
| Power sensor HP 8481A       | MY41092317       | 18-Oct-02 (SPEAG, in house check Oct-05)  | In house check: Oct-07 |
| RF generator Agilent E4421B | MY41000675       | 11-May-05 (SPEAG, in house check Nov-05)  | In house check: Nov-07 |
| Network Analyzer HP 8753E   | US37390585 S4206 | 18-Oct-01 (SPEAG, in house check Nov-05)  | In house check: Nov-06 |

|                |                       |                                   |               |
|----------------|-----------------------|-----------------------------------|---------------|
| Calibrated by: | Name<br>Judith Müller | Function<br>Laboratory Technician | Signature<br> |
| Approved by:   | Name<br>Katja Pokovic | Function<br>Technical Manager     | Signature<br> |

Issued: March 22, 2006

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Certificate No: D1900V2-5d041\_Mar06

Page 1 of 9



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Accreditation No.: SCS 108

## Glossary:

|       |                                 |
|-------|---------------------------------|
| TSL   | tissue simulating liquid        |
| ConvF | sensitivity in TSL / NORM x,y,z |
| N/A   | not applicable or not measured  |

## Calibration is Performed According to the Following Standards:

- 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
- 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
- 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", Supplement C (Edition 01-01) to Bulletin 65

## Additional Documentation:

- 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 Parameters with 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.
- 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. The Return Loss 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 1 W at the antenna connector.
- SAR for nominal TSL parameters:** The measured TSL parameters are used to calculate the nominal SAR result.

**Measurement Conditions**

DASY system configuration, as far as not given on page 1.

|                              |                           |             |
|------------------------------|---------------------------|-------------|
| DASY Version                 | DASY4                     | V4.7        |
| Extrapolation                | Advanced Extrapolation    |             |
| Phantom                      | Modular Flat Phantom V5.0 |             |
| Distance Dipole Center - TSL | 10 mm                     | with Spacer |
| Area Scan resolution         | dx, dy = 15 mm            |             |
| Zoom Scan Resolution         | dx, dy, dz = 5 mm         |             |
| Frequency                    | 1900 MHz $\pm$ 1 MHz      |             |

**Head TSL parameters**

The following parameters and calculations were applied.

|                                  | Temperature         | Permittivity   | Conductivity         |
|----------------------------------|---------------------|----------------|----------------------|
| Nominal Head TSL parameters      | 22.0 °C             | 40.0           | 1.40 mho/m           |
| Measured Head TSL parameters     | (22.0 $\pm$ 0.2) °C | 39.4 $\pm$ 6 % | 1.42 mho/m $\pm$ 6 % |
| Head TSL temperature during test | (21.5 $\pm$ 0.2) °C | ---            | ---                  |

**SAR result with Head TSL**

| SAR averaged over 1 cm <sup>3</sup> (1 g) of Head TSL | condition          |                                |
|-------------------------------------------------------|--------------------|--------------------------------|
| SAR measured                                          | 250 mW input power | 9.75 mW / g                    |
| SAR normalized                                        | normalized to 1W   | 39.0 mW / g                    |
| SAR for nominal Head TSL parameters <sup>1</sup>      | normalized to 1W   | 38.4 mW / g $\pm$ 17.0 % (k=2) |

| SAR averaged over 10 cm <sup>3</sup> (10 g) of Head TSL | Condition          |                                |
|---------------------------------------------------------|--------------------|--------------------------------|
| SAR measured                                            | 250 mW input power | 5.17 mW / g                    |
| SAR normalized                                          | normalized to 1W   | 20.7 mW / g                    |
| SAR for nominal Head TSL parameters <sup>1</sup>        | normalized to 1W   | 20.5 mW / g $\pm$ 16.5 % (k=2) |

<sup>1</sup> Correction to nominal TSL parameters according to d), chapter "SAR Sensitivities"

## Body TSL parameters

The following parameters and calculations were applied.

|                                  | Temperature     | Permittivity | Conductivity     |
|----------------------------------|-----------------|--------------|------------------|
| Nominal Body TSL parameters      | 22.0 °C         | 53.3         | 1.52 mho/m       |
| Measured Body TSL parameters     | (22.0 ± 0.2) °C | 54.7 ± 6 %   | 1.54 mho/m ± 6 % |
| Body TSL temperature during test | (21.6 ± 0.2) °C | ---          | ----             |

## SAR result with Body TSL

| SAR averaged over 1 cm <sup>3</sup> (1 g) of Body TSL | Condition          |                                   |
|-------------------------------------------------------|--------------------|-----------------------------------|
| SAR measured                                          | 250 mW input power | 10.2 mW / g                       |
| SAR normalized                                        | normalized to 1W   | 40.8 mW / g                       |
| SAR for nominal Body TSL parameters <sup>2</sup>      | normalized to 1W   | <b>41.1 mW / g ± 17.0 % (k=2)</b> |

| SAR averaged over 10 cm <sup>3</sup> (10 g) of Body TSL | condition          |                                   |
|---------------------------------------------------------|--------------------|-----------------------------------|
| SAR measured                                            | 250 mW input power | 5.40 mW / g                       |
| SAR normalized                                          | normalized to 1W   | 21.6 mW / g                       |
| SAR for nominal Body TSL parameters <sup>2</sup>        | normalized to 1W   | <b>21.8 mW / g ± 16.5 % (k=2)</b> |

<sup>2</sup> Correction to nominal TSL parameters according to d), chapter "SAR Sensitivities"

**Appendix****Antenna Parameters with Head TSL**

|                                      |                                |
|--------------------------------------|--------------------------------|
| Impedance, transformed to feed point | 53.5 $\Omega$ + 5.1 j $\Omega$ |
| Return Loss                          | - 24.8 dB                      |

**Antenna Parameters with Body TSL**

|                                      |                                |
|--------------------------------------|--------------------------------|
| Impedance, transformed to feed point | 47.9 $\Omega$ + 6.3 j $\Omega$ |
| Return Loss                          | - 23.4 dB                      |

**General Antenna Parameters and Design**

|                                  |          |
|----------------------------------|----------|
| Electrical Delay (one direction) | 1.200 ns |
|----------------------------------|----------|

After long term use with 100W radiated power, only a slight warming of the dipole near the feedpoint can be measured.

The dipole is made of standard semirigid coaxial cable. The center conductor of the feeding line is directly connected to the second arm of the dipole. The antenna is therefore short-circuited for DC-signals.

No excessive force must be applied to the dipole arms, because they might bend or the soldered connections near the feedpoint may be damaged.

**Additional EUT Data**

|                 |              |
|-----------------|--------------|
| Manufactured by | SPEAG        |
| Manufactured on | July 4, 2003 |

## DASY4 Validation Report for Head TSL

Date/Time: 14.03.2006 16:18:53

Test Laboratory: SPEAG, Zurich, Switzerland

**DUT: Dipole 1900 MHz; Type: D1900V2; Serial: D1900V2 - SN:5d041**

Communication System: CW; Frequency: 1900 MHz; Duty Cycle: 1:1

Medium: HSL U10 BB;

Medium parameters used:  $f = 1900 \text{ MHz}$ ;  $\sigma = 1.42 \text{ mho/m}$ ;  $\epsilon_r = 39.4$ ;  $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section

Measurement Standard: DASY4 (High Precision Assessment)

### DASY4 Configuration:

- Probe: ET3DV6 - SN1507 (HF); ConvF(4.74, 4.74, 4.74); Calibrated: 28.10.2005
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 15.12.2005
- Phantom: Flat Phantom 5.0 (front); Type: QD000P50AA; ;
- Measurement SW: DASY4, V4.7 Build 14; Postprocessing SW: SEMCAD, V1.8 Build 165

**Pin = 250 mW; d = 10 mm/Area Scan (71x71x1):** Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 11.7 mW/g

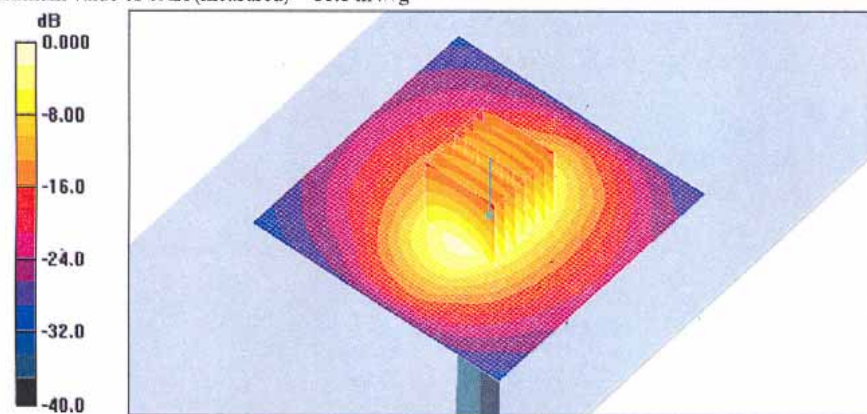
**Pin = 250 mW; d = 10 mm/Zoom Scan (7x7x7)/Cube 0:** Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 90.9 V/m; Power Drift = -0.093 dB

Peak SAR (extrapolated) = 16.6 W/kg

**SAR(1 g) = 9.75 mW/g; SAR(10 g) = 5.17 mW/g**

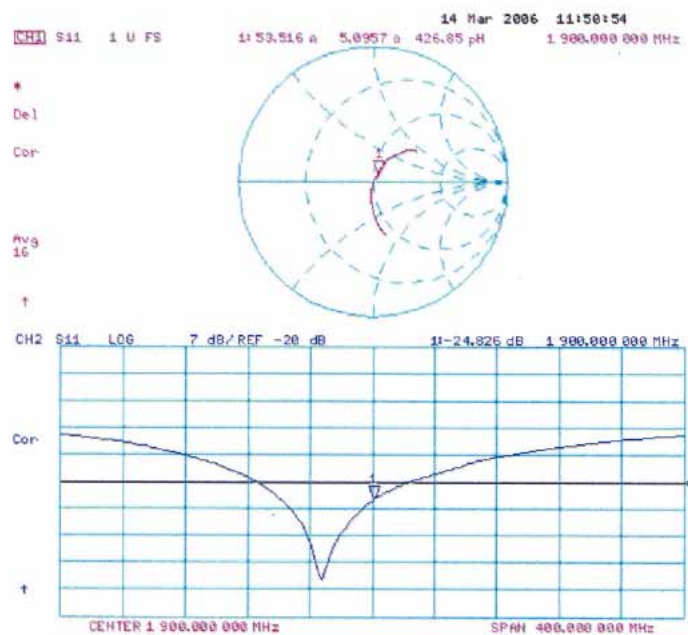
Maximum value of SAR (measured) = 11.1 mW/g



0 dB = 11.1 mW/g



Impedance Measurement Plot for Head TSL



## DASY4 Validation Report for Body TSL

Date/Time: 21.03.2006 13:59:55

Test Laboratory: SPEAG, Zurich, Switzerland

**DUT: Dipole 1900 MHz; Type: D1900V2; Serial: D1900V2 - SN:5d041**

Communication System: CW; Frequency: 1900 MHz; Duty Cycle: 1:1

Medium: MSL U10;

Medium parameters used:  $f = 1900$  MHz;  $\sigma = 1.54$  mho/m;  $\epsilon_r = 54.7$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Phantom section: Flat Section

Measurement Standard: DASY4 (High Precision Assessment)

### DASY4 Configuration:

- Probe: ET3DV6 - SN1507 (HF); ConvF(4.3, 4.3, 4.3); Calibrated: 28.10.2005
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 15.12.2005
- Phantom: Flat Phantom 5.0 (front); Type: QD000P50AA; ;
- Measurement SW: DASY4, V4.6 Build 23; Postprocessing SW: SEMCAD, V1.8 Build 161

**Pin = 250 mW; d = 10 mm/Area Scan (71x71x1):** Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 11.8 mW/g

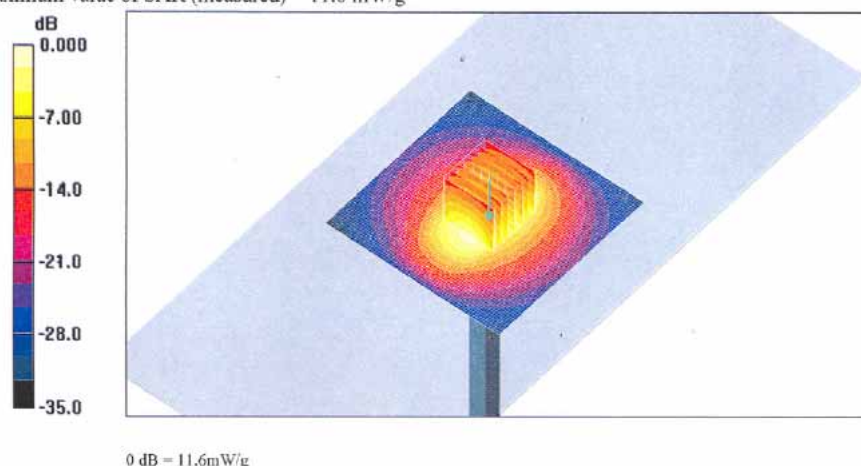
**Pin = 250 mW; d = 10 mm/Zoom Scan (7x7x7)/Cube 0:** Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 89.3 V/m; Power Drift = 0.045 dB

Peak SAR (extrapolated) = 17.4 W/kg

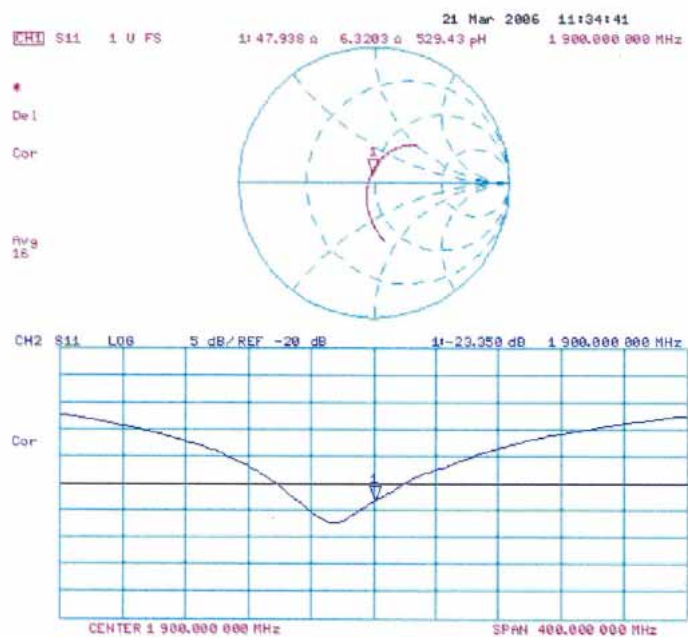
**SAR(1 g) = 10.2 mW/g; SAR(10 g) = 5.4 mW/g**

Maximum value of SAR (measured) = 11.6 mW/g





Impedance Measurement Plot for Body TSL





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Accreditation No.: SCS 108

Client Sporton (Auden)

Certificate No: ET3-1787\_May06

### CALIBRATION CERTIFICATE

Object: ET3DV6 - SN: 1767

Calibration procedure(s): QA CAL-01.v5  
Calibration procedure for dosimetric E-field probes

Calibration date: May 31, 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  $(22 \pm 3)^\circ\text{C}$  and humidity  $< 70\%$ .

Calibration Equipment used (M&E critical for calibration)

| Primary Standards          | ID #            | Cal Date (Calibrated by: Certificate No.) | Scheduled Calibration |
|----------------------------|-----------------|-------------------------------------------|-----------------------|
| Power meter E4419B         | GB41293874      | 5-Apr-06 (METAS, No. 251-00557)           | Apr-07                |
| Power sensor E4412A        | MY41495277      | 5-Apr-06 (METAS, No. 251-00557)           | Apr-07                |
| Power sensor E4412A        | MY41498067      | 5-Apr-06 (METAS, No. 251-00557)           | Apr-07                |
| Reference 3 dB Attenuator  | SN: S5054 (3c)  | 11-Aug-05 (METAS, No. 251-00499)          | Aug-06                |
| Reference 20 dB Attenuator | SN: S5085 (20b) | 4-Apr-06 (METAS, No. 251-00558)           | Apr-07                |
| 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         | 2-Feb-06 (SPEAG, No. DAE4-654_Feb06)      | Feb-07                |

| Secondary Standards       | ID #         | Check Date (in house)                    | Scheduled Check        |
|---------------------------|--------------|------------------------------------------|------------------------|
| RF generator HP 8645C     | US3542U01700 | 4-Aug-99 (SPEAG, in house check Nov-05)  | In house check: Nov-07 |
| Network Analyzer HP 8753E | US37390585   | 15-Oct-01 (SPEAG, in house check Nov-05) | In house check: Nov-08 |

Calibrated by: Name: Katja Polkovic Function: Technical Manager Signature: [Signature]

Approved by: Name: Niels Kuster Function: Quality Manager Signature: [Signature]

Issued: May 31, 2006

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

Certificate No: ET3-1787\_May06

Page 1 of 9

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Accreditation No.: **SCS 108**

## Glossary:

|                       |                                                                                                                                                |
|-----------------------|------------------------------------------------------------------------------------------------------------------------------------------------|
| TSL                   | tissue simulating liquid                                                                                                                       |
| NORM <sub>x,y,z</sub> | sensitivity in free space                                                                                                                      |
| ConF                  | sensitivity in TSL / NORM <sub>x,y,z</sub>                                                                                                     |
| DCP                   | diode compression point                                                                                                                        |
| Polarization $\phi$   | $\phi$ rotation around probe axis                                                                                                              |
| Polarization $\theta$ | $\theta$ rotation around an axis that is in the plane normal to probe axis (at measurement center), i.e., $\theta = 0$ is normal to probe axis |

## Calibration is Performed According to the Following Standards:

- 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
- 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:

- NORM<sub>x,y,z</sub>**: Assessed for E-field polarization  $\theta = 0$  ( $f \leq 900$  MHz in TEM-cell;  $f > 1800$  MHz: R22 waveguide). NORM<sub>x,y,z</sub> are only intermediate values, i.e., the uncertainties of NORM<sub>x,y,z</sub> does not effect the E<sup>2</sup>-field uncertainty inside TSL (see below *ConvF*).
- NORM( $f$ ),<sub>x,y,z</sub> = NORM<sub>x,y,z</sub> \* 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*.
- DCP<sub>x,y,z</sub>**: 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 NORM<sub>x,y,z</sub> \* *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  $\pm 50$  MHz to  $\pm 100$  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.



ET3DV6 SN:1787

May 31, 2006

# Probe ET3DV6

## SN:1787

|                  |                 |
|------------------|-----------------|
| Manufactured:    | May 28, 2003    |
| Last calibrated: | August 29, 2003 |
| Recalibrated:    | May 31, 2006    |

Calibrated for DASY Systems

(Note: non-compatible with DASY2 system!)



ET3DV6 SN:1787

May 31, 2006

**DASY - Parameters of Probe: ET3DV6 SN:1787**Sensitivity in Free Space<sup>A</sup>Diode Compression<sup>B</sup>

|       |              |                                     |       |       |
|-------|--------------|-------------------------------------|-------|-------|
| NormX | 1.57 ± 10.1% | $\mu\text{V}/(\text{V}/\text{m})^2$ | DCP X | 94 mV |
| NormY | 1.71 ± 10.1% | $\mu\text{V}/(\text{V}/\text{m})^2$ | DCP Y | 94 mV |
| NormZ | 2.09 ± 10.1% | $\mu\text{V}/(\text{V}/\text{m})^2$ | DCP Z | 94 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           | 3.7 mm | 4.7 mm |
| SAR <sub>iso</sub> [%] Without Correction Algorithm | 7.2    | 3.8    |
| SAR <sub>iso</sub> [%] With Correction Algorithm    | 0.0    | 0.2    |

TSL 1810 MHz Typical SAR gradient: 10 % per mm

|                                                     |        |        |
|-----------------------------------------------------|--------|--------|
| Sensor Center to Phantom Surface Distance           | 3.7 mm | 4.7 mm |
| SAR <sub>iso</sub> [%] Without Correction Algorithm | 6.3    | 3.6    |
| SAR <sub>iso</sub> [%] With Correction Algorithm    | 0.1    | 0.3    |

## Sensor Offset

Probe Tip to Sensor Center 2.7 mm

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

<sup>A</sup> The uncertainties of NormX,Y,Z do not affect the E<sub>2</sub>-field uncertainty inside TSL (see Page 6).<sup>B</sup> Numerical linearization parameter: uncertainty not required.

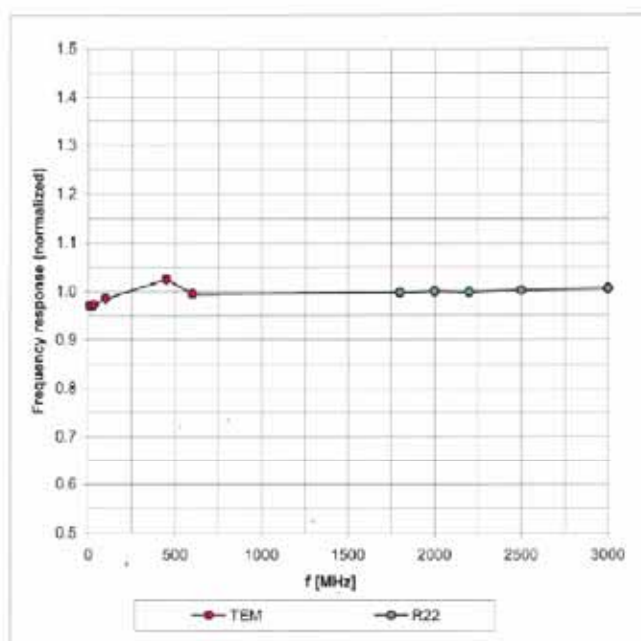


ET3DV6 SN:1787

May 31, 2006

### Frequency Response of E-Field

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



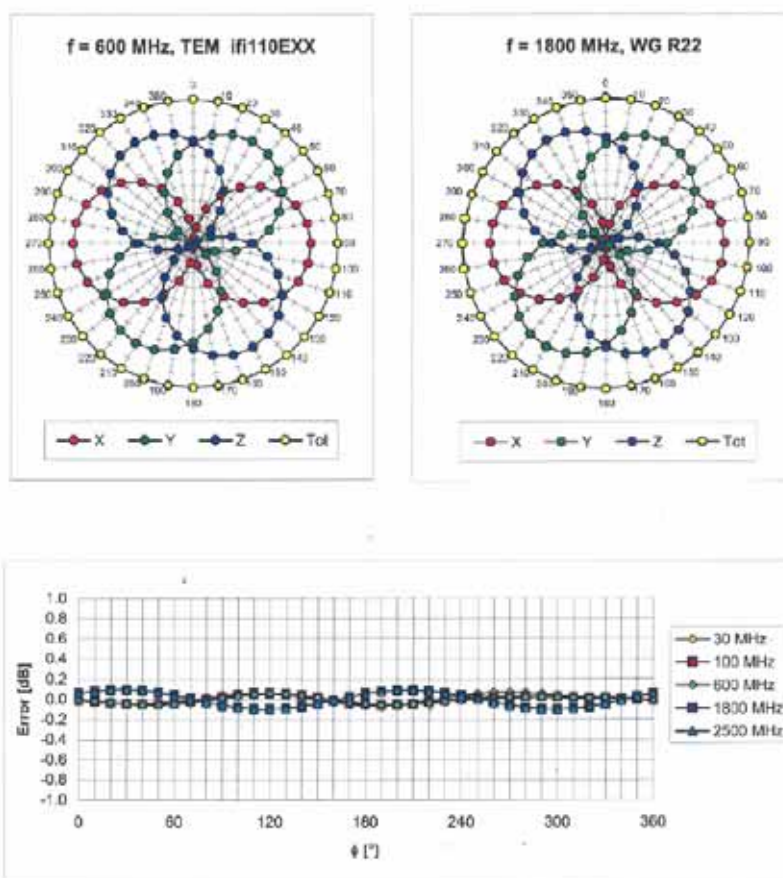
Uncertainty of Frequency Response of E-field:  $\pm 6.3\%$  ( $k=2$ )



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Receiving Pattern ( $\phi$ ),  $\theta = 0^\circ$



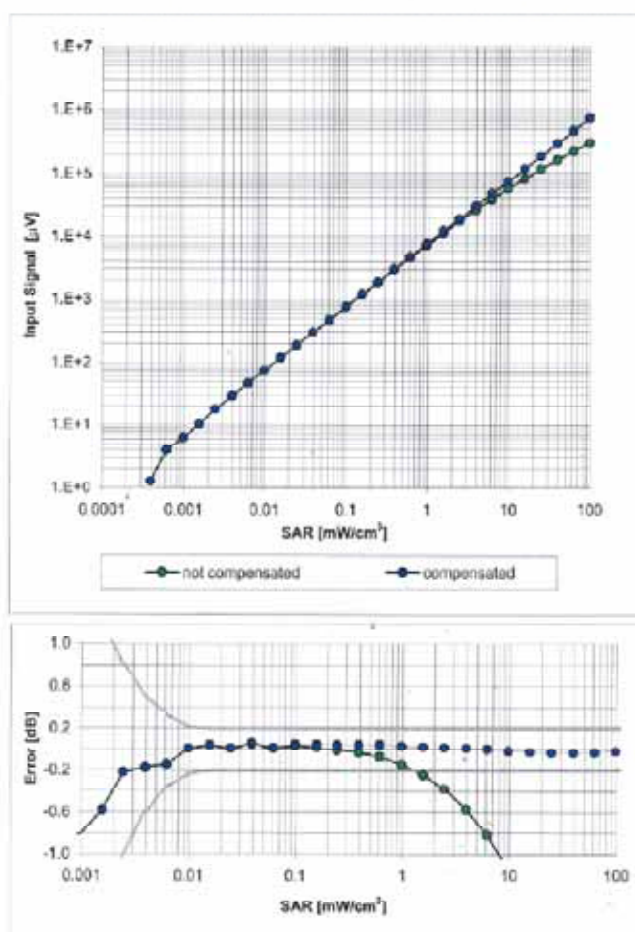
Uncertainty of Axial Isotropy Assessment:  $\pm 0.5\%$  ( $k=2$ )



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**Dynamic Range  $f(\text{SAR}_{\text{head}})$**   
(Waveguide R22,  $f = 1800 \text{ MHz}$ )

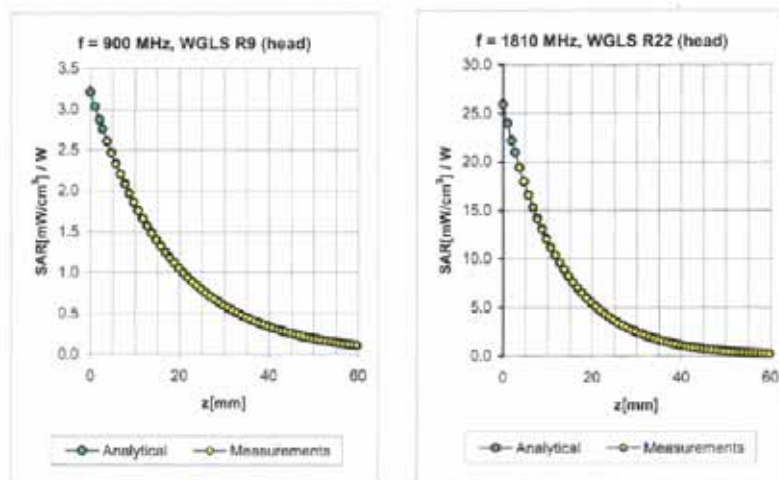


Uncertainty of Linearity Assessment:  $\pm 0.6\%$  ( $k=2$ )

ET3DV6 SN:1787

May 31, 2006

### Conversion Factor Assessment



| f [MHz] | Validity [MHz] <sup>c</sup> | TSL  | Permittivity | Conductivity | Alpha | Depth | ConvF Uncertainty  |
|---------|-----------------------------|------|--------------|--------------|-------|-------|--------------------|
| 900     | ± 50 / ± 100                | Head | 41.5 ± 5%    | 0.97 ± 5%    | 0.50  | 1.85  | 6.38 ± 11.0% (k=2) |
| 1810    | ± 50 / ± 100                | Head | 40.0 ± 5%    | 1.40 ± 5%    | 0.59  | 2.46  | 5.25 ± 11.0% (k=2) |
| 900     | ± 50 / ± 100                | Body | 55.0 ± 5%    | 1.05 ± 5%    | 0.44  | 2.10  | 6.18 ± 11.0% (k=2) |
| 1810    | ± 50 / ± 100                | Body | 53.3 ± 5%    | 1.52 ± 5%    | 0.62  | 2.44  | 4.86 ± 11.0% (k=2) |
| 2450    | ± 50 / ± 100                | Body | 52.7 ± 5%    | 1.95 ± 5%    | 0.62  | 2.13  | 4.13 ± 11.8% (k=2) |

<sup>c</sup> 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.

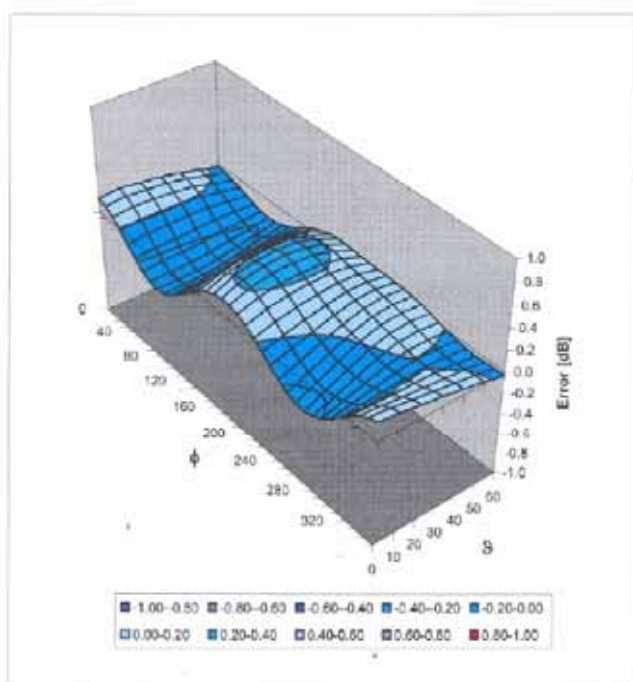


ET3DV6 SN:1787

May 31, 2006

### Deviation from Isotropy in HSL

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



Uncertainty of Spherical Isotropy Assessment:  $\pm 2.6\%$  ( $k=2$ )



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Accreditation No.: **SCS 108**

Client **Sporton (Auden)**

Certificate No: **DAE3-577\_Nov05**

## CALIBRATION CERTIFICATE

Object **DAE3 - SD 000 D03 AA - SN: 577**

Calibration procedure(s) **QA CAL-06.v12  
Calibration procedure for the data acquisition electronics (DAE)**

Calibration date: **November 11, 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 the closed laboratory facility: environment temperature  $(22 \pm 3)^{\circ}\text{C}$  and humidity  $< 70\%$ .

Calibration Equipment used (M&TE critical for calibration)

| Primary Standards                 | ID #        | Cal Date (Calibrated by, Certificate No.) | Scheduled Calibration |
|-----------------------------------|-------------|-------------------------------------------|-----------------------|
| Fluke Process Calibrator Type 702 | SN: 6295803 | 7-Oct-05 (Sintrel, No.E-050073)           | Oct-06                |

| Secondary Standards | ID #               | Check Date (in house)             | Scheduled Check       |
|---------------------|--------------------|-----------------------------------|-----------------------|
| Calibrator Box V1.1 | SE UMS 006 AB 1002 | 29-Jun-05 (SPEAG, in house check) | In house check Jun-06 |

|                | Name              | Function     | Signature |
|----------------|-------------------|--------------|-----------|
| Calibrated by: | Daniel Steinacher | Technician   |           |
| Approved by:   | Fin Bornholt      | R&D Director |           |

Issued: November 11, 2005

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Accreditation No.: **SCS 108**

## Glossary

DAE data acquisition electronics  
Connector angle information used in DASY system to align probe sensor X to the robot coordinate system.

## Methods Applied and Interpretation of Parameters

- **DC Voltage Measurement:** Calibration Factor assessed for use in DASY system by comparison with a calibrated instrument traceable to national standards. The figure given corresponds to the full scale range of the voltmeter in the respective range.
- **Connector angle:** The angle of the connector is assessed measuring the angle mechanically by a tool inserted. Uncertainty is not required.
- The following parameters contain technical information as a result from the performance test and require no uncertainty.
- **DC Voltage Measurement Linearity:** Verification of the Linearity at +10% and -10% of the nominal calibration voltage. Influence of offset voltage is included in this measurement.
- **Common mode sensitivity:** Influence of a positive or negative common mode voltage on the differential measurement.
- **Channel separation:** Influence of a voltage on the neighbor channels not subject to an input voltage.
- **AD Converter Values with inputs shorted:** Values on the internal AD converter corresponding to zero input voltage
- **Input Offset Measurement:** Output voltage and statistical results over a large number of zero voltage measurements.
- **Input Offset Current:** Typical value for information; Maximum channel input offset current, not considering the input resistance.
- **Input resistance:** DAE input resistance at the connector, during internal auto-zeroing and during measurement.
- **Low Battery Alarm Voltage:** Typical value for information. Below this voltage, a battery alarm signal is generated.
- **Power consumption:** Typical value for information. Supply currents in various operating modes.

**DC Voltage Measurement**

A/D - Converter Resolution nominal

High Range: 1LSB = 6.1 $\mu$ V , full range = -100...+300 mV

Low Range: 1LSB = 61nV , full range = -1.....+3mV

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

| Calibration Factors | X                        | Y                        | Z                        |
|---------------------|--------------------------|--------------------------|--------------------------|
| High Range          | 404.445 $\pm$ 0.1% (k=2) | 403.896 $\pm$ 0.1% (k=2) | 404.369 $\pm$ 0.1% (k=2) |
| Low Range           | 3.94241 $\pm$ 0.7% (k=2) | 3.89919 $\pm$ 0.7% (k=2) | 3.95427 $\pm$ 0.7% (k=2) |

**Connector Angle**

|                                           |                 |
|-------------------------------------------|-----------------|
| Connector Angle to be used in DASY system | 130 ° $\pm$ 1 ° |
|-------------------------------------------|-----------------|

**Appendix**
**1. DC Voltage Linearity**

| High Range        | Input ( $\mu\text{V}$ ) | Reading ( $\mu\text{V}$ ) | Error (%) |
|-------------------|-------------------------|---------------------------|-----------|
| Channel X + Input | 200000                  | 199999.3                  | 0.00      |
| Channel X + Input | 20000                   | 20006.75                  | 0.03      |
| Channel X - Input | 20000                   | -19997.90                 | -0.01     |
| Channel Y + Input | 200000                  | 200000.3                  | 0.00      |
| Channel Y + Input | 20000                   | 20004.58                  | 0.02      |
| Channel Y - Input | 20000                   | -20000.75                 | 0.00      |
| Channel Z + Input | 200000                  | 199999.6                  | 0.00      |
| Channel Z + Input | 20000                   | 20001.43                  | 0.01      |
| Channel Z - Input | 20000                   | -20003.93                 | 0.02      |

| Low Range         | Input ( $\mu\text{V}$ ) | Reading ( $\mu\text{V}$ ) | Error (%) |
|-------------------|-------------------------|---------------------------|-----------|
| Channel X + Input | 2000                    | 2000.1                    | 0.00      |
| Channel X + Input | 200                     | 200.42                    | 0.21      |
| Channel X - Input | 200                     | -200.30                   | 0.15      |
| Channel Y + Input | 2000                    | 2000.1                    | 0.00      |
| Channel Y + Input | 200                     | 199.35                    | -0.32     |
| Channel Y - Input | 200                     | -200.96                   | 0.48      |
| Channel Z + Input | 2000                    | 1999.9                    | 0.00      |
| Channel Z + Input | 200                     | 199.37                    | -0.31     |
| Channel Z - Input | 200                     | -200.62                   | 0.31      |

**2. Common mode sensitivity**

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

|           | Common mode Input Voltage (mV) | High Range Average Reading ( $\mu\text{V}$ ) | Low Range Average Reading ( $\mu\text{V}$ ) |
|-----------|--------------------------------|----------------------------------------------|---------------------------------------------|
| Channel X | 200                            | 13.40                                        | 12.55                                       |
|           | - 200                          | -12.29                                       | -13.06                                      |
| Channel Y | 200                            | -6.93                                        | -7.43                                       |
|           | - 200                          | 6.72                                         | 6.47                                        |
| Channel Z | 200                            | 0.71                                         | 0.36                                        |
|           | - 200                          | -1.67                                        | -1.93                                       |

**3. Channel separation**

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

|           | Input Voltage (mV) | Channel X ( $\mu\text{V}$ ) | Channel Y ( $\mu\text{V}$ ) | Channel Z ( $\mu\text{V}$ ) |
|-----------|--------------------|-----------------------------|-----------------------------|-----------------------------|
| Channel X | 200                | -                           | 1.59                        | 0.08                        |
| Channel Y | 200                | 1.69                        | -                           | 3.62                        |
| Channel Z | 200                | -0.73                       | -1.49                       | -                           |

**4. AD-Converter Values with inputs shorted**

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

|           | High Range (LSB) | Low Range (LSB) |
|-----------|------------------|-----------------|
| Channel X | 15946            | 15679           |
| Channel Y | 15960            | 16151           |
| Channel Z | 16233            | 15968           |

**5. Input Offset Measurement**

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

Input 10M $\Omega$

|           | Average ( $\mu$ V) | min. Offset ( $\mu$ V) | max. Offset ( $\mu$ V) | Std. Deviation ( $\mu$ V) |
|-----------|--------------------|------------------------|------------------------|---------------------------|
| Channel X | 0.08               | -1.13                  | 2.31                   | 0.51                      |
| Channel Y | -0.35              | -2.00                  | 0.81                   | 0.43                      |
| Channel Z | -0.38              | -2.76                  | 1.68                   | 0.40                      |

**6. Input Offset Current**

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

**7. Input Resistance**

|           | Zeroing (MOhm) | Measuring (MOhm) |
|-----------|----------------|------------------|
| Channel X | 0.2000         | 200.8            |
| Channel Y | 0.2000         | 201.4            |
| Channel Z | 0.2001         | 200.3            |

**8. Low Battery Alarm Voltage** (verified during pre test)

| Typical values | Alarm Level (VDC) |
|----------------|-------------------|
| Supply (+ Vcc) | +7.9              |
| Supply (- Vcc) | -7.6              |

**9. Power Consumption** (verified during pre test)

| Typical values | Switched off (mA) | Stand by (mA) | Transmitting (mA) |
|----------------|-------------------|---------------|-------------------|
| Supply (+ Vcc) | +0.0              | +6            | +14               |
| Supply (- Vcc) | -0.01             | -8            | -9                |